

It's All About Your Data

PROMISE[®]
TECHNOLOGY, INC.

VTrak EClass storage systems with two independent SAS or FC controller für SAS and/or SATA disk drives!

As storage requirements become more demanding, the need for increased flexibility and secure data access is paramount. The open architecture of the VTrak storage systems allows for the use of either SAS or SATA disk drives in the same system. All up-to-date RAID levels e.g. RAID 6 / 60, active/active, failover/failback dual controller provides high availability of the data to the users. Using Promise's VTrak J-Class SAS/SATA JBOD enclosures, users can now build highly scalable, highly available storage network which can grow as needed. The key features of the VTrak dual controller storage systems include:

- Redundant, hot swappable RAID controller with active/active Failover/Failback function
- Fibre Channel 4 Gb/s or 2 Gb/s Serial Attached SCSI (SAS)
- Redundant, hot swappable power supplies and fans
- 12/16 hot-swappable drive bays in a robust 2U/3U chassis
- Flexibility to use SAS and SATA 3Gb/s drives simultaneously
- Data protection with RAID 0, 1, 1E, 10, 5, 6, 50, 60 with multiple global or dedicated hot-spare drives support
- Online Capacity Expansion
- Online RAID Level Migration
- Advanced Error Handling (Predictive Data Migration)
- Expansion with up to four 2U/3U, 12/16bay J-Class units with up to 80 HDDs as one RAID Array
- Cascadable with up to 8 E-Class SAS systems, e.g. 8 x 80 HDDs at a single SASx4 Bus

Fully redundant and scalable RAID Storage Systems from Promise Technology

VTrak EClass Storage Systems for Enterprise-SAN, FibreChannel- and SAS IT-Environments

Controller **2**

VTrak



Cache Memory (RAM)

512 MByte RAM, upgradeable up to 2 GByte per controller unit supports maximum performance.

Two hotswap, redundant controllers

With two built in RAID controllers the VTrak dual controller storage system easily integrates into a „No Single Point of Failure“ (NSPOF) structure. The connections take place over 4 FibreChannel 4Gb/s channel or over 4 SASx4 interfaces. The controller active/active modus makes sure that when one controller fails, the other controller will take over the complete communication – e.g. RAID and system management (Failover). After exchanging of the defective controller unit, the system automatically fails back into the redundant working mode (Failback).

Two hotswap, redundant fans

The fans are located at the rear of the system and in case of failure can easily be taken out without using any additional tool.

Two hotswap, redundant power supplies

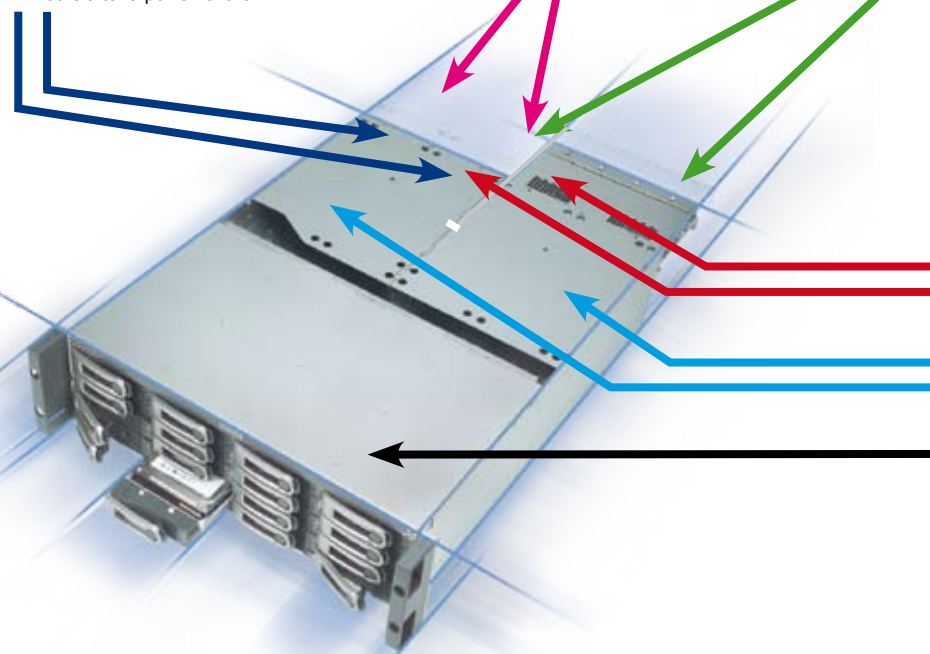
The PSUs are located at the rear of the system and in case of failure can easily be taken out without using any additional tool.

