**Application Notes** 

# **hp** StorageWorks Fabric Interoperability:

# Merging Fabrics Based on M-Series and B-Series Fibre Channel Switches

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Second Edition (November 2003)

Part Number: AA-RUQQB-TE

This document summarizes information for planning a merge of separate SAN fabrics, where one fabric consists of M-Series Product Line switches, and the other SAN fabric consists of B-Series Product Line switches. This guide provides the techniques and best practices for such an implementation.

For the latest version of these Application Notes and other SAN documentation, access the HP storage website at: <a href="http://www.hp.com/country/us/eng/prodserv/storage.html">http://www.hp.com/country/us/eng/prodserv/storage.html</a>.



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## About this Document

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## Topics

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- Checklist for Merging Fabrics, page 4
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## **Intended Audience**

This document is intended for customers who have separate SAN fabrics composed of M-Series or B-Series Fibre Channel switches, and who wish to merge these fabrics.

## **Related Documentation**

Related documents with relevant information include:

- Online Help/User Guide (accessible via the Web browser interface)
- Installation Guide

Additional documentation, including white papers and best practices documents, are available via the HP website at: <u>http://www.hp.com</u>..

# **Checklist for Merging Fabrics**

Complete the steps below before actually merging the fabrics:

- Verify the correct version of firmware is installed on the HP M-Series and HP B-Series products and also the correct version of High Availability Fabric Manager (HAFM) is installed.
- **Ensure** there are no duplicate domain ID's.
- Select an M-Series Director as the Principal Switch.
- Ensure there are no duplicate zone/zone set names.
- Ensure that B-Series and M-Series products have fabric zoning configured with WWN.
- Ensure that M-Series and B-Series products comply with proper zone naming.
- Ensure the fabrics are in the proper operating mode.
- Ensure HP default settings are in effect on both B-Series and M-Series switches
- Ensure M-Series ports are 1 Gbps for B-Series SAN Switch 8 and 16 models
- Ensure M-Series ports are 2 Gbps for the B-Series SAN Switch 2/8 and 2/16 models
- Disable Management Server if it is present
- Ensure Fabric Binding and Enterprise Fabric Mode are disabled
- Add the switches to the fabric one at a time.
- Use HAFM for Zoning Activities.

## Step 1: Verify Application and Firmware Versions

Before merging the two fabrics (M-Series and B-Series), make sure:

- The correct versions of HAFM is installed.
- The correct versions of firmware are installed.

Refer to Tables 2, 3, 4, and 5 to determine what versions are needed and if necessary, obtain the latest versions of applications and firmware.

## Step 2: Ensure There Are No Duplicate Domain ID's

When merging fabrics, you must ensure that no duplicate domain ID's exist among the switches between the two fabrics. For example, Figure 1 on page 5 shows two fabrics and the domain ID's assigned to the switches in each fabric. In the example, the M-Series domain IDs of 1 and 2 are equivalent to the B-Series domain IDs of 97 and 98. If you tried to merge these two fabrics, the merger would fail as the ISL's would segment due to the duplicate domain ID's.

A requirement for merging fabrics is that all domain ID's must be unique. In the example, you would change the M-Series domain ID's. See Figure 2 on page 5 for acceptable domain IDs. Please note that M-Series and B-Series use different numbering schemes for their domain ID numbers. For example, the M-Series domain 1 is equivalent to B-Series domain 97. See Table 1 on page 6 for a chart showing the correlation between M-Series's and B-Series's domain ID's.



Figure 1: Example of Duplicate Domain IDs (M-Series Conflicts with B-Series)



Figure 2: Example of Unique Domain IDs (M-Series Changed to Domains 4 & 5)

M-Series Domain ID Number	B-Series Domain ID Number
1	97
2	98
3	99
4	100
5	101
6	102
7	103
8	104
9	105
10	106
11	107
12	108
13	109
14	110
15	111
16	112
17	113
18	114
19	115
20	116
21	117
22	118
23	119
24	120
25	121
26	122
27	123
28	124
29	125
30	126
31	127

## Table 1: Domain ID Correlation Table (all numbers are Base 10)

#### **HAFM Method**

To change the domain ID on a M-Series switch, use HAFM or embedded webtools. This is an OFFLINE operation; therefore, plan accordingly. For B-Series switches, open a B-Series TELNET session.

To change an M-Series domain ID, use HAFM. Next, perform the following steps:

**Note:** Setting the product offline terminates all Fibre Channel connections.

- 1. From HAFM, select Maintenance, Set Online State
- 2. From the Set Online State dialog box, select Set Offline.
- 3. From HAFM, select Configure, Operating Parameters, Switch Parameters.
- 4. From the Configure Switch Parameters dialog box, change the number in Domain ID Preferred box to the appropriate domain ID. (You may want to review Table 1 on page 6 for information on M-Series and B-Series domain IDs before changing the domain ID.) Click Activate.



Figure 3: HAFM: Selecting Configure Operating Parameters

i	🚡 Intrepid 6064: Configure Switch Parameters 🛛 🔀									
	Domain ID	Operating Mode								
	Preferred 1	• Open Systems								
	🔲 Insistent	⊖ s/ <u>3</u> 90								
	<u>Rerouting Delay</u>									
	Domain RSCN's									
	Director Speed: 2 Gb/sec 💌									
		Activate Cancel								

Figure 4: HAFM: Changing Domain ID Preferred Field

The following provides a method of changing the domain IDs for B-Series switches. Follow these steps:

You can use a TELNET session to configure the operating parameters on a B-series product. This requires disabling the B-series products, so plan accordingly. The following is an example of this process:

```
login: admin
Password:
admin>switchdisable
admin>configure
Configure...
Fabric parameters (yes, y, no, n): [no] y
Domain: (97..127)[117]97[127]
```

**Note:** Refer to Table 1 on page 6.

```
BB credit: (1..16)[16]

R_A_TOV: (4000..120000)[10000]

E_D_TOV: (1000..5000)[2000]

Data field size: (256..2112)[2112]

Sequence Level Switching: (0..1)[0]

Disable Device Probing: (0..1)[0]

Suppress Class F Traffic: (0..1)[0]

SYNC 10 mode: (0..1)[0]

VC Encoded Address Mode: (0..1)[0]

Per-frame Route Priority (0..1)[0]

Long Distance Fabric (0..1)[0]
```

Virtual Channel parameters (yes, y, no, n):[no] Switch Operating Mode (yes, y, no, n):[no] Zoning Operation parameters (yes, y, no, n):[no] Arbitrated Loop parameters (yes, y, no, n):[no] System services (yes, y, no, n):[no] Portlog events enable (yes, y, no, n):[no] Committing configuration...done.

admin>switchenable

#### **EWS Method**

To use EWS to change domain ID, perform these steps:

1. Access the M-Series product, by typing the IP address of the M-Series product into the Web Address field on your web browser. For example, http://10.10.10.1.

