VNX SERIES ARCHITECTURAL OVERVIEW

February 2011

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Course Overview

Description	This course introduces the VNX series architecture. It focuses on the unified Block and File, File only, or Block only storage solution including host connectivity options and 6 Gb Serial Attached SCSI (SAS) backend.
Audience	The training is intended for those with a Block and File background who are involved in the design, installation, configuration, or implementation of the VNX series platform.
Objectives	Upon completion of this course, you should be able to: • Identify unified platform hardware components • Verify proper component locations and cabling requirements • Compare unified platform models and I/O module configurations • Describe the 6 Gb SAS backend

EMC believes the information in this course is accurate as of its publication date. It is based on pre-GA product information, which is subject to change without notice. For the most current information, see the EMC Support Matrix and product release notes on Powerlink.

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Module 1: Introduction to the VNX Series Unified Platform Hardware

This module introduces the VNX unified platform hardware.

Upon completion of this module, you should be able to:

- Identify VNX hardware components
- Compare VNX models and I/O module configurations

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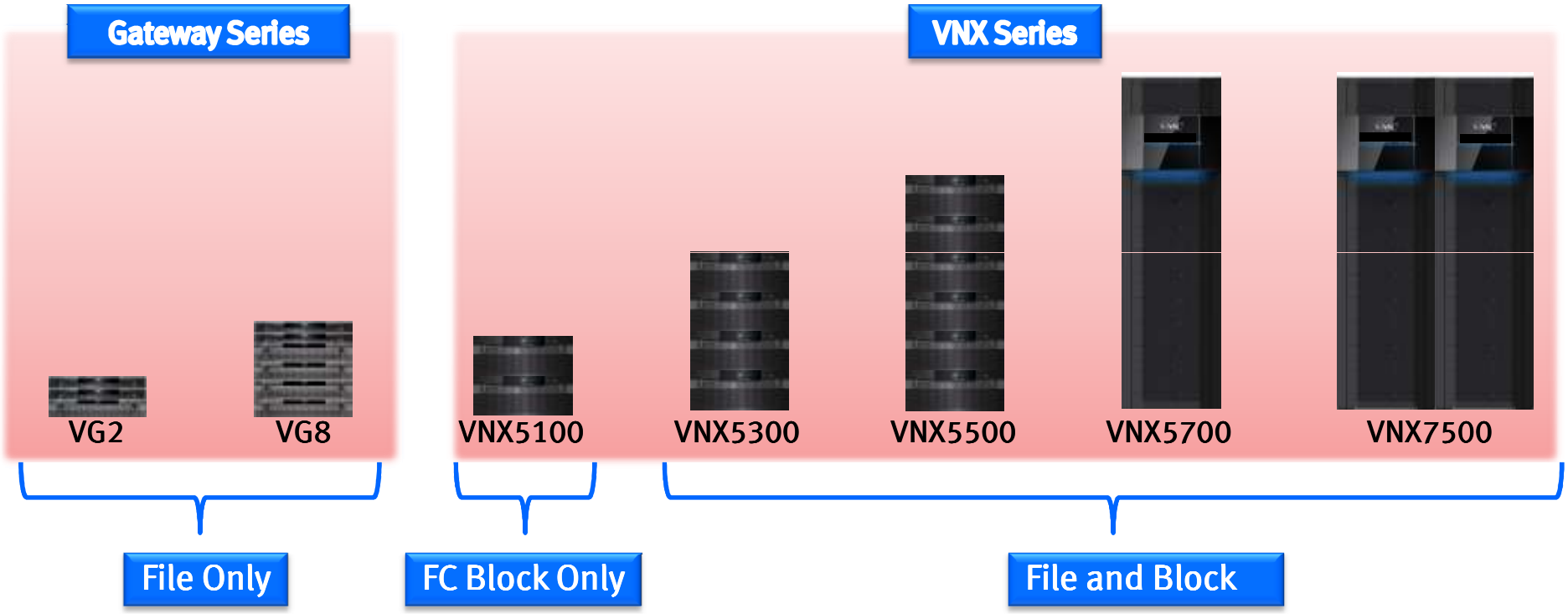
VNX Series Storage Systems – Simple and Efficient



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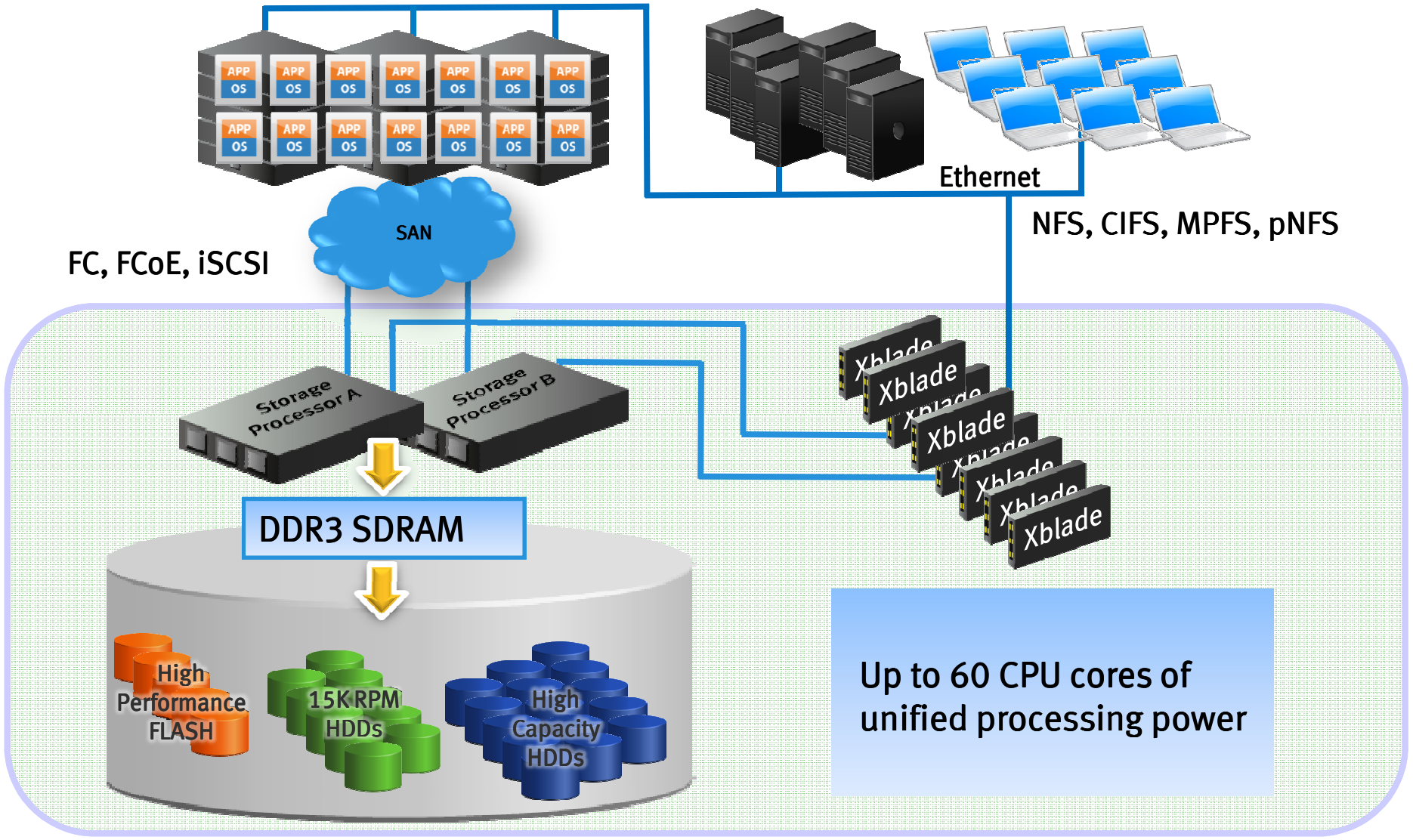
Unified Modular Architecture



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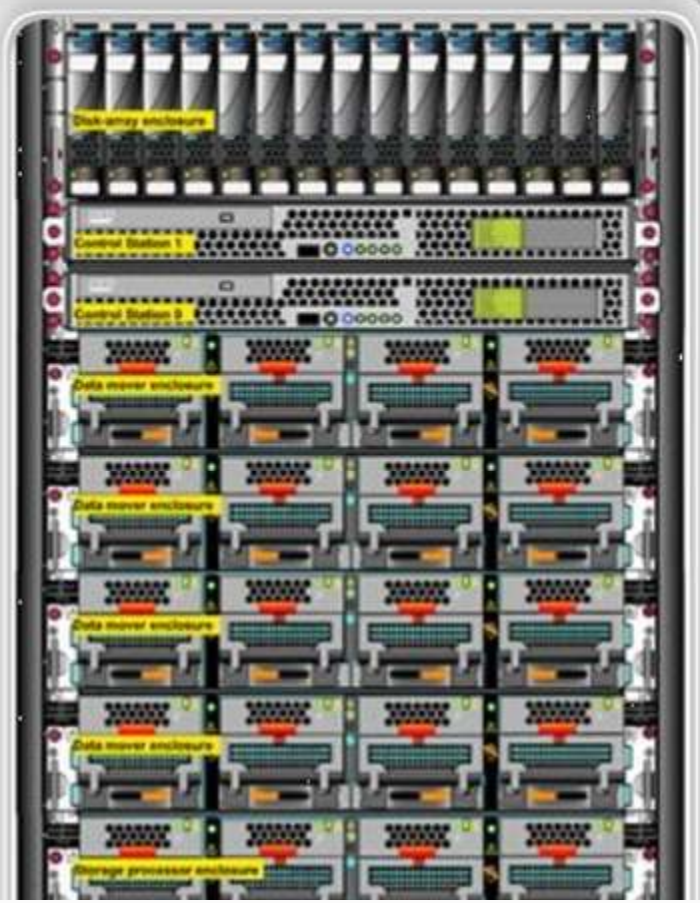
VNX5700/7500 Unified Hardware

Introduction

VNX7500 File only or unified hardware includes a dual Standby Power Supply (SPS), a Storage Processor Enclosure (SPE), at least one Disk Array Enclosure (DAE), one or two Control Stations, one to four Data Mover Enclosures (DMEs), and from four to 1000 disk drives. The VNX7500 supports from 2-8 X-Blades while the VNX5700 supports 2, 3, or 4 X-Blades. The VNX5700 maximum drive count is 500.



