Deployment Guide

VeloCloud SD-WAN Azure Virtual Edge

Services

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Chapter 1

Azure Virtual Edge Deployment Guide

This document provides step-by-step instructions for the Azure Virtual Edge Deployment Guide.

Chapter 2

Azure Virtual Edge Deployment Overview

The Azure Virtual Edge Deployment Guide provides information on how to deploy a virtual edge in Azure leveraging the convenience of an Azure Resource Manager (ARM) Template.

More customers are moving workloads to a public cloud infrastructure to extend SD-WAN from remote sites to a public cloud to guaranteed Service Level Agreements (SLAs). There are multiple options offered by VeloCloud SD-WAN, leveraging distributed VeloCloud Gateways to establish IPsec towards public cloud private network or deploy the Virtual Edge directly in Azure.

For small branch deployment that demand throughput less than 1G, single virtual edge can be deployed in the private network (Azure vNets). For larger data center deployments that demand multi-gig throughput, Hub clustering can be deployed.

Note: In the VeloCloud Hub clustering design, a Layer 3 Instance is leveraged on the LAN side to run BGP between Hubs in the cluster and the Layer 3 Instance for route distribution in LAN. Since the Azure UDR does not support dynamic routing protocol, a third-party virtual router is required in the Azure infrastructure.

Prerequisites

The following prerequisites are required before you begin:

- An Azure account and login information.
- Familiarity with Azure Virtual Network concepts, for more information, go to: https://learn.microsoft.com/en-us/azure/virtual-network/virtual-networks-overview.
- RSA Public Key, for more information, go to: https://learn.microsoft.com/en-us/azure/virtual-machines/linux/mac-create-ssh-keys.
- VeloCloud SD-WAN Azure Resource Manager (ARM) Templates:
  - VeloCloud SD-WAN ARM Template for regions with Availability Zones
  - VeloCloud SD-WAN ARM Template for regions without Availability Zones
- Orchestrator target and admin account to login.

Chapter 3

Azure Resource Manager Template Overview

This section provides an important overview of the Azure Resource Manager (ARM) template and links where you can download the template.

ARM Template Download Links

- VeloCloud SD-WAN ARM Template for regions with Availability Zones
- VeloCloud SD-WAN ARM Template for regions without Availability Zones

CAUTION: Make sure to review and understand the template before deploying. The template is intended as a reference and may need to be altered to accommodate specific environments.

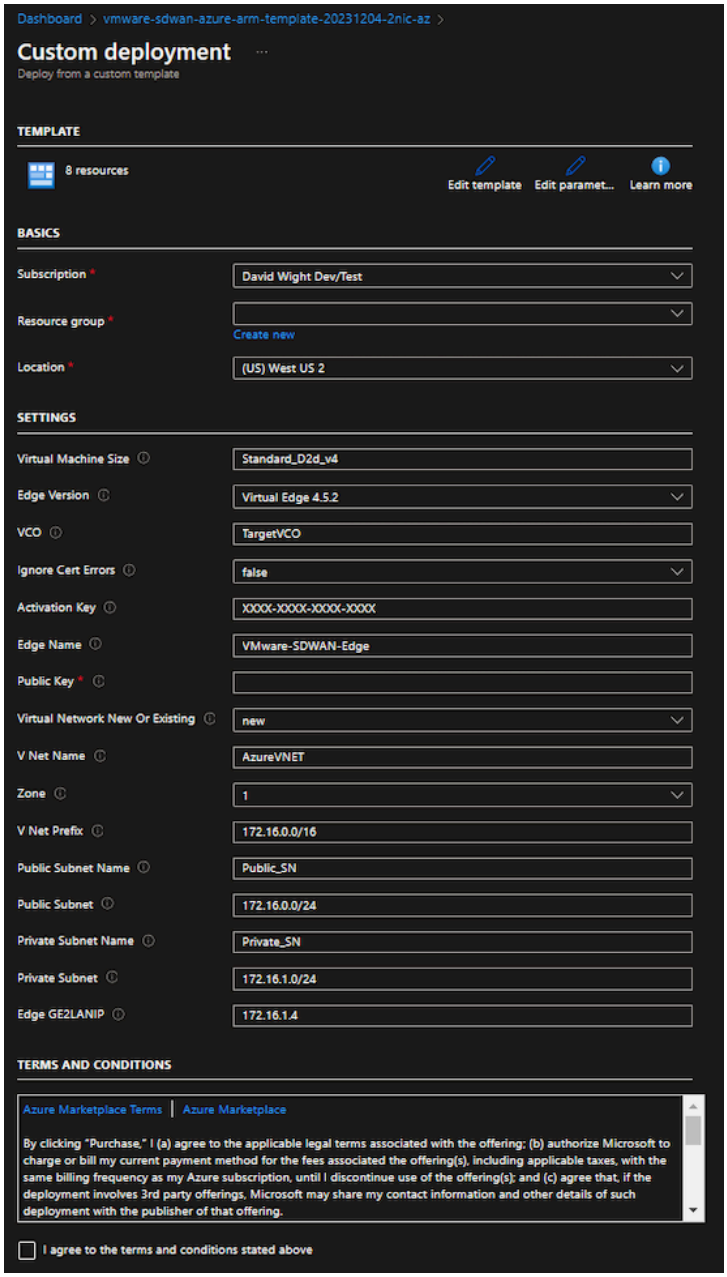
The default template is built to achieve a common deployment within Azure, representative of the basic topology illustrated in the next section. The ARM Template takes care of creating necessary resources, collecting the Orchestrator target and activation key to push via CLOUD-INIT.

The following are the default values represented in the template:

- Instance Type: Standard_DS3_v2
- Attach Interfaces to VeloCloud Instance (GE1 – WAN / GE2 – LAN)
- Allocate Public IP and attach to GE1
- Security Groups – Allowed Ports:
  - UDP 2426 – Multipath Protocol
  - TCP 22 – SSH Access (for Support Access)
  - UDP 161 – SNMP
- Public Route Table (UDR): 0.0.0.0/0 to Internet Gateway
- Private Route Table (UDR): 0.0.0.0/0 to Virtual Appliance (Edge GE2 IP address)

- Enable IP Forwarding on all interfaces

Figure 3-1: Custom Deployment



The template is built to accommodate either a **NEW** Virtual Network or an **EXISTING** Virtual Network. If using **EXISTING**, the vNET, subnets, and route tables are not created. Ensure vNET name, subnet name, and IP scheme reflect accurately with the existing environment.

While this template will activate a virtual edge, the simplicity of the topology will not accommodate all environments. It is up to the individual user to edit their environment accordingly. For better understanding of ARM Template structure and syntax, see: https://learn.microsoft.com/en-us/azure/azure-resource-manager/templates/syntax.

Chapter 4

Deploying Virtual Edge with ARM Template

This section describes how to deploy a virtual edge with an Azure Resource Manager (ARM) template.

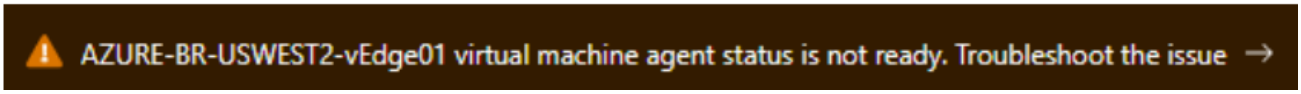
VeloCloud SD-WAN only supports a 2-NIC ARM deployment (i.e. GE1/WAN & GE2/LAN) when deploying a virtual edge. Of these two templates, one supports regions with Availability Zones (AZs) and the other supports regions without Availability Zones (AZs).

For regions with support/no support, see the following link: https://azure.microsoft.com/en-us/explore/global-infrastructure/geographies/#geographies.

> **Note:** Version 4.2.1 has been removed from the Marketplace in favor of supporting the following two base images, virtual edge 4.5.2 and virtual edge 5.0.1. If the version required is different, the VeloCloud Orchestrator upgrades or downgrades as necessary upon activation, based on the version selected for Enterprise or Edge.

During deployment, if the following message appears you can ignore this message as VeloCloud SD-WAN does not support Azure Agent on vEdge, and there is no impact on vEdge performance.

Figure 4-1: VMAGENT WARNING



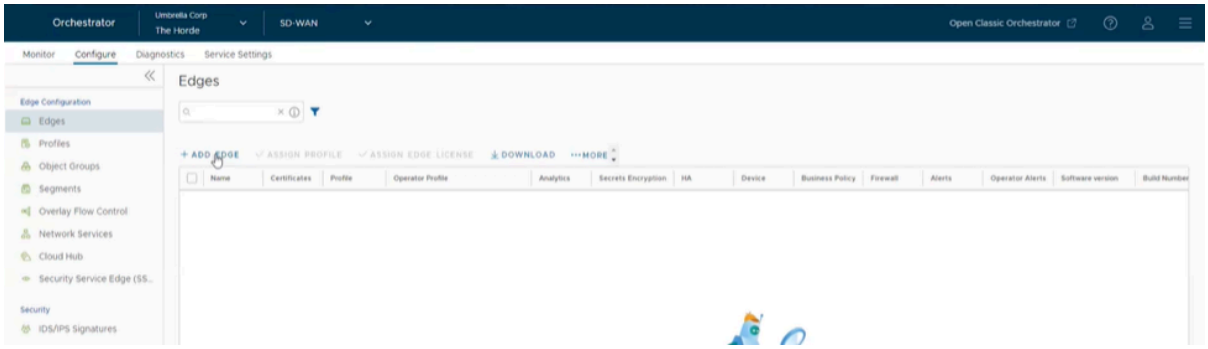
In this basic topology example, the Azure Virtual Network (vNET 172.16.0.0/16) is divided into a Public subnet (172.16.0.x/24) and a Private subnet (172.16.1.x/24). The virtual edge routes between the two subnets. The Public User-Defined Routes (UDR) will forward all offnet traffic to the Internet Gateway. The UDR in the Private subnet will forward all traffic to the LAN facing interface on the virtual edge (type Virtual Appliance). In this example, a default route is used to forward “ALL” traffic from the workloads but is not necessary. RFC1918 summarization or specific branch/Hub prefixes can be used to narrow what is sent to the virtual edge. For example, if the workloads in the Private Subnet still need to be accessible via SSH from publicly sourced IPs, then the UDR could be configured to point the default route (0.0.0.0/0) to Internet Gateway and RFC1918 summarization to the virtual edge.

