

Introduction to Cloud Computing

LAB 04

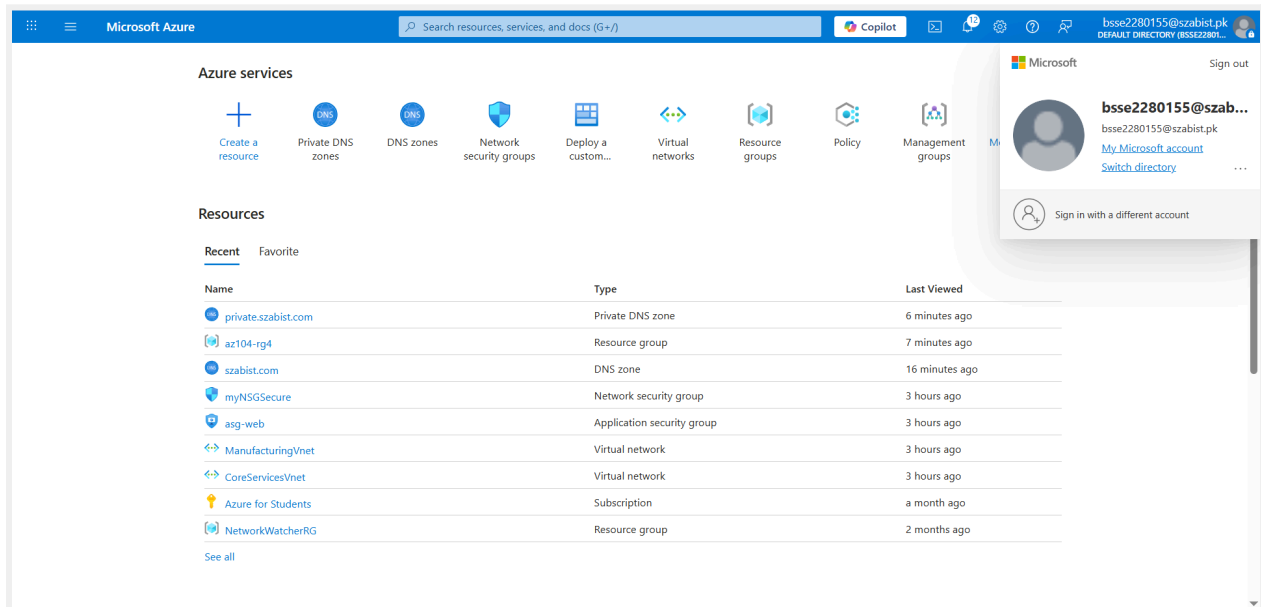
Name: Muhammad Yahya

ID: 2280155

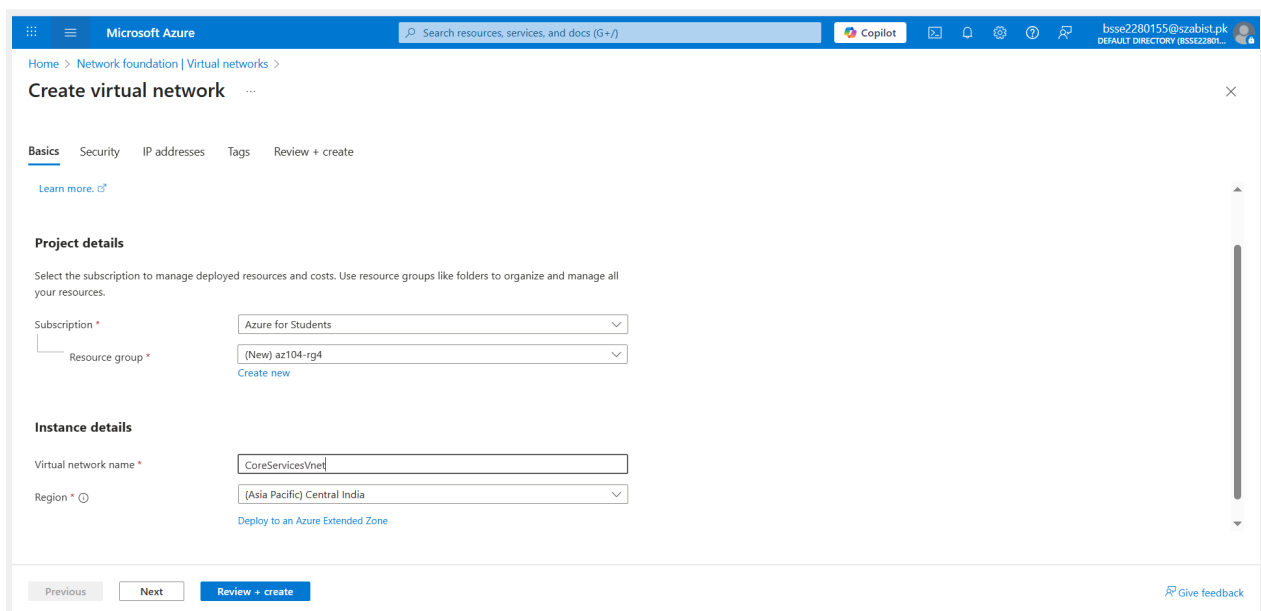
BS-SE 7B

Task 1: Create a virtual network with subnets using the portal

- Sign in to the **Azure portal**.



