Compute Grids in Africa

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Outline

- What is e-Infrastructure ?
- Exploring management models
- Virtualising Collaboration and cooperation
- Status of South African National Grid
- Enabling e-Science
    - Training
    - Operations
    - Research applications
- Regional, intercontinental coordination and development
- Expansion and sustainability

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What good is the network ?

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An integrated federal infrastructure to the end-user's benefit requires interoperability and collaboration at all levels

National Research Network connects

HPC resources and scientific equipment which **self-organising user communities** use to conduct their research

Operations, Support, Training

Users access instruments, software and computing resources independent of their location in a self-organised way, transparently across infrastructures

e-infrastructure

Federal/Joint Management, development, planning and research activities

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SAGrid : an example of an Integrated Infrastructure Initiative

- A coordinated effort to address all aspects of e-Infrastructure deployment, management and usage, modelled on experiences of similar projects worldwide
- Services provided by SAGrid to users and scientific collaborations :
  - Identity and security infrastructure
  - User Training
  - Application and User Support
- Services undertaken by SAGrid resource providers
  - Compute resource deployment
  - Operations
- Overall coordination and coordination with other infrastructures
  - Interoperability (EGI and other international infrastructure)
  - Network coordination (TENET, SANReN)
  - VO-level collaboration and new collaborations on the grid
  - Dissemination

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SAGrid Joint Research Unit

- SAGrid is a federation :
  - A technical collaboration to enable scientific collaboration, members of a Joint Research Unit
  - Adhere to principles and themes which they find self-evident
  - Agree to pool, share and jointly manage resources
  - Provides a framework for participation to collaborative projects aimed at deploying, maintaining and improving e-Infrastructure
  - An open document, inspired by very successful Italian Grid Initiative (IGI)
  - Precursor to a more formal National Grid Initiative (NGI) – along the lines of EGI model.

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Management and governance models

- Users want a simple, easy-to-use set of resources and services
- Coordination of management and governance is essential to
    - Consistent resource deployment
    - Long-term service development
    - Communication with user communities
    - Interoperability and hence collaboration with the rest of the world
- Several models to follow, and a lot of experience -
- Many different user communities spread across many national and institutional boundaries :
    - EELA, IGALC - “Iniciativa de Grid de America Latina – Caribe” http://www.igalc.org
    - EUAsiaGrid : http://www.euasiagrid.org
- The NGI / federation model is under experimentation in SA – working on blueprint for regional integration.

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Status of SAGrid

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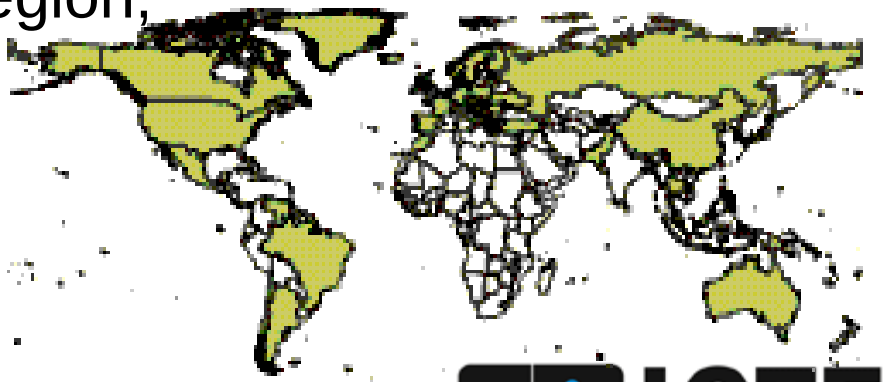
SAGrid Certificate Authority

- Security and identity infrastructure is crucial to the entire undertaking, yet no PMA exists for Africa
- SAGrid started with trust anchor in INFN CA (similar process to participants in EUMedGrid)
  - http://security.infn.it/CA/en/RA
- SAGrid CA under development – first presentation to EUGridPMA October 2009 (Berlin)
- Can act as trust centre for the region, evolve into AfricaGridPMA



