

**Welcome To The 54th
HPC User Forum
Meeting
September 2014**



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- Altair
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- Mellanox
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Tuesday Breakfast – Altair

AM Break – Panansas

Tuesday Lunch – AMD

PM Break – Mellanox

Tuesday Dinner – Intel and HP

Wednesday Breakfast – SUSE

AM Break – Terascala

Wednesday lunch – Cray

PM Break – Bright Computing

Important Dates For Your Calendar

FUTURE HPC USER FORUM MEETINGS:

2014 Meetings:

- **October 2014 in Stuttgart Germany at HLRS**

2015 Meetings:

- **April 13 to 15, Norfolk, Virginia**
- **September 8 to 10, Denver, Colorado**
- **Europe in the fall**

Monday Dinner Vendor Updates: 10 Minutes

- **Altair**
- **Cray**
- **Skytree**

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Thank You To:
Altair
For Breakfast



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FORUM ATTENDEES



Steering Committee

James Kasdorf
Chairman, Pittsburgh
Supercomputing Center

Rupak Biswas
NASA Ames

Steve Conway
IDC Research Vice President

Steve Finn
Cherokee Information Services

[Registration for Meetings](#)

[Next Meeting Agenda](#)

[The HPC User Forum
Community](#)

[Presentations from
Previous Meetings](#)



Introduction: Logistics

Ask Mary if you need a receipt

We have a very tight agenda (as usual)

- Please help us keep on time!

Review handouts

- Note: We will post most of the presentations on the web site
- Please complete the evaluation form

Welcome – And Announcements



Jim Kasdorf
HPC User Forum
Chairman

The Riken Meeting



HPC User Forum Mission

**To Improve The Health Of The
High Performance Computing Industry
Through Open Discussions, Information-
sharing And Initiatives Involving
HPC Users In Industry, Government And
Academia
Along With HPC Vendors
And Other Interested Parties**

Steering Committee Members

- James Kasdorf, Pittsburgh Supercomputing Center, Chairman
- Rupak Biswas, NASA Ames, Vice Chairman
- Earl Joseph, IDC, Executive Director
- Swamy Akasapu, General Motors
- Vijay Agarwala, Penn State University
- Alex Akkerman, Ford Motor Company
- Doug Ball, The Boeing Company
- Jeff Broughton, NERSC/Lawrence Berkeley National Lab
- Paul Buerger, Avetec
- Chris Catherasoo, Caltech
- Jack Collins, National Cancer Institute
- Steve Conway, IDC Research Vice President
- Steve Finn, Cherokee Information Services
- Merle Giles, NSCA/University of Illinois
- Keith Gray, British Petroleum
- Doug Kothe, Oak Ridge National Laboratory
- Jysoo Lee, National Institute of Supercomputing and Networking
- Paul Muzio, City University of New York
- Michael Resch, HLRS, University of Stuttgart
- Vince Scarafino, Industry Expert
- Suzy Tichenor, Oak Ridge National Laboratory

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New Steering Committee Chair

Paul Muzio

Director, CUNY HPC Center

College of Staten Island

Passing of the baton at close of HPCUF 54

XSEDE

Industry Skills Assessment Survey

XSEDE: National Science Foundation Extreme Science and and Engineering Discovery Environment: www.xsede.org

Survey:

Identify the training needs of industry for computational modeling and high performance computing skills

Help XSEDE share its training efforts with industry

XSEDE Industry Relations Team

David Hudac, Chair, Ohio Supercomputer Center

Melyssa Fratkin, TACC

Ron Hawkins, San Diego Supercomputer Center

Laura Herriott, NCSA

Jim Kasdorf, Pittsburgh Supercomputing Center

Suzy Tichenor, Oak Ridge National Laboratory

The Survey

<https://www.surveymonkey.com/s/3B696HB>

surveymonkey.com

/s/3B696HB

IDC HPC Market Update And Growth Areas



IDC's HPC Team



- **Earl Joseph**
IDC HPC research studies, HPC User Forum
- **Steve Conway**
Strategic consulting, HPC User Forum, market trends, Big Data
- **Chirag Dekate**
HPC QView, new technology trends, Big Data, innovation awards program
- **New: Bob Sorensen**
Strategic research projects, government studies and international analysis
- **Lloyd Cohen**
HPC data and workstations
- **Mike Thorp and Kurt Gantrish**
Government account support and special projects
- **Charlie Hayes**
Government HPC issues, DOE and special studies
- **Mary Rolph**
HPC User Forum conference planning and logistics

