

CST8912 – Cloud Solution Architecture

Graded Lab Activity #7

Lab 7

CST8912_011

Satyam Panseriya

ID :- 41128392

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Submitted to : Prof. Tanishq Bansal

Introduction:

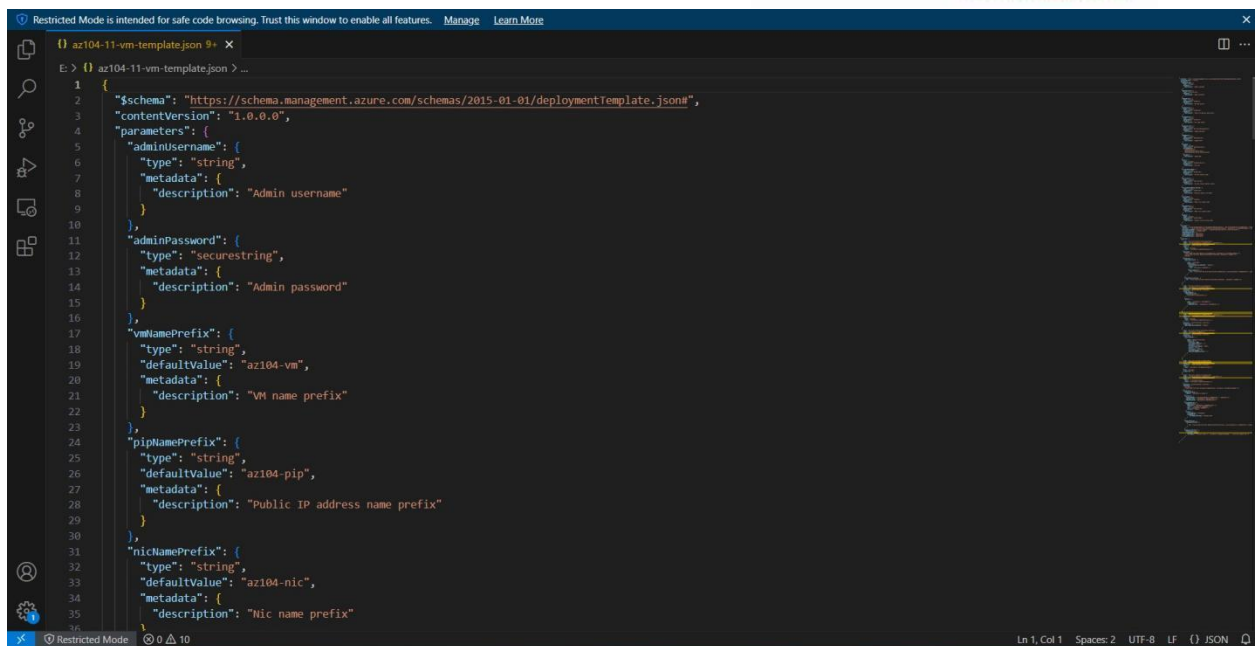
Cloud provider provides a variety of cloud services in a variety of cloud service models: IaaS, PaaS, and SaaS. When businesses migrate to the cloud, they must choose which model is best suited to their needs and is the most cost-effective. This course is designed to assist Cloud Architects in identifying their current cloud expenditures and providing greater awareness of the costs associated with each deployment model as well as each aspect of a cloud deployment.

Optimizing cloud costs begins with knowing your current cloud expenditures. This course introduces you to the tools built into the cloud Portal that can help you understand the total overall expenditures in cloud as well as break down those costs by area: Compute, Network, Storage, Identity, and App/Cloud Services.

The remainder of the course drills down on specific costs associated with each area of cloud identifies the costs associated with each service and provides very clear and concise methods for reducing cloud expenditures. Many of the cost savings methods will require minimal changes to your cloud deployment and will take just minutes to implement while other cost savings methods may take a shift in your cloud strategy, such as moving from IaaS to PaaS.

Task 1: Use a template to provision an infrastructure

1. In this task, you will deploy a virtual machine that will be used to test monitoring scenarios.
2. Download the `\Allfiles\Lab11\az104-11-vm-template.json` lab files to your computer.

