

Dana PETCU

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Romanian HPC and Cloud Services for eScience

HPC centers

- South: Bucharest (UPB, UB, ICI, IFIN-HH)
- West: Timisoara (UVT)
- Center: Cluj (UTCN)
- East: Iasi (UIAC)
- Nord (USV)

Organisation: **ARCAS** (www.arcas.org.ro)

- Romanian association for promoting advanced computational methods in scientific research

UVT e-Infra (currently the largest RO one)

<http://hpc.uvt.ro>

InfraGrid

2009



BlueGene

2011



GPU cluster

2012



Label	Computing power	Computing units	Internal memory	External memory
[InfraGRID] Cluster	1.5 TFlops	400 cores	500 GB	13.5 TB
[ICAM] BlueGene/P	13 TFlops	4096 cores	4 TB	28 TB
[HOST] GPU Cluster	3.6 Tflops	3100 CUDA cores	224GB + 42GB (GPU)	16.5 TB
Total	18 TFlops		4.8 TB	58 TB

Numbers:

- 3 profs, 1 assoc prof, 8 postdocs, 10+ PhDstud

Topics:

- *Parallel computing*
 - In numerics, remote sensing, image processing, graphics, computational geometry
- *Distributed computing*
 - Cloud, web and grid services
- *Artificial intelligence*
 - Natural computing, multi-criterial optimization
 - Expert systems

Papers (sample)

- *Remote sensing:*
 - Multi-GPU Implementation of the Minimum Volume Simplex Analysis Algorithm for Hyperspectral Unmixing, IEEE Journal of Selected Topics in Applied Earth Observations & Remote Sensing, 2014
 - Computational Challenges in Processing Large Hyperspectral Images, Procs. RO-LCG 2012
- *Scheduling*
 - Resource Management for HPC on the Cloud, In High-Performance Computing on Complex Environments, Wiley, 2014

Projects:

- FP7 HP-SEE (2010-2013) and HOST (2012-2014)
- COST Actions ComplexHPC (2009-2013) and NESUS (2014-2018)

Papers (sample)

- *Multi-Clouds and portability*
 - Consuming Resources and Services from Multiple Clouds. Journal of Grid Computing 12 (2), 2014
 - Portable Cloud Applications - from Theory to Practice, Future Generation Computer Systems 29 (6), 2013
- *Grid services*
 - Experiences in building a Grid-based platform to serve Earth observation training activities, Computers Standards & Interfaces 34, 2012

Software

- mOSAIC PaaS: <https://bitbucket.org/mosaic>

Projects

- FP7 mOSAIC (2010-2013), MODAClouds (2012-2015), SPECS (2013-2016);
- H2020 CloudLighting (2015-2017), DICE (2015-2017)
- Romanian AMICAS (2012-2015)

Tools:

- Packaging and deployment in Multi-Clouds
- Model-driven engineering for Clouds
- Cloud monitoring

Applications from UVT:

- Crystal raising: physics and material science groups
- Extreme weather - warning system: GIS group