Supercomputing and data centres revival of a French industry:

Symposium Honouring Prof Erol Gelenbe

Prof. Gérard Roucairol
Honorary President of the National Academy of Technologies of France
Former CTO of Groupe Bull
The Example of Tera 100
the first petaflops class machine in Europe

4370 interconnected servers, 138 368 cores (Intel), 500Tb RAM, 2Pb disk
500 Gb/s I/O bandwidth, 3MW, Linux OS
- Very High End complex product (6 months to assemble one machine)

- Focused added value relying on Bull know how:
  - Complex chips (several billions of transistors) allowing to build large server nodes with global access memory (NUMA) with cache consistency
  - total I/O bandwith 500Gb/s
  - Heat dissipation with innovative cooling doors of the racks
  - Strong optimization of Open Source software e. g. administration, communication software
  - ....

- Strong and Advanced cooperation with Intel
- Very Tight cooperation with very advanced users e. g. CEA/DAM
Racing for the « Exaflops »

The French Industrial Plan
To benefit from ongoing technology breakthroughs (massive parallelism, energy consumption, resilience, ...) to position France and Europe among the main worldwide actors of High Performance Computing

To benefit from HPC market breakthroughs (large diversification of domains and methods, Big Data, use of dedicated Clouds, ...) in order to improve competitiveness of the Industry (SMEs and large corporations)

HPC can change Nation’s wealth (IDC 2013)
- Mastering new technologies
- Developing sectorial initiatives
- Dissemination in the Industry
- Education
Mastering New Technologies

- New Architecture
- New Algorithmics

- Towards exaflops
- Dedicated vs Universal architectures
- New programming languages and development environments
New usages  New domains  New methods

- Health
- Urban Systems
- Agriculture
- Materials
- Manufacturing
- Multimedia
Promoting a very broad use of HPC

- Towards SMEs
  - Dedicated Office to animate and impulse the dissemination
  - Service Offering platform (HW, SW, Consulting)

- Educating specialists and users
  - Universities
  - Engineering schools
  - Continuing Education
2015 Achievements

- Technology available for building a 150 Petaflops supercomputer consuming 20MW i.e. 7.5 Gigaflops/watt (Bull/Atos)

- Launching of an INTEL lab on architectures dedicated to Big Data applications in the Teratec Area

- Launching 3 large application projects Agriculture, Materials, Multimedia (Large French companies +SMEs)

- Launching the dissemination initiative on 2 first dedicated fields: Civil Engineering, Mechanics
The Teratec campus

TGCC
The very large computer center of the CEA (French Atomic Energy Commission)

Industry and Research cooperation Labs

Large HPC actors

SMEs nursery

European Institute For HPC Education

Service platforms

A unique place covering major steps of the HPC value chain
French Industrial plan + European Technology Platform for HPC

Let’s win the race