Top Revenue Trends in HPC

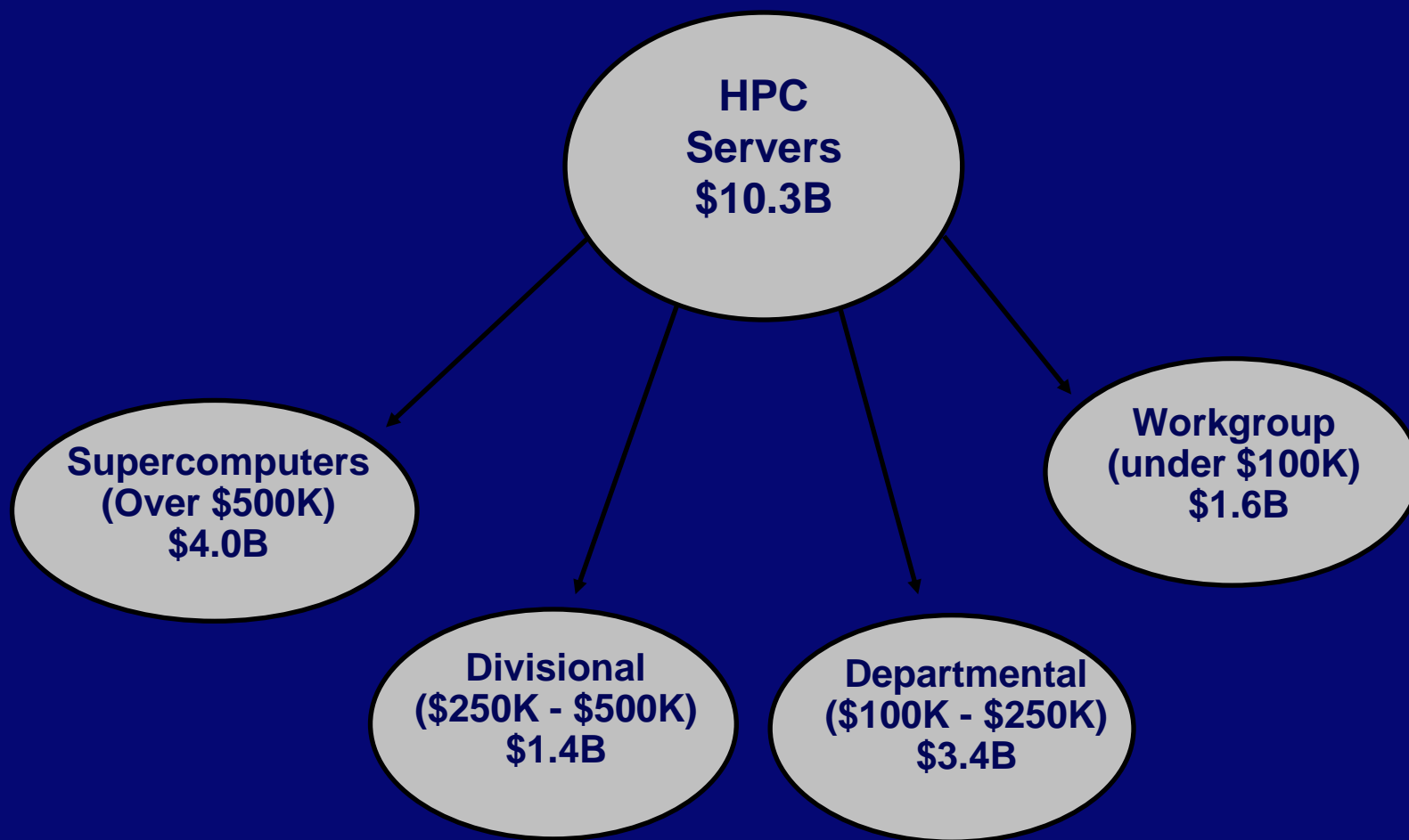
2013 declined overall – by \$800 million

- For a total of \$10.3 billion
- Mainly due to a few very large systems sales in 2012, that weren't repeated in 2013
- We are in the process of updating our forecasts forecasting – we expect healthy growth in 2015 to 2018

