



Dell Networking S4810 and Dell Force10 S4810

Switch Configuration Guide for EqualLogic SANs

Dell Storage Engineering
January 2016

Revisions

Date	Description
November 2012	Initial release
September 2013	Updated for Dell networking branding
February 2014	Updated for FTOS v9.3.0.0
April 2014	Minor update
December 2015	Updated for FTOS v9.9.0.0

THIS WHITE PAPER IS FOR INFORMATIONAL PURPOSES ONLY, AND MAY CONTAIN TYPOGRAPHICAL ERRORS AND TECHNICAL INACCURACIES. THE CONTENT IS PROVIDED AS IS, WITHOUT EXPRESS OR IMPLIED WARRANTIES OF ANY KIND.
Copyright © 2012-2016 Dell Inc. All rights reserved. Dell and the Dell logo are trademarks of Dell Inc. in the United States and/or other jurisdictions. All other marks and names mentioned herein may be trademarks of their respective companies.



Table of contents

Revisions.....	2
1 Introduction.....	5
1.1 Audience.....	5
1.2 Switch details.....	5
1.3 Cabling diagram.....	6
2 Dell recommended switch configuration.....	7
2.1 Hardware configuration.....	7
2.2 Delete startup configuration.....	7
2.3 Configure out of band (OOB) management port.....	7
2.4 Configure route for OOB management port (optional).....	8
2.5 Configure login credentials.....	8
2.6 Enable switch ports.....	8
2.7 Enable Jumbo Frames.....	8
2.8 Configure flow control.....	8
2.9 Configure spanning tree on edge ports.....	9
2.10 Configure port channel for LAG.....	9
2.11 Configure QSFP ports for LAG.....	9
2.12 Save configuration.....	9
2.13 Configure additional switch.....	9
3 Configure Data Center Bridging (DCB) (Optional).....	10
3.1 Disable 802.3x flowcontrol on SFP+ ports.....	10
3.2 Disable 802.3x flowcontrol on QSFP ports.....	10
3.3 Enable DCB and reload.....	10
3.4 Create tagged VLAN for all ports and port-channels.....	10
3.5 Configure DCB policies.....	11
3.6 Apply policies to switch ports.....	11
3.7 Save configuration.....	11
3.8 Configure additional switches.....	11
4 Reverting from DCB to non-DCB configuration (Optional).....	12
4.1 Disable DCB.....	12
4.2 Remove DCB policies and apply standard flow control.....	12



4.3	Revert to default VLAN ID on switch and arrays	12
4.4	Save configuration	13
4.5	Reload	13
4.6	Verify DCB status.....	13
4.7	Configure additional switch	13
5	Optional stack configuration	14
5.1	Delete startup configuration on first switch	14
5.2	Configure stack on the first switch	14
5.3	Delete startup configuration on the second switch.....	14
5.4	Configure stack on the second switch	15
5.5	Verify stack configuration.....	15
5.6	Configure out of band (OOB) management port	15
5.7	Configure route for OOB management port (optional)	15
5.8	Configure login credentials.....	16
5.9	Configuring switch ports	16
5.10	Save configuration and reload.....	16
A	Additional resources.....	17



1 Introduction

This document illustrates how to configure Dell™ Networking S4810 and Dell Force10™ S4810 switches for use with EqualLogic™ PS Series storage using Dell best practices. The recommended configuration uses link aggregation groups (LAGs) for inter-switch connections. Optional steps are provided in Section 3 to enable Data Center Bridging (DCB) and for stack configurations.

If you are following the **Rapid EqualLogic Configuration** steps at <http://en.community.dell.com/techcenter/storage/w/wiki/3615.rapid-equallogic-configuration-portal-by-sis.aspx>, use sections 1 and 2, or 1 and 5 in this Switch Configuration Guide.

