

# Mass Storage at NCSA

## Current Environment and Future Directions

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# Overview

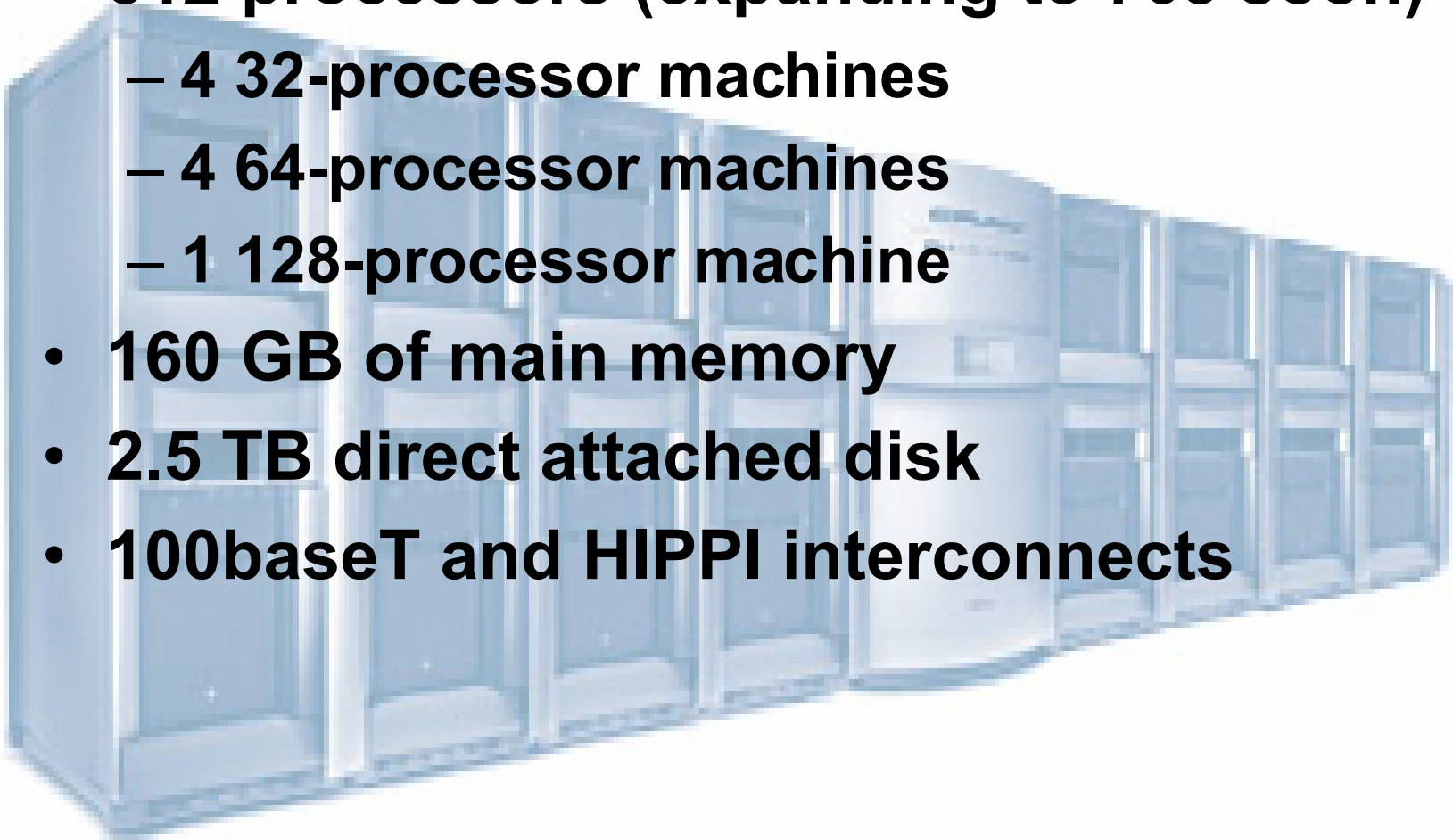
- **Computational Environment**
- **Current Mass Storage Architecture**
- **Performance**
- **Proposed DMF Systems**
- **Storage Futures**

