

Italian Theoretical Virtual Observatory Phase A study

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TVO IG Cambridge



Background

- **Data Provider:**
 - **Observational Instrument → produce enormous quantities of data (image, spectra, ...)**
 - Telescope
 - Satellite
 - **Computer and numerical Simulation → huge amount of data .**
 - Local beowulf cluster
 - Grid environment (EGEE, DEISA)
 - HPC (CINECA)



HPC Background

- From 1997 agreement from CINECA and INAF*: a big investment of National Community for the computer Facility.
 - More than 300 computational HPC projects
 - Cosmological Simulation
 - AGN jets
 - Evolution of globular Cluster
 - Large scale structure of the Universe
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 - Many of this data, produced by using this National Facility, are not organized, and their usage are limited to research groups Data Policy.....



Grid Background

- 2002-2005 INAF was involved into the Grid.it Project with INFN
- 2003-2005 INAF was founded to developed the DRACO Project (Datagrid for Italian research in Astrophysics and Coordination with the virtual Observatory)
 - Grow expertise
 - Developing tools (G-DSE: Query Element)
- Planck Simulations
- INAF is unfunded, generic application, partner in EGEE
- INAF-OACt participate to the Trigrid project and COMETA consortium
- A lot of simulated data were and will be create in a Grid environment.



Now

- INAF - Information System
 - Coordination with CINECA
 - Coordinating INAF GRID initiative
 - Coordinating INAF Vobs initiative
 - IVOA presence
 - VO-TECH
 - DS4, DS5, DS6
 - VO-DCA
 - WP5
 - VObs.it
 - IA2
Italian Center for Astronomical Archive
 - ITVO
Italian Theoretical Virtual Observatory



Theory → VObs

- How to implement numerical simulation in the VObs framework
 - Common features with Obs. Data can be found
 - Some deep differences are present
 - .. Amount of different quantity that are used in the simulations (different physics, algorithms, etc..)
 - Data are not generated from “organization”
 - Difficult to create a generic data model, like to that of observational data.
 - Try it! But, of course, starting from well know Case Study.



ITVO : Case Study

- N-Body and SPH Cosmological Simulation
 - Hydrodynamical simulations of self-gravitating systems
 - Simulation of X-Ray observations
 - N-Body simulations
 - Magnetorotational Instability Simulations
- Jets Simulations
- Planck Mission Simulated Data



ITVO : Institution and Working Team

- Development of the ITVO need several expert people in several fields.

– Astronomer Team

- S. Borgani, L. Tornatore == Univ of Trieste
- G. Bodo == INAF Torino
- F. Pasian, C. Vuerli == INAF Trieste
- V. Antonuccio, A. Bonanno == INAF Catania

– Technological Team

- R. Smareglia, V. Manna == INAF Trieste
- C. Gheller, P. Malfetti == CINECA
- U. Becciani, C. Costa == INAF Catania



ITVO : Starting HW Infrastructure

- CINECA
 - IBM CLX/1024 Linux Cluster
 - 1024 cpu / 1 Tb ram / 5.5. Tb storage
 - IBM Sp5/512 Cluster
 - 512 cpu / 1.2 Tb ram / 6.9 Tb Storage
 - SGI Altix 3700
 - 64 cpu / 128 Gb ram / 2.2 Tb Storage
- INAF
 - OACt (trigrig/COMETA)
 - ~ 1024 cpu / 1 Tb ram / 100 Tb Storage
 - OATs (beowulf systems)
 - 64 cpu / 128 Gb ram / 5 Tb Storage
 - IGI Grid Framework

