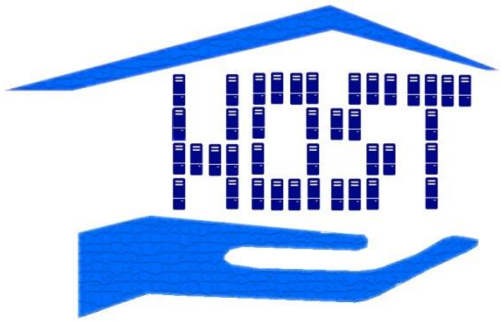

High Performance Computing Service Center

Final Report

Version 1.0
December 31, 2014

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1. Executive summary

The main objective of HOST project was to improve the research capacity and reinforce the scientific and technological potential of the Research Centre in Computer Science of the West University of Timisoara in order to unlock its capacity and make it accessible for European Research Area. The goal of HOST project was the transformation of the centre in the following dimensions:

1. To widen the R&D knowledge and experience of the team in HPC and related topics;
2. To raise the number of users of the data centre services;
3. To achieve the status of national and EU-regional supercomputing centre and of stakeholder in national and international e-Infrastructure initiatives;
4. To be an internationally visible centre specialized in HPC and related topics.

The entire action plan of HOST was devoted to the increase of the coordinator visibility in ERA activities. Achieving this aim is possible only by learning to act in ERA as an excellence centre at a European level. Knowledge and skills needed to achieve such a level can be acquired by following the shortcuts offered by the big players in the field. Therefore, the Action plan included strategic partnership with already internationally recognized centres of excellence in the topics of the project.

The topics of the mobilities to and from the strategic partners, were focused on: (a) acquiring new research skills; (b) acquiring knowledge on the management of large HPC and research centres; (c) acquiring knowledge of the software services in HPC centres. The level of knowledge of existing personnel in parallel and HPC topics was updated to a level compatible with the participation in EC collaborative programmes FP7/H2020. The quality of this level was checked in different contexts, e.g. by the scientific communities for published papers (more than forty papers).

The recruitment of new personnel was seen as a mean to encourage: (1) the return of nationals having left the country; (2) the return to a research position after an industrial experience; (3) the raise the level of the research centre from a national to an international one; (4) attract researchers from other teams in the region; (5) carrier development for young talents who already worked with the team; (6) refresh the list of the research topics and increase the quality of research activities.

Several actions (e.g. open access programme, national workshops) were dedicated to the identification of regional and European potential users of the services offered by the coordinator, as well as to the creation of opportunities to increase the contribution to the economic and social environment. An open access programme in the frame of HOST to the HPC center e-infrastructure for co-nationals and European researchers has allowed more than forty research groups to benefit from the HPC center resource availability on-site or remotely. Through its training activities, HOST intended to create job opportunities for young researchers studying HPC in Romania, to reinforce human potential and decrease brain drain.

HOST improved the communication between the coordinator and research entities having similar or complementary scientific interests. In this context, the number of participations to FP7/H2020 projects was increased as result of face-to-face visits, brokerage events and InfoDay participations as well as through the publicity of the coordinator activities with the occasion of the scientific events (organised locally or regular/invited participation to well-known scientific conferences). More than forty collaborative project proposals were already submitted, six of them being already selected for funding by the European Commission.

The project led to a substantial development of the centre in terms of personnel and equipment but also in terms of a strengthening of its status at a national, at European and international level as centre of excellent research and provider of know-how in HPC. Consequently it was invited to represent the country in PRACE and EGI Councils and new European initiatives like PLAN-E and to contribute to more than twenty proposals for FP7/H2020 calls.

The project had also a strong multi-cultural impact due to the fact that partners from 5 European countries were involved, one Greek researcher was employed in the Romanian team, and through open access program secondment stages for researchers from Slovenia, Spain and Italy were sustained.

2. Project context and the main objectives

The Research Centre in Computer Science from the West University of Timisoara, specialized in distributed and parallel computing, as well as artificial intelligence, aims to be internationally recognized as an excellence centre in HPC. The fast development of the centre in the last years led to a big pressure on the available researchers of the centre and has revealed the following needs:

(a) knowledge improvement of the current personnel in what concerns the collaboration skills and R&D marketing in an European context, the latest R&D in HPC and its applications, the exploitation of the powerful infrastructure and the governance mechanisms based on most successful models at comparable data centres;
(b) hire and retain specialized personnel for scientific and technical support for the end-users of the applications running on the infrastructure, technical support for the equipment, and for building a service platform for supporting remote users of the infrastructure;
(c) equipment acquisition and exploitation to complement existing one with novel specific devices and find scientific and commercial users of it;
(d) raising the awareness of the availability of HPC services and R&D competences of the centre at the national and international level through participation at relevant scientific events, publishing more intensively the R&D results of the centre, organization of training events, attracting foreigners to work with the centre personnel and equipment, and initiate collaborations with potential partners in new EC projects related to HPC.

In this context, the ***main objective*** of HOST project was to improve the research capacity and reinforce the scientific and technological potential of the Research Centre in Computer Science of the West University of Timisoara in order to unlock its capacity and make it accessible for European Research Area. The goal of HOST project was the transformation of the centre in the following dimensions:

5. To widen the R&D knowledge and experience of the team in HPC and related topics;
6. To raise the number of users of the data centre services;
7. To achieve the status of national and EU-regional supercomputing centre and of stakeholder in national and international e-Infrastructure initiatives;
8. To be an internationally visible centre specialized in HPC and related topics.

Each work package in the work plan of the project correlates with the above-stated dimensions by involving the specific objectives summarized below:

O-WP1 Improve the existing knowledge
O-WP2 Reinforce the research capacity
O-WP3 Promote and exploit the knowledge and capacity
O-WP4 Ensure the achievements of the proposed plan

Through the HOST project, the centre expects to exploit to a higher level its potential for research and technological innovation and to emerge as an internationally competitive centre of excellence, integrated firmly into the European Research HPC landscape, by the time of the completion of HOST project.

3. Main S&T results/foregrounds

3.1 Improve the existing knowledge

Aiming to achieve the first objective, *the secondments at the project partners* have offered to HOST coordinator team members the opportunity to increase their level of knowledge in HPC topics, in applications of HPC for scientific and commercial problems, and in providing HPC services towards the scientific community.

The *hosting of researchers from partner institutions* was an opportunity to deliver lectures, conduct short trainings and to participate in the research activities of the HOST team.

In the framework of an *open access programme*, several researchers needing HPC support had the possibility to visit the HOSTing institution and to conduct experiments on the HPC infrastructure in collaboration with the HOST team.

New strategic partnerships have been targeted through bilateral short visits of leading researchers, participation to brokerage events, discussions and meeting about collaborative projects. The secondments have follow-ups in terms of articles, software prototypes, collaborative project proposals, long term bonds for collaborative research. The number of new trustful contacts is raised to more than forty, and the number of project proposals as result of new contacts is more than thirty.

3.1.1 Achieving the objectives

The secondment and training activities addressed several objectives:

- O1.1 Augment the R&D experience and knowledge of the HOSTing team to reach the level of an European excellence centre
- O1.2 Exchange of know-how and experience with the partner teams and other specialists in the field of HPC services
- O1.3 Attract foreign specialists to work with and in the centre through an collaborative open access programme
- O1.4 Establish new collaborative R&D relationships and improve the existing ones in order to increase the participation of the HOSTing team in collaborative projects and to exploit the knowledge acquired during the project

Several types of secondment, training and collaborative activities, have been scheduled, as follows.

Secondments at partner organisations

The task activities offer to HOST team members the opportunity to increase their level of knowledge in HPC topics, in applications of HPC for scientific and commercial problems, and in providing HPC services towards the scientific community.

Strong scientific bond was established with the UEX team, reflected in the current inter-connected research activities and four publications. Beyond the scientific activities, the visits at PSNC and EPCC were also targeting the development of common H2020 proposals. The visits at CINECA had a strong training character, while the visits at INRIA have targeted the identification of new fields for potential collaborations.

Sixteen secondments have followed the plan (Table 1).

Table 1 Secondents at project partner premises

Partner	*Person*	*Period*	*Type*	*Topics*
EPCC	Claudiu Biris	December 2012	short visit	HPC operations
	Viorel Negru	January 2014	short visit	HPC user support
	Dana Petcu	January 2014	short visit	HPC research services
PSNC	Cristina Marinescu	December 2012	short visit	Parallel tools platform
	Marian Neagul	December 2012	short visit	Remote access for HPC research services
	Marian Neagul	September 2013	short visit	Benchmarks for HPC
	Daniel Pop	November 2014	short visit	HPC scientific applications
UEX	Alexander Agathos	January 2013	long visit	Hyperspectral data processing using HPC
	Alexander Agathos	January-February 2014	long visit	Large scale appls in Earth Sciences
	Mihail Gaianu	Nov 2013-Jan 2014	long visit	GPU usage in data processing
INRIA	Cristina Marinescu	November 2013	short visit	Heterogeneous computing
	Daniel Pop	February 2014	short visit	Event-driven communications
CINECA	Dana Petcu	September 2012	short visit	HPC for engineering
	Marian Neagul	September 2012	short visit	HPC operations
	Cristina Marinescu	May 2014	short visit	HPC for engineering
	Mihail Gaianu	May 2014	short visit	HPC for mathematics and physics

Hosting researchers from partner institutions

The scheduled activities supposed to deliver lectures, conduct short trainings and to participate in the research activities of the HOST team.

Four secondments have followed the plan (Table 2).

Table 2 Secondments at coordinator premises

Partner	*Person*	*Period*	*Type*	*Topics*
PSNC	Mariusz Mamonski	September 2012	short visit	HPC services benchmarking and profiling
UEX	Jorge Sevilla Cedillo	September-October 2012	long visit	Remote sensing data processing
	Luis Ignacion Jimenez	September 2013	short visit	Natural computing for Earth sciences
	Jorge Sevilla Cedillo	September-October 2013	long visit	GPU in data processing

The communication with Mariusz concerning the PSNC tools installation and usage for benchmarking purposes on HOST site is still on-going.

In the first secondment, Jorge has worked with Alexander and they have proposed a common paper for a journal. Jorge will come back at HOSTing team in September 2013 for one additional month.

In the second secondment, Jorge has worked with the local team and presented a paper, result of previous secondment, to the HOST international workshop from September 2013.

Open access programme

In the frame of this programme it has been offered to any researcher needing HPC support the possibility to visit the HOSTing institution and to conduct experiments on the HPC infrastructure in collaboration with the HOST team.

Seven visits have followed the plan (Table 3).

Table 3 Secondments in open access programme at coordinator premises

Partner	*Person*	*Period*	*Type*	*Topics*
University of Sannio	Mauro Turtur	February 2014	short visit	HPC applications in science
University Carlos III of Madrid	Gabriel Castane	October-November 2014	long visit	Self-organizing systems-based on HPC
	Alberto Garcia	November-December 2014	long visit	HPC applications in economy
Autonomous University of Barcelona	Debora Gill	June 2013	short visit	HPC applications in medicine and biology
	David Roche	June 2013	short visit	Artificial intelligence for and using HPC
Stefan Josef Institute, Slovenia	Matjaz Depolli	July 2012	short visit	HPC applications in material sciences
	Gregor Kosec	July 2012	short visit	HPC applications for environmental problems

The visit of the Spanish team is related also to a FP7 project proposal and another visit of a HOSTing member, Daniela Zaharie at Barcelona (invited in April 2013 by the Spanish team to establish scientific collaborations); clear collaboration paths were established. The Slovenian team has found common research topics for further collaborations with Claudiu Biris. Clear collaboration paths were established; two H2020 proposals were submitted together with the team from University Carlos III of Madrid, and the visit from University of Sannio enhanced the collaborative relationship and common understanding of the partner skills involved in an on-going FP7-ICT project, started in late 2013.

New strategic partnerships

The activities were included bilateral short visits of leading researchers, participation to brokerage events, discussions about collaborative projects. The HOSTing team has put a considerable effort in this task, as one that can ensure, through the new collaborative projects, the sustainability of the RTD activities of the team at an European level. The actions were covering a wide spectrum:

- **S**hort visits at potential collaborators
- Meetings related to the settings of collaboration projects
- Participation at brokerage events and information days

The subjects of the mobilities are mentioned in Table 4.

