

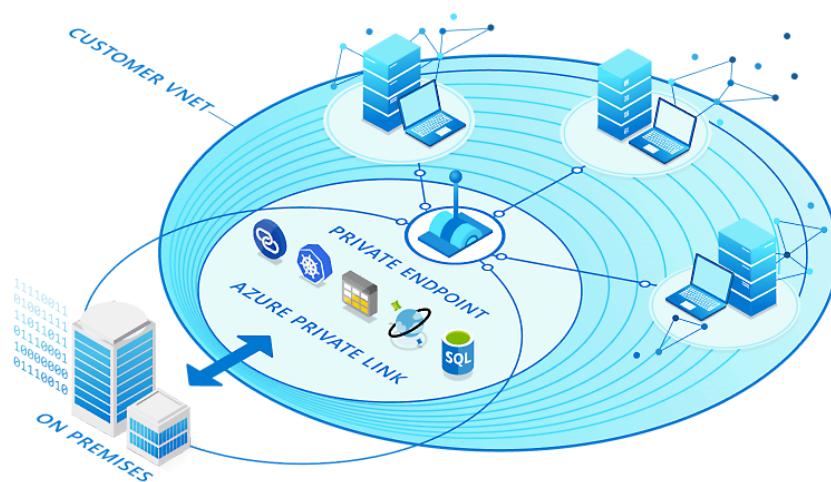
CST8912 – Cloud Solution Architecture

Graded Lab Activity #6

1. Distinguish between public-cloud, private-cloud, hybrid-cloud and multi-cloud solution design patterns. (2,5,6,7)
 - Classify and describe the type of clouds available in the marketplace
 - Identify the pros, cons, use cases, and pricing of each cloud computing service
 - Examine the risks associated with each type of cloud computing service
 - Assess security compliance requirements as part of the decision-making process

Introduction:

Azure Private Link provides private connectivity from a virtual network to Azure platform as a service (PaaS), customer-owned, or Microsoft partner services. It simplifies the network architecture and secures the connection between endpoints in Azure by eliminating data exposure to the public internet.



Private Endpoint is the key technology behind Private Link. Private Endpoint is a network interface that enables a private and secure connection between your virtual network



and an Azure service. In other words, Private Endpoint is the network interface that replaces the resource's public endpoint.

Private Link gives you private access from your Azure virtual network to PaaS services and Microsoft Partner services in Azure. However, what if your company has created its own Azure services for your company's customers to consume? Is it possible to offer those customers a private connection to your company's services?

Yes, by using Azure Private Link Service. This service lets you offer Private Link connections to your custom Azure services. Consumers of your custom services can then access those services privately—that is, without using the internet—from their own Azure virtual networks.

When to use Private Link?

You know what Private Link is and how it works. Now you need some criteria to help you evaluate whether Private Link is a suitable choice for your company. To help you make a decision, let's consider the following goals:

- Bringing Azure PaaS services into your virtual network
- Securing traffic between your company network and the Azure cloud
- Eliminating internet exposure for PaaS services
- Accessing Azure PaaS resources across networks
- Lowering the risk of data exfiltration
- Offering customers private access to company-created Azure services

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

Upon completion of this lab, you will be able to create, configure and test the private link for any CSP

Azure Private endpoint is the fundamental building block for Private Link in Azure. It enables Azure resources, like virtual machines (VMs), to privately and securely communicate with Private Link resources such as Azure Storage.

Create a Virtual network and Bastion Host

1. In the portal, search for and select Virtual networks.

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

Home > Virtual networks ...

Virtual networks ...

Algonquin College (AlgonquinLive.com.onmicrosoft.com)

+ Create Manage view Refresh Export to CSV Open query Assign tags

Filter for any field... Subscription equals all Resource group equals all Location equals all Add filter

Showing 0 to 0 of 0 records.

Name ↑ Resource group ↑ Location ↑ Subscription ↑

No grouping List view

No virtual networks to display

Create a virtual network to securely connect your Azure resources to each other. Connect your virtual network to your on-premises network using an Azure VPN Gateway or ExpressRoute.

Create virtual network Learn more

2. On the Virtual networks page, select + Create.

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

Home > Virtual networks >

Create virtual network ...

Basics Security IP addresses Tags Review + create

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 * (New) CST8912demo Create new

Instance details

Virtual network name * 8912-vnet1
 Region * (Canada) Canada Central

Previous Next Review + create Give feedback

3. On the Basics tab of Create virtual network, enter or select the following information:

Setting	Value

Subscription	Azure for students
Resource Group	CST8912demo
Name	8912-vnet1
Region	Canada Central

4. Select Next to proceed to the Security tab.
5. Select Enable Bastion in the Azure Bastion section of the Security tab.

Azure Bastion uses your browser to connect to VMs in your virtual network over secure shell (SSH) or remote desktop protocol (RDP) by using their private IP addresses. The VMs don't need public IP addresses, client software, or special configuration

6. Enter or select the following information in Azure Bastion:

Setting	Value
Azure Bastion host name	Enter Bastion8912
Azure Bastion public IP address	Select Create a public IP address. Enter public-ip in Name. Select OK.

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

shak0039@algonquolin... ALGONQUIN COLLEGE (ALGO...)

Home > Virtual networks >

Create virtual network ...

Basics **Security** IP addresses Tags Review + create

Azure Bastion

Azure Bastion is a paid service that provides secure RDP/SSH connectivity to your virtual machines over TLS. When you connect via Azure Bastion, your virtual machines do not need a public IP address. [Learn more.](#)

Enable Azure Bastion

Azure Bastion host name: Bastion8912

Azure Bastion public IP address *: (New) public-ip [Create a public IP address](#)

Azure Firewall

Azure Firewall is a managed cloud-based network security service that protects your Azure Virtual Network resources. [Learn more.](#)

Previous Next **Review + create** Give feedback

7. Select Next to proceed to the IP Addresses tab.
8. In the address space box in Subnets, select the default subnet.
9. In Edit subnet, enter or select the following information:

Setting	Value
Subnet template	Leave the default Default .
Name	Subnet-1-8912
IPv4 address range	Leave 10.0.0.0/16.
Starting address	Leave the default of 10.0.0.0.
Subnet size	Leave the default of /24(256 addresses).

Edit subnet

Select an address space and configure your subnet. You can customize a default subnet or select from subnet templates if you plan to add select services later. [Learn more](#)

Subnet purpose	Default
Name *	Subnet-1-8912

IPv4

Include an IPv4 address space

IPv4 address range *	10.0.0.0/16
Starting address *	10.0.0.0
Size	/24 (256 addresses)

Subnets IP address range Size

Subnets	IP address range	Size
default	10.0.0.0 - 10.0.0.255	/24 (256 addresses)
AzureBastionSubnet	10.0.1.0 - 10.0.1.63	/26 (64 addresses)

Add IPv4 address space | ▾

IPv6

Include an IPv6 address space This virtual network has no IPv6 address ranges.

