Storage Decisions

Hosted by STORAGE SearchStorage.com

Low Cost Technologies and Approaches in Storage Networks

Marc Farley
President, Building Storage Inc.

Storage Decisions

Hosted by STORAGE SearchStorage.com

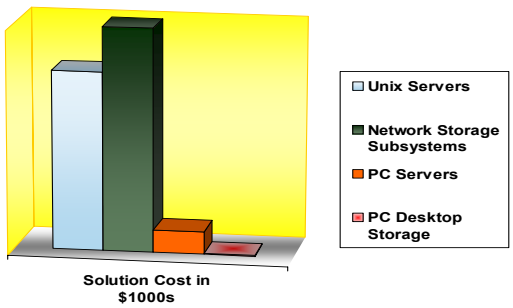
"Preferred" Storage is Expensive

- **Top-tier, high margin vendors have been the most successful.**
  - **EMC**
  - **Network Appliance**
  - **IBM**
  - **HPQ**
  - **Hitachi**
  - **Q Logic**
  - **Emulex**

Storage Decisions

Hosted by STORAGE SearchStorage.com

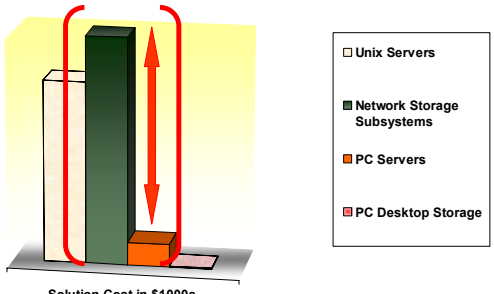
Comparing Server & Storage Costs



Storage Decisions

Hosted by STORAGE SearchStorage.com

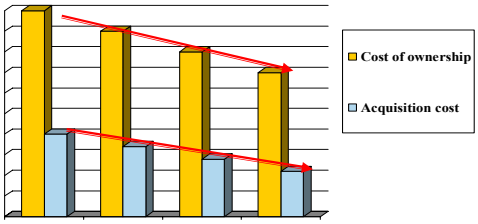
Comparing Server & Storage Costs



Storage Decisions

Hosted by STORAGE SearchStorage.com

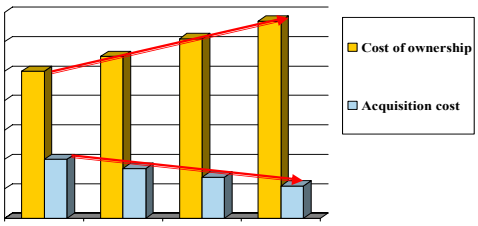
Cost of ownership and acquisition cost (best laid plans)



Storage Decisions

Hosted by STORAGE SearchStorage.com

Cost of ownership and acquisition cost (real risks)



Storage Decisions

Hosted by STORAGE SearchStorage.com

Products and Infrastructures

Products	Infrastructures
Cheap to purchase	Costly to purchase
Easy to install	"A process" to install
Cheap or costly to own	Cheap to own
Stand-alone or integrated	Integrated

Storage Decisions

Hosted by STORAGE SearchStorage.com

"Instant Infrastructure" Products (PBX approach, IBM SVC for example)

- Stability
- Flexibility
- Automation
- Beyond-Big Scalability
- Aggregation

Storage Decisions

Hosted by STORAGE SearchStorage.com

Lowering The Cost of Storage

- Less expensive components
- Less expensive subsystems
- Recycling
- Lower cost architectures

Storage Decisions

Hosted by STORAGE SearchStorage.com

Component Alternatives

- **SATA, ATA disk drives**
- **iSCSI / Ethernet**
- **Linux / Open Source Software**

Storage Decisions

Hosted by STORAGE SearchStorage.com

ATA Disk Drives

- **ATA – designed for desktop use**
  - **7200 RPM : 250 GB : 133 MB/sec (Try short-stroking)**
  - **No overlapped I/O, no command queuing**
  - **Mysterious "sleep" states during housekeeping**
  - **Low I/O rate systems & applications (email)**
  - **Reduced duty cycles**
  - **OK for disk backup, archiving & ILM**
  - **Connection-constrained**
    - **2 drives per controller**
    - **Not designed for hot swapping**

