WSDC Processing Hardware Status

October 20, 2009
Hardware System
Hardware System – Data Flow

Ingest

25 GB/day Raw Telemetry in 4 Downlinks

Operations Archive

150 TB Total (300 day mission)

Images

White Sands

Housekeeping

MOS

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

500 GB/day

IPAC Backup Infrastructure

150 TB Total (300 day mission)

Cluster
Status
**Status**

- **Operations Archive**
  - 5 Sun 4150 Fileservers + 9 Sun J4400 Disk Arrays
  - 180 TB deployed as ops archive
  - Additional 20 TB (1 array) for hot-spare/offline activities
  - 300 Day mission requires 150 TB
  - Each fileserver connected via 2x1Gbps (multi-link trunk) to WSDC switch; capability to expand up to 4x1Gbs multilink

- **Cluster**
  - ~40 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

IPAC Director’s Review – October 20, 2009
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
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.
  – Completed 10/07

• Security Patch for Cluster Linux 2.6.x Kernels
  – Deployed to cluster concurrent with install of new cluster nodes
  – Completed 10/13

• Remove one machine from cluster for dedicated Ingest
  – Turn off Condor daemons, Remove Condor from startup items
  – Completed 10/06
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
  – Completed 10/15

• **Raw Telemetry Backup for Offsite Storage**
  – IPAC has offsite contract in place
  – Have determined to use tapes
  – Supporting hardware installed 10/16
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
Current Performance - Backup

- Nightly incremental backup onto IPAC shared infrastructure
- Backup rate per fileserver ~50 Gb/hr
  - Variable depending on other network traffic, load on file servers
- Based on automated backup of ORT3 products, expect the nightly backup of 500 GB on 4 servers to take ~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/SFTP handled by wsdcin
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