Managing Virtualized Storage

A Buyer's Guide to Storage Management for Increasingly Complex Storage Environments

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HP WORLD 2002
Conference & Expo

Agenda

- Review the **state of the storage market** and different **architectural approaches** to: storage consolidation; storage networking; disaster recovery. Also, review some "new-comber" technology.
- Discuss **"storage virtualization"**: What is it? And how should you approach evaluating it?
- Review the issues and architectures surrounding **storage resource management**, and discuss important vs. irrelevant data when selecting this technology.
- Define a basic "**ROI proposition**" for storage management and virtualization.

The State of Storage
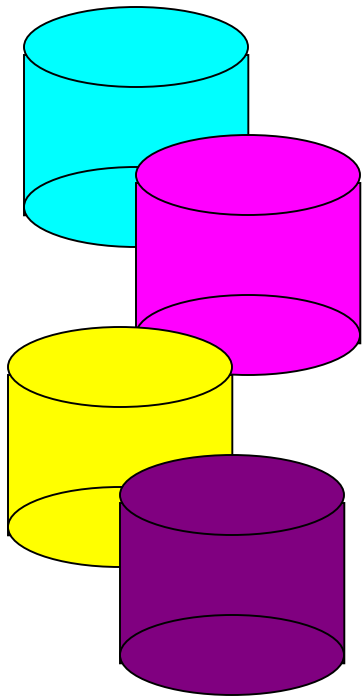
- Increased interest in disaster recovery and online backup sites after terrorist attacks.
- Centralization of the data for backup and server consolidation.
- Need to reduce backup windows from "all night" to a manageable timeframe.
- Increasingly affordable and scaleable mid-range storage array solutions.
- Increasing awareness of the benefits of technologies such as data"snaps", "point-in-time" copies, and "third mirrors".

The State of Storage

Simply put :

- ✓ Companies are moving to networked storage in droves!! (San, NAS, or a combination).

- ✓ Vendors are starved for new business and new market niches in order to shore up erosion of core markets: Cisco, HP, Sun.

- ✓ Storage is moving into another era or wave, where it is a function of software more than hardware.
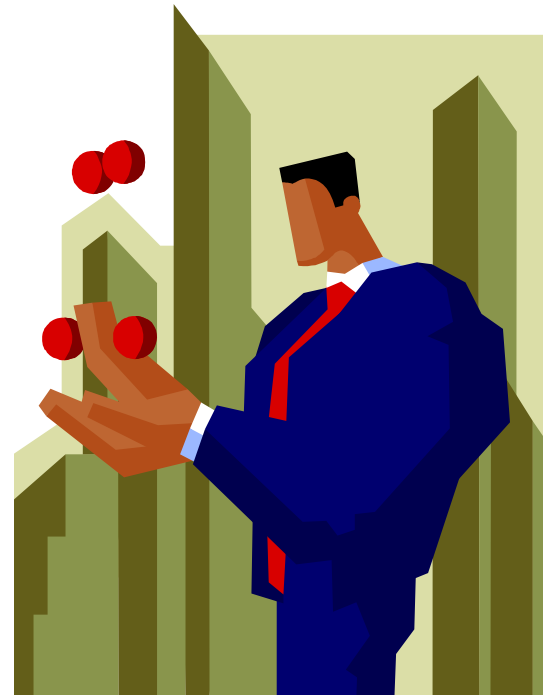
Virtualization?
buzz…buzz…buzz

- Not a new concept.
- Not a standard approach as of yet.
- Not always a customer requirement.
- Not always a good idea!

Virtualization? What IT Wants?

- Independence from the technological constraints of the physical infrastructure, when deciding on how to allocate available storage to the end-user community.

Virtualization

- Virtualization has been around for years on the inside of enterprise storage arrays from EMC, Hitachi, Compaq, and Hewlett Packard
- Today the term is over-used, with no common definition that everyone shares.
- The <u>defacto definition</u> seems to be:

"*Virtualization separates the physical partitions of the storage hardware from the storage space where data actually resides", thus creating a 'virtual pool' of storage space that operates with hardware and software from any enterprise storage array and SAN manufacturer".*

Virtualization: Two Different Camps

"Out-of-Band":

- Management tools for OOB virtualization are typically connected to the FC switched fabric.
- Storage traffic still runs over FC SAN.
- OOB tools scan SCSI addressing, and redirect traffic to the virtual data path directly from the host source.
- Intelligent agents on hosts provide the redirection logic.

