

# Fujitsu Storage ETERNUS AF, ETERNUS DX

## Configuration Guide -Server Connection-



Fibre Channel/  
ETERNUS AF650 S3/S2 All-Flash Arrays,  
ETERNUS DX100 S5/S4, DX500 S5/S4, DX600 S5/S4, DX900 S5, DX8900 S4, DX8700 S3 Hybrid Storage Systems  
Settings for BS2000 Connection

# Preface

For better clarity, the following naming conventions are used:

ETERNUS AF: ETERNUS AF650 S3/AF650 S2  
ETERNUS DX S5: ETERNUS DX100 S5, ETERNUS DX500 S5/DX600 S5/DX900 S5  
ETERNUS DX S4: ETERNUS DX100 S4, ETERNUS DX500 S4/DX600 S4, ETERNUS DX8900 S4  
ETERNUS DX S3: ETERNUS DX8700 S3  
ETERNUS AF/DX: ETERNUS AF, ETERNUS DX S5, ETERNUS DX S4, ETERNUS DX S3

This document briefly explains the required special settings in order to connect an ETERNUS AF/DX storage system to a server running BS2000 via a Fibre Channel interface.

This document should be used in conjunction with any other applicable user manuals, such as those for the ETERNUS AF/DX storage system, server, OS used, Fibre Channel card, drivers, etc.

- Fujitsu Storage ETERNUS AF, ETERNUS DX Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings
- Fujitsu Storage ETERNUS AF, ETERNUS DX Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings
- Web GUI User's Guide
- Any manuals supplied with the Fibre Channel card driver and software
- BS2000 specific manuals:
  - BS2000 System Installation - User Guide
  - BS2000 System Administration - User Guide
  - BS2000 Utility Routines - User Guide

You can find further information on the use of ETERNUS AF/DX with BS2000 Servers.

- in the release notices for ETERNUS DX/AF support on BS2000 Servers including FW support on  
<https://bs2manuals.ts.fujitsu.com>
- in the release notices of BS2000 Servers and Operating System at  
<https://bs2manuals.ts.fujitsu.com>

Replication functions for BS2000 volumes in ETERNUS AF/DX are provided by Fujitsu Software BS2000 SHC-OSD and StorMan. Information on SHC-OSD can be found in the manual and release notices at  
<https://bs2manuals.ts.fujitsu.com>.

Sixteenth Edition  
July 2023

# About this Manual

## Contents and Structure

---

This document is composed of the following seven chapters:

- Chapter 1 Workflow

This describes the workflow required to set up an ETERNUS AF/DX storage system for BS2000.

- Chapter 2 Notes

This describes issues to be noted when connecting the ETERNUS AF/DX storage system and the BS2000 Server.

- Chapter 3 Checking Prerequisites and Fibre Channel Card Information

This describes software requirements and how to get the Fibre Channel card WWNs of BS2000 Servers.

- Chapter 4 Set Up the ETERNUS AF/DX Storage System for BS2000

This describes special settings required when connecting an ETERNUS AF/DX storage system to a server with operating system BS2000.

- Chapter 5 Set Up the BS2000 Server for ETERNUS AF/DX Storage Systems

This describes the configuration of ETERNUS AF/DX volumes on SE Servers with the operating system BS2000.

- Chapter 6 Check the LUNs

This describes how to verify installation and configuration by means of X2000 and BS2000.

- Chapter 7 Example

Examples for the setup of ETERNUS AF/DX storage systems and BS2000 Server.

## Acknowledgements

---

- The company names, product names and service names mentioned in this document are registered trademarks or trademarks of their respective companies.

# Naming Conventions

- Product names
  - BS2000 represents the following products:
    - OSD/XC V11.0
    - BS2000 OS DX V1.0
- Other names
  - "Channel Adapter" (CA) refers to the Fibre Channel interface module that is used in an ETERNUS AF/DX storage system to connect to a server.
  - "Fibre Channel card" refers to the Fibre Channel interface module that is normally used by the server. A "Host Bus Adapter" (HBA) or "Channel Adapter" (CA) may be used instead, depending on the server.
  - Italics are used to show variables such as values and characters that appear in command parameters and output examples.

- ETERNUS disk storage system models  
The following naming conventions are used to describe ETERNUS disk storage system models in this document.