- Search for and select **Virtual Network**.
- Select **Create** on the Virtual networks page.



- Move to the **IP Addresses** tab.
- Select **Add a subnet**.

Microsoft Azure

Home > Network foundation | Virtual networks >

Create virtual network

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

virtual network address space into smaller ranges for use by your applications. When you deploy resources into a subnet, Azure assigns the resource an IP address from the subnet. [Learn more](#)

☐ Allocate using IP address pools. [Learn more](#)

+ Add a subnet

| Subnets | IP address range | Size | NAT gateway |
|----------------------|---------------------------|---------------------|-------------|
| SharedServicesSubnet | 10.20.10.0 - 10.20.10.255 | /24 (256 addresses) | - |
| DatabaseSubnet | 10.20.20.0 - 10.20.20.255 | /24 (256 addresses) | - |

Previous Next **Review + create**

Add a 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

Name

IPv4

Include an IPv4 address space ☒

IPv4 address range

Starting address

Size

Subnet address range

IPv6

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

Private subnet

Private subnets enhance security by not providing default outbound access. To enable outbound connectivity for virtual machines to access the internet, it is necessary to explicitly grant outbound access. A NAT gateway is the recommended way to provide outbound

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

- Select **Review + create**.

Microsoft Azure

Home >

CoreServicesVnet-1767692178367 | Overview

Deployment

Search Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

Your deployment is complete

Deployment name : CoreServicesVnet-1767692178367 Start time : 1/6/2026, 2:36:23 PM

Subscription : Azure for Students Correlation ID : 84530324-d685-4430-b53c-0c037d54b911

Resource group : az104-rg4

> Deployment details

> Next steps

Go to resource

Give feedback

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

Deployment succeeded

Deployment 'CoreServicesVnet-1767692178367' to resource group 'az104-rg4' was successful.

Go to resource **Pin to dashboard**

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[Set up cost alerts >](#)

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Work with an expert

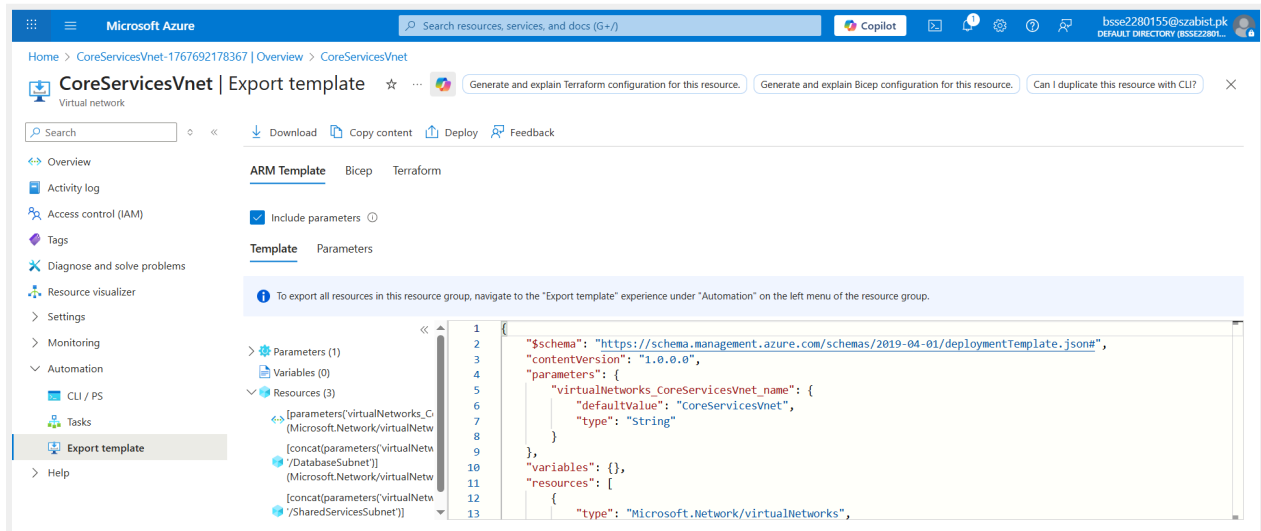
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.

