

Earth Science Grid Community

Virtual Research Communities –
EGI Technical Forum 2011

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- Earth Science VRC: trans-discipline; established on prior activities (strategic discipline cluster) in EGEE
- Meteorology, hydrology, seismology, climatology,....
- Concerned with common challenges – access to external data, automatization, specific job types, best-practices
- Sharing algorithms already ported on Grid, data sets, results, experience
- Contact point, support, harmonization, preserve experience

Community / Coordination

Direct User Services
Support, Consultancy

Development &
Evaluation of Tools and
Frameworks for ES
applications

Documentation
Best practice
documents

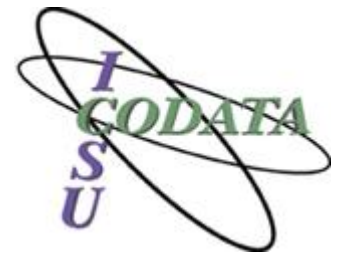
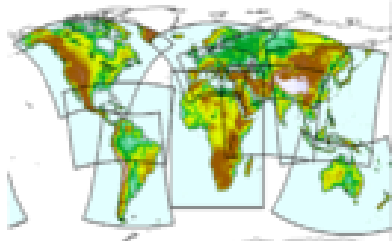
Dissemination

- High level goals
 - Create / support the creation of interest groups / communities for groups working on similar topics
 - Raise the popularity of distributed computing infrastructures
 - give the smaller (unrepresented) communities a voice in consortia
 - improve the utility of distributed computing for Earth Science users
 - give prospective users a generic contact and support point
 - Bring together effort in the community to avoid redundancy and thus (hopefully) be more efficient
 - enable international collaboration, directly and through cooperation of research projects

- Technical goals
 - transparent and easy access from the Grid environment to the data sets stored in discipline-specific infrastructures
 - transparent access to data distributed in the Grid environment directly from the tools or services that are used by scientists in their everyday activities, e.g. realize the integration of existing geospatial e-infrastructures through exploiting the most widely used standards (e.g. OpenGIS Web Service Standards).
 - Creation and maintenance of a central interface integrated with major online services, catalogues, and sample applications

- Community activities
 - Contact point and help
 - Dissemination activities
 - Community building
 - Maintaining Relations and Collaborations to third party effort
 - Representation of user interests and Requirements
 - VO Management
 - Application porting and deployment support
 - Tool development
 - Standardisation efforts
 - Documentation of tools, frameworks and common solutions
 - Interoperability

- ES popular applications (e.g. MM5, WRF, ..)
- Access/interfaces from/to existing ES community infrastructures
 - OWS (standardized interfaces for processing and data)
 - Processing outside of the infrastructure
 - Accessing data infrastructures outside of Grid
 - Accessing databases from Grid (interfaces and tools e.g. using GReIC, GENESI-DR)
- Specific site services
 - runtime environments (commercial and open-source C++, Fortran, Java, numerical libraries, IDL...)
 - support for parallel platforms (compiler and interconnect dependent MPIs & OpenMP, support / best practices)



Discovery

- Availability
- Locality (Data center)
- Policy (rights)

