INCDTIM-CJ, Cluj-Napoca, 25-27.10.2012

National and regional organization of collaborations in advanced computing

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http://indico.ipb.ac.rs//conferenceDisplay.py?confId=301

HPC in South East Europe and Cloud Computing

Saturday, October 27, 2012 from **09:30** to **13:00** (Europe/Bucharest)
at **INCDTIM**

Description This is a satellite event of the RO-LCG 2012 Conference "Grid, Cloud and High Performance Computing in Science", to be held between 25-27.10.2012 in Cluj-Napoca, Romania, under the banner of the IEEE Romania section.

Saturday, October 27, 2012

09:30 - 09:55	National and regional organization of collaborations in advanced computing 25' Speaker: Dr. Mihnea Dulea (IFIN-HH)
09:55 - 10:20	Cloudware Support for Scientific Applications 25' Speaker: Prof. Dana Petcu (UVT)
10:20 - 10:40	Computational Challenges in Processing Large Hyperspectral Images 20' Speaker: Prof. Dana Petcu (West University of Timisoara)
10:40 - 11:00	Eagle Eye – Feature Extraction from Satellite Images on a 3D Map of Romania 20' Speaker: Mr. Razvan Dobre (UPB)
11:00 - 11:30	Coffee break
11:30 - 13:00	Round table - Regional and national collaborations in high performance scientific computing 1h30'
25.10.2012	Integrated System for Modeling and data Analysis of complex Biomolecules (ISyMAB) Speaker: Ionut T. Vasile

Courtesy of Ioannis Liabotis, HP-SEE Technical Coordinator

HP-SEE

HP-SEE
High-Performance Computing Infrastructure
for South East Europe's Research Communities

- ❑ **Contract n°:** RI-261499
- ❑ **Project type:** CP & CSA
- ❑ **Call**: INFRA-2010-1.2.3: VRCs
- ❑ **Start date:** 01/09/2010
- ❑ **Duration:** 24 + 12 months
- ❑ **Total budget:** 3 885 196 €
- ❑ **Funding from the EC:** 2 100 000 €
- ❑ **Total funded effort, PMs:** 539.5
- ❑ **Web site:** www.hp-see.eu

HP-SEE

High-Performance Computing Infrastructure
for South East Europe's Research Communities

CAPACITIES

HP-SEE User Forum – Belgrade, Serbia 17th October 2012

HP-SEE Project Objectives

- ❑ Objective 1 – Empowering multi-disciplinary virtual research communities

- ❑ Objective 2 – Deploying integrated infrastructure for virtual research communities
  - ❑ Including a GEANT link to Southern Caucasus

- ❑ Objective 3 – Policy development and stimulating regional inclusion in pan-European HPC trends

- ❑ Objective 4 – Strengthening the regional and national human network

Coordinator: GRNET, Greece
Partners: countries from Western Balkans, Greece, Turkey, Bulgaria, Romania, Moldova, Southern Caucasus.

High-Performance Computing

- 120 Tflops aggregate
- 2 BlueGene machines
- Bulgaria, Romania, Serbia, Hungary, FYRoM offering resources
- Procurements coming - Greece and Serbia

- 26 applications in 3 VRCs

- Envisaged as bridge to PRACE

- Joint operations centre studied and assessed

HP-SEE User Forum – Belgrade, Serbia 17th October 2012

VRCs supported: Computational Physics, Computational Chemistry, Life Sciences

New Access Mechanisms

HP-SEE
High-Performance Computing Infrastructure for South East Europe's Research Communities

❑ Pilot call for access to resources
  ❑ Call closed -> 5th of October
  ❑ Resources to be offered: 4.6 Million Core hours, 1.8 Million GPU hours
  ❑ Allocations for 1 year – starting December 2012
  ❑ Peer review based
  ❑ Access to the resources from all countries of the region

❑ Fast track access mechanism
  ❑ Limited resources provided
  ❑ 2 Month allocation period
  ❑ Suitable for: New user communities – Non experienced users

The calls were opened in Sept. 2012
Pilot call - 20 submissions: **5 RO** (CP, meteorology, life sciences) ; 5 GR, 2 BG, …
Fast track access - 3 submissions: **1 RO** (astrophysics); …

HP-SEE STUDY ON ORGANIZATIONAL MODELS

HP-SEE provides, among other services, **support for the development of national and regional organizational models** for High Performance Scientific Computing (HPSC) collaborations.bb

The conclusions of the analysis of the national organization of the HPC activity within several HP-SEE partners and two representative PRACE countries (FR, SW) have been published in deliverable D2.2, 2011 - "*National HPC task-force modeling and organizational guidelines*" .

