HYBRID CLOUD FOR SCIENCE

Open Telekom Cloud

HELIX NEBULA THESCIENCECLOUD

Overview of T-Systems Pilot Platform – Public Session

November 29th 2018, Geneva

Team T-Systems/Huawei/Cyfronet/Divia

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AGENDA

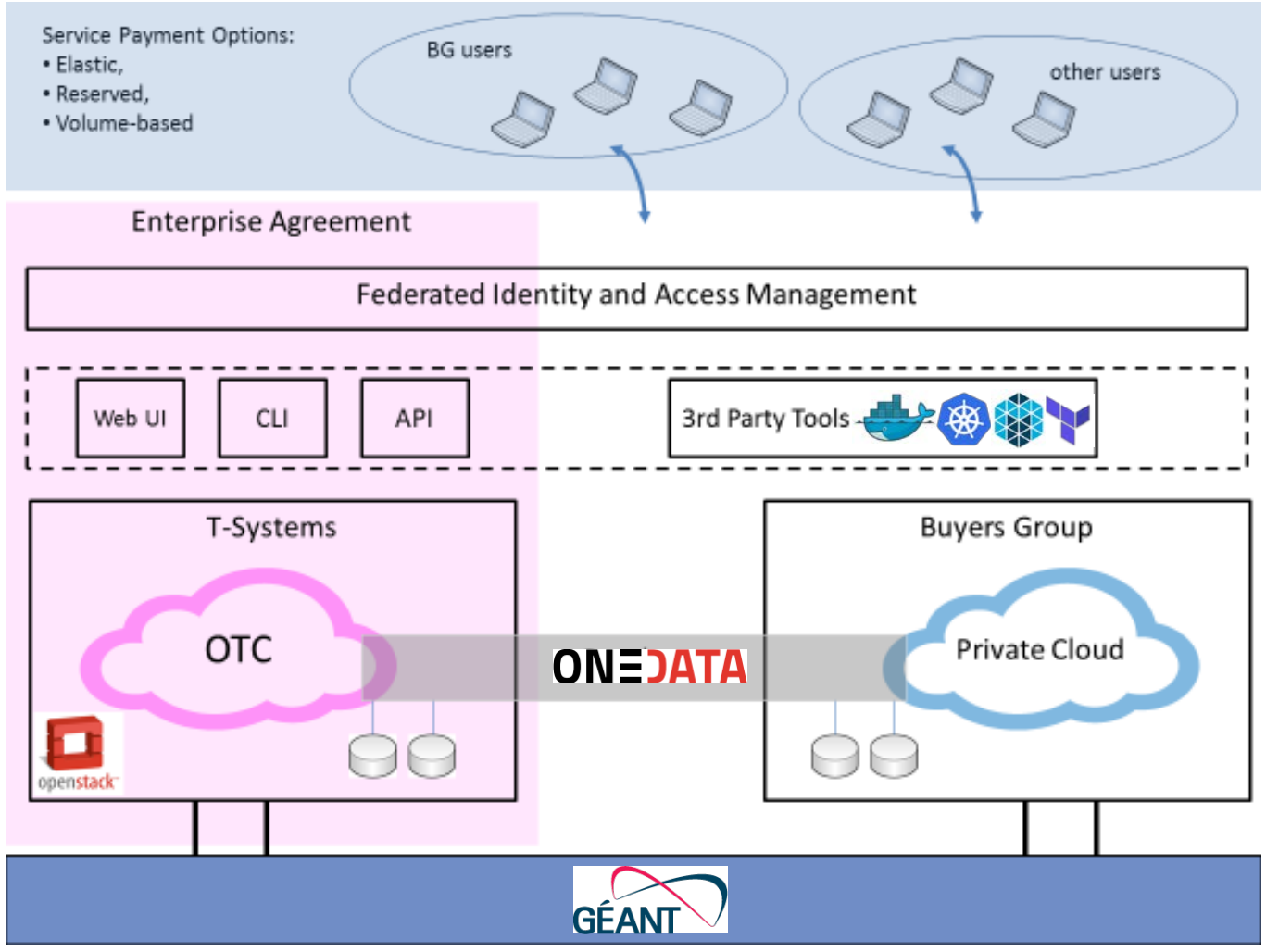
01 Pilot Platform

02 R&D Results and Service Innovation

03 TCO Study

04 Commercialisation Plan

HNSCICLOUD PILOT – T-SYSTEMS SOLUTION



HIGHLIGHTS

HYBRID CLOUD

FEDERATED IDENTITY

CLOUD-NATIVE

LARGE-SCALE DATA

HPC SERVICE

GÉANT ACCESS

DASHBOARDS

ENTERPRISE SERVICE

OPENSTACK

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OPEN TELEKOM CLOUD
NOVEMBER 2018

openstack.

