

# Testing the Archivas Cluster (ArC) for Ozone Monitoring Instrument (OMI) Scientific Data Storage

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- Archivas
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- ❑ NASA Goddard Space Flight Center
- ❑ Ozone Monitoring Instrument (OMI) on EOS Aura spacecraft
- ❑ Netherlands Agency for Aerospace Programs (NIVR) in collaboration with the Finnish Meteorological Institute (FMI) and the Royal Netherlands Meteorological Institute (KNMI) sponsored OMI construction.





- ❑ Approximately 100GB data/day
  - Level 0 – Raw instrument data
  - Level 1 – Geolocated/Calibrated
  - Level 2 – Geophysical parameters
  - Level 3 – Gridded in Space or Time
- ❑ Level 0 data received from Goddard Earth Science Distributed Active Archive Center (GES-DAAC)
- ❑ Run Level 1 algorithm to geolocate/calibrate
- ❑ Run a series for Level 2 algorithms to detect geophysical parameters and produce products for total column ozone, aerosols, NO<sub>2</sub>, SO<sub>2</sub>, formaldehyde, ozone profile, etc.
- ❑ Plan to produce Level 3, gridded, daily products later this year
- ❑ All data sent to the GES-DAAC for long term Archive and Distribution to the public



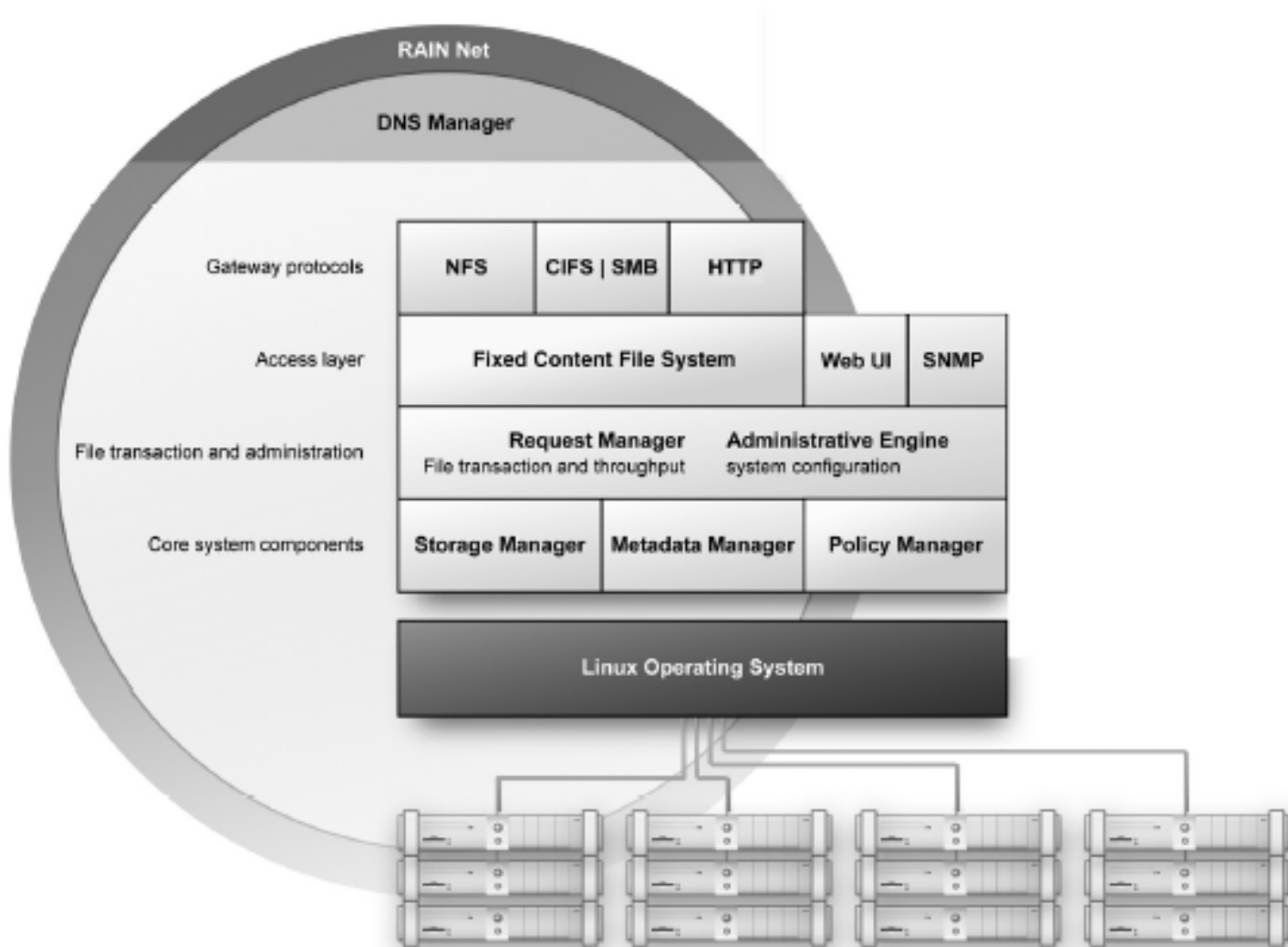


- ❑ Archivas, Inc. – see booth in exhibit hall
- ❑ Archivas Cluster (ArC) is a software product for data storage using a cluster of commodity, low cost Intel Linux hardware with local storage
- ❑ ArC provides a scalable global filesystem (a single namespace across the entire storage cluster) with high availability, high reliability with easy administration
- ❑ Development funded in part through a NASA Small Business Innovative Research (SBIR) grant
- ❑ The OMI project became an internal NASA partner to ensure the product will ultimately meet NASA needs
- ❑ Archivas presents an alternative to existing data servers





# Archivas Internal Architecture





# Archivas Cluster – Administrative Console

ArC: Archive Node 9 Status - Microsoft Internet Explorer

ARCHIVAS digital archiving

Logout | Documentation

Homepage Cluster Nodes Policy Defaults Gateways System Settings Detailed Logs

### Archive Node 9 Status

[restart node] [stop node] [remove node]

Archive Cluster is fully operational.  
As of Fri Jun 11 12:54:57 EDT 2004

#### Drive Details

Drive Type	IDE/ATA
Model Number	Maxtor 6Y200P0
Serial Number	Y610D7XE
Firmware	YAR41BW0
Revision	YAR41BW0
Usage / Capacity	2.7 / 19.2 GB
Channel/Unit	Primary Master (IDE/ATA 0:0)