A dialog box similar to the following displays.

>>>	Please type y	our user name and password.
3	Site:	172.22.102.45
	Realm	EWS Oper Access
	User Name	
	Password	
	Save this	password in your password list

Figure 5: EWS: Entering Network User Name and Password

- 2. From the Enter Network Password dialog box, enter the User Name and Password and click OK.
- 3. Select the Configure option and the following screen displays.



## Figure 6: EWS: Selecting Configure Option

4. Select the Switch tab and the following screen displays.

1	Configu	ire:	Refresh-3/17/03 at 14:01:47	
	· · · ·			
	Ports	Switch Management Zoning	Security Performance	
	Ident	ification Dute Time Parameters Fa	bric Parameters Network	
		and the second secon		
/iew	Name:	Teton_102_45		
	Description:	Fibre Channel Switch		
Configure	Location:	End User Premise (please configure)		
States and States	Contact:	End User Contact (please contigure)		
Aonitor	Activate Cancel			
marations	Contraction and	<b>*</b>		
perations				
lelo				
			and the second	

Figure 7: EWS: Selecting Switch Tab

5. Select the Parameters tab and the following screen displays.

dress 👔 Http://172.2	2.102.45/dg_sw_opparms_fs.htm	• CGo Links '
	Configure: Refresh-3 / 17 / 03 at 14:05 4	6
	Ports Switch Management Zoning Security Performance	
	Identification Date / Time Parameters Fabric Parameters Network	
	Preferred Domain ID:	
View	Insistent Domain ID: Disabled V	
Configure	Rerouting Delay: Disabled	Contraction of the
	Suppress RSCN's on Zone set activations: Disabled	
Monitor	Arthete Canal	
Operations	- Concer	A State of the second
titele.		
Freip		
		Contraction of the
		Contract International Account Account of the second se Second second s Second second seco

Figure 8: EWS: Selecting Parameters Tab

6. In the Preferred Domain ID field, enter the domain ID for the switch you want to use. In the example above, the domain ID is 4.

## Step 3: Select M-Series Director as the Principal Switch

You must select an M-Series Director as the Principal Switch. Below are reasons for making the M-Series Director the Principal Switch:

- Reduces build fabric traffic and hop count. If the M-Series Director is the Principal Switch, then build fabric traffic will go directly from the Director to B-series switches. If the B-series product is the Principal Switch, build fabric traffic will first go from B-series through the M-Series Director and then to B-series. This results in an additional hop in traffic that is not needed.
- Ensures that Fabric Address Zoning is not used.

At present, HP only supports an M-Series switch as a principal switch.



Figure 9: Core/Edge SAN Configuration with M-Series Director at the Core

There are two methods to select M-Series Director as the principal switch. HP recommends that you use HAFM. You can also use EWS.

## HAFM Method

To use HAFM, to select the M-Series switch as the Principal Switch, then perform these steps. Please note, this is an OFFLINE operation, so plan accordingly.

Caution: Setting the product offline terminates all Fibre Channel connections.

- 1. From HAFM, select Maintenance, Set Online State
- 2. From the Set Online State dialog box, select Set Offline.
- 3. Using HAFM, select Configure Operating Parameters, Fabric Parameters.
- 4. In the Configure Fabric Parameters dialog box, change Switch Priority to Principal.

Product Configure Logs Maintenance Help	
Hardwar Identification e Fru List	
Intrepi	
Status Part Parameters	
State State State State	
Mananoment Senjer	
Features	
Date/Time	
Threshold Alerts	
Export Configuration Report	
Enable Web Server     *	
🗹 Enable Telnet	
Front view Rear View	
	_
Configure the fabric operating parameters	

Figure 10: HAFM: Selecting Configure Operating Parameters and Fabric Parameters

📻 Intrepid 6064: (	Configure Fabric Parameters 🛛 🗙
BB_Credit:	16
R_A_TOV:	100 (tenths of a second)
E_D_TOV:	20 (tenths of a second)
Switch Priority:	Principal 👻
Interop Mode:	Open Fabric 1.0 👻
	Activate Cancel

Figure 11: HAFM: Changing Switch Priority to Principal

## **EWS Method**

To use EWS, to select the M-Series as the Principal Switch, perform these steps.

1. Access the M-Series product, by typing the IP address of the M-Series product into the Web Address field on your web browser. For example, http://10.10.10.1.

A dialog box similar to the following displays.

🔊 P	lease type.	your user name	and password.	
s	ite:	172.22.102	45	
F	Realm	EWS Oper	Access	
Ľ	ser Name			
E	assword			
Г	Save this	password in y	our password list	

#### Figure 12: EWS: Entering Network User Name and Password

- 2. From the Enter Network Password dialog box, enter the User Name and Password and click OK.
- 3. Select the Configure option and the following screen displays.



