



# Installing Cisco UCS E Virtual Network Analysis Module

This chapter provides details about installing Cisco UCS E Virtual Network Analysis Module (vNAM) software. The Cisco UCS E vNAM is only supported with Cisco NAM 6.2 and later versions.

## Prerequisites

Table 5-1 contains information about the prerequisites that should be met before installing Cisco UCS E Virtual Network Analysis Module (vNAM) software.

**Table 5-1** Prerequisites for Cisco UCS E vNAM Installation

Task	See...
1. Update the UCS E CIMC firmware to version 2.3.3 or later.	<a href="#">Updating UCS E CIMC Firmware Version, page 5-1</a>
2. Verify the router, E-Series server, and Cisco IOS software version compatibility.	<a href="#">Verifying the Router, E-Series Server, and Cisco IOS Software Version Compatibility, page 5-2</a>
3. Install the UCS E on ISR with CIMC IP configured and hypervisor installed.	<a href="#">Installing UCS E on ISR with CIMC IP Configured and Hypervisor Installed, page 5-2</a>
4. Enable NAM feature on UCS E CIMC.	<a href="#">Enabling NAM Feature on Cisco UCS E CIMC, page 5-2</a>
5. Enable CEF traffic on ISR.	<a href="#">Enabling CEF Traffic on ISR, page 5-3</a>

## Updating UCS E CIMC Firmware Version

You must update the CIMC firmware release version to 2.3.3 or later. You can download the latest CIMC firmware from:

<https://software.cisco.com/download/release.html?mdfid=286231776&flowid=50082&softwareid=284480160&release=2.3.3&reind=AVAILABLE&rellifecycle=&reltype=latest>

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## Verifying the Router, E-Series Server, and Cisco IOS Software Version Compatibility

Table 5-2 provides the router, E-Series Server, and Cisco IOS software version compatibility information.

**Table 5-2 Router, E-Series Server, and Cisco IOS Version Compatibility**

Router	Cisco IOS Software Version for Single-Wide E-Series Servers	Cisco IOS Software Version for Double-Wide E-Series Servers
2911	15.2(4)M and later versions	—
2921	15.2(4)M and later versions	15.2(4)M and later versions <b>Note:</b> Supports 4-core only.
2951	15.2(4)M and later versions	15.2(4)M and later versions <b>Note:</b> Supports 4-core only.
3925	15.2(4)M and later versions	15.2(4)M and later versions
3925e	15.2(4)M and later versions	15.2(4)M and later versions
3945	15.2(4)M and later versions	15.2(4)M and later versions
3945e	15.2(4)M and later versions	15.2(4)M and later versions

## Installing UCS E on ISR with CIMC IP Configured and Hypervisor Installed

See *Getting Started Guide for Cisco UCS E-Series Servers and the Cisco UCS E-Series Network Compute Engine, Release 2.x* to understand how to configure CIMC IP on UCS E.

## Enabling NAM Feature on Cisco UCS E CIMC

To enable the NAM feature on Cisco UCS E CIMC CLI:

- 
- Step 1** Connect Cisco UCS E CIMC with NAM installed through SSH.
- Step 2** Enter the following commands to enable the NAM monitoring feature:
- ```
E160DP-FOC16270UC0# scope cimc
E160DP-FOC16270UC0 /cimc # scope network
E160DP-FOC16270UC0 /cimc/network # scope nam
E160DP-FOC16270UC0 /cimc/network/nam # set enabled yes
E160DP-FOC16270UC0 /cimc/network/nam *# commit
```
- Step 3** Enter the command to verify the NAM feature status.
- ```
E160DP-FOC16270UC0 /cimc/network/nam # show detail
Network Analysis Module:
Enabled: yes
E160DP-FOC16270UC0 /cimc/network/nam #
```
-

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## Enabling CEF Traffic on ISR

Cisco UCS E vNAM allows you to monitor the CEF traffic that passes through the ISR.

To enable CEF monitoring on a ISR interface, enter the below commands in ISR terminal:

```
enable
configure terminal
ip cef
interface type slot/port
or
interface type slot/wic-slot/port
analysis-module monitoring
```

See section "Forwarding CEF Traffic" and "Understanding How the Prime NAM uses CEF" in *Cisco Prime Network Analysis Module User Guide for details, Release 6.2*.

## Installation Requirements

See section [Host Configuration Requirement for UCS E vNAM, page 2-3](#) and [Client Requirements, page 5-3](#) for details.

