

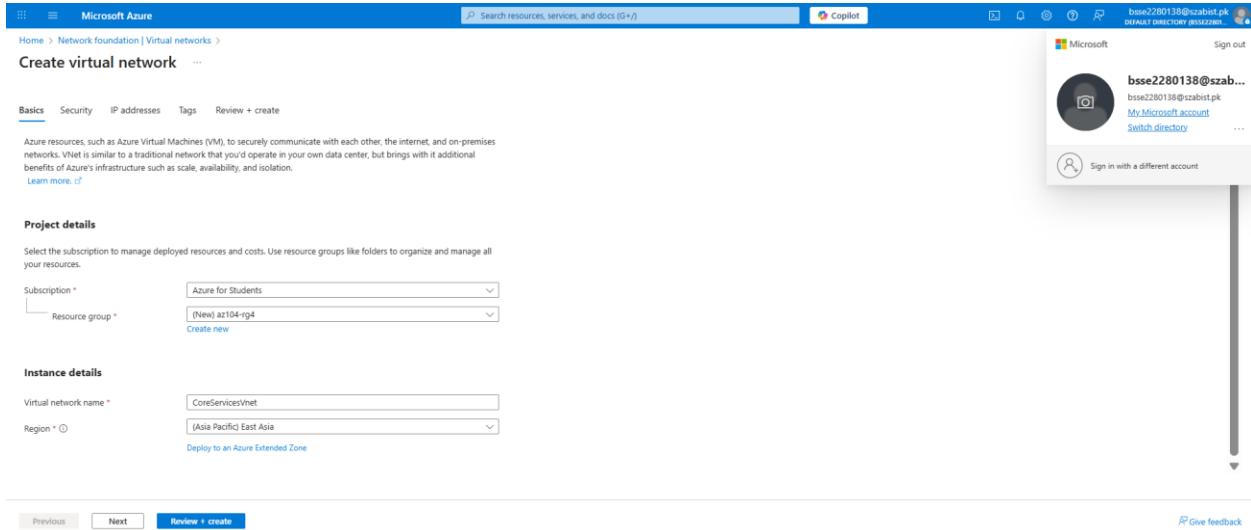
## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

Name: M. Talha Arif

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

- Create a Virtual network “CoreServicesVnet”:



Microsoft Azure

Home > Network foundation | Virtual networks >

Create virtual network ...

Basics Security IP addresses Tags Review + create

Azure resources, such as Azure Virtual Machines (VM), to securely communicate with each other, the internet, and on-premises networks. VNet is similar to a traditional network that you'd operate in your own data center, but brings with it additional benefits of Azure's infrastructure such as scale, availability, and isolation.

Learn more ↗

**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) az104-rg4 ✓

Create new

**Instance details**

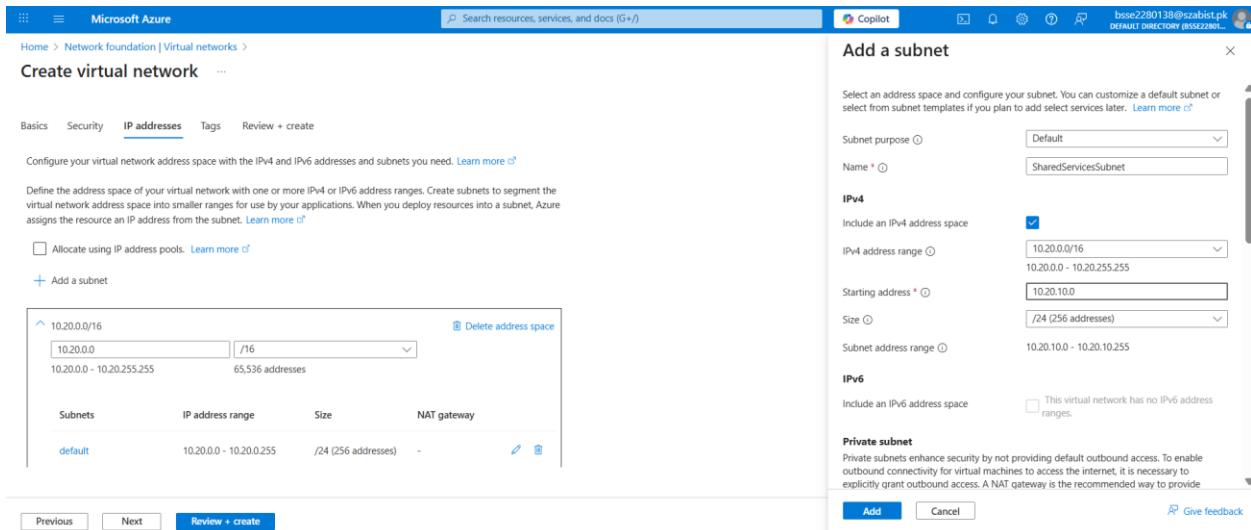
Virtual network name \* CoreServicesVnet