# NCSA Supports Three Architectures for High End Computing

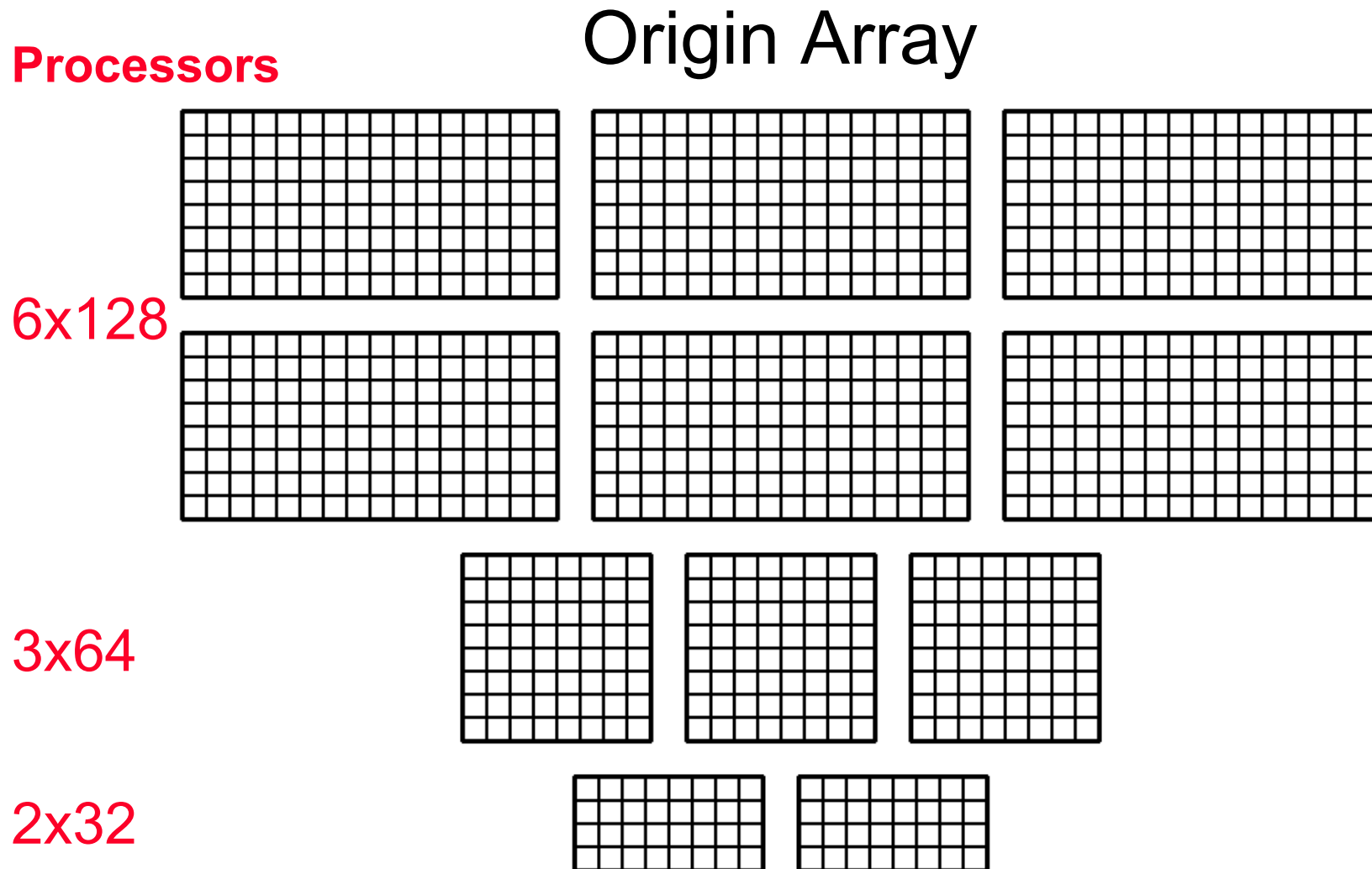
- **Clusters of DSM**
  - SGI Origin2000 UNIX DSMs
  - HP Exemplar UNIX DSM
- **Clusters of SMPs**
  - SGI Power Challenge UNIX SMPs
  - HP and Compaq NT/Intel SMPs
- **Networks of Computers**
  - UWisc. Condor for UNIX Workstations
  - NCSA Symbio for NT Desktops