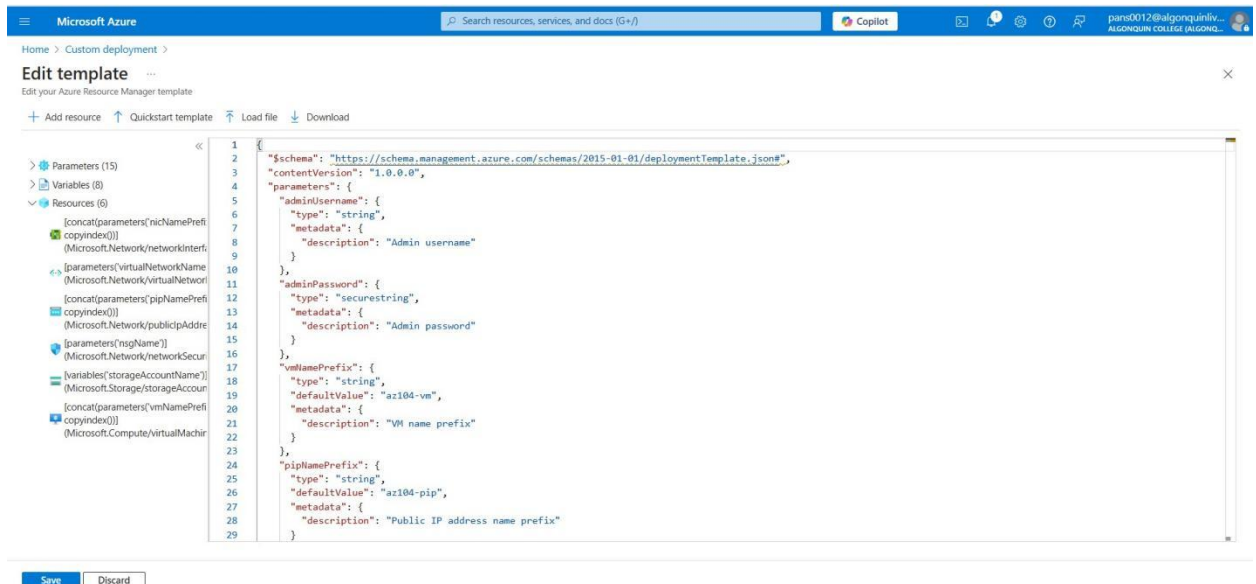


```

1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "adminUsername": {
6       "type": "string",
7       "metadata": {
8         "description": "Admin username"
9       }
10    },
11    "adminPassword": {
12      "type": "securestring",
13      "metadata": {
14        "description": "Admin password"
15      }
16    },
17    "vmNamePrefix": {
18      "type": "string",
19      "defaultValue": "az104-vm",
20      "metadata": {
21        "description": "VM name prefix"
22      }
23    },
24    "pipNamePrefix": {
25      "type": "string",
26      "defaultValue": "az104-pip",
27      "metadata": {
28        "description": "Public IP address name prefix"
29      }
30    },
31    "nicNamePrefix": {
32      "type": "string",
33      "defaultValue": "az104-nic",
34      "metadata": {
35        "description": "Nic name prefix"
36      }
37    }
38  }
39 }

```

3. Sign in to the Azure portal - <https://portal.azure.com>.
4. From the Azure portal, search for and select Deploy a custom template.
5. On the custom deployment page, select Build you own template in the editor.
6. On the edit template page, select Load file.
7. Locate and select the \Allfiles\Labs11\az104-11-vm-template.json file and select Open.



```

1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "adminUsername": {
6       "type": "string",
7       "metadata": {
8         "description": "Admin username"
9       }
10    },
11    "adminPassword": {
12      "type": "securestring",
13      "metadata": {
14        "description": "Admin password"
15      }
16    },
17    "vmNamePrefix": {
18      "type": "string",
19      "defaultValue": "az104-vm",
20      "metadata": {
21        "description": "VM name prefix"
22      }
23    },
24    "pipNamePrefix": {
25      "type": "string",
26      "defaultValue": "az104-pip",
27      "metadata": {
28        "description": "Public IP address name prefix"
29      }
30    }
31  }
32 }

```

8. Select Save.
9. Use the following information to complete the custom deployment fields, leaving all other fields with their default values:

10. Setting	11. Value
12. Subscription	13. Your Azure subscription
14. Resource group	15. CST8912 (If necessary, select Create new)
16. Region	17. Canada Central
18. Username	19. localadmin
20. Password	21. Provide a complex password
	22.

Microsoft Azure

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

Copilot

Home >

Custom deployment

Deploy from a custom template

New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →

Project details

Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription *

Resource group * [Create new](#)

Instance details

Region *

Admin Username *

Admin Password *

Vm Name Prefix

Pip Name Prefix

Nic Name Prefix

Image Publisher

Image Offer

Image SKU

[Previous](#) [Next](#) [Review + create](#)

23. Select Review + Create, then select Create.

Microsoft Azure

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

Copilot

Home > Microsoft.Template-20250310171819 | Overview

CST8912

Resource group

Search

+ Create Manage view Delete resource group Refresh Export to CSV Open query Assign tags Move Delete Export template Open in mobile

Overview

Activity log

Access control (IAM)

Tags

Resource visualizer

Events

Settings

Cost Management

Monitoring

Automation

Help

Essentials

Subscription [\(move\)](#): Azure for Students

Subscription ID: 63593e07-b1bc-4b20-8c26-b7fafac46e9f

Tags [\(edit\)](#): Add tags

Deployments: 1 Succeeded

Location: Canada Central

Resources

Recommendations

Filter for any field... Type equals all Location equals all Add filter

Showing 1 to 7 of 7 records. ☐ Show hidden types

Name	Type	Location
az104-nic0	Network interface	Canada Central
az104-nsg01	Network security group	Canada Central
az104-pip0	Public IP address	Canada Central
az104-vm0	Virtual machine	Canada Central
az104-vm0_disk1_0a0aff7804684139818eca9df571648f	Disk	Canada Central
az104-vnet	Virtual network	Canada Central
az104112dk3ywh5ilhpwc	Storage account	Canada Central

< Previous Page 1 of 1 Next >

Give feedback

Task 2: Create an alert

24. In this task, you create an alert for when a virtual machine is deleted.

25. Continue on the Monitor page , select Alerts.

26. Select Create + and select Alert rule.

The screenshot shows the Microsoft Azure portal interface. On the left, the 'Resource groups' page is visible, showing a list of resource groups including 'CST8912'. The main area displays the 'CST8912' resource group details, including its subscription ID and tags. On the right, a 'Delete a resource group' dialog box is open, listing the resource group and its dependent resources. A 'Delete confirmation' pop-up is also visible, stating that deleting the resource group and its dependent resources is a permanent action.