Region \* (Asia Pacific) East Asia ✓

Deploy to an Azure Extended Zone

Previous Next Review + create Give feedback

- Configure IP Address Space & Create SharedServicesSubnet:



Microsoft Azure

Home > Network foundation | Virtual networks >

Create virtual network ...

Basics Security IP addresses Tags Review + create

Configure your virtual network address space with the IPv4 and IPv6 addresses and subnets you need. Learn more ↗

Define the address space of your virtual network with one or more IPv4 or IPv6 address ranges. Create subnets to segment the 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
default	10.20.0.0 - 10.20.255.255	/24 (256 addresses)	-

**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 Default

Name \* SharedServicesSubnet

IPv4

Include an IPv4 address space

IPv4 address range 10.20.0.0/16

Starting address 10.20.10.0

Size /24 (256 addresses)

Subnet address range 10.20.10.0 - 10.20.10.255

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

Previous Next Review + create Give feedback

- Create DatabaseSubnet:

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

**Create virtual network**

**IP addresses**

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](#)

**Add a subnet**

Subnets	IP address range	Size	NAT gateway
default	10.20.0.0 - 10.20.255.255	/24 (256 addresses)	-
SharedServicesSubnet	10.20.10.0 - 10.20.10.255	/24 (256 addresses)	-

**Add a subnet**

**Subnet purpose**: Default  
Name: DatabaseSubnet

**IPv4**

Include an IPv4 address space:   
IPv4 address range: 10.20.0.0/16  
Starting address: 10.20.0.0  
Size: /24 (256 addresses)  
Subnet address range: 10.20.0.0 - 10.20.0.255

**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 connectivity for virtual machines in the subnet. [Learn more](#)

**Enable private subnet (no default outbound access)**:

**Add** **Cancel** **Review + create**

- Verify Virtual Network and Subnets:

**CoreServicesVnet | Address space**

**Address space**

Address space	Address range	Address count
10.20.0.0/16	10.20.0.0 - 10.20.255.255	65,536 addresses

**Peered virtual network address space**

Peer name	Peered to	Address space	Address range
No items found			

**Save** **Cancel** **Give feedback**

**CoreServicesVnet | Subnets**

**Subnets**

Name	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
default	10.20.0.0/24	-	251	-	-	-
SharedServicesSubnet	10.20.10.0/24	-	251	-	-	-
DatabaseSubnet	10.20.20.0/24	-	251	-	-	-

- Export ARM Template:

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The screenshot shows the Microsoft Azure portal interface for a resource group named 'CoreServicesVnet'. On the left, the navigation menu includes options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings, Monitoring, Automation, CLI / PS, Tasks, and Export template. The 'Export template' option is highlighted. The main content area displays the ARM Template configuration. A checkbox labeled 'Include parameters' is checked. Below it, the 'Template' tab is selected, showing the JSON code for the template:

```
$schema: "https://schema.management.azure.com/schemas/2019-04-01/deploymentTemplate.json#",
contentVersion: "1.0.0.0",
parameters": {
  "virtualNetworks_CoreServicesVnet_name": {
    "defaultValue": "CoreServicesVnet",
    "type": "String"
  }
},
variables": {},
resources": [
  {
    "type": "Microsoft.Network/virtualNetworks",
    "name": "[concat(parameters('virtualNetName'), '/Subnet1')]",
    "apiVersion": "2024-02-01",
    "dependsOn": [
      "[resourceId('Microsoft.Network/virtualNetworks', parameters('virtualNetName'))]"
    ],
    "properties": {
      "addressSpace": {
        "subnets": [
          {
            "name": "Subnet1",
            "prefixLength": 24,
            "ipConfigurations": [
              {
                "name": "ipconfig1",
                "subnet": "Subnet1"
              }
            ]
          }
        ]
      }
    }
  }
]
```

The screenshot shows a file explorer window titled 'ExportsTemplate-az104-rg4' under 'Downloads'. The contents are as follows:

Name	Date modified	Type	Size
parameters	12/20/2025 7:32 PM	JSON Source File	1 KB
template	12/20/2025 7:32 PM	JSON Source File	6 KB