# SGI Origin 2000

- **512 processors (expanding to 768 soon)**
  - 4 32-processor machines
  - 4 64-processor machines
  - 1 128-processor machine
- **160 GB of main memory**
- **2.5 TB direct attached disk**
- **100baseT and HIPPI interconnects**



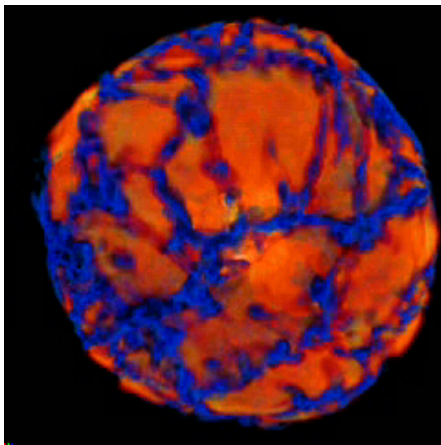
# Proposed NCSA SGI/Cray Origin Array FY99



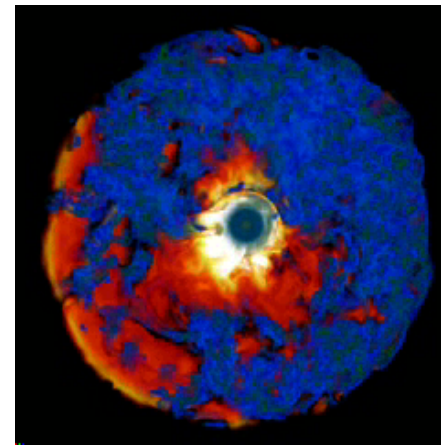
# This Week's Run on the 128 Processor Origin

