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SAN Management
The Evolution of Storage Management

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Situation Analysis

- **Computing is cheap**
  - Moore's law is holding
  - GHz home computers, $1K servers,…
- **Bandwidth is cheap**
  - ISDN, *x*DSL, cable modem,…
- **Storage is cheap at the physical layer**
  - <$.01 megabytes for the home, enterprise $.03
- **All this cheap stuff is being applied to make business more effective**
- **Result: fundamental changes in IT**
  - New application ⇒ new server
  - Email to the next cubicle
  - Text is a dying data form
  - Keep everything online forever, and
- **One word: *eBusiness***

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Situation Analysis Continued

- **"Information islands"**
  - It seems that data is never where it needs to be
- **Results:**
  - Applications are less available than they could be
  - Responsiveness to partners and customers is less than it could be
- **IT management nightmares**
  - Thousands of servers
  - Millions of files
  - Trillions of bytes
  - Tens of sysadmins
- **Results:**
  - impending data chaos
  - IT management cost consumes technology savings
- **The worst thing: with *eBusiness*, the competition is a click away**

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What is a SAN?

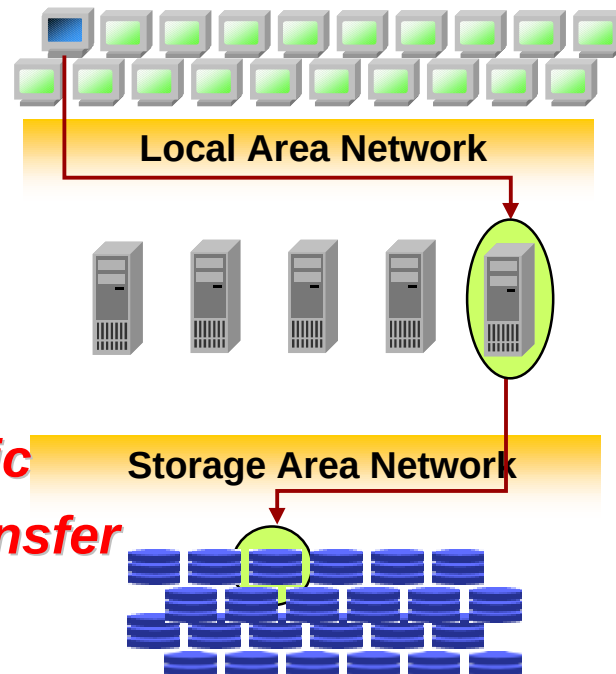
- **1996: Fibre Channel trying to get launched against a strong incumbent**
  - *Much* more expensive than SCSI
  - 80 MB/s on SCSI roadmaps
- ***Very* unproven**
  - Few devices with poor interoperability
  - Little infrastructure or system support
  - Disjoint topologies
  - Warring industry associations
- **Problem for promoters**
  - Make it seem like Fibre Channel offers something not available with alternative interconnects
  - Hold attention share until products mature

What You Were Supposed To Think

- ***Local Area Network***
  - Any-to-any connectivity
  - >>bandwidth
  - New computing "style" *client-server*
  - New apps, e.g. *collaborative computing*

by analogy:

- ***Storage Area Network***
- **Any-to-any connectivity**
- **>>bandwidth**
- **New storage "style" *storage-centric***
- **New apps, e.g. *server free data transfer***



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Surprise: It Happened!

