



# CCIE DATA CENTER LAB WORKBOOK



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## Lab Guidelines

The following scenarios are practice labs designed to test your readiness for the Cisco Systems CCIE Data Center Lab Exam. However, remember that, these practice labs should be used as a learning tool. Instead of rushing through the labs to complete all the configuration steps, take the time to research the networking technology and gain a deeper understanding of the principles behind its operation. For each lab of the CCIE Data Center Practice Labs Workbook, follow these guidelines:

- Read the entire lab scenario before starting the configuration, and correlate tasks within a section to get a complete overview of the lab objectives
- Identify dependencies between tasks of the same section and between tasks from different sections. Carefully read throughout the lab to identify and make notes of it
- Some tasks present a set of requirements for implementing a technology, and some tasks present outputs to be matched.
- Labs include both configuration and troubleshooting tasks; the number of faults relevant to each troubleshooting task may or not be specified.
- Before starting the lab, verify that all equipment is functional, powered up and that you can access it at the console.
- Devices are preconfigured, do not change it unless specifically allowed by the task. On troubleshooting tickets, you may change any of the initial configurations.
- IPv4/IPv6 static and default routes are allowed to complete any task, but only if this is the only available option, and unless otherwise stated in any task.
- Make sure you do not lock yourself out of any device, because password recovery or device reset is not available in the lab.
- At the end of the Lab, ensure that all devices are accessible at the console by using preconfigured credentials or the ones from specific task requirements.
- Lab Instructions

Before you begin, make sure that the initial configuration scripts for each lab have been applied. If you have any questions related to the scenario solutions, send an email to our support team at [techlabs@netmetric-solutions.com](mailto:techlabs@netmetric-solutions.com).

Refer to the attached physical and logical diagrams on each lab for interface and protocol assignments. Upon lab completion, end-to-end IPv4 connectivity is not a requirement unless specifically asked for, but you are required to meet task requirements and restrictions

## Lab Restrictions

Each lab scenario contains explicit general restrictions that you must conform to while configuring the lab. These restrictions are defined in the introductory section for each scenario. Examples of such restrictions include, but are not limited to, not adding additional IP addressing, not changing the default authentication methods, etc. There may also be certain restrictions for particular tasks within a lab scenario. Examples of these restrictions include, but are not limited to, not issuing a particular configuration command, not using the legacy configuration for a technology, etc.

### TIP

You may do whatever is necessary to complete a task unless the general requirements for the lab scenario or the specific requirements for the task explicitly prohibit you from doing so. All devices are accessible at the console without requiring any authentication; do not change this. To access other devices within the lab, use the following tables as a reference:

## REFERENCE SHEET

<b>Device</b>	<b>IP</b>	<b>Username</b>	<b>Password</b>
UCS-Cluster-IP	20.0.0.33	admin	Sanfran1234
DC1-FI-A	20.0.0.31	admin	Sanfran1234
DC1-FI-A	20.0.0.31	admin	Sanfran1234
DC1-FI-B	20.0.0.32	admin	Sanfran1234
ADMIN VDC	20.0.0.70	admin	Sanfran1234
DC1-N7K-1	20.0.0.71	admin	Sanfran1234
DC1-N7K-2	20.0.0.72	admin	Sanfran1234
DC1-N7K-3	20.0.0.73	admin	Sanfran1234
DC1-N7K-4	20.0.0.74	admin	Sanfran1234
DC2-N7K-1	20.0.0.171	admin	Sanfran1234
DC2-N7K-2	20.0.0.172	admin	Sanfran1234
DC2-N7K-3	20.0.0.173	admin	Sanfran1234
DC2-N7K-4	20.0.0.174	admin	Sanfran1234
5k1	20.0.0.51	admin	Sanfran1234
5k2	20.0.0.52	admin	Sanfran1234
3560-WAN	20.0.1.35	admin	Sanfran1234
ACI-APIC	20.0.254.11	admin	Sanfran1234
VCenter server	20.0.254.5	administrator@vsphere.local	NetMet@1234
ASAv	20.0.254.14	admin	Sanfran1234
NTP Server	20.0.0.130	-	-
Leaf101	20.0.254.101	admin	Sanfran1234
Leaf102	20.0.254.102	admin	Sanfran1234
Spine	20.0.254.201	admin	Sanfran1234



