Contents

- Azure Cost Management Documentation
  - Overview
    - What is Cost Management and Billing?
  - Quickstarts
    - Start analyzing costs
  - Tutorials
    - Create and manage budgets
    - Export data
    - Act on recommendations
  - Concepts
    - Azure Cost Management best practices
    - Understand Cost Management data
    - Understand and work with scopes
    - Migrate from EA to MCA APIs
  - How-to guides
    - Assign access to data
    - Use cost analysis for common tasks
    - Use cost alerts
    - Set up and configure AWS integration
    - Manage AWS cost and usage
    - Cost Management for partners
    - Connect with Power BI Desktop
  - Reference
    - Azure Cost Management REST API
    - Azure Consumption REST API
    - Resource Manager template
    - Cost Management REST API Samples
  - Resources
    - Build your skills with Microsoft Learn

- Cost Management feedback forum
- Azure Roadmap
- Pricing
- Regional Availability
- Cloudyn
  - Overview
    - What is Cloudyn?
  - Quickstarts
    - View cost data
    - View cost data - EA
    - View cost data - CSP
  - Tutorials
    - Review usage and costs
    - Forecast spending
    - Manage costs
    - Optimize reserved instances
    - Control access to data
  - Concepts
    - Understanding cost reports
  - How-to guides
    - Activate Azure subscriptions and accounts
    - Add extended metrics for VMs
    - Connect a Google account
    - Connect an AWS account
    - Configure storage accounts
    - Use Cloudyn reports
    - Use dashboards
    - Manage budgets
  - Resources
    - Cloudyn videos
    - Azure Roadmap
    - Cloudyn Pricing

Cloudyn Regional Availability

Cloudyn FAQ

Contact Cloudyn support

What is Azure Cost Management and Billing?

1/14/2020 • 6 minutes to read • Edit Online

With Azure products and services, you only pay for what you use. As you create and use Azure resources, you are charged for the resources. You use Azure Cost Management and Billing features to conduct billing administrative tasks and manage billing access to costs. You also its features to monitor and control Azure spending and to optimize Azure resource use.

Understand Azure Billing

Azure Billing features are used to review your invoiced costs and manage access to billing information. In larger organizations, procurement and finance teams usually conduct billing tasks.

A billing account is created when you sign up to use Azure. You use your billing account to manage your invoices, payments, and track costs. You can have access to multiple billing accounts. For example, you might have signed up for Azure for your personal projects. So, you might have an individual Azure subscription with a billing account. You could also have access through your organization's Enterprise Agreement or Microsoft Customer Agreement. For each scenario you would have a separate billing account.

Billing accounts

The Azure portal currently supports the following types of billing accounts:

- **Microsoft Online Services Program**: A individual billing account for a Microsoft Online Services Program is created when you sign up for Azure through the Azure website. For example, when you sign up for an Azure Free Account, account with pay-as-you-go rates or as a Visual studio subscriber.
- **Enterprise Agreement**: A billing account for an Enterprise Agreement is created when your organization signs an Enterprise Agreement (EA) to use Azure.
- **Microsoft Customer Agreement**: A billing account for a Microsoft Customer Agreement is created when your organization works with a Microsoft representative to sign a Microsoft Customer Agreement. Some customers in select regions, who sign up through the Azure website for an account with pay-as-you-go rates or upgrade their Azure Free Account may have a billing account for a Microsoft Customer Agreement as well. For more information, see Get started with your billing account for Microsoft Customer Agreement.

Scopes for billing accounts

A scope is a node in a billing account that you use to view and manage billing. It is where you manage billing data, payments, invoices, and conduct general account management.

Microsoft Online Services Program

SCOPE	DEFINITION
Billing account	Represents a single owner (Account administrator) for one or more Azure subscriptions. An Account Administrator is authorized to perform various billing tasks like create subscriptions, view invoices or change the billing for subscriptions.
Subscription	Represents a grouping of Azure resources. An invoice is generated at the subscription scope. It has its own payment methods that are used to pay its invoice.

Enterprise Agreement

SCOPE	DEFINITION
Billing account	Represents an Enterprise Agreement enrollment. Invoice is generated at the billing account scope. It's structured using departments and enrollment accounts.
Department	Optional grouping of enrollment accounts.
Enrollment account	Represents a single account owner. Azure subscriptions are created under the enrollment account scope.

Microsoft Customer Agreement

SCOPE	TASKS
Billing account	Represents a customer agreement for multiple Microsoft products and services. The billing account is structured using billing profiles and invoice sections.
Billing profile	Represents an invoice and its payment methods. Invoice is generated at this scope. The billing profile can have multiple invoice sections.
Invoice section	Represents a group of costs in an invoice. Subscriptions and other purchases are associated to the invoice section scope.

Understand Azure Cost Management

Cost management is the process of effectively planning and controlling costs involved in your business. Cost management tasks are normally performed by finance, management, and app teams. Azure Cost Management + Billing helps organizations plan with cost in mind. It also helps to analyze costs effectively and take action to optimize cloud spending. To learn more about how to approach cost management as an organization, take a look at the Azure Cost Management best practices article.

Watch the Azure Cost Management overview video for a quick overview about how Azure Cost Management can help you save money in Azure.

Although related, billing differs from cost management. Billing is the process of invoicing customers for goods or services and managing the commercial relationship.

Cost Management shows organizational cost and usage patterns with advanced analytics. Reports in Cost Management show the usage-based costs consumed by Azure services and third-party Marketplace offerings. Costs are based on negotiated prices and factor in reservation and Azure Hybrid Benefit discounts. Collectively, the reports show your internal and external costs for usage and Azure Marketplace charges. Other charges, such as reservation purchases, support, and taxes are not yet shown in reports. The reports help you understand your spending and resource use and can help find spending anomalies. Predictive analytics are also available. Cost Management uses Azure management groups, budgets, and recommendations to show clearly how your expenses are organized and how you might reduce costs.

You can use the Azure portal or various APIs for export automation to integrate cost data with external systems and processes. Automated billing data export and scheduled reports are also available.

Plan and control expenses

The ways that Cost Management help you plan for and control your costs include: Cost analysis, budgets,

recommendations, and exporting cost management data.

You use cost analysis to explore and analyze your organizational costs. You can view aggregated costs by organization to understand where costs are accrued and to identify spending trends. And you can see accumulated costs over time to estimate monthly, quarterly, or even yearly cost trends against a budget.

Budgets help you plan for and meet financial accountability in your organization. They help prevent cost thresholds or limits from being surpassed. Budgets can also help you inform others about their spending to proactively manage costs. And with them, you can see how spending progresses over time.

Recommendations show how you can optimize and improve efficiency by identifying idle and underutilized resources. Or, they can show less expensive resource options. When you act on the recommendations, you change the way you use your resources to save money. To act, you first view cost optimization recommendations to view potential usage inefficiencies. Next, you act on a recommendation to modify your Azure resource use to a more cost-effective option. Then you verify the action to make sure that the change you make is successful.

If you use external systems to access or review cost management data, you can easily export the data from Azure. And you can set a daily scheduled export in CSV format and store the data files in Azure storage. Then, you can access the data from your external system.

Consider Cloudyn

Cloudyn is an Azure service related to Cost Management. With Cloudyn, you can track cloud usage and expenditures for your Azure resources. It also supports other cloud providers including AWS and Google. Easy-to-understand dashboard reports help with cost allocation and showbacks/chargebacks as well. Currently, Cost Management doesn't support showback/chargeback or other cloud service providers. However, Cloudyn is an option that *does* support them. Currently, Cost Management doesn't support Microsoft Cloud Service Provider (CSP) accounts but Cloudyn does. If you have CSP accounts or if you want to use showback/chargeback, you can use Cloudyn to help manage your costs.

Watch the Azure Cost Management and Cloudyn video to see recommendations when you should use either Azure Cost Management or Cloudyn, based on your business needs.

Additional Azure tools

Azure has other tools that aren't a part of the Azure Cost Management and Billing feature set. However, they play an important role in the cost management process. To learn more about these tools, see the following links.

- Azure Pricing Calculator - Use this tool to estimate your up-front cloud costs.
- Azure Migrate - Assess your current datacenter workload for insights about what's needed from an Azure replacement solution.
- Azure Advisor - Identify unused VMs and receive recommendations about Azure reserved instance purchases.
- Azure Hybrid Benefit - Use your current on-premises Windows Server or SQL Server licenses for VMs in Azure to save.

Next steps

Now that you're familiar with Cost Management and Billing, the next step is to start using the service.

- Start using Azure Cost Management to analyze costs.
- You can also read more about Azure Cost Management best practices.

Quickstart: Explore and analyze costs with cost analysis

1/21/2020 • 15 minutes to read • Edit Online

Before you can properly control and optimize your Azure costs, you need to understand where costs originated within your organization. It's also useful to know how much money your services cost, and in support of which environments and systems. Visibility into the full spectrum of costs is critical to accurately understand organizational spending patterns. You can use spending patterns to enforce cost control mechanisms, like budgets.

In this quickstart, you use cost analysis to explore and analyze your organizational costs. You can view aggregated costs by organization to understand where costs occur over time and identify spending trends. You can view accumulated costs over time to estimate monthly, quarterly, or even yearly cost trends against a budget. A budget helps to provide adherence to financial constraints. And a budget is used to view daily or monthly costs to isolate spending irregularities. And, you can download the current report's data for further analysis or to use in an external system.

In this quickstart, you learn how to:

- Review costs in cost analysis
- Customize cost views
- Download cost analysis data

Prerequisites

Cost analysis supports different kinds of Azure account types. To view the full list of supported account types, see Understand Cost Management data. To view cost data, you need at least read access for your Azure account.

For information about assigning access to Azure Cost Management data, see Assign access to data.

Sign in to Azure

- Sign in to the Azure portal at https://portal.azure.com.

Review costs in cost analysis

To review your costs in cost analysis, open the scope in the Azure portal and select **Cost analysis** in the menu. For example, go to **Subscriptions**, select a subscription from the list, and then select **Cost analysis** in the menu. Use the **Scope** pill to switch to a different scope in cost analysis. For more information about scopes, see Understand and work with scopes.

The scope you select is used throughout Cost Management to provide data consolidation and control access to cost information. When you use scopes, you don't multi-select them. Instead, you select a larger scope, which others roll up to, and then filter down to the nested scopes you need. This approach is important to understand because some people may not have access to a single parent scope, which covers multiple nested scopes.

The initial cost analysis view includes the following areas.

Accumulated cost view: Represents the predefined cost analysis view configuration. Each view includes date range, granularity, group by, and filter settings. The default view shows accumulated costs for the current billing period, but you can change to other built-in views. For more information, see Customize cost views.

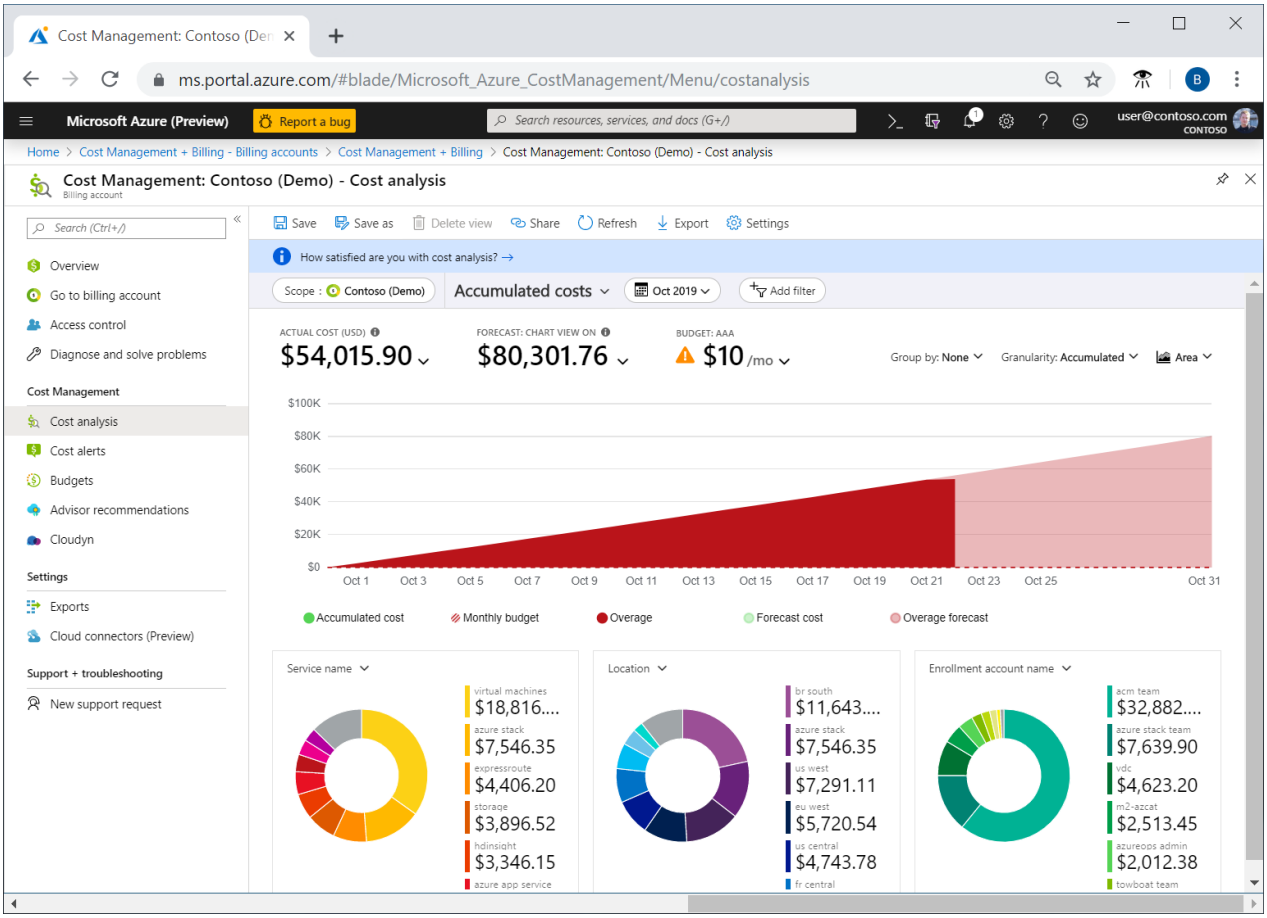
Actual cost: Shows the total usage and purchase costs for the current month, as they're accrued and will show on your bill.

Forecast: Shows the total forecasted costs for time period you choose. (Forecast is in preview.)

Budget: Shows the planned spending limit for the selected scope, if available.

Accumulated granularity: Shows the total aggregate daily costs, from the beginning of the billing period. After you create a budget for your billing account or subscription, you can quickly see your spending trend against the budget. Hover over a date to view the accumulated cost for that day.

Pivot (donut) charts: Provide dynamic pivots, breaking down the total cost by a common set of standard properties. They show the largest to smallest costs for the current month. You can change pivot charts at any time by selecting a different pivot. Costs are categorized by service (meter category), location (region), and child scope by default. For example, enrollment accounts are under billing accounts, resource groups are under subscriptions, and resources are under resource groups.

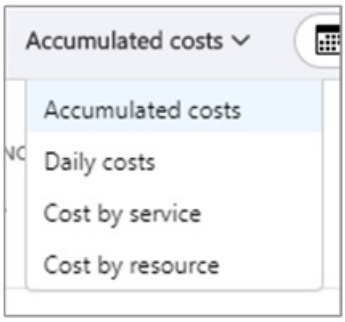


Customize cost views

Cost analysis has four built-in views, optimized for the most common goals:

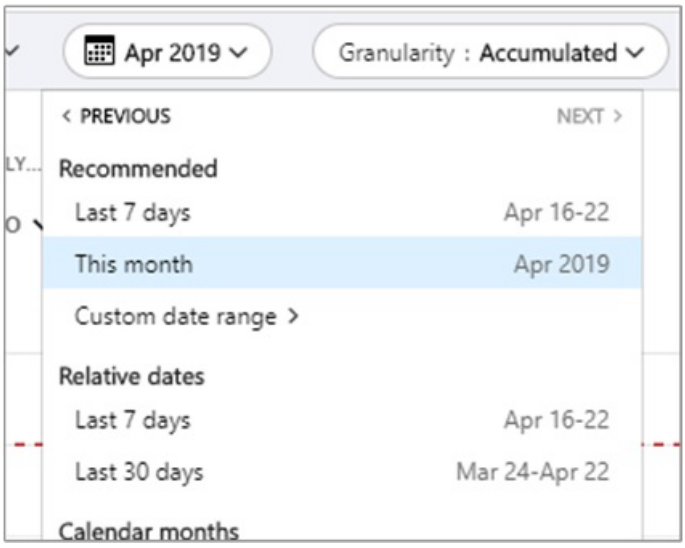
VIEW	ANSWER QUESTIONS LIKE
Accumulated cost	How much have I spent so far this month? Will I stay within my budget?
Daily cost	Have there been any increases in the costs per day for the last 30 days?
Cost by service	How has my monthly usage vary over the past three invoices?

VIEW	ANSWER QUESTIONS LIKE
Cost by resource	Which resources cost the most so far this month?



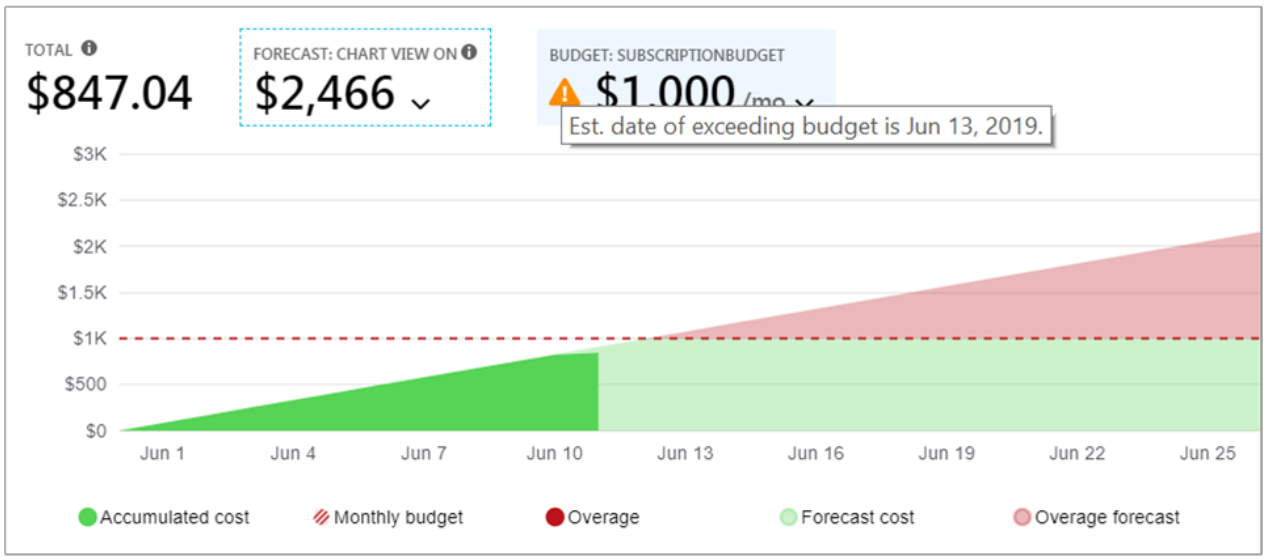
However, there are many cases where you need deeper analysis. Customization starts at the top of the page, with the date selection.

Cost analysis shows data for the current month by default. Use the date selector to switch to common date ranges quickly. Examples include the last seven days, the last month, the current year, or a custom date range. Pay-as-you-go subscriptions also include date ranges based on your billing period, which isn't bound to the calendar month, like the current billing period or last invoice. Use the **<PREVIOUS** and **NEXT>** links at the top of the menu to jump to the previous or next period, respectively. For example, **<PREVIOUS** will switch from the **Last 7 days** to **8-14 days ago** or **15-21 days ago**.



Cost analysis shows **accumulated** costs by default. Accumulated costs include all costs for each day plus the previous days, for a constantly growing view of your daily aggregate costs. This view is optimized to show how you're trending against a budget for the selected time range.

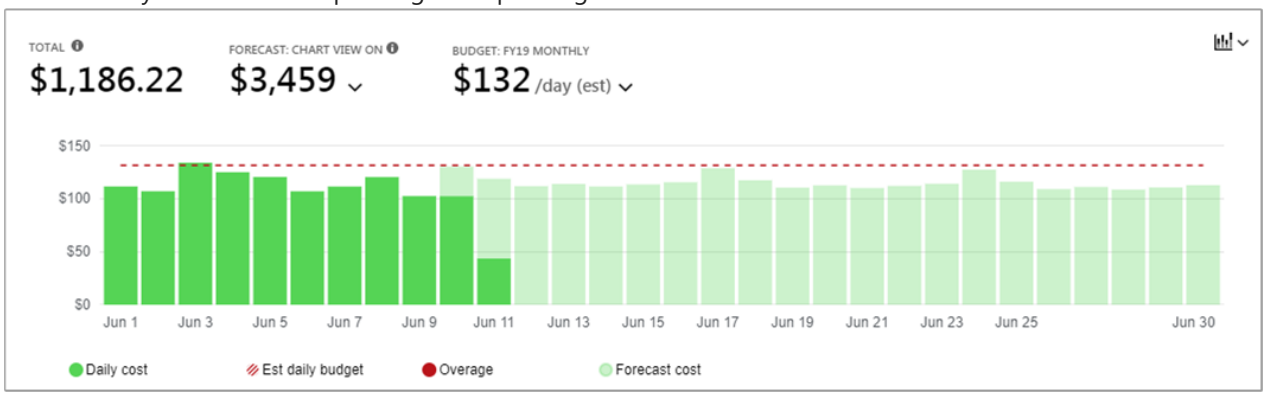
Use the forecast chart view to identify potential budget breaches. When there's a potential budget breach, projected overspending is shown in red. An indicator symbol is also shown in the chart. Hovering over the symbol shows the estimated date of the budget breach.



There's also the **daily** view showing costs for each day. The daily view doesn't show a growth trend. The view is designed to show irregularities as cost spikes or dips from day to day. If you've selected a budget, the daily view also shows an estimate of your daily budget.

When your daily costs are consistently above the estimated daily budget, you can expect you'll surpass your monthly budget. The estimated daily budget is a means to help you visualize your budget at a lower level. When you have fluctuations in daily costs, then the estimated daily budget comparison to your monthly budget is less precise.

Here's a daily view of recent spending with spending forecast turned on.



When turn off the spending forecast, you don't see projected spending for future dates. Also, when you look at costs for past time periods, cost forecast doesn't show costs.

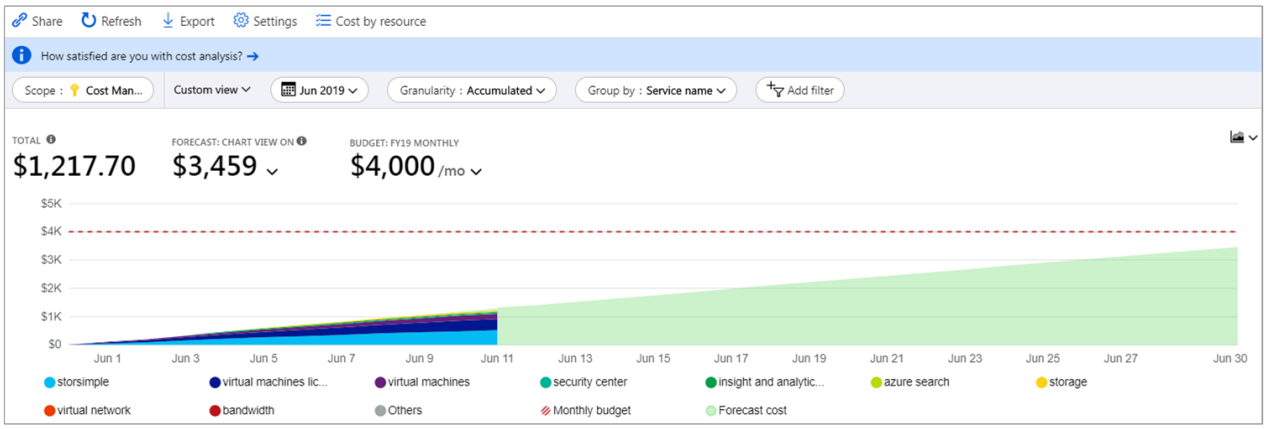
Generally, you can expect to see data or notifications for consumed resources within 8 to 12 hours.

Group by common properties to break down costs and identify top contributors. To group by resource tags, for example, select the tag key you want to group by. Costs are broken down by each tag value, with an extra segment for resources that don't have that tag applied.

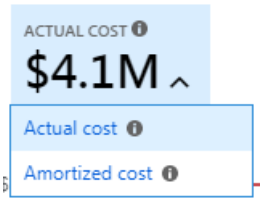
Most Azure resources support tagging. However, some tags aren't available in Cost Management and billing. Additionally, resource group tags aren't supported. Support for tags applies to usage reported *after* the tag was applied to the resource. Tags aren't applied retroactively for cost rollups.

Watch the How to review tag policies with Azure Cost Management video to learn about using Azure tag policy to improve cost data visibility.

Here's a view of Azure service costs for the current month.



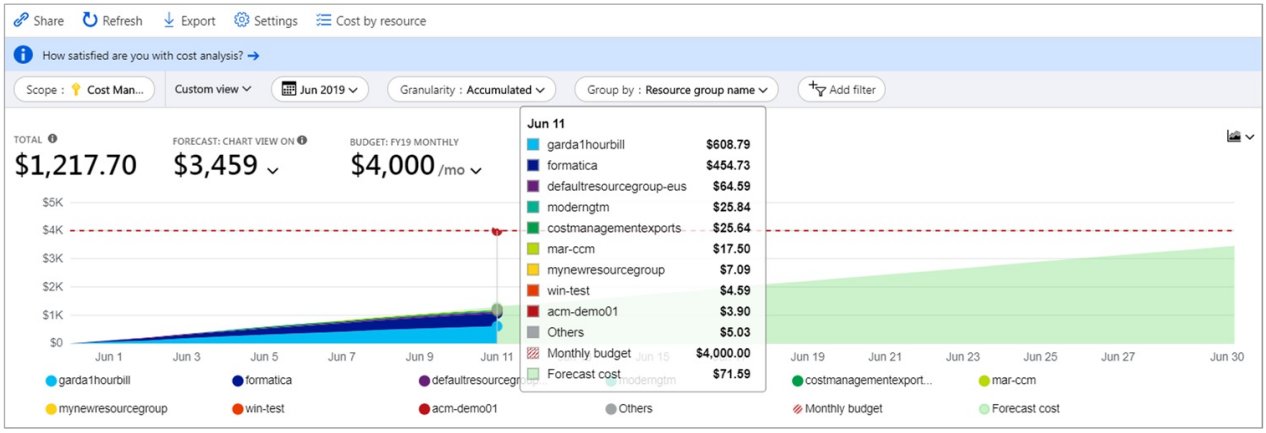
By default, cost analysis shows all usage and purchase costs as they are accrued and will show on your invoice, also known as **Actual cost**. Viewing actual cost is ideal for reconciling your invoice. However, purchase spikes in cost can be alarming when you're keeping an eye out for spending anomalies and other changes in cost. To flatten out spikes caused by reservation purchase costs, switch to **Amortized cost**.



Amortized cost breaks down reservation purchases into daily chunks and spreads them over the duration of the reservation term. For example, instead of seeing a $365 purchase on January 1, you'll see a $1 purchase every day from January 1 to December 31. In addition to basic amortization, these costs are also reallocated and associated by using the specific resources that used the reservation. For example, if that $1 daily charge was split between two virtual machines, you'd see two $0.50 charges for the day. If part of the reservation isn't utilized for the day, you'd see one $0.50 charge associated with the applicable virtual machine and another $0.50 charge with a charge type of `UnusedReservation`. Note that unused reservation costs can be seen only when viewing amortized cost.

Due to the change in how costs are represented, it's important to note that actual cost and amortized cost views will show different total numbers. In general, the total cost of months with a reservation purchase will decrease when viewing amortized costs, and months following a reservation purchase will increase. Amortization is available only for reservation purchases and doesn't apply to Azure Marketplace purchases at this time.

The following image shows resource group names. You can group by tag to view total costs per tag or use the **Cost by resource** view to see all tags for a particular resource.

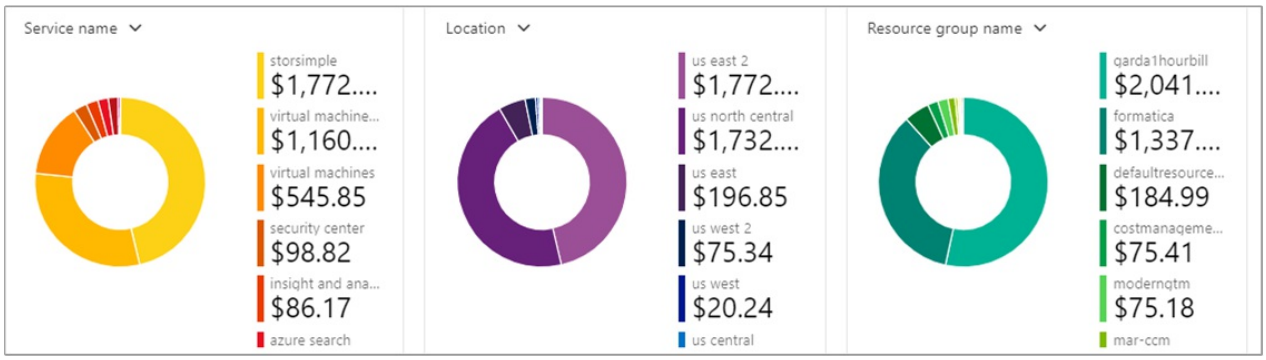


When you're grouping costs by a specific attribute, the top 10 cost contributors are shown from highest to lowest. If there are more than 10, the top nine cost contributors are shown with an **Others** group that represents all remaining groups combined. When you're grouping by tags, an **Untagged** group appears for costs that don't

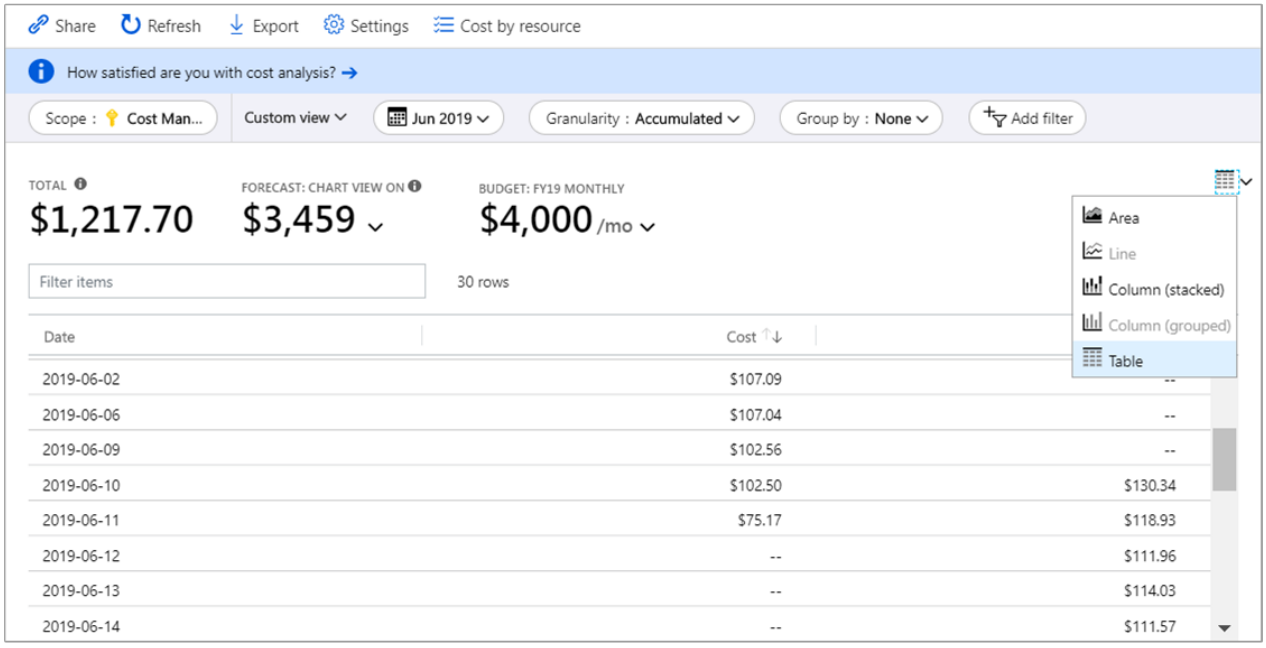
have the tag key applied. **Untagged** is always last, even if untagged costs are higher than tagged costs. Untagged costs will be part of **Others**, if 10 or more tag values exist. Switch to the table view and change granularity to **None** to see all values ranked from highest to lowest cost.

Classic virtual machines, networking, and storage resources don't share detailed billing data. They're merged as **Classic services** when grouping costs.

Pivot charts under the main chart show different groupings, which give you a broader picture of your overall costs for the selected time period and filters. Select a property or tag to view aggregated costs by any dimension.



You can view the full dataset for any view. Whichever selections or filters that you apply affect the data presented. To see the full dataset, select the **chart type** list and then select **Table** view.



Understanding grouping and filtering options

The following table lists some of the most common grouping and filtering options and when you should use them.

PROPERTY	WHEN TO USE	NOTES
Availability zones	Break down AWS costs by availability zone.	Applicable only to AWS scopes and management groups. Azure data does not include availability zone and will show as **Not applicable**.

PROPERTY	WHEN TO USE	NOTES
Billing period	Break down PAYG costs by the month they were (or will be) invoiced.	Use **Billing period** to get an accurate representation of invoiced PAYG charges. Include 2 extra days before and after the billing period if filtering down to a custom date range. Limiting to the exact billing period dates will not match the invoice. Will show costs from all invoices in the billing period. Use **Invoice ID** to filter down to a specific invoice. Applicable only to PAYG subscriptions because EA and MCA are billed by calendar months. EA/MCA accounts can use calendar months in the date picker or monthly granularity to accomplish the same goal.
Charge type	Break down usage, purchase, refund, and unused reservation costs.	Reservation purchases and refunds are available only when using actual costs and not when using amortized costs. Unused reservation costs are available only when looking at amortized costs.
Department	Break down costs by EA department.	Available only for EA and management groups. PAYG subscriptions do not have a department and will show as **Not applicable** or **unassigned**.
Enrollment account	Break down costs by EA account owner.	Available only for EA billing accounts, departments, and management groups. PAYG subscriptions do not have EA enrollment accounts and will show as **Not applicable** or **unassigned**.
Frequency	Break down usage-based, one-time, and recurring costs.	
Invoice ID	Break down costs by billed invoice.	Unbilled charges do not have an invoice ID yet and EA costs do not include invoice details and will show as **Not applicable**.
Meter	Break down costs by usage meter.	Purchases and Marketplace usage will show as **Not applicable**. Refer to **Charge type** to identify purchases and **Publisher type** to identify Marketplace charges.
Operation	Break down AWS costs by operation.	Applicable only to AWS scopes and management groups. Azure data does not include operation and will show as **Not applicable** – use **Meter** instead.

PROPERTY	WHEN TO USE	NOTES
Pricing model	Break costs down by on-demand, reservation, or spot usage.	Purchases show as **OnDemand**. If you see **Not applicable**, group by **Reservation** to determine whether the usage is reservation or on-demand usage and **Charge type** to identify purchases.
Provider	Break down costs by AWS and Azure.	Available only for management groups.
Publisher type	Break down AWS, Azure, and Marketplace costs.	
Reservation	Break down costs by reservation.	Any usage or purchases that aren't associated with a reservation will show as **Not applicable**. Group by **Publisher type** to identify other Azure, AWS, or Marketplace purchases.
Resource	Break down costs by resource.	Purchases show as **Not applicable**, because they're applied at an EA/PAYG billing account or MCA billing profile level and not associated with a specific resource. Group by **Publisher type** to identify other Azure, AWS, or Marketplace purchases.
Resource group	Break down costs by resource group.	Purchases, tenant resources not associated with subscriptions, subscription resources not deployed to a resource group, and classic resources do not have a resource group and will show as **others**, **classic services**, **$system**, or **Not applicable**.
Resource type	Break down costs by resource type.	Purchases and classic services do not have an Azure Resource Manager resource type and will show as **others**, **classic services**, or **Not applicable**.
Resource location	Break down costs by location or region.	Purchases and Marketplace usage may be shown as **unassigned**, **unknown**, **unmapped**, or **Not applicable**.
Service name or **Meter category**	Break down cost by Azure service.	Purchases and Marketplace usage will show as **Not applicable** or **unassigned**.
Service tier or **Meter subcategory**	Break down cost by Azure usage meter subclassification.	Purchases and Marketplace usage will show as **Not applicable** or **unassigned**.
Subscription	Break down costs by Azure subscription and AWS linked account.	Purchases and tenant resources may show as **Not applicable**.

PROPERTY	WHEN TO USE	NOTES
Tag	Break down costs by tag values for a specific tag key.	Tags are not available for purchases, tenant resources not associated with subscriptions, subscription resources not deployed to a resource group, or classic resources. Note some services do not include tags in usage data. Learn more about tags support for each resource type.

For more information about terms, see Understand the terms used in the Azure usage and charges file.

Saving and sharing customized views

Save and share customized views with others by pinning cost analysis to the Azure portal dashboard or by copying a link to cost analysis.

To pin cost analysis, select the pin icon in the upper-right corner. Pinning cost analysis will save only the main chart or table view. Share the dashboard to give others access to the tile. Note that this shares only the dashboard configuration and doesn't grant others access to the underlying data. If you don't have access to costs but do have access to a shared dashboard, you'll see an "access denied" message.

To share a link to cost analysis, select **Share** at the top of the blade. A custom URL will show, which opens this specific view for this specific scope. If you don't have cost access and get this URL, you'll see an "access denied" message.

To learn more about granting access to costs for each supported scope, review Understand and work with scopes.

Automation and offline analysis

There are times when you need to download the data for further analysis, merge it with your own data, or integrate it into your own systems. Cost Management offers a few different options. As a starting point, if you need an ad hoc high-level summary, like what you get within cost analysis, build the view you need. Then download it by selecting **Export** and selecting **Download data to CSV** or **Download data to Excel**. The Excel download provides additional context on the view you used to generate the download, like scope, query configuration, total, and date generated.

If you need the full, unaggregated dataset, download it from the billing account. Then, from the list of services in the portal's left navigation pane, go to **Cost Management + Billing**. Select your billing account, if applicable. Go to **Usage + charges**, and then select the **Download** icon for the desired billing period.

Take a similar approach to automate receiving cost data. Use the Query API for richer analysis with dynamic filtering, grouping, and aggregation, or use the UsageDetails API for the full, unaggregated dataset. The general availability (GA) version of these APIs is 2019-01-01. Use **2019-04-01-preview** to get access to the preview of reservation and Marketplace purchases within these APIs.

For example, following is an aggregated view of amortized costs broken down by charge type (usage, purchase, or refund), publisher type (Azure or Marketplace), resource group (empty for purchases), and reservation (empty if not applicable).

```
POST https://management.azure.com/{scope}/providers/Microsoft.CostManagement/query?api-version=2019-04-01-
preview
Content-Type: application/json

{
  "type": "AmortizedCost",
  "timeframe": "Custom",
  "timePeriod": { "from": "2019-04-01", "to": "2019-04-30" },
  "dataset": {
    "granularity": "None",
    "aggregation": {
      "totalCost": { "name": "PreTaxCost", "function": "Sum" }
    },
    "grouping": [
      { "type": "dimension", "name": "ChargeType" },
      { "type": "dimension", "name": "PublisherType" },
      { "type": "dimension", "name": "Frequency" },
      { "type": "dimension", "name": "ResourceGroup" },
      { "type": "dimension", "name": "SubscriptionName" },
      { "type": "dimension", "name": "SubscriptionId" },
      { "type": "dimension", "name": "ReservationName" },
      { "type": "dimension", "name": "ReservationId" },
    ]
  },
}
```

And if you don't need the aggregation and prefer the full, raw dataset:

```
GET https://management.azure.com/{scope}/providers/Microsoft.Consumption/usageDetails?
metric=AmortizedCost&$filter=properties/usageStart+ge+'2019-04-01'+AND+properties/usageEnd+le+'2019-04-
30'&api-version=2019-04-01-preview
```

If you need actual costs to show purchases as they are accrued, change **type**/**metric** to **ActualCost**. For more information about these APIs, see the Query and UsageDetails API documentation. Note that the published docs are for the GA version. However, they both work the same for the *2019-04-01-preview* API version outside of the new type/metric attribute and changed property names. (Read more about the property names below.)

Cost Management APIs work across all scopes above resources: resource group, subscription, and management group via Azure RBAC access, EA billing accounts (enrollments), departments, and enrollment accounts via EA portal access. Learn more about scopes, including how to determine your scope ID or manage access, in Understand and work with scopes.

Next steps

Advance to the first tutorial to learn how to create and manage budgets.

Create and manage budgets

Tutorial: Create and manage Azure budgets

1/14/2020 • 6 minutes to read • Edit Online

Budgets in Cost Management help you plan for and drive organizational accountability. With budgets, you can account for the Azure services you consume or subscribe to during a specific period. They help you inform others about their spending to proactively manage costs, and to monitor how spending progresses over time. When the budget thresholds you've created are exceeded, only notifications are triggered. None of your resources are affected and your consumption isn't stopped. You can use budgets to compare and track spending as you analyze costs.

Cost and usage data is typically available within 12-16 hours and budgets are evaluated against these costs every four hours. Email notifications are normally received within 12-16 hours.

Budgets reset automatically at the end of a period (monthly, quarterly, or annually) for the same budget amount when you select an expiration date in the future. Because they reset with the same budget amount, you need to create separate budgets when budgeted currency amounts differ for future periods.

The examples in this tutorial walk you through creating and editing a budget for an Azure Enterprise Agreement (EA) subscription.

Watch the Apply budgets to subscriptions using the Azure portal video to see how you can create budgets in Azure to monitor spending.

In this tutorial, you learn how to:

- Create a budget in the Azure portal
- Edit a budget

Prerequisites

Budgets are supported for a variety of Azure account types. To view the full list of supported account types, see Understand Cost Management data. To view budgets, you need at least read access for your Azure account.

For Azure EA subscriptions, you must have read access to view budgets. To create and manage budgets, you must have contributor permission. You can create individual budgets for EA subscriptions and resource groups. However, you cannot create budgets for EA billing accounts.

The following Azure permissions, or scopes, are supported per subscription for budgets by user and group. For more information about scopes, see Understand and work with scopes.

- Owner – Can create, modify, or delete budgets for a subscription.
- Contributor and Cost Management contributor – Can create, modify, or delete their own budgets. Can modify the budget amount for budgets created by others.
- Reader and Cost Management reader – Can view budgets that they have permission to.

For more information about assigning permission to Cost Management data, see Assign access to Cost Management data.

Sign in to Azure

- Sign in to the Azure portal at https://portal.azure.com.

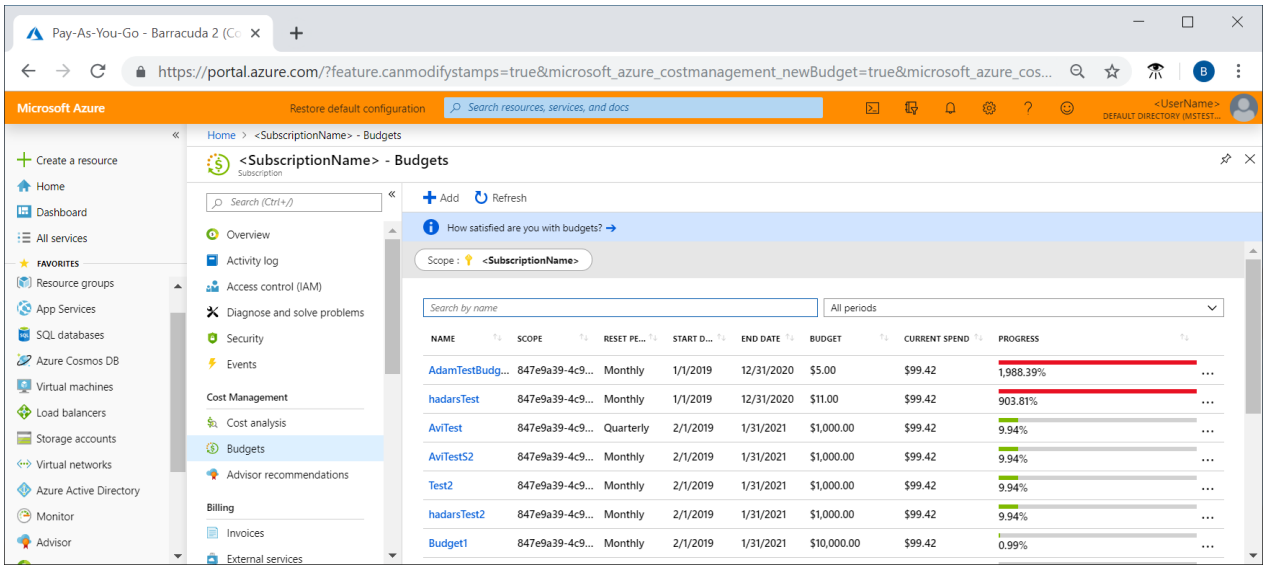
Create a budget in the Azure portal

You can create an Azure subscription budget for a monthly, quarterly, or annual period. Your navigational content in the Azure portal determines whether you create a budget for a subscription or for a management group.

To create or view a budget, open the desired scope in the Azure portal and select **Budgets** in the menu. For example, navigate to **Subscriptions**, select a subscription from the list, and then select **Budgets** in the menu. Use the **Scope** pill to switch to a different scope, like a management group, in Budgets. For more information about scopes, see Understand and work with scopes.

After you create budgets, they show a simple view of your current spending against them.

Click **Add**.



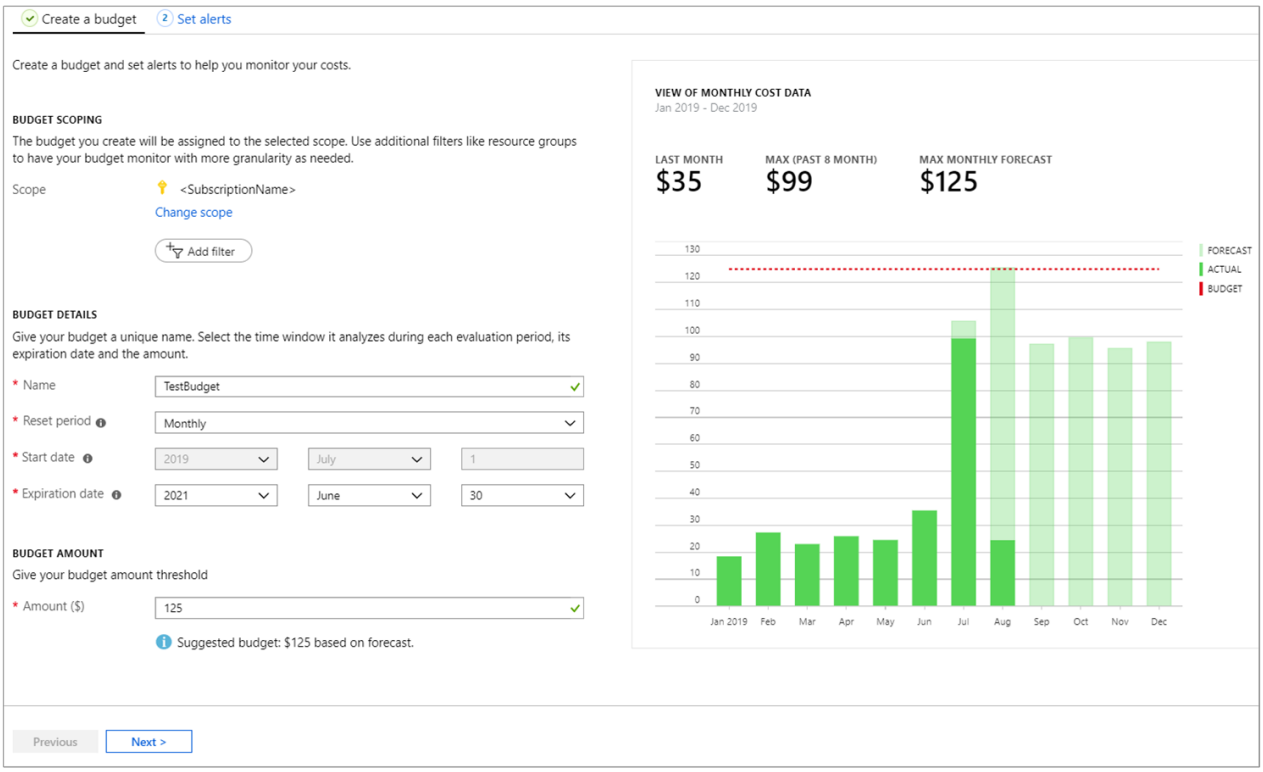
In the **Create budget** window, make sure that the scope shown is correct. Choose any filters that you want to add. Filters allow you to create budgets on specific costs, such as resource groups in a subscription or a service like virtual machines. Any filter you can use in cost analysis can also be applied to a budget.

After you've identified your scope and filters, type a budget name. Then, choose a monthly, quarterly or annual budget reset period. This reset period determines the time window that's analyzed by the budget. The cost evaluated by the budget starts at zero at the beginning of each new period. When you create a quarterly budget, it works in the same way as a monthly budget. The difference is that the budget amount for the quarter is evenly divided among the three months of the quarter. An annual budget amount is evenly divided among all 12 months of the calendar year.

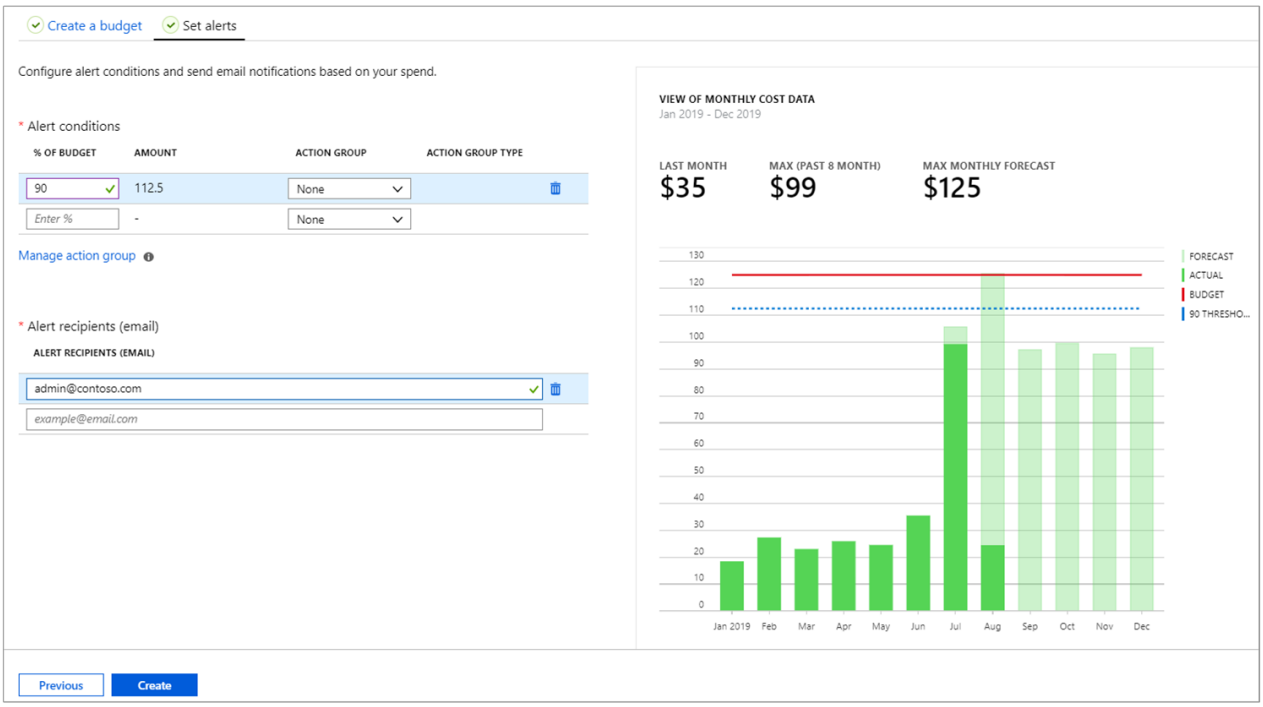
If you have a Pay-As-You-Go, MSDN, or Visual Studio subscription, your invoice billing period might not align to the calendar month. For those subscription types and resource groups, you can create a budget that's aligned to your invoice period or to calendar months. To create a budget aligned to your invoice period, select a reset period of **Billing month**, **Billing quarter**, or **Billing year**. To create a budget aligned to the calendar month, select a reset period of **Monthly**, **Quarterly**, or **Annually**.

Next, identify the expiration date when the budget becomes invalid and stops evaluating your costs.

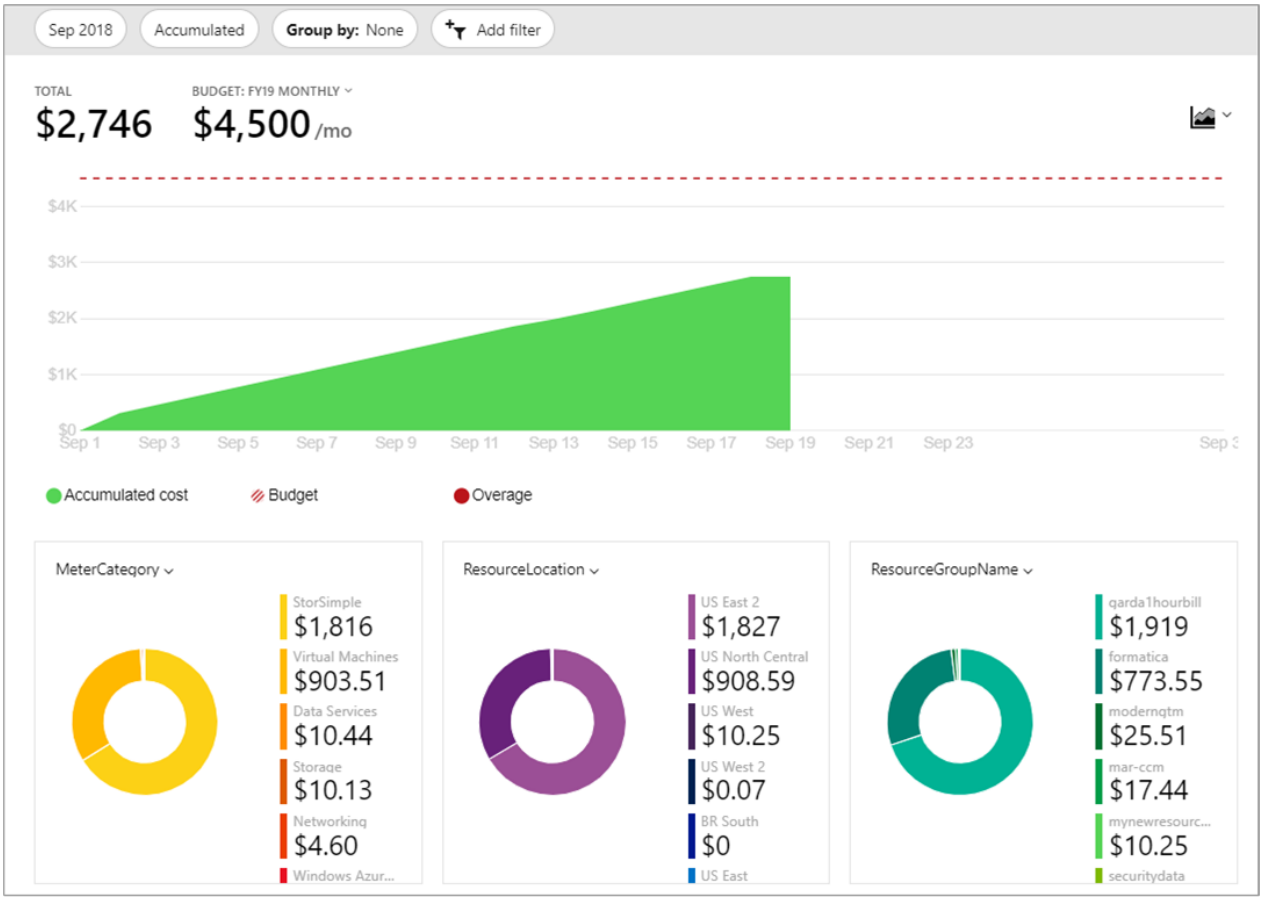
Based on the fields chosen in the budget so far, a graph is shown to help you select a threshold to use for your budget. The suggested budget is based on the highest forecasted cost that you might incur in future periods. You can change the budget amount.



After you configure the budget amount, click **Next** to configure budget alerts. Budgets require at least one cost threshold (% of budget) and a corresponding email address. You can optionally include up to five thresholds and five email addresses in a single budget. When a budget threshold is met, email notifications are normally received in less than 20 hours. For more information about notifications, see Use cost alerts. In the example below, an email alert gets generated when 90% of the budget is reached. If you create a budget with the Budgets API, you can also assign roles to people to receive alerts. Assigning roles to people isn't supported in the Azure portal. For more about the Azure budgets API, see Budgets API.



After you create a budget, it is shown in cost analysis. Viewing your budget in relation to your spending trend is one of the first steps when you start to analyze your costs and spending.

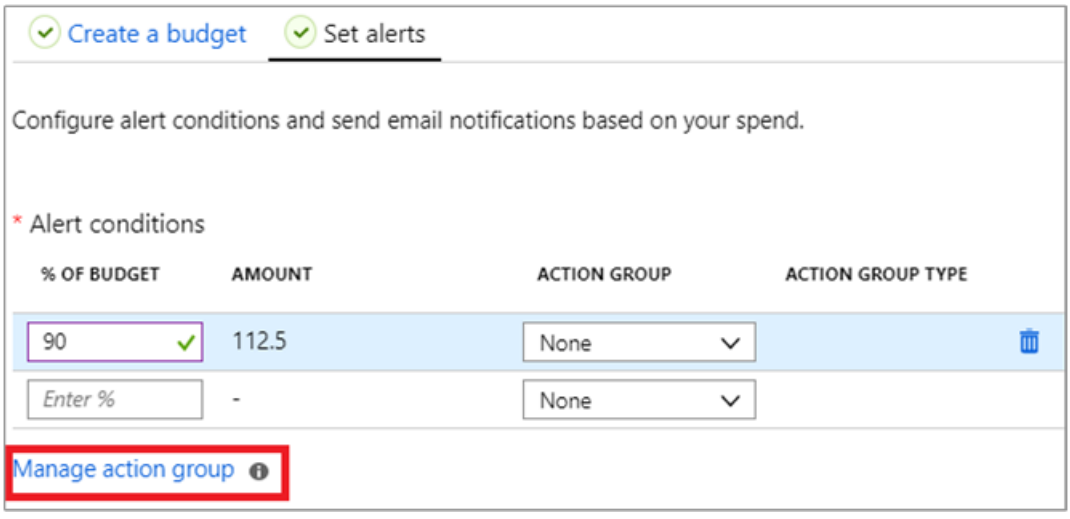


In the preceding example, you created a budget for a subscription. However, you can also create a budget for a resource group. If you want to create a budget for a resource group, navigate to **Cost Management + Billing** > **Subscriptions** > select a subscription > **Resource groups** > select a resource group > **Budgets** > and then **Add** a budget.

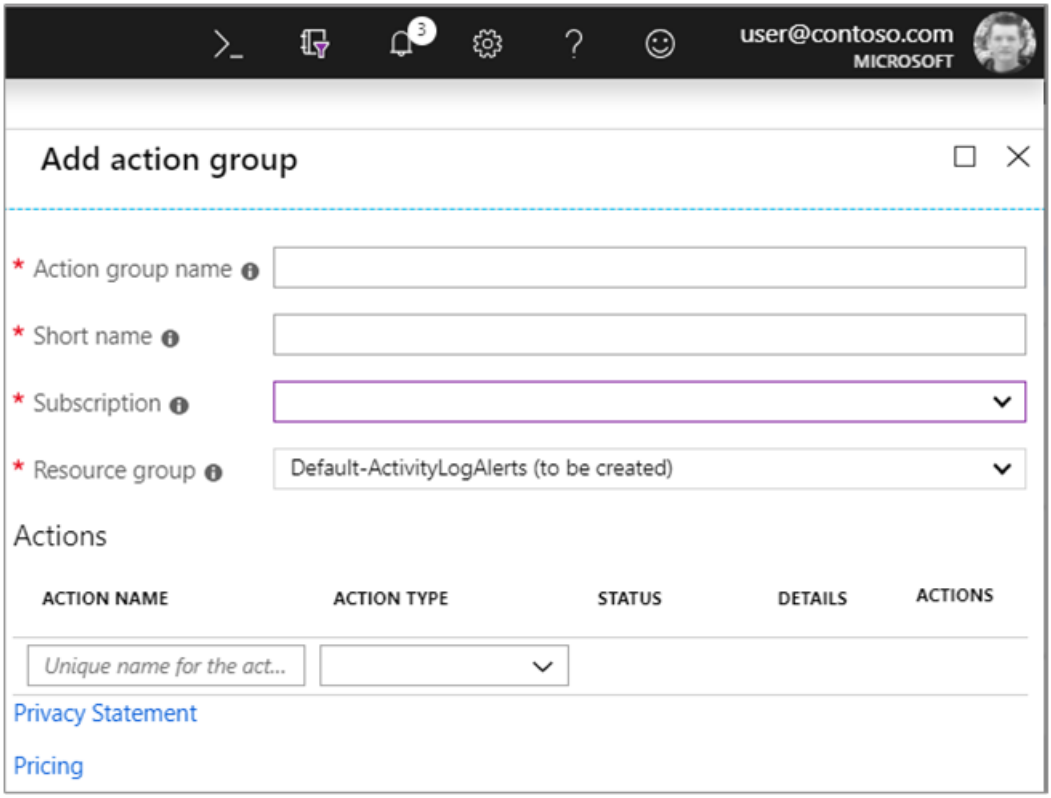
Trigger an action group

When you create or edit a budget for a subscription or resource group scope, you can configure it to call an action group. The action group can perform a variety of different actions when your budget threshold is met. Action Groups are currently only supported for subscription and resource group scopes. For more information about Action Groups, see Create and manage action groups in the Azure portal. For more information about using budget-based automation with action groups, see Manage costs with Azure budgets.

To create or update action groups, click **Manage action groups** while you're creating or editing a budget.

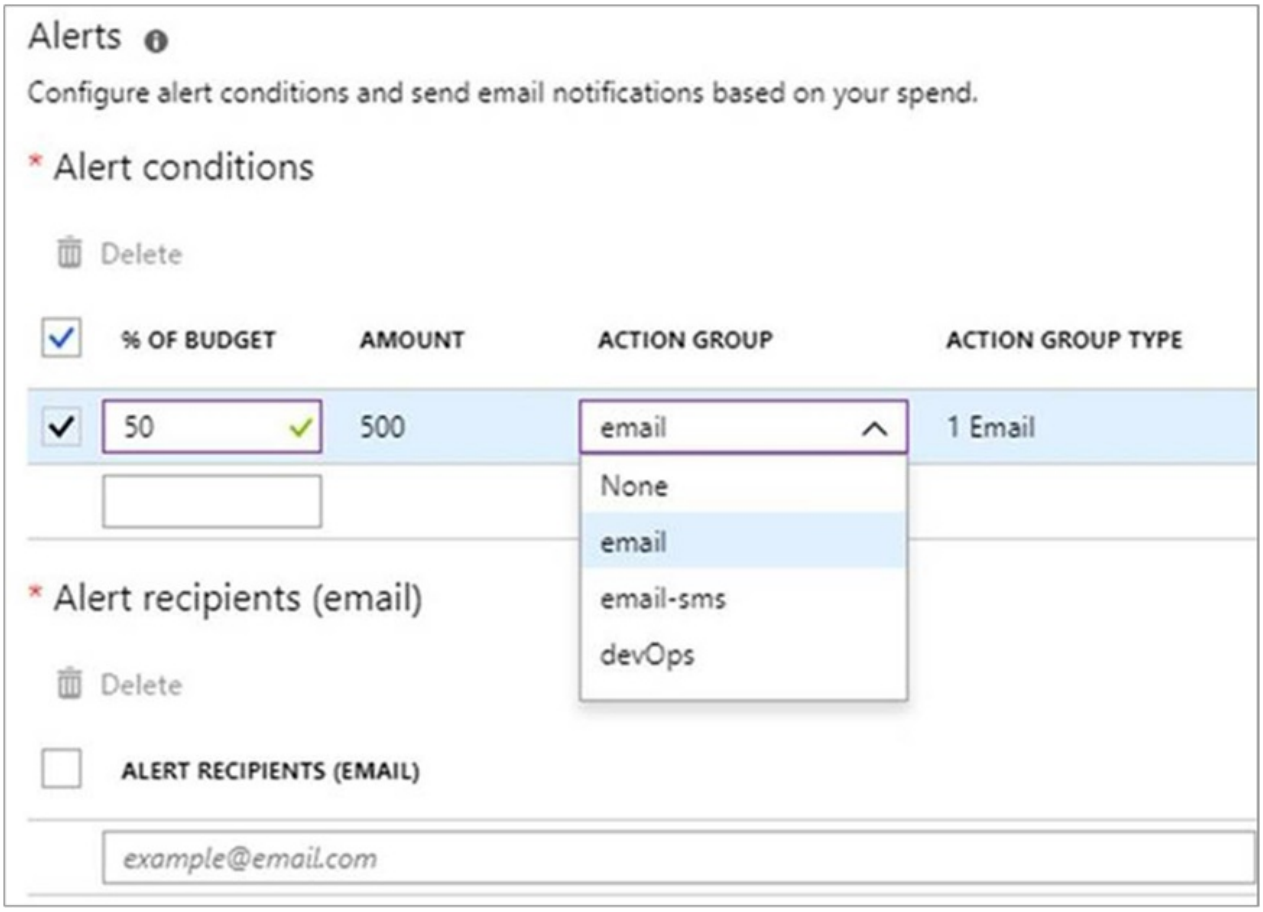


Next, click **Add action group** and create the action group.

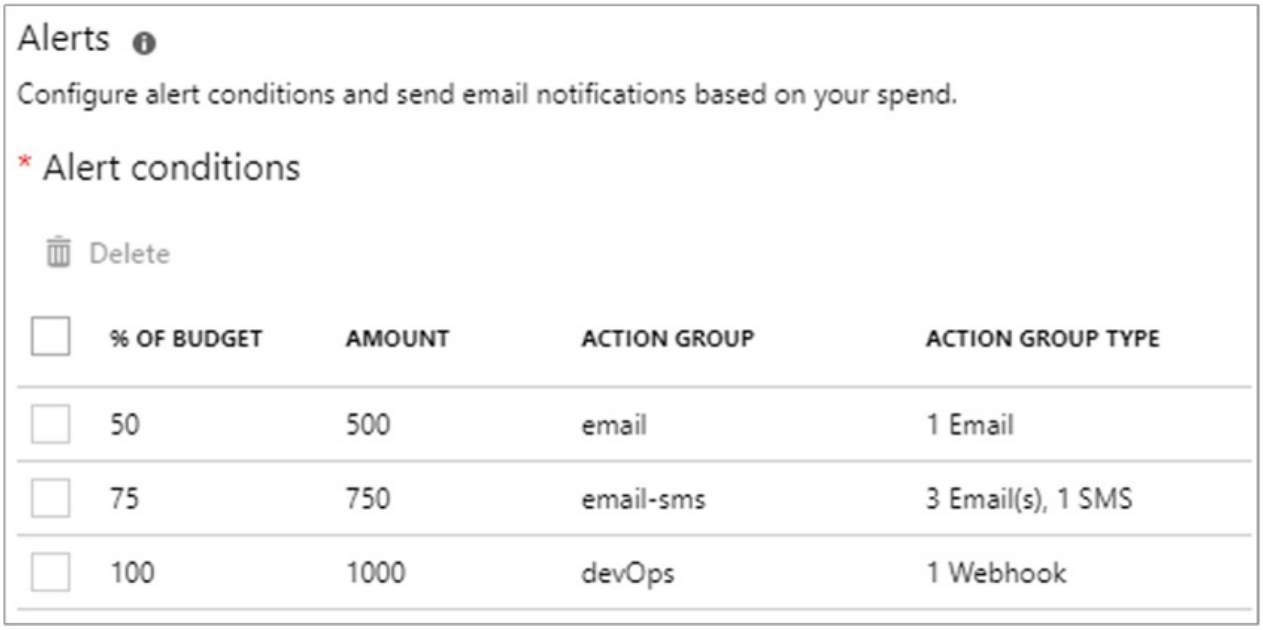


After the action group is created, close the box to return to your budget.

Configure your budget to use your action group when an individual threshold is met. Up to five different thresholds are supported.



The following example shows budget thresholds set to 50%, 75% and 100%. Each is configured to trigger the specified actions within the designated action group.



Budget integration with action groups only works for action groups that have the common alert schema disabled. For more information about disabling the schema, see How do I enable the common alert schema?

Next steps

In this tutorial, you learned how to:

- Create a budget in the Azure portal
- Edit a budget

Advance to the next tutorial to create a recurring export for your cost management data.

Create and manage exported data

Tutorial: Create and manage exported data

1/14/2020 • 5 minutes to read • Edit Online

If you read the Cost Analysis tutorial, then you're familiar with manually downloading your Cost Management data. However, you can create a recurring task that automatically exports your Cost Management data to Azure storage on a daily, weekly, or monthly basis. Exported data is in CSV format and it contains all the information that's collected by Cost Management. You can then use the exported data in Azure storage with external systems and combine it with your own custom data. And you can use your exported data in an external system like a dashboard or other financial system.

Watch the How to schedule exports to storage with Azure Cost Management video about creating a scheduled export of your Azure cost data to Azure Storage.

The examples in this tutorial walk you though exporting your cost management data and then verify that the data was successfully exported.

In this tutorial, you learn how to:

- Create a daily export
- Verify that data is collected

Prerequisites

Data export is available for a variety of Azure account types, including Enterprise Agreement (EA) and Microsoft Customer Agreement customers. To view the full list of supported account types, see Understand Cost Management data. The following Azure permissions, or scopes, are supported per subscription for data export by user and group. For more information about scopes, see Understand and work with scopes.

- Owner – Can create, modify, or delete scheduled exports for a subscription.
- Contributor – Can create, modify, or delete their own scheduled exports. Can modify the name of scheduled exports created by others.
- Reader – Can schedule exports that they have permission to.

For Azure Storage accounts:

- Write permissions are required to change the configured storage account, regardless of permissions on the export.
- Your Azure storage account must be configured for blob or file storage.

Sign in to Azure

Sign in to the Azure portal at https://portal.azure.com.

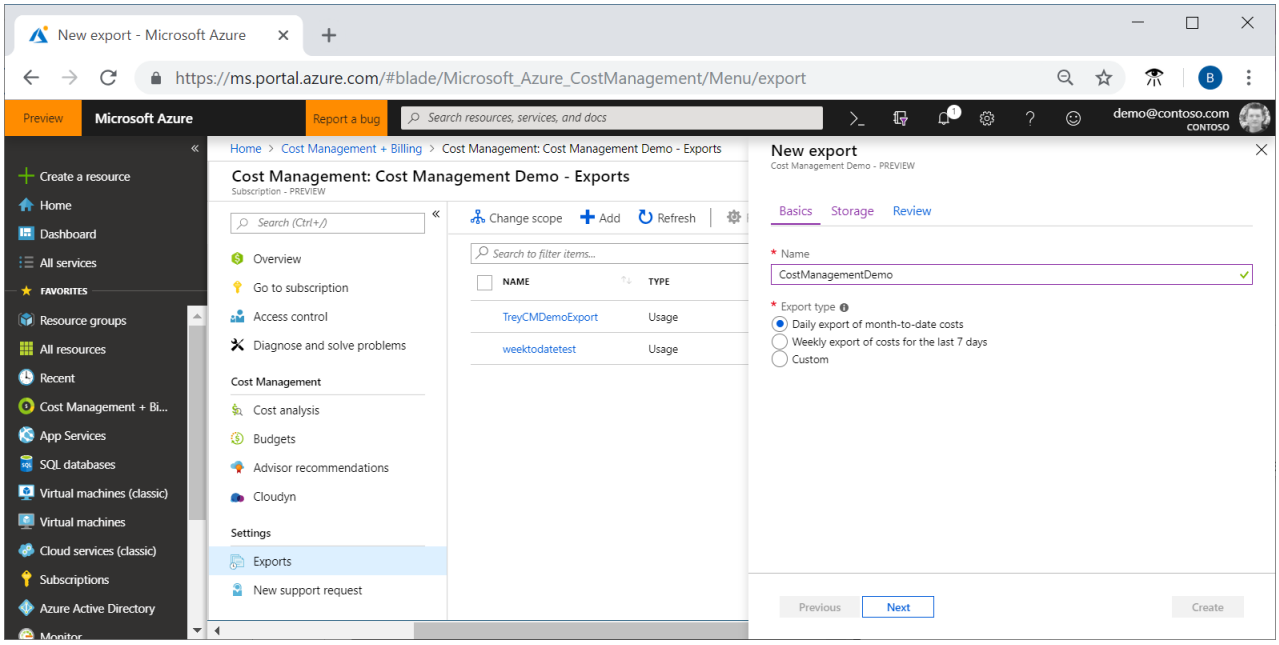
Create a daily export

To create or view a data export or to schedule an export, open the desired scope in the Azure portal and select **Cost analysis** in the menu. For example, navigate to **Subscriptions**, select a subscription from the list, and then select **Cost analysis** in the menu. At the top of the Cost analysis page, select **Export** and then choose an export option. For example, select **Schedule export**.

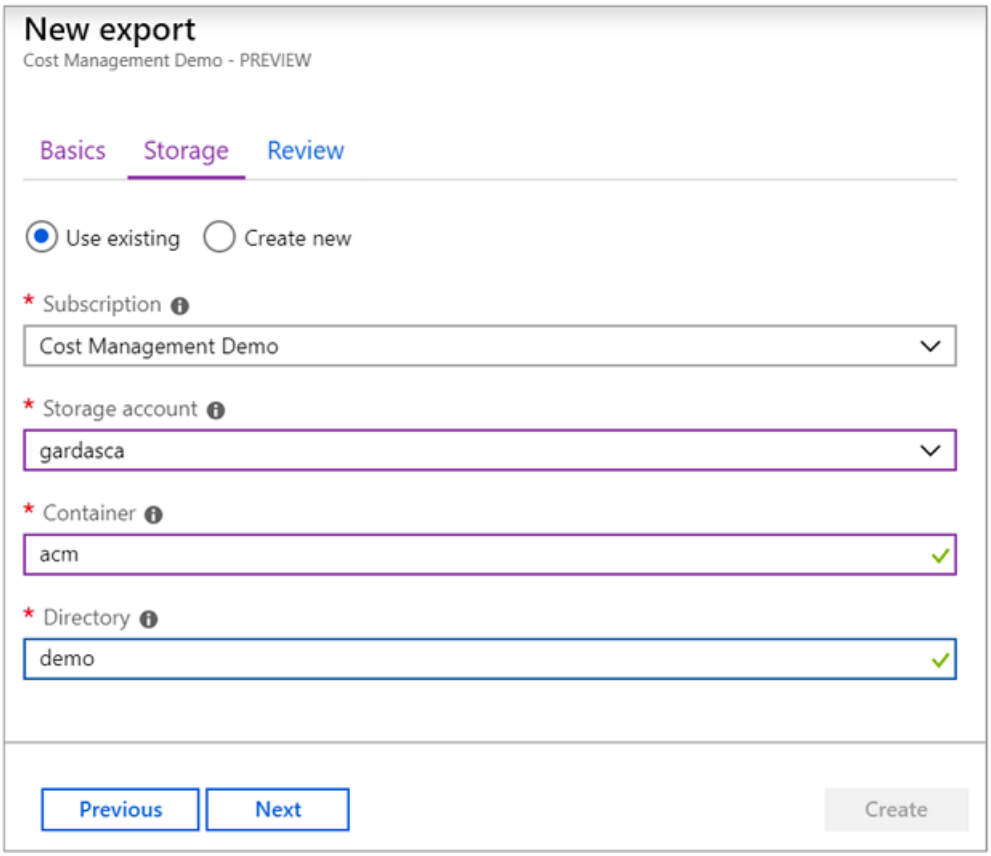
NOTE

- Besides subscriptions, you can create exports on resource groups, accounts, departments, and enrollments. For more information about scopes, see Understand and work with scopes.
- When you're signed in as a partner at the billing account scope or on a customer's tenant, you can export data to an Azure Storage account that's linked to your partner storage account. However, you must have an active subscription in your CSP tenant.

Select **Add**, type a name for the export, and then select the **Daily export of month-to-date costs** option. Select **Next**.



Specify the subscription for your Azure storage account, then select your storage account. Specify the storage container and the directory path that you'd like the export file to go to. Select **Next**.



Review your export details and select **Create**.

Your new export appears in the list of exports. By default, new exports are enabled. If you want to disable or delete a scheduled export, select any item in the list and then select either **Disable** or **Delete**.

Initially, it can take one to two hours before the export runs. However, it can take up to four hours before data is shown in exported files.

Export schedule

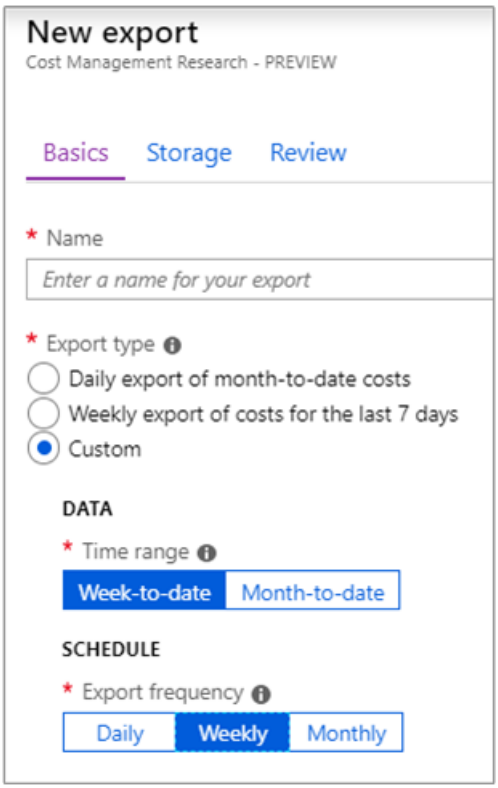
Scheduled exports are affected by the time and day of week of when you initially create the export. When you create a scheduled export, the export runs at the same frequency for each subsequent export occurrence. For example, for a month-to-date export set at a daily frequency, the export runs daily. Similarly for a weekly export, the export runs every week on the same day as it is scheduled. The exact delivery time of the export is not guaranteed and the exported data is available within four hours of run time." Each export creates a new file, so older exports are not overwritten.

There are two types of export options:

Daily export of month-to-date costs – The initial export runs immediately. Subsequent exports run the next day at the same time as the initial export. The latest data is aggregated from previous daily exports.

Custom – Allows you to schedule weekly and monthly exports with week-to-date and month-to-date options. *The initial export will run immediately.*

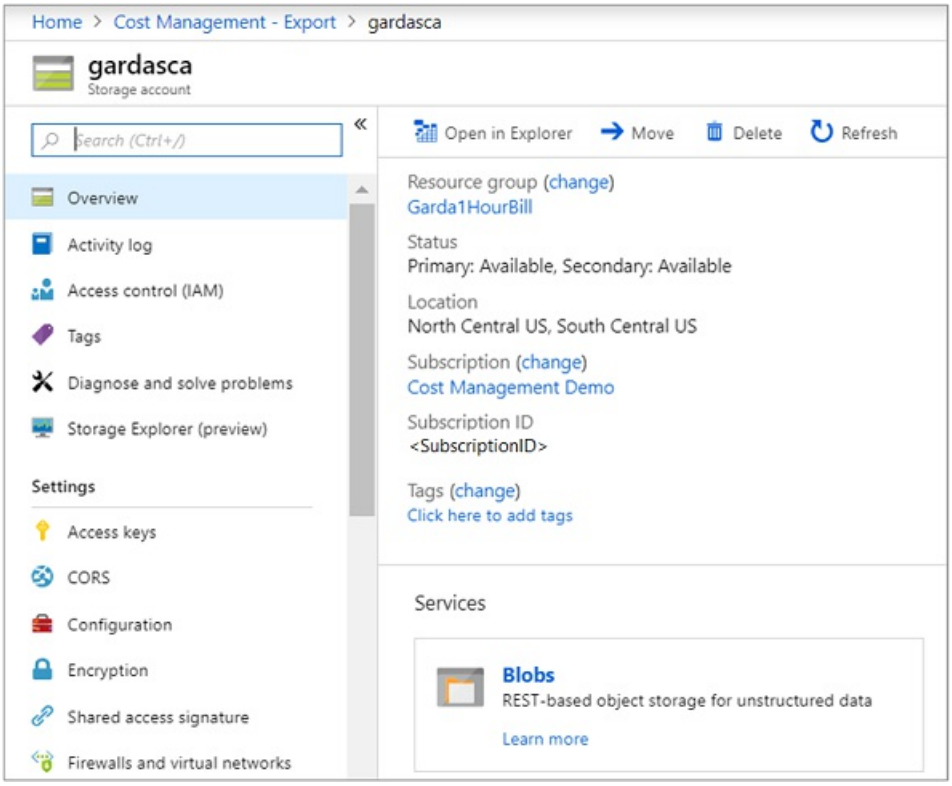
If you have a Pay-As-You-Go, MSDN, or Visual Studio subscription, your invoice billing period might not align to the calendar month. For those types of subscriptions and resource groups, you can create an export that's aligned to your invoice period or to calendar months. To create an export aligned to your invoice month, navigate to **Custom**, then select **Billing-period-to-date**. To create an export aligned to the calendar month, select **Month-to-date**.



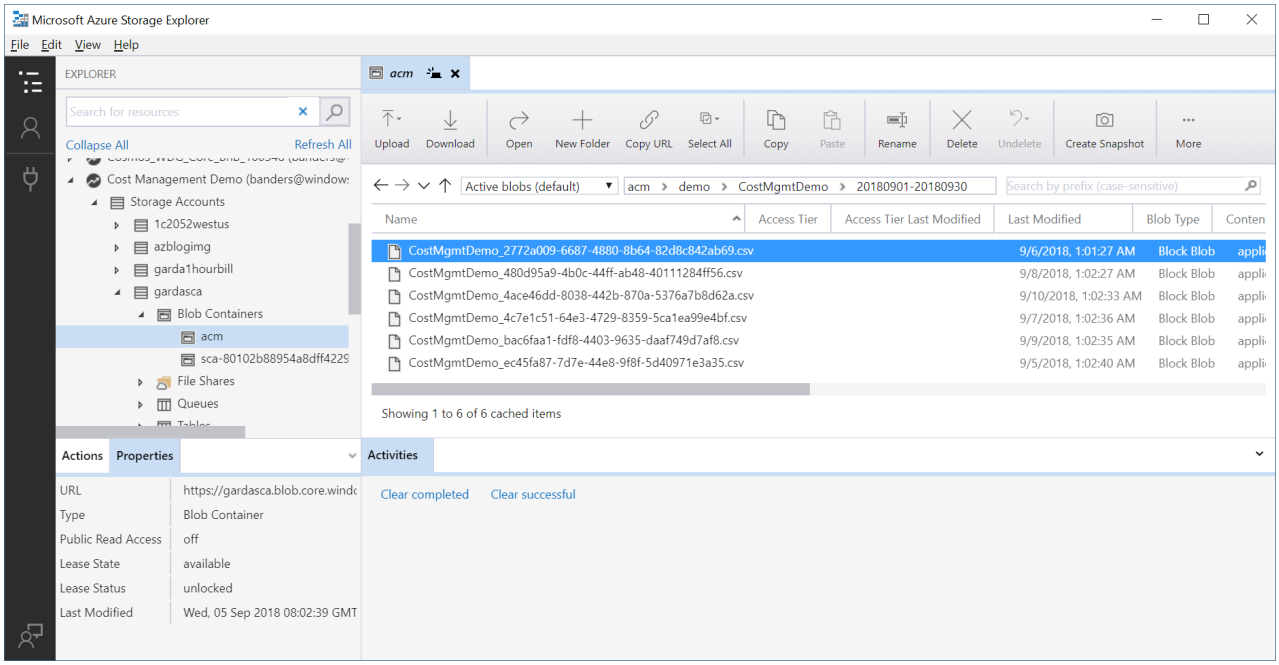
Verify that data is collected

You can easily verify that your Cost Management data is being collected and view the exported CSV file using Azure Storage Explorer.

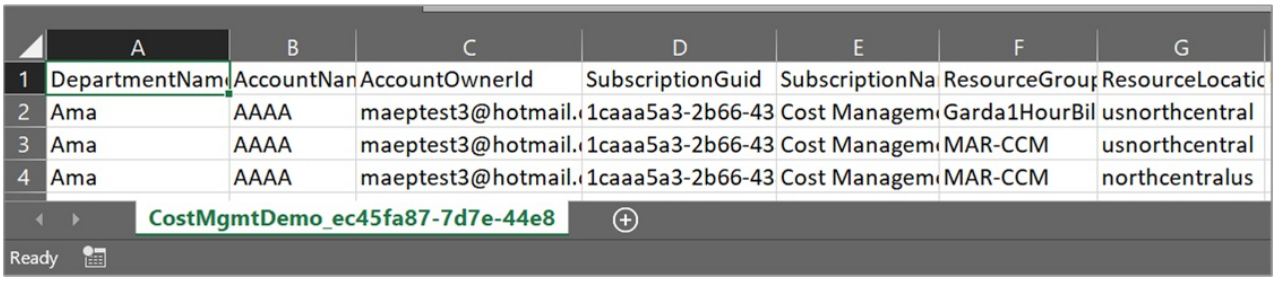
In the export list, select the storage account name. On the storage account page, select Open in Explorer. If you see a confirmation box, select **Yes** to open the file in Azure Storage Explorer.



In Storage Explorer, navigate to the container that you want to open and select the folder corresponding to the current month. A list of CSV files is shown. Select one and then select **Open**.



The file opens with the program or application that's set to open CSV file extensions. Here's an example in Excel.



Access exported data from other systems

One of the purposes of exporting your Cost Management data is to access the data from external systems. You might use a dashboard system or other financial system. Such systems vary widely so showing an example wouldn't be practical. However, you can get started with accessing your data from you applications at Introduction to Azure Storage.

Next steps

In this tutorial, you learned how to:

- Create a daily export
- Verify that data is collected

Advance to the next tutorial to optimize and improve efficiency by identifying idle and underutilized resources.

Review and act on optimization recommendations

Tutorial: Optimize costs from recommendations

1/14/2020 • 4 minutes to read • Edit Online

Azure Cost Management works with Azure Advisor to provide cost optimization recommendations. Azure Advisor helps you optimize and improve efficiency by identifying idle and underutilized resources. This tutorial walks you through an example where you identify underutilized Azure resources and then you take action to reduce costs.

In this tutorial, you learn how to:

- View cost optimization recommendations to view potential usage inefficiencies
- Act on a recommendation to resize a virtual machine to a more cost-effective option
- Verify the action to ensure that the virtual machine was successfully resized

Prerequisites

Recommendations are available for a variety of scopes and Azure account types. To view the full list of supported account types, see Understand Cost Management data. You must have at least read access to one or more of the following scopes to view cost data. For more information about scopes, see Understand and work with scopes.

- Subscription
- Resource group

You must have active virtual machines with at least 14 days of activity.

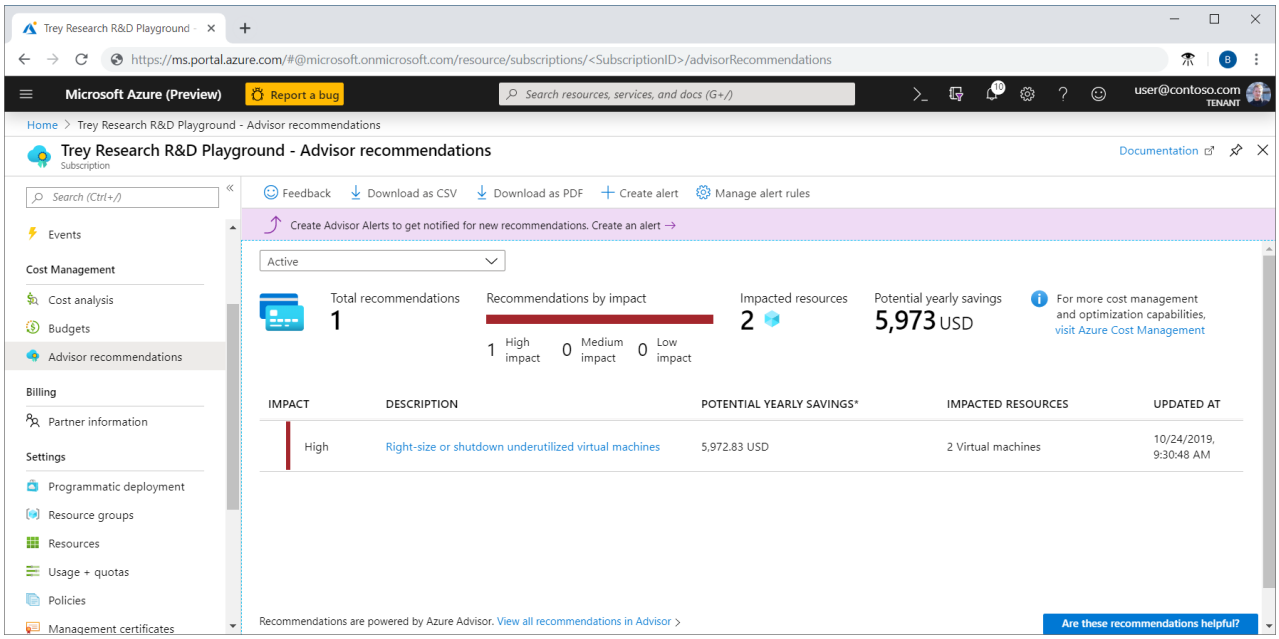
Sign in to Azure

Sign in to the Azure portal at https://portal.azure.com.

View cost optimization recommendations

To view cost optimization recommendations for a subscription, open the desired scope in the Azure portal and select **Advisor recommendations**.

To view recommendations for a management group, open the desired scope in the Azure portal and select **Cost analysis** in the menu. Use the **Scope** pill to switch to a different scope, such as a management group. Select **Advisor recommendations** in the menu. For more information about scopes, see Understand and work with scopes.



The list of recommendations identifies usage inefficiencies or shows purchase recommendations that can help you save additional money. The totaled **Potential yearly savings** shows the total amount that you can save if you shut down or deallocate all of your VMs that meet recommendation rules. If you don't want to shut them down, you should consider resizing them to a less expensive VM SKU.

The **Impact** category, along with the **Potential yearly savings**, are designed to help identify recommendations that have the potential to save as much as possible.

High impact recommendations include:

- Buy reserved virtual machine instances to save money over pay-as-you-go costs
- Optimize virtual machine spend by resizing or shutting down underutilized instances
- Use Standard Storage to store Managed Disks snapshots

Medium impact recommendations include:

- Delete Azure Data Factory pipelines that are failing
- Reduce costs by eliminating un-provisioned ExpressRoute circuits
- Reduce costs by deleting or reconfiguring idle virtual network gateways

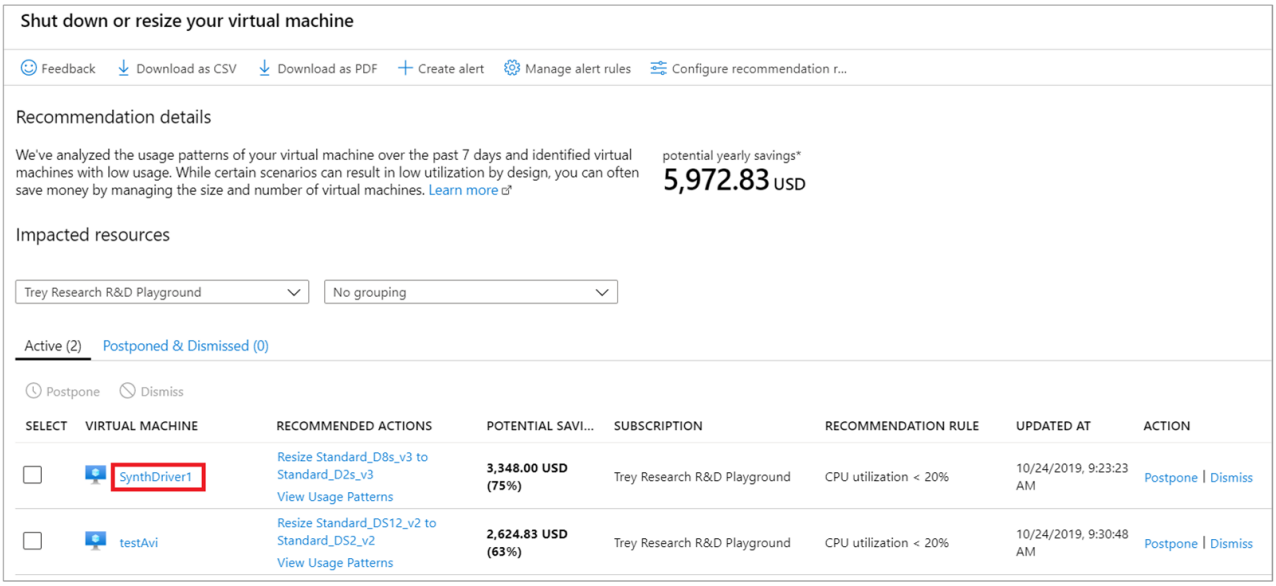
Act on a recommendation

Azure Advisor monitors your virtual machine usage for seven days and then identifies underutilized virtual machines. Virtual machines whose CPU utilization is five percent or less and network usage is seven MB or less for four or more days are considered low-utilization virtual machines.

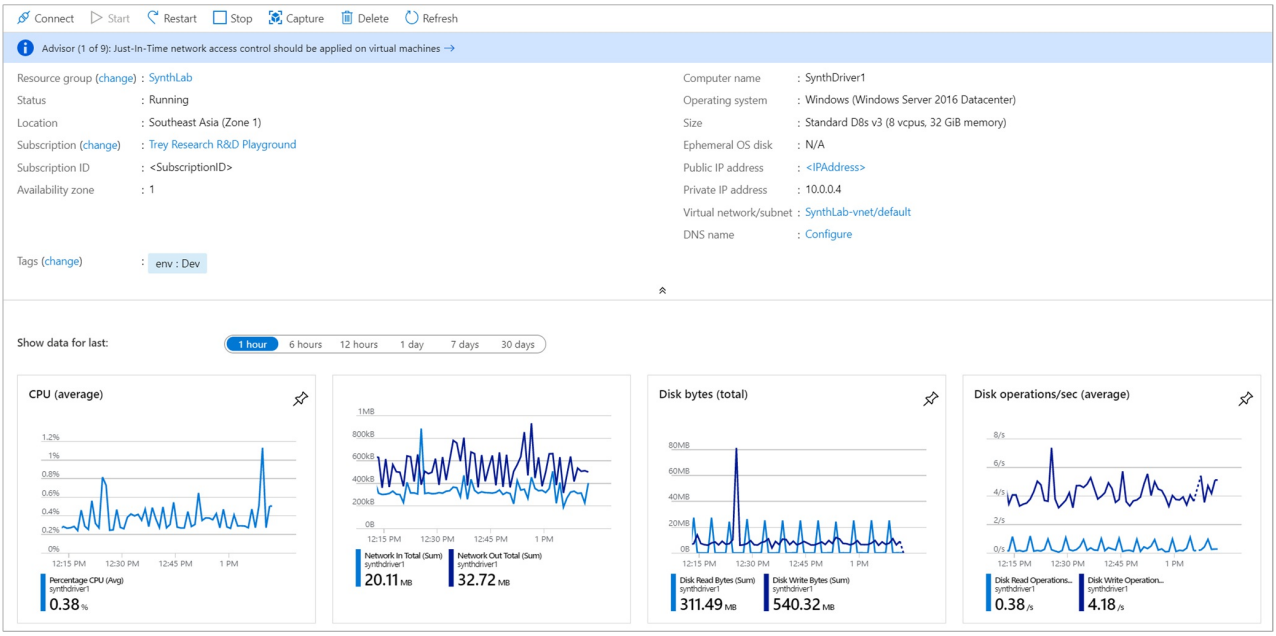
The 5% or less CPU utilization setting is the default, but you can adjust the settings. For more information about adjusting the setting, see the Configure the average CPU utilization rule or the low usage virtual machine recommendation.