To deploy a virtual edge with an ARM template, perform the following steps:

1. Login into the Orchestrator and add the virtual edge to the Enterprise.

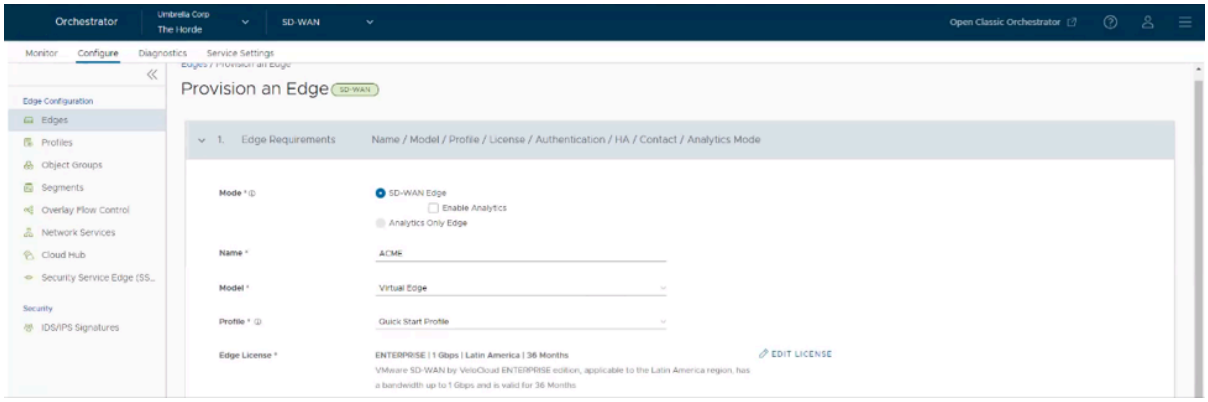
a. In the Orchestrator, go to **Configure** > **Edges** and click the **New Edge** button.

Figure 4-2: Configure Edges



b. The **Provision New Edge** dialog box displays.

Figure 4-3: Provision an Edge

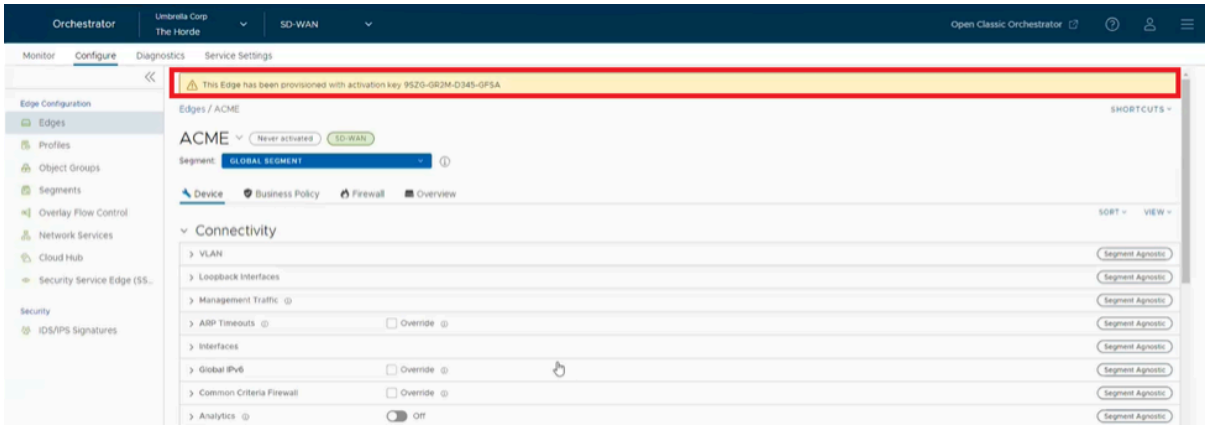


c. In the **Provision New Edge** dialog, provide the required details and click **Save**:

1. Enter a name in the **Name** text box.
2. From the **Model** drop-down menu, choose **Virtual Edge**.
3. From the **Profile** drop-down menu, choose a Profile.

The Edge is provisioned with an activation key, as shown in the following image. Make a note of this activation key.

Figure 4-4: Edge Provisioned with Activation Key

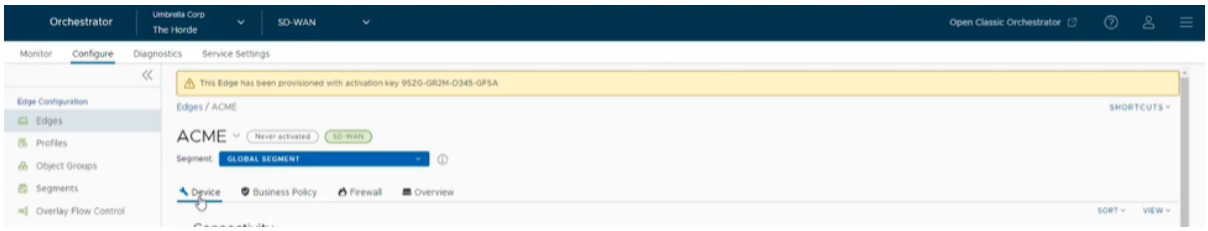


2. Configure virtual edge interfaces.

> **CAUTION:** Make sure to configure the Device settings before activating the virtual edge. If you miss to configure device setting, the virtual edge activates, but then goes offline a few minutes later.

a. Navigate to the virtual edge's **Device Settings** tab.

Figure 4-5: Device Settings for Virtual Edges

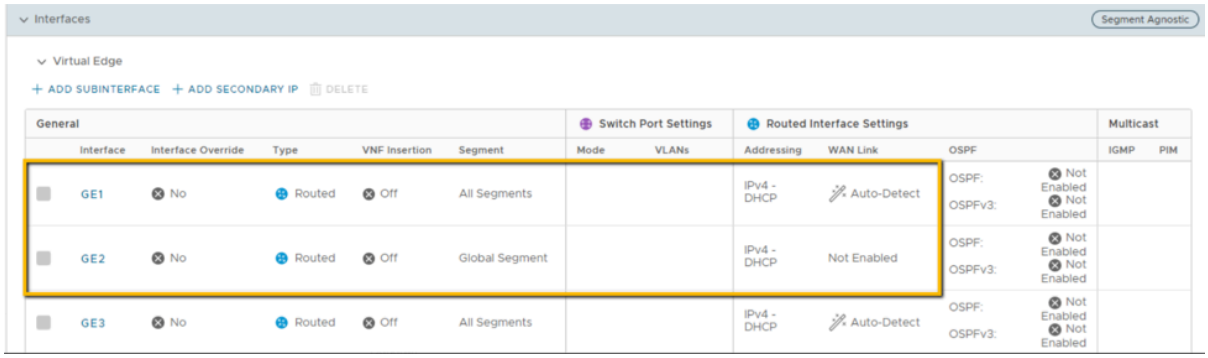


b. Change the Interface Settings as follows:

1. Change the GE1 interface capability from “Switched” to “Routed” (if needed) and activate DHCP addressing and WAN overlay.

2. In the GE2 interface, deactivate WAN overlay as this interface will be used for the LAN-side Gateway. Also, deactivate Network Address Translation (NAT) Direct Traffic.

