



Cisco DevNet Associate v1 Installation and Configuration Guide

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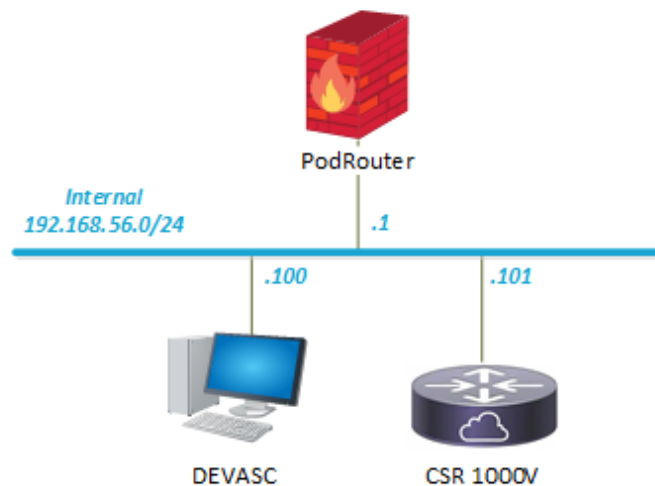
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1 Introduction

This document provides detailed guidance on performing the installation and configuration of the *Cisco DevNet Associate v1* pod on the *NETLAB+ VE* system.

1.1 Introducing the Cisco DevNet Associate v1 Pod

The *Cisco DevNet Associate v1* pod is a 100% virtual machine pod consisting of three virtual machines. Linked together through virtual networking, these three virtual machines provide the environment for a student or a team to perform the *Cisco DevNet Associate v1* labs.



2 Planning

This guide provides specific information pertinent to delivering the *Cisco DevNet Associate v1* pod. The [NETLAB+ Remote PC Guide Series](#) provides the prerequisite guidance for setting up your VMware infrastructure, including:

- An introduction to virtualization using *NETLAB+*
- Detailed setup instructions for standing up *VMware vCenter* and *VMware ESXi*
- Virtual machine and virtual pod management concepts using *NETLAB+*

This document assumes that you have set up virtual machine infrastructure in accordance with the [NETLAB+ Remote PC Guide Series](#). The planning information below refers to specific sections in the *Remote PC Guide* when applicable.

2.1 Pod Creation Workflow

The following list is an overview of the pod setup process.

1. Obtain the master virtual machine images required for the master pod.
2. Deploy the master virtual machine images to your *VMware vCenter Appliance*.
 - a. Deploy virtual machines using **Thin Provisioning** to reduce storage consumption.
 - b. Make necessary adjustments to each virtual machine in the environment.
 - i. Insert/Verify manual **MAC** addresses.
 - ii. Change the default network to **SAFETY NET**.
 - iii. Any other configuration changes mentioned in this guide.
3. Import the deployed virtual machines to the *NETLAB+ Virtual Machine Inventory*.
4. Activate or license the required software on each virtual machine when prompted.
5. Take a snapshot of each virtual machine in the master pod labeled **GOLDEN_MASTER** after all configurations and licensing have taken effect. The *GOLDEN_MASTER* snapshot is used to clone virtual machine images for the user pods.
6. Use the *NETLAB+ Pod Cloning* feature to create student pods from the master pod.
7. If multiple hosts are used in the *NETLAB+* environment, make a **Full Clone** of the master pod on the initial host (Host A) to the subsequent host (Host B) and so on using the *NETLAB+ Pod Cloning* feature.

2.2 Pod Resource Requirements

The *Cisco DevNet Associate v1* pod will consume 10.3 GB of storage per each master pod instance.

The following table provides details of the storage requirements for each of the virtual machines in the pod.

Virtual Machine	OVF/OVA	Initial Master Pod (Thin Provisioned)	Maximum Allocated Memory
CSR 1000V	842 MB	853 MB	4 GB
DEVASC	4.7 GB	9.3 GB	4 GB
PodRouter	64 MB	189 MB	128 MB
Total	5.6 GB	10.3 GB	8.1 GB

2.3 ESXi Host Server Requirements

Please refer to the *NDG* website for specific *ESXi* host requirements to support virtual machine delivery: <https://www.netdevgroup.com/products/requirements/>

The deployment of the *Cisco DevNet Associate v1* pod requires VMware ESXi version of **6.0** or greater.

**Please
Note**

The number of **active** pods that can be used simultaneously depends on the *NETLAB+* product license and the number of *VMware ESXi* host servers meeting the hardware requirements specifications.

2.4 NETLAB+ Requirements

Installation of the *Cisco DevNet Associate v1* pod, as described in this guide, requires that you are running *NETLAB+ VE*.

Previous versions of *NETLAB+* do not support requirements for the *Cisco DevNet Associate v1* pod on the physical host servers.

Please refer to the [NETLAB+ Remote PC Guide Series](#).

2.5 NETLAB+ Virtual Machine Infrastructure Setup

The *NETLAB+ Virtual Machine Infrastructure* setup is described in the following sections of the [NETLAB+ Remote PC Guide Series](#):

- *Registering a Virtual Datacenter in NETLAB+*
- *Adding ESXi hosts in NETLAB+*
- *Proactive Resource Awareness*



It is important to configure *Proactive Resource Awareness* to maximize the number of active pods per physical *ESXi* host.

2.6 Software Requirements

For the purpose of software licensing, each virtual machine is treated as an individual machine, PC, or server. Please refer to the specific vendor license agreements (and educational discount programs, if applicable) to determine licensing requirements for your virtual machines' software, operating system, and applications.

The minimum virtual infrastructure software required for standing up this pod is in the following table.

Virtual Infrastructure Requirements	
Software	Version
vSphere ESXi	6.0
vCenter Server	6.0

Please refer to the *Software and Licenses* section regarding the software requirements for virtual machines in the pod.

2.7 Networking Requirements

To accommodate the movement of large *VMs*, *OVF/OVAs*, and *ISO* disk images from one host to another, gigabit Ethernet or better connectivity is recommended to interconnect your *NETLAB+*, *vCenter Server* system, and *ESXi* host systems.