"In-Band":

- All data passes through the in-band appliance.
- The In-band device technically <u>is</u> the primary SAN.
- The appliance also hosts the storage intelligence, so that any storage array can participate.
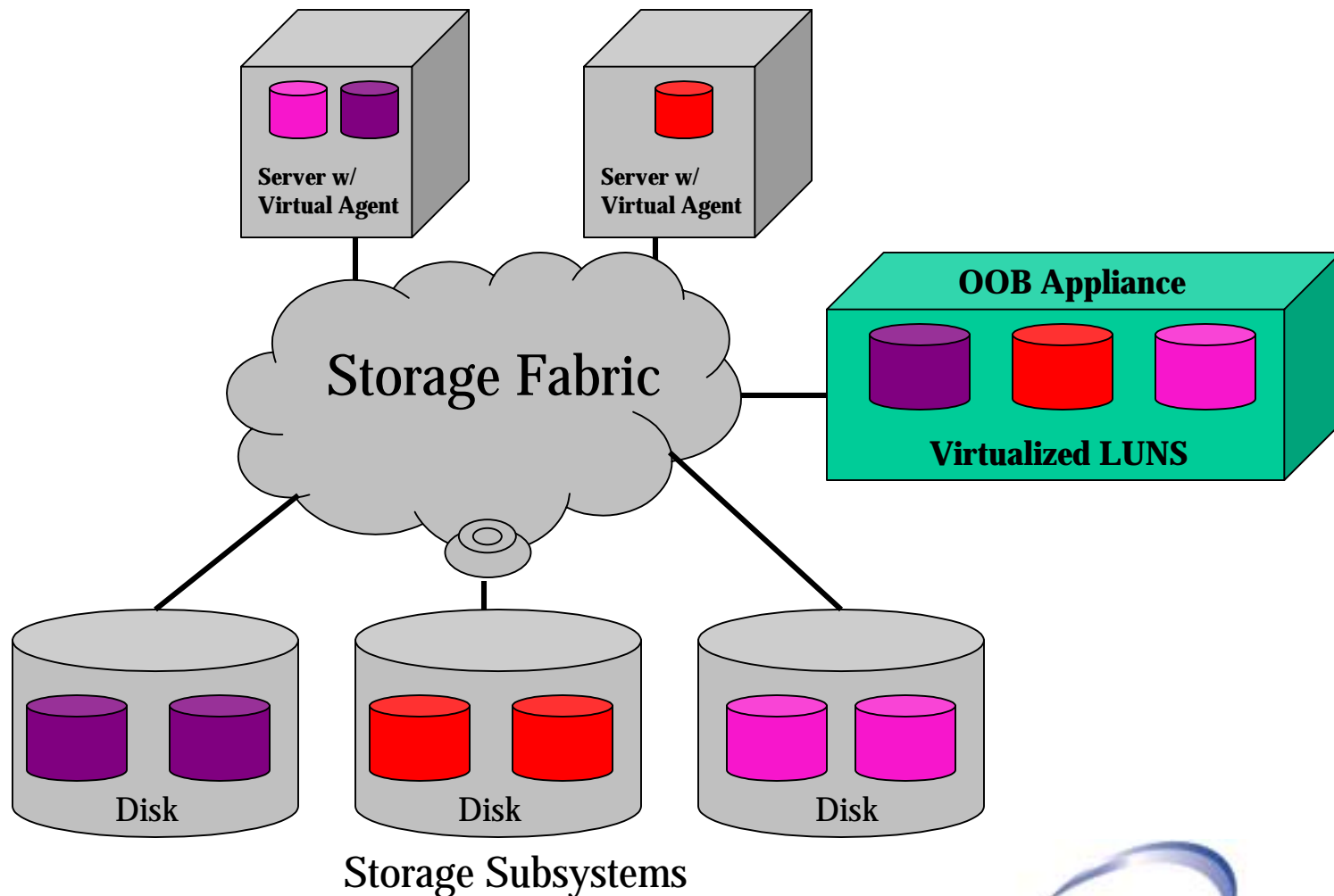
Virtualization: Out of Band

"Out-of-Band":

Pros:

- Less obtrusive to data path
- Much better performance
- Minimal queuing required – less latency.

Cons:

- Less access to hook-in proprietary measurement capabilities into the data stream.
- Less control over multi-vendor interoperability issues.

