

# Results of the HPC in Europe Taskforce (HET)

**e-IRG Workshop**

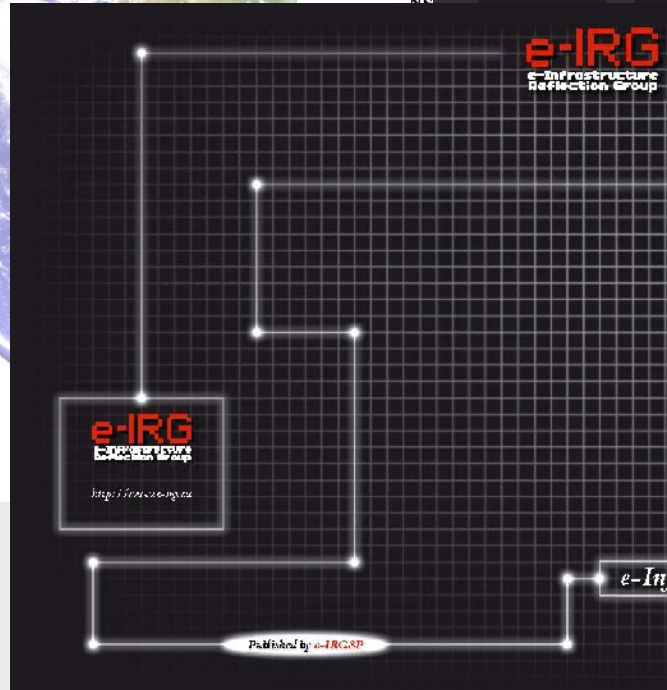
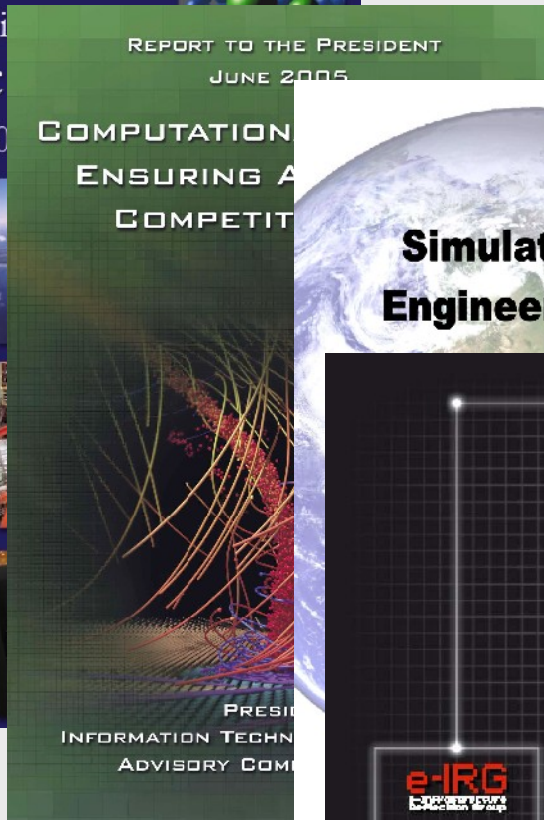
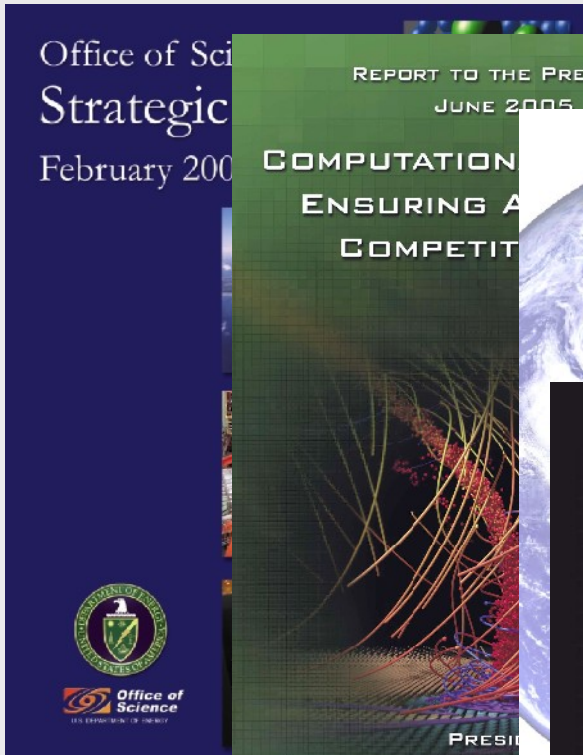
**Kimmo Koski**