- **Today,**
  - It is possible to connect tens of thousands of storage devices to hundreds of servers
- **Today,**
  - Fully interconnected system I/O bandwidth of tens of gigabytes per second can be purchased off the shelf
- **Today,**
  - It is possible to share automated tape libraries among servers, to move data directly between devices, and build large computer clusters
- **Today,**
  - Storage vendors talk openly of building computing strategies around a central storage strategy *and system vendors listen!*

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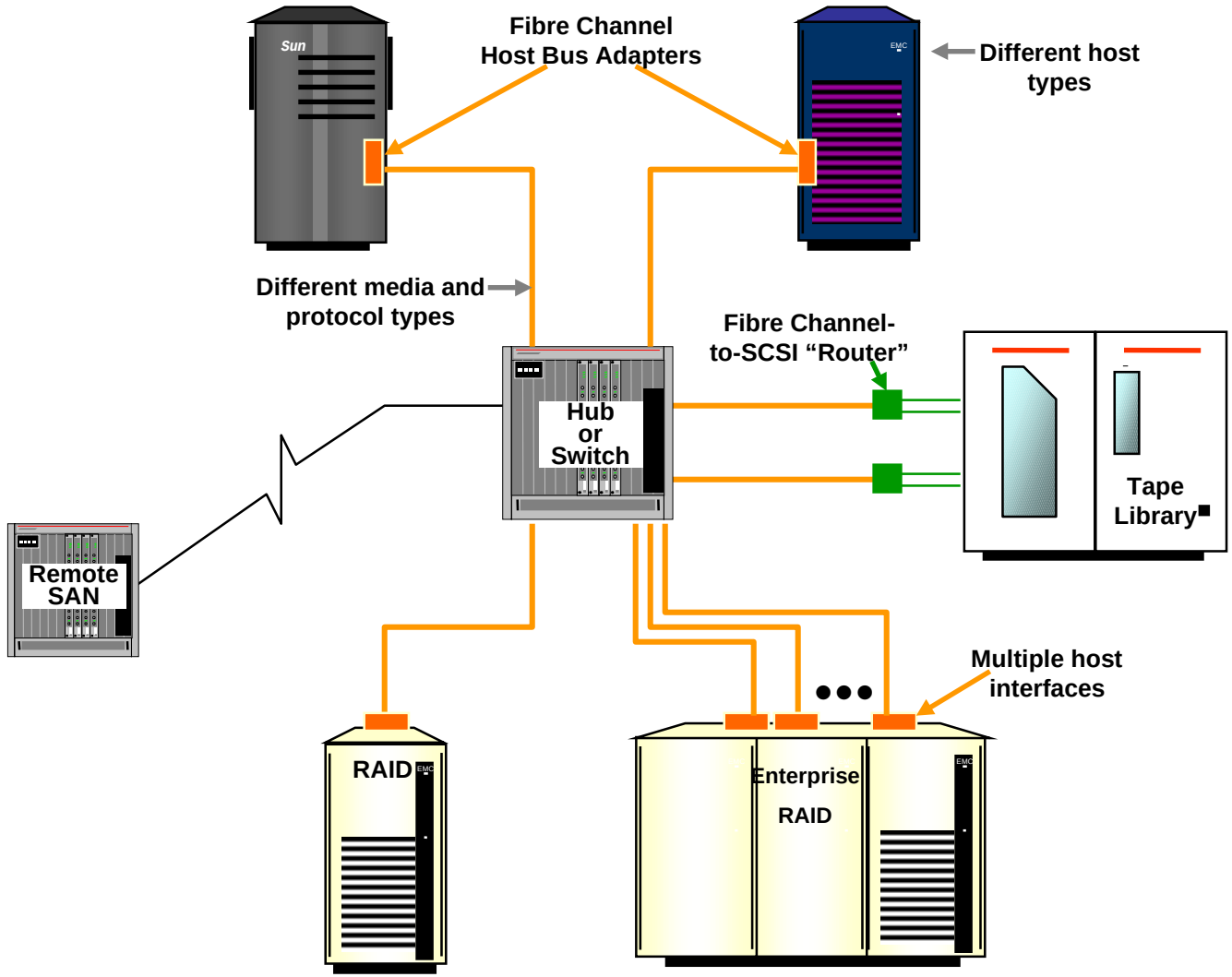
Anatomy Of A SAN



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"Infrastructure" Media And Protocols

