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vMX

vMX Getting Started Guide for Microsoft Azure

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vMX vMX Getting Started Guide for Microsoft Azure
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vMX and Microsoft Azure Overview

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The vMX router is a virtual version of the MX Series 3D Universal Edge Router. Like the MX Series router, the vMX router runs the Junos operating system (Junos OS) and supports Junos OS packet handling and forwarding modeled after the Trio chipset. Configuration and management of vMX routers are the same as for physical MX Series routers.

Benefits and Uses of vMX Routers

You can use the vMX router to:

- Quickly introduce new services
- More easily deliver customized and personalized services to customers
- Scale operations to push IP services closer to customers or to manage network growth when growth forecasts are low or uncertain
- Quickly expand service offerings into new sites

vMX Limitations on Microsoft Azure

vMX does not support these features on Microsoft Azure:

- Layer 2 features, and any features or protocols dependent on Layer 2 features
- Attachment or detachment of interfaces while a vMX instance is running
- VLAN tagging

- Jumbo frames (MTU greater than 1500)

vMX with Microsoft Azure

Microsoft Azure is Microsoft's application platform for the public cloud. It is an open, flexible, enterprise-grade cloud computing platform for building, deploying, and managing applications and services through a global network of Microsoft-managed data centers. You place your virtual machines (VMs) onto Azure virtual networks, where the distributed and virtual networks in Azure help ensure that your private network traffic is logically isolated from traffic on other Azure virtual networks.

You can add vMX as an application instance within an Azure virtual network.

You can deploy the vMX VM in Azure using the following deployment method:

- Azure CLI—You can customize the vMX VM deployment settings and dependencies based on your network requirements in Microsoft Azure Cloud. To help automate and simplify the deployment of the vMX VM in the Microsoft Azure virtual network, Juniper Networks provides script and configuration files.

  To use these files, you can install the latest version of Azure CLI on your server.

> **NOTE**: In Microsoft Azure, you can host servers and services on the cloud as a pay-as-you-go (PAYG) or bring-your-own-license (BYOL) service. PAYG images do not require Juniper Networks licenses.
>
> Some Junos OS software features require a license to activate the feature. To understand more about vMX Licenses, see, *Managing vMX Licenses*. Please refer to the Licensing Guide for general information about License Management. Please refer to the product Data Sheets for further details, or contact your Juniper Account Team or Juniper Partner.

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Minimum Software Requirements

Microsoft Azure supports a wide variety of sizes and options for deployed Azure virtual machines (VMs). For vMX, choose Standard_F8 size.

Table 1 on page 4 outlines the recommended system requirements for a vMX instance, Standard_F8 size VM.

Table 1: System Requirements for vMX - Standard_F8 VM

Component	Specification
Size	Standard_F8
CPU cores	8
Memory	16 GB
Maximum number of data disks	32
Maximum temporary storage throughput: IOPS / Read MBps / Write MBps	24,000 / 375 / 187
Maximum data disks / throughput: IOPS	32 / 32x500
Maximum number of NICs / network bandwidth (Mbps)	8 / 6,000

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CHAPTER

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Deploy vMX from Azure CLI

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The deployment script and sample configuration file in this section simplifies the deployment of vMX in the Microsoft Azure virtual network. The configuration file includes parameters that enable you to customize your vMX VM deployment, such as login username and network interfaces (NICs).

NOTE: We recommend that you deploy your vMX VMs using the Azure CLI method described in this section, instead of using the Azure Portal to deploy the vMX manually.

WHAT'S NEXT

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Before You Deploy vMX Using the Azure CLI

Before you begin deploying vMX from the Azure CLI:

- Obtain an account for and a subscription to Microsoft Azure. See Microsoft Azure.
- Use your Microsoft account username and password to log into the Microsoft Azure portal. The Azure Portal will be used later in this section to verify the deployment of the vMX using the Azure CLI method.
- Install the latest version of Azure command line interface (Azure CLI). See Install the Azure CLI).
- Purchase a vMX license or request an evaluation license. Licenses can be procured from the Juniper Networks License Management System (LMS).

For information about the evaluation license for vMX, see https://www.juniper.net/us/en/dm/free-vmx-trial/.

> **NOTE:** In Microsoft Azure, you can host servers and services on the cloud as a pay-as-you-go (PAYG) or bring-your-own-license (BYOL) service. PAYG images do not require Juniper Networks licenses.

- You must first run the following Azure CLI command to accept the End User License Agreement (EULA) terms for the specific BYOL or PAYG vMX image that you want to deploy. Otherwise, you will encounter a **MarketplacePurchaseEligibilityFailed** error in the VM creation stage of the deployment script discussed later in this section.

