



*TOMORROW
starts here.*

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CCIE DC Update

BRKCRT-8003

Mubasher Nawaz – CCIE Data Centre Exam Program Manager

#clmel

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Session Abstract

- The session introduces the new CCIE Data Centre expert certification. The objective of the session is to give an overview of the program including written and lab exam details in addition to guidelines on preparation and resources, exam tips and other test taking strategies. The session will provide a understanding of the technologies covered in both the written and the lab exam. We will discuss sample questions and how these and other networking skills will be required for the exam and your career path.

Disclaimer



- Not all topics discussed today appear on every exam
- Due to time restraints, we are unable to discuss every feature and topic described in the exam blueprint
- Exam is subject to change at any time

Agenda

- **CCIE Program Overview**
- **CCIE Data Centre Overview – Written Exam**
- **CCIE Data Centre Overview – Lab Exam**
- **Preparation & Study**
- **Questions**

A nighttime photograph of a city street. In the foreground, there are long, curved light trails from cars, primarily in shades of yellow and orange. In the middle ground, a pedestrian bridge with blue lighting spans across the street. In the background, there are several tall buildings with lit windows and some flags on poles. The overall scene is illuminated by city lights.

Cisco Certified Internetwork Export (CCIE)

Program Overview

CCIE Data Centre Overview

- Data Centre is one of the most dynamic areas in the industry
- Data Centre is on top agenda to all organisations
- There is an ever-growing demand for Data Centre professionals in the industry

Certification Tracks



<https://learningnetwork.cisco.com>

CCIEs Worldwide

- Most highly respected IT certification
 - for more than 20+ years!
- Industry standard
 - validating expert skills and experience
- Demonstrate strong commitment and investment to networking career, life-long learning, and dedication to remaining an active CCIE



Expert Level Tracks

Design

Emphasises network design principles and theory at the infrastructure level

Collaboration

Collaboration, Unified Communications, or Voice and Video Network for design, implementation and troubleshooting

Data Centre

Data centres infrastructure, storage, compute and virtualization

Routing & Switching

Networking across LAN and WAN interfaces and variety of routers and switches

Security

VPN solutions and security for Layer 2 and Layer 3 network infrastructure, application protocols and OS

Service Provider

IP fundamentals and technologies in building an extensible service provider network

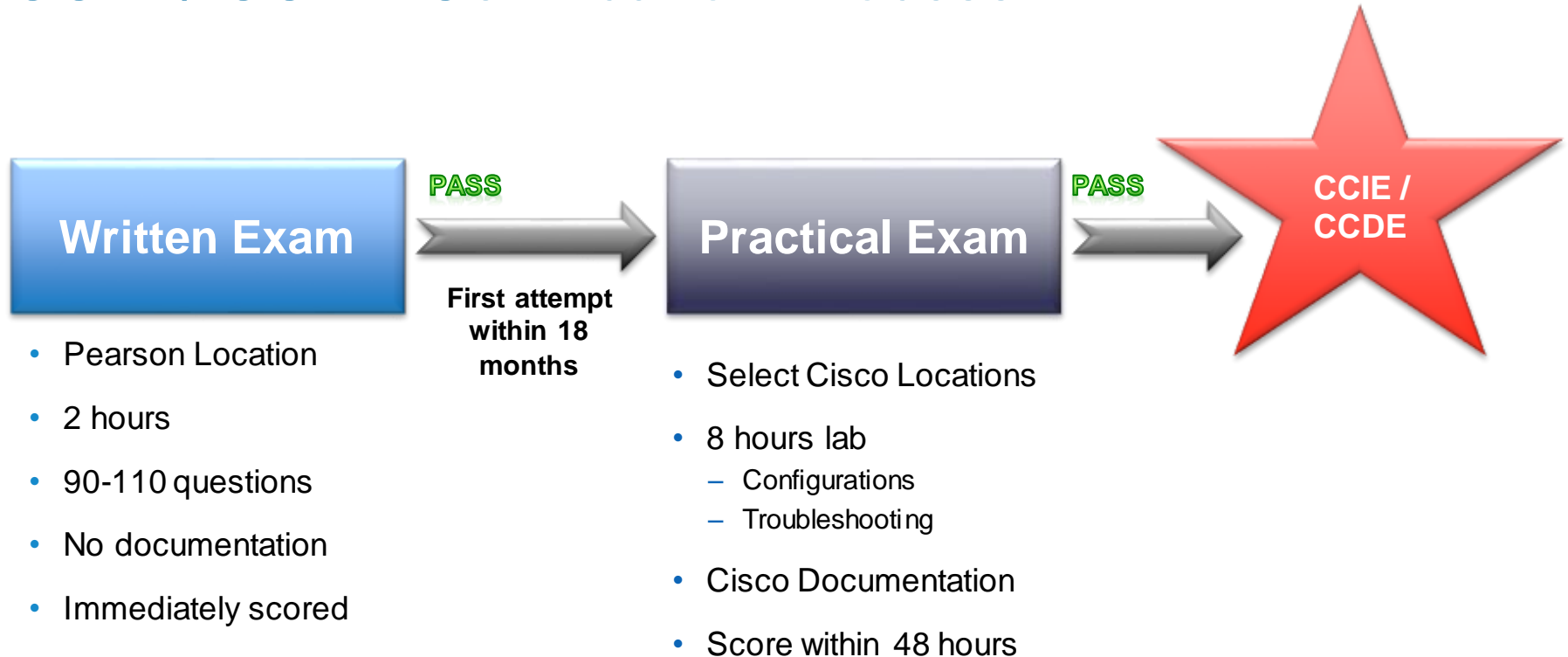
SP Operation

troubleshooting SP networks, managing SP processes and knowledge of NMS technology

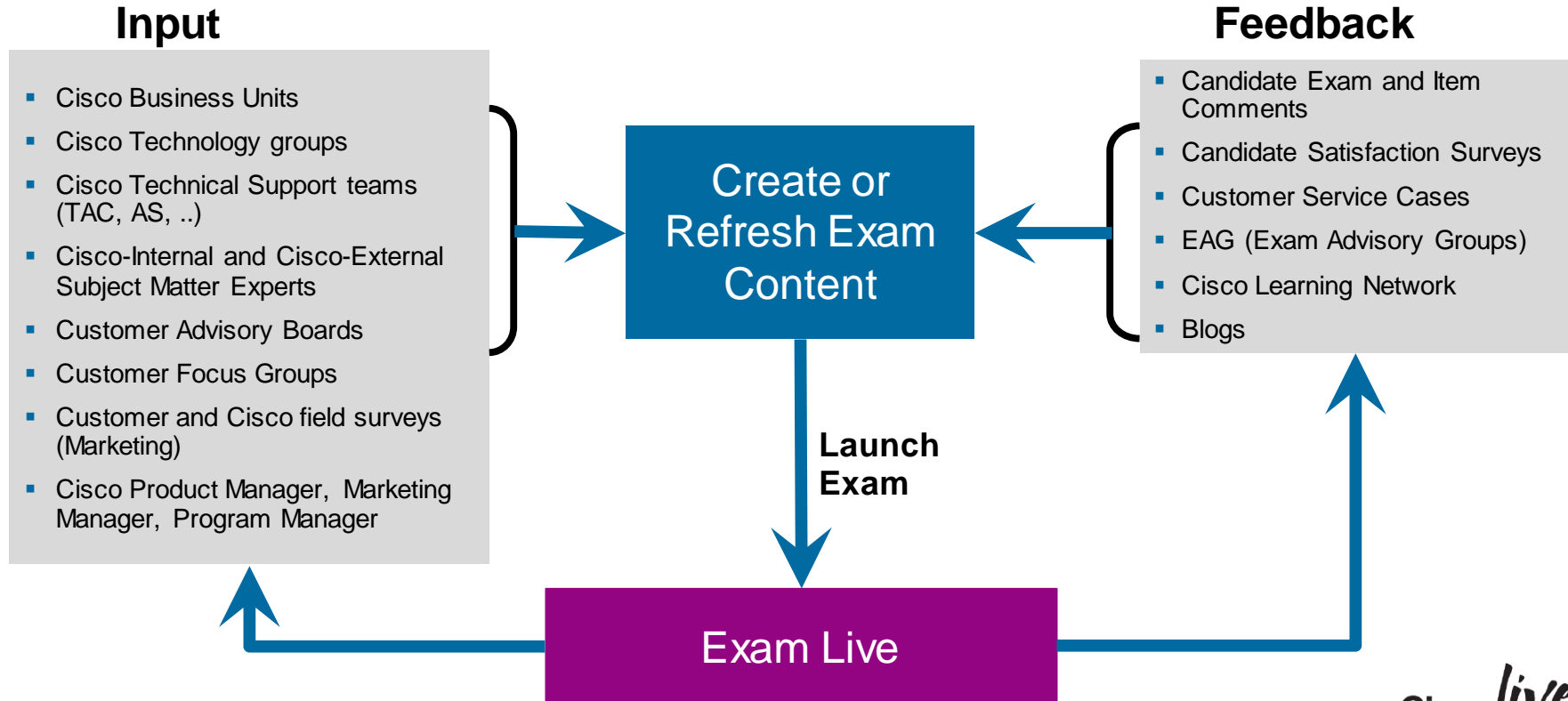
Wireless

Wireless networking with solid understanding of WLAN technologies from Cisco

CCIE / CCDE Certification Process



Proactive and Holistic Candidate Feedback

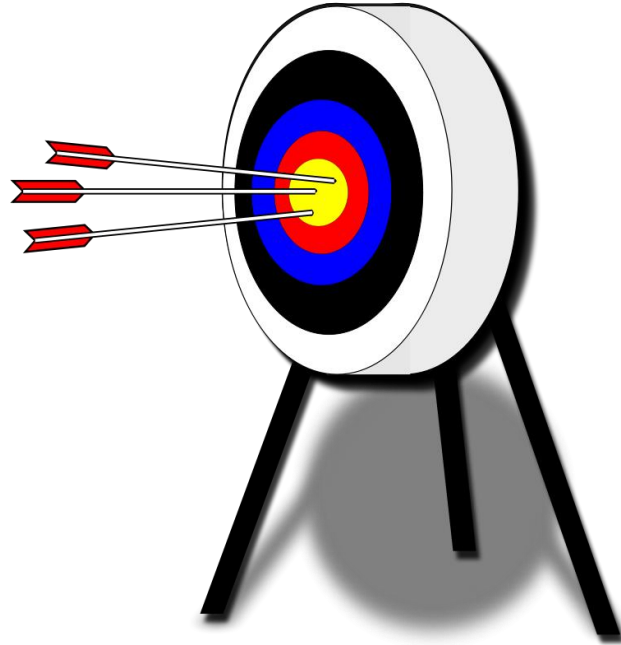


Performance Assessment

- Validity
- Reliability
- Fairness

- Congruency
- Relevancy

- Intended use of the test scores
- Definition of Minimally Qualified Candidate



Agenda

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A long-exposure photograph of a city street at night. The foreground is dominated by vibrant, multi-colored light trails from moving vehicles, creating a sense of motion and energy. In the background, modern buildings are illuminated with various lights, and a pedestrian bridge spans across the street. The overall scene is a dynamic urban environment.