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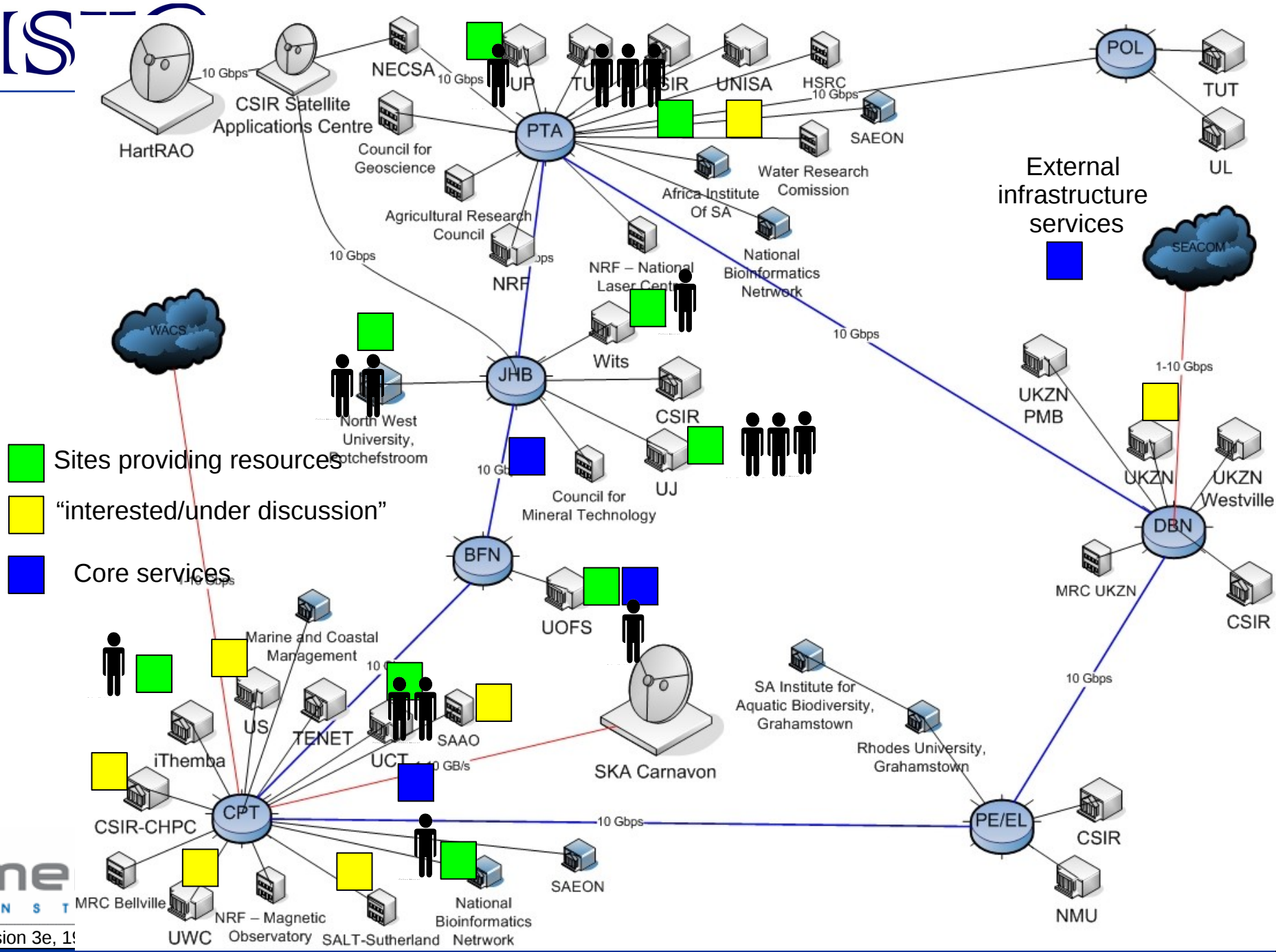
HartRAO
10 Gbps
CSIR Satellite Applications Centre
NECSA
10 Gbps
UP
TUT
SIR
UNISA
HSRC
10 Gbps
SAEON
POL
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UL
PTA
Council for Geoscience
Agricultural Research Council
NRF
Water Research Comission
Africa Institute Of SA
National Bioinformatics Netrwork
NRF – National Laser Centre
10 Gbps
External infrastructure services
SEACOM
WACS
JHB
Wits
CSIR
UJ
North West University, Potchefstroom
Council for Mineral Technology
10 Gbps
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UKZN PMB
UKZN
UKZN Westville
DBN
MRC UKZN
CSIR
BFN
UOFS
Marine and Coastal Management
US
TENET
SAAO
UCT
iThemba
CSIR-CHPC
CPT
SKA Carnavon
SA Institute for Aquatic Biodiversity, Grahamstown
Rhodes University, Grahamstown
10 Gbps
PE/EL
CSIR
NMU
SAEON
National Bioinformatics Netrwork
MRC Bellville
UWC
NRF – Magnetic Observatory
SALT-Sutherland
Sites providing resources
“interested/under discussion”
Core services

