Deploy the Firewall Threat Defense Virtual on OCI

You can deploy the Firewall Threat Defense Virtual on the Oracle Cloud Infrastructure (OCI), a public cloud computing service that enables you to run your applications in a highly-available, hosted environment offered by Oracle.

The following procedures describe how to prepare your OCI environment and launch the Firewall Threat Defense Virtual instance. You log into the OCI portal, search the OCI Marketplace for the Cisco Firepower NGFW virtual firewall (NGFWv) offering, and launch the compute instance. After launching the Firewall Threat Defense Virtual, you must configure route tables to direct traffic to the firewall depending on the traffic's source and destination.

Overview

The Cisco Secure Firewall Threat Defense Virtual runs the same software as physical Cisco Firewall Threat Defense to deliver proven security functionality in a virtual form factor. The Firewall Threat Defense Virtual can be deployed in the public OCI. It can then be configured to protect virtual and physical data center workloads that expand, contract, or shift their location over time.

OCI Compute Shapes

A shape is a template that determines the number of CPUs, amount of memory, and other resources that are allocated to an instance. The Firewall Threat Defense Virtual support the following OCI shape types:

Table 1: Supported Compute Shapes for Firewall Threat Defense Virtual

OCI Shape	Supported Threat Defense Virtual version	Attributes		Interfaces
		oCPUs	RAM (GB)	
Intel VM.DenseIO2.8	7.3.x and later	8	120	Minimum 4, Maximum 8
Intel VM.StandardB1.4	7.3.x and later	4	48	Minimum 4, Maximum 4
Intel VM.StandardB1.8	7.3.x and later	4	96	Minimum 4, Maximum 8
Intel VM.Standard1.4	7.3.x and later	4	28	Minimum 4, Maximum 4
Intel VM.Standard1.8	7.3.x and later	8	56	Minimum 4, Maximum 8
Intel VM.Standard2.4	7.1, 7.2.x, and 7.3.x	4	60	Minimum 4, Maximum 4
Intel VM.Standard2.8	7.1, 7.2.x, and 7.3.x	8	120	Minimum 4, Maximum 8
Intel VM.Standard3.Flex*	7.3.x and later	4	16	Minimum 4, Maximum 4
	7.3.x and later	6	24	Minimum 4, Maximum 6
	7.3.x and later	8	32	Minimum 4, Maximum 8
Intel VM.Optimized3.Flex*	7.3.x and later	4	16	Minimum 4, Maximum 8
	7.3.x and later	6	24	Minimum 4, Maximum 10
	7.3.x and later	8	32	Minimum 4, Maximum 10

OCI Shape	Supported Threat Defense Virtual version	Attributes		Interfaces
		oCPUs	RAM (GB)	
AMD VM.Standard.E4.Flex*	7.3.x and later	4	16	Minimum 4, Maximum 4
	7.3.x and later	6	24	Minimum 4, Maximum 6
	7.3.x and later	8	32	Minimum 4, Maximum 8
Altra processor from Ampere VM.Standard.A1.Flex	10.0.0 and later	4	8	Minimum 4, Maximum 4
	10.0.0 and later	8	16	Minimum 4, Maximum 8
	10.0.0 and later	12	24	Minimum 4, Maximum 10
	10.0.0 and later	16	32	Minimum 4, Maximum 10
AmpereOne processor from Ampere VM.Standard.A2.Flex	10.0.0 and later	4	8	Minimum 4, Maximum 4
	10.0.0 and later	8	16	Minimum 4, Maximum 8
	10.0.0 and later	12	24	Minimum 4, Maximum 10
	10.0.0 and later	16	32	Minimum 4, Maximum 10

- *SR-IOV mode is supported with Flex shapes from Version 7.4.x and later.
- In OCI, 1 oCPU is equal to 2 vCPU.
- The Firewall Threat Defense Virtual requires a minimum of 4 interfaces.

Recommendations for using the OCI Compute shapes supported by version Firewall Threat Defense Virtual 7.3 and later.

- OCI marketplace image version **7.3.0-69-v3** and later are compatible only with the OCI compute shapes of Firewall Threat Defense Virtual 7.3 and later.
- You can use the OCI compute shapes supported by Firewall Threat Defense Virtual 7.3 and later only for new deployments.
- OCI compute shapes version **7.3.0-69-v3** and later are not compatible with upgrading VMs that are deployed with Firewall Threat Defense Virtual using the OCI compute shape versions earlier to Firewall Threat Defense Virtual 7.3.

- The billing will continue for the **VM.DenseIO2.8** compute shape subscription, even after you shut down the instance. For more information, see OCI Documentation.

You create an account on OCI, launch a compute instance using the Cisco Firepower NGFW virtual firewall (NGFWv) offering on the Oracle Cloud Marketplace, and choose an OCI shape.

