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FlexNet Manager® Suite

Gathering FlexNet Inventory

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Preface: Gathering FlexNet Inventory

Optimizing your software licenses requires that you can balance your purchased license entitlements against consumption of those entitlements. Consumption is calculated by examining hardware and software *inventory* — details about your computing devices as well as the applications installed (or used) on them.

Inventory can be brought into FlexNet Manager Suite in three main ways:

- Inventory collected by third-party tools can be imported through adapters that normalize the data for use in FlexNet Manager Suite. There are several adapters supplied as standard (for example, see the *FlexNet Manager Suite Adapters Reference* PDF file, available through the title page of online help), and it is also possible to build custom adapters to import data from other third-party tools (see the *Inventory Adapter Studio* chapter of the *FlexNet Manager Suite System Reference*).
- Some systems provide APIs that FlexNet Manager Suite can interrogate for inventory information.
- FlexNet Manager Suite also has a "native" ability to collect inventory information, collectively called "FlexNet inventory" to distinguish it from inventory gathered through the other sources.

This document is solely concerned with the third of these methods, the collection of FlexNet inventory.

Learning about FlexNet inventory gathering involves understanding different configurations of the code elements that gather the inventory. As well, where these code elements are deployed influences both the capabilities and the management requirements of the system. In fact, even the methods of deployment can have some influence.

For these reasons, the first chapter summarizes these factors to arrive at a *standard nomenclature*, used consistently throughout this document. There is also an overview of some key scenarios to help you choose which combination of code elements, deployment location, and deployment method you need.

The following chapters each treat just one of the resulting "cases". Comparable details are provided for each of the cases. The concept here is to simplify your reading. Instead of needing to work out which data point applies to your case, you need read only the one chapter that applies to your case. It contains the relevant data points exclusively for that case. (Since there is considerable overlap between the cases, this makes the document overall rather repetitive. Fortunately, you do not need to read it all. It is a reference work, not a narrative.) Notice further that each case's *Details* chapter includes topics for:

- The *Normal Operation* expected for the case — this may help you make your final choice about the method(s) of gathering FlexNet inventory that you will use in your enterprise
- The *System Requirements* specific to this case
- The *Accounts and Privileges* required for the case
- The *Implementation* used for this case (for example, how to deploy the code entities for the case, if deployment is in fact required)
- *Troubleshooting* comments applicable to the case.

Those chapters are followed by one that covers material that is common to all cases. You may choose topics from the *Common: Details* chapter selectively, if they apply to your environment.

Finally, there are chapters of reference material covering the command lines for key code elements, and a significant number of preference settings that can control the behavior of those code elements.

But first, we need a clear understanding and nomenclature, covered in the first chapter.

Contents

1

Understanding What, Where, How, and Why

Discussing the techniques for inventory collection with FlexNet Manager Suite is made challenging because there are two closely-related (but distinct) code entities that can be used. Each of these can be deployed to different locations within your enterprise network, and managed in different ways. How they are deployed (whether by automation within FlexNet Manager Suite or by other techniques you choose to use) also affects both management and functionality. Finally, different combinations of these factors are best suited to different scenarios of what you are trying to achieve and what aspects you want to avoid.

This section establishes a map of the terminology used throughout this reference, and the ways that different approaches affect the system requirements for, and management of, inventory tools available within FlexNet Manager Suite. (This discussion excludes inventory collected by other "third party" tools, and imported into FlexNet Manager Suite through adapters, whether built-in adapters or customized add-ons.)

Those unfamiliar with the inventory technology in FlexNet Manager Suite are encouraged to work through the following foundational topics. Experts who want only a terminology update can use this executive summary of what is deployed, how, and where; with each combination given a case name used consistently throughout this document:

Case name	What	Where	How
Adopted	FlexNet inventory agent	Target inventory device	Automatically by FlexNet Manager Suite
Agent third-party deployment	FlexNet inventory agent	Target inventory device	Third-party deployment
Zero-footprint	FlexNet inventory core components	On an inventory beacon	n.a. (installed with the inventory beacon)
FlexNet Inventory Scanner	FlexNet inventory core components (in self-installing wrapper)	Target inventory device, or a network share	Third-party deployment

Case name	What	Where	How
Core deployment	FlexNet inventory core components	Target inventory device running Microsoft Windows	Third-party deployment

What Can Be Used for FlexNet Inventory Collection

There are two entities available for the collection of inventory (both software and hardware inventory) by FlexNet Manager Suite within your enterprise:

- The complete, most powerful, backward-compatible entity is called the **FlexNet inventory agent**. Whenever this name is used within this document, it always means the *complete* agent. The complete FlexNet inventory agent is the entity that is deployed automatically by FlexNet Manager Suite onto target inventory devices, if you choose to allow it. Its purposes are:
  - To take inventory of both the hardware and software on a computing device, and return an XML document (`.ndi`) describing this inventory
  - By default, to return additional files for extended discovery and inventory tasks, such as taking inventory of any Oracle Database discovered on the local computer
  - To optionally track usage of applications on the same device, based on watching specified files that form part of the application.
- The smaller footprint option, with reduced functionality that covers inventory collection most simply, is called **FlexNet inventory core components**. Although this includes the same core executable (`ndtrack`) as the complete FlexNet inventory agent, we consistently use this distinct name, FlexNet inventory core components, to help clarify the reduced set of functionality and differences in deployment and management. Its sole purpose is:
  - To take inventory of both the hardware and software on a computing device, and return an XML document (`.ndi`) describing this inventory.

  Tip: *If you are deploying the FlexNet inventory core components yourself, it is possible to deploy an additional special-purpose file to add the extended discovery and inventory tasks mentioned above; but this is not included by default.*

This clear distinction between the two entities is fundamental. However, alone the distinction is not enough to fully define the functionality set, since operational contexts also make a difference. For example, the FlexNet inventory core components are included as a standard element with each FlexNet inventory beacon.

- On one hand, this explains why inventory collection managed by the inventory beacon (remote from the target device) *cannot* collect application usage information, in contrast to the FlexNet inventory agent which (locally installed on the target device, with additional monitoring capabilities) *can* track usage. The distinction explains the missing functionality.

- On the other hand, the FlexNet inventory core components achieve more when operating on an inventory beacon than they do if you deploy them to another file share. This is because the inventory beacon provides additional code (installed as part of FlexNet Beacon) and integration services available only in this context.

Therefore, a full understanding of available functionality (and management needs) requires both knowledge of the different code entities, *and* knowledge of contexts.

A note about 'agents'

The word "agent" can be used with different scope. For example, the FlexNet inventory agent is a scope that includes several executables performing different functions. For example, one of these is `ndupload`, which is also colloquially called the "upload *agent*". Both the large scope and the small scope of the word "agent" fit the general definition of a software "agent": a software program that runs on a computer to collect information and transfer it to a central location. However, for clarity, this document reserves the word "agent" for the larger scope of the entire FlexNet inventory agent, referring to the smaller elements as either "elements", "components", or as individual "executables".

In every case, whether invoked as part of the FlexNet inventory agent or through the FlexNet inventory core components, the executable `ndtrack` (amongst others) runs in the context (memory) of the target inventory device. For this reason, this document does not describe use of any of these approaches as "agentless". Some people like to use this term to mean that nothing is permanently installed on the target device, and indeed there are deployment scenarios available that avoid such a permanent footprint. But the relevant code elements still execute in the context of the target machine. (Some *other* kinds of specialized inventory collection by FlexNet Manager Suite are truly agentless, in the sense that no 'agent' code element executes in the target context. Examples include an inventory beacon executing remote discovery and inventory for Oracle, Oracle VM, and VMware, which make use of services already available on the target machines. In these cases, execution is in the context of the inventory beacon, using the API offered by the installed software.)

Differences

Here are the key differences between the FlexNet inventory agent and the FlexNet inventory core components, using the Windows platform as our example (UNIX-like platforms support equivalent functionality).

Function	FlexNet inventory agent	FlexNet inventory core components
Included executables* ***Tip:*** *The full FlexNet inventory agent includes several components present for backward compatibility, so that the latest FlexNet inventory agent can function in earlier implementations during migration, for example.* Each case (FlexNet inventory agent and FlexNet inventory core components) also includes additional configuration files and libraries, here omitted for clarity.	• `ndtrack.exe` • `getSystemId.exe` • `mgspolicy.exe` • `mgssecsvc.exe` (and its plug-ins `mgsusageag` and `vdiendpoint`) • `ndinit.exe` • `ndlaunch.exe` • `ndschedag.exe` • `ndsens.exe` • `ndtask.exe` • `ndupload.exe` • `getSystemId.exe` • `UsageTechnicianTool.exe` Still included, but now deprecated: • `mgsdl.exe` • `mgsmsilist.exe` • `mgspostpone.exe` • `reboot.exe`	• `ndtrack.exe` • `getSystemId.exe`
Inventory types	• Machine • User (Windows only, backward compatibility only)	• Machine • User (Windows command line only, backward compatibility only)

Function	FlexNet inventory agent	FlexNet inventory core components
Policy, rules, and settings	Set in the web interface, automatically managed through the inventory beacons, and applied automatically as specified.	None included. Must be either: • Manually managed, usually through changing the command lines for scheduled tasks and the like • Managed by the FlexNet Beacon code (see Deployment Overview: Where to, and How for further details).
Scheduling (inventory collection)	Built in (follows schedule set in the web interface). Can be used for high-frequency inventory gathering for IBM PVU licensing.	None. Must be scheduled using external tools (including FlexNet Beacon).
Updates	Self-updating to a version set with a supplied command line tool.	None. Third-party deployments must be managed independently (presumably using the same deployment tools as were used in the initial deployment). (Components installed with FlexNet Beacon are also updated with future self-updates of the inventory beacon.)
Upload behavior (for collected inventory)	On by default	Off by default. To turn on requires: • Windows: Custom command line • UNIX: Custom command line or setting in `ndtrack.ini`. (On an inventory beacon, the FlexNet Beacon manages uploads.)
Usage tracking	Available, subject to configuration.	Not supported.

* The functions of some of the key executables included in the FlexNet inventory agent are as follows:

- The core component for inventory collection, `ndtrack`, which can optionally also immediately upload the gathered inventory to an inventory beacon
- The upload component (`ndupload`), which retries transfers of the inventory results to an inventory beacon to recover from transient network issues

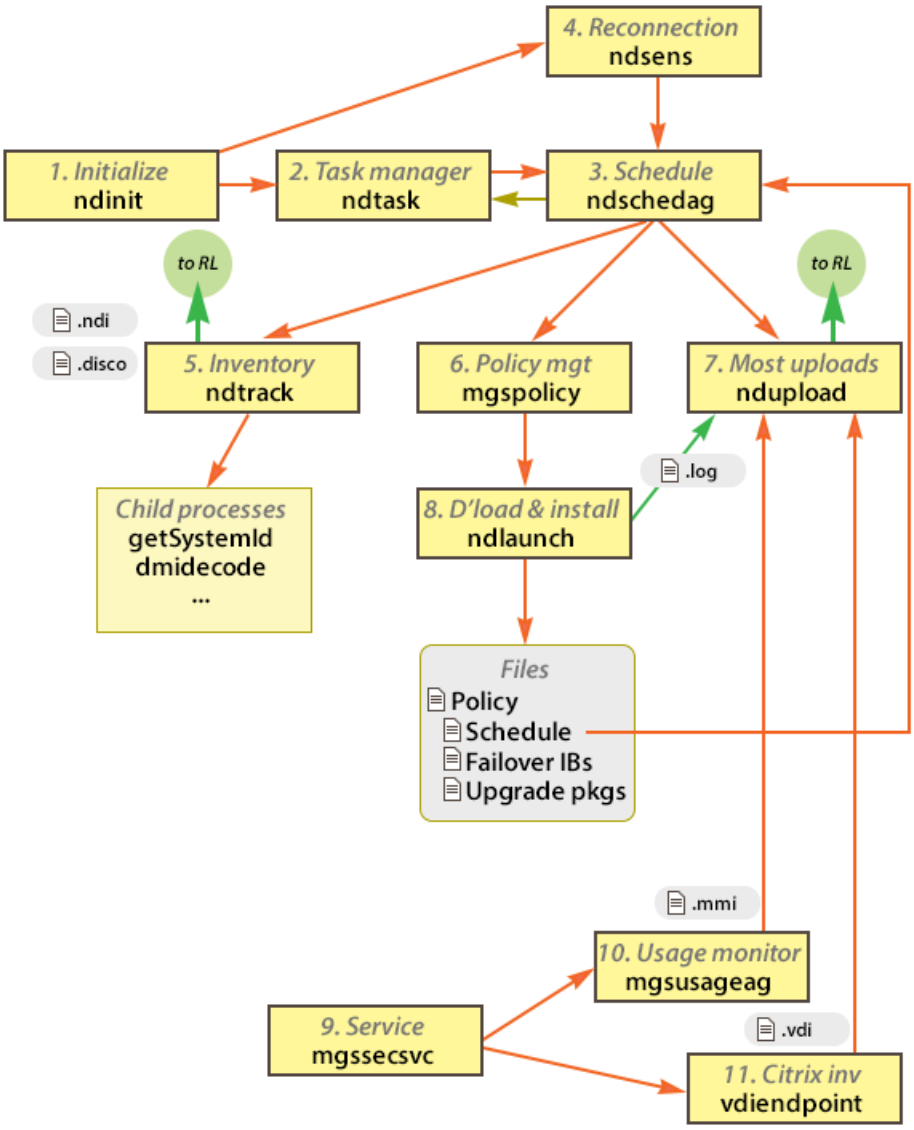
- The schedule component (`ndschedag`) to coordinate execution of the other components
- The task management component (`ndtask`), functionally identical with `mstask` (part of the Microsoft Task Scheduler) but available across platforms
- The policy component (`mgspolicy`), responsible for managing the various rules that the control the overall FlexNet inventory agent
- The installation component (`ndlaunch`) which downloads policy, schedule, self-update and other packages required for operation
- The service component (`ndinit`, available only on Windows) is automatically initialized as a service on machine reboot, and is responsible for starting `ndtask`. On UNIX-like platforms, `ndtask` is the service, which is initialized in platform-specific ways after a reboot.

For more details about the relationships between these components, see Agent Architecture.

Agent Architecture

This architectural diagram and the following notes give more insight into the interactions between the various components of the complete FlexNet inventory agent. In the diagram:

- Each box with a heavier outline represents one of the code components of the FlexNet inventory agent, combining a heading about purpose with the name of an executable. The numbers refer to the corresponding notes below the diagram.
- Fine red arrows indicate the process of invocation: the component where the arrow starts invokes the component where the arrow ends.
- The various file types created by components are identified by their file name extensions on the Microsoft Windows platform.
- Green arrows indicate which components are responsible for uploading the files produced; but see also the notes, as methods vary.
- Where there are variations between Microsoft Windows and UNIX-like platforms, the diagram favors the Windows presentation, and differences are explained in the notes below.



1. The `ndinit` component exists only on Windows. It is automatically initialized as a service on machine reboot, and is responsible for starting `ndtask` and, on reconnection to the network, `ndsens`.
2. The `ndtask` component is functionally identical with `mstask` (part of the Microsoft Task Scheduler), but is available across platforms. On UNIX-like platforms, it runs as a service. It functions rather like a to-do list, but does not start tasks directly. Instead, it invokes the `ndschedag` component to trigger tasks when required.
3. The schedule component (`ndschedag`) has two main functions:
   - When handed a new schedule and invoked by `ndlaunch`, `ndschedag` unpacks the contents of the schedule file (see Schedule Files (.nds)) and saves the details in separate task files (`.nts`) for use by `ndtask`. It then sends an IPC message to `ndtask` to process the updated task list.

- When a specified task is triggered, `ndschedag` is always invoked (most often by `ndtask`, and occasionally on Windows by `ndsens`), and then coordinates execution of the appropriate components (in particular, inventory gathering, policy updates, and data uploads).

4. The `ndsens` component (available only on Windows) is invoked only when the network connection is reestablished for the device on which the FlexNet inventory agent is running. When, after a disconnection, the device reconnects to the network, `ndsens` next invokes `ndschedag` to check for any scheduled events with an `OnConnect` trigger type (these are normally the `Update Machine Policy`, `Update Client Settings`, and `Upload Client Files` events). There is no equivalent functionality for the FlexNet inventory agent installed on UNIX-like machines.

5. All inventory gathering and discovery work on the local device is the responsibility of the tracker, or `ndtrack`. Once triggered by `ndschedag`, this collects inventory data in `.ndi` files, and discovery data in `.disco` files. Depending on configuration, compressed archives of `.ndi` files are produced, and archives of `.disco` files may also be produced. By default (in the case of the full FlexNet inventory agent), the tracker also tries an immediate upload of gathered data files to the `ManageSoftRL` file share on its chosen inventory beacon. If configuration or some transient networking problem prevents this upload, the files are saved on the local file system, where they are subsequently picked up by the `ndupload` component. The tracker also invokes other components of the FlexNet inventory agent, such as `getSystemId` on Windows and a supplied version of `dmidecode` on certain legacy Linux platforms. For more information about operating system elements that are also invoked by the tracker, see the platform-specific listings under Common: Child Processes Invoked by the Tracker.

6. The policy component (`mgspolicy`) is responsible for managing the various rules that the control the overall FlexNet inventory agent. Historically it had a significant role (when "client-side policy" was an option); but now that all agent policy is prepared by the inventory beacon ("server-side policy"), its main role is to invoke the download and installation component (`ndlaunch`) to check for, and if necessary download, changed policy.

7. The upload component (`ndupload`) is responsible for most uploads from the local device to its chosen inventory beacon, using the same `ManageSoftRL` file share mentioned above. (When, instead, the tracker uploads discovery and inventory results, it is using a shared library of common code from `ndupload`, so that the upload functionality is identical. This integration supports uploads in other configuration of the tracker, such as in the Core deployment case and the Zero-footprint case, when the separate `ndupload` component is not available.) The uploader may be invoked directly by other components to upload files handed off through the command line; or it may be invoked by the scheduler to look in defined folders on the local device and upload all files present there. In this way, `ndupload` provides a scheduled catch-up service to upload files which the tracker failed to upload, and saved on disk instead. (And it also follows that the *absence* of the separate `ndupload` component in the Core deployment and Zero-footprint cases means that there can be no catch-up uploads after a transient failure of uploads by the tracker.)

8. The download and installation component, `ndlaunch`, is the only component that downloads files from an inventory beacon to the FlexNet inventory agent on the local device. In each case, it checks for changed content, and only downloads files that have been updated. The first file checked is the device policy for the FlexNet inventory agent. As well as summarizing the applicable rules for agent behavior, the policy file (see Policy Files (.npl)) points to a number of other resources that the launcher downloads on demand (when changes have occurred). These include:

   - The agent schedule, which is either of:

- The default global schedule set for all installed agents in the web interface of FlexNet Manager Suite
- The special schedule used for the FlexNet inventory agent on devices linked to IBM PVU licenses, when FlexNet Manager Suite is configured for 30-minute inventory updates and sub-capacity license calculations (as an alternative to ILMT).

If `ndlaunch` downloads a revised schedule, it invokes `ndschedag` to respond appropriately.

- The agent configuration file
- The current version of `InventorySettings.xml`
- The list of available inventory beacons to which the FlexNet inventory agent may upload data
- The upgrade packages that support self-upgrade of the installed FlexNet inventory agent.

Depending on the agent configuration and the available upgrade packages, the launcher may download a new version of the FlexNet inventory agent, and automatically install it. The launcher also saves log files for all its activities to the local disk, from where they are subsequently uploaded by `ndupload` to support status reporting on the central application server. This means that central reporting is dependent on the schedule for uploads, which is typically set to once per day, overnight.

9. Another service that runs exclusively on Microsoft Windows is `mgssecsvc` (there is no equivalent on UNIX-like platforms). Like `ndinit`, it is automatically initialized as a service on machine reboot. It exists solely as a wrapper for its child processes (which are implemented as DLLs on Windows, and so are running whenever the service is running).
10. The component that monitors application usage (when you have usage tracking configured) is `mgsusageag`, which is a library exercised by `mgssecsvc` on Windows. On UNIX-like platforms, `mgsusageag` is a service in its own right. Because of the ephemeral nature of usage data, `mgsusageag` invokes the uploader any time it has usage data (an `.mmi` file) to upload. This means that application usage data is uploaded asynchronously with relation to the upload schedule saved on the local device.
11. Similarly, for use when gathering virtual desktop inventory, the `vdiendpoint` component is implemented as a shared library on Microsoft Windows (there is no equivalent on UNIX-like platforms). Since the use of the local device as an end-point for virtual applications is (like usage data) also ephemeral, transient information, the resulting `.vdi` file is handed off immediately to `ndupload` for immediate transfer, without reference to the upload schedule.

Deployment Overview: Where to, and How

Each of the FlexNet inventory agent and the FlexNet inventory core components can be deployed in different ways, and to different places within your network hierarchy. These decisions affect both the immediate deployment effort, and the ongoing management effort. In some cases, the options also impact functionality and system requirements. (These distinct names for the two entities were defined in What Can Be Used for FlexNet Inventory Collection.)

FlexNet inventory agent

FlexNet inventory agent must always be installed on the target inventory device. There are two main deployment options:

- Automatic deployment through FlexNet Manager Suite, managed by the inventory beacons, in accordance with the targets you declare in the web interface. This process is called "adoption", since it 'adopts' the target device into a closely managed environment.
- Deployment that you manage, using your existing tools and infrastructure. For convenience, we label these approaches "third-party deployment", meaning that you likely use tools/methods from a company other than Flexera Software. Installable packages are available through the web interface of FlexNet Manager Suite for use in third-party deployment. Under this loose heading, we include, for example:
  - Deployment with a tool such as Microsoft SCCM or Symantec IT Management Suite (formerly Altiris)
  - Pre-installation on the gold image for new device configuration
  - Logon scripts used in conjunction with domain controller(s)
  - Active Directory Group Policy Objects
  - Manual installation by a local administrator on the target device.

Provided that, in your deployment process, you identify a 'bootstrap' inventory beacon from which the FlexNet inventory agent can collect its initial policy, schedule, actions and so on, there is no significant difference in outcomes of these two methods (although you may want to configure your targets and rules differently; and for adoption, there is additional reporting and troubleshooting information available in the web interface).

FlexNet inventory core components

There are three ways that the FlexNet inventory core components are available for use within your enterprise:

- On inventory beacons
- In a self-extracting executable format
- As a 'code folder' available for third-party deployment.

Each of these ways is further explained below.

FlexNet inventory core components on inventory beacons (zero footprint inventory collection)

The FlexNet inventory core components are always installed as part of each inventory beacon (no separate deployment or installation is required). As discussed in What Can Be Used for FlexNet Inventory Collection, the fact that it is the FlexNet inventory core components explains why usage tracking is not available from inventory beacons (usage tracking is only available in the full FlexNet inventory agent).

However, its co-location on the inventory beacon provides a special use case, because the FlexNet Beacon code provides some of the functionality normally found only in the full FlexNet inventory agent. For example, provided that the target device is not included in any target configured for adoption, FlexNet Beacon invokes the FlexNet inventory core components in line with the rules you declare in the web interface for FlexNet Manager Suite, and honors the targeting and schedules used in those rules (a level of integration that is not available to the FlexNet inventory core components in any other context). FlexNet Beacon also manages uploads of the collected data; and [self-]updates to FlexNet Beacon include the latest version of FlexNet inventory core components.

Perhaps the most significant additional functionality provided by the inventory beacon is the ability to remotely install, execute, and subsequently remove the FlexNet inventory core components on a target inventory device.

Since there is no permanent agent installation on the target device either side of the inventory collection event, this model can be called "zero footprint" inventory collection. (It has previously been called 'remote execution' and 'zero touch', both of which are deprecated because of resulting misunderstandings.) This method is completely controlled by the inventory beacon, in accordance with the targeting and rules you declare in the web interface; but the code execution still occurs in the context of the target inventory device. The method details are different on different platforms:

- On Microsoft Windows, the inventory beacon creates a service on the target inventory device. This service then invokes the FlexNet inventory core components installed on the inventory beacon (using the inventory beacon as a file share), with command-line options to cause an immediate upload of the collected data to the inventory beacon. Finally, the service uninstalls the FlexNet inventory core components, and removes itself, leaving "zero footprint" after the inventory collection process is completed.
- On UNIX-like platforms (which includes various UNIX varieties and OS X), the inventory beacon connects to the target device (using `ssh`), and copies (`scp`) the FlexNet inventory core components to the target device, executing them there and uploading the resulting data. It then removes the copied files, and logs out.

Obviously, these different methods impose different requirements on the various platforms, all of which are detailed in later topics. For the moment, it is enough to understand that the zero footprint inventory collection is the primary reason for the inclusion of the FlexNet inventory core components on each inventory beacon.

Self-extracting executable (the FlexNet Inventory Scanner)

The FlexNet inventory core components are also available as a self-extracting executable. This format has been called the lightweight FlexNet Inventory Scanner ('lightweight' because of its relative ease of deployment and execution). For Microsoft Windows, this a separate executable (`FlexNetInventoryScanner.exe`), and on UNIX-like platforms, it is wrapped as a shell script (`ndtrack.sh`). If you copy the FlexNet Inventory Scanner to a target device (or for Windows, to a share accessible by target devices), and execute it with optional command-line preferences (or even by double-clicking the Windows EXE, for test purposes), the following actions occur:

- The executable extracts the FlexNet inventory core components (on UNIX-like system, it first determines the current operating system, and extracts the package appropriate to that platform).
- The `ndtrack` inventory component is immediately executed. If you provided any command line options, these are passed directly through to `ndtrack`.
- If your command line included an option for an upload location, the resulting data is uploaded; and if not, the file(s) are saved locally for your inspection and management.
- All extracted FlexNet inventory core components are then removed (only the FlexNet Inventory Scanner is left, in the folder where you had copied it originally).

The process, then, is not greatly different from the zero footprint inventory collection driven by the inventory beacon. The main differences are:

- The FlexNet Inventory Scanner is independent of any inventory beacon, so that you control its deployment, updating, and so on.
- The FlexNet Inventory Scanner does not respond to schedules or rules set in the web interface of FlexNet Manager Suite, so you control its operational behaviors, uploads, and so on.

- On Windows, the FlexNet inventory core components are extracted on the target device and later deleted, rather than being run from a file share as in the Zero-footprint case. (On UNIX-like systems, both approaches temporarily save the appropriate executable on the target device.)
- The FlexNet Inventory Scanner remains in the location where you placed it, so that there is a small disk footprint (documented later).
- By default, the FlexNet Inventory Scanner has less specialized functionality than the zero footprint inventory collection managed by the inventory beacon (and, indeed, less than the complete FlexNet inventory agent). FlexNet Inventory Scanner cannot collect Oracle Database inventory, for example, or some details about Microsoft SQL Server. However, as described later, you can enable this specialized additional functionality by deploying an auxiliary `InventorySettings.xml` control file.

The FlexNet Inventory Scanner meets the requirement (particularly for Windows) of a single executable that can be copied or shared, and *just run*. However, it incurs the overhead of installing the FlexNet inventory core components each time it is run (or on UNIX, extracting the appropriate executable per platform). To avoid that overhead, we have the third deployment option.

Code folder for third-party deployment

This approach is conceptually very simple. You simply take the folder of FlexNet inventory core components, and use your preferred method to deploy this. It is feasible to deploy it directly onto target inventory devices running Windows, but impractical (and unsupported) for the complexities of UNIX-like environments. As before, your deployment options for Windows include:

- Deployment with a tool such as Microsoft SCCM or Symantec IT Management Suite (formerly Altiris)
- Pre-installation on the gold image for new device configuration
- Logon scripts used in conjunction with domain controller(s)
- Active Directory Group Policy Objects
- Manual installation by a local administrator on the target device.

When you use this approach, you take responsibility for management (such as version control, updates and compatibility) and operations (such as scheduling, command line options, and uploads). If you require advanced inventory functionality, you must also deploy and manage the `InventorySettings.xml` file.

This option is simply referred to as Core deployment, meaning third-party deployment of the FlexNet inventory core components.

Summary

This discussion leads us to the following matrix of what is deployed, how, and where, with each combination given a unique case name. Subsequent topics provide more details for each of these cases.

Case name	What	Where	How
Adopted	FlexNet inventory agent	Target inventory device	Automatically by FlexNet Manager Suite

Case name	What	Where	How
Agent third-party deployment	FlexNet inventory agent	Target inventory device	Third-party deployment
Zero-footprint	FlexNet inventory core components	On an inventory beacon	n.a. (installed with the inventory beacon)
FlexNet Inventory Scanner	FlexNet inventory core components (in self-installing wrapper)	Target inventory device, or a network share	Third-party deployment
Core deployment	FlexNet inventory core components	Target inventory device running Microsoft Windows	Third-party deployment

Typical Scenarios and Use Cases

Here are some typical use cases for the various combinations of code objects and deployment approaches. This high-level summary helps you decide which approach you wish to adopt. Subsequent topics provide in depth coverage of each approach. By settling on your approach as early as possible, you can minimize study time.

The bold keywords in the following use cases are the ones summarized at the end of Deployment Overview: Where to, and How.

A replacement for ILMT managing IBM PVU licenses

"By agreement with IBM, we will use FlexNet inventory tools for sub-capacity reporting on IBM PVU licenses."

It is mandatory to use the full FlexNet inventory agent, locally installed on target inventory devices, whether in the **Adopted** case or the **Agent third-party deployment** case.

Minimum on-going management

"I have a straight-forward network configuration, and I am OK to provide a domain administrator password for installation. Thereafter, I want automatic self-updating of the system to version limits that I control, and maximum automation of all processes — including managing the mobile devices of our road warriors."

Consider the **Adopted** case.

Minimum deployment effort, minimum management

"We have well-established deployment processes. I don't want another one, and I don't want to store passwords, whether for deployment or operation. I also need to track usage to help manage license harvesting and redeployment. I must be able to control where the agent is installed. And I also want maximum automation for future management."

Consider **Agent third-party deployment**. After you manage the initial deployment, the FlexNet inventory agent self-manages in line with your policies set in the web interface of FlexNet Manager Suite. And unlike Zero-footprint inventory collection, there is no on-going requirement for password storage.

A quick test

"I want to run the core components in a test environment and inspect the inventory that is returned. I won't be tracking usage."

Consider **FlexNet Inventory Scanner**. Easy to deploy, test with default settings, and remove cleanly afterward.

Specialized and focused

"I have a moderately-sized group of servers from which I need to collect specialized inventory, such as Hyper-V, VMware, and I also have some Oracle virtual machines."

Consider **Zero-footprint** inventory collection. The inventory beacon can control agentless inventory collection for several specialized inventory types, as well as agent-based general hardware and software inventory when required; all conveniently controlled through the definition of rules in the web interface for FlexNet Manager Suite.

Leveraging current infrastructure

"We have deployment, monitoring, and security under tight control. We want minimum disruption of our current practices."

For Windows platforms, consider **Core deployment**, when it is necessary to augment your current inventory-gathering tools and methods with the advanced inventory-gathering capabilities of FlexNet Manager Suite. (You can, of course, import inventory from other tools, but that is not the subject of this document.) With this option, you manage deployment as well as future updates, scheduling, monitoring and any required remediation, and so on.

2

Adopted: Details

This chapter provides great detail about the FlexNet inventory agent automatically deployed through the inventory beacons to target devices (labeled the Adopted case in Deployment Overview: Where to, and How).

This document provides a consistent set of data (as far as possible) across all the different use cases, each in its own chapter. This means that, once you have chosen your preferred use case, you can focus only on the details for that one, and ignore all other use case chapters.

Because FlexNet inventory collection supports a range of operating system platforms, some topics necessarily contain several sets of information, and you can select only those details that apply to your chosen platform(s).

In addition to the distinct chapters for the different use cases, you should also review the subsequent chapter on functionality that is common throughout. This is followed by detailed reference material on command lines, preferences, file formats, and the like.

Adopted: Normal Operation

The operating procedures for the full FlexNet inventory agent deployed automatically through adoption are consistent across Microsoft Windows and UNIX-like systems, with some obvious distinctions in system dependencies like file paths. This topic assumes that adoption is complete (for those details, see Adopted: Implementation), and covers operations thereafter. The entire process is covered, including what happens to the collected data after it uploaded by the FlexNet inventory agent. Each numbered step provides a summary point, followed by further specific details that you can skip over until needed.

1. Normally only once (probably even before adoption, although you can certainly change it later if required), you set the schedule for operations of the FlexNet inventory agent in the web interface of FlexNet Manager Suite (navigate to **Discovery & Inventory > Settings**, in the **Agent inventory schedule** section).

   This schedule is automatically downloaded to all inventory beacons for delivery to installed FlexNet inventory agents on managed devices.

   Tip: *Once discovery and adoption are completed, on-going inventory operations of the installed FlexNet inventory agent in the Adopted case are not controlled by inventory rules created in the web interface. This includes the schedules that form part of rules, which have no effect on post-adoption inventory gathering by the installed FlexNet inventory agent (which is a state-based device, self-managing to align with its*

policy). It is for this reason that the schedule for on-going inventory operations in the Adopted case are set as described above, rather than as part of discovery and inventory rules.

2. Components of the FlexNet inventory agent are triggered by a long-running process (`ndinit` on Windows, and `ndtask` on UNIX-like platforms). The process is restarted automatically after a machine reboot.

3. Immediately upon first installation, and thereafter at a random time once every 12 hours, each FlexNet inventory agent asks an inventory beacon for its policy.

   (For details of the policy file, see Policy Files (.npl).) The FlexNet inventory agent downloads and checks the package files that are linked in the downloaded policy. The package files are very small and quick to download and process, and each identifies the version of its related content file. If the FlexNet inventory agent determines that no content files have changed since they were last collected, no further downloads take place at this time. If anything has changed, the changed content is downloaded and the appropriate settings on the inventory device are updated. These potential downloads include any change to the operational schedule for inventory collection.

4. If usage tracking is in policy for this device, the usage component monitors the running processes on the system, recording the number of times, and for how long, each process is run.

   This component does not have any noticeable impact on system performance. (Each application being tracked adds about 250 bytes of compressed data to the upload packages.) It looks up the OS-standard installation data (such as MSI on Windows, RPM on Linux, and so on) to associate a process with the installation evidence and file paths. Technically, the usage component `mgsusageag` is a daemon on UNIX-like systems, and on Windows it's a plug-in to `mgssecsvc.exe`, which starts as a Windows service at system start-up (for further details, refer back to Agent Architecture). After the results are uploaded, usage can be reported only against applications for which there is an independent installation record. (Usage results are not used to create an installation record, since the application may have been removed within the time window where usage is tracked.)

5. Apart from usage tracking, the FlexNet inventory agent sits dormant on the target inventory device until the scheduled time for inventory collection.

   The scheduled to-do list is managed by the `ndtask` component (this is a cross-platform component matching the functionality of `mstask`). When a schedule trigger fires, `ndtrack` runs `ndschedag` (passing it a GUID for the required action), and for inventory collection `ndschedag` runs the `ndtrack` component. Notice that `ndschedag` provides its own logging in `scheduler.log`, in the following default directories (there are several `LogFile` preferences that can override these default locations):

Windows platforms	`$(TempDirectory)\ManageSoft\`
UNIX-like platforms	`/var/opt/managesoft/log`

6. The `ndtrack` executable by default runs at low priority to collect software and hardware inventory details on the local device.

   This means that higher priority tasks are not interrupted, so that there is minimal impact on system performance. Inventory details are saved in an `.ndi` file on the local file system on the inventory device, by default:

Windows platforms	`$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\Inventories`
UNIX-like platforms	`/var/opt/managesoft/tracker/inventories`

This location may be altered with the `MachineInventoryDirectory` preference. This directory preserves the local copy of the inventory file (where you can inspect its contents) until it is over-written at the next inventory collection by the same account (since inventory file naming reflects the account running the inventory collection).

At the same time, a compressed (`.ndi.gz`) copy of the file is also saved, ready for upload, in a separate directory:

Windows platforms	`$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Common\Uploads\Inventories`
UNIX-like platforms	`/var/opt/managesoft/uploads/Inventories`

If the FlexNet inventory agent has uncovered any Oracle services running on the local device (and, for UNIX-like target devices, only when the FlexNet inventory agent is running as `root`), a second `.ndi.gz` file of Oracle inventory is also generated, and saved in the same directory (an uncompressed version is not saved). As well, the Oracle discovery is reported in an uncompressed `.disco` file, saved in the `Discovery` directory (a peer of the `Inventories` directory in the uploads set). Since the behavior of the installed FlexNet inventory agent is not controlled by inventory rules set in the web interface, this Oracle discovery and inventory does not rely on those rules, and will occur even when no rules for Oracle inventory collection exist, provided that:

- `InventorySettings.xml` is available to the FlexNet inventory agent (in the folder identified in the `InventorySettingsPath` preference setting, which defaults on Windows to `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\InventorySettings\` and on UNIX-like platforms to `/var/opt/managesoft/tracker/inventorysettings` — if either the preference or the file is missing, Oracle inventory is skipped)
- For UNIX-like target devices, the FlexNet inventory agent is running as `root` (for the installed FlexNet inventory agent, all Oracle discovery and database inventory gathering are blocked for any non-`root` account).

Tip: *A system trace on the UNIX version of `ndtrack` shows that it reads `/etc/passwd`. The UNIX `ndtrack` uses the `setpwent()` and `getpwent()` library calls to obtain the `pw_name`, `pw_dir` and `pw_shell` properties for each user. In particular, `ntrack` uses the `pw_dir` property (each user's home directory) to find user-based installation evidence for BEA and InstallAnywhere installation technologies.*

7. After collecting the hardware and software inventory, `ndtrack` immediately attempts to transfer the compressed inventory file(s) to an inventory beacon.

   The upload is a background process that does not take priority away from other current tasks running on the inventory device. The destination for the upload is `ManageSoftRL` (a web service on the inventory

beacon), which on free-standing inventory beacons saves the `.ndi.gz` file(s) to the folder *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories` on the inventory beacon.

Tip: *If the inventory beacon is co-located on your central application server (or in large-scale systems, the batch server), the `ManageSoftRL` web service does not save to disk, but instead saves directly to the database as described in step 9.*

(The upload functionality is shared between the `ndtrack` and `ndupload` components. Because the upload here is attempted as part of inventory collection, upload logging for this event is in the `ndtrack` or `tracker` logs, in the path given in step 5.)

- If the initial upload is unsuccessful for any reason, there is a catch-up task on the inventory device that triggers a retry of the upload. (If there are no files awaiting upload at catch-up time, this process shuts down immediately.)
  - *Timing:* The catchup schedule is internal (downloaded to the FlexNet inventory agent in the `.nds` schedule referenced in policy), and cannot be modified in any user interface. The task is called `Upload Client Files` and occurs once daily within a one hour window, the start time for which is randomized by the inventory beacon when it regenerates the schedule file after each update of beacon policy (that is, after each change to rules or schedules in the web interface for FlexNet Manager Suite). If the inventory device is turned off at the time, there is also a catch-up on machine restart.
  - *Logging:* For this catch-up, the upload uses the `ndupload` component, so that logging for the catchup attempt is in the `ndupload` logs.
- Once the upload is successful (either originally or in catch-up), the copy of each compressed inventory file in the `...\Uploads\Inventories` folder on the inventory device is deleted (meaning that the absence of files after the upload is a sign of success, and the continued presence of files after upload attempts is a sign of failure, with stale `.ndi.gz` files overwritten at the next inventory collection). After success, the process continues below.

Tip: *For ongoing operation of the full FlexNet inventory agent in the Adopted case, it is not required that the managed device is in a subnet assigned to the inventory beacon. (For the different requirements during discovery and adoption, see Adopted: Implementation.) At installation time, the adopting inventory beacon normally sets itself as the 'bootstrap' inventory beacon for the download of initial policy. Thereafter, the fail-over settings (linked in the downloaded policy) define every available inventory beacon, and the FlexNet inventory agent may contact the most appropriate one (by default, this is one in the same Active Directory site with the fastest ping response time at each upload time; but if these conditions cannot be met, it may be a random choice). Any inventory beacon will respond to a query from any installed FlexNet inventory agent (and calculate and provide a policy file for it), provided that the system is not in migration mode. Migration mode is set in the web interface for FlexNet Manager Suite (navigate to* ***Discovery & Inventory > Settings > Beacon settings > Migration mode: Restrict inventory settings to targeted devices****).*

8. FlexNet Beacon (the code entity on the inventory beacon) uploads the inventory data to its parent on a schedule set by the Microsoft Scheduled Task `Upload FlexNet logs and inventories` (by default, repeating every minute throughout the day).

The checking cycle when the folder is empty is very quick and does not perceptibly load the inventory beacon, even though it is frequently repeated. The parent of an inventory beacon may be the central application server, or another inventory beacon if these have been arranged in a hierarchy. In the latter case, each inventory beacon in turn repeats the upload process until the data reaches the application server.

9. On the application server (or, in a scaled-up system with separate servers, the inventory server), the web service `ManageSoftRL` receives the uploaded packages for both inventory and (if configured) usage tracking (and other uploaded files).

   These are processed immediately, being loaded into the internal operations databases: inventory (`.ndi`) and usage (`.mmi`) files are loaded into the inventory database; any Oracle discovery (`.disco`) file is loaded into the compliance database. If the service gets overloaded, it will temporarily spool incoming files to its local *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories` directory (or the peer `Discovery` folder for any Oracle discovery file). From these folders, file import is resumed under the control of Microsoft scheduled tasks (for example, `Import inventories`, which is triggered every 10 minutes).

10. On the next inventory import and license consumption calculation, the inventory and usage data is collected from the inventory database, socialized as necessary, and imported into the compliance database. Here it is used in license calculations, and made available in management views and reports.

    This import step can be triggered in one of three ways:

    - Normally, the batch scheduler triggers an import daily (by default, at 2am local time on your application server), with the license consumption calculation triggered thereafter. This default time is configurable by editing the Microsoft scheduled task `Inventory import and license reconcile` on your application server (or, in larger implementations, batch server).
    - An operator in the `Administrator` role can choose to import the waiting inventory and trigger license consumption calculation, or reconciliation, as soon as possible (navigate to **License Compliance > Reconcile**).
    - For testing, a knowledgeable system administrator could use a command line on your application server (or, in a scaled-up system, your batch server) like:

      ```
      BatchProcessTask.exe run InventoryImport
      ```

      (for details, see the *Server Scheduling* chapter in the *FlexNet Manager Suite System Reference* PDF).

Adopted: Services on UNIX

The installers for FlexNet inventory agent on UNIX-like platforms install two services which are automatically started after a successful installation and on every system boot. These services are:

- `ndtask` — The agent's task launcher. This runs `ndschedag` which executes further command lines (for example, for `ndtrack`, `ndupload`, `ndlaunch`) to perform the required actions.
- `mgsusageag` — The usage tracking agent.

The services are managed using the operating-system-specific service management tools. For example, to start `ndtask`:

Platform	Command
AIX (see note)	`/usr/bin/startsrc -s ndtask`
HP-UX	`/sbin/init.d/ndtask start`
Linux	`/etc/init.d/ndtask start`
Mac OS X	`/sbin/launchctl start com.flexerasoftware.ndtask`
Solaris	`/etc/init.d/ndtask start`

Similarly, to stop the `ndtask` service:

Platform	Command
AIX	`/usr/bin/stopsrc -s ndtask`
HP-UX	`/sbin/init.d/ndtask stop`
Linux	`/etc/init.d/ndtask stop`
Mac OS X	`/sbin/launchctl stop com.flexerasoftware.ndtask`
Solaris	`/etc/init.d/ndtask stop`

The `mgsusageag` service can be started and stopped in exactly the same way.

Note: *For AIX, the agents are in a group called `managesoft` and can both be started using `startsrc -g managesoft` and stopped using `stopsrc -g managesoft`.*

Adopted: System Requirements

The following details apply to the full FlexNet inventory agent when deployed through an inventory beacon to a target device.

Supported platforms

The FlexNet inventory agent operates on the following platforms (inventory targets):

Microsoft Windows	UNIX-like platforms
• Windows Server 2016 • Windows Server 2012 R2 SP1 • Windows Server 2012 R2 • Windows Server 2012 • Windows Server 2008 R2 x64 Server Core • Windows Server 2008 R2 x64 • Windows Server 2008 Server Core • Windows Server 2008 x64 Server Core • Windows Server 2008 x64 • Windows Server 2003 R2 • Windows Server 2003 R2 x64 • Windows Server 2003 • Windows Server 2003 x64 • Windows 10 x64 • Window 10 • Windows 8 x64 • Windows 8 • Windows 7 x64 • Windows 7 • Windows Vista x64 • Windows Vista • Windows XP Professional x64 • Windows XP Professional • Windows XP Home	• AIX 5.2, 5.3, 6.1, 7.1, LPARs • CentOS 4, 5, 6, 7 (x86/x86-64 only) • Debian 6, 7 (x86/x86-64 only) • Fedora 6–11, 18-23 (x86/x86-64 only) • HP-UX 11.00, 11i, 11i v2, 11i v3, vPars/nPars • Mac OS X 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12 • Oracle Linux 4.5 – 7.0 (x86/x86-64 only) • Red Hat Enterprise Linux 3 (x86 only), 4, 5, 6, 7 (x86/x86-64 only) • Red Hat Linux 8 and 9 (x86 only) • Solaris 8 (SPARC only) • Solaris 9, 10, 11 (x86/x86-64 and SPARC), Zones for versions 10 & 11 • SuSE Enterprise Server 11, 12 (x86/x86-64 only) • SuSE Professional 12, 13 (x86/x86-64 only) • Ubuntu 12-15 (x86/x86-64 only)

Disk space requirements

The following table gives three disk space figures for installation of FlexNet inventory agent:

- **Package type** gives the kind of installer package provided for each platform, and **Package size** defines the disk space to download or copy the installer for each of the platforms, before installation.
- **Installed** defines the disk space for the binary files after installation. The default locations for installation are:

  - Windows: `%ProgramFiles(x86)%\ManageSoft` (on modern 64-bit systems, this expands to `C:\Program Files (x86)\ManageSoft`)
  - UNIX-like systems: `/opt/managesoft`
- **Workspace** approximates a typical operating space requirement. The precise requirements depends on the self-update installer package size, the number of inventory files awaiting upload, usage tracking, the growth of log files, and the like. The default locations for this requirement are:
  - Windows: `%ProgramData%\ManageSoft Corp` for data; and `%temp%\ManageSoft` for log files. The default values for these on modern operating systems are typically `C:\ProgramData\ManageSoft Corp` and `C:\Windows\Temp\ManageSoft` (for the SYSTEM account running processes as Windows services).
  - UNIX-like systems: `/var/opt/managesoft` for working data, including `/var/opt/managesoft/log` for log files.

Platform	Package type	Package size	Installed	Workspace
AIX	LPP	20 MB	25 MB	100 MB
HP-UX	SD-UX	55 MB	55 MB	150 MB
Linux i386 (Red Hat, Oracle, CentOS, Fedora, SuSE)	RPM	10 MB	20 MB	100 MB
Linux x86_64 (Red Hat, Oracle, CentOS, Fedora, SuSE)	RPM	10 MB	25 MB	100 MB
Mac OS X	Mac Package Bundle	15 MB	35 MB	100 MB
Solaris SPARC	Sys V Package (pkg)	20 MB	20 MB	100 MB
Solaris x86	Sys V Package (pkg)	20 MB	20 MB	100 MB
Windows	MSI	18 MB	37 MB	100 MB

The following log files are available:

- `installation.log` — Log from `ndlaunch`, responsible for downloading and install all packages required for FlexNet inventory agent
- `policy.log` — Generated by the policy download agent, `mgspolicy`
- `schedule.log` — Log from the `ndschedag` schedule agent
- `tracker.log` — Generated by the inventory agent, `ndtrack`
- `uploader.log` — Log from the `ndupload` file upload agent
- `usageagent.log` — Generated by the `mgsusageag` usage tracking service.

Memory requirements

- Minimum RAM: 512 MB
- Recommended RAM: 2 GB

In general, through a cycle of inventory gathering and upload, the memory demand is in the order of 5-30 MB.

Communication protocols and ports

All ports used by FlexNet inventory agent are configurable to any value through preference settings, for example by including the port number in URL settings. The default values for communications supported between adopted devices and inventory beacons are:

- File upload and download using HTTP protocol: port 80
- File upload and download using HTTPS protocol: port 443
- Additional ports may be required if supporting a proxy.

Supported packages to inventory

FlexNet inventory can include data from most package technologies supported by the operating systems, and some additional third-party packaging technologies:

Platform	Supported package technologies
All platforms	InstallAnywhere (IA), InstallShield Multiplatform (ISMP), BEA/Oracle Installer (BEA), Oracle Universal Installer (OUI), IBM Installation Manager (IIM)
AIX	LPP, RPM
HP-UX	Software Distributor SD-UX Package
Linux	RPM (Red Hat, CentOS, Oracle, SuSE, Fedora, etc), DPKG (Debian, Ubuntu).
Mac OS X	Mac Application Bundle, Mac Package Bundle
Solaris	Sys V Package (pkg), IPS
Windows	MSI, Add/Remove Programs Registry Key

However, FlexNet inventory cannot collect data from some of the less common or newer operating system technologies and many third-party technologies. Some known examples include:

- All platforms — IBM InstallStream, IBM Tivoli Netcool Installer
- Mac OS X — Mac flat package.

System load benchmarks

The following notes reflect observed behavior on sample systems using the full installed FlexNet inventory agent.

Task	Run duration (seconds)	CPU usage (seconds)	CPU usage (% of single core)	Memory usage	Network load
Inventory collection	13 to 240 s	5 to 130 s	10% to 50%	4 MB to 20 MB	10 KB to 200 KB per upload
Usage monitoring	Ongoing	Under 1 s / day	Negligible	4 MB to 8 MB	5 KB to 20 KB / day
Policy update*	15 s to 33 s	Under 1 s per policy	Negligible	3 MB to 5 MB	10 KB to 100 KB per policy update

* For each policy update, FlexNet inventory agent downloads its current policy from its preferred inventory beacon. This links to several packages:

- Failover settings (upload and download locations on all available inventory beacons)
- Client configuration (the preferences for use by all installed components included in the FlexNet inventory agent)
- Schedule
- Inventory settings and extensions (`InventorySettings.xml`)
- Agent self-upgrade package.

Using each package, FlexNet inventory agent checks the last downloaded content against the version currently on the inventory beacon. When there is no change, there is no further download (so that the checking process is both rapid and lightweight for the network). Changed items are downloaded, which may increase the network load for that occasion. The largest single impact is when a new agent update package is declared: for details of the download size per platform for update packages, see the disk space listing above.

Adopted: Accounts and Privileges

The complete FlexNet inventory agent deployed automatically through the inventory beacons has distinct security requirements for different phases, and across different platforms.

Platform	Deployment (adoption by inventory beacon)	Operations
Windows	On the target device, a Microsoft service account with local administrator rights to allow for software installation. Optionally, this account may be any of: • A unique account for every target inventory device • An account known in common to a logical group of target devices • A domain administrator account that has installation rights on all target devices. In each case, the account credentials must be saved in the Password Store on the adopting inventory beacon. (The Password Store allows for filtering credentials against a group of devices, for example by pattern matching against machine names.) ***Tip:*** *If you choose to use a highly-privileged account, such as a domain administrator, you might also choose to remove it from the Password Store when all target devices have been adopted. (If you choose this approach, it is best practice when removing the account to disabled any targets that include a setting to adopt target devices, since adoption will fail without an appropriate privileged account.) You may also need to restore the account into the Password Store to allow for future adoption of newly-added target devices.*	FlexNet inventory agent runs as the local SYSTEM account.

Platform	Deployment (adoption by inventory beacon)	Operations
UNIX-like platforms	An account that allows `sudo` elevation without requiring an interactive password. Installation of the package for FlexNet inventory agent requires `root` level privileges.	The FlexNet inventory agent must run as `root` to install and run its services on the local device. The security settings for subdirectories of `/opt/managesoft`: • The `lib` and `libexec` folders are completely locked down to root only. • The `bin` folder is open to all, to allow easy access to the path of the executables in the folder when using privilege escalation tools like `sudo`. • The executables in the `bin` folder are locked down to root only. • `documentation` and `software tag` are readable by all. The `/var/opt/managesoft` directory is only accessible by root.

Adopted: Implementation

"Adoption" refers to the process by which FlexNet Manager Suite installs the FlexNet inventory agent on target devices, based on rules that you set.

This approach bypasses the manual preparation of installation packages and their deployment using the third-party deployment tools. In this process, the configuration and deployment of FlexNet inventory agent is fully automated, and you do not need to understand the various code components involved, nor their many settings, nor do any custom configuration.

Tip: *The trade-off is that, while not doing any custom configuration, you also cannot change the default installation location on the target device. (In contrast, the Agent third-party deployment case allows for custom installation paths for the complete FlexNet inventory agent.)*

The main requirements for this Adopted case are targeting the devices through an inventory beacon, and arranging credentials to allow for installation.

To manage automated adoption of discovered devices (summary):

1. Ensure that you have the appropriate inventory beacons fully operational.

   To do this, navigate to **Discovery & Inventory > Beacons** (in the **Network** group), and check the following properties for an existing inventory beacon:

Property	Expected Value
Beacon status	`Operating normally`
Policy status	`Up to date`
Connectivity status	`Connected`

To deploy and configure a new inventory beacon, click **Deploy a beacon**. Consult the online help for these pages for more information.

2. Ensure that at least one inventory beacon is configured to cover the subnet containing the target inventory devices.

   While all inventory beacons receive all rules declared in the web interface of FlexNet Manager Suite (when they download the `BeaconPolicy.xml` file), each one enacts only those rules that apply to target devices that fall within their assigned subnet(s). This setting is available through the web interface for FlexNet Manager Suite at **Discovery & Inventory > Beacons**. See the online help there for more information.

3. If yours is a highly secure, locked down environment, you may need to open network ports on the target computer devices to allow for remote execution.

   Since the inventory beacons use standard ports to access target devices and remotely install the FlexNet inventory agent, the required ports are already available in many environments. (The ports are documented in the online help, under *FlexNet Manager Suite Help* > *Inventory Beacons* > *Inventory Beacon Reference* > *Ports and URLs for Inventory Beacons*. The default requirements for remote execution are ports 445 for SMB on Windowsand 22 for SSH on Unix.)

4. Ensure adequate credentials are available for the remote execution process to run. There are two possible approaches for Windows devices:

   - You can register a domain administrator account that has installation privileges on all the target computer devices within the domain. This approach minimizes entries in the Password Store.
   - You can record appropriate (potentially unique) credentials for each device in the Password Store. With this approach, you should also add filters to limit the number of password attempts on each target device, so that the remote execution attempt is not terminated because it attempted too many credentials without success.

   These credentials must be recorded in the secure Password Store available on each inventory beacon (for details, see the online help, under *FlexNet Manager Suite Help* > *Inventory Beacons* > *Password Management Page*).

   For UNIX-like devices, the `ssh` daemon must be installed, and you must either:

   - Record `root` credentials for the target device in the Password Store on the applicable inventory beacon
   - Record *non*-root credentials for the target device in the Password Store on the applicable inventory beacon, and additionally ensure that a tool to allow privilege escalation (such as `sudo` or `priv`) is installed on target devices and either:
     a. The use of that tool is configured in the Password Store (in the extra fields exposed when you specify and SSH account type), or

   b. Target devices are configured to allow escalation of privileges without requiring an interactive password.

5. Set the schedule for operations of the FlexNet inventory agent in the web interface of FlexNet Manager Suite (navigate to **Discovery & Inventory > Settings**, in the **Agent inventory schedule** section).

6. Navigate to **Discovery & Inventory > Discovery and Inventory Rules**, and create one or more rules to take inventory from target computing devices within your enterprise, and then at the beginning of the inventory process, adoption occurs when in policy for the target device.

   Rules consist of

   - **Targets** that identify sets of devices, and (for all the devices identified within a single target) specify policy about how to connect, whether to collect CAL evidence, whether to track application usage, and whether to adopt — all devices intended for adoption must be included in at least one target that has **Allow these targets to be adopted** selected (and at the same time, must *not* be included in any overlapping target for which **Do not allow these targets to be adopted** is selected, as a 'deny' always over-rides an 'allow').

     Tip: *In the case of these policy settings such as adoption, targets need not be used in rules to have effect. Policy is determined by the net effect of the policy settings on all the targets that apply to a given device. This policy setting is a separate function of targets, independent of their possible use in rules. Secondly and separately, targets are also used to identify which devices a rule should act on. If a device is covered in at least one target used in a rule with an inventory gathering action (as listed next — this conditions ensures that an inventory beacon touches the target device), its adoption policy (allow or deny) can be specified in any overlapping target (overlapping because it covers the same device), regardless of whether the overlapping target is actually used in a rule.*

   - **Actions** that declare what to do to the targeted devices — to ensure adoption, the relevant rule must include at least one of the following inventory settings when you create or edit an action (the action may also include discovery settings, or alternatively you may look in the **Discovery of devices** area and select **Use previously discovered devices**):

     - In the **General devices discovery and inventory** section (click the title bar to expand the section), **Gather hardware and software inventory from all target devices** selected
     - In the **Microsoft Hyper-V discovery and inventory** section, both the **Discover Microsoft Hyper-V** check box and the **Gather Microsoft Hyper-V hardware and software inventory** check box selected; *and* Hyper-V is then discovered on the device
     - In the **Microsoft SQL Server discovery and inventory** section, both the **Discover Microsoft SQL Server** check box and the **Gather Microsoft SQL Server hardware and software inventory** check box selected; *and* SQL Server is then discovered on the device.

   - A schedule for implementing the action on the targeted devices.

     Tip: *Part of the art in this automated deployment may be in declaring a schedule that suits when the target devices are available (that is, running, connected to the network, and not too busy). Particularly with individual workstations and laptops, this may require some external process management. For example, you may communicate to users that they should leave target devices running overnight, or some similar arrangement. Since the discovery and adoption rules execute on a repeated schedule, there are many such 'windows' when devices can be automatically adopted.*

By specifying multiple targets, you can choose which computer devices are adopted. For more information, see the online help for these pages.

7. Wait for the execution of the rule(s), the installation of the FlexNet inventory agent, and the resultant data uploads.

   When the inventory beacon contacts a target device listed for gathering inventory, it checks the operating system and checks whether the full FlexNet inventory agent is already installed. On a target device that is listed in policy for adoption, *but* where the FlexNet inventory agent is not already present, the inventory beacon automatically installs the FlexNet inventory agent (that is, 'adopts' the device). No methods of inventory gathering other than by the locally-installed FlexNet inventory agent are ever used on target devices for which the policy (net of all targets) is adoption.

   To monitor progress and results, navigate to the system menu (in the top right corner), **System Health > System Tasks**, and see the online help there for more information. You can also navigate to **Discovery & Inventory > Discovery and Inventory Rules**, and select the **Rules** tab. On that page, click the name of any rule to expose additional details, including a table of **Adoption results**.

   ***Tip:** It is important to check for successful adoption. Should it happen for any reason that adoption fails, the fact that adoption has been set for the target device prevents inventory collection through (for example) the Zero-footprint process of inventory gathering. This combination may mean that no inventory is returned for the device at all.*

When initial execution of the rules is successfully completed:

- On the adopted inventory device, the FlexNet inventory agent is by default installed:
  - On Windows, in `C:\Program Files (x86)\ManageSoft`
  - On UNIX-like platforms, in `/opt/managesoft`.
- The adopted devices are visible in the web interface of FlexNet Manager Suite. For example, they are listed in **Discovery & Inventory > All Discovered Devices** page, and (after an inventory upload and import) the **Agent installed** column shows that the FlexNet inventory agent has been successfully deployed and is reporting.
- According to the global schedule you specified in **Discovery & Inventory > Settings > Agent inventory schedule** section, your adopted devices start reporting inventory collected by the FlexNet inventory agent. After subsequent inventory imports and compliance calculations, the results are visible in the management and reporting views within FlexNet Manager Suite.
- The targets you declared to set policy for adoption now have no further effect on adopted devices (they do not, for example, unnecessarily cause repeated installations). Each installation of FlexNet inventory agent is a state-based machine controlled by its policy, prepared for it on demand by an inventory beacon. However, keeping the policy-setting targets in place is best practice, for at least two reasons:
  - If you remove a target that specifies a policy combination (adoption, connection, CAL evidence and usage tracking), you may inadvertently switch behaviors of the installed agents
  - The same policy setting in favor of adoption also prevents overlapping gathering of FlexNet inventory by other means, such as the Zero-footprint case.

- Any changes to policy settings affecting installed FlexNet inventory agents are transmitted to all inventory beacons, and automatically included in subsequent policy updates on the next policy request by each installed FlexNet inventory agent.
- Through policy, you can also control the self-update mechanism when new versions of the FlexNet inventory agent are ready to deploy (for details, see Adopted: Specifying an Installed Agent Upgrade).

Note: *For UNIX-like platforms (only), you can manually update the preferences controlling the behavior of the installed FlexNet inventory agent. From a console or remote terminal connection, run the command:*

```
/opt/managesoft/bin/managesoft-configure
```

This will prompt for configuration items.