#### Figure 13: EWS: Selecting Configure Option

4. Select the Switch tab and the following screen displays.

Person +	14										Section.		10.00			d	ØSen	Looks Help	orites	idit <u>v</u> iew Fav
Wrew     Configure:     International Switch       Monitor     Operations       Help										,	• E 📿	ī.	5-0	3	edia	tes (JM	Favor	Search	2 3	
View       Orafigure:       Determine	Links	∂G0	é	-			-	-							Name of Street, or other	htm	fication_fs	/cfg_sw_ident	2.102.4	bttp://172.2
Verw         Configure         Verw         Configure         Monitor         Operations         Help				Self-		Concernant Name											-			
Ports     Switch     Management     Zoning     Security     Performance       Identification     Data     Time     Parameters     Performance       View     Description:     Fibre OneaneSwitch     Description:     PerformaneSwitch       Location:     End User Pome (please configure)       Monitor     Activate     Cancel					01:47	17/03 at 14:01	-31	esh	Refr							re:	nfigu	Co		
Identification     Date Time Parameters     Patrice Parameters     Network						erformance	1	rity	Secu	5]	Zoning	I	agemer	Man	ch	Swit	orts	F	1	
View Configure Monitor Operations Help						Network	ers	mal	ie Para	Fab	neters	um	no Pa	iter : Ti	Du	ification	Ident			
View     Name:     Teton_102_46       Description:     Fibre Channel Switch       Location:     End User Premise (please configure)       Monitor     Activate       Operations																				
Configure Location: Fibre Channel Switch Location: End User Premise (please configure) Monitor Operations Help											ALL DELTA			45	102	Teton		lame:		w
Configure     Location:     End User Pennise (please configure)       Monitor     End User Contact (please configure)       Operations     Activate       Help													ich	nel Swi	Chanr	Fibre 0	n:	escriptio		
Monitor Operations Help											ntigure)	con	(pleas	remise	ser P	End U		ocation:		ifigure
Monitor Operations Help											nfigure)	conf	please	ontact	ser C	EndU		ontact:		
Operations Help																1	Coursel	I		nitor
Operations Help																	Cancer	Activate		
Help																				erations
Help																				
																				P

#### Figure 14: EWS: Selecting Switch Tab

5. From the Switch screen, select the Fabric Parameters tab and the following screen displays.

	Configure:	
	Ports Switch Management Zoning Security Performance Identification Date (Time Parameters Fabric Parameters Network	
View	R_A_TOV:         100         (tenths of a second)           E D TOV:         20         (tenths of a second)	
Configure	Switch Priority: Principal  Interop Mode: Open Fabric 1.0	
Monitor		
Operations	Online State: Online Note: The device must be offline to activate any changes	
Help	Activate Cancel	

Figure 15: EWS: Selecting Fabric Parameters Tab

6. From the Fabric Parameters screen, ensure that the Switch Priority field displays Principal.

## Step 4: Check for Duplicate Active Zone Names

To make sure there are no zoning problems, you should verify that there are no duplicate active zone (or zone set) names between M-Series and B-series. If duplicate zone names exist, simply rename one of the zones via HAFM and B-series webtools.

For M-Series and B-series, you can check zone (and zone set) names via HAFM and B-series webtools. Review all active zone sets for any switches you plan to merge together.

## Step 5: Ensure All Switches Are Set Up with WWN Zoning

For merged fabrics, zoning must be managed by using the world-wide naming (WWN) technique. **You cannot use Fabric Addressing, Domain, Port, or Area zoning techniques.** Therefore, the M-Series and B-series cannot have Fabric Addressing, Domain, Port, or Area zoning. If anything other than WWN zoning is used, you must convert to WWN zoning.

## Step 6: Ensure Fabrics Comply with Proper Zone Naming

For heterogeneous fabrics, you must adhere to specific zone naming conventions. Before merging the fabrics, ensure all zones meet the specifications listed below (this information is compliant with ANSI FC-MI and FC-SW2 (Version 5.4 Table 10.4.5.3):

- A name must be between 1 and 64 characters in length.
- All characters must be ASCII characters.
- The first character of a given name must be a letter. A letter is defined as either an upper case (A-Z) or a lower case (a-z) character.
- Any character other than the first character must be a lower case character (a-z), an upper case character (A-Z), a number (0-9), or the following symbol (\_).
- Normally, the following three characters, (\$-^), are allowed for zone names as defined in ANSI SW2 specification, but some switch vendors do not support those characters.

## Step 7: Ensure Proper Operating Mode

There are two methods to select the proper operating mode. HP recommends that you use HAFM. You can also use EWS.

#### **HAFM Method**

To use HAFM, do the following:

To merge B-series and M-Series fabrics, you must use the proper mode. For M-Series, use the "Open Fabric Mode." For B-series, you must use INTEROPMODE 1. Perform these steps:

Caution: Setting the product offline terminates all Fibre Channel connections.

- 1. From HAFM, select Maintenance, Set Online State
- 2. From the Set Online State dialog box, select Set Offline.
- 3. From HAFM, select Configure, Advanced Zoning, Configure Default Zoning Set. Make sure the Default Zone Set is disabled.
- 4. From HAFM, select Configure, Operating Parameters, Fabric Parameters.
- 5. From the Configure Fabric Parameters dialog box, select Open Fabric 1.0.

Intrepid 6064 : Interop FU	JJT-2	
oduct <u>Configure</u> Logs	Maintenance Help	
ardware Port List Node htrepid 6064 Status itatus Fully Operational itate Online	Port Diagnostics Data Collection IPL Set Online State Firmware Library	Director
	Enable E-Mail Notification     Enable Call Home Notification     Backup & Restore Configuration     Reset Configuration	
From	nt View	Rear View
Set switch online sta	te	

Figure 16: HAFM: Selecting Set Online State

📻 Intrepid 6064: Set Online State 🛛 🛛 🗙									
Current state is ONLINE									
	Set Offline	Cancel							

Figure 17: HAFM: Setting Product Offline



Figure 18: HAFM: Disabling (Deactivating) the Default Zone

roduct	Configure Logs Maintenance	Help	
lardwar	Identification	e Fru List	
ntrepi	Operating Parameters	Switch Parameters	
Status State	Switch Binding Ports SMMP Agent Management Server Features Date/Time	Explic Parameters criticity in the second s	
	Inreshold Merts Export Configuration Report If Enable Web Server Enable Teinet		
	Front View	Rear View	

