

University of Naples Federico II AND Grid Computing

Prof. A. Murli
University of Naples Federico II
and ICAR - CNR

Grid computing: a **new technology**
for high performance computing
(and many other classes of
applications)

Grid: 21st century e-Science methodology

- "... as soon as **Grid Computing** exists, it will necessarily guide the future course of science. Whenever any result is sought by its aid, the question will then rise - by what course of calculation can these results be arrived at by **this technology** in the shortest time?..."

Grid: 21st century e-Science methodology

- "... as soon as **Analytical Engine** exists, it will necessarily guide the future course of science. Whenever any result is sought by its aid, the question will then rise - by what course of calculation can these results be arrived at by **machine** in the shortest time?..."

(Charles Babbage, 1864)



Grid computing: a (not so) new
methodology for computational
science

University of Naples Federico II initiatives in Grid Computing

- Campus Grid

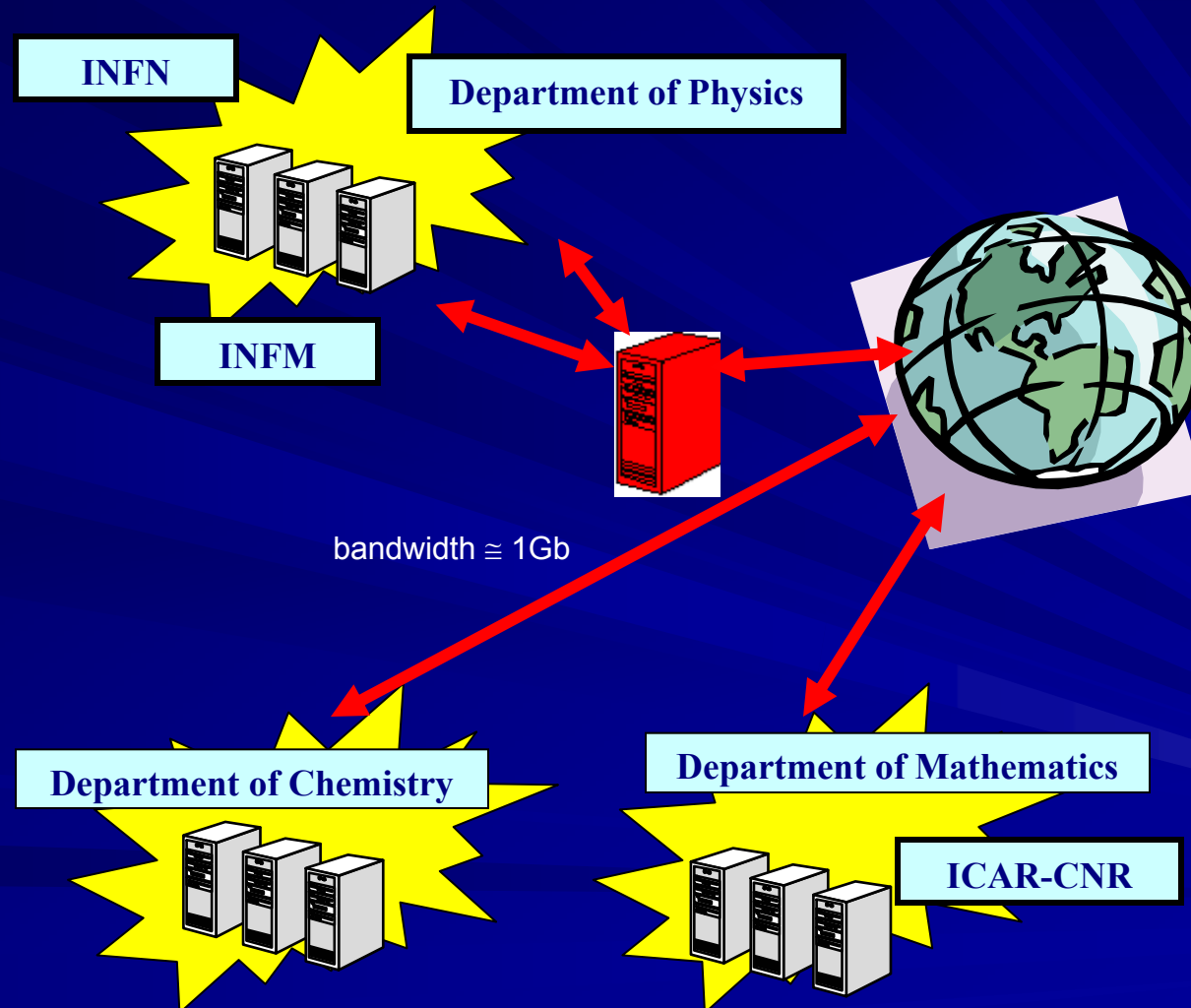
- SPACI

Campus Grid

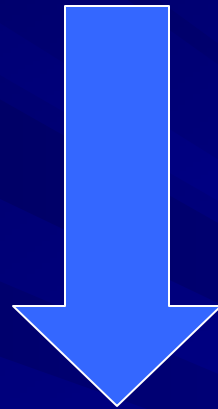
■ Initial participants

- Department of Chemistry
- Department of Physics
- Department of Mathematics
- INFN Naples branch
- INFN Naples branch
- ICAR - CNR (HPCN) Naples branch

Campus Grid



Campus Grid goal



"...To coordinate resource sharing and problem solving in multi-institutional virtual dynamic organizations..."

