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Software
Product
Description

PRODUCT NAME: **StorageWorks Network Storage Array**   **SPD 64.18.04**
                            Operating Software Version 2.2

DESCRIPTION

The SWXNA family of StorageWorks Network Storage Arrays integrates industry-leading Alpha technology with StorageWorks modular design to meet the storage needs of large multivendor FDDI- and FDDI-UTP (ANSI TP-PMD STD CDDI)-based networks. By providing interoperability and resource sharing between OpenVMS™ systems, UNIX® systems, and other systems that support the TCP/IP Protocol Suite, the arrays truly fulfill the storage requirements of today's multivendor computing environments in a centrally managed location. The embedded AlphaServers, independent of host or client intervention, perform storage management functions for VMScluster clients, NFS™-based systems, and Windows NT™ clients simultaneously, as today's multivendor business environment requires.

All SWXNA Network Storage Array models are housed in a single SW800 StorageWorks cabinet and are configurable using SW800 configuration guidelines. A wide range of devices is supported; consult the HSD50 Array Controller Operating Software Version 5.2, SPD 60.69.02 for further details.

SWXNAs' AlphaServers run OpenVMS Alpha operating system software with parameters that are optimized for storage services. In addition to serving on-line storage to hosts, the AlphaServers can utilize storage management software independent of host or client intervention to provide sophisticated storage management services. For enhanced data protection, user-configurable RAID and Disk Mirroring are included for the SWXNA's HSD50 Array Controllers. Consult SPD 64.19.03 for further details.

Standard Software

- Software Customization Procedure Software, V2.2

- OpenVMS Alpha Operating System Software, V7.1

- Volume Shadowing for OpenVMS, V7.1

- OpenVMS Cluster Software, V7.1

- Raxco Software, Inc.'s PerfectCache® Read Cache Software, V6

- Digital TCP/IP Services for OpenVMS V4.1

- Digital OpenVMS Disk Services for Windows NT V1.0

Software Customization Procedure

Each StorageWorks Network Storage Array ships from the factory with the OpenVMS Alpha operating system pre-loaded on the system disks. Operating software includes a Software Customization Procedure which is automatically invoked the first time the AlphaServer is booted. This Software Customization Procedure simplifies the installation process and allows the operator to set AlphaServer operating system parameters prior to normal operation. Once these parameters have been set, the Software Customization Procedure is no longer needed for normal SWXNA operation. The Software Customization Procedure includes functions which configure the Network File System parameters, control the read caching feature, and initiate operation of OpenVMS Disk Services for Windows NT.

OpenVMS Operating System

Each AlphaServer in a Network Storage Array is delivered with OpenVMS Alpha Operating System as standard software, factory installed. The OpenVMS operating system parameters are pre-set to perform well for network serving applications. The OpenVMS operating system has well-integrated networking and distributed computing capability for client/server, multiprocessing requirements. It contains extensive features that promote ease-of-use to improve application productivity and facilitate system management. For in-depth information on OpenVMS Operating System details, consult the OpenVMS Operating System for VAX and Alpha, Version 7.1, SPD 25.01.53.

Volume Shadowing

Two StorageWorks Network Storage Arrays may be used in conjunction with standard OpenVMS Volume Shadowing software to provide long-distance disk shadowing for data protection in the event of a site disaster. OpenVMS Volume Shadowing is standard in all SWXNA Arrays.

Volume Shadowing for OpenVMS Alpha is a System Integrated Product (SIP) that runs on the Alpha family of processors. Volume Shadowing for OpenVMS implements a RAID Level 1 storage strategy that provides high data availability for disk devices by preventing data loss resulting from media deterioration, controller or device failure. It prevents storage subsystem component failures from interrupting system or application operations. For further detailed information regarding Volume Shadowing, please reference the Volume Shadowing for OpenVMS, Version 7.1 SPD 27.29.14.

CAUTION: Disks which participate in Volume Shadowing for OpenVMS Alpha cannot be read cached on StorageWorks Network Storage Arrays.

VMScluster System Functionality

StorageWorks Network Storage Arrays function as full members of VMScluster systems, providing block I/O services to hosts. For additional OpenVMS Cluster information, please refer to the OpenVMS Cluster Software, V7.1, SPD 29.78.15. As full VMScluster members, StorageWorks Network Storage Arrays provide the complete range of OpenVMS data security features:

- I/O services are only provided to other members of the same VMScluster system

- low-level (non-file) I/O is restricted to privileged users

- files have the full protection of the OpenVMS file system, including access control by individual user if required.

NFS MultiVendor File Serving

The SWXNA family supports NFS file serving using NFS V2.0 protocol. The NFS feature is a layered application that provides clients with transparent access to remote files.