Storage Decisions

Hosted by STORAGE SearchStorage.com

SATA Disk Drives

- **SATA – desktop + server + network**
  - **10,000 RPM : 74 GB : 150 MB/sec**
  - **Native Command queuing – only 1 device per controller**
  - **Low I/O rate systems & applications (same as ATA)**
  - **Mysterious "sleep" states during housekeeping**
  - **Some have improved duty cycles**
  - **Future improvements for more applications**
  - **Connection improvements**
    - **1 drive per connector, small connectors and backplane-ready, built for hot swapping**

Storage Decisions

Hosted by STORAGE SearchStorage.com

NAS vendor solutions

- **Support can be invaluable**
- **Integrated data management (snapshot, backup) can be incredibly valuable**
- **Integrated Connectivity (hot swapping)**
- **Is it infrastructure?**
  - **Probably not, but they can be terrific products**

Storage Decisions

Hosted by STORAGE SearchStorage.com

DIY NAS with (S)ATA

- **Buy a system chassis, CPU, motherboard**
- **Buy disk controller & drives (3Ware ATA controller?)**
- **Buy server software**
- **Figure out how to back it up**

Storage Decisions

Hosted by STORAGE SearchStorage.com

DIY NAS cost estimate

- **24 drive, PC NAS system**
- **Hot swap disk, fans, power supplies**
- **$4000 – system hw**
  $4800 – disk drives
  $1500 – software

- **$10,300 for 2.4 TB (RAID 0+1) to 4.4 TB (RAID 5) of NAS with very good performance**

Storage Decisions

Hosted by STORAGE SearchStorage.com

iSCSI Storage

- **iSCSI systems to iSCSI storage**
  - **Slow but steadily growing # of storage suppliers**
  - **DIY is on the edge (Target software on PCs)**
    - **Datacore, Ardis, String Bean Software, Wasabi**
- **iSCSI systems to FC storage**
  - **Leverage FC infrastructure investment**
  - **Requires iSCSI to FC router (i.e. Cisco, SANRAD)**

Storage Decisions

Hosted by STORAGE SearchStorage.com

iSCSI, Gigabit Ethernet and TOE

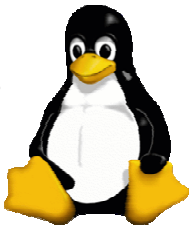
- **iSCSI and TOE**
  - **The requirement for TOE is overblown.**
  - **PC systems with >2.4 Ghz processors don't need it.**
  - **GbE NICs are virtually free.**

Storage Decisions

Hosted by STORAGE SearchStorage.com

Linux & Open Source Software

- **Linux enterprise distributions**
  - **RedHat, Debian, Suse, Gentoo**
- **Linux Volume managers**
  - **Sistina**
- **Linux file systems**
  - **GFS, XFS, Reiser, AFS**

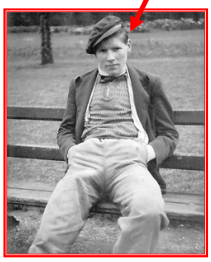


Storage Decisions

Hosted by STORAGE SearchStorage.com

Port Oversubscription for PC (slacker) Systems

- **How much I/O will PC systems actually create?**
- **How much I/O does the application need?**



Storage Decisions

Hosted by STORAGE SearchStorage.com

Single Connection SANs: When Redundancy is just overkill

- **Redundancy in PC systems is often covered at the system level.**
- **Dual HBAs in every server costs a lot.**
- **SAN reliability is very good.**

Storage Decisions

Hosted by STORAGE SearchStorage.com

Single Connection SANs

- **The main exposure is the loss of a switch.**
- **Switches rarely fail.**
- **Line cards can fail.**
- **Limit exposure by using multiple, smaller switches (8-ports) in single connection SANs.**

Storage Decisions

Hosted by STORAGE SearchStorage.com

Cost-Effective Management

- **Plan to leverage storage.**
  - **Storage at the center, not switches**
- **Leverage existing skills and standards.**
- **Change management, provisioning**
  - **Coordinating zoning. LUN masking and multi-pathing requires automation**
  - **Onero, App IQ**

Storage Decisions

Hosted by STORAGE SearchStorage.com

Recycle Storage

- **Aging storage can be re-purposed.**
- **Used equipment can be an amazing bargain.**
  - **HBAs on e-Bay for $25**
- **4-year-old storage is not spent.**
  - **But disk drives may need to be replaced**

Storage Decisions

Hosted by STORAGE SearchStorage.com

Thank you.

Marc Farley
marc@buildingstorage.com

Mr. Farley will be available in the

Ask-the-Expert booth in the Exhibit Hall:

Monday 4-5 PM

Tuesday 4-5 PM