Outline

• Why is Hybrid Cloud relevant?

• Activities and Achievements
  • Building the European Platform
  • Exploitation at Industry Partners (Atos, T-Systems)
  • Achievements (CERN, Onedata)
  • Adaptation in Industry

• Summary
Market shift towards Hybrid Cloud

Migration of enterprise IT workloads

<table>
<thead>
<tr>
<th>Deployment models</th>
<th>2015</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>On-premise</td>
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<tr>
<td>No plans</td>
<td>3</td>
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</tbody>
</table>

Multi Cloud Platforms

Amount of environments of unique cloud vendors currently used within companies

- One platform: 11%
- Two platforms: 18%
- Three platforms: 11%
- Four platforms: 12%
- Five or more platforms: 48%

Source: Forrester: Benchmark Enterprise Cloud Adoption, 2017

Observations

- Enterprises are quickly moving to both private and public IaaS cloud
- Hybrid cloud is the predominant deployment model, combining the best of both worlds

HYBRID IS NOW THE NORM, NOT THE FUTURE

Source: RightScale 2016 State of the Cloud Report

Cloud types planned by enterprises (1000+ employees)

- Hybrid cloud: 55%
- Single public: 9%
- Single private: 6%
- Multiple private: 11%
- Multiple public: 16%
- No plans: 3%

Source: McKinsey ITaaS Cloud Survey 2016
Hybrid cloud needs a holistic approach

European identity & data privacy

- Telco/carrier grade quality across the technology stacks
- Managing Both worlds
- Fast migration and data exchange
- Seamless integration
- All in One Data Center
- Consulting & Integration Capabilities

INDIGO - DataCloud
... independently from a certain technology
Building an open European platform

Only **multi-cloud hybrid strategy** can deliver

- at scale
- in a cost effective manner

Build on **pure IaaS** to ensure **no lock-in** and **market pricing** and with **minimum intrusion** into the Buyers’ infrastructure
The Goal

**THE GOAL:**
DEPLOY APPLICATIONS ON ANY COMBINATION OF INFRASTRUCTURE
INDIGO-Datacloud
Optimized Platform with reduced complexity

INDIGO provides:

- **Data and computing platform** for science
- **Open Source solutions** deployable on hybrid e-Infrastructures
- **Support Open Science** by enabling collaborations across diverse scientific communities worldwide

INDIGO supports a wide range of cloud and compute infrastructures:

- **Public cloud**: AWS, GCP, Azure, Open Telekom Cloud (OTC)
- **Private cloud**: OpenNebula, OpenStack
- **Federated**: EGI FedCloud, FogBow
- **Containers**: Docker, Kubernetes
Hybrid Cloud @ Atos

Better governance and ease of porting applications are key expectations for a hybrid cloud management solution.

Customer Expectations

- Expanding disaster recovery services: 52%
- Consolidating the management of all cloud services: 51%
- Moving more services to public cloud environment: 47%
- Mapping out dependencies in their application portfolio: 47%
- Rewriting applications to scale: 40%

Customer Expectations

- Ability to work effectively/engage with business and IT leaders: 51%
- Global delivery capability: 43%
- Knowledge/experience with my firm’s industry: 43%
- Expertise in new technologies: 43%
- Link business transformation with IT transformation: 42%

Base: 150 business and IT decision-makers in France, Germany, the UK, and the US with revenues of $1 billion.

Source: A commissioned study conducted by Forrester Consulting on behalf of Canopy and EMC, September 2015.

References

- Siemens
- Philips
- Monsanto
- Rheinmetall
- Ashland
- Rio 2016 Olympic Games
- SAP
- ... and many others
INDIGO-Datacloud@ T-Systems OTC

USER INTERFACE & CONTROL

GUI Clients
- Gateway Portal
- mobile clients
- workflows
- Gateway

Support Services
-...

PLATFORM & AUTOMATION

PAAS Orchestrator (Kubernetes)

Data Services
- Infrastructure Manager
- Accounting
- IAM Service
- Mesos Cluster
- ...

COMPUTE & STORAGE

Smart Scheduling

Storage Services
- Local Repository
- Heat / IM
- Native Docker
- QoS Support
- ...

INDIGO-DataCloud Final Review

INDIGO Industrial Exploitation
Exploitation Achievements
"Dynamic On-Demand Analysis Service"

- On-demand creation of CMS environment
- Full-automated setup through APIs
- All jobs transferred into containers
- Embedded self-healing
- Hybrid Cloud with seamless integration into existing workflows (HTCondor)
- Reduction of costs through setup and operational efficiency increase
- Very high operational stability for multiple-day workflows including hundreds of jobs
Onedata @ T-Systems OTC

Functionality and performance evaluation:

- Run 1000 containers with Oneclient parallel I/O access to datasets
- Manage datasets up to 350 TB across Cyfronet (PL) and OTC (D) infrastructure with 10 Gps connect through GEANT

- I/O performance
  - Block storage (CEPH, Gluster FS, Lustre) and Object Storage
  - Each client can access data close to max. throughput
  - I/O overhead less than 10%

- Scalability: ongoing
HNSciCloud moves to the Prototype Phase: 3 consortia have been awarded at CERN, in Geneva

On the 3rd April 2017, the award ceremony for the successful consortia moving to the Prototype Phase of the Helix Nebula Science Cloud Pre-Commercial Procurement took place at CERN, in Geneva, Switzerland. Congratulations to the three winning consortia!

Contractor 1: T-Systems, Huawei, Cyfronet, Divia

Contractor 2: IBM

Contractor 3: RHEA Group, T-Systems, exoscale, SixSq
Summary
Summary

• Diverse workloads (processing, data-oriented) can be run and fully automated, on private and public infrastructures

• Users benefit from fast-provisioning, flexibility and scalability for better science and reduction of IT costs

• A European approach – independent and trusted - for digital and open science and hybrid cloud transformation

• H2020 WP 2018 outlines the way to the EOSC
  • INFRAEOSC-01-2018: Access to commercial services through the EOSC hub
  • INFRAEOSC-02-2019: Prototyping new innovative services
Thank you

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