The two standard networking models recommended to interconnect your servers are described in detail in the *Networking Models* section of the [Remote PC Guide Series, Volume 1 - Introduction and Planning](#).

2.7.1 Pod Internet Access

The *Cisco DevNet Associate v1* pod requires internet access. This access is required to access the Cisco Network Academy curriculum as well as completing the lab objectives in the student pods.

This environment is designed to leverage one vSwitch per host that attaches to a network that has a DHCP server to assign IPv4 addresses that are routable to the internet.

This lab environment is also designed to leverage the public DNS servers 8.8.8.8 and 4.2.2.2. This vSwitch must be able to access those servers, which may require adjustments in a firewall if applicable.

2.7.2 Completing the NETLAB+ Pod Internet Access and Use Agreement



You are required to complete the *NETLAB+ Pod Internet Access and Use Agreement* prior to obtaining access to the pod or content for this course.

Due to the security and legal implications regarding accessing the internet from within the pod, we require that you agree to the terms contained within this online document prior to obtaining access to the pod or content for this course: <https://www.netdevgroup.com/content/cnap/devnetagreement>

3 Software and Licenses

3.1 Downloading OVF/OVA Files from CSSIA

The virtual machines are made available as *Open Virtualization Format (OVF)* or *Open Virtualization Archive (OVA)* files. These files are available for download from *CSSIA*.

To request access to the preconfigured virtual machine templates from *CSSIA*:

1. Go to the *CSSIA Resources* page: <https://www.cssia.org/cssiaresources/>
2. Select **CSSIA VM Image Sharing Agreement**.
3. Complete and submit your access request by following the instructions on the request form.
4. *CSSIA* will provide, via email, password-protected download links. Access to the download links is provided only to customers who are current with their *NETLAB+* support contract and are participants in the appropriate partner programs (*i.e.*, *Cisco Networking Academy*, *VMware IT Academy*, *Red Hat Academy*, and/or *Palo Alto Networks*).
5. Once all virtual machines have been downloaded, they can be deployed following the steps in the appropriate pod installation guide. Each virtual machine is deployed individually.

3.2 Downloading the CSR 1000V ISO File

Only the instructor or anyone with proper credentials is allowed to download ISO files from Cisco. This step must be done by the instructor.

1. To download the **CSR 1000V** ISO visit the following link:
<https://software.cisco.com/download/home/284364978/type/282046477/release/Fuji-16.9.5>



**Please
Note**

To download software from *cisco.com*, you must be an active *NetAcad* instructor and have a CCO account with a *NetAcad Maintenance* agreement.

2. Download the **Cisco CSR1000V IOS XE Universal - CRYPTO ISO** file.
3. Once downloaded, the instructor may now share the *CSR 1000V* ISO with the *NETLAB+* administrator so that it can be attached to the *CSR 1000V* VM after being deployed on the local *NETLAB+* system.

4 Master Pod Configuration

4.1 Deploying Virtual Machine OVF/OVA Files

Deploy on your host server the pod virtual machine *OVF/OVA* files you have downloaded.

1. Navigate to your **vSphere Client** using your management workstation, ensure that your downloaded *OVA/OVF* files are accessible on this machine, and then connect to your **vCenter Server**.
2. From the *vSphere Client* interface, navigate to **Hosts and Clusters**.
3. Right-click on the target **ESXi Host Server** and select **Deploy OVF Template**.
4. In the *Deploy OVF Template* window, on the *Select source* step, select the **Local File** radio button and click **Browse**.
5. Locate and select one of the VMs for the pod, click **Open**.

Virtual Machine	VM OS	Virtual Machine File Name
CSR 1000V	Linux	Cisco_DEVASCv1_FM.CSR1000V.ova
DEVASC	Linux	Cisco_DEVASCv1_FM.DEVASC.ova
Pod Router	Linux	Cisco_DEVASCv1_FM.PodRouter.ova

6. Verify that the VM information populates next to the *Browse* button and click **Next**.

Please Note

Only one VM can be selected using this wizard. The process will have to be repeated for the remaining VMs.

7. On the *Review details* step, make sure to click the checkbox for **Accept extra configuration options (if present)** and click **Next**.
8. On the *Select name and folder* step, change the name of the virtual machine to something that is easy to manage. You can use the names provided in the list below as names for the virtual machines if you do not have a set naming convention. Select the appropriate **datacenter** and click **Next**.

Virtual Machine	VM OS	Virtual Machine Deployment Name
CSR 1000V	Linux	Cisco_DEVASCv1_Master.CSR1000V
DEVASC	Linux	Cisco_DEVASCv1_Master.DEVASC
Pod Router	Linux	Cisco_DEVASCv1_Master.PodRouter

9. On the *Select Storage* step, choose the appropriate storage device and make sure that **Thin Provision** is selected. Click **Next**.
10. In the *Setup networks* section, select **SAFETY NET** as the destination and click **Next**.



If **SAFETY NET** is not available, refer to the *Create a Safe Staging Network* section in the [Remote PC Guide Series – Volume 2](#).

11. In the *Ready to complete* section, make sure **Power on after deployment** is **unchecked** and confirm the settings. Click **Finish**.
12. *vCenter* will begin deploying the virtual machine. This may take some time, depending on the speed of your connection, HDDs, etc. Repeat the previous steps for each remaining virtual machine in the master pod.

4.1.1 Modify Virtual Machines

Once the virtual machines are imported onto the host, verify the configurations. The following steps will guide you through the process.

1. In the *vSphere Client* interface, right-click on the imported virtual machine and select **Edit Settings**.
2. For all the virtual machines, manually assign the *MAC* addresses for each *NIC*. The table below identifies the *MAC* addresses per *NIC*.