CCIE Data Centre

Written Exam Overview

CCIE Data Centre Written Exam (350-080) version 1.0 Curriculum Overview

#	Topic	% in exam
1.0	Cisco Data Centre Architecture	10%
2.0	Cisco Data Centre Infrastructure-Cisco NX-OS	20%
3.0	Cisco Storage Networking	15%
4.0	Cisco Data Centre Virtualisation	20%
5.0	Cisco Unified Computing System	30%
6.0	Cisco Application Networking Services	5%

Full blueprint available on the Cisco Learning Network:

<https://learningnetwork.cisco.com/docs/DOC-13984>

Step 1: CCIE DC Written Exam: # 350-080

- Available worldwide at any Pearson VUE testing facility for ~\$350 USD. Costs may vary due to exchange rates and local taxes (VAT, GST)
- Two-hour exam with 90-110 multiple-choice questions
- Closed book; no outside reference materials allowed
- Pass/Fail results are available immediately following the exam; the passing score is set by statistical analysis and is subject to periodic change
- Candidates who pass a CCIE written exam must wait a minimum of 180 days before taking the same number exam
- From passing written, candidate must take first lab exam attempt within 18 months
- No “skip-question” functionality

Step 1: CCIE DC Written Exam: # 350-080

- Candidates who fail any CCIE or CCDE written exam must wait for a period of 15 calendar days, beginning the day after the failed attempt, before retaking the same exam. (Effective August 2nd, 2014)
- Candidates may attempt any CCIE or CCDE written exam up to four times per rolling calendar year. Candidates cannot retake the same written exam more than four times per rolling calendar year regardless of passing or failing the exam. (Effective August 2nd, 2014)

<http://www.cisco.com/web/learning/exams/policies.html#~Written>,

- The goal of the DC written exam is to test concepts and theoretical knowledge of Cisco Data Centre Technologies in the blue print
- Awareness of industry standard best practices, standard bodies, policy frameworks, and common RFC/BCP's
- Lays foundation for Data Centre lab exam

Written Exam: Sample Question 1 MC-SA

Q. What is the best description of the FCoE Initiation Protocol FIP function?

- A. It is required to establish the point-to-point FCoE links with the first switch in the path
- B. It is required to establish the point-to-point FCoE links with any switch across multiple Ethernet segment
- C. It is not used to build the FCoE links
- D. It is used to ensure lossless transport

Written Exam: Sample Question 2 MC-MA

Q: Which of the following two server characteristics cannot be configured via the UCS service profile? (Choose 2)

- A. The number of vNICs and vHBAs to present to the OS
- B. The server boot order
- C. The amount of CPU and memory to present to the OS.
- D. The server BIOS settings
- E. The operating system to install

Written Exam: Sample Question 3 Exhibit

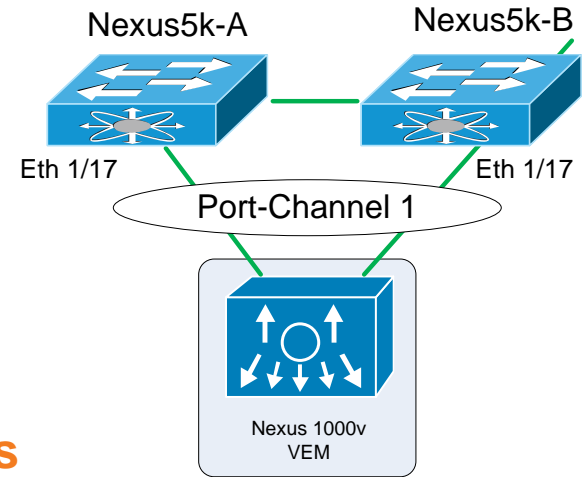
Nexus5k-B# show run

```
interface Ethernet1/17
  switchport mode trunk
  channel-group 17 mode active
```

```
interface port-channel17
  switchport mode trunk
  vpc 39
```

Nexus5k-B# show vpc 17
vPC status

id	Port	Status	Consistency	Reason	Active vlans
17	Po17	up	success	success	100-200

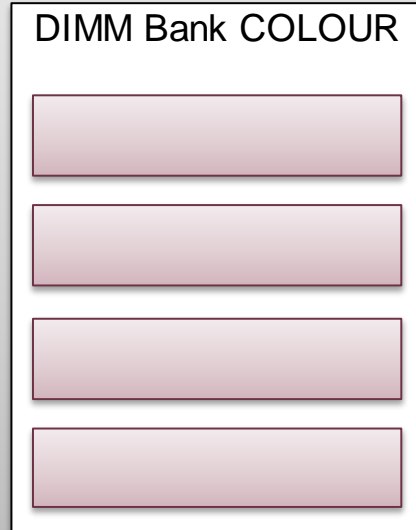
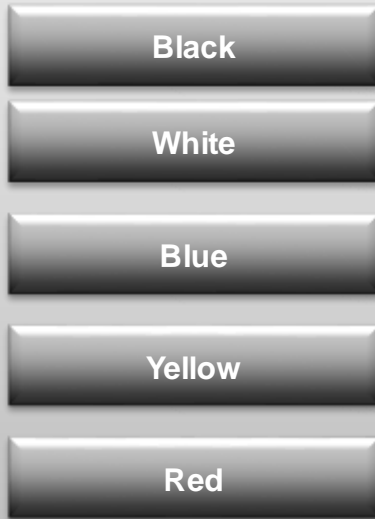


Q: Which of the following port-channel modes is appropriate for this topology?

- A. lACP port-channel
- B. vPC-HM with manual subgroups
- C. static port-channel
- D. vPC-HM mac-pinning

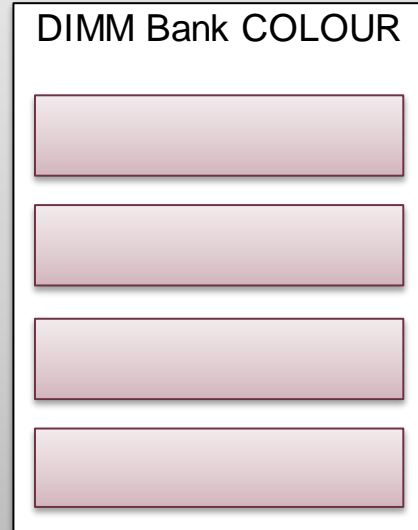
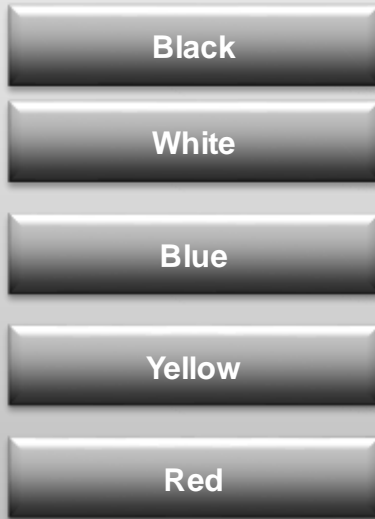
Drag and Drop

Drag and drop from the column on the left to the column on the right the correct colour scheme in right order for the UCS DIMM bank colour.



Drag and Drop

Drag and drop from the column on the left to the column on the right the correct colour scheme in right order for the UCS DIMM bank colour.



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CCIE Data Centre

Lab Exam Overview

CCIE Data Centre Lab Exam version 1.0 Curriculum Overview

#	Topic	% in exam
1.0	Cisco Data Centre Infrastructure-Cisco NX-OS	30%
2.0	Cisco Storage Networking	20%
3.0	Cisco Data Centre Virtualisation	10%
4.0	Cisco Unified Computing System	30%
5.0	Cisco Application Networking Services	10%

Full blueprint available on the Cisco Learning Network:
<https://learningnetwork.cisco.com/docs/DOC-13992>

CCIE Data Centre Lab Exam

- Candidates build a data centre configuration based on supplied specifications
- Eight-hour exam requires working configurations and troubleshooting to demonstrate expertise
- Must achieve a pass mark scored from several sections that cover configuration and troubleshooting as per lab exam blueprint
- The point values for each question are shown on the exam
- Some questions depend upon completion of previous parts of the network

