Legal Information

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Product Support Resources

The following resources are available to assist you with using this product:

- Flexera Product Documentation
- Flexera Community
- Flexera Learning Center
- Flexera Support

Flexera Product Documentation

You can find documentation for all Flexera products on the Flexera HelpNet site:

https://helpnet.flexerasoftware.com
Flexera Community

On the Flexera Community site, you can quickly find answers to your questions by searching content from other customers, product experts, and thought leaders. You can also post questions on discussion forums for experts to answer. For each of Flexera's product solutions, you can access forums, blog posts, and knowledge base articles.

https://community.flexera.com

Flexera Learning Center

Flexera offers a variety of training courses—both instructor-led and online—to help you understand how to quickly get the most out of your Flexera products. The Flexera Learning Center offers free, self-guided, online training classes. You can also choose to participate in structured classroom training delivered as public classes. You can find a complete list of both online content and public instructor-led training in the Learning Center.

https://learn.flexera.com

Flexera Support

For customers who have purchased a maintenance contract for their product(s), you can submit a support case or check the status of an existing case by making selections on the Get Support menu of the Flexera Community.

https://community.flexera.com

Contact Us

Optima

Flexera is headquartered in Itasca, Illinois, and has offices worldwide. To contact us or to learn more about our products, visit our website at:

http://www.flexera.com

You can also follow us on social media:

- Twitter
- Facebook
- LinkedIn
- YouTube
- Instagram

Contact Billing

Email: billing@rightscale.com
Optima is a cost management and optimization solution that enables enterprises to cut cloud costs and ensure the ongoing efficient use of cloud resources across all of their business units, cloud accounts, clouds, and applications.

One of the biggest challenges when optimizing cloud costs is implementing recommended savings across large organizations where control of cloud accounts is decentralized. Optima offers a unique approach to cost management and optimization that enables cloud governance teams to work collaboratively with business units and cloud resource owners to reduce wasted cloud spend.

With Optima you can:

- Get visibility into costs across all your clouds
- Analyze costs by a variety of factors, including cloud provider, account, regions, data centers, applications, users, tags, and time periods.
- Get scheduled reports on cloud spend delivered to your email inbox.
- Create and export reports for chargeback and showback.
- Forecast and budget for cloud costs by application, team, user, cloud, or other factors.
- Set alerts when budgets are exceeded or projected to be exceeded.
- Plan for and manage Reserved Instances

Before using Optima:

- Configure your accounts by establishing Billing Data Connections to connect your cloud billing data to Optima
- Create Billing Centers to allocate cloud costs to your teams and provide them access to their data
- Prepare for Your Cost Optimization Assessment
- Watch the Optima Training Videos
Optima documentation is organized into the following sections:

**Table 2-1 • Optima Help Topics**

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<th>Topic</th>
<th>Content</th>
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<td><strong>Getting Started with Optima</strong></td>
<td>Before using Optima:</td>
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<td></td>
<td>• Configure your accounts by establishing <a href="#">Billing Data Connections</a> to connect your cloud billing data to Optima</td>
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<td>• Create <a href="#">Billing Centers</a> to allocate cloud costs to your teams and provide them access to their data</td>
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<td>• <a href="#">Prepare for Your Cost Optimization Assessment</a></td>
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<tr>
<td><strong>Common Optima Controls</strong></td>
<td>In Optima, there are many controls that are common across different pages. This page describes the common controls that you will find in many pages throughout Optima.</td>
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<td><strong>Optima Dashboards</strong></td>
<td>This section describes Optima’s several dashboard options to analyze cloud cost information:</td>
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<td>• Default Dashboard</td>
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<td>• AWS Instance Analyzer Default</td>
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<td>• Resource Analyzer Default</td>
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<td>• Custom (New) Dashboard</td>
</tr>
<tr>
<td><strong>Sample Optima Reports</strong></td>
<td>This section describes the reports that you can create in Optima.</td>
</tr>
<tr>
<td><strong>Cloud Provider Billing Data Instructions</strong></td>
<td>Optima uses billing data to provide an accurate view of your costs across accounts and services. This data is consumed by the Optima platform and made available for pre-built and ad-hoc analyses. In order to gather the cost information, certain configuration steps must be performed with specific data and credentials being shared with Optima.</td>
</tr>
<tr>
<td><strong>Optima Billing Centers Guide</strong></td>
<td>This section describes the many features of Optima’s Billing Centers Guide.</td>
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<tr>
<td><strong>Reserved Instances</strong></td>
<td>This section shows information about your Reserved Instances for the selected organization for a 7-day rolling window (starting 9 days back).</td>
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<tr>
<td><strong>Automated Optimization</strong></td>
<td>Optima allows you to optimize cloud cost with a variety of automated optimization capabilities. These features identify savings opportunities, as well as help you set up automated actions to realize potential savings and prevent future waste.</td>
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<tr>
<td><strong>Optima Recommendations</strong></td>
<td>Optima Recommendations help you discover and realize saving opportunities to reduce your cloud spend.</td>
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<tr>
<td><strong>Optima API</strong></td>
<td>This section provides links to Optima’s bill connection and configuration APIs.</td>
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Billing Data Connections

Optima ingests billing data provided by major cloud providers and allows you to allocate costs, identify waste, and performed detailed analysis of your cloud spend. The following articles explain how to configure Optima to read your billing data.

In addition to the steps on this page, there are Cloud Provider Billing Data Instructions for configuring bill data from each of the cloud providers which must be completed.

There are two ways to create new billing data connections and update credentials for existing billing data connections:

- Using the Optima UI
- Automate Using the Optima API

Using the Optima UI

Note • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager.

Using the Optima UI, complete the following to configure your billing data connections:

- Navigate to the Optima UI Billing Configuration Settings
- Add New Billing Data Using the Optima UI
- View Billing Configuration Information Using the Optima UI
- Update Billing Data Configurations Using the Optima UI
- Remove Billing Data Using the Optima UI

Navigate to the Optima UI Billing Configuration Settings

From any screen in Optima, select the Settings option in the left-hand navigation bar, and then select the Billing Configuration tab.

Note • The Billing Configuration option is only available for users that have the enterprise_manager role.
Add New Billing Data Using the Optima UI

**Task**

To add new billing data to Optima:

1. Select the **Add a cloud bill** button in the upper-right corner of the **Billing Configuration** page.
2. Select the cloud provider that you would like to connect to Optima.

   **Note** • Each cloud provider requires different billing configuration information. For details, see **Cloud Provider Billing Data Instructions**.
3. Click **Continue**.
4. Optima performs the initial validation of the configuration data and provides a success or failure message.
   - If successful, billing data can be expected to be available within 24 hours.
   - If unsuccessful, please check all configuration information and try again, or **Contact Us**.

View Billing Configuration Information Using the Optima UI

In the **Billing Configuration** page, all connected bills are listed on the left. Selecting any bill provides details about the configuration information in the **Info** pane on the right. For Azure CSP connections, the **Tenants** tab shows the CSP tenants that are currently configured.

For each cloud, non-sensitive configuration information is made available. Sensitive key material is not available via the Optima UI.

   **Note** • The **Last updated on** date reflects the last change of configuration information for this bill, not the last bill that was processed.

Update Billing Data Configurations Using the Optima UI

In the case of credential rotation or other changes in the cloud environment, the configuration of each bill can be updated. Each cloud allows most configuration data to be updated except for the account ID (or equivalent).

**Task**

To update billing data configurations:

1. Select the bill that needs to be updated.
2. Click the blue **Edit** button in the lower-right corner of the **Bill Information** panel.
3. Change the billing configuration data as needed.

   **Note** • Each cloud provider requires different billing configuration information. For details, see **Cloud Provider Billing Data Instructions**.
4. Click **Update**.
5. Optima performs an initial validation of the configuration data and provides a success or failure message:
   • If successful, the new configuration is saved.
   • If unsuccessful, please check all configuration information and try again, or Contact Us. The current configuration will not be updated.

**Remove Billing Data Using the Optima UI**

Bill data configurations can be removed from Optima to prevent data from being updated for a given account.

*Important* • Once removed, any rules, dashboards, or other features relying on that billing data will no longer contain updated information for that account.

**Task**

To remove a set of billing data from Optima:

1. Select the bill to remove.
2. Click the red **Delete** button in the lower-left of the **Bill Information** panel.
3. Confirm the billing data deletion by clicking **Remove Configuration**.

**Automate Using the Optima API**

The Optima Bill Connect API provides full control of billing data configuration and can be used to automate connections or credential rotation using a REST-compliant interface.

The **BillConnects** resource provides a list of all billing data configurations (except for Azure CSP), while cloud-specific resources are used for creating, updating, and removing billing data configurations.

*Note* • For Azure Cloud Solutions Provider (CSP) partners, see Managing CSP Partnerships and Customers in Optima.

Using the Optima API, complete the following to configure your billing data connections:

• Add New Billing Data Using the Optima API
• Update Billing Data Configurations Using the Optima API
• Remove Billing Data Using the Optima API

**Add New Billing Data Using the Optima API**

To add new billing data, use the cloud-specific path for bill connects with the **POST** method. Each cloud provider requires different payloads in the **POST**. For details, see Cloud Provider Billing Data Instructions.

The specific API resources/paths for each cloud provider are as follows:

• **AWS** - AWSBillConnects
• **Google** - GoogleBillConnects
• **Microsoft Azure (Enterprise Agreement)** - AzureEABillConnects
• **Microsoft Cloud Solution Provider (CSP) Partner** - Managing CSP Partnerships and Customers in Optima.
If the API returns a success code, the configuration has been saved and billing data can be expected to be available within
24 hours.

**Update Billing Data Configurations Using the Optima API**

To update the credentials or other configurations for an existing bill data connection, locate the ID of the bill connect
resource through the API or UI and make a PATCH call to that href. Each cloud provider requires different payloads in the
PATCH.

For details, see [Cloud Provider Billing Data Instructions](#).

The specific API resources/paths for each cloud provider are as follows:

- **AWS** - AWSBillConnects
- **Google** - GoogleBillConnects
- **Microsoft Azure (Enterprise Agreement)** - AzureEABillConnects
- **Microsoft Cloud Solution Provider (CSP) Partner** - Managing CSP Partnerships and Customers in Optima.

If the API returns a success code, the configuration has been saved.

**Remove Billing Data Using the Optima API**

Bill data configurations can be removed from Optima to prevent data from being updated for a given account.

---

**Important** • Once removed, any rules, dashboards, or other features relying on that billing data will no longer contain
updated information for that account.

To remove billing data configurations from Optima, locate the ID of the bill connect resource through the API or UI and
make a DELETE call to that href. Each cloud requires different payloads in the DELETE call.

For details, see [Cloud Provider Billing Data Instructions](#).

The specific API resources/paths for each cloud provider are as follows:

- **AWS** - AWSBillConnects
- **Google** - GoogleBillConnects
- **Microsoft Azure (Enterprise Agreement)** - AzureEABillConnects
- **Microsoft Cloud Solution Provider (CSP) Partner** - Managing CSP Partnerships and Customers in Optima.

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**Billing Centers**

Billing centers provide a method to allocate costs into certain groups, or cost centers, which can then be analyzed and
reported or alerted on. Users can create any number of billing centers, each one spanning multiple cloud vendors and
accounts. The aggregated costs are rolled up into the associated billing center.

This section details:

- **What are Billing Centers?**
- **Contact Information for Billing Center Account Specifics or Support**
What are Billing Centers?

A billing center contains a collection of cloud charges which come from public cloud bills that have been connected to RightScale. Bill charges are associated with a billing center by creating allocation rules designating specific cloud accounts or cloud tags. Billing centers should be logically organized by cost center, department, project, etc., to separate cloud costs for costs analysis, showback, and/or chargeback.

Use billing centers to provide scheduled cost reports, implement budgets, and organize your cloud charges across all of your public cloud providers.

See the Optima Billing Centers Guide for more details on creating and using billing centers.

Contact Information for Billing Center Account Specifics or Support

Optima billing center contact information for:

- **Sales** - For information about your account specifics, contact your account manager or email sales@rightscale.com.
- **Support** - To report any bugs related to Optima, raise a support ticket from the Optima Dashboard or email support@rightscale.com.

Prepare for Your Cost Optimization Assessment

This section helps you gather all of the required information for Optima to run an effective cost optimization assessment. You may also be interested in learning more about our paid Cost Optimization Service, which provides ongoing expertise to help you continually optimize spend on an ongoing basis.

- **Cost Optimization Assessment Discovery Call**
- **Cost Optimization Assessment Prerequisites**

Cost Optimization Assessment Discovery Call

In most cases, your account manager will schedule an initial discovery call between you and your Cost Management Specialist before the assessment is performed. This call provides the background information necessary to ensure a comprehensive cost optimization assessment.

Cost Optimization Assessment Prerequisites

To produce a complete cost optimization assessment, RightScale requires that you perform a few simple steps ahead of time. Based on your cloud provider(s), the prerequisite steps listed below provide RightScale with cloud billing data as well as cloud credentials to access cloud usage data, which helps provide a complete picture of your cloud spend and potential savings.

- **Set up Your RightScale Accounts for Cost Optimization**
- **Provide Access to Your Amazon Web Services (AWS) Billing and Usage Data**
- **Provide Access to Your Azure Billing and Usage Data**
- **Provide Access to Your Google Compute Engine Billing and Usage Data**

Once you’ve completed the prerequisites listed above, RightScale will automatically discover your cloud assets and the information needed for the optimization through the cloud API using the credentials you provide in the instructions below.
Note • You do not need to install any agent, and you do not need to provision cloud resources through RightScale in order to perform the cost assessment.

Set up Your RightScale Accounts for Cost Optimization

You will need to connect each cloud account that will be analyzed to an account in RightScale. (You will need to connect all cloud accounts, not just payer accounts.) This process requires you to have enterprise manager access to the RightScale organization:

- Login to RightScale and select your primary account.
- Create one RightScale account for each cloud account.

Provide Access to Your Amazon Web Services (AWS) Billing and Usage Data

AWS Billing Data: Hourly Cost and Usage Report (HCUR)

Optima needs access to your AWS Hourly Cost and Usage Report. Once you set up this specific report in AWS (if it is not already set up), we will need access to the S3 Bucket where the report is placed. For details, see: Connect Amazon Web Services Platform to Optima for Cost Reporting.

Note • AWS GovCloud (US) is treated as any other AWS Region and comes through in the AWS Hourly Cost and Usage Report (HCUR) that Optima uses to ingest AWS bill data.

AWS Usage Data from Your AWS Account Family

You will need to connect your AWS payer account and all of the AWS linked accounts that make up the AWS account family to RightScale. This is important because Reserved Instances (RIs) can be shared across an entire account family and access is required to the complete set of information to perform a comprehensive assessment.

To connect each cloud account to RightScale, see Connect Individual AWS Accounts to RightScale.

Note • You will need to repeat this connection process for each account in the AWS account family (Payer and Linked accounts) that is not connected to RightScale.

If you cannot connect all of the accounts in your AWS account family, we suggest that you connect the following:

- Accounts where you have purchased significant numbers of Reserved Instances. For example, some AWS users purchase RIs in their Payer account, while others buy RIs in individual linked accounts.
- Accounts with the largest amount of AWS spend.

The more complete the registration, the more comprehensive and accurate the cost assessment will be.

Provide Access to Your Azure Billing and Usage Data

Azure Billing Data: Azure Enterprise Agreement

To connect your Azure Enterprise Agreement with RightScale, see Connect Azure Enterprise Agreement to Optima for Cost Reporting.
Azure Usage Data from All Azure Subscriptions

You will need to connect your cloud credentials for each Azure subscription to RightScale. Repeat these steps for each Azure subscription. Depending on the type of subscription, you will need to connect in different ways. If, for a given subscription, you have resources in both Azure Classic and Azure Resource Manager, you will have to follow the process for each in order to fully connect that subscription.

- Azure Classic
- Azure Resource Manager Using Custom Active Directory Application
- Azure Resource Manager Using RightScale Service Principal

For either Azure Classic or Azure Resource Manager, we recommend starting the process from the Settings > Organization > Accounts menu where you can click New Child Account to connect the accounts all in one place.

Provide Access to Your Google Compute Engine Billing and Usage Data

Google Cloud Platform Billing Data

To connect your Google Cloud Platform billing data with RightScale, see Connect Google Cloud Platform to Optima for Cost Reporting.

Google Cloud Platform (GCP) Usage Data from All GCP Projects

To connect your cloud credentials for each GCP project to RightScale, repeat the Connect Google Cloud Platform to Optima for Cost Reporting steps for each project.

Optima Training Videos

To learn more about using Optima, watch the training videos in the Flexera Learning Center.

You can also access the Flexera Learning Center through the Flexera Customer Community, which you should have received a login to.

The Learning Center training videos for Optima include:

- Getting Started with Optima
  - Introduction to Cloud Optimization with Optima
  - Managing Costs with Optima
  - Analyzing Your Cloud Spend
  - Automate Cloud Spend Optimization with Policies
Common Optima Controls

Note • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager. You can tell if you are enabled on these capabilities if you see a Tabular view tab in Billing Centers.

In Optima, there are many controls that are common across different pages. This page describes the common controls that you will find in many pages throughout Optima.

• Organization Selector
• Left-hand Navigation
• Product Selector
• User Configuration
• Give Feedback
• Date Selector
• Cost Type Selector
• Dimension Selector

Organization Selector

Important • If you have access to only one organization, this control will not be visible (this access is very common).

Left-hand Navigation

The left-hand navigation provides one-click access to the top-level capabilities within Optima. Access to individual pages within the navigation are sometimes gated by certain roles or access to certain datasets.

The left-hand navigation menu can be collapsed/expanded using the handle control at the top-left of the screen.
Chapter 3  Common Optima Controls

Product Selector

*Important* • *This control may be hidden if you have access only to Optima capabilities.*

The product selector allows you to quickly navigate to other parts of the RightScale product, including Self-Service, Cloud Management, and Governance.

User Configuration

The user menu allows you to configure your user properties (including changing your password), get quick access to support and documentation, and logout of the platform.

Give Feedback

In the lower-left of Optima is an option to Give Feedback to the Optima team. This is a hugely beneficial capability for you and the Optima team - please use it freely to report issues, share ideas, ask questions, or just say hi.

Date Selector

Many of the Optima pages contain a date selector, which changes the time range to which the data on the current page applies. Click the date selector to open the picker. Some pages allow the granularity of data to be selected between Daily, Weekly, Monthly, Quarterly, and Biannually. Other pages only support Monthly granularity but allow you to pick the time range from which to show data. A convenient list of common date selections (Shortcuts such as Past 3 months or Past Year) is provided on the right and can be set with a single click.

Each date selection query has its limits:

- Daily = 31 day maximum
- Monthly = 24 months maximum
- Quarterly = 8 quarters maximum
- Biannually = 2 year maximum

Once the data selector has been set, its configuration is saved as you navigate across other pages.

Cost Type Selector

Many pages offer the choice to view different cost types based on your use case. These options currently focus on amortizing one-time costs and on showing the AWS Reserved Instance blended costs. On any page with the cost type option, your selection will be reflected in the cost data on that page. On any page that doesn't have the option, the costs shown are blended, non-amortized.

Cost types in Optima are divided into the following categories:

- Cost Amortization
- Cost Blending (AWS only)

Cost Amortization

Amortizing costs is defined as taking one-time costs and spreading the cost out over the lifetime of the purchase. If such a cost were shown non-amortized, then the full cost of that item is attributed to the time of the purchase. If a cost were amortized, then the cost would be divided into all of the hours of the duration of the cost and shown in each hour.
The simplest example of such a cost would be an up-front purchase of a Reserved Instance. Let’s assume we purchase a 1-year Reserved Instance from AWS on January 5, 2018 at 3:00 p.m. and it cost us $15,000. Here is how that purchase will be shown under both scenarios:

- **non-amortized** - the full $15,000 shows in cost data on Jan 5, 2018.
- **amortized** - the full cost is divided by the number of hours in the lifespan of the item (there are 8,760 hours in a year), and the result is attributed to each hour in the lifespan. In this case, we would see a $1.71 charge on every single hour between Jan 5, 2018 3:00 p.m. and Jan 5, 2019 2:00 p.m.

### Cost Blending (AWS only)

Cost blending is a cost reporting approach that is used by AWS to spread the discounts from Reserved Instances over all applicable instances. In Optima, you can choose whether to see costs that are blended or unblended.

- **Unblended costs** are savings from reserved instances that are applied first to matching instances in the account where it was purchased.
- **Blended costs** are savings from reserved instances that are shared equally by all matching instances in all accounts.

To learn more about cost blending in AWS, see their documentation on [Blended Rates and Costs](#).

### Dimension Selector

Dimension refers to labels or metadata associated with items in your bill. Some dimension examples include category, service or resource type.

On pages with a dimension selector, it is used to break down the costs on the given page. In some pages there is only one option to choose from while other pages allow multiple dimensions to be selected. The selected dimension is used to break down the costs in some graphs on the page.

Optima offers the following types of cost dimensions:

- **RightScale-generated Cost Dimension: Category**
- **Cloud Provider Bill-based Cost Dimensions**
- **Custom Cost Dimensions**
Optima Dashboards

**Note** • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager. You can tell if you are enabled on these capabilities if you see a Tabular view tab in Billing Centers.

Optima offers several dashboard options to analyze cloud cost information:

- Default Dashboard
- AWS Instance Analyzer Default
- Resource Analyzer Default
- Custom (New) Dashboard

**Default Dashboard**

The Default Dashboard page in Optima combines all of the data from all of the billing centers that you have access to in the selected organization into one view. If you have the `billing_center_viewer` role at the organization level, this means you are seeing all costs across the organization. If you have the role on one or more billing centers, the dashboard combines the cost from all of those billing centers into one page.

The following summarizes:

- Access to Default Dashboard
- Default Dashboard Properties
- Default Dashboard Reports
- Default Dashboard Forecast
Access to Default Dashboard

To access the Default Dashboard page, you must have the billing_center_viewer role on either the organization or at least one billing center. The data shown in the Default Dashboard is a collection of all of the billing centers to which you have access.

Default Dashboard Properties

The Default dashboard is built-in and matches what has historically been shown as the dashboard on the billing center overview page. This dashboard has some special behaviors to be aware of:

1. It cannot be deleted.
2. It cannot be modified in any way (no adding, removing, changing, or moving reports).
3. It cannot be duplicated to create a new dashboard.
4. The date period selected at the top of the page affects all reports.
5. All reports can show daily, monthly, quarterly, or biannual data. The selected date period in the top bar chart appears highlighted in gray.

Default Dashboard Reports

The Default Dashboard provides an overview of your cloud costs across clouds, accounts and services for the selected time period (day, month, quarter, biannual) in a bar chart at the top of the page. The remaining charts on the page show data from the selected bar on the top chart (this data is denoted with a gray highlight behind the selected bar).

Hover over any date period on the chart to see the breakdown of costs by the selected dimension. Click your desired date selector (day, month, quarter, biannual) to change the lower charts on the page to show data for that period. The upper left of the chart shows the costs of the selected date period and the prior date period.

Default Dashboard Forecast

A forecast of the current Date Selector spend is provided when amortized is selected in the Cost Type Selector. Hovering over the tooltip next to the forecast in the chart key explains how the forecast is calculated.

For example, the forecast for amortized costs in a monthly period (31 day maximum) is calculated by using the average daily spend and projecting that amount forward for the remaining days in the month. The average spend is calculated using the last 7 days for which we have full data from the cloud providers. For further forecasting model details, see Timeseries Analysis.

For further clarification regarding the dimensions used in the Filters tab or the options Functions in the Resource List, see Cloud Provider Bill-based Cost Dimensions, listed under Columns, Filters, and Functions.

AWS Instance Analyzer Default

The AWS Instance Analyzer Default dashboard is filtered to show the cost from all Amazon Web Services (AWS) instances such as EC2 Compute Instances, Spot Instances, and Reserved Instances on one page.
To use the AWS Instance Analyzer Default dashboard, make the following selections:

1. Select a date period for your cost reporting (Daily, Weekly, Monthly, Quarterly, Biannually, or one of the “Shortcuts”) using the Date Selector.

2. Select the Cost amortization and Cost blending method.

3. In the Activity Chart (line graph), select the appropriate spend dimension to graph such as billing center, cloud vendor account, or resource types. Depending on your organization’s AWS spend, you may further filter a particular dimension such as by selecting a specific geographic region or a specific AWS service. Based on the dimensions you selected, your total cost for your desired date period appears in the top right corner as Total Cost for Period. For further clarification regarding the dimensions used in the Activity Chart, see Amazon Web Services (AWS) Bill-based Data Dimensions.

4. The Resource List provides a spreadsheet view of your AWS instance spend with the ability to drill down to a specific virtual machine. On the right side, click Columns to select the categories to include in the Resource List. Then click Filters to further refine your selected categories. Filters can be sorted ascending or descending using the up or down arrow next to the column’s category name. Columns in the Resource List can be dragged to your preferred order, and the column width can be expanded to show the entire category title. If you prefer to create a pivot table view, select Functions and select the appropriate filters, row groups, values, and column labels. For further clarification regarding the Columns, Filters, and Functions options in the Resource List, see Amazon Web Services (AWS) Bill-based Data Dimensions. Once you have your Resource List set to your desired preferences, you can export this list by clicking Export CSV.

5. The full list of your individual cloud resources can be a very large dataset and may exceed the capacity of the interface. In terms of date range, only the most recent 90 days are shown. If you see a “Not all resources shown” message in the upper right of the Resource List, the interface and any CSV exports have reached their capacity of displaying only the first 100,000 rows. The remaining rows will not display. Shorten your date range to a narrower window to avoid seeing this message.

Note • If the Resource List has hit the capacity limit and is displaying the “Not all resources shown” message, applying filters within the Resource List will only further filter down the truncated dataset of 100,000 rows. The “Not all resources shown” message will continue to display. The only way to reduce the dataset in this dashboard is by using the date selector.

Resource Analyzer Default

The Resource Analyzer Default dashboard displays all spend across all resources without any filtering. It also includes an additional Filters report so you can drill down on the resources of your choice.

To use the Resource Analyzer Default dashboard, make the following selections:

1. Select a date period for your cost reporting (Daily, Weekly, Monthly, Quarterly, Biannually, or one of the “Shortcuts”) using the Date Selector.

2. Select a cost type for your cost reporting using the Cost Type Selector.
3. In the Activity Chart (line graph), select the appropriate spend dimension to graph such as billing center, cloud vendor account, or resource type. Based on the dimensions you selected, your total cost for your desired date period appears in the top right corner as Total Cost for Period. For further clarification regarding the dimensions used in the Activity Chart or Filters report, see Cloud Provider Bill-based Cost Dimensions.

4. The Resource Analyzer Default dashboard contains a Resource List report that is linked to a Filter report. All Resource List reports in both default and user-generated Custom Dashboards display zero-cost usage for billing. Even if the usage was not charged, for example if an instance was fully covered by a Reserved Instance, the Cost column will display $0.00. For further clarification regarding the Columns, Filters, and Functions options in the Resource List, see Cloud Provider Bill-based Cost Dimensions. Once you have your Resource List set to your desired preferences, you can export this list by clicking Export CSV.