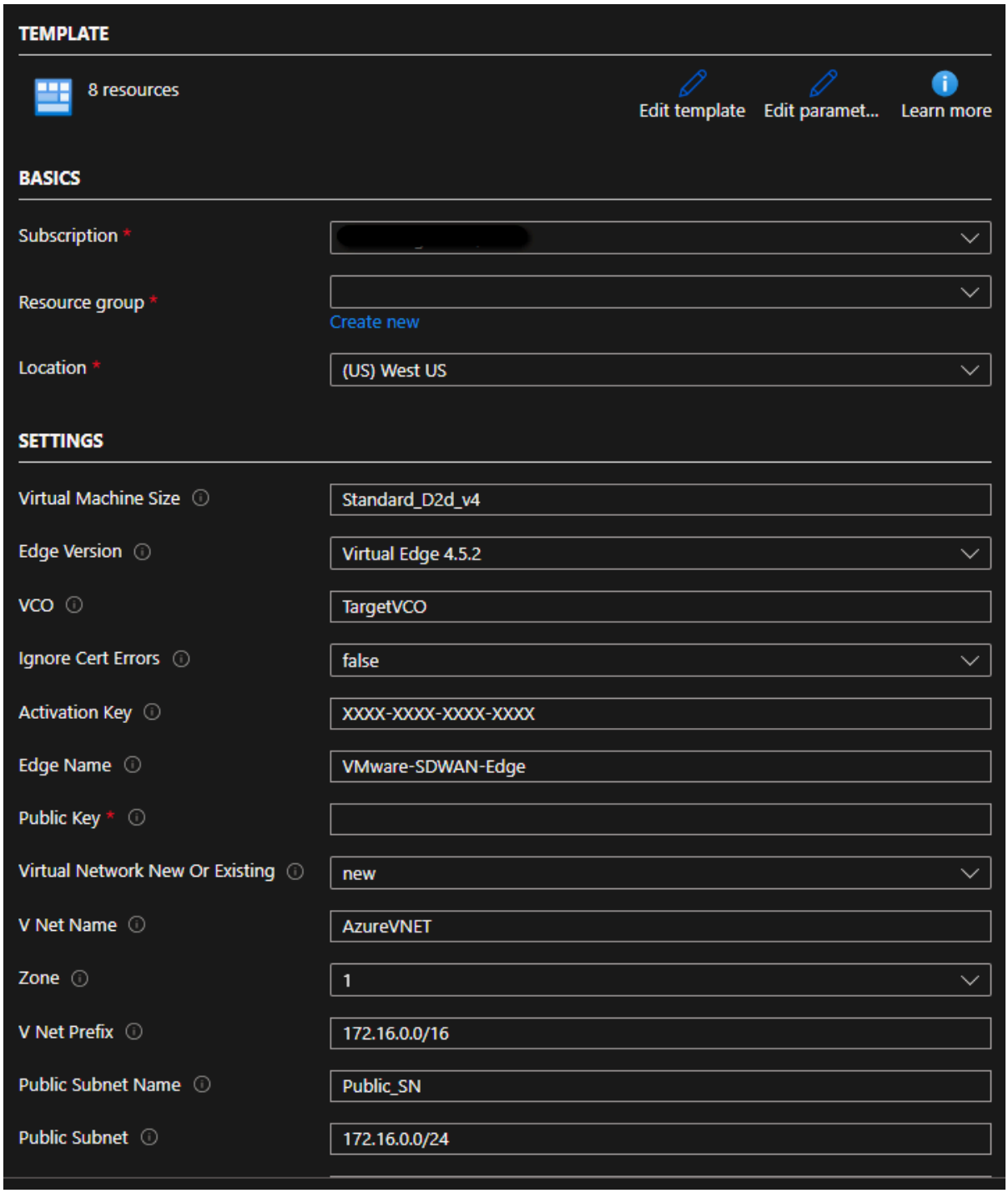
Figure 4-6: Interface Settings for Virtual Edge



3. Launch the virtual edge via one of the two ARM templates as follows:

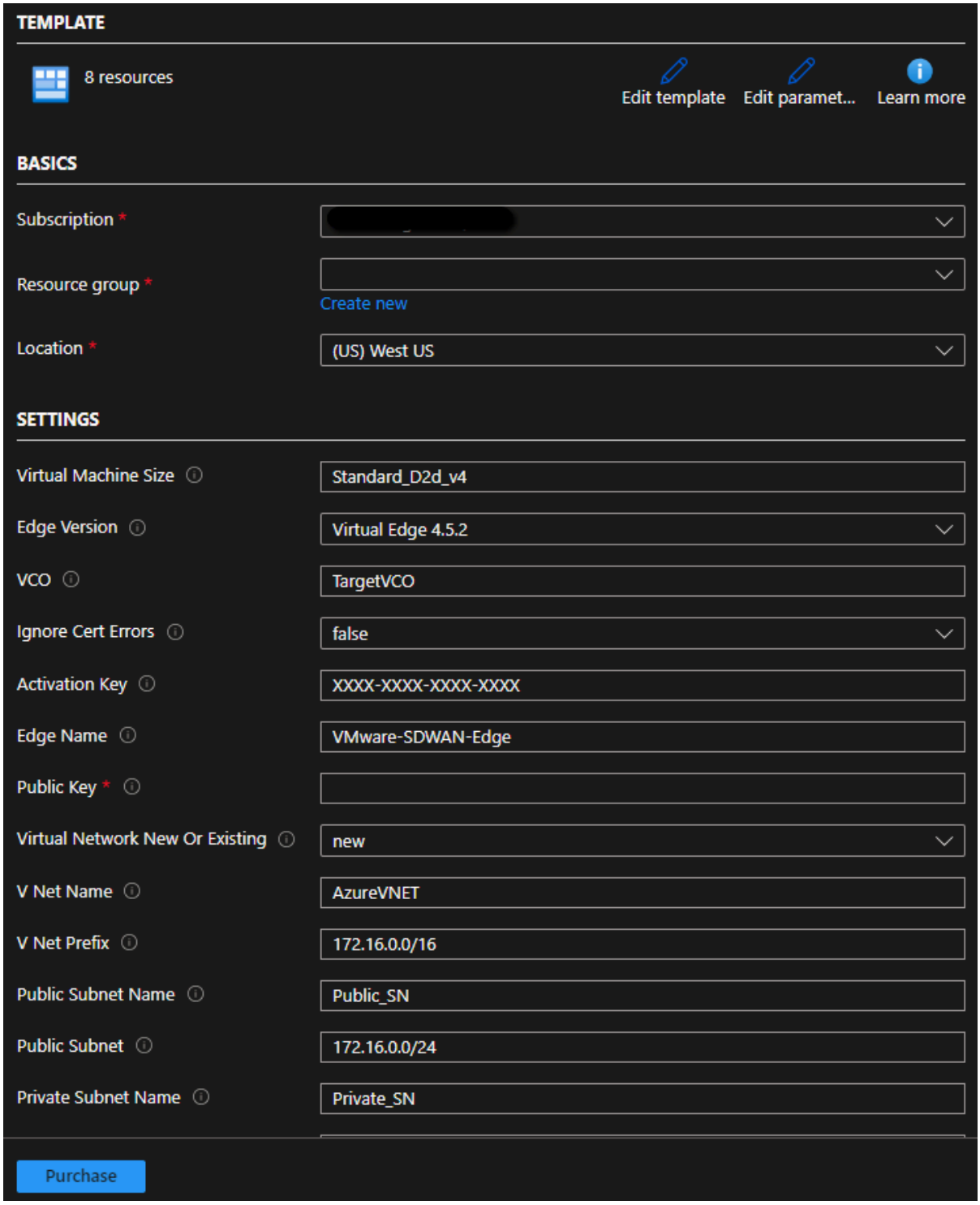
- VeloCloud SD-WAN ARM Template for regions with Availability Zones:

Figure 4-7: SDWAN Azure ARM Template for AZs 2-NIC



- VeloCloud SD-WAN ARM Template for regions without Availability Zones:

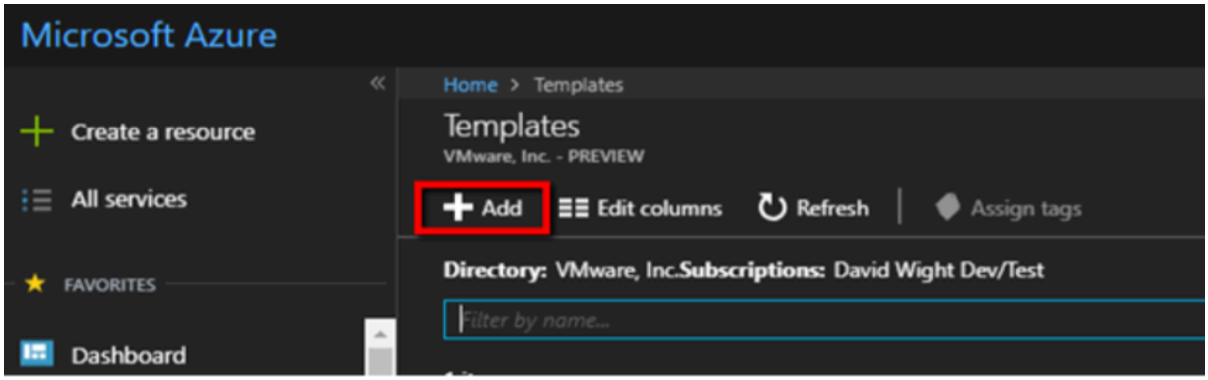
  Figure 4-8: SDWAN Azure ARM Template without AZs 2-NIC



> **Note:** If this is the first deployment of the virtual edge, it might be necessary to “Subscribe” to the Edge version in the Azure Marketplace before deploying from ARM Template.

