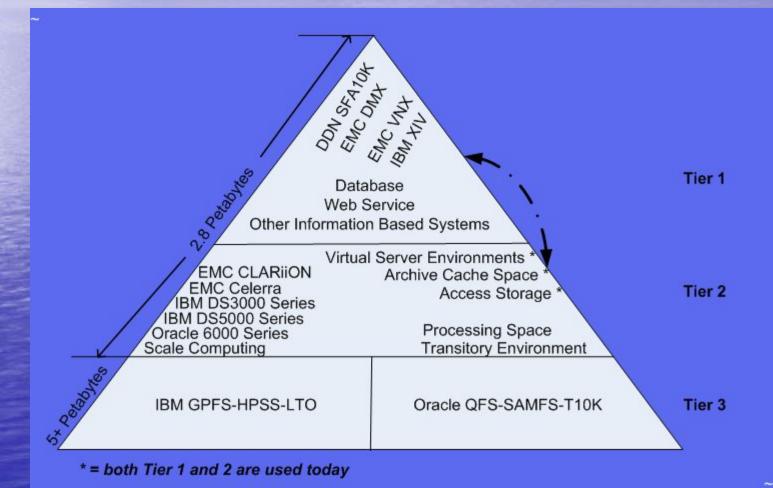# Library of Congress Storage Environment

Presented by:

Carl Watts
Information Technology Specialist
Enterprise Server Engineering

LC Storage Environment [Today]

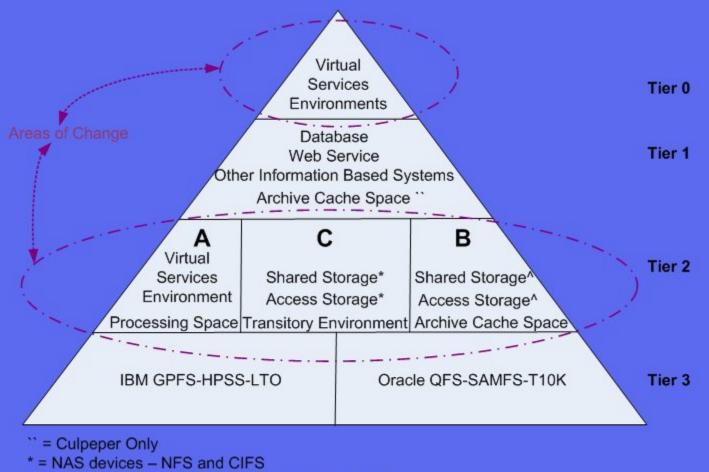DDN SFA10K
EMC DMX
EMC VNX
IBM XIV

2.8 Petabytes

Database
Web Service
Other Information Based Systems

Tier 1

EMC CLARiiON
EMC Celerra
IBM DS3000 Series
IBM DS5000 Series
Oracle 6000 Series
Scale Computing

Virtual Server Environments *
Archive Cache Space *
Access Storage *

Tier 2

Processing Space
Transitory Environment

5+ Petabytes

IBM GPFS-HPSS-LTO

Oracle QFS-SAMFS-T10K

Tier 3

* = both Tier 1 and 2 are used today

- Storage changes are needed to support
  - Internal and external digitization efforts
  - Receipt and acquisitions of digital collections
  - Born digital submissions
  - Dissemination of digital materials
  - Virtualized server and desktop environments

Near Term Changes

Virtual Services Environments — Tier 0

Database
Web Service
Other Information Based Systems
Archive Cache Space `` — Tier 1

Areas of Change

A	C	B
Virtual Services Environment	Shared Storage*	Shared Storage^
	Access Storage*	Access Storage^
Processing Space	Transitory Environment	Archive Cache Space

Tier 2

IBM GPFS-HPSS-LTO   Oracle QFS-SAMFS-T10K — Tier 3

`` = Culpeper Only
* = NAS devices – NFS and CIFS
^ = DAS devices – Share file system GPFS and QFS

Environment Changes

- Add Tier 0
  - SSD for High Transaction Environments
    - VM
    - VDI
    - Indexing
- Changes in Tier 2
  - Segmenting Tier 2 storage into 3 sub-tiers
    - A – Defined QoS FC Attached (i.e. EMC CLARiiON)
    - B – FC Attached Bulk Storage
    - C – Network Attached Bulk Storage
  - Reduce the acquisition cost by 75% (less than $1K / TB)

Other Near Term Changes

- Adding Storage Resource Management
  - improve storage monitoring and management
- Heterogeneous Global Namespace
  - agency wide abstraction of all file information across all systems
- Fibre Channel over Ethernet (FCoE)
  - one fabric for all data movement

Thank You

Contact Information: Carl Watts
Email: cwat @ loc.gov