



Nirvana[®]
A DIVISION OF GENERAL ATOMICS

An Advanced Architecture for Preservation Challenges

September 27, 2011

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General Atomics & Nirvana

Background

- **General Atomics founded 1955 and involved in...**

- *Nuclear fission and fusion, Uranium*
- *Predator and Warrior UAVs*
- *Electromagnetic carrier launch systems*

- **GA founded and managed the San Diego Supercomputer Center (SDSC)**

- **Storage Resource Broker (SRB) was first demonstrated at SDSC in 1995**

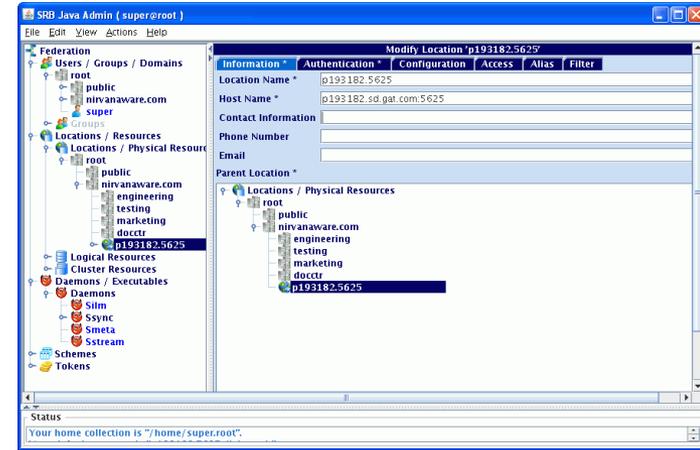
- **GA has commercialized and supported SRB since 2000**



Nirvana SRB

Key Design Considerations

1. One Global Namespace for all your data.
 - Federation of legacy and future storage
2. Virtual Collection Views
 - Limitless data views without duplication
3. Integration of users, storage, and metadata.
4. Automated Storage Lifecycle Management (SLM)
 - Transparent migrations, replication, expiration, etc.
5. Dozens of access mechanisms  (N):
 - Cloud, scripts, Virtual mounts, virtual disks, web, SOAP, REST, C, Java, .NET, Perl, PHP, Python, etc.



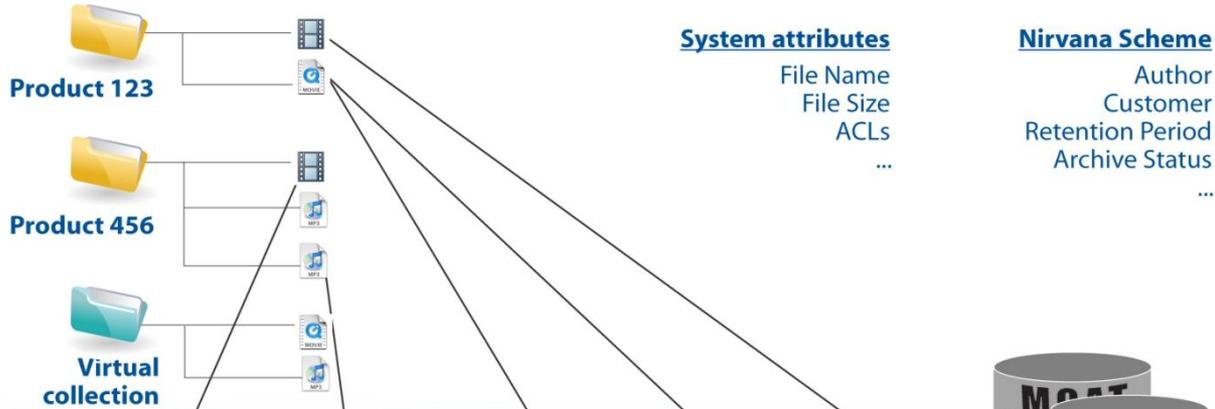
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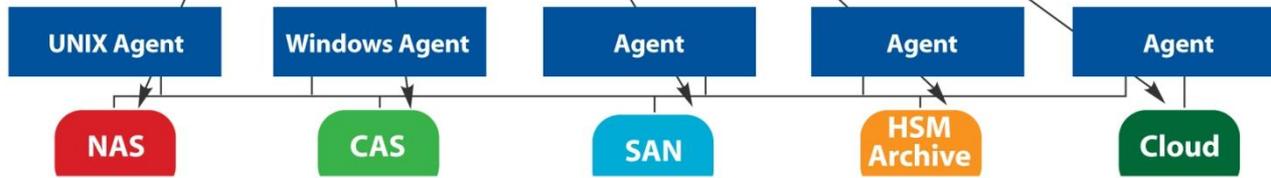
Global Namespace & Metadata



Global Namespace



Metadata Catalog



DOD HPCMP Project

A Challenging Federation

- 6 main centers, over 4,500 users, more than 170 total sites
- 40 PB (dual copy)/ 400M files today with 40% annual growth
- 115 PB in 4 years

An Ambitious Solution

- **Storage Lifecycle Management (SLM) = ILM + HSM**
- **Information Lifecycle Management (ILM)**
 - Metadata for better data management
 - Users decide what to archive and when to create offsite copy
 - Central policies for archival, synchronization, and expiration
 - Virtual data views
 - Global Namespace
- **Hierarchical Storage Management (HSM)**
 - Existing archival infrastructure (software + hardware)
 - Near-real-time file system sync with ILM
- **User Interfaces**
 - Command-line
 - Global file system
 - Web
- **Single-console Administration**





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