Virtual Machine	NIC	Network	MAC
CSR 1000V	1	SAFETY NET	00:50:56:92:03:36
DEVASC	1	SAFETY NET	00:50:56:99:d0:99
PodRouter	1	Network with DHCP Internet Access	<i>(automatic)</i>
	2	SAFETY NET	00:50:56:99:2d:2f

- For the *PodRouter* virtual machine, change *Network adapter 1* to the network that has DHCP Internet access available, as well as making sure that the *MAC Address* is set to **Automatic**, see [Pod Internet Access](#). Verify *Network adapter 2* is set to the **SAFETY NET** network, as well as making sure the *MAC Address* is set to **Manual** and changed to **00:50:56:99:2d:2f**.

Edit Settings | Cisco_DEVASCv1_Master.PodRouter ×

Virtual Hardware VM Options ADD NEW DEVICE

> CPU	1	
> Memory	128	MB
> Hard disk 1	1.19921875	GB
> SCSI controller 0	LSI Logic Parallel	
Network adapter 1 *	DMZ	
Status	<input checked="" type="checkbox"/> Connect At Power On	
Adapter Type	VMXNET 3	
DirectPath I/O	<input checked="" type="checkbox"/> Enable	
MAC Address	00:50:56:99:f9:50	Automatic
Network adapter 2	SAFETY NET	
Status	<input checked="" type="checkbox"/> Connect At Power On	
Adapter Type	VMXNET 3	
DirectPath I/O	<input checked="" type="checkbox"/> Enable	
MAC Address	00:50:56:99:2d:2f	Manual
> Video card	Specify custom settings	
VMCI device	Device on the virtual machine PCI bus that provides support for the	

CANCEL OK

4. For the *DEVASC* virtual machine, verify *Network adapter 1* is set to the **SAFETY NET** network, as well as making sure the *MAC Address* is set to **Manual** and changed to **00:50:56:99:d0:99**

Edit Settings | Cisco_DEVASCv1_Master.DEVASC ✕

Virtual Hardware

VM Options

ADD NEW DEVICE

> CPU	2	▼	ⓘ
> Memory	4	▼ GB ▼	
> Hard disk 1	31.25	▼ GB ▼	
▼ Network adapter 1	SAFETY NET ▼		
Status	<input checked="" type="checkbox"/> Connect At Power On		
Adapter Type	VMXNET 3 ▼		
DirectPath I/O	<input checked="" type="checkbox"/> Enable		
MAC Address	00:50:56:99:d0:99	Manual ▼	
> Video card	Specify custom settings ▼		
VMCI device	Device on the virtual machine PCI bus that provides support for the virtual machine communication interface		
> Other	Additional Hardware		

CANCEL

OK

- For the *CSR 1000V* virtual machine, verify *Network adapter 1* is set to the **SAFETY NET** network, as well as making sure the *MAC Address* is set to **Manual** and changed to **00:50:56:92:03:36**.

Edit Settings
Cisco_DEVASCv1_Master.CSR1000V
✕

Virtual Hardware

VM Options

ADD NEW DEVICE

> CPU	1	<input type="checkbox"/>	
> Memory	4	<input type="checkbox"/>	GB
> Hard disk 1	8	<input type="checkbox"/>	GB
<input checked="" type="checkbox"/> Network adapter 1	SAFETY NET	<input type="checkbox"/>	
Status	<input checked="" type="checkbox"/> Connect At Power On		
Adapter Type	VMXNET 3		
DirectPath I/O	<input checked="" type="checkbox"/> Enable		
MAC Address	00:50:56:92:03:36	<input type="checkbox"/>	Manual
> CD/DVD drive 1	Client Device	<input type="checkbox"/>	Connect...
> CD/DVD drive 2	Datastore ISO File	<input checked="" type="checkbox"/>	Connect...
> Video card	Specify custom settings		
VMCI device	Device on the virtual machine PCI bus that provides support for the virtual machine communication interface		
> Other	Additional Hardware		

CANCEL

OK

4.1.2 Modify CSR1000v Installation ISO Location

- In the *vSphere Client* interface, right-click on the **CSR 1000V** virtual machine and select **Edit Settings**.

2. In the VM settings, select the dropdown arrow for **CD/DVD drive 1**, select **Datastore ISO File**.
3. In the *Select File* window, select the **CSR1000V ISO** file. At the time this lab was written, the file name was **csr1000v-universalk9.16.09.05.iso**. However, the version (16.09.05) may have changed, altering the file name. Click **OK** to confirm the selected ISO file.



When selecting the ISO file, it is recommended to move or copy the ISO in the same folder for the *CSR 1000V* VM on the datastore.

4. Make sure to check the checkbox for **Connect At Power On**. Select **OK** to close *Edit Settings* for the *CSR 1000V* VM.

Edit Settings | Cisco_DEVASCv1_Master.CSR1000V ✕

Virtual Hardware | VM Options ADD NEW DEVICE

> CPU	1		
> Memory	4	GB	
> Hard disk 1	8	GB	
> Network adapter 1	SAFETY NET		<input checked="" type="checkbox"/> Connect...
> CD/DVD drive 1 *	Datastore ISO File		<input checked="" type="checkbox"/> Connect At Power On
Status			
CD/DVD Media		BROWSE...	
Device Mode	Passthrough CD-ROM		
Virtual Device Node	IDE 0	IDE(0:1) CD/DVD drive 1	
> CD/DVD drive 2	Datastore ISO File		<input checked="" type="checkbox"/> Connect...
> Video card	Specify custom settings		
VMCI device	Device on the virtual machine PCI bus that provides support for the virtual machine communication interface		
> Other	Additional Hardware		

CANCELOK

Please Note

Do **NOT** change the configuration for *CD/DVD drive 2*. This drive is used for the initial configuration of the router.

4.2 NETLAB+ Virtual Machine Inventory Setup

This section will guide you in adding your templates to the *Virtual Machine Inventory* of your *NETLAB+ VE* system.

1. Log in to your *NETLAB+ VE* system using the administrator account.
2. Select the **Virtual Machine Infrastructure** icon.



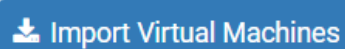
3. Click the **Virtual Machine Inventory** icon.



