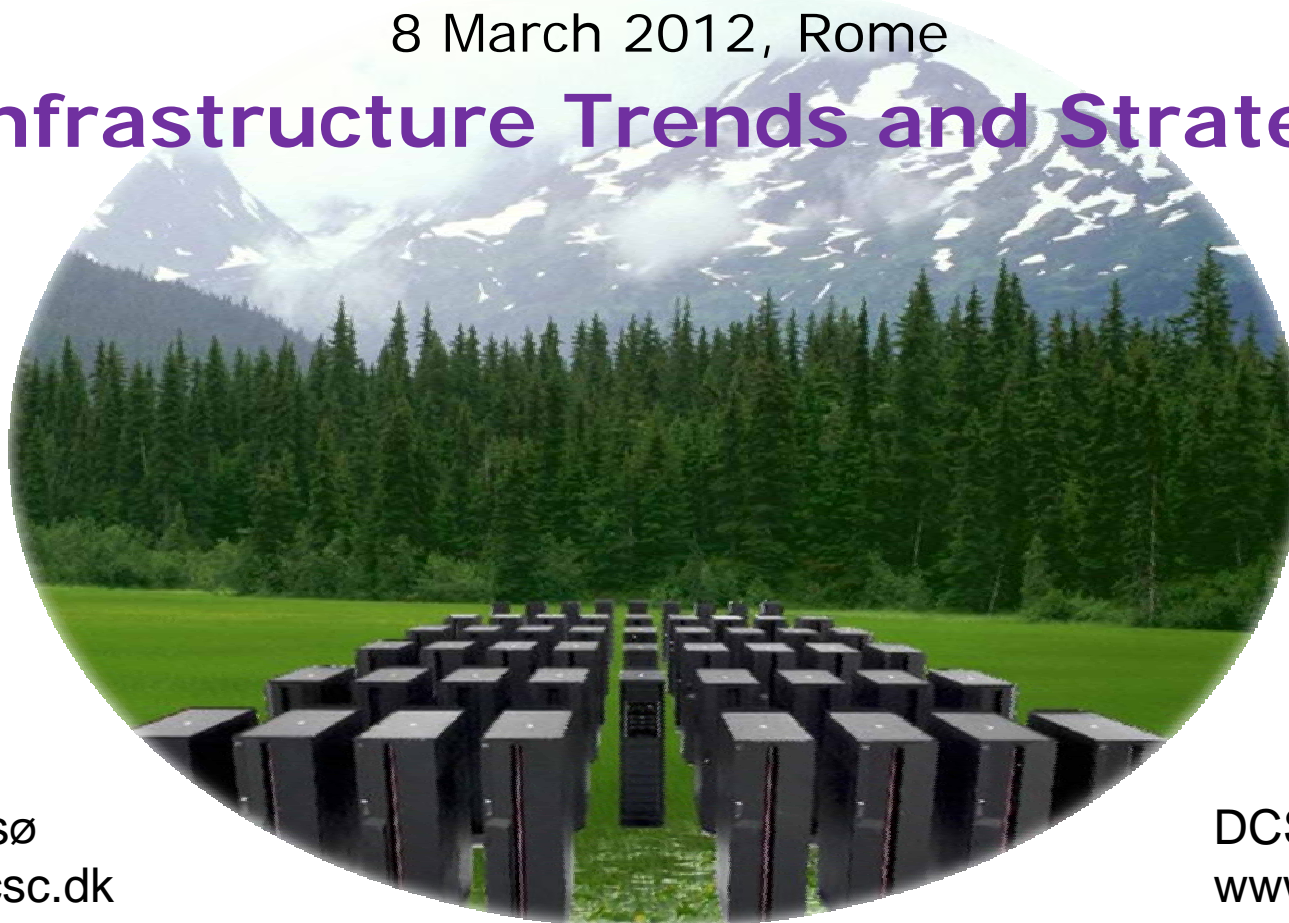


DC-NET Final Conference

8 March 2012, Rome

e-Infrastructure Trends and Strategies



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1. e-IRG, what is it?
2. Development within e-Infrastructure for the scientific mission
3. Current e-IRG main points
4. e-Infrastructure trends and strategies

What is the **e-Infrastructure Reflection Group**

The main objective of the e-Infrastructure initiative is to support the creation of a political, technological and administrative framework for an easy and cost-effective shared use of distributed electronic resources across Europe. Particular attention is directed towards grid computing, storage, and networking.