5. The full list of your individual cloud resources can be a very large dataset and may exceed the capacity of the interface. In terms of date range, only the most recent 90 days are shown. If you see a “Not all resources shown” message in the upper right of the Resource List, the interface and any CSV exports have reached their capacity of displaying only the first 100,000 rows. The remaining rows will not display. Shorten your date range or use the filters in the Filter report about the Resource List to filter on a narrower subset of resources to avoid seeing this message.

**Note** • The filters in the Filters report limit the data coming into the Resource List from the server, whereas the filters within the Resource List only secondarily limit the data that has already been pulled into the Resource List and do not apply back to the Filters report. In other words, any filters applied secondarily within the Resource List will not appear as applied filters in the Filters report. If the Resource List has hit the capacity limit and is displaying the “Not all resources shown” message, applying filters within the Resource List will only further filter down the truncated dataset of 100,000 rows. The “Not all resources shown” message will continue to display.

**Custom (New) Dashboard**

**Note** • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager. You can tell if you are enabled on these capabilities if you see a Tabular view tab in Billing Centers.

This page describes how to create and modify (new) custom dashboards in Optima, allowing you to tailor your view of billing data based on your use case. Any new dashboards created by the Custom Dashboards functionality will appear alongside the Default Dashboard, but they will function somewhat differently. All user-created Custom Dashboards can be modified or deleted, but the Default Dashboard, AWS Instance Analyzer Default and Resource Analyzer Default cannot. However, if you create a copy of the Default Dashboard, AWS Instance Analyzer Default or Resource Analyzer Default, the copied dashboard can be modified.

Custom dashboards are currently available at the entire organizational level (the main dashboard) and within each billing center.

Custom dashboards are scoped to the user within the organization, so creating and modifying them only affects the current user.

Following are descriptions of the Custom Dashboard features:

- Working with a Custom Dashboard
Working with a Custom Dashboard

Custom dashboards are made up of reports, which can be defined and arranged in a layout of the user’s choosing. Each report is configured independently, with all reports using the dashboard-level time frame selection for showing the duration of data and data type for showing amortized, nonamortized, blended costs, and unblended costs.

Once dashboards are created, you can select which one you wish to view using the dashboard selector within any billing center by clicking the name of the dashboard you are currently viewing.

Creating a New Custom Dashboard

Task  To create a new custom dashboard:

1. Click the name of the dashboard you are currently viewing.

2. Select New Dashboard. You can create a custom dashboard from scratch (click Create New) or copy the current custom dashboard (click Duplicate This Dashboard).

   Note • The Default Dashboard cannot be duplicated.

3. After you click Create New, the Dashboard Properties window appears.

4. In Dashboard Properties, enter your custom dashboard Name and Description. Under Layouts, click your desired layout for the new custom dashboard. The dark gray lines in each layout preview show the zones while the light gray lines indicate how reports will be laid out in each zone. Click Save.

   The custom dashboard properties can be modified at any time by selecting the Edit button on the upper-right corner of the dashboard.

Configuring Custom Dashboard Reports

Reports are the configurable visualizations of data that show up on your dashboard. Each report has customizable fields, filters and time frames, which can be configured independently, linked to those of another report, or fixed to the overall dashboard default.

The following sections describe how to configure custom dashboard reports:

● Adding a Report
● Editing Report Details
● Linking Custom Values to Other Reports
● Custom Report Types
Adding a Report

**Task** To add a custom report to the current custom dashboard:

1. Click **Add Report** in the upper-right of the dashboard. The “layout mode” of the custom dashboard appears.
2. In the region in which you’d like the report to appear, click **Add Report**. Click **Cancel** to cancel adding a report and to exit layout mode.

Editing Report Details

**Task** To edit report details:

1. There are two ways to edit report details in the report editor panel:
   - After adding a new report and selecting the report region in the layout mode, the **Add Report** window appears.
   - After clicking the gear-shaped settings icon in the upper-right corner of an existing report, the **Edit Report** window appears.
2. Enter or edit the report details:
   - After adding a new report, enter the report **Name** (this name appears above the report content in the custom dashboard) and a report **Description**. From the **Report Type** drop-down menu, click the appropriate report type. Depending on the report type selected, you can select **Group by**, **Cost type**, **Date range**, **Calendar period**, and **Report Filters**. For these options, you can select either **Dashboard default** (The value will come from a filter at the dashboard level) or **Custom value** (The value will be entered manually). After adding the appropriate report details, click **Add**.
   - After clicking the appropriate report to edit, edit the appropriate report fields. When done editing, click **Save**. If you have already added several reports, and you would like to link a particular custom value, such as a date range, from one report to another, see **Linking Custom Values to Other Reports**.

Linking Custom Values to Other Reports

When you create a custom value, such as a date range, you can use this custom value in other reports by linking it to other reports within a custom dashboard. After creating the first report with the custom value, each additional report can be linked to the custom value by clicking the option **Link the value to another report in the dashboard** and selecting the appropriate report name to link to.

In the custom dashboard view and dashboard layout view, linked report values are designated with a chain link icon and a description of the original report source for the custom value.
Custom Report Types

All reports also have a Report Type that must be selected. The table below lists the report types and describes their properties and configurable settings:

Table 4-1 • Optima Custom Report Types

<table>
<thead>
<tr>
<th>Report Type</th>
<th>Description</th>
<th>Time frame</th>
<th>Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar Chart</td>
<td>A vertical clustered bar chart with each element of the bar configured in the settings.</td>
<td>Each vertical bar in the chart is one day, month, quarter-year or half-year in duration depending on the range specified in the date selector.</td>
<td>Dimension - the dimension that breaks up the colors within each vertical bar.</td>
</tr>
<tr>
<td>Costs List</td>
<td>A list of costs broken down by up to 3 dimensions, with the styling of the list slightly changing depending on the number of dimensions selected.</td>
<td>The values in the list are across the entire time frame selected.</td>
<td>Group By - the dimension(s) to group the data by in the list. At least 1 and as many as 3 can be selected.</td>
</tr>
<tr>
<td>Line Chart</td>
<td>A line chart with each line representing the selected dimension in the settings.</td>
<td>Each data point on the line is one day, and the graph in total covers the entire time frame selected.</td>
<td>Dimension - the dimension that breaks up the graph into each line.</td>
</tr>
<tr>
<td>Single Total</td>
<td>A single cost number that is the sum of the costs configured in the settings.</td>
<td>The single total is a sum across the entire time frame selected.</td>
<td></td>
</tr>
<tr>
<td>Table</td>
<td>A data table breakdown of cost information based on the configured dimensions in the settings (similar to Tabular View).</td>
<td>Each column of the data table represents one day, month, quarter-year or half-year in duration depending on the range specified in the date selector.</td>
<td>Group By - the dimension(s) to group the data by in the list. At least 1 and as many as 5 can be selected.</td>
</tr>
<tr>
<td>Resource Table</td>
<td>A spreadsheet breakdown of cost information based on the configured dimensions such as cost type, date range, calendar period, and report filters</td>
<td>The time frame can be reported as daily, monthly, quarterly, or biannually.</td>
<td></td>
</tr>
</tbody>
</table>

Custom Report Filters

Every report type optionally allows Filters to be defined to narrow down the data that is displayed in the report. With no Filters set, the data in every report shows all data within the scope of the Dashboard. This means that if you are in billing center X, and a report has no Filters defined, then it is showing all data for billing center X. If you were to navigate to billing center Y and select the same dashboard, you would be seeing all data for billing center Y.
To narrow down the data that is in a given report, you can use Filters. Filters let you specify which dimension values to show in a given report.

When filters contain multiple dimensions, they are ANDed together. Filter values within a given dimension are ORed together.

**Tip** • Use the **Table** report type or Tabular View to drill-down into various dimensions and see the values that you can use for filters. Then switch to the report type that you want for the dashboard.

### Task
**Create custom report filters for a Table report:**

1. Enter the **Name** and **Description** for the Table report.

2. Under the **Group by** drop-down menu, click the **Inline (Change the value straight on the dashboard)** option. The Table report will then appear in the custom dashboard for you to edit.

3. Under the Table report name in the **Group by** field, click the + sign to add dimension filters. You can add up to ten filters maximum and order the filters however you wish.

   You can change the order of these dimensions by dragging and dropping the dimension filter (a blue “Move Here” will appear for you to drop the filter into the new location). A dimension can be removed from the filters by clicking the X to the right of its name.

   Once you have selected your preferred order for your cost dimension filters, your table will go through some number crunching. The far left column of your table, labeled **Group**, will then be populated with your **Group by** dimension selection. Each dimension can be expanded by clicking the up arrow or collapsed using the down arrow.

4. Click the **Show** drop-down menu to show **Percent Change** in your Table report to review the increase or decrease in spend between a date range or calendar period.

5. To drill down to a particular filter, enter a filter term in the Filter search bar. Incomplete filter terms are allowed. You will see the results begin to filter as soon as you start typing.

6. Click **Export** to export your Table report to a **CSV File** or an **Excel File**.

### Moving a Report

**Task**

**To move a report:**

1. Click the move icon on the report you’d like to move. You will enter layout mode on the dashboard.

2. Click the zone that you’d like to move the report to. You will see “Move Here” when you hover over the zone you want to move the report to.

**Important** • Moving a report is not a drag-and-drop operation, rather a click on the move icon and a click on the target zone.
Deleting a Report

<table>
<thead>
<tr>
<th>Task</th>
<th>To remove a report from a dashboard:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Click the Settings icon to enter the report editor panel.</td>
</tr>
<tr>
<td></td>
<td>2. Click the Remove button in the lower-left of the panel.</td>
</tr>
</tbody>
</table>

Deleting a Custom Dashboard

<table>
<thead>
<tr>
<th>Task</th>
<th>To delete a custom dashboard:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Click the Delete button in the upper-right corner of the custom dashboard screen. A Delete Current Dashboard window will ask if you want to delete the dashboard.</td>
</tr>
<tr>
<td></td>
<td>2. Click the Delete button.</td>
</tr>
</tbody>
</table>

Caution • Once a custom dashboard has been deleted, it cannot be recovered!
Sample Optima Reports

Note • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager.

This section describes the sample reports that you can create in Optima:

• Reserved Instance (RI) Coverage
• Amazon Web Services (AWS) Reserved Instance Coverage
• Azure Reserved Instance Coverage
• Google Committed Use Discounts (CUD) Reports

Reserved Instance (RI) Coverage

This report shows on-demand instance spend vs RI spend. Different chart types allow you to track your RI (or Google CUD) coverage across time in different ways:

• Bar chart shows monthly granularity
• Line chart shows daily granularity
• Table compares monthly cost figures

Amazon Web Services (AWS) Reserved Instance Coverage

These reports show you the proportion of monthly and daily AWS spend coming from Reserved vs On-Demand instances.
To set up these AWS RI Coverage reports, use a bar chart to see monthly data and a line chart to see daily data. Simply change the report type between bar, line, or table to see these variations.

**Azure Reserved Instance Coverage**

These reports shows you the proportion of monthly and daily Azure spend coming from Reserved vs On-Demand instances.
To set up these Azure RI Coverage reports, use a bar chart to see monthly data and a line chart to see daily data. Simply change the report type between bar, line or table to see these variations.
Google Committed Use Discounts (CUD) Reports

These reports show you the proportion of monthly and daily Google spend coming from CUD vs On-Demand instances.

To set up these Google CUD Coverage reports, use a bar chart to see monthly data and a line chart to see daily data. Simply change the report type between bar, line or table to see these variations.
<table>
<thead>
<tr>
<th>Name</th>
<th>Google CUD Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>The reports show you the proportion of alerts Google marked coming from CUD vs. non-Dedicated SLOs.</td>
</tr>
<tr>
<td>Report Type</td>
<td>Core/Leaf</td>
</tr>
<tr>
<td>Dimension</td>
<td>Category</td>
</tr>
<tr>
<td>Report Filters</td>
<td>Adjust filters to focus on specific points in your data</td>
</tr>
<tr>
<td></td>
<td>Category</td>
</tr>
<tr>
<td></td>
<td>Resource Type</td>
</tr>
<tr>
<td></td>
<td>Network</td>
</tr>
<tr>
<td></td>
<td>Value</td>
</tr>
<tr>
<td></td>
<td>Filter</td>
</tr>
</tbody>
</table>
Chapter 5  Sample Optima Reports
Google Committed Use Discounts (CUD) Reports
Cloud Provider Billing Data Instructions

Optima uses billing data to provide an accurate view of your costs across accounts and services. This data is consumed by the Optima platform and made available for pre-built and ad-hoc analyses. In order to gather the cost information, certain configuration steps must be performed with specific data and credentials being shared with Optima.

For instructions on using Optima to add or update billing information, see the Optima Billing Centers Guide.

If you have any questions and would like assistance, email us at support@rightscale.com.

This section describes the Cloud Provider Billing Data instructions that must be completed before connecting to Optima’s Billing Centers:

- Connect Amazon Web Services Platform to Optima for Cost Reporting
- Connect Google Cloud Platform to Optima for Cost Reporting
- Connect Azure Enterprise Agreement to Optima for Cost Reporting
- Connect Azure Cloud Solution Provider to Optima for Cost Reporting
- Connect Azure MCA Cloud Solution Provider to Optima for Cost Reporting
- Handling of Cloud Bill Credits

Connect Amazon Web Services Platform to Optima for Cost Reporting

This page walks you through the steps to configure Amazon Web Services (AWS) for cost reporting purposes in Optima.

- AWS Role-Based Onboarding
- Enable Cost and Usage Reporting on your AWS Account
AWS Role-Based Onboarding

Onboarding a customer with AWS role-based access requires the customer to create an IAM role with a policy attached that grants access to the billing bucket. This policy should be attached to a role that has been set up with a trust relationship with the Flexera trusted account, using the customers RightScale Organization ID as the external id.

Role-based onboarding is different from the traditional AWS on-boarding process, which requires the user to create an IAM user with programmatic (access and secret key) access.

AWS Role-Based Onboarding requires the following:

- Create a New AWS IAM Policy for Optima
- Create an IAM User that Can Read AWS Billing Reports

---

**Task**

**To onboard a customer with AWS role-based access:**

1. Create and configure an S3 bucket.
2. Configure AWS billing reports.

---

**Tip** • Steps 3 to 5 are all done at the same time in the AWS UI, which walks you through most of the manual effort shown here.

3. Create a New AWS IAM Policy for Optima.
4. Create a role in the AWS console and attach the role to the policy created in step 3.
5. Create a trust relationship within the role and edit the policy JSON to include the following JSON payload.

```json

01: ' {
02:   "Version": "2012-10-17",
03:   "Statement": [
04:     {
05:       "Effect": "Allow",
06:       "Principal": {"AWS": "arn:aws:iam::451234325714:role/production_customer_access"},
07:       "Action": "sts:AssumeRole",
08:       "Condition": {
09:         "StringEquals": {"sts:ExternalId": "<org id>"}
10:       }
11:     }
12:   ]
13: }

```

**Note** • Make sure you have the right Organization ID entered on line 9.

6. Create a bearer token following this process.
7. Using the ARN for the role you created in step 4 + the bucket name + bucket path you created in step 1, make the following request to set up the bill connection.
View Code


Note • Make sure that you have completed the JSON payload with the correct values, including the Organization ID.

Create a New AWS IAM Policy for Optima

To allow read-only access to your S3 billing bucket + metadata about the accounts referenced in your bill, create a new AWS IAM policy with the required Optima permissions (see example below).

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Effect": "Allow",
            "Action": [
                "s3:ListBucket",
                "s3:GetBucketLocation"
            ],
            "Resource": [
                "arn:aws:s3:::YOUR_BILLING_BUCKET_NAME_HERE"
            ]
        },
        {
            "Effect": "Allow",
            "Action": [
                "s3:GetObject"
            ],
            "Resource": [
                "arn:aws:s3:::YOUR_BILLING_BUCKET_NAME_HERE/*"
            ]
        },
        {
            "Effect": "Allow",
            "Action": [
                "organizations:Describe*",
                "organizations:List*"
            ],
            "Resource": "*"
        },
        {
            "Effect": "Allow",
            "Action": [
                "ce:GetReservationUtilization"
            ],
            "Resource": "*"
        }
    ]
}
```

Then Create an IAM User that Can Read AWS Billing Reports.
Create an IAM User that Can Read AWS Billing Reports

For Optima to digest your AWS bills, we require read access via an IAM user to the S3 bucket that you are exporting the bills to.

Task

To create an IAM user that can read AWS billing reports:

1. Create a New AWS IAM Policy for Optima.
2. Create a new IAM user who only has the newly created policy attached. AWS has a tutorial that documents this process. For details, see Creating an IAM User in Your AWS Account.

Enable Cost and Usage Reporting on your AWS Account

To obtain all of the detail required to accurately display your cost information, we require you to enable the AWS Cost and Usage report. If your account is part of a consolidated billing group, this action must be performed on the payer account. This process is detailed in Configure AWS Billing Reports.

In this section you will:

- Create and Configure an S3 Bucket
- Configure AWS Billing Reports

Create and Configure an S3 Bucket

You need to create an S3 bucket and grant AWS permission to write your billing details into this bucket (the animation below illustrates the process flow). A bucket with existing CUR reports will work, as long as they are configured as specified in the following section.

Task

To create and configure an S3 bucket:

1. Create a new S3 bucket to hold your cloud bills if you have not done so already (save the bucket name for a future step).
2. Grant AWS permission to write your bills into that bucket. (Please see the example policy below. Be sure to replace the two occurrences of YOUR_BILLING_BUCKET_NAME_HERE accordingly.)

```json
{
  "Version": "2008-10-17",
  "Id": "Policy1335892530063",
  "Statement": [

