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How Cineca supports IT

/ **CINECA: an overview**

/ **Systems and Services for Higher Education**

/ **HPC for Research Activities and Industries**

Cineca: the Consortium

Not For Profit

Founded in 1969

HPC
FERMI: TOP500
EURORA: TOPGREEN500

IS
500 applications
All Italian Universities
Ministry of Higher Ed

75 Members:
70 Universities
4 Research Institutes
Ministry of Education



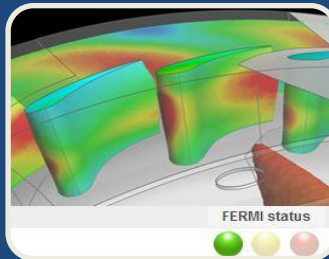
>900 employees

The Activities



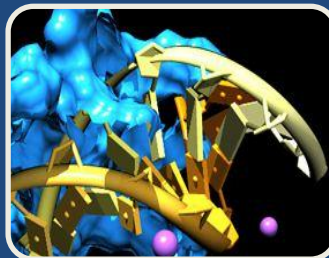
Higher Education

- Solutions & Services for the University Administration
- Services for the Ministry of Education, University and Research (MIUR)



Scientific Research

- High Performance Computing
 - FERMI: in the TOP500 List
 - EURORA: in the TOPGREEN500 List
- Scientific Visualization & Interactive Virtual Environments



Technological Innovation

- Data Center
- Information and Knowledge Management Services
- Health Care Systems

/ **CINECA: an overview**

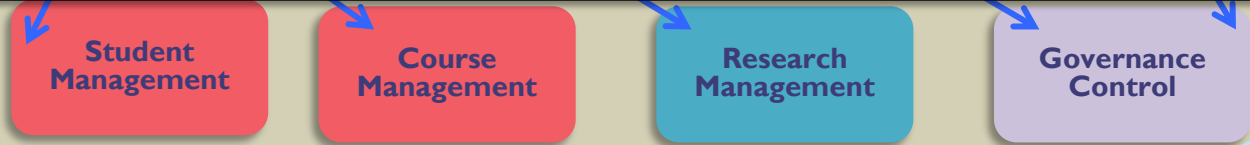
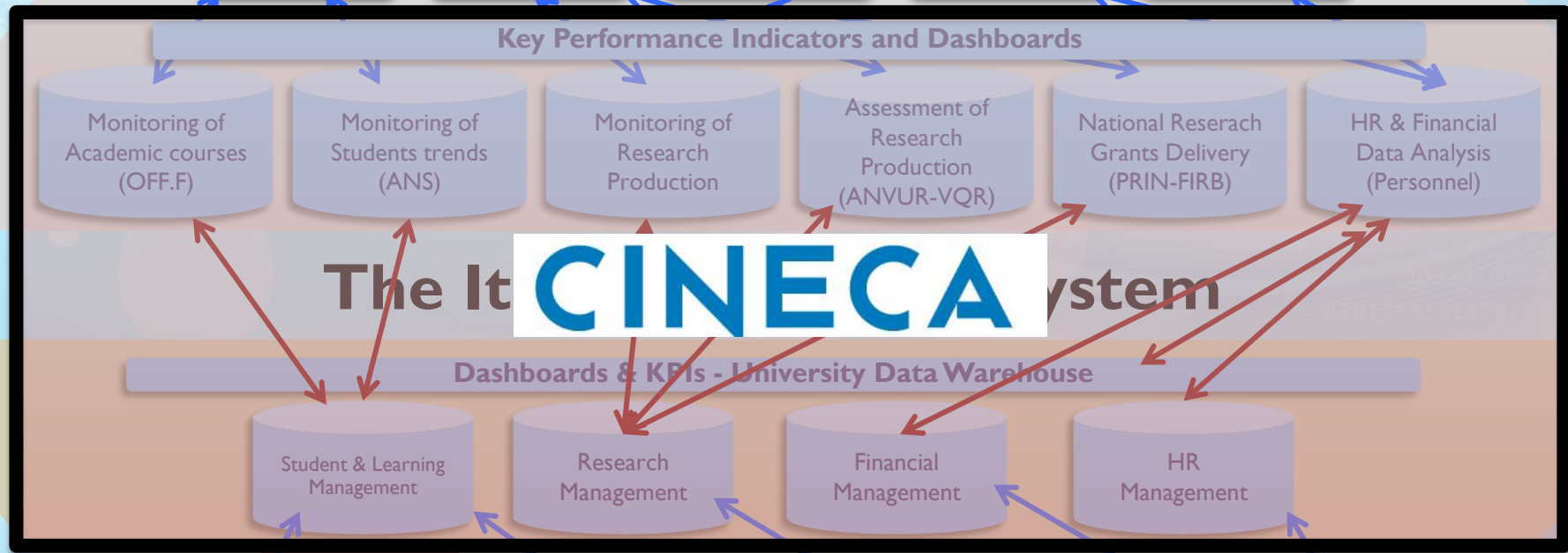
/ **Systems and Services for Higher Education**