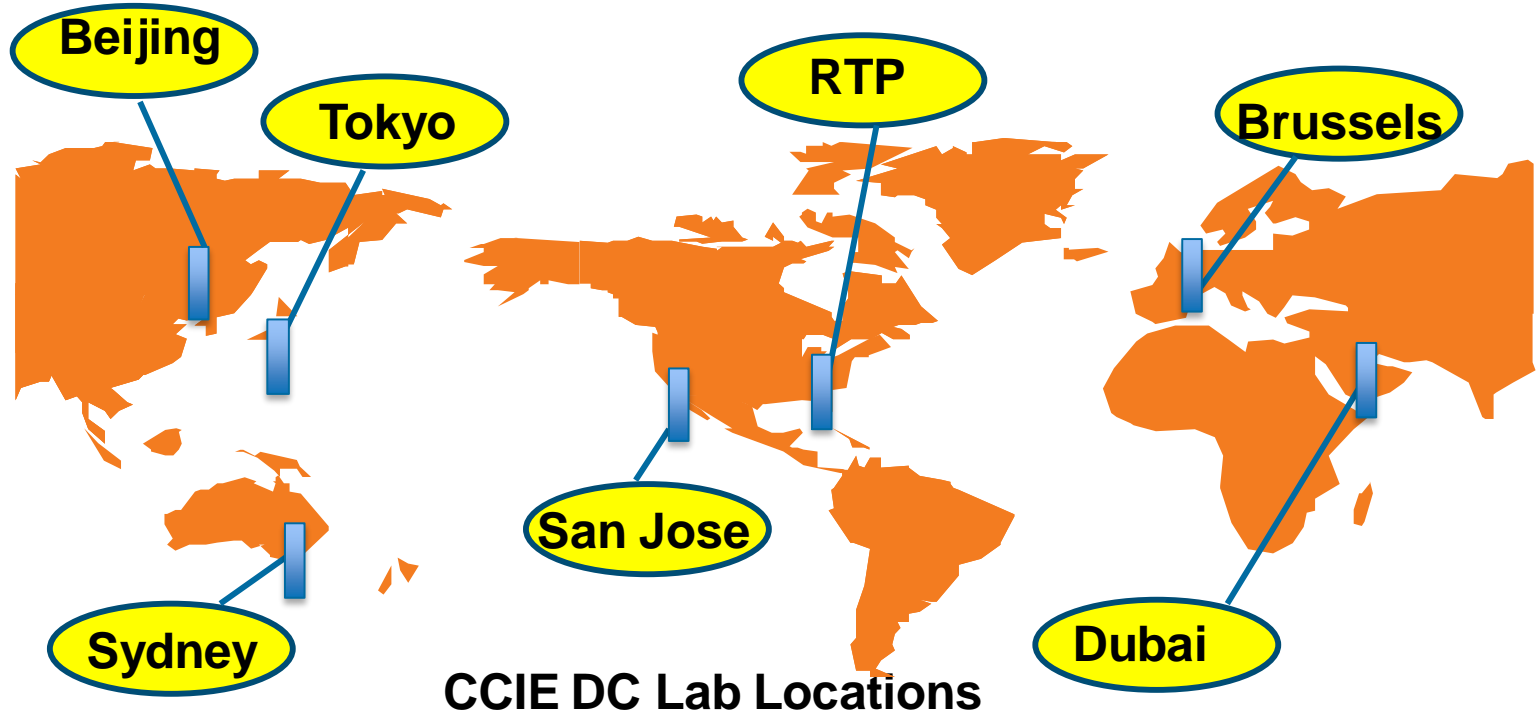
https://learningnetwork.cisco.com/community/certifications/ccie_data_center

Retake Policy: Lab Exam

# Failed Attempts	Next Attempt Number	Wait time
>0	1	*N/A
1	2	30 Days
2	3	90 Days
3	4	90 Days
4	5	90 Days
5	6	180 Days
6	7	180 Days

<http://www.cisco.com/web/learning/exams/policies.html#~Lab>,

CCIE Data Centre Lab Locations:



http://www.cisco.com/web/learning/certifications/general/pop_exam_locations.html

Data Centre Lab Exam:

Equipment and Software Versions

The lab exam tests any feature that can be configured on the equipment and the NXOS versions indicated below. Occasionally, you may see more recent NXOS versions installed in the lab, but you will not be tested on the new features of a release unless indicated below.

- MDS 9222i
 - Nexus 7009
 - Nexus 5548
 - Nexus 2224 / 2232
 - Nexus 1000v
 - UCS C200 Series Server
 - UCS-6248 Fabric Interconnects
 - UCS-5108 Blade Chassis (B200)
 - Cisco Application Control Engine Appliance - ACE4710
 - Dual attached JBODs
- Note the version change in the exam Blueprint!!**
- NXOS v6.x on Nexus 7000 Switches
 - NXOS v5.x on Nexus 5000 Switches
 - NXOS v4.2.x on Nexus 1000v
 - NXOS v5.x on MDS 9222i Switches
 - UCS Software release 2.x for UCS-6248 Fabric Interconnect
 - Software Release A5(1.x) for ACE 4710
 - Cisco Data Centre Manager software v5.x
-

CCIE DC Lab Exam:

Pre-Configuration

The Routers and Switches in Your Topology Are Preconfigured With:

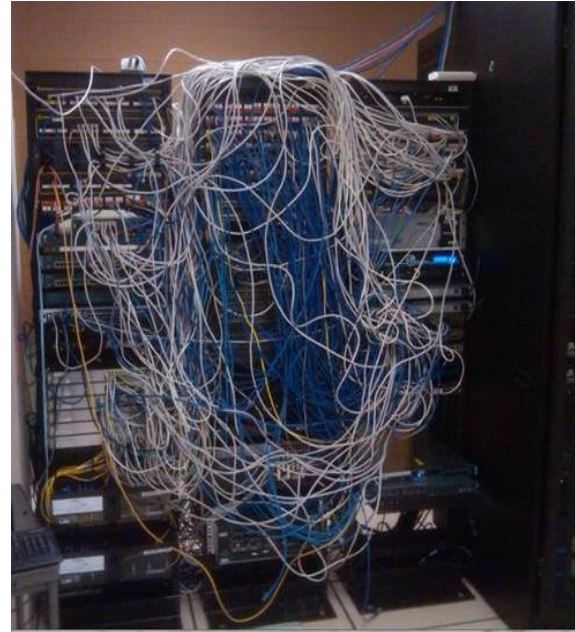
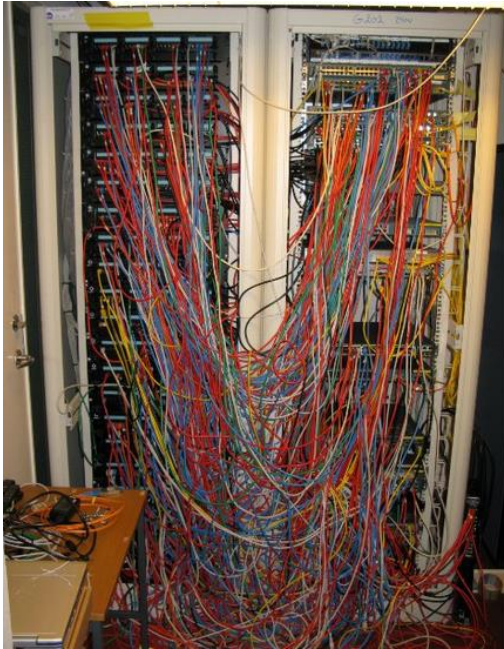
- Basic IP addressing, hostname, passwords
- All pre-configured passwords are 'cisco'
- Please read all instructions carefully

Do NOT change any pre-configuration on any devices unless explicitly stated in a question

CCIE DC Lab Exam:

Sample Topology

Racks Are **Fully Cabled**



Candidates Do Not Have to Touch any Physical Equipment

CCIE Lab Exam:

Grading

- Proctors grade all lab exams
- Automatic tools aid proctors with simple grading tasks
- **Automatic tools** are never solely responsible for lab exam grading—proctors are
- Proctors complete grading of the exam and submits the final score within 48 hours
- No partial credit awarded on questions
- Points are awarded for **working solutions** only
- Some questions have multiple solutions

A nighttime photograph of a city street. In the foreground, there are long, curved light trails from cars, primarily in shades of yellow and orange. In the middle ground, a pedestrian bridge with blue lighting spans across the street. In the background, there are several tall buildings with lit windows and some flags on poles. The overall scene is illuminated by city lights.

CCIE Data Centre

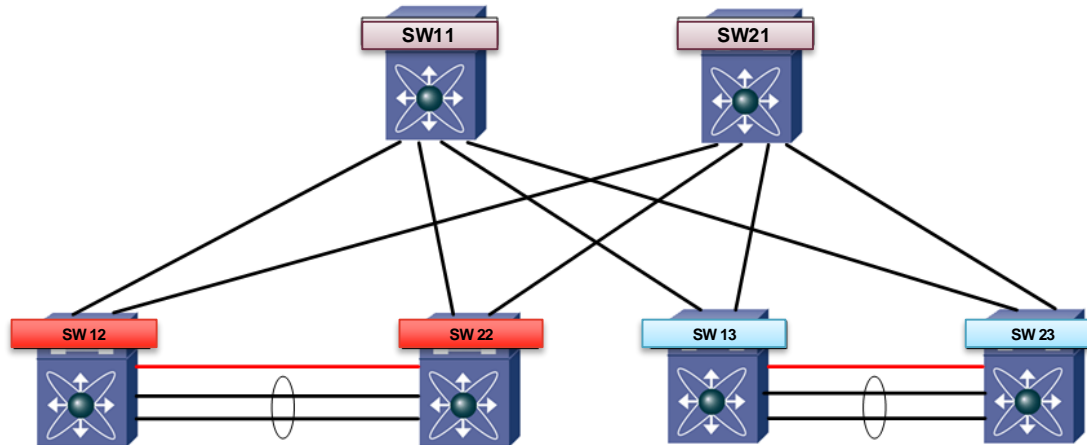
Sample Lab Questions

Sample Lab Question: VDC

- Create Following VDCs and Assign ports as outlined below:
Nexus 7000 Switch-1
Nexus 7000 Switch-2