    { 
      "Sid": "Stmt1335892150622",
      "Effect": "Allow",
      "Principal": {
        "AWS": "arn:aws:iam::386209384616:root"
      },
      "Action": [
        "s3:GetBucketAcl",
        "s3:GetBucketPolicy"
      ],
    },
```
Configure AWS Billing Reports

Configure AWS Billing to send bills to your S3 bucket with the required information in the proper format. The numbered instructions below refer to the steps described in the AWS documentation.

<table>
<thead>
<tr>
<th>Task</th>
<th>To configure AWS billing reports:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>On the top-right of the console, hover over your name and select <strong>My Billing Dashboard</strong>.</td>
</tr>
<tr>
<td>2.</td>
<td>Select <strong>Reports</strong> on the left-hand menu.</td>
</tr>
<tr>
<td>3.</td>
<td>Click <strong>Create report</strong>.</td>
</tr>
<tr>
<td>4.</td>
<td>Enter a <strong>Report Name</strong> of your choosing.</td>
</tr>
<tr>
<td>5.</td>
<td>Ensure <strong>Hourly</strong> is selected as the Time unit.</td>
</tr>
<tr>
<td>6.</td>
<td>Toggle the checkbox to include <strong>Resource IDs</strong>.</td>
</tr>
<tr>
<td>7.</td>
<td>Ensure the checkbox for ’Data refresh settings’ is checked.</td>
</tr>
<tr>
<td>8.</td>
<td>Click <strong>Next</strong>.</td>
</tr>
<tr>
<td>9.</td>
<td>Enter your <strong>S3 Bucket Name</strong> from the previous step.</td>
</tr>
<tr>
<td>10.</td>
<td>Enter a <strong>Report Prefix</strong>.</td>
</tr>
</tbody>
</table>

**Important** • This prefix is required, can be a simple value like `aws-billing-reports`.

| 11.  | Ensure **GZIP** is selected as the compression type. |
| 12.  | Click **Next**. |
| 13.  | Click **Review and Complete**. |

**Note** • To submit the AWS billing data to Optima, see **Billing Data Connections**.
Connect Google Cloud Platform to Optima for Cost Reporting

This page describes the configuration and input information needed to connect Google billing data to Optima using BigQuery billing exports. Following are the steps to connect your Google cloud billing data to Optima for cost reporting purposes.

- Enable Billing Data Export to BigQuery in Google Compute Engine
- Allow Optima to access the BigQuery dataset using a Service Account

Enable Billing Data Export to BigQuery in Google Compute Engine

Optima consumes Google billing data via the BigQuery export method in Google. This feature can be enabled in Google Compute Engine (GCE) for each billing account and will contain data for all projects in that billing account. Allow Optima to access the BigQuery dataset using a Service Account.

**Important** • Optima uses BigQuery billing data as the source for billing information because the data is more complete (per Google). The estimated cost for BigQuery for billing purposes is no more than $100/yr for extremely large usage amounts (lesser usage will incur less cost). In some cases, the cost will be $0 as the entire usage will fall in the free tier of BigQuery.

If you have already configured billing export to BigQuery, please ensure you have the **Dataset ID** and **Project** that contains the dataset, and proceed to the next step.

If you need to configure data export to BigQuery, please follow the instructions provided by Google for your Google billing accounts.

Take note of the **Dataset ID** when you create the dataset as well as the **Project** in which the dataset exists.

**Note** • The Dataset ID is sometimes shown prepended with the project ID. For example, `project_id:dataset_id`. In this case, please ensure you submit only the Dataset ID when registering your bill.

Allow Optima to access the BigQuery dataset using a Service Account

Once your billing data is being exported to BigQuery, Optima needs access to the BigQuery dataset to read the data. The Optima platform uses a **Google Service Account** to gain access to the BigQuery dataset.

Create or identify which Google Service Account you want to use for this permission, and ensure you have access to the **JSON private key** for the service account as well as the service account ID.

Once you have determined the service account you would like to use, the following steps must be completed:

- Grant Project-level IAM Roles
- Share the Dataset with the Service Account
To submit Google billing data to Optima, see Billing Data Connections.

**Grant Project-level IAM Roles**

The first step is to grant the service account the roles necessary to interact with BigQuery within the project.

<table>
<thead>
<tr>
<th>Task</th>
<th>To grant project-level IAM roles:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>In Google Cloud Platform, navigate to the IAM menu.</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure the selected project is the one that contains the billing BigQuery dataset.</td>
</tr>
<tr>
<td>3.</td>
<td>Click the Add icon at the top of the page.</td>
</tr>
<tr>
<td>4.</td>
<td>Enter the service account ID.</td>
</tr>
<tr>
<td>5.</td>
<td>Select the BigQuery Data Viewer and BigQuery Job User roles:</td>
</tr>
<tr>
<td></td>
<td>• Data Viewer - required to read data from the specified dataset</td>
</tr>
<tr>
<td></td>
<td>• Job User - needed to create query jobs from which results can be read (currently 2 jobs per day are created)</td>
</tr>
<tr>
<td>6.</td>
<td>Click Add.</td>
</tr>
<tr>
<td>7.</td>
<td>Continue to Share the Dataset with the Service Account.</td>
</tr>
</tbody>
</table>

**Share the Dataset with the Service Account**

After completing Grant Project-level IAM Roles, the BigQuery dataset must explicitly be shared with the service account.

<table>
<thead>
<tr>
<th>Task</th>
<th>To share the dataset with the service account:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>In the Google Cloud Platform, navigate to BigQuery.</td>
</tr>
<tr>
<td>2.</td>
<td>Locate the dataset that contains your billing data and hover your mouse on the right to expose the drop-down menu.</td>
</tr>
<tr>
<td>3.</td>
<td>In the drop-down menu, click Share dataset.</td>
</tr>
<tr>
<td>4.</td>
<td>Towards the bottom, in the Add people box, enter the service account ID, ensure Can view is selected, and click Add.</td>
</tr>
<tr>
<td>5.</td>
<td>Click Save changes.</td>
</tr>
</tbody>
</table>

**Connect Azure Enterprise Agreement to Optima for Cost Reporting**

This page describes the configuration and input information needed to connect Azure with Enterprise Agreement billing data to Optima.

If you are part of the Azure Cloud Solution Provider program and wish to connect your partner data to Optima for cost reporting purposes, see Connect Azure Cloud Solution Provider to Optima for Cost Reporting.
Please note the user who creates the API Key needs to have the Enterprise Enrollment Admin role assigned to their user before creating the key.

The following steps must be completed for Optima to provide insight on your Azure Enterprise Agreement (EA) bill:

- Locate Your Azure Enterprise Agreement Enrollment Number
- Generate an Azure Enterprise Agreement API Key

To submit Azure Enterprise Agreement billing data to Optima, see Billing Data Connections.

Locate Your Azure Enterprise Agreement Enrollment Number

Task

Locate your Azure enterprise agreement enrollment number:

1. Open a new internet browser tab and navigate to https://ea.azure.com/ and log in.
2. Locate the enrollment number at the top right-hand side of the page, or click the Manage menu on the left.
3. Continue to Generate an Azure Enterprise Agreement API Key.

Generate an Azure Enterprise Agreement API Key

Task

Generate an Azure enterprise agreement API key:

1. From the Azure EA portal, click Reports from the left-hand menu.
2. Select Download Usage at the top left of the page.
3. Select API Access Key from the sub menu.
4. Click the Key icon to generate the API key.

Note • This API key is quite long. Ensure you have selected the entire key, not just the visible part of the key in the Azure EA portal.

Connect Azure Cloud Solution Provider to Optima for Cost Reporting

If your organization is a Microsoft Azure Cloud Solution Provider (CSP), Optima can generate cost information for your customer subscriptions that they can leverage in the platform. For details on how cost information is generated, including limitations, see Managing CSP Partnerships and Customers in Optima.

This page describes how to connect your Azure CSP partnership to Optima, which is the first requisite step to generating and showing back your customer cost information. If you are not part of the Azure CSP program, these instructions are not relevant; instead, see Connect Azure Enterprise Agreement to Optima for Cost Reporting.
For Optima to generate cost information for your customers, you must provide your CSP Partner information. This information allows the Optima platform to call the Microsoft Azure CSP Partner API on your behalf to get information about your CSP customers and their detailed subscription usage information.

The following steps must be completed for Optima to provide insight on your Azure Enterprise Agreement (AE) bill:

- Locate your Microsoft Partner Network ID (MPN ID)
- Locate your Microsoft Partner Default Domain
- Create the Azure CSP Web App
- Generate an Azure CSP Key for the Web App

To submit Azure CSP billing data to Optima, see Billing Data Connections.

Once your partner information has been provided to Optima, continue to Managing CSP Partnerships and Customers in Optima.

**Locate your Microsoft Partner Network ID (MPN ID)**

Use the Microsoft Azure Partner Center or other means to obtain your MPN ID, which you will need in future steps.

To find your MPN ID in the Partner Center navigate to the Microsoft Partner Profile page. The Associated MPN ID field is listed on the right side of the page.

*Note* • You need to be logged in to your Microsoft Partner Center account to view your MPN ID.

**Locate your Microsoft Partner Default Domain**

Use the Microsoft Azure Partner Center or other means to obtain your partner domain, which you will need in future steps.

To find your domain in the Partner Center, navigate to the Microsoft Partner Organization Profile page where the Default domain is displayed.

**Create the Azure CSP Web App**

*Note* • The user performing these steps must be a Global Admin on the CSP Tenant.

**Task**

To create the Azure CSP web app:

1. Log in to the Microsoft Azure Partner Center and navigate to the Dashboard.

2. Click the Settings icon in the upper-right and select Partner Settings.

3. Click App Management on the left.

4. The Optima CSP integration uses the Web App on this page. Azure limits each partner tenant to only one web app. If needed, Register a Web App (if you already have one that is active, this is not needed).
5. Note the Application ID, which will be required to Generate an Azure CSP Key for the Web App.

**Generate an Azure CSP Key for the Web App**

- **Task**
  - To generate an Azure CSP key for the web app:
    1. Navigate to the Microsoft Azure Resource Manager Portal using the same login and ensure you are in the CSP tenant.
    2. Navigate to the Azure Active Directory and select App Registrations blade.
    3. Find the Web App in the list matching the partner center web app by Application ID (see Create the Azure CSP Web App) and select it.
    4. Select Keys under API Access.
    5. Add a new key by filling out the Key Description, select Never expires, and then click Save.

  **Note** • If you would prefer to set an expiration date, that is acceptable as well, but please note that you are responsible for ensuring that a new key is generated and provided to Flexera before the key expires. Failure to do so will result in incorrect data for your customers.

6. Copy the key Value and save it for submittal to Flexera.

**Connect Azure MCA Cloud Solution Provider to Optima for Cost Reporting**

To connect the Azure MCA Cloud Solution Provider to Optima, you need to first obtain data fields from Azure, and then enter those data fields into Optima.

- Obtaining the Required Data Fields from Azure
- Connecting Azure MCA Cloud Solution Provider in Optima
Obtaining the Required Data Fields from Azure

To successfully connect Azure MCA CSP to Optima, you will need to first register the Azure MCA Partner in Optima, and then register customer(s). To perform these registrations, you must first obtain the following data:

| Table 6-1 • Data Required to Connect Azure MCA CSP to Optima |
|----------------|----------------|----------------|
| **Category**   | **Required Data**  | **Data Field Name**  |
| Azure MCA Partner | Application ID     | application_id     |
|                  | Application Directory ID | application_directory_id |
|                  | Application Secret Key | application_secret |
|                  | Billing Account ID    | billing_account_id |
|                  | Microsoft Partner Network ID (MPN ID) | mpn_id |
| Customers        | Azure Tenant ID       | customer_tenant_id |

To obtain the required data, perform the following tasks:

- Obtaining the Application Data Fields and Assigning Application Permissions
- Obtaining the Billing Account ID
- Obtaining the MPN ID
- Obtaining the Customer Tenant ID

Obtaining the Application Data Fields and Assigning Application Permissions

To obtain the required application data fields from Azure, perform the following steps.

<table>
<thead>
<tr>
<th>Task</th>
<th>To obtain the application data fields:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Open the Microsoft Partner Center:</td>
</tr>
<tr>
<td>2.</td>
<td>In the top right corner, click the gear icon then select Azure AD profile.</td>
</tr>
<tr>
<td>4.</td>
<td>Select your desired Web App, and locate and copy the following information:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data Field</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application ID</td>
<td>Listed under the new native app in the App ID field.</td>
</tr>
<tr>
<td>Application Directory ID</td>
<td>Listed in the Account ID field.</td>
</tr>
</tbody>
</table>
Chapter 6  Cloud Provider Billing Data Instructions
Connect Azure MCA Cloud Solution Provider to Optima for Cost Reporting

<table>
<thead>
<tr>
<th>Data Field</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Secret Key</td>
<td>Listed below, as a key.</td>
</tr>
</tbody>
</table>

**Important** • The application secret keys are like passwords with longer expiry. We recommend saving this in a secure location for future use.

Assigning Application Permissions in Azure

To assign application permissions in Azure, perform the following steps.

**Task**  
*To assign application permissions in Azure:*

1. Open Microsoft Azure:
   
   [https://portal.azure.com/#blade/Microsoft_Azure_CostManagement/Menu/access](https://portal.azure.com/#blade/Microsoft_Azure_CostManagement/Menu/access)

   **Note** • If this link does not work, you may want to check with your cloud administrator that you have a Microsoft Partner Agreement in place.

2. Click + Add. The Add Permission panel opens.

3. In the Select box, enter the name of your application from before.

4. Select the name of your application, and in the Role box select Billing account reader.

5. Click Save.

Obtaining the Billing Account ID

To obtain the Billing Account ID from Azure, perform the following steps.

**Task**  
*To obtain the Billing Account ID:*

1. Open the following Microsoft Azure URL:
   
   [https://portal.azure.com/#home](https://portal.azure.com/#home)

2. In the Cost Management panel, navigate to Go to billing account.

   **Important** • There are two cost management views: one in Azure Services and one in the Tools section. Make sure that you are in the Tools section.

Note • This information is hard to find. You need to make sure that you are logged in to Azure as an admin to the partner account. If you are using the old Azure UI, you may need to switch to the new Azure UI.
3. Click Settings > Properties. On this page, the Billing Account ID can be found in the Billing Account Name field. The Billing Account ID is the first part of the Billing Account Name (everything before the first semicolon).

For example, if the full Billing Account Name is 1bc3aca-5016-4db0-a6bc-1111fccdf72b:5efda3d-936b-4534-99cf-46b0d0a1211e_2018-09-30, then the Billing Account ID is 1bc3aca-5016-4db0-a6bc-1111fccdf72b.

Note • If the Billing Account Name field is empty, the Microsoft Partner Agreement may still need to be signed.

Obtaining the MPN ID
To obtain the MPN ID from Azure, perform the following steps.

Task To obtain the MPN ID:
1. Open the following Microsoft Azure URL:
2. Copy the MPN ID from the right side of the page.

Obtaining the Customer Tenant ID
To obtain the Customer Tenant ID from Azure, perform the following steps.

Task To obtain the Customer Tenant ID:
1. Open the following Microsoft Azure URL:
   https://partner.microsoft.com/commerce/customers/list
2. Navigate to the desired customer and then to the Account section for the customer.
3. Locate and copy the ID in the Customer account info > Microsoft ID field; this is the needed Customer Tenant ID.

Connecting Azure MCA Cloud Solution Provider in Optima
To connect Azure MCA Cloud Solution Provider in Optima, perform the following steps.

Task To connect Azure MCA CSP in Optima:
1. Open Optima.
2. Open the Settings view and click ADD A CLOUD BILL in the upper right corner.
3. Choose Microsoft Azure.
4. Choose MCA Partner (under the Microsoft Customer Agreement heading).
5. On this view, enter the following information, which you obtained in Obtaining the Required Data Fields from Azure:
   • Application ID
Handling of Cloud Bill Credits

All credits contained in the bill are accounted for in the cost dashboard including billing center dashboards.
This section describes the many features of Optima’s Billing Centers Guide:

- Setting Up Billing Data
- Managing Billing Centers
- Cost Dimensions
- Currency in Optima
- Billing Center Hierarchies
- Tabular View
- Recommendations in Billing Centers
- Scheduled Reports and Budget Alerts
- Allocation Rules
- Monthly CSV Reports in Billing Centers

## Setting Up Billing Data

Billing Centers use costs from billing data to enable an accurate view of costs across accounts and services. Supported clouds include AWS, Azure, and GCP. To connect your bill data to RightScale, follow the instructions below for each cloud provider’s instructions:

<table>
<thead>
<tr>
<th>Cloud Provider</th>
<th>Billing Data Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon Web Services (AWS)</td>
<td>Connect Amazon Web Services Platform to RightScale for Cost Reporting</td>
</tr>
</tbody>
</table>
Once your billing data is connected to RightScale, any tags configured in the Optima Billing Center Allocation Rules must be native cloud tags (not RightScale tags) and must be present in the cloud bill. When using tag-based allocation, some vendors require additional configuration:

- **Amazon Web Services (AWS)** - Configure User-Defined Cost Allocation Tags
- **Azure** - No additional configuration is required. All tags exist in data sources.
- **Google** - tags are known as “label(s)” in Google Cloud Platform. Tag/Label-based allocation rules are supported in Optima.

### Managing Billing Centers

This section describes how to manage Billing Centers:

- View Existing Billing Centers
- Create a New Billing Center
- Manage Billing Center Access
- Edit a Billing Center
- Delete a Billing Center
- Manage Sub-billing Centers

### View Existing Billing Centers

All configured Billing Centers can be seen from the Billing view of Optima. From here, users can select an existing Billing Center to review cost data or setup alerts and reports. By default, the current month is shown starting on the 3rd of the month (on the 1st/2nd we show the prior month). You can change the month using the month switcher in the filter bar.

Use the Show menu to hide or show data while in the Billing Centers card view.

### Create a New Billing Center

Users with the appropriate access can create new billing centers by first clicking the New Billing Center button from the Billing Centers home page and following the steps in the wizard. Users can create any number of Billing Centers within each organization. Additionally, you can create Billing Center Hierarchies to allow for additional breakdown of cost information.
Task  To create a new billing center:

1. Click New Billing Center.
2. Enter a Billing Center Name and optionally add a Billing Center Description.

*Important* • Billing Center names cannot include the word “Unallocated” as “Unallocated” is reserved for Optima’s default unallocated billing center.

3. To configure Cloud Accounts and Tags for any specific Billing Center, see Allocation Rules.

*Note* • New Billing Centers can also be created while you Create Allocation Rules.

Manage Billing Center Access

There are two dedicated roles to view and manage billing centers.

*Important* • When granting billing center access via the Optima UI, the users and/or RightScale groups are users or email addresses that have already been invited to the organization via Cloud Management. This access granting can only be done by users with the enterprise_manager role.

- **billing_center_admin**: This role gives full access to View/Add/Edit/Delete Billing Centers including managing granular user permissions. This role can only be granted at the organization level and gets access to all billing centers within the organization.

- **billing_center_viewer**: This role gives view only access to based on whether it’s granted at the organization level or individual billing centers level. If granted at the organization, users will have view only access to billing centers within it. Otherwise, the access is limited to the billing center they are part of (and any sub-billing centers of the billing center). This role does not provide full access to rest of the Optima.

Users with the enterprise_manager role have full access on all billing centers and can grant organizational level billing center roles to users and/or groups from RightScale Governance.

*Note* • Within the Billing Center UI, users with the enterprise_manager and/or the billing_center_admin role will see a dedicated Users tab where they can view all users who have access to the Billing Center, including inherited roles from the organization.

Task  To add users with the billing_center_viewer role to a billing center:

1. Open the billing center and click the Users tab. Click the Add Users button.
2. Use the type-ahead feature to quickly find and select users and/or RightScale groups.
3. Click Save to commit changes.
To remove existing users from a billing center:

**Note** • You must have the `enterprise_manager` and/or `billing_center_admin` role to complete this task.
1. Open the billing center and click the **Users** tab.
2. Select the desired users to be removed and click **Remove Selected**.
3. Confirm the action by clicking **Remove**.

**Note** • Inherited roles can only be removed by enterprise managers from RightScale Governance.
Governance users will see a new message to indicate that users can have granular permissions on billing centers.

**Edit a Billing Center**
A Billing Center’s name and description can be edited by navigating to the appropriate Billing Center and editing the appropriate field.

**Delete a Billing Center**

**Task**

**To delete a billing center:**
1. For users with the appropriate access, navigate to the top-right corner of the **Billing Center** screen and click the **Delete** button.
2. Users are presented with a confirmation screen before the billing center is deleted. Once a billing center has been deleted, allocated costs that are not picked up by any of the remaining Allocation Rules are reallocated to the **Unallocated Billing Center**.

**Manage Sub-billing Centers**
Users with the `billing_center_admin` role can create sub-billing centers and further allocate costs. For more information, see Billing Center Hierarchies.

**Cost Dimensions**
Cost dimensions allow you to slice and dice your cost information to provide insights on spend and potential savings. Optima offers the following types of cost dimensions:

- **RightScale-generated Cost Dimension: Category**
- **Cloud Provider Bill-based Cost Dimensions**
Custom Cost Dimensions

RightScale-generated Cost Dimension: Category

RightScale-generated dimensions are created by the RightScale platform, combining data from across providers into a standardized form. Today there is only one such dimension, Category.

The **Category** dimension in Optima is generated by the RightScale platform based off of data in each cloud provider. RightScale evaluates each line item in the bill and applies a set of rules to place each line item in a given high-level category. The set of category values are as follows: *Admin, AI, App-Service, Applications, Compute, Database, IOT, MachineLearning, Marketplace, Network, Other, RI/CUD, Storage, Streaming*, and *Support*.

To determine which category a given cost falls into, a set of prioritized rules are applied to each cost. The rules use various data elements from each provider to divvy up the cost.

The following sections detail the rules that are used for each cloud provider in terms of category:

- **Amazon Web Services (AWS) Cost Categories**
- **Google Cloud Platform Cost Categories**
- **Microsoft Azure Cost Categories**

### Amazon Web Services (AWS) Cost Categories

Data for AWS is sourced from the [AWS Cost and Usage Report CSV](https://aws.amazon.com). The source columns below are the column names that correlate to data in those billing files.

**Table 7-2 • AWS Cost Categories**

<table>
<thead>
<tr>
<th>Rule Priority</th>
<th>Category</th>
<th>lineItem/ProductCode</th>
<th>product/productFamily</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Storage</td>
<td>AmazonS3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Storage</td>
<td>AmazonGlacier</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Storage</td>
<td>AWS Import/Export</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Storage</td>
<td>Storage Snapshot</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Storage</td>
<td>Storage</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Network</td>
<td>AmazonCloudFront</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Network</td>
<td>AWSDataTransfer</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Network</td>
<td>AmazonRoute53</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Network</td>
<td>AmazonVPC</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Network</td>
<td>Data Transfer</td>
<td></td>
</tr>
<tr>
<td>Rule Priority</td>
<td>Category</td>
<td>lineItem/ProductCode</td>
<td>product/productFamily</td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------</td>
<td>-----------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>11</td>
<td>RI/CUD</td>
<td></td>
<td>Reserved Instance Purchase</td>
</tr>
<tr>
<td>12</td>
<td>Compute</td>
<td>AmazonEC2</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Compute</td>
<td>AWSLambda</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Compute</td>
<td>ElasticMapReduce</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Database</td>
<td>AmazonRDS</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Database</td>
<td>AmazonSimpleDB</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Database</td>
<td>AmazonDynamoDB</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Database</td>
<td>AmazonRedshift</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Database</td>
<td>AmazonElasticache</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Database</td>
<td>AWSDatabaseMigrationSvc</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Streaming</td>
<td>AmazonKinesis</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Streaming</td>
<td>AWSQueueService</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Streaming</td>
<td>AmazonSWF</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Streaming</td>
<td>AmazonSNS</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Streaming</td>
<td>datapipeline</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Applications</td>
<td>AmazonQuickSight</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Admin</td>
<td>AWSConfig</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>Admin</td>
<td>AmazonCloudWatch</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Admin</td>
<td>AWSCloudTrail</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>Admin</td>
<td>AWSXRay</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Admin</td>
<td>AmazonECR</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Admin</td>
<td>awskms</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Google Cloud Platform Cost Categories

Data for Google Cloud Platform (GCP) is sourced from the [GCP BigQuery Billing Export](#). The source columns below are the column names that correlate to the fields in BigQuery.

Table 7-3 • Google Cloud Platform Cost Categories

<table>
<thead>
<tr>
<th>Rule Priority</th>
<th>Category</th>
<th>service.description</th>
<th>sku.description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RI/CUD</td>
<td></td>
<td>Commitment*</td>
</tr>
<tr>
<td>2</td>
<td>Storage</td>
<td>Cloud Storage</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Network</td>
<td>Cloud CDN</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Network</td>
<td>Cloud DNS</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Compute</td>
<td>Container Builder</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Compute</td>
<td>Container Engine</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Compute</td>
<td>Cloud Dataflow</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Compute</td>
<td>App Engine</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Compute</td>
<td>Cloud Functions</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Compute</td>
<td>Compute Engine</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Database</td>
<td>BigQuery</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Database</td>
<td>Cloud Bigtable</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Database</td>
<td>Cloud Spanner</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Database</td>
<td>Cloud SQL</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Database</td>
<td>Firebase Database</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Database</td>
<td>Firebase Hosting</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>MachineLearning</td>
<td>Cloud Machine Learning Engine</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>MachineLearning</td>
<td>Cloud Natural Language API</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>MachineLearning</td>
<td>Cloud Speech API</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Applications</td>
<td>Cloud Pub/Sub</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Admin</td>
<td>Cloud Key Management Service (KMS)</td>
<td></td>
</tr>
</tbody>
</table>
Microsoft Azure Cost Categories

Data for Microsoft Azure is sourced from the Enterprise billing Usage Details API. The source columns below are the fields from that API response. Reference information for all fields from the Azure billing API can be found here.

Table 7-4 • Microsoft Azure Cost Categories

<table>
<thead>
<tr>
<th>Rule Priority</th>
<th>Category</th>
<th>consumedService</th>
<th>MeterSubCategory -or- MeterCategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RI/CUD</td>
<td>Microsoft.Reservation</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Marketplace</td>
<td>Microsoft.Reservation</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Network</td>
<td>Networking</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>App-Service</td>
<td>Azure App Service</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>App-Service</td>
<td>Azure App Service - Standard</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Database</td>
<td>Azure Redis Cache</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Network</td>
<td>Instance IP Address</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Network</td>
<td>Load balanced IP Address</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Other</td>
<td>Microsoft.1</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Admin</td>
<td>Microsoft.AAD</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Admin</td>
<td>Microsoft.AADDomainServices</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>App-Service</td>
<td>Microsoft.AnalysisServices</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>App-Service</td>
<td>Microsoft.ApiManagement</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>App-Service</td>
<td>Microsoft.Automation</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Database</td>
<td>Microsoft.Cache</td>
<td></td>
</tr>
</tbody>
</table>
Table 7-4 • Microsoft Azure Cost Categories (cont.)

<table>
<thead>
<tr>
<th>Rule Priority</th>
<th>Category</th>
<th>consumedService</th>
<th>MeterSubCategory -or- MeterCategory</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Network</td>
<td>Microsoft.Cdn</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Admin</td>
<td>Microsoft.CertificateRegistration</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Other</td>
<td>Microsoft.Citrix.Services</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>AI</td>
<td>Microsoft.CognitiveServices</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Compute</td>
<td>Microsoft.Compute</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Database</td>
<td>Microsoft.DBforMySQL</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>App-Service</td>
<td>Microsoft.DataFactory</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>Database</td>
<td>Microsoft.DataLakeStore</td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>Database</td>
<td>Microsoft.Database</td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>IOT</td>
<td>Microsoft.Devices</td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Database</td>
<td>Microsoft.DocumentDB</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>Network</td>
<td>Microsoft.DomainRegistration</td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>App-Service</td>
<td>Microsoft.HDInsight</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Admin</td>
<td>Microsoft.KeyVault</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>AI</td>
<td>Microsoft.MachineLearning</td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>Network</td>
<td>Microsoft.Network</td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>App-Service</td>
<td>Microsoft.NotificationHubs</td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>Database</td>
<td>Microsoft.PowerBI</td>
<td></td>
</tr>
<tr>
<td>34</td>
<td>App-Service</td>
<td>Microsoft.RecoveryServices</td>
<td></td>
</tr>
<tr>
<td>35</td>
<td>App-Service</td>
<td>Microsoft.Scheduler</td>
<td></td>
</tr>
<tr>
<td>36</td>
<td>App-Service</td>
<td>Microsoft.Search</td>
<td></td>
</tr>
<tr>
<td>37</td>
<td>App-Service</td>
<td>Microsoft.ServiceBus</td>
<td></td>
</tr>
<tr>
<td>38</td>
<td>Database</td>
<td>Microsoft.Sql</td>
<td></td>
</tr>
</tbody>
</table>
Cloud Provider Bill-based Cost Dimensions

Cloud provider bill-based cost dimensions are dimensions whose values are derived directly from data in the cloud provider’s bill. These dimensions are generally not modified (or only lightly modified) and represent a true representation of the data in the bill. When the provider adds new values for these dimensions (such as adding a new resource type), the data is immediately available in Optima.
The specific mappings from the vendor data to Optima dimensions can be found for each vendor below. Note that some dimensions are available only in Monthly CSV Reports in Billing Centers.

- Amazon Web Services (AWS) Bill-based Data Dimensions
- Google Cloud Platform Bill-based Data Dimensions
- Microsoft Azure Enterprise Agreement Bill-based Data Dimensions

### Amazon Web Services (AWS) Bill-based Data Dimensions

Data for AWS is sourced from the AWS Cost and Usage Report CSV. The source columns below are the column names that correlate to data in those billing files.

<table>
<thead>
<tr>
<th>Optima Dimension</th>
<th>Source Column</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Vendor</td>
<td>N/A</td>
<td>Always Amazon Web Services</td>
</tr>
<tr>
<td>Cloud Vendor Account</td>
<td>lineItem/UsageAccountId</td>
<td><a href="#">AWS Line Item Details</a></td>
</tr>
<tr>
<td>Instance Type</td>
<td>product/instanceType</td>
<td><a href="#">AWS Product Details</a></td>
</tr>
<tr>
<td>Region</td>
<td>product/location</td>
<td><a href="#">AWS Product Details</a></td>
</tr>
<tr>
<td>Resource Type</td>
<td>product/productFamily</td>
<td><a href="#">AWS Product Details</a></td>
</tr>
<tr>
<td>Service</td>
<td>lineItem/ProductCode</td>
<td><a href="#">AWS Line Item Details</a></td>
</tr>
<tr>
<td>Resource ID</td>
<td>lineItem/ReesourceId</td>
<td>Available in Optima for the last 31 days in daily granularity or last 3 months in monthly granularity</td>
</tr>
<tr>
<td>Resource Name</td>
<td>resourceTags/user:Name</td>
<td>Available only in Monthly CSV Reports in Billing Centers</td>
</tr>
<tr>
<td>Usage Type</td>
<td>lineItem/UsageType</td>
<td>If lineItem/LineItemType is DiscountedUsage or UsageType matches HeavyUsage, MediumUsage, or LightUsage, UsageType is set to DiscountedUsage.</td>
</tr>
</tbody>
</table>

*Note • AWS GovCloud (US) is treated as any other AWS Region and comes through in the AWS Hourly Cost and Usage Report (HCUR) that Optima uses to ingest AWS bill data.*
Google Cloud Platform Bill-based Data Dimensions

Data for Google Cloud Platform (GCP) is sourced from the Google Cloud Platform Billing Export. The source columns below are the column names that correlate to the fields in BigQuery.

**Table 7-6 • GCP Bill-based Data Dimensions**

<table>
<thead>
<tr>
<th>Optima Dimension</th>
<th>Source Column</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Vendor</td>
<td>N/A</td>
<td>Always Google</td>
</tr>
<tr>
<td>Cloud Vendor Account</td>
<td>project.id</td>
<td></td>
</tr>
<tr>
<td>Instance Type</td>
<td>location.region</td>
<td>Not currently available from Google source data</td>
</tr>
<tr>
<td>Region</td>
<td>sku.description</td>
<td></td>
</tr>
<tr>
<td>Resource Type</td>
<td>service.description</td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>service.description</td>
<td></td>
</tr>
<tr>
<td>Resource ID</td>
<td>N/A for Google</td>
<td>Resource-level granularity is not available from Google source data.</td>
</tr>
<tr>
<td>Resource Name</td>
<td>N/A for Google</td>
<td></td>
</tr>
</tbody>
</table>
Microsoft Azure Enterprise Agreement Bill-based Data Dimensions

Data for Microsoft Azure is sourced from the Enterprise billing Usage Details API. The source columns below are the fields from that API response. Reference information for all fields from the Azure billing API can be found here.

<table>
<thead>
<tr>
<th>Optima Dimension</th>
<th>Source Column</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud Vendor</td>
<td>N/A</td>
<td>Always Microsoft Azure</td>
</tr>
<tr>
<td>Cloud Vendor Account</td>
<td>subscriptionGuid</td>
<td></td>
</tr>
<tr>
<td>Instance Type</td>
<td>additionalInfo.serviceType</td>
<td></td>
</tr>
<tr>
<td>Region</td>
<td>resourceLocation</td>
<td>Falls back to meterRegion if the location can’t be mapped. Values are normalized to a common format.</td>
</tr>
</tbody>
</table>
| Resource Type                  | meterCategory-meterSubCategory | SubCategory is excluded if it’s the same as Category.  
“Marketplace Charge-[PublisherName]” for marketplace charges.  
“Reservation Order-[Description]” for Reserved Instance charges. |
| Service                        | consumedService       | Prepends “Microsoft.” if not already present.  
Always “Microsoft.Reservation” for Reserved Instance charges. |
Custom Cost Dimensions

Custom dimensions are dimensions that are specific to your organization. Today, only Resource Tag/Label-based Custom Cost Dimensions are supported.

Resource Tag/Label-based Custom Cost Dimensions

*Note* • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager.

Any resource tags (labels in Google) in your bill data can be enabled as custom dimensions. For Google and Microsoft Azure, all resource tags/labels are available in the bill data by default. For Amazon Web Services, resource tags must be configured as user-defined cost allocation tags for them to be available in the bill and to be used as custom dimensions in Optima.

**Task**

To configure a tag/label as a custom dimension:

1. Navigate to *Settings > Custom Tags*.
2. Click *Add* to create your custom tag.
3. In the *Add custom tag* pop-up window, enter the *Tag Key* (The tag may contain only letters, spaces, number, periods (.), colons (:), hyphen (-), and underscore (_)) and *Display Name* (The name must start with a letter and only contain letters, spaces, and numbers.). Click *Save*.
4. At any time, you can edit or delete a custom tag by clicking the appropriate option in the *Actions* column.

---

<table>
<thead>
<tr>
<th>Optima Dimension</th>
<th>Source Column</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resource ID</td>
<td>instanceId</td>
<td>Available in Optima for the last 31 days in daily granularity or last 3 months in monthly granularity.</td>
</tr>
<tr>
<td>Resource Name</td>
<td></td>
<td>Available only in Monthly CSV Reports in Billing Centers</td>
</tr>
<tr>
<td>Usage Type</td>
<td>meterName</td>
<td>This dimension represents the units in which the “Usage Amount” metric is measured.</td>
</tr>
<tr>
<td>Usage Unit</td>
<td>Unit of Measure</td>
<td></td>
</tr>
<tr>
<td>Resource Group</td>
<td>resourceGroup</td>
<td>N/A for Azure</td>
</tr>
<tr>
<td>Datacenter</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

Table 7-7 • Microsoft Azure Enterprise Agreement Bill-based Data Dimensions (cont.)
Currency in Optima

**Note** • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager.

At a high-level, Optima currently does not support currency conversion in the product. Every data point consumed from billing data is consumed as a number, with no regard for the currency information in the data. Although the USD $ is shown in the UI by default, that does not indicate that the source data was in USD nor that any currency conversion was applied.

The following topics describe how currency is handled in Optima billing information:

- Non-USD Bills
- Currency Symbols in Optima
- Currency Situations and Use Cases

**Non-USD Bills**

If a non-USD bill is encountered by Optima, the numbers from the bill are read, stored, and processed with no conversion. By default, the UI will show these numbers with a USD $ sign, but it is only processing the data as numbers, not as the source bill currency.

If multiple bill sources are provided to Optima in different currencies, the numbers are added together with no conversion occurring. This can lead to inaccurate numbers in Optima as two different currencies are being summed as if the conversion between them was 1:1.

If you have multiple bills with different currencies, please contact your account manager to discuss options that can provide cost reporting without mixing numbers of two different currencies.

**Currency Symbols in Optima**

As discussed above, Optima processes all data as simple numbers, with no regard for the currency. When displaying these numbers back to users, Optima defaults to using the USD $ standard, regardless of the actual source data currency.

The default currency symbol (and decimal formatting) can be modified to any standard currency. Note that this does not do any kind of conversion, it simply changes the currency symbol shown in the UI. This option is ideal when an organization’s bills are all of the same currency and that currency is not USD.

To change the default currency symbol, please Contact Us via phone or email at support@rightscale.com and provide the RightScale organization ID/name and the 3-letter currency code that you would like to see in Optima for that organization.

**Important** • Changing the currency symbol does NOT convert currencies, it only changes the symbol and decimal format displayed in the UI.
Currency Situations and Use Cases

If you are wondering what your options are with Optima if you use non-USD currencies, please consult the table below:

Table 7-8 • Currency Situations and Use Cases

<table>
<thead>
<tr>
<th>Situation</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>All cloud provider bills are provided in USD.</td>
<td>No action needed. Optima shows USD $ as the default currency symbol.</td>
</tr>
<tr>
<td>All cloud provider bills are provided in non-USD currency and all the same currency.</td>
<td>Contact Us via phone or email at <a href="mailto:support@rightscale.com">support@rightscale.com</a> to request a change to your default currency symbol in Optima.</td>
</tr>
<tr>
<td>Cloud provider bills are provided in differing currencies.</td>
<td>Contact your Account Manager to discuss options.</td>
</tr>
</tbody>
</table>

Billing Center Hierarchies

Note • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager. You can tell if you are enabled on these capabilities if you see a Tabular view tab in Billing Centers.

Billing centers can be configured in a hierarchical structure so that the cost reporting functionality in Optima can better match the reporting structure of your organization. Costs are allocated down the hierarchy, with each level providing additional splitting of costs into constituent buckets. Billing centers at every level of the hierarchy have much the same set of functionality, including custom cost reporting and user access controls.

Important • Sub-billing centers do not yet support scheduled reports, budget alerts, or recommendations. This functionality is coming soon.

Use hierarchical billing centers to break down your costs into the pieces small enough so that any cloud consumer in your organization can see the costs that are relevant to them.

There are no limits to the number of levels in the billing center hierarchy.

To create sub-billing centers and to modify their allocation rules, you must have the billing_center_admin role.

The topics below further describe billing center hierarchies:

- How Billing Center Hierarchies Work
- Create Sub-billing Center and Allocation Rules
- View Sub-billing Centers
- Sub-billing Center Permissions
How Billing Center Hierarchies Work

When configuring the hierarchy, it is important to understand the conceptual approach used to allocate costs to billing centers and sub-billing centers. Imagine all of the costs being funneled from the top down to each billing center - meaning that a child billing center will not have costs allocated to it unless they are allocated to its parent first. The following diagram demonstrates this concept - costs must first be allocated to any parent billing center before they can be allocated to a child billing center.

To accomplish this, each billing center has its own set of allocation rules, defining how the costs in that billing center are further allocated to its children. This is optional, so although each billing center can have a set of allocation rules, it may not.

For situations in which account-based allocation is exclusively used, this concept is relatively simple to understand - a given account cannot be allocated to a child if that account has not been allocated to its parent(s).

However, in scenarios that involve tag-based allocation, this rule does not quite hold true. This is because a given tag could have costs in any account, and it is not possible to know which account will have matching costs at the time of allocation rule definition.

The system will allow you to define any allocation rule at any level but when processing a bill and allocating costs, it follows the top down funnel rule. The use of tag-based rules and account-based rules is allowed, and the general concept of the costs funnelling down will apply.

The UI attempts to assist in creating tag-based allocation rules by showing only those accounts that are possible to be allocated to the current billing center given rules higher up in the hierarchy.

Create Sub-billing Center and Allocation Rules

**Important** • You must have the billing_center_admin role to create sub-billing and allocation rules.

By default, billing centers do not have any sub-billing centers or allocation rules.
To create a sub-billing center:

1. Navigate to the billing center that needs to be further decomposed. If there is not a Billing Centers or Allocation Rules tab, that means that no sub-billing centers currently exist.

2. Click the New Billing Center button in the upper-right hand corner of the billing center. A message, Child of the current billing center, should appear.

3. When the New Billing Center window appears, enter a Billing Center Name and optionally add a Billing Center Description. Click Save.

Once you create your first sub-billing center, the Billing Centers and Allocation Rules tabs will be available. From this point, you can follow the normal process for creating Allocation Rules minding the concepts above.

View Sub-billing Centers

To view the sub-billing centers of a given billing center

1. Navigate to the Billing > Billing Centers tab.

2. Click the appropriate parent billing center.

3. If there are any sub-billing centers (child billing centers), they will appear under the parent’s Billing Centers tab.

4. Click the appropriate sub-billing center (child billing center) to view. The parent-child billing center hierarchy displays at the top of the screen.

Sub-billing Center Permissions

You can be granted access to billing centers at any level of the hierarchy. When you have access to a billing center, you can see all of the information of that billing center, including all children below the billing center.

When you navigate to the main billing center page, you are only able to see the highest parent in each branch of the hierarchy that you have access to. For example, given the following organization structure and you have been granted access to the highlighted billing centers.
You will have access to the Development billing center under Shared and access to the Indigo billing center and all of its children. When viewing the top-level billing center page, you will see the highest parent in each branch of the hierarchy - in this case:

- Development (under Shared) and
- Indigo (under Engineering).

**Tabular View**

Tabular View is a data table, found in the Billing Centers module, that gives users a granular view into their cloud costs. Tabular View only shows costs that are scoped to the Billing Center that you are viewing it from. It works at both the top Organization level Billing Center that the user has access to, as well as all child Billing Centers below that. You can group and filter data, select the dates, drill down to details, and export the data.

Tabular View has several options to control the data shown:

- **Date Selector**: choose the date range for your column headings
- **Cost Type Selector**: choose between the cost amortization and cost blending (AWS only) options
- **Usage Metric Selector in Tabular View**: choose to show or hide the usage metric
- **Group By Filter in Tabular View**: “pivot” and sum costs based on a number of dimensions
- **Search Box Filter in Tabular View**: enter specific words or phrases to select which rows you want to display
- **Drilling Down in Tabular View**: expand or collapse one group or all groups of data to display
- **Percent Change Indicators in Tabular View**: show how a particular cost grouping is changing

Once you decide which Tabular View data to show, you can:

- **Format the Tabular View Reports**
- **Export Tabular View Data**
Usage Metric Selector in Tabular View

The **Usage Metric Selector** appears to the right of the **Cost Type Selector** in Tabular View and is set to show the usage metric by default. When shown, the usage metric appears in addition to the cost metric. A usage column will be visible to the right of the cost column under each date period you have configured for display (Examples: day, month, or quarter). Both a **Cost Total** and a **Usage Total** column are visible to the right under the **Totals** heading. These columns will also appear in CSV or Excel exports from Tabular View.

To hide the usage metric or show it again, open the dropdown menu under **Usage metric is shown** and select **Hide usage** or **Show usage** as appropriate.

---

**Note** • *When viewing the usage metric:*

- Usage amount breaks down according to many different usage units which vary by resource, such as Gigabytes (GB), Requests, or Hours.
- Total usage amount can only be summed across a common **Usage Unit**. For this reason, when you show the usage metric, the **Usage Unit** dimension will appear as a forced dimension in your **Group by** list. The forced **Usage Unit** dimension (pale yellow in color) can be dragged up or down in the hierarchy, but it cannot be deleted as long as the usage metric is shown.
- Usage amount totals will be visible for the **Usage Unit** dimension and any other dimensions below (to the right of) it in the hierarchy.
- Usage amount totals will not be visible for any dimensions above (to the left of) **Usage Unit** in the hierarchy. The display will show “…” in place of a number for these dimensions.

---

**Tip** • *Usage units and amounts cover a broad array of data and can be confusing when being viewed for the first time. Here are some common issues.*

- **Similar usage units**
  The usage units displayed in Optima are pulled directly from the bill data and may have some confusing similarities, such as “Hrs,” “Hours,” and “Hour.” They tend to be uniform across a single **Resource Type** or **Usage Type**, however. Adding those dimensions to **Group by** and filtering on a specific resource or usage type will often yield a single, uniform **Usage Unit**.

- **Usage unit of “None”**
  Some usage amounts simply have no associated unit in the bill data, and these appear as “None” in the Optima UI. The free tier for AWS often appears with a **Usage Unit** of “None,” for example. If you see a number for usage with $0 of associated cost, this is likely the explanation.

- **Availability of data**
  Usage data has been pulled into the Optima backend since April 1, 2019. It is possible to see some usage data from before that date if an organization has had its bill reprocessed since then, but usage data from before April 1, 2019 may not be complete.
Group By Filter in Tabular View

To get to the level of detail that is necessary to compare costs, you can select up to 5 criteria in the **Group By** function. When the ‘+’ is clicked, a drop-down menu appears, so you can choose from the list below:

- Adjustments
  - Adjustment Cost Multiplier
  - Adjustment Name
  - Adjustment Usage Multiplier
- Billing Centers
  - Billing Centers
- Cloud
  - Cloud Vendor
  - Cloud Vendor Accounts
  - Cloud Vendor Account Name
- Resources
  - Category
  - Instance Type
  - Line Item Type
  - Region
  - Resource Group
  - Resource Type
  - Service
  - Usage Type
  - Usage Unit
- Custom Dimensions (Tags)

**Note** • Custom Dimensions are tags specific to your Optima organization. [Contact Us](#) to add new custom dimensions.

After you select the appropriate **Group By** criteria, the data table will begin to populate with the cost from the selected criteria. The **Group By** columns are ordered based on which criteria are selected first. You can move the **Group By** criteria to the left or right to group the data to your liking.
Search Box Filter in Tabular View

To scale down the data to your exact specifications, use the search box filter. In the screen shot above, we entered Storage into the search box. Now the table only displays the results with the name “Storage” in part of the group text. When you export the Tabular View data, only data from that “Filter” criteria in the search box will be exported.

Drilling Down in Tabular View

To drill down to the exact data you are looking for, click the up and down arrows next to a grouping.

<table>
<thead>
<tr>
<th>Task</th>
<th>To expand or collapse all groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Click the three-solid-lines icon on the right side of the Group column header.</td>
<td></td>
</tr>
<tr>
<td>2. Click Expand All or Collapse All.</td>
<td></td>
</tr>
</tbody>
</table>

Percent Change Indicators in Tabular View

The percent change arrows show trends from month to month. To display the arrows, click the Show button and check the Show percent change if cost difference is greater than $ box. This selection enables the color-coded up and down arrows to reflect the percent change from the previous month.

- **Dark Green:** The decrease is 30% or more.
- **Light Green:** The decrease is more than 5% and less than 30%.
- **Gray:** The increase or decrease is 5% or less.
- **Orange:** The increase is more than 5% and less than 30%.
- **Red:** The increase is 30% or more.

Format the Tabular View Reports

You can format the view of the reports by clicking the three-solid-lines icon to the right of each column header. A popup will appear that displays the following options:

- **Pin Column:** pins the column to the left, to the right, or removes a pin using this option. Pin Column freezes the column, allowing for easier reading of the report if there are a lot of columns.
- **Autosize This Column:** sizes the column to the appropriate width.
- **Autosize All Columns:** sizes all columns to the appropriate width.
- **Reset Columns:** restores all columns to the default view.
- **Tool Panel:** offers the option to hide/unhide the columns you’ve selected in the Group By criteria.
- **Expand All:** expands all the rows to show detail for all the Group By criteria selected.
- **Collapse All:** collapses all the rows to only the first Group By criteria selected.
The screen shot below is an example of a Tabular View report that also shows zero-cost usage for billing. Even if the usage was not charged, for example if an instance was fully covered by a Reserved Instance, the cost will display $0.00.

Export Tabular View Data

**Note** • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager. You can tell if you are enabled on these capabilities if you see a Tabular view tab in Billing Centers.

Once you have the appropriate **Date Selector**, **Group By**, and **Search Box Filter** criteria selected, you can export the data to either a .csv or Excel file. The file will show all columns and dates that were selected as part of that criteria, and the filters also apply.

**Tip** • If you consume data in non-US formatted currencies, the Excel export provides a better experience.

Recommendations in Billing Centers

Within each billing center, the **Recommendations** tab shows a set of tailored recommendations to help you better understand waste in your cloud spend as well as realize more savings. You can view complete details, share, and/or export these recommendations, all within the context of your **Billing Centers**. For details, see **Optima Recommendations**.

The set of recommendations in a billing center are those that match the same rules that are used for allocating costs to the billing center.
Scheduled Reports and Budget Alerts

We provide two cost policies to meet your reporting and alerting needs: the Scheduled Report Policy and Budget Alert Policy increase cost visibility and management in your multi-cloud world and take appropriate actions to run an efficient infrastructure. The benefits of these cost policies allow you to:

- Identify where you are wasting spend and realize immediate savings
- Collaborate to reduce future cloud costs
- Use tagging as a foundation for ongoing cost management
- Automate waste prevention

Scheduled Report Policy

Task

To apply the Scheduled Report Policy:

1. Navigate to RightScale Governance.
2. Find the Scheduled Report policy in the catalog.
3. Click Apply and complete the following policy fields.

- Policy Name - No need to change
- Policy Description - You may ignore the [here you can find details on the policies definition].
- Policy Schedule - Select the desired cadence of your emailed reports. The report cadence is relative to the initial launch of the policy. By choosing when to run the policy, you can control the day of the week and time of day when the reports will go out.

Note • There is a delay of 2-3 days before cloud vendors release cost data, so those most recent days will always be incomplete.

- Test Mode - This is a reporting-only policy. The only action taken by the policy is to send the email notification, so changing the toggle will have no effect.
- Select Accounts - The dropdown list contains accounts you have been granted access to run policies in. The account in which this policy runs does not determine the costs that will be reported in the email notification. You will determine which billing centers to report on in a later step.

Best Practice • We recommend running policies in the primary account.

- Email List - Includes your email by default. You can also add any other email addresses you would like to notify (including non-Flexera Optima users).
- Billing Center List - Enter the name(s) of the top-level or lower-level billing center(s) you want to report costs from. This field, rather than the Select Accounts field above, is where you determine the costs you will see in your
report. Leave this field blank to report on all costs (all top-level billing centers). The name(s) you enter must be exact matches for the name(s) of the corresponding billing center(s) in Optima.

- **Cost Metric** - Make your selection from the following:
  - **Amortized** - One-time costs such as upfront Reserved Instance (RI) fees are spread across the lifespan of the resources in question.
  - **Unamortized** - One-time costs appear in full at the time they were incurred.
  - **Blended** - This cost metric is only for Amazon Web Services (AWS). If you select this cost metric for Microsoft Azure, you will not change anything.
  - **Unblended** - This cost metric is only for AWS. If you select this cost metric for Microsoft Azure, you will not change anything.

- **Graph Dimension** - Select which dimension you would like to see broken out on the graph in the report. These are the same default dimensions available in Default Dashboard Reports.

4. Click **Apply Policy** to apply the Scheduled Report policy.

---

**Task**

**To interpret the emailed Scheduled Report:**

1. Once you have applied the scheduled report policy, you should receive email reports per the cadence you specified. The email headings will appear as follows: “*Account name: [Org ID:* _[#]_ *]: Full Cost Scheduled Report*”

2. The email includes a **Spending Overview Chart** image. The bar chart displays the last 6 months of spend broken down by the Graph Dimension you selected when launching the policy (such as Category, Service, etc.). Depending on your email client, you may need to allow images to display before you can see the Spending Overview Chart.

3. Beneath the Spending Overview Chart is the cost breakdown in a table format. The amounts shown are in the same currency as your Optima bill data.
  - **Daily Average** column gives you the average per-day cost across the last week and last month.
  - **Previous** gives you the total cost across the previous full week and previous full month.
  - **Current (incomplete)** gives you the total cost so far during this week and this month. Remember that the last few days of data will always be incomplete due to vendor delay in releasing bill data.

4. If you wish to terminate the policy or check its status or configuration, click the blue **View Details** button to return to the Applied Policies interface.

5. In the **Actions** column of the Applied Policies interface, click the ellipses (...) to select the appropriate policy action (Terminate, Apply Similar, Run Now, View Log).
Task  To apply the Budget Alert Policy:

1. Navigate to RightScale Governance.
2. Find the Budget Alert policy in the catalog.
3. Click Apply and complete the following policy fields.
   - **Policy Name** - No need to change
   - **Policy Description** - You may ignore the [here you can find details on the policies definition].
   - **Policy Schedule** - Select the desired cadence of your emailed reports. The report cadence is relative to the initial launch of the policy. By choosing when to run the policy, you can control the day of the week and time of day when the reports will go out.

   **Note**  • There is a delay of 2-3 days before cloud vendors release cost data, so those most recent days will always be incomplete.

   - **Test Mode** - This is a reporting-only policy. The only action taken by the policy is to send the email notification, so changing the toggle will have no effect.

   - **Select Accounts** - The dropdown list contains accounts you have been granted access to run policies in. The account in which this policy runs does not determine the costs that will be reported in the email notification. You will determine which billing centers to report on in a later step.

   **Best Practice**  • We recommend running policies in the primary account.

   - **Monthly budget** - This is where you enter the monthly budget. Currency is not relevant; the currency will default to whichever is used in Optima.

   - **Budget Scope** - Select one of the following:
     - **Organization** - This option includes your entire organization structure, including all child accounts and billing centers.
     - **Billing Center** - This option allows you to drill down to the budget of a specific billing center. This policy can be filtered on top-level or lower-level billing centers.

   **Important**  • If you want to apply a budget alert for multiple targets, you will need to apply this Budget Alert policy multiple times.

   - **Billing Center Name** - If you chose **Billing Center** as your **Budget Scope**, enter the name of the billing center you want to report costs from. The name you enter must be an exact match for the name of the corresponding billing center in Optima. Ignore this field if you chose **Organization** as your **Budget Scope**.

   - **Budget Alert Type** - Select one of the following budget types you want to be notified about:
• **Actual Spend** - Based off incurred costs that will raise an incident when the input monthly budget target has exceeded the monthly budget.

• **Forecasted Spend** - Based off usage monthly run rates that will raise an incident when the input monthly budget target’s run rate is on track to exceed the monthly budget for the month.

• **Cost Metric** - Make your selection from the following:
  - **Amortized** - One-time costs such as upfront Reserved Instance (RI) fees are spread across the lifespan of the resources in question.
  - **Unamortized** - One-time costs appear in full at the time they were incurred.
  - **Blended** - This cost metric is only for Amazon Web Services (AWS). If you select this cost metric for Microsoft Azure, you will not change anything.
  - **Unblended** - This cost metric is only for AWS. If you select this cost metric for Microsoft Azure, you will not change anything.

• **Email List** - Includes your email by default. You can also add any other email addresses you would like to notify (including non-Flexera Optima users).

Below is an email example of a Budget Alert Type: Actual Spend.

### Allocation Rules

Allocation Rules are a prioritized list that costs are matched against, and then properly allocated to a corresponding Billing Center. Each Allocation Rule specifies a tag (key=value) or Cloud Account number(s), and a target Billing Center. Allocation Rules exist at the Organization level and can optionally be created within any billing center to define the sub-billing centers. For details, see Create Sub-billing Center and Allocation Rules. Multiple Allocation Rules can target the same Billing Center.

This section describes the following allocation rule features:

• **Rule Priority**

• **Create Allocation Rules**

• **Edit Allocation Rules**

• **Delete Allocation Rules**

• **Create a New Billing Center while Creating an Allocation Rule**

### Rule Priority

Allocation Rules are applied in ascending numerical order. It is possible that a single cost could match multiple rules (that is, a Server that matches a Cloud Account Rule and a Cloud Tag Rule); in these cases, the first processed rule (lower numbered) takes priority.
Create Allocation Rules

To create an Allocation Rule:

2. Click Create New Rule.

Note • When creating allocation rules to define sub-billing centers, note the method with which rules are applied top-down. For details, see How Billing Center Hierarchies Work.

After clicking Create New Rule, complete the following features, as needed, for the new allocation rule:

- Cloud Tag Rules
- Cloud Account Rules
- Multiple Cloud Tags

Cloud Tag Rules

To create a new Cloud Tag Rule:

1. Under Rule Type, select Cloud tag.
2. In the Rule Definition string text box, enter a tag key-value pair. Any number of asterisks (*) can be used as a wildcard value in either of the tag fields. For example: *code=1234 or env=Prod*.
3. Select a Billing Center from the drop-down list to which costs should be allocated.

Note • Tag keys and values are case-sensitive.

Cloud Account Rules

To create a new Cloud Account Rule:

1. Under Rule Type, select Cloud account(s).
2. Under Rule Definition click Choose Cloud Accounts to select the vendor accounts you would like associated with this rule.
3. Select a Billing Center from the drop-down list to which costs should be allocated.
Multiple Cloud Tags

In charge-back scenarios where one tag key is used with multiple values, the Multiple Cloud Tags option can be used to quickly create allocation rules and billing centers for all values of the chargeback tag.

Task  To create Multiple Cloud Tags:

1. Under Rule Type, select Multiple cloud tags.
2. In the first Rule Definition text box, enter the tag key to be used for all the created allocation rules. In the second Rule Definition text box, enter all of the possible tag values for that key.

Example: assume that you have resources tagged with the following tags that you wish to use for billing center allocation:

- project = secretProjectA
- project = Maintenance
- project = Special

For tag key you would enter project.

For multiple tag values enter each tag value, one per line, as shown in the screenshot below.

3. When each allocation rule is created, determine whether a Billing Center already exists with a name matching the given tag value.

If a billing center has a name that matches the given tag value, the rule is set to that billing center.

If no billing center has a name that matches the tag value, choose one of the following options:

- Create a new billing center with the same name as the tag value.
  This option will create a new billing center with the name set to the value of the tag. This is the most common approach.

- Do not create a new allocation rule.
  This option will skip the creation of the allocation rule altogether.

After completing the above steps, three new allocation rules are created along with new billing centers (assuming that no billing center exists named secretProjectA, Maintenance, or Special) in the Allocation Rules tab.

Edit Allocation Rules

Task  To edit an Allocation Rule:

1. Click the pencil icon next to the target rule. A pop-up window will present the same fields that were set when the rule was created.

2. Edit the Rule Definition (Cloud Tag or Cloud Accounts) and/or the associated Billing Center.

3. Click Update Rule.
Delete Allocation Rules

**Task**

To delete an Allocation Rule:

1. Click the trash can icon next to the target rule.
2. When the Delete Rule pop-up window appears, click Delete.

Create a New Billing Center while Creating an Allocation Rule

**Task**

To create a new billing center while creating an Allocation Rule:

1. Click Create New Rule.
2. Click + Create a new Billing Center.
3. Under Rule Definition, enter a key and value (Example: env=QA*).
4. Enter the Billing Center Name (Example: QA).
5. Click Save.
6. In the Allocation Rules tab, view the new Billing Center with the new allocation rule.

Monthly CSV Reports in Billing Centers

**Note** • The content on this page applies to the new Optima capabilities only. New customers onboarded since January 15th, 2019 have access to this functionality by default. If you are a preexisting customer and would like access to the new Optima features, please contact your account manager.

Monthly CSV reports are available for any user with organization-wide access to Optima. Reports are not yet available on a per-billing center level basis. For users with sufficient privileges, simply navigate to the top-level Billing page for the organization and select Monthly Reports. The page lists all available monthly reports along with the date at which they were most recently generated.

By default, Optima ensures that the current and prior month CSV reports are updated on a regular basis. Contact Us to regenerate prior months on-demand.

The CSV reports provide a resource-level view of the information. Each row in the report corresponds to a unique resource, and the cost for the resource is the total cost for the month. Note that some resources in cloud bills do not have a resource ID. Such resources have a null value for the resource ID and are grouped together in the monthly report.
The CSV reports also provide some data points that are not available elsewhere, including resource IDs and Azure Resource Group information.

The `billing_center` field contains a top-down list of the billing center hierarchy that the cost is allocated to. Each level in the hierarchy is separated by a pipe | character.
Chapter 7 Optima Billing Centers Guide
Monthly CSV Reports in Billing Centers
Reserved Instances

To view all types of cloud provider Reserved Instances (RI) including the utilization percentage, click the Reserved Instances link on the left navigation of Optima. This page shows information about your RIs for the selected organization for a 7-day rolling window (starting 9 days back). If you belong to more than one RightScale organization, select the appropriate organization to view RI information.

**Important** • To access Reserved Instance information, you must have the ca_user role at the organization level.

At this time, Optima supports:

- Amazon Web Services Reserved Instances
- Microsoft Azure Reserved Instances

### Amazon Web Services Reserved Instances

In the Amazon Web Services (AWS) Reserved Instances screen, you can:

- View AWS Reserved Instances
- Export AWS Reserved Instance Information

#### View AWS Reserved Instances

<table>
<thead>
<tr>
<th>Task</th>
<th>To view AWS RIs:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Navigate to the appropriate organization’s Amazon Web Services Reserved Instances page.</td>
</tr>
<tr>
<td>2.</td>
<td>The information presented on the Amazon Web Services Reserved Instances page is retrieved from the AWS Cost Explorer API. To fetch this data, the following Identity and Access Management (IAM) stanza needs to be added to the RightScale user’s IAM policy on your AWS parent account.</td>
</tr>
</tbody>
</table>