A few basic governance models were identified:
    1) MoU-based collaborations (which is the most frequent in SEE);
    2) entities coordinated by institutions designated by a governmental body;
    3) consortia coordinated by centers of excellence;
    4) legal entities, possibly with mixed ownership.

The analysis has shown that the governments are indirectly represented in the coordination process, through the funding of the involved research institutions and of dedicated national R&D and infrastructure projects.

ROMANIAN HPSC INFRASTRUCTURE

The HPSC infrastructure was created through the funding by the National Authority for Scientific Research (ANCS) of various independent R&D projects, and by means of the EU structural funds under the Sectoral Operational Programme for Increasing the Economic Competitiveness (SOP IEC).

FEATURES

The main HPC contribution to the infrastructure comes from 11 parallel computing systems (one BlueGene/P supercomputer @ UVT and 10 medium-size clusters), which are hosted by 4 R&D institutes and 7 universities.

These provide > 8,000 cores, > 50 Tflops Rpeak available in centers that are specialized in specific applications of scientific computing in various research fields.

Skilled technical staffs and developers are attached to the hosting institutions.

There is **no correlation between the services offered by various HPSC centres**, even if they share the same communications infrastructure provided by RoEduNet.

There are **issues** regarding:
- **idle resource centres**, that were put into service but have no users
- **discontinued activity**, due to absence of funding for paying utilities
- **limited communication and sharing of expertise** between centres

USERS REQUIREMENTS

A public survey was conducted in 2011 regarding the requirements of the scientific community. After analyzing the responses received from various research groups of more than 30 institutions, the following targets have been set in order to meet user demands:

❑ Continuing the development of the existing HPSC centres, in order to fulfill the growing needs of the research and academic community;

❑ Increasing the HPC support in the scientific areas of national interest (Computational Physics, Computational Chemistry, Astronomy & Astrophysics, Life Sciences, Meteorology and Environmental Sciences);

❑ Providing HPC support for large scale, long-term international collaborations (LHC - CERN experiments, ELI-NP, ITER/EURATOM, FAIR-GSI, etc.);

❑ Strengthening the role of the scientific research and education community in the coordination at the national level of the HPSC activity;

❑ Connecting to the European partnerships regarding the HPSC infrastructure, such as PRACE.

ATTEMPTING NATIONAL COORDINATION
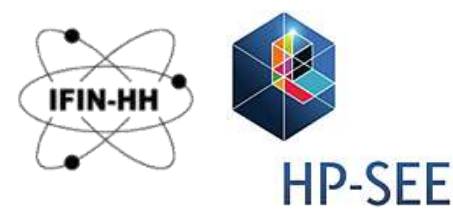
Except for temporary and limited partnerships required for conducting some R&D or infrastructure projects, until recently there has been a lack of implementation of the HPSC concept at national scale, as well as a relatively low interest in highly scalable and computational intensive applications.

The MoU-based collaboration model was applied at an intermediate scale in 2009, when a first association of entities was established between the participants to the HP-SEE project in the purpose of the development of the national HPSC infrastructure - the JRU for HPC and Supercomputing. The MoU, which is valid until 2014, expresses the commitment of the partners in coordinating their efforts for the strengthening of the national HPC community and their collaboration in order to participate to European projects. The consortium, which was recognized by ANCS in 2010, is open for the accession of new members.

The global solving of the situation of imbalance between the demand and the supply of HPC resources, and the sharing of advanced hardware and software between the partners of the R&D projects at national scale required a new solution.

