

2024-S2-BUS5001 - CLOUD PLATFORMS AND ANALYTICS - Workshop (Week 1)

Azure Cost Management and Usage Monitoring

In this Workshop, you will get a hands-on introduction to Azure and cost management and usage monitoring of your Azure subscription.

IMPORTANT:

- The services covered in this course are only a subset of a much larger family of Azure services. Similar outcomes can be achieved by leveraging other services and/or features not covered by this Workshop. Specific business requirements may also ask for the use of different services or features not included in this Workshop.
- Some concepts presented in this course can be quite complex and you may need to seek more information from different sources to complement your understanding of the Azure services covered.

Document Structure

This document contains detailed step-by-step instructions on how to manage cost and monitor usage of your Azure subscription. It's recommended you carefully read the detailed description contained in this document for a successful experience with all Azure services.

You will see the label **IMPORTANT** whenever there is a critical step in the Workshop. Please pay close attention to the instructions given.

Additional Resources

Azure [Cost Management + Billing documentation](#)

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Azure Student Account

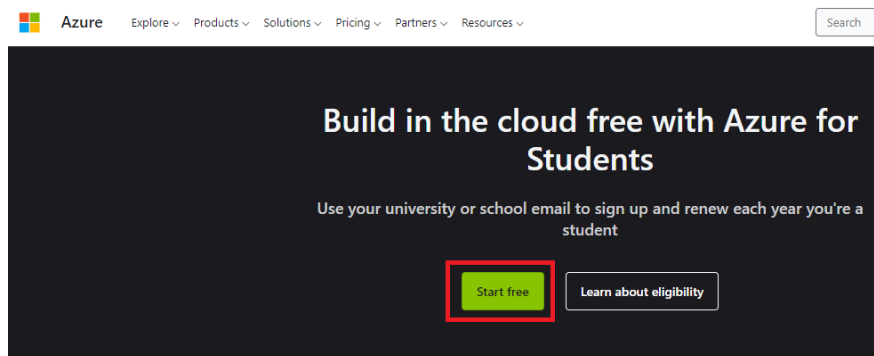
For students embarking on the journey of learning cloud computing, Azure offers a unique opportunity through the Azure for Students account. This initiative is designed to provide access to Azure's vast array of services without any cost, giving students the tools they need to explore, learn, and innovate in the cloud.

Key Features of Azure for Students:

- **No Credit Card Required:** Signing up for Azure for Students doesn't require a credit card, making it accessible for students worldwide without the need for financial prerequisites.
- **\$100 in Azure Credits:** Upon verification of your academic status, you'll receive \$100 in Azure credits that can be used over 12 months. This allows you to experiment with and learn about different Azure services without any initial investment.
- **Access to Free Azure Services:** Beyond the credits, Azure for Students provides access to a selection of free Azure services. This includes key services that are always free (subject to certain usage limits), such as Azure App Service, Azure Functions, and Azure DevOps, among others.
- **Comprehensive Learning Resources:** Azure for Students comes with access to Microsoft Learn, a platform offering self-paced learning paths and modules tailored to various Azure topics. This resource is invaluable for students looking to deepen their cloud computing knowledge at their own pace.

Sign Up with Azure Student Offer

1. Go to [Azure for Students](#).
2. Select **Start Free**.



3. Sign in using your La Trobe Student Account.
4. Follow the steps outlined to finish the process.
5. You will be taken to the screen outlined in the figure below; you will have been provided a \$100 in credit.

Microsoft Azure

Search resources, services, and docs (G+ /)

Home >

Education | Overview

Overview

Learning resources

Roles

Software

Learning

Templates

Need help?

Support

Get started

Overview

Student offer details

Available credits

\$100 out of \$100

Days until credits expire

366

Expires on 03/07/2024

View cost details

Popular solutions

Deploy a Docker container

Create simple containers to host apps.