The NFS software promotes data sharing among clients by providing a central data storage facility for OpenVMS Alpha, UNIX, and WindowsNT clients. The NFS software provides the following types of file access for remote clients, including PC's equipped with NFS client software:

- OpenVMS file system

- XPG4 compliant environment supporting the semantics of the UNIX file system

For further detailed information on NFS File Serving, consult the Digital TCP/IP Services for OpenVMS V4.1, SPD 46.46.05.

Read Cache

A pre-loaded, customized version of Raxco Software, Incorporated's PerfectCache read cache software is furnished with each AlphaServer in the SWXNA family. PerfectCache intercepts VMS I/O requests and retrieves the data from cache in the AlphaServer CPU RAM to enhance QIO performance. PerfectCache has both menu-driven and command-line interfaces to allow the following functions:

- Start Caching

- Stop Caching

- Display a summary of caching statistics (snapshot or continuous)

- Reset caching statistics

The manual *Getting Started with the StorageWorks Network Storage Array* (EK-SWXNA-IG) contains operating procedures.

CAUTION: Multiple SWXNA's running their embedded PerfectCache may be configured into a cluster. However, no node in the VMScluster should run any host-based, block-serving caching software other than the PerfectCache embedded on the SWXNA. Data corruption could result if another host-based, block-serving caching software product is installed on a SWXNA or other OpenVMS client in the same cluster as the SWXNA. Another host-based, block-serving caching product (including the standard version of PerfectCache) may be installed in a VMScluster containing a SWXNA, if desired, provided the embedded version of PerfectCache is stopped, the array rebooted, and the caching product's installation instructions followed.

However, Digital supports the use of the embedded Per-fectCache version only.

OpenVMS Disk Services for Windows NT

DIGITAL OpenVMS Disk Services for Windows NT allows customers to store Windows NT data on an OpenVMS Cluster to take advantage of the economies of centralized storage and of the failover capabilities of OpenVMS Clusters. OpenVMS Alpha nodes in the cluster serve virtual disks to Windows NT systems. The virtual disk behaves like a locally attached disk, although its data is actually stored on a disk in the OpenVMS Cluster. The virtual disk is formatted with a native Windows NT file system, such as NTFS, using standard Windows NT tools. The Windows NT system can share the virtual disk out to user workstations or desktops via the standard Windows NT network sharing mechanisms.

Standby nodes in the OpenVMS Cluster provide automatic failover of disk services. The failover is transparent to Windows NT users accessing the virtual disk; they continue accessing the disk, unaware that a different node in the OpenVMS Cluster is serving it.

DIGITAL OpenVMS Disk Services for Windows NT has a client component on Windows NT, and a server component on OpenVMS, and uses TCP/IP to communicate between them.

For additional, detailed information on OpenVMS Disk Services for Windows NT, consult the OpenVMS Disk Services for Windows NT V1.0 SPD 60.80.00.

Licenses

The following licenses are factory installed:

- Software Customization Procedure and Perfect-Cache, QL-4D4A9-AA

- OpenVMS Alpha V7.1, Operating System License, QL-MT1AE-6R

- Volume Shadowing License, QL-2A1AE-AA

- VMScluster License, QL-MUZAE-AA

- HSD50 Array Controller Operating Software Traditional License and Media, QB-5C5AA-SC (Write-Back Cache, RAID, & Disk Mirror)

- DIGITAL TCP/IP Services License, QL-0LXAE-AA

- DIGITAL OpenVMS Disk Services for Windows NT License, QL-5TA9A-2B

HARDWARE REQUIREMENTS

StorageWorks Network Storage Arrays may be connected into an FDDI Ring via a DECconcentrator 500 (Part Number DEFCN-BC), a DECbridge 520 (Part Number DEFEB-DA), or a GIGAswitch (Part Number DEFGA-AA). Connection between these devices and the Network Storage Arrays is made using a DEC-connect Fiber Optic Cable Type DFNR (UL) 62.5/125 E102042, Part Number BN24B, connected to the FDDI adapter card in the back of each SWXNA AlphaServer. For connections to CDDI networks, use cable Part Number BN25H-03 (not included) in place of Part Number BN24B.

During installation of the Network Storage Array, a console terminal with DEC 423 Serial Communication capability is required to boot the server processor, perform system shutdowns, and configure the storage system.

OPTIONAL HARDWARE

A full range of upgrade kits is available. In addition, the following hardware expansion options are available:

- SWXNA-DA/HA—Expands an SW800 cabinet to an SWXNA-Ex/Jx model.

- SWXNA-CX—Expansion Kit for attachment to an SWXNA-Bx/Gx Network Storage Array. Expands the number of device buses by four and the number of available device ports by 72. Available in 50 Hz and 60 Hz options.