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 and Dell Force10 S4810	
Switch vendor	Dell
Switch model	S4810
Switch firmware	9.9.0.0 or later

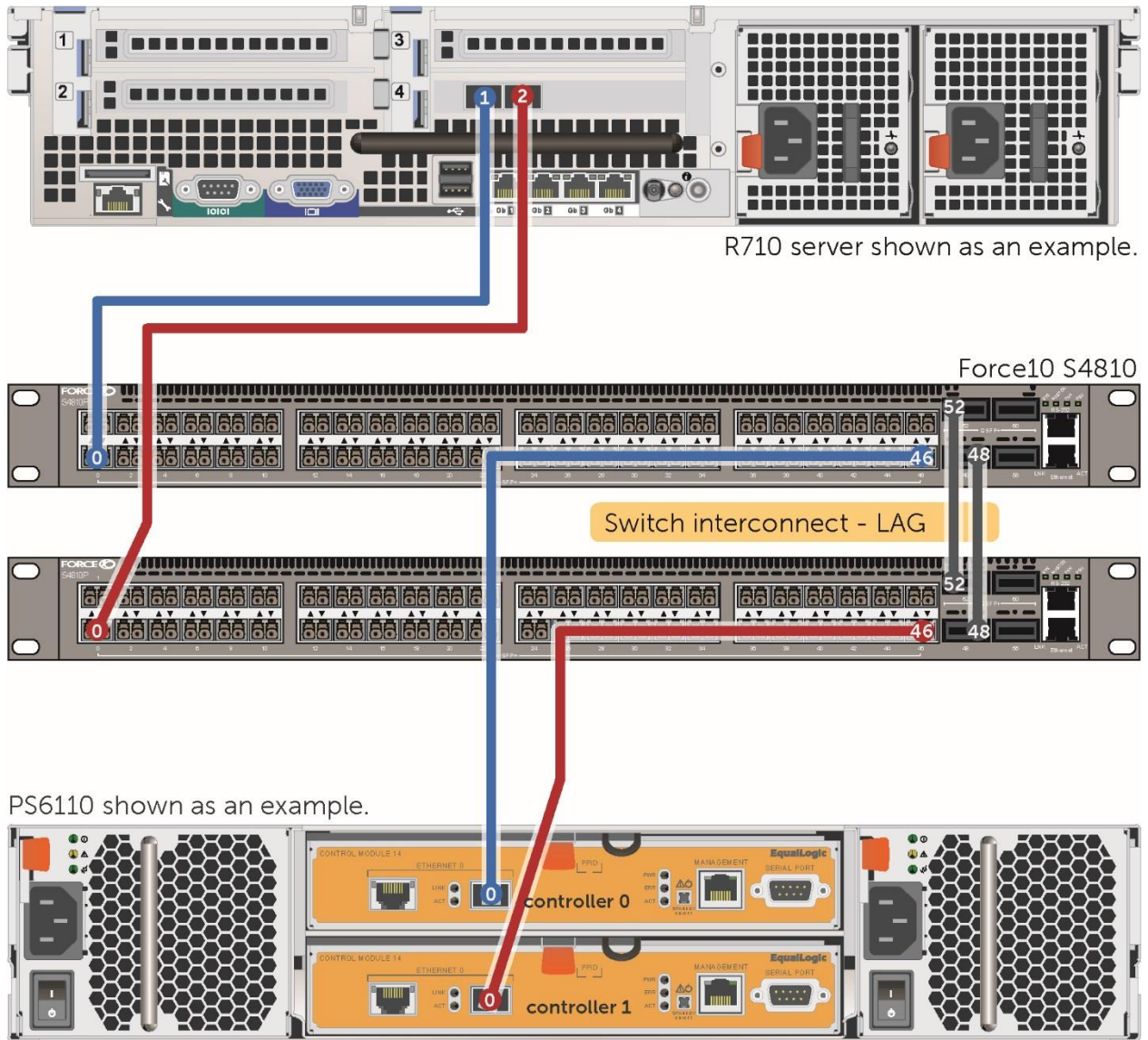
Note: For proper functionality, the switch must be at the switch firmware version shown in the table above before proceeding with this configuration. Using previous firmware versions may have unpredictable results.