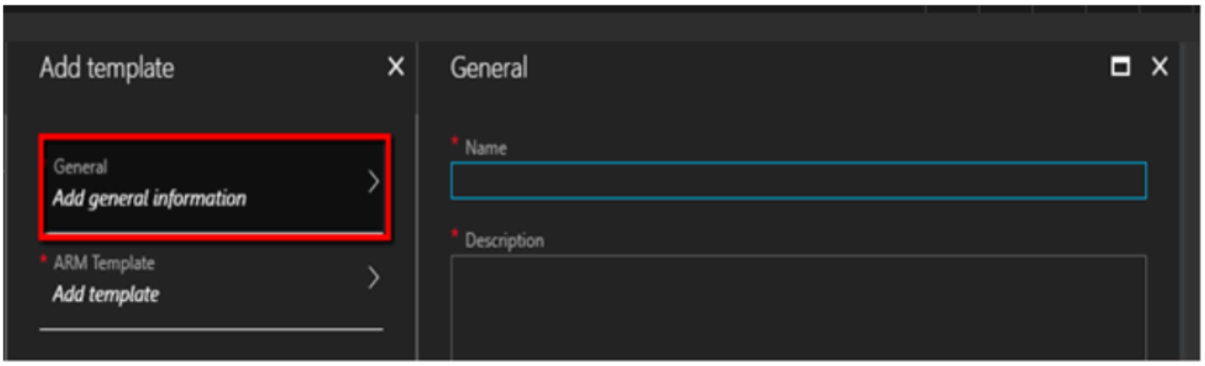
a. In the Microsoft Azure portal, navigate to **Templates** and click **+Add**.

Figure 4-9: Add Templates



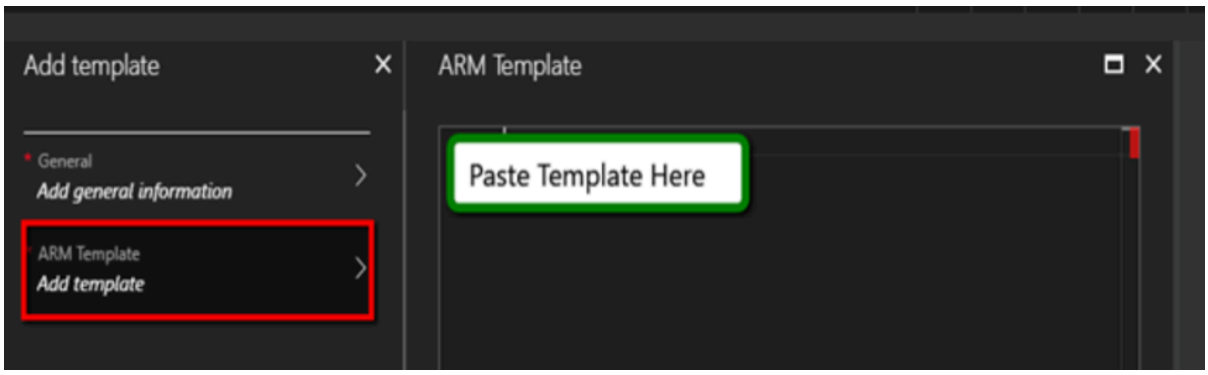
b. Enter the name and description of the template or deployment.

Figure 4-10: Add General Information



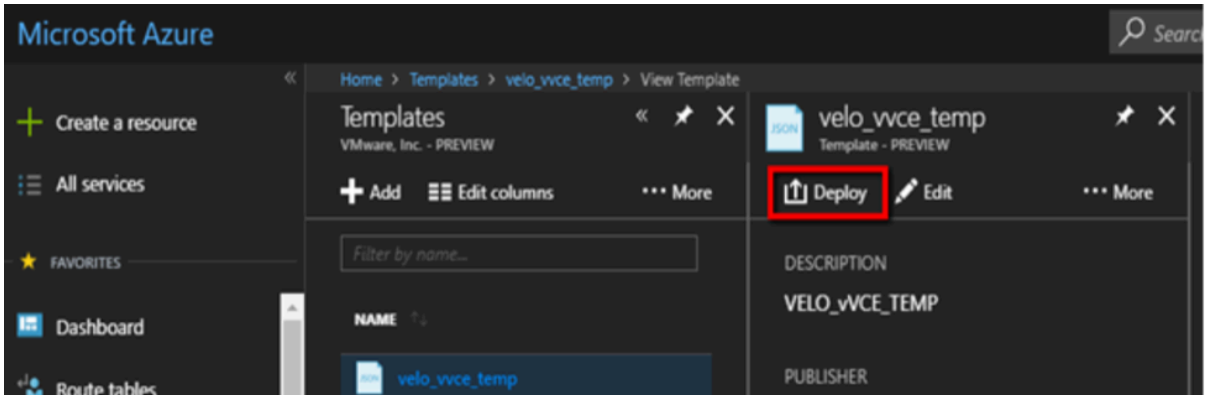
c. Cut and paste the template in the **ARM Template** area.

Figure 4-11: Add ARM Template



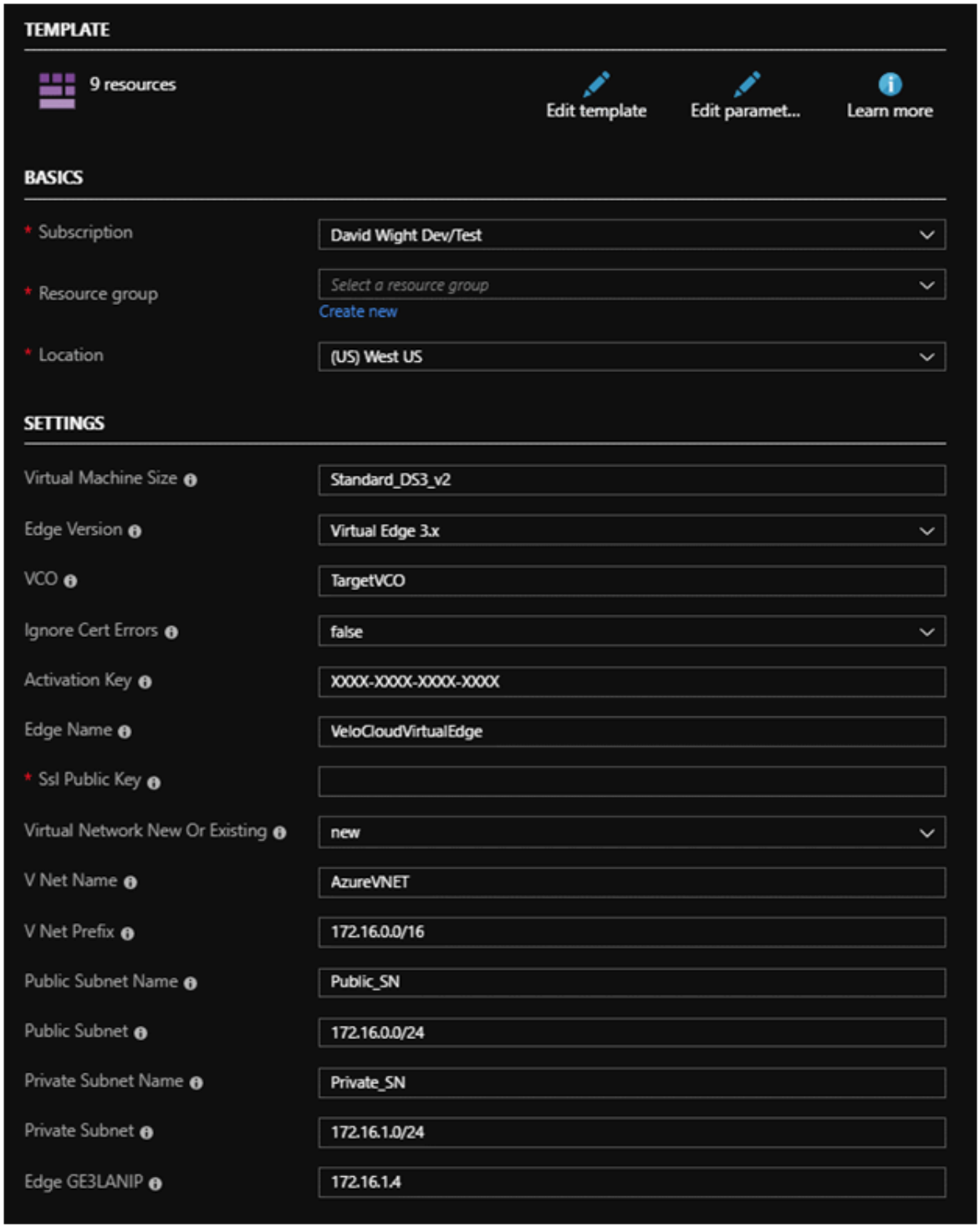
d. Click Deploy.

Figure 4-12: Deploy Template



e. Complete the template form.