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

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

#### • Edit ARM Template for ManufacturingVnet & Modify Address Space and Subnets:

```
C:\> Users > hp > Downloads > ExportedTemplate-az104-rg4 > template.json > resources > properties > subnets > properties >
```

```
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": "eastasia",
17             "properties": {
18                 "addressSpace": {
19                     "addressPrefixes": [
20                         "10.30.0.0/16"
21                     ]
22                 },
23                 "encryption": {
24                     "enabled": false,
25                     "enforcement": "AllowUnencrypted"
26                 },
27                 "privateEndpointVNetPolicies": "Disabled",
28                 "subnets": [
29                     {
30                         "name": "default",
31                         "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'default')]",
32                         "properties": {
33                             "addressPrefixes": [
34                                 "10.30.0.0/24"
35                             ],
36                             "delegations": [],
37                             "privateEndpointNetworkPolicies": "Disabled",
38                             "privateLinkServiceNetworkPolicies": "Enabled"
39                         },
40                         "type": "Microsoft.Network/virtualNetworks/subnets"
41                     },
42                     {
43                         "name": "SensorSubnet1",
44                         "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'SensorSubnet1')]",
45                         "properties": {
46                             "addressPrefixes": [
47                                 "10.30.20.0/24"
48                             ],
49                             "delegations": [],
50                             "privateEndpointNetworkPolicies": "Disabled",
51                             "privateLinkServiceNetworkPolicies": "Enabled"
52                         },
53                         "type": "Microsoft.Network/virtualNetworks/subnets"
54                     }
55                 ]
56             }
57         }
58     ]
59 }
```

```
C:\> Users > hp > Downloads > ExportedTemplate-az104-rg4 > template.json > resources > properties > subnets > properties > privateLinkServiceNetworkPolicies
```

```
11
12
13     "privateLinkServiceNetworkPolicies": "Enabled",
14
15     "subnets": [
16         {
17             "name": "default",
18             "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'default')]",
19             "properties": {
20                 "addressPrefixes": [
21                     "10.30.0.0/24"
22                 ],
23                 "delegations": [],
24                 "privateEndpointNetworkPolicies": "Disabled",
25                 "privateLinkServiceNetworkPolicies": "Enabled"
26             },
27             "type": "Microsoft.Network/virtualNetworks/subnets"
28         },
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                 "delegations": [],
37                 "privateEndpointNetworkPolicies": "Disabled",
38                 "privateLinkServiceNetworkPolicies": "Enabled"
39             },
40             "type": "Microsoft.Network/virtualNetworks/subnets"
41         },
42         {
43             "name": "SensorSubnet2",
44             "id": "[resourceId('Microsoft.Network/virtualNetworks/subnets', parameters('virtualNetworks_ManufacturingVnet_name'), 'SensorSubnet2')]",
45             "properties": {
46                 "addressPrefixes": [
47                     "10.30.21.0/24"
48                 ],
49                 "delegations": [],
50                 "privateEndpointNetworkPolicies": "Disabled",
51                 "privateLinkServiceNetworkPolicies": "Enabled"
52             },
53             "type": "Microsoft.Network/virtualNetworks/subnets"
54         }
55     ]
56 }
```

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

```
73  {
74      "type": "Microsoft.Network/virtualNetworks/subnets",
75      "apiVersion": "2024-07-01",
76      "name": "[concat(parameters('virtualNetworks_ManufacturingVnet_name'), '/SensorSubnet2')]",
77      "dependsOn": [
78          "[resourceId('Microsoft.Network/virtualNetworks', parameters('virtualNetworks_ManufacturingVnet_name'))]"
79      ],
80      "properties": {
81          "addressPrefixes": [
82              "10.30.21.0/24"
83          ],
84          "delegations": [],
85          "privateEndpointNetworkPolicies": "Disabled",
86          "privateLinkServiceNetworkPolicies": "Enabled"
87      }
88 },
89 {
90     "type": "Microsoft.Network/virtualNetworks/subnets",
91     "apiVersion": "2024-07-01",
92     "name": "[concat(parameters('virtualNetworks_ManufacturingVnet_name'), '/default')]",
93     "dependsOn": [
94         "[resourceId('Microsoft.Network/virtualNetworks', parameters('virtualNetworks_ManufacturingVnet_name'))]"
95     ],
96     "properties": {
97         "addressPrefixes": [
98             "10.30.0.0/24"
99         ],
100        "delegations": [],
101        "privateEndpointNetworkPolicies": "Disabled",
102        "privateLinkServiceNetworkPolicies": "Enabled"
103    }
104 },
105 {
106     "type": "Microsoft.Network/virtualNetworks/subnets",
107     "apiVersion": "2024-07-01",
108     "name": "[concat(parameters('virtualNetworks_ManufacturingVnet_name'), '/SensorSubnet1')]",
109     "dependsOn": [
110         "[resourceId('Microsoft.Network/virtualNetworks', parameters('virtualNetworks_ManufacturingVnet_name'))]"
111     ],
112     "properties": {
113         "addressPrefixes": [
114             "10.30.20.0/24"
115         ],
116         "delegations": [],
117         "privateEndpointNetworkPolicies": "Disabled",
118         "privateLinkServiceNetworkPolicies": "Enabled"
119     }
120 },
121 ]
122 }
```