Virtual Machine Inventory

Import, clone, and manage the inventory of virtual machines to be used with NETLAB+.

4. Click the **Import Virtual Machines** button located at the bottom of the list.



5. Select the appropriate datacenter from the list where your master VMs reside.
6. Select the checkbox next to the virtual machines you had just deployed and click **Import Selected Virtual Machines**.



7. When the *Configure VMs* window loads, you can set your virtual machine parameters.
 - a. Check the dropdown box for the correct operating system for each imported virtual machine.
 - b. Change *Role* to **Master** for each VM.
 - c. Add any comments for each virtual machine in the last column.



It is advised to leave the *Version* and *Build* numbers for reference when requesting *NDG* support.

- d. Verify your settings and click **Import (X) Virtual Machines** (notice the number in parenthesis is dynamic, depending on the amount of VMs selected).

Virtual Machine Name	Operating System	Role
Cisco_DEVASCv1_Master.CSR1000V	Linux	Master
Cisco_DEVASCv1_Master.DEVASC	Linux	Master
Cisco_DEVASCv1_Master.PodRouter	Linux	Master

Show 100 entries Showing 1 to 3 of 3 items

Import (3) Virtual Machines Cancel

- e. Verify all *Import Statuses* report back with **OK** and then click on the **Dismiss** button.
 f. Verify that your virtual machines show up in the inventory.

For additional information, please refer to the [NETLAB+ VE Administrator Guide](#).

4.3 Building the Master Pod

This section will assist you in adding the *Cisco DevNet Associate v1* pod to your *NETLAB+* system.

4.3.1 Enabling Lab Content in Course Manager

Please refer to the *Course Manager* section of the [NETLAB+ VE Administrator Guide](#) on how to enable content. Please install the **Cisco DevNet Associate v1** course.

4.3.2 Create the Master Pod

1. Log into **NETLAB+ VE** with the *administrator* account.
2. Select the **Pods** icon.



3. Create a new pod by scrolling to the bottom and clicking the **Create New Pod** button.



4. Then, click on the **Cisco DevNet Associate** pod design from the list of installed pod types.

 <p>DevNet Associate v1</p>	<p>Cisco DevNet Associate v1</p> <p>The Cisco DevNet Associate v1 training prepares candidates to become familiar with infrastructure automation by understanding modern software development practices with the combination of DevOps concepts.</p> <p>2022 Copyright (C) Network Development Group, Inc. https://www.netdevgroup.com/support/tech_support.html</p>
--	--

5. On the *New Pod* window, input a value into the **Pod ID** and **Pod Name** fields. Click **Next**.

New Pod

Pod Type: 

Pod ID:

Pod Name:

Used Pod IDs:

- 1
- 2
- 3
- 1005
- 1010
- 1015
- 1020



The **Pod ID** determines the order in which the pods will appear in the scheduler. It is best practice to use a block of sequential ID numbers for the *Pod Id* that allows for the number of pods you are going to install.

The **Pod Name** identifies the pod and is unique per pod. Here we used the name of the lab set or course in a shortened form along with a host identifier (H120), the type and number of the pod (M1000).

6. To finalize the wizard, click **OK**.

For additional information, please refer to the [NETLAB+ VE Administrator Guide](#).

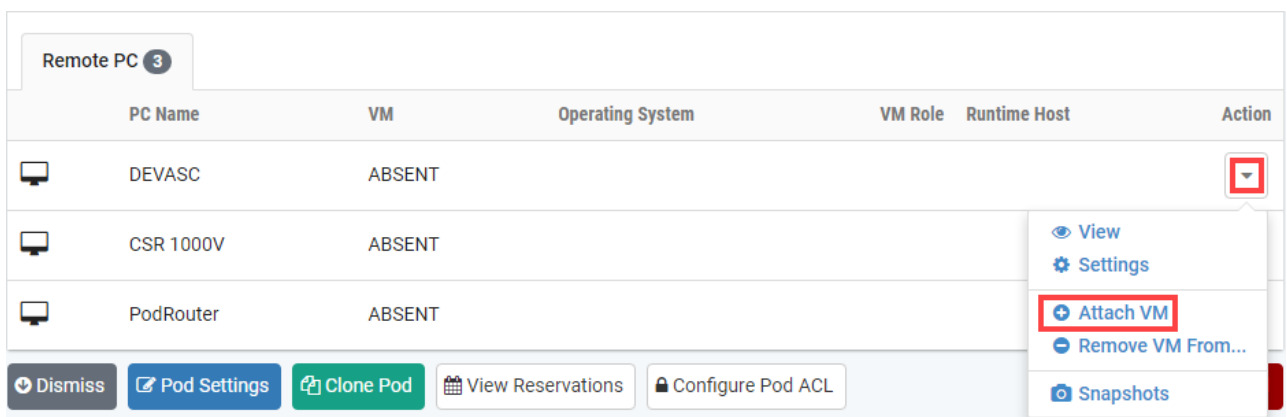
4.3.3 Attach Virtual Machines to the Master Pod

Update the master pod to associate the virtual machines with the newly created pod.

1. Select the **Cisco DevNet Associate v1** master pod from the pod list.

1000	 DevNet Associate v1	Cisco_DEVASCv1_H120_M1000
------	---	---------------------------

2. Click on the **Action** dropdown next to the virtual machine you are about to assign and select **Attach VM**.



The screenshot shows a 'Remote PC' interface with a table of virtual machines. The table has columns for PC Name, VM, Operating System, VM Role, Runtime Host, and Action. The 'Action' column for the 'DEVASC' row is open, showing a dropdown menu with options: View, Settings, Attach VM (highlighted with a red box), Remove VM From..., and Snapshots. Below the table are buttons for Dismiss, Pod Settings, Clone Pod, View Reservations, and Configure Pod ACL.

