



# Microsoft Cloud Workshop

Establishing Network Connectivity in Azure  
Hands-on lab step-by-step

August 2018

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# Establishing Network Connectivity in Azure

## hands-on lab step-by-step

### Abstract and learning objectives

The student will build a series of resources over a few labs that will present a logical network, covering Azure native networking services in Azure. All step-by-step configurations will be done via the portal to build familiarity.

Attendees will be better able to understand all the proper technical terminology surrounding Azure Networking as well as design robust networking in Azure.

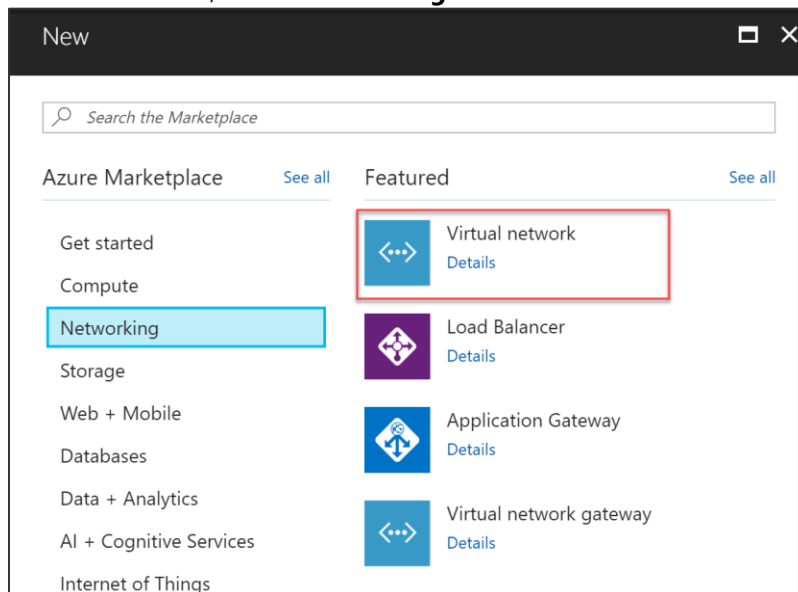
## Networking References

- 1) [Azure Virtual Network Overview](#)
- 2) [Azure Virtual Network FAQ](#)
- 3) [IP Addresses](#)
  - a. [Public IP Addresses](#)
  - b. [Internal IP Addresses](#)
- 4) DNS
  - a. [Azure DNS](#)
  - b. [Name Resolution for Azure VNets](#)
- 5) Connectivity for Azure Virtual Networks
  - a. [Site-to-Site VPN](#)
  - b. [VNet-to-VNet VPN](#)
  - c. [Point-to-Site VPN](#)
  - d. [Regional VNet Peering](#)
  - e. [Global VNet Peering](#)
  - f. [ExpressRoute Overview](#)
- 6) Load Balancers
  - a. [Azure Load Balancer](#)
  - b. [Azure Traffic Manager](#)
  - c. [Azure Application Gateway](#)
- 7) Network Security Strategies
  - a. [DMZ Between Azure and On-Premises](#)
  - b. [DMZ Between Azure and the Internet](#)
  - c. [Network Security Groups](#)
  - d. [User Defined Routes](#)
  - e. [Virtual Network Service Tunneling](#)
  - f. [Web Application Firewall](#)
  - g. [Service Endpoints](#)
  - h. [Network Virtual Appliances](#)
- 8) Monitoring
  - a. [Network Watcher](#)
  - b. [Network Performance Monitor Overview](#) & [Solution](#)
  - c. [ExpressRoute Monitor](#)
  - d. [DNS Analytics](#)
  - e. [Service Endpoint Monitoring](#)

## Exercise 1: Create Virtual Networks & Establish Connectivity Between Regions (VNet-to-VNet VPN Gateway)

### Task 1: Create a VNET in the first region with 2 subnets

1. Browse to the Azure portal and login: <https://portal.azure.com/>.
2. In the left pane, click + **Create Resource**.
3. In the **New** blade, select **Networking > Virtual Network**.



4. For the **Create virtual network** settings, enter the following information:
  - a. Name: **AJG-EUS2-VNet1**
  - b. Address space: **10.1.0.0/16**
  - c. Subnet name: **SharedServices**
  - d. Subnet address range: **10.1.1.0/24**
  - e. Subscription: **Choose your subscription**
  - f. Resource group: **AJGNetworking**
  - g. Location: **East US 2**
  - h. Leave **DDoS Protection** at **Basic** and **Service Endpoints** as **Disabled**.
  - i. Click the **Create** button to continue.

Create virtual network

✕

Name

AJG-EUS2-VNet1

Address space

10.1.0.0/16

10.1.0.0 - 10.1.255.255 (65536 addresses)

Subscription

Shannon Visual Studio Enterprise

Resource group

☒ Create new
 ☐ Use existing

AJGNetworking

Location

East US 2

Subnet

Name

SharedServices

Address range

10.1.1.0/24

10.1.1.0 - 10.1.1.255 (256 addresses)

DDoS protection

☒ Basic
 ☐ Standard

Service endpoints

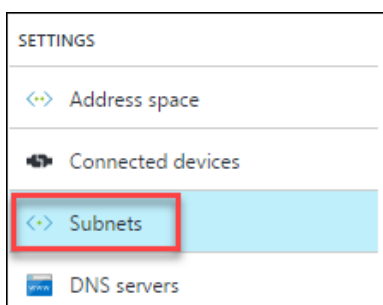
Disabled

Enabled

Create

Automation options

5. Once the deployment is complete, add one more subnet to the VNET. To do this, select the **Subnets** > icon in the **Settings** area.



6. Click the **+ Gateway Subnet** option, and enter the following settings:

☒ Subnet
 ☒ **Gateway subnet**

Search subnets				
NAME	ADDRESS RANGE	AVAILABLE ADDRESSES	SECURITY GROUP	
SharedServices	10.1.1.0/24	251	-	...

- a. The name (GatewaySubnet) cannot be changed and will be grayed out.