- **Update Parameters File:**



```
LAB_04-Implement_Virtual_Networking.md  parameters.json  template.json 1

C: > Users > hp > Downloads > ExportedTemplate-az104-rg4 > parameters.json > ...

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  }
```

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

#### • Deploy Custom ARM Template:

The screenshot shows the 'Custom deployment' page in the Microsoft Azure portal. At the top, there are tabs for 'Select a template', 'Basics', 'Review + create', and 'Copilot'. Below the tabs, a section titled 'Automate deploying resources with Azure Resource Manager templates in a single, coordinated operation. Create or select a template below to get started.' includes a link 'Learn more about template deployment'. There is a button 'Build your own template in the editor'. Under 'Common templates', there are links for 'Create a Linux virtual machine', 'Create a Windows virtual machine', 'Create a web app', 'Create a SQL database', and 'Azure landing zone'. A section 'Start with a quickstart template or template spec' allows selecting 'Template source' (Quickstart template or Template spec). A dropdown for 'Quickstart template (disclaimer)' is shown.

The screenshot shows the 'Edit template' page in the Microsoft Azure portal. At the top, there are tabs for '+ Add resource', 'Quickstart template', 'Load file', and 'Download'. Below the tabs, the ARM template code is displayed in a code editor. The code defines a 'Parameters' object with a single parameter 'virtualNetworks\_ManufacturingVnet\_name' (type String, default value 'ManufacturingVnet'). It also defines a 'Resources' object with one resource of type 'Microsoft.Network/virtualNetworks', named 'parameters('virtualNetworks\_ManufacturingVnet\_name')', located in 'eastasia', with properties including an 'addressSpace' (prefixes 10.30.0.0/16) and 'encryption' (enabled: false). At the bottom, there are 'Save' and 'Discard' buttons.

The screenshot shows the 'Custom deployment' page in the Microsoft Azure portal. At the top, there are tabs for 'Custom deployment', 'Can I deploy multiple resources within a single ARM template?', 'Where can I find sample ARM templates?', and 'Difference between ARM Template, Terraform & Bicep?'. Below the tabs, there is a message 'New! Deployment Stacks let you manage the lifecycle of your deployments. Try it now →'. The 'Template' section shows a 'Customized template' (4 resources) with options to 'Edit template', 'Edit parameters', and 'Visualize'. The 'Project details' section allows selecting a subscription ('Azure for Students') and a resource group ('az104-r4'). The 'Instance details' section specifies the region as '(Asia Pacific) East Asia' and the virtual network as 'ManufacturingVnet'. At the bottom, there are 'Previous', 'Next', and 'Review + create' buttons.

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

#### • Verify ManufacturingVnet and Subnets:

The image consists of three vertically stacked screenshots of the Microsoft Azure portal, all sharing the same header and footer.

**Header:** Microsoft Azure | Search resources, services, and docs (G+) | Copilot | Help | Settings | Log out | bse2280138@szabist.pk | DEFAULT DIRECTORY (BSE2280138)

**Screenshot 1: ManufacturingVnet Overview**

ManufacturingVnet | Virtual network

Overview | Activity log | Access control (IAM) | Tags | Diagnose and solve problems | Resource visualizer | Settings | Monitoring | Automation | CLI / PS | Tasks | Export template | Help

Tags (edit) : Add tags

Topology Properties Capabilities (5) Recommendations Tutorials

Essentials

Resource group (move) : az104-rg4	Address space : 10.30.0.0/16
Location (move) : East Asia	Subnets : 3 subnets
Subscription (move) : Azure for Students	DNS servers : Azure provided DNS service
Subscription ID : 57a8b5a5-89cd-44d7-aaaf-c65ebdf15a43	BGP community string : Configure
	Virtual network ID : 2f131b26-beef-4e77-a124-72b1ef0d2b33

