Storage – Systeme im Überblick

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Rheinlandtreffen der DECUS

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in Köln

Der Inhalt

- Begriffsbestimmung
- DAS
- Network Attached Storage
  - Task Smart N-Series NAS Appliance
  - StorageWorks NAS Executor E7000
- Die Komponenten eines SAN‘s
  - Server
  - MA 8000 / EMA 12000 / ...
  - Switche
  - SAN Management Appliance
  - Modular Data Router
  - Bandlaufwerke
  - Enterprise Backup Solution
- Neuigkeiten
  - Enterprise Virtual Array

Speicherplatzinflation

Von der Problemstellung zur Lösung

Das Problem

Explodierende Datenmengen, die Forderung nach permanenter Verfügbarkeit sowie der zunehmende Kostendruck erzwingen die Suche nach neuen Wegen in der Informationsverwaltung.

Die Lösung

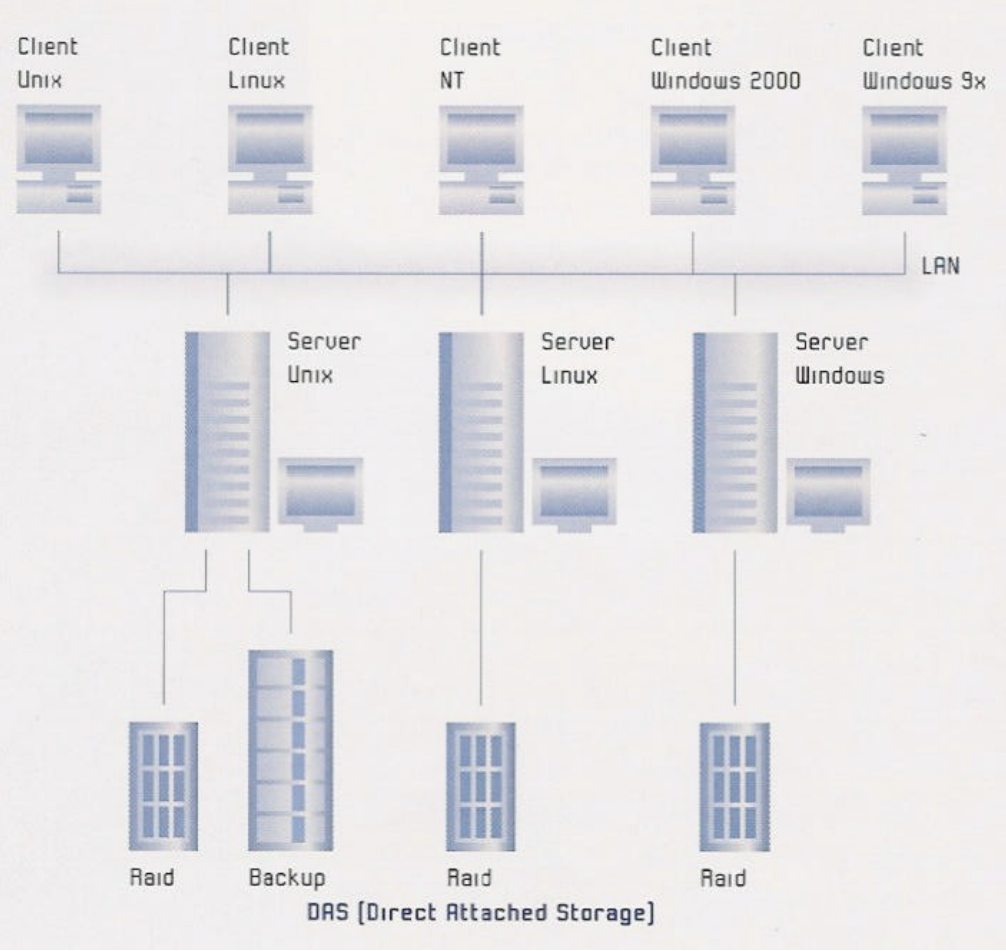
Effizientes Speichermanagement ist im Zeitalter von Internet und E-Business wichtiger denn je. Ein Lösungsansatz stellt der Einsatz neuer Storage-Technologien, wie Storage Area Network und Network Attached Storage dar.

Die Leistungen

Wir unterstützen Sie bei allen Schritten, wie der Konzeption, Planung und Umsetzung, hin zu diesen neuen innovativen Technologien.

DAS

DIRECT ATTACHED STORAGE



Vorteile

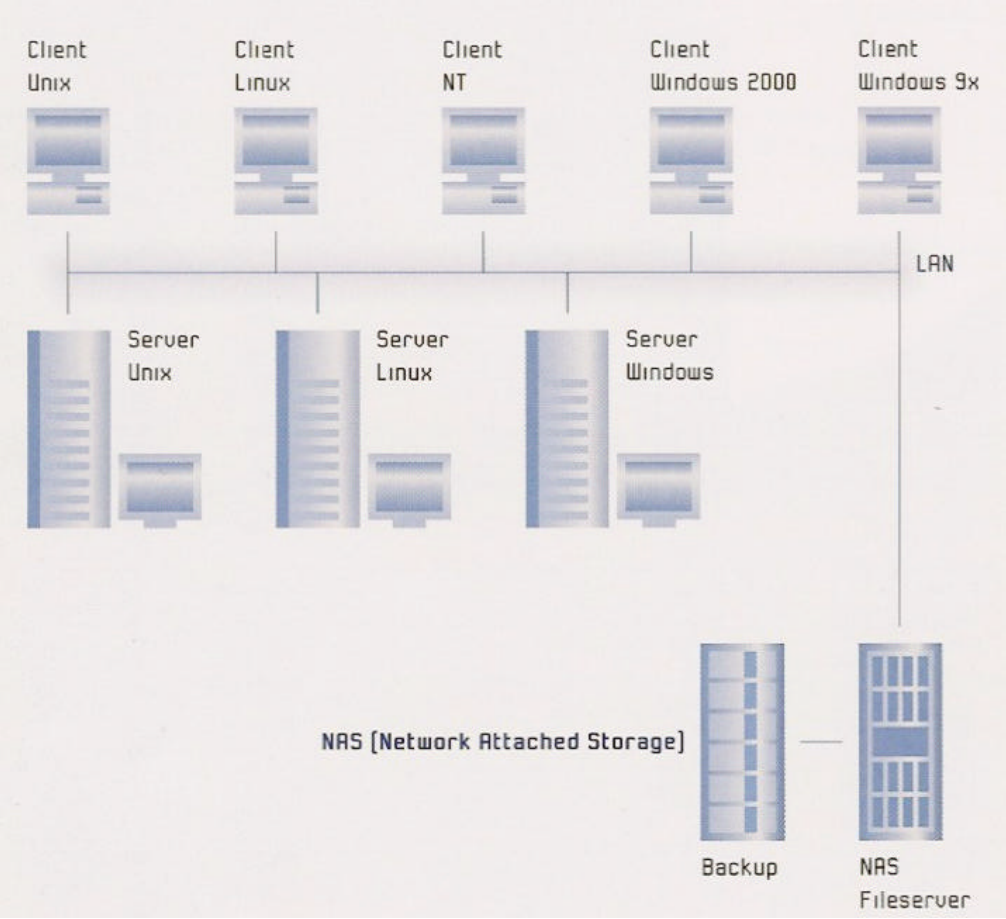
- Preiswerte Speicherlösung
- Hohe Datentransferraten (MB/s)
- Ausgereifte Technologie
- Einfache Installation

Nachteile

- Hoher Administrationsaufwand
- Nur lokale Zuordnung des Speicherplatzes möglich
- Hohe Belastung von Servern und Netzwerk in I-O intensiven Fileserving-Umgebungen