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Supporting the Academic System



National Processes



Local Processes



Installations



Figures (2014)



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+ 1 Million
Students

+ 2 Millions
Payslips/Year

+ 1.5 Millions
Research Publications

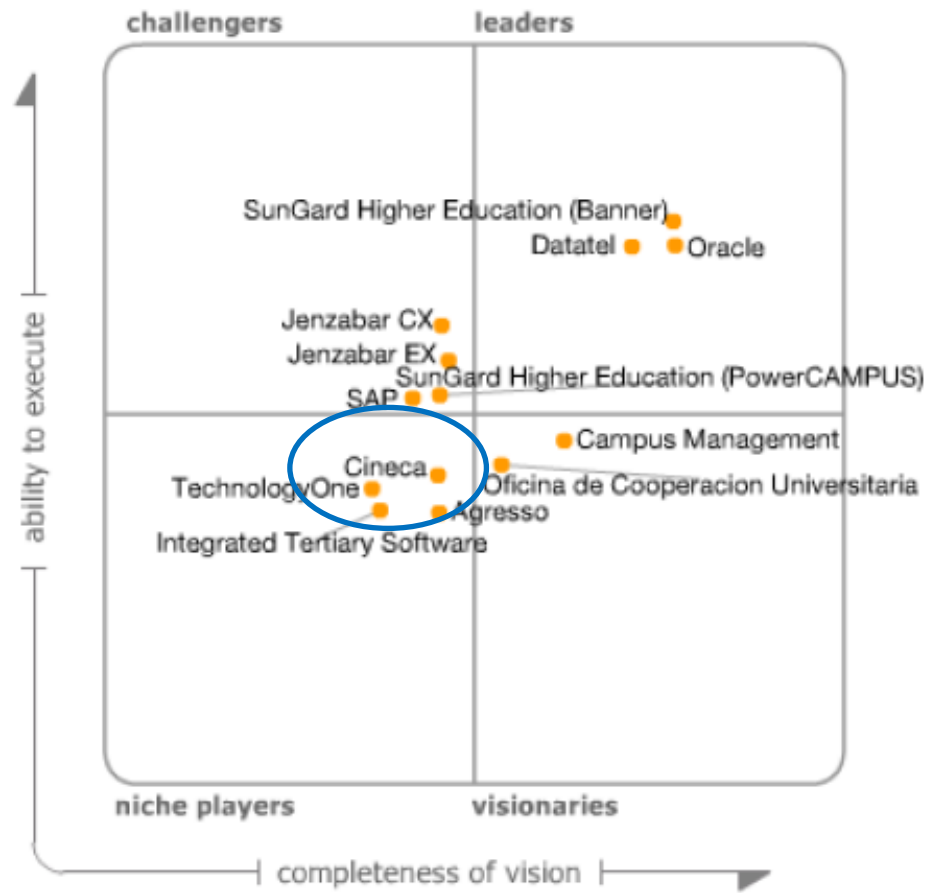
+ 2 Millions
Account operations/Year

500
Application Managed

+ 250.000
BI reports executed/Year

Gartner - Magic Quadrant Higher Ed.

Figure 1. Magic Quadrant for Higher Education Administrative Suites



As of October 2008

Source: Gartner (October 2008)

Topics



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The History of HPC



Cineca HPC Today



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FERMI - IBM BG/Q



Architecture: 10 BGQ Frames
Model: IBM-BG/Q
Processor Type: IBM PowerA2, 1.6 GHz
Computing Cores: 163840
Computing Nodes: 10240
RAM: 1GByte / core
Internal Network: Network interface with 11 links -> 5D Torus
Disk Space: 2.6 PByte of scratch space
Peak Performance: 2PFlop/s

