Microsoft Technical Computing
Modeling the world with greater fidelity
Beat Sommerhalder, Marketing Director
Objective?
1.2 x 10^{21} bytes

New Bytes of Information in 2011

Source: IDC, as reported in The Economist

(1,200,000,000,000,000,000,000 bytes)
The data deluge

AND HOW TO HANDLE IT: A 14-PAGE SPECIAL REPORT
Moore’s Law...

...a hardware issue just became a software problem

“The era of single processor systems is over; the multi- and many-core systems world is here. If you're not ready for this change, there's an IT train wreck in your future.

- HPC Wire

Source: Jack Dongarra, Kunle Olukotun, Lance Hammond, Herb Sutter, Burton Smith, Chris Batten, Krste Asanovic, and Kathy Yelick
• 1 Million body images needed to ‘train’ Kinect for a great experience
• Using a 4-core machine, this would take almost 2 months
• Using a cluster they can train 1M images in < 1 day
What if?

C C C
Technical Computing Primary Investments

1. Simplify Parallel Development
2. Deliver TC Focused Tools & Applications
3. Bring Technical Computing to the Cloud

Provide millions of scientists, engineers, and analysts with the computing power and tools to help them make faster, more accurate predictions.
Client
single node
multi-core or
manycore
shared memory
Parallel Development on Windows
Cluster
multiple nodes
distributed memory
Trends in HPC

Data Proliferation Management
- Data Explosion
- Managing data
- Data Analytics

Accelerate Innovation
- Multi-core platforms
- Cloud computing

Trends Impacting HPC Landscape

To Make HPC Broadly Accessible
- Easier access to more end users in organizations of all sizes
- Use regular IT resources for HPC Systems Administration

Control & Align Costs
- Total cost of ownership
- Enmeshing of Enterprise IT and HPC
HPC Services for Excel 2010*
Run more sophisticated models.
Faster response to market trends.
Reduce time to results.

* With Ansys13 general availability
Desktop Compute Clouds*: Harnessing Idle Cores

Expand the capacity of existing HPC clusters. Utilize idle compute cycles as part of your overall HPC infrastructure.

* Available for Ansys today!
Cloud
"burst-out" to the cloud
Windows HPC in Azure

Concepts

- Use Azure servers to run HPC compute Jobs
- Can be used to “burst-out” to the cloud to handle peak demand
- Can create clusters that include dedicated on-premise servers, non-dedicated workstations and shared Azure servers
  - Jobs can run unchanged across all 3 types of compute nodes (no support for MPI in SP1)
  - Azure nodes are added to cluster using the Administration console (just like Workstation nodes)
Microsoft Innovation Center for Technical Computing

... a place to think about change!
The Consortium Caspur is a non-profit organization, financed by MIUR and by associated Universities. Their activities are mainly focused on five areas: Computational Chemistry and Bio-Informatics, Computational Physics, Computational Mathematics, Applications Materials Science, Data Analysis and Statistical Methodologies.

“In 2009, together with Microsoft we started at CASPUR a many-core environment on Microsoft HPC Server 2008, named CASPUR@Xlrate, dedicated to biomed applications. The first of its kind in Europe to offer GPU technologies for HPC under the Windows operating systems” said Prof. Nico Sanna. CASPUR is ranked #5 in the Little Green 500 list of November 2010 amongst the most efficient supercomputers in the world. Their Jazz cluster with Microsoft HPC Server 2008 is at present the most sustainable supercomputer in Europe.

Thanks to its contributions to the GPU computing, CASPUR has been also nominated CUDA Research Center by NVIDIA Corporate. (http://research.nvidia.com/content/cuda-research-centers.)

In collaborazione con L’Università’ di Pisa, Prof. Antonio Cisternino, Assistant Professor dell’Univ. di Pisa e Maurizio Davini, Direttore dell’IT Center abbiamo creato un altro Competence Center Microsoft ed entrambi fanno anche parte del TC Executive Advisory Council di Microsoft Corporate. Inoltre l’Univ. di Pisa e’ anche il HPC Competence Center di Gateway, ovvero il braccio enterprise di Acer e Competence Center Hitachi Data Systems.

L’HPC Competence Center di Pisa è strutturato in maniera flessibile e offre la possibilità ai clienti di personalizzare sia le soluzioni che le topologie HPC. Possano effettuare prove e chiedere consigli, in modo tale da sviluppare soluzioni migliori per soddisfare esigenze di business sempre più complesse. L’HPC Competence Center di Pisa offre varie tipologie di questi servizi innovativi, per esempio Benchmarking di applicazioni specifiche, design e valutazione di cluster di server e storage per ambiti HPC, Supporto a installazioni di Grid e Cloud Computing, Gestione di ambienti virtualizzati per ambiti HPC e Secure Remote user access HPC etc. etc.

CILEA, il cui acronimo si scioglie in "Consorzio Interuniversitario Lombardo per l’Elaborazione Automatica", è un consorzio interuniversitario (senza scopo di lucro) fondato nel 1974. Gli scopi principali iniziali del Consorzio consistevano nell’offrire alle università consorziate potenza elaborativa e i relativi servizi per rispondere alle esigenze della ricerca e, in seconda istanza, della didattica.

Nel tempo il Consorzio ha diversificato le sue attività: non si occupa più soltanto di mettere a disposizione l’utilizzo delle proprie macchine, ma ha sviluppato numerosi altri servizi in settori eterogenei (calcolo ad alte prestazioni, biblioteche–editoria elettronica–digital library, sviluppo software, servizi ICT per Industria e Universita. Cilea ha anche grande competenze su gli analisi strutturali.
Helping the CIO become a recognized business leader within his/her organization and with industry peers by providing and fostering:

- Peer Relationships
- Access to MS Executives
- Original Thought Leadership Content
Reality!
Microsoft Technical Computing

For over two decades, Antonio Calabrese has been learning and sharing know-how with high-profile organizations in many areas of business. In 2002 Antonio joined Scuderia Ferrari as Head of Information systems. At the end of 2008 Antonio founded Rippols with the mission to enable organizations to use technology as a competitive differentiator.

Some of the Antonio’s commitments and achievement:

- 5 Formula1 Constructor’s World Championships
- 2005 Most Innovative Implementation of an HPC Application - Readers' Choice Award - Editors' Choice Award
- 2007 Most Innovative use of HPC in Automotive - Readers’ Choice Award
- 2008 Best use of HPC in automotive - Editors' Choice Award"

Antonio Calabrese, Founder of Rippols