Figure 19: HAFM: Selecting Configure Operating Parameters for Fabric

🔚 Intrepid 6064:	Configure Fabric Parameters 🛛 🗙
BB_Credit:	16
R_A_TOV:	100 (tenths of a second)
E_D_TOV:	20 (tenths of a second)
Switch Priority:	Principal 👻
Interop Mode:	Open Fabric 1.0 👻
	McDATA Fabric 1.0
	Open Fabric 1.0
	Activate Cancel

Figure 20: HAFM: Changing Interop Mode to Open Fabric 1.0

For B-series, use the TELNET session to enable interopmode as show below: [Text in **bold** represents information you must enter or default values you can use. If you need to change the default value, the text will be shown next to the default value in *bold italics*.] Follow these steps:

login: admin
password: xxxxxxxxx
Admin> switchdisable
Admin)> interopmode 1
Admin> reboot
Remember to reboot after changing the mode on B-series.

#### **EWS Method**

You can use EWS to select the proper operating mode. Perform these steps:

1. Access the M-Series product, by typing the IP address of the M-Series product into the Web Address field on your web browser. For example, http://10.10.10.1.

A dialog box similar to the following displays.

<b>?</b> >	Please type y	our user name and password.
3	Site:	172.22.102.45
	Realm	EWS Oper Access
	User Name	
	Password	
	Save this	password in your password list

Figure 21: EWS: Entering Network User Name and Password

2. From the Enter Network Password dialog box, enter the User Name and Password and click OK.



3. Select the Configure option and the following screen displays.

#### Figure 22: EWS: Selecting Configure Option

4. Select the Zoning tab and the following screen displays.

1500: Teton_102_45-1 File Edit View Favorite	Grosoft Internet Explorer s _look _iteb	
Address http://172.22.10	2.45/dg_zoring_zor fs.htm	
	Configure: Refresh-3/17/03 at 13:37:25	
1	Ports Switch Management Zoning Security Performance	
View Configure	Displayed Zoning Configuration is: Saved	
Monitor	Zone Set Name: Inter_Ring_SANav Rename Zone Set	
Operations	Default Zone: Disabled Enable Default Zone	
Help	Disable Zone Set (Place all attached devices in the Default Zone) Discard Changes (Revert to Saved Zoning Configuration)	

Figure 23: EWS: Selecting Zoning Tab

- 5. Ensure that the Default Zone field displays Disabled.
- To return to the Configure screen, select the Configure option and the following screen 6. displays.



#### Figure 24: EWS: Selecting Configure Option

7. Select the Switch tab and the following screen displays.

	Configu	ure:	Refresh-3 / 17 / 03 at 14:01:47	
	Ports	Switch Management Zoning	Security Performance	
	Ident	tification Dute Time Parameters Fa	bric Parameters Network	
/iew	Name:	Teton_102_45		
	Description:	Fibre Channel Switch		
Configure	Location:	End User Premise (please configure)		
	Contact:	End User Contact (please configure)		
lonitor	Anti-ata   Consul			
	Activate Cancer			
Operations				
lein				
	Contraction of the second s Second second s Second second se			

## Figure 25: EWS: Selecting Switch Tab

8. Select the Fabric Parameters tab and the following screen displays.



Figure 26: EWS: Selecting Fabric Parameters Tab

9. In the Interop Mode field, select Open Fabric 1.0 and click Activate.

## Step 8: Ensure Rerouting Delay is Set

The rerouting delay is set by default for HP switches. Verify that all switches have the rerouting delay set.

#### **B-series switches:**

Telnet into the B-series switch and verify:

login: admin
password: xxxxxxx
admin> iodShow
admin> IOD is set

If IOD is not set, use the following command

admin> iodSet admin> iodShow

#### **M-series switches:**

Using EWS or HAFM, verify that "Rerouting Delay" is enabled.

#### EWS:

- 1. Use EWS and select View/Operating Parameters
- 2. Verify "Rerouting Delay" is "Enabled"
- 3. If not select Configure/Switch/Parameters/Rerouting Delay and Enable it.

#### HAFM:

- 1. Use HAFM and select products
- 2. Select Configure/Operating Parameters/Switch Parameters/Rerouting Delay
- 3. Verify "Rerouting Delay" is enabled or selected.
- 4. If not mark it and click on "Activate"

# Step 9: Ensure HP M-Series ISL Ports are 1 Gb for B-Series SAN Switch 8 and 16 Models

It is recommended that the speed of the M-Series ports for the SAN Switch 8 and 16 be lowered. Change the M-Series ports from 2 Gb to 1 Gb when you attach the SAN Switch 8 and 16. This is only required for the ports that attach to the SAN Switch 8 and 16. All other ports on M-Series can remain at 2 Gb.

There are two methods to ensure that M-Series ports for the SAN Switch 8 and 16 are lowered to 1 Gb. HP recommends that you use HAFM. You can also use EWS.

## HAFM Method

To ensure that M-Series ports are 1 Gb, use HAFM and perform these steps:

- 1. From HAFM, select Configure Ports.
- 2. From the Configure Ports dialog box, select 1 Gb for the port you want to attach to the SAN Switch 8 and 16 and click Activate.



Figure 27: HAFM: Selecting Configure Ports

Port#	Name	Blocked	10-100 km	LIN Alerts	Туре	Speed	Port Binding	Bound WWN	
					C PORT	Negotiate			
				P	C DODT	Negotiate			
0						Negotiate			_
4					C DODT	Negotiate			
2					G_PURT	Negotiate			
2				<u>r</u>	G_PORT	Negotiate			
3				Ľ	U_PURT	Negotiate			
4				Ľ	G_PORT	Negotiate			
5				4	G_PORT	Negotiate			
6				V	G_PORT	Negotiate			
7				r	G_PORT	Negotiate			
8				Y	G_PORT	Negotiate			
9				r	G_PORT	Negotiate			
0				r	G_PORT	Negotiate			
1				r	G_PORT	Negotiate			
2				r	G_PORT	1 Gb/sec			
3				1	G_PORT	1 Gh/ 🔻			
4				V	G PORT	1 Ghisec			
5				r	G PORT	1 Chiego			_
6				V	G PORT	Z OWSEL			_
7		Ē	Ē	7	G PORT	Negotiate			-
8			Ē	7	G PORT	Negotizte			
9		Ē	Ē	7	G PORT	Negotiate			-
:0			Ē	V	G PORT	Negotiate			
·		1777	6775		0_10101	negotiete			

Figure 28: HAFM: Verifying Port Speed of 1 Gb is Selected

#### **EWS Method**

To use EWS, to ensure that M-Series ports are 1 Gb, perform these steps:

1. Access the M-Series product, by typing the IP address of the M-Series product into the Web Address field on your web browser. For example, http://10.10.10.1.