Private subnet

Save **Cancel** [Give feedback](#)

10. Select save

Create virtual network

Basics Security IP addresses Tags Review + create

Subnets IP address range Size NAT gateway

Subnets	IP address range	Size	NAT gateway
Subnet-1-8912	10.0.0.0 - 10.0.0.255	/24 (256 addresses)	-
AzureBastionSubnet	10.0.1.0 - 10.0.1.63	/26 (64 addresses)	-

Delete address space

Add IPv4 address space | ▾

Previous **Next** **Review + create** [Give feedback](#)

11. Create and review when the validation passes

Microsoft Azure Search resources, services, and docs (G+) Copilot shak0039@algonquinlive... ALGONQUIN COLLEGE (ALGONQ...

Home > Virtual networks > Create virtual network ...

Review + create

View automation template

Basics

Subscription	Azure for Students
Resource Group	CST8912demo
Name	8912-vnet1
Region	Canada Central

Security

Azure Bastion	Enabled
- Name	(New) Bastion8912
- Public IP Address	(New) public-ip
Azure Firewall	Disabled
Azure DDoS Network Protection	Disabled

Previous Next Create Give feedback

Microsoft Azure Search resources, services, and docs (G+) Copilot shak0039@algonquinlive... ALGONQUIN COLLEGE (ALGONQ...

Home > 8912-vnet1-1730685115920 | Overview

Deployment

Overview

- Inputs
- Outputs
- Template

Deployment is in progress

Deployment name : 8912-vnet1-1730685115920
 Subscription : Azure for Students
 Resource group : CST8912demo
 Start time : 11/3/2024, 8:51:58 PM
 Correlation ID : 69bac396-f2dc-4718-b45f-cbdd357c51e6

Deployment details

Resource	Type	Status
Bastion8912	Bastion	Created
8912-vnet1	Virtual network	OK
public-ip	Public IP address	OK

Notifications

More events in the activity log → Dismiss all

Deployment in progress... Deployment to resource group 'CST8912demo' is in progress. 4 minutes ago

Give feedback Tell us about your experience with deployment

Microsoft Azure Search resources, services, and docs (G+/-) Copilot Notifications shak0039@algonquinlive... ALGONQUIN COLLEGE (ALGONQ...

Home > 8912-vnet1-1730685115920 | Overview Deployment

Deployment Search Delete Cancel Redeploy Download Refresh

Overview Your deployment is complete Deployment name : 8912-vnet1-1730685115920 Subscription : Azure for Students Resource group : CST8912demo Start time : 11/3/2024, 8:51:58 PM Correlation ID : 69bac396-f2dc-4718-b45f-cbdd357c51e6

Deployment details Next steps Go to resource

Give feedback Tell us about your experience with deployment

Notifications More events in the activity log → Dismiss all Deployment succeeded Deployment '8912-vnet1-1730685115920' to resource group 'CST8912demo' was successful. Go to resource Pin to dashboard 3 minutes ago

Microsoft Azure Search resources, services, and docs (G+/-) Copilot shak0039@algonquinlive... ALGONQUIN COLLEGE (ALGONQ...

Home > 8912-vnet1 Virtual network

Virtual network Search Move Delete Refresh Give feedback

Overview Activity log Access control (IAM) Tags Diagnose and solve problems Settings Address space Connected devices Subnets Bastion DDoS protection Firewall Microsoft Defender for Cloud Network manager DNS servers

Essentials Resource group (...) : CST8912demo Location (move) : Canada Central Subscription (move) : Azure for Students Subscription ID : d690b447-1036-4d22-b055-a8625e53fed5 Address space : 10.0.0.0/16 DNS servers : Azure provided DNS service Flow timeout : Configure BGP community stri... : Configure Virtual network ID : 0ae49427-c0b2-4471-bab7-2714919224fd

Tags (edit) : Add tags JSON View

Topology Properties Capabilities (5) Recommendations Tutorials

DDoS protection Configure additional protection from distributed denial of service attacks. Not configured

Azure Firewall Protect your network with a stateful L3-L7 firewall. Not configured

Peerings Seamlessly connect two or more virtual networks. Not configured

Create a Storage Account

1. In the search box at the top of the portal, enter Storage account. Select Storage accounts in the search results.

The screenshot shows the Microsoft Azure Storage accounts page. At the top, there's a search bar and a Copilot button. Below the header, there are buttons for 'Create', 'Restore', 'Manage view', 'Refresh', 'Export to CSV', 'Open query', 'Assign tags', and 'Delete'. There are also filter options for 'Subscription equals all', 'Resource group equals all', 'Location equals all', and a 'No grouping' dropdown. The main area displays a message: 'Showing 0 to 0 of 0 records.' Below this, there's a small icon of a storage account and the text 'No storage accounts to display'. A descriptive paragraph explains what storage accounts are used for, followed by a 'Create storage account' button, a 'Learn more' link, and a 'Give feedback' link.

2. Select + Create.
3. In the Basics tab of Create a storage account enter or select the following information:

Setting	Value
Subscription	Azure for students
Resource Group	CST8912demo
Storage Account Name	Storage1-8912
Location	Canada Central
Performance	Standard
Redundancy	Local Redundant Storage (LRS)

Microsoft Azure Search resources, services, and docs (G+) Copilot Home > Storage accounts > Create a storage account ...

manage your storage account together with other resources.

Subscription * Azure for Students

Resource group * CST8912demo [Create new](#)

Instance details

Storage account name * storage108912

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](#)

4. Select review

Microsoft Azure Search resources, services, and docs (G+) Copilot Home > Storage accounts > Create a storage account ...

[Review + create](#)

[View automation template](#)

Basics

Subscription	Azure for Students
Resource group	CST8912demo
Location	Canada Central
Storage account name	storage108912
Primary service	Standard
Performance	Locally-redundant storage (LRS)

Advanced

Enable hierarchical namespace	Disabled
Enable SFTP	Disabled
Enable network file system v3	Disabled
Allow cross-tenant replication	Disabled

[Previous](#) [Next](#) [Create](#) [Give feedback](#)

5. Select create

Microsoft Azure Search resources, services, and docs (G+/-) Copilot Home > storage108912_1730687008466 | Overview

storage108912_1730687008466 | Overview Deployment

Search Delete Cancel Redeploy Download Refresh

Overview Deployment

Your deployment is complete

Deployment name: storage108912_1730687008466 Start time: 11/3/2024, 9:23:43 PM
Subscription: Azure for Students Correlation ID: 0876660c-2da3-41ba-8f2e-330606b15840
Resource group: CST8912demo

Deployment details

Next steps

[Go to resource](#)

Give feedback [Tell us about your experience with deployment](#)

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Microsoft Azure Search resources, services, and docs (G+/-) Copilot shak0039@algonquinlive... ALGONQUIN COLLEGE (ALGONQ...