DDoS protection | Azure Firewall | Peering | Microsoft Defender for Cloud

Not configured | Not configured | Not configured | Not configured

**Screenshot 2: ManufacturingVnet | Address space**

ManufacturingVnet | Address space

Address space

Add address space | Refresh

The address space for a virtual network is composed of one or more non-overlapping address ranges that are specified in CIDR notation. IP Address Management (IPAM) is recommended to simplify address management and avoid overlapping address space. When not using IPAM, it is recommended to use an address range that is not globally routable, such as 172.16.0.0/12, or a range defined in RFC 1918 or RFC 6598. Learn more.

Address space	Address range	Address count
10.30.0.0/16	10.30.0.0 /16 10.30.0.0 - 10.30.255.255	65,536 addresses

Peered virtual network address space

Peering name	Peered to	Address space	Address range

Save | Cancel | Give feedback

**Screenshot 3: ManufacturingVnet | Subnets**

ManufacturingVnet | Subnets

Subnets

+ Subnet | Refresh | Manage users | Delete | Export to CSV

Create subnets to segment the 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.

Name ↑	IPv4	IPv6	Available IPs	Delegated to	Security group	Route table
default	10.30.0.0/24	-	251	-	-	
SensorSubnet1	10.30.20.0/24	-	251	-	-	
SensorSubnet2	10.30.21.0/24	-	251	-	-	

Showing 3 subnets | Give feedback

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

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

- **Create Application Security Group (ASG):**

Validation passed

Basics Tags Review + create

Subscription: Azure for Students  
Resource group: az104-rg4  
Location: East Asia  
Name: asg-web

Create < Previous Next > Download a template for automation

Search Overview

Activity log Access control (IAM) Tags Resource visualizer

Essentials

Resource group (move) az104-rg4

Location (move) East Asia

Subscription (move) Azure for Students

Subscription ID 57a8b5a5-89cd-44d7-aaa-fc65ebdf15a43

Provisioning state Succeeded

Tags (edit) Add tags

Add or remove resources from this resource group

- **Create Network Security Group (NSG):**

Validation passed

Basics Tags Review + create

Subscription: Azure for Students  
Resource group: az104-rg4  
Region: East Asia  
name: myNSGSecure

Tags None

Create < Previous Next > Download a template for automation

Deployment succeeded

Deployment 'CreateNetworkSecurityGroupBladeV2-20251220200604' to resource group 'az104-rg4' was successful.

Go to resource Pin to dashboard

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

- Associate NSG with Subnet:

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

Home > CreateNetworkSecurityGroupBladeV2-20251220200604 | Overview > myNSGSecure

**myNSGSecure | Subnets**

Network security group

Associate

Search subnets

Name	Address range	Virtual network
SharedServicesSubnet	10.20.10.0/24	CoreServicesVnet

Saving subnet  
Successfully saved network security group for subnet 'SharedServicesSubnet'.

Give feedback

- Configure Inbound Rule to Allow ASG Traffic:

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

Home > CreateNetworkSecurityGroupBladeV2-20251220200604 | Overview > myNSGSecure

**myNSGSecure | Inbound security rules**

Network security group

Add inbound security rule

Source: Application security group: asg-web

Source application security groups: asg-web

Source port ranges: 80,443

Destination: Any

Service: Custom

Destination port ranges: 80,443

Protocol: TCP

Add Cancel Give feedback

Action: Allow

Priority: 100

Name: AllowASG

Description:

Action	Name	Port	Protocol	Source	Destination	Allow	More
<input checked="" type="checkbox"/>	AllowASG	80,443	TCP	ASG-WEBSITE	Any	Allow	
<input type="checkbox"/>	AllowVnetInBound	Any	Any	VirtualNetwork	VirtualNetwork	Allow	
<input type="checkbox"/>	AllowAzureLoadBalancerInBo--	Any	Any	AzureLoadBalancer	Any	Allow	
<input type="checkbox"/>	DenyAllInBound	Any	Any	Any	Any	Deny	

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

- Configure Outbound Rule to Deny Internet Access:

**Add outbound security rule**

myNSGSecure

Source: Any

Source port ranges: \* (dropdown menu)

Destination: Service Tag

Destination service tag: Internet

Service: Custom

Destination port ranges: \* (dropdown menu)

Protocol: Any (radio button selected)

