

Lab 12

FICON

with Detailed Walkthrough Solutions



- FICON
- FICON with Port Channels
- Prohibiting ports
- Port Swapping
- Port Names
- Active = Saved
- Fabric Binding
- In-Order Delivery (IOD)

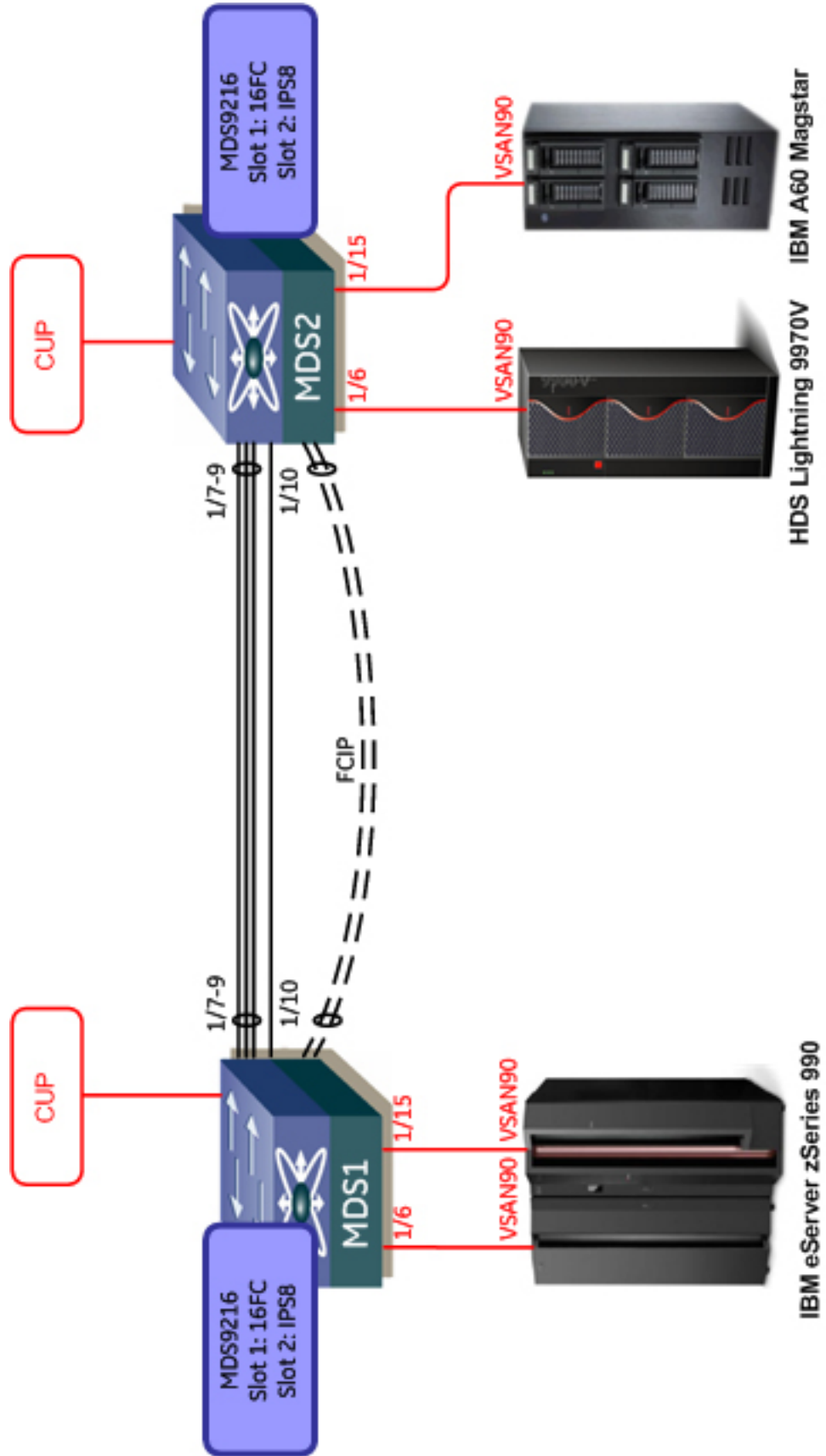
Overview:

Fibre Connection (FICON) capability extends MDS 9000 support from the open standard Fibre Channel networks to the mainframe storage network environments. In this lab, you will learn what configuration steps you need to complete before attempting to enable FICON VSAN. You will also perform FICON port swapping and fabric binding configuration.