**CSC – The Finnish IT Center for Science**

**April 19<sup>th</sup>, 2007**



# Computational science infrastructure





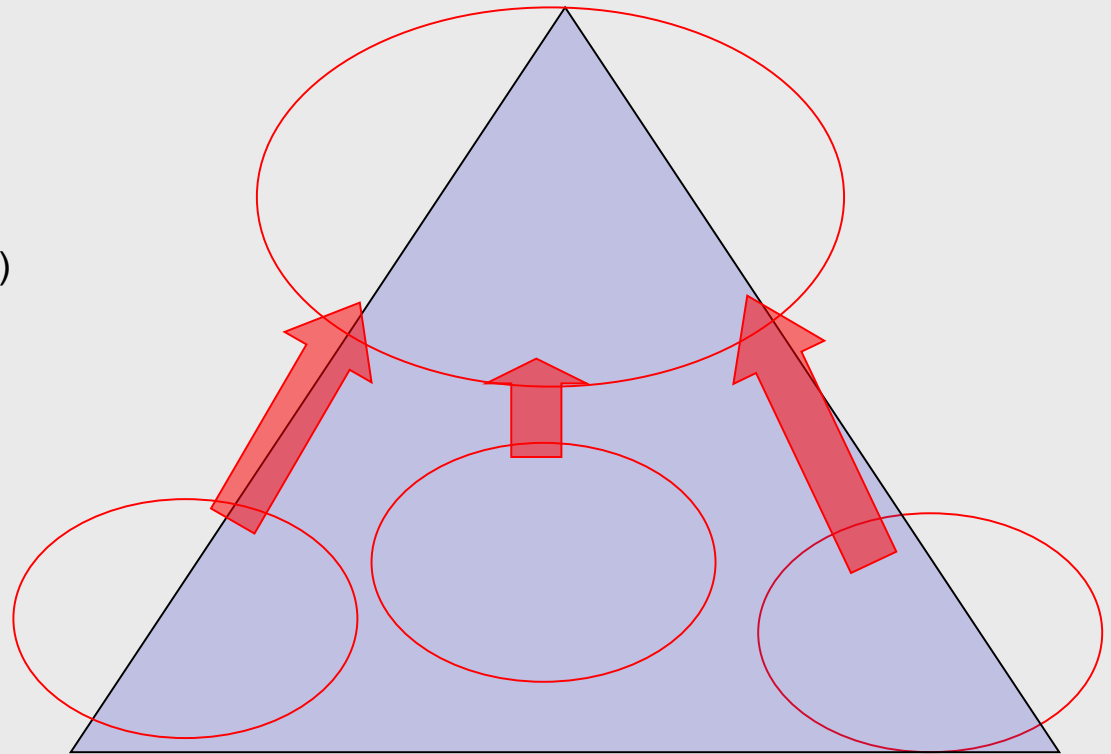
# HPC in Europe Taskforce (HET)

- **Temporary taskforce shaping the European strategy for petaflop computing**
- **Founded in June 2006**
- **Strategy work delivered in January 2007**
- **Members from 11 European countries**
- **Chaired by CSC, Finland**
  
- **Complete documentation available:**  
<http://www.hpcineuropetaskforce.eu/>
  
- **EU FP7 project to build the petaflop infrastructure based on HET strategy is currently planned**



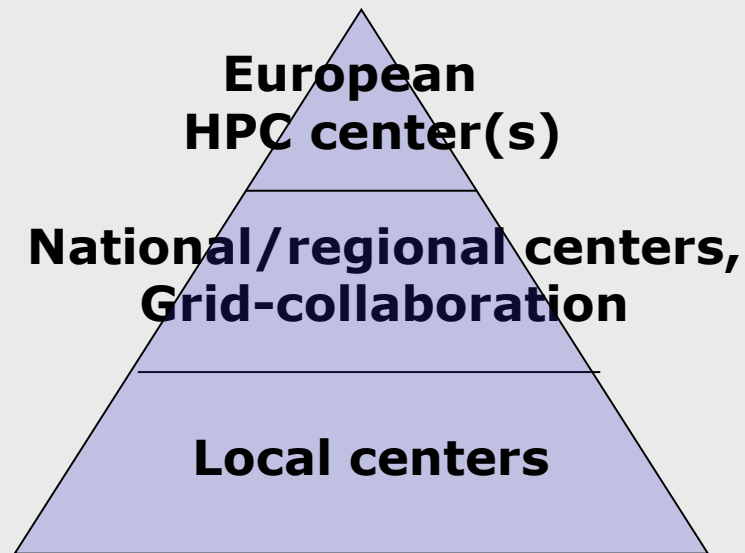
# HET Scope

- **The upper layers of the pyramid**
  - HPC centers / services
  - European projects (HPC/Grid, networking, ...)
- **Activities which enable efficient usage of upper layers**
  - Inclusion of national HPC infrastructures
  - Software development and scalability issues
  - Competence development