In first half of the project, proposals for new projects were sent to 7 different objectives, ranging from pure computer science ones (Software Engineering, Services and Cloud Computing and Trustworthy ICT) to applied fields (Smart Cities or Sustainability and Social Innovation) prove a broadening of the experience and knowledge of HOSTing team members.

In the second half of the project, FP7/H2020 project proposals were sent to 9 different calls and 12 objectives, ranging from pure computer science ones (ICT) and infrastructures (INFRASUPP, E-INFRA) to future emerging technologies (FET) and human resources (MSCA, PEOPLE, GERI), prove a broadening of the experience and knowledge of HOSTing team members. Other calls for collaborative projects at European level have been also addressed (COST, Chist-ERA, EGI).

Beyond the partnerships established for various project proposals, formal strategic partnerships for joint research projects were established through the visit at HOSTing site of key decision personnel with Technical University of Moldavia and University of Information Technologies from Macedonia. Other visits were related to new collaborations with Cloud Competence Center of University of Linz and University of Milano-Bicocca.

Table 4 Mobilities for new partnerships

Type	*Person*	*When*	*Where*	*Aim*
Short visits	Dana Petcu	January 2013	Madrid	follow-up a COST project proposal
	Daniela Zaharie	April 2013	Barcelona	FP7-ICT project proposal
	Darian Onchis	Mar, Jun, Oct 2014	Vienna	preparation of a H2020 proposal
	Mihail Gaianu	Mar 2014	Vienna	scientific cooperation & proposal prospect
	Darian Onchis	Apr&Jul 2014	Marseille	scientific cooperation & proposal prospect
	Mihail Gaianu	Jul 2014	Marseille	scientific cooperation& HPC center presentation
	Madalina Erascu	Jun&Aug2014	Koblenz	scientific cooperation& proposal prospect
	Isabela Dramnesc	Oct 2014	Linz	discuss about potential H2020 collaborations
	Mihail Gaianu	Nov 2014	Barcelona	HPC center presentations for collaboration
Brokerage events	Florin Fortis	September 2012	Warsaw	follow up an FP7-ICT project proposal
	Daniel Pop	July 2012	Berlin	new consortium that submitted a proposal to FP7-SMARTCITIES call
	Daniel Pop	Jan 2014	Luxembourg	EC H2020 InfoDay, search for partners
	Dana Petcu	Feb 2014	Brussels	InfoDay Infra
	Viorel Negru	Feb 2014	Brussels	InfoDay Infra
	Stelian Mihalas	Mar 2014	Dublin	Research Data Alliance Meeting
	Stelian Mihalas	Jun 2014	Budapest	FET Open/HPC InfoDay
	Stelian Mihalas	Jul 2014	Brussels	InfoDay Spreading Excellence
	Florin Fortis	Oct 2014	Florence	ICT Proposal Days
Meetings for proposals	Daniel Pop	April 2012	Essen	follow-up an Erasmus Mundus project proposal
	Daniel Pop	July 2012	Berlin	Kick-off an FP7-ICT project proposal
	Daniel Pop	Sept 2012	Linz	Follow-up an FP7-ICT project proposal
	Dana Petcu	December 2012	Munchen	follow up an FP7-ICT project proposal
	Dana Petcu	June 2013	Bucharest	National HPC strategy and community building
	Florin Fortis	Mar&Apr 2014	Brussels	preparation of a H2020-ICT proposal

3.1.2 Main results

The main results can be resumed as follows:

1. The secondments have follow-ups in terms of articles (+15), software prototypes (5 on-going), collaborative project proposals (30), and long term bonds for collaborative research
2. The number of new trustful contacts is more than 40
3. The number of project proposals as result of new contacts is more than 25
4. Three new project proposals were submitted together with the partners, and two papers
5. Six project proposals were accepted for funding – an FP7-ICT with PSNC; another one in FP7-ICT, and a CIP-IST; a COST Action with INRIA and led by a new contact (Madrid); two H2020-ICT under contracting (a third of the proposals are still under evaluation).

3.2 Reinforce the research capacity

Aiming to achieve the second objective, the infrastructure capacity was expanded to a level that is compatible with the equipment available in European excellence centers, being the most powerful supercomputing centre in Romania and second in Balkans after Sofia's National Centre for Supercomputing Applications. The new equipment was ready for their usage starting from the 10th month of the project.

Three support people were hired for the project: an engineer with responsibilities in the project related to supercomputing facilities of the centre and the user support; a technician responsible for the clusters maintenance and integration; a second technician responsible for the networking facilities of the research centre and code development.

Five experienced researchers were hired to conduct research activities in: (1) Cloud computing technologies for HPC service exposure; (2) scheduling algorithms and techniques; (3) parallel computing in remote data processing; (4) large scale numerical computations; (5) HPC-based intelligent services. The new researchers were quickly integrated in the HOSTing team and established effective working relationships with the project partners. The research activities are reflected in more than thirty publications in journals and conference proceedings. Software service prototypes are available too.

3.2.1 Achieving the objectives

The main objectives of the group of activities were:

- O2.1. Wider the offer and raise the quality of the R&D services currently offered to the community by the HOSTing team to a level of European excellence
- O2.2. Raise the degree of infrastructure usage by developing useful and new services based on the high performance infrastructure
- O2.3. Expand the infrastructure capacity to a level that is compatible with the equipment available in European excellence centers
- O2.4. Ensure the technical support for the infrastructure to increase the number of its users and collaborators with the HOSTing team

In order to achieve these objectives the following specific activities were conducted by the HOSTing team, organized in three tasks.

Infrastructure improvements and usage

A GPU cluster was acquired and multiple other equipments needed by the HPC center for integration and extensions of the existing equipment (Figure 1). The new equipment was ready for starting from October 2012. Monitoring and tracking of the usage of the equipment is done continuously.

The activities were related to the monitoring and tracking of the usage of the HPC center equipment.

The number of users of the e-infrastructure served in the frame of HOST project has been increased to almost forty.

In the second half of the project, small equipment was acquired (video-projector), several faulty hardware components were replaced and the lab conditions were further improvement (new floor coverage).

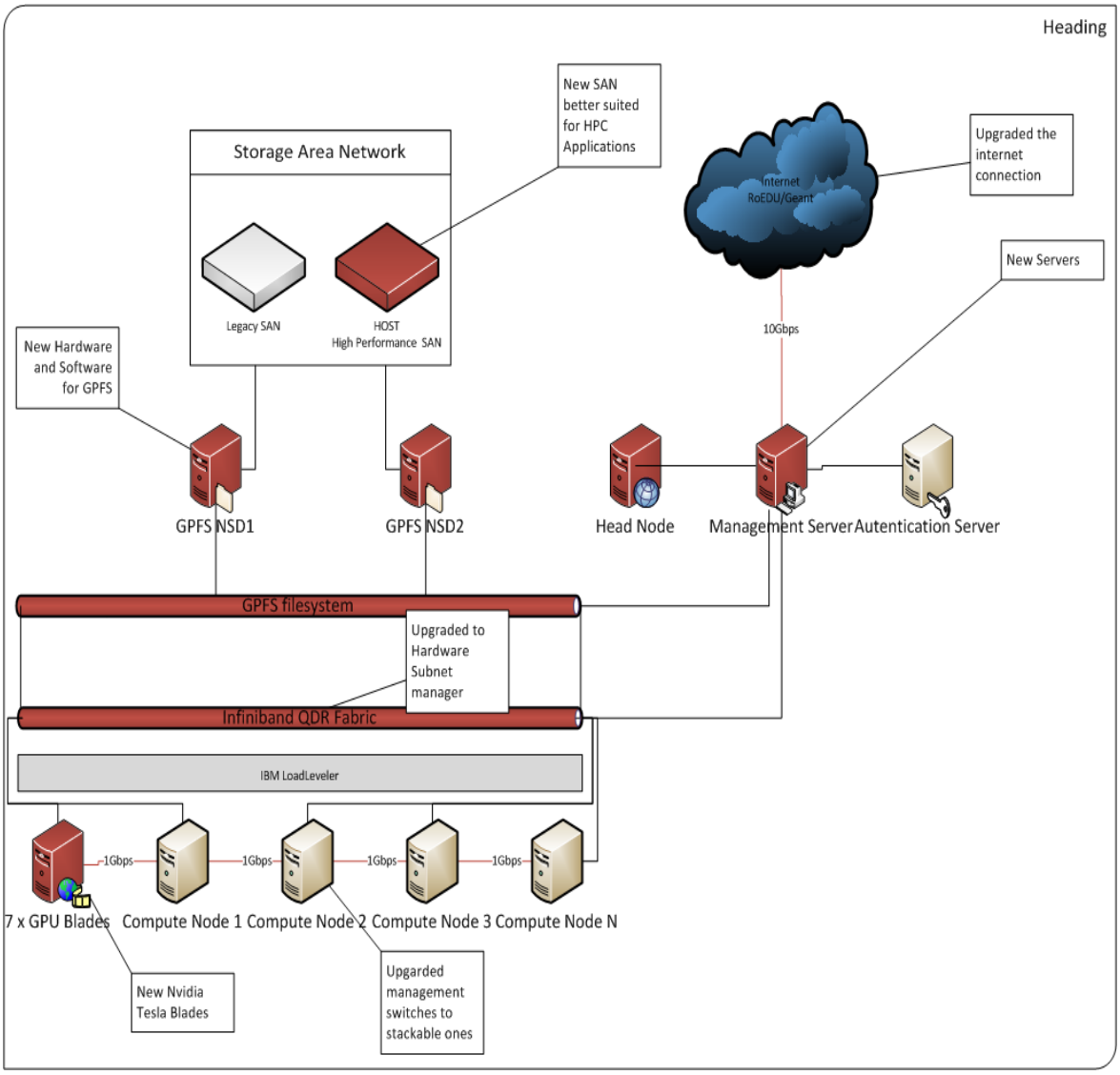


Figure 1. Layout of the HPC infrastructure after HOST upgrades (in red the HOST contribution)

Technical support

Three persons activated in the frame of the task:

1. Position 1, Engineer, Mr. Silviu Panica, MSc, with responsibilities in the project related to supercomputing facilities of the centre and the user support;
2. Position 2, Technician 1, Mr. Marian Neagul, MSc, with responsibilities in the project related to the clusters maintenance (including the new HOST equipment) and integration;
3. Position 3, Technician 2, Mr. Alin-Ioan Paulesc, BSc, with responsibilities related to the networking facilities of the research centre and code development.

The access, programmability and interaction with the e-infrastructure was documented and is presented on-line (Figures 2-4). The infrastructure description and the documentation needed to work with it are available at http://hpc.uvt.ro .