IOCP CONFIGURATION

```

CHIPID PATH(44, 55), SHARED, PARTITION=((LPARZOS, LPARZVMS), (LPARZOS, LPARZVMS)), SWITCH=AA, TYPE=FC
CNTLUNIT CUNUMBR=5544, PATH(55), UNITADD((00, 016)), LINK(8805), CUADD=1, UNIT=3590
CNTLUNIT CUNUMBR=4455, PATH(44, 55), UNITADD((00, 064)), LINK(880E), CUADD=0, UNIT=2105
CNTLUNIT CUNUMBR=EF88, PATH(44, 55), UNITADD((00, 001)), LINK(88FE), UNIT=2032
CNTLUNIT CUNUMBR=EFAA, PATH(44, 55), UNITADD((00, 001)), LINK(AAFE), UNIT=2032
  
```



12.1: Configure FICON on VSAN 90 for a fictitious Mainframe system according to the diagram and IOCP configuration.

- ◆ IBM Mainframe is connected with two channels to fc1/6 and fc1/15 interfaces on MDS1
- ◆ HDS Lightning 9970V is connected to fc1/6 interface on MDS2
- ◆ IBM A60 Magstar is connected to fc1/15 interface on MDS2
- ◆ Use Port Channel 128 for FICON traffic

12.2: Prohibit mainframe users from moving MDS1 to an offline state.

12.3: Prohibit mainframe users from configuring FICON parameters on MDS2.

12.4: Active=Saved is turned on.

12.5: Port swap mainframe channel ports.

12.6: Name all FICON ports: CH44, CH55, CU-STORAGE, CU-TAPE.

12.7: Prohibit storage port to talk to tape port.

WALKTHROUGH SOLUTIONS

Let's create new VSAN 90 on both switches, assign interfaces into it, and enable trunking.

```
MDS1(config)# vsan database
MDS1(config-vsan-db)# vsan 90
MDS1(config-vsan-db)# vsan 90 interface fc1/6
MDS1(config-vsan-db)# vsan 90 interface fc1/15
MDS1(config-vsan-db)# exit
MDS1(config)# int fc1/6
MDS1(config-if)# no shut
MDS1(config-if)# exit
MDS1(config)# int fc1/15
MDS1(config-if)# no shut
MDS1(config-if)# exit
MDS1(config)# int po128
MDS1(config-if)# switchport trunk allowed vsan add 90

MDS2(config)# vsan database
MDS2(config-vsan-db)# vsan 90
MDS2(config-vsan-db)# vsan 90 interface fc1/6
MDS2(config-vsan-db)# vsan 90 interface fc1/15
MDS2(config-vsan-db)# exit
MDS2(config)# int fc1/6
MDS2(config-if)# no shut
MDS2(config-if)# exit
MDS2(config)# int fc1/15
MDS2(config-if)# no shut
MDS2(config-if)# exit
MDS2(config)# int po128
MDS2(config-if)# switchport trunk allowed vsan add 90
```

Let's prepare for FICON configuration:

1. Enable In-order-delivery on both switches VSAN 90.
2. Configure static Domain IDs in VSAN 90.
3. Enable fabric binding in VSAN 90, add sWWNs of both switches to the fabric binding database.
4. Set default zone policy to permit in VSAN 90.
5. Enable FICON.

.....
Tip: It's possible to use "setup ficon" command, but we prefer that you learn how to enable ficon manually.
.....