Processing

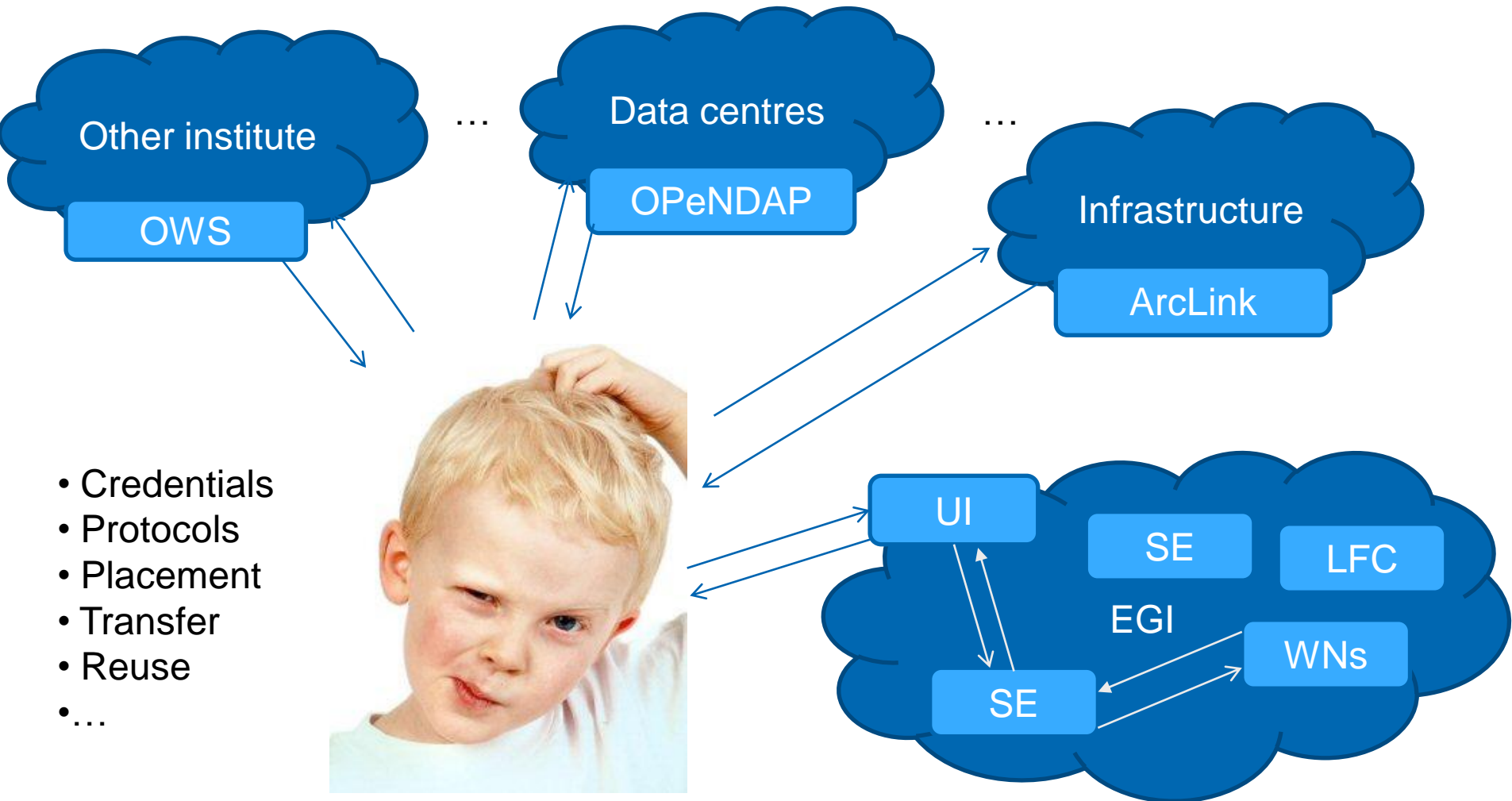
- Usage rights
- Formats
- Transformation
- Analysis

Access

- Access channel / Protocols
- AuthN & AuthZ
- Performance

Archiving

- Traceability / Reproducibility
- Storage



- Credentials
- Protocols
- Placement
- Transfer
- Reuse
- ...

- GENESI-DR
 - FP7 project, successor GENESI-DEC
 - Infrastructure for earth science data repositories
- Collaboration started in EGEE III Earth Science SDC
 - Proof of concept to access EGI from GENESI-DR
 - Using data from EGI storage elements and data center in GENESI
 - Proof of concept to use GENESI-DR in gLite job (retrieving data sets of different series corresponding to input files)
 - Ozone profile validation with GOME / LIDAR measurements



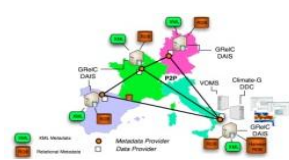
- Command line client to search & download (accessible) data set files for easy integration in job scripts
- AuthN & AuthZ not dealt with in GENESI
 - different schemes at the sites, registration, access control,...
 - Can't solve this ultimately, but can try to facilitate
- Web user interface connected to Grid job submission
- Following GENESI-DEC developments regarding publishing to GENESI-DR from EGI results
 - Either with the same technology but EGI specific or accessible through GENESI central-site



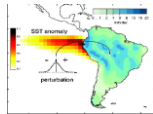
- Working group in TSA3.6
 - IPSL & SCAI
 - IPSL is working on CMIP5
 - Bottom up approach
 - Starting with simple access to a data node
 - Scenario using a MPI application for statistical evaluation of data row
 - Login to ESG PKI on gLite UI
 - Download data to worker nodes
 - Scaling up now