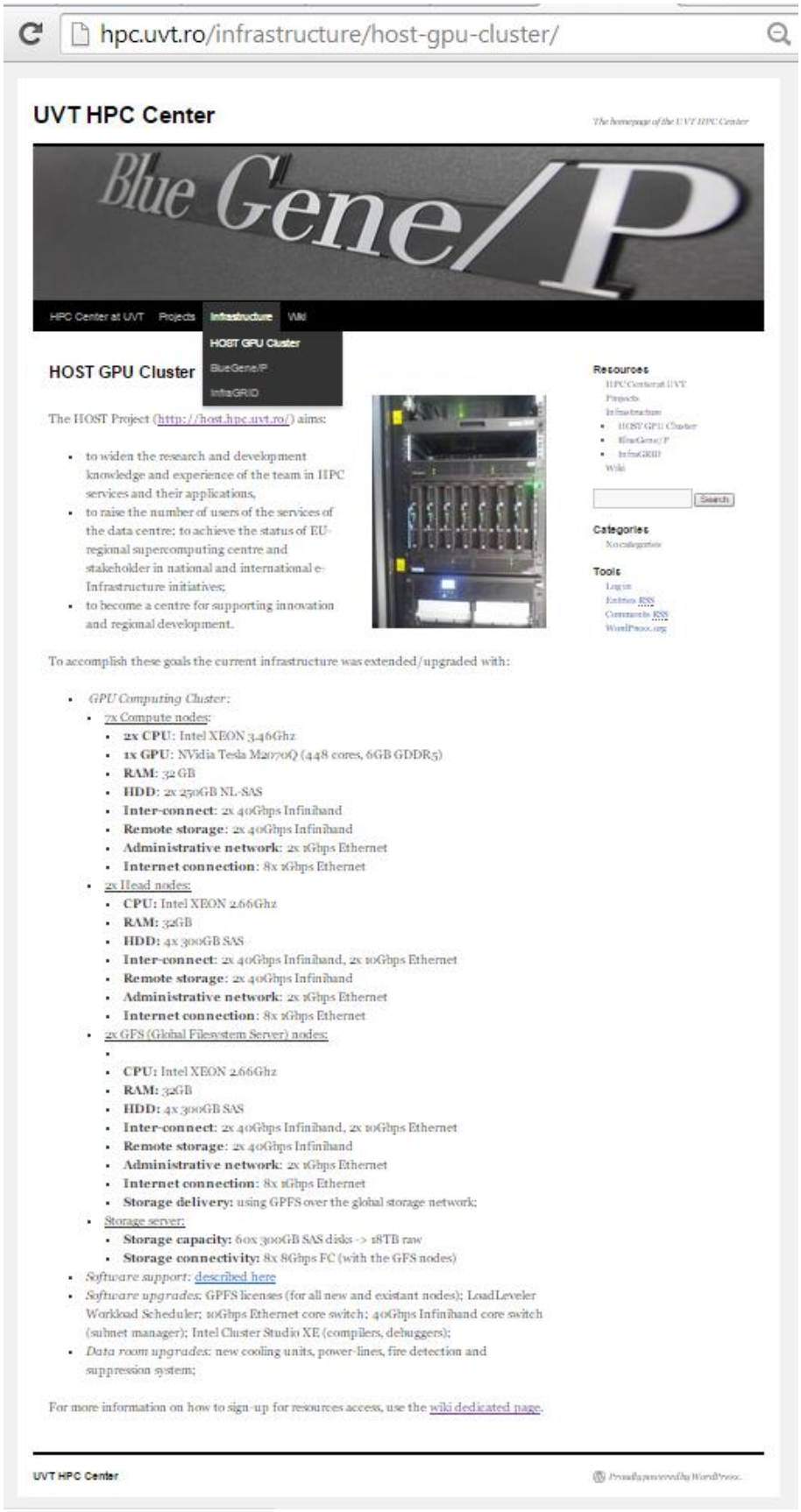


Figure 2. HOST GPU Cluster presentation

Figure 3. On-line help for the application execution

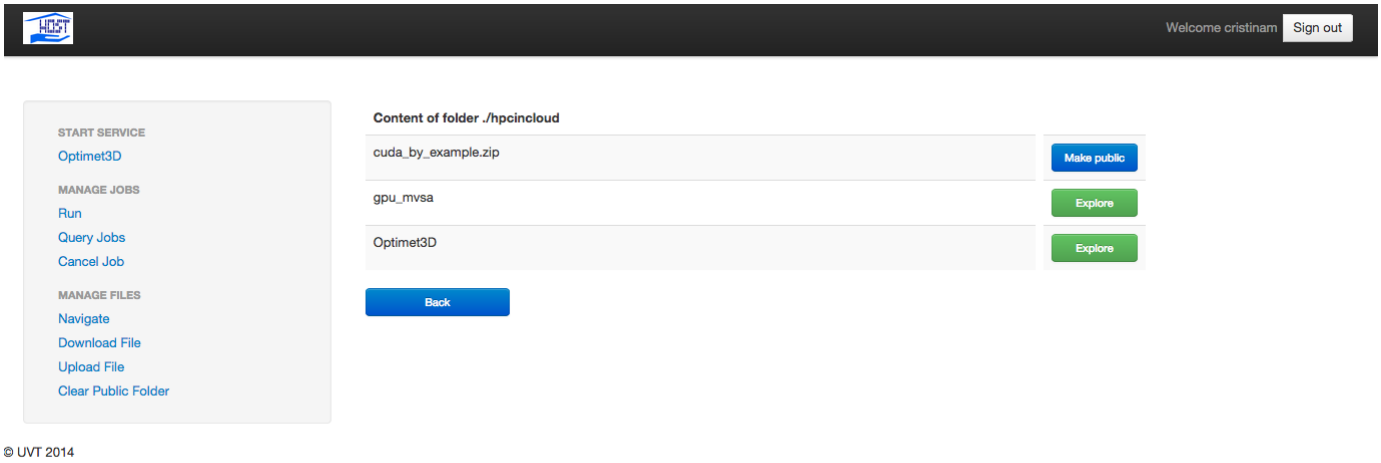


Figure 4. Cristina Marinescu: HPCaaS Prototype – The Navigate Service for browsing the files on the Data Center

Beyond the user support, equipment maintenance and connectivity, six training sessions were sustained by the first two employees for potential users of the e-infrastructure (Figures and 5).

Figure 5. Snapshots from the training videos at national workshops:
(top) Marian Neagul in April 2012 - https://www.youtube.com/watch?v=FBR6fbCAxaE
(bottom) Silviu Panica in July 2014 - https://www.youtube.com/watch?v=ygv26QVTi-0

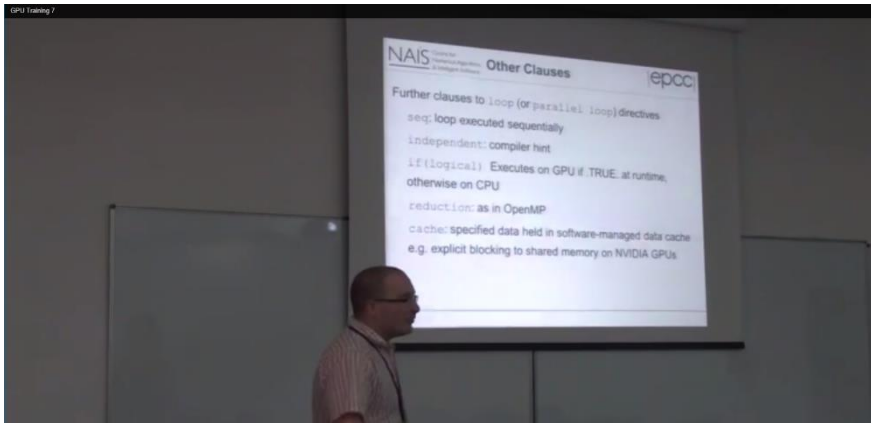


Figure 6. Snapshot from the training videos at international workshops: Adrian Jackson from EPCC in September 2014 - https://www.youtube.com/watch?v=R9Xk8kPRoOk

Human resources

The positions were filled as explained in Table 5.

Table 5 Research positions

No	*Position*	*Period*	*Who*	*Experience*
1	Research in Cloud computing technologies for HPC service exposure	Sept 2012-Dec 2014	Cristina Marinescu	experience in software engineering and development
2	Research in scheduling algorithms and techniques	Feb 2012-Oct 2012	Marc Eduard Frincu	scheduling techniques in distributed computing
		Jan 2014 – Dec 2014	Darian Onchis	parallel computing
3	Research in parallel computing in remote data processing	Sept 2012-Dec 2014	Alexander Agathos	image processing
4	Research in large scale numerical computations	Apr 2012 – Feb 2014	Claudiu Biris	numerical computational methods
		Mar 2014 – Dec 2014	Alexandra Popescu	numerical computations
5	Research in HPC-based intelligent services	Apr 2012 – Dec 2014	Daniel Pop	experience in artificial intelligence and project management

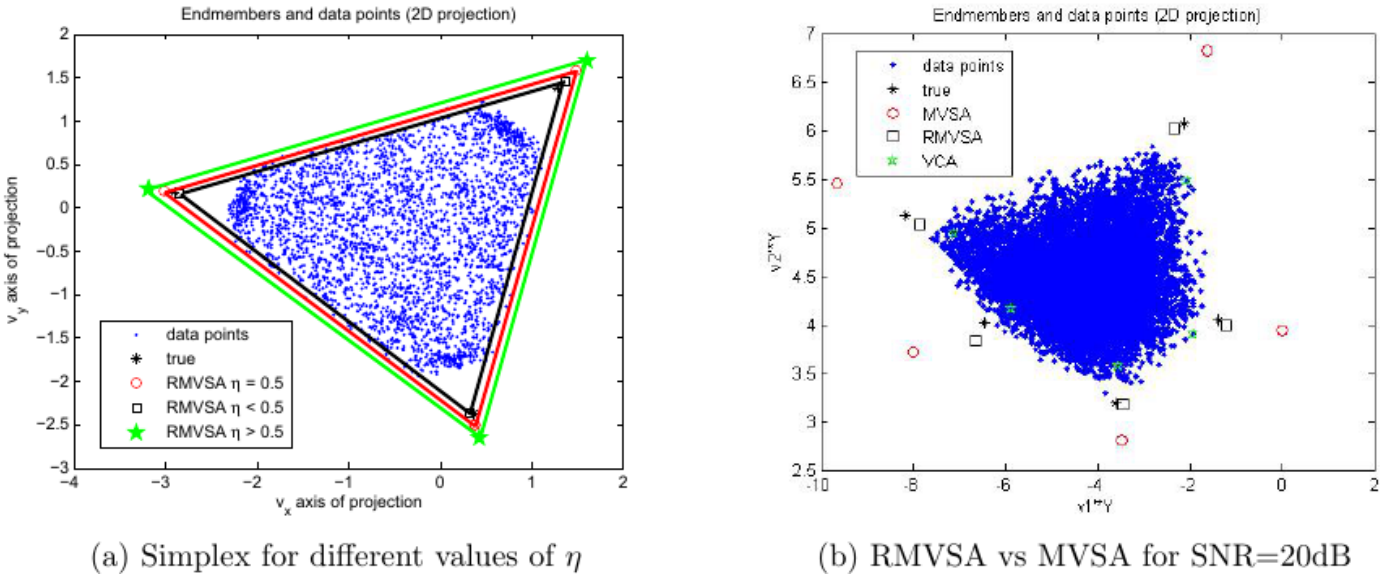
The availability of the research positions was announced through different media channels, including project's web site and announcements on specialized forums and professional groups. Two rounds of announcements were performed, in February 2012 and May 2012. Recruitment information was disseminated on different web sites, mostly related with academia and research careers and also professional groups related to computer science (HPC, distributed computing, cloud computing and others). Among these web sites and professional groups, the following were accessed: Euraxess, EuroScience, ResearchGate, Sci.Research.Postdoc, Math jobs, HPC groups, Distributed Computing groups, Google/Usenet and Linkedin groups. Around thirty applications were received, allowing filling the five available positions.

The availability of the 2nd research position in 2013 (from M11 of the project) has triggered the need to repeat for the third time (relative to the full duration of the project) the call for filling the research position announced through different media channels, including project's web site and announcements on specialized forums and professional groups. Six applications were received, allowing to fill the available positions. The 4th position was also left in M26

of the project, but a replacement was found fortunately in short time, from the same research group in which Claudiu Biris has activated (with similar competences and research interests).

The new researchers were quickly integrated in the HOSTing team and established collaboration relationships with the project partners: Ms. Marinescu with PSNC team (testing and integration of PSNC tools at HOSTing team site), Mr. Agathos with UEX team (papers and software prototypes), Mr. Claudiu Biris with EPCC (training).

The research activities are reflected in 28 articles. Software service prototypes are available too. Some exciting images from the papers are presented in Figures 7-13.