  You only have to run the following CLI command once for the PAYG or BYOL image type you want to deploy.

  ```
  az vm image terms accept --urn juniper-networks:vmx-services-gateway-byol:vmx-services-gateway-byol:18.3.2
  ```

- The vMX for Azure deployment scripts are written in shell and in the latest version of Azure CLI commands. Pre-2.x versions of Azure CLI is not supported.
- Deployment of vMX to Microsoft Azure does not support the use of the Azure CLI from Microsoft Windows because the shell scripts that are used as part of the deployment procedure can be run only from the Linux or Mac OS CLI.

Deploying vMX from the Azure CLI

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Use the following procedure to deploy and configure vMX in a Microsoft Azure virtual network from the Azure CLI.

Using the Microsoft Azure CLI

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To run the Azure CLI script provided, you can install Azure CLI on your server.

Perform one of the following tasks for your chosen method:

Installing the Azure CLI

To install and log in to the Azure CLI :

1. Install the latest version of Azure CLI. See Install the Azure CLI for more details. You have several options to install the Azure CLI package for either the Linux or Mac OS; be sure to select the correct installation package
2. Log into the Azure CLI.

```
az login
```

3. At the prompt. copy the code that appears in the command output.

```
Executing command login
To sign in, use a web browser to open the page https://microsoft.com/
devicelogin. Enter the code XXXXXXXXX to authenticate
```

4. Open a Web browser to https://microsoft.com/devicelogin, enter the code, and then click **Continue**. Enter your Microsoft Azure username and password. When the process completes, the command shell completes the login process.

```
Added subscription Microsoft Azure Enterprise
To sign in, use a web browser to open the page http://aka.ms/deviceloginlogin
command OK
```

> **NOTE**: If you have multiple Azure subscriptions, connecting to Azure grants access to all subscriptions associated with your credentials. One subscription is selected as the default, and used by the Azure CLI when performing operations. You can view the subscriptions, including the current default subscription, using the **az account list -o table** command.

Using the vMX Deployment Tools

Juniper Networks provides a set of script and configuration files. These tools are intended to help simplify the deployment of vMX to Azure when using the Azure CLI.

- **azure.config** configuration file
- **azure_vmx_deploy.sh** shell script

azure_vmx_deploy.sh automates the deployment of the vMX virtual machine (VM) and virtual networks respectively, using the parameters in the **azure.config** configuration file. The **azure_vmx_deploy.sh** shell script creates network interfaces, virtual networks, virtual subnets, and the VM.

To copy the **azure_vmx_deploy.sh** and **azure.config** files:

1. Open a text editor on the server where you installed the Azure CLI.
2. Cut and paste the contents of the file in the editor and save the file.

   See "azure.config file" on page 10 and "azure_vmx_deploy.sh file" on page 10.

> **TIP**: Open this document in HTML format and use the Copy button to copy the code to clipboard in a single button-click.

After you have saved the files, you can modify the **azure.config** file for your configuration and run the **azure_vmx_deploy.sh** script.

azure.config file

```
#
# Sample VMX deployment settings for Microsoft Azure
#

# Account config

account="12345bf4b32bf-1234-5678-aaaa-4b348978e06a"
grpname="vmxcloudv2"
location="westus"

# VM config
vmname="vmx183-x3"
admin="azuser"
vmximagename="juniper-networks:vmx-services-gateway-byol:vmx-services-gateway-
byol:18.3.2"

# Network Config
number_of_nics=4
addressprefix="30.0.0.0/16"
PrivateIpAddress="30.0.0.10"
PrivateIpAddress2="30.0.1.10"
subnet_prefixes=( 30.0.0.0/24 30.0.1.0/24 30.0.2.0/24 30.0.3.0/24 )
```