Virtualization: Out of Band

Server w/
Virtual Agent

Server w/
Virtual Agent

OOB Appliance

Virtualized LUNS

Storage Fabric

Disk

Disk

Disk

Storage Subsystems

Virtualization: In Band

Pros:

- **Addition of value added services:**
  - Creation of a single virtual-volume
  - Storage Accounting and Quota Management
  - QoS by Application or User Group.
  - Centralized management integration.
- **Component and data path redundancy.**
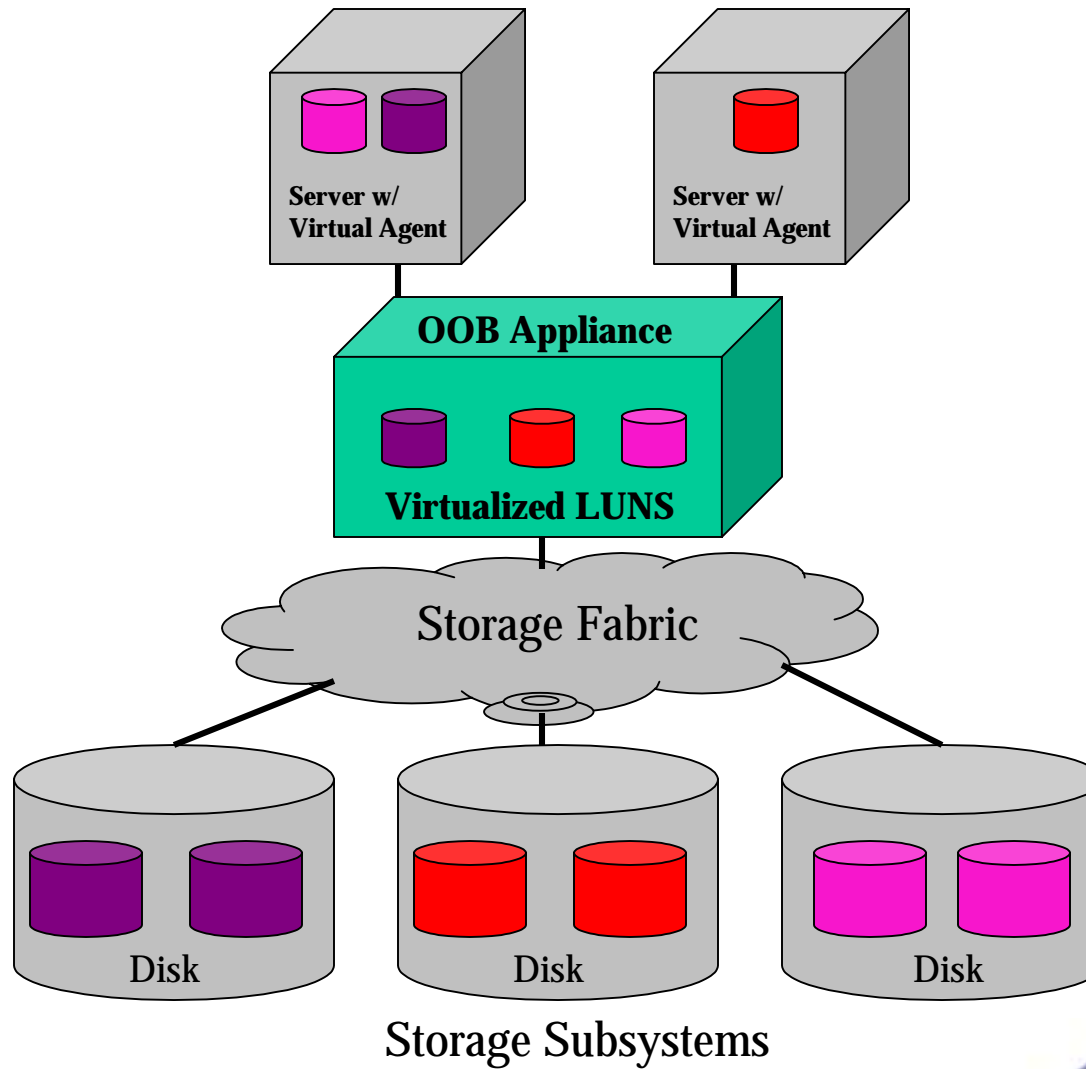- **Integrated host connectivity and DR link connectivity.**

Cons:

- **Appliance becomes the Target for every host I/O.**
- **Performance can really suffer if high OLTP environments are run through virtualization engine.**
- **Costly and proprietary ($100K+ each), still immature and awaiting standards.**

Virtualization: In Band

Server w/
Virtual Agent

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OOB Appliance

Virtualized LUNS

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Storage Subsystems

Virtualization: Market Positioning

"Out-of-Band" Software Virtualization:

- EMC's WideSky (Array-based)
- Compaq's VersaStor
- Hitachi HiCommand (Array-based)
- Veritas' ServPoint Control (Host-based)
- Vicom (now Sun's partner)

"In-Band" Virtualization Appliances:

- HP SANlink (Storage Apps)
- DataCore's SANsymphony
- XIOtech Magnitude

Virtualization: Market Positioning

Hybrid Approaches: Best of Both Worlds

- FalconStor – Appliance with In-Band and OOB features, and lots of proprietary goodies.