Although some scenarios can result in low utilization by design, you can often save money by changing the size of your virtual machines to less expensive sizes. Your actual savings might vary if you choose a resize action. Let's walk through an example of resizing a virtual machine.

In the list of recommendations, click the **Right-size or shutdown underutilized virtual machines** recommendation. In the list of virtual machine candidates, choose a virtual machine to resize and then click the virtual machine. The virtual machine's details are shown so that you can verify the utilization metrics. The **potential yearly savings** value is what you can save if you shut down or remove the VM. Resizing a VM will probably save you money, but you won't save the full amount of the potential yearly savings.

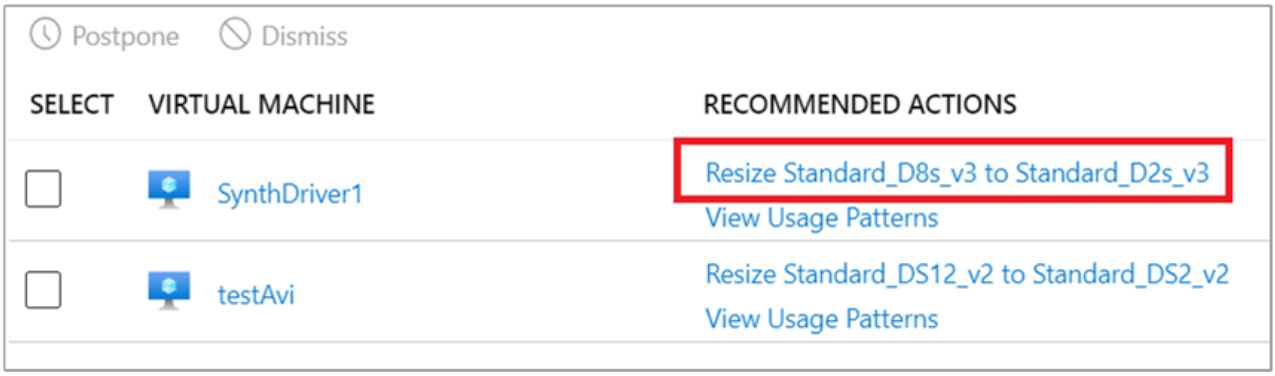


In the VM details, check the utilization of the virtual machine to confirm that it's a suitable resize candidate.

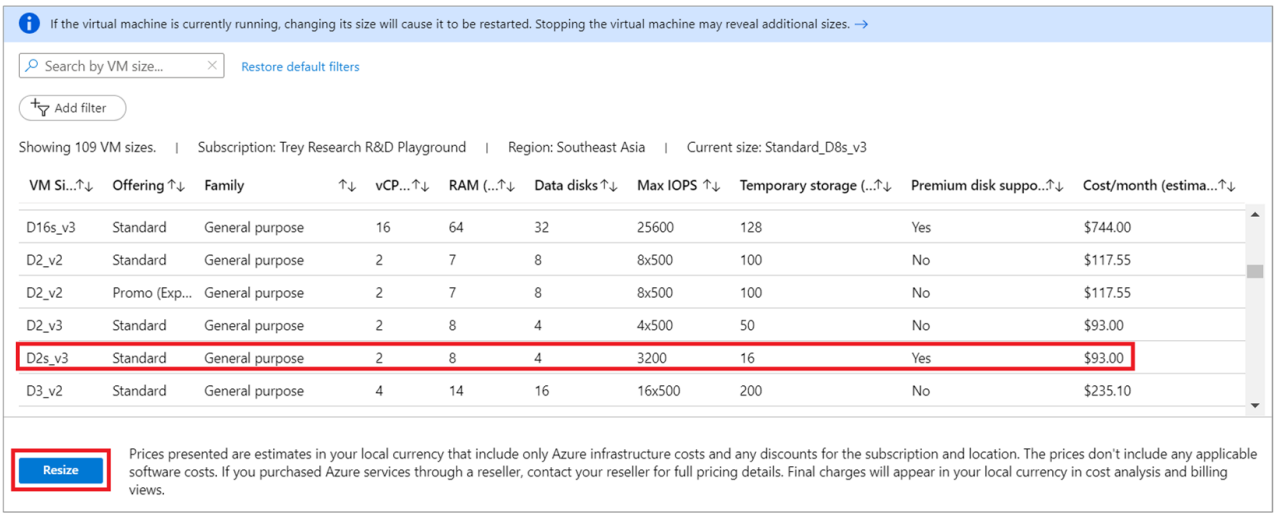


Note the current virtual machine's size. After you've verified that the virtual machine should be resized, close the VM details so that you see the list of virtual machines.

In the list of candidates to shut down or resize, select **Resize *<FromVirtualMachineSKU>* to *<ToVirtualMachineSKU>***.



Next, you're presented with a list of available resize options. Choose the one that will give the best performance and cost-effectiveness for your scenario. In the following example, the option chosen resizes from **Standard_D8s_v3** to **Standard_D2s_v3**.



After you choose a suitable size, click **Resize** to start the resize action.

Resizing requires an actively running virtual machine to restart. If the virtual machine is in a production environment, we recommend that you run the resize operation after business hours. Scheduling the restart can reduce disruptions caused by momentarily unavailability.

Verify the action

When the VM resizing completes successfully, an Azure notification is shown.

Next steps

In this tutorial, you learned how to:

- View cost optimization recommendations to view potential usage inefficiencies
- Act on a recommendation to resize a virtual machine to a more cost-effective option
- Verify the action to ensure that the virtual machine was successfully resized

If you haven't already read the Cost Management best practices article, it provides high-level guidance and principles to consider to help manage costs.

Cost Management best practices

How to optimize your cloud investment with Azure Cost Management

1/14/2020 • 9 minutes to read • Edit Online

Azure Cost Management gives you the tools to plan for, analyze and reduce your spending to maximize your cloud investment. This document provides you with a methodical approach to cost management and highlights the tools available to you as you address your organization's cost challenges. Azure makes it easy to build and deploy cloud solutions. However, it's important that those solutions are optimized to minimize the cost to your organization. Following the principles outlined in this document and using our tools will help to make sure your organization is prepared for success.

Methodology

Cost management is an organizational problem and should be an ongoing practice that begins before you spend money on cloud resources. To successfully implement cost management and optimize costs, your organization must:

- Be prepared with the proper tools for success
- Be accountable for costs
- Take appropriate action to optimize spending

Three key groups, outlined below, must be aligned in your organization to make sure that you successfully manage costs.

- **Finance** - People responsible for approving budget requests across the organization based on cloud spending forecasts. They pay the corresponding bill and assign costs to various teams to drive accountability.
- **Managers** - Business decision makers in an organization that need to understand cloud spending to find the best spending results.
- **App teams** - Engineers managing cloud resources on a day-to-day basis, developing services to meet the organization's needs. These teams need the flexibility to deliver the most value in their defined budgets.

Key principles

Use the principles outlined below to position your organization for success in cloud cost management.

Planning

Comprehensive, up-front planning allows you to tailor cloud usage to your specific business requirements. Ask yourself:

- What business problem am I solving?
- What usage patterns do I expect from my resources?

Your answers will help you select the offerings that are right for you. They determine the infrastructure to use and how it's used to maximize your Azure efficiency.

Visibility

When structured well, Cost Management helps you to inform people about the Azure costs they're responsible for or for the money they spend. Azure has services designed to give you insight into *where* your money is spent. Take advantage of these tools. They can help you find resources that are underused, remove waste, and maximize cost-saving opportunities.

Accountability

Attribute costs in your organization to make sure that people responsible are accountable for their team's spending. To fully understand your organization's Azure spending, you should organize your resources to maximize insight into cost attribution. Good organization helps to manage and reduce costs and hold people accountable for efficient spending in your organization.

Optimization

Act to reduce your spending. Make the most of it based on the findings gathered through planning and increasing cost visibility. You might consider purchase and licensing optimizations along with infrastructure deployment changes that are discussed in detail later in this document.

Iteration

Everyone in your organization must engage in the cost management lifecycle. They need to stay involved on an ongoing basis to optimize costs. Be rigorous about this iterative process and make it a key tenet of responsible cloud governance in your organization.

Plan with cost in mind

Before you deploy cloud resources, assess the following items:

- The Azure offer that best meets your needs
- The resources you plan to use
- How much they might cost

Azure provides tools to assist you in the assessment process. The tools can give you a good idea of the investment required to enable your workloads. Then you can select the best configuration for your situation.

Azure onboarding options

The first step in maximizing your experience within Cost Management is to investigate and decide which Azure offer is best for you. Think about how you plan to use Azure in the future. Also consider how you want your billing model configured. Consider the following questions when making your decision:

- How long do I plan to use Azure? Am I testing, or do I plan to build longer-term infrastructure?
- How do I want to pay for Azure? Should I prepay for a reduced price or get invoiced at the end of the month?

To learn more about the various options, visit How to buy Azure. Several of the most common billing models are identified below.

Free

- 12 months of popular free services
- $200 in credit to explore services for 30 days
- 25+ services are always free

Pay as you go

- No minimums or commitments
- Competitive Pricing
- Pay only for what you use
- Cancel anytime

Enterprise Agreement

- Options for up-front monetary commitments
- Access to reduced Azure pricing

Estimate the cost of your solution

Before you deploy any infrastructure, assess how much your solution will cost. The assessment will help you create a budget for your organization for the workload, up-front. Then you can use a budget over time to benchmark the validity of your initial estimation. And you can compare it with the actual cost of your deployed solution.

Azure pricing calculator

The Azure pricing calculator allows you to mix and match different combinations of Azure services to see an estimate of the costs. You can implement your solution using different ways in Azure - each might influence your overall spending. Thinking early about all of the infrastructure needs of your cloud deployment helps you use the tool most effectively. It can help you get a solid estimate of your estimated spending in Azure.

For more information, see the Azure pricing calculator.

Azure Migrate

Azure Migrate is a service that assesses your organization's current workloads in on-premises datacenters. It gives you insight into what you might need from an Azure replacement solution. First, Migrate analyzes your on-premises machines to determine whether migration is feasible. Then, it recommends VM sizing in Azure to maximize performance. Finally, it also creates a cost estimate for an Azure-based solution.

For more information, see Azure Migrate.

Analyze and manage your costs

Keep informed about how your organization's costs evolve over time. Use the following techniques to properly understand and manage your spending.

Organize and tag your resources

Organize your resources with cost in mind. As you create subscriptions and resource groups, think about the teams that are responsible for associated costs. Make sure your reporting keeps your organization in mind. Subscriptions and resource groups provide good buckets to organize and attribute spending across your organization. Tags provide a good way to attribute cost. You can use tags as a filter. And you can use them to group by when you analyze data and investigate costs. Enterprise Agreement customers can also create departments and place subscriptions under them. Cost-based organization in Azure helps keep the relevant people in your organization accountable for reducing their team's spending.

Use cost analysis

Cost analysis allows you to analyze your organizational costs in-depth by slicing and dicing your costs using standard resource properties. Consider the following common questions as a guide for your analysis. Answering these questions on a regular basis will help you stay more informed and enable more cost-conscious decisions.

- **Estimated costs for the current month** – How much have I incurred so far this month? Will I stay under my budget?
- **Investigate anomalies** – Do routine checks to make sure that costs stay within a reasonable range of normal usage. What are the trends? Are there any outliers?
- **Invoice reconciliation** - Is my latest invoiced cost more than the previous month? How did spending habits change month-over-month?
- **Internal chargeback** - Now that I know how much I'm being charged, how should those charges be broken down for my organization?

For more information, see cost analysis.

Export billing data on a schedule

Do you need to import your billing data into an external system, like a dashboard or financial system? Set up automated exports to Azure Storage and avoid manually downloading files every month. You can then easily set up automatic integrations with other systems to keep your billing data in sync.

For more information about exporting billing data, see Create and manage exported data.

Create budgets

After you've identified and analyzed your spending patterns, it's important to begin setting limits for yourself and your teams. Azure budgets give you the ability to set either a cost or usage-based budget with many thresholds and alerts. Make sure to review the budgets that you create regularly to see your budget burn-down progress and make changes as needed. Azure budgets also allow you to configure an automation trigger when a given budget threshold is reached. For example, you can configure your service to shut down VMs. Or you can move your infrastructure to a different pricing tier in response to a budget trigger.

For more information, see Azure Budgets.

For more information about budget-based automation, see Budget Based Automation.

Act to optimize

Use the following ways to optimize spending.

Cut out waste

After you've deployed your infrastructure in Azure, it's important to make sure it is being used. The easiest way to start saving immediately is to review your resources and remove any that aren't being used. From there, you should determine if your resources are being used as efficiently as possible.

Azure Advisor

Azure Advisor is a service that, among other things, identifies virtual machines with low utilization from a CPU or network usage standpoint. From there, you can decide to either shut down or resize the machine based on the estimated cost to continue running the machines. Advisor also provides recommendations for reserved instance purchases. The recommendations are based on your last 30 days of virtual machine usage. When acted on, the recommendations can help you reduce your spending.

For more information, see Azure Advisor.

Size your VMs properly

VM sizing has a significant impact on your overall Azure cost. The number of VMs needed in Azure might not equate to what you currently have deployed in an on-premises datacenter. Make sure your choose the right size for the workloads that you plan to run.

For more information, see Azure IaaS: proper sizing and cost.

Use purchase discounts

Azure has many discounts that your organization should take advantage of to save money.

Azure Reservations

Azure Reservations allow you to prepay for one-year or three-years of virtual machine or SQL Database compute capacity. Pre-paying will allow you to get a discount on the resources you use. Azure reservations can significantly reduce your virtual machine or SQL database compute costs — up to 72 percent on pay-as-you-go prices with one-year or three-year upfront commitment. Reservations provide a billing discount and don't affect the runtime state of your virtual machines or SQL databases.

For more information, see What are Azure Reservations?.

Use Azure Hybrid Benefit

If you already have Windows Server or SQL Server licenses in your on-premises deployments, you can use the Azure Hybrid Benefit program to save in Azure. With the Windows Server benefit, each license covers the cost of the OS (up to two virtual machines), and you only pay for base compute costs. You can use existing SQL Server licenses to save up to 55 percent on vCore-based SQL Database options. Options include SQL Server in Azure Virtual Machines and SQL Server Integration Services.

For more information, see Azure Hybrid Benefit savings calculator.

Other resources

Azure also has a service that allows you to build services that take advantage of surplus capacity in Azure for reduced rates. For more information, see Use low priority VMs with Batch.

Next steps

- If you're new to Cost Management, read What is Azure Cost Management? to learn how it helps monitor and control Azure spending and to optimize resource use.

Understand Cost Management data

1/14/2020 • 6 minutes to read • Edit Online

This article helps you better understand Azure cost and usage data that's included in Azure Cost Management. It explains how frequently data is processed, collected, shown, and closed. You're billed for Azure usage monthly. Although billing cycles are monthly periods, cycle start and end dates vary by subscription type. How often Cost Management receives usage data varies based on different factors. Such factors include how long it takes to process the data and how frequently Azure services emit usage to the billing system.

Cost Management includes all usage and purchases, including reservations and third-party offerings for Enterprise Agreement (EA) accounts. Microsoft Customer Agreement accounts and individual subscriptions with pay-as-you-go rates only include usage from Azure and Marketplace services. Support and other costs are not included. Costs are estimated until an invoice is generated and do not factor in credits.

Supported Microsoft Azure offers

The following information shows the currently supported Microsoft Azure offers in Azure Cost Management. An Azure offer is the type of the Azure subscription that you have. Data is available in Cost Management starting on the **Data available from** date. If a subscription changes offers, costs before the offer change date will not be available.

CATEGORY	OFFER NAME	QUOTA ID	OFFER NUMBER	DATA AVAILABLE FROM
Azure Government	Azure Government Enterprise	EnterpriseAgreement_2014-09-01	MS-AZR-USGOV-0017P	May 2014[1]
Enterprise Agreement (EA)	Enterprise Dev/Test	MSDNDevTest_2014-09-01	MS-AZR-0148P	May 2014[1]
Enterprise Agreement (EA)	Microsoft Azure Enterprise	EnterpriseAgreement_2014-09-01	MS-AZR-0017P	May 2014[1]
Microsoft Customer Agreement	Microsoft Azure Plan	EnterpriseAgreement_2014-09-01	N/A	March 2019[3]
Microsoft Customer Agreement	Microsoft Azure Plan for Dev/Test	MSDNDevTest_2014-09-01	N/A	March 2019[3]

CATEGORY	OFFER NAME	QUOTA ID	OFFER NUMBER	DATA AVAILABLE FROM
Microsoft Customer Agreement supported by partners	Microsoft Azure Plan	CSP_2015-05-01, CSP_MG_2017-12-01, and CSPDEVTEST_2018-05-01 The quota ID is reused for Microsoft Customer Agreement and legacy CSP subscriptions. Currently, only Microsoft Customer Agreement subscriptions are supported.	N/A	October 2019
Microsoft Developer Network (MSDN)	MSDN Platforms[4]	MSDN_2014-09-01	MS-AZR-0062P	October 2, 2018[2]
Pay-As-You-Go	Pay-As-You-Go	PayAsYouGo_2014-09-01	MS-AZR-0003P	October 2, 2018[2]
Pay-As-You-Go	Pay-As-You-Go Dev/Test	MSDNDevTest_2014-09-01	MS-AZR-0023P	October 2, 2018[2]
Pay-As-You-Go	Microsoft Partner Network	MPN_2014-09-01	MS-AZR-0025P	October 2, 2018[2]
Pay-As-You-Go	Free Trial[4]	FreeTrial_2014-09-01	MS-AZR-0044P	October 2, 2018[2]
Pay-As-You-Go	Azure in Open[4]	AzureInOpen_2014-09-01	MS-AZR-0111P	October 2, 2018[2]
Pay-As-You-Go	Azure Pass[4]	AzurePass_2014-09-01	MS-AZR-0120P, MS-AZR-0122P - MS-AZR-0125P, MS-AZR-0128P - MS-AZR-0130P	October 2, 2018[2]
Visual Studio	Visual Studio Enterprise – MPN[4]	MPN_2014-09-01	MS-AZR-0029P	October 2, 2018[2]
Visual Studio	Visual Studio Professional[4]	MSDN_2014-09-01	MS-AZR-0059P	October 2, 2018[2]
Visual Studio	Visual Studio Test Professional[4]	MSDNDevTest_2014-09-01	MS-AZR-0060P	October 2, 2018[2]
Visual Studio	Visual Studio Enterprise[4]	MSDN_2014-09-01	MS-AZR-0063P	October 2, 2018[2]
Visual Studio	Visual Studio Enterprise: BizSpark[4]	MSDN_2014-09-01	MS-AZR-0064P	October 2, 2018[2]

[1] *For data before May 2014, visit the Azure Enterprise portal.*

[2] *For data before October 2, 2018, visit the Azure Account Center.*

[3] *Microsoft Customer Agreements started in March 2019 and do not have any historical data before this point.*

[4] *Historical data for credit-based and pay-in-advance subscriptions might not match your invoice. See Historical data may not match invoice below.*

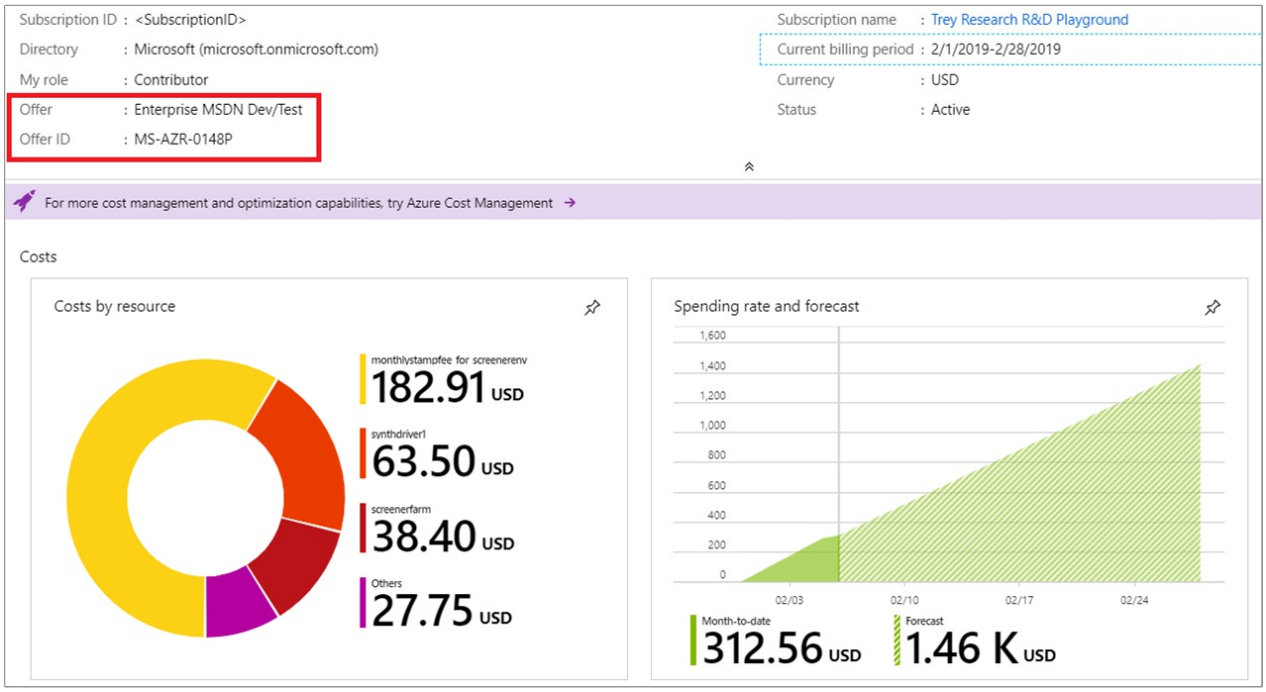
The following offers are not supported yet:

CATEGORY	OFFER NAME	QUOTA ID	OFFER NUMBER
Azure Germany	Azure Germany Pay-As-You-Go	PayAsYouGo_2014-09-01	MS-AZR-DE-0003P
Azure Government	Azure Government Pay-As-You-Go	PayAsYouGo_2014-09-01	MS-AZR-USGOV-0003P
Cloud Solution Provider (CSP)	Microsoft Azure	CSP_2015-05-01	MS-AZR-0145P
Cloud Solution Provider (CSP)	Azure Government CSP	CSP_2015-05-01	MS-AZR-USGOV-0145P
Cloud Solution Provider (CSP)	Azure Germany in CSP for Microsoft Cloud Germany	CSP_2015-05-01	MS-AZR-DE-0145P
Pay-As-You-Go	Azure for Students Starter	DreamSpark_2015-02-01	MS-AZR-0144P
Pay-As-You-Go	Azure for Students[4]	AzureForStudents_2018-01-01	MS-AZR-0170P
Pay-As-You-Go	Microsoft Azure Sponsorship	Sponsored_2016-01-01	MS-AZR-0036P
Support Plans	Standard support	Default_2014-09-01	MS-AZR-0041P
Support Plans	Professional Direct support	Default_2014-09-01	MS-AZR-0042P
Support Plans	Developer support	Default_2014-09-01	MS-AZR-0043P
Support Plans	Germany support plan	Default_2014-09-01	MS-AZR-DE-0043P
Support Plans	Azure Government Standard Support	Default_2014-09-01	MS-AZR-USGOV-0041P
Support Plans	Azure Government Pro-Direct Support	Default_2014-09-01	MS-AZR-USGOV-0042P
Support Plans	Azure Government Developer Support	Default_2014-09-01	MS-AZR-USGOV-0043P

Determine your offer type

If you don't see data for a subscription and you want to determine if your subscription falls under the supported

offers, you can validate that your subscription is supported. To validate that an Azure subscription is supported, sign-in to the Azure portal. Then select **All Services** in the left menu pane. In the list of services, select **Subscriptions**. In the subscription list menu, click on the subscription that you want to verify. Your subscription is shown on the Overview tab and you can see the **Offer** and **Offer ID**. The following image shows an example.



Costs included in Cost Management

The following tables show data that's included or isn't in Cost Management. All costs are estimated until an invoice is generated. Costs shown do not include free and prepaid credits.

Cost and usage data

INCLUDED	NOT INCLUDED
Azure service usage[5]	Support charges - For more information, see Invoice terms explained.
Marketplace offering usage[6]	Taxes - For more information, see Invoice terms explained.
Marketplace purchases[6]	Credits - For more information, see Invoice terms explained.
Reservation purchases[7]	
Amortization of reservation purchases[7]	

[5] *Azure service usage is based on reservation and negotiated prices.*

[6] *Marketplace purchases are not available for Pay-As-You-Go, MSDN, and Visual Studio offers at this time.*

[7] *Reservation purchases are only available for Enterprise Agreement (EA) accounts at this time.*

Metadata

INCLUDED	NOT INCLUDED
Resource tags[8]	Resource group tags

[8] *Resource tags are applied as usage is emitted from each service and aren't available retroactively to historical usage.*

Rated usage data refresh schedule

Cost and usage data is available in Cost Management + Billing in the Azure portal and supporting APIs. Keep the following points in mind as you review costs:

- Estimated charges for the current billing period are updated six times per day.
- Estimated charges for the current billing period can change as you incur more usage.
- Each update is cumulative and includes all the line items and information from the previous update.
- Azure finalizes or *closes* the current billing period up to 72 hours (three calendar days) after the billing period ends.

The following examples illustrate how billing periods could end.

Enterprise Agreement (EA) subscriptions – If the billing month ends on March 31, estimated charges are updated up to 72 hours later. In this example, by midnight (UTC) April 4.

Pay-as-you-go subscriptions – If the billing month ends on May 15, then the estimated charges might get updated up to 72 hours later. In this example, by midnight (UTC) May 19.

Rerated data

Whether you use the Cost Management APIs, Power BI, or the Azure portal to retrieve data, expect the current billing period's charges to get rerated, and consequently change, until the invoice is closed.

Usage data update frequency varies

The availability of your incurred usage data in Cost Management depends on a couple of factors, including:

- How frequently Azure services (such as Storage, Compute, CDN, and SQL) emit usage.
- The time taken to process the usage data through the rating engine and cost management pipelines.

Some services emit usage more frequently than others. So, you might see data in Cost Management for some services sooner than other services that emit data less frequently. Typically, usage for services takes 8-24 hours to appear in Cost Management. Keep in mind that data for an open month gets refreshed as you incur more usage because updates are cumulative.

Historical data might not match invoice

Historical data for credit-based and pay-in-advance offers might not match your invoice. Some Azure pay-as-you-go, MSDN, and Visual Studio offers can have Azure credits and advanced payments applied to the invoice. However, the historical data shown in Cost Management is based on your estimated consumption charges only. Cost Management historical data doesn't include payments and credits. As a result, the historical data shown for the following offers may not match exactly with your invoice.

- Azure for Students (MS-AZR-0170P)
- Azure in Open (MS-AZR-0111P)
- Azure Pass (MS-AZR-0120P, MS-AZR-0123P, MS-AZR-0125P, MS-AZR-0128P, MS-AZR-0129P)
- Free Trial (MS-AZR-0044P)
- MSDN (MS-AZR-0062P)
- Visual Studio (MS-AZR-0029P, MS-AZR-0059P, MS-AZR-0060P, MS-AZR-0063P, MS-AZR-0064P)

See also

- If you haven't already completed the first quickstart for Cost Management, read it at Start analyzing costs.

Understand and work with scopes

1/14/2020 • 13 minutes to read • Edit Online

This article helps you understand billing and resource management scopes available in Azure and how to use the scopes in Cost Management and APIs.

Scopes

A *scope* is a node in the Azure resource hierarchy where Azure AD users access and manage services. Most Azure resources are created and deployed into resource groups, which are part of subscriptions. Microsoft also offers two hierarchies above Azure subscriptions that have specialized roles to manage billing data:

- Billing data, such as payments and invoices
- Cloud services, such as cost and policy governance

Scopes are where you manage billing data, have roles specific to payments, view invoices, and conduct general account management. Billing and account roles are managed separately from those used for resource management, which use Azure RBAC. To clearly distinguish the intent of the separate scopes, including the access control differences, these are referred to as *billing scopes* and *RBAC scopes*, respectively.

How Cost Management uses scopes

Cost Management works at all scopes above resources to allow organizations to manage costs at the level at which they have access, whether that's the entire billing account or a single resource group. Although billing scopes differ based on your Microsoft agreement (subscription type), the RBAC scopes do not.

Azure RBAC scopes

Azure supports three scopes for resource management. Each scope supports managing access and governance, including but not limited to, cost management.

- **Management groups** - Hierarchical containers, up to eight levels, to organize Azure subscriptions.

  Resource type: Microsoft.Management/managementGroups

- **Subscriptions** - Primary containers for Azure resources.

  Resource type: Microsoft.Resources/subscriptions

- **Resource groups** - Logical groupings of related resources for an Azure solution that share the same lifecycle. For example resources that are deployed and deleted together.

  Resource type: Microsoft.Resources/subscriptions/resourceGroups

Management groups allow you to organize subscriptions into a hierarchy. For example, you might create a logical organization hierarchy using management groups. Then, give teams subscriptions for production and dev/test workloads. And then create resource groups in the subscriptions to manage each sub-system or component.

Creating an organizational hierarchy allows cost and policy compliance roll-up organizationally. Then, each leader can view and analyze their current costs. And then they can create budgets to curb bad spending patterns and optimize costs with Advisor recommendations at the lowest level.

Granting access to view costs and optionally manage cost configuration, such as budgets and exports, is

performed on governance scopes using Azure RBAC. You use Azure RBAC to grant Azure AD users and groups access to perform a predefined set of actions that are defined in a role on a specific scope and below. For instance, a role assigned to a management group scope also grants the same permissions to nested subscriptions and resource groups.

Cost Management supports the following built-in roles for each of the following scopes:

- **Owner** – Can view costs and manage everything, including cost configuration.
- **Contributor** – Can view costs and manage everything, including cost configuration, but excluding access control.
- **Reader** – Can view everything, including cost data and configuration, but cannot make any changes.
- **Cost Management Contributor** – Can view costs, manage cost configuration, and view recommendations.
- **Cost Management Reader** – Can view cost data, cost configuration, and view recommendations.

Cost Management Contributor is the recommended least-privilege role. It allows people access to create and manage budgets and exports to more effectively monitor and report on costs. Cost Management Contributors might also require additional roles to support end-to-end cost management scenarios. Consider the following scenarios:

- **Act when budgets are exceeded** – Cost Management Contributors also need access to create and/or manage action groups to automatically react to overages. Consider granting Monitoring Contributor to a resource group that contains the action group to use when budget thresholds are exceeded. Automating specific actions requires additional roles for the specific services used, such as Automation and Azure Functions.
- **Schedule cost data export** – Cost Management Contributors also need access to manage storage accounts to schedule an export to copy data into a storage account. Consider granting Storage Account Contributor to a resource group that contains the storage account where cost data is exported.
- **Viewing cost-saving recommendations** – Cost Management Readers and Cost Management Contributors have access to *view* cost recommendations by default. However, access to act on the cost recommendations requires access to individual resources. Consider granting a service-specific role if you want to act on a cost-based recommendation.

Enterprise Agreement scopes

Enterprise Agreement (EA) billing accounts, also called enrollments, have the following scopes:

- **Billing account** - Represents an EA enrollment. Invoices are generated at this scope. Purchases that aren't usage-based, such as Marketplace and reservations, are only available at this scope. They aren't represented in departments or enrollment accounts.

  Resource type: `Microsoft.Billing/billingAccounts (accountType = Enrollment)`

- **Department** - Optional grouping of enrollment accounts.

  Resource type: `Billing/billingAccounts/departments`

- **Enrollment account** - Represents a single account owner. Doesn't support granting access to multiple people.

  Resource type: `Microsoft.Billing/billingAccounts/enrollmentAccounts`

Although governance scopes are bound to a single directory, EA billing scopes aren't. An EA billing account may have subscriptions across any number of Azure AD directories.

EA billing scopes support the following roles:

- **Enterprise admin** – Can manage billing account settings and access, can view all costs, and can manage cost

configuration. For example, budgets and exports. In function, the EA billing scope is the same as Cost Management Contributor Azure RBAC role.

- **Enterprise read-only user** – Can view billing account settings, cost data, and cost configuration. For example, budgets and exports. In function, the EA billing scope is the same as the Cost Management Reader Azure RBAC role.
- **Department admin** – Can manage department settings, such as cost center, and can access, view all costs, and manage cost configuration. For example, budgets and exports. The **DA view charges** billing account setting must be enabled for department admins and read-only users to see costs. If **DA view charges** is disabled, department users can't see costs at any level, even if they are an account or subscription owner.
- **Department read-only user** – Can view department settings, cost data, and cost configuration. For example, budgets and exports. If **DA view charges** is disabled, department users can't see costs at any level, even if they are an account or subscription owner.
- **Account owner** – Can manage enrollment account settings (such as cost center), view all costs, and manage cost configuration (such as budgets and exports) for the enrollment account. The **AO view charges** billing account setting must be enabled for account owners and RBAC users to see costs.

EA billing account users don't have direct access to invoices. Invoices are available from an external volume licensing system.

Azure subscriptions are nested under enrollment accounts. Billing users have access to cost data for the subscriptions and resource groups which are under their respective scopes. They don't have access to see or manage resources in the Azure portal. Billing users can view costs by navigating to **Cost Management + Billing** in the Azure portal list of services. Then, they can filter costs to the specific subscriptions and resource groups they need to report on.

Billing users don't have access to management groups because they don't fall explicitly under a specific billing account. Access must be granted to management groups explicitly. Management groups roll-up costs from all nested subscriptions. However, they only include usage-based purchases. They don't include purchases such as reservations and third-party Marketplace offerings. To view these costs, use the EA billing account.

Individual agreement scopes

Azure subscriptions created from individual offers like pay-as-you-go and related types like Free Trial and dev/test offers, don't have an explicit billing account scope. Instead, each subscription has an account owner or account admin, like the EA account owner.

- **Billing account** - Represents a single account owner for one or more Azure subscriptions. It doesn't currently support granting access to multiple people or access to aggregated cost views.

  Resource type: Not applicable

Individual Azure subscription account admins can view and manage billing data, such as invoices and payments, from the Azure Account Center. However, they can't view cost data or manage resources in the Azure portal. To grant access to the account admin, use the Cost Management roles mentioned previously.

Unlike EA, individual Azure subscription account admins can see their invoices in the Azure portal. Keep in mind that Cost Management Reader and Cost Management Contributor roles don't provide access to invoices. For more information, see How to grant access to invoices.

Microsoft Customer Agreement scopes

Microsoft Customer Agreement billing accounts have the following scopes:

- **Billing account** - Represents a customer agreement for multiple Microsoft products and services. Customer Agreement billing accounts aren't functionally the same as EA enrollments. EA enrollments are

more closely aligned to billing profiles.

Resource type: `Microsoft.Billing/billingAccounts (accountType = Organization)`

- **Billing profile** - Defines the subscriptions that are included in an invoice. Billing profiles are the functional equivalent of an EA enrollment, since that's the scope that invoices are generated at. Similarly, purchases that aren't usage-based (such as Marketplace and reservations) are only available at this scope. They aren't included in invoice sections.

  Resource type: `Microsoft.Billing/billingAccounts/billingProfiles`

- **Invoice section** - Represents a group of subscriptions in an invoice or billing profile. Invoice sections are like departments—multiple people can have access to an invoice section.

  Resource type: `Microsoft.Billing/billingAccounts/invoiceSections`

- **Customer** - Represents a group of subscriptions that are associated to a specific customer that is onboarded to a Microsoft Customer Agreement by partner. This scope is specific to CSP.

Unlike EA billing scopes, Customer Agreement billing accounts *are* bound to a single directory and can't have subscriptions across multiple Azure AD directories.

Customer Agreement billing scopes don't apply to partners. Partner roles and permissions are documented at Assign users roles and permissions.

Customer Agreement billing scopes support the following roles:

- **Owner** – Can manage billing settings and access, view all costs, and manage cost configuration. For example, budgets and exports. In function, this Customer Agreement billing scope is the same as the Cost Management Contributor Azure RBAC role.
- **Contributor** – Can manage billing settings except access, view all costs, and manage cost configuration. For example, budgets and exports. In function, this Customer Agreement billing scope is the same as the Cost Management Contributor Azure RBAC role.
- **Reader** – Can view billing settings, cost data, and cost configuration. For example, budgets and exports. In function, this Customer Agreement billing scope is the same as the Cost Management Reader Azure RBAC role.
- **Invoice manager** – Can view and pay invoices and can view cost data and configuration. For example, budgets and exports. In function, this Customer Agreement billing scope is the same as the Cost Management Reader Azure RBAC role.
- **Azure subscription creator** – Can create Azure subscriptions, view costs, and manage cost configuration. For example, budgets and exports. In function, this Customer Agreement billing scope is the same as the EA enrollment account owner role.

Azure subscriptions are nested under invoice sections, like how they are under EA enrollment accounts. Billing users have access to cost data for the subscriptions and resource groups that are under their respective scopes. However, they don't have access to see or manage resources in the Azure portal. Billing users can view costs by navigating to **Cost Management + Billing** in the Azure portal list of services. Then, filter costs to the specific subscriptions and resource groups they need to report on.

Billing users don't have access to management groups because they don't explicitly fall under the billing account. However, when management groups are enabled for the organization, all subscription costs are rolled-up to the billing account and to the root management group because they are both constrained to a single directory. Management groups only include purchases that are usage-based. Purchases like reservations and third-party Marketplace offerings aren't included in management groups. So, the billing account and root management group may report different totals. To view these costs, use the billing account or respective billing profile.

AWS scopes

After AWS integration is complete, see setup and configure AWS integration. The following scopes are available:

- **External Billing account** - Represents a customer agreement with a third-party vendor. This is similar to the EA billing account.

  Resource type: `Microsoft.CostManagement/externalBillingAccounts`

- **External subscription** - Represents a customer operational account with a third-party vendor. This is similar to an Azure subscription.

  Resource type: `Microsoft.CostManagement/externalSubscriptions`

Cloud Solution Provider (CSP) scopes

The following scopes are supported for CSPs with customers on a Microsoft Customer Agreement:

- **Billing account** - Represents a customer agreement for multiple Microsoft products and services. Customer Agreement billing accounts aren't functionally the same as EA enrollments. EA enrollments are more closely aligned to billing profiles.

  Resource type: `Microsoft.Billing/billingAccounts (accountType = Organization)`

- **Billing profile** - Defines the subscriptions that are included in an invoice. Billing profiles are the functional equivalent of an EA enrollment, since that's the scope that invoices are generated at. Similarly, purchases that aren't usage-based (such as Marketplace and reservations) are only available at this scope.

  Resource type: `Microsoft.Billing/billingAccounts/billingProfiles`

- **Customer** - Represents a group of subscriptions that are associated to a specific customer that is onboarded to a Microsoft Customer Agreement by a partner.

Only the users with *Global admin* and *Admin agent* roles can manage and view costs for billing accounts, billing profiles, and customers directly in the partner's Azure tenant. For more information about partner center roles, see Assign users roles and permissions.

Azure Cost Management only supports CSP partner customers if the customers have a Microsoft Customer Agreement. For CSP supported customers who are not yet on a Microsoft Customer Agreement, see Partner Center.

Switch between scopes in Cost Management

All Cost Management views in the Azure portal include a **Scope** selection pill at the top-left of the view. Use it to quickly change scope. Click the **Scope** pill to open the scope picker. It shows billing accounts, the root management group, and any subscriptions that aren't nested under the root management group. To select a scope, click the background to highlight it and then click **Select** at the bottom. To drill-in to nested scopes, like resource groups in a subscription, click the scope name link. To select the parent scope at any nested level, click **Select this <scope>** at the top of the scope picker.

Identify the resource ID for a scope

When working with Cost Management APIs, knowing the scope is critical. Use the following information to build the proper scope URI for Cost Management APIs.

Billing accounts

1. Open the Azure portal and then navigate to **Cost Management + Billing** in the list of services.

2. Select **Properties** in the billing account menu.
3. Copy the billing account ID.
4. Your scope is: `"/providers/Microsoft.Billing/billingAccounts/{billingAccountId}"`

Billing profiles

1. Open the Azure portal and then navigate to **Cost Management + Billing** in the list of services.
2. Select **Billing profiles** in the billing account menu.
3. Click the name of the desired billing profile.
4. Select **Properties** in the billing profile menu.
5. Copy the billing account and billing profile IDs.
6. Your scope is:
   `"/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingProfiles/{billingProfileId}"`

Invoice sections

1. Open the Azure portal and then navigate to **Cost Management + Billing** in the list of services.
2. Select **Invoice sections** in the billing account menu.
3. Click the name of the desired invoice section.
4. Select **Properties** in the invoice section menu.
5. Copy the billing account and invoice section IDs.
6. Your scope is:
   `"/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/invoiceSections/{invoiceSectionId}"`

EA departments

1. Open the Azure portal and then navigate to **Cost Management + Billing** in the list of services.
2. Select **Departments** in the billing account menu.
3. Click the name of the desired department.
4. Select **Properties** in the department menu.
5. Copy the billing account and department IDs.
6. Your scope is: `"/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/departments/{departmentId}"`

EA enrollment account

1. Open the Azure portal and navigate to **Cost Management + Billing** in the list of services.
2. Select **Enrollment accounts** in the billing account menu.
3. Click the name of the desired enrollment account.
4. Select **Properties** in the enrollment account menu.
5. Copy the billing account and enrollment account IDs.
6. Your scope is:
   `"/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/enrollmentAccounts/{enrollmentAccountId}"`

Management group

1. Open the Azure portal and navigate to **Management groups** in the list of services.
2. Navigate to the desired management group.
3. Copy the management group ID from the table.
4. Your scope is: `"/providers/Microsoft.Management/managementGroups/{id}"`

Subscription

1. Open the Azure portal and navigate to **Subscriptions** in the list of services.
2. Copy the subscription ID from the table.
3. Your scope is: `"/subscriptions/{id}"`

Resource groups

1. Open the Azure portal and navigate to **Resource groups** in the list of services.
2. Click the name of the desired resource group.
3. Select **Properties** in the resource group menu.
4. Copy the resource ID field value.
5. Your scope is: `"/subscriptions/{id}/resourceGroups/{name}"`

Cost Management is currently supported in Azure Global and Azure Government. For more information about Azure Government, see Azure Global and Government API endpoints.

Next steps

- If you haven't already completed the first quickstart for Cost Management, read it at Start analyzing costs.

Migrate from Enterprise Agreement to Microsoft Customer Agreement APIs

1/22/2020 • 17 minutes to read • Edit Online

This article helps you understand the data structure, API, and other system integration differences between Enterprise Agreement (EA) and Microsoft Customer Agreement (MCA) accounts. Azure Cost Management supports APIs for both account types. Review the Setup billing account for Microsoft Customer Agreement article before continuing.

Organizations with an existing EA account should review this article in conjunction with setting up an MCA account. Previously, renewing an EA account required some minimal work to move from an old enrollment to a new one. However, migrating to an MCA account requires additional effort. Additional effort is because of changes in the underlying billing subsystem, which affect all cost-related APIs and service offerings.

MCA APIs and integration

MCA APIs and new integration allow you to:

- Have complete API availability through native Azure APIs.
- Configure multiple invoices in a single billing account.
- Access a combined API with Azure service usage, third-party Marketplace usage, and Marketplace purchases.
- View costs across billing profiles (the same as enrollments) using Azure Cost Management.
- Access new APIs to show costs, get notified when costs exceed predefined thresholds, and export raw data automatically.

Migration checklist

The following items help you transition to MCA APIs.

- Familiarize yourself with the new Microsoft Customer Agreement billing account.
- Determine which APIs you use and see which ones are replaced in the following section.
- Familiarize yourself with Azure Resource Manager REST APIs.
- If you're not already using Azure Resource Manager APIs, register your client app with Azure AD.
- Update any programming code to use Azure AD authentication.
- Update any programming code to replace EA API calls with MCA API calls.
- Update error handling to use new error codes.
- Review additional integration offerings, like Cloudyn and Power BI, for other needed action.

EA APIs replaced with MCA APIs

EA APIs use an API key for authentication and authorization. MCA APIs use Azure AD authentication.

PURPOSE	EA API	MCA API		
Balance and credits	/balancesummary	Microsoft.Billing/billingAccounts/billingProfiles/availableBalanceussae		
Usage (JSON)	/usagedetails/usagedetailsbycustomdate	Microsoft.Consumption/usageDetails[1]		
Usage (CSV)	/usagedetails/download/usagedetails/submit	Microsoft.Consumption/usageDetails/download[1]		
Marketplace Usage (CSV)	/marketplacecharges/marketplacechargesbycustomdate	Microsoft.Consumption/usageDetails/download[1]		
Billing periods	/billingperiods	Microsoft.Billing/billingAccounts/billingProfiles/invoices		
Price sheet	/pricesheet	Microsoft.Billing/billingAccounts/billingProfiles/pricesheet/default/download format=json	csv Microsoft.Billing/billingAccounts/.../billingProfiles/.../invoices/.../pricesheet/default/download format=json	csv Microsoft.Billing/billingAccounts/../billingProfiles/../providers/Microsoft.Consumption/pricesheets/download
Reservation purchases	/reservationcharges	Microsoft.Billing/billingAccounts/billingProfiles/transactions		
Reservation recommendations	/SharedReservationRecommendations/SingleReservationRecommendations	Microsoft.Consumption/reservationRecommendations		
Reservation usage	/reservationdetails/reservationsummaries	Microsoft.Consumption/reservationDetailsMicrosoft.Consumption/reservationSummaries		

[1] Azure service and third-party Marketplace usage are available with the Usage Details API.

The following APIs are available to MCA billing accounts:

PURPOSE	MICROSOFT CUSTOMER AGREEMENT (MCA) API
Billing accounts[2]	Microsoft.Billing/billingAccounts
Billing profiles[2]	Microsoft.Billing/billingAccounts/billingProfiles
Invoice sections[2]	Microsoft.Billing/billingAccounts/invoiceSections

PURPOSE	MICROSOFT CUSTOMER AGREEMENT (MCA) API
Invoices	Microsoft.Billing/billingAccounts/billingProfiles/invoices
Billing subscriptions	{scope}/billingSubscriptions

[2] APIs return lists of objects, which are scopes, where Cost Management experiences in the Azure portal and APIs operate. For more information about Cost Management scopes, see Understand and work with scopes.

If you use any existing EA APIs, you need to update them to support MCA billing accounts. The following table shows other integration changes:

PURPOSE	OLD OFFERING	NEW OFFERING
Cloudyn	Cloudyn.com	Azure Cost Management
Power BI	Microsoft Consumption Insights content pack and connector	Azure Consumption Insights connector

APIs to get balance and credits

The Get Balance Summary API gives you a monthly summary of:

- Balances
- New purchases
- Azure Marketplace service charges
- Adjustments
- Service overage charges

All Consumption APIs are replaced by native Azure APIs that use Azure AD for authentication and authorization. For more information about calling Azure REST APIs, see Getting started with REST.

The Get Balance Summary API is replaced by the Microsoft.Billing/billingAccounts/billingProfiles/availableBalance API.

To get available balances with the Available Balance API:

METHOD	REQUEST URI
GET	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingP` `api-version=2018-11-01-preview`

APIs to get cost and usage

Get a daily breakdown of costs from Azure service usage, third-party Marketplace usage, and other Marketplace purchases with the following APIs. The following separate APIs were merged for Azure services and third-party Marketplace usage. The old APIs are replaced by the Microsoft.Consumption/usageDetails API. It adds Marketplace purchases, which were previously only shown in the balance summary to date.

- Get usage detail/download
- Get usage detail/submit
- Get usage detail/usagedetails
- Get usage detail/usagedetailsbycustomdate
- Get marketplace store charge/marketplacecharges
- Get marketplace store charge/marketplacechargesbycustomdate

All Consumption APIs are replaced by native Azure APIs that use Azure AD for authentication and authorization. For more information about calling Azure REST APIs, see Getting started with REST.

All the preceding APIs are replaced by the Consumption/Usage Details API.

To get usage details with the Usage Details API:

METHOD	REQUEST URI
GET	`https://management.azure.com/{scope}/providers/Microsoft.Consumption/usageDetails?` `api-version=2019-01-01`

The Usage Details API, as with all Cost Management APIs, is available at multiple scopes. For invoiced costs, as you would traditionally receive at an enrollment level, use the billing profile scope. For more information about Cost Management scopes, see Understand and work with scopes.

TYPE	ID FORMAT
Billing account	`/Microsoft.Billing/billingAccounts/{billingAccountId}`
Billing profile	`/Microsoft.Billing/billingAccounts/{billingAccountId}/billingProfiles/{billingProfileId}`
Subscription	`/subscriptions/{subscriptionId}`
Resource group	`/subscriptions/{subscriptionId}/resourceGroups/{resourceGroupName}`

Use the following querystring parameters to update any programming code.

OLD PARAMETERS	NEW PARAMETERS
`billingPeriod={billingPeriod}`	Not supported
`endTime=yyyy-MM-dd`	`endDate=yyyy-MM-dd`
`startTime=yyyy-MM-dd`	`startDate=yyyy-MM-dd`

The body of the response also changed.

Old response body:

```
{
  "id": "string",
  "data": [{...}, ...],
  "nextLink": "string"
}
```

New response body:

```
{
  "value": [{
    "id": "{scope}/providers/Microsoft.Consumption/usageDetails/###",
    "name": "###",
    "type": "Microsoft.Consumption/usageDetails",
    "tags": {...},
    "properties": [{...}, ...],
    "nextLink": "string"
  }, ...]
}
```

The property name containing the array of usage records changed from data to *values*. Each record used to have a flat list of detailed properties. However, each record now all details are now in a nested property named *properties*, except for tags. The new structure is consistent with other Azure APIs. Some property names have changed. The following table shows corresponding properties.

OLD PROPERTY	NEW PROPERTY	NOTES
AccountId	N/A	The subscription creator isn't tracked. Use invoiceSectionId (same as departmentId).
AccountNameAccountOwnerId and AccountOwnerEmail	N/A	The subscription creator isn't tracked. Use invoiceSectionName (same as departmentName).
AdditionalInfo	additionalInfo	
ChargesBilledSeparately	isAzureCreditEligible	Note that these properties are opposites. If isAzureCreditEnabled is true, ChargesBilledSeparately would be false.
ConsumedQuantity	quantity	
ConsumedService	consumedService	Exact string values might differ.
ConsumedServiceId	None	
CostCenter	costCenter	
Date and usageStartDate	date	
Day	None	Parses day from date.
DepartmentId	invoiceSectionId	Exact values differ.
DepartmentName	invoiceSectionName	Exact string values might differ. Configure invoice sections to match departments, if needed.
ExtendedCost and Cost	costInBillingCurrency	
InstanceId	resourceId	
Is Recurring Charge	None	
Location	location	
MeterCategory	meterCategory	Exact string values might differ.
MeterId	meterId	Exact string values differ.
MeterName	meterName	Exact string values might differ.
MeterRegion	meterRegion	Exact string values might differ.
MeterSubCategory	meterSubCategory	Exact string values might differ.
Month	None	Parses month from date.
Offer Name	None	Use publisherName and productOrderName.
OfferID	None	
Order Number	None	
PartNumber	None	Use meterId and productOrderName to uniquely identify prices.
Plan Name	productOrderName	

OLD PROPERTY	NEW PROPERTY	NOTES
Product	Product	
ProductId	productId	Exact string values differ.
Publisher Name	publisherName	
ResourceGroup	resourceGroupName	
ResourceGuid	meterId	Exact string values differ.
ResourceLocation	resourceLocation	
ResourceLocationId	None	
ResourceRate	effectivePrice	
ServiceAdministratorId	N/A	
ServiceInfo1	serviceInfo1	
ServiceInfo2	serviceInfo2	
ServiceName	meterCategory	Exact string values might differ.
ServiceTier	meterSubCategory	Exact string values might differ.
StoreServiceIdentifier	N/A	
SubscriptionGuid	subscriptionId	
SubscriptionId	subscriptionId	
SubscriptionName	subscriptionName	
Tags	tags	The tags property applies to root object, not to the nested properties property.
UnitOfMeasure	unitOfMeasure	Exact string values differ.
usageEndDate	date	
Year	None	Parses year from date.
(new)	billingCurrency	Currency used for the charge.
(new)	billingProfileId	Unique ID for the billing profile (same as enrollment).
(new)	billingProfileName	Name of the billing profile (same as enrollment).
(new)	chargeType	Use to differentiate Azure service usage, Marketplace usage, and purchases.
(new)	invoiceId	Unique ID for the invoice. Empty for the current, open month.
(new)	publisherType	Type of publisher for purchases. Empty for usage.
(new)	serviceFamily	Type of purchase. Empty for usage.
(new)	servicePeriodEndDate	End date for the purchased service.
(new)	servicePeriodStartDate	Start date for the purchased service.

Billing Periods API replaced by Invoices API

MCA billing accounts don't use billing periods. Instead, they use invoices to scope costs to specific billing periods. The Billing Periods API is replaced by the Invoices API. All Consumption APIs are replaced by native Azure APIs that use Azure AD for authentication and authorization. For more information about calling Azure REST APIs, see Getting started with REST.

To get invoices with the Invoices API:

METHOD	REQUEST URI
GET	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingP` `api-version=2018-11-01-preview`

Price Sheet APIs

This section discusses existing Price Sheet APIs and provides recommendations to move to the Price Sheet API for Microsoft Customer Agreements. It also discusses the Price Sheet API for Microsoft Customer Agreements and explains fields in the price sheets. The Enterprise Get price sheet and Enterprise Get billing periods APIs are replaced by the Price Sheet API for Microsoft Customer Agreements (Microsoft.Billing/billingAccounts/billingProfiles/pricesheet). The new API supports both JSON and CSV formats, in asynchronous REST formats. All Consumption APIs are replaced by native Azure APIs that use Azure AD for authentication and authorization. For more information about calling Azure REST APIs, see Getting started with REST.

Billing Enterprise APIs

You used Billing Enterprise APIs with Enterprise enrollments to get price and billing period information. Authentication and authorization used Azure Active Directory web tokens.

To get applicable prices for the specified Enterprise Enrollment with the Price Sheet and Billing Period APIs:

METHOD	REQUEST URI
GET	`https://consumption.azure.com/v2/enrollments/{enrollmentNumber}/pricesheet`
GET	`https://consumption.azure.com/v2/enrollments/{enrollmentNumber}/billingPeriods/{billingPeriod}/price`

Price Sheet API for Microsoft Customer Agreements

Use the Price Sheet API for Microsoft Customer Agreements to view prices for all Azure Consumption and Marketplace consumption services. The prices shown for the billing profile apply to all subscriptions that belong to the billing profile.

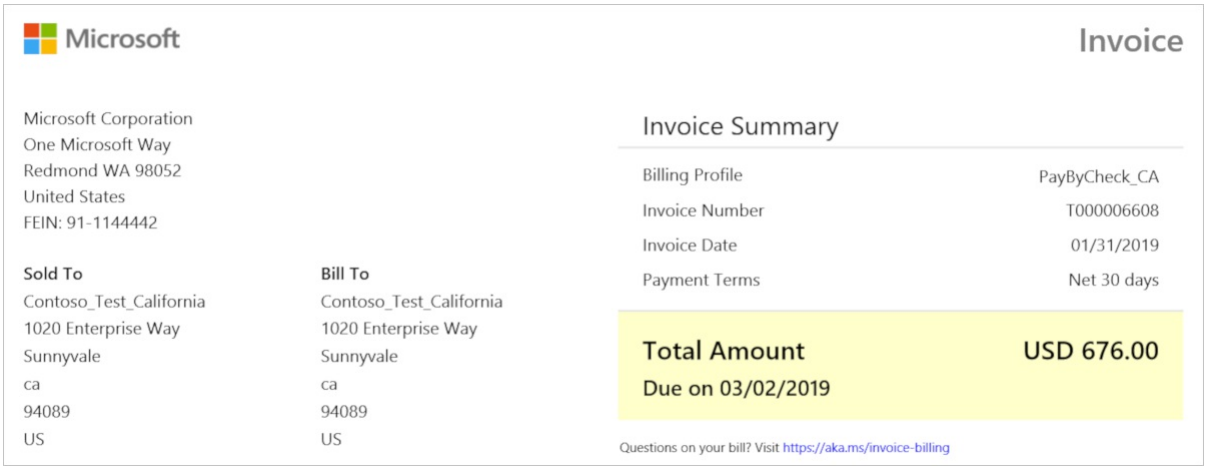
Use the Price Sheet API to view all Azure Consumption services Price Sheet data in CSV format:

METHOD	REQUEST URI
POST	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingP api-version=2018-11-01-preview&startDate=2019-01-01&endDate=2019-01-31&format=csv`

Use the Price Sheet API to view all Azure Consumption services Price Sheet data in JSON format:

METHOD	REQUEST URI
POST	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingP api-version=2018-11-01-preview&startDate=2019-01-01&endDate=2019-01-31&format=json`

Using the API returns the price sheet for the entire account. However, you can also get a condensed version of the price sheet in PDF format. The summary includes Azure Consumption and Marketplace consumption services that are billed for a specific invoice. The invoice is identified by the {invoiceId}, which is the same as the **Invoice Number** shown in the Invoice Summary PDF files. Here's an example.



Microsoft

Invoice

Microsoft Corporation
One Microsoft Way
Redmond WA 98052
United States
FEIN: 91-1144442

Sold To
Contoso_Test_California
1020 Enterprise Way
Sunnyvale
ca
94089
US

Bill To
Contoso_Test_California
1020 Enterprise Way
Sunnyvale
ca
94089
US

Invoice Summary

Billing Profile	PayByCheck_CA
Invoice Number	T000006608
Invoice Date	01/31/2019
Payment Terms	Net 30 days

Total Amount USD 676.00
Due on 03/02/2019

Questions on your bill? Visit https://aka.ms/invoice-billing

To view invoice information with the Price Sheet API in CSV format:

METHOD	REQUEST URI
POST	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/2909cffc-b0a2-5de1-bb7b-5d3383764184/billingProfiles/2dcffe0c-ee92-4265-8647-515b8fe7dc78/invoices/{invoiceId}/pricesheet/default/download?api-version=2018-11-01-preview&format=csv`

To view invoice information with the Price Sheet API in JSON Format:

METHOD	REQUEST URI
POST	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/2909cffc-b0a2-5de1-bb7b-5d3383764184/billingProfiles/2dcffe0c-ee92-4265-8647-515b8fe7dc78/invoices/{invoiceId}/pricesheet/default/download?api-version=2018-11-01-preview&format=json`

You can also see estimated prices for any Azure Consumption or Marketplace consumption service in the current open billing cycle or service period.

To view estimated prices for consumption services with the Price Sheet API in CSV format:

METHOD	REQUEST URI
POST	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingProfiles/{billingProfileId}/pricesheet/default/download?api-version=2018-11-01-preview&format=csv`

To view estimated prices for consumption services with the Price Sheet API in JSON format:

METHOD	REQUEST URI
POST	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingProfiles/{billingProfileId}/pricesheet/default/download?api-version=2018-11-01-preview&format=json`

The Microsoft Customer Agreement Price Sheet APIs are *asynchronous REST APIs*. The responses for the APIs changed from the older synchronous APIs. The body of the API response also changed.

Old response body

Here's an example of the synchronous REST API response:

```
[
        {
            "id": "enrollments/573549891/billingperiods/2016011/products/343/pricesheets",
            "billingPeriodId": "201704",
            "meterId": "dc210ecb-97e8-4522-8134-2385494233c0",
            "meterName": "A1 VM",
            "unitOfMeasure": "100 Hours",
            "includedQuantity": 0,
            "partNumber": "N7H-00015",
            "unitPrice": 0.00,
            "currencyCode": "USD"
        },
        {
    ]
```

New response body

The APIs support the Azure REST asynchronous format. Call the API using GET and you receive the following response:

```
No Response Body

HTTP Status 202 Accepted
```

The following headers are sent with the location of the output:

```
Location:https://management.azure.com/providers/Microsoft.Consumption/operationresults/{operationId}?sessiontoken=XZDFSnvdkbkdsb==

Azure-AsyncOperation:https://managment.azure.com/providers/Microsoft.Consumption/operationStatus/{operationId}?sessiontoken=XZDFSnvdkbkdsb==

Retry-After: 10

OData-EntityId: {operationId}
```

Make another GET call to the location. The response to the GET call is the same until the operation reaches a completion or failure state. When completed, the response to the GET call location returns the download URL. Just as if the operation was executed at the same time. Here's an example:

```
HTTP Status 200

{
  "id": "providers/Microsoft.Consumption/operationresults/{operationId}",
  "name": {operationId},
  "type": “Microsoft.Consumption/operationResults”,
  "properties" : {
    "downloadUrl": {urltoblob},
    "validTill": "Date"
  }
}
```

The client can also make a GET call for the `Azure-AsyncOperation`. The endpoint returns the status for the operation.

The following table shows fields in the older Enterprise Get price sheet API. It includes corresponding fields in the new price sheet for Microsoft Customer Agreements:

OLD PROPERTY	NEW PROPERTY	NOTES
billingPeriodId	*Not applicable*	Not applicable. For Microsoft Customer Agreements, the invoice and associated price sheet replaced the concept of billingPeriodId.
meterId	meterId	
unitOfMeasure	unitOfMeasure	Exact string values might differ.
includedQuantity	includedQuantity	Not applicable for services in Microsoft Customer Agreements.
partNumber	*Not applicable*	Instead, use a combination of productOrderName (same as offerID) and meterID.
unitPrice	unitPrice	Unit price is applicable for services consumed in Microsoft Customer Agreements.
currencyCode	pricingCurrency	Microsoft Customer Agreements have price representations in pricing currency and billing currency. The currencyCode corresponds to the pricingCurrency in Microsoft Customer Agreements.
offerID	productOrderName	Instead of OfferID, you can use productOrderName but isn't the same as OfferID. However, productOrderName and meter determine pricing in Microsoft Customer Agreements related to meterId and OfferID in legacy enrollments.

Consumption Price Sheet API operations

For Enterprise Agreements, you used the Consumption Price Sheet API Get and Get By Billing Period operations for a scope by subscriptionId or a billing period. The API uses Azure Resource Management authentication.

To get the Price Sheet information for a scope with the Price Sheet API:

METHOD	REQUEST URI
GET	`https://management.azure.com/subscriptions/{subscriptionId}/providers/Microsoft.Consumption/priceshe api-version=2018-10-01`

To get Price Sheet information by billing period with the Price Sheet API:

METHOD	REQUEST URI
GET	`https://management.azure.com/subscriptions/{subscriptionId}/providers/Microsoft.Billing/billingPeric api-version=2018-10-01`

Instead of the above API endpoints, use the following ones for Microsoft Customer Agreements:

Price Sheet API for Microsoft Customer Agreements (asynchronous REST API)

This API is for Microsoft Customer Agreements and it provides additional attributes.

Price Sheet for a Billing Profile scope in a Billing Account

This API is the existing API. It was updated to provide the price sheet for a billing profile in a billing account.

Price Sheet for a scope by billing account

Azure Resource Manager authentication is used when you get the Price Sheet at the enrollment scope in a billing account.

To get the Price Sheet at the enrollment account in a billing account:

METHOD	REQUEST URI
GET	`/providers/Microsoft.Billing/billingAccounts/65085863/providers/Microsoft.Consumption/pricesheets/dc api-version=2019-01-01`

For a Microsoft Customer Agreement, use the information in the following section. It provides the field properties used for Microsoft Customer agreements.

Price Sheet for a billing profile scope in a billing account

The updated Price Sheet by billing account API gets the Price Sheet in CSV format. To get the Price Sheet at the billing profile scope for an MCA:

METHOD	REQUEST URI
GET	`/providers/Microsoft.Billing/billingAccounts/28ae4b7f-41bb-581e-9fa4-8270c857aa5f/billingProfiles/ef37facb-cd6f-437a-9261-65df15b673f9/providers/Microsoft.Consumption/pricesheets/download?api-version=2019-01-01`

At the EA's enrollment scope, the API response and properties are identical. The properties correspond to the same MCA properties.

The older properties for Azure Resource Manager Price Sheet APIs and the same new properties are in the following table.

OLD AZURE RESOURCE MANAGER PRICE SHEET API PROPERTY	NEW MICROSOFT CUSTOMER AGREEMENT PRICE SHEET API PROPERTY	DESCRIPTION
Meter ID	*meterId*	Unique identifier for the meter. Same as meterID.
Meter name	meterName	Name of the meter. Meter represents the Azure service deployable resource.
Meter category	service	Name of the classification category for the meter. Same as the service in the Microsoft Customer Agreement Price Sheet. Exact string values differ.
Meter subcategory	meterSubCategory	Name of the meter subclassification category. Based on the classification of high-level feature set differentiation in the service. For example, Basic SQL DB vs Standard SQL DB.
Meter region	meterRegion	
Unit	*Not applicable*	Can be parsed from unitOfMeasure.
Unit of measure	unitOfMeasure	
Part number	*Not applicable*	Instead of part number, use productOrderName and MeterID to uniquely identify the price for a billing profile. Fields are listed on the MCA invoice instead of the part number in MCA invoices.
Unit price	unitPrice	Microsoft Customer Agreement unit price.
Currency code	pricingCurrency	Microsoft Customer Agreements represent prices in pricing currency and billing currency. Currency code is the same as the pricingCurrency in Microsoft Customer Agreements.
Included quantity	includedQuantity	Not applicable to services in Microsoft Customer Agreements. Show with values of zero.
Offer ID	productOrderName	Instead of OfferID, use productOrderName. Not the same as OfferID, however the productOrderName and meter determine pricing in Microsoft Customer Agreements. Related to meterId and OfferID in legacy enrollments.

The price for Microsoft Customer Agreements is defined differently than Enterprise agreements. The price for services in the Enterprise enrollment is unique for product, part number, meter, and offer. The part number isn't used in Microsoft Customer Agreements.

The Azure Consumption service price that's part of a Microsoft Customer Agreement is unique for productOrderName and meterID. They represent the service meter and the product plan.

To reconcile between the price sheet and the usage in the Usage Details API, you can use the productOrderName and meterID.

Users that have billing profile owner, contributor, reader, and invoice manager rights can download the price sheet.

The price sheet includes prices for services whose price is based on usage. The services include Azure consumption and Marketplace consumption. The latest price at the end of each service period is locked and applied to usage in a single service period. For Azure consumption services, the service period is usually a calendar month.

Retired Price Sheet API fields

The following fields are either not available in Microsoft Customer Agreement Price Sheet APIs or have the same fields.

RETIRED FIELD	DESCRIPTION
billingPeriodId	No applicable. Corresponds to InvoiceId for MCA.
offerID	Not applicable. Corresponds to productOrderName in MCA.
meterCategory	Not applicable. Corresponds to Service in MCA.
unit	Not applicable. Can be parsed from unitOfMeasure.
currencyCode	Same as the pricingCurrency in MCA.
meterLocation	Same as the meterRegion in MCA.
partNumber partnumber	Not applicable because part number isn't listed in MCA invoices. Instead of part number, use the meterId and productOrderName combination to uniquely identify prices.
totalIncludedQuantity	Not applicable.
pretaxStandardRate	Not applicable.

Reservation Instance Charge API replaced

You can get billing transactions for reservation purchases with the Reserved Instance Charge API. The new API includes all purchases, including third-party Marketplace offerings. All Consumption APIs are replaced by native Azure APIs that use Azure AD for authentication and authorization. For more information about calling Azure REST APIs, see Getting started with REST. The Reserved Instance Charge API is replaced by the Transactions API.

To get reservation purchase transactions with the Transactions API:

METHOD	REQUEST URI
GET	`https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/billingP` `api-version=2018-11-01-preview`

Recommendations APIs replaced

Reserved Instance Purchase Recommendations APIs provide virtual machine usage over the last 7, 30, or 60 days. APIs also provide reservation purchase recommendations. They include:

- Shared Reserved Instance Recommendation API
- Single Reserved Instance Recommendations API

All Consumption APIs are replaced by native Azure APIs that use Azure AD for authentication and authorization. For more information about calling Azure REST APIs, see Getting started with REST. The reservation recommendations APIs listed previously are replaced by the Microsoft.Consumption/reservationRecommendations API.

To get reservation recommendations with the Reservation Recommendations API:

METHOD	REQUEST URI
GET	`https://management.azure.com/providers/Microsoft.Consumption/reservationRecommendations?` `api-version=2019-01-01`

Reservation Usage APIs replaced

You can get reservation usage in an enrollment with the Reserved Instance Usage API. If there's more than one reserved instance in an enrollment, you can also get the usage of all the reserved instance purchases using this API.

They include:

- Reserved Instance Usage Details
- Reserved Instance Usage Summary

All Consumption APIs are replaced by native Azure APIs that use Azure AD for authentication and authorization. For more information about calling Azure REST APIs, see Getting started with REST. The reservation recommendations APIs listed previously are replaced by the Microsoft.Consumption/reservationDetails and Microsoft.Consumption/reservationSummaries APIs.

To get reservation details with the Reservation Details API:

METHOD	REQUEST URI
GET	`https://management.azure.com/providers/Microsoft.Consumption/reservationDetails?` `api-version=2019-01-01`

To get reservation summaries with the Reservation Summaries API:

METHOD	REQUEST URI
GET	`https://management.azure.com/providers/Microsoft.Consumption/reservationSummaries?api-version=2019-01-01`

Move from Cloudyn to Cost Management

Organizations using Cloudyn should start using Azure Cost Management for any cost management needs. Cost Management is available in the Azure portal with no onboarding and an eight-hour latency. For more information, see the Cost Management documentation.

With Azure Cost Management, you can:

- View costs over time against a predefined budget. Analyze daily cost patterns to identify and stop spending anomalies. Break down costs by tags, resource group, service, and location.
- Create budgets to set limits on usage and costs and get notified when important thresholds are approached. Set up automation with action groups to trigger custom events and enforce hard limits on your terms.
- Optimize cost and usage with recommendations from Azure Advisor. Discover purchase optimizations with reservations, downsize underused virtual machines, and delete unused resources to stay within budgets.
- Schedule a cost and usage data export to publish a CSV file to your storage account daily. Automate integration with external systems to keep billing data in sync and up to date.

Power BI integration

You can also use Power BI for cost reporting. The Azure Cost Management connector for Power BI Desktop can be used to create powerful, customized reports that help you better understand your Azure spend. The Azure Cost Management connector currently supports customers with either a Microsoft Customer Agreement or an Enterprise Agreement (EA).

Next steps

- Read the Cost Management documentation to learn how to monitor and control Azure spending. Or, if you want to optimize resource use with Cost Management.

Assign access to Cost Management data

1/14/2020 • 8 minutes to read • Edit Online

For users with Azure Enterprise agreements, a combination of permissions granted in the Azure portal and the Enterprise (EA) portal define a user's level of access to Azure Cost Management data. For users with other Azure account types, defining a user's level of access to Cost Management data is simpler by using Azure role-based access control. This article walks you through assigning access to Cost Management data. After the combination of permissions is assigned, the user views data in Cost Management based the scope that they have access to and on the scope that they select in the Azure portal.

The scope that a user selects is used throughout Cost Management to provide data consolidation and to control access to cost information. When using scopes, users don't multi-select them. Instead, they select a larger scope that child scopes roll up to and then they filter-down to what they want to view. Data consolidation is important to understand because some people shouldn't have access to a parent scope that child scopes roll up to.

Watch the How to assign access with Azure Cost Management video to learn about assigning access to view costs and charges with Azure role-based access control.

Cost Management scopes

Cost management supports a variety of Azure account types. To view the full list of supported account types, see Understand Cost Management data. The type of account determines available scopes.

Azure EA subscription scopes

To view cost data for Azure EA subscriptions, a user must have at least read access to one or more of the following scopes.

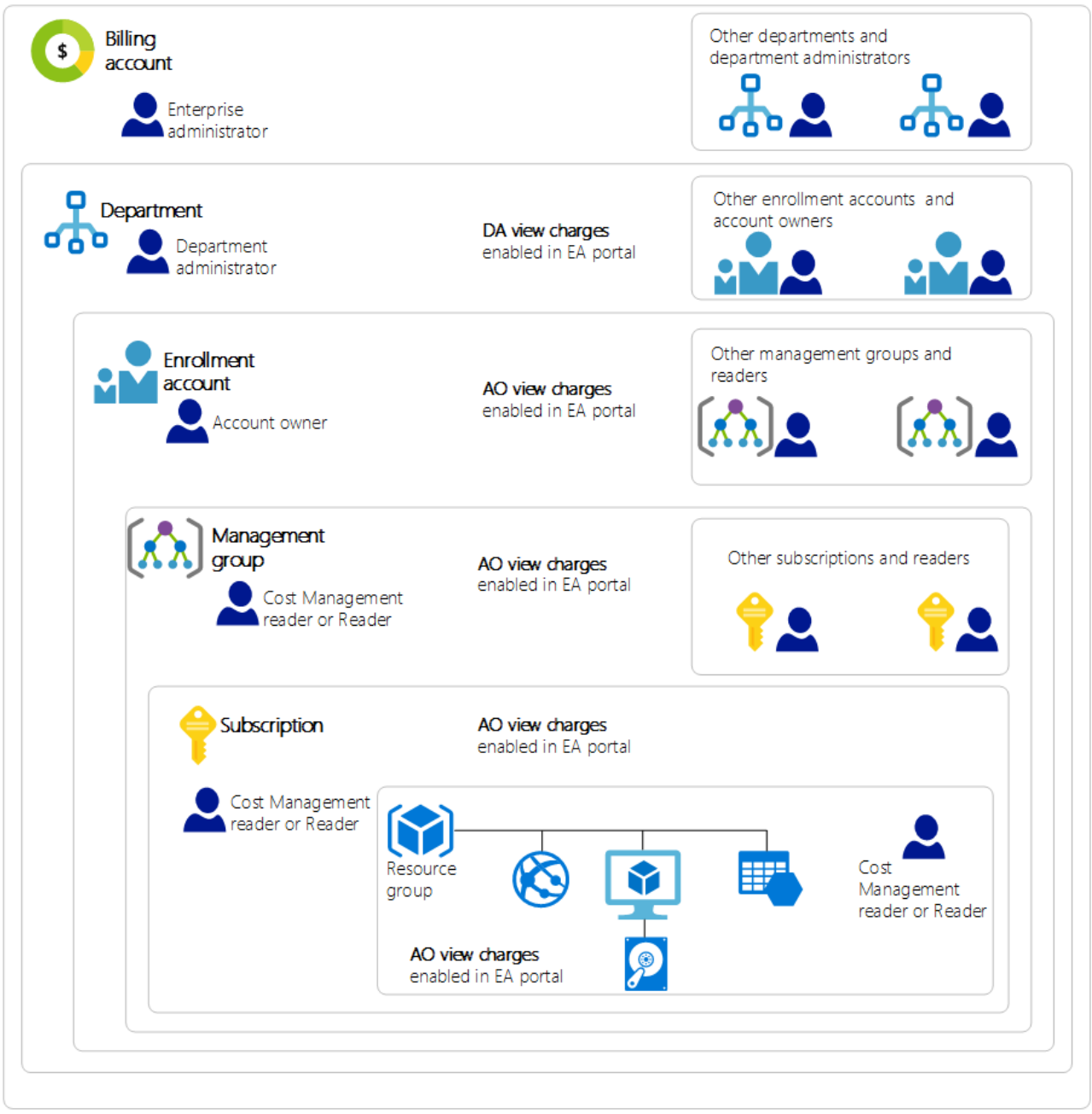
SCOPE	DEFINED AT	REQUIRED ACCESS TO VIEW DATA	PREREQUISITE EA SETTING	CONSOLIDATES DATA TO
Billing account[1]	https://ea.azure.com	Enterprise Admin	None	All subscriptions from the enterprise agreement
Department	https://ea.azure.com	Department Admin	**DA view charges** enabled	All subscriptions belonging to an enrollment account that is linked to the department
Enrollment account[2]	https://ea.azure.com	Account Owner	**AO view charges** enabled	All subscriptions from the enrollment account
Management group	https://portal.azure.com	Cost Management Reader (or Reader)	**AO view charges** enabled	All subscriptions below the management group
Subscription	https://portal.azure.com	Cost Management Reader (or Reader)	**AO view charges** enabled	All resources/resource groups in the subscription

SCOPE	DEFINED AT	REQUIRED ACCESS TO VIEW DATA	PREREQUISITE EA SETTING	CONSOLIDATES DATA TO
Resource group	https://portal.azure.com	Cost Management Reader (or Reader)	**AO view charges** enabled	All resources in the resource group

[1] The billing account is also referred to as the Enterprise Agreement or Enrollment.

[2] The enrollment account is also referred to as the account owner.

The following diagram illustrates the relationship between Cost Management scopes with roles and EA portal settings.



When **DA view charges** are disabled in the EA portal, you'll see a message stating *Costs disabled for your organization* when you try to view costs for departments and accounts.

Similarly, when **AO view charges** are disabled in the EA portal, you'll see a message stating *Costs disabled for your organization* when you try to view costs for enrollment accounts, management groups, subscriptions, and resource groups.

Other Azure account scopes

To view cost data for other Azure subscriptions, a user must have at least read access to one or more of the following scopes:

- Azure account
- Management group
- Resource group

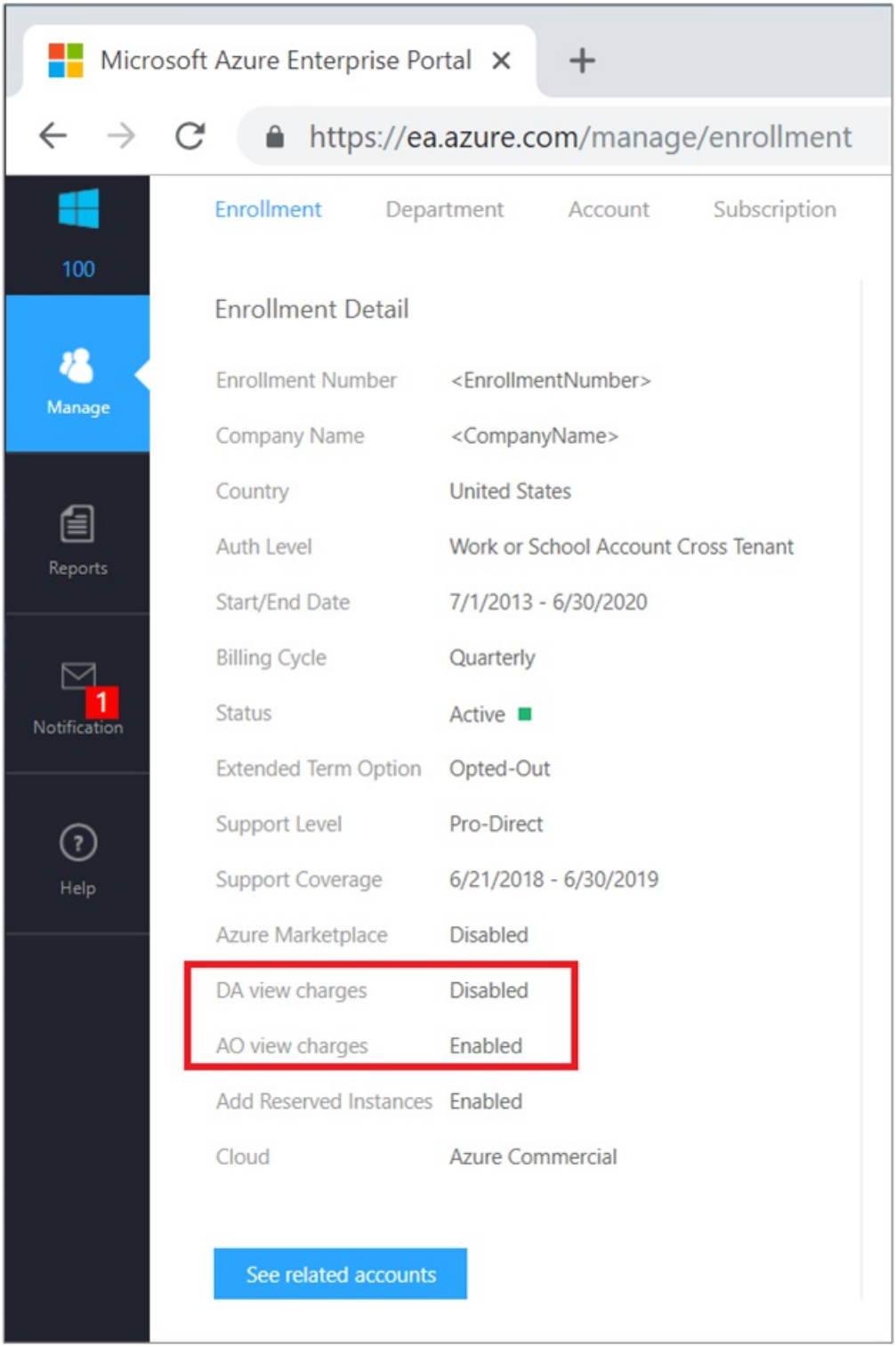
Various scopes are available after partners onboard customers to a Microsoft Customer Agreement. CSP customers can then use Cost Management features when enabled by their CSP partner. For more information, see Get started with Azure Cost Management for partners.

Enable access to costs in the EA portal

The department scope requires the **DA view charges** option **Enabled** in the EA portal. All other scopes require the **AO view charges** option **Enabled** in the EA portal.

To enable an option:

1. Sign in to the EA portal at https://ea.azure.com with an enterprise administrator account.
2. Select **Manage** in the left pane.
3. For the cost management scopes that you want to provide access to, enable the charge option to **DA view charges** and/or **AO view charges**.



After the view charge options are enabled, most scopes also require role-based access control (RBAC) permission configuration in the Azure portal.

Enterprise administrator role

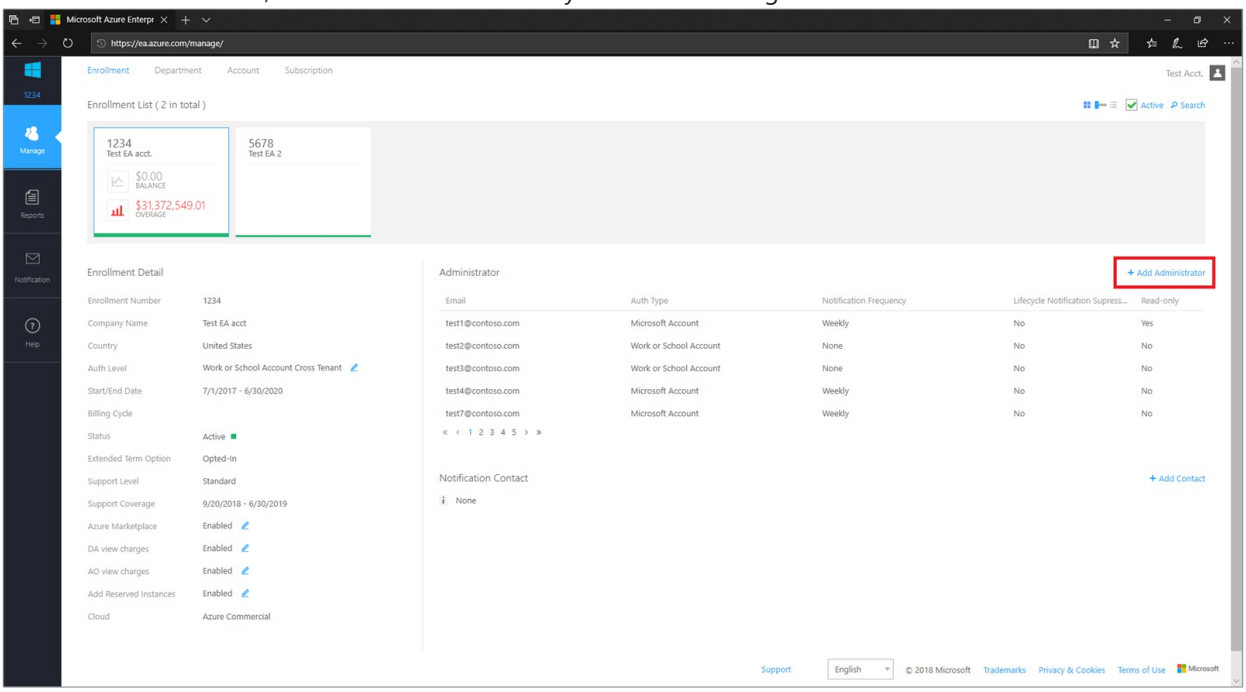
By default, an enterprise administrator has access to the billing account (Enterprise Agreement/enrollment) and to all other scopes, which are child scopes. The enterprise administrator assigns access to scopes for other users. As a best practice for business continuity, you should always have two users with enterprise administrator access. The following sections are walk-through examples of the enterprise administrator assigning access to scopes for other users.

Assign billing account scope access

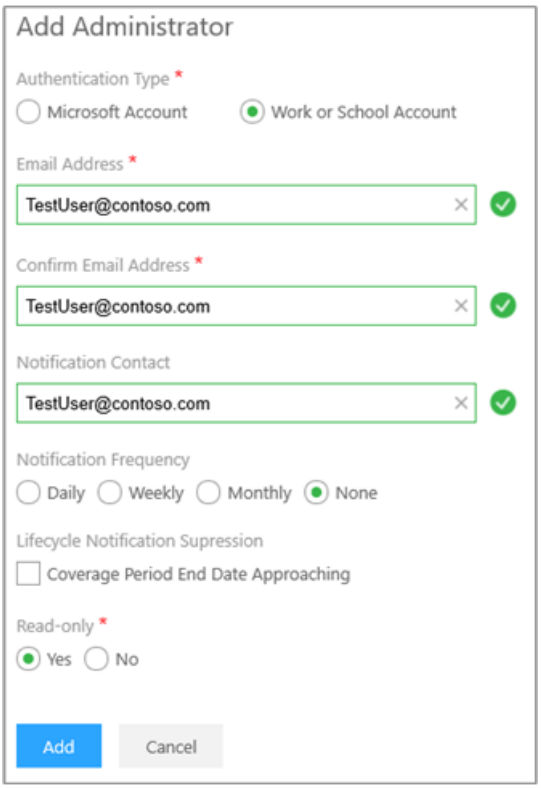
Access to the billing account scope requires enterprise administrator permission in the EA portal. The enterprise

administrator has access to view costs across the entire EA enrollment or multiple enrollments. No action is required in the Azure portal for the billing account scope.

1. Sign in to the EA portal at https://ea.azure.com with an enterprise administrator account.
2. Select **Manage** in the left pane.
3. On the **Enrollment** tab, select the enrollment that you want to manage.



4. Click **+ Add Administrator**.
5. In the Add Administrator box, select the authentication type and type the user's email address.
6. If the user should have read-only access to cost and usage data, under **Read-only**, select **Yes**. Otherwise, select **No**.
7. Click **Add** to create the account.

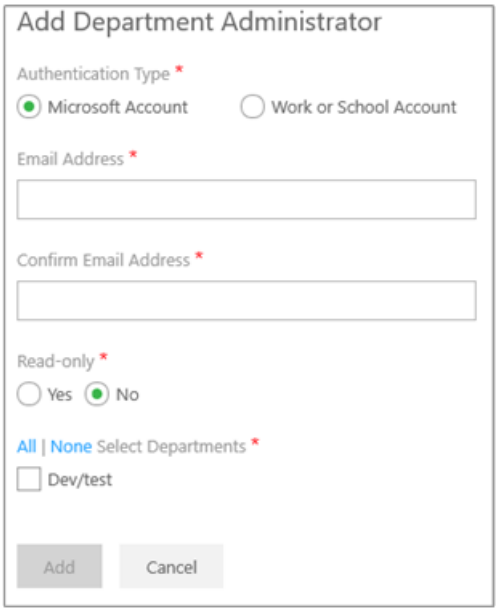


It may take up to 30 minutes before the new user can access data in Cost Management.

Assign department scope access

Access to the department scope requires department administrator (DA view charges) access in the EA portal. The department administrator has access to view costs and usage data associated with a department or to multiple departments. Data for the department includes all subscriptions belonging to an enrollment account that are linked to the department. No action is required in the Azure portal.

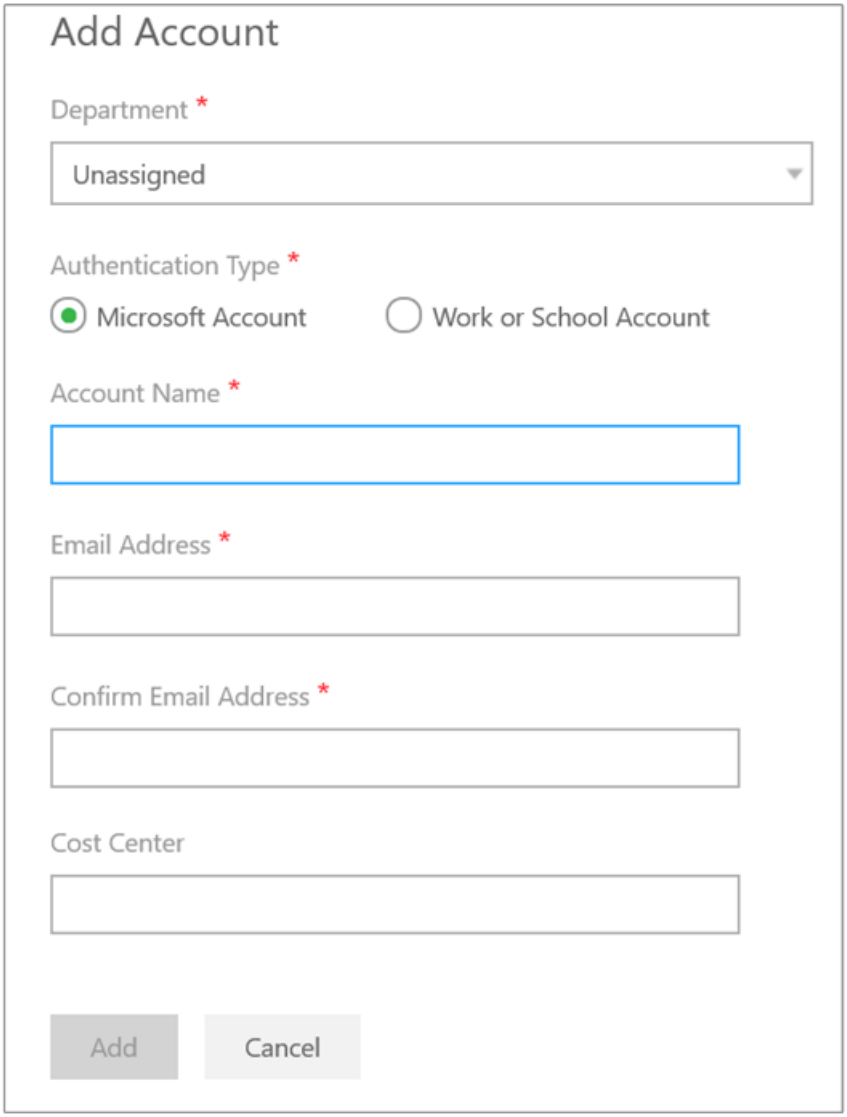
1. Sign in to the EA portal at https://ea.azure.com with an enterprise administrator account.
2. Select **Manage** in the left pane.
3. On the **Enrollment** tab, select the enrollment that you want to manage.
4. Click the **Department** tab and then click **Add Administrator**.
5. In the Add Department Administrator box, select the authentication type and then type the user's email address.
6. If the user should have read-only access to cost and usage data, under **Read-only**, select **Yes**. Otherwise, select **No**.
7. Select the departments that you want to grant department administrative permission to.
8. Click **Add** to create the account.



Assign enrollment account scope access

Access to the enrollment account scope requires account owner (AO view charges) access in the EA portal. The account owner can view costs and usage data associated with the subscriptions created from that enrollment account. No action is required in the Azure portal.

1. Sign in to the EA portal at https://ea.azure.com with an enterprise administrator account.
2. Select **Manage** in the left pane.
3. On the **Enrollment** tab, select the enrollment that you want to manage.
4. Click the **Account** tab and then click **Add Account**.
5. In the Add Account box, select the **Department** to associate the account to, or leave it as unassigned.
6. Select the authentication type and type the account name.
7. Type the user's email address and then optionally type the cost center.
8. Click on **Add** to create the account.

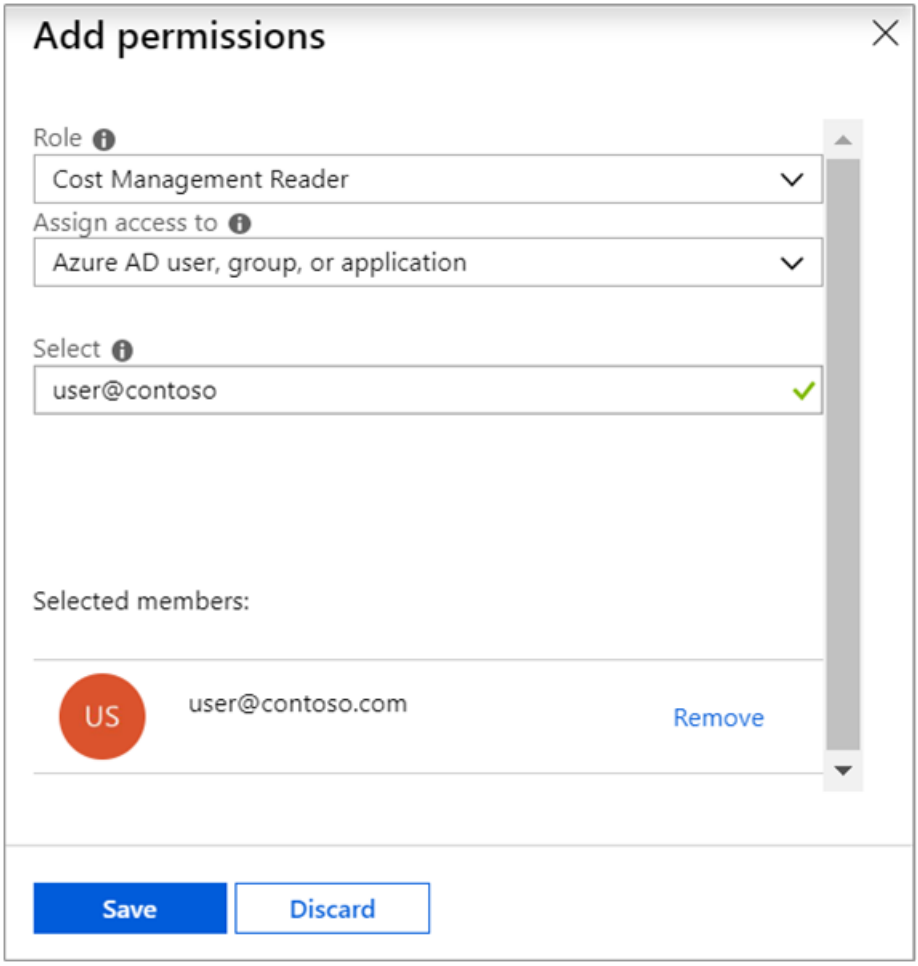


After completing the steps above, the user account becomes an enrollment account in the Enterprise portal and can create subscriptions. The user can access cost and usage data for subscriptions that they create.