```
Reserved Instances
Microsoft Azure Reserved Instances

"Effect": "Allow",
"Action": [
    "ce:GetReservationUtilization"
],
"Resource": "*"
}

For the complete AWS IAM policy details, see Create an IAM User that Can Read AWS Billing Reports.

3. In Optima, you can choose the AWS RI columns you wish to see in your view by selecting the appropriate fields from the Columns picker.

4. To download the AWS RI information as a CSV including all columns (visible and hidden) in the table, click the Export to CSV button.

Export AWS Reserved Instance Information

You can export your organization’s AWS RI information to a CSV file to track, share, or perform calculations on coverage by clicking Export to CSV.

Note • Regardless of the number of filters selected in the Columns drop-down menu, all filters are exported to the CSV file.

Microsoft Azure Reserved Instances

In the Microsoft Azure Reserved Instances screen, you can:

• View Microsoft Azure Reserved Instances
• View Upfront vs. Monthly Microsoft Azure Reserved Instances
• Export Microsoft Azure Reserved Instance Information

View Microsoft Azure Reserved Instances

In Optima you can view Microsoft Azure Reserved Instances (Azure RIs) by:

• Total active Azure RIs purchased across an organization
• Azure RI event date and terms to determine when RIs need to be replaced
• Any newly purchased Azure RIs - to confirm a planned purchase went through or to notice if someone purchased RIs without my knowledge or permission

Task

To view the total active Microsoft Azure RIs purchased across an organization:

1. Navigate to the appropriate organization’s Microsoft Azure Reserved Instances page.
2. Click the Columns drop-down menu and select:
**Reserved Instances**

**Microsoft Azure Reserved Instances**

- **Event Date:** the date of the RI purchase, cancellation, or refund
- **Event Type:** purchase, cancellation, or refund
- **Term:** the commitment term is either 1 years or 3 years

---

**Task**

**To view Azure RI event date and terms to determine when RIs need to be replaced:**

1. Navigate to the appropriate organization’s Microsoft Azure Reserved Instances page.
2. Click the **Columns** drop-down menu and select:
   - **Event Date:** the date of the RI purchase, cancellation, or refund
   - **Term:** the date of the RI purchase, cancellation, or refund
   - **Expiration Date:** the date the RI needs to be replaced based on the **Event Date** and **Term**.

