Lumen® SASE Solutions

Fortinet VM in Azure overview
August 2024

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Overview

This document provides an overview of the steps you need to complete in your Azure environment to support a Lumen SASE Solutions branch VM deployment. Lumen SASE service delivery will not have access to configuration steps within MS Azure and can only assist in the Versa VM additional configuration after you successfully deploy the virtual instance(s) and connect it to the management plane (FortiManager).

Topics covered in this document:

- Overview of design topologies with internet WAN connectivity.

- Completing the TDG form in SASE Manager.

- Configuring Azure from the SASE Manager.

- Connecting to host/application VNets with Azure Route Server.

- Final configuration and validation.

You are required to have your own Azure infrastructure account and must complete all Azure steps to support the VM deployment. Your account should have, but be not limited to, a VNet with associated CIDR block, Internet gateway, security groups, and route tables.

NOTE: Lumen is providing an automated deployment process and templates within SASE Manager to assist in the required steps and resources to deploy a virtual instance.

Design only supports 1 WAN and LAN interface. The primary use cases for this deployment are as part of an SD-WAN overlay connecting Azure resources to the remainder of the network and/or as part of a secure web gateway for remote connections. It is not recommended as an in-bound firewall for all Azure resources.

You are responsible for all charges within your Microsoft Azure account for resources related to the deployment of the Lumen SASE VM or virtual instance.

Design topologies

Lumen recommends that you establish a separate VNet to host the VMs in your Azure environment. Figure 1 below shows a brief overview of each deployment.
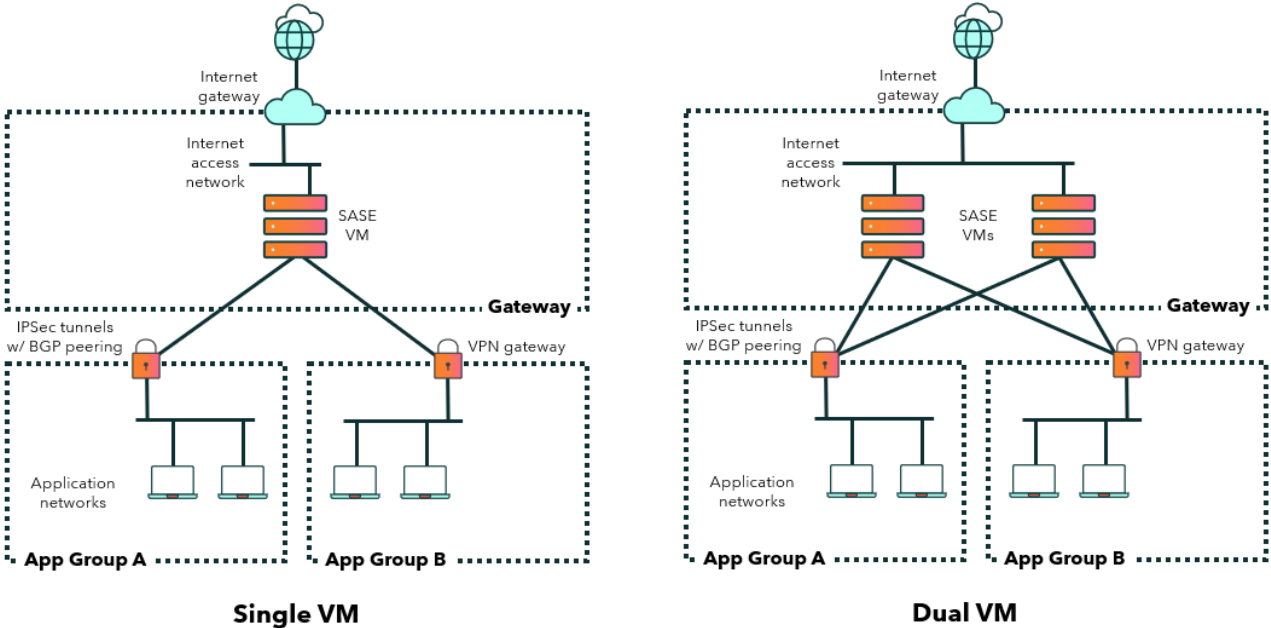

