

**Welcome To The 56th
HPC User Forum
Meeting
April 2015**



Thank You To Our Sponsors!

GOLD

- HP
- Intel

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- Altair

BRONZE

- Bright Computing
- Mellanox
- Panasas
- Ryft
- Seagate

Tuesday:

- Breakfast – Panasas
- Tuesday Lunch – Altair
- PM Refreshments – Mellanox
- Dinner – HP and Intel

Wednesday:

- Breakfast – Bright Computing
- AM Refreshments –Ryft
- Lunch –Seagate

Important Dates For Your Calendar

FUTURE HPC USER FORUM MEETINGS:

2015 Meetings:

- September 8 to 10, Denver, Colorado
- October 12 to 13 in Paris
- October 14 to 15 in Munich Germany, LRZ

2016 Meetings:

- April 11 to 13, Tucson, Arizona
- September 6 to 8, Austin Texas
- October in Asia and/or Europe

Monday Dinner Vendor Updates: 10 Minutes

- Altair
- Bright Computing
- Extreme Scale Solutions
- Mellanox
- Panasas
- Ryft
- Seagate
- SGI

Needs Updating

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**Thank You To:
Panasas
For Breakfast**



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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

Paul Muzio
HPC User Forum
Chairman



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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

- Paul Muzio, City University of New York, 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
- Simon Burbidge, Imperial College London
- 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
- James Kasdorf, Pittsburgh Supercomputing Center
- Arno Kolster, Paypal
- Doug Kothe, Oak Ridge National Laboratory
- Jysoo Lee, National Institute of Supercomputing and Networking
- Michael Resch, HLRS, University of Stuttgart
- Vince Scarafino, Industry Expert
- Suzy Tichenor, Oak Ridge National Laboratory

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FORUM ATTENDEES



Steering Committee

James Kasdorf
Chairman, Pittsburgh
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Rupak Biswas
NASA Ames

Steve Conway
IDC Research Vice President

Steve Finn
Cherokee Information Services

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Previous Meetings](#)



Agenda: Day One Morning

8:00am Meeting Welcome and Announcements

- Chairman's and Co-chairman's Welcome, Paul Muzio and Rupak Biswas
- HPC Market Update, Earl Joseph, Steve Conway and Bob Sorensen

Session Chair: Jack Collins

8:15am Focus Area: HPC in the Life Sciences

- Computational Challenges from New Instruments and Initiatives, Raul Cachau, National Cancer Institute (NCI)
- Rock Science to Cancer – Turning DOE Research into Social Impact Projects, Dani Ushizima, Lawrence Berkeley National Laboratory
- The National Consortium for Data Science and iRODS, David Knowles, Renaissance Computing Institute (RENCI)

9:45am Break

10:15am Focus Area: HPC in the Life Sciences (Continued)

- HPC Requirements for Bioscience, Ari Berman, BioTeam
- Clinical Genomics and the RENCI Genomics Pipeline, Charles Schmitt, RENCI
- Finding New Ways to Solve the Ebola Problem, Dimitri Kusnezov, DOE/NNSA

11:45pm Vendor Technical Update: IBM R&D Plans for HPC

12:00pm Networking Lunch

IDC HPC Market Update



About IDC: IDC HPC Activities

- Track all HPC servers sold each quarter
- 4 HPC User Forum meetings each year
- Publish 75 plus research reports each year
- Visit all major supercomputer sites & write reports
- Assist in collaborations between buyers/users and vendors
- Assist governments in HPC plans, strategies and direction
- Assist buyers/users in planning and procurements
- Maintain 5 year forecasts in many areas/topics
- Conduct special research studies
- **New: Developing a worldwide ROI measurement system**
- **New: HPDA program**
- **New: Quarterly tracking of GPUs/accelerators**



Top Trends in HPC



2014 ended soft at the high end, but strong in the volume space

- Top10 system purchases has slowed for ~2 years
- The IBM/Lenovo deal also delayed many purchases
- 2014 was basically flat with 2013 (\$10.2 billion in 2014 vs. \$10.3 billion in 2013)