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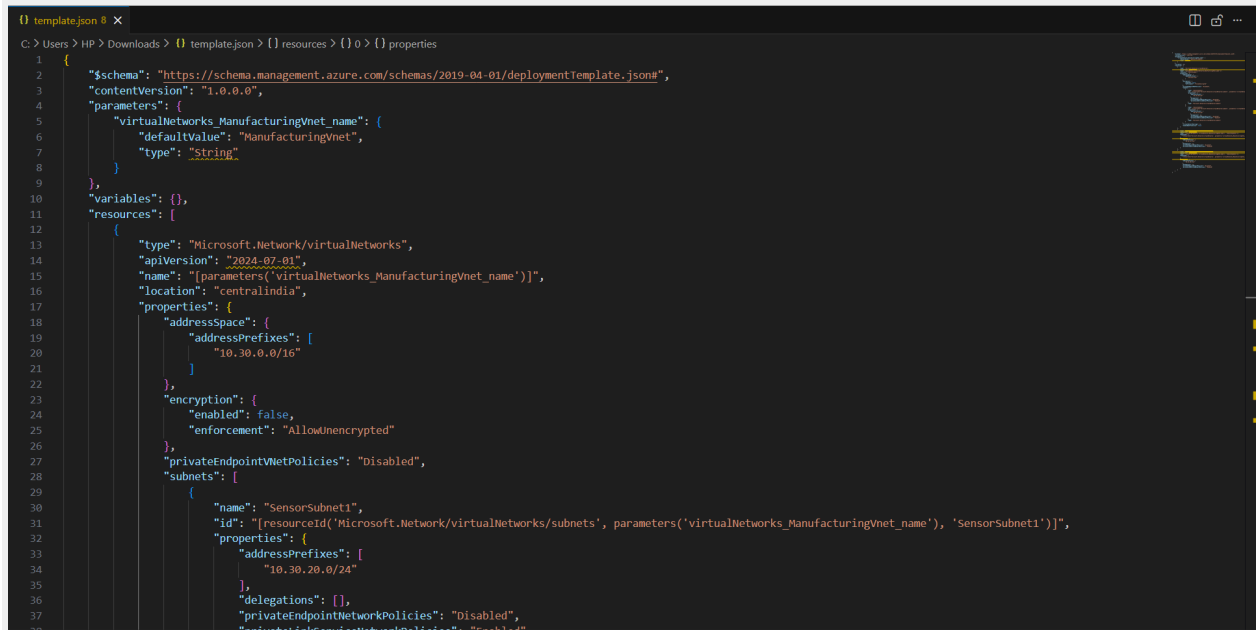
- Wait for the virtual network to deploy and then select **Go to resource**.

- In the **Automation** section, select **Export template**, and then wait for the template to be generated.
- **Download** the template.



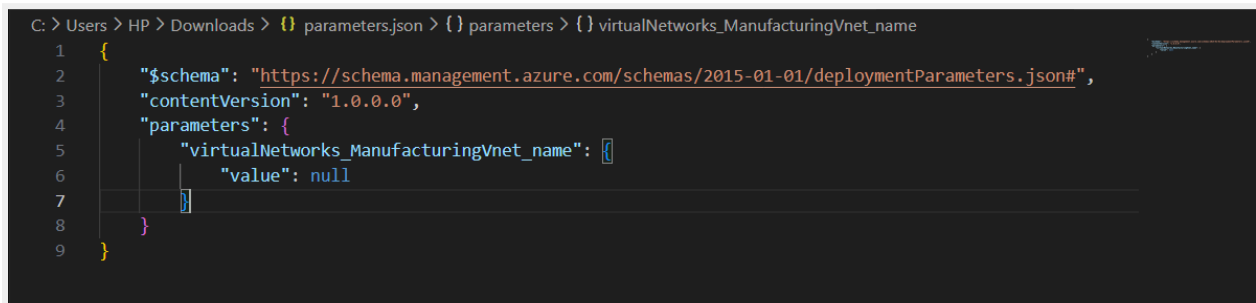
Task 2: Create a virtual network and subnets using a template