Adopted: Specifying an Installed Agent Upgrade

The installed FlexNet inventory agent manages its own self-updates to the limit of a maximum version specified in the operations databases and distributed through the inventory beacons as part of the policy downloaded to all managed devices. Use this procedure to define the maximum version permitted as part of the self-update process.

To specify the latest permitted version of FlexNet inventory agent:

1. Log in to your batch server using the installing user account (suggestion: fnms-admin).

   To change the target version for installed FlexNet inventory agents, this account must have read/write access to the operations databases. (In smaller implementations, log into the server that includes your batch processing functionality, such as your processing server or your application server.)

2. In a command window, navigate to *installation-folder*\DotNet\bin.

3. To identify which version of the FlexNet inventory agent you have currently authorized as the target version for all upgrades:

   ```
   .\ConfigureSystem.exe current-agent-upgrade
   ```

4. To review a list of the FlexNet inventory agent versions to which you may upgrade:

   ```
   .\ConfigureSystem.exe list-agent-versions
   ```

   This lists all versions of the FlexNet inventory agent that are stored in your database and available for use as upgrades to your currently deployed agents. The list is typically updated at each release of FlexNet Manager Suite. Versions are shown by their internal major-minor-update numbering (such as `12.0.0`). Take note of the exact version numbering of your chosen upgrade target.

5. To authorize a new version of the FlexNet inventory agent as the target version for all upgrades:

   ```
   .\ConfigureSystem.exe select-agent-upgrade --version versionString
   ```

   Replace *versionString* with the same major-minor-update numbering as is displayed by the `list-agent-versions` action. This value must be an exact match for one of the available versions listed by

`list-agent-versions`. If not, no action is taken. (Notice that there is no requirement for the new version to be greater than versions previously installed: you can specify an earlier version from the available list, which causes any later FlexNet inventory agents to downgrade to the specified earlier version.)

Tip: *The same version (number) of the FlexNet inventory agent is normally installed across all platforms.*

The new version is identified in the database. At the next update to inventory beacon policy (which occurs automatically after any change to rules or agent settings in the web interface), the new version limit is distributed to all inventory beacons, along with the installers for the currently authorized target version of the FlexNet inventory agent for all platforms. Thereafter each managed device is updated on its next policy download, receiving both the new version number and (if necessary) the installer for the machine on which it is running. The installed FlexNet inventory agents then upgrade (or downgrade) themselves to the identified target version, and resume normal operations.

Adopted: Troubleshooting Inventory

Inventory gathering and upload is a sophisticated chain from target inventory device through inventory beacon to central application server. For general trouble-shooting over the whole process, see the online help for FlexNet Manager Suite under *Inventory Beacons* > *Inventory Beacon Reference* > *Troubleshooting: Inventory Not Uploading*. This topic focuses entirely on inventory collection on the target inventory device.

The regular log file for the `ndtrack` executable is identified in `[Registry]\ManageSoft\Tracker\CurrentVersion\LogFile` (see LogFile (inventory component)). In the Adopted case, the default paths are:

- On Windows platforms, `$(TempDirectory)\ManageSoft\tracker.log`
- On UNIX-like platforms, `/var/opt/managesoft/log/tracker.log` (when the `ndtrack` executable runs as root).

For advanced trouble-shooting, you may require more advanced tracing and logging. You may also be asked to submit a trace file to assist the Support team at Flexera Software to solve difficult problems in your environment.

To configure advanced tracing for the installed FlexNet inventory agent:

1. In a flat text editor, open the `etcp.trace` file.

   In the Adopted case, this file is co-located with the installed `ndtrack` executable on the target inventory device:

   - On Windows, the default is `C:\Program Files (x86)\ManageSoft\etcp.trace`
   - On UNIX-like platforms, the default is `/opt/managesoft/etcp.trace`.

2. Configure the name and location of the trace/log file that will be generated on the inventory device.

   The hash or pound character (#) identifies a comment. To "uncomment" a line in the `.trace` configuration file means to delete (only) the leading hash character. Choose one of the following lines, uncomment it, and optionally modify it to your requirements. On Windows:

   ```
   #filename=C:\ManageSoft.log
   #filename=C:\ManageSoft%p_%d_%t_%u.log        # filename pattern with everything!
   ```

On UNIX-like platforms:

```
#filename=/tmp/log/mgstrace.log
#filename=/tmp/log/ManageSoft%p_%d_%t_%u.log # filename pattern with everything!
```

See the notes within the file header for the use of the supported variables within the file name.

Tip: *It is best practice to use a pattern that includes (at least) either a date stamp (%d) or a sequential number (%u). Without these, the fixed file name means tracing information is appended to the same file with every inventory collection. This can quickly produce a trace file too large for text editors to read, and too hard to manage in terms of disk space. Variables in the file name trigger creation of a new file each time the associated variable is changed (or, for %u, at every invocation of `ndtrack`).*

Important: *The log file path:*

- *Must be on the same drive as the `ndtrack` executable (on Windows devices)*
- *Must exist and be writable before the `ndtrack` executable is next invoked (tracing does not create any directories, and does not function if any directory in the specified path is missing or unwritable).*

3. Uncomment the lines for which you want to enable tracing (ensuring that the uncommented line now starts with a plus sign).

The tracing controls are arranged hierarchically. For example, uncommenting the one line for `+Inventory/Tracker` enables tracing for all child controls, as in this example:

```
+Inventory/Tracker
#+Inventory/Tracker/Preferences
#+Inventory/Tracker/Environment
#+Inventory/Tracker/Hardware
#+Inventory/Tracker/Hardware/WMI
#+Inventory/Tracker/Hardware/WMI/Class
#+Inventory/Tracker/Hardware/WMI/Instance
#+Inventory/Tracker/Hardware/WMI/Property
#+Inventory/Tracker/Hardware/Processor
#+Inventory/Tracker/Hardware/Memory
#+Inventory/Tracker/Hardware/Hypervisor
#+Inventory/Tracker/Hardware/DiskDrive
#+Inventory/Tracker/Registry
#+Inventory/Tracker/Registry/Keys
#+Inventory/Tracker/Registry/Values
#+Inventory/Tracker/Package
#+Inventory/Tracker/Package/Info
#+Inventory/Tracker/Software
#+Inventory/Tracker/Software/Directory
#+Inventory/Tracker/Software/File
#+Inventory/Tracker/Software/Version
#+Inventory/Tracker/Oracle
#+Inventory/Tracker/Oracle/Listener
#+Inventory/Tracker/Generate
```

```
#+Inventory/Tracker/Compress
#+Inventory/Tracker/Upload
```

This setting enables (almost) *all* tracing related to the tracker component (`ndtrack`). You can also create an exemption to the general setting by making the appropriate line starts with a minus sign. For example, this one-line change within the above:

```
-Inventory/Tracker/Registry
#+Inventory/Tracker/Registry/Keys
#+Inventory/Tracker/Registry/Values
```

turns off tracing for everything related gathering inventory from the Windows registry (that is, the disable setting is also inherited by the `Inventory/Tracker/Registry/Keys` and `/Values` controls).
One control that may affect the tracker component is outside this set. Because the tracker attempts an upload to the inventory beacon as soon as inventory gathering is complete, its tracing is affected by the `+Communication/Network` setting (along with the `ndupload` and `ndlaunch` components). This enables tracing of all network communications, including server certificate checking and the like.

Some common choices for tracing the inventory gathering process are listed in the table below.

4. To turn off tracing for an individual line that has previously been enabled, either comment out the line again, or switch the plus sign to a minus sign at the start of the line. A quick way to turn off tracing but keep all the settings for future use is to comment out only the `filename` setting that specifies the log file.

Some of the more commonly used tracing options for the tracker include the following:

Category	Option	Notes
Networking	`+Communication/Network`	Traces all low-level upload and download actions (whether HTTP or HTTPS). It includes HTTPS certificate checking and related areas. Covers actions by the `ndtrack`, `ndupload`, and `ndlaunch` components.
All inventory	`+Inventory`	Traces all inventory operations, which on large inventory tasks, could result in a sizable trace file.
All tracker	`+Inventory/Tracker`	This traces almost all operations of the `ndtrack` executable.
Preferences	`+Inventory/Tracker/Environment`	Shows active preferences, whether set in the registry (on Windows platforms) or in the `config.ini` file (on UNIX-like platforms), or inbuilt default values.
Hardware inventory	`+Inventory/Tracker/Hardware`	Traces all hardware inventory classes visible in the `<Hardware>` node in the `.ndi` inventory file, including CPU information and virtualization.
Software inventory	`+Inventory/Tracker/Package`	Traces the inventory operations that populate the `<Package>` nodes in the `.ndi` inventory file.

Category	Option	Notes
Software inventory	`+Inventory/Tracker/Software`	Tracing mainly for file inventory gathering (such as the `<Content>` and `MD5` nodes of the `.ndi` file).
Oracle inventory	`+Inventory/Tracker/Oracle`	When the inventory device hosts Oracle Database, this is the tracing for local Oracle inventory.
Operations	`+Inventory/Tracker/Generate`	Traces the preparation of the `.ndi` inventory file(s), keeping in mind that on an Oracle Database server, there may be multiple files generated.
Operations	`+Inventory/Tracker/Compress`	Traces the compression of the `.ndi` file into a `.gz` archive.
Operations	`+Inventory/Tracker/Upload`	Traces the upload of the `.ndi.gz` archive to an inventory beacon by the tracker. ***Tip:*** *If the immediate upload by the tracker fails for some temporary reason, the upload is attempted again later by the* `ndupload` *component. While this component does not provide this same level of operations tracing as the tracker does, you can enable* `+Communication/Network` *for low-level tracing of each step in the upload interaction.*

3

Agent third-party deployment: Details

This chapter provides great detail about the FlexNet inventory agent deployed by methods of your own choosing (*not* using FlexNet Manager Suite to perform adoption), and installed on target devices for subsequent control by downloaded policy (labeled the Agent third-party deployment case in Deployment Overview: Where to, and How). Keep in mind that this label is a shorthand for "the full FlexNet inventory agent deployed using third party tools". If you are looking for details about how in general to deploy inventory-gathering code elements, see the *Implementation* topic within the *Details* chapter for each of the methodological cases.

This document provides a consistent set of data (as far as possible) across all the different use cases, each in its own chapter. This means that, once you have chosen your preferred use case, you can focus only on the details for that one, and ignore all other use case chapters.

Because FlexNet inventory collection supports a range of operating system platforms, some topics necessarily contain several sets of information, and you can select only those details that apply to your chosen platform(s).

In addition to the distinct chapters for the different use cases, you should also review the subsequent chapter on functionality that is common throughout. This is followed by detailed reference material on command lines, preferences, file formats, and the like.

Agent third-party deployment: Normal Operation

This topic assumes that deployment and installation is complete (for those details, see Agent third-party deployment: Implementation and its subtopics), and describes operations thereafter (to help you decide whether to proceed with this particular case). It describes the operation of FlexNet inventory agent once you have used your preferred third-party tool to deploy it into locations within your computer estate where each installation can access one or more inventory beacons, and function normally (labeled the Agent third-party deployment case for short). These computer devices are to become "inventory devices" within FlexNet Manager Suite.

The operating procedures for the full FlexNet inventory agent deployed in this way are consistent across Microsoft Windows and UNIX-like systems, with some obvious distinctions in system dependencies like file paths. The entire process is covered, including what happens to the collected data after it uploaded by the FlexNet

inventory agent. Each numbered step provides a summary point, followed by further specific details that you can skip over until needed.

1. Normally only once (probably even before deploying FlexNet inventory agent, although you can certainly change it later if required), you set the schedule for operations of the FlexNet inventory agent in the web interface of FlexNet Manager Suite (navigate to **Discovery & Inventory > Settings**, in the **Agent inventory schedule** section).

   This schedule is automatically downloaded to all inventory beacons for delivery to installed FlexNet inventory agents on your inventory devices.

   Tip: *Inventory operations of the installed FlexNet inventory agent in the Agent third-party deployment case are never controlled by inventory rules created in the web interface. This includes the schedules that form part of rules, which have no effect on inventory gathering by the installed FlexNet inventory agent (which is a state-based device, self-managing to align with its policy). It is for this reason that the schedule for on-going inventory operations in the Agent third-party deployment case are set as described above, rather than as part of discovery and inventory rules.*

2. Components of the FlexNet inventory agent are triggered by a long-running process (`ndinit` on Windows, and `ndtask` on UNIX-like platforms). The process is restarted automatically after a machine reboot.

   For more information about the services on UNIX-like platforms, see Agent third-party deployment: Services on UNIX. For full architectural details of the FlexNet inventory agent, see Agent Architecture.

3. Immediately upon first installation, each FlexNet inventory agent asks its bootstrap inventory beacon for its initial policy. Thereafter at a random time once every 12 hours, it checks for policy updates.

   The bootstrap inventory beacon is the one you identified in the bootstrap configuration file (`mgssetup.ini` for Windows devices or `mgsft_rollout_response` for UNIX-like systems). Once the initial policy is successfully downloaded, the installed FlexNet inventory agent has a complete list of all existing inventory beacons, and makes future policy update requests to the most appropriate one (by default, this is one in the same Active Directory site with the fastest ping response time at each upload time; but if these conditions cannot be met, it may be a random choice). Any inventory beacon will respond to a query from any installed FlexNet inventory agent (and calculate and provide a policy file for it), provided that the system is not in migration mode. Migration mode is set in the web interface for FlexNet Manager Suite (navigate to **Discovery & Inventory > Settings > Beacon settings > Migration mode: Restrict inventory settings to targeted devices**).

   (For details of the policy file, see Policy Files (.npl).) The FlexNet inventory agent downloads and checks the package files that are linked in the downloaded policy. The package files are very small and quick to download and process, and each identifies the version of its related content file. If the FlexNet inventory agent determines that no content files have changed since they were last collected, no further downloads take place at this time. If anything has changed, the changed content is downloaded and the appropriate settings on the inventory device are updated. These potential downloads include any change to the operational schedule for inventory collection.

4. If usage tracking is in policy for this device, the usage component monitors the running processes on the system, recording the number of times, and for how long, each process is run.

   This component does not have any noticeable impact on system performance. (Each application being tracked adds about 250 bytes of compressed data to the upload packages.) It looks up the OS-standard installation data (such as MSI on Windows, RPM on Linux, and so on) to associate a process with the

installation evidence and file paths. Technically, the usage component `mgsusageag` is a daemon on UNIX-like systems, and on Windows it's a plug-in to `mgssecsvc.exe`, which starts as a Windows service at system start-up (for further details, refer back to Agent Architecture). After the results are uploaded, usage can be reported only against applications for which there is an independent installation record. (Usage results are not used to create an installation record, since the application may have been removed within the time window where usage is tracked.)

5. Apart from usage tracking, the FlexNet inventory agent sits dormant on the target inventory device until the scheduled time for inventory collection.

   The scheduled to-do list is managed by the `ndtask` component (this is a cross-platform component matching the functionality of `mstask`). When a schedule trigger fires, `ndtrack` runs `ndschedag` (passing it a GUID for the required action), and for inventory collection `ndschedag` runs the `ndtrack` component. Notice that `ndschedag` provides its own logging in `scheduler.log`, in the following default directories (there are several `LogFile` preferences that can override these default locations):

Windows platforms	`$(TempDirectory)\ManageSoft\`
UNIX-like platforms	`/var/opt/managesoft/log`

6. The `ndtrack` executable by default runs at low priority to collect software and hardware inventory details on the local device.

   This means that higher priority tasks are not interrupted, so that there is minimal impact on system performance. Inventory details are saved in an `.ndi` file on the local file system on the inventory device, by default:

Windows platforms	`$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\Inventories`
UNIX-like platforms	`/var/opt/managesoft/tracker/inventories`

   This location may be altered with the `MachineInventoryDirectory` preference. This directory preserves the local copy of the inventory file (where you can inspect its contents) until it is over-written at the next inventory collection by the same account (since inventory file naming reflects the account running the inventory collection).

   At the same time, a compressed (`.ndi.gz`) copy of the file is also saved, ready for upload, in a separate directory:

Windows platforms	`$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Common\Uploads\Inventories`
UNIX-like platforms	`/var/opt/managesoft/uploads/Inventories`

   If the FlexNet inventory agent has uncovered any Oracle services running on the local device (and, for UNIX-like target devices, only when the FlexNet inventory agent is running as `root`), a second `.ndi.gz` file of Oracle inventory is also generated, and saved in the same directory (an uncompressed version is not saved). As well, the Oracle discovery is reported in an uncompressed `.disco` file, saved in the `Discovery` directory

(a peer of the `Inventories` directory in the uploads set). Since the behavior of the installed FlexNet inventory agent is not controlled by inventory rules set in the web interface, this Oracle discovery and inventory does not rely on those rules, and will occur even when no rules for Oracle inventory collection exist, provided that:

- `InventorySettings.xml` is available to the FlexNet inventory agent (in the folder identified in the `InventorySettingsPath` preference setting, which defaults on Windows to `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\InventorySettings\` and on UNIX-like platforms to `/var/opt/managesoft/tracker/inventorysettings` — if either the preference or the file is missing, Oracle inventory is skipped)
- For UNIX-like target devices, the FlexNet inventory agent is running as `root` (for the installed FlexNet inventory agent, all Oracle discovery and database inventory gathering are blocked for any non-`root` account).

Tip: *A system trace on the UNIX version of `ndtrack` shows that it reads `/etc/passwd`. The UNIX `ndtrack` uses the `setpwent()` and `getpwent()` library calls to obtain the `pw_name`, `pw_dir` and `pw_shell` properties for each user. In particular, `ntrack` uses the `pw_dir` property (each user's home directory) to find user-based installation evidence for BEA and InstallAnywhere installation technologies.*

7. After collecting the hardware and software inventory, `ndtrack` immediately attempts to transfer the compressed inventory file(s) to an inventory beacon.

   The upload is a background process that does not take priority away from other current tasks running on the inventory device. The destination for the upload is `ManageSoftRL` (a web service on the inventory beacon), which on free-standing inventory beacons saves the `.ndi.gz` file(s) to the folder *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories` on the inventory beacon.

   Tip: *If the inventory beacon is co-located on your central application server (or in large-scale systems, the batch server), the `ManageSoftRL` web service does not save to disk, but instead saves directly to the database as described in step .*

   (The upload functionality is shared between the `ndtrack` and `ndupload` components. Because the upload here is attempted as part of inventory collection, upload logging for this event is in the `ndtrack` or `tracker` logs, in the path given in step .)

   - If the initial upload is unsuccessful for any reason, there is a catch-up task on the inventory device that triggers a retry of the upload. (If there are no files awaiting upload at catch-up time, this process shuts down immediately.)
     - *Timing:* The catchup schedule is internal (downloaded to the FlexNet inventory agent in the `.nds` schedule referenced in policy), and cannot be modified in any user interface. The task is called `Upload Client Files` and occurs once daily within a one hour window, the start time for which is randomized by the inventory beacon when it regenerates the schedule file after each update of beacon policy (that is, after each change to rules or schedules in the web interface for FlexNet Manager Suite). If the inventory device is turned off at the time, there is also a catch-up on machine restart.

- *Logging:* For this catch-up, the upload uses the `ndupload` component, so that logging for the catchup attempt is in the `ndupload` logs.

- Once the upload is successful (either originally or in catch-up), the copy of each compressed inventory file in the `...\Uploads\Inventories` folder on the inventory device is deleted (meaning that the absence of files after the upload is a sign of success, and the continued presence of files after upload attempts is a sign of failure, with stale `.ndi.gz` files overwritten at the next inventory collection). After success, the process continues below.

8. FlexNet Beacon (the code entity on the inventory beacon) uploads the inventory data to its parent on a schedule set by the Microsoft Scheduled Task `Upload FlexNet logs and inventories` (by default, repeating every minute throughout the day).

   The checking cycle when the folder is empty is very quick and does not perceptibly load the inventory beacon, even though it is frequently repeated. The parent of an inventory beacon may be the central application server, or another inventory beacon if these have been arranged in a hierarchy. In the latter case, each inventory beacon in turn repeats the upload process until the data reaches the application server.

9. On the application server (or, in a scaled-up system with separate servers, the inventory server), the web service `ManageSoftRL` receives the uploaded packages for both inventory and (if configured) usage tracking (and other uploaded files).

   These are processed immediately, being loaded into the internal operations databases: inventory (`.ndi`) and usage (`.mmi`) files are loaded into the inventory database; any Oracle discovery (`.disco`) file is loaded into the compliance database. If the service gets overloaded, it will temporarily spool incoming files to its local *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories` directory (or the peer `Discovery` folder for any Oracle discovery file). From these folders, file import is resumed under the control of Microsoft scheduled tasks (for example, `Import inventories`, which is triggered every 10 minutes).

10. On the next inventory import and license consumption calculation, the inventory and usage data is collected from the inventory database, socialized as necessary, and imported into the compliance database. Here it is used in license calculations, and made available in management views and reports.

    This import step can be triggered in one of three ways:

    - Normally, the batch scheduler triggers an import daily (by default, at 2am local time on your application server), with the license consumption calculation triggered thereafter. This default time is configurable by editing the Microsoft scheduled task `Inventory import and license reconcile` on your application server (or, in larger implementations, batch server).

    - An operator in the `Administrator` role can choose to import the waiting inventory and trigger license consumption calculation, or reconciliation, as soon as possible (navigate to **License Compliance > Reconcile**).

    - For testing, a knowledgeable system administrator could use a command line on your application server (or, in a scaled-up system, your batch server) like:

      ```
      BatchProcessTask.exe run InventoryImport
      ```

      (for details, see the *Server Scheduling* chapter in the *FlexNet Manager Suite System Reference* PDF).

Agent third-party deployment: Services on UNIX

The installers for FlexNet inventory agent on UNIX-like platforms install two services which are automatically started after a successful installation and on every system boot. These services are:

- `ndtask` — The agent's task launcher. This runs `ndschedag` which executes further command lines (for example, for `ndtrack`, `ndupload`, `ndlaunch`) to perform the required actions.
- `mgsusageag` — The usage tracking agent.

The services are managed using the operating-system-specific service management tools. For example, to start `ndtask`:

Platform	Command
AIX (see note)	`/usr/bin/startsrc -s ndtask`
HP-UX	`/sbin/init.d/ndtask start`
Linux	`/etc/init.d/ndtask start`
Mac OS X	`/sbin/launchctl start com.flexerasoftware.ndtask`
Solaris	`/etc/init.d/ndtask start`

Similarly, to stop the `ndtask` service:

Platform	Command
AIX	`/usr/bin/stopsrc -s ndtask`
HP-UX	`/sbin/init.d/ndtask stop`
Linux	`/etc/init.d/ndtask stop`
Mac OS X	`/sbin/launchctl stop com.flexerasoftware.ndtask`
Solaris	`/etc/init.d/ndtask stop`

The `mgsusageag` service can be started and stopped in exactly the same way.

Note: *For AIX, the agents are in a group called `managesoft` and can both be started using `startsrc -g managesoft` and stopped using `stopsrc -g managesoft`.*

Agent third-party deployment: System Requirements

The following details apply to the full FlexNet inventory agent when deployed to a target device using third-party deployment tools/methods of your own choice.

Supported platforms

The FlexNet inventory agent operates on the following platforms (inventory targets):

Microsoft Windows	UNIX-like platforms
• Windows Server 2016 • Windows Server 2012 R2 SP1 • Windows Server 2012 R2 • Windows Server 2012 • Windows Server 2008 R2 x64 Server Core • Windows Server 2008 R2 x64 • Windows Server 2008 Server Core • Windows Server 2008 x64 Server Core • Windows Server 2008 x64 • Windows Server 2003 R2 • Windows Server 2003 R2 x64 • Windows Server 2003 • Windows Server 2003 x64 • Windows 10 x64 • Window 10 • Windows 8 x64 • Windows 8 • Windows 7 x64 • Windows 7 • Windows Vista x64 • Windows Vista • Windows XP Professional x64 • Windows XP Professional • Windows XP Home	• AIX 5.2, 5.3, 6.1, 7.1, LPARs • CentOS 4, 5, 6, 7 (x86/x86-64 only) • Debian 6, 7 (x86/x86-64 only) • Fedora 6–11, 18-23 (x86/x86-64 only) • HP-UX 11.00, 11i, 11i v2, 11i v3, vPars/nPars • Mac OS X 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12 • Oracle Linux 4.5 – 7.0 (x86/x86-64 only) • Red Hat Enterprise Linux 3 (x86 only), 4, 5, 6, 7 (x86/x86-64 only) • Red Hat Linux 8 and 9 (x86 only) • Solaris 8 (SPARC only) • Solaris 9, 10, 11 (x86/x86-64 and SPARC), Zones for versions 10 & 11 • SuSE Enterprise Server 11, 12 (x86/x86-64 only) • SuSE Professional 12, 13 (x86/x86-64 only) • Ubuntu 12-15 (x86/x86-64 only)

Disk space requirements

The following table gives three disk space figures for installation of FlexNet inventory agent:

- **Package type** gives the kind of installer package provided for each platform, and **Package size** defines the disk space to download or copy the installer for each of the platforms, before installation.
- **Installed** defines the disk space for the binary files after installation. The default locations for installation are:

  - Windows: `%ProgramFiles(x86)%\ManageSoft` (on modern 64-bit systems, this expands to `C:\Program Files (x86)\ManageSoft`)
  - UNIX-like systems: `/opt/managesoft`
- **Workspace** approximates a typical operating space requirement. The precise requirements depends on the self-update installer package size, the number of inventory files awaiting upload, usage tracking, the growth of log files, and the like. The default locations for this requirement are:
  - Windows: `%ProgramData%\ManageSoft Corp` for data; and `%temp%\ManageSoft` for log files. The default values for these on modern operating systems are typically `C:\ProgramData\ManageSoft Corp` and `C:\Windows\Temp\ManageSoft` (for the SYSTEM account running processes as Windows services).
  - UNIX-like systems: `/var/opt/managesoft` for working data, including `/var/opt/managesoft/log` for log files.

Platform	Package type	Package size	Installed	Workspace
AIX	LPP	20 MB	25 MB	100 MB
HP-UX	SD-UX	55 MB	55 MB	150 MB
Linux i386 (Red Hat, Oracle, CentOS, Fedora, SuSE)	RPM	10 MB	20 MB	100 MB
Linux x86_64 (Red Hat, Oracle, CentOS, Fedora, SuSE)	RPM	10 MB	25 MB	100 MB
Mac OS X	Mac Package Bundle	15 MB	35 MB	100 MB
Solaris SPARC	Sys V Package (pkg)	20 MB	20 MB	100 MB
Solaris x86	Sys V Package (pkg)	20 MB	20 MB	100 MB
Windows	MSI	18 MB	37 MB	100 MB

The following log files are available:

- `installation.log` — Log from `ndlaunch`, responsible for downloading and install all packages required for FlexNet inventory agent
- `policy.log` — Generated by the policy download agent, `mgspolicy`
- `schedule.log` — Log from the `ndschedag` schedule agent
- `tracker.log` — Generated by the inventory agent, `ndtrack`
- `uploader.log` — Log from the `ndupload` file upload agent
- `usageagent.log` — Generated by the `mgsusageag` usage tracking service.

Memory requirements

- Minimum RAM: 512 MB
- Recommended RAM: 2 GB

In general, through a cycle of inventory gathering and upload, the memory demand is in the order of 5-30 MB.

Communication protocols and ports

All ports used by FlexNet inventory agent are configurable to any value through preference settings, for example by including the port number in URL settings. The default values for communications supported between the FlexNet inventory agent (in the Agent third-party deployment case) and inventory beacons are:

- File upload and download using HTTP protocol: port 80
- File upload and download using HTTPS protocol: port 443
- FTP file transfers (not supported by FlexNet Beacon on inventory beacons, but may be used in custom infrastructure): port 21
- Windows direct file upload and download (UNC shares) may be used in custom infrastructure, but are not directly supported by FlexNet Beacon
- Additional ports may be required if supporting a proxy.

Supported packages to inventory

FlexNet inventory can include data from most package technologies supported by the operating systems, and some additional third-party packaging technologies:

Platform	Supported package technologies
All platforms	InstallAnywhere (IA), InstallShield Multiplatform (ISMP), BEA/Oracle Installer (BEA), Oracle Universal Installer (OUI), IBM Installation Manager (IIM)
AIX	LPP, RPM
HP-UX	Software Distributor SD-UX Package
Linux	RPM (Red Hat, CentOS, Oracle, SuSE, Fedora, etc), DPKG (Debian, Ubuntu).
Mac OS X	Mac Application Bundle, Mac Package Bundle
Solaris	Sys V Package (pkg), IPS
Windows	MSI, Add/Remove Programs Registry Key

However, FlexNet inventory cannot collect data from some of the less common or newer operating system technologies and many third-party technologies. Some known examples include:

- All platforms — IBM InstallStream, IBM Tivoli Netcool Installer
- Mac OS X — Mac flat package.

System load benchmarks

The following notes reflect observed behavior on sample systems using the full installed FlexNet inventory agent.

Task	Run duration (seconds)	CPU usage (seconds)	CPU usage (% of single core)	Memory usage	Network load
Inventory collection	13 to 240 s	5 to 130 s	10% to 50%	4 MB to 20 MB	10 KB to 200 KB per upload
Usage monitoring	Ongoing	Under 1 s / day	Negligible	4 MB to 8 MB	5 KB to 20 KB / day
Policy update*	15 s to 33 s	Under 1 s per policy	Negligible	3 MB to 5 MB	10 KB to 100 KB per policy update

* For each policy update, FlexNet inventory agent downloads its current policy from its preferred inventory beacon. This links to several packages:

- Failover settings (upload and download locations on all available inventory beacons)
- Client configuration (the preferences for use by all installed components included in the FlexNet inventory agent)
- Schedule
- Inventory settings and extensions (`InventorySettings.xml`)
- Agent self-upgrade package.

Using each package, FlexNet inventory agent checks the last downloaded content against the version currently on the inventory beacon. When there is no change, there is no further download (so that the checking process is both rapid and lightweight for the network). Changed items are downloaded, which may increase the network load for that occasion. The largest single impact is when a new agent update package is declared: for details of the download size per platform for update packages, see the disk space listing above.

Agent third-party deployment: Accounts and Privileges

When you choose to deploy the FlexNet inventory agent using third-party tools under your own management, you handle all the account security required for deployment and installation on target devices. The following comments assume that installation is complete, and address only the account requirements for ongoing operation.

The operational account requirements vary slightly across platforms.

Microsoft Windows

FlexNet inventory agent runs as the local SYSTEM account.

UNIX-like platforms

The FlexNet inventory agent must run as `root` to install and run its services on the local device.

The security settings for subdirectories of `/opt/managesoft`:

- The `lib` and `libexec` folders are completely locked down to root only.
- The `bin` folder is open to all, to allow easy access to the path of the executables in the folder when using privilege escalation tools like `sudo`.
- The executables in the `bin` folder are locked down to root only.
- `documentation` and `software tag` are readable by all.

The `/var/opt/managesoft` directory is only accessible by root.

Agent third-party deployment: Implementation

Preparation and third-party deployment of the FlexNet inventory agent varies across different platforms.

For all platforms, start with Agent third-party deployment: Collecting the Software.

Thereafter branch, based on the operating system running on the target device:

- For deployment to Microsoft Windows, read the subtopics under Agent third-party deployment: Configuring Installation on Microsoft Windows
- For deployment to UNIX-like systems, read the subtopics under Agent third-party deployment: Configuring Installations on UNIX-like Platforms.

Agent third-party deployment: Collecting the Software

You have decided to deploy the FlexNet inventory agent with a third-party tool of your choice. Start with the appropriate version(s) of the FlexNet inventory agent.

The FlexNet inventory agent is supported on a variety of platforms (listed in Agent third-party deployment: System Requirements).

To collect the FlexNet inventory agent software:

1. On the workstation where you plan to configure the package for installing FlexNet inventory agent, use a web browser to log in to the web interface for FlexNet Manager Suite.
2. Navigate to the system menu (▾ in the top right corner) > **Data Inputs**, and select the **Inventory Data** tab.
3. Click **Download inventory agent**.

The **Download inventory agent** page appears.

4. Prepare for editing the bootstrapping file:
   - For target devices running any version of Microsoft Windows: click the hyperlink to **Download bootstrapping template file**, saving the file to a folder of your choice (such as `C:\temp`). This file must be customized for your deployment, minimally to identify the bootstrap inventory beacon with which FlexNet inventory agent will first communicate (details are forthcoming in Agent third-party deployment: Edit the Configuration File for Microsoft Windows).
   - For target devices running UNIX-like systems: there is no equivalent download of a sample file, but full details for constructing your own are included in Agent third-party deployment: Configure the Bootstrap File for UNIX. No immediate action on the bootstrapping file is needed now.
5. From the **Inventory agent** drop-down list, select the (first) version of the FlexNet inventory agent you want to deploy.

   Be sure to scroll down, as the most recent releases are at the bottom of the drop-down list. You may choose whichever recent version is approved for use in your enterprise. In general, it is recommended to deploy the latest version.

   The same software is known by different (historical) names on different platforms (a managed device is one which has the FlexNet inventory agent locally installed). In the current release, you can select from the following supported platforms:

   - FlexNet Inventory Agent, which is for Windows platforms

     Tip: *In earlier releases, the FlexNet inventory agent was known as ManageSoft for Managed Devices.*
   - ManageSoft for AIX Managed Devices
   - ManageSoft for HP-UX Managed Devices
   - ManageSoft for Linux (i386) Managed Devices
   - ManageSoft for Linux (x86_64) Managed Devices
   - ManageSoft for Mac OS X Managed Devices
   - ManageSoft for Solaris (sparc) Managed Devices
   - ManageSoft for Solaris (x86) Managed Devices.
6. Click **Download**, and save the archive to a folder of your choice.
7. If necessary, repeat the download of any additional versions that you choose to configure and deploy.

Agent third-party deployment: Configuring Installation on Microsoft Windows

Broadly, there are two ways to configure the installation of the FlexNet inventory agent for Microsoft Windows:

- You can edit the Windows Installer command line to add transforms or specify that particular components should or should not be installed. For more details, see Agent third-party deployment: Customizing the Windows Installer Command Line.
- You can set preferences in the bootstrap configuration file, as described in Agent third-party deployment: Edit the Configuration File for Microsoft Windows.

If you are using alternative deployment methods but then wanting the managed device to fit neatly into the standard operating procedure of FlexNet Manager Suite, there is nothing more to do after those steps. In contrast, if you are customizing the installation or behavior of the FlexNet inventory agent, you could also review Agent third-party deployment: Protecting Your Customizations in case you want to prevent your customizations being over-written by the system-wide standard policy. When you are satisfied with both forms of configuration/customization and your protection settings, you can use your preferred deployment tool to distribute the completed packages for installation on target devices.

Agent third-party deployment: Edit the Configuration File for Microsoft Windows

Initial implementation of the FlexNet inventory agent is controlled by its bootstrapping configuration file.

In Agent third-party deployment: Collecting the Software, you downloaded the template for the bootstrap configuration file (`mgssetup.ini`) for use on Microsoft Windows platforms. This file can contain many legacy settings, especially for those interested in customizing the behavior of the FlexNet inventory agent. For example, the latter part of the file allows for individual preferences to be set that will automatically be written to the registry of the managed device during the installation process (some of these are documented in the chapter on Preferences for the advanced administrator).

However, for a straightforward deployment and installation, there are only two significant specifications required:

- Identifying the inventory beacon that the FlexNet inventory agents should contact after installation, to collect their policy (which includes rules to apply, schedules, and the like) — this much is mandatory
- Configure whether or not these managed devices should monitor application usage (by default they do not).

Some sections of the bootstrap file are historical, and should not be modified (as noted below).

To modify the `mgssetup.ini` configuration file:

1. Open a copy of `mgssetup.ini` in a flat text editor of your choice.

   As you may need several versions of your custom bootstrap files, it is best practice to save a backup copy of the original, unedited file. In deployment, the file name must not be changed. It is therefore good practice to save each customized copy in its own directory. Also beware of editors which may insert special (non-ASCII) characters in the file.

   Note: *Lines starting with a semi-colon character (;) are comments and have no effect. 'Uncommenting' a line means to remove the semi-colon from the start of the line.*

2. To customize the installation directory for the FlexNet inventory agent, locate the lines (around line 42) that give the default path, and modify the value (such as in this example to switch to E: drive):

```
; Set product installation directory.
TMPMAINDIR = E:\Program Files (x86)\Flexera Software\Agent
```

3. To cause the installed FlexNet inventory agent to immediately seek its policy and commence normal operation, ensure that the following line is *not* commented out:

```
INSTALLMACHINEPOLICY = 1
```

Tip:

- *Without this preference (either in the `mgssetup.ini` file or added to the installation command line), a successful installation ends with the FlexNet inventory agent in place but doing nothing, awaiting delivery of a policy by some third-party means.*
- *In contrast, when this preference is correctly set as above, after installation the FlexNet inventory agent immediately attempts to contact its inventory beacon (specified in the following preference) to collect its policy; and if successful, to commence operations in line with the policy settings.*

(If your `mgssetup.ini` file still contains mention of a user policy, ensure that this preference remains commented out, as user-based policy is no longer supported.)

4. To specify the inventory beacon from which this managed device should collect its policy, locate the following, and uncomment and customize the second line, following the guidelines below:

```
[Custom Install Settings]
DEPLOYSERVERURL = http://beacon.server.com/ManageSoftDL
```

Tip: *The legacy naming is because an inventory beacon is derived from an earlier form of deployment server, and still deploys policy and agent updates to its managed devices.*

- The trailing `ManageSoftDL` is mandatory, and identifies the web share on the inventory beacon which must be accessible to managed devices (check permissions).
- The value must be a URL (a UNC value of the form `\\servername\ManageSoftDL$` will not work). The URL may have either of the following protocols:
  - `http://`
  - `https://`
- The URL must be no longer than 80 characters.

Important: *If this value is not set correctly, devices will not be managed and will require a software re-install.*

Remember that the `INSTALLMACHINEPOLICY` preference must be true (see previous step).

If the details are specified correctly but the policy was not initially available (perhaps because of network issues, or because the inventory beacon was unavailable when the FlexNet inventory agent attempted to connect, or because policy had not yet been prepared and distributed from the central application server), FlexNet inventory agent retries policy collection at each reboot of the managed device until

successful. (This behavior is different than for the FlexNet inventory agent on UNIX-like systems, where it makes a daily attempt to download policy at a random time each day.)

5. To switch the default behavior for application usage tracking by the FlexNet inventory agent from disabled to enabled, locate and uncomment the following line:

```
[Usage Agent]
USAGEAGENT_DISABLE = False
```

Background: Application usage tracking (sometimes called "application metering") by the FlexNet inventory agent is disabled by default. When enabled, it works by tracking the time during which installed files are opened and active on the targeted devices, where those installed files are known to be part of a particular installed application. This usage data is uploaded to the central application server, where the usage tracking calculations occur at each license reconciliation (whether or not usage data is available from any particular inventory source). The `USAGEAGENT_DISABLE` setting from the `mgssetup.ini` file is written to the registry on all adopted devices in *`[Registry]`*`\ManageSoft\Usage Agent\CurrentVersion\Disabled`, with the default being `True` (so that usage tracking in inventory is disabled). Independently, you can also control the same usage tracking preference through the web interface, in the target settings for any discovery and inventory rule (navigate to **Discovery & Inventory > Discovery and Inventory Rules > Targets** tab, and scroll down to the **Application usage options** section). This means that a good practice is to adopt devices with usage tracking defaulting to disabled, and then selectively turn it on for your desired targets.

For most situations, you have finished configuring this file. Skip the advanced steps, and see the notes at the end.

6. ADVANCED USE ONLY: Optionally, insert any preferences for the operation of the FlexNet inventory agent in the later sections of the `mgssetup.ini` file that allow storing the preferences in the Windows registry.

For example, if you wanted to modify the current default values (shown here as an example) for the fail-over algorithms that determine how the FlexNet inventory agent attempts to prioritize inventory beacons when choosing which one to access, edit the following section, changing to your own preferences:

```
; Registry settings to be created under
  ; HKLM\Software\ManageSoft Corp\ManageSoft\NetSelector
  [NetSelector]
  desc0 = SelectorAlgorithm
  val0  = MgsRandom;MgsPing;MgsADSiteMatch
```

More more information about the available preferences, see Preferences.

Note: *Other settings in the `mgssetup.ini` file should typically be left unchanged. They may be edited for advance, legacy, or other unusual configuration scenarios. If you need such changes, follow the guidance provided within the template file itself.*

7. Save the customized copy of `mgssetup.ini` in the same folder as the FlexNet Inventory Agent zip archive downloaded in Agent third-party deployment: Collecting the Software.

(If you are preparing distinct customizations for different parts of your computing estate, use folder naming to separate and distinguish the different copies of `mgssetup.ini`. Do not rename the `mgssetup.ini` file.)

Tip: *For another advanced preference, see Agent third-party deployment: Uninstalling from Windows Platforms.*

The following legacy sections of the configuration file should not be edited, and should be left commented out:

- `;BOOTSTRAPPEDPOLICY`
- `;WAITFORPOLICY`
- `;IGNOREPOLICYFAILURE`.

Agent third-party deployment: Customizing the Windows Installer Command Line

You can customize the Windows Installer in the usual ways.

The two paths for configuring your installation of the FlexNet inventory agent are:

- Configuring the `mgssetup.ini` file (for which see Agent third-party deployment: Edit the Configuration File for Microsoft Windows)
- Modifying the MSI installation, covered in this topic. This entire process is optional, for advanced use by those who have transforms planned.

You downloaded the installer archive in Agent third-party deployment: Collecting the Software, saving it to a convenient directory. Return to that location now.

To customize the Windows Installer command line:

1. Unzip the downloaded archive (named like `managesoft-MM.N.B.zip`, where the placeholders represent release numbering).

   The MSI file for the FlexNet inventory agent is called `FlexNet Inventory Agent.msi`. You can customize the installation, for example, by installing or preventing installation of particular components, or by applying transforms. To do this, you can edit the Windows Installer command line, stored in the `Setup.ini` file that is in the same folder as the MSI. (Alternatively, you may prefer to run the Windows Installer from the command line.)

2. In the unzipped archive, open `Setup.ini` in the flat text editor of your choice.

3. Locate the following section, and amend the command line as required:

   ```
   [Startup]
   CmdLine=/l*v "%TEMP%\FlexNet Inventory Agent.msi.log"
   ```

   For example:

   - To apply a transform, append `TRANSFORMS="custom.mst"` to the end of the command line. Use semicolons (`;`) to separate multiple transforms. For example, to apply `custom1.mst` and `custom2.mst` for both initial installs and upgrades, the addition would look like: `TRANSFORMS="custom1.mst;custom2.mst"`

- Add or remove any other Windows Installer command line options.
  For example, to prevent installation of the application usage agent on computers being brought under management, add `REMOVE=aua` to the end of the `CmdLine`:

```
[Startup]
CmdLine=/l*v "%TEMP%\FlexNet Inventory Agent.msi.log" REMOVE=aua
```

4. Save the modified `Setup.ini` file.

When you have completed modifications to the configuration file and to the command line of the installer, you can use your preferred deployment tool(s) to pack, validate, and deploy the installation package. See the following deployment notes.

Agent third-party deployment: Deployment Notes for Windows Platforms

You have finished editing the bootstrap configuration file (`mgssetup.ini`) and, if necessary customized the MSI command line stored in `Setup.ini`. These files may now be handed off, together with `FlexNet Inventory Agent.msi` and the associated `Data1.cab` file, for packaging and deployment. The following notes about the installation may be helpful to the packaging team.

1. The `mgssetup.ini` bootstrap configuration file must be placed in the same folder as the `FlexNet Inventory Agent.msi` file before executing the install command.
2. In this location, the `mgssetup.ini` file must be readable by both the SYSTEM and installing user at installation time. This means that the MSI package cannot be installed from a mapped drive (which would only be visible to the installing user), or a file share which is not visible to both user accounts.
3. As usual, the installing account needs administrator privileges to complete the installation.
4. If you are using Microsoft Installer and providing a command line, you may conveniently modify the installation directory like this (all in one line):

```
msiexec  /i “FlexNet Inventory Agent.msi”
     INSTALLDIR=”E:\Program Files (x86)\Flexera Software\Agent” /qb
```

   If you are not preparing your own command line, see Agent third-party deployment: Edit the Configuration File for Microsoft Windows for another method of changing the installation directory.
5. For operation, the FlexNet inventory agent services must be configured to run as the Local System account.
6. Once the FlexNet inventory agent has been successfully deployed and is reporting inventory, it is visible in the **Discovery & Inventory > All Discovered Devices** page.

Tip: *The **Agent installed** column on that page is populated only for the Adopted case, through the automated processes where an inventory beacon installed the standard FlexNet deployment package. Since you chose to use alternate deployment methods using your own package, this column does not change state to show when the FlexNet inventory agent is deployed.*

Agent third-party deployment: Uninstalling from Windows Platforms

If you decide to remove the FlexNet inventory agent from a system running Microsoft Windows, you have two basic approaches:

- Use the deployment tool with which you completed the original installation to now remove it.
- Manually navigate to Add/Remove Programs (or equivalent) in Microsoft Windows and uninstall FlexNet inventory agent.

Tip: *This standard Windows facility means that, depending on privileges in your environment, users of managed devices can remove FlexNet inventory agent. If you wish to prevent users on these target devices from using Windows Add/Remove Programs to uninstall the FlexNet inventory agent, uncomment this line in* `mgssetup.ini` *before deployment:*

```
   [Custom Install Settings]
ALLOWUNINSTALL = 0
```

Of course, this reduces your options for uninstallation, and you must then use your deployment tool to do any planned removal.

Uninstallation removes the executables, but leaves behind the folders `%ProgramFiles%\ManageSoft\Launcher\Cache`, and its peer `PkgCache`, since these may contain content that a future re-install of the FlexNet inventory agent can use. (On 64-bit platforms, substitute `%ProgramFiles(x86)%.`)

Agent third-party deployment: Configuring Installations on UNIX-like Platforms

This section includes information on preparing and deploying your bootstrap configuration file, and installing the FlexNet inventory agent on UNIX-like platforms.

Agent third-party deployment: Configure the Bootstrap File for UNIX

The initial configuration of the FlexNet inventory agent can be set for UNIX-like platforms, even though no template file is provided.

For UNIX and OS X, there is no sample bootstrap configuration file available through the central application server. Instead, you can prepare your customized bootstrap configuration file as follows:

To prepare a `mgsft_rollout_response` ***file:***

1. Copy the sample text from Agent third-party deployment: Sample UNIX Bootstrap Configuration File into your preferred flat-text editor.
2. Locate and edit the following line to identify the inventory beacon from which the new managed device should download its initial policy:

```
MGSFT_BOOTSTRAP_DOWNLOAD=http://beacon.mydomain.com:8080/ManageSoftDL/
```

- For comparison, in the automated adoption process (the Adopted case, where the inventory beacon installs FlexNet inventory agent by remote execution), it is *mandatory* to use the HTTP protocol. Because you are independently managing your own deployment, it's also normal to use the HTTP protocol for bootstrapping, because it is simpler to set up and get operational. However, if you require the HTTPS protocol for your own deployment, insert it in this value.
- Replace the placeholder *beacon.mydomain.com* with the fully qualified domain name of the inventory beacon. If required, and provided that you are using the HTTP protocol, you may instead use the server's IP address. (There are widely publicized issues around using an IP address with the HTTPS protocol.)
- If you are using the default port (80 for HTTP, and 443 for HTTPS), you can omit the port number. For any custom port numbers, include the port number in the URL as shown (`:8080`).
- The string literal `ManageSoftDL` is the name of the web service that handles downloads to managed devices. This value is mandatory.

3. Following those same guidelines, edit the following value for the upload location on the same inventory beacon.

```
MGSFT_BOOTSTRAP_UPLOAD=http://beacon.mydomain.com:8080/ManageSoftRL/
```

To bootstrap the UNIX agents, both the download and upload locations must be specified. (This is not the case for the agents on Windows, where only the download location is required.) Notice that `ManageSoftRL` is the name of a web service on the inventory beacon that receives the uploaded inventory and saves it by default to *%CommonAppData%*`\Flexera Software\Incoming\Inventories`.

Tip: *The section about proxies in the bootstrap file is only required in the unusual circumstances that you have a proxy between the managed device(s) and the inventory beacon(s) (in which case follow the guidance in the template). When this is not the case, leave these settings commented out.*

4. Optionally, configure the local web server on inventory beacons to use HTTPS protocol.

The web server on the inventory beacon defaults to using the HTTP protocol for simplicity of communications between managed devices and the inventory beacon. However, if you need to use the HTTPS protocol over this leg of the upload/download chain, you may also need to configure how the managed devices should check the security certificates originating from the inventory beacon server. The choice of protocol, along with the configuration for certificate checking if HTTPS is used, are downloaded to managed devices as part of their policy (policy is generated automatically by the inventory beacons). From large to small granularity, the available certificate controls that can be configured in the `mgsft_rollout_response` file include:

- Whether to check the security certificates at all.
- If checking the supplied certificate, whether to check that the certificate is still current (that is, checking that the certificate has not been revoked by a certificate authority). The default is to validate that the certificate has not been revoked and is still current. This is particularly important when using certificates from public certificate authorities on the Internet. Perhaps if you are providing your own

internal certificate authority and long-term certificates, you may turn off the check for revocation of certificates.

- Choosing between, and prioritizing, the two methods for checking certificate revocation.
- Creating caches where downloaded revocation responses can be saved for a limited time.
- Setting cache time-out values for each method used.

Tip: *If you are checking server certificates, you must deploy a copy of the appropriate certificate to each managed device. This allows the managed device to check the supplied certificate that covers each download from the inventory beacon server. This is described in Agent third-party deployment: Installing FlexNet inventory agent on UNIX, and there is more information in Agent third-party deployment: Enabling the HTTPS Protocol on UNIX Agents and Agent third-party deployment: HTTPS CA Certificate File Format (UNIX).*

Settings declared in the `mgsft_rollout_response` affect all components of the FlexNet inventory agent equally. It is also possible to override behaviors for individual components. For details see the preference topics included in the following list. To modify the defaults for certificate checking, use the following settings (in the order corresponding to the above descriptions):

a. Server certificates are checked by default. Uncomment and edit the following line to prevent any certificate checking:

```
MGSFT_HTTPS_CHECKSERVERCERTIFICATE=false
```

With this setting false, you get the standard encryption of network traffic between managed device and inventory beacon, but no further security. (After installation of the FlexNet inventory agent, this setting appears as `CheckServerCertificate` in the `/var/opt/managesoft/etc/config.ini` file, in the `[ManageSoft\Common]` section. See CheckServerCertificate for more.)

b. Optionally when you are using internal certificate authorities, you may uncomment and edit the following line to prevent a check for revocation of certificates:

```
MGSFT_HTTPS_CHECKCERTIFICATEREVOCATION=false
```

With this setting false, you get a check that the download is coming from the genuine inventory beacon; but there is no check whether the inventory beacon may have been compromised and its certificate subsequently revoked. (After installation of the FlexNet inventory agent, this setting appears as `CheckCertificateRevocation` in the `/var/opt/managesoft/etc/config.ini` file, in the `[ManageSoft\Common]` section. See CheckCertificateRevocation for more.)

c. Optionally, modify the method(s) that the FlexNet inventory agent uses to check whether a downloaded server certificate has been revoked by a certificate authority. Uncomment and edit this line:

```
MGSFT_HTTPS_PRIORITIZEREVOCATIONCHECKS=OCSP,CRL
```

With this default setting, the FlexNet inventory agent first tries for an efficient OCSP response about the single certificate. If this fails, it next tries to download a Certificate Revocation List (CRL) from the certificate authority; but as this file lists every revoked certificate, can be a large file that is time-consuming to fetch. Reverse the order (`CRL,OCSP`) to change the priorities around; or omit

one or the other (and the comma) to turn off that kind of revocation checking. (After installation of the FlexNet inventory agent, this setting appears as `PrioritizeRevocationChecks` in the `/var/opt/managesoft/etc/config.ini` file, in the `[ManageSoft\Common]` section. See PrioritizeRevocationChecks for more.)

d. Optionally, change the settings for each cache you may use by uncommenting and editing the appropriate lines from the following pair:

```
MGSFT_HTTPS_SSLCRLCACHELIFETIME=64800
MGSFT_HTTPS_SSLOCSPCACHELIFETIME=64800
```

After installation of the FlexNet inventory agent, these settings also appears in the `/var/opt/managesoft/etc/config.ini` file, in the `[ManageSoft\Common]` section. For more information about these settings, see:

- SSLCRLCacheLifetime
- SSLOCSPCacheLifetime.

5. If you are planning to deploy the FlexNet inventory agent to a custom location on the AIX operating system, and you want to use a custom folder for data exchange by the various components, append the following line to your file:

```
COMMONAPPDATAFOLDER=/absolute/path/and/folder
```

The path should *not* contain white space characters. Use an absolute path in its simplest canonical form, without relative path elements. For example, to use the folder `/var/lib/flexera` as the data directory accessed by all components of the FlexNet inventory agent, include this line in your `mgsft_rollout_response` file:

```
COMMONAPPDATAFOLDER=/var/lib/flexera
```

Unlike the installation path, the data path is created by the installer if it does not already exist. If you omit this option from the `mgsft_rollout_response` file for a new installation, the default (`/var/opt/managesoft`) is used for the data folder. This setting is required only on the AIX platform, and only when you require a custom data folder. The setting is ignored for all other platforms.

6. If you prefer that UNIX-like devices report themselves as present in a Windows domain (which may help resolve inventories from multiple sources, as well as providing consistent data presentation in the web interface of FlexNet Manager Suite), you can set the domain name by adding lines like the following to your file:

```
# Dummy domain name for reporting by UNIX-like devices
MGSFT_DOMAIN_NAME=mydomain.com
```

Replace the *`mydomain.com`* placeholder with the domain name to use for reporting. (After deployment, this value is stored in the `ComputerDomain` preference, saved for UNIX-like devices in the `/var/opt/managesoft/etc/config.ini` file. For details, see ComputerDomain.)

7. Save the file as `mgsft_rollout_response`.

Tip: *Leave `MGSFT_RUNPOLICY=1` unchanged, so that downloaded policy is applied after installation. For as long as policy is not available for any reason, on UNIX and OS X the agents run a daily check for policy at a random time between 8am and 11pm (local time on the managed device) until policy is successfully downloaded. (This catch-up behavior is different than the Windows agents, which rely on a machine reboot to check again for missing policy.) Once policy (with schedule) is initially downloaded, it is updated daily on the downloaded schedule, refreshing client settings, inventory-gathering schedule, and the like.*

8. Configure your preferred deployment technology to install a copy of this file as `/var/tmp/mgsft_rollout_response` on the target device(s).

   The path and file name are mandatory. This file must be present before FlexNet inventory agent is installed. Post installation scripts in the installation package for FlexNet inventory agent use properties from this file to create the initial configuration.

Tip: *In preparing the Windows bootstrap file (`mgssetup.ini`), you could turn application usage tracking on for the managed devices using the bootstrap file. This is not possible in the bootstrap file for UNIX-like systems. To turn on usage tracking, the simplest path is to set usage tracking as part of defining targets (in the web interface of FlexNet Manager Suite), so that managed devices receive this setting as part of their downloaded policy. Manually editing `config.ini` for UNIX-like platforms is also possible (see Agent third-party deployment: Updating config.ini on a UNIX Device), but this approach is not as easy to scale.*

Agent third-party deployment: Sample UNIX Bootstrap Configuration File

```
       # The initial download location(s) for the installation.
       # For example, http://myhost.mydomain.com/ManageSoftDL/
       # Refer to the documentation for further details.
       MGSFT_BOOTSTRAP_DOWNLOAD=http://beacon.mydomain.com:8080/ManageSoftDL/

       # The initial reporting location(s) for the installation.
       # For example, http://myhost.mydomain.com/ManageSoftRL/
       # Refer to the documentation for further details.
       MGSFT_BOOTSTRAP_UPLOAD=http://beacon.mydomain.com:8080/ManageSoftRL/

       # The initial proxy configuration.  Uncomment these to enable proxy
configuration.
       # Note that setting values of NONE disables this feature.
       # MGSFT_HTTP_PROXY=http://webproxy.local:3128
       # MGSFT_HTTPS_PROXY=https://webproxy.local:3129
       # MGSFT_PROXY=socks:socks.socksproxy.local:19121,direct
       # MGSFT_NO_PROXY=internal1.local,internal2.local

       # Check the HTTPS server certificate's existence, name, validity period,
       # and issuance by a trusted certificate authority (CA).  This is enabled
       # by default and can be disabled with false.
       # MGSFT_HTTPS_CHECKSERVERCERTIFICATE=true
```

```
       # Check that the HTTPS server certificate has not been revoked. This is
       # enabled by default and can be disabled with false.
       # MGSFT_HTTPS_CHECKCERTIFICATEREVOCATION=true

       # Prioritize the method of checking for revocation of the HTTPS server
       # certificate. You can reverse the values to swap the default order.
       # MGSFT_HTTPS_PRIORITIZEREVOCATIONCHECKS=OCSP,CRL

       # These settings control the caching of HTTPS server certificate checking.
       # Default values are shown (these take effect when no settings are
specified).
       # Lifetime is in seconds. There are parallel settings for using CRL or OCSP
       # checking. See documentation for more information.
       # MGSFT_HTTPS_SSLCRLCACHELIFETIME=64800
       # MGSFT_HTTPS_SSLOCSPCACHELIFETIME=64800

       # The run policy flag determines if policy will run after installation.
       #    "1" or "Yes" will run policy after install
       #    "0" or "No" will not run policy
       MGSFT_RUNPOLICY=1
```

Agent third-party deployment: Installing FlexNet inventory agent on UNIX

You downloaded the installers of interest in Agent third-party deployment: Collecting the Software. You have also customized your bootstrap configuration file (or potentially multiple variants for different platforms and contexts) in Agent third-party deployment: Configure the Bootstrap File for UNIX.

Note: *For some UNIX-like platforms, you can customize the command line to install the FlexNet inventory agent in the folder of your choice. Because FlexNet Manager Suite uses the native installation technology on each platform, this introduces some diversity into the installation process, as described below. As well, notice the following points:*

1. *If you previously had the FlexNet inventory agent installed in the default location, and now wish to switch to a custom installation path, first uninstall the old agent.*
2. *With a customized installation path, in-place self-upgrade of the FlexNet inventory agent is not supported (because, if you allow self-upgrade to occur as part of policy, on most platforms the new version of FlexNet inventory agent installs itself in the default location, rather than in your custom location). This means that if you use third-party deployment to a custom location, you are also committing to update the FlexNet inventory agent in that location using your chosen third-party technology.*
3. *If you previously turned on self-upgrade of the FlexNet inventory agent (and are now switching to a custom installation path), you should also use the following command on your administration server to restore the default (no self-upgrade):*

```
installation-folder\DotNet\bin\ConfigureSystem.exe clear-agent-upgrades
```

Currently, a custom installation folder is supported for the following platforms:

- *AIX version 5.3 or later, where the custom path is called a User Specified Installation Location (USIL)*
- *Linux x86 (RPM)*
- *Linux x86_64 (RPM)*
- *Solaris SPARC*
- *Solaris x86.*

To deploy FlexNet inventory agent to UNIX-like platforms:

1. Configure your deployment/installation tool to deliver the bootstrap configuration file to `/var/tmp/mgsft_rollout_response`.

   This file must be in place on the device before you run the installer for FlexNet inventory agent.

   Tip: *If you are installing to a custom location (USIL) on the AIX operating system, remember to include the `COMMONAPPDATAFOLDER` option (for details, see Agent third-party deployment: Configure the Bootstrap File for UNIX).*

2. If the target computer device is to use the HTTPS protocol to communicate with an inventory beacon, and you require certificate checking to validate that the device is talking to the correct inventory beacon (for details, see Agent third-party deployment: Enabling the HTTPS Protocol on UNIX Agents):

   a. Prepare a summary HTTPS CA certificate for the target device(s) (see notes in Agent third-party deployment: HTTPS CA Certificate File Format (UNIX))

   b. Configure your deployment/installation tool to deliver the certificate file as `/var/tmp/mgsft_rollout_cert` on the target device.

      This file must be in place on the device before you run the installer for FlexNet inventory agent. During installation, the `/var/tmp/mgsft_rollout_cert` file is copied to `/var/opt/managesoft/etc/ssl/cert.pem`.