Create your first Node.js app

Build and deploy web, mobile and API-based

Create and train a Machine Learning model

Train, deploy, automate, manage, and track

Build and deploy your first website

Automatically publish to web as your code

Explore all

Free Services

Azure Virtual Machines – Windows

Use 750 hours of access to 81s virtual

Azure Blob Storage

Get 5 GB of locally redundant storage (LRS)

Computer Vision

Receive 5000 AI transactions to process visual

Azure App Service

Quickly create up to 10 powerful apps with 1

Explore all

Free software

SQL Server 2019 Developer

Visual Studio Enterprise Edition 2022

Machine Learning Server 9.4.7 for Windows

Microsoft R Client 9.4.7

Agents for Visual Studio 2019 (version 16.0)...

Free learning paths

Data Scientist

Nineteen learning paths with 75+ hours of content.

AI Engineer

Nine learning paths with 25+ hours of content.

Developer

Forty-six learning paths with 110+ hours of content.

DevOps Engineer

Eight learning paths with 50+ hours of content.

Resources

Get started guide for Azure developers

Learn the languages and tools needed to develop

Pricing calculator

Estimate costs for Azure services.

Optimize your cloud investment with cost ...

Plan, analyze, and reduce spending.

Explore student hub

Learn technical skills for your future career.

FAQs

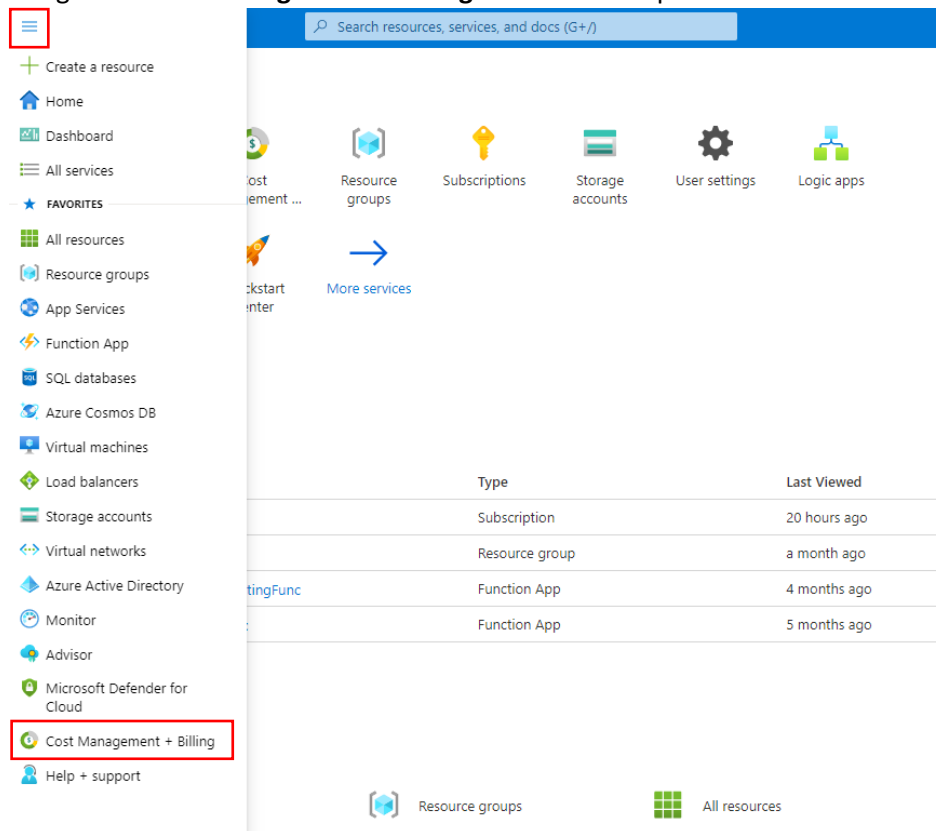
Find answers to frequently asked questions.