- b. Address range (CIDR block): **10.1.0.0/27**
- c. Leave the Route Table at None and do not configure Service Endpoints.
- d. Click the **OK** button to add this subnet:

Add subnet

AJG-EUS2-VNet1

Name

GatewaySubnet

Address range (CIDR block)

10.1.0.0/27

10.1.0.0 - 10.1.0.31 (27 + 5 Azure reserved addresses)

Route table

None

Service endpoints

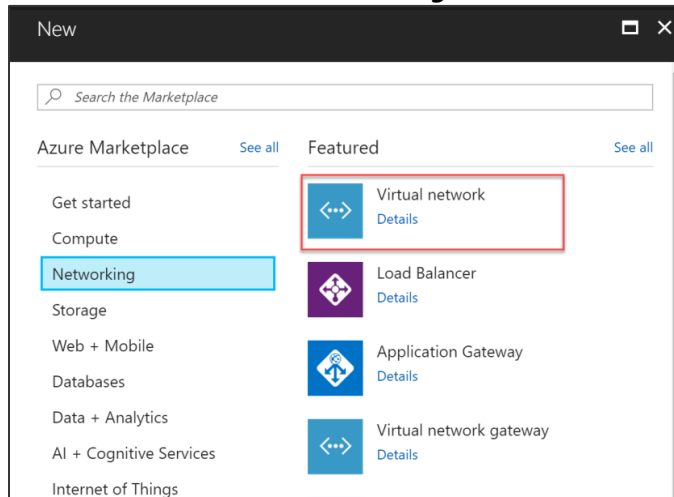
Services

0 selected

OK

## Task 2: Create a VNET in the second region with 2 subnets

1. In the left pane, click + **Create Resource**.
2. In the **New** blade, select **Networking > Virtual Network**.



3. For the **Create virtual network** settings, enter the following information:
  - a. Name: **AJG-WUS2-VNet1**
  - b. Address space: **10.2.0.0/16**
  - c. Subnet name: **SharedServices**
  - d. Subnet address range: **10.2.1.0/24**
  - e. Subscription: **Choose your subscription**
  - f. Resource group: **AJGNetworking (use existing)**
  - g. Location: **West US 2**
  - h. Leave **DDoS Protection** at **Basic** and **Service Endpoints** as **Disabled**.
  - i. Click the **Create** button to continue.



Create virtual network

Name

AJG-WUS2-VNet1

Address space

10.2.0.0/16

10.2.0.0 - 10.2.255.255 (65536 addresses)

Subscription

Shannon Visual Studio Enterprise

Resource group

☐ Create new
 ☒ Use existing

AJGNetworking

Location

West US 2

Subnet

Name

SharedServices

Address range

10.2.1.0/24

10.2.1.0 - 10.2.1.255 (256 addresses)

DDoS protection

☒ Basic
 ☐ Standard

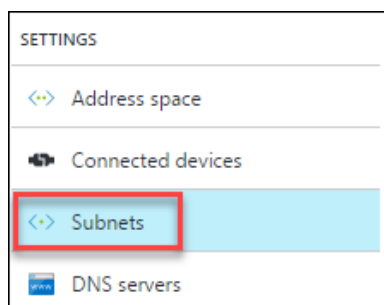
Service endpoints

Disabled
  Enabled

Create

Automation options

4. Once the deployment is complete, add one more subnet to the VNET. To do this, select the **Subnets** > icon in the **Settings** area.

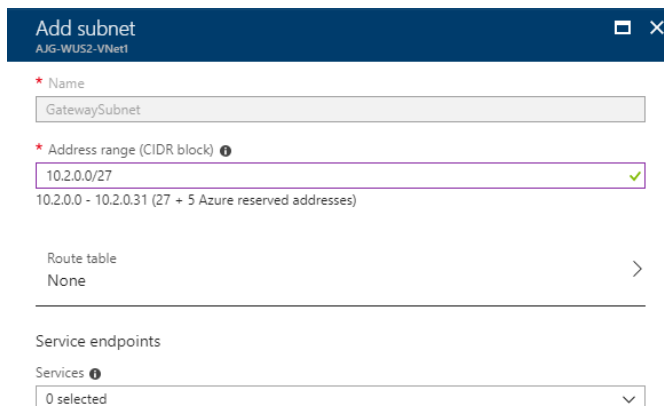


5. Click the **+ Gateway Subnet** option, and enter the following settings:

<div> <div>+ Subnet</div> <div>+ Gateway subnet</div> </div>														
<div> <div>Search subnets</div> <table> <tr> <th>NAME</th><th>ADDRESS RANGE</th><th>AVAILABLE ADDRESSES</th><th>SECURITY GROUP</th><th></th></tr> <tr> <td>SharedServices</td><td>10.1.1.0/24</td><td>251</td><td>-</td><td>...</td></tr> </table> </div>					NAME	ADDRESS RANGE	AVAILABLE ADDRESSES	SECURITY GROUP		SharedServices	10.1.1.0/24	251	-	...
NAME	ADDRESS RANGE	AVAILABLE ADDRESSES	SECURITY GROUP											
SharedServices	10.1.1.0/24	251	-	...										

- The name (GatewaySubnet) cannot be changed and will be grayed out.
- Address range (CIDR block): **10.2.0.0/27**

- c. Leave the Route Table at None and do not configure Service Endpoints.
- d. Click the **OK** button to add this subnet:



**Add subnet**  
AJG-WUS2-VNet1

\* Name  
GatewaySubnet

\* Address range (CIDR block) ⓘ  
10.2.0.0/27 ✓  
10.2.0.0 - 10.2.0.31 (27 + 5 Azure reserved addresses)

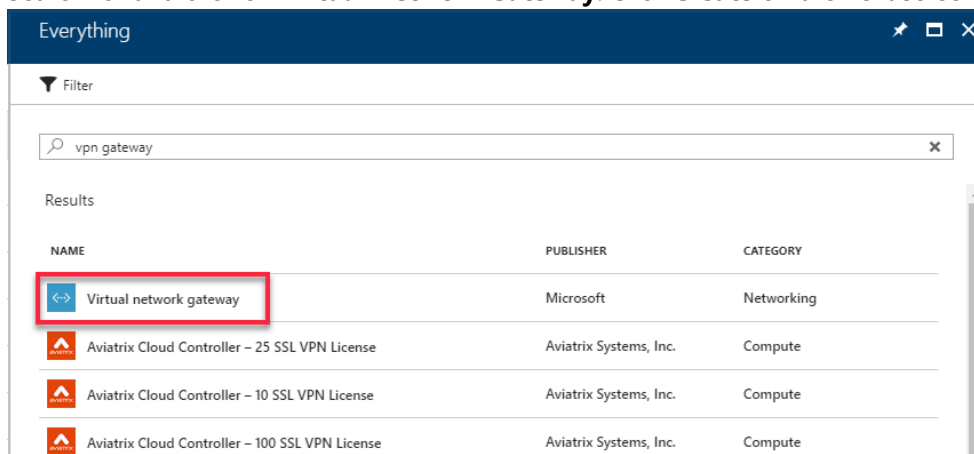
Route table  
None >

Service endpoints  
Services ⓘ  
0 selected

**OK**

### Task 3: Create a Virtual Network Gateway in first region

1. In the left pane, click + **Create Resource**.
2. Search for and click on **Virtual Network Gateway**. Click **Create** on the next screen







Everything

Filter

vpn gateway

Results

NAME	PUBLISHER	CATEGORY
 Virtual network gateway	Microsoft	Networking
 Aviatrix Cloud Controller – 25 SSL VPN License	Aviatrix Systems, Inc.	Compute
 Aviatrix Cloud Controller – 10 SSL VPN License	Aviatrix Systems, Inc.	Compute
 Aviatrix Cloud Controller – 100 SSL VPN License	Aviatrix Systems, Inc.	Compute