VDC Name	Ports
SW11	E9/1-8,E10/1-8
SW12	E9/9-16,E10/9-16
SW13	E9/17-24,E10/17-24

VDC Name	Ports
SW21	E9/1-8,E10/1-8
SW22	E9/9-16,E10/9-16
SW23	E9/17-24,E10/17-24



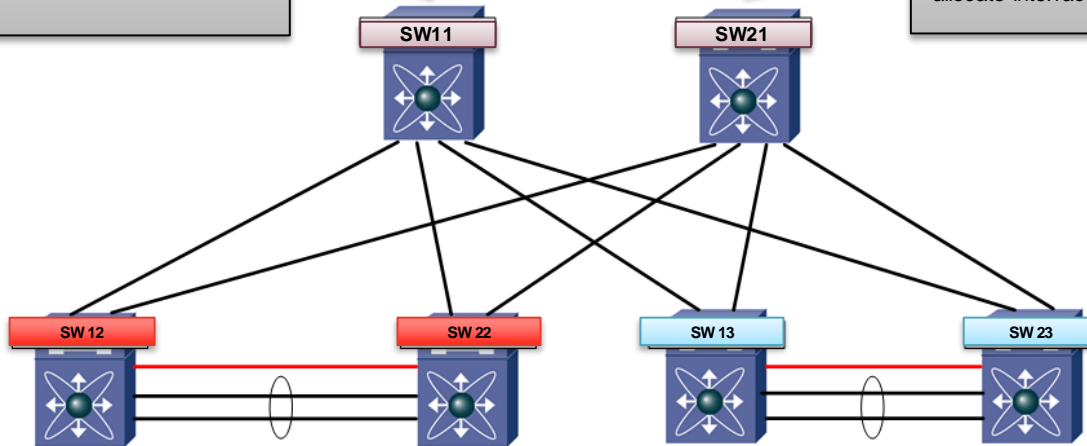
Solution:

Nexus 7000

```
vdc SW12 id 2
  allocate interface Ethernet9/9-16
  allocate interface Ethernet10/9-16
vdc SW13 id 3
  allocate interface Ethernet9/17-24
  allocate interface Ethernet10/17-24
```

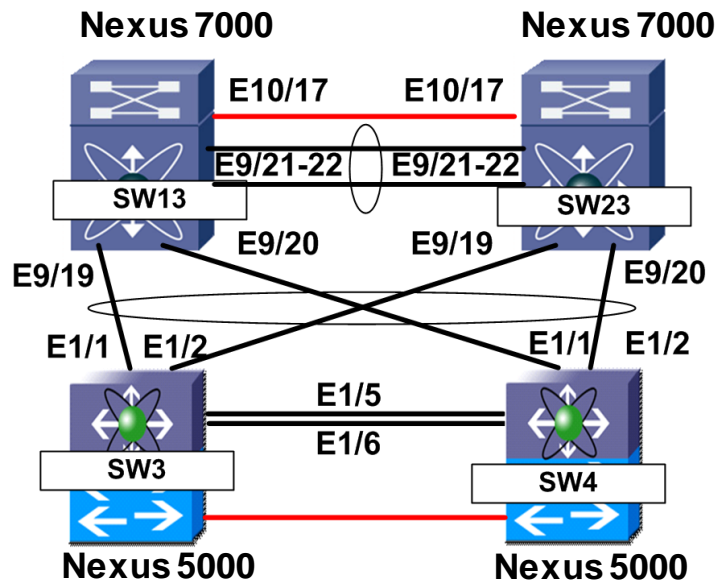
Nexus 7000

```
vdc SW22 id 2
  allocate interface Ethernet9/9-16
  allocate interface Ethernet10/9-16
vdc SW23 id 3
  allocate interface Ethernet9/17-24
  allocate interface Ethernet10/17-24
```



Sample Lab Question: VPC

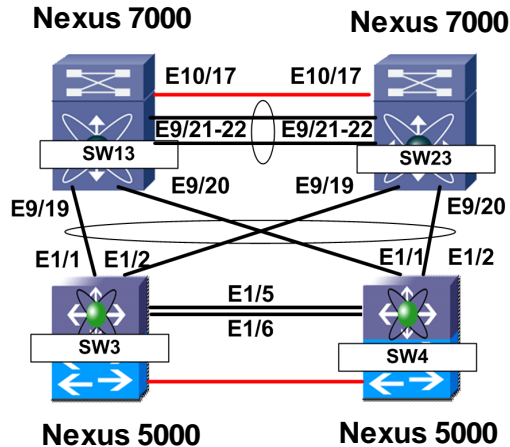
- Create vPC on Nexus 7000 as described below:
 - SW13 and SW23 are in vPC Domain 100
 - Use E9/21 and E9/22 on each switch as peer-link
 - Use E10/17 on each switch as peer-keepalive
 - IP address of SW13 is 10.1.1.25
 - IP address of SW23 is 10.1.1.26
 - Port E9/19 and E9/20 on SW13 and SW23 are in vPC 2
- Create vPC on Nexus 5000 as described below:
 - SW3 and SW4 are in vPC Domain 200
 - Use E1/5 and E1/6 on each switch as peer-link
 - Use Management port on each switch as peer-keepalive
 - IP address of SW3 is 10.113.8.3
 - IP address of SW4 is 10.113.8.4
 - Port E1/1 and E1/2 on SW3 and SW4 are in vPC 2
- Allow all VLANs on vPC link



Solution:

```
Feature vpc
vpc domain 100
peer-keepalive destination 10.1.1.26 source
10.1.1.25 vrf default
interface Ethernet9/21-22
switchport
channel-group 1 mode active
interface port-channel1
switchport mode trunk
vpc peer-link
interface Ethernet9/19-20
switchport
channel-group 2 mode active
interface port-channel2
switchport mode trunk
vpc 2
```

```
Feature vpc
vpc domain 200
peer-keepalive destination 10.113.80.4 source
10.113.80.3 vrf management
interface Ethernet1/5-6
switchport
channel-group 1 mode active
interface port-channel1
switchport mode trunk
vpc peer-link
interface Ethernet1/1-2
switchport
channel-group 2 mode active
interface port-channel2
switchport mode trunk
vpc 2
```

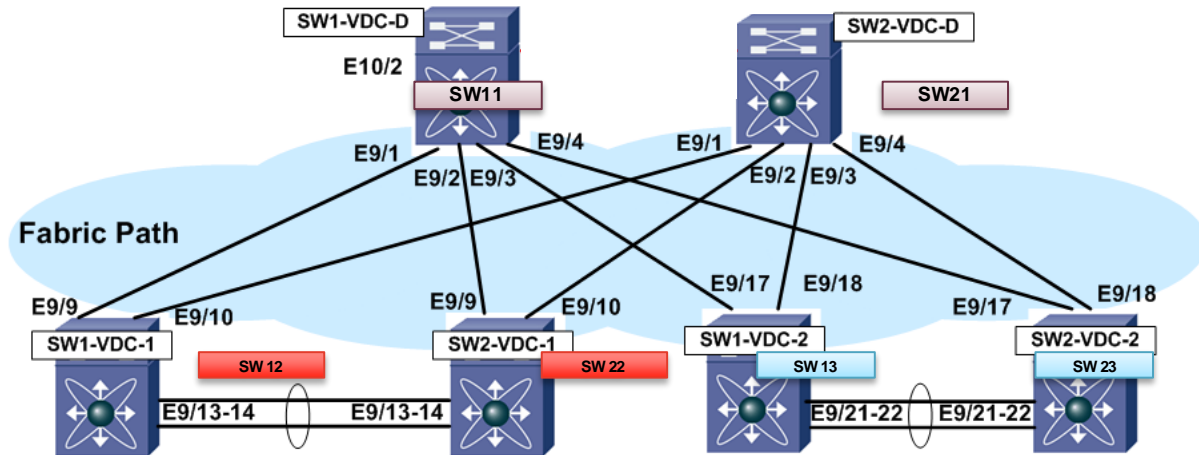


```
Feature vpc
vpc domain 100
peer-keepalive destination 10.1.1.26 source
10.1.1.25 vrf default
interface Ethernet9/21-22
switchport
channel-group 1 mode active
interface port-channel1
switchport mode trunk
vpc peer-link
interface Ethernet9/19-20
switchport
channel-group 2 mode active
interface port-channel2
switchport mode trunk
vpc 2
```

```
Feature vpc
vpc domain 200
peer-keepalive destination 10.113.80.3 source
10.113.80.4 vrf management
interface Ethernet1/5-6
switchport
channel-group 1 mode active
interface port-channel1
switchport mode trunk
vpc peer-link
interface Ethernet1/1-2
switchport
channel-group 2 mode active
interface port-channel2
switchport mode trunk
vpc 2
```

Sample Lab Question: Fabric Path

- Configure FabricPath as shown in the topology below
 - SW11 and SW21 are spine switches
 - SW12, SW22, SW13, and SW23 are leaf switches
 - Make sure VLAN 100 and 101 are reachable via FabricPath



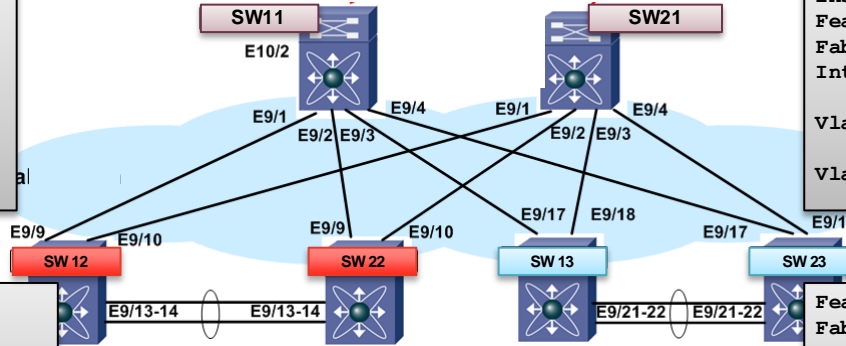
Solution:

SW11

```
install feature-set fabricpath
Feature-set fabricpath
Fabricpath switch-id 11
Interface ethernet 9/1-4
  switchport mode fabricpath
Vlan 100
  mode fabricpath
Vlan 101
  mode fabricpath
```

SW21

```
install feature-set fabricpath
Feature-set fabricpath
Fabricpath switch-id 21
Interface ethernet 9/1-4
  switchport mode fabricpath
Vlan 100
  mode fabricpath
Vlan 101
  mode fabricpath
```