      Tip: *If you do not complete this as part of the deployment and installation process, after installation you can simply copy the completed certificate to `/var/opt/managesoft/etc/ssl/cert.pem` on a device where FlexNet inventory agent is locally installed.*

3. For Solaris platforms where you want a silent installation without user interaction, prepare a flat text `admin` file with the following content to include in your deployment package:

```
mail=
instance=overwrite
partial=nocheck
runlevel=nocheck
idepend=nocheck
rdepend=nocheck
space=quit
setuid=nocheck
conflict=nocheck
```

```
action=nocheck
basedir=default
```

Tip: *If you are planning a custom installation folder for your Solaris implementation, do not alter the value for* `basedir` *in this file. Keep the line* `basedir=default` *unchanged, and see the next step.*

4. If you intend to install FlexNet inventory agent in a custom location on a Solaris platform, prepare a separate package response file (such as `/var/tmp/flexera_package_response`) with the following content (noting that the variable names are case sensitive and *must* be supplied in all upper case, as shown):

```
INSTALLDIR=/install/Path
COMMONAPPDATAFOLDER=/data/Path
```

Important: *These paths must not contain white space characters. These will cause the installation to fail. Use absolute paths in their simplest canonical form, without relative path elements.*

Tip: *You may customize either or both of these paths. Omit either one for which you want to use the default path (*`/opt/managesoft` *and* `/var/opt/managesoft` *respectively).*

This file is to be included in your deployment package, and must be in place in your chosen path before the installation command line is issued.

5. Prepare the installation tool command line appropriately for each target platform.

   There are different command lines for different UNIX platforms. The following examples all assume that you execute the command line in the directory containing the installation package. For HP-UX alone, it is *mandatory* to include a fully-qualified path to the package. On other platforms, if the installation package is not in the current directory, add a value for *`[PACKAGE PATH]`* in the respective command.

   Installations on UNIX-like platforms require `root` privileges. Configure your deployment and installation technology to execute the following commands on the appropriate platforms (substituting *`[VERSION]`* and *`[PACKAGE PATH]`* with appropriate values):

Platform	Installation command line
AIX	For the default installation path: `installp -aYX -d managesoft.[VERSION].bff managesoft.rte` **Tip:** *You may use a custom data folder in conjunction with the default installation path. For more information, see Agent third-party deployment: Configure the Bootstrap File for UNIX.* For a custom installation path (on a single line): `/usr/sbin/installp -R /new/install/path -aYX -d managesoft.version.number.bff managesoft.rte` where • */new/install/path* (the User Specified Installation Location) is the base for your installation path (the path is automatically extended with `/opt/managesoft` appended to the base you provide). **Important:** *The base path must exist on the target system before issuing the installation command line.* • *version.number* is the multi-part version numbering for the current installation package. The `-R` option creates and maintains a User Specified Installation Location (USIL) with its own package database. This has the following consequences: • You must use the same `-R` option for all management of the package, including upgrade of the agent with `installp`, removal of the agent with `installp`, listing the installed agent with `lslpp`, and verification of the package with `lppchk`. • If you are upgrading a previous installation in the default (or any other) path, and now wish to deploy to a new custom folder, first uninstall the previous installation of the FlexNet inventory agent. As an example command line, to install version 12.1 of the FlexNet inventory agent into `/u/software/opt/managesoft`, use: `/usr/sbin/installp -R /u/software -aYX -d managesoft.12.1.0.0.bff managesoft.rte`

Platform	Installation command line
	 ***Tip:*** *For future upgrades, be sure to supply the same custom installation path or USIL (with the same* `-R` *option) using your third-party deployment tool. You can always check your custom installation path values as follows:* `cat /etc/managesoft.ini` *As well as its installation path, the upgraded FlexNet inventory agent requires a data storage folder. The* `COMMONAPPDATAFOLDER` *value used for the most recent custom installation is also saved in the same* `.ini` *file. For a future upgrade using the same locations for executables and data, if the* `mgsft_rollout_response` *file is missing, the installer can use the data folder value from* `/etc/managesoft.ini`*. (Therefore at upgrade time, ensure that either a* `mgsft_rollout_response` *file or* `/etc/managesoft.ini` *is available, to prevent the upgraded configuration being lost.)*
Debian/Ubuntu Linux x86	`dpkg --install managesoft_[VERSION]_i386.deb`
Debian/Ubuntu Linux x86_64	`dpkg --install managesoft_[VERSION]_amd64.deb`
HP-UX	`swinstall -v -x mount_all_filesystems=false -x allow_downdate=true` `-s [PACKAGE PATH]/managesoft-[VERSION].depot managesoft`

Platform	Installation command line
Linux x86 (RPM)	For the default installation path: `rpm --upgrade --oldpackage --verbose managesoft-[VERSION]-1.i386.rpm` For a custom installation path (on a single line): `rpm --upgrade --oldpackage --verbose --relocate /opt/managesoft=/new/install/path --relocate /var/opt/managesoft=/new/data/path managesoft-[VERSION]-1.i386.rpm` ***Tip:*** *The default values to be replaced are case sensitive and must be supplied exactly as shown. The new paths must not contain any white space characters. Use absolute paths in their simplest canonical form, without relative path elements.* If you omit either `--relocate` option, the corresponding default value is used for the installation. ***Tip:*** *For future upgrades, be sure to supply the same custom installation path using your third-party deployment tool. You can always check your custom installation path values as follows:* `cat /etc/managesoft.ini`

Platform	Installation command line
Linux x86_64 (RPM)	For the default installation path: `rpm --upgrade --oldpackage --verbose managesoft-[VERSION]-1.x86_64.rpm` For a custom installation path (on a single line): `rpm --upgrade --oldpackage --verbose --relocate /opt/managesoft=/new/install/path --relocate /var/opt/managesoft=/new/data/path managesoft-[VERSION]-1.x86_64.rpm` ***Tip:*** *The default values to be replaced are case sensitive and must be supplied exactly as shown. The new paths must not contain any white space characters. Use absolute paths in their simplest canonical form, without relative path elements.* If you omit either `--relocate` option, the corresponding default value is used for the installation. ***Tip:*** *For upgrades, be sure to supply the same custom installation path using your third-party deployment tool. You can always check your custom installation path values as follows:* `cat /etc/managesoft.ini`
Mac OS X	`installer -verbose -pkg ManageSoft.pkg -target /` ***Tip:*** *The `dmg` disk image includes appropriate permissions. If you copy the installation package directly (or create a zip archive), you may first need to restore the execute permissions on shell script files with the following command:* `chmod 755 ManageSoft.pkg/Contents/Resources/*` ***Note:*** *If you are running antivirus software, ensure that FlexNet Manager Suite is white-listed in your antivirus settings so that the installation is not blocked.*

Platform	Installation command line
Solaris SPARC	For the default installation path: `pkgadd -n -a admin -r /dev/null -d managesoft-[VERSION].sparc.pkg ManageSoft` **Tip:** *If you saved your `admin` file under a different name, modify the command line appropriately.* For a custom installation path: `pkgadd -n -a adminFile -r responseFile -d packageFile ManageSoft` For example (all on one line): `/usr/sbin/pkgadd -n -a admin -r /var/tmp/flexera_package_response -d managesoft-12.1.0.x86.pkg ManageSoft` **Tip:** *For upgrades, be sure to supply the same custom installation path using your third-party deployment tool. You can always check your custom installation path values as follows:* `cat /etc/managesoft.ini`
Solaris x86	For the default installation path: `pkgadd -n -a admin -r /dev/null -d managesoft-[VERSION].x86.pkg ManageSoft` For a custom installation path, use the command line shown above for Solaris SPARC.

6. You can now hand off these materials (the configured installer, the bootstrap configuration file, the optional HTTPS CA certificate, and for Solaris the `admin` file and optional package response file) to the people responsible for packaging and deployment to the target devices.

Tip: *If you are manually completing a single installation on an UNIX-like device, remember to have the bootstrap configuration file and the HTTPS CA certificate in place first, and then run the installer with your prepared command line.*

After installation (assuming the standard setting of `MGSFT_RUNPOLICY=1`), FlexNet inventory agent attempts to connect with the inventory beacon. You may need to protect your customization, for which see the notes in Agent third-party deployment: Protecting Your Customizations.

Agent third-party deployment: Enabling the HTTPS Protocol on UNIX Agents

The FlexNet inventory agent (or more precisely, its component executables) may make use of the HTTPS protocol for communications with inventory beacons. Whereas Windows systems can manage the security certificates for you, on UNIX and OS X some manual configuration is required.

Note: *The HTTPS protocol is only available to the installed agents, and is not available to the zero-touch FlexNet Inventory Scanner.*

There are three security levels which can be enabled for HTTPS, using two preference settings. From the highest level of security to the lowest, these are as follows.

Checking certificate(s) and excluding revoked certificates

Full checking of each HTTPS server certificate involves having a local copy on the managed device of all the public certificates from each certificate authority (CA) that are used to validate the HTTPS server certificates. These certificates must be available in the `/var/opt/managesoft/etc/ssl/cert.pem` file on the managed device (or an alternative folder — see Agent third-party deployment: HTTPS CA Certificate File Format (UNIX) for more details). The device must also be able to download the certificate revocation list from an HTTP location, and/or perform an OCSP check for certificate revocation. For this level of security, both the `CheckServerCertificate` and `CheckCertificateRevocation` settings should be set to `True` (these are the default settings). When these are both true, a number of other settings can come into play, a few of which can be configured in the `mgsft_rollout_response` file that assists with deployment (see Agent third-party deployment: Configure the Bootstrap File for UNIX), and others must be modified in the `/var/opt/managesoft/etc/config.ini` file that functions in place of the Windows registry for UNIX-like platforms (see Agent third-party deployment: Updating config.ini on a UNIX Device). The additional preferences are:

- PrioritizeRevocationChecks
- SSLCACertificateFile
- SSLCACertificatePath
- SSLCRLCacheLifetime
- SSLCRLPath
- SSLDirectory
- SSLOCSPCacheLifetime
- SSLOCSPPath.

Checking certificate(s)

This mid-level security model provides an encrypted channel and validation of the HTTPS server, but does not provide a way to check whether the certificate used to validate the HTTPS server has been revoked. This may be adequate where you are confident of the longevity of your certificates, perhaps because you are using an internal certificate authority.

Checking of the server certificate still requires the CA certificate be installed on the managed device in the `/var/opt/managesoft/etc/ssl/cert.pem` file (and/or the alternative folder). As well, the `CheckServerCertificate` preference must preserve its default value of `True`. Ignoring the revocation list

can configured by disabling (setting to `False`) the `CheckCertificateRevocation` settings for all component agents on the managed device.

Tip: *It is also possible to generally disable for most agents, but create exceptions where a particular agent still checks for possible certificate revocation. For details, see CheckCertificateRevocation. (If you override the behavior for particular agent components, you may need to review the revocation settings listed above for the same components.)*

Relying on encryption

If you are confident of the security of your infrastructure, it is possible to ignore the server certificates entirely. This provides an encrypted channel of communication, but does not provide validation that the device is actually talking to the correct HTTPS server.

Disabling checking of the server certificate can be achieved by disabling (setting to `False`) both the `CheckServerCertificate` and `CheckCertificateRevocation` settings for all component agents on the managed device. In this mode of operation, the CA certificate is not required to be installed on the managed device.

Agent third-party deployment: HTTPS CA Certificate File Format (UNIX)

By default, if the FlexNet inventory agent is (or in more detail, its component agents are) configured to use the HTTPS protocol to communicate with an inventory beacon, the certificate(s) for the HTTPS server are checked. This ensures that the agents are communicating with the correct inventory beacon server. Since the server certificate is authorized (signed) by a Certificate Authority, the process may include checking whether that Certificate Authority is trusted (that is, it may be an intermediate Certificate Authority that is itself trusted because it is authorized by a 'higher' Certificate Authority). The checking process continues until it reaches the root Certificate Authority (CA), one which the client device can recognize as trusted. This trust occurs when a CA certificate is 'known' to the client device.

Therefore certificate checking requires that a copy of the certificate for the root CA has been installed on the managed device. When a certificate being validated matches the locally-stored certificate for the root CA, trust is confirmed.

Tip: *Since an authorizing Certificate Authority may also revoke a previously-authorized server certificate that has somehow been compromised, by default the certificates are also checked for currency: that is, a check is made that each certificate in the chain (up to but excluding the root CA) has not been revoked. For the preference settings controlling revocation behaviors, see Agent third-party deployment: Enabling the HTTPS Protocol on UNIX Agents.*

On Windows devices, the operating system handles all root CA certificates (and there may be many), and on Windows the FlexNet inventory agent uses those operating system services.

For UNIX-like platforms, the FlexNet inventory agent supports two ways of storing root CA certificates:

- Individual root CA certificates (in the PEM format discussed here) can be saved in the directory identified in the preference `SSLCACertificatePath` (default value `/var/opt/managesoft/etc/ssl/certs` — see SSLCACertificatePath). In this case, the files must be named with the CA subject name hash value (such as `9d66eef0`), with any duplicates differentiated by numeric file extensions (such as `9d66eef0.0`, `9d66eef0.1`, and so on).

- All the root CA certificates that are used by the HTTPS web servers supplying content to the managed device or receiving content from the managed device can be concatenated into a single file. (For many organizations, this will be a single certificate for a single root Certification Authority. It may even be a CA that is internal to the enterprise.) Each root CA certificate is added to the file named and saved as identified in the `SSLCACertificateFile` preference (default `/var/opt/managesoft/etc/ssl/cert.pem`), a simple naming convention. If you have multiple root CA certificates, simple shell commands allow the concatenation:

```
#!/bin/sh
rm cert.pem
for i in ca1.pem ca2.pem ca3.pem ; do
  openssl x509 -in $i -text >> cert.pem
done
```

Tip: *Before, between, and after the certificates in the concatenated file (that is, everywhere except between BEGIN and END tags), free text is allowed that can be used, for example, for descriptions of the certificates.*

This concatenated certificate file should be saved using the PEM format. Each PEM-format certificate should be base-64 encoded plain text surrounded by a `BEGIN CERTIFICATE` header and an `END CERTIFICATE` footer. That is:

```
-----BEGIN CERTIFICATE-----
MIIDiTCCAnGgAwIBAgIQWO/IibrLpZ5Hts3u3xH7TzANBgkqhkiG9w0BAQUFADAR
MQ8wDQYDVQQDEwZ0ZncyazMwHhcNMTAxMTI1MDEyMDM4WhcNMTUxMTI1MDEyODA1

......

wXvMSERKsNsJ6FwwXFGA3HBrRLTHzqzsfUlUAbV+SBm/FSFkuWsy4QWAuJCbnCnv
c3ClFHXqwaIq9UWvO5FR5kD4gK9LZOUY4B7tLTQmpJScFSiPZrIBa1cQ5uWl
-----END CERTIFICATE-----
```

To deploy the resulting certificate during deployment of FlexNet inventory agent to managed devices, see Agent third-party deployment: Installing FlexNet inventory agent on UNIX.

Both storage methods may be used at once. The FlexNet inventory agent first checks the single concatenated file (where available), and then checks the folder of individual certificates. The checking stops at the first certificate that the managed device recognizes (that is, the first that matches the public certificate for the certificate authority that has been stored locally on the managed device).

Agent third-party deployment: Updating config.ini on a UNIX Device

For OS X and UNIX managed devices, many preferences are stored in the `config.ini` file stored in `/var/opt/managesoft/etc`. This file acts as a "virtual registry": that is, a repository on non-Windows platforms for settings that, on Windows platforms, are stored in the registry.

Initially, this file will contain a few factory default settings, plus the values imported from the `mgsft_rollout_response` file described in Agent third-party deployment: Configure the Bootstrap File for UNIX. Some of the installed components (such as the `ndschedag` and the `mgsuseag`) read their preferences directly from this file.

If you wish to update settings in `config.ini`, you can use the following approach, which can be completed manually or can be scripted with an appropriate deployment tool. In this description, the example used is to disable network sense in an installed FlexNet inventory agent.

To update the `config.ini` file:

1. Create a temporary file following the format of `config.ini`, but including only the section names containing changes, and the changed values.

   Example:

   ```
   [ManageSoft\Launcher\CurrentVersion]
   NetworkSense=False
   [ManageSoft\NetSelector\CurrentVersion]
   SelectorAlgorithm=MgsSubnetMatch(,false)
   ```

2. Save (or deploy) this patch as a temporary file on the target device (where FlexNet inventory agent is locally installed), giving it a distinct name.

   For example, deploy (or save) the patch file to `/var/tmp/tempconfig.ini` on the target device(s).

3. Execute the `mgsconfig` tool with the `-i` option identifying your temporary patch file.

   Example:

   ```
   /opt/managesoft/bin/mgsconfig -i /var/tmp/tempconfig.ini
   ```

4. Remove the temporary file.

Inspecting the `/var/opt/managesoft/etc/config.ini` file shows that the settings in your temporary file have been applied to the `config.ini`.

***Tip:** The `config.ini` file is used only for the FlexNet inventory agent installed locally on the target device (the Adopted case). Do not attempt to use it for any of the other cases.*

Agent third-party deployment: Uninstalling FlexNet inventory agent from UNIX

If you need to manually uninstall FlexNet inventory agent from a managed device, use the following command lines.

***Note:** Uninstallation leaves behind the folder `/var/opt/managesoft` since it may contain a package cache that a future re-install of the FlexNet inventory agent can use.*

Platform	Uninstallation command line
AIX	For removal from the standard installation path, use: `installp -u managesoft` If you have used a custom installation path, known as a User Specified Installation Location (USIL), you must include the same USIL so that FlexNet inventory agent is removed from the correct object repository (and keep the options in this order): `installp -R path -u managesoft`
Debian Linux x86 and x86_64	`dpkg --purge managesoft`
HP-UX	`swremove managesoft`
Linux x86 and x86_64	`rpm --erase --verbose managesoft`
Mac OS X	`/opt/managesoft/bin/uninstall-managesoft.command -force`
Solaris x86 and SPARC	`echo action=nocheck > admin.mgs` `pkgrm -n -a admin.mgs ManageSoft` `rm -f admin.mgs`

Agent third-party deployment: Protecting Your Customizations

As soon as its installation is complete, the FlexNet inventory agent attempts to contact the inventory beacon identified in the bootstrap configuration file, and if successful, requests its policy (including the schedule on which it should perform the specified actions).

You might desire either of two distinct outcomes here:

- Most likely, you may want this computing device to 'join the family', sharing the same schedule, policy, and controlled self-updating as all other instances of the FlexNet inventory agent on devices that were adopted automatically. If you take no special action, this is the default behavior.
- You may want to protect the unique settings on this instance of FlexNet inventory agent, such as a distinct set of failover inventory beacons. In this case, continue below.

To prevent standard policy over-writing your custom settings:

1. Prevent the distribution of policy to those devices that are outside all known targets:

a. In the web interface for FlexNet Manager Suite, navigate to **Discovery & Inventory > Settings**.

b. In the **Beacon settings** group, select the check box **Migration mode: Restrict inventory settings to targeted devices**.

c. Click **Save**.

This setting must remain permanently on for as long as you want to keep some of your devices (with FlexNet inventory agent installed) outside the reach of standard policies and settings (including the agent inventory schedule specified a little higher on the same product page).

Warning: *Turning on migration mode is a universal control that prevents every inventory beacon from answering requests from any random FlexNet inventory agents that call. When this control is set, inventory beacons provide policy and accept uploads only from FlexNet inventory agents installed on devices identified in targets that are in subnets assigned to each individual inventory beacon. You will therefore need to manage targets and assignments more carefully, and you may also wish to modify the preference SelectorAlgorithm.*

2. Ensure that the protected devices are never included in any target for discovery and inventory rules.

   These rules are specified in **Discovery & Inventory > Discovery and Inventory Rules**. There is no programmatic way to prevent these protected devices from being accidentally included in a target; it must simply be a matter of corporate guidelines that (for example) the specified subnet or the particular machine(s) must never be included in any target.

3. Plan to arrange your own updates to the FlexNet inventory agent on all protected devices, probably using the same configuration and deployment methods you have used for initial installation.

Agent third-party deployment: Checking the Installed Version

You may need to verify the installed version of FlexNet inventory agent on a managed device, either for manual checking or as part of a scripted solution. You can inspect the version in the web interface for FlexNet Manager Suite; or you can dig deeper (including programmatically). As expected, the methods for digging deeper depend on the operating system on the managed device.

In the web interface

If the managed device has already reported inventory, you can inspect the results as follows:

1. Navigate to **Discovery & Inventory > All Inventory** (in the **Inventory** group).
2. On the **All Inventory** page, use searching or filters to find the managed device of interest, and click its **Name** to open its properties.
3. Select the **Applications** tab, and filter for `Inventory Manager Agent`. The installed version appears in the **Version** column.

Tip: *Ignore the `FlexNet Agent` listing, which is for a separate entity.*

The version shown is the friendly name (such as "2016 R2"). If you need to know major/minor version numbering, click through the **Product** value to reach the application properties, select the **Evidence** tab (with its default presentation for **Installer** evidence), and inspect the **Version** values for the evidence. Although typically wildcarded to match multiple builds, these show the major and minor numbering of the installer evidence that can produce the application record.

For managed devices on Microsoft Windows

Microsoft Windows Installer does not offer a simple command to list the version of an installed package.

However, you can check the registry. The installed version of the FlexNet inventory agent is stored in

```
HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ManageSoft\ETCPVersion
```

(on 64-bit machines) or

```
HKEY_LOCAL_MACHINE\SOFTWARE\ManageSoft\ETCPVersion
```

(on 32-bit machines). This contains a string version showing major, minor, and build numbers (such as `11.04.19`).

For managed devices on UNIX and OS X systems

While these platforms do not have a registry, you can still inspect registry preferences in `/var/opt/managesoft/etc/config.ini`. (This is populated from the bootstrap file `/etc/managesoft.ini` during installation.) Look for the following section in `config.ini`:

```
[ManageSoft]

InstallDir=/opt/managesoft
ETCPInstallDir=/opt/managesoft
ETCPVersion=11.0.4
```

Note: *The format of the version number is different on UNIX-like systems than on Windows. Versions internally are numbered with four integers, `a`, `b`, `c`, and `d`. On Microsoft Windows, these are presented as `a.bc.d` (`b` and `c` are not separated) but on UNIX-like systems, they are presented as `a.b.c` (with the final integer unavailable). This variation means that the example given here for UNIX-like systems is the same release number as shown above for Microsoft Windows.*

This `config.ini` file remains available even after the FlexNet inventory agent is uninstalled (as noted in Agent third-party deployment: Uninstalling FlexNet inventory agent from UNIX).

In addition, on UNIX-like systems, there are command lines available for checking the installed version of a package. You can use the following command lines on each of the platforms:

Platform	Version inspection command line
AIX	`lslpp -l managesoft.rte`

Platform	Version inspection command line
Debian Linux x86 and x86_64	`dpkg-query -W managesoft`
HP-UX	`swlist managesoft`
Mac OS X	`grep "ManageSoft " /Library/Receipts/ManageSoft.pkg/Contents/Info.plist`
RPM Linux x86 and x86_64	`rpm --query managesoft`
Solaris x86 and SPARC	`pkginfo -l ManageSoft`

Agent third-party deployment: Troubleshooting Inventory

Inventory gathering and upload is a sophisticated chain from target inventory device through inventory beacon to central application server. For general trouble-shooting over the whole process, see the online help for FlexNet Manager Suite under *Inventory Beacons* > *Inventory Beacon Reference* > *Troubleshooting: Inventory Not Uploading*. This topic focuses entirely on inventory collection on the target inventory device.

After you have deployed and installed the FlexNet inventory agent, the regular log file for the `ndtrack` executable is identified in `[Registry]\ManageSoft\Tracker\CurrentVersion\LogFile` (see LogFile (inventory component)). In the Agent third-party deployment case, the default paths are:

- On Windows platforms, `$(TempDirectory)\ManageSoft\tracker.log`
- On UNIX-like platforms, `/var/opt/managesoft/log/tracker.log` (when the `ndtrack` executable runs as root).

For advanced trouble-shooting, you may require more advanced tracing and logging. You may also be asked to submit a trace file to assist the Support team at Flexera Software to solve difficult problems in your environment.

To configure advanced tracing for the installed FlexNet inventory agent:

1. In a flat text editor, open the `etcp.trace` file.

   In the Agent third-party deployment case, this file is co-located with the installed `ndtrack` executable on the target inventory device:

   - On Windows, the default is `C:\Program Files (x86)\ManageSoft\etcp.trace`
   - On UNIX-like platforms, the default is `/opt/managesoft/etcp.trace`.

2. Configure the name and location of the trace/log file that will be generated on the inventory device.

   The hash or pound character (#) identifies a comment. To "uncomment" a line in the `.trace` configuration file means to delete (only) the leading hash character. Choose one of the following lines, uncomment it, and optionally modify it to your requirements. On Windows:

   ```
   #filename=C:\ManageSoft.log
   #filename=C:\ManageSoft%p_%d_%t_%u.log        # filename pattern with everything!
   ```

   On UNIX-like platforms:

   ```
   #filename=/tmp/log/mgstrace.log
   #filename=/tmp/log/ManageSoft%p_%d_%t_%u.log # filename pattern with everything!
   ```

   See the notes within the file header for the use of the supported variables within the file name.

   Tip: *It is best practice to use a pattern that includes (at least) either a date stamp (%d) or a sequential number (%u). Without these, the fixed file name means tracing information is appended to the same file with every inventory collection. This can quickly produce a trace file too large for text editors to read, and too hard to manage in terms of disk space. Variables in the file name trigger creation of a new file each time the associated variable is changed (or, for %u, at every invocation of `ndtrack`).*

   Important: *The log file path:*

   - *Must be on the same drive as the `ndtrack` executable (on Windows devices)*
   - *Must exist and be writable before the `ndtrack` executable is next invoked (tracing does not create any directories, and does not function if any directory in the specified path is missing or unwritable).*

3. Uncomment the lines for which you want to enable tracing (ensuring that the uncommented line now starts with a plus sign).

   The tracing controls are arranged hierarchically. For example, uncommenting the one line for `+Inventory/Tracker` enables tracing for all child controls, as in this example:

   ```
   +Inventory/Tracker
   #+Inventory/Tracker/Preferences
   #+Inventory/Tracker/Environment
   #+Inventory/Tracker/Hardware
   #+Inventory/Tracker/Hardware/WMI
   #+Inventory/Tracker/Hardware/WMI/Class
   #+Inventory/Tracker/Hardware/WMI/Instance
   #+Inventory/Tracker/Hardware/WMI/Property
   #+Inventory/Tracker/Hardware/Processor
   #+Inventory/Tracker/Hardware/Memory
   #+Inventory/Tracker/Hardware/Hypervisor
   #+Inventory/Tracker/Hardware/DiskDrive
   #+Inventory/Tracker/Registry
   #+Inventory/Tracker/Registry/Keys
   #+Inventory/Tracker/Registry/Values
   #+Inventory/Tracker/Package
   ```

```
#+Inventory/Tracker/Package/Info
#+Inventory/Tracker/Software
#+Inventory/Tracker/Software/Directory
#+Inventory/Tracker/Software/File
#+Inventory/Tracker/Software/Version
#+Inventory/Tracker/Oracle
#+Inventory/Tracker/Oracle/Listener
#+Inventory/Tracker/Generate
#+Inventory/Tracker/Compress
#+Inventory/Tracker/Upload
```

This setting enables (almost) *all* tracing related to the tracker component (`ndtrack`). You can also create an exemption to the general setting by making the appropriate line starts with a minus sign. For example, this one-line change within the above:

```
-Inventory/Tracker/Registry
#+Inventory/Tracker/Registry/Keys
#+Inventory/Tracker/Registry/Values
```

turns off tracing for everything related gathering inventory from the Windows registry (that is, the disable setting is also inherited by the `Inventory/Tracker/Registry/Keys` and `/Values` controls).

One control that may affect the tracker component is outside this set. Because the tracker attempts an upload to the inventory beacon as soon as inventory gathering is complete, its tracing is affected by the `+Communication/Network` setting (along with the `ndupload` and `ndlaunch` components). This enables tracing of all network communications, including server certificate checking and the like.

Some common choices for tracing the inventory gathering process are listed in the table below.

4. To turn off tracing for an individual line that has previously been enabled, either comment out the line again, or switch the plus sign to a minus sign at the start of the line. A quick way to turn off tracing but keep all the settings for future use is to comment out only the `filename` setting that specifies the log file.

Some of the more commonly used tracing options for the tracker include the following:

Category	Option	Notes
Networking	`+Communication/Network`	Traces all low-level upload and download actions (whether HTTP or HTTPS). It includes HTTPS certificate checking and related areas. Covers actions by the `ndtrack`, `ndupload`, and `ndlaunch` components.
All inventory	`+Inventory`	Traces all inventory operations, which on large inventory tasks, could result in a sizable trace file.
All tracker	`+Inventory/Tracker`	This traces almost all operations of the `ndtrack` executable.
Preferences	`+Inventory/Tracker/Environment`	Shows active preferences, whether set in the registry (on Windows platforms) or in the `config.ini` file (on UNIX-like platforms), or inbuilt default values.

Category	Option	Notes
Hardware inventory	`+Inventory/Tracker/Hardware`	Traces all hardware inventory classes visible in the `<Hardware>` node in the `.ndi` inventory file, including CPU information and virtualization.
Software inventory	`+Inventory/Tracker/Package`	Traces the inventory operations that populate the `<Package>` nodes in the `.ndi` inventory file.
Software inventory	`+Inventory/Tracker/Software`	Tracing mainly for file inventory gathering (such as the `<Content>` and `MD5` nodes of the `.ndi` file).
Oracle inventory	`+Inventory/Tracker/Oracle`	When the inventory device hosts Oracle Database, this is the tracing for local Oracle inventory.
Operations	`+Inventory/Tracker/Generate`	Traces the preparation of the `.ndi` inventory file(s), keeping in mind that on an Oracle Database server, there may be multiple files generated.
Operations	`+Inventory/Tracker/Compress`	Traces the compression of the `.ndi` file into a `.gz` archive.
Operations	`+Inventory/Tracker/Upload`	Traces the upload of the `.ndi.gz` archive to an inventory beacon by the tracker. ***Tip:*** *If the immediate upload by the tracker fails for some temporary reason, the upload is attempted again later by the `ndupload` component. While this component does not provide this same level of operations tracing as the tracker does, you can enable `+Communication/Network` for low-level tracing of each step in the upload interaction.*

4

Zero-footprint: Details

This chapter provides great detail about the FlexNet inventory core components when these are included as part of the standard installation of the FlexNet Beacon code on an inventory beacon. When used in this environment, the functionality of the FlexNet inventory core components is augmented by other code elements that are part of FlexNet Beacon, making this use case unique.

In this configuration on an inventory beacon, the FlexNet inventory core components are capable of collecting hardware and software inventory from separate target devices, using remote execution technique fully described in this chapter.

Although the inventory component (`ndtrack`) executes in the context of the target inventory device, it is removed after each inventory exercise. Since nothing is permanently installed on the target inventory device, this is called the Zero-footprint case. For details of the distinct use cases, refer back to Understanding What, Where, How, and Why.

This document provides a consistent set of data (as far as possible) across all the different use cases, each in its own chapter. This means that, once you have chosen your preferred use case, you can focus only on the details for that one, and ignore all other use case chapters.

In addition to the distinct chapters for the different use cases, you should also review the subsequent chapter on functionality that is common throughout. This is followed by detailed reference material on command lines, preferences, file formats, and the like.

Zero-footprint: Normal Operation

Because of the requirement that no executables are permanently installed on target inventory devices in the Zero-footprint case, there are some variations across platforms in how the remote execution operates. However, the principles of the process are consistent. This description assumes that you have configured the system to allow for Zero-footprint discovery and inventory collection (described in Zero-footprint: Implementation). The entire operational process is covered, including what happens to the collected data after it uploaded to the inventory beacon and beyond. Each numbered step provides a summary point, followed by further specific details that you can skip over until needed.

The process always begins with discovery, and moves directly to inventory gathering from the appropriate devices.

1. On the schedule declared an the applicable rule, the FlexNet Beacon engine conducts a sweep of its assigned subnet.

   This sweep may use either (or both) of:

   - A network scan, with testing of a specified list of ports (this method is mandatory for discovery and inventory of UNIX-like machines)
   - A scan by the Windows Computer Browser service.

   Your choice is recorded in **Discovery & Inventory > Discovery and Inventory Rules > Actions > Action settings > General devices discovery and inventory** section.

   A set of IP addresses is returned.

2. Each IP address is assessed as follows:

   a. Is the IP address within a subnet that is assigned to this inventory beacon?

      If not, the IP address is discarded, and the next one is processed. Log files for the work of the FlexNet Beacon engine are saved in *%CommonAppData%*`\Flexera Software\Compliance\Logging\BeaconEngine`.

   b. Is this IP address matched by the target in the rule (for which the action includes discovery and inventory gathering) that has been triggered?

      If not, the IP address is discarded.

   c. Appropriate ports are probed.

      There may be several reasons why ports are probed:

      - If the action settings included **Discover devices using network scan**, there is a list of default ports, including for example port 22 (for SSH on UNIX-like platforms) and port 135 (for NetBIOS on Windows), and others. You may have added additional ports to this set.
      - Additional parts of the action definition, such as **Oracle VM discovery and inventory**, **Microsoft SQL Server discovery and inventory**, **VMware discovery and inventory**, and so on may also specify ports, on which specialized probes are conducted to identify the services you are checking for.
      - If you have selected **TNS names file** as a discovery method in the **Oracle discovery and inventory** section of the action specification, and there is a `tnsnames.ora` file present in *%CommonAppData%*`\Flexera Software\Repository\TNSNames\` on the inventory beacon, the servers (and ports) identified in that file are also probed as part of discovery. (If there are multiple `.ora` files, each is processed in turn.)

   d. Are there credentials for this device recorded in the local Password Store on the inventory beacon?

      This is confirmed by a successful log in. If not, the IP address is discarded.

   e. With successful login, a query is used to identify the operating system on the device (so that appropriate command lines can be constructed), and a check is made for the presence of the FlexNet inventory agent.

- For Windows devices, the status of the `ndinit` service is checked. If it is present, this also gives the installed version of the FlexNet inventory agent, and an indication of its healthy operation.
- For UNIX-like devices, the following command is used both to identify the operating system type and to determine whether the device is already adopted (such that the FlexNet inventory agent is already installed on the device, as shown by the `ETCPVersion` result):

```
/bin/sh -c "PATH=$PATH:/bin:/usr/bin;
echo \"UnameKernel=`uname`\";
[ -r /etc/managesoft.ini ] &&
grep ETCPVersion /etc/managesoft.ini || echo \"ETCPVersion=NONE\"”
```

If found by these means, the FlexNet inventory agent is logged in the inventory database as installed on the discovered device.

Note: *The discovery of the installed FlexNet inventory agent by this means does not have the impacts that you may imagine:*

- *It does not cause its appearance in the web interface for FlexNet Manager Suite, and in particular does not drive the result shown in* ***Discovery & Inventory > All Discovered Devices*** *in the* ***Agent installed*** *column. (This column is derived from inventory results, not from discovery results, allowing for results from third-party inventory tools to also be reflected in the column.)*
- *It does not influence the decision about whether to apply any Zero-footprint inventory gathering specified in the current rule to the device. When specified, this kind of inventory gathering goes ahead on all devices except those for which their policy specifies adoption. As a consequence, if you have used third-party tools (or manual effort) to deploy the full FlexNet inventory agent to this device, and the device is outside the policy for adoption but inside the target(s) for a rule specifying Zero-footprint inventory gathering, then you collect inventory from both methods: Zero-footprint inventory gathering, and inventory taken by the locally-installed FlexNet inventory agent. While uncommon, it is then possible that your customized settings could cause resulting data to flip-flop based on which inventory method was used most recently.*

The main purpose of this discovery check for an installed FlexNet inventory agent comes in the next step, in the adoption check.

This completes discovery, and any device still under consideration is included in the list of discovered devices visible in the web interface of FlexNet Manager Suite. Meanwhile, if the rule included any inventory gathering as part of its action, the process continues.

3. If, in the **General devices discovery and inventory** section of the action settings for the relevant rule, the **Gather hardware and software inventory** check box is selected, the FlexNet Beacon engine checks the `BeaconPolicy.xml` file to see whether the current device is listed (in the net result of all targets) for adoption.
   - If the device policy is for adoption, two consequences follow:
     a. The discovery result for an installed FlexNet inventory agent is assessed. If the FlexNet inventory agent is not present, adoption is initiated immediately.
     b. When the FlexNet inventory agent is present (or adoption has been initiated in this pass), the Zero-footprint inventory process is terminated for this device, and the process moves onto the next

device in the list. (If this device was targeted for Microsoft SQL Server or Microsoft Hyper-V inventory collection, these forms of Zero-footprint inventory collection are also terminated in this case, and are left to the installed FlexNet inventory agent.)

- If the device is not targeted for adoption (or specifically excluded from adoption in at least one target), the process continues.

> ***Tip:*** *The adoption test is entirely based on target policy settings in the web interface. This means that, if you deployed the FlexNet inventory agent independently (the Agent third-party deployment case) and also include the device in a target for inventory gathering in the Zero-footprint case, inventory gathering proceeds twice for this device.*

4. The method of gathering general hardware and software inventory varies across platforms:

   Microsoft Windows:

   a. The FlexNet Beacon engine, which is still logged into the target device, creates and runs a Windows service (with the display name `mgs-GUID`, executing `mgsreservice.exe`).

   b. The service executes the `ndtrack.exe` inventory component from the inventory beacon file share `mgsRET$`.

      The executables are available on the inventory beacon in the default path `%ProgramFiles%\Flexera Software\Inventory Beacon\RemoteExecution\Public\Inventory` (defined in the Windows share `mgsRET$`) .

   c. Because the command line parameters passed to `ndtrack` included the `-o UploadLocation` preference that identified the parent inventory beacon, the `ndtrack` component immediately attempts an upload of the collected inventory.

      On the inventory beacon, uploaded FlexNet inventory files are saved in *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories`.

      > ***Tip:*** *Since only one inventory beacon is identified in the preference, there is no fail-over should the specified inventory beacon be unavailable for any reason. (Fail-over inventory beacons are identified only for installed FlexNet inventory agents that are self-managing based on collected device policy, in either the Adopted case or the Agent third-party deployment case.)*

   d. The service is closed down.

   The following artifacts remain on the target inventory device, and are over-written on the next execution of the same process:

   - An uncompressed inventory (`.ndi`) file is left in `%ProgramData%\ManageSoft Corp\ManageSoft\Tracker\ZeroTouch`
   - A `tracker.log` log file is saved on the target inventory device in `C:\Windows\temp\ManageSoft`.

   UNIX-like platforms

   a. The FlexNet Beacon engine, which is still logged into the target device, executes `sudo` to elevate its privileges to `root` level.

> **Tip:** *It is technically possible to run Zero-footprint inventory collection from UNIX-like devices as a non-root user; but this prevents collection of complete inventory (for details, see Zero-footprint: Non-Root Accounts).*

b. The FlexNet Beacon engine then executes `ssh` to establish a secure link.

c. The engine then uses `scp` to copy the FlexNet inventory core components to the target device.

For convenience in dealing with the variety of target platforms, these are deployed in the form of ndtrack.sh, a 'self-installing' script. This is available on the inventory beacon in the default path `%ProgramFiles%\Flexera Software\Inventory Beacon\RemoteExecution\Public\Inventory`.

> **Tip:** *The same directory may also contain `ndtrack.ini`, a configuration file (for UNIX-like machines only, and only in the Zero-footprint or FlexNet Inventory Scanner cases) that may contain preferences applicable to `ndtrack`. With the restriction that preferences apply only to this one component, this file has the same schema as `config.ini`, the substitute registry for agent preferences for the cases where the FlexNet inventory agent is locally installed on the target device (see, for example, Agent third-party deployment: Updating config.ini on a UNIX Device). However, there are no fail-over settings included in `ndtrack.ini`, for the reasons noted below. It is not mandatory to supply this file, since `ndtrack.sh` has built-in default settings that provide all necessary values beside those supplied in the command line. However, if you wish to override any of these default values, you can customize the `ndtrack.ini` file available in this same folder as `ndtrack.sh`.*

d. The ndtrack.sh script is executed, identifies the particular platform, and unzips the appropriate executable either into the home directory of the `root` account or (if that home directory is `/`) into `/var/tmp`.

e. The `ndtrack` component collects the inventory.

f. Because the command line parameters passed to `ndtrack` included the `-o UploadLocation` preference that identified the parent inventory beacon, the `ndtrack` component immediately attempts an upload of the collected inventory.

On the inventory beacon, uploaded FlexNet inventory files are saved in *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories`.

> **Tip:** *Since only one inventory beacon is identified in the preference, there is no fail-over should the specified inventory beacon be unavailable for any reason. (Fail-over inventory beacons are identified only for installed FlexNet inventory agents that are self-managing based on collected device policy, in either the Adopted case or the Agent third-party deployment case.)*

g. The FlexNet Beacon engine, still running as `root`, deletes the executable, deletes the `ndtrack.sh` script, and logs out.

The following artifacts remain on the target inventory device, and are over-written on the next execution of the same process:

- An uncompressed inventory (`.ndi`) file is leftin the operational folder (either the home directory of the executing account, or `/var/tmp`).
- Log files are saved on the target inventory device when inventory collection is (as usual) run as `root`, in `/var/tmp/flexera/log`; or if inventory collection is run as another user, in `/var/tmp/flexera.`*`userName`*. One called `ndtrack.log` is created by the shell script wrapper, and `tracker.log` is the logging output from the `ndtrack` component itself.

5. In parallel with the above process for general hardware and software inventory, the FlexNet Beacon engine also conducts specialized inventory gathering on discovered devices matching the specifications in the action for the rule being executed.

   These are the devices for which inventory gathering has been specified for VMware, Microsoft Hyper-V, Citrix XenDesktop, Oracle Database environments or Oracle VM infrastructure. Each type of inventory gathering creates its own `.ndi` inventory file. These are added to the uploaded general inventory files in *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories`.

6. FlexNet Beacon (the code entity on the inventory beacon) uploads the inventory data to its parent on a schedule set by the Microsoft Scheduled Task `Upload FlexNet logs and inventories` (by default, repeating every minute throughout the day).

   The checking cycle when the folder is empty is very quick and does not perceptibly load the inventory beacon, even though it is frequently repeated. The parent of an inventory beacon may be the central application server, or another inventory beacon if these have been arranged in a hierarchy. In the latter case, each inventory beacon in turn repeats the upload process until the data reaches the application server.

7. On the application server (or, in a scaled-up system with separate servers, the inventory server), the web service `ManageSoftRL` receives the uploaded inventory file(s).

   These are processed immediately, being loaded into the internal inventory database. If the service gets overloaded, it will temporarily spool incoming files to its local *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories` directory. From here, file import is resumed under the control of the Microsoft scheduled task `Import inventories`, which is triggered every 10 minutes.

8. On the next inventory import and license consumption calculation, the inventory data is collected from the inventory database, socialized as necessary, and imported into the compliance database. Here it is used in license calculations, and made available in management views and reports.

   This import step can be triggered in one of three ways:

   - Normally, the batch scheduler triggers an import daily (by default, at 2am local time on your application server), with the license consumption calculation triggered thereafter. This default time is configurable by editing the Microsoft scheduled task `Inventory import and license reconcile` on your application server (or, in larger implementations, batch server).
   - An operator in the `Administrator` role can choose to import the waiting inventory and trigger license consumption calculation, or reconciliation, as soon as possible (navigate to **License Compliance > Reconcile**).
   - For testing, a knowledgeable system administrator could use a command line on your application server (or, in a scaled-up system, your batch server) like:

```
BatchProcessTask.exe run InventoryImport
```

(for details, see the *Server Scheduling* chapter in the *FlexNet Manager Suite System Reference* PDF).

Zero-footprint: Non-Root Accounts

By default for UNIX-like target devices, the FlexNet Beacon engine collects Zero-footprint inventory by escalating its privileges to act as `root` on the target device.

It is technically possible to collect inventory as a non-`root` user (that is, the `ndtrack` executable will run and produce a `.ndi` document). However, information that cannot obtained without root or administrative rights includes:

Platform	Missing inventory details (non-root users)
Linux	• BIOS details (dmidecode): serial number, UUID, manufacturer, model, chassis type • All hard disk information (from device files).
Solaris	• MAC addresses of network adapters • x86 BIOS details (dmidecode): model, manufacturer • SPARC model using OpenPROM interface. It fails over to using the sysinfo SI_PLATFORM value which can be different.
HP-UX	• SD-UX installation evidence from `swlist` if access has been locked down with `swreg` or `swacl` • vPar evidence including VMType, VMName and vPar capacity (vparstatus requires root) • Hard disk drive properties including capacity.
Mac OS X	Mac OS X package bundle paths under `/Applications` or `/System/Library` that are not accessible by the executing user.
All UNIX-like platforms	• Collection of Oracle inventory is blocked for non-`root` accounts • Collection of inventory for IBM MQ (previously WebSphere MQ) is blocked for non-`root` accounts • File evidence from any file system path not accessible by the executing user • InstallAnywhere, InstallShield Multiplatform, Oracle Universal Installer evidence under paths not accessible by the executing user.

If this reduced functionality is acceptable for certain inventory targets, you can configure the account for these devices in the Password Store to prevent elevation of privileges.

Zero-footprint: System Requirements

These details apply to the use of the FlexNet inventory core components installed as standard on each inventory beacon server (as part of the installation of FlexNet Beacon). In this configuration, the FlexNet inventory core components use remote execution techniques to gather inventory from separate targets (the techniques are naturally different for Windows and UNIX-like platforms, and are detailed in Zero-footprint: Normal Operation). Therefore, there are two sets of requirements that become important in this Zero-footprint case:

- The requirements on the inventory beacon server itself
- Any impacts on the target inventory devices.

Note: *At the risk of confusion, we should note that an inventory beacon can also be a managed device, a computer for which you want to collect its own inventory. This uses a separate code collection. For the remainder of this topic, we are overlooking this aspect, and focusing exclusively on the capacity of the FlexNet Beacon code installed on the inventory beacon to remotely collect inventory from other target inventory devices, excluding itself.*

Supported platforms

On the inventory beacon itself, the FlexNet inventory core components impose no limits on the supported platforms. The FlexNet Beacon code (including the FlexNet inventory core components) can be installed on the following platforms:

- Windows Server 2012 R2
- Windows Server 2012
- Windows Server 2008 R2 x64
- Windows Server 2008
- Windows Server 2008 x64
- Windows 10 x64
- Window 10
- Windows 8 x64
- Windows 8
- Windows 7 x64
- Windows 7.

For remote inventory collection in the Zero-footprint case, inventory can be gathered from the following platforms:

Microsoft Windows	UNIX-like platforms
• Windows Server 2016 • Windows Server 2012 R2 SP1 • Windows Server 2012 R2 • Windows Server 2012 • Windows Server 2008 R2 x64 Server Core • Windows Server 2008 R2 x64 • Windows Server 2008 Server Core • Windows Server 2008 x64 Server Core • Windows Server 2008 x64 • Windows Server 2003 R2 • Windows Server 2003 R2 x64 • Windows Server 2003 • Windows Server 2003 x64 • Windows 10 x64 • Window 10 • Windows 8 x64 • Windows 8 • Windows 7 x64 • Windows 7 • Windows Vista x64 • Windows Vista • Windows XP Professional x64 • Windows XP Professional • Windows XP Home	• AIX 5.2, 5.3, 6.1, 7.1, LPARs • CentOS 4, 5, 6, 7 (x86/x86-64 only) • Debian 6, 7 (x86/x86-64 only) • Fedora 6–11, 18-23 (x86/x86-64 only) • HP-UX 11.00, 11i, 11i v2, 11i v3, vPars/nPars • Mac OS X 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12 • Oracle Linux 4.5 – 7.0 (x86/x86-64 only) • Red Hat Enterprise Linux 3 (x86 only), 4, 5, 6, 7 (x86/x86-64 only) • Red Hat Linux 8 and 9 (x86 only) • Solaris 8 (SPARC only) • Solaris 9, 10, 11 (x86/x86-64 and SPARC), Zones for versions 10 & 11 • SuSE Enterprise Server 11, 12 (x86/x86-64 only) • SuSE Professional 12, 13 (x86/x86-64 only) • Ubuntu 12-15 (x86/x86-64 only)

Disk space requirements

On the inventory beacon itself, the FlexNet inventory core components are included in the disk space requirement for FlexNet Beacon:

- 1 GB of free disk space for each 10,000 devices from which FlexNet inventory is collected.

On target inventory devices (in the Zero-footprint process), the following are platform-specific disk space requirements:

- Windows: Where the target device is a typical workstation, in the order of 2MB; and for an Oracle server, in the order of 5MB.
- UNIX-like platforms: The downloaded code is approaching 23MB, and it then looks for an additional 16MB of working disk space in either (in priority order):
  1. The home directory of the account running the inventory (unless that directory is `/`)
  2. `/var/tmp`.

  Where this space is not available, inventory collection is not attempted.

After Zero-footprint inventory collection, the following (non-executable) files are left on the target inventory device as a potential aid to process validation or trouble-shooting, and are all replaced at the next iteration of the same process:

- An uncompressed inventory (`.ndi`) file is left:
  - For Windows devices, in `%ProgramData%\ManageSoft Corp\ManageSoft\Tracker\ZeroTouch`
  - For UNIX-like devices, in the operational folder (either the home directory of the executing account, or `/var/tmp`).
- Log files are saved on the target inventory device:
  - For Windows devices, in `C:\Windows\temp\ManageSoft`
  - For UNIX-like devices,when inventory collection is (as usual) run as `root`, in `/var/tmp/flexera/log`; or if inventory collection is run as another user, in `/var/tmp/flexera.`*`userName`*.

The following log file is available on the target inventory device in the Zero-footprint case:

- `tracker.log` — Generated by the inventory agent, `ndtrack`

Memory requirements

On the inventory beacon itself, the memory demands in the Zero-footprint inventory collection process are negligible, and entirely covered by the standard specification for the inventory beacon of 1GB minimum RAM, 2GB or higher recommended.

On target inventory devices, the memory requirements are:

- Minimum RAM: 512 MB
- Recommended RAM: 2 GB

In general, through a cycle of inventory gathering and upload, the memory demand is in the order of 5-30 MB.

Communication protocols and ports

All ports used in Zero-footprint discovery and inventory collection are configurable to any value either through preference settings or by including the port number in URL settings.

The default ports used for discovery depend on what the inventory beacon is tasked to discover:

- ICMP is used for ping discovery of networked computers
- 135 (default) on the target device for WMI-based discovery of Hyper-V or XenDesktop (other ports depend on your configuration of WMI)
- 80 (with HTTP), 443 (with HTTPS) for VMware ESX/VCenter (default values, and of course using TCP)
- 1433 for Microsoft SQL Server (default)
- 1521, 2483 for Oracle DB (default)
- 137 for NetBIOS discovery of networked computers (default)
- 161 for SNMP discovery of networked computers (default)

The default ports for communications required for the Zero-footprint inventory case are:

- Windows: Outbound from inventory beacon to set up the service: for SMB, port 445; and for NetBIOS, port 139
- UNIX-like platforms: Outbound from inventory beacon to establish secure connection and copy the FlexNet inventory core components (in self-installing form): port 22
- Additional ports outbound from inventory beacon to an Oracle Database: ports 1521 and 2483
- Additional ports outbound from inventory beacon to a virtual machine under either ESX or VCenter: 80 and 443
- Windows and UNIX: Inbound from FlexNet inventory core components on target device: File upload using HTTP protocol: port 80
- Windows only: Inbound from FlexNet inventory core components on target device: File upload using HTTPS protocol: port 443

Tip: *HTTPS is not supported for UNIX-like platforms in the Zero-footprint case.*

- Additional ports may be required if supporting a proxy.

Supported packages to inventory

FlexNet inventory can include data from most package technologies supported by the operating systems, and some additional third-party packaging technologies:

Platform	Supported package technologies
All platforms	InstallAnywhere (IA), InstallShield Multiplatform (ISMP), BEA/Oracle Installer (BEA), Oracle Universal Installer (OUI), IBM Installation Manager (IIM)
AIX	LPP, RPM
HP-UX	Software Distributor SD-UX Package
Linux	RPM (Red Hat, CentOS, Oracle, SuSE, Fedora, etc), DPKG (Debian, Ubuntu).
Mac OS X	Mac Application Bundle, Mac Package Bundle

Platform	Supported package technologies
Solaris	Sys V Package (pkg), IPS
Windows	MSI, Add/Remove Programs Registry Key

However, FlexNet inventory cannot collect data from some of the less common or newer operating system technologies and many third-party technologies. Some known examples include:

- All platforms — IBM InstallStream, IBM Tivoli Netcool Installer
- Mac OS X — Mac flat package.

System load benchmarks

The following notes reflect observed behavior on sample target inventory devices during collection of FlexNet inventory:

Task	Run duration (seconds)	CPU usage (seconds)	CPU usage (% of single core)	Memory usage	Network load
Inventory collection	13 to 240 s	5 to 130 s	10% to 50%	4 MB to 20 MB	10 KB to 200 KB per upload

Zero-footprint: Accounts and Privileges

In the Zero-footprint case, when the FlexNet inventory core components (installed as part of the FlexNet Beacon code base) reach out to gather hardware and software inventory from remote target inventory devices, there are accounts required on both the local inventory beacon and on the remote target device.

On the inventory beacon, no *separate* account or privileges are required inventory beacon to exercise the Zero-footprint case: the FlexNet Beacon itself must be executed by a service account able to log on as a batch job, and to run scheduled tasks (and, if the inventory beacon is running IIS, to run IIS application pools). This same account executes the remote discovery and inventory collection tasks.

Tip: *A service account configured for the above privileges does not normally allow interactive login. To access the FlexNet Beacon interface on an inventory beacon requires a separate account with local administrator privileges.*

One of the first actions when Zero-footprint inventory gathering is triggered is to configure software on the target inventory device to complete the inventory gathering action (the methods vary across platforms, and are detailed in Zero-footprint: Normal Operation. This means that there may be two accounts required for each device:

- The initializing account
- The operational account that actually gathers the inventory.

Naturally, the requirements vary across platforms.

On Microsoft Windows target devices

- The initializing account:
  - May be either a Windows domain account, or a local account on the target device
  - Requires full access to the Windows Service Control Manager on the target device (specifically, it must have the `SC_MANAGER_ALL_ACCESS` access right)
  - Must be appropriately registered in the secure Password Store on the inventory beacon that is responsible for collecting inventory from this target device (for details, see *FlexNet Manager Suite Help* > *Inventory Beacons* > *Password Management Page* and its child topics)
  - May conveniently be the `LocalSystem` account, since this is required for the following operational stage.
- For the operational account, FlexNet inventory core components (and in particular the `ndtrack` component) run as the `LocalSystem` account.

On UNIX-like target devices

- The initializing account:
  - Is a local account on the target inventory device
  - Has `ssh` privileges on that device
  - Must be appropriately registered in the secure Password Store on the inventory beacon that is responsible for collecting inventory from this target device (for details, see *FlexNet Manager Suite Help* > *Inventory Beacons* > *Password Management Page* and its child topics)
- For the operational account, FlexNet inventory core components (and in particular the `ndtrack` component) run as `root`.

Zero-footprint: Implementation

The Zero-footprint case does not require any software deployment, since the FlexNet inventory core components are installed on every inventory beacon as part of the FlexNet Beacon code installation. However, there are preliminary configuration steps needed to allow remote execution to proceed.

To configure remote execution:

1. Ensure that you have the appropriate inventory beacons fully operational.

   To do this, navigate to **Discovery & Inventory > Beacons** (in the **Network** group), and check the following properties for an existing inventory beacon:

Property	Expected Value
Beacon status	`Operating normally`
Policy status	`Up to date`

Property	Expected Value
Connectivity status	`Connected`

To deploy and configure a new inventory beacon, click **Deploy a beacon**. Consult the online help for these pages for more information.

2. Ensure that at least one inventory beacon is configured to cover the subnet containing the target inventory devices.

   While all inventory beacons receive all rules declared in the web interface of FlexNet Manager Suite (when they download the `BeaconPolicy.xml` file), each one enacts only those rules that apply to target devices that fall within their assigned subnet(s). This setting is available through the web interface for FlexNet Manager Suite at **Discovery & Inventory > Beacons**. See the online help there for more information.

   Tip: *It is best practice to deploy an inventory beacon into each subnet that contains target inventory devices. This allows the inventory beacon to reliably use ARP or* `nbtstat` *requests to determine the MAC address of a discovered device (reliability of these results is reduced across separate subnets). Where, across subnets, only an IP address can be found for a device (that is, the device data is missing both a MAC address and a fully-qualified domain name), a record is created for the discovered device, but this record is not matched with more complete records (which also contain either or both of the MAC address and FQDN). This means you may see multiple discovered device records with duplicate IP addresses: one record is complete, and one or more others are missing identifying data as discussed. In contrast, having a local inventory beacon in the same subnet as target devices provides both the IP address and the MAC address, which is sufficient for matching discovered device records. If you must do discovery across subnet boundaries without a local inventory beacon, ensure that there are full DNS entries visible to the inventory beacon for all devices you intend to discover. This allows the inventory beacon to report both an IP address and a fully-qualified domain name (FQDN), which is again sufficient for record matching.*

   If yours is a highly secure, locked down environment, you may need to open network ports on the target computer devices to allow for remote execution.

   Since the inventory beacons use standard ports to access target devices and remotely gather inventory, the required ports are already available in many environments. (The ports are documented in the online help, under *FlexNet Manager Suite Help > Inventory Beacons > Inventory Beacon Reference > Ports and URLs for Inventory Beacons*. The default requirements for remote execution are ports 445 for SMB on Windowsand 22 for SSH on Unix.)

4. Ensure adequate credentials are available for the remote execution process to run. There are two possible approaches for Windows devices:

   - You can register a domain administrator account that has installation privileges on all the target computer devices within the domain. This approach minimizes entries in the Password Store.
   - You can record appropriate (potentially unique) credentials for each device in the Password Store. With this approach, you should also add filters to limit the number of password attempts on each target device, so that the remote execution attempt is not terminated because it attempted too many credentials without success.

   These credentials must be recorded in the secure Password Store available on each inventory beacon (for details, see the online help, under *FlexNet Manager Suite Help > Inventory Beacons > Password Management Page*).

For UNIX-like devices, the `ssh` daemon must be installed, and you must either:

- Record `root` credentials for the target device in the Password Store on the applicable inventory beacon
- Record *non*-root credentials for the target device in the Password Store on the applicable inventory beacon, and additionally ensure that a tool to allow privilege escalation (such as `sudo` or `priv`) is installed on target devices and either:
  - **a.** The use of that tool is configured in the Password Store (in the extra fields exposed when you specify and SSH account type), or
  - **b.** Target devices are configured to allow escalation of privileges without requiring an interactive password.

5. Navigate to **Discovery & Inventory > Discovery and Inventory Rules**, and create one or more rules to take inventory from target computing devices within your enterprise, and then to collect inventory from them.

   Rules consist of:

   - **Targets** that identify sets of devices, and (for all the devices identified within a single target) specify policy about how to connect, whether to collect CAL evidence, whether to track application usage, and whether to adopt — for the Zero-footprint case, it is *critical* that either
     - The target device is *not* included in any target that has **Allow these targets to be adopted** selected; *or*
     - The target device *is* included in an active target for which **Do not allow these targets to be adopted** is selected (as a 'deny' always over-rides an 'allow'). This may be the easier condition to set and maintain over time.
   - **Actions** that declare what to do to the targeted devices — to ensure discovery and inventory collection, the relevant action must ensure that, in the **General devices discovery and inventory** section (click the title bar to expand the section), one or both of the **Discover ...** check boxes is selected, and **Gather hardware and software inventory** is selected. In addition, other specialized kinds of inventory may be selected, depending on the target inventory device. By specifying multiple rules, you can customize actions to gather all required inventory types while minimizing activity on any individual target device.
   - A schedule for implementing the action on the targeted devices.

   For more information, see the online help on these product pages.

When these preliminary configuration steps are in place, the inventory beacon collects inventory from target devices in its assigned subnet on the schedule declared in the relevant rule(s). The details of the execution process are included in Zero-footprint: Normal Operation.

Zero-footprint: Troubleshooting Inventory

Inventory gathering and upload is a sophisticated chain from target inventory device through inventory beacon to central application server. For general trouble-shooting over the whole process, see the online help for FlexNet Manager Suite under *Inventory Beacons > Inventory Beacon Reference > Troubleshooting: Inventory Not Uploading*. This topic focuses entirely on inventory collection on the target inventory device.

When you use Zero-footprint inventory collection, the normal log files for the `ndtrack` executable are saved on the target inventory device:

- On Windows platforms, in `C:\Windows\temp\ManageSoft\tracker.log`
- On UNIX-like platforms, in `/var/tmp/flexera/log` (when the executable was invoked by the `root` account, as recommended) or `/var/tmp/flexera.`*`UserName`*`/log` (when invoked by the *`UserName`* account).

For advanced trouble-shooting, you may require more advanced tracing and logging. You may also be asked to submit a trace file to assist the Support team at Flexera Software to solve difficult problems in your environment.

By default, tracing is not available with Zero-footprint inventory gathering. However, with some custom preparation, you can set up for, and control, tracing with a `.trace` configuration file of your own. Even though Zero-footprint inventory gathering is triggered from the inventory beacon, the configuration file and the resulting log(s) all reside on the target inventory device.