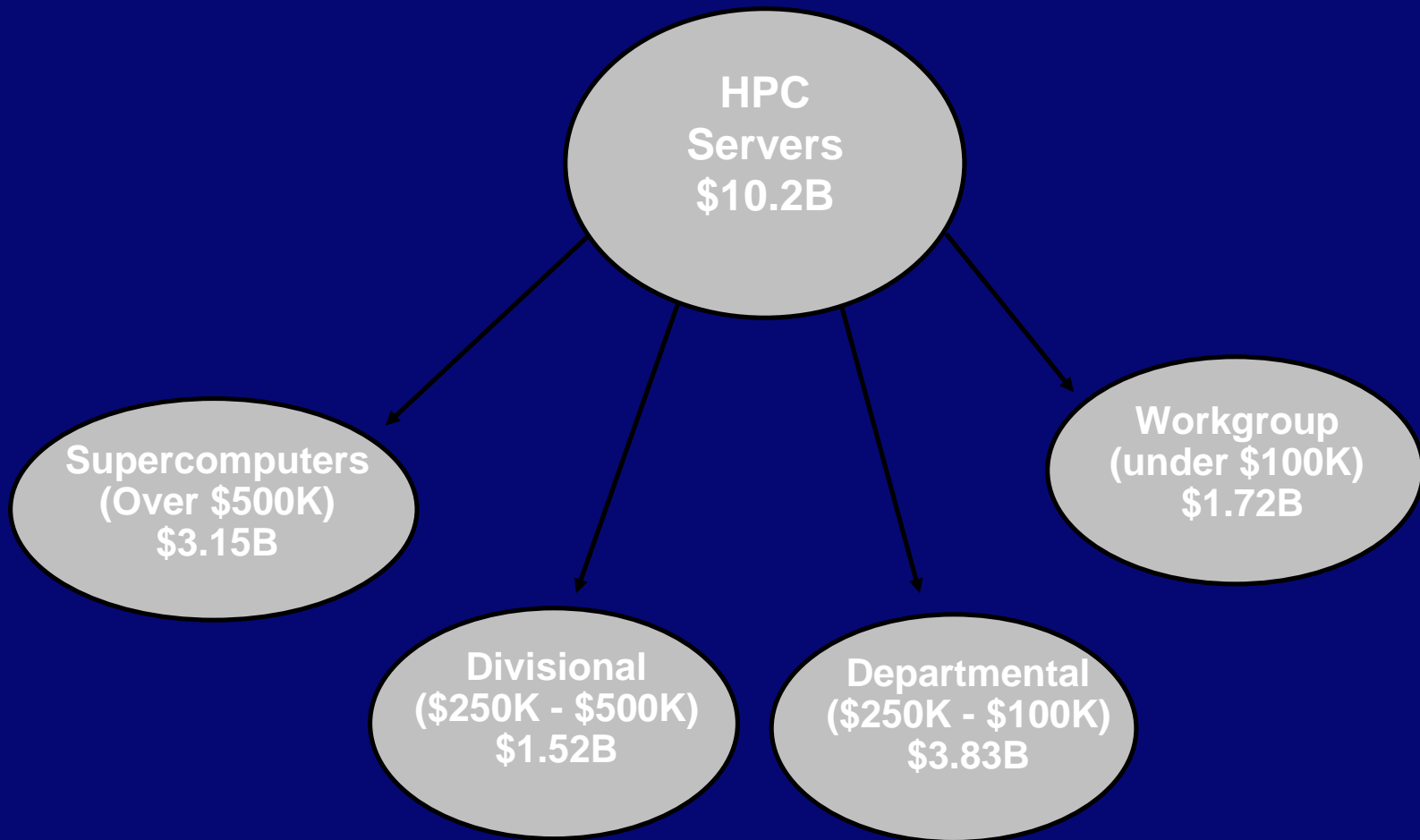
Big data combined with HPC is creating new solutions in new areas