## Evolution of a Red Giant with White Dwarf Core

Surface View



Interior View

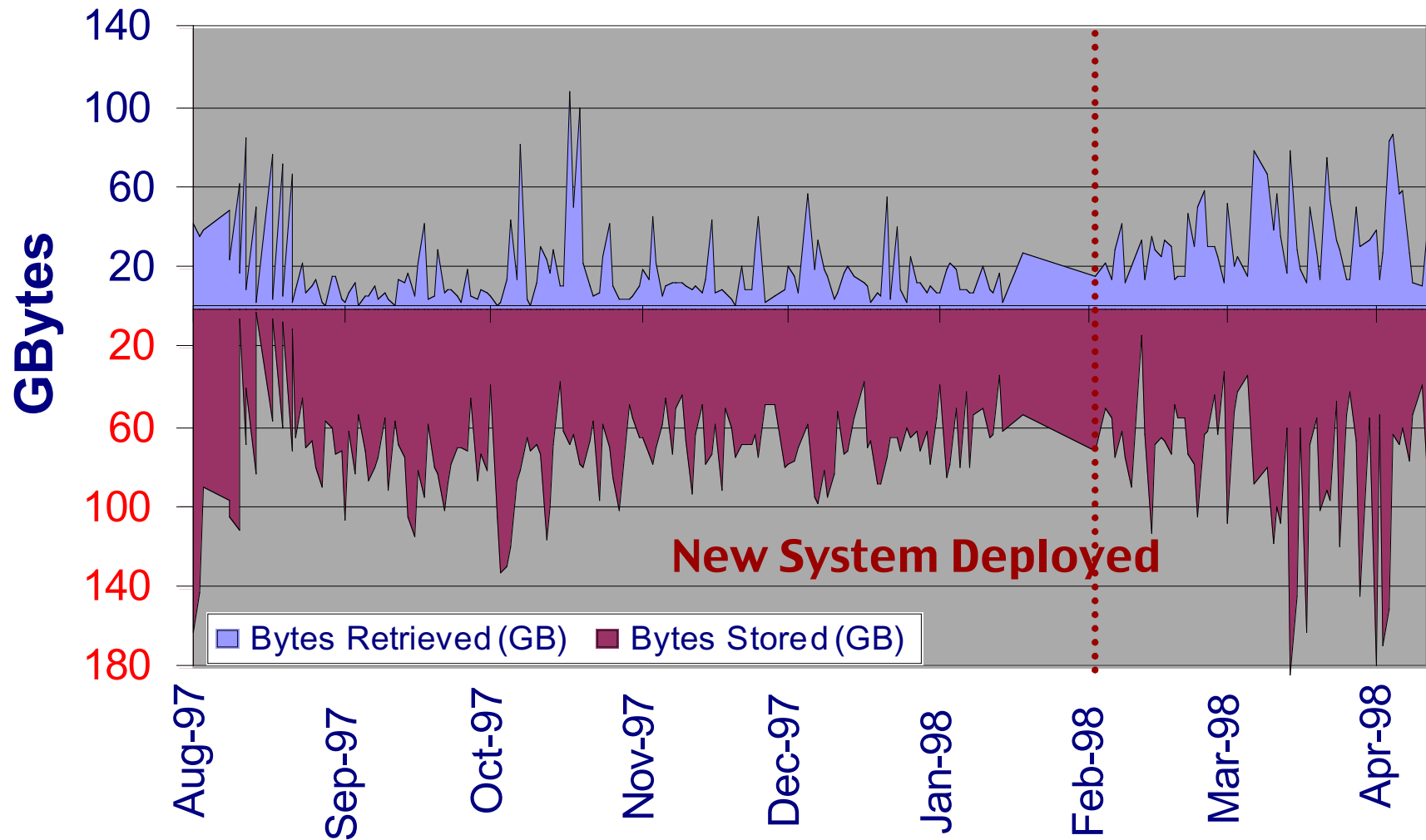


- **Generated 2 TB of Data**
- **Write-Only Application**
- **Data Transferred over vBNS**

# Current Mass Storage System

- **Unitree+ 3.1.1**
- **HP SPP-2000 Exemplar**
  - **8 processor**
  - **2 GB memory**
  - **400 GB disk cache**
  - **24 UltraSCSI channels**
- **10 IBM Magstar Drives**
- **STK Powderhorn, IBM 3494**
- **10/100BT and 2 HIPPI**