NAS

NETWORK ATTACHED STORAGE



Vorteile

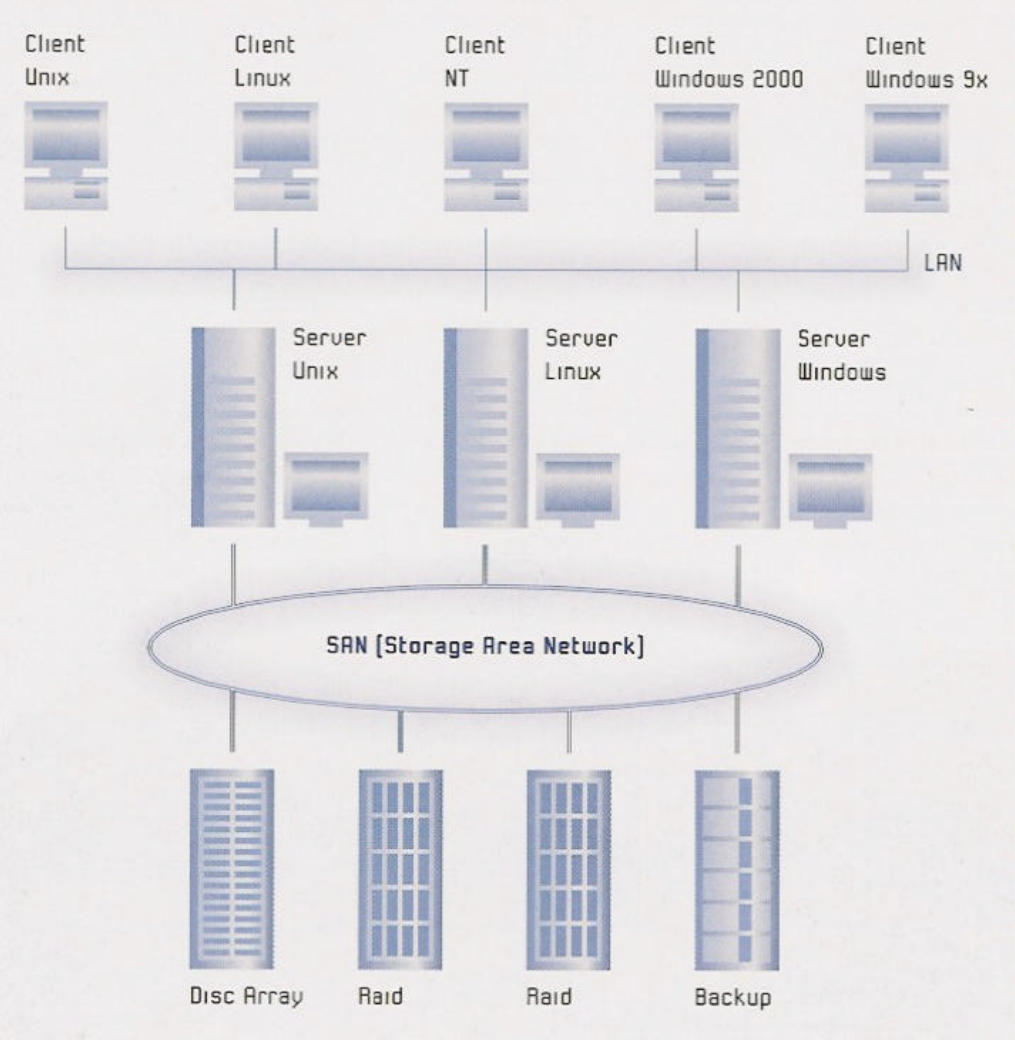
- Geringer Administrationsaufwand
- Speicherplatz ist netzwerkweit verfügbar
- Filesharing in heterogenen Umgebungen mit Standard-protokollen (NFS/CIFS)
- Einfache Installation

Nachteile

- Nur wenige Geräte für den professionellen Einsatz verfügbar
- Transferrate ist von der Netzwerkbelastung abhängig
- Höhere Investitionskosten als bei DAS

SAN

STORAGE AREA NETWORK



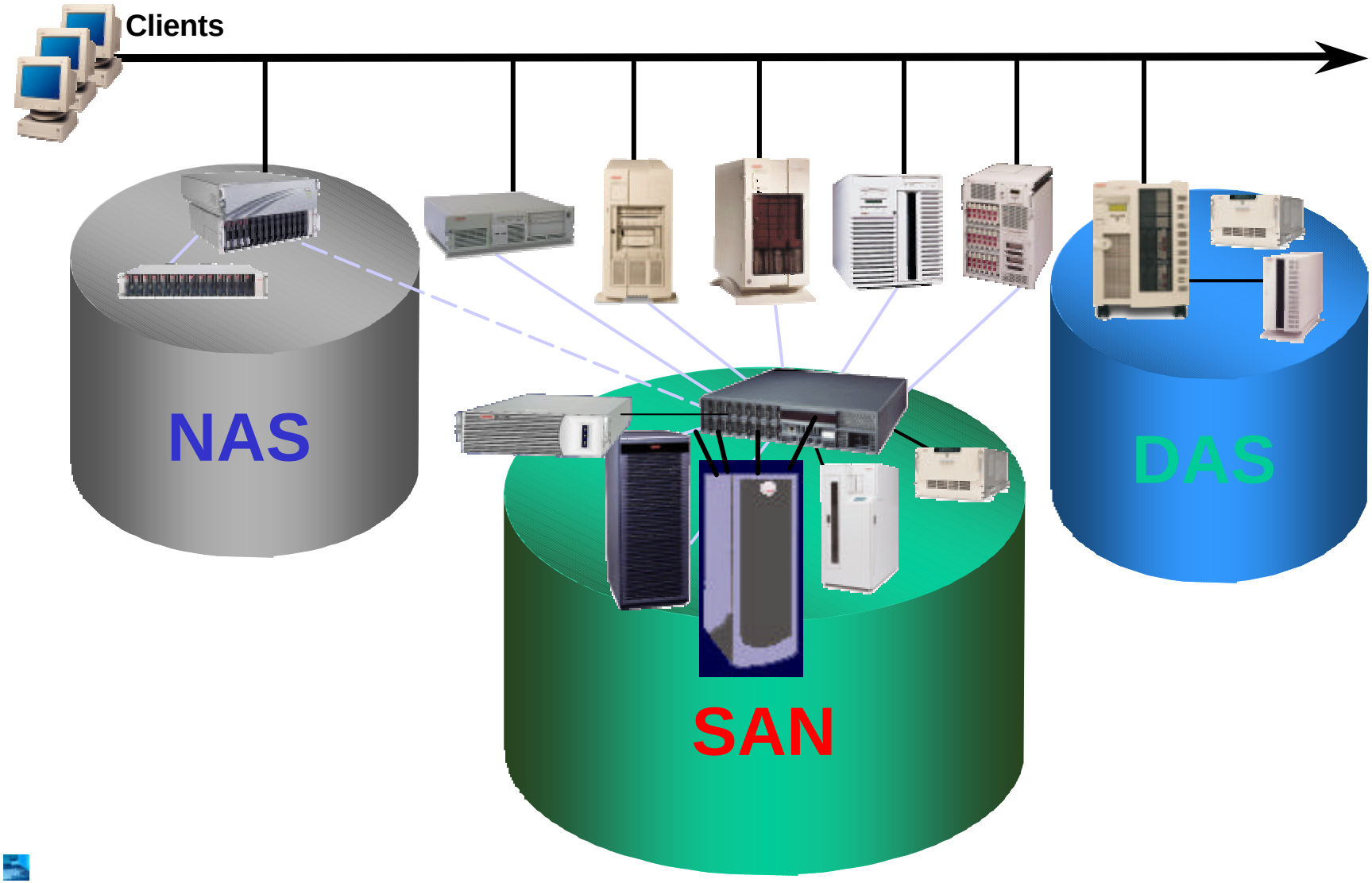
Vorteile

- Zentrale Speicherverwaltung
- Hohe Datentransferraten (MB/s)
- Entlastung des LAN‘s
- Redundanz über große Entfernungen dank Fibre Channel
- Entlastung von Servern und LAN durch Serverless-Backup

Nachteile

- Relativ hohe Investitionskosten
- Implementierung erfordert Spezialisten
- Nicht von allen Server-Produkten auf dem Markt unterstützt
- Derzeit noch keine Hersteller-übergreifende Normierung