Figure 1: Cloud deployment topologies

NOTE: Lumen does not sell a packaged high availability for virtual instance. To deploy with dual appliances, you need to purchase two virtual instances.
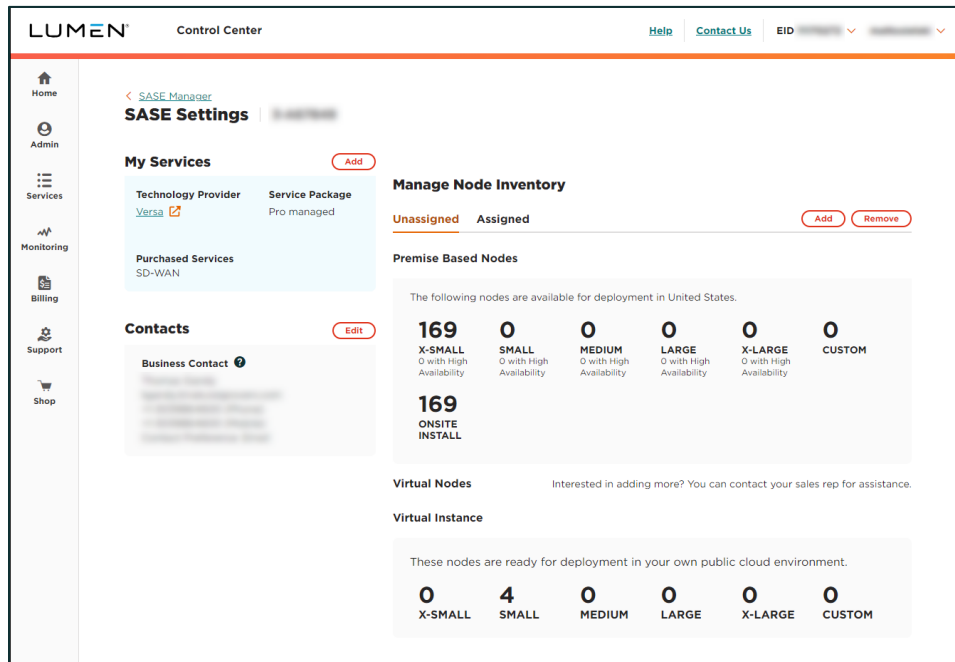
Deployment requirements and overview

Step 1 – Complete the TDG form in SASE Manager

1. OPTIONAL – To view what services are available to deploy, click **Manage** (in the **SASE Settings** section).
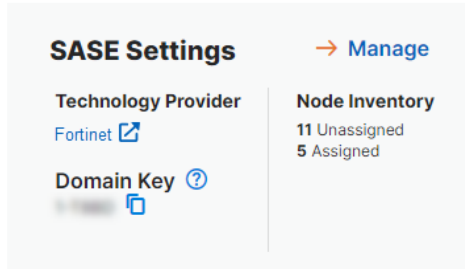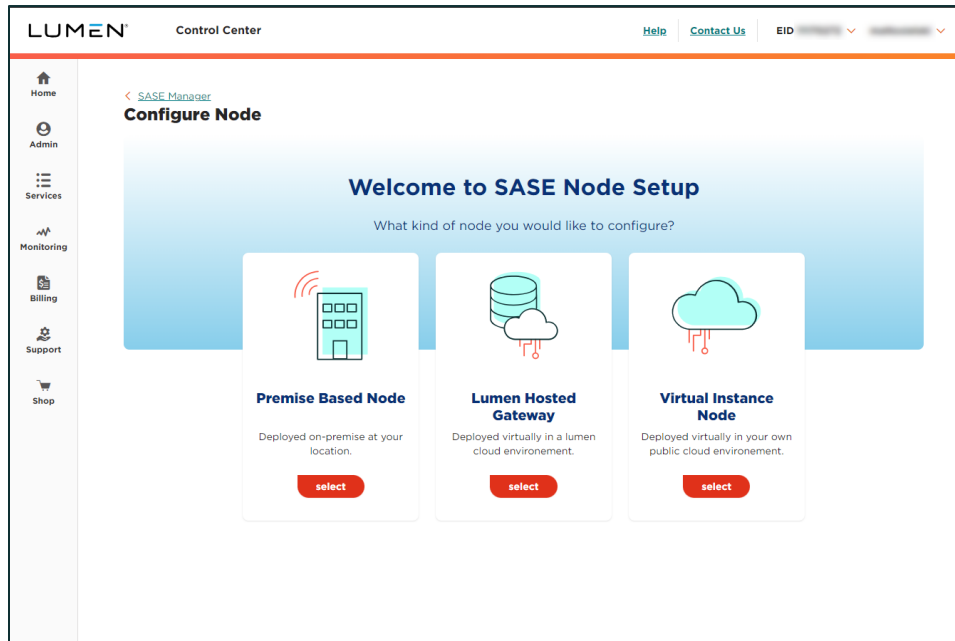