Enable IOD for VSAN 90 on both switches.

```
MDS1(config)# in-order-guarantee vsan 90
```

```
MDS2(config)# in-order-guarantee vsan 90
```

Now you have to figure out what static Domain IDs to assign to MDS1 and MDS2 in VSAN 90. Refer to the IOCP configuration on the drawing.

```
CHPID PATH(44, 55), SHARED, PARTITION=((LPARZOS, LPARZVMS), (LPARZOS, LPARZVMS)), SWITCH=AA, TYPE=FC
CNTLUNIT CUNUMBR=5544, PATH(55), UNITADD((00, 016)), LINK(8805), CUADD=1, UNIT=3590
CNTLUNIT CUNUMBR=4455, PATH(44, 55), UNITADD((00, 064)), LINK(880E), CUADD=0, UNIT=2105
CNTLUNIT CUNUMBR=EF88, PATH(44, 55), UNITADD((00, 001)), LINK(88FE), UNIT=2032
CNTLUNIT CUNUMBR=EFAA, PATH(44, 55), UNITADD((00, 001)), LINK(AAFE), UNIT=2032
```

From the IOCP configuration you should conclude the following:

- ◆ SWITCH=AA
 - a. Both channels are connected to a switch with Domain ID 170 (0xAA). That's MDS1.
- ◆ LINK(8805)
 - a. IBM A60 Magstar Tape Backup (Control Unit 3590) is connected to a switch with Domain ID 136 (0x88). That's MDS2.
 - b. IBM A60 Magstar Tape Backup (Control Unit 3590) is connected to port number 5 (0x05). You can see that it is actually physically connected to the interface fc1/15. Fc1/15 interface is FICON port number 14. Therefore you'll have to do a port swap with port 5.
- ◆ LINK(880E)
 - a. Hitachi Data Systems (HDS) Lightning Storage (Control Unit 2105) is connected to a switch with Domain ID 136 (0x88). That's MDS2.
 - b. Hitachi Data Systems (HDS) Lightning Storage (Control Unit

2105) is connected to port number 14 (0x0E). You can see that it is actually physically connected to the interface fc1/6. Fc1/6 interface is FICON port number 5. Therefore you'll have to do a port swap with port 14.

Tip: Our Storage Walkthrough Workbook goes into detailed explanation of FICON, IOCP configuration, and many other topics.

Configure static domain IDs on MDS1 and MDS2 VSAN 90.

```
MDS1(config)# fcdomain domain 170 static vsan 90
MDS1(config)# fcdomain restart disruptive vsan 90

MDS2(config)# fcdomain domain 136 static vsan 90
MDS2(config)# fcdomain restart disruptive vsan 90
```

Enable fabric binding. Make sure to add **both** switches to fabric binding database on MDS1 and on MDS2.

```
MDS1(config)# fabric-binding enable
MDS1(config)# fabric-binding database vsan 90
MDS1(config-fabric-binding)# swwn [MDS2_SWWN] domain 136
MDS1(config-fabric-binding)# swwn [MDS1_SWWN] domain 170
MDS1(config-fabric-binding)# exit
MDS1(config)# fabric-binding activate vsan 90

MDS2(config)# fabric-binding enable
MDS2(config)# fabric-binding database vsan 90
MDS2(config-fabric-binding)# swwn [MDS2_SWWN] domain 136
MDS2(config-fabric-binding)# swwn [MDS1_SWWN] domain 170
MDS2(config-fabric-binding)# exit
MDS2(config)# fabric-binding activate vsan 90
```

Set default zone policy to permit on VSAN 90.

```
MDS1(config)# zone default-zone permit vsan 90

MDS2(config)# zone default-zone permit vsan 90
```

Enable FICON on VSAN 90, leave snmp control turned on.

Tip: You are asked to leave "Active Equals Saved" feature turned on. We recommend you to turn it off for now, because it's going to slow you down significantly. If it's enabled, every time you leave configuration mode, running configuration will be saved to the startup config. For now, keep it turned off. Don't forget to enable it at the end of the lab, otherwise you'll lose points!

```
MDS1(config)# ficon vsan 90
MDS1(config-ficon)# no active equals saved

MDS2(config)# ficon vsan 90
MDS2(config-ficon)# no active equals saved
```

Check VSAN90 status on interface po128 by doing `show interface po128`. You will notice that VSAN90 is isolated. It is isolated because we have configured yet a ficon portnumber on the port channel 128 interface. It is required to configure ficon portnumber on Port Channel and FCIP interfaces when you want to run FICON traffic over them. There's a specific range of numbers that can be used to configure portnumber on Port Channel and FCIP interfaces:

- ◆ MDS9216: from 64 (0x40) through 89 (0x59)
- ◆ MDS9506: from 128 (0x80) through 153 (0x99)
- ◆ MDS9509: from 224 (0xE0) through 249 (0xF9)

```
MDS1(config)# int po128
MDS1(config-if)# ficon portnumber 0x40

MDS2(config)# int po128
MDS2(config-if)# ficon portnumber 0x40
```

Check interface po128 again, you'll notice that vsan 90 is no longer isolated.