To set up and configure tracing for Zero-footprint inventory gathering:

1. Obtain a copy of an `etcp.trace` file from an installed FlexNet inventory agent on another device.

   Where the full FlexNet inventory agent has been installed on a target device, the `etcp.trace` file is located with the `ndtrack` executable:

   - On Windows, the default is `C:\Program Files (x86)\ManageSoft\etcp.trace`
   - On UNIX-like platforms, the default is `/opt/managesoft/etcp.trace`.

   Because this file format is consistent across platforms, you may take your copy of `etcp.trace` from any inventory device where the full FlexNet inventory agent is installed.

2. On a Windows target device:

   a. Save the `etcp.trace` file in `C:\Temp\`.

   b. On the same target device, create the registry key `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ManageSoft Corp\ManageSoft`, add the string value `InstallDir`, and set the value to the full path to the directory where you have saved `etcp.trace`.

3. On UNIX-like platforms, a rename and relocation are mandatory:

   a. Rename the `etcp.trace` file as `ndtrack.trace`.

   b. Save the file as `/etc/ndtrack.trace`.

4. Configure the name and location of the trace/log file that will be generated on the inventory device.

   The hash or pound character (`#`) identifies a comment. To "uncomment" a line in the `.trace` configuration file means to delete (only) the leading hash character. Choose one of the following lines, uncomment it, and optionally modify it to your requirements. On Windows:

   ```
   #filename=C:\ManageSoft.log
   #filename=C:\ManageSoft%p_%d_%t_%u.log        # filename pattern with everything!
   ```

   On UNIX-like platforms:

```
#filename=/tmp/log/mgstrace.log
#filename=/tmp/log/ManageSoft%p_%d_%t_%u.log # filename pattern with everything!
```

See the notes within the file header for the use of the supported variables within the file name.

Tip: *It is best practice to use a pattern that includes (at least) either a date stamp (%d) or a sequential number (%u). Without these, the fixed file name means tracing information is appended to the same file with every inventory collection. This can quickly produce a trace file too large for text editors to read, and too hard to manage in terms of disk space. Variables in the file name trigger creation of a new file each time the associated variable is changed (or, for %u, at every invocation of `ndtrack`).*

Important: *The log file path:*

- *Must be on the same drive as the `ndtrack` executable (on Windows devices)*
- *Must exist and be writable before the `ndtrack` executable is next invoked (tracing does not create any directories, and does not function if any directory in the specified path is missing or unwritable).*

5. Uncomment the lines for which you want to enable tracing (ensuring that the uncommented line now starts with a plus sign).

   For Zero-footprint inventory gathering, the typical lines to uncomment are:

   ```
   +Inventory
   +Error
   +Communication/Network
   ```

When Zero-footprint inventory gathering is invoked on the inventory beacon, it creates the log file on the target inventory device as you specified, ready for your inspection.

5

FlexNet Inventory Scanner: Details

This chapter provides great detail about the FlexNet inventory core components when these are deployed as self-extracting executables (also known as the FlexNet Inventory Scanner). As part of the functionality available in this case, the operational executables are removed after each execution, although the FlexNet Inventory Scanner package itself is not automatically removed.

In this configuration, and given appropriate command lines, the FlexNet inventory core components are capable of collecting hardware and software inventory from a target device, and uploading it to a location specified in the command line. This configuration is often useful for pilot studies and test cases. For details of the distinct use cases, refer back to Understanding What, Where, How, and Why.

This document provides a consistent set of data (as far as possible) across all the different use cases, each in its own chapter. This means that, once you have chosen your preferred use case, you can focus only on the details for that one, and ignore all other use case chapters.

In addition to the distinct chapters for the different use cases, you should also review the subsequent chapter on functionality that is common throughout. This is followed by detailed reference material on command lines, preferences, file formats, and the like.

FlexNet Inventory Scanner: Normal Operation

The regular operation of the FlexNet inventory core components in the FlexNet Inventory Scanner configuration have a number of differences across Windows and non-Windows platforms. For simpler reading, each is treated separately in one of the following topics.

For details about deployment and implementation, see FlexNet Inventory Scanner: Implementation and appropriate subtopics.

FlexNet Inventory Scanner: Operation on Windows

This description assumes that you have obtained and appropriately deployed the FlexNet Inventory Scanner to working locations (see FlexNet Inventory Scanner: Implementation on Windows).

The FlexNet Inventory Scanner may be invoked through a command line (details are available in ndtrack Command Line), through a scheduled task (although this is not generally recommended), or simply by double-clicking the executable file while you are logged on using an account with suitable administrator privileges.

At each invocation, the self-installing executable:

1. Installs the Windows version of the tracker (or inventory collection) executable (`ndtrack.exe`) and related control files in the `temp` directory of the account that is executing it.
2. Executes `ndtrack`, either according to the command-line options supplied, or using its default parameters. This means that the tracker component runs as the same account that executed the FlexNet Inventory Scanner.

   Running as the `LocalSystem` account is recommended, because elevated privileges are required to complete several aspects of inventory gathering. It is *possible* to run the tracker under a non-`LocalSystem` account, but best practice is to run it with administrator privileges, or you may lose inventory functionality.

   Note: *On Microsoft Windows, the tracker does not prevent invocation by an account that has lesser privileges; but you would then need to ensure that such an account had all the required access rights for the kinds of inventory you expected to gather on a target device. Since this is highly dependent on your environment, this approach is unsupported.*

   When no command-line options are supplied, the default behaviors are:

   - The tracker gathers a machine inventory on the local computer on which it is currently running.
   - It saves this inventory in `%temp%\FlexeraSoftware\$(UserName) on $(MachineId).ndi`, where `%temp%` is the temporary directory for the account that is running the FlexNet Inventory Scanner, with the file name showing the account and machine ID related to the inventory run.
   - Returns an exit code of `0` for success. (For any other exit code, check the log file.)
   - Records the log for this activity in `%temp%\ManageSoft\tracker.log`.
   - If `InventorySettings.xml` is supplied and `ndtrack` can connect to the Oracle Database, returns a separate `.ndi` Oracle inventory file. (Details about `InventorySettings.xml` are included in FlexNet Inventory Scanner: Implementation on Windows. Details of account setup for gathering Oracle inventory are included in *Credentials for FlexNet Inventory Scanner Inventory* in the *Oracle Discovery and Inventory* chapter of the *FlexNet Manager Suite 2017 R1 System Reference* PDF file, available through the title page of online help.)
   - If the Oracle Net Listener can be found and queried, returns a discovery file with details of the Oracle listener.

   These behaviors can be modified with command-line options for `ndtrack`, attached to the command line for FlexNet Inventory Scanner (which passes them directly through to `ndtrack`). For example, you can configure the FlexNet Inventory Scanner to trigger an immediate upload to an inventory beacon of your choice for integration into the standard inventory processes. For details of these command-line options, see ndtrack Command Line.

3. When execution is completed, FlexNet Inventory Scanner uninstalls the `ndtrack` executable, leaving only the self-installing executable `FlexNet Inventory Scanner.exe` in place.

FlexNet Inventory Scanner: Operation on UNIX-Like Platforms

This description assumes that you have deployed `ndtrack.sh`, optionally its customized configuration file `ndtrack.ini`, and the current and unedited `InventorySettings.xml` (required when Oracle inventory is in play). These processes are described in FlexNet Inventory Scanner: Implementation on UNIX-like Platforms.

For normal operation, do either of the following:

- To run `ndtrack.sh` from the command line, it's convenient to change directory to the location of these files (all in the same folder), and invoke the executable together with any further command-line parameters (documented in FlexNet Inventory Scanner Command Line).
- To run the lightweight scanner regularly, configure your preferred scheduling tool (such as `cron`) on the target device to regularly invoke `ndtrack.sh`, either using the options available in FlexNet Inventory Scanner Command Line or using a customized copy of `ndtrack.ini` (see Configuring ndtrack.ini for UNIX-like Platforms). To execute the scanner, you can either use the `chmod` command to set the execute permissions on `ndtrack.sh`; or you can start `ndtrack.sh` using a shell (such as `/bin/sh /path/ndtrack.sh [options]`.

Tip: *Experienced administrators can also combine use of `ndtrack.ini` (for common defaults) with matching command-line parameters (for local overrides on specific devices).*

You may execute `ndtrack.sh` either as `root` (recommended), or as a different user. Running as a non-`root` user limits the effectiveness of inventory gathering, as described in FlexNet Inventory Scanner: Accounts and Privileges.

At each invocation, `ndtrack.sh`:

1. First determines the current operating system, and extracts the package appropriate to that platform to a unique folder under the home directory of the current user, provided that this has sufficient space and is not the root directory (`/`). If that is unsuccessful, it uses the `/var/tmp` folder.

   If there is insufficient space in `/var/tmp`, `ndtrack.sh` writes an error to `stderr`, and the process stops.

2. Checks in its installed folder for a customized `ndtrack.ini` configuration file.

   If found, this file in its entirety replaces all the default values for operating preferences and data providers (see Configuring ndtrack.ini for UNIX-like Platforms). Take care that the configuration file is complete, in case missing parameters are effectively 'turned off'.

3. Uses any command-line parameters to override matching values (whether built-in defaults, or values from `ndtrack.ini`).

4. Executes the inventory collection according to the resulting set of preferences.

When neither command-line options nor preferences in `ndtrack.ini` are specified, `ndtrack.sh` does the following:

- Conducts a machine inventory on the local computer on which it is currently running. (Only machine inventory is supported for UNIX-like platforms: there has never been any equivalent of the "user"-based inventory available on Microsoft Windows for backward compatibility.)
- Creates an inventory file named `$(UserName) on $(MachineId).ndi`, where these variables are replaced as follows:
  - `$(UserName)` is replaced by the name of the account running the executable. When `ndtrack` is run as root, this value is returned as `system`, for consistency with inventory reported from Windows platforms.
  - `$(MachineId)` is replaced by the computer name of the inventory device, as returned from the operating system.
- Saves this inventory file (both uncompressed for inspection and compressed for upload) in either of the following paths:
  - When the executable has run as the `root` account, in `/var/tmp/flexera/uploads/inventories`
  - When the executable has been run by any other user account (represented as *UserName*), in `/var/tmp/flexera.`*UserName*`/uploads/inventories`.
- Returns an exit code of `0` for success. For any other exit code, check the log file.
- Where `InventorySettings.xml` is supplied and `ndtrack` is running as `root` and can connect to an instance of Oracle Database, creates a separate Oracle inventory file (such as `$(MachineId) at DateTimeInISO8601 (Oracle).ndi.gz`) in the same `inventories` folder.
- Where the Oracle listened is found and can be queried (by `ndtrack` running as `root`), creates a `.disco` discovery file containing details of the local Oracle Net Listener (such as `$(MachineId) at DateTimeInISO8601.disco`), saved in `/var/tmp/flexera/uploads/Discovery`.
- Records the log for these activities in `tracker.log` in either of the following locations:
  - When the executable has run as the `root` account, in `/var/tmp/flexera/log`
  - When the executable has been run by any other user account (represented as *UserName*), in `/var/tmp/flexera.`*UserName*`/log`.

Tip: *Discovery of Oracle Net Listener and collection of inventory from Oracle database instances are both blocked unless the tracker component (`ndtrack` executable) invoked by the FlexNet Inventory Scanner is running as `root`.*

These behaviors can be changed with command-line parameters described in FlexNet Inventory Scanner Command Line, or preferences saved in `ndtrack.ini` (see Configuring ndtrack.ini for UNIX-like Platforms). As a customization example, you can configure `ndtrack.sh` to upload the resulting inventory file immediately to an inventory beacon of your choice for integration into the standard inventory processes.

FlexNet Inventory Scanner: System Requirements

The following details apply to the FlexNet inventory core components when deployed as a self-extracting executable to a target device (or where applicable to a file share).

Supported platforms

The FlexNet inventory core components operate on the following platforms (inventory targets):

Microsoft Windows	UNIX-like platforms
• Windows Server 2016 • Windows Server 2012 R2 SP1 • Windows Server 2012 R2 • Windows Server 2012 • Windows Server 2008 R2 x64 Server Core • Windows Server 2008 R2 x64 • Windows Server 2008 Server Core • Windows Server 2008 x64 Server Core • Windows Server 2008 x64 • Windows Server 2003 R2 • Windows Server 2003 R2 x64 • Windows Server 2003 • Windows Server 2003 x64 • Windows 10 x64 • Window 10 • Windows 8 x64 • Windows 8 • Windows 7 x64 • Windows 7 • Windows Vista x64 • Windows Vista • Windows XP Professional x64 • Windows XP Professional • Windows XP Home	• AIX 5.2, 5.3, 6.1, 7.1, LPARs • CentOS 4, 5, 6, 7 (x86/x86-64 only) • Debian 6, 7 (x86/x86-64 only) • Fedora 6–11, 18-23 (x86/x86-64 only) • HP-UX 11.00, 11i, 11i v2, 11i v3, vPars/nPars • Mac OS X 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12 • Oracle Linux 4.5 – 7.0 (x86/x86-64 only) • Red Hat Enterprise Linux 3 (x86 only), 4, 5, 6, 7 (x86/x86-64 only) • Red Hat Linux 8 and 9 (x86 only) • Solaris 8 (SPARC only) • Solaris 9, 10, 11 (x86/x86-64 and SPARC), Zones for versions 10 & 11 • SuSE Enterprise Server 11, 12 (x86/x86-64 only) • SuSE Professional 12, 13 (x86/x86-64 only) • Ubuntu 12-15 (x86/x86-64 only)

Disk space requirements

On target inventory devices in the FlexNet Inventory Scanner case, the following are platform-specific disk space requirements:

- Windows: Where the target device is a typical workstation, in the order of 2MB; and for an Oracle server, in the order of 5MB.

- UNIX-like platforms: The downloaded code is approaching 23MB, and it then looks for an additional 16MB of working disk space in either (in priority order):

  1. The home directory of the account running the inventory (unless that directory is `/`)
  2. `/var/tmp`.

  Where this space is not available, inventory collection is not attempted.

After inventory collection in the FlexNet Inventory Scanner case, the following (non-executable) files are left on the target inventory device as a potential aid to process validation or trouble-shooting, and are all replaced at the next iteration of the same process:

- An uncompressed inventory (`.ndi`) file is left:
  - For Windows devices, in `%ProgramData%\ManageSoft Corp\ManageSoft\Tracker\ZeroTouch`
  - For UNIX-like devices, in the operational folder (either the home directory of the executing account, or `/var/tmp`).
- Log files are saved on the target inventory device:
  - For Windows devices, in `C:\Windows\temp\ManageSoft`
  - For UNIX-like devices,when inventory collection is (as usual) run as `root`, in `/var/tmp/flexera/log`; or if inventory collection is run as another user, in `/var/tmp/flexera.`*`userName`*.

The following log file is available on the target inventory device in the FlexNet Inventory Scanner case:

- `tracker.log` — Generated by the inventory agent, `ndtrack`
-

Memory requirements

On target inventory devices, the memory requirements are:

- Minimum RAM: 512 MB
- Recommended RAM: 2 GB

In general, through a cycle of inventory gathering and upload, the memory demand is in the order of 5-30 MB.

Communications protocols and ports

When the FlexNet inventory core components execute on the target device (in the FlexNet Inventory Scanner case), the only ports required are the standard ports for communication with the inventory beacon:

- Windows and UNIX: From FlexNet inventory core components on target device inbound on the inventory beacon — File upload using HTTP protocol: port 80
- Windows only: From FlexNet inventory core components on target device inbound on the inventory beacon — File upload using HTTPS protocol: port 443

Tip: *HTTPS is not supported for UNIX-like platforms in the FlexNet Inventory Scanner case.*

Supported packages to inventory

FlexNet inventory can include data from most package technologies supported by the operating systems, and some additional third-party packaging technologies:

Platform	Supported package technologies
All platforms	InstallAnywhere (IA), InstallShield Multiplatform (ISMP), BEA/Oracle Installer (BEA), Oracle Universal Installer (OUI), IBM Installation Manager (IIM)
AIX	LPP, RPM
HP-UX	Software Distributor SD-UX Package
Linux	RPM (Red Hat, CentOS, Oracle, SuSE, Fedora, etc), DPKG (Debian, Ubuntu).
Mac OS X	Mac Application Bundle, Mac Package Bundle
Solaris	Sys V Package (pkg), IPS
Windows	MSI, Add/Remove Programs Registry Key

However, FlexNet inventory cannot collect data from some of the less common or newer operating system technologies and many third-party technologies. Some known examples include:

- All platforms — IBM InstallStream, IBM Tivoli Netcool Installer
- Mac OS X — Mac flat package.

System load benchmarks

The following notes reflect observed behavior on sample target inventory devices during collection of FlexNet inventory:

Task	Run duration (seconds)	CPU usage (seconds)	CPU usage (% of single core)	Memory usage	Network load
Inventory collection	13 to 240 s	5 to 130 s	10% to 50%	4 MB to 20 MB	10 KB to 200 KB per upload

FlexNet Inventory Scanner: Accounts and Privileges

In the FlexNet Inventory Scanner case, when the FlexNet inventory core components (run locally as the FlexNet Inventory Scanner) gather hardware and software inventory from the target inventory device, they execute as the user name (or account) that triggered the execution.

To effectively gather inventory, this account must have elevated privileges:

- On Windows, it must have administrator privileges on the local machine.

- To collect complete inventory on UNIX-like platforms, you must elevate privileges (for example, with `sudo` or `priv`) and execute `ndtrack.sh` as `root`.

If `ndtrack.sh` executes as a non-root user on UNIX-like systems, the following are amongst the inventory details that *cannot* be collected:

- File evidence from any file system path not accessible by the executing user
- InstallAnywhere, InstallShield Multiplatform, or Oracle Universal Installer evidence under paths not accessible by the executing user
- Oracle Database service discovery via the local listener using `lsnrctl`
- Oracle Database inventory which may use impersonation of an Oracle Database administration user when running the `sqlplus` command
- On Linux systems:
  - BIOS details (`dmidecode`): serial number, UUID, manufacturer, model, chassis type
  - All hard disk information (from device files)
- On Solaris systems:
  - MAC addresses of network adapters
  - x86 BIOS details (`dmidecode`): model, manufacturer
  - SPARC model using OpenPROM interface (the tracker fails over to using the value from `sysinfo SI_PLATFORM` instead, which may give different results)
- On HP-UX systems:
  - SD-UX installation evidence from `swlist` if access has been locked down with `swreg` or `swacl`
  - vPar evidence including `VMType`, `VMName`, and vPar capacity (`vparstatus` requires root)
  - Hard disk drive properties including capacity
- On Mac OS X systems:
  - Mac OS X package bundle paths under `/Applications` or `/System/Library` not accessible by the executing user.

FlexNet Inventory Scanner: Implementation

The processes for obtaining, configuring, deploying, and using the FlexNet inventory core components in the FlexNet Inventory Scanner configuration have a number of differences across Windows and non-Windows platforms. For simpler reading, each is treated separately in one of the following topics.

Those topics are followed by details of configuration.

There are two ways to configure the inventory agent on inventory devices:

- At run-time, using command-line options (see FlexNet Inventory Scanner Command Line).

- Use the configuration file specific to the platform:
  - On Microsoft Windows, use the `wmitrack.ini` file that governs the Windows Management Instrumentation class tracking behavior. This is described in Configuring WMI for FlexNet Inventory Scanner.
  - On UNIX-like platforms, use the `ndtrack.ini` file that (like the `wmitrack.ini` file on Windows) controls the providers used for various kinds of inventory gathering; but unlike the other, can also be extended to include any of the preferences that may be set on the command-line (see Configuring ndtrack.ini for UNIX-like Platforms).

Note: *On Microsoft Windows, the FlexNet Inventory Scanner is different than the installed FlexNet inventory agent (where an inventory target has been 'adopted' by the local installation of the full inventory agent) in this regard:*

- *The lightweight FlexNet Inventory Scanner does not access Windows registry settings to determine options.*
- *The full FlexNet inventory agent may access a wide range of registry settings to control its behavior.*

FlexNet Inventory Scanner: Implementation on Windows

This process covers obtaining, configuring, and deploying the FlexNet inventory core components in the FlexNet Inventory Scanner configuration on Microsoft Windows platforms. Two forms of deployment are covered:

- A one-off manual deployment for testing, evaluation, or simple infrastructures
- A repeatable process for deploying the FlexNet Inventory Scanner to multiple devices.

Tip: *It is best practice for a user account with local administrator privileges to execute the FlexNet Inventory Scanner. While the agent still runs with lesser privileges, it only collects the full range of inventory when executed with administrator privileges. Therefore, if you are about to do a one-off, manual deployment, it is helpful to log into the target device using a local administrator account.*

You can conveniently begin this process on a server where you want to deploy the FlexNet Inventory Scanner.

To install and run the FlexNet Inventory Scanner:

1. Use your browser to access the Flexera Software Customer Community.
   a. On https://flexeracommunity.force.com/customer/CCLanding, use the account details emailed to you with your order confirmation from Flexera Software to log in (using the **Login** link in the top right).

      Tip: *Access requires your Customer Community user name and password. If you do not have one, use the `Request Community Access` link on the login page to request one. Your credentials are configured for access to content you have licensed.*

   b. Select the **Downloads** tab from the row across the top of the page.

      A routing page appears to let you `Access Product and License Center`, displaying lists of products from Flexera Software.

c. In the lists of products, identify FlexNet Manager Platform, and click the **Access Above Products** button that is *below* that product name.

   The `Product and License Center` site is displayed.

d. In the `Your Downloads` section of the `Home` page, click the link for FlexNet Manager Platform.

e. In the `Download Packages` page, click the link for FlexNet Manager Platform 2017 R1 to access the downloads. (You may need to repeat this action on a second page to access the downloadable files.)

2. Select the **Inventory Scanner** archive (`Inventory Scanner for` FlexNet Manager Suite 2017 R1`.zip`), and download to a convenient location (such as `C:\temp`).

3. Expand (unzip) the archive and save `FlexeraInventoryScanner.exe` to your preferred path.

   A typical path is in the `temp` folder for the logged-in account (or, if you prefer, a subfolder such as `temp\FIS`). When the self-installing executable is run, it installs the operational code into the current user's `temp` folder, making it convenient if both the self-installing executable and the operational code objects are in the same folder (or one closely related).

   Tip: *Optionally, you may save `FlexeraInventoryScanner.exe` to a file share that is accessible from many target devices.*

4. Optionally, customize the WMI classes used for inventory collection on this device.

   The inventory tool within the FlexNet Inventory Scanner provides defaults for normal operation. You may override and extend these default behaviors by providing a customized `wmitrack.ini` in the same folder where the self-installing executable is saved (suggested: the `temp\FIS` folder). Notice that this is not the operational folder where the tools execute, but the storage location of `FlexeraInventoryScanner.exe`. If a customized `wmitrack.ini` file is present, it replaces *all* the default values used by the inventory tool when it is installed, so be careful not to omit any settings that you may require from your customized file. To customize:

   a. Log into an inventory beacon, navigate to `%ProgramFiles%\Flexera Software\Inventory Beacon\Tracker`, and take a copy of `wmitrack.ini` to the device where you are working.

   b. Edit your new copy of `wmitrack.ini` to suit your requirements.

      For more information, see WMI Configuration File (wmitrack.ini).

   c. Save the modified file with the same `wmitrack.ini` file name in the same folder where you stored `FlexeraInventoryScanner.exe` (suggested: the `temp\FIS` folder).

5. Optionally, extend the inventory-gathering of the FlexNet Inventory Scanner with additional functionality you have licensed.

   Functionality extensions are embedded in the file `InventorySettings.xml`, which may be updated from time to time in the ARL download process. Your current license terms are integrated with the same file on the central application server, and the result is automatically downloaded to your inventory beacons after each update. On the inventory beacon, the file is saved in `%CommonAppData%\Flexera Software\Beacon\InventorySettings`. Particularly if

a. You have licensed the FlexNet Manager for Oracle product, or the FlexNet Manager for Microsoft product, and

b. You want this instance of FlexNet Inventory Scanner to collect Oracle inventory, or Microsoft SQL Server inventory, from the target device,

copy `InventorySettings.xml` from an inventory beacon to the target device, into the same folder where you stored `FlexeraInventoryScanner.exe` (suggested: the `temp\FIS` folder).

Important: *Do not edit this file!*

Tip: *Take note of the revision number in the first line of the `InventorySettings.xml` file for future reference. Set a reminder for yourself in your preferred tool to check the revision number of `InventorySettings.xml` after future updates of the Application Recognition Library. If the revision changes, you should manually update all the copies you manually deployed. These changes allow the inventory tool to stay abreast of inventory changes necessary to support the latest Oracle or SQL Server licenses.*

6. To run a test and inspect the resulting inventory files, double-click the self-installing `FlexeraInventoryScanner.exe` in Windows Explorer.

Tip: *Remember that, for complete hardware and software inventory collection, you should be logged in with local administrator privileges.*

The installer copies the executables, together with any co-located configuration files (`wmitrack.ini` and `InventorySettings.xml`), into the `temp` directory of the current user account on the target device, and immediately initiates inventory collection. When started in this way, there are no settings for uploading the result, and the uncompressed inventory (`.ndi`) file(s) are left in the user's `temp` directory. You may open an `.ndi` file in a text editor to review its contents.

7. To run once and upload the resulting inventory files:

a. Using your account with administrator privileges, open a command window on the device.

b. Navigate to the folder containing the self-installing executable (suggested: the `temp\FIS` folder).

c. Execute the FlexNet Inventory Scanner with command-line options for inventory upload, such as the following (all on one line):

```
FlexeraInventoryScanner.exe
    -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
    -o Upload="true"
```

substituting the fully qualified domain name of your inventory beacon for the placeholder *`InventoryBeacon`*. (`ManageSoftRL` is the name of a web service on the inventory beacon that receives the uploaded inventory and saves it by default to *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories`.) Keep in mind that the `-o Upload="true"` option (including enclosing the value in double quotation marks) is mandatory for uploads by this executable on the Windows platform.

Any command-line options you provide to the self-installing executable are passed directly through to the inventory tool (`ndtrack.exe`). For details of other available options, see ndtrack Command Line.

Immediately after completing the inventory collection, the inventory tool attempts to compress and upload the inventory file(s) to the inventory beacon you identified.

Tip: *Because the FlexNet Inventory Scanner does not include the separate `ndupLoad` component, there is no retry in the event of the failure of this one-time upload attempt.*

When the initial upload attempt is successful, the inventory file(s) are collected with all others uploaded to this inventory beacon, and join the standard process of upload to, and resolution on, the central application server. When the process is complete, the executables (and any optional configuration files) are uninstalled from the user's `temp` directory. As always, uncompressed copies of the `.ndi` files are saved in the `temp` directory of the executing account on the target device, and replaced at each future repeat of this process.

Note: *The purpose of the FlexNet Inventory Scanner is as described above: one-time use in special circumstances, including for testing during infrastructure development. It is not intended for full-time production use, as it lacks facilities like upload retries, policy updates, self-updates, and the like that are needed in a production environment. For production use, best practice is to deploy the full FlexNet inventory agent (in either the Adopted case or the Agent third-party deployment case). At the very least, it is preferable to deploy the FlexNet inventory core components (in the Core deployment case) to avoid the repeated overheads of installation and removal of the executable code by the self-installing executable `FlexeraInventoryScanner.exe`. The following steps, then, are not recommended, but provided only as thought starters if you intend to deploy FlexNet Inventory Scanner.*

8. If you choose to deploy the FlexNet Inventory Scanner more widely:

   a. Package the `FlexeraInventoryScanner.exe`, along with the optional `wmitrack.ini` and `InventorySettings.xml` files (when applicable), in your preferred deployment tool.

   b. Deploy these to known locations on target devices.

      One location to consider is on a file share accessible from many target devices.

   c. As part of the deployment process, set up a scheduled task in your preferred scheduling tool (such as Microsoft Scheduler) on each target device:

      - The task should run under an account with administrator privileges, preferably the local `SYSTEM` account.
      - The command line must include parameters to attempt uploads to an inventory beacon (preferably a high-reliability server and network, since there is no catch-up from failed upload attempts), such as the following (on a single line, and inserting your inventory beacon server's domain name in place of the place-holder):

        ```
        drive-and-path\FlexeraInventoryScanner.exe
            -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
        ```

      - The command line may include other parameters discussed in ndtrack Command Line.

- You may need to vary (or randomize) the scheduled time for inventory collection, to spread the load on either the file share hosting the self-installing executable or the inventory beacon accepting the subsequent uploads.

Configuring WMI for FlexNet Inventory Scanner

The behavior of FlexNet Inventory Scanner on Windows devices can (in part) be configured in a `wmitrack.ini` file.

The WMI (Windows Management Instrumentation) configuration file is used to inform the inventory agent what hardware, software and operating system components it should track. This file is only used if WMI tracking is selected as the preferred mechanism for hardware inventory tracking (set by the `WMI` preference, for which see FlexNet Inventory Scanner Command Line).

The components to be tracked can be any valid Win32 classes. A full list of supported classes is provided through the following URLs:

- Win32 classes: http://msdn.microsoft.com/en-us/library/aa394084(v=vs.85).aspx
- CIM classes: http://msdn.microsoft.com/en-us/library/aa386179(v=vs.85).aspx
- Software licensing classes: http://msdn.microsoft.com/en-us/library/ee957720(v=vs.85).aspx

You can edit this text-based file to change the items being tracked. For example, if you want to track user logons, edit the `wmitrack.ini` file to include the lines:

```
[Win32_ComputerSystem]
                    UserName
```

The `UserName` value returns the name of the user currently logged on. In a terminal services session, `UserName` returns the name of the user that is logged on to the console — not the user logged on during the terminal service session. `UserName` may be null if the user currently logged on does not have administrative privileges. If you experience this problem, try using;

```
[Win32_LoggedOnUser]
                    Antecedent
```

The user data collected will be available in hardware inventory reports.

You can also exclude an entire section, or an individual item, by commenting them out with a leading semi-colon. For example, in the sample file, see

```
;[Win32_USBDevice]
```

Locations

For remote inventory collection from Windows devices, the FlexNet Inventory Scanner checks the following in this order:

1. It looks for a command-line option `-o WMIConfigFile= "`*`FullPathAndFileName`*`"`, and uses the file declared there (and no further checking occurs).

Note: *There is no limitation on the file name or extension you may specify with this option.*

2. In the absence of a command-line option, FlexNet Inventory Scanner looks for a `wmitrack.ini` file in the same folder where the self-executing zip expanded (`%temp%\FlexeraInventoryScanner`), on the computer where the scanner is executing. This is the standard operating location for this `ini` file.

If a `wmitrack.ini` file is not found in either way, no WMI hardware components are tracked.

Sample file

The following default `wmitrack.ini` file specifies the Win32 items collected during standard inventory tracking. (You may use this as source for modifying your own alternative configuration file.)

```
[Win32_ComputerSystem]
Manufacturer
Model
Domain
DomainRole
NumberOfProcessors
NumberOfLogicalProcessors
TotalPhysicalMemory
Status
UserName

[Win32_ComputerSystemProduct]
IdentifyingNumber
Name
UUID
Vendor
Version

[Win32_OperatingSystem]
Name
Manufacturer
Version
ServicePackMajorVersion
ServicePackMinorVersion
SerialNumber
InstallDate
LastBootUpTime
OSLanguage
FreePhysicalMemory
FreeVirtualMemory
CountryCode
WindowsDirectory
SystemDirectory
Caption
CSDVersion
Status
```

```
CSName
OSType
OSArchitecture

[Win32_BIOS]
Manufacturer
Version
ReleaseDate
SerialNumber
BiosCharacteristics
Status

[Win32_Processor]
Description
Manufacturer
Version
ProcessorId
CurrentClockSpeed
CurrentVoltage
L2CacheSize
Status
MaxClockSpeed
Name
ProcessorType
NumberOfLogicalProcessors
NumberOfCores
DeviceID

[Win32_DiskDrive]
Description
Manufacturer
Model
Size
InterfaceType
Partitions
Status

[Win32_LogicalDisk]
Description
VolumeName
FileSystem
FreeSpace
Size
VolumeSerialNumber
DriveType
MediaType
Status
ProviderName
```

```
[Win32_CDROMDrive]
Description
Manufacturer
Drive
Status
Capabilities

[Win32_NetworkAdapter]
Manufacturer
MACAddress
MaxSpeed
Speed
Status

[Win32_NetworkAdapterConfiguration]
Caption
Description
Index
MACAddress
IPEnabled
DHCPEnabled
IPAddress
DHCPServer
DNSHostName
DNSDomain
DNSServerSearchOrder
DefaultIPGateway
IPSubnet

[Win32_PhysicalMemory]
Capacity
MemoryType
PositionInRow
Speed
Status

[Win32_SoundDevice]
Name
Manufacturer

[Win32_VideoController]
Name
VideoProcessor
DriverVersion
DriverDate
InstalledDisplayDrivers
AdapterRAM
```

```
[Win32_VideoConfiguration]
AdapterRAM
AdapterType
Description
HorizontalResolution
MonitorManufacturer
MonitorType
Name
VerticalResolution

[Win32_SystemEnclosure]

;[Win32_USBDevice]
;Caption
;ClassGuid
;Description
;DeviceID
;Manufacturer
;Name
;Status
;SystemName

[SoftwareLicensingProduct]
ApplicationID
Description
EvaluationEndDate
GracePeriodRemaining
LicenseStatus
MachineURL
Name
OfflineInstallationId
PartialProductKey
ProcessorURL
ProductKeyID
ProductKeyURL
UseLicenseURL

[SoftwareLicensingService]
ClientMachineID
IsKeyManagementServiceMachine
KeyManagementServiceCurrentCount
KeyManagementServiceMachine
KeyManagementServiceProductKeyID
PolicyCacheRefreshRequired
RequiredClientCount
Version
```

```
VLActivationInterval
VLRenewalInterval
```

FlexNet Inventory Scanner: Implementation on UNIX-like Platforms

This process covers obtaining, configuring, and deploying the FlexNet inventory core components in the FlexNet Inventory Scanner configuration on UNIX-like platforms.

For UNIX-like platforms, there is no conveniently pre-packaged, downloadable form of the FlexNet inventory core components specifically branded as the FlexNet Inventory Scanner. However, the following process allows you to obtain equivalent functionality.

Tip: *The required files are available only after the inventory beacon has downloaded its settings from the central application server.*

1. Log into a registered inventory beacon, and navigate to the default path `%ProgramFiles%\Flexera Software\Inventory Beacon\RemoteExecution\Public\Inventory` (defined in the Windows share `mgsRET$`) .
2. From this folder, collect a copy of each of the following files:
   - `ndtrack.sh` – This script determines the operating system on which it is running, and installs and then executes the platform-specific version of `ndtrack` (known as "the tracker", the core code element for inventory gathering).
   - `ndtrack.ini` – This is the configuration file for the tracker (on UNIX-like platforms only). This file is optional, and only needed if you wish to configure the behavior or settings for the tracker. If used, it must be installed in the same folder as the tracker. For more information about customizing the configuration, see Configuring ndtrack.ini for UNIX-like Platforms.
   - `InventorySettings.xml` – Functionality extensions are embedded in the file `InventorySettings.xml`, which may be updated from time to time in the ARL download process. Your current license terms are integrated with the same file on the central application server, and the result is automatically downloaded to your inventory beacons after each update. On the inventory beacon, the file is saved in `%CommonAppData%\Flexera Software\Beacon\InventorySettings`. A copy is also saved in the folder identified above for remote execution. The file is mandatory if you wish to collect Oracle inventory (or Microsoft Server inventory, but that is hardly relevant for UNIX-like platforms). If used, this file must also be installed in the same folder as `ndtrack.sh`. It may be omitted for a particular installation of the shell script where this installed instance does not collect Oracle inventory.

     Important: *Do not edit this file!*

     Tip: *Take note of the revision number in the first line of the `InventorySettings.xml` file for future reference. Set a reminder for yourself in your preferred tool to check the revision number of*

`InventorySettings.xml` after future updates of the Application Recognition Library. If the revision changes, you should manually update all the copies you manually deployed. These changes allow the inventory tool to stay abreast of inventory changes necessary to support the latest Oracle or SQL Server licenses.

Configuring ndtrack.ini for UNIX-like Platforms

The optional configuration file `ndtrack.ini` can be used:

- To disable specific parts of inventory gathering (although doing this places at risk your ability to calculate consumption for licenses that rely on the inventory being available)
- To store run-time preferences that would otherwise be required on the command line at each invocation.

All the specifications embedded in the default `ndtrack.ini` file are also embedded in the `ndtrack.sh` executable, so that when the `.ini` file is omitted, default functionality is preserved. When the tracker is first invoked, it checks for the presence of an `ndtrack.ini` file in the same directory where the executable is running. If present, the external file takes precedence, *in its entirety*. This means that if, for example, your copy omits a provider statement that is present in the default file, this is equivalent to turning off that part of inventory gathering. For this reason, it is critically important to always start customization with a complete copy of the latest default file from your inventory beacon (see FlexNet Inventory Scanner: Implementation on UNIX-like Platforms), and to change only those elements that are essential, preserving all other values.

Disabling a part of inventory

Find the appropriate section in the `ndtrack.ini` file, and remove or comment out the provider details. For example, the following change prevents collection of the physical memory size on Solaris platforms:

```
[ManageSoft\Tracker\CurrentVersion\SunOS\Hardware\MGS_PhysicalMemory]
#provider=SolarisPhysicalMemory
```

***Note:** A line commencing with the hash character (#) is commented out. This character is also known as the pound character, or number sign.*

Be cautious about what you comment out, since an unusual variety of hardware attributes can affect consumption calculations on different kinds of licenses.

Storing a run-time preference

The behavior of the `ndtrack.sh` executable can be conditioned by a large number of preferences. When the parallel executable on Windows, `ndtrack.exe`, is operating within the locally-installed, complete FlexNet inventory agent, it can read these preferences either from the command line or from values saved in the Windows registry (in contrast, the Windows version of the light FlexNet Inventory Scanner does *not* check registry entries, simplifying its deployment and operation). On UNIX-like platforms, there is (of course) no Windows registry, so that preferences are either:

- Read from the command line as parameters, which parameters are common for both Windows and UNIX-like platforms (see FlexNet Inventory Scanner Command Line for details)
- Saved in a configuration file that acts as an alternative storage medium on these non-Windows platforms.

On UNIX-like platforms, the configuration file is different in these two cases:

- When the complete FlexNet inventory agent is locally installed on the target device running a UNIX-like operating system, the file is called `config.ini`.
- When `ndtrack.sh` is being deployed alone as a light inventory scanner, the file is called `ndtrack.ini`.

The naming difference keeps clear their different purpose and differences in content; but these two files have one thing in common — their ability to store preferences for use by `ndtrack.sh` (acting as a 'virtual' registry). Furthermore, this common functionality is achieved in exactly the same way:

- The equivalent of the Windows registry key is listed inside square brackets
- The following lines under each key show the registry value (or values) set under that key.

For example, suppose that you want the collected inventory from your UNIX-like device uploaded to your inventory beacon. One way is to use the following two preferences on the command line (this example shows an IP address for the `UploadLocation`):

```
./ndtrack.sh -o Upload=True -o UploadLocation=http://198.51.100.3/ManageSoftRL
```

Another way is useful when you want to deploy the lightweight inventory scanner but by default have it regularly upload inventory. To achieve this, you can customize the `ndtrack.ini` file with the following addition, and simply deploy this into the same directory as the executable `ndtrack.sh` (the `UploadLocation` can alternatively be the fully qualified server name):

```
[ManageSoft\Tracker\CurrentVersion]
Upload=True
UploadLocation=http://FQServerNameOrIP/ManageSoftRL
```

Such customizations require that you know the equivalent registry paths used on Microsoft Windows (as well as the name/value pairs). Many preferences, complete with the relevant registry paths, are documented in the *Preferences* chapter of this document.

For our previous example, that chapter shows the registry path for the computer-based preference `Upload` in this manner:

```
[Registry]\ManageSoft\Tracker\CurrentVersion
```

Here, the placeholder `[Registry]\` stands for one of the following values, as appropriate for the context:

- The registry base path on Windows 32-bit devices
- The registry base path on Windows 64-bit devices
- The `config.ini` file for the full FlexNet inventory agent locally installed on the device
- The `ndtrack.ini` file for the lightweight deployment of `ndtrack.sh` as a stand-alone inventory scanner.

In the case of the lightweight FlexNet Inventory Scanner, the placeholder `[Registry]\` should be read as "add the following path inside square brackets to your `ndtrack.ini` file". This reading, together with the information in the *Value/range* entry in the relevant topics, produces the example shown above, which is good for anonymous authentication on the upload. The standard URL construct can also be used where an account name and password are required for the upload, although you may prefer this format on a transitory command line rather than in a plain text file:

```
[ManageSoft\Tracker\CurrentVersion]
Upload=True
UploadLocation=http://AccountName:Password@FQServerNameOrIP/ManageSoftRL
```

In a similar manner, you can include in your `ndtrack.ini` file any other preferences for `ndtrack` from `FlexNetInventoryAgentAndMDs.pdf` that are relevant to UNIX-like platforms.

Note: *Any preference setting in `ndtrack.ini` is over-ridden by a different value for the same preference given as a command-line parameter. The priority order is: default (built in) values are over-ridden by settings in `ndtrack.ini`, which are over-ridden by command-line parameters.*

Customizing Searches for FlexNet Inventory Scanner

You can extensively customize the FlexNet Inventory Scanner behavior using the command line by instructing it to include or exclude any of the following:

- Folders (and optionally, their subfolders)
- Particular file extensions
- Specific filenames
- Specific MD5 digest values.

Tip: *Checking MD5 digests across all inventory can significantly extend the time required for gathering inventory on a device.*

When including or excluding extensions, file names and MD5 values, there is a possibility that a file could be both included and excluded. To overcome this problem, a matching MD5 value overrides a file name, which overrides a file extension.

For example, if

- File extension `exe` is included
- Filename `xcopy.exe` is excluded
- MD5 value `123456...` (the MD5 for `xcopy.exe`) is included

then the FlexNet Inventory Scanner includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`

If the same directory, file extension, filename or MD5 value is explicitly included and excluded, the exclusion command takes precedence.

All such customizations are available through command-line options when you execute the FlexNet Inventory Scanner (see FlexNet Inventory Scanner Command Line). On UNIX-like platforms only, in addition to the command-line options, they may be configured in the `ndtrack.ini` configuration file (see Configuring ndtrack.ini for UNIX-like Platforms).

FlexNet Inventory Scanner Command Line

Command line summary for the FlexNet Inventory Scanner on both Windows and UNIX-like platforms.

Syntax:
(On Microsoft Windows) **`FlexeraInventoryScanner.exe [options...]`**

Syntax:
(On UNIX-like platforms) **`ndtrack.sh [options...]`**

Options:

Syntax:
`-o` *tag = value*

These optional parameters individually override the default FlexNet Inventory Scanner settings on Windows. On UNIX-like platforms, they override both the individual default settings and any matching preference recorded in `ndtrack.ini`.

Preferences for FlexNet Inventory Scanner are directly passed through to the `ndtrack` executable, so that details for each option are included in the preferences topics listed and linked below.

Enclose values in double quotation marks if the values include spaces; otherwise, double quotation marks are optional. Special characters (double quotation marks, backslash) must be escaped with a backslash.

Tip: *The `-t` command-line option available on Windows for the installed FlexNet inventory agent is not supported for the FlexNet Inventory Scanner. Instead, you can specify the inventory type using the command line parameter:*

```
-o InventoryType=User|Machine
```

If the `InventoryType` preference is not specified, the type of inventory collected on Windows platforms depends on the account running the FlexNet Inventory Scanner:

- *For the **LocalSystem** account, a computer (machine) inventory is collected*
- *For all other accounts, a user inventory is collected.*

For UNIX-like platforms, only machine-based inventory is supported.

Return codes

FlexNet Inventory Scanner returns a zero on success. If you receive a non-zero return code, check the log file. Details of the log file may also be configured with command-line options, as listed below.

Example: Command line examples
This example collects a computer inventory and stores it locally (on the computer device where the FlexNet Inventory Scanner is executing) for upload by a separate system:

```
FlexeraInventoryScanner.exe
          -o InventoryType=Machine
          -o MachineZeroTouchDirectory="local-folder"
          -o Upload=False
```

This example collects user-based inventory and uploads it to an inventory beacon:

```
FlexeraInventoryScanner.exe
          -o InventoryType=User
          -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
```

Options

Except as specifically noted, the same options are supported for the FlexNet Inventory Scanner on Microsoft Windows, and for the use of `ndtrack.sh` as a scanner on UNIX-like platforms.

- DateTimeFormat
- ComputerDomain
- ExcludeDirectory
- ExcludeExtension
- ExcludeFile
- ExcludeMD5
- GenerateMD5
- Hardware
- IncludeDirectory

  Important: *Since the default for this preference is blank, this means that no files are included in inventory gathering by default. Inventory then relies entirely on installer evidence. If you wish to collect file evidence for any reason, it is mandatory to set an appropriate value for* `IncludeDirectory`.

- IncludeExecutables
- IncludeExtension
- IncludeFile
- IncludeMachineInventory
- IncludeMD5
- IncludeRegistryKey (ignored for UNIX-like platforms)
- IncludeUserInventory (ignored for UNIX-like platforms)
- InventoryFile

- InventoryScriptsDir
- `InventoryType` is deprecated on Windows and ignored on UNIX-like platforms. The defaults for Windows are `User` unless the account executing FlexNet Inventory Scanner is `LocalSystem`, in which case the default switches to `Machine`. Available for backward compatibility only.
- LogFile (installation component)
- LogLevel (inventory component)
- LogModules (inventory component)
- LowProfile (inventory component)
- MachineName
- MachineZeroTouchDirectory (ignored for UNIX-like platforms)
- MSI (ignored for UNIX-like platforms)
- ProgramFiles, ProgramFilesX86Folder, ProgramFilesX64Folder (ignored for UNIX-like platforms)
- Recurse
- RunInventoryScripts (ignored for UNIX-like platforms)
- ShowIcon (inventory component) (ignored for UNIX-like platforms)
- SysDirectory (ignored for UNIX-like platforms)
- Upload

Tip: *The default `False` value for FlexNet Inventory Scanner is the inverse of the default for the installed, complete FlexNet inventory agent.*

- UploadLocation
- `UserHardware` (ignored for UNIX-like platforms, and deprecated for Windows). Available for backward compatibility only. Effective only when running in the user context (also deprecated). The default `False` excludes hardware inventory data from the user's software inventory.
- `UserZeroTouchDirectory` (ignored for UNIX-like platforms, and deprecated for Windows). Available for backward compatibility only. The FlexNet Inventory Scanner uses the location specified in this option for any user-based inventory (user-based inventory is also deprecated). It has no default value.
- VersionInfo (ignored for UNIX-like platforms)
- WinDirectory (ignored for UNIX-like platforms)
- WMI (ignored for UNIX-like platforms)
- WMIConfigFile (ignored for UNIX-like platforms).

Notes

1. Default values only apply if the parameter is not specified.

2. Directory paths must be specified as absolute paths (that is, on Windows, starting with a drive name). The typical wildcards in directory names are supported (`*` representing any number of characters, and `?` representing a single character).
3. The FlexNet Inventory Scanner accepts all name/value combinations, although if a preference is used that does not appear in the list above, it may be ignored. On UNIX-like platforms, preferences may be included in the `ndtrack.ini` configuration file (not supported for Microsoft Windows).
4. A preference value can symbolically refer to another preference by enclosing its name thus: `$(`*`preferenceName`*`)`. References can contain further references.
   Example: The command

   ```
   FlexeraInventoryScanner.exe -o IncludeDirectory=$(WinDirectory)
   ```

   includes the Windows directory in the scan. References are resolved after all preferences are loaded so there are no ordering issues. Hopefully it is self-evident that, on UNIX-like platforms, only supported preferences can be referenced.
5. Semicolon or comma-separated values are the only method for defining multiple values in the FlexNet Inventory Scanner. Only the `Include` and `Exclude` preferences listed above may have multiple values. All other preferences contain a single value that can be overwritten.
   Example: The command

   ```
   FlexeraInventoryScanner.exe -o IncludeDirectory=C:\\;D:\\;E:\\
   ```

   will scan the computer's C:, D:, and E: drives if they are fixed (hard) disks, but not if they are CD-ROM drives or logical drives (mapped to network locations).

For more information, see ndtrack Command Line.

FlexNet Inventory Scanner: Troubleshooting Inventory

Inventory gathering and upload is a sophisticated chain from target inventory device through inventory beacon to central application server. For general trouble-shooting over the whole process, see the online help for FlexNet Manager Suite under *Inventory Beacons* > *Inventory Beacon Reference* > *Troubleshooting: Inventory Not Uploading*. This topic focuses entirely on inventory collection on the target inventory device.

When you use FlexNet Inventory Scanner, the normal log file for the `ndtrack` executable is saved:

- On Windows platforms, in `%temp%\ManageSoft\tracker.log`
- On UNIX-like platforms, in `/var/tmp/flexera/log` (when the executable was invoked by the `root` account, as recommended) or `/var/tmp/flexera.`*`UserName`*`/log` (when invoked by the *`UserName`* account).

For advanced trouble-shooting, you may require more advanced tracing and logging. You may also be asked to submit a trace file to assist the Support team at Flexera Software to solve difficult problems in your environment.

By default, tracing is not a function deployed with FlexNet Inventory Scanner. However, with some custom preparation, you can set up for, and control, tracing with a `.trace` configuration file of your own.

To set up and configure tracing for FlexNet Inventory Scanner:

1. Obtain a copy of an `etcp.trace` file from an installed FlexNet inventory agent on another device.

   Where the full FlexNet inventory agent has been installed on a target device, the `etcp.trace` file is located with the `ndtrack` executable:

   - On Windows, the default is `C:\Program Files (x86)\ManageSoft\etcp.trace`
   - On UNIX-like platforms, the default is `/opt/managesoft/etcp.trace`.

   Because this file format is consistent across platforms, you may take your copy of `etcp.trace` from any inventory device where the full FlexNet inventory agent is installed.

2. On a Windows device:

   a. Save the `etcp.trace` file in the directory on the target device where the FlexNet Inventory Scanner will execute (the `temp` directory of the account that is invoking it).

   b. On the same target device, create the registry key `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ManageSoft Corp\ManageSoft`, add the string value `InstallDir`, and set the value to the full path to the directory where you have saved `etcp.trace`.

3. On UNIX-like platforms, a rename and relocation are mandatory:

   a. Rename the `etcp.trace` file as `ndtrack.trace`.

   b. Save the file as `/etc/ndtrack.trace`.

4. Configure the name and location of the trace/log file that will be generated on the inventory device.

   The hash or pound character (#) identifies a comment. To "uncomment" a line in the `.trace` configuration file means to delete (only) the leading hash character. Choose one of the following lines, uncomment it, and optionally modify it to your requirements. On Windows:

   ```
   #filename=C:\ManageSoft.log
   #filename=C:\ManageSoft%p_%d_%t_%u.log        # filename pattern with everything!
   ```

   On UNIX-like platforms:

   ```
   #filename=/tmp/log/mgstrace.log
   #filename=/tmp/log/ManageSoft%p_%d_%t_%u.log # filename pattern with everything!
   ```

   See the notes within the file header for the use of the supported variables within the file name.

Tip: *It is best practice to use a pattern that includes (at least) either a date stamp (%d) or a sequential number (%u). Without these, the fixed file name means tracing information is appended to the same file with every inventory collection. This can quickly produce a trace file too large for text editors to read, and too hard to manage in terms of disk space. Variables in the file name trigger creation of a new file each time the associated variable is changed (or, for %u, at every invocation of `ndtrack`).*

Important: *The log file path:*

- *Must be on the same drive as the `ndtrack` executable (on Windows devices)*

- *Must exist and be writable before the `ndtrack` executable is next invoked (tracing does not create any directories, and does not function if any directory in the specified path is missing or unwritable).*

5. Uncomment the lines for which you want to enable tracing (ensuring that the uncommented line now starts with a plus sign).

   For FlexNet Inventory Scanner, the typical lines to uncomment are:

   ```
   +Inventory
   +Error
   +Communication/Network
   ```

When FlexNet Inventory Scanner is invoked, it creates the tracing log file as you specified, ready for your inspection.

6

Core deployment: Details

This chapter provides great detail about the FlexNet inventory core components when you deploy them to target Windows devices using the third-party (or non-FlexNet) deployment technology of your choice.

In this configuration, and given appropriate command lines, the FlexNet inventory core components are capable of collecting hardware and software inventory from a target device, and uploading it to a location specified in the command line. This configuration is helpful when you want to take full control of deployment, scheduling, agent updates, and the like, using your existing processes and technologies. (For details of the distinct use cases, refer back to Understanding What, Where, How, and Why.)

This document provides a consistent set of data (as far as possible) across all the different use cases, each in its own chapter. This means that, once you have chosen your preferred use case, you can focus only on the details for that one, and ignore all other use case chapters.

In addition to the distinct chapters for the different use cases, you should also review the subsequent chapter on functionality that is common throughout. This is followed by detailed reference material on command lines, preferences, file formats, and the like.

Core deployment: Normal Operation

For details about deployment and configuration of the FlexNet inventory core components, see Core deployment: Implementation. To help you decide whether to proceed with that process, this topic describes the resulting operation in some detail, assuming that you have deployed the FlexNet inventory core components into locations within your Windows computer estate where each installation can access one or more inventory beacons, and function normally. Furthermore, you have configured a Microsoft scheduled task to invoke the tracker component (`ndtrack.exe`) on each inventory device, setting the appropriate command line parameters.

The entire process is covered, including what happens to the collected data after it uploaded by the FlexNet inventory core components. Each numbered step provides a summary point, followed by further specific details that you can skip over until needed.

Tip: *Inventory operations of the installed FlexNet inventory core components in the Core deployment case are never controlled by inventory rules created in the web interface of FlexNet Manager Suite. The results of those settings are distributed through policy, and the FlexNet inventory core components do not include any mechanism for requesting, downloading, or applying policy. To have the target inventory device managed*

through settings in the web interface, switch instead to either of the Adopted case or the Agent third-party deployment case.

1. The FlexNet inventory core components sit dormant on the target inventory device until your custom scheduled task triggers the `ndtrack.exe` component to collect inventory.

2. In accordance with the command-line parameters included in the invocation, the tracker collects the hardware and software inventory from its local device.

   By default, the tracker runs at low priority so that higher priority tasks are not interrupted, and there is minimal impact on system performance. Inventory details are saved in two ways:

   - An `.ndi` file is saved (by default) in `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\Inventories`. This directory preserves the local copy of the inventory file (where you can inspect its contents) until it is over-written at the next inventory collection by the same account (since inventory file naming reflects the account running the inventory collection).
   - At the same time, a compressed (`.ndi.gz`) copy of the file is also saved, ready for upload, by default in `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Common\Uploads\Inventories`. (If this file is subsequently uploaded successfully, it is removed; but if there is a failure it remains in this directory until over-written at the next inventory collection by the same account.)

3. If the tracker has been configured for Oracle inventory, and has uncovered any Oracle services running on the local device, and the tracker is running as `root`, additional files are created:

   - A second `.ndi.gz` file of Oracle inventory is also generated, and saved in `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Common\Uploads\Inventories` (an uncompressed version is not saved).
   - As well, the Oracle discovery is reported in an uncompressed `.disco` file, saved in the `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Common\Uploads\Discovery` directory.

   Note: *On UNIX-like platforms, Oracle discovery and inventory gathering is only possible when the tracker (`ndtrack` executable) is running as `root`.*

4. After collecting the hardware and software inventory, `ndtrack` immediately attempts to transfer the compressed inventory file(s) to an inventory beacon.

   - The inventory beacon is the one identified in the command-line parameters when the tracker was invoked (either of the UploadLocation or UploadSettings options may have been used).
   - If the upload succeeds, the compressed inventory files are removed from `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Common\Uploads\Inventories`.
   - Results are logged to `$(TempDirectory)\ManageSoft\tracker.log` by default (although there are other command line options that can modify this).
   - The upload is a background process that does not take priority away from other current tasks running on the inventory device.
   - If the initial upload is unsuccessful for any reason, there is no attempt at a catch-up upload overnight (that functionality requires the full FlexNet inventory agent). Either you may script a catch-up, or the

compressed files are left in place, and are overwritten at the next inventory collection trigger using the same account name.

5. FlexNet Beacon (the code entity on the inventory beacon) uploads the inventory data to its parent on a schedule set by the Microsoft Scheduled Task `Upload FlexNet logs and inventories` (by default, repeating every minute throughout the day).

   The checking cycle when the folder is empty is very quick and does not perceptibly load the inventory beacon, even though it is frequently repeated. The parent of an inventory beacon may be the central application server, or another inventory beacon if these have been arranged in a hierarchy. In the latter case, each inventory beacon in turn repeats the upload process until the data reaches the application server.

6. On the application server (or, in a scaled-up system with separate servers, the inventory server), the web service `ManageSoftRL` receives the uploaded packages for both inventory and (if configured) usage tracking (and other uploaded files).

   These are processed immediately, being loaded into the internal operations databases: inventory (`.ndi`) and usage (`.mmi`) files are loaded into the inventory database; any Oracle discovery (`.disco`) file is loaded into the compliance database. If the service gets overloaded, it will temporarily spool incoming files to its local *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories` directory (or the peer `Discovery` folder for any Oracle discovery file). From these folders, file import is resumed under the control of Microsoft scheduled tasks (for example, `Import inventories`, which is triggered every 10 minutes).

7. On the next inventory import and license consumption calculation, the inventory and usage data is collected from the inventory database, socialized as necessary, and imported into the compliance database. Here it is used in license calculations, and made available in management views and reports.

   This import step can be triggered in one of three ways:

   - Normally, the batch scheduler triggers an import daily (by default, at 2am local time on your application server), with the license consumption calculation triggered thereafter. This default time is configurable by editing the Microsoft scheduled task `Inventory import and license reconcile` on your application server (or, in larger implementations, batch server).
   - An operator in the `Administrator` role can choose to import the waiting inventory and trigger license consumption calculation, or reconciliation, as soon as possible (navigate to **License Compliance > Reconcile**).
   - For testing, a knowledgeable system administrator could use a command line on your application server (or, in a scaled-up system, your batch server) like:

     ```
     BatchProcessTask.exe run InventoryImport
     ```

     (for details, see the *Server Scheduling* chapter in the *FlexNet Manager Suite System Reference* PDF).

Core deployment: System Requirements

The following details apply to the FlexNet inventory core components when you use your preferred third-party deployment processes to install them on a target Windows device.

Supported platforms

The FlexNet inventory core components operate on the following platforms (inventory targets):

Microsoft Windows	UNIX-like platforms
• Windows Server 2016 • Windows Server 2012 R2 SP1 • Windows Server 2012 R2 • Windows Server 2012 • Windows Server 2008 R2 x64 Server Core • Windows Server 2008 R2 x64 • Windows Server 2008 Server Core • Windows Server 2008 x64 Server Core • Windows Server 2008 x64 • Windows Server 2003 R2 • Windows Server 2003 R2 x64 • Windows Server 2003 • Windows Server 2003 x64 • Windows 10 x64 • Window 10 • Windows 8 x64 • Windows 8 • Windows 7 x64 • Windows 7 • Windows Vista x64 • Windows Vista • Windows XP Professional x64 • Windows XP Professional • Windows XP Home	• AIX 5.2, 5.3, 6.1, 7.1, LPARs • CentOS 4, 5, 6, 7 (x86/x86-64 only) • Debian 6, 7 (x86/x86-64 only) • Fedora 6–11, 18-23 (x86/x86-64 only) • HP-UX 11.00, 11i, 11i v2, 11i v3, vPars/nPars • Mac OS X 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12 • Oracle Linux 4.5 – 7.0 (x86/x86-64 only) • Red Hat Enterprise Linux 3 (x86 only), 4, 5, 6, 7 (x86/x86-64 only) • Red Hat Linux 8 and 9 (x86 only) • Solaris 8 (SPARC only) • Solaris 9, 10, 11 (x86/x86-64 and SPARC), Zones for versions 10 & 11 • SuSE Enterprise Server 11, 12 (x86/x86-64 only) • SuSE Professional 12, 13 (x86/x86-64 only) • Ubuntu 12-15 (x86/x86-64 only)

Disk space requirements

On target Windows inventory devices in the Core deployment case, the following are disk space requirements:

- Where the target device is a typical workstation, in the order of 6MB
- For an Oracle server, in the order of 9MB.

The following log file is available on the target inventory device in the Core deployment case:

- `tracker.log` — Generated by the inventory agent, `ndtrack`

Memory requirements

On target inventory devices, the memory requirements are:

- Minimum RAM: 512 MB
- Recommended RAM: 2 GB

In general, through a cycle of inventory gathering and upload, the memory demand is in the order of 5-30 MB.