ETERNUS disk storage system model	Naming conventions
ETERNUS AF650 S3/S2	ETERNUS AF series
ETERNUS DX100 S5 ETERNUS DX500 S5/DX600 S5/DX900 S5	ETERNUS DX S5 series
ETERNUS DX100 S4 ETERNUS DX500 S4/DX600 S4 ETERNUS DX8900 S4	ETERNUS DX S4 series
ETERNUS DX8700 S3	ETERNUS DX S3 series
ETERNUS AF650 S3/S2 ETERNUS DX100 S5/S4 ETERNUS DX500 S5/DX600 S5/DX900 S5 ETERNUS DX500 S4/DX600 S4 ETERNUS DX8900 S4 ETERNUS DX8700 S3	ETERNUS AF/DX storage system

- BS2000 Servers:  
The following naming conventions are used to describe BS2000 Server models in this document.

BS2000 Server model	Naming conventions
SE300B, SE310, SE320, SE330, SE500B, SE700B, SE710, SE730	SE Server series

# Table of Contents

Chapter 1	Workflow	8
<hr/>		
Chapter 2	Notes	10
<hr/>		
2.1	Installation Notes .....	10
2.2	ETERNUS AF/DX Storage System Setup Notes .....	10
2.3	Server Notes .....	11
Chapter 3	Checking Prerequisites and Fibre Channel Card Information	12
<hr/>		
3.1	ETERNUS Firmware Prerequisites .....	12
3.2	BS2000 Hardware Prerequisites .....	12
3.3	BS2000 Software Prerequisites .....	13
3.4	Fibre Channel Cards .....	13
Chapter 4	Set Up the ETERNUS AF/DX Storage System for BS2000	14
<hr/>		
4.1	Setting the Host Responses .....	14
4.2	Configuring Settings for the Fibre Channel Ports (CA Parameters) .....	15
4.3	Registering the WWNs of the Accessing Fibre Channel Cards .....	16
4.4	Configure Thin Provisioning Volumes .....	16
4.5	Configure the RAID Groups and Create the Logical Volumes .....	17
4.6	Creating the LUN Groups/Affinity Groups .....	18
4.7	Configuring the Host Affinity .....	18
4.8	Setting the CA Reset Groups .....	19
4.9	Checking the WWNs .....	19

---

Chapter 5	Set Up the BS2000 Server for ETERNUS AF/DX Storage Systems	20
<hr/>		
5.1	SE Server (SU /390) .....	20
5.2	SE Server (SU x86) .....	21
Chapter 6	Check the LUNs	22
<hr/>		
6.1	SE Server (SU /390) .....	22
6.2	SE Server (SU x86) .....	22
Chapter 7	Example	23
<hr/>		
7.1	Configuration and Generation of an ETERNUS DX8700 S3 for BS2000 (SE Server) .....	23
7.2	Generation of the ETERNUS DX8700 S3 on the SE Server (SU /390) .....	26

# List of Tables

Table 4.1	Fabric connection settings (all host via fabric connections and host direct connection between SE310 and DX100 S4/S5).....	15
-----------	--	----

# Chapter 1

## Workflow

### Documents required during the workflow:

- Fujitsu Storage ETERNUS AF, ETERNUS DX Configuration Guide -Server Connection- Fibre Channel/ ETERNUS AF series, ETERNUS DX S5/S4/S3 series Hybrid Storage Systems Settings
- Fujitsu Storage ETERNUS AF, ETERNUS DX Configuration Guide -Server Connection- (Fibre Channel) Fibre Channel Switch Settings
- Web GUI User's Guide
- Any manuals supplied with the Fibre Channel card driver and software
- BS2000 specific manuals:
  - BS2000 System Installation - User Guide
  - BS2000 System Administration - User Guide
  - BS2000 Utility Routines - User Guide

### Workflow

1

#### Checking prerequisites and Fibre Channel Card Information

Checking software requirements and getting Fibre Channel Card information.



- ["Chapter 3 Checking Prerequisites and Fibre Channel Card Information" \(page 12\)](#)



2

#### Set Up the ETERNUS AF/DX Storage System for BS2000

Configure RAID Groups and Logical Volumes and do all settings in the ETERNUS in consideration of special BS2000 settings.



- ["Chapter 4 Set Up the ETERNUS AF/DX Storage System for BS2000" \(page 14\)](#)



3

#### Set Up the Fibre Channel Switch

Set up the Fibre Channel switch (if it is to be used).





# 4

## Set Up the BS2000 Server for ETERNUS AF/DX

On SE Server (SU /390), do the generation as described in manual "System installation".

On SE Server (SU X86), do the set up as described in manual "Fujitsu Server BS2000 SE Series Administration and Operation - User Guide".



- ["Chapter 5 Set Up the BS2000 Server for ETERNUS AF/DX Storage Systems" \(page 20\)](#)



# 5

## Check the LUNs

Check whether the server recognizes the LUNs of the ETERNUS AF/DX storage system.