Making geography irrelevant

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Interoperability

- Interoperability is crucial to collaboration and the “death of distance”
- SAGrid provides a near clone of Italian Grid Infrastructure middleware release for all services – 100 % self-supported
- SAGrid infrastructure designed to support as many different scientific communities as possible :
  - All EGEE VO's (by default)
  - Research collaborations using gLite or UMD middleware stack
  - VO's with dedicated operations team and members in South Africa

italian grid infrastructure

Lightweight Middleware for Grid Computing

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Interoperability means : EGEE VO's are accessible to South Africans

EGEE Applications Registry

Home | User | Download | Admin — Logged in as: User

You are in: Region: EGEE >> User >> Registry

Click here for regional contacts.

Records shown 1 - 10 of 247

http://appdb.eu-egee.org/

Custom Filter | All Fields | Whole words only | Apply Filter | Reset Filter

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 Next >>

	Id	Logo	Acronym	Application Name	Discipline	Sub-Discipline	Description	Scientific Contact	Web Site	Region	VO
View	48		LAWEF-GRID	Limited Area Weather and Environmental Forecasting on a Grid Platform	Earth Sciences	Meteorology	This application is targeting to produce early warnings related with hazardous weather events. Such real time operations are approached using the MPI based Skiron/Eta weather forecasting system for short time periods (18 hours forecasting horizon). Using the concept of "nowcasting", the system is daily integrated on a very high resolution domain (~5 km) covering the wider area of Eastern Mediterranean. The normal operation of the computational model runs in a deterministic fashion under Grid ... more	View ...		SEE	gridcc
View	50	N/A	AMIAS	A Model Independent Analysis Scheme (AMIAS) for Extracting Multipole Amplitudes.	Life Sciences	Other	A novel method for extracting multipole amplitudes in the nucleon resonance region from electroproduction data is applied. The method is based on statistical concepts and it relies heavily on Monte Carlo and simulation techniques; it produces precise identification and determination of the contributing multipole amplitudes in the resonance region and for the first time a rigorous determination of the associated experimental uncertainty. The results are demonstrated to be independent of any model ... more	View ...		SEE	SEE
View	51	N/A	AA-GISSmodelE	Academy of Athens-NASA-Goddard Institute for Space Studies modelE	Earth Sciences	Metrology	To better understand and describe Earth's Climate and address past and future climate change, natural as well as anthropogenic,at the Centre for Atmospheric Physics and Climatology in the Academy of Athens, we employ a hierarchy of numerical models of different resolutions, geographical extent, and parameterization complexity. 1) A state-of-the-art coupled Atmosphere-Ocean-Land-Ice numerical model that was developed at NASA-Goddard Institute for Space Studies in New York City. The model has b ... more	View ...		SEE	SEE
View	53		CAMx-UOA	Numerical simulations of meteorology and atmospheric pollution	Earth Sciences	Meteorology	The first application that will be attempted through SEE uses the atmospheric pollution model CAMx. Current simulations involve atmospheric aerosol over Greece and Attica. Special focus is given on sea-salt aerosol production and chemical interaction with other pollutants.	View ...		SEE	SEE
View	49	N/A	STFCAPP	Simulation of three-dimensional folding by prediction of critical amino acid positions in proteins	Life Sciences	Biophysics	This application lies in the field of Bioinformatics and more precisely, in the domain of ab initio prediction of protein folding. From the point of view of Biology and Biophysics, it simulates the initial stages of the folding process of a polypeptide chain into a unique, globular, stable and biologically functional protein. By using only amino acid sequence data, it provides a set of amino acid residues, called MIRs, which play a critical role in the folding process. The knowledge of these re ... more	View ...		SEE	SEE
View	54	N/A	In Silico	Development and customization of an in silico (computational) oncology	Life Sciences	Other	The in silico oncology application concerns four-dimensional simulation models of tumour growth and tumour and -to a lesser extent- normal tissue response to radiotherapeutic or chemotherapeutic schemes. The goals are a better understanding of cancer disease and a	View ...		SEE	SEE