PROPERTIES

Allow user to leave interaction:	**Anytime**
Show 'Next Slide' Button:	**Show upon completion**
Completion Button Label:	**Next Slide**

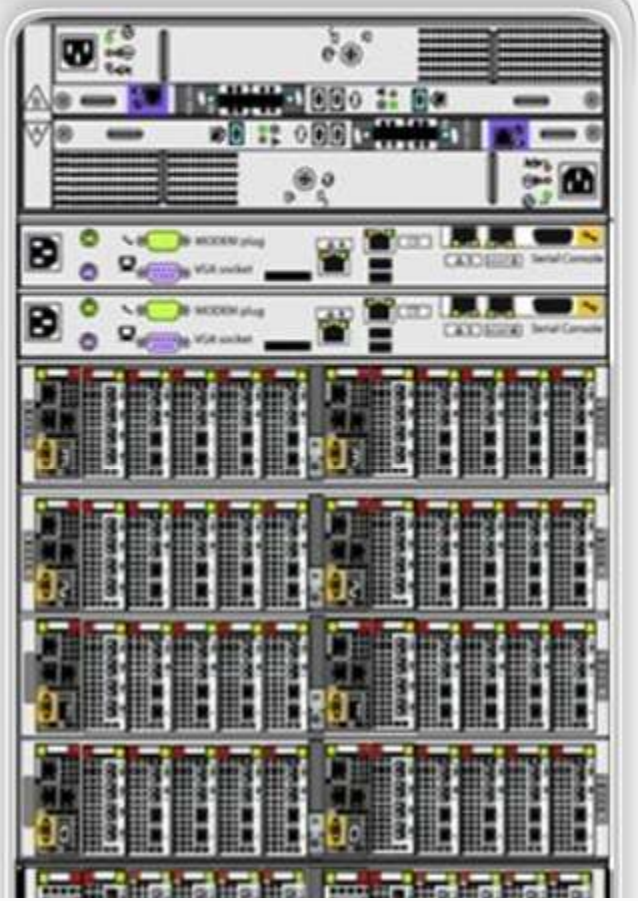
Properties...

Edit in Engage

VNX5700/7500 Unified Hardware Rear View

Introduction

Shown here is the rear view of a Unified or File only VNX7500. The VNX5700 is similar except that the maximum DME count is two.



PROPERTIES

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Properties...

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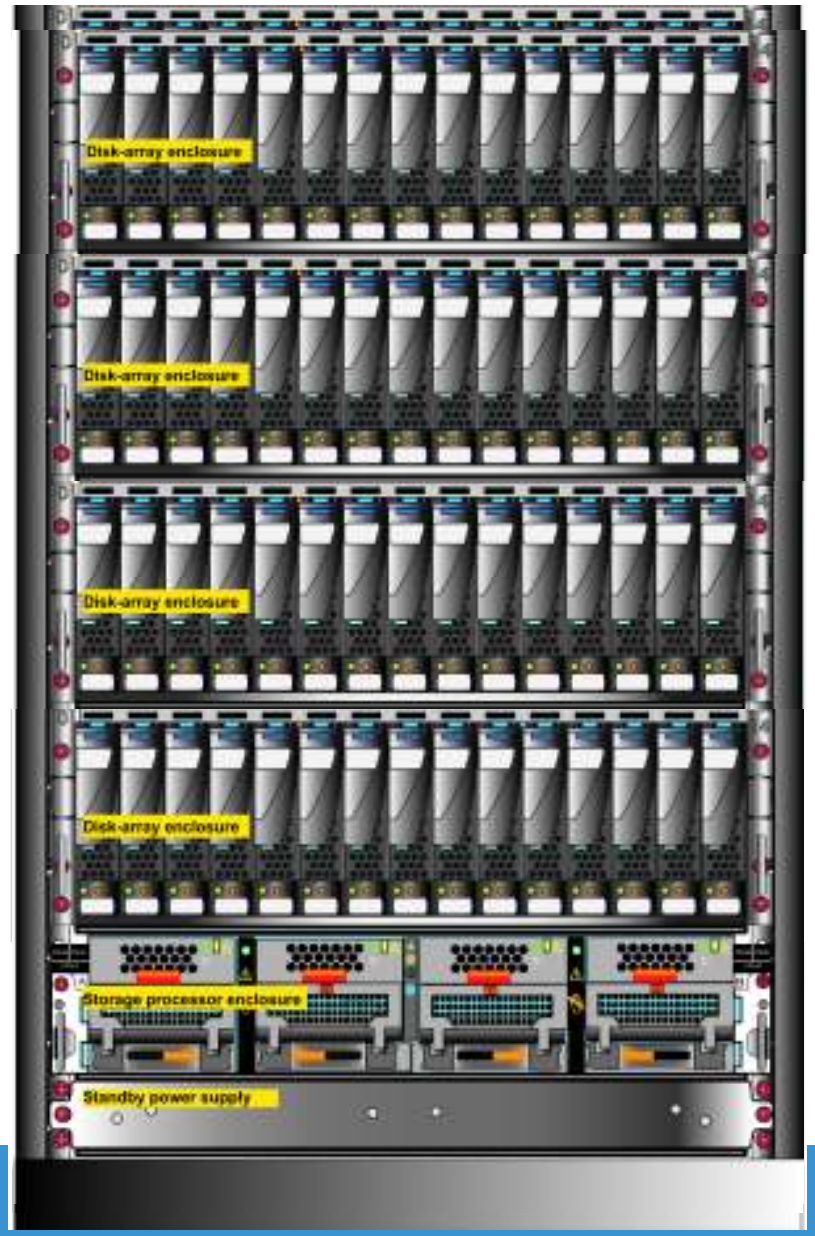
VNX Series Considerations



Block only with 6U reserve for unified upgrade

Block or File or Unified hardware

File only hardware

VNX5500/5300 Unified Hardware

Introduction

VNX5500 File Only or unified hardware includes two Standby Power Supplies (SPS), a Disk Processor Enclosure (DPE), one or two Control Stations, up to three X-Blades, and from four to 250 disk drives. A VNX5300 can have one or two SPSs, a maximum of two X -Blades and a maximum drive count of 125. Note that the VNX5100 is available as Block only and therefore does not include any Control Stations or DMEs. It supports a maximum drive count of 75.

PROPERTIES

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Show 'Next Slide' Button:	**Show upon completion**
Completion Button Label:	**Next Slide**

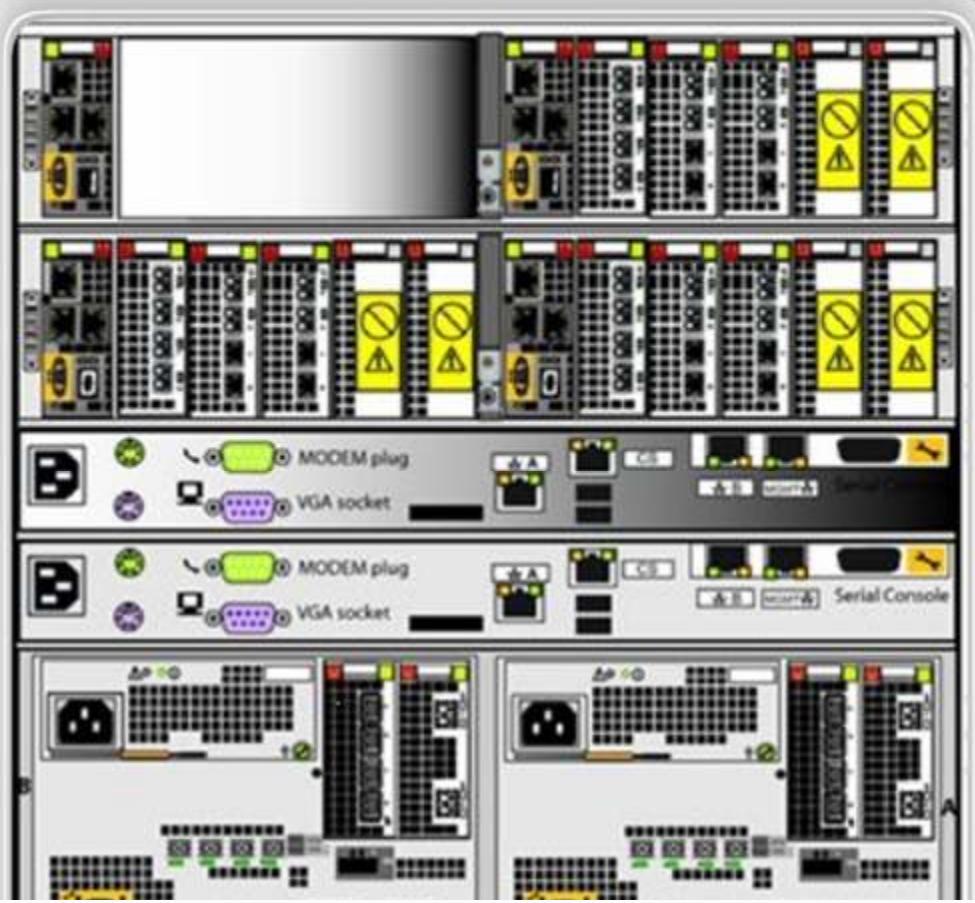
Properties...

