Workshop Welcome

CERN openlab technical workshop

Maria Girone, CERN openlab CTO

23/01/2019
Following the White Paper and many brainstorming, CERN openlab phase VI has started in January 2018. Since last Technical Workshop in 2018 we have new members and projects

• New industry members
  • Micron is a new partner, project kicked-off
    • Specialist in FPGA and ML
  • E4 is a new contributor, project kicked-off
    • A project on applications of GPU technology (many and diverse use cases)

• Ongoing discussions with Google for project definition

• More than 20 ongoing projects, whose status and plans will be presented today
Three Main Areas of R&D

Increase **data centre performance** with hardware accelerators (FPGAs, GPUs, ..) optimized software

Scale out capacity with public clouds, HPC, new architectures

Change the computing paradigms with new technologies like Machine Learning, Deep Learning, Advanced Data Analytics, Quantum Computing
COLLABORATION MEMBERS
A public-private partnership between the research community and industry

<table>
<thead>
<tr>
<th>PARTNERS</th>
<th>CONTRIBUTORS</th>
<th>ASSOCIATES</th>
<th>RESEARCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel</td>
<td>Extreme Partner Network</td>
<td>INFN</td>
<td>Fermilab</td>
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<tr>
<td>Oracle</td>
<td>Rackspace</td>
<td>TU/e</td>
<td>King’s College London</td>
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<td>Siemens</td>
<td>E4 Engineering</td>
<td>Newcastle University</td>
<td>EMBL-EBI</td>
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<td>Huawei</td>
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<td>IVI</td>
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<td>Micron</td>
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<td>Google</td>
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# Workshop overview – Day 1

### Intel big data analytics
- **Location**: Council Chamber, CERN
- **Time**: 09:45 - 10:05

### Oracle Data Analytics and Autonomous Data Warehouse service on the Cloud
- **Location**: Council Chamber, CERN
- **Time**: 10:05 - 10:25

### Siemens Data Analytics and SCADA evolution status report
- **Location**: Council Chamber, CERN
- **Time**: 10:25 - 10:45

### Partner talk Siemens: AI on the machine level in industrial automation
- **Location**: Council Chamber, CERN
- **Time**: 11:15 - 11:35

### Intel fast simulation
- **Location**: Council Chamber, CERN
- **Time**: 11:35 - 11:55

### IBM Evaluation of power architectures for machine learning
- **Location**: Council Chamber, CERN
- **Time**: 11:55 - 12:15

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### Computing architectures for machine learning, data acquisition and processing

- **Micron: Exploring Accelerated Machine Learning for Experiment Data Analytics**
  - **Location**: Council Chamber, CERN
  - **Time**: 13:30 - 13:50

- **Partner talk Micron: Advanced Computing Solutions**
  - **Location**: Council Chamber, CERN
  - **Time**: 13:50 - 14:10

- **E4: A Testbed for GPU Accelerated Applications**
  - **Location**: Council Chamber, CERN
  - **Time**: 14:10 - 14:30

- **Status of the DEEP-EST project and outlook**
  - **Location**: Council Chamber, CERN
  - **Time**: 14:30 - 14:50

- **Intel: Fast deep neural network interference on FPGAs**
  - **Location**: Council Chamber, CERN
  - **Time**: 14:50 - 15:10
# Workshop overview – Day 1

## Data Center Technologies

<table>
<thead>
<tr>
<th>Title</th>
<th>Speaker</th>
<th>Time</th>
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<tbody>
<tr>
<td>Storage Services evolution at CERN</td>
<td>Alberto Pace</td>
<td>15:50 - 16:10</td>
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<tr>
<td>Comtrade EOS productization</td>
<td>Luca Mascetti</td>
<td>16:10 - 16:30</td>
</tr>
<tr>
<td>Oracle Management Cloud: A unified monitoring platform</td>
<td>Aimilos Tsouvelakakis</td>
<td>16:30 - 16:50</td>
</tr>
<tr>
<td>Running JAVA application servers on Kubernetes</td>
<td>Antonio Nappi</td>
<td>16:50 - 17:10</td>
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<tr>
<td>Oracle partner talk: Making databases smarter and faster: innovations enabled by engineering software and hardware together</td>
<td>Cris Pedregal</td>
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Workshop overview – Day 2

<table>
<thead>
<tr>
<th>Event</th>
<th>Speaker</th>
<th>Location</th>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>Partner talk Intel: 2019 technology innovation</td>
<td>Andrea Luiselli et al.</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>09:00 - 09:20</td>
</tr>
<tr>
<td>Intel high performance cloud caching technologies</td>
<td>Danilo Cicalesse</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>09:20 - 09:40</td>
</tr>
<tr>
<td>Extreme Networks Flow optimizer</td>
<td>Stefan Nicolae Stancu</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>09:40 - 10:00</td>
</tr>
<tr>
<td>Huawei OpenStack Cloud</td>
<td>Ms Surya Seetharaman</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>10:00 - 10:20</td>
</tr>
<tr>
<td>Rackspace: Cloud storage performance</td>
<td>Julien Collet</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>10:20 - 10:40</td>
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</tbody>
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Data Center Technologies

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# Workshop overview – Day 2

## Multidisciplinary Knowledge Sharing Platforms

<table>
<thead>
<tr>
<th>Event</th>
<th>Presenter</th>
<th>Room</th>
<th>Time</th>
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<tbody>
<tr>
<td>Introduction to Data Analytics Platforms for Science</td>
<td>Alberto Di Meglio</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>11:10 - 11:25</td>
</tr>
<tr>
<td>Biodynamo</td>
<td>Lukas Breitwieser</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>11:25 - 11:40</td>
</tr>
<tr>
<td>Satellite Image Analysis for UNOSAT</td>
<td>Taghi Aliyev</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>11:40 - 11:55</td>
</tr>
<tr>
<td>Medical Data Analysis</td>
<td>Alberto Di Meglio</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>11:55 - 12:10</td>
</tr>
<tr>
<td>Smart platforms for science</td>
<td>Taghi Aliyev</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>12:10 - 12:25</td>
</tr>
<tr>
<td>Mobility</td>
<td>Fons Rademakers</td>
<td>503-1-001 - Council Chamber, CERN</td>
<td>12:25 - 12:40</td>
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Workshop overview – Day 2

A new area of work, kicked-off in November 2018

Quantum Computing

<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Presenter</th>
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<tr>
<td>22</td>
<td>Quantum computing and CERN openlab</td>
<td>Federico Caminati</td>
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<td>23</td>
<td>Machine Learning in quantum computing</td>
<td>Dr Sofia Vallecorsa</td>
</tr>
<tr>
<td>24</td>
<td>Applying IBM quantum computing to LHC physics analysis Higgs coupling to two top quarks</td>
<td>Wen Guan</td>
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Quantum Computing for High Energy Physics workshop

5-6 November 2018
CERN
Europe/Zurich timezone

https://indico.cern.ch/event/719844/

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Posters

- Three poster sessions
  - Please vote for best posters
- A ballot box will be available
CERN openlab in 2019

CERN openlab continues to innovate and engage with our collaborators

• Our focus for phase VI is advancing the computing systems in preparation for the LHC experiment upgrades and the HL-LHC
  • Transforming the techniques and technologies used in data processing and data analysis
  • Optimizing and enhancing the computing infrastructure
  • Finding common scientific computing solutions
  • Investigating disruptive technologies

• Exciting progress will be presented over the next two days
Have a good workshop!