## Configuring Cisco UCS E vNAM to Receive Data Traffic

In order for the Cisco UCS E vNAM to receive traffic, you must configure its data port to receive data traffic from your virtual machine. Any traffic that arrives on the data port will be processed and analyzed.

Connectivity using vSwitch in VMware ESXi requires promiscuous mode to be configured. See VMware documentation for details.

Connectivity using network bridge on RHEL KVM requires promiscuous mode to be configured. See RHEL documentation for details.

As Cisco UCS E vNAM supports three different deployment models on hypervisor, each one has different network configuration and has its own advantage/disadvantage. For more details see section [Deploying Cisco UCS E NAM on Hypervisor, page 5-9](#).

## Installing Cisco UCS E vNAM on VMware vSphere ESXi

This section provides instructions on how to install the Cisco UCS E vNAM on VMware vSphere ESXi.

[Table 5-3](#) summarizes how to quickly get up and running on ESXi:

**Table 5-3** *Installation Overview for ESXi*

Task	See...
1. Review the prerequisites for Cisco UCS E vNAM.	<a href="#">Prerequisites, page 5-1</a>
2. Review the requirements and preparations for Cisco Prime vNAM.	<a href="#">Installation Requirements, page 5-3</a>

*DRAFT - Cisco Confidential***Table 5-3**      *Installation Overview for ESXi*

Task	See...
3. Download the Cisco UCS E vNAM OVA file from Cisco.com.	<a href="#">Downloading Cisco UCS E vNAM Virtual Appliance OVA File, page 5-4</a>
4. Install Cisco UCS E vNAM software.	<a href="#">Deploying Cisco UCS E vNAM on ESXi Server Using vSphere Client, page 5-4</a>
5. (Optional) Request permanent license to replace 90-day evaluation license.	<a href="#">Configuring Cisco UCS E vNAM to Receive Data Traffic, page 5-3</a>

## Downloading Cisco UCS E vNAM Virtual Appliance OVA File

The Cisco UCS E vNAM software is distributed as an Open Virtualization Archive (OVA) file. The file contains everything in the Open Virtualization Format (OVF) folder and is all you need to install Cisco UCS E vNAM in an ESX virtualization environment. The OVA defines the network interface requirements for Cisco UCS E vNAM.

Cisco UCS E vNAM on ESXi platform is distributed as an OVA file, named nam-yyy-x.x.x.ova.

**Note**

You can deploy the Cisco UCS E vNAM software file directly from any of the supported hypervisors (for example, the vSphere Client); and do not need to extract the archive before performing the deployment.

**Step 1** Access the Cisco UCS E vNAM application image at the following location:

<https://software.cisco.com/download/navigator.html>

**Step 2** Download the file to your desktop and ensure it is accessible.

## Deploying Cisco UCS E vNAM on ESXi Server Using vSphere Client

You can use a vSphere client to install an instance of Cisco UCS E vNAM. We recommend you to use the two Dataports two vSwitches deployment model. For more details see section [2 Dataports, 2 vSwitches Model, page 5-12](#) for more details.

To set up the Cisco UCS E vNAM on VMware ESXi using the OVA file:

**Step 1** Download a vSphere client and connect it to the VMware ESXi server. You must ensure you use the same IP address as that of the management port.

**Step 2** Once connected to the VMware ESXi server, choose **File > Deploy OVF Template** from vSphere menu. For details on how to download the OVA file, see [Downloading Cisco UCS E vNAM Virtual Appliance OVA File, page 5-4](#).

**Step 3** To select the OVA file from hard disk, click **Browse** and choose the OVA file (.ova) available in the local machine where the vSphere is running, in the directory in which you unzipped the file earlier. You can also enter a URL to download and install the OVA package from the Internet.

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- Step 4** In the Deploy OVF Template Source window, click **Next**. The OVF Template Details window appears. It displays the product name, the size of the OVA file, and the amount of disk space that needs to be available for the virtual appliance.
- Step 5** Verify the OVF template details and click **Next**. The Name and Location window appears.
- Step 6** Enter the name of the new virtual appliance (Cisco UCS E vNAM). If you are using the vCenter to manage the virtual machine, then you also have the option of selecting the location of the inventory. For example, *nam-vs-x.x-yyy*. Select a location from the Datastore defaults that display. You can also customize a location, if desired.
- Step 7** Click **Next**. The Deployment Configuration page appears.
- Step 8** Choose the UCSe model, verify the hardware profile detail, and click **Next**.
- Step 9** Choose the Storage location for the virtual machine files and click **Next** to choose the Disk Format type.
- Step 10** Click **Next**. The Network Mapping page appear.
- Set the MgmtNetwork's destination network to the management network in your environment.
  - Set the DataNetwork1 to the management network to monitor the management traffic as well as the CEF traffic that pass through your ISR.
  - Set the DataNetwork2 to the front panel port for monitoring the external traffic.
- Step 11** Click **Next**, if you are using the vCenter to configure the virtual machine. The Properties page appears. The vNAM's network credentials, root password, snmp community string can be set from the vsphere client, so you do not have to configure it when the vNAM installation is completed.
- Step 12** Click **Next**. The Ready to Complete window appears.
- Step 13** Click **Finish** to Review the setting details of your deployment.
- 