- ["Chapter 6 Check the LUNs" \(page 22\)](#)

# Chapter 2

## Notes

### 2.1 Installation Notes

- To ensure reliable access to ETERNUS AF/DX storage systems, multipath configuration is recommended.
- Setting up multiple access paths between the BS2000 Server and the ETERNUS AF/DX storage systems provides improved access redundancy.
- Before setting up a multipath configuration, create Storage Repositories for all the LUNs that exist in the ETERNUS AF/DX storage system.
- The ETERNUS Multipath Driver does not need to be installed for BS2000 Servers.

### 2.2 ETERNUS AF/DX Storage System Setup Notes

- Host Response must be set before the ETERNUS AF/DX storage system is connected to the BS2000 Server host.
- Assign Affinity Group values starting from LUN0 in ascending order. The server cannot recognize the ETERNUS AF/DX storage system LUNs if some other assignment order is used.
- Please be aware that only a homogeneous sharing with other BS2000 Servers is supported for FC Ports which are connected to a BS2000 Server.  
The combined Port Mode CA/RA is tolerated.

#### Note

In these terms the Server Unit and Management Unit (MU) of an SE Server is considered to be a BS2000 Server, irrespective whether Linux/Windows guests are running or not. The Application Unit of an SE Server is a non-BS2000 Server.

- The feature Transparent failover (TFO) / Storage Cluster Option is supported for BS2000 volumes.

#### Caution

ETERNUS DX100 S4/S5 is supported for SE Server SE310/SE320/SE330 with Host-direct-connection only.  
No SHC-OSD support is provided.

## 2.3 Server Notes

---

Before turning the server on, check that the ETERNUS AF/DX storage systems and Fibre Channel switches are all "Ready". If the server is turned on and they are not "Ready", the server will not be able to recognize the ETERNUS AF/DX storage systems.

Storage replication functions (local and remote) are managed by SHC-OSD (subsystem of BS2000) instead of ETERNUS SF AdvancedCopy Manager.

**SE Server (SU /390):**

For online firmware upgrades in 'operator intervention mode', additional conditions apply. Please respect 'important notices' and 'restrictions' in the storage bulletins.

# Chapter 3

## Checking Prerequisites and Fibre Channel Card Information

### 3.1 ETERNUS Firmware Prerequisites

For all BS2000 Servers

(please respect 'important notices' and 'restrictions' in the storage bulletins):

- AF650 S3: A firmware version of V11L60 or higher is required
- AF650 S2: A firmware version of V10L90 or higher is required
- DX100 S5: A firmware version of V11L60 or higher is required
- DX500 S5/DX600 S5: A firmware version of V11L60 or higher is required
- DX900 S5/DX8900 S4: A firmware version of V11L60 or higher is required
- DX100 S4: A firmware version of V10L90 or higher is required
- DX500 S4/DX600 S4: A firmware version of V10L90 or higher is required
- DX8700 S3: A firmware version of V10L90 or higher is required
- Using 4096 LUN feature is supported

### 3.2 BS2000 Hardware Prerequisites

The following server models are supported:

- SE Server: SE300B, SE310, SE320, SE330, SE500B, SE700B, SE710, SE730

## 3.3 BS2000 Software Prerequisites

Support of the ETERNUS DX Storage Systems is provided as of the following versions with the current SP. Please refer to the BS2000 related Release Notes for detailed information.

### ■ ETERNUS DX900 S5/ETERNUS DX8900 S4:

- SE Server: SE V6.4 SP3, OSD/XC V11.0B, SHC-OSD V15.0
- Service Pack: SP21.2

### ■ Models other than the ETERNUS DX900 S5/ETERNUS DX8900 S4:

- SE Server: SE V6.4 SP3, OSD/XC V11.0B, SHC-OSD V14.0

## 3.4 Fibre Channel Cards

Obtain the WWN information of the Fibre Channel card of a BS2000 Server.

### **SE Server:**

Obtain the WWN via the Management Unit (MU):

- Select "Units" in the dashboard
- Expand the Server Unit
- Select "Information" --> "FC Interfaces", see column "WWPN"

# Chapter 4

## Set Up the ETERNUS AF/DX Storage System for BS2000

This section explains the required special settings for BS2000. For details of how to use Web GUI to perform these settings, refer to the "Web GUI User's Guide".

### 4.1 Setting the Host Responses

The ETERNUS AF/DX storage system Host Response parameters must be set to match the way in which the server will process the ETERNUS AF/DX storage system request responses.

These parameters are different for each OS, they must be set before connecting the ETERNUS AF/DX storage system to the server.

#### Caution

When setting the access path using the ETERNUS SF Storage Cruiser, Host Response No. will be set to default values.  
Set the Host Response No. after setting the access path using the ETERNUS SF Storage Cruiser.