Enterprise Storage: SAN, NAS and DAS



DAS Direct Attached Storage

Das ist die Generation: Smart Array 5300

Industriestandard “Bester in seiner Klasse”
PCI RAID Controller

4x160MB/s

56x18GB=1TB Volumen

oder

56x36GB=2TB Volumen

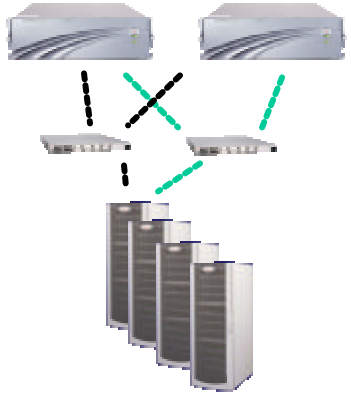
Network Attached Storage

- *TaskSmart* N-Series Networked Attached Storage Appliances

TaskSmart N-Series
Model N2400

TaskSmart N-Series
Model N2400 2TB

TaskSmart N-Series
Cluster Kit



Original TaskSmart N2400

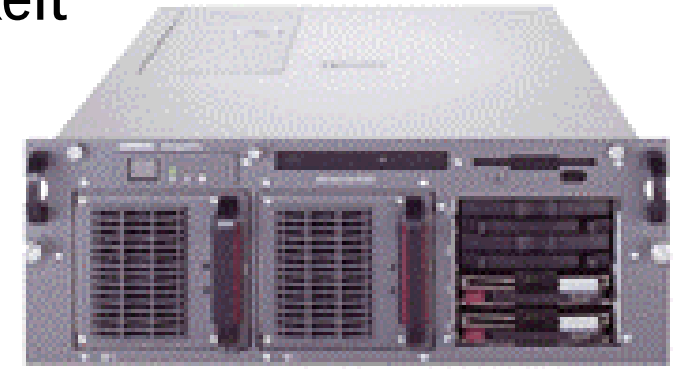
- ProLiant DL380 server platform (modified) with Dual 1Ghz PIII
- 1GB RAM
- Smart Array 5300 controller
- Array Configuration Utility
- StorageWorks Storage System (4314)
  - One standard
  - Up to 4 supported
- Wide Ultra3 SCSI hot-pluggable drives
- SANworks Virtual Replicator
- Remote Insight Lights-Out Edition
- Compaq Management Agents
- Support of Gigabit Ethernet NC6132 addition to Four-port NC3135/3134 Intel 82559 10/100 NIC (upgrade loses two 10/100 ports)
- Novell NCP Support

StorageWorks NAS Executor E7000

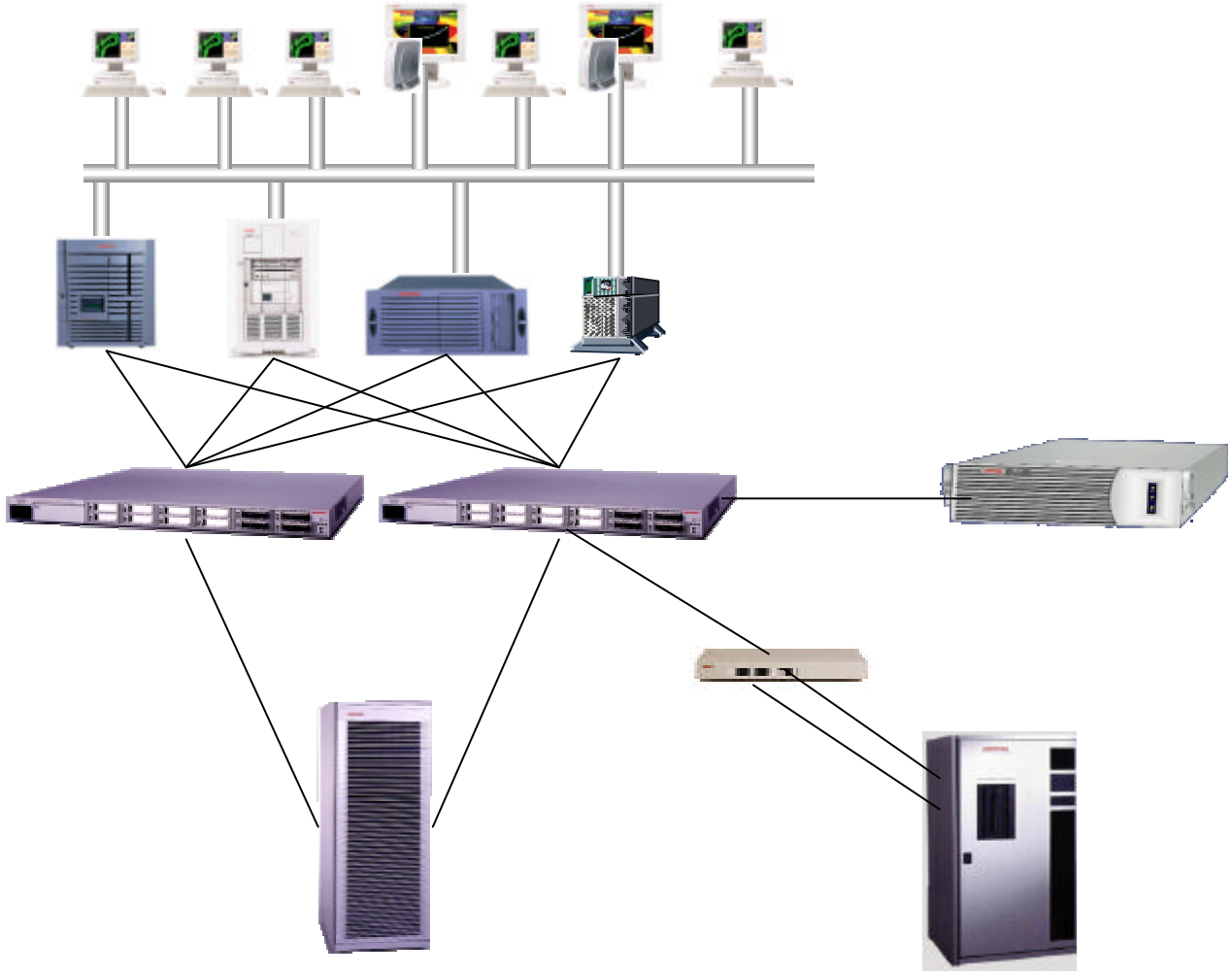
- The StorageWorks NAS Executor E7000 is the enterprise-class NAS solution that provides unlimited scalability, continuous data availability and maximizes return on storage investment through the fusion of NAS and SAN
- The NAS E7000 brings SAN level management, scalability, availability and investment protection into the NAS file serving space
- The New StorageWorks NAS Executor E7000 provides heterogeneous file serving capabilities (CIFS, NFS, NCP and MAC) to Compaq MA based SAN customers
- Performance optimized solution for file serving and storage consolidation
- Mission critical levels of availability and uptime provided via a NSPoF configuration
- Simplified deployment, setup and management