Explore and analyze costs with cost analysis

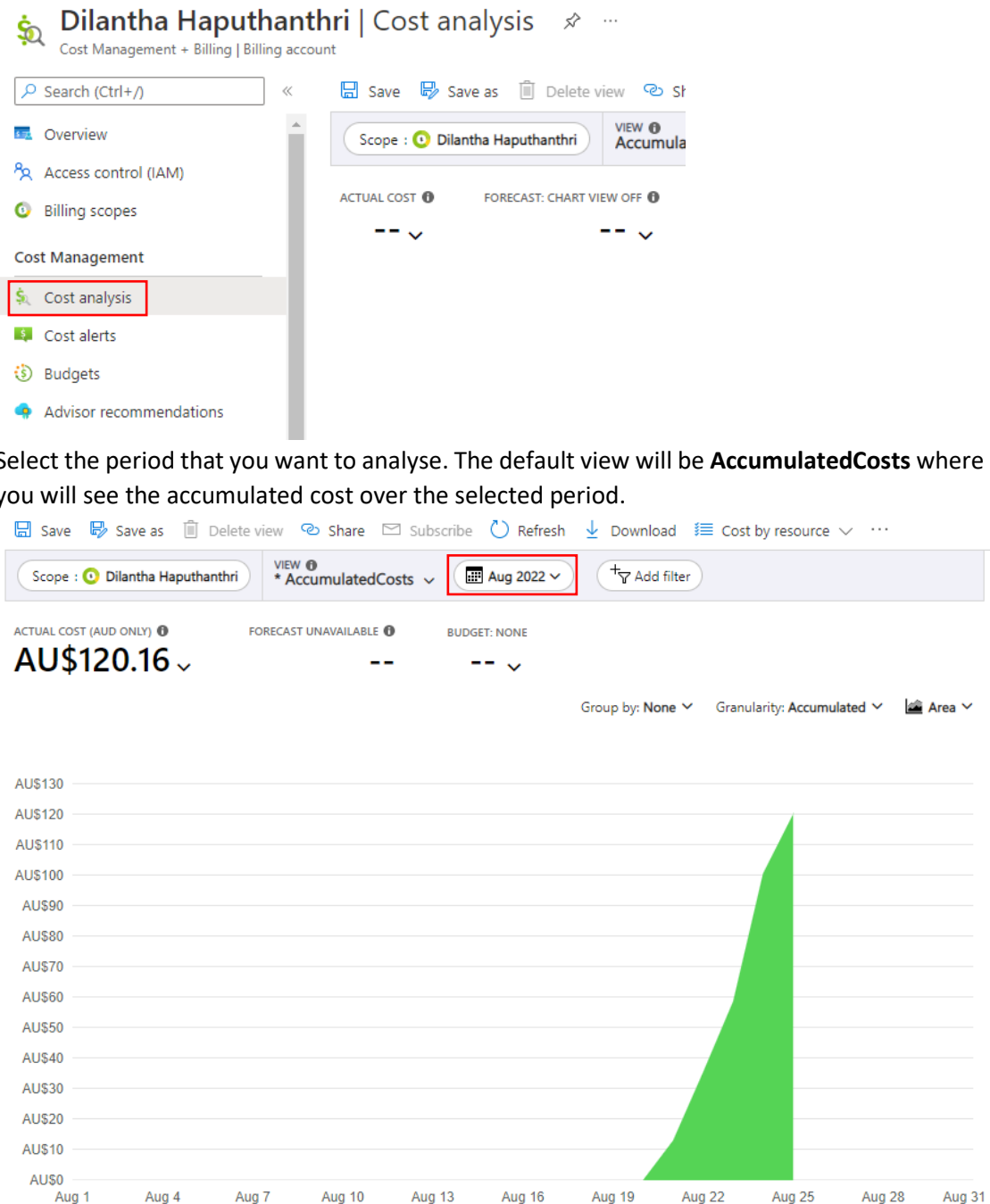
Before you can properly control and optimize your Azure costs, you need to understand where costs originated. It is also useful to know how much money your services cost, and in support of which environments and systems. Visibility into the full spectrum of costs is critical to accurately understand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

In this section, you use cost analysis to explore and analyze your account costs. You can view aggregated costs 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. You can use budgets to get notified as cost exceeds specific thresholds.