Assign management group scope access

Access to view the management group scope requires at least the Cost Management Reader (or Reader) permission. You can configure permissions for a management group in the Azure portal. You must have at least the User Access Administrator (or Owner) permission for the management group to enable access for others. And for Azure EA accounts, you must also have enabled the **AO view charges** setting in the EA portal.

1. Sign in to the Azure portal at https://portal.azure.com.
2. Select **All Services** in the sidebar, search for *management groups*, then select **management groups**.
3. Select the management group in the hierarchy.
4. Next to the name of your management group, click **Details**.
5. Select **Access Control (IAM)** from the left pane.
6. Click **Add**.
7. Under **Role**, select **Cost Management Reader**.
8. Under **Assign access to**, select **Azure AD user, group, or application**.
9. To assign access, search for and then select the user.
10. Click **Save**.



Assign subscription scope access

Access to a subscription requires at least the Cost Management Reader (or Reader) permission. You can configure permissions to a subscription in the Azure portal. You must have at least the User Access Administrator (or Owner) permission for the subscription to enable access for others. And for Azure EA accounts, you must also have enabled the **AO view charges** setting in the EA portal.

1. Sign in to the Azure portal at https://portal.azure.com.
2. Select **All Services** in the sidebar, search for *subscriptions*, then select **Subscriptions**.
3. Select your subscription.
4. Select **Access Control (IAM)** from the left pane.
5. Click **Add**.
6. Under **Role**, select **Cost Management Reader**.
7. Under **Assign access to**, select **Azure AD user, group, or application**.
8. To assign access, search for and then select the user.
9. Click **Save**.

Assign resource group scope access

Access to a resource group requires at least the Cost Management Reader (or Reader) permission. You can configure permissions to a resource group in the Azure portal. You must have at least the User Access Administrator (or Owner) permission for the resource group to enable access for others. And for Azure EA accounts, you must also have enabled the **AO view charges** setting in the EA portal.

1. Sign in to the Azure portal at https://portal.azure.com.
2. Select **All Services** in the sidebar, search for *resource groups*, then select **Resource groups**.
3. Select your resource group.

4. Select **Access Control (IAM)** from the left pane.
5. Click **Add**.
6. Under **Role**, select **Cost Management Reader**.
7. Under **Assign access to**, select **Azure AD user, group, or application**.
8. To assign access, search for and then select the user.
9. Click **Save**.

Cross-tenant authentication issues

Currently, Azure Cost Management has limited support for cross-tenant authentication. In some circumstances when you try to authenticate across tenants, you may receive an **Access denied** error in cost analysis. This issue might occur if you configure role-based access control (RBAC) to another tenant's subscription and then try to view cost data.

To work around the problem: After you configure cross-tenant RBAC, wait an hour. Then, try to view costs in cost analysis or grant Cost Management access to users in both tenants.

Next steps

- If you haven't already completed the first quickstart for Cost Management, read it at Start analyzing costs.

Common cost analysis uses

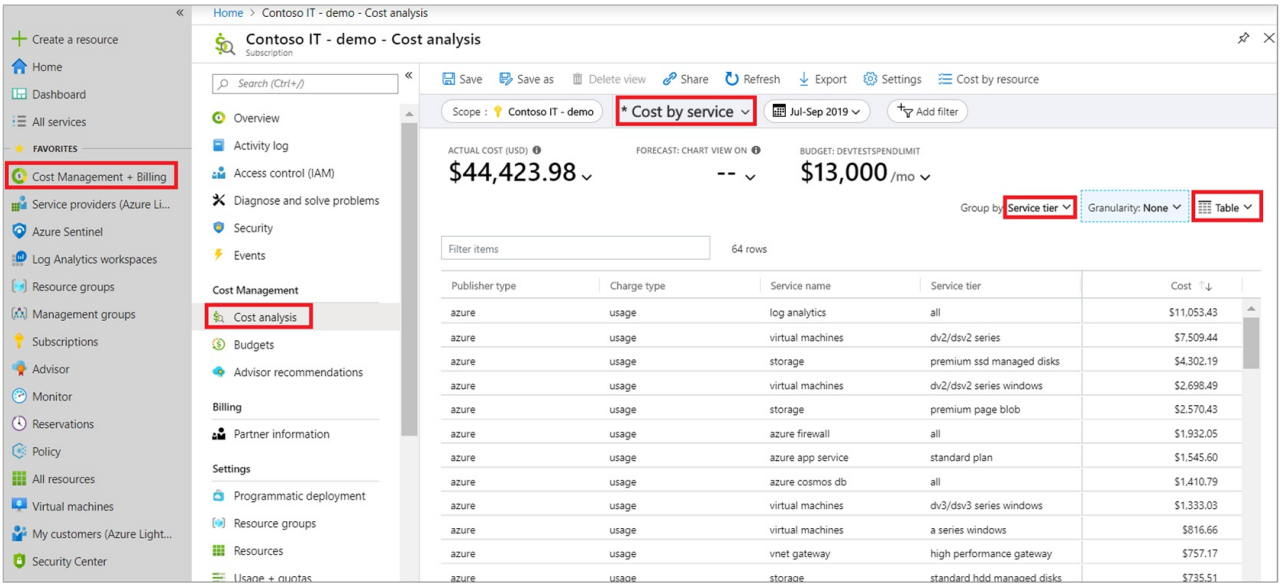
1/14/2020 • 4 minutes to read • Edit Online

Azure Cost Management users often want answers to questions that many others ask. This article walks you through getting results for common cost analysis tasks in Cost Management.

View cost breakdown by Azure service

Viewing costs by an Azure service can help you to better understand the parts of your infrastructure that cost the most. For example, VM compute costs might be small. Yet you might accrue significant networking costs because of the amount of information emitting from the VMs. Understanding the primary cost drivers of your Azure services is essential so that you can adjust service usage, as needed.

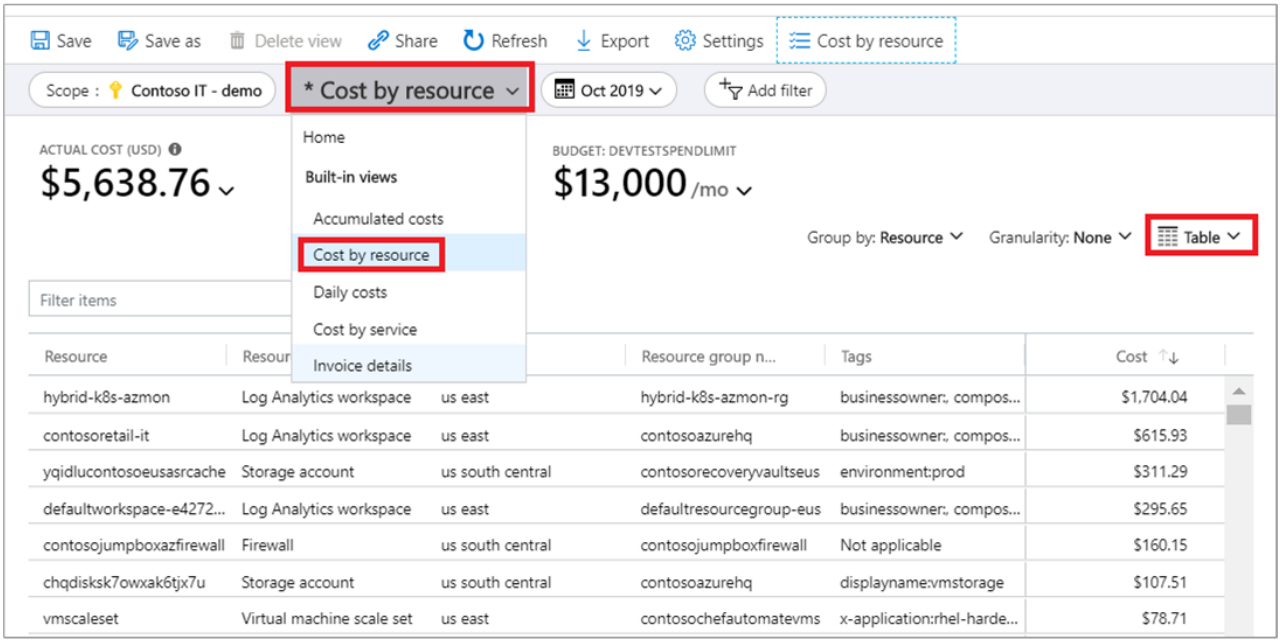
1. In the Azure portal, navigate to cost analysis for your scope. For example: **Cost Management + Billing** > **Cost Management** > **Cost analysis**.
2. Select **Cost by service** and then group by **Service tier**.
3. Change the view to **Table**.



View cost breakdown by Azure resource

Your services are built with Azure resources. Reviewing costs based on resources can help you quickly identify your primary cost contributors. If a service has resources that are too expensive, consider making changes to reduce your costs.

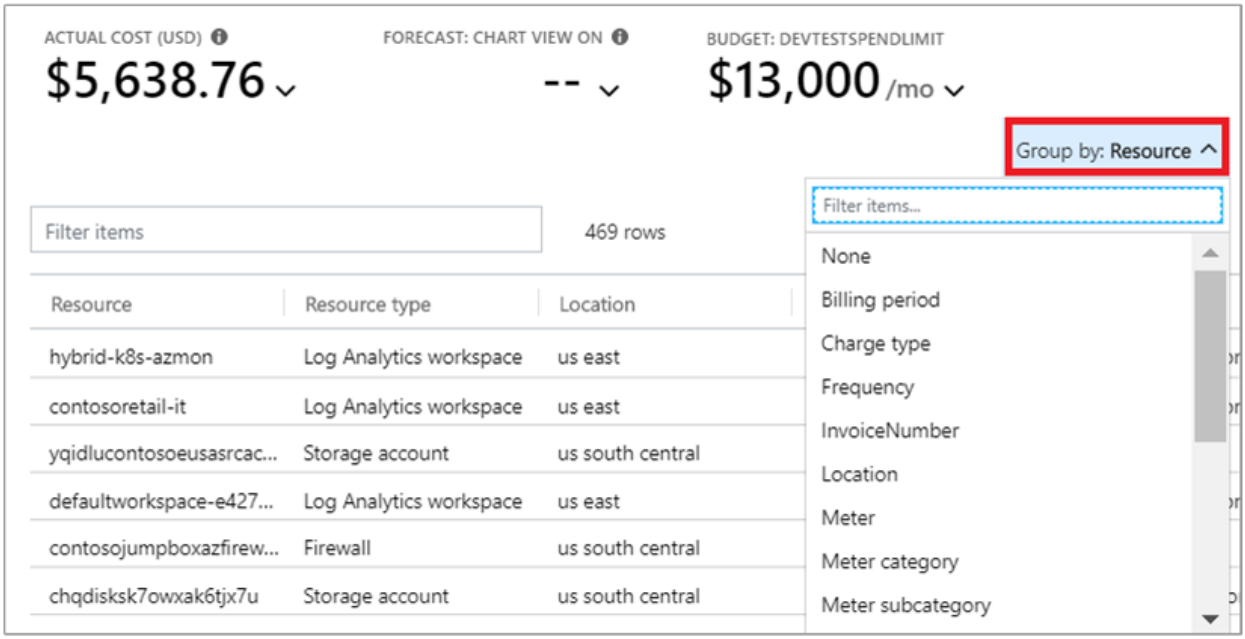
1. In the Azure portal, navigate to cost analysis for your scope. For example: **Cost Management + Billing** > **Cost Management** > **Cost analysis**.
2. Select **Cost by resource**.
3. Change the view to **Table**.



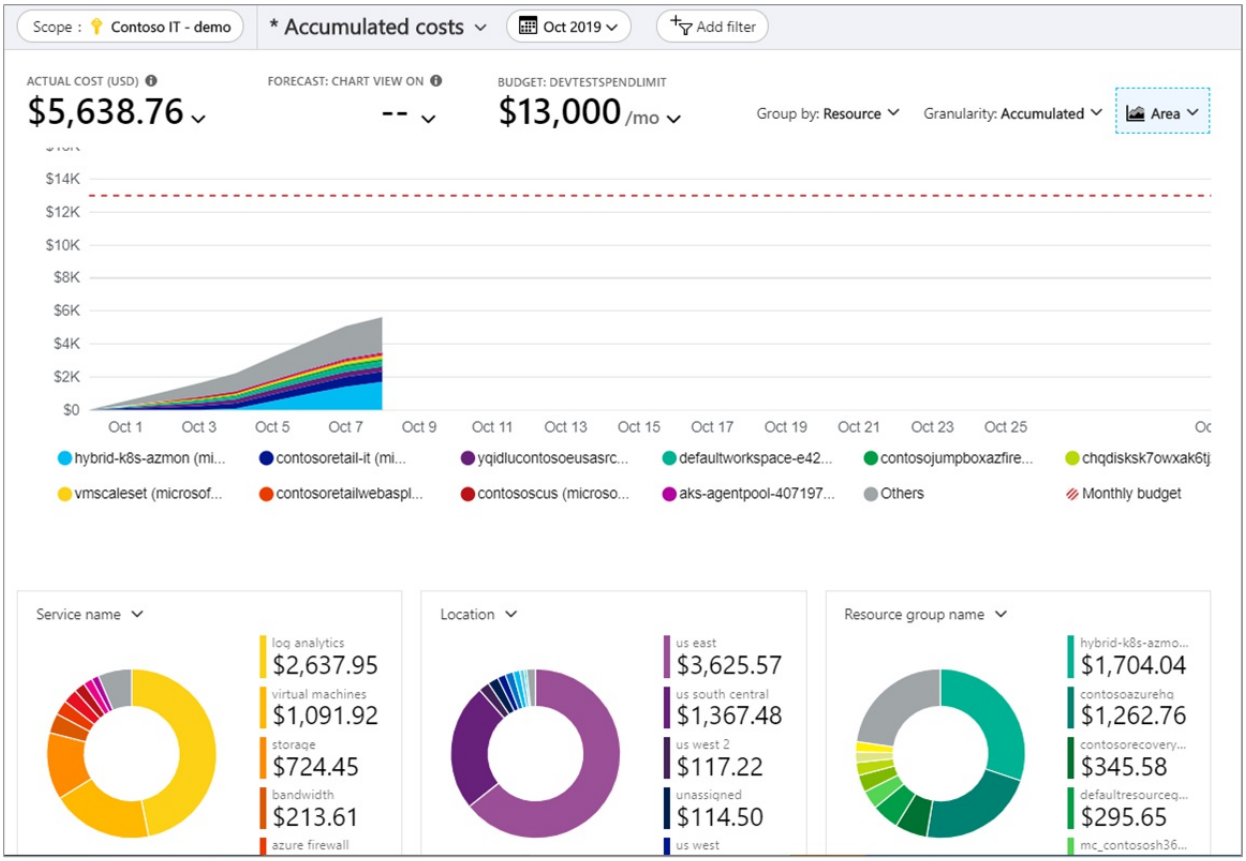
View cost breakdown by selected dimensions

Dimensions allow you to organize your costs based on various metadata values shown in your charges. For example, you could group your costs by location.

1. In the Azure portal, navigate to cost analysis for your scope. For example: **Cost Management + Billing** > **Cost Management** > **Cost analysis**.
2. Select the **Group by** filter.



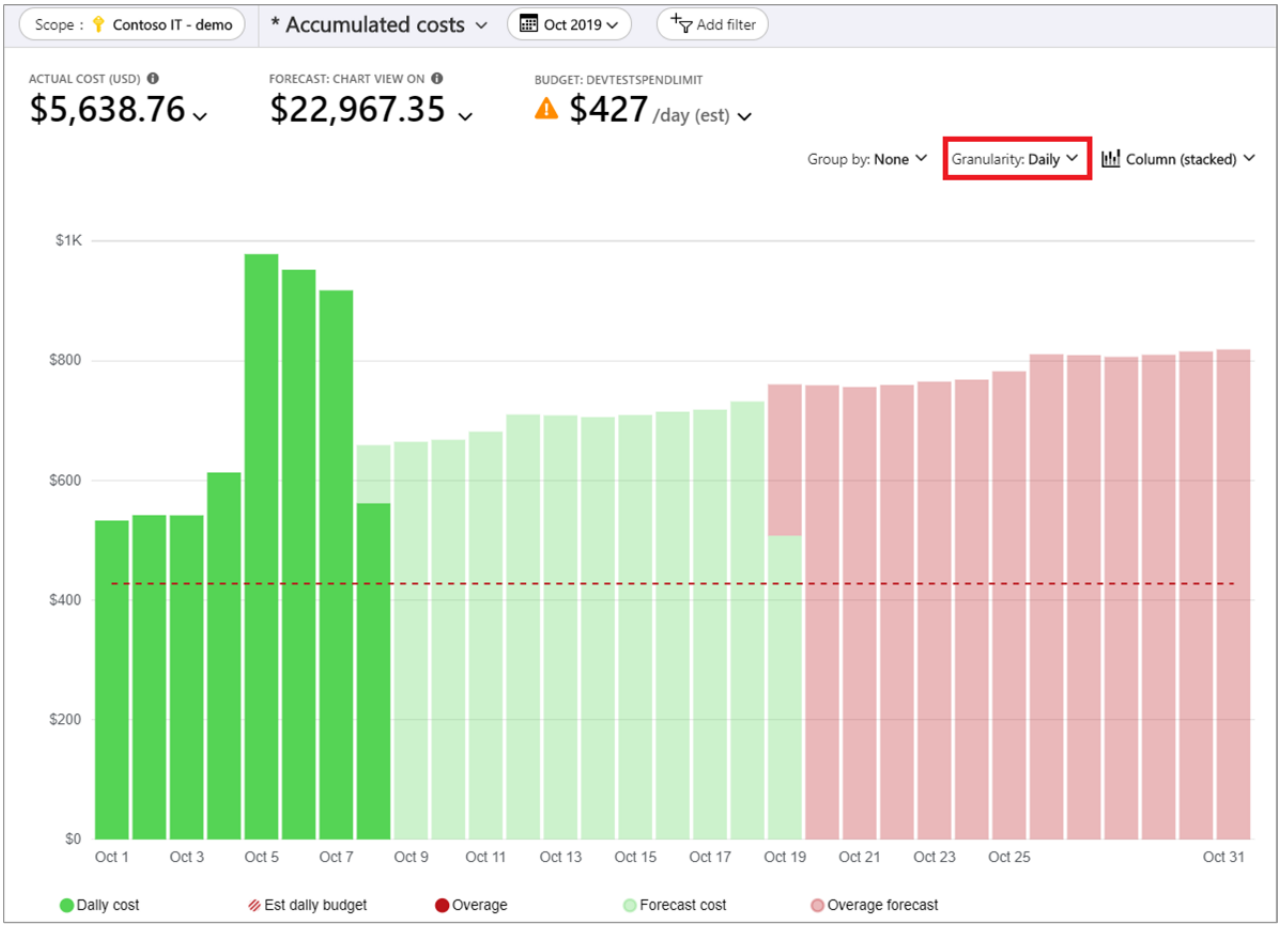
3. Optionally, you save the view for later use.
4. Click a pie chart below the graph to view more detailed data.



View costs per day or by month

Looking at daily and monthly costs can help you to better understand if there's a time of the week or year where your costs are higher. If you have more customer traffic in a holiday period, does that lead to a corresponding increase in your Azure costs? Is Friday a more costly day than Monday?

1. In the Azure portal, navigate to cost analysis for your scope. For example: **Cost Management + Billing** > **Cost Management** > **Cost analysis**.
2. Set the **Granularity** to **Monthly** or **Daily**.

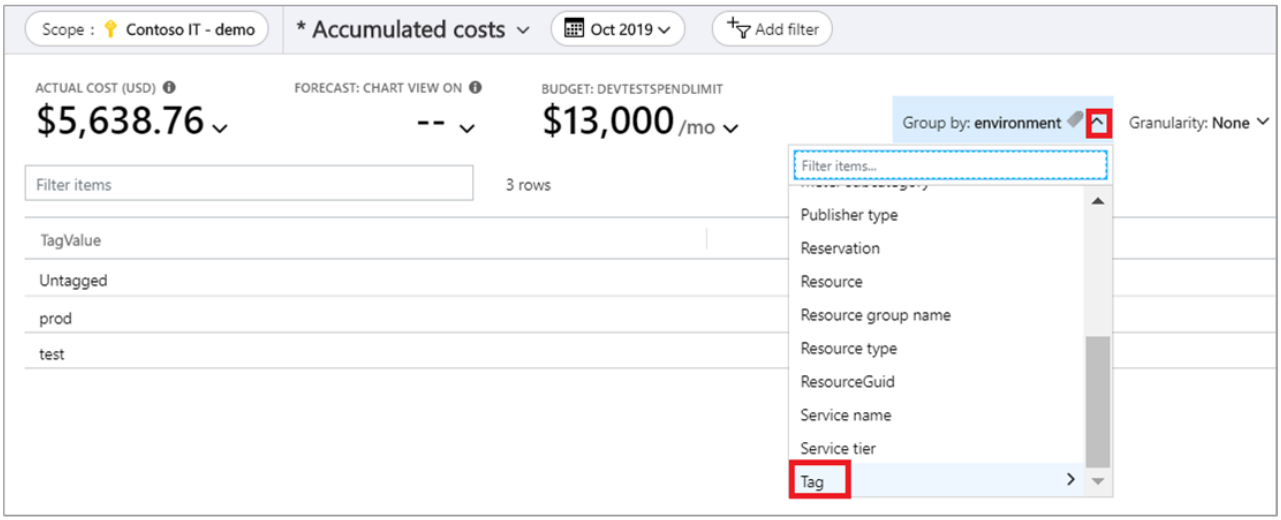


View costs for a specific tag

Many Azure users apply tags to their resources such as a cost center or development environment (production and test) to better categorize charges. Tags appear as a dimension in cost analysis. You can use the dimension to gain insights into your custom tagging categorizations.

Support for tags applies to usage reported *after* the tag was applied to the resource. Tags aren't applied retroactively for cost rollups.

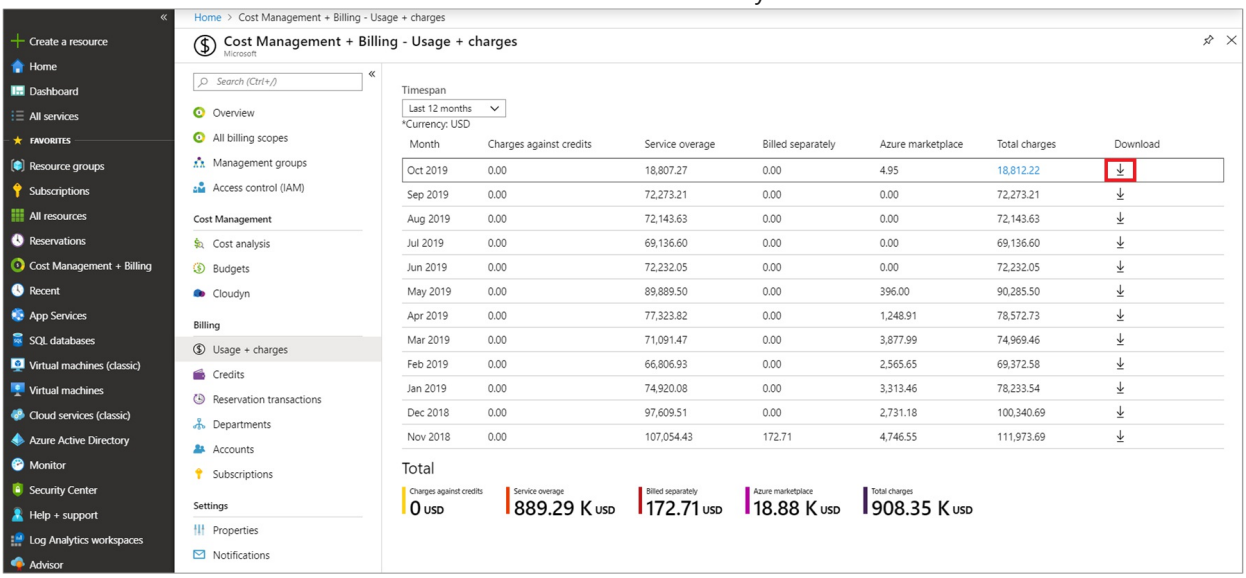
1. In the Azure portal, navigate to cost analysis for your scope. For example: **Cost Management + Billing** > **Cost Management** > **Cost analysis**.
2. Select **Group by** for your tag.



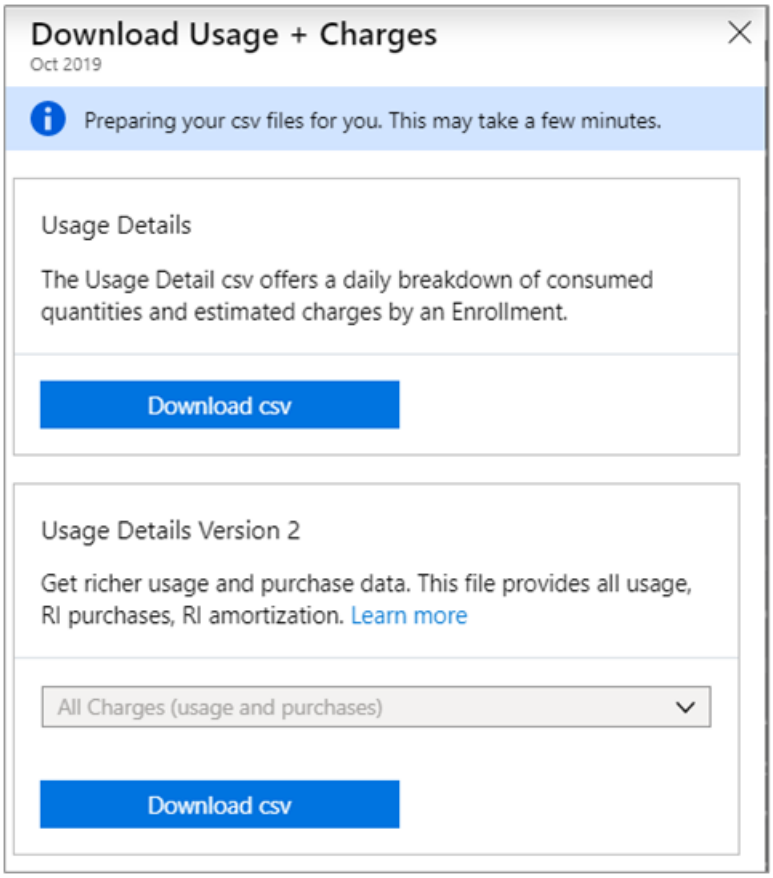
Download your usage details

Your usage details report file, in CSV format, provides a breakdown of all the charges that accrued towards an invoice. You can use the report to compare it to, and better understand, your invoice. Each billed charge on your invoice corresponds to broken-down charges in the usage report.

1. In the Azure portal, navigate to the **Usage and Charges** tab for a billing account or subscription. For example: **Cost Management + Billing** > **Billing** > **Usage + charges**.
2. Select the line item to download from and then click the download symbol.



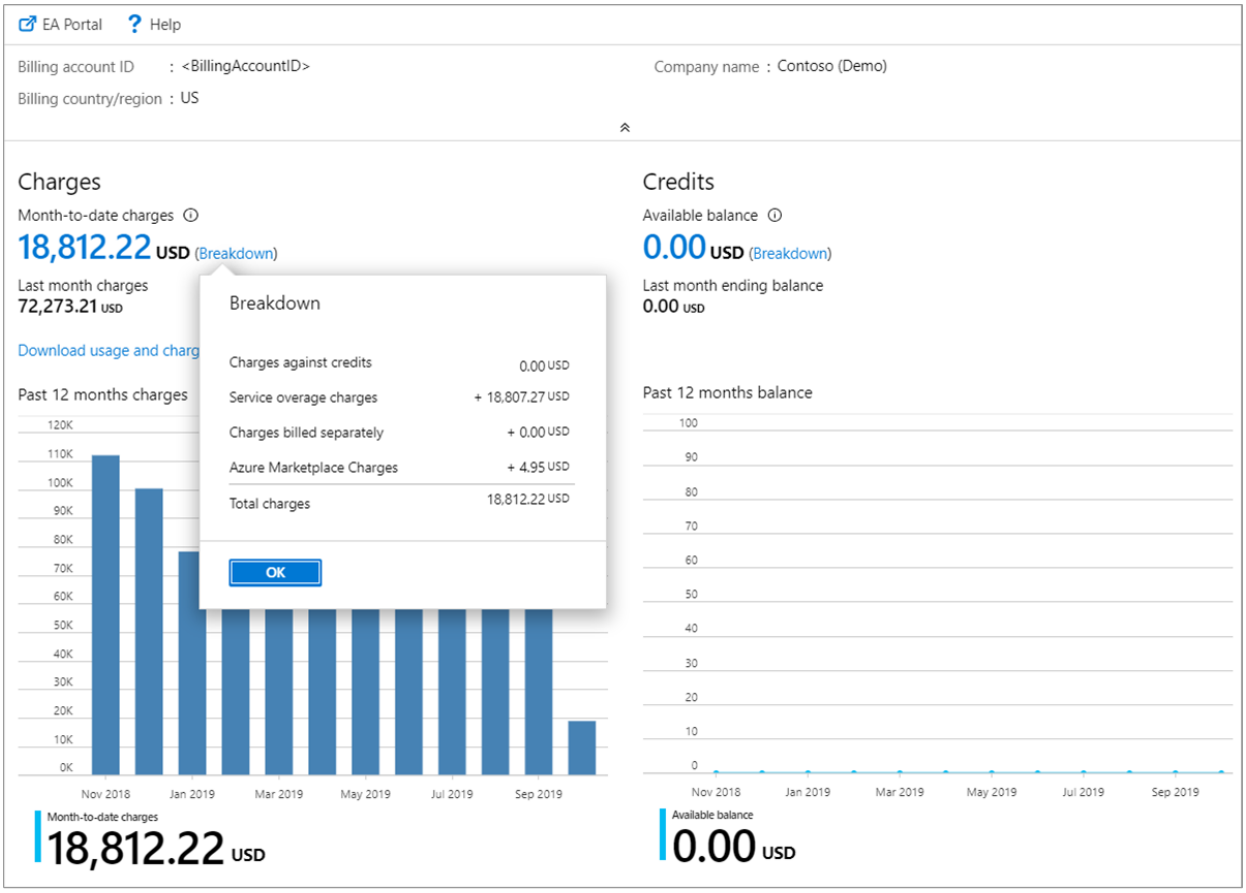
3. Select the usage file to download.



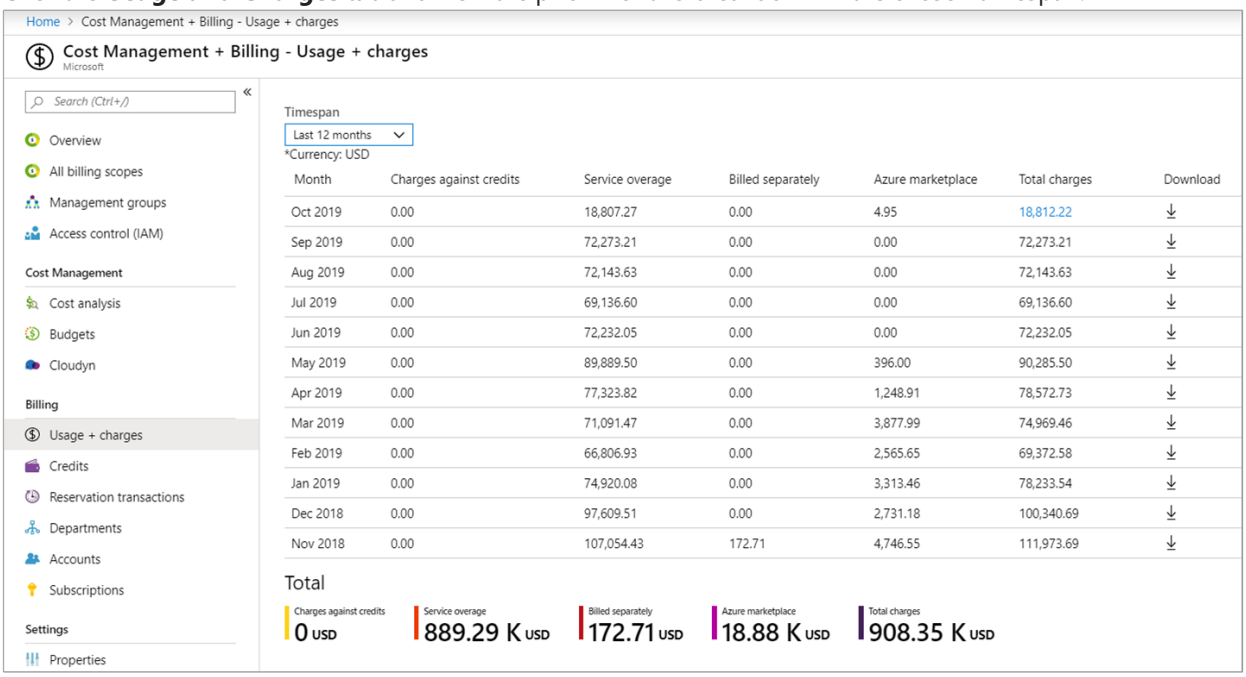
View monthly EA cost breakdown

Your EA enrollment accrues costs for your entire organization. Understanding how costs accrue and are invoiced over time helps you to engage the appropriate stakeholders to ensure that costs are managed responsibly.

1. In the Azure portal, navigate to **Cost Management + Billing** > **Overview**.
2. Click **Breakdown** for the current month and view your monetary commitment burn down.



3. Click the **Usage and Charges** tab and view the prior month's breakdown in the chosen timespan.

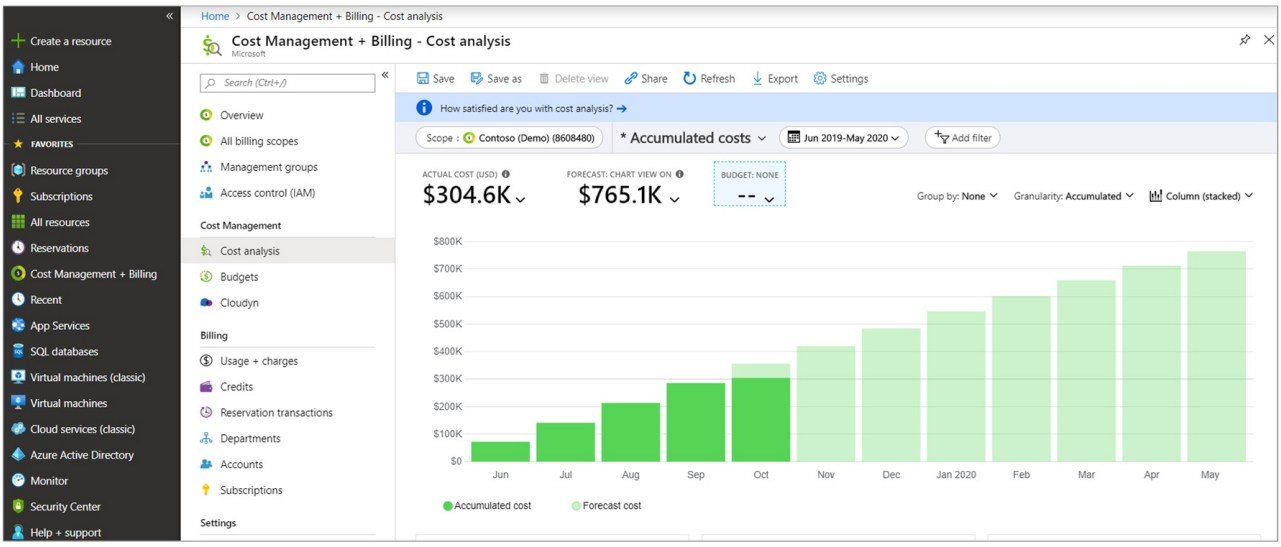


View enrollment monthly cost by term

Use a graphical view of your enrollment's monthly costs to understand the cost trends and invoiced amounts for a given period.

1. In the Azure portal, navigate to cost analysis for your scope. For example: **Cost Management + Billing** > **Cost Management** > **Cost analysis**.
2. Select your enrollment and set the enrollment term.
3. Set the granularity to monthly and then set the view to **Column (stacked)**.

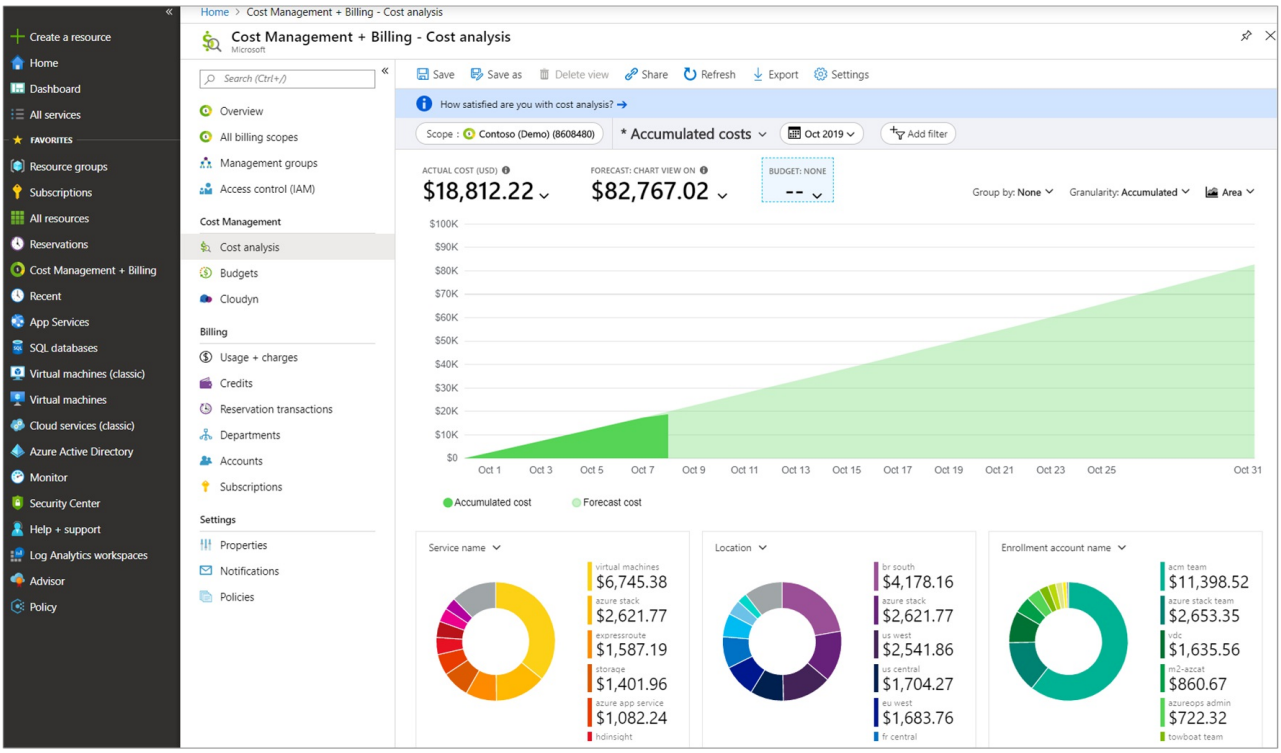
You can group by and filter your data for a more detailed analysis.



View EA enrollment accumulated costs

View the net accumulated charges over time to understand overall expenditures for your organization for a given period.

1. In the Azure portal, navigate to cost analysis for your scope. For example: **Cost Management + Billing** > **Cost Management** > **Cost analysis**.
2. Select your enrollment and then view your current accumulated costs.



Next steps

- If you haven't already completed the first quickstart for Cost Management, read it at Start analyzing costs.
- Read the Cost Management documentation.

Use cost alerts to monitor usage and spending

1/14/2020 • 3 minutes to read • Edit Online

This article helps you understand and use Cost Management alerts to monitor your Azure usage and spending. Cost alerts are automatically generated based when Azure resources are consumed. Alerts show all active cost management and billing alerts together in one place. When your consumption reaches a given threshold, alerts are generated by Cost Management. There are three types of cost alerts: budget alerts, credit alerts, and department spending quota alerts.

Budget alerts

Budget alerts notify you when spending, based on usage or cost, reaches or exceeds the amount defined in the alert condition of the budget. Cost Management budgets are created using the Azure portal or the Azure Consumption API.

In the Azure portal, budgets are defined by cost. Using the Azure Consumption API, budgets are defined by cost or by consumption usage. Budget alerts support both cost-based and usage-based budgets. Budget alerts are generated automatically whenever the budget alert conditions are met. You can view all cost alerts in the Azure portal. Whenever an alert is generated, it's shown in cost alerts. An alert email is also sent to the people in the alert recipients list of the budget.

Credit alerts

Credit alerts notify you when your Azure credit monetary commitments are consumed. Monetary commitments are for organizations with Enterprise Agreements. Credit alerts are generated automatically at 90% and at 100% of your Azure credit balance. Whenever an alert is generated, it's reflected in cost alerts and in the email sent to the account owners.

Department spending quota alerts

Department spending quota alerts notify you when department spending reaches a fixed threshold of the quota. Spending quotas are configured in the EA portal. Whenever a threshold is met it generates an email to department owners and is shown in cost alerts. For example, 50% or 75% of the quota.

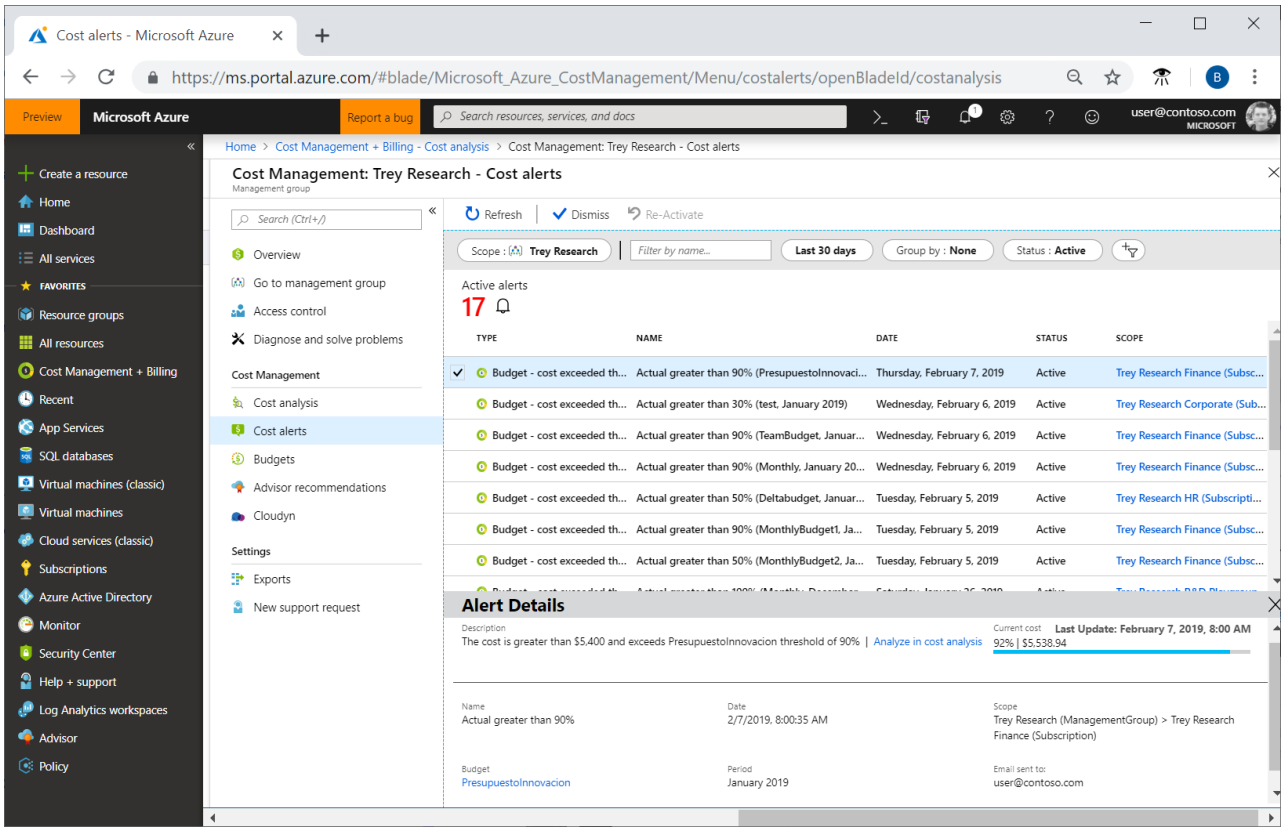
Supported alert features by offer categories

Support for alert types depends on the type of Azure account that you have (Microsoft offer). The following table shows the alert features that are supported by various Microsoft offers. You can view the full list of Microsoft offers at Understand Cost Management data.

ALERT TYPE	ENTERPRISE AGREEMENT	MICROSOFT CUSTOMER AGREEMENT	WEB DIRECT/PAY-AS-YOU-GO
Budget	✔	✔	✔
Credit	✔	✘	✘
Department spending quota	✔	✘	✘

View cost alerts

To view cost alerts, open the desired scope in the Azure portal and select **Budgets** in the menu. Use the **Scope** pill to switch to a different scope. Select **Cost alerts** in the menu. For more information about scopes, see Understand and work with scopes.

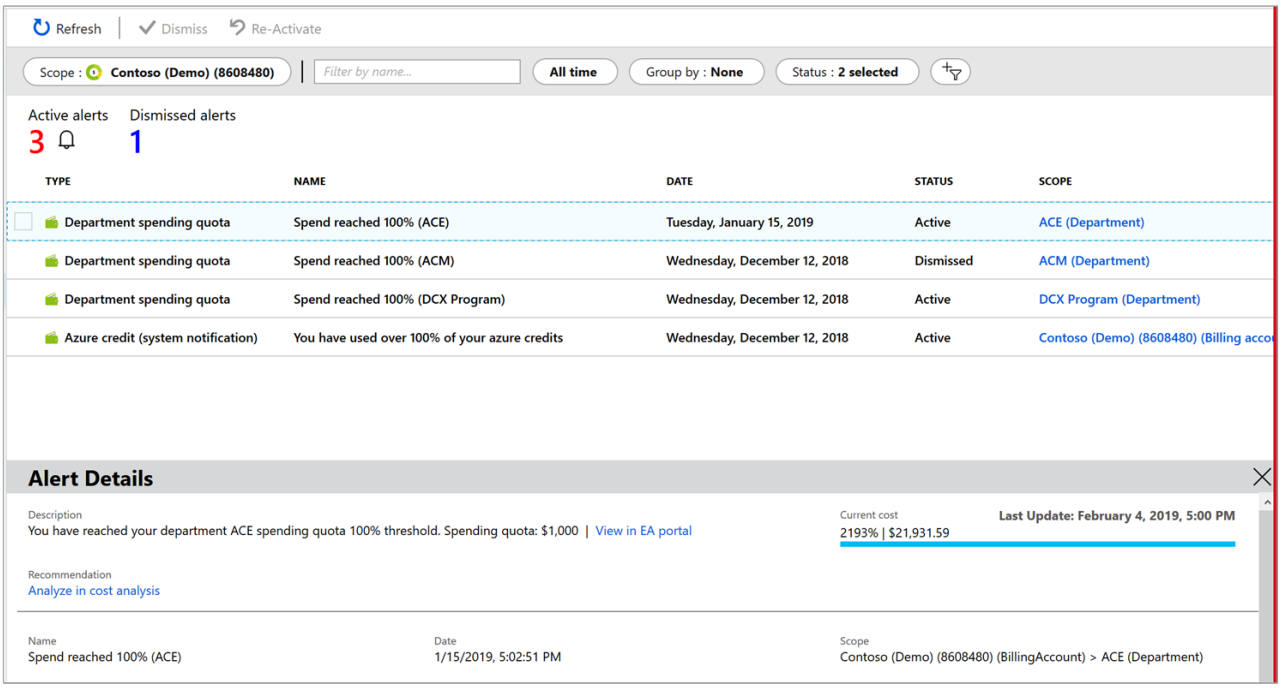


The total number of active and dismissed alerts appears on the cost alerts page.

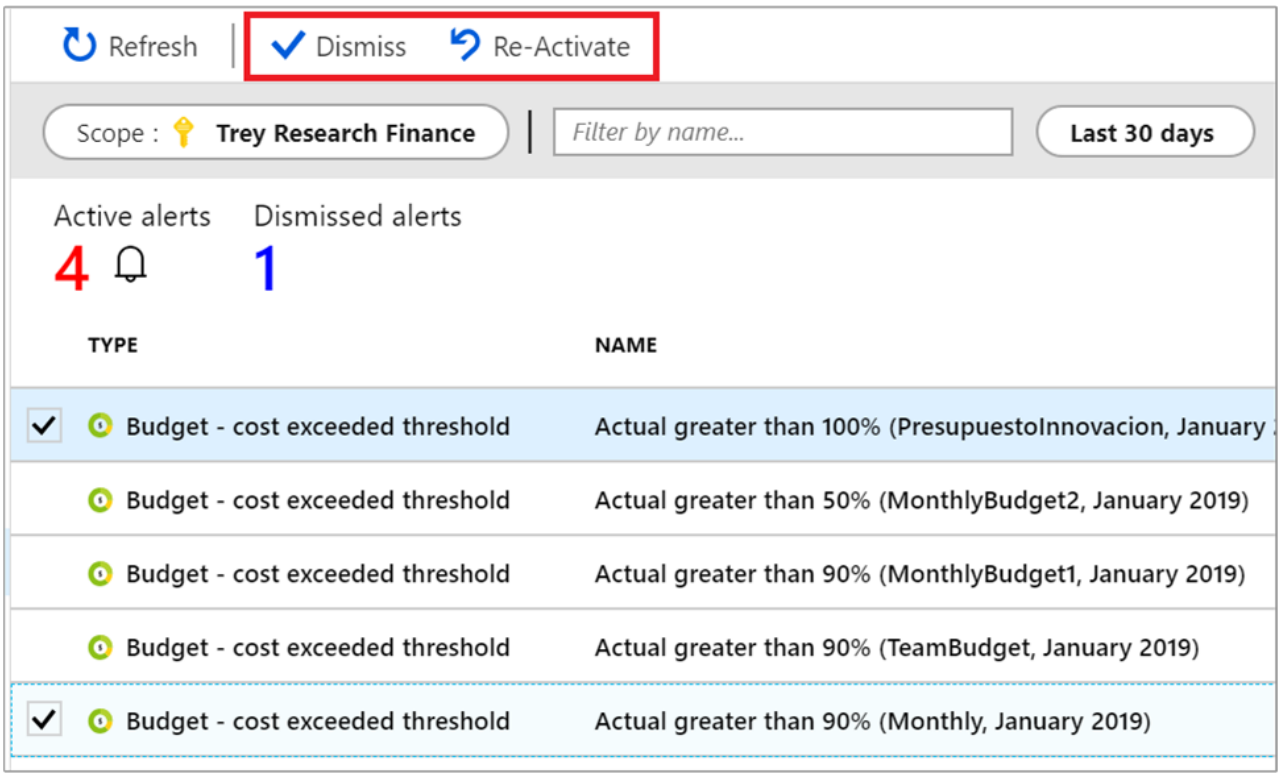
All alerts show the alert type. A budget alert shows the reason why it was generated and the name of the budget it applies to. Each alert shows the date it was generated, its status, and the scope (subscription or management group) that the alert applies to.

Possible status includes **active** and **dismissed**. Active status indicates that the alert is still relevant. Dismissed status indicates that someone has marked the alert to set it as no longer relevant.

Select an alert from the list to view its details. Alert details show more information about the alert. Budget alerts include a link to the budget. If a recommendation is available for a budget alert, then a link to the recommendation is also shown. Budget, credit, and department spending quota alerts have a link to analyze in cost analysis where you can explore costs for the alert's scope. The following example shows spending for a department with alert details.



When you view the details of a dismissed alert, you can reactivate it if manual action is needed. The following image shows an example.



See also

- If you haven't already created a budget or set alert conditions for a budget, complete the Create and manage budgets tutorial.

Set up and configure AWS Cost and Usage report integration

1/14/2020 • 9 minutes to read • Edit Online

With Amazon Web Services (AWS) Cost and Usage report (CUR) integration, you monitor and control your AWS spending in Azure Cost Management. The integration allows a single location in the Azure portal where you monitor and control spending for both Azure and AWS. This article explains how to set up the integration and configure it so that you can use Azure Cost Management features to analyze costs and review budgets.

Cost Management processes the AWS Cost and Usage report stored in an S3 bucket by using your AWS access credentials to get report definitions and download report GZIP CSV files.

Create a Cost and Usage report in AWS

Using a Cost and Usage report is the AWS-recommended way to collect and process AWS costs. For more information, see the AWS Cost and Usage Report documentation.

Use the **Cost & Usage Reports** page of the Billing and Cost Management console in AWS to create a Cost and Usage report with the following steps:

1. Sign in to the AWS Management Console and open the Billing and Cost Management console.
2. In the navigation pane, select **Cost & Usage Reports**.
3. Select **Create report**.
4. For **Report name**, enter a name for your report.
5. Under **Additional report details**, select **Include resource IDs**.
6. For **Data refresh settings**, select whether you want the AWS Cost and Usage report to refresh if AWS applies refunds, credits, or support fees to your account after finalizing your bill. When a report refreshes, a new report is uploaded to Amazon S3. We recommend that you leave the setting selected.
7. Select **Next**.
8. For **S3 bucket**, choose **Configure**.
9. In the Configure S3 Bucket dialog box, do one of the following tasks:
    a. Select an existing bucket from the drop-down list and choose **Next**.
    b. Enter a bucket name and the Region where you want to create a new bucket and choose **Next**.
10. Select **I have confirmed that this policy is correct**, then click **Save**.
11. (Optional) For Report path prefix, enter the report path prefix that you want prepended to the name of your report. If you don't specify a prefix, the default prefix is the name that you specified for the report. The date range has the `/report-name/date-range/` format.
12. For **Time unit**, choose **Hourly**.
13. For **Report versioning**, choose whether you want each version of the report to overwrite the previous version, or if you want additional new reports.
14. For **Enable data integration for**, no selection is required.

15. For **Compression**, select **GZIP**.
16. Select **Next**.
17. After you've reviewed the settings for your report, select **Review and Complete**.

    Note the report name. You'll use it in later steps.

It can take up to 24 hours for AWS to start delivering reports to your Amazon S3 bucket. After delivery starts, AWS updates the AWS Cost and Usage report files at least once a day. You can continue configuring your AWS environment without waiting for delivery to start.

Create a role and policy in AWS

Azure Cost Management accesses the S3 bucket where the Cost and Usage report is located several times a day. The service needs access to credentials to check for new data. You create a role and policy in AWS to allow Cost Management to access it.

To enable role-based access to an AWS account in Cost Management, the role is created in the AWS console. You need to have the *role ARN* and *external ID* from the AWS console. Later, you use them on the **Create an AWS connector** page in Cost Management.

Use the Create a New Role wizard:

1. Sign in to your AWS console and select **Services**.
2. In the list of services, select **IAM**.
3. Select **Roles** and then select **Create Role**.
4. On the next page, select **Another AWS account**.
5. In **Account ID**, enter **432263259397**.
6. In **Options**, select **Require external ID (Best practice when a third party will assume this role)**.
7. In **External ID**, enter the external ID which is a shared passcode between the AWS role and Azure Cost Management. The same external ID is also used on the **New Connector** page in Cost Management. Microsoft recommends that you use a strong passcode policy when entering the external ID.

   > **NOTE**
   > Don't change the selection for **Require MFA**. It should remain cleared.

8. Select **Next: Permissions**.
9. Select **Create policy**. A new browser tab opens. That's where you create a policy.
10. Select **Choose a service**.

Configure permission for the Cost and Usage report:

1. Enter **Cost and Usage Report**.
2. Select **Access level** > **Read** > **DescribeReportDefinitions**. This step allows Cost Management to read what CUR reports are defined and determine if they match the report definition prerequisite.
3. Select **Add additional permissions**.

Configure permission for your S3 bucket and objects:

1. Select **Choose a service**.

2. Enter **S3**.
3. Select **Access level** > **List** > **ListBucket**. This action gets the list of objects in the S3 Bucket.
4. Select **Access level** > **Read** > **GetObject**. This action allows the download of billing files.
5. Select **Resources**.
6. Select **bucket – Add ARN**.
7. In **Bucket name**, enter the bucket used to store the CUR files.
8. Select **object – Add ARN**.
9. In **Bucket name**, enter the bucket used to store the CUR files.
10. In **Object name**, select **Any**.
11. Select **Add additional permissions**.

Configure permission for Cost Explorer:

1. Select **Choose a service**.
2. Enter **Cost Explorer Service**.
3. Select **All Cost Explorer Service actions (ce:*)**. This action validates that the collection is correct.
4. Select **Add additional permissions**.

Add permission for AWS Organizations:

1. Enter **Organizations**.
2. Select **Access level** > **List** > **ListAccounts**. This action gets the names of the accounts.
3. In **Review Policy**, enter a name for the new policy. Check that you entered the correct information, and then select **Create Policy**.
4. Go back to the previous tab and refresh your browser's webpage. On the search bar, search for your new policy.
5. Select **Next: Review**.
6. Enter a name for the new role. Check that you entered the correct information, and then select **Create Role**.

   Note the role ARN and the external ID used in the preceding steps when you created the role. You'll use them later when you set up the Azure Cost Management connector.

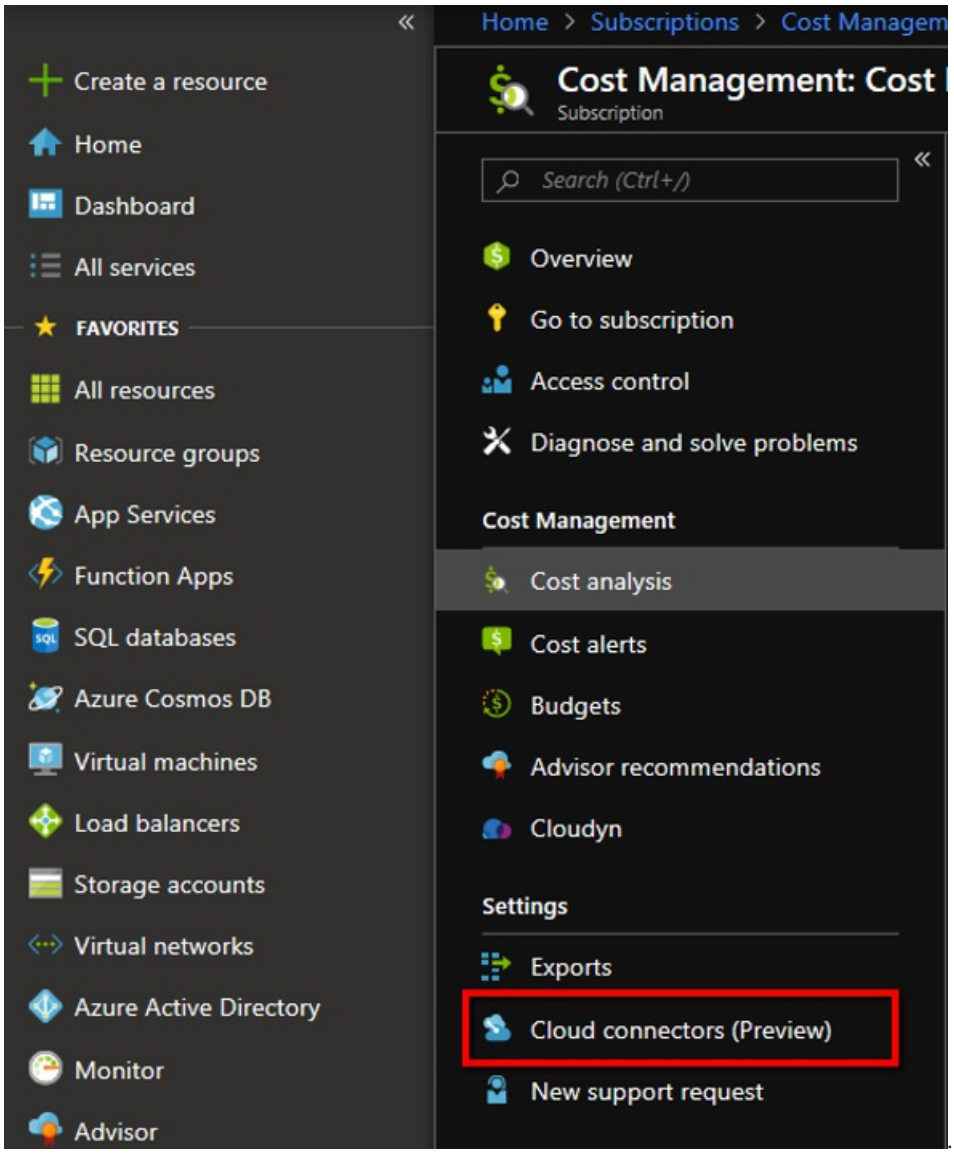
The policy JSON should resemble the following example. Replace *bucketname* with the name of your S3 bucket.

```
{
    "Version": "2012-10-17",
    "Statement": [
        {
            "Sid": "VisualEditor0",
            "Effect": "Allow",
            "Action": [
"organizations:ListAccounts",
          "ce:*",
          "cur:DescribeReportDefinitions"
            ],
            "Resource": "*"
        },
        {
            "Sid": "VisualEditor1",
            "Effect": "Allow",
            "Action": [
                "s3:GetObject",
                "s3:ListBucket"
            ],
            "Resource": [
                "arn:aws:s3:::bucketname",
                "arn:aws:s3:::bucketname/*"
            ]
        }
    ]
}
```

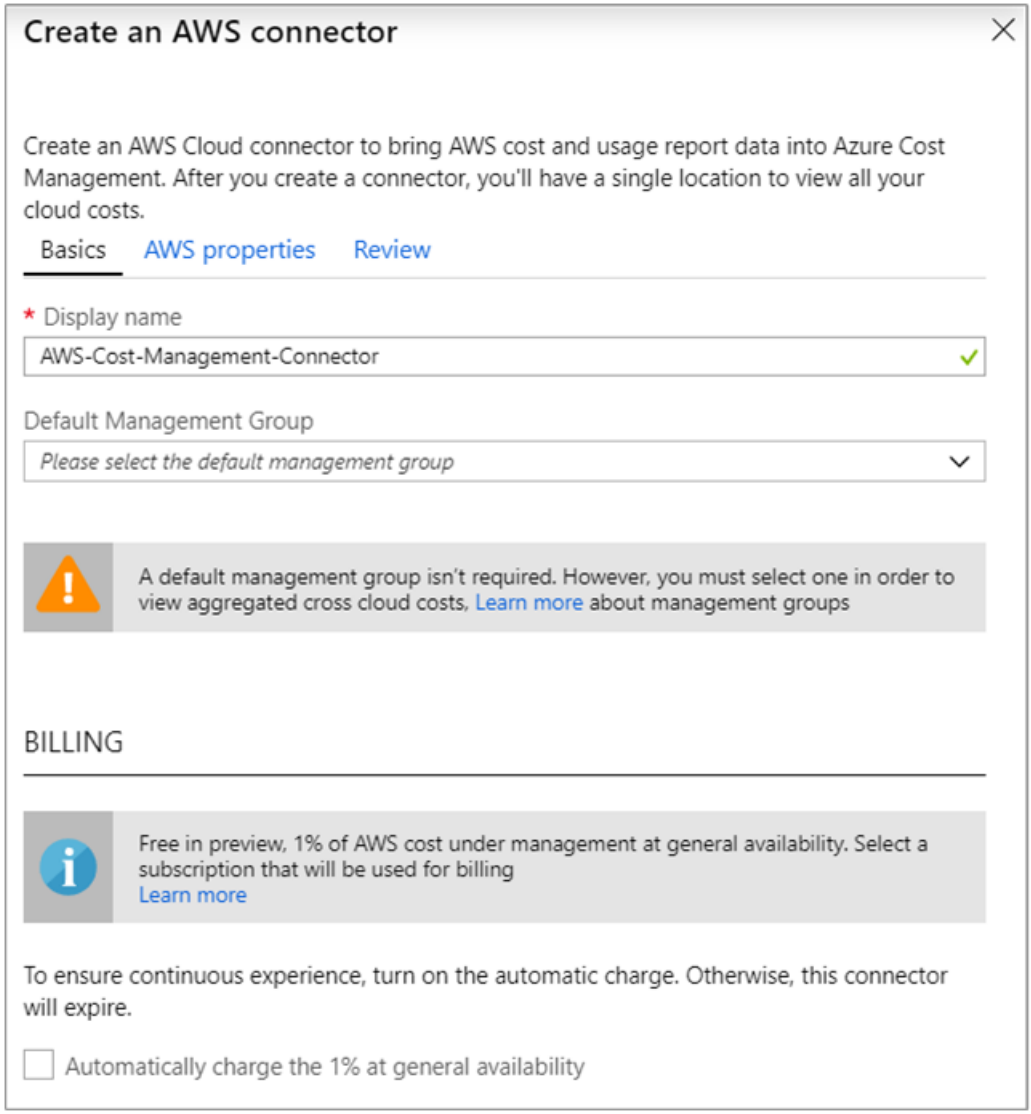
Set up a new AWS connector in Azure

Use the following information to create an AWS connector and start monitoring your AWS costs:

1. Sign in to the Azure portal.
2. Go to **Cost Management + Billing** > **Cost Management**.
3. Under **Settings**, select **Cloud connectors (Preview)**.



4. Select **+Add** at the top of the page to create a connector.
5. On the **Create an AWS connector** page, in **Display name**, enter a name for your connector.



6. Optionally, select the default management group. It will store all discovered linked accounts. You can set it up later.
7. In the **Billing** section, select **Automatically charge the 1% at general availability** if you want to ensure continuous operation when the preview expires. If you select the automatic option, you must select a billing subscription.
8. For **Role ARN**, enter the value that you used when you set up the role in AWS.
9. For **External ID**, enter the value that you used when you set up the role in AWS.
10. For **Report Name**, enter the name that you created in AWS.
11. Select **Next** and then select **Create**.

It might take a few hours for the new AWS scopes, AWS consolidated account, AWS linked accounts, and their cost data to appear.

After you create the connector, we recommend that you assign access control to it. Users are assigned permissions to the newly discovered scopes: AWS consolidated account and AWS linked accounts. The user who creates the connector is the owner of the connector, the consolidated account, and all linked accounts.

Assigning connector permissions to users after discovery occurs doesn't assign permissions to the existing AWS scopes. Instead, only new linked accounts are assigned permissions.

Take additional steps

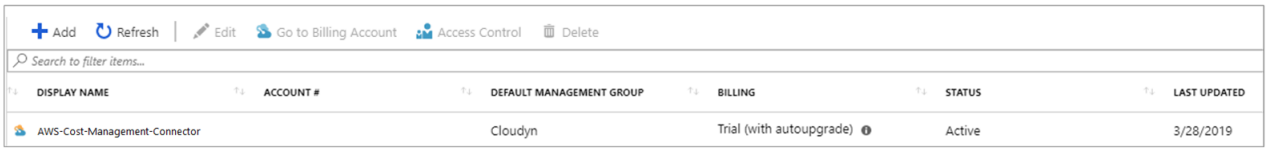
- Set up management groups, if you haven't already.
- Check that new scopes are added to your scope picker. Select **Refresh** to view the latest data.

- On the **Cloud connectors** page, select your connector and select **Go to billing account** to assign the linked account to management groups.

Manage cloud connectors

When you select a connector on the **Cloud connectors** page, you can:

- Select **Go to Billing Account** to view information for the AWS consolidated account.
- Select **Access Control** to manage the role assignment for the connector.
- Select **Edit** to update the connector. You can't change the AWS account number, because it appears in the role ARN. But you can create a new connector.
- Select **Verify** to rerun the verification test to make sure that Cost Management can collect data by using the connector settings.



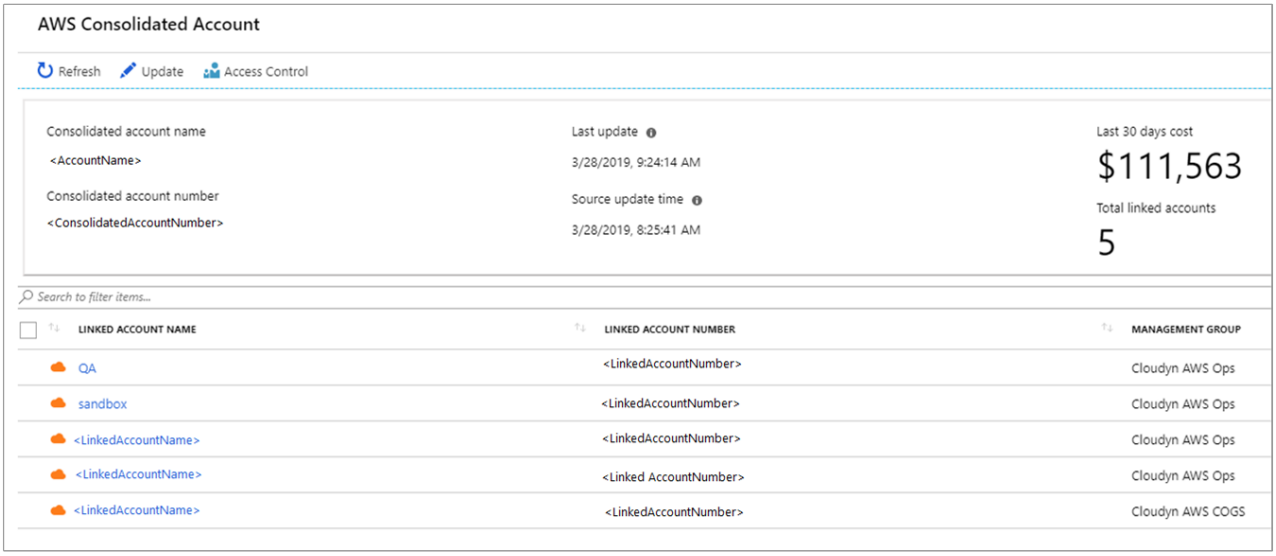
Set up Azure management groups

Place your Azure subscriptions and AWS linked accounts in the same management group to create a single location where you can see cross-cloud provider information. If you haven't already configured your Azure environment with management groups, see Initial setup of management groups.

If you want to separate costs, you can create a management group that holds just AWS linked accounts.

Set up an AWS consolidated account

The AWS consolidated account combines billing and payment for multiple AWS accounts. It also acts as an AWS linked account.



From the page, you can:

- Select **Update** to bulk update the association of AWS linked accounts with a management group.
- Select **Access Control** to set the role assignment for the scope.

Permissions for an AWS consolidated account

By default, permissions for an AWS consolidated account are set upon the account's creation, based on the AWS connector permissions. The connector creator is the owner.

You manage the access level by using the **Access Level** page of the AWS consolidated account. However, AWS linked accounts don't inherit permissions to the AWS consolidated account.

Set up an AWS linked account

The AWS linked account is where AWS resources are created and managed. A linked account also acts as a security boundary.

From this page, you can:

- Select **Update** to update the association of an AWS linked account with a management group.
- Select **Access Control** to set a role assignment for the scope.

Permissions for an AWS linked account

By default, permissions for an AWS linked account are set upon creation, based on the AWS connector permissions. The connector creator is the owner. You manage the access level by using the **Access Level** page of the AWS linked account. AWS linked accounts don't inherit permissions from an AWS consolidated account.

AWS linked accounts always inherit permissions from the management group that they belong to.

Next steps

- Now that you've set up and configured AWS Cost and Usage report integration, continue to Manage AWS costs and usage.
- If you're unfamiliar with cost analysis, see Explore and analyze costs with cost analysis quickstart.
- If you're unfamiliar with budgets in Azure, see Create and manage Azure budgets.

Manage AWS costs and usage in Azure

1/14/2020 • 6 minutes to read • Edit Online

After you've set up and configured AWS Cost and Usage report integration for Azure Cost Management, you're ready to start managing your AWS costs and usage. This article helps you understand how to use cost analysis and budgets in Cost Management to manage your AWS costs and usage.

If you haven't already configured the integration, see Set up and configure AWS Usage report integration.

Before you begin: If you're unfamiliar with cost analysis, see the Explore and analyze costs with Cost analysis quickstart. And, if you're unfamiliar with budgets in Azure, see the Create and manage Azure budgets tutorial.

View AWS costs in cost analysis

AWS costs are available in Cost Analysis in the following scopes:

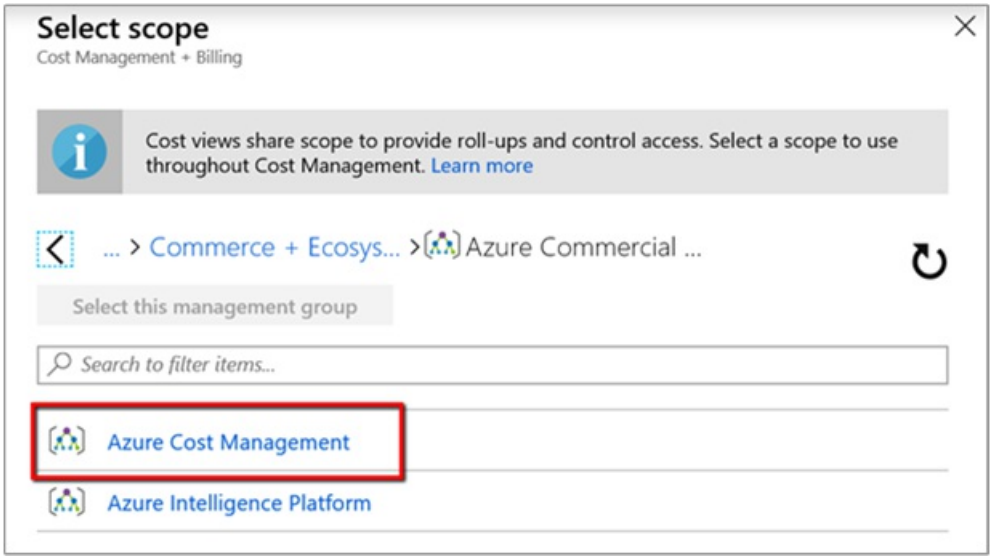
- AWS linked accounts under a management group
- AWS linked account costs
- AWS consolidated account costs

The next sections describe how to use the scopes so that you see cost and usage data for each one.

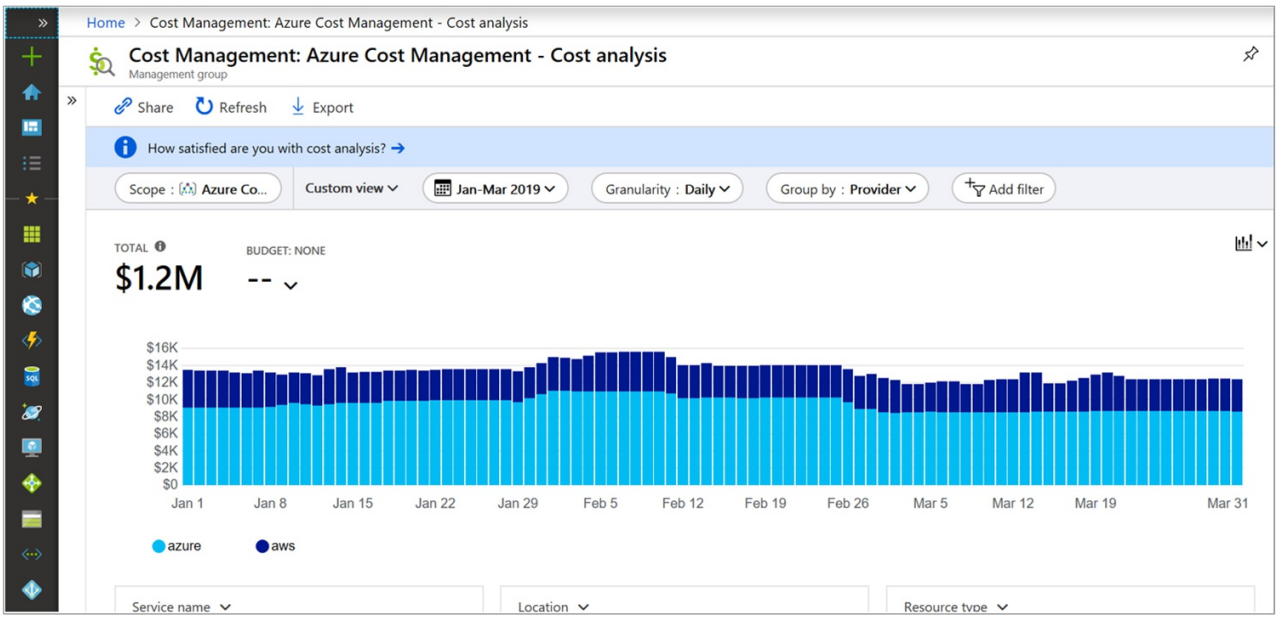
View AWS linked accounts under a management group

Viewing costs by using the management group scope is the only way to see aggregated costs coming from different subscriptions and linked accounts. Using a management group provides a cross-cloud view.

In cost analysis, open the scope picker and select the management group that holds your AWS linked accounts. Here's an example image in the Azure portal:



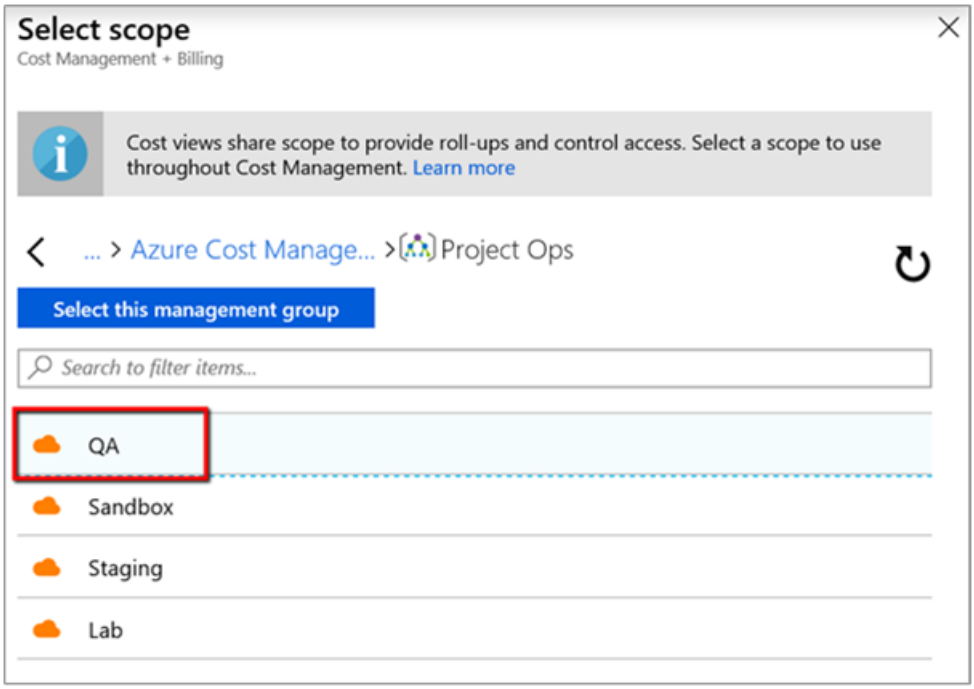
Here's an example showing the management group cost in cost analysis, grouped by Provider (Azure and AWS).



View AWS linked account costs

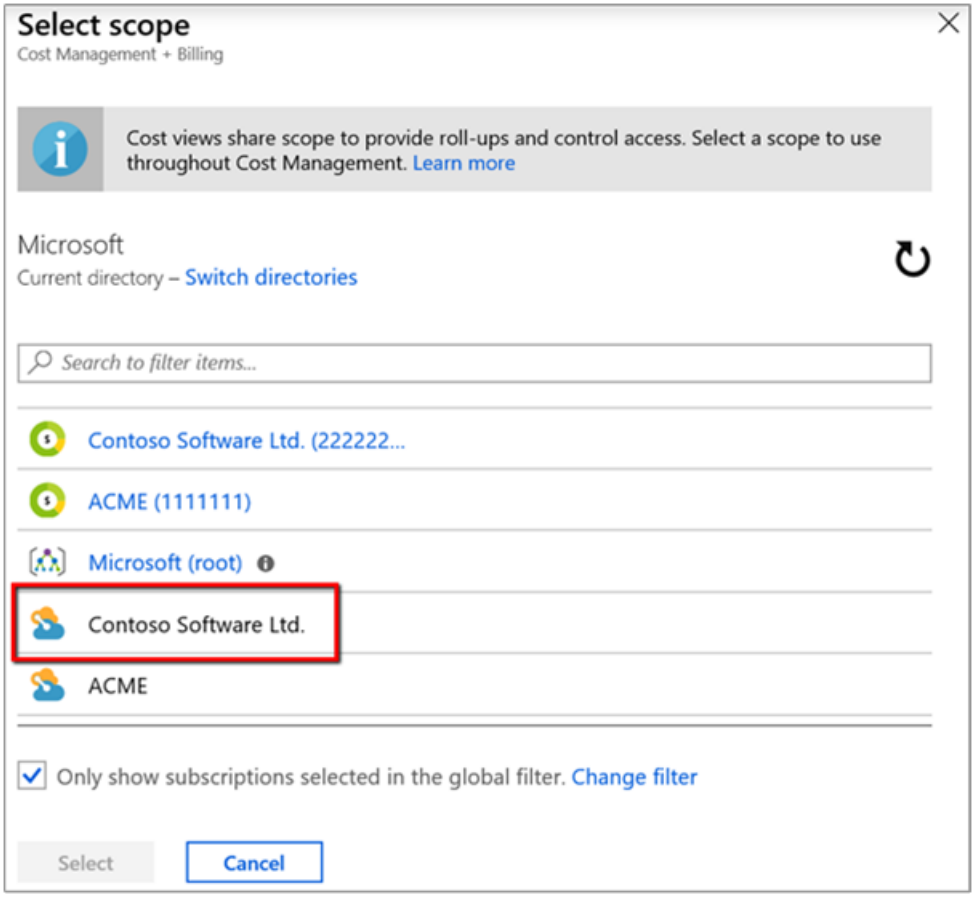
To view AWS link account costs, open the scope picker and select the AWS linked account. Note that linked accounts are associated to a management group, as defined in the AWS connector.

Here's an example that shows selecting an AWS linked account scope.

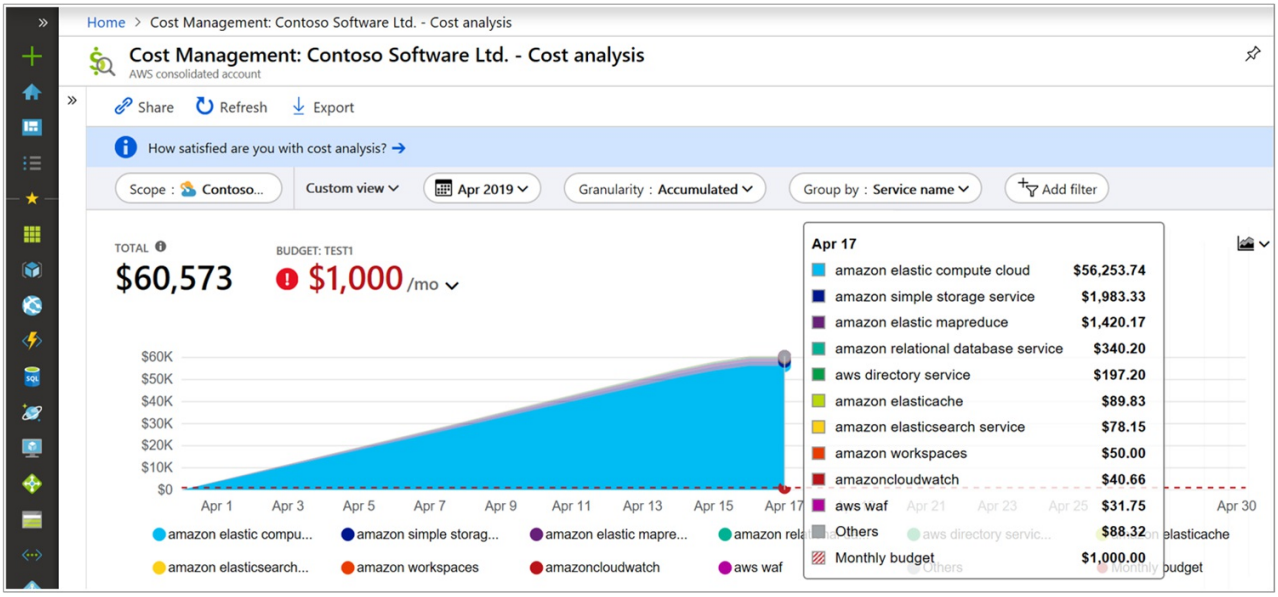


View AWS consolidated account costs

To view AWS consolidated account costs, open the scope picker and select the AWS consolidated account. Here's an example that shows selecting an AWS consolidated account scope.



This scope provides an aggregated view of all AWS linked accounts associated with the AWS consolidated account. Here's an example showing costs for an AWS consolidated account, grouped by service name.



Dimensions available for filtering and grouping

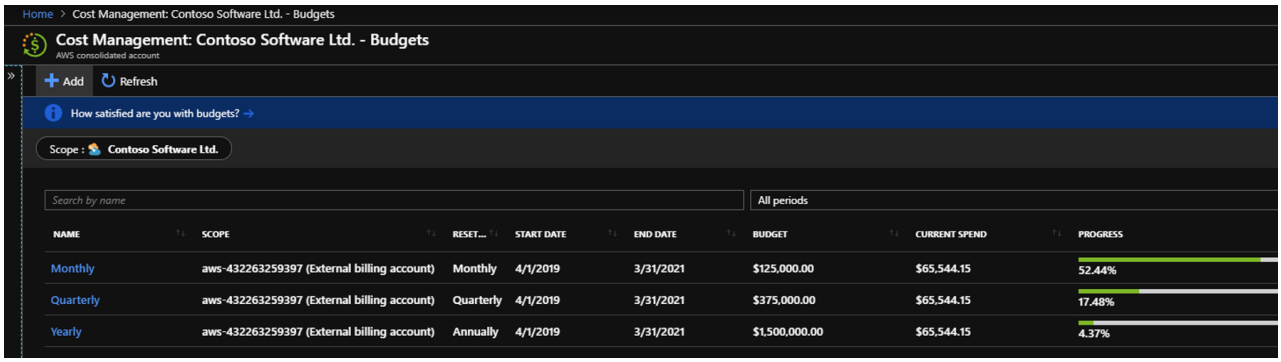
The following table describes dimensions available to group and filter by in cost analysis.

DIMENSION	AMAZON CUR HEADER	SCOPES	COMMENTS
Availability zone	lineitem/AvailabilityZone	All	
Location	product/Region	All	
Meter		All	

DIMENSION	AMAZON CUR HEADER	SCOPES	COMMENTS
Meter category	lineItem/ProductCode	All	
Meter subcategory	lineitem/UsageType	All	
Operation	lineItem/Operation	All	
Resource	lineItem/ResourceId	All	
Resource type	product/instanceType	All	If product/instanceType is null, lineItem/UsageType is used.
ResourceGuid	N/A	All	Azure meter GUID.
Service name	product/ProductName	All	If product/ProductName is null, lineItem/ProductCode is used.
Service tier			
Subscription ID	lineItem/UsageAccountId	Consolidated account and management group	
Subscription name	N/A	Consolidated account and management group	Account names are collected using the AWS Organization API.
Tag	resourceTags/*	All	The *user:* prefix is removed from user-defined tags to allow cross-cloud tags. The *aws:* prefix is left intact.
Billing account ID	bill/PayerAccountId	Management group	
Billing account name	N/A	Management group	Account names are collected using the AWS Organization API.
Provider	N/A	Management group	Either AWS or Azure.

Set budgets on AWS scopes

Use budgets to proactively manage costs and drive accountability in your organization. Budgets are set on the AWS consolidated account and AWS linked account scopes. Here's an example of budgets for an AWS consolidated account shown in Cost Management:



AWS data collection process

After setting up the AWS connector, data collection and discovery processes start. It might take few hours to collect all usage data. The duration depends on:

- The time needed to process the CUR files that are in the AWS S3 bucket.
- The time needed to create the AWS Consolidated account and AWS Linked account scopes.
- The time and frequency of AWS are writing the Cost and Usage Report files in the S3 bucket

AWS integration pricing

Each AWS connector gets 90 free trial days. During Public Preview, there is no charge.

The list price is 1% of your AWS monthly costs. Each month you are charged based on your invoiced costs from the previous month.

Accessing AWS APIs may incur additional costs.

AWS integration limitations

- Cost Management doesn't support cost reports that contain multiple currency types. An error message is shown if you select a scope that has multiple currencies.
- Cloud connectors don't support AWS GovCloud (US), AWS Gov, or AWS China.
- Cost Management shows AWS *usage costs* only. Tax, support, refunds, RI, credits or any other charge types aren't supported yet.

Troubleshooting AWS integration

Use the following troubleshooting information to resolve common problems.

No permission to AWS Linked accounts

Error code: *Unauthorized*

There are two ways to get permissions to access AWS linked accounts costs:

- Get access to the management group that has the AWS Linked accounts.
- Have someone give you permission to the AWS linked account.

By default, the AWS connector creator is the owner of all the objects that the connector created. Including, the AWS consolidated account and the AWS linked account.

In order to be able to Verify the connector settings you will need at least a contributor role, reader can not Verify connector settings

Collection failed with AssumeRole

Error code: *FailedToAssumeRole*

This error means that Cost Management is unable to call the AWS AssumeRole API. This problem can happen because of an issue with the role definition. Verify that the following conditions are true:

- The external ID is the same as the one in the role definition and the connector definition.
- The role type is set to **Another AWS account Belonging to you or 3rd party.**
- The **Require MFA** choice is cleared.
- The trusted AWS account in the AWS Role is *432263259397*.

Collection failed with Access Denied - CUR report definitions

Error code: *AccessDeniedReportDefinitions*

This error means that Cost Management is unable to see the Cost and Usage report definitions. This permission is used to validate that the CUR is defined as expected by Azure Cost Management. See Create a Cost and Usage report in AWS.

Collection failed with Access Denied - List reports

Error code: *AccessDeniedListReports*

This error means that Cost Management is unable to list the object in the S3 bucket where the CUR is located. AWS IAM policy requires a permission on the bucket and on the objects in the bucket. See Create a role and policy in AWS.

Collection failed with Access Denied - Download report

Error code: *AccessDeniedDownloadReport*

This error means that Cost Management is unable to access and download the CUR files stored in the Amazon S3 bucket. Make sure that the AWS JSON policy attached to the role resembles the example shown at the bottom of the Create a role and policy in AWS section.

Collection failed since we did not find the Cost and Usage Report

Error code: *FailedToFindReport*

This error means that Cost Management can't find the Cost and Usage report that was defined in the connector. Make sure it isn't deleted and that the AWS JSON policy attached to the role resembles the example shown at the bottom of the Create a role and policy in AWS section.

Unable to create or verify connector due to Cost and Usage Report definitions mismatch

Error code: *ReportIsNotValid*

This error relates to the definition of AWS Cost and Usage Report, we require specific settings for this report, see the requirements in Create a Cost and Usage report in AWS

Next steps

- If you haven't already configured your Azure environment with management groups, see Initial setup of management groups.

Get started with Azure Cost Management for partners

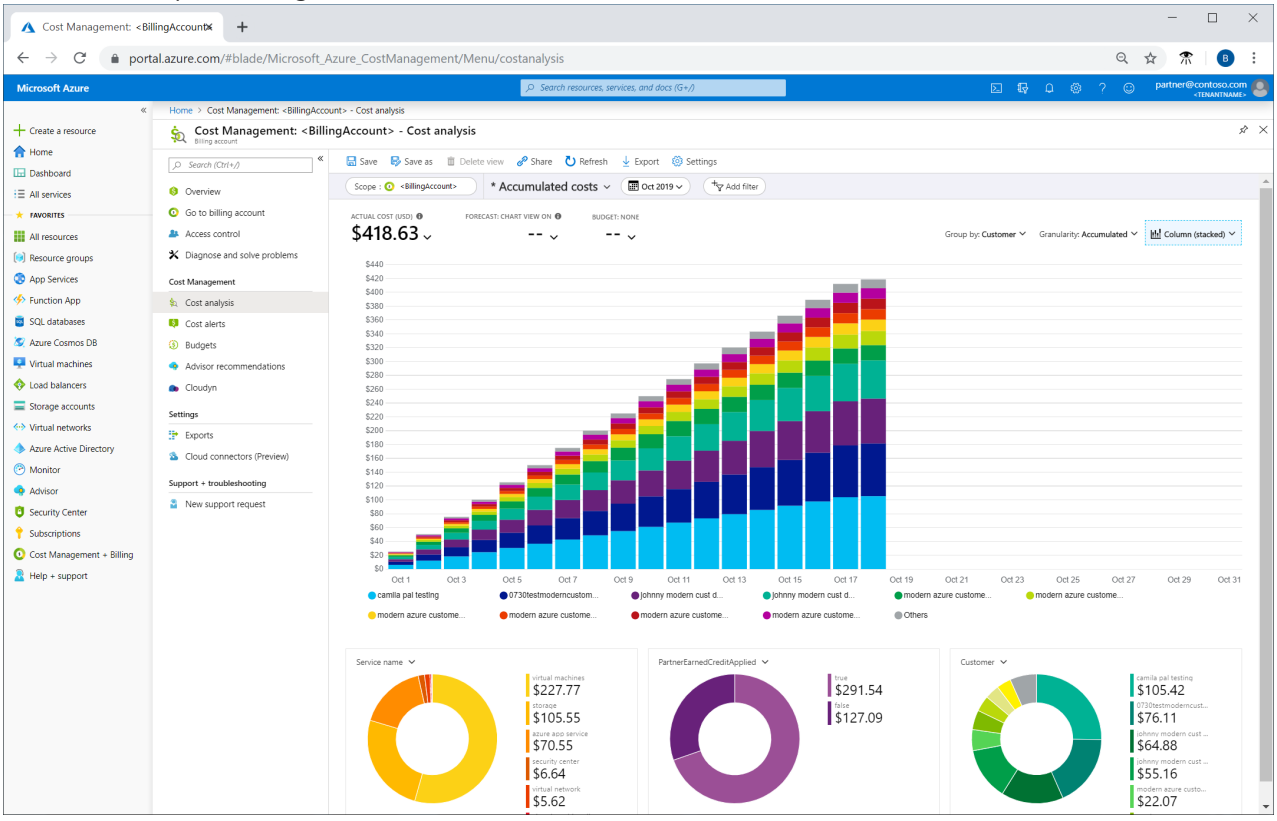
1/21/2020 • 20 minutes to read • Edit Online

Azure Cost Management is natively available for partners who have onboarded their customers to a Microsoft Customer Agreement and have purchased an Azure Plan. This article explains how partners use Azure Cost Management features to view costs for subscriptions in the Azure Plan. It also describes how partners enable Cost Management access for their customers. Customers can use Cost Management features when enabled by their CSP partner.