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Interoperability means : SAGrid sites are part of the global Grid

- Even a perfectly functional infrastructure will not be used if users are not engaged. We provide 3 kinds of events :
  - Grid Open Days : 1 day event, open to public and wide audience, demonstration of capability of the grid and associated services
  - Basic training : 3-5 day event, first training course for new users and site administrators, aimed at bringing new sites and users to the grid
  - Grid Schools : 2-3 week application porting and training school, aimed at bringing new communities to the grid, with dedicated applications.
- Training done in collaboration with GILDA - http://gilda.ct.infn.it
- We also provide day-to-day “after-sales” support via ops.sagrid.ac.za
  - Site operations support
  - General user support

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SAGrid Support portal : http://ops.sagrid.ac.za

Login | Preferences | Help/Guide | About Trac | Register

Request Support | Documentation | SAGrid portal and links | Timeline | View Tickets

Start Page | Index | History | Last Change

Welcome to the SAGrid User Support and Operations Portal

There are 50 currently Open tickets (all milestones)

#23, #24, #25, #26, #82, #97, #99, #100, #101, #102, #103, #104, #105, #106, #107, #108, #109, #122, #126, #128, #129, #132, #135, #140, #141, #147, #155, #156, #157, #159, #160, #163, #164, #165, #166, #168, #169, #172, #178, #180, #182, #186, #190, #191, #192, #193, #197, #198, #199, #200

Welcome to the SAGrid User Support and Operations Portal
SAGrid Ops and User Support on EVO
SAGrid monitoring at GSTAT
Operations Milestones
Sites Overview
Starting Points

This is the operations and user support portal for the South African National Grid - SAGrid. The computing infrastructure is based on the gLite middleware stack from EGEE. SAGrid partners with the Grid INFN Laboratory for Dissemination Activities (GILDA) and the Italian Grid Infrastructure (IGI) for training and upstream technical support for the middleware. This portal provides user and site support, as well as an interface to other support systems, from

- GILDA
- Enabling Virtual Organisations (EVO)
- Global Grid User Support
- IGI Operations
- Centre for High-Performance Computing Helpdesk

and others. Once you log in (register here if you don't have an account yet), you will see more context-driven menus.

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A global research environment means interoperability of support platforms is crucial

