



Dell Networking S5000

Switch Configuration Guide for EqualLogic SANs

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Revisions

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July 2013	Initial release
August 2013	Updated Force10 brand to Dell Networking
March 2014	Revised for Firmware release 9.1.1
April 2014	Minor update

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1 Introduction

This document shows how to configure Dell™ Networking S5000 switches for use with EqualLogic™ PS Series storage using Dell best practices. The recommended configuration uses only Ethernet modules and uses link aggregation groups (LAGs) for inter-switch connections. Optional steps are provided in Section 3 to enable Data Center Bridging (DCB).

For more information on EqualLogic SAN design recommendations, see the EqualLogic Configuration Guide at: www.delltechcenter.com/page/equallogic+configuration+guide.

1.1 Audience

This switch configuration guide describes an optimal configuration following Dell best practices for an EqualLogic iSCSI SAN and is intended for storage or network administrators and deployment personnel.

1.2 Switch details

The table below provides an overview of the switch configuration.

Table 1 Switch specifications

Dell Networking S5000	
Switch vendor	Dell
Switch model	S5000
Switch firmware	9.1.1.0 or later

Note: For proper functionality, the switch must be at the firmware version shown in the table above before proceeding with this configuration. Using previous firmware versions may have unpredictable results.

The latest firmware updates and documentation can be found at: www.force10networks.com. This site requires a login.



1.3 Cabling diagram

The cabling diagram shown below represents the Dell recommend method for deploying your servers and EqualLogic arrays.