---

**Note** • The time stamp following the Event Date and Expiration Date (Example: 2020-03-19T16:22Z, where T and Z enclose the time stamp) is based on Microsoft Azure’s format.

---

**Task**

**To view any newly purchased Azure RIs to confirm a planned purchase went through or to notice if someone purchased RIs without my knowledge or permission:**

1. Navigate to the appropriate organization’s Microsoft Azure Reserved Instances page.
2. Click the **Columns** drop-down menu and select:
   - **Amount Paid:** for the transaction
   - **Currency:** the currency the amount was paid in
   - **Event Date:** the date of the RI purchase, cancellation, or refund
   - **Reservation Order ID:** Microsoft Azure’s unique identifier for a reservation transaction. Each reservation order ID represents a single transaction. A reservation order contains reservations. The reservation order specifies the Virtual Machine size and region for the reservations.
   - **Reservation Order Name:** the friendly name of the reservation order
   - **Cost Center:** the cost center associated with the purchasing subscription

---

**View Upfront vs. Monthly Microsoft Azure Reserved Instances**

You can pay for Microsoft Azure Reserved Instances (RI) either up front (pay the full amount) or on a monthly basis.

For RIs paid monthly, the total cost of the reservation is divided evenly over each month of the RI term (1 or 3 years). The total cost of upfront and monthly reservations is the same, and you don’t pay any extra fees when you choose to pay monthly. When you renew a reservation, you can change the billing frequency from upfront to monthly.

Monthly Microsoft Azure RI payments are available for:

- Virtual machines
• Azure Storage
• SQL Database
• SQL Data Warehouse
• Cosmos DB
• App Service stamp fee

For additional Monthly Microsoft Azure RI information, see Purchase Reservations with Monthly Payments.

**Task**

**To view upfront vs. monthly Microsoft Azure RIs:**

1. Within Reserved Instances, navigate to the Microsoft Azure tab.
2. From the rightmost Columns drop-down menu, select Billing Frequency (if a check mark does not already appear).

**Export Microsoft Azure Reserved Instance Information**

You can export your organization's Azure RI information to a CSV file to track, share, or perform calculations on coverage by clicking Export to CSV.

**Note** • Regardless of the number of filters selected in the Columns drop-down menu, all filters are exported to the CSV file.

**Best Practice** • To calculate your organization's Azure RI coverage levels, you can export the Reservation Order ID and Instance Quant Qty (number of RIs purchased) into a CSV file and combine that exported information with instance counts to calculate RI coverage levels.
Automated Optimization

Optima allows you to optimize cloud cost with a variety of automated optimization capabilities. These features identify savings opportunities, as well as help you set up automated actions to realize potential savings and prevent future waste.

This section covers the following Automated Optimization topics:

- Instance Rightsizing
- Cloud PaaS Services Rightsizing
- Idle Compute Instance Termination
- Unused Storage Deletion
- Old Snapshot Deletion
- Unused PaaS Service Termination
- Unused Resource Decommissioning
- Instance Scheduling
- Reservation Purchase Recommendation
- Reservation Expiration Alert
- Object Storage Class Optimization
- Scheduled Report with Forecast
- Monthly Actual vs Budgeted Spend Report
- Budget Alert
- Billing Center Cost Anomaly Detection
- AWS Reserved Instance Coverage Report
- AWS Reserved Instance Utilization Report
- Azure Reserved Instance Utilization Report
- AWS Instance CloudWatch Utilization
Instance Rightsizing

Cloud providers charge you for all active Compute Instances, regardless of whether you are using the full Central Processing Unit (CPU) and memory capacity. Each underutilized instance may be costing you 50-75% in wasted cost. The Instance Rightsizing feature assesses utilization metrics to identify any instances that could be downsized, and with your approval, will take the action of switching over to a smaller instance size.

This section walks you through how to:

- Configure the Instance Rightsizing Policy
- Define the Scope of the Instances to Include
- Define the Thresholds for Rightsizing
- Define the Instance Rightsizing Actions to Take
- Configure the General Instance Rightsizing Policy Options
- Customize the Instance Rightsizing Policy
- Review Actions Taken by the Instance Rightsizing Policy
- Notify Users on How to Use the Instance Rightsizing Policy

**Configure the Instance Rightsizing Policy**

**Task**

*To configure the Instance Rightsizing Policy:*

1. From the **Policies** screen, select the appropriate policy and click **Apply**.
2. Select the options to configure the policy. Our policy catalog includes solutions for both downsizing and upsizing across multiple cloud vendors.

**Define the Scope of the Instances to Include**

**Task**

*To define the scope of the instances to include:*

Determine which resources to evaluate for underutilization.

- To define scope using **Select Accounts**: Specify the list of accounts to evaluate. For example, you may wish to limit the rightsizing to non-production accounts or to any subset of accounts.

- To define scope using **Tag filtering**: Limit the scope within the selected accounts by specifying tags. For example, if your production and non-production resources are mixed in your cloud accounts, you can leverage this tag-based filtering functionality to limit the rightsize action based on an environment tag. Instances can also be tagged with a rightsize-related tag key to mark whether they have been selected as suitable for rightsizing.

**Define the Thresholds for Rightsizing**

Having defined a scope, you’ll need to set percent thresholds to allow for downsize or upsize depending on which policy you have selected. You can assess both memory and CPU metrics to determine suitability, and you are able to set separate thresholds for both average and maximum utilization.
Maximum utilization will be affected directly by any spikes in CPU or memory usage. For example, CPU usage can spike during recurring weekly scans or nightly backups. In some cases these types of activities are not materially impacted if the CPU size is lower. If you are concerned about provisioning capacity to accommodate these short-lived spikes, set a high maximum free memory percent. If you are not concerned by slowed performance during periodic activity spikes, reduce the maximum percent threshold.

Depending on whether memory capacity is more critical to your applications than CPU or vice versa, you will need to set different CPU and memory thresholds.

For the majority of compute instances, a single downsize will reduce the instance’s capacity by half. Accordingly, in standard downsize cases you should select a number below 50 for the average percent to allow for downsize. For example, if you set the threshold to 40 percent, the utilization would still remain under 80 percent once downsizing has occurred.

How far you set this number below 50 will define a more or less conservative capacity buffer in the event that future usage patterns depart from the historical trend. To disregard any of the four thresholds for downsize, enter a value of -1. A blank field will be recorded as a value of 0.

For upsizing, you will configure thresholds according to the same logic to determine when to give an instance higher capacity by upsizing.

**Define the Instance Rightsizing Actions to Take**

<table>
<thead>
<tr>
<th>Task</th>
<th>To define the Instance Rightsizing actions to take:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Perform the following actions.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Configure users to be notified:</strong> Specify the list of recipients who should receive notifications about rightsizing. Add as many recipients as you like to the <strong>Email addresses of the recipients you wish to notify</strong> field. They do not need to be registered as Optima users.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Configure automated actions for the policy:</strong> Specify whether you want the recipients to receive an emailed report of downsize recommendations with no automated action, or send the report as well as taking automated action to downsize instances that meet the previously defined criteria.</td>
</tr>
</tbody>
</table>

**Configure the General Instance Rightsizing Policy Options**

<table>
<thead>
<tr>
<th>Task</th>
<th>To configure the general Instance Rightsizing Policy options:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Set the following standard policy configuration options when the Instance Rightsizing Policy is applied.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Frequency for policy to run:</strong> Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>• <strong>Fully automated vs approval required:</strong> Specify at the time it is applied whether the policy will take action after user approval versus automatically without user intervention. For details, see the <a href="#">Skip Action Approvals</a> documentation.</td>
</tr>
</tbody>
</table>
Chapter 9  Automated Optimization

Instance Rightsizing

Customize the Instance Rightsizing Policy

**Task**

**To customize the Instance Rightsizing Policy:**

Policy designers can customize the Instance Rightsizing Policy definition in several ways:

- **Change the observation period.** By default, this policy calculates utilization over a 30-day period. To calculate over a different period of time, you can update the policy template. More information on this is available in the *readme*.

- **Change the script to draw monitoring data for rightsizing from different monitoring tools.** Samples are provided for tools including Cloudwatch (AWS), Stackdriver (GCE), LogAnalytics (Azure), and Datadog in the public GitHub repository.

- **Adjust the logic that generates the recommendations to incorporate a risk profile defined by percentiles.**

- **Customize the mapping for larger and smaller instance sizes.** This optimization action works on a default set of standard larger and smaller instance size mappings. These can be modified in cases where users wish to take specialized factors into account, such as storage drivers, network drivers, 32/64 bit architecture, or non-standard instance mappings. The files containing predefined instance mappings for each cloud vendor can be accessed via the links below:
  - AWS Instance Size Relationship Mapping
  - Azure Instance Size Relationship Mapping
  - Google Instance Size Relationship Mapping

  Instructions for modifying the relationships, such as including cross-family recommendations, are available in the *readme*.

Review Actions Taken by the Instance Rightsizing Policy

These actions may occur with approval or fully automated depending on whether the policy manager has selected the *Skip Action Approvals* option.

Any instances that meet the conditions specified will be stopped, size changed, and restarted. The default instance mappings do not include moves between instance families that would imply major infrastructure (such as network), operating system, or cloud image changes. If the user configures a custom mapping between families, the policy action could result in image or driver incompatibilities that could cause loss of service.

To generate recommendations and automate same-sizing moves to less expensive sub-regions, apply the *Cheaper Region Policy*.

Notify Users on How to Use the Instance Rightsizing Policy

Once the Instance Rightsizing Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the *Policy Schedule* field. Users can also access this information in the *Applied Policies* section of the *Policies* menu.

The *Incidents* section shows any triggered recommendations.

If *Skip Action Approvals* has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to *Approve* or *Deny* the recommended action.
Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

# Cloud PaaS Services Rightsizing

Just like Compute Instances, Platform as a Service (PaaS) such as Amazon RDS database instances, Azure SQL database instances, and Google Cloud SQL database instances may be larger and more expensive than usage patterns indicate is necessary. We assess utilization metrics to identify any database instances that could be downsized.

This section walks you through how to:

- Configure the Cloud PaaS Services Rightsizing Policy
- Define the Scope of the Cloud PaaS Services Instances to Include
- Define the Cloud PaaS Services Threshold for Downsizing
- Define the Cloud PaaS Services Rightsizing Actions to Take
- Define the General Cloud PaaS Services Rightsizing Policy Options
- Customize the Cloud PaaS Services Rightsizing Policy
- Review Actions Taken by the Cloud PaaS Services Rightsizing Policy
- Notify Users on How to Use the Cloud PaaS Services Rightsizing Policy

## Configure the Cloud PaaS Services Rightsizing Policy

**Task**

<table>
<thead>
<tr>
<th>To configure the Instance Rightsizing Policy:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. From the Policies screen, select the appropriate policy and click Apply.</td>
</tr>
<tr>
<td>2. Select the options to configure the policy.</td>
</tr>
</tbody>
</table>

## Define the Scope of the Cloud PaaS Services Instances to Include

**Task**

<table>
<thead>
<tr>
<th>To define the scope of the Cloud PaaS Services instances to include:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine which resources to evaluate for underutilization.</td>
</tr>
<tr>
<td>- To define scope using Select Accounts: Specify the list of accounts to evaluate. For example, you may wish to limit the rightsizing to non-production accounts or to any subset of accounts.</td>
</tr>
<tr>
<td>- To define scope using Tag filtering: Limit the scope within the selected accounts by specifying tags. For example, if your production and non-production resources are mixed in your cloud accounts, you can leverage this tag-based filtering functionality to limit the rightsize action based on an environment tag. Database instances can also be tagged with a rightsize-related tag key to mark whether they have been selected as suitable for rightsizing.</td>
</tr>
</tbody>
</table>
Define the Cloud PaaS Services Threshold for Downsizing

Having defined a scope, you'll need to set percent thresholds to allow for downsize. You can assess both memory and CPU metrics to determine suitability, and you are able to set separate thresholds for both average and maximum utilization.

Maximum utilization will be affected directly by any spikes in CPU or memory usage. For example, CPU usage can spike during occasional processes such as backups. In some cases these types of activities are not materially impacted if the CPU size is lower. If you are concerned about provisioning capacity to accommodate these short-lived spikes, set a high maximum free memory percent. If you are not concerned by slowed performance during periodic activity spikes, reduce the maximum percent threshold.

Depending on whether memory capacity is more critical to your applications than CPU or vice versa, you will need to set different CPU and memory thresholds.

For the majority of database instances, a single downsize will reduce the instance’s capacity by half. Accordingly, in standard downsize cases you should select a number below 50 for the average percent to allow for downsize. For example, if you set the threshold to 40 percent, the utilization would still remain under 80 percent once downsizing has occurred.

How far you set this number below 50 will define a more or less conservative capacity buffer in the event that future usage patterns depart from the historical trend. To disregard any of the four thresholds for downsize, enter a value of -1. A blank field will be recorded as a value of 0.

Define the Cloud PaaS Services Rightsizing Actions to Take

Task

To define the Cloud PaaS Services Rightsizing actions to take:

Perform the following actions.

- **Configure users to be notified**: Specify the list of recipients who should receive notifications about rightsizing. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.

- **Configure automated actions for the policy**: Specify whether you want the recipients to receive an emailed report of downsize recommendations with no automated action, or send the report as well as taking automated action to downsize instances that meet the previously defined criteria.

Configure the General Cloud PaaS Services Rightsizing Policy Options

Task

To configure the general Cloud PaaS Services Rightsizing Policy options:

Set the following standard policy configuration options when the Cloud PaaS Services Rightsizing Policy is applied.

- **Frequency for policy to run**: Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

- **Fully automated vs approval required**: Specify at the time it is applied whether the policy will take action after user approval versus automatically without user intervention. For details, see the Skip Action Approvals documentation.
Chapter 9  Automated Optimization
Idle Compute Instance Termination

Customize the Cloud PaaS Services Rightsizing Policy

Task  To customize the Cloud PaaS Services Rightsizing Policy:

Policy designers can customize the Cloud PaaS Services Rightsizing Policy definition in several ways:

- **Change the observation period.** By default, this policy calculates utilization over a 30-day period. To calculate over a different period of time, you can update the policy template. More information on this is available in the readme.

- **Change the script to draw monitoring data for rightsizing from different monitoring tools.** Samples are provided for tools including Cloudwatch (AWS), Stackdriver (GCE), LogAnalytics (Azure), and Datadog in the public GitHub repository.

- **Customize the mapping for larger and smaller instance sizes.** This optimization action works on a default set of standard larger and smaller instance size mappings. These can be modified in cases where users wish to take specialized factors into account, such as storage drivers, network drivers, 32/64 bit architecture, or non-standard instance mappings. The files containing predefined instance mappings for each cloud vendor can be accessed in our GitHub repository:

  Instructions for modifying the relationships, such as including cross-family recommendations, are available in the readme linked in the policy details.

Review Actions Taken by the Cloud PaaS Services Rightsizing Policy

These actions may occur with approval or fully automated depending on whether the policy manager has selected the **Skip Action Approvals** option.

Any database instances that meet the conditions specified will be stopped, size changed, and restarted. The default database instance mappings do not include moves that would imply major infrastructure (such as network) changes, such as moves between instance families. If the user configures a nonstandard custom mapping, the policy action could result in incompatibilities that could cause loss of service.

Notify Users on How to Use the Cloud PaaS Services Rightsizing Policy

Once the Cloud PaaS Services Rightsizing Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the **Policy Schedule** field. Users can also access this information in the **Applied Policies** section of the **Policies** menu.

The **Incidents** section shows any triggered recommendations.

If **Skip Action Approvals** has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to **Approve** or **Deny** the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

Idle Compute Instance Termination

Compute Instances that were provisioned for a past initiative may remain active, incurring cost even when utilization metrics indicate they are not in use. Identifying these and automatically terminating them can generate significant cost savings.
This section walks you through how to:

- Configure the Idle Compute Instance Termination Policy
- Define the Scope of Idle Compute Instances to Include
- Define the Idle Compute Instance Threshold for Termination
- Define the Idle Compute Instance Termination Actions to Take
- Configure the General Idle Compute Instance Termination Policy Options
- Customize the Idle Compute Instance Termination Policy
- Review Actions Taken by the Idle Compute Instance Termination Policy
- Notify Users on How to Use the Idle Compute Instance Termination Policy

**Configure the Idle Compute Instance Termination Policy**

**Task**

To configure the Idle Compute Instance Termination Policy:

1. From the **Policies** screen, select the appropriate policy and click **Apply**.
2. Select the options to configure the policy.

**Define the Scope of Idle Compute Instances to Include**

**Task**

To define the scope of the Idle Compute Instances to include:

Determine which resources to evaluate for the Idle Compute Instances Policy.

- To define scope using **Select Accounts**: Specify the list of accounts to evaluate. For example, you may wish to limit the termination to non-production accounts or to any subset of accounts.
- To define scope using **Tag filtering**: Limit the scope within the selected accounts by specifying tags for items to exclude. For example, if your production and non-production resources are mixed in your cloud accounts, you can leverage this tag-based filtering functionality to limit the action based on an environment tag.

**Define the Idle Compute Instance Threshold for Termination**

Having defined a scope, you will need to set percent utilization thresholds to allow for termination. You can assess both memory and CPU metrics to determine suitability.

**Define the Idle Compute Instance Termination Actions to Take**

**Task**

To define the Idle Compute Instance Termination actions to take:

Perform the following action.
Configure users to be notified: Specify the list of recipients who should receive notifications about termination. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.

**Configure the General Idle Compute Instance Termination Policy Options**

<table>
<thead>
<tr>
<th>Task</th>
<th>To configure the general Idle Compute Instance Termination Policy options:</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Set the following standard policy configuration options when the Idle Compute Instance Termination Policy is applied.</td>
</tr>
<tr>
<td></td>
<td>• Frequency for policy to run: Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.</td>
</tr>
<tr>
<td></td>
<td>• Fully automated vs approval required: Specify at the time it is applied whether the policy will take action after user approval versus automatically without user intervention. For details, see the Skip Action Approvals documentation.</td>
</tr>
</tbody>
</table>

**Customize the Idle Compute Instance Termination Policy**

<table>
<thead>
<tr>
<th>Task</th>
<th>To customize the Idle Compute Instance Termination Policy:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Policy designers can customize the Idle Compute Instance Termination Policy definition in several ways.</td>
</tr>
<tr>
<td></td>
<td>• Change the observation period. By default, this policy calculates utilization over a 30-day period. To calculate over a different period of time, you can update the policy template.</td>
</tr>
<tr>
<td></td>
<td>• Change the script to draw monitoring data for rightsizing from different monitoring tools. Samples are provided for tools including Cloudwatch (AWS), Stackdriver (GCE), LogAnalytics (Azure), and Datadog in the public GitHub repository.</td>
</tr>
</tbody>
</table>

**Review Actions Taken by the Idle Compute Instance Termination Policy**

These actions may occur with approval or fully automated depending on whether the policy manager has selected the Skip approval option.

Any instances that meets the conditions specified will be Terminated.

**Notify Users on How to Use the Idle Compute Instance Termination Policy**

Once the Idle Compute Instance Termination Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the Policy Schedule field. Users can also access this information in the Applied Policies section of the Policies menu.

The Incidents section shows any triggered recommendations.

If Skip Action Approvals has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to Approve or Deny the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.
Unused Storage Deletion

When Compute Instances are terminated, it is fairly common to see that the associated storage resources are not deleted at the same time, whether through the forgetfulness of a human performing manual terminations or an incomplete automated deletion process. Some storage volume types incur cost whether or not they are utilized.

This section walks you through how to:

- Configure the Unused Storage Deletion Policy
- Define the Scope of the Unused Storage Deletion Resources to Include
- Define the Unused Storage Time Period Thresholds for Deletion
- Define the Unused Storage Deletion Actions to Take
- Configure the General Unused Storage Deletion Policy Options
- Customize the Unused Storage Deletion Policy
- Review Actions Taken by the Unused Storage Deletion Policy
- Notify Users on How to Use the Unused Storage Deletion Policy

Configure the Unused Storage Deletion Policy

**Task**

*To configure the Unused Storage Deletion Policy:*

1. From the Policies screen, select the appropriate policy and click **Apply**.
2. Select the options to configure the policy.

Define the Scope of the Unused Storage Deletion Resources to Include

**Task**

*To define the scope of the Unused Storage Deletion resources to include:*

Determine which resources to evaluate for the Unused Storage Deletion Policy.

- To define scope using **Select Accounts**: Specify the list of accounts to evaluate. For example, you may wish to limit the deletion of storage to non-production accounts or to any subset of accounts.
- To define scope using **Tag filtering**: Limit the scope within the selected accounts by specifying tags to exclude. For example, if your production and non-production resources are mixed in your cloud accounts, you can leverage this tag-based filtering functionality to limit the deletion based on an environment tag.

Define the Unused Storage Time Period Thresholds for Deletion

Specify the number of days the volume should be unattached before deletion.
Define the Unused Storage Deletion Actions to Take

**Task**  
*To define the Unused Storage Deletion actions to take:*

Perform the following actions.

- **Configure users to be notified:** Specify the list of recipients who should receive notifications of storage deletion. Add as many recipients as you like to the *Email addresses of the recipients you wish to notify* field. They do not need to be registered as Optima users.

- **Configure automated actions for the policy:** Specify whether you want the recipients to receive an emailed report of deletion recommendations with no automated action, or send the report as well as taking automated action to delete the storage volumes that meet the criteria defined above.

- **Configure whether to take a snapshot:** Check the box if you want the policy to automatically take a final snapshot before deleting.

Configure the General Unused Storage Deletion Policy Options

**Task**  
*To configure the general Unused Storage Deletion Policy options:*

Set the following standard policy configuration options when the Unused Storage Deletion Policy is applied.

- **Frequency for policy to run:** Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

- **Fully automated vs approval required:** Specify at the time it is applied whether the policy will take action after user approval versus automatically without user intervention. For details, see the *Skip Action Approvals* documentation.

Customize the Unused Storage Deletion Policy

**Task**  
*To customize the Unused Storage Deletion Policy:*

Policy designers can customize the Unused Storage Deletion Policy definition as they choose.

Review Actions Taken by the Unused Storage Deletion Policy

These actions may occur with approval or fully automated depending on whether the policy manager has selected the *Skip approval* option.

Any storage that meets the conditions specified will be:

- **Snapshotted** (if the option was selected)

- **Deleted** (if the Email and Delete option was selected)

If the volume is not able to be deleted for any reason, such as the volume being locked, the volume will be tagged to indicate the CloudException error that was received. If the issue causing the delete failure is removed, the next run of the policy will delete the volume.
Note • The unattached volumes report will reflect the updated set of unattached volumes on the subsequent run.

Notify Users on How to Use the Unused Storage Deletion Policy

Once the Unused Storage Deletion Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the Policy Schedule field. Users can also access this information in the Applied Policies section of the Policies menu.

The Incidents section shows any triggered recommendations.

If Skip Action Approvals has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to Approve or Deny the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

Old Snapshot Deletion

Snapshots that sit around for too long outlive their usefulness for backup. Relying on manual deletions often means that old snapshots incur unnecessary cost until someone remembers to check on them. Our Old Snapshot solution sends alerts when snapshots outlive a given timeframe and can also delete them, either automatically or upon approval.

This section walks you through how to:

- Configure the Old Snapshot Deletion Policy
- Define the Scope of the Old Snapshots to Include
- Define the Old Snapshot Time Period Thresholds for Deletion
- Define the Old Snapshot Deletion Actions to Take
- Configure the General Old Snapshot Deletion Policy Options
- Customize the Old Snapshot Deletion Policy
- Review Actions Taken by the Old Snapshot Deletion Policy
- Notify Users on How to Use the Old Snapshot Deletion Policy

Configure the Old Snapshot Deletion Policy

Task To configure the Unused Storage Deletion Policy:

1. From the Policies screen, select the appropriate policy and click Apply.
2. Select the options to configure the policy.
Define the Scope of the Old Snapshots to Include

Task To define the scope of the Old Snapshots to include:

Determine which resources to evaluate for the Old Snapshot Deletion Policy.

- To define scope using Select Accounts: Specify the list of accounts to evaluate. For example, you may wish to limit the deletion of storage to non-production accounts or to any subset of accounts.

- To define scope using Tag filtering: Limit the scope within the selected accounts by specifying tags to exclude. For example, if your production and non-production resources are mixed in your cloud accounts, you can leverage this tag-based filtering functionality to limit the deletion based on an environment tag.

Define the Old Snapshot Time Period Thresholds for Deletion

Specify the age of the snapshot in number of days before deletion.

Define the Old Snapshot Deletion Actions to Take

Task To define the Old Snapshot Deletion actions to take:

Perform the following actions.

1. Configure users to be notified: Specify the list of recipients who should receive the storage deletion notifications. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.

2. Delete the actual snapshot.

Configure the General Old Snapshot Deletion Policy Options

Task To configure the general Old Snapshot Deletion Policy options:

Set the following standard policy configuration options when the Old Snapshot Deletion Policy is applied.

- Frequency for policy to run: Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

- Fully automated vs approval required: Specify at the time it is applied whether the policy will take action after user approval versus automatically without user intervention. For details, see the Skip Action Approvals documentation.

Customize the Old Snapshot Deletion Policy

Task To customize the Old Snapshot Deletion Policy:

Policy designers can customize the Old Snapshot Deletion Policy definition as they choose.
**Review Actions Taken by the Old Snapshot Deletion Policy**

These actions may occur with approval or fully automated depending on whether the policy manager has selected the *Skip approval* option.

Any snapshots that meet the conditions specified will be *Deleted*.

**Notify Users on How to Use the Old Snapshot Deletion Policy**

Once the Old Snapshot Deletion Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the *Policy Schedule* field. Users can also access this information in the *Applied Policies* section of the *Policies* menu.

The *Incidents* section shows any triggered recommendations.

If *Skip Action Approvals* has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to *Approve* or *Deny* the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

**Unused PaaS Service Termination**

Cloud services such as Amazon Web Services (AWS) Elastic Container Service (ECS), Elastic Load Balancing (ELB), and Relational Database Service (RDS) incur wasted cost when sitting idle. Automatically identify idle nodes and, if desired, terminate them to realize savings.

This section walks you through how to:

- Configure the Unused PaaS Service Termination Policy
- Define the Scope of the Unused PaaS Services to Include
- Define the Unused PaaS Service Termination Actions to Take
- Configure the General Unused PaaS Service Termination Policy Options
- Customize the Unused PaaS Service Termination Policy
- Review Actions Taken by the Unused PaaS Service Termination Policy
- Notify Users on How to Use the Unused PaaS Service Termination Policy

**Configure the Unused PaaS Service Termination Policy**

**Task**

*To configure the Unused PaaS Service Termination Policy:*

1. From the *Policies* screen, select the appropriate policy and click *Apply*.
2. Select the options to configure the policy.
Chapter 9  Automated Optimization
Unused PaaS Service Termination

Define the Scope of the Unused PaaS Services to Include

Task  To define the scope of the Unused PaaS Services to include:

Determine which resources to evaluate for underutilization.