StorageWorks NAS Executor E7000

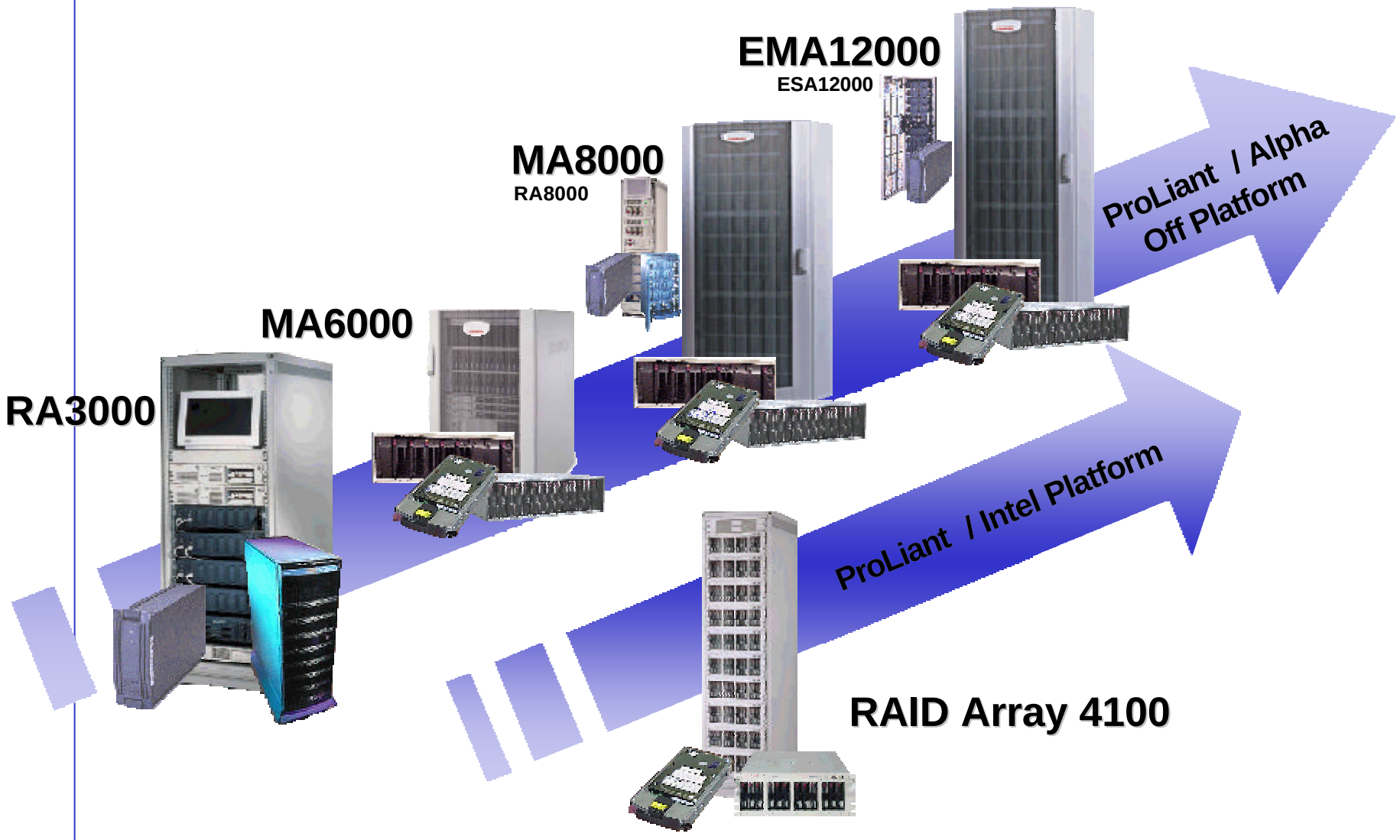
- Enterprise NAS-Lösung
- Verschmelzung vonNAS und SAN in einem gemeinsam, vernetzten Storage Pool
- Zugriff je nach Applikation auf Dateiebene (NAS) oder Blockebene (SAN)
- Uneingeschränkte Skalierbarkeit



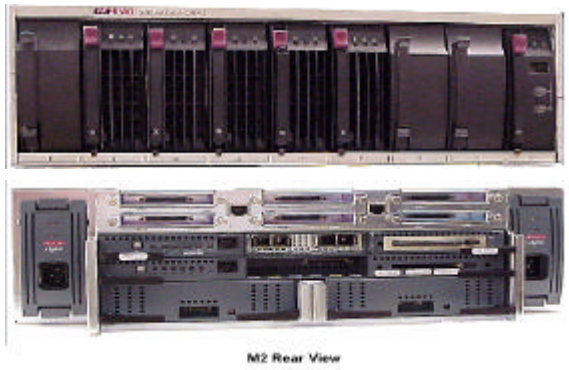
Die Komponenten des SAN



Modular Storage Subsysteme

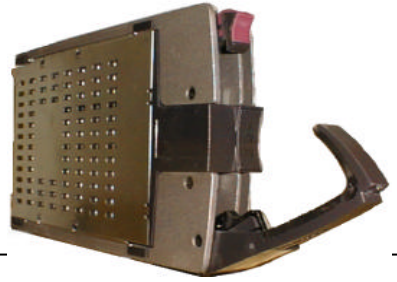


MA 8000 / EMA 12000



RAID Controller Enclosure

Drive Enclosure



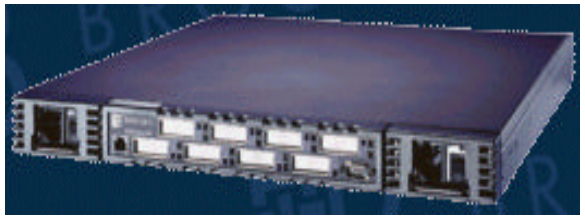
Universal Drive

42 HU **36 HU** **22 HU**

HSG80 Controller Features

- 128 assign-able LUNs
- 512 GB LUN capacity
- Striping, Mirroring, Striped Parity
- 45 RAID-0, RAID-1, or RAID-5 storagesets
- 8 partitions per storageset or individual disk
- 6 members per Mirrorset
- 14 members per RAID-5 storageset
- 24 members per Stripeset
- Dynamic LUN Expansion

SAN FC Switch Products

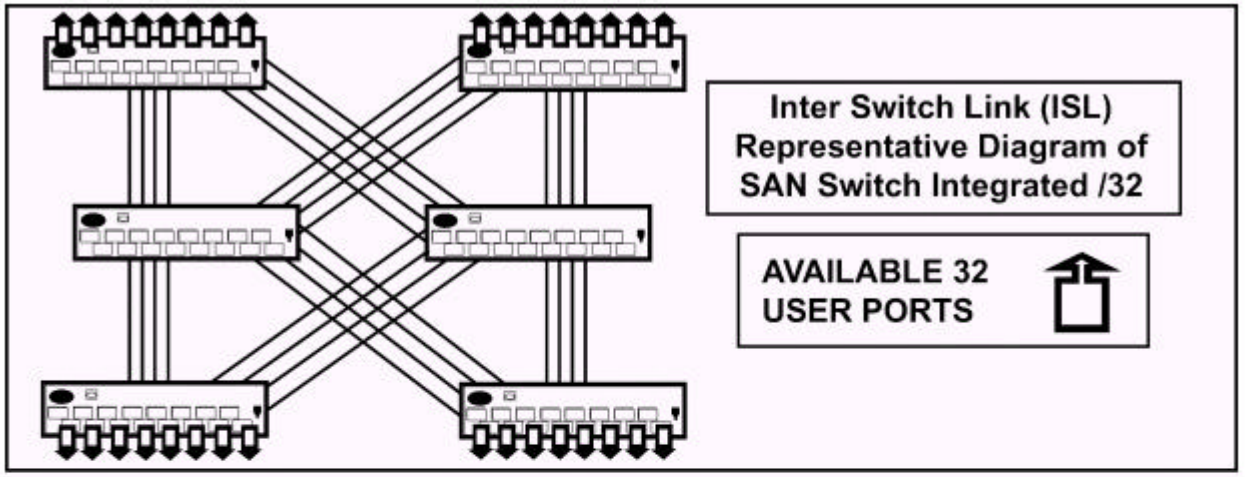


8 ports switch
24bit Work fabric
Universal: E-Ports, FL-Ports, F-Ports
cascadable, zoning, quickloop

16 ports switch
24bit Work fabric
Universal: E-Ports, FL-Ports, F-Ports
cascadable, zoning, quickloop