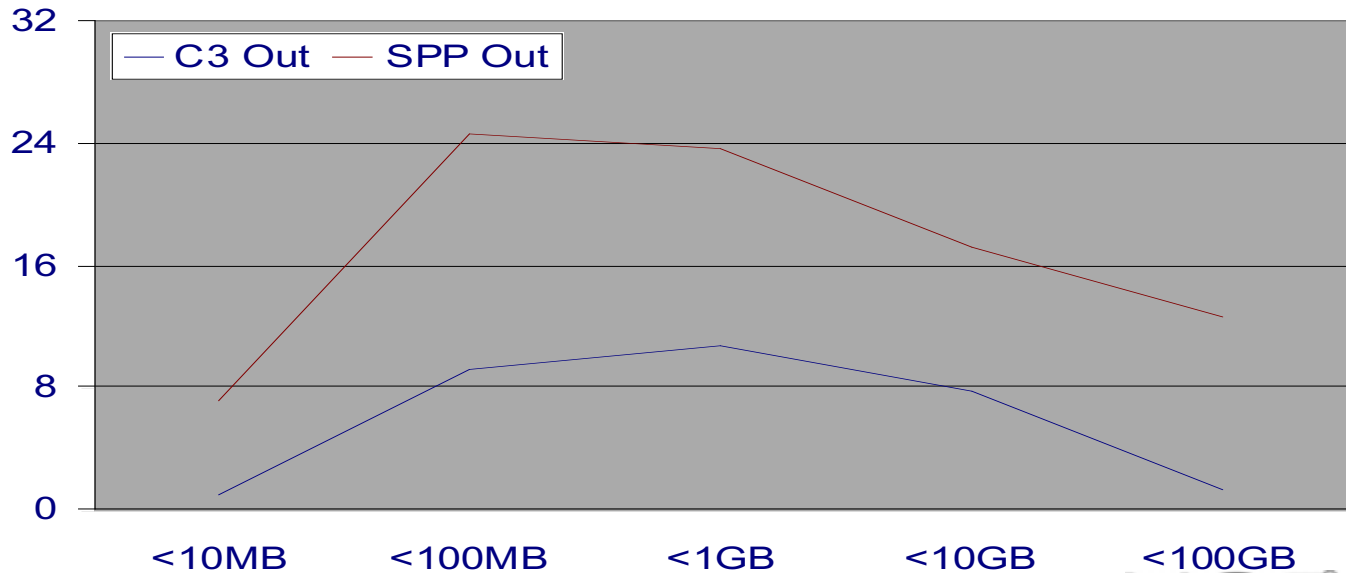
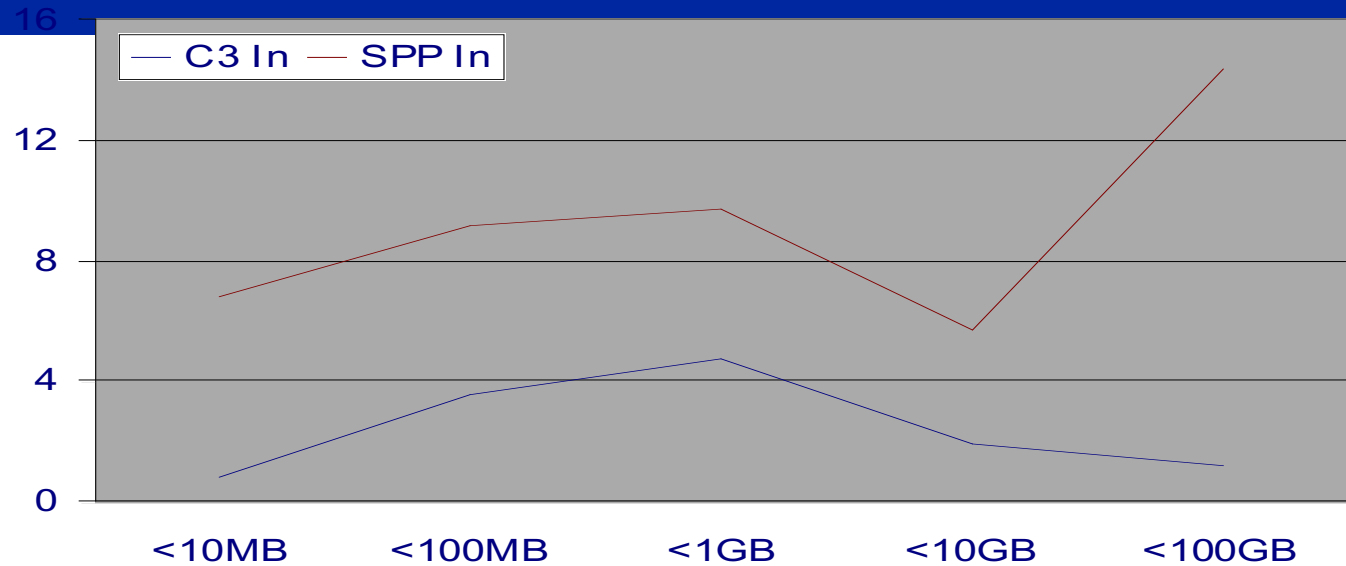
# Archive Traffic: GBytes





# UniTree: SPP-2000 Replaces C3

Performance  
in GB/Second  
VS.  
File Size



# DMF Configurations

## DMF Platform

- SGI Origin with 8 processors
- 500 MB memory
- 300 GB disk (RAID disk)
- DLT 7000 tape drives

## DMF Configurations

- Traditional FTP Archive
- Managed File System 02K with DMF server
- DMF Front-end with Convex UniTree backend

# Traditional FTP Archive

## Pros

- **Painless Installation**
- **Detailed Migration Policies**
- **Flexible File Handling**