Communications protocols and ports

When the FlexNet inventory core components execute on the target device (in the Core deployment case), the only ports required are the standard ports for communication with the inventory beacon:

- From FlexNet inventory core components on target device, inbound on the inventory beacon — File upload using HTTP protocol: port 80
- From FlexNet inventory core components on target device, inbound on the inventory beacon — File upload using HTTPS protocol: port 443

Supported packages to inventory

FlexNet inventory can include data from most package technologies supported by the operating systems, and some additional third-party packaging technologies:

Platform	Supported package technologies
All platforms	InstallAnywhere (IA), InstallShield Multiplatform (ISMP), BEA/Oracle Installer (BEA), Oracle Universal Installer (OUI), IBM Installation Manager (IIM)
AIX	LPP, RPM
HP-UX	Software Distributor SD-UX Package
Linux	RPM (Red Hat, CentOS, Oracle, SuSE, Fedora, etc), DPKG (Debian, Ubuntu).
Mac OS X	Mac Application Bundle, Mac Package Bundle
Solaris	Sys V Package (pkg), IPS
Windows	MSI, Add/Remove Programs Registry Key

However, FlexNet inventory cannot collect data from some of the less common or newer operating system technologies and many third-party technologies. Some known examples include:

- All platforms — IBM InstallStream, IBM Tivoli Netcool Installer

- Mac OS X — Mac flat package.

System load benchmarks

The following notes reflect observed behavior on sample target inventory devices during collection of FlexNet inventory:

Task	Run duration (seconds)	CPU usage (seconds)	CPU usage (% of single core)	Memory usage	Network load
Inventory collection	13 to 240 s	5 to 130 s	10% to 50%	4 MB to 20 MB	10 KB to 200 KB per upload

Core deployment: Accounts and Privileges

In the Core deployment case, when the FlexNet inventory core components gather hardware and software inventory from the target Windows inventory device, they execute as the user name (or account) that triggered the execution.

To effectively gather inventory, this account must have administrator privileges on the local machine. The preferred practice is for the FlexNet inventory core components to be invoked by the Local `SYSTEM` user. In production use, this can be configured when you set up the Microsoft scheduled task that is to trigger inventory collection.

Core deployment: Implementation

Deploying on the FlexNet inventory core components, and doing so with third-party tools, is not the recommended best practice for using FlexNet Manager Suite to gather specialized inventory. It is a path available for those who cannot use any of the other preferred paths (in particular, third-party deployment of the complete FlexNet inventory agent in the Agent third-party deployment case offers much better automation and simplified on-going management). Because it is not recommended, there is no easy path to securing and configuring all the required elements.

In particular, the task is impracticably difficult on UNIX-like platforms, so that only a path for Windows platforms is described here.

To use third-party deployment tools for the FlexNet inventory core components on Windows platforms:

1. Obtain a copy of the appropriate files from a convenient inventory beacon:
    a. In Windows Explorer on your inventory beacon, navigate to `C:\Program Files (x86)\Flexera Software\Inventory Beacon\RemoteExecution\Public\Inventory`.
    b. Take a working copy of all files in this directory (including the `plugins` subdirectory), with the exception of the two files for UNIX-like platforms (`ndtrack.sh` and `ndtrack.ini`).

c. Save this collection to a working location suitable for preparing deployment with your preferred technology.

These files are the version of the tracker component that is automatically installed with the FlexNet Beacon software. You may wish to note in your procedural documentation that a future update to your inventory beacons should also trigger a re-deployment of the updated tracker.

2. Optionally, in that working location, customize the `wmitrack.ini` file to reconfigure the WMI classes used for inventory collection on target Windows devices.

   The components to be tracked can be any valid Win32 classes. A full list of classes is provided at .

3. Optionally (and subject to your license terms), extend the inventory gathering capabilities to cover Oracle inventory, or Microsoft SQL Server inventory, on target devices:

   This functionality is only available if you have licensed the FlexNet Manager for Oracle product.
   Check that your saved folder contains a copy of `InventorySettings.xml`.

   Important: *Do not edit this file!*

   Tip: *Take note of the revision number in the first line of the `InventorySettings.xml` file for future reference. Set a reminder for yourself in your preferred tool to check the revision number of `InventorySettings.xml` after future updates of the Application Recognition Library. If the revision changes, you should manually update all the copies you manually deployed. These changes allow the inventory tool to stay abreast of inventory changes necessary to support the latest Oracle or SQL Server licenses.*

   For this Core deployment case, the `InventorySettings.xml` file must be deployed to the same directory as the `ndtrack` executable. (Don't be confused by other cases, such as the Agent third-party deployment case, where the `InventorySettings.xml` file must *not* be co-located with the full agent.)

4. Configure your deployment tool to set a schedule for inventory collection and upload on each target inventory device (for example, using a Microsoft Scheduled Task, or your preferred scheduling technology).

   - The task should run under an account with administrator privileges, preferably the local `SYSTEM` account. When run as `SYSTEM`, it is not necessary to specify the inventory type, as the default for this account is to take machine inventory. If you run under any other account, you *must* include the `-t Machine` command line parameter.
   - The command line *must* include a parameter to attempt uploads to an inventory beacon (preferably a high-reliability server and network, since there is no catch-up from failed upload attempts), such as the following (on a single line, and inserting your inventory beacon server's domain name in place of the place-holder):

     ```
     drive-and-path\ndtrack.exe -t Machine
         -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
     ```

   - The command line may include other parameters discussed in ndtrack Command Line.
   - You may need to vary (or randomize) the scheduled time for inventory collection, to spread the load on both the network and the inventory beacon accepting the subsequent uploads.

5. As required for your deployment tool/method, pack and deploy the modified folder of files.

   The typical folder for installation of the FlexNet inventory core components is:

   ```
   C:\Program Files (x86)\Flexera Software\Agent
   ```

   However, you may customize the installation path as required (for example, to install on another fixed disk drive).

6. Validate by visiting a targeted Windows inventory device, and using the scheduling tool to trigger an immediate (one-off) inventory collection and upload.

   Alternatively, use the same command line and options in the command-line window. For details of saved files, paths, and logs, see Core deployment: Normal Operation.

The installed FlexNet inventory core components continue to collect and upload hardware and software inventory (and, where applicable, additional Oracle and Microsoft SQL Server inventory and discovery data) as scheduled. Because there is no download of policy possible to the FlexNet inventory core components, inventory gathering on these devices is not controlled by any aspects of the web interface of FlexNet Manager Suite. Control, and future management of updates, are entirely in your hands.

Core deployment: Troubleshooting Inventory

Inventory gathering and upload is a sophisticated chain from target inventory device through inventory beacon to central application server. For general trouble-shooting over the whole process, see the online help for FlexNet Manager Suite under *Inventory Beacons* > *Inventory Beacon Reference* > *Troubleshooting: Inventory Not Uploading*. This topic focuses entirely on inventory collection on the target inventory device.

After you have deployed and installed the FlexNet inventory core components on a Windows device, the regular log file for the `ndtrack` component is `$(TempDirectory)\ManageSoft\tracker.log` by default (although there are command line options that can modify this).

For advanced trouble-shooting, you may require more advanced tracing and logging. You may also be asked to submit a trace file to assist the Support team at Flexera Software to solve difficult problems in your environment.

To set up and configure tracing for FlexNet inventory core components:

1. Obtain a copy of an `etcp.trace` file from an installed FlexNet inventory agent on another device.

   Where the full FlexNet inventory agent has been installed on a target device, the `etcp.trace` file is located with the `ndtrack` executable:

   - On Windows, the default is `C:\Program Files (x86)\ManageSoft\etcp.trace`
   - On UNIX-like platforms, the default is `/opt/managesoft/etcp.trace`.

   Because this file format is consistent across platforms, you may take your copy of `etcp.trace` from any inventory device where the full FlexNet inventory agent is installed.

2. Save the `etcp.trace` file in the directory on the target device where the FlexNet inventory core components will execute.
3. Create a registry key that identifies this location:
   a. Create the registry key `HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ManageSoft Corp\ManageSoft`.
   b. Add the string value `InstallDir`.
   c. Set the value to the full path to the directory where you have saved `etcp.trace`.
4. Configure the name and location of the trace/log file that will be generated on the inventory device.

   The hash or pound character (#) identifies a comment. To "uncomment" a line in the `.trace` configuration file means to delete (only) the leading hash character. Choose one of the following lines, uncomment it, and optionally modify it to your requirements.

   ```
   #filename=C:\ManageSoft.log
   #filename=C:\ManageSoft%p_%d_%t_%u.log        # filename pattern with everything!
   ```

   See the notes within the file header for the use of the supported variables within the file name.

   Tip: *It is best practice to use a pattern that includes (at least) either a date stamp (%d) or a sequential number (%u). Without these, the fixed file name means tracing information is appended to the same file with every inventory collection. This can quickly produce a trace file too large for text editors to read, and too hard to manage in terms of disk space. Variables in the file name trigger creation of a new file each time the associated variable is changed (or, for %u, at every invocation of `ndtrack`).*

   Important: *The log file path:*

   - *Must be on the same drive as the `ndtrack` executable (on Windows devices)*
   - *Must exist and be writable before the `ndtrack` executable is next invoked (tracing does not create any directories, and does not function if any directory in the specified path is missing or unwritable).*
5. Uncomment the lines for which you want to enable tracing (ensuring that the uncommented line now starts with a plus sign).

   For FlexNet inventory core components, the typical lines to uncomment are:

   ```
   +Inventory
   +Error
   +Communication/Network
   ```

When the tracker component is invoked, it creates the tracing log file as you specified, ready for your inspection.

7

Common: Details

This chapter provides useful details that apply to the operation of the `ndtrack` executable, regardless of whether that is deployed as part of FlexNet inventory agent or of FlexNet inventory core components. The details in this chapter are also unaffected by the deployment methods.

Earlier chapters provide a consistent set of data (as far as possible) across all the different deployment methods, each in its own chapter. This means that, once you have chosen your preferred deployment method, you can focus only on the details for that one, and ignore all other deployment method chapters.

In contrast, this chapter focuses on functionality that is common throughout.

Common: Child Processes Invoked by the Tracker

Whenever the tracker (the `ndtrack` executable) is invoked on a target device, it calls a few utilities and operating system commands to fulfill its inventory-gathering tasks. The behavior of the tracker is consistent (per platform), regardless of how it is delivered to the target device or how it is invoked. For this reason, the following per-platform listings of child processes invoked by the tracker apply equally across all these tracker cases described in this document:

- Adopted through the automated processes within FlexNet Manager Suite
- Agent third-party deployment using the third-party tools of your choice
- Zero-footprint, where the tracker is copied from the inventory beacon, and installed and run
- FlexNet Inventory Scanner, where the tracker is invoked by the `ndtrack.sh` script
- Core deployment, where you have arranged for the deployment of FlexNet inventory core components and now manage invoking the `ndtrack` executable within your specialized scenario

(To revise details of the cases, see the chapter Understanding What, Where, How, and Why.)

To operate securely, the tracker invokes these child processes with appropriate levels of privilege. Security and functionality can often be a trade-off, and in those cases, the priority is with security. This may mean that, depending on the security configuration in your computing estate, some inventory-gathering processes cannot

succeed until you update the configuration to allow the specific tasks. In many cases, the outcomes of such restrictions are visible in the discovered device properties by selecting the **Status** tab, and expanding the **Oracle database inventory** heading. However, some issues are recorded only in the `tracker.log` file on the target inventory device. For more details, see the chapter on *Oracle Discovery and Inventory* in the *System Reference* PDF.

Because the details vary across platforms, the processes and accounts used are documented separately in the following topics, first for Windows and then for UNIX-like platforms. Each gives a complete listing, and they may be read independently.

Common: Child Processes on UNIX-Like Platforms

The tracker normally runs as `root`, because elevated privileges are required to complete several aspects of inventory gathering.

Note: *If you choose to run the tracker using another account that does not have elevated privileges, you considerably weaken the resulting inventory:*

- *Oracle inventory is disabled*
- *IBM WebSphere inventory is disabled*
- *All hard disk information for Linux systems is excluded*
- *Software inventory from paths not accessible to the executing user is omitted for all systems*
- *Several further losses occur, as noted in the table of child processes below.*

The implications of running as `root` include the following:

- Commands in safe system paths (not writable by other users) are run as `root`.
- Commands found within paths listed in the `$PATH` environment variable for the `root` user are run as `root`.

  Note: *This makes it important that, as is normal secure practice, you do not allow any unsecured directories to be included in the `$PATH` environment variable for the `root` user.*

- Commands and utilities saved in unsecured directories on the file system are *not* run as `root`. These must be run with no more trust that you already provide in your environment. To do this, the tracker uses *user impersonation*, so that it invokes child processes with the same level of trust and security management that you have already established for the existing account being impersonated. On UNIX-like platforms, the method is to impersonate the user account that is running the service related to the executable in question. For example, the executable `lsnrctl` normally starts the `tnslsnr` service. Therefore, when the tracker needs to invoke `lsnrctl`, it impersonates the user account running the `tnslsnr` service. Since this account is already running the process in question, it is a trusted account for the path on the target device where inventory is being collected.

The table of child processes is organized in alphabetical order of the executables invoked by the tracker. Where the details vary across various UNIX-like platforms, a separate entry exists for each [group of] platform[s] where the command line is distinct.

Tip: *The* `date` *command is not in the following list because it is not invoked by the tracker. It is invoked in the Zero-footprint case when the remote inventory beacon tests to see whether the account (recovered from its Password Store) can successfully elevate privileges on the target device, in order to complete the process as described in Zero-footprint: Normal Operation.*

Executable	Platform	Path	Notes
`arp`	All	The following are searched in this order: • `$PATH` • `/usr/sbin`.	*Command line:* `/successfulPath/arp IPaddress` *Purpose:* Reports the MAC address of network interface(s). *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`dmidecode`	Linux, Solaris (Intel)	The following are searched in this order: • `/usr/sbin` • `/opt/managesoft/libexec` • `$PATH`.	*Command line:* `/successfulPath/dmidecode` *Purpose:* Reports serial number, UUID, manufacturer, model, and chassis type, extracted from the computer's DMI (or SMBIOS) table. ***Tip:*** *On older versions of Linux where this utility is unavailable, an equivalent* `mgsdmidecode` *supplied with the full FlexNet inventory agent may be used instead. (This is also run as* `root`*.)* *Invoked using:* The account running the `ndtrack` executable, which in this case must be `root` (otherwise the relevant elements are missed from the uploaded inventory, such as the computer model and manufacturer for Solaris x86).

Executable	Platform	Path	Notes
`dpkg-query`	Linux	The following are searched in this order: • `/bin` • `/usr/bin` • `/usr/local/bin`.	*Command line:* `/successfulPath/dpkg-query -W --showformat=formatString` *Purpose:* Obtain a formatted list of packages identified in the `dpkg` database. ***Tip:*** *While the FlexNet inventory agent looks for this command on all Linux platforms (and runs it if present), it is typically only present on Debian/ Ubuntu Linux distributions.* *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
`dspmq`	All	Path(s) found in the process listing in which IBM MQ was identified.	*Command line:* `/successfulPath/dspmq -o all` *Purpose:* Reports as installation evidence the name (as `ProductName`) and active/inactive state (as `EditionName`, blank for active) of the queue managers on the system. Used by the Application Recognition Library to recognize IBM MQ (previously known as WebSphere MQ). *Invoked using:* An account determined by the following rules: • If the queue is active (so that the queue manager process is running), impersonate the user account that is running the queue manager process, and execute `dspmq` from the path used by the process. • When the queue is inactive, execute `dspmq` as the owner of that executable. The method of discovering the executable depends on the operating system configuration: ◦ If `chown` is enabled for non-`root` accounts (for example, on HP-UX), the `dspmq` path is identified in the `/etc/opt/mqm/mqinst.ini` configuration file. ◦ When `chown` is *not* enabled for non-`root` accounts, the `dspmq` path is identified by the first of the following methods to be successful: 1. Examining `/opt/mqm` 2. Looking in the `/etc/opt/mqm/mqinst.ini` file 3. Checking results of any file system scan (if run).

Executable	Platform	Path	Notes
`dspmqver`	All	Path(s) found in the process listing in which IBM MQ was identified.	*Command line:* `/successfulPath/dspmqver` *Purpose:* Collect the IBM MQ (previously known as WebSphere MQ) version and build information for inclusion in inventory. *Invoked using:* An account determined by the same rules as described above for `dspmq`.
`eeprom`	Solaris	`/usr/sbin`	*Command line:* `/usr/sbin/eeprom nvramrc` *Purpose:* Examines the contents of NVRAMRC to collect the chassis serial number. *Invoked using:* The account running the `ndtrack` executable (default: `root`). If you use a non-privileged account to run the tracker, the SPARC model information may be incorrect in inventory (for non-privileged accounts, the data collected is the value for `sysinfo SI_PLATFORM`, which is sometimes inconsistent).
`entstat`	AIX	`$PATH`	*Command line:* `/successfulPath/entstat adapter` *Purpose:* Reports the device type and MAC address of the network interface(s). *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`getconf`	HP-UX	`/usr/bin`	*Command line:* `/usr/bin/getconf CPU_CHIP_TYPE` *Purpose:* Reports the type of the central processor in the server, for inclusion in hardware inventory. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
`ifconfig`	All	`/usr/sbin` or `$PATH`	*Command lines:* On all platforms except HP-UX: `/successfulPath/ifconfig -a` On HP-UX: `/successfulPath/ifconfig adapter` *Purpose:* Lists all network interfaces; or reports the configuration of the interface identified as *adapter*. *Invoked using:* The account running the `ndtrack` executable (default: `root`). If running as an account other than root, information is less complete (for example, no MAC addresses for network adapters).
`ioscan`	HP-UX	`/usr/sbin`	*Command line:* `/usr/sbin/ioscan -k -F -n` *Purpose:* Scans the kernel for data about installed hardware and I/O options, for inclusion in the hardware inventory data. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`isainfo`	Solaris	`/usr/bin`	*Command line:* `/usr/bin/isainfo -kv` *Purpose:* Determines the system architecture (32-bit or 64-bit) and related kernel information to include in inventory reporting. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`kctune`	HP-UX	`/usr/sbin`	*Command line:* `/usr/sbin/kctune lcpu_attr` *Purpose:* Reports whether hyperthreading is enabled on the system. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
`lanscan`	HP-UX	`/usr/sbin`	*Command line:* `/usr/sbin/lanscan` *Purpose:* Collects the name and MAC address of each network adapter. Names are passed to `ifconfig` (see above). *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`lppchk`	All	`/usr/bin`	*Command line:* `/usr/bin/lppchk -c packageName` *Purpose:* Performs a check of an installed AIX `lpp` package to ensure it is in a healthy state. Used to validate the package for the installed FlexNet inventory agent. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`lsbom`	OS X	`/usr/bin`	*Command line:* `/usr/bin/lsbom -p f path` *Purpose:* Obtains a listing of files identified within `path` by the installer's Bill of Materials (binary bom file). *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`lscfg`	AIX	`$PATH`	*Command line:* `/successfulPath/lscfg -p` *Purpose:* Reports details about the video controller information (on AIX) for inclusion in hardware inventory. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
`lsnrctl`	All	`$ORACLE_HOME/bin`	*Command line:* `$ORACLE_HOME/bin/lsnrctl` *Purpose:* Invokes the Oracle Listener Control utility against a running listener to gather its network port address and the services (local and remote database instances) to which it provides access. *Invoked using:* Impersonation of the account running the `tnslsnr` service. (Impersonation requires that the `ndtrack` executable is running as `root`, without which Oracle discovery and inventory are disabled.)
`lspci`	Linux	`/sbin`	*Command line:* `/sbin/lspci` *Purpose:* Reports details about the video controller information (on Linux) for inclusion in hardware inventory. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`machinfo`	HP-UX	`/usr/contrib/bin`	*Command line:* `/usr/contrib/bin/machinfo` *Purpose:* Reports information about the machine processor. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`netstat`	All	`$PATH`	*Command line:* `/successfulPath/netstat -nr` *Purpose:* Collects the default IP gateway address. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
`osdbagrp`	All	`$ORACLE_HOME/bin`	*Command line:* `$ORACLE_HOME/bin/osdbagrp` *Purpose:* Identify the OS group for which each Oracle database instance has been configured. Used to provide logging information and allow warnings about potential issues running `sqlplus`. *Invoked using:* Impersonation of an account from the process list running either a database instance or a listener service from the same installation path as the `osdbagrp` executable being invoked.
`oslevel`	AIX	`$PATH`	*Command line:* `/successfulPath/oslevel -r` *Purpose:* Reports the operating system level, determined by examining a known set of Authorized Program Analysis Reports (APARs) supplied with the operating system. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`parstatus` and `vparstatus`	HP-UX	`/usr/sbin`	*Command line:* `/usr/sbin/parstatus -wM` `/usr/sbin/parstatus -CM` `/usr/sbin/vparstatus -wM` `/usr/sbin/vparstatus -M` `/usr/sbin/vparstatus -AM` *Purpose:* The `parstatus` command retrieves information about the nPartitions or hardware within a server, for inclusion in the hardware inventory data. The `vparstatus` version collects information about virtual partitions and their available resources (effectively, reporting on 'virtual machines'). *Invoked using:* The account running the `ndtrack` executable (default: `root`). If a non-root account is used, `vparstatus` cannot be used, and inventory details including VMType, VMName and vPar capacity are lost.

Executable	Platform	Path	Notes
pkg	Solaris	/usr/bin	*Command line:* `/usr/bin/pkg contents -H -s pkg.fmri -o pkg.fmri,action.raw -tset -tfile -tlink -thardlink` *Purpose:* Identify the contents (including actions and attributes) of packages installed on the target device and registered in the Image Packaging System (IPS), specific to Solaris 11. This data is included in software inventory. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
pkginfo	Solaris	$PATH	*Command line:* `/successfulPath/pkginfo -l name` *Purpose:* Gathers information about the named software package. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
pkgutil	OS X	/usr/sbin	*Command line:* To collect details of a package: `/usr/sbin/pkgutil --pkg-info-plist packageName` To list the files for a package: `/usr/sbin/pkgutil --files packageName` *Purpose:* Collects details of packages and the files they contain to include in software inventory. *Invoked using:* The account running the `ndtrack` executable (default: `root`). If an account other than `root` is used, some OS X bundles under `/Applications` or `/System/Library` that are not accessible by the executing user cannot be reported in inventory.

Executable	Platform	Path	Notes
`ps`	AIX, Solaris	`/bin`	*Command line:* `/bin/ps -e -opid= -oruid= -ocomm=` *Purpose:* A fail-over step to identify processes that are required in later inventory gathering, when these could not be recovered from the `proc` file system. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`ps`	HP-UX	`/bin`	*Command line:* `/bin/ps -ef -opid= -oruid= -oargs=` *Further notes:* See initial entry for `ps` above. Note that the `ps` command is always required on HP-UX.
`ps`	Linux	`/bin`	*Command line:* `/bin/ps -e -opid= -oruid= -ocommand=` *Further notes:* See initial entry for `ps` above.
`ps`	OS X	`/bin`	*Command line:* `/bin/ps -ax -o pid,ruid,command` *Further notes:* See initial entry for `ps` above.
`rpm`	AIX, Linux	The following are searched in this order: • `/bin` • `/usr/bin` • `/usr/local/bin` • `/opt/freeware/bin` • `/opt/sfw/bin` • `/opt/local/bin`.	*Command line:* `/successfulPath/rpm --query --all --queryformat format` *Purpose:* Obtain a formatted list of packages from the Red Hat Package Manager. The multiple paths are mostly required for AIX. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
`setboot`	HP-UX	`/usr/sbin`	*Command line:* `/usr/sbin/setboot` *Purpose:* Reports whether hyperthreading is available on the system. ***Note:*** *For efficiency,* `setboot` *is only used when the* `kctune` *command returns a positive result. (This second call is not redundant on certain older versions of the OS.)* *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`sh`	All	`/bin`	*Command line:* `/bin/sh -c script` *Purpose:* Runs the named script that has been delivered within `InventorySettings.xml` (these scripts may be updated through the Application Recognition Library). These scripts provide specialized inventory-gathering steps for use with Oracle products. They include the Oracle LMS scripts required for preparing an Oracle audit report. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
sqlplus	All	$ORACLE_HOME/bin	*Command line:* Variations based on preference settings discussed below: `$ORACLE_HOME/bin/sqlplus "/ as sysdba"` `$ORACLE_HOME/bin/sqlplus "/ "` *Purpose:* Perform queries against running Oracle database instances to gather inventory on the Oracle Database product. (For ways that the tracker identifies $ORACLE_HOME, see the topic *How Agent-Based Collection of Oracle Inventory Works* in the *Gathering FlexNet Inventory* PDF.) This Oracle utility is invoked by a script delivered within InventorySettings.xml (described in the entry for sh). *Invoked according to:* The following rules: • If ndtrack is running as any account other than root, discovery of, and gathering inventory for, Oracle databases are both disabled on the target device. • When ndtrack is running as root, settings for the two preferences OracleInventoryAsSysdba and OracleInventoryUser determine the behavior (see OracleInventoryAsSysdba and OracleInventoryUser). • If OracleInventoryAsSysdba=True (or omitted), the first command line shown above is used (with the parameter "/ as sysdba"). The account used depends on the second preference: ◦ If OracleInventoryUser is configured, the command is invoked impersonating that nominated account, with the database connection being made with the SYSDBA privilege. ◦ If OracleInventoryUser is not configured (the default), the command is invoked impersonating the account that is running the database instance, with the database connection being made with the SYSDBA privilege. • If OracleInventoryAsSysdba=False, the second command line shown above is used (with the

Executable	Platform	Path	Notes
			parameter "/ "). The accounts used depend on the second preference: ◦ If `OracleInventoryUser` is configured, the command is invoked impersonating that nominated account, with the database connection being made as the same `OracleInventoryUser` account. Obviously, to use this configuration, you must have set up this account as an Oracle user account with appropriate database access (see Appendix B-Oracle Tables and Views for Oracle Inventory Collection). ◦ If `OracleInventoryUser` is not configured, Oracle inventory collection is not supported. ***Note:*** *This approach means that the tracker can collect inventory only from running database instances. Instances that are discovered, but are not running at inventory time, are reported in the task status: navigate to the discovered device properties, select the* ***Status*** *tab, and expand the* ***Oracle database inventory*** *heading.*
`swlist`	HP-UX	`/usr/sbin`	*Command line:* `/usr/sbin/swlist -v -lproduct -atag -arevision -atitle -ainstall_date -avendor_tag -asize -aarchitecture -ais_patch -lfile -apath -atype` *Purpose:* Obtains a listing of software products installed on the local host. *Invoked using:* The account running the `ndtrack` executable (default: `root`). If, instead, you choose to run the tracker using a non-privileged account, installation evidence will be missed where access has been restricted.

Executable	Platform	Path	Notes
`vxlicrep`	All	`/sbin`	*Command line:* `/sbin/vxlicrep` *Purpose:* Creates installation evidence used by the Application Recognition Library to recognize installations of Symantec. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`xl`	Linux	The following are searched in this order: • `/sbin` • `/usr/sbin` • `/usr/local/sbin` • `/bin` • `/usr/bin` • `/usr/local/bin`.	*Command lines:* `/successfulPath/xl info -n` `/successfulPath/xl vm-list` `/successfulPath/xl list-vm` *Purpose:* This Xen management tool reports any guest domains (virtual machines) present on the server. This information assists in correctly reporting device inventory, including the mapping between host devices and virtual devices. *Invoked using:* The account running the `ndtrack` executable (default: `root`).
`zoneadm`	Solaris	`/usr/sbin/`	*Command line:* `/usr/sbin/zoneadm list -p` *Purpose:* Provides the list of zones that are running inside the global zone (and therefore is run only inside the global zone). Inventory includes the name and UUID of each zone. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Executable	Platform	Path	Notes
zonecfg	Solaris	/usr/sbin/	*Command line:* `/usr/sbin/zonecfg -z {zonename} info {dedicated-cpu|capped-cpu|pool}` *Purpose:* Provides configuration information about the specified zone, and specifically its resource management method (`dedicated-cpu`, `capped-cpu`, or resource `pool`). This command is run only inside the global zone. *Invoked using:* The account running the `ndtrack` executable (default: `root`).

Common: Child Processes on Windows Platforms

In all of the Adopted case, the Agent third-party deployment case, and the Zero-footprint case, the tracker always runs as `LocalSystem`, because elevated privileges are required to complete several aspects of inventory gathering. In the Core deployment case or the FlexNet Inventory Scanner case, it is possible to run the tracker under a different account, but best practice is to run it with administrator privileges, or you may lose inventory functionality.

Note: *On Microsoft Windows, the tracker does not prevent invocation by an account that has lesser privileges; but you would then need to ensure that such an account had all the required access rights for the kinds of inventory you expected to gather on a target device. Since this is highly dependent on your environment, this approach is unsupported.*

Since the tracker always runs with elevated privileges, it is important that it only acts in place of accounts that are known and trusted in your environment. In many cases, the commands or services are already running as `LocalSystem` on your Oracle server(s), so there is no effective change when the tracker does the same. But with Oracle Database 12c, or with IBM MQ (previously WebSphere MQ), it is possible that a service account has been used. To ensure that only actions by accounts that are trusted are also run by the tracker, it relies on details found in the Windows registry and in Windows Service Control Manager (SCM), both of which can only be modified by a system administrator.

In summary:

- Commands in safe system paths (not writable by other users) are run as `LocalSystem`.
- Commands found within paths listed in the `%PATH%` environment variable for the `LocalSystem` user are run as `LocalSystem`.

  Note: *This makes it important that, as is normal secure practice, you do not allow any unsecured directories to be included in the `%PATH%` environment variable for the `LocalSystem` user.*

- Other necessary commands and utilities are run as `LocalSystem` only if:

- They are normally executed by accounts trusted in your Windows SCM configuration, or
- They are saved in paths recorded in Oracle keys or IBM MQ keys in the Windows registry.

The table of child processes on Windows is organized in alphabetical order of the executables invoked by the tracker.

Tip: *All child processes are invoked in hidden mode.*

Executable	Path	Notes
`cmd`	`C:\Windows\System32`	*Command line:* `C:\Windows\System32\cmd.exe script` *Purpose:* Runs the named script that has been delivered within `InventorySettings.xml` (these scripts may be updated through the Application Recognition Library). These scripts provide specialized inventory-gathering steps for use with Oracle products. They include the Oracle LMS scripts required for preparing an Oracle audit report. *Invoked using:* The account running the `ndtrack` executable (default: `LocalSystem`).
`dspmq`	Path(s) found in the Windows registry for IBM MQ.	*Command line:* `\successfulPath\dspmq -o all` *Purpose:* Reports as installation evidence the name (as `ProductName`) and active/inactive state (as `EditionName`, blank for active) of the queue managers on the system. Used by the Application Recognition Library to recognize IBM MQ (previously known as WebSphere MQ Manager). *Invoked using:* The account running the `ndtrack` executable (default: `LocalSystem`).
`dspmqver`	Path(s) found in the Windows registry for IBM MQ.	*Command line:* `\successfulPath\dspmqver` *Purpose:* Collect the IBM (or WebSphere) MQ version and build information for inclusion in inventory. *Invoked using:* The account running the `ndtrack` executable (default: `LocalSystem`).

Executable	Path	Notes
lsnrctl	%ORACLE_HOME%\bin	*Command line:* `%ORACLE_HOME%\bin\lsnrctl` *Purpose:* Invokes the Oracle Listener Control utility against a running listener to gather its network port address and the services (local and remote database instances) to which it provides access. *Invoked using:* The account running the ndtrack executable (default: LocalSystem).
nbtstat	%PATH%	*Command line:* `\%PATH%\nbtstat -A IPAddr` *Purpose:* Returns the local NetBIOS name table for the computer at the nominated IP address, as well as the MAC address of the adapter card connecting it to the network. This data is used in discovery. *Invoked using:* The account running the ndtrack executable (default: LocalSystem).
powershell	On 64-bit systems: %SystemRoot%\system32\WindowsPowerShell\v1.0and on 32-bit systems: %SystemRoot%\SysWOW64\WindowsPowerShell\v1.0	*Command line:* `\platformPath\powershell.exe` *Purpose:* Runs the named script that has been delivered within InventorySettings.xml (these scripts may be updated through the Application Recognition Library). These scripts provide specialized inventory-gathering steps for use with Oracle products. They include the Oracle LMS scripts required for preparing an Oracle audit report. *Invoked using:* The account running the ndtrack executable (default: LocalSystem).

Executable	Path	Notes
sqlplus	%ORACLE_HOME%\bin	*Command line:* `%ORACLE_HOME%\bin\sqlplus "/ as sysdba"` *Purpose:* Perform queries against running Oracle database instances to gather inventory on the Oracle Database product. (For ways that the tracker identifies %ORACLE_HOME%, see the topic *How Agent-Based Collection of Oracle Inventory Works* in the *Gathering FlexNet Inventory* PDF.) This Oracle utility is invoked by a script delivered within InventorySettings.xml (described in the entry for cmd). *Invoked using:* The account running the ndtrack.exe executable (default: LocalSystem). The account running ndtrack must be a member of the ora_dba security group for the target Oracle Database (where the LocalSystem account is displayed as NT_AUTHORITY\SYSTEM; and if this account is missing, it must be entered as SYSTEM). ***Tip:*** *From Oracle Database 12c, there is a distinct ora_dba group for each separate %ORACLE_HOME%.* ***Note:*** *This approach means that the tracker can collect inventory only from running database instances. Instances that are discovered, but are not running at inventory time, are reported in the task status: navigate to the discovered device properties, select the* ***Status*** *tab, and expand the* ***Oracle database inventory*** *heading.*
vxlicrep	File path extracted from %VCS_ROOT%.	*Command line:* `\successfulPath\VRTSsfmh\bin\vxlicrep.exe` *Purpose:* Creates installation evidence used by the Application Recognition Library to recognize installations of Symantec. *Invoked using:* The account running the ndtrack executable (default: LocalSystem).

Common: Collection from Virtual Environments

FlexNet Manager Suite can collect inventory from a number of virtual and partitioned environments (collectively: virtualization), including the following virtual machine or partition types:

- Microsoft Hyper-V
- LPAR (logical partition) on IBM AIX
- nPAR (Hewlett-Packard hard partition with separate hardware facilities, each of which may also host vPARs)
- Oracle VM
- VMware
- vPar (Hewlett-Packard software partition, a virtual machine)
- Zone (non-global zones on Solaris 10 and later).

(In addition, virtualization inventory can be collected by separate adapters for Citrix XenApp and XenDesktop, but this topic is focused only on inventory collection that may involve the `ndtrack` executable.)

In each case, the business goal is to review relationships that show which virtual machines are operating on which hosts (as well as the application software in use). Obviously, there are different techniques across these different technologies, falling into two main classes:

- For hypervisor virtualization, inventory is collected from the host (or hypervisor), and also collected separately from each of the virtual machines (which, in most systems, are ignorant about their host machine). Then common data from the BIOS for the guest OS (that is, the serial number of the virtualized hardware) is matched to the host's list of guest serial numbers, allowing FlexNet Manager Suite to present a structured set of records of virtual machines related to their hosts. This is the approach used for Hyper-V, Oracle VM, and VMware. In the case of VMware, the VMware host inventory is collected remotely by an inventory beacon (using the API available on either a vCenter management server or an ESX host). In other cases, the host inventory may be gathered either by an installed FlexNet inventory agent, or by zero footprint inventory collection by an inventory beacon.
- For container virtualization, no inventory is required (or taken) for the virtualization host. Inventory is collected from each of the partitions/zones/containers, which includes the resource allocations for that partition, its unique identifiers, and information about the physical host that the partition is running on (including the host's serial number). When the inventories have been imported, FlexNet Manager Suite compares common values in the records to fabricate a host record (since no direct inventory has been collected from the host itself). Because the partitioned host does not supply a machine name, the fabricated record uses the serial number (again) as the machine name. (For Solaris, the global zone is inventoried particularly for the processor, core and thread counts of the host server; and a VM host record is then fabricated to include both global and non-global zones on the host server.)

These differences have the following general implications for deployment of `ndtrack`. These implications are common for both the full FlexNet inventory agent and the FlexNet inventory core components, and regardless of deployment method:

- For hypervisor virtualization like Hyper-V and OracleVM, `ndtrack` must be deployed to every virtual machine *and* to the host server. In the absence of inventory imported from the host server (or if you subsequently delete the host device record), the virtual machine records are left unlinked, without a host.
- For most container virtualization, as on AIX using LPARs, `ndtrack` must be deployed to every partition, and should *not* be deployed to the host.

However, there are specific exceptions to this general division by virtualization type, so the following listing makes specific whether to collect inventory from the host, and if so by what methods (using the short-hand labels defined in Deployment Overview: Where to, and How).

Technology	Host inventory required	Method(s)
Microsoft Hyper-V	Yes	Adopted, Zero-footprint.
LPAR (logical partition) on IBM AIX	No	n.a.
nPAR (HP-UX)	No	n.a.
Oracle VM	Yes	Adopted, Zero-footprint. Additional inventory is remotely collected (agentless) by an inventory beacon using an Oracle API. See note below.
VMware	Yes	Remote agentless inventory by an inventory beacon using the vCenter or ESX API.
vPar (HP-UX)	No	n.a.
Zone (Solaris 10 and later)	Yes (global zone)	Adopted, Zero-footprint.

Note: *Collecting complete inventory from Oracle VM requires two forms of host inventory collection:*

- *Agentless inventory remotely collected from the Oracle VM Manager by an inventory beacon identifies all managed VM hosts, their guest VMs, and any related cluster information. Clustering information is required for full capacity licensing of Oracle Database. However, Oracle VM Manager does not identify CPU pinning for any of the guest VMs.*
- *Inventory collected on the Oracle VM hosts by* `ndtrack` *(in either the Adopted case or Zero-footprint case) identifies the VM host, its guest VMs, and the relevant CPU pinning applicable to any of the VMs. Pinning information is required for subcapacity licensing of Oracle Database using Oracle Processor or Oracle NUP license types (and this has the potential for considerable cost savings over full capacity licensing). However, the individual Oracle VM hosts do not reveal details about clustering, needed for full capacity licensing.*

For these reasons, both forms of host inventory are available for an Oracle VM solution, so that both clustering and CPU pinning information is available. (If you use only full capacity licensing for Oracle Database, which may require you to license entire clusters, you could omit the `ndtrack` *inventory collection from each Oracle VM host.)*

Inventory for guest devices

For each of the technologies listed in the previous table, inventory from the guest virtual machine (or partition) can be collected by the `ndtrack` executable. This can be achieved through any of the established use cases:

- Installation of the FlexNet inventory agent on the virtual device in the Adopted case
- Installation of the FlexNet inventory agent on the virtual device in the third-party Agent third-party deployment case

- Zero-footprint inventory collection by the inventory beacon (where virtual machine up-time and network access make this practical)
- Your own deployment of the FlexNet inventory core components, either to the target device or to a network share, in the Core deployment case.

Common: Gathering Inventory from Solaris Zones

Calculating the license compliance position for Oracle Processor and IBM PVU licenses becomes complex when the applications are installed on Solaris zones as the license consumption depends on the number of processor threads assigned to a Solaris zone. For example, the license consumption for an Oracle Database Processor license depends on the maximum number of processor threads that can be used by the Solaris zone where the application has been installed.

To calculate the license consumption for these licenses, Flexera Software inventory collection component (`ndtrack`, either deployed locally or run remotely) collects the hardware-specific information like the maximum number of processor threads and some other properties. This information is used to calculate the license position for some Oracle Processor, Oracle Named User Plus, and IBM PVU licenses.

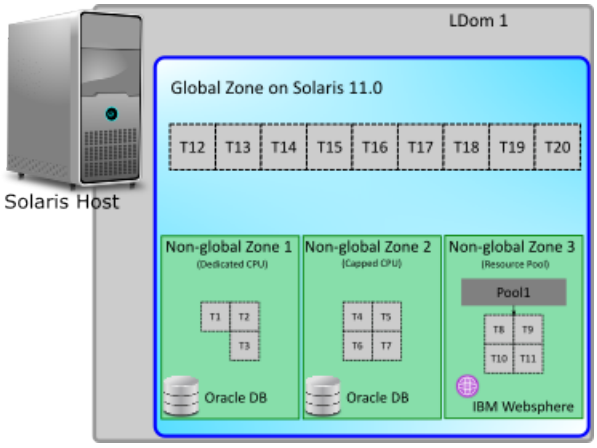
Compatibility matrix

Solaris zones with the following environments are supported for inventory collection:

Zone property	Support
Architecture	• SPARC, including Logical Domains • X86
Resource management method for zones	• Resource pool • Capped CPU • Dedicated CPU

Common: Targeting for Solaris Zones

To calculate the compliance position for Oracle Processor and IBM PVU licenses, FlexNet Manager Suite needs hardware-specific information about the Solaris zone where the application has been installed. As the global zone manages and keeps track of the host resources used by the non-global zones, you must collect inventory from the global zone when you collect inventory from one or more non-global zones. Consider the following example architecture of a Solaris host:



The diagram illustrates a Solaris host with a logical domain (LDom 1) that contains a global zone and three non-global zones. Non-global Zone 1 uses three processor threads in a dedicated mode from the Logical Domain, Non-global Zone 2 uses four processor threads through the capped CPU resource management method, and Non-global zone 3 uses another four processor threads through the resource pool resource management method.

To calculate the compliance position for the Oracle Processor and IBM PVU licesnes for the applications installed on Non-global Zone1, you need to inventory the Global Zone and Non-global Zone 1 through one or more discovery and inventory rules. The hardware details would be collected from the global zone, and the application inventory would be collected from the non-global zone. The same targeting technique applies for Non-global Zone 2 and Non-global zone 3. For more information on creating targets, see the online help.

Representation of Solaris architecture

The following table describes how different entities of Solaris architecture are displayed on the **Virtual Devices and Clusters** page :

Solaris entity	Representation
LDom	VM host
Processor set and Pool	Resource Pool
Global or non-global zone	Virtual Machine

Note: *When a physical machine has been hard-partitioned into two LDoms, two default global zones are created. FlexNet Manager Suite collects a .ndi file for each global zone.*

Data sources for Solaris zones inventory

To get an accurate license compliance position for Oracle Processor and IBM PVU licenses for the applications installed on Solaris zones, Flexera Software recommends using its inventory collection component.

License consumption calculations

An accurate license consumption for license metrics relying on hardware properties can only be calculated when the required data is available to FlexNet Manager Suite. For example, the license consumption calculation for an Oracle Processor or IBM PVU license requires processor, core, threads or similar from the host, pool, or the

virtual machine itself. The virtualization hierarchy and properties (such as capped, uncapped, dedicated partitioning) are also required. Missing hardware details for any level of the virtualization hierarchy may lead to the following values for consumption on a Solaris zone:

- **Approximated value**: When the **Threads (max)** property is missing for a pool, FlexNet Manager Suite uses the capping value defined at the processor set level. If this value is also missing, the value at the host level is used.
- **Zero**: In all other cases.

The following table summarizes the impact of missing hardware details on Oracle Processor and IBM PVU license consumption calculations:

License type	Level	Missing property value	UI location	Consumption value
Oracle Processor	Host	Cores	The **Hardware** tab of the host properties.	0
	Host	Threads	The **Hardware** tab of the host properties.	0
	VM	Threads (max)	The **VM Properties** tab, under the **Virtual machine properties** section.	0
	Pool	Threads (max)	The **VM Properties** tab, under the **Pool properties** section.	Approximated value
IBM PVU	Host	Cores	The **Hardware** tab of the host properties.	0
	Host	Threads	The **Hardware** tab of the host properties.	0
	VM	Threads	The **Hardware** tab of the VM properties.	0
	Pool	Threads	The **VM Properties** tab, under the **Pool properties** section.	Approximated value

Inventory beacon settings for Solaris zones inventory

To collect inventory from Solaris zones through the zero footprint method, the inventory beacon needs the credentials of the root user for these zones. For this, the Password Store on the appropriate inventory beacon(s) needs to be updated with these credentials. Use the value `SSH account (password)` for the **Account Type** field while adding the root user to the Password Store. For more information on using the password store, see the online help on inventory beacon.

Common: License Reconciliation Considerations for Processor-Based Licenses

The inventory data collected by the inventory component contains the details of the maximum and active processor threads used by each Solaris zone. If a resource pool has been configured, the maximum number of processor threads and the active number of processor threads are considered at the pool level. If no poolis configured, these properties are considered at the zone level. Wherever necessary in the virtualization hierarchy (host, pset, pool, and zone), the required resource capping is applied. For example, if a host has only 16 threads and the pool consumption sums up to 24 threads, only 16 would be considered as consumption.

To calculate the license consumption of a zone, the maximum number of threads. This collected is processed to generate the compliance position for Oracle and IBM licenses using the following logic.

1. The MaximumNumberOfLogicalThreads per non-global zone (say TZ) is obtained from the non-global zone inventory.
2. The NumberOfThreadsPerCore for the host (say TC) is obtained from the global zone inventory.
3. The first number is divide by the second (TZ/TP) to get the number of cores for the zone.

Common: Acting on Inventory Results

This topic applies to all forms of gathered inventory:

- All forms of FlexNet inventory gathering, including all the cases covered in this document
- Inventory imported from third-party tools, such as Microsoft SCCM, IBM ILMT, and others
- Inventory imported in spreadsheets or CSV files.

Computer details imported from software and hardware inventory are displayed in the web interface of FlexNet Manager Suite under **Discovery & Inventory > All Inventory**. Here you may choose whether to:

- Manage each device as an asset.
- Mark the device as `Ignored` (unmanaged). At a later time, you may choose to begin managing any ignored computers.

These cases and others are explained below.

Managed Assets

You may manage the following device types as assets:

- Computers
- Mobile devices
- VM Hosts.

Virtual machines, VDI templates, and remote devices are not tangible assets (remote devices are created when the only inventory available is usage or access control list data from a Citrix environment, when it assumed that, for example, a user's home computer that cannot be inventoried has used a virtualized application).

When your goal is to link devices to asset records, it may be easier to start from **Discovery & Inventory > Inventory without Assets**. In any inventory list, simply select one or more devices, and click **Create an asset** (see the online help for more information).

Once you choose to manage a device as an asset, you are then able to perform all of the normal hardware asset operations:

- Assign ownership of the asset in your enterprise (as you can also assign ownership of computers that are not assets)
- Associate the asset with purchase orders and contracts (including lease contracts) and monitor expiry of lease contracts
- Monitor warranty details
- Allocate licenses to the computer (licenses are also managed on devices that are not assets)
- Have FlexNet Manager Suite automatically flag changes made to the device's configuration
- Receive alerts for any assets that stop reporting their configuration details during compliance imports.

Ignored Computers

Inventory devices that you choose to ignore are those that you do not wish to manage, at least for the present time. The records are not deleted, but these devices become 'inactive' in the following ways:

- Ignored devices are not visible in most inventory listings, including **Inventory Issues**, **Out-of-Date Inventory**, **Inventory without Assets**, and **Active Inventory** (but of course, they are available in **Ignored Inventory**)
- Changes to the configuration of ignored devices are not flagged
- If an ignored device stops reporting during inventory imports, the missing device does not appear in the **Out-of-Date Inventory** list
- Applications installed on ignored computers are not counted in license compliance calculations.

Tip: *You cannot ignore an inventory device that is linked to an asset record. If you need to do this, first select the device in a listing, and choose* ***Remove link****.*

At any time, you can choose to begin managing an ignored device as a hardware asset. Simply select the device in **Discovery & Inventory > Ignored Inventory**, and click **Activate**.

Duplicate serial numbers

FlexNet Manager Suite does not rely on serial numbers alone to differentiate between inventory device records. For example, other attributes used may include:

- The external ID, the identifier for the inventory item in the source data (for example, the numeric `MachineID` returned from Microsoft SCCM, or the numeric `ComputerID` assigned in the internal inventory database of FlexNet inventory data)
- The computer type, manufacturer, and model
- For virtualization, the type of virtual machine, and (when applicable) a partition ID

and so on.

However, it happens that inventory records may be different in all other values, but have matching (duplicate) serial numbers. There are a few common causes for inventory correctly containing multiple devices with a common serial number:

- Computer manufacturers do not always assign unique serial numbers, so that it is quite possible to get duplicate serial numbers from quite separate machines (particularly when these were bought in a batch).
- A computer may have been partitioned, and the inventory tool may return the common serial number of the underlying host for separate partitions, producing multiple records with the same serial number.
- Computers that have been rebuilt may, for a time, produce two different inventory records with the same serial number — one from before the rebuild that has not yet gone stale and been removed by the inventory tool (the last inventory date on this record is typically old), and a second from after the rebuild. Typically these will have the same serial number; but the rebuilt computer may have a different name and be deployed to a new domain. If, as commonly happens, the inventory tool does not recognize the new computer as a rebuild, the two records will also have different external IDs from the inventory tool. This means that nothing matches except the serial numbers.

You can identify inventory devices with duplicate serial numbers as follows:

1. Navigate to your preferred listing of inventory devices (for example, **Discovery & Inventory > All Inventory**).
2. Clear any existing filter, and in the simple filter control (top left, near the page heading):
   a. Click **Add filter**.
   b. In the left-hand option list, choose `Alert`.
   c. After a moment, in the right-hand option list, choose `Serial number is not unique`.
   d. Click the blue check (tick) icon to commit this filter. After a moment, only devices with duplicate serial numbers are shown (hover over any of the red alert bubbles to confirm this by reviewing the tooltip text).
3. Click the **Serial number** column header to sort the listing by serial number. This groups the matched sets together.

You can now investigate the duplicates. It may be possible, for example, to ignore old device records of machines that have been rebuilt (although best practice is to have them cleaned out of the inventory source data).

Common: Resolving Inventory Records

This topic applies to all forms of gathered inventory:

- All forms of FlexNet inventory gathering, including all the cases covered in this document
- Inventory imported from third-party tools, such as Microsoft SCCM, IBM ILMT, and others
- Inventory imported in spreadsheets or CSV files.

One of the primary tasks performed by FlexNet Manager Suite when it imports inventory is to resolve multiple inventory records that all represent the same device in your environment. (It's easy to imagine this for physical devices like a workstation; but it also applies to virtual machines as well.)

The simplest example of multiple records is when inventory was collected from my workstation last week, and new inventory was collected again this week. Clearly the new inventory record has to be matched to the previous inventory record, so that values can be updated. Or if there is no match with a previous record, a new inventory device record must be created.

However, there may be other reasons why multiple records need resolution, even within a single inventory import. For example:

- You have multiple tools collecting inventory (say, ADDM and ILMT), and they overlap so that some devices appear in both sources. How does the inventory import process decide when two or more records actually describe the same device?
- In a variation on that theme, you may use one tool (say, Microsoft SCCM) as the primary source of inventory data, but deploy FlexNet inventory agent to specific devices to augment details about Microsoft SQL Server. How do these two sources get combined?
- You deployed FlexNet inventory agent to some devices (in the Agent third-party deployment case), but because these devices are not identified in any target for adoption, the relevant inventory beacon is also collecting Zero-footprint inventory. Will these records clash somehow, or be resolved?

You may have additional reasons to seek a deep understanding of the process, such as:

- You want to understand why some devices visible in your Microsoft SCCM listing are not visible in FlexNet Manager Suite, even though SCCM is your main inventory tool.
- You are creating a custom inventory adapter, and want to know which fields must be imported for successful socialization with the inventory records already existing in FlexNet Manager Suite.

There are two parts to the question of data resolution:

- Determining when multiple records apply to the same inventory device. For full details, see Common: Identifying Related Inventory.
- Once a set of imported records is known to apply to the same device, how do we select which data values to use from which record? See Common: Choosing Values from Multiple Inventory Records.

Common: Identifying Related Inventory

This topic applies to all forms of gathered inventory:

- All forms of FlexNet inventory gathering, including all the cases covered in this document
- Inventory imported from third-party tools, such as Microsoft SCCM, IBM ILMT, and others.

Before gathered data sets can be merged into distinct inventory records, the group (or set) of imported records that relate to a single device must be identified. This topic gives considerable detail about the process of matching records into sets that relate to a single device.

The process of grouping incoming inventory records into matched sets, such that each set relates to a single unique device, is controlled by an XML file (from which the examples below are taken). The process is:

1. All incoming inventory records held in the staging tables are copied into memory for faster processing.
2. An ordered list of assessments (called "Matchers") is applied to the incoming inventory records. Each Matcher is applied in turn:
   a. A Matcher preselects only those records that fit a list of conditions. Whenever a list of multiple conditions is present, every condition in the list must be matched.

      (Strictly speaking, conditions are an optional part of a Matcher, but they are ubiquitous. If ever there were no conditions, the subsequent tests in the Matcher would be applied to every inventory record currently left in the memory array.)

      Each Condition specifies an inventory Property, a testing Method, and one or more values used as the test cases. Those records that meet all the conditions in the list are used for further processing in this Matcher, while other records not meeting the current list of conditions are left aside for later reconsideration in other Matchers. In short, the list of conditions filters down the set of incoming inventory records to be assessed in the current Matcher.

      For example:

      ```
      <Condition Property="ComputerType" Method="InRange" Value="Computer,
       VMHost"/>
      ```

      This condition admits only computers and VM hosts for possible matching, and excludes VMs, remote devices, mobile devices, and VDI templates.

   b. The Matcher then tests the preselected processing candidates using a list of one or more rules. Every rule in the Matcher's list must be satisfied.

      Each Rule specifies that a named inventory Property must match across inventory records, using a defined matching Method (the methods include `equal`, `not equal`, `like`, `set`, and `not set`, with the default being `equal`). Pairs (or sets) of devices that pass all the rules are considered matched, and those that fail any rule in the list are set aside for later reconsideration in other Matchers.

      For example:

      ```
      <Rule Property="Manufacturer"/>
       <Rule Property="ModelNo"/>
       <Rule Property="FirmwareSerialNumber"/>
      ```

      This list of rules means that when each of these properties in turn has a common value across candidate records (because "equal" is the default when no Method is specified), inventory records from the preselected processing candidates are considered "matched", so that they refer to a single device.

   c. Any group of records that have been matched by this Matcher are now known to refer to a single device. They are removed from the testing pool, and are not subjected to any further assessment by other Matchers. Each matched group (or set) is queued up for import into the compliance database.
3. After all Matchers have been processed in turn, the unmatched records left in the testing pool are known to be individual records each applying to a unique device, and these are now similarly queued for import into the compliance database.

4. The queue of matched sets (including the sets with just a single member) are now tested for matching against the existing records in the compliance database. The exact same tests used to bunch up the incoming inventory records are now applied to align the matched sets with existing records.
   - If any Matcher in the XML file finds that an incoming set is matched to an existing record, that existing record is updated with values from the incoming set. The constraints about Primary source and latest inventory date are used to select which of the incoming set of records is used to update each property (see Common: Acting on Inventory Results).
   - If all Matchers fail to connect an incoming set with an existing record, a new inventory device record is created. Once again, properties are taken first from the Primary inventory source with gaps filled from secondary inventory sources; and competition is resolved by using the most recent inventory if there are multiples from the same priority source(s).

The tests used to match sets of inventory records to individual devices are listed in the following table. The Matchers run in order from top to bottom in this table. In each case, every Condition must be satisfied before an inventory record is included in an individual assessment; and then every Rule must be satisfied before two (or more) records are taken as matched, applying to a single device. Both Conditions and Rules assess Properties from (firstly) the incoming inventory records, which in the database have been staged in the appropriate staging tables:

- **`ImportedComputer`** table
- **`ImportedVirtualMachine`** table.

Thereafter, the incoming matched sets are compared against existing compliance records using the same set of Matchers. The database schema is described in the *FlexNet Manager Suite Schema Reference*.

Table 1: Matchers

Candidates (Conditions)	Assessment (Rules)
1. Matcher for physical computer with manufacturer, model and firmware serial number	
• `VMType` is not set • `Manufacturer` is set • `ModelNo` is set • `FirmwareSerialNumber` is set	Records have identical values for each of: • `Manufacturer` • `ModelNo` • `FirmwareSerialNumber`
2. Matcher for physical computer with manufacturer, host type and firmware serial number	
• `VMType` is not set • `Manufacturer` is set • `HostType` is set • `FirmwareSerialNumber` is set	Records have identical values for each of: • `Manufacturer` • `HostType` • `FirmwareSerialNumber`

Candidates (Conditions)	Assessment (Rules)
3. Matcher for physical computer with machine ID	
• VMType is not set • MachineID is set	Records have identical: • MachineID
4. Matcher for physical computer with manufacturer, host ID and computer name	
• VMType is not set • Manufacturer is set • HostID is set • FirmwareSerialNumber is set	Records have identical values for each of: • Manufacturer • HostID • FirmwareSerialNumber
5. Matcher for vPar, LPAR and Zone with Partition ID	
• VMType is one of vPar, LPAR, or Zone • PartitionID is set	Records have identical values for each of: • VMType • PartitionID
6. Matcher for LPAR with firmware serial number and partition number	
• VMType is LPAR • FirmwareSerialNumber is set • PartitionNumber is set	Records have identical values for each of: • FirmwareSerialNumber • PartitionNumber
7. Matcher for LPAR with Machine ID and partition number	
• VMType is LPAR • MachineID is set • PartitionNumber is set	Records have identical values for each of: • MachineID • PartitionNumber
8. Matcher for vPar, nPar and LPAR with machine ID and partition name	
• VMType is one of vPar, LPAR, or Zone • VMName is set • MachineID is set	Records have identical values for each of: • MachineID • VMType • VMName

Candidates (Conditions)	Assessment (Rules)
9. Matcher for vPar, nPar, LPAR and Zone with partition name and firmware serial number	
• VMType is one of vPar, nPar, LPAR, or Zone • FirmwareSerialNumber is set • VMName is set	Records have identical values for each of: • FirmwareSerialNumber • VMType • VMName
10. Matcher for Zones with host ID and partition name	
• VMType is Zone • HostID is set • VMName is set	Records have identical values for each of: • HostID • VMName
11. Matcher for computers using HostIdentifyingNumber, HostType and Manufacturer	
• HostIdentifyingNumber is set • HostType is set • Manufacturer is set	Records have identical values for each of: • HostIdentifyingNumber • HostType • Manufacturer
12. Matcher for computers using HostIdentifyingNumber and HostType when Manufacturer not provided	
• HostIdentifyingNumber is set • HostType is set • Manufacturer is null in either or both of the records being compared	Records have identical values for each of: • HostIdentifyingNumber • HostType
13. Matcher for computers using HostIdentifyingNumber and Manufacturer when HostType not provided	
• HostIdentifyingNumber is set • HostType is null in either or both of the records being compared • Manufacturer is set	Records have identical values for each of: • HostIdentifyingNumber • Manufacturer
14. Matcher for computers using HostIdentifyingNumber when HostType and Manufacturer are not provided	

Candidates (Conditions)	Assessment (Rules)
• HostIdentifyingNumber is set • HostType is null in either or both of the records being compared • Manufacturer is null in either or both of the records being compared	Records have identical values for: • HostIdentifyingNumber
15. Matcher for VMware ESX Servers via UUID	
• OperatingSystem contains vmware (see note 1) • UUID is set	Records have identical values for: • UUID (see note 2)
16. Matcher for computers using the serial number and computer name	
• UntrustedSerialNo is false • SerialNo is set • ComputerName is set	Records have identical values for each of: • SerialNo • ComputerName
17. Matcher for computers using the agent ID which IBM ILMT uses for tracking operating environments	
• ILMTAgentID is set	Records have identical values for: • ILMTAgentID
18. Matcher for incomplete computers using computer name and domain details	
• The ObjectType is Incomplete (see note 3) • ComputerName is set • ComplianceDomainID is set	Records have identical values for each of: • ComputerName • ComplianceDomainID
19. Matcher for incomplete computers using computer name where no domain is available	
• The ObjectType is Incomplete (see note 3) • ComputerName is set • ComplianceDomainID is null in either or both of the records being compared	Records have identical values for: • ComputerName
20. Matcher for unmatched computers without hardware details using computer name and domain details	

Candidates (Conditions)	Assessment (Rules)
• The `ObjectType` is `Unmatched` (see note 3) • `ComputerName` is set • `ComplianceDomainID` is set	Records have identical values for each of: • `ComputerName` • `ComplianceDomainID`
21. Matcher for unmatched computers using computer name where no domain is available	
• The `ObjectType` is `Unmatched` (see note 3) • `ComputerName` is set • `ComplianceDomainID` is null in either or both of the records being compared	Records have identical values for: • `ComputerName`

Note:

1. *For Condition checks, the method "contains" tests whether the value of the property under test includes the test string in any position.*
2. *In this case, the test method is `BigOrLittleEndianEqual`. This means that the two compared values are normalized for byte order before the comparison for equality.*
3. *Here, `ObjectType` is an intermediate value calculated during import and not saved to the compliance database. It may be `Complete` (default), `Incomplete`, or `Unmatched`.*

Tip: *The XML file of Matchers is located on your batch server (or, in smaller implementations, on whichever server hosts this functionality, such as your processing server or your single application server), in `%ProgramData%\Flexera Software\Compliance\ImportProcedures\Inventory\Matcher\Computer.xml`. Do not edit this file, as any changes may be over-written in the next product upgrade.*

While you should not edit the factory-supplied `Computer.xml`file, there is a supported method to integrate a custom Matcher into the process described above. To customize a Matcher:

1. Create your own `Computer.xml` file with the root `Matchers` element:

```
<?xml version="1.0" encoding="utf-8"?>
<Matchers xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xmlns:xsd="http://www.w3.org/2001/XMLSchema">

</Matchers>
```

2. In the gap, insert your custom `Matcher` element, modeled on the factory-supplied ones in the standard (unchanged) file.
3. Set the `Order` attribute of your Matcher so that it will fall in the correct place between the standard Matchers. For example, if you wish to override the current Matcher with `Order="30"`, set your `Order="25"` so that your custom Matcher runs first, "stealing" the candidates it needs and removing matched sets from the pool before the standard `Order="30"` Matcher runs. (You do not need to remove the standard

Matcher, since if it has no suitable candidates to match, it runs with no net effect, and little impact on performance.) The standard Matchers are ordered with numbering gaps that accommodate 'insertions' like this.