27. Select the Condition tab and then select the See all signals link.

28. Search for and select Delete Virtual Machine (Virtual Machines). Notice the other built-in signals. Select Apply

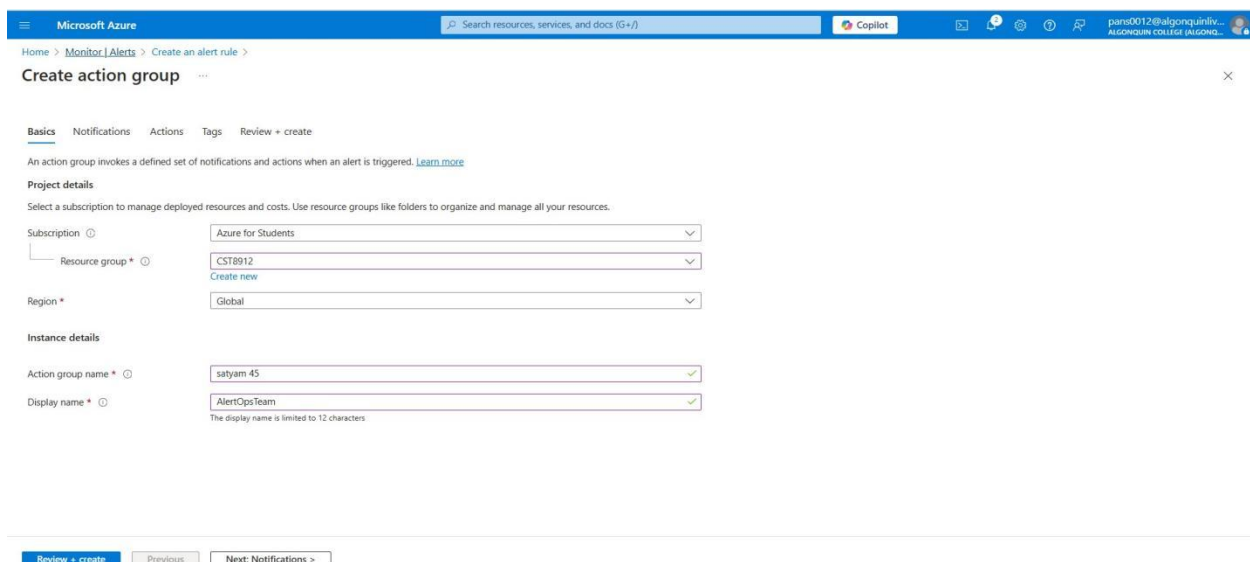
The screenshot shows the Microsoft Azure portal interface. On the left, the 'Create an alert rule' page is visible, with the 'Condition' tab selected. The 'See all signals' link is visible. On the right, a 'Select a signal' dialog box is open, displaying a list of built-in signals. The signal 'Delete Virtual Machine (Virtual Machines)' is highlighted.

29. In the Alert logic area (scroll down), review the Event level selections. Leave the default of All selected.
30. Review the Status selections. Leave the default of All selected.
31. Leave the Create an alert rule pane open for the next task.

Task 3: Configure action group notifications

1. In this task, if the alert is triggered send an email notification to the operations.
2. Continue working on your alert. Select Next: Actions, and then select Create
3. On the Basics tab, enter the following values for each setting.

Setting	Value
Project details	
Subscription	your subscription
Resource group	CST8912
Region	Global (default)
Instance details	
Action group name	Alert the operations team
Display name	AlertOpsTeam



Microsoft Azure Search resources, services, and docs (G+7) Copilot

Home > Monitor | Alerts > Create an alert rule >

Create action group

Basics Notifications Actions Tags Review + create

An action group invokes a defined set of notifications and actions when an alert is triggered. [Learn more](#)

Project details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription ⓘ Azure for Students

Resource group * ⓘ CST8912
Create new

Region * Global

Instance details

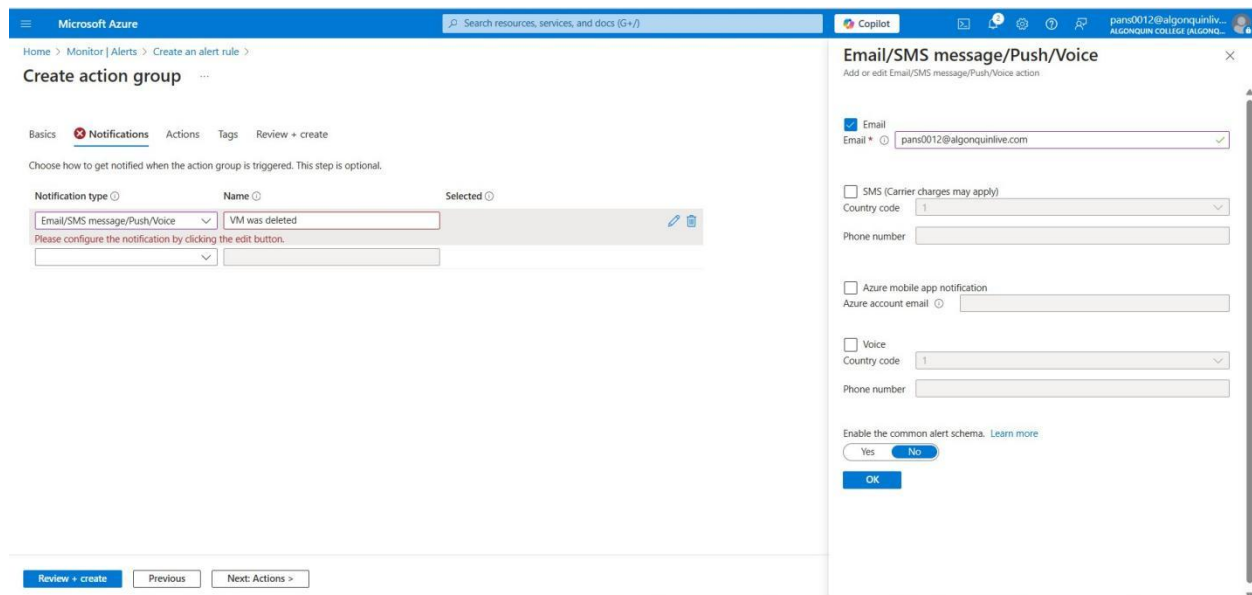
Action group name * ⓘ satyam 45

Display name * ⓘ AlertOpsTeam
The display name is limited to 12 characters

Review + create Previous Next: Notifications >

- Select Next: Notifications and enter the following values for each setting.

