

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

«HP-SEE project Kick-off meeting: High-Performance Computing  
Infrastructure for South East Europe's Research Communities»  
06-08 September 2010, report



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**HP-SEE**

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

# High Performance Computing (HPC)

**HP-SEE**   
**Project kick-off**  
**PSC01 Meeting, Athens, 6-8 September 2010**  
[www.hp-see.eu](http://www.hp-see.eu)

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



## Abstracts from the Press Release on HP-SEE project Kick-off meeting, Athens, 10 September, 2010

A new project that will link existing and upcoming HPC facilities in South East Europe in a common infrastructure...

...HP-SEE will support and strengthen a number of strategic Virtual Research Communities, which will bring together users across the SEE region within a common cooperative research space, enabling them to share HPC facilities, software, tools, data and results of their work...

...The project brings together 14 partners from the South-East European region...

...With HP-SEE, regional scientists and engineers that will be provided with access to capability computers of leadership-class, will remain competitive at the European and international level, thus overcoming fragmentation in Europe.

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



**High Performance Computing, (HPC)** – is a branch of Applied Computer Science, dealing with finding solutions to problems that require a large amount of computing resources.

**HPC** today - it's high-performance computing on high performance computing environments.

The aim of the **HP-SEE** project - combine existing and developed in the region **HPC**-resources in a single infrastructure.

For participating countries without their **HPC**-resources provide access to these resources in virtual research organizations in the areas of computational physics, chemistry and life sciences.

Project duration 2 years.

The project involves 14 countries.

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Countries and organizations participating in the project.

<b>Greece</b>	<b>GRNET</b>	<b>Bosnia and Herzegovina</b>	<b>UOBL ETF</b>
<b>Bulgaria</b>	<b>PP- BAS</b>	<b>Former Yugoslav Republic of Macedonia</b>	<b>UKIM</b>
<b>Romania</b>	<b>FIN- HH</b>	<b>Montenegro</b>	<b>UOM</b>
<b>Turkey</b>	<b>TUBITAK ULAKBIM</b>	<b>Moldova (Republic of)</b>	<b>RENAM</b>
<b>Hungary</b>	<b>NIIFI</b>	<b>Armenia</b>	<b>IAP NAS RA</b>
<b>Serbia</b>	<b>PB</b>	<b>Georgia</b>	<b>GRENA</b>
<b>Albania</b>	<b>UPT</b>	<b>Azerbaijan</b>	<b>AZRENA</b>

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It is planned to adapt more than 20 applications, among them:

- Serbia:**..... Numerical study of ultra-cold quantum gases
- Bulgaria:**..... Computer Simulation of Complex Gas Flows in Micro-sized Channels and Domains (CSCG)
- Bulgaria:**..... Simulation of Electron Transport (SET)
- Moldova:**..... **Adaptive Mesh Refinement (AMR)**
- FYR of Macedonia:**... Study of atomic collisions of highly charged ions in plasma
- Albania:**..... Computational Resources for Lattice QCD

From RENAM and the Institute of Mathematics at the kick off meeting was presented a brief presentation on the problem. (The next 3 slides).