- Locate the **template.json** file exported in the previous task.
- Edit the file. Be sure to **save** your changes.



```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "virtualNetworks_ManufacturingVnet_name": {
6       "defaultValue": "ManufacturingVnet",
7       "type": "String"
8     }
9   },
10  "variables": {},
11  "resources": [
12    {
13      "type": "Microsoft.Network/virtualNetworks",
14      "apiVersion": "2024-07-01",
15      "name": "[parameters('virtualNetworks_ManufacturingVnet_name')]",
16      "location": "centralindia",
17      "properties": {
18        "addressSpace": {
19          "addressPrefixes": [
20            "10.30.0.0/16"
21          ]
22        },
23        "encryption": {
24          "enabled": false,
25          "enforcement": "AllowUnencrypted"
26        },
27        "privateEndpointNetworkPolicies": "Disabled",
28        "subnets": [
29          {
30            "name": "SensorSubnet1",
31            "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'SensorSubnet1')]",
32            "properties": {
33              "addressPrefixes": [
34                "10.30.20.0/24"
35              ]
36            },
37            "delegations": [],
38            "privateEndpointNetworkPolicies": "Disabled",
39            "privateLinkServiceConnections": []
40          }
41        ]
42      }
43    }
44  ]
45 }
```

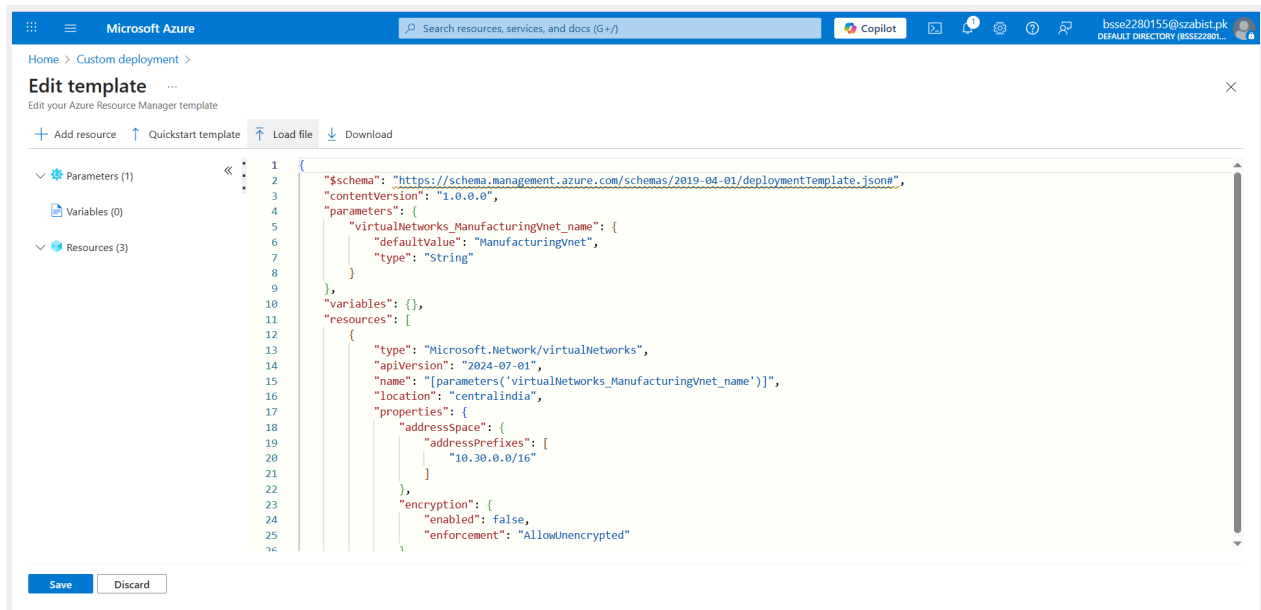
- Make changes to the **parameters** file.