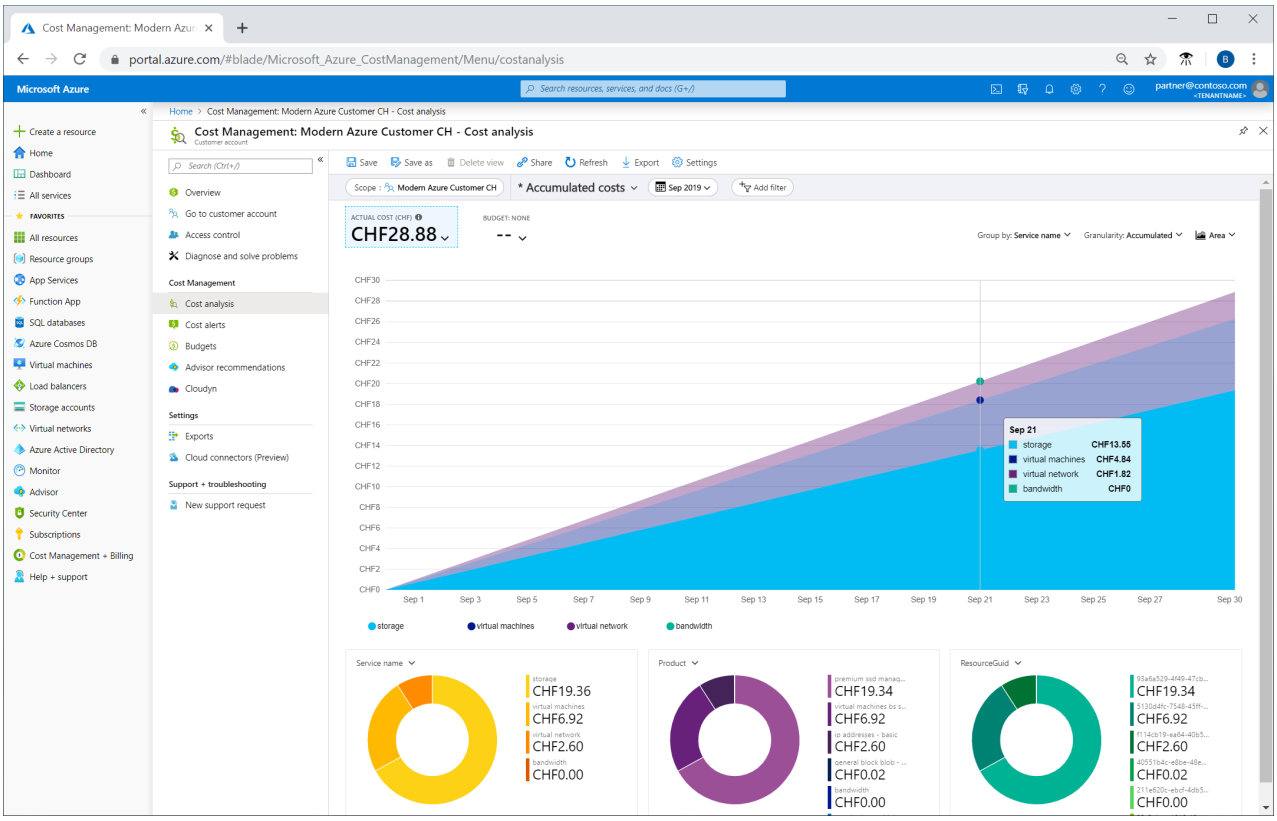
CSP partners use Cost Management to:

- Understand invoiced costs and associate the costs to the customer, subscriptions, resource groups, and services.
- Get an intuitive view of Azure costs in cost analysis with capabilities to analyze costs by customer, subscription, resource group, resource, meter, service, and many other dimensions.
- View resource costs that have Partner Earned Credit (PEC) applied in Cost Analysis.
- Set up notifications and automation using programmatic budgets and alerts when costs exceed budgets.
- Enable the Azure Resource Manager policy that provides customer access to Cost Management data. Customers can then view consumption cost data for their subscriptions using pay-as-you-go rates.
- Export their cost and usage data to a storage blob with a pay-as-you-go subscription.

Here's an example showing costs for all customers.



Here's an example showing costs for a single customer.



All functionality available in Azure Cost Management is also available with REST APIs. Use the APIs to automate cost management tasks.

Prerequisites

As a partner, Azure Cost Management is natively available only for subscriptions that are on the Azure plan.

To enable Azure Cost Management in the Azure portal, you must have confirmed customer acceptance of the Microsoft Customer Agreement (on behalf of the customer) and transitioned the customer to the Azure Plan. Only the costs for subscriptions that are transitioned to the Azure plan are available in Azure Cost Management.

Azure Cost Management requires read access to your billing account or subscription.

For more information about enabling and assigning access to Azure Cost Management for a billing account, see Assign users roles and permissions. The **Global admin** and **Admin agent** roles can manage costs for a billing account.

To access Azure Cost Management at the subscription scope, any user with RBAC access to a subscription can view costs at retail (pay-as-you-go) rates. However the cost visibility policy for the customer tenant must be enabled. To view a full list of supported account types, see Understand Cost Management data.

How Cost Management uses scopes

Scopes are where you manage billing data, have roles specific to payments, view invoices, and conduct general account management. Billing and account roles are managed separately from scopes used for resource management, which use RBAC. To clearly distinguish the intent of the separate scopes, including the access control differences, they are referred to as billing scopes and RBAC scopes, respectively.

To understand billing scopes and RBAC scopes and how cost management works with scopes, see Understand and work with scopes.

Manage costs with partner tenant billing scopes

After you've onboarded your customers to a Microsoft Customer Agreement, the following *billing scopes* are

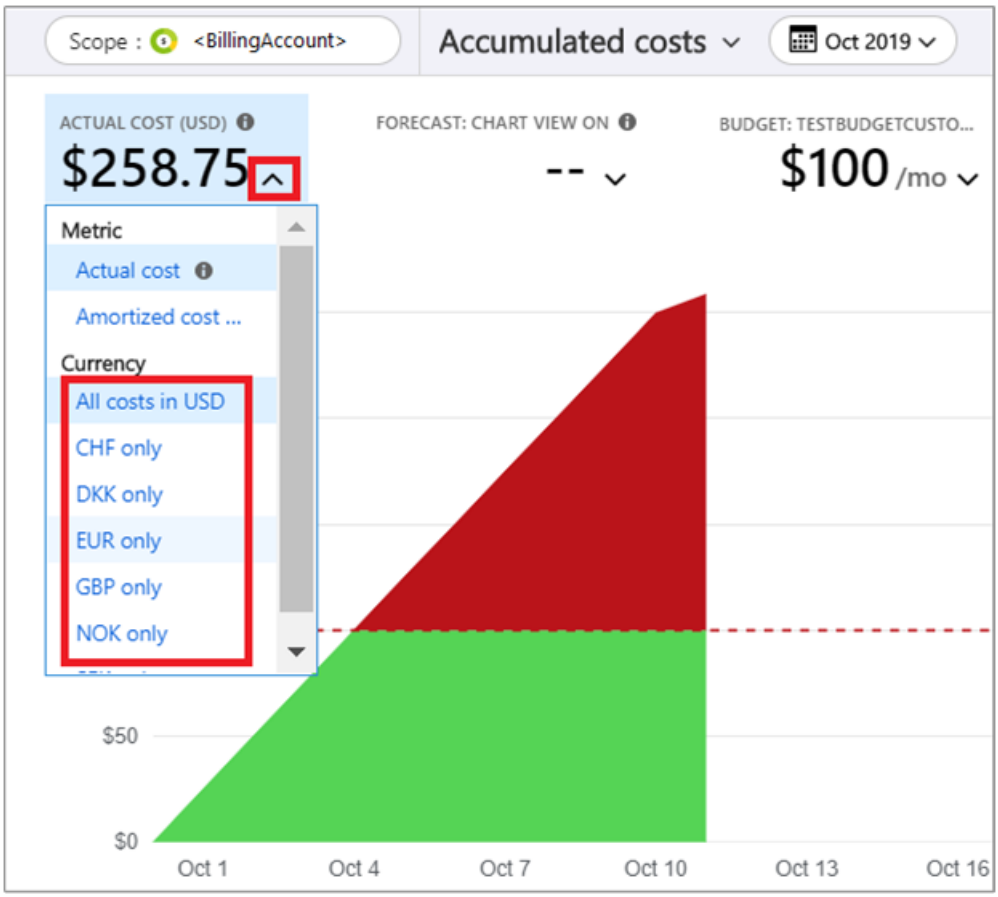
available in your tenant. Use the scopes to manage costs in Cost Management.

Billing account scope

Use the billing account scope to view pre-tax costs across all your customers and billing profiles. Invoice costs are only shown for customer's consumption-based products on the Microsoft Customer Agreement. However, invoice costs are shown for purchased-based products for customers on both the Microsoft Customer Agreement and the CSP offer. Currently, the default currency to view costs in the scope is US dollars. Budgets set for the scope are also in USD.

Regardless of different customer-billed currencies, partners use Billing account scope to set budgets and manage costs in USD across their customers, subscriptions, resources, and resource groups.

Partners also filter costs in a specific billing currency across customers in the cost analysis view. Select the **Actual cost** list to view costs in supported customer billing currencies.



Use the amortized cost view in billing scopes to view reserved instance amortized costs across a reservation term.

Billing profile scope

Use the billing profile scope to view pre-tax costs in the billing currency across all your customers for all products and subscriptions included in an invoice. You can filter costs in a billing profile for a specific invoice using the **InvoiceID** filter. The filter shows the consumption and product purchase costs for a specific invoice. You can also filter the costs for a specific customer on the invoice to see pre-tax costs.

After you onboard customers to a Microsoft Customer Agreement, you receive an invoice that includes all charges for all products (consumption, purchases, and entitlements) for these customers on the Microsoft Customer Agreement. When billed in the same currency, these invoices also include the charges for entitlement and purchased products such as SaaS, Azure Marketplace, and reservations for customers who are still in the CSP offer.

To help reconcile charges against the customer invoice, the billing profile scope enables you to see all costs that accrue for an invoice for your customers. Like the invoice, the scope shows costs for every customer in the new Microsoft Customer Agreement. The scope also shows every charge for customer entitlement products still in the

current CSP offer.

The billing profile and billing account scopes are the only applicable scopes that show charges for entitlement and purchase-based products like Azure Marketplace and reservation purchases.

Billing profiles define the subscriptions that are included in an invoice. Billing profiles are the functional equivalent of an enterprise agreement enrollment. A billing profile is the scope where invoices are generated.

Currently, the customer's billing currency is the default currency when viewing costs in the billing profile scope. Budgets set at the billing profile scope are in the billing currency.

Partners can use the scope to reconcile to invoices. And, they use the scope to set budgets in the billing currency for the following items:

- Specific filtered invoice
- Customer
- Subscription
- Resource group
- Resource
- Azure service
- Meter
- ResellerMPNID

Customer scope

Partners use the scope to manage costs associated to customers that are onboarded to the Microsoft Customer Agreement. The scope allows partners to view pre-tax costs for a specific customer. You can also filter the pre-tax costs for a specific subscription, resource group, or resource.

The customer scope doesn't include customers who are on the current CSP offer. The scope only includes customers who have a Microsoft Customer Agreement. Entitlement costs, not Azure usage, for current CSP offer customers are available at the billing account and billing profile scopes when you apply the customer filter.

Partner access to billing scopes in Cost Management

Only the users with **Global admin** and **Admin agent** roles can manage and view costs for billing accounts, billing profiles, and customers directly in the partner's Azure tenant. For more information about partner center roles, see Assign users roles and permissions.

Enable cost management in the customer tenant

Partners may enable access to Cost Management after customers are onboarded to a Microsoft Customer Agreement. Then partners can then enable a policy allowing customers to view their costs computed at pay-as-you-go retail rates. Costs are shown in the customer's billing currency for their consumed usage at RBAC subscription and resource groups scopes.

When the policy for cost visibility is enabled by the partner, any user with Azure Resource Manager access to the subscription can manage and analyze costs at pay-as-you-go rates. Effectively, resellers and customers that have the appropriate RBAC access to the Azure subscriptions can view cost.

Regardless of the policy, partners can also view the costs if they have access to the subscription and resource group.

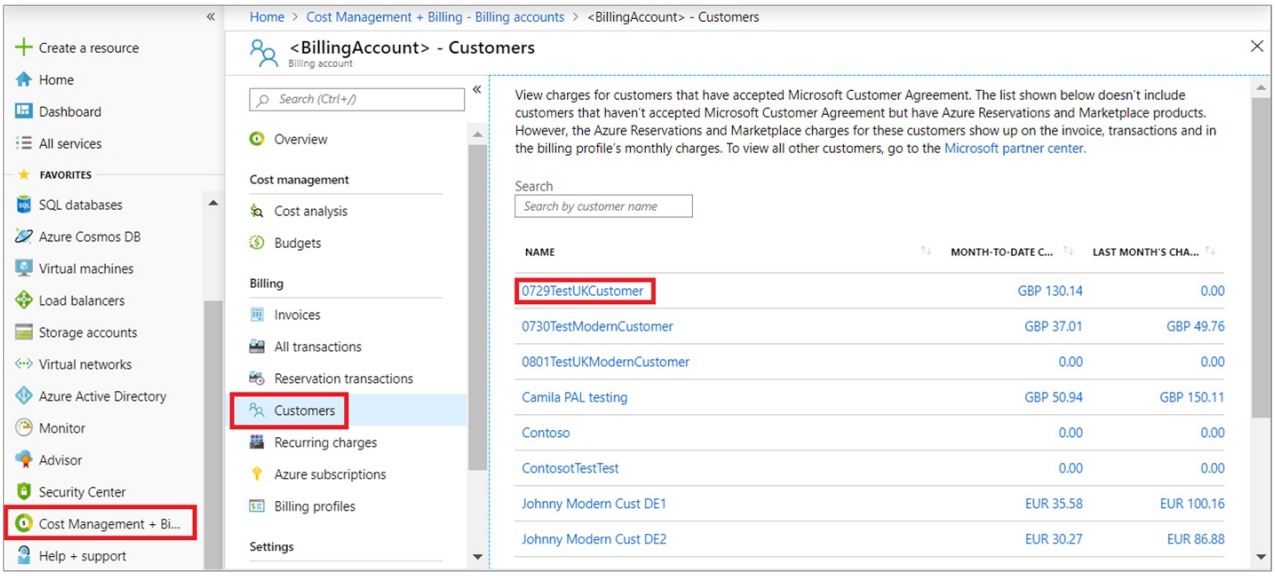
Enable the policy to view Azure usage charges

Partners use the following information to enable to the policy to view Azure usage charges for their customers.

In the Azure portal, sign in to the partner tenant and select **Cost Management + Billing**. Select the relevant

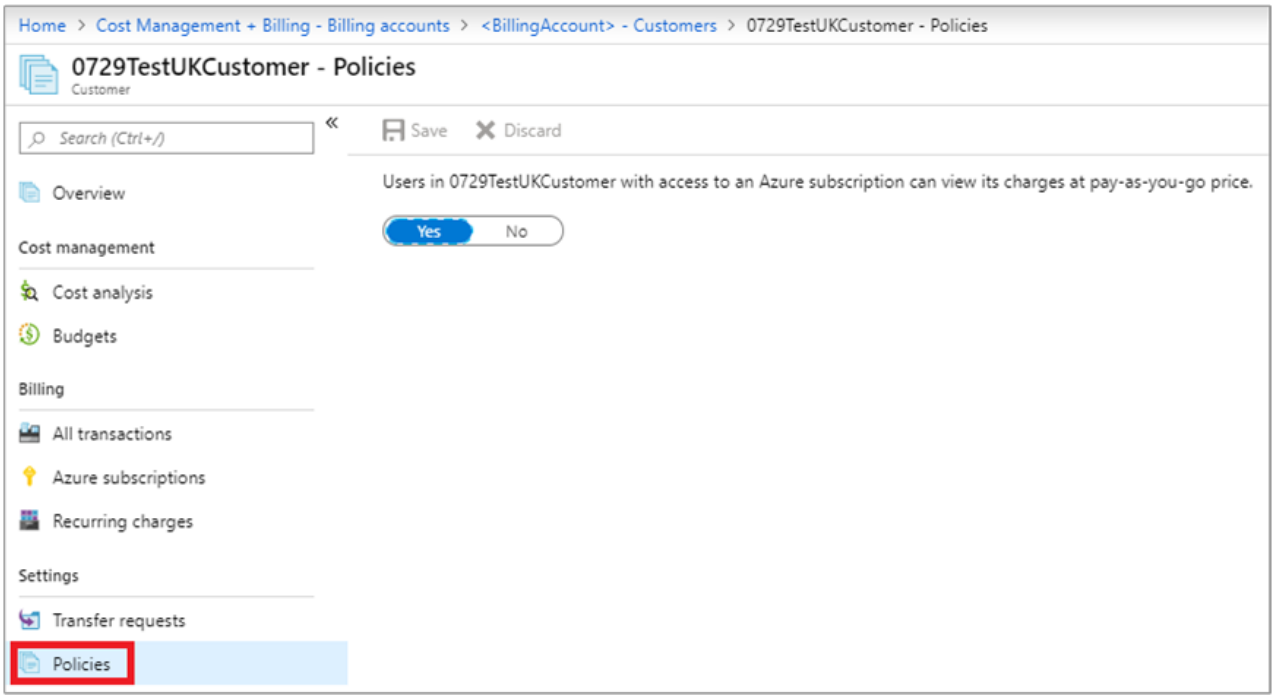
Microsoft Partner Agreement billing account, and then select **Customers**. The list of customers is associated with the billing account.

In the list of customers, select the customer that you want to allow to view costs.



Under **Settings**, select **Policies**.

The current cost visibility policy is shown for **Azure Usage** charges associated to the subscriptions for the selected customer.

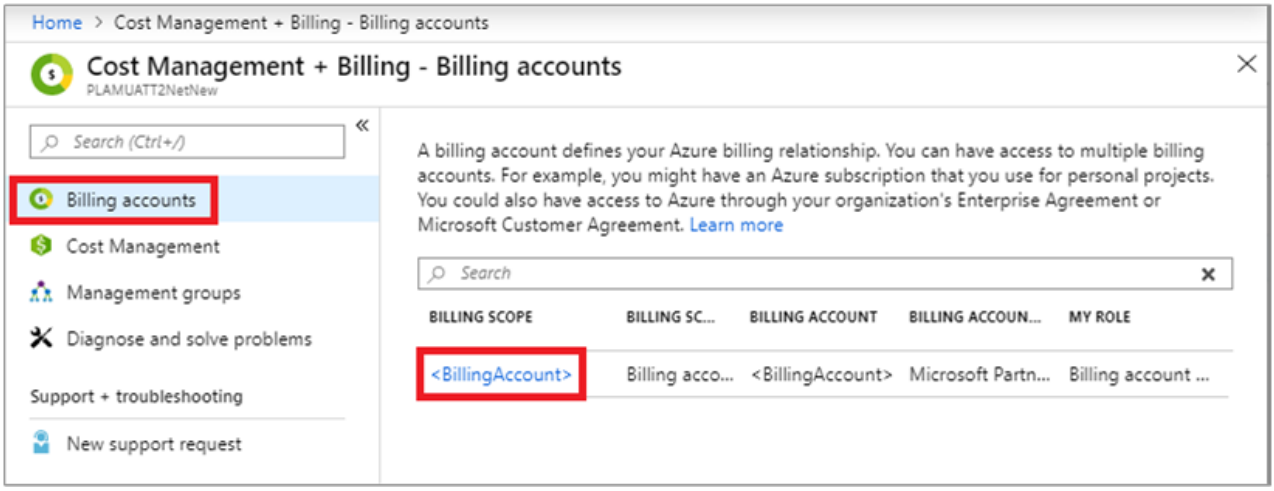


When the policy is set to **No**, Azure Cost Management isn't available for subscription users associated to the customer. Unless enabled by a partner, the cost visibility policy is disabled by default for all subscription users.

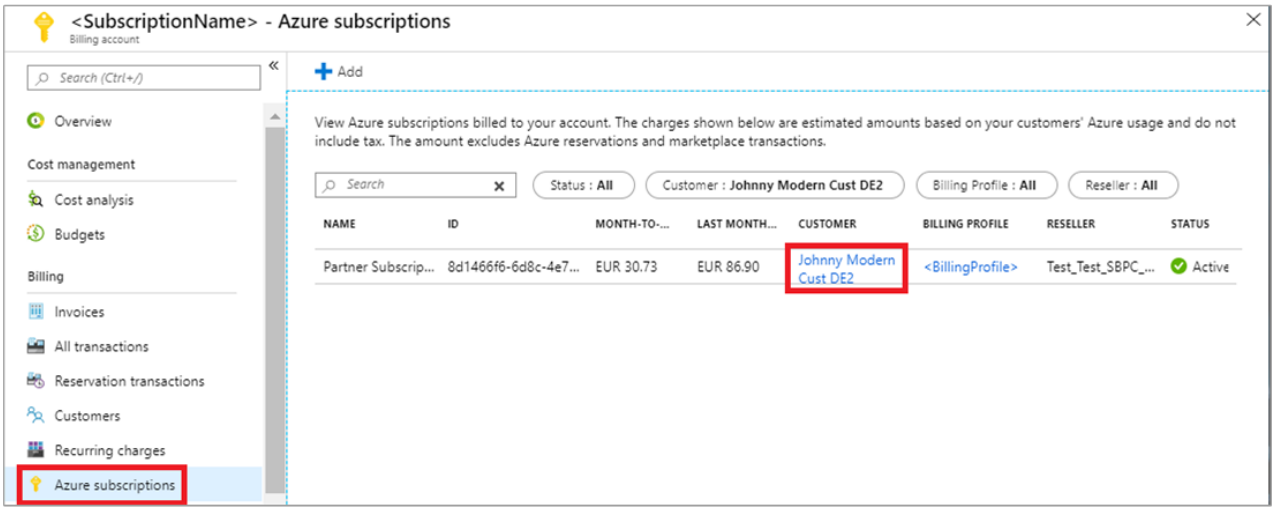
When the cost policy is set to **Yes**, subscription users associated to the customer tenant can see usage charges at pay-as-you go rates.

When the cost visibility policy is enabled, all services that have subscription usage show costs at pay-as-you-go rates. Reservation usage appears with zero charges for actual and amortized costs. Purchases and entitlements are not associated to a specific subscription. So, purchases aren't displayed at the subscription scope.

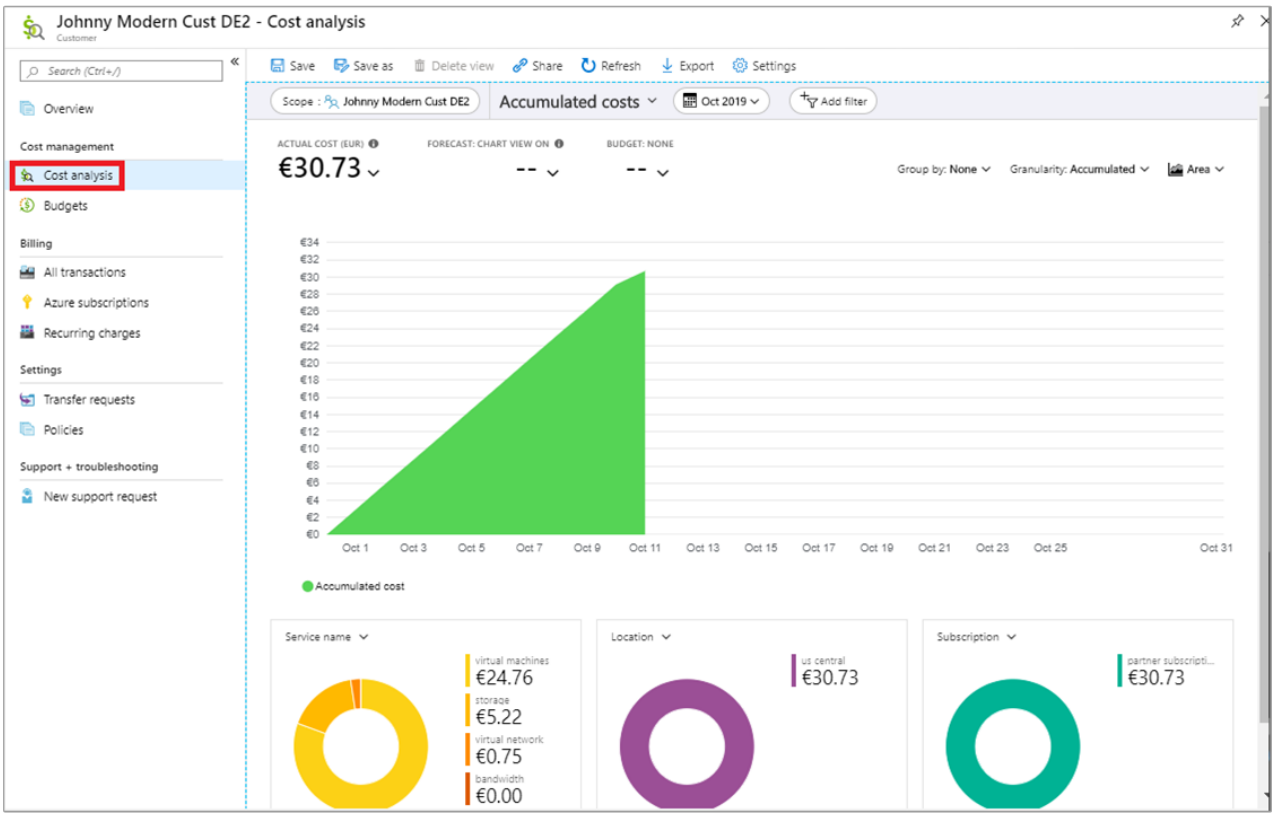
To view costs for the customer tenant, open **Cost Management + Billing** and select the relevant Microsoft Partner Agreement billing account.



Under **Billing**, select **Azure subscriptions**, and then select a customer.



select **Cost analysis** and start reviewing costs. Cost analysis, budgets, and alerts are available for the subscription and resource group RBAC scopes at pay-as-you-go rate-based costs.



Amortized views and actual costs for reserved instances in the RBAC scopes show zero charges. Reserved instance

costs are only showing in billing scopes where the purchases were made.

Analyze costs in cost analysis

Partners with access to billing scopes in the partner tenant can explore and analyze invoiced costs in cost analysis across customers for a specific customer or for an invoice. In the cost analysis view, you can also save views and export data to CSV and PNG files.

RBAC users with access to the subscription in the customer tenant can also analyze retail costs for subscriptions in the customer tenant, save views, and export data to CSV and PNG files.

You can use filter and group by features in cost analysis to analyze costs by multiple fields. Partner-specific fields are shown in the next section.

Data fields

The following data fields are found in usage detail files and Cost Management APIs. Where available, Partner Center equivalent information is shown. For the following bold fields, partners can use filter and group by features in cost analysis to analyze costs by multiple fields. Bold fields apply only to Microsoft Customer Agreements supported by partners.

FIELD NAME	DESCRIPTION	PARTNER CENTER EQUIVALENT
invoiceId	Invoice ID shown on the invoice for the specific transaction.	Invoice number where the transaction is shown.
previousInvoiceID	Reference to an original invoice there is a refund (negative cost). Populated only when there is a refund.	N/A
billingAccountName	Name of the billing account representing the partner. It accrues all costs across the customers who have onboarded to a Microsoft customer agreement and the CSP customers that have made entitlement purchases like SaaS, Azure Marketplace, and reservations.	N/A
billingAccountID	Identifier for the billing account representing the partner.	MCAPI Partner Commerce Root ID. Used in a request, but not included in a response.
billingProfileID	Identifier for the billing profile that groups costs across invoices in a single billing currency across the customers who have onboarded to a Microsoft customer agreement and the CSP customers that have made entitlement purchases like SaaS, Azure Marketplace, and reservations.	MCAPI Partner Billing Group ID. Used in a request, but not included in a response.

FIELD NAME	DESCRIPTION	PARTNER CENTER EQUIVALENT
billingProfileName	Name of the billing profile that groups costs across invoices in a single billing currency across the customers who have onboarded to a Microsoft customer agreement and the CSP customers that have made entitlement purchases like SaaS, Azure Marketplace, and reservations.	N/A
invoiceSectionName	Name of the project that is being charged in the invoice. Not applicable for Microsoft Customer Agreements onboarded by partners.	N/A
invoiceSectionID	Identifier of the project that is being charged in the invoice. Not applicable for Microsoft Customer Agreements onboarded by partners.	N/A
CustomerTenantID	Identifier of the Azure Active Directory tenant of the customer's subscription.	Customer's organizational ID - the customer's Azure Active Directory TenantID.
CustomerName	Name of the Azure Active Directory tenant for the customer's subscription.	Customer's organization name, as shown in the Partner Center. Important for reconciling the invoice with your system information.
CustomerTenantDomainName	Domain name for the Azure Active Directory tenant of the customer's subscription.	Customer Azure Active Directory tenant domain.
PartnerTenantID	Identifier for the partner's Azure Active Directory tenant.	Partner Azure Active Directory Tenant ID called as Partner ID, in GUID format.
PartnerName	Name of the partner Azure Active Directory tenant.	Partner name.
ResellerMPNID	MPNID for the reseller associated with the subscription.	MPN ID of the reseller on record for the subscription. Not available for current activity.
costCenter	Cost center associated to the subscription.	N/A
billingPeriodStartDate	Billing period start date, as shown on the invoice.	N/A
billingPeriodEndDate	Billing period end date, as shown on the invoice.	N/A

FIELD NAME	DESCRIPTION	PARTNER CENTER EQUIVALENT
servicePeriodStartDate	Start date for the rating period when the service usage was rated for charges. The prices for Azure services are determined for the rating period.	ChargeStartDate in Partner Center. Billing cycle start date, except when presenting dates of previously uncharged latent usage data from a previous billing cycle. The time is always the beginning of the day, 0:00.
servicePeriodEndDate	End date for the period when the service usage was rated for charges. The prices for Azure services are determined based on the rating period.	N/A
date	For Azure consumption data, it shows date of usage as rated. For reserved instance, it shows the purchased date. For recurring charges and one-time charges such as Marketplace and support, it shows the purchase date.	N/A
productID	Identifier for the product that has accrued charges by consumption or purchase. It is the concatenated key of productID and SKuID, as shown in the Partner Center.	The ID of the product.
product	Name of the product that has accrued charges by consumption or purchase, as shown on the invoice.	The product name in the catalog.
serviceFamily	Shows the service family for the product purchased or charged. For example, Storage or Compute.	N/A
productOrderID	The identifier of the asset or Azure plan name that the subscription belongs to. For example, Azure Plan.	N/A
productOrderName	The name of the Azure plan that the subscription belongs to. For example, Azure Plan.	N/A
consumedService	Consumed service (legacy taxonomy) as used in legacy EA usage details.	Service shown in the Partner Center. For example, Microsoft.Storage, Microsoft.Compute, and microsoft.operationalinsights.
meterID	Metered identifier for measured consumption.	The ID of the used meter.
meterName	Identifies the name of the meter for measured consumption.	The name of the consumed meter.
meterCategory	Identifies the top-level service for usage.	The top-level service for the usage.

FIELD NAME	DESCRIPTION	PARTNER CENTER EQUIVALENT
meterSubCategory	Defines the type or subcategory of Azure service that can affect the rate.	The type of Azure service that can affect the rate.
meterRegion	Identifies the location of the datacenter for certain services that are priced based on datacenter location.	The regional location of a data center for services, where applicable and populated.
subscription ID	Unique Microsoft generated identifier for the Azure subscription.	N/A
subscriptionName	Name of the Azure subscription.	N/A
Term	Displays the term for the validity of the offer. For example, reserved instances show 12 months of a yearly term of the reserved instance. For one-time purchases or recurring purchases, the term displays one month for SaaS, Azure Marketplace, and support. Not applicable for Azure consumption.	N/A
publisherType (firstParty, thirdPartyReseller, thirdPartyAgency)	Type of publisher that identifies the publisher as first party, third-party reseller, or third-party agency.	N/A
partNumber	Part number for the unused reserved instance and Azure Marketplace services.	N/A
publisherName	Name of the publisher of the service including Microsoft or third-party publishers.	The name of the product's publisher.
reservationId	Identifier for the reserved instance purchase.	N/A
reservationName	Name of the reserved instance.	N/A
reservationOrderId	OrderID for the reserved instance.	N/A
frequency	Payment frequency for a reserved instance.	N/A
resourceGroup	Name of the Azure resource group used for lifecycle resource management.	Name of the resource group.
instanceID (or) ResourceID	Identifier of the resource instance.	Shown as a ResourceURI that includes complete resource properties.
resourceLocation	Name of the resource location.	The location of the resource.
Location	Normalized location of the resource.	N/A

FIELD NAME	DESCRIPTION	PARTNER CENTER EQUIVALENT
effectivePrice	The effective unit price of the service, in pricing currency. Unique for a product, service family, meter, and offer. Used with pricing in the price sheet for the billing account. When there is tiered pricing or an included quantity, it shows the blended price for consumption.	The unit price after adjustments are made.
Quantity	Measured quantity purchased or consumed. The amount of the meter used during the billing period.	Number of units. Ensure it matches the information in your billing system during reconciliation.
unitOfMeasure	Identifies the unit that the service is charged in. For example, GB and hours.	Identifies the unit that the service is charged in. For example, GB, hours, and 10,000 s.
pricingCurrency	The currency defining the unit price.	The currency in the price list.
billingCurrency	The currency defining the billed cost.	The currency of the customer's geographic region.
chargeType	Defines the type of charge that the cost represents in Azure Cost Management like purchase and refund.	The type of charge or adjustment. Not available for current activity.
costinBillingCurrency	ExtendedCost or blended cost before tax in the billed currency.	N/A
costinPricingCurrency	ExtendedCost or blended cost before tax in pricing currency to correlate with prices.	N/A
costinUSD	Estimated ExtendedCost or blended cost before tax in USD.	N/A
paygCostInBillingCurrency	Shows costs if pricing is in retail prices. Shows pay-as-you-go prices in the billing currency. Available only at RBAC scopes.	N/A
paygCostInUSD	Shows costs if pricing is in retail prices. Shows pay-as-you-go prices in USD. Available only at RBAC scopes.	N/A
exchangeRate	Exchange rate used to convert from the pricing currency to the billing currency.	Referred to as PCToBCExchangeRate in the Partner Center. The pricing currency to billing currency exchange rate.
exchangeRateDate	The date for the exchange rate that's used to convert from the pricing currency to the billing currency.	Referred to as PCToBCExchangeRateDat in the Partner Center. The pricing currency to billing currency exchange rate date.
isAzureCreditEligible	Indicates whether the cost is eligible for payment by Azure credits.	N/A

FIELD NAME	DESCRIPTION	PARTNER CENTER EQUIVALENT
serviceInfo1	Legacy field that captures optional service-specific metadata.	Internal Azure service metadata.
serviceInfo2	Legacy field that captures optional service-specific metadata.	Service information. For example, an image type for a virtual machine and ISP name for ExpressRoute.
additionalInfo	Service-specific metadata. For example, an image type for a virtual machine.	Any additional information not covered in other columns. The service-specific metadata. For example, an image type for a virtual machine.
tags	Tag that you assign to the meter. Use tags to group billing records. For example, you can use tags to distribute costs by the department that uses the meter.	Tags added by the customer.
partnerEarnedCreditRate	Rate of discount applied if there is a partner earned credit (PEC) based on partner admin link access.	The rate of partner earned credit (PEC). For example, 0% or 15%.
partnerEarnedCreditApplied	Indicates whether the partner earned credit has been applied.	N/A

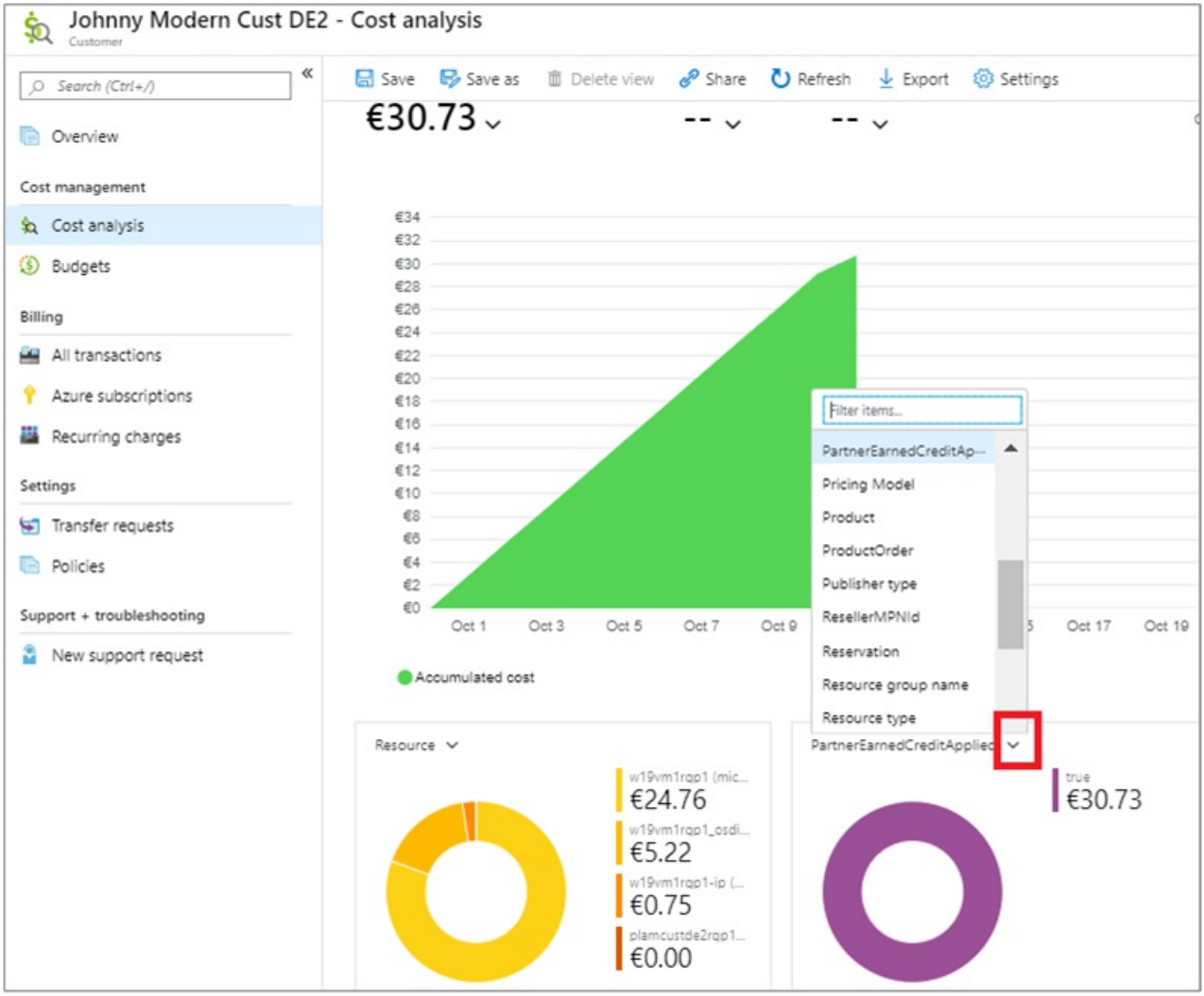
View Partner Earned Credit (PEC) resource costs

In Azure Cost Management, partners can use cost analysis to view costs that received the PEC benefits.

In the Azure portal, sign in to the partner tenant and select **Cost Management + Billing**. Under **Cost Management**, select **Cost analysis**.

The Cost analysis view shows costs of the billing account for the partner. Select the **Scope** as needed for the partner, a specific customer, or a billing profile to reconcile invoices.

In a donut chart, select the drop-down list and select **PartnerEarnedCreditApplied** to drill into PEC costs.

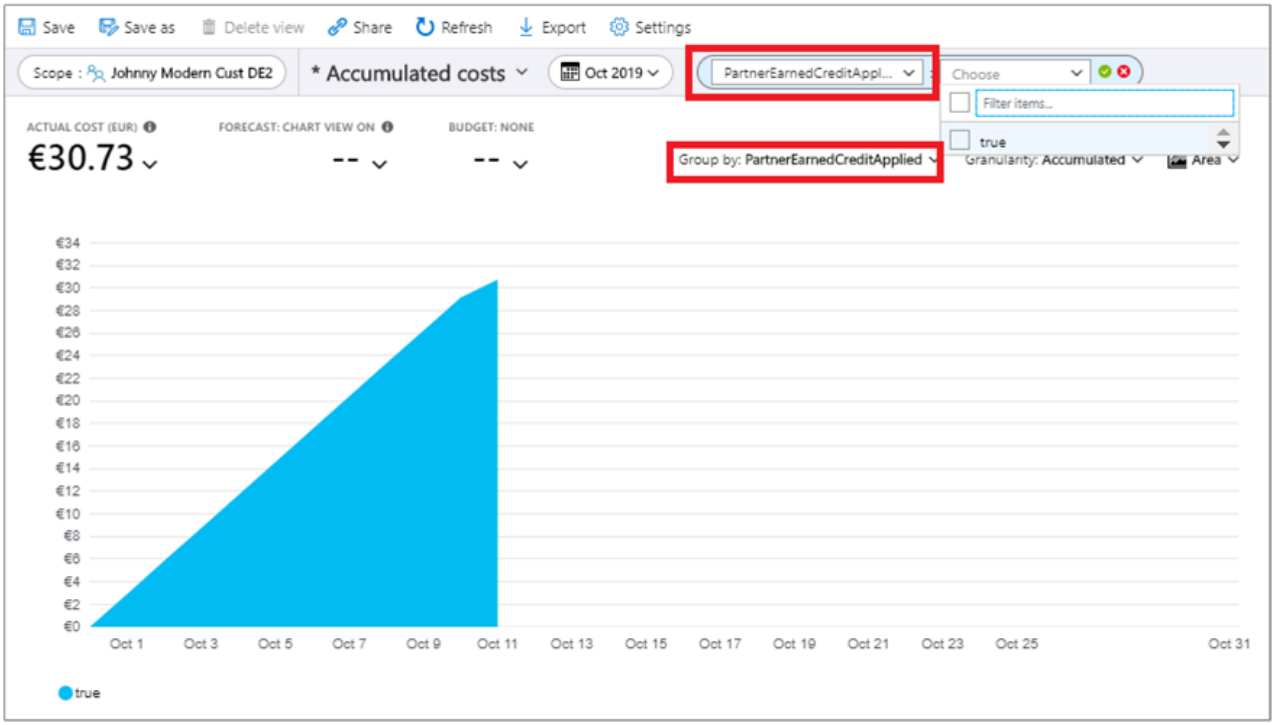


When the **PartnerEarnedCreditApplied** property is *True*, the associated cost has the benefit of the partner earned admin access.

When the **PartnerEarnedCreditApplied** property is *False*, the associated cost hasn't met the required eligibility for the credit. Or, the service purchased isn't eligible for partner earned credit.

Service usage data normally takes 8-24 hours to appear in Cost Management. For more information, see Usage data update frequency varies. PEC credits appear within 48 hours from time of access in Azure Cost Management.

You can also group and filter by the **PartnerEarnedCreditApplied** property using the **Group by** options. Use the options to examine costs that do and don't have PEC.



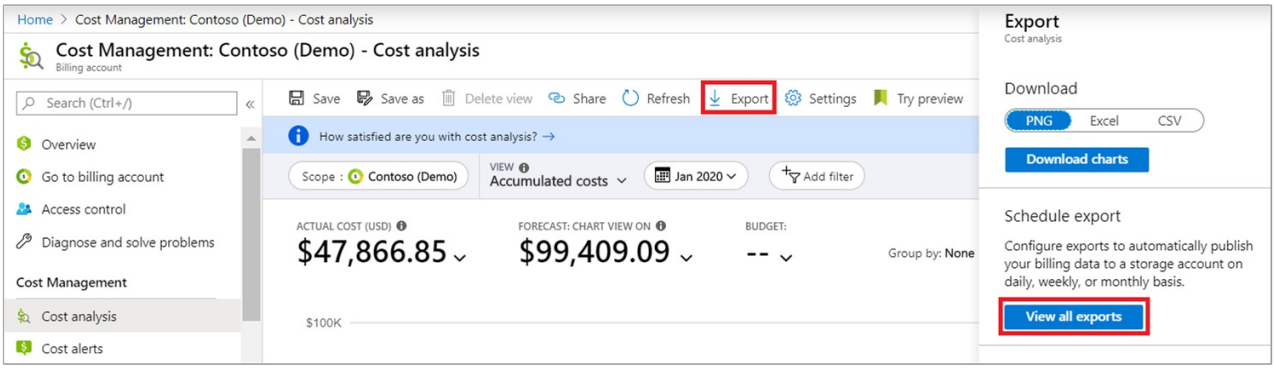
Export cost data to Azure Storage

Partners with access to billing scopes in a partner tenant can export their cost and usage data to an Azure Storage blob. The blob must be on a subscription in the partner tenant that's not a shared service subscription or a customer's subscription. To enable cost data export, we recommended that you set up an independent pay-as-you-go subscription in the partner tenant to host the exported cost data. The export storage account is created on the Azure Storage blob hosted in the pay-as-you-go subscription. Based on the scope where the partner creates the export, the associated data is exported to the storage account automatically on a recurring basis.

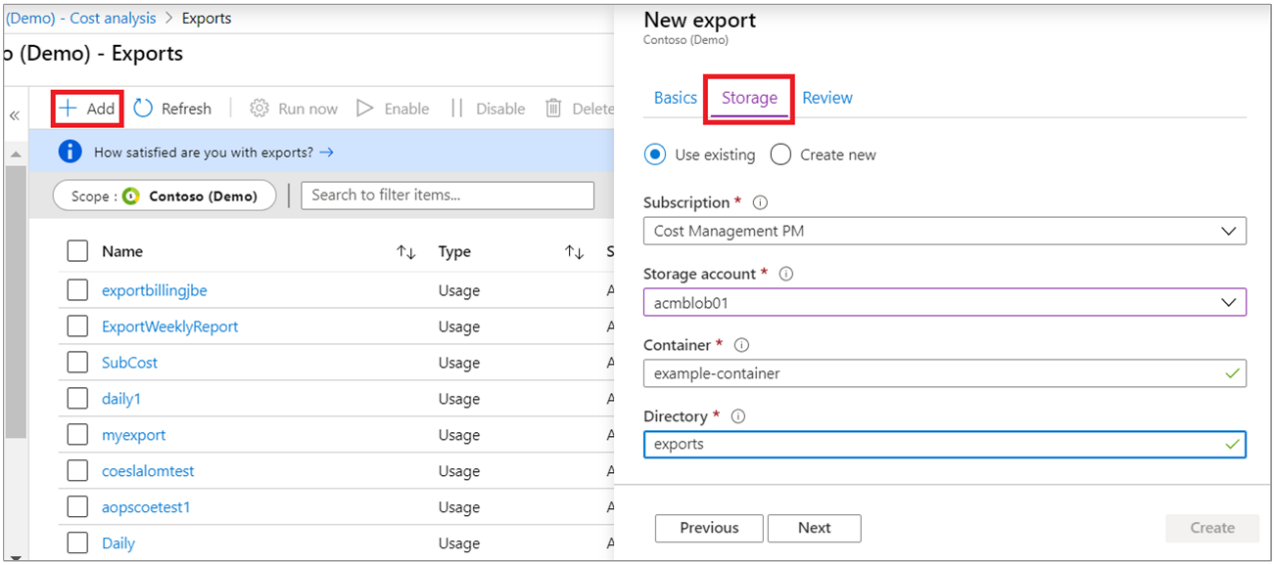
Users with RBAC access to the subscription can also export the cost data to an Azure storage blob hosted in any subscription in the customer tenant.

Create an export in a partner tenant or customer tenant

In the Azure portal, sign in to the partner tenant or customer tenant and select **Cost Management + Billing**. Select an appropriate scope, for example a Microsoft Partner Agreement billing account, and then select **Cost Analysis**. When the page loads, select **Export**. Select **View all exports** under Schedule Export.



Next, select **Add** and type the name and select an export type. Select the **Storage** tab and enter required information.



When you create an export in the partner tenant, select the pay-as-you-go subscription in the partner tenant. Create an Azure Storage account using that subscription.

For RBAC users in the customer tenant, select a subscription in the customer tenant. Create an Azure Storage account using the subscription.

Review the content and then select **Create** to schedule an export.

To verify data in the export list, select the storage account name. On the storage account page, select **Containers** and then select the container. Navigate to the corresponding folder and select the CSV file. Select **Download** to get the CSV file and open it. The exported data exported resembles cost data similar to usage details from the Azure portal.

A	B	C	D	E	F	G	H	I
InvoiceId	PreviousInv	BillingAcco	BillingAcco	BillingProfi	BillingProfi	InvoiceSect	InvoiceSect	PartnerTen
G000493998		aff095f4-f2	PLAMUATT	5XQV-V4U(	PLAMUATT	WBEJ-VB7F-PJA-AJ4D-(	0e195b37-·	
G000493998		aff095f4-f2	PLAMUATT	5XQV-V4U(	PLAMUATT	WBEJ-VB7F-PJA-AJ4D-(	0e195b37-·	
G000493998		aff095f4-f2	PLAMUATT	5XQV-V4U(	PLAMUATT	WBEJ-VB7F-PJA-AJ4D-(	0e195b37-·	

Cost Management REST APIs

Partners and customers can use Cost Management APIs described in the following sections for common tasks.

Azure Cost Management APIs - Direct and indirect providers

Partners with access to billing scopes in a partner tenant can use the following APIs to view invoiced costs.

APIs at the subscription scope can be called by a partner regardless of the cost policy if they have access to the subscription. Other users with access to the subscription, like the customer or reseller, can call the APIs only after the partner enables the cost policy for the customer tenant.

To get a list of billing accounts

```
GET https://management.azure.com/providers/Microsoft.Billing/billingAccounts?api-version=2019-10-01-preview
```

To get a list of customers

```
GET https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/customers?
api-version=2019-10-01-preview
```

To get a list of subscriptions

```
GET
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/billingSubscript
ions?api-version=2019-10-01-preview
```

To get a list of invoices for a period of time

```
GET https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/invoices?
api-version=2019-10-01-preview&periodStartDate={periodStartDate}&periodEndDate={periodEndDate}
```

The API call returns an array of invoices that has elements similar to the following JSON code.

```
    {
      "id":
"/providers/Microsoft.Billing/billingAccounts/{billingAccountID}/billingProfiles/{BillingProfileID}/invoices/{
InvoiceID}",
      "name": "{InvoiceID}",
      "properties": {
        "amountDue": {
          "currency": "USD",
          "value": x.xx
        },
        ...
    }
```

Use the preceding returned ID field value and replace it in the following example as the scope to query for usage details.

```
GET https://management.azure.com/{id}/providers/Microsoft.Consumption/UsageDetails?api-version=2019-10-01
```

The example returns the usage records associated with the specific invoice.

To get the policy for customers to view costs

```
GET
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/customers/{custo
merID}/policies/default?api-version=2019-10-01-preview
```

To set the policy for customers to view costs

```
PUT
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/customers/{custo
merID}/policies/default?api-version=2019-10-01-preview
```

To get Azure service usage for a billing account

```
GET
https://management.azure.com/providers/Microsoft.Billing/BillingAccounts/{billingAccountName}/providers/Micros
oft.Consumption/usageDetails?api-version=2019-10-01
```

To download a customer's Azure service usage

The following get call is an asynchronous operation.

```
GET
https://management.azure.com/Microsoft.Billing/billingAccounts/{billingAccountName}/customers/{customerID}/pro
viders/Microsoft.Consumption/usageDetails/download?api-version=2019-10-01 -verbose
```

Call the `Location` URI returned in the response to check the operation status. When the status is *Completed*, the `downloadUrl` property contains a link that you can use to download the generated report.

To get or download the price sheet for consumed Azure services

First, use the following post.

```
POST
https://management.azure.com/providers/Microsoft.Billing/BillingAccounts/{billingAccountName}/billingProfiles/
{billingProfileID}/pricesheet/default/download?api-version=2019-10-01-preview&format=csv" -verbose
```

Then, call the asynchronous operation property value. For example:

```
GET
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/billingProfiles/
{billingProfileID}/pricesheetDownloadOperations/{operation}?sessiontoken=0:11186&api-version=2019-10-01-
preview
```

The preceding get call returns the download link containing the price sheet.

To get aggregated costs

```
POST
https://management.azure.com/providers/microsoft.billing/billingAccounts/{billingAccountName}/providers/micros
oft.costmanagement/query?api-version=2019-10-01
```

Create a budget for a partner

```
PUT
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/providers/Micros
oft.CostManagement/budgets/partnerworkshopbudget?api-version=2019-10-01
```

Create a budget for a customer

```
PUT
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountName}/customers/{custo
merID}/providers/Microsoft.Consumption/budgets/{budgetName}?api-version=2019-10-01
```

Delete a budget

```
DELETE
https://management.azure.com/providers/Microsoft.Billing/billingAccounts/{billingAccountId}/providers/Microsof
t.CostManagement/budgets/{budgetName}?api-version=2019-10-01
```

Next steps

- Start analyzing costs in Cost Management
- Create and manage budgets in Cost Management

What is the Cloudyn service?

1/14/2020 • 3 minutes to read • Edit Online

Cloudyn, a Microsoft subsidiary, allows you to track cloud usage and expenditures for your Azure resources and other cloud providers including AWS and Google. Easy-to-understand dashboard reports help with cost allocation and showbacks/chargebacks as well. Cloudyn helps optimize your cloud spending by identifying underutilized resources that you can then manage and adjust.

To watch an introductory video, see Introduction to Azure Cloudyn.

Azure Cost Management offers similar functionality to Cloudyn. Azure Cost Management is a native Azure cost management solution. It helps you analyze costs, create and manage budgets, export data, and review and act on optimization recommendations to save money. For more information, see Azure Cost Management.

Watch the Azure Cost Management and Cloudyn video to see recommendations when you should use either Azure Cost Management or Cloudyn, based on your business needs.

Cloudyn features moving to Azure Cost Management

Microsoft acquired Cloudyn and is migrating its cost management features from the Cloudyn portal natively into Azure. To use the new features, sign-in to the Azure portal and navigate to Cost Management and Billing in the list of Azure services. Compared to Cloudyn, the native experience offers improved performance and lower data latency of about eight hours.

Key feature migration for Enterprise Agreement, Pay-As-You-Go, and MSDN offer categories to Azure Cost Management is complete. CSP subscriptions are in the process of being migrated over to Azure Cost Management.

If you have an offer category not yet migrated, you should continue to use the Cloudyn portal. Everyone else can use Azure Cost Management.

MICROSOFT AZURE OFFERS AND FEATURES	RECOMMENDED COST MANAGEMENT SERVICE
Azure Enterprise Agreement	Azure Cost Management
Azure Web Direct (PAYG/MSDN)	Azure Cost Management
Azure Government	Azure Cost Management
Azure CSP	Cloudyn
Cross-cloud cost analysis support for AWS (in preview)	Azure Cost Management
AWS recommendations	Cloudyn

Some of the following features are available in Cloudyn, but all of them are available now in Azure Cost Management.

- APIs
- Azure compute recommendations

- Azure Reservation recommendations
- Budgets
- Cost analysis
- Export data to an Azure storage account
- Lower latency
- Power BI content pack and connector
- Resource tag support

Monitor usage and spending

Monitoring your usage and spending is critically important for cloud infrastructures because organizations pay for the resources they consume over time. When usage exceeds agreement thresholds, unexpected cost overages can quickly occur. A few important factors can make ad hoc monitoring difficult. First, projecting costs based on average usage assumes that your consumption remains consistent over a given billing period. Second, when costs are near or exceed your budget, it's important you get notifications proactively to adjust your spending. And, cloud service providers might not offer cost projection vs. thresholds or period to period comparison reports.

Reports help you monitor spending to analyze and track cloud usage, costs, and trends. Using Over Time reports, you can detect anomalies that differ from normal trends. Inefficiencies in your cloud deployment are visible in optimization reports. You can also notice inefficiencies in cost analysis reports.

Manage costs

Historical data can help manage costs when you analyze usage and costs over time to identify trends. Trends are then used to forecast future spending. Cloudyn also includes useful projected cost reports.

Cost allocation manages costs by analyzing your costs based on your tagging policy. You can use tags on your custom accounts, resources, and entities to refine cost allocation. Category Manager organizes your tags to help provide additional governance. And, you use cost allocation for showback/chargeback to show resource utilization and associated costs to influence consumption behaviors or charge tenant customers.

Access control helps manage costs by ensuring that users and teams access only the cost management data that they needed. You use entity structure, user management, and scheduled reports with recipient lists to assign access.

Alerting helps manage costs by notifying you automatically when unusual spending or overspending occurs. Alerts can also notify other stakeholders automatically for spending anomalies and overspending risks. Various reports support alerts based on budget and cost thresholds. However, alerts are not currently supported for CSP partner accounts or subscriptions.

Improve efficiency

You can determine optimal VM usage and identify idle VMs or remove idle VMs and unattached disks with Cloudyn. Using information in Sizing Optimization and Inefficiency reports, you can create a plan to down-size or remove idle VMs. However, optimization reports are not currently supported for CSP partner accounts or subscriptions.

If you provisioned AWS Reserved Instances, you can improve your reserved instances utilization with Optimization reports where you can view buying recommendations, modify unused reservations, and plan provisioning.

Next steps

Now that you’re familiar with Cloudyn, the next step is to register your cloud environment and start exploring your data.

- Register an individual Azure subscription

Register an individual Azure subscription and view cost data

1/14/2020 • 3 minutes to read • Edit Online

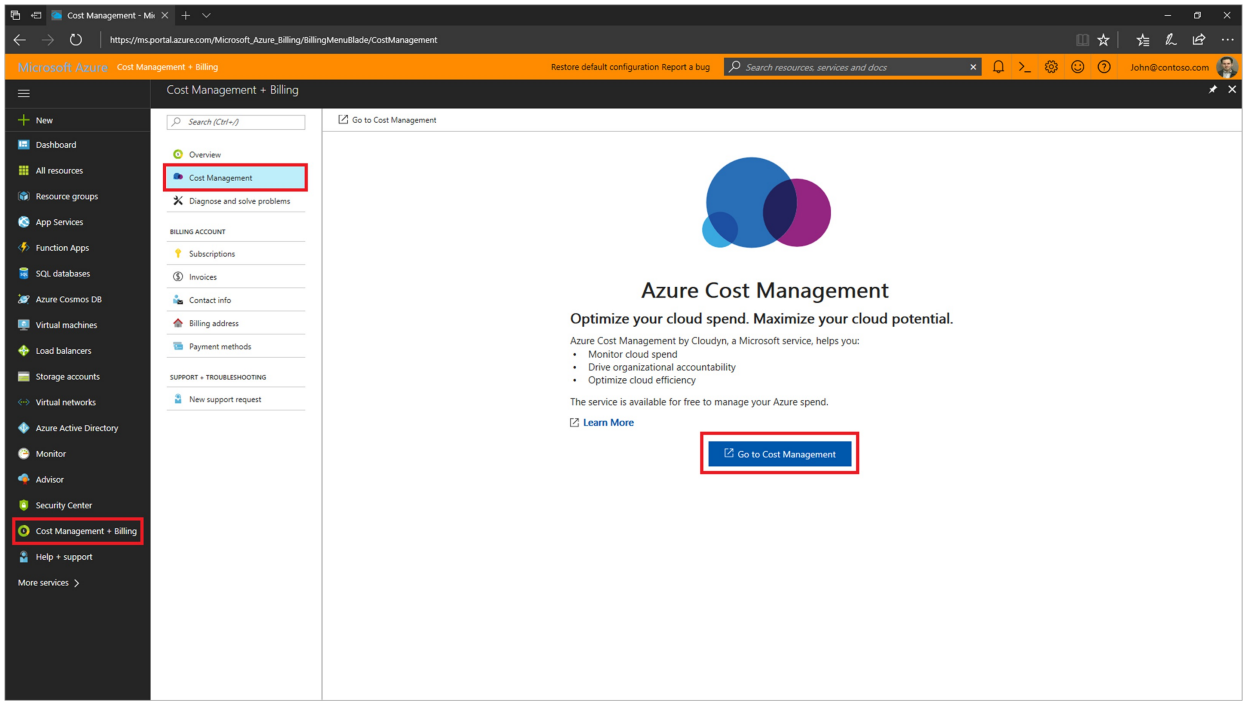
You use your Azure subscription to register with Cloudyn. Your registration provides access to the Cloudyn portal. This quickstart details the registration process needed to create a Cloudyn trial subscription and sign in to the Cloudyn portal. It also shows you how to start viewing cost data right away.

Sign in to Azure

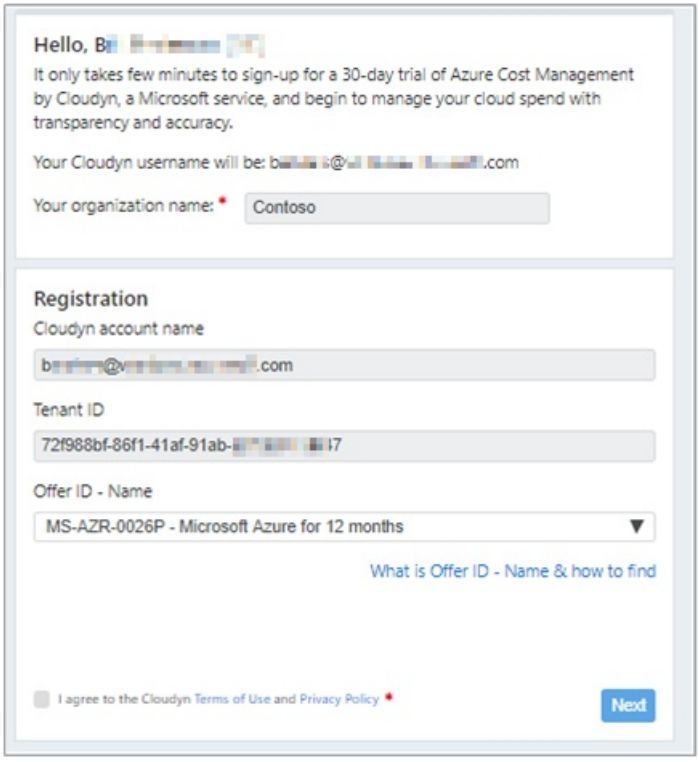
- Sign in to the Azure portal at https://portal.azure.com.

Register with Cloudyn

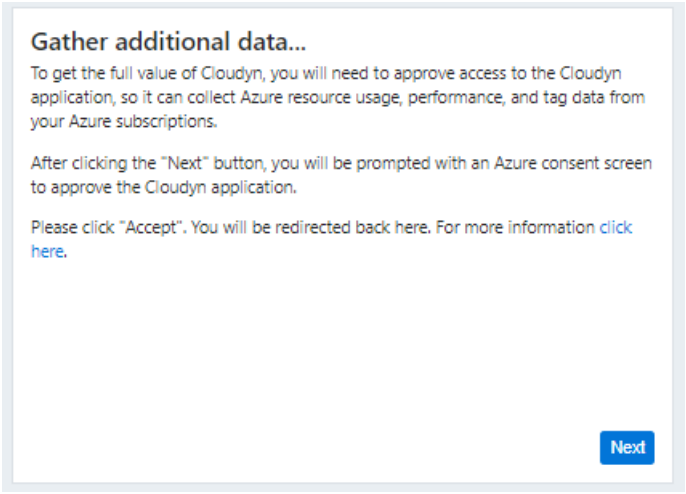
1. In the Azure portal, click **Cost Management + Billing** in the list of services.
2. Under **Overview**, click **Cloudyn**



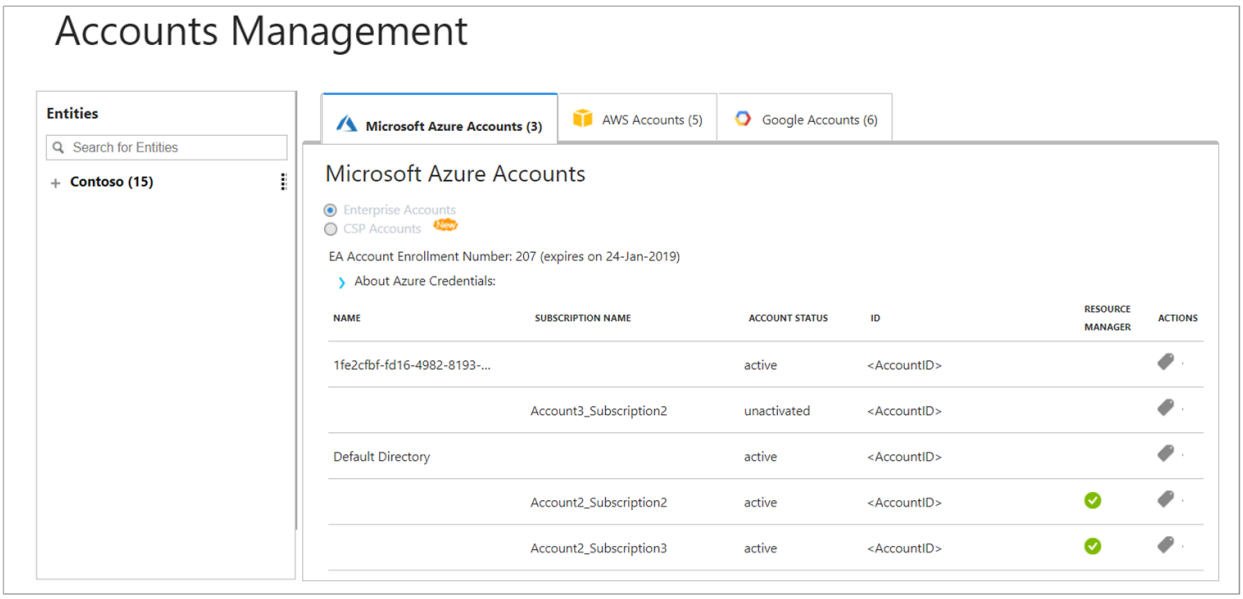
3. On the **Cost Management** page, click **Go to Cloudyn** to open the Cloudyn registration page in a new window.
4. On the Cloudyn portal trial registration page, type your company name and then select **Azure Individual Subscription Owner** and then click **Next**. Your account name and Tenant ID is automatically added to the form.



5. Select your **Offer ID - Name** associated with your subscription. If you're unsure of what your Rate ID is for your subscription, you can view your Azure bill and look for **Offer ID**.
6. Agree to the Terms of Use then validate your information and then click **Next**.
7. In the **Gather additional data** page, click **Next** to authorize Cloudyn to collect Azure resource data. Data collected includes usage, performance, billing, and tag data from your subscriptions.



8. Your browser takes you to the sign in page for Cloudyn. Sign in with your Azure subscription credentials.
9. Click **Go to Cloudyn** to open the Cloudyn portal and then on the **Accounts Management** page, you should see your Azure subscription account information.



To watch a tutorial video about registering your Azure subscription, see Finding your Directory GUID and Rate ID for use in Cloudyn.

View cost data

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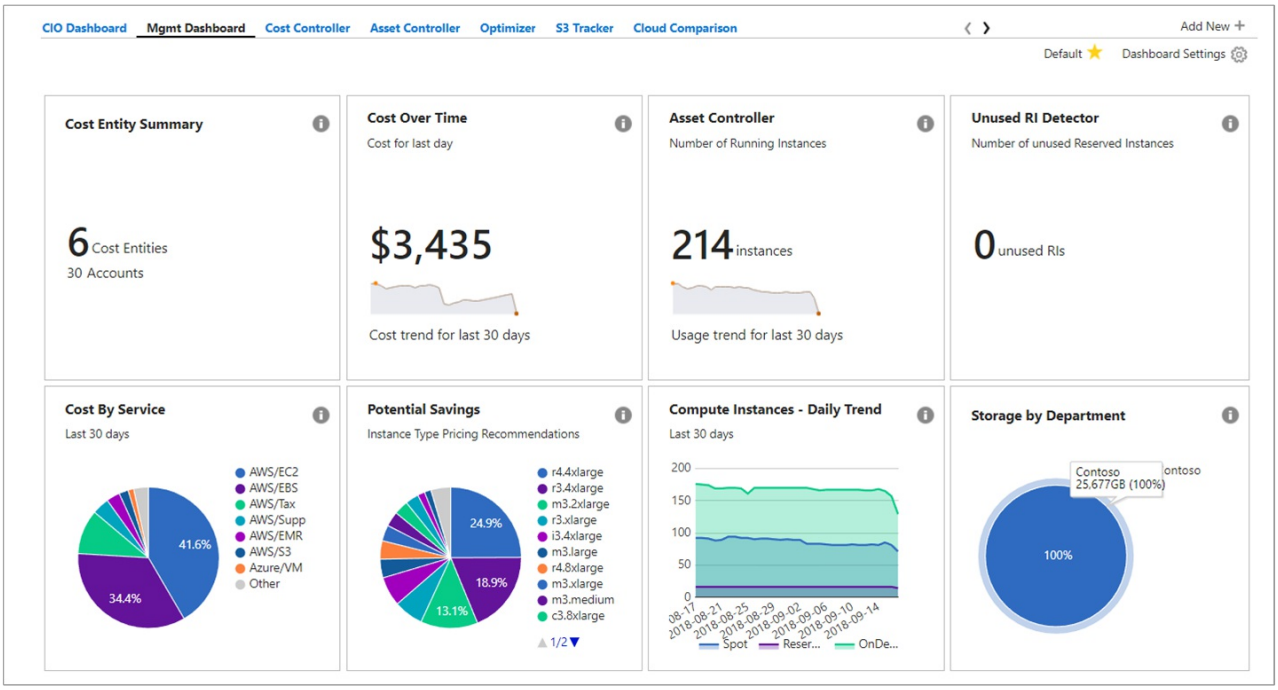
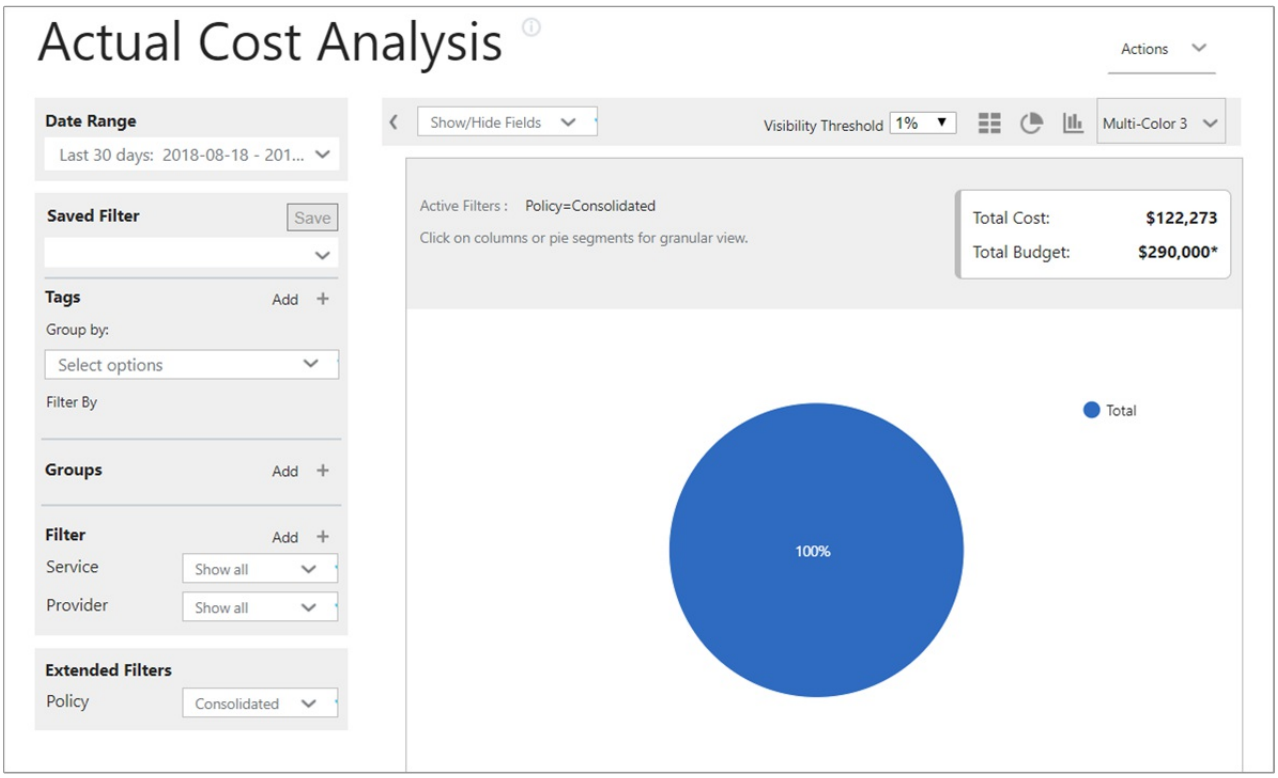


In this example, the Management dashboard shows consolidated costs for the Contoso business across all their cloud resources. Contoso uses Azure, AWS, and Google. Dashboards provide at-a-glance information and are quick way to navigate into reports.

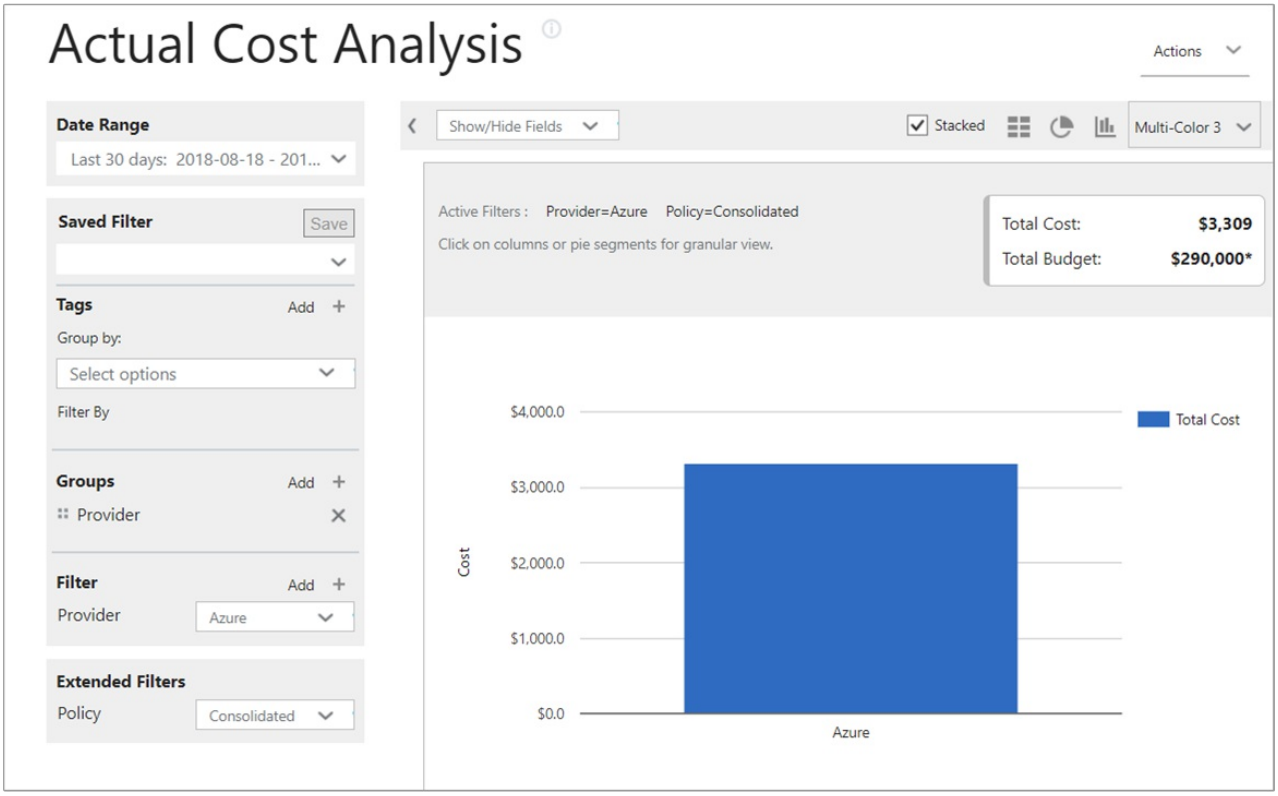
If you're unsure of a report's purpose in a dashboard, hover over the **i** symbol to see an explanation. Click any report on a dashboard to view the full report.

You can also view reports using the reports menu at the top of the portal. Let's take a look at Contoso's Azure resource spending over the last 30 days. Click **Costs** > **Cost Analysis** > **Actual Cost Analysis**. Clear any values if there are any set for tags, groups, or filters in your report.



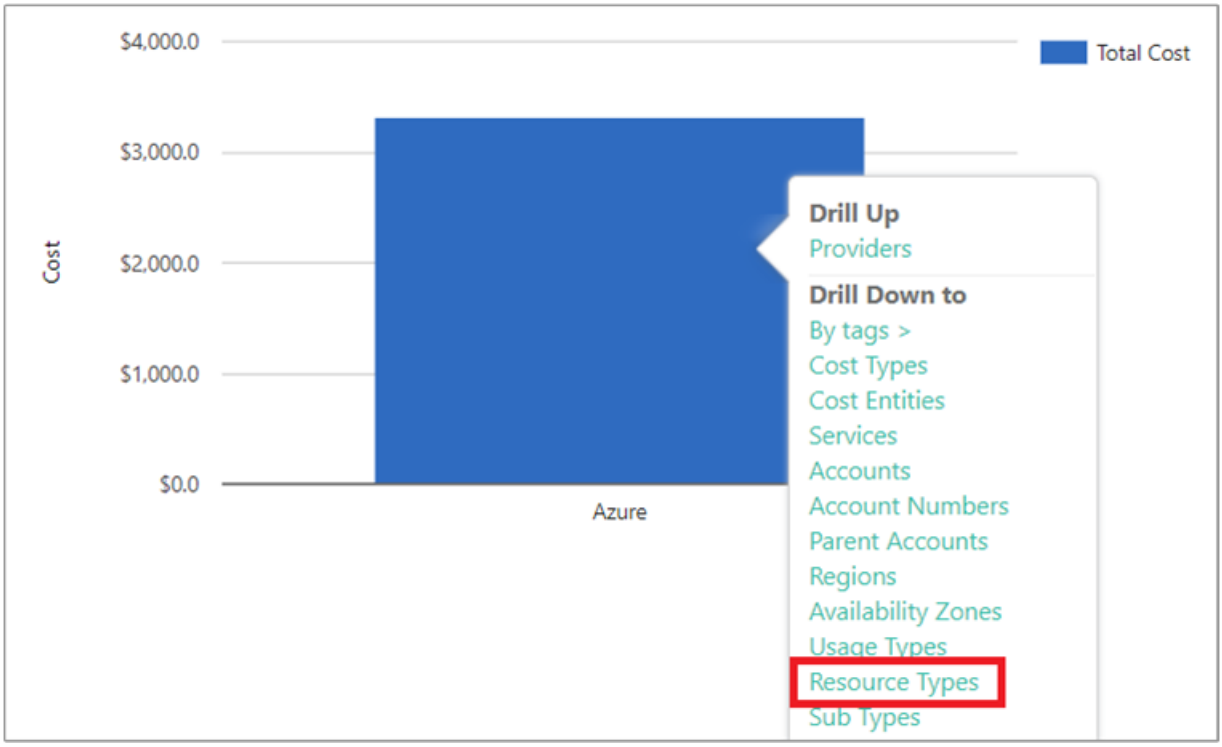
In this example, $122,273 is the total cost and the budget is $290,000.

Now, let's modify the report format and set groups and filters to narrow results for Azure costs. Set the **Date Range** to the last 30 days. In the top right, click the column symbol to format as a bar chart and under Groups, select **Provider**. Then, set a filter for **Provider** to **Azure**.

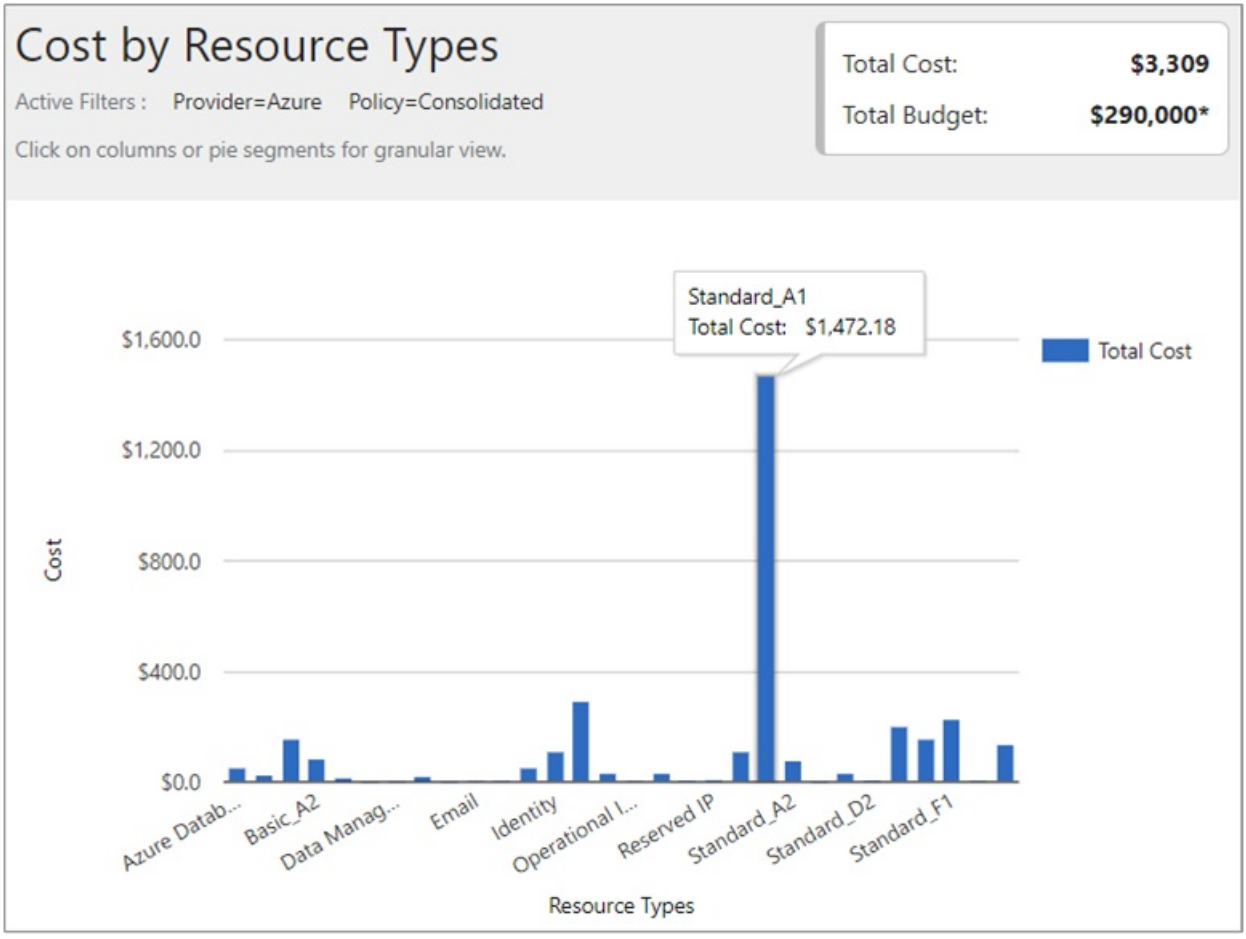


In this example, the total cost of Azure resources was $3,309 over the last 30 days.

Right-click the Provider (Azure) bar and drill down to **Resource types**.



The following image shows the costs for Azure resources that Contoso incurred. The total was $3,309. In this example, about half of costs were for Standard_A1 VMs and about the other half of costs were for various Azure services and VM instances.



Right-click a resource type and select **Cost Entities** to view cost entities and the services that have consumed the resource. In the following example image Locally Redundant Storage is set as the Resource type. Contoso|Azure/Storage consumed $15.65. Engineering|Azure Storage consumed $164.25. Shared Infrastructure|Azure/Storage consumed $116.58. The total cost for the services is $296.

To watch a tutorial video about viewing your cloud billing data, see Analyzing your cloud billing data with Azure Cost Management by Cloudyn.

Next steps

In this quickstart, you used your Azure subscription information to register with Cloudyn. You also signed into the Cloudyn portal and started viewing cost data. To learn more about Cloudyn, continue to the tutorial for Cloudyn.

Review usage and costs

Register an Azure Enterprise Agreement and view cost data

1/14/2020 • 3 minutes to read • Edit Online

You use your Azure Enterprise Agreement to register with Cloudyn. Your registration provides access to the Cloudyn portal. This quickstart details the registration process needed to create a Cloudyn trial subscription and sign in to the Cloudyn portal. It also shows you how to start viewing cost data right away.

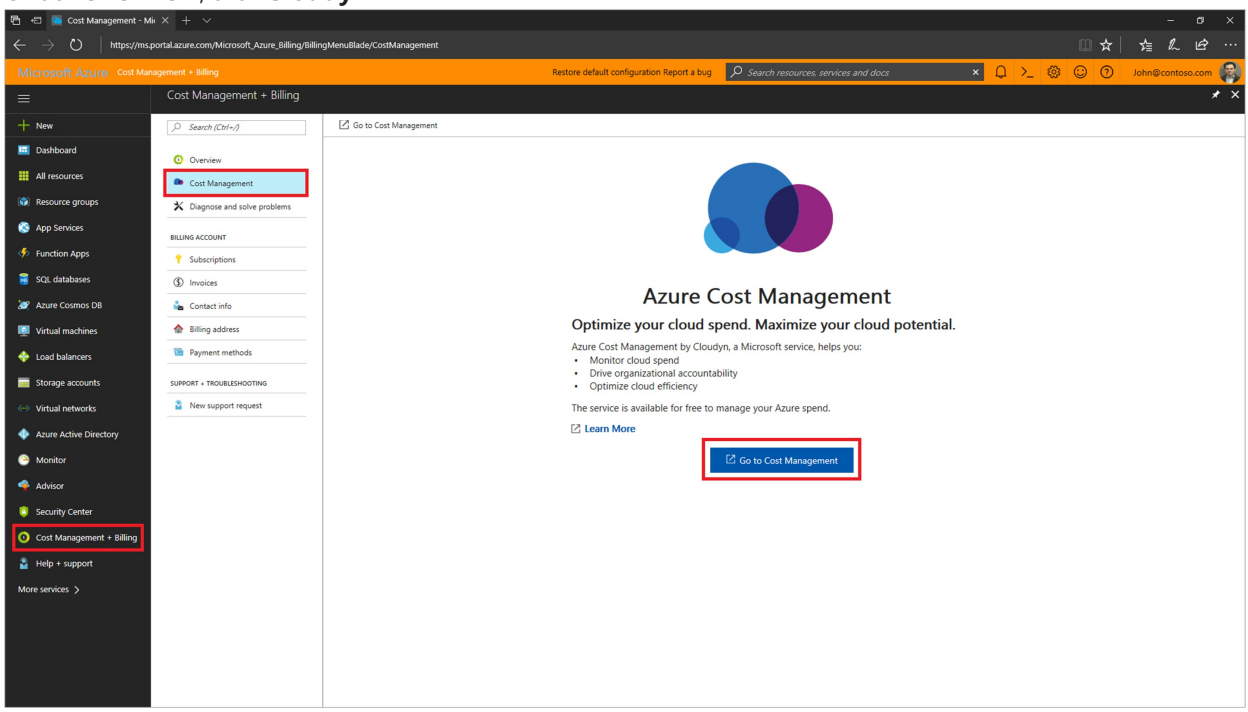
Azure Cost Management offers similar functionality to Cloudyn. Azure Cost Management is a native Azure cost management solution. It helps you analyze costs, create and manage budgets, export data, and review and act on optimization recommendations to save money. For more information, see Azure Cost Management.

Sign in to Azure

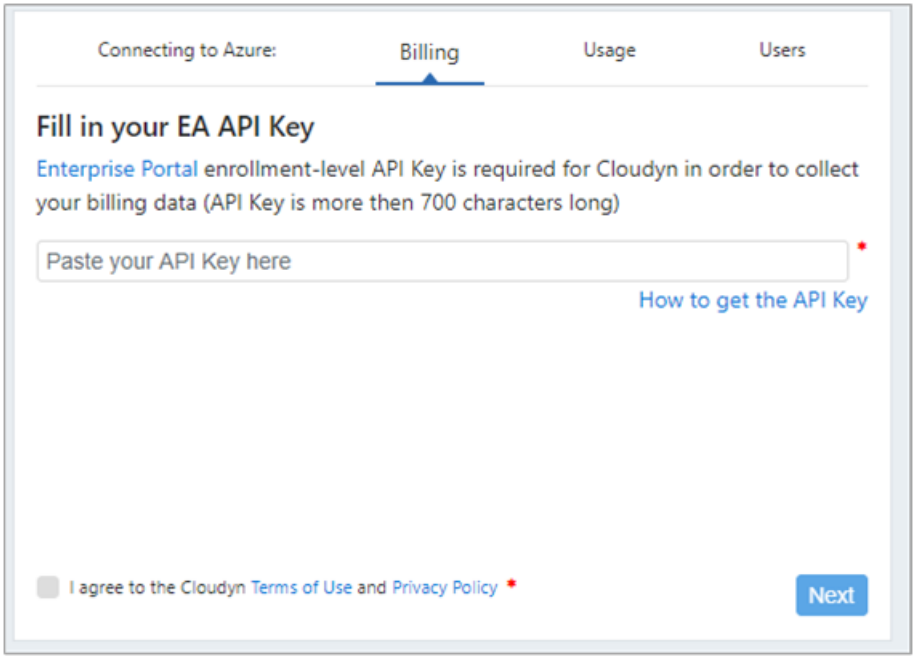
- Sign in to the Azure portal at https://portal.azure.com.

Register with Cloudyn

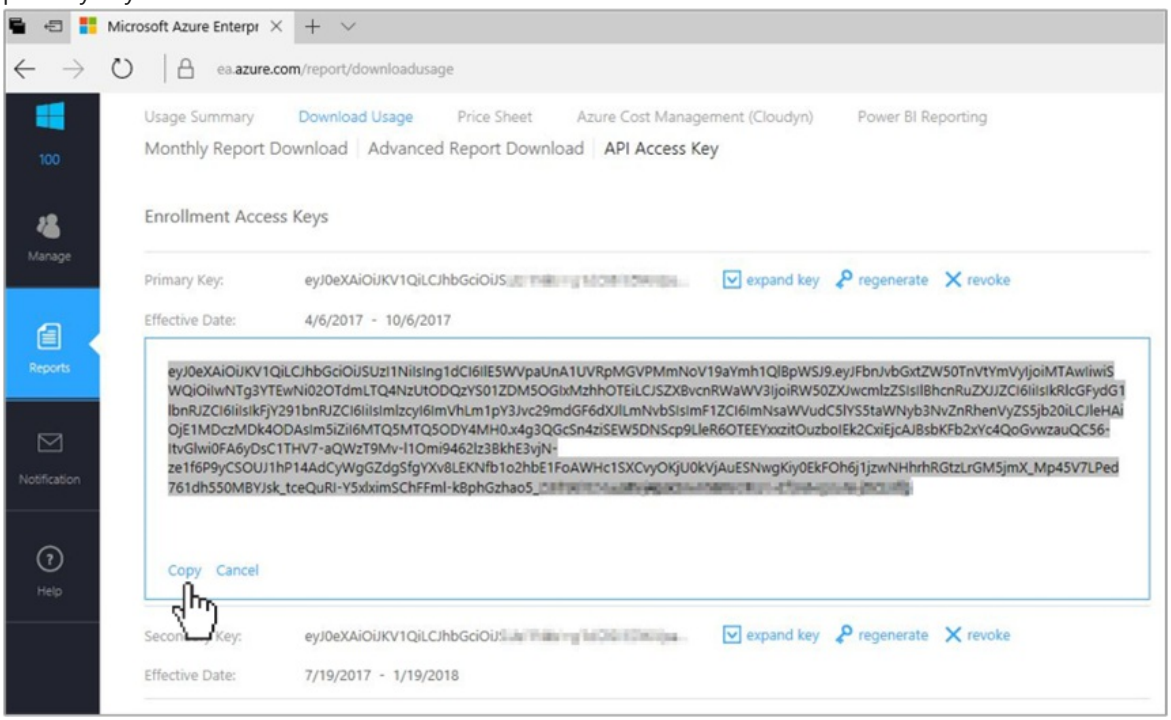
1. In the Azure portal, click **Cost Management + Billing** in the list of services.
2. Under **Overview**, click **Cloudyn**



3. On the **Cloudyn** page, **Go to Cloudyn** to open the Cloudyn registration page in a new window.
4. On the Cloudyn portal trial registration page, type your company name and then select **Azure Enterprise Enrollment Administrator**.
5. Enter your Enterprise Portal enrollment API key. If you don't have your key handy, click the Enterprise Portal link and do the following steps:

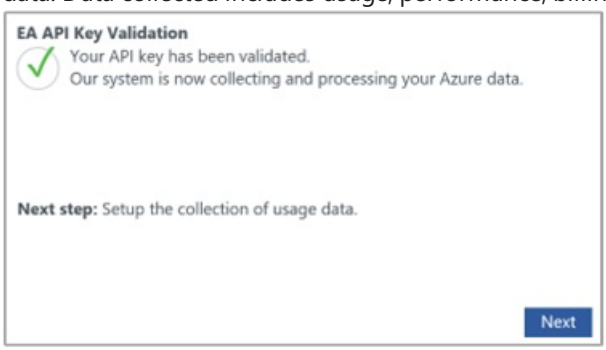


a. Sign in to the Azure Enterprise website and click **Reports**, click **API Access Key** and then copy your primary key.



b. Go back to the registration page and paste in your API key.

6. Agree to the Terms of Use then validate your key. Click **Next** to authorize Cloudyn to collect Azure resource data. Data collected includes usage, performance, billing, and tag data from your subscriptions.



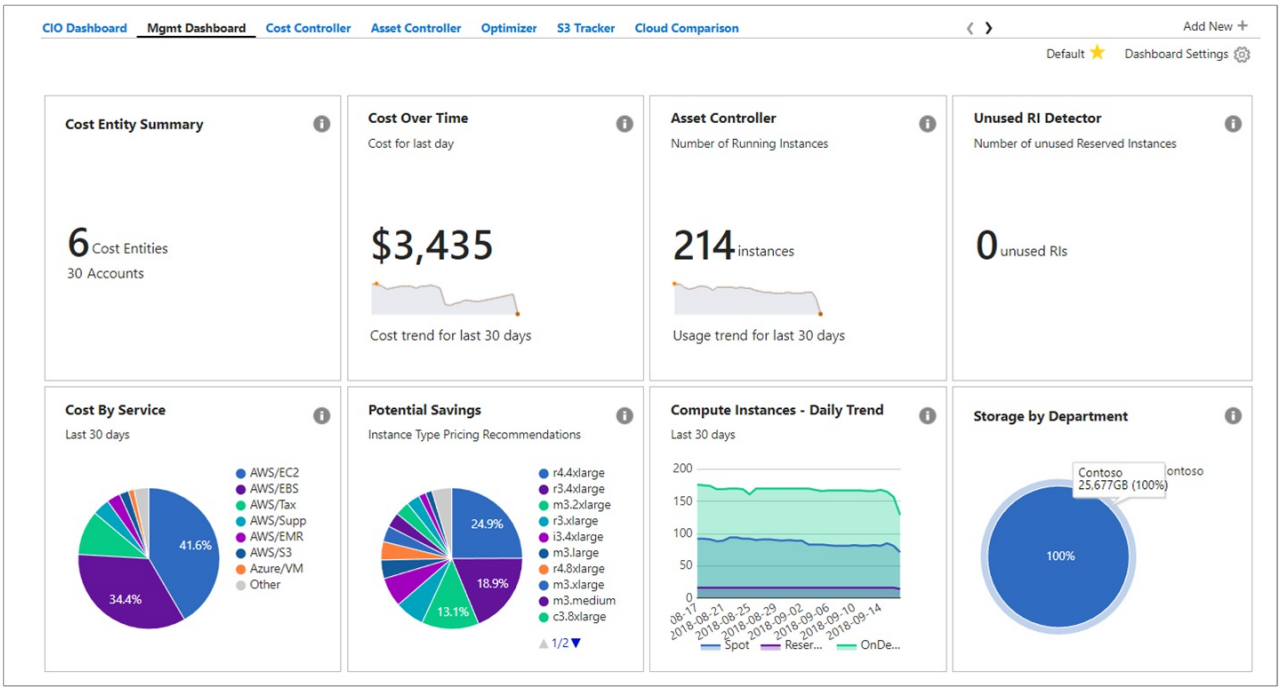
7. Under **Invite other stakeholders**, you can add users by typing their email addresses. When complete, click **Next**. Depending on the size of your Azure enrollment, it can take up to 24 hours for all of your billing data to get added to Cloudyn.