Home > storage108912_1730687008466 | Overview >

storage108912 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
- Data storage
- Containers
- File shares
- Queues
- Tables
- Security + networking

Essentials		Properties		Monitoring		Capabilities (7)		Recommendations (0)		Tutorials		Tools + SDKs	
Resource group (...	: CST8912demo	Performance	: Standard	JSON View									
Location	: canadacentral	Replication	: Locally-redundant storage (LRS)										
Subscription (move)	: Azure for Students	Account kind	: StorageV2 (general purpose v2)										
Subscription ID	: d690b447-1036-4d22-b055-a8625e53fed5	Provisioning state	: Succeeded										
Disk state	: Available	Created	: 2024-11-03, 9:23:50 p.m.										
Tags (edit)	: Add tags												

Blob service		Security	
Hierarchical namespace	Disabled	Require secure transfer for REST API operations	Enabled
Default access tier	Hot	Storage account key access	Enabled
Blob anonymous access	Disabled	Minimum TLS version	Version 1.2
Blob soft delete	Enabled (7 days)	Infrastructure encryption	Disabled
Container soft delete	Enabled (7 days)		
Versioning	Disabled		
Change feed	Disabled		

Networking	

Disable public access to storage account

- In the search box at the top of the portal, enter Storage account. Select Storage accounts in the search results.
- Select storage1 or the name of your existing storage account.

storage108912 Storage account

Overview

- Activity log
- Tags
- Diagnose and solve problems
- Access Control (IAM)
- Data migration
- Events
- Storage browser
- Storage Mover
- Partner solutions
- Containers
- File shares
- Queues
- Tables
- Security + networking

Essentials

Resource group (move) CST8912demo	Performance Standard
Location canadacentral	Replication Locally-redundant storage (LRS)
Subscription (move) Azure for Students	Account kind StorageV2 (general purpose v2)
Subscription ID d690b447-1036-4d22-b055-a8625e53fed5	Provisioning state Succeeded
Disk state Available	Created 2024-11-03, 9:23:50 p.m.

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

Blob service Hierarchical namespace **Security** Require secure transfer for REST API operations

3. In Security + networking, select Networking.

storage108912 | Networking

Firewalls and virtual networks Private endpoint connections Custom domain

Save Discard Refresh Give feedback

Public network access

- Enabled from all networks
- Enabled from selected virtual networks and IP addresses
- Disabled

All networks, including the internet, can access this storage account. [Learn more](#)

Network Routing

Determine how you would like to route your traffic as it travels from its source to an Azure endpoint. Microsoft routing is recommended for most customers.

Routing preference *

- Microsoft network routing
- Internet routing

Publish route-specific endpoints

- Microsoft network routing
- Internet routing

4. In the Firewalls and virtual networks tab in Public network access, select Disabled.

Storage accounts

storage108912 | Networking

Firewalls and virtual networks

Public network access to this storage account has been disabled. Please create a private endpoint connection to grant access.

Firewall settings restricting access to storage services will remain in effect for up to a minute after saving updated settings allowing access.

Public network access

- Enabled from all networks
- Enabled from selected virtual networks and IP addresses
- Disabled

Configure network security for your storage accounts. [Learn more](#)

Network Routing

Determine how you would like to route your traffic as it travels from its source to an Azure endpoint. Microsoft routing is recommended for most customers.

Routing preference *

- Microsoft network routing
- Internet routing

5. Select Save.

Storage accounts

storage108912 | Networking

Firewalls and virtual networks

Successfully saved firewall and virtual network settings for storage account 'storage108912'.

Public network access to this storage account has been disabled. Please create a private endpoint connection to grant access.

Public network access

- Enabled from all networks
- Enabled from selected virtual networks and IP addresses
- Disabled

Configure network security for your storage accounts. [Learn more](#)

Network Routing

Determine how you would like to route your traffic as it travels from its source to an Azure endpoint. Microsoft routing is recommended for most customers.

Routing preference *

- Microsoft network routing
- Internet routing

Publish route-specific endpoints

- Microsoft network routing
- Internet routing

Create private endpoint

1. In the search box at the top of the portal, enter Private endpoint. Select Private endpoints.

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

Copilot Home > Private Link Center Private Link Center | Private endpoints

Private endpoints

No private endpoints to display

Try changing or clearing your filters.

Learn more ↗ Give feedback

2. Select + Create in Private endpoints.
3. In the Basics tab of Create a private endpoint, enter or select the following information.

Setting	Value
Subscription	Azure for students
Resource Group	CST8912demo
Name	Privateendpoint-8912
Network Interface Name	Leave the default of private-endpoint-nic .
Region	Canada Central

The screenshot shows the 'Create a private endpoint' wizard in the Microsoft Azure portal. The 'Basics' step is selected. Project details include a subscription to 'Azure for Students' and a resource group named 'CST8912demo'. Instance details specify a name 'Privateendpoint-8912', a network interface name 'Privateendpoint-8912-nic', and a region 'Canada Central'. Navigation buttons at the bottom allow moving between steps.

4. Select Next:Resource

5. In the Resource pane, enter or select the following information.

Setting	Value
Connection method	Leave the default of Connect to an Azure resource in my directory.
Subscription	Select your subscription.
Resource type	Select Microsoft.Storage/storageAccounts.
Resource	Select Storage1-8912 or your storage account.
Target subresource	Select blob.

Microsoft Azure Search resources, services, and docs (G+) Copilot Home > Private Link Center | Private endpoints > Create a private endpoint ...

Basics **Resource** Virtual Network DNS Tags Review + create

Private Link offers options to create private endpoints for different Azure resources, like your private link service, a SQL server, or an Azure storage account. Select which resource you would like to connect to using this private endpoint. [Learn more](#)

Connection method: Connect to an Azure resource in my directory. Connect to an Azure resource by resource ID or alias.

Subscription *: Azure for Students

Resource type *: Microsoft.Storage/storageAccounts

Resource *: storage108912

Target sub-resource *: blob

< Previous Next : Virtual Network >

6. Select Next: Virtual Network.
7. In Virtual Network, enter or select the following information.

Setting	Value
Virtual network	Select 8912-vnet (CST8912demo).
Subnet	Select Subnet-1-8912.
Network policy for private endpoints	<p>Select edit to apply Network policy for private endpoints.</p> <p>In Edit subnet network policy, select the checkbox next to Network security groups and Route Tables in the Network policies setting for all private endpoints in this subnet pull-down.</p> <p>Select Save.</p>
Private IP configuration	Select Dynamically allocate IP address.

Edit subnet network policy

To apply network security groups (NSGs) and user defined routes (UDRs) to a private endpoint, network policies must be enabled on the subnet. All private endpoints within the subnet are affected. [Learn more](#)

Virtual network	8912-vnet1 (CST8912demo)
Subnet	Subnet-1-8912 (10.0.0.0/24)
Network policies setting for all private endpoints in this subnet.	Enabled
<input checked="" type="checkbox"/> Network security groups <input checked="" type="checkbox"/> Route tables	

Existing private endpoints

Name	Private IP	Resource	Sub-resource
------	------------	----------	--------------

< Previous | Next : DNS >

Save | **Discard**

Create a private endpoint

Networking

To deploy the private endpoint, select a virtual network subnet. [Learn more](#)

Virtual network	8912-vnet1 (CST8912demo)
Subnet	Subnet-1-8912
Network policy for private endpoints	Enabled (edit)

Private IP configuration

Dynamically allocate IP address
 Statically allocate IP address

Application security group

Configure network security as a natural extension of an application's structure. ASG allows you to group virtual machines and define network security policies based on those groups. You can specify an application security group as the source or destination in an NSG security rule [Learn more](#)

+ Create

< Previous | Next : DNS >

8. Select Next: DNS.
9. Leave the defaults in DNS. Select Next: Tags, then Next: Review + create.
10. Select Create.

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

Home > Private Link Center | Private endpoints >

Create a private endpoint

Basics Resource Virtual Network **DNS** Tags Review + create

Private DNS integration

To connect privately with your private endpoint, you need a DNS record. We recommend that you integrate your private endpoint with a private DNS zone. You can also utilize your own DNS servers or create DNS records using the host files on your virtual machines. [Learn more](#)

Integrate with private DNS zone Yes No

Configuration name	Subscription	Resource group	Private DNS zone
privatelink-blob-core-win...	Azure for Students	CST8912demo	(new) privatelink.blob.cor...