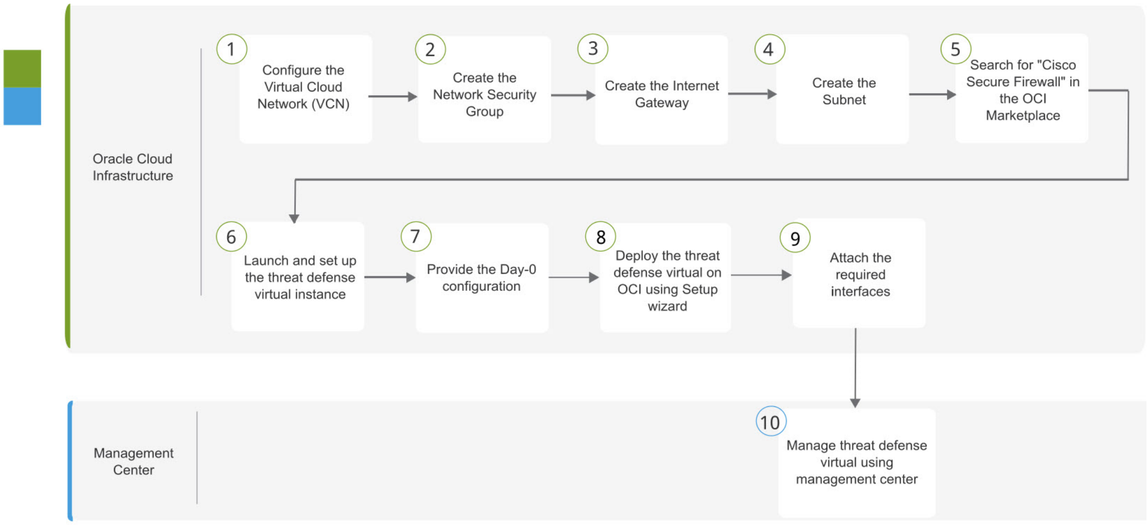
Firmware support:

By default, Threat Defense Virtual instances are deployed using UEFI mode.

Note Secure Boot is not supported by the Cloud platform.

End-to-End Procedure

The following flowchart illustrates the workflow for deploying Threat Defense Virtual on Oracle Cloud Infrastructure.


Oracle Cloud Infrastructure
1
Configure the Virtual Cloud Network (VCN)
2
Create the Network Security Group
3
Create the Internet Gateway
4
Create the Subnet
5
Search for "Cisco Secure Firewall" in the OCI Marketplace
6
Launch and set up the threat defense virtual instance
7
Provide the Day-0 configuration
8
Deploy the threat defense virtual on OCI using Setup wizard
9
Attach the required interfaces
Management Center
10
Manage threat defense virtual using management center

	Workspace	Steps
1	Oracle Cloud Infrastructure	Deploy the Threat Defense virtual on OCI: Configure the Virtual Cloud Network (VCN) (**Networking** > **Virtual Cloud Networks** > **CIDR block** > **Create VCN**.
2	Oracle Cloud Infrastructure	Deploy the Threat Defense virtual on OCI: Create the Network Security Group. (**Networking** > **Virtual Cloud Networks** > **Virtual Cloud Network Details** > **Network Security Groups** > **Create Network Security Group**.
3	Oracle Cloud Infrastructure	Deploy the Threat Defense Virtual on OCI: Create the Internet Gateway. **Networking** > **Virtual Cloud Networks** > **Virtual Cloud Network Details** > **Internet Gateways** > **Create Internet Gateway**.

	Workspace	Steps
4	Oracle Cloud Infrastructure	Deploy the Threat Defense Virtual on OCI: Create the Subnet. **Networking** > **Virtual Cloud Networks** > **Virtual Cloud Network Details** > **Subnets** > **Create Subnet**.
5	Oracle Cloud Infrastructure	Deploy the Threat Defense Virtual on OCI, on page 14: Search for “Cisco Secure Firewall” in the OCI Marketplace.
6	Oracle Cloud Infrastructure	Deploy the Threat Defense Virtual on OCI, on page 14: Launch and set up the threat defense virtual instance.
7	Oracle Cloud Infrastructure	Deploy the Threat Defense Virtual on OCI, on page 14: Provide the Day-0 configuration.
8	Oracle Cloud Infrastructure	Deploy the Threat Defense Virtual on OCI, on page 14: Deploy the threat defense virtual on OCI using setup wizard.
9	Oracle Cloud Infrastructure	Deploy the Threat Defense Virtual on OCI: Attach the Interfaces.**Compute** > **Instances** > **Instance Details** > **Attached VNICs**.
10	Management Center	Manage the Firewall Threat Defense Virtual by using the Management Center

Prerequisites

- Create an OCI account at https://www.oracle.com/cloud/.
- A Cisco Smart Account. You can create one at Cisco Software Central (https://software.cisco.com/).
- License the Firewall Threat Defense Virtual.
  - Configure all license entitlements for the security services from the Firewall Management Center.
  - See “Licensing” in the *Cisco Secure Firewall Management Center Admin Guide* for more information about how to manage licenses.

Note All the default License entitlement offered by Cisco, previously for Firewall Threat Defense Virtual will have the IPv6 configuration support.

- Interface requirements:
  - Management interfaces (2) — One used to connect the Firewall Threat Defense Virtual to the Firewall Management Center, second used for diagnostics; cannot be used for through traffic.
  - Traffic interfaces (2) — Used to connect the Firewall Threat Defense Virtual to inside hosts and to the public network.
- Communications paths:
  - Public IPs for access into the Firewall Threat Defense Virtual.

- For Firewall Threat Defense Virtual system requirements, see Cisco Secure Firewall Threat Defense Compatibility Guide.

Guidelines and Limitations

Supported Features

- Deployment in the OCI Virtual Cloud Network (VCN)
- Routed mode (default)
- Licensing – Only BYOL is supported
- IPv6
- Firewall Management Center support only.
- Single Root I/O Virtualization (SR-IOV) is supported.