8. Click **Go to Cloudyn** to open the Cloudyn portal and then on the **Cloud Accounts Management** page, you should see your registered EA account information.

To watch a tutorial video about registering your Enterprise Agreement, see How to Find Your EA Enrollment ID and API Key for use in Cloudyn.

View cost data

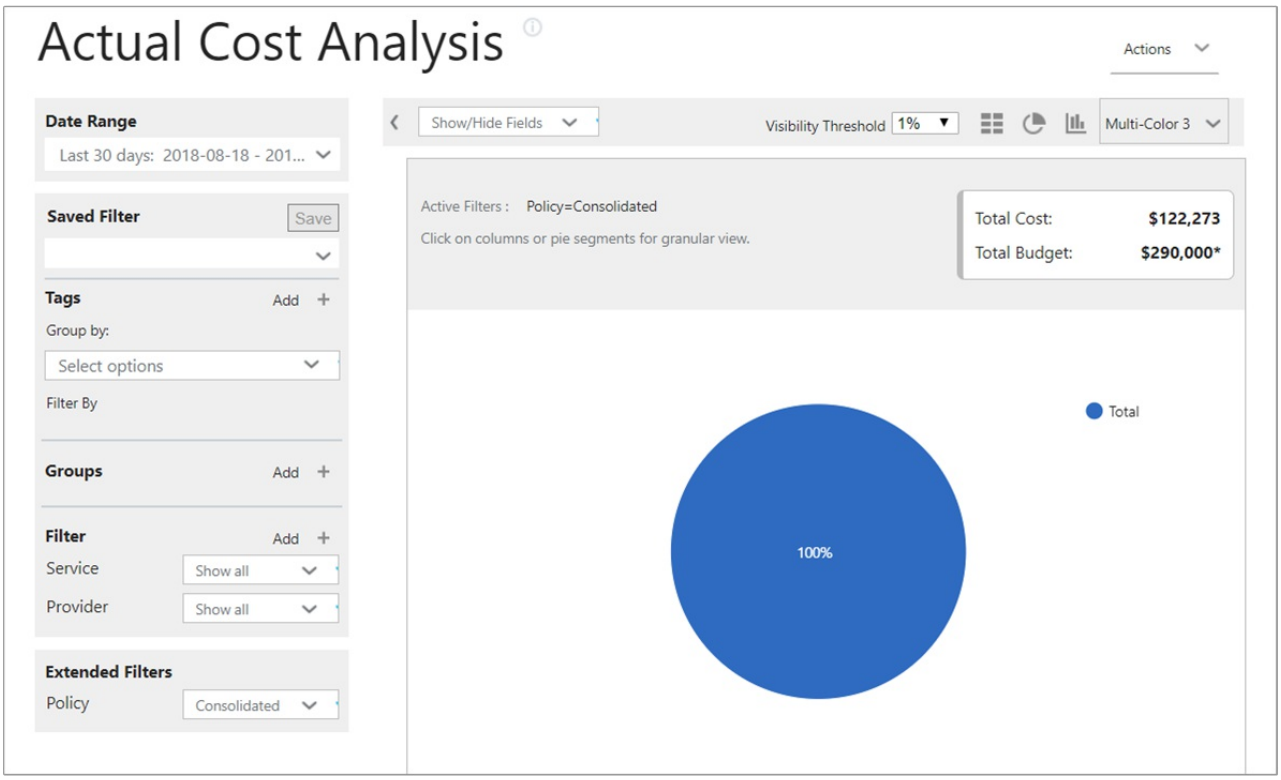
Azure Cost Management by Cloudyn provides you access to all of your cloud resource data. From the dashboard reports you can find both standard and custom reports in a tabbed view. The following are examples of a popular dashboard and a report that show you cost data right away.



In this example, the Management dashboard shows consolidated costs for the Contoso business across all their cloud resources. Contoso uses Azure, AWS, and Google. Dashboards provide at-a-glance information and are quick way to navigate into reports.

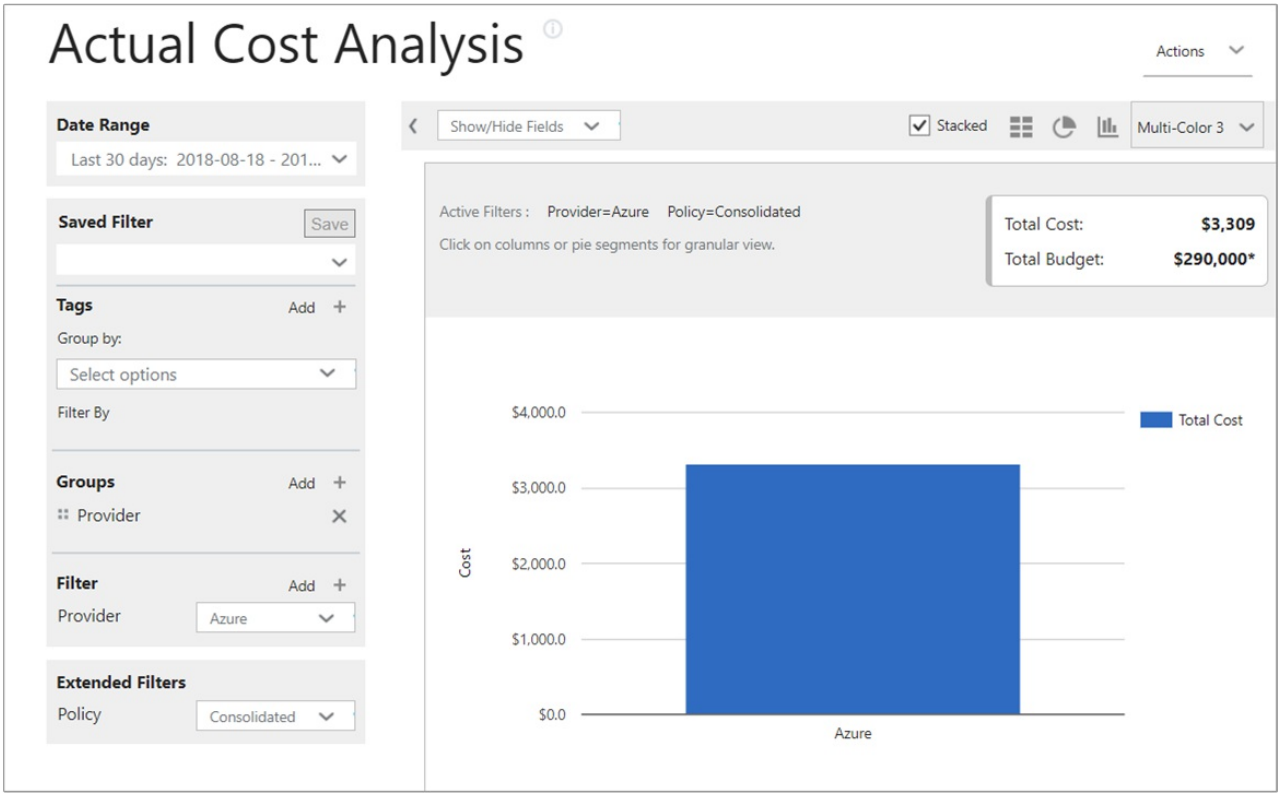
If you're unsure of a report's purpose in a dashboard, hover over the **i** symbol to see an explanation. Click any report on a dashboard to view the full report.

You can also view reports using the reports menu at the top of the portal. Let's take a look at Contoso's Azure resource spending over the last 30 days. Click **Costs** > **Cost Analysis** > **Actual Cost Analysis**. Clear any values if there are any set for tags, groups, or filters in your report.



In this example, $122,273 is the total cost and the budget is $290,000.

Now, let's modify the report format and set groups and filters to narrow results for Azure costs. Set the **Date Range** to the last 30 days. In the top right, click the column symbol to format as a bar chart and under Groups, select **Provider**. Then, set a filter for **Provider** to **Azure**.



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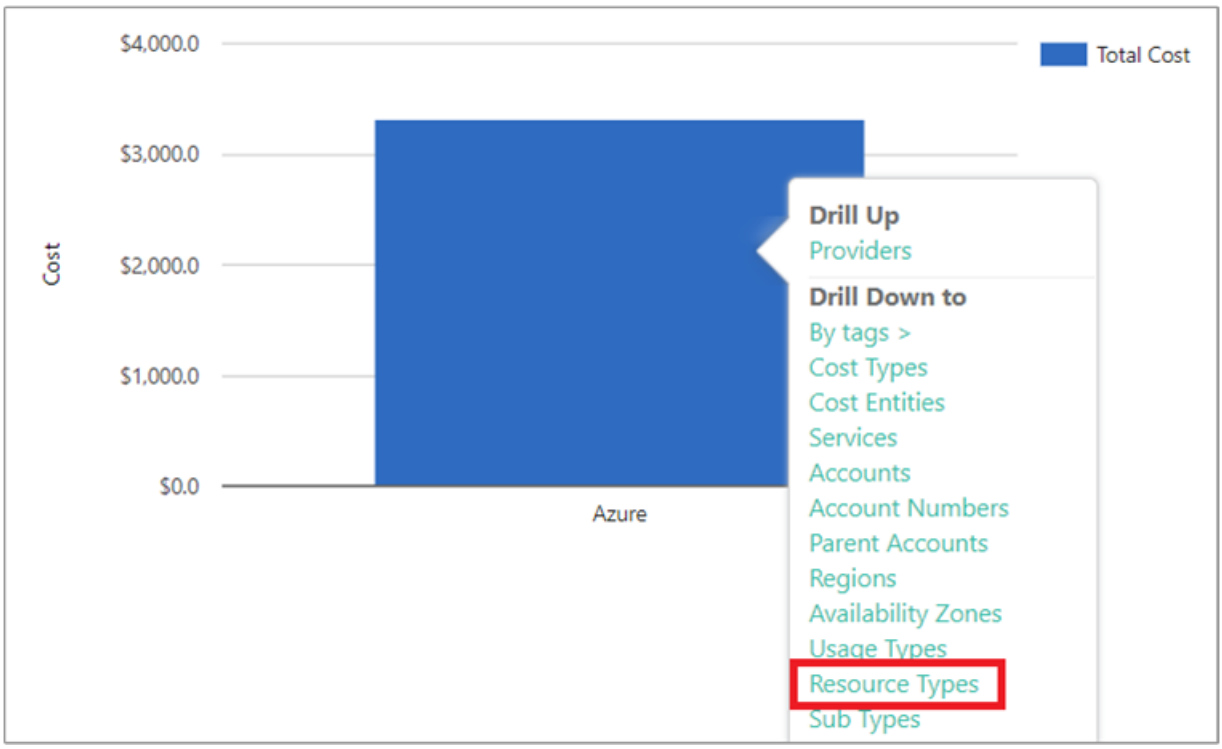
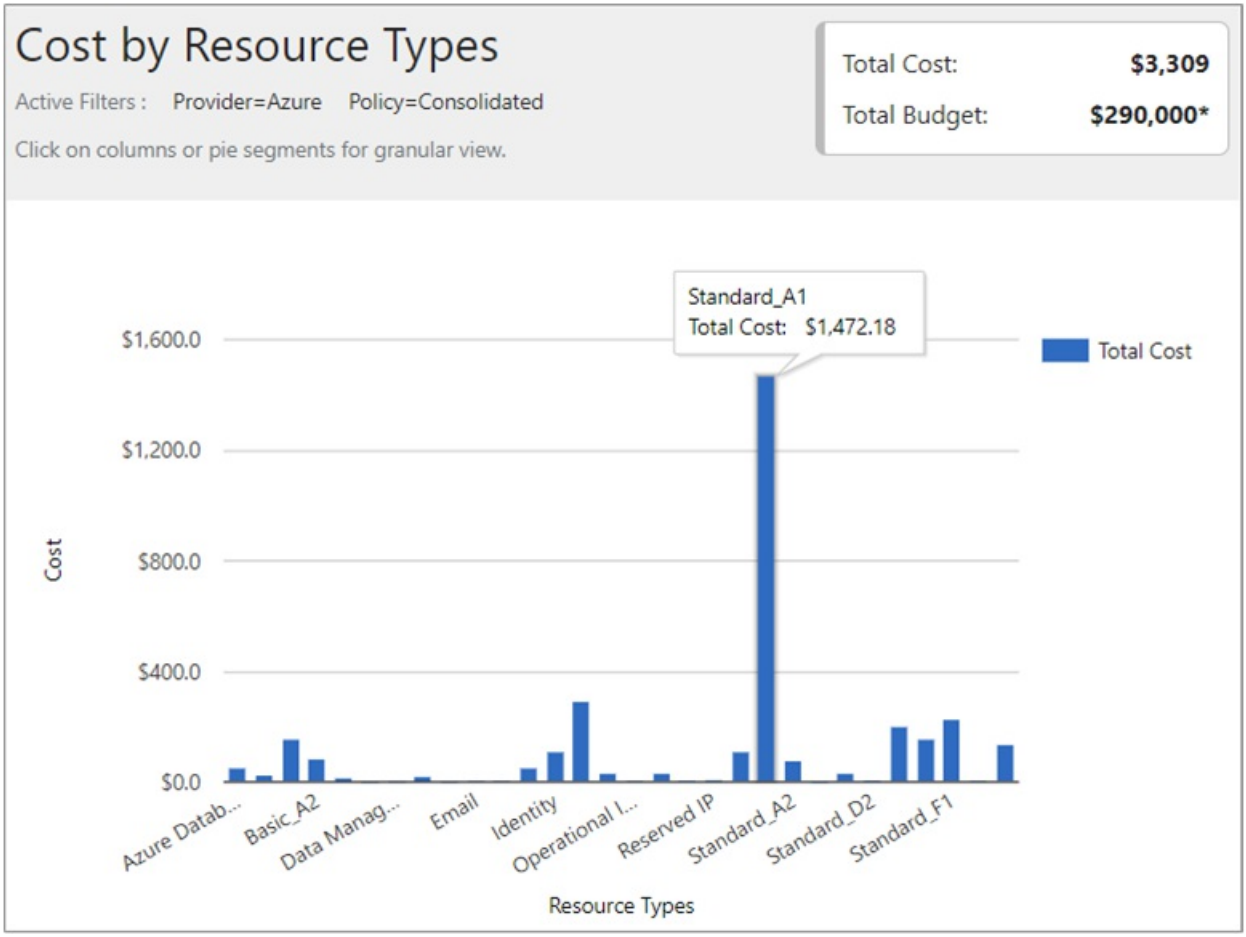
Right-click the Provider (Azure) bar and drill down to **Resource types**.



The following image shows the costs for Azure resources that Contoso incurred. The total was $3,309. In this example, about half of costs were for Standard_A1 VMs and about the other half of costs were for various Azure services and VM instances.



Right-click a resource type and select **Cost Entities** to view cost entities and the services that have consumed the resource. In the following example image Locally Redundant Storage is set as the Resource type. Contoso|Azure/Storage consumed $15.65. Engineering|Azure Storage consumed $164.25. Shared Infrastructure|Azure/Storage consumed $116.58. The total cost for the services is $296.

To watch a tutorial video about viewing your cloud billing data, see Analyzing your cloud billing data with Azure Cost Management by Cloudyn.

Next steps

In this quickstart, you used your Azure Enterprise Agreement information to register with Cloudyn. You also signed into the Cloudyn portal and started viewing cost data. To learn more about Cloudyn, continue to the tutorial for Cloudyn.

Review usage and costs

Register with the CSP Partner program and view cost data

1/14/2020 • 5 minutes to read • Edit Online

As a CSP partner, you can register with Cloudyn. Your registration provides access to the Cloudyn portal. This quickstart details the registration process needed to create a Cloudyn trial subscription and sign in to the Cloudyn portal. It also shows you how to start viewing cost data right away.

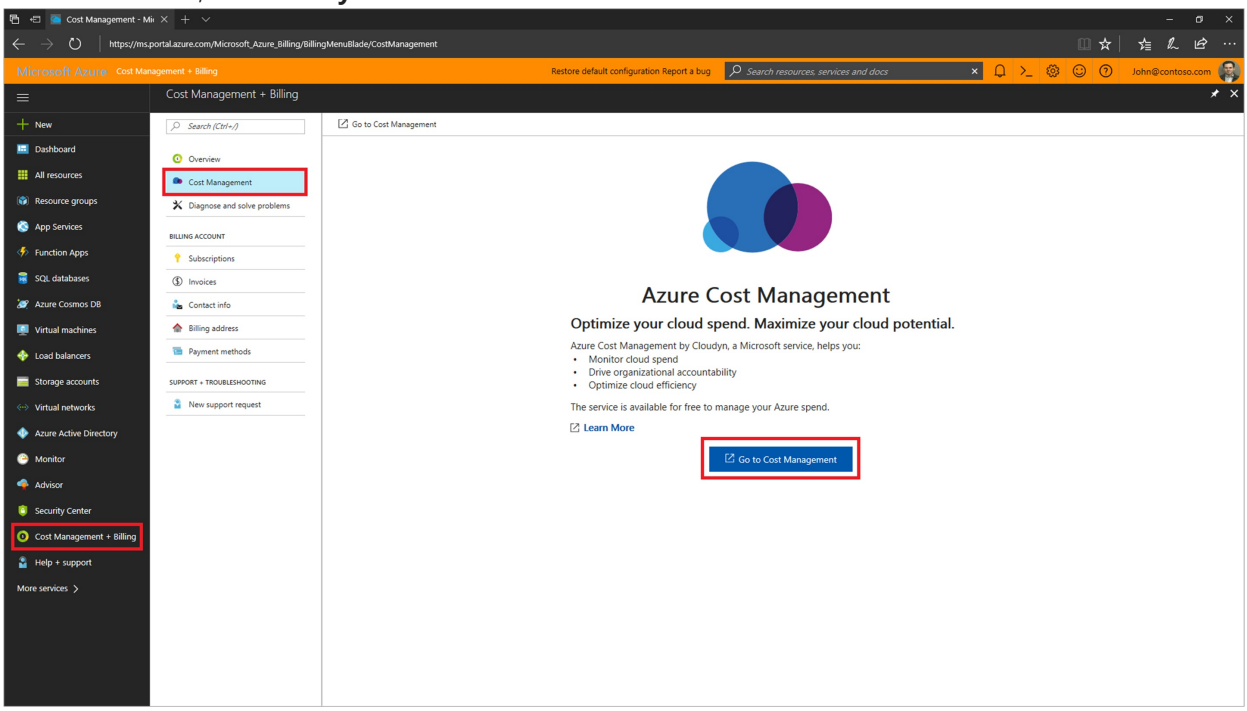
> **NOTE**
>
> Only CSP Direct partners and CSP Indirect Providers can complete Cloudyn registration.
>
> Configuring the Partner Center API is required for authentication and data access. A Partner Center Global Administrator account is needed to provision API access. For more information, see Connect to the Partner Center API.
>
> Access to Cloudyn can be made available to CSP Indirect Resellers after their CSP Indirect Provider registers with Cloudyn. CSP Indirect Resellers can then provide Cloudyn access to Azure customers and subscriptions.
>
> Cloudy is complaint with the Microsoft Secure Application model. For more information, see Enabling the Secure Application Model framework.

Sign in to Azure

- Sign in to the Azure portal at https://portal.azure.com.

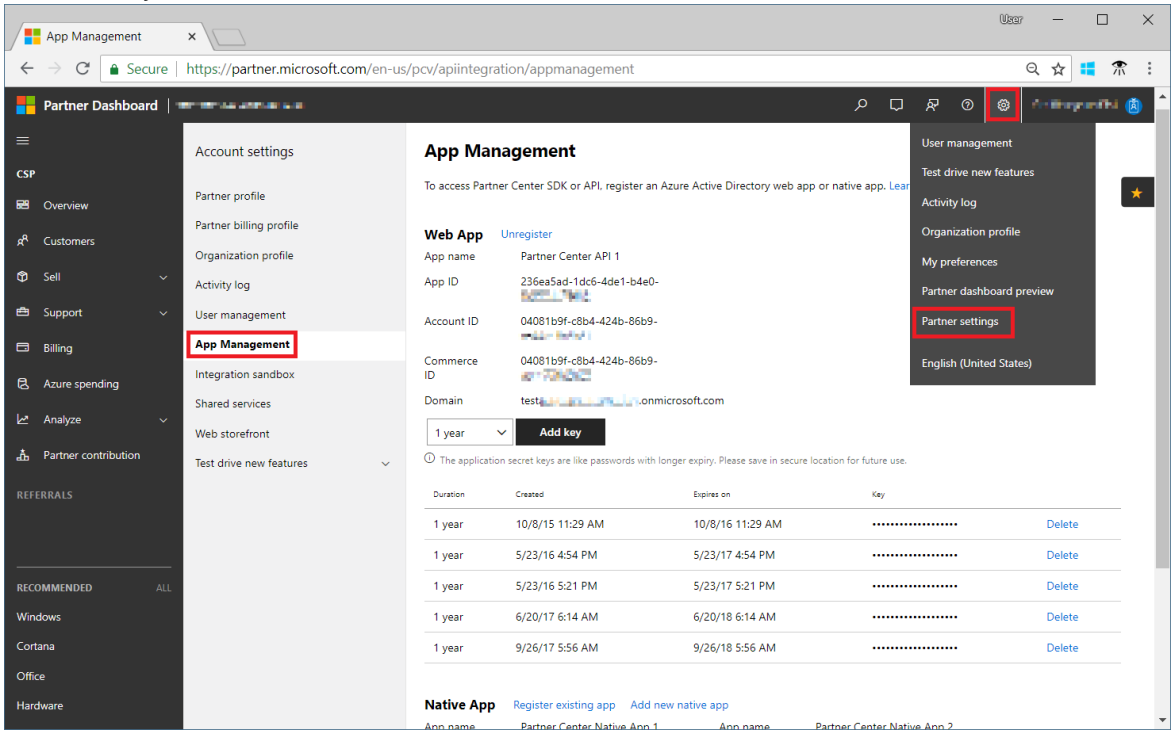
Register with Cloudyn

1. In the Azure portal, click **Cost Management + Billing** in the list of services.
2. Under **Overview**, click **Cloudyn**

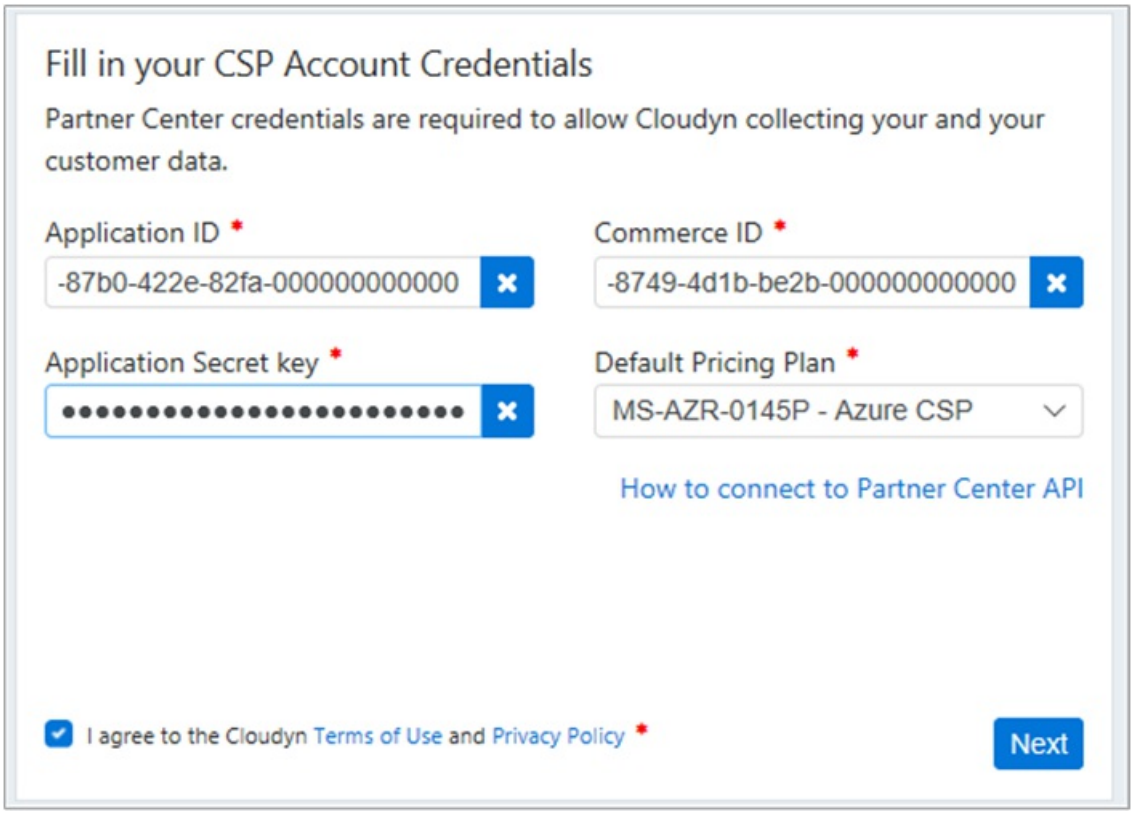


3. On the **Cloudyn** page, click **Go to Cloudyn** to open the Cloudyn registration page in a new window.
4. On the Cloudyn portal trial registration page, type your company name, select **Microsoft CSP Partner Program Administrator**, and then click **Next**.

5. Enter an **Application ID**, **Commerce ID**, **Application Secret key**, and select the **Default Pricing Plan**. If you don't have the information handy, sign in to the Partner Center portal at https://partnercenter.microsoft.com with your primary administrator account and do the following steps:
   a. Go to **Dashboard**, click the **Settings** symbol, click **Partner settings**, and then click **App Management**.
   b. If you have previously created a Web App, skip this step. Otherwise, click **Add new web app** in the **Web App** section.
   c. Copy the **App ID** GUID from your web application.
   d. Copy the **Commerce ID** GUID from your web application.
   e. Select the key validity duration as one or two years, as needed. Select **Add key** and then copy and save the secret key value.



   f. Go back to the Cloudyn registration page and paste the information.



6. Agree to the Terms of Use then validate your information. Click **Next** to authorize Cloudyn to collect Azure

resource data. Data collected includes usage, performance, billing, and tag data from your subscriptions.

7. Under **Invite other stakeholders**, you can add users by typing their email addresses. When complete, click **Next**. It takes about two hours for all your billing data to get added to Cloudyn.
8. Click **Go to Cloudyn** to open the Cloudyn portal and then on the **Cloud Accounts Management** page, you should see your registered CSP account information.

Configure indirect CSP access in Cloudyn

By default, the Partner Center API is only accessible to direct CSPs. However, a direct CSP provider can configure access for their indirect CSP customers or partners using entity groups in Cloudyn.

To enable access for indirect CSP customers or partners, follow the steps in Register with Cloudyn to set up a trial registration. Next, complete the following steps to segment indirect CSP data by using Cloudyn entity groups. Then, assign the appropriate user permissions to the entity groups.

1. Create an entity group with the information at Create entities.
2. Follow the steps at Assigning subscriptions to Cost Entities. Associate the indirect CSP customer's account and their Azure subscriptions to the entity that you create previously.
3. Follow the steps at Create a user with admin access to create a user account with Admin access. Then, ensure the user account has admin access to the specific entities that you created previously for the indirect account.

Indirect CSP partners sign in to the Cloudyn portal using the accounts that you created for them.

View cost data

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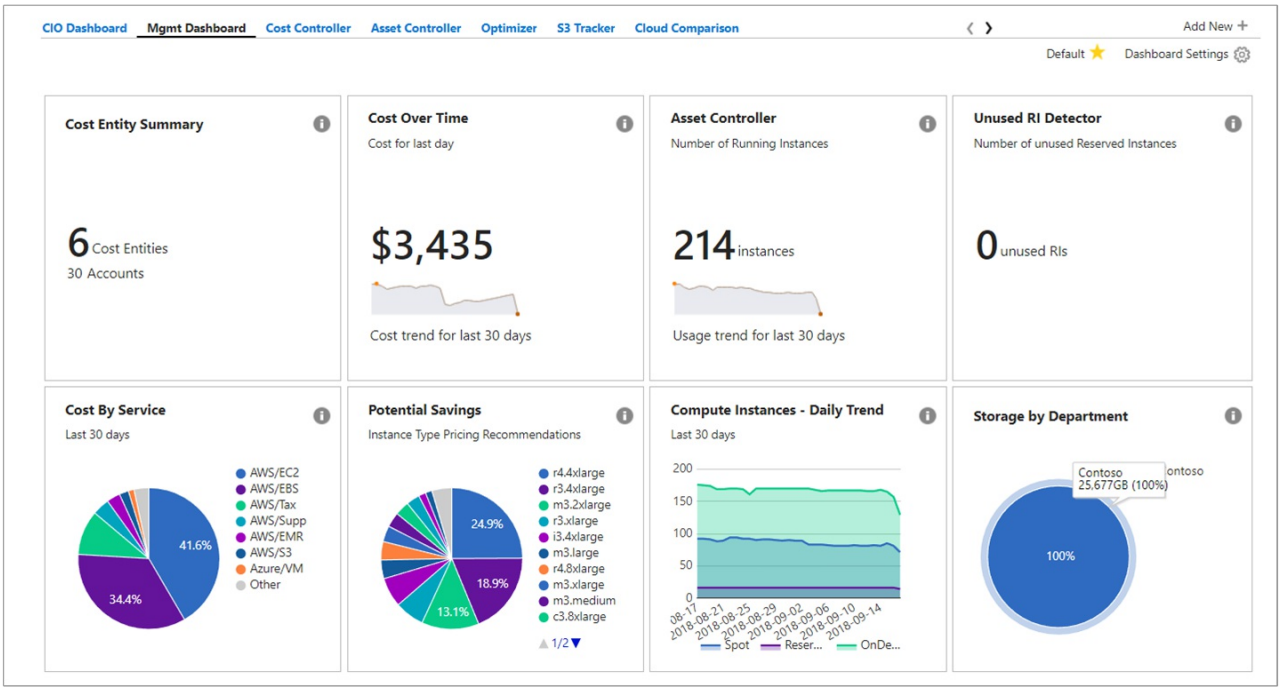

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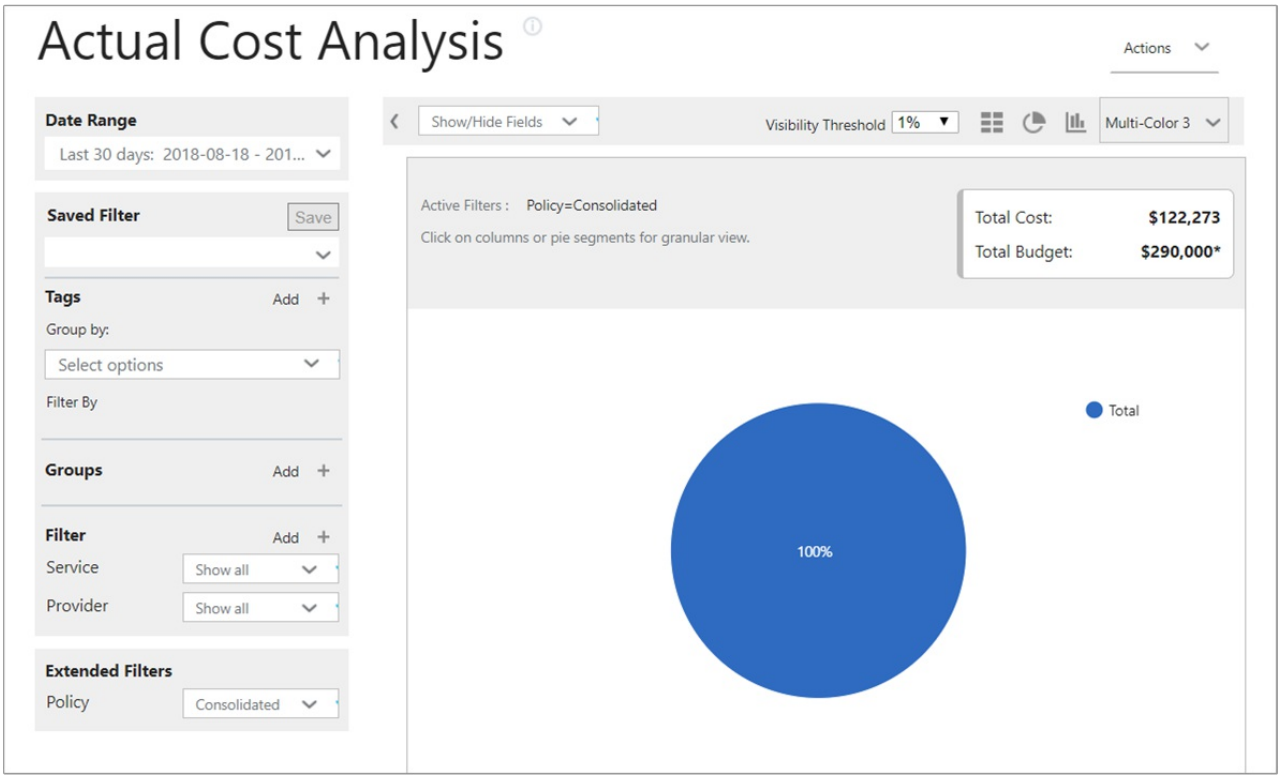

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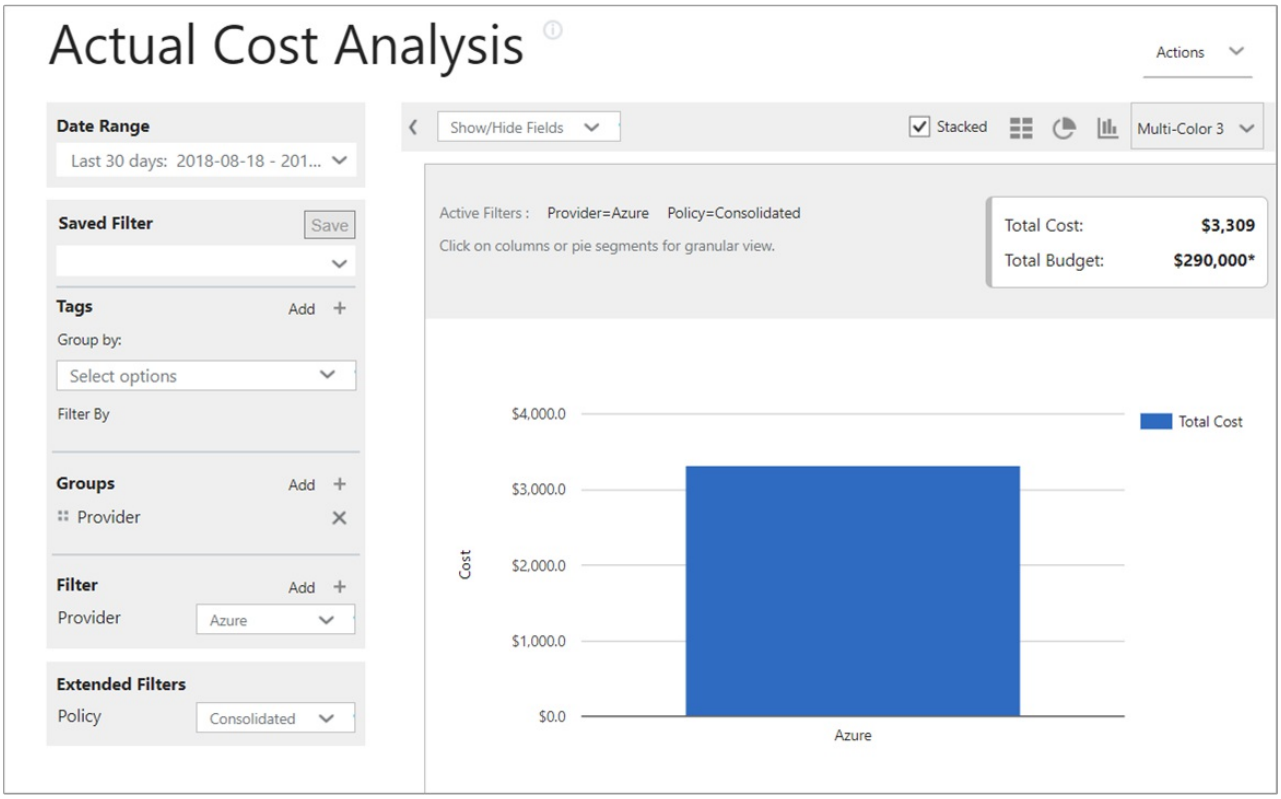

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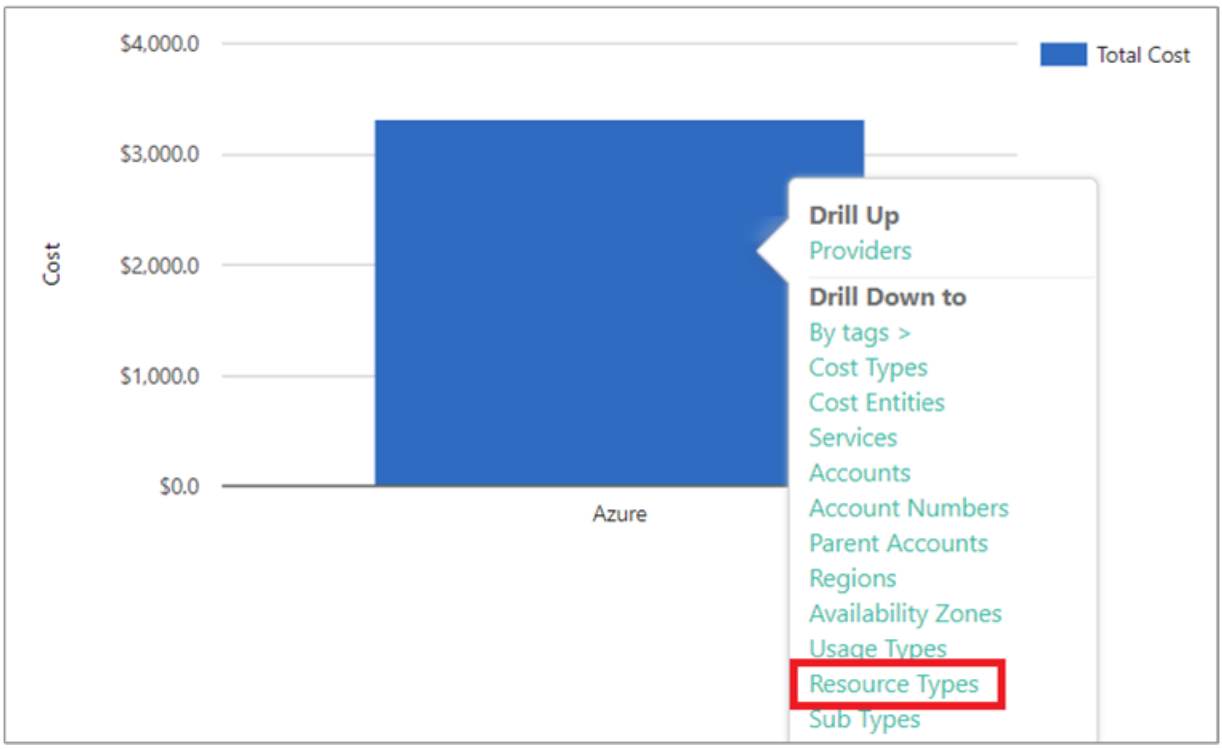
Right-click the Provider (Azure) bar and drill down to **Resource types**.



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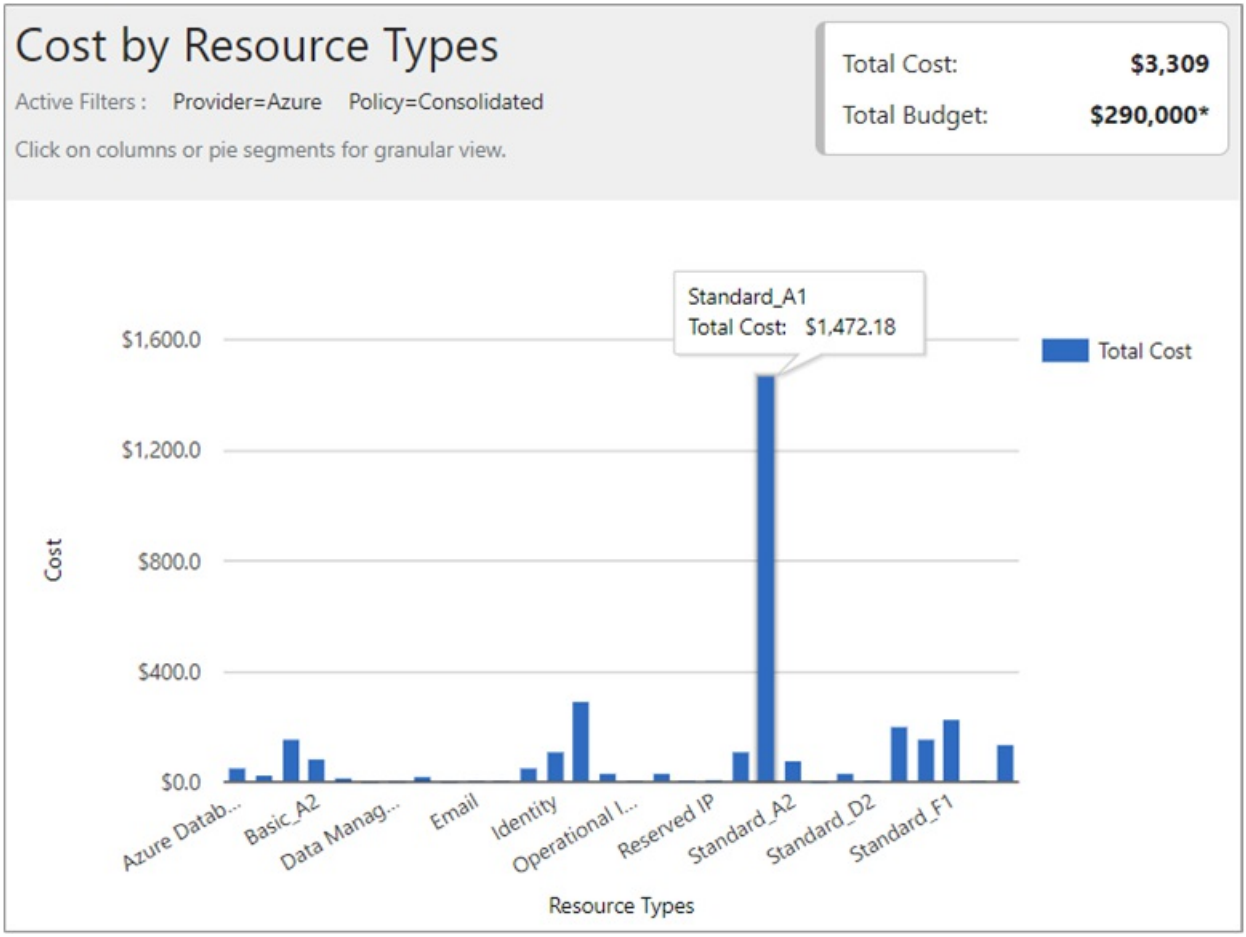

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To watch a tutorial video about viewing your cloud billing data, see Analyzing your cloud billing data with Azure Cost Management by Cloudyn.

Next steps

In this quickstart, you used your CSP information to register with Cloudyn. You also signed into the Cloudyn portal and started viewing cost data. To learn more about Cloudyn, continue to the tutorial for Cloudyn.

Review usage and costs

Tutorial: Review usage and costs

1/14/2020 • 5 minutes to read • Edit Online

Cloudyn shows you usage and costs so that you can track trends, detect inefficiencies, and create alerts. All usage and cost data is displayed in Cloudyn dashboards and reports. The examples in this tutorial walk you though reviewing usage and costs using dashboards and reports.

Azure Cost Management offers similar functionality to Cloudyn. Azure Cost Management is a native Azure cost management solution. It helps you analyze costs, create and manage budgets, export data, and review and act on optimization recommendations to save money. For more information, see Azure Cost Management.

In this tutorial, you learn how to:

- Track usage and cost trends
- Detect usage inefficiencies
- Create alerts for unusual spending or overspending
- Export data

If you don't have an Azure subscription, create a free account before you begin.

Prerequisites

- You must have an Azure account.
- You must have either a trial registration or paid subscription for Cloudyn.

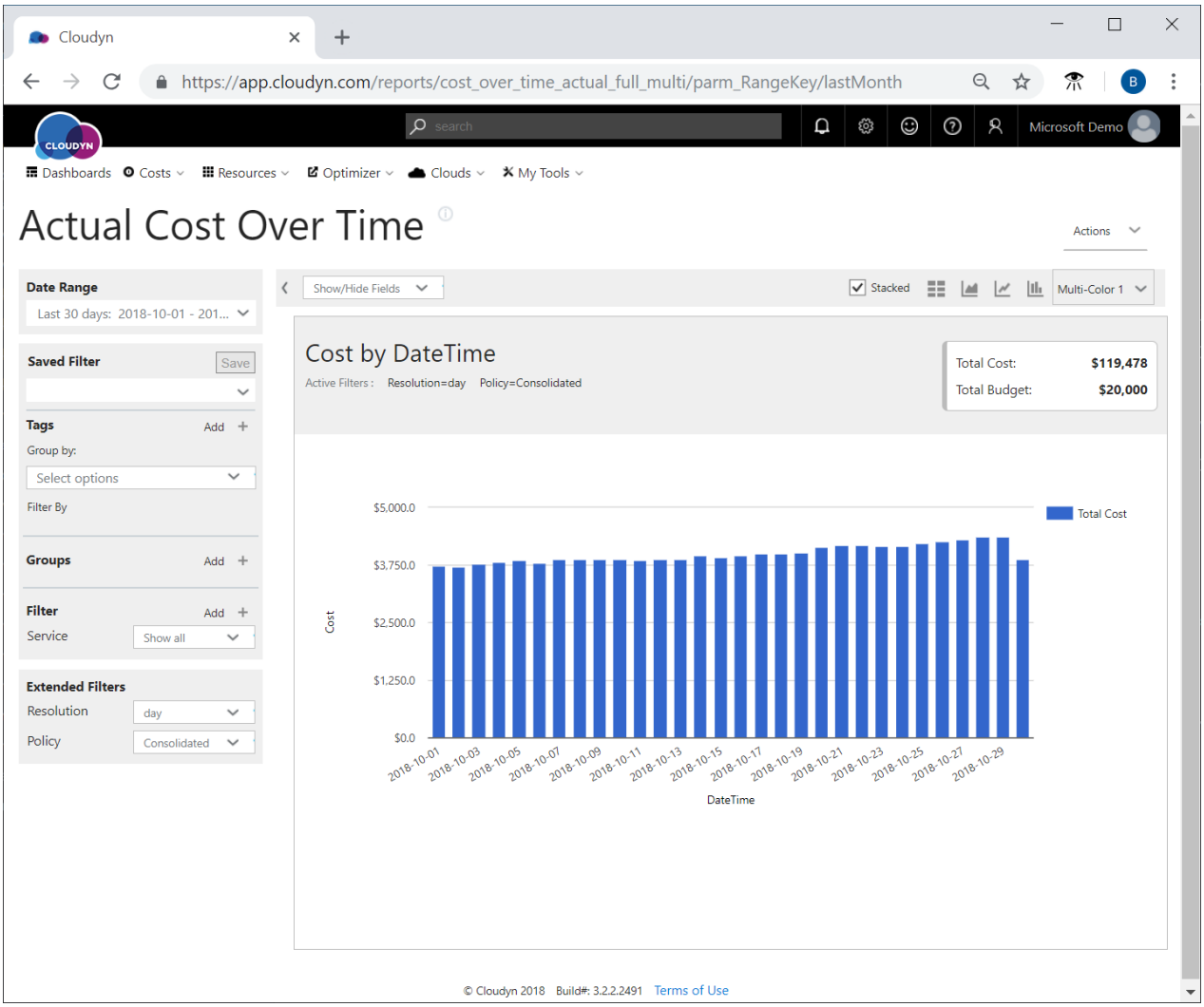
Open the Cloudyn portal

You review all usage and costs in the Cloudyn portal. Open the Cloudyn portal from the Azure portal or navigate to https://azure.cloudyn.com and sign in.

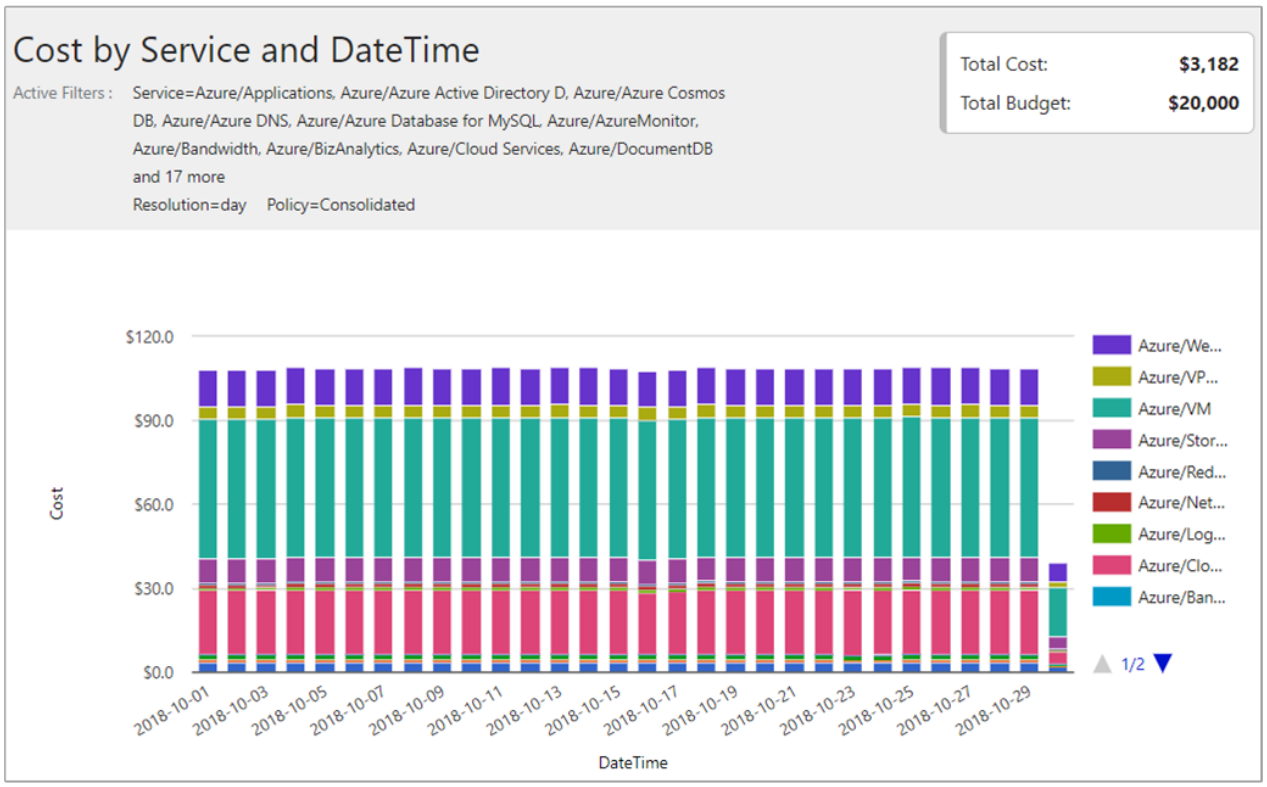
Track usage and cost trends

You track actual money spent for usage and costs with Over Time reports to identify trends. To start looking at trends, use the Actual Cost Over Time report. On the top left of the portal, click **Costs** > **Cost Analysis** > **Actual Cost Over Time**. When you first open the report, no groups or filters are applied to it.

Here is an example report:

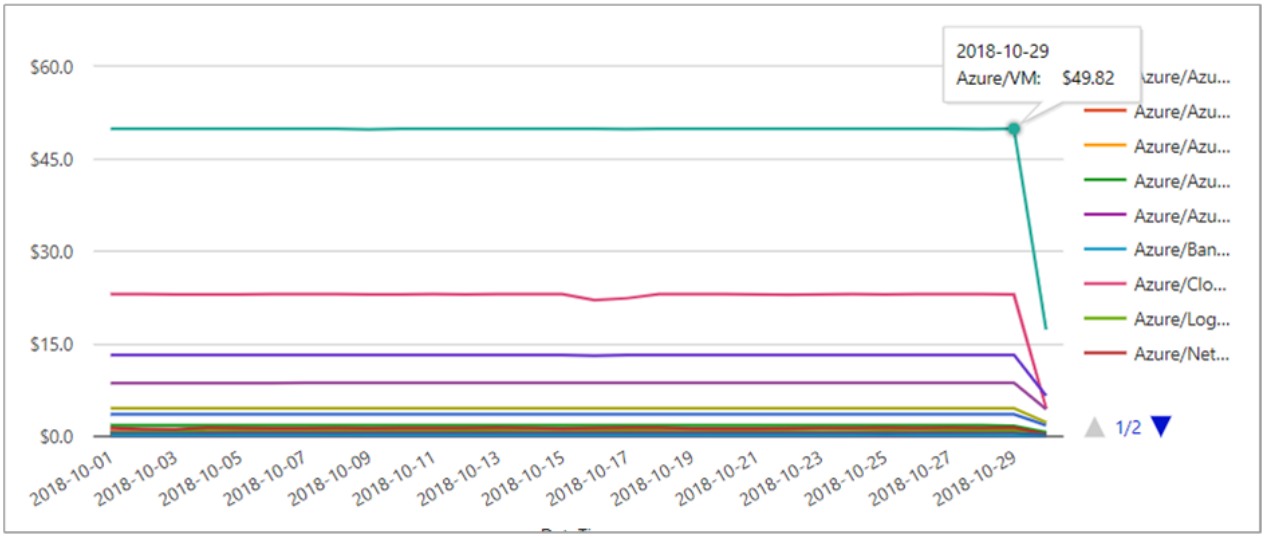


The report shows all spending over the last 30 days. To view only spending for Azure services, apply the Service group and then filter for all Azure services. The following image shows the filtered services.



In the preceding example, less money was spent starting on 2018-10-29. But, too many columns can obscure an obvious trend. You can change the report view to a line or area chart to see the data displayed in other views. The

following image shows the trend more clearly.



Continuing with the example, you can see that the cost for Azure VM dropped. Costs for other Azure services also started dropping on that day. So, what caused that reduction in spending? In this example, a large work project was completed so consumption of many Azure services also dropped.

To watch a tutorial video about tracking usage and cost trends, see Analyzing your cloud billing data vs. time with Cloudyn.

Detect usage inefficiencies

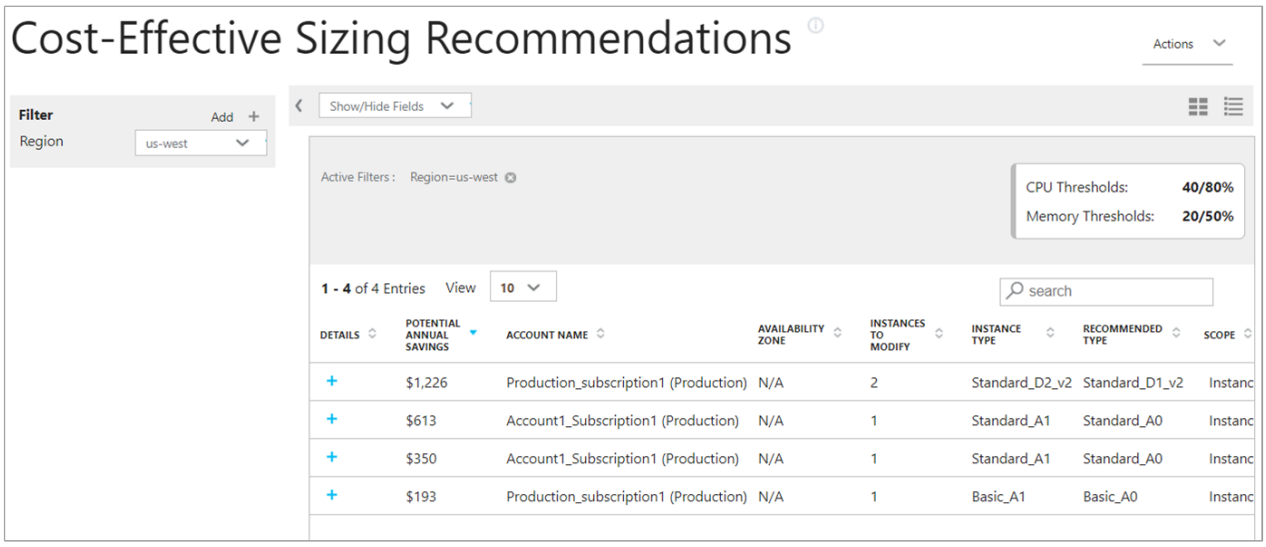
Optimizer reports improve efficiency, optimize usage, and identify ways to save money spent on your cloud resources. They are especially helpful with cost-effective sizing recommendations intended to help reduce idle or expensive VMs.

A common problem that affects organizations when they initially move resources in to the cloud is their virtualization strategy. They often use an approach similar to the one they used for creating virtual machines for the on-premises virtualization environment. And, they assume that costs are reduced by moving their on-premises VMs to the cloud, as-is. However, that approach is not likely to reduce costs.

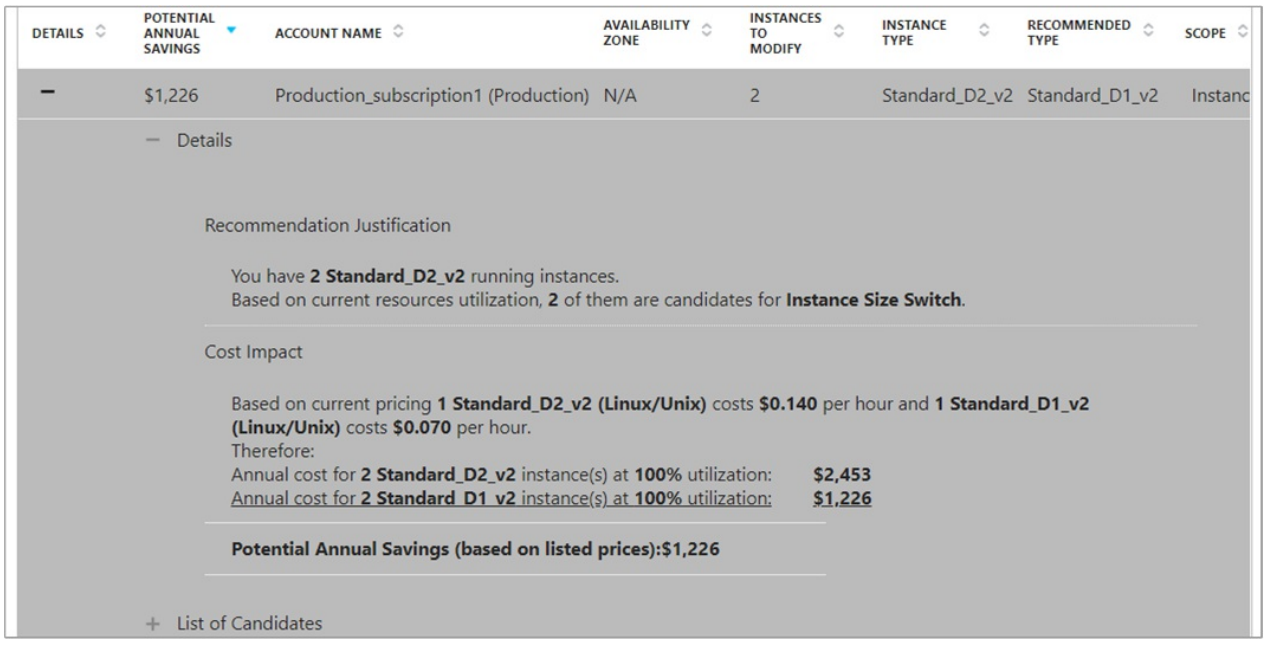
The problem is that their existing infrastructure was already paid for. Users could create and keep large VMs running if they liked—idle or not and with little consequence. Moving large or idle VMs to the cloud is likely to *increase* costs. Cost allocation for resources is important when you enter into agreements with cloud service providers. You must pay for what you commit to whether you use the resource fully or not.

The Cost Effective Sizing Recommendations report identifies potential annual savings by comparing VM instance type capacity to their historical CPU and memory usage data.

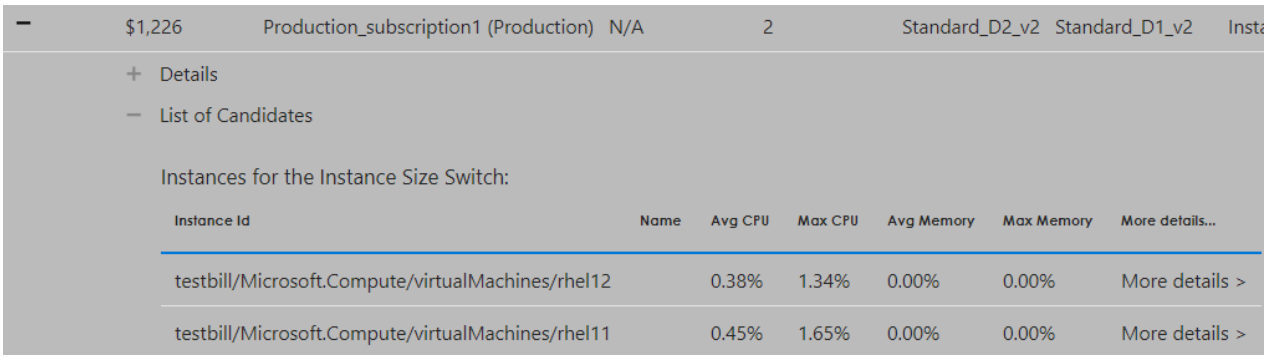
On the menu at the top of the portal, click **Optimizer** > **Sizing Optimization** > **Cost Effective Sizing Recommendations**. If useful, apply a filter to reduce results. Here's an example image.



In this example, $2,382 could be saved by following the recommendations to change the VM instance types. Click the plus symbol (+) under **Details** for the first recommendation. Here are details about the first recommendation.



View VM instance IDs by clicking the plus symbol next to **List of Candidates**.



To watch a tutorial video about detecting usage inefficiencies, see Optimizing VM Size in Cloudyn.

Azure Cost Management also provides cost-saving recommendations for Azure services. For more information, see Tutorial: Optimize costs from recommendations.

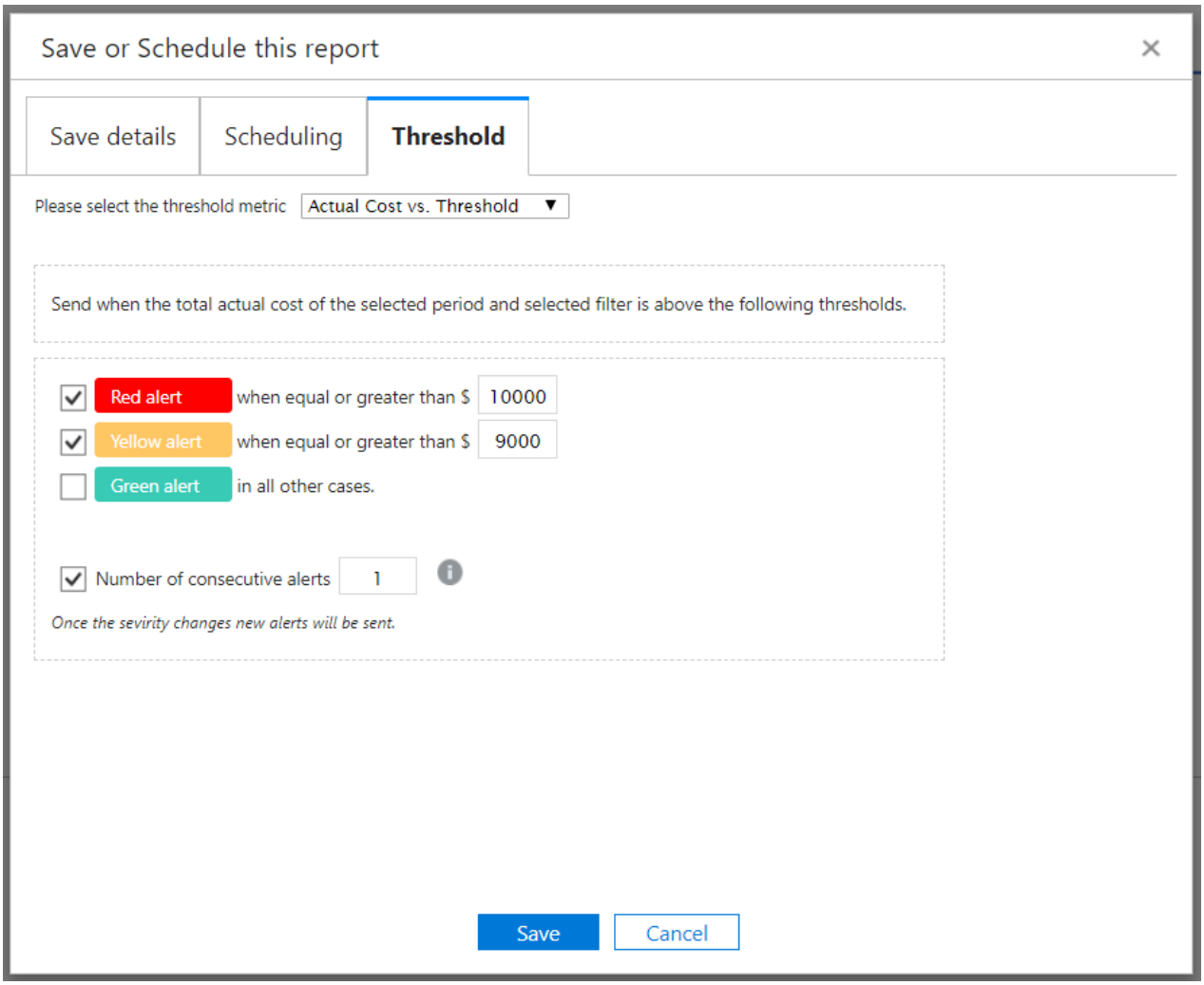
Create alerts for unusual spending

Alerts allow you to automatically notify stakeholders of spending anomalies and overspending risks. You can

create alerts using reports that support alerts based on budget and cost thresholds.

This example uses the **Actual Cost Over Time** report to send a notification when your spending on an Azure VM nears your total budget. In this scenario, you have a total budget of $20,000 and you want to receive a notification when costs are approaching half of your budget, $9,000, and an additional alert when costs reach $10,000.

1. From the menu at the top of the Cloudyn portal, select **Costs** > **Cost Analysis** > **Actual Cost Over Time**.
2. Set **Groups** to **Service** and set **Filter on the service** to **Azure/VM**.
3. In the top right of the report, select **Actions** and then select **Schedule report**.
4. To send yourself an email of the report at scheduled interval, select the **Scheduling** tab in the **Save or Schedule this** report dialog. Be sure to select **Send via email**. Any tags, grouping, and filtering you use are included in the emailed report.
5. Select the **Threshold** tab and then select **Actual Cost vs. Threshold**.
   a. In the **Red alert** threshold box enter 10000.
   b. In the **Yellow alert** threshold box enter 9000.
   c. In the **Number of consecutive alerts** box, enter the number of consecutive alerts to receive. When you receive the total number of alerts that you specified, no additional alerts are sent.
6. Select **Save**.



You can also choose the **Cost Percentage vs. Budget** threshold metric to create alerts. This allows you to specify the thresholds as percentages of your budget instead of currency values.

Export data

Similar to way you create alerts for reports, you can also export data from any report. For example, you might

want to export a list of Cloudyn accounts or other user data. To export any report, open the report and then in the top right of the report, click **Actions**. Some of the actions you might want to take are **Export all report data** so that you can download or print the information. Or, you can select **Schedule report** to schedule the report to get sent as an email.

Next steps

In this tutorial, you learned how to:

- Track usage and cost trends
- Detect usage inefficiencies
- Create alerts for unusual spending or overspending
- Export data

Advance to the next tutorial to learn how to forecast spending using historical data.

Forecast future spending

Tutorial: Forecast future spending

1/14/2020 • 2 minutes to read • Edit Online

Cloudyn helps you forecast future spending using historical usage and spending data. You use Cloudyn reports to view all cost projection data. The examples in this tutorial walk you through reviewing cost projections using the reports. In this tutorial, you learn how to:

- Forecast future spending

If you don't have an Azure subscription, create a free account before you begin.

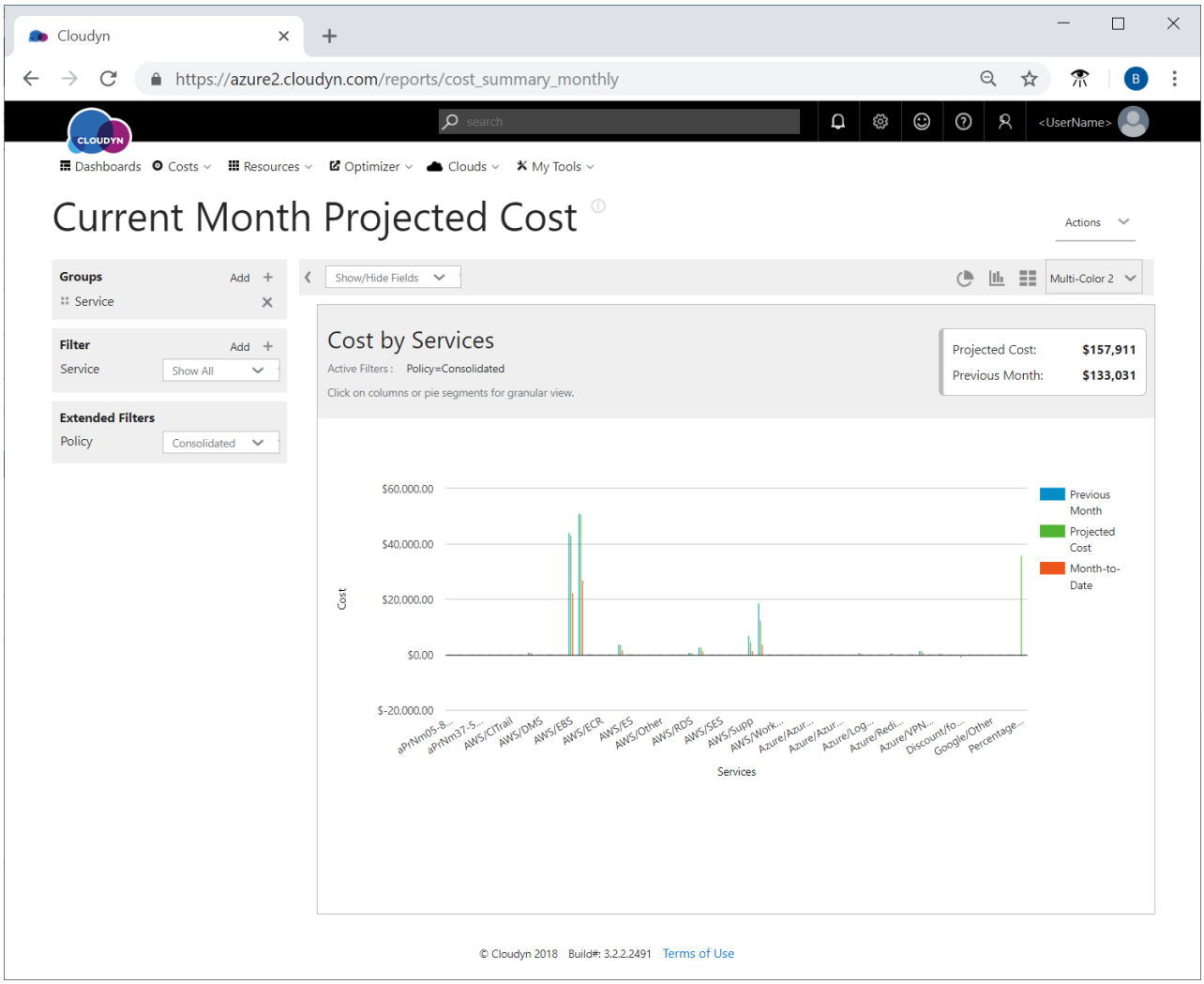
Prerequisites

- You must have an Azure account.
- You must have either a trial registration or paid subscription for Cloudyn.

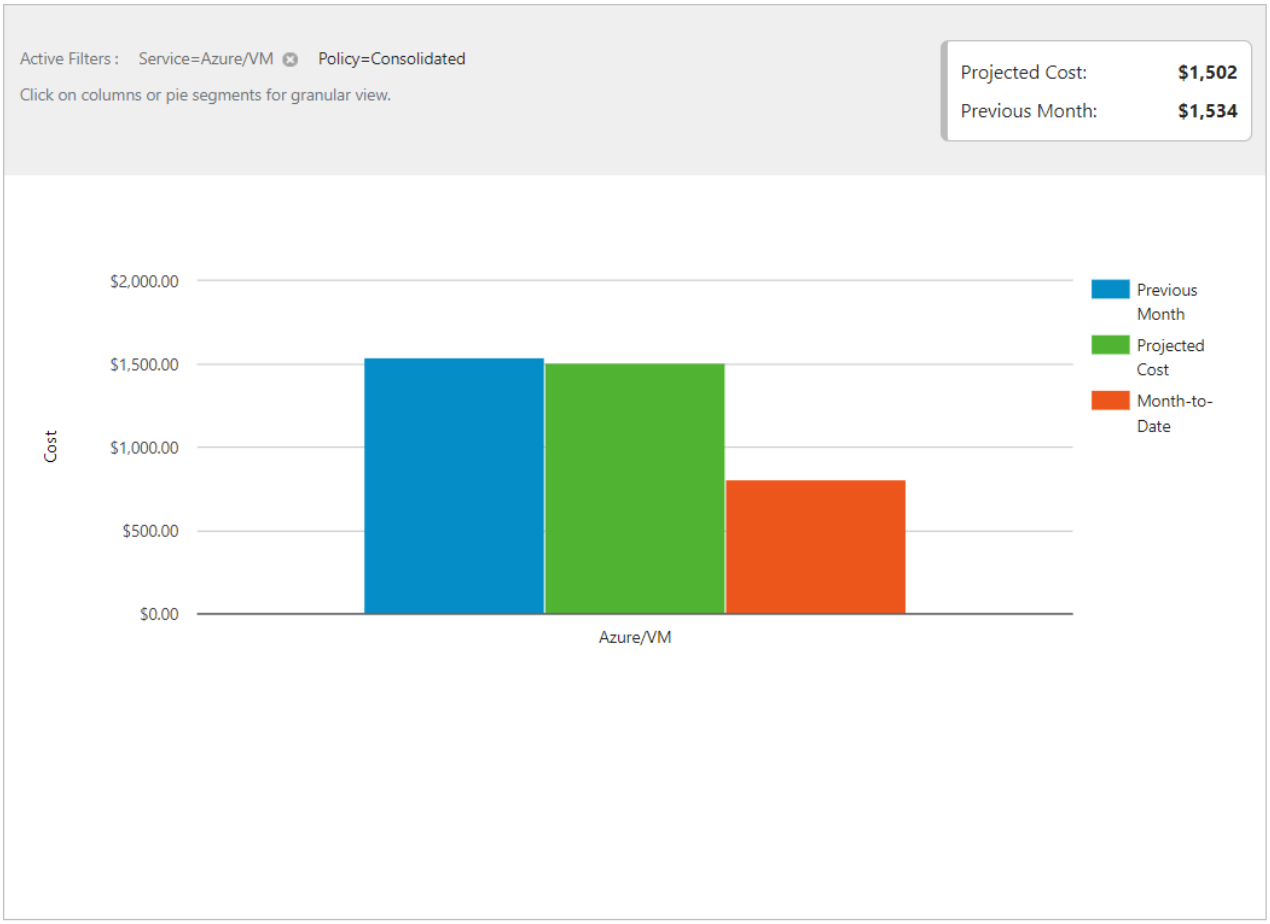
Forecast future spending

Cloudyn includes cost projection reports to help you forecast spending based on your usage over time. Their primary purpose is to help you ensure that your cost trends do not exceed your organization's expectations. The reports you use are Current Month Projected Cost and Annual Projected Cost. Both show projected future spending if your usage remains relatively consistent with your last 30 days of usage.

The Current Month Projected Cost report shows the costs of your services. It uses costs from the beginning of the month and the previous month to show the projected cost. On the reports menu at the top of the portal, click **Costs** > **Projection and Budget** > **Current Month Projected Cost**. The following image shows an example.



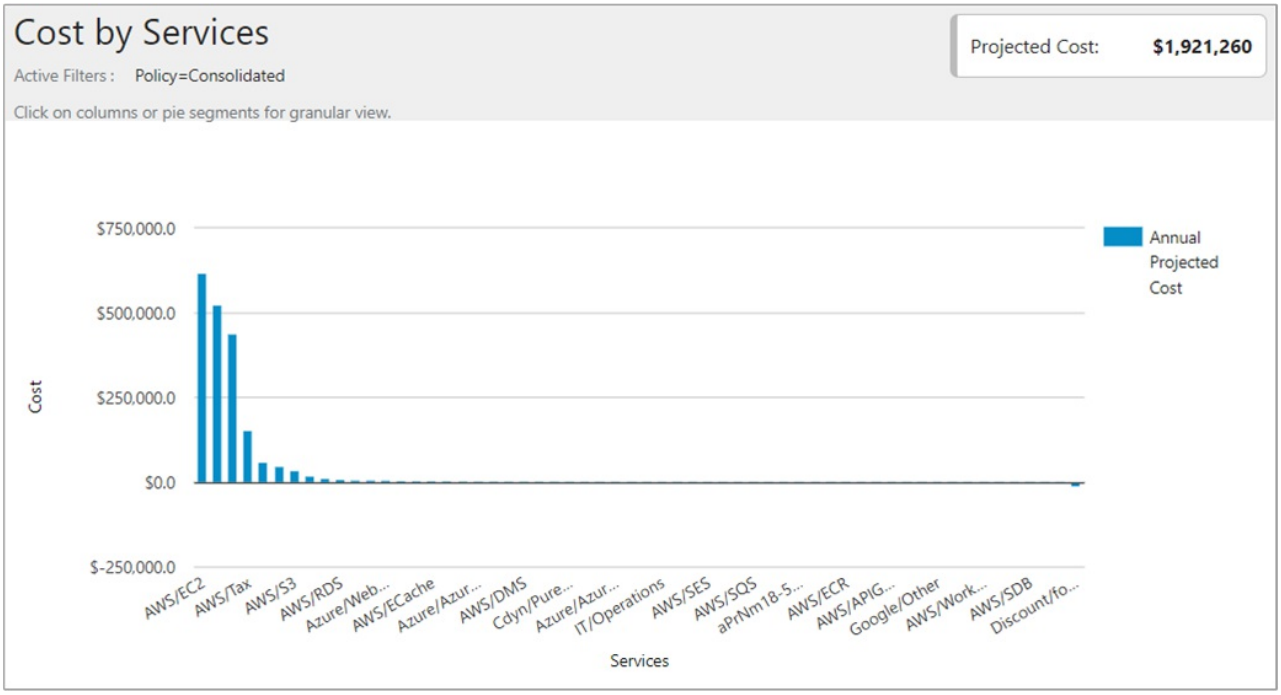
In the example, you can see which services spent the most. Azure costs were lower than AWS costs. If you want to see cost projection details for Azure VMs, in the **Filter** list, select **Azure/VM**.



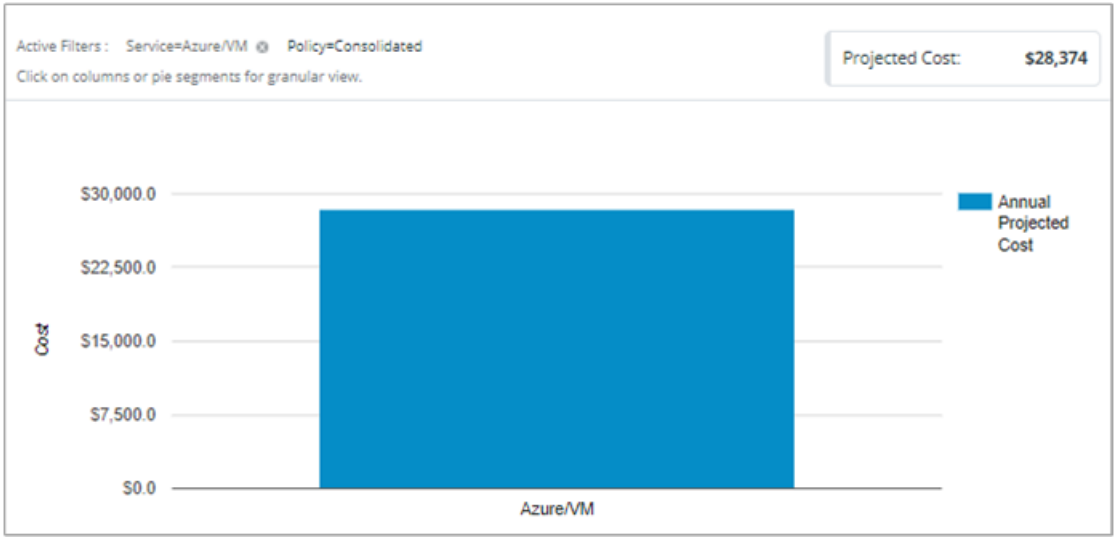
Follow the same basic preceding steps to look at monthly cost projections for other services you're interested in.

The Annual Projected Cost report shows the extrapolated cost of your services over the next 12 months.

On the reports menu at the top of the portal, click **Costs** > **Projection and Budget** > **Annual Projected Cost**. The following image shows an example.



In the example, you can see which services spent the most. Like the monthly example, Azure costs were lower than AWS costs. If you want to see cost projection details for Azure VMs, in the **Filter** list, select **Azure/VM**.



In the image above, the annual projected cost of Azure VMs is $28,374.

Next steps

In this tutorial, you learned how to:

- Forecast future spending

Advance to the next tutorial to learn how to manage costs with cost allocation and showback reports.

Manage costs with cost allocation and showback reports

Tutorial: Manage costs by using Cloudyn

1/14/2020 • 7 minutes to read • Edit Online

You manage costs and produce showback reports in Cloudyn by allocating costs based on tags. The process of cost allocation assigns costs to your consumed cloud resources. Costs are fully allocated when all your resources are categorized with tags. After costs are allocated, you can provide showback or chargeback to your users with dashboards and reports. However, many resources might be untagged or untaggable when you start to use Cloudyn.

For example, you might want to get reimbursed for engineering costs. You need to be able to show your engineering team that you need a specific amount, based on resource costs. You can show them a report for all the consumed resources that are tagged *engineering*.

In this article, tags and categories are sometimes synonymous. Categories are broad collections and can be many things. They might include business units, cost centers, web services, or anything that is tagged. Tags are name/value pairs that enable you to categorize resources and to view and manage consolidated billing information by applying the same tag to multiple resources and resource groups. In earlier versions of the Azure portal, a *tag name* was referred to as a *key*. Tags are created for and stored by a single Azure subscription. Tags in AWS consist of key/value pairs. Because both Azure and AWS have used the term *key*, Cloudyn uses that term. Category Manager uses keys (tag names) to merge tags.

In this tutorial, you learn how to:

- Use custom tags to allocate costs.
- Create showback and chargeback reports.

If you don't have an Azure subscription, create a free account before you begin.

Prerequisites

- You must have an Azure account.
- You must have either a trial registration or paid subscription for Cloudyn.
- Unactivated accounts must be activated in the Cloudyn portal.
- Guest-level monitoring must be enabled on your virtual machines.

Use custom tags to allocate costs

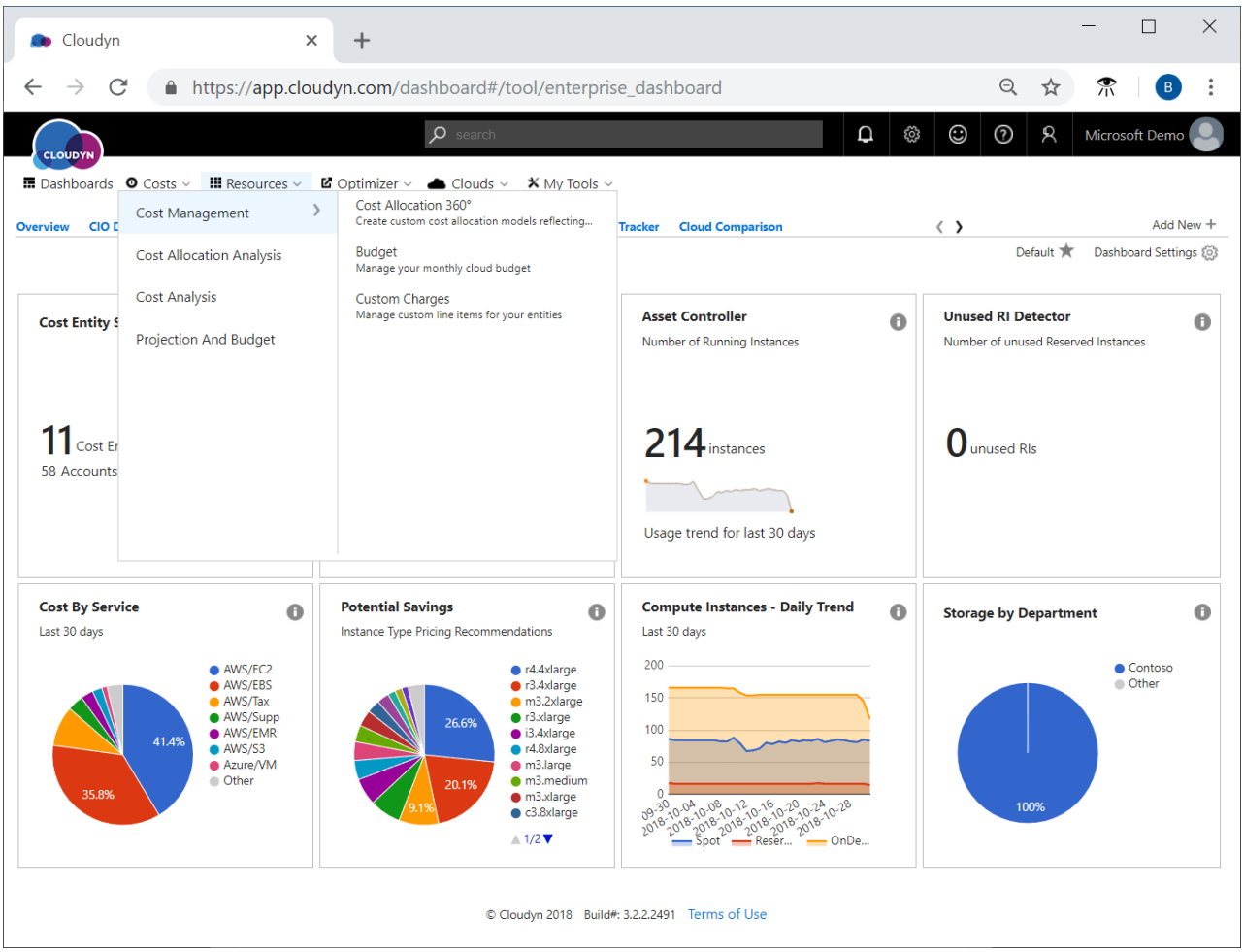
Cloudyn gets resource group tag data from Azure and automatically propagates tag information to resources. In cost allocation, you can see cost by resource tags.

Using the Cost Allocation model, you define categories (tags) that get applied internally to uncategorized (untagged) resources to group your costs and define rules to handle the untagged costs. Cost allocation rules are your saved instructions where a service's costs are distributed to some other service. Afterward, those resources then show tags/categories in *cost allocation* reports by selecting the model that you created.

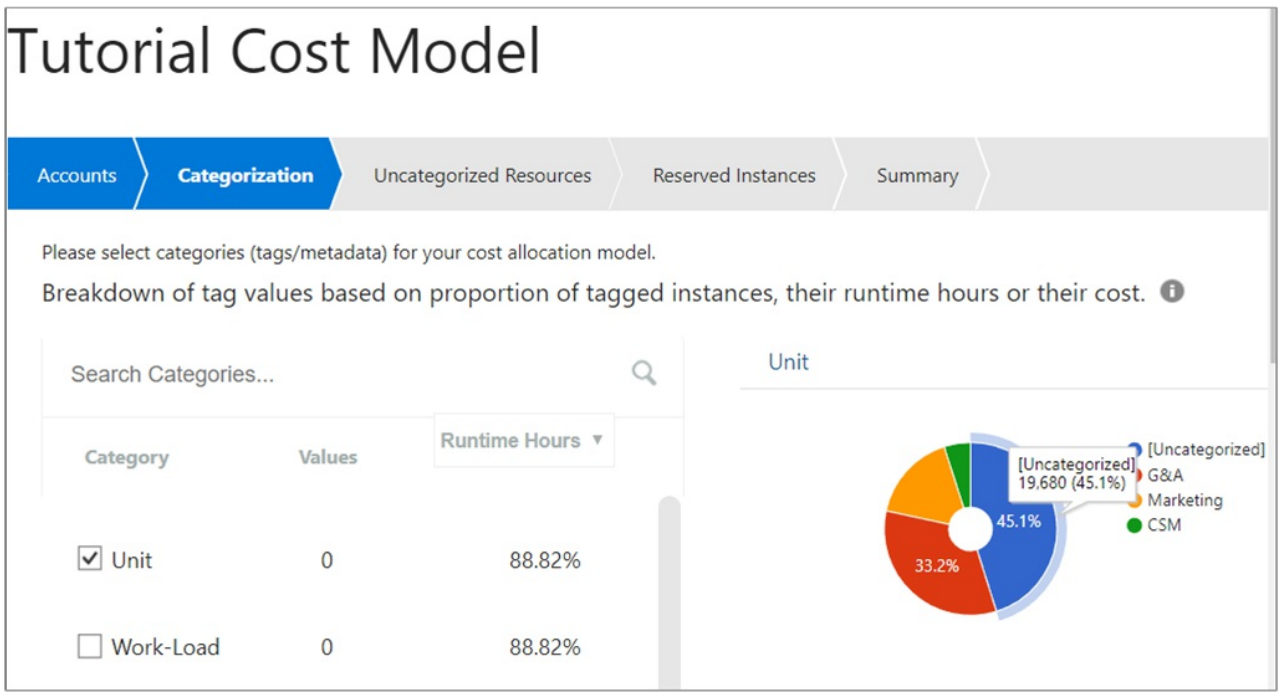
Keep in mind that tag information doesn't appear for those resources in *cost analysis* reports. Also, tags applied in Cloudyn using cost allocation aren't sent to Azure, so you won't see them in the Azure portal.

When you start cost allocation, the first thing you do is define the scope by using a cost model. The cost model does not change costs, it distributes them. When you create a cost model, you segment your data by cost entity, account, or subscription, and by multiple tags. Common example tags might include a billing code, cost center, or group name. Tags also help you perform showback or chargeback to other parts of your organization.

To create a custom cost allocation model, select **Costs** > **Cost Management** > **Cost Allocation 360°** on the report's menu.



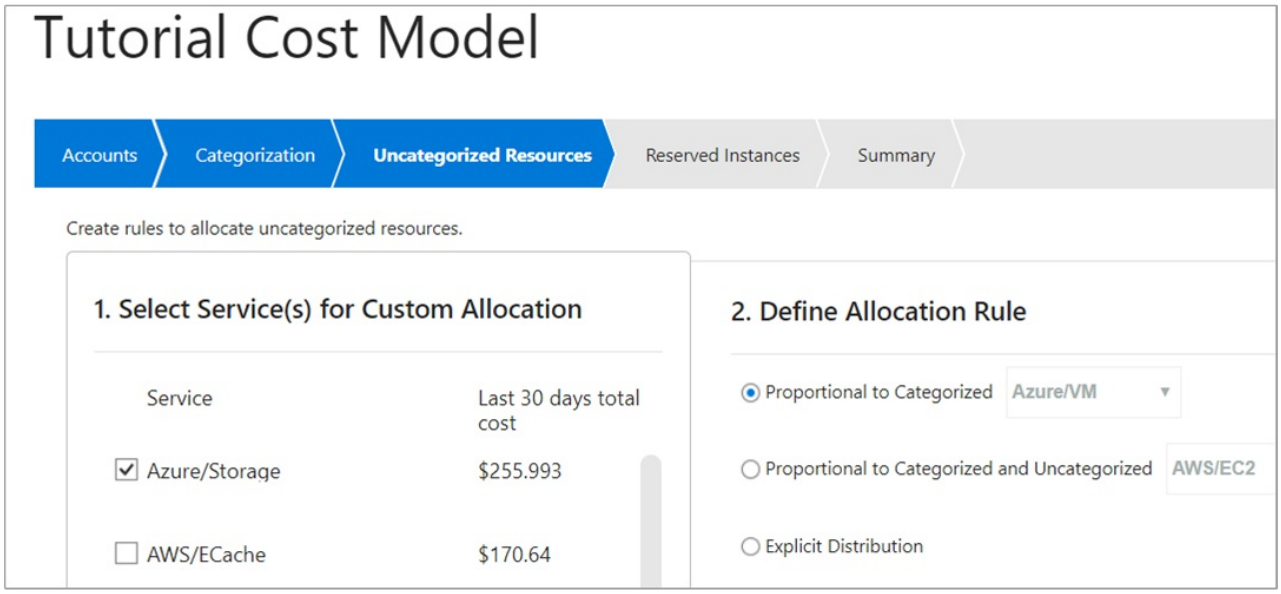
On the **Cost Allocation 360** page, select **Add** and then enter a name and description for your cost model. Select either all accounts or individual accounts. If you want to use individual accounts, you can select multiple accounts from multiple cloud service providers. Next, click **Categorization** to choose the discovered tags that categorize your cost data. Choose tags (categories) that you want to include in your model. In the following example, the **Unit** tag is selected.



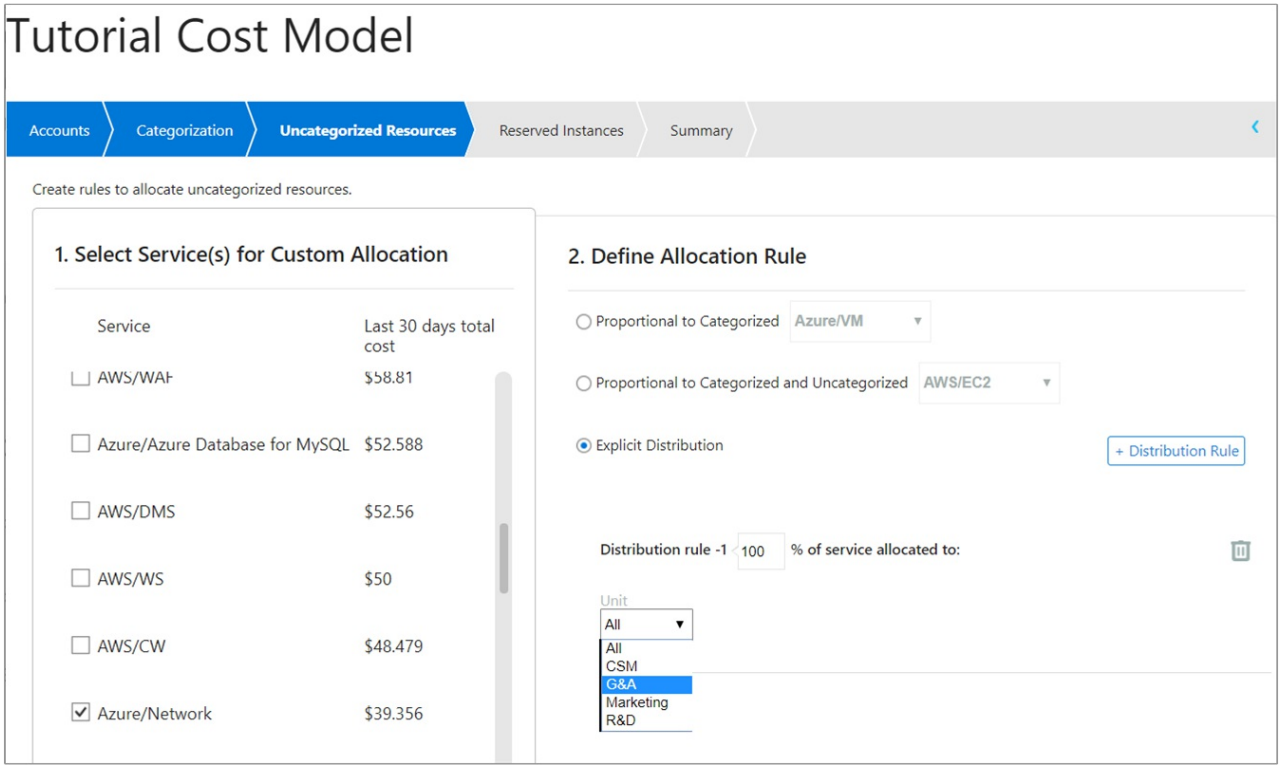
The example shows that $19,680 is uncategorized (without tags).