3. For the **Create virtual network gateway** settings, enter the following:

- a. Name: **AJG-EUS2-VPN**
- b. Gateway type: **VPN**
- c. VPN Type: **Route Based**
- d. SKU: **VpnGw1**
- e. Leave **Enable active-active mode** unchecked
- f. Virtual network: **AJG-EUS2-VNet1**
- g. Create new Public IP Address: **AJG-EUS2-VPN-pip**
- h. Leave Configure **BGP ASN** unchecked
- i. Click **Create** (this process will take approximately 40-45 minutes to create)

Create virtual network gateway

\* Name  
AJG-EUS2-VPN ✓

Gateway type ⓘ  
☒ VPN ☐ ExpressRoute

VPN type ⓘ  
☒ Route-based ☐ Policy-based

\* SKU ⓘ  
VpnGw1

☐ Enable active-active mode ⓘ

\* Virtual network ⓘ  
AJG-EUS2-VNet1 >

\* Gateway subnet address range ⓘ  
10.1.0.0/27 ✓  
10.1.0.0 - 10.1.0.31 (32 addresses)

\* Public IP address ⓘ  
☒ Create new ☐ Use existing

Configure public IP address

SKU  
Basic

\* Assignment  
☒ Dynamic ☐ Static

☐ Configure BGP ASN ⓘ

\* Subscription  
Shannon Visual Studio Enterprise

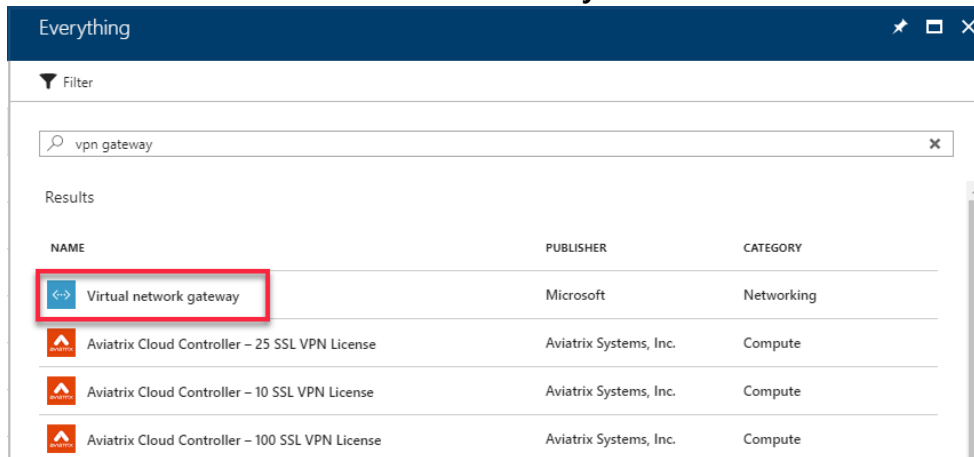
Resource group ⓘ  
AJGNetworking

\* Location ⓘ  
East US 2

Create Automation options

## Task 4: Create a Virtual Network Gateway in second region

1. In the left pane, click + **Create Resource**.
2. Search for and click on **Virtual Network Gateway**. Click **Create** on the next screen



3. For the **Create virtual network gateway** settings, enter the following:
  - a. Name: **AJG-WUS2-VPN**
  - b. Gateway type: **VPN**
  - c. VPN Type: **Route Based**
  - d. SKU: **VpnGw1**
  - e. Leave **Enable active-active mode** unchecked
  - f. Virtual network: **AJGVNet2**
  - g. Create new Public IP Address: **AJG-WUS-VPN-pip**
  - h. Leave Configure **BGP ASN** unchecked
  - i. Click **Create** (this process will take approximately 40-45 minutes to create)

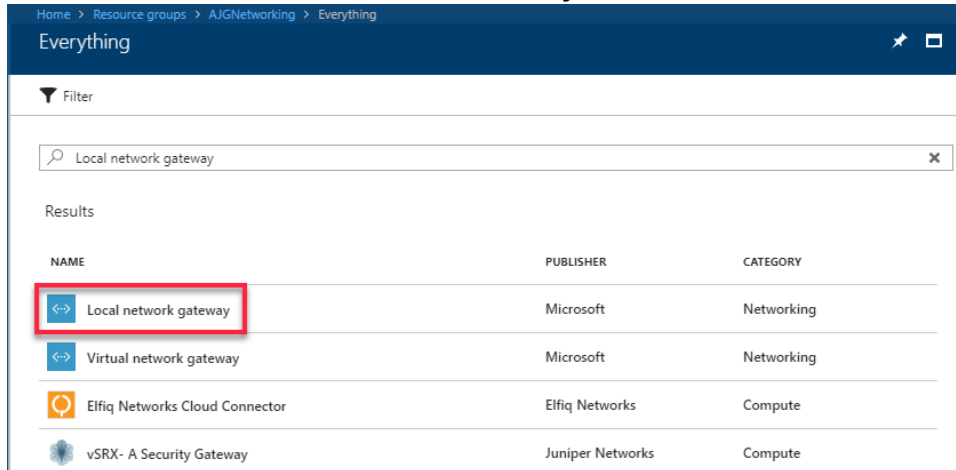
The screenshot shows the 'Create virtual network gateway' form in the Azure portal. The form is filled out with the following values:

- Name:** AJG-WUS2-VPN
- Gateway type:** VPN (selected)
- VPN type:** Route-based (selected)
- SKU:** VpnGw1
- Enable active-active mode:** unchecked
- Virtual network:** AJG-WUS2-VNet1
- Public IP address:** Create new (selected)
- Public IP address name:** AJG-WUS-VPN-pip
- Subscription:** Shannon Visual Studio Enterprise
- Resource group:** AJGNetworking
- Location:** West US 2
- Assignment:** Dynamic (selected)
- Configure BGP ASN:** unchecked

The **Create** button is highlighted with a red box. There is also a link for **Automation options**.

## Task 5: Create Local Network Gateways, Connections, and Establish VPN

1. In the left pane, click + **Create Resource**.
2. Search for and click on **Local Network Gateway**. Click **Create** on the next screen.