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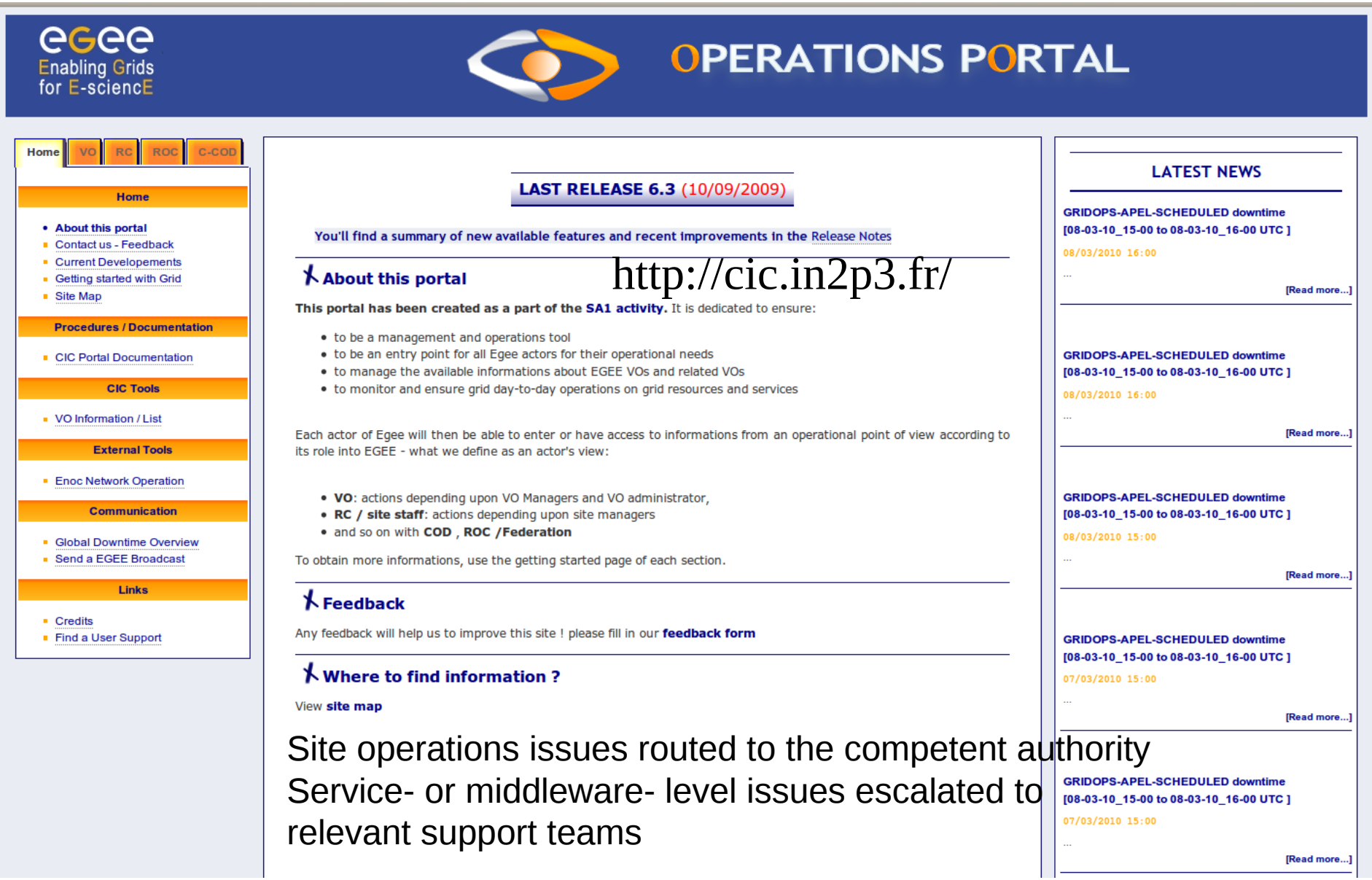
Under development : a Regional Operations Centre for integration with the Global Operations Centre



Site operations issues routed to the competent authority
Service- or middleware- level issues escalated to relevant support teams

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A Southern-African ROC

- National operations teams take time to develop and mature – as to user communities
- No need to delay the scientific and training activities of users, due to the lack of local technical support
- A “regional operations centre” is being created in South Africa to serve the “region”,
- “Region” needs to still be defined, depends on the capacity in South Africa, and size of user communities – not necessarily geography.
- Work done in collaboration with EGI EUMedGrid-Support

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Research collaborations using the infrastructure

- Sites can decide which EGEE VO's to enable, depends on local user community.
- Some VO's enabled nationally, due to MoU between JRU and experiment/collaboration
  - BIOMED VO – biomedical and bioinformatic applications, especially drug discovery (WISDOM project)
  - E-NMR – system biology, protein structure
  - LHC experiments ATLAS and ALICE
- SAGrid VO : catch all VO for South Africans – access to all South African researchers (http://voms.virt.sagrid.ac.za)
- GILDA VO : access to all who undergo training

HP/UNESCO Brain Gain Initiative : an African collaboration “on the grid”

- Project managed by UNESCO
  - See talk by M. Bellon yesterday
- 20 institutes in Africa
- Budget $1M from HP
- Several scientific domains
- Operational and technical support from SAGrid
- Other projects :
  - ERINA4Africa
  - “Lighthouse” projects
- Regional scientific research projects (SKA, ASP2010, EGY)

United Nations Educational, Scientific and Cultural Organization

EPIKH : exchanging ideas with the world

- “Exchange Programme to advance e-Infrastructure Know-How” (EPIKH)
- EU FP7- Marie Curie Actions – People - International Research Staff Exchange Scheme (IRSES)
- Consortium “numbers”:
  - 23 partners;
  - 18 countries;
  - 4 continents (**Africa**, Latin America, Asia, Europe);
  - 115 persons involved;
  - >650 researcher-months;
  - >500 secondments;
- Duration: March, 1, 2009 – February, 28, 2013 (48 months)
- EC contribution: 1,188,000 €
- See yesterday's talk by Valeria Ardizzione