< Previous Next : Tags >

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

Home > Private Link Center | Private endpoints >

Create a private endpoint

Validation passed

Basics Resource Virtual Network DNS Tags **Review + create**

Basics

Subscription	Azure for Students
Resource group	CST8912demo
Region	Canada Central
Name	Privateendpoint-8912
Network Interface Name	Privateendpoint-8912-nic

Resource

Subscription ID	d690b447-1036-4d22-b055-a8625e53fed5 (Azure for Students)
Link type	Microsoft.Storage/storageAccounts
Resource group	CST8912demo
Resource	storage108912
Target sub-resource	blob

Create < Previous Next > Download a template for automation

The screenshot shows the Microsoft Azure portal interface. At the top, there's a search bar and a Copilot button. On the right, the user's email (shak0039@algonquolin...) and name (ALGONQUIN COLLEGE (ALGONQ...)) are displayed. Below the header, the URL indicates the page is for a Microsoft PrivateEndpoint resource.

Privateendpoint-8912 | Overview

Essentials

- Resource group: CST8912demo
- Location: Canada Central
- Subscription: Azure for Students
- Subscription ID: d690b447-1036-4d22-b055-a8625e53fed5
- Provisioning state: Succeeded
- Virtual network/subnet: 8912-vnet1/Subnet-1-8912
- Network interface: Privateendpoint-8912-nic
- Private link resource: storage108912
- Target sub-resource: blob
- Connection status: Approved
- Request/Response: Auto-Approved

Tags: Add tags

JSON View | Give feedback

Create test virtual machine

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

The screenshot shows the Microsoft Azure portal interface for Virtual machines. At the top, there's a search bar and a Copilot button. On the right, the user's email (shak0039@algonquolin...) and name (ALGONQUIN COLLEGE (ALGONQ...)) are displayed. Below the header, the URL indicates the page is for the Virtual machines section.

Virtual machines

Showing 0 to 0 of 0 records.

Name ↑↓	Subscription ↑↓	Resource group ↑↓	Location ↑↓	Status ↑↓	Operating system ↑↓	Size ↑↓	Public IP address ↑↓
 No virtual machines to display Create a virtual machine that runs Linux or Windows. Select an image from the marketplace or use your own customized image. + Create							

Learn more about Windows virtual machines
Learn more about Linux virtual machines

Give feedback

2. In Virtual machines, select + Create, then Azure virtual machine.

3. On the Basics tab of Create a virtual machine, enter or select the following information:

Setting	Value
Subscription	Azure for students
Resource Group	CST8912demo
Virtual Machine name	8912-VM1
Region	Canada central
Availability options	No infrastructure redundancy required
Security type	Standard
Image	Select Windows Server 2022 Datacenter - x64 Gen2.
VM architecture	Leave the default of x64.
Size	Select size (B1)
Authentication	Choose username and password
Public inbound ports	Select None

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

Home > Virtual machines > Create a virtual machine

Subscription * Azure for Students
Resource group * CST8912demo Create new

Instance details

Virtual machine name * 8912-VM1

Region * (Canada) Canada Central

Availability options No infrastructure redundancy required

Security type Standard

Image * Windows Server 2022 Datacenter: Azure Edition - x64 Gen2 See all images Configure VM generation

This image is compatible with additional security features. [Click here to swap to the Trusted launch security type.](#)

< Previous Next : Disks > Review + create Give feedback

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

Home > Virtual machines > Create a virtual machine

Size * Standard_B1s - 1 vcpu, 1 GiB memory (\$11.39/month) (free services eligible) See all sizes

Enable Hibernation

Hibernate is not supported by the size that you have selected. Choose a size that is compatible with Hibernate to enable this feature. [Learn more](#)

Administrator account

Username * nikki

Password * *****

Confirm password * *****

Inbound port rules

Select which virtual machine network ports are accessible from the public internet. You can specify more limited or granular network access on the Networking tab.

Public inbound ports * None

< Previous Next : Disks > Review + create Give feedback

4. Select the Networking tab at the top of the page.
5. Enter or select the following information in the Networking tab:

Setting	Value
Virtual Network	Select 8912-vnet (CST8912demo).
Subnet	Select Subnet-1-8912.

Public IP	Select None
NIC network security group	Select Advanced
Configure network security group	Select Create new. Enter nsg-1 for the name. Leave the rest at the defaults and select OK.

The screenshot shows the 'Create a virtual machine' wizard in the Microsoft Azure portal. The user is on the 'Network interface' step. Key configuration details include:

- Virtual network:** 8912-vnet1 (selected from dropdown)
- Subnet:** Subnet-1-8912 (10.0.0.0/24) (selected from dropdown)
- Public IP:** None (selected from dropdown)
- NIC network security group:** Advanced (selected radio button)
- Configure network security group:** (new) nsg-1 (selected from dropdown)

At the bottom, there are navigation buttons: '< Previous', 'Next : Management >', and a prominent blue 'Review + create' button.

The screenshot shows the 'Create network security group' page in Microsoft Azure. The 'Name' field is filled with 'nsg-1'. Under 'Inbound rules', there is one rule: '1000: default-allow-rdp' which allows 'Any' RDP (TCP/3389). There are buttons for '+ Add an inbound rule' and '+ Add an outbound rule'. The 'Outbound rules' section shows 'No results.' An 'OK' button is visible at the bottom left.

6. Leave the rest of the settings at the defaults and select Review + create.

The screenshot shows the 'Create a virtual machine' page in Microsoft Azure. A green banner at the top indicates 'Validation passed'. Below it, three help buttons are shown: 'Help me create a low cost VM', 'Help me create a VM optimized for high availability', and 'Help me choose the right VM size for my workload'. The 'Review + create' tab is selected. Under 'Price', it shows '1 X Standard B1s by Microsoft' and 'Subscription credits apply' with a price of '0.0156 USD/hr'. Under 'TERMS', there is a detailed legal statement about agreeing to terms and conditions. At the bottom, there are navigation buttons ('< Previous', 'Next >', 'Create') and links for 'Download a template for automation' and 'Give feedback'.

7. Review the settings and select Create.

The screenshot shows the Microsoft Azure portal interface for a virtual machine named "8912-VM1". The left sidebar contains a navigation menu with items such as Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Connect, Networking, Network settings, Load balancing, Application security groups, Network manager, Settings, Availability + scale, Security, and Backup + disaster recovery. The main content area displays the "Essentials" section with details about the VM, including its Resource group (CST8912demo), Status (Running), Location (Canada Central), Subscription (Azure for Students), and Subscription ID (d690b447-1036-4d22-b055-a8625e53fed5). It also shows the operating system (Windows), size (Standard B1s), public IP address (52.228.39.203), virtual network/subnet (8912-vnet1/Subnet-1-8912), DNS name (Not configured), and time created (11/4/2024, 2:59 AM UTC). A JSON View button is located in the top right corner of the essentials table.