- TruSAN "Cloudbreak" – combination of management and virtualization feature sets to be able to provide virtualization , plus storage area management.

- Pirus PSX-1000: Hybrid virtualization appliance and storage media concentrator. Can tie in FC, SCSI, iSCSI, Gig-E, etc.

Virtualization: Middleware

<u>EMC's WideSky</u>:

- Ambitious attempt to unify the console and data management of many different Vendors' platforms by writing storage admin. commands to a common API set—based on the emerging Common Information Model.

- Storage vendors will feel pressure to comply with an emerging standard by writing to these common calls.

- EMC will write whatever code the Vendors' do not write for them—particularly for commonly installed storage arrays and infrastructure.

Virtualization: Where is the market?

The market is still the start-up phase:

- Major storage providers are coming onboard by buying or partnering.

- The market must get educated, and the major storage sellers: EMC, Hitachi, IBM, SUN, will provide the education.

- Best features of "in-band" and "out-of-band" will merge into more full-featured solutions.

- Standards like iSCSI, FCoIP, must standardize or fade away to better approaches.

Virtualization: Alliances du Jour

These are the alliances/partnerships as of Mid-June 2002:

- EMC/Dell/TruSAN

- IBM/DataCore

- Sun/Vicom

- HP/Storage Apps (now HP Storage Virtualization Software Division – SVS)

Virtualization: What does this mean to you?

Proceed with Caution:

- Anytime you add another layer between storage and server, you have to make sure it is stable and highly available.

- Products are changing rapidly, as standards emerge and/or the customers start showing which approaches are preferential.

- Partnerships, buy-outs, and functionality failures will change the competitive landscape daily (as witnesses the breakdown of the Brocade/Cisco union.

- Management Tools that provide in-depth knowledge and fault/performance monitoring of the virtualized storage environment will not be optional—they will be invaluable.

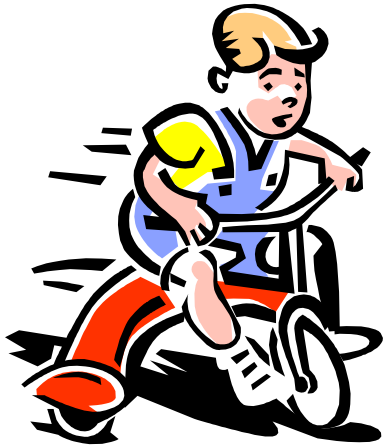# Storage Management Solutions
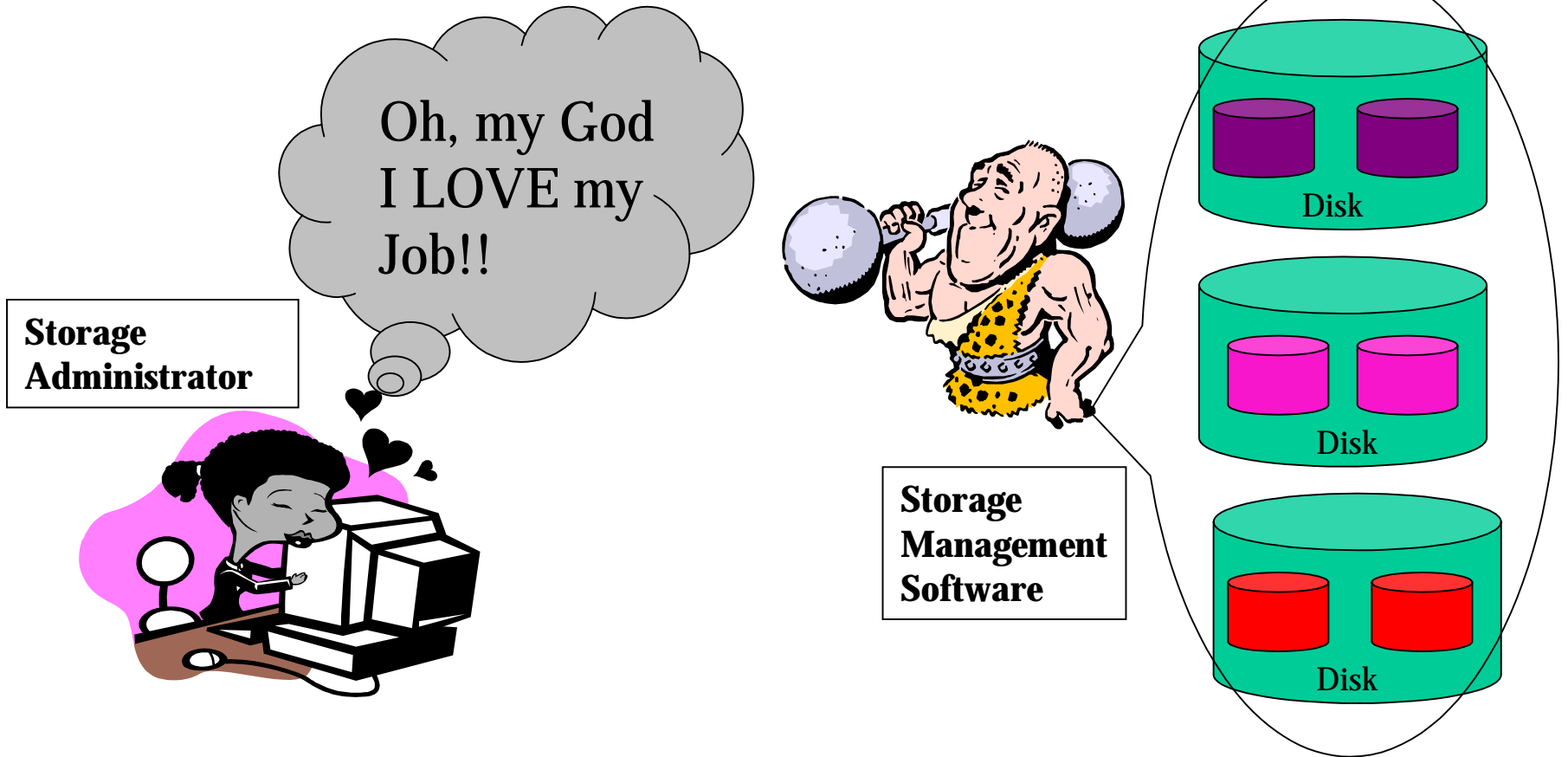
Storage Management Software