- Tasks
 - Facilitate authentication
 - Cache data in Grid
 - Search / find data sets / replicas using the THREDDS catalogues or (possibly) results of the Prodiguer project
 - Managed file transfer (c.f . FTS)
 - Additional functionality @ data node (e.g. subsetting)
 - Combine with discovery (GUI / service)

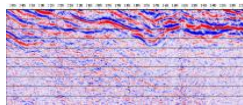
Climate - GReIC
 CMCC (Italy), IPSL (France), Univ Cantabria (Spain), SCAI (Germany)



Climate - El Niño
 Univ. Cantabria – EELA2

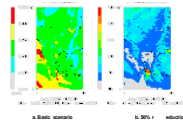


Geosciences- Geocluster
 CGGVeritas (France), DSI-IRD, Geoazur, IPGP, IPGS, ISTEP, Sisyphé, UBO

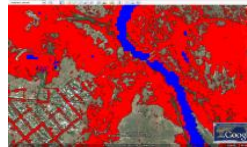


Pollution

IPP-BAS (Bulgaria), IASA (Greece), EnvVO-SEEGRID



Flood
 EMA (France), IISAS (Slovakia), SRI (Ukraine)



Flood map for Normanton area, Queensland, Australia derived from RADARSAT2 14-17 Feb 2009 (SRI)

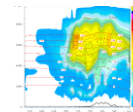
Biodiversity

BRGM (France), Footways(France),JKI (Germany)
 Scenarios climatological



Meteorology

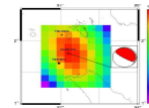
Greece: AUTH, IASA, NOA; SRI (Ukraine), GCRAS (Russia)



From IASA

Seismology

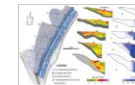
AUTH (Greece), IPGP (France), AUTH (Greece), Tubitak Ulakbim (Turkey), Univ. patras (Greece), INFPP (Romania)



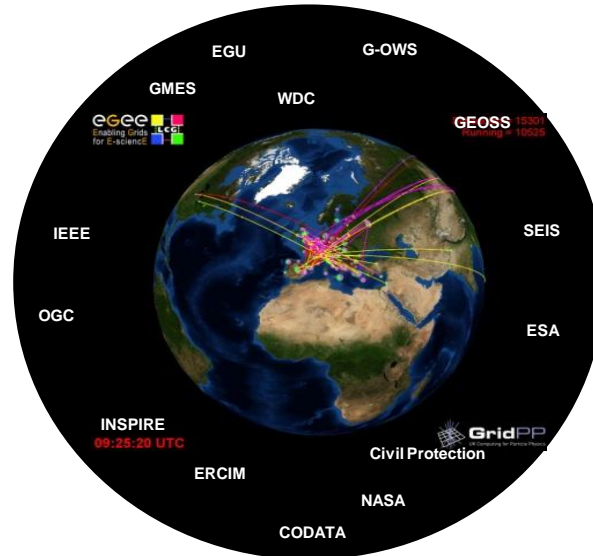
From E. Clévéde - IPGP

Hydrology

CRS4 (Italy), Univ. Genève, Univ. Neuchâtel, INHGA (Romania), Institute for Water Resources "Jaroslav Cerni", Belgrade and CSASA at University of Kragujevac, Serbia



Forecasting seawater intrusion in a coastal aquifer From J. Kerrou Univ. Neuchâtel



Examples of supported and deployed applications:

- Flood Prediction (Institute of Informatics Slovak Academy of Sciences (IISAS) with new institutes from Slovakia),
- Flood Prediction on the basis of satellite imagery (National Academy of Science of Ukraine (SRI/NASU)),
- Flood Prediction with neural networks using MATLAB on the grid (LGE, Institut de Physique du Globe de Paris (IPGP)),
- Different MM5/WRF implementations (SRI/NASU, SEEGrid, Geophysical center of the Russian Academy of Sciences (GCRAS), IISAS),
- The port of IISAS of WRF and fog movement for the Microstep company [R 11],
- Seismic CMT (IPGP),
- Seismic Sensor (IPGP),
- Seismic Applications (University of Istanbul, Turkey (SEE-GRID)),
- Civil protection for fire (CNR-IMAA (Italy), Universidade do Minho (Portugal)),
- Civil protection for flash flood (LGEI, France),
- Ozone processing and validation scenario (ESA-ESRIN, IPSL, SCAI).

Thank you for your attention.