Storage access key

1. In the search box at the top of the portal, enter Storage account. Select Storage accounts in the search results.
2. Select the storage account you created in the previous steps or your existing storage account.
3. In the Security + networking section of the storage account, select Access keys.

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

storage108912 | Access keys

Storage account

storage108912

Storage accounts

Storage Mover

Partner solutions

Data storage

- Containers
- File shares
- Queues
- Tables

Security + networking

- Networking
- Front Door and CDN
- Access keys**
- Shared access signature
- Encryption
- Microsoft Defender for Cloud

Data management

Set rotation reminder Refresh Give feedback

Access keys authenticate your applications' requests to this storage account. Keep your keys in a secure location like Azure Key Vault, and replace them often with new keys. The two keys allow you to replace one while still using the other.

Remember to update the keys with any Azure resources and apps that use this storage account. [Learn more about managing storage account access keys](#)

Storage account name: storage108912

key1 Rotate key Last rotated: 2024-11-03 (0 days ago) Key: [REDACTED] Show

Connection string: DefaultEndpointsProtocol=https;AccountName=storage108912;AccountKey=MTJ... Copy to clipboard Hide

key2 Rotate key Last rotated: 2024-11-03 (0 days ago) Key: [REDACTED] Show

Connection string: DefaultEndpointsProtocol=https;AccountName=storage108912;AccountKey=MTJ... Copy to clipboard Hide

4. Select Show, then select copy on the Connection string for key1.

MTJcdVk8shCVOic74js3eUiHJ/7wb4UWKPUw6WtdfRpMSoBir3vuNXVgkb8bSHV8O0dOW+SYpIV
I+ASTvDWOhg==

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

storage108912 | Access keys

Storage account

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Remember to update the keys with any Azure resources and apps that use this storage account. [Learn more about managing storage account access keys](#)

Storage account name: storage108912

key1 Rotate key Last rotated: 2024-11-03 (0 days ago) Key: [REDACTED] Show

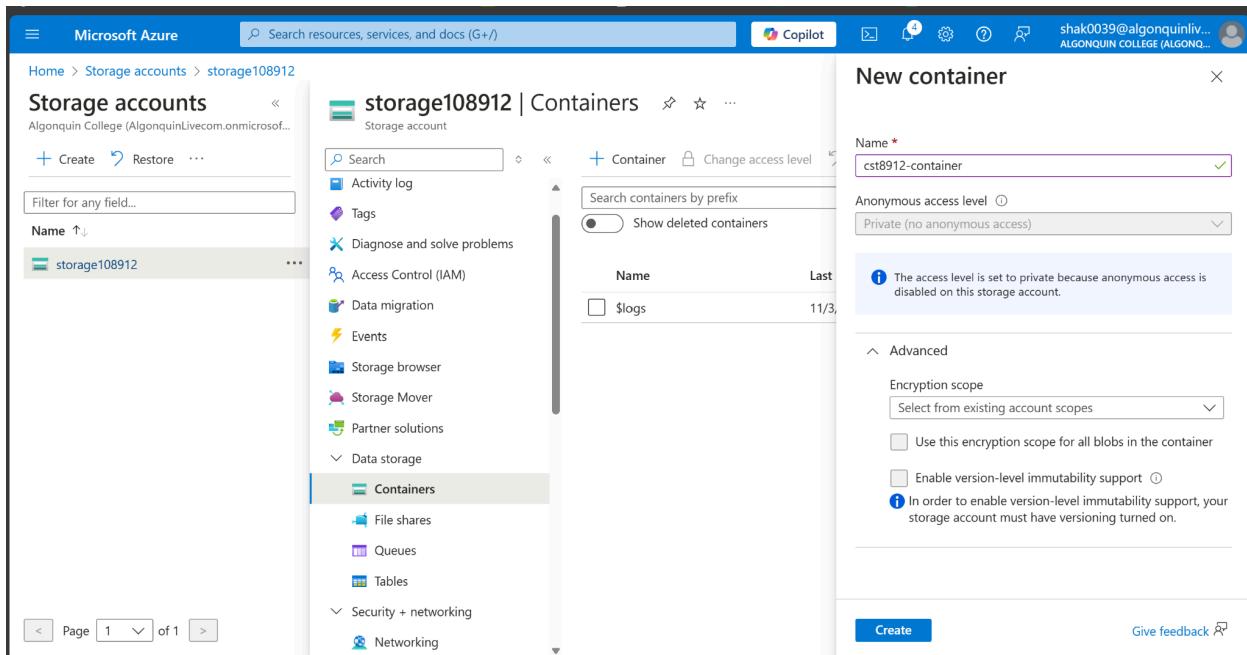
Connection string: DefaultEndpointsProtocol=https;AccountName=storage108912;AccountKey=MTJ... **Copy to clipboard** Hide

key2 Rotate key Last rotated: 2024-11-03 (0 days ago) Key: [REDACTED] Show

Connection string: DefaultEndpointsProtocol=https;AccountName=storage108912;AccountKey=MTJ... **Copy to clipboard** Hide

Add a blob container

1. In the search box at the top of the portal, enter Storage account. Select Storage accounts in the search results.
2. Select the storage account you created in the previous steps.
3. In the Data storage section, select Containers.
4. Select + Container to create a new container.
5. Enter container in Name and select Private (no anonymous access) under Public access level.



The screenshot shows the Microsoft Azure Storage Accounts blade for the storage108912 account. On the left, there's a sidebar with various options like Create, Restore, and a search bar. The main area shows a list of containers, with one named '\$logs'. On the right, a modal window titled 'New container' is open. It has a 'Name' field containing 'cst8912-container' with a green checkmark. Below it is an 'Anonymous access level' dropdown set to 'Private (no anonymous access)'. A note says 'The access level is set to private because anonymous access is disabled on this storage account.' At the bottom of the modal are 'Create' and 'Give feedback' buttons.

6. Select Create.

The screenshot shows the Microsoft Azure Storage accounts interface. On the left, a sidebar lists various storage-related services like Activity log, Tags, Diagnose and solve problems, Access Control (IAM), Data migration, Events, Storage browser, Storage Mover, Partner solutions, Data storage (Containers, File shares, Queues, Tables), and Security + networking (Networking). The main pane displays the 'Containers' section for the storage account 'storage108912'. It shows two containers: '\$logs' and 'cst8912-container'. A success message at the top right indicates 'Successfully created storage container'.