Performance Tiers for FTDv Smart Licensing

The Firewall Threat Defense Virtual supports performance-tiered licensing that provides different throughput levels and VPN connection limits based on deployment requirements.

Table 2: Firewall Threat Defense Virtual Licensed Feature Limits Based on Entitlement

Performance Tier	Device Specifications (Core/RAM)	Rate Limit	RA VPN Session Limit
FTDv5, 100Mbps	4 core/8 GB	100Mbps	50
FTDv10, 1Gbps	4 core/8 GB	1Gbps	250
FTDv20, 3Gbps	4 core/8 GB	3Gbps	250
FTDv30, 5Gbps	8 core/16 GB	5Gbps	250
FTDv50, 10Gbps	12 core/24 GB	10Gbps	750
FTDv100, 16Gbps	16 core/32 GB	16Gbps	10,000

See the "Licensing" chapter in the *Cisco Secure Firewall Management Center Admin Guide* for guidelines when licensing your Firewall Threat Defense Virtual device.

Note To change the vCPU/memory values, you must first power off the Firewall Threat Defense Virtual device.

Performance Optimizations

To achieve the best performance out of the Firewall Threat Defense Virtual, you can make adjustments to the both the VM and the host. See Virtualization Tuning and Optimization on OCI for more information.

Receive Side Scaling—The Firewall Threat Defense Virtual supports Receive Side Scaling (RSS), which is a technology utilized by network adapters to distribute network receive traffic to multiple processor cores. Supported on Version 7.0 and later. See Multiple RX Queues for Receive Side Scaling (RSS) for more information.

Snort

- If you are observing abnormal behavior such as Snort taking a long time to shut down, or the VM being slow in general or when a certain process is executed, collect logs from the Firewall Threat Defense Virtual and the VM host. Collection of overall CPU usage, memory, I/O usage, and read/write speed logs will help troubleshoot the issues.
- High CPU and I/O usage is observed when Snort is shutting down. If a number of Firewall Threat Defense Virtual instances have been created on a single host with insufficient memory and no dedicated CPU, Snort will take a long time to shut down which will result in the creation of Snort cores.

Unsupported Features

- Local management support via Firewall Device Manager.
- Firewall Threat Defense Virtual native HA
- Transparent/inline/passive modes
- Data Interface configuration via DHCP

Limitations

- Firewall Threat Defense Virtual deployment on OCI does not support Mellanox 5 as vNICs in the SR-IOV mode.
- IPv6 works in only Dualstack with (VCN IPv4 and IPv6) configuration as per OCI standards.
- Separate routing rules required for Firewall Threat Defense Virtual for both static and DHCP configuration.

OCI Ampere A1 (ARM) Instance Considerations

- When deployed on legacy hypervisors, OCI Ampere A1 (ARM) instances may experience reduced throughput, particularly when SR-IOV is enabled. If you observe degraded performance in such deployments, contact Oracle Cloud Infrastructure (OCI) Support by opening a service request.
- The OCI team has documented a known limitation with SR-IOV-enabled networking for Ampere A1 instances. For additional details, see the Oracle Cloud Infrastructure Known Issues documentation:

  https://docs.oracle.com/en-us/iaas/Content/Compute/known-issues.htm
- **VM.Standard.A1.Flex Instance Networking Limitation**
  - The VM.Standard.A1.Flex shape supports only the paravirtualized networking launch option.
  - Instances launched with hardware-assisted (SR-IOV) networking may encounter performance degradation and, in rare cases, data corruption. To prevent these issues, OCI platform images for Ampere A1 Compute (aarch64) are preconfigured to use paravirtualized networking only. If hardware-assisted networking is selected during instance creation, the launch will fail with an error message similar to *Failed to validate instance launch options.*

- Custom images that are compatible with OCI Ampere A1 Compute may successfully launch with SR-IOV enabled; however, Cisco strongly recommends avoiding hardware-assisted networking to prevent potential performance and data integrity issues.

Workaround

When creating a VM.Standard.A1.Flex instance using a platform image, allow Oracle to automatically select the recommended paravirtualized networking launch type. For custom images, do not select hardware-assisted (SR-IOV) networking.

Upgrade Restrictions and Limitations

Revert upgrade restrictions

⚠

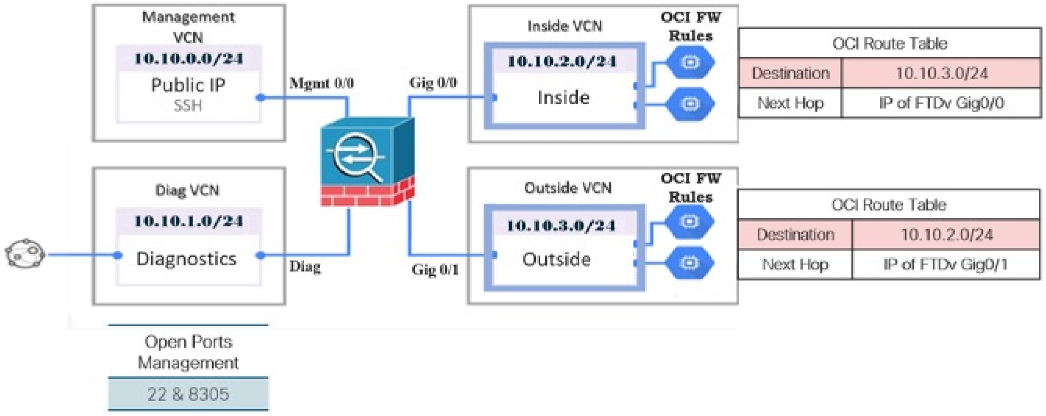
Caution Revert upgrades are blocked.