Action: Deny (radio button selected)

**Priority**: 4096

**Name**: DenyInternetOutbound

Action

- Allow
- Deny

Priority \*

4096

Name \*

DenyInternetOutbound

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

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

## Task 4: Configure public and private Azure DNS zones.

### Public DNS Zone

- Create Public DNS Zone:

The screenshot shows the 'Create a DNS Zone' wizard in the Microsoft Azure portal. The current step is 'Review + Create'. The 'Validation passed' message is displayed. The 'Basics' tab is selected, showing the following details:

Subscription	Azure for Students
Resource group	az104-rg4
Resource group location	East Asia
Name	contoso.az104

The 'DNS Zone Record Set(s)' section indicates 0 record set(s). At the bottom, there are 'Create', '< Previous', 'Next >', and 'Give feedback' buttons.

- Add A Record (www):

The screenshot shows the 'Add record set' dialog for the 'contoso.az104' zone. The 'Name' field is set to 'www' and the 'Type' field is set to 'A - IPv4 Address records'. The 'Alias record set' dropdown is set to 'No'. The 'TTL' field is set to '1'. The 'IP address' field contains '10.1.1.4'. The 'Add' and 'Cancel' buttons are visible at the bottom.

The screenshot shows the 'Records' table for the 'contoso.az104' zone. It displays three record sets:

Name	Type	TTL	Value	Alias resource type	Alias target
@	NS	172800	ns1.05.azure-dns.com. ns2.05.azure-dns.net. ns3.05.azure-dns.org. ns4.05.azure-dns.info.		
@	SOA	3600	Email: azuredns-hostmaster.microsoft.com Host: ns1.05.azure-dns.com. Refresh: 3600 Retry: 300 Expire: 2419200 Minimum TTL: 300 Serial number: 1		
www	A	3600	10.1.1.4		

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

- Verify DNS Resolution Using nslookup:

```
PS /home/ariha> nslookup www.contoso.az104 ns1-05.azure-dns.com
Server:      ns1-05.azure-dns.com
Address:     13.107.236.5#53

Name:        www.contoso.az104
Address:    10.1.1.4
```

## Private DNS Zone

- Create Private DNS Zone:

The screenshot shows the 'Create Private DNS Zone' wizard in the Microsoft Azure portal. The 'Review + Create' tab is selected. A green validation bar at the top indicates 'Validation passed'. Below it, there are tabs for Basics, Private DNS Zone Editor, Virtual Network Links, Tags, and Review + Create. The Basics section shows the following details:

Subscription	Azure for Students
Resource group	az104-r4
Resource group location	East Asia
Name	private.contoso.az104

The DNS Zone Record Set(s) section shows 0 record set(s). The Virtual network link(s) section shows 0 virtual network link(s). At the bottom, there are 'Create' and 'Next >' buttons.

- Link Private DNS Zone to Virtual Network:

The screenshot shows the 'private.contoso.az104 | Overview' page in the Microsoft Azure portal. The left sidebar has sections like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings, DNS Management, Recordsets, and Virtual Network Links (which is currently selected). The main area shows a table of virtual network links:

Link Name	Link Status	Virtual Network	Auto-Registration	Fallback to Internet
manufacturing-link	Completed	ManufacturingVnet	Disabled	Disabled

A success message in a toast notification says: 'Creating virtual network link' and 'Successfully created virtual network link 'manufacturing-link''. The URL in the address bar is 'Home > private.contoso.az104\_1766245871614 | Overview > private.contoso.az104'.

## INTRODUCTION TO CLOUD COMPUTING

### Lab Task 03 (Implement Virtual Networking)

#### • Add Private DNS A Record:

The screenshot shows the Microsoft Azure Private DNS zone interface for the domain `private.contoso.az104`. On the left, the navigation menu includes options like Overview, Activity log, Access control (IAM), Tags, Diagnose and solve problems, Resource visualizer, Settings, DNS Management, and Records. The Records section is selected, showing a table with one existing SOA record. On the right, a modal window titled "Add record set" is open, allowing the creation of a new A record named "sensorvm". The IP address is set to "10.1.1.4". Other fields include TTL (set to 1) and TTL unit (set to Hours). The "Add" button is visible at the bottom of the modal.

The screenshot shows the same Microsoft Azure Private DNS zone interface after the A record has been added. The table now displays two records: a SOA record and the newly created A record "sensorvm" with the value "10.1.1.4". The "Auto registered" column shows "False" for both entries. The "Edit" and "Delete" icons are visible next to each record entry.