Edit in Engage

VNX5500/5300 Unified Hardware Rear view

Introduction

Shown here is the rear view of a unified or File Only VNX5500. The VNX5300 is similar except that the maximum X-Blade count is two.



PROPERTIES

Allow user to leave interaction:	**Anytime**
Show 'Next Slide' Button:	**Show upon completion**
Completion Button Label:	**Next Slide**

Properties...

Edit in Engage

VNX Hardware Overview

	VNX5100	VNX5300	VNX5500	VNX5700	VNX7500
File					
X-Blades	N/A	1 - 2	1, 2, or 3	2, 3, or 4	2 - 8
CPU / Cores / Memory	N/A	2.13GHz / 4/ 6GB	2.13GHz / 4 / 12GB	2.4GHz / 4 / 12GB	2.8GHz / 6 / 24GB
Control Stations	N/A	1 or 2	1 or 2	1 or 2	1 or 2
Block					
SPs	2	2	2	2	2
CPU / Cores / Memory (per SP)	1.6GHz / 2 / 4GB	1.6GHz / 4 / 8GB	2.13GHz / 4 / 12GB	2.4GHz / 4 / 18GB	2.8GHz / 6 / 24GB
SPSs	1 or 2	1 or 2	2	2	2
Maximum Drives	75	125	250	500	1000

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VNX DAE and Drive Options

Disk Array Enclosure (DAE)	VNX6GSDAE25	VNX6GSDAE15
Number, Size, and Type of Drives	25, 2.5 inch, 6Gb SAS drives	15, 3.5 inch, 6Gb SAS drives
Flash options	N/A	100GB, 200GB
SAS options 15K	N/A	300GB, 600GB
SAS options 10K	300GB, 600GB	300GB, 600GB
NL SAS options 7.2K	N/A	2TB

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VNX Hardware Tour

This video shows a quick hardware tour of a VNX5500 and a VNX5700.

- *Please note that this video was produced using pre-release hardware that may not match post GA hardware labeling, racking order, and I/O Module slot and port restrictions.*

Launch

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Module 2: VNX System Components

This module describes the components of the VNX series systems.

Upon completion of this module, you should be able to:

- Identify and describe the functions of the VNX series components

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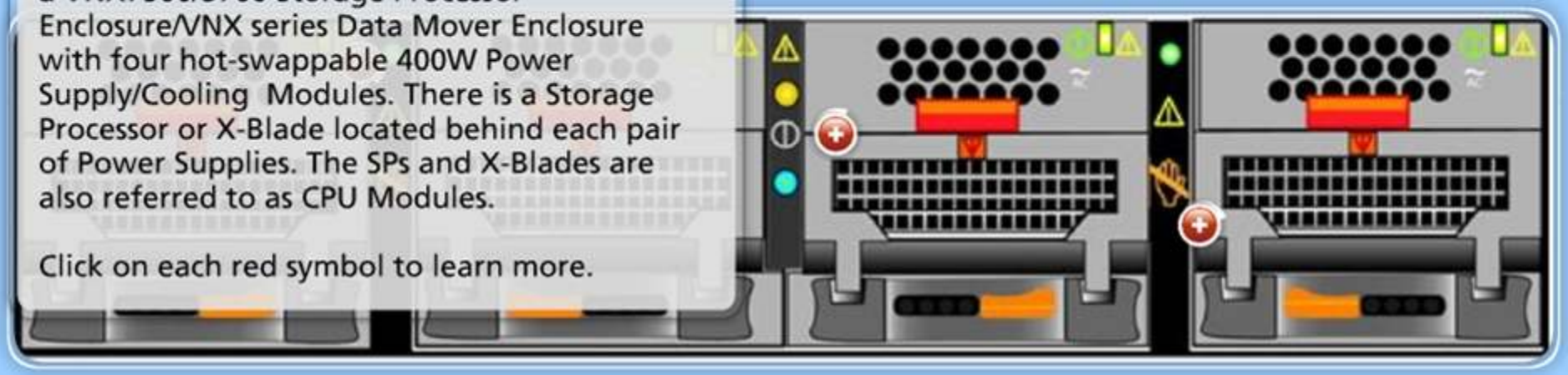
Storage Processor/Data Mover Enclosure Status LEDs

Introduction

Shown here is a graphical representation of the a VNX7500/5700 Storage Processor Enclosure/VNX series Data Mover Enclosure with four hot-swappable 400W Power Supply/Cooling Modules. There is a Storage Processor or X-Blade located behind each pair of Power Supplies. The SPs and X-Blades are also referred to as CPU Modules.

Click on each red symbol to learn more.



PROPERTIES

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Completion Button Label:	**Next Slide**

Properties...

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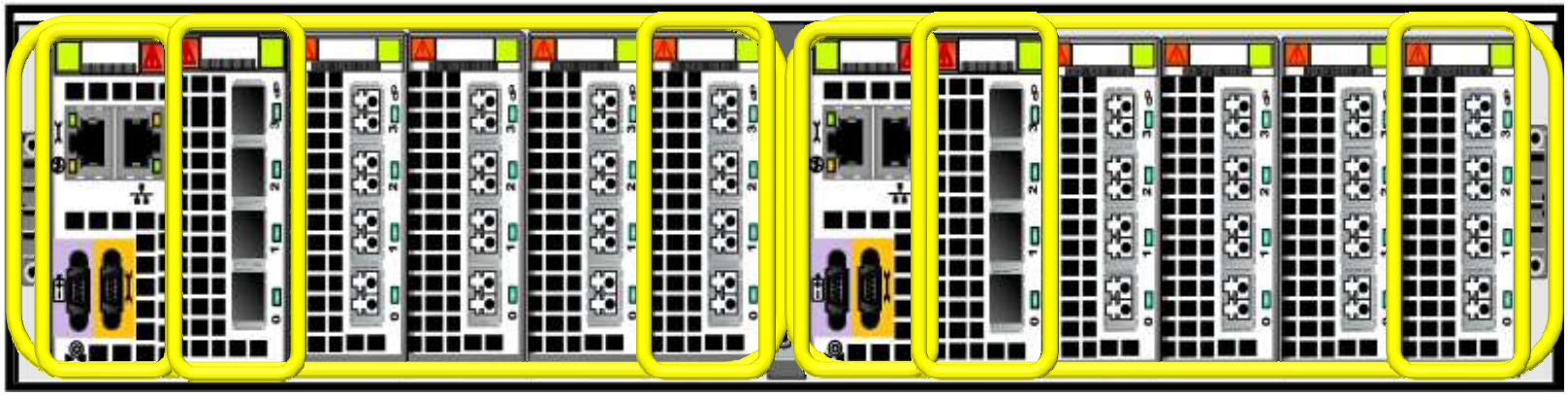
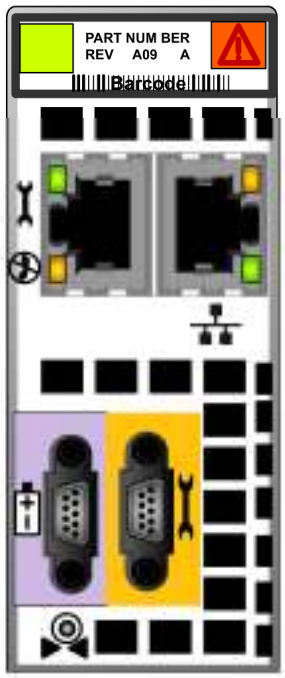
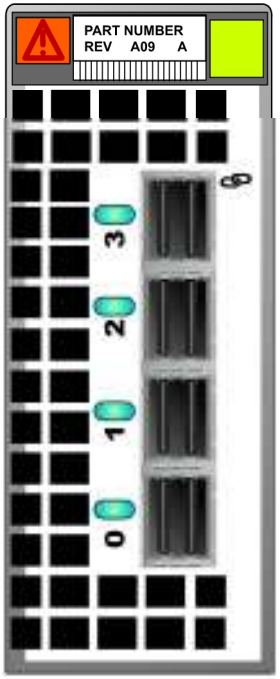
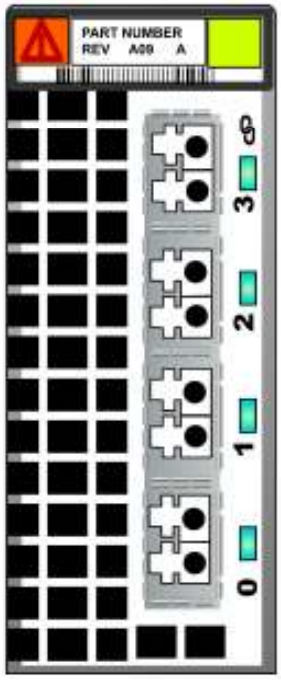
Storage Processor Enclosure Rear View