Pre Y2K:

- Storage Management was the storage configuration console provided with the storage array.

- Interoperability amongst different Vendors' storage configuration utilities was just a dream.

- Storage array logic was "hard coded" into configuration files on the storage array.

- Managing the storage network and the IP network on a "single pane of glass" was not possible with anyone's tools.

Storage Management Software

Today in 2002:

- Storage Management solutions are being released that promise heterogeneous storage management.

- Interoperability amongst different Vendors' storage configuration utilities is coalescing around the Common Information Model.

- Storage array logic has been moved into the SAN, therefore SAM Management and Storage Management are being addressed with single solutions.

- Storage Management tool sets are "rolling out", but they are not quite ready to remove the "training wheels".

Storage Management Software

Why do you want to invest in SRM?

"When you add up the cost of outages, time to do conversions, backup and recovery—all of which are much simpler on a SAN—and then throw in the extra cost of the arrays, switches, and management software" it is estimated by an end-user that the "break even (is between) 40-50 Servers"

Source: Chuck Kinne: AT&T Labs: Computer World: January 28, 2002

Storage Area Manager

What do you want a storage management environment to help you ensure?

- **Self-managing storage environment, capable of notification and automated actions to keep data safe and available.**

- **Self-tuning performance parameters that continually optimize and adjust to SLAs.**

- **Self-healing environment that achieves "five nines" for uptime, and virtually eliminates re-loading data from tape.**

Storage Area Manager

What features do you need in a Storage Area Manager?

- Storage device and resource management

- Storage allocation and quota management

- Storage performance and optimization management

- Storage QoS and SLA Rules-based Management Logic

Storage Area Manager

What features do you need in a Storage Area Manager?

- <u>Automatic</u> host, storage device, and storage interconnect device <u>discovery</u> and map placement.

- <u>Automatic Storage Inventory and Data Migration planning tools</u>; plus Storage Accounting to facilitate departmental charge-back and/or resource consumption monitoring.

- <u>Automated Reporting</u> functionality to easily evaluate the current resource utilization against historical trends and potential growth scenarios

- <u>Automated Event Correlation</u>, prioritization, and Alert escalation to pagers, email, operator console, etc.
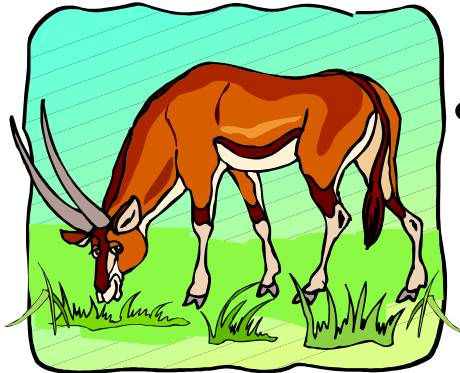
Who are the Big Players in this Market?