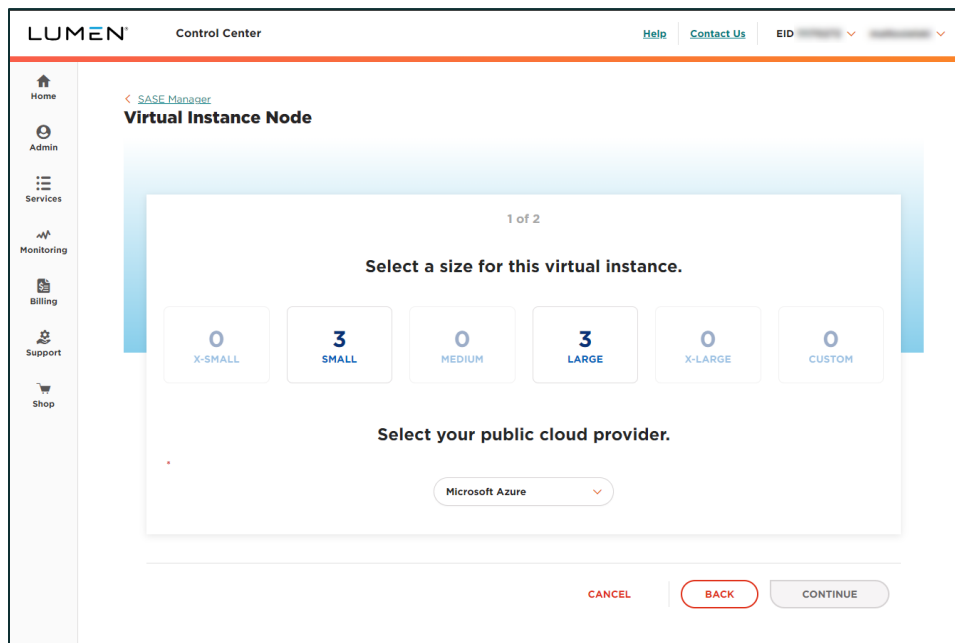2. On this screen, you can view all the available SASE instances that are available to configure.

3. When ready, click **Configure Node** on the SASE Manager dashboard.

4. Now, select what type of SASE node to configure. For VM in Azure, click **select** (on the **Virtual Instance Node** tile).

5. Select the size of VM you are deploying, select the cloud provider, then click **CONTINUE**.

6. Select or add a new contact. (This should be the best contact to work with on the VM deployment.)

7. To begin the process of creating the VM instance, click **DEPLOY NODE**.
   NOTE: This step prepares the VM data and automation for the deployment. To start the automated process into the Azure environment, continue to step 2 (below).

Step 2 – Configure Azure in SASE Manager

The next step is to complete the "Azure Config" step within the SASE Manager to deploy the VM into your Azure environment. Please make sure to wait at least 15 minutes after completing step 1 above to move to step 2. The node status will also change to *ACTION REQUIRED*.

NOTE: The person completing this step should have the appropriate Azure login and management credentials as this step will interact with your Azure account.

1. You will first see the Azure instance created in Step 1 on the homepage of SASE Manager (within Control Center) with a status of *ACTION REQUIRED*.

2. Click on the 3-dot icon, then select **Azure Config**.
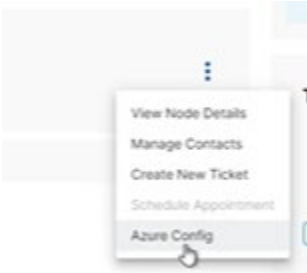
3. In the window that appears, type the login credentials for your Azure account.