(a) Simplex for different values of η (b) RMVSA vs MVSA for SNR=20dB

Figure 7. Alexander Agathos:
Endmembers and data points

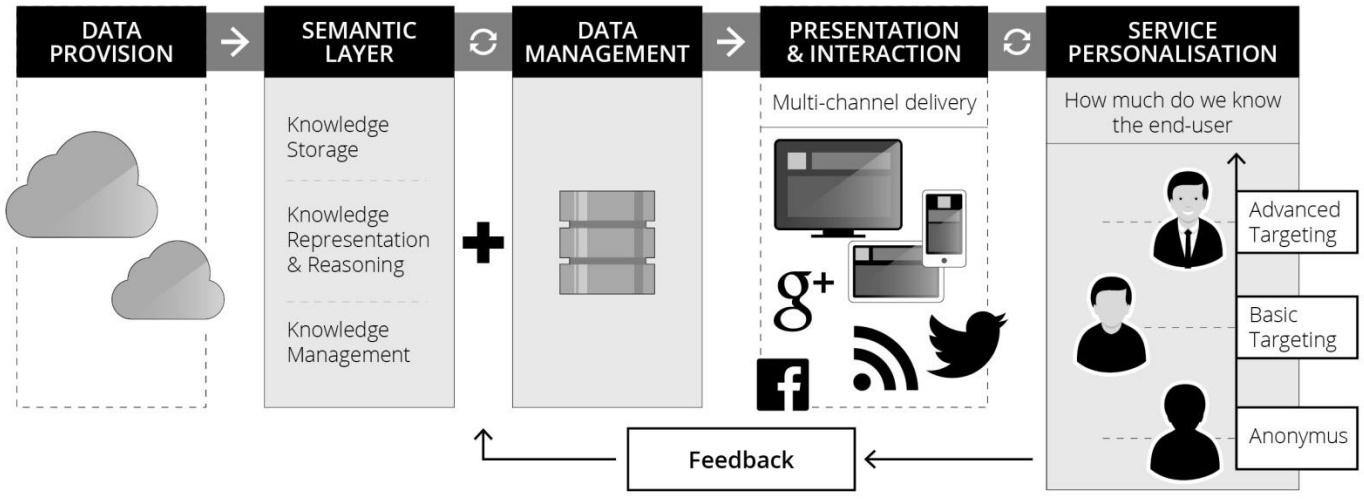


Figure 8. Daniel Pop et al:
Semantic platform for Public Service Advertisement

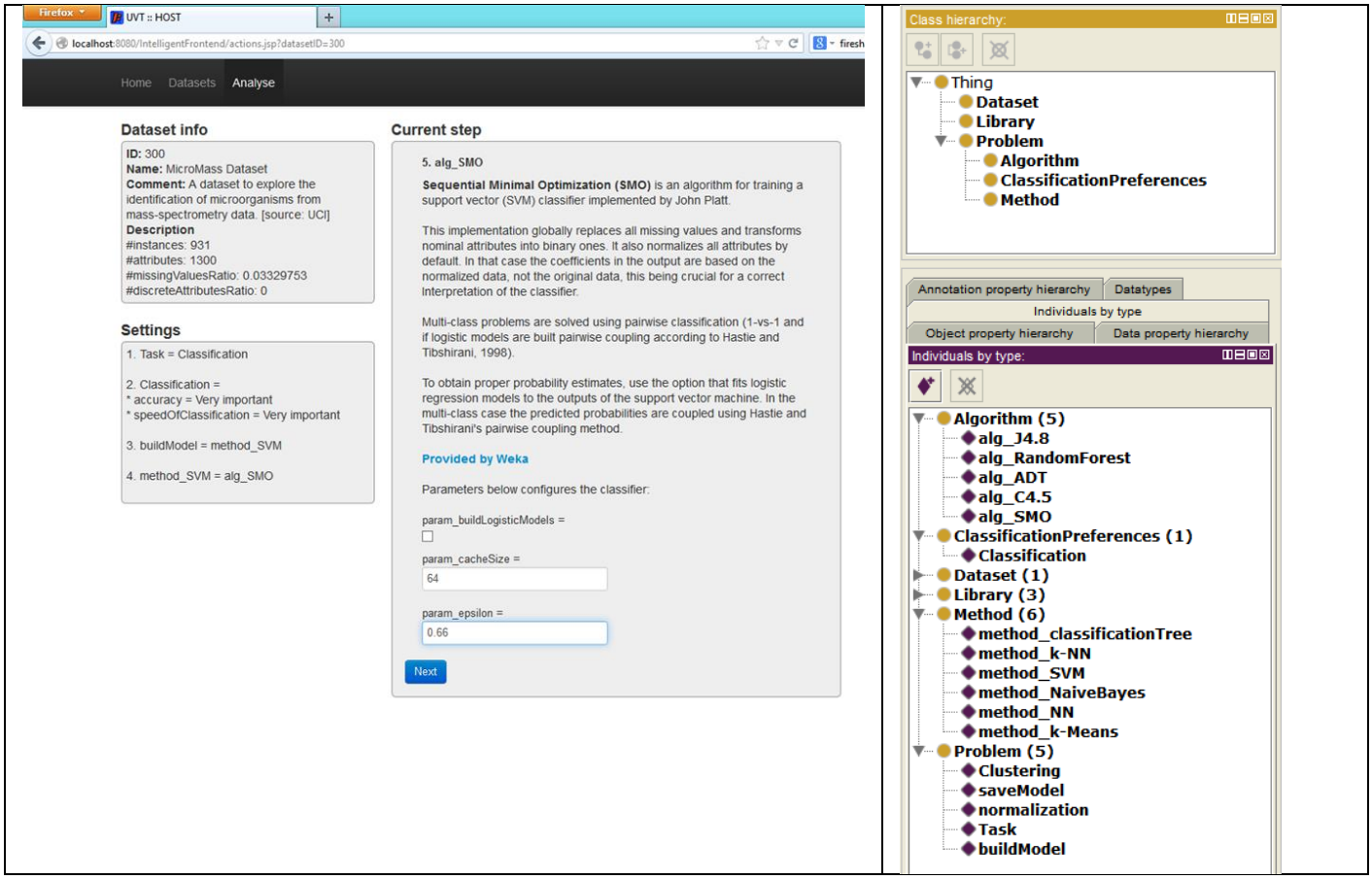


Figure 9. Daniel Pop at al:
GUI screen-shot and Ontology

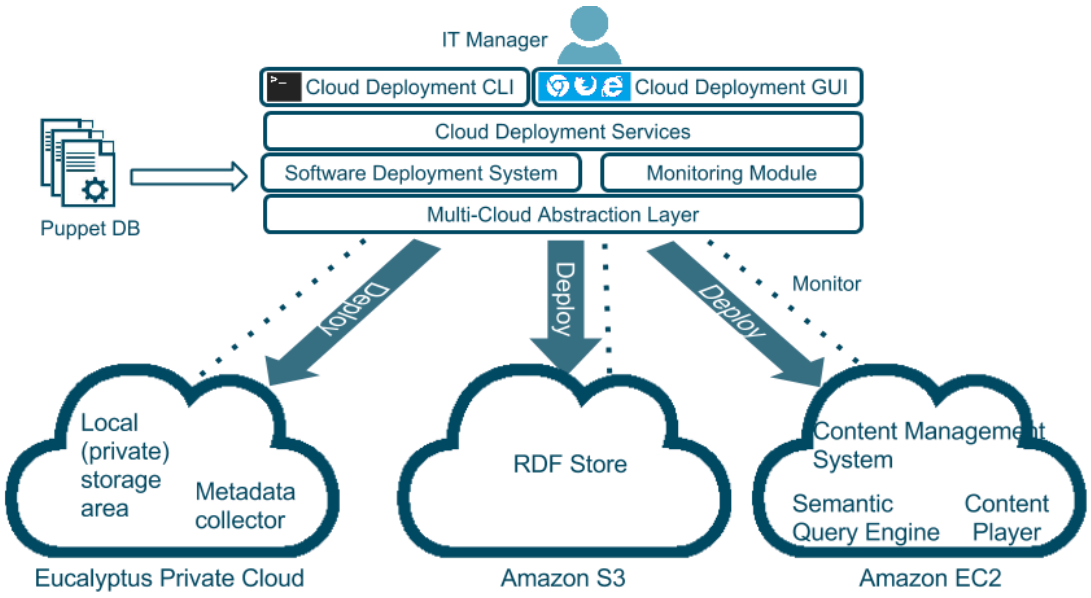


Figure 10. Daniel Pop, Marian Neagul et al:
Cloud Deployment

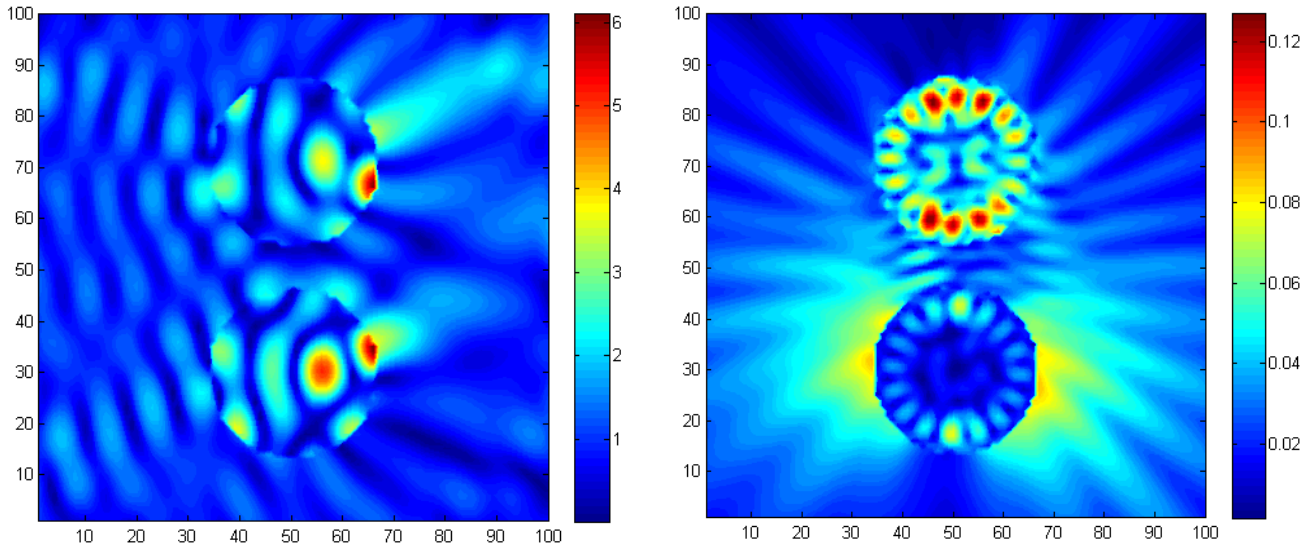


Figure 11. Claudiu Biris et al:
Electric field distribution for a Si sphere dimer at the Fundamental Frequency (left panel) and Second Harmonic (right panel).

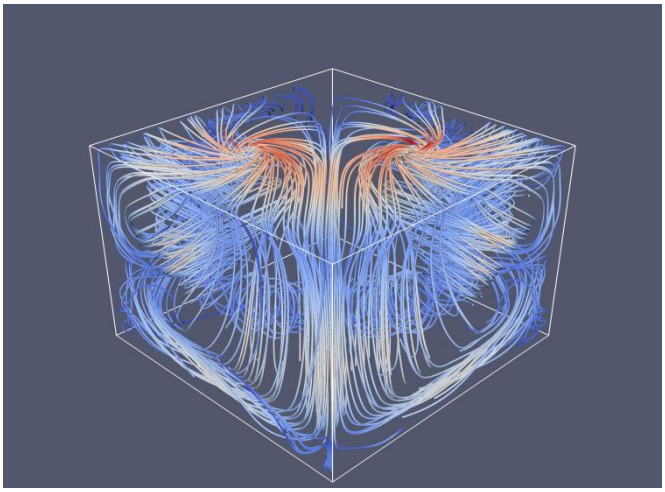


Figure 12. Alexandra Popescu et al:
Particle tracking plots for different combination of the input parameters

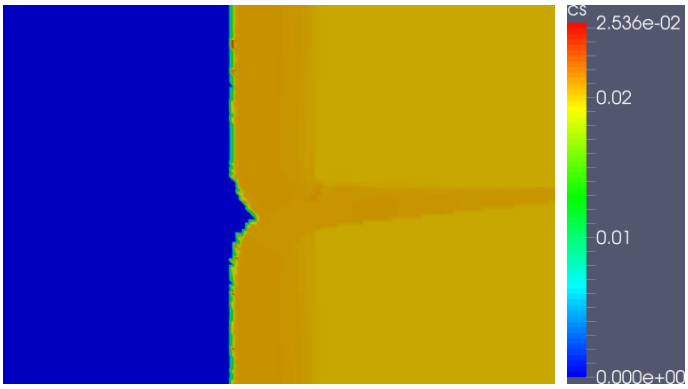


Figure 13. Alexandra Popescu et al:
Concentration in the solid in the region around the solid liquid interface at different time steps.