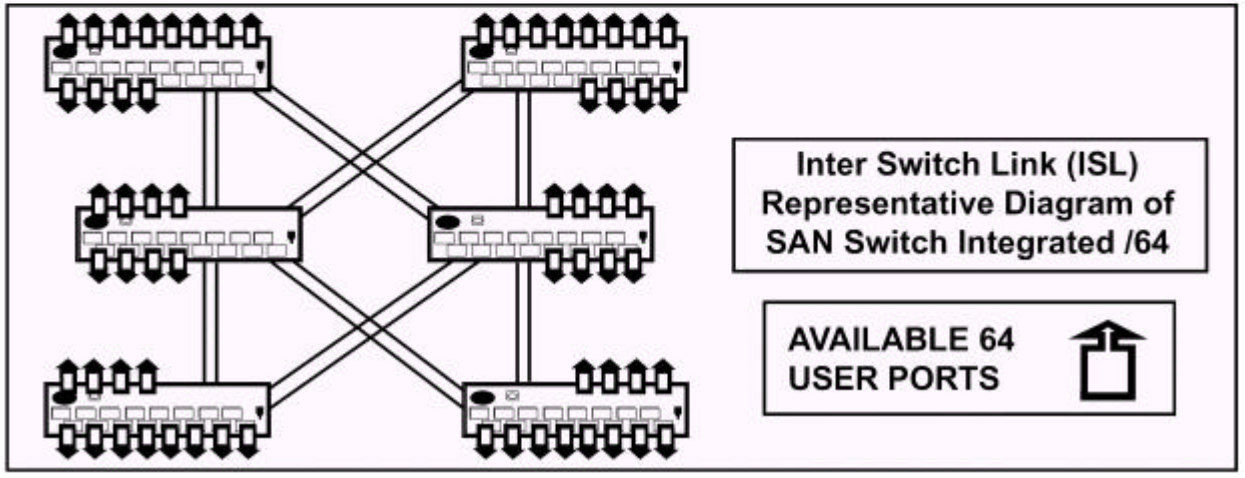
SAN Switch 8-EL / 16-EL (Entry Level)
24bit Work fabric
Universal: E-Ports, FL-Ports, F-Ports
cascadable, zoning, none quickloop support

SAN FC Switch Products 32 / 64 port



SAN Switch Integrated /32

Rack Density 14U



SAN Switch Integrated /64

Rack Density 14U

SANworks Management Appliance

- Vereinfacht SAN Element Management und Monitoring
- Hohe Performance (nicht im Datenpfad)
- Einfache Implementation (headless)
- Host-Server unabhängig
- Für mehrere Applikationen
- Open SAN Unterstützung
- Empfohlen bei SANs grös-ser vier Switches

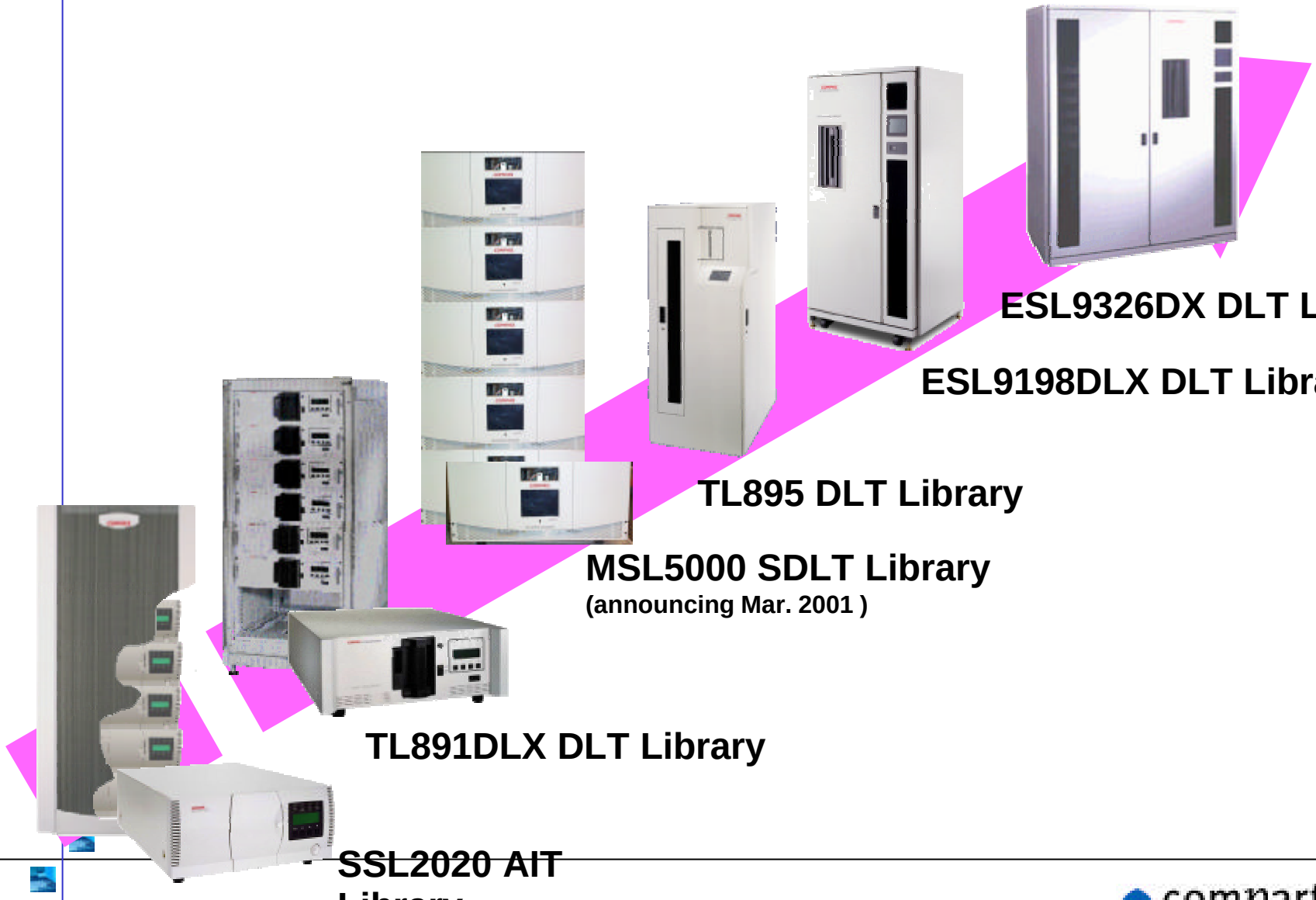
SANworks Resource Monitor

- Appliance-based high availability solution
  - Continuously monitors *StorageWorks* switches, arrays
  - Provides automatic event notification broadcast to user site and/or Compaq Services
  - Pager, e-mail, NT Event Log, Web browser notification
  - Future integration with Compaq Proactive Services
- Faster identification of failures
- Faster mean time to repair
- Increases customer service levels
- Host-server independent

SANworks Storage Allocation Reporter

- SAN Appliance-based SAN storage accounting solution
  - Allocated capacity and attribute reports
  - Charge-per-GB-per-time-period calculations
  - Customer and storage subsystem billing reports
  - Customizable by customer, local currency
- Easier storage cost tracking, accounting, recovery
- Easier capacity planning and analysis
- Easier billing
- Host-server independent and agnostic

Compaq Tape Library Positioning



ESL9326DX DLT Library

ESL9198DLX DLT Library

TL895 DLT Library

MSL5000 SDLT Library
(announcing Mar. 2001)