EURORA

Architecture: 1 rack
Model: Eurora prototype
Processor Type:
Intel Xeon CPU E5-2658 @ 2.10GHz
Intel Xeon CPU E5-2687W @ 3.10GHz
Accelerator Type:
Nvidia Tesla K20s
Intel Xeon-Phi 5120D
Computing Cores: 1024
Computing Nodes: 64
RAM: 16GByte DDR3
1600MHz per node
(5 nodes with 32 GByte)
Internal Network:
1 FPGA (Altera Stratix V) per node
IB QDR interconnect
3D Torus interconnect
Disk Space: 90 GByte SSD per node
Sustained Performance: 3,150MFlop/w

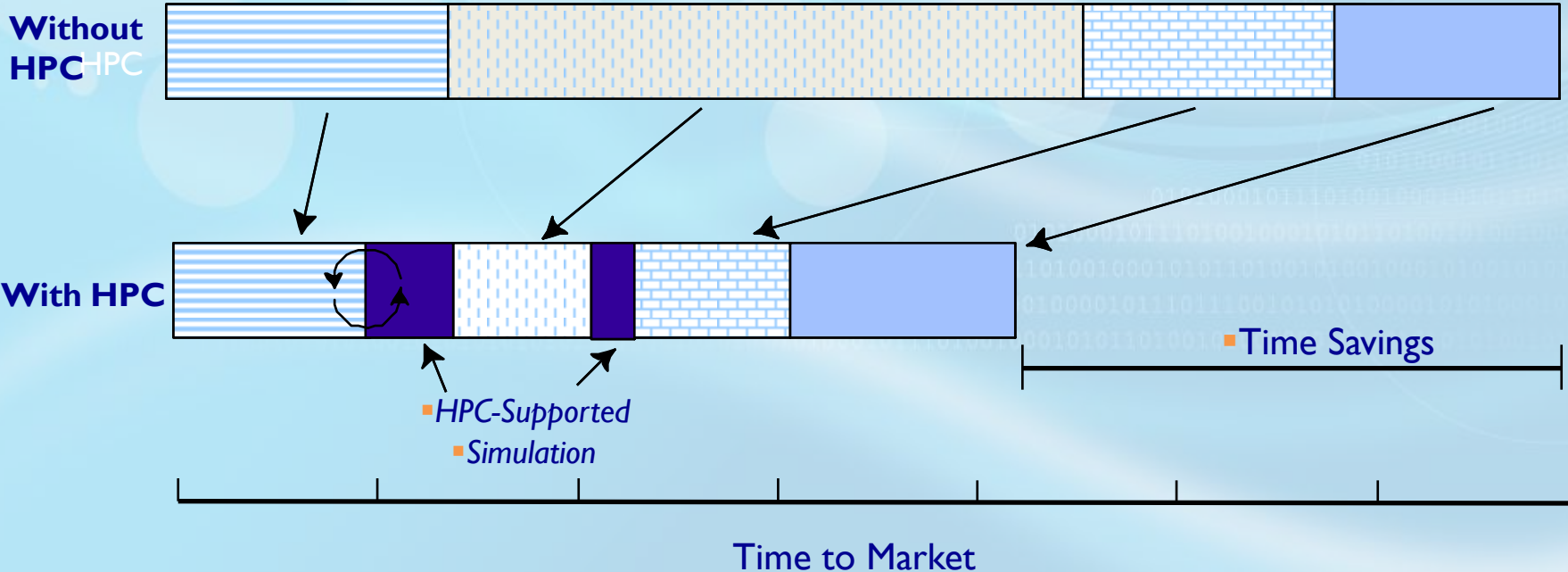


HPC's Key Impact for industries

Reduction in Time to Market

Product Development Process

Concept Development Prototype/ Physical Testing Manufacturing Design Final Preparation/Delivery



Offers, Services & Tech. Transfer



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HCP on demand: logical partitions; core hours, cloud computing. For peak workload, for industries which do not consider core business the management of HCP complex infrastructures'

Performance: HCP infrastructure life cycle less than three years, continuous upgrade.

Flexibility: pay per use, increasing of the costs driven by effective needs

Lower costs: economy of scale

Business continuity: UPS, Moto generators, graceful degradation, redundancies

Security: access physical security, logical networking security

Privacy: reserved file systems, file system encryption, NDAs'

HPC International Activities (1/2)



PRACE RI created

- PRACE is in operation since April 2010
 - PRACE AISBL created with 20 European countries
(Association Internationale Sans But Lucratif with headoffice in Brussels)
 - Since August 2010, PRACE is providing Tier-0 capability on JUGENE, the first European Petaflop-Supercomputer