Next, select **Uncategorized Resources** and select services that have unallocated costs. Then, define rules to allocate costs.

For example, you might want to take your Azure storage costs and distribute the costs equally to Azure virtual machines (VMs). To do so, select the **Azure/Storage** service, select **Proportional to Categorized**, and then select **Azure/VM**. Then, select **Create**.



In a different example, you might want to allocate all your Azure network costs to a specific business unit in your organization. To do so, select the **Azure/Network** service and then under **Define Allocation Rule**, select **Explicit Distribution**. Then, set the distribution percentage to 100 and select the business unit—**G&A** in the following image:



For all remaining uncategorized resources, create additional allocation rules.

If you have any unallocated Amazon Web Services (AWS) reserved instances, you can assign them to tagged categories with **Reserved Instances**.

To view information about the choices that you made to allocate costs, select **Summary**. To save your information and to continue working on additional rules later, select **Save As Draft**. Or, to save your information and have

Cloudyn start processing your cost allocation model, select **Save and Activate**.

The list of cost models shows your new cost model with **Processing status**. It can take some time before the Cloudyn database is updated with your cost model. When processing is done, the status is updated to **Completed**. You can then view data from your cost model in the Cost Analysis report under **Extended Filters** > **Cost Model**.

Category Manager

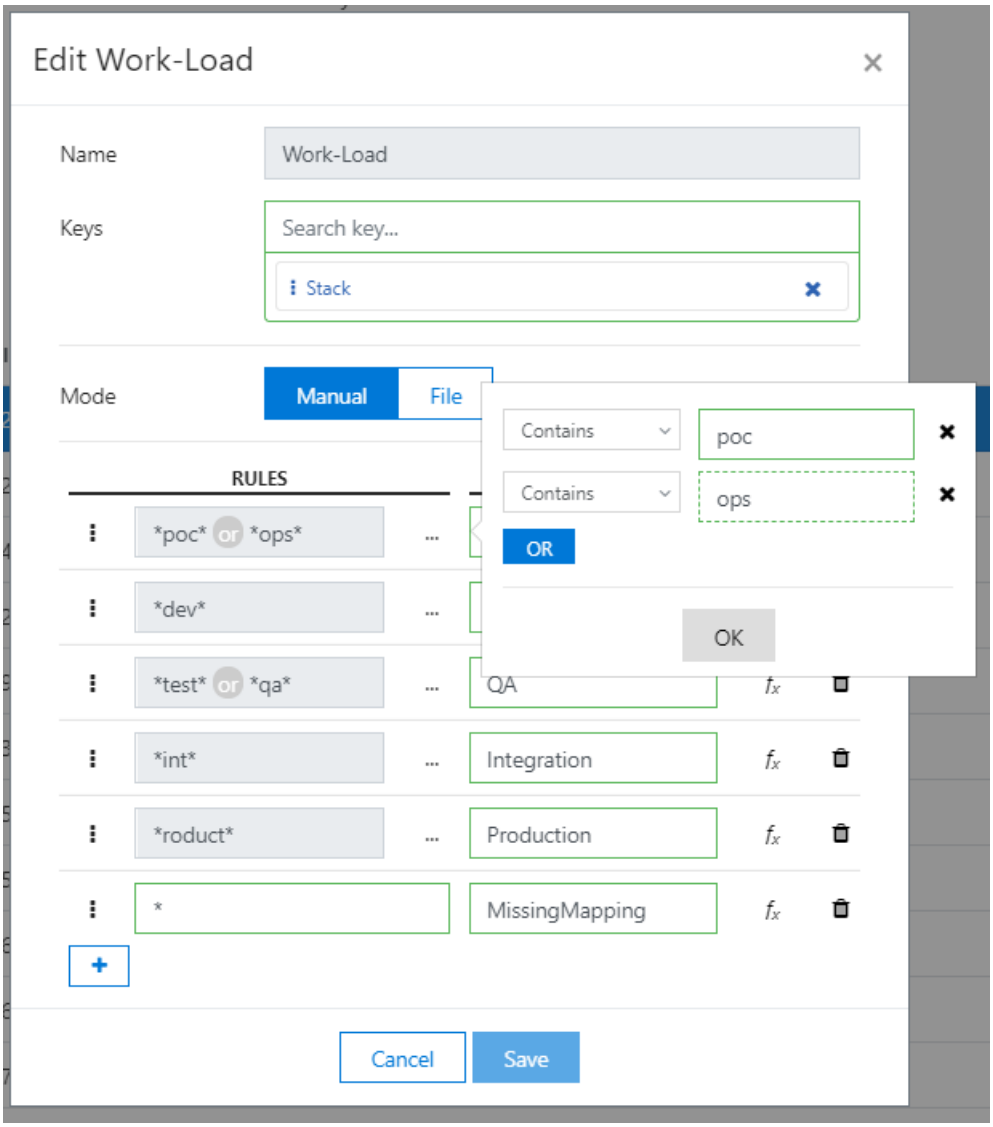
Category Manager is a data-cleansing tool that helps you merge the values of multiple categories (tags) to create new ones. It's a simple rule-based tool where you select a category and create rules to merge existing values. For example, you might have existing categories for **R&D** and **dev** where both represent the development group.

In the Cloudyn portal, click the gear symbol in the upper right and select **Category Manager**. To create a new category, select the plus symbol (**+**). Enter a name for the category and then under **Keys**, enter the category keys that you want to include in the new category.

When you define a rule, you can add multiple values with an OR condition. You can also do some basic string operations. For either case, click the ellipsis symbol (**...**) to the right of **Rule**.

To define a new rule, in the **Rules** area, create a new rule. For example, enter **dev** under **Rules** and then enter **R&D** under **Actions**. When you're done, save your new category.

The following image shows an example of rules created for a new category named **Work-Load**:



Tag sources and reports

Tag data that you see in Cloudyn reports originates in three places:

- Cloud provider resources APIs
- Cloud provider billing APIs
- Manually-created tags from the following sources:
  - Cloudyn entity tags - user-defined meta data applied to Cloudyn entities
  - Category Manager - a data cleansing tool that creates new tags based on rules that are applied to existing tags

To view cloud provider tags in Cloudyn cost reports you must create a custom cost allocation model using Cost Allocation 360. To do so, go to **Costs** > **Cost Management** > **Cost Allocation 360**, select the desired tags, and then define rules to handle untagged costs. Then, create a new cost model. Afterward, you can view reports in Cost Allocation Analysis to view, filter, and sort on your Azure resource tags.

Azure resource tags only appear in **Costs** > **Cost Allocation Analysis** reports.

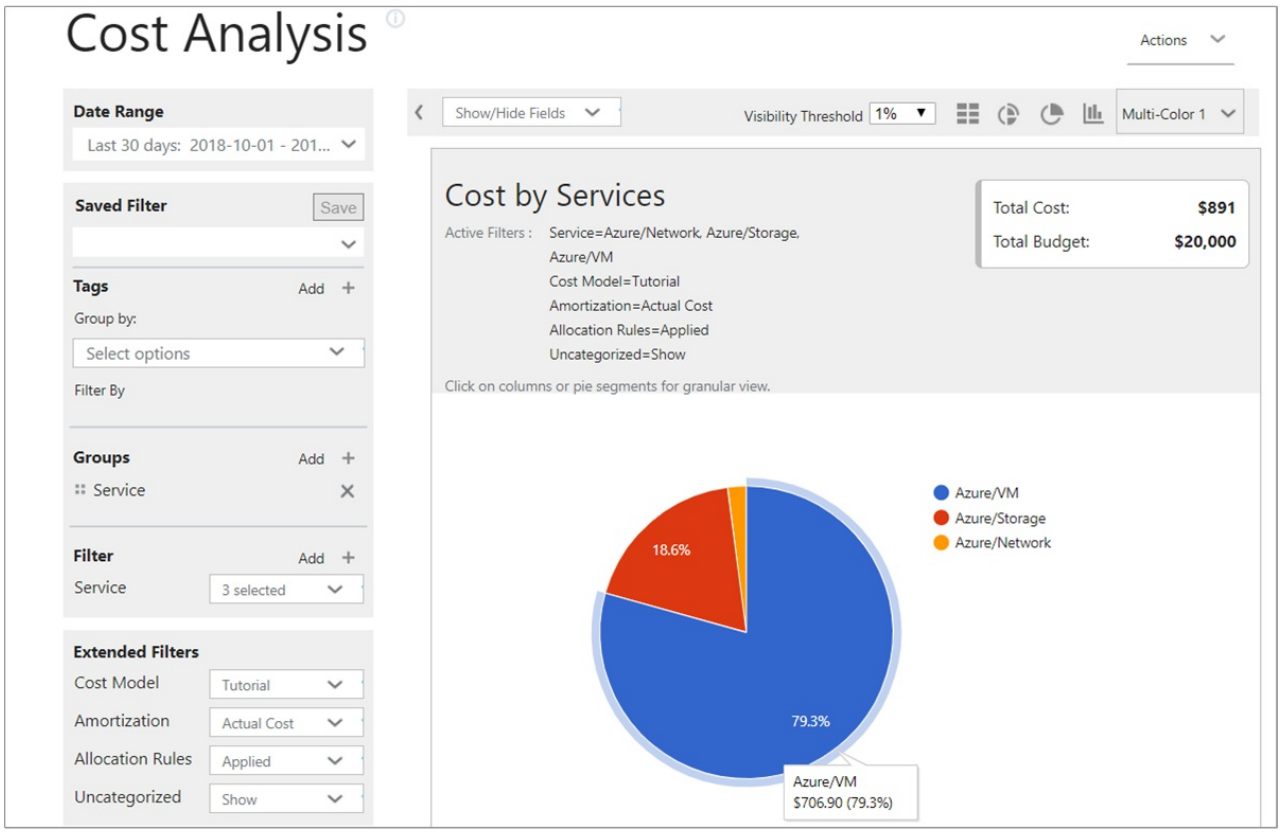
Cloud provider billing tags appear in all cost reports.

Cloudyn entity tags and tags that you manually create appear in all cost reports.

Create showback and chargeback reports

The method that organizations use to perform showback and chargeback varies greatly. However, you can use any of the dashboards and reports in the Cloudyn portal as the basis for either purpose. You can provide user access to anyone in your organization so that they can view dashboards and reports on demand. All Cost Analysis reports support showback because they show users the resources that they consumed. And, they allow users to drill into cost or usage data that's specific to their group within your organization.

To view the results of cost allocation, open the Cost Analysis report and select the cost model that you created. Then, add a grouping by one or more of the tags selected in the cost model.



You can easily create and save reports that focus on specific services consumed by specific groups. For example, you might have a department that uses Azure VMs extensively. You can create a report that's filtered on Azure VMs to show consumption and costs.

If you need to provide snapshot data to other teams, you can export any report in PDF or CSV format.

Next steps

In this tutorial, you learned how to:

- Use custom tags to allocate costs.
- Create showback and chargeback reports.

Advance to the next tutorial to learn about controlling access to data.

Control access to data

Tutorial: Optimize reserved instances

1/14/2020 • 11 minutes to read • Edit Online

In this tutorial, you learn how Cloudyn can help you optimize your reserved instance costs and utilization for Azure and Amazon Web Services (AWS). A reserved instance with either cloud service provider is a commitment to a long-term contract where you commit up-front for future use of the VM. And, it can potentially offer considerable savings versus standard Pay-per-Use VM pricing model. Potential savings are only realized when you fully use the capacity of your reserved instances.

This tutorial explains how Azure and AWS Reserved Instances (RIs) are supported by Cloudyn. It also describes how you can optimize reserved instance costs. Primarily, by ensuring that your reservations are fully utilized. In this tutorial, you will:

- Understand Azure RI costs
- Learn about the benefits of RIs
- Optimize Azure RI costs
- View RI costs
- Assess Azure RI cost effectiveness
- Optimize AWS RI costs
- Buy recommended RIs
- Modify unused reservations

If you don't have an Azure subscription, create a free account before you begin.

Prerequisites

- You must have an Azure account.
- You must have either a trial registration or paid subscription for Cloudyn.
- You must have purchased RIs in Azure or AWS.

Understand Azure RI costs

When you buy Azure Reserved VM Instances, you pay up-front for future use. The up-front payment covers the cost of your future use of the VMs:

- of a specific type
- in a specific region
- for a term of either one or three years
- up to a purchased VM quantity.

You can view your purchased Azure Reserved VM Instances in the Azure portal at Reservations.

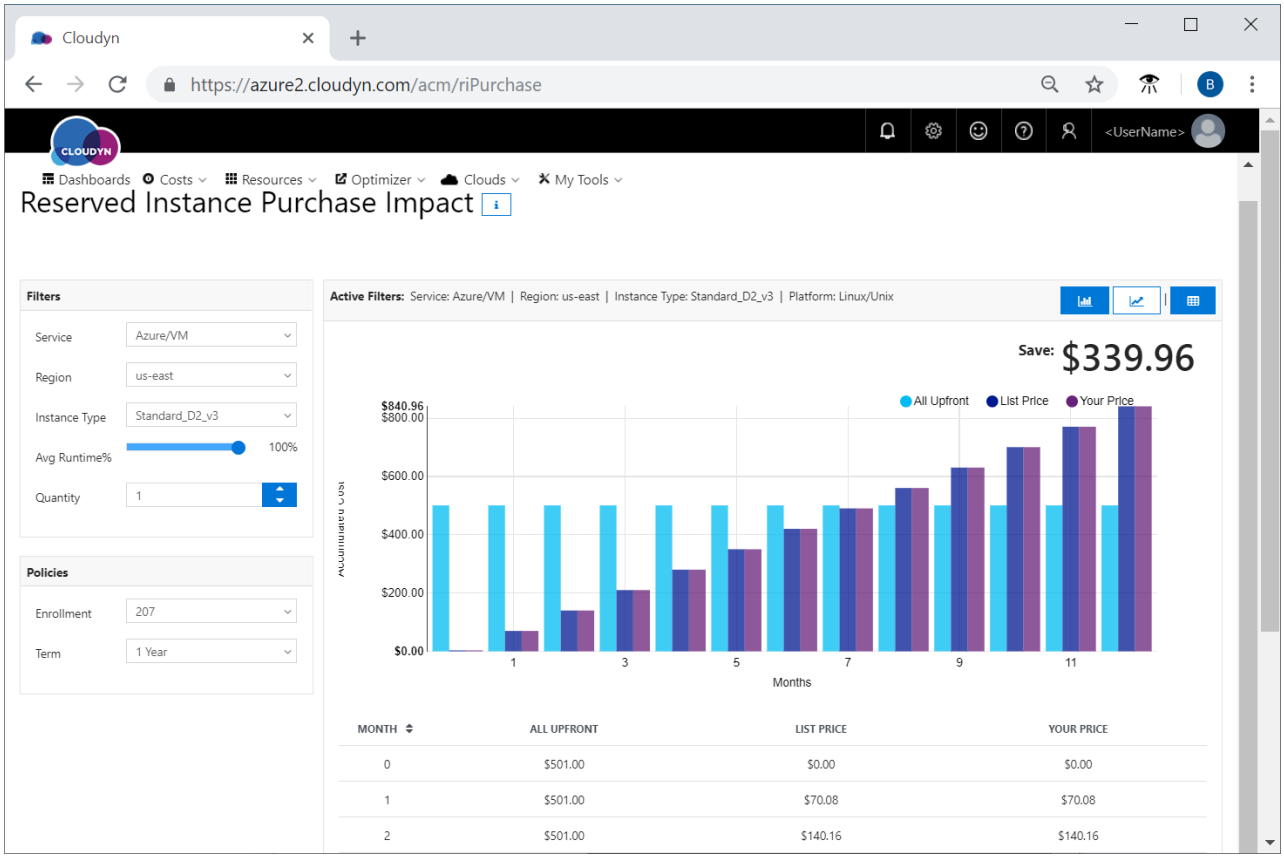
The term *Azure Reserved VM Instance* applies only to a pricing model. It doesn't change your running VMs at all. The term is specific to Azure and is it more generally referred to as *reserved instance* or *reservation*. Reserved instances that you've purchased do not apply to specific VMs - they apply to any matching VM. For example, a reservation for a VM type that runs in a region that you chose for your purchased reservation.

Purchased reserved instances apply only to the basic hardware. They don't cover software licenses of a VM. For example, you might reserve an instance and you have a matching VM running Windows. The reserved instance only covers the base cost of the VM. In this example, you pay the full price of any required Windows licenses. To

get a discount on the operating system or other software running on your VMs, you should consider using Azure Hybrid Benefits. Hybrid Benefits offer you a similar type of discount for your software licenses as the reserved instances do for the base VMs.

Reserved instance utilization does not directly affect cost. In other words, running a VM at 100% CPU utilization or at 0% CPU utilization has the same effect: you are pre-paying for the VM allocation—not its actual utilization.

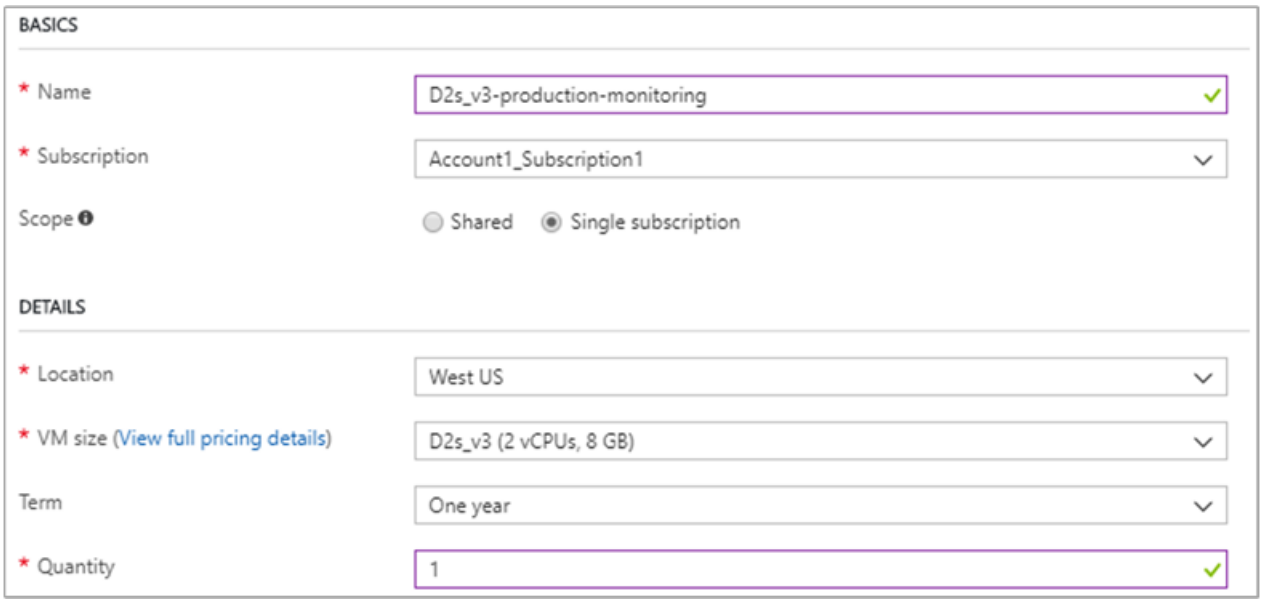
Let's see how standard on-demand VM usage relates to costs in relation to reserved instances, in the following image:



The red bars show the accumulated cost of the reserved instance purchase. You pay only the one-time fee. VM usage is free. The blue bars show the accumulated cost of the same VM running with the pay-as-you-go or on-demand pricing model. Somewhere between the seventh and eighth months in to VM usage there's a *break-even point*. Starting at the eighth month you start saving money, in this example.

Benefits of RIs

Every reserved instance purchase applies to a VM of a specific size and location. For example, D2s_v3 running in the West US location as shown in the following image:



The reserved instance purchase becomes beneficial when a VM runs a sufficient number of hours to reach the reservation break-even point. The VM must match the size and a location of your reserved instance. For example, the break-even point is at about the seventh and a half month in the preceding chart. So, the purchase is beneficial when the VM matching the reservation runs at least 7.5 months * 30 days * 24 hours = 5,400 hours. If the matching VM runs less than 5,400 hours, the reservation is more expensive than pay-as-you-go.

The break-even point might differ for each VM size and for each location. It also depends on your negotiated VM pay-as-you-go price. Before you make a purchase, you should check the break-even point applicable to your case.

Another point to consider when you purchase the reservation is the reserved instance scope. The scope determines whether the benefit of the reservation is shared or if it applies to a specific subscription. Shared reserved instances are randomly applied across all your subscriptions to first-found matching VMs.

The shared purchase scope is the most flexible and it is recommended whenever possible. Your chances of utilizing all your reserved instances are significantly higher with the shared scope. However, when the owner of a subscription pays for the reserved instance, they may have no choice but to purchase it with the Single Subscription scope.

Optimize Azure RI costs

Cloudyn supports reserved instances and Hybrid Benefits by:

- Showing you the costs associated with pricing models
- Tracking RI usage
- Assessing RI impact
- Allocating RI costs according to your policies

The first action you should take before you purchase a reserved instance, is to assess the impact of the RI purchase:

- How much will it cost you?
- How much will you save?
- What is the break-even point?

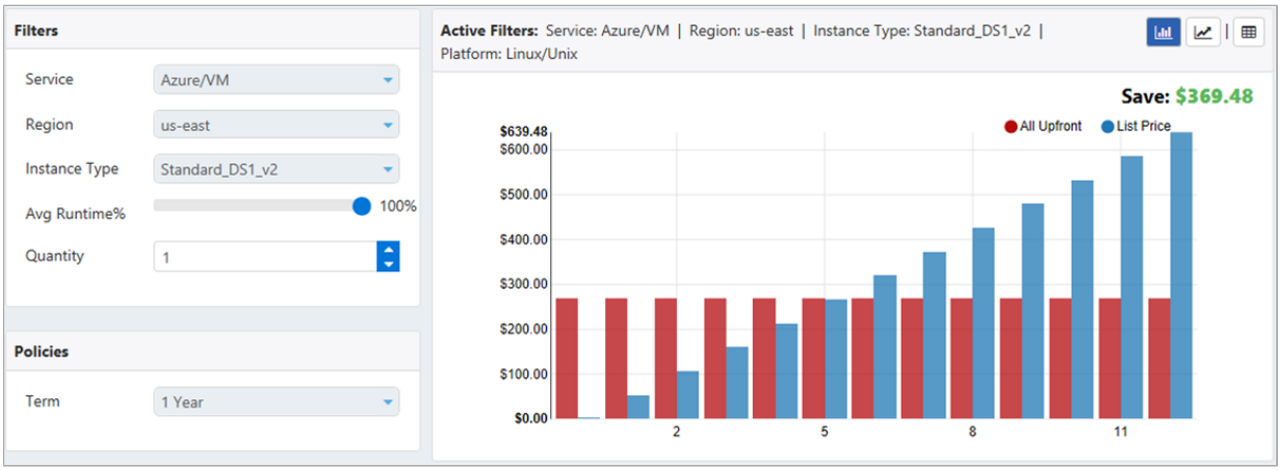
The Reserved Instance Purchase Impact report can help answer those questions.

Assess Azure RI cost effectiveness

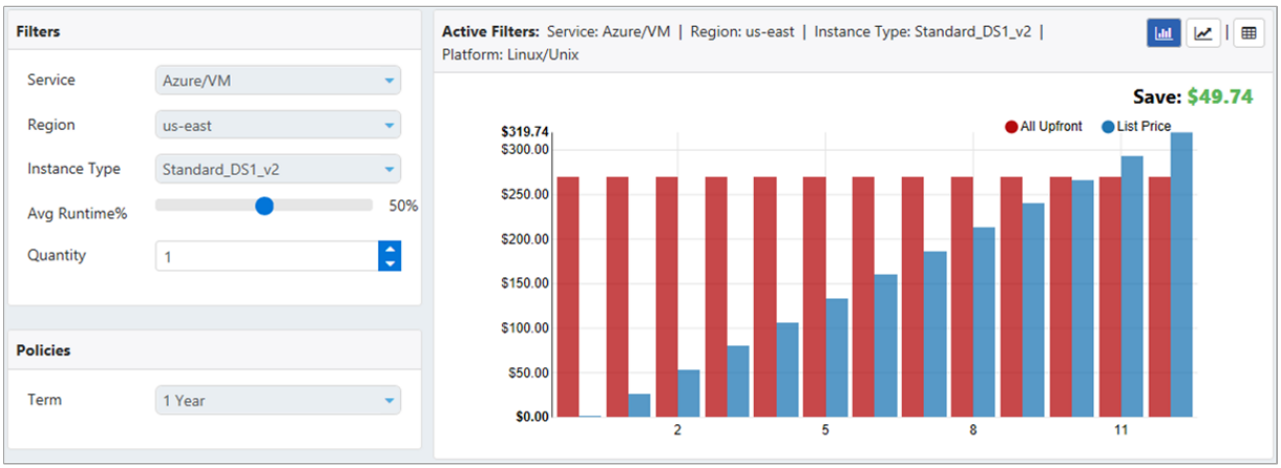
In the Cloudyn portal, navigate to **Optimizer** > **RI Comparison** and then select **Reserved Instance Purchase Impact**.

In the Reserved Instance Purchase Impact report, select a VM size (Instance Type), Location (Region), reservation term, quantity, and the expected runtime. Then you can assess whether your purchase will save you money.

For example, if you purchase a reservation for a VM of type DS1_v2 in East US and it runs 24x7 through an entire year, then you could save $369.48 annually. The break-even point is at five months. See the following image:



However, if it runs only 50% of the time, the break-even point will be at 10 months and the saving will be only $49.74 annually. You might not benefit by purchasing the reservation for that instance type in this example. See the following image:



View RI costs

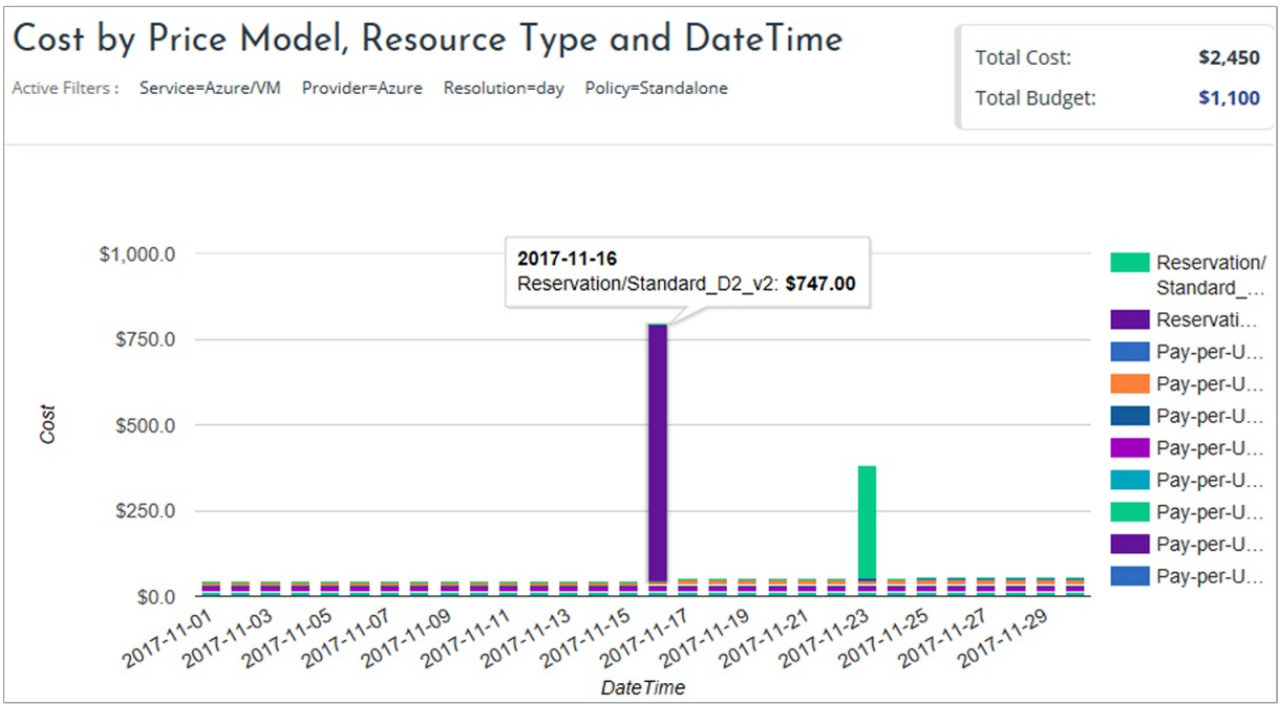
When you purchase a reservation, you make a one-time payment. There are two ways to view the payment in Cloudyn:

- Actual Cost
- Amortized Cost

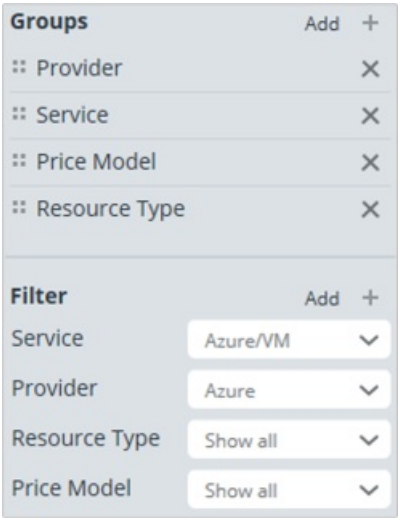
Actual reserved instance cost

The Actual Cost Analysis and Analysis Over Time reports show the full amount that you paid for the reservation, starting in the month of purchase. They help you see your actual spending over a period.

Navigate to **Costs** > **Cost Analysis** > in the Cloudyn portal and then select either **Actual Cost Analysis** or **Actual Cost Over Time**. Set the filters next. For example, filter just Azure/VM service and group by Resource Type and Price Model. See the following image:



You can filter by a service, **Azure/VM** in this example, and group by **Price Model** and **Resource Type** as shown in the following image:



You can also analyze the type of payments you've made such as one-time fees, usage fees, and license fees.

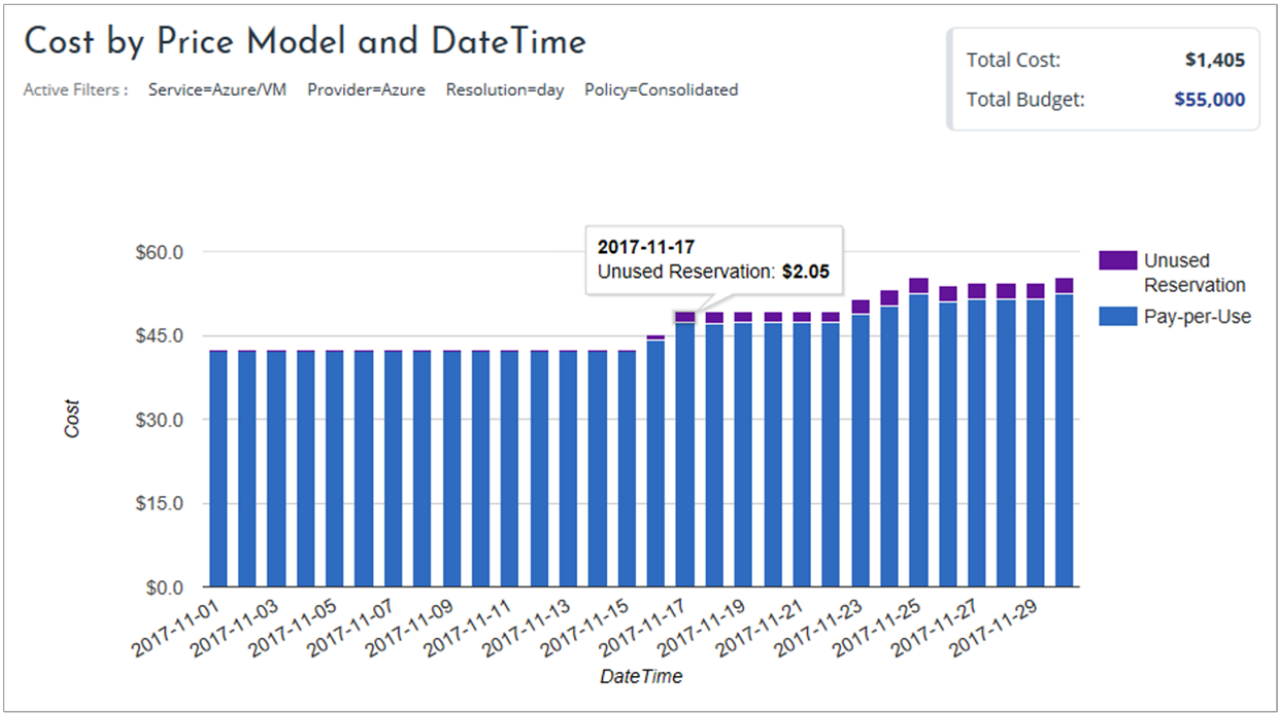
Amortized reserved instance cost

You pay an up-front fee which is visible at the month of the purchase when you purchase an RI. It is not visible in your subsequent invoices. So, looking at your monthly usage may be misleading. Your month truly costs you the monthly usage plus the proportional (amortized) part of any previously made one-time fees. The Amortized Cost report can help you get the true picture.

The amortized reserved instance cost is calculated by taking the reservation one-time fee and amortizing it over the reservation term. In Actual Cost reports, one-time fees are visible in the month of the reservation purchase. Daily and monthly spending does not appear in the actual cost of the deployment. Amortized Cost reports show the actual cost of the deployment over time. The amortized cost report is the only way to see your true cost trends. It is also the only way to project your future spending.

In the Actual Cost report, you saw a spike for an RI purchase on November 16 of $747. In the Amortized Cost report (see the following image), there's a partial day cost on November 16. Starting on November 17 you see the amortized RI cost of $747/365 = $2.05. Incidentally, you also notice that the purchased reservation is unused, so you can optimize it by switching it to a different VM size.

To view it, navigate to **Costs** > **Cost Analysis** > and then select **Amortized Cost Analysis** or **Amortized Cost Over Time**.



Optimize AWS RI costs

Reserved instances are an open commitment. They are useful when you have sustained usage for VMs because reserved instances are less expensive than on-demand instances. However, they need to be sufficiently used. The commitment is to use resources, typically VMs, for a defined period—one or three years. When you make the commitment to buy, you prepay for the resources with a reservation. However, you might not always fully use what you've committed to in the reservation.

For example, you might assess your environment and determine that you had 20 standard D2 instances running constantly over the last year. You could purchase a reservation for them and potentially save significant money. In a different example, you might have committed to using ten MA4 instances for the year. But you might have only used five to date. Both examples illustrate inefficient RI use. There are two ways to optimize costs for reserved instances with Cloudyn optimization reports:

- Review buying recommendations for what you could buy based on your historical usage
- Modify unused reservations

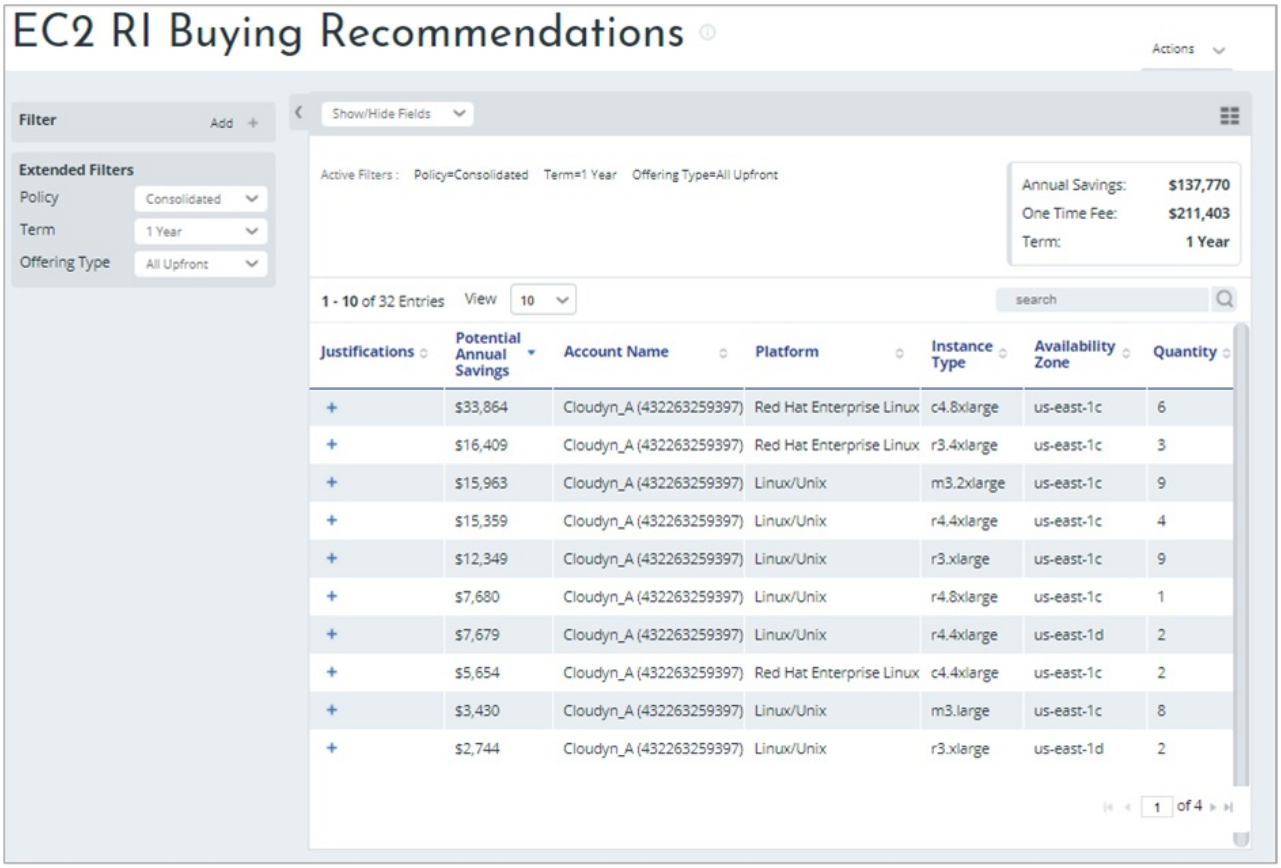
You use the *EC2 RI Buying Recommendations* and *EC2 Currently Unused Reservations* reports to improve your reserved instance usage and costs.

Buy recommended RIs

Cloudyn compares on-demand instance usage and compares it to potential reserved instances. Where it finds possible savings, its recommendations are shown in the EC2 Buying Recommendations report.

On the reports menu at the top of the portal, click **Optimizer** > **Pricing Optimization** > **EC2 RI Buying Recommendations**.

The following image shows buying recommendations from the report.

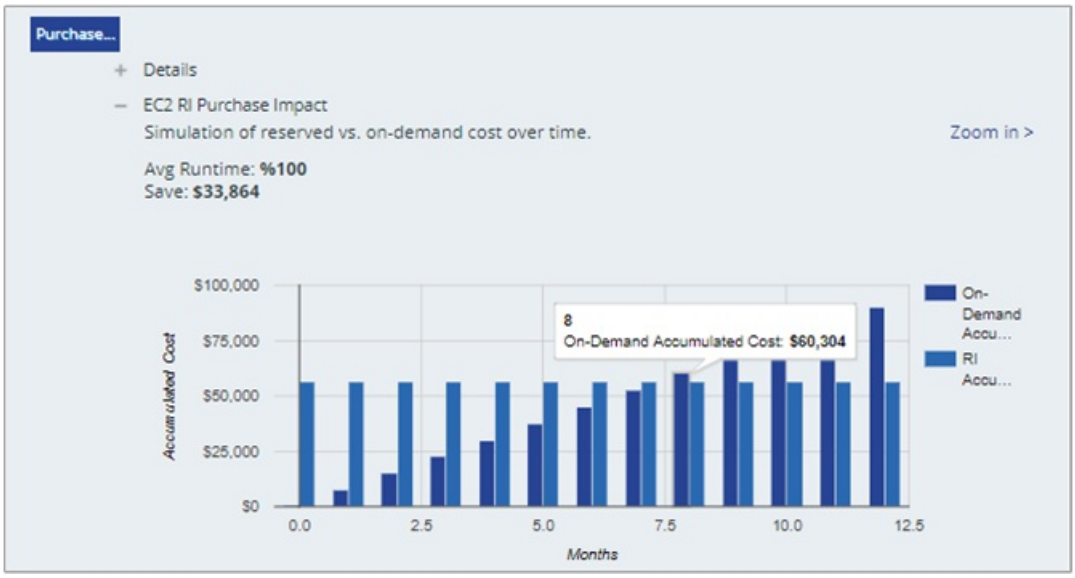


In this example, the Cloudyn_A account has 32 reserve instance buying recommendations. If you follow all the buying recommendations, you could potentially save $137,770 annually. Keep in mind that the purchase recommendations provided by Cloudyn assume that usage for your running workloads will remain consistent.

To view details explaining why each purchase is recommended, click the plus symbol (**+**) under **Justifications** . Here's an example for the first recommendation in the list.

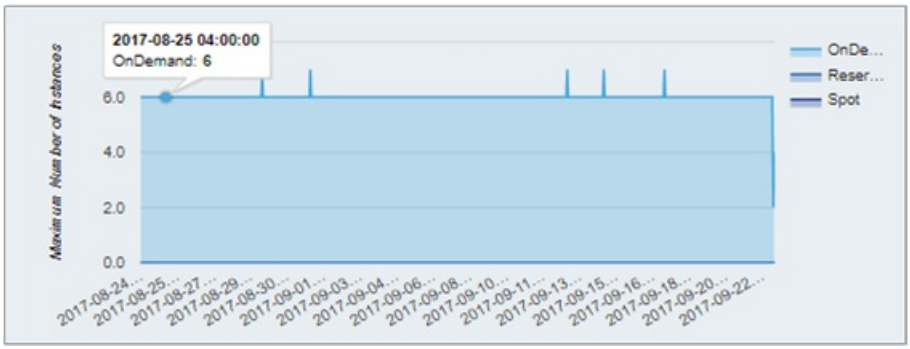
The preceding example shows that running the workload on-demand would cost $90,456 annually. However, if you purchase the reservation in advance, the same workload would cost $56,592 and save you $33,864 annually.

Click the plus symbol next to **EC2 RI Purchase Impact** to view your break-even point over a year to see approximately when your purchase investment is realized. About eight months after making the purchase the on-demand accumulated cost starts to exceed the RI accumulated cost in the following example:



You start saving money at that point.

You can review **Instances over Time** to verify the accuracy of the suggested buying recommendation. In this example, you can see that six instances were used on average for the workload over the last 30-day period.



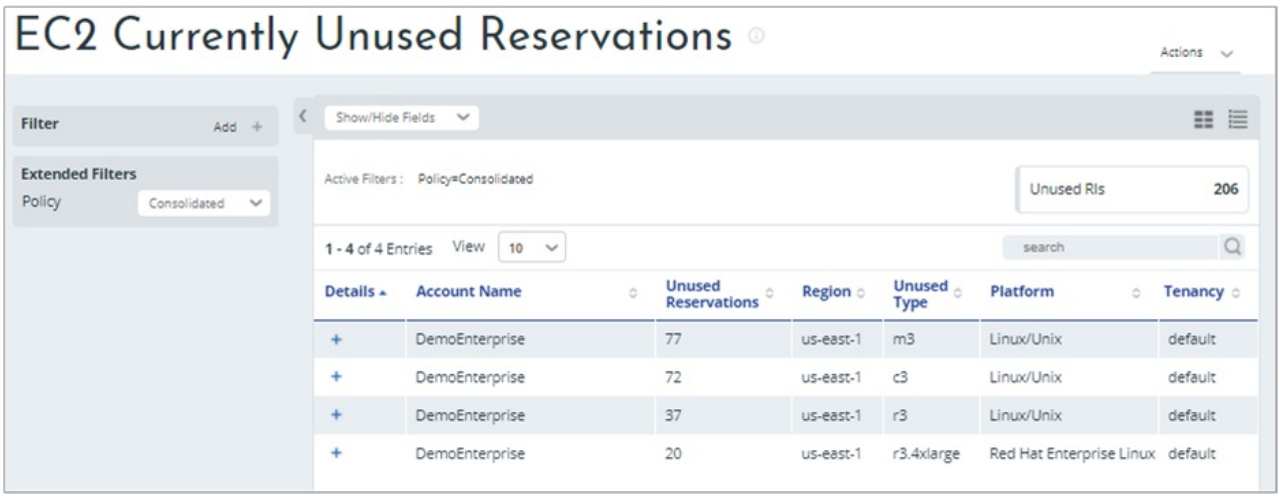
Modify unused reservations

Unused reservations are common in many cloud resource consumer's computing environments. Ensuring that unused reservations are fully used can save you money when you modify the reservations to meet your current needs. For example, you might have a subscription containing standard D3 instances running on Linux. If you will not fully utilize the reservation, then you can change the instance type. Or, you might move the unused resources to a different reservation or to a different account.

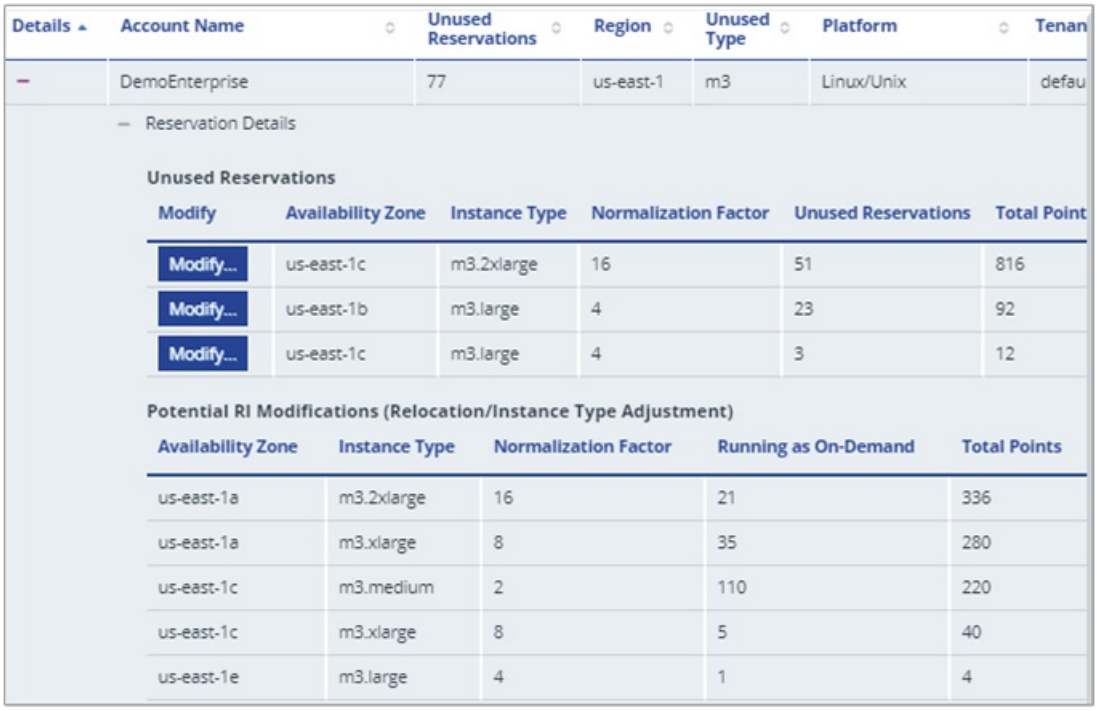
AWS sells reserved instances for specific availability zones and regions. If you've purchased reserved instances for a specific availability zone, then you cannot move the reservations between zones. However, you can easily move regional reserved instances between zones using the **EC2 Currently Unused Reservations** report. Or alternatively, you may modify them to have a regional scope, and then they'll apply matching instances across all availability zones.

On the reports menu at the top of the portal, click **Optimizer** > **Inefficiencies** > **EC2 Currently Unused Reservations**.

The following images show the report with unused reserved instances.

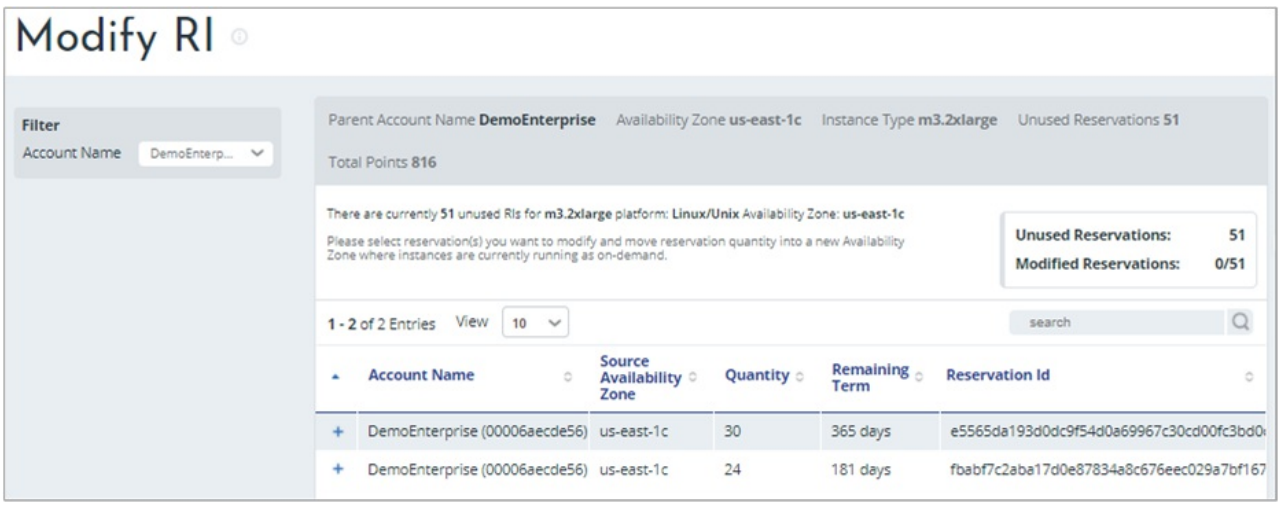


Click the plus symbol under **Details** to view reservation details for a specific reservation.



In the preceding example, there are 77 unused reservations total in various availability zones. The first reservation has 51 unused instances. Looking lower in the list, there are potential reservation instance modifications that you can make using the **m3.2xlarge** instance type in the **us-east-1c** availability zone.

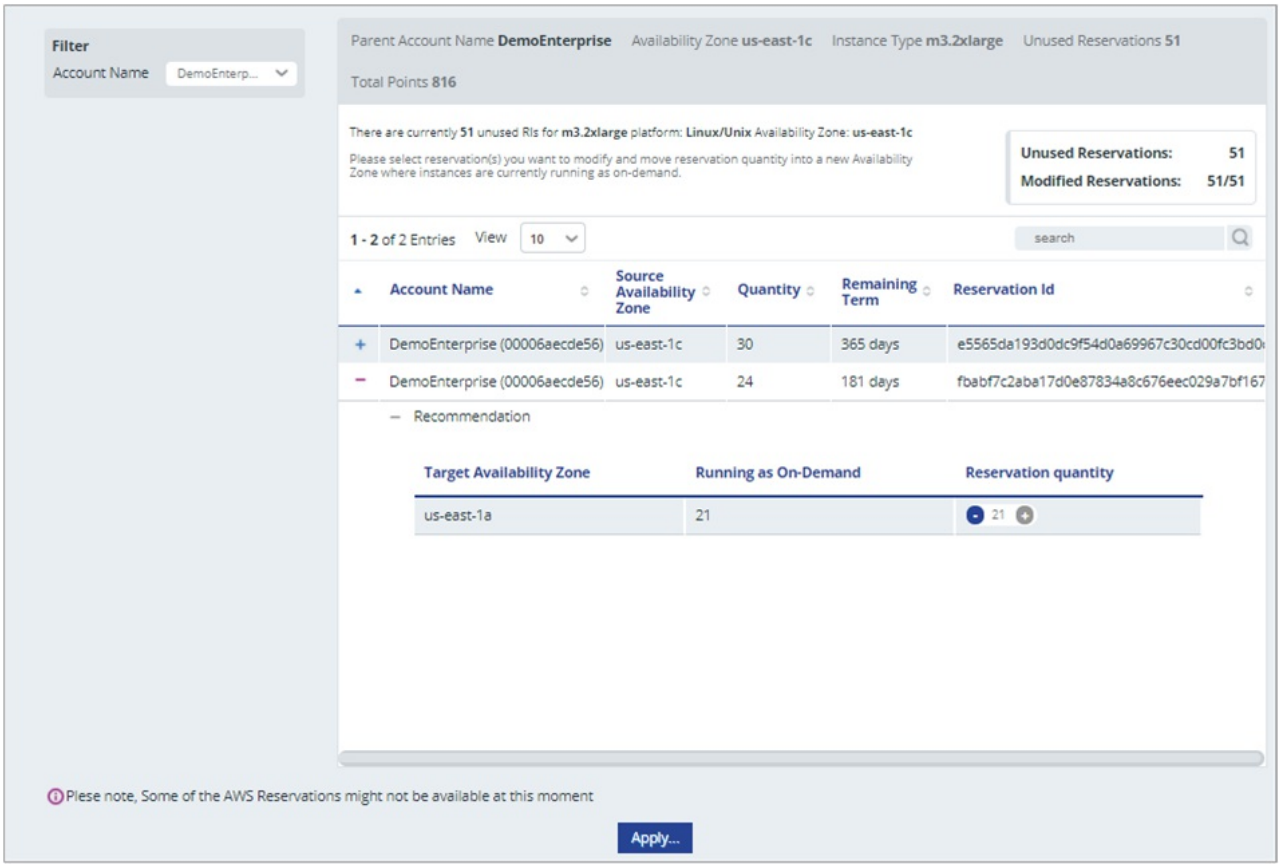
Click **Modify** for the first reservation in the list to open the **Modify RI** page that shows data about the reservation.



Reserve instances that you can modify are listed. In the following example image, there are 51 unused reservations

that you can modify but there is a need for 54 between the two reservations. If you modify your unused reservations to use them all, four instances will continue to run on demand. For this example, split your unused reservations where the first reservation will use 30 and the second reservation will use 21.

Click the plus symbol for the first reservation entry and set the **Reservation quantity** to **30**. For the second entry, set the reservation quantity to **21** and then click **Apply**.



All your unused instances for the reservation are fully utilized and 51 instances are no longer running on-demand. In this example, you save your organization money by significantly reducing on-demand use and using reservations that are already paid for.

Next steps

In this tutorial, you successfully accomplished the following tasks:

- Understood Azure RI costs
- Learned about the benefits of RIs
- Optimized Azure RI costs
- Viewed RI costs
- Assessed Azure RI cost effectiveness
- Optimized AWS RI costs
- Bought recommended RIs
- Modified unused reservations

Advance to the next tutorial to learn about controlling access to data.

Control access to data

Tutorial: Assign access to Cloudyn data

1/14/2020 • 6 minutes to read • Edit Online

Access to Cloudyn data is provided by user or entity management. Cloudyn user accounts determine access to *entities* and administrative functions. There two types of access: admin and user. Unless modified per user, admin access allows a user unrestricted use of all functions in the Cloudyn portal, including: user management, recipient lists management and root entity access to all entity data. User access is intended for end users to view reports and create reports using the access they have to entity data.

Entities are used to reflect your business organization's hierarchical structure. They identify departments, divisions, and teams in your organization in Cloudyn. The entity hierarchy helps you accurately track spending by the entities.

When you registered your Azure agreement or account, an account with admin permission was created in Cloudyn, so you can perform all the steps in this tutorial. This tutorial covers access to Cloudyn data including user management and entity management. You learn how to:

- Create a user with admin access
- Create a user with user access
- Delete a user
- Delete or export personal data
- Create and manage entities

If you don't have an Azure subscription, create a free account before you begin.

Prerequisites

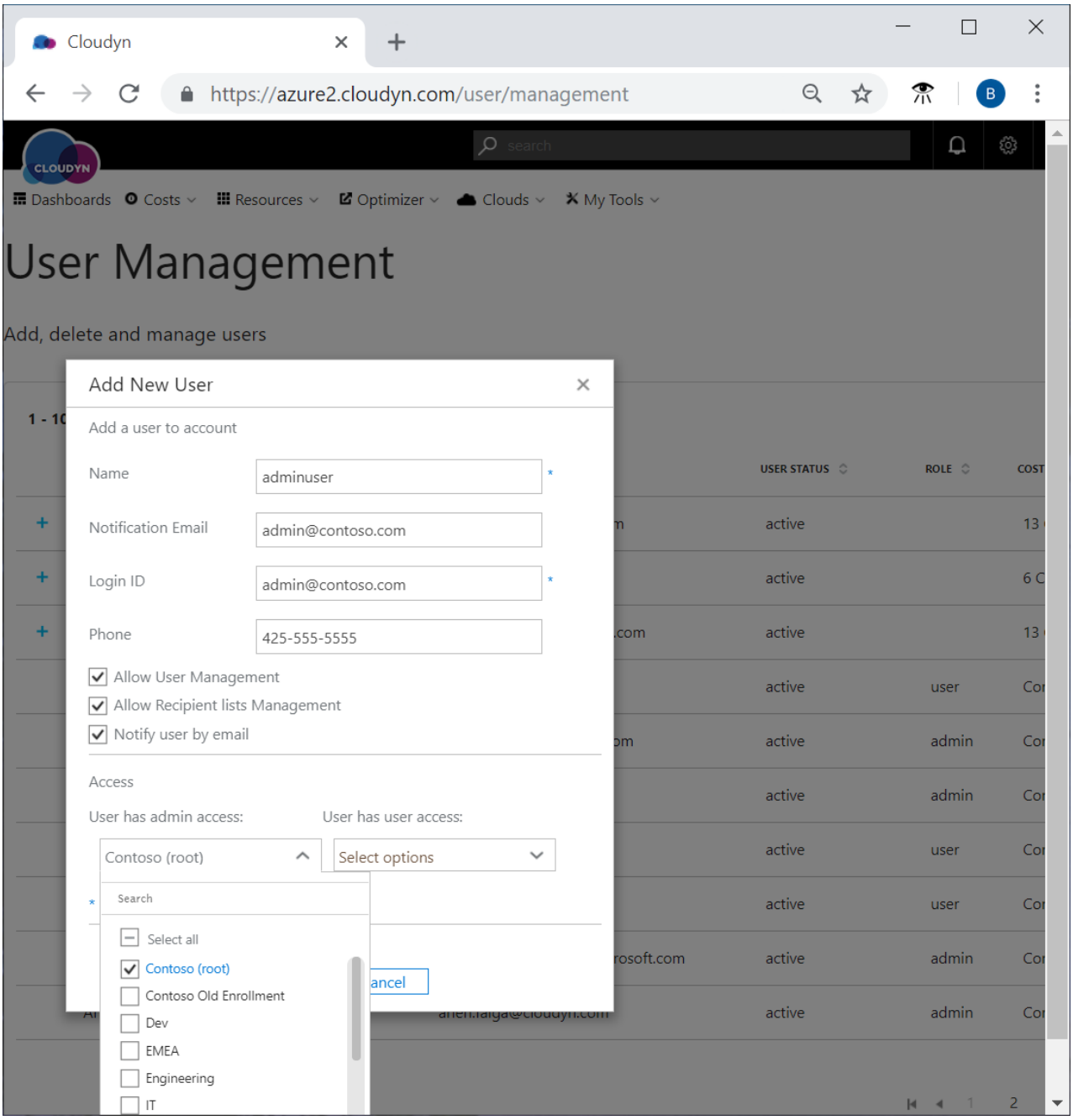
- You must have an Azure account.
- You must have either a trial registration or paid subscription for Cloudyn.

Create a user with admin access

Although you already have admin access, coworkers in your organization might also need to have admin access. In the Cloudyn portal, click the gear symbol in the upper right and select **User Management**. Click **Add New User** to add a new user.

Enter required information about the user. The **login ID** must be a valid e-mail address. Choose permissions to allow User Management so that the user can create and modify other users. Recipient Lists Management allow the user to edit recipient lists. A link with sign in information gets sent to the user by e-mail from Cloudyn when you select **Notify user by email**. On first sign-in the user sets a password.

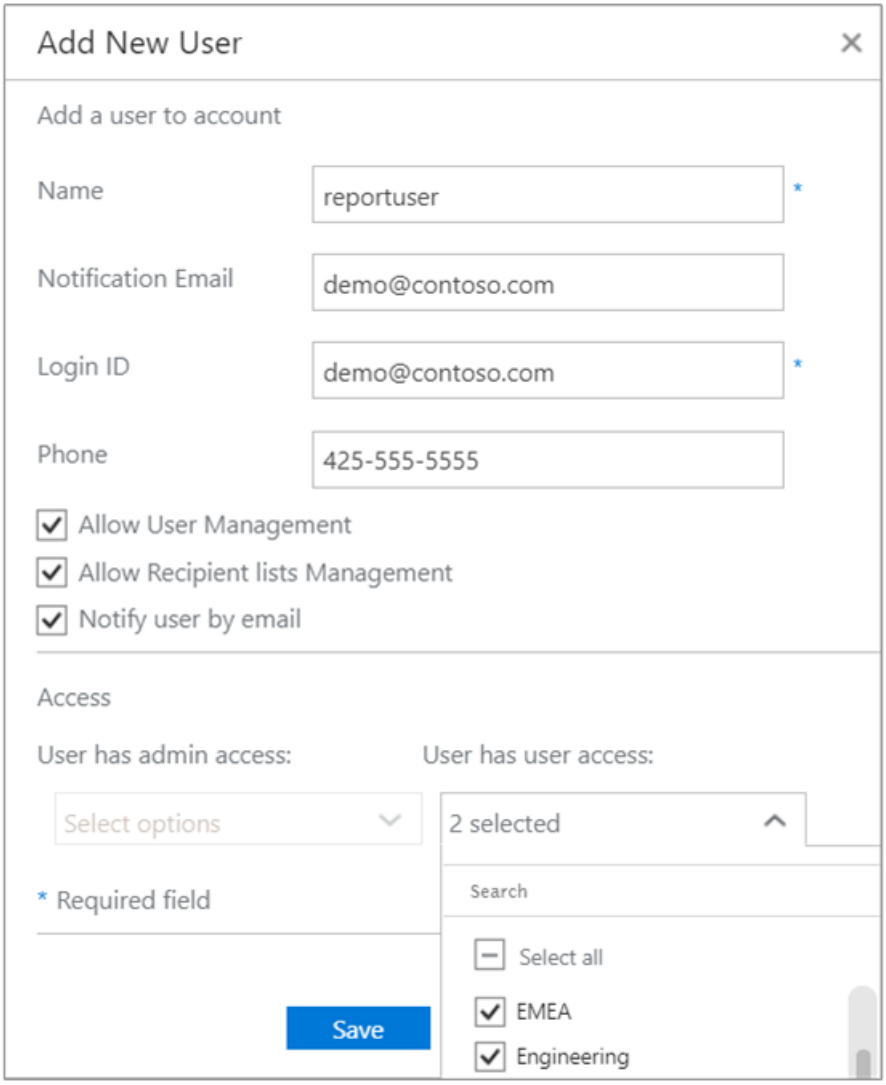
Under **User has admin access**, the root entity of your organization is selected. Leave root selected and then save the user information. Selecting the root entity allows the user to have admin permission not only to the root entity in the tree, but also to all the entities that reside below it.



Create a user with user access

Typical users that need access to Cloudyn data like dashboards and reports should have user access to view them. Create a new user with user access similar to the one you created with admin access, with the following differences:

- Clear **Allow User Management**, **Allow Recipient lists Management**, and clear all in the **User has admin access** list.
- Select the entities that the user needs access to in the **User has user access** list.
- You can also allow admin to access to specific entities, as needed.



To watch a tutorial video about adding users, see Adding Users to Cloudyn.

Delete a user

When you delete a user, any entities that the user has access to remain intact. Saved *personal* reports are removed when the user is deleted. Saved *public* reports created by the user are not deleted.

You cannot remove yourself as a user.

> **WARNING**
> When you delete a user, it can't be restored.

1. In the Cloudyn portal, click the gear symbol in the upper right and then select **User Management**.
2. In the list of users, select the user that you want to delete and then click **Delete User** (the trash can symbol).
3. In the Delete User box, click **Yes** and then click **OK**.

Delete or export personal data

If you want to delete or export personal data from Cloudyn, you need to create a support ticket. When the support ticket is created, it acts as formal request - a Data Subject Request. Microsoft then takes prompt action to remove the account and delete any customer or personal data. To learn about how you can request to have your data deleted or exported, see Data Subject Requests of Cloudyn Data.

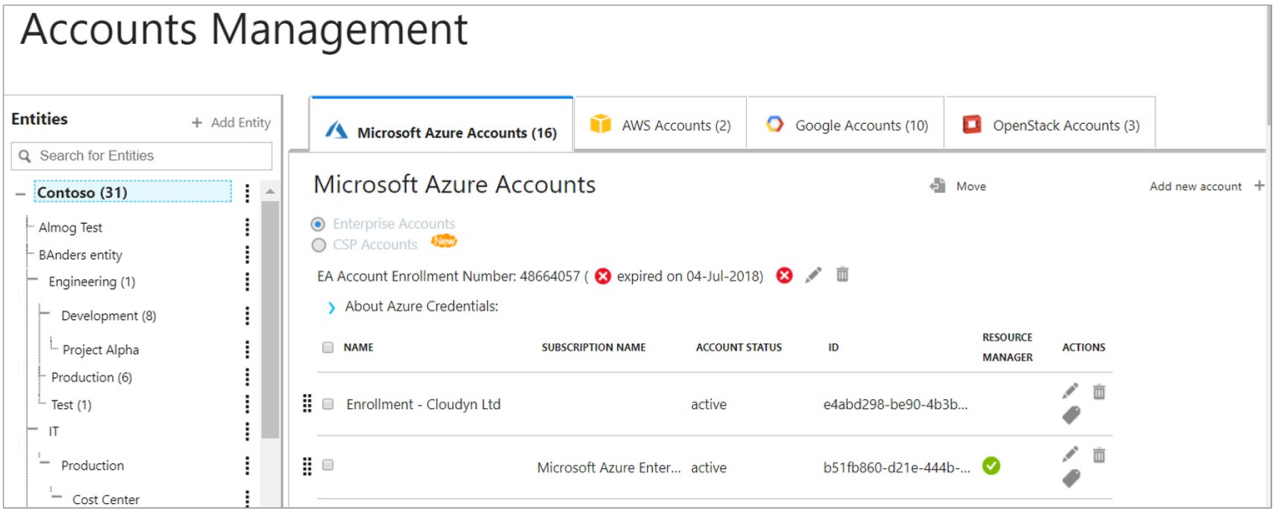
Create and manage entities

When you define your cost entity hierarchy, a best practice is to identify the structure of your organization. Entities allow you to segment spending by individual accounts or subscriptions. You create cost entities to create logical groups to manage and track spending. As you build the tree, consider how you want or need to see their costs segregated by business units, cost centers, environments, and sales departments. The entity tree in Cloudyn is flexible due to entity inheritance.

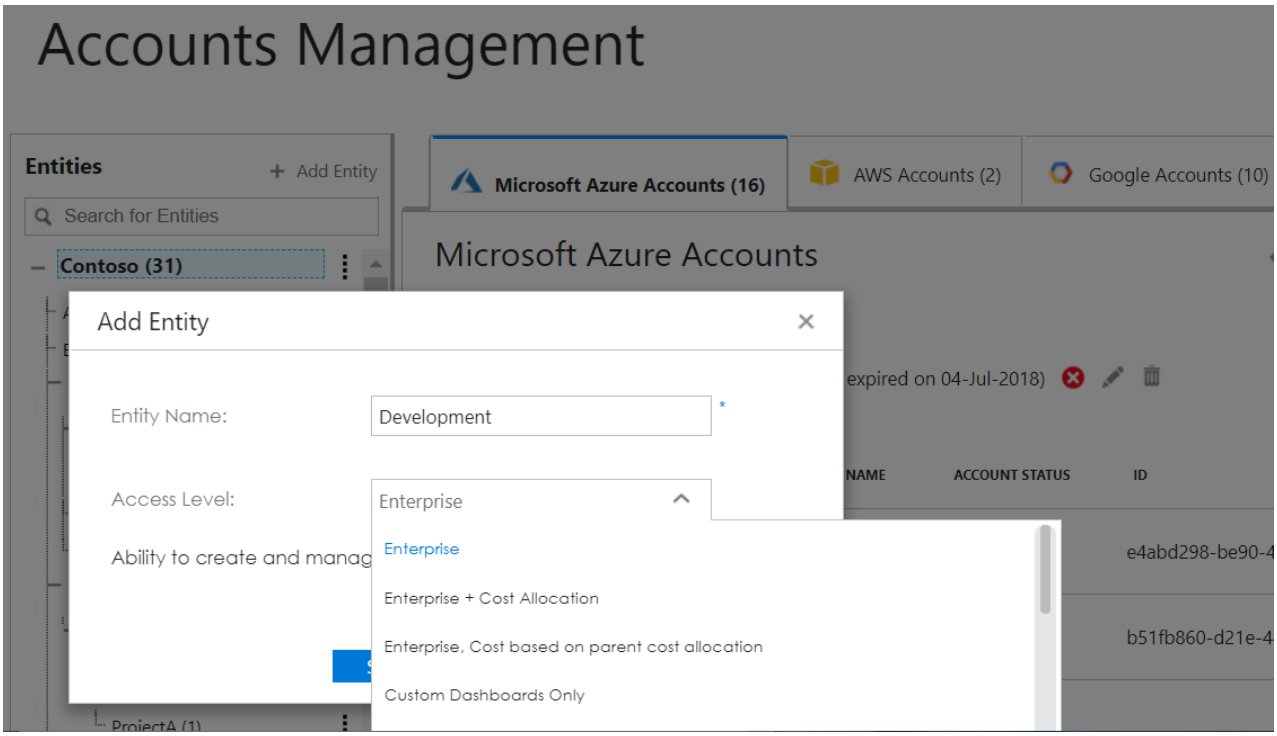
Individual subscriptions for your cloud accounts are linked to specific entities. You can associate an entity with a cloud service provider account or subscription. So, entities are multi-tenant. You can assign specific users access to only their segment of your business using entities. Doing so keeps data isolated, even across large portions of a business like subsidiaries. And, data isolation helps with governance.

When you registered your Azure agreement or account with Cloudyn, your Azure resource data including usage, performance, billing, and tag data from your subscriptions was copied to your Cloudyn account. However, you must manually create your entity tree. If you skipped the Azure Resource Manager registration, then only billing data and a few asset reports are available in the Cloudyn portal.

In the Cloudyn portal, click the gear symbol in the upper right and select **Cloud Accounts**. You start with a single entity (root) and build your entity tree under the root. Here's an example of an entity hierarchy that might resemble many IT organizations after the tree is complete:



Next to **Entities**, click **Add Entity**. Enter information about the person or department that you want to add. The **Full Name** and **Email** fields to do not have to match existing users. If you want to view a list of access levels, search in help for *Adding an entity*.



When you're done, **Save** the entity.

Entity access levels

Entity access levels in conjunction with a user's access allows you to define what type of actions are available in the Cloudyn portal.

- **Enterprise** - Provides the ability to create and manage child cost entities.
- **Enterprise + Cost Allocation** - Provides the ability to create and manage child cost entities including cost allocation for consolidated accounts.
- **Enterprise, Cost based on parent cost allocation** - Provides the ability to create and manage child cost entities. Costs for the account are based on the parent's cost allocation model.
- **Custom Dashboards Only** - Provides the user to only see predefined custom dashboards.
- **Dashboards Only** - Provides the user the ability to only see dashboards.

Create a cost entity hierarchy

To create a cost entity hierarchy, you must have an account with enterprise or enterprise + cost allocation access.

In the Cloudyn portal, click the gear symbol in the upper right and select **Cloud Accounts**. The **Entities** tree is shown in the left pane. If necessary, expand the entity tree so that you can view the entity that you want to associate with an account. Your cloud service provider accounts are shown on tabs in the right pane. Select a tab and then click and drag an account/subscription to the entity, then drop it. The **Move** box informs you that the account was successfully moved. Click **OK**.

You can also associate multiple accounts to an entity. Select the accounts and then click **Move**. In the Move Accounts box, select the entity where you want to move the account to and then click **Save**. The Move accounts box asks you to verify that you want to move the accounts. Click **Yes**, and then click **OK**.

To watch a tutorial video about creating a cost entity hierarchy, see Creating a Cost Entity Hierarchy in Cloudyn.

If you are an Azure Enterprise Agreement user, watch a tutorial video about associating accounts and subscriptions to entities at Connecting to Azure Resource Manager with Cloudyn.

Next steps

In this tutorial, you learned how to:

- Create a user with admin access
- Create a user with user access
- Delete a user
- Delete or export personal data
- Create and manage entities

If you haven't already enabled Azure Resource Manager API access for your accounts, proceed to the following article.

Activate Azure subscriptions and accounts

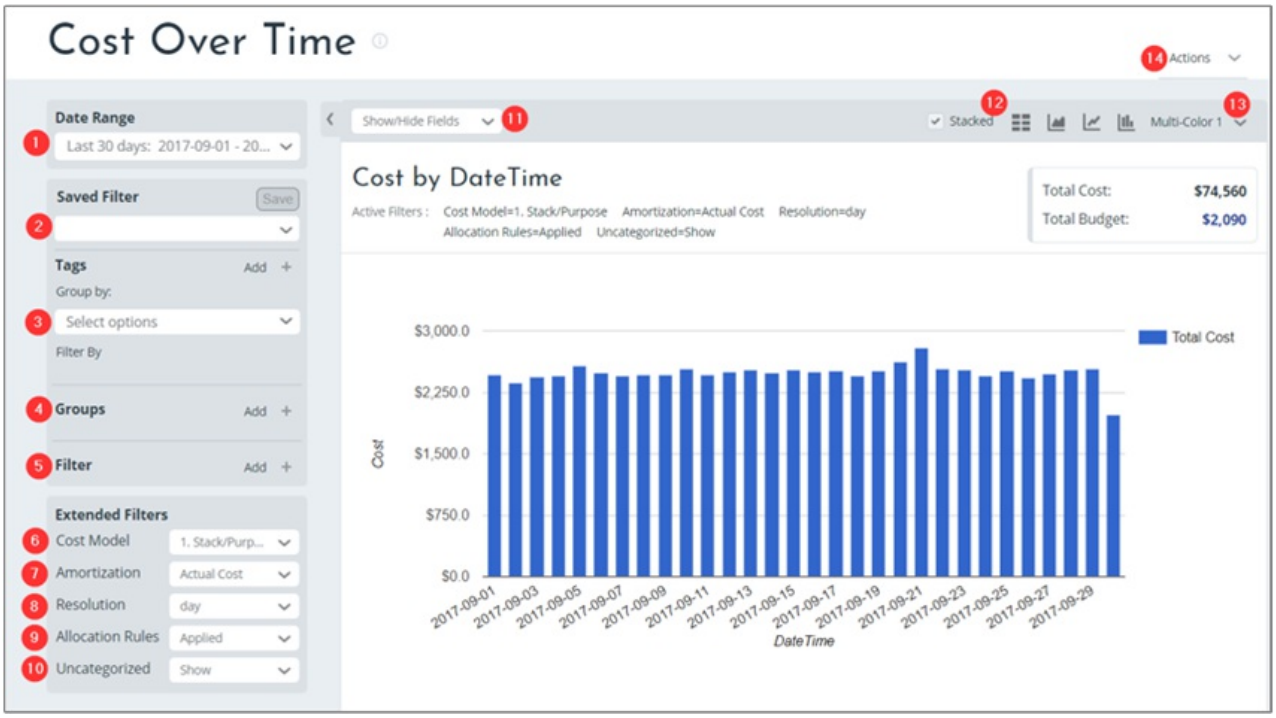
Understanding Cloudyn cost management reports

1/14/2020 • 6 minutes to read • Edit Online

This article helps you understand Cloudyn cost management reports basic structure and functions. Most Cloudyn reports are intuitive and have a uniform look and feel. After you read this article, are ready to use all the cost management reports. Many standard features are available throughout the various reports, allowing you to navigate the reports with ease. Reports are customizable, and you can select from several options to calculate and display results.

Report fields and options

Here's a look at an example of the Cost Over Time report. Most Cloudyn reports have a similar layout.



Each numbered area in the preceding image is described in detail in the following information:

1. **Date Range**

   Use the Date Range list to define a report time interval using a preset or custom.

2. **Saved Filter**

   Use the Saved Filter list to save the current groups and filters that are applied to the report. Saved filters are available across cost and performance reports, including:

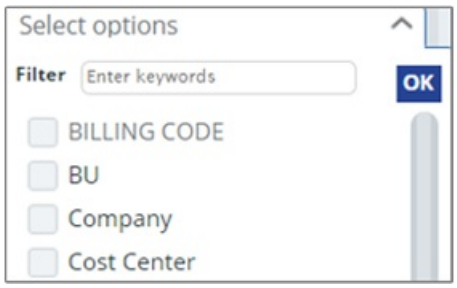
   - Cost Analysis
   - Allocation
   - Asset Management
   - Optimization

   Type a filter name and the click **Save**.

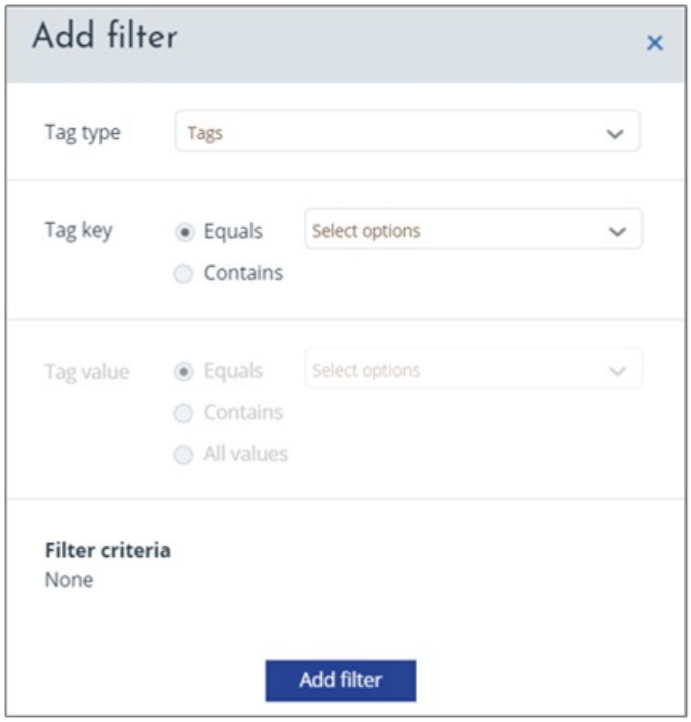
3. **Tags**

   Use the Tags area to group by tag categories. Tags listed in the menu are Azure department or cost center

tags or they are Cloudyn's cost entity and subscription tags. Select tags to filter results. You can also type a tag name (keyword) to filter results.



Click **Add** to add a new filter.

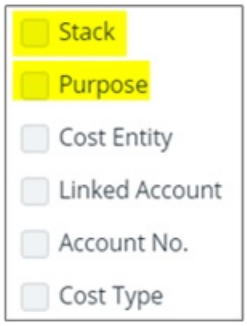


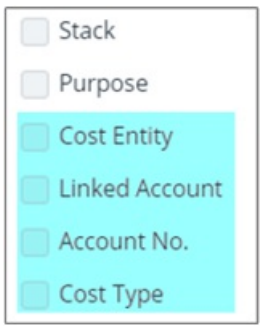
Tag grouping or filtering does not relate to Azure resources or resource group tags.

Cost allocation tag grouping and filtering are available in the **Groups** menu option.

4. **Groups in reports**

   Use groups in Cost Analysis reports to show standard, itemized categories from billing data in your report. However, groups in Cost Allocation reports show view tag-based categories. Tag-based categories are defined in the cost allocation model and standard itemized categories from billing data.





In Cost Allocation Reports, groups in tag-based group categories might include:

- Tags
- resource group tags
- Cloudyn cost entity tags
- Subscription tag categories for cost allocation purposes

Examples might include:

- Cost center
- Department
- Application
- Environment
- Cost code

  Here's a list of built-in groups available in reports:

  - **Cost Type**
  - Select a cost type or multiple cost types, or select all. Cost types include:
    - One-Time Fee
    - Support
    - Usage Cost
  - **Customer**
    - Select a specific customer, multiple customers, or select all customers.
  - **Account Name**
    - The account or subscription name. In Azure, it is the name of the Azure subscription.
  - **Account No**
    - Select an account, multiple accounts, or all accounts. In Azure, it is the Azure subscription's GUID.
  - **Parent Account**
    - Select the parent account, multiple accounts, or select all.
  - **Service**
    - Select a service, multiple services, or select all services.
  - **Provider**
    - The cloud provider where assets and expenses are associated.
  - **Region**
    - Region where the resource is hosted.
  - **Availability Zone**
    - AWS isolated locations within a region.
  - **Resource Type**
    - The type of resource in use.

- **Sub-Type**
  - Select the sub-type.
- **Operation**
  - Select the operation or **Show all**.
- **Price Model**
  - All Upfront
  - No Upfront
  - Partial Upfront
  - On Demand
  - Reservation
  - Spot
- **Charge Type**
  - Select Negative or Positive charge type or both.
- **Tenancy**
  - Whether a machine is running as a dedicated machine.
- **Usage Type**
  - Usage type can be one-time fees or recurring fees.

5. **Filters**

   Use single or multi-select filters to set ranges to selected values. To set a filter, click **Add** and then select filter categories and values.

6. **Cost Model**

   Use Cost Model to select a cost model that you previously created with Cost Allocation 360. You might have multiple Cloudyn cost models, depending on your cost allocation requirements. Some of your organizational teams might have cost allocation requirements that differ from others. Each team can have their own dedicated cost model.

   For information about creating a cost allocation model definition, see Use custom tags to allocate costs.

7. **Amortization**

   Use Amortization in Cost Allocation reports to view non-usage based service fees or one-time payable costs and spread their cost over time evenly during their lifespan. Examples of one-time fees might include:

   - Annual support fees
   - Annual security components fees
   - Reserved instances purchase fees
   - Some Azure Marketplace items.

   Under Amortization, select **Amortized cost** or **Actual Cost**.

8. **Resolution**

   Use Resolution to select the time resolution within the selected date range. Your time resolution determines how units are displayed in the report and can be:

   - Daily
   - Weekly
   - Monthly
   - Quarterly
   - Annual

9. **Allocation rules**

Use Allocation Rules to apply or disable the cost allocation cost recalculation. You can enable or disable the cost allocation recalculation for billing data. The recalculation applies to the selected categories in the report. It allows you to assess the cost allocation recalculation impact against raw billing data.

10. **Uncategorized**

    Use Uncategorized to include or exclude uncategorized costs in the report.

11. **Show/hide fields**

    The Show/hide option does not have any effect in reports.

12. **Display formats**

    Use Display formats to select various graph or table views.

13. **Multi-color**

    Use Multi-color to set the color of charts in your report.

14. **Actions**

    Use Actions to save, export, or schedule the report.

15. **Policy**

    Although not pictured, some reports include a projected cost calculation policy. In those reports, the **Consolidated** policy shows recommendations for all accounts and subscriptions under the current entity such as Microsoft enrollment or AWS payer. The **Standalone** policy shows recommendations for one account or subscription as if no other subscriptions exist. The policy that you select varies on the optimization strategy used by your organization. Cost projections are based on the last 30 days of usage.

Save and schedule reports

After you create a report, you can save it for future use. Saved reports are available in **My Tools** > **My Reports**. If you make changes to an existing report and save it, the report is saved as a new version. Or, you can save it as a new report.

Save a report to the Cloudyn portal

While viewing any report, click **Actions** and then select **Save to my reports**. Name the report and then either add a your own URL or use the automatically created URL. You can optionally **Share** the report publicly with others in your organization or you can share it to your entity. If you do not share the report, it remains a personal report and that only you can view. Save the report.

Save a report to cloud provider storage

In order to save a report to your cloud service provider, you must have already configured a storage account. While viewing any report, click **Actions** and then select **Schedule report**. Name the report and then either add a your own URL or use the automatically created URL. Select **Save to storage** and then select the storage account or add a new one. Enter a prefix that gets appended to the report file name. Select a CSV or JSON file format and then save the report.

Schedule a report

You can run reports at scheduled intervals and you can sent them to a recipient list or cloud service provider storage account. While viewing any report, click **Actions** and then select **Schedule report**. You can send the report by email and save to a storage account. Under **Schedule**, select the interval (daily, weekly or monthly). For weekly and monthly, select the day or dates to deliver and select the time. Save the scheduled report. If you select

the Excel report format, the report is sent as an attachment. When you select email content format, report results that are displayed in chart format are delivered as a graph.

Export a report as a CSV file

While viewing any report, click **Actions** and then select **Export all report data**. A pop-up window appears and a CSV file is downloaded.

Next steps

- Learn about the reports that are included in Cloudyn at Use Cloudyn reports.
- Learn about how to use reports to create dashboards.

Activate Azure subscriptions and accounts with Cloudyn

1/14/2020 • 5 minutes to read • Edit Online

Adding or updating your Azure Resource Manager credentials allows Cloudyn to discover all the accounts and subscriptions within your Azure Tenant. If you also have Azure Diagnostics extension enabled on your virtual machines, then Cloudyn can collect extended metrics like CPU and memory. This article describes how to enable access using Azure Resource Manager APIs for new and existing accounts. It also describes how to resolve common account problems.

Cloudyn cannot access most of your Azure subscription data when the subscription is *unactivated*. You must edit *unactivated* accounts so that Cloudyn can access them.

Required Azure permissions

Specific permissions are needed to complete the procedures in this article. Either you or your tenant administrator must have both of the following permissions:

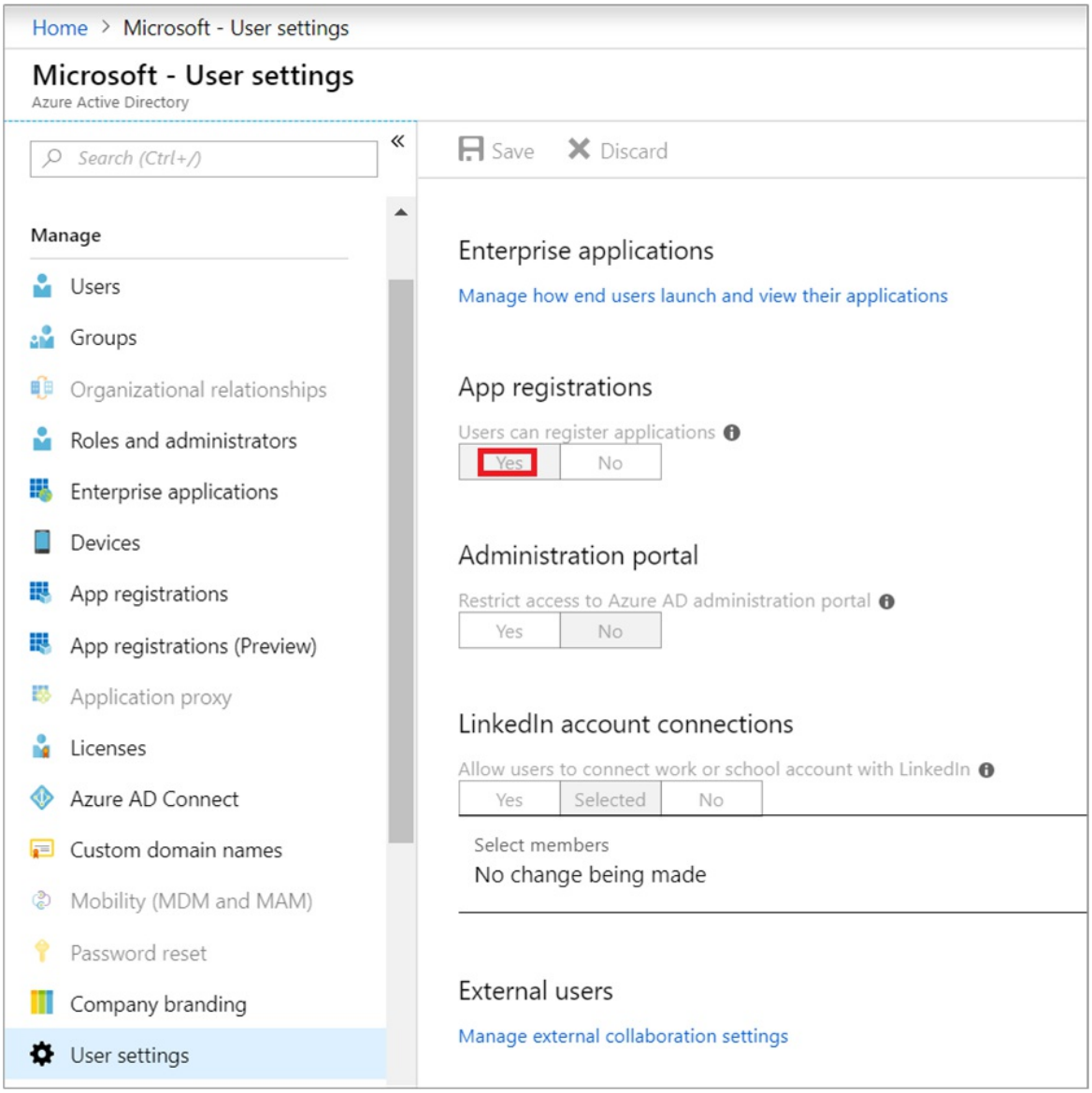
- Permission to register the CloudynCollector application with your Azure AD tenant.
- The ability to assign the application to a role in your Azure subscriptions.

In your Azure subscriptions, your accounts must have `Microsoft.Authorization/*/Write` access to assign the CloudynCollector application. This action is granted through the Owner role or User Access Administrator role.

If your account is assigned the **Contributor** role, you do not have adequate permission to assign the application. You receive an error when attempting to assign the CloudynCollector application to your Azure subscription.

Check Azure Active Directory permissions

1. Sign in into the Azure portal.
2. In the Azure portal, select **Azure Active Directory**.
3. In Azure Active Directory, select **User settings**.
4. Check the **App registrations** option.
    - If it is set to **Yes**, then non-administrator users can register AD apps. This setting means any user in the Azure AD tenant can register an app.



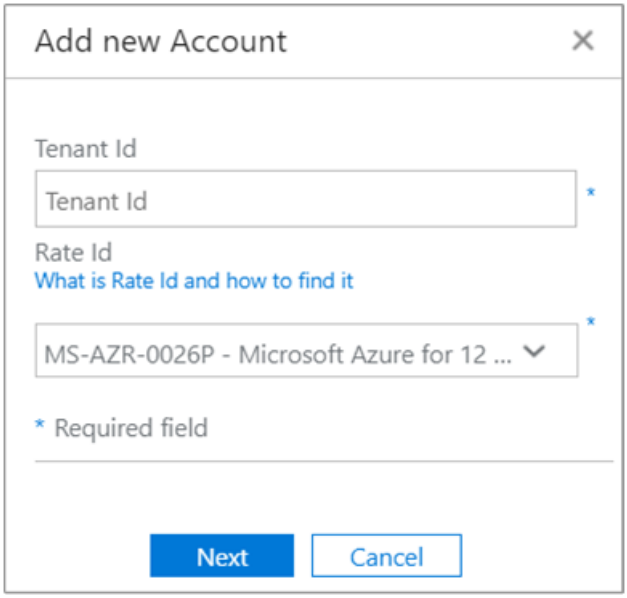
- If the **App registrations** option is set to **No**, then only tenant administrative users can register Azure Active Directory apps. Your tenant administrator must register the CloudynCollector application.

Add an account or update a subscription

When you add an account update a subscription, you grant Cloudyn access to your Azure data.

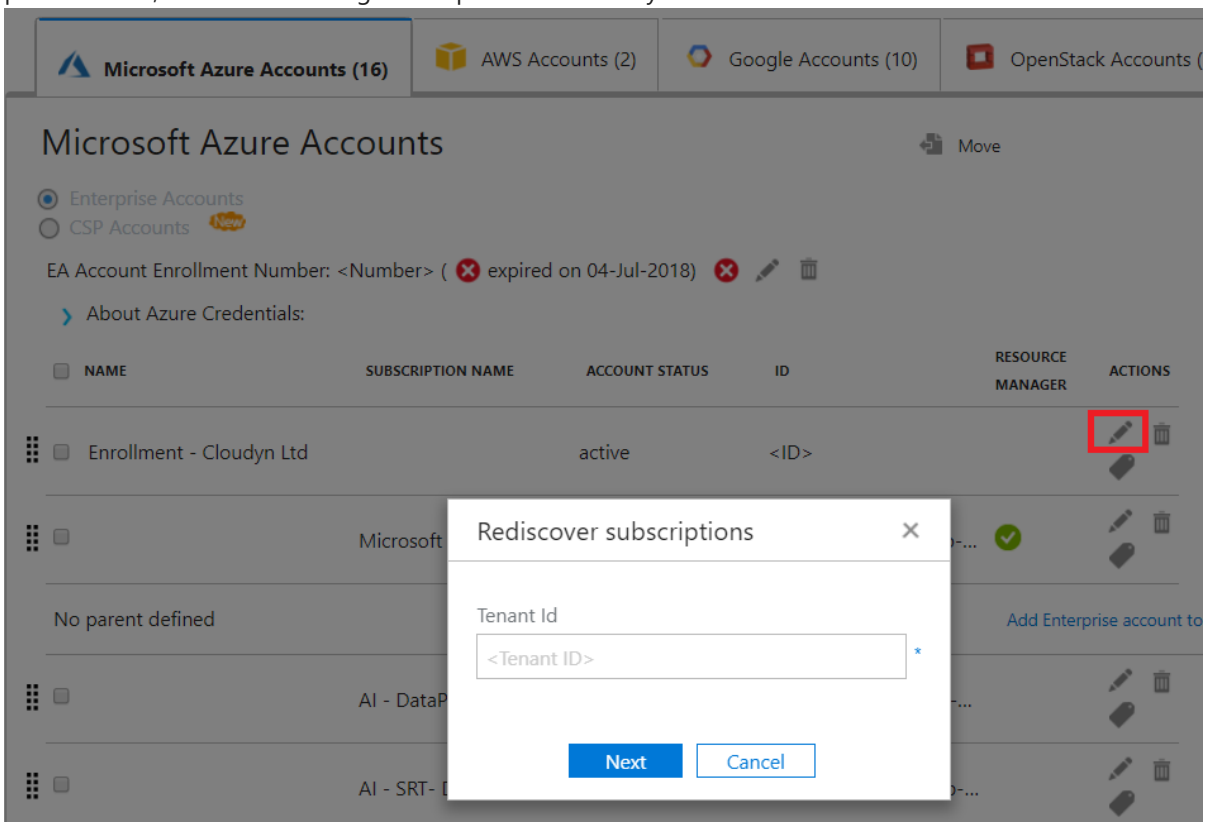
Add a new account (subscription)

1. In the Cloudyn portal, click the gear symbol in the upper-right and select **Cloud Accounts**.
2. Click **Add new account** and the **Add new account** box appears. Enter the required information.