azure_vmx_deploy.sh file

```
#!/bin/sh
# Copyright (c) 2020, Juniper Networks, Inc.
# All rights reserved.
#
#
# Sample deployment script for vMX on Microsoft Azure
#

source ./azure.config

stor="stor"
cont="cont"
vm="_image"
```

```
vnet=$grpname-vnet1
base_subnet=$vnet-vsubnet
base_nic=$vmname-wan-nic
mdisk="_Managed_Disk"
storageacc=$grpname$stor
STORAGE_CONT=$grpname$cont

az account set -s $account
echo "Creating resource group"
az group create -n $grpname -l $location -o table
echo "Created group $grpname"

echo "Creating storage account"
# Create storage account
az storage account create --sku Standard_LRS --location $location --kind Storage
--resource-group $grpname --name $storageacc --output table
echo "Created storage account $storageacc"

# Get connection string for the storage account
KEY1=`az storage account keys list --account-name $storageacc --resource-group
$grpname  | grep -m 1 \"value\": | awk '{print $2}'`

# Create storage container
az storage container create --account-name $storageacc --name $STORAGE_CONT --
account-key $KEY1 --output table
echo "Created container $STORAGE_CONT"

count=$(( $number_of_nics - 1 ))
while [ $count -ge 0 ]
do
    subnet_names[$count]=$base_subnet"$count"
    nic_names[$count]=$base_nic"$count"
    count=$(( $count - 1 ))
done

skip=1
az network vnet show -g $grpname  --name  $vnet > /dev/null 2>&1
if [ $? -eq 0 ]; then
        skip=2
        echo "Vnet \"$vnet\" already exists, skipping vnet and subnet creation"
fi

if [ $skip -eq 1 ]; then
```

```
    # Create VNET
    echo "Creating Azure virtual network $vnet...."
    az network vnet create \
        --resource-group $grpname \
        --name $vnet \
        --address-prefix $addressprefix \
        --location $location \
        --output table

    echo "Done creating Azure virtual network $vnet"

    # Create as many subnets as there are NICs
    i=0
    for prefix in "${subnet_prefixes[@]}"
    do
        echo "Creating virtual subnet ${subnet_names[$i]} $prefix.."
        az network vnet subnet create \
            --address-prefix $prefix \
            --name ${subnet_names[$i]} \
            --resource-group $grpname \
            --vnet-name $vnet \
            --output table
        echo "Done creating subnet ${subnet_names[$i]} with prefix $prefix"
        let i++
    done
fi

#
# Creating routing tables for vMX WAN ports (add tables as needed for more than
2 wan ports)
#
echo "Creating routing tables..."

az network route-table create --name $grpname-rt-to-subnet2 --resource-group
$grpname --location $location --output table
az network route-table create --name $grpname-rt-to-subnet3 --resource-group
$grpname --location $location --output table

az network vnet subnet update --resource-group $grpname --vnet-name $vnet --name
$vnet-vsubnet2 --route-table $grpname-rt-to-subnet3 --output table
az network vnet subnet update --resource-group $grpname --vnet-name $vnet --name
$vnet-vsubnet3 --route-table $grpname-rt-to-subnet2  --output table
#
```

```
# Create all NICs
#

echo "Creating public IP addresses and NICs..."

i=0
for nic in "${nic_names[@]}"
do
    if [ $i -eq 0 ]; then
        # Create Public IP for first NIC:
        ip=$vmname-vfp-public-ip
        az network public-ip create \
            --name $ip \
            --allocation-method Static \
            --resource-group $grpname \
            --location $location \
            --output table

        # Create 1st NIC
    nic=$vmname-vfp-nic
        allnics="$allnics ""$nic"
        az network nic create \
            --resource-group $grpname \
            --location $location \
            --name $nic \
            --vnet-name $vnet \
            --subnet ${subnet_names[$i]} \
            --public-ip-address $ip \
            --private-ip-address $PrivateIpAddress \
            --output table
        echo "Created NIC $nic with public IP..."

    elif [ $i -eq 1 ]; then
        # Create Public IP for first NIC:
        ip2=$vmname-vcp-public-ip
        az network public-ip create \
            --name $ip2 \
            --allocation-method Static \
            --resource-group $grpname \
            --location $location \
            --output table

        # Create 2nd NIC
```

```
    nic=$vmname-vcp-nic
        allnics="$allnics ""$nic"
        az network nic create \
            --resource-group $grpname \
            --location $location \
            --name $nic \
            --vnet-name $vnet \
            --subnet ${subnet_names[$i]} \
            --public-ip-address $ip2 \
            --private-ip-address $PrivateIpAddress2 \
            --output table
        echo "Created NIC $nic with public IP..."
      else
        allnics="$allnics ""$nic"
        az network nic create \
            --resource-group $grpname \
            --location $location \
        --accelerated-networking true \
            --name $nic \
            --vnet-name $vnet \
            --subnet ${subnet_names[$i]} \
            --output table
        echo "Created NIC $nic..."
    fi
    let i++
done

#
# Add routes to route tables
#
echo "Adding routes to routing tables"

ip=`az network nic show -g $grpname --name $base_nic"2"|grep privateIpAddress\"|
awk '{print $2}'|sed -e  s/\"//g -e s/\,//`
az network route-table route create -g $grpname --route-table-name $grpname-rt-
to-subnet3 --next-hop-type VirtualAppliance --name ToSubnet3 --next-hop-ip-
address $ip --address-prefix ${subnet_prefixes[3]} --output table
ip=`az network nic show -g $grpname --name $base_nic"3"|grep privateIpAddress\"|
awk '{print $2}'|sed -e  s/\"//g -e s/\,//`
az network route-table route create -g $grpname --route-table-name $grpname-rt-
to-subnet2 --next-hop-type VirtualAppliance --name ToSubnet2 --next-hop-ip-
address $ip --address-prefix ${subnet_prefixes[2]}  --output table
```

```
#
# Create vMX VM
#
echo "Creating vMX VM..."

az vm create \
    --name $vmname \
    --size Standard_F8  \
    --image $vmximagename \
    --nics $allnics \
    --resource-group $grpname \
    --location $location \
    --authentication-type ssh \
    --admin-username $admin \
    --generate-ssh-keys \
    --storage-sku Standard_LRS  \
    --boot-diagnostics-storage ${grpname}stor \
    --output table
echo "vMX deployment complete"
```