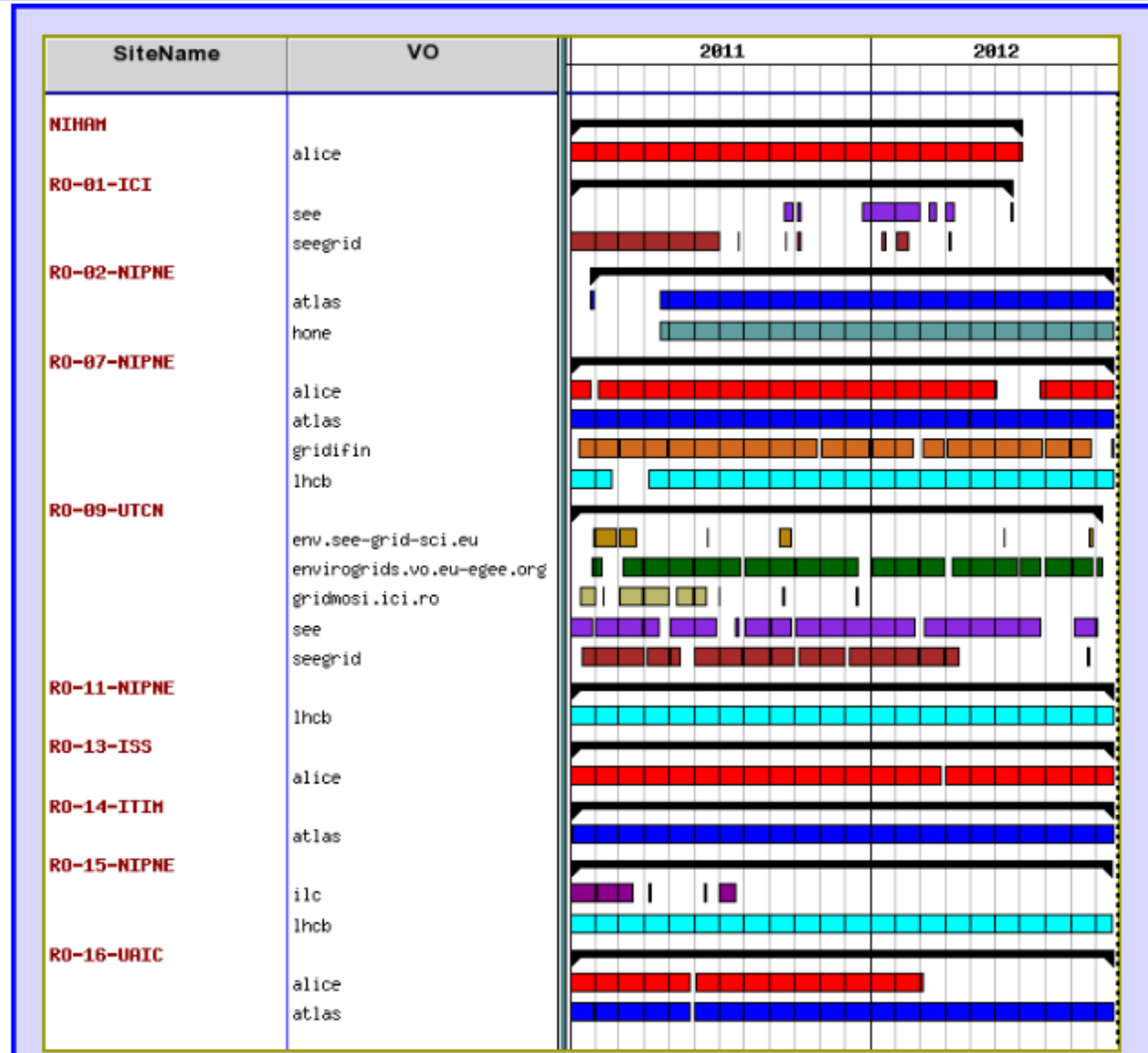2nd model analysed: coordination by institution designated by a governmental body.

GLOBAL View | VO MANAGER View | VO MEMBER View | SITE ADMIN View | USER View | REPORTS | METRICS PO

Following a **political decision**, since 2010 the Romanian Grid Initiative (NGI_RO) is represented in the EGI and in the EGI-inSPIRE project by the **RoGrid-NGI Consortium** (http://www.rogrid.ro/en)

Coordinator: National Institute for R&D in Informatics (ICI)

Partners:
• Polytechnic University of Bucharest (UPB)
• National Institute for Aerospace Research - "Elie Carafoli" (INCAS)
• University of Bucharest (UB)
• Technical University of Cluj-Napoca (UTCN)
• Western University of Timisoara (WUT)
• University of Pitesti (UPIT)

RoGrid-NGI failed to represent the interests of RO-LCG, which provides 98% of the grid production.