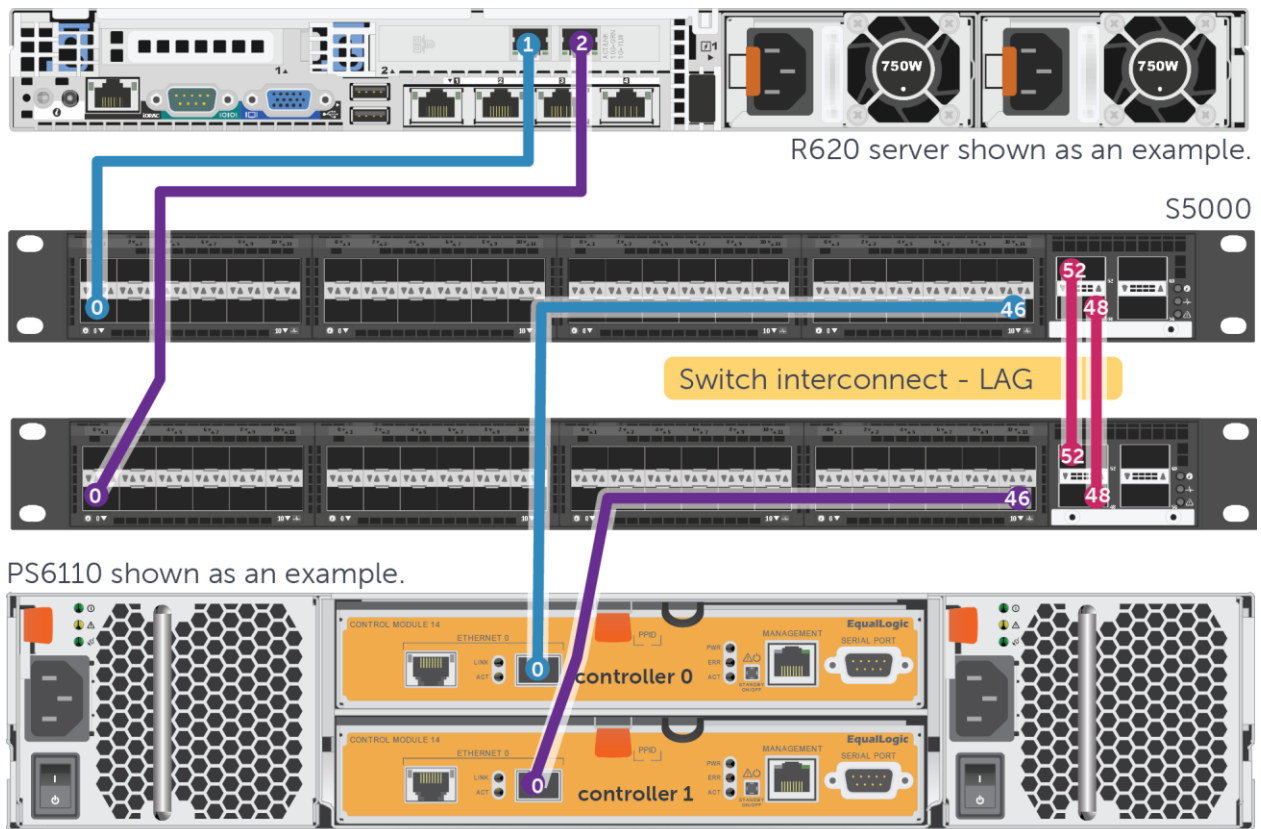


Figure 1 Cabling diagram



2 Dell recommended switch configuration

These steps outline how to configure two S5000 switches with a Link Aggregation Group (LAG) interconnect. The switches are interconnected using two 40 GbE Quad Small Form-factor Pluggable (QSFP) uplink ports, and the LAG is configured for Dynamic Link Aggregation Control Protocol (LACP).

2.1 Hardware configuration

1. Power on the two switches.
2. Connect a serial cable to the serial port of the first switch.
3. Using any terminal utility, open a serial connection session to the switch.
4. Open the terminal emulator and configure it to use the serial port (usually COM1, but this may vary depending on the system). Configure serial communications for 9600,N,8,1 and no flow control.
5. Connect the (QSFP) LAG cables between the switches by connecting port 48 on switch 1 to port 48 on switch 2. Then connect port 52 on switch 1 to port 52 on switch 2. This configuration is illustrated in Figure 1.

2.2 Delete startup configuration

Note: This example assumes a switch at its default configuration settings. Using the `delete startup-config` command will set the startup configuration file to its default settings. You should always backup your configuration settings prior to performing any configuration changes

```
FTOS>enable
```

```
FTOS#delete startup-config
```

```
Proceed to delete startup-config [confirm yes/no]yes
```

```
FTOS#reload
```

```
System configuration has been modified. Save? [yes/no]no
```

```
Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

2.3 Disabling DCB configuration

Note: For DCB environments, skip this section. For non-DCB environments, DCB must be manually disabled using the following steps:

```
FTOS>enable
```

```
FTOS#configure
```



```
FTOS (conf) #no dcb enable

FTOS (conf) #exit

FTOS#copy running-config startup-config
```

2.4 Configure out of band (OOB) management port

```
FTOS>enable

FTOS>#config

FTOS (conf) #interface Managementethernet 0/0

FTOS (conf-if-ma-0/0) #no shutdown

FTOS (conf-if-ma-0/0) #ip address ipaddress mask

FTOS (conf-if-ma-0/0) #exit
```

2.5 Configure route for OOB management port (optional)

```
FTOS (conf) #management route X.Y.Z.0 /24 A.B.C.1
```

Note: X.Y.Z.0 is the network your management system is connecting from and A.B.C.1 is the gateway for the switch. If your management system is on the same subnet as the switch, the previous step may be omitted. The example above assumes a class C subnet mask.

2.6 Configure login credentials

```
FTOS (conf) #username admin password yourpassword privilege 15

FTOS (conf) #enable password yourpassword
```

2.7 Enable switch ports

Option 1: You can enable ports individually by entering the port number

```
FTOS (conf) #interface tengigabitethernet 0/0

FTOS (conf-if-te-0/0) #switchport

FTOS (conf-if-te-0/0) #no shutdown

FTOS (conf-if-te-0/0) #exit
```

Option 2: You can enable multiple ports at once using the "range" parameter




```
FTOS(conf) #interface range tengigabitethernet 0/0 - 47
```

Note: The message below will be displayed if there are FC ports.

% Warning: Non-existing ports (non configured) are ingnored by interface-range

```
FTOS(conf-if-range-te-0/0-47) #switchport
```

```
FTOS(conf-if-range-te-0/0-47) #no shutdown
```

2.8 Enable Jumbo Frames

```
FTOS(conf-if-range-te-0/0-47) #mtu 12000
```

2.9 Enable flow control

```
FTOS(conf-if-range-te-0/0-47) #flowcontrol rx on tx off
```

2.10 Configure spanning tree on edge ports

```
FTOS(conf-if-range-te-0/0-47) #spanning-tree rstp edge-port
```

```
FTOS(conf-if-range-te-0/0-47) #exit
```

2.11 Configure port channel for LAG

These commands create a port channel or LAG.

```
FTOS(conf) #interface Port-channel 1
```

```
FTOS(conf-if-po-1) #mtu 12000
```

```
FTOS(conf-if-po-1) #switchport
```

```
FTOS(conf-if-po-1) #no shutdown
```

```
FTOS(conf-if-po-1) #exit
```

2.12 Configure QSFP ports for LAG

This step assigns the 40Gb QSFP ports to the Port Channel.