Modifying vMX Configuration Parameters for Deployment

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To deploy vMX, you might need to modify the configuration parameters by performing these tasks:

Changing the Azure Configuration Parameters

In the **azure.config** file, set these parameters:

- **account="*account subscription id*"**—This is the Microsoft Azure account subscription ID.
- **grpname="*group-name*"**—Resource group name. Enter your existing resource group. A resource group name can include alphanumeric characters, periods (.), underscores (_), hyphens (-), and parenthesis (), but the name cannot end with a period.

- **location="*region*"**—Resource group location. Select the location of the Microsoft Azure data center from which you intend to deploy the VM. Specify a location where the majority of your resources will reside. Typically, select the location that is closest to your physical location.
- **vmname="*vm-name*"**—vMX VM name. The VM name cannot contain non-ASCII or special characters.
- **admin="*admin-username*"**—Name of user logging into the VM using SSH. The username cannot contain uppercase characters or special characters, and cannot start with a dollar sign ($) or hyphen (-).
- **vmximagename="*image-name*"**—Name of the vMX image.
- **number_of_nics=*number-of-interfaces***—Number of interfaces, including VFP (eth0), VCP (fxp0) and any WAN ports (WAN ports appear as ge-*x*/*x*/*x* on the vMX). This number must be between 3 and 8.
- **addressprefix="*address-prefix*"**—Address space. Enter the virtual network's address range in CIDR notation. By default, the address range is 30.0.0.0/16.

  NOTE: Ensure that the address space does not overlap with an existing network

- **PrivateIpAddress="*ip-address*"**—Private IP address for VFP (eth0) management port. It must be contained by the address space of the virtual network, as defined in the **addressprefix** parameter.
- **PrivateIpAddress2="*ip-address*"**—Private IP address for VCP (fxp0) management port. It must be contained by the address space of the virtual network, as defined in the **addressprefix** parameter.
- **subnet_prefixes=(*subnet-prefix0 subnet-prefix1 subnet-prefix2 subnet-prefix3*)**—Array of subnet address ranges for each subnet under the virtual network. Enter each network subnet address range in CIDR notation. It must be contained by the address space of the virtual network, as defined in the **addressprefix** parameter. Subnet address ranges cannot overlap one another.

  The subnet is a range of IP addresses in your virtual network to isolate VMs. Public subnets have access to the Internet gateway, but private subnets do not.

  Enter as many subnets in the array as the number of interfaces. Each NIC will have a corresponding subnet defined in this array. For example, if **number_of_nics** is 4, there will be four entries in the **subnet_prefixes** array.

  A vMX VM requires two public subnets and one or more public or private subnets for each individual instance group. The management interfaces for the VFP (eth0) and VCP (fxp0) use a public subnet and the revenue (data) interfaces can use either public or private subnets. The private subnets, connected to the other vMX interfaces, ensure that all traffic between applications on the private subnets and the Internet must pass through the vMX instance.

For example, a virtual network with four subnets for the four NICs that will be created has this setting: **subnet_prefixes=(30.0.0.0/24 30.0.1.0/24 30.0.2.0/24 30.0.3.0/24)**.

For example, the **azure.config** file might resemble the following:

```
grpname="vmxcloudv2"
location="westus"

# VM config
vmname="vmxv2"
admin="azuser"
vmximagename="juniper-networks:vmx-services-gateway-byol:vmx-services-gateway-
byol:18.3.2"
number_of_nics=4

# Network Config
addressprefix="30.0.0.0/16"
PrivateIpAddress="30.0.0.1"
PrivateIpAddress2=”30.0.1.10”
subnet_prefixes=( 30.0.0.0/24 30.0.1.0/24 30.0.2.0/24 30.0.3.0/24 )
```

You can get the vMX image details by using the following command:

az vm image list --all --publisher juniper-networks

Adding NICs to the Configuration

- The Standard_F8 CPU type supports a total of 8 ports. Each vMX requires two management ports on Azure leaving a maximum of 6 WAN ports.

  The vMX instance contains two separate virtual machines (VMs), one for the virtual forwarding plane VMX FPC (VFP) and one for the virtual control plane (VCP)

  - VFP has a dedicated management port (eth0) mapped to the <vm-name>-vfp-nic of the vMX.
  - VCP has a dedicated management port (fxp0) mapped to the <vm-name>-vcp-nic of the vMX.

- The public IP address configured in Resource groups > vMX resource group > *vmname*-vcp-nic. vMX name is the IP address to use for connecting to the VMX RE (VCP) FPC using SSH.