Controller	Category	Action
AF/DX series	Connectivity > Host Response	Add Host Response

Using the predefined "Host Response Profile" with the name "BS2000" is recommended. The standard BS2000 Host Response "BS2000" is preset with the correct parameter settings (incl. 4096 volumes / port).

Parameter	BS2000
Name	BS2000
Byte-0 of Inquiry Response	No Conversion (Default)
Inquiry VPD ID Type	Type1 + Type3
Inquiry Standard Data Version	Version 6 (Default)
Command Timeout Interval	Default (25sec.)
Load Balance Response	Unit Attention (Default)
Reservation Conflict Response for Test Unit Ready	Conflict
Change Volume Mapping	Report
Volume Capacity Expansion	Report
Vendor Unique Sense Code	No Report (Default)
Host Specific Mode	NR1000V Mode, 4096 LUNs: BS2000 Mode
Asymmetric / Symmetric Logical Unit Access	ACTIVE / ACTIVE (Default)
iSCSI Discovery Reply Mode	All - Reply All ports (Default)

Parameter	BS2000
TPGS Mode	Enable (Default)
Sense Data Conversion	No Conversion (Default)

## 4.2 Configuring Settings for the Fibre Channel Ports (CA Parameters)

**Caution**

Please be aware that only a homogeneous sharing with other BS2000 Servers is supported for FC Ports which are connected to a BS2000 Server. The combine Port Mode CA/RA is tolerated. Note: In these terms the Management Unit (MU) and the Server Unit (SU x86) of an SE Server are considered to be a BS2000 Server, irrespective of whether Linux/Windows guests are running or not on the Server Unit. The Application Unit (AU) of an SE Server is a non-BS2000 Server.

When setting a Fabric connection, complete the preparation work and set up the Fibre Channel switch beforehand.

For further details, refer to "ETERNUS AF/DX Storage Systems Server Connection Guide (Fibre Channel) Fibre Channel Switch Settings Administrator's Guide".

Controller	Category	Action
AF/DX series	Connectivity > Port Group > FC	Configure FC Port

For each connection configuration, set the indicated items.

Table 4.1 Fabric connection settings (all host via fabric connections and host direct connection between SE310 and DX100 S4/S5)

Parameter	BS2000
Connection Topology	Fabric Connection
FC Frame Size	2048 byte (Default value)
Transfer Rate	See the table below (*1)
Affinity Mode	(ON)
Reset Scope	T_L
Reserve Cancel at Chip Reset	ON / Enable

\*1: Set the appropriate value from the following table. Do not use [8G Auto].

Fibre Channel switch maximum speed	ETERNUS AF/DX storage system CA type		
	32Gbit/s CA	16Gbit/s CA	8Gbit/s CA
64Gbit/s	32Gbit/s	16Gbit/s	-
32Gbit/s	32Gbit/s	16Gbit/s	8Gbit/s
16Gbit/s	16Gbit/s	16Gbit/s	8Gbit/s
8Gbit/s	8Gbit/s	8Gbit/s	8Gbit/s

## 4.3 Registering the WWNs of the Accessing Fibre Channel Cards

Register the WWN of each Fibre Channel card installed on the server that will access the ETERNUS AF/DX storage system. At the same time, set the host response numbers registered in ["4.1 Setting the Host Responses" \(page 14\)](#) to accept these WWNs.

WWN registration combined with the host affinity settings (described later) limits which server has access to which ETERNUS AF/DX storage system LUNs.

### Caution

When a server-side Fibre Channel is replaced (SE Server (SU x86)), the WWN of the replacement Fibre Channel card must be re-registered to the ETERNUS AF/DX storage system.

Controller	Category	Action
AF/DX series	Connectivity > Host Group > FC/FCoE	Add FC/FCoE Host

#### **SE Server (SU /390):**

We recommend assigning a name which identifies the host and the FC channel (e.g. FC channel 8C on the host SE710 -> Name "SE710-8C").

#### **SE Server (SU x86):**

We recommend assigning a name which identifies the host and the slot and port number of the FC channel (e.g. FC channel in slot 2 port 0 on the host host1 -> Name "host1-2-0").

## 4.4 Configure Thin Provisioning Volumes

Thin Provisioning volumes are support by BS2000. For further details, refer to "Web GUI User's Guide". For BS2000, it is recommended to configure Thin Provisioning volumes to avoid the limit of 128 Volumes per RAID Group.



## 4.5 Configure the RAID Groups and Create the Logical Volumes

### Configure a RAID Group

Controller	Category	Action
AF/DX series	RAID Group	Create

With the (default) setting "Controlling CM = Automatic" Web GUI automatically assigns the RAID group to a Control Module (CM) and a CPU in the CM. The assignment can also be made directly by specifying a CM# and a CPU#.

