

# CST8912 – Cloud Solution Architecture

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## Graded Lab Activity #11

### Introduction:

When you build a cloud infrastructure, you might have anywhere from a small to many resources. Checking the needed parameters for each resource that you have into your cloud environment could become hard. That's where monitoring can help you organize and handle the metrics and checks for your resources. Cloud Monitoring is a Cloud service that collects metrics, events, and metadata from your Cloud environment. Cloud Monitoring automatically detects all the resources that you are running into your cloud infrastructure and provides you rich visualization tools to work with. By using Cloud Monitoring, you can create dashboards with metrics that you need, create checks on critical resources, and create alerts triggered when certain events happen. In this lab, you will work in a cloud environment where you will find an existent Compute Engine instance to work with. You will install the Cloud Monitoring agent and then start practicing with Cloud Monitoring. You will create an uptime check and an alert policy triggered when the uptime check fails. You will also create a chart with the CPU metrics of your Compute Engine instance.

### Purpose of this hands-on lab that can be simulated in any CSP:

Upon completion of this lab, you will be able to create resources for azure:

1. Create an uptime check for your resources (storage account and a virtual machine with lowest memory option) created in Canada central region

Microsoft Azure

Search resources, services, and docs (0+)

Copilot

Home > Virtual machines >

Create a virtual machine

Help me create a low cost VM

Help me create a VM optimized for high availability

Help me choose the right VM size for my workload

Subscription \*

Azure for Students

Resource group \*

(New) Lab-11

Create new

Instance details

Virtual machine name \*

monitoring-vm

Region \*

(Canada) Canada Central

Availability options

No infrastructure redundancy required

Security type

Trusted launch virtual machines

Configure security features

Trusted launch virtual machine is required when using 1P Gallery images.

Image \*

Ubuntu Server 24.04 LTS - x64 Gen2

See all images | Configure VM generation

VM architecture

Arm64

☒ x64

Run with Azure Spot discount

☐

Size \*

Standard\_B1ls - 1 vcpu, 0.5 GiB memory (\$4.23/month)

See all sizes

Enable Hibernation

☐

Hibernate does not currently support Trusted launch and Confidential virtual machines for Linux images. [Learn more](#)

Administrator account

< Previous

Next: Disks >

Review + create

Give feedback

Microsoft Azure

Home

CreateVm>canonical/ubuntu-24.04-lts>server-202504021837441/Overview

monitoring-vm

Virtual machine

Search

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Connect

Networking

Network settings

Load balancing

Application security groups

Network manager

Settings

Disks

Extensions + applications

Operating system

Configuration

Advisor recommendations

Properties

Locks

Availability + scale

Search

monitoring-vm virtual machine agent status is not ready. Troubleshoot the issue →

Help me copy this VM in any region

Connect

Start

Restart

Stop

Hibernate

Capture

Delete

Refresh

Open in mobile

Feedback

CU / PS

Essentials

Resource group (move)

Lab-11

Status

Running

Location

Canada Central

Subscription (move)

Azure for Students

Subscription ID

63593e07-b1bc-4b20-bc26-b7fafc46ef9f

Operating system

Linux

Size

Standard B1ls (1 vcpu, 0.5 GiB memory)

Public IP address

4.205.237.91

Virtual network/subnet

monitoring-vm-vnet/default

DNS name

Not configured

Health state

-

Time created

2/4/2025, 10:43 pm UTC

Tags (edit)

Add tags

Properties

Monitoring

Capabilities (7)

Recommendations

Tutorials

Virtual machine

Computer name

monitoring-vm

Operating system

Linux

VM generation

V2

VM architecture

x64

Agent status

Not Ready

Agent version

Unknown

Hibernation

Disabled

Host group

-

Host

-

Networking

Public IP address

4.205.237.91 (Network interface monitoring-vm161)

Public IP address (IPv6)

-

Private IP address

10.0.0.4

Private IP address (IPv6)

-

Virtual network/subnet

monitoring-vm-vnet/default

DNS name

Configure

Size

Size

Standard B1ls

vCPUs

1

Microsoft Azure

Home > Virtual machines > monitoring-vm

Virtual machines

Algonquin College (AlgonquinLivecom.onmicrosoft...)