PC Name	VM	Operating System	VM Role	Runtime Host	Action
DEVASC	ABSENT				<ul style="list-style-type: none"> View Settings Attach VM Remove VM From... Snapshots
CSR 1000V	ABSENT				
PodRouter	ABSENT				

3. Select the corresponding virtual machine from the inventory list.

Virtual Machine Name	Operating System	Role
Cisco_DEVASCv1_Master.CSR1000V	Linux	Master
Cisco_DEVASCv1_Master.DEVASC	Linux	Master
Cisco_DEVASCv1_Master.PodRouter	Linux	Master

4. Click **OK** to confirm the VM attachment and repeat the previous steps for the remaining virtual machines.

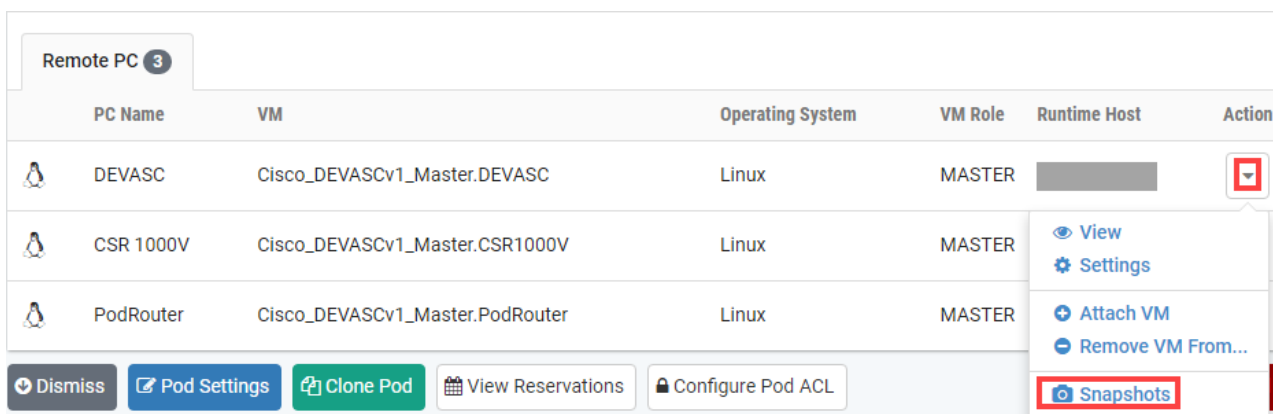
4.3.4 Create Snapshots for the Master Virtual Machines

In order to proceed with pod cloning, snapshots must be created on each of the pod's virtual machines.



Verify that all VMs are still powered off before taking snapshots.

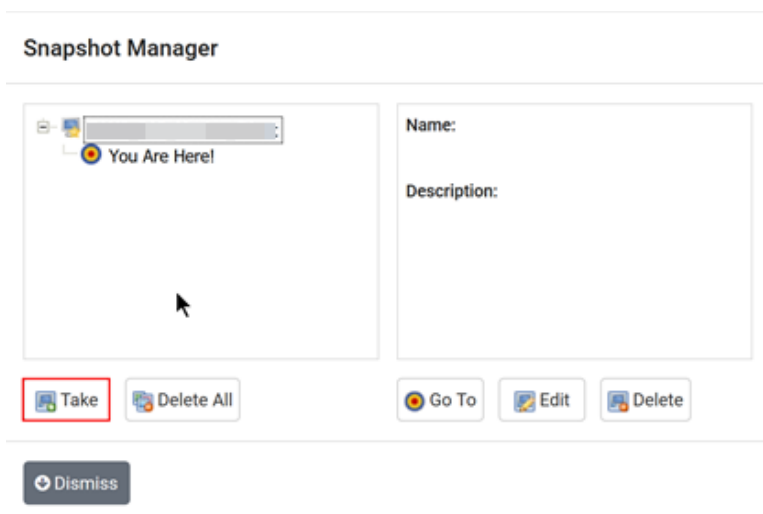
1. Make sure to view the **Cisco DevNet Associate v1** master pod you just assigned machines to. In the pod view, click on the dropdown menu option underneath the *Action* column for a specific VM and select **Snapshots**.



PC Name	VM	Operating System	VM Role	Runtime Host	Action
DEVASC	Cisco_DEVASCv1_Master.DEVASC	Linux	MASTER		⌵
CSR 1000V	Cisco_DEVASCv1_Master.CSR1000V	Linux	MASTER		View Settings
PodRouter	Cisco_DEVASCv1_Master.PodRouter	Linux	MASTER		Attach VM Remove VM From...

Buttons: Dismiss, Pod Settings, Clone Pod, View Reservations, Configure Pod ACL, Snapshots

2. In the *Snapshot Manager* window, click on the **Take** button. This will take a snapshot of the current state of the virtual machine.



Snapshot Manager

Name: _____
Description: _____

Buttons: Take, Delete All, Go To, Edit, Delete, Dismiss



Any changes made after this will require a new snapshot or those changes will not reflect in the reset state of the pod or its clones.

- In the *Take Snapshot* window, type **GOLDEN_MASTER** into the *Name* text field, or you may choose another naming convention as long as it is consistent for easy management. Click **OK**.

Take Snapshot

Name:

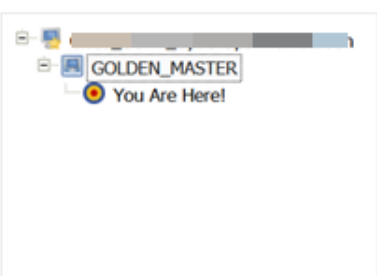
Description:



It is recommended to use *GOLDEN_MASTER* as the snapshot name when working with normalized pod types.

- In the *Snapshot Manager* window, notice the snapshot is created. Click the **Dismiss** button.

