



# CyberSKA

## Cyberinfrastructure for Global Radio Astronomy

### What is CyberSKA?

- Initiative to develop a scalable and distributed cyberinfrastructure platform to meet evolving science needs of the Square Kilometre Array (SKA)
- Led by the University of Calgary with several partner institutions from North America currently
- Canadian funding for CyberSKA provided by CANARIE, as part of their Network Enabled Platforms (NEP) program, and Cybera
- Starting by establishing cyberinfrastructure to support current large-scale astrophysical data needs generated by GALFACTS, PALFA and other high data volume SKA Pathfinder projects

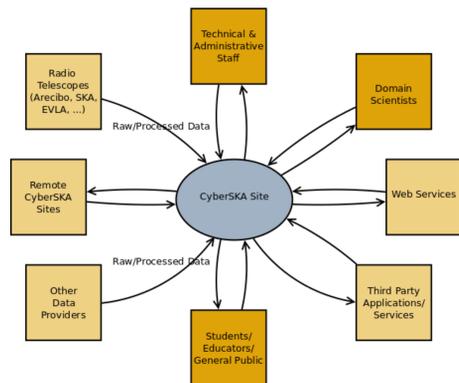
### Requirements

- Distributed
  - provide access to distributed data, computing resources and services
- Scalable
  - must be able to scale to support increasing data and processing needs
- Deployable
  - different sites should be able to deploy developed tools and participate in CyberSKA relatively easily
- Heterogeneous
  - provide a framework to enable interaction with different types of data, computing resources and services and to add/execute different processing algorithms and workflows
- Automated
  - Automation and dynamic reconfiguration of services and data workflows in response to user demand, changing user objectives, available data and resource availability

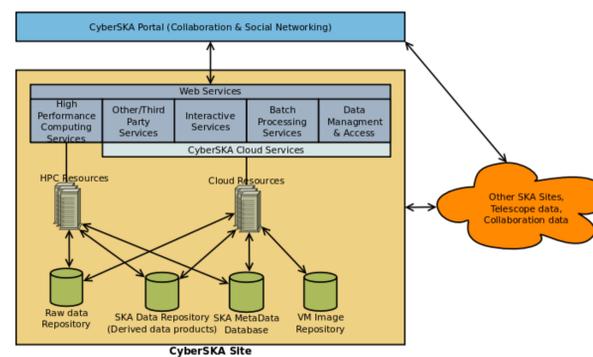
### Requirements - II

- Transparent
  - provide users with transparent access to data, computing resources and services
- Web-enabled
  - a Web-based platform that users can access from anywhere with Internet access
- Collaborative
  - enable international/distributed teams to collaborate and communicate effectively
- Interactive
  - enable on-line interactive visualization of data
- Auditable
  - be able to track where data has come from and processes applied to it (data provenance)
- Interoperable
  - compliant with existing standards such as Virtual Observatory (VO)

### System Context Model

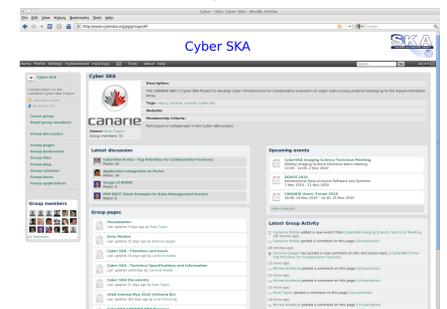


### High Level Architecture



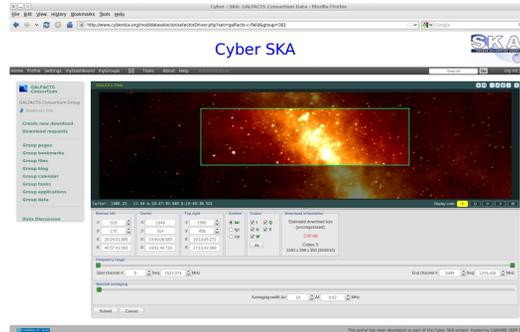
### Solutions - Collaboration

- Portal built on top of the Elgg open source social networking platform provides many Facebook-like features including: tags, bookmarks, profiles, blogs, wikis, contacts, groups, document sharing, discussions, message boards, calendars, status, activity feeds, etc.



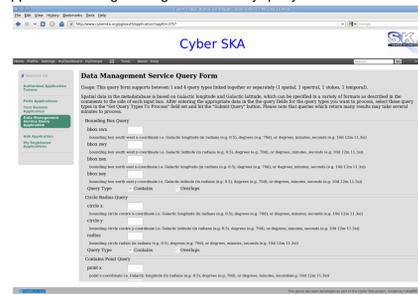
### Solutions - Data

- Access/download data for selected parameters and region of interest
- Requested data generated in virtualized Condor pool on server side



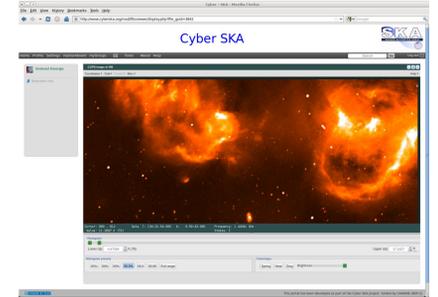
### Solutions - Data II

- Distributed data management service
  - built on iRODS and running at two sites currently (UBCO & UofC)
  - PostgreSQL database for image metadata (adherent to VO metadata standards)
  - query service with RESTful API (spatial, temporal and spectral queries supported)
  - supports mosaicing of images returned by query



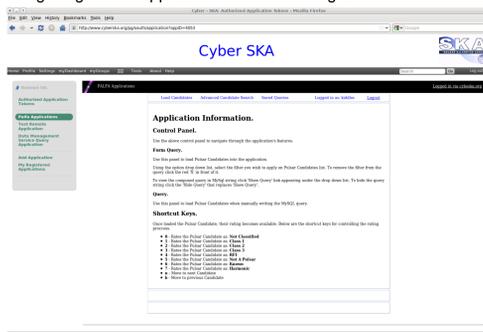
### Solutions - Visualization

- On-line visualization of multidimensional FITS files
  - Supports interactive panning & zooming, histogram correction, color map adjustments, display pixel data value, multiple coordinated systems, grids, selection of frame for multi-dimensional images



### Solutions - Applications

- API for integrating third party applications with portal
- Single sign-on to applications enabled using OAuth



### CyberSKA Portal Usage

- 100+ members from around the world
- 10+ groups (GALFACTS, PALFA, EVLA, GMRT, CASA Users...)



### Contact Information

Portal: <http://www.cyberska.org/> E-mail: [info@cyberska.org](mailto:info@cyberska.org)