# Adaptive Mesh Refinement (AMR) Methods of adaptive grids

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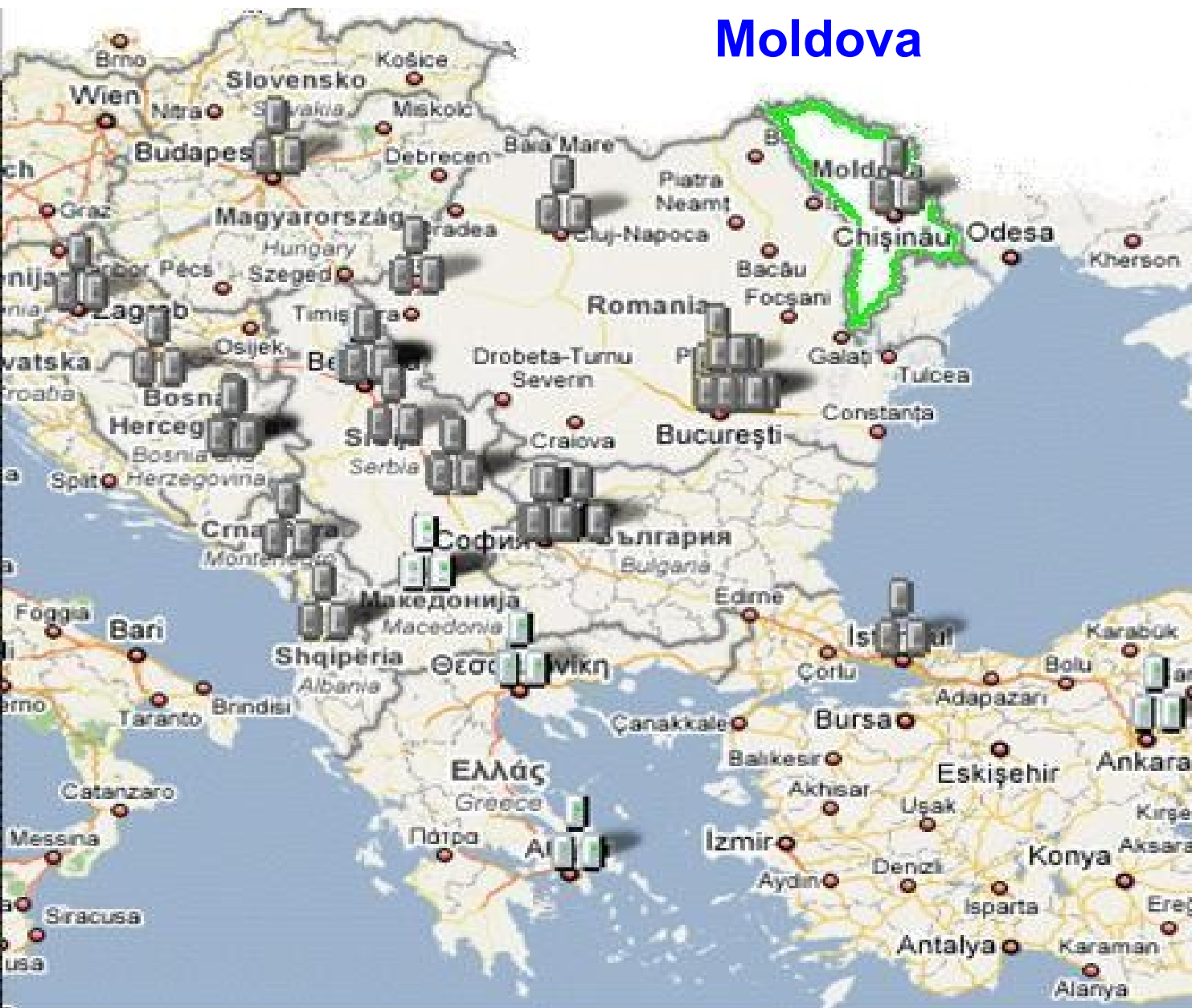
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## Moldova

## South Eastern Europe (SEE)

## RENAM IMI ASM

[www.renam.md](http://www.renam.md)  
[www.math.md](http://www.math.md)





Institute of Mathematics and Computer Science, Academy of Sciences of Moldova (IMI ASM), is involved in development program systems in various applied fields, like programming tools for underground gas storage protection under influence of seismic waves and shocks.

In IMI ASM is installed and operating multi-processor cluster that is used for Grid applications development and for running applications, based on parallel algorithms.





For increase of accuracy of numerical calculations and improvement of algorithms efficiency, recently **methods of adaptive grids (AMR)** are using.

Such approaches allow reducing in ten times of computer time consumption and volume of used memory. These methods are especially effective in problems of **gas dynamics** where shock waves and contact discontinuities arise.

Application of adaptive grids allows investigating processes with a desirable degree of accuracy in areas with complex geometry or the big gradients.

**Method AMR** allows reducing the number of cells and, accordingly, time of calculation. Technology AMR is based on use of hierarchical structure of cells. Thus, to each level of hierarchy there corresponds the level of the spatial and time resolution. Feature of such organization is the opportunity locally, in the dynamic image to add cells in a grid in the given place of settlement area.

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## HP-SEE project consists of 8 Work Packages:

- WP1 – Project administrative and technical management
- WP2** – National and Regional HPC initiatives and international liaison
- WP3** – Dissemination and training
- WP4** – Virtual Research Communities support
- WP5 – Regional HPC operations and interoperation
- WP6 – Procurement and network design
- WP7 – Network operations
- WP8 – Software stack and technologies updates

RENAM involved in WP2 and WP4, with emphasis on the involvement of national communities to the use of regional infrastructure for high performance computing.

IMI ASM task under WP4 - development of HPC applications and deploying them in regional HPC-infrastructure.

Within WP3 RENAM IMI and ASM should be engaged in promoting the project ideas, organize and participate in training events at the national and regional levels.

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The meeting was well organized.