But 2014 is still uncertain – a very weak Q1, followed by an okay Q2, **but down ~5% for 1H**

Note: we just added GPUs and coprocessors to the Qview this quarter

IDC HPC Competitive Segments: 2013



HPC Growth Areas



By Competitive Segments

	2012	2013	Est. 1H 2014	1H14 vs 1H13
Supercomputer	5,654,960	3,994,740	1,309,873	-24.1%
Divisional	1,216,187	1,355,097	734,215	4.6%
Departmental	2,979,230	3,363,263	1,846,428	2.9%
Workgroup	1,247,375	1,585,666	881,840	9.0%
Total	11,097,752	10,298,766	4,772,356	-5.1%
<i>Source: IDC 2014</i>				

Green = Large or high growth

Yellow = Moderate growth

Red = Uncertain or lower growth

Total Market by Vendor

	2012	2013	Est. 1H 2014	1H14 vs 1H13
IBM	3,551,731	2,856,334	1,127,332	-27.9%
HP	3,419,554	3,343,758	1,589,416	1.0%
Dell	1,493,172	1,478,322	790,663	7.2%
Cray	465,448	436,741	91,750	-24.9%
SGI	274,693	310,581	179,609	-17.1%
Fujitsu	686,657	127,988	66,431	2.0%
NEC	64,112	72,901	67,158	81.0%
Dawning	115,359	200,497	81,500	8.8%
Bull	60,494	77,322	46,966	17.3%
Other	966,531	1,394,321	731,530	21.9%
Total	11,097,752	10,298,766	4,772,356	-5.1%
<i>Source: IDC 2014</i>				

By Application/Industry Segments

	2012	2013	CAGR
Bio-Sciences	1,138,720	1,069,859	94.0%
CAE	1,127,614	1,152,021	102.2%
Chemical Engineering	187,967	177,160	94.3%
DCC & Distribution	599,191	598,732	99.9%
Economics/Financial	336,509	336,075	99.9%
EDA / IT / ISV	666,158	664,968	99.8%
Geosciences	746,927	749,417	100.3%
Mechanical Design	61,706	60,255	97.6%
Defense	1,025,473	1,007,821	98.3%
Government Lab	2,709,827	2,048,220	75.6%
University/Academic	1,942,808	1,894,374	97.5%
Weather	460,280	444,143	96.5%
Other	94,562	95,721	101.2%
Total Revenue	11,097,743	10,298,766	92.8%
<i>Source: IDC 2014</i>			

WW By Geographic Segments

	2012	2013	Est. 1H2014	1H14 vs 1H13
NA	4,872,880	4,527,601	2,091,471	-8.1%
EMEA	3,282,144	3,090,757	1,490,141	-6.6%
APAC w/o Japan	1,591,306	1,912,454	774,382	-1.4%
Japan	1,247,371	663,301	368,349	14.9%
ROW	104,050	104,653	48,012	-11.4%
Total	11,097,752	10,298,766	4,772,356	-5.1%
<i>Source: IDC 2014</i>				

Green = Large or high growth

Yellow = Moderate growth

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WW By Processors

	2012	2013	Est. 1H 2014	1H14 vs 1H13
EPIC	18,539	2,179	-	-
RISC	258,553	142,251	70,068	2.3%
RISC-BG	201,221	14,794	-	-
x86-64	2,956,370	3,094,427	1,507,035	-4.0%
Total	3,434,683	3,270,595	1,608,313	-2.8%
<i>Source: IDC 2014</i>				

Green = Large or high growth

Yellow = Moderate growth

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IDC Top 10 HPC Predictions for 2014

1. HPC Server Market Growth Will Continue in 2014, after a decline in 2013
2. The Global Exascale Race Will Pass the 100PF Milestone
3. High Performance Data Analysis Will Enlarge Its Footprint in HPC
4. ROI Arguments Will Become Increasingly Important for Funding Systems
5. Industrial Partnerships Will Proliferate, with Mixed Success
6. x86 Base Processor Dominance Will Grow and Competition Will Heat Up
7. Storage and Interconnects Will Benefit as HPC Architectures Gradually Course-Correct from Today's Extreme Compute Centrism
8. More Attention Will Be Paid to the Software Stack
9. Cloud Computing Will Experience Steady Growth
10. HPC Will Be Used More for Managing IT Mega-Infrastructures

Conclusions

HPC is still expect to be a strong growth market

- Growing recognition of HPC's strategic value is helping to drive high-end sales
- Low-end buyers are back into a growth mode

HPC vendor market share positions will likely shifted greatly in 2014 and 2015

Recognition of HPC's strategic/economic value will drive the exascale race, with 100PF systems in 2H 2014/2015

- 20/30MW exascale systems will wait till 2022-2024

The formative HPDA market will expand opportunities for vendors

Questions?

