Welcome To The 68th HPC User Forum Meeting
March 6-7, 2018
We Want To Thank TERATEC and CEA For Hosting The Forum!
Thank You To Our Sponsors!

- Atos
- Intel
- Teratec
- CEA
Important Dates For Your Calendar

HPC USER FORUM MEETINGS:

2018 Meetings:

- March 6 & 7, CEA & Teratec, Bruyères-Le-Chatel, France
- April 16 to 18, Tucson, Arizona
- September 4 to 6, Dearborn, Michigan
- October 1-2, Stuttgart, Germany
Introduction: Logistics

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

Dinner event
CHAIRMAN’S WELCOME
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
The IDC HPC User Forum: 68 Meetings Worldwide Since 2000

Amsterdam, Netherlands (SARA)  Manchester, UK (Manchester University)
Annecy, France
Bangalore, India (Indian Institute of Technology)
Beijing, China (Chinese Academy of Sciences)
Bologna, Italy (CINECA)
Bristol, UK
Bruyères-le-Châtel, France (Teratec)
Canberra, Australia
Geneva, Switzerland (CERN)
Kobe, Japan (RIKEN)
Lausanne, Switzerland (EPFL)
London, UK (Imperial College)
Melbourne, Australia
Munich, Germany (LRZ)
New Delhi, India (Indian Institute of Science)
Paris, France (GENCI)
Seoul, Korea (National Institute of Supercomputing & Networking)
Stuttgart, Germany (HLRS)
Warsaw, Poland (University of Warsaw)
Yokohama, Japan (Earth Simulator Center)
Zurich, Switzerland (ETH Zurich)
United States (many locations)
Introduction

HPC User Forum Steering Committee

- Paul Muzio, City University of New York (Chair)
- Rupak Biswas, NASA Ames (Vice Chair)
- Earl Joseph, IDC (Executive Director)
- Swamy Akasapu, General Motors
- Vijay Agarwala, Penn State University
- Alex Akkerman, Ford Motor Company
- C. Scot Atkins, Industry Expert: Advanced Analytics/Dense Supercomputing
- Doug Ball, HPC expert (formerly Boeing)
- Jeff Broughton. NERSC/Lawrence Berkeley National Lab
- Paul Buerger, Avetec
- Simon Burbidge, Imperial College London
- Chris Catherasoo, Caltech
- Clayton Chandler, Credit Suisse/New York
- 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
- Sharan Kalwani, Fermilab
- Arno Kolster, PayPal
- Doug Kothe, Oak Ridge National Laboratory
- Jysoo Lee, King Abdullah University of Science and Technology (KAUST)
- David Martin, Argonne National Laboratory
- Stephane Requena, GENCI
- Michael Resch, HLRS, University of Stuttgart
- Vince Scarafino, Industry Expert
- Suzy Tichenor, Oak Ridge National Laboratory
Hyperion Research Update
Check Out Our Website:
www.HyperionResearch.com

Hyperion Research helps organizations make effective decisions and seize growth opportunities by providing research and recommendations in both high performance computing and emerging technology areas.
The Hyperion Research Team

- **Earl Joseph**: Research studies & strategic consulting
- **Steve Conway**: Strategic consulting, HPC UF, Big Data, AI
- **Bob Sorensen**: Strategic research, government studies, QC
- **Alex Norton**: Special studies, new data analysis, surveys
- **Mike Thorp**: Global sales management
- **Kurt Gantrish**: Global sales management
- **Mary Rolph**: Meetings and events planning
- **Jean Sorensen**: Office manager
- **Kirsten Chapman**: Data collection and surveys
Hyperion Research HPC Activities

- Track all HPC servers sold each quarter
- 4 HPC User Forum meetings each year
- Publish 85 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
- Developing a worldwide ROI measurement system
- HPDA program (includes ML/DL/AI)
- HPC Cloud usage tracking
- Quarterly tracking of GPUs/accelerators
- Cyber Security
- Quantum Computing
Locating HPC Centers: Total US HPC Centers of Activity

Blue = Industry User Site,  Green = Academia/Govt Provider Site

A total of 759 unique sites

- Record revenues
- Strong $250K+ growth
- Low-end decline

HPC Servers $11.2B

- Supercomputers (Over $500K) $4.1B
- Divisional ($250K - $500K) $2.3B
- Workgroup (under $100K) $1.7B
- Departmental ($250K - $100K) $3.1B
### 2016 Market Results