+ Create Switch to classic

Filter for any field...

Name ↑

monitoring-vm

monitoring-vm | Network settings

Virtual machine

This is a new experience. [Please provide feedback](#)

Network interface : monitoring-vm161

Virtual network / subnet : monitoring-vm-vnet / default

Public IP address : 4.205.237.91

Private IP address : 10.0.0.4

Admin security rules : 0 (Configure)

Load balancers : 0 (Configure)

Application security groups : 0 (Configure)

Network security group : monitoring-vm-nsg

Accelerated networking : Disabled

Effective security rules : 0

Rules

Collapse all

Network security group monitoring-vm-nsg (attached to networkinterface: monitoring-vm161)

Impacts 0 subnets, 1 network interfaces

+ Create port rule

Search rules

Source == all Destination == all Protocol == all Action == all

Priority ↑	Name	Port	Protocol	Source	Destination	Action
300	SSH	22	TCP	Any	Any	Allow
310	AllowAnyCustom8080Inbound	8080	Any	Any	Any	Allow
65000	AllowVnetInbound	Any	Any	VirtualNetwork	VirtualNetwork	Allow
65001	AllowAzureLoadBalancerInBound	Any	Any	AzureLoadBalancer	Any	Allow
65500	DenyAllInBound	Any	Any	Any	Any	Deny

Inbound port rules (5)

Outbound port rules (3)

Page 1 of 1

Microsoft Azure

Home > Storage accounts >

Create a storage account

Basics Advanced Networking Data protection Encryption Tags Review + create

Azure Storage is a Microsoft-managed service providing cloud storage that is highly available, secure, durable, scalable, and redundant. Azure Storage includes Azure Blobs (objects), Azure Data Lake Storage Gen2, Azure Files, Azure Queues, and Azure Tables. The cost of your storage account depends on the usage and the options you choose below. [Learn more about Azure storage accounts](#)

Project details

Select the subscription in which to create the new storage account. Choose a new or existing resource group to organize and manage your storage account together with other resources.

Subscription \* Azure for Students

Resource group \* Lab-11

Create new

Instance details

Storage account name \* (s) satyamstorage11

Region \* (Canada) Canada Central

Deploy to an Azure Extended Zone

Primary service (Select a primary service)

Performance \* Standard: Recommended for most scenarios (general-purpose v2 account)

Premium: Recommended for scenarios that require low latency.

Redundancy \* Locally-redundant storage (LRS)

Previous Next Review + create

Give feedback

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

Home > satyamstorage11 | Overview >

**satyamstorage11** Storage account

Search

Upload Open in Explorer Delete Move Refresh Open in mobile CLI / PS Feedback

Overview

Activity log Tags Diagnose and solve problems Access Control (IAM) Data migration Events Storage browser Storage Mover Partner solutions Resource visualizer Data storage Containers File shares Queues Tables Security + networking Data management Settings Monitoring Monitoring (classic) Automation Help

Essentials

Resource group (move) : Lab-11  
Location : canadacentral  
Subscription (move) : Azure for Students  
Subscription ID : 63593e07-b1bc-4b20-8c26-b7fafa46e9f  
Disk state : Available  
Tags (edit) : Add tags

Performance : Standard  
Replication : Locally-redundant storage (LRS)  
Account kind : StorageV2 (general purpose v2)  
Provisioning state : Succeeded  
Created : 4/2/2025, 6:51:30 PM

Properties Monitoring Capabilities (7) Recommendations (0) Tutorials Tools + SDKs