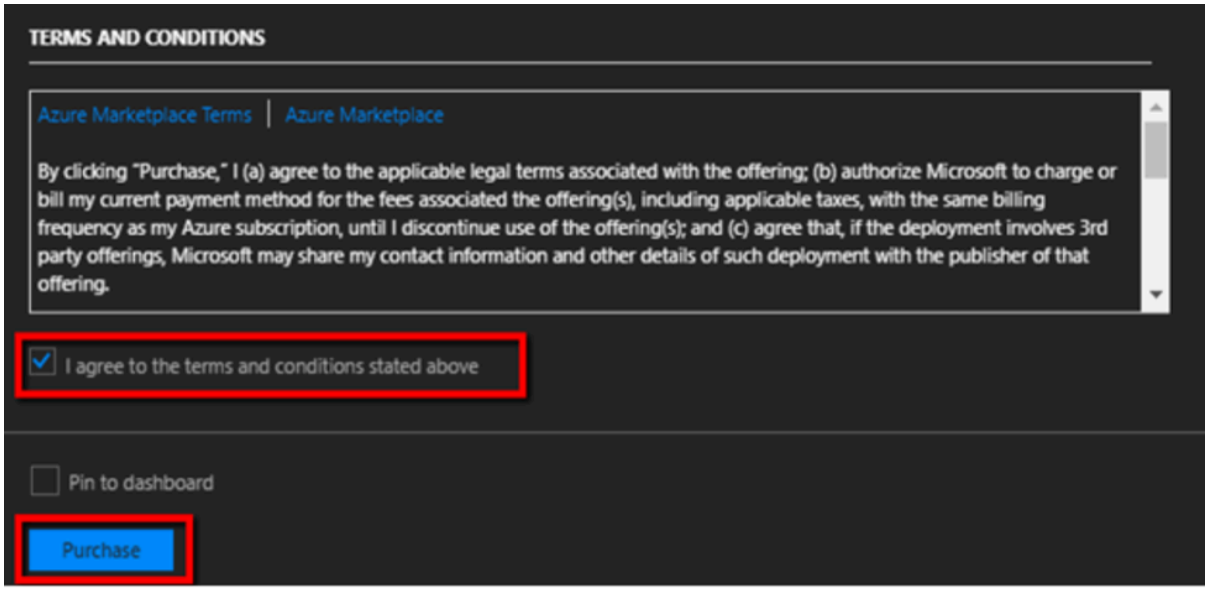
Figure 4-13: Template Form



Note: You can only SSH and login with a private key.

f. Agree to the terms and conditions and click the **Purchase** button.

Figure 4-14: Azure Marketplace Terms and Conditions



Azure will begin the deployment which can take a few minutes to complete. To follow the progress, click **Deployment in Progress…** and refresh.

Figure 4-15: Deployment In Progress State

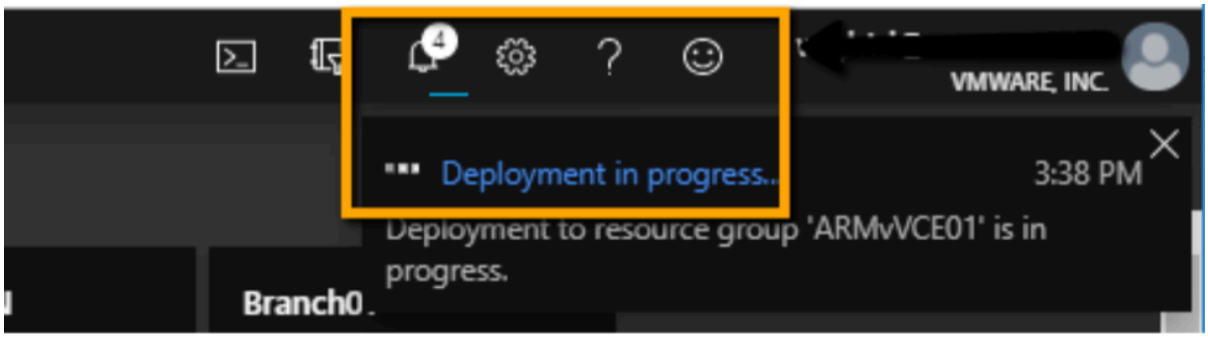
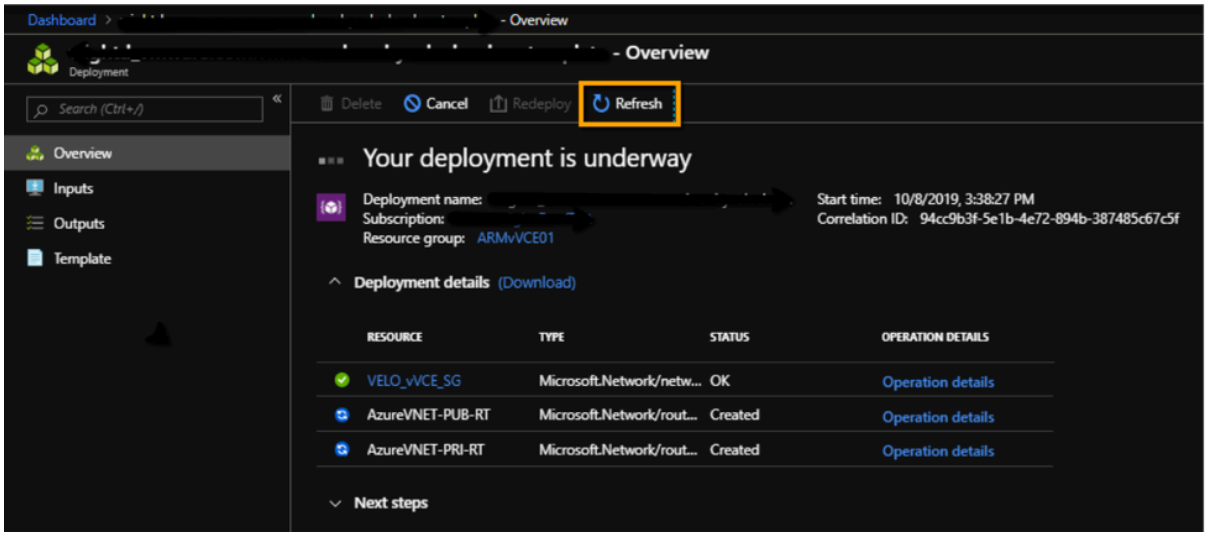


Figure 4-16: Deployment Underway State



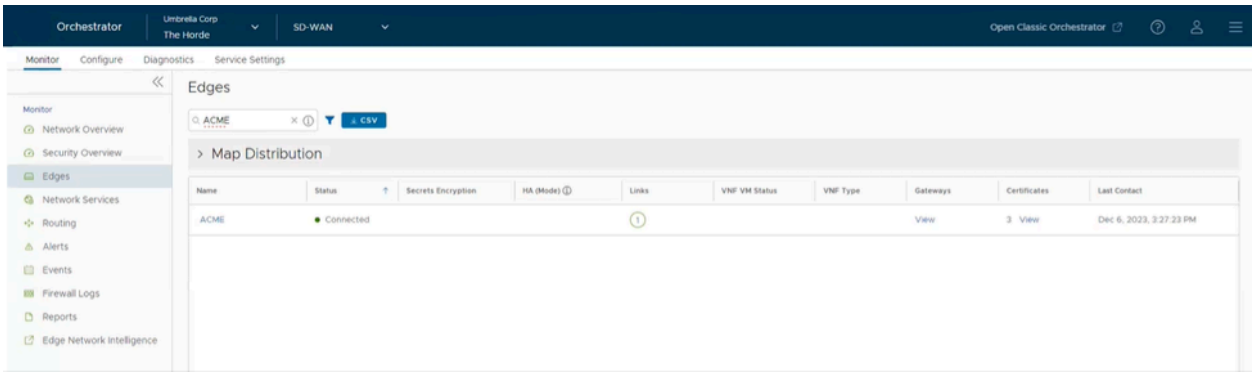
Once the virtual edge deployment is complete, the virtual edge will boot up and reach out to the Orchestrator with its activation key to complete virtual edge activation.

Figure 4-17: Deployment Complete State

4. Verify that the virtual edge is activated in the Orchestrator.

Once the instance is running in Azure and all information provided is correct, the virtual edge will reach out to the Orchestrator with the activation key, activate, and perform software update if needed, and reboot if upgraded. Typical deployment time is between three to four minutes.

Figure 4-18: Verify Virtual Edge Activation



Appendix A

References

- Arista SDWAN Azure ARM Template for AZs 2-NIC
- Arista SDWAN Azure ARM Template without AZs 2-NIC
- Related Documents