4. Save your file separately in `%ProgramData%\Flexera Software\Compliance\ImportProcedures\CustomInventory\Matcher\Computer.xml`.

Both the standard `Computer.xml` file and your customized one are read from their separate locations, their Matchers are merged into a single ordered list, and executed in the process as described above.

Common: Choosing Values from Multiple Inventory Records

This topic applies to all forms of gathered inventory:

- All forms of FlexNet inventory gathering, including all the cases covered in this document
- Inventory imported from third-party tools, such as Microsoft SCCM, IBM ILMT, and others
- Inventory imported in spreadsheets or CSV files.

Once sets of imported inventory records that relate to a single device have been identified (see Common: Identifying Related Inventory), it is still necessary to decide, if the records have different values for any properties, which value should be used to update the "golden record" in the compliance database. Since it is possible that one property will be selected from imported record A and a different property from imported record B, this process is called data *merging*.

The process of data merging is relatively straight-forward:

- All data from the primary inventory source is used. If there are two data sets from the primary source (for example, last week's inventory and this week's inventory), values from the record with the most recent date/time stamp are used. (The primary data source is selected through the system menu (▼ in the top right corner) > **Data Inputs > Inventory Data** tab.)
- For any individual property values missing from the primary source record:
  - If a missing property appears in any single secondary source, it is inserted to augment the data from the primary source (however, existing values taken from the primary inventory source are never modified)
  - If missing properties appear in multiple secondary sources, values from the record with the most recent date/time stamp are used (secondary sources cannot be prioritized relative to one another by any means other than the inventory collection date).

In these ways, information gathered from primary and secondary inventory sources is merged to produce a single record in which data from the primary source is always dominant.

The fact that values are merged individually means that data from a previous inventory collection may still "show through" in an updated record. For example, imagine this scenario:

- ADDM is used as your primary inventory source, and its inventory is imported daily.
- FlexNet inventory agent is installed on selected long-running servers, and inventory is taken weekly. This inventory contains values not available in ADDM.

On Monday, inventory of an AIX system is imported from both sources. The merging process (described above) inserts into the primary record (from ADDM) the missing value of the host type (`8202`, collected by FlexNet inventory agent). On Tuesday, new ADDM inventory is imported, and the fields collected by ADDM are updated. Because there is no new inventory from the secondary sources on this day, the value of the host type previously collected is left unchanged. The inventory device record displayed in FlexNet Manager Suite remains complete.

8

Command Lines

To assist with the preparation of custom solutions, this section summarizes the command lines for the various code entities that together function as the FlexNet inventory agent. The mapping of descriptive titles to executable names is:

- FlexNet inventory agent is `ndtrack`
- Installation agent is `ndlaunch`
- Policy agent is `mgspolicy`
- Schedule agent is `ndschedag`
- Upload component (or uploader) is `ndupload`.

The application usage agent does not have any command line available (on Windows, it runs as a plug-in, and on UNIX-like systems, it runs as a service or daemon). However, there are still a few preferences relevant to the application usage agent. Since there is no command line, these can only be adjusted by directly editing the registry (or the `config.ini` file on UNIX-like platforms). Relevant items are listed in the chapter Preferences.

mgspolicy Command Line

Command line reference for the policy component.

The policy component is responsible for checking and applying policy on the managed device.

Because server-side policy merging is run on the inventory beacons, the policy component simply invokes the installation component. The installation component retrieves the resulting policy files from the appropriate inventory beacon, and installs the required packages. For command line details for the installation component, see ndlaunch Command Line.

During adoption, the policy component attempts to collect policy and its operating schedule from the bootstrapping inventory beacon (which has collected these from the central application server). If for any reason this collection does not succeed, then until the FlexNet inventory agent receives its operating schedule, the policy component runs:

- On Windows platforms, each time the managed device reboots

- On UNIX-like platforms, once each day at a random time between 0800 and 2300 (local time on the managed device).

Once the operating schedule is received from the bootstrapping inventory beacon, this behavior is discontinued, and the policy component is triggered regularly to check for changes, and apply the policy when amended. The policy component uses preference settings on the managed device to determine the appropriate command line parameters.

Synopses

Syntax:
`mgspolicy` [*options* ...]

Options:

Syntax:
`-o` *tag* = *value*
`-s` *source*
`-t User | Machine`

`-o`	*tag*=*value*	Each instance over-rides the specified preference for the policy component. Each parameter set at the command line must be accompanied by its own `-o` flag. Do not repeat any individual tag within the command line. Possible tags are listed below. ***Note:*** *In addition to the tags listed below, you may also set any preferences for the inventory component (`ndtrack`) on the command line. When the policy component launches `ndtrack`, these preferences will be passed to the `ndtrack` command line. When you set policy agent logging preferences on the command line, these are also passed to `ndtrack`, and the log file becomes a single combined file for both `mgspolicy` and `ndtrack` activities. For details, see ndtrack Command Line.*
`-s`	*source*	Identifies the source location of server-side merged policy (`.npl`) files on the inventory beacon. If you do not specify a source, the policy agent uses the last known location (set in the `PolicyServerURL` preference). Example: `-s "http://beacon.mydomain.com/ManageSoftDL/Policies/Merged/Machine/deviceHostname.npl"`
`-t`	`User` | `Machine`	Identifies the type of policy to be merged. This can be user or machine policy. ***Note:*** *User-based policy is now deprecated.*

Options

Possible tags for use in a command line with the `-o` options are shown below.

Note: *Most preferences for the policy agent are not passed through to the installation agent when it is called. Either list the preferences in the* `Common` *registry key, or use separate preferences for the installation agent.*

- LogFile (policy component)
- LogFileOld (policy component)
- LogFileSize (policy component)
- LogLevel (policy component)
- LogModules (policy component)
- MachinePolicy
- MachinePolicyDirectory
- MachinePolicyPackageDirectory
- PolicyServerURL.

In addition, the following preferences set in the registry on the managed device influence the behavior of the policy agent:

- DefaultSchedulePath
- InstallDefaultSchedule
- LauncherCommandLine
- StrictInstall.

The following preferences available in earlier releases are now deprecated, and should not be used:

- `AllowedPkgSubtypes`
- `AutoDetectDC`
- `MinimumDCSpeed`
- `PolicySource`
- `UserPolicy`
- `UserPolicyDirectory`
- `UserPolicyPackageDirectory`.

ndlaunch Command Line

Command line reference for the installation component.

The installation component on managed devices is now limited to installing various packages required by the FlexNet inventory agent, including updating the FlexNet inventory agent itself.

Synopses

Syntax:

`ndlaunch` [**`-f`** *preferenceFile* | **`-o`** *tag* = *value*] [*catalogFile*]

`ndlaunch -a` *PackageName* [**`-o`** *tag* = *value* ...]

`ndlaunch -d` *PackageName*

`ndlaunch -r` *urlOfCatalogFile* [**`-o`** *tag* = *value* ...]

`-a`	*`PackageName`*	Updates the named package from the last location from which it was downloaded and installed. If no update is necessary or available, runs the currently installed version (if execution is required). This parameter is equivalent to using both `-p` and `-r`. This is the mechanism by which the FlexNet inventory agent checks for any changes to its policy. Examples: `%BASE\ndlaunch –a mypolicy` ***Tip:*** *Use the %BASE path substitution variable to include the full path to the FlexNet inventory agent installation.*
	`catalogFile`	The full pathname to a locally available FlexNet catalog. If specified, the *`catalogFile`* filename must appear last on the command line. FlexNet catalogs have the file extension `.osd`.
`-d`	*`PackageName`*	Delete the application identified by the package name. You can identify the package name of any installed application by looking in the installation component's application cache; each installed application has its own folder (named for the associated package) in this location. ***Warning:*** *Do not use this parameter to delete standard packages distributed by FlexNet Manager Suite through the inventory beacons.*

-f	*preferenceFile*	Advanced parameter, recommended for use by experienced administrators only. Sets the value of a symbol used in a catalog by passing it the contents of a preference file using the installation component's command line. The installation component reads the list of symbol values specified in *preferenceFile*, and substitutes them for the symbols used in the catalog. *preferenceFile* uses the standard `.ini` file format. For example: `[Symbols]` `symbolName="value"` `symbolName2="value2"` `symbolName3="value3"` where: • `symbolName` is the name of a symbol for which you wish to define a value • `value` is the value assigned to the symbol.
-o	*tag=value*	Each instance over-rides the specified preference for the installation component. Each parameter set at the command line must be accompanied by its own `-o` flag. Do not repeat any individual tag within the command line. Possible tags are listed below. If your command line will exceed the length limit of your operating system's command line, use the `-f` parameter instead.
-r	*urlOfCatalogFile*	Check to see if an updated catalog file exists at the specified URL. If so, download and install it. Example: `%BASE\ndlaunch -r http://www.mysite.org/myapp.osd`

Options

Possible tags for use with the `-o` options are:

- AllowedPkgTypes
- CheckCertificateRevocation
- CheckServerCertificate
- http_proxy
- InstallProfile
- LogFile (installation component)
- LogFileOld (installation component)
- LogFileSize (installation component)
- NetworkHighSpeed
- NetworkHighUsage

- NetworkHighUsageLowerLimit
- NetworkHighUsageUpperLimit
- NetworkLowUsage
- NetworkLowUsageLowerLimit
- NetworkLowUsageUpperLimit
- NetworkMaxRate
- NetworkMinSpeed
- NetworkSense
- NetworkSpeed
- no_proxy
- PrioritizeRevocationChecks (UNIX-like platforms only)
- SSLCACertificateFile (UNIX-like platforms only)
- SSLCACertificatePath (UNIX-like platforms only)
- SSLCRLCacheLifetime (UNIX-like platforms only)
- SSLCRLPath (UNIX-like platforms only)
- SSLDirectory (UNIX-like platforms only)
- SSLOCSPCacheLifetime (UNIX-like platforms only)
- SSLOCSPPath (UNIX-like platforms only)
- StrictInstall
- UserInteractionLevel (installation component)

In previous releases, `ndlaunch` had greater functionality and many more preferences. The following are now deprecated (meaning that their use is discouraged, that their ongoing functionality is not guaranteed, and that at an unspecified future time they may be entirely removed from the `ndlaunch` component):

`AddRemove`	`AlertExecute`	`AllowByteLevel`
`AllowedPkgSubtypes`	`AllowRebootIfLocked`	`AllowRebootIfServer`
`AllowTimeoutIfLocked`	`AlwaysDisplayReboot`	`ApplyPolicy`
`AskAboutDependencies`	`AutoAlertExecute`	`AutoDetectDC`
`AutoPromptOn InstallCompletion`	`AutoPromptOn UnInstallCompletion`	`AutoRedundancy`
`BrandARP`	`CacheDir`	`CacheDirectory`
`CachedVersion`	`CheckCatalogDigest`	`CheckFileDigest`

CheckRegistry	CmdLineOverrides	CompressMSA
ConfirmSharedFileRemoval	ConnectionAttempts	DetectApplicationVersion Conflicts
DisplayAllAuthcode	DownloadOnly	DownloadPolicy
EventLogs (installation component)	ForceCOMRegistration	ForceReboot
ForceRebootIfLocked	ForceValidSignature	GlobalConfigSource
IgnoreConnectionWindows	InstallationStatus RefreshPeriod	InstallerARPModify
InstallerARPRemove	LogInstallCheck	LogInstallFail
LogInstallPass	LogLevel (installation component)	LogModules (installation component)
LogNotRequiredCheck	LogUninstallFail	LogUninstallPass
LowProfile (installation component)	MgsMsiArgs	MinimumDCSpeed
MsiAllPkgBaseURL	MsiBaseURL	MsiBaseURLList
MsiCustomBaseURL	MsiInstallArgs	MsiReinstallFeatures
MsiReinstallModeLevel	MsiRepair	MsiRepairLevel
MsiSourceListUpdate	MsiSourceLocation	MsiUILevel
MsiUninstallArgs	MsiUserDomain	NetworkRetries
NetworkRetryPeriodIncrement	NetworkTimeout (installation component)	NoStage
PkgCacheDirectory	PlatformSpecificPackages	PolicyPackageRefreshPeriod
PolicyRefreshPeriod	PolicyServerPriority	PostponeByDefault
PostponementQueryBefore	PostponeUserInteractionLevel	PrivateAppAccess
PromptOnCOMRegFailures	PromptOnInstallCompletion	PromptOnUnInstallCompletion
PropagatePkgChanged	PublicAppAccess	QuietUntilUpdate
RebootCmdLine	RebootIfRequired	RebootContinueAfterCmdFailure
RebootPostCommand	RebootPreCommand	RebootPromptCycles
RebootPromptWait	ReInstallRequires VersionChange	RenotifyTimeout
RotateConnections OnFailedConnectionAttempt	RunAllUsersInstallAsUser	SaveAllUserSymbols

SecurityAnalysisFile	ServiceConnectTimeout	StagedInstall
StagedOnly	StageInactivePackages	SupplyWorstCaseReturnValue
UITimeoutWait	UploadEventLogs	UseLastUpdateLocation
UseTrustDatabase	VerifyCatalogSigned	VerifyDownload
VerifyFilesSigned	VerifyTrustOrSign	VirusScan
VirusScanCommand		

ndschedag Command Line

Command line reference for the schedule component

Schedules are created on the central application server, and distributed to inventory beacons from which they are retrieved by managed devices. Managed devices then install the schedules, which are later read by the managed device's scheduling component.

Tip: *Listings of scheduled tasks are contextual to the privileges of the credentials running the schedule query. To see a full list of scheduled activities, be certain to choose the* ***Run as administrator*** *option when starting the Windows command window. Even if you are already logged in using an account that is an administrator on the computer, use this option, as Microsoft Windows by default runs some commands with lower privilege levels.*

Synopsis

Syntax:
ndschedag [*options*...]

Options:

Syntax:
-A
-e (non-Windows devices only)
-o *tag* = *value*
-x *eventId* (non-Windows devices only)

-A	Run all events of type `Schedule Update` in the installed schedule.
-e	Non-Windows devices only. Display a list of all scheduled events and their next run time.
-o *tag*=*value*	Advanced parameter, recommended for use by experienced administrators only. Each instance over-rides the specified preference for the schedule component. Each parameter set at the command line must be accompanied by its own `-o` flag. Do not repeat any individual tag within the command line. Possible tags are listed below.

-x	*eventId*	Available on non-Windows devices only. Run the specified event. To identify the *eventId*, open the file `/var/opt/managesoft/scheduler/schedules/sched.nds` with a text editor. Find the line that defines the relevant event in the file, and copy the *eventId* associated with the event. Paste the *eventId* on the command line.

Example: Command line example

The following command runs the event with the ID {25ec6994-8f40-4985-bf4c-d57566c707c3}:

```
ndschedag -x "{25ec6994-8f40-4985-bf4c-d57566c707c3}"
```

Options

Possible tags for use with the `-o` options are:

- Catchup
- DisablePeriod (Windows devices only)
- MachineScheduleDirectory
- ndsensNetType (Windows devices only)
- OnConnect (Windows devices only)
- ScheduleType (Windows devices only)
- Startup
- UIMode (Windows devices only)
- UserScheduleDirectory (Windows devices only)

ndtrack Command Line

This is the command line reference for the tracker (the executable `ndtrack`). There is large overlap between use of the tracker in all its use cases, and specifically between the FlexNet inventory agent case and the FlexNet Inventory Scanner case. For this reason, variations are noted below, and you should use this reference for all cases.

Synopses

Syntax:

FlexNet inventory agent on Microsoft Windows:

```
ndtrack.exe [options...]
```

FlexNet Inventory Scanner on Microsoft Windows:

```
FlexeraInventoryScanner.exe [options...]
```

FlexNet inventory agent on UNIX-like platforms:
`ndtrack [options...]`

FlexNet Inventory Scanner on UNIX-like platforms:
`ndtrack.sh [options...]`

Options:

Syntax:
`-o` *tag* = " *value*"
`-t Machine`

Note: *The `-t Machine` option is mandatory for, and valid only for, a single use case: when you are running FlexNet inventory agent on Microsoft Windows from a user account other than the local `SYSTEM` account.*

- *On UNIX-like platforms, it is always ignored.*
- *When running the lightweight FlexNet Inventory Scanner on Microsoft Windows, it is the default value and must not be specified in the command line.*
- *When executing `ndtrack.exe` on Microsoft Windows:*
  - *As the local `SYSTEM` account, it is the default.*
  - *As any other account, it must be specified.*

Any parameters declared on the command line override the default tracker settings. (On UNIX-like platforms in the FlexNet Inventory Scanner case [using `ndtrack.sh`], command-line parameters override both the default settings and any preferences recorded in `ndtrack.ini`.)

Tip: *The command line is processed left-to-right. This means that, where overlapping parameters are declared within the command line, the last one declared takes effect. For example:*

```
FlexeraInventoryScanner.exe -o Upload="false" -o Upload="true"
```

means that upload of collected inventory is attempted. In general, do not repeat any individual tag within the command line.

Possible tags are listed below (and see also the notes). Special characters (double quotation marks, backslash) must be escaped with a backslash. Double quotation marks enclosing values are optional, except in the following cases where they are mandatory:

- Surrounding any value that includes white space
- On Windows platforms using the `FlexeraInventoryScanner` executable, where `Upload="true"` is mandatory for normal operation, and the value *must* be enclosed in double quotation marks.

Return codes

The tracker returns a zero on success. If you receive a non-zero return code, check the log file. Details of the log file may also be configured with command-line options, as described in the section on Preferences:

- LogFile (inventory component)
- LogLevel (inventory component)
- LogModules (inventory component).

Example: Command line examples

This example collects a computer inventory and stores it locally (on the computer device where the FlexNet inventory agent is executing) for upload by a separate system (assuming execution by a non-`LocalSystem` account):

```
ndtrack.exe
          -t Machine
          -o MachineZeroTouchDirectory="local-folder"
          -o Upload=False
```

Tip: *An additional inventory (`.ndi`) file may be generated when all of the following conditions are true:*

- *You have licensed the FlexNet Manager for Oracle product.*
- *The invoking account is correctly configured (for details, see the Oracle Discovery and Inventory chapter of the FlexNet Manager Suite 2017 R1 System Reference PDF).*
- *Your current `InventorySettings.xml` file is correctly located for the tracker. Correct location depends on the particular case:*
  - *For the Adopted case and Agent third-party deployment case, in the folder identified in the `InventorySettingsPath` preference (defaults are `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\InventorySettings\` on Windows and `/var/opt/managesoft/tracker/inventorysettings` on UNIX-like platforms). This is handled automatically for devices where the installed agent is managed by policy.*
  - *For the FlexNet Inventory Scanner case, in the same folder as the self-installing executable on Windows or the `ndtrack.sh` script for UNIX-like platforms,*
  - *For the Core deployment case, deployed into the same folder as the `ndtrack` executable.*
- *An Oracle Database is found on the target (local) device.*

The following example collects inventory and uploads it to an inventory beacon (assuming execution by the `LocalSystem` account). `ManageSoftRL` is the name of a web service on the inventory beacon that receives the uploaded inventory and saves it by default to *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories`:

```
ndtrack.exe -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
```

Same purpose on a UNIX-like platform:

```
ndtrack -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
```

Same purpose using FlexNet Inventory Scanner on Microsoft Windows (for this executable on this platform, the `-o Upload="true"` option, including the use of the double quotation marks, is mandatory):

```
FlexeraInventoryScanner.exe
    -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
    -o Upload="true"
```

And same purpose using `ndtrack.sh` as a scanner on UNIX-like platforms:

```
ndtrack.sh -o UploadLocation="http://InventoryBeacon/ManageSoftRL"
```

Notes

1. Default values apply when a parameter is not specified.
2. If no drive is indicated when specifying directory paths, the tracker applies the path to every fixed drive of the local computer.
3. The tracker supports all name/value combinations as command-line options, although a warning is logged if a preference is used that does not appear in the list below.
4. A preference value can symbolically refer to another supported preference by enclosing its name thus: `$(preferenceName)`. References can contain further references.
   Example: The command

   ```
   ndtrack.exe -o IncludeDirectory=$(WinDirectory)
   ```

   includes the Windows directory in the scan (which is likely to produce a massive increase in file evidence!). References are resolved after all preferences are loaded so there are no ordering issues. Self-evidently, on UNIX-like platforms, only supported preferences can be referenced.
5. Semicolon or comma-separated values are the only method for defining multiple values in preferences for the tracker. (Do not repeat any individual tag within the command line.)
   Example: The command

   ```
   ndtrack.exe -o IncludeDirectory=C:\\;D:\\;E:\\
   ```

   will scan the computer's C:, D:, and E: drives if they are fixed (hard) disks, but not if they are CD-ROM drives or logical drives (mapped to network locations).
6. To activate all logging, use the default preferences as follows:

   ```
   Logging=true
   LogLevel=A-Z
   LogFile=<file>
   LogModules=default
   ```

Options

Supported options are listed in the table below. A "Y" in columns 2-5 indicate support in:

- The full FlexNet inventory agent on Microsoft Windows, where preferences may also be included in the Windows registry (these same command-line settings may also be used if you have deployed just the FlexNet

inventory core components in the Core deployment case, but in this case there is no checking of the Windows registry)

- The full FlexNet inventory agent on UNIX-like platforms (where preferences may also be included in the `config.ini` file)
- The lightweight FlexNet Inventory Scanner on Microsoft Windows (preferences can only be used in the command line)
- The scanner equivalent `ndtrack.sh` on UNIX-like platforms (where preferences may also be included in the `ndtrack.ini` file).

Possible tags for use with the `-o` options are:

Preference	Windows full agent	UNIX ndtrack	Windows Scanner	UNIX ndtrack.sh
CALInventory	Y		Y	
CALInventoryPeriod	Y		Y	
CheckCertificateRevocation	Y	Y	Y	
CheckServerCertificate	Y	Y	Y	
ComputerDomain	Y	Y	Y	Y
DateTimeFormat	Y	Y	Y	Y
EmbedFileContentDirectory	Y	Y	Y	Y
EmbedFileContentExtension	Y	Y	Y	Y
EmbedFileContentMaxSize	Y	Y	Y	Y
ExcludeDirectory	Y	Y	Y	Y
ExcludeEmbedFileContentDirectory	Y	Y	Y	Y
ExcludeExtension	Y	Y	Y	Y
ExcludeFile	Y	Y	Y	Y
ExcludeLocalScriptRule	Y	Y	Y	Y
ExcludeMD5	Y	Y	Y	Y
GenerateMD5	Y	Y	Y	Y
Hardware	Y	Y	Y	Y
IncludeDirectory	Y	Y	Y	Y
IncludeExecutables	Y	Y	Y	Y
IncludeExtension	Y	Y	Y	Y

Preference	Windows full agent	UNIX ndtrack	Windows Scanner	UNIX ndtrack.sh
IncludeFile	Y	Y	Y	Y
IncludeMachineInventory	Y		Y	
IncludeLocalScriptRule	Y	Y	Y	Y
IncludeMD5	Y	Y	Y	Y
IncludeRegistryKey	Y		Y	
InventoryFile	Y	Y	Y	Y
InventoryScriptsDir	Y	Y	Y	Y
LogFile (inventory component)	Y	Y	Y	Y
LogLevel (inventory component)	Y	Y	Y	Y
LogModules (inventory component)	Y	Y	Y	Y
LowProfile (inventory component)	Y	Y	Y	Y
MachineInventoryDirectory	Y	Y		
MachineName	Y	Y	Y	Y
MachineZeroTouchDirectory			Y	
MSI	Y	Y	Y	Y
NetworkHighSpeed	Y	Y	Y	Y
NetworkHighUsage	Y	Y	Y	Y
NetworkHighUsageLowerLimit	Y	Y	Y	Y
NetworkHighUsageUpperLimit	Y	Y	Y	Y
NetworkLowUsage	Y	Y	Y	Y
NetworkLowUsageLowerLimit	Y	Y	Y	Y
NetworkLowUsageUpperLimit	Y	Y	Y	Y
NetworkMaxRate	Y	Y	Y	Y
NetworkMinSpeed	Y	Y	Y	Y
NetworkSense	Y	Y	Y	Y
NetworkSpeed	Y	Y	Y	Y
OracleInventoryAsSysdba		Y		Y
OracleInventoryUser		Y		Y

Preference	Windows full agent	UNIX ndtrack	Windows Scanner	UNIX ndtrack.sh
PerformLocalScripting	Y	Y	Y	Y
PerformOracleInventory	Y	Y	Y	Y
PerformOracleListenerScan	Y	Y	Y	Y
PrioritizeRevocationChecks		Y	Y	
ProgramFiles, ProgramFilesX86Folder, ProgramFilesX64Folder	Y	Y		
Recurse	Y	Y	Y	Y
RunInventoryScripts	Y	Y		
ShowIcon (inventory component)	Y	Y		
SSLCACertificateFile		Y		
SSLCACertificatePath		Y		
SSLCRLCacheLifetime		Y		
SSLCRLPath		Y		
SSLDirectory		Y		
SSLOCSPCacheLifetime		Y		
SSLOCSPPath		Y		
SysDirectory	Y	Y		
UploadLocation	Y	Y	Y	Y
VersionInfo	Y	Y		
WinDirectory	Y		Y	
WMI	Y		Y	
WMIConfigFile.	Y		Y	
Upload (note separate defaults)	Y	Y	Y	Y

ndupload Command Line

Command line reference for the uploader.

The uploader runs on managed devices and inventory beacons. It allows you to transfer event logs, inventories and other files from managed devices to FTP or local file servers.

Tip: *Only HTTP and HTTPS protocols are supported by inventory beacons. File and FTP protocols are available for alternative upload arrangements.*

The uploader can transfer any file to a specified URL. If an FTP URL is supplied, then a username and password must also be given.

The uploader deletes files from managed devices after they have been successfully uploaded. Files are not removed if the upload fails.

The file path supplied to the uploader can contain wildcards, so that multiple files of a similar type can be uploaded with a single command.

Synopsis

Syntax:
`ndupload.exe` [*options*...]

Options:

Syntax:
`-a`
`-f` *path\and\filename.ext*
`-o` *tag* **`=`** *value*

`-a`		This is the same as `-o UploadRule` and means "upload all file types". If you run `ndupload` with no command line parameters, this is the default behavior.
`-f`	*`path\and\filename.ext`*	Identifies the file to upload. This is the same as `-o SourceFile`.
`-o`	*`tag`*`=`*`value`*	Each instance over-rides the specified preference for the uploader. Each parameter set at the command line must be accompanied by its own `-o` flag. Do not repeat any individual tag within the command line. Possible tags are listed below.

Return codes

The uploader returns a zero on success. If you receive a non-zero return code, check the log file. Details of the log file may also be configured with command-line options, as described in the section on Preferences:

- LogFile (upload component)
- LogFileOld (upload component)
- LogFileSize (upload component).

Example: Command line examples
The following command uploads the file `file.txt` to the FTP location `ftp://server/dir1/dir2` using the login name `user1` and the password `abc123`:

```
ndupload -f file.txt -o UploadLocation=ftp://server/dir1/dir2
-o UploadUser=user1 -o UploadPassword=abc123
```

The following command uploads the file `file.txt` to the mapped drive `f:/dir1/dir2`:

```
ndupload -f file.txt -o UploadLocation=file:///f:/dir1/dir2
```

This example uploads the inventory file `myInventory.ndi` to an inventory beacon (where `ManageSoftRL` is the name of a web service on the inventory beacon that receives the uploaded inventory and saves it by default to *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories`):

```
ndupload -f myInventory.ndi -o
UploadLocation="http://InventoryBeacon/ManageSoftRL"
```

Options

Tip: *Although the `Network*` preferences remain available for special circumstances, network throttling for package downloads is not normally required. For details, see the discussion under NetworkSpeed.*

Possible tags for use with the `-o` options are:

- CheckCertificateRevocation
- CheckServerCertificate
- LogFile (upload component)
- LogFileOld (upload component)
- LogFileSize (upload component)
- NetworkHighSpeed
- NetworkHighUsage
- NetworkHighUsageLowerLimit
- NetworkHighUsageUpperLimit
- NetworkLowUsage
- NetworkLowUsageLowerLimit
- NetworkLowUsageUpperLimit
- NetworkMaxRate
- NetworkMinSpeed
- NetworkSense
- NetworkSpeed
- PrioritizeRevocationChecks (UNIX-like platforms only)

- SourceFile
- SourceRemove
- SSLCACertificateFile (UNIX-like platforms only)
- SSLCACertificatePath (UNIX-like platforms only)
- SSLCRLCacheLifetime (UNIX-like platforms only)
- SSLCRLPath (UNIX-like platforms only)
- SSLDirectory (UNIX-like platforms only)
- SSLOCSPCacheLifetime (UNIX-like platforms only)
- SSLOCSPPath (UNIX-like platforms only)
- `TenantUID`, to override the value set in the registry (multi-tenant mode only)
- UploadLocation
- UploadPassword
- UploadProxy
- UploadRule
- UploadType
- UploadUser.

9

Preferences

This section contains an alphabetic listing of some useful preferences you can declare on agent command lines (for example, during testing or in scheduled tasks) or store in the registry for run-time assessment.

[Registry] Explained

The following definitions of computer preferences use the placeholder `[Registry]`. This text represents the location of all relevant registry entries in the registry:

- On Windows servers, inventory beacons, and managed devices, agent registry entries on 32-bit operating systems are usually stored under the key:

  ```
  HKEY_LOCAL_MACHINE\SOFTWARE\ManageSoft Corp\
  ```

  For 64-bit operating systems, the normal key is:

  ```
  HKEY_LOCAL_MACHINE\SOFTWARE\Wow6432Node\ManageSoft Corp\
  ```

  For these platforms, the `[Registry]` placeholder should be interpreted as the appropriate one of these keys.

  Tip: *Equivalent keys in the `HKEY_CURRENT_USER` hive are now deprecated (meaning that their use is discouraged, that their ongoing functionality is not guaranteed, and that at an unspecified future time support for this hive may be entirely removed).*

- On non-Windows managed devices, registry entries are stored in the `/var/opt/managesoft/etc/config.ini` file. Within this file, registry keys are shown in square brackets. The lines below each key show the registry entries set under that key. For example, to set the type of inventory to be collected as a 'registry' preference on UNIX-like managed devices:

  ```
  [ManageSoft\Tracker\CurrentVersion]
  InventoryType=User
  ```

  In other words, on UNIX-like devices, the documentation placeholder `[Registry]\` should be taken to mean "look in the `/var/opt/ managesoft/etc/config.ini` file for the following key".

Absent keys

Not all registry keys cited in the following preferences exist by default. These are usually marked "Code internals, or manual configuration". If the registry key does not exist, or if it exists but has no value, the default value is provided by the FlexNet inventory agent (without modifying the registry). However, if you wish to override the default value for the preference, you should manually create the registry key shown, and populate it with your alternate value.

AllowedPkgTypes

Command line | Registry

`AllowedPkgTypes` is a semi-colon (`;`) separated list of installable package types. Whereas the policy for the FlexNet inventory agent references all the packages (of all kinds) that are available for this managed device, the `AllowedPkgTypes` setting acts as a filter, so that only the listed types are included in policy updates. An empty value allows installation of all package types. Clearly this preference is intended for internal use, but may on rare occasions be useful for testing.

The package types available are:

- `Package` (normal FlexNet packages)
- `ClientSettings` (only packages containing fail-over settings)
- `ClientConfiguration` (only packages containing managed device settings)
- `Schedule` (only packages containing details of scheduled events).

Values

Values / range	`Package`, `ClientSettings`, `ClientConfiguration`, `Schedule`
Default value	(No default.)
Example values	`ClientSettings;Schedule`

Command line

Tool	Installation component (`ndlaunch`), policy component (`mgspolicy`)
Example	`-o AllowedPkgTypes=”ClientConfiguration”`

Registry

Installed by	Code internals

Computer preference	`[Registry]\ManageSoft\Common`

AutoPriority

Registry

`AutoPriority` determines whether an inventory beacon has a priority calculated at the time of download or upload (`True`), or whether it is fixed at the value declared in the `Priority` registry key (`False`).

Priorities are used to determine the order in which connections to reporting locations or distribution locations are attempted. If `AutoPriority` does not exist under a download or upload location's registry settings, the appropriate agent assumes the value `True`. If you want to use fixed priorities, you must create the `AutoPriority` registry key if it does not exist, and assign to it the value `False`.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`

Registry

Installed by	Failover list for inventory beacons, or manual configuration
Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>`

CALInventory

Command line | Registry

`CALInventory` determines whether or not the FlexNet inventory agent attempts to collect access evidence from the managed device in a `.swacc` file.

Tip: *The `.swacc` file is saved on the managed device in `...\Uploads\ClientAcess` (the default path is `C:\ProgramData\ManageSoft Corp\ManageSoft\Common\Uploads\ClientAccess`). This location cannot*

be modified. Because the data here is strongly time-related, the file is removed after it has been uploaded to an inventory beacon.

Values

Values / range	Boolean (`True` or `False`)
Default value	`False`
Example values	`True`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o CALInventory=True`

Registry

Installed by	A downloaded client settings package, or manual setting (computer preference)
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

CALInventoryPeriod

Command line | Registry

`CALInventoryPeriod` sets the interval (in days) between times when FlexNet inventory agent saves a `.swacc` file on the managed device.

***Tip:** If `CALInventory` is false (the default), `CALInventoryPeriod` is ignored.*

Values

Values / range	Zero or a positive integer
Default value	`90` (This is the default value when there is no entry in the registry or command line options.)
Example values	`7`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o CALInventoryPeriod=10`

Registry

Installed by	Manual configuration (computer preference)
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

Catchup

Command line | Registry

`Catchup` controls the behavior of events occurring on the managed device. It determines when the FlexNet inventory agent will catch up missed scheduled events. Possible actions include:

- `Always`: the agent always attempts to catch up on missed events
- `Never`: the agent never attempts to catch up on missed events
- `Query`: the agent queries the user regarding catch up on missed events (available for Windows devices only).

Values

Values / range	`Always`, `Never`, `Query`
Default value	No default in registry; default behavior is `Never`
Example values	`Always`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o Catchup=Query`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)

Computer preference	`[Registry]\ManageSoft\Schedule Agent\CurrentVersion`

CheckCertificateRevocation

Command line | Registry

When transferring data to or from an inventory beacon using the HTTPS protocol, a web server certificate is applied to the data being transferred.

When receiving web server certificates from servers, the appropriate agent checks the CA (certification authority) server to ensure that the certificates are not on the CRL (certificate revocation list). If an agent cannot check the CRL (for example, the CA server is firewalled and cannot be contacted), the system may time out on the CRL download, and consequently fail the revocation check. To avoid this, you can use the `CheckCertificateRevocation` preference to prevent agents from performing the CRL check.

Tip: *Turning off CRL checking should be only a temporary measure while you fix the problem that prevents successful checking. It is poor security practice to omit the check for certificate currency, since without this check your system may continue to trust a certificate that has been compromised as part of a wider attack.*

You can set this as a common registry entry, so that the same behavior occurs across all agents, and you can override the common behavior by setting an overriding registry entry for any individual agent if required. By default, this preference is set so that all agents check the CRL.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example values	`False`

Command line

Tool	`ndtrack`, `ndlaunch`, `ndupload`
Example	`-o CheckCertificateRevocation="False"`

Registry

Installed by	Manual configuration

Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *<Agent>* is the registry key for an individual agent

CheckServerCertificate

Command line | Registry

When transferring data to or from an inventory beacon using the HTTPS protocol, a web server certificate is applied to the data being transferred. All component agents can (and by default do) validate the public certificates received from the inventory beacon against their local copy (on Windows, in the certificate store; and on UNIX in the PEM file).

If you wish, you can use the `CheckServerCertificate` preference to prevent agents from performing the certificate check. (Without this check, the certificate is ignored, and the HTTPS protocol provides only encryption as security on the transfer, without validating that the agent is contacting the correct inventory beacon server.)

You can set this as a common registry entry, so that the same behavior occurs across all agents; and you can override the common behavior by setting an overriding registry entry for any individual agent if required. By default, this preference is set so that all agents check the inventory beacon server certificate against the root CA certificate.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example values	`False`

Command line

Tool	`ndtrack`, `ndlaunch`, `ndupload`
Example	`-o CheckServerCertificate="False"`

Registry

Installed by	Manual configuration

Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *<Agent>* is the registry key for an individual agent

CommonAppDataFolder

Command line | Registry

`CommonAppDataFolder` provides the path to the folder in which application details are located. On Windows managed devices, these are application details for `[ALL USERS]`. This is a system variable which you can override in the registry or on the command line.

Values

Values / range	Local directory path. Read-only preference.
Default value	The default installation of Windows uses: `%ALLUSERSPROFILE%\Application Data` where %ALLUSERSPROFILE% defaults to: • On Windows 2000/XP: `C:\Documents and Settings\All Users` • On Windows Vista: `C:\ProgramData` • On Windows 7 and higher: `C:\Users\Public` For Macintosh and UNIX devices, the value is: `/var/opt/managesoft`
Example values	Windows: `C:\Users\Public\Application Data` UNIX-like systems: `/var/opt/bin`

Variable

Defined:	Predefined within Windows.
Reference as:	`$(CommonAppDataFolder)`

ComputerDomain

Command line | Registry

`ComputerDomain` contains the canonical name of the domain of the local computing device, from which inventory is being gathered. One reason for setting this value is to cause UNIX-like devices to report in a particular domain in listings and reports within FlexNet Manager Suite.

Note: *You can configure this setting for deployment to UNIX-like devices by setting the* `MGSFT_DOMAIN_NAME` *property in the* `mgsft_rollout_response` *file. Alternatively, you can manually edit the value in the* `/var/opt/ managesoft/etc/config.ini` *file that serves as a registry store on UNIX-like devices where the FlexNet inventory agent is installed. For more information, see Agent third-party deployment: Configure the Bootstrap File for UNIX.*

Values

Values / range	Valid domain name.
Default value	On Windows, the current local Active Directory domain for Windows devices. For UNIX-like devices, the default is no value.
Example value	`MyDomain.com`

Command line

Tool	Inventory agent
Example	`-o ComputerDomain=MyDomain.com`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Common`

ConnectionAttempts

Command line | Registry

`ConnectionAttempts` applies only to the use of the `file:` protocol for uploads/downloads in a custom implementation. For standard protocols used by inventory beacons, see NetworkRetries.

When the installation tool within the FlexNet inventory agent is trying to connect with a file share using the `file:` protocol, `ConnectionAttempts` specifies how many times it will accept a "no connection is available" error before discarding that location and logging a network failure. The "no connection is available" condition occurs when the number of active connections to a file share reaches the maximum allowed.

Values

Values / range	Numeric
Default value	`2`
Example values	`100`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o ConnectionAttempts=100`

Registry

Installed by	Installation of FlexNet inventory agent, or manual configuration
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

DateTimeFormat

Command line | Registry

`DateTimeFormat` sets the date/time format for all inventory agent activity.

Warning: *Internal use only: do not edit.*

Values

Values / range	Date/time format definition string, based on the ANSI C function `strftime()`.
Default value	`%Y%m%dT%H%M%S`

Example value	`%I.%M.%S %p - %A, %d %B %Y` This would result in a date format such as `10.30.05 am - Monday, 26 February 2010` ***Note:*** *Since the DateTimeFormat string is also used as a file name, you may use only characters that are valid in file names across all platforms (in particular, you may not use a colon).*

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o DateTimeFormat=”%H.%M.%S %p - %A, %d %B %Y”`

Registry

Installed by	Agent code, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

DefaultSchedulePath

Command line | Registry

`DefaultSchedulePath` gives the URL or path to the default machine schedule that is installed by the policy agent before applying policy if `InstallDefaultSchedule` is `True`.

Usually this preference is used to point to a schedule, but it can be configured to point to any `.osd` file that the policy agent wants the installation agent to process before applying policy.

Values

Values / range	Any valid directory path and filename
Default value	`$(DownloadRootURL)/Schedules/Default Machine Schedule/Default Machine Schedule.osd`
Example values	`C:\temp\debugSchedule.osd`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o DefaultSchedulePath=”C:\Schedules\Default Machine Schedule\Default Machine Schedule.osd”`

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

Directory

Registry

`Directory` represents one of the following:

- For uploads, the folder representing the reporting location’s upload folder
- For downloads, the location of the distribution location, within the specified host
- For trusted and excluded locations, the location of the distribution location, within the specified host.

Values

Values / range	Folder location
Default value	(No default.)
Example values	`/ManageSoftDL`

Registry

Installed by	Failover list for inventory beacons, or manual configuration

Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>` For trusted locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\TrustedLocations\<serverkey>` For excluded locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\ExcludedLocations\<serverkey>`

Disabled (application usage component)

Command line | Registry

`Disabled` specifies whether the application usage component is inactive on this managed device. When set to `True`, the FlexNet inventory agent does not record application usage data. When set to `False`, the FlexNet inventory agent records application usage data.

Note: *The schedule component has a preference of the same name, used for a slightly different purpose.*

Background: Application usage tracking (sometimes called "application metering") by the FlexNet inventory agent works by tracking the time during which installed files are opened and active on the targeted devices, where those installed files are known to be part of a particular installed application. This usage data is uploaded to the central application server, where the usage tracking calculations occur at each license reconciliation (whether or not usage data is available from any particular inventory source). This preference can be modified in three ways:

- At adoption or installation time for the FlexNet inventory agent on a target Windows device, the installation configuration file can establish your preferred default (but only for Windows):
  - On Windows, the `USAGEAGENT_DISABLE` setting from the `mgssetup.ini` file is written to the registry location shown below
  - On UNIX-like platforms, the `mgsft_rollout_response` file does not support a setting for application usage tracking; but manual editing of the preference is possible (described next).
- On a target device, you can edit this preference setting manually:
  - On Windows, edit the registry setting shown below, or deploy a registry change using your preferred deployment tool

- For UNIX-like platforms, you can edit the UNIX preference file (`config.ini`) and deploy the update separately.

- The simplest method is that you can update the setting for selected target devices through the web interface. Navigate to **Discovery & Inventory > Discovery and Inventory Rules > Targets** tab, and scroll down to the **Application usage options** section. Changes recorded here are deployed automatically to the target inventory devices through the next policy update, where they adjust this setting appropriately on each device.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`

Command line

Tool	Application usage agent
Example	`-o Disabled=False`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Usage Agent\CurrentVersion`

Disabled (schedule component)

Command line | Registry

`Disabled` determines whether the schedule component is disabled on the managed device. By default, this value is set to `False`, enabling the schedule component.

If a date and time in the future is specified, the schedule component is disabled, and remains disabled until this date and time. Settings are not cleared as a given date and time passes, so that a date and time that has passed is also a possible value. Such past values are ignored, and have the same effect as the value `False` (that is, when the date is in the past, the schedule agent is enabled).

On Windows devices, management of this preference is different for user schedules and machine schedules:

- For user schedules, the user can run the schedule agent on the managed device. If users open a command line window, they can navigate to `$(ProgramFiles)\ManageSoft\Schedule Agent`, and run `ndschedag.exe`, without parameters. This presents a user interface where they can set the **Disabled** check box. When the schedule agent window closes (with the check box set), the schedule agent adds the number of seconds in the

`DisablePeriod` preference to the current date and time, and writes the result to this `Disabled` (schedule agent) setting.

> ***Note:*** *User-based inventory (and therefore user-based scheduling) are deprecated, and are included only for backward compatibility. Use of machine schedules is recommended.*

- Machine schedules cannot be disabled through any user interface, nor through command line interaction. If you need to temporarily disable a machine schedule, enter an appropriate date and time string in ISO format in the *Computer preference* registry setting listed in the **Registry** table below.

Values

Values / range	Either `False`, or a date/time value in the ISO standard format *`yyyymmdd`*`Thhmmss`. If this date and time is in the future, it is the date and time at which the agent schedules will be re-enabled on this managed device.
Default value	`False`
Example values	`20160312T101520`

Command line

Tool	Schedule component (`ndschedag`)
Example	`-o Disabled=20150823T143014`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Schedule Agent\CurrentVersion`

DisablePeriod

Command line | Registry

`DisablePeriod` is only applicable when `Disabled` (schedule agent) is set to `True`. It sets the number of seconds for which agent schedules are disabled when the user selects "Disabled" from the scheduling agent user interface on the managed device. (The scheduling agent user interface is only available on Windows devices.)

The default value is 3600 seconds (one hour). When set to 3600, agent schedules are automatically re-enabled after one hour.

Values

Values / range	0 - 2147483647
Default value	`3600`
Example values	`1800`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o DisablePeriod=600`

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\Schedule Agent\CurrentVersion`

DownloadSettings

Registry

`DownloadSettings` is a registry key (container) for several preferences that can control the download of data by the FlexNet inventory agent. These registry values are in sets that apply to a particular download location, for which reason the registry key must be completed with an identifier for the download location. The completed path leads to the relevant set of registry values, as shown below.

When configured by the failover list generated by an inventory beacon, the placeholder *<download_location>* takes the form of a GUID that identifies the download location on the particular inventory beacon (for example, `{EEFC121D-2BB3-4318-8014-8DDC339C7553}`).

For manual configuration, four name/value pairs must be specified, and others are optional. To omit an optional value, you may include the name and leave the value blank (as shown in the example below), or omit the name/value pair entirely. The values that may be set are:

- `Protocol` – Mandatory. For download from an inventory beacon, this must be either `http` or `https`.
- `Name`
- `Directory` – Mandatory. By default, the download location is called `ManageSoftDL`, but as this may have been renamed during installation, you need to check details of your implementation.
- `Host` – Mandatory.

- `Port` – Mandatory. As this has no default value, you must specify this setting to suit your environment (typically port 80 for HTTP and port 443 for HTTPS).
- `User` – If omitted (or left with a blank value), anonymous authentication is used for downloads from this download location.
- `Password` – Stores an encrypted copy of the password needed when Windows authentication is specified for the download.
- `Proxy`
- `Priority`
- `AutoPriority`.

Values

Values / range	Requires a subkey that uniquely identifies the download location on an individual inventory beacon.
Default value	None.
Example values	`[Registry]\ManageSoft\Common\` `DownloadSettings\{EEFC121D-2BB3-4318-8014-8DDC339C7553}` `Protocol=http` `Name=ss-server1 Download Location` `Directory=ManageSoftDL` `Host=ss-server1` `Port=80` `User=` `Password=` `Proxy=` `Priority=10` `AutoPriority=True`

Registry

Installed by	Download of failover settings, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common\DownloadSettings\<download_location>`

EmbedFileContentDirectory

Command line | Registry

`EmbedFileContentDirectory` specifies folders that must be scanned in the search for ISO 19770-2 software identification tags (known as "ISO tags"). Note that subfolders may be included, based on the value of `Recurse`

(which defaults to true). When recursion is needed, specific subfolders may also be excluded (see ExcludeEmbedFileContentDirectory).

Tip: *This is not the only preference that causes folders to be scanned. See also IncludeDirectory.*

Values

Values / range	Any valid folder path. Multiple paths may be specified with a semi-colon separator between them.
Default value	`"%APPDATA%;%ProgramFiles%;%PROGRAMFILES(x86)%"` This default applies on Windows platforms when there is no value visible in the registry or command line. **Note:** *On UNIX-like platforms, there is no default path scanned. To embed ISO tag files on these platforms, you must specify this preference either on a command line or in:* • *For the FlexNet inventory agent case, the `/var/opt/managesoft/etc/config.ini` file that serves in place of a registry on these platforms* • *For the FlexNet Inventory Scanner case, the co-located `ndtrack.ini` file that holds preferences for `ndtrack.sh`.*
Example value	`"\\"` The double backslash works around the command prompt escaping, and becomes a single backslash to the inventory component. This searches all folders on all available drives for ISO tag files. **Note:** *This would be a time-consuming operation, and not best practice given that the ISO specification defines where ISO tag file should be stored (see the default value above).*

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o EmbedFileContentDirectory="C:\Program Files (x86)"`

Registry

Installed by	Code internals, or manual configuration

Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

EmbedFileContentExtension

Command line | Registry

`EmbedFileContentExtension` defines the file extension(s) that must be matched for a small text file (by design, an ISO tag file) to be embedded within the uploaded inventory (`.ndi`) file.

Values

Values / range	Any valid file extension, excluding the leading dot or period character. Multiple file extensions may be included, separated by the semicolon character.
Default value	`swidtag` Default applies when no value is visible in the registry or command line. ***Note:*** *This default value excludes the ISO tag files for Adobe products (such as Adobe Acrobat 9 and Creative Suite 4) released around the time that the ISO 19770-2 standard was announced. These early implementations used a file extension of `swtag`. The following example changes the default to include both standard and early-adopter versions of the ISO tag file extension.*
Example values	`"swidtag;swtag"`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o EmbedFileContentExtension="swidtag;swtag"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

EmbedFileContentMaxSize

Command line | Registry

`EmbedFileContentMaxSize` specifies an upper file size limit in bytes for text files (such as ISO tag files) that are to be included/embedded in the uploaded inventory (`.ndi`) file.

Values

Values / range	Any valid integer, which is interpreted as bytes.
Default value	*1000000* This default is approximately equivalent to one megabyte.
Example values	`"1024"` This value limits the size of embedded files to one kilobyte.

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o EmbedFileContentMaxSize="1024"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

ExcludeDirectory

Command line | Registry

`ExcludeDirectory` excludes a specified folder from the path(s) for file inventory scanning declared in `IncludeDirectory`. If `Recurse` is `True` , then all subfolders of the excluded folder are also excluded.

***Tip:** A folder may still be scanned, but as part of the search for ISO tag files, if it is included through EmbedFileContentDirectory and not also excluded by ExcludeEmbedFileContentDirectory. Even in this case, no normal file inventory is returned from a path identified in `ExcludeDirectory`.*

This preference can accept multiple values in a list separated by either commas or semi-colons.

The value can symbolically refer to another preference by enclosing its name thus: `$(preferenceName)`. References can contain further references.

If a folder is identified in both the `ExcludeDirectory` and `IncludeDirectory` preferences, it is excluded. Exclusions always override inclusions.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*
- *MD5 value.*

For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Values

Values / range	Valid folders
Default value	Default behavior on Windows platforms: `$(WindowsFolder)` ***Note:*** *This default prevents inventory collection of potentially millions of file evidence records from (by default) `C:\Windows` and is subfolders. The default is not visible in the `[Registry]` but can be over-ridden by entries as shown below.* There is no default behavior on UNIX-like platforms.

Example value	This example adds another folder to the current default behavior on Windows platforms: `$(WindowsFolder);C:\Temp` Another way to add an exclusion to the current default behavior is: `$(ExcludeDirectory);C:\Temp` If you specify a path in other ways that do not also include the existing default, you over-ride that default, and re-introduce the large volume of file evidence records possible in the Windows folder. For example, this specification on Windows platforms would include inventory of the `$(WindowsFolder)` folder and its subfolders: `C:\Temp`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o ExcludeDirectory=C:\Temp`

Registry

Installed by	Manual configuration (otherwise predefined within the tracker).
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

ExcludedMSIs

Command line | Registry

For Microsoft Windows devices only, `ExcludedMSIs` prevents the recording of application usage data for specified native package format (MSI) applications. The applications are excluded when their MSI product code GUID is listed in this preference. Once excluded, no application usage data is recorded for the applications installed from the listed MSI packages. This preference can accept multiple comma-separated values.

Values

Values / range	Valid application GUIDs, enclosed in curly braces, and (for multiples) comma-separated.
Default value	The product code GUID for the FlexNet inventory agent.

Example values	`{00000409-78E1-11D2-B60F-006097C998E7}`

Command line

Tool	Application usage component (`mgssecsvc` service)
Example	No command line support.

Registry

Installed by	Installation of the FlexNet inventory agent, or manual configuration
Computer preference	`[Registry]\ManageSoft\Usage Agent\CurrentVersion`

ExcludeEmbedFileContentDirectory

Command line | Registry

`ExcludeEmbedFileContentDirectory` identifies a subpath within the current search target (declared in EmbedFileContentDirectory) that must be excluded from scanning for ISO tag files.

***Tip:** A folder may still be scanned, but as part of the search for general file inventory, if it is included through IncludeDirectory and not also excluded by ExcludeDirectory. Even in this case, no ISO tag files are returned from a path identified in `ExcludeEmbedFileContentDirectory`.*

Values

Values / range	One (or more) folder(s) to be excluded from the search path scanned for ISO tag files to embed in the uploaded inventory (`.ndi`) file. Multiple paths should be separated by the semi-colon character.
Default value	Nothing.
Example values	`"C:\Program Files (x86)\Adobe"` This example excludes Adobe applications from checking for ISO tag files (perhaps to save scanning folders containing non-standard file extensions — see EmbedFileContentExtension).

Command line

Tool	Inventory component (`ndtrack`)

Example	`-o ExcludeEmbedFileContentDirectory="C:\Program Files (x86)\Adobe"`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

ExcludeExtension

Command line | Registry

`ExcludeExtension` excludes files with the specified extension from inventory, or excludes all files if set to the value `*` (asterisk). This filter is applied to the files within a folder included in inventory. This preference can accept multiple values, separated by commas or semicolons.

You can specify any valid file extensions (no leading dot required). Be aware that including `exe` in this list prevents tracking of executable files on Windows platforms.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*
- *MD5 value.*

For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Values

Values / range	File extensions (no period required)
Default value	(No default.)
Example value	`DLL`

Command line

Tool	Inventory agent
Example	`-o ExcludeExtension=dll`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

ExcludeFile

Command line | Registry

`ExcludeFile` excludes a specific file from inventory collection. This filter is applied to files within a folder included in inventory. This preference can accept multiple values, separated by commas or semi-colons.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*
- *MD5 value.*

For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Values

Values / range	Valid file names.
Default value	(No default.)
Example value	`myfile.txt`

Command line

Tool	Inventory agent

Example	`-o ExcludeFile=myfile.txt`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

ExcludeFileSystemType

Command line | Registry

For UNIX-like devices, `ExcludeFileSystemType` allows you to prevent inventory collection from specific types of files systems that may otherwise be included. (This preference is not applicable to Microsoft Windows.)

This file system black list is complemented by a white list in `IncludeFileSystemType`. Note that if a file system type is specified in both lists, the exclude has priority.

Keep in mind the potential interaction between the following preferences:

- `IncludeDirectory`
- `IncludeNetworkDrives`
- `IncludeFileSystemType` and `ExcludeFileSystemType` (on UNIX-like systems only).

Of these, `IncludeDirectory` has lowest priority, and priority increases down the list. This means that, on UNIX-like systems, `IncludeFileSystemType` (the highest priority) can be an exception to the general rule that "exclude overrides include". The following table illustrates cases where the other settings may over-ride the `IncludeDirectory` preference, where that specifies a network drive. The first three cases fit the general rule, but the fourth is a special case:

...FileSystemType	IncludeNetworkDrives	IncludeDirectory	Result
Not specified (including Microsoft Windows)	`False` (this setting operates like an "exclude")	A network share (or subdirectory thereof) on any file system type.	No inventory returned.
Not specified (including Microsoft Windows)	`True`	A network share (or subdirectory thereof) on any file system type.	Software inventory from the specified directory.

...FileSystemType	IncludeNetworkDrives	IncludeDirectory	Result
`ExcludeFileSystemType=XXX`	Either `True` or `False` (here, a `True` setting is over-ridden by the exclude)	A network share (or subdirectory thereof) on file system type `XXX` (here, the setting is over-ridden by the exclude).	No inventory returned.
`IncludeFileSystemType=XXX`	Either `True` or `False` (here, a `False` setting is over-ridden, because the file system type has higher precedence)	A network share (or subdirectory thereof) on file system type `XXX`.	Software inventory from the specified directory.

Tip: *`IncludeDirectory` is not the only preference that causes folders to be scanned. See also EmbedFileContentDirectory.*

Values

Values / range	Comma-separated list of standard file system type names, as recognized by the UNIX `mount` command. Either omit white space, or enclose the list in double quotation marks.
Default value	No `[Registry]` default value, and no default behavior. (Equivalent to a default value of `""`.)
Example value	`zfs` This value excludes inventory collection from the `zfs` file system. This modifies the default behavior (for more details, see IncludeFileSystemType).

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o ExcludeFileSystemType=zfs`

Registry

Installed by	Manual configuration in `/var/opt/ managesoft/etc/config.ini` (see [Registry] Explained).
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

ExcludeLocalScriptRule

Command line | Registry

Tip: *This preference requires that the up-to-date* `InventorySettings.xml` *file is either:*

- *Co-located with the FlexNet Inventory Scanner (or the scanner-like* `ndtrack.sh` *on UNIX-like platforms)*
- *Correctly installed with the fully-installed FlexNet inventory agent.*

Unless this condition is met, this preference is ignored.

By default when the above condition is met, the tracker (`ndtrack` executable) will perform all local scripting actions specified in `InventorySettings.xml`. For example, this file includes enhanced inventory abilities related to Oracle databases and the hardware they run on, and Microsoft Exchange (although the functionality available is subject to the products you have licensed within FlexNet Manager Suite). When the `ExcludeLocalScriptRule` preference is included, any local script rules that are included as parameters in the list will *not* be performed (while any rules not identified will continue to run). This means that you should use this preference only when you want to exclude specific scripts because they are not required, or are affecting performance, or are outside your security policies.

Tip: *As an alternative to the* `ExcludeLocalScriptRule` *preference, you can use the* `IncludeLocalScriptRule` *preference (which runs only the named scripts and implicitly excludes all others). While it is not recommended that you use both preferences at the same time, if both are used,* `ExcludeLocalScriptRule` *takes precedence.*

Tip: *Collection of Oracle inventory may be affected by any of the following preferences:*

- *PerformLocalScripting*
- *PerformOracleInventory*
- *PerformOracleListenerScan*
- *ExcludeLocalScriptRule*
- *IncludeLocalScriptRule*.

Values

Values / range	Valid rule name. For reference, valid rule names can be found in `InventorySettings.xml` by searching for the `Id` attribute of the `RecognitionRule` XML element.
Default value	There is no default. You must specify a rule name as a value. When neither of `ExcludeLocalScriptRule` or `IncludeLocalScriptRule` is specified, the default is to execute all the scripts in `InventorySettings.xml` (assuming `PerformLocalScripting` is true).

Example values	`OracleCPURule` This rule controls the collection of Oracle hardware inventory. `OracleRule` This rule controls the collection of Oracle Database inventory.

Command line

Tool	`ndtrack`
Example	`-o ExcludeLocalScriptRule="OracleCPURule"` To exclude more than one rule, use a comma-delimited list: `-o ExcludeLocalScriptRule="OracleCPURule,OracleRule,AdditionalRule"`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\Managesoft\Tracker\CurrentVersion`

ExcludeMD5

Command line | Registry

For files within a folder included in inventory, the tracker performs an MD5 checksum, and excludes any files from the inventory that have an MD5 value equal to any value stored in `ExcludeMD5`. This preference can accept multiple values, separated by commas or semicolons.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*
- *MD5 value.*

For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Values

Values / range	Valid MD5 values
Default value	(No default.)
Example value	`7d9d2440656fdb3645f6734465678c60`

Command line

Tool	Inventory agent
Example	`-o ExcludeMD5=7d9d2440656fdb3645f6734465678c60`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

GenerateMD5

Command line | Registry

`GenerateMD5` specifies whether or not to calculate the MD5 digest of any file being considered by the tracker, and to include it with stored inventory data. Since MD5 digests are not used to identify versions of inventoried files, set this preference to `True` only when it is needed to support an `IncludeMD5` or `ExcludeMD5` preference. Be aware that calculating MD5 digests will degrade performance where many files are being tracked.

Values

Values / range	Boolean (`True` or `False`).
Default value	`False`
Example value	`True`

Command line

Tool	Inventory component (`ndtrack`)

Example	`-o GenerateMD5=True`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

Hardware

Command line | Registry

`Hardware` allows you to track hardware either using Windows Management Instrumentation (WMI) or native APIs. (If WMI is available, by default it is used for tracking — see WMI.) When set to `True`, `Hardware` allows the tracking of hardware inventory. When set to `False`, the inventory tool does not track hardware inventory.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example value	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o Hardware=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

Host

Registry

`Host` identifies the inventory beacon on which the reporting location (uploads) or distribution location (downloads) is hosted.