**Blob service**

Hierarchical namespace	Disabled
Default access tier	Hot
Blob anonymous access	Disabled
Blob soft delete	Enabled (7 days)
Container soft delete	Enabled (7 days)
Versioning	Disabled
Change feed	Disabled
NFS v3	Disabled
Allow cross-tenant replication	Disabled
Storage tasks assignments	None

**File service**

Large file share	Enabled
Identity-based access	Not configured
Default share-level permissions	Disabled

**Security**

Require secure transfer for REST API operations	Enabled
Storage account key access	Enabled
Minimum TLS version	Version 1.2
Infrastructure encryption	Disabled

**Networking**

Allow access from	All networks
Private endpoint connections	0
Network routing	Microsoft network routing
Access for trusted Microsoft services	Yes
Endpoint type	Standard

JSON View

2. Define an alert policy that will advise you when certain events happen. /3
3. Handle the Cloud Monitoring dashboard to create a chart that will show you the CPU metrics of the instance

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

Home > Monitor | Alerts > Alert rules >

**Create an alert rule**

Scope Condition Actions Details Tags Review + create

Create an alert rule to identify and address issues when important conditions are found in your monitoring data. [Learn more](#)

+ Select scope

Resource	Hierarchy
No resource selected yet	

Review + create Previous Next: Condition >

**Select a resource**

Browse Recent

Subscription: Azure for Students Resource types: All resource types Locations: All locations

Search to filter items...

Resource	Resource type	Location
<input type="checkbox"/> Azure for Students	Subscription	-
<input type="checkbox"/> DefaultResourceGroup-CCAN	Resource group	-
<input type="checkbox"/> DefaultResourceGroup-EUS	Resource group	-
<input type="checkbox"/> Lab-11	Resource group	-
<input checked="" type="checkbox"/> monitoring-vm	Virtual machine	Canada Central
<input type="checkbox"/> monitoring-vm-ip	Public IP address	Canada Central
<input type="checkbox"/> monitoring-vm-nsg	Network security group	Canada Central
<input type="checkbox"/> monitoring-vm-vnet	Virtual network	Canada Central
<input type="checkbox"/> monitoring-vm-lb1	Network interface	Canada Central
<input type="checkbox"/> monitoring-vm-disk1_72988fedecb47ed98062...	Disk	Canada Central
<input type="checkbox"/> satyamstorage11	Storage account	Canada Central
<input type="checkbox"/> NetworkWatcherRG	Resource group	-

**Selected resources** 1 virtual machine

Resource	Resource type	Location
monitoring-vm	Virtual machine	Canada Central

Apply Cancel Clear all selections

Microsoft Azure

Search resources, services, and docs (G+7)