Once upgraded to **Threat Defense Virtual 10.0.0**, reverting to earlier versions is **not supported**.

Sample Network Topology

The following figure shows the recommended topology for the Firewall Threat Defense Virtual in Routed Firewall Mode with 4 subnets configured in OCI for the Firewall Threat Defense Virtual (management, diagnostic, inside, and outside).

Figure 1: Sample Firewall Threat Defense Virtual on OCI Deployment with subnets in four VCNs



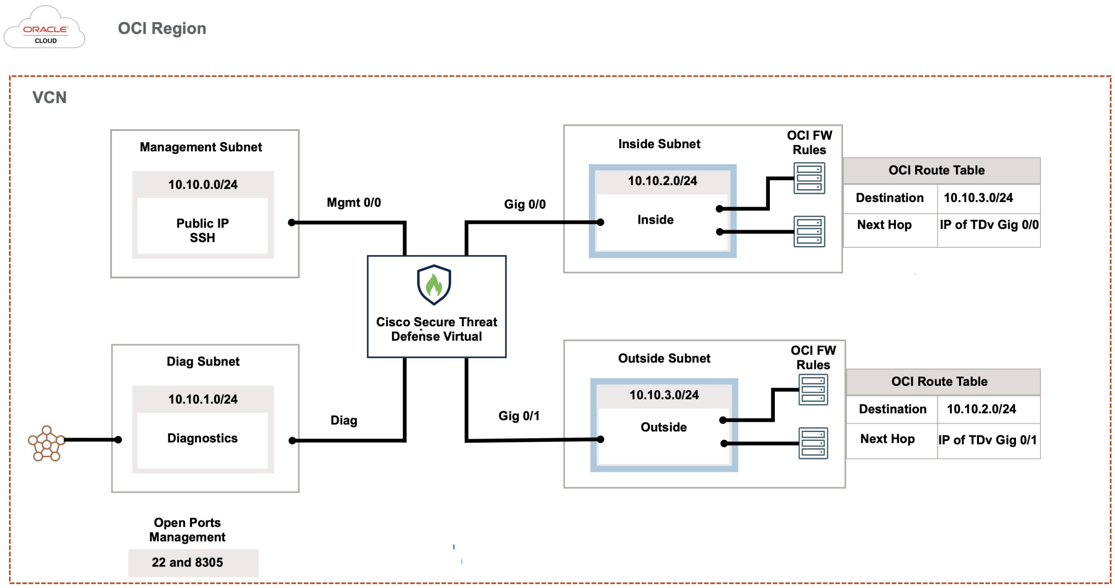
OCI Route Table

Destination	10.10.3.0/24
Next Hop	IP of FTDv Gig0/0

OCI Route Table

Destination	10.10.2.0/24
Next Hop	IP of FTDv Gig0/1

Figure 2: Sample Firewall Threat Defense Virtual on OCI Deployment with four subnets in a VCN

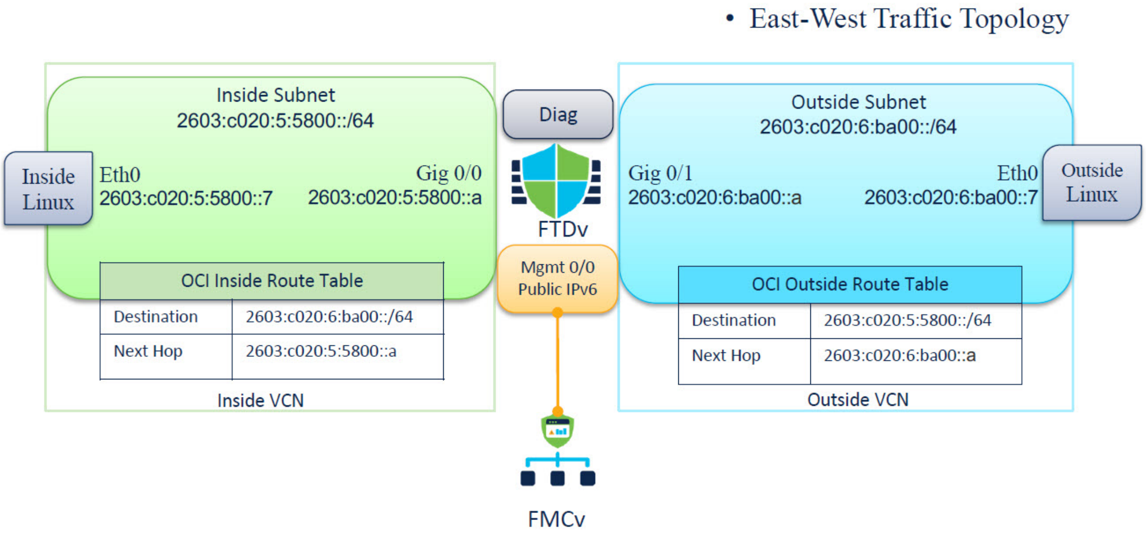


OCI Route Table	
Destination	10.10.3.0/24
Next Hop	IP of TDv Gig 0/0

OCI Route Table	
Destination	10.10.2.0/24
Next Hop	IP of TDv Gig 0/1

Note When you are using four subnets in a single VCN, the routes specific to a subnet must be added to the route table associated with the subnet.