Status	Available

#### Hardware Details

Node Number	9
IP Address	192.168.100.115
Usage / Capacity	5.4 / 38.5 GB
Boot Time	Mon May 10 13:43:57 EDT 2004
Status	Available

#### Disk Volume (GB)

Drive	Used Capacity (GB)	Available Capacity (GB)
IDE/ATA 0:0	~2.7	~16.5
IDE/ATA 0:0	~5.4	~33.1

#### Node Logs Events for the Last 30 Days ( show details | hide details )

Severity	Time/Date	Event Name
Notice	11:37 AM 6/11/2004	Protection Policy Finished
Notice	11:37 AM 6/11/2004	Protection Policy Started
Notice	11:37 AM 6/11/2004	Scavenging Policy Finished
Notice	11:37 AM 6/11/2004	Scavenging Policy Started
Notice	11:37 AM 6/11/2004	Garbage Collection Policy Finished
Notice	11:37 AM 6/11/2004	Garbage Collection Policy Started
Notice	11:37 AM 6/10/2004	Protection Policy Finished
Notice	11:37 AM 6/10/2004	Scavenging Policy Finished
Notice	11:37 AM 6/10/2004	Protection Policy Started
Notice	11:37 AM 6/10/2004	Scavenging Policy Started
Notice	11:37 AM 6/10/2004	Garbage Collection Policy Finished
Notice	11:37 AM 6/10/2004	Garbage Collection Policy Started
Notice	11:37 AM 6/09/2004	Protection Policy Finished
Notice	11:37 AM 6/09/2004	Protection Policy Started
Notice	11:37 AM 6/09/2004	Scavenging Policy Finished
Notice	11:37 AM 6/09/2004	Scavenging Policy Started
Notice	11:37 AM 6/09/2004	Garbage Collection Policy Finished
Notice	11:37 AM 6/09/2004	Garbage Collection Policy Started
Notice	11:37 AM 6/08/2004	Protection Policy Finished
Notice	11:37 AM 6/08/2004	Protection Policy Started
Notice	11:37 AM 6/08/2004	Scavenging Policy Finished





- ❑ SBIR Phase I : IBM cluster of 6 nodes with 5TB of data, using 100BaseT
- ❑ Focused mainly on exercising functionality rather than performance.
- ❑ Used the HTTP gateway to push data from the OMI (first simulated data, then real data)
- ❑ Several new releases fixed bugs and expanded functionality
- ❑ Filled the 5TB several times
- ❑ Stored over 12 million files
- ❑ Retrieved/verified over 2 million files
- ❑ Unplanned disk failure occurred, and was handled gracefully by the system







- ❑ SBIR Phase II : Dell cluster with 36TB of data, using Gigabit Ethernet
- ❑ The OMI production system will push its data products to ArC using HTTP
- ❑ We will allow scientists direct, read-only NFS access to the Arc filesystem, allowing them to easily run ad-hoc analyses across the entire OMI data set on a cluster of client workstations
- ❑ Storage cluster easily expanded by adding more nodes





# Planned Architecture