# LAB 1: VIRTUAL DEVICE CONTEXT

## Task 1: Check basic information of N7K

⇒ **Check for the software and hardware version of the device.**

```
ADMIN#configure terminal
ADMIN(config)#show version
Cisco Nexus Operating System (NX-OS) Software
TAC support: http://www.cisco.com/tac
Documents: http://www.cisco.com/en/US/products/ps9372/tsd\_products\_support\_series\_home.html
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The copyrights to certain works contained in this software are
owned by other third parties and used and distributed under
license. Certain components of this software are licensed under
the GNU General Public License (GPL) version 2.0 or the GNU
Lesser General Public License (LGPL) Version 2.1. A copy of each
such license is available at
http://www.opensource.org/licenses/gpl-2.0.php and
http://www.opensource.org/licenses/lgpl-2.1.php

Software
  BIOS:    version 2.12.0
  kickstart: version 7.3(1)D1(1)
  system:   version 7.3(1)D1(1)
  BIOS compile time:    05/29/2013
  kickstart image file is: bootflash:///n7000-s2-kickstart.7.3.1.D1.1.bin
  kickstart compile time: 9/9/2016 23:00:00 [09/10/2016 02:59:14]
  system image file is:   bootflash:///n7000-s2-dk9.7.3.1.D1.1.bin
  system compile time:   9/9/2016 23:00:00 [09/10/2016 04:28:21]

Hardware
  cisco Nexus7000 C7004 (4 Slot) Chassis ("Supervisor Module-2")
  Intel(R) Xeon(R) CPU      with 32940112 kB of memory.
  Processor Board ID JAF1849AEAK

  Device name: ADMIN
  bootflash: 2007040 kB
  slot0:      0 kB (expansion flash)

Kernel uptime is 0 day(s), 3 hour(s), 58 minute(s), 56 second(s)

Last reset at 662410 usecs after Tue Jul 23 09:44:59 2019

Reason: Reset Requested by CLI command reload
System version: 7.3(1)D1(1)
Service:

Plugin
```

⇒ Check the modules inserted on the device.

ADMIN(config)#show module

Mod	Ports	Module-Type	Model	Status
1	0	Supervisor Module-2	N7K-SUP2E	active *
3	48	1/10 Gbps Ethernet Module	N7K-F248XP-25E	ok
4	48	10/100/1000 Mbps Ethernet XL Module	N7K-M148GT-11L	ok

Mod	Sw	Hw
1	7.3(1)D1(1)	6.1
3	7.3(1)D1(1)	1.2
4	7.3(1)D1(1)	1.2

Mod	MAC-Address(es)	Serial-Num
1	50-87-89-4d-5b-c1 to 50-87-89-4d-5b-d3	JAF1849AEAK
3	50-87-89-4d-db-50 to 50-87-89-4d-db-83	JAF1851AHFL
4	f4-cf-e2-ac-1f-0c to f4-cf-e2-ac-1f-3f	JAF1852ANTF

Mod	Online Diag Status
1	Pass
3	Pass
4	Pass

⇒ Check the number of VDCs created on the device

ADMIN(config)#show vdc

vdc_id	vdc_name	state	mac	type	lc
1	ADMIN	active	50:87:89:48:10:41	Admin	None
2	dc1-7k-1	active	50:87:89:48:10:42	Ethernet	m1 m1xl m2xl f2e
3	dc1-7k-2	active	50:87:89:48:10:43	Ethernet	m1 m1xl m2xl f2e
4	dc1-7k-3	active	50:87:89:48:10:44	Ethernet	m1 m1xl m2xl f2e
5	dc1-7k-4	active	50:87:89:48:10:45	Ethernet	m1 m1xl m2xl f2e
6	dc2-7k-1	active	50:87:89:48:10:46	Ethernet	m1 m1xl m2xl f2e
7	dc2-7k-2	active	50:87:89:48:10:47	Ethernet	m1 m1xl m2xl f2e
8	dc2-7k-3	active	50:87:89:48:10:48	Ethernet	m1 m1xl m2xl f2e
9	dc2-7k-4	active	50:87:89:48:10:49	Ethernet	m1 m1xl m2xl f2e