As FC ports are also assigned to a CM and a CPU, direct assignment can also lead to better performance results under certain circumstances.

### Create the Logical Volume on a RAID Group

Controller	Category	Action
AF/DX series	Volume	Create

A maximum of 128 Volumes can be created per RAID Group. For BS2000 configurations, the best practice is to configure Thin Provisioning Pools to avoid the limitation of 128 volumes per RAID group.

BS2000 supports a maximum of  $2^{32} - 1$  blocks of 512 bytes per logical volume. Logical volumes of 2TB or larger are thus not completely utilized by BS2000. Only use values of up to  $2048 \times 1024 = 2,097,152$  in "Capacity".

The recommended capacity of the logical volumes for BS2000 should be between 25 GB and 100 GB.

The maximum supported LUN capacity is 2TB.

## 4.6 Creating the LUN Groups/Affinity Groups

Set the LUN groups which will be accessible by the BS2000 Server.

Controller	Category	Action
AF/DX series	Connectivity > LUN Group	Add LUN Group

### ETERNUS AF/DX storage system:

A maximum of 4096 LUNs per FC port of the storage system is supported for connections to the BS2000 Server depending on the server model.

Please be aware that if the storage system is configured for 4096 LUNs per FC port, the number of host FC ports per CA port is limited to 32.

### SE Server (SU /390):

A maximum of 4096 volumes can be configured in an affinity group, i.e. for a connection from one FC channel to one FC port in the RAID system. However, we recommend assigning appropriately fewer volumes to an affinity / LUN group so that PAV or FastDPAV alias devices can also be generated on the same channel path.

### SE Server (SU x86):

A maximum of 2048 volumes is supported per affinity / LUN group and HBA port (server). No free volumes in the affinity group are required for PAV alias devices as PAV is not supported.

## 4.7 Configuring the Host Affinity

Allocate the WWN of each server to an affinity and specify the accessible LUNs. This sets the access restrictions for each server connected to the ETERNUS AF/DX storage system.

### Caution

To recognize a LUN which has the same configuration for multiple Fibre Channel cards, such as in multipath and cluster configurations, add settings to assign these Fibre Channel cards to the same Host Affinity.

Controller	Category	Action
AF/DX series	Connectivity	Create Host Affinity

## 4.8 Setting the CA Reset Groups

All FC ports (CAs) assigned to one affinity group or referring the same LUN group must be assigned to the same reset group.

Controller	Category	Action
AF/DX series	Connectivity > CA Reset Group	Modify Reset Group

When multiple BS2000 Servers share LUNs on an ETERNUS AF/DX storage system, any disk storage system CA port that connects a shared LUN to a BS2000 Server must be assigned to the same reset group, whether multipath connections are used for the BS2000 Servers or not.

If servers other than the BS2000 are connected to the ETERNUS AF/DX storage system, dedicated ports for the BS2000 Servers are necessary due to different CA parameter settings (see ["4.2 Configuring Settings for the Fibre Channel Ports \(CA Parameters\)" \(page 15\)](#)).

"Reset Scope: T\_L" and "Reserve Cancel at Chip Reset: On" are necessary for BS2000 Server connections, but different default values are mandatory for non-BS2000 Server connections.

## 4.9 Checking the WWNs

Use Web GUI to check the WWN of each ETERNUS AF/DX storage system CA port. They are required to connect the ETERNUS AF/DX storage system to the server.

Controller	Category	Action
AF/DX series	Component > Controller Enclosure > Channel Adapters > CA	—

# Chapter 5

## Set Up the BS2000 Server for ETERNUS AF/DX Storage Systems

The ETERNUS AF/DX storage system is configured in the same way as any other disk storage system with host connection via FC supported by BS2000.

### 5.1 SE Server (SU /390)

Set up the SE Server for BS2000 volumes on an ETERNUS AF/DX storage system.

An affinity group is generated on the SE Server as a logical controller. A maximum of 4 FC channels is recommended, up to 8 FC channels are supported.

A maximum of 4096 LUNS is supported per channel path. However, we recommend assigning appropriately fewer volumes to an affinity group, thus enabling PAV or FastDPAV alias devices to be generated on the same channel path.

Please be aware that if there are up to 4096 LUNs per channel path, the number of host FC ports per CA port is limited to 32 for the storage system.

For performance reasons

- each volume should be configured with one or two additional PAV alias devices (SE500B, SE700B).
- a pool of FastDPAV alias devices should be configured for each set of logical volumes with identical channel paths (SE710, SE730).