A dialog box similar to the following displays.

Enter Nets	work Passwo	ind		<u>?×</u>
<b>&gt;</b>	Please type y	our user name	and password.	
3	Site:	172.22.102	45	
	Realm	EWS Oper/	Access	
	User Name			
	Password			
	Save this	password in y	our password list	
			OK	Cancel

#### Figure 29: EWS: Entering Network User Name and Password

- 2. From the Enter Network Password dialog box, enter the User Name and Password and click OK.
- 3. Select the Configure option and the following screen displays.



Figure 30: EWS: Selecting Configure Option

4. Select the Port Properties tab and the following screen displays.

dress 1 http://172.22.	102.45/cfg_ports_fs.htm						• 260	Links *
	Confi	gure: Switch M	snagement Zc	ning ] S	ecurity Per	7/03 at 14:26:0	4	
View	Port #	Name	Blocked	FAN	Туре	Speed		i
	0			<b>_</b>	G Port 💌	1 Gb/sec 💌		
Configure	1				G Port 💌	1 Gb/sec 💌		
Monitor	2				Gx Port 💌	1 Gb/sec 💌		
	3				Gx Port 💌	1 Gb/sec 💽		
Operations	4				G Port 💌	Negotiate 💌		
	5				G Port 💌	Negotiate 💌		
Help	6				G Port 💌	Negotiate 💌		
	7				G Port 💌	Negotiate 💌		
	8				G Port 💌	Negotiate 💌		
	9				G Port 💌	Negotiate 🚬		
	10				G Port	Negotiate 💌		
	11			<u> </u>	GPort -	Negotiate 💌		
	12				GPon 💌	Negotiate 💌		
					the second se			

Figure 31: EWS: Selecting Port Properties Tab

5. From the Port Properties screen, select the port speed for each port. Any ports connected to a SAN Switch 16 must be set to 1 Gb/sec. For an example, see ports 0-3.

## Step 10: Ensure M-Series Ports are 2 Gb for B-Series SAN Switch 2/8 and 2/16 Models

It is recommended that you configure the speed of the M-Series ports for the B-Series SAN Switch 2/8 and 2/16. Therefore, change the M-Series ports from Negotiate to 2 Gb for attachment of the SAN Switch 2/8 and 2/16. This is only required for the ports attaching to the SAN Switch 2/8 and 2/16 (HP B-series FW 3.1 and above.) All other ports on M-Series can remain at Negotiate. It is also recommended that you configure the ports on the SAN Switch 2/8 and 2/16 for 2 Gb.

For the SAN Switch 2/8 and 2/16, this is accomplished via the *portcfgspeed* command. For example, configuring port 3 to run at 2Gb would be:

```
login: admin
password: xxxxxx
Admin> portcfgspeed 3,2
```

To change the ports on M-Series, use HAFM or EWS (Embedded Web Server)

## **HAFM Method**



Figure 32: HAFM: Select Configure > Ports

膏 Intre	pid 6064: Configure Po	ts							×
Port#	Name	Blocked	10-100 km	LIN Alerts	Туре	Speed	Port Binding	Bound WWN	1
0				~	G_PORT	Negotiate		-	
1				r	G_PORT	Negotiate			100
2				r	G_PORT	Negotiate			
3				r	G_PORT	Negotiate			
4				r	G_PORT	Negotiate			
5				V	G_PORT	Negotiate			1111
6				2	G_PORT	1 Gh/ 🔻			
7				V	G_PORT	1 Gb/sec			
8				r	G_PORT	2 Gb/sec			0.00
9				r	G_PORT	Nonotiato			
10				r	G_PORT	regulate			
11				r	G_PORT	Negotiate			
12				r	G_PORT	Negotiate			
13				r	G_PORT	Negotiate			
14				r	G_PORT	Negotiate			
15				r	G_PORT	Negotiate			
16				r	G_PORT	Negotiate			
17				r	G_PORT	Negotiate			
18				r	G_PORT	Negotiate			
19				r	G_PORT	Negotiate			
20				r	G_PORT	Negotiate			
21				r	G_PORT	Negotiate			
22				r	G_PORT	Negotiate			4
23				V	G PORT	Negotiate			1
								Activate Cancel	]

Figure 33: HAFM: Select Port Speed

## **EWS Method**

First, you will need to take your web browser and point to the IP address of the M-Series product (for example, http://10.10.10.1). Doing so allows you to see a dialog similar to that shown below. Go ahead and logon with your user name and password.

Enter Netv	vork Passwor	d	<u>? ×</u>
<b>?</b> >	Please type yo	our user name and password.	
8	Site:	172.22.102.45	
	Realm	EWS Oper Access	
	<u>U</u> ser Name		
	Password		
	□ <u>S</u> ave this p	password in your password list	
		OK Car	ncel

Next, you will need to select the tab called "Configure."



Next, you can select the port speed for each port. Remember, any ports connecting to a SAN Switch 2/8 or 2/16 must be set to 2 Gb/sec. See ports 0-3 as an example.