Copilot

Home > Monitor > Alerts > Alert rules >

## Create an alert rule

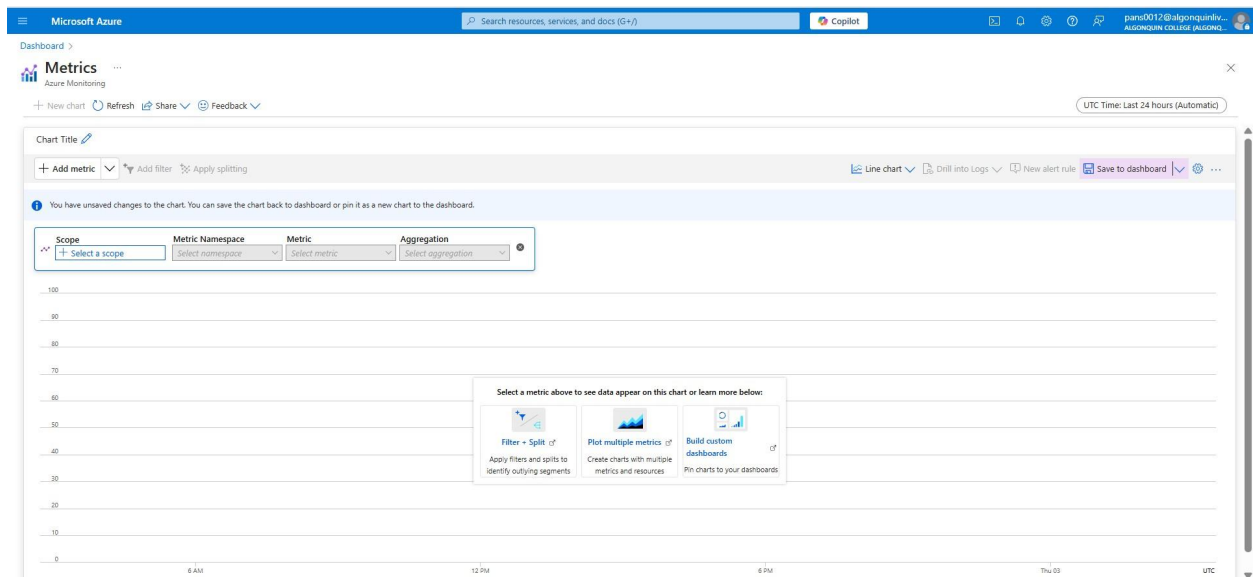
Scope Condition Actions Details Tags Review + create

Create an alert rule to identify and address issues when important conditions are found in your monitoring data. [Learn more](#)

+ Select scope

Resource: satyamstorage11 Hierarchy: Azure for Stude... > Lab-11

## 4. Use log queries to interact with data



Microsoft Azure

Search resources, services, and docs (G+7)

Copilot

Dashboard >

### Metrics

Azure Monitoring

+ New chart Refresh Share Feedback

Chart Title

+ Add metric Add filter Apply splitting

You have unsaved changes to the chart. You can save the chart back to dashboard or pin it as a new chart to the dashboard.

Scope: + Select a scope Metric Namespace: Select namespace Metric: Select metric Aggregation: Select aggregation

Select a metric above to see data appear on this chart or

Filter + Split: Apply filters and splits to identify outlying segments

Plot multiple metrics: Create charts with multiple metrics and resources

Build custom dashboards: Pin charts to your dashboards

### Select a scope

Browse Recent

Subscription: Azure for Students Resource types: All resource types Locations: All locations

Search to filter items...

Scope	Resource type	Location
<input type="checkbox"/> Azure for Students	Subscription	-
<input type="checkbox"/> DefaultResourceGroup-CCAN	Resource group	-
<input type="checkbox"/> DefaultResourceGroup-EUS	Resource group	-
<input type="checkbox"/> Lab-11	Resource group	-
<input checked="" type="checkbox"/> monitoring-vm	Virtual machine	Canada Central
<input type="checkbox"/> monitoring-vm-ip	Public IP address	Canada Central
<input type="checkbox"/> monitoring-vm161	Network interface	Canada Central
<input type="checkbox"/> monitoring-vm_disk1_72988fede6c47ed980d2...	Disk	Canada Central
<input type="checkbox"/> satyamstorage11	Storage account	Canada Central
<input type="checkbox"/> NetworkWatcherRG	Resource group	-

**Selection requirements for cross-resource compatible resources** You must select items of the same resource type and location. To select resources of a different resource type or location, please first uncheck your current selection.

**Selected scopes** 1 virtual machine

monitoring-vm Virtual machine Canada Central

Apply Cancel Clear all selections

## 5. Create azure data factory in Canada central region

Microsoft Azure
Search resources, services, and docs (G+/I)
Copilot
pans0012@algonquiniv...
ALGONQUIN COLLEGE (ALGONQ...)