D3435 (internal type A5) must be specified as disk device type and D3435-FP (internal type A6) as FastDPAV alias device type. (See manual “BS2000 System Installation” and the example in the annex.)

## 5.2 SE Server (SU x86)

Set up the SE Server (SU x86) for BS2000 volumes on an ETERNUS AF/DX storage system.

Use the SE Manager as described in the manuals “Fujitsu Server BS2000 SE Series Administration and Operation - User Guide” to configure LUNs on the ETERNUS AF/DX storage system as D3435 disk device types.

If there is a gap between the Host LUNs of an existing affinity group and a newly generated affinity group a reboot of the SE Server is necessary. If there is no gap, the new device nodes will be built automatically online. It is recommended to create the LUNs and the required affinity groups before activation of the FC zoning and configuration on the SE Server (SU x86).

Special Settings for ETERNUS DX100 S5/S4 on SE Server SE310/SE320/SE330:

For ETERNUS DX100 S5/S4 on SE Server (SU x86) only Host direct connection is supported (1 path only).

To configure ETERNUS DX100 S5/S4 for SE Server (SU x86) the settings for Fabric connection apply as defined in [Table 4.1](#).

# Chapter 6

## Check the LUNs

---

If VM2000 is in use, disk devices must be assigned to a guest VM by VM2000 administration (/ADD-VM-DEVICES).

### 6.1 SE Server (SU /390)

Use /ATTACH-DEVICE and /SHOW-DISK-STATUS for checks by means of BS2000, resp. /SHOW-STORAGE-DEVICE-CONFIG for checks by means of SHC-OSD.

### 6.2 SE Server (SU x86)

The ETERNUS AF/DX storage system and the new devices must be visible from the X2000. Please check by using Web GUI or by using the X2000 command "emptool display paths".

Use /ATTACH-DEVICE and /SHOW-DISK-STATUS for checks by means of BS2000, resp. /SHOW-STORAGE-DEVICE-CONFIG for checks by means of SHC-OSD.

# Chapter 7

## Example

### 7.1 Configuration and Generation of an ETERNUS DX8700 S3 for BS2000 (SE Server)

#### ■ Configuration Data

80 logical volumes are to be configured, each connected via 4 paths.

The ETERNUS DX8700 S3 has 2 Controller Enclosures (CEs) with totally 4 control modules (CMs), 2 channel adapters (CAs) per CM and 4 FC ports on CA0 and 2 FC ports on CA1 of each CM. Not all ports are used in this example.

#### ■ Configuration of the Fabric

The following describes a sub-configuration which is connected to a SE710 via FC switches:

##### 4 16Gbit FC ports in the DX8700 S3

```
(CE#0, CM#0, CA#0, Port#0) with WWPN 5000 00E0 DAC1 9A00 (Fabric1)
(CE#1, CM#0, CA#1, Port#1) with WWPN 5000 00E0 DAC1 9A15 (Fabric1)
(CE#0, CM#1, CA#1, Port#1) with WWPN 5000 00E0 DAC1 9AC5 (Fabric2)
(CE#1, CM#0, CA#0, Port#0) with WWPN 5000 00E0 DAC1 9A10 (Fabric2)
```

are connected to 4 16Gbit FC ports on the FC fabrics.

A transfer rate of 16Gbit/s is set for the FC ports on the switches.

##### 4 FC channels of the SE710 (16Gbit/s)

```
4A with WWPN 204A 0000 0EA0 0CE3 (Fabric1)
47 with WWPN 2047 0000 0EA0 0CE3 (Fabric1)
0D with WWPN 200D 0000 0EA0 0CE3 (Fabric2)
04 with WWPN 2004 0000 0EA0 0CE3 (Fabric2)
```

are connected to 4 16Gbit FC ports on the FC fabrics.

A transfer rate of 16Gbit/s is set for the FC ports on the switches.

4 zones (2 x 2) are configured for the channel paths in the FC fabrics.

#### ■ Configuration of the ETERNUS DX8700 S3

First, configure the host-related settings in the DX8700 S3.

## ■ Defining the Host Response

[Connectivity > Host response](#)  
[Add Host Response](#)

For the host connection, a host response with the name "BS2000" is predefined in the "Host Response Parameters".