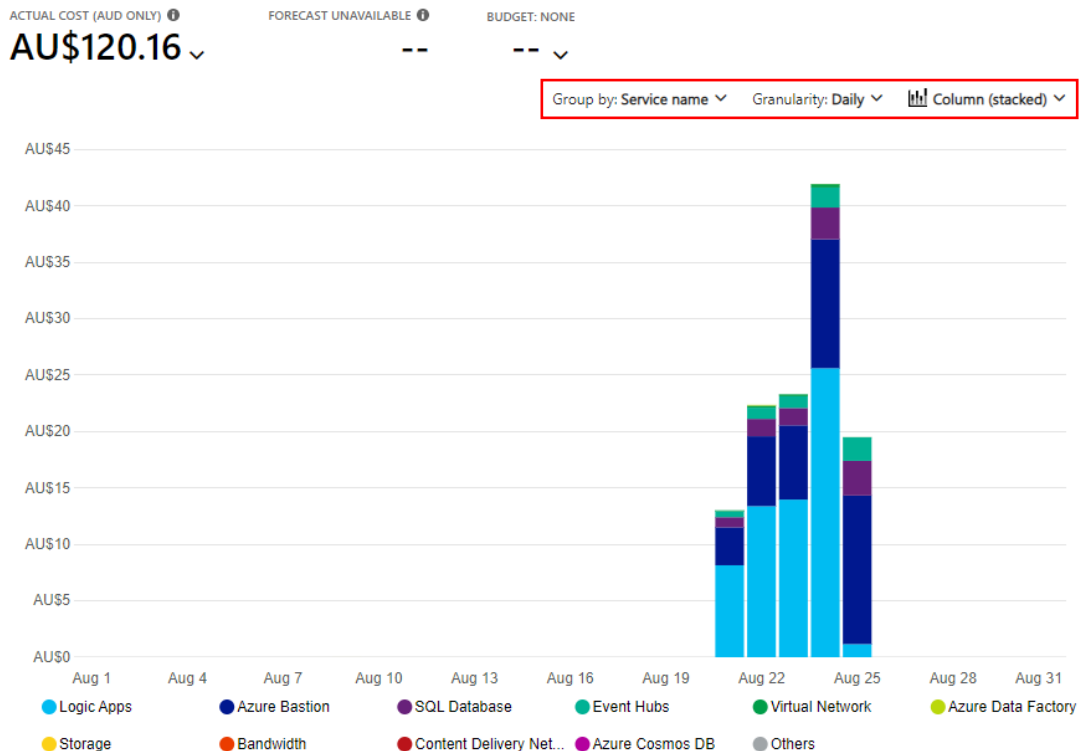
1. Sign in to the Azure [portal](#).
2. Navigate to **Cost Management + Billing** in the left side pane.



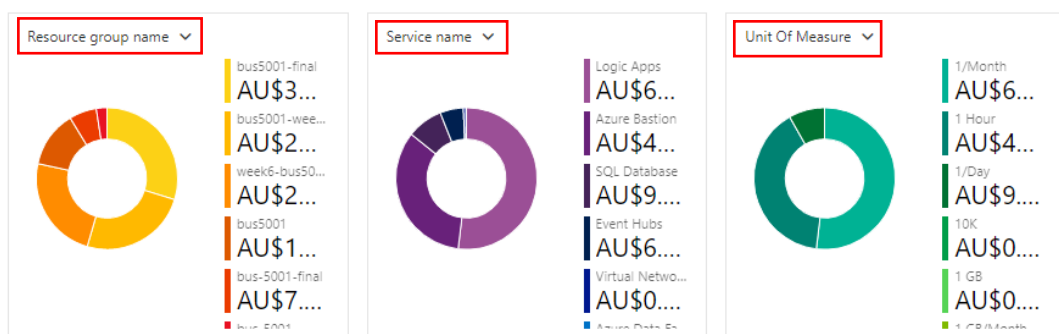
1. Navigate to **Cost analysis**.



- Change the Three settings to view further information. For example, **Group by:** Service name, **Granularity:** Daily, Column (stacked).