Snapshot Manager



Name:
GOLDEN_MASTER

Description:

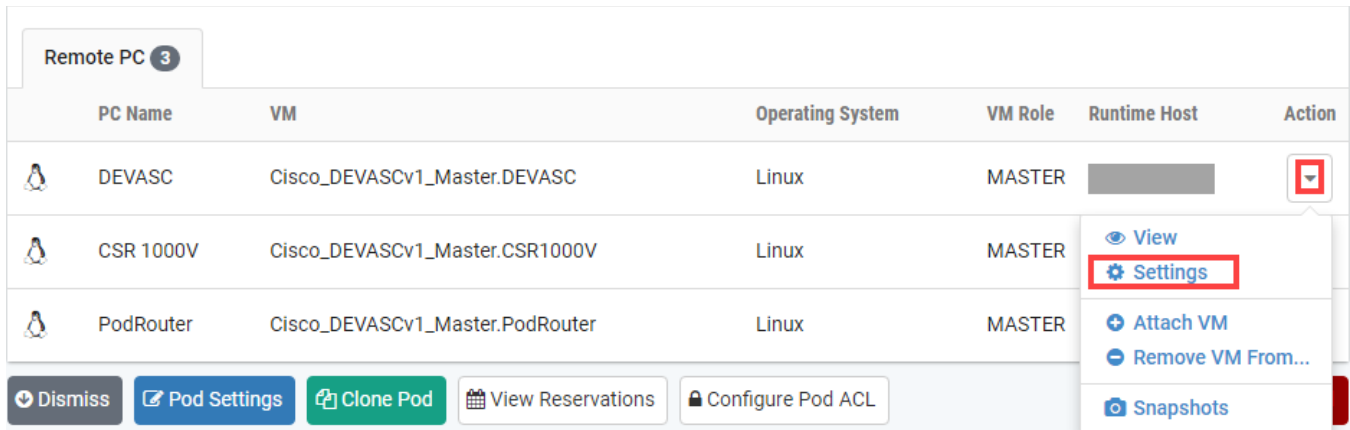


At this point, it is good to verify that you have only one snapshot on the virtual machine. Multiple snapshots increase the likelihood of having problems, especially if the snapshots are named the same. Also, the more snapshots a virtual machine has, the slower the performance and the more drive space is used.

- Repeat the previous steps for the remaining virtual machines.

4.3.5 Set the Revert to Snapshot

1. In the pod view, click on the dropdown menu option underneath the *Action* column and select **Settings**.



PC Name	VM	Operating System	VM Role	Runtime Host	Action
DEVASC	Cisco_DEVASCv1_Master.DEVASC	Linux	MASTER		⌵
CSR 1000V	Cisco_DEVASCv1_Master.CSR1000V	Linux	MASTER		<ul style="list-style-type: none"> View Settings Attach VM Remove VM From...
PodRouter	Cisco_DEVASCv1_Master.PodRouter	Linux	MASTER		

2. In the virtual machine's *Settings* window, click on the *Revert to Snapshot* dropdown and select **GOLDEN_MASTER** and then click the **Submit** button.



This sets the snapshot on the virtual machine that will get reverted to each time the pod is scheduled.

DEVASC Settings

PC Name	DEVASC
PC Type	Virtual Machine
Datacenter	
Virtual Machine	Cisco_DEVASCv1_Master.DEVASC
Role	Master
Revert to Snapshot	GOLDEN_MASTER
Shutdown Preference	Graceful Shutdown
Guest Operating System	Linux

Options

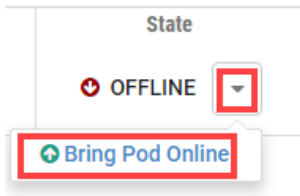
- enable remote display auto-configuration
- enable network auto-configuration
- enable advanced setting auto-configuration
- enable minimum requirements verification

3. Click **OK** to confirm.

- Return to the pod view page and repeat the previous steps for the remaining virtual machines.

4.3.6 Bring the Master Pod Online

In the pod view, click the drop-arrow under *State* and select **Bring Pod Online**.



4.4 Testing the Master Pod (optional)

Some pods have software that needs to be altered on the host machine before it can be used properly. This normally happens when software requires licenses to function.

If there are changes that need to be made to the master pod prior to link cloning, either student pods or full cloning other master pods on other hosts, you will need to follow this set of instructions to ready your master pod.

For the Cisco DevNet Associate v1 master pod, you should test the pod prior to cloning to ensure that the pod spins up correctly, the networking options function as planned, and that the pod reverts back to its snapshot after the reservation is ended. This process consists of:

- Scheduling the master pod
- Testing the master pod
- Ending the reservation
- Taking the master pod offline

4.4.1 Create Class and Schedule the Master Pod

Create a class as identified in the *Add Classes* section of the [NETLAB+ VE Instructor Guide](#), followed by adding the appropriate content to the selected class, and then schedule the *Master Pod*.



When scheduling the *Master Pod*, it is important to schedule the pod for enough time to complete the following steps. Failure to complete the steps prior to taking the final snapshot could mean redeploying necessary virtual machines.

4.4.2 Testing the Master Pod

1. Launch the **DEVASC** virtual machine.
2. After the **DEVASC** virtual machine starts up, open a web browser window and navigate to **cisco.com**.



If the *Cisco Networking Academy* login page does not come up, the most likely cause is that *Network Adapter 1* on the *PodRouter* VM is not connected to a *vSwitch Port Group* where there is DHCP server and/or Internet access.

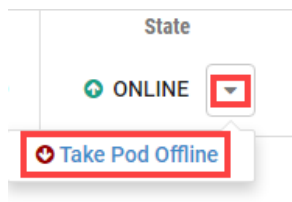
3. Log in to the *Cisco Networking Academy*.
4. Load the Cisco DevNet Associate v1 course.
5. Go to the Modules section and open the course content into a new window.
6. Navigate to a module that has a Cisco DevNet Associate v1 lab exercise.
7. Close the *Cisco Networking Academy* course.
8. Logout of the *Cisco Networking Academy* website.

4.4.3 End Reservation

You may now end the reservation of the master pod.

4.4.4 Taking the Master Pod Offline

In the pod view, click the drop-arrow under *State* and select **Take Pod Offline**.



5 Pod Cloning

This section will help you create multiple student pods. The following sections describe the *NETLAB+* pod cloning feature used to create student pods on one or two host systems.

5.1 Linked Clones and Full Clones

NETLAB+ can create *linked clones* or *full clones*.