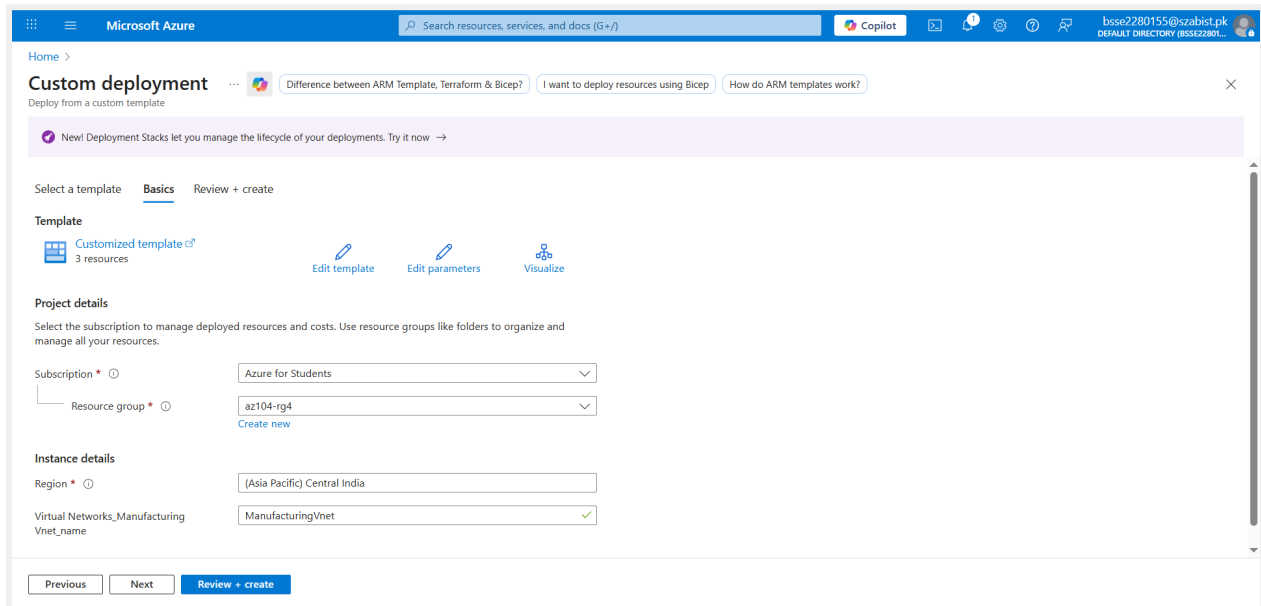
```
1 {
2   "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentParameters.json#",
3   "contentVersion": "1.0.0.0",
4   "parameters": {
5     "virtualNetworks_ManufacturingVnet_name": {
6       "value": null
7     }
8   }
9 }
```

- **Save** your changes.

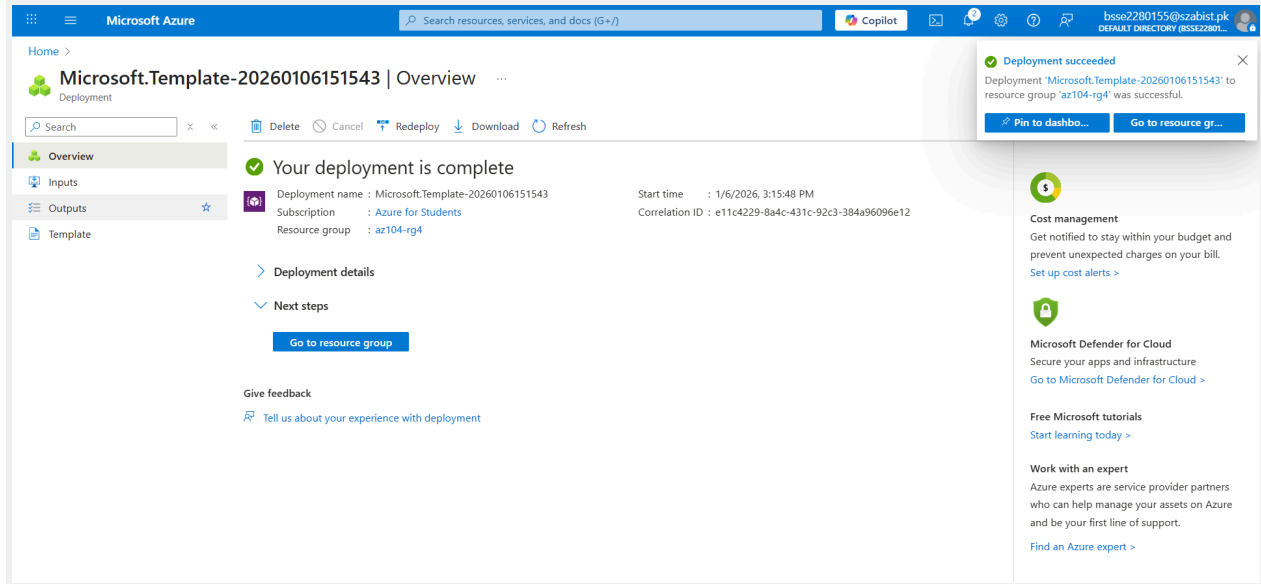
- In the portal, search for and select **Deploy a custom template**.
- Select **Build your own template in the editor** and then **Load file**.
- Select the **template.json** file with your Manufacturing changes, then select **save**.



- Select **Edit parameters**, and then **Load file**.
- Select the **parameters.json** file with your Manufacturing changes, then select **save**.