Home > Data factories >

Create Data Factory

Basics
Git configuration
Networking
Advanced
Tags
Review + create

One-click to create data factory with sample pipeline and datasets. [Try it](#)

**Project details**  
Select the 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 \*
Lab-11
Create new

**Instance details**  
Name \*
factory-11
Region \*
Canada Central
Version \*
V2

Previous
Next
Review + create
Give feedback

## 6. Create Azure Log Analytics workspace in same region as other resources

Microsoft Azure
Search resources, services, and docs (G+/I)
Copilot
pans0012@algonquiniv...
ALGONQUIN COLLEGE (ALGONQ...)

Home > Log Analytics workspaces >

Create Log Analytics workspace

Basics
Tags
Review + Create

A Log Analytics workspace is the basic management unit of Azure Monitor Logs. There are specific considerations you should take when creating a new Log Analytics workspace. [Learn more](#)

With Azure Monitor Logs you can easily store, retain, and query data collected from your monitored resources in Azure and other environments for valuable insights. A Log Analytics workspace is the logical storage unit where your log data is collected and stored.

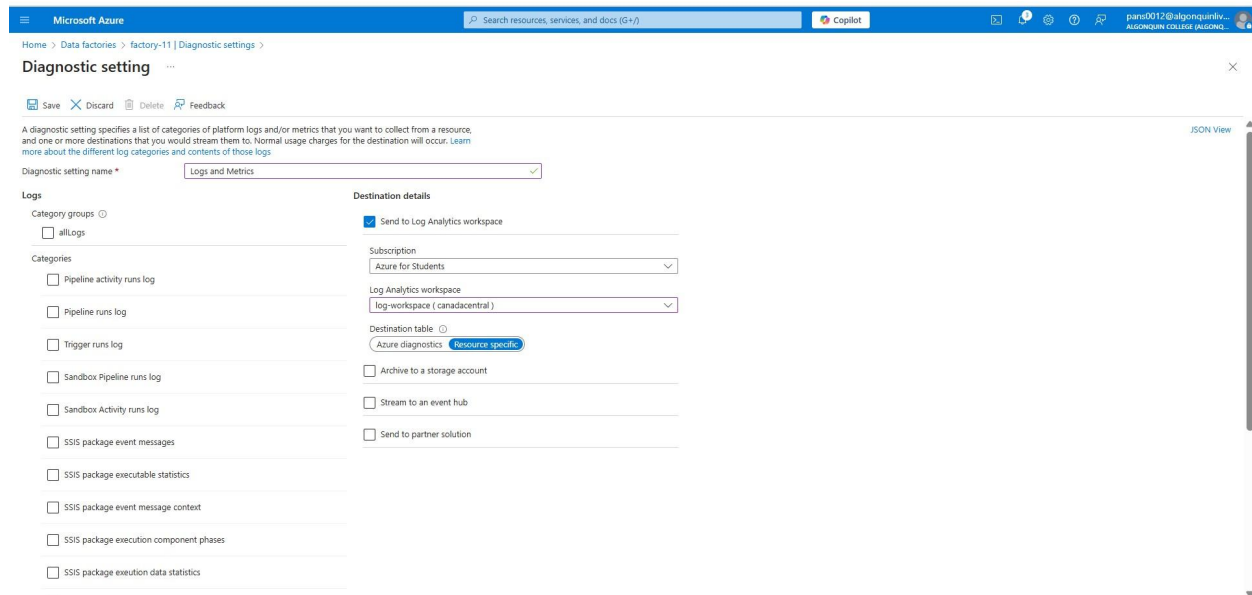
**Project details**  
Select the subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription \*
Azure for Students
Resource group \*
Lab-11
Create new

