Atacama Large Millimeter Array (ALMA) Computing & Network Requirements

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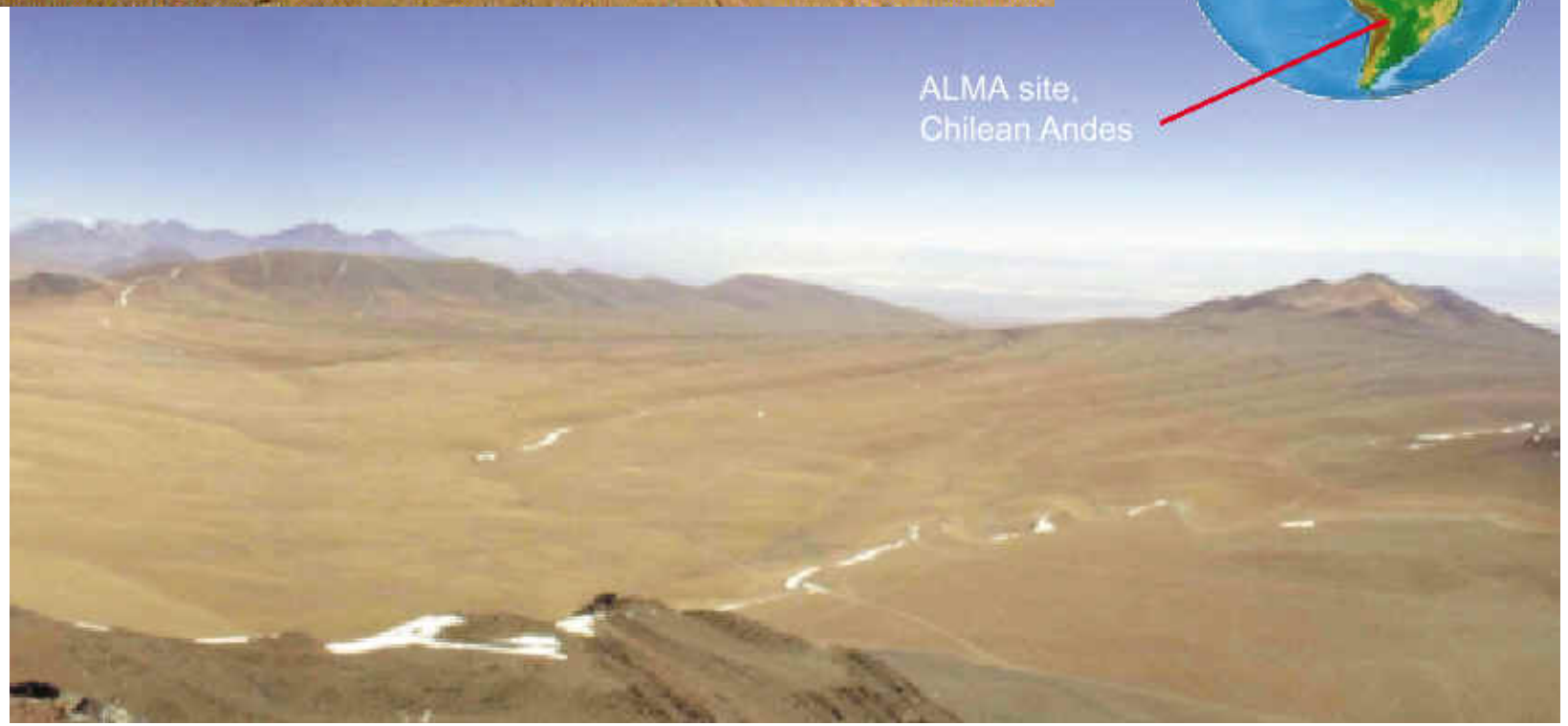
ALMA is:

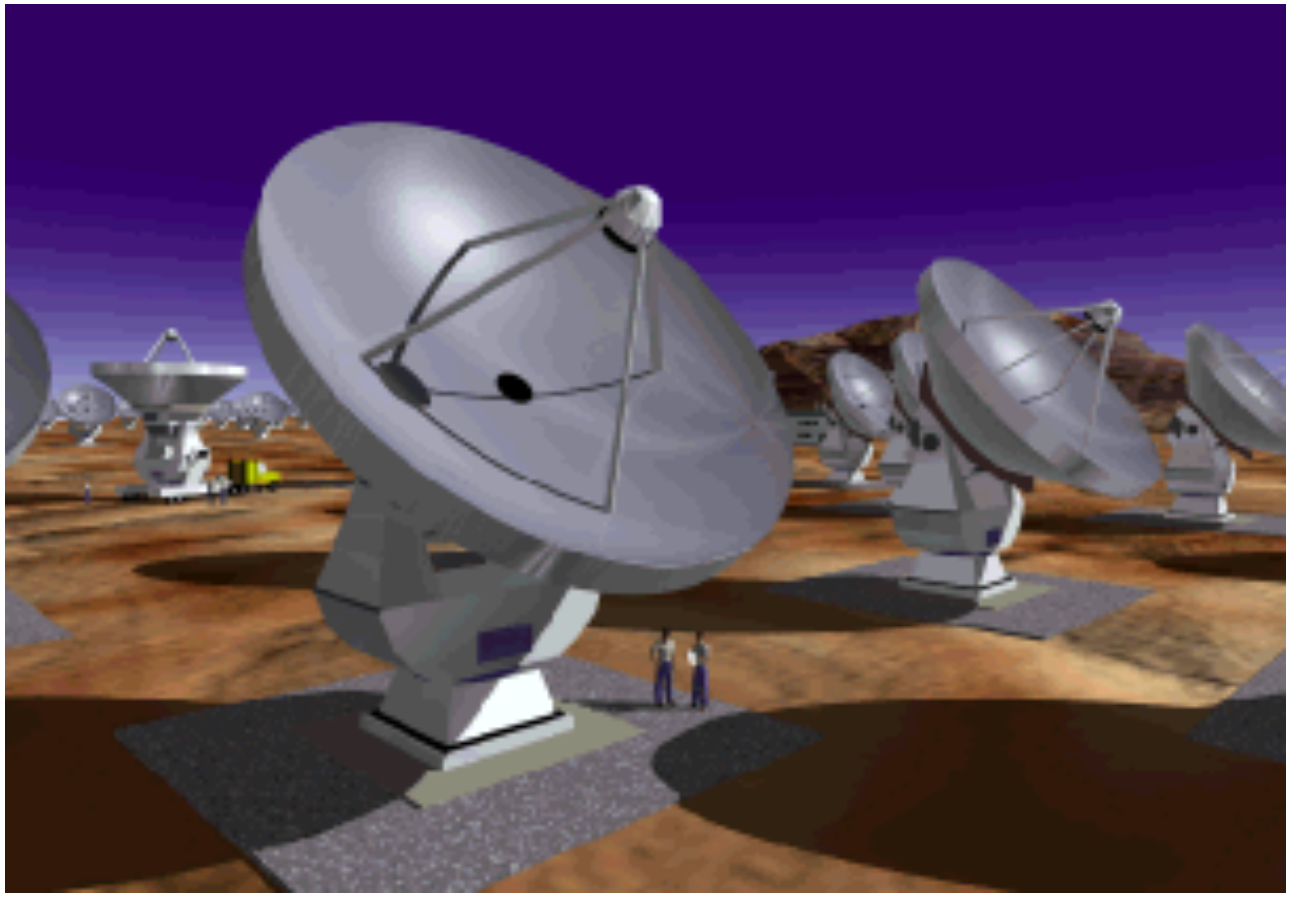
- A $700 million international (U.S., Europe, Japan, Chile) project
- At least 64 12-meter antennas located at 16,400 feet at Llano de Chajnantor, Chile
- Imaging instrument in all atmospheric windows between 0.35 mm to 10 mm wavelength
- Spatial resolution of 0.01 arcseconds, 10 times better than the VLA and Hubble Space Telescope
- Largest and most sensitive instrument in the world at millimeter and submillimeter wavelengths