3.2.2 Main results

The main results can be resumed as follows:

1. The timely acquisition and installation of the equipment (upgrading from 14 TFlops beginning of HOST to 18 TFlops today)
2. Employments for all positions with highly qualified personnel
3. Smooth integration of personnel and equipment
4. Availability of research results and software prototypes
5. Intensive usage of the new equipment by the new researchers and external users
6. Shift of the interest of the users from the old equipment to the new HOST equipment

3.3 Promote and exploit the knowledge and capacity

Aiming to achieve the third objective, seven workshops were organized:

(1) WPCI - Workshop on Clouds, Cluster and HPC Infrastructures, in April 2012;
(2) WoHS – International Workshop on HPC Services, in September 2012;
(3) WeIPS - Workshop of e-Infrastructure for Public Sector, in March 2013;
(4) HPCSP – Workshop on HPC for Scientific Problems, in September 2013;
(5) Workshop on Intellectual Properties in ICT and e-Infrastructures, in March 2014;
(6) Workshop of e-infrastructures for society, in July 2014;
(7) HPCReS – Workshop on HPC Research services, in September 2014.

More than 300 participants were registered to these events. The project partners have consistently contribute to the success of these events. Moreover, multiple training sessions and tutorials were also organized to create the confidence in knowledge and skills of the HOSTing team as well as to expose the availability of the HPC services and the ways to exploit them.

HOSTing team mobilities were scheduled in order to attend high level scientific events in HPC and software services. Also, attendance to specialized training events was planned. So far, the HOSTing team has participated at more than forty events for HOST activities dissemination. Six members have participated to international training events or delivered lectures to international summer schools.

3.3.1 Achieving the objectives

The main objectives of the workpackage devoted to dissemination (WP3), as specified in the HOST workplan, are:

O3.1. Disseminate the achievements of the HOSTing team and facilitate this dissemination by organizing international and national events.
O3.2. Raise the skills level in the fields of HPC and Cloud by assimilating the knowledge presented at the scientific events.
O3.3. Raise awareness about the HOST aims and opportunities through the web site, publicity materials or participation in informal meetings.

In order to achieve these objectives the following specific activities were conducted by the HOSTing team, organized as follows.

International workshops on HPC services

The WoHS – International Workshop on HPC Services was organized in September 2012 in conjunction with SYNASC conference (its 14th edition, Figure 14). The event attracted more than 60 participants, 7 researchers from the project partners, 6 invited talks and has included an HPC training and several satellite workshops on the project topics. HOST project was promoted through the presentations, flyers and posters. The collaboration discussions initiated at the event have led to two project proposals for FP7-ICT Call 11, both approved for funding. A HOST meeting with the partners has also took place.

Figure 14. Participants at event from September 2012

The HPCSP – International Workshop on HPC for Scientific Problems was organized in September 2013 in conjunction with SYNASC conference (its 15th edition). The event attracted more than 40 participants, 4 researchers from the project partners, 6 invited talks and has included an HPC training and 4 satellite workshops on the project topics (Figure 15). HOST project was promoted through the presentations and posters. A HOST meeting with the partners has also took place, and a special session for project collaborations.

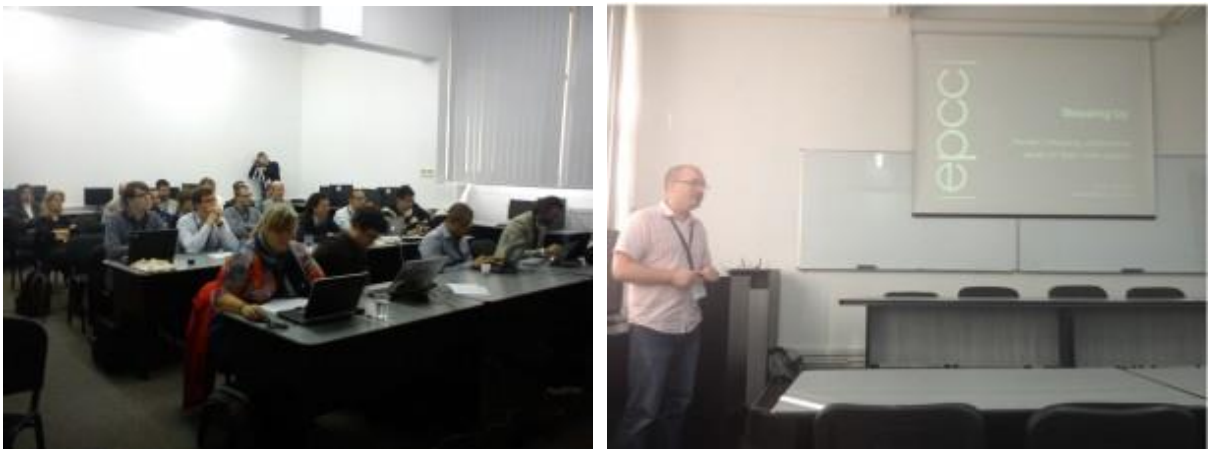


Figure 15. Participants at the event from September 2013

The HPCReS – International Workshop on HPC research services was organized in September 2014 in conjunction with SYNASC conference (its 16th edition). The event attracted more than 40 participants, 1 researcher from the project partners, 6 invited talks and has included a HPC training and 6 satellite workshops on the project topics (Figure 16). HOST project was promoted through flyers and posters.

Figure 16. Participants at event from September 2014

A training event was organized in the frame of each workshop, sustained by a foreign highly experienced HPC trainer to increase the knowledge of the HOSTing team and the participants at the workshops and to the SYNASC symposium (e.g. Figure 15 – right photo, Adrian Jackson from EPCC giving a tutorial on HPC).

Beyond the dissemination achievements, the HOST team was exploiting the fact that the full team can access the knowledge of the event participants and can make direct contacts with various teams.

National workshop of Romanian e-Infrastructure community

The WPCI - Workshop on Clouds, Cluster and HPC Infrastructures was organized in April 2012. The event attracted more than 40 participants, 3 from the project partners (Figure 17), and constituted a forum for discussions on the national and project partners' experiences in parallel and distributed computing. The participants have represented not only academic or research institutions, but also Romanian Research Ministry, companies, National Academic Network, FP7 HP-SEE project (HPC in South Eastern Europe) and ARCAS (National Associations of HPC users and providers).

Figure 17. Invited speakers at WPCI 2012:
Alison Kenedy, EPCC, Krzysztof Kurowski (PSNC), Elda Rossi (CINECA)

The second workshop, WeIPS - Workshop of e-Infrastructure for Public Sector, was organized in March 2013. The event attracted more than 40 participants (Figure 18) and constituted a forum to identify and discuss the requirements of the public sector in terms of computational power and storage capacity. An ARCAS meeting has

taken place with this occasion. The event was organized after IBM Academic Days organized in this year at the same site (including a HOST presentation), to increase the impact and gather more participants.

Figure 18. Participants at the event from March 2013

The WIP - Workshop on Intellectual Properties in ICT and e-Infrastructures was organized in March 2014. The event attracted 40 participants, 1 from the project partners, 9 invited speakers. The participants were representatives of IT companies from the West region of Romania, researchers from several universities from Timisoara, Arad and Resita (Figure 19).The participants had the opportunity to get information about the particularities if intellectual rights in the field of software and about the national regulations and main steps to be followed for patenting a product. The training was very beneficial for researchers preparing H2020 proposals, as the aspects of IP management in Horizon 2020 have been also discussed.

Figure 19. Participants at the event from March 2014

The third workshop, WeISS - Workshop of e-Infrastructure Services for Society, was organized in July 2014. The event attracted around 40 participants out of which 20 were speakers/trainers (Figure 20). The event attracted mainly representatives of academia and research institutes from Arad, Bucharest, Cluj Napoca, Craiova and Timisoara. Several representatives from the companies were also present. A training on using e-infrastructures addressing aspects related to cluster computing, HPC, GPU and cloud computing was organized with the occasion of the workshop. The training sessions attracted also PhD and master students from the West University and from the „Politehnica" University of Timisoara.

Figure 20. Participants at the event from July 2014

Training sessions were organized with the occasion of first two and the last workshops to raise the confidence in the knowledge and skills of the HOSTing team as well as to expose the availability of the HPC services and the ways to exploit them. At the third workshop the tutorial on IPRs was provide By Dr. Pelligrini from INRIA.

All four events attracted several new users to the HPC infrastructure as well as contacts to be exploited in further collaborations (e.g. with Republic of Moldavia).

HOSTing team mobilities

The HOSTing team has participated at 47 events for HOST activities dissemination, several being funded by HOST as follows:

1. 17 for presenting research papers
2. 3 as invited talks (at HPC 2012, ACA 2012, Multicore Summer School),
3. 3 poster display at e-Infrastructure conferences (ISC 2012 & 2013, ICRI 2012).
4. 1 invited presence of EC projects booth at e-Infrastructure conference,
5. 6 trainings
6. 2 presentations at summer schools
7. 1 information exchange with a similar RegPot project

Two members of the technical team have participated to an international training event in June 2012 a NCIT Summer School in Bucharest, winning in a competition a Tesla card (GPU cores), used later on in WP2 activities.

The presence at these events of the HOST representative(s) for dissemination or acquisition of knowledge was also an opportunity to initiate discussions with representatives of teams with similar research interests.

Project dissemination

Specific project dissemination activities are including the HOST open house, establishing and maintaining the project web site, writing articles in popular magazines and newspapers, designing and distributing project flyers and dissemination materials.

The web site (http://host.hpc.uvt.ro) is active from the middle of January 2012 and has attracted around 500 visitors in each month. It presents the latest news, the workshops, or the research positions (Figure 21).