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



6. Click Download if you want to download this report as PNG/Excel/CSV.

Refresh Download Cost by resource

Aug 2022 ▾ Add filter

BET: NONE

▾ ▾ Group by: Service name ▾

Download ×

Cost analysis

Download

PNG Excel CSV

Download charts

Schedule export

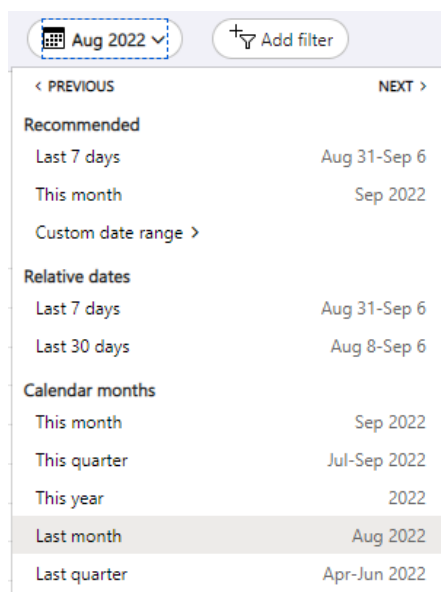
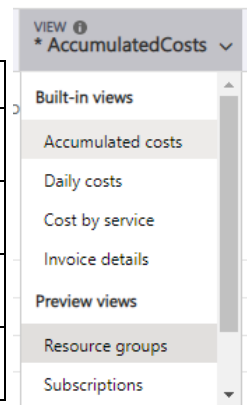
Configure exports to automatically publish your billing data to a storage account on daily, weekly, or monthly basis.

View all exports

Select a cost view

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 costs	Have there been any increases in the costs per day for the last 30 days?
Cost by service	How has my monthly usage varied over the past three invoices?
Preview views	Which Resource groups/Subscriptions/Services cost the most so far this month?



Select a date range

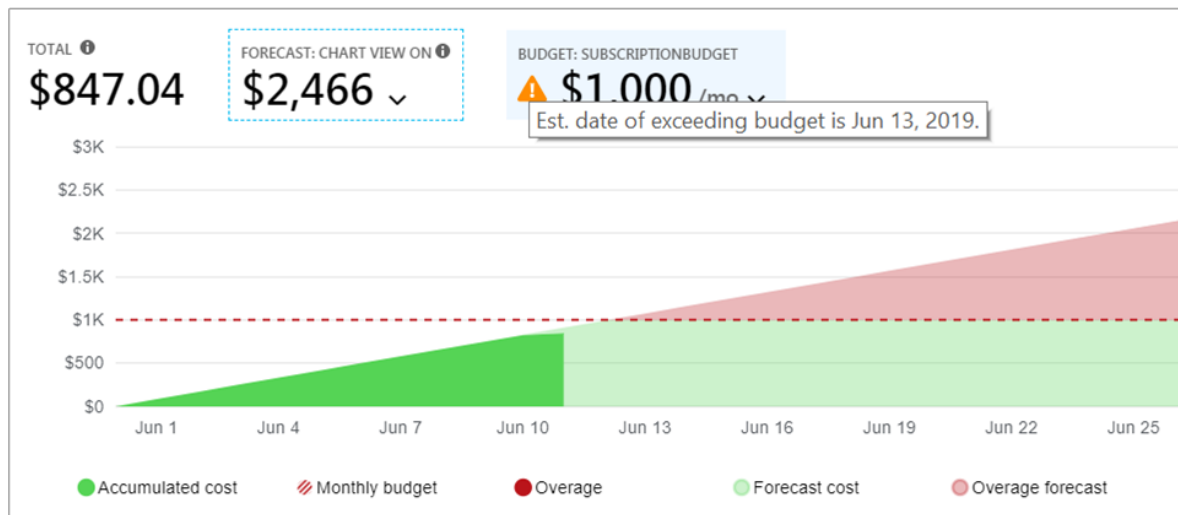
There are many cases where you need deeper analysis. Customization starts at the top of the page, with the date selection.

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.

View costs

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.

You can use the forecast chart view to identify potential budget breaches. (This will not be yet available to you since your usage data is not enough for forecasting) 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 that shows 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.