🏄 4500: 4500 Interop - Mic	rosoft Internet Exp	olorer						
Eile Edit View Favorites	<u>T</u> ools <u>H</u> elp	<i>ð</i> Send						
🕁 Back 🔹 🤿 🐇 👔	🖞 😡 Search 👔	Favorites ()Media	3 3-30	• 🔍				
Address 🙆 http://172.22.102	.45/cfg_ports_fs.htm	í					▼ 🖓 Go L	.inks »
× 6 - 6	Conf	igure:			Refresh-8/1	8 / 03 at 10:07:42		
1	Por	s Switch	Management	Zoning	Security Pe	rformance		
				5		<u> </u>		
Mour					Gx Port 💌	2 Gb/sec 💌		_
VIEW	2				Gx Port 💌	2 Gb/sec 💌		_
Configure	3				Gx Port 💌	2 Gb/sec 💌		
	4				Gx Port 💌	Negotiate		
Monitor	5				Gx Port -	1 Gb/sec		
					Gx Port	2 Gb/sec		
Operations					Gx Port	Negotiate		
	0				Gx Pont	Negotiate		
Help	10				GX PUR	Negotiate		
	11	-			Gx Port	Negotiate		
	12				Gx Port			
	12				Gx Port	Negotiate		
	10				Gx Port •	Negotiate		
	14				Gx Port -	Negotiate		
	16				Gx Port -	Negotiate		44
Done							internet	-

Next, click "Activate" to make the port speed effective.

## Step 11: Ensure Management Server is Disabled

If the M-Series product has a license key for Open Systems Management Server (OSMS), ensure the Management Server is disabled. Perform these steps:

- 1. To disable the Management Server, use HAFM and select Configure Management Server. If this feature is not installed, no further is action required. Go to item #3.
- 2. From the Configure Open Systems Management Server dialog box, make sure the Enable Management Server box and the Host Control Prohibited box are not selected (not checked).

EIntrepid 6140 :	
Product Configure Logs Maintenance Help	
Hardwar Identification	RUList
Intrepi	
Switch Binding	inn Eliza Channal Diratar
Status Ports ation	End User Premise (please configure)
SNMP Agent	
Indigendent Storer Features Date/Time Threshold Alerts Open Trunking Export Configuration Report If Enable Web Server If Enable Teinet Configuration Report Problement Storer (Storer (	
Fight view	Rear view
Configure management server	

Figure 34: HAFM: Selecting Management Server



Figure 35: HAFM: Disabling Management Server

Note:	Note that both features are disabled.

3. If the B-series product has Platform Management Services Enabled, you will need to disable it. To disable it, follow these steps:

login: admin
password: xxxxxx
Admin> switchdisable
Admin>msPlMgmtDeactivate
Admin>switchenable
Admin>reboot

## Step 12: Ensure Fabric Binding and Enterprise Fabric Mode are Disabled

If the M-Series product has a license key for SANtegrity Binding, ensure Fabric Binding and Enterprise Fabric Mode are disabled. Perform these steps:

- 1. To disable Fabric Binding and Enterprise Fabric Mode, use HAFM and select Fabrics, Enterprise Fabric Mode and Fabric Binding. If this feature is not installed, no further action is required.
- 2. From the Fabric Binding dialog box, make sure the Enable Fabric Binding box is not selected (not checked).
- 3. From the Enterprise Fabric Mode dialog box, make sure the Enable Fabric Binding box is not selected (not checked).



Figure 36: HAFM: Selecting Fabric Binding and Enterprise Fabric Mode



Figure 37: HAFM: Disabling Fabric Binding



Figure 38: HAFM: Disabling Enterprise Fabric Mode

## Step 13: Add Switches to the Fabric One at a Time

It is recommended you add one switch at a time to the fabric. This is not a technical requirement; it is simply a recommendation. For example, before adding the ISL cables, you can block each port. After the cables are installed, you can then unblock each port "one at a time." Between each unblocking, ensure the fabric is up and operational by using HAFM to verify the fabric is up. Perform these steps:

- 1. To block ports on the M-Series, launch HAFM.
- 2. From HAFM, select Configure Ports and then check the Blocked Ports box.



## Step 14: Merging and Managing Zoning Activities

To merge the Zone Sets (and their associated zones) properly:

- 1. Ensure that all the requirements, as specified in step-5 and step-6, are properly met
- 2. Ensure that an active Zone Set is present in both the fabrics after interopmode is enabled on B-series and all operating parameters are set on M-series as specified in the previous steps.
- 3. Join the fabrics and the active Zone Sets should merge
- 4. Once the merge is complete, to view and manage zones using HAFM, save the Zone Set. Use the "Save active zone set as.." button in "HAFM/Fabrics/Zone Set" for this purpose. Once you save it, the Zone Set and all zones will then be saved in the zone library.

After successfully merging the fabrics, HP recommends that you use HAFM for further management of zoning activities. You can also use EWS.

## HAFM Method

To use HAFM, perform these steps:

After you successfully merge the fabrics (M-Series & B-series), any further configuring of zones must be done using HAFM. **Do Not** use other software products for zoning the merged fabric.

#### **EWS Method**

You can use EWS to manage your zoning. Perform these steps:

1. Access the M-Series product, by typing the IP address of the M-Series product into the Web Address field on your web browser. For example, http://10.10.10.1.

A dialog box similar to the following displays.

3	Please type y	our user name and password.	
3	Site:	172.22.102.45	
	Realm	EWS Oper Access	
	User Name		
	Password		
	Save this	password in your password list	

#### Figure 39: EWS: Entering Network User Name and Password

- 2. From the Enter Network Password dialog box, enter the User Name and Password and click OK.
- 3. Select the Configure option and the following screen displays.



#### Figure 40: EWS: Selecting Configure Option

4. Select the Zoning tab and the following screen displays.



Figure 41: EWS: Selecting Zoning Tab

5. You can create, edit, and delete zones. You can also, activate and deactivate zoning.

# **Segmentation Errors**

Reason Code	Reason
0	Segment not defined
1	Incompatible Link Parameters
2	Duplicate Domain ID's
3	Incompatible Zoning Configuration
4	Build Fabric Protocol Error
5	No Principal Switch
6	No Response from the attached switch

To view segmentation reasons, you can launch HAFM.