To change the number of network interfaces (NICs):

1. In the **azure.config** file, specify the correct number of NICs for the **number_of_nics** parameter. The first NIC acts as the management port for the VCP, the second NIC acts as the management port for

the VCP/RE (fxp0) and the other NICs are assigned to WAN ports (corresponding to ge-0/0/0, ge-0/0/1, and so on). This number must be between 3 and 8.

For example, the following parameter sets the number of NICs to 4 and creates eth0 (VFP), fxp0 (VCP), ge-0/0/0, and ge-0/0/1 interfaces.

```
number_of_nics=4
```

2. In the **azure.config** file, make sure you add the corresponding subnets for the NICs in the **subnet_prefixes** parameter.

   For example, the following parameter adds four subnets with these address ranges for the interfaces.

```
subnet_prefixes=( 30.0.0.0/24 30.0.1.0/24 30.0.2.0/24 30.0.3.0/24 )
```

Deploying the vMX Using the Shell Script

The **azure_vmx_deploy.sh** shell script deploys the vMX virtual machine (VM) in a resource group that is based on your Azure Cloud geographic location.

To deploy vMX to the Azure virtual network, run the **azure_vmx_deploy.sh** script to create the virtual network subnets, NICs, and VM. The parameters defined in the **azure.config** configuration file are used to deploy the vMX.

For example, if the **azure.config** file contains the following parameters:

```
grpname="vmxcloudv2"
location="westus"

# VM config
vmname="vmxv2"
admin="user"
vmximagename="juniper-networks:vmx-services-gateway-byol:vmx-services-gateway-
byol:18.3.2"
number_of_nics=4

# Network Config
addressprefix="30.0.0.0/16"
PrivateIpAddress="30.0.0.10"
subnet_prefixes=( 30.0.0.0/24 30.0.1.0/24 30.0.2.0/24 30.0.3.0/24 )
```

