

E-Gov Institute

Web-Enabled Government Conference

Storage for Government Enterprises Seminar

An Overview of Storage Technology: What

Works, What's New,

and How to Evaluate

June 2, 2005

Washington, D.C.

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Introduction

- ◆ Overview of storage technology at NASA JPL
 - Viewpoint of the JPL Information Services (JPL IS)
 - Under the JPL CIO
- ◆ What works for JPL IS and our customers
- ◆ What's new for JPL IS and our customers
- ◆ How we evaluate storage technology





Overview

- ◆ JPL IS Storage System Components
 - Storage Service
 - Backup/Recovery Service
- ◆ Completely integrated services
- ◆ Simplified customer interface
- ◆ Simplified billing





Some of Our Customers

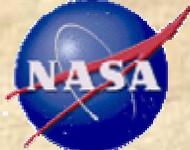
◆ Storage

- Oracle databases
- Oracle Application Servers
- Web Sites
- Remedy
- DocuShare
- Institutional e-mail
- Institutional voice mail
- AFS

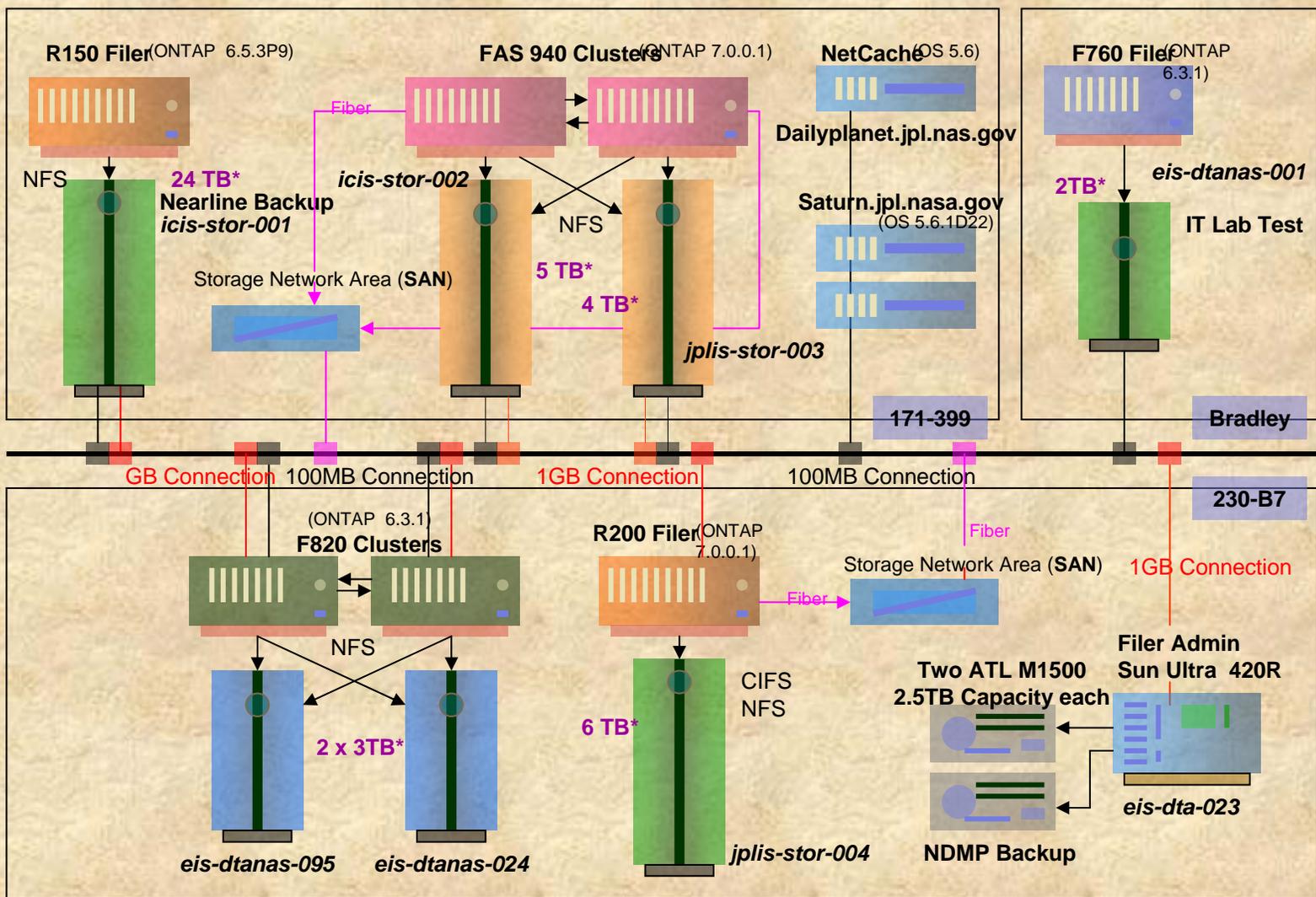
◆ Backup/Recovery

- 1,200 PCs and workstations
- Institutional servers
- Personal, Application and Project Data





Storage Architecture





Key Features - Storage

◆ Competitive Pricing

- Space is rented by the month in 1 TB RAW increments
- Includes primary space, mirrors and snapshots
- \$1,200/month/TB for HA clustered storage (FC disk)
- \$600/month/TB for near-line (SATA disk)

◆ Scalability

- Additional 15 TB RAW in clustered storage (open shelves)
 - ~3 years at current growth rate
- Additional 88 TB RAW in near-line capacity (open shelves)
 - ~3 years at current growth rate

◆ Availability

- 24x7 access to data (initial cluster has uptime of over 800 days)
- NAS (Fast E or Gig E) and SAN
- Fully automated backups



