LARGE-SCALE DATA PROCESSING AND HPC FOR SCIENCE WITH T-SYSTEMS HYBRID CLOUD

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CHEP 2018, July 9th, Sofia
HNSECICLOUD PILOT – T-SYSTEMS SOLUTION

Highlights

- OpenStack Cloud and APIs
- eduGAIN and ELIXIR AAI access
- Extensive 3rd party tools support
- HPC and Big Data options
- GÉANT and Internet networking
- Help Center & Enterprise Agreement (SLA, custom support)

Features

- Web UI
- CLI
- API
- 3rd Party Tools

Benefits

- Transparent processing and data mgmt. between institute and public cloud
- On-demand burst and scale-out
- Flexible service payment
- Committed services
- Reduced costs for science experiments
HYBRID CLOUD LIGHTHOUSE USE CASES

CERN FEDERATED KUBERNETES CLUSTER (CLENIMAR FILEMON, RICARDO ROCHA)

INFN DODAS SERVICE FOR HEP (DANIELE SPIGA)

CERN OPENLAB DEEP LEARNING FOR FAST SIMULATION (SOFIA VALLECORSA)

The suggested LHC computing model

<table>
<thead>
<tr>
<th>Method</th>
<th>Machine</th>
<th>Time/Shower (msec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Simulation (geant4)</td>
<td>Intel Xeon Platinum 8180</td>
<td>17000</td>
</tr>
<tr>
<td>3d GAN (batch size 128)</td>
<td>Intel Xeon Platinum 8180</td>
<td>7</td>
</tr>
<tr>
<td>3d GAN (batch size 128)</td>
<td>GeForce GTX 1080</td>
<td>0.04</td>
</tr>
</tbody>
</table>

Time to create an electron shower
DATA MANAGEMENT SOLUTION

STORAGE FEDERATION AND MULTI-TENANCY

• Ease of access to distributed data in hybrid cloud
• Secure data sharing between users

UNIFIED TRANSPARENT ACCESS TO HYBRID-CLOUD STORAGE RESOURCES

• Transparent data access across hybrid-cloud deployment based on POSIX and CDMI

https://onedata.org

https://onedata.hnsc.otc-service.com
ONEDATA HIGH-THROUGHPUT DATA PROCESSING ON OTC

Onedata Transparent POSIX File System
Processing transparently cached data – 37 GBytes/sec
HIGH-THROUGHPUT DATA MIGRATION IN PEER TO PEER MESH

- Data Transfer Mesh
- 3 One providers connected by 20+Gbit/s links
- Transfer data between all them
- Single VM Node per Provider
- Linear scalability

Data Migration at combined Throughput 56 Gbit/s
ONEDATA FILE POPULARITY AND SMART CACHING

Onedata can evict least important replicas
Based on file popularity
SERVICE PAYMENT MONITORING & CONTROL

Highlights

- Global view
- One Dashboard per Institute
- Budget alert
- Dashboard can be customized
- Automated data upload
- Responsive UI design

Functionalities

- Global view
- One Dashboard per Institute
- Budget alert
- Dashboard can be customized
- Automated data upload
- Responsive UI design

Benefits

- More transparency of costs
- Budget management
- Open source
- User self-service
# A TOP PRIORITY – DATA PRIVACY AND SECURITY

https://cloud.telekom.de/en/infrastructure/open-telekom-cloud/compliance

<table>
<thead>
<tr>
<th>CERTIFICATION</th>
<th>DATA STORED IN GERMANY</th>
<th>LEGALLY COMPLIANT</th>
<th>PRIVACY</th>
<th>CONTRACTUALLY DEFINED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 20000, ISO 27001, ISO 27017, ISO 27018, CSA Star Level 2, TISAX/ENX, Trusted Cloud (EU-GDPR) and TÜV Trusted Cloud</td>
<td>All data stored in Germany only, meeting EU and German legal requirements</td>
<td>In accordance with Sections 3 and 11, German Federal Data Protection Act (BDSG)</td>
<td>Technical and organizational measures (TOM) for contract data processing according to EU-GDPR</td>
<td>Information on legislation provided in advance in the service specifications, T&amp;Cs and contract data processing agreement</td>
</tr>
</tbody>
</table>
MORE SCIENCE WITH MORE CLOUD

https://cloud.telekom.de/en/infrastructure/open-telekom-cloud

OPEN TELEKOM CLOUD
PRIVATE, PUBLIC OR HYBRID
THANK YOU.