Running the **azure_vmx_deploy.sh** script generates the following output.

```
$ ./azure_vmx_deploy.sh
Creating resource group
Location    Name
----------  -----------
westus      vmxcloudv2
Created group vmxcloudv2
Creating storage account
CreationTime                      EnableHttpsTrafficOnly    Kind     Location
Name             PrimaryLocation    ProvisioningState    ResourceGroup
StatusOfPrimary
--------------------------------  ------------------------  -------  ----------
---------------  -----------------  -------------------  ---------------
-----------------
2020-03-11T00:12:55.943835+00:00  True                      Storage  westus
vmxcloudv2stor  westus             Succeeded            vmxcloudv2      available
Created storage account vmxcloudv2stor
Created
---------
False
Created container vmxcloudv2cont
Creating Azure virtual network vmxcloudv2-vnet1....

Done creating Azure virtual network vmxcloudv2-vnet1
Creating virtual subnet vmxcloudv2-vnet1-vsubnet0 30.0.0.0/24..
AddressPrefix    Name                        PrivateEndpointNetworkPolicies
PrivateLinkServiceNetworkPolicies    ProvisioningState    ResourceGroup
---------------  --------------------------  ---------------------------------
-----------------------------------  -------------------  ---------------
30.0.0.0/24      vmxcloudv2-vnet1-vsubnet0  Enabled
Enabled                              Succeeded            vmxcloudv2
Done creating subnet vmxcloudv2-vnet1-vsubnet0 with prefix 30.0.0.0/24
Creating virtual subnet vmxcloudv2-vnet1-vsubnet1 30.0.1.0/24..
AddressPrefix    Name                        PrivateEndpointNetworkPolicies
PrivateLinkServiceNetworkPolicies    ProvisioningState    ResourceGroup
---------------  --------------------------  ---------------------------------
-----------------------------------  -------------------  ---------------
30.0.1.0/24      vmxcloudv2-vnet1-vsubnet1  Enabled
Enabled                              Succeeded            vmxcloudv2
Done creating subnet vmxcloudv2-vnet1-vsubnet1 with prefix 30.0.1.0/24
Creating virtual subnet vmxcloudv2-vnet1-vsubnet2 30.0.2.0/24..
```

```
AddressPrefix    Name                         PrivateEndpointNetworkPolicies
PrivateLinkServiceNetworkPolicies    ProvisioningState    ResourceGroup
---------------  ---------------------------  -------------------------------
-----------------------------------  -------------------  ---------------
30.0.2.0/24      vmxcloudv2-vnet1-vsubnet2  Enabled
Enabled                              Succeeded            vmxcloudv2
Done creating subnet vmxcloudv2-vnet1-vsubnet2 with prefix 30.0.2.0/24
Creating virtual subnet vmxcloudv2-vnet1-vsubnet3 30.0.3.0/24..
AddressPrefix    Name                         PrivateEndpointNetworkPolicies
PrivateLinkServiceNetworkPolicies    ProvisioningState    ResourceGroup
---------------  ---------------------------  -------------------------------
-----------------------------------  -------------------  ---------------
30.0.3.0/24      vmxcloudv2-vnet1-vsubnet3  Enabled
Enabled                              Succeeded            vmxcloudv2
Done creating subnet vmxcloudv2-vnet1-vsubnet3 with prefix 30.0.3.0/24
Creating routing tables...
DisableBgpRoutePropagation    Location    Name
ProvisioningState    ResourceGroup
----------------------------  ----------  -------------------------
-------------------  ---------------
False                         westus      vmxcloudv2-rt-to-subnet2
Succeeded            vmxcloudv2
DisableBgpRoutePropagation    Location    Name
ProvisioningState    ResourceGroup
----------------------------  ----------  -------------------------
-------------------  ---------------
False                         westus      vmxcloudv2-rt-to-subnet3
Succeeded            vmxcloudv2
AddressPrefix    Name                         PrivateEndpointNetworkPolicies
PrivateLinkServiceNetworkPolicies    ProvisioningState    ResourceGroup
---------------  ---------------------------  -------------------------------
-----------------------------------  -------------------  ---------------
30.0.2.0/24      vmxcloudv2-vnet1-vsubnet2  Enabled
Enabled                              Succeeded            vmxcloudv2
AddressPrefix    Name                         PrivateEndpointNetworkPolicies
PrivateLinkServiceNetworkPolicies    ProvisioningState    ResourceGroup
---------------  ---------------------------  -------------------------------
-----------------------------------  -------------------  ---------------
30.0.3.0/24      vmxcloudv2-vnet1-vsubnet3  Enabled
Enabled                              Succeeded            vmxcloudv2
Creating public IP addresses and NICs...
```

```
Created NIC vmx183-x3-vfp-nic with public IP...


Created NIC vmx183-x3-vcp-nic with public IP...

Created NIC vmx183-x3-wan-nic2...

Created NIC vmx183-x3-wan-nic3...
Adding routes to routing tables
AddressPrefix    Name       NextHopIpAddress    NextHopType
ProvisioningState    ResourceGroup
---------------  ---------  ------------------  ----------------
------------------  ---------------
30.0.3.0/24      ToSubnet3  30.0.2.4            VirtualAppliance
Succeeded            vmxcloudv2
AddressPrefix    Name       NextHopIpAddress    NextHopType
ProvisioningState    ResourceGroup
---------------  ---------  ------------------  ----------------
------------------  ---------------
30.0.2.0/24      ToSubnet2  30.0.3.4            VirtualAppliance
Succeeded            vmxcloudv2
Creating vMX VM...
ResourceGroup    PowerState    PublicIpAddress           Fqdns
PrivateIpAddress
MacAddress
Location    Zones
---------------  ------------  ------------------------  -------
-----------------------------------
-------------------------------------------------------------------------
----------  -------
vmxcloudv2      VM running    52.160.86.48,40.83.167.5
30.0.0.10,30.0.1.10,30.0.2.4,30.0.3.4
00-0D-3A-5C-0B-1D,00-0D-3A-5C-08-9C,00-0D-3A-5C-09-83,00-0D-3A-5C-0E-D8  westus
vMX deployment complete
```