TL891DLX DLT Library

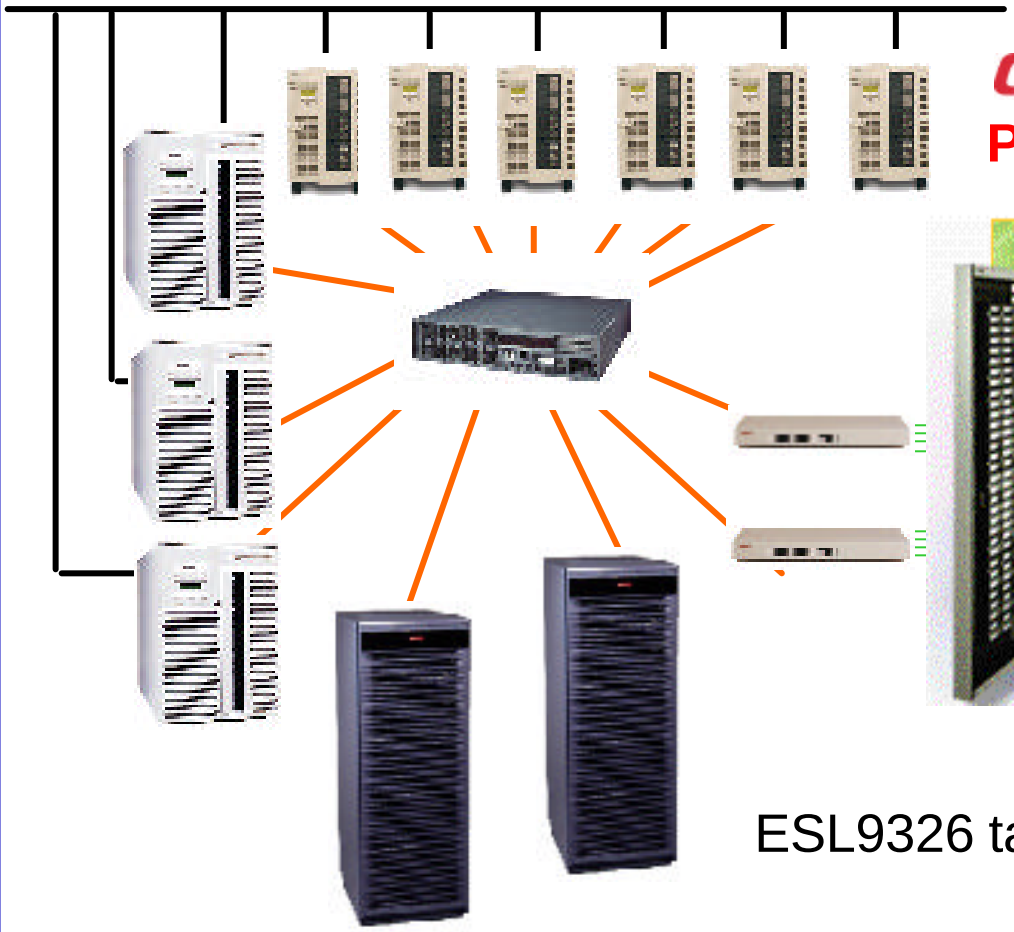
SSL2020 AIT Library

Enterprise Library

Enterprise Library ESL9198
Tape Slots x198
DLT 4000 20/40 GB
DLT 7000 35/70 GB
DLT 8000 40/80 GB
SDLT 110/220GB

Enterprise Library ESL9326
Tape Slots x326
DLT 4000 20/40 GB
DLT 7000 35/70 GB
DLT 8000 40/80 GB
SDLT 110/220GB

SAN Enterprise Backup Solution (EBS)



COMPAQ

Proliant NT/Unix

- Legato
- Veritas
- ArcServe
- Proliant NT
- Tru64 Unix
- MA8000
- EMA12000
- ESL9326 library
- Switched Fabric based

ESL9326 tape library

Serverless Backup

Server

RAID Array

Modular Data Router

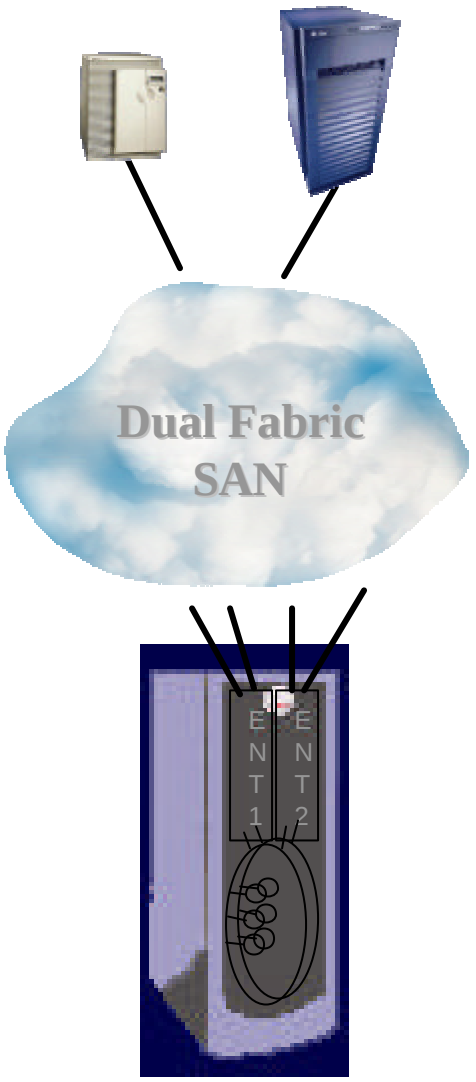
Tape Library

Neuigkeiten

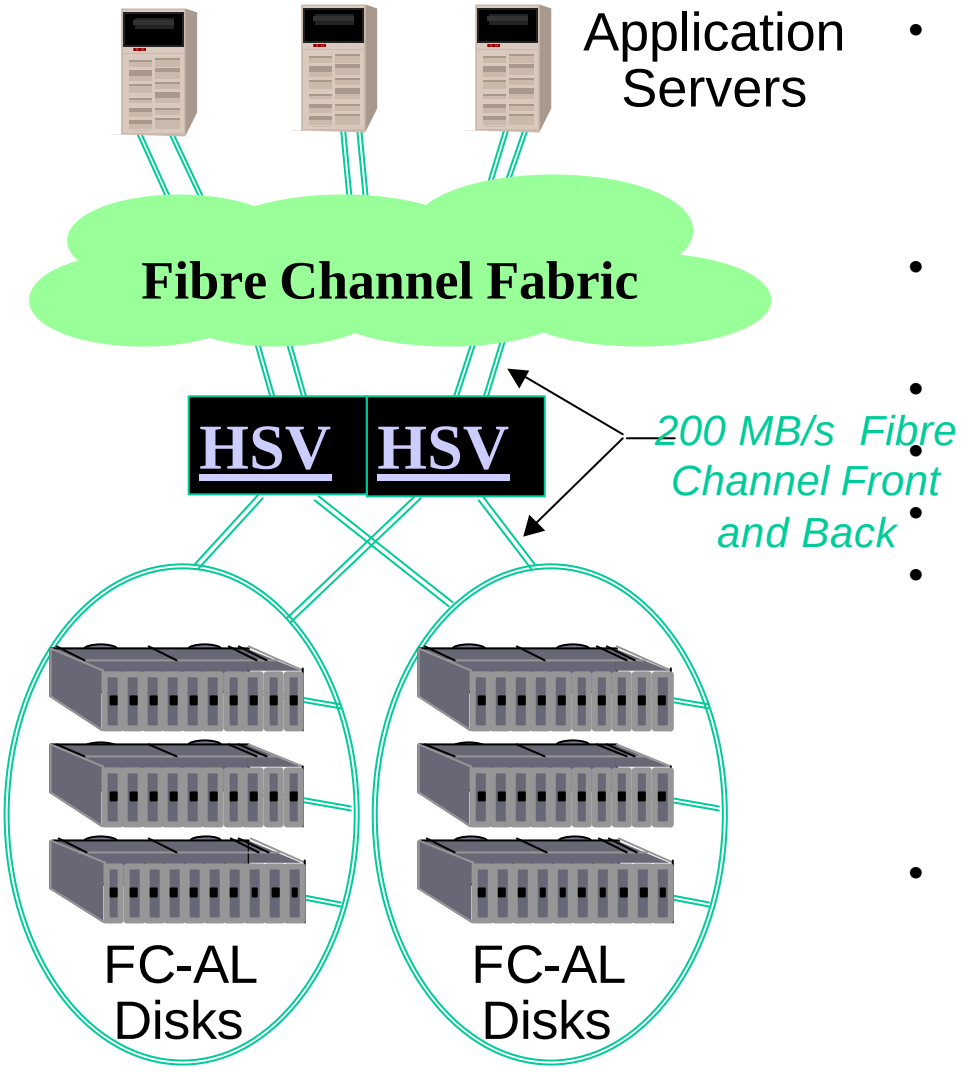
EVA kommt

Introducing StorageWorks Virtual Raid Array

- Next generation storage subsystem
  - Array based virtualization
  - High performance
  - Family of products
    - Range of function/performance
    - Easy migration across the family
  - Greater disaster tolerance capabilities
- New High-End Family addition
  - Not Yet Another HSG80
  - Different in Architecture, Management, Servicing and Troubleshooting
- Advanced RAID technology
  - Distributed Virtual RAID (DVR)
  - Expandable virtual disks
  - Load leveling/Autospare from pool
  - Full redundancy
  - Improved snapshot and cloning
  - Advanced data replication (DRM)