## ■ Configuring settings for FC ports

[Connectivity > Port Group](#)  
[Create FC Port](#)

The CA parameters are defined for each of the 4 FC ports. The transfer rate is set to 16Gbit/s. 4 Port Groups are registered in the ETERNUS DX8700 S3:

CA Port Group	Port Group Member
PG0000_F1	CE#0 CM#0 CA#0 Port#0
PG1011_F1	CE#1 CM#0 CA#1 Port#1
PG0111_F2	CE#0 CM#1 CA#1 Port#1
PG1000_F2	CE#1 CM#0 CA#0 Port#0

## ■ Registering Host WorldWideName(s)

[Connectivity > Host Group > FC/FCoE](#)  
[Add FC/FCoE Host](#)

The WWPNs of the 4 SE710 FC channels are registered in the ETERNUS DX8700 S3 at the corresponding FC ports:

FC Host	WWN	Host Group
SE710 47	204700000EA00CE3	S_1011_F1
SE710 4A	204A00000EA00CE3	S_0000_F1
SE710 0D	200D00000EA00CE3	S_0111_F2
SE710 04	200400000EA00CE3	S_1000_F2

The logical volumes will now be configured via the following steps and combined in affinity groups:



## ■ Configuring RAID groups

### RAID Group Create

4 RAID groups from RG01 to RG04 are set up. The assignment of the RAID groups to the CPUs is made manually as follows:

RAID group	CM#	CPU#	RAID Type
RG01	0	0	RAID1
RG02	1	0	RAID1
RG03	0	1	RAID1
RG04	1	1	RAID1

## ■ Creating logical volumes on the RAID group

### Volume Create

80 logical volumes are set up (20 on each RAID group).

RAID group	Volume	Size (GB)
RG01	000 - 019	30.0
RG02	020 - 039	30.0
RG03	040 - 059	30.0
RG04	060 - 079	30.0

## ■ Configuring LUN groups

### Connectivity > LUN Group Add LUN Group

1 LUN group of 80 LUNs (volumes) is established:

LUN Group	Host LUN	Volume
LG01	000 - 079	000 - 079

■ Configuring the host affinity

[Connectivity](#)  
[Create Host Affinity](#)

The LUN group to be used with the SE Server is combined with matching port groups and host groups in the ETERNUS DX8700 S3:

Host Group	CA Port Group	LUN Group	Host Response
S_0000_F1	PG0000_F1	LG01	BS2000
S_1011_F1	PG1011_F1	LG01	BS2000
S_0111_F2	PG0111_F2	LG01	BS2000
S_1000_F2	PG1000_F2	LG01	BS2000

■ Setting CA Reset Groups

[Connectivity > CA Reset Group](#)  
[Modify Reset Group](#)

All FC ports (CAs) assigned to one affinity group or referring the same LUN group must be assigned to the same reset group.

FC Ports
CE#0 CM#0 CA#0 Port#0
CE#1 CM#0 CA#1 Port#1
CE#0 CM#1 CA#1 Port#1
CE#1 CM#0 CA#0 Port#0

## 7.2 Generation of the ETERNUS DX8700 S3 on the SE Server (SU /390)

The ETERNUS DX8700 S3 is generated in the same way as any other disk storage system connection via FC. D3435 (internal type A5) must be specified as disk type.

The generation is explained using the previously configured ETERNUS DX8700 S3 as an example. The LUN group LG01 consists of 1024 volumes with the LUNs 0000-03FF. The connectivity of this LUN group to the SE Server (SU /390) is defined in the affinity group.

4 connections for this LUN group are defined:

SE7xx FC-Channel Identifier	ETERNUS DX8700 S3 FC-Port WWPN	SAN switch connection
4A	5000 00E0 DAC1 9A00	Fabric 1
47	5000 00E0 DAC1 9A15	Fabric 1
0D	5000 00E0 DAC1 9AC5	Fabric 2
04	5000 00E0 DAC1 9A10	Fabric 2

Excerpts for IOGEN instructions for the SE700B/SE710 Server with ETERNUS DX8700 S3 are listed below.

### ■ Generation instructions for the 4 FC channels

1 channel is generated for each SE700B/SE710 Server FC channel:

```
CHN 4A,IBF,A,MODE=FCP
CHN 47,IBF,A,MODE=FCP
CHN 0D,IBF,A,MODE=FCP
CHN 04,IBF,A,MODE=FCP
```

### ■ Generation instructions for controllers and devices

Every volume of the LUN group shall be accessible over each of the 4 connections.

For the generation instructions the 1024 volumes of the LUN group are divided into 4 groups with 256 devices each. They are generated with the mnemonics 2000-23FF.

For each 256 devices with host LUNs '0n00' to '0nFF' 2 controllers with 2 connections are defined. These controller pairs get identical connections for all devices.

The controller pairs get the mnemonics 2n00 and 2n01 for devices 2n00 to 2nFF.