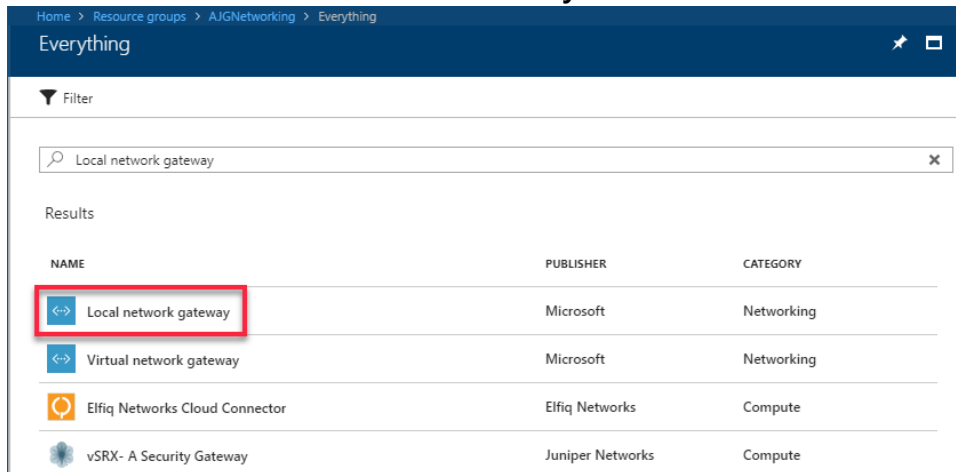
3. For the Create Local Network Gateway settings, enter the following:
  - a. Name: **AJG-EUS2-LGW**
  - b. IP Address: **Use public IP address assigned to VPN during creation**
  - c. Address Space: **10.0.0.0/16**
  - d. Leave Configure BGP settings blank
  - e. Use existing Resource Group
  - f. Location: **East US 2**
  - g. Click Create

The screenshot shows the 'Create local network gateway' form in the Azure portal. The form has the following fields and options:

- Name:** AJG-EUS2-LGW (with a green checkmark)
- IP address:** 104.209.171.234 (with a green checkmark)
- Address space:** 10.1.0.0/16 (with a dropdown arrow)
- Configure BGP settings:** ☐ (unchecked)
- Subscription:** Shannon Visual Studio Enterprise (dropdown)
- Resource group:** ☐ Create new ☒ Use existing (selected)
- Resource group:** AJGNetworking (dropdown)
- Location:** East US 2 (dropdown)

**Create** Automation options

4. In the left pane, click + **Create Resource**.
5. Search for and click on **Local Network Gateway**. Click **Create** on the next screen.



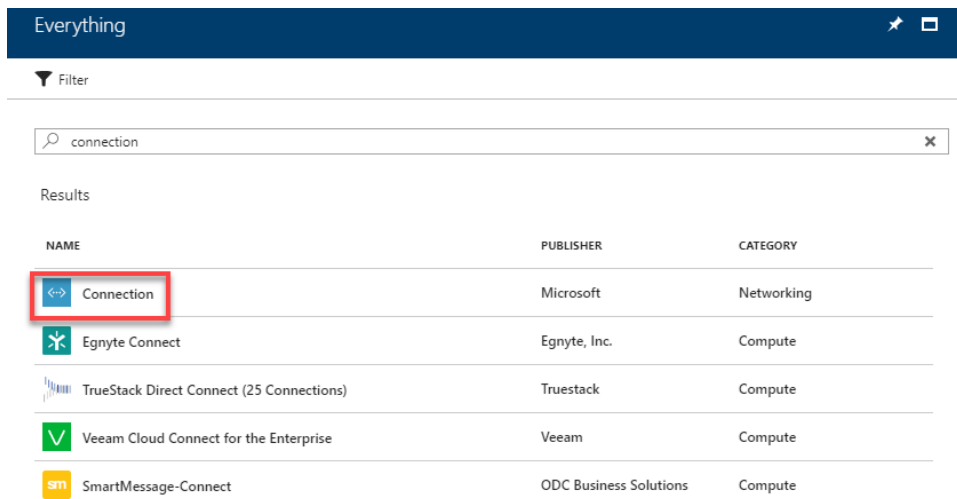
6. For the Create Local Network Gateway settings, enter the following:
  - a. Name: **AJG-WUS2-LGW**
  - b. IP Address: Use public IP address assigned to VPN during creation
  - c. Address Space: **10.2.0.0/16**
  - d. Leave Configure BGP settings blank
  - e. Use existing Resource Group
  - f. Location: West US 2
  - g. Click Create

The screenshot shows the 'Create local network gateway' form in the Azure portal. The form has the following fields and values:

- Name: AJG-WUS2-LGW
- IP address: 157.56.160.222
- Address space: 10.2.0.0/16
- Configure BGP settings: ☐
- Subscription: Shannon Visual Studio Enterprise
- Resource group: ☒ Use existing (AJGNetworking)
- Location: West US 2

The 'Create' button at the bottom is highlighted with a red box.

7. In the left pane, click + Create Resource.
8. Search for and click on **Connection**. Click Create on the next screen.



9. For the Basics blade, enter the following:
  - a. Connection Type: VNet-to-VNet
  - b. Select subscription
  - c. Use existing Resource Group
  - d. Location: East US 2
  - e. Click OK









The screenshot shows the 'Basics' blade configuration form. It contains the following fields and options:

- Connection type**: VNet-to-VNet (dropdown)
- Subscription**: Shannon Visual Studio Enterprise (dropdown)
- Resource group**: ☐ Create new ☒ Use existing (radio buttons)
- Resource group**: AJGNetworking (dropdown)
- Location**: East US 2 (dropdown)



OK

10. For the Settings blade, enter the following:
- Choose first virtual network gateway: AJG-EUS2-VPN
  - Choose second virtual network gateway: AJG-WUS2-VPN
  - Leave the check mark in Establish bidirectional connectivity
  - Leave defaults for First connection name and second connection name
  - Enter the Shared Key: AJGNetworkingTraining
  - Click OK at the bottom
  - Click OK on the summary page

Settings	Summary
<p>* First virtual network gateway  &gt;</p> <p>AJG-EUS2-VPN</p> <hr/> <p>* Second virtual network gateway  &gt;</p> <p>AJG-WUS2-VPN</p> <hr/> <p><input checked="" type="checkbox"/> Establish bidirectional connectivity </p> <p>* First connection name</p> <p>AJG-EUS2-VPN-to-AJG-WUS2-VPN </p> <p>* Second connection name</p> <p>AJG-WUS2-VPN-to-AJG-EUS2-VPN </p> <p>* Shared key (PSK) </p> <p>AJGNetworkingTraining </p> <p><input type="checkbox"/> Enable BGP </p>	<p>Basics</p> <p>Connection type VNet-to-VNet</p> <p>Subscription Shannon Visual Studio Enterprise</p> <p>Resource Group AJGNetworking</p> <p>Location East US 2</p> <p>Settings</p> <p>First virtual network gateway AJG-EUS2-VPN</p> <p>Second virtual network gateway AJG-WUS2-VPN</p> <p>Establish bidirectional connectivity Yes</p> <p>First connection name AJG-EUS2-VPN-to-AJG-WUS2-VPN</p> <p>Second connection name AJG-WUS2-VPN-to-AJG-EUS2-VPN</p> <p>Shared key (PSK) AJGNetworkingTraining</p>
<p>OK</p>	<p>OK</p>



- After a minute or two, you will see 2 Connection resources show up in the resource group and both will show the VPN status as Connected:

Add
Edit columns
Delete resource group
Refresh
Move
Assign tags
Delete

Subscription (change)  
Shannon Visual Studio Enterprise
Subscription ID
Deployments  
1 Deploying, 10 Succeeded

