Japanese Virtual Observatory Project

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2004/03/08

Japan-France Grid Computing Workshop in Paris

Large Telescopes of NAOJ

- Subaru (optical & Infrared) @ Hawaii
- Nobeyama (Radio) single dish : \$\overline{45}\$-m interferometer : 6 x \$\overline{10}\$-m solar interferometer : 84 x \$\overline{75}\$-cm
 HALCA – in orbit \$\overline{8}\$-m

Subaru Telescope (optical & IR)



8.3-m mirror

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5000+ Galaxies

45m Radio Telescope



HALCA VLBI Space Observatory Programme

JAXA is going to join JVO !!

Infrared Satellite by JAXA

ASTRO-F

Launch : 2005 ? © Newton Press

Data Productivity

- Nobeyama Radio :~1TB/yr
- Subaru@Hawaii :~20TB/yr
- ALMA(planned) :~PB/yr

Flood of excellent data (survey data) Digitized & Archived



JVO prototype : Ver. 1

 To establish seamless access to federated DBs by using the Grid technology

 To define JVO Query Language, and to implement its parser

Queries for Astronomical Data

- Need to consider the following items:
 - Searches on Spherical Coordinate

 deg west of longitude 0 is longitude
 359 deg !
 - Difference of spatial resolutions
 - Pointing accuracy of telescope



Astronomical Data

- Image
- Spectrum
- Photon count
- Light curves
- etc.

 Catalogue source position, size, brightness, other parameters

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JVO QL (ADQL) for Federated DBs



User Interfaces

Need to know about SQL to use JVOQL

An editor to create JVOQL from GUI

Editable on screen more flexibility for advanced users

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Development of Prototype2

For preparation of Operational System

- User registration : single sign-on
- User area over Firewall : GSI-SFS
- Adoption of GT3
- Implementation of several analysis tools



Comparison of two Prototypes

	Prototype 1	Prototype 2
toolkit	Globus tk 2	Globus tk 3
Services	GRAM	Grid Services
used	GridFTP	RFT
registry	UDDI	XMLDB
Commu. overhead	~20 – 30 sec	~ 30 msec

Search for Gravitational Lenses created (?) by Cosmic Strings

- SXDS data observed by Subaru
- Query results were obtained less than 5 min., displaying SEDs
- It has been proven that VO can accelerate researches.



2004/03/08

Workshop in Paris

Road Map

2003 Prototype 2 development of components for operation 2004 start to develop operational system late 2004 ?? trial use 2005-2006 trial use & upgrade 2007 prepare for partial operation of ALMA

Need to Solve

- How to use existing software ?
 - We want to minimize developing period.
- How to manage MY jobs in OTHER site.
 - We want to know the job status in remote site.
- How to manage distributed users' data.
 - We want to make seamless access to remote data as if they are local files.
- etc.

Virtual Observatory Common Infrastructure for Astronomy