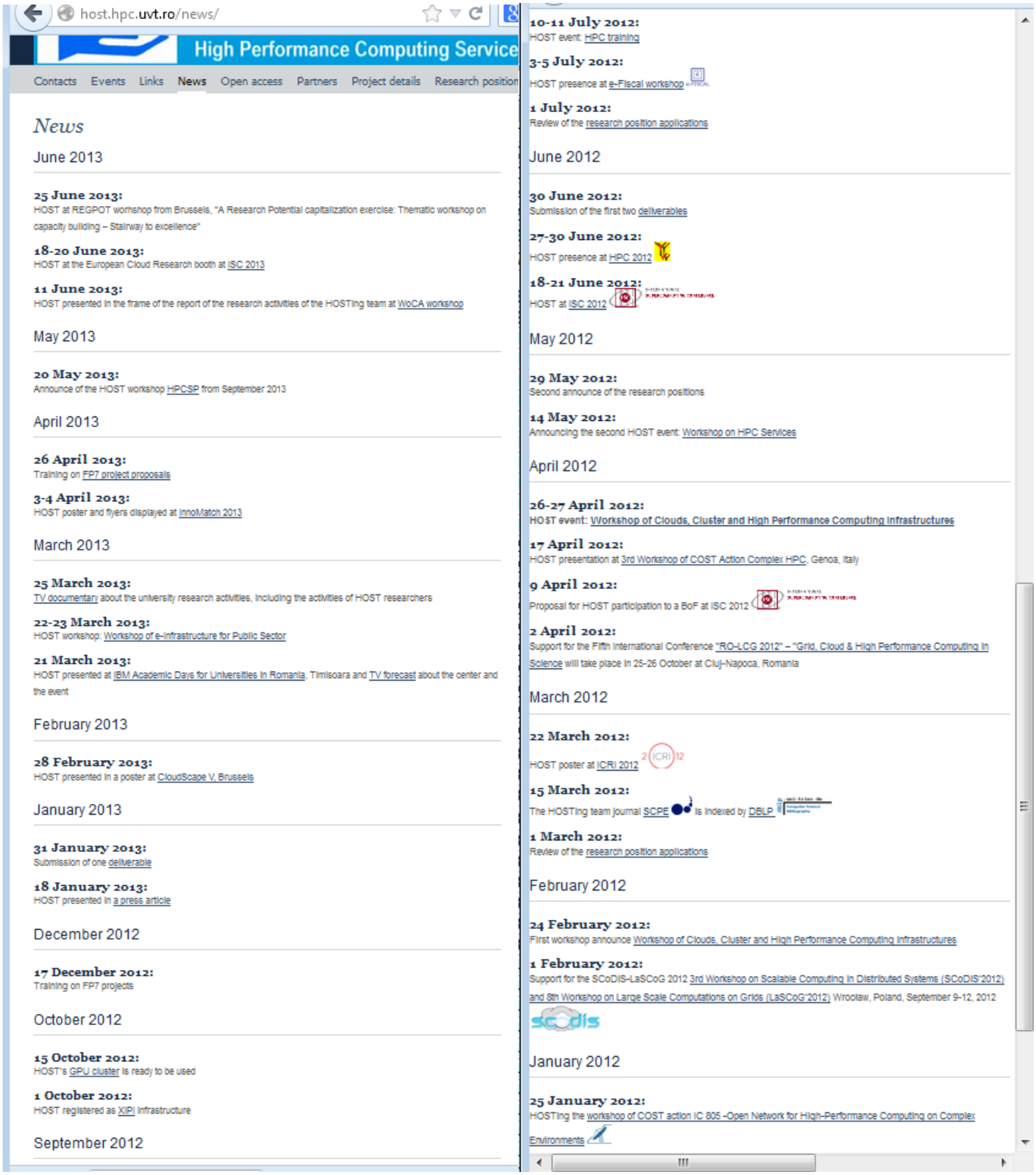


Fig 8. Web site news (June 2013)

Guided visits of the HPC centre facilities and poster displays (explaining the research activities of the team) were organized: (a) with the occasion of all scientific events organized by the HOSTing team (including the HOST

events, but also national ones like IBM Academic Days); (b) decision factor visits (at university level); (c) events targeting scholars (e.g. University Open Doors day).

Announces about HOST activities were present six times in the electronic newsletter of the university, four in two different regional journals (Figure 22), three times at a national TV channel (Figure 23), twice on the web site of other initiatives, and twice in conjunction with IBM press conference releases (IBM being the main equipment provider of the HPC center).

Figure 22. HOST's in press in 18 January (electronic version at http://www.opiniatimisoarei.ro/supercomputerul-de-la-uvt-a-pus-timisoara-pe-harta-europei-in-cercetare-veniturile-generate-de-clusterele-cu-care-se-lucreaza-la-uvt-depasesc-5-milioane-de-euro/18/01/2013): last paragraph from the image, about HOST, announces the availability of the GPU cluster ("cluster de placi grafice" in Romanian)

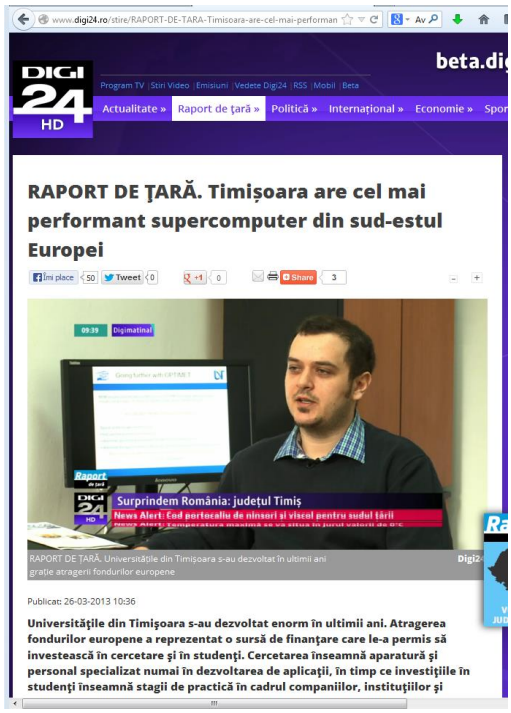


Figure 23. TV Interview (26 March 2013) available at http://www.digi24.ro/stire/RAPORT-DE-TARA-Timisoara-are-cel-mai-performant-supercomputer-din-sud-estul-Europei_90624

Trainings on using the HPC services were also organized, as the event for a team coming from another Romanian university that is interested to acquire HPC infrastructure.

Most of the presentations at the HOST events are available on the event sites. Video material is available also for the three training (associated with the first national workshop, respectively with the HPCReS and WeISS workshops, see also Figures 4-6).

HOST related posters were presented to 7 international events, and one is continuously displayed in a public place in the university premises (Figure 24).

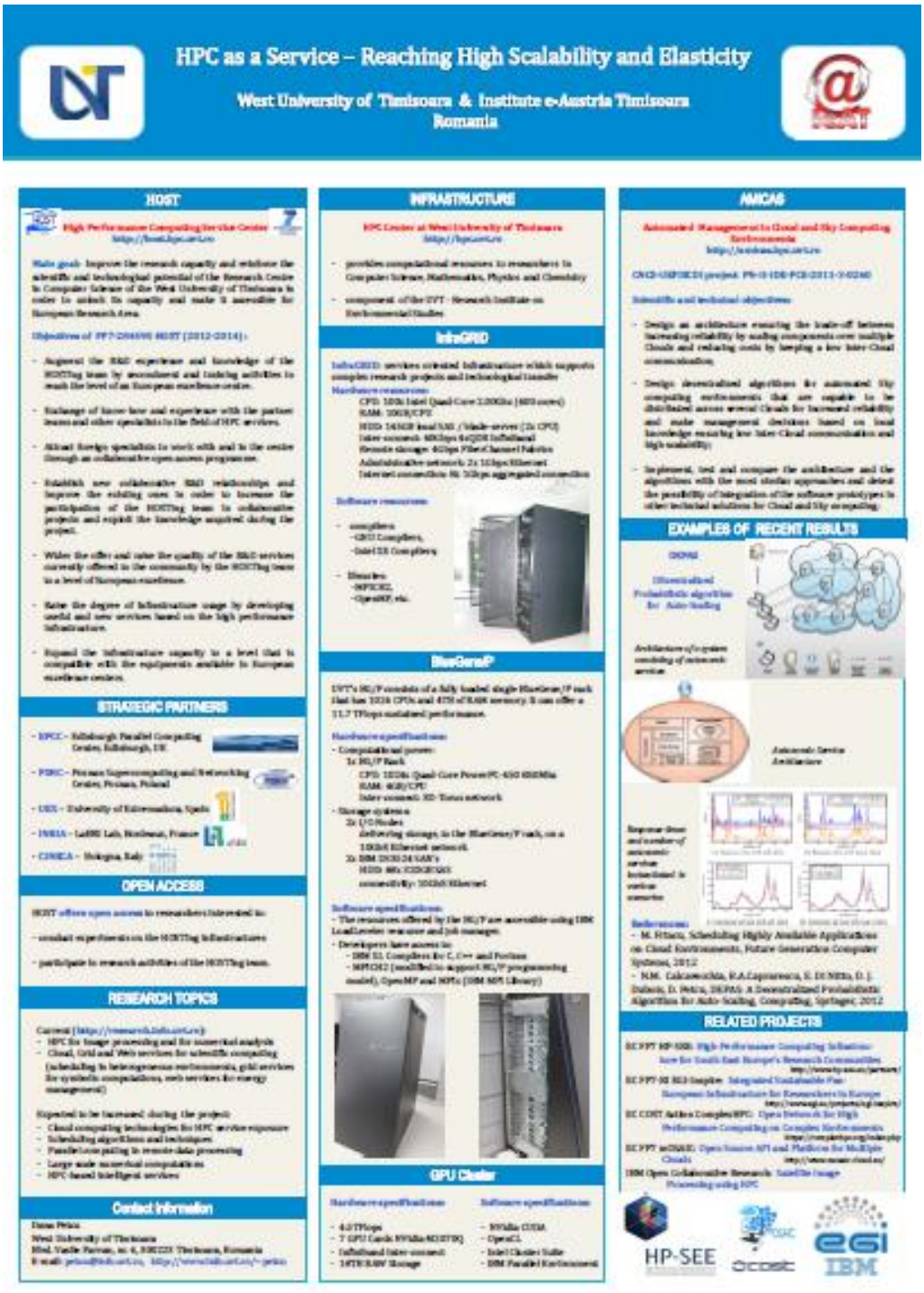


Figure 24. Poster sample (ICRI 2012)

Figure 25. Flyer from June 2013

HOST related flyers (Figure 25) were distributed at 32 national and international events (scientific, political or industrial meetings).

3.3.2 Main results

The main results can be resumed as follows:

1. The timely organization of the workshops
2. Achieved the impact in terms of the number of participants (+40) and their diverse backgrounds and nationalities
3. New collaboration contacts and project proposals established as consequence of the face to face meetings (2 proposals selected for funding)
4. Media and news announces were generated by the interest of externals in the project activities
5. Project achievements disseminated at considerable more events (+30) than initially planned.

3.4 Project outcomes

The main project outcomes are enumerated in Table 6.

Table 6. Main project outcomes

Category	*Project outcome*	*Quantity and quality*
Public documents	Project reports	3 public
	Workshops proceedings	2 workshop proceedings available online Another is scheduled for early 2015
	Training materials	Video materials and slides available at http://host.hpc.uvt.ro
Collaboration relationships	Collaborations established due to secondments, workshops, trainings, open access programme	More than 30 trustful contacts
	New contacts established for project collaborations	More than 40 collaborative project proposals, most of them bringing more than 4 new contacts (5 proposals approved until now for funding)
Knowledge	Development of advanced R&D competencies	Specialization in 5 directions associated with the project research positions
	Strategic orientation of the R&D towards fields of interest at European level	New competences in Big Data, Open Data, Smart cities, Trustworthy ICT, Data analytics, Social innovation
	Competitive lead in know-how	Enhanced the HPC competences
Capacity improvement	Increase the e-Infrastructure capacity to a competitive one at European level	Acquisition of a state-of-the-art GPU cluster
	Increase the number of researchers	5 new researchers
Software prototypes	Software tools and libraries that can be made available as open-source to researchers and developers	Contributions to 6 tools and prototypes

4. The potential impact, the main dissemination activities and the exploitation of results

4.1 Reaching the expected impact as listed in the work programme

4.1.1 Better integration of the selected research entities in the ERA as a whole

The entire action plan of HOST is devoted to the increase of the coordinator visibility in ERA activities. The path considered by the coordinator team included as a first step the learning to act in ERA as an excellence center at a European level. Therefore the Action plan includes strategic partnership with already internationally recognized centres of excellence in the topics of the project. Through the secondment and training activities, beyond the scientific and technical knowledge enhancement, the transfer of knowledge about the management, organisation and funding attraction was seek. The main actions to achieve the integration during the project time are the ones from Table 7.