- To define scope using Select Accounts: Specify the list of accounts to evaluate. For example, you may wish to limit the termination to non-production accounts or to any subset of accounts.

- To define scope using Tag filtering: Limit the scope within the selected accounts by specifying tags for items to exclude.

Define the Unused PaaS Service Termination Actions to Take

Task  To define the Unused PaaS Service Termination actions to take:

Perform the following action.

Configure users to be notified: Specify the list of recipients who should receive the notifications about termination. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.

Configure the General Unused PaaS Service Termination Policy Options

Task  To configure the general Unused PaaS Service Termination Policy options:

Set the following standard policy configuration options when the Unused PaaS Service Termination Policy is applied.

- Frequency for policy to run: Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

- Fully automated vs approval required: Specify at the time it is applied whether the policy will take action after user approval versus automatically without user intervention. For details, see the Skip Action Approvals documentation.

Customize the Unused PaaS Service Termination Policy

Task  To customize the Unused PaaS Service Termination Policy:

Policy designers can customize the Unused PaaS Service Termination Policy definition in several ways:

- Change the observation period. By default, this policy calculates utilization over a 30-day period. To calculate over a different period of time, you can update the policy template.

- Change the script to draw monitoring data for rightsizing from different monitoring tools (the default is Amazon CloudWatch). Samples are provided for tools such as Datadog in the public GitHub repository.
**Review Actions Taken by the Unused PaaS Service Termination Policy**

These actions may occur with approval or fully automated depending on whether the policy manager has selected the **Skip Action Approvals** option.

This policy gets a list of Relational Database Service (RDS) instances and uses CloudWatch DBConnection metric to check for connections over a 30-day period. If there are no DBConnections, the policy will terminate the RDS instance.

**Notify Users on How to Use the Unused PaaS Service Termination Policy**

Once the Unused Resource Decommissioning Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the **Policy Schedule** field. Users can also access this information in the **Applied Policies** section of the **Policies** menu.

The **Incidents** section shows any triggered recommendations.

If **Skip Action Approvals** has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to **Approve** or **Deny** the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

**Unused Resource Decommissioning**

When network resources such as Internet Protocol (IP) addresses are unused, they can continue to incur cost. Automatically identify any unassociated IP addresses and take automated or approval-driven action to decommission them and eliminate waste.

This section walks you through how to:

- Configure the Unused Resource Decommissioning Policy
- Define the Scope of the Unused Resources to Include
- Define the Unused Resource Decommissioning Actions to Take
- Configure the General Unused Resource Decommissioning General Policy Options
- Customize the Unused Resource Decommissioning Policy
- Review Actions Taken by the Unused Resource Decommissioning Policy
- Notify Users on How to Use the Unused Resource Decommissioning Policy

**Configure the Unused Resource Decommissioning Policy**

**Task**

To configure the Unused Resource Decommissioning Policy:

1. From the **Policies** screen, select the appropriate policy and click **Apply**.

2. Select the options to configure the policy.
**Chapter 9  Automated Optimization**

**Unused Resource Decommissioning**

**Define the Scope of the Unused Resources to Include**

**Task**  
To define the scope of the Unused Resources to include:

Determine which resources to evaluate for the Unused Resource Decommissioning Policy.

- To define scope using **Select Accounts**: Specify the list of accounts to evaluate. For example, you may wish to limit the deletion of resources to non-production accounts or to any subset of accounts.

- To define scope using **Safelisting**: Limit the scope within the selected accounts by specifying Internet Provider (IP) addresses to exclude. For example, if your production and non-production resources are mixed in your cloud accounts, you can leverage this safelisting functionality to prevent the deletion of specific IP addresses.

**Define the Unused Resource Decommissioning Actions to Take**

**Task**  
To define the Unused Resource Decommissioning actions to take:

**Configure users to be notified**: Specify the list of recipients who should receive notifications of Internet Provider (IP) address deletion. Add as many recipients as you like to the **Email addresses of the recipients you wish to notify** field. They do not need to be registered as Optima users.

**Configure the General Unused Resource Decommissioning General Policy Options**

**Task**  
To configure the general Unused Resource Decommissioning Policy options:

Set the following standard policy configuration options when the Unused Resource Decommissioning Policy is applied.

- **Frequency for policy to run**: Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

- **Fully automated vs approval required**: Specify at the time it is applied whether the policy will take action after user approval versus automatically without user intervention. For details, see the [Skip Action Approvals](#) documentation.

**Customize the Unused Resource Decommissioning Policy**

**Task**  
To customize the Unused Resource Decommissioning Policy:

Policy designers can customize the Unused Resource Decommissioning Policy definition as they choose, such as to act on additional network resources.

**Review Actions Taken by the Unused Resource Decommissioning Policy**

These actions may occur with approval or fully automated depending on whether the policy manager has selected the **Skip approval** option.

Any Internet Provider (IP) address that meets the conditions specified will be **Deleted**.
Notify Users on How to Use the Unused Resource Decommissioning Policy

Once the Unused Resource Decommissioning Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the **Policy Schedule** field. Users can also access this information in the **Applied Policies** section of the **Policies** menu.

The **Incidents** section shows any triggered recommendations. If **Skip Action Approvals** has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to **Approve** or **Deny** the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

### Instance Scheduling

Running all Compute instances nonstop is like leaving the lights on in the office after the employees have gone home. Set tags to indicate which instances are required 24/7 and which are only in use during work hours. Then save approximately 65% of instance cost by automatically stopping these Compute instances on nights and weekends. Instance Scheduling is typically one of the largest areas of potential optimization for cloud cost savings.

This section walks you through how to:

- Configure Instance Scheduling
- Specify Instance Scheduling Tags
- Configure the Instance Scheduling Policy
- Define the Scope of the Instances to Include for Scheduling
- Define the Instance Scheduling Actions to Take
- Configure the General Instance Scheduling Policy Options
- Customize the Instance Scheduling Policy
- Review Actions Taken by the Instance Scheduling Policy
- Notify Users on How to Use the Instance Scheduling Policy

**Configure Instance Scheduling**

You will define the desired schedule for each instance using a tag on the instance. The policy will then look for the tags and start and stop the instances on that schedule.

The tag `instance:schedule` defines the schedule when you want each instance to run. The schedule consists of a start hour, stop hour, and days of the week. The start and stop hour are in 24-hour format, and the days of the week are two-character abbreviations, for example: MO, TU, WE. Use an optional time zone TZ value to indicate a time zone to stop or start the instance.

**Specify Instance Scheduling Tags**

**Start and Stop hours:** 24-hour format: for example, 8-17 is start at 8 a.m. and stop at 5 p.m.
**Days of the week:** SU, MO, TU, WE, TH, FR, SA

**Time zone:** Optionally, use the TZ database name from the Time Zone List. For example, use America/New_York for Eastern time. Times default to Coordinated Universal Time (UTC) if no value is provided in the time zone field.

For example, the tag `instance:schedule=8-17;MO,TU,WE,TH,FR;America/New_York` will start the instance at 8 a.m. and stop it at 5 p.m. Monday-Friday, Eastern Time.

To automate setting default schedule tags, use the Unboxed Resource Policy.

### Configure the Instance Scheduling Policy

**Task**

To configure the Instance Scheduling Policy:

1. From the Policies screen, select the appropriate policy and click **Apply**.
2. Select the options to configure the policy.

### Define the Scope of the Instances to Include for Scheduling

**Task**

To define the scope of the instances to include for scheduling:

Determine which resources to include in the scheduling policy by clicking **Select Accounts** to specify the list of accounts to evaluate. You may wish to limit the rightsizing to non-production accounts or to any subset of accounts.

### Define the Instance Scheduling Actions to Take

**Task**

To define the Instance Scheduling actions to take:

Perform the following action.

Select users to be notified: Specify the list of recipients who should receive email reports about scheduling. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.

### Configure the General Instance Scheduling Policy Options

**Task**

To configure the general Instance Scheduling Policy options:

Set the following standard policy configuration options when the Instance Scheduling Policy is applied.

- **Frequency for policy to run:** Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

- **Fully automated vs approval required:** Specify at the time when applied whether the policy will take action after user approval versus automatically without user intervention. Please see the Skip Action Approvals documentation.
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Reservation Purchase Recommendation

Note • Approvals may delay the start and stop schedule, so it is recommended to operate this policy with Skip Approvals activated.

Customize the Instance Scheduling Policy

Task

To customize the Instance Scheduling Policy:

Policy designers can customize the Instance Scheduling Policy definition in several ways:

- Add actions to be taken before stopping the instances, such as snapshotting.
- Allow user input of commands to take before stopping instances.
- Control the order in which actions are taken.
- Provide scheduling of other services, such as Database as a Service (DBaaS) instances.

Review Actions Taken by the Instance Scheduling Policy

Any instances that meet the conditions specified will be stopped and started at the appropriate times. While the instances are stopped, they will no longer incur charges.

Notify Users on How to Use the Instance Scheduling Policy

Once the Reservation Expiration Alert Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the Policy Schedule field. Users can also access this information in the Applied Policies section of the Policies menu.

The Incidents section shows any triggered recommendations that will match those sent out in the emailed report.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

Reservation Purchase Recommendation

Buying reservations on Compute instances is a popular cost savings strategy, but it can just as easily create additional waste if the reservations are not well matched to the active instances in your environment. How do you know how many to buy and which kind? We walk you through the options and provide purchase recommendations for Amazon Web Services (AWS) and Azure Reserved Instances to guide your purchase, minimizing risk, and maximizing your savings.

This section walks you through how to:

- Define the Scope of the Resources to Include
- Define the Reservation Purchase Parameters
- Define the Reservation Purchase Actions to Take
- Configure the General Reservation Purchase Policy Options
- Customize the Reservation Purchase Policy
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Reservation Purchase Recommendation

• Actions Taken by the Reservation Purchase Policy
• Notify Users on How to Use the Reservation Purchase Policy

Define the Scope of the Resources to Include

Task  To define the scope of the resources to include:

Determine which resources to evaluate for the policy by clicking Select Accounts to specify the list of accounts to evaluate.

Define the Reservation Purchase Parameters

Task  To define the reservation purchase parameters:

Input the following parameters to launch the Reservation Purchase Policy for each vendor.

Amazon Web Services (AWS):

• Look Back Period - Specify the number of days of past usage to analyze.
• Service - Specify the AWS Service to search for Reserved Instances (RIs).
• EC2 Specification - If the Service is "EC2", specify whether to look for Standard or Convertible RIs. For Services besides EC2, this parameter will be ignored.
• RI Term - Specify the Term length for the RI.
• Payment Option - Optionally, specify the payment option for this RI (all upfront, no upfront, etc.).
• Net Savings Threshold - Specify the minimum Net Savings that should result in an RI purchase recommendation.

Microsoft Azure:

• Enrollment ID - the Microsoft Azure Enterprise Agreement (EA) enrollment ID.
• Look Back Period - Specify the number of days of past usage to analyze.
• Net Savings Threshold - Specify the minimum Net Savings that should result in an RI purchase recommendation.

Define the Reservation Purchase Actions to Take

Task  To define the Reservation Purchase actions to take:

Perform the following action.

Configure users to be notified: Specify the list of recipients who should receive the Reserved Instance (RI) purchase plan. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.
Configure the General Reservation Purchase Policy Options

**Task** To configure the general Reservation Purchase Policy options:

Set the following standard policy configuration options when the Reservation Purchase Policy is applied.

- **Frequency for policy to run:** Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

- **Fully automated vs approval required:** Specify at the time when applied whether the policy will take action after user approval versus automatically without user intervention. Please see the Skip Action Approvals documentation.

**Note** • This is a reporting-only policy, so the Skip Action Approvals toggle will have no effect.

Customize the Reservation Purchase Policy

**Task** To customize the Reservation Purchase Policy:

Policy designers can customize the Reservation Purchase Policy definition as they choose.

**Actions Taken by the Reservation Purchase Policy**

The Reservation Purchase Policy will produce a purchase plan for buying reservations that meet the conditions specified and an estimation of savings if the purchases are made. The policy does not purchase the recommendations.

Notify Users on How to Use the Reservation Purchase Policy

Once the Reservation Purchase Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the Policy Schedule field. Users can also access this information in the Applied Policies section of the Policies menu.

The Incidents section shows any triggered recommendations that will match those sent out in the emailed purchase plan.

If Skip Action Approvals has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to Approve or Deny the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

Reservation Expiration Alert

Replacing Reserved Instances promptly as they expire is critical to maximizing cost savings, but it can take time to review purchase plans and get approvals. The Reservation Expiration Alert gives you advance notice of pending expirations, so you have time to organize your replacement purchase.

This section walks you through how to:

- **Configure the Reservation Expiration Alert**
• Define the Scope of the Reserved Instances to Include
• Define the Thresholds for Alerting
• Define the Reservation Expiration Alert Actions to Take
• Configure the General Reservation Expiration Alert Policy Options
• Customize the Reservation Expiration Alert Policy
• Actions Taken by the Reservation Expiration Alert Policy
• Notify Users on How to Use the Reservation Expiration Alert Policy

Configure the Reservation Expiration Alert

Task  
To configure the Instance Rightsizing Policy:

1. From the Policies screen, select the appropriate policy and click Apply.
2. Select the options to configure the policy.

Define the Scope of the Reserved Instances to Include

Task  
To define the scope of the Reserved Instances to include:

Determine which resources to evaluate for the policy by clicking Select Accounts to specify the list of accounts to evaluate.

Define the Thresholds for Alerting

Having defined a scope, you will need to set a number of days prior to the expiration date to receive an alert.

Define the Reservation Expiration Alert Actions to Take

Task  
To define the Reservation Expiration Alert actions to take:

Perform the following action.

Configure users to be notified: Specify the list of recipients who should receive the expiration alert notifications. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.

Configure the General Reservation Expiration Alert Policy Options

Task  
To configure the general Reservation Expiration Alert Policy options:

Set the following standard policy configuration options when the Reservation Expiration Alert Policy is applied.

• Frequency for policy to run: Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.
- **Fully automated vs approval required:** Specify at the time when applied whether the policy will take action after user approval versus automatically without user intervention. Please see the [Skip Action Approvals](#) documentation.

**Note** • This is a reporting-only policy, so the [Skip Action Approvals](#) toggle will have no effect.

### Customize the Reservation Expiration Alert Policy

**Task**

To customize the **Reservation Expiration Alert Policy**:

Policy designers can customize the Reservation Expiration Alert Policy definition as they choose.

**Actions Taken by the Reservation Expiration Alert Policy**

The Reservation Expiration Alert Policy will send out an email notification alerting of any Reserved Instances (RIs) expiring within the specified number of days.

### Notify Users on How to Use the Reservation Expiration Alert Policy

Once the Reservation Expiration Alert Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the [Policy Schedule](#) field. Users can also access this information in the [Applied Policies](#) section of the [Policies](#) menu.

The **Incidents** section shows any triggered recommendations that will match those sent out in the emailed purchase plan.

If [Skip Action Approvals](#) has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to [Approve](#) or [Deny](#) the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

### Object Storage Class Optimization

Moving your storage objects to warmer or colder classes according to consumption is an effective savings strategy, but manually assessing the appropriate class for each resource can be complicated and time consuming. Our Object Storage Class Optimization capability assesses observed access patterns after objects have persisted for a given period of time, then offers adjustments to reduce waste.

This section walks you through how to:

- **Configure the Object Storage Class Optimization Policy**
- **Define the Scope of the Object Storage Resources to Include**
- **Define the Threshold for Moving to Cooler Storage**
- **Define the Object Storage Class Optimization Actions to Take**
- **Configure the General Object Storage Class Optimization Policy Options**
Customize the Object Storage Class Optimization Policy
Review Actions Taken by the Object Storage Class Optimization Policy
Notify Users on How to Use the Object Storage Class Optimization Policy

Configure the Object Storage Class Optimization Policy

Task
To configure the Instance Rightsizing Policy:

1. From the Policies screen, select the appropriate policy and click Apply.
2. Select the options to configure the policy.

Define the Scope of the Object Storage Resources to Include

Task
To define the scope of the Object Storage Class resources to include:

Define the Threshold for Moving to Cooler Storage

Specify the number of days after which the item will be moved to a cooler storage option. You can set different lengths of time for each level of storage.

Define the Object Storage Class Optimization Actions to Take

Task
To define the Object Storage Class Optimization actions to take:

Perform the following action.

Configure users to be notified: Specify the list of recipients who should receive notifications about rightsizing. Add as many recipients as you like to the Email addresses of the recipients you wish to notify field. They do not need to be registered as Optima users.

Configure the General Object Storage Class Optimization Policy Options

Task
To configure the general Object Storage Class Optimization Policy options:

Set the following standard policy configuration options when the Object Storage Class Optimization Policy is applied.
• **Frequency for policy to run:** Specify the frequency the policy will perform the checks, such as weekly, daily, hourly, or every 15 minutes.

• **Fully automated vs approval required:** Specify at the time when applied whether the policy will take action after user approval versus automatically without user intervention. Please see the [Skip Action Approvals] documentation.

### Customize the Object Storage Class Optimization Policy

#### Task

**To customize the Object Storage Class Optimization Policy:**

Policy designers can customize the policy definition as they choose, such as:

- Customize the policy to move to warmer storage classes.
- Leverage log data from cloud provider to determine last access dates.

### Review Actions Taken by the Object Storage Class Optimization Policy

These actions may occur with approval or fully automated depending on whether the policy manager has selected the [Skip Action Approvals] option.

- Any Amazon Web Services (AWS) storage that meets the conditions specified will be copied to the new type, and the old version will be removed.

- Microsoft Azure and Google storage that meet the conditions specified will be switched directly over to the new type.

### Notify Users on How to Use the Object Storage Class Optimization Policy

Once the Reservation Expiration Alert Policy has been configured and applied, any email addresses specified will receive an email report listing every recommendation triggered on the cadence selected in the Policy Schedule field. Users can also access this information in the Applied Policies section of the Policies menu.

The Incidents section shows any triggered recommendations that will match those sent out in the emailed purchase plan.

If [Skip Action Approvals] has been activated, optimization actions will be taken automatically. If not, users can click into the incident and a specific account to Approve or Deny the recommended action.

Depending on user access, these policy activity summaries are visible on an account-by-account basis or, for administrators, as an organizational summary.

### Scheduled Report with Forecast

This feature allows you to set up scheduled reports that will provide summaries of cloud cost across all resources in the billing centers you specify as well as estimated costs for the next 3 months, delivered to any email addresses you specify.

This section describes:

- Scheduled Report with Forecast Functionality
Scheduled Report with Forecast Functionality

The Scheduled Report email includes a chart of the previous 6 months of utilization based on whichever reporting dimension you select (only bill data and Optima-generated dimensions are supported).

The chart includes the following values:

- **Daily Average - Weekly** - Daily average costs calculated from Monday of the previous week through today
- **Daily Average - Monthly** - Daily average costs calculated from the 1st of the previous month through today
- **Previous - Weekly** - Total costs during previous full week (Monday-Sunday)
- **Previous - Monthly** - Total costs during previous full month
- **Current - Weekly** - Total costs during current (incomplete) week
- **Current - Monthly** - Total costs during current (incomplete) month
- **Monthly Estimated Cost** for each metric for the next 3 months based on previous costs

*Best Practice* • We recommend running this report on a weekly cadence and applying it to your primary account.

*Note* • The last 3 days of data in the current week or month will contain incomplete data.

*Note* • The account you apply this feature to is unimportant as Optima metrics are scoped to the Organization.

Scheduled Report with Forecast Cost Metrics

There are four cost metrics to choose from.

- **Unamortized Unblended** - One-time and upfront costs are shown at the time of purchase. (AWS Only) Savings from reserved instances are applied first to matching instances in the account where it was purchased.
- **Amortized Unblended** - One-time and upfront costs are spread evenly over the term of the item purchased. (AWS Only) Savings from reserved instances are applied first to matching instances in the account where it was purchased.
- **Unamortized Blended** - One-time and upfront costs are shown at the time of purchase. (AWS Only) Savings from reserved instances are shared equally by all matching instances in all accounts.
- **Amortized Blended** - One-time and upfront costs are spread evenly over the term of the item purchased. (AWS Only) Savings from reserved instances are shared equally by all matching instances in all accounts.

Scheduled Report with Forecast Input Parameters

This feature requires the following input parameters during configuration.
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Monthly Actual vs Budgeted Spend Report

- **Email list** - Email addresses of the recipients you wish to notify
- **Billing Center List** - List of top-level Billing Center names you want to report on. Names must be exactly as shown in Optima. Leave the field blank to report on all top-level Billing Centers.
- **Graph Dimension** - The cost dimension by which to break out the cost data in the embedded bar chart image

**Scheduled Report with Forecast Required User Roles**

This feature requires permissions to access Optima resources. A user who wishes to configure scheduled reports will require the following role, which should be applied to each account where reporting is desired or to the entire organization. For more information on modifying roles, read the Governance User Roles documentation.

**Optima - billing_center_viewer**

**Scheduled Report with Forecast Supported Clouds**

- AWS
- Azure
- Google

**Monthly Actual vs Budgeted Spend Report**

This feature allows you to set up scheduled reports that will provide monthly actual vs budgeted cloud cost across all resources in the Billing Center(s) you specify, delivered to any email addresses you specify.

This section describes:

- **Monthly Actual vs Budgeted Spend Report Functionality**
- **Monthly Actual vs Budgeted Spend Report Cost Metrics**
- **Monthly Actual vs Budgeted Spend Report Input Parameters**
- **Monthly Actual vs Budgeted Spend Report Required Permissions**
- **Monthly Actual vs Budgeted Spend Report Supported Clouds**

**Monthly Actual vs Budgeted Spend Report Functionality**

The scheduled report emails provide a report with a bar chart of actual vs budgeted spend for the current month.

**Best Practice** • *We recommend running this report on a weekly cadence and applying it to your primary account.*

**Important** • *The monthly budget inputs are compared against the current month’s actual cloud costs of the applied feature. As a best practice, terminate and reconfigure reports on an annual basis to reflect the current year’s monthly budgeted cloud costs.*
**Note** • The last 3 days of data in the current week or month will contain incomplete data.

**Note** • The account you apply the feature to is unimportant as Optima metrics are scoped to the Organization.

**Monthly Actual vs Budgeted Spend Report Cost Metrics**

There are four cost metrics to choose from.

- **Unamortized Unblended** - One-time and upfront costs are shown at the time of purchase. (AWS Only) Savings from reserved instances are applied first to matching instances in the account where it was purchased.

- **Amortized Unblended** - One-time and upfront costs are spread evenly over the term of the item purchased. (AWS Only) Savings from reserved instances are applied first to matching instances in the account where it was purchased.

- **Unamortized Blended** - One-time and upfront costs are shown at the time of purchase. (AWS Only) Saving from reserved instances are shared equally by all matching instances in all accounts.

- **Amortized Blended** - One-time and upfront costs are spread evenly over the term of the item purchased. (AWS Only) Saving from reserved instances are shared equally by all matching instances in all accounts.

**Monthly Actual vs Budgeted Spend Report Input Parameters**

This feature requires the following input parameters during configuration.

- **Email list** - Email addresses of the recipients you wish to notify

- **Billing Center List** - List of top-level Billing Center names you want to report on. Names must be exactly as shown in Optima. Leave the field blank to report on all top-level Billing Centers.


- **January Budgeted Cost** - January budgeted cost for corresponding Billing Center

- **February Budgeted Cost** - February budgeted cost for corresponding Billing Center

- **March Budgeted Cost** - March budgeted cost for corresponding Billing Center

- **April Budgeted Cost** - April budgeted cost for corresponding Billing Center

- **May Budgeted Cost** - May budgeted cost for corresponding Billing Center

- **June Budgeted Cost** - June budgeted cost for corresponding Billing Center

- **July Budgeted Cost** - July budgeted cost for corresponding Billing Center

- **August Budgeted Cost** - August budgeted cost for corresponding Billing Center

- **September Budgeted Cost** - September budgeted cost for corresponding Billing Center

- **October Budgeted Cost** - October budgeted cost for corresponding Billing Center

- **November Budgeted Cost** - November budgeted cost for corresponding Billing Center

- **December Budgeted Cost** - December budgeted cost for corresponding Billing Center
Monthly Actual vs Budgeted Spend Report Required Permissions

This feature requires permissions to access Optima resources. Before applying this feature, add the following role for the user hoping to leverage this functionality. The role should be applied to any individual accounts where the feature will run, or to the entire organization to apply to all accounts. For more information on modifying roles, read the Governance User Roles documentation.

Optima - billing_center_viewer

Monthly Actual vs Budgeted Spend Report Supported Clouds

- AWS
- Azure
- Google

Budget Alert

This feature is used to determine if a Billing Center or the entire Organization has exceeded its monthly cost budget.

This section describes:

- Budget Alert Functionality
- Budget Alert Input Parameters
- Budget Alert Required Permissions
- Budget Alert Supported Clouds

Budget Alert Functionality

- This feature supports a single target (that is, one specific Billing Center or the entire Organization). To apply a budget alert for multiple targets, you need to apply this feature multiple times.
- Actual Spend budget alerts will raise an incident when the target has exceeded the budget for the month.
- Forecasted Spend budget alerts will raise an incident when the target’s run rate is on track to exceed the budget for the month.

Budget Alert Input Parameters

This feature requires the following input parameters during configuration.

- Monthly Budget - Specify the monthly budget. Currency is irrelevant; the feature will default to whichever currency is used in Optima.
- Budget Scope - Organization or Billing Center
- Billing Center Name - If the scope is “Billing Center”, supply the name of the target Billing Center.
- Cost Metric - Specify options for amortized vs nonamortized and blended vs unblended costs.
- Budget Alert Type - Actual Spend or Forecasted Spend
- Email addresses of the recipients you wish to notify - A list of email addresses to notify
Budget Alert Required Permissions

This feature requires permissions to access Optima resources. Before applying this feature, add the following roles for the user hoping to leverage this functionality. The roles should be applied to any individual accounts where the feature will run, or to the entire organization to apply to all accounts. For more information on modifying roles, read the Governance User Roles documentation.

- feature_manager
- billing_center_viewer

Note • The billing_center_viewer role must be applied at the Organization level.

Budget Alert Supported Clouds

- AWS
- Azure
- Google

Billing Center Cost Anomaly Detection

The Cost Anomaly Detection feature analyzes the spend of all Billing Centers in an Organization over a specified time period. If the percentage change of the most recent period compared to the previous period exceeds the specified threshold, then an email alert is sent out to any addresses indicated during configuration.

This section describes:

- Billing Center Cost Anomaly Functionality
- Billing Center Cost Anomaly Input Parameters
- Billing Center Cost Anomaly Required Permissions
- Billing Center Cost Anomaly Supported Clouds

Billing Center Cost Anomaly Functionality

- The feature polls all Billing Centers, looking for any that have exceeded the Percent Change threshold.
- The last 2 days are not included in the analysis, due to potential delays of the cloud providers updating their billing data.