**Instance details**  
Name \*
log-workspace
Region \*
Canada Central

Review + Create
Previous
Next: Tags >

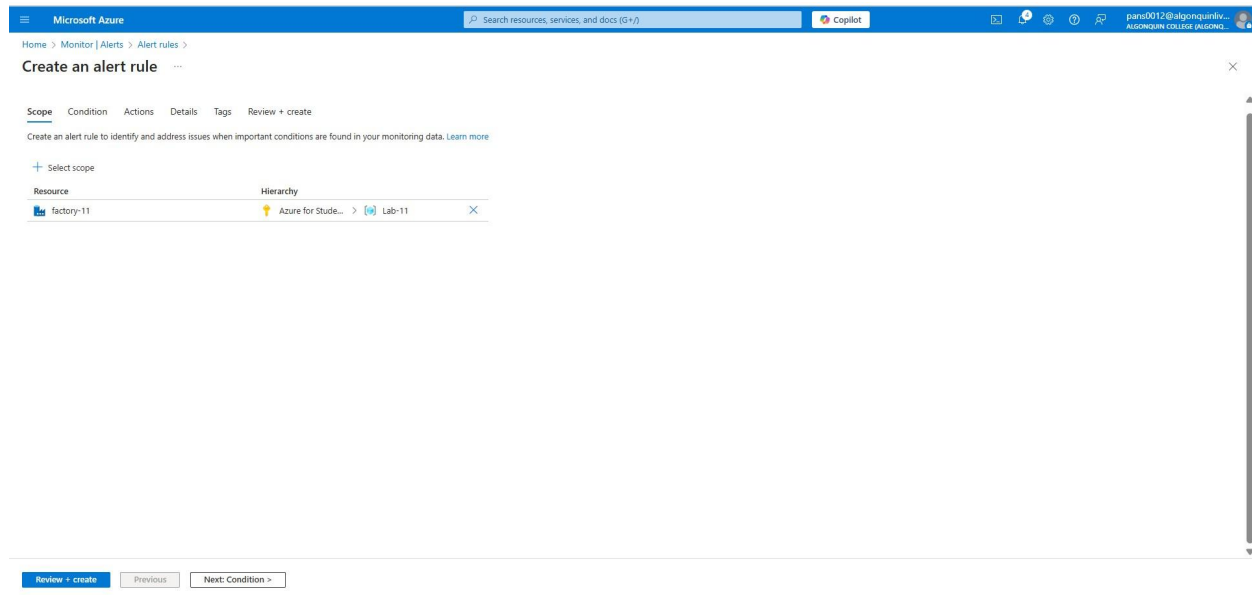
## 7. Configure Diagnostic settings for Azure Data Factory



The screenshot shows the 'Diagnostic setting' page in the Azure portal for a resource named 'factory-11'. The page is titled 'Diagnostic setting' and includes a 'JSON View' toggle. Below the title, there are buttons for 'Save', 'Discard', 'Delete', and 'Feedback'. A brief description states: 'A diagnostic setting specifies a list of categories of platform logs and/or metrics that you want to collect from a resource, and one or more destinations that you would stream them to. Normal usage charges for the destination will occur. Learn more about the different log categories and contents of those logs.' The 'Diagnostic setting name' is set to 'Logs and Metrics'. The 'Logs' section on the left lists various categories with checkboxes, including 'allLogs', 'Pipeline activity runs log', 'Pipeline runs log', 'Trigger runs log', 'Sandbox Pipeline runs log', 'Sandbox Activity runs log', 'SSIS package event messages', 'SSIS package executable statistics', 'SSIS package event message context', 'SSIS package execution component phases', and 'SSIS package execution data statistics'. The 'Destination details' section on the right shows that 'Send to Log Analytics workspace' is selected. The 'Subscription' is 'Azure for Students', the 'Log Analytics workspace' is 'log-workspace ( canadacentral )', and the 'Destination table' is 'Azure diagnostics (Resource specific)'. Other options like 'Archive to a storage account', 'Stream to an event hub', and 'Send to partner solution' are unchecked.

