

Findings of the IESP breakout group on X-stack cooperation in international perspective

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reporting

Europe

- EC is committed to be fully engaged in all levels of development into Exascale and beyond
- This involves
 - technology development
 - Software
 - Applications
- How?
 - Test centres (co-development?)
 - Open source from the onset (how?)
 - Funding through FP7-FP8 and ...

European flavours (1)

- International interaction body for exascale: EESI
- EESI project due to be extended for another few years after October next
- EESI and PRACE communicate well
- In Europe: discussion on “European IP”
- How to balance between
 - Exascale-*development*
 - Beyond exascale *research*
- How to balance between
 - Framework funding
 - Beyond Framework funding (“Iter or Cern model”)
 - Research Council funding at the national levels

European flavours (2)

- How to balance between
 - Incremental developments and medium scope (FPx?)
 - Scientists need to publish-> applications conservatism
 - Industry looks for optimum investment with a 3-4 year scope
 - European economic/social impact of investments
 - Disruptive technologies and long term scope (Research Councils?)
 - New operating systems
 - New programming languages
 - New computer designs
 - New materials

Japanese flavors (1)

JST CREST (Core Research for Evolutional Science and Technology) for “Post-Peta HPC technologies“

(See also: <http://www.senryaku.jst.go.jp/teian/en/koubo/04-ch2202.html>)

- \$ 5M (500-600M JPY) for 5-7 years ~\$40 million total (4-5 B JPY)
- System *software*-oriented, NOT hardware
- Assume post-petascale architecture
- Real Software deliverable pieces required, not just papers

Research for the next of NGS (exascale?) will also be conducted in the AICS (Kobe Center)

- 2 teams currently by Ishikawa and Sato

In the 4th Science and Technology Basic Plan (FY2011-FY2015)

- Now under discussion toward exaflops class HPC technology
- Recent turn of events may change priority (green, safety)

JST-CREST Post-Petascale First Round

(Started Apr. 1, 2011)

- Parallel System Software for Multi-Core and Many-Core (OS)
- System Software for Post Petascale Data Intensive Science (Data, Filesystem)
- Highly Productive, High Performance Application Frameworks for Post Petascale Computing (Programming, Frameworks)
- ppOpen-HPC (Numerical Library)
- Development of an Eigen-Supercomputing Engine using a Post-Petascale Hierarchical Model (Numerical Library)

2nd round call due May 17th, to start Oct. 1, 2011

Chinese flavors

- Wants very much to participate
- 5 years working plan
- China presently in between 5y-plans
- Next meeting China presents what is known about the next 5y-plan, but encompasses research centres for software (numerical) and applications

Remarks from the X-stack group (1)

- International cooperation
 - Formalise IESP
 - Workshop and standardisation/workshops for exchange of information
 - Roadmap: identify topics that can be tackled incrementally and those that better be tackled through disruptive approaches
 - Roadmap: identify master plan approach versus competition at micro level
 - Or should we only adopt small example/pilot projects to cooperate on from 2012 and learn from that rather than wait for everything to be worked out in full
 - Use gap analysis results to inspire national research funding programs

Remarks from the X-stack group (2)