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.



R710 server shown as an example.

Force10 S4810

Switch interconnect - LAG

PS6110 shown as an example.

Figure 1 Cabling diagram



2 Dell recommended switch configuration

These steps show you how to configure two S4810 switches with a Link Aggregation Group (LAG). The switches are interconnected using two of the 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 Putty or another terminal utility, open a serial connection session to the switch.
4. Open your terminal emulator and configure it to use the serial port (usually COM1 but this may vary depending on your 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 switch2 and port 52 on switch 1 to port 52 on switch 2. See this configuration in Figure 1.

2.2 Delete startup configuration

Note: The following commands will delete all configuration settings.

```
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 Configure out of band (OOB) management port

```
FTOS>enable
```

After the startup configuration is deleted, the factory default Enable mode password is **force10**.

```
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
```



2.4 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.

2.5 Configure login credentials

```
FTOS (conf) #username admin privilege 15 password 0 yourpassword  
FTOS (conf) #enable password level 15 0 yourpassword
```

2.6 Enable switch ports

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

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

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

```
FTOS#configure  
FTOS (conf) #interface range tengigabitethernet 0/0 - 47  
FTOS (conf -if-range-te-0/0-47) #switchport  
FTOS (conf -if-range-te-0/0-47) #no shutdown  
FTOS (conf -if-range-te-0/0-47) #exit  
FTOS (conf) #exit
```

2.7 Enable Jumbo Frames

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

2.8 Configure flow control

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



2.9 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
FTOS (conf) #protocol spanning-tree rstp
FTOS (conf-rstp) #no disable
FTOS (conf-rstp) #exit
```

2.10 Configure port channel for LAG

These commands configure the switch interconnect as a 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
```

2.11 Configure QSFP ports for LAG

These commands assigns 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) #no ip address
FTOS (conf-if-range-fo-0/48,fo-0/52) #mtu 12000
FTOS (conf-if-range-te-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
```

2.12 Save configuration

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

2.13 Configure additional switch

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

Note: The preceding procedure places all switch ports in the default VLAN. If you prefer to place ports in a non-default VLAN, refer to the documentation for your switch.



3 Configure Data Center Bridging (DCB) (Optional)

To enable DCB mode on the switch, use the following commands.

Note: You must complete the Dell recommended switch configuration steps in Sections 2.1 to 2.12 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 QSFP ports

```
FTOS (conf) # interface range fortyGigE 0/48 , fortyGigE 0/52
FTOS (conf-if-range-fo-0/48-52) #no flowcontrol rx on tx off
FTOS (conf-if-range-fo-0/48-52) #exit
```

3.3 Enable DCB and reload

```
FTOS (conf) #dcb enable
FTOS (conf) #exit
FTOS#copy running-config startup-config

FTOS#reload
```

Note: The switch will reboot.

3.4 Create tagged VLAN for all ports and port-channels

```
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
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 ten 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 , fortyGigE 0/52
FTOS (conf-if-range-fo-0/48,fo-0/52) # dcb-map profile-name
FTOS (conf-if-range-fo-0/48,fo-0/52) #exit
FTOS (conf) #exit
```

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

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 requires 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 , fortyGigE 0/52
FTOS (conf-if-range-fo-0/48,fo-0/52) #no dcb-map profile-name
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) #exit
FTOS (conf) #exit
```

4.3 Revert to default VLAN ID on switch and arrays

Once DCB is disabled on the switch, the EqualLogic arrays will no longer use the VLAN ID that was configured when DCB was enabled. The arrays will 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 or native 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 native VLAN on the switch.



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

4.4 Save configuration

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

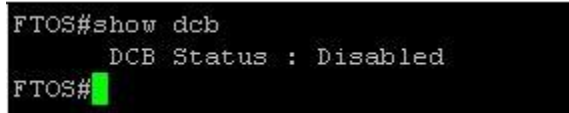
4.5 Reload