SW12

```
Feature-set fabricpath
Fabricpath switch-id 12
Interface ethernet 9/9-10
  switchport mode fabricpath
Vlan 100
  mode fabricpath
Vlan 101
  mode fabricpath
```

SW23

```
Feature-set fabricpath
Fabricpath switch-id 23
Interface ethernet 9/17-18
  switchport mode fabricpath
Vlan 100
  mode fabricpath
Vlan 101
  mode fabricpath
```

SW22

```
Feature-set fabricpath
Fabricpath switch-id 22
Interface ethernet 9/9-10
  switchport mode fabricpath
Vlan 100
  mode fabricpath
Vlan 101
  mode fabricpath
```

SW13

```
Feature-set fabricpath
Fabricpath switch-id 13
Interface ethernet 9/17-18
  switchport mode fabricpath
Vlan 100
  mode fabricpath
Vlan 101
  mode fabricpath
```

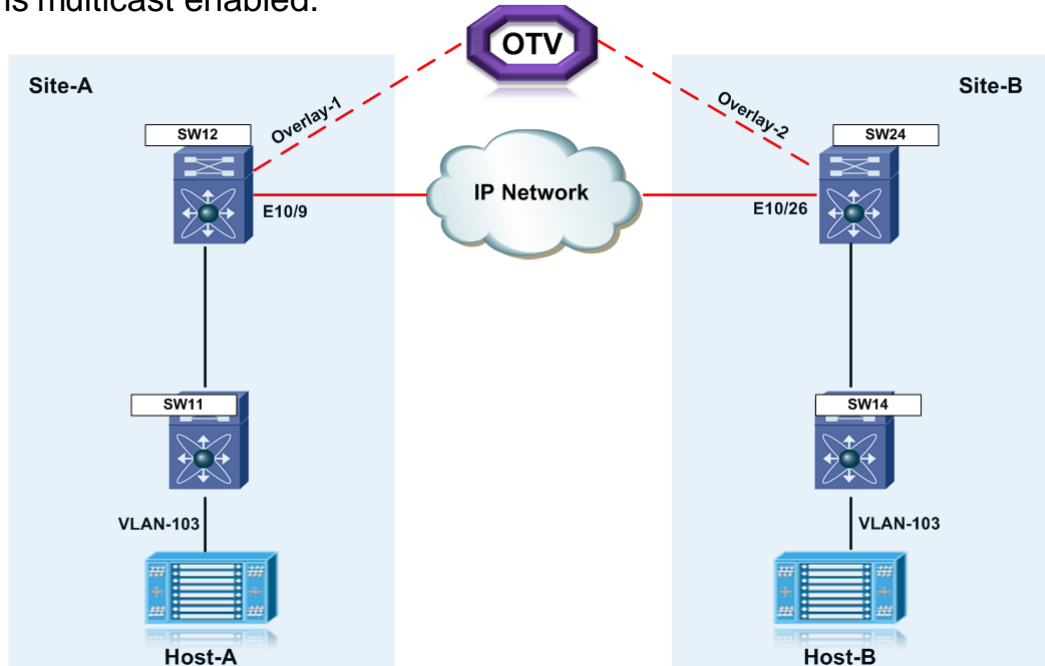
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Sample Lab Question: OTV

Configure OTV on SW12 and SW24 to Extend VLAN 103 between Site-A and Site-B.

SW12 and SW24 can reach each other using IP network.

IP network is multicast enabled.



Solution:

SW12

```
!Configure the physical interface that OTV uses to reach
!the DCI transport infrastructure
interface ethernet 10/9
 ip address <IP-Address>
 ip igmp version 3
 no shutdown
```

```
!Configure the VLAN that will be extended on the
!overlay network
vlan 103
```

```
!Configure OTV including the VLANs that will be extended.
```

```
feature otv
otv site-identifier 10
interface Overlay1
 otv control-group 239.1.1.1
 otv data-group 232.1.1.0/28
 otv join-interface ethernet 10/9
!Extend the configured VLAN
 otv extend-vlan 11
 no shutdown
```

SW24

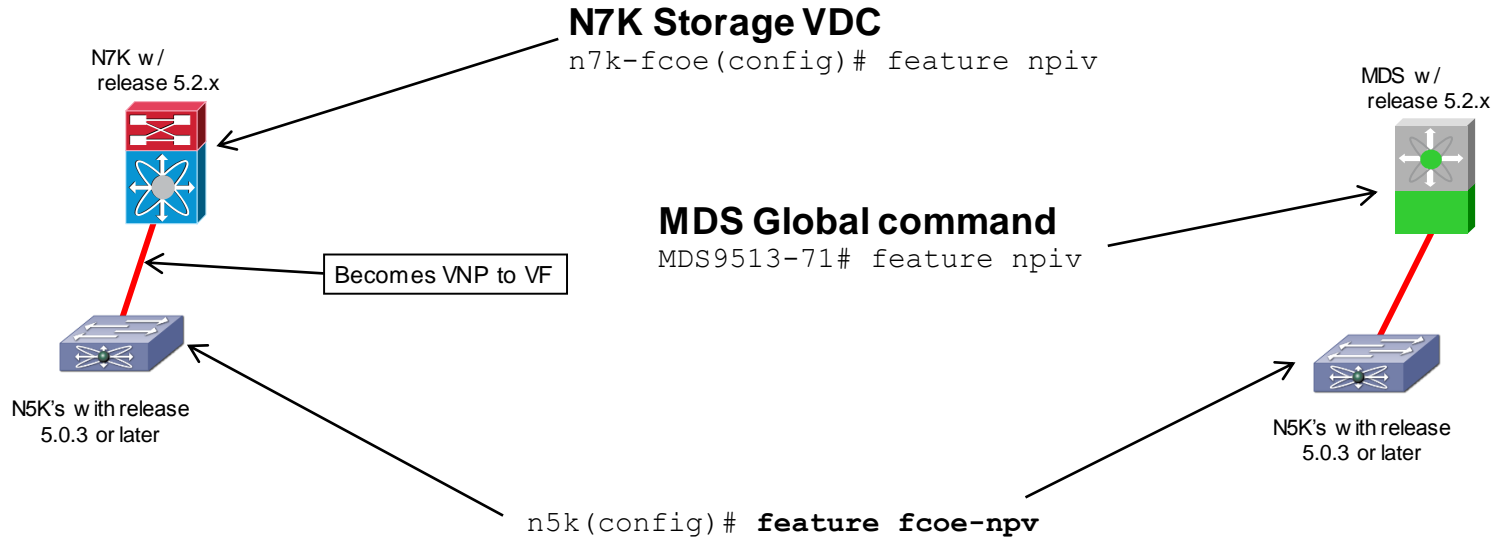
```
!Configure the physical interface that OTV uses to reach
!the DCI transport infrastructure
interface ethernet 10/26
 ip address <IP-Address>
 ip igmp version 3
 no shutdown
```

```
!Configure the VLAN that will be extended on the
!overlay network
vlan 103
```

```
!Configure OTV including the VLANs that will be extended.
```

```
feature otv
otv site-identifier 11
interface Overlay2
 otv control-group 239.1.1.1
 otv data-group 232.1.1.0/28
 otv join-interface ethernet 10/26
!Extend the configured VLAN
 otv extend-vlan 11
 no shutdown
```

FCoE - NPV Configuration Details



LACP Port-channels can be configured between switches for high availability

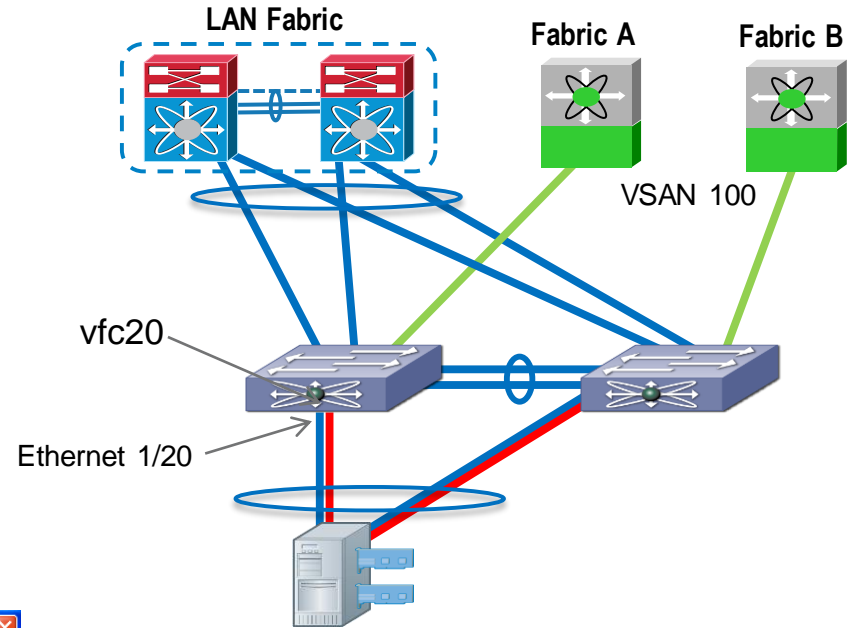
FCoE Port Configurations

```
feature fcoe
vlan 100
  fcoe vsan 100

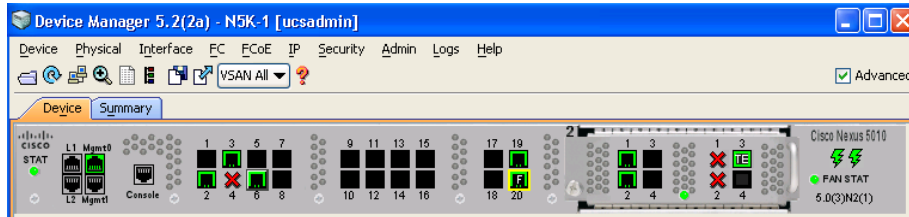
interface vfc20
  bind interface Ethernet1/20
  no shutdown

vsan database
  vsan 100 interface vfc20

interface Ethernet1/20
  switchport mode trunk
  switchport trunk allowed vlan 1,100
  spanning-tree port type edge trunk
```