[C.Kesselman]

G. Aloisio - University of Lecce
L. Grandinetti - University of Cosenza
A. Murli - University of Naples

SPACI

Southern **P**artnership for
Advanced **C**omputational
Infrastructures

SPACI - The Core Nodes

SPACI is a grid infrastructure based on three geographically spread High Performance Computing Centers located in Southern Italy



- **ISUFI/CACT**
Centre for Advanced Computational Technology
University of Lecce (Resp. prof. Giovanni Aloisio)
- **ICAR (Institute for HPCN) Section of Naples**
National Research Council (CNR)
(ex CPS/CNR, Resp. prof. Almerico Murli)
- **MIUR/HPC Center of Excellence**
University of Cosenza (Resp. prof. Lucio Grandinetti)

SPACI – The Mission

- Creation, Development and Support of a “production” Grid Infrastructure in Southern Italy

- Advanced Research, Technological & Education Centre
 - Applied research and technological transfer on Grid & HPC
 - Development of “Data & Computation intensive” real applications
 - Advanced training for Grid & HPC specialists
 - Mixed Expertise in several technological and application contexts
 - High end Computational & Network infrastructures
 - Industrial Partnerships

- Single Interface for national, european and international GRID & HPC initiatives
 - Research & Coordinated Projects on GRID applications

SPACI — the Infrastructure and the Expertise

■ Infrastructure

- Integrated Computing Power of the Geographic Grid

■ Expertise

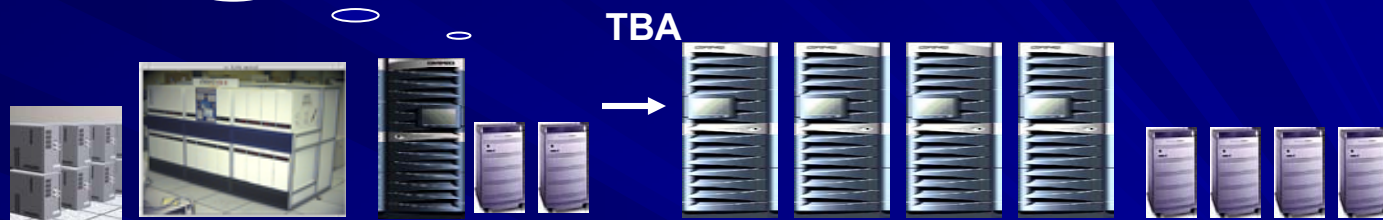
- Integration of the primary nodes specific expertise in several technological and application contexts

■ Man Power

- 50 people (staff, phd students, contractors,)
- Spinoff Companies (Grid S.r.L/Lecce, Inten S.r.L/Napoli)

Univ. of Lecce – Campus Grid

ISUFI/CACT



Gigabit Ethernet

Gigabit Ethernet

Gigabit Ethernet

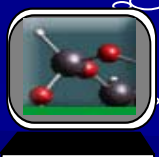
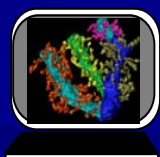
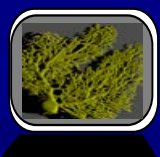
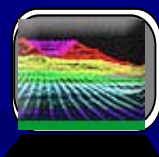
*DII
Eng. Fac.*