Setting	Value
Notification type	Select Email/SMS message/Push/Voice
Name	VM was deleted



Microsoft Azure

Home > Monitor | Alerts > Create an alert rule >

Create action group

Basics **Notifications** Actions Tags Review + create

Choose how to get notified when the action group is triggered. This step is optional.

Notification type Name Selected

Please configure the notification by clicking the edit button.

Email/SMS message/Push/Voice

Add or edit Email/SMS message/Push/Voice action

☒ Email

Email *

☐ SMS (Carrier charges may apply)

Country code

Phone number

☐ Azure mobile app notification

Azure account email

☐ Voice

Country code

Phone number

Enable the common alert schema. [Learn more](#)

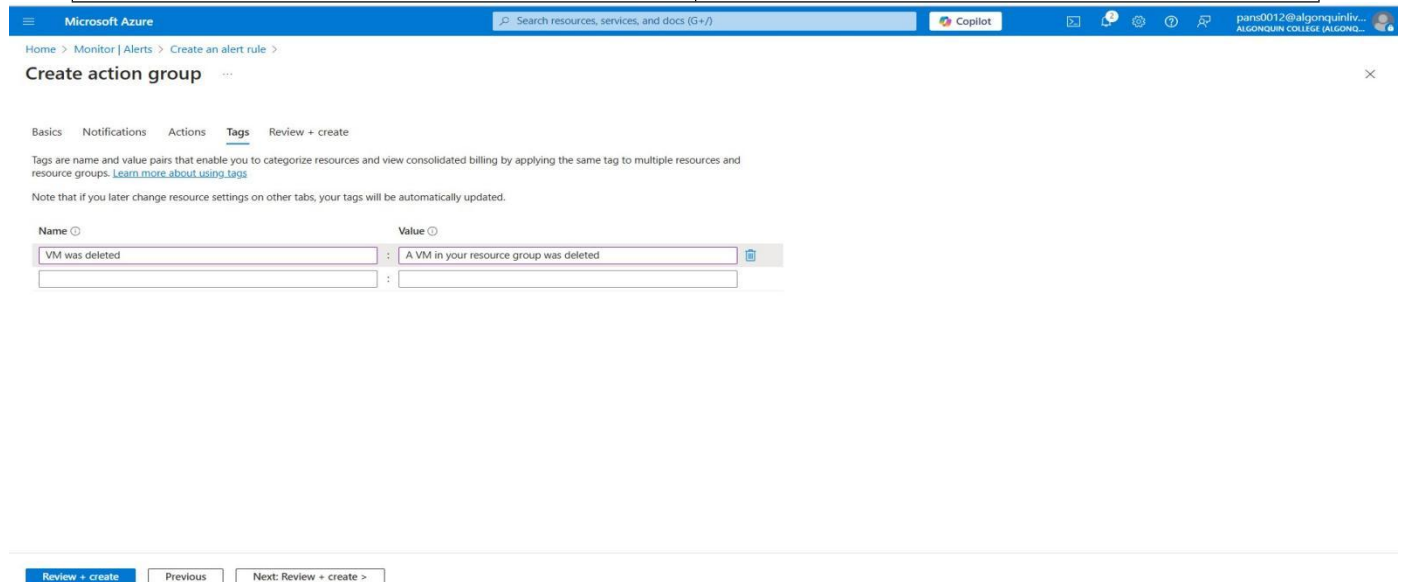
☐ Yes ☒ No

OK

Review + create Previous Next: Actions >

- Select Email, and in the Email box, enter your email address, and then select OK.
- Once the action group is created move to the Next: Details tab and enter the following values for each setting.

Setting	Value
Alert rule name	VM was deleted
Alert rule description	A VM in your resource group was deleted



Microsoft Azure

Home > Monitor | Alerts > Create an alert rule >

Create action group

Basics Notifications Actions **Tags** Review + create

Tags are name and value pairs that enable you to categorize resources and view consolidated billing by applying the same tag to multiple resources and resource groups. [Learn more about using tags](#)

Note that if you later change resource settings on other tabs, your tags will be automatically updated.

Name	Value
VM was deleted	A VM in your resource group was deleted

[Review + create](#)
[Previous](#)
[Next: Review + create >](#)