Can also be configured with DCNM Device Manager



FCoE Multihop Configuration

```
N7K-50-fcoe-1 (config-vlan) # interface ethernet 4/11-12
N7K-50-fcoe-1 (config-if-range) # switchport mode trunk
N7K-50-fcoe-1 (config-if-range) # switchport trunk allowed vlan 50
N7K-50-fcoe-1 (config-if-range) # channel-group 50 force mode active
N7K-50-fcoe-1 (config-if-range) # no shut

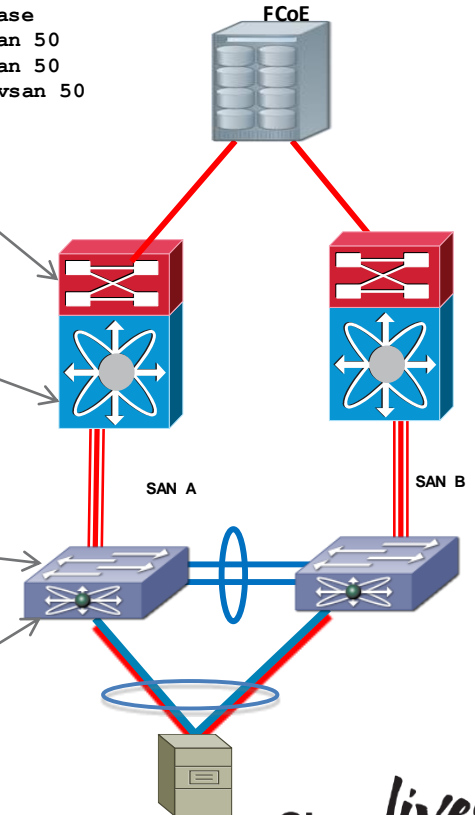
N7K-50-fcoe-1 (config) # interface vfc-port-channel 50
N7K-50-fcoe-1 (config-if) # switchport mode f
N7K-50-fcoe-1 (config-if) # switchport trunk allowed vsan 50
N7K-50-fcoe-1 (config-if) # no shut
```

```
n5k-2 (config-vlan) # interface ethernet 1/1-2
n5k-2 (config-if-range) # switchport mode trunk
n5k-2 (config-if-range) # switchport trunk allowed vlan 50
n5k-2 (config-if-range) # channel-group 350 mode active
```

```
n5k-2-104 (config) # interface vfc350
n5k-2-104 (config-if) # switchport mode np
n5k-2-104 (config-if) # bind interface port-channel 350
n5k-2-104 (config-if) # switchport trunk allowed vsan 50
n5k-2-104 (config-if) # no shut
```

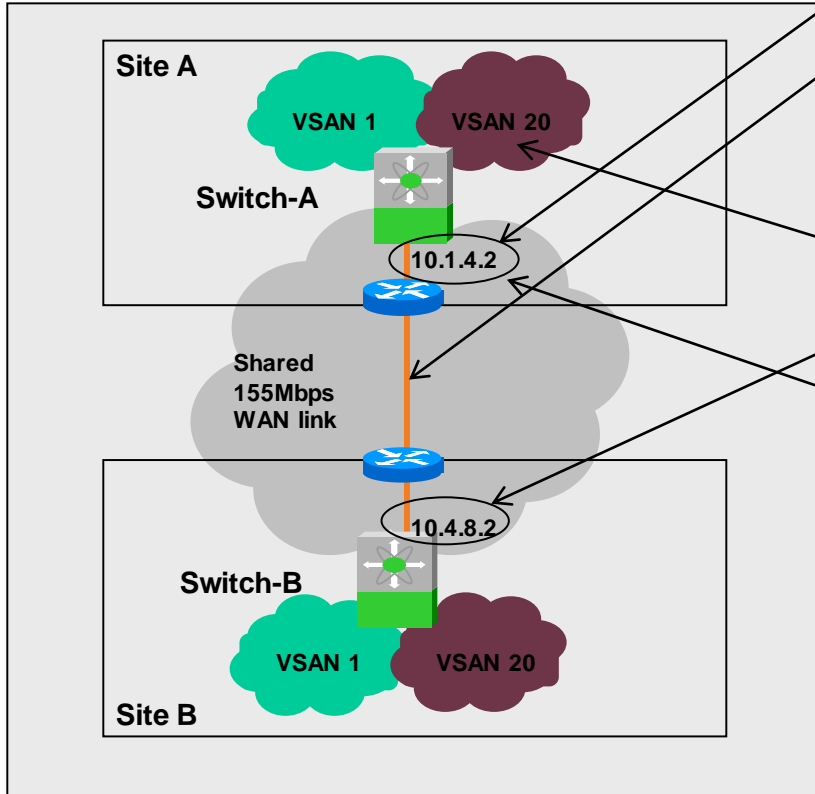
```
N7K-50-fcoe (config) # vsan database
N7K-50-fcoe (config-vsan-db) # vsan 50
N7K-50-fcoe (config-vsan-db) # vlan 50
N7K-50-fcoe (config-vlan) # fcoe vsan 50
```

```
n5k-2-104 (config) # vsan database
n5k-2-104 (config-vsan-db) # vsan 50
n5k-2-104 (config-vsan-db) # vlan 50
n5k-2-104 (config-vlan) # fcoe vsan 50
```



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FCIP Configuration Example: MDS9000



```
fcip profile 10
ip address 10.1.4.2
tcp max-bandwidth-mbps 155 min-available-bandwidth-mbps 20 round-trip-time-ms 1

interface fcip50
switchport mode E
no shutdown
switchport trunk allowed vsan 1
switchport trunk allowed vsan add 20
use-profile 10
peer-info ipaddr 10.4.8.2

interface GigabitEthernet2/5
ip address 10.1.4.2 255.255.255.0
switchport mtu 2300
no shutdown
```

RTT will autconfigure and adapt to network changes during idle periods

Jumbo Frame MTU - 2300 Bytes will handle largest FC frame

- Three steps for FCIP config – Profile, GigE i/f and FCIP i/f
- Min-bandwidth set to minimum bandwidth available (through QoS or other means). Sender will start at this rate
- Peer FCIP interface configured similarly



Example: FCIP Interface – Show Command

```
MDS-9509# sh int fcip 1
FCIP1 is trunking
Hardware is GigabitEthernet
Port WWN is 22:06:00:05:30:00:51:1e
Peer port WWN is 20:46:00:05:30:00:47:9e
Admin port mode is auto, trunk mode is on
Port mode is TE
vsan is 1
Trunk vsans (allowed active) (1-2,200)
Trunk vsans (operational) (1-2)
Trunk vsans (up) (1)
Trunk vsans (isolated) (2,200)
Trunk vsans (initializing) ( )
Using Profile id 1 (interface GigabitEthernet9/2)
Peer Information
  Peer Internet address is 1.1.1.1 and port is 3225
  Special Frame is disabled
  Maximum number of TCP connections is 2
  Time Stamp is disabled
  B-port mode disabled
TCP Connection Information
  2 Active TCP connections
    Control connection: Local 1.1.1.1:3225, Remote 1.1.1.2:65491
    Data connection: Local 1.1.1.1:3225, Remote 1.1.1.2:65492
  2 Attempts for active connections, 3 closed connections
TCP Parameters
  Path MTU 1500 bytes
  Current retransmission timeout is 100 ms
  Round trip time: Smoothed 2 ms, Variance: 1
  Advertized window: Current: 64 KB, Maximum: 64 KB, Scale: 1
  Peer receive window: Current: 64 KB, Maximum: 64 KB, Scale: 1
  Congestion window: Current: 5 KB
  5 minutes input rate 13 bits/sec, 104 bytes/sec, 0 frames/sec
  5 minutes output rate 13 bits/sec, 104 bytes/sec, 0 frames/sec
  3039 frames input, 282916 bytes
    3021 Class F frames input, 280852 bytes
    18 Class 2/3 frames input, 2064 bytes
    0 Error frames
  3220 frames output, 301160 bytes
    3038 Class F frames output, 272920 bytes
    182 Class 2/3 frames output, 28240 bytes
  0 Error frames 0 reass frames
```

Peer Information
IP Address and
TCP port

MDS to MDS Two
TCP Connections

One Connection Is
F-Class (Control)
Second
Connection Is the
Data

TCP Parameters

Special Frame verification and would
display Peer Switch WWN if e enabled

Time-stamp
information

Acceptable difference
value would be
displayed here if
enabled

E_Port Operation
Enabled

UCS VLAN Troubleshooting common show commands

```
FarNorth-A# connect nxos
FarNorth-A(nxos) # show vlan ?
<CR>
>          Redirect it to a file
>>        Redirect it to a file in append mode
access-list  Vlan access list
access-map   List VLAN access maps
brief        All VLAN status in brief
counters     Display counters
dot1q        Display dot1q parameters
fcoe         FCOE Congiguration
filter       Information about VLAN filters
id           VLAN status by VLAN id
internal     Show VLAN manager internal
name         VLAN status by VLAN name
private-vlan Private VLAN information
summary      VLAN summary information
|           Pipe command output to filter
```

Need to connect to NXOS
Default connects to primary FI

```
FarNorth-B(nxos) # )# show vlan internal usage
```

VLAN	DESCRIPTION
-----	-----
3968-4031	Multicast
4032	Online diagnostics vlan1
4033	Online diagnostics vlan2
4034	Online diagnostics vlan3
4035	Online diagnostics vlan4
4036-4043	Reserved
4094	Reserved

```
FarNorth-B(nxos) # sh vlan
```

VLAN Name	Status	Ports
-----	-----	-----
1 default	active	Eth1/1, Eth1/2, Eth1/3, Eth1/4 Eth1/5, Eth1/6, Eth1/7, Eth1/8 Eth1/9, Eth1/10, Eth1/11 Eth1/12, Eth1/13, Eth1/14 Eth1/17, Eth1/18, Eth1/19 Eth1/20, Eth1/1/1, Eth1/1/2 Eth1/1/3, Eth1/1/4, Eth1/1/5 Eth1/1/6, Eth1/1/8
200 fcoe-vsan-200	active	veth9510
300 VLAN0300	active	
4044 SAM-vlan-management	active	
4047 SAM-vlan-boot	active	

Cisco *live!*

UCS Troubleshooting Port Channels

- Are the physical member ports up?