HARDWARE SUPPORT

Consult the HSD50 Array Controller Operating Software Version 5.2, SPD 60.69.02, for the up-to-date listing of supported SCSI-attached storage devices.

SOFTWARE REQUIREMENTS

Each AlphaServer in the Network Storage Array is a node in the VMScluster running OpenVMS Alpha Version 7.1 Operating System.

SOFTWARE RESTRICTIONS

StorageWorks Network Storage Arrays are designed to operate in a wide variety of FDDI- or FDDI/UTP (CDDI)-based VMScluster systems. The following restrictions and considerations apply, however:

- The OpenVMS operating system supports up to 96 nodes in a single VMScluster system. Each StorageWorks Network Storage Array's AlphaServer is a full VMScluster member, and therefore decreases the maximum number of supported host nodes by 2.

- StorageWorks Network Storage Array-attached storage may be used to load the OpenVMS Operating System to other VMScluster nodes provided that the client processors' console supports the FDDI/CDDI remote boot feature. Consult respective Alpha and VAX processor documentation.

- The OpenVMS operating system restricts the operating system versions that may run in a single VMS-cluster system, both in terms of the number of different versions that may be active simultaneously and in terms of valid combinations of versions. StorageWorks Network Storage Arrays (SWXNA) use OpenVMS Alpha Version 7.1. These arrays may be used in combination with any OpenVMS systems that are cluster-compatible with these operating system versions. For version restrictions, consult the OpenVMS Cluster Software Product Description, Version 7.1 (SPD 29.78.15).

- Disks participating in Volume Shadowing for OpenVMS Alpha or host-based RAID cannot be read cached on StorageWorks Network Storage Arrays.

OTHER SOFTWARE

The following software ships with each HSD50 Array Controller in a StorageWorks Network Storage Array. See the HSD50 Array Controller Operating Software Version 5.2, SPD 60.69.02, for details.

- QB-5C5AA-HS HSD50 Operating Software PCMCIA & License

HARDWARE WARRANTY

StorageWorks Network Storage Array Hardware components come with a three-year limited warranty. The first year of the warranty provides for on-site Basic Service. The second and third years require return-to-factory.

SOFTWARE WARRANTY FOR SWXNA NETWORK STORAGE ARRAYS

StorageWorks Network Storage Array Software components come with a 90-day limited software warranty. Additionally, a one-year software update service that includes media and documentation is standard. These warranties are honored worldwide and can be further enhanced with Digital's responsive supplemental service offerings.

DISTRIBUTION MEDIA

All standard software is shipped pre-installed. Two CD-ROMs are included with each model of the StorageWorks Network Storage Array. The operating system CD-ROM contains:

- OpenVMS Alpha Operating System V7.1

- Software Customization Procedure V2.2

- Raxco Software, Inc.'s PerfectCache Read Cache Software V6

- DIGITAL TCP/IP Services

- DIGITAL OpenVMS Disk Services for Windows NT

- Software Product Descriptions

- Release Notes

- Other frequently accessed documentation

The documentation CD-ROM contains extensive operating system documentation in PostScript, BookReader and text formats.

OpenVMS Disk Services for Windows NT Client Software must be downloaded from the operating system CD-ROM and installed on Windows NT clients.

ORDERING INFORMATION

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Table 1
StorageWorks Network Storage
Array Software Ordering Information

StorageWorks Network Storage Array Software Options	Description
QA-4D4AB-H8	StorageWorks Network Storage Array Software CD-ROM
QL-4D4A9-AA	StorageWorks Network Storage Array Software Traditional License
QL-4D4A9-RA	StorageWorks Network Storage Array Software Traditional Upgrade License
QL-4D4A9-LA	StorageWorks Network Storage Array Software 90 Day License Loan
QL-4D4A9-LB	StorageWorks Network Storage Array Software 30 Day License Loan
QL-4D4A9-LD	StorageWorks Network Storage Array Software 60 Day License Loan
QL-4D4A9-LG	StorageWorks Network Storage Array Software 180 Day License Loan

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SOFTWARE PRODUCT SERVICES

The full range of Digital MultiVendor Customer Services is available for the StorageWorks Network Storage Array family, including installation and maintenance.

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™   WindowsNT is a registered trademark of Microsoft Corporation.

®   PerfectCache is a registered trademark of Raxco Software, Inc.

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SWXNA SOFTWARE LICENSING

All SWXNA standard OpenVMS Alpha software licenses require a separate license key be installed for correct operation. The key is pre-installed at the factory.

The Software Customization Procedure and Raxco Software, Incorporated's PerfectCache licenses are provided via the Network Storage Array Hardware License letter.

Software component licenses are shipped with every AlphaServer system as identified in the licensing section of this SPD. The license deliverable for AlphaServer software is in the form of a hardware license letter.