- Adding many new users/buyers to the HPC space

Software Issues continue to grow

GPUs & accelerators extend their impact at the high end

IDC HPC Competitive Segments: 2014



2014 HPC Revenue Results

Competitive Segments	2012	2013	2014
Supercomputer	5,654,960	3,994,740	3,149,520
Divisional	1,216,187	1,355,097	1,524,240
Departmental	2,979,230	3,363,263	3,830,867
Workgroup	1,247,375	1,585,666	1,717,656
Total	11,097,752	10,298,766	10,222,283

2014 HPC Results: Processors Shipped

Competitive Segments	2012	2013	2014
Supercomputer	1,634,152	1,018,973	844,797
Divisional	426,099	443,809	488,992
Departmental	1,048,805	1,211,616	1,357,651
Workgroup	323,668	495,573	472,900
Total	3,432,723	3,169,972	3,164,340

HPC Revenues: By Vendor

	2012	2013	2014
IBM	3,551,731	2,856,334	2,364,528
HP	3,419,554	3,343,758	3,483,471
Dell	1,493,172	1,478,322	1,510,845
Cray	353,800	436,741	459,900
SGI	274,693	310,581	344,455
Fujitsu	686,657	127,988	134,285
NEC	64,112	72,901	130,482
Appro	111,648		
Dawning	115,359	200,497	217,200
Bull	60,494	77,322	98,468
Other	966,531	1,394,321	1,478,650
Total	11,097,752	10,298,766	10,222,283

HPC By Industry/Applications

	2014
Bio-Sciences	1,018,578
CAE	1,202,500
Chemical Engineering	171,931
DCC & Distribution	616,819
Economics/Financial	340,390
EDA / IT / ISV	700,410
Geosciences	741,787
Mechanical Design	59,205
Defense	947,381
Government Lab	2,004,735
University/Academic	1,880,761
Weather	441,037
Other	96,750
Total Revenue	10,222,283

The Broader HPC Market

	2014
Server	10,222,283
Storage	4,279,445
Middleware	1,181,457
Applications	3,561,962
Service	1,782,472
Total Revenue	21,986,294

IDC Top 10 HPC Predictions for 2015

1. The HPC Server Market Will Return to Growth after Two Slow Years
2. The Bottom Half of the HPC Server Market Is Coming on Strong
3. The Global Exascale Race Will Rocket Higher, But Challenges Remain
4. The High Performance Data Analysis Market Will Grow and Diversify
5. Market Share for Leading Server Vendors Will Shift Dramatically in 2015
6. x86 Will Remain Dominant Amid Growing Competition
7. Basic HPC Architecture Will Not Change Soon But Configurations Will Stress Data Movement, Memory, Storage & Networks
8. The Penalties for Neglecting the Software Stack will Grow More Severe
9. Cloud Computing Will Experience Steady Growth and Influence in HPC
10. Striking the Right Balance between Commodity and Custom Is Getting Harder



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 shift greatly in 2015

Recognition of HPC's strategic/economic value will drive the exascale race

The formative HPDA market will expand opportunities for vendors

Questions?

Please email:
hpc@idc.com

Or check out:
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- Finding New Ways to Solve the Ebola Problem, Dimitri Kusnezov, DOE/NNSA

11:45pm Vendor Technical Update: IBM R&D Plans for HPC

12:00pm Networking Lunch

**Lunch Thanks to:
Altair**

Please Return Promptly at 1:00pm

Agenda: Day One Afternoon

Session Chair: Jim Kasdorf

1:00pm Focus Area: HPC in the Life Sciences (Continued)

- Ebola Research Using HPC, Kevin Shinpaugh, Virginia Bioinformatics Institute
- HPC and Alzheimer's Research, Joseph Lombardo, University of Nevada
- NCI Pilot Program: Cancer Genomics Cloud, Devin Locke, Seven Bridges Genomics