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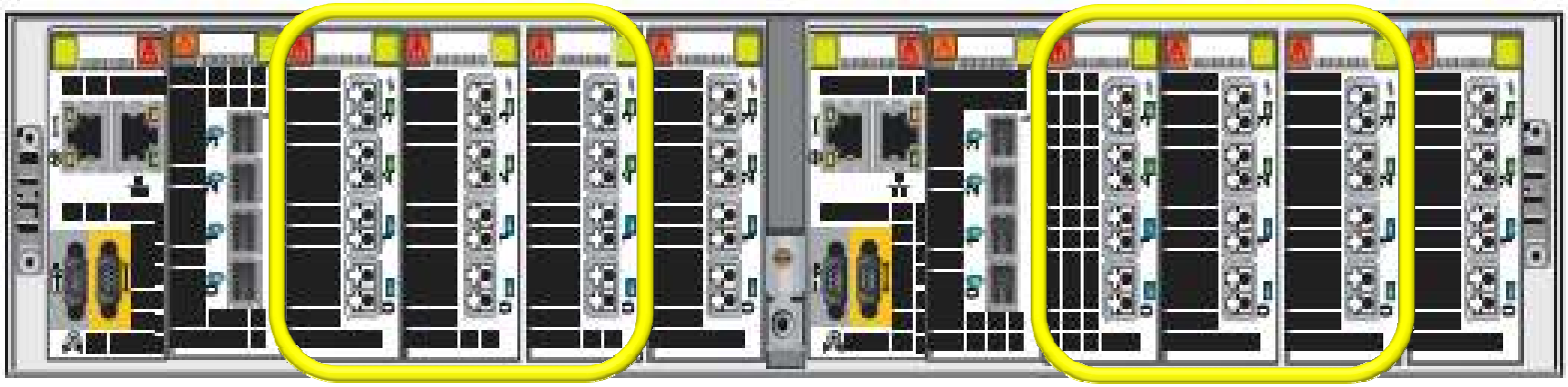
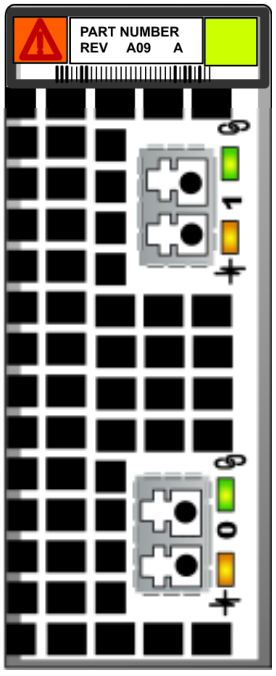
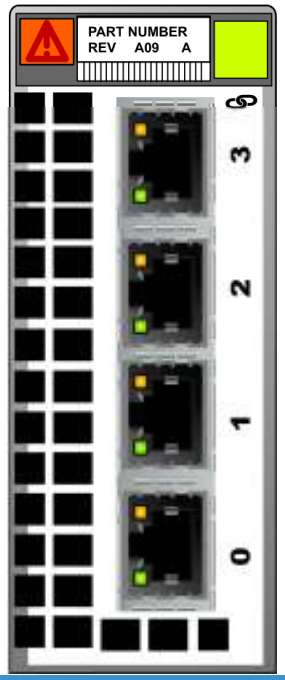
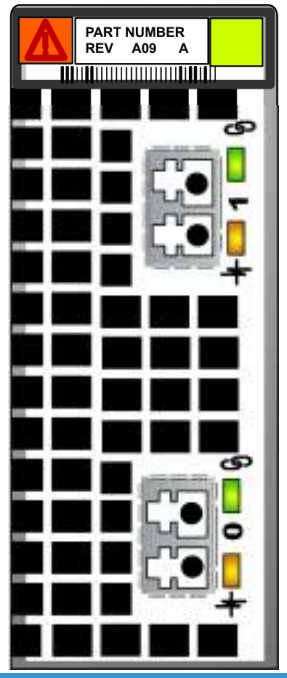
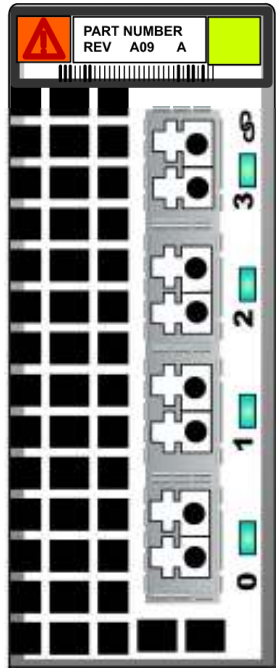
VNX7500/5700 Block Frontend I/O Module Options











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Storage Processor/Data Mover Enclosure Front View

Power Supply/Cooling Module

CPU Module

DIMM

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VNX Series Storage System Serial Number

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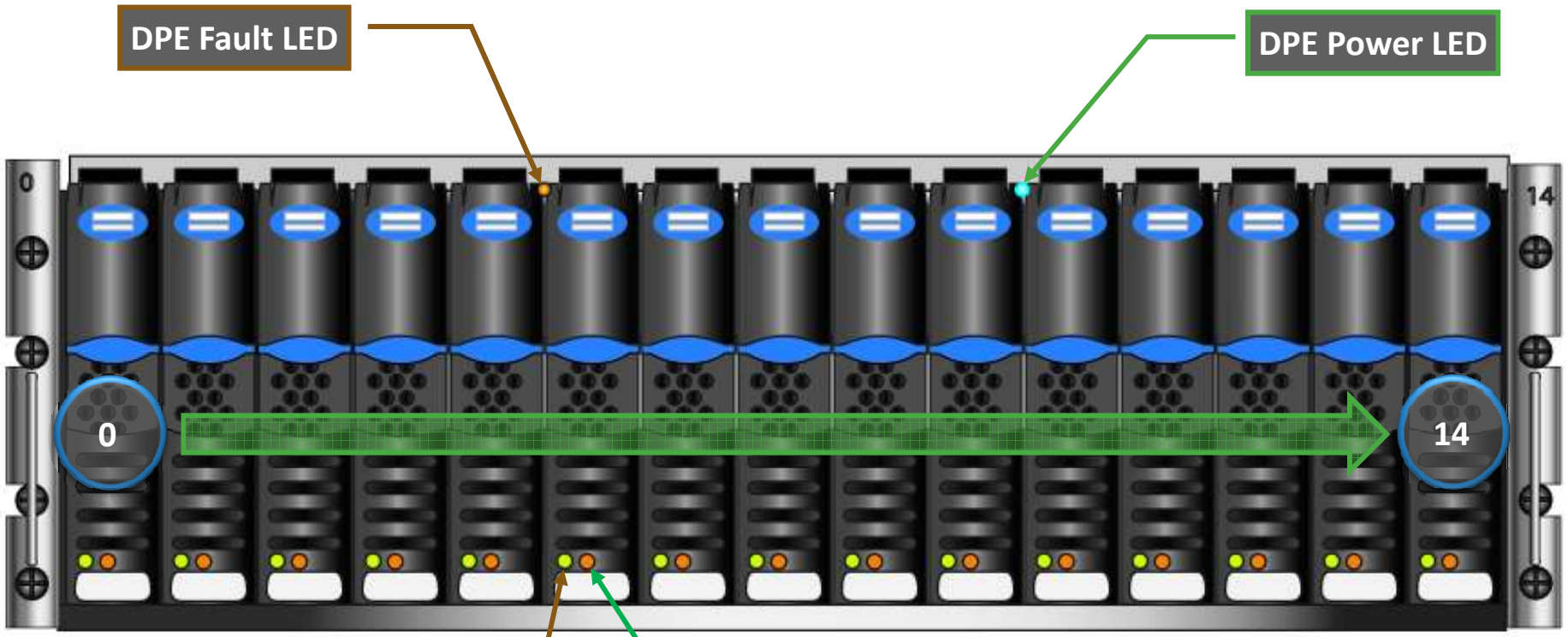
VNX 15 Drive Disk Processor Enclosure



State	Description
On	Po
Blinking, mostly on	On with I/O activity
Blinking at a constant rate	Spinning up or down normally
Blinking, mostly off	On but not spinning

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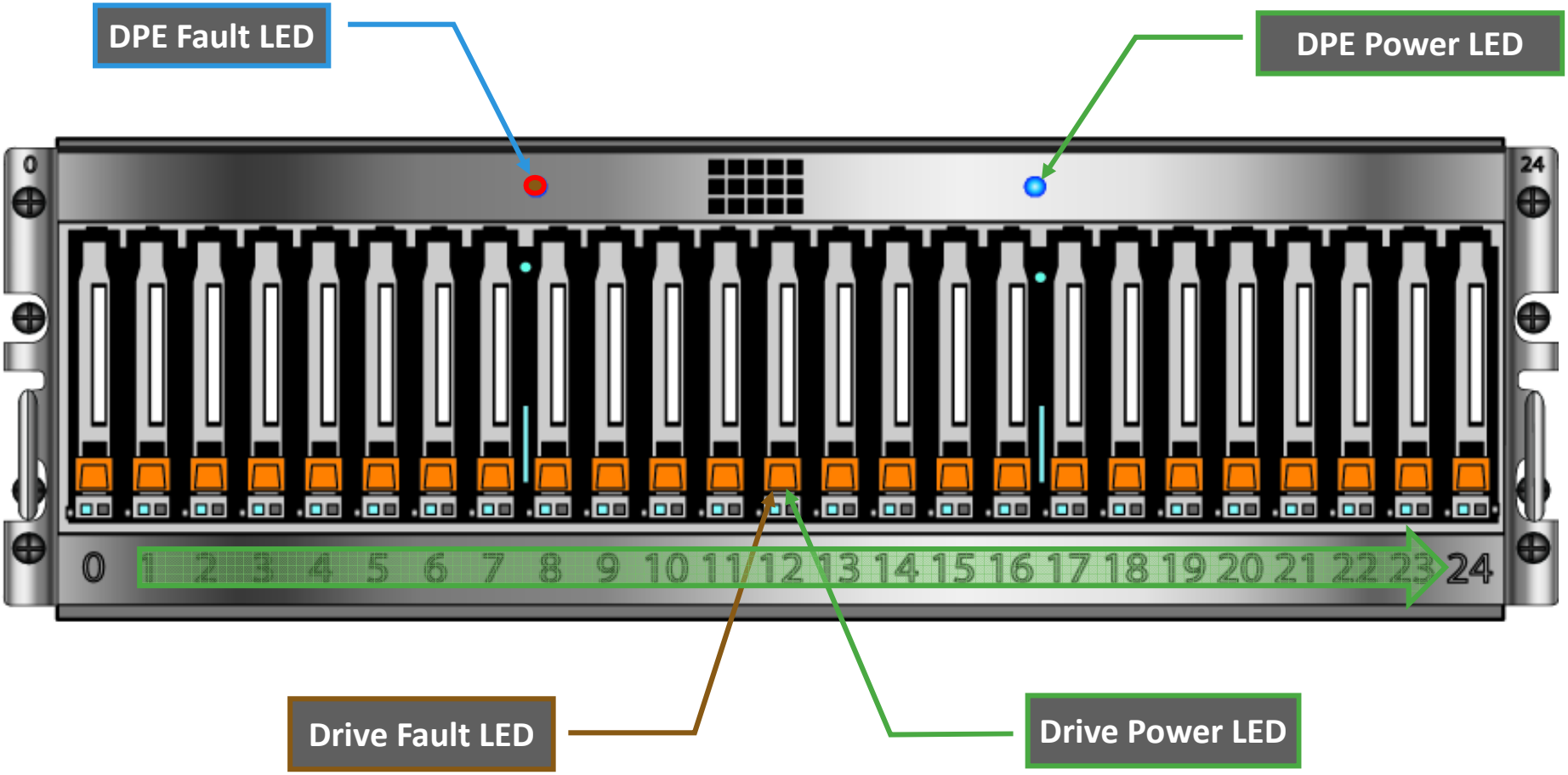
VNX 25 Drive Disk Processor Enclosure