A.1 Arista SDWAN Azure ARM Template for AZs 2-NIC

```
{
    "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
    "contentVersion": "1.0.0.0",
    "parameters": {
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            "defaultValue": "Standard_D2d_v4",
            "metadata": {
                "description": "Virtual machine size"
            }
        },
        "EdgeVersion": {
            "type": "string",
            "allowedValues": [
                "Virtual Edge 4.5.2",
                "Virtual Edge 5.0.1"
            ],
            "defaultValue": "Virtual Edge 4.5.2",
            "metadata": {
                "description": "The version of the Edge to deploy from Marketplace"
            }
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            "metadata": {
                "description": "FQDN or IP address of VCO"
            }
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        "IgnoreCertErrors": {
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                "false"
            ],
            "defaultValue": "false",
            "metadata": {
                "description": "Determines whether or not to ignore certificate errors"
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        "ActivationKey": {
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            "metadata": {
                "description": "Activation Key"
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        },
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            }
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            "metadata": {
              "description": "Virtual Network Name"
            }
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            "allowedValues": [
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            "defaultValue": "Public_SN",
            "metadata": {
              "description": "Public Subnet Name for Edge WAN Interface within vNET"
            }
        },
        "PublicSubnet": {
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            "defaultValue": "172.16.0.0/24",
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            }
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            "defaultValue": "Private_SN",
            "metadata": {
              "description": "Private Subnet Name for Edge LAN Interface witin vNET"
```

```
            }
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            "defaultValue": "172.16.1.0/24",
            "metadata": {
              "description": "Private Subnet for Edge LAN Interface"
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          "defaultValue": "172.16.1.4",
          "metadata": {
            "description": "IP Address used for Edge LAN Interface GE2"
          }
        }
    },
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        "nic1": "[concat(parameters('EdgeName'),'-nic-ge1')]",
        "nic2": "[concat(parameters('EdgeName'),'-nic-ge2')]",
        "ipGE1": "[concat(parameters('EdgeName'),'-ipconfig-ge1')]",
        "ipGE2": "[concat(parameters('EdgeName'),'-ipconfig-ge2')]",
        "publicIP": "[concat(parameters('EdgeName'),'-publicIP')]",
        "virtualNetworkName": "[parameters('vNetName')]",
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        "subnet2Name": "[parameters('PrivateSubnetName')]",
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        "PublicSubnetSpace": "[parameters('PublicSubnet')]",
        "PrivateSubnetSpace": "[parameters('PrivateSubnet')]",
        "PrivateSubnetStartAddress": "[parameters('EdgeGE2LANIP')]",
        "routeTablePublic": "[concat(parameters('vNetName'),'-PUB-RT')]",
        "routeTablePrivate": "[concat(parameters('vNetName'),'-PRI-RT')]",
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        "subnet2Ref": "[resourceId('Microsoft.Network/virtualNetworks/subnets', variables('virtualNetworkName'), variables('subnet2Name'))]",
        "networkSecurityGroupName": "VELO_vVCE_SG",
        "sshKeyPath": "[concat('/home/azureuser/.ssh/authorized_keys')]",
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        "cloudinit": "[concat('#cloud-config\nvelocloud:\n vce:\n  management_interface: false\n  vco: ',parameters('VCO'), '\n  activation_code:
',parameters('ActivationKey'), '\n  vco_ignore_cert_errors: ', parameters('IgnoreCertErrors'),'\n')]",
        "images": {
             "Virtual Edge 4.5.2": {
                "publisher": "vmware-inc",
                "offer": "sol-42222-bbj",
                "sku": "vmware_sdwan_452"
            },
             "Virtual Edge 5.0.1": {
                "publisher": "vmware-inc",
                "offer": "sol-42222-bbj",
                "sku": "vmware_sdwan_501x"
            }
        },
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        "imagePublisher": "[variables('images')[parameters('EdgeVersion')].publisher]",
        "imageOffer": "[variables('images')[parameters('EdgeVersion')].offer]"
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    "resources": [
        {
            "name": "[variables('virtualMachineName')]",
            "type": "Microsoft.Compute/virtualMachines",
            "apiVersion": "2018-06-01",
            "location": "[resourceGroup().location]",
            "zones": [
                "[parameters('zone')]"
            ],
            "plan": {
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                "product": "[variables('imageOffer')]",
                "name": "[variables('imageSku')]"
            },
            "comments": "VMware SDWAN",
            "dependsOn": [
                "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic1'))]",
                "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic2'))]"
            ],
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                },
                "osProfile": {
                    "computerName": "[variables('virtualMachineName')]",
                    "adminUsername": "azureuser",
                    "adminPassword": "notallowed",
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                        "disablePasswordAuthentication": true,
                        "ssh": {
                            "publicKeys": [
                                {
                                "path": "[variables('sshKeyPath')]",
                                "keyData": "[parameters('PublicKey')]"
                                }
                            ]
                        }
                    }
                },
                "storageProfile": {
                    "imageReference": {
                        "publisher": "[variables('imagePublisher')]",
                        "offer": "[variables('imageOffer')]",
                        "sku": "[variables('imageSku')]",
                        "version": "latest"
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                    "osDisk": {
                        "createOption": "FromImage"
                    },
                    "dataDisks": []
                },
                "networkProfile": {
                    "networkInterfaces": [
                        {
                            "properties": {
                                "primary": true
                            },
                            "id": "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic1'))]"
                        },
                        {
                            "properties": {
                                "primary": false
                            },
                            "id": "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic2'))]"
                        }
                    ]
                }
            }
        },
        {
```

```
            "condition": "[equals(parameters('virtualNetworkNewOrExisting'), 'new')]",
            "name": "[variables('virtualNetworkName')]",
            "type": "Microsoft.Network/virtualNetworks",
            "apiVersion": "2017-06-01",
            "location": "[resourceGroup().location]",
            "comments": "Deploy Virtual Network",
            "dependsOn": [
                "[resourceId('Microsoft.Network/routeTables/', variables('routeTablePublic'))]",
                "[resourceId('Microsoft.Network/routeTables/', variables('routeTablePrivate'))]"
            ],
            "properties": {
                "addressSpace": {
                    "addressPrefixes": [
                        "[variables('vNetPrefixSpace')]"
                    ]
                },
                "subnets": [
                    {
                        "name": "[variables('subnet1Name')]",
                        "properties": {
                            "addressPrefix": "[variables('PublicSubnetSpace')]",
                            "routeTable": {
                                "id": "[resourceId('Microsoft.Network/routeTables', variables('routeTablePublic'))]"
                            }
                        }
                    },
                    {
                        "name": "[variables('subnet2Name')]",
                        "properties": {
                            "addressPrefix": "[variables('PrivateSubnetSpace')]",
                            "routeTable": {
                                "id": "[resourceId('Microsoft.Network/routeTables', variables('routeTablePrivate'))]"
                            }
                        }
                    }
                ]
            }
        },
        {
            "name": "[variables('nic1')]",
            "type": "Microsoft.Network/networkInterfaces",
            "apiVersion": "2017-06-01",
            "location": "[resourceGroup().location]",
            "comments": "VMware SASE vEdge GE1 - WAN.",
            "dependsOn": [
                "[resourceId('Microsoft.Network/networkSecurityGroups/', variables('networkSecurityGroupName'))]",
                "[resourceId('Microsoft.Network/virtualNetworks/', variables('virtualNetworkName'))]",
                "[resourceId('Microsoft.Network/publicIpAddresses/', variables('publicIP'))]"
            ],
            "properties": {
                "enableIPForwarding": true,
                "ipConfigurations": [
                    {
                        "name":  "[variables('ipGE1')]",
                        "properties": {
                            "subnet": {
                                "id": "[variables('subnet1Ref')]"
                            },
                            "privateIPAllocationMethod": "Dynamic",
                            "publicIpAddress": {
                                "id": "[resourceId('Microsoft.Network/publicIpAddresses', variables('publicIP'))]"
                            }
                        }
                    }
                ],
                "networkSecurityGroup": {
                    "id": "[resourceId('Microsoft.Network/networkSecurityGroups', variables('networkSecurityGroupName'))]"
                }
            }
        },
        {
            "name": "[variables('nic2')]",
            "type": "Microsoft.Network/networkInterfaces",
            "apiVersion": "2017-06-01",
            "location": "[resourceGroup().location]",
            "comments": "VMware SASE vEdge GE2 - LAN.",
            "dependsOn": [
                "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic1'))]",
                "[resourceId('Microsoft.Network/virtualNetworks/', variables('virtualNetworkName'))]"
            ],
            "properties": {
                "enableIPForwarding": true,
                "ipConfigurations": [
                    {
                        "name": "[variables('ipGE2')]",
                        "properties": {
                            "subnet": {
                                "id": "[variables('subnet2Ref')]"
                            },
                            "privateIPAllocationMethod": "Static",
                            "privateIPAddress": "[variables('PrivateSubnetStartAddress')]"
                        }
                    }
                ],
                "networkSecurityGroup": {
                    "id": "[resourceId('Microsoft.Network/networkSecurityGroups', variables('networkSecurityGroupName'))]"
                }
            }
        },
        {
            "name": "[variables('publicIP')]",
            "type": "Microsoft.Network/publicIPAddresses",
            "apiVersion": "2017-08-01",
            "location": "[resourceGroup().location]",
            "comments": "Public IP for WAN Interface GE1",
         "sku": {
                "name": "Standard"
            },
            "zones": [
                "[parameters('zone')]"
            ],
            "properties": {
                "publicIPAllocationMethod": "Static"
            }
        },
        {
            "condition": "[equals(parameters('virtualNetworkNewOrExisting'), 'new')]",
            "type": "Microsoft.Network/routeTables",
            "name": "[variables('routeTablePublic')]",
            "apiVersion": "2015-06-15",
            "location": "[resourceGroup().location]",
            "properties": {
                "routes": [
                    {
                        "name": "DefaultRouteToInternet",
                        "properties": {
                            "addressPrefix": "0.0.0.0/0",
                            "nextHopType": "Internet"
```

```
                        }
                    }
                ]
            }
        },
        {
            "condition": "[equals(parameters('virtualNetworkNewOrExisting'), 'new')]",
            "type": "Microsoft.Network/routeTables",
            "name": "[variables('routeTablePrivate')]",
            "apiVersion": "2015-06-15",
            "location": "[resourceGroup().location]",
            "properties": {
                "routes": [
                    {
                        "name": "RFC1918_10_ToGE2",
                        "properties": {
                            "addressPrefix": "10.0.0.0/8",
                            "nextHopType": "VirtualAppliance",
                            "nextHopIpAddress": "[variables('PrivateSubnetStartAddress')]"
                        }
                    },
                    {
                        "name": "RFC1918_172_16_ToGE2",
                        "properties": {
                            "addressPrefix": "172.16.0.0/12",
                            "nextHopType": "VirtualAppliance",
                            "nextHopIpAddress": "[variables('PrivateSubnetStartAddress')]"
                        }
                    },
                    {
                        "name": "RFC1918_192_168_ToGE2",
                        "properties": {
                            "addressPrefix": "192.168.0.0/16",
                            "nextHopType": "VirtualAppliance",
                            "nextHopIpAddress": "[variables('PrivateSubnetStartAddress')]"
                        }
                    }
                ]
            }
        },
        {
            "name": "[variables('networkSecurityGroupName')]",
            "type": "Microsoft.Network/networkSecurityGroups",
            "apiVersion": "2016-09-01",
            "location": "[resourceGroup().location]",
            "comments": "Network Security Group (NSG)",
            "properties": {
                "securityRules": [
                    {
                        "name": "VCMP",
                        "properties": {
                            "priority": 1000,
                            "sourceAddressPrefix": "*",
                            "protocol": "Udp",
                            "destinationPortRange": "2426",
                            "access": "Allow",
                            "direction": "Inbound",
                            "sourcePortRange": "*",
                            "destinationAddressPrefix": "*"
                        }
                    },
                    {
                        "name": "SSH",
                        "properties": {
                            "priority": 1001,
                            "sourceAddressPrefix": "*",
                            "protocol": "Tcp",
                            "destinationPortRange": "22",
                            "access": "Allow",
                            "direction": "Inbound",
                            "sourcePortRange": "*",
                            "destinationAddressPrefix": "*"
                        }
                    },
                    {
                        "name": "SNMP",
                        "properties": {
                            "priority": 1002,
                            "sourceAddressPrefix": "*",
                            "protocol": "Udp",
                            "destinationPortRange": "161",
                            "access": "Allow",
                            "direction": "Inbound",
                            "sourcePortRange": "*",
                            "destinationAddressPrefix": "*"
                        }
                    }
                ]
            }
        }
    ],
    "outputs": {}
}
```