COMPUTE

- UPDATE CCE -new architecture
- Bare Metal Server
- UPDATE DeH -new flavor
- Elastic Cloud Server
- Auto Scaling
- UPDATE IMS -new image

STORAGE

- NEW Storage Disaster Recovery Service
- Scalable File Service
- UPDATE CSBS -new retention rule
- Object Storage
- Elastic Volume Service
- UPDATE VBS -new retention rule

NETWORK

- NAT Gateway
- UPDATE PLAS -IntraSelect
- Content Delivery Network
- Elastic IP
- Virtual Private Cloud
- Elastic Load Balancing
- Domain Name Service
- Direct Connect

SECURITY & MGMT

- UPDATE Independent Quota Mgmt
- UPDATE Financial Dashboard*
- Firewall as a Service
- Mobile Storage Solution
- UPDATE TMS -new resources
- Key Management Service
- UPDATE IAM -ACL API
- Anti-DDoS
- NEW Health Dashboard
- Cloud Trace Service
- Resource Template Service
- Simple Message Notification
- Distributed Message Service
- Price Online Display
- Migration as a Service
- Cloud Eye

PAAS

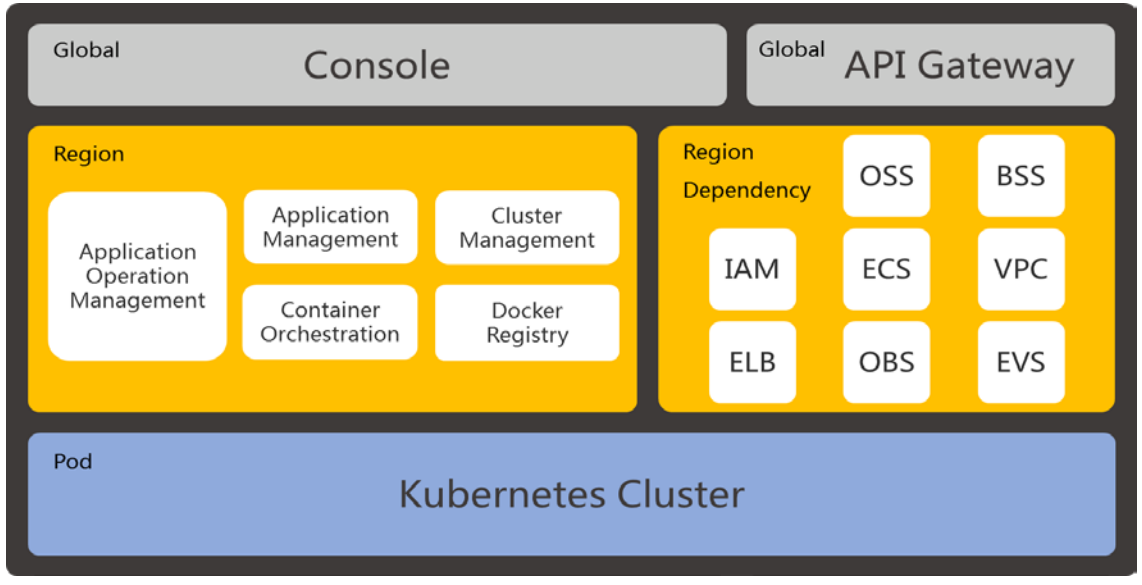
- UPDATE DDS -Replica sets
- Data Ingestion Service
- UPDATE DWS -MRS integration
- Distributed Cache Service
- UPDATE RDS -Postgres plugin
- UPDATE WKS - Encryption

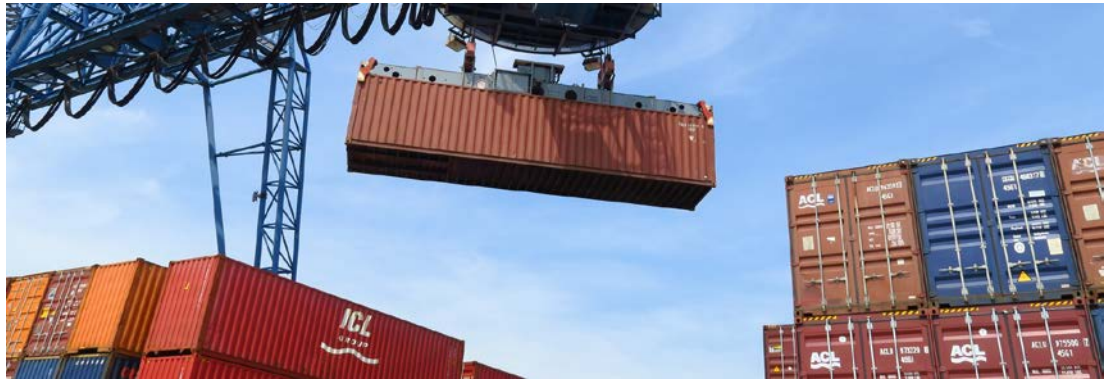
SAAS

- Big Data: MapReduce Service

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

CLOUD CONTAINER ENGINE





HIGHLIGHTS

500,000 CONTAINERS

CLUSTER FEDERATION

AUTOSCALING

CONSOLE AND API ACCESS

KUBERNETES V1.9

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FLEXIBLE, ADVANCED COMPUTE FLAVORS