```
FTOS#reload  
System configuration has been modified. Save? [yes/no]yes  
Proceed with reload [confirm yes/no]yes
```

Note: The switch will reboot.

4.6 Verify DCB status

```
FTOS#show dcb
```



```
FTOS#show dcb  
      DCB Status : Disabled  
FTOS#
```

Figure 2 Screen shot of show DCB

4.7 Configure additional switch

Repeat the commands from section 4 to disable DCB on any additional switches.

5 Optional stack configuration

Note: If you wish to use a stack configuration instead of LAG, follow the instructions below instead of Section 2.

One advantage of stacked switches is that they can be managed as a single switch; however firmware updates will update all members of the stack simultaneously and therefore should only be done during planned downtime.

5.1 Delete startup configuration on first switch

```
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.

5.2 Configure stack on the first switch

```
FTOS>enable
```

After the startup configuration is deleted, the factory default Enable mode password is **force10**.

```
FTOS#config
FTOS (conf) #stack-unit 0 priority 1
FTOS (conf) #stack-unit 0 stack-group 12
FTOS (conf) #stack-unit 0 stack-group 13
FTOS (conf) #exit
FTOS#copy running-config startup-config
FTOS#reload
```

5.3 Delete startup configuration on the second switch

```
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.

5.4 Configure stack on the second switch

```
FTOS>enable
FTOS#stack-unit 0 renumber 1
```

Note: The switch will reboot.

```
FTOS#config
FTOS (conf) #stack-unit 1 priority 1
FTOS (conf) #stack-unit 1 stack-group 12
FTOS (conf) #stack-unit 1 stack-group 13
FTOS (conf) #exit
FTOS#copy running-config startup-config
FTOS#reload
```

5.5 Verify stack configuration

From the first switch (Master) CLI, confirm that the stack has formed:

```
FTOS#show redundancy
```

Note: The switch front panel will show a steady light in the MASTER LED for the Master unit and a blinking light for the Standby unit. All of the following configuration step must be performed from the master switch.

5.6 Configure out of band (OOB) management port

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

5.7 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.



5.8 Configure login credentials

```
FTOS(conf)#username admin privilege 15 password 0 yourpassword  
FTOS(conf)#enable password level 15 0 yourpassword
```

5.9 Configuring switch ports

```
FTOS(conf)#interface range tengigabitethernet 0/0 - 47  
FTOS(conf-if-range-te-0/0-47)#mtu 12000  
FTOS(conf-if-range-te-0/0-47)#switchport  
FTOS(conf-if-range-te-0/0-47)#spanning-tree rstp edge-port  
FTOS(conf-if-range-te-0/0-47)#flowcontrol rx on tx off  
FTOS(conf-if-range-te-0/0-47)#no shutdown  
FTOS(conf-if-range-te-0/0-47)#exit  
FTOS(conf)#interface range tengigabitethernet 1/0 - 47  
FTOS(conf-if-range-te-1/0-47)#mtu 12000  
FTOS(conf-if-range-te-1/0-47)#switchport  
FTOS(conf-if-range-te-1/0-47)#spanning-tree rstp edge-port  
FTOS(conf-if-range-te-1/0-47)#flowcontrol rx on tx off  
FTOS(conf-if-range-te-1/0-47)#no shut  
FTOS(conf-if-range-te-1/0-47)#exit  
FTOS(conf)#protocol spanning-tree rstp  
FTOS(conf-rstp)#no disable  
FTOS(conf-rstp)#exit  
FTOS(conf)#exit
```

5.10 Save configuration and reload

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

Reload the stack to allow settings to take effect:

```
FTOS#reload
```

Note: The preceding procedure places all switch ports in the default VLAN. If you prefer to place ports in a non-default VLAN, refer to the documentation for your switch.



A Additional resources

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

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>