Values

Values / range	Valid host name
Default value	(No default.)
Example values	`server.domain.com`

Registry

Installed by	Failover list for inventory beacons, or manual configuration
Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>` For trusted locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\TrustedLocations\<serverkey>` For excluded locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\ExcludedLocations\<serverkey>`

http_proxy

Command line | Registry

`http_proxy` gives the proxy settings for the installation component (`ndlaunch`) when using the HTTP protocol. See also no_proxy.

Values

Values / range	Any valid URL
Default value	Not to use a proxy.
Example values	`tmnis.com;tmnis.com.de`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o http_proxy=tmnis.com;tmnis.com.de`

Registry

Installed by	Installation of FlexNet inventory agent on a managed device (computer preference)
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

https_proxy

Command line | Registry

`https_proxy` gives the proxy settings for the installation component (`ndlaunch`) when using the HTTPS protocol. See also no_proxy.

Values

Values / range	Any valid URL
Default value	Not to use a proxy.
Example values	`tmnis.com;tmnis.com.de`

Command line

Tool	Installation component (`ndlaunch`)

Example	`-o http_proxy=tmnis.com;tmnis.com.de`

Registry

Installed by	Installation of FlexNet inventory agent on a managed device (computer preference)
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

IncludeDirectory

Command line | Registry

`IncludeDirectory` targets a specified folder for scanning for files to include in inventory. If `Recurse` is `True`, then all subfolders are also included.

Important: *The FlexNet inventory agent never follows symbolic links (on UNIX-like platforms) or NTFS junction points (on Microsoft Windows). This restriction cannot be changed. On some UNIX servers, for example, `/bin` is a symbolic link to `/usr/bin`. On such a system, if you specified `IncludeDirectory=/bin`, no inventory would be collected, because the symbolic link cannot be followed. Changing the preference on such a system to `IncludeDirectory=/usr/bin` solves the problem, since there is now no intermediate symbolic link. On UNIX-like systems, check for symbolic links with the `ls -l` command.*

For UNIX-like platforms, a setting of "`/`" scans the entire file system. For Microsoft Windows platforms, when the value of this entry is set to "`\`", it means "include all drives", with the exception of $(WindowsFolder) and its subfolders. (To change this default exclusion, see ExcludeDirectory.)

This preference can accept multiple values, separated by commas or semi-colons. If a folder is identified in both the `ExcludeDirectory` and `IncludeDirectory` preferences, it is excluded. Exclusions (of the same thing) always override inclusions.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*
- *MD5 value.*

For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Keep in mind the potential interaction between the following preferences:

- `IncludeDirectory`
- `IncludeNetworkDrives`
- `IncludeFileSystemType` and `ExcludeFileSystemType` (on UNIX-like systems only).

Of these, `IncludeDirectory` has lowest priority, and priority increases down the list. This means that, on UNIX-like systems, `IncludeFileSystemType` (the highest priority) can be an exception to the general rule that "exclude overrides include". The following table illustrates cases where the other settings may over-ride the `IncludeDirectory` preference, where that specifies a network drive. The first three cases fit the general rule, but the fourth is a special case:

...FileSystemType	IncludeNetworkDrives	IncludeDirectory	Result
Not specified (including Microsoft Windows)	`False` (this setting operates like an "exclude")	A network share (or subdirectory thereof) on any file system type.	No inventory returned.
Not specified (including Microsoft Windows)	`True`	A network share (or subdirectory thereof) on any file system type.	Software inventory from the specified directory.
`ExcludeFileSystemType=XXX`	Either `True` or `False` (here, a `True` setting is over-ridden by the exclude)	A network share (or subdirectory thereof) on file system type `XXX` (here, the setting is over-ridden by the exclude).	No inventory returned.
`IncludeFileSystemType=XXX`	Either `True` or `False` (here, a `False` setting is over-ridden, because the file system type has higher precedence)	A network share (or subdirectory thereof) on file system type `XXX`.	Software inventory from the specified directory.

Tip: *`IncludeDirectory` is not the only preference that causes folders to be scanned. See also EmbedFileContentDirectory.*

Values

Values / range	Valid folder(s)

Default value	Different defaults for different cases: • For the full FlexNet inventory agent driven by policy downloaded from an inventory beacon, the value reflects the current settings displayed in the web interface (navigate to **Discovery & Inventory > Settings > File inventory**). The standard settings on that page triggers scanning of the entire file system. • For the lightweight FlexNet Inventory Scanner case (including `ndtrack.sh` on UNIX-like platforms), the default is blank. This means that *no files are included in inventory gathering by default* when you use the FlexNet Inventory Scanner. Reported inventory then relies entirely on installer evidence. If you wish the FlexNet Inventory Scanner to collect file evidence for any reason, it is mandatory to set an appropriate value for `IncludeDirectory`.
Example value	`C:\Program Files`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeDirectory=C:\Temp`

Registry

Installed by	Installation of FlexNet inventory agent on a managed device (computer preference), or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeExecutables

Command line | Registry

`IncludeExecutables` extends the meaning of 'executable files' across platforms. If `IncludeDirectory` is blank (its default), this setting has no effect. However, when `IncludeDirectory` has any value:

- A setting of `False` means that only files with a file extension of `.exe` are included in executable files inventory (normally, this means only Windows executables)
- A setting of `True` means that (for files not already matched by other settings) the tracker will report:
  - On Windows, files with an `exe` filename extension

- On UNIX-like platforms, files with no filename extension and an execute bit set (in any of local, group, or universal scope in the file permission bits).

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example value	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeExecutables=True`

Registry

Installed by	Installation of FlexNet inventory agent on a device, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeExtension

Command line | Registry

`IncludeExtension` includes files with the specified extension, or includes all files if this preference is set to the value `*`. This filter is applied within one or more folders included in inventory (see IncludeDirectory). This preference can accept multiple values, separated by commas or semi-colons. The dot separator for file extensions is not required.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*
- *MD5 value.*

For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Values

Values / range	Any file extension
Default value	`sys;sys2;swtag;cmptag;lax;swidtag;sig;exe` ***Tip:*** *The `exe` extension is applicable only to Windows platforms.*
Example value	`bat`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeExtension=bat`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeFile

Command line | Registry

`IncludeFile` searches for the specific file to report in inventory; but keep in mind that the search is constrained to folders that are specified as included in inventory. This preference can accept multiple values, separated with commas or semi-colons.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*

- *MD5 value.*

  For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Values

Values / range	Valid file
Default value	(No default.)
Example value	`xcopy.exe`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeFile=myfile.txt`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeFileSystemType

Command line | Registry

For UNIX-like devices, `IncludeFileSystemType` allows you to include specific types of files systems that may otherwise be excluded. (This preference is not applicable to Microsoft Windows.)

The `ufs`, `zfs`, and `lofs` file systems use virtual device nodes (within the operating system) rather than listing their drives as physical `/dev/...` devices. This makes it more difficult to determine whether they are local or remote file systems, and they would therefore logically be excluded when `IncludeNetworkDrives=False` (the default). When you have these file systems running locally on a UNIX-like device, this setting allows you to exclude network drives and still allow inventory collection from the local file system by nominating the file system type(s).

This file system white list is complemented by a black list in `ExcludeFileSystemType`. Note that if a file system type is specified in both lists, the exclude has priority.

Keep in mind the potential interaction between the following preferences:

- `IncludeDirectory`
- `IncludeNetworkDrives`
- `IncludeFileSystemType` and `ExcludeFileSystemType` (on UNIX-like systems only).

Of these, `IncludeDirectory` has lowest priority, and priority increases down the list. This means that, on UNIX-like systems, `IncludeFileSystemType` (the highest priority) can be an exception to the general rule that "exclude overrides include". The following table illustrates cases where the other settings may over-ride the `IncludeDirectory` preference, where that specifies a network drive. The first three cases fit the general rule, but the fourth is a special case:

...FileSystemType	IncludeNetworkDrives	IncludeDirectory	Result
Not specified (including Microsoft Windows)	`False` (this setting operates like an "exclude")	A network share (or subdirectory thereof) on any file system type.	No inventory returned.
Not specified (including Microsoft Windows)	`True`	A network share (or subdirectory thereof) on any file system type.	Software inventory from the specified directory.
`ExcludeFileSystemType=XXX`	Either `True` or `False` (here, a `True` setting is over-ridden by the exclude)	A network share (or subdirectory thereof) on file system type `XXX` (here, the setting is over-ridden by the exclude).	No inventory returned.
`IncludeFileSystemType=XXX`	Either `True` or `False` (here, a `False` setting is over-ridden, because the file system type has higher precedence)	A network share (or subdirectory thereof) on file system type `XXX`.	Software inventory from the specified directory.

Tip: *`IncludeDirectory` is not the only preference that causes folders to be scanned. See also EmbedFileContentDirectory.*

Values

Values / range	Comma-separated list of standard file system type names, as recognized by the UNIX `mount` command. Either omit white space, or enclose the list in double quotation marks.
Default value	No `[Registry]` default value. If no value is specified in the registry or command line, the default behavior is `ufs,zfs,lofs`.

Example value	`ufs,lofs` Specifying any value for this preference overrides (replaces) the default behavior. This example value excludes the `zfs` file system (otherwise included in the default), which exclusion may be required if this is in fact a remote file system.

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeFileSystemType=ufs,lofs`

Registry

Installed by	Manual configuration in `/var/opt/ managesoft/etc/config.ini` (see [Registry] Explained).
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeLocalScriptRule

Command line | Registry

Tip: *This preference requires that the up-to-date `InventorySettings.xml` file is either:*

- *Co-located with the FlexNet Inventory Scanner (or the scanner-like `ndtrack.sh` on UNIX-like platforms)*
- *Correctly installed with the fully-installed FlexNet inventory agent.*

Unless this condition is met, this preference is ignored.

By default when the above condition is met, the tracker (`ndtrack` executable) will perform all local scripting actions specified in `InventorySettings.xml`. For example, this file includes enhanced inventory abilities related to Oracle databases and the hardware they run on, and Microsoft Exchange (although the functionality available is subject to the products you have licensed within FlexNet Manager Suite). When the `IncludeLocalScriptRule` preference is included, only local script rules that are included as parameters in the list will be performed (all others are implicitly excluded). This means that you should use this preference only when you want to limit the number of local scripts running on an inventory device.

Tip: *As an alternative, the `ExcludeLocalScriptRule` preference lists specific rules to exclude, leaving all others running. If you use both preferences, `ExcludeLocalScriptRule` has priority.*

Tip: *Collection of Oracle inventory may be affected by any of the following preferences:*

- *PerformLocalScripting*
- *PerformOracleInventory*
- *PerformOracleListenerScan*
- *ExcludeLocalScriptRule*
- *IncludeLocalScriptRule*.

Values

Values / range	Valid rule name. For reference, valid rule names can be found in `InventorySettings.xml` by searching for the `Id` attribute of the `RecognitionRule` XML element.
Default value	There is no default. You must specify a rule name as a value. When neither of `IncludeLocalScriptRule` or `ExcludeLocalScriptRule` is specified, the default is to execute all the scripts in `InventorySettings.xml` (assuming `PerformLocalScripting` is true).
Example values	`OracleCPURule` This rule controls the collection of Oracle hardware inventory. `OracleRule` This rule controls the collection of Oracle Database inventory.

Command line

Tool	`ndtrack`
Example	`-o IncludeLocalScriptRule="OracleCPURule"` To include more than one rule, use a comma-delimited list: `-o IncludeLocalScriptRule="OracleCPURule,AdditionalRule"`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\Managesoft\Tracker\CurrentVersion`

IncludeMachineInventory

Command line | Registry

`IncludeMachineInventory` If `True`, the tracker performs a computer inventory including hardware and all user packages.

Values

Values / range	Boolean (`True` or `False`).
Default value	Different default for different platforms: • On Microsoft Windows, for both the full FlexNet inventory agent and the lightweight FlexNet Inventory Scanner: `True` if running as `LocalSystem` or running a machine inventory on the command line. • On UNIX-like platforms, always `True`. This value cannot be over-ridden on UNIX-like systems.
Example value	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	(Microsoft Windows only): `-o IncludeMachineInventory=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeMD5

Command line | Registry

`IncludeMD5` includes in the inventory report any files having the specific MD5 digest. This filter is applied to files within a folder included in inventory. This preference can accept multiple values, separated with commas or semi-colons.

Note: *Inclusions and exclusions can cover folders (and optionally their sub-folders), file name extensions, specific file names, and specific MD5 digest values. To resolve conflicting specifications, the specifications of folders provides a data set to which the following specifications are applied as filters, prioritized from lowest to highest as:*

- *File extension*
- *File name*
- *MD5 value.*

For example, if file extension `exe` is included, filename `xcopy.exe` excluded, and MD5 value `123456...` (the MD5 for `xcopy.exe`) is included, then the inventory agent includes all files with extension `exe` except for all versions of `xcopy.exe` that do not have an MD5 value `123456...`.

Values

Values / range	Any valid MD5 digest
Default value	(No default.)
Example value	`7d9d2440656fdb3645f6734465678c60`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeMD5=7d9d2440656fdb3645f6734465678c60`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeNetworkDrives

Command line | Registry

`IncludeNetworkDrives` allows for the inclusion of mounted network drives in inventory. There are differences across platforms:

- On Microsoft Windows, drives are included (`True`) or excluded (`False`) as a whole.
- On UNIX-like platforms, network file systems are mounted as directories in the same way that all devices are mounted. When `Recurse` is `True`, inventory collection starts at each folder listed in `IncludeDirectory` and

drills down through all child folders. If this process encounters a directory that is a mounted network drive, and `IncludeNetworkDrives` is not specified or `False`, the process goes no further down this path. However, if `IncludeNetworkDrives=True`, recursion continues. Note that this preference controls the recursion process, and does not prevent inventory scanning of a directory specified in `IncludeDirectory`, even if that is a mounted network drive.

Tip: *Use this setting with great care. Scanning mounted network drives can cause a massive increase in the amount of inventory collected, depending on the other settings used in the same execution.*

Keep in mind the potential interaction between the following preferences:

- `IncludeDirectory`
- `IncludeNetworkDrives`
- `IncludeFileSystemType` and `ExcludeFileSystemType` (on UNIX-like systems only).

Of these, `IncludeDirectory` has lowest priority, and priority increases down the list. This means that, on UNIX-like systems, `IncludeFileSystemType` (the highest priority) can be an exception to the general rule that "exclude overrides include". The following table illustrates cases where the other settings may over-ride the `IncludeDirectory` preference, where that specifies a network drive. The first three cases fit the general rule, but the fourth is a special case:

...FileSystemType	IncludeNetworkDrives	IncludeDirectory	Result
Not specified (including Microsoft Windows)	`False` (this setting operates like an "exclude")	A network share (or subdirectory thereof) on any file system type.	No inventory returned.
Not specified (including Microsoft Windows)	`True`	A network share (or subdirectory thereof) on any file system type.	Software inventory from the specified directory.
`ExcludeFileSystemType=XXX`	Either `True` or `False` (here, a `True` setting is over-ridden by the exclude)	A network share (or subdirectory thereof) on file system type `XXX` (here, the setting is over-ridden by the exclude).	No inventory returned.
`IncludeFileSystemType=XXX`	Either `True` or `False` (here, a `False` setting is over-ridden, because the file system type has higher precedence)	A network share (or subdirectory thereof) on file system type `XXX`.	Software inventory from the specified directory.

Tip: *`IncludeDirectory` is not the only preference that causes folders to be scanned. See also EmbedFileContentDirectory.*

Values

Values / range	Boolean (`True` or `False`).
Default value	No registry default value. If no value is specified in the registry or command line, the default behavior is `False`.
Example value	`True`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeNetworkDrives=True`

Registry

Installed by	Manual configuration.
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeRegistryKey

Command line | Registry

Set `IncludeRegistryKey` to instruct the FlexNet inventory agent to return the contents of the specified registry keys or values. (Applies to Microsoft Windows devices only, and is ignored on UNIX-like platforms.)

In order to collect *all* values under a specified key, the key path specified must end with a trailing backslash. If the path specified corresponds to a key (rather than a registry value) but does not end with a trailing backslash, only the `(Default)` value (if it is set) for the specified key will be collected.

Note: *Default values in the registry are typically not set.*

For example:

- `HKLM\SOFTWARE\ManageSoft Corp\ManageSoft\` will track all values under the specified key (because it has a trailing backslash)
- `HKLM\SOFTWARE\ManageSoft Corp\ManageSoft` will only track the `(Default)` values under the specified key (where they exist).

When setting this preference, you can use:

- The * wildcard to replace a key or value (including multiple times for different key elements in a single path)

- The abbreviations HKLM, HKCU, HKCR, HKU, HKCC. These will be automatically expanded to appropriate values.

Tip: *Although in the FlexNet Inventory Scanner case, `ndtrack.exe` does not read preferences from the registry to modify its own behavior, it can still be instructed to collect registry keys and values to return in inventory. To modify the default value (shown below) for registry key(s) to be read by FlexNet Inventory Scanner, set the special case on the command line.*

Important: *While `IncludeRegistryKey` controls inclusion of registry values in the uploaded inventory `.ndi` file, a separate preference on the inventory server (or, in smaller implementations, the application server) must be present and set to true for this data to be saved to the FlexNet inventory database. Be precise with the following settings: do not use the `Wow6432Node` path. The setting in the registry of the inventory server is:*

- *Key: `HKLM\SOFTWARE\ManageSoft Corp\ManageSoft\Reporter\CurrentVersion\Registry`*
- *Name: `SaveRegistry`*
- *Type: `REG_SZ`*
- *Value: `True`.*

Values

Values / range	Valid registry key or value
Default value	If no value is specified, the FlexNet inventory agent (and FlexNet Inventory Scanner) use `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows \CurrentVersion\ Uninstall\` and include any keys and values thereunder in the returned inventory.
Example values	Track all registry keys and values under `HKEY_LOCAL_MACHINE\SOFTWARE`: `HKLM\SOFTWARE\*\` Track all values (only) under `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft`: `HKLM\SOFTWARE\Microsoft\*` Use multiple wildcards: `HKLM\SOFTWARE\*\CurrentVersion\*\*`

Command line

Tool	Inventory component (`ndtrack`)

Example	`-o IncludeRegistryKey="HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\App Paths\"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

IncludeUserInventory

Command line | Registry

`IncludeUserInventory`, ff `True`, causes collection of user inventory.

Values

Values / range	Boolean (`True` or `False`).
Default value	`TRUE` if running as user or running a user inventory (`-t User` on the command line)
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o IncludeUserInventory=False`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

InstallDefaultSchedule

Command line | Registry

When `InstallDefaultSchedule` is `True`, the policy agent invokes the installation agent to install the package specified by `DefaultSchedulePath` before applying policy. Used by automated processes for adoption of the managed device.

Values

Values / range	Boolean (`True` or `False`)
Default value	`False`
Example values	`True`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o InstallDefaultSchedule=True`

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

InstallProfile

Command line | Registry

`InstallProfile` is set to `Public` if the package is to be installed for All Users, or `Private` if it's to be installed for an individual user.

Values

Values / range	`Public`, `Private`
Default value	(No default.)

Example values	`Public`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o InstallProfile=Public`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

InventoryFile

Command line | Registry

`InventoryFile` identifies the name of a local copy of the inventory file.

The name may consist of system properties that can be expanded to identify a value. For example, the default value `$(UserName) on $(MachineId).ndi` expands so that the name contains the account and machine ID related to the inventory run. This format works on both Microsoft Windows and UNIX-like platforms.

Values

Values / range	`*.ndi`
Default value	`$(UserName) on $(MachineId).ndi`
Example values	`myComputer.ndi`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o InventoryFile=myfile.ndi`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

InventoryScriptsDir

Command line | Registry

Available on Windows devices only.

`InventoryScriptsDir` gives the location of your additional scripts to be run by the `ndtrack` executable immediately before inventory data is uploaded to an inventory beacon. There are no standard scripts supplied as part of FlexNet Manager Suite in this folder: it is intended for specialized scripts of your own creation and under your own control. For example, you may have used this folder to save a VB script to collect specialized inventory values. Where the preference and its specified folder exist, all scripts that exist in this location are run on each invocation of the `ndtrack` executable.

Warning: *There is no validation of the content of the scripts found in this folder. For security, it is imperative that, when your administrator creates the folder and records it in the `InventoryScriptsDir` registry key, the folder is locked down so that it is accessible only to the account running the `ndtrack` executable (by default, local `SYSTEM`), and to a trusted human administrator who has permission to install your preferred scripts in the specified folder.*

Any scripts in the folder are executed by `scripttrack.dll`, a plug-in for `ndtrack`. (This same DLL is also required for the execution of specialized inventory tasks in the `InventorySettings.xml` file.) This means that the script execution capability is supported in the following cases of FlexNet inventory gathering:

- The Adopted case
- The Zero-footprint case
- The FlexNet Inventory Scanner case
- The Agent third-party deployment case, unless you have deliberately removed `scripttrack.dll` when preparing the deployment package
- The Core deployment case, unless you have deliberately removed `scripttrack.dll` when preparing the deployment package (noting that this cannot be removed where you are relying on `InventorySettings.xml` for advanced inventory collection, as described in Core deployment: Implementation).

As noted below, operation in any of these cases requires that the folder exists and is identified in the `InventoryScriptsDir` registry setting on the target device where the scripts must run.

Values

Values / range	String identifying an existing directory.

Default value	`$(ScriptDir)\InventoryScanningOptionsInventoryScripts` This default is used when the registry key does not exist, and no value is provided on the command line. This means that this folder (if it exists) must also be locked down; or if not, its creation must be prevented, most likely by security the parent `$(ScriptDir)` directory.
Example values	`$(ScriptDir)\private`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o InventoryScriptDir=C:\private`

Registry

Installed by	Manual installation
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

InventorySettingsPath

Command line | Registry

`InventorySettingsPath` identifies the directory where the FlexNet inventory agent looks for the downloaded `InventorySettings.xml` file. This file transmits all relevant settings from the central application server to the installed FlexNet inventory agent (`ndtrack`) on the local device.

The registry value is set by the Launcher (`ndlaunch`) which downloads and installs any changed package(s) with each policy update. The Launcher also installs the `InventorySettings.xml` in the same path. Thereafter, the FlexNet inventory agent recovers the path from the registry, and then opens the XML file.

Values

Values / range	`*.ndi`

Default value	On Microsoft Windows: `$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\InventorySettings\` On UNIX-like platforms: `/var/opt/managesoft/tracker/inventorysettings`
Example values	Do not adjust value manually. This path is included in the downloaded settings, and set automatically.

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o InventorySettingsPath="$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\InventorySettings\"`

Registry

Installed by	Launcher (`ndlaunch`)
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

InventoryType

Command line | Registry

`InventoryType` identifies the inventory type, either machine-based or user-based.

Note: *User-based inventory collection is deprecated, and included only for backward compatibility. Specifically, no policy is generated in FlexNet Manager Suite for user-based inventory collection, so that the `ndtrack` component does not normally generate any user-based inventory. Furthermore, there is no guarantee of future operation of user-based inventory, and the recommendation is to convert any legacy systems to use machine-based inventory.*

Values

Values / range	String literals `User` or `Machine`.
Default value	`User` unless the account executing `ndtrack` is `LocalSystem`, in which case the default switches to `Machine`.

Example values	`Machine`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o InventoryType=Machine`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

LauncherCommandLine

Command line | Registry

`LauncherCommandLine` specifies `ndlaunch` parameters to pass to the installation agent when applying policy information.

Values

Values / range	Valid installation agent command line parameters (see ndlaunch Command Line).
Default value	(No default.)
Example values	`-o UserInteractionLevel=Quiet` ***Note:*** *The `-o` is required as part of the value to be appended to the command line of `ndlaunch`.*

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o LauncherCommandLine="-o UserInteractionLevel=Quiet"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

LogFile (installation component)

Command line | Registry

`LogFile` gives the location of the log file (on the computer device where the FlexNet inventory agent is executing) when logging is enabled for `ndlaunch` (installation component). All actions performed by `ndlaunch` are logged to this file. If you wish to use a log file located in a folder other than the default installation log folder, specify a full pathname.

Values

Values / range	Valid log file name, including local and UNC network files.
Default value	`$(TempDirectory)\ManageSoft\installation.log`
Example values	`C:\temp\MyInstallerLog.log`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o Logfile=C:\temp\mylauncherlogfile.log`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

LogFile (inventory component)

Command line | Registry

`LogFile` gives the location and file name of the log file (on the computer device where the tracker is executing) when logging is enabled for `ndtrack`.

Values

Values / range	Valid log file name and path.
Default value	Different defaults for different cases: • Full FlexNet inventory agent or FlexNet Inventory Scanner on Microsoft Windows: `$(TempDirectory)\ManageSoft\tracker.log` • Full FlexNet inventory agent on UNIX-like platforms: `/var/opt/managesoft/log/tracker.log` • Scanner equivalent `ndtrack.sh` on UNIX-like platforms: `/var/tmp/flexera/log/tracker.log` ***Tip:*** *If `ndtrack.sh` is executed by a non-root account `userName`, the log defaults to:* *`/var/tmp/flexera.userName/log/tracker.log`*
Example values	`C:\temp\inventory.log`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o LogFile=Inventory.log`

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

LogFile (policy component)

Command line | Registry

`LogFile` gives the location of the log file (on the computer device where the FlexNet inventory agent is executing) when logging is enabled for `mgspolicy` (policy component).

Values

Values / range	Valid log file name, including local and UNC network files.
Default value	`$(TempDirectory)\ManageSoft\policy.log`
Example values	`C:\temp\policy.log`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o LogFile=policy.log`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

LogFile (upload component)

Command line | Registry

`LogFile` gives the location of the log file (on the computer device where the FlexNet inventory agent is executing) when logging is enabled for `ndupload` (uploader component). All actions performed by `ndupload` are logged to this file. If you wish to use a log file located in a folder other than the default installation log folder, specify a full pathname.

Values

Values / range	Valid log file name, including local and UNC network files.
Default value	`$(TempDirectory)\ManageSoft\uploader.log`
Example values	`C:\temp\MyUploaderLog.log`

Command line

Tool	Uploader component (`ndupload`)
Example	`-o Logfile=C:\temp\myuploaderlogfile.log`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

LogFileOld (installation component)

Command line | Registry

When the main installation component log file (defined in LogFile (installation component)) reaches its maximum size (defined in LogFileSize (installation component)), the file is renamed to the value in `LogFileOld`. This overwrites any existing `LogFileOld` file. A new log file is created, using the name defined in `LogFile (installation component)`. This allows you to retain additional log information.

Values

Values / range	Valid file name for local or UNC network files
Default value	`$(TempDirectory)\ManageSoft\launcher.old.log`
Example values	`$(TempDirectory)\installationold.log`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o LogFileOld=$(TempDirectory)\installationold.log`

Registry

Installed by	Installation of inventory beacon (computer preference)
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

LogFileOld (policy component)

Command line | Registry

When the main policy merging log file (defined in LogFile (policy component)) reaches a particular size (defined in LogFileSize (policy component)), the file is renamed to the value in `LogFileOld`. This overwrites any existing `LogFileOld` file. A new log file is created. This allows you to retain additional log information.

Values

Values / range	Valid file name for local or UNC network files
Default value	`$(TempDirectory)\ManageSoft\policy.old.log`
Example values	`$(TempDirectory)\mgspolicyold.log`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o LogFileOld=$(TempDirectory)\mgspolicyold.log`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

LogFileOld (upload component)

Command line | Registry

When the main upload component log file (defined in LogFile (upload component)) reaches its maximum size (defined inLogFileSize (upload component)), the file is renamed to the value in `LogFileOld`. This overwrites any existing `LogFileOld` file. A new log file is created, using the name defined in `LogFile (upload component)`. This allows you to retain additional log information.

Values

Values / range	Valid file name for local or UNC network files

Default value	`$(TempDirectory)\ManageSoft\uploader.old.log`
Example values	`$(TempDirectory)\uploaderold.log`

Command line

Tool	Upload component (`ndupload`)
Example	`-o LogFileOld=$(TempDirectory)\uploaderold.log`

Registry

Installed by	Installation of inventory beacon (computer preference)
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

LogFileSize (installation component)

Command line | Registry

When the main installation component log file (defined in LogFile (installation component)) reaches the maximum size defined here in `LogFileSize (installation component)`, the file is renamed (to the value in LogFileOld (installation component)). This overwrites any existing `LogFileOld` (installation agent) file. A new log file is created, with the name defined in `LogFile (installation component)`. This allows you to retain additional log information.

The size must be expressed as the number of bytes of the maximum allowed log size. If this entry is empty or set to zero, there is no log size limit and the size of the log file continues to grow.

Values

Values / range	Number (number of bytes)
Default value	`4000000`
Example values	`3126000` (3 Mb)

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o LogFileSize=1024000`

Registry

Installed by	Installation of FlexNet inventory agent (adoption) sets the computer preference.
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

LogFileSize (policy component)

Command line | Registry

When the main policy merging log file (defined in LogFile (policy component)) reaches the size defined in `LogFileSize`, the file is renamed (to the value in LogFileOld (policy component)). This overwrites any existing `LogFileOld` (policy component) file, A new log file is created. This allows you to retain additional log information.

The size must be expressed as the number of bytes of the maximum allowed log size. If this entry is empty or set to zero, there is no log size limit and the size of the log file continues to grow.

Values

Values / range	Number (number of bytes)
Default value	`4000000`
Example values	`3126000` (3 Mb)

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o LogFileSize=3126000`

Registry

Installed by	Installation of FlexNet inventory agent (adoption)
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

LogFileSize (upload component)

Command line | Registry

When the main upload component log file (defined in LogFile (upload component)) reaches the maximum size defined here in `LogFileSize` (upload component), the file is renamed (to the value in LogFileOld (upload component)). This overwrites any existing `LogFileOld` (upload component) file. A new log file is created, with the name defined in `LogFile` (upload component). This allows you to retain additional log information.

The size must be expressed as the number of bytes of the maximum allowed log size. If this entry is empty or set to zero, there is no log size limit and the size of the log file continues to grow.

Values

Values / range	Number (number of bytes)
Default value	`524288`
Example values	`3126000` (3 Mb)

Command line

Tool	Uploader component (`ndupload`)
Example	`-o LogFileSize=1024000`

Registry

Installed by	Installation of FlexNet inventory agent (adoption) sets the computer preference.
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

LogLevel (inventory component)

Command line | Registry

`LogLevel` sets the category of logging used by the `ndtrack` executable. This logging is output to the file whose name is stored in the `LogFile` preference (see LogFile (inventory component)). Individual entries include the following:

- `A` - Schedule logging
- `C` - Callout logging
- `G` - General logging
- `N` - Network logging
- `P` - Preference logging
- `S` - Security logging
- `U` - User interface logging
- `V` - Verification logging

Values

Values / range	A-z
Default value	`A-z` (this enables all logging)
Example values	`G`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o LogLevel=G`

Registry

Installed by	Installation of the FlexNet inventory agent

Computer preference	In order of precedence: • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Common`

LogLevel (policy component)

Command line | Registry

`LogLevel` sets the level of logging used by the policy component. This logging is output to the file whose name is stored in the `LogFile` (policy component) entry (see LogFile (policy component)). Individual entries include the following:

- `A` - Schedule logging
- `C` - Callout logging
- `G` - General logging
- `N` - Network logging
- `P` - Preference logging
- `S` - Security logging
- `U` - User interface logging
- `V` - Verification logging

Values

Values / range	A-z
Default value	`A-z` (this enables all logging)
Example values	`G`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o LogLevel=G`

Registry

Installed by	Installation of the FlexNet inventory agent
Computer preference	In order of precedence: • `[Registry]\ManageSoft\Policy Client\CurrentVersion` • `[Registry]\ManageSoft\Common`

LogModules (inventory component)

Command line | Registry

`LogModules` specifies the modules used to log events for the tracker (`ndtrack` executable). When unspecified, the default inventory agent log modules are used. To use custom logging, include the location of your custom logging DLL.

Values

Values / range	`default; <path to modules>`
Default value	On Microsoft Windows platforms: `default;C:\Program Files (x86)\ManageSoft\Common\mgssyslg.dll; C:\Program Files (x86)\ManageSoft\Common\mgsamtlg.dll` On UNIX-like platforms: `default;$(InstallDir)/lib/levtlog.so`
Example values	`C:\temp\myModule.dll`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o LogModules=C:\temp\myModule.dll`

Registry

Installed by	Installation of FlexNet inventory agent, or manual configuration

Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion` `[Registry]\ManageSoft\Common`

LogModules (policy component)

Command line | Registry

`LogModules` specifies the modules used to log events for the policy component. When unspecified, the default inventory agent log modules are used. To use custom logging, include the location of your custom logging DLL.

Values

Values / range	`default; <path to modules>`
Default value	On Microsoft Windows platforms: `default;C:\Program Files (x86)\ManageSoft\Common\mgssyslg.dll; C:\Program Files (x86)\ManageSoft\Common\mgsamtlg.dll` On UNIX-like platforms: `default;$(InstallDir)/lib/levtlog.so`
Example values	`C:\temp\myModule.dll`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o LogModules=C:\temp\myModule.dll`

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion` `[Registry]\ManageSoft\Common`

LowProfile (inventory component)

Command line | Registry

`LowProfile` determines the CPU priority of the tracker (`ndtrack` executable) on the computer device where it is executing.

- When set to `True`, the tracker processes run with low priority. For UNIX-like systems, this sets the nice level of the process to 10. On recent Windows platforms, it uses background processing mode (`PROCESS_MODE_BACKGROUND_BEGIN`). On legacy Windows platforms where this is not supported (such as Windows XP and earlier), it uses a priority of idle (`IDLE_PRIORITY_CLASS`).
- When set to `False`, the same processes run with normal priority.

Values

Values / range	Boolean (`True` or `False`).
Default value	No default in registry; default behavior is `True`.
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o LowProfile=True`

Registry

Installed by	Installation of the FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

MachineID

Command line | Registry

`MachineID` stores the computer name of the target device, as returned from the operating system (typically shifted to all upper case).

This value is derived from the operating system, and on recent versions of Windows, is the same (possibly apart from case) as the computer name visible in the **Computer > Properties** dialog, displayed as **Computer name**.

By default, this preference is not set manually, but is referenced as `$(MachineName)`. This reference causes the FlexNet inventory agent to query the operating system for the name of the machine.

However, it is possible to override the value with a manual setting. This may be useful, for example, when taking inventory of UNIX-like machines, where you may prefer a particular machine name to appear in inventory. This value may be set:

- In the installation bootstrap file `mgsft_rollout_response`, used for custom installations on UNIX-like platforms (for more details, see Agent third-party deployment: Configure the Bootstrap File for UNIX.
- In the command line (on all platforms), as described below.
- In the registry (or, on UNIX-like platforms, for the full FlexNet inventory agent locally installed on the computer, the `config.ini` file; or when using `ndtrack.sh` alone as a lightweight inventory scanner, the `ndtrack.ini` file).

If this preference is customized to a non-default value, it should typically be configured under `[Registry]\ManageSoft\Common` (only) to ensure that all agents use the same value of `MachineId`. Note that a setting for any individual agent overrides the setting in `Common`.

Values

Values / range	Alphanumeric (best restricted to ASCII characters).
Default value	`$(MachineName)` This variable is expanded by FlexNet inventory agent by querying the operating system.
Example values	`MyMachine`

Command line

Tool	Installation component (`ndlaunch`), policy component (`mgspolicy`), scheduling component (`ndschedag`), usage agent, inventory component (`ndtrack`)
Example	`-o MachineId=MyMachine`

Registry

Installed by	Installation of FlexNet inventory agent on the target device (by adoption).

Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion` `[Registry]\ManageSoft\Policy Client\CurrentVersion` `[Registry]\ManageSoft\Schedule Agent\CurrentVersion` `[Registry]\ManageSoft\Usage Agent\CurrentVersion` `[Registry]\ManageSoft\Common` (If set in both the `Common` hive and another hive, the value in the `Common` hive is not used for that agent.)

MachineInventoryDirectory

Command line | Registry

`MachineInventoryDirectory` defines the location in which the locally-installed FlexNet inventory agent stores machine inventories.

Note: *The FlexNet inventory agent uses this option only for machine inventory when it is executing on a computer device in local mode. Local mode is set automatically when the base directory for the executable matches the value stored in the registry key `HKLM\Software\ManageSoft Corp\ManageSoft\EtcpInstallDir`. This is the normal state after installation of FlexNet inventory agent on a computer device in the Adopted case. (This means that this folder is not used for the Zero-footprint case, for which see MachineZeroTouchDirectory.)*

Values

Values / range	Any valid file path.
Default value	`$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Tracker\Inventories`
Example values	`C:\temp`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o MachineInventoryDirectory=C:\ManageSoft Corp\ManageSoft\Tracker\Inventories`

Registry

Installed by	Installation of the FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

MachineName

Command line | Registry

`MachineName` contains the name of the local machine. Unlike `MachineId` , this preference should not be changed.

Values

Values / range	Any valid machine name.
Default value	(No default.) If no value is set, FlexNet Inventory Scanner uses the current machine name.
Example values	`MyMachine`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o MachineName=MyMachine`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

MachinePolicy

Command line | Registry

`MachinePolicy` gives the full directory path and file name of the merged policy file for machine policy on this managed device. This file is prepared on the inventory beacon, and is the summary of all applicable machine policies. The setting can be overridden on the command line for testing purposes, but this setting should generally be read-only.

Values

Values / range	Any valid directory path and file name of a well-formed merged policy file
Default value	`$(MachinePolicyDirectory)\$(MachineId).npl`
Example values	`C:\Document and Settings\All Users\Application Data\Flexera Software\FlexNet Inventory\Policy Client\Policies\Merged\Machine\ WORKSTATION_34.npl`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o MachinePolicy="C:\temp\testpolicy.npl"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Selector\CurrentVersion`

MachinePolicyDirectory

Command line | Registry

`MachinePolicyDirectory` gives the location to store the current machine policy on the local managed device.

Values

Values / range	Valid folder and path.
Default value	`$(CommonAppDataFolder)\ManageSoft Corp\ ManageSoft\Policy Client\Policies\Merged\ Machine`
Example values	`C:\Temp\MachinePolicies`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o C:\Temp\MachinePolicies`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

MachinePolicyPackageDirectory

Command line | Registry

`MachinePolicyPackageDirectory` gives the location where package information associated with machine policy is cached.

Values

Values / range	Valid folder and path.
Default value	`$(CommonAppDataFolder)\ManageSoft Corp\ ManageSoft\Policy Client\Packages`
Example values	`C:\Temp\MyMachinePolicy\PackageInfo`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o C:\Temp\MyMachinePolicy\PackageInfo`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

MachineScheduleDirectory

Command line | Registry

`MachineScheduleDirectory` gives the folder in which the machine schedules are stored.

A machine schedule is run for the computer on which it is installed, regardless of any users that may or may not have accounts on that machine.

Warning: *Altering this value is not recommended. Additional actions need to be taken when redirecting this to another folder. Contact your Flexera Software professional services consultant for further information.*

Values

Values / range	Valid folder path
Default value	Windows devices: `$(CommonAppDataFolder)\ManageSoft Corp\ ManageSoft\Schedule Agent\Schedules` Non-Windows devices: `$(CommonAppDataFolder)/scheduler/schedules`
Example values	`C:\Program Files\Flexera Software\Schedule Agent\ MachineSchedules`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o MachineScheduleDirectory="C:\Program Files\Flexera Software\schedule agent\ MachineSchedules"`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Schedule Agent\CurrentVersion`

MachineZeroTouchDirectory

Command line | Registry

`MachineZeroTouchDirectory` identifies the Microsoft Windows directory where machine inventory files are written (temporarily, pending upload) during any inventory gathering by FlexNet inventory agent, or by the tracker operating remotely as in the Zero-footprint case. If the upload (called as part of the inventory scanning process) proceeds normally, each temporary file is cleaned up after upload. (This preference is ignored on UNIX-like platforms.)

Note: *The tracker (`ndtrack.exe`) references this setting for any machine inventory involving remote execution (including the Zero-footprint case). Remote mode is set automatically when the registry key `HKLM\Software\ManageSoft Corp\ManageSoft\EtcpInstallDir` does not exist or does not match the base directory for the executable. The registry key is typically missing during Zero-footprint inventory gathering, because the inventory agent has not been permanently installed on the managed device. (This means that, when the full FlexNet inventory agent is locally installed on the managed device, this folder is not used. Instead, in this case see MachineInventoryDirectory.)*

Values

Values / range	Any valid directory.
Default value	`%temp%\FlexeraSoftware\` This is in the temporary directory for the account running the inventory scan.
Example values	`C:\temp`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o MachineZeroTouchDirectory=C:\temp`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

MaximumNetworkRetryPeriod

Command line | Registry

`MaximumNetworkRetryPeriod` specifies the maximum number of seconds to delay between retries when downloading files from a particular inventory beacon. Each time a failure occurs whilst downloading from an inventory beacon, the time to delay before the next retry is increased by NetworkRetryPeriodIncrement (see), up to a maximum value specified by this `MaximumNetworkRetryPeriod`.

Values

Values / range	Numeric (seconds)
Default value	`300`
Example values	`60`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o MaximumNetworkRetryPeriod=60`

Registry

Installed by	Installation of FlexNet inventory agent, or manual configuration
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

MSI

Command line | Registry

`MSI` applies to inventory for Microsoft Windows devices (and is ignored on UNIX-like platforms):

- When set to `True`, Microsoft Installer (MSI) package information is added to the inventories.
- When set to `False`, the tracker does not include MSI package information in inventories.

Values

Values / range	Boolean (`True` or `False`).

Default value	`True`
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o MSI=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

Name

Registry

`Name` is a human-friendly name for this upload or download record. For example, if the host name is `beacon1.tmnis.org`, you might choose to name this entry `beacon1.tmnis.org Upload Location` or `beacon1.tmnis.org Download Location` respectively.

Values

Values / range	Any name
Default value	(No default.)
Example values	`beacon1.tmnis.org Download Location`

Registry

Installed by	Failover list for inventory beacons, or manual configuration

Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>` For trusted locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\TrustedLocations\<serverkey>` For excluded locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\ExcludedLocations\<serverkey>`

ndsensNetType

Command line | Registry

`ndsensNetType` applies only on Windows devices. This value determines when a `When connected to network trigger` is deemed to have occurred, causing the command given by `ndsensNetUp` to be executed. It will only trigger if the network is of a certain type. There are three possible values:

- `1` Local area network (LAN)
- `2` Wide area network (WAN)
- `3` Either LAN or WAN.

The scheduling agent monitors the specified network type(s). For example, if `ndsensNetType=2`, the agent only monitors for connections to WANs.

Values

Values / range	1, 2, 3
Default value	`3`
Example values	`1`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o ndsensNetType=2`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Schedule Agent\CurrentVersion`

NetworkHighSpeed

Command line | Registry

`NetworkHighSpeed` specifies the lowest measured network speed (in bits per second) that the FlexNet tools will consider to be a high-speed network connection to an inventory beacon. For a full discussion of interacting preferences and tests, see NetworkSpeed.

If `NetworkHighSpeed` has the special (and default) value of `0` (zero), assessment of network bandwidth is terminated, and transfers are attempted at the rate specified by `NetworkMaxRate`.

A non-zero value for `NetworkHighSpeed` acts as the test value for whether a particular network connection is assessed as high speed or low speed. In these cases, transfers are attempted as specified for `NetworkHighUsage` or `NetworkLowUsage`, respectively.

Values

Values / range	Numeric (number of bits per second)
Default value	`0`
Example values	`320`

Command line

Tool	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`ndupload`)
Example	`-o NetworkHighSpeed=320`

Registry

Installed by	Installation of FlexNet inventory agent, or manual configuration
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkHighUsage

Command line | Registry

`NetworkHighUsage` specifies the maximum percentage of bandwidth that FlexNet tools uses for uploads and downloads on a high-speed connection. The following special cases apply:

- If `NetworkHighUsage` is set to `0`, the installation agent downloads files using 0.1% of the measured bandwidth.
- If `NetworkHighUsage` is outside the range prescribed in `NetworkHighUsageLowerLimit` and `NetworkHighUsageUpperLimit`, it is reset to the nearest range endpoint. For example, consider a case with the following settings:
  - `NetworkHighUsageLowerLimit = 10`
  - `NetworkHighUsageUpperLimit = 40`

  If you set `NetworkHighUsage` to 5 (too low), it is automatically reset to 10 (the lower limit). Similarly, if you set `NetworkHighUsage` to 60 (too high), it is automatically reset to 40 (the upper limit).

Use the `Common` key (without any more specialized settings) to keep all tools aligned on the same value.

Values

Values / range	Numeric (percentage 0-100).
Default value	For downloads, `100`. For uploads, no default.
Example values	`55`

Command line

Tool	Installation component (`ndlaunch`), upload component (`ndupload`)

Example	`-o NetworkHighUsage=75`

Registry

Installed by	For downloads, installation of FlexNet inventory agent. For uploads, manual configuration.
Computer preference	For downloads, in order of precedence: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Common`. For data reporting and inventory uploads, in order of precedence: • `[Registry]\ManageSoft\Uploader\CurrentVersion` • `[Registry]\ManageSoft\Common`.

NetworkHighUsageLowerLimit

Command line | Registry

`NetworkHighUsageLowerLimit` specifies the minimum value that can be set for NetworkHighUsage, as described there. The range limits are now useful only for correcting unsuitable values for `NetworkHighUsage`, for example when carelessly specified in a command line. Using the `Common` key (only) causes all tools to adhere to the same standard.

Values

Values / range	Numeric (percentage 0 to 100)
Default value	`100`
Example values	`10`

Command line

Tool	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`ndupload`)

Example	`-o NetworkHighUsageLowerLimit=10`

Registry

Installed by	Installation of FlexNet inventory agent on an inventory device
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkHighUsageUpperLimit

Command line | Registry

`NetworkHighUsageUpperLimit` specifies the maximum value that can be set for NetworkHighUsage, as described there. The range limits are now useful only for correcting unsuitable values for `NetworkHighUsage`, for example when carelessly specified in a command line. Using the `Common` key (only) causes all tools to adhere to the same standard.

Values

Values / range	Numeric (percentage 0 to 100)
Default value	`100`
Example values	`90`

Command line

Tool	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`ndupload`)
Example	`-o NetworkHighUsageUpperLimit=90`

Registry

Installed by	Installation of FlexNet inventory agent on an inventory device
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkLowUsage

Command line | Registry

`NetworkLowUsage` specifies the maximum percentage of bandwidth that FlexNet tools use for uploads and downloads on a low-speed connection. The following special cases apply:

- If `NetworkLowUsage` is set to `0`, the installation agent downloads files using 0.1% of the measured bandwidth.
- If `NetworkLowUsage` is outside the range prescribed by `NetworkLowUsageLowerLimit` and `NetworkLowUsageUpperLimit`, it is reset to the nearest range endpoint. For example, consider a case with the following settings:
  - `NetworkLowUsageLowerLimit = 10`
  - `NetworkLowUsageUpperLimit = 40`

  If you set `NetworkLowUsage` to 5 (too low), it is automatically reset to 10 (the lower limit). Similarly, if you set `NetworkLowUsage` to 60 (too high), it is automatically reset to 40 (the upper limit).

> ***Tip:*** *If you wish to use `NetworkLowUsage` to control bandwidth consumption, be sure to modify the default value of NetworkLowUsageLowerLimit.*

Use the `Common` key (without any more specialized settings) to keep all tools aligned on the same value.

Values

Values / range	Numeric (percentage 0-100).
Default value	For downloads, `100`. For uploads, no default.
Example values	`30`

Command line

Tool	Installation component (`ndlaunch`), upload component (`ndupload`)
Example	`-o NetworkLowUsage=50`

Registry

Installed by	For downloads, installation of FlexNet inventory agent. For uploads, manual configuration.
Computer preference	For downloads, in order of precedence: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Common`. For data reporting and inventory uploads, in order of precedence: • `[Registry]\ManageSoft\Uploader\CurrentVersion` • `[Registry]\ManageSoft\Common`.

NetworkLowUsageLowerLimit

Command line | Registry

`NetworkLowUsageLowerLimit` specifies the minimum value that can be set for NetworkLowUsage, as described there. The range limits are now useful only for correcting unsuitable values for `NetworkLowUsage`, for example when carelessly specified in a command line. If you wish to set practical limits on network bandwidth usage by the various tools, you must modify the default value, which otherwise forces all tools to attempt to use all available bandwidth. Using the `Common` key (only) causes all tools to adhere to the same standard.

Values

Values / range	Numeric (percentage 0 to 100)
Default value	`100`
Example values	`10`

Command line

Tool	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`nduplo ad`)
Example	`-o NetworkLowUsageLowerLimit=10`

Registry

Installed by	Installation of FlexNet inventory agent on an inventory device
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkLowUsageUpperLimit

Command line | Registry

`NetworkLowUsageUpperLimit` specifies the maximum value that can be set for NetworkLowUsage, as described there. The range limits are now useful only for correcting unsuitable values for `NetworkLowUsage`, for example when carelessly specified in a command line. If you wish to set practical limits on network bandwidth usage by the various tools, you may want to modify the default value to ensure that less than the total available bandwidth is used on low-speed networks. Using the `Common` key (only) causes all tools to adhere to the same standard.

Values

Values / range	Numeric (percentage 0 to 100)
Default value	`100`
Example values	`80`

Command line

Tool	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`nduplo ad`)

Example	`-o NetworkLowUsageUpperLimit=80`

Registry

Installed by	Installation of FlexNet inventory agent on an inventory device
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkMaxRate

Command line | Registry

`NetworkMaxRate` sets the number of bytes per second at which the FlexNet tools attempt network transfers (noting that this is specified in bytes and not bits). This preference is not used if:

- `NetworkSpeed` can be determined (for which `NetworkSense` must be `True`)
- `NetworkHighSpeed` has a non-zero value.

In short, `NetworkMaxRate` sets the default bytes per second for network transfers, unless you modify several other default values in preferences.

The special (and default) value of zero means that the tools do not limit transfer rates, and will compete for the maximum available network bandwidth against all other network activity.

Use only the `Common` key to have all tools use the same values with convenient single-point maintenance.

Values

Values / range	Numeric (bytes per second)
Default value	`0` (unlimited)
Example values	`64`

Command line

Tool	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`nduplo ad`)
Example	`-o NetworkMaxRate=64`

Registry

Installed by	Installation of FlexNet inventory agent, or manual configuration
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkMinSpeed

Command line | Registry

`NetworkMinSpeed` defines the minimum network speed (in bits per second) for the FlexNet tools to attempt any transfers, including any check for updates to download. For a discussion of the tests and processes, see NetworkSpeed. Using the `Common` key (only) causes all tools to adhere to the same standard.

Values

Values / range	Numeric (bits per second)
Default value	No default in registry; default behavior `1`
Example values	`2000`

Command line

Tool	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`nduplo ad`)
Example	`-o NetworkMinSpeed=2000`

Registry

Installed by	Code internals, or manual configuration
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkRetries

Command line | Registry

`NetworkRetries` specifies the number of times a failed network operation is retried before an alternative inventory beacon is contacted. This setting applies to the HTTP and HTTPS protocols (as used by inventory beacons), as well as the FTP protocol (which may be used in your own custom implementations). Note that, for custom implementations, the maximum number of attempts to connect to a file share using the `file:` protocol is controlled by the `ConnectionAttempts` preference (see ConnectionAttempts), and not by this `NetworkRetries` preference.

Values

Values / range	Numeric
Default value	`1`
Example values	`5`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o NetworkRetries=2`

Registry

Installed by	Installation of FlexNet inventory agent, or manual configuration

Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

NetworkRetryPeriodIncrement

Command line | Registry

`NetworkRetryPeriodIncrement` specifies the number of seconds to increase each delay between successive attempts to retry a network connection to an inventory beacon. The maximum delay between retries is capped by `MaximumNetworkRetryPeriod` (see MaximumNetworkRetryPeriod). For example, given the following values for these three preferences:

- `NetworkRetries=5`
- `NetworkRetryPeriodIncrement=10`
- `MaximumNetworkRetryPeriod=120`

the delays are increased (from zero) before each retry, giving resultant increments of 10, 20, 30, 40, and 50 seconds. Measuring elapsed time from the initial failure, the retries occur at:

- 10 seconds after initial failure (total delay is 0 + 10)
- 30 seconds after initial failure (total delay is 10 + 20)
- 60 seconds after initial failure (total delay is 30 + 30)
- 100 seconds after initial failure (total delay is 60 + 40)
- 120 seconds after initial failure (total delay is 100 + 50 = 150, but capped at 120 seconds maximum).

The default value of zero for `NetworkRetryPeriodIncrement` means that the retries occur immediately after one another.

Values

Values / range	Numeric (Seconds)
Default value	`0` (zero)
Example values	`10`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o NetworkRetryPeriodIncrement=10`

Registry

Installed by	Installation of FlexNet inventory agent, or manual configuration
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

NetworkSense

Command line | Registry

`NetworkSense` determines whether network speed checks are performed prior to attempting uploads or downloads.

- When set to true, the various tools that may attempt transfers first check for access and available bandwidth by measuring ping response times for two different sized ping packets. The result is stored in NetworkSpeed, where possible outcomes are discussed. (These speed tests are applied to the top candidate inventory beacon in the fail-over list. These speed tests, and possible network throttling for downloads, do not re-order the fail-over list.)

  Important: *Where ping is disabled or blocked, be sure to use the default (`False`) value for `NetworkSense`. Otherwise the tested connection is deemed to have 0 bps transfer speed, and is discarded from the fail-over list.*

- When set to false (the default), no checks are performed, and the upload or download is attempted immediately.

Because several tools may attempt transfers, this preference can be set in the `Common` key (shown below) so that all tools behave alike. You can also configure an exceptional setting for any one tool (in its `CurrentVersion` key) which overrides the common setting. One scenario you might consider is to have the default `False` value for uploads (since compressed `.ndi` files are small), but set the installation component (`ndlaunch`) preference to `True`, since downloads of agent upgrade packages and the like can be significantly larger.

Values

Values / range	Boolean (`True` or `False`)
Default value	`False`
Example values	`True`

Command line

Tools	Installation component (`ndlaunch`), inventory component (`ndtrack`), upload component (`ndupload`).

Example	`-o NetworkSense=True`

Registry

Installed by	Installation of the FlexNet inventory agent, or manual configuration.
Computer preference	Each tool first checks its own registry entry; and if nothing is found there, next checks `[Registry]\ManageSoft\Common`. The tool-specific registries are: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Uploader\CurrentVersion`.

NetworkSpeed

`NetworkSpeed` is an internal storage place for the last detected network speed (saved in bits per second).

Note: *Network throttling is not required for normal operations of FlexNet Manager Suite. The throttling controls apply only to the download of packages (such as self-update packages for FlexNet inventory agent in the Adopted case, which are only downloaded when changed, and are rarely updated). For upload of inventories and discovery files, the `.ndi` and `.disco` file formats allow for very efficient compression, giving as much as 90% reduction in file size when compressed for upload. Accordingly, these controls do not provide throttling of uploads. (Speed tests are applied to the top candidate inventory beacon in the fail-over list. These speed tests, and possible network throttling for downloads, do not re-order the fail-over list.)*

The network speed is only assessed when NetworkSense is set to `True`. Before attempting transfers from a new inventory beacon, the applicable tool uses ping packages of different sizes to assess the available bandwidth, saving the result here. This value continues to be used (while `NetworkSense` is true) to manage transfers from this inventory beacon, until a different inventory beacon is chosen, at which time the network speed is reassessed and this value updated. This is then compared with the (non-zero) value of `NetworkHighSpeed` and other preferences as discussed below:

- If `NetworkSpeed` is less than or equal to `NetworkMinSpeed`, no download is attempted. In this case, the connection is 'failed' and the tools assess the next available connection in the fail-over list (see NetworkMinSpeed).
- If `NetworkHighSpeed` has the special (and default) value of `0`, this testing is discontinued, and instead the transfer is attempted at the rate specified in `NetworkMaxRate` (see NetworkMaxRate).
- If `NetworkSpeed` is greater than a non-zero value of `NetworkHighSpeed`, the connection is considered high speed, and the download may use up to the percentage of available bandwidth saved in `NetworkHighUsage` (see NetworkHighUsage).

- If `NetworkSpeed` is non-zero and less than `NetworkHighSpeed`, the transfer may use no more than the percentage of available bandwidth saved in `NetworkLowUsage` (see NetworkLowUsage).
- If ping is disabled or blocked (for example, by a firewall, or because inventory beacons do not respond to ping), the `NetworkSpeed` is deemed to be 0 bits/second, and the connection is discarded from the fail-over list. Testing is ten resumed on the next inventory beacon in the fail-over list.

Important: *Where ping is disabled or blocked, be sure to use the default (`False`) value for NetworkSense.*

Values

Values / range	Numeric (bits per second)
Default value	No default.
Example values	`32000`

Callout reference

Reference as	`$(NetworkSpeed)`

no_proxy

Command line | Registry

`no_proxy` lists the addresses for which the installation agent should ignore the proxy settings entered in the `http_proxy` registry entry.

Values

Values / range	Any valid URL.
Default value	(No default.)
Example values	`tmnis.com;tmnis.com.de`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o no_proxy=tmnis.com;tmnis.com.de`

Registry

Installed by	Installation of FlexNet inventory agent on a managed device (computer preference)
Computer preference	`[Registry]\ManageSoft\Launcher\CurrentVersion`

OnConnect

Command line only

`OnConnect` applies only on Windows devices. Determines scheduling tasks that are initiated when an `OnConnect` trigger occurs. There are two options:

- `True`: Run missed tasks (automatically setting the preference `Catchup=Always`) and run all events with `OnConnect` triggers
- `False`: Do nothing.

Values

Values / range	Boolean (`True` or `False`)
Default value	`False`
Example values	`True`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o OnConnect=True`

OracleInventoryAsSysdba

Command line | Registry

`OracleInventoryAsSysdba` applies on UNIX-like platforms only. It modifies the command line used for the Oracle utility `sqlplus` during inventory gathering, allowing use of a custom account name.

Tip: *This preference only controls the command line to be used in the event that gathering Oracle inventory is permitted by other preferences:*

- *PerformLocalScripting*
- *PerformOracleInventory*
- *IncludeLocalScriptRule*
- *ExcludeLocalScriptRule*.

The effect of `OracleInventoryAsSysdba` is:

- When `OracleInventoryAsSysdba=True` (or when the value is not specified), the inventory component (`ndtrack`) uses the following command to access the Oracle Database for inventory gathering:

  ```
  sqlplus "/ as sysdba"
  ```

- When `OracleInventoryAsSysdba=False`, the inventory component (`ndtrack`) uses the following:

  ```
  sqlplus "/ "
  ```

  Notice the trailing white space in this case.

Tip: *When `OracleInventoryAsSysdba=False`, it is mandatory to set an account name, using `OracleInventoryUser` (see OracleInventoryUser).*

Values

Values / range	Boolean (`True` or `False`)
Default value	`True` (This is the default value when there is no entry in the registry file or command line options.)
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o OracleInventoryAsSysdba=False`

Registry

Installed by	Manual configuration (computer preference)

Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion` in the `config.ini` or `ndtrack.ini` file: `[ManageSoft\Tracker\CurrentVersion]` `OracleInventoryAsSysdba=False`

OracleInventoryUser

Command line | Registry

`OracleInventoryUser` specifies an account which the FlexNet inventory agent may use when collecting inventory data from an Oracle Database on a UNIX host. This preference applies only to UNIX-like platforms.

(On Microsoft Windows, `ndtrack` executes as `SYSTEM`, which must be a member of the `ora-dba` database group on the Windows Server. For manual execution on the command line in Microsoft Windows, you can alternatively specify another account that has administrator privileges and is a member of `ora-dba`.)

On UNIX-like platforms, there are additional requirements in different contexts:

- By default (when `OracleInventoryAsSysdba=True`), this account must be a member of the Oracle `dba` group. In this case, `ndtrack` logs into the Oracle Database with the command:

  ```
  sqlplus "/ as sysdba"
  ```

- When `OracleInventoryAsSysdba=False`, the account need not be in the `dba` group, but:
  - The Oracle user account must exist in the Oracle Database with appropriate permissions for inventory gathering (for permission details, see *Appendix B- Oracle Tables and Views for Oracle Inventory Collection* in the *FlexNet Manager Suite System Reference* PDF, available through the title page of online help)
  - That user account must have `OS authentication` enabled, and must not prompt for a password for logging into Oracle
  - An account of the same name must exist at the UNIX operating system level.