4. Complete the form as follows:

    a. Select the subscription and resource group to create the VM into. (A new resource group can be created here, if required.)

    b. Validate/populate the region for the VM. (**NOTE:** Not every resource is available in every region.)

    c. Select the instance type. (For each VM size, Lumen defaults to a recommended value, but you can choose any valid size from the list. **REFERENCE**: VM Sizing (see appendix).)

    d. Select VNet New or Existing. (Lumen recommends deploying VMs into a new VNet and then creating connections to host VNets as defined in the next section below. First instance goes into new VNet and if a second is ordered, it can be added to the existing newly created VNet on the previous build.)

    e. If a new VNet, provide a name for the VNet or a default name will be used.

    f. Populate the VNet address prefix. This will be the subnet for an existing VNet or enter a new subnet if creating a new VNet (e.g., 10.1.0.0/16).

    g. Type the Fortinet external subnet prefix and the Fortinet external subnet start address. This is the subnet 1 WAN prefix and start address. This should be the subnet of the Azure public IP. Use the desired IP address for the WAN port of the VM as the subnet start address. **NOTE:** You must have created and have available a public static IP address that can be assigned to this VM deployment.

    h. Type the Fortinet internal subnet prefix and the Fortinet internal subnet start address. This is the subnet 2 LAN prefix and start address. Set the desired LAN subnet and start address.

5. When you're done, click **Review + create**.

This starts the automated process to deploy the VM. This process may take up to 15 minutes to complete.

Connecting to host VNets with Azure Route Server
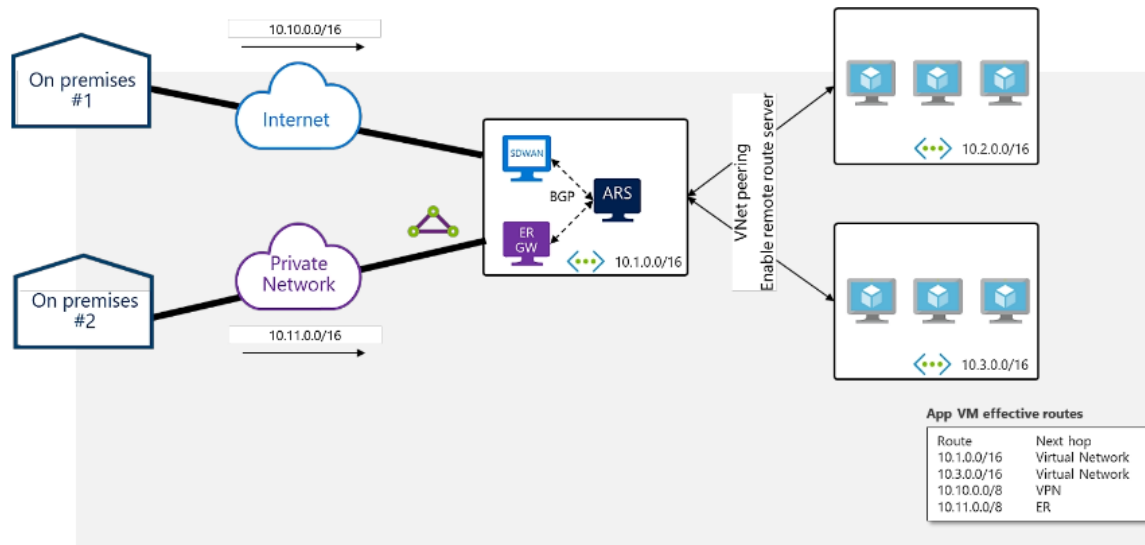
Figure 2: Azure Route Server

Azure Route Server allows you to set up dynamic routing between your network appliances and the gateways in Azure. Azure Route Server provides border gateway protocol (BGP) endpoints using standard routing protocol to exchange routes.

For more information and instructions on setting up Azure Route Server, please see the following resources:

- Azure Route Server overview
- Azure Route Server documentation

NOTE: You are responsible for all Microsoft Azure charges related to the deployment of the Lumen SASE VM or virtual instances. Azure Route Server will incur additional charges that you are responsible for in your Azure environment.

