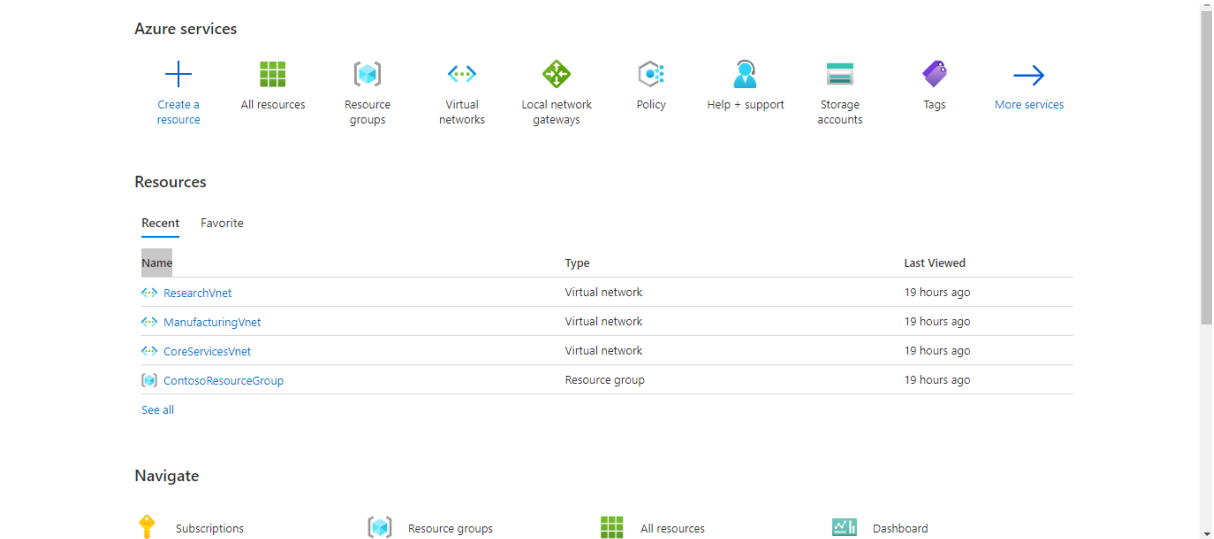


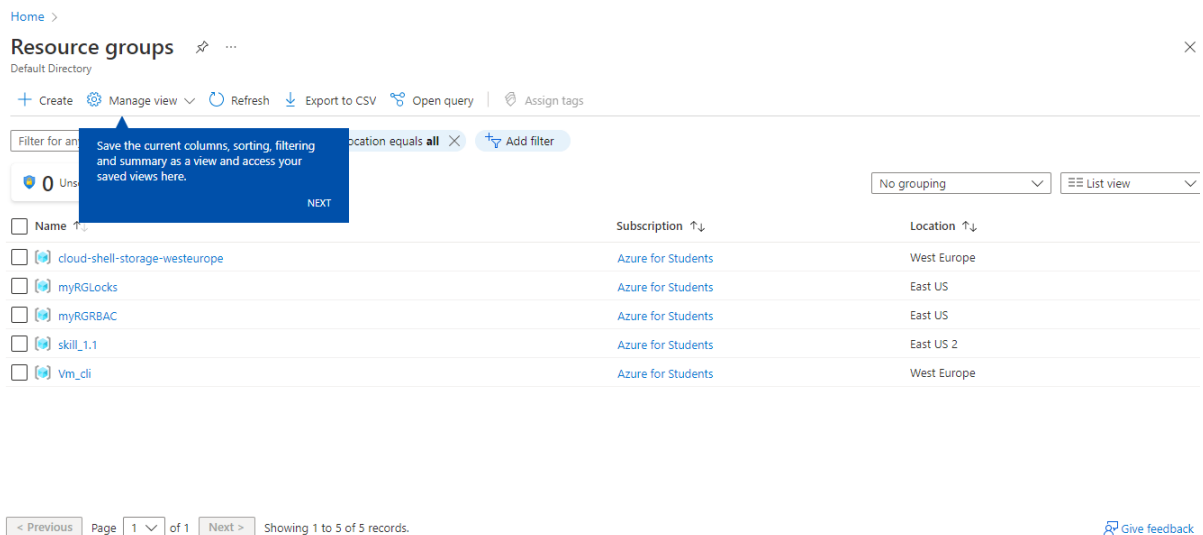
Design and Implement a Virtual Network in Azure