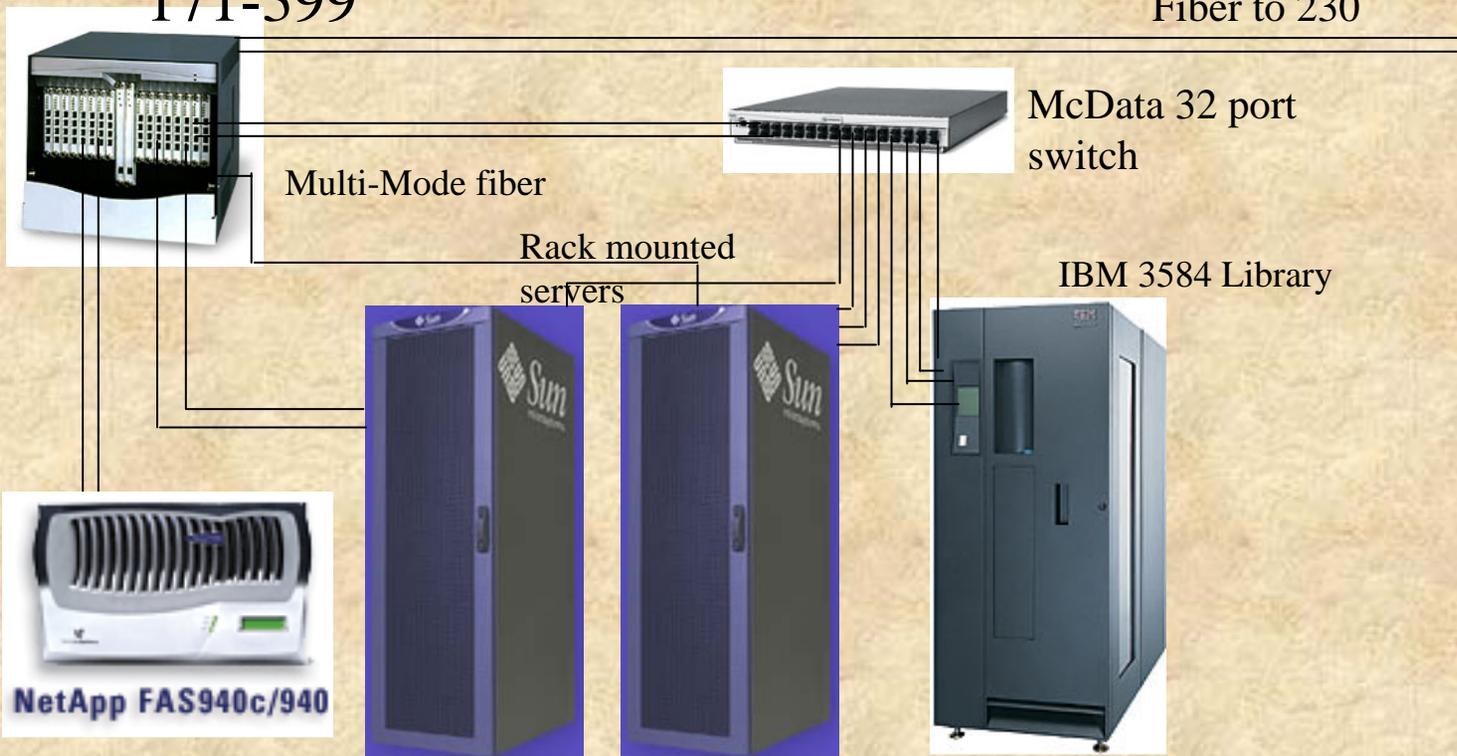


Backup/Recovery Architecture



171-399

Fiber to 230



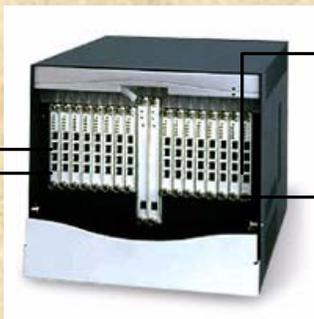


Backup/Recovery Architecture



230-B7A

McData 6064 Director



Single Mode Fibre to 171-399

230-B35

Dual IBM 2109 16 port switches



Sun Servers and Storage

Multi-Mode Fibre to Switches



IBM 3494 Library containing eight 3590H1A Drives



Key Features - Backup/Recovery

- ◆ Competitive Pricing
 - Chargeback model includes all aspects of service
 - Cost reductions annually for the past three FY's
 - Expected FY05 costs:
 - \$2.35/GB per month for servers
 - \$3.50/GB per month for workstations
 - \$.90/GB per month for 1TB+ servers
- ◆ Scalability
 - Hardware/Software
 - Addition of 80TB storage frames (up to four)
 - Addition of additional LTO2 tape drives
 - Additional servers may share the library
 - Ability to add servers quickly and with no impact to current service
- ◆ Availability
 - 24x7 access to data
 - Redundant hardware
 - Fully automated system; scheduling, tape management, notification, restores, etc.





What Works for Us at JPL

- ◆ Providing a service that's more cost effective and robust than "rolling your own"
- ◆ Educating customers about data architecture and data lifecycle
- ◆ Supporting the customer's full application lifecycle with appropriate storage and backup
- ◆ Intelligent, timely support
- ◆ Simplified billing





What's New to Us

- ◆ iSCSI protocol support is new to us and our customers
 - Available for development and I&T on our system
 - Customers have not yet migrated to a iSCSI production environment
 - Waiting for first major off-site DR application





Evaluation Criteria

- ◆ Labor is the primary factor in evaluating new systems or upgrading current ones
 - Design labor
 - Integration labor
 - Operation labor
 - Maintenance labor

Storage system has .5 FTE for storage engineer, .16 FTE for management and .33 FTE for 24x7x365 consolidated operations support tax.

- ◆ Customer demand
 - We do some capitalization on risk but customers pay for service through chargeback.
- ◆ Technology maturity and robustness
 - Forget the bleeding edge and think best of breed.
- ◆ Vendor support
 - Vendors are part of our Team and full partners in our success.
- ◆ Acquisition cost
 - It's definitely a consideration but not the consideration.