## Deploying Cisco UCS E vNAM on ESXi Server Using VMware Command Line

This section describes how to deploy Prime vNAM from the command line.

As an alternative to using the vSphere Client to deploy the Cisco UCS E vNAM OVA distribution, you can use the VMware OVF Tool, which is a command-line client.

To deploy an OVA with the VMware OVF Tool, use the following command syntax:

```
ovftool <source locator> <target locator>
```

where *<source locator>* is the path to the OVA package and *<target locator>* is the path target for the virtual machine, OVA package or VI. A VI location refers to any location on a VMware product, such as vSphere, VMware Server or ESXi.

For complete documentation on the VMware OVF Tool, see the VMware vSphere or OVF Tool user documentation.

## Installing Cisco UCS E vNAM on Red Hat Enterprise Linux KVM

This section provides instructions on how to install Cisco UCS E vNAM on Red Hat Enterprise Linux (RHEL) KVM using an ISO file.

[Table 5-4](#) summarizes how to quickly get up and running on RHEL KV.

*DRAFT - Cisco Confidential***Table 5-4** *Installation Overview for KVM*

Task	See...
1. Review the prerequisites for Cisco UCS E vNAM.	<a href="#">Prerequisites, page 5-1</a>
2. Review the requirements and preparations for Cisco Prime vNAM	<a href="#">Installation Requirements, page 5-3</a>
3. Download the Cisco UCS E vNAM ISO file from Cisco.com	<a href="#">Downloading Cisco UCS E vNAM Virtual Appliance ISO File, page 5-7</a>
4. Configure Virtual Network Bridges.	<a href="#">Configuring Virtual Network Bridges, page 5-6</a>
5. Install Cisco UCS E vNAM software on the virtual machine	<a href="#">Deploying Cisco UCS E vNAM on KVM using Virtual Machine Manager, page 5-7</a>
6. (Optional) Request permanent license to replace 90-day evaluation license.	<a href="#">Configuring Cisco UCS E vNAM to Receive Data Traffic, page 5-3</a>

## Configuring Virtual Network Bridges

In order to make the Cisco UCS E vNAM accessible to the public network and to provide an interface that will accept SPAN data, you must create network bridging which reflects the local configuration and matches the bridges appropriately to the interfaces on the VM. This cannot be standardized and delivered as an automatic and simple installation due to the generic KVM environment and requires customer input.



### Note

You must perform this task before Cisco UCS E vNAM installation.

This section provides details on how to configure your virtual network bridges for the two or three required Cisco UCS E vNAM ports:

- Management port—Bridge to include the external physical management port. You can skip this step if you already have a network bridge configured, which can be used for the Cisco UCS E vNAM management port.
- Data port—Bridge to include the physical port receiving the SPAN traffic.

To configure the virtual network bridges to the Prime Cisco UCS E vNAM ports:

**Step 1** Log into RHEL KVM as root.

**Step 2** Enter the commands to add the two bridges.

For example, the commands below assume eth0 is the physical management port and eth1 is the data port, and you want to set a Cisco UCS E vNAM to monitor both management port and dataport's traffic:

```
brctl addbr bridge1
brctl addbr bridge2
brctl addif bridge1 eth0
brctl addif bridge2 eth1
```

**Step 3** Step 3 : Enter the commands to let the bridges work all the time:

```
brctl setageing bridge0 0
brctl setageing bridge1 0
```

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To download the Prime vNAM image onto your KVM host continue to [Downloading Cisco UCS E vNAM Virtual Appliance ISO File, page 5-7](#).

## Downloading Cisco UCS E vNAM Virtual Appliance ISO File

The ISO file contains configuration requirements. The file will be named similar to `nam-yyy-x.x.x.bin.gz`.