7. Select Review + create to validate your input, then select Create.

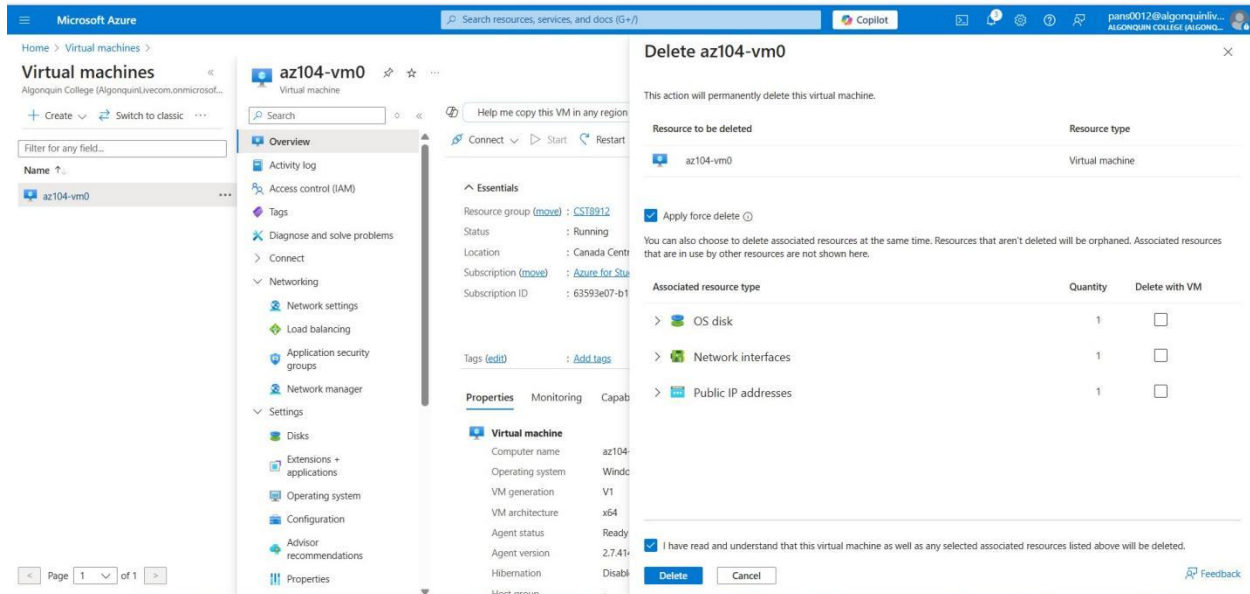
Task 4: Trigger an alert and confirm it is working

8. In this task, you trigger the alert and confirm a notification is sent.

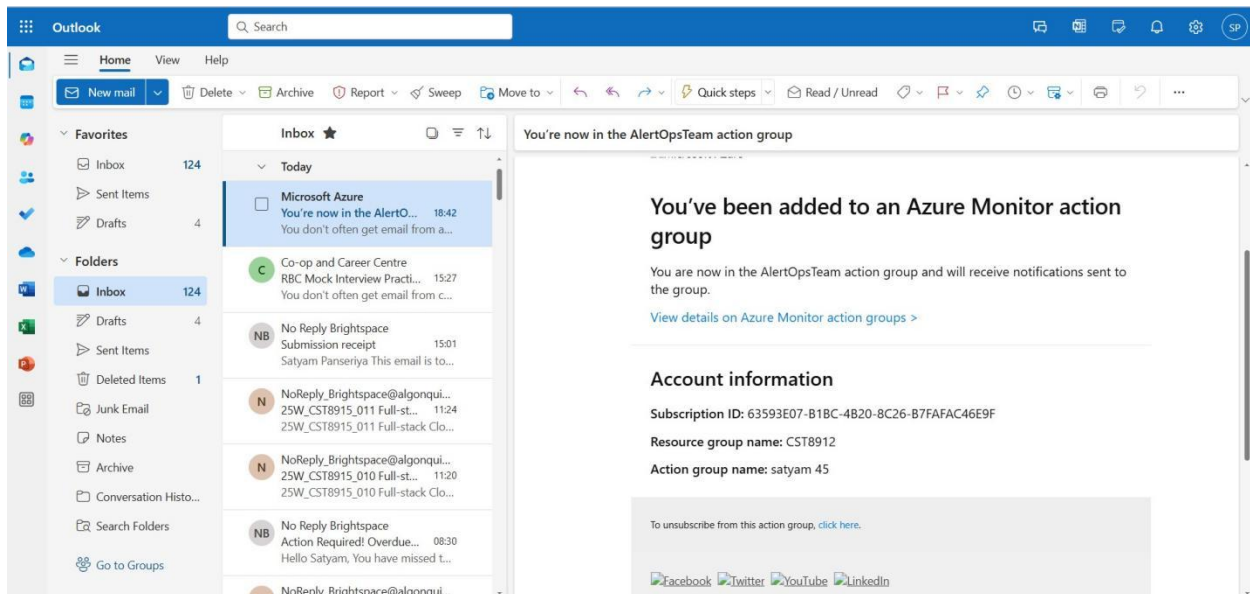
Note: If you delete the virtual machine before the alert rule deploys, the alert rule might not be triggered.

9. In the portal, search for and select Virtual machines.

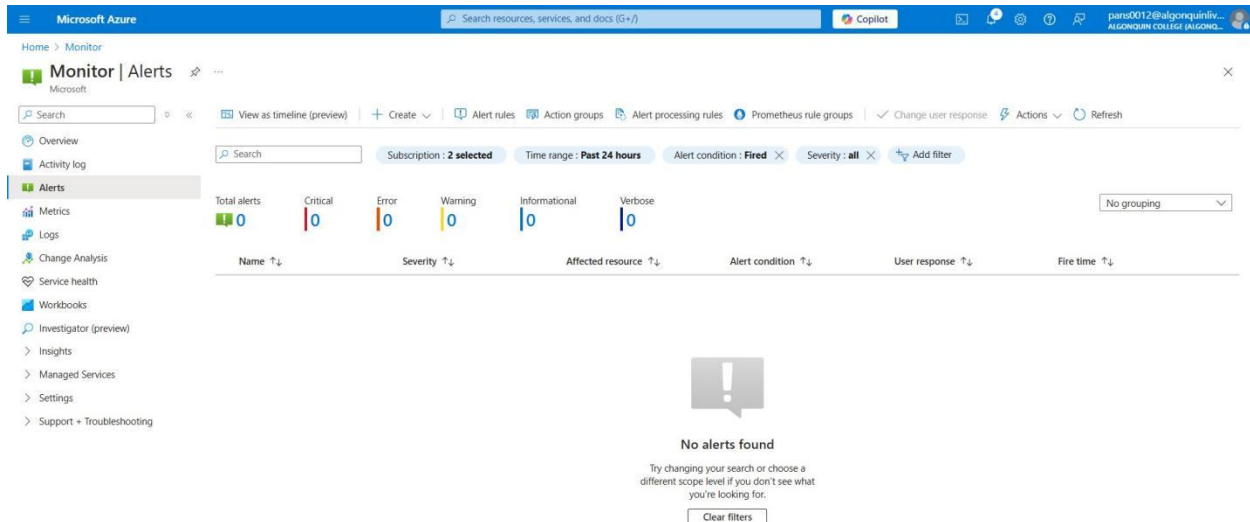
10. Check the box for the az104-vm0 virtual machine.