A.2 Arista SDWAN Azure ARM Template without AZs 2-NIC

```
{
    "$schema": "https://schema.management.azure.com/schemas/2015-01-01/deploymentTemplate.json#",
    "contentVersion": "1.0.0.0",
    "parameters": {
        "virtualMachineSize": {
            "type": "string",
            "defaultValue": "Standard_D2d_v4",
            "metadata": {
                "description": "Virtual machine size"
            }
        },
        "EdgeVersion": {
            "type": "string",
            "allowedValues": [
                "Virtual Edge 4.5.2",
                "Virtual Edge 5.0.1"
            ],
            "defaultValue": "Virtual Edge 4.5.2",
            "metadata": {
                "description": "The version of the Edge to deploy from Marketplace"
            }
        },
        "VCO": {
            "type": "string",
            "defaultValue": "TargetVCO",
            "metadata": {
                "description": "FQDN or IP address of VCO"
            }
        },
        "IgnoreCertErrors": {
            "type": "string",
            "allowedValues": [
                "true",
                "false"
            ],
            "defaultValue": "false",
            "metadata": {
                "description": "Determines whether or not to ignore certificate errors"
            }
        },
        "ActivationKey": {
            "type": "string",
            "defaultValue": "XXXX-XXXX-XXXX-XXXX",
            "metadata": {
                "description": "Activation Key"
            }
        },
        "EdgeName": {
            "type": "string",
            "defaultValue": "VMware-SDWAN-Edge",
            "metadata": {
                "description": "Name of the Virtual Edge"
            }
        },
        "PublicKey": {
            "type": "string",
            "metadata": {
                "description": "The public key for Edge instance paired with local private key"
            }
        },
        "virtualNetworkNewOrExisting": {
            "type": "string",
            "allowedValues": [
                "new",
                "existing"
            ],
            "defaultValue": "new",
            "metadata": {
                "description": "Determines whether or not a new virtual network should be provisioned."
            }
        },
        "vNetName": {
            "type": "string",
            "defaultValue": "AzureVNET",
            "metadata": {
              "description": "Virtual Network Name"
            }
        },
        "vNetPrefix": {
            "type": "string",
            "defaultValue": "172.16.0.0/16",
            "metadata": {
              "description": "Virtual Network IP Address Space"
            }
        },
        "PublicSubnetName": {
            "type": "string",
            "defaultValue": "Public_SN",
            "metadata": {
              "description": "Public Subnet Name for Edge WAN Interface within vNET"
            }
        },
        "PublicSubnet": {
            "type": "string",
            "defaultValue": "172.16.0.0/24",
            "metadata": {
              "description": "Public Subnet IP Range for Edge WAN Interface"
            }
        },
        "PrivateSubnetName": {
            "type": "string",
            "defaultValue": "Private_SN",
            "metadata": {
              "description": "Private Subnet Name for Edge LAN Interface witin vNET"
            }
        },
        "PrivateSubnet": {
            "type": "string",
            "defaultValue": "172.16.1.0/24",
            "metadata": {
              "description": "Private Subnet for Edge LAN Interface"
            }
        },
        "EdgeGE2LANIP": {
          "type": "string",
          "defaultValue": "172.16.1.4",
```

```
          "metadata": {
            "description": "IP Address used for Edge LAN Interface GE2"
          }
        }
    },
    "variables": {
        "virtualMachineName": "[parameters('EdgeName')]",
        "nic1": "[concat(parameters('EdgeName'),'-nic-ge1')]",
        "nic2": "[concat(parameters('EdgeName'),'-nic-ge2')]",
        "ipGE1": "[concat(parameters('EdgeName'),'-ipconfig-ge1')]",
        "ipGE2": "[concat(parameters('EdgeName'),'-ipconfig-ge2')]",
        "publicIP": "[concat(parameters('EdgeName'),'-publicIP')]",
        "virtualNetworkName": "[parameters('vNetName')]",
        "subnet1Name": "[parameters('PublicSubnetName')]",
        "subnet2Name": "[parameters('PrivateSubnetName')]",
        "vNetPrefixSpace": "[parameters('vNetPrefix')]",
        "PublicSubnetSpace": "[parameters('PublicSubnet')]",
        "PrivateSubnetSpace": "[parameters('PrivateSubnet')]",
        "PrivateSubnetStartAddress": "[parameters('EdgeGE2LANIP')]",
        "routeTablePublic": "[concat(parameters('vNetName'),'-PUB-RT')]",
        "routeTablePrivate": "[concat(parameters('vNetName'),'-PRI-RT')]",
        "subnet1Ref": "[resourceId('Microsoft.Network/virtualNetworks/subnets', variables('virtualNetworkName'), variables('subnet1Name'))]",
        "subnet2Ref": "[resourceId('Microsoft.Network/virtualNetworks/subnets', variables('virtualNetworkName'), variables('subnet2Name'))]",
        "networkSecurityGroupName": "VELO_vVCE_SG",
        "sshKeyPath": "[concat('/home/azureuser/.ssh/authorized_keys')]",
        "sshPubKey": "parameters('PublicKey')",
        "cloudinit": "[concat('#cloud-config\nvelocloud:\n vce:\n  management_interface: false\n  vco: ',parameters('VCO'), '\n  activation_code:
',parameters('ActivationKey'), '\n  vco_ignore_cert_errors: ', parameters('IgnoreCertErrors'),'\n')]",
        "images": {
             "Virtual Edge 4.5.2": {
                "publisher": "vmware-inc",
                "offer": "sol-42222-bbj",
                "sku": "vmware_sdwan_452"
            },
             "Virtual Edge 5.0.1": {
                "publisher": "vmware-inc",
                "offer": "sol-42222-bbj",
                "sku": "vmware_sdwan_501x"
            }
        },
        "imageSku": "[variables('images')[parameters('EdgeVersion')].sku]",
        "imagePublisher": "[variables('images')[parameters('EdgeVersion')].publisher]",
        "imageOffer": "[variables('images')[parameters('EdgeVersion')].offer]"
    },
    "resources": [
        {
            "name": "[variables('virtualMachineName')]",
            "type": "Microsoft.Compute/virtualMachines",
            "apiVersion": "2018-06-01",
            "location": "[resourceGroup().location]",
            "plan": {
                "publisher": "[variables('imagePublisher')]",
                "product": "[variables('imageOffer')]",
                "name": "[variables('imageSku')]"
            },
            "comments": "VMware SDWAN",
            "dependsOn": [
                "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic1'))]",
                "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic2'))]"
            ],
            "properties": {
                "hardwareProfile": {
                    "vmSize": "[parameters('virtualMachineSize')]"
                },
                "osProfile": {
                    "computerName": "[variables('virtualMachineName')]",
                    "adminUsername": "azureuser",
                    "adminPassword": "notallowed",
                    "customData": "[base64(variables('cloudinit'))]",
                    "linuxConfiguration": {
                        "provisionVMAgent": false,
                        "disablePasswordAuthentication": true,
                        "ssh": {
                            "publicKeys": [
                                {
                                "path": "[variables('sshKeyPath')]",
                                "keyData": "[parameters('PublicKey')]"
                                }
                            ]
                        }
                    }
                },
                "storageProfile": {
                    "imageReference": {
                        "publisher": "[variables('imagePublisher')]",
                        "offer": "[variables('imageOffer')]",
                        "sku": "[variables('imageSku')]",
                        "version": "latest"
                    },
                    "osDisk": {
                        "createOption": "FromImage"
                    },
                    "dataDisks": []
                },
                "networkProfile": {
                    "networkInterfaces": [
                        {
                            "properties": {
                                "primary": true
                            },
                            "id": "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic1'))]"
                        },
                        {
                            "properties": {
                                "primary": false
                            },
                            "id": "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic2'))]"
                        }
                    ]
                }
            }
        },
        {
            "condition": "[equals(parameters('virtualNetworkNewOrExisting'), 'new')]",
            "name": "[variables('virtualNetworkName')]",
            "type": "Microsoft.Network/virtualNetworks",
            "apiVersion": "2017-06-01",
            "location": "[resourceGroup().location]",
            "comments": "Deploy Virtual Network",
            "dependsOn": [
                "[resourceId('Microsoft.Network/routeTables/', variables('routeTablePublic'))]",
                "[resourceId('Microsoft.Network/routeTables/', variables('routeTablePrivate'))]"
            ],
            "properties": {
                "addressSpace": {
                    "addressPrefixes": [
                        "[variables('vNetPrefixSpace')]"
                    ]
```

```
                },
                "subnets": [
                    {
                        "name": "[variables('subnet1Name')]",
                        "properties": {
                            "addressPrefix": "[variables('PublicSubnetSpace')]",
                            "routeTable": {
                                "id": "[resourceId('Microsoft.Network/routeTables', variables('routeTablePublic'))]"
                            }
                        }
                    },
                    {
                        "name": "[variables('subnet2Name')]",
                        "properties": {
                            "addressPrefix": "[variables('PrivateSubnetSpace')]",
                            "routeTable": {
                                "id": "[resourceId('Microsoft.Network/routeTables', variables('routeTablePrivate'))]"
                            }
                        }
                    }
                ]
            }
        },
        {
            "name": "[variables('nic1')]",
            "type": "Microsoft.Network/networkInterfaces",
            "apiVersion": "2017-06-01",
            "location": "[resourceGroup().location]",
            "comments": "VMware SDWAN vEdge GE1 - WAN.",
            "dependsOn": [
                "[resourceId('Microsoft.Network/networkSecurityGroups/', variables('networkSecurityGroupName'))]",
                "[resourceId('Microsoft.Network/virtualNetworks/', variables('virtualNetworkName'))]",
                "[resourceId('Microsoft.Network/publicIpAddresses/', variables('publicIP'))]"
            ],
            "properties": {
                "enableIPForwarding": true,
                "ipConfigurations": [
                    {
                        "name":  "[variables('ipGE1')]",
                        "properties": {
                            "subnet": {
                                "id": "[variables('subnet1Ref')]"
                            },
                            "privateIPAllocationMethod": "Dynamic",
                            "publicIpAddress": {
                                "id": "[resourceId('Microsoft.Network/publicIpAddresses', variables('publicIP'))]"
                            }
                        }
                    }
                ],
                "networkSecurityGroup": {
                    "id": "[resourceId('Microsoft.Network/networkSecurityGroups', variables('networkSecurityGroupName'))]"
                }
            }
        },
        {
            "name": "[variables('nic2')]",
            "type": "Microsoft.Network/networkInterfaces",
            "apiVersion": "2017-06-01",
            "location": "[resourceGroup().location]",
            "comments": "VMware SASE vEdge GE2 - LAN.",
            "dependsOn": [
                "[resourceId('Microsoft.Network/networkInterfaces/', variables('nic1'))]",
                "[resourceId('Microsoft.Network/virtualNetworks/', variables('virtualNetworkName'))]"
            ],
            "properties": {
                "enableIPForwarding": true,
                "ipConfigurations": [
                    {
                        "name": "[variables('ipGE2')]",
                        "properties": {
                            "subnet": {
                                "id": "[variables('subnet2Ref')]"
                            },
                            "privateIPAllocationMethod": "Static",
                            "privateIPAddress": "[variables('PrivateSubnetStartAddress')]"
                        }
                    }
                ],
                "networkSecurityGroup": {
                    "id": "[resourceId('Microsoft.Network/networkSecurityGroups', variables('networkSecurityGroupName'))]"
                }
            }
        },
        {
            "name": "[variables('publicIP')]",
            "type": "Microsoft.Network/publicIPAddresses",
            "apiVersion": "2017-08-01",
            "location": "[resourceGroup().location]",
            "comments": "Public IP for WAN Interface GE1",
         "sku": {
                "name": "Standard"
            },
            "properties": {
                "publicIPAllocationMethod": "Static"
            }
        },
        {
            "condition": "[equals(parameters('virtualNetworkNewOrExisting'), 'new')]",
            "type": "Microsoft.Network/routeTables",
            "name": "[variables('routeTablePublic')]",
            "apiVersion": "2015-06-15",
            "location": "[resourceGroup().location]",
            "properties": {
                "routes": [
                    {
                        "name": "DefaultRouteToInternet",
                        "properties": {
                            "addressPrefix": "0.0.0.0/0",
                            "nextHopType": "Internet"
                        }
                    }
                ]
            }
        },
        {
            "condition": "[equals(parameters('virtualNetworkNewOrExisting'), 'new')]",
            "type": "Microsoft.Network/routeTables",
            "name": "[variables('routeTablePrivate')]",
            "apiVersion": "2015-06-15",
            "location": "[resourceGroup().location]",
            "properties": {
                "routes": [
                    {
                        "name": "RFC1918_10_ToGE2",
                        "properties": {
                            "addressPrefix": "10.0.0.0/8",
                            "nextHopType": "VirtualAppliance",
```

```
                        "nextHopIpAddress": "[variables('PrivateSubnetStartAddress')]"
                    }
                },
                {
                    "name": "RFC1918_172_16_ToGE2",
                    "properties": {
                        "addressPrefix": "172.16.0.0/12",
                        "nextHopType": "VirtualAppliance",
                        "nextHopIpAddress": "[variables('PrivateSubnetStartAddress')]"
                    }
                },
                {
                    "name": "RFC1918_192_168_ToGE2",
                    "properties": {
                        "addressPrefix": "192.168.0.0/16",
                        "nextHopType": "VirtualAppliance",
                        "nextHopIpAddress": "[variables('PrivateSubnetStartAddress')]"
                    }
                }
            ]
        }
    },
    {
        "name": "[variables('networkSecurityGroupName')]",
        "type": "Microsoft.Network/networkSecurityGroups",
        "apiVersion": "2016-09-01",
        "location": "[resourceGroup().location]",
        "comments": "Network Security Group (NSG)",
        "properties": {
            "securityRules": [
                {
                    "name": "VCMP",
                    "properties": {
                        "priority": 1000,
                        "sourceAddressPrefix": "*",
                        "protocol": "Udp",
                        "destinationPortRange": "2426",
                        "access": "Allow",
                        "direction": "Inbound",
                        "sourcePortRange": "*",
                        "destinationAddressPrefix": "*"
                    }
                },
                {
                    "name": "SSH",
                    "properties": {
                        "priority": 1001,
                        "sourceAddressPrefix": "*",
                        "protocol": "Tcp",
                        "destinationPortRange": "22",
                        "access": "Allow",
                        "direction": "Inbound",
                        "sourcePortRange": "*",
                        "destinationAddressPrefix": "*"
                    }
                },
                {
                    "name": "SNMP",
                    "properties": {
                        "priority": 1002,
                        "sourceAddressPrefix": "*",
                        "protocol": "Udp",
                        "destinationPortRange": "161",
                        "access": "Allow",
                        "direction": "Inbound",
                        "sourcePortRange": "*",
                        "destinationAddressPrefix": "*"
                    }
                }
            ]
        }
    }
],
"outputs": {}
}
```