One ISO file contains the pieces necessary for Cisco UCS E vNAM installation.

- 
- Step 1** Access the Cisco UCS E vNAM application image at the following location:  
<http://software.cisco.com/download/navigator.html>
- Step 2** Download the Cisco UCS E vNAM image onto the RH KVM host where there is enough disk space. Usually `/home` is the largest partition. An example of the internal download command is:
- ```
wget ftp://172.20.98.174/pub/naml/mydir/kvm/filename.iso -O /home/admin/filename.iso
```
- 

## Deploying Cisco UCS E vNAM on KVM using CLI

You can deploy Cisco UCS E vNAM using command line interface. See KVM documentation for details. See also the [Configuring Cisco UCS E vNAM to Receive Data Traffic, page 5-3](#).

To deploy the Cisco UCS E vNAM and start a console connection, use something similar to the following command.



### Note

Change the iso path (`-disk`), and network bridge names as appropriate.

```
virt-install -n <name>_ -c /<path to .iso file> -r 4096 --vcpus=2 --arch=x86_64
--os-type=linux --os-variant=generic26 --disk
path=</path/to/file/that/contains/disk,size=100,bus=ide --network
bridge=<management_bridge>,model=virtio --network bridge=<data_bridge>,model=virtio
```

This command starts a console session on the terminal. You should see the installation process and eventually the Prime vNAM login appears.

## Deploying Cisco UCS E vNAM on KVM using Virtual Machine Manager

These steps assume you have already configured the virtual network bridges before starting the installation. The network bridges enable Cisco UCS E vNAM to share the KVM host system physical network connections.

To create a new Cisco UCS E vNAM virtual machine:

- 
- Step 1** Log in to the server, and launch the KVM console.
- Step 2** Launch the Virtual Machine Manager, and click the **Create a New Virtual Machine** icon.

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- Step 3** Enter the unique name for this instance of Prime vNAM and select the installation option, then click **Forward**. In the example below, the name is *vNAM\_Sample*.
- Step 4** Under Choose how you would like to install the operating system, select Local install media (ISO image or CDROM), then click **Forward**.
- Step 5** Select Use ISO Image, click **Browse** to select the location of the Cisco UCS E vNAM iso file, then click **Forward**.
- Step 6** Enter the RAM memory size of 4096 MB and select two CPUs.
- Step 7** Select **Enable storage for this virtual machine** and ensure the **Allocate entire disk now** check box is checked. Create a new volume, and choose raw format. You must also enter the maximum size for the storage unit (100GB).
- Step 8** Select the new volume and click **Choose Volume**.
- Step 9** Verify your VM settings, check the **Customize configuration before install** check box.
- Step 10** Click **Advanced Options** drop-down. Make sure that the bridge you have created for management is selected.
- Step 11** Click **Finish**.
- Step 12** Before you install, make sure the following are configured correctly.
- Step 13** Select **Disk 1** in the installation menu panel, change the advanced option Disk Bus to *IDE*, then click **Apply**.
- Step 14** Select **Boot Options** in the installation menu panel. Check the select hard disk, then click **Apply**.
- Step 15** Select **NIC** in the installation menu panel. The NIC that displays is that of the management port for the vNAM. In the Device Model drop-down, choose **virtio**.
- Step 16** Click **Add Hardware**.
- Step 17** In the Add new virtual hardware window, select **Network**. We recommend you to select the 2 Dataports 2 vSwitches deployment model (see [2 Dataports, 2 vSwitches Model, page 5-12](#) for more details), so you should add two network hardwares. Select **NIC** in the installation menu panel. Select the NIC that displays the bridge including the management port for newly added Network Hardware 1, to monitor the management traffic as well as the CEF traffic pass through the ISR, Select the NIC that displays the bridge including the front panel port for newly added Hardware 2, to monitor the external traffic.
- Step 18** In the Device Model drop-down, choose **virtio**.
- Step 19** From the Host device details drop-down, select the interface on which your Cisco UCS E vNAM will connect to the network. This will be the bridge you created for data.
- Step 20** In the Device Model drop-down, choose **virtio**.
- Step 21** Click **Finish**. Do a quick review of the NIC and other details.
- Step 22** Close the window, the installation begins.

We recommend that you monitor the messages that appear in the console window to ensure that you are informed about the progress of the installation process.