Billing Center Cost Anomaly Input Parameters

- Time Period • Number of days to analyze in each period. For example, if 6 days is set, then the latest time period will be 8 days ago to 3 days ago (to account for cloud provider bill delays) and the previous time period will be 14 days ago to 9 days ago.
  - Minimum Value: 1
  - Maximum Value: 31
• **Anomaly Threshold** - Percentage change threshold. If the percentage change of Billing Center spend from the latest time period compared to the previous time period exceeds this value, then a report is sent out via email.

• **Cost Metric** - Specify options for amortized vs nonamortized and blended vs unblended costs

• **Email addresses of the recipients you wish to notify** - A list of email addresses to notify

**Billing Center Cost Anomaly Required Permissions**

This feature requires permissions to access Optima resources. Before applying this feature, add the following roles for the user hoping to leverage this functionality. The roles should be applied to any individual accounts where the feature will run, or to the entire organization to apply to all accounts. For more information on modifying roles, read the [Governance User Roles documentation](#).

• Feature Manager

• Billing Center Viewer

**Billing Center Cost Anomaly Supported Clouds**

• AWS

• Azure

• Google

**AWS Reserved Instance Coverage Report**

This feature retrieves the Reserved Instance coverage data for your account and sends out a coverage report to the email addresses the user specified in the field: **Email addresses of the recipients you wish to notify**.

This section describes:

• **AWS Reserved Instance Coverage Report Input Parameters**

• **AWS Reserved Instance Coverage Report Required Permissions**

• **AWS Reserved Instance Coverage Report: AWS Required Permissions**

• **AWS Reserved Instance Coverage Report Supported Clouds**

**AWS Reserved Instance Coverage Report Input Parameters**

This feature requires the following input parameters during configuration.

• **Number of days in the past to view Reserved Instance Coverage** - allowed values 7,14,30,90,180,365

• **Email addresses of the recipients you wish to notify** - A list of email addresses to notify

**AWS Reserved Instance Coverage Report Required Permissions**

• Cloud Management - Actor

• Cloud Management - Observer

• Cloud Management - credential_viewer
AWS Reserved Instance Coverage Report: AWS Required Permissions

This feature requires permissions to describe AWS Cost Explorer GetReservationCoverage. The Cloud Management Platform automatically creates two Credentials when connecting AWS to Cloud Management: `AWS_ACCESS_KEY_ID` and `AWS_SECRET_ACCESS_KEY`. The IAM user credentials contained in those credentials require the following permissions:

```json
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": "ce:GetReservationCoverage",
            "Resource": "*"
        }
    ]
}
```

AWS Reserved Instance Coverage Report Supported Clouds

AWS

AWS Reserved Instance Utilization Report

This feature leverages AWS Reserved Instance (RI) data to generate a report. It will notify by email only if utilization of a RI falls below the value specified in the field: **Show RI's with utilization below this value**. If any reservations are lower in utilization than the threshold, a report goes out by email to the user(s) specified in: **Email addresses of the recipients you wish to notify**.

This section describes:

- AWS Reserved Instance Utilization Report Input Parameters
- AWS Reserved Instance Utilization Report Required Permissions
- AWS Reserved Instance Utilization Report Supported Clouds

AWS Reserved Instance Utilization Report Input Parameters

This feature requires the following input parameters during configuration.

- **Show RI's with utilization below this value**
- **Email addresses of the recipients you wish to notify**: A list of email addresses to notify

**Note** - As a best practice, this feature should only be applied to the Master Account, and not to each individual Account.

AWS Reserved Instance Utilization Report Required Permissions

This feature requires permissions to access Optima resources. Before applying this feature, add the following roles for the user hoping to leverage this functionality. The roles should be applied to any individual accounts where the feature will run, or to the entire organization to apply to all accounts. For more information on modifying roles, read the Governance User Roles documentation.
Azure Reserved Instance Utilization Report

This feature produces reports on the utilization level of Azure Reserved Instances (RI). It leverages the Azure EA API for Reserved Instance Utilization. It will notify only if utilization of a RI falls below the value specified in the field: Show RI's with utilization below this value. It examines the RI utilization for the prior 7 days (starting from 2 days ago) in making this determination.

It will email the users specified in Email addresses of the recipients you wish to notify.

This section describes:

- Azure Reserved Instance Utilization Report Required Permissions
- Azure Reserved Instance Utilization Report Input Parameters
- Azure Reserved Instance Utilization Report Feature Actions
- Azure Reserved Instance Utilization Report: Optima Required Permissions
- Azure Reserved Instance Utilization Report: Azure Required Permissions
- Azure Reserved Instance Utilization Report Supported Clouds

Azure Reserved Instance Utilization Report Required Permissions

This feature requires external permissions to access Azure resources. Before applying this feature, add the following role for the user hoping to leverage this functionality.

AZURE_EA_KEY - the Azure EA key for the enrollment being checked

Azure Reserved Instance Utilization Report Input Parameters

This feature has the following input parameters required when launching the feature.

- Enrollment ID - the Azure EA enrollment ID
- Show RI's with utilization below this value
- Email addresses of the recipients you wish to notify - A list of email addresses to notify

Azure Reserved Instance Utilization Report Feature Actions

The following feature action is taken on any resources found to be out of compliance.

Send an email report.
**Azure Reserved Instance Utilization Report: Optima Required Permissions**

- Cloud Management - Actor
- Cloud Management - Observer
- Cloud Management - credential_viewer

**Azure Reserved Instance Utilization Report: Azure Required Permissions**

Microsoft.Consumption/reservationSummaries/read

**Azure Reserved Instance Utilization Report Supported Clouds**

Azure

---

**AWS Instance CloudWatch Utilization**

This feature gathers AWS CloudWatch data for instances on 30-day intervals.

⭐️

**Best Practice** • We recommend running the AWS CloudWatch data on a monthly basis.

This section describes:

- AWS Instance CloudWatch Required Permissions
- AWS Instance CloudWatch Functionality
- AWS Instance CloudWatch: Windows Support
- AWS Instance CloudWatch Input Parameters
- AWS Instance CloudWatch: AWS Required Permissions
- AWS Instance CloudWatch Supported Clouds
- AWS Instance CloudWatch Observation Period

**AWS Instance CloudWatch Required Permissions**

**Optima Cloud Management Roles**

- credential_viewer, observer
- feature_designer, feature_manager, and feature_publisher

**AWS IAM Feature**

CloudWatchReadOnlyAccess

**AWS Instance CloudWatch Functionality**

- This feature identifies all instances reporting performance metrics to CloudWatch whose CPU or Memory utilization is below the thresholds set in the *Average used memory percentage* and *Average used CPU percentage* parameters.
• The **Exclusion Tag Key** parameter is a string value. Only supply the Tag Key. Tag Values are not analyzed and therefore are not needed. If the exclusion tag key is used on an Instance, that Instance is presumed to be exempt from this feature.

• This feature sets the tag defined in the **Action Tag Key:Value** parameter on the underutilized instances that were identified.

• If you get an **N/A** in a field, you need to install the CloudWatch Agent on the instance to get those metrics.

• This feature only pulls running instances, as it is unable to get correct monitoring metrics from instances in other states.

**AWS Instance CloudWatch: Windows Support**

To enable Windows support, you need to add the following to your `cloudwatch config.json` and restart the CloudWatch agent.

```
"metrics": {
   "append_dimensions": {
      "AutoScalingGroupName": "${aws:AutoScalingGroupName}",
      "ImageId": "${aws:ImageId}",
      "InstanceId": "${aws:InstanceId}"
   }
}
```

**AWS Instance CloudWatch Input Parameters**

This feature requires the following input parameters during configuration.

• **Email addresses of the recipients you wish to notify** - A list of email addresses to notify

• **Average used memory percentage** - Utilization below this percentage will trigger an action to tag the instance. Providing -1 will turn off this metric for consideration.

• **Average used CPU percentage** - Utilization below this percentage will trigger an action to tag the instance. Providing -1 will turn off this metric for consideration.

• **Exclusion Tag Key** - An AWS-native instance tag to ignore instances that you don’t want to consider for downsizing. Only supply the tag key.

• **Action Tag Key:Value** - The tag key:value pair to set on an instance that is underutilized.

**AWS Instance CloudWatch: AWS Required Permissions**

This feature requires permissions to list Metrics and Get Metric Statistics from the AWS Cloudwatch API. The Cloud Management Platform automatically creates two Credentials when connecting AWS to Cloud Management; AWS_ACCESS_KEY_ID and AWS_SECRET_ACCESS_KEY. The IAM user credentials contained in those credentials will require the following permissions:

```
```
AWS Instance CloudWatch Supported Clouds

AWS Instance CloudWatch Observation Period

By default, this feature calculates utilization over a 30-day period.

To calculate over a different period of time, you can update the feature template.

Replace the 30 wherever you see `var start_date = new Date(new Date().setDate(new Date().getDate() - 30)).toISOString();` with the new number of days you want to use.

Depending on the number of days you choose to collect metrics for, you may need to update the `period` property. For 30 days, we use the value of 2592000, which is 30 days in seconds. You will need to update the value wherever you see `'Period': "2592000"`. For more details, see the official AWS CloudWatch API Documentation.
Optima Recommendations help you discover and realize saving opportunities to reduce your cloud spend. It includes a variety of features, including:

- Optimizing costs across all of your clouds
- Automated recommendations
- Ad hoc sharing recommendations with team members
- Customization of recommendations
- Noise reductions to prevent future alerts on a specified item

This section provides the following Optima recommendation information:

- Accessing Optima Recommendations
- How Recommendations Work
- List of Optima Recommendations
- Reviewing Optima Recommendations
- Exporting Recommendations as CSV
- Optima Recommendation Rules Details and Configurations
- Optima Recommendation Actions
- Optima Recommendation FAQs

### Accessing Optima Recommendations

Optima provides you recommendations at different levels of granularity to make it easier to take actions.

- **Organization level view**: If you wish to see all recommendations for your RightScale Organization, navigate to [optima.rightscale.com](http://optima.rightscale.com). You will need **actor role** (organization scope) permissions to edit recommendations settings and **observer role** (organization scope) permissions to view recommendations.
• **Billing center level view:** If you wish to see recommendations, specific to a billing center, simply navigate to the billing centers from analytics.rightscale.com and you will see a Recommendations tab within each Billing Centers. For details, see the Optima Billing Centers Guide.

## How Recommendations Work

Optima includes a recommendations engine that embodies a number of rules that analyze cloud consumption data and produce recommendations for reducing costs. The set of rules is fixed and provided by RightScale but each rule can be customized using settings. These settings have defaults provided by RightScale but can be changed to fit each organization’s business needs. For example, one of the rules recommends the use of cheaper regions (AWS Ohio is cheaper than AWS Toronto) and for many organization this rule can flag waste, but clearly for some organizations the use of the Toronto region is intentional. These organizations can modify the setting that maps expensive to cheaper regions to better reflect their needs.

Each rule in Optima can produce many recommendations and, in general, a rule produces one recommendation per cloud resource. For example, the rule that flags instances that could be relaunched in a cheaper region produces one recommendation per instance. The recommendations are grouped by rule in the UI and can be filtered to provide an overview about the savings embodied by all recommendations produced by a rule. Having a separate recommendation for each resource makes it easier to dole out specific recommendations to the appropriate stakeholders, to track the status of each affected resource, and to hook-up automation.

To calculate savings, Optima uses an estimated current monthly run-rate that is generally calculated over the 7 days preceding the last available data. In essence, recommendations state that if the consumption were to continue indefinitely at the same rate as observed over the past 7 days then by following the recommendation monthly savings of the specified value would be obtained. The monthly run rate includes monthly and daily up-front costs as well as hourly costs (for example, many AWS EC2 reserved instances have a monthly cost and it is common for the run-rate of an instance to be a combination of a portion of this monthly cost and hourly costs).

In addition to settings, Optima also allows individual recommendations to be ignored and patterns to be written to automatically ignore recommendations. There is a subtle difference between settings and ignoring, which is that settings prevent a recommendation from being issued while ignoring a recommendation just marks it as ignored. The ignored recommendations remain part of the user’s workflow in Optima in that it is easy to see the value of all ignored recommendations and to come back to them later by placing an expiration on the ignore status. As an example, a setting to recommend moving usage from the AWS N. California region to the cheaper AWS Oregon region may make sense for an organization in general, but a small set of resources tagged norcal may need to remain there for latency reasons, and another set may need to be moved but need to wait 3 months for personnel to become available. In such a situation an ignore pattern based on the tag can auto-ignore the first set of resources, and a manual ignore with a 3 month expiration can provide a reminder for the second set. The forgone and impending savings remain visible at any point in time by checking the ignored recommendations in the Optima UI.

The recommendations produced by Optima, as well as the settings and ignore patterns that modify them, are organization-wide, meaning that all users see the same recommendations based on the same settings and with the same status (active, ignored, etc). This ensures that when recommendations are shared between users all parties see the same data.

Optima uses two primary data sources for helping you manage costs:

- **Bill data:** Bill information is collected from your public cloud provider to enable an accurate view of all of your costs across your accounts and services.

- **Usage data:** Usage data is collected from RightScale Cloud Management to provide additional detail for slicing and dicing costs across many different dimensions.
Recommendations in Optima operate on either Bill data or Usage data depending on the recommendation. However, the existing functionality from Optima operates on both Bill data and Usage data.

Follow the instructions below to connect both bill and usage data.

- Recommendations Based on Bill Data
- Recommendations Based on Usage Data

**Recommendations Based on Bill Data**

Public cloud providers publish billing data as a CSV or JSON dataset on a semi-regular schedule, typically once to 3 times daily. This billing data covers all month-to-date usage up to some time-point a few hours before the dataset was produced. Optima automatically ingests the latest dataset and produces recommendations based on the last consistent hour found in the dataset. It also regenerates all recommendations based on the latest available dataset when any settings are changed to ensure that the new settings are taken into account. The result of this process is that the data on which the recommendations are based may be anywhere from a few hours to 36 hours in the past.

There are two major benefits to using bill data to produce recommendations:

- in one operation all consumption across all services in all regions in all linked accounts becomes visible
- the cost information is based on actuals reported by the cloud vendor

The disadvantages of using bill data and the reason for also using usage data are:

- the data is always a few hours old
- the granularity is limited and only allows a restricted set of recommendation rules

**Recommendations Based on Usage Data**

For some recommendations, detailed usage data from the cloud provider is required to evaluate the recommendation conditions. In such cases, RightScale requires vendor account-level credentials for every account in which you wish to see recommendations generated. In all cases for recommendations, read-only credentials will suffice for recommendation generation.

For more information, see:

- Cloud Provider Billing Data Instructions
- Add a Cloud Account to a RightScale Account
- Register a Private Cloud with RightScale

When using usage data for recommendations, resources are polled on a frequent schedule to ensure up-to-date information. For example, the Unattached Volumes Recommendation polls every couple of minutes.

**List of Optima Recommendations**

Optima provides automated recommendations that identify areas where you can save costs. Optima includes a set of predefined Recommendation Rules. Select a rule to see the detailed list of individual recommendations and what the total potential monthly savings would be if the recommendations were implemented.
In addition to the list of Optima Recommendation Rules below, see the Optima Recommendation Rules Details and Configurations.

### Table 10-1 • Optima Recommendation Rules

<table>
<thead>
<tr>
<th>Recommendation Rule</th>
<th>What It Does</th>
<th>Source Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cheaper Region Recommendation</strong></td>
<td>Identifies instances in regions where there is a nearby region with lower costs. These resources can be moved to the less expensive region.</td>
<td>Cloud bill only</td>
</tr>
<tr>
<td><strong>Disallowed Usage Recommendation</strong></td>
<td>Identifies combinations of clouds, accounts, regions, and services that are not allowed according to your organization’s policies. This usage can be investigated for potential termination.</td>
<td>Cloud bill only</td>
</tr>
<tr>
<td><strong>Low Account Usage Recommendation</strong></td>
<td>Identifies accounts with spend below a configurable threshold. This can represent tests or experiments that can be terminated or usage that can be consolidated into other accounts.</td>
<td>Cloud bill only</td>
</tr>
<tr>
<td><strong>Low Service Usage Recommendation</strong></td>
<td>Identifies specific cloud services in a particular region with spend below a configurable threshold. This can represent tests or experiments that can be terminated or usage that can be consolidated into other accounts.</td>
<td>Cloud bill only</td>
</tr>
<tr>
<td><strong>Schedule Instances Recommendation</strong></td>
<td>Identifies instances that can be stopped or terminated outside of business hours to save on cost.</td>
<td>Cloud bill only</td>
</tr>
<tr>
<td><strong>Superseded Instance Type Recommendation</strong></td>
<td>Identifies older instance types that can be migrated to newer, better, and less expensive instance types.</td>
<td>Cloud bill only</td>
</tr>
<tr>
<td><strong>Unattached Volumes Recommendation (AWS Feature Only)</strong></td>
<td>Identifies volumes that are unattached and can be deleted to save on cost.</td>
<td>Usage data only</td>
</tr>
</tbody>
</table>

**Note** • *Instance-based recommendations are not generated for some Azure Classic Instances. Azure ScaleSet instances are shown as individual instances in Optima. They are not grouped together as one ScaleSet.*

### Reviewing Optima Recommendations

Once you select a recommendation rule from the list, you can review what the individual recommendations and the potential savings would be if that recommendation were implemented.

You can filter the list of recommendations and select View Details to see more information about the recommendation.
Exporting Recommendations as CSV

When reviewing recommendations you can further analyze the data by exporting the information to CSV. You can do this in one of two different ways:

1. Download a CSV of all recommendations. This can be done by clicking Export all to CSV at the top of the page.

2. Download a CSV of recommendations based on a specific Recommendation Rule. This can be done by clicking Export to CSV at the top of the table. Note Filters will not be applied to any exports. If you use the filter recommendations functionality under a specific Recommendation Rule and click the Export to CSV, you will receive a full unfiltered export of the currently selected Recommendation Rule.

The same fields are exported for every recommendation type, regardless of whether that field applies to that specific recommendation. If a field is blank, it generally means that field does not apply to that recommendation type. As such it is not unusual to see blank fields dependent on the relevance of that field to a particular recommendation.

Optima Recommendation Rules Details and Configurations

For each recommendation, you can access all of the information about that recommendation from the Recommendation Details panel. The data at field in the table at the top of the recommendation indicates which hour of data from the cloud bill was used to make the recommendation. The refreshed at field indicates when the recommendations engine was last run while taking the latest data and latest settings into account.

Configuring Recommendation Rules

You can configure Rule Settings for each of the Optima recommendation rules. Choose the rule you want to configure and use the gear icon above the recommendations list. Each recommendation rule has default settings, but you can adjust the settings for your organization. You must have an actor role on the RightScale organization to change settings.

This section provides details for the following Optima Recommendation Rules:

- Global Rule Setting: Minimum Savings Threshold
- Cheaper Region Recommendation
Chapter 10  Optima Recommendations
Optima Recommendation Rules Details and Configurations

- Disallowed Usage Recommendation Rule Settings
- Low Account Usage Recommendation
- Low Service Usage Recommendation
- Schedule Instances Recommendation
- Superseded Instance Type Recommendation
- Unattached Volume Duration Rule Settings

Global Rule Setting: Minimum Savings Threshold

The minimum savings threshold is the forecasted minimum monthly savings amount ($) per resource that triggers a recommendation.

**Important** - The minimum savings threshold setting applies to all Optima recommendations. Changing the value of this setting will be reflected in all recommendations.

- Type: float
- Default value: 1.0

**Example**: 1.5 This will exclude recommendations that save less than $1.50.

Cheaper Region Recommendation

**Cheaper Region Recommendation Objective**: move instances to nearby, less expensive regions.

Following is more information about this recommendation:

- How Does the Cheaper Region Recommendation Work?
- Cheaper Region Recommendation Rule Settings

How Does the Cheaper Region Recommendation Work?

Instance costs are not the same across all regions of a given cloud, and in certain cases there may be a less expensive region in a nearby geographic area. Unless you have requirements for running in an expensive region, you should consider moving those resources.

These recommendations are made by comparing the actual monthly instance cost of the current region (including any applied Reserved Instances) with the on-demand cost of the less expensive nearby region.

**Sample Cheaper Region Recommendation**

Move the instance from EU (Frankfurt) to EU (Ireland) to reduce the forecast monthly spend from $470.676 to $347.700, calculated using on-demand rates.
Cheaper Region Recommendation Rule Settings

Following are the Cheaper Region Recommendation rule settings for:

- Azure Cheaper Regions
- EC2 Cheaper Regions
- Cheaper Region Minimum Instance Savings Threshold

Azure Cheaper Regions

Specify which regions have cheaper alternatives by specifying the expensive region name and the cheaper region name for analysis. Valid values for these mappings can be found in the documentation. Example: East US 2 -> East US

- Type: string_map
- Default value:

<table>
<thead>
<tr>
<th>Expensive Region Name</th>
<th>Cheaper Region Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada Central</td>
<td>Canada East</td>
</tr>
<tr>
<td>Central US</td>
<td>West US 2</td>
</tr>
<tr>
<td>East US</td>
<td>East US 2</td>
</tr>
<tr>
<td>Japan East</td>
<td>Korea South</td>
</tr>
<tr>
<td>Japan West</td>
<td>Korea South</td>
</tr>
<tr>
<td>Korea Central</td>
<td>Korea South</td>
</tr>
<tr>
<td>North Europe</td>
<td>UK West</td>
</tr>
<tr>
<td>West Europe</td>
<td>UK South</td>
</tr>
<tr>
<td>West US</td>
<td>West US 2</td>
</tr>
</tbody>
</table>

EC2 Cheaper Regions

Specify which regions have less expensive alternatives by specifying the expensive region name and the less expensive nearby region name that you want Optima to analyze for savings. Valid values can be found in the Region Name column on the Amazon Simple Storage Service table. Example: US West (N. California) -> US West (Oregon)

- Type: string_map
• Default value:

**Table 10-3** • Expensive vs. Cheaper EC2 Regions

<table>
<thead>
<tr>
<th>Expensive Region Name</th>
<th>Cheaper Region Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>US West (N. California)</td>
<td>US West (Oregon)</td>
</tr>
<tr>
<td>Canada (Central)</td>
<td>US East (Ohio)</td>
</tr>
<tr>
<td>EU (London)</td>
<td>EU (Ireland)</td>
</tr>
<tr>
<td>EU (Frankfurt)</td>
<td>EU (Ireland)</td>
</tr>
<tr>
<td>Asia Pacific (Tokyo)</td>
<td>Asia Pacific (Seoul)</td>
</tr>
<tr>
<td>Asia Pacific (Singapore)</td>
<td>Asia Pacific (Mumbai)</td>
</tr>
</tbody>
</table>

**Cheaper Region Minimum Instance Savings Threshold**

The minimum savings threshold is the minimum forecasted monthly savings per instance that will trigger a recommendation.

*Note* • *This setting applies to multiple recommendations, including Superseded Instance Type Recommendation and Schedule Instances Recommendation.*

*Important* • *Changing the value of this setting will also be reflected in the Superseded Instance Type & Place Instances On A Schedule recommendation.*

Example: 100.00

• Type: float

• Default value: **1.0**

**Disallowed Usage Recommendation**

**Disallowed Usage Recommendation Objective**: track disallowed usage.

Following is more information about this recommendation:

• How Does the Disallowed Usage Recommendation Work?

• Disallowed Usage Recommendation Rule Settings

• AWS and Azure Regions (Locations) and Services
How Does the Disallowed Usage Recommendation Work?

Usage of specific services and regions may be unexpected, unnecessary, or against policy. This recommendation can help identify such usage so that it can be investigated and potentially terminated for cost savings. You can specify both safelists and blocklists for allowed and disallowed services and regions. Optima will trigger a recommendation for anything that is disallowed after applying both safelist and blocklist items.

These safelist and blocklist lists are applied in the following order:

1. Any safelisted usage is allowed.
2. Then any blocklisted usage is disallowed (flagged in a recommendation).
3. Finally any remaining usage is allowed (default-allow).

If you want to globally restrict a specific service, you will need to use the Disallowed Service Usage rule for the appropriate cloud provider (i.e. */AmazonEC2/*). If you would like to restrict a service in specific accounts or regions, you can create individual Disallowed Service Usage rules for the black-listed accounts or regions for the appropriate cloud provider (i.e. */AmazonEC2/EU (London)).

Sample Disallowed Usage Recommendation

The usage of this service is disallowed by the AWS Disallowed Svc Usage rule, and has an estimated monthly run-rate of $62.068, which is 44.80086437833907% of the total usage.

The top 10 costs/resources observed are:

- $0.762 for Storage (rightscale-vsphere-dev) TimedStorage-ByteHrs
- $1.801 for Storage (rightscale-openstack) TimedStorage-ByteHrs
- $1.941 for Storage (rightscale-cloudstack-dev) TimedStorage-ByteHrs
- $1.953 for Storage (rightscale-openstack-dev) TimedStorage-ByteHrs
- $2.249 for Storage (rightscale-vscale) TimedStorage-ByteHrs
- $2.437 for Storage (rightscale-cloudstack) TimedStorage-ByteHrs
- $2.970 for Storage (rightscale-us-west) TimedStorage-ByteHrs
- $8.556 for Storage (rightscale-vsphere-windows) TimedStorage-ByteHrs
- $15.489 for Storage (rightscale-openstack-windows) TimedStorage-ByteHrs
- $22.131 for Storage (rightscale-cloudstack-windows) TimedStorage-ByteHrs

Disallowed Usage Recommendation Rule Settings

Following are the Disallowed Usage Recommendation rule settings for:

- AWS Disallowed Svc Usage
- Azure Disallowed Svc Usage
- AWS Allowed Svc Usage
- Azure Allowed Svc Usage
AWS Disallowed Svc Usage

Any service within AWS that is not already allowed by the AWS Allowed Svc Usage setting can be explicitly disallowed. Otherwise, it will be flagged as allowed in the disallowed usage recommendation. Wildcards (*) are supported in any of the three positions to denote any.

- Type: string_array
- Default value: [*/AmazonGameLift/* */*/South America (Sau Paulo)]

Azure Disallowed Svc Usage

Any service within Azure that is not already allowed by the Azure Allowed Svc Usage setting can be explicitly disallowed, otherwise it will be flagged as allowed in the disallowed usage recommendation. Wildcards (*) are supported in any of the three positions to denote any.

- Type: string_array
- Default value: [*/Microsoft.CognitiveServices/* */Microsoft.Devices/*]

AWS Allowed Svc Usage

Any service usage within AWS matching this setting will be allowed by the Disallowed Usage recommendation. Wildcards (*) are supported in any of the three positions to denote any.

- Type: string_array
- Default value: No Default

Azure Allowed Svc Usage

Any service usage within Azure matching this setting will be allowed by the Disallowed Usage recommendation. Wildcards (*) are supported in any of the three positions to denote any.

- Type: string_array
- Default value: No Default

AWS and Azure Regions (Locations) and Services

Below is a list of AWS and Azure Regions (locations) that would be used for the location parameter of the disallowed usage settings.

Format for Disallowed/Allowed Service Usage Settings: [Account Number -or- Subscription ID]/[Service Type]/[Location]

**AWS Account Number**: This is the 12 digit account number of your Cloud Account. Your consolidated billing group/organization may contain many individual accounts. The number should be typed with no dashes or spaces. **Example**: 123456789012

**Azure Subscription ID**: The Azure Subscription ID is a GUID which can be found by clicking on the Cloud name/link in **Your Clouds** list.
Task

To navigate to Your Clouds list:

1. Select Settings from the Primary Navigation.
2. Select Clouds from the Account settings column from the drop-down menu.
3. Select the Cloud that you would like to retrieve the Subscription ID (see below).