Please email:
hpc@idc.com

Or check out:
www.hpcuserforum.com



Agenda: Day One Morning

- 8:00am Meeting Welcome and Announcements
- Chairman's and Co-chairman's Welcome and Our New Chairman, Jim Kasdorf, Paul Muzio and Rupak Biswas
- 8:15am HPC Market Update and IDC's Top Growth Areas for 2014 and Beyond, Earl Joseph, Steve Conway and Chirag Dekate
Session Chair: Steve Conway
- 8:30am** Focus Area: HIGH PERFORMANCE DATA ANALYSIS -- Examples of using HPC and big data around the world
- Building Scalable Technologies for Semantic Analysis, John Feo, Pacific Northwest National Laboratory
 - Real-Time Geospatial Rendering Project, Amit Vij and Nima Neghaban, GIS Federal
 - Commercial Firms Exploiting Multi-Cluster Grids for HPC, Charlotte Crain, SAS
 - 10:00am -10:30am Break
 - Using Genomic Sequencing and HPC to Help Save The Lives of Critically Ill Children, Shane Corder, Center for Pediatric Genomic Medicine
 - Update on HPC at PayPal, Arno Kolster and Ryan Quick, PayPal
 - HPC in the Life Sciences, Jack Collins, National Cancer Institute
- 11:30am Update on HPC in Poland, Marek Niezgódka, ICM/University of Warsaw
- 12:00pm Networking Lunch

**Morning Break
Thanks to:
Panasas**

**Lunch Thanks to:
AMD**

Please Return Promptly at 1:00pm

**Thanks to:
Mellanox
For the Break**

Agenda: Day One Afternoon

Session Chair: Jim Kasdorf

3:40pm Emerging HPC Requirements and Major Trends Panel -- Panelists will briefly present what they see are the top HPC requirements and/or trends that need addressing in both the near term and in the longer term.

Moderator: Steve Conway

4:00pm Disruptive Technologies Panel -- Panelists will briefly present potentially disruptive technologies
Moderator: Earl Joseph

5:15pm Networking Break and Time for 1-on-1 Meetings

6:30pm Special Dinner Event -- at the Museum of Flight
BUSES LEAVE AT 6:00 and 615pm

Welcome To The Disruptive Technologies Panel



Disruptive Technologies Panel

How the panel works:

- 1. First each panel member will briefly (in 5 minutes) present their view of one or two disruptive technologies that could change the HPC industry**
- 2. Then we will ask each panel member to respond to key questions about the technologies that they presented**
- 3. Then we will have a Q&A session**

Disruptive Technologies Panel

Panelists will briefly (in 4 minutes or less) present potentially disruptive technologies:

- Adaptive Computing
- Altair
- Rich Brueckner
- Cray
- Dwave
- IceoTope
- Intelligent Light
- LiquidCooled Solutions
- Nvidia
- Panansas
- Skytree
- SUSE
- Terascala

Disruptive Technologies: Question #1

Panel Discussion:

For the disruptive technologies that you presented:

What is most needed to bring it to market faster or with more certainty?

Disruptive Technologies: Question #2

Panel Discussion:

For the disruptive technologies that you presented:

What parts of the market will use it first – and will it likely become a mainstream technology?

Disruptive Technologies: Question #3

Panel Discussion:

For the disruptive technologies that you presented:

What supporting technologies are required to make it a major success?

Disruptive Technologies: Question #4

Panel Discussion:

For the disruptive technologies that you presented:

What partners (if any) would you like to help bring it to market sooner?

Questions?