Firewall Threat Defense Virtual IPv6 Deployment Topology



OCI Inside Route Table	
Destination	2603:c020:6:ba00::/64
Next Hop	2603:c020:5:5800::a

OCI Outside Route Table	
Destination	2603:c020:5:5800::/64
Next Hop	2603:c020:6:ba00::a

How to Manage Secure Firewall Threat Defense Virtual Device

You have two options to manage your Secure Firewall Threat Defense Virtual.

Secure Firewall Management Center

If you are managing large numbers of devices, or if you want to use the more complex features and configurations that the Firewall Threat Defense allows, use the Firewall Management Center to configure your devices instead of the integrated Firewall Device Manager.

Important You cannot use both the Firewall Device Manager and the Firewall Management Center to manage the Firewall Threat Defense device. Once the Firewall Device Manager integrated management is enabled, it won't be possible to use the Firewall Management Center to manage the Firewall Threat Defense device, unless you disable the local management and re-configure the management to use the Firewall Management Center. On the other hand, when you register the Firewall Threat Defense device to the Firewall Management Center, the Firewall Device Manager onboard management service is disabled.

Caution Currently, Cisco does not have an option to migrate your Firewall Device Manager configuration to the Firewall Management Center and vice-versa. Take this into consideration when you choose what type of management you configure for the Firewall Threat Defense device.

Secure Firewall Device Manager

The Firewall Device Manager is a web interface included on most Firewall Threat Defense devices. It lets you configure the basic features of the software that are most commonly used for small networks. It is especially designed for networks that include a single device or just a few, where you do not want to use a high-powered multiple-device manager to control a large network with many devices.

Note See the Cisco Secure Firewall Threat Defense Compatibility Guide for list of devices that support the Firewall Device Manager.

Configure OCI Environment

You can configure the Virtual Cloud Network (VCN) for your threat defense virtual deployment as follows:

- **Multiple VCNs** - At a minimum, you need four VCNs, one for each interface of the Firewall Threat Defense Virtual. This allows for isolated traffic inspection between different networks.
- **Single VCN with Subnets** - Alternatively, you can configure a single VCN with four subnets, one for each interface of the threat defense virtual. In this configuration, traffic between subnets within the same VCN can be inspected and controlled by the firewall using associated route tables. This allows you to manage inter-subnet traffic effectively while using a single VCN.

You can continue with the following procedures to complete the Management VCN. Then you return to **Networking** to create VCNs for the diagnostic, inside, and outside interfaces.

Procedure

Step 1 Log into OCI and choose your region.

OCI is divided into multiple regions that are isolated from each other. The region is displayed in the upper right corner of your screen. Resources in one region do not appear in another region. Check periodically to make sure you are in the intended region.

Step 2 Choose **Networking** > **Virtual Cloud Networks** and click **Create VCN**.

Step 3 Enter a descriptive **Name** for your VCN, for example, *FTDv-Management*.

Step 4 Enter a **CIDR block** for your VCN.

a) An IPv4 CIDR block of IP addresses. CIDR (Classless Inter-Domain Routing) notation is a compact representation of an IP address and its associated routing prefix. For example, 10.0.0.0/24.

Note
Use DNS hostnames in this VCN.

b) An IPv6 CIDR block of IP addresses. CIDR (Classless Inter-Domain Routing) notation is a compact representation of an IP address and its associated routing prefix. For example, [::/0].

c) Select the IPv6 CIDR block as Oracle-assigned IPv6/56 prefix to your Virtual Cloud Network.

Step 5 Click **Add IPv6 CIDR Block** to add a new IPv6 block.

Step 6 Add the IPv6 prefix for your VCN, for example, */54*.

Step 7 Click **Create VCN**.

What to do next

Continue with the following procedures to complete the Management VCN. When you complete the management VCN you'll create VCNs for the diagnostic, inside, and outside interfaces.

Note After you select a service from the navigation menu, the menu on the left includes the compartments list. Compartments help you organize resources to make it easier to control access to them. Your root compartment is created for you by Oracle when your tenancy is provisioned. An administrator can create more compartments in the root compartment and then add the access rules to control which users can see and take action in them. See the Oracle document Managing Compartments for more information.

Create the Network Security Group

A network security group consists of a set of vNICs and a set of security rules that apply to those vNICs.

Procedure

Step 1 Choose **Networking** > **Virtual Cloud Networks** > **Virtual Cloud Network Details** > **Network Security Groups**, and click **Create Network Security Group**.

Step 2 Enter a descriptive **Name** for your Network Security Group, for example, *FTDv-Mgmt-Allow-22-8305*.

Step 3 Click **Next**.

Step 4 Add your security rules:

a) Add a rule to allow TCP port 22 for SSH access.

b) Add a rule to allow TCP port 8305 for HTTPS access.

The Firewall Threat Defense Virtual can be managed via the Firewall Management Center, which requires port 8305 to be opened for HTTPS connections.

Note
You apply these security rules to the management interface/VCN.

Step 5 Click **Create**.

Create the Internet Gateway

An Internet gateway is required to make your management subnet publicly accessible.

Procedure

Step 1 Choose **Networking** > **Virtual Cloud Networks** > **Virtual Cloud Network Details** > **Internet Gateways**, and click **Create Internet Gateway**.

Step 2 Enter a descriptive **Name** for your Internet gateway, for example, *FTDv-IG*.