```
FTOS(conf) #interface range fortyGigE 0/48 , fortyGigE 0/52
```

```
FTOS(conf-if-range-fo-0/48,fo-0/52) #mtu 12000
```

```
FTOS(conf-if-range-fo-0/48,fo-0/52) #no shutdown
```



```
FTOS (conf-if-range-fo-0/48,fo-0/52) #flowcontrol rx on tx off

FTOS (conf-if-range-fo-0/48,fo-0/52) #port-channel-protocol lacp

FTOS (conf-if-range-fo-0/48,fo-0/52-lacp) #port-channel 1 mode active

FTOS (conf-if-range-fo-0/48,fo-0/52-lacp) #exit

FTOS (conf-if-range-fo-0/48,fo-0/52) #exit

FTOS (conf) #exit
```

2.13 Save configuration

```
FTOS#copy running-config startup-config
```

2.14 Configure additional switch

Repeat the commands from Section 2 to configure the second switch.



3 Configure Data Center Bridging (DCB) (Optional)

DCB is enabled by default. This section shows the steps required to configure DCB.

Note: You must complete the Dell recommended switch configuration steps in Sections 2.1 to 2.14 before configuring the switch for DCB mode.

3.1 Disable 802.3x flowcontrol on SFP+ ports

FTOS#**configure**

FTOS (conf) #**interface range tengigabitethernet 0/0 - 47**

FTOS (conf-if-range-te-0/0-47) #**no flowcontrol rx on tx off**

FTOS (conf-if-range-te-0/0-47) #**exit**

3.2 Disable 802.3x flowcontrol on all QSFP ports

FTOS (conf) #**interface range fortyGigE 0/48 - 60**

FTOS (conf-if-range-fo-0/48-60) #**no flowcontrol rx on tx off**

FTOS (conf-if-range-fo-0/48-60) #**exit**

3.3 Enable DCB

FTOS (conf) #**dcb enable**

FTOS (conf) #**exit**

FTOS#**copy running-config startup-config**

3.4 Create tagged VLAN for all ports and port-channels

Note: The arrays will temporarily lose communication with each other when a non-default VLAN is configured on the switch. Therefore, the appropriate VLAN must be configured on the arrays to resume array communications. All hosts NICS must also be configured with the same VLAN.

FTOS#**configure**

FTOS (conf) #**interface vlan *vlan-id***

Note: You must supply a VLAN id. The valid range is 2-4093.

FTOS (conf-if-vl-vlan-id*) #**no shutdown**



```
FTOS (conf-if-vl-vlan-id*)#tagged tengigabitethernet 0/0-47
```

Note: For the previous command, you must supply a valid range of populated ports. For example, if only two Ethernet modules are installed, then the valid range would be: **tengigabitethernet 0/0-23**

```
FTOS (conf-if-vl-vlan-id*)#tagged port-channel 1
```

```
FTOS (conf-if-vl-vlan-id*)#exit
```

3.5 Configure DCB policies

```
FTOS(conf)#dcb-map profile-name
```

```
FTOS(conf-dcbmap-profile-name*)#priority-group 0 bandwidth 50 pfc off
```

```
FTOS(conf-dcbmap-profile-name*)#priority-group 1 bandwidth 50 pfc on
```

Note: The sum of the bandwidth percentages must be equal to 100.

```
FTOS(conf-dcbmap-profile-name*)#priority-pgid 0 0 0 0 1 0 0 0
```

```
FTOS(conf-dcb-profile-name*)#exit
```

3.6 Apply policies to switch ports

```
FTOS(conf)#interface range tengigabitethernet 0/0 - 47
```

```
FTOS(conf-if-range-te-0/0-47)#dcb-map profile-name
```

```
FTOS(conf-if-range-te-0/0-47)#exit
```

```
FTOS(conf)#interface range fortyGigE 0/48 - 60
```

```
FTOS(conf-if-range-fo-0/48-60)#dcb-map profile-name
```

```
FTOS(conf-if-range-fo-0/48-60)#exit
```

```
FTOS(conf)#exit
```

3.7 Save configuration

```
FTOS#copy running-config startup-config
```

3.8 Configure additional switches

Repeat the commands from Section 3 to configure DCB on additional switches.



4 Reverting from DCB to non-DCB configuration (Optional)

One method to revert from a DCB configured switch to a non-DCB configured switch is to delete the current configuration (startup-config) and follow the steps in Section 2. If deleting the current configuration is not an option, then use the following procedure to unconfigure DCB and enable standard flow control.

Note: This is a disruptive operation that will require down time. The arrays will temporarily lose communication with each other. Power off all arrays and hosts connected to the SAN before proceeding with these steps.

4.1 Disable DCB