  In this case, `ndtrack` logs into the Oracle Database with the command:

  ```
  sqlplus "/ "
  ```

Note: *When `OracleInventoryAsSysdba=True` and `OracleInventoryUser` is not set, `ndtrack` analyzes the services process listings to extract the SID of running instances of Oracle Database. It then identifies the user account that launched that process (which account is assumed to be a member of the `dba` group), and uses the same account name to take inventory of the Oracle Database instance.*

Values

Values / range	An exact match for any Oracle user name that is either (as described above): • A current member of the `dba` database group on the UNIX host server • An account on the operating system that is also registered in the database as an Oracle user, with `OS authentication` enabled and adequate permissions for inventory gathering.
Default value	None. (See note above for impacts when this preference is not specified.)
Example value	`dbauser`

Command line

Tool	Command line or `config.ini` for FlexNet inventory agent locally installed on UNIX only (`ndtrack`) in the Adopted case; or command line for FlexNet inventory agent collecting UNIX-based Oracle inventory remotely from an inventory beacon (`ndtrack.sh`), in the Zero-footprint case.
Example	`-o OracleInventoryUser=dbauser`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion` in the `config.ini` or `ndtrack.ini` file: `[ManageSoft\Tracker\CurrentVersion]` `OracleInventoryUser=dbauser`

Password

Registry

`Password` stores the encrypted password required for authentication during upload of files from the managed device to the inventory beacon.

Values

Values / range	This can be any characters. The characters are encrypted.
Default value	For FT protocol only: `Anonymous` Otherwise, there is no default.

Registry

Installed by	Failover list for inventory beacons, or manual configuration
Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>`

PerformLocalScripting

Command line | Registry

Tip: *This preference requires that the up-to-date* `InventorySettings.xml` *file is either:*

- *Co-located with the FlexNet Inventory Scanner (or the scanner-like* `ndtrack.sh` *on UNIX-like platforms)*
- *Correctly installed with the fully-installed FlexNet inventory agent.*

Unless this condition is met, this preference is ignored.

By default when the above condition is met, the tracker (`ndtrack` executable) will perform all local scripting actions specified in `InventorySettings.xml`. For example, this file includes enhanced inventory abilities related to Oracle databases and the hardware they run on, and Microsoft Exchange (although the functionality available is subject to the products you have licensed within FlexNet Manager Suite). When false, the `PerformLocalScripting` option prevents execution of any of the scripting enabled in the `InventorySettings.xml` file.

Tip: *Using either the* `IncludeLocalScriptRule` *or* `ExcludeLocalScriptRule` *preference, you can separately manage local scripting by leaving some enhanced inventory collection operational.*

Note: *Collecting inventory from local Oracle Database instances requires that none of the following conditions apply:*

- *`PerformLocalScripting=False` (this turns off all scripts, including Oracle inventory)*
- *`PerformOracleInventory=False` (this turns off Oracle inventory)*
- *`ExcludeLocalScriptRule="OracleRule"`*
- *`IncludeLocalScriptRule` is set to any value that does not include `OracleRule` (which is thereby excluded).*

When all these preferences have their default values, inventory gathering from local Oracle Database instances can proceed.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example values	`False`

Command line

Tool	`ndtrack`
Example	`-o PerformLocalScripting=False`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\Managesoft\Tracker\CurrentVersion`

PerformOracleInventory

Command line | Registry

***Tip:** This preference requires that:*

- *The FlexNet Manager for Oracle product has been licensed*
- *The up-to-date `InventorySettings.xml` file is either:*
  - *Co-located with the FlexNet Inventory Scanner (or the scanner-like `ndtrack.sh` on UNIX-like platforms)*

- *Correctly installed with the fully-installed FlexNet inventory agent.*

Unless both of these conditions are met, this preference is ignored.

By default when the above conditions are met, the tracker (`ndtrack` executable) tests for, and if possible collects, Oracle Database instance inventory each time an inventory collection job is scheduled. By setting the value to `false`, you can use the `PerformOracleInventory` option to prevent the tracker from collecting Oracle Database inventory on an individual target device. This preference affects only the collection of inventory from Oracle Database instances, and does not control the collection of Oracle hardware information.

Tip: *Collection of Oracle inventory may be affected by any of the following preferences:*

- *PerformLocalScripting*
- *PerformOracleInventory*
- *PerformOracleListenerScan*
- *ExcludeLocalScriptRule*
- *IncludeLocalScriptRule*.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example values	`False`

Command line

Tool	`ndtrack`
Example	`-o PerformOracleInventory=False`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\Managesoft\Tracker\CurrentVersion`

PerformOracleListenerScan

Command line | Registry

When `PerformOracleListenerScan` is `True` (or not set), the inventory component (`ndtrack`) checks process listings to discover Oracle listeners running on the local device, and if any are found, prepares a `.disco` file listing all Oracle Database instances identified by the local Oracle listener(s) (the database instances themselves may be on the same local device, or on a different server). When this preference is false, or when no listeners are found, no Oracle `.disco` file is prepared for the local device.

Tip: *This `.disco` file is not a prerequisite for gathering local Oracle Database inventory. The inventory component (`ndtrack`) takes inventory of local Oracle Database instances based on the `PerformOracleInventory` preference. These two controls (and processes) are independent.*

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example values	`PerformOracleListenerScan=False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o PerformOracleListenerScan=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

PolicyServerURL

Command line | Registry

`PolicyServerURL` gives the location of policy for server-side merging. The policy agent passes this path through to the installation agent.

Warning: *Internal use only: do not edit.*

Values

Values / range	Valid URL.
Default value	`http://beacon.domain.com/ManageSoftDL/Policies/Merged/Machine/deviceHostname.npl`
Example values	`http://InvBeaconB/ManageSoftDL/Policies/Merged/Machine/MgdDev2.npl`

Command line

Tool	Policy component (`mgspolicy`)
Example	`-o PolicyServerURL=http://InvBeaconB/ManageSoftDL/Policies/Merged/Machine/MgdDev2.npl`

Registry

Installed by	Code internals
Computer preference	`[Registry]\ManageSoft\Policy Client\CurrentVersion`

Port

Registry

`Port` is the port number for data transfer.

Values

Values / range	Integers
Default value	(No default.)
Example values	1099

Registry

Installed by	Failover list for inventory beacons, or manual configuration
Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>` For trusted locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\TrustedLocations\<serverkey>` For excluded locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\ExcludedLocations\<serverkey>`

PrioritizeRevocationChecks

Command line | Registry

Tip: *`PrioritizeRevocationChecks` is supported only on UNIX-like platforms. On Windows platforms, revocation checking behavior is determined by Group Policy. For further details, see https://technet.microsoft.com/en-us/library/ee619754%28v=ws.10%29.aspx.*

On UNIX-like platforms, `PrioritizeRevocationChecks` determines the ordering of processes for checking revocation of PKI certificates, such as certificates normally issued as part of data transfers using the HTTPS protocol. (This preferences applies only when `CheckServerCertificate` and `CheckCertificateRevocation` are both true.) Two methods are supported for checking whether a certificate has been revoked:

- Certificate Revocation Lists (CRL), which require the client device to download a file listing all certificates revoked by the relevant Certification Authority
- Online Certificate Status Protocol (OCSP), where the client device receives a response specific to the single certificate being checked.

The agent component(s) stop checking as soon as an authoritative revocation result (either affirmative or negative) is determined. For example, with the default value, if the networked OCSP check shows that the certificate is revoked, the CRL is not downloaded or checked.

Omitting one of the values from the string turns off that method of checking. For example, a command line parameter `-o PrioritizeRevocationChecks="OCSP"` limits checking to OCSP, and prevents download or checking of the CRL.

Tip: *Beware of turning off a type of checking which may be uniquely specified in the server certificate (or any intermediate certificate up the chain). For example, if a certificate specifies a URI only for CRL checking, and you use this preference as* `-o PrioritizeRevocationChecks="OCSP"`*, then every certificate check must by definition fail because of these contradictory settings. Recommended general practice is to use the default value, which uses the most efficient check first but fails over to the older technology if OCSP checking is not available for a certificate. Vary the setting only if your enterprise has an internal certificate authority and you are sure of the revocation settings for your internal certificates.*

A null (or unrecognized) value is the same as not having the preference set in the registry: the default value is used in these cases.

Assuming that preferences allow revocation checking, the processing order for revocation checking is:

1. The CRL cache is checked. (This is always first, regardless of the setting of `PrioritizeRevocationChecks`.)
2. If the value of `PrioritizeRevocationChecks` includes `OCSP` (whether first or second), the OCSP cache is checked.
3. When neither cache provides an authoritative result, networked resources are accessed in the order specified by `PrioritizeRevocationChecks`.
4. When neither of the networked revocation checks provides an authoritative result, the check results in a hard failure, and data transfer between the client component and the inventory beacon cannot proceed using the HTTPS protocol.

This order may result in CRL checking being used longer than expected. An example scenario might be:

1. `CheckServerCertificate=True`, `CheckCertificateRevocation=True`, `PrioritizeRevocationChecks=OCSP,CRL`. OCSP checking is on and given top priority.
2. An HTTPS transfer is attempted, and for networking reasons the OCSP server is temporarily unavailable. Accordingly, fail-over occurs, so that the CRL is downloaded for the revocation check. Since it includes a `nextUpdate` setting a week in advance, the CRL is cached.
3. Later (but within the week), another HTTPS transfer is attempted. Because there is a valid CRL in the cache, this is checked first (and provides the revocation result). A networked OCSP revocation check does not occur (despite the preference in `PrioritizeRevocationChecks`) until after the cached CRL expires.

Values

Values / range	A comma-separated list of two string literals, `OCSP` and `CRL`, in your chosen order.
Default value	`OCSP,CRL`
Example values	`OCSP`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`ndupload`)
Example	`-o PrioritizeRevocationChecks="CRL,OCSP"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\`*`<Agent>`*`\CurrentVersion` where *`<Agent>`* is the registry key for an individual agent

Priority

Registry

`Priority` determines the order in which upload or download connections to inventory beacons should be attempted if `AutoPriority` is `False`. (If `AutoPriority` is `True`, the `Priority` registry key is set dynamically for each download and upload activity.)

To define a location as primary server for download and/or upload, set `AutoPriority` to `False`, and set `Priority` to `1`.

To define a location as one that should not be used for download and/or upload, set `AutoPriority` to `False`, and set `Priority` to `100`.

Values

Values / range	Recommended range of 0 - 100
Default value	`50`
Example values	`75`

Registry

Installed by	Failover list for inventory beacons, or manual configuration

Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>`

ProgramFiles, ProgramFilesX86Folder, ProgramFilesX64Folder

Command line | Registry

`ProgramFiles, ProgramFilesX86Folder, ProgramFilesX64Folder` are a set of options that point to the Windows program files folder (across various versions of the operating system) on the target device where inventory is being gathered. `Program Files` exists for backwards compatibility; current distributions operate using `ProgramFilesX86Folder`. These preferences are ignored on UNIX-like platforms.

Note: *`ndtrack` (the executable underlying both the FlexNet inventory agent and FlexNet Inventory Scanner) is a 32-bit executable.*

Values

Values / range	The valid folder name where applications are installed.
Default values	Default values respectively on a 32-bit platform are: • `Program Files` • `Program Files` • "" (empty value). Default values on a 64-bit platform are: • `Program Files` • `Program Files (x86)` • `Program Files`
Example values	`-o ProgramFiles=”D:\Program Files”`

Command line

Tool	Inventory component (`ndtrack`)
Example	`option`

Registry

Installed by	Predefined by Microsoft Windows.
Reference as	`$(ProgramFiles)`

Protocol

Registry

`Protocol` identifies the uploads (or download) protocol for transferring files from (or to) the managed device.

Values

Values / range	`http`, `https`, `file`, `ftp` ***Note:*** *Only `http` and `https` are supported by inventory beacons. The other values are available for testing or custom solutions.*
Default value	(No default.)

Registry

Installed by	Failover list for inventory beacons, or manual configuration

Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>` For trusted locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\TrustedLocations\<serverkey>` For excluded locations: `[Registry]\ManageSoft\Launcher\CurrentVersion\ExcludedLocations\<serverkey>`

Proxy

Registry

`Proxy` describes the server name and port number of the SOCKS proxy (available for both uploads and downloads).

Values

Values / range	• Valid SOCKS proxy server name and port number in the form of `socks:hostName:portNumber` • `direct`, which tells the installation agent to try to directly access the URL if connection attempts through the proxy server fail.
Default value	(No default.)
Example values	`socks:myServer:1080, direct`

Registry

Installed by	Failover list for inventory beacons, or manual configuration

Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>`

Recurse

Command line | Registry

`Recurse` controls whether the tracker (`ndtrack` executable) drills down for inventory collection:

- When set to `True`, the tracker includes folders beneath the top-level folder(s) specified by `IncludeDirectory` or `EmbedFileContentDirectory`.
- When set to `False`, the tracker does not recurse folders beneath the top level folder(s). It only tracks files immediately within the folder(s) specified by `IncludeDirectory` or `EmbedFileContentDirectory`.

Values

Values / range	Boolean (`True` or `False`).
Default value	`True`
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o Recurse=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

RunInventoryScripts

Command line | Registry

When `RunInventoryScripts` is `True`, this preference specifies that inventory scripts should be run after target Windows devices have been inventoried. All custom scripts located in the location specified by `InventoryScriptsDir` are then executed immediately after inventory data collection is complete. By default, no custom scripts are run.

Tip: *This preference is set to `true` by `InventorySettings.xml`, as required for advanced inventory gathering for CALs, Microsoft Outlook, and so on. If you are using this advanced functionality, the effective default value is reversed to true.*

This preference is ignored for UNIX-like platforms.

Values

Values / range	Boolean (`True` or `False`).
Default value	`False`
Example values	`True`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o RunInventoryScripts=True`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

ScheduleType

Command line only

`ScheduleType` applies only for Windows managed devices. Determines the type of schedule that is run when the scheduling agent is run via the command line. There are two options:

- `Machine`—Runs the schedule agent in "Machine" mode. You must have administrator privileges, or run under the Local System account. Any schedules installed on the same command line are installed as Machine schedules. This option can also be used to view scheduled tasks from the currently installed Machine schedule. (A Machine schedule is run for the machine on which it is installed, regardless of any users that may or may not have accounts on that machine.)
- `User`—Runs the scheduling agent in "User" mode. Will not work if the scheduling agent is run as the Local System account. Any schedules installed on the same command line are installed as User schedules. This option can also be used to view scheduled tasks from the currently installed User schedule. (A User schedule is run for the specified user account on the machine where the schedule resides.)

Values

Values / range	`Machine`, `User`
Default value	If running as the Local System account: `Machine` If running as any User account (including Administrator): `User`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o ScheduleType=User`

ScriptDir

Registry

`ScriptDir` identifies the starting directory for a tree where scripts used by the FlexNet inventory agent are stored. It is referenced by other preferences.

Values

Values / range	A string identifying an existing directory on (or accessible by) the managed device.
Default value	`$(CommonAppDataFolder)\ManageSoft Corp\ManageSoft\Scripts`

Example values	`\\my-organization-server\Scripts\`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common`

SelectorAlgorithm

Registry

`SelectorAlgorithm` specifies the algorithm(s) used to assign values to the `Priority` registry key for download and upload locations.

After application of the nominated algorithm(s), the managed device will attempt to collect packages from the highest priority server. In the event of connection failure, the managed device uses the other prioritized servers remaining in the list as failover servers.

The NetSelector includes the following algorithms:

- `MgsADSiteMatch`: Moves all servers in the current managed device's site to the front of the priority list
- `MgsBandwidth`: Priorities are based on end-to-end bandwidth availability to the server
- `MgsDHCP`: Priorities are based on lists of servers specified in DHCP
- `MgsDomainMatch`: Priorities are determined by closest match in domain name
- `MgsIPMatch`: Priorities are determined by closest IP address match
- `MgsNameMatch`: Matches prefixes in computer names
- `MgsPing`: Priorities are determined by fastest ping response time
- `MgsRandom`: Random priorities are assigned
- `MgsServersFromAD`: (Windows devices only) Priorities are determined according to lists of servers specified in Active Directory
- `MgsSubnetMatch`: Moves all servers in the current subnet to the front of the priority list, but retaining the relative order of existing priorities.

Each algorithm may be given an integer parameter that determines the number of servers to which priorities will be assigned. Some algorithms may also be given an additional boolean attribute that can cause unmatched servers to be discarded from the list (priority set to the string literal invalid). Some algorithms also accept other parameters.

Values

Values / range	`MgsADSiteMatch`, `MgsBandwidth`, `MgsDHCP`, `MgsDomainMatch`, `MgsIPMatch`, `MgsNameMatch`, `MgsPing`, `MgsRandom`, `MgsServersFromAD`, `MgsSubnetMatch`
Default value	`MgsRandom;MgsPing;MgsADSiteMatch`
Example values	`MgsRandom(3)` This means that ManageSoft should randomly assign the top three servers (based on the priorities currently assigned). `MgsADSiteMatch(, True);MgsSubnetMatch` This means that the NetSelector lists servers outside the current managed device's site as "invalid". (`MgsSubnetMatch` will only prioritize valid servers set by `MgsADSiteMatch`.)

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	`[Registry]\ManageSoft\NetSelector\CurrentVersion`

ShowIcon (installation component)

Command line | Registry

`ShowIcon` influences visibility to the user on the computer device being inventoried:

- When set to `True`, `ndlauch` displays an icon in the system tray when it is installing a package. This icon displays, regardless of the value of the `UserInteractionLevel` (installation agent) preference. If this icon is double-clicked and `UserInteractionLevel` (installation agent) is set to `Status` or `Auto`, the progress display toggles from being hidden to being visible.
- When set to `False`, no icon will display.

Tip: *On modern versions of Windows, this preference affects FlexNet inventory agent when it is being executed by a particular user account. When (as is normal) the inventory is being run by the local `SYSTEM` account, no icon is visible in the system tray.*

Values

Values / range	Boolean (`True` or `False`).

Default value	No registry default. If no value is supplied, the behavior depends on `UserInteractionLevel`. Where this is `Full`, the behavior is equivalent to `ShowIcon=False`; and otherwise the behavior is as for `ShowIcon=True`.
Example values	`False`

Command line

Tool	Installation component (`ndlaunch`)
Example	`-o ShowIcon=False`

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	In order of precedence: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Common`

ShowIcon (inventory component)

Command line | Registry

`ShowIcon` influences visibility to the user on the Windows computer device being inventoried by a non-`SYSTEM` user account:

- When set to `True`, the tracker (`ndtrack.exe`) displays an icon in the system tray when it is collecting inventory. This icon displays, regardless of the value of the `UserInteractionLevel` preference. If this icon is double-clicked and `UserInteractionLevel` is set to `Status` or `Auto`, the progress display toggles from being hidden to being visible.
- When set to `False`, no icon will display.

Tip: *On modern versions of Windows, this preference affects the tracker when it is being executed by a particular user account. When (as is normal) the inventory is being run by the local `SYSTEM` account, no icon is visible in the system tray.*

Values

Values / range	Boolean (`True` or `False`).

Default value	No registry default. If no value is supplied, the behavior depends on `UserInteractionLevel`. Where this is `Full`, the behavior is equivalent to `ShowIcon=False`; and otherwise the behavior is as for `ShowIcon=True`.
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o ShowIcon=False`

Registry

Installed by	Installation of FlexNet inventory agent
Computer preference	In order of precedence: • `[Registry]\ManageSoft\Tracker\CurrentVersion` • `[Registry]\ManageSoft\Common`

SourceFile

Command line | Registry

`SourceFile` identifies the file or files to be uploaded by the upload agent.

Values

Values / range	Either a UNC (`\\MYCOMPUTER\...`) or a drive (`C:\`) path to the required file or files. Wildcard characters can be used in the filename component.
Default value	(No default.)
Example values	`C:\Temp\*.log`

Command line

Tool	Upload component (`ndupload`)

Example	`-o SourceFile=c:\temp\mylogfile.log`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

SourceRemove

Command line | Registry

`SourceRemove` determines whether the upload agent removes the uploaded file(s) from the source location after a successful upload. If `True`, the files are removed from the source location.

Values

Values / range	Boolean (`True` or `False`)
Default value	`True`
Example values	`False`

Command line

Tool	Upload component (`ndupload`)
Example	`-o SourceRemove` `-o SourceRemove=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

SSLCACertificateFile

Command line | Registry

`SSLCACertificateFile`, available only for UNIX-like platforms, gives the path and file name for the file that concatenates all trusted certificates in the chain to the Certificate Authority. For details about the file format, see Agent third-party deployment: HTTPS CA Certificate File Format (UNIX).

You can combine this file with another storage option that allows multiple separate certificate files to be stored in a directory (see SSLCACertificatePath), in which case the agent(s) scan the combined file first, and then check the certificates in the folder.

Values

Values / range	A valid file path (or variable that references the file path) and file name.
Default value	`$(SSLDirectory)/cert.pem` The default expansion is `/var/opt/managesoft/etc/ssl/cert.pem`.
Example values	`/tmp/test/cert.pem`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`ndupload`)
Example	`-o SSLCACertificateFile="/tmp/test/cert.pem"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *<Agent>* is the registry key for an individual agent

SSLCACertificatePath

Command line | Registry

`SSLCACertificatePath`, supported only on UNIX-like platforms, gives a directory path in which multiple trusted Certification Authority certificates may be saved.

Tip: *Individual certificate files must be named with the CA subject name hash value (such as `9d66eef0`).*

You can combine the use of this folder with a merged certificate file (see SSLCACertificateFile), in which case the file is searched first, and then the directory of individual certificates.

Values

Values / range	Any valid path and directory existing on the client device.
Default value	`$(SSLDirectory)/certs` The default expansion is `/var/opt/managesoft/etc/ssl/certs`
Example values	`/tmp/test/certs`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`ndupload`)
Example	`-o SSLCACertificatePath="/tmp/test/certs"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *`<Agent>`* is the registry key for an individual agent

SSLCRLCacheLifetime

Command line | Registry

`SSLCRLCacheLifetime`, supported only for UNIX-like platforms, sets the maximum lifetime of certificate Revocation Lists (CRLs) cached in the `SSLCRLPath`, expressed as a whole number of seconds. A cached CRL is expired on the earlier of

- Its own `nextUpdate` value (which is the certificate's *valid until* date), or
- The sum of the `SSLOCSPCacheLifetime` and the operating system's `Last modified` date/time on the cached file.

The special case of `0` means that the cache lifetime is disabled, and a CRL expires as set in its `nextUpdate` field. (If the CRL does not have any `nextUpdate` value when the `SSLCRLCacheLifetime=0`, the CRL is not cached.)

Depending on your environment, one possible use is to set this to about 10 minutes (600 seconds). This is sufficient for an agent to complete a policy update, for example, and then refresh the cache on the next occurrence.

Values

Values / range	Zero, or a positive integer.
Default value	`0` This default means that certificate validity period is as specified on the certificate itself.
Example values	`600`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`ndupload`)
Example	`-o SSLCRLCacheLifetime=600`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *`<Agent>`* is the registry key for an individual agent

SSLCRLPath

Command line | Registry

`SSLCRLPath`, supported only on UNIX-like platforms, identifies a directory that stores cached certificate revocation lists.

Values

Values / range	Any valid path and directory name.

Default value	`$(SSLDirectory)/crls` The default expansion is `/var/opt/managesoft/etc/ssl/crls`
Example values	`/tmp/test/crl-cache`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`ndupload`)
Example	`-o SSLCRLPath="/tmp/test/crl-cache"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *<Agent>* is the registry key for an individual agent

SSLDirectory

Command line | Registry

`SSLDirectory`, supported only on UNIX-like platforms, defines a base directory for folders and files related to Transport Layer Security (TLS). Its value is then referenced in other settings.

You can set this as a common 'registry' entry (in `/var/opt/managesoft/etc/config.ini`), so that the same behavior occurs across all relevant agents; and you can override the common behavior by setting an overriding entry for any individual agent if required.

Values

Values / range	Any valid directory path.
Default value	`$(CommonAppDataFolder)/etc/ssl` By default, this expands to `/var/opt/managesoft/etc/ssl`.
Example values	`/tmp/test`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`ndupload`)
Example	`-o SSLDirectory="/tmp/test"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *<Agent>* is the registry key for an individual agent

SSLOCSPCacheLifetime

Command line | Registry

`SSLOCSPCacheLifetime`, supported only for UNIX-like platforms, sets the maximum lifetime of OCSP responses cached in the `SSLOCSPPath`, expressed as a whole number of seconds. A cached response is expired on the earlier of:

- Its own `nextUpdate` value (which is the certificate's *valid until* date), or
- The sum of the `SSLOCSPCacheLifetime` and the operating system's `Last modified` date/time on the cached file.

The special value of `0` means that the cache lifetime is disabled, and an OCSP response expires as set in its `nextUpdate` field. (If the OCSP response does not have any `nextUpdate` value when the `SSLOCSPCacheLifetime=0`, the response is not cached.)

Depending on your environment, one possible use is to set this to about 10 minutes (600 seconds). This is sufficient for an agent to complete a policy update, for example, and then refresh the cache on the next occurrence.

Values

Values / range	Zero, or a positive integer.
Default value	`0` This default means that certificate validity period is as specified on the certificate itself.

Example values	`600`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`nduplo`ad)
Example	`-o SSLOCSPCacheLifetime=600`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *<Agent>* is the registry key for an individual agent

SSLOCSPPath

Command line | Registry

`SSLOCSPPath`, supported only on UNIX-like platforms, identifies a directory that stores responses to OCSP (Online Certificate Status Protocol) checks of revocation status on server PKI certificates normally issued as part of HTTPS data transfers.

Values

Values / range	Any valid path and directory name.
Default value	`$(SSLDirectory)/ocsp` The default expansion is `/var/opt/managesoft/etc/ssl/ocsp`
Example values	`/tmp/test/ocsp-cache`

Command line

Tool	Inventory component (`ndtrack`), installation component (`ndlaunch`), and upload component (`nduplo`ad)

Example	`-o SSLCRLPath="/tmp/test/ocsp-cache"`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common` or `[Registry]\ManageSoft\<Agent>\CurrentVersion` where *<Agent>* is the registry key for an individual agent

Startup

Command line | Registry

Warning: *Internal use only: do not edit.*

The scheduling agent checks the `Startup` flag to determine if it has been called as part of system startup or while an end-user is logging on:

- For system startup, the scheduling agent is run by the scheduled event `MGSStartup`.
- For logon processing (Windows only), the scheduling agent is run as a result of the value for the registry key `HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows \CurrentVersion\Run\SchedulingAgent_nDG`.
  The scheduling agent cannot be called during logon processing for non-Windows devices.

The command line parameter `-o Startup=True` is passed in by default. Setting this preference elsewhere in the registry will have no effect.

Notice: *If the command line is changed to `-o Startup=False`, the scheduling agent will still trigger missed events if configured.*

Values

Values / range	Boolean (`True` or `False`)
Default value	`False`

Command line

Tool	Scheduling component (`ndschedag`)

Example	`-o Startup=True`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Schedule Agent\CurrentVersion`

StrictInstall

Command line | Registry

If `StrictInstall` is set to `True`, the policy agent returns a non-zero exit code if any package in policy fails to install. If set to `False`, the policy agent may return a zero exit code even if packages failed to install. Do not use the policy agent's return code to test for success unless this preference is set to `True`.

Values

Values / range	Boolean (`True` or `False`)
Default value	No registry default; default behavior False
Example values	`True`

Command line

Tool	Policy component (`mgspolicy`), installation component (`ndlaunch`)
Example	`-o StrictInstall=True`

Registry

Installed by	Manual configuration
Computer preference	In order of precedence: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Common`

SysDirectory

Command line | Registry

`SysDirectory` is a FlexNet pre-defined variable for the path to the Windows `System` folder. Intended for use as a reference, as `$(SysDirectory)`, but the value can be over-written.

Values

Values / range	Valid folder name.
Default value	The path to the system folder on the Windows operating system.
Example values	`C:\Winnt\System32`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o SysDirectory=C:\Windows\System`

Registry

Installed by	Predefined within FlexNet inventory agent / Windows.
Reference as	`$(SysDirectory)`

UIMode

Command line only

`UIMode` only applies for Windows managed devices.

Determines the user interface when the scheduling agent is run from the command line. There are two options:

- `LogUI`—Display the event log user interface.
- `EventUI`—Display currently scheduled events.

Values

Values / range	`LogUI`, `EventUI`

Default value	`EventUI`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o UIMode=LogUI`

Upload

Command line | Registry

When `Upload` is set to `True`, the inventory files generated by the inventory tool are immediately uploaded to the reporting location on the inventory beacon. When set to `False`, the inventory files are not uploaded (for example, in case you wish to inspect or validate their contents).

Values

Values / range	Boolean (`True` or `False`).
Default value	There are separate defaults for different cases: • In the Adopted case or Agent third-party deployment case (when the inventory tool is locally installed on the target inventory device and receiving policy updates). the default is `True`. • In the FlexNet Inventory Scanner case, the default is `False`. • In the Zero-footprint case, the preference is not applicable.
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o Upload=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

UploadLocation

Command line | Registry

Unless the `Upload` parameter is `False` (when this preference is ignored), an upload location must be specified, and `UploadLocation` is a convenient method. The value must be a URI of the form:

```
protocol separator server-name/webService
```

where

- *`protocol`* and *`separator`* comprise one of these combinations (note three slashes for the file protocol):
  - `http://`
  - `https://`
  - `ftp://`
  - `file:///`

> **Tip:** *If you are uploading to an inventory beacon, use one of the HTTP or HTTPS protocols. The FlexNet Beacon software does not provide native support for FTP or file shares. (Those protocols are available only for configuration of your own uploads, such as for disconnected inventory beacons.) (In addition, on UNIX-like platforms for the scanner-like `ndtrack.sh`, network shares are not supported.)*

- *`server-name`* is either the IP address or a server name (where the system running the inventory tool has DNS access to resolve server names) of the destination for the upload (such as a parent inventory beacon, or a central application server).

> **Tip:** *If the target server is not listening on the default port number for the selected protocol, add the port number to the server name, separated by a colon. Example:*
>
> ```
> https://myServer.example.com:886/ManageSoftRL
> ```

- *`webService`* is the mandatory string `ManageSoftRL`, which is the name of the web service that receives the uploaded inventory, and stores it (briefly) in *`%CommonAppData%`*`\Flexera Software\Incoming\Inventories` on the inventory beacon. The scheduled task `Upload FlexNet logs and inventories`, which by default runs every minute, then transfers the file to the central server.

> **Note:** *If `Upload` is `True` and `UploadLocation` is not supplied, the uploader looks for upload information in `[Registry]\ManageSoft\Common\UploadSettings` (and similarly in `HKEY_CURRENT_USER`), where the*

upload information inside each key will be used in sequence until the file(s) are successfully uploaded. (The uploader ignores servers listed in `UploadSettings` whose priority values are "invalid" or non-numeric.)

Values

Values / range	Any valid URL.
Default value	(No default.)
Example values	`ftp://server/dir1/dir2`

Command line

Tool	Upload component (`ndupload`) or inventory component (`ndtrack`)
Example	`-o UploadLocation=http://server/dir1/dir2/`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion` `[Registry]\ManageSoft\Tracker\CurrentVersion` `[Registry]\ManageSoft\Common`

UploadPassword

Command line | Registry

`UploadPassword` provides the password of the specified `UploadUser`. If the option is not used, the upload agent attempts to use the sequence of upload passwords from the registry.

Values

Values / range	A valid password.
Default value	(No default.)
Example values	`mypassword`

Command line

Tool	Upload component (`ndupload`)
Example	`-o UploadPassword=mypassword`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

UploadProxy

Command line | Registry

`UploadProxy` provides the name of the proxy server required for `UploadLocation`. Specifying `direct` tells the uploader to try directly accessing the URL, if connection attempts through the proxy server fail.

If the option is not used, the uploader refers to the sequence of any upload proxies identified in the failover list of inventory beacons. (For uploads,this list is saved in the registry under `[Registry]\ManageSoft\Common\UploadSettings\`.) Normally this means that if this preference is not set, proxies are not used for uploads from the managed device to the inventory beacon.

Values

Values / range	The name and port number of a proxy server, in the format: `Socks:`*`serverName`*`:`*`portNumber`*`,direct`
Default value	(No default.)
Example values	`Socks:lyonesse:1080,direct`

Command line

Tool	Upload component (`ndupload`)
Example	`-o UploadProxy=Socks:lyonesse:1080,direct`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

UploadRule

Command line | Registry

`UploadRule` identifies the upload rule governing this command. Each rule covers a specific file type, mapping it to an upload destination set aside for receiving the matching file type. The mappings can be found in `[Registry]\ManageSoft\Common\Rules`. Setting this option also tells the uploader to transfer files of the specified type.

Note: *If this option is set, any value of* `UploadLocation` *is ignored.*

Values

Values / range	One of `Inventory`, `Log`, `PolicyComplianceLog`, `SMSStatusMessage`
Default value	(No default.)
Example values	`Log`

Command line

Tool	Upload component (`ndupload`)
Example	`-o UploadRule=Log`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

UploadSettings

Registry

`UploadSettings` is a registry key (container) for several preferences that can control the upload of data by the FlexNet inventory agent (or the lightweight inventory scanner configurable for UNIX-like platforms, where the values can be stored in the `ndtrack.ini` configuration file). These registry values are in sets that apply to a particular reporting location, for which reason the registry key must be completed with an identifier for the reporting location. The completed path leads to the relevant set of registry values, as shown below.

When configured by the failover list generated by an inventory beacon, the placeholder *<reporting_location>* takes the form of a GUID that identifies the reporting location on the particular inventory beacon (for example, `{8909c9ba-8492-420e-b6e0-100ecf115b0a}`). In contrast, if you are manually configuring `UploadSettings` in an `ndtrack.ini` file for the lightweight inventory scanner on UNIX-like platforms, you may use any string of ASCII characters (excluding white space) that is unique within the context of the `ndtrack.ini` file for these locations.

Four name/value pairs must be specified, and others are optional. To omit an optional value, you may include the name and leave the value blank (as shown in the example below), or omit the name/value pair entirely. The values that may be set are:

- `Protocol` – Mandatory. For upload to an inventory beacon, this must be either `http` or `https`.
- `Name`
- `Directory` – Mandatory, and must be called `ManageSoftRL` (this is the name of a web service on the inventory beacon that accepts uploaded files and by default saves them to *%CommonAppData%*`\Flexera Software\Incoming\Inventories`).
- `Host` – Mandatory.
- `Port` – Mandatory. As this has no default value, you must specify this setting to suit your environment (typically port 80 for HTTP and port 443 for HTTPS).
- `User` – If omitted (or left with a blank value), anonymous authentication is used for uploads to this reporting location.
- `Password` – Stores an encrypted copy of the password needed when Windows authentication is specified for the upload.

  Tip: *Since this value is encrypted, it cannot be used when manually editing an `ndtrack.ini` configuration file. Use of this setting in a manually-edited file dictates anonymous authentication.*
- `Proxy`
- `Priority`
- `AutoPriority`.

For an alternative more suited to command lines, see `UploadLocation`.

Values

Values / range	Requires a subkey that uniquely identifies the reporting location on an individual inventory beacon.
Default value	None.
Example values	`[Registry]\ManageSoft\Common\` `UploadSettings\{8909c9ba-8492-420e-b6e0-100ecf115b0a}` `Protocol=http` `Name=Server Room Reporting Location` `Directory=ManageSoftRL` `Host=WIN-KCPMHPHA0GR` `Port=80` `User=` `Password=` `Proxy=` `Priority=100` `AutoPriority=True`

Registry

Installed by	Download of failover settings, or manual configuration
Computer preference	`[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>`

UploadType

Command line | Registry

`UploadType` determines whether the upload agent uploads machine generated files or user generated files.

Values

Values / range	`Machine`, `User`
Default value	If running as the `SYSTEM` user: `Machine` If runner as any other user: `User`

Example values	`Machine`

Command line

Tool	Upload component (`ndupload`)
Example	`-o UploadType=Machine`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

UploadUser

Command line | Registry

`UploadUser` provides the username of the account required to access the location to which files are to be uploaded.

It is rare to specify this preference. In general, the credentials for bootstrapping are embedded in the upload URLs; and for normal operation, the inventory beacon downloads a failover list of all available inventory beacons (including encrypted credentials). The FlexNet inventory agent saves the contents of this list into the registry on the managed device, under the `DownloadSettings` and `UploadSettings` keys. There may be several keys thereunder, one for each download (or upload) location included in the failover list.

Therefore when (as is normal) `UploadUser` is not defined, the upload agent attempts to use credentials saved in the `[Registry]\ManageSoft\Beacon\UploadSettings` group of keys.

Values

Values / range	Valid user name
Default value	(No default.)
Example values	`JoSmith`

Command line

Tool	Upload component (`ndupload`)

Example	`-o UploadUser=JoSmith`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Uploader\CurrentVersion`

User

Registry

`User` stores the account name required for authentication during transfer of files between the managed device and the inventory beacon.

When configured by the failover list generated by an inventory beacon, the placeholders *<reporting_location>* and *<distribution_location>* take the form of GUIDs that identify the relevant location on the particular inventory beacon (for example, `{8909c9ba-8492-420e-b6e0-100ecf115b0a}`). In contrast, if you are manually configuring `UploadSettings` in an `ndtrack.ini` file for the lightweight inventory scanner on UNIX-like platforms, you may use any string of ASCII characters (excluding white space) that is unique within the context of the `ndtrack.ini` file for these locations.

Values

Values / range	Valid user name.
Default value	For FTP protocol only: `Anonymous` Otherwise, there is no default.
Example value	`NewUser`

Registry

Installed by	Failover list for inventory beacons, or manual configuration

Computer preference	For uploads: `[Registry]\ManageSoft\Common\UploadSettings\<reporting_location>` For downloads: `[Registry]\ManageSoft\Common\DownloadSettings\<distribution_location>`

UserInteractionLevel (installation component)

Command line | Registry

`UserInteractionLevel` defines the degree of user interaction with the installation component (this is controlled separately from the inventory component). The preference setting for this component also controls behavior during device reboot. Possible values are:

- `Full`: Installation activities operate in full interactive mode. The user has full control over a package's installation options, and will see all dialogs during the download, installation and uninstall phases. This is generally not encouraged for packages used with the FlexNet inventory agent.
- `Auto`: Installation activities are fully displayed, but no user interaction is required unless an error occurs. Installation proceeds automatically, using the default install values. Again, this is not generally recommended for packages used with the FlexNet inventory agent.
- `Quiet`: No user interface is displayed during operation, and no user feedback or interaction is available.
- `Status`: Only status dialogs are displayed (for example, progress dialogs).

Values

Values / range	`Full`, `Auto`, `Quiet`, `Status`
Default value	`Full` (This default was appropriate to previous scenarios for the installation component, and should probably be changed now.)
Example values	`Quiet`

Command line

Tool	Installation component (`ndlaunch`)

Example	`-o UserInteractionLevel=Quiet`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	In order of precedence: • `[Registry]\ManageSoft\Launcher\CurrentVersion` • `[Registry]\ManageSoft\Common`

UserScheduleDirectory

Command line | Registry

`UserScheduleDirectory` applies only on Windows devices.

Determines the folder where the user schedules are stored. A user schedule is run for the specified user account on the machine where the schedule resides.

Note: *Changing this preference is not recommended.*

Values

Values / range	Valid folder and path.
Default value	`$(CommonAppDataFolder)\ManageSoft Corp\ ManageSoft\Schedule Agent\Schedules`
Example values	`C:\Program Files\Flexera Software\schedule agent\ UserSchedules`

Command line

Tool	Scheduling component (`ndschedag`)
Example	`-o UserScheduleDirectory="C:\Program Files\Flexera Software\schedule agent\ UserSchedules"`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Schedule Agent\CurrentVersion`

VersionInfo

Command line | Registry

When `VersionInfo` is set to `True`, the tracker (`ndtrack` executable) includes file version header information in the inventory collected on Microsoft Windows systems.

When set to `False`, the tracker does not include file version header information in the inventory.

This preference is ignored for UNIX-like systems.

Values

Values / range	Boolean (`True` or `False`).
Default value	`True`
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o VersionInfo=False`

Registry

Installed by	Code internals, or manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

WinDirectory

Command line | Registry

`WinDirectory` references the path to the Windows folder. You can also use `WindowsFolder`, which points to the same folder.

Warning: *Changing either of these values may have unpredictable results. The two preferences are initialized at start-up, and are set from the Windows environment. If you manually change either one, the change is not synchronized, and the behavioral impacts are unpredictable.*

This preference is ignored for UNIX-like platforms.

Values

Values / range	
Default value	`C:\Windows`
Example values	`C:\Windows`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o WinDirectory=C:\Winnt`

Registry

Installed by	Predefined within FlexNet inventory agent / Microsoft Windows
Reference as:	`$(WinDirectory)`

WMI

Command line | Registry

When `WMI` is set to `True`, the Windows Management Instrumentation (WMI) tracking is specified as the preferred option for tracking hardware. In this case, if WMI is not available (and the `Hardware` preference is set to `True`), the tracker (`ndtrack` executable) attempts to track hardware using a native API.

When set to `False`, the tracker uses another tracking mechanism instead of WMI.

This preference is ignored for UNIX-like platforms.

Values

Values / range	Boolean (`True` or `False`).
Default value	When taking machine-based inventory, the default behavior is: `True`
Example values	`False`

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o WMI=False`

Registry

Installed by	Manual configuration
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

WMIConfigFile

Command line | Registry

`WMIConfigFile` defines the location of the Windows Management Instrumentation (WMI) configuration file, used to inform the tracker (`ndtrack` executable) what hardware components it should track. This is only used if `WMI` is `True`.

This preference is ignored for UNIX-like platforms.

Values

Values / range	Valid location.
Default value	`$(ProgramPath)\wmitrack.ini`
Example values	The value should point to a valid `.ini` file that contains WMI configuration.

Command line

Tool	Inventory component (`ndtrack`)
Example	`-o WMIConfigFile=C:\Program Files\ManageSoft\Tracker\wmitrack.ini`

Registry

Installed by	Installation of FlexNet inventory agent (computer preference)
Computer preference	`[Registry]\ManageSoft\Tracker\CurrentVersion`

10

File Formats

The content in the following topics is common to all methods of FlexNet inventory collection, except as specifically noted.

Catalog files (.osd)

A catalog file is small, usually around 1KB, and thus provides a fast way for the FlexNet inventory agent to check whether downloads of larger files are required (that is, whether the file that the catalog points to has changed). In this description, that larger file is called the "target file" to distinguish it from the catalog file. The catalog and its target file are together called a 'package'.

The catalog file includes:

- A pointer to the target file
- An MD5 checksum for the target file
- The software version
- Optionally, licensing details
- The names and versions of any dependent packages.

The format of the catalog file was derived from the W3C's Open Software Description (OSD) format, described at http://www.w3corg/TR/NOTE-OSD.html. However, the catalog file format ignores some elements of the OSD proposal, and adds others (through a namespace declaration with a related DTD file).

Details for package (.osd) files

Server location	Generated on demand by (and saved on) inventory beacons.

Folder	On inventory beacon: In the appropriate subdirectories under *%CommonAppData%*\Flexera Software\Staging\Common\. Relevant subdirectories for catalogs include: • ClientConfiguration • ClientSettings • InventorySettingsConfiguration • Packages • Schedules. ***Tip:*** *Catalog files exist only after an installed FlexNet inventory agent has requested the relevant download. For example, the Default Machine Schedule.osd catalog is created only after a managed device has requested a schedule update.* On Windows devices after download: On UNIX-like devices after download:
Updated	The catalog files are initially generated (and cached) when requested by a managed device, using the latest inventory beacon policy downloaded from the central application server. Thereafter each catalog is checked on demand for changes to the target file requested by the installed FlexNet inventory agents.
File name format	*packageType*.osd Example: Default Machine Schedule.osd
Format	XML (text).

Sample file

In the following sample (which is a catalog for a schedule), line numbers have been added for reference only; some lines have been elided to shorten them for presentation.

```
(1) <?xml version="1.0" encoding="UTF-8"?>
(2) <!DOCTYPE SOFTPKG SYSTEM "http://www.managesoft.com/softpkg.dtd">
(3) <?XML::NAMESPACE HREF="http://www.managesoft.com/managesoft.dtd" AS="NETDEPLOY"?>
(4) <SOFTPKG NAME="Default Machine Schedule" TYPE="Schedule" VERSION="1,0,0,0"
FORMAT="1.5">
(5)         <TITLE>Default Machine Schedule</TITLE>
(6)         <ABSTRACT>.
(7) </ABSTRACT>
(8)         <NETDEPLOY::PROPERTY NAME="PackageTransferSize">0</NETDEPLOY::PROPERTY>
(9)         <NETDEPLOY::USERDOMAIN DEFAULT="public" USERSELECT="True" INHERIT="True"/>
(10)        <IMPLEMENTATION>
(11)                <NETDEPLOY::DIGEST ALGORITHM="MD5" VALUE="e61e527...3033"/>
(12)                <NETDEPLOY::SYMBOL NAME="SelfHeal" VALUE="True"/>
```

```
(13)                <CODEBASE HREF="Default%20Machine%20Schedule.nds"/>
(14)        </IMPLEMENTATION>
(15) </SOFTPKG>
```

The components in the catalog file, line by line, are:

- (1) and (2): The XML header. The FlexNet inventory agent has built-in knowledge of the catalog file structure, and does not use the DTD reference.
- (3): A namespace definition that allows the use of additional elements through the second DTD file. Once again, knowledge of this structure is built into the FlexNet inventory agent, and the DTD reference is not used.
- (4) and (15): Catalog (`SOFTPKG`) start and end tags, with attributes for the name, type, version, and format.
- (5): A display title for the catalog.
- (6): An abstract that may be used to summarize the purpose of the package.
- and (8), (9) and (15), (16) and (22), and (23) and (27): Event start and end tags, with the most helpful attribute being the `NAME`.
- (6), (10), and similarly in later events: The action to execute when any of the following triggers fires. The relevant component of the FlexNet inventory agent is identified, along with any command line parameters to inject.
- (7), (11)-(14), and similarly in later events: Details of the trigger (or schedule pattern) when the above action should be executed. The parameters include typical scheduling details, such as:
  - The start of the time window within which the trigger should fire, along with the length of the time window in seconds (this time window allows for randomization across different devices, so that they do not all impact the network at the same time)
  - Whether the event should repeat during the day (with the delay in seconds, so that for example the policy update repeats every 12 hours)
  - Optionally, additional triggers to fire the same event when a new user logs on, when the device reconnects to the network, or immediately on machine reboot.

Policy Files (.npl)

Files with `.npl` extensions contain policy information for use by the FlexNet inventory agent (whether deployed in the Adopted case or the Agent third-party deployment case).

Tip: *Policy files are not available to FlexNet inventory core components, in any of the Zero-footprint, FlexNet Inventory Scanner, or Core deployment scenarios.*

Policy files are generated on demand by inventory beacons, based on information downloaded from the central application server. Each file contains links to all the information needed by the FlexNet inventory agent for normal operation. A separate policy file is generated when the first request is received from each installed FlexNet inventory agent, and the newly-generated policy (and all its dependent files) are cached against future requests. If the inventory beacon receives updated instructions from the central application server, the cache is

cleared, such that new policies, incorporating the changed information, are generated when fresh requests are received.

You should not edit policy files, but viewing them can help you to determine that the policy information being distributed to managed devices is as you expect. For example, if the policy cache does not contain a policy for a target device that you expect to see, it may be because:

- The managed device is requesting policy from a different inventory beacon
- The managed device is yet to request policy from this inventory beacon since updated data from the central application server caused the policy cache to be cleared
- The managed device is not correctly configured, or is malfunctioning.

Details for policy files created during policy distribution

Server location	Generated on demand by (and saved on) inventory beacons.
Folder	*%CommonAppData%*\Flexera Software\Staging\Common\Policies
Updated	Automatically on first request from a managed device. Calculated policy (and all dependent files) are cached against future requests. The cache is cleared when the inventory beacon receives updated data from the central application server.
File name format	*deviceName-UID*.npl (the unique identifier is derived from the IP addresses applicable to the managed device).
Format	XML (text).

Sample file

In the following sample, line numbers have been added for reference only; and lines have been shortened with placeholders for reproduction.

```
(1) <?xml version="1.0" encoding="utf-8"?>
(2) <!DOCTYPE Policy PUBLIC "Policy" "http://www.managesoft.com/policy.dtd">

(3) <Policy AppliesTo="*" Source="ManageSoft" Version="0">
(4)   <Policy GUID="GUID-for-policy-version" Source="ManageSoft" Version="0">
(5)     <Package href="PathToSchedule" ObjectID="IDForSchedule" Precedence="0" />
(6)     <Package href="PathToConfig" ObjectID="IDForConfig" Precedence="0" />
(7)     <Package href="PathToInvSettings" ObjectID="IDForInvSettings" Precedence="0" />
(8)     <Package href="PathToFailover" ObjectID="IDForFailover" Precedence="0" />
(9)     <Package href="PathToUpgrade" ObjectID="IDForUpgrade" Precedence="0" />
            ...
(10)   </Policy>
(11) </Policy>
```

The policy file contains links to package (.osd) files, and those files identify others that contain the actual content. The FlexNet inventory agent is able to deduce from the package files whether any of the referenced content files have been updated since last downloaded to the managed device by the FlexNet inventory agent. If

there are no updates, there are no further downloads, which minimizes network load and maximizes performance. The components in the policy file, line by line, are:

- (1) and (2): The XML header. The FlexNet inventory agent has built-in knowledge of the policy file structure, and does not use the DTD reference.
- (3), (4), (10), and (11): Policy start and end tags, with attributes for version, source, and so on. The attribute `AppliesTo="*"` identifies machine policy (all users), and must not be changed.
- (5): A link to the schedule for inventory collection by the FlexNet inventory agent. The schedule is saved on the inventory beacon in *%CommonAppData%*`\Flexera Software\Staging\Common\Schedules`. (Within the policy file, this path is referenced only as `/Schedules/`, with the file name appended.) This link is to the `.osd` file in the folder, and this in turn links to an `.nds` file that contains details of the schedule itself.
- (6): A link to the client configuration file that contains initial settings for FlexNet inventory agent. Client configurations are saved on the inventory beacon in *%CommonAppData%*`\Flexera Software\Staging\Common\ClientConfiguration`. (Within the policy file, this path is referenced only as `/ClientConfiguration/`, with a subfolder and the file name appended. The subfolders hold distinct sets of client configurations, separated by the appropriate UID.) This link is to the `.osd` file in the folder, and this in turn links to an `.ndc` file that contains details of the client configuration itself. Client configuration is minimal, mainly declaring the starting point for use of the registry on the managed device by the FlexNet inventory agent, any settings for the `IncludeDirectory` preference, and whether usage tracking is enabled.
- (7): A link to the inventory settings file that extends the inventory collection capabilities of the FlexNet inventory agent. Inventory settings packages for download and installation on managed devices are saved on the inventory beacon in `%CommonAppData%\Flexera Software\Staging\Common\InventorySettingsConfiguration\InventorySettings`. (Within the policy file, this path is referenced only as `/InventorySettingsConfiguration/InventorySettings/`, with the `.osd` file name appended.) The `.osd` package file links to an `.ndc` file, which in turn points to an `InventorySettings.xml` file that contains extensions for inventory gathering, including (for example) the queries used for Oracle Database inventory gathering.

  Tip: *In operation for the Zero-footprint case, the inventory beacon uses an installed copy saved in* *%ProgramFiles%*`\Flexera Software\Inventory Beacon\RemoteExecution\Public\Inventory`.

- (8): A link to the failover settings, saved in *%CommonAppData%*`\Flexera Software\Staging\Common\ClientSettings\Default Failover Settings` (again, everything down to the `Common` folder is assumed in the policy file). As is common in the policy file, the link is to an `.osd` package file that links to an `.ndc` file containing the data. In this case, the data consists of a list of registry settings where the FlexNet inventory agent can save connection details for every known inventory beacon. If its preferred inventory beacon is unavailable, the FlexNet inventory agent can attempt inventory uploads to another inventory beacon that responds to an initial contact. Notice that the failover settings are used independently by the `ndupload`, `ndtrack`, and `ndlaunch` components of the FlexNet inventory agent. (It is the `ndlaunch` component that downloads policy, and downloads and checks all `.osd` packages.)
- (9): The first of several links to upgrade packages for the FlexNet inventory agent on supported platforms, with the first link being for Microsoft Windows, and following packages for named platforms. These are stored on

the inventory beacon under *%CommonAppData%*\Flexera Software\Staging\Common\Packages\Flexera\Upgrade\ (with the path down to the Common folder being assumed in the policy file). Folders for approved version(s) of the FlexNet inventory agent, and for the revision to packages for that version, are included in the path; along with a platform-specific folder. The link concludes with the .osd file name, and this in turn points to the elements needed by for self-updating of the FlexNet inventory agent. This line of the policy file is repeated once for each supported platform on which the FlexNet inventory agent runs. The installed FlexNet inventory agent has the intelligence to download only its own required version, and only when an upgrade is required.

Schedule Files (.nds)

Files with the .nds extension contain data about schedules for use by the FlexNet inventory agent (in both the Adopted case and the Agent third-party deployment case).

A single schedule file is generated by inventory beacons each time changed schedule information is downloaded from the central application server. The file is cached against future requests, and a package file (.osd) is created at each update that references the new schedule. (The package file is referenced in the policy file downloaded by each FlexNet inventory agent, for which see Policy Files (.npl).) A single schedule file is used in common by all FlexNet inventory agents.

You should not edit schedule files, but viewing them can help you to determine that the schedule information distributed to managed devices is as you expect.

Details for schedule (.nds) files created during schedule changes

Server location	Generated on demand by (and saved on) inventory beacons.
Folder	On inventory beacon: *%CommonAppData%*\Flexera Software\Staging\Common\Schedules On Windows devices after download: %CommonAppData% \ManageSoft Corp\ManageSoft\Schedule Agent\Schedules On UNIX-like devices after download: /var/opt/managesoft/scheduler/schedules
Updated	Automatically each time that inventory beacon policy downloaded from the central application server includes a change to the schedule for installed FlexNet inventory agents.
File name format	Default Machine Schedule.npl
Format	XML (text).

Sample file

In the following sample, line numbers have been added for reference only; some lines have been wrapped for reproduction; and others have been elided when they repeat similar content.

```
(1) <?xml version="1.0" encoding="utf-8"?>
(2) <!DOCTYPE Schedule PUBLIC "ManageSoft Schedule"
         "http://www.managesoft.com/schedule.dtd">
(3)
(4) <Schedule SCHEDSCHEMA="60" NAME="Default Machine Schedule"
          TIMEDATESTAMP="20160204T151801Z">
(5)        <Event NETWORK="false" NAME="Generate Inventory"
            ID="{de9cddcd-53ac-4796-b02c-f00764f00a1f}"
            CATCHUP="Never" IDLEDURATION="60">
(6)               <LogicalCommand PARAM=" -o UserInteractionLevel=Quiet"
                  COMPONENT="Tracker" ACTION="Report" />
(7)               <Trigger TIMESTART="080030" TYPE="Daily" TYPE_PARAM="1"
                  TIMEWINDOW="28800" DATESTART="20100101" />
(8)        </Event>
(9)        <Event NETWORK="false" NAME="Update Machine Policy"
            ID="{30c8899c-9eab-4f07-9160-d8610b27f67f}"
            CATCHUP="Never" IDLEDURATION="0">
(10)            <LogicalCommand PARAM="-t Machine -o UserInteractionLevel=Quiet"
                  COMPONENT="PolicyClient" ACTION="Apply" />
(11)            <Trigger TIMESTART="000500" REPEAT="43200" DURATION="86400"
                  TYPE="Daily" TYPE_PARAM="1" TIMEWINDOW="3600" DATESTART="20160204" />
(12)            <Trigger TYPE="Logon" ... />
(13)            <Trigger TYPE="OnConnect" ... />
(14)            <Trigger TYPE="Now" ... />
(15)       </Event>
(16)       <Event NETWORK="false" NAME="Update Client Settings" ... >
(17-21)       ...
(22)       </Event>
(23)       <Event NETWORK="false" NAME="Upload Client Files" ... >
(24-26)     ...
(27)       </Event>
(28) </Schedule>
```

The components in the schedule file, line by line, are:

- (1) and (2): The XML header. The FlexNet inventory agent has built-in knowledge of the schedule file structure, and does not use the DTD reference.
- (4) and (28): Schedule start and end tags, with attributes for the time and date of last change, and schema version (the schema is internal to the `ndschedag` component).
- (5) and (8), (9) and (15), (16) and (22), and (23) and (27): Event start and end tags, with the most helpful attribute being the `NAME`.
- (6), (10), and similarly in later events: The action to execute when any of the following triggers fires. The relevant component of the FlexNet inventory agent is identified, along with any command line parameters to inject.
- (7), (11)-(14), and similarly in later events: Details of the trigger (or schedule pattern) when the above action should be executed. The parameters include typical scheduling details, such as:

- The start of the time window within which the trigger should fire, along with the length of the time window in seconds (this time window allows for randomization across different devices, so that they do not all impact the network at the same time)
- Whether the event should repeat during the day (with the delay in seconds, so that for example the policy update repeats every 12 hours)
- Optionally, additional triggers to fire the same event when a new user logs on, when the device reconnects to the network, or immediately on machine reboot.

WMI Configuration File (wmitrack.ini)

The WMI (Windows Management Instrumentation) configuration file is used on Microsoft Windows platforms to inform the inventory tool (`ndtrack.exe`) what hardware, software and operating system components it should track. This file is referenced by default, but for the installed FlexNet inventory agent, its use may be turned off by setting the `WMI` preference to false (see WMI). For the FlexNet Inventory Scanner case, it is always enabled (since the lightweight FlexNet Inventory Scanner does not check registry entries).

The components to be tracked can be any valid Win32 classes. A full list of classes is provided at .

You can edit this file to change the items being tracked.

Details of file availability

Machine location	On managed devices (machines where the full FlexNet inventory agent is installed); with a copy saved on inventory beacons.
Folder	On managed devices: `$(ProgramPath)\wmitrack.ini` On inventory beacons: `%ProgramFiles%\Flexera Software\Inventory Beacon\Tracker`
Updated	Installed on managed devices when the FlexNet inventory agent is installed (for example, in the Adopted case). Installed on inventory beacons when the FlexNet Beacon software is installed. This file is never updated automatically.
File name	`wmitrack.ini`
Format	`.ini` file (text, with section headings enclosed in square brackets following by the member settings in plain text).

Sample file

This sample shows all the default settings. Notice that some lines are commented out with the leading semi-colon character.

```
[Win32_ComputerSystem]
Manufacturer
Model
```

```
Domain
DomainRole
NumberOfProcessors
NumberOfLogicalProcessors
TotalPhysicalMemory
Status
UserName

[Win32_ComputerSystemProduct]
IdentifyingNumber
Name
UUID
Vendor
Version

[Win32_OperatingSystem]
Name
Manufacturer
Version
ServicePackMajorVersion
ServicePackMinorVersion
SerialNumber
InstallDate
LastBootUpTime
OSLanguage
FreePhysicalMemory
FreeVirtualMemory
CountryCode
WindowsDirectory
SystemDirectory
Caption
CSDVersion
Status
CSName
OSType
OSArchitecture

[Win32_BIOS]
Manufacturer
Version
ReleaseDate
SerialNumber
BiosCharacteristics
Status

[Win32_Processor]
Description
Manufacturer
```

```
Version
ProcessorId
CurrentClockSpeed
CurrentVoltage
L2CacheSize
Status
MaxClockSpeed
Name
ProcessorType
NumberOfLogicalProcessors
NumberOfCores
DeviceID

[Win32_DiskDrive]
Description
Manufacturer
Model
Size
InterfaceType
Partitions
Status

[Win32_LogicalDisk]
Description
VolumeName
FileSystem
FreeSpace
Size
VolumeSerialNumber
DriveType
MediaType
Status
ProviderName

[Win32_CDROMDrive]
Description
Manufacturer
Drive
Status
Capabilities

[Win32_NetworkAdapter]
Manufacturer
MACAddress
MaxSpeed
Speed
Status
```

```
[Win32_NetworkAdapterConfiguration]
Caption
Description
Index
MACAddress
IPEnabled
DHCPEnabled
IPAddress
DHCPServer
DNSHostName
DNSDomain
DNSServerSearchOrder
DefaultIPGateway
IPSubnet

[Win32_PhysicalMemory]
Capacity
MemoryType
PositionInRow
Speed
Status

[Win32_SoundDevice]
Name
Manufacturer

[Win32_VideoController]
Name
VideoProcessor
DriverVersion
DriverDate
InstalledDisplayDrivers
AdapterRAM

[Win32_VideoConfiguration]
AdapterRAM
AdapterType
Description
HorizontalResolution
MonitorManufacturer
MonitorType
Name
VerticalResolution

[Win32_SystemEnclosure]

;[Win32_USBDevice]
;Caption
```

```
;ClassGuid
;Description
;DeviceID
;Manufacturer
;Name
;Status
;SystemName

[SoftwareLicensingProduct]
ApplicationID
Description
EvaluationEndDate
GracePeriodRemaining
LicenseStatus
MachineURL
Name
OfflineInstallationId
PartialProductKey
ProcessorURL
ProductKeyID
ProductKeyURL
UseLicenseURL

[SoftwareLicensingService]
ClientMachineID
IsKeyManagementServiceMachine
KeyManagementServiceCurrentCount
KeyManagementServiceMachine
KeyManagementServiceProductKeyID
PolicyCacheRefreshRequired
RequiredClientCount
Version
VLActivationInterval
VLRenewalInterval
```