Gemini Networking

Eduardo Toro R.
AURA/Gemini Observatory in Chile

SAACC: Gemini report April 2019
The Gemini Observatory Mission

“To advance our knowledge of the Universe by providing the International Gemini community with forefront access to the entire sky”
Gemini Observatory
“ One Observatory, Two Telescopes”

Gemini Telescopes
- Gemini North
  - Mauna Kea Mountain, Hawaii
- Gemini South
  - Cerro Pachon, Chile

Gemini Partners
- United States
- Canada
- Chile
- Brazil
- Argentina
- Korea
Gemini Observatory
Data Centers

Gemini North

- Hilo Base Facility (HBF), Hilo City
- Mauna Kea Operations (MKO), at 4200m

Gemini South

- La Serena Base Facility (SBF), La Serena
- Cerro Pachon Operation (CPO), at 2700m

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High level Diagram
Key Use Cases:

• #1 = Base Facility Operations: High QoS
• #2 = Summit Base Data Transfer: High Bandwidth
• #3 = High Availability: Multiple Paths
• #4 = Cross-site Coordination, Hilo - La Serena: Low Latency
• #5 = Cloud Data Archiving: High Reliability
Gemini Network Use

• Remote Observing
  – Base Facility Operations

• Instrumentation
  – Each Telescope is equipped with four instruments fed by advanced AO Systems:
    • GMOS
    • GSAOI
    • GPI
    • FLAMINGOS-2
  – Visiting Instruments
    • DSSI
    • Phoenix
    • IGRINS

Gemini South staff Javier Fuentes and Joy Chavez conduct remote observations from the control room in La Serena, Chile.
Summit Base Data Transfer

Primary Channel

- **Current**: SM Fiber DWDM, 20 Gb/s
  - Port-Channel 2x10Gb/s
- **Future**: Upgrade: 40 Gb/s

Backup link

- **Gemini/Telconor Link**: 300 Mb/s (2 Microwave radios)
Multiple Paths: HA

Data Center Redundancy:
- Core Switches
- Authentication Servers
- Virtualization nodes
- Storage servers
- Power and Cooling Systems

Fiber Optic
- Port-Channel
Microwave Link
- Two Radios 150 Mb/s
  - Gemini/Telconor
Cross Site Coordination

VPN L2L between:
- SBF and HBF
- SBF and MKO
- CPO and HBF
- CPO and MKO

Low Latency ~220 ms

La Serena <=> Hilo

Many Services in common:
- Mail and Google Apps
- ISE
- Active Directory
- DNS
- Zoom Conference
Cloud Data Archiving

- Fast and low cost Observatory data archive running on the cloud

- https://archive.gemini.edu/
Next Important upgrades 2019

- Upgrade to the Next Generation Firewalls
- Migrating from old EoL equipment in 4 locations
- Increase BW to the AURA Border router
- Improvement using High availability
- New features incorporated:
  - New IPS
  - AMP
  - URL Filtering

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Gemini and NCOA

Gemini IT is planning to leverage the benefits that NCOA can provide, to deliver efficient and effective IT throughout the organization.

- Knowledge transfer across Programs
- Increased support capacity
- Economies of scale
- Standardization of infrastructure
Thanks