The e-IRG consists of national delegates, originating from, representing or appointed by national ministries responsible for research infrastructure.

What is:

... the **e-Infrastructure Reflection Group** ?

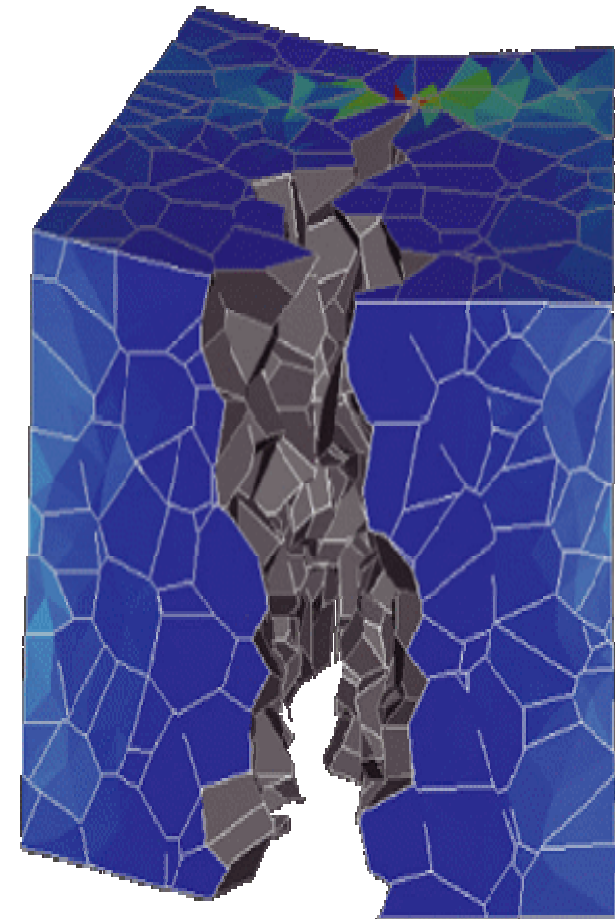
Think tank & debate forum, through delegate meetings and workshops producing:

- e-IRG recommendations – for EC & National Gov.
- White papers
- Blue papers
- Roadmaps
- Other policy papers
 - e-IRG workshop reports
 - e-IRG task force reports
 - e-IRG Newsletter
 - Press releases
 - e-IRG Articles

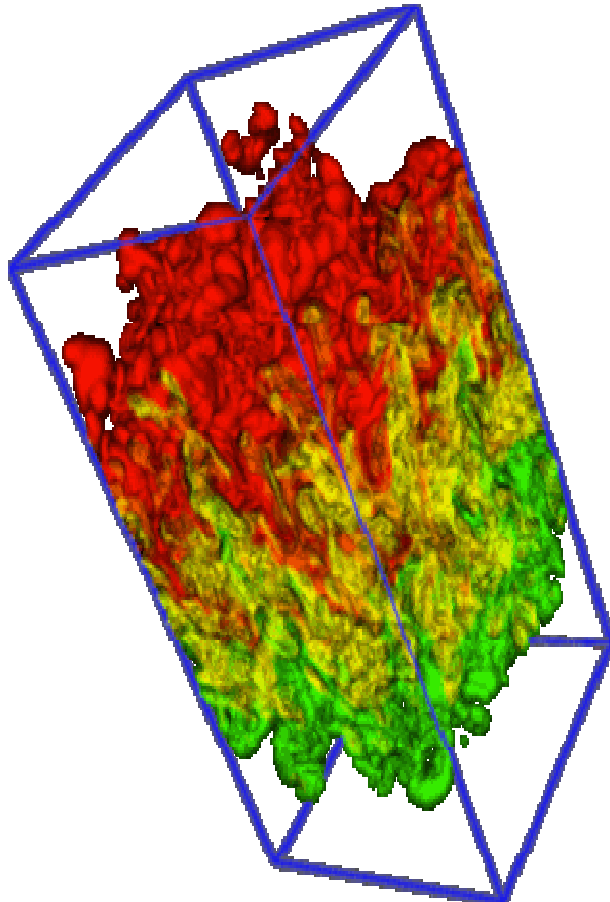


Development within e-Infrastructure for the scientific mission: HPC is becoming R&D 3ed pillar

- “Computational simulation offers to enhance, as well as leapfrog, theoretical and experimental progress in many areas of science critical to the scientific mission...” (US Department of Energy).
- “Computational science is one of the most important technical fields of the 21st century because it is essential to advances throughout society” (US President’s Information Technology Advisory Committee)
- “Computational science has become the third pillar of the scientific enterprise, a peer alongside theory and physical experiment” (US President’s Information Technology Advisory Committee)