Please email:
hpc@idc.com

Or check out:
www.hpcuserforum.com



Dinner Logistics

- **Special Dinner Event**
- **Sponsored by Intel and HP**

**Welcome
To Day 2 Of The
HPC User Forum
Meeting**



Dinner
Thanks to:
Intel and HP

Breakfast
Thanks to:
SUSE

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Agenda: Day Two Morning

8:00am Welcome: Jim Kasdorf, Earl Joseph and Steve Conway
Session Chair: Paul Muzio

8:05am Focus area: ACCELERATORS/COPROCESSORS

- Industrial achievements on Blue Waters using CPUs and GPUs, Seid Koric, NCSA
- Development of Intel MIC Codes in NWChem, Edoardo Apra, Pacific Northwest National Laboratory
- Experiences Using Intel Phi Coprocessors, Troy Porter, Stanford University
- Experiences Using Accelerators at ORNL, Doug Kothe, ORNL
- 10:00am to 10:30am Break
- Initial Experiences Programming Xilinx Virtex-6 FPGAs Inside Convey's HC01ex, Stephen Bique, Naval Research Laboratory
- Memory-Driven Near-Data Acceleration, Jan van Lunteren, IBM Research Labs, Zurich
- Advancing Science In Alternative Energy And Bioengineering With Many-Core Processors And Accelerators, Michael Brown, Intel
- Use of Many-Core Processors with the Berkeley GW Code, Jack Deslippe, Lawrence Berkeley National Laboratory

12:30pm Networking Lunch

Thank You To:
Terascala
For The Break



**Lunch Thanks to:
Cray**

Please Return Promptly at 1:00pm

Thank You To:
Cray
For Lunch



Agenda: Day Two Afternoon

1:30pm Focus area: LEADERSHIP COMPUTING

- Cori: The NERSC-8 System, Jay Srinivasan, NERSC
- Intel update
- Ready for Takeoff or Preparing for a Soft Landing: HPC at HLRS and in Germany, Michael Resch, HLRS/University of Stuttgart
- HP Update
- Multiphase Flow Modeling and Simulation: HPC-Enabled Capabilities Today and Tomorrow, Igor Bolotnov, North Carolina State University

3:00pm – 3:30pm Break

- Bits, Bytes and BTUs: Warm Water Liquid Cooling at NREL, Steven Hammond, NREL
- Update on Trinity System Procurement and Plans, Manuel Vigil, Los Alamos National Laboratory
- Results of Study Comparing Liquid Cooling Methods, Jon Summers, University of Leeds

5:00pm Meeting Wrap-Up, Jim Kadorf, Paul Muzio, Earl Joseph and Steve Conway

**Thank You To:
Bright Computing
For The Break**



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The IDC HPC Innovation Award Program

HPC Award Program Goals

#1 Help to expand the use of HPC by showing real ROI examples:

1. Expand the “Missing Middle” – SMBs, SMEs, SMSs -- by providing examples of what can be done with HPC
2. Show mainstream and leading edge HPC success stories

#2 Create a large database of success stories across many industries/verticals/disciplines

- To help justify investments and show non-users ideas on how to adopt HPC in their environment
- Creating many examples for funding bodies and politicians to use and better understand the value of HPC → to help grow public interest in expanding HPC investments
- For OEMs to demonstrate success stories using their products

Users Have to Submit the Value of the Accomplishment

Users are required to submit the value achieved with their HPC system, in any of 3 broad categories:

- a) Dollar value of the HPC usage
 - e.g. made \$\$\$ in new revenues, saved \$\$\$ in costs, made \$\$\$ in profits, etc.
- b) Scientific or engineering accomplishment
 - e.g. discovered how xyz really works, develop a new drug that does xyz, etc.
- c) Value to society as a whole
 - e.g. ended nuclear testing, made something safer, provided protection against xyz, etc.

... and the investment in HPC that was required (in order to calculate the ROI)

The Judgment Process -- Clear, Fair And Transparent

The ranking of the accomplishments are done by only HPC USERS, following very specific rules.

A three step process is proposed:

1. First the submission has to be complete with a clear “Value” shown
 - A number of the submissions were good, but needed a little more information – we have invited them to apply for the fall award
2. Secondly, an assessment is made to see that it is a realistic assessment of the value/returns
 - By the HPC User Forum Steering Committee
3. Then in cases where the value isn't clear, or a deeper technical depth is required -- the final evaluation is by experts in the specific area/discipline

The Trophy For Winners

**The Innovation
Excellence Award**



For the Outstanding Application of HPC

IDC
The Innovation
Excellence
Award

HPC USER FORUM

Global • 2011

Presented to:

**For the Outstanding Application of HPC for
Business and Scientific Achievements**