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# Deploying Cisco UCS E NAM on Hypervisor

As the network on hypervisor is configurable, there are many deployment models and each has its own advantage and disadvantage. This section explains VMware ESXi host based configuration instance. For the KVM hypervisor, you must follow the same rule to map the related port with created bridges. 2 Dataports, 2 vSwitches model is recommended.



**Note**

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When you install vNAM with OVA image and select "UCS E model", it will automatically create two dataports on NAM and you need to use [2 Dataports, 2 vSwitches Model](#).

---

This section describes the following UCS E NAM deployment models on hypervisor:

- [1 Dataport, 1 vSwitch Model](#)
- [1 Dataport, 2 vSwitches Model](#)
- [2 Dataports, 2 vSwitches Model](#)

## 1 Dataport, 1 vSwitch Model

- vSwitch connects to Cisco UCS E port0 and front panel port.
- NAM management port connects to vSwitch.
- NAM dataport connects to vSwitch.
- Traffic from all physical ports, port0 and front panel port will flood into the switch.

### Advantage

- Management traffic from ISR and traffic from front panel ports will be monitored on NAM data port.
- CEF dataport will be created when it receives CEF traffic from ISR.

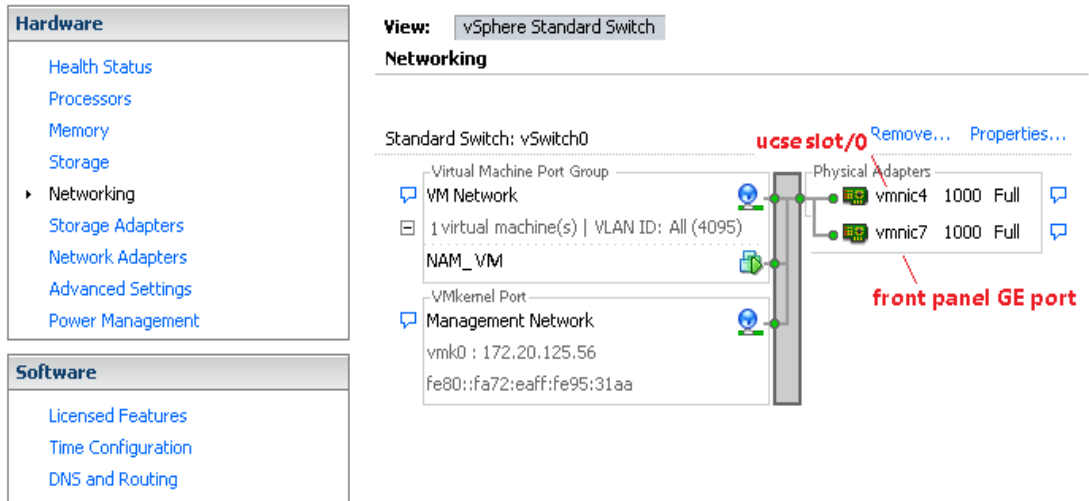
### Disadvantage

- System performance will be impacted as each port will be flooded with various traffic including management, CEF traffic and SPAN traffic.
- Miscellaneous packets from router interface will be received on dataport.
- Internal management traffic from router and traffic from front panel are integrated into one dataport in GUI.

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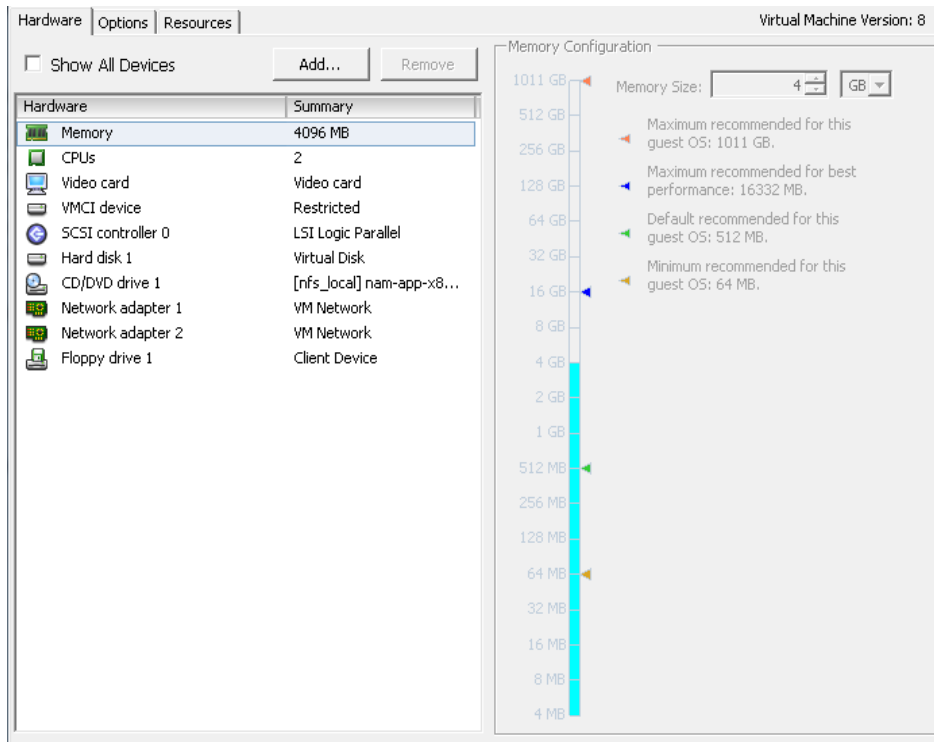
## Configuring Network on Hypervisor using 1 Dataport, 1 vSwitch Model