2:30pm Vendor Technology Update: HP R&D plans for HPC

2:45pm Break

3:15pm Technology Focus Area: HPC Storage/Data Management and High Performance Data Analysis

- Building Data Sharing Infrastructure at a Global Scale – the Research Data Alliance, Fran Berman, Rensselaer Polytechnic Institute
- Next-Generation Commercial Analytics: How the HPC Community Can Help, Arno Kolster and Ryan Quick, PayPal
- NASA Earth Exchange, Rama Nemani, NASA Ames Research Center

4:45pm A New MLS Initiative, Sarah Storms, Lockheed Martin

5:00pm Networking Break

6:00pm Special Dinner Event: 6:00 PM - 7:00pm -- Tour Battleship Wisconsin & Nautilus Museum (Bar opens at 6:45pm) -- 7:30pm - Dinner

Thank You To:
Mellanox
For The Break



Dinner Logistics

- **Special Dinner Event:**
 - 6:00 PM - 7:00pm -- Tour Battleship Wisconsin & Nautilus Museum
 - Bar opens at 6:45pm
 - 7:15pm - Dinner
- **Sponsored by Intel and HP**

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



Dinner
Thanks to:
Intel and HP

Breakfast
Thanks to:
Bright Computing

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Agenda: Day Two Morning

8:00am Focus Area #2: Government HPC Updates And New Uses Of HPC

- HPC Usage And Future HPC Needs For Army Rotorcraft Problems, Roger Strawn, U.S. Army Research, Development and Engineering Command
- DARPA's Work To Spur The Creation Of Scalable Software, Doug Gelbach, DARPA
- The Wrangler System At TACC, Dan Stanzione, Texas Advanced Computing Center

9:30am Break

10:00am Focus Area #2: Government HPC Updates And New Uses Of HPC (Continued)

- Complex Data Integration in Biomedical Research, Kenneth Buetow, Arizona State University
- Bridges and the DXC, James Kasdorf, Pittsburgh Supercomputing Center
- Jetstream: A Self-Provisioned, Scalable Science and Engineering Cloud Environment, Dave Hancock, Indiana University

11:40am **Vendor Technical Update: Extreme Scale**

11:45am Vendor Technology Update: Intel R&D plans for HPC going forward

12:00pm Networking Lunch

Thank You To:
Ryft
For The Break



Agenda: Day Two Morning

10:00am Focus Area #2: Government HPC Updates And New Uses Of HPC (Continued)

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11:40am Vendor Technical Update: Extreme Scale

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12:00pm Networking Lunch

**Lunch Thanks to:
Seagate**

Please Return Promptly at 1:00pm

Thank You To:
Seagate
For Lunch



Agenda: Day Two Afternoon

Session Chair: Suzy Tichenor

- 1:00pm Panel: The Who-What-When of Getting Applications Ready to Run On, And Across, Office of Science Next-Gen Leadership Computing Systems
- OLCF Center for Accelerated Application Readiness (CAAR), Tjerk Straatsma, Oak Ridge Leadership Computing Facility
 - NERSC Exascale Science Applications Program (NESAP), Katie Antypas, NERSC
 - ALCF Early Science Program, Tim Williams, Argonne Leadership Computing Facility
- 2:45pm Vendor Technical Update: User Centered Innovation and HPC, Gabriel Broner, SGI
- 3:00pm Break
- 3:30pm Exascale As An In Silico Enabler For Grand Challenge Problems In Chemistry, Materials Science, And Biology, Sadasivan Shankar, Harvard University
- 4:00pm HPC in the Cloud: Subsea Jumper Vortex Induced Vibration, Mustafa Kara, DNV GL Group (www.dnvgl.com)
- 4:30pm CFD 2030 Project, Mujeeb Malik, NASA Langley Research Center
- 5:00pm Meeting Wrap-Up, Paul Muzio, Rupak Biswas, Earl Joseph and Steve Conway

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