Tags (change)  
Click here to add tags

Filter by name...
All types
All locations
No grouping

12 items
☐ Show hidden types

<input type="checkbox"/>	NAME	TYPE	LOCATION	
<input type="checkbox"/>	AJG-EUS2-LGW	Local network gateway	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VNet1	Virtual network	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VNet2	Virtual network	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VPN	Virtual network gateway	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VPN-pip	Public IP address	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VPN-to-AJG-WUS2-VPN	Connection	East US 2	...
<input type="checkbox"/>	AJG-WUS2-LGW	Local network gateway	West US 2	...
<input type="checkbox"/>	AJG-WUS2-VNet1	Virtual network	West US 2	...
<input type="checkbox"/>	AJG-WUS2-VNet2	Virtual network	West US 2	...
<input type="checkbox"/>	AJG-WUS2-VPN	Virtual network gateway	West US 2	...
<input type="checkbox"/>	AJG-WUS2-VPN-to-AJG-EUS2-VPN	Connection	West US 2	...
<input type="checkbox"/>	AJG-WUS2-VPN-pip	Public IP address	West US 2	...

Move
Delete

Resource group (change)  
AJGNetworking
Status  
Connected
Location  
East US 2
Subscription (change)  
Shannon Visual Studio Enterprise
Subscription ID

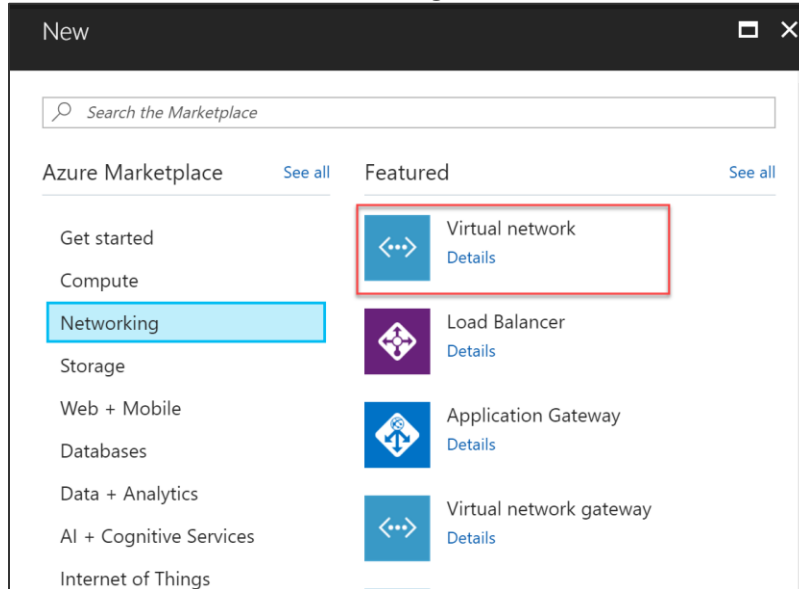
Data in  
4.06 KiB
Data out  
4.06 KiB
Virtual network  
AJG-EUS2-VNet1, AJG-WUS2-VNet1
Virtual network gateway 1  
AJG-EUS2-VPN (104.209.171.234)
Virtual network gateway 2  
AJG-WUS2-VPN (13.66.174.93)

Tags (change)  
Click here to add tags

## Exercise 2: Establish Connectivity with Regional and Global VNet Peering

### Task 1: Create 2 Additional Virtual Networks – 1 in East US and 1 in West US

1. In the left pane, click + **Create Resource**.
2. In the **New** blade, select **Networking > Virtual Network**.



3. For the **Create virtual network** settings, enter the following information:
  - a. Name: **AJG-EUS2-VNet2 (East US 2) AJG-WUS2-VNet2 (West US 2)**
  - b. Address space: **10.3.0.0/16 (East US 2) 10.4.0.0/16 (West US 2)**
  - c. Subnet name: **SharedServices (Both)**
  - d. Subnet address range: **10.3.1.0/24 (East US 2) 10.4.1.0/24 (West US 2)**
  - e. Subscription: **Choose your subscription**
  - f. Resource group: **AJGNetworking**
  - g. Location: **East US and West US**
  - h. Leave **DDoS Protection** at **Basic** and **Service Endpoints** as **Disabled**.
  - i. Click the **Create** button to continue.

### Create virtual network

\* Name  
AJG-EUS2-VNet2 ✓

\* Address space ⓘ  
10.3.0.0/16 ✓  
10.3.0.0 - 10.3.255.255 (65536 addresses)

\* Subscription  
Shannon Visual Studio Enterprise ▼

\* Resource group  
☐ Create new ☒ Use existing  
AJGNetworking ▼

\* Location  
East US 2 ▼

Subnet

\* Name  
SharedServices ✓

\* Address range ⓘ  
10.3.1.0/24 ✓  
10.3.1.0 - 10.3.1.255 (256 addresses)

DDoS protection ⓘ  
☒ Basic ☐ Standard

Service endpoints ⓘ  
**Disabled** Enabled

**Create** Automation options

### Create virtual network

\* Name  
AJG-WUS2-VNet2 ✓

\* Address space ⓘ  
10.4.0.0/16 ✓  
10.4.0.0 - 10.4.255.255 (65536 addresses)

\* Subscription  
Shannon Visual Studio Enterprise ▼

\* Resource group  
☐ Create new ☒ Use existing  
AJGNetworking ▼

\* Location  
West US 2 ▼

Subnet

\* Name  
SharedServices ✓

\* Address range ⓘ  
10.4.1.0/24 ✓  
10.4.1.0 - 10.4.1.255 (256 addresses)