Step 3 Click **Create Internet Gateway**.

Step 4 Add the route to the Internet Gateway:

a) Choose **Networking** > **Virtual Cloud Networks** > **Virtual Cloud Network Details** > **Route Tables**.

b) Click on the link for your default route table to add route rules.

c) Click **Add Route Rules**.

d) From the **Target Type** drop-down, select **Internet Gateway**.

e) Enter the Destination IPv4 CIDR Block, for example 0.0.0.0/0.

f) Enter the Destination IPv6 CIDR Block, for example [::/0].

g) From the **Target Internet Gateway** drop-down, select the gateway you created.

h) Click **Add Route Rules**.

Create the Subnet

Each VCN will have one subnet, at a minimum. You'll create a Management subnet for the Management VCN. You'll also need a Diagnostic subnet for the Diagnostic VCN, need an Inside subnet for the Inside VCN, and an Outside subnet for the Outside VCN.

If you are using one VCN, then you will create Management subnet, Diagnostic subnet, Inside subnet, and Outside subnet within the VCN.

Procedure

Step 1 Choose **Networking** > **Virtual Cloud Networks** > **Virtual Cloud Network Details** > **Subnets**, and click **Create Subnet**.

Step 2 Enter a descriptive **Name** for your subnet, for example *Management*.

Step 3 Select a **Subnet Type** (leave the recommended default of **Regional**).

Step 4 Enter a **CIDR Block**, for example, 10.10.0.0/24. The internal (non-public) IP address for the subnet is taken from this CIDR block.

a) If you are enabling IPv6, then select the **ENABLE IPv6 CIDR BLOCK** check box.

b) In the **IPv6 CIDR Block**, enter the IPV6 prefix range.

Step 5 Select one of the route tables you created previously from the **Route Table** drop-down.

Step 6 Select the **Subnet Access** for your subnet.

For the Management subnet, this must be **Public Subnet**.

Step 7 Select the **DHCP Option**.

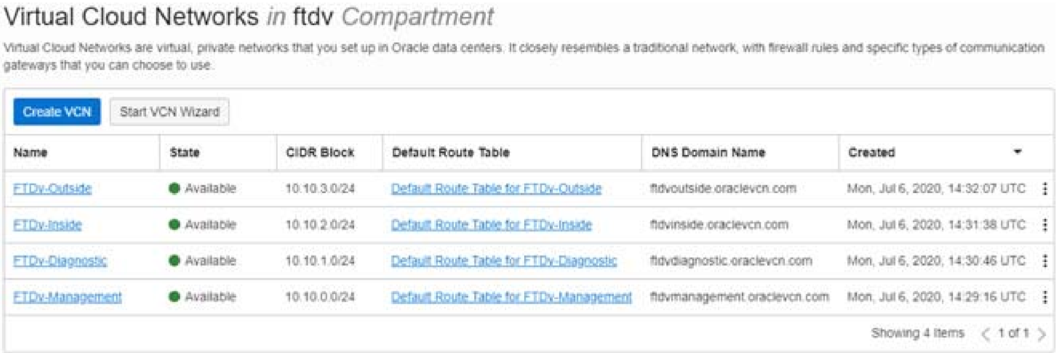
Step 8 Select a **Security List** that you created previously.

Step 9 Click **Create Subnet**.

What to do next

After you configure your VCNs (Management, Diagnostic, Inside, Outside), you are ready to launch the Firewall Threat Defense Virtual. See the following figure for an example of the Firewall Threat Defense Virtual VCN configuration.

Figure 3: Firewall Threat Defense Virtual Virtual Cloud Networks



Virtual Cloud Networks *in* ftdv *Compartment*

Virtual Cloud Networks are virtual, private networks that you set up in Oracle data centers. It closely resembles a traditional network, with firewall rules and specific types of communication gateways that you can choose to use.

Name	State	CIDR Block	Default Route Table	DNS Domain Name	Created
FTDv-Outside	● Available	10.10.3.0/24	Default Route Table for FTDv-Outside	ftdvoutside.oraclevcn.com	Mon, Jul 6, 2020, 14:32:07 UTC
FTDv-Inside	● Available	10.10.2.0/24	Default Route Table for FTDv-Inside	ftdvinside.oraclevcn.com	Mon, Jul 6, 2020, 14:31:38 UTC
FTDv-Diagnostic	● Available	10.10.1.0/24	Default Route Table for FTDv-Diagnostic	ftdvdiagnostic.oraclevcn.com	Mon, Jul 6, 2020, 14:30:46 UTC
FTDv-Management	● Available	10.10.0.0/24	Default Route Table for FTDv-Management	ftdvmanagement.oraclevcn.com	Mon, Jul 6, 2020, 14:29:16 UTC

Showing 4 Items < 1 of 1 >

Configure IPv6 Gateway Address Using Cloud Shell

In OCI, each subnet has a unique IPv6 gateway address which you must configure in Firewall Threat Defense Virtual for IPv6 traffic to work. This gateway address is retrieved from the subnet details running an OCI command in the cloud shell.

Procedure

Step 1 Go to **OCI** > **Open CloudShell (OCI Cloud Terminal)** .

Step 2 Execute following command to get the IPv6 details from the subnet:

```
oci network subnet get –subnet_id <subnet_OCID>
```

Step 3 From the command result find the `ipv6-virtual-router-ip` key.

Step 4 Copy the value of this key and use it as required.