Up to sixteen hotswap HDD carriers

SAS or S-ATA HDDs can be used separate or simultaneously and in case of failure can be easily hot swapped. There are 12bay systems in 2U or 16bay systems in 3U available for built into racks.

Battery Backup Unit (BBU)

Stores the data of the controller caches minimum 72 hours after a power failure.



FibreChannel-Interface:

This proven and wellknown system interface is normally built up with an optical topology and connects via a Storage Area Network (SAN) server and storage units through FibreChannel switches. The data speed is specified with 2 Gb/s or 4 Gb/s.

Serial Attached SCSI (SAS):

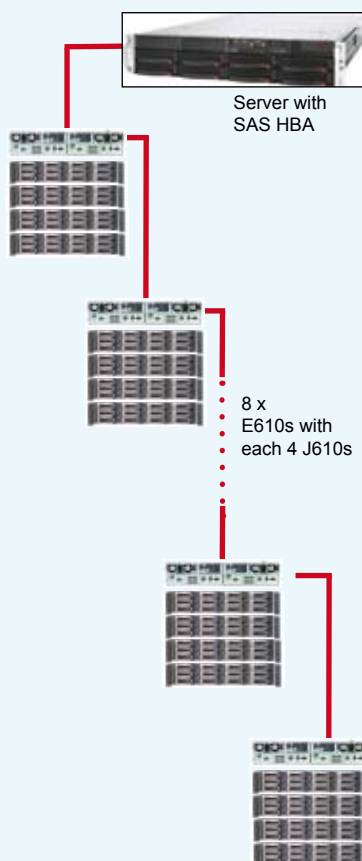
The SAS interface is the technological follower of the well established SCSI interface and uses serial data communication instead of parallel data transfer. Normally an external SAS interfaces carry 4 serial data lines with 300 MB/s each - this sum up to a total data transfer rate of up to 1,2 GB/s per SAS port (full duplex).

SAS-Cascade:

Example: VTrak E610s/J610s

Highlights:

- up to 8 x E610s (SAS) with each 80 HDDs (incl. 4 x J610s)
- up to 640 HDDs at one SASx4 system interface



Storage Power par excellence!

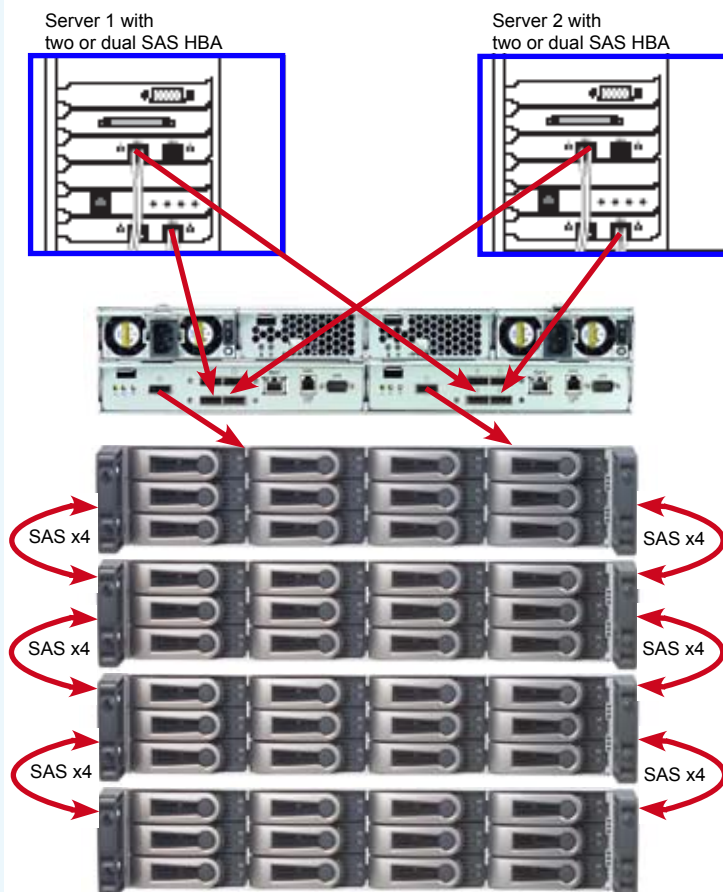
VTrak dual controller storage systems are fully redundant and scalable RAID storage systems for medium and enterprise sized IT environments. Designed for use in Storage Area Networks (SAN) as well as in proven and well known Direct Attached Storage (DAS) structures VTrak storage systems benefit as primary storage device and ensures the data reliability and availability of all connected users. Please refer to the latest HDD compatibility list on www.promise.com