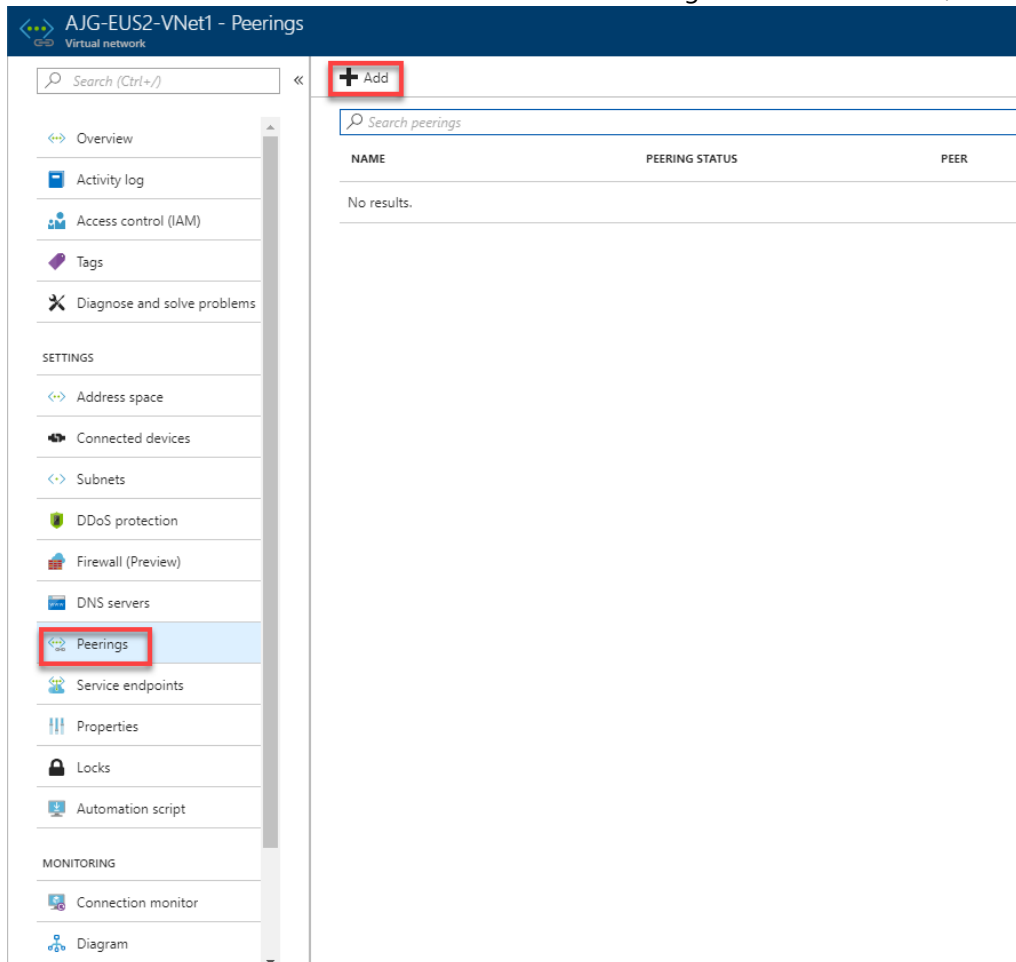
DDoS protection ⓘ  
☒ Basic ☐ Standard

Service endpoints ⓘ  
**Disabled** Enabled

**Create** Automation options

## Task 2: Create Regional VNet Peer Between AJG-EUS2-VNet1 and AJG-EUS2-VNet2

4. Go into the AJG-EUS2-VNet1 resource and click on Peerings. On the next screen, click +Add.



5. On the Add peering blade, enter the following information:
- Name: **AJG-EUS-REG-VNETPEER**
  - Use Resource Manager**
  - Select subscription**
  - Select **AJG-EUS2-VNet2**
  - Leave Allow virtual network access at Enabled**
  - Place a **check mark** next to **Allow forwarded traffic**
  - Click OK

Add peering  
AJG-EUS2-VNet1

\* Name

AJG-EUS-REG-VNETPEER

Peer details

Virtual network deployment model ⓘ  
☒ Resource manager ☐ Classic  
☐ I know my resource ID ⓘ

\* Subscription ⓘ

Shannon Visual Studio Enterprise

\* Virtual network

AJG-EUS2-VNet2 (AJGNetworking)

Configuration

Allow virtual network access ⓘ

☒ Allow forwarded traffic ⓘ  
☐ Allow gateway transit ⓘ  
☐ Use remote gateways ⓘ

Virtual network 'AJG-EUS2-VNet1' has a gateway; peerings created from this virtual network can't enable 'use remote gateways'.

6. Move onto the next step when you see a status of **Initiated** when viewing the Peerings.

+ Add

Search peerings			
NAME	PEERING STATUS	PEER	GATEWAY TRANSIT
AJG-EUS-REG-VNETPEER	Initiated	AJG-EUS2-VNet2	Disabled

7. Go into AJG-EUS2-VNet2 and click on Peerings. On the next screen, click **+Add**.

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The screenshot displays the Azure portal interface for a virtual network named 'AJG-EUS2-VNet2'. The left-hand navigation pane lists various settings and monitoring options. The 'Peerings' option is highlighted with a red box. In the main content area, the 'Add' button is also highlighted with a red box. Below the 'Add' button, there is a search bar for peerings and a table with columns 'NAME', 'PEERING STATUS', and 'PEER'. The table currently shows 'No results.'

8. For the Add peering blade, enter the following information:
  - a. Name: **AJG-EUS-REG-VNETPEER**
  - b. Use **Resource Manager**
  - c. **Select subscription**
  - d. Select **AJG-EUS-VNet1**
  - e. **Leave Allow virtual network access at Enabled**
  - f. **Place a check mark next to Allow forwarded traffic**
  - g. Click **OK**
  - h. **Ignore the warning about 'use remote gateways.'**

Home > Virtual networks > AJG-EUS2-VNet2 - Peerings > Add peering

Add peering

AJG-EUS2-VNet2

Name

AJG-EUS-REG-VNETPEER

Peer details

Virtual network deployment model

Resource manager

Classic

I know my resource ID

Subscription

Shannon Visual Studio Enterprise

Virtual network

AJG-EUS2-VNet1 (AJGNetworking)

Configuration

Allow virtual network access

Disabled

Enabled

Allow forwarded traffic

Allow gateway transit

Use remote gateways

OK

9. Both Peerings will now show **Connected**.
- a. AJG-EUS2-VNet1 to AJG-EUS2-VNet2:

+ Add

Search peerings

NAME	PEERING STATUS	PEER	GATEWAY TRANSIT	
AJG-EUS-REG-VNETPEER	Connected	AJG-EUS2-VNet2	Disabled	...

- b. AJG-EUS-VNet2 to AJG-EUS-VNet1:

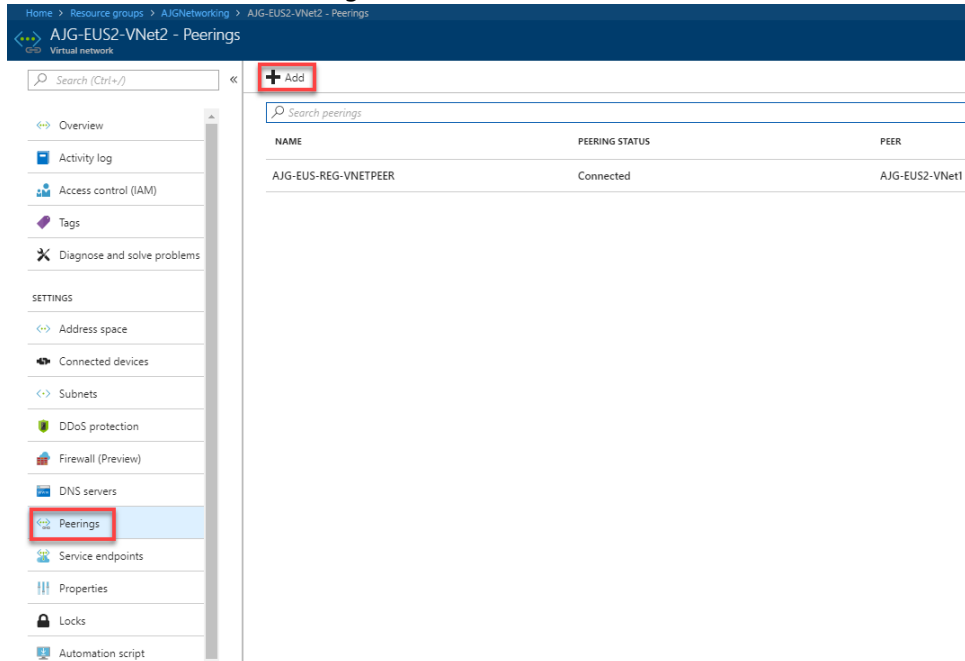
+ Add

Search peerings

NAME	PEERING STATUS	PEER	GATEWAY TRANSIT	
AJG-EUS-REG-VNETPEER	Connected	AJG-EUS2-VNet1	Disabled	...