- EMC Control Center: Open Edition
  - Foundation of Auto IS Vision Strategy
- HP Storage Area Manager:
  - Foundation of FSAM Vision Strategy
- Hitachi's HiCommand:

- BMC's PSM/MainView:

- Veritas's SANPoint Manager:

- Tivoli Storage Manager:

Who are the New Players in this Market?

- Fujutsu Softek's Storage Manager:
  - Heterogeneous SANs

- TrueSAN's Cloudbreak:
  - Management and Virtualization. Growth by partnerships.

- Powerquest's: PowerExpert Storage Resource Manager:
  - NT/2000 SAN Niche

Who will Lead?

EMC and HP both have an opportunity for real leadership in the Storage Resource Management—based on different strengths:

- <u>EMC</u>: Emerging Software Focus on building a developers environment in storage management around EMC's suite of API's and a CIM data model called WideSky.


- <u>HP</u>: Perceived as more of a "Switzerland" of storage management, since HP is not the dominate vendor of enterprise storage arrays,   but IS the dominate player in enterprise management.

EMC ControlCenter/Open Edition

- 800 Pound Gorilla in Storage Industry

- Who can afford to go against the resources that EMC is prepared to commit to making its WideSky APIs the prevalent SNIA choice.

- In large corporations, EMC almost invariably has some installed base, so all of the Niche SRM Management players will write to WideSky.

- Even if someone else gives away a perfectly usable approach, the dominate players with market momentum will likely win (witness the adoption of Sun's StarOffice as opposed to Office 2000.)

EMC ControlCenter/Open Edition
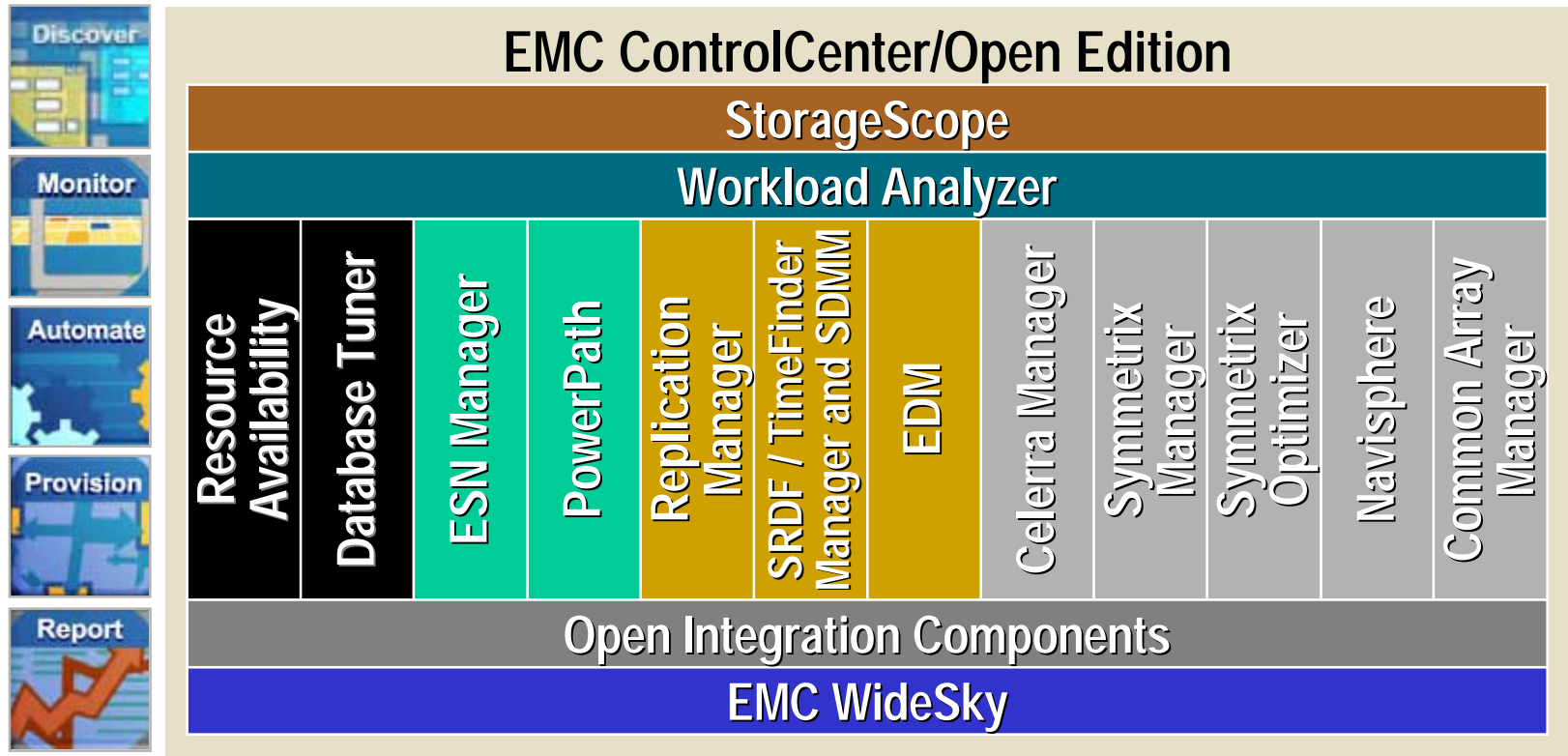
HP OpenView Storage Area Manager