Participants of the kick off meeting:

- discussed methods of solving the Project tasks;
- induct the leaders of Work Packages;
- agreed upon milestones and their dates.

At coffee-breaks participants acquainted with each other, exchange opinions and discuss project details.

Links:

HP-SEE, [www.hp-see.eu](http://www.hp-see.eu)

SEERA-EI, [www.seera-ei.eu](http://www.seera-ei.eu)

SEEREN, [www.seeren.org](http://www.seeren.org)

SEE-GRID, [www.see-grid.eu](http://www.see-grid.eu)

SEE-GRID-SCI, [www.see-grid-sci.eu](http://www.see-grid-sci.eu)

The following slides shows the working points of the meeting.





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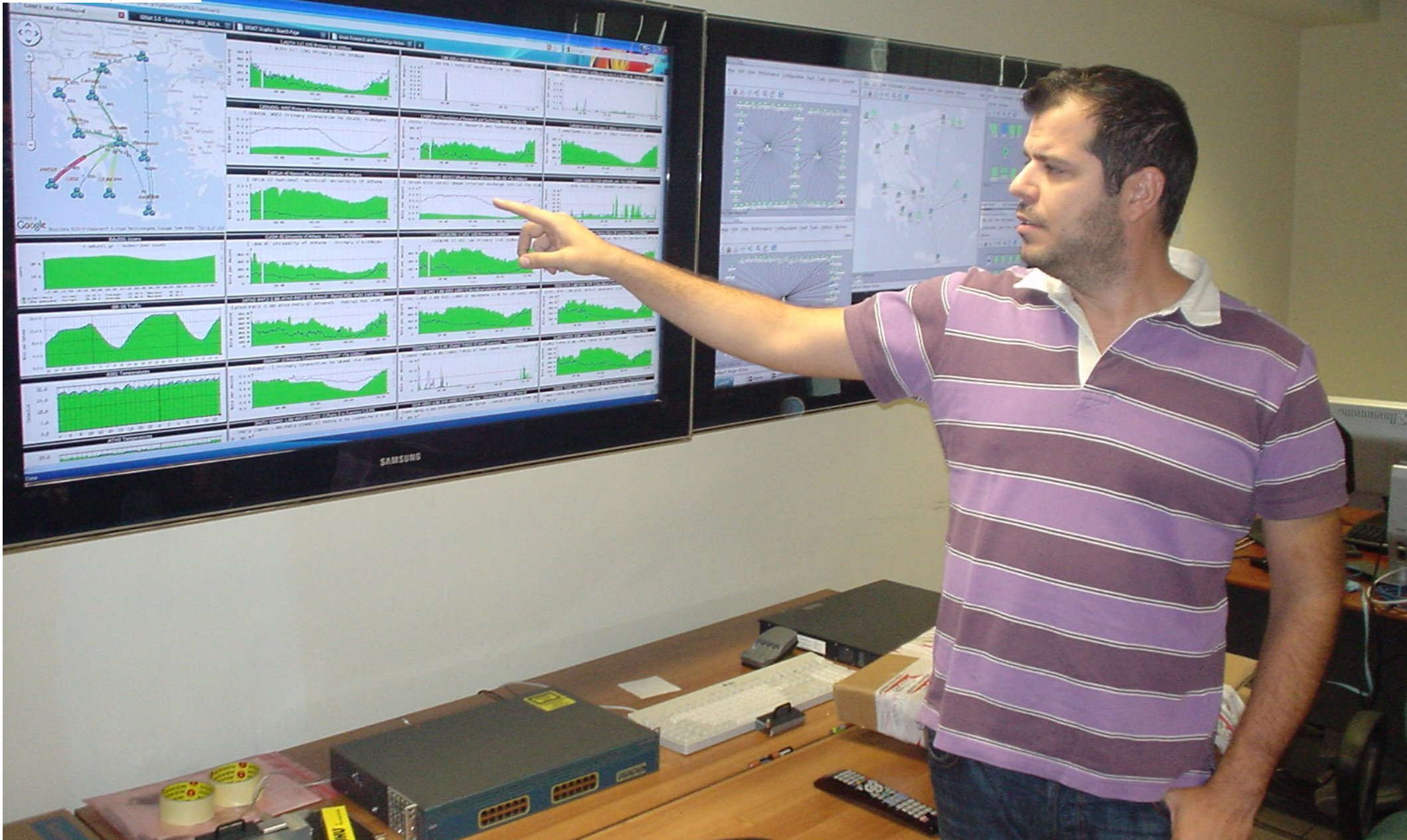




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## Questions ?



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PSC01 – Athens – 06-08 September 2010

**The End**