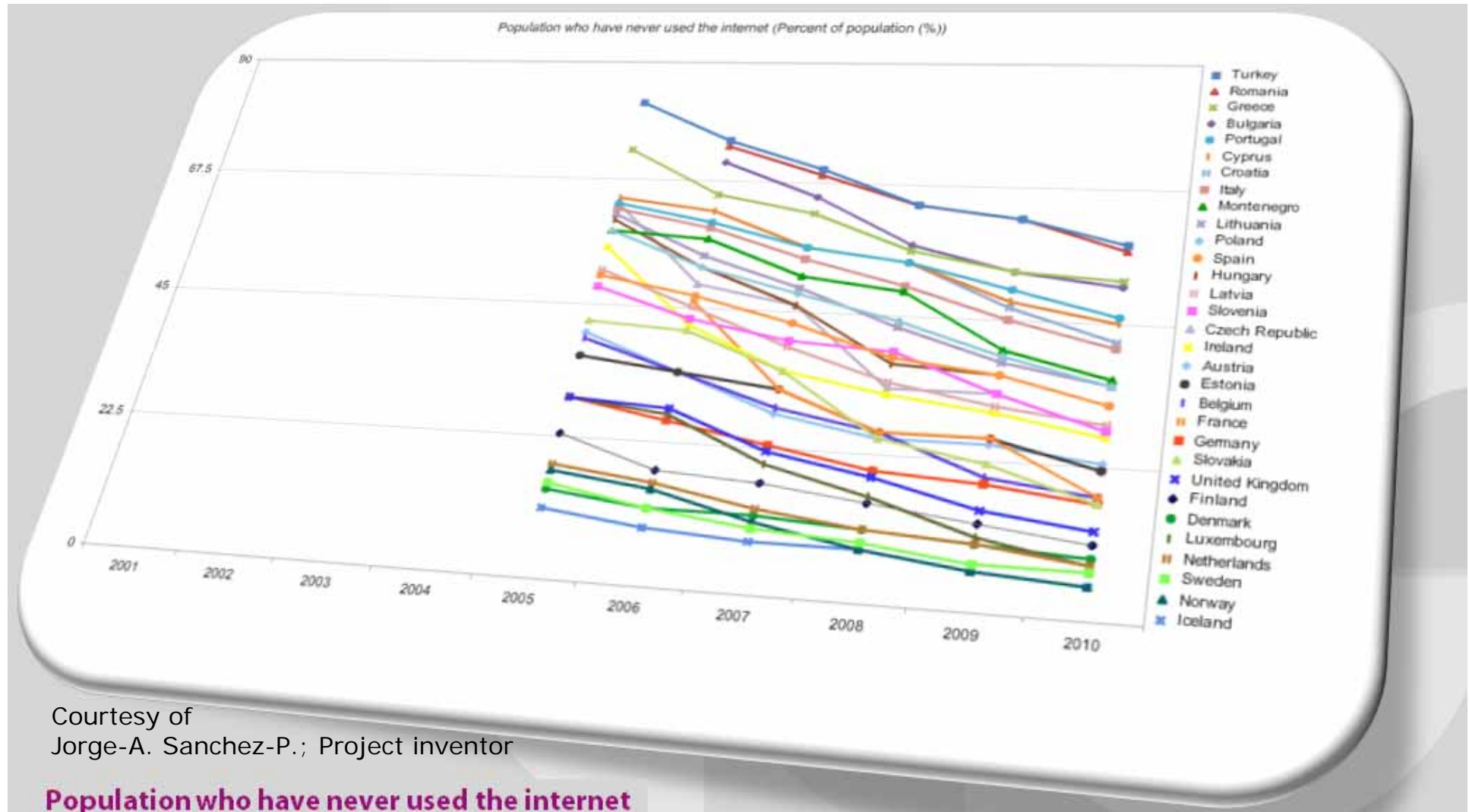


Development within e-Infrastructure for the scientific mission: Growing HPC utilisation; growing budget burden



- “The next 10 to 20 years will see computational science firmly embedded in the fabric of science – the most profound development in the scientific method in over three centuries” (US Department of Energy).
- “A host of technologies are on the horizon that we cannot hope to understand, develop, or utilize without simulation” (US National Science Foundation)

However, alarming facts exist:
The majority is still left behind



Computing !