Example: 1234567a-123b-123f-g555-12121212h102

Service Type: This is the billing product code. Example: AmazonEC2

Location: This is the product/location code. Example: US West(Oregon)

Table 10-4 • AWS and Azure Regions (Locations) and Services

<table>
<thead>
<tr>
<th>AWS Locations</th>
<th>AWS Services</th>
<th>Azure Locations</th>
<th>Azure Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>AsiaPacific(Tokyo)</td>
<td>AmazonApiGateway</td>
<td>EastUS</td>
<td>Compute</td>
</tr>
<tr>
<td>AsiaPacific(Seoul)</td>
<td>AmazonCloudFront</td>
<td>EastUS2</td>
<td>Microsoft.Compute</td>
</tr>
<tr>
<td>AsiaPacific(Singapore)</td>
<td>AmazonCloudWatch</td>
<td>CentralUS</td>
<td>Microsoft.Network</td>
</tr>
<tr>
<td>AsiaPacific(Sydney)</td>
<td>AmazonDynamoDB</td>
<td>NorthCentralUS</td>
<td>Microsoft.Storage</td>
</tr>
<tr>
<td>AsiaPacific(Mumbai)</td>
<td>AmazonEC2</td>
<td>SouthCentralUS</td>
<td>Microsoft.Web</td>
</tr>
<tr>
<td>Canada(Central)</td>
<td>AmazonECR</td>
<td>WestCentralUS</td>
<td>Storage</td>
</tr>
<tr>
<td>EU(Frankfurt)</td>
<td>AmazonEFS</td>
<td>WestUS</td>
<td>microsoft.security</td>
</tr>
<tr>
<td>EU(Ireland)</td>
<td>AmazonElastiCache</td>
<td>WestUS2</td>
<td></td>
</tr>
<tr>
<td>EU(London)</td>
<td>AmazonES</td>
<td>USGovVirginia</td>
<td></td>
</tr>
<tr>
<td>SouthAmerica(SaoPaulo)</td>
<td>AmazonGlacier</td>
<td>USGovIowa</td>
<td></td>
</tr>
<tr>
<td>USEast(N.Virginia)</td>
<td>AmazonKinesis</td>
<td>USGovArizona</td>
<td></td>
</tr>
<tr>
<td>USEast(Ohio)</td>
<td>AmazonKinesisFirehose</td>
<td>USGovTexas</td>
<td></td>
</tr>
<tr>
<td>USWest(N.California)</td>
<td>AmazonRDS</td>
<td>USDoDEast</td>
<td></td>
</tr>
<tr>
<td>USWest(Oregon)</td>
<td>AmazonRedshift</td>
<td>USDoDCentral</td>
<td></td>
</tr>
<tr>
<td>AWSGovCloud(US)</td>
<td>AmazonRoute53</td>
<td>CanadaEast</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AmazonS3</td>
<td>CanadaCentral</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AmazonSES</td>
<td>BrazilSouth</td>
<td></td>
</tr>
</tbody>
</table>
### Table 10-4 • AWS and Azure Regions (Locations) and Services (cont.)

<table>
<thead>
<tr>
<th>AWS Locations</th>
<th>AWS Services</th>
<th>Azure Locations</th>
<th>Azure Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>AmazonSimpleDB</td>
<td>NorthEurope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AmazonSNS</td>
<td>WestEurope</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AmazonSWF</td>
<td>GermanyCentral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AmazonVPC</td>
<td>GermanyNortheast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AmazonWorkMail</td>
<td>UKWest</td>
<td></td>
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</tr>
<tr>
<td>AWSCloudTrail</td>
<td>UKSouth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWSConfig</td>
<td>UKSouth2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWSDirectConnect</td>
<td>UKNorth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWSDirectoryService</td>
<td>FranceCentral</td>
<td></td>
<td></td>
</tr>
<tr>
<td>awsKms</td>
<td>FranceSouth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWSLambda</td>
<td>SoutheastAsia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWSQueueService</td>
<td>EastAsia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWSSupportBusiness</td>
<td>AustraliaEast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>awswaf</td>
<td>AustraliaSoutheast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AWSXRay</td>
<td>China</td>
<td></td>
<td></td>
</tr>
<tr>
<td>datapipeline</td>
<td>ChinaEast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ElasticMapReduce</td>
<td>ChinaNorth</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CentralIndia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WestIndia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SouthIndia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>JapanEast</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>JapanWest</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KoreaCentral</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>KoreaSouth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
AWS and Azure Regions (Locations) and Services Example

Scenario:
- I only want to allow the following services: EC2, S3, & RDS.
- I want to allow EC2, but only in US West (Oregon) and US East (Ohio).
- I want to restrict account 123456789012 from using RDS.

Rule Settings:
- **Disallowed Service Usage:** [123456789012/AmazonRDS/* '*/*/*]
- **Allowed Service Usage:** [*/AmazonEC2/US East (Ohio) */AmazonEC2/US West (Oregon) */AmazonS3/* */ AmazonRDS/*]

Low Account Usage Recommendation

**Low Account Usage Recommendation Objective:** cancel or consolidate accounts with low usage.

Following is more information about this recommendation:
- How Does the Low Account Usage Recommendation Work?
- Low Account Spend Threshold Rule Settings

How Does the Low Account Usage Recommendation Work?

Accounts with very low usage often stem from tests or experiments, and users often forget to shut down all servers and services in such accounts. Investigate these accounts to determine if they should be canceled or could be consolidated into larger accounts for ease of management.

**Sample Low Account Usage Recommendation**

This account has a monthly run rate of only $894.168, which is only 0.7286237403714132% of the total monthly run-rate. You should consider deleting this account or consolidating it.

The top 10 costs/resources in this account are:
- $20.420 for AmazonEC2 (SpotUsage) in US East (N. Virginia)
- $30.269 for AmazonEC2 (BoxUsage) in US East (N. Virginia)
- $30.269 for AmazonEC2 (BoxUsage) in US East (N. Virginia)
- $30.269 for AmazonEC2 (BoxUsage) in US East (N. Virginia)
- $35.685 for AmazonEC2 (SpotUsage) in US East (N. Virginia)
Chapter 10  Optima Recommendations
Optima Recommendation Rules Details and Configurations

- $39.355 for AmazonEC2 (EBS:VolumeUsage.gp2) in US East (N. Virginia)
- $63.052 for AmazonEC2 (ElasticIP:IdleAddress) in US East (N. Virginia)
- $118.755 for AmazonEC2 (EBS:SnapshotUsage) in US East (N. Virginia)
- $139.080 for AmazonEC2 (HeavyUsage) in US East (N. Virginia)
- $139.080 for AmazonEC2 (HeavyUsage) in US East (N. Virginia)

Low Account Spend Threshold Rule Settings
A low account spend threshold is the estimated run-rate for an account, below which, a recommendation should be triggered.
Example: 1000.0
- Type: float
- Default value: **1000.0**

Low Service Usage Recommendation

**Low Service Usage Recommendation Objective**: terminate unused services.

Following is more information about this recommendation:
- How Does the Low Service Recommendation Work?
- Low Service Spend Threshold Rule Settings

How Does the Low Service Recommendation Work?
Low usage of a specific service in a region by an account is often indicative of tests or experiments by users, which often are forgotten and left running when they are no longer being used. Investigate this usage to determine if these services should be terminated or potentially consolidated into a larger account or region for ease of management.

**Sample Low Service Recommendation**
At an estimated run-rate of $90.582, this service in this account and region represents only 0.0738119335191068% of the total estimated run-rate for this month in this cloud. Investigate this service to determine if it can be terminated or consolidated into another account/region for ease of management.

The top 10 costs/resources are:
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
- $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
• $0.492 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage
• $0.787 for Storage vol-xxxxxxxxxxxxx EBS:VolumeUsage.gp2
  LoadBalancerUsage
• $28.660 for Compute Instance i-xxxxxxxxxxxxx BoxUsage

Low Service Spend Threshold Rule Settings

A low service spend threshold is the estimated run-rate for a service in a particular account/region, below which a recommendation should be triggered.

Example: 100.0

• Type: float
• Default value: 100.0

Schedule Instances Recommendation

Schedule Instances Recommendation Objective: stop or terminate instances outside of business hours.

Following is more information about this recommendation:

• How Does the Schedule Instances Recommendation Work?
• Schedule Instances Recommendation Rule Settings

How Does the Schedule Instances Recommendation Work?

By stopping or terminating instances outside of business hours up to 65% of costs can be saved. This recommendaiton is primarily applicable to instances used for development and test purposes.

Note • Only instances that have been running non-stop for the past 7 days in the current month are flagged. Therefore, no recommendations will be issued until the 8th of the month.

Important • Only tags from the bill can be used to qualify instances for a recommendation. For more information, see AWS Cost Allocation Tags and Azure Tags and Billing.

Sample Schedule Instances Recommendation

Terminate or stop this instance, which has been running non-stop since at least 2017-04-01 00:00:00 +0000 UTC (418h0m0s) to reduce the monthly cost from a projected $79.06 to $23.53 by stopping the instance for 10 hours/night or $51.76 by stopping the instance over the weekend.
Schedule Instances Recommendation Rule Settings

Following are the Schedule Instances Recommendation rule settings for:

- **Azure Dev Tags**
- **EC2 Dev Tags**
- **Schedule Instances Minimum Instance Savings Threshold**
- **Schedule Instances Minimum Savings Threshold**

**Azure Dev Tags**

Azure dev tags are a set of tags that flag dev and test Azure instances. An asterisk (*) may be used as wildcard.

Examples: dev, name=test, dev

**EC2 Dev Tags**

EC2 Dev Tags are a set of AWS Cost Allocation Tags that flag EC2 instances for recommendations. An asterisk (*) may be used as wildcard. It is recommended to prefix your tag patterns with an asterisk (*).

Examples: "*dev", "*role=dev", "*dev=*"

- **Type:** string_array
- **Default value:** dev* *test*

**Schedule Instances Minimum Instance Savings Threshold**

The minimum instance savings threshold is the minimum forecasted monthly savings per instance that will trigger a recommendation.

*Note* • This rule setting applies to multiple Optima recommendations, including Cheaper Region Recommendation and Superseded Instance Type Recommendation.

*Important* • Changing the value of the Minimum Instance Savings Threshold rule setting will also be reflected in the Cheaper Region Recommendation and Superseded Instance Type Recommendation.

Example: 100.00

- **Type:** float
- **Default value:** 1.0

**Schedule Instances Minimum Savings Threshold**

This rule setting specifies the minimum monthly savings value required for a recommendation to be issued, on a per resource basis.

*Note* • This rule setting applies to all Optima recommendations.
Superseded Instance Type Recommendation

**Superseded Instance Recommendation Objective**: change instances to use newer, less expensive instance types.

Following is more information about this recommendation:

- How Does the Superseded Instance Type Recommendation Work?
- Superseded Instance Recommendation Rule Settings

**How Does the Superseded Instance Type Recommendation Work?**

Cloud vendors periodically offer new instance types that have similar profiles (high mem, high CPU, etc.), but they deliver higher performance and lower costs than the legacy instance types they replace. This recommendation will identify opportunities to shift to the newer instance types to get better value. These recommendations are made by comparing the actual monthly cost of the current instance (including any applied Reserved Instances) with the on-demand cost of the equivalent size of the newer generation instance type.

**Sample Superseded Instance Type Recommendation**

Relaunch the instance using instance type m3.xlarge instead of the current m1.xlarge to reduce the monthly cost from a projected $256.200 to $194.712, calculated using on-demand rates.

**Superseded Instance Recommendation Rule Settings**

Following are the Superseded Instance Recommendation rule settings for:

- Microsoft Compute New Instance Type Mappings
- New EC2 Instance Type Mappings
- Superseded Instance Minimum Instance Savings Threshold

**Microsoft Compute New Instance Type Mappings**

This rule setting specifies which Azure instance types to analyze for this recommendation by using specific instance types or a pattern for old instance types and the corresponding new instance types. A pattern can only be used to map older series types to a newer generation of the same series.

For instance, specifying a pattern as Standard_D*v1->Standard_D*_v2 maps all Standard D-series v1 types to the corresponding Standard D-series v2 types. Example: StandardD*v1->Standard_D*_v2, BasicA3->Standard_A3_v2

- Type: string_map
• Default value:

**Table 10-5 • Microsoft Compute New Instance Type Mappings**

<table>
<thead>
<tr>
<th>Old Instance Type</th>
<th>New Instance Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard_A1</td>
<td>Standard_A1_v2</td>
</tr>
<tr>
<td>Standard_A2</td>
<td>Standard_A2_v2</td>
</tr>
<tr>
<td>Standard_A3</td>
<td>Standard_A4_v2</td>
</tr>
<tr>
<td>Standard_A4</td>
<td>Standard_A8_v2</td>
</tr>
<tr>
<td>Standard_A5</td>
<td>Standard_A2m_v2</td>
</tr>
<tr>
<td>Standard_A6</td>
<td>Standard_A4m_v2</td>
</tr>
<tr>
<td>Standard_A7</td>
<td>Standard_A8m_v2</td>
</tr>
<tr>
<td>Standard_D*_.v1</td>
<td>Standard_D*_.v2</td>
</tr>
</tbody>
</table>

**New EC2 Instance Type Mappings**

This rule setting specifies which instance types to analyze for this recommendation by specifying a pattern for old instance types and the corresponding pattern for the new types. Use an asterisk (*) as a wildcard to indicate that all instance sizes in a family should map to the same size. In cases where the instance size must be changed to match the specs for the new instance family, you can specify both the instance family and the instance size as shown in the m2 to r3 mappings below.

• Type: string_map

• Default value:

**Table 10-6 • New EC2 Instance Type Mappings**

<table>
<thead>
<tr>
<th>Old Instance Type</th>
<th>New Instance Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1.*</td>
<td>c3.*</td>
</tr>
<tr>
<td>hs1.*</td>
<td>d2.*</td>
</tr>
<tr>
<td>m2.xlarge</td>
<td>r3.large</td>
</tr>
<tr>
<td>m2.2xlarge</td>
<td>r3.xlarge</td>
</tr>
<tr>
<td>m2.4xlarge</td>
<td>r3.2large</td>
</tr>
<tr>
<td>m1.*</td>
<td>m3.*</td>
</tr>
<tr>
<td>t1.*</td>
<td>t2.*</td>
</tr>
</tbody>
</table>
Optima Recommendation Rules Details and Configurations

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Table 10-6 • New EC2 Instance Type Mappings (cont.)

<table>
<thead>
<tr>
<th>Old Instance Type</th>
<th>New Instance Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>i2.*</td>
<td>i3.*</td>
</tr>
<tr>
<td>cr1.*</td>
<td>r3.*</td>
</tr>
<tr>
<td>hi1.*</td>
<td>i3.*</td>
</tr>
</tbody>
</table>

Superseded Instance Minimum Instance Savings Threshold

This rule setting specifies the minimum forecasted monthly savings per instance that will trigger a recommendation.

Note • This rule setting applies to multiple Optima recommendations, including Cheaper Region Recommendation and Schedule Instances Recommendation.

Important • Changing the value of the Minimum Instance Savings Threshold rule setting will also be reflected in the Cheaper Region Recommendation & Schedule Instances Recommendation.

Example: 100.00

Type: float

Default value: 1.0

Unattached Volumes Recommendation

Unattached Volumes Recommendation Objective: terminate volumes that are not attached to instances.

Following is more information about this recommendation:

- How Does the Unattached Volumes Recommendation Work?
- Unattached Volume Duration Rule Settings

How Does the Unattached Volumes Recommendation Work?

Unattached volumes generally serve no useful purpose and are often remains of terminated instances. Such volumes should be deleted. If the data needs to be preserved a snapshot can be taken.

Sample Unattached Volumes Recommendation

Delete this volume which has been running non-stop since at least 2017-09-08 21:40 UTC to reduce the monthly cost from a projected $4.00 to $0.

Unattached Volume Duration Rule Settings

This rule setting specifies the number of hours before an unattached volume is considered for deletion.
Optima Recommendation Actions

Optima has the ability to analyze usage, provide cost savings recommendations, and allow for recommendations to be acted upon.

A recommendation is associated to a specific resource and includes information about why the recommendation exists, what the recommended action(s) are, what the potential savings are if these actions are executed, and any historical information about the recommendation.

Optima provides the ability to take the following actions on recommendations:

- **Ignore Recommendations**: you can select one or more recommendations to be ignored for a specific resource listed.
- **Restore Recommendations**: you can select one or more recommendations from the Ignore recommendations list.
- **Modify Recommendations**: you can modify a recommendation’s rule settings
- **Share Recommendations**: you can share one or more recommendations with by entering their email address.

Ignore Recommendations

The purpose of ignoring a recommendation is to keep recommendations that are most important to you in a list that does not include recommendations that you are not interested in pursuing at a given time. Ignoring a recommendation results in the selected recommendation being removed from the **Active Recommendations** list and added to the **Ignored Recommendations** list.

**Note** • *Ignored recommendations will continue to be updated/reviewed by Optima. However, it will remain in the Ignored Recommendations list.*

Optima offers several ways in which a recommendation can be ignored:

- **Ignore Recommendation from Selected Actions Dropdown**
- **Ignore from Actions Column**
- **Ignore from Recommendation Detail Window**
Ignore Recommendation from Selected Actions Dropdown

Task  To ignore a recommendation from the Show Actions Dropdown:

1. Select the check box of one or more recommendations that you would like to put on the Ignored Recommendations list.

2. Click the Selected Actions dropdown and select Ignore Recommendation.

   The ignored recommendations will be removed from your current recommendation list. To validate that the recommendations have been ignored, click on the Show: Active dropdown and select Ignored.

Ignore from Actions Column

When you first visit the page the default Show list is the Show: Active list. There is not an option to ignore a recommendation from the More Options link when Show: Inactive list is displayed.

Task  To ignore a recommendation from the Actions column:

1. Click the Show: Active dropdown and select Ignored.

   Note • If the dropdown is displaying Show: Ignored, you can skip this step as you will see the list of recommendations that are currently being ignored.

2. Click the More Options link (ellipse) in the Actions Column.


Ignore from Recommendation Detail Window

To ignore a recommendation from the Recommendation Detail window click the Ignore Recommendation button.

Note • To view the Recommendation Detail Window, you can click the resource name/link or click the More Options link (ellipses) and select View Details.

Restore Recommendations

Optima offers several ways in which recommendations can be restored. Once restored, the recommendation will be added to the Active Recommendations list and removed from the Ignored Recommendations list:

- Restore from Show Dropdown
- Restore from Actions Column
- Restore from Recommendation Detail Window
Chapter 10  Optima Recommendations

Optima Recommendation Actions

**Restore from Show Dropdown**

<table>
<thead>
<tr>
<th>Task</th>
<th>To restore a recommendation from the Show Dropdown/Button:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Click the <strong>Show: Active</strong> dropdown and select <strong>Ignored</strong>.</td>
</tr>
</tbody>
</table>

**Note** • If the dropdown is displaying **Show: Ignored**, you can skip this step as you will see the list of recommendations that are currently being ignored.

<table>
<thead>
<tr>
<th>Task</th>
<th><strong>Ignored</strong>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Select the check box of one or more of the listed recommendations that you would like to restore.</td>
</tr>
<tr>
<td>3.</td>
<td>Click the <strong>Selected Actions</strong> dropdown and select <strong>Restore Selected</strong>.</td>
</tr>
</tbody>
</table>

**Restore from Actions Column**

<table>
<thead>
<tr>
<th>Task</th>
<th>To restore a recommendation from the Actions Column:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Click the <strong>Show: Active</strong> dropdown and select <strong>Ignored</strong>.</td>
</tr>
</tbody>
</table>

**Note** • If the dropdown is displaying **Show: Ignored**, you can skip this step as you will see the list of recommendations that are currently being ignored.

<table>
<thead>
<tr>
<th>Task</th>
<th><strong>Ignored</strong>.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Click the More Options link (ellipsis) in the <strong>Actions Column</strong>.</td>
</tr>
<tr>
<td>3.</td>
<td>Select <strong>Restore Recommendation</strong>.</td>
</tr>
</tbody>
</table>

**Restore from Recommendation Detail Window**

To restore a recommendation from the Recommendation Detail window click the **Restore Recommendation** button.

To view the Recommendation Detail Window, you can click the resource name/link or click the More Options link (ellipses) and select **View Details**.

**Modify Recommendations**

<table>
<thead>
<tr>
<th>Task</th>
<th>To modify a recommendation’s rule settings:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Navigate to the organization level recommendations from <strong>optima.rightscale.com</strong>.</td>
</tr>
<tr>
<td>2.</td>
<td>Select the gear icon next to the recommendation’s name.</td>
</tr>
<tr>
<td>3.</td>
<td>Adjust the <strong>Rule Settings</strong> to your desired settings and click <strong>Save</strong>.</td>
</tr>
</tbody>
</table>
Important • The amount of time it takes a Rule Setting change to take effect varies based on the size of the data set. However, they are typically applied within a few seconds after clicking Save. A notification pop-up will appear indicating that the change is being applied:

Share Recommendations

Optima makes it easy to share individual recommendations or lists of recommendations. Click Share at the top right of the recommendations list to get a shareable link for the whole list, or click Share on an individual recommendation. You can copy the URL and then share it via email, chat, or other means.

When sharing recommendations, you can:

- Share all Recommendations for a Rule
- Share an Individual Recommendation
- Share Multiple Recommendations

Share all Recommendations for a Rule

Task

To share all recommendations for a rule:

1. Click the Share button.
2. Click Copy on the dialog box.

Note • This shared recommendation link is not public and can only be accessed by teammates who also have access to Optima.

Share an Individual Recommendation

Task

To share an individual recommendation:

1. Scroll down to the recommendation that you want to share.
2. Click the ellipses icon … and select Share Recommendation.
3. Click Copy on the dialog box.

Note • This shared recommendation link is not public and can only be accessed by teammates who also have access to Optima.
Share Multiple Recommendations

<table>
<thead>
<tr>
<th>Task</th>
<th>To share multiple recommendations:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Mark the check box of all the recommendations you want to share.</td>
</tr>
<tr>
<td></td>
<td>2. Click the Selected Actions dropdown and select Share Recommendation.</td>
</tr>
<tr>
<td></td>
<td>3. Click Copy on the dialog box.</td>
</tr>
</tbody>
</table>

**Note** • *This shared recommendation link is not public and can only be accessed by teammates who also have access to Optima.*

Optima Recommendation FAQs

This section includes the following Optima Recommendation FAQs:

- What data is used for generating recommendations?
- How old is the data used for recommendations?
- How often does Optima ingest the latest data?
- Why doesn’t the Savings amount in my recommendation match my bill?
- Do recommendations account for my existing discounts and pricing agreements?

**What data is used for generating recommendations?**

Different recommendations are based on different data sources. Some recommendations are based solely on the cloud bill data from the cloud provider and are updated as and when the bill is updated by the cloud provider. Other recommendations require account-level credentials to gather more detailed information about resource usage. For details, see List of Optima Recommendations.

**How old is the data used for recommendations?**

Recommendations are based on data that may be anywhere from a few hours to 36 hours in the past. Unattached Volumes (UAVs) data is refreshed every couple of minutes. However, what is seen in the Optima Recommendations depends on the rule settings (number of hours and/or cost savings threshold). If the rules settings is $1 and the minimum time is set to 1 hour, any UAVs matching that will be shown/updated in Optima/Billing Center Recommendations in 1 hour.

**How often does Optima ingest the latest data?**

Every two hours, Optima will check for new billing data to process. The first 36 hours of a month are the exception to this rule, due to a lack of data available to make recommendations.
Why doesn’t the Savings amount in my recommendation match my bill?

Optima reports potential savings by analyzing your usage and computes a projected run-rate based on recent usage. In some circumstances, this savings can differ from your billed monthly cost for that resource, depending on your usage pattern.

**Billed Cost:** This represents the actual amount you were billed by the Cloud Provider.

**Projected Run Rate:** Optima analyzes your detailed billing data frequently and analyzes recent usage. Using this data, it extrapolates this level of recent usage for a full month to project your monthly costs and potential savings.

**Savings Amount Example 1**

It’s the 15th of the month. The Cloud Provider bill for this month shows a month-to-date spend of $150 in a disallowed services. If this usage is shut down, Optima will project a $300 per month savings.

**Savings Amount Example 2**

It’s the 20th day of the month. The cloud provider bill for this month, shows $3000 of spend in a disallowed service. For the first 10 days of the month, the cost was $100/day. Then usage increased on the 11th, going to $200/day. The cloud bill only has usage for 2/3 of the billing period at this point ($3000, in the example). Assuming usage levels remain consistent, the final bill for the month should be $5000. Optima projects the savings based on a full month of usage of the new run rate. If you continue to consume $200/day, the future monthly cost of this service will be $6000. Therefore, Optima projects savings of $6000, if this usage is terminated.

Do recommendations account for my existing discounts and pricing agreements?

Any existing discounts that are represented in the bill data (such as reserved instances) are used when calculating the current cost of a resource. To determine potential future costs, Optima uses public price information for Amazon Web Services (AWS) and your Enterprise Agreement (EA) price sheet for Microsoft Azure. This process ensures that recommendations are as conservative as possible and will not result in the recommended action being more expensive than the current state.
The following Optima API capabilities are available:

- Optima Bill Connect API
- Azure Cloud Solution Provider Cost Management API

**Optima Bill Connect API**

The BillConnect resource represents credentials and information that Optima uses to analyze cloud costs. For more information about connecting bills for Amazon Web Services (AWS), Google, and Azure Enterprise Agreement (EA), see Billing Data Connections.

**Azure Cloud Solution Provider Cost Management API**

This API provides actions for managing billing data connections to Optima for Azure Cloud Solution Provider (CSP) partners and their customers. For more information on managing Azure CSP customers, see Connect Azure Cloud Solution Provider to Optima for Cost Reporting.
RightScale Cloud Comparison is a tool for comparing public clouds based on the features they offer and which include:

- Security Certifications
- Operating Systems
- Locations
- Compute Services
- Network Services
- Storage Services
- Application Services
- Security and Identity
- Database-as-a-Service offerings

This section explains:

- How to Use Cloud Comparison
- How to Receive Cloud Comparison Updates

**How to Use Cloud Comparison**

In the left menu of Cloud Comparison, select the requirements for your workload by checking the relevant boxes. As you do so, the number of the selected requirements that are available for each cloud provider will be displayed below the cloud provider logo.

The greater the number, the higher the match rate is for that particular cloud provider based on the requirements that you specified.

To see the specific features that match your requirements, scroll down the page to see the green vertical line to the left of each feature that is available from that cloud provider. If the feature exists for the cloud provider, the name of the feature is listed along with a link to more information on the cloud provider’s site.
Once you have used Cloud Comparison to narrow down your options, you have the option to copy a link for sharing the results, in addition to exporting either your selected requirements or all data for offline use.

**How to Receive Cloud Comparison Updates**

Click the **Subscribe to Updates** button to receive emails when new features have been added to Cloud Comparison.