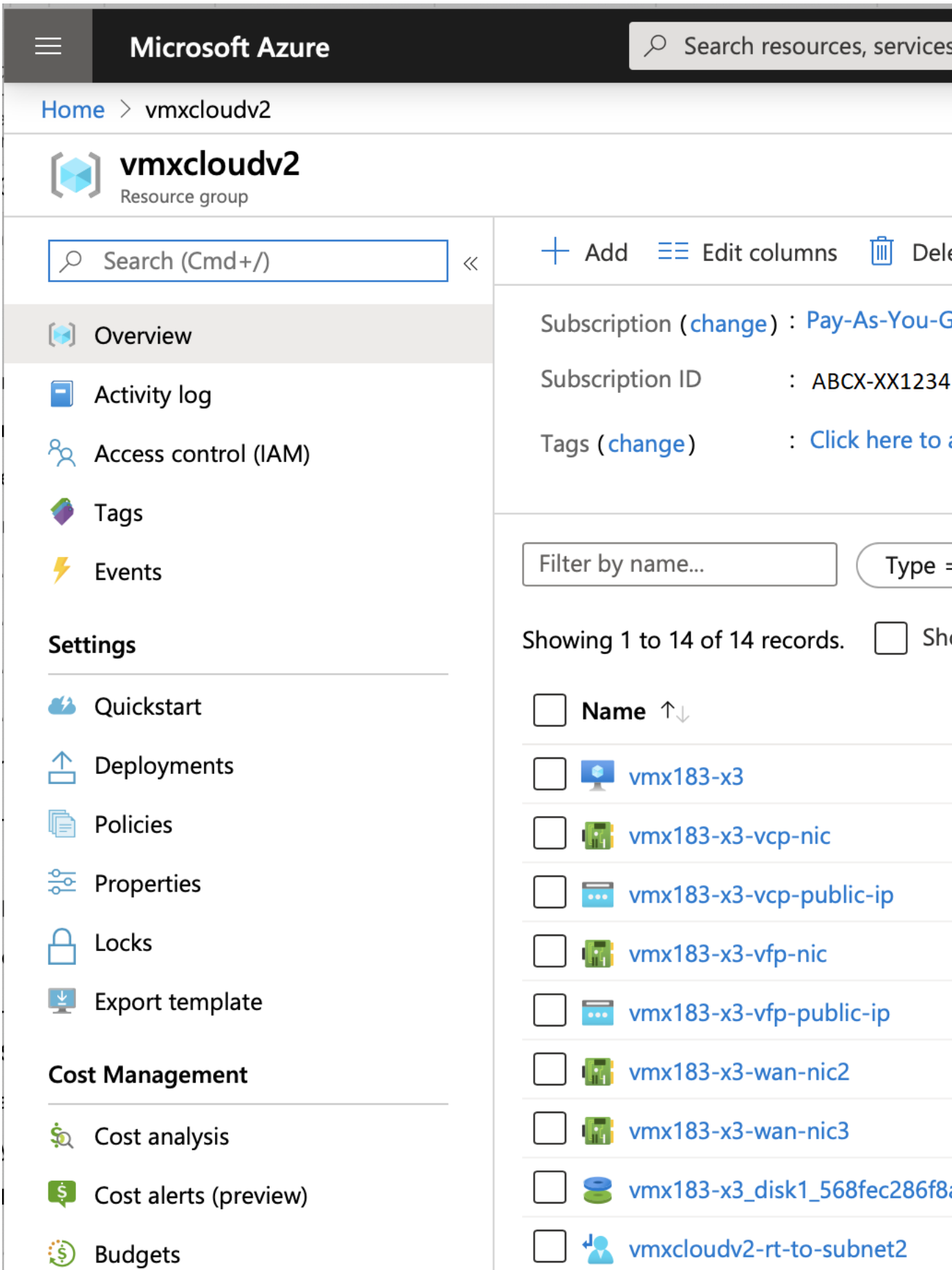
Verifying Deployment of vMX to Microsoft Azure

To verify the deployment of the vMX instance to Microsoft Azure:

1. Open a Web browser to https://portal.azure.com/ and login to the Microsoft Azure portal using your login credentials. The Dashboard view appears in the Azure portal. You will see a unified dashboard for all your assets in Azure. Verify that the Dashboard includes all subscriptions to which you currently have access, and all resource groups and associated resources.

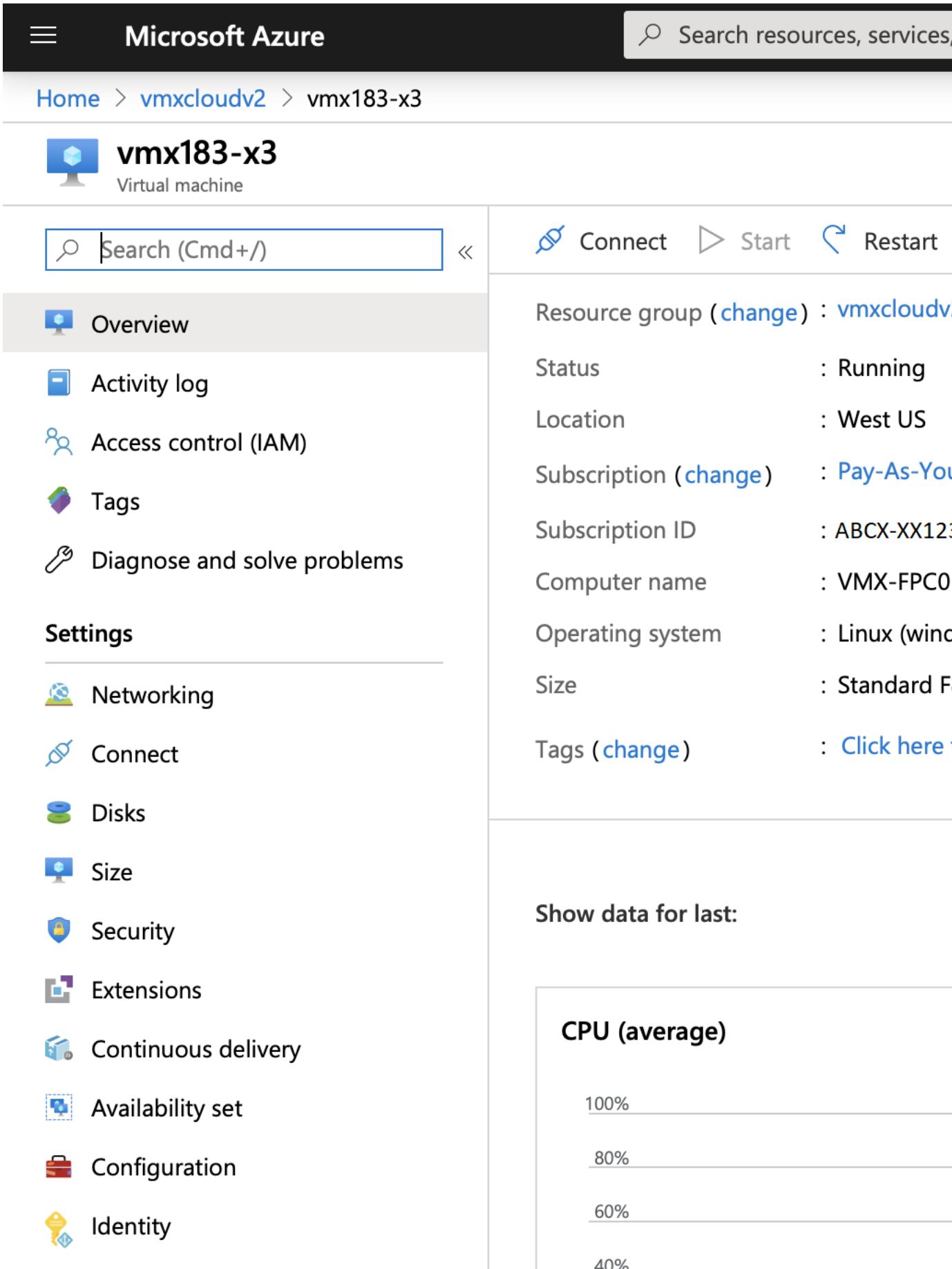
2. To view the vMX resource group and its resources after deployment is completed, from the right-hand menu, click **Resource groups** to access the Resource Groups page as shown in Figure 1 on page 23.

