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Benefits from our Participation in European Projects

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The Distributed Systems Architecture Research Group

Mission

- Research in advanced distributed computing and virtualization technologies for large-scale infrastructures and resource provisioning platforms. Ongoing research lines address the challenges of Infrastructure-as-a-Service (IaaS) Cloud Computing

Main Figures

- Started in 2002
- 7 Ph.D.'s, 7 researchers, and many PhD students
- **European Commission:** iAstro, **EGEE**, **EGEE-II**, **EGEE-III**, BEinGRID, RESERVOIR, 4CaaSt, **StratusLab**, BonFIRE, and **IGE**
- **Ministry Science & Innovation:** GridWay, Grid4Utility, HPCcloud...
- **Community of Madrid:** MEADIANET, BIOGRIDNET...
- More than 100 papers, with publications in IEEE Computer, IEEE Internet Computing, IEEE Distributed Computing...
- Contribution to open-source technologies: Globus, GridWay, OpenNebula...
- Contribution to technology platforms and standards bodies: NESSI, OGF, DMTF...



Agreement 22667
120 partners, 60 M€
(2006-2010)

Enabling Grids for e-Science

- Provide a seamless Grid infrastructure for e-Science that is available to scientists 24 hours-a-day



Agreement 261552
6 partners, 3,5 M€
(2010-2012)

Enhancing Grid Infrastructures with Cloud Computing

- Simplify and optimize its use and operation, providing a more flexible, dynamic computing environment for scientists; and enhance existing computing infrastructures with “IaaS” paradigms



Agreement 261560
11 partners, 3,7 M€
(2010-2013)

Initiative for Globus in Europe

- Service provider for the European e-infrastructures regarding the development, customization, provisioning, support, and maintenance of components of the Globus Toolkit.



Agreement 215605 (2008-2011)
**Service and Sw Architectures
and Infrastructures**