Do we need it? Do we need to manage it? Do we need to rethink it?

Danish HPC estimate:

"For every million Euro spent on HPC hardware, in the order of one million Euro is spent on electricity ..."

Current e-IRG main points: The Digital Agenda

The Digital Agenda – is one of the seven flagships of EC's **2020 Strategy**.

The Digital Agenda - describes Europe's strategy, policies and actions to allow the European economy and society to **benefit from the Digital Revolution**.



e-Infrastructures
in support of the Digital Agenda

Current e-IRG main points: e-IRG whitepaper

Analysis & recommendations

- e-Infrastructure governance
- Future of research networking
- Authentication, authorization and accounting
- Energy and Green IT
- Exascale computing and related software
- e-Infrastructure services
- Data infrastructures



e-IRG White Paper 2011

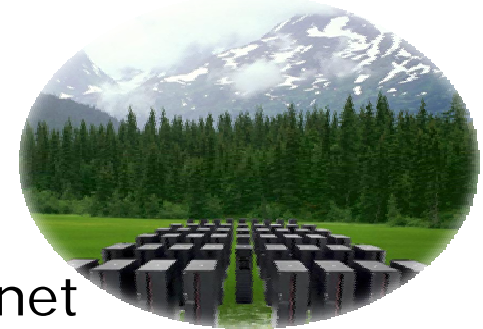
Structural Computing Trends

Consumption vs. Specialisation

Infrastructure vs. Instrument

Infrastructure – Consumption

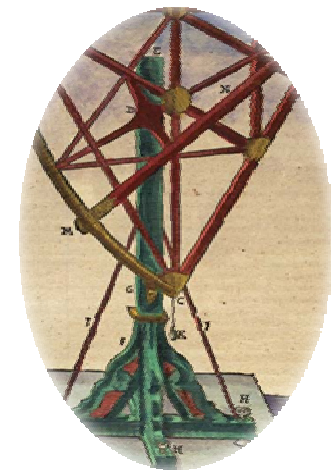
General purpose Linux computing clusters;
General purpose (slow) storage; Standard Internet



VS.

Instrument – Specialisation

Specialised High Performance Computing (HPC) and
advanced storage architectures (often controlled
by big R&D communities, e.g. within ESFRI).

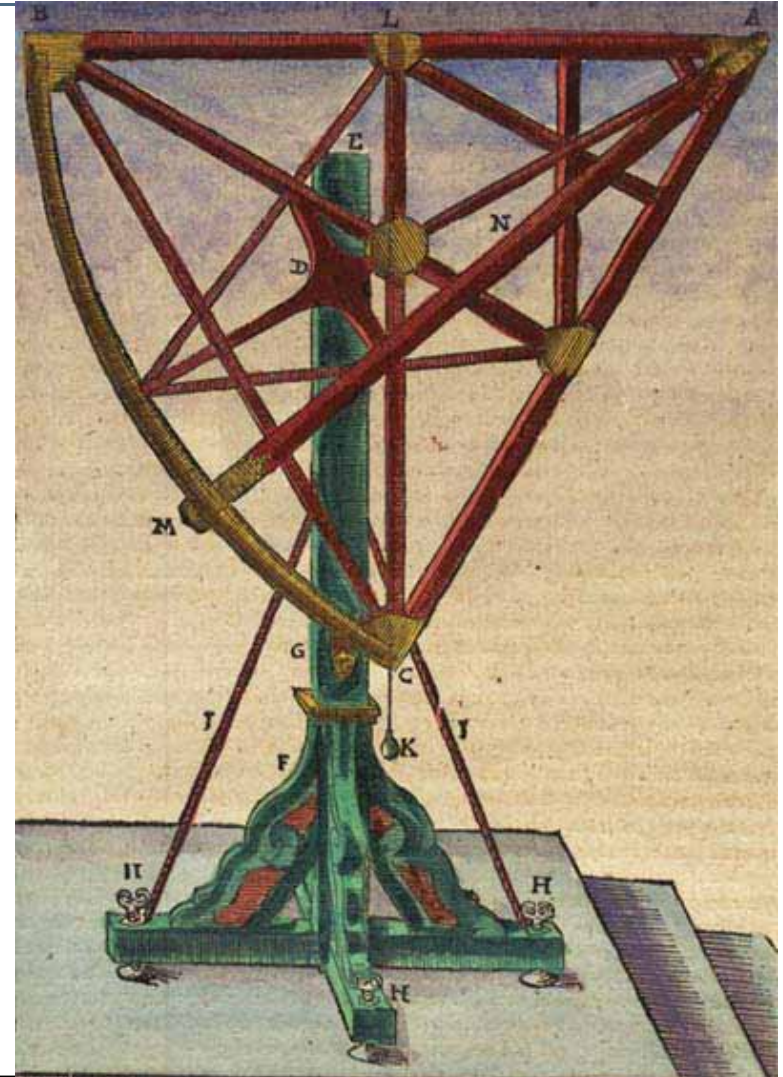


Structural Computing Trends

Specialisation: From infrastructure to instrument

Some researchers need:

- to build specialised e-infrastructure
- to have instrument-proximity
- to have control (root password, complete middleware and software dictatorship)
- To “own” the system administrator

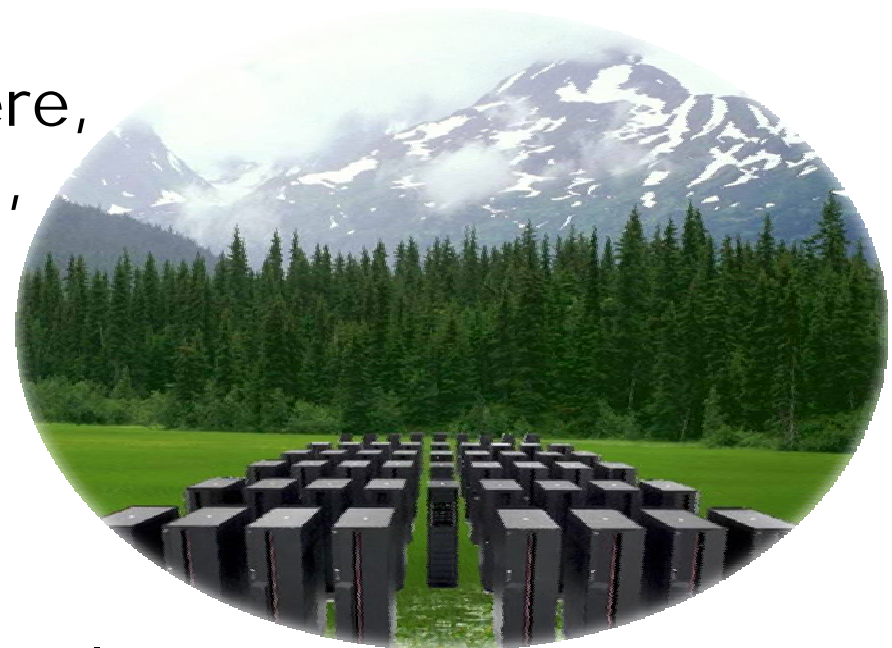


Structural Computing trends

Consumption: From instrument to infrastructure

Other researchers need:

- to just compute... Anywhere, with whatever (e.g. cloud), as long as it works, and is affordable
- to have a nice *User Interface*; no voodoo, command line scripts
- to have no hassle with a local system administrator or computer centre boss



Structural Computing Trends

The classical computer centre - Do we need it?

Research needs to radically change the classical computer centre. Or possibly even need to do away with them, since they might be too conservative to change fast enough.

Development is significantly slowed due to lack of *Darwinism* (i.e. due to public sector monopolies, university culture...) =>

- Blockage in regard to significant savings on, or increase in computing capacity.
- Blockage in regard to needed advancements in “level of complexity”, in turn blocking improvements in national economic competitiveness, and intellectual development.

So, researchers need challenge their infrastructure providers

The Incentive Structures

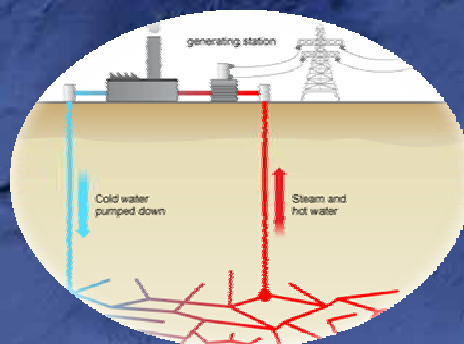
Rational: *PRO et CONTRA*

Concluding PRO et CONTRA

Competence spin off vs. Competence frog leaps



*Thank you
for your attention*



*Use the e-IRG:
Ask us e-Infrastructure
questions; identify your
needs; set you demands
and forward them to us*



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DCSC

Danish Center for Scientific Computing
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Ministry of Science, Technology and Innovation