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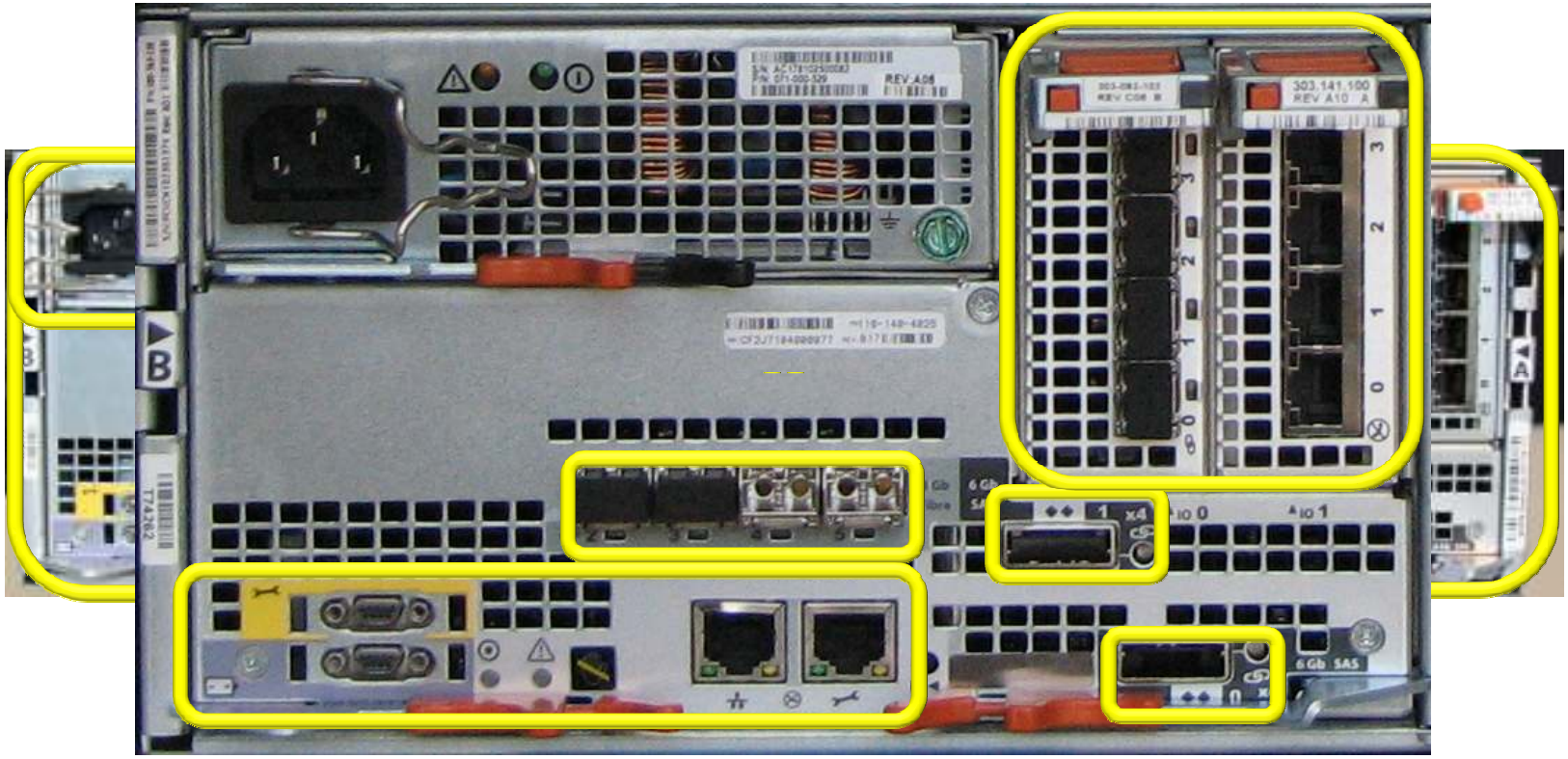
VNX Disk Processor Enclosure Rear View



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Disk Processor Enclosure Components

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Standby Power Supply (SPS)

Introduction

The 1.2 KW 1U Standby Power Supply or SPS provides power to the Storage Processors in order to prevent data loss during a power outage. The VNX5100 has one SPS, the VNX5300 can have one or two SPSs, and the VNX5500, 5700 and 7500 require dual SPSs. In a single SPS system, the SPS is associated with SPA. In a dual SPS system, one is associated with SPA and one is associated with SPB. A faulted or not fully charged SPS in a single SPS system disables write caching.

Click on the red dots to learn more.

PROPERTIES

Allow user to leave interaction:	**Anytime**
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Completion Button Label:	**Next Slide**

Properties...

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15 Drive Disk Array Enclosure

Front

Rear

Power Supply

LCC

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15 Drive DAE Details

Power Supply B Power LED Green

Power Supply B Fault LED Amber

Power Supply B Fan Fault LED Amber

Input (Double Circles) from previous DAE LCC on A side or Storage Processor A

LCC A Enclosure ID

LCC A Power & Fault LEDs

LCC A Bus (Loop) ID

SPS Monitor N/A on VNX

LCC A Output (Double Diamonds) to next DAE LCC A input on the same bus

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25 Drive Disk Array Enclosure

Drive

LCC

Power Supply

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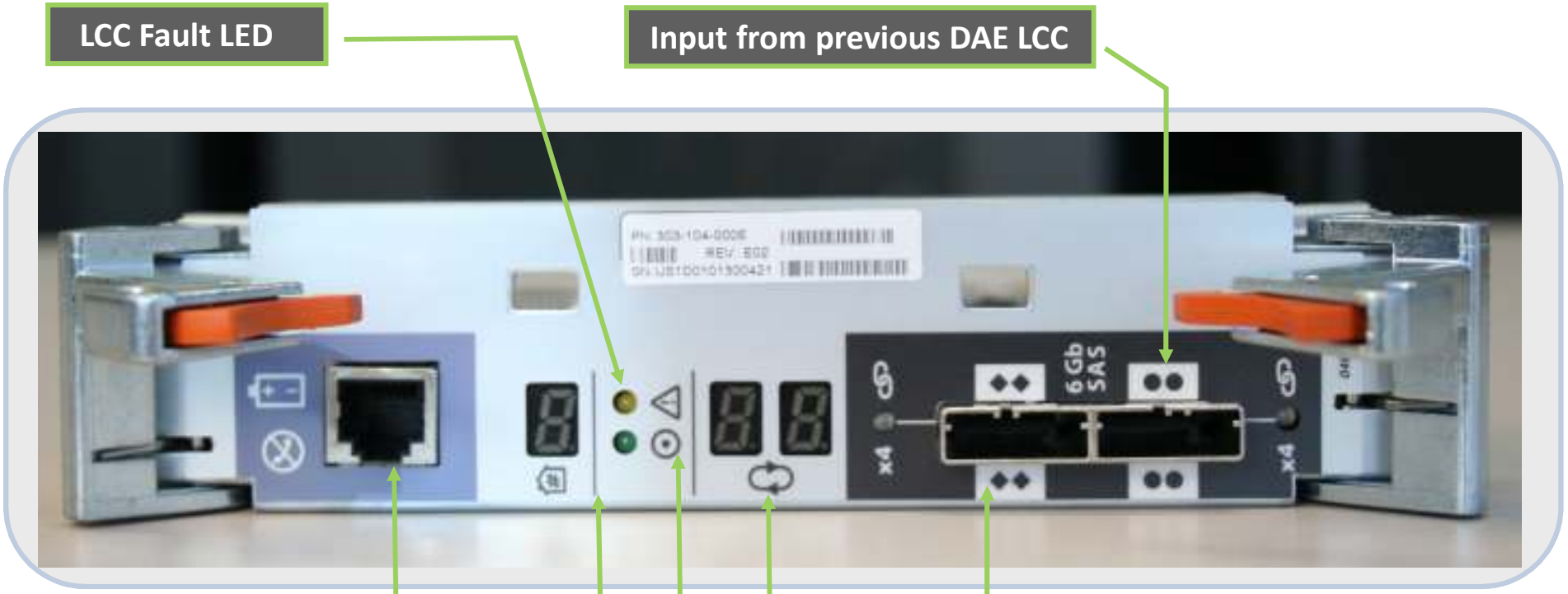
25 Drive DAE Link Control Card