## Cons

- **Tape Drives Not Shared Across Data Policies**
- **Simple Unix-based Security**
- **No Tape Management Facility**
- **No Management GUI**
- **No SNMP**

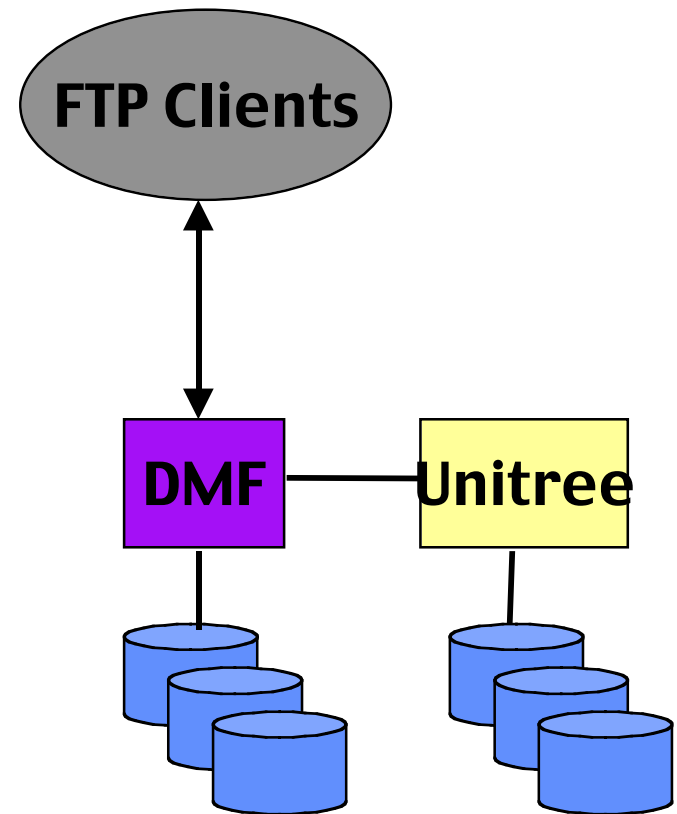
# DMF / Unitree Hybrid

## Pros

- Ease of Integration
- DMF Data Policies w/  
Unitree Tape Management

## Cons

- Complex Administration
- Double Disk Caches
- Security Issues



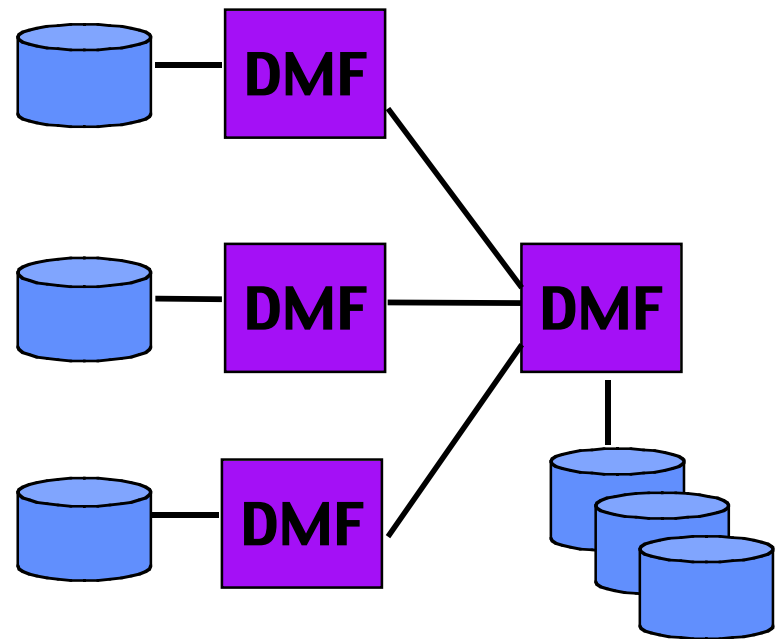
# Multiple DMFs

## Pros

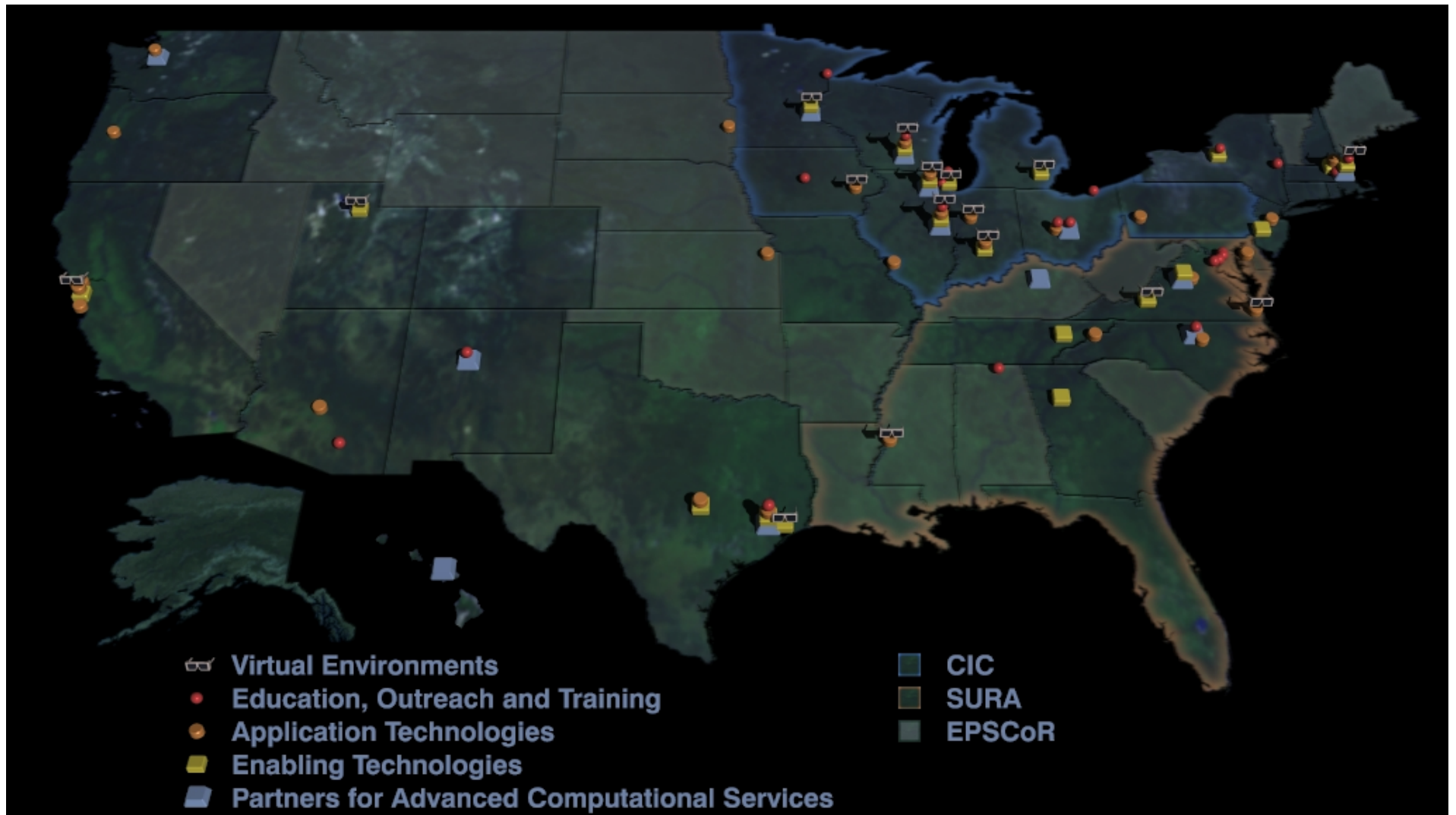
- Simple Data Management
- Power and Flexibility

## Cons

- Complex Administration
- File Sharing Difficult
- Security Issues



# The Alliance National Technology Grid



# Futures

**Supercomputer applications will no longer be write-only. Applications will need access to large data sets for post-processing and data mining.**

- **Direct data access**
- **Data as objects instead of opaque files**

# Storage Area Networks

## Direct Access to FibreChannel RAID