For M-Series products, segmentation reasons are indicated in the Event Log list (HAFM).



Figure 42: HAFM: Selecting View Event Log for Segmentation Errors

702 3:25:08 AM 702 10:13:43 AM 702 6:49:13 PM 702 4:56:30 PM	070 081 430	E_Port has become segmented.	To All sold sold sold sold sold sold sold so		
/02 10:13:43 AM /02 6:49:13 PM /02 4:56:30 PM	081 430		Intermational		04 00 00 00 01 00 00 00 17 00 00 0
/02 6:49:13 PM /02 4:56:30 PM	430	Port set to invalid attachment state	Informational		10 00 00 00 05 00 00 00 00 00 00 00 0
/02 4:56:30 PM	100	Excessive Ethernet transmit errors.	Informational	CTP-0	E9 03 00 00 00 00 00 00 00 00 00 00 00
	422	CTP firmware synchronization complete	Informational	CTP-0	
/02 4:56:30 PM	421	Firmware download complete.	Informational	CTP-0	30 34 2E 30 30 2E 30 30 20 32 33 (
/02 4:55:20 PM	417	CTP firmware synchronization initiated.	Informational	CTP-0	30 34 2E 30 30 2E 30 30 20 32 33 (
/02 4:55:16 PM	410	CTP card reset.	Informational	CTP-0	44
/02 4:54:44 PM	070	E_Port has become segmented.	Informational		05 00 00 00 01 00 00 00 17 00 00 0
/02 4:54:05 PM	423	CTP firmware download initiated.	Informational	CTP-0	
/02 4:31:26 PM	070	E_Port has become segmented.	Informational		03 00 00 00 04 00 00 00 04 00 00 0
/02 4:31:21 PM	070	E_Port has become segmented.	Informational		00 00 00 00 04 00 00 00 04 00 00 0
/02 4:28:04 PM	070	E_Port has become segmented.	Informational		04 00 00 00 01 00 00 00 17 00 00 0
/02 3:55:09 PM	070	E_Port has become segmented.	Informational		03 00 00 00 04 00 00 00 04 00 00 0
/02.1:11:51 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/021:10:57 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:10:03 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:09:09 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:08:15 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:07:20 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:06:26 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:05:32 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:04:38 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:03:44 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:02:49 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:01:56 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:01:02 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 1:00:07 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0
/02 12:59:13 PM	081	Port set to invalid attachment state	Informational		06 00 00 00 05 00 00 00 10 00 08 0

Figure 43: HAFM: Viewing Event Log for Segmentation

**Note:** the Description Field provides the activity. The event data field (byte 4) provides the reason. For this example, byte 4 of the Event Data is 01. By looking at the segmentation table on *Segmentation Errors* on page 35, you find the segmentation reason is due to an Incompatible Link Parameters error. Byte 0 of the Event Data provides the port number. For this example, byte 0 is 04, which is port 4.

## **Supported Configuration Rules**

To obtain a list of supported configurations, please contact your local HP Customer Representative. They can tell you the exact firmware and software versions and the specific models that are recommended for both M-Series and B-series.

## **Fabric Rules**

- Up to 16 switches and 3 hops maximum per fabric
- Each fabric can consist of a mix of the switch models listed in Table 2 and Table 3
- B-Series switches must utilize all the default HP configuration settings with the exception of INTEROPMODE 1.
- M-Series switches must utilize all the default HP configuration settings.

Note: CA/DRM products are not supported in a merged SAN fabric.

#### Table 2: StorageWorks B-Series Product Line Switches

HP StorageWorl	ks Switch Name	Firmware Version	Number of Ports
HP StorageWorks MSA SAN sw	ritch 2/8		8
HP StorageWorks SAN Switch 2	2/8 EL, 2/8 Power Pak	3.1	8
HP StorageWorks SAN Switch 2	2/16, 2/16 EL, 2/16 Power Pak		16
HP StorageWorks SAN Switch 2	2/32, 2/32 Power Pak	4.1	32
HP Switch Name	Compaq StorageWorks Switch Name		Number of Ports
HP Brocade 2400 (HP reseller)	CPQ StorageWorks SAN Switch 8		8
N/A	CPQ StorageWorks SAN Switch 8-EL		8
HP Brocade 2800 (HP reseller)	CPQ StorageWorks SAN Switch 16		16
N/A	CPQ StorageWorks SAN Switch 16-EL	2.6.1	16
HP Surestore FC Switch 6164 (64 ISL Ports)	CPQ StorageWorks SAN Switch Integrated/32 (64 ISL Ports)		32 (counts as 6 switches and 2 hops when applying configuration rules)
HP Surestore FC Switch 6164 (32 ISL Ports)	CPQ StorageWorks SAN Switch Integrated/64 (32 ISL Ports)		64 (counts as 6 switches and 2 hops when applying configuration rules)

HP StorageWorl	ks Switch Name	Firmware Version	Number of Ports
HP Surestore FC 1Gb/2Gb Entry Switch 8B	N/A		8
N/A	CPQ StorageWorks SAN Switch 2/8-EL		8
N/A	CPQ StorageWorks SAN Switch 2/16-EL	3.1	16
HP Surestore FC 1Gb/2Gb Switch 8B	N/A		8
HP Surestore FC 1Gb/2Gb Switch 16B	CPQ StorageWorks SAN Switch 2/16		16

#### Table 2: StorageWorks B-Series Product Line Switches (Continued)

#### Table 3: HP StorageWorks M-Series Product Line Switches

hp StorageWorks Switch Name	Firmware Version	Number of Ports
hp StorageWorks edge switch 2/16		16
hp StorageWorks edge switch 2/24	05.01.00-24	24
hp StorageWorks edge switch 2/32	07.01.00-09	32
hp StorageWorks director 2/64	HAFM	64
hp StorageWorks director 2/140		140