Figure 5-1 Network Configuration on Hypervisor for 1 Data Port, 1 vSwitch Model



## Configuring Virtual Machine using 1 Dataport, 1 vSwitch Model

Figure 5-2 Virtual Machine Configuration for One Dataport One vSwitch Model



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## 1 Dataport, 2 vSwitches Model

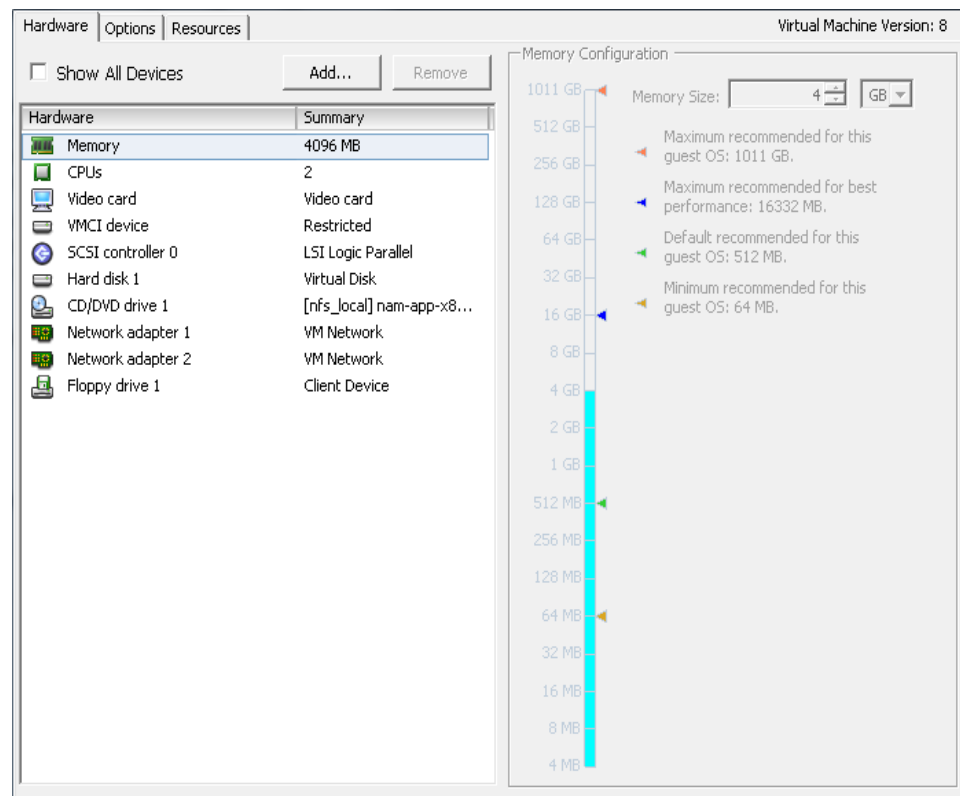
- First vSwitch connects to Cisco UCS E port0.
- Second vSwitch connects to front panel port.
- NAM management port (Network Adapter 1 on virtual machine) connects to the first vSwitch.
- NAM dataport (Network Adapter 2 on virtual machine) connects to either first vSwitch (when monitoring internal management traffic) or the second vSwitch (when monitoring external traffic) depending on the traffic that the NAM needs to monitor.