- **Function**
  - Links between SAN components
  - Protocols: "languages" optimized for data movement
- **What's new with SAN**
  - Short-haul copper (30m/link)
  - Campus and long-haul fiber (2km-10km/link)
  - Multiple data protocols on one physical interconnect
- **What's enabled by SAN capabilities**
  - **Trading cost for distance**
  - **Remote mirroring and vaulted tape drives**
  - **A single communications infrastructure for volumes and files**

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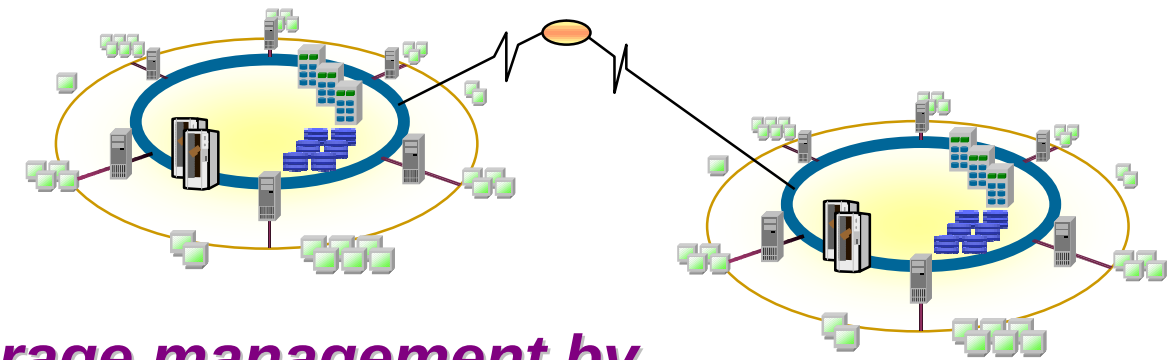
The SAN Storage Challenge

- **SAN storage has network-like characteristics**
  - Too many devices to enumerate
  - Devices come and go
  - Devices can be widely separated
  - Device capabilities can vary
  - Storage access security is an issue



In general, "*storage management by wandering around*" is no longer a viable option

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Why Aren't We "There"?

- **SAN hardware is an enabler**
  - connects lots of servers to lots of storage
  - Provides enough bandwidth to do something useful
  - creates opportunity for innovation
- **The good news: lots of innovation is going on**
  - Everyone wants to be your SAN storage supplier
  - Everyone wants to run your SAN backups
  - Everyone wants to manage your SAN
- **The bad news: lots of innovation is going on**
  - Everyone's SAN storage is slightly different
  - Everyone has approached SAN backup differently
  - Everyone has his own ideas about management

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SANs Need Cooperation

- **SANs have most value when connected entities cooperate**
  - To control storage device access
  - To negotiate storage device ownership
  - To share access to files or databases
  - To pass data directly between devices
- **Cooperation happens through software**
- **SANs have a software dimension**
  - And the software industry has largely been asleep at the switch!
    - The hardware is here
    - The software has yet to exploit it

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VERITAS and SANs Today

- **Today VERITAS ships 6 SAN-enabled products:**
  - Cluster Server
  - Volume Manager
  - Backup Exec and NetBackup Shared Storage Option
    - More than 1000 licenses
  - Storage Migrator (HSM)
  - V^3 Storage Appliance
- **Soon More**
  - SAN Management Solutions
  - Allocation Solutions
  - And More…

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Keys to SAN Success: Standards

- **VERITAS a leader in all key I/O industry interoperability standards groups**

SNIA
Storage Networking Industry Association

Fibre Alliance

Until standards mature, SAN interoperability will be via case-by-case qualification

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Testing the SAN Solutions

- **VERITAS has created the iLab whose role it is to:**
  - Find out what really works and what doesn't
    - Testing and certifying solutions
    - Make the information available to the world
  - Interoperability testing of VERITAS applications
    - On supported hardware and OS platforms
- **Located in the VERITAS Headquarters location in Mountain View, California (USA)**