⇒ **If the number of VDCs has maxed out, you can delete a VDC.**

```
ADMIN(config)#no vdc dc2-7k-4
Deleting this vdc will remove its config. Continue deleting this vdc (y/n)? [no] y
Note: Deleting VDC, Files under bootflash:/vdc_9/* will be deleted! One moment please ...
ADMIN(config)#
```

## Task 2: Create a Non-Default VDC

⇒ **Create a non-default VDC with name 'Netmetric-Test'**

```
ADMIN(config)#vdc Netmetric-Test
Note: Creating VDC, one moment please ...
ADMIN(config-vdc)#
```

## Task 3: Allocate interfaces to the vdc

⇒ **Allocate int e3/25 and e4/40 to the created VDC.**

```
ADMIN(config)#vdc Netmetric-Test
ADMIN(config-vdc)#allocate int e3/25, e4/40
Entire port-group is not present in the command. Missing ports will be included automatically
Additional interfaces included are:
  Ethernet 3/26
  Ethernet 3/27
  Ethernet 3/28
Moving ports will cause all config associated to them in the source vdc to be removed. Are you sure you
want to move the ports (y/n)? [yes]
```

### Verify

```
ADMIN(config)#show vdc membership
```

## Task 4: Change the CPU-share and boot-order for the vdc

⇒ **Change the CPU-Share of the created VDC to 10. Also, change the boot-order**

```
ADMIN(config)#vdc Netmetric-Test
ADMIN(config-vdc)#cpu-share ?
<1-10> Priority of this vdc. Control cpu time during periods of contention
ADMIN(config-vdc)#cpu-share 10
ADMIN(config-vdc)#boot-order ?
<1-9> The order at which a vdc will boot up. VDCs at the same level will be started parallely
ADMIN(config-vdc)#boot-order 4
```

### Verify

```
ADMIN(config)#show netmetric-test detail
```

## Task 5: Create a new resource template

⇒ Create a new resource template with name 'temp' and assign it to the created vdc. Make sure the following changes are made to the resource template:

- Set the limits for VLANs with range 16-25.
- Set the max limit equal to the minimum limit of 5 on the number of Port-channels.

```
ADMIN(config)#vdc resource template temp
ADMIN(config-vdc-template)#limit-resource vlan min 16 max 25
ADMIN(config-vdc-template)#limit-resource port-channel min 5 max equal-to-min
ADMIN(config-vdc-template)#ex
ADMIN(config)#vdc netmetric-test
ADMIN(config-vdc)#template temp
```

### Verify

```
Netmetric-Test(config)#show resource
```

## Task 6: Assign the mgmt IP address to the vdc.

⇒ Assign the Mgmt IP 20.0.0.179/24 to the VDC.

```
Netmetric-Test(config)#int mgmt 0
Netmetric-Test(config)#ip address 20.0.0.179/24
Netmetric-Test(config)#no shut
```

### Verify

```
Netmetric-Test(config)#show int brief
```

## Task 7: Create local users and check access

- ⇒ Create a user 'User1' with read-write access to the admin VDC but not the non-default VDCs.
- ⇒ Create a user 'User2' with read access to the admin VDC but not the non-default VDCs.
- ⇒ Create a user 'User3' with read-write access to the created non-default VDC.
- ⇒ Create a user 'User4' with read access to the created non-default VDC.

**Note :** Use any password of your choice for the above task.

```
ADMIN(config)#username User1 password Sanfran1234 role network-admin  
ADMIN(config)#username User2 password Sanfran1234 role network-operator  
ADMIN(config)#show user-account
```

```
Netmetric-Test(config)#username User3 password Sanfran1234 role vdc-admin  
Netmetric-Test (config)#username User4 password Sanfran1234 role vdc-operator  
Netmetric-Test (config)#show user-account
```