<table>
<thead>
<tr>
<th>Vertical</th>
<th>Revenue ($ Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bio-Sciences</td>
<td>1,049</td>
</tr>
<tr>
<td>CAE</td>
<td>1,251</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>183</td>
</tr>
<tr>
<td>DCC &amp; Distribution</td>
<td>692</td>
</tr>
<tr>
<td>Economics/Financial</td>
<td>624</td>
</tr>
<tr>
<td>EDA / IT / ISV</td>
<td>823</td>
</tr>
<tr>
<td>Geosciences</td>
<td>844</td>
</tr>
<tr>
<td>Mechanical Design</td>
<td>57</td>
</tr>
<tr>
<td>Defense</td>
<td>1,125</td>
</tr>
<tr>
<td>Government Lab</td>
<td>2,059</td>
</tr>
<tr>
<td>University/Academic</td>
<td>1,934</td>
</tr>
<tr>
<td>Weather</td>
<td>490</td>
</tr>
<tr>
<td>Other</td>
<td>70</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>11,200</strong></td>
</tr>
</tbody>
</table>

*Source: Hyperion 2017*
### 1H-2017 HPC Market By Regions ($K)

<table>
<thead>
<tr>
<th>Data</th>
<th>Q1-2017</th>
<th>Q2-2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td>1,163,472</td>
<td>1,298,153</td>
</tr>
<tr>
<td>EMEA</td>
<td>648,976</td>
<td>730,000</td>
</tr>
<tr>
<td>Asia/Pacific</td>
<td>449,927</td>
<td>484,618</td>
</tr>
<tr>
<td>Japan</td>
<td>146,194</td>
<td>131,404</td>
</tr>
<tr>
<td>Rest-of-World</td>
<td>28,615</td>
<td>31,175</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2,437,183</strong></td>
<td><strong>2,675,351</strong></td>
</tr>
<tr>
<td>Mfrtr</td>
<td>Q1-2017</td>
<td>Q2-2017</td>
</tr>
<tr>
<td>--------------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>HPE/HP</td>
<td>896,027</td>
<td>984,974</td>
</tr>
<tr>
<td>Dell</td>
<td>488,628</td>
<td>547,582</td>
</tr>
<tr>
<td>Lenovo</td>
<td>190,521</td>
<td>209,995</td>
</tr>
<tr>
<td>IBM</td>
<td>97,125</td>
<td>131,682</td>
</tr>
<tr>
<td>Sugon (Dawning)</td>
<td>71,796</td>
<td>76,369</td>
</tr>
<tr>
<td>Cray</td>
<td>21,100</td>
<td>47,000</td>
</tr>
<tr>
<td>NEC</td>
<td>38,572</td>
<td>32,182</td>
</tr>
<tr>
<td>Fujitsu</td>
<td>42,692</td>
<td>25,801</td>
</tr>
<tr>
<td>Bull Atos</td>
<td>26,938</td>
<td>19,862</td>
</tr>
<tr>
<td>Other</td>
<td>563,784</td>
<td>599,905</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>2,437,183</strong></td>
<td><strong>2,675,351</strong></td>
</tr>
</tbody>
</table>
## HPC Market Forecasts ($ Millions)

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2021</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supercomputer</strong></td>
<td>4,091</td>
<td>5,356</td>
</tr>
<tr>
<td><strong>Divisional</strong></td>
<td>2,273</td>
<td>2,902</td>
</tr>
<tr>
<td><strong>Departmental</strong></td>
<td>3,147</td>
<td>4,274</td>
</tr>
<tr>
<td><strong>Workgroup</strong></td>
<td>1,689</td>
<td>2,287</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11,200</td>
<td>14,819</td>
</tr>
</tbody>
</table>

*Source: Hyperion 2017*
## Forecast: The Broader HPC Market ($ Millions)

<table>
<thead>
<tr>
<th></th>
<th>2016</th>
<th>2021</th>
<th>CAGR 16-21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server</td>
<td>11,200</td>
<td>14,819</td>
<td>5.8%</td>
</tr>
<tr>
<td>Storage</td>
<td>4,316</td>
<td>6,269</td>
<td>7.8%</td>
</tr>
<tr>
<td>Middleware</td>
<td>1,277</td>
<td>1,786</td>
<td>6.9%</td>
</tr>
<tr>
<td>Applications</td>
<td>3,739</td>
<td>5,071</td>
<td>6.3%</td>
</tr>
<tr>
<td>Service</td>
<td>1,907</td>
<td>2,309</td>
<td>3.9%</td>
</tr>
<tr>
<td><strong>Total Revenue</strong></td>
<td><strong>22,439</strong></td>
<td><strong>30,253</strong></td>
<td><strong>6.2%</strong></td>
</tr>
</tbody>
</table>

*Source: Hyperion 2017*
WW M/L, D/L, & AI Forecasts

FIGURE 2

Worldwide M/L, D/L & AI HPC-Based Revenues

Source: Hyperion Research 2017
Questions?