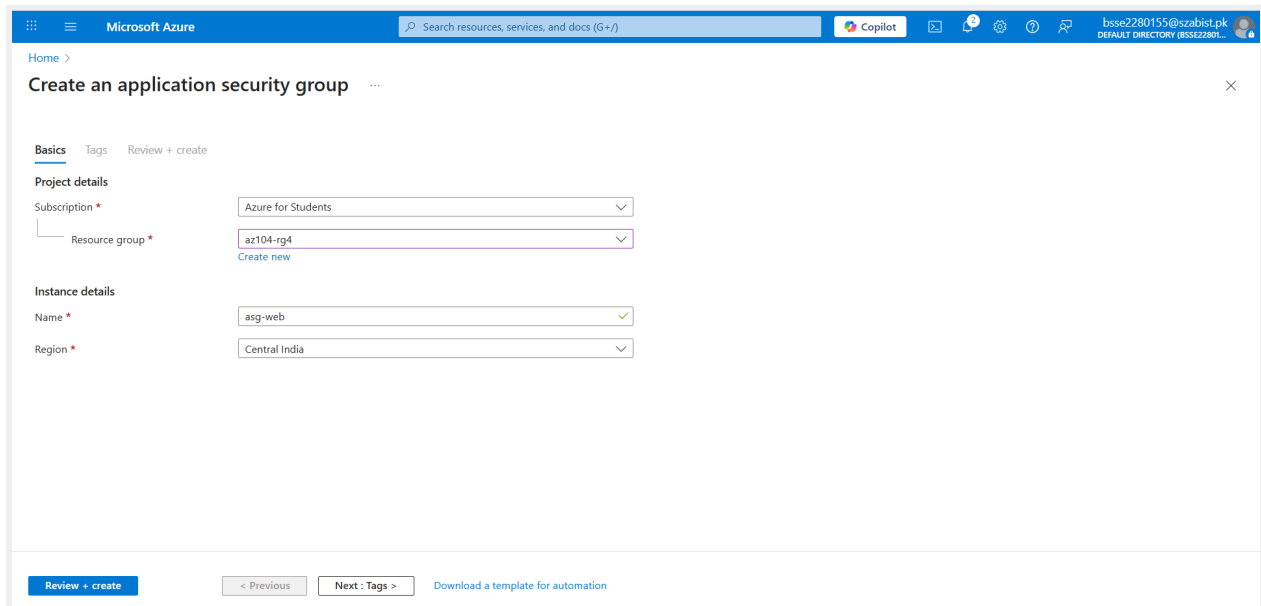


- Select **Review + create** and then **Create**.



Task 3: Create and configure communication between an Application Security Group and a Network Security Group

- In the Azure portal, search for and select **Application security groups**.
- Click **Create**.



- Click **Review + create** and then after the validation click **Create**.

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

bsse2280155@szabist.pk
DEFAULT DIRECTORY (BSSE22801...)

Home > CreateApplicationSecurityGroupBladeViewModel | Overview ...

Deployment

Search

Delete Cancel Redeploy Download Refresh

Overview

Inputs

Outputs

Template

✓ Your deployment is complete

Deployment name : CreateApplicationSecurityGroupBladeViewModel

Subscription : Azure for Students

Resource group : az104-rg4

Start time : 1/6/2026, 3:21:33 PM

Correlation ID : 9a6149ec-bfda-4136-b045-539270efb407

Deployment details

Next steps

Go to resource

Give feedback

Tell us about your experience with deployment

Deployment succeeded

Deployment 'CreateApplicationSecurityGroupBladeViewModel' to resource group 'az104-rg4' was successful.

Go to resource Pin to dashboard

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- In the Azure portal, search for and select **Network security groups**.
- Select **Create**.

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Home > Network foundation | Network security groups >

Create network security group ...

Validation passed

Basics Tags Review + create

Basics

Subscription Azure for Students

Resource group az104-rg4

Region Central India

name myNSGSecure

Tags

None

Create < Previous Next > Download a template for automation

Initializing deployment...

Initializing template deployment to resource group 'az104-rg4'.

- Under **Settings** click **Subnets** and then **Associate**.

The screenshot shows the Microsoft Azure portal interface. On the left, the 'Settings' menu is expanded, and 'Subnets' is selected. The main area displays the 'myNSGSecure' Network Security Group. On the right, the 'Associate subnet' dialog is open, showing the 'Virtual network' as 'CoreServicesVnet (az104-rg4)' and the 'Subnet' as 'SharedServicesSubnet'. An 'OK' button is at the bottom of the dialog.