Alternative approach: Connecting to host/application vNets using IPsec tunnels

In these designs, you use WAN internet connectivity into your cloud environment. Figure 3 below shows an overview of the single VM or dual VM deployment topologies.
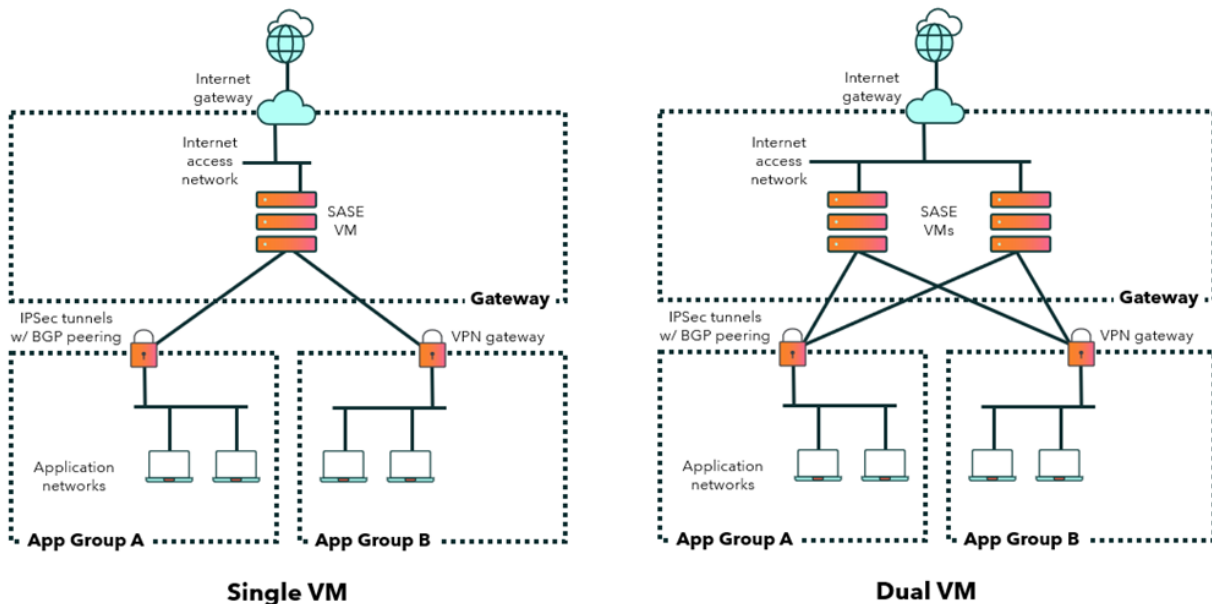
Figure 3: Connecting VNets with IPsec

Summary of steps for you to connect to host/application vNets

For the internet deployment topologies, below is a summary of the steps you must complete to configure/deploy this.

NOTE: The person completing these steps should have MS Azure configuration access to connect the deployed SASE virtual instance to the host/application vNets. Lumen SASE service delivery will only have access to assist and configure the Fortinet VM side of the deployment.

1. Create local network gateways: This step defines the SASE virtual instances as your VPN gateways that can be used by the VNGW:

    a. Navigate to **Local Network Gateways** and click the **+** to add a local gateway.

    b. Provide a unique name, public IP assigned to the SASE virtual instance, the IP subnet in slash notation of the LAN port of the SASE virtual instance, check **Configure BGP**, enter the AS number used in the LAN-VR of the SASE virtual instance (64514 by default), enter the LAN IP address of the SASE virtual instance and select the appropriate resource group.

    c. Click **Create** to start the deployment process.

    d. Repeat the above steps for the second virtual instance.

2. Create VNGW: You must create a VNGW in each Host VNet that will use the SASE virtual instances.

    a. Navigate to the **Virtual Network Gateways** blade and click the **+** to create a new VNGW.

b. Provide a name, select a region, select **VPN** as the gateway type, select **Route-based** for VPN type, select the appropriate SKU (do not use Basic) and select the appropriate Host VNet from the list.

c. For active-backup mode, create a new IP and provide a name, leave **Enable active-active mode** set to **Disabled**, enable **Configure BGP ASN** and enter the AS number that will be assigned to the VNGW. This will be used as the peer-as in the SASE virtual instances.

d. For active-active mode, create a new IP and provide a name, click **Enable active-active mode**, create a new, second public IP and provide a name, enable **Configure BGP ASN** and enter the AS number that will be assigned to the VNGW. This will be used as the peer-as in the SASE virtual instances.

e. Click **Review + create** to run a validation, then click **Create** to begin the VNGW deployment. This process can take considerable time (Azure advises up to 45 minutes).

Note: This step creates a gateway subnet in the Host VNet that is used to associate the VNGW, BGP sessions and routes to. This subnet will use the next available IP range out of the CIDR for the VNet.