- Port Channel fails to come up
- Ports remain in isolated (I) state

The screenshot shows the UCS Manager GUI for a Fabric Interconnect B (subordinate). The 'Uplink Ports' table is displayed with the following data:

Slot	Port ID	MAC	If Role	If Type	Overall Status	Administrative State
1	5	00:0D:EC:B1:37:0C	network	physical	up	enabled
1	6	00:0D:EC:B1:37:0D	network	physical	up	enabled

```
CWD-35-03-UCS-250-A(nxos)# show int brief
```

```
-----  
Ethernet  VLAN  Type Mode  Status Reason          Speed  Port  
Interface                                     Ch #  
-----  
Eth1/1    1    eth fabric up    none  
Eth1/2    1    eth fabric up    none  
Eth1/3    1    eth fabric up    none  
Eth1/4    1    eth fabric up    none  
Eth1/5    1    eth trunk up    none  
Eth1/6    1    eth trunk up    none
```

UCS Troubleshooting Port Channels

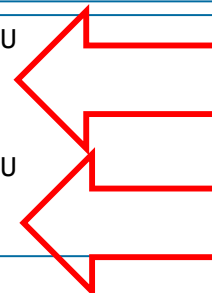
- Is LACP configured on the upstream Switch?
- Is UCS sending & receiving LACP PDUs?

```
CWD-35-03-UCS-250-A(nxos)# show port-channel summary
Flags:  D - Down          P - Up in port-channel (members)
        I - Individual    H - Hot-standby (LACP only)
        s - Suspended     r - Module-removed
        S - Switched     R - Routed
        U - Up (port-channel)
```

```
-----
Group Port-      Type      Protocol  Member Ports
Channel
-----
1     Po1(SD)    Eth      LACP      Eth1/5(I)  Eth1/6(I)
CWD-35-03-UCS-250-A(nxos)#
```

```
CWD-35-03-UCS-250-A(nxos)# show lacp interface ethernet 1/5 | i PDU
PDU sent: 1527580
PDU rcvd: 0
```

```
CWD-35-03-UCS-250-A(nxos)# show lacp interface ethernet 1/6 | i PDU
PDU sent: 1527619
PDU rcvd: 0
```



UCS Per FI allocation of Port Type

The image shows a sequence of three screenshots from the UCS Manager interface, illustrating the process of configuring port types for a Fabric Interconnect.

- Top Screenshot:** Shows the 'Fabric Interconnect A (primary)' configuration page. The 'Actions' menu on the left has 'Configure Unified Ports' highlighted with a red box. An arrow points from this box to the next screenshot.
- Middle Screenshot:** Shows the 'Configure Unified Ports' wizard. A warning dialog box is displayed with the text: "The Configure Unified Ports wizard allows you to change the port mode from Ethernet to Fibre Channel or FC to Ethernet. Changing the port mode on either module causes an interruption in data traffic because changes to the fixed module require a reboot of the fabric interconnect and changes on an expansion module require a reboot of that module. Are you sure you want to launch this wizard and reboot the modules associated with any reconfigured ports?". The 'Yes' button is highlighted with a red box, and an arrow points from it to the final screenshot.
- Bottom Screenshot:** Shows the 'Configure Fixed Module Ports' wizard. A slider control is shown with a red box around it, and a text box next to it says "Last 6 ports are Fibre Channel". Below the slider, there are sections for 'Ethernet Ports' and 'Fibre Channel Ports' with various configuration options like 'Uplink', 'FCoE Storage', 'Server', 'Monitor Port', 'Appliance', 'Appliance Port Channel Member', 'Server Port Channel Member', 'Storage', and 'Port Channel Member'. A legend at the bottom indicates port status: Up (green), Admin Down (yellow), Fail (red), Link Down (orange).

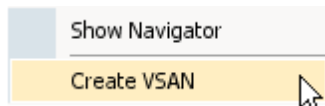
UCS VSAN Configurations

- VSAN numbers on UCS should match the VSAN's on Cisco MDS
- VSAN's will be mapped to a VLAN within the UCS, this VLAN is for FC traffic only. The VLAN you choose can be configured as a Data VLAN

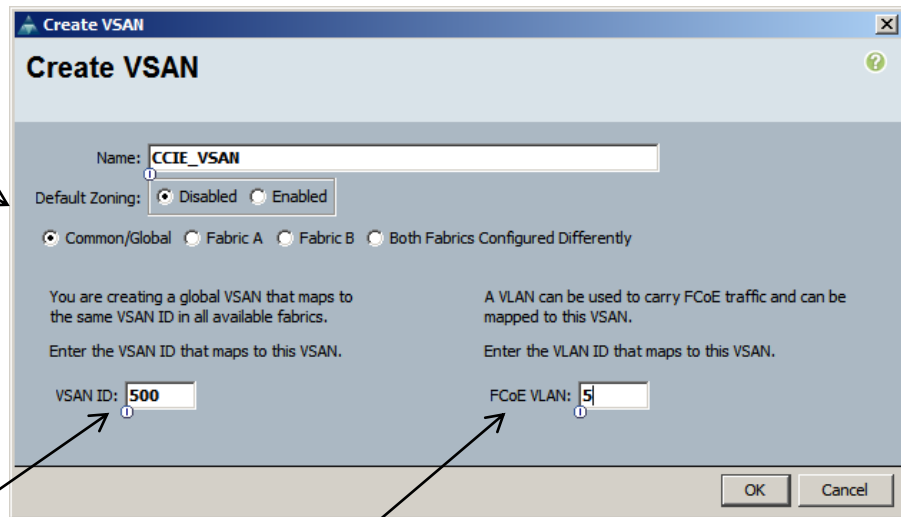
The image displays two screenshots from the UCS Manager interface. The left screenshot shows the 'Fault Summary' at the top with four status icons (0 critical, 4 major, 5 minor, 3 warning). Below is a navigation menu with 'SAN' selected. A tree view shows the hierarchy: SAN > SAN Cloud > Fabric A > VSANs > VSAN 100 (100). The right screenshot shows the configuration page for 'Fabric A' > 'VSANs'. The 'Actions' panel includes options like 'Create VSAN', 'Enable All Uplink FC Interfaces', and 'Enable FC Uplink Trunking'. The 'Properties' panel shows 'Name', 'Network Type: San', 'Transport Type: Fc', and 'Locale: External'.

UCS VSAN to VLAN Mapping for FCoE

- VSAN is created with wizard



- Zoning is Default, zoning is done from SAN core network
- Can be Global VSAN or just on one side



The 'Create VSAN' wizard dialog box is shown. It has a title bar with 'Create VSAN' and a close button. The main content area includes:

- Name: CCIE_VSAN
- Default Zoning: Disabled Enabled
- Radio buttons for zoning: Common/Global Fabric A Fabric B Both Fabrics Configured Differently
- Text: 'You are creating a global VSAN that maps to the same VSAN ID in all available fabrics.'
- Text: 'A VLAN can be used to carry FCoE traffic and can be mapped to this VSAN.'
- Text: 'Enter the VSAN ID that maps to this VSAN.'
- Text: 'Enter the VLAN ID that maps to this VSAN.'
- VSAN ID: 500
- FCoE VLAN: 5
- Buttons: OK, Cancel

VSAN should match MDS SAN for trunking

VLAN that will carry VSAN 500's FC traffic

DCNM or CLI for Configuration, Zoning Management

Pick your Method

zone name **Server-1-Palo vsan 100**

member **pwwn**

20:00:00:25:b5:10:10:01

member **pwwn**

21:00:00:20:37:42:4a:b2

zoneset name **ZS_mn_bootcamp_v100**

vsan 100

member **Server-1-Palo**

zoneset activate name

ZS_mn_bootcamp_v100 vsan 100

The screenshot displays the DCNM SAN 5.2(2a) interface. The left pane shows the Logical Domains tree with the following structure:

- DataCenter
 - SAN
 - UCS-SAN
 - All VSANs
 - VSAN0001
 - VSAN0100
 - ZS_mn_bootcamp_v100
 - Linux
 - Netapp-ESX-51
 - Palo_SANboot-VNX
 - Server-1-Palo**
 - Server-2-Palo
 - UC_UCS_C1-S3
 - UC_UCS_C2-S3
 - W2K8

The Physical Attributes pane shows:

- Switches
- ISLs
- End Devices
- Events
- Intelligent Features

The Members table is as follows:

Zone	Type	Switch Interface	Name	WWN	FcId	LUNs	Status
Server-1-Palo	WWN	Farnorth-A vfc693(veth8885->eth1/1/1)	Cisco_20:00:00:25:b5:10:10:01	20:00:00:25:b5:10:10:01	0x400009		
Server-1-Palo	WWN	MDS-1 fc1/6	Seagate_21:00:00:20:37:42:4a:b2	21:00:00:20:37:42:4a:b2	0x2400d9		

The UCS-SAN diagram shows a network topology with nodes including Cisco_20:00:00:20:37:42:4a:b2, MDS-1, MDS-2, MDS-91M, MDS-1 Kc16, MDS-1 Kc17, Farnorth-A, Cisco_20:00:00:25:b5:01:00:09, Cisco_20:00:00:20:37:42:4a:b2, and NDK-10:2.