- Configure an inbound security rule to allow ASG traffic

The screenshot shows the 'Inbound security rules' page for the 'myNSGSecure' Network Security Group. A table lists the rules with columns for Priority, Name, Port, Protocol, Source, Destination, and Action. The rules are as follows:

| Priority | Name | Port | Protocol | Source | Destination | Action |
|----------|-------------------------------|--------|----------|-------------------|----------------|--------|
| 100 | AllowASG | 80,443 | TCP | ASG-WEB | Any | Allow |
| 65000 | AllowVnetInBound | Any | Any | VirtualNetwork | VirtualNetwork | Allow |
| 65001 | AllowAzureLoadBalancerInBound | Any | Any | AzureLoadBalancer | Any | Allow |
| 65500 | DenyAllInBound | Any | Any | Any | Any | Deny |

- Configure an outbound NSG rule that denies Internet access

The screenshot shows the 'Outbound security rules' page for the 'myNSGSecure' Network Security Group. A table lists the rules with columns for Priority, Name, Port, Protocol, Source, Destination, and Action. The rules are as follows:

| Priority | Name | Port | Protocol | Source | Destination | Action |
|----------|-----------------------|------|----------|----------------|----------------|--------|
| 4096 | DenyInternetOutbound | Any | Any | Any | Internet | Deny |
| 65000 | AllowVnetOutBound | Any | Any | VirtualNetwork | VirtualNetwork | Allow |
| 65001 | AllowInternetOutBound | Any | Any | Any | Internet | Allow |
| 65500 | DenyAllOutBound | Any | Any | Any | Any | Deny |

Task 4: Configure public and private Azure DNS zones

- Configure a **public** DNS zone.

Microsoft Azure

Home > DNS zones >

Create a DNS Zone

Validation passed

Basics DNS Zone Editor Tags **Review + Create**

[View automation template](#)

Basics

| | |
|-------------------------|--------------------|
| Subscription | Azure for Students |
| Resource group | az104-rg4 |
| Resource group location | Central India |
| Name | szabist.com |

DNS Zone Record Set(s)

| | |
|-----------------------|-----------------|
| Number of record sets | 0 record set(s) |
|-----------------------|-----------------|

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

- On the **Overview** blade notice the names of the four Azure DNS name servers assigned to the zone.

Microsoft Azure

Home > szabist.com_1767696090016 | Overview >

szabist.com DNS zone

Search

+ Child zone Record sets DNSSEC Import Export Move Refresh Delete Give feedback

Overview

Activity log Access control (IAM) Tags Diagnose and solve problems Resource visualizer Settings DNS Management Monitoring Automation Help

Essentials

| | | | |
|-----------------------|--|---------------------------|--------------------------|
| Resource group (move) | : az104-rg4 | Max number of record s... | : 10000 |
| Location | : Global | Name server 1 | : ns1-08.azure-dns.com. |
| Subscription (move) | : Azure for Students | Name server 2 | : ns2-08.azure-dns.net. |
| Subscription ID | : db878fcc-8781-42d0-a61d-55de3d976446 | Name server 3 | : ns3-08.azure-dns.org. |
| Recordsets | : 2 | Name server 4 | : ns4-08.azure-dns.info. |
| Tags (edit) | : Add tags | | |

Get Started Tutorials Tools + SDK

Azure DNS is a hosting service for DNS domains that provides name resolution by using Microsoft Azure infrastructure. By hosting your domains in Azure, you can manage your DNS records by using the same credentials, APIs, tools, and billing as your other Azure services.

Add DNS record sets

Begin hosting your domain in Azure DNS by adding record sets. A record set is a collection of records in a zone that have the same name and are the same type.

Import record sets from file

You have the option to import your zone directly using the import utility. This utility offers a rapid, dependable, and convenient method for transferring DNS zone data into or out of Azure DNS.

Access control

View your level of access to DNS zone. Review the level of access a user, group, service principal, or managed identity has to this DNS zone.

Azure DNS Documentation

For detail understanding of Azure DNS, refer to the documentation.

Add or remove favorites by pressing Ctrl+Shift+F

- Expand the **DNS Management** blade and select **Recordsets**. Click **Add**.

Microsoft Azure portal interface showing the DNS Management section for the zone **szabist.com**. The **Recordsets** blade is expanded, displaying a table of record sets. The table shows two record sets: an NS record and a SOA record.

| Name | Type | TTL | Value |
|------|------|--------|---|
| @ | NS | 172800 | ns1-08.azure-dns.com, ns2-08.azure-dns.net, ns3-08.azure-dns.org, ns4-08.azure-dns.info |
| @ | SOA | 3600 | Email: azure-dns-hostmaster.microsoft.com, Host: ns1-08.azure-dns.com, Refresh: 3600, Retry: 300, Expire: 2419200, Minimum TTL: 300, Serial number: 1 |

The **Add record set** dialog is open, showing the following fields:

- Name: **www**
- Type: **A - IPv4 Address records**
- Alias record set: **No**
- TTL: **1**
- TTL unit: **Hours**
- IP address: **10.1.1.4**

The **Add** button is visible at the bottom of the dialog.