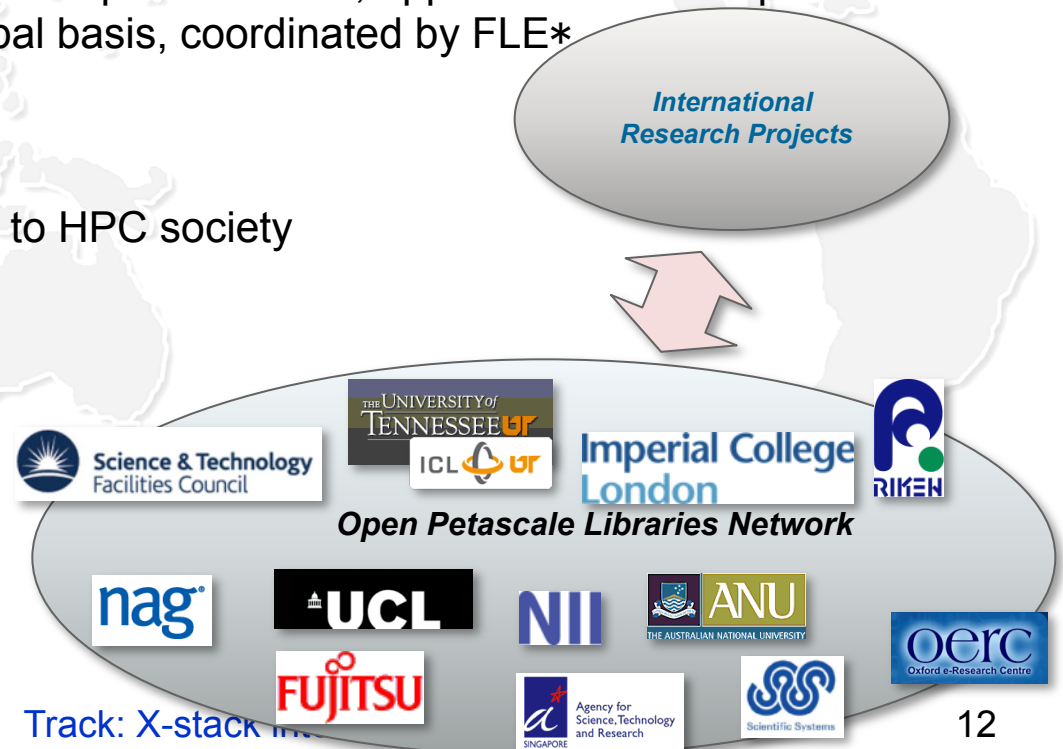
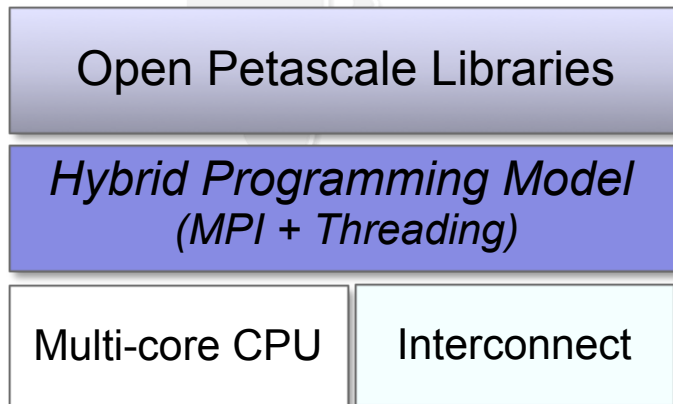
- Inject (funded) disruptive technology research activities into IESP
- Cooperation certainly possible for tools, libraries, emulators
- IP: Japan, EC, software must be open source
- IP: China Open source high recommended
- IP: chose early between the two flavors of open source licensing

Remarks from the X-stack group (3)

- G8-type of inspirations for funding helpful, but only if broadened up enough (Gn-n large enough)
- Define specific exascale challenges that could be tackled at national research levels in (normal) competition
- Define working groups that become problem owners of specific topics on the IESP roadmap (keep track of timing, etc.)

The Japanese appendix additional info

- How to reduce the burden to application implementation over multi/many core system, i.e. How to reduce the burden of the two stage parallelization?
- Collaborative R&D project for Mathematical Libraries just started
 - Target system
 - Multi-core CPU based MPP type system
 - Hybrid execution model (MPI + threading by OpenMP/automatic parallelization)
 - Cooperation and collaboration with computer science, application and computational engineering communities on a global basis, coordinated by FLE*
- **Open-source implementation**
 - Sharing information and software
 - Results of this activity will be open to HPC society



*: Fujitsu Labs Europe, located in London IESP workshop April 2011 Track: X-stack