```
FTOS#configure
```

```
FTOS (conf) #no dcb enable
```

```
FTOS (conf) #exit
```

4.2 Remove DCB policies and apply standard flow control

```
FTOS#configure
```

```
FTOS (conf) #interface range tengigabitethernet 0/0 - 47
```

```
FTOS (conf-if-range-te-0/0-47) #no dcb-map profile-name
```

```
FTOS (conf-if-range-te-0/0-47) #flowcontrol rx on tx off
```

```
FTOS (conf-if-range-te-0/0-47) #exit
```

```
FTOS (conf) #interface range fortyGigE 0/48 - 60
```

```
FTOS (conf-if-range-fo-0/48-60) #no dcb-map profile-name
```

```
FTOS (conf-if-range-fo-0/48-60) #flowcontrol rx on tx off
```

```
FTOS (conf-if-range-fo-0/48-60) #exit
```

4.3 Revert to default VLAN ID on switch and arrays

Once DCB is disabled on the switch, host ports and the EqualLogic arrays will no longer use the VLAN ID that was configured when DCB was enabled. The arrays revert to the default or native VLAN. Therefore, a valid VLAN must be configured for all host servers, switches, and EqualLogic array members. A valid VLAN can use the default VLAN ID (typically 0 or 1) or a specific VLAN can be configured (for example, VLAN 100). If a non-default VLAN is configured, then any ports connected to the arrays must be configured as "untagged".



Note: Host NICS must also be updated with matching VLAN information.

Use the steps below to configure the default VLAN on the switch.

```
FTOS#configure
```

```
FTOS (conf) #no interface vlan vlan-id
```

```
FTOS (conf) #exit
```

4.4 Save configuration

```
FTOS#copy running-config startup-config
```

4.5 Configure additional switch

Repeat the commands in Section 4 to disable DCB on any additional switches.



5 Configure UPM ports as Ethernet Pass-through (Optional)

The FC ports on the Unified Port Module (UPM) can be configured as Ethernet Pass-Through. The 12 ports are divided into six port groups numbered 0-5. Two ports in each port group can be configured separately as FC or Ethernet Pass-through.

Note: This operation requires a reload for the changes to take effect.

5.1 View the current configuration

Use this command to view the current mode of the ports and also the port group mapping.

```
FTOS# show system stack-unit 0 port-group portmode
```

PortGroupId	Ports	Mode (Curr Boot)	Mode (Next Boot)
0	0,1	FC	FC
1	2,3	FC	FC
2	4,5	FC	FC
3	6,7	FC	FC
4	8,9	FC	FC
5	10,11	FC	FC

5.2 Configure port group 0 as Ethernet Pass-through

```
FTOS(conf)# stack-unit 0 port-group 0 portmode Ethernet
```

Changing port mode on slot 0 port-group 0 will make interface configs of 0 and 1 obsolete after a save and reload.

```
[confirm yes/no]:yes
```

Please save and reload for the changes to take effect.

Note: Save and reload is required.



5.3 To revert Ethernet Pass-through to FC ports

```
FTOS(conf)# no stack-unit 0 port-group 0 portmode ethernet
```

Changing port mode on slot 0 port-group 0 will make interface configs of 0 and 1 obsolete after a save and reload.

```
[confirm yes/no]:yes
```

Please save and reload for the changes to take effect.

Note: Save and reload is required.



Additional resources

[Support.dell.com](http://support.dell.com) is focused on meeting your needs with proven services and support.

[DellTechCenter.com](http://delltechcenter.com) is an IT Community where you can connect with Dell Customers and Dell employees for the purpose of sharing knowledge, best practices, and information about Dell products and your installations.

Referenced or recommended Dell publications:

- Dell EqualLogic Configuration Guide:
<http://en.community.dell.com/techcenter/storage/w/wiki/equallogic-configuration-guide.aspx>
- Dell EqualLogic Compatibility Matrix
<http://en.community.dell.com/techcenter/storage/w/wiki/2661.equallogic-compatibility-matrix.aspx>

For EqualLogic best practices white papers, reference architectures, and sizing guidelines for enterprise applications and SANs, refer to Storage Infrastructure and Solutions Team Publications at:

- <http://dell.to/sM4hJT>