\* 256 devices 2000 to 20FF , LUNs 0000 to 00FF

```
CTL 2000,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2001,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2000,A5,D,0000,(2000),(2001),MULT=256
```

\* 256 devices 2100 to 21FF , LUNs 0100 to 01FF

```
CTL 2100,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2101,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2100,A5,D,0100,(2100),(2101),MULT=256
```

\* 256 devices 2200 to 22FF , LUNs 0200 to 02FF

```
CTL 2200,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2201,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2200,A5,D,0200,(2200),(2201),MULT=256
```

\* 256 devices 2300 to 23FF , LUNs 0300 to 03FF

```
CTL 2300,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2301,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2300,A5,D,0300,(2300),(2301),MULT=256
```

### ■ Generation instructions for PAV configurations

#### Generation instructions for FastDPAV configuration on SE710 Servers

For SE710 Servers it is recommended to use FastDPAV alias devices instead of static PAV alias devices. However static PAV alias devices are still supported, also in combination with FastDPAV alias devices, mainly for the purpose of smooth integration.

FastDPAV alias devices are configured with device type D3435-FP (internal type A6) and the mandatory host LUN range from 0xFF00 to 0xFFFF.

For a FastDPAV alias device the host LUN number is modified during each I/O.

For all 1024 volumes a common pool of 256 FastDPAV alias devices is generated. The generated controllers must have the same connections configured as those for the range of base devices 2000-23FF.

\* 256 FastDPAV alias devices for devices 2000 to 23FF

```
CTL 2F00,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2F01,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2F00,A6,D,FF00,(2F00),(2F01),PAV=01,MULT=256
```

### Generation instructions for PAV configuration on SE700B Servers

On SE700B Servers 2 PAV alias devices are generated for each LUN. This permits 3 parallel input/outputs per volume. Without PAV alias devices, it is possible to execute only 1 input/output per volume at the same time.

The mnemonics of the alias devices are 2700-2AFF for the first alias, 2B00-2EFF for the second alias.

They are divided in groups of 256 LUNs each.

\* first alias device for devices 2000 to 20FF , LUNs 0000 to 00FF

```
CTL 2700,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2701,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2700,A5,D,0000,(2700),(2701),PAV=01,MULT=256
```

\* first alias device for devices 2100 to 21FF , LUNs 0100 to 01FF

```
CTL 2800,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2801,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2800,A5,D,0100,(2800),(2801),PAV=01,MULT=256
```

\* first alias device devices 2200 to 22FF , LUNs 0200 to 02FF

```
CTL 2900,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2901,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2900,A5,D,0200,(2900),(2901),PAV=01,MULT=256
```

\* first alias device for devices 2300 to 23FF , LUNs 0300 to 03FF

```
CTL 2A00,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2A01,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2A00,A5,D,0300,(2A00),(2A01),PAV=01,MULT=256
```

\* second alias device for devices 2000 to 20FF , LUNs 0000 to 00FF

```
CTL 2B00,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2B01,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2B00,A5,D,0000,(2B00),(2B01),PAV=01,MULT=256
```

\* second alias device for devices 2100 to 21FF , LUNs 0100 to 01FF

```
CTL 2C00,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2C01,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2C00,A5,D,0100,(2C00),(2C01),PAV=01,MULT=256
```

\* second alias device devices 2200 to 22FF , LUNs 0200 to 02FF

```
CTL 2D00,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2D01,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2D00,A5,D,0200,(2D00),(2D01),PAV=01,MULT=256
```

\* second alias device for devices 2300 to 23FF , LUNs 0300 to 03FF

```
CTL 2E00,BLM,A,(4A,0,500000E0DAC19A00),(0D,0,500000E0DAC19AC5) *FABRIC1/2
CTL 2E01,BLM,A,(47,0,500000E0DAC19A15),(04,0,500000E0DAC19A10) *FABRIC1/2
DVC 2E00,A5,D,0300,(2E00),(2E01),PAV=01,MULT=256
```

---

Fujitsu Storage ETERNUS AF, ETERNUS DX Configuration Guide  
-Server Connection-  
Fibre Channel/ ETERNUS AF650 S3/S2 All-Flash Arrays,  
ETERNUS DX100 S5/S4, DX500 S5/S4, DX600 S5/S4, DX900 S5,  
DX8900 S4, DX8700 S3 Hybrid Storage Systems  
Settings for BS2000 Connection

P3AM-5672-16ENZ0

Date of issuance: July 2023  
Issuance responsibility: Fujitsu Limited

---

- The content of this manual is subject to change without notice.
- This manual was prepared with the utmost attention to detail. However, Fujitsu shall assume no responsibility for any operational problems as the result of errors, omissions, or the use of information in this manual.
- Fujitsu assumes no liability for damages to third party copyrights or other rights arising from the use of any information in this manual.
- The content of this manual may not be reproduced or distributed in part or in its entirety without prior permission from Fujitsu.

  
**FUJITSU**