3. Create connections: This step will create the IPSec connections and BGP sessions between the VNGW and SD-WAN appliances.

a. Navigate to **Virtual Network Gateways** and select the VNGW created in the last step.

b. Select **Configuration** and ensure the VNGW is in the correct mode. Ensure the correct BGP ASN is configured and make a note of the BGP peer IP address(s). This information will be required to configure the SASE virtual instance and will need to be provided to Lumen personnel.

c. Select **Connections**, then click the **+** to add a connection.

d. Provide a unique name, select **Site-to-Site (IPSec)** for the connection type, select a local network gateway from the list, type a pre-shared key, then click **OK** to create the connection. The pre-shared for each connection is required to configure the SASE virtual instance and will need to be provided to Lumen personnel.

e. Once created, navigate back to **Virtual Network Gateways**, select **Connections**, click on the connection you just added, click **Configuration** and ensure BGP is enabled. If this changes, click **Save** at the top of the blade.

f. Repeat the above steps to create the connection(s) to the second virtual instance.

Note: If you have additional host VNets that will use the SASE virtual instances, repeat the above steps for each host VNet. A maximum of five host VNets can be supported by a pair of SASE virtual instances due to limitations with the allowed number of WAN based IPSec tunnels. Only ten WAN-based IPSec tunnels are allowed per appliance and with the VNGWs in active-active mode with two IPSec tunnels active, that allows for five host VNets.

Final configuration and setup

- Lumen SASE Service Delivery can work with you on any additional configuration requirements related to the Fortinet virtual instances.

- You also have access to the Fortinet virtual instances via SSO to FortiManager in SASE Manager.

Appendix: VM sizing

The following table represents the VM sizes that are available and are standard Azure VM sizes. The size of the VM you choose should be based on the desired throughput and interfaces required.

Small (FG-VM04v). The following table are all the available options for the small VM size. Lumen recommends using the Standard_D4s_v3, but any of the other options are compatible.

Series	Instance type	vCPUs	Max NICs	Notes
F	Standard_F4	4	4	Compute-optimized instance types
Fs	Standard_F4s	4	4	
Fsv2	Standard_F4s_v2	4	2	
DSv2	Standard_DS3_v2	4	4	General-purpose instance type
DSv3	**Standard_D4s_v3**	**4**	**2**	**Lumen virtual instance default selection. General-purpose instance type**
DV4	Standard_D4_v4	4	2	General-purpose instance types. The DV4 and DsV4 series contain support for Intel Xeon (Ice Lake [2020] and Cascade Lake [2018] for general-purpose workloads The DsV4 series has the option for premium storage.
DsV4	Standard_D4s_v4	4	2	
DaV4	Standard_D4a_v4	4	2	General-purpose instance types. The Dav4 and Dasv4 series contain support for second-generation AMD EPYC 7452 (Rome 2019) for production/multithreaded workloads. The DaSV4 series has the option for premium storage.
DasV4	Standard_D4as_v4	4	2	
DV5	Standard_D4_v5	4	2	General-purpose instance types. The Dv5 and Dsv5 series contain support exclusively for Intel Xeon (Ice Lake [2020]) for general-purpose workloads. A premium storage tier is available on Dsv5.
DsV5	Standard_D4s_v5	4	2	
DasV5	Standard_D4as_v5	4	2	General-purpose instance types. The Dasv5 and Dadsv5 series contain support for third-generation AMD EPYC 7763v (Milan 2021) for production/multithreaded workloads.
DadsV5	Standard_D4ads_v5	4	2	
Dpsv5	Standard_D4ps_v5	4	2	General-purpose instance types. The Dpsv5 and Dpdsv5 series contain support for Ampere Altra ARM-based processors delivering a high price-to-performance ratio for general-purpose workloads.
Dpdsv5	Standard_D4pds_v5	4	2	
Dplsv5	Standard_D5pls_v5	4	2	General-purpose instance types.
Dpldsv5	Standard_D4plds_v5	4	2	
Epsv5	Standard_E4ps_v5	4	2	
Epdsv5	Standard_E4pds_v5	4	2	

Medium (FG-VM08v). The following table are all the available options for the medium VM size. Lumen recommends using the Standard_D8s_v3, but any of the other options are compatible.