- 800 Pound Gorilla in Management Industry

- Technology that HP is releasing supports SNIA standards, and HP is working to build API's for most popular brands of storage.

- OV SAM is maturing, since it has been evolving for over 2 years now.

- Biggest asset may be that Compaq, Hitachi, IBM, Sun, and others may be far more trusting of exposing their system level micro-code to HP than to their prime "box" competitor– EMC.

HP SAM
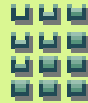
OpenView Storage Area Manager)

Storage Node Manager	Storage Optimizer	Storage Builder	Storage Allocater	Storage Accountant

CORE Services (JCORE,DIAL,XML,JavaBeans,etc.)
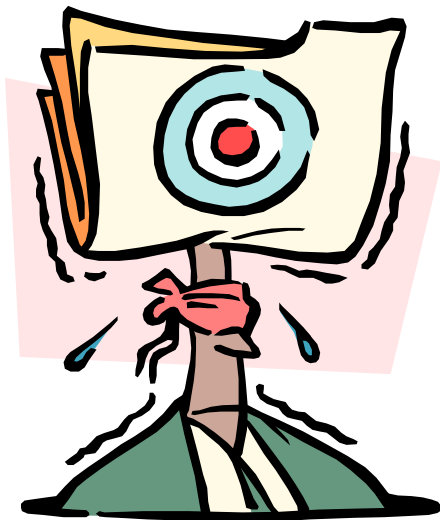(Licensing,discovery,mapping,configuration,etc.)

My Advice to Someone Evaluating SRM Vendors?

- Select your partner carefully.

- Let a single, trusted partner guide you through.

- Avoid complexity.

So How Can Virtualization and SRM make Sense in your Enterprise?

- Carefully assess what you want your new storage system to provide:
  - Disaster Recovery Site?
  - Backup Mirror or snapshots?
  - More efficient use of storage space—less wasted storage?
  - User administration and management?
  - Uniting IT support across OS's?
  - Quota Management?
  - Charge-back of storage use to departments?
 - Storage SLA Guarantees?

So How Can Virtualization and SRM make Sense in your Enterprise?

Plan what features you need your new storage system before you meet with vendors:

- Have Apps broken down by type, location, host, OS, DB, etc.
- Estimate your data change rate deltas for DR purposes.
- Figure out which data needs to be RAID-1 vs. RAID-5?
- Estimate your RTO and RPO by each App.
- Decide which departments need 3rd Mirrors.
- Ask your DBA's for any specific requirements of Apps in advance.