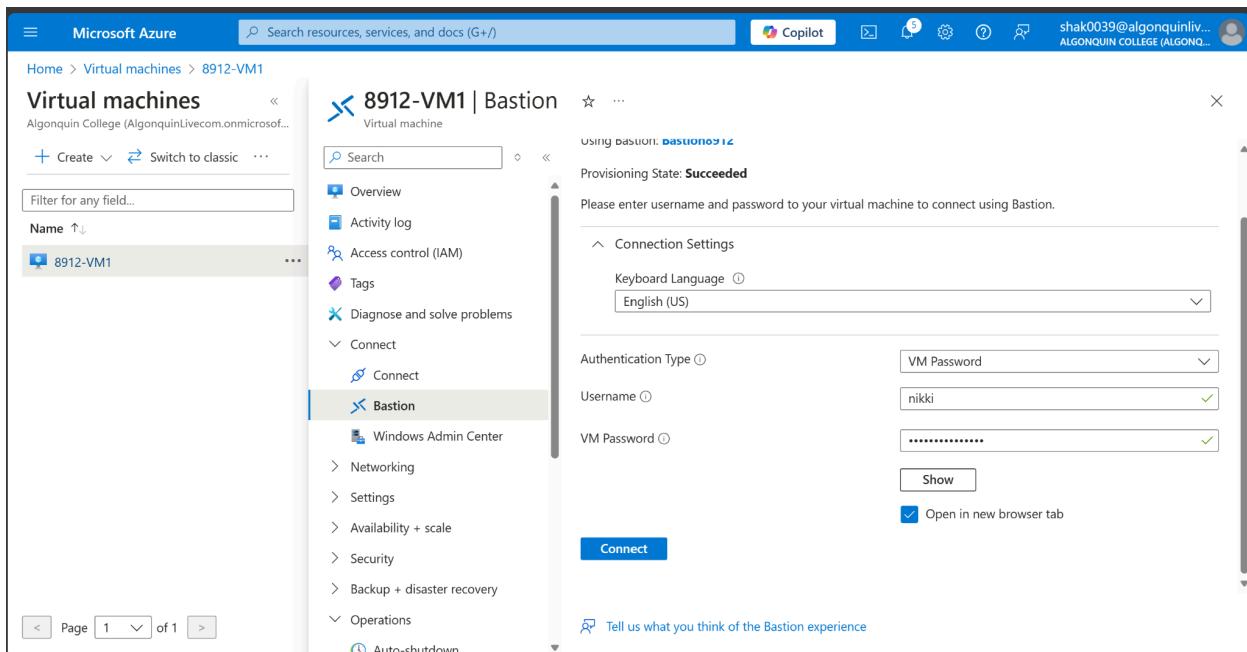
Test connectivity to private endpoint

1. In the search box at the top of the portal, enter Virtual machine. Select Virtual machines in the search results.
2. Select 8912-VM1.

The screenshot shows the Microsoft Azure Virtual machines interface. The left sidebar includes options like Create, Switch to classic, Filter for any field..., Name, and a list of virtual machines (8912-VM1). The main pane displays the 'Overview' tab for the virtual machine '8912-VM1'. It provides details such as Resource group (CST8912demo), Status (Running), Location (Canada Central), Subscription (Azure for Students), Subscription ID (d690b447-1036-4d22-b055-a8625e53fed5), and Tags (edit, Add tags). Buttons for Help me copy this VM in any region, Connect, Start, Restart, Stop, Hibernate, Capture, Delete, and JSON View are also visible.

3. In Operations, select Bastion.

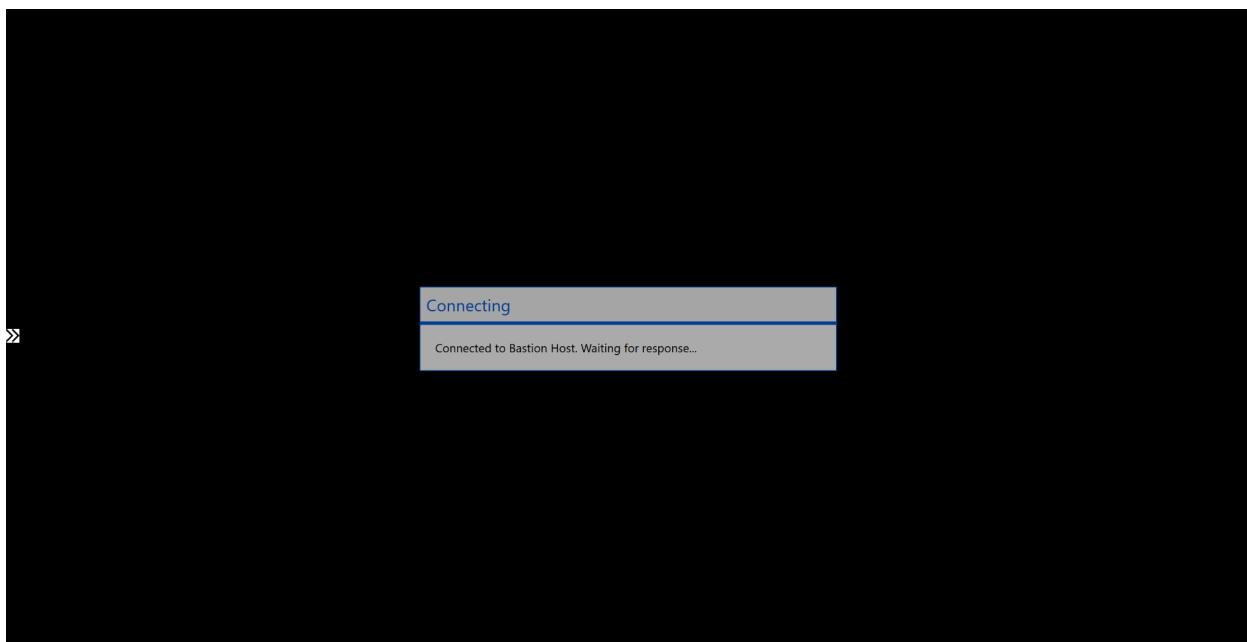
4. Enter the username and password that you entered during the virtual machine creation.