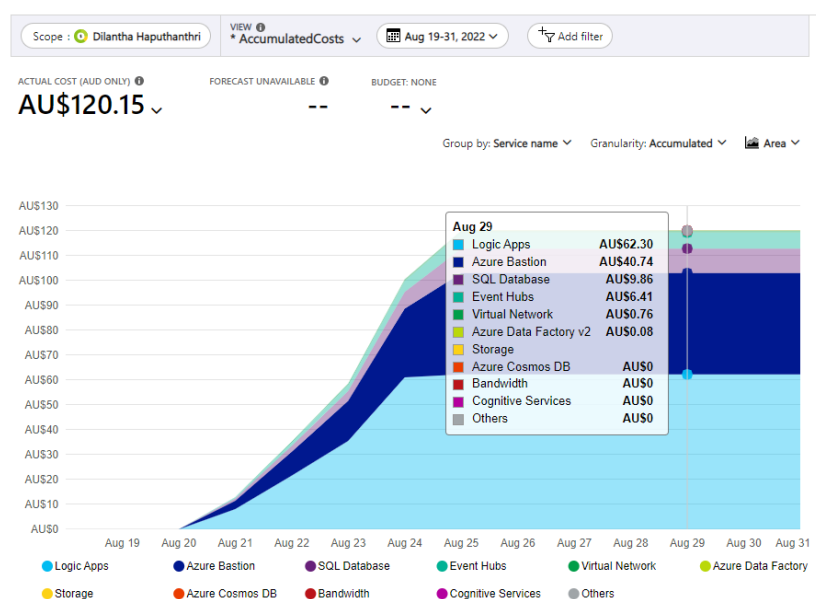
When turning off the spending forecast, you don't see projected spending for future dates. Also, when you look at costs for past periods, the cost forecast doesn't show costs.

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

Group costs

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.

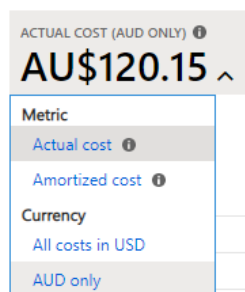
Most Azure resources support tagging. However, some tags aren't available in Cost Management and billing. Additionally, resource group tags aren't supported. Support for tags applies to usage reported after the tag was applied to the resource. Tags aren't applied retroactively for cost rollups.



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.

Switch between actual and amortized cost

By default, cost analysis shows all usage and purchase costs as they're accrued and will show on your invoice, also known as Actual cost. Viewing the 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. Most reservation terms are one or three years. Let's look at a one-year reservation example. Instead of seeing a \$365 purchase on January 1, you'll see a \$1.00 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 \$1.00 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. Unused reservation costs can be seen only when viewing amortized costs.

Because of 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 the 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.

View costs in table format

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.

ACTUAL COST (AUD ONLY) ⓘ AU\$120.15 ^

FORECAST UNAVAILABLE ⓘ --

BUDGET: NONE -- ^

Group by: Service name ^ Granularity: Accumulated ^

Filter items 52 rows

Date	Service name	Cost ↑↓
2022-08-24	Logic Apps	AU\$25.62
2022-08-23	Logic Apps	AU\$13.97
2022-08-22	Logic Apps	AU\$13.39
2022-08-25	Azure Bastion	AU\$13.17
2022-08-24	Azure Bastion	AU\$11.42