## Table 4: O/S and Storage Systems Versions

Operating System	HBA	"Driver, FW, BIOs"	Multi-path	Storage	Storage FW
HP-UX 11.00	A6795A	B11.00.10	SP 3.0b	EVA	VCS 2.005
HP-UX 11.00	A6795A	B11.00.10	AP 2.01.02	XP128/1024	21.05.06.00/00
HP-UX 11.11	A6795A	B11.11.09	SP 3.0b	EVA	VCS 2.005
HP-UX 11.11	A6795A	B11.11.09	AP 2.01.02	XP128/1024	21.05.06.00/00
Windows 2000 SP3	FCA2101	"5-4.82a16, 3.91a1, 1.63a1"	SP 4.0a	EVA	VCS 2.005
Windows 2000 SP3	LP9002	"5-4.82a16, 3.91a1, 1.63a1"	AP 2.01.00	XP128/1024	21.05.06.00/00
Sun Solaris 8	FCA2257P	"3.26, 3.1.2, 1.18.5 (FCODE)"	SP 3.0b	EVA	VCS 2.005
Sun Solaris 8	QLA2310	"3.26, 3.1.2, 1.18.5 (FCODE)"	Veritas DMP	XP128/1024	21.05.06.00/00
Linux AS 2.1	FCA2214	"6.0.4, 1.33"		EVA	VCS 2.005

Feature Description	B-Series only Fabric	M-Series only Fabric	Interoperating Fabric based on existing T11 standards documents
StorageWorks Fabric Watch: Monitor fabric elements for fabric events, errors, performance thresholds.	Supported	N.A.	Works in interoperating fabric on B-Series switches.
SAN/Fibre Channel Switch Management: IP connections to switch management GUIs.	Supported	N.A.	Works in interoperating fabric on B-Series switches.
HP StorageWorks HAFM	N.A.	Supported	Works in interoperating fabric, identifies B-Series as generic switches
ISL Trunking: Multiple ISL between a switch pair are grouped to look like one tast ISL.	B-Series ISL Trunking: Works on ISLs connected to ports on one ASIC pair.	Not supported at this time.	Not Supported.
Frame Level Zoning: Provides isolation between groups of ports by controlling admission of frames to fabric based on zone definitions and frame destination addresses.	B-Series Hardware Enforced Zoning: Checks incoming frames to see whether delivery is allowed. Backs off to name server zoning if many entries.	M-Series Hardware Enforced Zoning: Checks incoming frames to see whether delivery is allowed. Hard Zoning requires (5.01.00-24 and above)	No public protocol for per-frame zoning is defined.
Name Server Zoning: Prevents discovery of unauthorized addresses, but does not prevent frame delivery if addresses are found out some other way.	Supported	Supported.	Name Server Zoning is a mandatory features of the T11 interoperability standards.
Fabric performance monitoring: Gives insight into performance of the SAN.	Advanced Performance Monitoring: Provides information on end-to-end performance of tabric.	Port Level Monitoring	Not Supported
Real-time monitoring of fabric events.	Fabric Watch: Tracks a variety of SAN fabric elements, events, and counters	HAFM tool: Tracks a variety of SAN fabric elements and events.	Management server talks to switch agents independently.

Table 5: B-Series and M-Series Interoperable Features

Feature Description	B-Series only Fabric	M-Series only Fabric	Interoperating Fabric based on existing T11 standards documents
FC-AL support.	QuickLoop: supports Fibre Channel Arbitrated Loop devices.	Supported on M-Series 2/24	Operates on individual switches.
Support for traditional SNMP management method.	Switch MIBs.	Switch MIBs.	Each switch is managed independently.
Simple Name Server: Provides centralized control of device addresses.	Simple Name Server	Simple Name Server	Interoperate under T11 standards.
Alias Server: Supports broadcast function.	B-Series Alias Server.	Broadcast.	Interoperate under T11 standards.
Fabric Security	B-Series Secure Fabric OS: 2.6x/3.1/4.1 code streams	M-Series: SANtegrity	Will interoperate under T11 standards when they are agreed upon. M-Series Switch Binding feature of SANtegrity will operate in an interoperating fabric.
Stand-alone switch management console.	Not available.	Embedded Web Server	Not applicable: Switch teature.
Port Error reporting.	Yes.	Yes.	Yes.
Alerts and Traps.	Yes.	Yes.	Yes.
Port Statistics.	Yes.	Yes.	Yes.
Event Logs.	Yes.	Yes.	Yes.
Telnet.	Yes.	Yes.	Yes.
Phone Home Feature.	No.	Yes.	Yes.
Email Home Feature.	Yes.	Yes.	Yes.

Table 5: B-Series and M-Series Interoperable Features (Continued)

## Troubleshooting

- 1. If you see an ISL on the M-Series product that segments due to a Build Fabric Protocol Error, you can recover by blocking, then unblocking the port. You may need to do this several times.
- 2. If you see an ISL on the M-Series product that segments due to Incomp Zoning Config, and you believe this is incorrect, you can recover by blocking, then unblocking the port. You may need to do this several times.
- 3. If you see fabric segmentation errors and messages like "Platform Management Database inconsistency" on B-Series switches, then disable management server on B-Series using "msPlMgmtDeactivate", and then reboot the B-Series switch as shown in step-11, item #3.
- 4. If you have zone merging problems, check the following:
  - Remember the Active Zone set in the M-Series and the Active Zone set in the B-series must be unique. You cannot have the same zone name with different WWN members.
  - Only WWN zoning is permitted for heterogeneous fabrics. Domain, Port, or Area zoning are not supported.
  - Make sure the zones are compatible between the M-Series and B-series. See Step 5: Ensure All Switches Are Set Up with WWN Zoning, page 16 for more details.

# Glossary

#### ISL

Interswitch Link. This is the link that connects two switches.

#### **Operating Mode**

This is the mode of the fabric. For M-Series, two modes exist (M-Series Fabric or Open Fabric). "M-Series Fabric" mode is designed for a fabric that consists only of M-Series products. The "Open Fabric" mode is designed for fabrics that consist of M-Series and other vendor switches.

#### Segmentation

The act of "Non-Connection" between two switches. Numerous reasons exist for an ISL to segment. See *Segmentation Errors* on page 35 for more details.