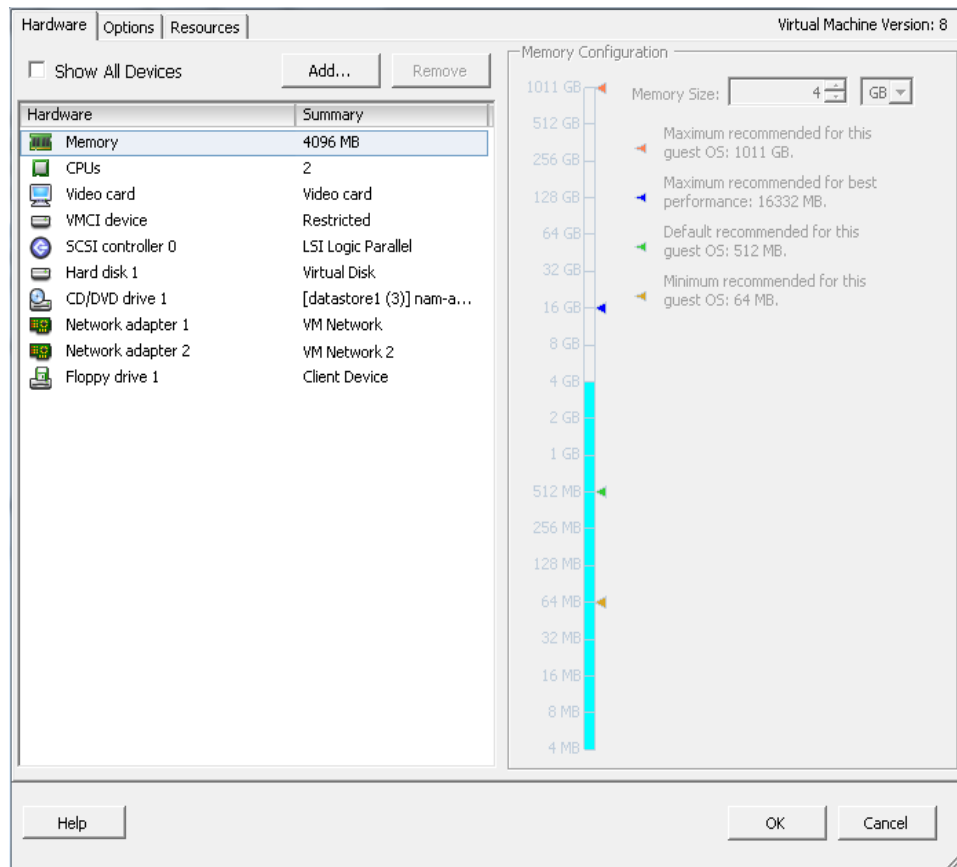
### Disadvantage

- It cannot monitor CEF traffic or external traffic at a same time.
- ISR miscellaneous packets are not filtered when dataport connects to the first vSwitch.

## Configuring Virtual Machine using 1 Dataport, 2 vSwitches Model

**Figure 5-3** Virtual Machine Configuration for 1 Dataport 2 vSwitches model\_1



*DRAFT - Cisco Confidential***Figure 5-4 Virtual Machine Configuration for 1 Dataport 2 vSwitches Model\_2**

## 2 Dataports, 2 vSwitches Model

We recommend you to use this deployment model as it has the ability to support two dataports.

- First vSwitch connects to Cisco UCS E port0 for CEF traffic monitoring and ISR to UCS E management traffic.
- Second vSwitch connects to front panel port for external traffic monitoring.
- NAM management port (Network Adapter 1 on virtual machine) connects to the first vSwitch.
- NAM dataport 1 (Network Adapter 2 on virtual machine) connects to the first vSwitch for CEF traffic and internal management traffic monitoring.
- NAM dataport 2 (Network Adapter 3 on virtual machine) connects to the second vSwitch for external traffic monitoring.

### Advantage

- ISR to Cisco UCS E management traffic is monitored on dataport 1.
- ISR to Cisco UCS E CEF traffic is monitored on CEF port.
- Internal and external traffic will not flood together.