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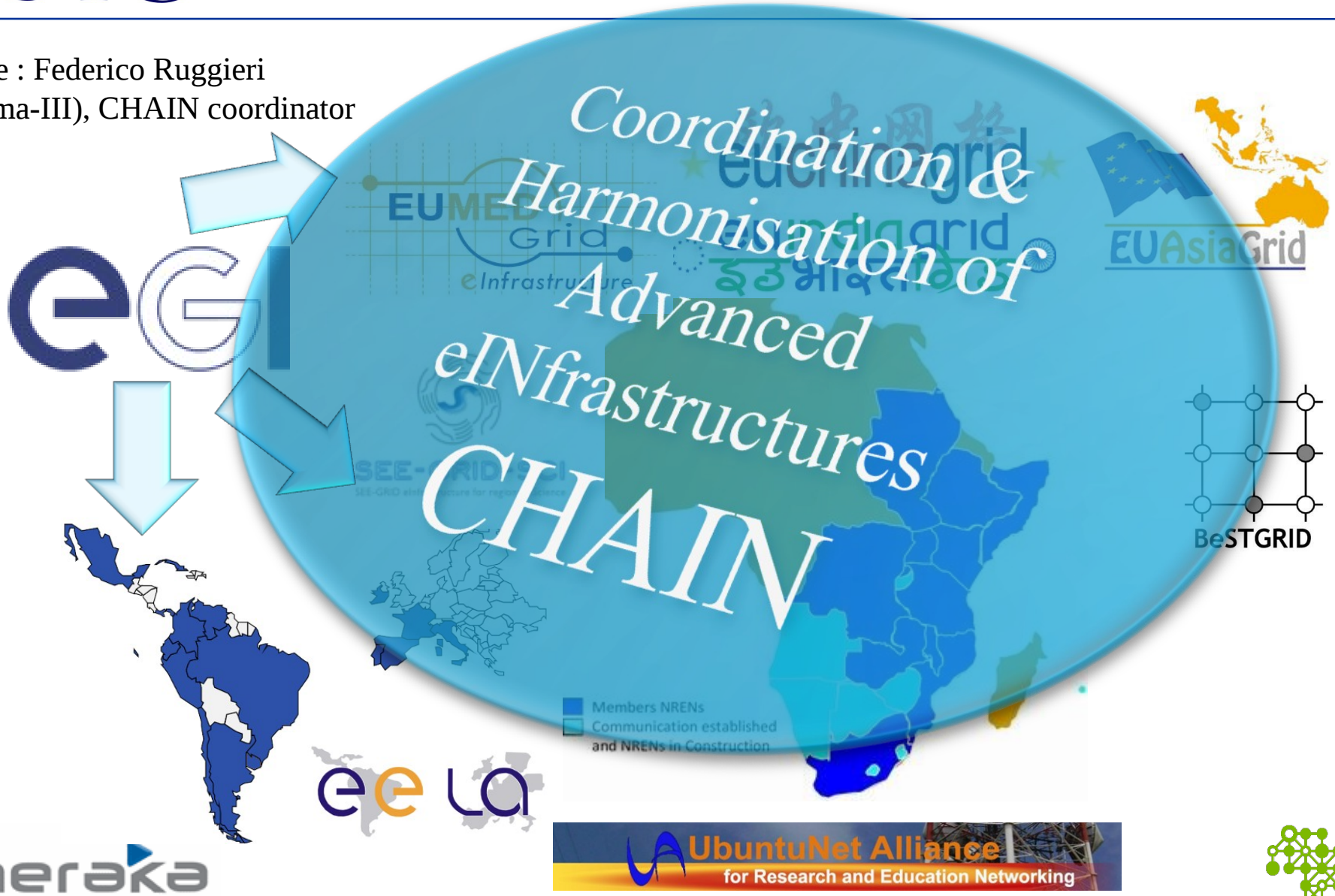
IST Africa Global interoperability between e-Infrastructures

Slide : Federico Ruggieri
(Roma-III), CHAIN coordinator



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Exporting the blueprint

- We have worked hard to design an infrastructure which is repeatable in the region
- Prototype phase of integrated, distributed computing infrastructure and related services completed in South Africa
- Interoperable “by design” with international infrastructure
  - Technical interoperability via appropriate middleware and technology
  - Operational interoperability via consistent training and support, localised support teams
- User community engagement from the start to develop a relevant infrastructure, widely used
  - But is very hard to do, need to partner with dissemination and research projects !
- Good base from which to expand, however, much coordination is needed in order to ensure the final success

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