Please email: ejoseph@hyperionres.com

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00-13:00</td>
<td>Registration and lunch</td>
</tr>
<tr>
<td>13:00-13:15</td>
<td>Welcome: HPC User Forum, CEA/Teratec, and Hyperion Research Update</td>
</tr>
<tr>
<td></td>
<td>HPC STRATEGIES AND VISIONS</td>
</tr>
<tr>
<td>13:45-14:15</td>
<td>Promotion of HPC Industrial Use in Japan: Experience with the K and post-K Supercomputers, Shig Okaya, Flagship 2020/RIKEN</td>
</tr>
<tr>
<td>14:15-14:30</td>
<td>Atos Company Update, Agnes Boudot</td>
</tr>
<tr>
<td>14:30-15:10</td>
<td>The View from America: The AI/BD/HPC Technology Intersection &amp; Precision Medicine, Dimitri Kusnezov, U.S. Department of Energy</td>
</tr>
<tr>
<td>15:10-16:00</td>
<td>Break: Social Networking</td>
</tr>
<tr>
<td>16:00-16:20</td>
<td>TECHNICAL TALKS</td>
</tr>
<tr>
<td>16:00-16:20</td>
<td>ARM Technologies for HPC by Atos BULL, Eric Eppe</td>
</tr>
<tr>
<td>16:20-16:40</td>
<td>The Status and Prospects for Quantum Computing, Bob Sorensen, Hyperion Research</td>
</tr>
<tr>
<td>16:40-17:00</td>
<td>HPC in the Cloud Era, Beppe Ugolotti, NICE SRL</td>
</tr>
<tr>
<td>17:00-17:20</td>
<td>The Market for HPC Cloud Computing, Steve Conway and Bob Sorensen, Hyperion Research</td>
</tr>
<tr>
<td>17:20-17:40</td>
<td>Updates from ETP4HPC and TERATEC</td>
</tr>
<tr>
<td>17:40-18:00</td>
<td>Question and Answers</td>
</tr>
<tr>
<td>18:10-18:40</td>
<td>Shuttle Buses to Domaine de Fremigny (dinner and hotel)</td>
</tr>
<tr>
<td>19:15-20.00</td>
<td>Aperitif/Cocktail Time at the Domaine de Frémigny</td>
</tr>
<tr>
<td>20:00-22:00</td>
<td>Dinner (Domaine de Frémigny)</td>
</tr>
</tbody>
</table>
TECHNICAL TALKS

16:00-16:20  ARM Technologies for HPC by Atos BULL, Eric Eppe
            HPC-based AI/Deep Learning in the Commercial World, Ryan Quick, Providentia Worldwide

16:20-16:40  The Status and Prospects for Quantum Computing, Bob Sorensen, Hyperion Research

16:40-17:00  HPC in the Cloud Era, Beppe Ugołotti, NICE SRL

17:00-17:20  The Market for HPC Cloud Computing, Steve Conway and Bob Sorensen, Hyperion Research

17:20-17:40  Updates from ETP4HPC and TERATEC

17:40-18:00  Question and Answers

18:10-18:40  Shuttle Buses to Domaine de Fremigny (dinner and hotel)

19:15-20:00  Aperitif/Cocktail Time at the Domaine de Frémigny

20:00-22:00  Dinner (Domaine de Frémigny)
Welcome To The Second Day Of The HPC User Forum Meeting
HPC APPLICATIONS

11:10-11:30  HPC in Agriculture, Denis Wouters, Cybeletech

11:30-11:50  The POP Centre of Excellence: On the Difficulty of "Selling" Free Performance Analysis Services, Bernd Mohr, Forschungszentrum Juelich

11:50-12:10  HPC in Material Science, Andre Colom and Thomas Homolle, Michelin

12:10-12:30  Update on the DOE Exascale Computing Project, Doug Kothe, DOE

12:30-12:50  HPC in Aerospace, Frederic Feyel, SAFRAN

12:50-13:00  Close of HPC User Forum

13:00-14:00  Lunch (provided by CEA/Teratec hosts)

14:00  Shuttle buses to Massy-Palaiseau Railway Station (connections to Paris and airports)
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