Application: Database, Datasilo, E-Mail, Internet, ERP, ECM applications
primary RAID storage system, SAN, DAS

Product	Controller/ I/O Module	Interfaces	No of Disk Drive Carrier	RAID Level
VTrak E610f - Dual (2) controller	2 Controllers	4 x FC 4Gb/s (Host) 2 x SAS x4 (JBOD Expansion) 2 x GbE Management Ports	16 x SAS or S-ATA 3Gb/s	0,1,1E,10 5,6,50,60
VTrak E310f - Dual (2) controller	2 Controllers	4 x FC 4Gb/s (Host) 2 x SAS x4 (JBOD Expansion) 2 x GbE Management Ports	12 x SAS or S-ATA 3Gb/s	0,1,1E,10 5,6,50,60
VTrak E610s - Dual (2) controller	2 Controllers	4 x SAS x4 (Host) 2 x SAS x4 (JBOD Expansion) 2 x GbE Management Ports	16 x SAS or S-ATA 3Gb/s	0,1,1E,10 5,6,50,60
VTrak E310s - Dual (2) controller	2 Controllers	4 x SAS x4 (Host) 2 x SAS x4 (JBOD Expansion) 2 x GbE Management Ports	12 x SAS or S-ATA 3Gb/s	0,1,1E,10 5,6,50,60
VTrak J610s - Dual (2) JBOD Expansion	2 I/O Modules	2 x SAS x4 (Host) 2 x SAS x4 (JBOD Expansion)	16 x SAS or S-ATA 3Gb/s	JBOD
VTrak J310s - Dual (2) JBOD Expansion	2 I/O Modules	2 x SAS x4 (Host) 2 x SAS x4 (JBOD Expansion)	12 x SAS or S-ATA 3Gb/s	JBOD

Note: VTrak EClass RAID Storage Systems are also available as single configuration with one controller unit only. An update with a second controller unit is possible.

Full redundant VTrak RAID Storage System in a Serial-Attached SCSI (SAS) Environment at two Server:



- E310s - dual (2) controller
- 2U, 12 HDDs SAS or 16 HDDs SATA incl. 12 AA MUX adapters

- J310s - 2 x I/O modules
- 2U, 12 HDDs SAS or 16 HDDs SATA incl. 12 AA MUX adapters

- J310s - 2 x I/O modules
- 2U, 12 HDDs SAS or 16 HDDs SATA incl. 12 AA MUX adapters

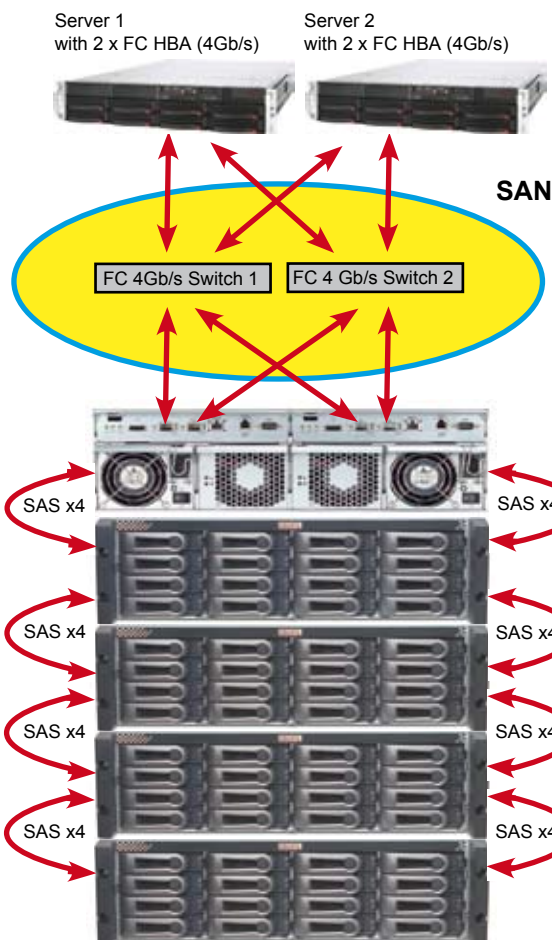
- J310s - 2 x I/O modules
- 2U, 12 HDDs SAS or 16 HDDs SATA incl. 12 AA MUX adapters