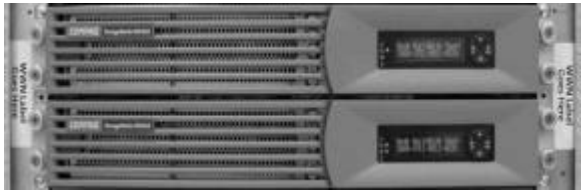
Enterprise Virtualizing Array Controller



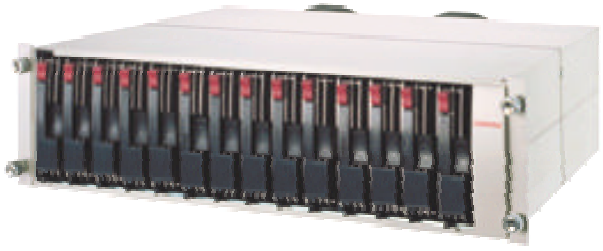
- 2Gb FC capable Array Controller
  - 1st in the industry
  - Two Dual Loop FC-AL device ports/array
- Distributed Virtual RAID (DVR)
  - RAID 0, 1, 0+1, 5 equivalents
- Mirrored write-back cache
- Fully redundant; NSPOF design
- High Performance (4-8x RA8000)
- Supports 240 FC drives
  - 36GB/dev = ~ 9TB,
  - 17TB w/72GB drives
  - Simultaneous connections to two loops
- 5th generation Fibre Channel drives
  - 2Gb operation(10 & 15K drives)
  - Future: Larger capacity, more cache, Multiple Actuators

Enterprise Array Configurations

- Enterprise Configurations
  - Fault Tolerant
    - Two Sets of FC shelves, cascaded from shelf to shelf within a set
  - Non-Stop
    - 4 FC-AL attached to two paths of two sets of FC shelves.
    - In-band mgmt



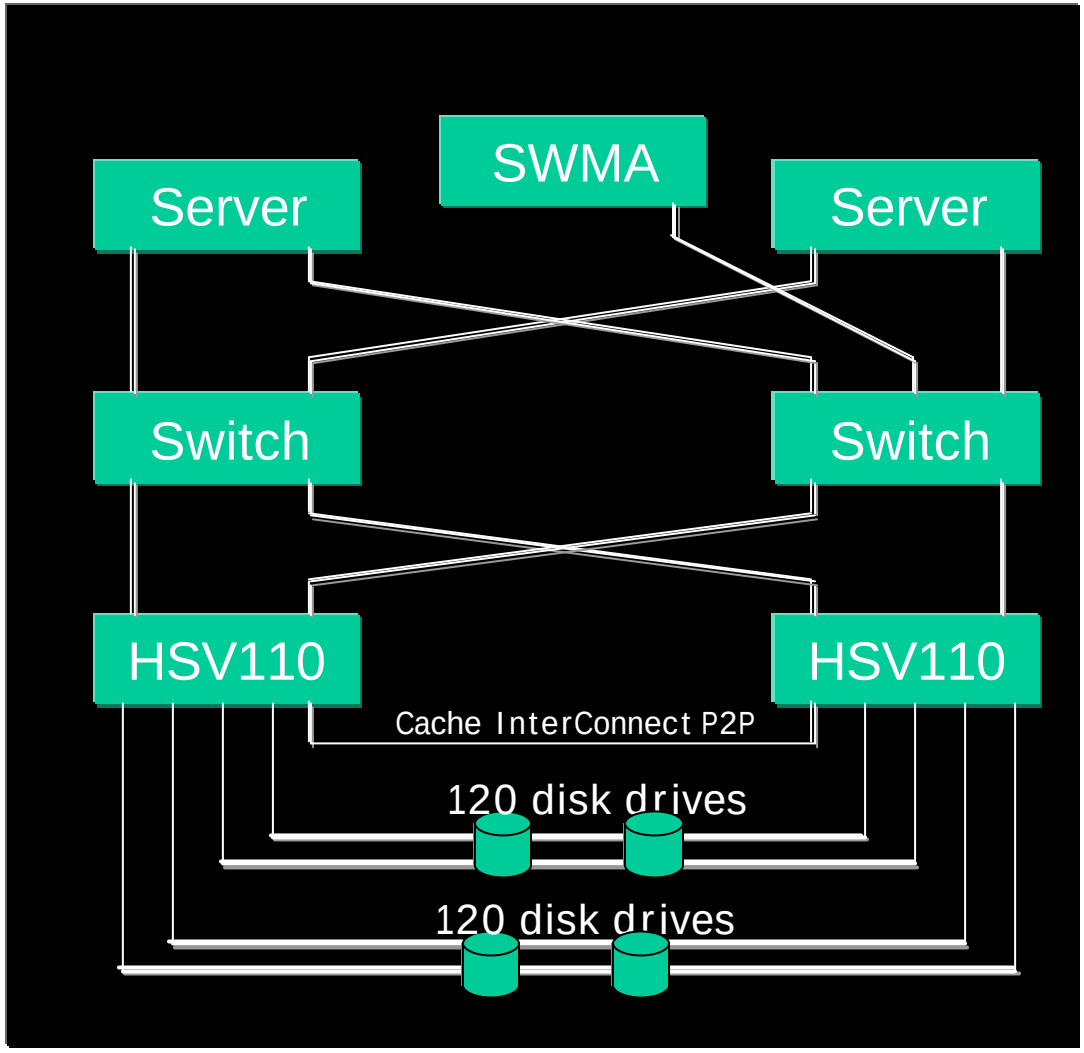
Enterprise Enclosures comprising a dual controller configuration



Disk Enclosure

EVA diagram

- HSV110 pair
- 4 Host fabric ports
- 4 Backend Loop ports
- Dedicated Mirror Port
- 1GB Cache Size
- Read Cache:
  - Read Ahead, Adaptive
- Battery backed up Write Back Cache
  - mirrored or not selectable