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Companies In the SAN Space

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SAN Management-TOTAL Control

- **SAN Management is about much more than managing the Physical Interconnect**

- **Management at a higher level, including:**
  - Volume Management
  - File System Management
  - Interconnect Management-Physical
    - Availability
    - Bandwidth utilization

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SAN Management Tools Strategy

- **Reduce Complexity of SAN Administration**
  - Manage heterogeneous SAN storage resources from a central point
  - Deploy functional applications for zone management and capacity allocation
- **Provide useable and flexible tools to enable proactive, policy-based management capabilities**
- **Leverage core VERITAS SAN applications to provide an un-matched, integrated, end to end solution for SAN environments**
- **Modular Architecture**
  - Scales from point application management to large SANs using optional central repositories
  - Built on standards (JIRO,CIM,WMI,DMTF, SNIA) & supports frameworks (Tivoli,CA,HP,BMC)

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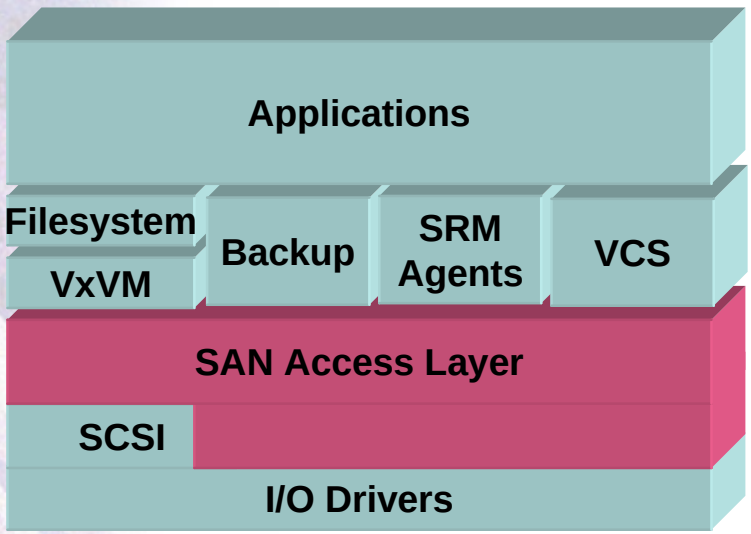
What's the Target Market for the SAN Management Tool?

- Enterprises that have deployed or are thinking about deploying SANs on a local or global basis-Global 2000
- Customers looking to manage their SANs to insure availability and performance are maintained
- Customers looking to manage their heterogeneous SAN Deployments (SUN, HP, NT, using several interconnect vendors)
- Customers looking to manage their data on the SAN versus the interconnect

The VERITAS V³ SAN Access Layer Creates SAN-Aware Storage Management

V³ SAN Access Layer is a new host-based technology that provides a virtual interface into the new, more complex SAN environment



- "Client API" for host applications are common across NT/UNIX
- "SAN API" for communication with SAN Fabric,Devices, Services
- Complements more limited legacy SCSI I/O services

First Key Feature : "SAN Discovery Services"

SAN APIs based on de-facto and formal standards… vendor specific extensions added as needed

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SAN Management

- **What makes up a compelling SAN Management Solution?**
  - Provisioning
  - Storage Management
  - Discovery of SAN Connected devices
  - Event Management
  - Policy Management
  - Capacity Management
  - Reporting
  - Notification
  - Integration
  - Charge back
  - And More…

- **What's the Problem?**
  - Are we ready for all of this now?