Task 1: Create the Contoso resource group

1. Go to Azure portal.



2. On the home page, under Azure services, select Resource groups.



3. In Resource groups, select + Create.

[Home](#) > [Resource groups](#) >

Create a resource group


Basics

Tags


Review + create

Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#)


Project details

Subscription * 

Azure for Students

Resource group * 

Resource details

Region * 

(US) East US

Review + create

< Previous

Next : Tags >

4. Use the information in the following table to create the resource group.

[Home](#) > [Resource groups](#) >

Create a resource group


Basics

Tags


Review + create

Resource group - A container that holds related resources for an Azure solution. The resource group can include all the resources for the solution, or only those resources that you want to manage as a group. You decide how you want to allocate resources to resource groups based on what makes the most sense for your organization. [Learn more](#)

Project details


Subscription * 

Azure for Students

Resource group * 

ContosoResourceGroup

Resource details

Region * 

(US) East US

Review + create

< Previous

Next : Tags >

5. In Resource groups, verify that ContosoResourceGroup appears in the list.

Home >

Resource groups

Default Directory

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

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

0 Unsecure resources No grouping List view

Name	Subscription	Location
ContosoResourceGroup	Azure for Students	East US

< Previous Page 1 of 1 Next > Showing 1 to 1 of 1 records. Give feedback

Task 2: Create the CoreServicesVnet virtual network and subnets

1. On the Azure portal home page, navigate to the Global Search bar and search Virtual Networks and select virtual networks under services.

Home >

Virtual networks

Default Directory

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

Filter for any field... resource group equals all Location equals all Add filter

No grouping List view

Name	Resource group	Location	Subscription
------	----------------	----------	--------------

Save the current columns, sorting, filtering and summary as a view and access your saved views here.

Next

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

Give feedback

2. Select Create on the Virtual networks page

[Home](#) > [Virtual networks](#) >

Create virtual network ...

×

[Basics](#) [IP Addresses](#) [Security](#) [Tags](#) [Review + create](#)

Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. VNet enables many types of 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 about virtual network](#)

Project details

Subscription * ⓘ

Resource group * ⓘ
[Create new](#)

Instance details

Name *

Region *

[Review + create](#)

[< Previous](#)

[Next : IP Addresses >](#)

[Download a template for automation](#)

3. Use the information in the following table to create the CoreServicesVnet virtual network.

Remove or overwrite the default IP Address space

[Home](#) > [Virtual networks](#) >

Create virtual network ...

×

[Basics](#) [IP Addresses](#) [Security](#) [Tags](#) [Review + create](#)

Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. VNet enables many types of 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 about virtual network](#)

Project details

Subscription * ⓘ

Resource group * ⓘ
[Create new](#)

Instance details

Name * ✓

Region *

[Review + create](#)

[< Previous](#)

[Next : IP Addresses >](#)

[Download a template for automation](#)

Create virtual network ...

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

The virtual network's address space, specified as one or more address prefixes in CIDR notation (e.g. 192.168.1.0/24).

IPv4 address space

10.0.0.0/16 10.0.0.0 - 10.0.255.255 (65536 addresses)

10.20.0.0/16

☐ Add IPv6 address space ⓘ

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.

[+ Add subnet](#) Remove subnet

<input type="checkbox"/> Subnet name	Subnet address range	NAT gateway
<input type="checkbox"/> default	10.0.0.0/24	-

[Review + create](#)[< Previous](#)[Next : Security >](#)[Download a template for automation](#)

4. Use the information in the following table to create the CoreServicesVnet subnets

5. To begin creating each subnet, select + Add subnet. To finish creating each subnet, select Add.

Create virtual network ...

☐ Add IPv6 address space ⓘ

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.

