

Tidbits from ISC2013



S.Jarp, CERN openlab

In a nutshell

- **ISC is held in a German city around the 20th of June every year**
- **Focus on Supercomputing (HPC)**
- **This year: Leipzig**
 - **2400 participants**
 - **Sunday:**
 - **Special activities, including Tutorials**
 - **Monday – Thursday lunch:**
 - **Conference and Exposition**
- **Previous years:**
 - **Hamburg, Dresden, Mannheim**

Very rich conference programme

- **Keynote sessions (daily)**
- **Research paper sessions**
- **HPC sessions**
 - Including Big Data, Fast Interconnect, etc.
- **“Distinguished Speakers” series**
- **Vendor Sessions/Vendor Showdowns**
- **and many more ...**

Keynote speakers

- **Future Challenges of Large-Scale Computing**
 - Bill Dally (NVIDIA)
- **Moore's Law 2020**
 - Stephen S. Pawlowski (INTEL)
- **HPC Achievement & Impact 2013**
 - Thomas Sterling (U-Indiana)
- **Fooling the Masses with Performance Results**
 - Gerhard Wellein (Erlangen RCC)

Distinguished Speakers

- **Weather and Climate**
 - Jürgen Enders (AI&S)
- **Computational Quantum Chemistry**
 - Hans Peter Lüthi (ETH)
- **HPC for Industry**
 - Merle Giles (U-Illinois)
- **New Memory Technologies**
 - Dean Klein (Micron)
- **NSA's 65 MW Bluffdale Supercomputer**
 - Daniel Bernstein (U-Illinois)
- **Big Value Data, Not Just Big Data**
 - Joseph Reger (Fujitsu)

New TOP500 (TOP10)

Pos	Name	Computer	Frequency (GHz)	Total cores (K)	Rmax (Tfl)	Rpeak (Tfl)	Power (KW)	Processor
1 China	Tianhe-2 (NUDT)	Xeon/Xeon Phi cluster	2.2	3120000	33'862	54'904	17'808	IVB (Xeon E5-2692) 12C
2 USA	Titan	Cray XK7	2.2	560640	17'590	27'112	8'209	AMD Opteron 6274 16C, NVIDIA Kepler
3 USA	Sequoia (LLNL)	IBM Blue-Gene/Q	1.6	1572864	17'173	20'133	7'890	Power BQC16C
4 Japan	K (RIKEN)	Fujitsu K computer	2.0	705024	10'510	11'280	12'660	SPARC64 VIIIfx 8C
5 USA	Mira (Argonne)	IBM Blue-Gene/Q	1.6	786432	8'586	10'066	3'945	Power BQC 16C
6 USA	Stampede (TACC)	Xeon/Xeon Phi cluster	2.7	462462	5'168	8'520	4'510	Xeon E5-2680 8C
7 DE	JuQUEEN	IBM Blue-Gene/Q	1.6	458752	5'008	5'872	2'301	Power BQC 16C
8 USA	Vulcan (LLNL)	IBM Blue Gene/Q	1.6	393216	4'293	5033	1'972	Power BQC 16C
9 DE	SuperMUC (LRZ)	iDataPlex DX360M4	2.7	147456	2'897	3'185	3'423	Xeon E5-2680 8C
10 China	Tianhe-1A (Tianjin)	NUDT YH MPP	2.93	186368	2'566	4'701	4'040	Xeon X5670 6C, Nvidia 2050

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Dissecting Tianhe-2

- **TOP1:**
 - Assembled in 1 month !
 - 16'000 Xeon servers (with early Ivy_Bridge EP processors)
 - 3 Xeon Phi (57C) accelerators per server
 - 88 GB of RAM (1.4 PB in total)
 - 17'800 KW (~1.1 KW per server). Cooling not included
 - 2 Gflops/W



Next Xeon Phi

- **Knights Landing**
 - 14 nm
 - Stand-alone socket or PCIe co-processor
 - Integrated on-package memory
 - Significantly higher memory bandwidth
 - Increased performance



Power consumption

- **Still “stuck” around 2 GFLOPS/W**
 - **Cooling in addition**
- **An exascale supercomputer (in 2018) will probably be above 50 MW**
- **Apparently NSA has Centres in the range of 50 – 100 MW**
 - **Including the Bluffdale Center (Utah)**

Intel people

- **US:**
 - Stephen Pawlowski
 - Rajeeb Hazra, Stephen Wheat, Joe Curley
 - Alan Gara, Mike Patterson, Bob Wisniewski
 - George Chrysos, Avinash Sodani
 - CJ Newburn
- **Europe:**
 - Claudio Bellini, Herbert Cornelius, Stephan Gillich
 - Hans-Christian Hoppe, Marie-Christine Sawley, Karl Solchenbach
 - Levent Akyil, Christopher Dahnken
- **Many others**

BACKUP