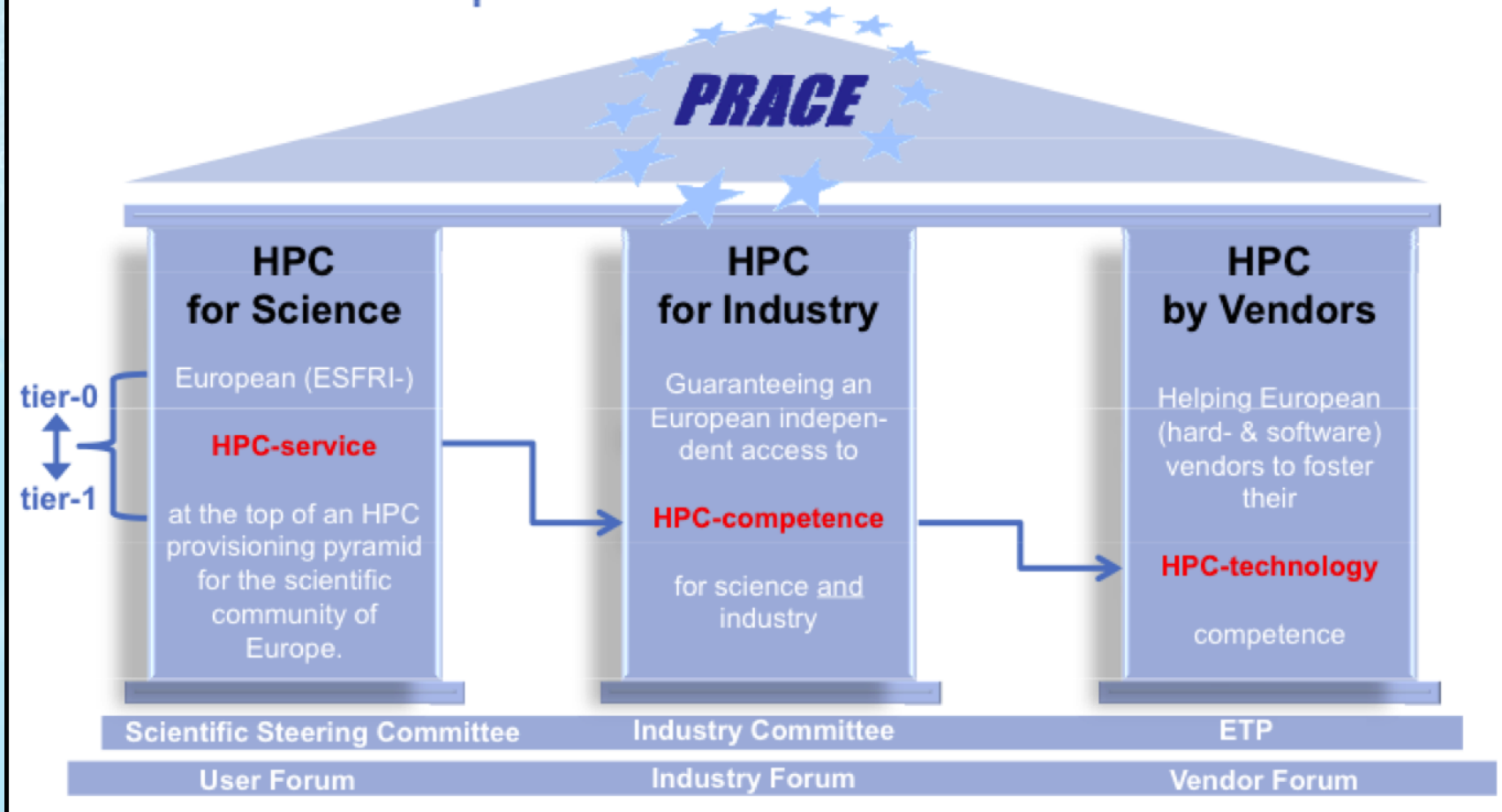


- Funding secured for 2010 - 2015
 - 400 Million € from France, Germany, Italy, Spain
Provided as Tier-0 services on TCO basis
 - 70+ Million € from EC FP7 for preparatory and implementation
Grants INFSO-RI-211528 and 261557
Complemented by ~ 60 Million € from PRACE members



The PRACE Pillars

Three pillars of the PRACE Mission



HPC International Activities

(2/2)



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EUDAT

/ European project, co-funded within the 7th Framework Programme

/ a Collaborative Data Infrastructure that allows researchers to share data within and between communities



FORTISSIMO

/ European Project coordinated by the University of Edinburgh and involves 45 partners

/ use of simulation services running on a High Performance Computing cloud infrastructure.

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