Table 7. Integration of the HOSTing team in ERA

Mean	Comment on the status
Submit project proposals in the frame of EC programmes	More than forty proposals were elaborated, in competitions for the FP7/CIP/COST/H2020 calls. Six were successfully contracted (4 from first period, 2 from the second, more than 10 still under evaluation).
Mobilities	The mobility plan between the partners has followed the DoW. Part of it was followed as scheduled. Several mobilities have concern the participation of the HOSTing team to scientific events, trainings and EC or HPC event booths, or meetings for new scientific collaborations
Organize training events	Training events were organized together with the national and international HOST workshops. They were sustained by coordinator or partner representatives, and in one case a high experienced trainer in HPC. The aim was twofold: (a) transfer of knowledge: raise the awareness and knowledge of individuals how can benefit from the available infrastructure and HOSTing support; (b) raise the visibility: expose the skills and knowledge of the HOSTing team to the participants to the trainings. Organizing trainings in association with conferences with international participation has been done in order to ensure a worldwide impact. Moreover the coordinator team has organized two H2020 national trainings, one for a large audience, and another for ICT community.
Organize workshops	Seven workshops (4 national and 3 international) were organized with more than three hundreds participants in total
Identify the competences of other research teams	The partnership with well-known units in the field allowed a fast acquisition of new knowledge. The participation and interactions at scientific events (organized by HOST or beyond it) has allow an update of the state-of-the-art
Disseminate the project achievement teams interested in FP7/H2020 programme	The project was disseminated to at least twenty scientific events relevant for the topics of the projects and at least three policy decision meetings to (a) create awareness about the project activities (b) to enhance the potential for the exploitation of the project results
Participation to brokerage events	HOSTing team members participated at more than 5 brokerage events where contacts with important players of ERA were established that generated more than 6 project proposals submitted to calls of EC FP7/H2020 programmes

4.1.2 Upgrading the RTD capacity and capability as well as the quality of research carried out by the selected research entities

The HOST activities aimed to increase the human resources with at least 25% and the infrastructure capacity with a similar percent. The level of knowledge of existing personnel in parallel and HPC topics as well as IaaS/PaaS/SaaS was expected to be updated to level compatible with the participation in EC collaborative programmes FP7/H2020. The quality of the achieved level was checked in different contexts, e.g. by the scientific communities with the occasions of publications.

Recruitment of personnel was seen as a mean to encourage:

1. the return of nationals having left the country (2 persons),
2. the return to a research position after an industrial experience (1 person),
3. the raise of the level of the research center from a national to an international one (1 person).
4. attract researchers from other teams in the region (1 person)
5. carrier development for young talents who have worked with the HOSTing team (two researchers who continue to work elsewhere in the field exploiting the skills acquired through HOST)
6. refresh the list of the research topics and increase the quality of research activities.

The main actions to achieve the upgrading during the project time are the ones from Table 8.

Table 8. Upgrading the RTD capability and capacity

Mean	Comment on the status
Improve the infrastructure	In the first year of the project, the computing power was increased with 3.6 TFlops reaching a level of 18 TFlops (increase with 25%); the computing units were increased with 3600 cores of GPU time, specialized for the HOST research activities (before HOST, 4496 cores of CPU type); the internal memory with 0.3 TB reaching a level of 4.8 TB (increase of 7%); the external memory was increased with 16.5 TB reaching a level of 58 TB (increase with 40%). Note that the GPU cluster is a specialized cluster, not earlier accessible by the HOSTing team or the center users (with direct use in the new research activities).
Employ new researchers	Five new research positions and three technical ones were announced at the beginning of the project. Ten persons have benefit from these positions availability. Nine other positions of the project were related to the HOSTing team involved in WP executions. Four PhD/postdoc students were also involved in the research activities of the HOSTing team (not pay from the project). Six new employees mentioned in the list presented before this table have brought an increase with 25% of the coordinator team.
Improve the knowledge level through secondment activities and training activities	Strong collaboration relationships were established with UEX and PSNC. In both cases secondments stages were done in both directions and the results are reflected in scientific papers and software prototypes. The secondments to INRIA and EPCC targeted to acquire new skills and knowledge, and new project proposals. The secondments to CINECA have led to consistent knowledge improvements. Five employees have followed external trainings and were involved in providing the five trainings for externals. Moreover, the HOSTing team has provided five trainings for EC FP7/CIP/H2020 programmes project proposals for externals
Opening of the HPC Lab	In the first year a lab was set and equipped for the researchers employed for the project, where they were able to perform their activities. Moreover, a lab for the PhD students was also set, with facilities to access the e-infrastructure for their research activities. In the frame of the open access programme, the visitors were able to access and exploit the proximity of the e-infrastructure of the HOST project and the Research Center. The e-infrastructure access policy is allowing any academic researcher in contact with the HOSTing team to access the e-infrastructure during the project duration free of taxes (the technical team of HOST ensured the user support).

4.1.3 Improved research capacity for increased contribution to regional economic and social development

Several actions (e.g. open access programme, national workshops, dissemination via media) were dedicated to the identification of national and European potential users of the services offered by the coordinator, as well as to the creation of the opportunities to increase the contribution to the economic and social environment (offer HPC as a Service through the HOST platform prototype).

In its dissemination activities, HOSTing team claimed the status of supercomputing centre with open access to its infrastructure for co-nationals and European researchers using the latest technologies of Cloud computing. The organised training activities intended to provide skills for young researchers studying HPC in Romania, to reinforce human potential and decrease brain drain.

The main actions to enable the potential for economic and social contributions during the project time are the ones from Table 9.

Table 9. Enabling the social and economic contributions at regional level

Mean	Comment on the status
Elaborate the HPCaaS platform	The platform available since M18 of the project exposes the HOST' scientific services in a web interface in a Cloud computing style, so that complex HPC services are easily accessible. Moreover it was designed to be extensible (to include easily new services that are customized for the user needs) and to be portable (to be installable beyond the HOST premises in another HPC center, or even in a Public Cloud with HPC services). The HPC services, as result of the research activities of HOST project, are exposed and can be used by externals for their R&D purposes.
Dissemination of the competences towards stakeholders	Four national workshops have been organized to target the national stakeholders, aiming: (1) create awareness about the competences availability; (2) state the position and availability to support research and development in the region; (3) attract the potential users of the e-infrastructure and knowledge; (4) create synergies with other national/regional activities like the national association ARCAS or the regional initiative IT-Cluster. Two TV interviews on a nation-wide coverage station Digi24 (www.digi24.ro) and a press documentary have target also citizens awareness of best practices in attracting and use community funds, as well as job creation. Trainings organization in the frame of the HOST workshops has target particular groups interested to use the e-infrastructure and the support from the HOSTing team, creating them new opportunities for HPC skills development. The participation in ARCAS national association of HPC providers and users (including the National Authority for Research) as founder member is a key element in reaching the target of being involved in HPC large EC initiatives as PRACE. In June 2014 the status of observer has been granted to Romania and as the representative in the PRACE Council was nominated the HOST project manager. Late 2014, the same person was nominated as EGI deputy representative from Romania side. The position in the regional IT Cluster of the regionally located Romanian and multi-national companies involved in ICT (more than 300 in the region) of UVT as stakeholder with HPC competences and infrastructure, available for research activities common with companies was clarified in several meetings of the IT Cluster. HOST was presented also to two IBM Academic Days events (one organized at coordinator side, to increase the impact), plus 1 national and 1 international technology exhibitions, targeting the academic and industrial communities interested in e-infrastructure services
Open access programme	The open access programme targeted the support of research teams interested to use HOSTing team experience to be applied to their research problems. The skills of the seven visitors were improved in what concerns the HPC & Cloud services topics. Two visitors were from new members states, where HOST team is targeting mainly to expose their knowledge and e-infrastructure availability as not having significant competitors with the same capacity.

4.1.4 Improvement of participation of the applicant entity in FP7/H2020 projects

HOST is expected to improve the communication between the coordinator and research entities having similar or complementary scientific interests. In this context, the number of participations to FP7/H2020 project proposals was increased as results of all WP activities, through face-to-face visits and scientific publicity of the coordinator activities with the occasion of the project events and mobilities. The main actions to improve the participation of HOSTing team to the EC programmes from Table 10.

At the start of the HOST project the HOSTing team has been in four EC projects. Four new projects were started with HOSTing team contributions, and two others are contracted to start in February under H2020-ICT.

Table 10. Improvement of participation to the applicant in FP7/H2020 projects

Mean	Comment on the status
Open access programme	Six from seven visits have been finalized with submission of FP7/H2020 proposals. The seven visit has been finalized with a published paper and the HOSTing team is cooperating in the frame of on-going FP7 project approved in the first period of HOST
Increase the number of contacts	Each project proposal (from the list of more than forty) that was submitted as response has briought new contacts (more than 4 contacts for each proposal; exception the two Marie Currie proposals with 1-2 contacts). New contacts were established in the frame of the workshops/ trainings/ InfoDays / Brokerage events as well the special mobilities targeting new partnerships
Collaborate with the partners for project proposals	The FP-ICT SCAPE project proposal elaborated together with PSNC was a successful one; same for COST Action NESUS with INRIA, UEX and PSNC. Three other proposals were elaborated together with EPCC and PSNC and are currently under evaluation.
Submit project proposals	Over 45 project proposals were prepared by the HOSTing team in the HOST period for various EC programmes (H2020, FP7, COST, CIP, Tempus, Erasmus), 6 successful until now, more than 10 still under evaluations

4.1.5 Measures of the project impact

While in the previous sections we described the activities and the state-of-the-art here we provide some quantitative estimators.

Table 11. Measures of the project impact at project milestones

Mean	Measure	Reached at M36
Secondments and other visits	Number of teams with which the R&D collaboration has been established or improved	32
	Number of common research papers or activities between the coordinator team and other teams	15
	Number of proposals for European projects in which the coordinator team is involved	47
Workshops and trainings	Number of participants	300
	Number of contributions presented during the workshops	100
	Number of collaborations established during and beyond the events due to the workshops presence	6
	Number of citations of the researcher papers published in the proceedings/journals	41
Project proposals for FP7/H2020	Number of proposals	36
	Number of contacts established for collaborating in FP7/H2020 proposals	45
Capacity improvement	Number of new employees	6
	Number of new cores, TFlops, TB	3600, 3.6, 0.3
	Number of working places in HPC lab for the researchers	5
Research improvement	Number of publications of the researchers (and of the management team)	28 (+27)
	Number of new topics in which excellence is proved	5

4.2 Main dissemination activities

The public deliverable D3.2 and D3.3 available on the project site at http://host.hpc.uvt.ro/project-details/ are providing details about the dissemination activities, while the lists of publications and dissemination activities records are attached to this report.

Table 12 summarizes some quantitative numbers related to the dissemination activities

Table 12. Dissemination in numbers

Category	Activity	Numbers
Organisation of events	International workshops	3
	National workshops	4
	Info Days	2
	Open doors	2
	E infrastructure trainings	4
	Invited tutorials	4
Participation to events	Trainings	8
	Sci. workshops, conferences	35
	Info Days	14
Scientific publications	Journal papers	8
	Book chapters	6
	Papers in conference proceedings	26
	Technical reports	2
	PhD thesis	1
Displays and presentations	Events with posters	7
	Events with flyers	32
	Oral presentations (excluding to the above events with proceedings)	45
Interaction with civil society	Press releases	6
	TV clips	3
	Articles in newspapers	4

4.3 Main exploitation of results

4.3.1 Feeding results and know-how into own institution

High quality research papers and project reports

As academic institution, UVT is interested to feed the results of the projects into scientific publications, student lectures, labs or training, consulting activities, spin-offs and technological transfers, as well as follow ups of know-how. Knowledge in scientific fields was acquired by the coordinator team in the frame of the project through several channels: (1) Outgoing secondments, by which individual team members have been exposed to new research directions and have worked closely with the hosting teams; (2) Incoming secondments, by which the local team tried to assimilate knowledge from the secondee and to promote its own achievements; (3) Working, during or after the secondment stages, on common research problems with the secondment partners; (4) Elaborating scientific papers together with the partners employees; (5) Participating in scientific events and training on the project directions; (6) Developing the S&T part of the project proposals for H2020 calls.

The international visibility of the coordinator team publications is essential for UVT team to maintain its leader position on national level in the topic of Computer Science and in particular HPC. The HOST activities contributed with more than 40 papers (more than half produced by the researchers employed on the new positions) and attracted more than 40 citations until date.

Beyond the scientific publications, the project has brought a new dimension in what concerns the publications of the HOST team. While HOST team regularly produces the scientific publications, the public deliverables of HOST and media materials have imposed the acquirement of a new knowledge in writing documents and express the opinion of the scientific community to a large audience. In particular preparing the information to be disseminated towards citizens through TV interviews has been challenging. This new knowledge is exploitable in different contexts: (1) new ability to manage non-scientific documents in European projects; (2) awareness of the national and European decision makers about the team capacity to deal with community problems beyond the scientific ones; (3) new skills to present research results to a wide public.