A.3 Related Documents

The following documentation is available for ***Arista VeloCloud SD-WAN***:

- *Arista VeloCloud SD-WAN Operator Guide*
- *Arista VeloCloud SD-WAN Administration Guide*
- *Arista VeloCloud SD-WAN Gateway Monitoring Guide*
- *Arista VeloCloud SD-WAN Orchestrator Deployment and Monitoring Guide*
- *Arista VeloCloud SD-WAN Partner Guide*
- *Arista VeloCloud SASE Global Settings Guide*
- *Arista VeloCloud SD-WAN Troubleshooting Guide*
- *Arista VeloCloud SD-WAN Design Guide for Enhanced Firewall Services*
- *Arista VeloCloud SD-WAN 6.4 API*
- *Arista VeloCloud Portal API 6.4*
- *Arista AliCloud Virtual Edge Deployment Guide*
- *Arista AWD Virtual Edge Deployment Guide*
- *Arista Azure Virtual Edge Deployment Guide*
- *Arista Google Cloud Platform Virtual Edge Deployment Guide*
- *Arista VeloCloud SASE and QRadar SIEM Integration Guide*
- *Arista VeloCloud SD-WAN and Cloud on AWS Deployment Guide*
- *Arista VeloCloud SD-WAN and Forcepoint SSE Integration Guide*
- *Arista VeloCloud SD-WAN and Google Network Connectivity Center Integration Guide*
- *Arista VeloCloud SD-WAN and Microsoft Route Server Integration Guide*
- *Arista VeloCloud SD-WAN and Netskope SSE Integration Guide*
- *Arista VeloCloud SD-WAN Azure Private Multi-Access Edge Compute Deployment Guide*
- *Arista VeloCloud SD-WAN License Management Guide*