Deploy the Threat Defense Virtual on OCI

Deploy the Firewall Threat Defense Virtual on OCI via a Compute instance using the Cisco Firepower NGFW virtual firewall (NGFWv) offering on the Oracle Cloud Marketplace. Select the most appropriate machine shape based on characteristics such as the number of CPUs, amount of memory, and network resources.

Procedure

Step 1 Log into the OCI portal.

The region is displayed in the upper right corner of your screen. Make sure you are in the intended region.

Step 2 Choose **Marketplace** > **Applications**.

Step 3 Search Marketplace for “Cisco Firepower NGFW virtual firewall (NGFWv)” and choose the offering.

Step 4 Review the Terms and Conditions, and check the **I have reviewed and accept the Oracle Terms of Use and the Partner terms and conditions.**check box.

Step 5 Click **Launch Instance**.

Step 6 Enter a descriptive **Name** for your instance, for example *FTDv-6-7*.

Step 7 Click **Change Shape** and select the shape with the number of CPUs, amount of RAM, and number of interfaces required for the Firewall Threat Defense Virtual, for example VM.Standard2.4 (see Overview, on page 1).

Step 8 From the **Virtual Cloud Network** drop-down, choose the Management VCN.

Step 9 From the **Subnet** drop-down, choose the Management subnet if it's not autopopulated.

Step 10 Check **Use Network Security Groups to Control Traffic** and choose the security group you configured for the Management VCN.

Step 11 Click the **Assign a Public Ip Address** radio button.

Step 12 Under **Add SSH keys**, click the **Paste Public Keys** radio button and paste the SSH key.

Linux-based instances use an SSH key pair instead of a password to authenticate remote users. A key pair consists of a private key and public key. You keep the private key on your computer and provide the public key when you create an instance. See Managing Key Pairs on Linux Instances for guidelines.

Step 13 Click the **Show Advanced Options** link to expand the options.

Step 14 Under **Initialization Script**, click the **Paste Cloud-Init Script** radio button to provide the day0 configuration for your Firewall Threat Defense Virtual. The day0 configuration is applied during the firstboot of the Firewall Threat Defense Virtual.

The following example shows a sample day0 configuration you can copy and paste in the **Cloud-Init Script** field:

```
{
"Hostname": "ftdv-oci",
"AdminPassword": "myPassword@123456",
"FirewallMode": "routed",
"IPv4Mode": "dhcp",
"IPv6Mode": "dhcp",
"ManageLocally":"No",
"FmcIp": "1.2.3.4",
"FmcRegKey": "cisco123reg",
"FmcNatId": "cisco123nat"
}
```

- **FmcRegKey —** This is a one-time-use registration key used to register registering the device to a Firewall Management Center. The registration key is any user-defined alphanumeric value up to 37 characters in length.
- **FmcNatId —** This is a unique one-time-use string (user-defined). If the device and the Firewall Management Center are separated by a NAT device, you must enter a unique NAT ID, along with the unique registration key.

Step 15 Click **Create**.

What to do next

Monitor the Firewall Threat Defense Virtual instance, which shows the state as Provisioning after you click the **Create** button.

Important It's important to monitor the status. As soon as the Firewall Threat Defense Virtual instance goes from Provisioning to Running state, you need to attach the VNICs as required before the Firewall Threat Defense Virtual boot completes.

Attach the Interfaces

The Firewall Threat Defense Virtual enters the Running state with one VNIC attached (see **Compute** > **Instances** > **Instance Details** > **Attached VNICs**). This is referred to as the Primary VNIC, and maps to the Management VCN. Before the Firewall Threat Defense Virtual completes the first boot, you need to attach the VNICs for the other VCN subnets you created previously (diagnostic, inside, outside) so that the VNICs are correctly detected on the Firewall Threat Defense Virtual.

Procedure

Step 1 Select your newly launched Firewall Threat Defense Virtual instance.

Step 2 Choose **Attached VNICs** > **Create VNIC**.

Step 3 Enter a descriptive **Name** for your VNIC, for example, *Inside*.

Step 4 Select the VCN from the **Virtual Cloud Network** drop-down.

Step 5 Select your subnet from the **Subnet** drop-down.

Step 6 Check **Use Network Security Groups to Control Traffic** and choose the security group you configured for the selected VCN.

Step 7 Check **Skip Source Destination Check** Network Security Groups to Control Traffic.

Step 8 (Optional) Specify a **Private IP Address**. This is only required if you want to choose a particular IP for the VNIC.

If you do not specify an IP, OCI will assign an IP address from the CIDR block you assigned to the subnet.

Step 9 Click **Save Changes** to create the VNIC.

Step 10 Repeat this procedure for each VNIC your deployment requires.

Add Route Rules for the Attached VNICs

Add route table rules to the diagnostic, inside, and outside route tables.

Procedure

Step 1 Choose **Networking** > **Virtual Cloud Networks** and click the default route table associated with the VCN (inside or outside).

Step 2 Click **Add Route Rules**.

Step 3 From the **Target Type** drop-down, select **Private IP**.

Step 4 From the **Destination Type** drop-down, select **CIDR Block**.

Step 5 Enter the **Destination CIDR Block**, for example 0.0.0.0/0.

Step 6 Enter the private IP address of the VNIC in the **Target Selection** field.

If you did not explicitly assign an IP address to the VNIC, you can find the auto-assigned IP address from the VNIC details (**Compute** > **Instances** > **Instance Details** > **Attached VNICs**).