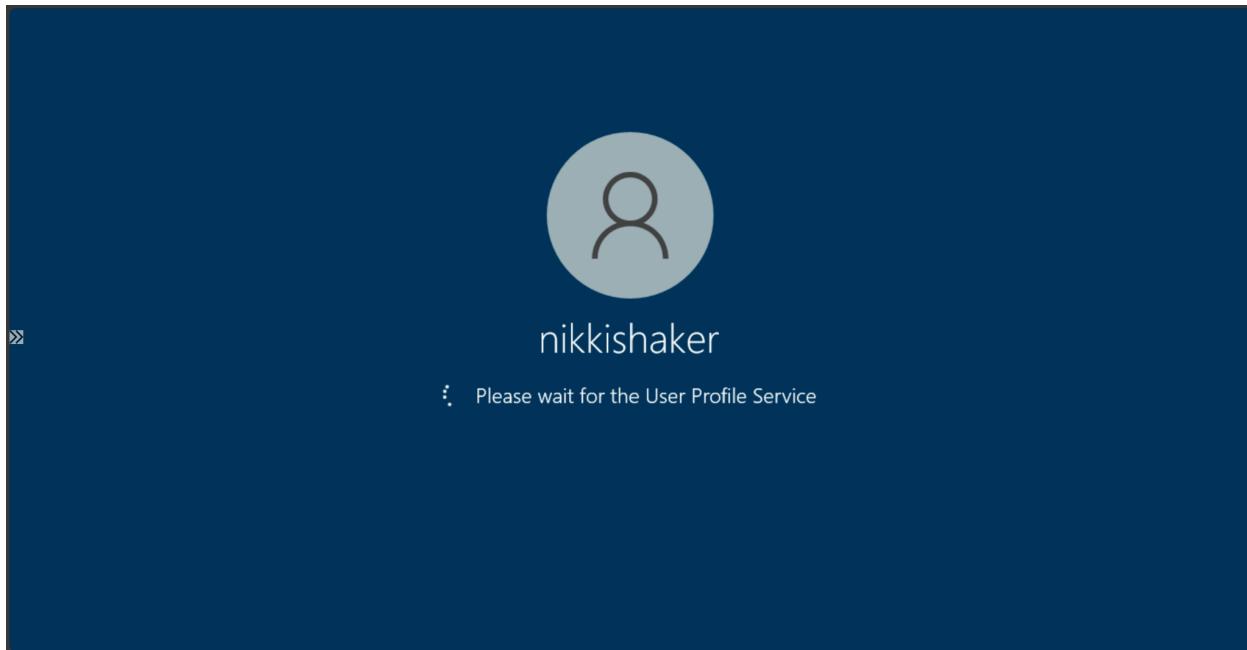


The screenshot shows the Microsoft Azure portal interface. The left sidebar lists 'Virtual machines' and '8912-VM1'. The main content area is titled '8912-VM1 | Bastion' and displays the following information:

- Using bastion: BASTION0914**
- Provisioning State: Succeeded**
- A message: "Please enter username and password to your virtual machine to connect using Bastion."
- Connection Settings**:
 - Keyboard Language: English (US)
- Authentication Type**: VM Password
- Username**: nikki
- VM Password**: (redacted)
- Show** button
- Open in new browser tab** checkbox (checked)
- Connect** button
- Tell us what you think of the Bastion experience** link

5. Select Connect.





6. Open Windows PowerShell on the server after you connect.
7. Enter nslookup <storage-account-name>.blob.core.windows.net. Replace <storage-account-name> with the name of the storage account you created in the previous steps. The following example shows the output of the command.

Server: UnKnown

Address: 168.63.129.16

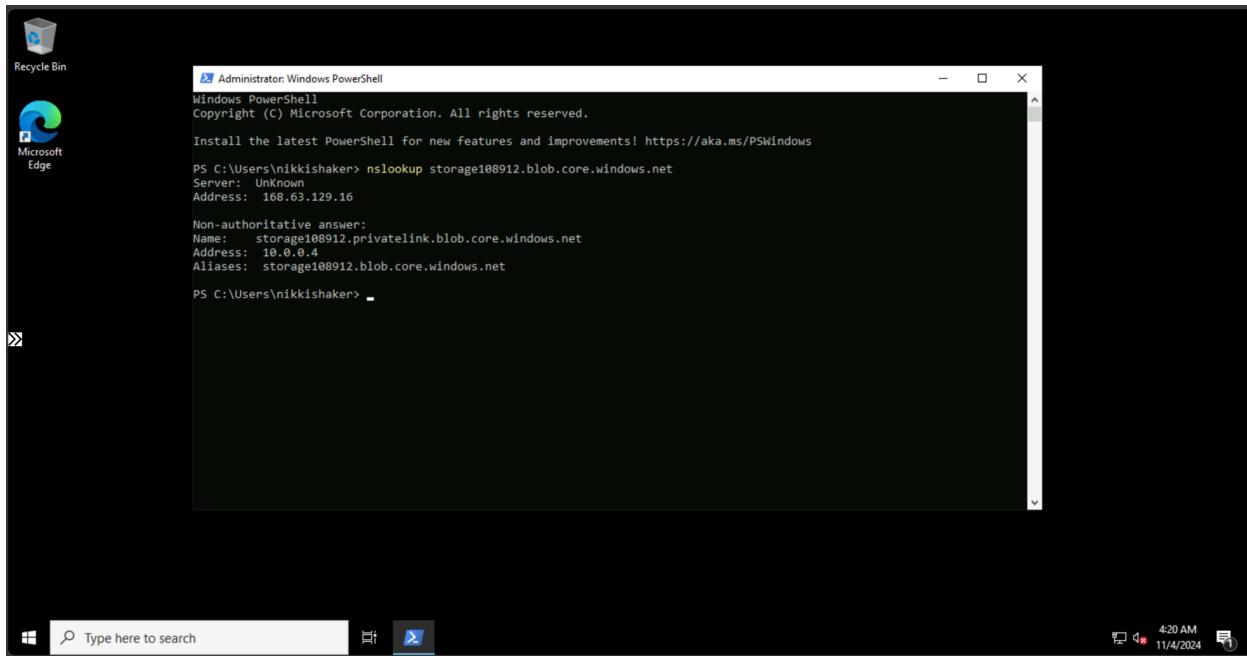
Non-authoritative answer:

Name: storage1.privateli**n**.blob.core.windows.net

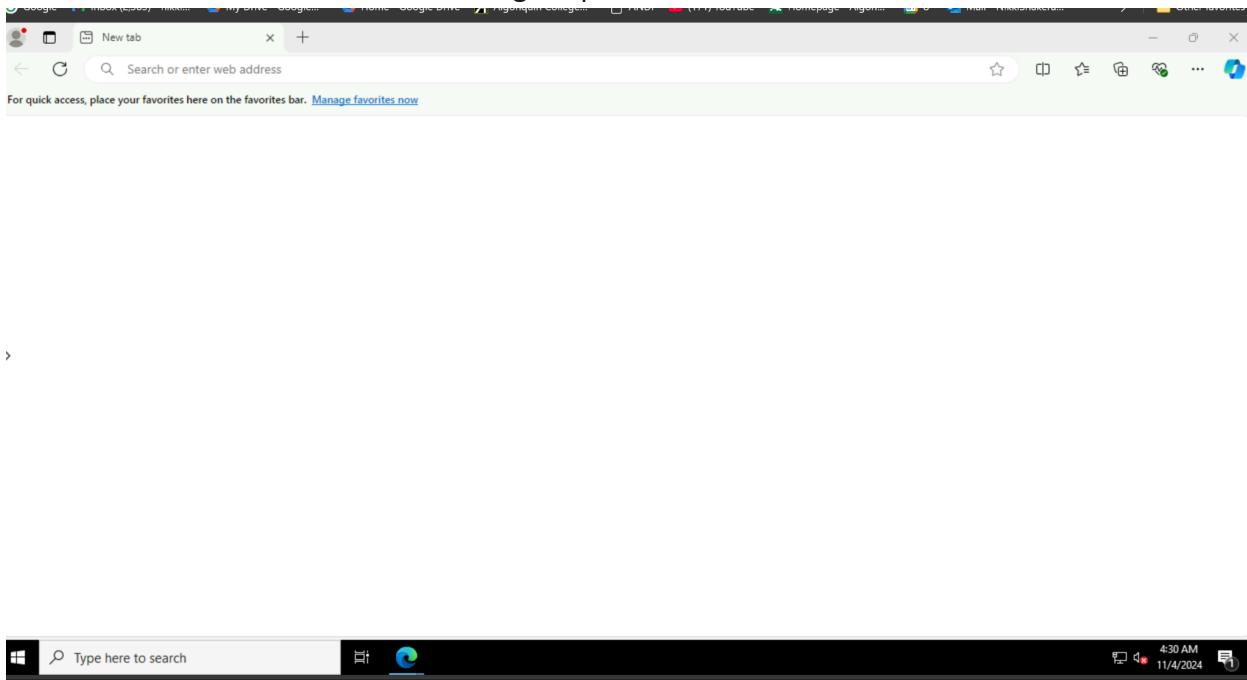
Address: 10.0.0.10

Aliases: mystorageaccount.blob.core.windows.net

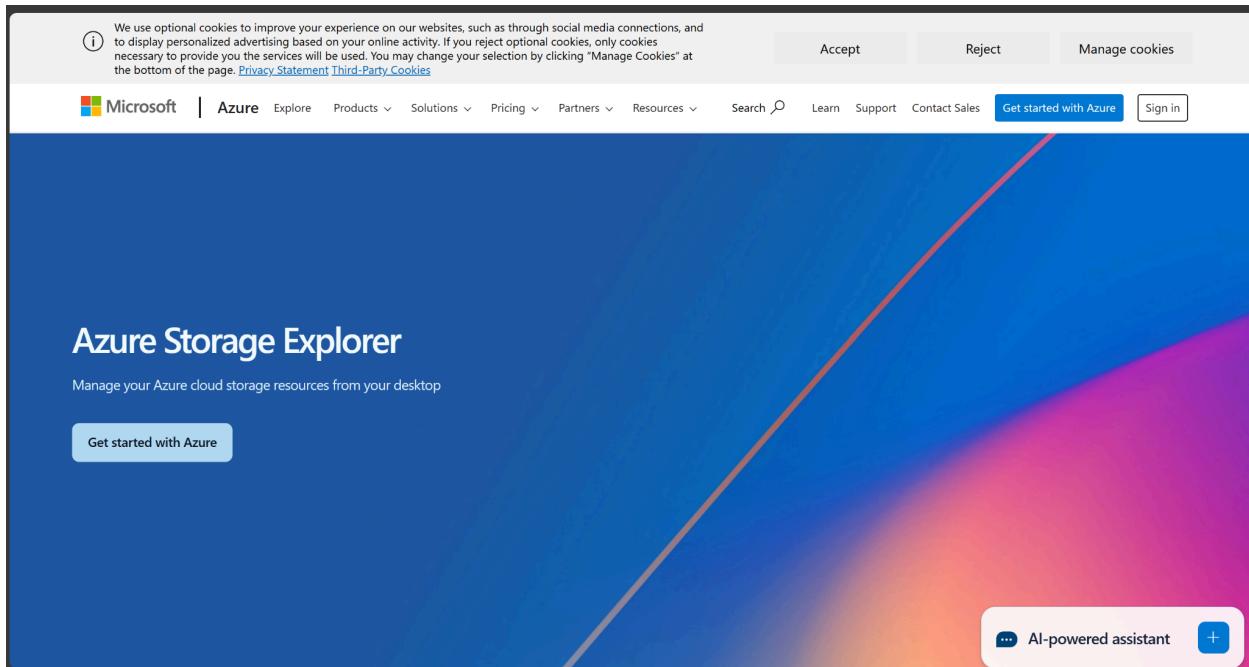
A private IP address of 10.0.0.10 is returned for the storage account name. This address is in Subnet-1-8912 subnet of 8912-vnet virtual network you created previously.



8. Install Microsoft Azure Storage Explorer on the virtual machine.



9. Select Finish after the Microsoft Azure Storage Explorer is installed. Leave the box checked to open the application.



10. Select the Power plug symbol to open the Select Resource dialog box in the left-hand toolbar.
11. In Select Resource , select Storage account or service to add a connection in Microsoft Azure Storage Explorer to your storage account that you created in the previous steps.
12. In the Select Connection Method screen, select Connection string, and then Next.
13. In the box under Connection String, paste the connection string from the storage account you copied in the previous steps. The storage account name automatically populates in the box under Display name.
14. Select Next.
15. Verify the settings are correct in Summary.
16. Select Connect
17. Select your storage account from the Storage Accounts in the explorer menu.
18. Expand the storage account and then Blob Containers.
19. The container you created previously is displayed.
20. Close the connection to 8912-VM1.
21. Clean all the resources created during the lab and document all the steps using screenshots and paste that in the lab report.

Delete a resource group

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

Resource group to be deleted

CST8912demo

Dependent resources to be deleted (15)

All dependent resources, including hidden types, are shown

Name
8912-VM1
8912-VM1-ip
8912-VM1-nsg
8912-vm125
8912-vm165R

Delete confirmation

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

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

Enter resource group name to confirm deletion *

CST8912demo

Delete **Go back**

Notifications

More events in the activity log → Dismiss all

... Deleting resource group CST8912demo Running X
Deleting resource group CST8912demo 8 minutes ago

Overview

Subscription (move) : Azure for Students
Subscription ID : d690b447-1036-4d22-b055-a86...
Deployments : 11 Succeeded
Location : Canada Central
Tags (edit) : Add tags

Resources Recommendations (1)

Filter for any field... Add filter More (2)

Showing 1 to 14 of 14 records. Show hidden types
No grouping List view

Name	Type	Location
8912-VM1	Virtual machine	Canada Central
8912-VM1-ip	Public IP address	Canada Central
8912-VM1-nsg	Network security group	Canada Central
8912-vm165R	Network Interface	Canada Central

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

CST8912demo Resource group

Notifications

More events in the activity log → Dismiss all

Deleted resource group CST8912demo Deleted resource group CST8912demo a few seconds ago

Essentials

- Subscription ([move](#)) : [Azure for Students](#)
- Subscription ID : d690b447-1036-4d22-b055-a86...
- Deployments : [11 Succeeded](#)
- Location : Canada Central
- Tags ([edit](#)) : [Add tags](#)

Resources Recommendations (1)

Name	Type	Location
8912-VM1	Virtual machine	Canada Central
8912-VM1-ip	Public IP address	Canada Central
8912-VM1-nsg	Network security group	Canada Central
8912-vm1298	Network Interface	Canada Central

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

NetworkWatcherRG Resource group

Notifications

More events in the activity log → Dismiss all

Deleted resource group NetworkWatcherRG Deleted resource group NetworkWatcherRG a few seconds ago

Deleted resource group CST8912demo Deleted resource group CST8912demo 2 minutes ago

Essentials

Resources Recommendations

Name	Type	Location
NetworkWatcher_canadacentr...	Network Watcher	Canada Central

Lab Report

This lab focused on configuring and testing Azure Private Link to securely connect virtual networks to Azure resources without exposing data to the internet. First, I created a virtual network, Bastion Host, and storage account. Then, I disabled public access to the storage account, and set up a private endpoint to establish private connectivity. A test virtual machine was created and connected using Azure Bastion; however, I had connectivity issues, because of a popup blocker that caused a login failure error, which I was able to fix by making changes to the popup blocker. A test virtual machine was created and connected using Azure Bastion, and in order to verify secure access to the storage account, I used a private IP using PowerShell. I also used Microsoft Azure Storage Explorer to confirm blob storage connectivity through the private endpoint. Finally, I cleaned up resources to avoid costs, which shows how the Azure Private Link enhances security and network architecture by facilitating secure, private access to Azure PaaS services.