Configuration Example

E1 2C6D Random Access Performance

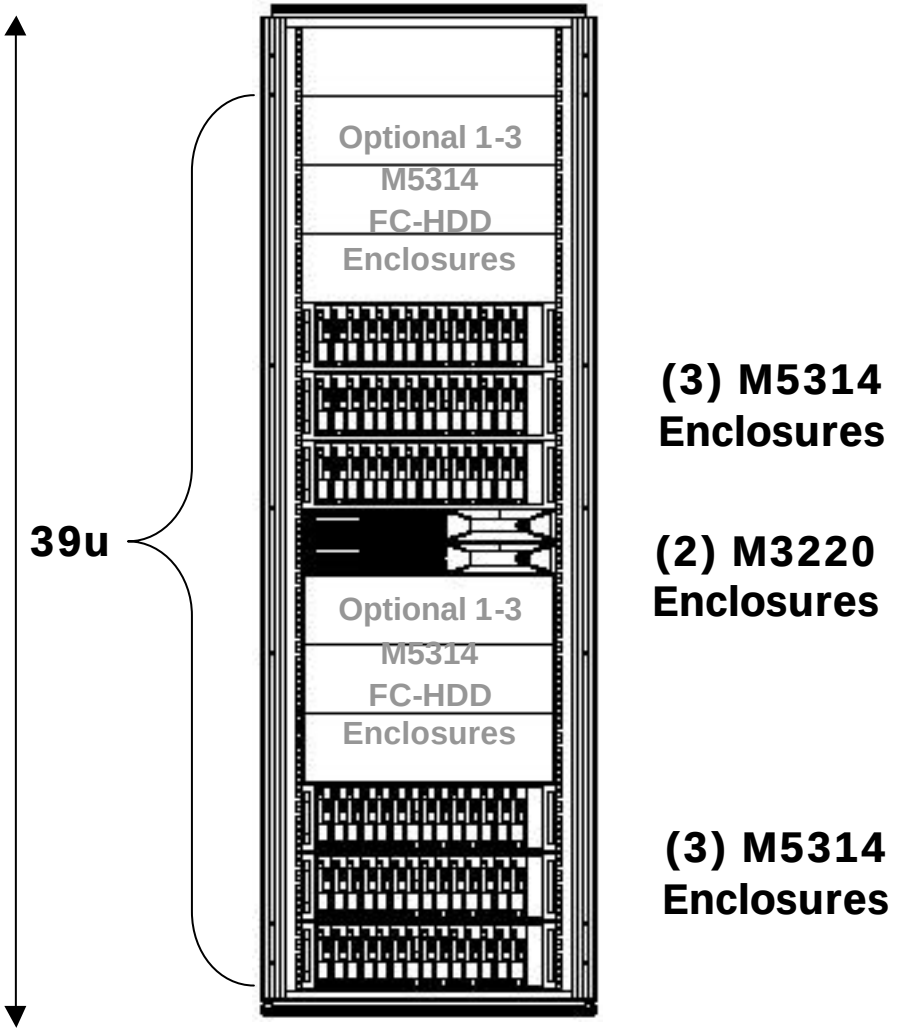
Model E1 2C6D – Phase 1

(1) 42U Modular Storage Cab.
(1) M3220 Enclosure pair w
(2) HSV110 Controllers
(2) Cache Batteries per encl
(6) 14-bay FC Enclosures
(17) Int FCCables
(7) 2-port EMU boxes
(8) AC strips
(2) 0u PDUs

Disks ordered separately

3.0 TBytes (36GB)
6.0 Tbytes (72GB)

Max Drive Configurations



Configuration Example 2

E1 2C12D Random Access Performance

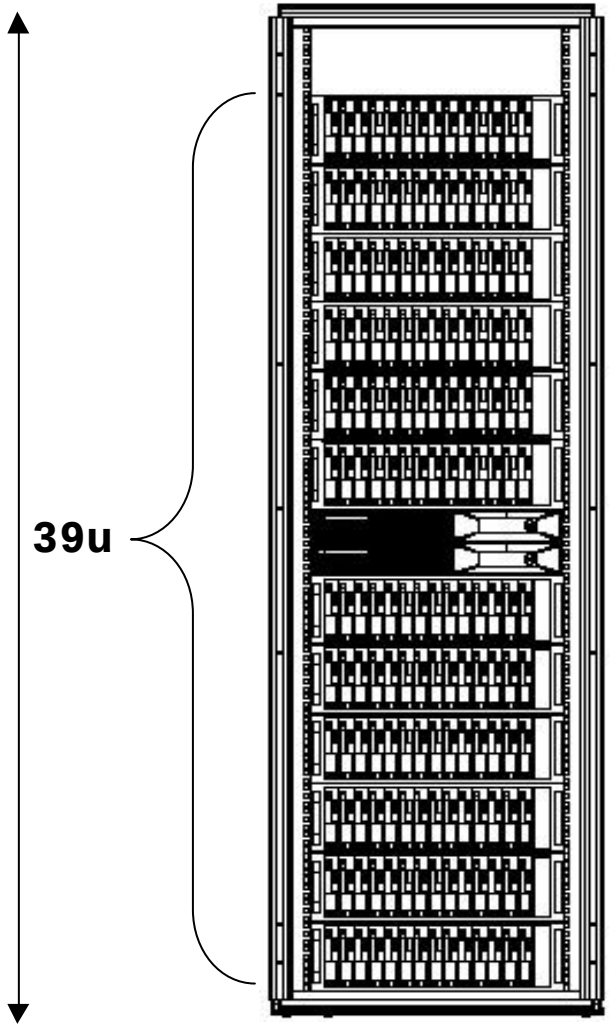
Model E1 2C12D - Phase 1

(1) 42U Modular Storage Cab.
(1) M3220 Enclosure pair w
(2) HSV110 Controllers
(2) Cache Batteries per encl
(12) 14-bay FC Enclosures
(37) Int FC Cables
(7) 2-port EMU boxes
(8) AC strips
(2) 0u PDUs

Disks ordered separately

6.0 TBytes (36GB)
12.0 Tbytes (72GB)

Max Drive Configurations



Configuration Example 3

E1 8C8D Write Performance Model – Phase 1

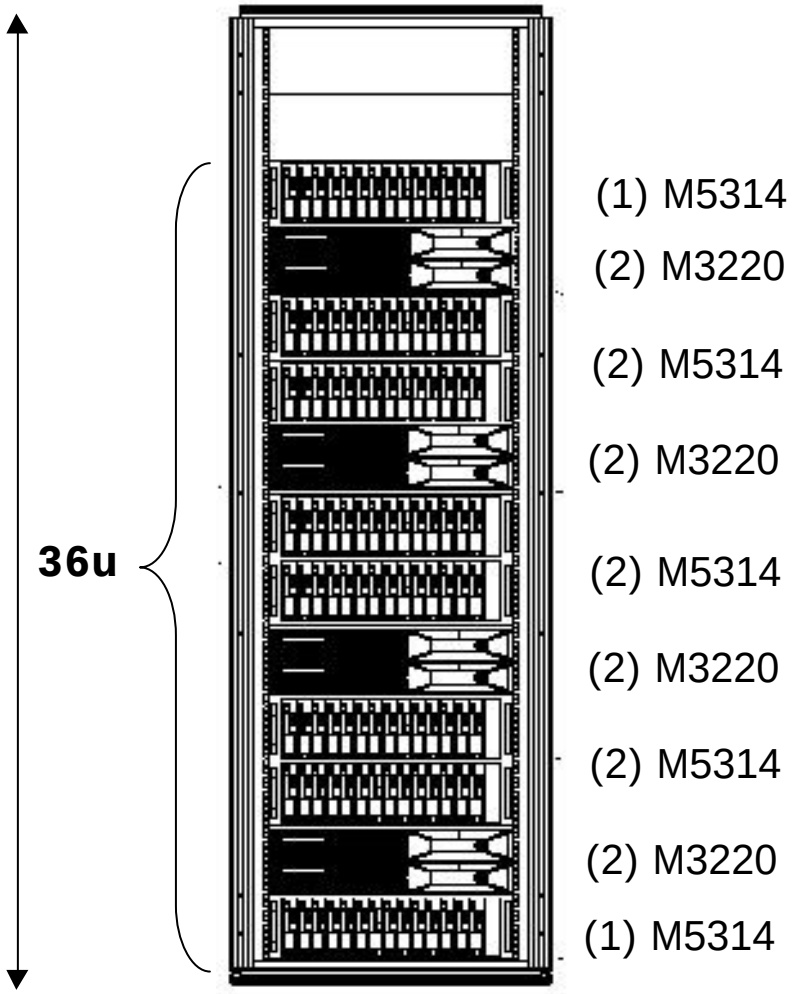
Model E1 8C8D – Phase 1

(1) 42U Modular Storage Cabinet
(4) M3220 Enclosure pair w
(8) HSV110 Controllers
(8) Cache Batteries
(8) 14-bay FC Enclosures
(36) Int FCCables
(7) 2-port EMU boxes
(8) AC strips
(2) 0u PDUs

Disks ordered separately

8.0 TB (112x 72GB) - Max Drive Configuration

This model is for "memory dump" (high speed, large block, consecutive 100% write) operations typically for Scientific Applications



Vielen Dank

für Ihre Aufmerksamkeit