11. Select Delete from the menu bar.
12. Check the box for Apply force delete. Enter delete to confirm and then select Delete.
13. In the title bar, select the Notifications icon and wait until vm0 is successfully deleted.
14. You should receive a notification email that reads, Important notice: Azure Monitor alert VM was deleted was activated... If not, open your email program and look for an email from azure-noreply@microsoft.com.
15. Screenshot of alert email.



16. On the Azure portal resource menu, select Monitor, and then select Alerts in the menu on the left.



17. You should have verbose alerts that were generated by deleting vm0.

18. Note: It can take a few minutes for the alert email to be sent and for the alerts to be updated in the portal. If you don't want to wait, continue to the next task and then return.

19. Select the name of one of the alerts (For example, VM was deleted). An Alert details pane appears that shows more details about the event.

Task 5: Configure an alert processing rule

1. In this task, you create an alert rule to suppress notifications during a maintenance period.
2. Continue in the Alerts blade, select Alert processing rules and then + Create.

Microsoft Azure

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Copilot

Home > Monitor | Alerts > Alert processing rules >

Create an alert processing rule

Scope Rule settings Scheduling Details Tags Review + create

Use alert processing rules to decide what happens when an alert is triggered, like suppressing notifications or applying specific actions to certain resources. [Learn more](#)

Scope

This rule will apply to alerts that are triggered on the resources you select.

+ Select scope

Resource Hierarchy

No resource selected yet

Filter

Filters Operator Value

Review + create Previous Next: Rule settings >

Select a scope

Browse

You may only choose items from the same subscription.

Subscription All subscriptions Resource types All resource types

Search to filter items...

Scope	Resource type	Location
> AVO-Prod	Subscription	-
> Azure for Students	Subscription	-
> CST8912	Resource group	-
> DefaultResourceGroup-CCAN	Resource group	-
> DefaultResourceGroup-EUS	Resource group	-
> NetworkWatcherRG	Resource group	-

Selected scopes 1 scope

> CST8912 Resource group

Apply Cancel Clear all selections

3. Select your resource group, then select Apply.
4. Select Next: Rule settings, then select Suppress notifications.

Microsoft Azure

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

Copilot

Home > Monitor | Alerts >

Create an alert rule

Scope Condition Actions Details Tags Review + create

Configure when the alert rule should trigger by selecting a signal and defining its logic.

Signal name * Select a signal

[See all signals](#)

Review + create Previous Next: Actions >

Select a signal

Delete User Assigned Identity (User Assigned Identities)	Administrative
Delete user profiles. (user profiles)	Administrative
Delete User Settings (UserSettings)	Administrative
Delete users. (Users)	Administrative
Delete Vault (Vaults)	Administrative
Delete vCenters (vCenters)	Administrative
Delete Video (Video Resource)	Administrative
Delete View (View)	Administrative
Delete views (Views)	Administrative
Delete Virtual Hub proxy (Virtual Hub Proxy)	Administrative
Delete Virtual Machine (Virtual Machines)	Administrative
Delete Virtual Machine and Virtual Machine scale sets in a Azure Fleet resource (Fle...	Administrative
Delete Virtual Machine Associated Network Security Group (Virtual Machine Associa...	Administrative
Delete Virtual Machine Extension (Virtual Machine Extensions)	Administrative
Delete Virtual Machine Image (Virtual Machine Image)	Administrative