[+ Add subnet](#) Remove subnet

<input type="checkbox"/> Subnet name	Subnet address range	NAT gateway
<input type="checkbox"/> default	10.0.0.0/24	-
<input type="checkbox"/> GatewaySubnet	10.20.0.0/27	-
<input type="checkbox"/> SharedServicesSubnet	10.20.10.0/24	-
<input type="checkbox"/> DatabaseSubnet	10.20.20.0/24	-
<input type="checkbox"/> PublicWebServiceSubnet	10.20.30.0/24	-

ⓘ Use of a NAT gateway is recommended for outbound internet access from a subnet. You can deploy a NAT gateway and assign it to a subnet after you create the virtual network. [Learn more](#) ⓘ

[Review + create](#)[< Previous](#)[Next : Security >](#)[Download a template for automation](#)

6. To finish creating the CoreServicesVnet and its associated subnets, select Review + create

Home > Virtual networks >

Create virtual network ...

✓ Validation passed

Basics IP Addresses Security Tags Review + create

Basics

Subscription	Azure for Students
Resource group	ContosoResourceGroup
Name	CoreServicesVnet
Region	East US

IP addresses

Address space	10.0.0.0/16, 10.20.0.0/16
Subnet	default (10.0.0.0/24), GatewaySubnet (10.20.0.0/27), SharedServicesSubnet (10.20.10.0/24), DatabaseSubnet (10.20.20.0/24), PublicWebServiceSubnet (10.20.30.0/24)

Tags

[Create](#) < Previous Next > [Download a template for automation](#)

7. Verify your configuration passed validation, and then select **Create**.

Home >

Microsoft.VirtualNetwork-20220725135013 | Overview ☆ ...

Deployment

Search (Ctrl+/) << Delete Cancel Redeploy Refresh

Overview Inputs Outputs Template

✓ We'd love your feedback! →

✓ Your deployment is complete

Deployment name: Microsoft.VirtualNetwork-2022072513... Start time: 7/25/2022, 2:01:31 PM
Subscription: Azure for Students Correlation ID: 5504f817-c073-4eb4-b204-f8e31aafbbd8

Resource group: ContosoResourceGroup

Deployment details (Download)

Next steps

[Go to resource](#)

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Task 3: Create the ManufacturingVnet virtual network and subnets

[Home](#) > [Virtual networks](#) >

Create virtual network

BasicsIP AddressesSecurityTagsReview + create

Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure. VNet enables many types of 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 about virtual network](#)

Project details

Subscription *

Azure for Students

Resource group *

ContosoResourceGroup

Create new

Instance details

Name *

ManufacturingVnet

Region *

West Europe

Review + create

< Previous

Next : IP Addresses >

Download a template for automation

[Home](#) > [Virtual networks](#) >

Create virtual network

BasicsIP AddressesSecurityTagsReview + create

The virtual network's address space, specified as one or more address prefixes in CIDR notation (e.g. 192.168.1.0/24).

IPv4 address space

10.1.0.0/16

10.1.0.0 - 10.1.255.255 (65536 addresses)

10.30.0.0/16

☐ Add IPv6 address space

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.

+ Add subnet

Remove subnet

<input type="checkbox"/> Subnet name	Subnet address range	NAT gateway
<input type="checkbox"/> default	10.1.0.0/24	-

Review + create

< Previous

Next : Security >

Download a template for automation

To begin creating each subnet, select + Add subnet. To finish creating each subnet, select Add.

Home > Virtual networks >

Create virtual network

10.1.0.0/16 10.1.0.0 - 10.1.255.255 (256,000 addresses)

10.30.0.0/16 ✓

☐ Add IPv6 address space ⓘ

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.

+ Add subnet Remove subnet

<input type="checkbox"/> Subnet name	Subnet address range	NAT gateway
<input type="checkbox"/> default	10.1.0.0/24	-
<input type="checkbox"/> ManufacturingSystemSubnet	10.30.10.0/24	-
<input type="checkbox"/> SensorSubnet1	10.30.20.0/24	-
<input type="checkbox"/> SensorSubnet2	10.30.21.0/24	-
<input type="checkbox"/> SensorSubnet3	10.30.22.0/24	-

[Review + create](#) [< Previous](#) [Next : Security >](#) [Download a template for automation](#)

To finish creating the CoreServicesVnet and its associated subnets, select Review + create.