*NNL
Lecce*

*Mathematics
& Physics
Departments*

*ISAC/CNR
Sez. Lecce*

*INFN
Sez. Lecce*



Remote Access

DII
Comp. facilities

SAR
Processing

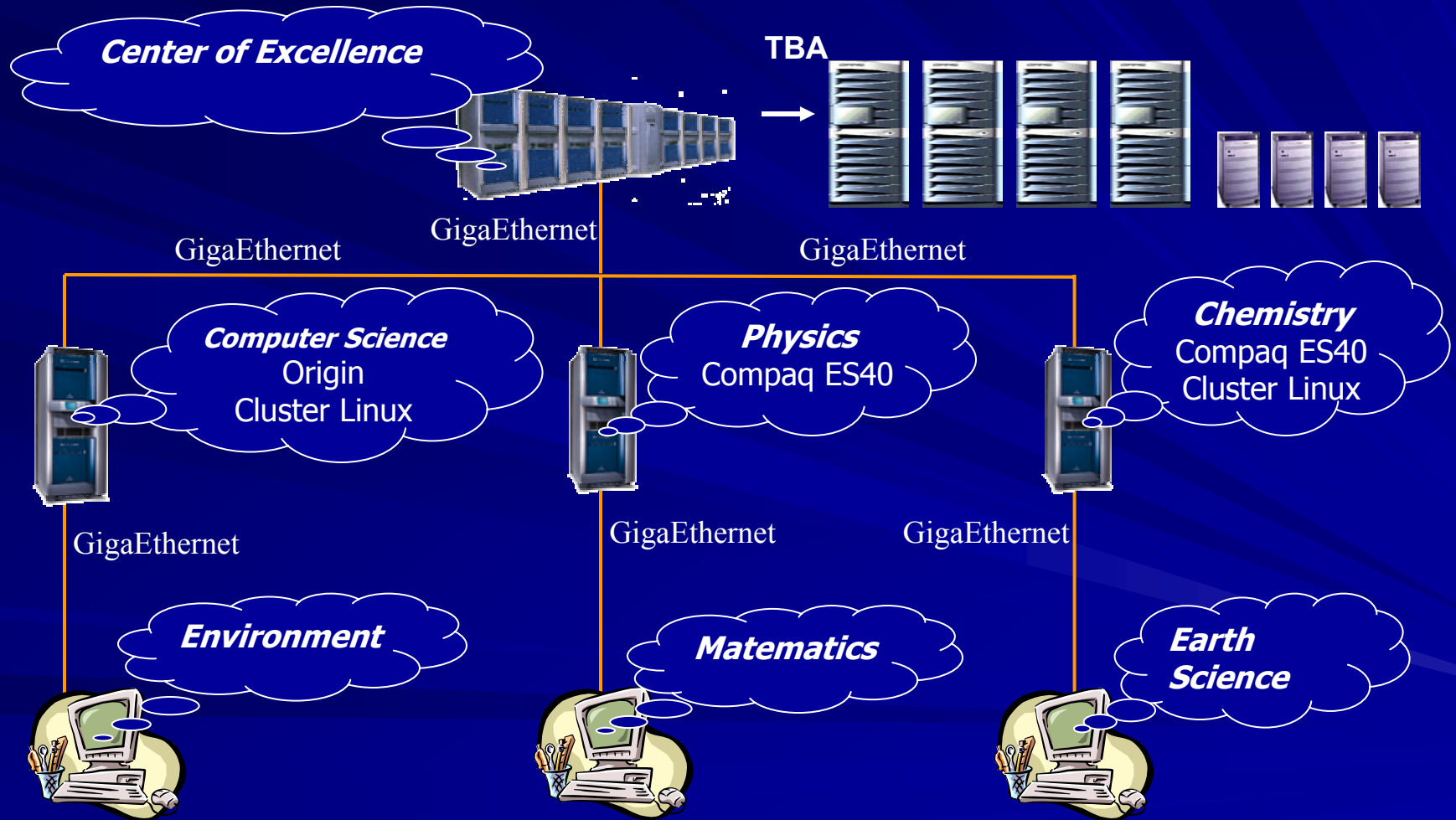
Processing
Analysis

Advanced
Visualization

Molecular
Modelling

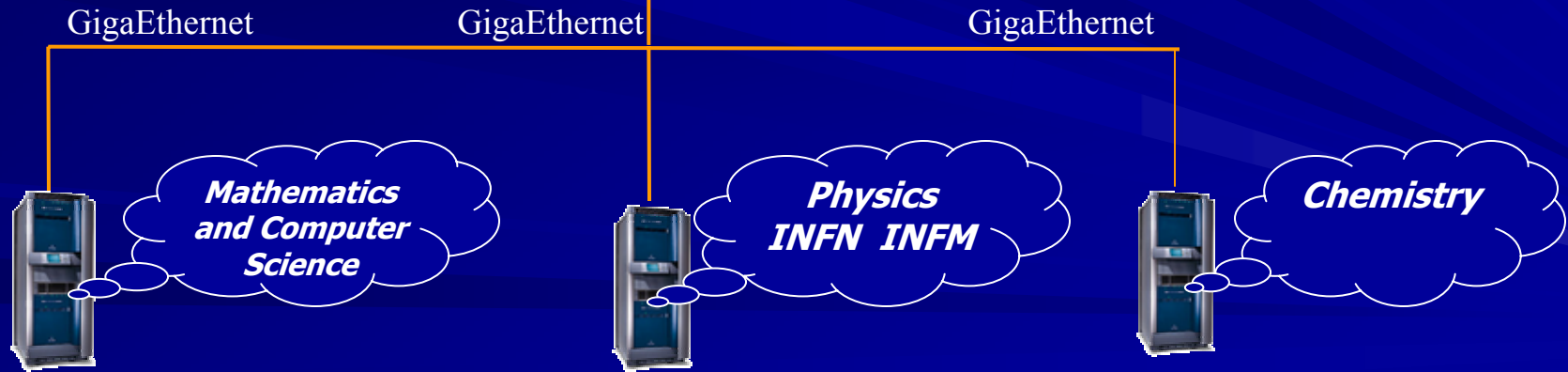
Air Quality
Modelling and Viz

Univ. of Cosenza/HPCC – Campus Grid



Univ. of Naples - Campus Grid

*ICAR-CNR Section
of Naples*



SPACI is a partner in the

EGEE Project

Enabling Grids and E-Science in Europe

VI European Framework

<http://egee-ei.web.cern.ch/egee-ei/2003/index.html>

SPACI



One of the main components of the Italian Grid infrastructure