## Task 3: Create Global VNet Peer Between AJGVNet4 and AJGVNet2

1. This task will follow similarly to the previous task.
2. Here are the details to enter as you walk through setting up the global VNet peer:
  - a. Name: **AJG-EUS-GLOB-VNETPEER**
  - b. Use **Resource Manager**
  - c. **Select Subscription**
  - d. Select **AJG-EUS2-VNet2** (1<sup>st</sup> configuration) Select **AJG-WUS2-VNet2** (2<sup>nd</sup> configuration)
  - e. Place a checkmark next to **Allow forwarded traffic**
3. Please reference the following screen shots.





Add peering

AJG-EUS2-VNet2

Name

AJG-EUS-GLOB-VNETPEER

Peer details

Virtual network deployment model

Resource manager

Classic

I know my resource ID

Subscription

Shannon Visual Studio Enterprise

Virtual network

AJG-WUS2-VNet2 (AJGNetworking)

Configuration

Allow virtual network access

Disabled

Enabled

Allow forwarded traffic

Allow gateway transit

Use remote gateways

OK

23 | Page

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Add peering

AJG-WUS2-VNet2

\* Name

AJG-WUS-GLOB-VNETPEER

Peer details

Virtual network deployment model ⓘ

☒ Resource manager ☐ Classic

☐ I know my resource ID ⓘ

\* Subscription ⓘ

Shannon Visual Studio Enterprise

\* Virtual network

AJG-EUS2-VNet2 (AJGNetworking)

Configuration

Allow virtual network access ⓘ

☒ Allow forwarded traffic ⓘ

☐ Allow gateway transit ⓘ

☐ Use remote gateways ⓘ

OK

+ Add

Search peerings

NAME	PEERING STATUS	PEER	GATEWAY TRANSIT	
AJG-EUS-REG-VNETPEER	Connected	AJG-EUS2-VNet1	Disabled	...
AJG-EUS-GLOB-VNETPEER	Connected	AJG-WUS2-VNet2	Disabled	...

+ Add

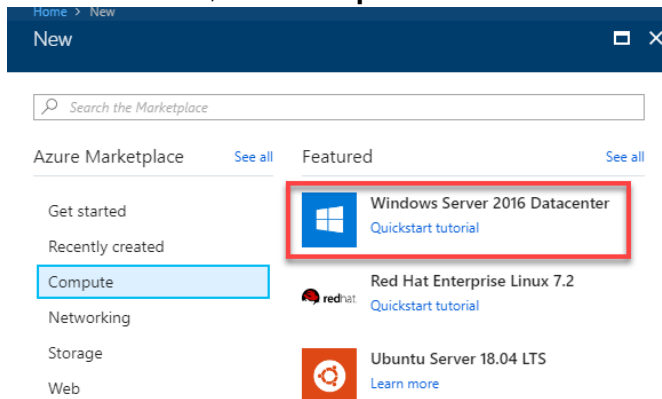
Search peerings

NAME	PEERING STATUS	PEER	GATEWAY TRANSIT	
AJG-WUS-GLOB-VNETPEER	Connected	AJG-EUS2-VNet2	Disabled	...

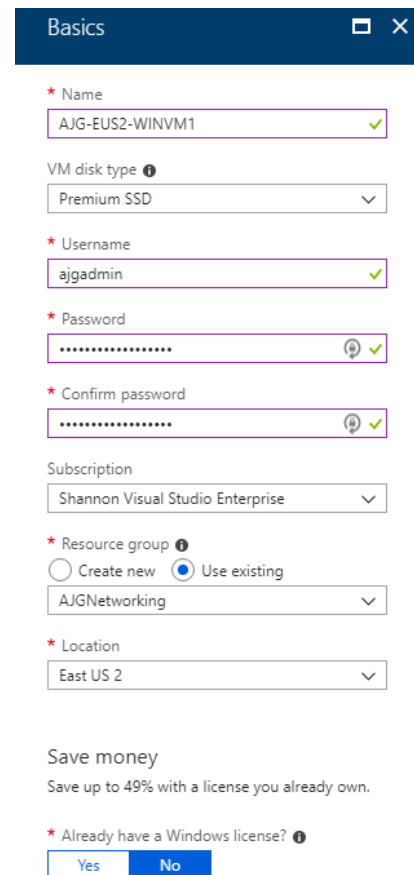
## Exercise 3: Create VMs to Test Connectivity

### Task 1: Create Windows VM in AJG-EUS2-VNet1, AJG-EUS2-VNet2, AJG-WUS2-VNet1, and AJG-WUS2-VNet2

1. In the left pane, click + **Create Resource**.
2. In the **New** blade, select **Compute** > Windows Server



3. For the Basics blade, enter the following:
  - a. Name: AJG-EUS2-WINVM1
  - b. Leave VM type on Premium SSD
  - c. Username: ajgadmin
  - d. Password: pick a complex password and input that twice
  - e. Select your subscription
  - f. Use the existing Resource Group
  - g. Location: East US
4. Select D2\_V2 (or something comparable size wise)