Home > Virtual networks >

Create virtual network

✓ Validation passed

Basics IP Addresses Security Tags Review + create

Basics

Subscription	Azure for Students
Resource group	ContosoResourceGroup
Name	ManufacturingVnet
Region	West Europe

IP addresses

Address space	10.1.0.0/16, 10.30.0.0/16
Subnet	default (10.1.0.0/24), ManufacturingSystemSubnet (10.30.10.0/24), SensorSubnet1 (10.30.20.0/24), SensorSubnet2 (10.30.21.0/24), SensorSubnet3 (10.30.22.0/24)

Tags

[Create](#) [< Previous](#) [Next >](#) [Download a template for automation](#)

Verify your configuration passed validation, and then select Create

The screenshot shows the Azure portal interface for a virtual network named 'ManufacturingVnet'. The left sidebar contains navigation options like 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, and DNS servers. The main content area displays the 'Essentials' section with details such as Resource group (ContosoResourceGroup), Location (West Europe), Subscription (Azure for Students), and Subscription ID. It also shows Address space (10.1.0.0/16), DNS servers (Azure provided DNS service), Flow timeout, BGP community string, and Virtual network ID. Below this, there are tabs for Topology, Capabilities (5), Recommendations, and Tutorials. The 'Capabilities' tab is active, showing five cards: DDoS protection, Azure Firewall, Peerings, Security, and Private endpoints. Each card indicates a status (e.g., 'Not configured') and provides a link to configure it.

Task 4: Create the ResearchVnet virtual network and subnets

The screenshot shows the 'Create virtual network' wizard in the Azure portal, specifically the 'Basics' tab. The wizard is titled 'Create virtual network' and includes a breadcrumb trail: Home > virtual networks > Create virtual network. Below the title, there are tabs for Basics, IP Addresses, Security, Tags, and Review + create. The 'Basics' tab is selected, and it contains a description of Azure Virtual Network (VNet) and a link to 'Learn more about virtual network'. The 'Project details' section includes dropdown menus for Subscription (Azure for Students) and Resource group (ContosoResourceGroup). The 'Instance details' section includes input fields for Name (ResearchVnet) and Region (Southeast Asia). At the bottom, there are buttons for 'Review + create', '< Previous', 'Next : IP Addresses >', and a link to 'Download a template for automation'.


Create virtual network ...




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

The virtual network's address space, specified as one or more address prefixes in CIDR notation (e.g. 192.168.1.0/24).

IPv4 address space

10.2.0.0/16 10.2.0.0 - 10.2.255.255 (65536 addresses) 

10.40.0.0/16  

☐ Add IPv6 address space ⓘ

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.


+ Add subnet  Remove subnet



<input type="checkbox"/> Subnet name	Subnet address range	NAT gateway
<input type="checkbox"/> default	10.2.0.0/24	-

Review + create < Previous Next : Security > [Download a template for automation](#)

Create virtual network ...



10.2.0.0/16 10.2.0.0 - 10.2.255.255 (65536 addresses) 

10.40.0.0/16  

☐ Add IPv6 address space ⓘ

The subnet's address range in CIDR notation (e.g. 192.168.1.0/24). It must be contained by the address space of the virtual network.

+ Add subnet  Remove subnet

<input type="checkbox"/> Subnet name	Subnet address range	NAT gateway
<input type="checkbox"/> default	10.2.0.0/24	-
<input type="checkbox"/> ResearchSystemSubnet	10.40.0.0/24	-

 Use of a NAT gateway is recommended for outbound internet access from a subnet. You can deploy a NAT gateway and assign it to a subnet after you create the virtual network. [Learn more](#) ⓘ

Review + create < Previous Next : Security > [Download a template for automation](#)

[Home](#) > [Virtual networks](#) >

Create virtual network ...

×

✓ Validation passed

Basics IP Addresses Security Tags Review + create

Basics

Subscription Azure for Students
Resource group ContosoResourceGroup
Name ResearchVnet
Region Southeast Asia

IP addresses

Address space 10.2.0.0/16, 10.40.0.0/16
Subnet default (10.2.0.0/24), ResearchSystemSubnet (10.40.0.0/24)

Tags

None

Create

< Previous

Next >

[Download a template for automation](#)

[Home](#) >

Microsoft.VirtualNetwork-20220725153150 | Overview ...