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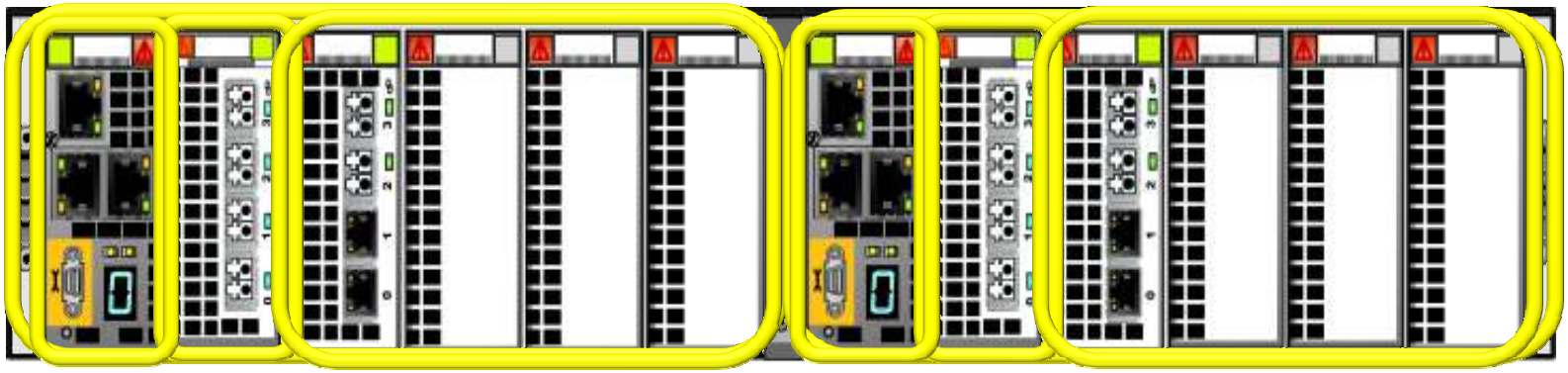
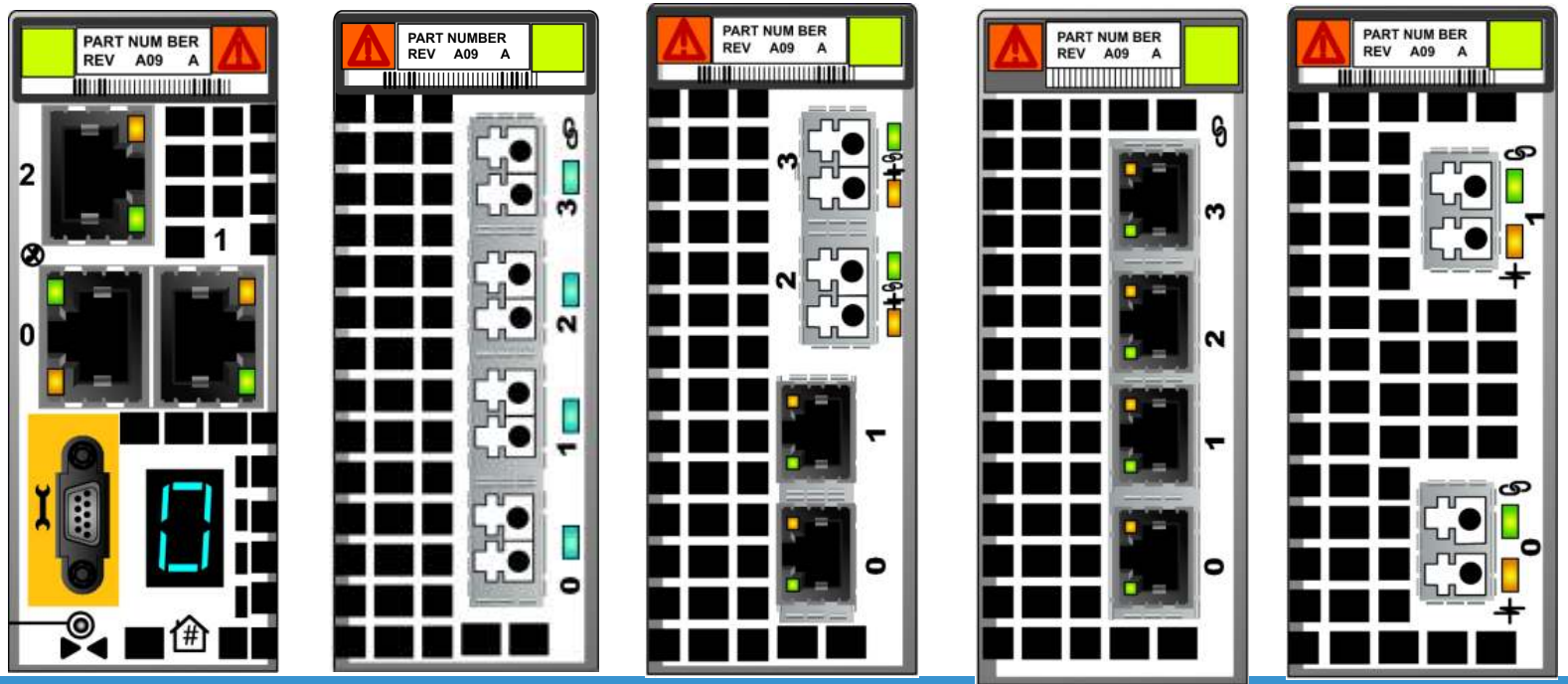
Data Mover Enclosure Rear View





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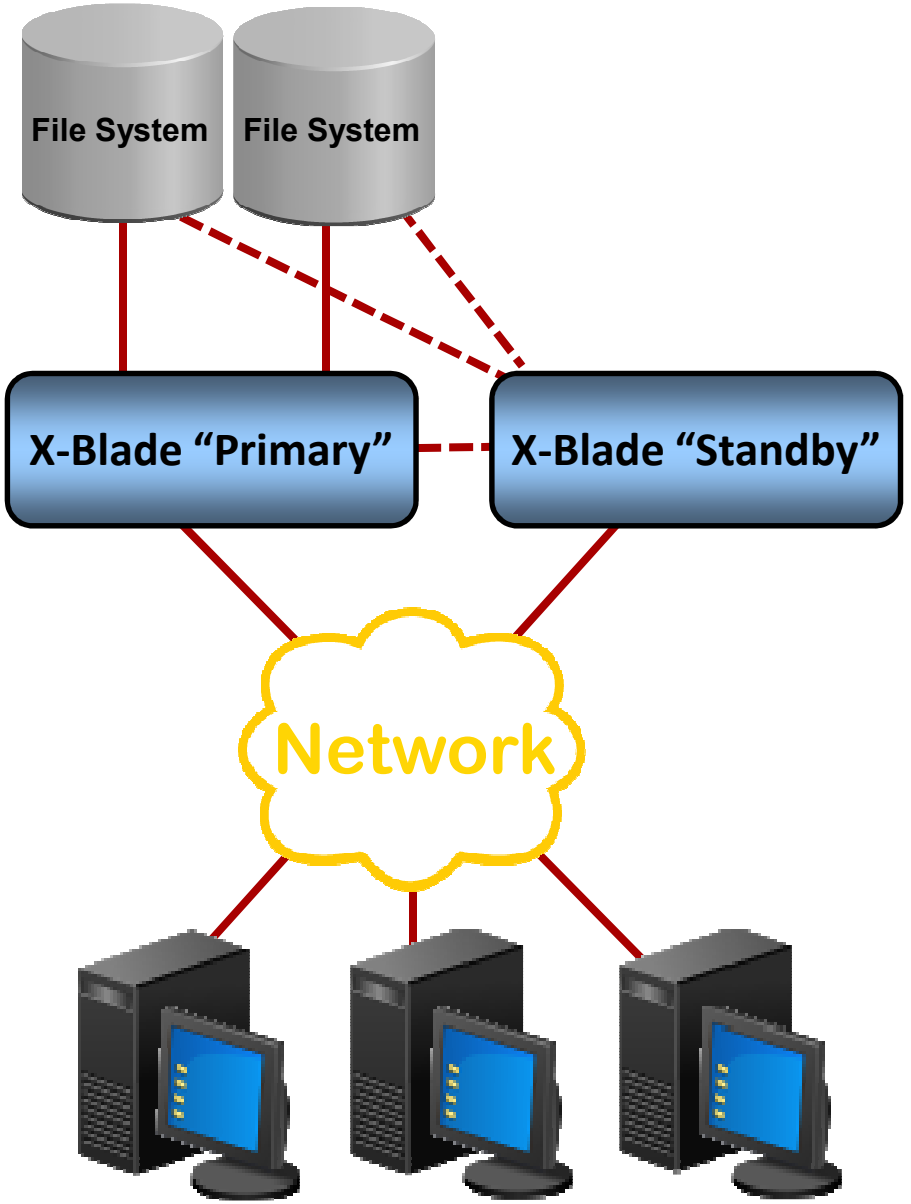
DM Failover