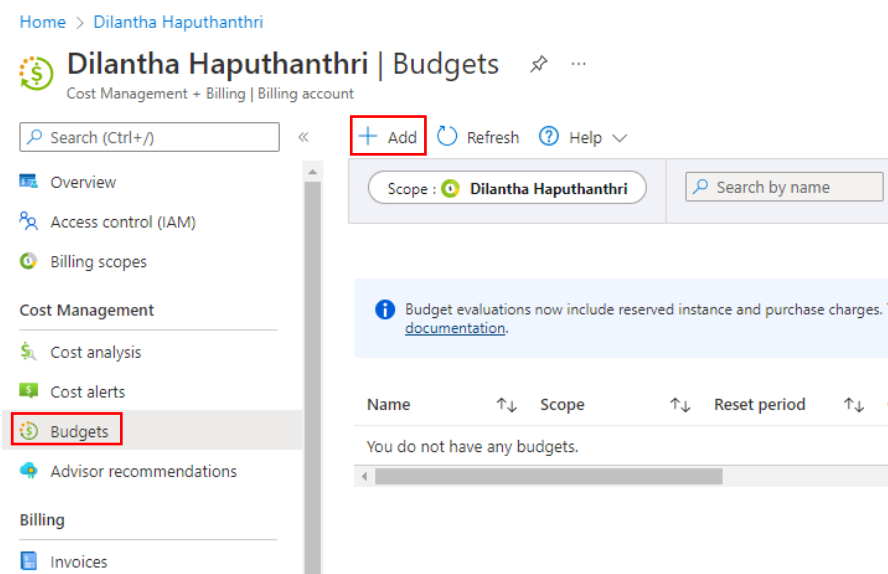
Create and manage Azure budgets

Budgets in Cost Management help you plan for and drive organizational accountability. They help you inform others about their spending to proactively manage costs and monitor how spending progresses over time. You can configure alerts based on your actual cost or forecasted cost to ensure that your spending is within your spend limit. When the budget thresholds you have created are exceeded, only notifications are triggered. None of your resources are affected and your consumption is not stopped. You can use budgets to compare and track spending as you analyze costs.

Cost and usage data is typically available within 8-24 hours and budgets are evaluated against these costs every 24 hours. Be sure to get familiar with Cost and usage data updates specifics. When a budget threshold is met, email notifications are normally sent within an hour of the evaluation.

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. When a budget expires, it's automatically deleted.

2. Sign in to the Azure [portal](#).
3. Navigate to **Cost Management + Billing** in the left side pane.
4. Navigate to **Budgets** and click **+ Add** to create a new budget.



5. Enter a unique name and select the Reset period, Creation date, and Expiration date for the budget.
6. Enter the budget amount and scroll down.

Budget Details

Give your budget a unique name. Select the time window it analyzes during each evaluation period, its expiration date and the amount.

* Name ✓

* Reset period ⓘ ▼

* Creation date ⓘ ▼ ▼

* Expiration date ⓘ ▼ ▼ ▼

Budget Amount

Give your budget amount threshold





Amount * ✓

7. The view of monthly cost data can be used to come up with a practical budget amount considering the past monthly costs.



8. Click **Next**.
9. Under Alert conditions, select,
- Type: Actual or Forecast. (Cost forecast may not be available for you at the moment because of a lack of past data.)
 - % of budget: Percentage of the allocated budget at which the alert should be created.
- You can scroll down and view the alert condition on the view of monthly cost data.
10. Under Alert recipients, enter the email address for which the alert should be sent.

*** Alert conditions**

Type	% of budget	Amount	
Actual 	90 	90.00	
Select type 	Enter %	-	

*** Alert recipients (email)**

Alert recipients (email)

index_no@students.latrobe.edu.au 

example@email.com

It is recommended to add azure-noreply@microsoft.com to your email white list to ensure alert mails do not go to your spam folder.

11. Click **Create**.

IMPORTANT: Clean up resources

If you created a budget and you no longer need it, view its details and delete it.

More information on alerts

Cost alerts are automatically generated based on 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 main types of cost alerts: budget alerts, credit alerts, and department spending quota alerts.

Required permissions for alerts

The following table shows how Cost Management alerts are used by each role. The behaviour below applies to all Azure RBAC scopes.

Feature/Role	Owner	Contributor	Reader	Cost Management Reader	Cost Management Contributor
Alerts	Read, Update	Read, Update	Read-only	Read-only	Read, Update

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.

In the Azure portal, budgets are defined by cost. 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 is 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 Prepayment (previously called monetary commitment) is consumed. Azure Prepayment is for organizations with Enterprise Agreements. Credit alerts are generated automatically at 90% and 100% of your Azure Prepayment credit balance. Whenever an alert is generated, it's reflected in cost alerts and the email sent to the account owners.

Respond to alerts

When you receive an alert, check the current consumption data. Budget alerts aren't triggered in real-time. There may be a delay between the alert and the current actual cost. Look for a significant difference between cost values when the alert happened and the current cost. Next, conduct a cost review to discuss the cost trend, possible causes, and any required action.

If the alert was caused because of unnecessary or expensive resources, you can implement additional Azure Policy controls. You can also add budget automation to trigger resource scaling or shutdowns.