Step 7 Click **Add Route Rules**.

If you want to configure IPv6 internet access through internet gateway, then perform the following:

a) From the **Target Type** drop-down, select **Internet Gateway**.
b) In the **Destination CIDR Block**, specify the IP address
c) From the **Target Internet Gateway** drop-down, select an existing internet gateway compartment or create new one.

Step 8 Repeat this procedure for each VNIC your deployment requires.

Note
If the IPv6 address configured with the Routing rule through DHCP or IPv6 address prefix is /128, then you must add the following routes in Firewall Threat Defense Virtual route table.

ipv6 route <interface_name> <interface_subnet_CIDR> <ipv6_virtual_router_ip>

Example:

- `ipv6 route inside 2603:c020:5:5800::/64 fe80::200:17ff:fe96:921b`
- `ipv6 route outside 2603:c020:6:ba00::/64 fe80::200:17ff:fe21:748c`

Connect to the Firewall Threat Defense Virtual Instance Using SSH

To connect to the Firewall Threat Defense Virtual instance from a Unix-style system, log in to the instance using SSH.

Procedure

Step 1 Use the following command to set the file permissions so that only you can read the file:

```
$ chmod 400 <private_key>
```

Where:

`<private_key>` is the full path and name of the file that contains the private key associated with the instance you want to access.

Step 2 Use the following SSH command to access the instance:

```
$ ssh –i <private_key> <username>@<public-ip-address>
```

`<private_key>` is the full path and name of the file that contains the private key associated with the instance you want to access.

`<username>` is the username for the Firewall Threat Defense Virtual instance.

`<public-ip-address>` is your instance IP address that you retrieved from the console.

Connect to the Firewall Threat Defense Virtual Instance Using OpenSSH

To connect to the Firewall Threat Defense Virtual instance from a Windows system, log in to the instance using OpenSSH.

Procedure

Step 1 If this is the first time you are using this key pair, you must set the file permissions so that only you can read the file.

Do the following:

a) In Windows Explorer, navigate to the private key file, right-click the file, and then click **Properties**.
b) On the **Security** tab, click **Advanced**.
c) Ensure that the **Owner** is your user account.
d) Click **Disable Inheritance**, and then select **Convert inherited permissions into explicit permissions on this object**.
e) Select each permission entry that is not your user account and click **Remove**.
f) Ensure that the access permission for your user account is **Full control**.
g) Save your changes.

Step 2 To connect to the instance, open Windows PowerShell and run the following command:

```
$ ssh -i <private_key> <username>@<public-ip-address>
```

Where:

`<private_key>` is the full path and name of the file that contains the private key associated with the instance you want to access.

`<username>` is the username for the Firewall Threat Defense Virtual instance.

`<public-ip-address>` is your instance IP address that you retrieved from the Console.

Connect to the Firewall Threat Defense Virtual Instance Using PuTTY

To connect to the Firewall Threat Defense Virtual instance from a Windows system using PuTTY:

Procedure

Step 1 Open PuTTY.

Step 2 In the **Category** pane, select **Session** and enter the following:

- **Host Name (or IP address):**

  ```
  <username>@<public-ip-address>
  ```

  Where:

  `<username>` is the username for the Firewall Threat Defense Virtual instance.

  `<public-ip-address>` is your instance public IP address that you retrieved from the Console.

- **Port:** 22

- **Connection type:** SSH

Step 3 In the **Category** pane, expand **Window**, and then select **Translation**.

Step 4 In the **Remote character set** drop-down list, select **UTF-8**.

The default locale setting on Linux-based instances is UTF-8, and this configures PuTTY to use the same locale.

Step 5 In the **Category** pane, expand **Connection**, expand **SSH**, and then click **Auth**.

Step 6 Click **Browse**, and then select your private key.

Step 7 Click **Open** to start the session.

If this is your first time connecting to the instance, you might see a message that the server's host key is not cached in the registry. Click **Yes** to continue the connection.

IPv6 Troubleshooting

Problem SSH—Firewall Threat Defense Virtual with IPv6 is not working

- **Solution** Make sure the route for IPv6 public access via internet gateway is added.
- **Solution** Enable IPv6 is present in the Firewall Threat Defense Virtual management configuration.
- **Solution** Verify IPv6 related access-list been added to Firewall Threat Defense Virtual deployed.
- **Solution** Verify if “ipv6 address dhcp default” is used for configuring IPv6 on management interface. If used “ipv6 address dhcp” only then add the following route separately “ipv6 route management ::/0 <IPv6_Gateway_address>.”
- **Solution** Verify if proper ssh ingress is allowed. Use following command to set ssh access allow for all “ssh ::/0 management.”

Problem Not able to assign IPv6 address to existing subnet.

- **Solution** Verify if VCN to which the subnet belongs is enabled with IPv6 already.
- **Solution** Make sure that correct IPv6 CIDR is being used.
- **Solution** Subnet can only have “/64” IPv6 CIDR prefix.

Problem East-West traffic not working.

- **Solution** Verify if following routes are added properly.

  Solution ipv6 route <interface_name> <interface_subnet_CIDR> <ipv6_virtual_router_ip>

  Solution Example: ipv6 route inside 2603:c020:5:5800::/56 fe80::200:17ff:fe96:921b
- **Solution** Make sure that correct IPv6 CIDR is being used.
- **Solution** Make sure if proper access list is configured for IPv6.