Cisco's Nexus 1000V 'Virtual Chassis' Concept

```
CCIE-pod5-vsm# show module
```

Mod	Ports	Module-Type	Model	Status
1	0	Virtual Supervisor Module	Nexus1000V	active *
2	0	Virtual Supervisor Module	Nexus1000V	ha-standby
3	248	Virtual Ethernet Module	NA	ok



Cisco VSMs



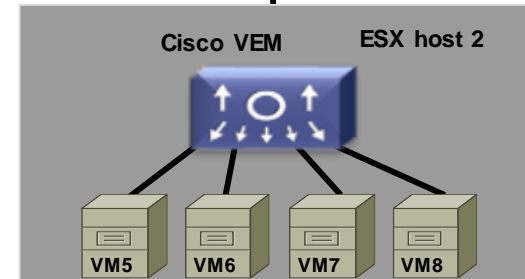
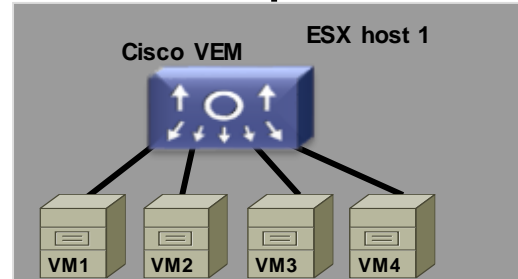
Virtual Supervisor Module(VSM)

- CLI interface -Nexus 1000V
- Leverages NX-OS
- Controls multiple VEMs as a single network device



Virtual Ethernet Module(VEM)

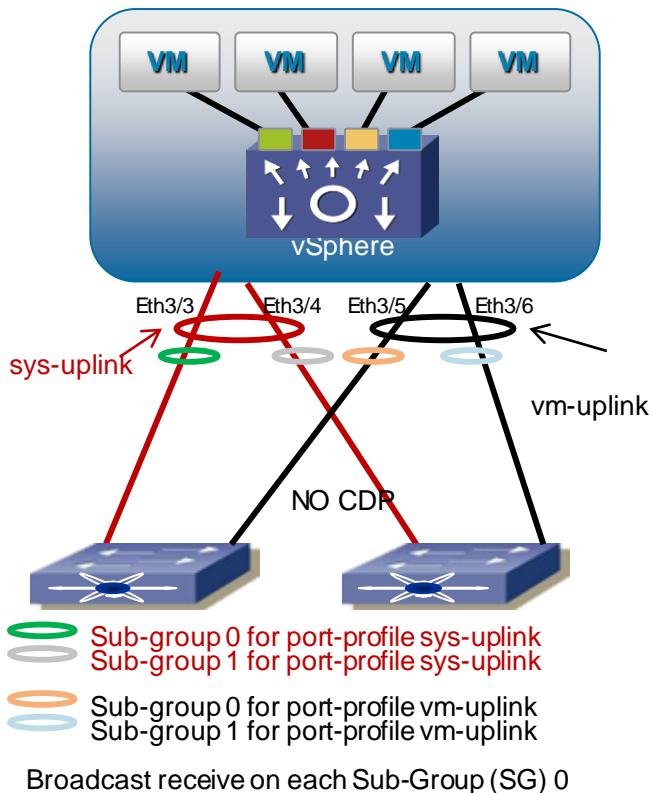
- Replaces Vmware's virtual switch
- Enables advanced switching capability on the hypervisor
- Provides each VM with dedicated 'switch-ports' or 'port-profiles'
- Provides enhanced Security Capabilities (see VSG)



CiscoLive!

Manual Configuration of VPC Host-Mode

- The user can specifically select which interface is part of which sub-group.



```
Nexus1000(config)#port-profile sys-uplink
Nexus1000(config-port-prof)#capability uplink
Nexus1000(config-port-prof)#channel-group auto sub-group manual
Nexus1000(config-port-prof)#switchport mode trunk
Nexus1000(config-port-prof)#switchport trunk allowed vlan 10-15
Nexus1000(config-port-prof)#system-vlan 10-13
```

```
Nexus1000(config)#port-profile vm-uplink
Nexus1000(config-port-prof)#capability uplink
Nexus1000(config-port-prof)#channel-group auto sub-group manual
Nexus1000(config-port-prof)#switchport mode trunk
Nexus1000(config-port-prof)#switchport trunk allowed vlan 16-25
```

If CDP is not supported upstream, the user can still leverage and benefits of VPC Host-Mode

```
Nexus1000(config)#int ethernet 3/3
Nexus1000(config-if)#sub-group-id 0
Nexus1000(config)#int ethernet 3/4
Nexus1000(config-if)#sub-group-id 1
```

```
Nexus1000(config)#int ethernet 3/5
Nexus1000(config-if)#sub-group-id 0
Nexus1000(config)#int ethernet 3/6
Nexus1000(config-if)#sub-group-id 1
```


Agenda

- CCIE Program Overview
- CCIE Data Centre Overview – Written Exam
- CCIE Data Centre Overview – Lab Exam
- **Preparation & Study**
- Questions



Preparation and Study

Keeping your Eye on the Prize

- Be prepared to commit to at least 4-8 months
- Studying becomes a work/life commitment
- Home Lab where possible (N1K, UCSPE, VIRL)
- Hands on Experience is a MUST (Remote labs included)
- Plan your success!
 - Set milestones/goals and do what's needs to be done to achieve them.

Pop Quiz Next

Pop Quiz

- Count the # of “F”s on this page

**FINISHED FILES ARE OFTEN THE
RESULT OF YEARS OF SCIENTIFIC
STUDY COMBINED WITH THE
EXPERIENCE OF YEARS...**

How many did you count?

Pop Quiz

- Count the # of “F”s on this page

**FINISHED FILES ARE OFTEN THE
RESULT OF YEARS OF SCIENTIFIC
STUDY COMBINED WITH THE
EXPERIENCE OF YEARS...**

How many did you count?

What does it take to pass the Lab Exam?

Skills



■ Technical Competency

■ Time Management

■ Knowing Where to find information

■ Attention to Detail

■ Troubleshooting Skills

Lab Exam: Tips & Tricks

- Before the exam
- Prepare for the exam!
- Plan your study
 - Do self assessment, “know what I don’t know”
 - Dedicate time per day
 - Always ask “What if”
 - Practice, practice and practice
- Learn how to browse on Cisco Documentation (sort, don’t search)
- Choose materials from trustworthy source
- Practice for speed and troubleshooting



Build a study plan that works for you

Don't do it alone

- There are many groups, forums and study groups available.
 - 95% of successful CCIEs participate in a study group of some form.
 - On going groups available including Learning @ Cisco etc
- If you can't team up locally, do it virtually

Lab Exam: Tips & Tricks

Day Before the Lab Exam

- Arrive in the country, if you have to travel
 - Check Visa requirement in advanced
- Survey the lab location
- Plan the trip to the lab location
 - train timetable
 - book a taxi
 - etc



Lab Exam: Tips & Tricks

Night Before the Big Day



- Have a good dinner
- Have a good sleep
- Do whatever you enjoy
 - to have a fit body, and
 - A mental condition for the BIG DAY

Lab Exam: Tips & Tricks “THE BIG DAY”

- Have a good Breakfast. Most important Meal of the Day.
- Reduce stress, arrive early and prepare IDs!
- Listen to the proctor’s guidelines
- **Re-draw the topology:** physical and logical(if needed)
- Manage your time! Stick to your strategy!
- Read the whole module, don’t forget the guidelines!
- Read, read and read the questions before asking for clarification to the proctor
- **Save the configuration often!**
- **Avoid last minute change!**
- Plan for “regression tests” and overall validations at the end of each module!

What Happens if I Get Stuck???

- If you get into a question and hit a wall (not sure what to do), make a note, move on and come back to it.
- Lab Exams are composed of multiple questions and multiple tasks. Weigh the score value against the time invested. Sometimes its better to skip a question and focus on the rest.
- Some questions will affect others. Many lab scenarios are treated as a datacentre solution – questions may have an impact on other outcome of another.

A Note on Lab Proctors

- Proctors are there to run the exam
- They are not there to help you on any technically related questions
- A Proctor will:
 - Clarify a Question
 - Deal with Hardware Issues Encountered
- A Proctor will not:
 - Solve or Troubleshoot Configuration Issues
 - Answer questions on how to configure devices (Confirming good/bad configuration)
 - Answer Questions regarding a choice of how to configure something

Lab Exam: Tips & Tricks

Aftermath

- If you pass
 - CONGRATULATION
- If you fail
 - Release the anger! Do whatever you have to do
 - Try to switch from “Denial” to “Curious” quickly
 - Start looking for your mistakes
 - Repeat the scenarios in your own lab
 - Back to lab practice focusing on the failed scenarios
 - Book the next lab exam in 6 weeks time.
 - Even some of the best TAC engineers require multiple attempts!
 - **If you are 100% sure the CCIE Program team is wrong ask for review**



Available Resources

- Learning @ Cisco – Forum for asking questions, support and free online resources such as webinars and other virtual events
https://learningnetwork.cisco.com/community/certifications/ccie_data_center
- Recommended Reading List
<https://learningnetwork.cisco.com/docs/DOC-13986>
- Recommended Training
<https://learningnetwork.cisco.com/docs/DOC-13985>
- Online Resources
<https://learningnetwork.cisco.com/docs/DOC-13987>
- Other Courses
<http://www.cisco.com/web/learning/le31/ase/offerings/datacenter/index.html>

Got a question after the session?

- Join the CCIE Data Centre Study Group on CLN
- <https://learningnetwork.cisco.com/groups/ccie-data-center-study-group>
 - Ask technical questions
 - Find study partner(s)
- Open a CertSupport case at <http://www.cisco.com/go/certsupport>
- Send me an email at munawaz@cisco.com

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Now!

<http://www.cisco.com/go/certsme>



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- Give back to community
- Experience with assessment techniques
- Join creativity with experience, knowledge and skills
- Use and sharpen technical expertise
- Collaborate and network with other engineers

SME= Subject Matter Expert

Participate in the “My Favorite Speaker” Contest

Promote Your Favorite Speaker and You Could be a Winner

- Promote your favorite speaker through Twitter and you could win \$200 of Cisco Press products (@CiscoPress)
- Send a tweet and include
 - Your favorite speaker’s Twitter handle <Speaker – enter your twitter handle here>
 - Two hashtags: #CLUS #MyFavoriteSpeaker
- You can submit an entry for more than one of your “favorite” speakers
- Don’t forget to follow @CiscoLive and @CiscoPress
- View the official rules at <http://bit.ly/CLUSwin>



Q & A

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Thank you.

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