OK

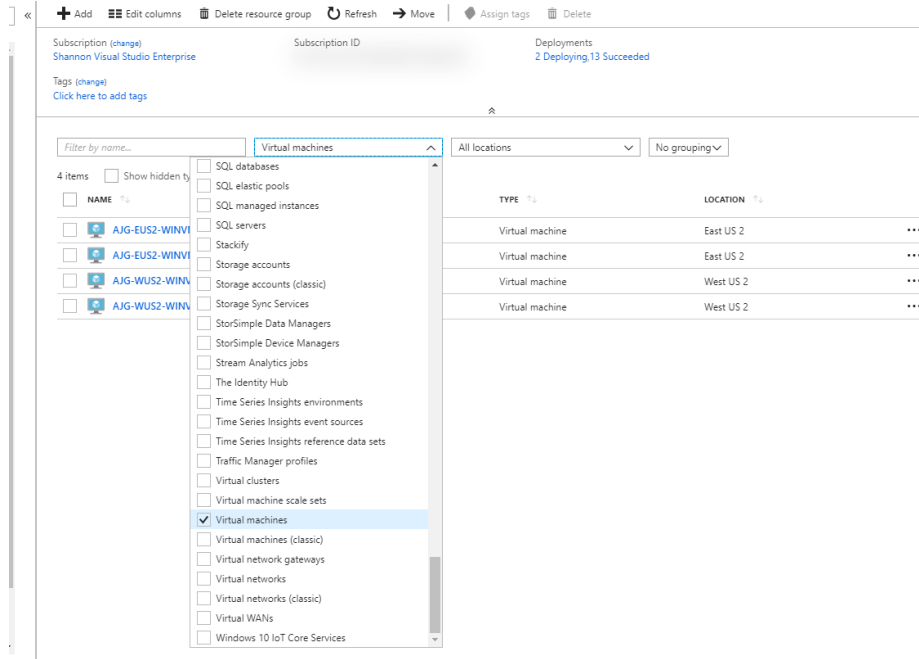
5. For the Settings blade, use the following:
  - a. Leave Availability Set as 'None'
  - b. Use Managed Disks
  - c. Place VM in AJG-EUS2-VNet1
  - d. Use the SharedServices Subnet
  - e. Assign a Public IP address (leave default or change name)
  - f. Click on Advanced for Network Security Group and then click on the public IP. In the new blade, select None to ensure you don't have any Network Security Groups created.
  - g. Do not add extensions
  - h. Turn Auto-Shutdown off
  - i. Disable Boot Diagnostics
  - j. Do not register a managed service identity
  - k. Leave Backup as Disabled
  - l. Click OK to create
  - m. Once validation passes, click Create

The screenshot shows the 'Settings' blade for an Azure virtual machine. The left sidebar contains sections for 'High availability', 'Storage', and 'Network'. The 'Network' section is expanded, showing 'Virtual network' (AJG-EUS2-VNet1), 'Subnet' (SharedServices (10.1.1.0/24)), and 'Public IP address' ((new) AJG-EUS2-WINVM1-ip). The 'Network Security Group' section is also expanded, showing 'Basic' and 'Advanced' tabs, with 'Advanced' selected. Below this, a 'Network security group (firewall)' is listed as '(new) test-nsg'. The right sidebar contains sections for 'Extensions', 'Auto-shutdown', 'Monitoring', 'Managed service identity', and 'Backup'. The 'Auto-shutdown' section has 'Enable auto-shutdown' set to 'Off'. The 'Monitoring' section has 'Boot diagnostics' set to 'Disabled'. The 'Managed service identity' section has 'Register with Azure Active Directory' set to 'No'. The 'Backup' section has 'Backup' set to 'Disabled'. The 'OK' button at the bottom right is highlighted in a red box.

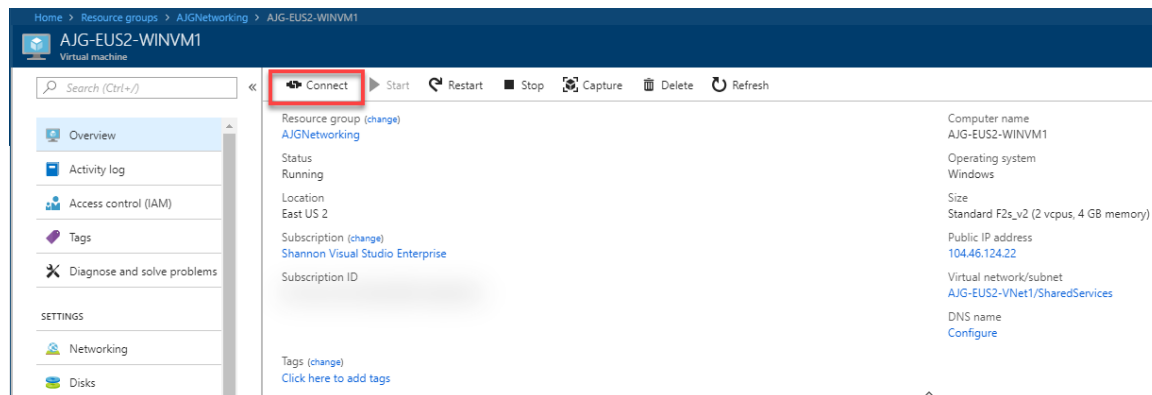
6. Follow the same steps above and create 3 more virtual machines, 1 in AJG-EUS2-VNet2, 1 in AJG-WUS2-VNet1, and 1 in AJG-WUS2-VNet2

## Task 2: Log into VMs and Test Connectivity

1. Go into the AJGNetworking Resource Group. By now, you will have several resources deployed to 1 Resource Group. This is by design, as after all tutorials are finished, you will easily be able to delete everything in that resource group with a simple delete Resource Group command issued from the portal.
2. Filter by Virtual Machines at the top of your resource group:



3. Click on AJG-EUS2-WINVM1. Within the Overview blade, click Connect at the top.



4. Click on Download RDP File and then double click on the Remote Desktop file that saves to your machine.

Connect to virtual machine  
AJG-EUS2-WINVM1

RDP SSH

To connect to your virtual machine via RDP, select an IP address, optionally change the port number, and download the RDP file.

\* IP address  
Public IP address (104.46.124.22)

\* Port number  
3389

**Download RDP File**

**i** Inbound traffic to the Public IP address may be blocked. You can update inbound port rules in the **VM Networking** page.

**🔧** You can troubleshoot VM connection issues by opening the **Diagnose and solve problems** page.

5. Once inside the computer, open up Windows PowerShell and issue out the following command:  
`New-NetFirewallRule -DisplayName "Allow ICMPv4-In" -Protocol ICMPv4`
6. Go back to the portal and complete the same steps above for AJG-EUS2-WINVM2, AJG-WUS2-WINVM1, and AJG-WUS2-WINVM2.
7. From each PowerShell prompt, try pinging the internal IP address for the VMs you just created. Remember to ping over the S2S VPN and by each VNet Peer (regional and global). ICMP is turned off by default with Azure VMs, so creating the firewall rule above allows ICMP traffic.
8. At the end of this lab, go into AJGNetworking and delete the resource group by clicking Delete resource group at the top and entering the name of the resource group:

+ Add   Edit columns   **Delete resource group**   Refresh   Move   Assign tags   Delete

Subscription (change)   Shannon Visual Studio Enterprise   Subscription ID   Deployments   18 Succeeded

Tags (change)   Click here to add tags

---

Filter by name...   All types   All locations   No grouping

43 items   ☐ Show hidden types

<input type="checkbox"/>	NAME ↑↓	TYPE ↑↓	LOCATION ↑↓	
<input type="checkbox"/>	AJG-EUS2-LGW	Local network gateway	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VNet1	Virtual network	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VNet2	Virtual network	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VPN	Virtual network gateway	East US 2	...
<input type="checkbox"/>	AJG-EUS2-VPN-pip	Public IP address	East US 2	...