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Full redundant VTrak Storage System with SAN FibreChannel in „No Single Point of Failure“:



In a No Single Point of Failure (NSPOF) structure all components in a server-/storage system have been duplicated. In case of failure, this means the fall-out of one of the two components; the second unit will take over all tasks. The functionality and data transfer of the total system remains active. The operability and data integrity of the complete IT-environment will be noticeably increased by a NSPOF-environment and is significant for the data availability of the user. The data availability lays around 99%.

- E610f - dual (2) controller
- 3U, 16 HDDs SAS or 16 HDDs SATA incl. 16 AA MUX adapters
- J610s - 2 x I/O modules
- 3U, 16 HDDs SAS or 16 HDDs SATA incl. 16 AA MUX adapters
- J610s - 2 x I/O modules
- 3U, 16 HDDs SAS or 16 HDDs SATA incl. 16 AA MUX adapters
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- 3U, 16 HDDs SAS or 16 HDDs SATA incl. 16 AA MUX adapters

VTrak E310 - Back view:

HotSwap Power supplies!

Two powerful, redundant power supplies are available for the whole system and easy to swap in case of service.

Redundant, HotSwap Fans!

The fan unit is designed to be redundant and easy to swap in case of service.



FibreChannel Controller:

Fibre Channel data port 1

Fibre Channel data port 2

SAS expansion port (to JBOD)

Management port

FibreChannel RAID-Controller:

- 2 x FibreChannel 4Gb/s (also compatible to 2 Gb/s)
- 1 x SAS x4 Expansions-Port
- 1 x 1 Gb/s Ethernet (GbE) Management-Port
- with 2 Controllern: HotSwap, active/active failover/failback

oder:

SAS Controller:

SAS data port (optional)

SAS data/cascade port (optional)

SAS expansion port (to JBOD)

SAS data/cascade port

SAS data port

SAS RAID-Controller:

- 2 x SAS x4 Interfaces (Host)
- 2 x SAS x4 Interfaces (option for E-Class Cascade)
- 1 x SAS x4 Expansions-Port
- 1 x 1 Gb/s Ethernet (GbE) Management-Port
- with 2 Controllern: HotSwap, active/active failover/failback



WebPAM PROe

High performance, embedded management-software for the VTrak RAID Storage Systems

The VTrak RAID storage system features an embedded management software, WebPAM PROe, that eliminates the need to install additional software on the network. All VTrak systems in your network can be configured and monitored through single, easy-to-manage webbased graphic user interface. The software works through the VTrak system's Ethernet port — locally, across a LAN, or across an internet connection — to configure and monitor one or multiple VTrak system(s) and provide error reporting through pop-up messages, event logging, or email notification. In the event of a controller failure, Promise's management software will also seamlessly failover and failback. The VTrak family also simplifies integration with third-party management applications using industry-standard SNMP and CIM protocols.



The most important management functions:

1. Configurations Active/Active - Passive/Passive set failover/failback for „No Single Point of Failure“ applications.
2. Interface setup, for example: IP Address, Server-Name, Read-/Write Modus, Cable sizes.
3. HDD-Arrays, RAID-Level, LUN Management
4. RAID Level Migration. Example: a HDD array is migrated from RAID level 1 towards RAID level 5
5. Online Capacity Expansion (OCE): an existing HDD array can be expanded with extra HDD while the system is in process.
6. HotSpare Functionality: The VTrak E-Class supports both „Multiple Globale HotSpare“, as well as „Dedicated HotSpare“.
7. Event Notification: Email, NET SEND; audible (buzzer), and visible (LEDs) alarms
8. Systemstatus and System-/Error-Log: with the use of WebPAM PROe the system status of all sectors and components can be monitored at all times. System- and failure reports will be stored and are available in the system's history.