(C) CESGA 'EGI View': / normcpu / 2011:1-2012:10 / SITE-VO / all (x) / GRBAR-LIN / x   2012-10-25 20:14 UTC

(C) CESGA 2012

European Grid Infrastructure

Accounting records (all Romanian sites, all VOs except ops)

The **Romanian Association for the Promotion of the Advanced Computational Methods in Scientific Research** (ARCAŞ) is a private legal entity, apolitical, non-governmental and non-profit, founded in 2011 by a group of professionals representing highly-ranked academic and research institutions interested in the development of the advanced IT infrastructure:

• Alexandru Ioan Cuza University of Iasi (UAIC) – oldest higher education institution in RO

• IFIN-HH - largest public R&D institute and the most important provider of advanced computing support for physics research in Romania;

• ISS – institute that develops HPC resources for high energy physics and astrophysics;

• UPB – institution which delivered the highest rate of parallel computing publications in the recent years;

• ROSA – that operates RomanianGrid CA and coordinates space-related technology and programs;

• Technical University of Cluj-Napoca (UTCN) – that ranks 2nd in terms of recent HPC titles published;

• UVT – with a leading position in computer science and owner of the BlueGene/P.

ARCAŞ aims to attract the most representative **institutions and professionals** in the field of computer science, computational science, and information technology.

ARCAŞ gathers both users **and** providers .

Mission: unify and coordinate at national level the efforts of the scientific community towards the promotion and development of advanced computational methods and the realization of a sustainable computing infrastructure for scientific research.

Richard Kenway:

Objectives:

• Support of the development and application of advanced computational methods in scientific research, such as **HPC**, **grid computing**, and **cloud computing**.

• Representation of the professional interests of the providers and beneficiaries of the resources and services for HPSC

• Implementation of a **national network of HPSC centers** for the R&D community

• Participation in the elaboration of the projects of normative acts, of national standards, and regulations in the HPSC field.

• Participation in European and national projects

• Strengthening the role of the scientific research and education community in the coordination at the national level of the HPSC activity;

• Organization of a national competence network for the evaluation of the software applications and allocation of computing time, involving researchers with experience in HPSC.

NATIONAL HPSC NETWORK
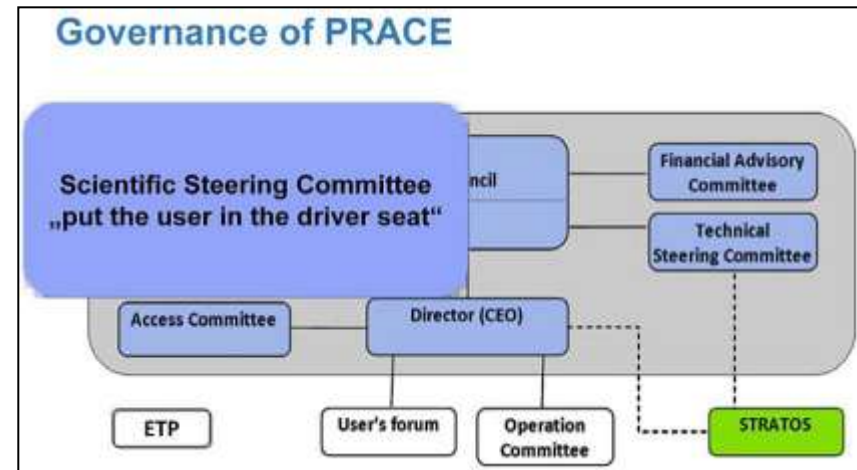
An integrated system for **providing platform and software as a service** to the national research and education community, in order to support and stimulate scientific collaboration through the sharing of advanced computing resources.

The system will be designed such as to meet HPC and big data processing requirements of the large-scale collaborations, and will be organized around the existing resource centers, with data communication ensured by RoEduNet.

Beyond the modernization and streamlining of the existing infrastructure, the extension of the services to academic users from non-technical universities is foreseen. This, on one hand, will improve the efficiency in using their own HPC resources and, on the other hand, will allow the HPC access and training of new user communities.

The system should be able to connect resource centres created through EU SOP IEC structural funds to other HPC centres funded from the national R&D programs, and should allow the subsequent addition of new centres.

Feasibility study + pilot project aimed at proving the potential of the on-demand resource allocation in the unified HPSC infrastructure

CONCLUSIONS

The success of the governance model depends not only on the quality of the infrastructure, but also on the capacity of the coordinating factors to understand the professional needs of the research, academic and IT communities that use or operate the infrastructure.

In this regard, an independent, legal entity, led by a representative board freely elected from these communities can guarantee the maximum receptivity of the professionals' requirements, and the best representability of their interests in the interaction with the funding (public or private) factors.

Due to its widely distributed structure of medium-size HPC centres and to the variety of research interests, the Romanian infrastructure of advanced computing seems to very well fit the model of coordination by an independent legal entity.

Accordingly, the governance is currently shifting from the MoU to the professional association model, which is represented by ARCAŞ.

ACKNOWLEDGEMENTS

THANK YOU

FOR YOUR ATTENTION !