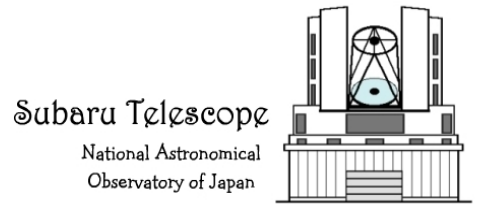


A Second Generation Observation Control System for Subaru Telescope

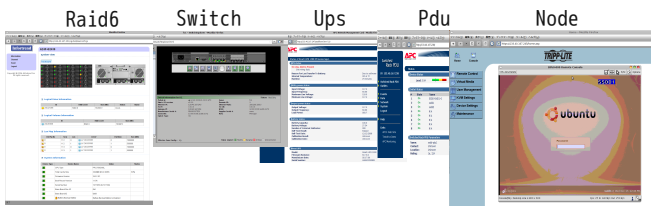


Inagaki, Jeschke, Streeper, Bon, Takami (OCS team), Terada, Tomono(Gen2 advisory) Copyright © 2004 National Astronomical Observatory of Japan, all rights reserved.

Overview

The Subaru Observation Control System (OCS) team is developing a second generation observation control system ("Gen2") for Subaru telescope. Our goal is to produce an OCS that is easy to use, flexible, robust, extensible, maintainable, and secure. The server side of Gen2(aka "back end") is basically complete. We are now beginning the phase of designing new user interfaces that can efficiently optimize telescope time as well as a user's preparation time. For legacy compatibility, some user interfaces were ported from current Subaru Observation System(SOS) to use with Gen2 until the new user interfaces are completed.

Gen2 Remote Monitoring



Gen2 Back-Ends(servers)

| | | | |
|------------------------|--|---------------------------|---|
| Boot Manager | Start/stop front and back-end services | Task Manager | Create/execute task(s) either sequentially or concurrently |
| Session Manager | Maintain the set of sessions and provide a client authentication | Gen2 Tasks | A unit of command(s) that can be easily built up observer's own tasks |
| Monitor | Provide a "bulletin board" where all activities on Gen2 can be monitored | Sk File Interp | Skeleton file decoder/interpreter for legacy observation scripts |
| Status | Fetch/derive/store status values from the telescope, instruments and OCS | External Interface | Interfaces to external systems, i.e. telescope, instrument, guider, STARS |
| Frame Server | Provide a frame IDs for the creation of a fits file | Archiver | Handles post-reception routing and display of data files |

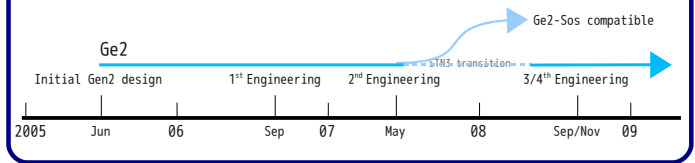
Legacy Interfaces(clients)



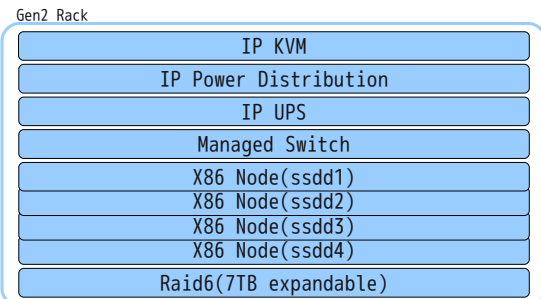
Future Work

- Pure Gen2 user interface
 - Unified guiding interface
 - Quick look
 - Data analysis pipeline
 - Observation tool(s)
 - Phase 2 preparation tool
 - Interface to support service and queued observation?
- Flexible remote observation support

Gen2 Path



Gen2 Summit Cluster



Gen2 Concept

Centralized Monitoring and Control

- A Monitor process running on the Gen2 back end monitors and logs all Gen2 transactions with instruments, telescope, STARS and other entities.
- Log files are few and consolidated into one directory.
- Nagios/Munin software is used to continuously monitor and graph the health of computer systems and network.

High-Availability Design

- Redundancy - redundant hardware removes single points of failure: RAID arrays, multiple power supplies, multiple network ports, etc.
- Hot swap - all disks are replaceable without shutting down the application.
- Network-capable KVM, UPS, switches, power distribution units, etc. allow full remote management from Hilo base.
- Generic x86 cluster design - no specialized hardware, any node can perform any function.
- Failover - software supports automated failover to alternate nodes when possible.
- Easy migration of services to alternate hosts.
- New user interfaces to allow simple start up/shut down/restart of each software component of Gen2.

Enhanced Language for Future

- Uses Python as the native language for tasks.
- Has mind-share language among many international scientists.
- Provides powerful libraries and packages for astronomical data manipulations, such as pyfits, numpy, matplotlib, etc.
- Rich data structure with very clean & minimal syntax.

Legacy Compatibility through "SOSS Compatibility Mode"

- Supports legacy status values, skeleton/OPE/PARA files, and user interfaces(low retraining cost).

Reference

- Eric Jeschke, [A Framework for the Subaru Telescope Observation Control System Processing Based on the Command Design Pattern], 2008
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- Peter S. Weygant, [Clusters for High Availability], Prentic Hall PTR, 1996