RTO's and RPO's
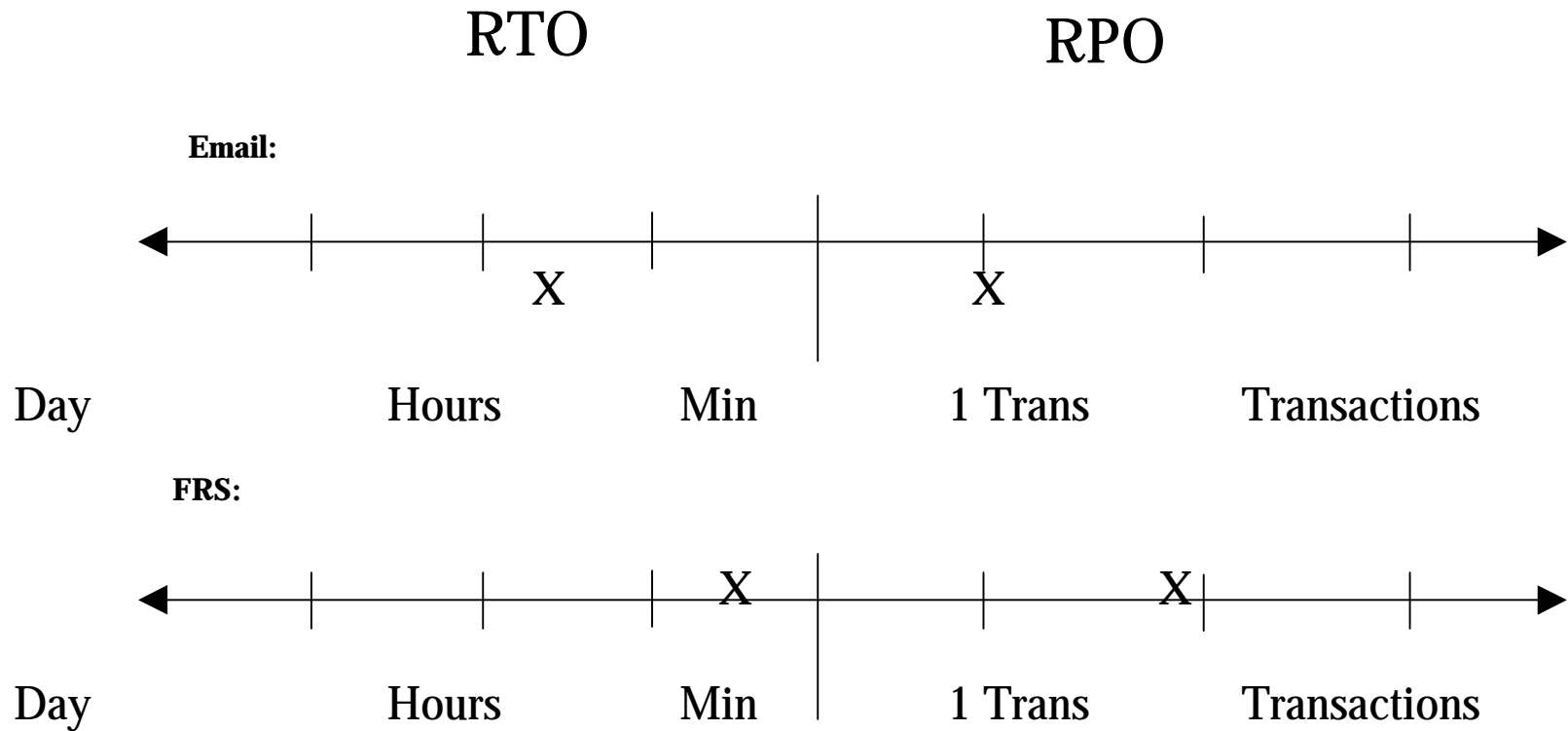
Other Advice

- Demand a lot of your Partners, but stay loyal to them if they work with you.

- Do the proper planning upfront. It will help you sort through the hype and key in on YOUR needs during the vendor meetings.

- Explore your virtualization and management strategy together; as they are very co-dependent.

Closing Remarks!!

Please fill out the evaluation forms before you leave!
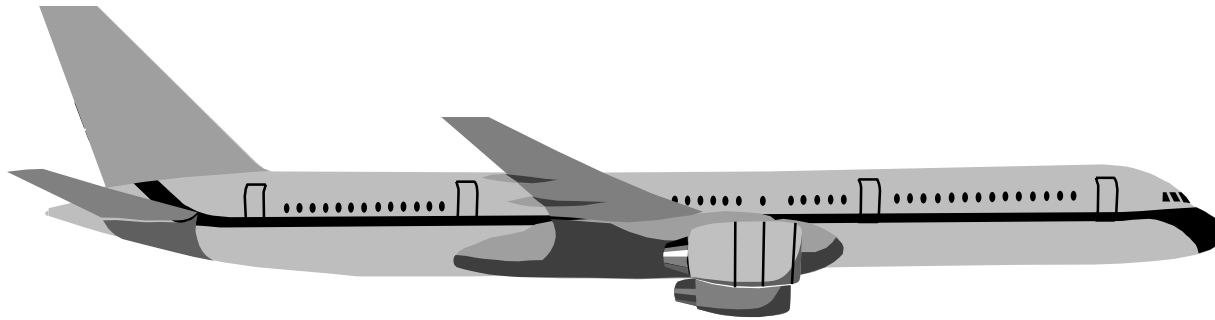
Have a Safe Journey Home!
Thanks for Attending Today's Event!

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