Tutorial activities

The scientific events that were organized in the UVT facilities attracted young researchers (master, PhD and postdocs students enrolled in the programmes of the Computer Science Department), their access to the events being considered free of charge. The training events organized in the frame of the HOST workshops have attracted more than 100 young participants (from the region or abroad). Their skills are expected to have improved in what concern the usage of e-infrastructures and HPC programming.

The materials presented by the participants at the training and workshops have been used and can be also later used in the Parallel Computing lecture for the second semester of the first year of Master studies in Artificial Intelligence and Distributed computing (AIDC, studies in English and Romanian), and Software Engineering (IS). Dr. Alexander Agathos was invited to teach the Parallel Computing lecture at the English direction in Spring semester of the last two academic years.

Other specific lectures for master studies in AIDC and IS that are touching the software service topics (e.g. Basic techniques in research activities, or Software engineering management) have pointed to the events materials. Dr. Daniel Pop has sustained the Human-Machine Interfaces lecture to Master students in Software Engineering in the last two academic years.

The incoming secondees were invited to present their team achievements in the Scientific Seminar of the Computer Science Department that gathers periodically both the research staff of the department but also the master students from the second year of AIDC and IS studies. The open discussions have stimulated the students to question and investigate in details the topics of research directions that were new for the audience.

Most of the materials used in tutorials and trainings (slides, links, videos) are available and will be maintained on the project site.

Consultancy

During the HOST events, the execution team provided free consultancy to the event participants concerning: the participation at FP7/H2020 programmes; management of EC projects, proposal writing or partner search, best practices in new member states participation at EC programmes. Two special events were organized at the end of 2013 to create awareness about the H2020 opportunities. The materials of latest event are available on HOST site.

The team considers the opportunity to exploit the consultancy knowledge at a larger scale, either to national and international events (freely), or to offer professional consultancy services. HOST team continues to offer freely advices to Romanian teams about the FP7/H2020 collaborations for the UVT employees and its partners (e.g. the Politehnica University of Timisoara), but it takes also in consideration, as long term strategy, to provide such consultancy on contractual bases.

New researchers' integration

The group of new researchers and the technical team gathered in the HOST project and the collaboration relationships that were established as project results are valuable assets that must be maintained by the HOSTing team.

The management team has and is working intensively to deal with the followings: identify opportunities for continuing the research in other R&D projects; offer permanent positions at the Computer Science Department or at its spin-off research institute; define carrier plans for the new researchers and the technical team and the plan integration in the short-term strategy and plans of the research center.

Equipment exploitation

The equipment like the ones that were acquired through HOST project are still not available in the region. This uniqueness has already attracted several research team interests. The following exploitation paths are foreseen:

(1) The infrastructure capacity enables the participation to specific calls for project proposals tackling with R&D subjects related to HPC, simulations, image processing, natural computing and so on. This is already the case of around 10 proposals for H2020 (e-infra and FET-HPC calls) and 4 proposals for Romanian project proposal calls.
(2) Access to the infrastructure from external teams can be conceived to be based on a fee that can be used to maintain and upgrade the equipment. The payment mechanism will be put in place when a certain threshold of the equipment usage will be reached, not allowing the timely allocation of the resources for research projects of UVT teams.
(3) The strengthening (through the HOST equipment acquisition) of the position of UVT as infrastructure provider with the highest in the country has led to its inclusion in decision-making committees (national ARCAS, and European PRACE, EGI). This position obtained through the equipment ownership is expected to be maintained for certain period as similar investments are not foreseen too soon at national level. Therefore HOST team expects to be able to raise the interest of collaboration from national and regional stakeholders, including companies.

Spin off's improved RTD and collaboration activities

Through the HOST activities, the Computer Science Department's spin-off for research activities, IeAT, was promoted. On another hand, IeAT has supported HOST activities as described below.

The private non-profit research Institute e-Austria Timisoara (IeAT) is a spin-off of the Computer Science Department of UVT, the Computer Department of the Technical University of Timisoara and the RISC Institute of the Johannes Kepler University of Linz, Austria. The main aim is to support the research activities of the three associated institutions by stimulating the participation of the young researchers (employees of the three associates and own employees) to competitive research projects. IeAT is currently involved in FP7-ICT, national RTD projects as well as transfer knowledge towards regional and foreign companies. In the StReAM report of the EC from June 2013 about the ICT statistical report for annual monitoring, IeAT is listed as the 3rd most successful unit in Romania in attracting FP7-ICT funds. The HOST project manager and the WP1 leader are the executive director of the IeAT, respectively the transfer knowledge director. WP2 leader is also senior researcher at IeAT.

Until now, HOST influenced the IeAT's RTD activities as follows: (1) increasing the visibility – since IeAT is involved in several FP7-ICT projects, it was promoted as an example of good practice during the HOST events related to FP7 trainings; (2) helping the dissemination of a STREP project – the mOSAIC platform developed under the scientific coordinated by the HOSTing team (with the spin-off umbrella) is used in HOST for its unique facility of Cloud service portability; (3) participation to new EC projects: the collaboration negotiation during HOST workshops have led to the current participation of IeAT to one FP7-ICT project started in Nov 2013, and in contracting two H2020 actions.

Grateful for the HOST support, IeAT has offered to the HOST activities the followings: (1) free of charge secretariat for the events organized by HOST; (2) promotion of HOST activities to the events organized or attended by IeAT team members (based on flyers, e.g. to ICT 2013 event organized by EC in Vilnius).

4.3.2 Feeding results and know-how into European projects

Clustering with the projects approved for funding in the frame of EC programmes is of high interest for: self-evaluation and corrections procedures, detecting overlaps and establish consensus for similar actions identifying the potential common actions in benefit of all the parties. Until now, the activities related to the clustering with other projects during the HOST events or during the presence of HOST representatives to external events (e.g. collaboration events organized by the EC, like ICRI 2012, ICRI 2014, ICT 2013), have helped to: establish collaborative relationships with other teams; feed of the results of other projects in the on-going R&D projects of the Romanian team; create the awareness of the HOST activities and aims; opportunities to direct invitations for involvements at the HOST events; identify the opportunities for new collaborations

During the HOST events concrete collaboration actions were established with: FP7-ICT O.1.2 projects: CONTRAIL, mOSAIC and MODAClouds (common booths at ISC 2012 and 2013, and in the case of the last two also common posters to two Cloud related events); the other Romanian REGPOT project in ICT, ERRIC (promotion in HOST events); other FP7-Capacity project, HP-SEE (promotion in the HOST events); Project collaboration meeting in September 2013, at Timisoara, during SYNASC 2013, for HOST, SPECS, MODAClouds, SeaCloud, ARTIST, PaaSage (finalized with a list of collaboration actions).

Aiming to start an HPC national initiative, the setup with the help of HOSTing team of the ARCAS association of HPC users and providers was done. An important step forward was its promotion at Romanian authorities (ministerial level) as potential Romanian representative in European HPC initiatives, like PRACE. HOST team considers the acceptance of Romania as observer in PRACE as an important achievement. The Romanian presence in PRACE is main targets of HOST. Follow-up of the active involvement (to support e-infrastructure services in the region, but also including lobby at Romanian ministries), the HOST project manager was nominated as Romanian representative in the PRACE Council.

The participation at the COST Action IC0805 ComplexHPC "Open European network for high performance computing on complex environments" (leaded by the team from INRIA involved in HOST project) offered the opportunity to disseminate their knowledge. The opening of the HOST was declared the COST meeting organized by the HOSTing team in January 2012, in order to ensure the awareness at European scale as in COST Action most of the European countries are represented. The HOST team activities and the partnership with INRIA, UEX and PSNC have led to the inclusion of UVT in the COST Action IC1305 NESUS "Network for sustainable ultrascale computing" started in Spring 2014. The HOST team activities were summarized in the first of its workshops.

The changes in the orientation of the Romanian NGI involved in EGI-Inspire (drop out of the Ro-Grid NGI as national representative in EGI-Inspire), and the HOSTing team involvement the EGI-Inspire activities (including a proposal for ELI competence center to the EGI call targeting proposals writing for H2020-EINFRA call from Autumn 2014) was involved in a new initiative together with the ARCAS leadership. In November 2014 the HOST project manager was nominated as deputy representative of Romania in EGI Council.

The HOSTing team put a lot of hopes in the new initiative to which it has participated to its conception, PLAN-E, PLAtform of National eScience/Data Research Organizations in Europe (kick-off meeting in Amsterdam, September 2014), as potential future stakeholder in what concerns the e-infrastructure skills.

The clustering activities are expected to continue beyond the end of the project, based on the HOST project results. While HOST has supported a series of the clustering activities with other project, a follow-up by the still on-going project is expected for the benefit of the HOST result exploitation.

As pointed earlier, HOSTing team is involved in new EC projects as consequence of the HOST activities and the number of on-going EC projects/actions in which the team is involved has been increased with 20%. An important fact is that the number of the HOSTing team members able to write competitive H2020 proposals was considerable increased (doubled, from 3 to 6). This is a direct consequence of the HOST activities for knowledge improvement and is reflected in the high number of the project proposals finalized for H2020 calls (over 20, around half of them still under evaluation). This was also a result of the increased visibility of the HOSTing team activities that has led to multiple invitations to participate in project proposals which were not able to be handled by a reduced number of project managers.

In particular for the H2020-ICT-1 call from April 2014, the HOSTing team was the Romanian team with the highest number of proposal submissions (counter of UVT plus its spin-off IeAT); consequently it has the highest number of accepted proposals (2, at equality with the Politehnica University from Bucharest which is a considerable larger institution).

In the context that the number of project coordinators in FP7-ICT programme by new member state teams is very low (21 projects from 1720 in FP7-ICT according the EC ICT statistical report for annual monitoring – StReAM, June 12, 2013), there are high expectations in the near future that the experience accumulated in HOST will lead its team to another level (e.g. H2020 action coordination).

Gaining trust in own strength for leading a project, four H2020 proposals were coordinated by HOSTing team. Two are under evaluation. The first two received very good evaluations, but have not reached the funding limits.

4.3.3 Feeding results and know-how into national collaborative projects and initiatives

The activities aiming to promote the technological platform developed in the frame of HOST, as well as promotion of Romanian teams presence at HOST at national events (e.g. Ministry actions for e-Infrastructures activities dissemination, meetings of ARCAS) are targeted an improvement of the clustering of UVT with other institutions and representatives. Until now, following the organization of the national HOST events, the strategic partnership in ARCAS with several institutions has been enhanced: with IFIN-HH (leader of ARCAS association), with the NCP for ICT, from the National Authority for Research.

The regional IT Cluster activities to raise the quality of IT services for the business environment of the region, leaded by the Regional Development Agency and involving also the HOSTing team are offering great opportunity to easily interact with the industrial partners and make them aware about the availability of knowledge that can be involved in their applied research activities. The partnership between Department of Compute Science of West University of Timisoara and Net Academy, a local training provider for advanced IT trainings, open new opportunities for HOSTing team members and broadens the visibility of the computing center and team competences towards major industrial players in the West region of Romania.

The HOSTing team is expecting to continue exploiting its top position of e-infrastructure and scientific knowledge owner in further development of collaboration relationship with the Romanian research community and commercial sector. The new knowledge in HPC services acquired by the local team during the scientific events, secondments and the collaboration contacts established with the teams participating to the organized events are expected to be exploited in national research projects. Two project proposals have been proposed by the HOSTing team to the national call for proposals closing in middle of December 2014, as follow-up of HOST activities.

5.Web site and relevant contact

5.1 Address of the project public website

http://host.hpc.uvt.ro

5.2 Relevant contact details or list of partners

Coordinator:

West University of Timisoara
B-dul Vasile Parvan 4
300223 Timisoara, Romania

Contact person: Prof. Dana Petcu, petcu@info.uvt.ro

Institutions participating to the project activities:

1. EPCC – Edinburgh Parallel Computing Center, Edinburgh, UK
2. PSNC – Poznan Supercomputing and Networking Center, Poznan, Poland
3. UEX – University of Extremadura, Extremadura, Spain
4. INRIA – LaBRI Lab, Bordeaux, France
5. CINECA– Bologna, Italy