## 8. Create and review a Log Solution for the Azure Data Factory.

## 9. Setup Monitor Alerts for Azure Data Factory



The screenshot shows the 'Create an alert rule' page in the Azure portal. The page is titled 'Create an alert rule' and includes a 'Review + create' button. Below the title, there are tabs for 'Scope', 'Condition', 'Actions', 'Details', 'Tags', and 'Review + create'. A brief description states: 'Create an alert rule to identify and address issues when important conditions are found in your monitoring data. Learn more'. The 'Scope' tab is selected, showing a 'Select scope' button. Below this, the 'Resource' is 'factory-11' and the 'Hierarchy' is 'Azure for Studes... > Lab-11'. At the bottom, there are buttons for 'Review + create', 'Previous', and 'Next: Condition >'.

Microsoft Azure

Home > Monitor | Alerts > Alert rules >

## 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 \*  [See all signals](#)

Search resources, services, and docs (G+)

Copilot

paris0012@algonquin... ALGONQUIN COLLEGE (ALGONQ...)

### Select a signal

Search:  Signal type: All Signal source: All

Signal name	Signal source
<b>Log search</b>	
PipelineRuns Availability	Log Analytics (example query)
<b>Metrics</b>	
Cancelled pipeline runs metrics	Platform metrics
Elapsed Time Pipeline Runs Metrics	Platform metrics
<b>Failed pipeline runs metrics</b>	Platform metrics
Pipeline available capacity percentage of MVNet integration runtime	Platform metrics
Pipeline capacity utilization of MVNet integration runtime	Platform metrics
Pipeline waiting queue length of MVNet integration runtime	Platform metrics
Succeeded pipeline runs metrics	Platform metrics
<b>Activity log</b>	
Cancel any Pipeline Run (Data Factory)	Administrative
Cancel Debug Pipeline Runs (Data Factory)	Administrative
Query Debug Pipeline Runs (Data Factory)	Administrative
Query Debug Pipeline Runs (Data Factory)	Administrative
Query Pipeline Runs (Data Factory)	Administrative

Apply Cancel

Review + create Previous Next: Actions >

## 10. After demo delete all the resources created in the lab

Microsoft Azure

Home >

### Lab-11

Resource group

Search

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

Overview

Activity log

Access control (IAM)

Tags

Resource visualizer

Events

Settings

Cost Management

Cost analysis

Cost alerts (preview)

Budgets

Advisor recommendations

Monitoring

Insights (preview)

Alerts

Metrics

Diagnostic settings

Logs

Advisor recommendations

Workbooks

Automation

Help

Essentials

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

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

Deployments: 4 Succeeded

Location: Canada Central

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

Resources Recommendations (1)

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

Showing 1 to 9 of 9 records. Show hidden types

Name	Type
factory-11	Data factory (V2)
log-workspace	Log Analytics workspace
monitoring-vm	Virtual machine
monitoring-vm-ip	Public IP address
monitoring-vm-nsg	Network security group
monitoring-vm-vnet	Virtual network
monitoring-vm161	Network interface
monitoring-vm_disk1_72988fdec6c47e980d26e2a4a4ff22	Disk
satyamstorage11	Storage account

< Previous Page 1 of 1 Next >

### Delete a resource group

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

**Resource group to be deleted**

Lab-11

**Dependent resources to be deleted (11)**

All dependent resources, including hidden types, are shown.

Name	Resource type
AADSSLoginForLinux (monitoring-vm/AADS)	Microsoft.Compute/virtualMachines/e...
factory-11	Data factory (V2)
log-workspace	Log Analytics workspace
MOE.Linux	Microsoft.Compute/virtualMachines/e...
monitoring-	
monitoring-	
monitoring-	
monitoring-	
monitoring-vm161	Network interface
monitoring-vm_disk1_72988fdec6c47e980d26e2a4a4ff22	Disk
satyamstorage11	Storage account

**Delete confirmation**

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

Delete Go back

☒ Apply force delete for selected Virtual machines and Virtual machine scale sets

Enter resource group name to confirm deletion \*

Lab-11

Delete Cancel