Update a subscription

1. If you want to update an *unactivated* subscription that already exists in Cloudyn in Accounts Management, click the edit pencil symbol to the right of the parent *tenant GUID*. Subscriptions are grouped under a parent tenant, so avoid activating subscriptions individually.



2. If necessary, enter the Tenant ID. If you don't know your Tenant ID, use the following steps to find it:

   a. Sign in to the Azure portal.
   b. In the Azure portal, select **Azure Active Directory**.
   c. To get the tenant ID, select **Properties** for your Azure AD tenant.
   d. Copy the Directory ID GUID. This value is your tenant ID. For more information, see Get tenant ID.

3. If necessary, select your Rate ID. If you don't know your rate ID, use the following steps to find it.

   a. In the upper-right of the Azure portal, click your user information and then click **View my bill**.
   b. Under **Billing Account**, click **Subscriptions**.
   c. Under **My subscriptions**, select the subscription.

d. Your rate ID is shown under **Offer ID**. Copy the Offer ID for the subscription.

4. In the Add new account (or Edit Subscription) box, click **Save** (or **Next**). You're redirected to the Azure portal.

5. Sign in to the portal. Click **Accept** to authorize Cloudyn Collector access your Azure account.

   You're redirected to the Cloudyn Accounts management page and your subscription is updated with **active** Account Status. It should display a green check mark symbol under the Resource Manager column.

   If you don't see a green checkmark symbol for one or more of the subscriptions, it means that you do not have permissions to create the reader app (the CloudynCollector) for the subscription. A user with higher permissions for the subscription needs to repeat this process.

Watch the Connecting to Azure Resource Manager with Cloudyn video that walks through the process.

Resolve common indirect enterprise set-up problems

When you first use the Cloudyn portal, you might see the following messages if you are an Enterprise Agreement or Cloud Solution Provider (CSP) user:

- *The specified API key is not a top level enrollment key* displayed in the **Set Up Cloudyn** wizard.
- *Direct Enrollment – No* displayed in the Enterprise Agreement portal.
- *No usage data was found for the last 30 days. Please contact your distributor to make sure markup was enabled for your Azure account* displayed in the Cloudyn portal.

The preceding messages indicate that you purchased an Azure Enterprise Agreement through a reseller or CSP. Your reseller or CSP needs to enable *markup* for your Azure account so that you can view your data in Cloudyn.

Here's how to fix the problems:

1. Your reseller needs to enable *markup* for your account. For instructions, see the Indirect Customer Onboarding Guide.
2. You generate the Azure Enterprise Agreement key for use with Cloudyn. For instructions, see Register an Azure Enterprise Agreement and view cost data.

Before you can generate the Azure Enterprise Agreement API key to set up Cloudyn, you must enable the Azure Billing API by following the instructions at:

- Overview of Reporting APIs for Enterprise customers
- Microsoft Azure enterprise portal Reporting API under **Enabling data access to the API**

You also might need to give department administrators, account owners, and enterprise administrators permissions to *view charges* with the Billing API.

Only an Azure service administrator can enable Cloudyn. Co-administrator permissions are insufficient. However, you can work around the administrator requirement. You can request that your Azure Active Directory administrator grant permission to authorize the **CloudynAzureCollector** with a PowerShell script. The following script grants permission to register the Azure Active Directory Service Principal **CloudynAzureCollector**.

```
#THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED
TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL
THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF
CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER
DEALINGS IN THE SOFTWARE.

#Tenant - enter your tenant ID or Name
$tenant = "<ReplaceWithYourTenantID>"

#Cloudyn Collector application ID
$appId = "83e638ef-7885-479f-bbe8-9150acccdb3d"

#URL to activate the consent screen
$url = "https://login.windows.net/"+$tenant+"/oauth2/authorize?api-
version=1&response_type=code&client_id="+$appId+"&redirect_uri=http%3A%2F%2Flocalhost%3A8080%2FCloudynJava&pro
mpt=consent"

#Choose your browser, the default is Internet Explorer

#Chrome
#[System.Diagnostics.Process]::Start("chrome.exe", "--incognito $url")

#Firefox
#[System.Diagnostics.Process]::Start("firefox.exe","-private-window $url" )

#IExplorer
[System.Diagnostics.Process]::Start("iexplore.exe","$url -private" )
```

Next steps

- If you haven't already completed the first tutorial for Cloudyn, read it at Review usage and costs.

Add extended metrics for Azure virtual machines

1/14/2020 • 3 minutes to read • Edit Online

Cloudyn uses Azure metric data from your Azure VMs to show you detailed information about their resources. Metric data, also called performance counters, is used by Cloudyn to generate reports. However, Cloudyn does not automatically gather all Azure metric data from guest VMs — you must enable metric collection. This article helps you enable and configure additional diagnostics metrics for your Azure VMs.

After you enable metric collection, you can:

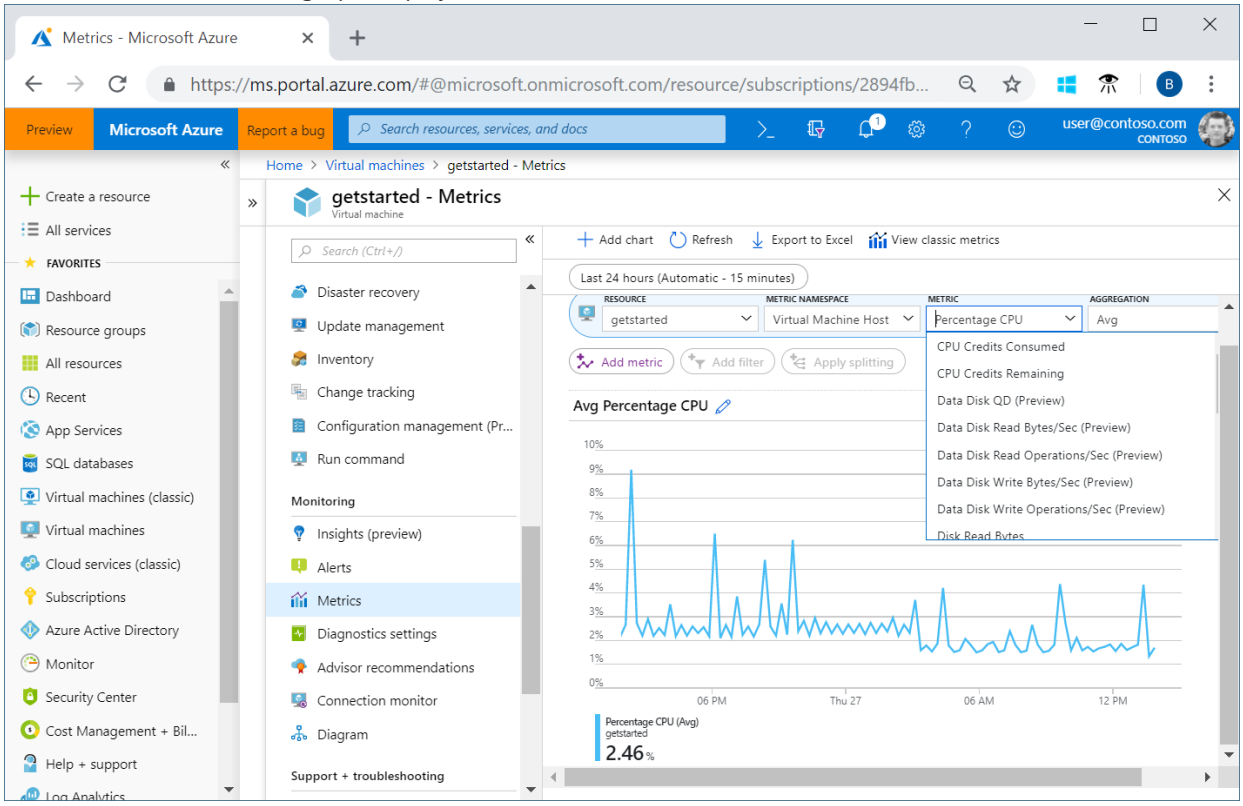
- Know when your VMs are reaching their memory, disk, and CPU limits.
- Detect usage trends and anomalies.
- Control your costs by sizing according to usage.
- Get cost effective sizing optimization recommendations from Cloudyn.

For example, you might want to monitor the CPU % and Memory % of your Azure VMs. The Azure VM metrics correspond to *Percentage CPU* and *\Memory% Committed Bytes In Use*.

> **NOTE**
> Extended metric data collection is only supported with Azure guest-level monitoring. Cloudyn is not compatible with the Log Analytics agent.

Determine whether extended metrics are enabled

1. Sign in to the Azure portal at https://portal.azure.com.
2. Under **Virtual machines**, select a VM and then under **Monitoring**, select **Metrics**. A list of available metrics is shown.
3. Select some metrics and a graph displays data for them.



In the preceding example, a limited set of standard metrics are available for your hosts, but memory metrics are not. Memory metrics are part of extended metrics. In this case, extended metrics are not enabled for the VM. You must perform some additional steps to enable extended metrics. The following information guides you through enabling them.

Enable extended metrics in the Azure portal

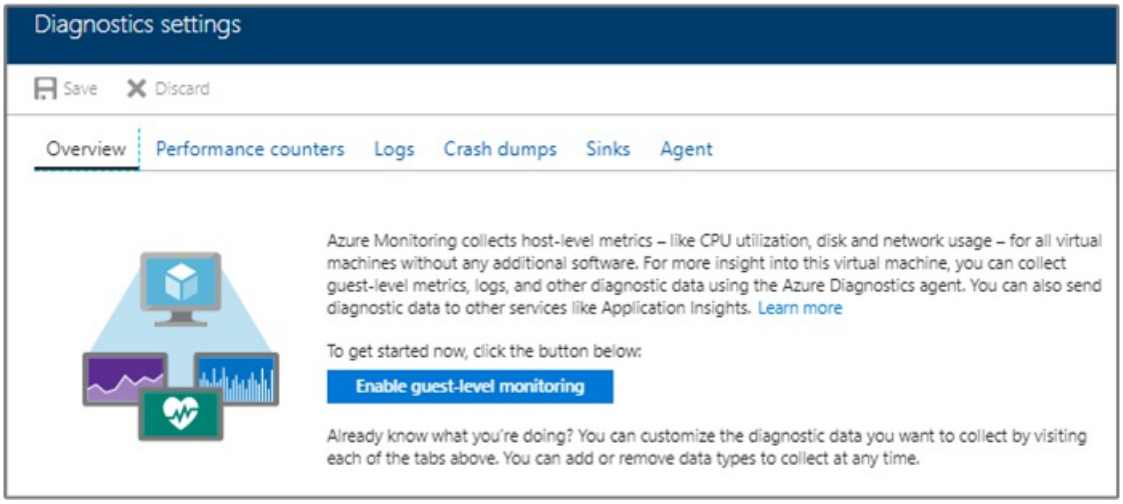
Standard metrics are host computer metrics. The *Percentage CPU* metric is one example. There are also basic metrics for guest VMs and they're also called extended metrics. Examples of extended metrics include *\Memory% Committed Bytes In Use* and *\Memory\Available Bytes*.

Enabling extended metrics is straightforward. For each VM, enable guest-level monitoring. When you enable guest-level monitoring, the Azure diagnostics agent is installed on the VM. By default, a basic set of extended metrics are added. The following process is the same for classic and regular VMs and the same for Windows and Linux VMs.

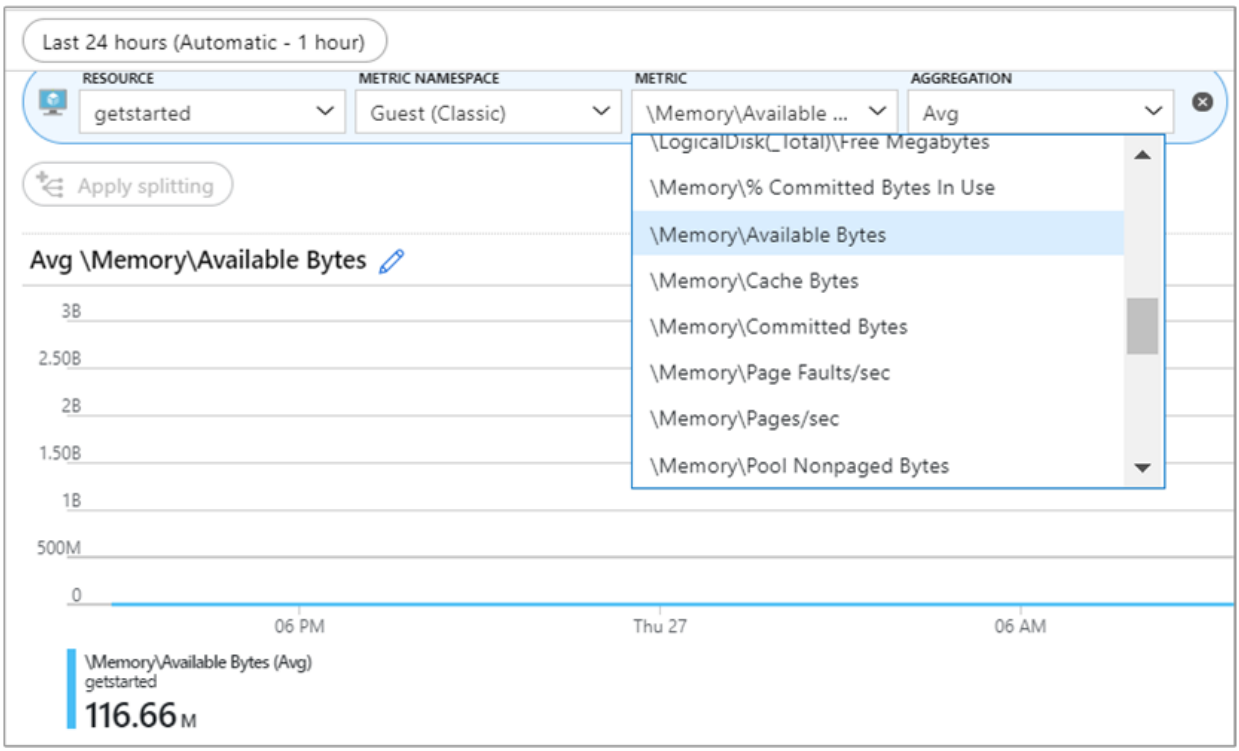
Keep in mind that both Azure and Linux guest-level monitoring require a storage account. When you enable guest-level monitoring, if you don't choose an existing storage account, then one is created for you.

Enable guest-level monitoring on existing VMs

1. In **Virtual Machines**, view your list of your VMs and then select a VM.
2. Under **Monitoring**, select **Diagnostic settings**.
3. On the Diagnostics settings page, click **Enable guest-level monitoring**.

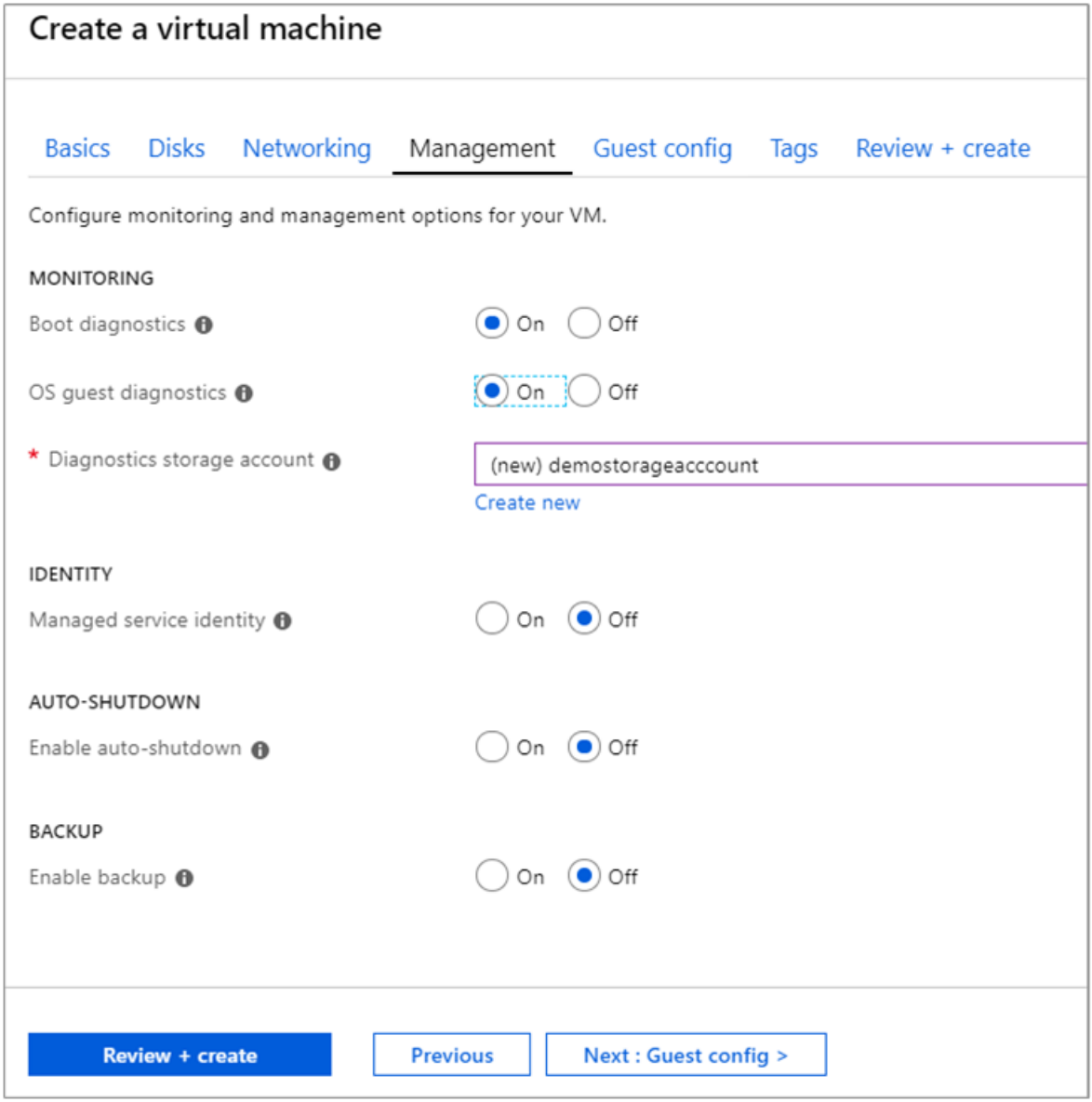


4. After a few minutes, the Azure diagnostics agent is installed on the VM. A basic set of metrics are added. Refresh the page. The added performance counters appear on the Overview tab.
5. Under Monitoring, select **Metrics**.
6. In the metrics chart under **Metric Namespace**, select **Guest (Classic)**.
7. In the Metric list, you can view all of the available performance counters for the guest VM.



Enable guest-level monitoring on new VMs

When you create new VMs, on the Management tab, select **On** for **OS guest diagnostics**.



For more information about enabling extended metrics for Azure virtual machines, see Understanding and using the Azure Linux agent and Azure Virtual Machine Agent overview.

Resource Manager credentials

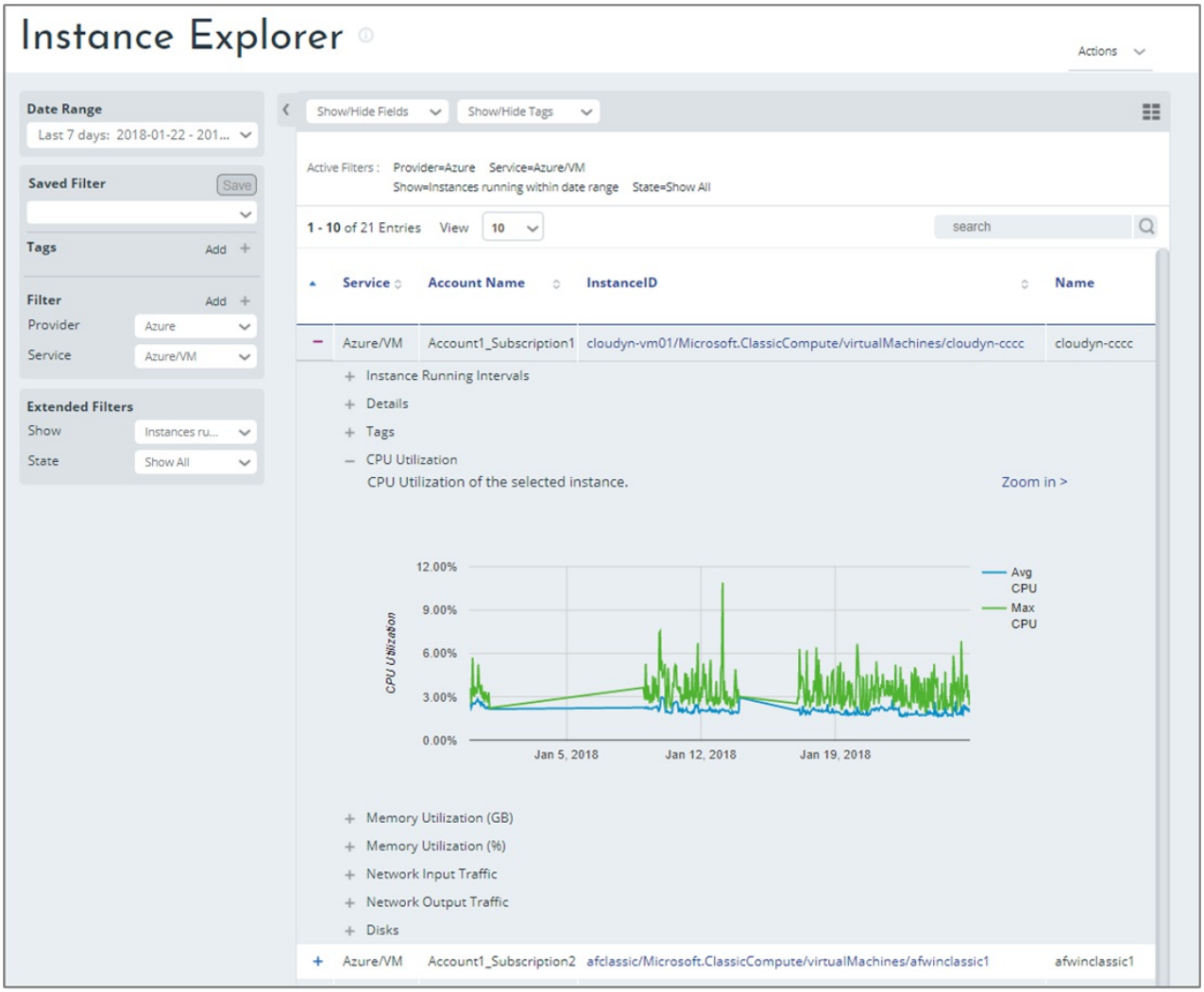
After you enable extended metrics, ensure that Cloudyn has access to your Resource Manager credentials. Your credentials are required for Cloudyn to collect and display performance data for your VMs. They're also used to create cost optimization recommendations. Cloudyn needs at least three days of performance data from an instance to determine if it is a candidate for a downsizing recommendation.

Enable VM metrics with a script

You can enable VM metrics with Azure PowerShell scripts. When you have many VMs that you want to enable metrics on, you can use a script to automate the process. Example scripts are on GitHub at Azure Enable Diagnostics.

View Azure performance metrics

To view performance metrics on your Azure Instances in the Cloudyn portal, navigate to **Assets** > **Compute** > **Instance Explorer**. In the list of VM instances, expand an instance and then expand a resource to view details.



Next steps

- If you haven't already enabled Azure Resource Manager API access for your accounts, proceed to Activate Azure subscriptions and accounts.

Connect a Google Cloud Platform account

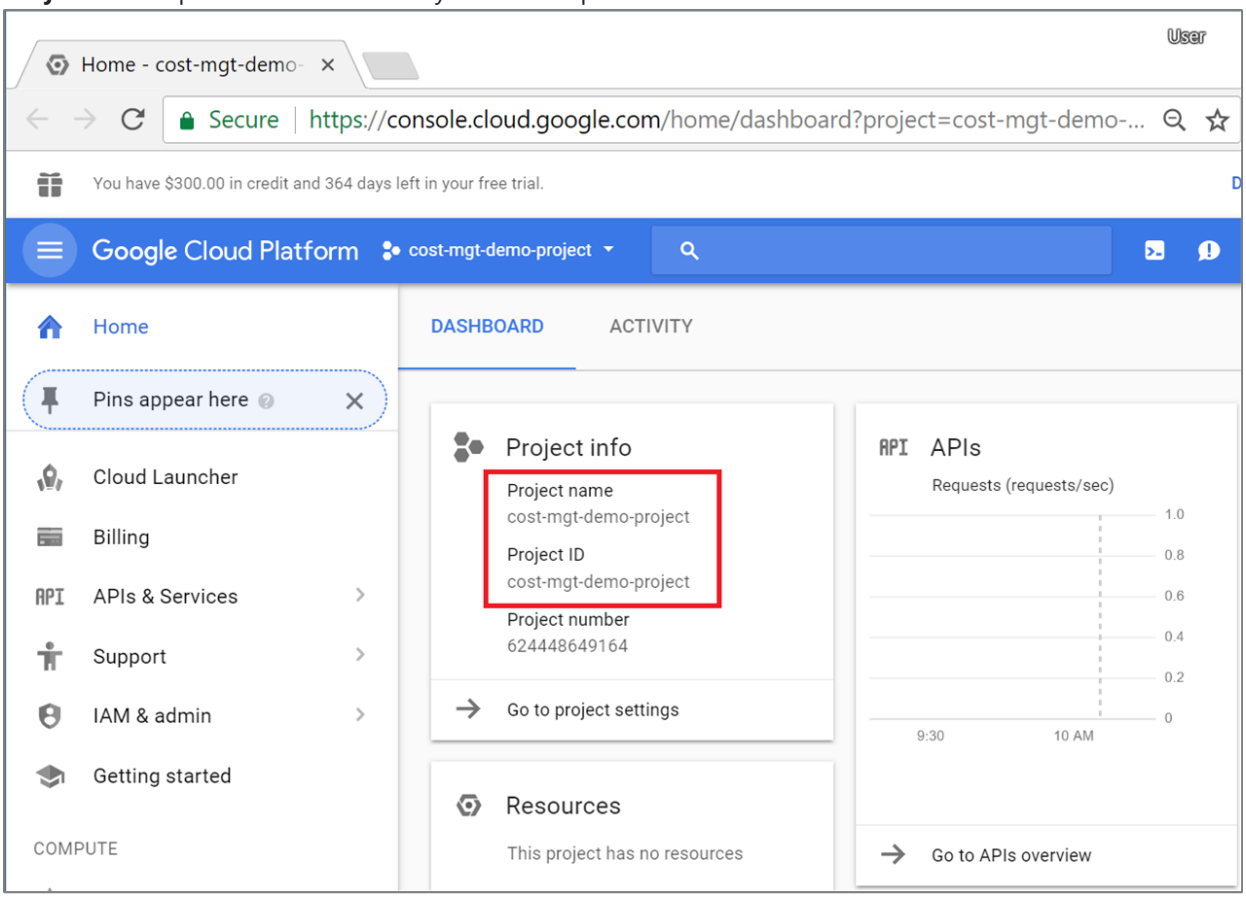
1/14/2020 • 2 minutes to read • Edit Online

You can connect your existing Google Cloud Platform account to Cloudyn. After you connect your account to Cloudyn, cost and usage data is available in Cloudyn reports. This article helps you to configure and connect your Google account with Cloudyn.

Collect project information

You start by gathering information about your project.

1. Sign in to the Google Cloud Platform console at https://console.cloud.google.com.
2. Review the project information that you want to onboard to Cloudyn and note the **Project name** and the **Project ID**. Keep the information handy for later steps.



3. If billing is not enabled and linked to your project, create a billing account. For more information, see Create a new billing account.

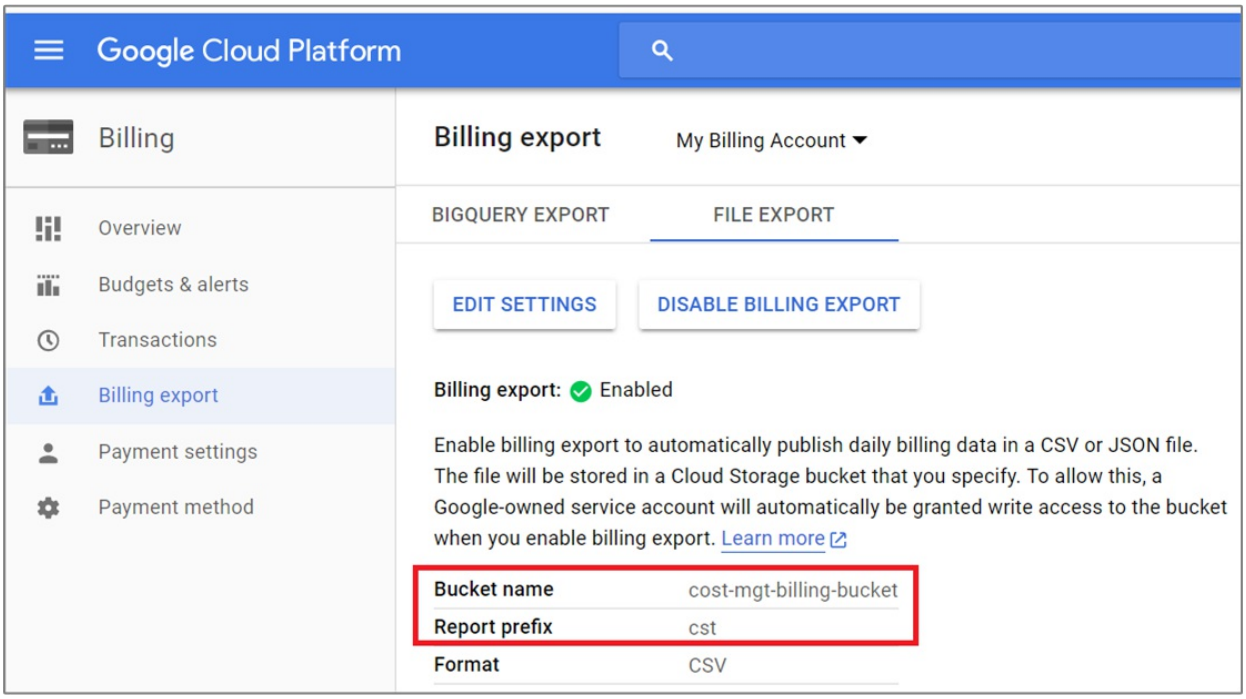
Enable storage bucket billing export

Cloudyn retrieves your Google billing data from a storage bucket. Keep the **Bucket name** and **Report prefix** information handy for later use during Cloudyn registration.

Using Google Cloud Storage to store usage reports incurs minimal fees. For more information, see Cloud Storage Pricing.

1. If you have not enabled billing export to a file, follow the instructions at How to enable billing export to a file. You can use either JSON or CSV billing export format.

2. Otherwise, in the Google Cloud Platform console, navigate to **Billing** > **Billing export**. Note your billing **Bucket name** and **Report prefix**.



Enable Google Cloud Platform APIs

To collect usage and asset information, Cloudyn needs the following Google Cloud Platform APIs enabled:

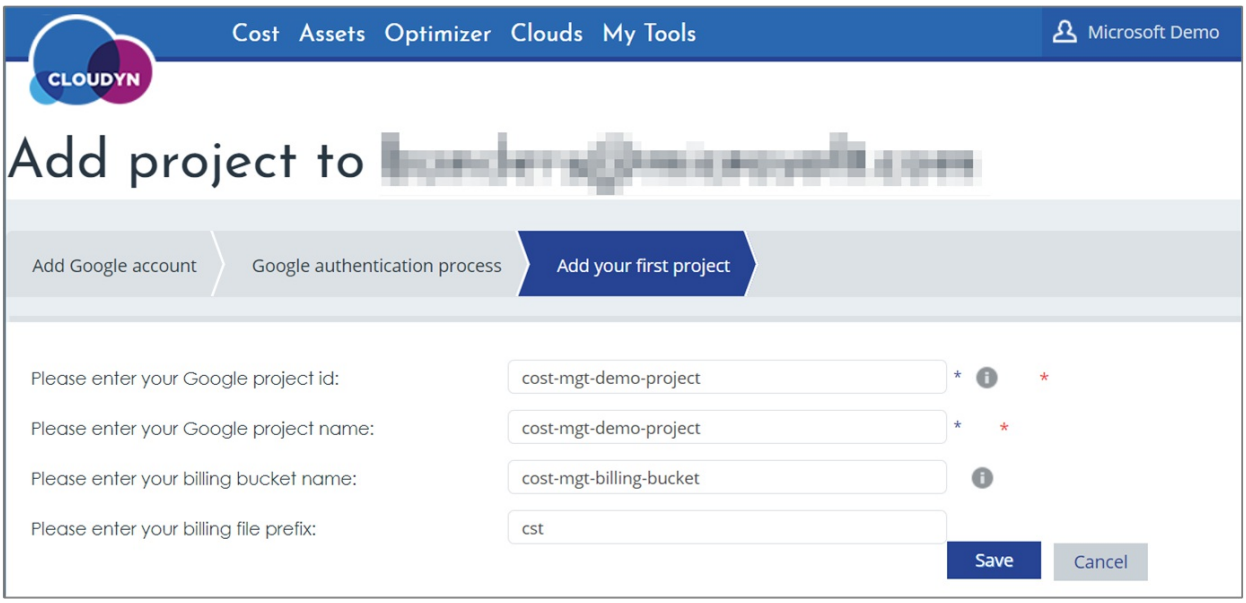
- BigQuery API
- Google Cloud SQL
- Google Cloud Datastore API
- Google Cloud Storage
- Google Cloud Storage JSON API
- Google Compute Engine API

Enable or verify APIs

1. In the Google Cloud Platform console, select the project that you want to register with Cloudyn.
2. Navigate to **APIs & Services** > **Library**.
3. Use search to find each previously listed API.
4. For each API, verify that **API enabled** is shown. Otherwise, click **ENABLE**.

Add a Google Cloud account to Cloudyn

1. Open the Cloudyn portal from the Azure portal or navigate to https://azure.cloudyn.com and sign in.
2. Click **Settings** (cog symbol) and then select **Cloud Accounts**.
3. In **Accounts Management**, select the **Google Accounts** tab and then click **Add new +**.
4. In **Google Account Name**, enter the email address for the billing account then click **Next**.
5. In the Google authentication dialog, select or enter a Google account and then **ALLOW** cloudyn.com access to your account.
6. Add the request project information that you had previous noted. They include **Project ID**, **Project** name, **billing** bucket name, and **billing file** Report prefix then click **Save**.



Your Google account appears in the list of accounts and it should say **Authenticated**. Under it, your Google project name and ID should appear and have a green check mark symbol. Account Status should say **Completed**.

Within a few hours, Cloudyn reports show Google cost and usage information.

Next steps

- To learn more about Cloudyn, continue to the Review usage and costs tutorial for Cloudyn.

Connect an Amazon Web Services account

1/14/2020 • 6 minutes to read • Edit Online

You have two options to connect your Amazon Web Services (AWS) account to Cloudyn. You can connect with an IAM role or with a read-only IAM user account. The IAM role is recommended because it allows you to delegate access with defined permissions to trusted entities. The IAM role doesn't require you to share long-term access keys. After you connect an AWS account to Cloudyn, cost and usage data is available in Cloudyn reports. This document guides you through both options.

For more information about AWS IAM identities, see Identities (Users, Groups, and Roles).

Also, you enable AWS detailed billing reports and store the information in an AWS simple storage service (S3) bucket. Detailed billing reports include billing charges with tag and resource information on an hourly basis. Storing the reports allows Cloudyn to retrieve them from your bucket and display the information in its reports.

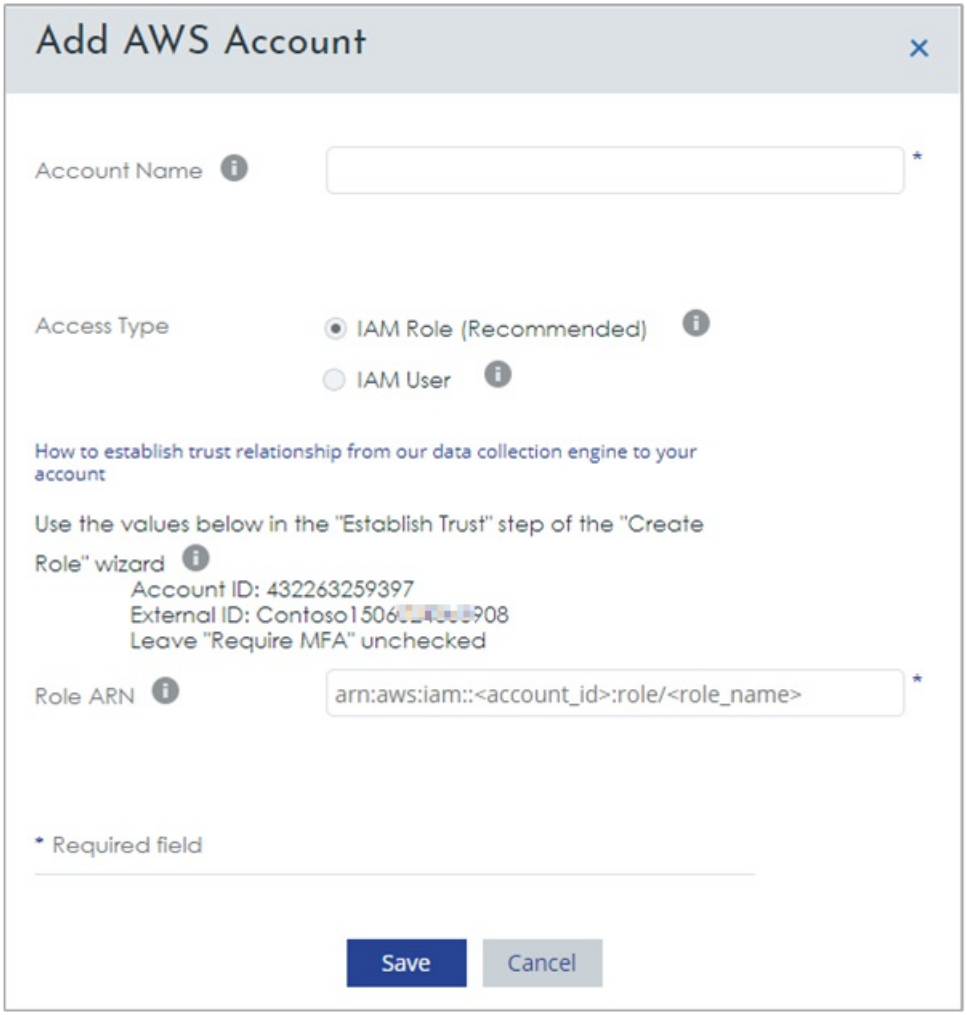
AWS role-based access

The following sections walk you through creating a read-only IAM role to provide access to Cloudyn.

Get your Cloudyn account external ID

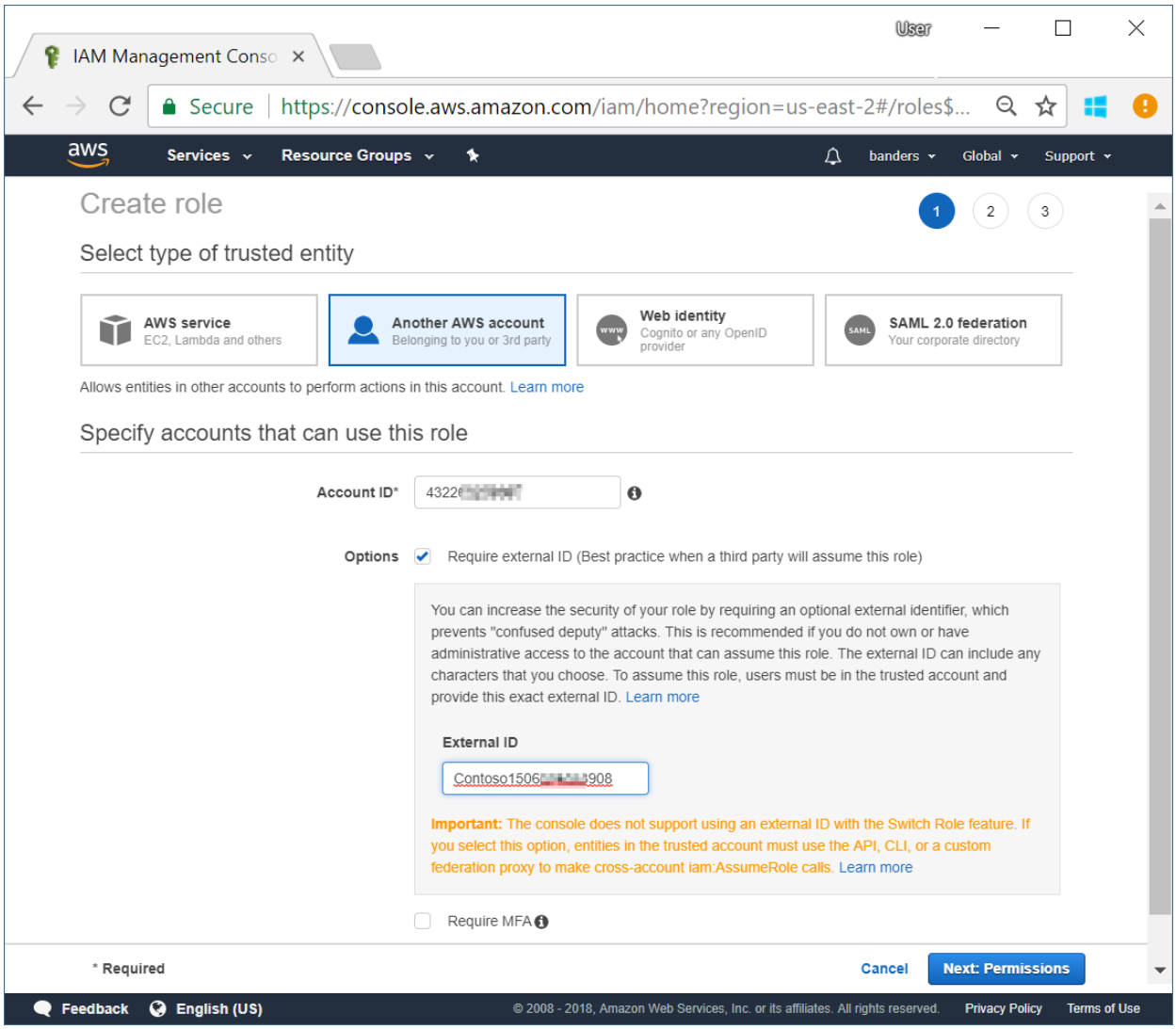
The first step is to get the unique connection passphrase from the Cloudyn portal. It is used in AWS as the **External ID**.

1. Open the Cloudyn portal from the Azure portal or navigate to https://azure.cloudyn.com and sign in.
2. Click the cog symbol and then select **Cloud Accounts**.
3. In Accounts Management, select the **AWS Accounts** tab and then click **Add new +**.
4. In the **Add AWS Account** dialog, copy the **External ID** and save the value for AWS Role creation steps in the next section. The External ID is unique to your account. In the following image, the example External ID is *Contoso* followed by a number. Your ID differs.

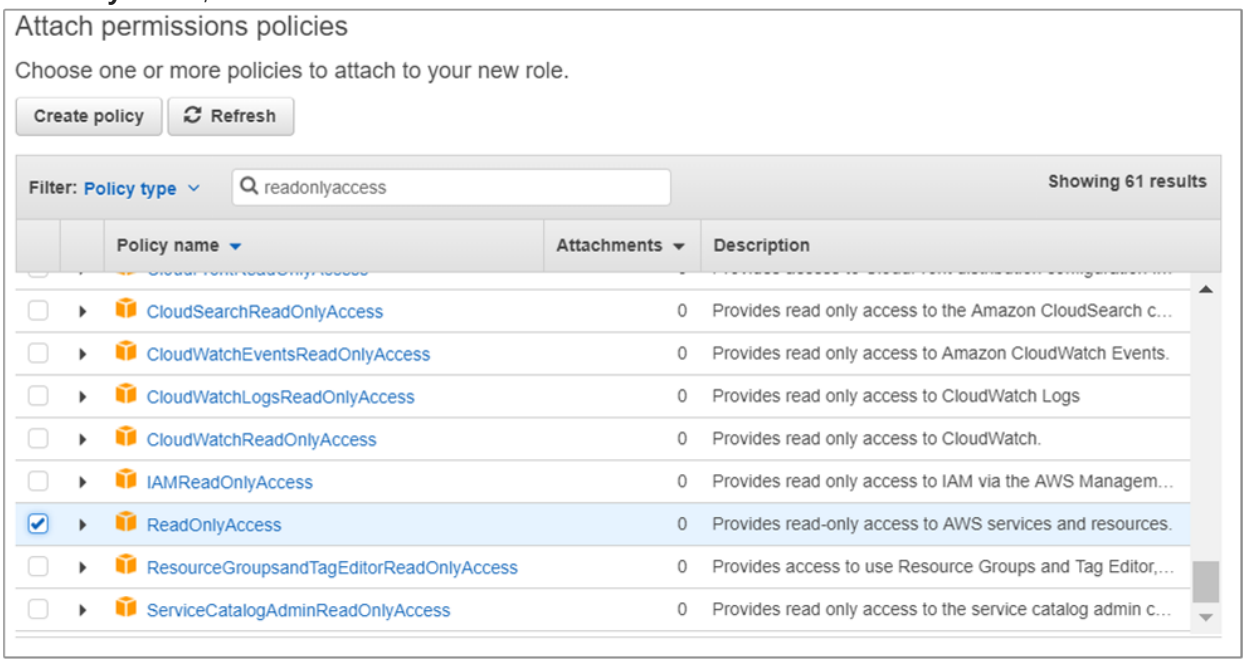


Add AWS read-only role-based access

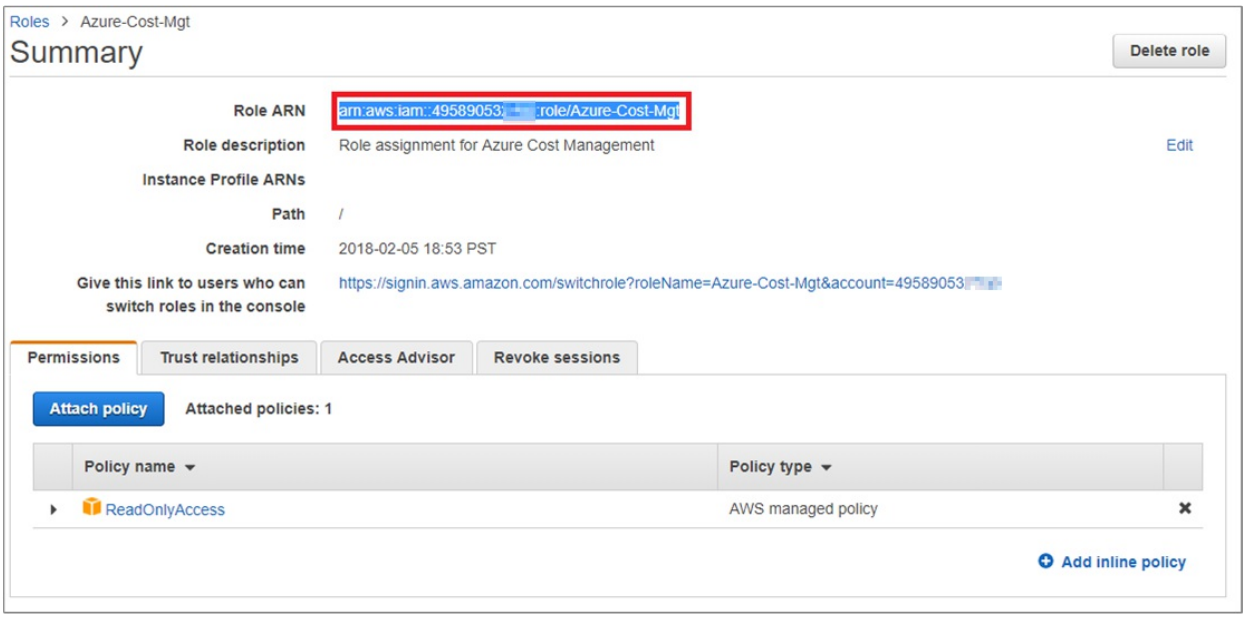
1. Sign in to the AWS console at https://console.aws.amazon.com/iam/home and select **Roles**.
2. Click **Create Role** and then select **Another AWS account**.
3. In the **Account ID** box, paste `432263259397`. This Account ID is the Cloudyn data collector account assigned by AWS to the Cloudyn service. Use the exact Account ID shown.
4. Next to **Options**, select **Require external ID**. Paste your unique value that copied previously from the **External ID** field in Cloudyn. Then click **Next: Permissions**.



5. Under **Attach permissions policies**, in the **Policy type** filter box search, type `ReadOnlyAccess`, select **ReadOnlyAccess**, then click **Next: Review**.

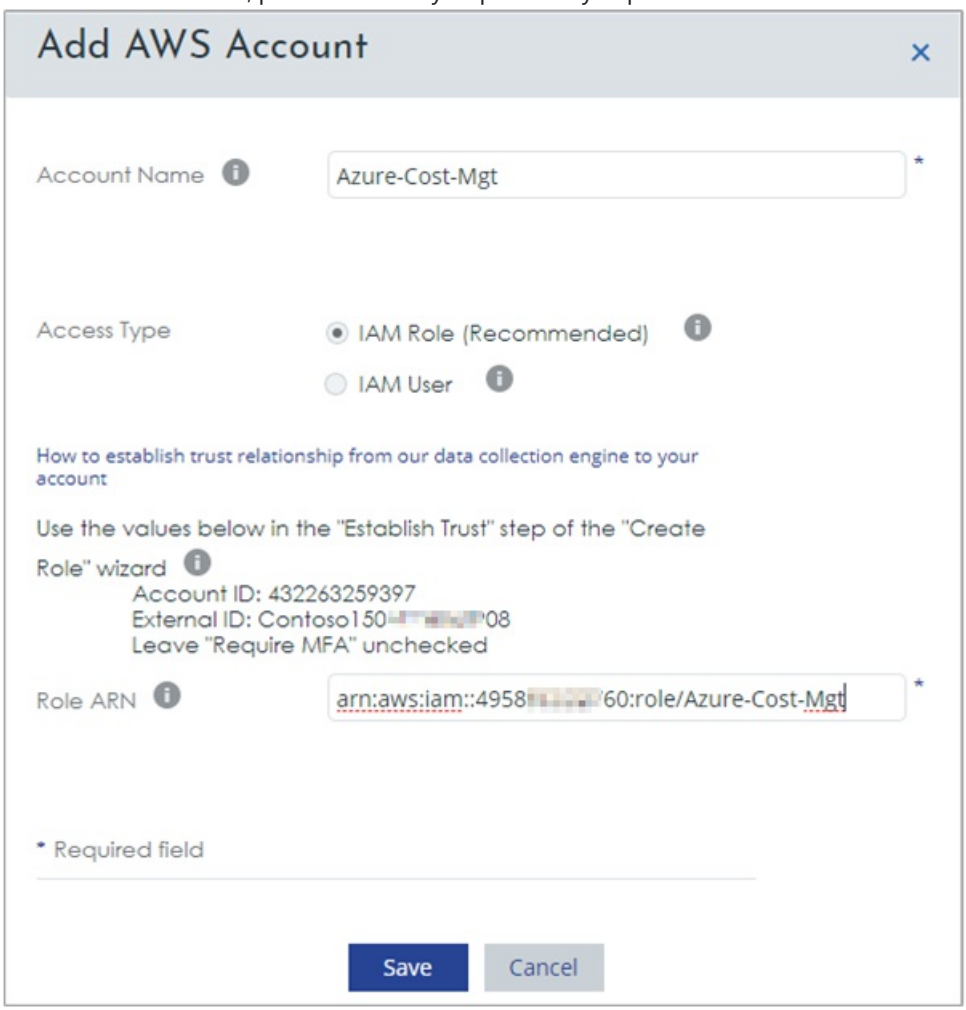


6. On the Review page, ensure your selections are correct and type a **Role name**. For example, *Azure-Cost-Mgt*. Enter a **Role description**. For example, *Role assignment for Cloudyn*, then click **Create role**.
7. In the **Roles** list, click the role you created and copy the **Role ARN** value from the Summary page. Use the Role ARN (Amazon Resource Name) value later when you register your configuration in Cloudyn.



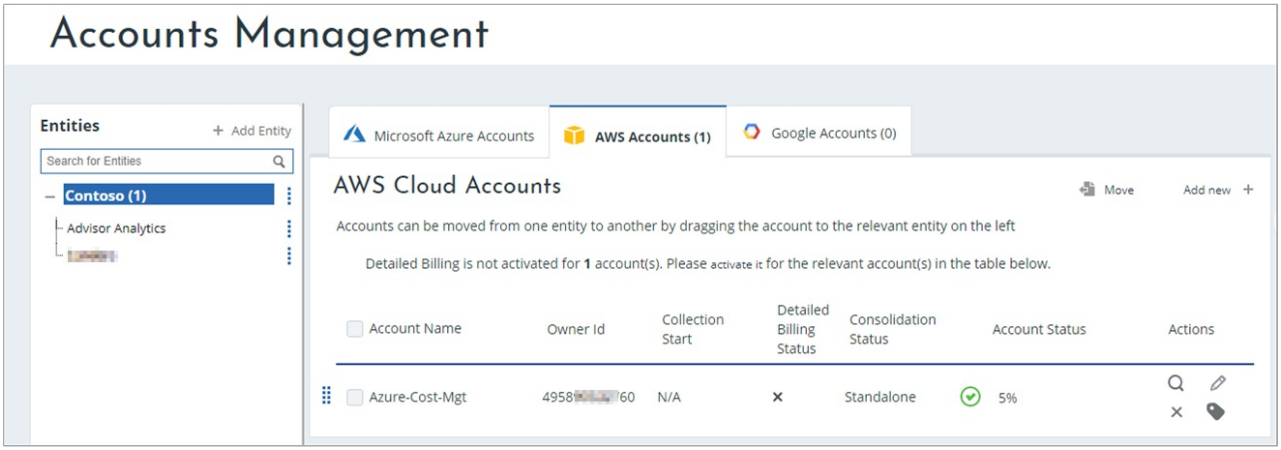
Configure AWS IAM role access in Cloudyn

1. Open the Cloudyn portal from the Azure portal or navigate to https://azure.cloudyn.com/ and sign in.
2. Click the cog symbol and then select **Cloud Accounts**.
3. In Accounts Management, select the **AWS Accounts** tab and then click **Add new +**.
4. In **Account Name**, type a name for the account.
5. Next to **Access Type**, select **IAM Role**.
6. In the **Role ARN** field, paste the value you previously copied and then click **Save**.



Your AWS account appears in the list of accounts. The **Owner ID** listed matches your Role ARN value. Your **Account Status** should have a green check mark symbol indicating that Cloudyn can access your AWS account.

Until you enable detailed AWS billing, your consolidation status appears as **Standalone**.



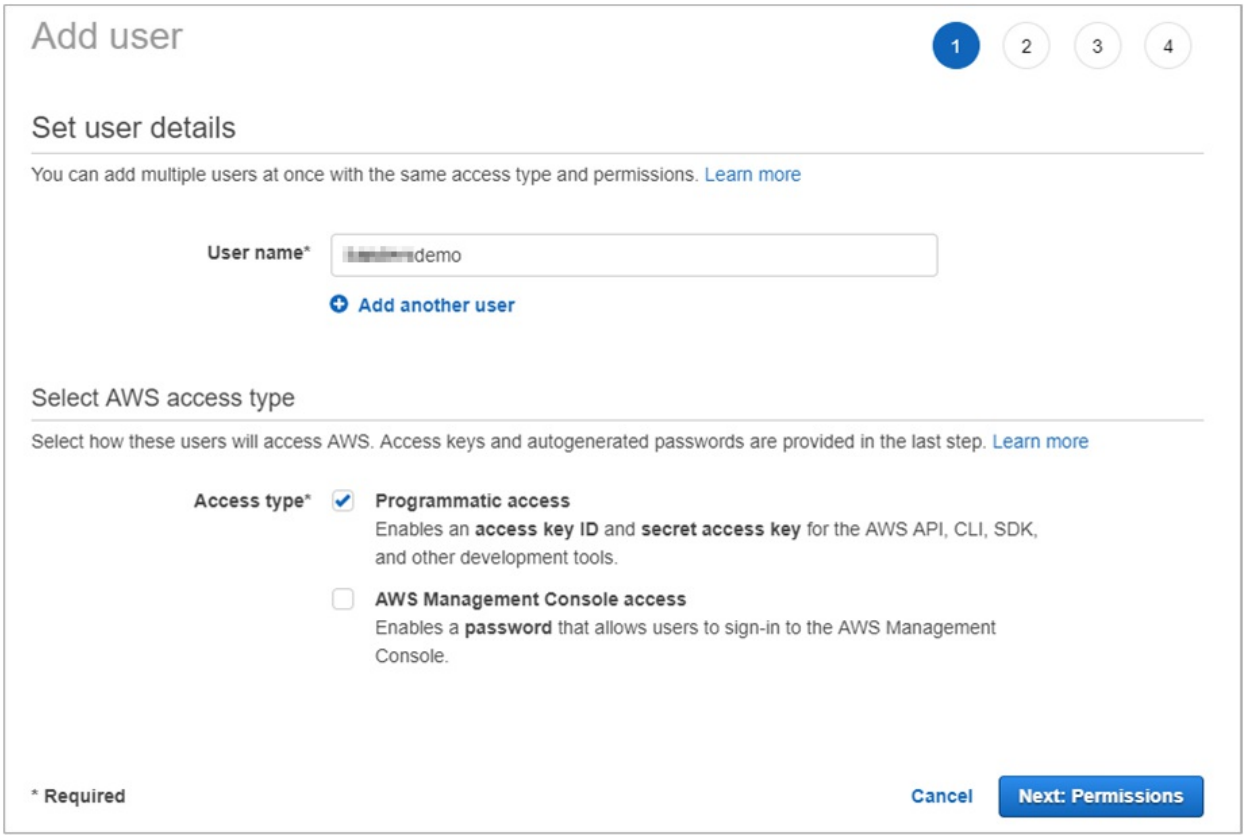
Cloudyn starts collecting the data and populating reports. Next, enable detailed AWS billing.

AWS user-based access

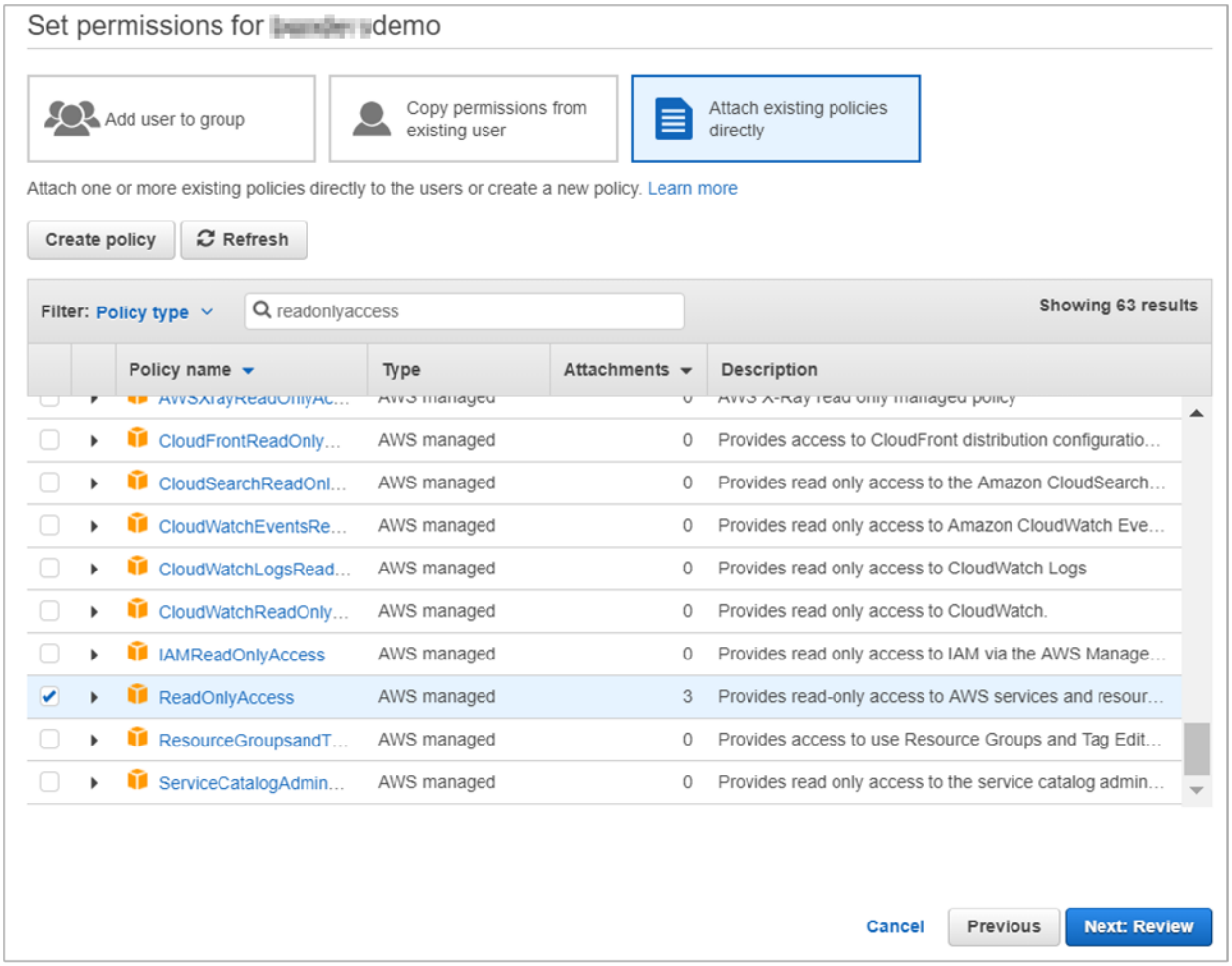
The following sections walk you through creating a read-only user to provide access to Cloudyn.

Add AWS read-only user-based access

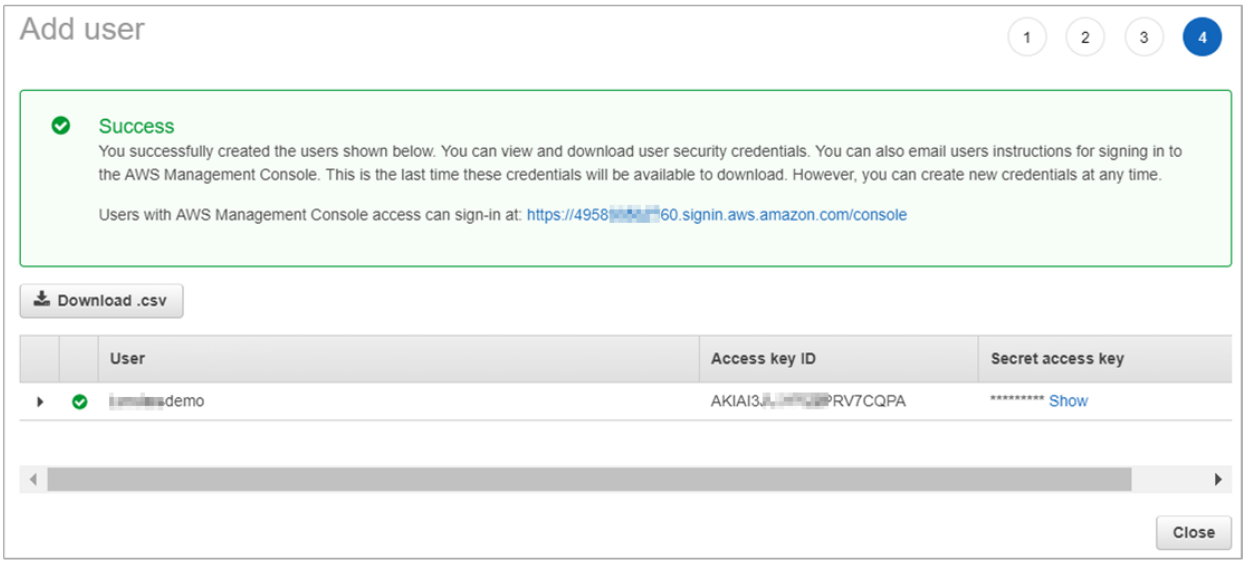
1. Sign in to the AWS console at https://console.aws.amazon.com/iam/home and select **Users**.
2. Click **Add User**.
3. In the **User name** field, type a user name.
4. For **Access type**, select **Programmatic access** and click **Next: Permissions**.



5. For permissions, select **Attach existing policies directly**.
6. Under **Attach permissions policies**, in the **Policy type** filter box search, type `ReadOnlyAccess`, select **ReadOnlyAccess**, and then click **Next: Review**.



7. On the Review page, ensure your selections are correct then click **Create user**.
8. On the Complete page, your Access key ID and Secret access key are shown. You use this information to configure registration in Cloudyn.
9. Click **Download .csv** and save the credentials.csv file to a secure location.



Configure AWS IAM user-based access in Cloudyn

1. Open the Cloudyn portal from the Azure portal or navigate to https://azure.cloudyn.com/ and sign in.
2. Click the cog symbol and then select **Cloud Accounts**.
3. In Accounts Management, select the **AWS Accounts** tab and then click **Add new +**.
4. For **Account Name**, type an account name.
5. Next to **Access Type**, select **IAM User**.
6. In **Access Key**, paste the **Access key ID** value from the credentials.csv file.

7. In **Secret Key**, paste the **Secret access key** value from the credentials.csv file and then click **Save**.

Your AWS account appears in the list of accounts. Your **Account Status** should have a green check mark symbol.

Cloudyn starts collecting the data and populating reports. Next, enable detailed AWS billing.

Enable detailed AWS billing

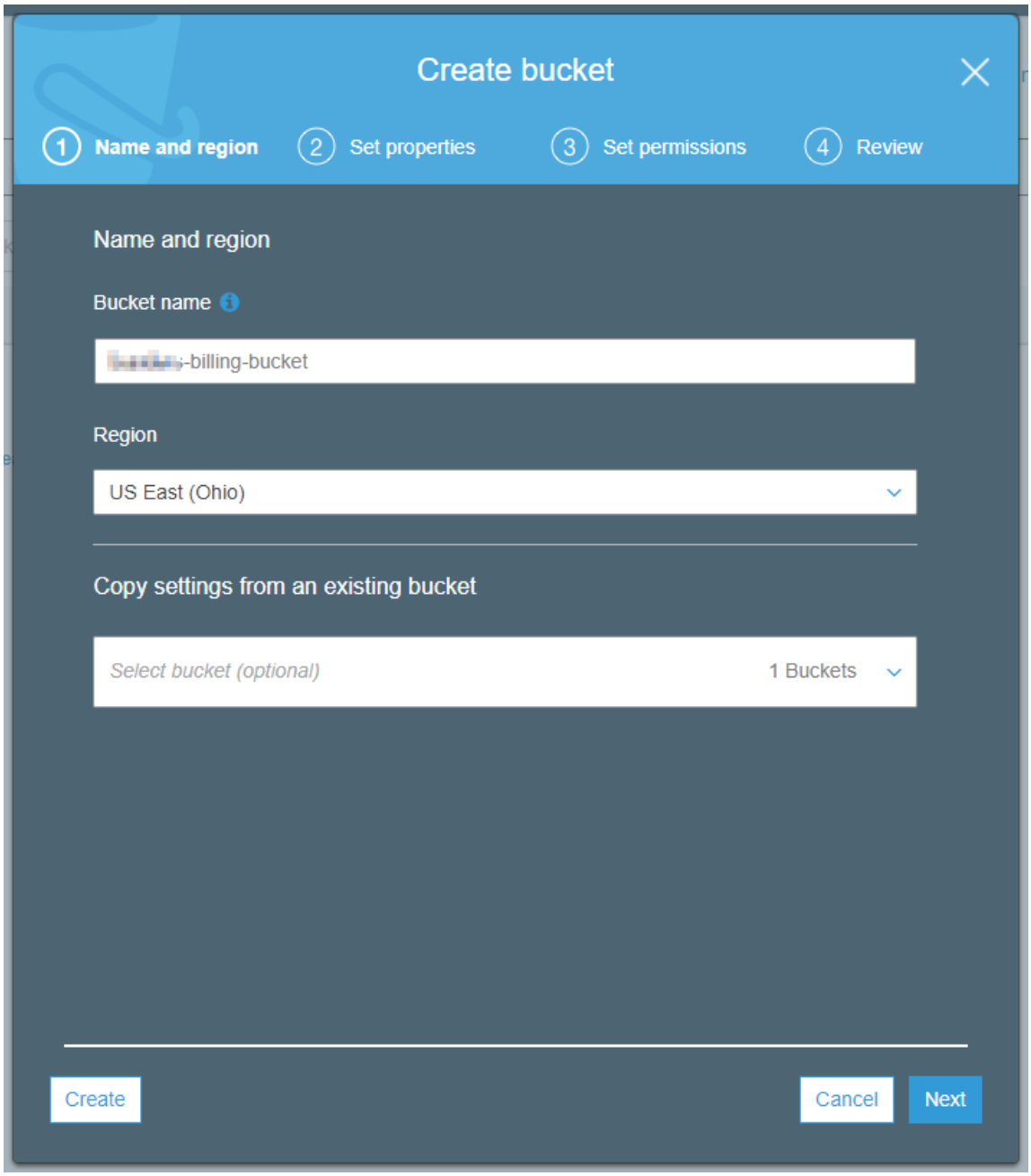
Use the following steps to get your AWS Role ARN. You use the Role ARN to grant read permissions to a billing bucket.

1. Sign in to the AWS console at https://console.aws.amazon.com and select **Services**.
2. In the Service Search box type *IAM*, and select that option.
3. Select **Roles** from the left-hand menu.
4. In the list of Roles, select the role that you created for Cloudyn access.
5. On the Roles Summary page, click to copy the **Role ARN**. Keep the Role ARN handy for later steps.

Create an S3 bucket

You create an S3 bucket to store detailed billing information.

1. Sign in to the AWS console at https://console.aws.amazon.com and select **Services**.
2. In the Service Search box type *S3*, and select **S3**.
3. On the Amazon S3 page, click **Create bucket**.
4. In the Create bucket wizard, choose a Bucket name and Region and then click **Next**.



5. On the **Set properties** page, keep the default values, and then click **Next**.
6. On the Review page, click **Create bucket**. Your bucket list is displayed.
7. Click the bucket that you created and select the **Permissions** tab and then select **Bucket Policy**. The Bucket policy editor opens.
8. Copy the following JSON example and paste it in the Bucket policy editor.
   - Replace `<BillingBucketName>` with the name of your S3 bucket.
   - Replace `<ReadOnlyUserOrRole>` with the Role or User ARN that you had previously copied.

```
{
 "Version": "2012-10-17",
 "Id": "Policy1426774604000",
 "Statement": [
  {
   "Sid": "Stmt1426774604000",
   "Effect": "Allow",
   "Principal": {
    "AWS": "arn:aws:iam::386209384616:root"
   },
   "Action": [
    "s3:GetBucketAcl",
    "s3:GetBucketPolicy"
   ],
   "Resource": "arn:aws:s3:::<BillingBucketName>"
  },
  {
   "Sid": "Stmt1426774604001",
   "Effect": "Allow",
   "Principal": {
    "AWS": "arn:aws:iam::386209384616:root"
   },
   "Action": "s3:PutObject",
   "Resource": "arn:aws:s3:::<BillingBucketName>/*"
  },
  {
   "Sid": "Stmt1426774604002",
   "Effect": "Allow",
   "Principal": {
    "AWS": "<ReadOnlyUserOrRole>"
   },
   "Action": [
    "s3:List*",
    "s3:Get*"
   ],
   "Resource": "arn:aws:s3:::<BillingBucketName>/*"
  }
 ]
}
```

9. Click **Save**.

Bucket policy editor ARN: arn:aws:s3:::[redacted]-billing-bucket

Type to add a new policy or edit an existing policy in the text area below.

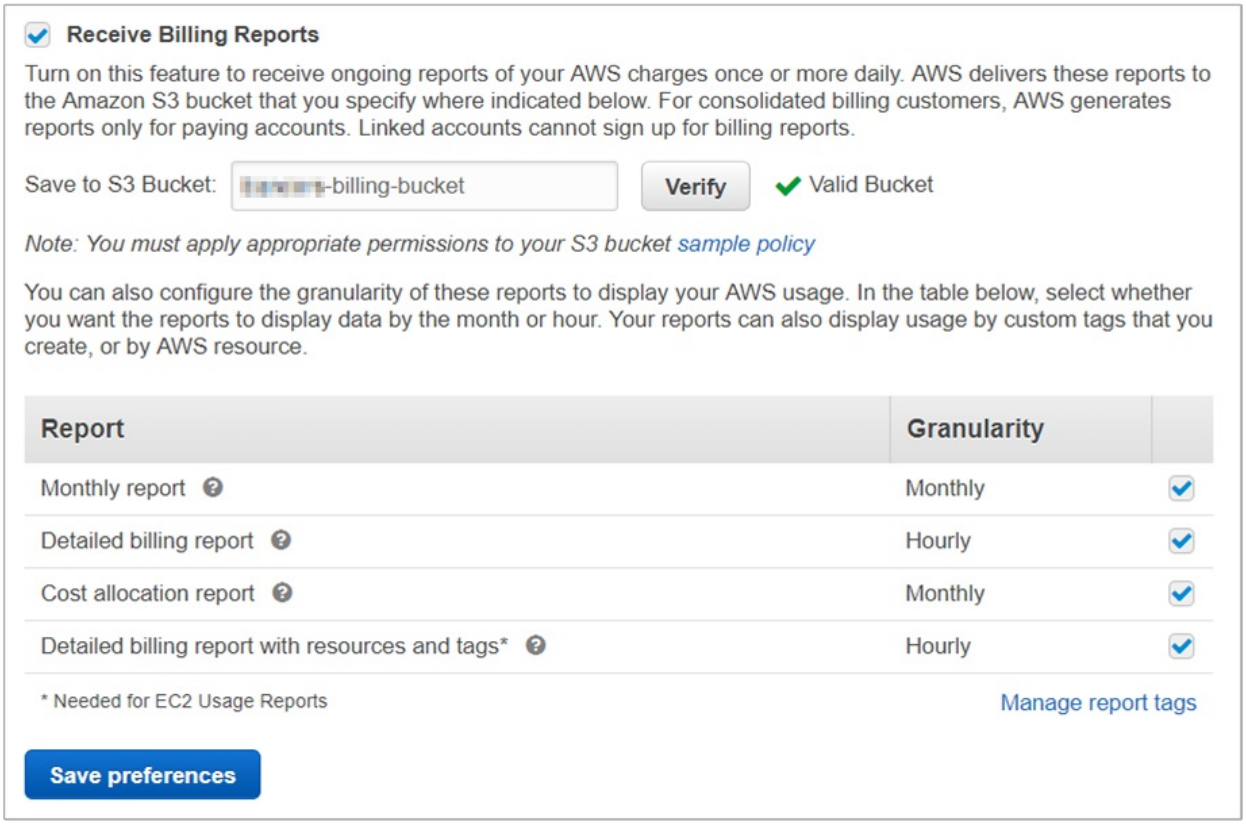
Delete | Cancel | Save

```
{
    "Version": "2012-10-17",
    "Id": "Policy1426774604000",
    "Statement": [
        {
            "Sid": "Stmt1426774604000",
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::386209384616:root"
            },
            "Action": [
                "s3:GetBucketAcl",
                "s3:GetBucketPolicy"
            ],
            "Resource": "arn:aws:s3:::[redacted]-billing-bucket"
        },
        {
            "Sid": "Stmt1426774604001",
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::386209384616:root"
            },
            "Action": "s3:PutObject",
            "Resource": "arn:aws:s3:::[redacted]-billing-bucket/*"
        },
        {
            "Sid": "Stmt1426774604002",
            "Effect": "Allow",
            "Principal": {
                "AWS": "arn:aws:iam::4958[redacted]60:role/Azure-Cost-Mgt"
            },
            "Action": [
                "s3:List*",
                "s3:Get*"
            ],
            "Resource": "arn:aws:s3:::[redacted]-billing-bucket/*"
        }
    ]
}
```

Enable AWS billing reports

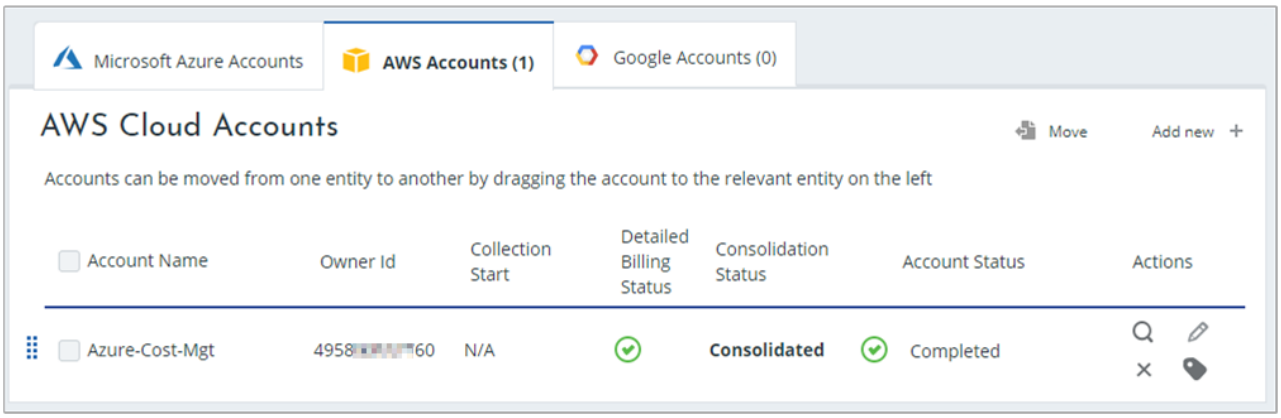
After you create and configure the S3 bucket, navigate to Billing Preferences in the AWS console.

1. On the Preferences page, select **Receive Billing Reports**.
2. Under **Receive Billing Reports**, enter the name of the bucket that you created and then click **Verify**.
3. Select all four report granularity options and then click **Save preferences**.



Cloudyn retrieves detailed billing information from your S3 bucket and populates reports after detailed billing is enabled. It can take up to 24 hours until detailed billing data appears in the Cloudyn console. When detailed billing data is available, your account consolidation status appears as **Consolidated**. Account status appears as

Completed.



Some of the optimization reports may require a few days of data to get an adequate data sample size for accurate recommendations.

Next steps

- To learn more about Cloudyn, continue to the Review usage and costs tutorial for Cloudyn.

Configure storage accounts for Cloudyn

1/14/2020 • 4 minutes to read • Edit Online

You can save Cloudyn reports in the Cloudyn portal, Azure storage, or AWS storage buckets. Saving your reports to the Cloudyn portal is free of charge. However, saving your reports to your cloud service provider's storage is optional and incurs additional cost. This article helps you configure Azure storage accounts and Amazon Web Services (AWS) storage buckets to store your reports.

Prerequisites

You must have either an Azure storage account or an Amazon storage bucket.

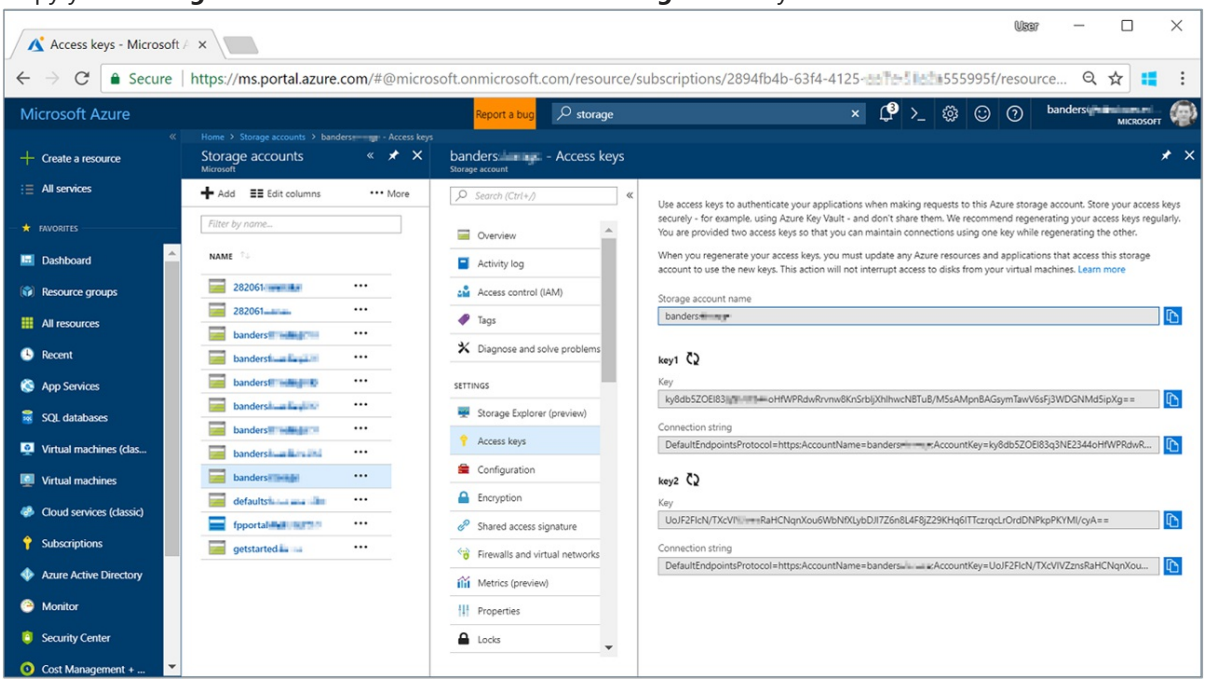
If you don't have an Azure storage account, you need to create one. For more information about creating an Azure storage account, see Create a storage account.

If you don't have an AWS simple storage service (S3) bucket, you need to create one. For more information about creating an S3 bucket, see Create a Bucket.

Configure your Azure storage account

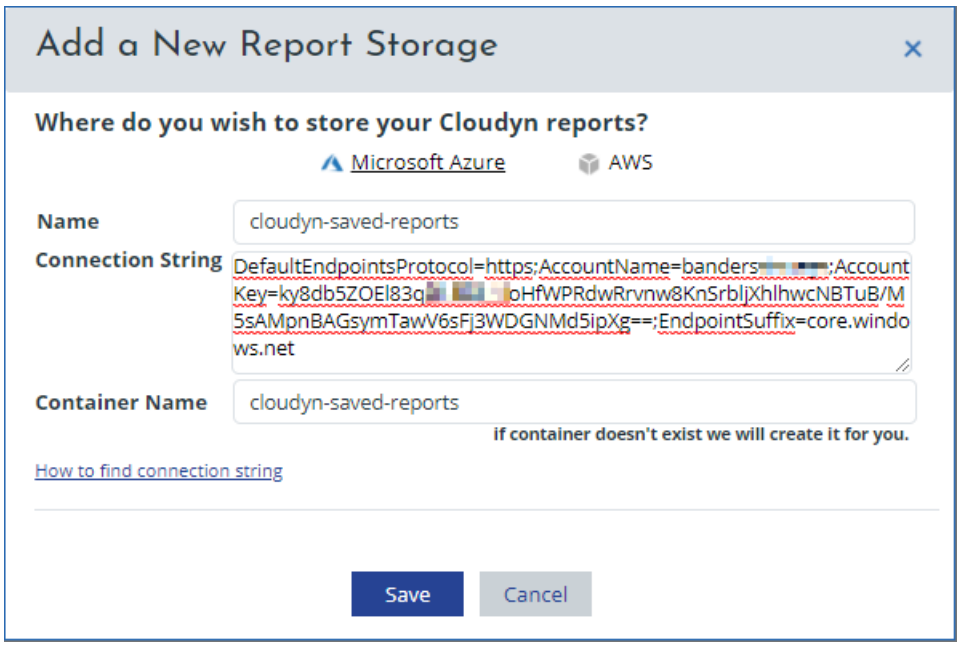
Configuring you Azure storage for use by Cloudyn is straightforward. Gather details about the storage account and copy them in the Cloudyn portal.

1. Sign in to the Azure portal at https://portal.azure.com.
2. Click **All Services**, select **Storage accounts**, scroll to the storage account that you want to use, and then select the account.
3. On your storage account page under **Settings**, click **Access Keys**.
4. Copy your **Storage account name** and **Connection string** under key1.



5. Open the Cloudyn portal from the Azure portal or navigate to https://azure.cloudyn.com and sign in.
6. Click the cog symbol and then select **Reports Storage Management**.

7. Click **Add new +** and ensure that Microsoft Azure is selected. Paste your Azure storage account name in the **Name** area. Paste your **connection string** in the corresponding area. Enter a container name and then click **Save**.



Your new Azure report storage entry appears in the storage account list.

Provider	Name	Storage Account	Actions
	1gb-versioned	Cloudyn_B / cloudyn-B-1GB-Versioned	
	aaaa	Cloudyn_A / -test-bucket-with-minus	
	cloudyn-b-shared-bucket	Cloudyn_B / cloudyn-saved-reports	
	cloudyn-saved-reports	**********	

You can now save reports to Azure storage. In any report, click **Actions** and then select **Schedule report**. Name the report and then either add your own URL or use the automatically created URL. Select **Save to storage** and then select the storage account. Enter a prefix that gets appended to the report file name. Select either CSV or JSON file format and then save the report.

Configure an AWS storage bucket

The Cloudyn uses existing AWS credentials: User or Role, to save the reports to your bucket. To test the access, Cloudyn tries to save a small text file to the bucket with the file name *check-bucket-permission.txt*.

You provide the Cloudyn role or user with the PutObject permission to your bucket. Then, use an existing bucket or create a new one to save reports. Finally, decide how to manage the storage class, set lifecycle rules, or remove any unnecessary files.

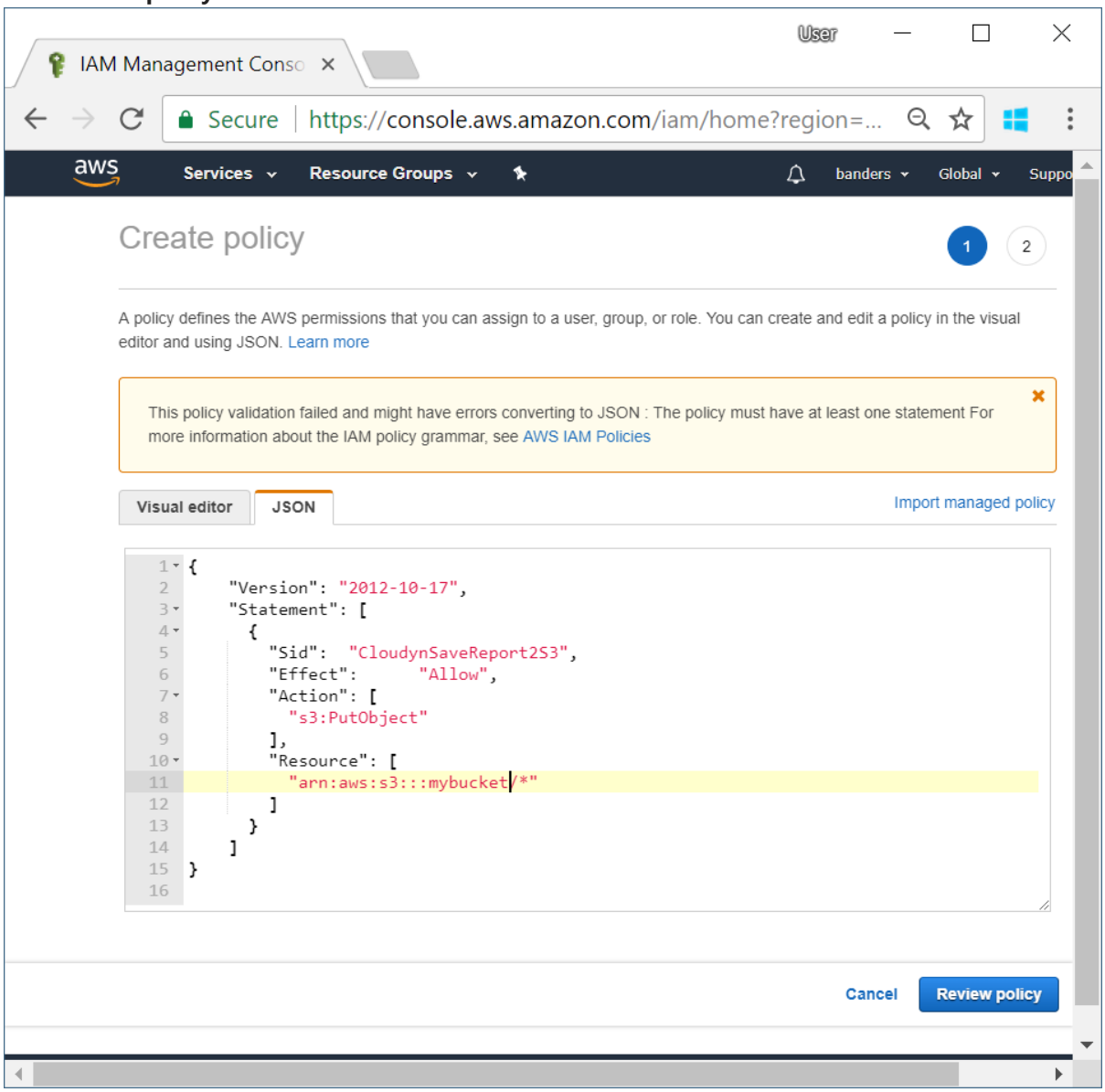
Assign permissions to your AWS user or role

When you create a new policy, you provide the exact permissions needed to save a report to a S3 bucket.

1. Sign in to the AWS console and select **Services**.
2. Select **IAM** from the list of services.
3. Select **Policies** on the left side of the console and then click **Create Policy**.
4. Click the **JSON** tab.
5. The following policy allows you to save a report to a S3 bucket. Copy and paste the following policy example to the **JSON** tab. Replace <bucketname> with your bucket name.

```
{
 "Version": "2012-10-17",
 "Statement": [
   {
  "Sid":  "CloudynSaveReport2S3",
  "Effect":      "Allow",
  "Action": [
    "s3:PutObject"
  ],
  "Resource": [
    "arn:aws:s3:::<bucketname>/*"
  ]
   }
 ]
}
```

6. Click **Review policy**.



7. On the Review policy page, type a name for your policy. For example, *CloudynSaveReport2S3*.

8. Click **Create policy**.

Attach the policy to a Cloudyn role or user in your account

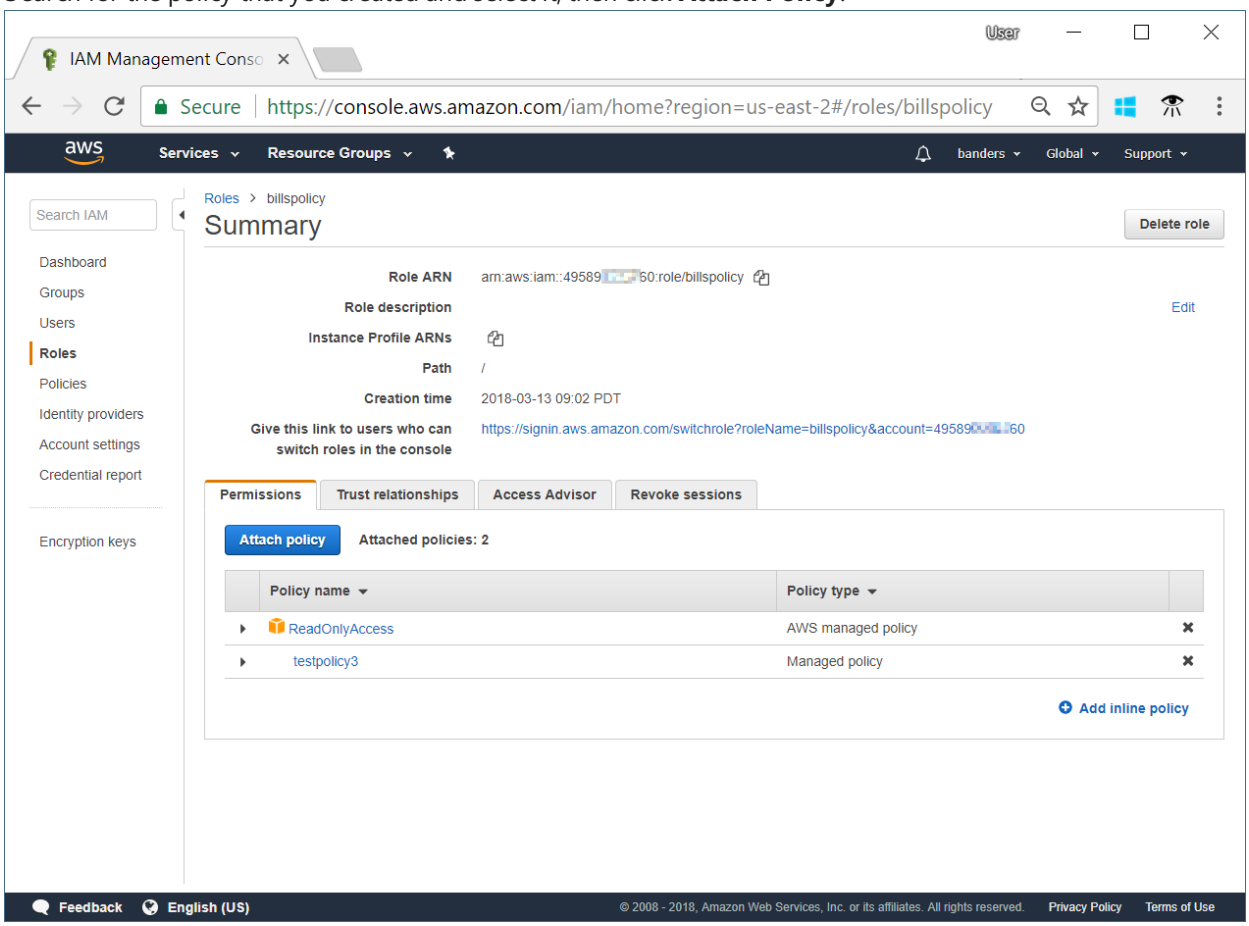
To attach the new policy, you open the AWS console and edit the Cloudyn role or user.