*DRAFT - Cisco Confidential***Configuring Network on Hypervisor using 2 Dataports, 2 vSwitches Model****Figure 5-5** Network Configuration on Hypervisor for 2 Dataports 2 vSwitches Model

**Standard Switch: vswitch0**

Virtual Machine Port Group

- VM Network
  - 1 virtual machine(s) | VLAN ID: All (4095)
    - NAM\_VM
- VMkernel Port
  - Management Network
    - vmk0 : 172.20.125.56
    - fe80::fa72:eaff:fe95:31aa

Physical Adapters

- vmmnic0 1000 Full
- vmmnic1 1000 Full

**Standard Switch: vswitch1**

Virtual Machine Port Group

- VM Network 2
  - 1 virtual machine(s) | VLAN ID: All (4095)
    - NAM\_VM

Physical Adapters

- vmmnic1 1000 Full
- vmmnic2 1000 Full

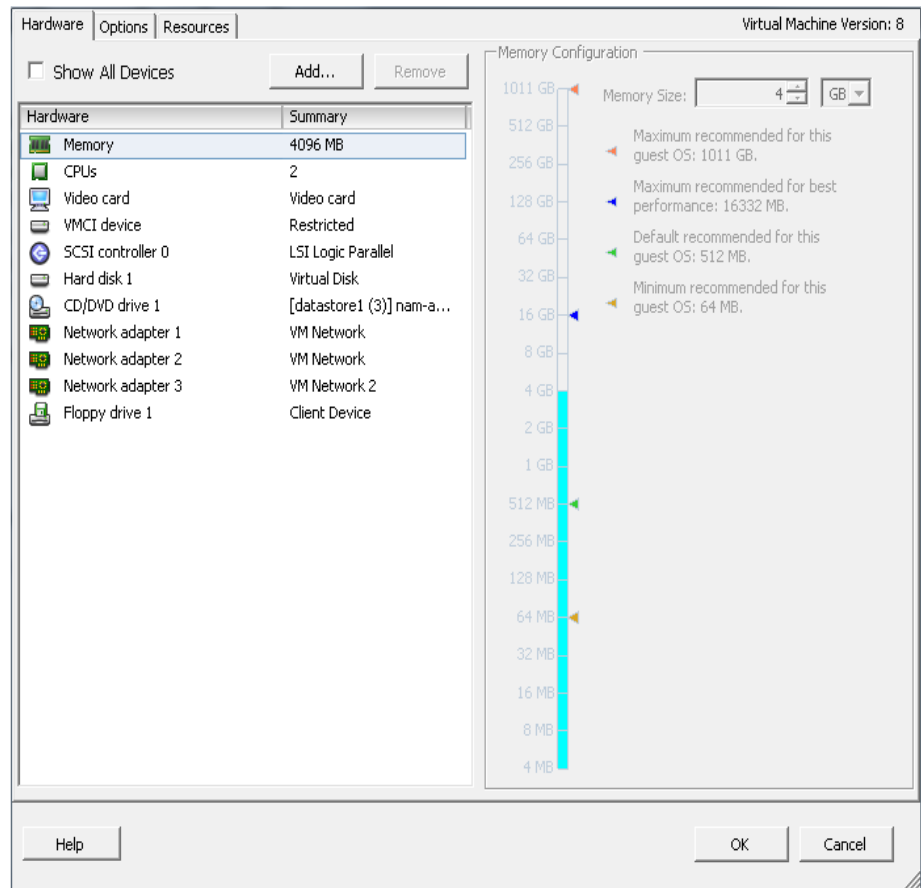
**Cisco Discovery Protocol Properties**

|                     |                               |
|---------------------|-------------------------------|
| Version:            | 2                             |
| Timeout:            | 0                             |
| Time to live:       | 156                           |
| Samples:            | 829                           |
| Device ID:          | namlab-3945-15.yourdomain.com |
| IP Address:         | 172.20.125.15                 |
| Port ID:            | ucse4/0                       |
| Software Version:   | unknown                       |
| Hardware Platform:  | Cisco C15C03945-CHASSIS       |
| IP Prefix:          | 0.0.0.0                       |
| IP Prefix Length:   | 0                             |
| VLAN:               | 0                             |
| Full Duplex:        | Enabled                       |
| MTU:                | 0                             |
| System Name:        | --                            |
| System OId:         | --                            |
| Management Address: | 172.20.125.15                 |
| Location:           | --                            |

**Peer Device Capability Enabled**

|                      |     |
|----------------------|-----|
| Router:              | Yes |
| Transparent Bridge:  | No  |
| Source Route Bridge: | Yes |
| Network Switch:      | Yes |
| Host:                | No  |
| IGMP:                | Yes |
| Repeater:            | No  |

**Configuring Virtual Machine using 2 Dataports, 2 vSwitches Model****Figure 5-6** Virtual Machine Configuration for 2 Dataports 2 vSwitches Model

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- Network adapter 1: NAM management port
- Network adapter 2: NAM dataport 1
- Network adapter 3: NAM dataport 2