NOTE:

The VTrak RAID storage systems can also be managed over a Command Line Interface (CLI) with the use of a serial or GbE- (1Gb/s Ethernet) connection.

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VTrak RAID Storage System Contents:

VTrak RAID storage systems are prepared for immediate implementations. Disk drives are easy to build into the drive carrier and need to be fastened with specific screws which are part of the product content. The drive carrier are easy to mount into the storage system as described in the manual's instructions.

Please note:

- System units of VTrak EClass do not contain any data cable as well as SFPs which are needed for FibreChannel connection. Please order separately.
- Expansion units VTrak JClass with dual I/O modules contain two MiniSAS to MiniSAS data cables and are easy to connect to the system units VTrak EClass.
- System units VTrak EClass are equipped from the factory with one Battery Backup Unit and 512 MB/ cache RAM per controller.
- All VTrak storage systems contain a pair of rails for easy mount into 19" rack systems.

VTrak System	Content
System unit: E310f-dual E310s-dual E610f-dual E610s-dual	• System unit incl. 2 controller-, 2 fan and 2 power supply units as well as 12 or 16 drive carriers and BBUs • 1 serial communication cable and 2 power cords • rackmount rails for 19" rack • Manual, CD • Screws for HDDs
Expansion unit: J310s-dual J610s-dual	• Expansion unit incl. 2 I/O modules, 2 fans, 2 power supply units as well as 12 or 16 drive carriers • 2 data cables MiniSAS to MiniSAS and 2 power cords • rackmount rails for 19" rack • Manual, CD • Screws for HDDs

Options for Memory Expansion:

The VTrak E-Class has as standard a 512 MB internal memory per controller unit. In most cases the optimal seek performance levels of the IT-environment will be reached. With higher accessibility rates you can increase the performance by expanding the internal memory. Every controller can be supplied with up to max. 2 GByte. When using a 1 GB or 2 GB memory module it has to be recommended to also upgrade the Battery-Back-up (BBU) to the 4-Cells one.

Memory/Battery	Description
E-Class 2 GB Memory	2 GByte memory for one Ex10f/Ex10s controller
E-Class 1 GB Memory	1 GB memory for one Ex10f/Ex10s controller
VTrak BBU 4cells	4 Cells Battery Backup Unit (BBU) for VTrak systems

AA-MUX Adapter for SATA HDDs:

When using S-ATA HDDs for VTrak EClass or the expansion unit VTrak JClass, per HDD an AA-MUX adapter needs to be built into the „No Single Point of Failure“ structure. It is a SATA multiplexer that allows a customer to install SATA drives in a dual I/O module configuration. Each SATA drive installed in a dual I/O module configuration requires an adapter (i.e. 10 SATA drives = 10 Promise SATA MUX adapters)



Option	Description
AA MUX Adapter for VTrak EClass and/or for VTrak JClass	Additional module for the connection of SATA disk drives in NSPOF 1 x per SATA disk drive required (= 12 x for 12bay Systemen) (= 16 x for 16bay Systemen)

Promise Technology - 20 years of Technology Innovation

SAS- and SATA RAID are the core techniques held at Promise Technology who is the originator of ATA RAID and worldwide leader in SATA RAID with over 15 million controllers shipped. Using Serial ATA and Serial Attached SCSI (SAS) technology to design and manufacture fast, reliable cost-effective data protection, Promise is the preferred choice for SATA host bus adapters, RAID controllers and SAS/SATA external storage systems. Promise Technology maintains ongoing product development relationships with leading storage and server manufacturers. Headquartered in Milpitas, CA, the company is ISO-9001:2000 and ISO-14001:2004 certified and has offices and operations throughout Asia and Europe to support local business partners and customers. For further information, visit: www.promise.com.



Promise Technology - Contact us!

We are available for our customers through:

- Worldwide hotline telephone
- E-support via internet

Please refer to our website www.promise.com for up to date contact information.

www.promise.com

Service Policy for VTrak RAID Storage Systems:

- Presales Support
- Hotline (business hours)
- 3 years warranty
- Worldwide service and support centers
- Direct manufacturer RMA handling
- 24 hours advance replacement service (available via hotline contact)

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