1. Sign in to the AWS console and select **Services**, then select **IAM** from the list of services.

2. Select either **Roles** or **Users** from the left side of the console.

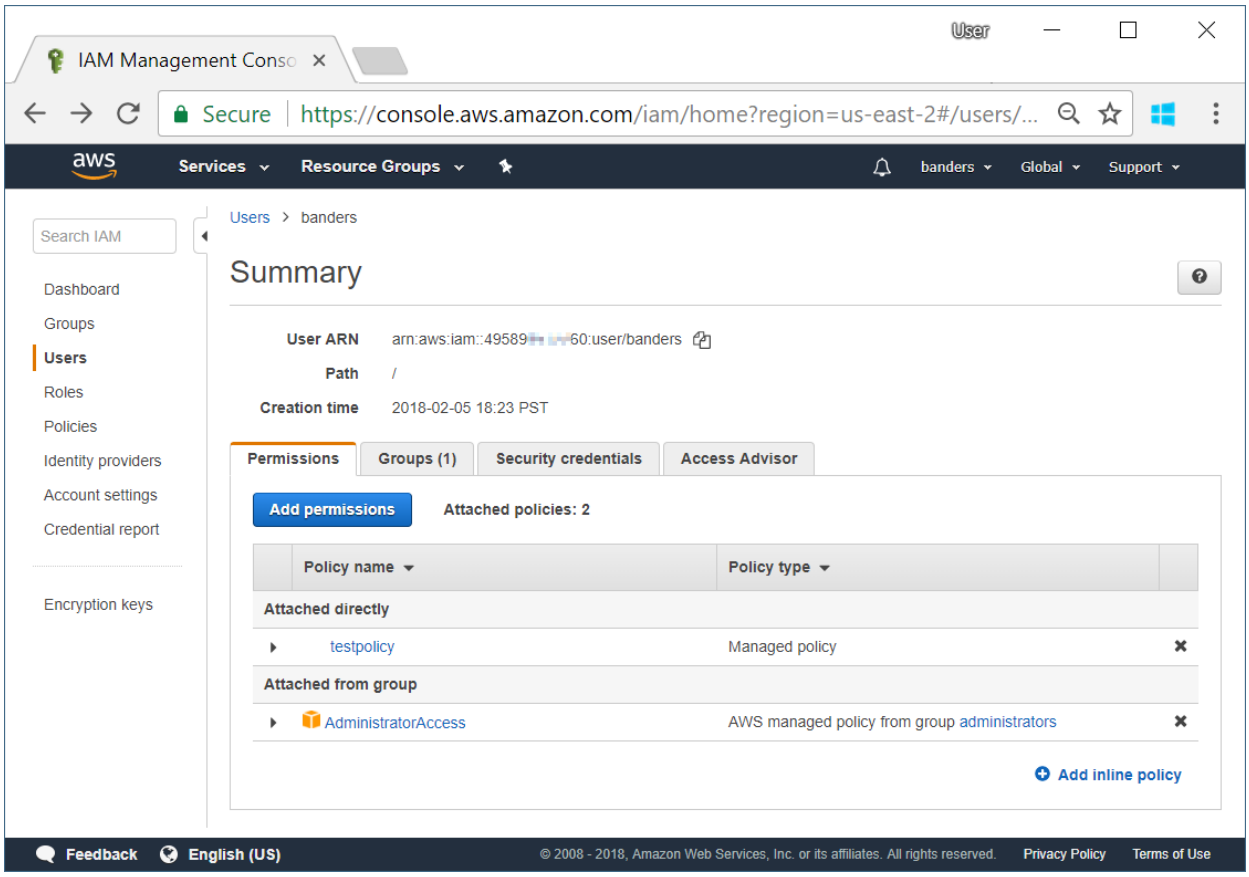
For roles:

1. Click your Cloudyn role name.
2. On the **Permissions** tab, click **Attach Policy**.
3. Search for the policy that you created and select it, then click **Attach Policy**.



For users:

1. Select the Cloudyn User.
2. On the **Permissions** tab, click **Add permissions**.
3. In the **Grant Permission** section, select **Attach existing policies directly**.
4. Search for the policy that you created and select it, then click **Next: Review**.
5. On the Add permissions to role name page, click **Add permissions**.



Optional: Set permission with bucket policy

You can also set permission to create reports on your S3 bucket using a bucket policy. In the classic S3 view:

1. Create or select an existing bucket.
2. Select the **Permissions** tab and then click **Bucket policy**.
3. Copy and paste the following policy sample. Replace <bucket_name> and <Cloudyn_principle> with the ARN of your bucket. Replace the ARN of either the role or user used by Cloudyn.

```
{
"Id": "Policy1485775646248",
"Version": "2012-10-17",
"Statement": [
 {
   "Sid": "SaveReport2S3",
   "Action": [
     "s3:PutObject"
   ],
   "Effect": "Allow",
   "Resource": "<bucket_name>/*",
   "Principal": {
     "AWS": [
       "<Cloudyn_principle>"
     ]
   }
 }
]
}
```

4. In the Bucket policy editor, click **Save**.

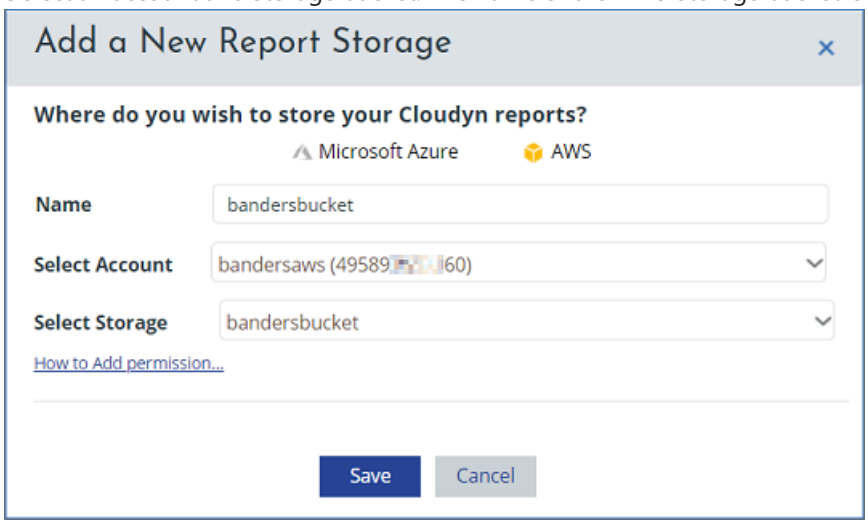
Add AWS report storage to Cloudyn

1. Open the Cloudyn portal from the Azure portal or navigate to https://azure.cloudyn.com and sign in.

2. Click the cog symbol and then select **Reports Storage Management**.

3. Click **Add new +** and ensure that AWS is selected.

4. Select an account and storage bucket. The name of the AWS storage bucket is automatically filled-in.



5. Click **Save** and then click **Ok**.

   Your new AWS report storage entry appears in the storage account list.

You can now save reports to Azure storage. In any report, click **Actions** and then select **Schedule report**. Name the report and then either add your own URL or use the automatically created URL. Select **Save to storage** and then select the storage account. Enter a prefix that gets appended to the report file name. Select either CSV or JSON file format and then save the report.

Next steps

- Review Understanding Cloudyn reports to learn about the basic structure and functions of Cloudyn reports.

Reports available in the Cloudyn portal

1/14/2020 • 27 minutes to read • Edit Online

This article describes the purpose of the Cloudyn reports that are included in the Cloudyn portal. It also describes how you can effectively use the reports. Most reports are intuitive and have a uniform look and feel. Most of the actions that you can do in one report, you can also do in other reports. For an overview about how to use Cloudyn reports, including how to customize and save or to schedule reports, see Understanding cost reports.

Azure Cost Management offers similar functionality to Cloudyn. Azure Cost Management is a native Azure cost management solution. It helps you analyze costs, create and manage budgets, export data, and review and act on optimization recommendations to save money. For more information, see Azure Cost Management.

Report types

There are three types of Cloudyn reports:

- Over-time reports. For example, the Cost Over Time report. Over-time reports show a time series of data over a selected interval with a predefined resolution and show a weekly resolution for last two months. You can use grouping and filtering to zoom in to various data points.
  - Over-time reports can help you view trends and detect spikes or anomalies.
- Analysis reports. For example, the Cost Analysis report. These reports show aggregated data over a period that you define and allow grouping and filtering on the data.
  - Analysis reports can help you view spikes and determine anomaly root-causes and to show you a granular break-down of your data.
- Tabular reports. You can view any report as a table, but some reports are viewed only as a table. These reports provide you detailed lists of items.
  - Recommendations are tabular reports—there are no visualizations for recommendations. However, you can visualize recommendation results. For example, savings over time.
  - Tabular reports are useful as lists of actions or for data export for further processing. For example, a chargeback report.

Cost reports show either *actual* or *amortized* costs.

Actual cost reports display the payments made during the selected time frame. For example, all one-time fees such as reserved instance (RI) purchases are shown in actual cost reports as spikes in cost.

Amortized cost reports spread one-time fees over a period to which they apply. For example, one-time fees for RI purchases are spread over the reservation term and are not shown as a spike. The amortized view is the only way to see true trends and make cost projections.

In some cases, the amortization is presented as a separate report. Examples include the Cost Analysis and Amortized Cost Analysis reports. In other cases, amortization is a report policy such as the Cost Allocation and Cost Analysis reports.

You can schedule any report for periodic delivery. Cost reports allow setting a threshold, so they're useful for alerts.

Cost analysis vs. cost allocation

Cost analysis reports display billing data from your cloud providers. Using the reports, you can group and drill into various data segments itemized from the billing file. The reports enable granular cost navigation across your cloud

vendor's raw billing data.

Some *cost analysis* reports don't group costs by resource tags. And, tag-based billing information only appears in reports after you allocate costs by creating a cost model using Cost Allocation 360.

Cost allocation reports are available after you create a cost model using Cost Allocation 360. Cloudyn processes cost and billing data and *matches* the data to the usage and tag data of your cloud accounts. To match the data, Cloudyn requires access to your usage data. If you have accounts that are missing credentials, they are labeled as *uncategorized resources*.

Dashboards

Dashboards in Cloudy provide a high-level view of reports. Dashboards are made up of widgets and each widget is essentially a report thumbnail. When you customize reports, you save them to My Reports and they're added to the dashboard. For more information about dashboards, see View key cost metrics with dashboards.

Budget information in reports

Many Cloudyn reports show budget information after you've manually created one. So reports won't show budget information until you create a budget. For more information, see Budget Management settings.

Reports and reporting features

Cloudyn includes the following reports and reporting features.

Cost Navigator report

The Cost Navigator report is a quick way to view your billing consumption using a dashboard view. It has a subset of filters and basic views to immediately show a summarized view of organization's costs. Costs are shown by date. Because the report is intended as an initial view of your costs, it's not as flexible or as comprehensive as many other reports or custom dashboards that you create yourself.

By default, major views in the report show:

- Cost over time showing a work week bar chart view. You can change the **Date Range** to change date range bar chart.
- Expenditures by service, using a pie chart.
- Resource categorization by tags, using a pie chart.
- Expenditures by cost entities, using a pie chart.
- Cost total, per date in a list view.

Cost Analysis report

The Cost Analysis report is a calculation of showback and chargeback, based on your policy. It aggregates your cloud consumption during a selected time frame, after having applied all allocation rules to your cost. For example, it calculates the costs by tags, reassigns the costs of untagged resources and optionally allocates the utilization of reserved instances.

The policies set in Cost Allocation 360 are used in the Cost Analysis report and results are then combined with information from your cloud vendor's raw data.

How is this report calculated? The Cloudyn service ensures allocation retains the integrity of each linked account by applying *account affinity*. Affinity ensures an account that doesn't use a specific service doesn't have any costs of this service allocated to it. The costs accrued in that account remain in that account and are not calculated by the allocation policies. For example, you might have five linked accounts. If only three of them use storage services, then the cost of storage services is only allocated across tags in the three accounts.

Use the Cost Analysis report to:

- Calculate your organization chargeback/showback
- Categorize all your costs
- Display an aggregated view of your entire deployment for a specific time frame.
- View costs by tag categories based on policies created in the cost model.

To use the Cost Analysis report:

1. Select a date range.
2. Add tags, as needed.
3. Add groups.
4. Choose a cost model that you created previously.

Cost Over Time report

The Cost over Time report displays the results of cost allocation as time series. It allows you to observe trends and detect irregularities in your deployment. It essentially shows costs distributed over a defined period. The report includes your main cost contributors including ongoing costs and one-time reserved instance fees that are being spent during a selected time frame. Policies set in Cost Allocation 360 are used in this report.

Use the Cost Over Time report to:

- See changes over time and which influences change from one day (or date range) to the next.
- Analyze costs over time for a specific instance.
- Understand why there was a cost increase for a specific instance.

To use the Cost Over Time report:

1. Select a date range.
2. Add tags, as needed.
3. Add groups.
4. Choose a cost model that you created previously.
5. Select actual costs or amortized costs.
6. Choose whether to apply allocation rules to view raw billing data view or to recalculated cost view.

Actual Cost Analysis report

The Actual Cost Analysis report shows provider costs with no modifications. It shows your main cost contributors, including ongoing costs and one-time fees.

You can use the report to view cost information for your subscriptions. In the report, Azure subscriptions are shown as **account name** and **account number**. **Linked accounts** show AWS subscriptions. To view per subscription costs, a breakdown for each account, under **Groups**, select the type of subscription that you have.

Use the Actual Cost Analysis report to:

- Analyze and monitor raw provider costs spent during a specified time frame.
- Schedule a threshold alert.
- Analyze unmodified costs incurred by your accounts and entities.

Actual Cost Over Time report

The Actual Cost Over Time report is a standard cost analysis report distributing cost over a defined time resolution. The report displays spending over time to allow you to observe trends and detect spending irregularities. This report shows your main cost contributors including ongoing costs and one-time reserved instance fees that are being spent during a selected time frame.

Use the Actual Cost Over Time report to:

- See cost trends over time.

- Find irregularities in cost.
- Find all cost-related questions related to cloud providers.

Amortized cost reports

This set of amortized cost reports shows linearized non-usage based service fees, or one-time payable costs and spread their cost over time evenly during their lifespan. For example, one-time fees might include:

- Annual support fees
- Annual security component fees
- Reserved Instances purchase fees
- Some Azure Marketplace items

In the billing file, one-time fees are characterized when the service consumption start and end dates (timestamp) have equal values. The Cloudyn service then recognizes them as one-time fees that are amortized. Other consumption-based services with on-demand usage costs are not amortized.

Amortized cost reports include:

- Amortized cost analysis
- Amortized cost over time

Cost Analysis report

The Cost Analysis report provides insight into your cloud consumption and spending during a selected time frame. The policies set in the Cost Allocation 360 are used in the Cost Analysis report.

How does Cloudyn calculate this report?

Cloudyn ensures that allocation retains the integrity of each linked account by applying *account affinity*. Affinity ensures an account that doesn't use a specific service also doesn't have any costs of this service allocated to it. The costs accrued in that account remain in that account and aren't calculated by the allocation policies. For example, you might have five linked accounts. If only three of them use storage services, then the cost of storage services is only allocated across tags in the three accounts.

Use the Cost Analysis report to:

- Display an aggregated view of your entire deployment for a specific time frame.
- View costs by tag categories based on policies created in the cost model.

Cost Over Time report

The Cost Over Time report displays spending over time so you can spot trends and notice irregularities in your deployment. It essentially shows costs distributed over a defined period. The report includes your main cost contributors including ongoing costs and one-time reserved instance fees that are being spent during a selected time frame. Policies set in Cost Allocation 360 are used in this report.

Use the Cost Over Time report to:

- See changes over time and which influences change from one day (or date range) to the next.
- Analyze costs over time for a specific instance.
- Understand why there was a cost increase for a specific instance.

Custom Charges report

Enterprise and CSP users often find themselves providing added services to their external or internal customers, in addition to their own cloud resource consumption. You define custom charges for added services or discounts that are added to customer's billing or chargeback reports as custom line items.

Custom service charges reflect services that aren't normally shown in a bill. The custom charges that you create

are then shown in Cost reports.

Custom charges aren't custom pricing. The list of custom charges doesn't show the different rates that you may be charging. For example, AWS billing charges are displayed just as they are charged.

To create a custom charge:

1. In **Custom Charges**, click **Add New**. The *Add New Custom Charge* dialog box is displayed.
2. In **Provider Name**, enter the name of the provider.
3. In **Service Name**, enter the type of service.
4. In **Description**, add a description for the custom charge.
5. In **Type**, enter the select **Percentage** and then in Services dropdown, select the services to include as custom charges in the cost reports.
6. In **Payment**, select if the charge is a One-Time Fee or Recurring Fee. If the charge is a Recurring Fee, select Amortized if you want the charge to be amortized and select the number of months.
7. In **Dates**, if a one-time fee is selected, in **Effective Date**, enter the date the charge is paid. If Recurring Fee is selected, enter the date range including start date and the end date for the charge.
8. In the **Entities tree**, select the entities that you want to apply the charge to and then select **On**.

When charges are assigned to an entity, users can't change them. Charges that are added by an administrator to a parent entity are read-only.

To view custom charges:

Custom charges are shown in Cost reports. For example, open the Actual Cost Analysis report, then under **Extended Filters**, select **Standalone**. Then filter to show **Custom Charges**.

Cost Allocation 360

You use Cost Allocation 360 to create custom cost allocation models to assign costs to consumed cloud resources. Many reports show information from custom cost models that you've created with custom cost models. And, some reports only show information after you've created a custom cost model with cost allocation.

For more information about creating custom cost models, see Tutorial: Manage costs by using Cloudyn.

Cost vs. Budget Over Time report

The Cost vs. Budget Over Time report allows you to compare the main cost contributors against your budget. The assigned budget appears in the report so that you can view your (over/under/par) budget consumption over time. Using Show/Hide Fields at the top of the report, you can select to view cost, budget, accumulated cost, and total budget.

Current Month Projected Cost report

The Current Month Projected Cost report provides insight into your current month-to-date cost summary. This report displays your costs from the beginning of month, from the previous month, and the total projected cost for the current month. The current month projected cost is calculated as sum of the up-to-date monthly cost and a projection based on the cost monitored in the last 30 days.

Use the Current Month Projected Cost report to:

- Project monthly costs by service
- Project monthly costs by account

Annual Projected Cost report

The Annual Projected Costs report allows you to view annual projected costs based on previous spending trends. It shows the next 12 months of overall projected costs. The projections are made using a trend function extrapolated over the next 12 months, based on the costs associated with the last 30 days of usage.

Budget Management settings

Budget Management allows you to set a budget for your fiscal year.

To add a budget to an entity:

1. On the Budget Management page, under **Entities**, select the entity where you want to create the budget.
2. In the budget year, select the year where you want to create the budget.
3. In each month, set your budget and then and click **Save**.

To import a file for the annual budget:

1. Under **Actions**, select **Export** to download an empty CSV template to use as your basis for the budget.
2. Fill in the CSV file with your budget entries and save it locally.
3. Under **Actions**, select **Import**.
4. Select your saved file and then click **OK**.

To export your completed budget as a CSV file, under **Actions**, select **Export** to download the file.

When completed, your budget is shown in Cost Analysis reports and in the Cost vs. Budget Over Time report. You can also schedule reports based on budget thresholds.

Azure Resource Explorer report

The Azure Resource Explorer report shows a bulk list of all the Azure resources available in Cloudyn. To effectively use the report, your Azure accounts should have extended metrics enabled. Extended metrics provide Cloudyn access to your Azure VMs. For more information, see Add extended metrics for Azure virtual machines.

Azure Resources Over Time report

The Azure Resources Over Time report shows a breakdown of all resources running over a specific period. To effectively use the report, your Azure accounts should have extended metrics enabled. Extended metrics provide Cloudyn access to your Azure VMs. For more information, see Add extended metrics for Azure virtual machines.

Instance Explorer report

The Instance Explorer report is used to view various metrics for assets of your virtual machines. You can drill-into specific instances to view information such as:

- Instance running intervals
- Life cycle in the selected period
- CPU utilization
- Network input
- Output traffic
- Active disks

The Instance Explorer report collects all running intervals within the defined date range and aggregates data accordingly. To view each of the running intervals during the date range, expand the instance. The cost of each instance is calculated for the date range selected based on AWS and Azure list prices. No discounts are applied. You can add additional fields to the report using Show/Hide Fields.

Use Instance Explorer report to:

- Calculate the estimated cost per machine.
- Create a full list, including aggregated running hours, of all machines that were active during a time range.
- Create a list by cloud service provider or account.
- View machines created or terminated during a time range.
- View all currently stopped machines.
- View the tags of each machine.

Instances Over Time report

Using the Instances Over Time report, you can see the maximum number of machines that were active each during the selected time range. If the defined resolution is by week or month, results are the maximum number of machines active on any given day during that month. Select a date range to select the filters that you want displayed in the report.

Instance Utilization Over Time report

This report shows a breakdown of CPU or memory use over time for all your instances.

Compute Power Cost Over Time report

The Compute Power Over Time report provides a breakdown of compute power over a specified date range. Although other reports show the number of running machines or the runtime hours, this report shows Core hours, Compute unit hours, or GB RAM hours.

Use the report to:

- Check compute power within a specified date range.
- View compute times based on cost allocation models.

This report is linked to your Cost Allocation 360 policies so results are shown based on the defined tagging and policies your selected cost policy. When you don't have a policy created, then results aren't shown.

Compute Power Average Cost Over Time report

You use the Compute Power Average Cost Over Time report to view more than just the cost of each running machine. The report shows your average cost per instance hour, core hour, compute unit hour, and GB RAM hour. The report provides insight into the efficiency of your deployment.

This report is linked to your Cost Allocation 360 policies so results are displayed based on the defined tagging and policies your selected cost policy. When you don't have a policy created, then results aren't shown.

S3 Cost Over Time report

The S3 Cost Over Time report provides a breakdown of Amazon Simple Storage Service (S3) costs per bucket over time for a specified time frame. The report helps you find the buckets that are your main cost drivers and it shows you trends in your S3 usage and spending.

S3 Distribution of Cost report

Use the report to analyze your S3 cost for the last month by bucket and storage class. You can use the pie chart view to set the visibility threshold. Or, you can use the table view to see subtotals.

S3 Bucket Properties report

Use the report to view S3 bucket properties. You can use the pie chart view to set the visibility threshold. Or, you can use the table view to see subtotals.

RDS Instances Over Time report

Use the report to view a breakdown of all Amazon Relational Database Service (RDS) instances running during the specified period.

RDS Active Instances report

Use the report to analyze RDS active instances. In the report, expand the line item to view additional information.

Azure Reserved Instances report

The Azure Reserved Instances report provides you with a single view of all your Azure reserved instances. This report displays each purchase as is its own line item. The report also shows details about that purchase such as the account that purchased it, the type of purchase and instance type, days remaining and so on. You can show or hide report data using Show/Hide Fields.

Use the Azure Reserved Instances report to view:

- A list of all reservations by purchase date.
- Time remaining until the RI expires.
- One-time fees.
- The account that purchased RIs, and when.

AWS Reserved Instances report

The AWS Reserved Instances report provides you with a single view of all AWS reserved instances. This report displays each purchase is its own line item and details about that purchase such as the account that purchased it, the type of purchase and instance type, days remaining and so on. You can show or hide report data using Show/Hide Fields.

Use the AWS Reserved Instances report to view:

- A list of all reservations by purchase date.
- Time remaining until the RI expires.
- One-time fees.
- Original purchase ID (reservation ID).
- The account that purchased RIs and when.

EC2 RI Buying Recommendations report

The foundation of cloud resource consumption is the on-demand model, where resources incur cost only when used. There are no up-front commitments — you pay only for what you use, when you use it.

AWS offers an alternative pricing model for its Elastic Compute Cloud (EC2) services — the reserved instance (RI). This pricing model guarantees users the capacity whenever they need it for the duration of the RI. The RI offers significant price discounts over on-demand pricing. In return, users make an upfront commitment for the use of a virtual instance. The commitment is bound to a specific family, size, availability zone (AZ), and operating system, over the period of commitment (one or three years). The RI allows AWS to efficiently plan future capacity, as well as to gain customer commitment to using its services.

Three payment options for RIs, which are all-upfront:

- Bulk sum at day 0, offering the highest discount
- No upfront - in which the cost of RI is paid in monthly installments over the duration of the RI, offering the lowest discount
- Partial upfront, in which ¼ - ½ of the price is paid up front, and the rest in monthly installments, with a discount rate that is lower, but close, to the all-upfront rate

Cloudyn evaluates the uptime of each machine for the last 30 days. Cloudyn recommends buying RIs when it is more cost-effective to run the machine with an RI at the current uptime level.

The report shows the justification for its recommendations to save the most money over the year. The recommendations suggest replacing on-demand instances with RIs. You can purchase RIs directly from the report.

Each tab opens as a full report. Notable sections in tabs include:

- **EC2 RI Purchase Impact** - This section provides a simulation of the difference between on-demand vs reserved instances. Click **Zoom in**, to see the full EC2 RI Purchase Impact report with the filters already defined to your recommendation. This report shows the purchase impact of all potential RI purchases. You can adjust the expected average uptime to see the potential saving when you purchase EC2 Reserved Instances.
- **Saving Analysis** - This section provides the potential savings achieved and the month the savings are actualized when following Cloudyn recommendations. The actual savings and the percent saved are

highlighted in red.

- **EC2 RI Type Comparison** - This section emphasizes the ROI highlights of Cloudyn's recommended deployment, including all relevant options. The results in this report assume that the machine is running at 100% uptime. Click **Zoom In** to open the detailed report.
- **Instances Over Time** - This section displays a breakdown of all instances associated with the recommendation, OnDemand, Reserved Instances, and Spot. Click **Zoom In** to open the detailed report.
- **Breakeven Points** - This section displays a table of all the possible recommended deployments and the ROI and the month when the ROI occurs. Click **Zoom In** to open the detailed report.

EC2 Reservations Over Time report

The EC2 Reservations Over Time report tracks the status of your usage of your purchased EC2 RIs. You can set the resolution of the report to hour, day, or week.

Use the report to:

- Display reservations purchased that are used and not used.
- Drill in to the resolution by hour to see RI usage per hour.

Savings Over Time report

Use the Savings Over Time report to view the savings achieved using reserved instances as well as spot instances. The report shows the ROI achieved over time resulting from RI purchases.

To view savings from RIs, group the results by **Price Model** and select **Reservation**. To view RI savings achieved by a specific account or instance type, add the relevant grouping and filter to the account or instance type.

To see savings from Spot instance use, filter the **Price Model** to **Spot**. The default filter for this report is RI and Spot Instances.

RDS RI Buying Recommendations report

RDS RI Buying Recommendations report recommends when to use RDS RIs instead of on-demand instances.

Each tab opens as a full report. Notable sections in tabs include:

- **RDS RI Purchase Impact** - This section provides a simulation of the difference between on demand vs reserved instances. Click **Zoom in** to see the full RDS RI Purchase Impact report with the filters already defined to your recommendation. This report allows you to see the purchase impact of all potential RI purchases. You can adjust the expected average uptime and see the potential saving by purchasing RIs.
- **Saving Analysis** – This section provides the potential savings achieved and the month the savings are actualized when following Cloudyn recommendations. The actual savings and the percent saved are highlighted in red.
- **RDS RI Type Comparison** - This section emphasizes the ROI highlights of the recommended deployment, including all relevant options. The results in this report assume that the machine is running at 100% uptime. Click **Zoom In** to open the detailed report for the selected machine.
- **Instances Over Time** – This section displays a breakdown of all instances associated with the recommendation, OnDemand, Reserved Instances, and Spot. Click **Zoom In** to open the detailed report.
- **Breakeven Points** – This section displays a table of all the possible recommended deployments and the ROI and the month when the ROI occurs. Click **Zoom In** to open the detailed report.

RDS Reservations Over Time report

Use the RDS Reservation Over Time report to view a breakdown of both your used and unused reservations during the specified period.

Reserved Instance Purchase Impact report

The EC2 RI Purchase Impact report allows you to simulate reserved instance cost versus on-demand cost over time. It can help you make better purchasing decisions. Adjust the filters such as average runtime, term, platform, and others to make informed decisions when you consider RI purchases.

Cost-Effective Sizing Recommendations report

The Cost-Effective Sizing Recommendations report provides results for AWS and Azure. For AWS users, your RI purchases are taken into consideration and the results don't include machines running as RI's. This report provides a list of underutilized instances that are candidates to downsize. Recommendations are based on your usage and performance data from the last 30 days. In each recommendation is a list of candidates to downsize, the justification to downsize, and a link to view complete details and performance metrics of the instance. And when relevant recommendations advise changing to newer generation instance types.

You can't download the list of instance IDs that are recommended to downsize from this report. To download Instance IDs, use the All Sizing Recommendations report.

Consider the following downsizing example:

You have six m3.xlarge running instances. Cloudyn analysis shows that five of them have low CPU utilization. Consider downsizing them.

In Cost Impact, the cost impact is calculated. In this example, by expanding the line item, you can see the current price for one m3.xlarge instance (Linux/Unix) costs $0.266 per hour and one m3.large instance (Linux/Unix) costs $0.133 per hour. So, the annual cost is $11,651 for five m3.xlarge instances running at 100% utilization. The annual cost is $5,825 for five m3.large instances running at 100% utilization. The potential savings are $5,825.

To view cost-effective sizing justifications, click + to expand the line item. In **Details**:

- The **Recommendation Justification** section displays the current deployment and the number of instances recommended to downsize.
- The **Cost Impact** section displays the calculation used to determine potential savings.
- The **Potential Annual Savings** section displays the potential annual savings when downsizing per Cloudyn's recommendation.

All Sizing Recommendations report

This report provides a list of underutilized instances that are candidates to downsize. The recommendations are based on your usage and performance data from the last 30 days. In each recommendation, you can view complete details and performance metrics of the instance.

If you've purchased AWS reserved instances, this report contains results for all running instances, including instances running as RIs.

Use the All Sizing Recommendations report to:

- See a list of all your instances that are candidates to downsize.
- Export a report list containing Instance Names and IDs.

To view recommendation details for a specific Instance, click **+** to expand the details. The Recommendation Details section provides an overview of the recommendation.

The **Tags** section provides the list of the tag keys and values for the selected instance. Use Tags in the left pane to filter the section.

The **CPU Utilization** section provides the CPU utilization for the instance over the last month, by day.

Click the graph to drill down and open the Instance CPU Over Time Report to see a breakdown of the instances.

- Use **Show/Hide Fields** to add or remove fields: Timestamp, Avg CPU, Min CPU, Max CPU.

- Use **Date Range** to enter a date or date range and drill into a specific InstanceID.
- Use **Extended Filters** to show all or a specific Instance ID
- Click **Zoom in** to open the CPU Utilization Report

If the instance hasn't been monitored for 30 days, incomplete data is shown.

The **Memory Utilization (GB)** section provides information about the memory utilized. For AWS users, memory metrics are not automatically available and need to be added per instance through AWS. AWS charges you to enable memory metrics for EC2 instances.

The **Memory Utilization (%)** section displays the percent of memory used.

The **Network Input Traffic** section displays a snapshot over time of the network traffic, average, and maximum, for the selected instance. Hover over the lines to see the date and maximum traffic for that time. Click **Zoom In** to open the Network Input Traffic Report.

The **Network Output Traffic** section displays a snapshot of the network output traffic for the selected instance. Hover over the lines to see the date and maximum traffic for that time. Click **Zoom In** to open the Network Output Traffic report.

Instance Metrics Explorer report

The Instance Metrics Explorer report shows cross-cloud performance metrics per instance. Use the report to view instances that are over or under-utilized based on CPU, memory, and network metric thresholds.

To view cross-cloud performance per instance:

1. In **Date Range**, select a date range for which you want to view performance.
2. In **Tags**, select any tags that you want to view.
3. In **Filters**, select the filters you want to display in the report.
4. In **Extended Filters**, adjust the report thresholds for:
   - Avg CPU
   - Max CPU
   - Avg Memory
   - Max Memory
5. In **Extended Filters**, click **Show** and then select the type of instances to display.

To view a specific instance's metrics over time:

- Go to the Instance Metrics Explorer report and click **+** to view details.

RDS Sizing Recommendations report

The RDS Sizing Recommendations report provides RDS sizing recommendations to optimize your cloud usage. It provides a list of underutilized instances that are candidates to downsize. Cloudyn recommendations are based on the usage and performance data of the last 30 days. You can filter recommendations by Account Name, Region, Instance Type, and Status.

Sizing Threshold Manager report

Cloudyn's built-in sizing recommendations are calculated using a complex algorithm to provide accurate sizing suggestions. You can adjust the thresholds for downsizing recommendations.

To manually adjust threshold sizing recommendations:

1. In Sizing Threshold Manager, adjust the following thresholds as you like:
   - Average CPU %
   - Maximum CPU %
   - Average Memory %

- Maximum Memory %

2. Click **Apply** to save changes.
3. Changes apply immediately to all your recommendations.

To restore default thresholds:

- In Sizing Threshold Manager, click **Restore Defaults**.

Compute Instance Types report

Use the Instance Types report to:

- View instance types by Service, Family, API Name, and Name.
- View details such as CPU, ECU, RAM, and Network.

You can use **Search** to find specific line items.

Next steps

- Learn about how to use reports, including how to customize or save and schedule reports, see Understanding cost reports.
- Learn about the dashboards included in Cloudyn and about how to create your own custom dashboards, see View key cost metrics with dashboards.

View key cost metrics with dashboards

1/14/2020 • 11 minutes to read • Edit Online

Dashboards in Cloudyn provide a high-level view of reports. Dashboards allow you to view key cost metrics in a single view. They also provide business trend highlights to help you make important business decisions.

Dashboards are also used to create views for people with different responsibilities in your organization, which might include:

- Financial controller
- Application or project owner
- DevOps engineer
- Executives

Dashboards are made up of widgets and each widget is essentially a report thumbnail. Click a widget to open its report. When you customize reports, you save them to My Reports and they're added to the dashboard.

Dashboard versions differ for Management (MSP), Enterprise, and Premium Cloudyn users. The differences are determined by entity access levels. For more information about access levels, see Entity access levels.

Dashboard availability depends on the type of cloud service provider account that is used when viewing dashboards. The type of information available and collected by Cloudyn affects reports in dashboards. For example, if you don't have an AWS account then you won't see the S3 Tracker dashboard. Similarly, if you don't enable Azure Resource Manager access to Cloudyn then you won't see any Azure-specific information in Optimizer dashboard widgets.

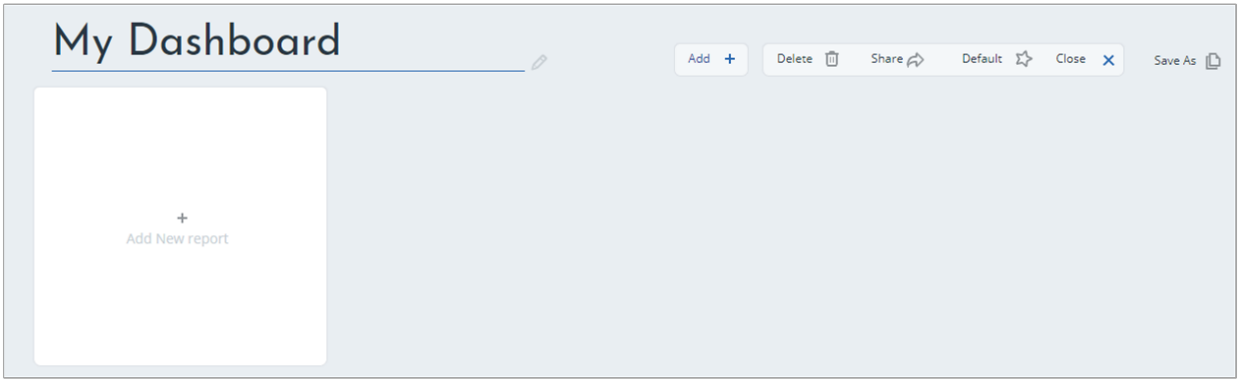
You can use any of the premade dashboards or you can create your own dashboard with customized reports. If you're unfamiliar with Cloudyn reports, see Use Cloudyn reports.

Create a custom dashboard

To quickly get started with a custom dashboard, you can duplicate an existing one to use its properties. Then you can modify it to suit your needs. On the dashboard you want to copy, click **Save As**. You can only duplicate customized dashboards — you can't duplicate the dashboards that are included with Cloudyn.

To create a custom dashboard:

1. On the homepage, click **Add New +**. The My Dashboard page is displayed.



2. Click **Add New Report**. The Add Report box is displayed.
3. Select the report that you want to add to the dashboard widget. The widget is added to the dashboard.
4. Repeat the preceding steps until the dashboard is complete.
5. To change the name of the dashboard, click the name of the dashboard on the Dashboard home page and type

the new name.

Modify a custom dashboard

Like creating a custom dashboard, you can't modify the dashboards included with Cloudyn. To modify a custom dashboard report:

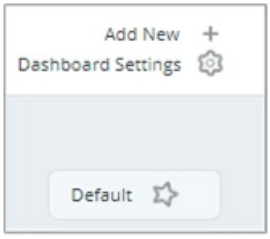
1. In the dashboard, find the report you want to modify and click **Edit**. The report is displayed.
2. Make any changes that you want to the report and click **Save**. The report is updated and displays your changes.

Share a custom dashboard

You can share a custom dashboard with others to *Public* or *My Entity*. When you share to Public, all users can view the dashboard. Only users with access to the current entity can view the dashboard when you share to My Entity. The steps to share a custom dashboard with Public and My Entity are similar.

To share a custom dashboard to Public:

1. In a dashboard, click **Dashboard Settings**. The Dashboard Settings box is displayed.



2. In the Dashboard Settings box, click the arrow symbol and then click **Public**. The Public Dashboard confirmation dialog box is displayed.
3. Click **Yes**. The dashboard is now available to others.

Delete a custom dashboard report

You can delete a custom report component from the dashboard. Deleting the report from the dashboard doesn't delete the report from the reports list. Instead, deleting the report removes it from the dashboard only.

To delete a dashboard component, on the dashboard component, click **Delete**. Clicking **Delete** immediately deletes the dashboard component.

Share a dashboard (Enterprise)

You can share custom dashboards to all users in your organization or with the users of the current entity. Sharing a dashboard can give others a quick high-level view of your KPI. When you share a dashboard, it automatically replicates the dashboard to all your Cloudyn entities/customers. Changes to the shared dashboard are automatically updated.

To share a dashboard with all users including subentities:

1. On the dashboard home page, click **Edit**.
2. Click **Share** and then select **Public**.
3. The Global Public Dashboard confirmation box is displayed.
4. Click **Yes** to set the dashboard as a global public dashboard.

To share a dashboard with all users of a current entity:

1. From the Dashboard home page, click **Edit**.

2. Click **Share** and then select **My Entity**.
3. Click **Yes** to set the dashboard as a public dashboard.

Duplicate a custom dashboard

When you create a new dashboard, you might want to use similar properties from an existing dashboard. You can duplicate the dashboard to create a new one.

You can only duplicate custom dashboards. You can't duplicate standard dashboards.

To duplicate (clone) a custom dashboard:

1. On the Dashboard that you want to duplicate, click **Save As**. A new dashboard opens with the same name and a number.
2. Rename the duplicated dashboard and modify it as you like.

-Or-

1. In Dashboard Settings, click **Save As** on the line of the dashboard that you want to duplicate.
2. The duplicated dashboard opens.
3. Rename the dashboard and modify it as you like.

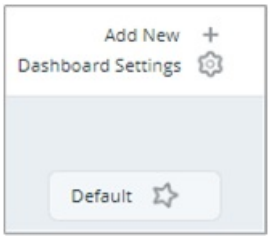
Set a default dashboard

You can set any dashboard as your default. Setting it to your default makes it appear as the left-most tab in the dashboard tab list. The default dashboard displays when open the Cloudyn portal.

- Click the dashboard tab you would like to set as default, then click **Default** on the right.

-Or-

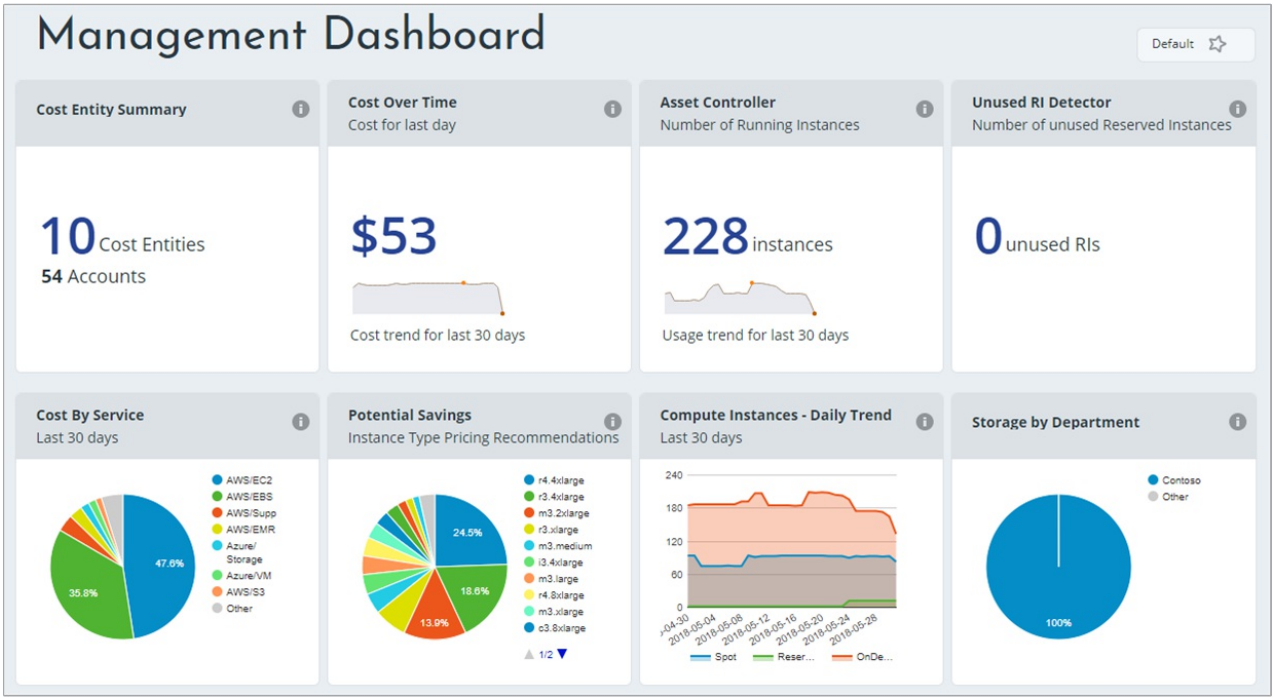
1. Click **Dashboard Settings** to see the list of available dashboards and select the dashboard that you want to set as the default.



2. Click **Default** in the line of the dashboard. The Default Dashboard confirmation box is displayed.
3. Click **Yes**. The dashboard is set to default.

Management dashboard

The Management (or MSP dashboard for MSP users) dashboard includes highlights of the main report types.



Cost Entity Summary (Enterprise only)

This widget summarizes the managed cost entities, including the number of entities and number of accounts.

- Click the widget to open the Enterprise Details report.

Cost Over Time

This widget can help you spot cost trends. It highlights the cost for the last day, based on the trend of the last 30 days.

- Click the widget to open the Actual Cost Over Time report to view and filter additional details.

Asset Controller

This widget highlights the number of running instances from the previous day, above the usage trend over the last 30 days.

- Click the widget to open the Asset Controller dashboard.

Unused RI Detector

This widget highlights the number of Amazon EC2 unused reservations.

- Click the widget to open the Currently Unused Reservations report where you can view the unused reservations you can modify.

Cost by Service

This widget highlights amortized costs by service for the last 30 days. Hover over the pie chart to see the costs per service.

- Click the widget to open the Actual Cost Analysis report.

Potential savings

This widget shows instance type pricing recommendations for Amazon EC2 and Amazon RDS.

- Click the widget open the Savings Analysis report. It lists your costs by instance types with potential savings.

Compute Instances - Daily Trend

This widget displays the active instances by type, for the last 30 days.

- Click the widget to open the Instances Over Time report, where you can view a breakdown of all instances

running during the last 30 days.

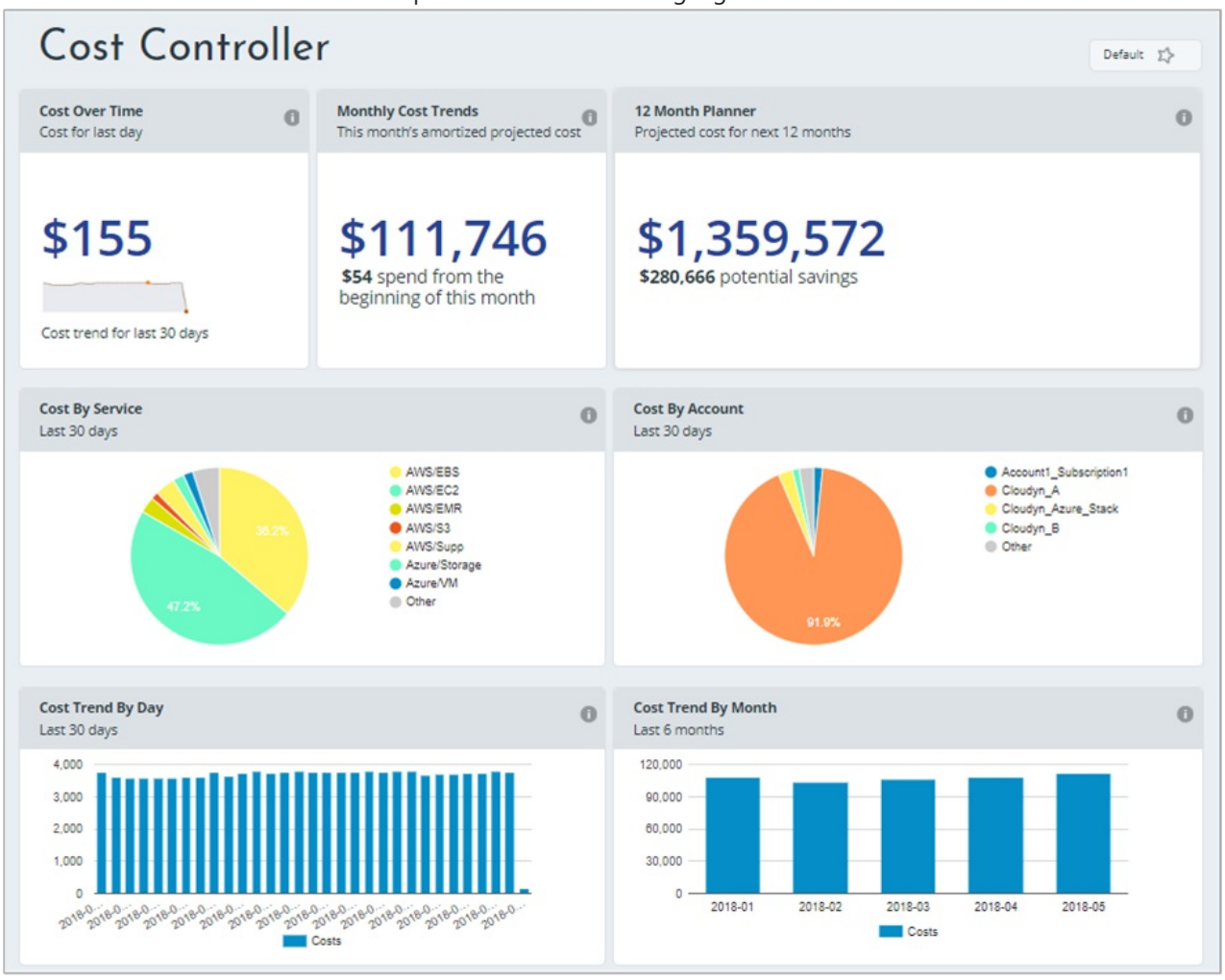
Storage by department

This widget displays the storage services used by departments. Hover over the pie chart to see your storage consumption by department.

- Click the widget to open the S3 Tracker dashboard.

Cost Controller dashboard

The Cost Controller dashboard shows pre-set cost allocation highlights.



Cost Over Time

This widget helps you spot cost trends. It highlights the cost for the last day, based on the trend of the last 30 days.

- Click the widget to open the Actual Cost Over Time report to view and filter additional details.

Monthly Cost Trends

This widget highlights projected amortized spending and your actual spend since the beginning of the month.

- Click the widget to open the Current Month Projected Cost report, which provides a month-to-date cost summary.

This report shows the cost from the beginning of month, the cost of previous month, and the current month projected cost. The current month projected cost is calculated by adding the up-to-date monthly cost and projection. The projection is based on the cost monitored over the last 30 days.

12 Month Planner

This widget highlights the projected costs over the next 12 months and the potential savings.

- Click the widget to open the Annual Projected Cost report.

Cost by Service

This widget highlights amortized costs by service for the last 30 days.

- Hover over the pie chart to see the costs per service.
- Click the widget to open the Actual Cost Analysis report.

Cost by Account

This widget highlights amortized costs by account for the last 30 days.

- Hover over the pie chart to see the costs per account.
- Click the widget to open the Actual Cost Analysis report.

Cost Trend by Day

This widget highlights spend over the last 30 days.

- Hover over the bar graph to see costs per day.
- Click the widget to open the Actual Cost Over Time report.

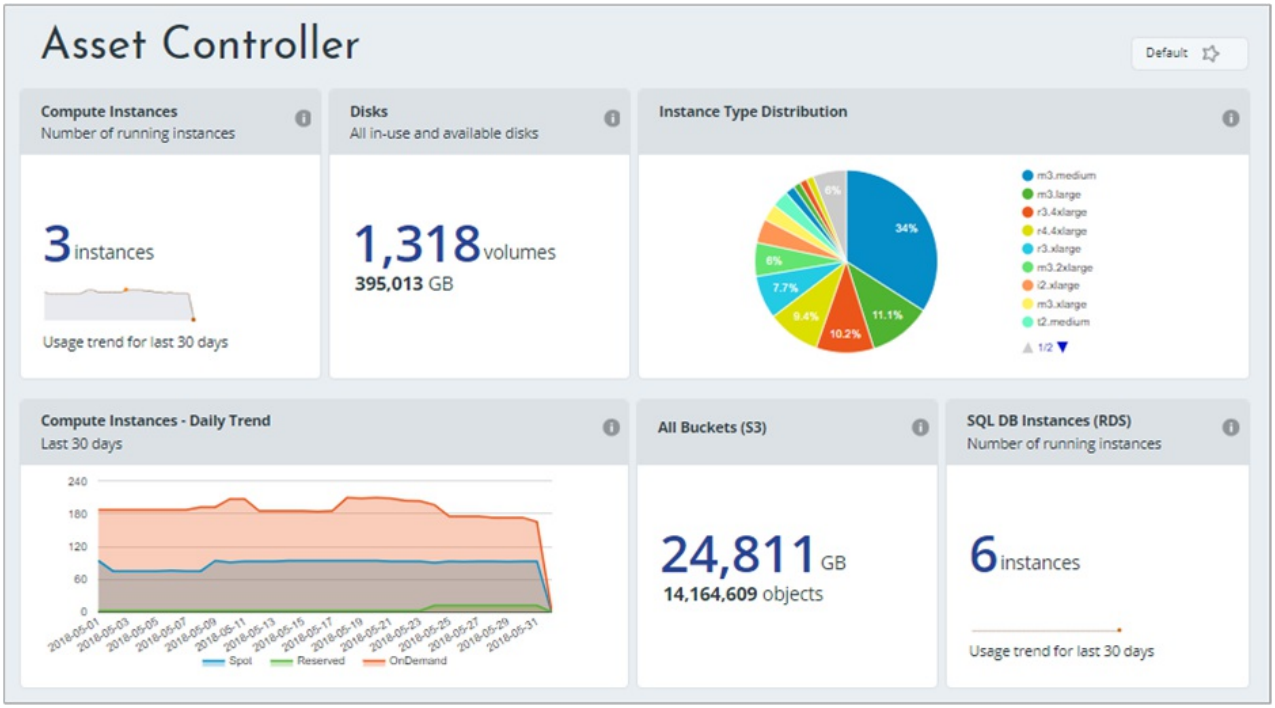
Cost Trend by Month - Last 6 months

This widget highlights spend over the last six months.

- Hover over the bar graph to see costs per month.
- Click the widget to open the Actual Cost Over Time report.

Asset Controller dashboard

This dashboard displays the number of running instances, available and in-use disks, distribution of instance types, and storage information.



Compute Instances

This widget displays the number of running instances based on the usage trend over the last 30 days.

- Click the widget to open the Instances Over Time report.

Disks

This widget highlights the total number and volume of disks, that are in-use and available.

- Click the widget to open the Active Disks report.

Instance Type Distribution

This widget highlights the instance types in a pie chart.

- Click on the widget to open the Instance Distribution report, which provides a breakdown of your active instances by the selected aggregation.

Compute Instances - Daily Trend

This widget highlights the compute instances (spot, reserved, and on-demand) per day for the last 30 days.

- Hover over the graph to view the number of compute instances, per type per day.
- Click the widget to open the Instances Over Time report.

All Buckets (S3)

This widget highlights the total S3 storage and number of objects stored.

- Click the widget to open the S3 Tracker Dashboard. The dashboard helps you find, analyze, and display your current storage usage and trends.

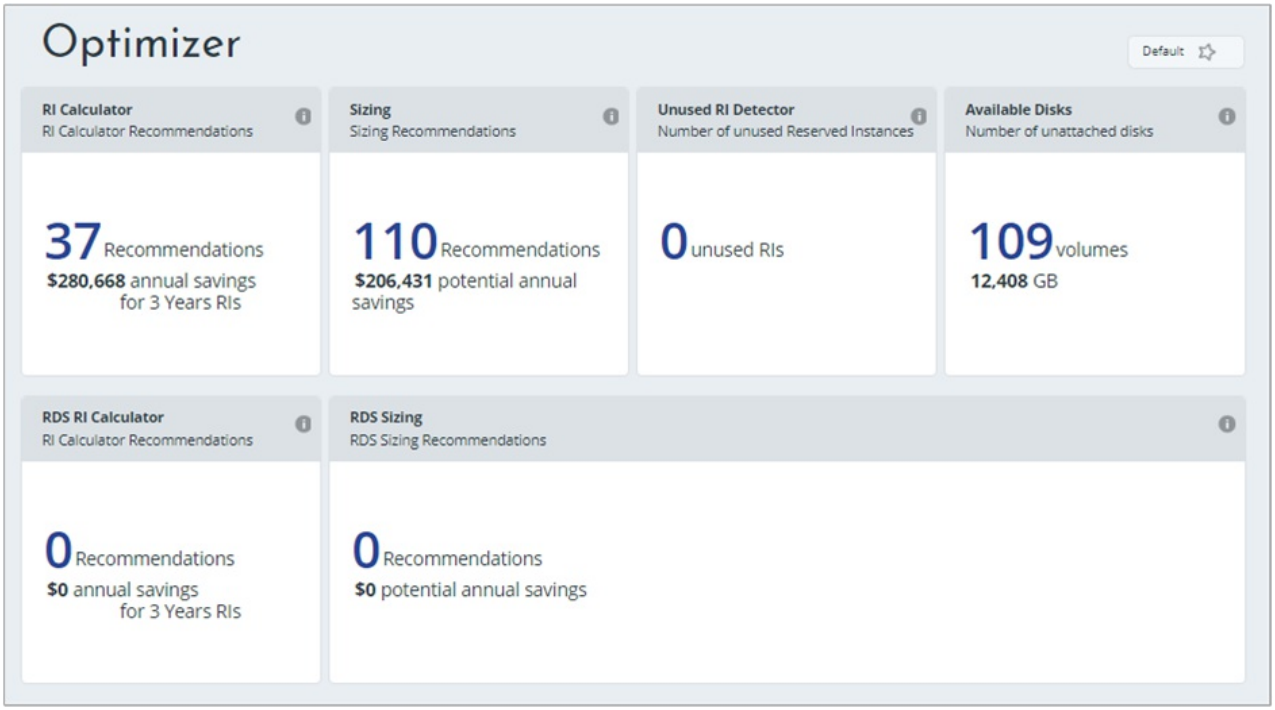
SQL DB Instances (RDS)

This widget highlights the number of running Amazon RDS instances based on the trend of the last 30 days.

- Click the widget to open the RDS Instance Over Time report.

Optimizer Dashboard

This dashboard displays downsizing recommendations, unused resources, and potential savings.



RI Calculator

This widget displays the number of RI buying recommendations and highlights the potential annual savings.

- Click the widget to open the Reserved Instance Calculator where you can determine when to use on-demand vs. reserved pricing plans.

Sizing

This widget highlights the sizing recommended and potential savings, if implemented.

- Click the widget to open the EC2 Cost Effective Sizing Recommendations report.

Unused RI Detector

This widget highlights the number of Amazon EC2 unused reservations.

- Click the widget to open the Currently Unused Reservations report where you can view the unused reservations that you can modify.

Available Disks

This widget highlights the number of unattached disks in your deployment.

- Click the widget to open the Unattached Disks report.

RDS RI Calculator

This widget highlights the number of reservation recommendations for your Amazon RDS instances and the potential savings.

- Click the widget to open the RDS RI Buying Recommendations report where you can see Cloudyn recommendations to use reserved instances instead of on-demand Instances.

RDS Sizing

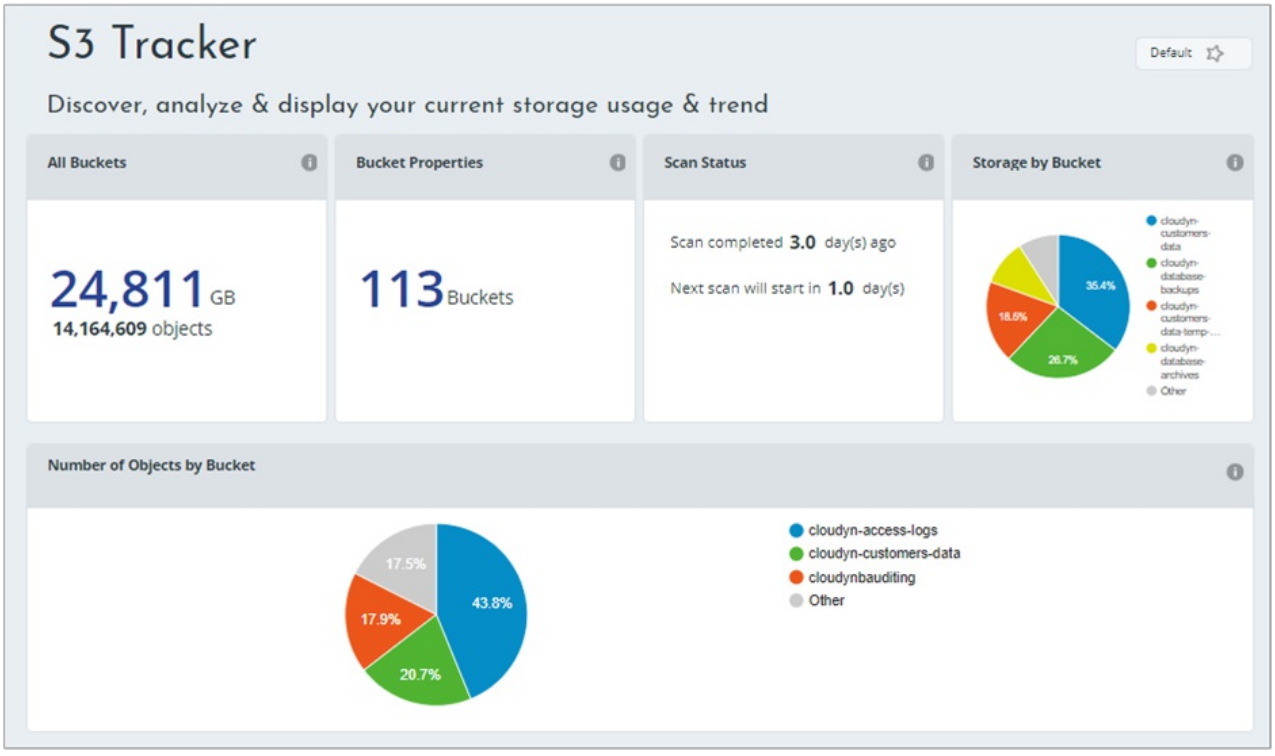
This widget shows the number of sizing recommendations and the potential savings.

- Click the widget to open the RDS Sizing Recommendations report, which displays detailed Amazon RDS sizing recommendations.

The optimization recommendations are based on the usage and performance data monitored in the last month.

S3 Tracker dashboard

The S3 Tracker dashboard helps you find, analyze, and display your current storage usage and trends.



All Buckets

This widget highlights the total size of all your buckets, in GB, and the total number of objects in your buckets.

- Click the widget to open the Distribution of S3 Size report. The report helps you analyze your S3 size by bucket, top-level folder, storage class, and versioning state.

Bucket Properties

This widget highlights the total number of storage buckets.

- Click the widget to view the S3 Bucket Properties report.

Scan Status

This widget highlights when the last S3 scan was done and when the next one will start.

- Click the widget to open the S3 Scan Status report.

Storage by Bucket

This widget highlights the percentage that each bucket storage class is using.

- Click the widget to open the Distribution of S3 Size report. The report helps you analyze your S3 size by bucket, top-level folder, storage class, and versioning state.

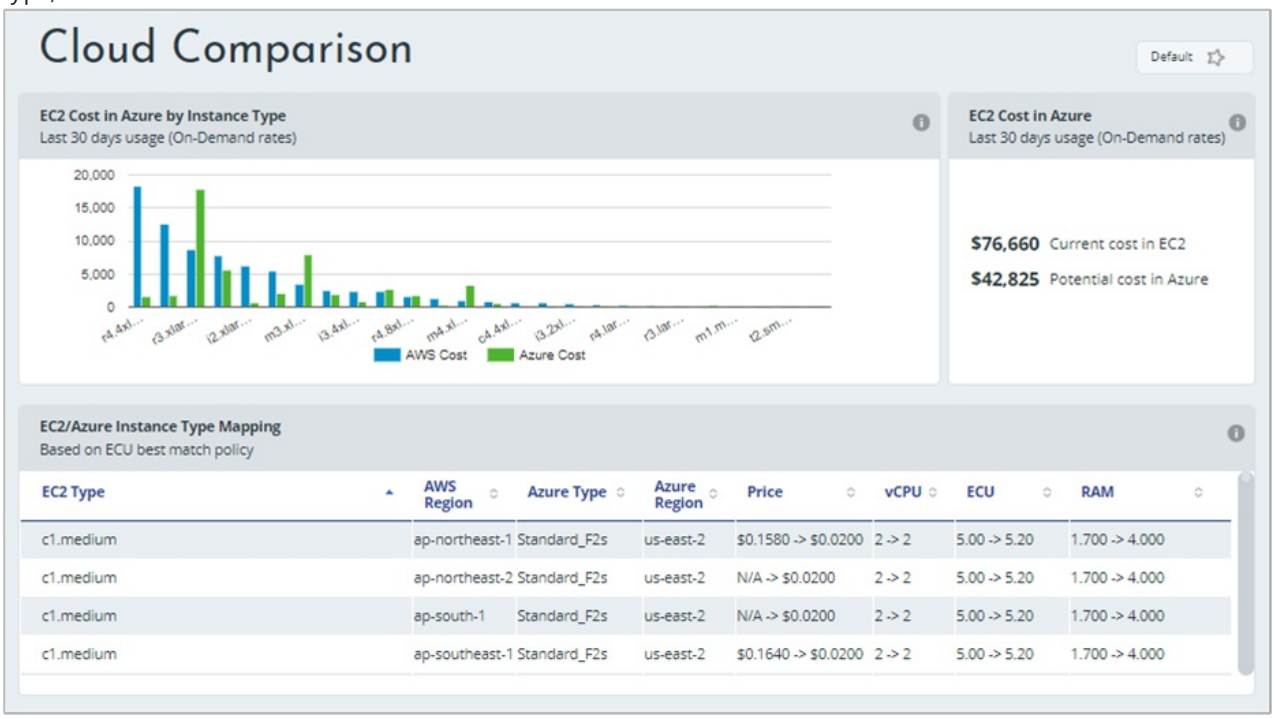
Number of Objects by Bucket

This widget highlights the number of objects per bucket in actual number and percentage. Hover over the bucket to see the total objects.

- Click the widget to open the Distribution of S3 Size report (Scan based).

Cloud Comparison Dashboard

The Cloud Comparison dashboard helps you compare costs from different cloud providers based on pricing, CPU type, and RAM size.



EC2 Cost in Azure by Instance Type

This widget highlights the last 30 days of usage in on-demand rates. It compares the cost with the current Amazon EC2 cost vs the potential cost in Azure.

- Hover over the bars to compare costs per instance type.
- Click the widget to open the Porting Your Deployment – Cost Analysis report.

EC2 Cost in Azure

This widget shows your current Amazon EC2 costs and compares them to Azure. The comparison is based on the last 30 days of usage in on-demand rates.

- Click the widget to open the Porting Your Deployment - Cost Analysis report.

EC2/Azure Instance Type Mapping

This widget highlights the best mapping of elastic compute units between Amazon EC2 and Azure.

- Click the widget to open the Instances Type Mapping report.

Next steps

- Read the Use Cloudyn reports article to learn more about reports.

Manage Azure budgets with Cloudyn

1/14/2020 • 3 minutes to read • Edit Online

Setting up budgets and budget-based alerts help to improve your cloud governance and accountability. This article helps you quickly create budgets and start managing them in Cloudyn.

When you have an Enterprise or MSP account, you can use your hierarchical cost entity structure to assign monthly budget quotas to different business units, departments, or any other cost entity. When you have a Premium account, you can use the budget management functionality, which is then applied to your entire cloud expenditure. All budgets are manually assigned.

Based on assigned budgets, you can set threshold alerts based on the percentage of your budget that's consumed and define the severity of each threshold.

Budget reports show the assigned budget. Users can view when their spending is over, under, or at par with their consumption over time. When you select **Show/Hide Fields** at the top of a budget report, you can view cost, budget, accumulated cost, or total budget.

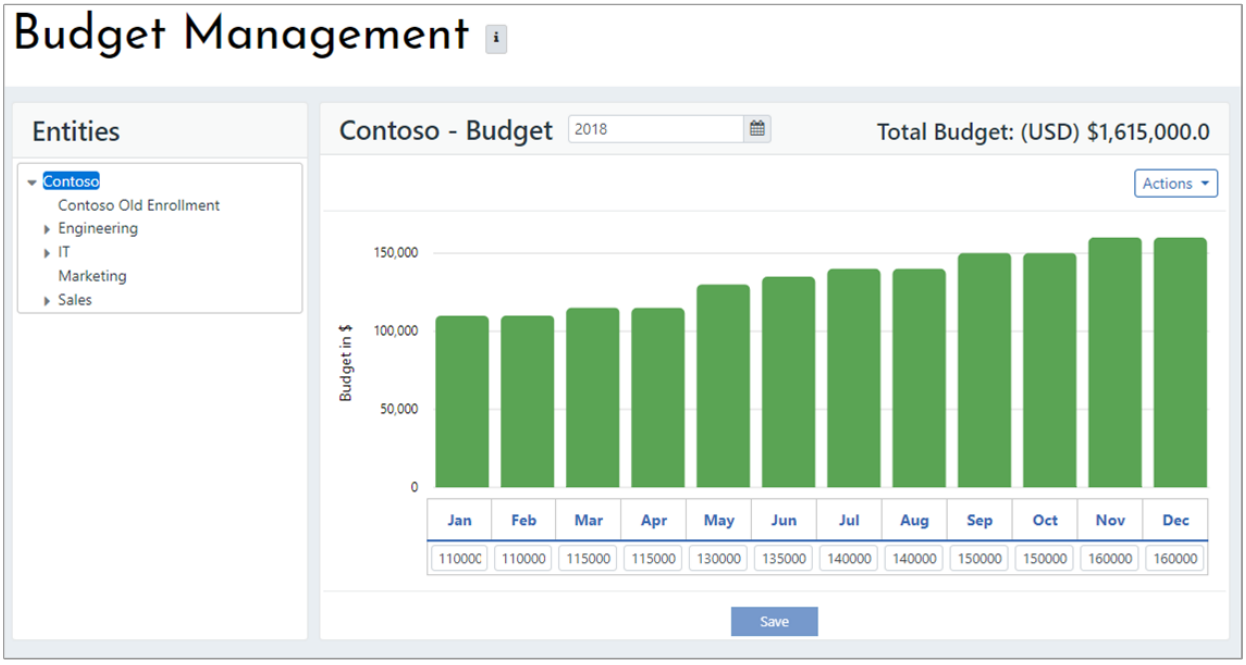
Azure Cost Management offers similar functionality to Cloudyn. Azure Cost Management is a native Azure cost management solution. It helps you analyze costs, create and manage budgets, export data, and review and act on optimization recommendations to save money. For more information about budgets in Cost Management, see Create and manage budgets.

Create budgets

When you create a budget, you set it for your fiscal year and it applies to a specific entity.

To create a budget and assign it to an entity:

1. Navigate to **Costs** > **Cost Management** > **Budget**.
2. On the Budget Management page, under **Entities**, select the entity where you want to create the budget.
3. In the budget year, select the year where you want to create the budget.
4. For each month, set a budget value. When you're done, click **Save**. In this example, the monthly budget for June 2018 is set to $135,000. The total budget for the year is $1,615,000.00.



To import a file for the annual budget:

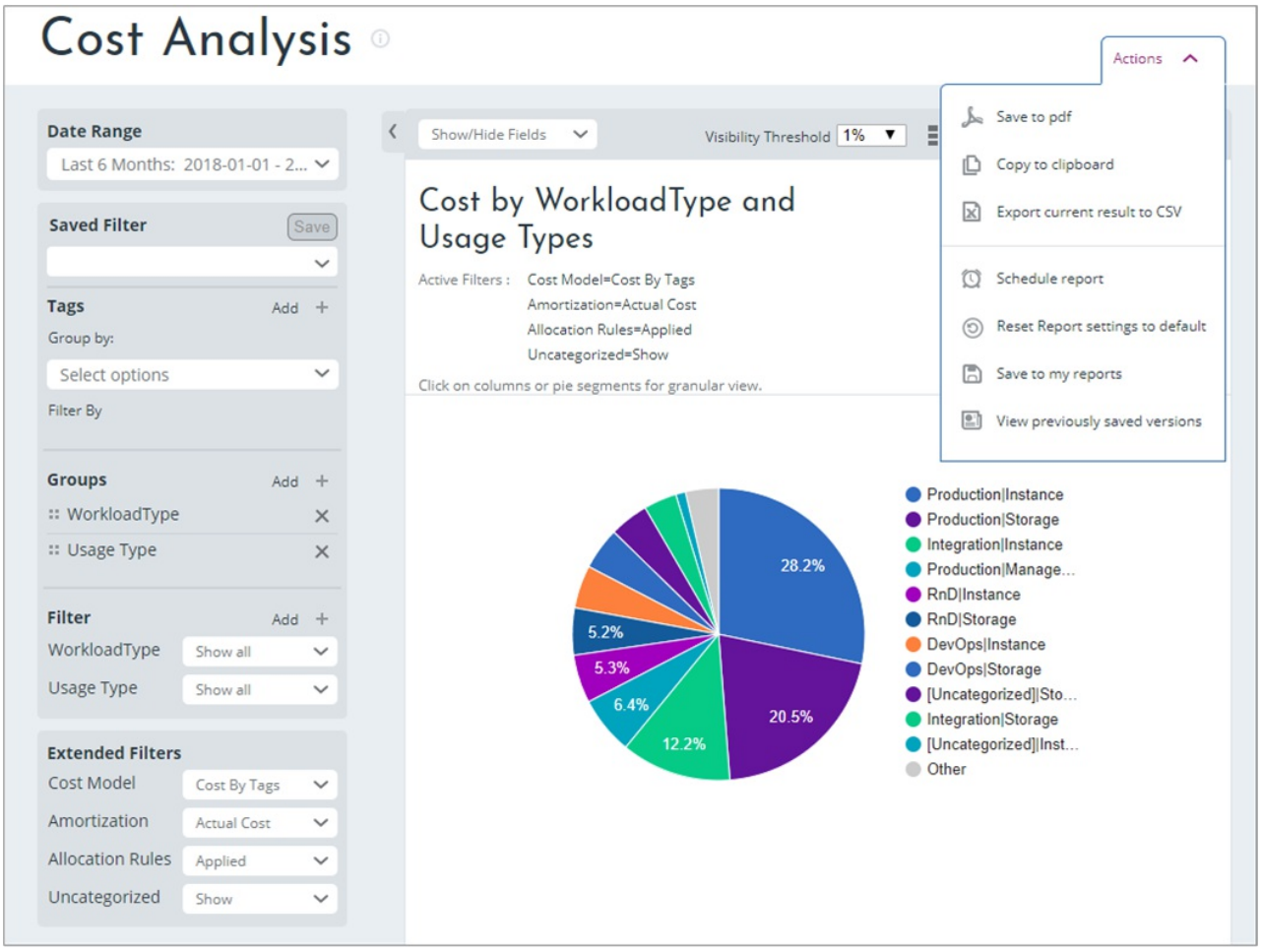
1. Under **Actions**, select **Export** to download an empty CSV template to use as your basis for the budget.
2. Fill in the CSV file with your budget entries and save it locally.
3. Under **Actions**, select **Import**.
4. Select your saved file and then click **OK**.

To export your completed budget as a CSV file, under **Actions**, select **Export** to download the file.

View budget in reports

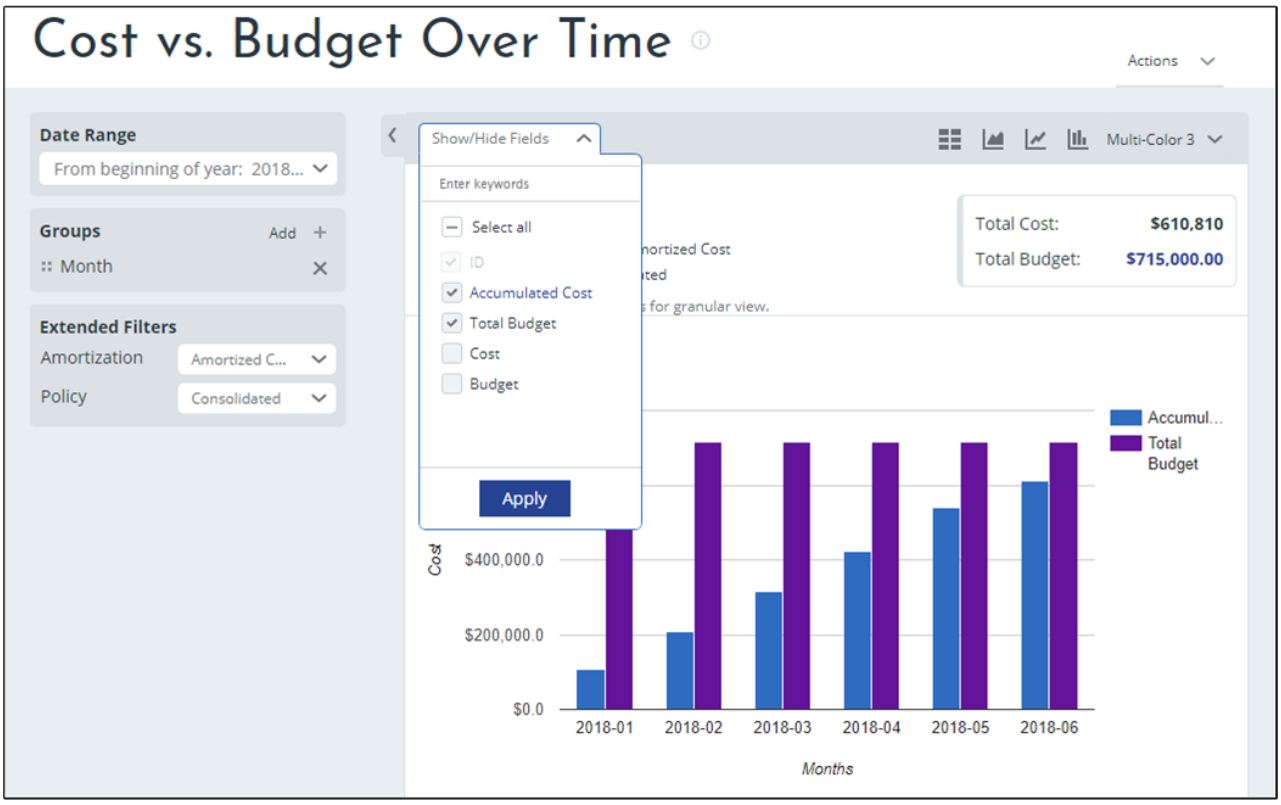
When completed, your budget is shown in most Cost reports under **Costs** > **Cost Analysis** and in the Cost vs. Budget Over Time report. You can also schedule reports based on budget thresholds using **Actions**.

Here's an example of the Cost Analysis report. It shows the total budget and cost by workload and usage types since the beginning of the year.

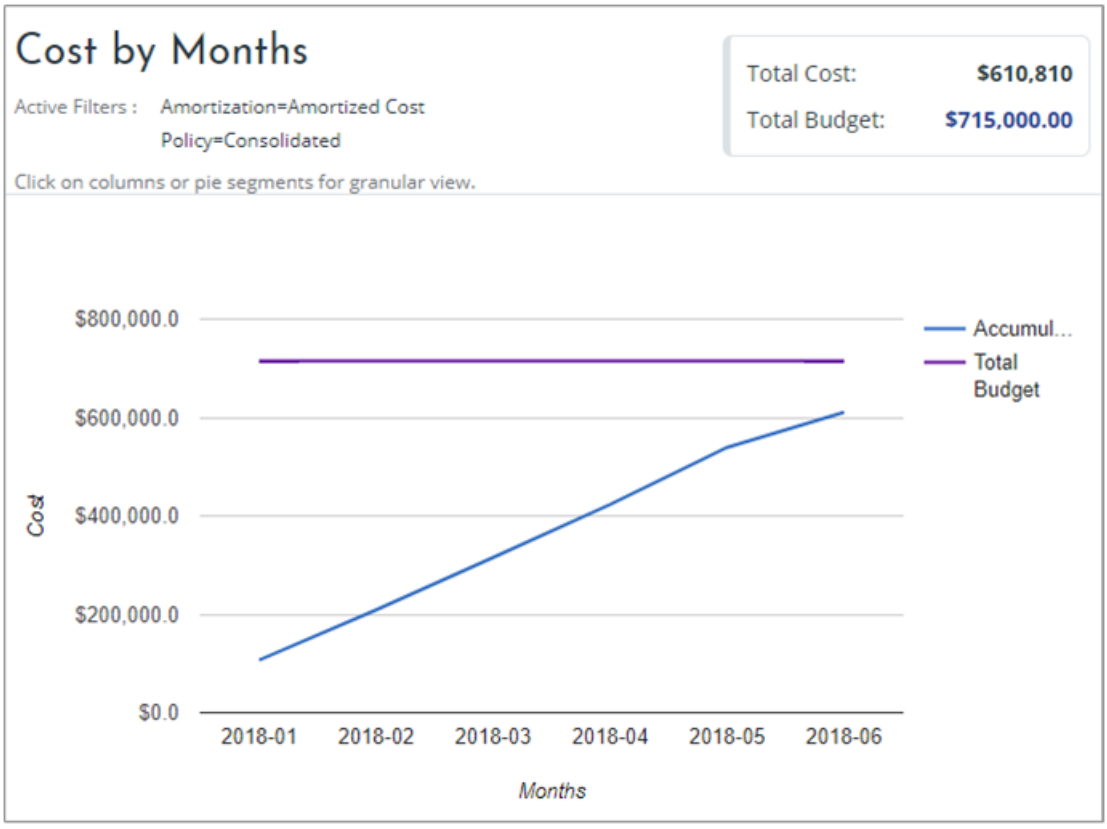


In this example, assume the current date is June 22. The cost for June 2018 is $71,611.28 compared to the monthly budget of $135,000. The cost is much lower than the monthly budget because there are still eight days of spending before the end of the month.

Another way to view the report is to look at accumulated cost vs your budget. To see accumulated costs, under **Show/Hide Fields**, select **Accumulated Cost** and **Total Budget**. Here's an example showing the accumulated cost since the beginning of the year.



Sometime in the future your accumulated cost might exceed your budget. You can more easily see that if you change the chart view to the *line* type.



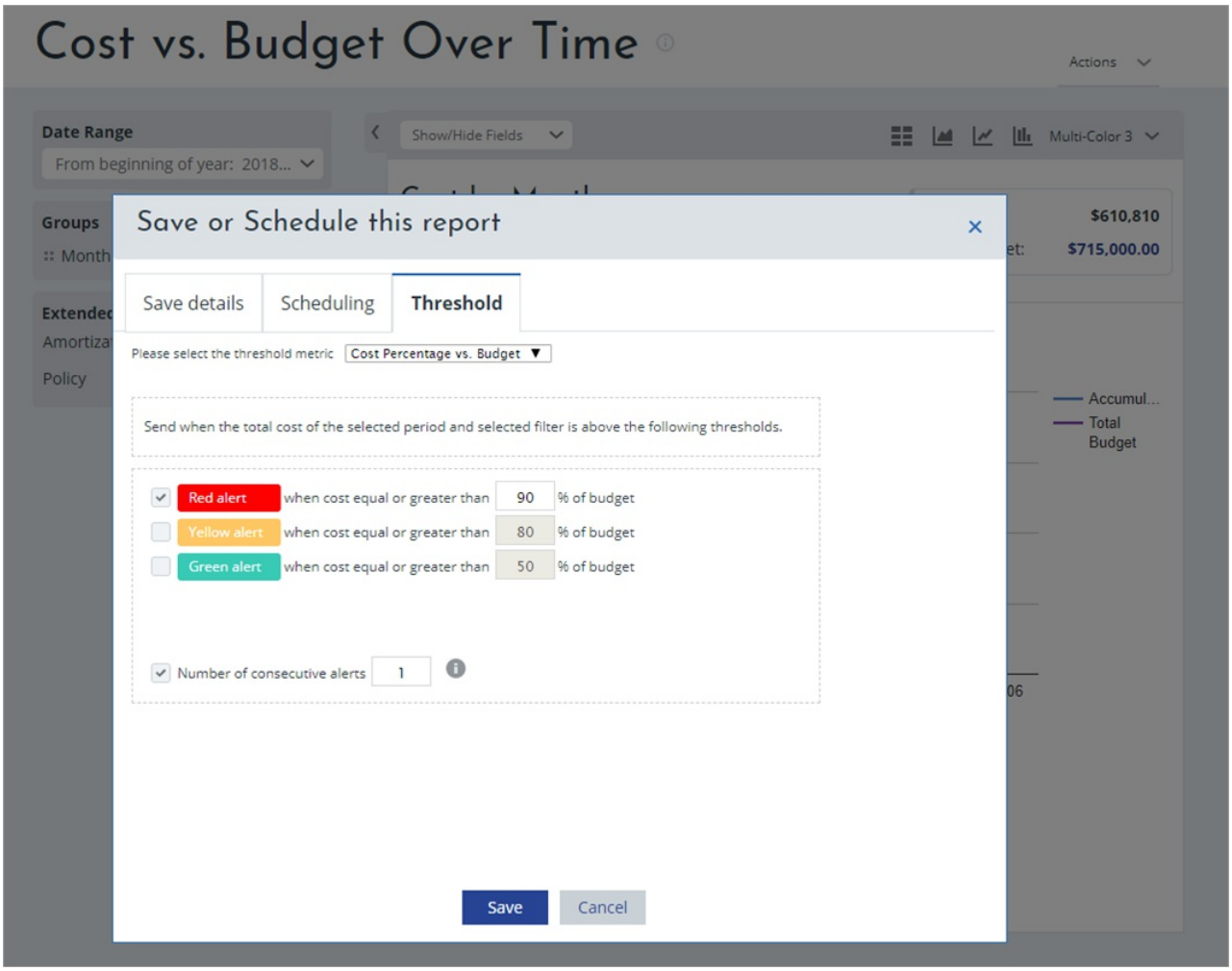
Create budget alerts for a filter

In the previous example, you can see that the accumulated cost approached the budget. You can create automatic budget alerts so that you're notified when spending approaches or exceeds your budget. Basically, the alert is a scheduled report with a threshold. Budget alert threshold metrics include:

- Remaining cost vs. budget – to specify a currency value threshold
- Cost percentage vs. budget – to specify a percentage value threshold

Let's look at an example.

In the Cost vs. Budget Over Time report, click **Actions** and then select **Schedule report**. On the Threshold tab, select a threshold metric. For example, **Cost percentage vs budget**. Select an alert type and enter a percentage value of the budget. If you want to get notified only once, select **Number of consecutive alerts** and then type *1*. Click **Save**.



Next steps

- If you haven't already completed the first tutorial for Cloudyn, read it at Review usage and costs.
- Learn more about the reports available in Cloudyn.

Cloudyn walk-through training videos

1/14/2020 • 2 minutes to read • Edit Online

The following videos provide demonstrations to walk you through getting started with Cloudyn and using its features. Cloudyn supports multi-cloud cost tracking and optimization including Microsoft Azure, Amazon Web Services, and Google Cloud Platform.

Overview video

Introduction to Cloudyn

Walk-through videos

Analyzing your cloud billing data vs. time with Cloudyn

Adding Users to Cloudyn

Creating a Cost Entity Hierarchy in Cloudyn

Optimizing VM Size in Cloudyn

Defining a Cost Allocation Model in Cloudyn

Defining Custom Charges in Cloudyn

How to Find Your EA Enrollment ID and API Key for use in Cloudyn

Finding your Directory GUID and Rate ID for use in Cloudyn

Assigning Accounts and Subscriptions to Cost Entities in Cloudyn

Connecting to Azure Resource Manager with Cloudyn

Analyzing your cloud billing data with Cloudyn

Frequently asked questions for Cloudyn

1/14/2020 • 9 minutes to read • Edit Online

This article addresses some common questions about Cloudyn. If you have questions about Cloudyn, you can ask them at FAQs for Cloudyn.

How can I resolve common indirect enterprise setup problems?

When you first use the Cloudyn portal, you might see the following messages if you are an Enterprise Agreement or Cloud Solution Provider (CSP) user:

- "The specified API key is not a top level enrollment key" displayed in the **Set Up Cloudyn** wizard.
- "Direct Enrollment – No" displayed in the Enterprise Agreement portal.
- "No usage data was found for the last 30 days. Please contact your distributor to make sure markup was enabled for your Azure account" displayed in the Cloudyn portal.

The preceding messages indicate that you purchased an Azure Enterprise Agreement through a reseller or CSP. Your reseller or CSP needs to enable *markup* for your Azure account so that you can view your data in Cloudyn.

Here's how to fix the problems:

1. Your reseller needs to enable *markup* for your account. For instructions, see the Indirect Customer Onboarding Guide.
2. You generate the Azure Enterprise Agreement key for use with Cloudyn. For instructions, see Adding Your Azure EA or How to Find Your EA Enrollment ID and API Key.

Only an Azure service administrator can enable Cloudyn. Co-administrator permissions are insufficient.

Before you can generate the Azure Enterprise Agreement API key to set up Cloudyn, you must enable the Azure Billing API by following the instructions at:

- Overview of Reporting APIs for Enterprise customers
- Microsoft Azure enterprise portal Reporting API under **Enabling data access to the API**

You also might need to give department administrators, account owners, and enterprise administrators permissions to *view charges* with the Billing API.

Why don't I see Optimizer recommendations?

Recommendation information is only available for accounts that are activated. You will not see any recommendation information in **Optimizer** report categories for accounts that are *unactivated*, including:

- Optimization Manager
- Sizing Optimization
- Inefficiencies

If you cannot view any Optimizer recommendation data, then most likely, you have accounts that are unactivated. To activate an account, you need to register it with your Azure credentials.

To activate an account:

1. In the Cloudyn portal, click **Settings** in the upper right and select **Cloud Accounts**.

2. On the Microsoft Azure Accounts tab, look for accounts that have an **unactivated** subscription.
3. To the right of an unactivated account, click the **edit** symbol that resembles a pencil.
4. Your tenant ID and rate ID is automatically detected. Click **Next**.
5. You're redirected to the Azure portal. Sign in to the portal and authorize Cloudyn Collector to access your Azure data.
6. Next, you're redirected to the Cloudyn Accounts management page and your subscription is updated with **active** Account Status. It shows a green check mark symbol.
7. If you don't see a green checkmark symbol for one or more of the subscriptions, it means that you do not have permissions to create a reader app (the CloudynCollector) for the subscription. A user with higher permissions for the subscription needs to repeat steps 3 and 4.

After you complete the preceding steps, you can view Optimizer recommendations within one to two days. However, it can take up to five days before full optimization data is available.

How do I enable suspended or locked-out users?

First, let's look at the most common scenario that causes user accounts to get *initiallySuspended*.

> Admin1 might be a Microsoft Cloud Solution Provider or Enterprise Agreement user. Their organization is ready to start using Cloudyn. He registers through the Azure portal and signs into the Cloudyn portal. As the person who registers the Cloudyn service and signs into the Cloudyn portal, Admin1 becomes the *primary administrator*. Admin1 does not create any user accounts. However, using the Cloudyn portal, they do create Azure accounts and set up an entity hierarchy. Admin1 informs Admin2, a tenant administrator, that they need to register with Cloudyn and sign in to the Cloudyn portal.
>
> Admin2 registers through the Azure portal. However when they try to sign in to the Cloudyn portal, they get an error saying their account is **suspended**. The primary administrator, Admin1, is notified of the account suspension. Admin1 needs to activate Admin2's account and grant *admin entity access* for the appropriate entities and allows user management access and active the user account.

If you receive an alert with a request to allow access for a user, you need to activate the user account.

To activate the user account:

1. Sign in to Cloudyn by using the Azure administrative user account that you used to set up Cloudyn. Or, sign in with a user account that was granted administrator access.
2. Select the gear symbol in the upper right, and select **User Management**.
3. Find the user, select the pencil symbol, and then edit the user.
4. Under **User status**, change the status from **Suspended** to **Active**.

Cloudyn user accounts connect by using single sign-on from Azure. If a user mistypes their password, they might get locked out of Cloudyn, even though they can still access Azure.

If you change your e-mail address in Cloudyn from the default address in Azure, your account can get locked out. It might show "status initiallySuspended." If your user account is locked out, contact an alternate administrator to reset your account.

We recommend that you create at least two Cloudyn administrator accounts in case one of the accounts gets locked out.

If you can't sign in to the Cloudyn portal, ensure that you're using the correct URL to sign in to Cloudyn. Use https://azure.cloudyn.com.

Avoid using the Cloudyn direct URL https://app.cloudyn.com.

How do I activate unactivated accounts with Azure credentials?

As soon as your Azure accounts are discovered by Cloudyn, cost data is immediately provided in cost-based reports. However, for Cloudyn to provide usage and performance data, you need to register your Azure credentials for the accounts. For instructions, see Add an account or update a subscription.

To add Azure credentials for an account, in the Cloudyn portal, select the edit symbol to the right of the account name, not the subscription.

Until your Azure credentials are added to Cloudyn, the account appears as *un-activated*.

How do I add multiple accounts and entities to an existing subscription?

Additional entities are used to add additional Enterprise Agreements to a Cloudyn subscription. For more information, see Create and manage entities.

For CSPs:

To add additional CSP accounts to an entity, select **MSP Access** instead of **Enterprise** when you create the new entity. If your account is registered as an Enterprise Agreement and you want to add CSP credentials, Cloudyn support personnel might need to modify your account settings. If you're a paid Azure subscriber, you can create a new support request in the Azure portal. Select **Help + support**, and then select **New support request**.

Currency symbols in Cloudyn reports

You might have multiple Azure accounts using different currencies. However, cost reports in Cloudyn do not show more than one currency type per report.

If you have multiple subscriptions using different currencies, a parent entity and its child entity currencies are displayed in USD **$**. Our suggested best practice is to avoid using different currencies in the same entity hierarchy. In other words, all your subscriptions organized in an entity structure should use the same currency.

Cloudyn automatically detects your Enterprise Agreement subscription currency and presents it properly in reports. However, Cloudyn only displays USD **$** for CSP and web-direct Azure accounts.

What are Cloudyn data refresh timelines?

Cloudyn has the following data refresh timelines:

- **Initial**: After you set up, it can take up to 24 hours to view cost data in Cloudyn. It can also take up to 10 days for Cloudyn to collect enough data to display sizing recommendations.
- **Daily**: From the tenth day to the end of each month, Cloudyn should show your data up to date from the previous day after about UTC+3 the next day.
- **Monthly**: From the first day to the tenth day of each month, Cloudyn might show your data only through the end of the previous month.

Cloudyn processes data for the previous day when full data from the previous day is available. The previous day's data is usually available in Cloudyn by about UTC+3 each day. Some data, such as tags, can take an additional 24 hours to process.

Data for the current month isn't available for collection at the beginning of every month. During the period, service providers finalize their billing for the previous month. The previous month's data appears in Cloudyn 5 to 10 days after the start of each month. During this time, you might see only amortized costs from the previous month. You might not see daily billing or usage data. When the data becomes available, Cloudyn processes it retroactively. After processing, all the monthly data is displayed between the fifth day and the tenth day of each month.

If there is a delay sending data from Azure to Cloudyn, data is still recorded in Azure. The data is transferred to Cloudyn when the connection is restored.

Cost fluctuations in Cloudyn Cost Reports

Cost reports can show cost fluctuations whenever cloud service providers send updated billing files. Fluctuating costs occur when new files are received from a cloud service provider outside of the usual daily or monthly reporting schedule. Cost changes don't result from Cloudyn recalculation.

Throughout the month, all billing files sent by your cloud service provider are an estimation of your daily costs. Sometimes data is updated frequently — occasionally multiple times per day. Updates are more frequent with AWS than Azure. Cost totals should remain stable when the billing calculation for the previous month is complete and the final billing file is received. Usually, by the 10th of the month.

Changes occur when you receive cost adjustments from your cloud service provider. Receiving credits is one example. Changes can occur months after the relevant month was closed. Changes are shown whenever a recalculation is made by your cloud service provider. Cloudyn updates its historical data to make sure that all adjustments are recalculated. It also verifies that the costs are shown accurately in it reports.

How can a direct CSP configure Cloudyn access for indirect CSP customers or partners?

For instructions, see Configure indirect CSP access in Cloudyn.

What causes the Optimizer menu item to appear?

After you add Azure Resource Manager access and data is collected, you should see the **Optimizer** option. To activate Azure Resource Manager access, see How do I activate unactivated accounts with Azure credentials?

Is Cloudyn agent based?

No. Agents are not used. Azure virtual machine metric data for VMs is gathered from the Microsoft Insights API. If you want to gather metric data from Azure VMs, they need to have diagnostics settings enabled.

Do Cloudyn reports show more than one AD tenant per report?

Yes. You can create a corresponding cloud account entity for each AD tenant that you have. Then you can view all of your Azure AD tenant data and other cloud platform providers including Amazon Web Services and Google Cloud Platform.

Create a support request for Cloudyn

1/14/2020 • 2 minutes to read • Edit Online

You can open a support request if you can't find the information you're looking for. Or, if you suspect a problem is a service disruption or bug. When you open a support ticket, make sure that open it for a single problem. Do so helps to quickly route the reported issue.

Open a support ticket

1. Sign in to the Azure portal (https://portal.azure.com).
2. On the top navigation bar, click **Help**.
3. In the **Help** menu, click **Help + support**.
4. In the Help + support menu under Support, click **New support request**.
5. In the Basics area under Issue type, select **Billing**.
6. Under Subscription, choose any listed subscription. The subscription that you choose isn't used for issue routing.
7. Under Support plan, select your Azure Support Plan and then click **Next**.
8. In the Problem area, select a **Severity** level to help determine response time.
9. In **Problem type** select **Cloudyn Legacy**, and then select a **Category**.
10. In the **Title** box, enter a title that describes your request.
11. In the **Details** box, type additional information.
12. For **When did the problem start?**, select an approximate date and time for and then click **Next**.
13. In the **Contact information** area, select your preferred contact method and provide your contact information, then click **Create**.

When the support ticket is created, it is added to the support queue. Response time varies, based on the Support Plan and Severity (business impact) of the issue. For more information, see Support scope and responsiveness.

If you want to create a billing support ticket for Cost Management, under **Problem type**, select **Azure Cost Management**.

To check the status of an incident that you've filed, see All support requests.

If you're a legacy Cloudyn user without an Azure account, you can open a support request at https://support.microsoft.com/oas/default.aspx?prid=16451.

Next steps

- To learn more about Cloudyn, continue to the Review usage and costs tutorial for Cloudyn.