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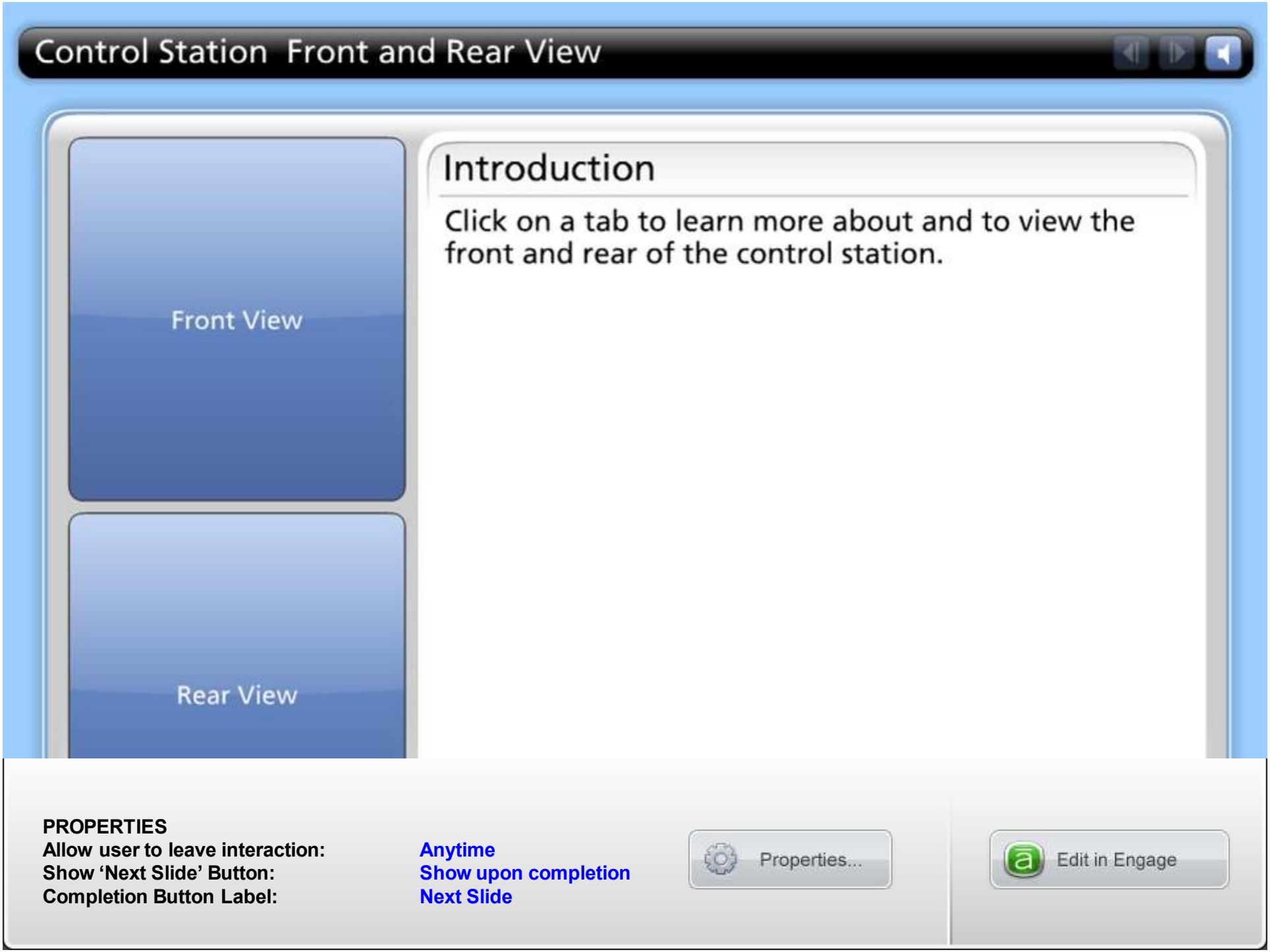
Control Station Front and Rear View
Front View
Rear View
Introduction
Click on a tab to learn more about and to view the front and rear of the control station.
PROPERTIES
Allow user to leave interaction:
Anytime
Show 'Next Slide' Button:
Show upon completion
Completion Button Label:
Next Slide
Properties...
Edit in Engage

VNX I/O Slot & Port Configurations

	VNX5100	VNX5300	VNX5500	VNX5700	VNX7500
File					
Configurable I/O Slots per X-Blade	N/A	3	4	4	5
I/O Slots per X-Blade available for client I/O	N/A	2	3	3	4
Storage per X-Blade	N/A	200TB	256TB	256TB	256TB
Block					
Configurable I/O Slots per SP	N/A	2	2	5	5
I/O Slots per SP available for host I/O	N/A	2	2	4	3 or 4
Backend Ports per SP	2	2	2	4	4 or 8

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Module 3: 6 Gb SAS Backend

This module introduces the VNX 6 Gb SAS backend.

Upon completion of this module, you should be able to:

- Describe VNX SAS 6 Gb backend
- Verify proper VNX backend cabling

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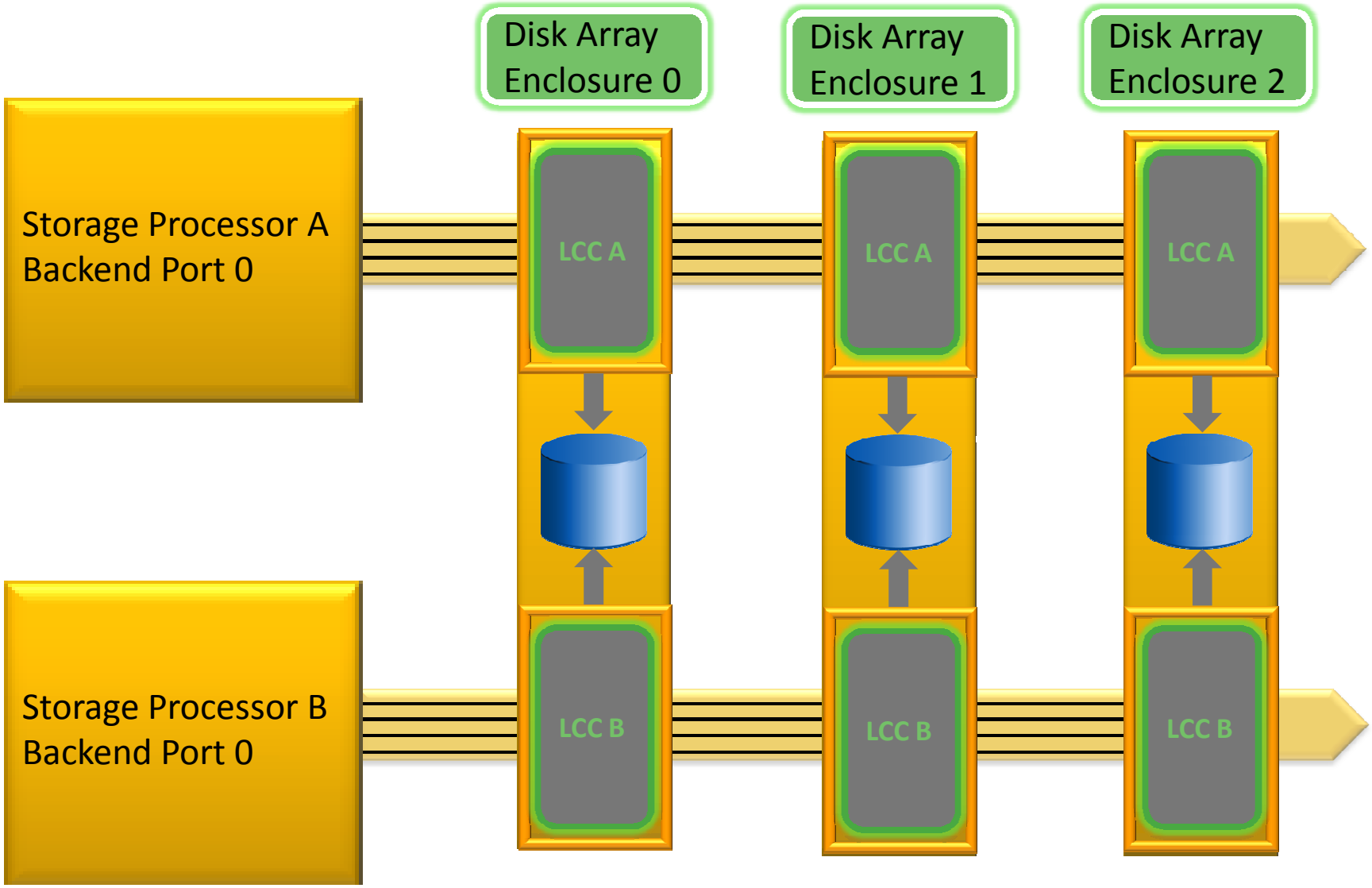
SPE Based VNX Storage System Backend Architecture