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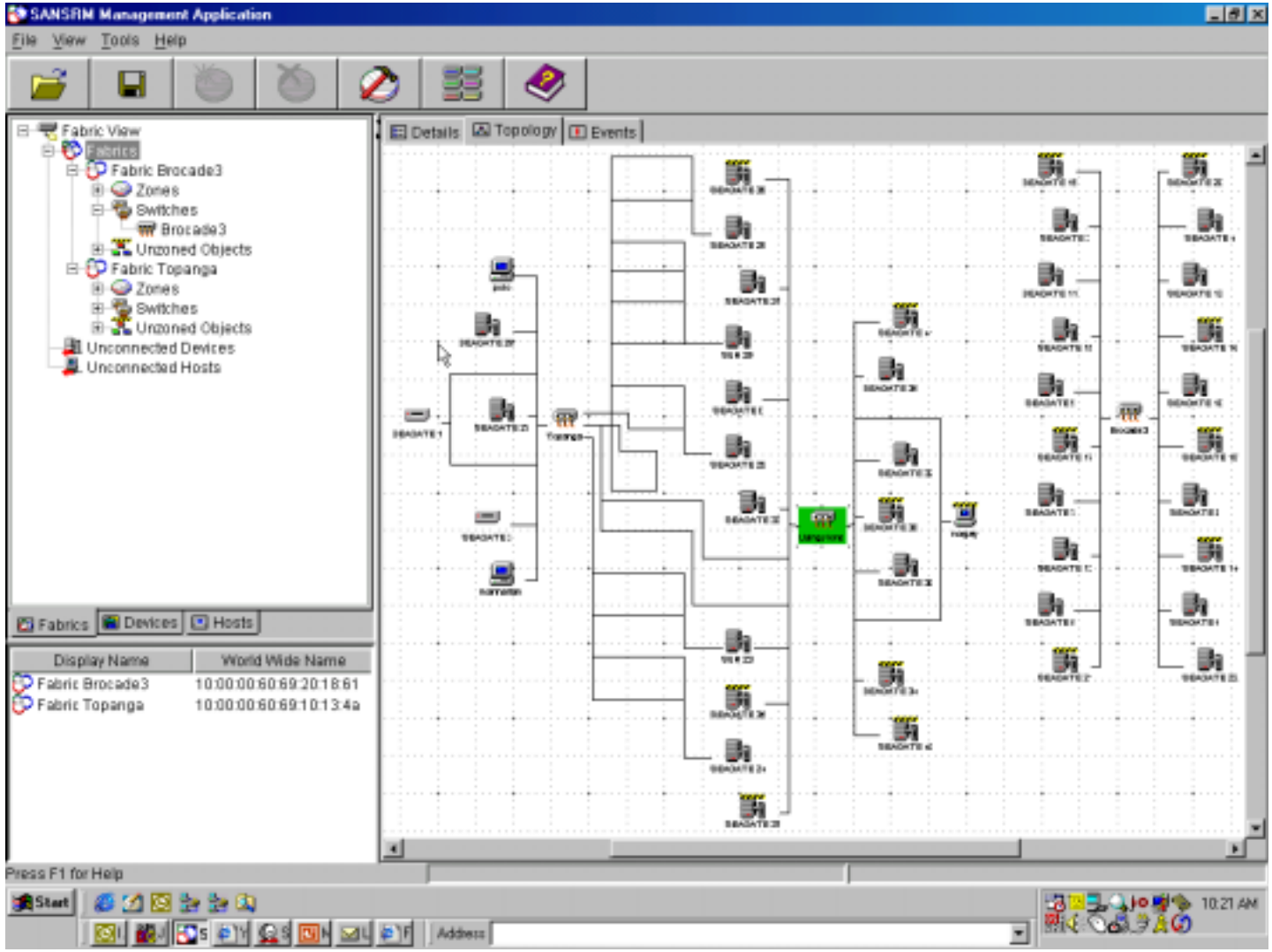
VERITAS V³ SAN Management Solution



