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Prof. Dr. Eng. Valentin Cristea

PhD coordination in “Computers and Information Technology”

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Research profile

Valentin Cristea’s research topics belong to the large scale distributed systems domain. These systems process large volumes of data and use a large volume of resources to offer services to a large number of users. They are based on advanced solutions regarding the interoperability, scalability, availability, fault tolerance, security, and performance of computer systems, and networks, software services, collaborative systems and others, responding at the same time to high requirements of specific applications. The proposed solutions target original models, methods and techniques, embedded in middleware platforms of Cloud, Grid, and Web architectures and responding to the above mentioned requirements. The results include: efficient storing of large data volumes (Big Data), reducing the energy consumption in Cloud while respecting the Service Level Agreements, decentralized adaptive task scheduling in dynamic distributed systems, fault detection in large scale distributed systems, monitoring and analytical services of distributed applications, distributed intrusion detection, context and event based middleware platforms, monitoring and control of the vehicular traffic, e-services for e-commerce and online banking, e-services for water monitoring and management.

PhD Advisor since 1996;

- 19 finalized PhD Thesis

Scientific publications: 30 monographs / book chapters; 280 papers in journals and conference proceedings.

Research projects (selection from last 10 Years):

- 2016-2019 Data4Water: Excellence in Smart Data and Services for Water Management, H2020-TWINN-2015
- 2014-2016 ClueFarm: Information system based on cloud services, accessible through mobile devices, for quality improvement of products and business development in farms, Proiect de parteneriat, CNCSIS-PN-II-PT-PCCA-2013-4
- 2013-2017 AAPELE: Algorithms, Architectures and Platforms for Enhanced Living Environments, ICT COST Action IC1303
- 2013-2017 KEYSTONE: Semantic keyword-based search on structured data sources, ICT COST Action IC1302
- 2013-2014 SideSTEP: Metode de Planificare pentru Sisteme Distribuite Dinamice: o Abordare Adaptiva (Scheduling Methods for Dynamic Distributed Systems: a self-* approach), International PNII - Cooperări Bilaterale
- 2012-2015 CyberWater: Prototype Cyberinfrastructure-based System for Decision-Making Support in Water Resources Management, National PNII - Parteneriate PCCA 1
- 2011-2013 CHANGE: Enabling Innovation in the Internet Architecture through Flexible Flow-Processing Extensions, Proiect FP7
- 2010-2013 INSEED: Program strategic pentru promovarea inovarii in servicii prin educatie deschisa, continua, OIPOS DRU
- 2010-2012 DataCloud@work, Proiect echipa asociata INRIA-UPB,
- 2010-2012 EGI-inSPIRE: Integrated Sustainable Pan-European Infrastructure for Researchers in Europe, proiect FP7
- 2008-2010 SEE GRID SCI: SEE-GRID eInfrastructure for regional eScience, proiect FP7
- 2008-2010 EGEE III: Enabling Grids for the E-science in Europe, proiect FP7
- 2008-2011 DEPSYS: Modele și Tehnici de Asigurare a Fiabilității, Siguranței, Disponibilității și Securității Sistemelor Distribuite de Mari Dimensiuni. Proiect IDEI
- 2008-2011 SERAFIMO: Platforma integrată pentru tranzacții și servicii electronice financiar-bancare realizate folosind tehnologia disponibilă pe dispozitivele mobile cu răspândire largă, Proiect PN-II Parteneriate
- 2008-2011 INFOSTRUCTURE: Platforma avansata de servicii electronice pentru optimizarea si adaptarea afacerilor la economia in timp real, Proiect PN-II Parteneriate
- 2007-2010 PEGAF: Experimental Grid platform for the development of applications oriented towards workflows with dynamic resource allocation, PN-II-PARTENERIATE
- 2007-2010 Planificarea Descentralizata in Medii Grid Bazata pe Arhitectura Sistemelor WEB, TEMA NR. 25, ANEXA 1a, COD CNCSIS 154

- 2006-2008 EGEE II: Enabling Grids for the E-science, project FP6
- 2006-2008 SEE GRID-II - South Eastern European GRid-enabled eInfrastructure Development, project FP6
- 2005-2007 COOPER: Collaborative Open Environment for Project-Centred Learning, project FP6
- 2005-2008 EU-NCIT leading to EU IST excellency FP6 "Integrating and Strengthening the European Research Area, FP6-INCO programme
- 2005-2008 MedioGRID: Parallel and distributed processing on Grid of geographical and environmental data, Grant INFOSOC
- 2005-2008 GridMOSI: Virtual organization in Grid technology for high-performance modeling, simulation and optimization, Grant RELANSIN

Leading positions / Membership to scientific organizations, committees, editorial boards

- Member of the Romanian Academy of Technical Sciences
- Co-director of the National Center for Information Technology, UPB
- Member of the Editorial board of the “International Journal of Space-Based and Situated Computing”.
- Chairman international conferences: AINA, INCOS (General co-Chair), CloudCP, co-founder of the HiPerGRID workshop, co-chairman of the session HiPerGRID of the ICCP conference. Organizer of CISIS 2012 conference.
- Member of steering committee of international conferences: ISPDC, CSCS, ICA3PP.
- Reviewer ISI/ international journals: IEEE Communications Magazine, Future Generation Computer Systems – Elsevier, Journal of Supercomputing – Springer, Cluster Computing, Measurement – Elsevier, Advances in Human-Computer Interaction, Emergent and Distributed Systems, IEEE Transactions on Industrial Electronics, Journal of Ambient Intelligence and Smart Environments, Journal of Network and Computer Applications – Elsevier, Computational Intelligence and Neuroscience, JISR-Computing, Information & Management – Elsevier, Computers in Industry – Elsevier, CEAI - Journal of Control Engineering and Applied Informatics, Applied Mathematics and Computation – Elsevier.
- Member of scientific committees of international conferences: 3PGCIC, ISTA, ICCP, AINA, ARMSCC, CSE, ECMS, CCGris, CIT, ICSTTC, SYNASC, ICWL, IDC, NBiS, SeDiS.

Proposed PhD subjects:

The proposed subjects have in common the following aspects: the aim to develop solutions for realistic problems of today large scale distributed systems and applications; the solutions are based on collecting and storing large volumes of data and their processing for extracting useful knowledge for customers; the focus is on middleware frameworks, which ease the development of distributed applications; the solutions respond to the quality requirements regarding the interoperability, scalability, availability, fault tolerance, security, and performance; the solutions will be validated in experiments with realistic data, collected from the real world.

In addition, the subjects include particular aspects concerning the functionalities, context, service types and others.

Each proposed subject is open to the collaboration of PhD students and researchers in the group of Distributed systems, and can be approached by several PhD students.

Subject 1 – Framework for improving water management by using smart data

The particular issues that might be taken into account are: multiple heterogeneous monitoring data sources, need for more accurate models used in the decision making process, efficient, low cost for the consumption management, efficient processing or data for generating alerts, high performance prediction methods, increase consumers' awareness regarding water consumption and induce sustainable changes in consumption behavior, improve social perceptions for water.

Subject 2 – Support framework for agriculture farms management and product quality improvement

The subject targets the development of an environment that ensures the improvement of the performance and quality of activities in farms through e-services for farmers' information and instruction, knowledge exchange among farmers, efficient collaborating with local and central administration, and with specialists in the domain, interoperability with other knowledge sources regarding the proper methods, instruments and techniques applied to various crops. The solutions will be based on large data volumes collected in the farm monitoring or from other data sources. Processing these data will allow the adaptation to the local context of methods and models successfully used in other cases.