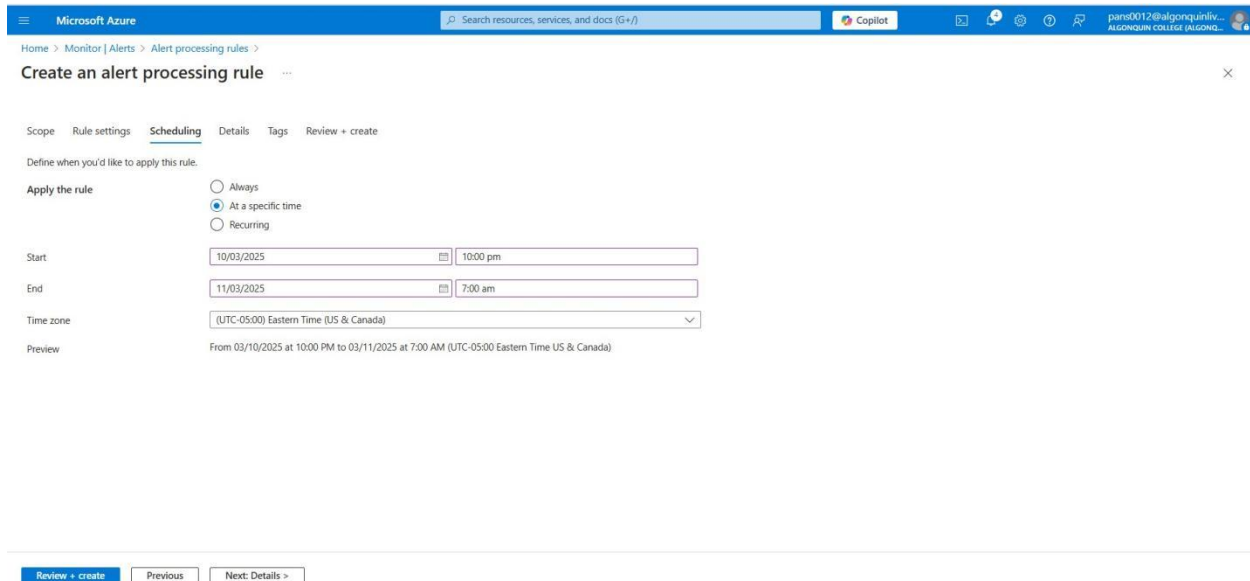
Apply Cancel

5. Select Next: Scheduling.
6. By default, the rule works all the time, unless you disable it or configure a schedule. You are going to define a rule to suppress notifications during overnight maintenance. Enter these settings for the scheduling of the alert processing rule:

Setting	Value
Apply the rule	At a specific time

Start	Enter today's date at 10 pm.
End	Enter tomorrow's date at 7 am.
Time zone	Select the local timezone.

Screenshot of the scheduling section of an alert processing rule



Microsoft Azure

Search resources, services, and docs (G+)

Copilot

Home > Monitor > Alerts > Alert processing rules >

Create an alert processing rule

Scope Rule settings **Scheduling** Details Tags Review + create

Define when you'd like to apply this rule.

Apply the rule

☐ Always

☒ At a specific time

☐ Recurring

Start 10/03/2025 10:00 pm

End 11/03/2025 7:00 am

Time zone (UTC-05:00) Eastern Time (US & Canada)

Preview From 03/10/2025 at 10:00 PM to 03/11/2025 at 7:00 AM (UTC-05:00 Eastern Time US & Canada)

Review + create Previous Next: Details >

7. Select Next: Details and enter these settings:

Setting	Value
Resource group	CST8912
Rule name	Planned Maintenance
Description	Suppress notifications during planned maintenance.

Microsoft Azure Search resources, services, and docs (G+/I) Copilot pan0012@algonquiniv... ALGONQUIN COLLEGE (ALGONQ...

Home > Monitor | Alerts > Alert processing rules >

Create an alert processing rule

Scope Rule settings Scheduling **Details** Tags Review + create

Select the subscription and resource group in which to save the alert processing rule.

Project details

Subscription Azure for Students

Resource group CST8912

Create new

Alert processing rule details

Rule name * Planned Maintenance

Description Suppress notifications during planned maintenance

Enable rule upon creation ☒

Review + create Previous Next: Tags >

8. Select Review + create to validate your input, then select Create.

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Home >

Alert processing rules

+ Create Columns Refresh Open query Delete Enable Disable

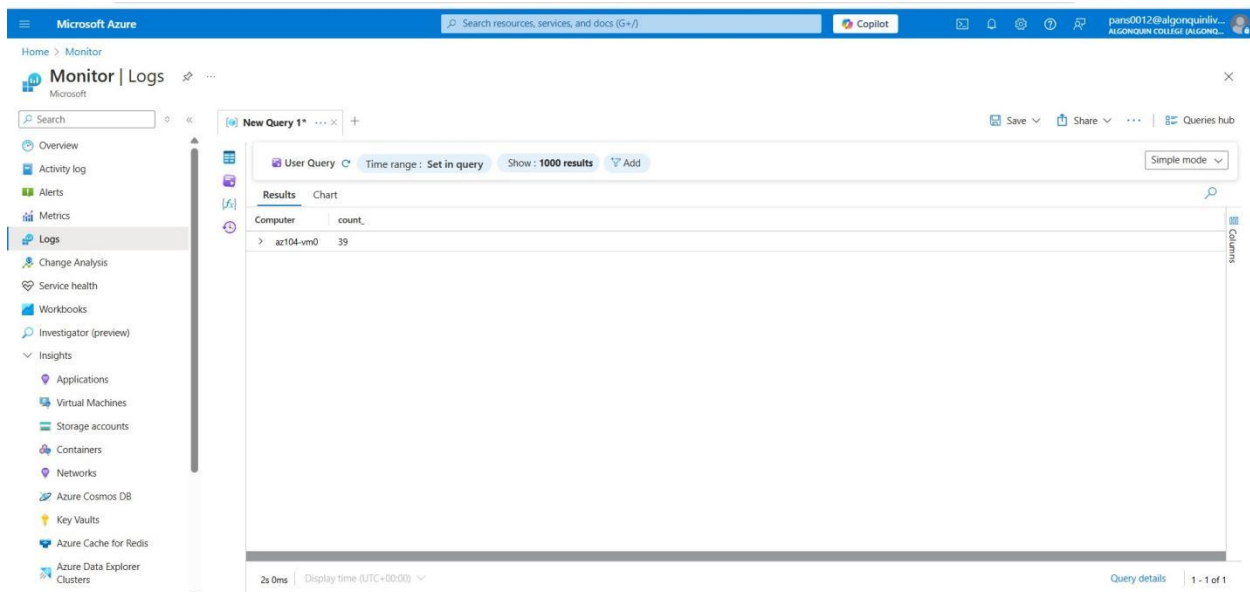
Search Subscription: 2 selected Resource group: all Target scope: all Status: Enabled Rule type: all Add tag filter

Name ↑↓	Scope	Filter	Rule type ↑↓	Scheduling	Status ↑↓	
<input type="checkbox"/> Planned Maintenance	CST8912		Suppression	At a specific time	Enabled	...