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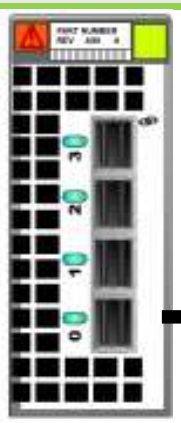
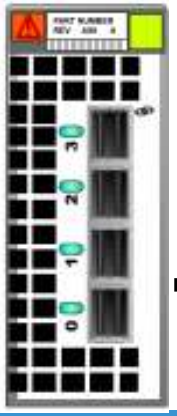
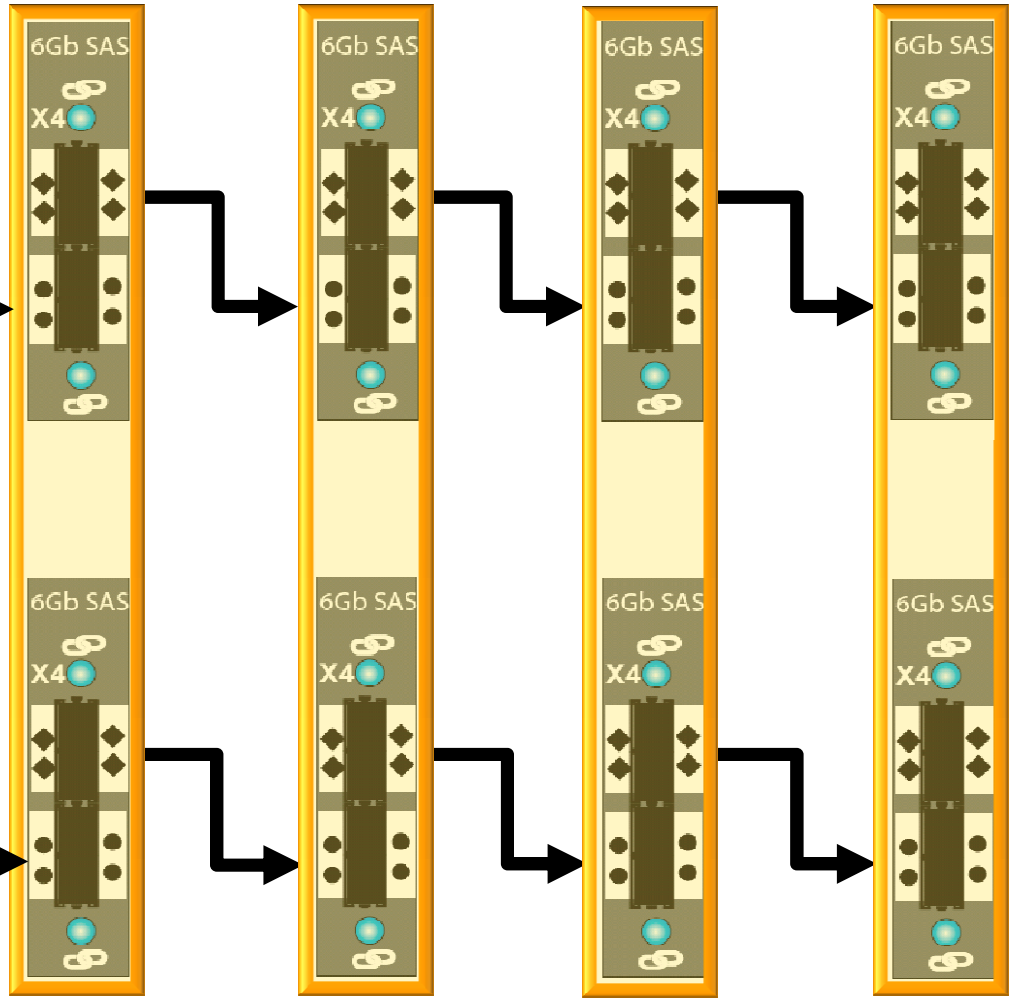
SAS Backend Cabling

Storage Processor A
6Gb SAS I/O Module



Storage Processor B
6Gb SAS I/O Module





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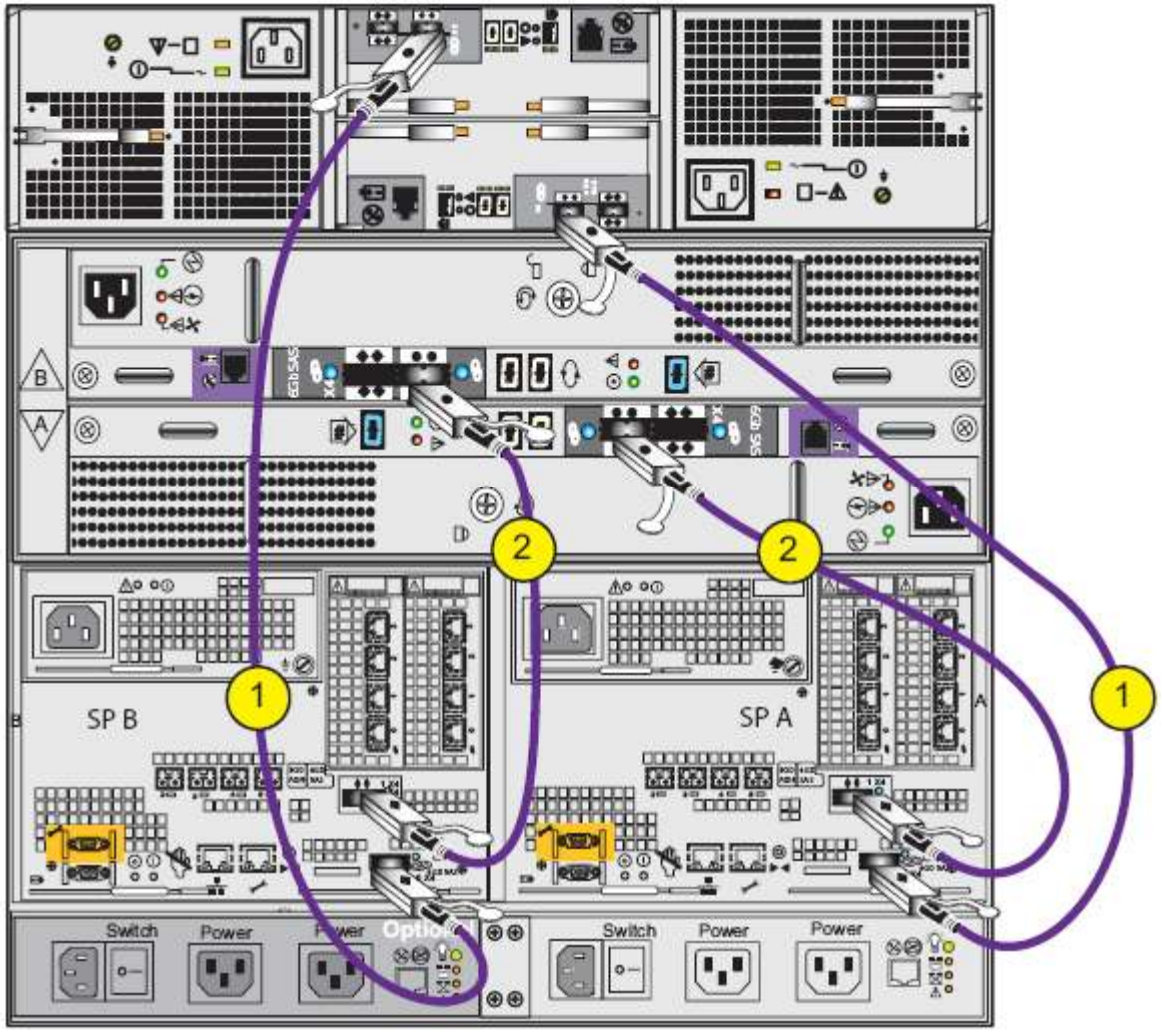
Disk Processor Enclosure Backend Cabling



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Common Disk Enclosure Subsystem

- Common set of logic for all 6Gb/s DAE/DPE designs
  - Drive power down
  - Adaptive cooling
  - Ambient temperature reporting
- Serial Attached SCSI
  - 6 Gps = 750 MBps
  - 4 x 750 MBps = 3 GBps
- Fibre Channel
  - 4 Gps = 500 MBps or 0.5 GBps

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Course Summary

- The VNX series platform combines Block array and the File serving components into a single unified storage solution.
- The VNX series storage systems leverage Intel multi-core CPUs and PCI Express 2.0 interconnects to deliver uncompromising scalability and flexibility while providing market leading simplicity and efficiency.
- Serial Attached SCSI (SAS) is a data transfer technology designed to move data to and from computer storage devices transmitting data at 6 Gb/s.

This concludes the instruction; proceed to the course assessment.
After launching the assessment, you must complete it before returning to the course.
The course will automatically move to your Transcript within 48 hours after passing the assessment.

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VNX Architectural Overview

Question 1 of 10

Point Value: 10

Which Enclosure ID is assigned to the first Disk Array Enclosure connected to a VNX7500 backend bus?

- 1
- 10
- 0
- 100

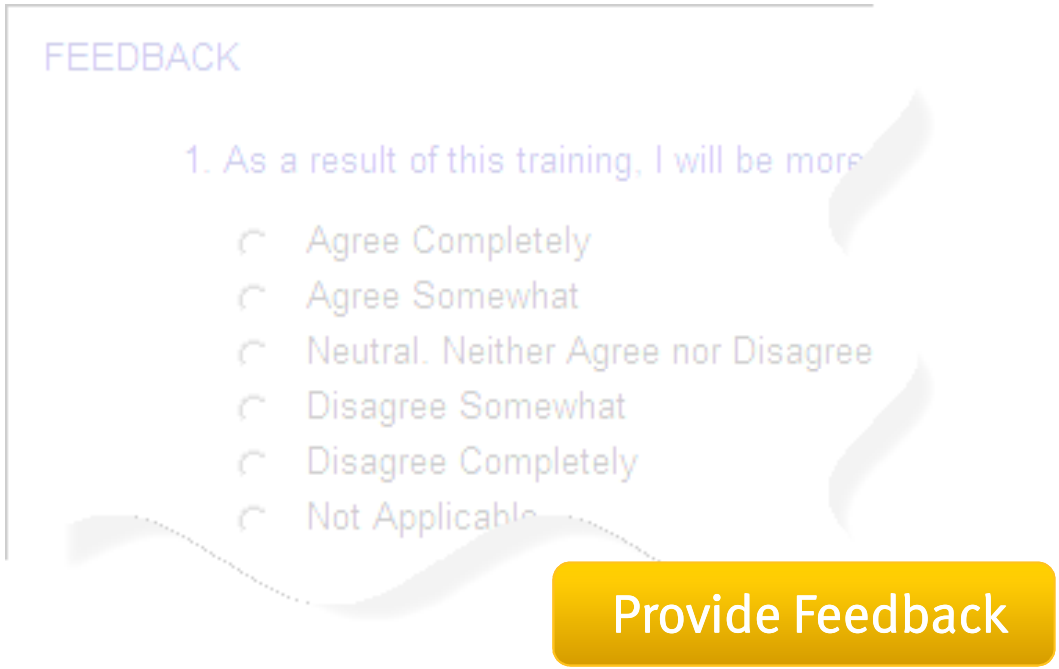
PROPERTIES

On passing, 'Finish' button:	Goes to Next Slide
On failing, 'Finish' button:	Goes to Next Slide
Allow user to leave quiz:	After user has completed quiz
User may view slides after quiz:	At any time
User may attempt quiz:	Unlimited times

Properties...

Edit in Quizmaker

Course Feedback



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