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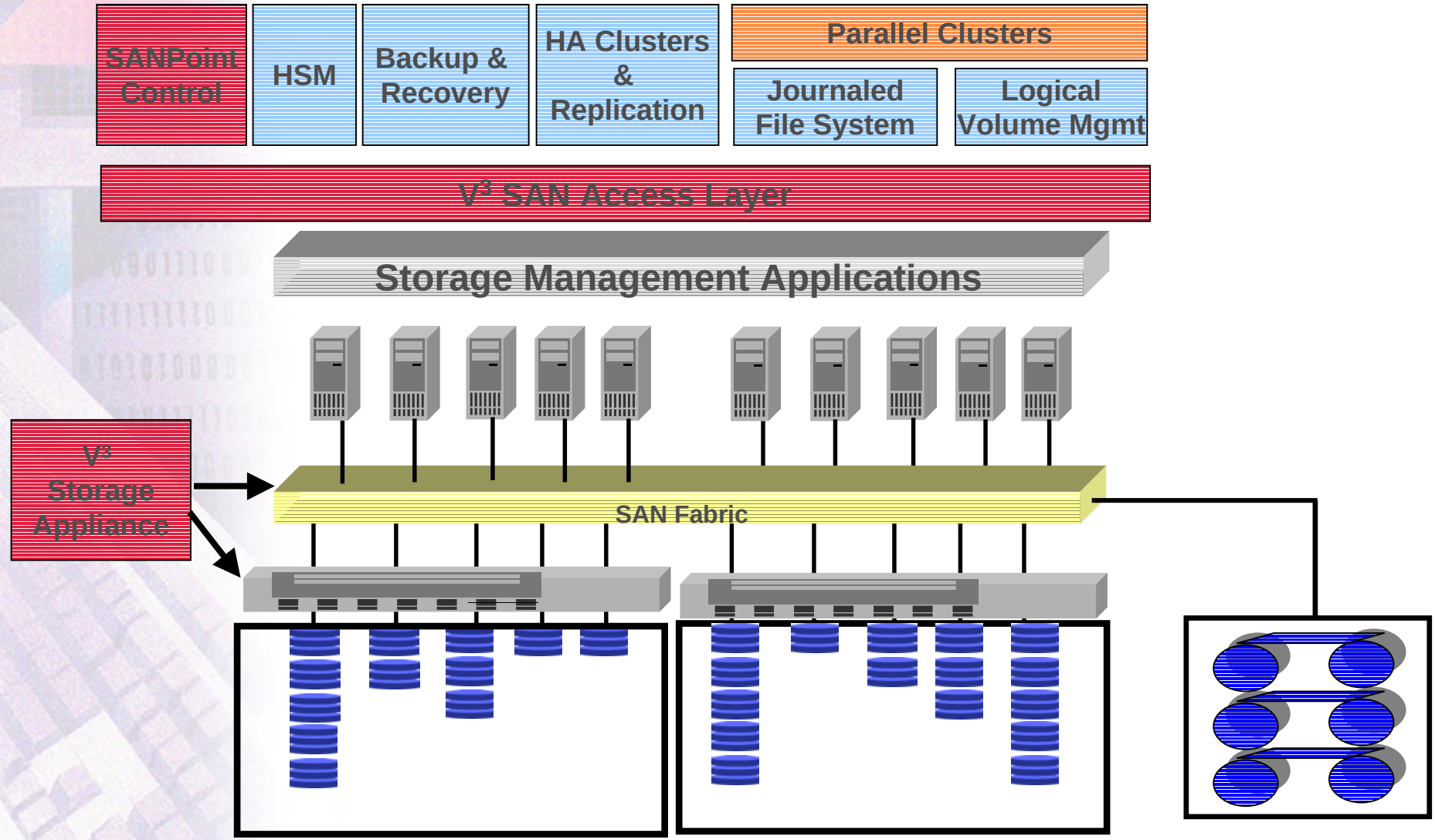
VERITAS is Planning for the Next Generation of SAN



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Next Steps?

- Try solutions from a variety of vendors
- Be aware of the Standards Groups and What they are delivering on with the vendors that participate
- Ask the vendor if they can provide what you need and put them to the test!
- Establish rules of engagement
- Establish standard operating procedures (SOP)
- Continue to evaluate where appropriate

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Questions?