# Basic Ecosystem

- **Balanced approach with sufficient peak and strong base of the pyramid**
- **Access to the extreme computing power for the top European scientists**
- **Strong support by software and competence development activities**
- **Methods to allocate cycles and exchange infrastructure and competence based resources**
- **Inclusion for the whole European Union**



# HET Recommendations

- **Recommendation for the development and operation of a “top end” infrastructure**
  - HET recommends establishment of a small number of European HPC facilities to provide extreme computing power – exceeding petaflop capability – for the most demanding computational tasks.
- **Recommendation for developing the full European ecosystem**
  - HET recommends increased emphasis on the development of the full HPC ecosystem, including the local infrastructure, national and regional facilities, top-level European computing capabilities and the interoperability of their services.
- **Recommendation to enable petascale computing by supporting the development of novel software architectures**
  - HET recommends starting a range of activities aimed at addressing the key issues in building software that allows exploiting the performance potential of petascale machines in a coherent, efficient, scalable and sustainable manner.

# HET Recommendations (cont.)

- **Recommendation to implement an efficient and highly reliable infrastructure for storing large amounts of data**
  - HET recommends increasing emphasis on permanent and persistent data repositories as a part of the HPC ecosystem.
- **Recommendation to support competence development in computational science through extensive training and education activities**
  - HET recommends supporting extensive training and education activities which focus on enabling more efficient and higher quality use of the top-end facilities in the long run
- **Recommendation to raise the visibility of HPC**
  - HET recommends strong activities to increase the visibility and improve the publicity of computational science in order to highlight the strategic impact and need of numerical simulation for most areas of science and engineering

# HET Recommendations (cont.)

## ➤ **Recommendation to boost collaboration**

- HET recommends support for collaborative actions with a target to link the major players in HPC Ecosystem – existing grid and HPC projects, national and regional centers, main computational research groups, funding organizations and potential new planned FP7 efforts – in order to maximize synergy for actions.

## ➤ **Recommendation to support European industry**

- HET recommends support for collaborative efforts with European industrial HPC users and European HPC industry at large – from hardware and software R&D to product design and manufacturing.



# HET outcome

- **Entry in ESFRI list for petaflop computing**
- **Papers:**
  - Scientific case for European HPC (most work done by previous HPCEUR project)
  - Proposal for funding models
  - Proposal for peer review process
  - Views for HPC Ecosystem
  - Summary paper with recommendations
- **Good team spirit with a common approach**
- **Basis for practical implementation**
  - Consortium for ESFRI Preparatory phase
  - Memorandum of Understanding for European Tier 0 HPC service

# Partnership for Advanced Computing in Europe (PACE)



# PACE

- **Project proposal for preparatory phase, call deadline 2.5.2007**
- **Memorandum of Understanding, 14 countries signed and more to come**
- **PACE consortium with 14 partners (14 countries)**
  - Austria
  - Finland
  - France
  - Germany
  - Greece
  - Italy
  - Norway
  - Poland
  - Portugal
  - Spain
  - Sweden
  - Switzerland
  - The Netherlands
  - United Kingdom



# ESFRI

- **Strategy Forum with a consulting role to EU**
- **Wide representation of scientists in various disciplines**
- **Roadmap process for major new European research infrastructures (range of 10-1000 MEUR for an infrastructure)**
- **Roadmap published in 2006**
  - 35 projects labeled mature
  - One of the projects European HPC Service
- **Preparatory projects for each project**
  - 1-4 years
  - Deadline for project call May 2<sup>nd</sup>, 2007



# New market for European HPC

- **35 ESFRI list new research infrastructure projects, most of them starting a preparatory phase project late 2007**
  - 1-4 years
  - 1-7 MEUR \* 2 (petaflop computing 10 MEUR \* 2)
- **Successful new research infrastructures start construction 2009-2011**
  - 10-1000 MEUR per infrastructure
- **Existing infrastructures are also growing**
- **Results:**
  - Growing RI market, considerably rising funding volume
  - Need for horizontal activities (computing, data, networks, computational methods and scalability, application development,...)
  - Real danger to build disciplinary silos instead of searching IT synergy

# Targets for European HPC collaboration 2007 onwards

- **Continuation of existing grid projects (DEISA, EGEE ...) and development in GEANT2 network infrastructure**
- **Building European petaflop computing services integrated in the full HPC ecosystem according to the performance pyramid model (PACE)**
- **Maximal synergy between PACE and DEISA (integration after some time?)**
- **Interoperability between PACE and EGI/EGEE**
- **Building up research infrastructure services for ESFRI roadmap**
- **Target to establish an active European community for HPC: infrastructure, resource sharing, communication and collaboration over country borders**