Showing 1 - 1 of 1 results. Give feedback

Task 6: Use Azure Monitor log queries

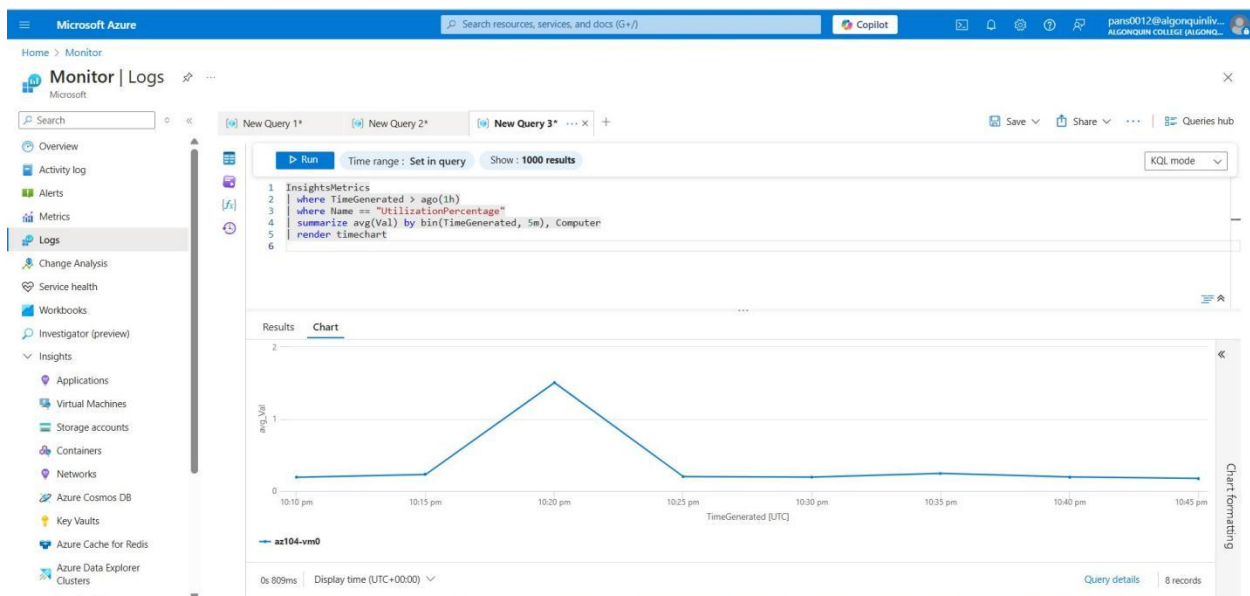
- In this task, you will use Azure Monitor to query the data captured from the virtual machine.
- In the Azure portal, search for and select Monitor blade, click Logs.



11. If necessary close the splash screen.

12. Select a scope, your resource group. Select Apply.

13. As you have time, review and run other queries.



14. Clean up the resources and document all the steps in the lab report

Microsoft Azure Search resources, services, and docs (G+)

Home > **Planned Maintenance** Alert processing rule

Search Edit Disable Delete Refresh

Overview

Activity log Access control (IAM) Tags Diagnose and solve problems Settings Locks Automation Tasks Export template Help

Delete this alert processing rule?
This action will permanently delete this alert processing rule.

Subscription ID : 63593e07-b1bc-4b20-8c26-b7fafac46e9f

Tags (edit) : Add tags

Scope

Resource Hierarchy

CST8912 Azure for Students

Scheduling

Apply the rule At a specific time

Schedule From 03/10/2025 at 10:00 PM to 03/11/2025 at 7:00 AM (Eastern Sta...

Rule settings

Rule type Suppress notifications

Microsoft Azure Search resources, services, and docs (G+)

Home > Resource groups > **CST8912** Resource group

Create Manage view Delete resource group Refresh Export

Overview

Activity log Access control (IAM) Tags Resource visualizer Events Settings Cost Management Monitoring Insights (preview) Alerts Metrics Diagnostic settings Logs Advisor recommendations Workbooks Automation Help

Delete a resource group

The following resource group and all its dependent resources will be permanently deleted.

Resource group to be deleted

CST8912

Dependent resources to be deleted (7)
All dependent resources, including hidden types, are shown

Name	Resource type
az104-nic0	Network interface
az104-nsg01	Network security group
az104-pip0	Public IP address
az104-vm0	Virtual machine
az104-vm0_0a0a1f7804684139818eca9d57f648f	Virtual machine
az104-vnet	Virtual network
az104112dk3ywh5lthpwc	Virtual network
satyam 45	Virtual network

Delete confirmation

Deleting this resource group and its dependent resources is a permanent action and cannot be undone.

Delete Go back

Enter resource group name to confirm deletion *

CST8912

Delete Cancel

Conclusion:

Lastly, we utilized **Azure Monitor log queries** to analyze captured data, providing valuable insights into system performance and usage trends. These queries helped visualize resource utilization and demonstrated the importance of log-based analytics for cloud monitoring.

Through this hands-on lab, we have reinforced key cloud architecture principles, including **cost optimization, automation, and proactive monitoring**. Implementing these best practices in a real-world cloud environment helps organizations **reduce costs, enhance security, and maintain high availability** of cloud-based services.