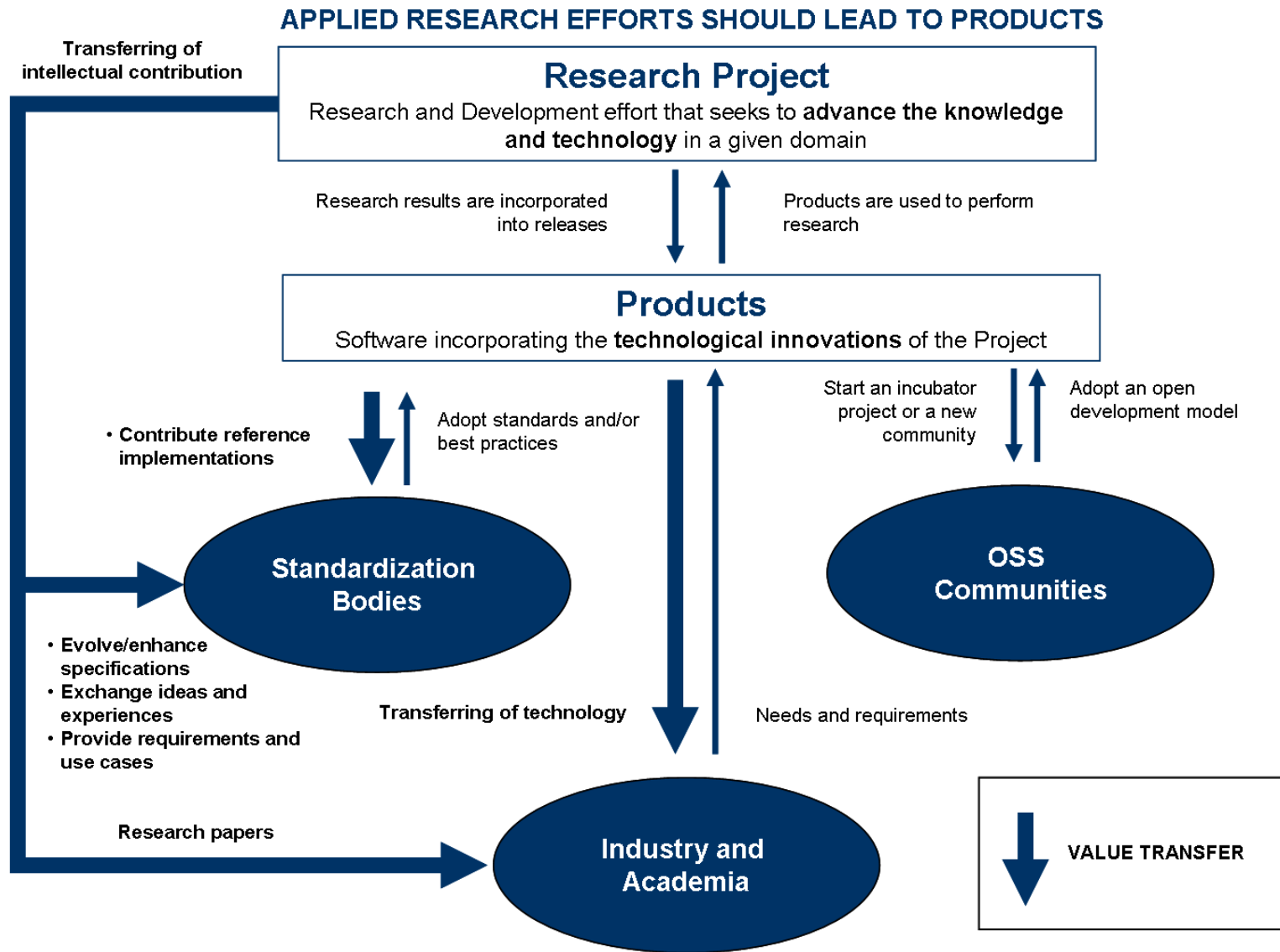


Agreement 258862 (2010-2013)
**Service and Sw Architectures
and Infrastructures**



Agreement 257386 (2010-2013)
**New Infrastructure Paradigms
and Experimental Facilities**

Research Model



Performing Applied Research to Address Real Needs

Framework to Address Real-world Problems

- Collaboration with leading companies and research centers in the definition of architectures, interfaces and standards for next generation infrastructures
- Access to large-scale infrastructures for testing, development...

Maximize the Value, Relevance and Impact of Research

- Definition of research objectives in order to address research and technology challenges from real business and science use cases

Maximize Technology Transfer and Research Visibility

- Technology outcomes, incorporating research and technology innovations, are used in the infrastructures

Support the Development Team Building Innovation

- Funding instrument to hire engineers for the development of innovative technology to support the research

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Research and Innovation in Cloud Computing

The DSA (Distributed Systems Architecture) Research Group at Complutense University of Madrid conducts research in **advanced distributed computing and virtualization technologies for large-scale infrastructures and resource provisioning platforms**.

Ongoing research lines address the challenges of **Infrastructure-as-a-Service (IaaS) Cloud Computing**:

- Cloud architectures
- Energy-efficient cloud computing
- Cloud federation and interoperability
- High Performance Computing (HPC) clouds

DSA-Research group is a core partner and leader of the Activity on Management of Virtual Machines in the RESERVOIR project, **flagship of European research initiatives in virtualized infrastructures and cloud computing**; leads the OpenNebula Cloud Toolkit, **widely used open-source technology to build cloud infrastructures**; and is a co-founder of the O Interface. The results of the research have been published in **virtualization and cloud computing**, and members of the group have participated in **the most important workshops and conference in the research area**. The Strategy section describes the **complete research profile of the group in 2002**.



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The next generation of Cloud Computing Platforms

Cloud computing is transforming the way we use the web but there's still a long way to go before we make full use of the promise, offers Professor Ignacio Martín Llorente looking ahead to a more flexible and agile future of internet-enabled service provision in a virtual computing environment.

But what's clear is that Cloud Computing is already transforming the way we use the web.

Just as we do not concern ourselves with how our electricity is generated but simply plug a switch whenever we need power, so Cloud Computing provides a platform for the development of a service-based online economy in a virtual computing environment.

Cloud Computing allows data centres to operate more like the Internet by enabling computing services to be distributed, globally accessible, flexible and scalable.

Clouds can be private or public, or a mix of both. They can be used for a wide range of services, from simple web hosting to complex applications.

Cloud Computing offers two key areas of research challenge: "How addressing the requirements of next-generation private, public and hybrid Cloud Computing platforms, and their addressing the adaptation of service workflows to take