Prohibit mainframe users from moving MDS1 to an offline state.

```
MDS1(config)# ficon vsan 90
MDS1(config-ficon)# no host control switch offline
```

Prohibit mainframe users from configuring FICON parameters on MDS2.

```
MDS2(config)# ficon vsan 90
MDS2(config-ficon)# no host port control
```

Previously we've discovered that mainframe IOCP configuration expects the HDS Control Unit to connect to port number 14 (0x0E). But it is physically connected to the interface fc1/6 (port number 5). On the other hand, IBM Magstar connects to port number 5 (0x05) according to IOCP configuration, but it is physically connected to the interface fc1/15 (port number 14). You have to do a port swap between ports 5 and 14 on MDS2.

```
MDS2# ficon swap portnumber 5 14 after swap noshut 5 noshut 14
```

`after swap noshut` is an optional parameter that does no shut on both interfaces after swapping port numbers. The result of this command on MDS2 is the following.

```
interface fc1/6
  ficon portaddress 0xe
  no shutdown

interface fc1/15
  ficon portaddress 0x5
  no shutdown
```

Port swap mainframe channel ports.

```
MDS1# ficon swap portnumber 5 14 after swap noshut 5 noshut 14
```

```
MDS1# ficon swap portnumber 5 14 after swap noshut 5 noshut 14
```

Results on MDS1.

```
interface fc1/6
  ficon portaddress 0xe
  no shutdown

interface fc1/15
  ficon portaddress 0x5
  no shutdown
```

Name all FICON ports: CH44, CH55, CU-STORAGE, CU-TAPE and prohibit storage port to talk to the tape port. Make sure not to mix up port numbers and names, because some ports were swapped.

Interface	Port Number	Name
MDS1 fc1/6	14 (0xe)	CH44
MDS1 fc1/15	5 (0x5)	CH55
MDS2 fc1/6	14 (0xe)	CU-STORAGE
MDS2 fc1/15	5 (0x5)	CU-TAPE

```
MDS1(config)# ficon vsan 90
MDS1(config-ficon)# portaddress 14
MDS1(config-ficon-portaddr)# name CH44
MDS1(config-ficon-portaddr)# exit
MDS1(config-ficon)# portaddress 5
MDS1(config-ficon-portaddr)# name CH55

MDS2(config)# ficon vsan 90
MDS2(config-ficon)# portaddress 14
MDS2(config-ficon-portaddr)# name CU-STORAGE
MDS2(config-ficon-portaddr)# prohibit portaddress 5
MDS2(config-ficon-portaddr)# exit
MDS2(config-ficon)# portaddress 5
MDS2(config-ficon-portaddr)# name CU-TAPE
```

It's not necessary to repeat `prohibit portaddress 14` command under MDS2 `portaddress 5`. This command is executed automatically when you `prohibit portaddress 5`.

```
MDS1# show ficon vsan 90
```

```
Ficon information for VSAN 90
Ficon is online
VSAN is active
Host port control is Enabled
Host offline control is Disabled
User alert mode is Disabled
SNMP port control is Enabled
Host set director timestamp is Enabled
Active=Saved is Disabled
Number of implemented ports are 90
Key Counter is 71
FCID last byte is 0(0)
Serial number is 05.000ACEE153AB
Date/Time is same as system time (Thu Jan 12 18:31:57.782762 2006)
Device Allegiance not locked
Codepage is us-canada
Saved configuration files
IPL
```

```
MDS2# show ficon vsan 90
```

```
Ficon information for VSAN 90
Ficon is online
VSAN is active
Host port control is Disabled
Host offline control is Enabled
User alert mode is Disabled
SNMP port control is Disabled
Host set director timestamp is Enabled
Active=Saved is Disabled
Number of implemented ports are 90
Key Counter is 93
FCID last byte is 0(0)
Serial number is 05.000335912E4C
Date/Time is same as system time (Thu Jan 12 18:32:18.614232 2006)
Device Allegiance not locked
Codepage is us-canada
Saved configuration files
IPL
```