WSDC Processing Hardware Status

H. Brandenburg - IPAC

October 7-8, 2009
Hardware System

IPAC Perimeter Network

- Science Team
  - SFTP

- SOC, MOS, Science Team
  - HTTPS

- Public
  - HTTP

- White Sands, MOS
  - FastCopy SFTP

IPAC Internal Network

- Test Data Archive
  - Backup Services

- web application server (QA, Science Issue Tracking)
  - NFS

- WISE Subnet
  - Operations Archive
  - IPAC Backup Infrastructure

- Cluster
  - NFS

Operational Readiness Review – October 7-8, 2009
Hardware System – Data Flow

**Ingest**

25 GB/day Raw Telemetry in 4 Downlinks

**Operations Archive**

150 TB Total (300 day mission)

**IPAC Backup Infrastructure**

500 GB/day

**Images**

White Sands

MOS

**Cluster**

L0: 30 GB/day
L1: 250 GB/day
L3: 120 GB/day

Operational Readiness Review – October 7-8, 2009
Status

• **Operations Archive**
  – 4 Sun 4150 Fileservers + 8 Sun J4400 Disk Arrays
  – Additional server + 2 disk arrays in-process
  – 160 TB deployed, expanding to ~200 TB
  – 300 Day mission requires 150 TB
  – Currently each fileserver connected via 1x1Gbps to WSDC switch; capability to expand up to 4x1Gbs multilink-trunking

• **Cluster**
  – 41 2xQuad-Core Intel Xeon Dell Servers for cluster nodes
  – 16 GB Memory minimum
  – 500 GB Internal Disk minimum
  – Internal Disk is temporary work space: Max 130 GB/day/node Min: 75 GB/day/node
Current Status

• Perimeter Network Services Deployed
  – Inbound FastCopy, SFTP (wsdcin)
  – Application Server for webQA and Anomaly Reporting (lila)
  – WSDC Wiki (IPAC Shared infrastructure)
  – WSDC Public Webpages (phoebe)
  – Test Data Archive (phoebe)

• Backup
  – Daily backup of telemetry & processing products to IPAC backup infrastructure
  – Backup operation controlled by WSDC Operators
  – Data lives on spinning disk; rolled to tape after ~40 days
CDR Hardware RFAs

RFA #5 Hardware Architecture is at PDR level
Recommended Action: Suggest a delta peer level review of hardware architecture in mid 2009 to review final configuration and projected system loading
  • Hardware Status Peer Review held at IPAC March 19, 2009

RFA #8 Hardware system development
Concern: The plan to construct the WSDC hardware system is not adequately concrete. The team needs a plan that tracks the system resource use. That plan can then be used to construct the hardware system based on recorded usage patterns.
Recommended Action: (summary) The system engineer should specify a resource allocation budget to each system module, including the Exec infrastructure.
  • Performance budget developed
  • Performance reporting tools developed
Updates During Operations

- **Critical OS Security Patches**
  - Applied to a test node. Run RTB & compare results with current release.

- **Critical Performance Patches (eg. Disk Controller Firmware)**
  - Applied to spare disk array. Run RTB & compare results with current release

- **Other Updates**
  - ISG Blocktimes expected to span 4 hours or less; fits into normal operations schedule.
  - Non-critical patches and general third party software updates occur between first pass and second pass processing

Operational Readiness Review – October 7-8, 2009
To-do Before Launch

• Installation of 1 new fileserver with ~40Tb of storage
  – Total operations operations storage to ~200Tb
  – One disk array (20 Tb) not used for processing; available for offline activities, testing updates, and as a hot spare.

• Security Patch for Linux 2.6.x Kernels
  – Deployed to cluster concurrent with install of new cluster nodes

• Remove one machine from cluster for dedicated Ingest
  – Turn off Condor daemons, Remove Condor from startup items
  – Save this configuration in a new kickstart profile
To-do Before Launch

• Kickstart Rehearsal Oct 15
  – WSDC & IPAC ISG will verify that we can kickstart any cluster node
to be:  
    wsdcin (FastCopy)
    lila (web application server)
    caustic (development)
    ingest

• Raw Telemetry Backup for Offsite Storage
  – IPAC has offsite contract in place
  – Have determined to use tapes
  – Will purchase supporting hardware in the next month
Current Performance – Processing

- ORT3 Day 2 Processing (31 Node-Cluster)
  - Quicklook Pipeline: 0.8 hours
  - ScanFrame Pipeline: 3.5 hours
  - MultiScan Pipeline: 1.1 hours
  - Coadd Pipeline (max set): 80% done at 2.5 hours
  - Total: 7.9 hours

- Pipelines ran independently during ORT3. In OPS jobs will be mixed to provide better cluster utilization.
- Pipelines are generally CPU bound
• Nightly incremental backup onto IPAC shared infrastructure

• Backup rate per filesaver $\sim 50$ Gb/hr
  – Variable depending on other network traffic, load on fileservers

• Based on automated backup of ORT3 products, expect the nightly backup of 500 GB on 4 servers to take $\sim 4$ hours
  – Backup of each server partially overlaps in time
Backup Slides
Perimeter Network Services

- webQA Reports and Science Issue Tracking (Redmine ticketing system) deployed on lila. http://wise.ipac.caltech.edu/qa
- Wiki deployed on shared IPAC infrastructure (TDB outside user access) http://wise.ipac.caltech.edu/wiki
- Inbound Data & Telemetry via FastCopy handled by wsd cin
- Test data archive and public webpages expecting a pre-launch upgrade to new hardware. ftp://phoebe.ipac.caltech.edu
Backup

• Ops archive backup
  – ~500 GB/day
  – Existing IPAC disk-to-disk backup with LTO-3 (400 GB/tape) tape library archive
  – Takes about 4 hours to backup one day’s products
  – Takes ~2 hours to restore one day’s products (80 MB/s)
  – ~4 tapes written per day: one pair stored elsewhere at CIT
  – No time for full tape backups; all incrementals
  – System commissioned July ’09

• No node disk backup