Series	Instance type	vCPUs	Max NICs	Notes
F	Standard_F8	8	8	Compute-optimized instance types
Fs	Standard_F8s	8	8	
Fsv2	Standard_F8s_v2	8	4	
DSv2	Standard_DS4_v2	8	8	General-purpose instance type
DSv3	**Standard_D8s_v3**	**8**	**4**	**Lumen virtual instance default selection. General-purpose instance type**
DV4	Standard_D8_v4	8	4	General-purpose instance types. The DV4 and DsV4 series contain support for Intel Xeon (Ice Lake [2020] and Cascade Lake [2018] for general-purpose workloads The DsV4 series has the option for premium storage.
DsV4	Standard_D8s_v4	8	4	
DaV4	Standard_D8a_v4	8	4	General-purpose instance types. The Dav4 and Dasv4 series contain support for second-generation AMD EPYC 7452 (Rome 2019) for production/multithreaded workloads. The DaSV4 series has the option for premium storage.
DasV4	Standard_D8as_v4	8	4	
DV5	Standard_D8_v5	8	4	General-purpose instance types. The Dv5 and Dsv5 series contain support exclusively for Intel Xeon (Ice Lake [2020]) for general-purpose workloads. A premium storage tier is available on Dsv5.
DsV5	Standard_D8s_v5	8	4	
DasV5	Standard_D8as_v5	8	4	General-purpose instance types. The Dasv5 and Dadsv5 series contain support for third-generation AMD EPYC 7763v (Milan 2021) for production/multithreaded workloads.
DadsV5	Standard_D8ads_v5	8	4	
Dpsv5	Standard_D8ps_v5	8	4	General-purpose instance types. The Dpsv5 and Dpdsv5 series contain support for Ampere Altra ARM-based processors delivering a high price-to-performance ratio for general-purpose workloads.
Dpdsv5	Standard_D8pds_v5	8	4	
Dplsv5	Standard_D8pls_v5	8	4	General-purpose instance types.
Dpldsv5	Standard_D8plds_v5	8	4	
Epsv5	Standard_E8ps_v5	8	4	
Epdsv5	Standard_E8pds_v5	8	4	

Large (FG-VM16v). The following table are all the available options for the large VM size. Lumen recommends using the Standard_D16s_v3, but any of the other options are compatible.

Series	Instance type	vCPUs	Max NICs	Notes
F	Standard_F16	16	8	Compute-optimized instance types
Fs	Standard_F16s	16	8	
Fsv2	Standard_F16s_v2	16	4	
DSv2	Standard_DS5_v2	16	8	General-purpose instance type
DSv3	**Standard_D16s_v3**	**16**	**8**	**Lumen virtual instance default selection. General-purpose instance type**
DV4	Standard_D16_v4	16	4	General-purpose instance types. The DV4 and DsV4 series contain support for Intel Xeon (Ice Lake [2020] and Cascade Lake [2018] for general-purpose workloads The DsV4 series has the option for premium storage.
DsV4	Standard_D16s_v4	16	8	
DaV4	Standard_D16a_v4	16	8	General-purpose instance types. The Dav4 and Dasv4 series contain support for second-generation AMD EPYC 7452 (Rome 2019) for production/multithreaded workloads. The DaSV4 series has the option for premium storage.
DasV4	Standard_D16as_v4	16	8	
DV5	Standard_D16_v5	16	8	General-purpose instance types. The Dv5 and Dsv5 series contain support exclusively for Intel Xeon (Ice Lake [2020]) for general-purpose workloads. A premium storage tier is available on Dsv5.
DsV5	Standard_D16s_v5	16	8	
DasV5	Standard_D16as_v5	16	8	General-purpose instance types. The Dasv5 and Dadsv5 series contain support for third-generation AMD EPYC 7763v (Milan 2021) for production/multithreaded workloads.
DadsV5	Standard_D16ads_v5	16	8	
Dpsv5	Standard_D16ps_v5	16	4	General-purpose instance types. The Dpsv5 and Dpdsv5 series contain support for Ampere Altra ARM-based processors delivering a high price-to-performance ratio for general-purpose workloads.
Dpdsv5	Standard_D16pds_v5	16	4	
Dplsv5	Standard_D16pls_v5	16	4	General-purpose instance types.
Dpldsv5	Standard_D16plds_v5	16	4	
Epsv5	Standard_E16ps_v5	16	4	
Epdsv5	Standard_E16pds_v5	16	4	