



Analyzing the Business of Enterprise IT Innovation

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HPC Market Trends and Forecasts, 2012

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Trends and Forecasts : 2010 to 2012

- Look at HPC trends and forecasts we discussed in 2010
- See where we are today
- And look into the crystal ball again



Trends and Forecasts : 2010 to 2012

- Multicore
- GPU
- Scalability
- Cloud
- Software



Multicore

Trend

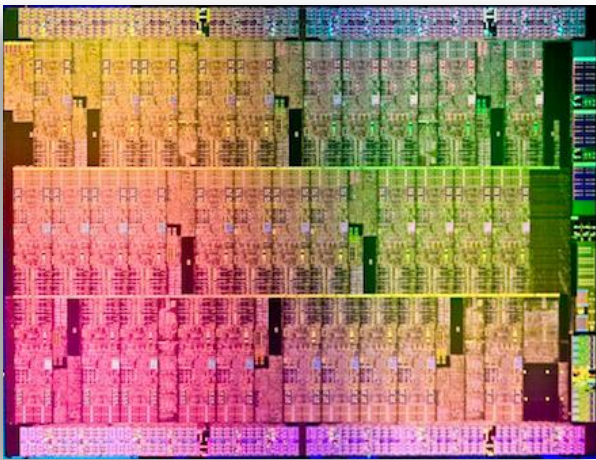
- 2 or 4 core
- 8 or 12 core
- Hyper threading

Forecast

- Future Processors
 - IBM Cyclops
 - Intel Polaris, “Cloud on a chip”
 - 50+ cores
 - Memory bandwidth?
 - Shared memory?
 - Cache architecture?
 - Interconnect on a chip?

2012

- Intel MIC
 - 50+ cores
- AMD Interlagos
 - 16 cores
- Intel Xeon E7
 - 10 cores



GPU

Trend

- NVIDIA
- AMD/ATI
- FPGA

Forecast

- Heterogeneous processors
- GPU and CPU will share the same die

2012

- NVIDIA Kepler
 - 1536 cores
- Intel MIC
 - Knights Corner
- FPGA remains niche



Multicore vs Manycore



Scalability

Trend

- Cores
- Sockets
- Clusters
- Systems
- Grids

Forecast

- Commodity SMP systems > 100 cores
- High end Exascale systems

2012

- HP DL900
 - 8 sockets
 - 10 cores
 - 80 cores
 - 160 way parallelism
- Still some way from Exascale



Cloud

Trend

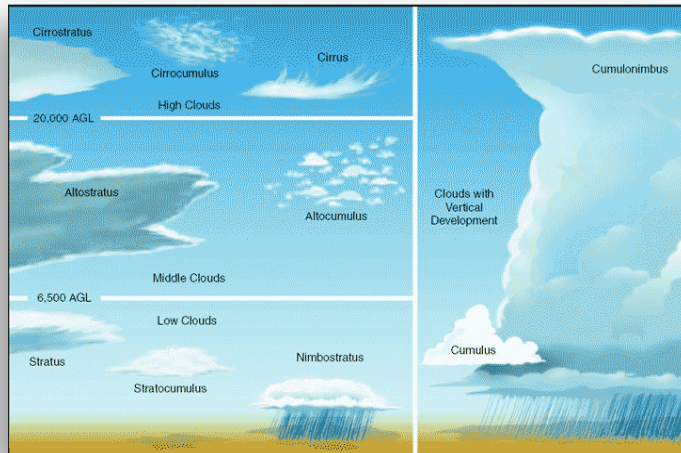
- Amazon
- Google
- Microsoft
- Telco
- ISP

Forecast

- HPC is all about Optimization
- Cloud is all about Abstraction and Virtualization

2012

- HPC Clouds
 - Amazon
 - Cycle
 - Penguin
 - SGI



Trend

- Existing
 - OpenMP
 - MPI
- Emerging
 - CUDA
 - Ct
 - OpenCL
 - PGAS

Forecast

- Many hardware options
- Write once, deploy anywhere?
- HPC for the masses
- Evolution or revolution?
- Target emerging hardware platforms
 - And the Cloud

2012

- CUDA well established
- Intel tools on MIC
- OpenACC
- Write once, deploy anywhere is still a dream!



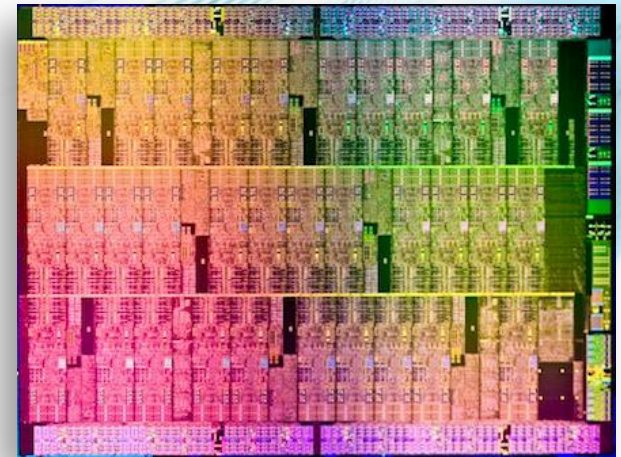
Forecasts for 2014

- Multicore
- Accelerators ~~GPU~~
- Scalability
- Cloud
- Software



Multicore Forecasts

- x86 will continue to grow cores
- ARM/Calxeda/HP
- Adapteva Epiphany (to 4,096 cores)



GPU Accelerator Forecasts

- Intel Knights family
- NVIDIA GPU
- NVIDIA and ARM
- FPGA



Scalability Forecasts

- Systems will continue to scale
 - Cores per server
 - High end HPC systems grow faster than Moore's Law



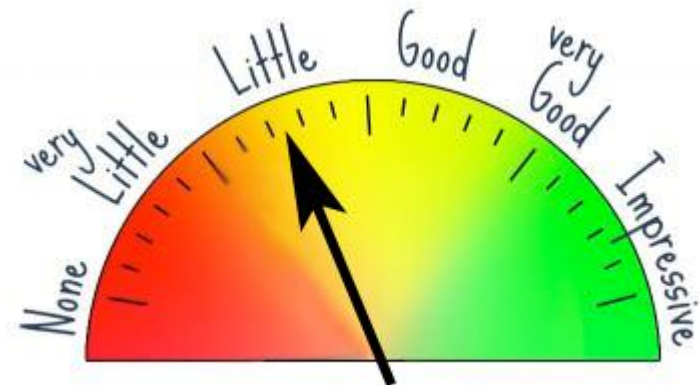
Cloud Forecasts

- HPC in the Cloud will reach maturity
 - More HPC/Cloud vendors
 - HPC SaaS
 - ISV licensing to adapt
 - HPC to reach new (non-HPC savvy) market



Software Forecasts

- **Mainstream HPC**
 - OpenMP, MPI, CUDA
 - OpenACC to emerge
- **Exascale Report**
 - Still a big debate



Exascale Progress Meter : The Exascale Report



“May you live in interesting times”

Thank You

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