Figure 1: Resource Groups Page



3. To view details of the vMX VM associated with the resource group, click the name of the vMX. Details are displayed as shown in Figure 2 on page 25.

Figure 2: vMX VM Details



4. To see a summary view of the VMs in your subscription, including the newly deployed vMX, click the Virtual Machines icon in the left pane. On the Virtual machines page, check the vMX VM status after deployment is completed. Observe that the status is **Running**.

> **NOTE**: You can stop, start, restart, and delete a VM from the Virtual machines page in the Microsoft Azure portal.

Logging In to a vMX Instance

After vMX deployment is completed, the vMX instance is automatically powered on and launched. At this point, you can use an SSH client to log in to the vMX instance.

> **NOTE**: It can take 15 minutes or more for the vMX to finish deploying and be ready for login via SSH.

To log in to the vMX VM:

1. From the Azure portal, click **Resource groups** from the menu of services on the dashboard, and then select the vcp-public-ip resource. Locate the public IP address on that page.

   You can also use the following Azure CLI command to determine the public IP address of the VCP (RE):

   az network public-ip show --name $*vmname*-vcp-public-ip -g $*grpname* --query "{address: *ipAddress*}

   where ***grpname*** is the resource group name and ***vmname*** is the name of the VM.

   This returns the public IP for the VCP (RE):

```
{
  "address": "40.83.167.5"
}
```

2. Use an SSH client to log in to a vMX instance.
3. At the prompt, enter the following login credentials:

> **NOTE**: The vMX instance is automatically configured for username and SSH public and private key authentication. To log in, use the login username credentials that were defined for the **admin** parameter in the VM configuration file (see "Deploying vMX from the Azure CLI"

on page 7). After initially logging to the vMX, you can configure password-based authentication.

```
# ssh username@vm-ip-address
```

4. Configure the basic settings for the vMX VM (see "Initial Configuration for vMX" on page 27).

Initial Configuration for vMX

At a minimum, you must perform these initial Junos OS configuration tasks after logging in to vMX:

1. Start the CLI.

```
root# cli
```

2. Enter configuration mode.

```
root# configure
```

3. Configure the WAN interfaces with the same private IP address associated with the network interface.

```
[edit]
root# set interfaces interface-name unit 0 family inet address address
```

For example:

```
[edit]
root# set interfaces ge-0/0/0 unit 0 family inet address 30.0.2.4/24
```

4. Configure the MTU value 1400 for WAN interfaces.

```
[edit]
root#  set interfaces interface-name mtu mtu-value
```

```
[edit]
root#  set interface ge-0/0/0 mtu 1400
```

The default MTU for Azure VMs is 1500 bytes. However, the Azure Virtual Network stack will attempt to fragment a packet at 1400 bytes. TCP/IP performance tuning for Azure VMs .

5. Commit the configuration.

```
[edit]
root#  commit
```

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