×

Deployment
Search (Ctrl+/) << Delete Cancel Redeploy Refresh

Overview

Inputs

Outputs

Template

✓ We'd love your feedback! →

✓ Your deployment is complete

Deployment name: Microsoft.VirtualNetwork-2022072515... Start time: 7/25/2022, 3:37:11 PM
Subscription: Azure for Students Correlation ID: da57e931-17b0-4bc9-8a50-9b7b0ed221a4
Resource group: ContosoResourceGroup

Deployment details (Download)

Next steps

Go to resource



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HOME / MICROSOFT Azure / Virtual network

ResearchVnet

Virtual network

Search (Ctrl+/)

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 (move): ContosoResourceGroup

Location (move): Southeast Asia

Subscription (move): Azure for Students

Subscription ID: 2a8e3ab1-f621-4dd7-a587-e036a332e9c4

Address space: 10.2.0.0/16, 1 more

DNS servers: Azure provided DNS service

Flow timeout: Configure

BGP community string: Configure

Virtual network ID: 21dd042a-be94-4b49-b373-167c692baeb4

Tags (edit): Click here to add tags

JSON View

Topology Capabilities (5) Recommendations Tutorials

DDoS protection

Configure additional protection from distributed denial of service

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

Security

Filter network traffic to and from

Private endpoints

Privately access Azure services

Task 5: Verify the creation of VNets and Subnets

Home >

All resources

Default Directory

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

Filter for all resources resource group equals all Type equals all Location equals all Add filter

0 Unsaved views

Save the current columns, sorting, filtering and summary as a view and access your saved views here.

Next

Name	Type	Resource group	Location	Subscription
CoreServicesVnet	Virtual network	ContosoResourceGroup	East US	Azure for Students
ManufacturingVnet	Virtual network	ContosoResourceGroup	West Europe	Azure for Students
NetworkWatcher_eastus	Network Watcher	NetworkWatcherRG	East US	Azure for Students
NetworkWatcher_southeastasia	Network Watcher	NetworkWatcherRG	Southeast Asia	Azure for Students
NetworkWatcher_westeurope	Network Watcher	NetworkWatcherRG	West Europe	Azure for Students
ResearchVnet	Virtual network	ContosoResourceGroup	Southeast Asia	Azure for Students

No grouping List view

< Previous Page 1 of 1 Next > Showing 1 to 6 of 6 records.

Give feedback

2. Verify that the CoreServicesVnet, ManufacturingVnet, and ResearchVnet are listed

Home > All resources

Default Directory

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

Filter for all Save the current columns, sorting, filtering and summary as a view and access your saved views here. resource group equals all Type equals all Location equals all Add filter

No grouping List view

Name	Type	Resource group	Location	Subscription
CoreServicesVnet	Virtual network	ContosoResourceGroup	East US	Azure for Students
ManufacturingVnet	Virtual network	ContosoResourceGroup	West Europe	Azure for Students
NetworkWatcher_eastus	Network Watcher	NetworkWatcherRG	East US	Azure for Students
NetworkWatcher_southeastasia	Network Watcher	NetworkWatcherRG	Southeast Asia	Azure for Students
NetworkWatcher_westeurope	Network Watcher	NetworkWatcherRG	West Europe	Azure for Students
ResearchVnet	Virtual network	ContosoResourceGroup	Southeast Asia	Azure for Students

< Previous Page 1 of 1 Next > Showing 1 to 6 of 6 records. Give feedback

3-6 .In CoreServicesVnet | Subnets, verify that the subnets you created are listed, and that the IP address ranges are correct.

Home > All resources > CoreServicesVnet

All resources

Default Directory

+ Create Manage view

Filter for any field...