ALMA location



ALMA telescopes

ALMA concept

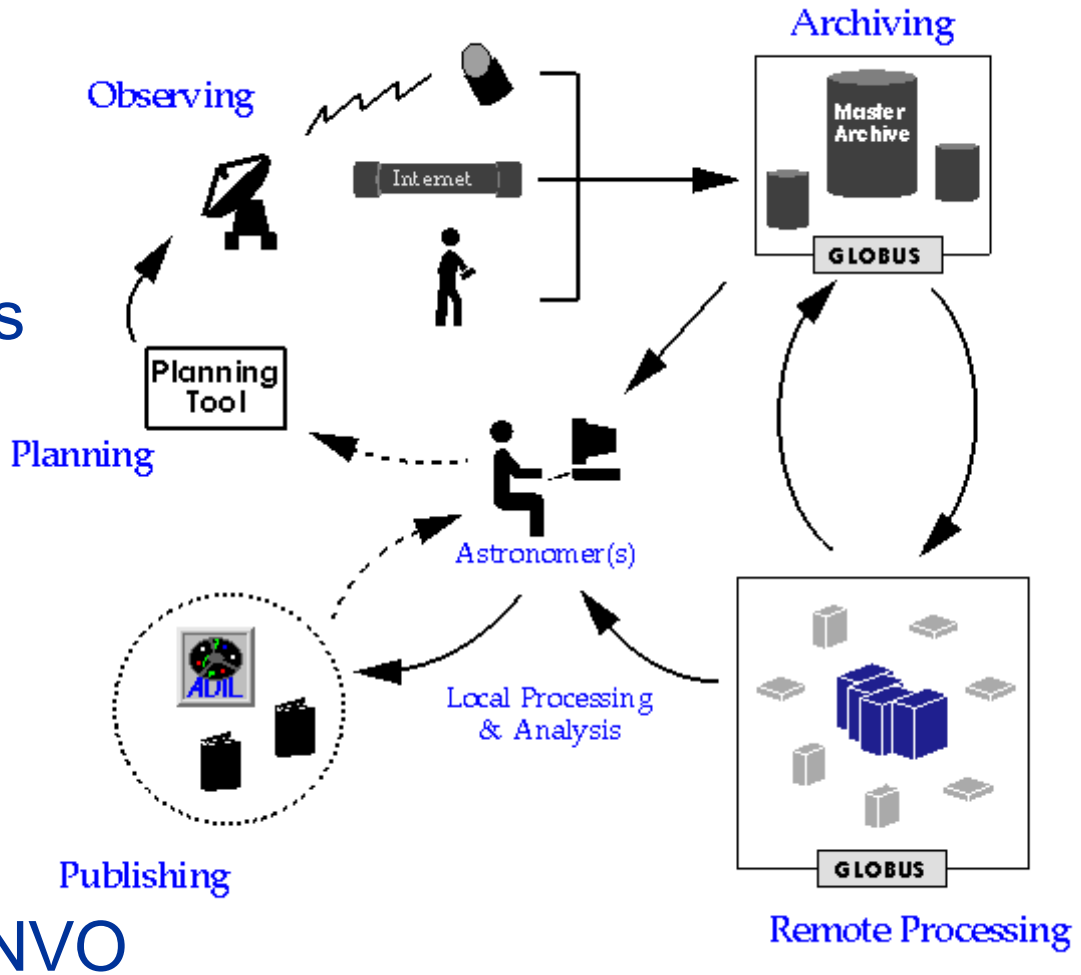


ALMA antenna

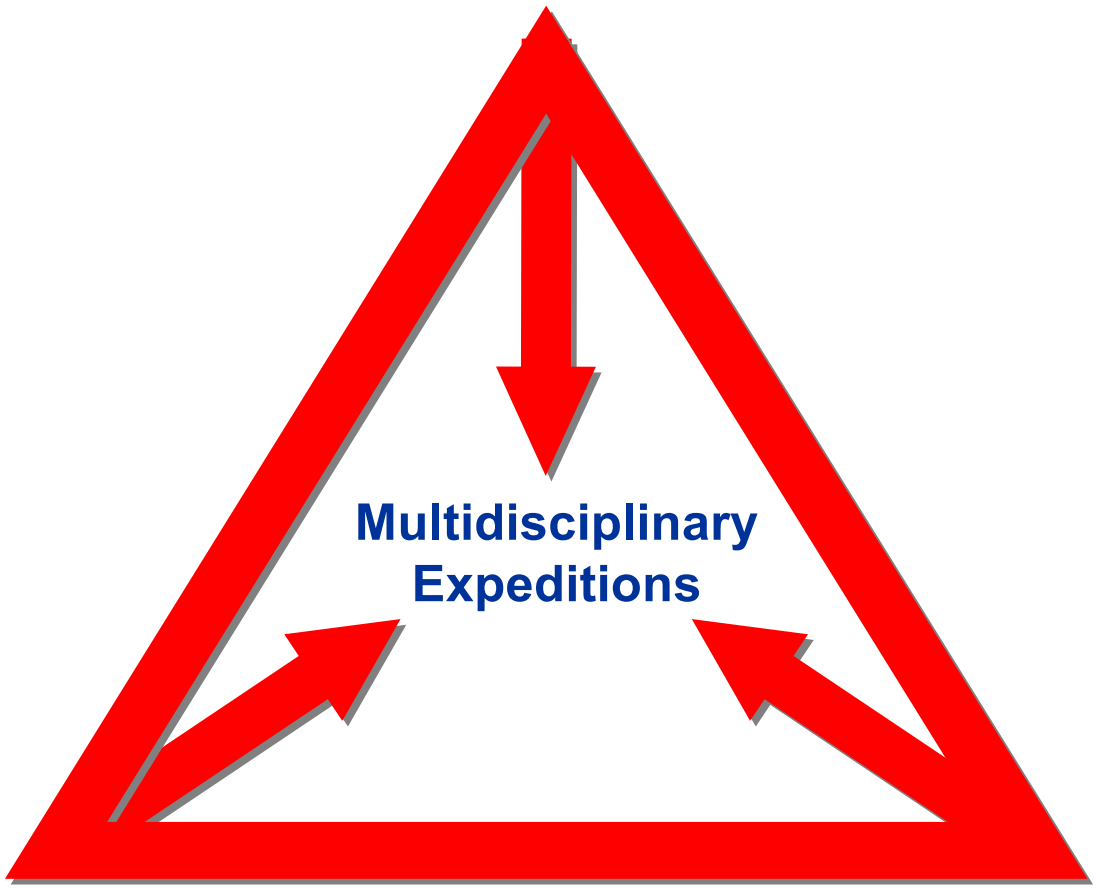
A New Paradigm

Astronomers will rarely go to the telescope

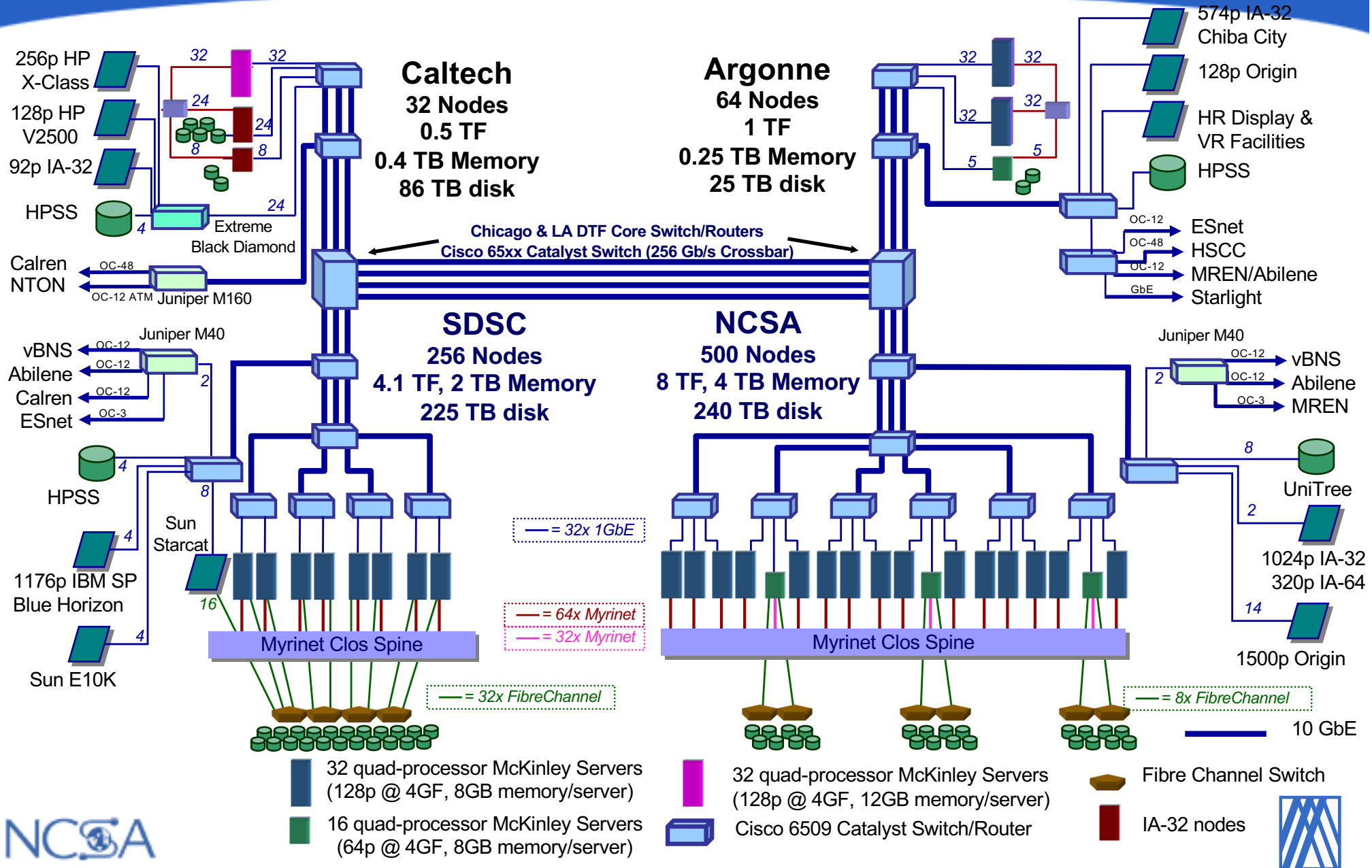
- Electronic proposals
- Computer observing scripts
- Internet telescope access
- Real-time limited data access
- Near real-time data transfer
- Distributed data archives
- Remote data processing
- Pipeline image production
- Visualization/analysis tools
- Collaboration tools
- Final image library – part of NVO



Inventing The Future



PACI 13.6 TF Linux TeraGrid



ALMA Computing Prototype

BIMA radio array in northern California

1. Observing
   - by computer scripts without PI at telescope
   - PI may monitor & modify observing remotely
2. Data handling
   - data transferred in real time to NCSA
   - metadata on disk in database system
   - data stored on NCSA mass storage system
   - browser portal for searching & retrieving data
3. Data processing
   - AIPS++ (new object-oriented radio astronomy toolkit) pipeline on NCSA Linux cluster

Conclusions

- ALMA will be world's leading radio telescope system
- Network operations for observing and data transfer will be essential for success of ALMA
- Plans for network operation of ALMA are well underway