- Verify the host name **www.szabist.com** resolves to the IP address you provided.

```

Microsoft Windows [Version 10.0.19045.6466]
(c) Microsoft Corporation. All rights reserved.

C:\Users\HP>nslookup www.szabist.com
Server:      Unknown
Address:     fe80::1

Non-authoritative answer:
Name:       www.szabist.com
Addresses:  76.223.54.146
            13.248.169.48

C:\Users\HP>nslookup www.szabist.com ns1-08.azure-dns.com.
0.0.0.0.1.6.0.1.3.0.6.2.ip6.arpa    nameserver = ns4-04.azure-dns.info
0.0.0.0.1.6.0.1.3.0.6.2.ip6.arpa    nameserver = ns3-04.azure-dns.org
0.0.0.0.1.6.0.1.3.0.6.2.ip6.arpa    nameserver = ns2-04.azure-dns.net
0.0.0.0.1.6.0.1.3.0.6.2.ip6.arpa    nameserver = ns1-04.azure-dns.com
Server:      Unknown
Address:     2603:1061:0:700::8

Name:       www.szabist.com
Address:    10.1.1.4
  
```

- Configure a private DNS zone.

Microsoft Azure

Search resources, services, and docs (G+)

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DEFAULT DIRECTORY (BSSE22801...

Home > Private DNS zones >

Create Private DNS Zone

Validation passed

Basics Private DNS Zone Editor Virtual Network Links Tags **Review + Create**

[View automation template](#)

Basics

| | |
|-------------------------|---------------------|
| Subscription | Azure for Students |
| Resource group | az104-rg4 |
| Resource group location | Central India |
| Name | private.szabist.com |

DNS Zone Record Set(s)

| | |
|-----------------------|-----------------|
| Number of record sets | 0 record set(s) |
|-----------------------|-----------------|

Virtual network link(s)

| | |
|--------------------------------|---------------------------|
| Numer of Virtual Network Links | 0 virtual network link(s) |
|--------------------------------|---------------------------|

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

- Expand the **DNS Management** blade and then select **Virtual network links**.

Microsoft Azure

Search resources, services, and docs (G+)

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bsse2280155@szabist.pk
DEFAULT DIRECTORY (BSSE22801...

Home > private.szabist.com_1767703755201 | Overview > private.szabist.com | Virtual Network Links >

Add Virtual Network Link

private.szabist.com

Link name *

manufacturing-link

Virtual network details

Only virtual networks with Resource Manager deployment model are supported for linking with Private DNS zones. Virtual networks with Classic deployment model are not supported.

☐ I know the resource ID of virtual network

Subscription *

Azure for Students

Virtual Network *

ManufacturingVnet (az104-rg4)

Configuration

☐ Enable auto registration

☐ Enable fallback to internet

Create Cancel [Give feedback](#)

- From the **DNS Management** blade select **Recordsets**.

The screenshot shows the Microsoft Azure portal interface. The top navigation bar includes the Microsoft Azure logo, a search bar, and user information. The main content area is divided into a left sidebar and a central pane. The sidebar contains a list of navigation options: Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings, DNS Management, and Recordsets. The central pane displays the 'private.szabist.com | Recordsets' page. It includes a search bar, a list of record sets (currently empty), and a table with columns for Name, Type, and TTL. The table shows one record set: 'sensorvm' with Type 'SOA' and TTL '3600'. The right pane shows the 'Add record set' dialog. It includes fields for Name (sensorvm), Type (A - IPv4 Address records), TTL (1), TTL unit (Hours), and IP address (10.1.1.4). The dialog also has an 'Add' button and a 'Cancel' button.

Microsoft Azure

Search resources, services, and docs (G+)

Copilot

bsse2280155@szabist.pk
DEFAULT DIRECTORY (BSSE22801...

Home > private.szabist.com_1767703755201 | Overview > private.szabist.com

private.szabist.com | Recordsets ☆ ...

Private DNS zone

Search

«

+ Add Refresh Delete Give feedback

Overview

Activity log

Access control (IAM)

Tags

Diagnose and solve problems

Resource visualizer

Settings

DNS Management

Recordsets

Virtual Network Links

Monitoring

Automation

Help

A record set is a collection of records in a zone that have the same name and are the same type. Record Sets will be automatically fetched in batches of 100 as you scroll through the existing record sets. [Learn more](#)

Search

Fetches 1 record set(s).

0 record sets selected

| Name | Type | TTL |
|----------|------|------|
| sensorvm | SOA | 3600 |

Add record set

private.szabist.com

Name

sensorvm

Type

A - IPv4 Address records

TTL *

1

TTL unit

Hours

IP address

10.1.1.4

0.0.0.0

Add Cancel Give feedback