Name

- CoreServicesVnet
- ManufacturingVnet
- NetworkWatcher_eastus
- NetworkWatcher_southeastasia
- NetworkWatcher_westeurope
- ResearchVnet

CoreServicesVnet | Subnets

Virtual network

Search (Ctrl+/)

+ Subnet + Gateway subnet Refresh Manage users Delete

Search subnets

Name	IPv4	IPv6	Available IPs	Delegated to
default	10.0.0.0/24	-	251	-
GatewaySubnet	10.20.0.0/27	-	availability dependent ...	-
SharedServicesSubnet	10.20.10.0/24	-	251	-
DatabaseSubnet	10.20.20.0/24	-	251	-
PublicWebServiceSub...	10.20.30.0/24	-	251	-

Page 1 of 1

ManufacturingVnet

Home > All resources >

All resources

Default Directory

+ Create

Manage view

Filter for any field...

Name

CoreServicesVnet

ManufacturingVnet

NetworkWatcher_eastus

NetworkWatcher_southeastasia

NetworkWatcher_westeurope

ResearchVnet

Page 1 of 1

ManufacturingVnet

Virtual network

Search (Ctrl+J)

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 (move)

ContosoResourceGroup

Location (move)

West Europe

Subscription (move)

Azure for Students

Subscription ID

2a8e3ab1-f621-4dd7-a587-e036a332e9c4

Tags (edit)

Click here to add tags

Topology

Capabilities (5)

Recommendations

Tutorials

DDoS protection

Azure Firewall

Address space

10.1.0.0/16, 1 more

DNS servers

Azure provided DNS service

Flow timeout

Configure

BGP community string

Configure

Virtual network ID

149194e4-ae00-4b67-b529-fc36c3292cc8

JSON View

Home > All resources > ManufacturingVnet

All resources

Default Directory

+ Create

Manage view

Filter for any field...

Name

CoreServicesVnet

ManufacturingVnet

NetworkWatcher_eastus

NetworkWatcher_southeastasia

NetworkWatcher_westeurope

ResearchVnet

Page 1 of 1

ManufacturingVnet | Subnets

Virtual network

Search (Ctrl+J)

+ Subnet

+ Gateway subnet

Refresh

Manage users

Delete

Search subnets

Name	IPv4	IPv6	Available IPs	Delegated to
default	10.1.0.0/24	-	251	-
ManufacturingSystem...	10.30.10.0/24	-	251	-
SensorSubnet1	10.30.20.0/24	-	251	-
SensorSubnet2	10.30.21.0/24	-	251	-
SensorSubnet3	10.30.22.0/24	-	251	-

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

ResearchVnet

Home > All resources >

All resources

Default Directory

+ Create

Manage view

Filter for any field...

Name ↑↓

CoreServicesVnet

ManufacturingVnet

NetworkWatcher_eastus

NetworkWatcher_southeastasia

NetworkWatcher_westeurope

ResearchVnet

Page 1 of 1

ResearchVnet

Virtual network

Search (Ctrl+/)

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 (move)

ContosoResourceGroup

Location (move)

Southeast Asia

Subscription (move)

Azure for Students

Subscription ID

2a8e3ab1-f621-4dd7-a587-e036a332e9c4

Tags (edit)

Click here to add tags

Topology

Capabilities (5)

Recommendations

Tutorials

JSON View

Address space

10.2.0.0/16, 1 more

DNS servers

Azure provided DNS service

Flow timeout

Configure

BGP community string

Configure

Virtual network ID

21dd042a-be94-4b49-b373-167c692baeb4

DDoS protection

Configure additional protection

Azure Firewall

Protect your network with a

Home > All resources > ResearchVnet

All resources

Default Directory

+ Create

Manage view

Filter for any field...

Name ↑↓

CoreServicesVnet

ManufacturingVnet

NetworkWatcher_eastus

NetworkWatcher_southeastasia

NetworkWatcher_westeurope

ResearchVnet

Page 1 of 1

ResearchVnet | Subnets

Virtual network

Search (Ctrl+/)

+ Subnet

+ Gateway subnet

Refresh

Manage users

Delete

Search subnets

Name ↑↓	IPv4 ↑↓	IPv6 ↑↓	Available IPs ↑↓	Delegated to ↑↓
default	10.2.0.0/24	-	251	-
ResearchSystemSubnet	10.40.0.0/24	-	251	-