A **linked clone** (or linked virtual machine) is a virtual machine that shares virtual disks with the parent (or master) virtual machine in an ongoing manner. This conserves disk space and allows multiple virtual machines to use the same software installation. Linked clones can be created very quickly because most of the disk is shared with the parent VM.

A **full clone** is an independent copy of a virtual machine that shares nothing with the parent virtual machine after the cloning operation. The ongoing operation of a full clone is entirely separate from the parent virtual machine.

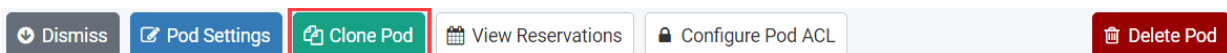
5.2 Creating User Pods

The following section describes how to create user pods on the same *VMware Host* system that holds your master pod's virtual machines. In this scenario, we will create linked virtual machines using the *NETLAB+* pod cloning utility.

1. Log in to **NETLAB+ VE** with the *administrator* account.
2. Select the **Pods** icon.



3. Click on your master pod.
4. Make sure the pod is offline by selecting **Take Pod Offline**.
5. Click the **Clone Pod** button to create a new pod, based on the settings and snapshots of this pod.



6. Input a new ID value into the **New Pod ID** field. It is advised to keep the pods in numerical order. If the pod IDs are not in numerical order, they will not show up in the scheduler in numerical order. Click **Next**.

7. Enter a name for the cloned pod into the **New Pod Name** field. For example, **Cisco_DEVASCv1_H120_S1001**. Click **Next**.



The **Pod Name** identifies the pod and is unique per pod. Here we used the name of the lab set or course in a shortened form along with a host identifier (H120), the type and number of the pod (S1001).

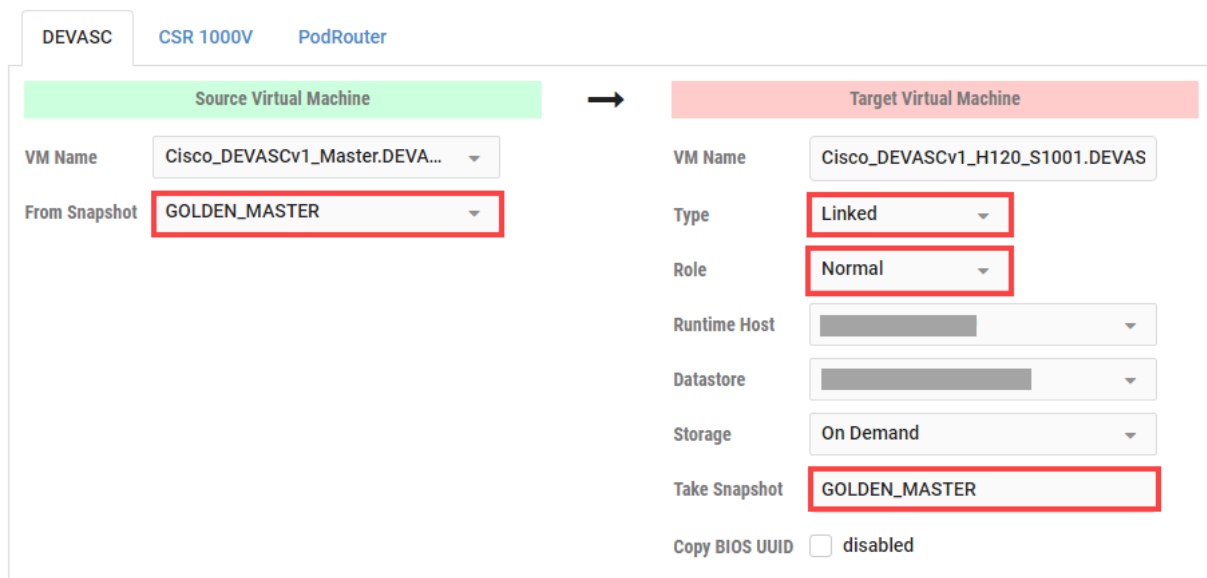
8. When the action has finished processing, you are presented with a settings screen. Notice each VM has its own tab. Go through each tab and verify the following:

Source Virtual Machine:

- a. *From Snapshot* should be set to the **GOLDEN_MASTER** snapshot you created previously.

Target Virtual Machine:

- a. For *Type*, verify that **Linked** is selected.
- b. For *Role*, verify that the **Normal** role is selected.
- c. For *Take Snapshot*, verify that **GOLDEN_MASTER** is inputted.
- d. For *Copy BIOS UUID*, only choose this option if you wish to preserve the VM's BIOS UUID for the targeted clone VM (when this option is checked, it will help with keeping licensing intact such as Microsoft Windows Licensing/Activation).



The screenshot shows a configuration interface with two tabs: 'DEVASC' (selected) and 'PodRouter'. Under 'DEVASC', there are sub-tabs for 'CSR 1000V' and 'PodRouter'. The interface is divided into two main sections: 'Source Virtual Machine' (highlighted in green) and 'Target Virtual Machine' (highlighted in red). An arrow points from the Source to the Target section.

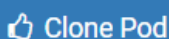
Source Virtual Machine settings:

- VM Name: Cisco_DEVASCv1_Master.DEVA...
- From Snapshot: GOLDEN_MASTER (highlighted with a red box)

Target Virtual Machine settings:

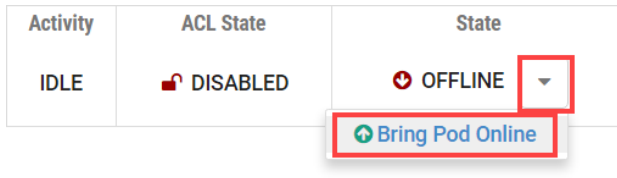
- VM Name: Cisco_DEVASCv1_H120_S1001.DEVAS
- Type: Linked (highlighted with a red box)
- Role: Normal (highlighted with a red box)
- Runtime Host: [Dropdown menu]
- Datastore: [Dropdown menu]
- Storage: On Demand (dropdown)
- Take Snapshot: GOLDEN_MASTER (highlighted with a red box)
- Copy BIOS UUID: disabled

9. When you are done changing settings, click **Clone Pod**. This should complete within a minute as we are creating linked virtual machines.



10. When the pod clone process is finished, click **OK**.
11. If you want to dedicate this pod to a particular class, team, or student, use the *Pod ACLs* feature. For details, see the [NETLAB+ VE Instructor Guide](#).

12. Click the **Online** Button on the *Pod Management* page to make the pod available.



The user pod can now be reserved. When the reservation becomes active, *NETLAB+* will automatically configure virtual machines and virtual networking for your new pod.



The *GOLDEN_MASTER* snapshot is the starting point for all pods. We recommend that you reserve the 1st pod and conduct some labs to make sure the snapshot images work correctly. If there are defects, make corrections to the images to the master pod and retake the *GOLDEN_MASTER* snapshot before creating additional pods.

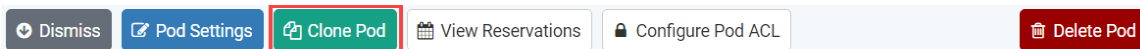
5.3 Copying Your Master Pod to the Second Host

For this task, we will use the pod cloning utility to copy our master pod to the second host.

1. Log in to *NETLAB+* with the administrator account.
2. Select the **Pods** icon.



3. Click on the master pod.
4. Make sure the pod is offline by selecting **Take Pod Offline**.
5. Click the **Clone** button to create a new pod, based on the settings of this pod.



6. Input a new ID value into the **New Pod ID** field. It is advised to keep the pods in numerical order. If the pod IDs are not in numerical order, they will not show up in the scheduler in numerical order. Click **Next**.
7. Enter a name for the cloned pod into the **New Pod Name** field. For example, **Cisco_DEVASCv1_H130_M1000**. Click **Next**.



The **Pod Name** identifies the pod and is unique per pod. Here we used the name of the lab set or course in a shortened form along with a host identifier (H130), the type and number of the pod (M1000).

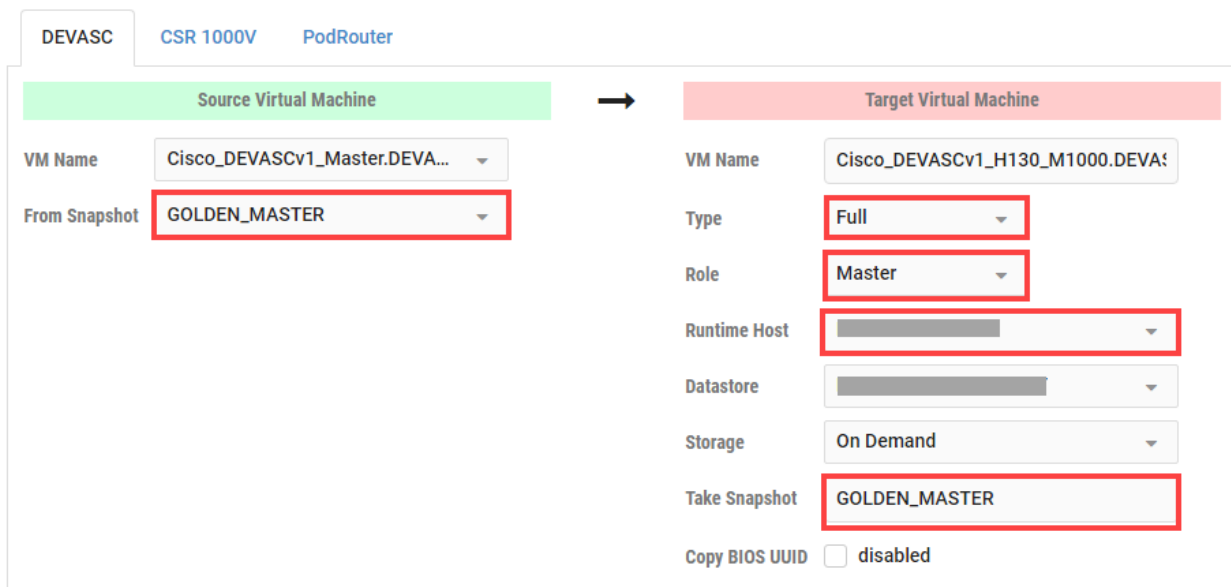
8. When the action has finished processing, you are presented with a settings screen. Notice each VM has its own tab. Go through each tab and verify the following:

Source Virtual Machine:

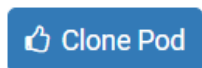
- a. *From Snapshot* should be set to the **GOLDEN_MASTER** snapshot you created previously.

Target Virtual Machine:

- a. For *Type*, verify that **Full** is selected.
- b. For *Role*, verify that the **Master** role is selected.
- c. For *Take Snapshot*, verify that **GOLDEN_MASTER** is inputted.
- d. For *Runtime Host*, select the second host system (which should be different than the system you are cloning from).
- e. For *Copy BIOS UUID*, only choose this option if you wish to preserve the VM's BIOS UUID for the targeted clone VM (when this option is checked, it will help with keeping licensing intact such as Microsoft Windows Licensing/Activation).



9. When you are done changing settings, click **Clone Pod**. This may take up to 30 minutes as full copies are being made. You may navigate away from the cloning progress screen, and then later return to the pod to check progress.



10. When the pod clone process is finished, click **OK**.
11. It is likely that you will need to reactivate the licensing on any Windows VMs in the Master pod on the second (third, etc.) host. Please test the master pod prior to cloning student pods.

5.4 Creating User Pods on the Second Host

To create user pods on the second host, repeat the steps to create user pods on the first host (see [Creating User Pods](#)), substituting the second master pod (created in the previous section) as the cloning source.

5.5 Assigning Pods to Students, Teams, or Classes

Please refer to the [NETLAB+ VE Instructor Guide](#) for details on using the *Pod ACLs* feature.