vCPU	RAM [GB] and resources					
	High Performance II	GPU* NVIDIA V100	Memory Optimized II + III	Large Memory	Disk Intensive II	Dedicated General Purpose
2			16			4, 8
4			32	128	32 + 3,6 TB SAS	8, 16
8		64 + V100	64	128/256	64 + 7,2 TB SAS	16, 32
16	128* + 3,2TB NVMe** 256* + 3,2TB NVMe**	128 + 2*V100	128	470	128 + 14,4 TB SAS	32, 64
24					192 + 21,6 TB SAS	
32	256*	256 + 4*V100	256	940	256 + 28,8 TB SAS	64, 128
60			512		540 + 43,2 TB SAS	128, 256

Price Calculator: https://cloud.telekom.de/en/infrastructure/open-telekom-cloud/price-calculator

*with InfiniBand

STORAGE

	Common I/O (SATA)	High I/O (SAS)	High I/O (SAS boosted)	Ultra-High I/O (SSD)	Ultra-high I/O (SSD boosted)
Max. throughput per EVS disk	40 MB/s	120 MB/s	550 MB/s	320 MB/s	1 GB/s

	Object Storage (OBS)	Block Storage (EVS)
Features	▪ Standard, Warm and Cold types ▪ Single objects up to 5 TB ▪ Encryption ▪ S3- and Swift-API	▪ HW-decoupled storage ▪ SATA, SAS, SSD types ▪ Up to 32 TB per disk, 40 disk p. server ▪ Encryption ▪ Performance boost option for SAS and SSD ▪ Volume replication between different AZ via API
Benefits	▪ Seamless capacity expansion without technical limit ▪ High data durability ▪ Adaption of storage class to data consumption ▪ Reusability of existing application code (S3, OpenStack)	▪ Storage on demand, fast availability and scalability ▪ Cost efficient: choice of transfer rate ▪ Data is stored in multiple identical copies to improve the data disaster recovery capability
Use Cases	▪ Long-term data storage for read-only data ▪ Web platforms with strong data growth ▪ IoT data collection for further analyses ▪ Simplifies OBS access for OpenStack users	▪ Offload internal storage systems ▪ Disaster recovery ▪ Fast temporary storage to bypass shortages ▪ Access to data for external usage

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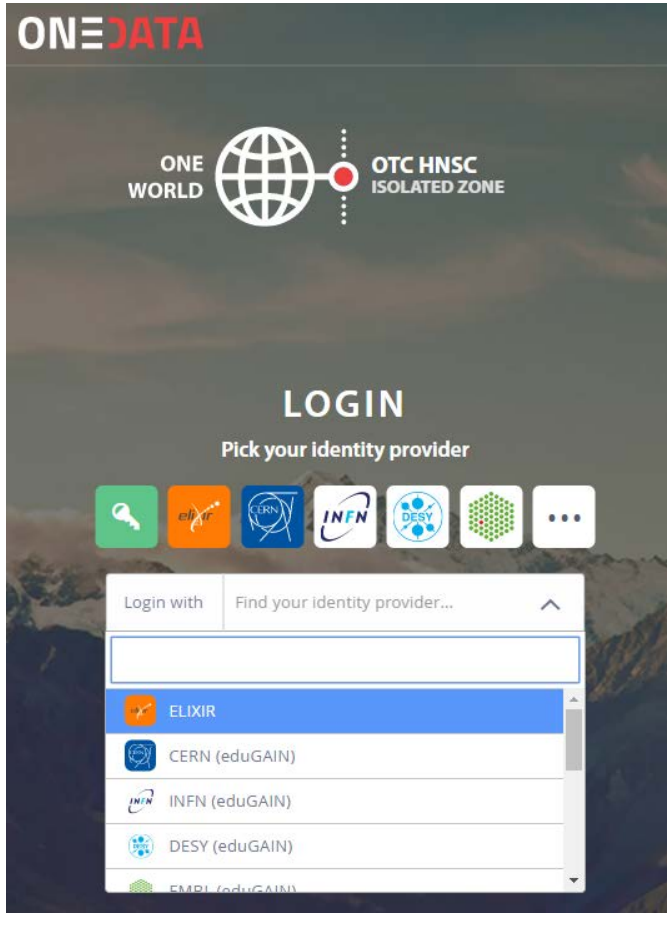
FEDERATED IDENTITY AUTHENTICATION



HIGHLIGHTS

SAML STANDARD

LOGIN MENUS

CONVERSION RULES

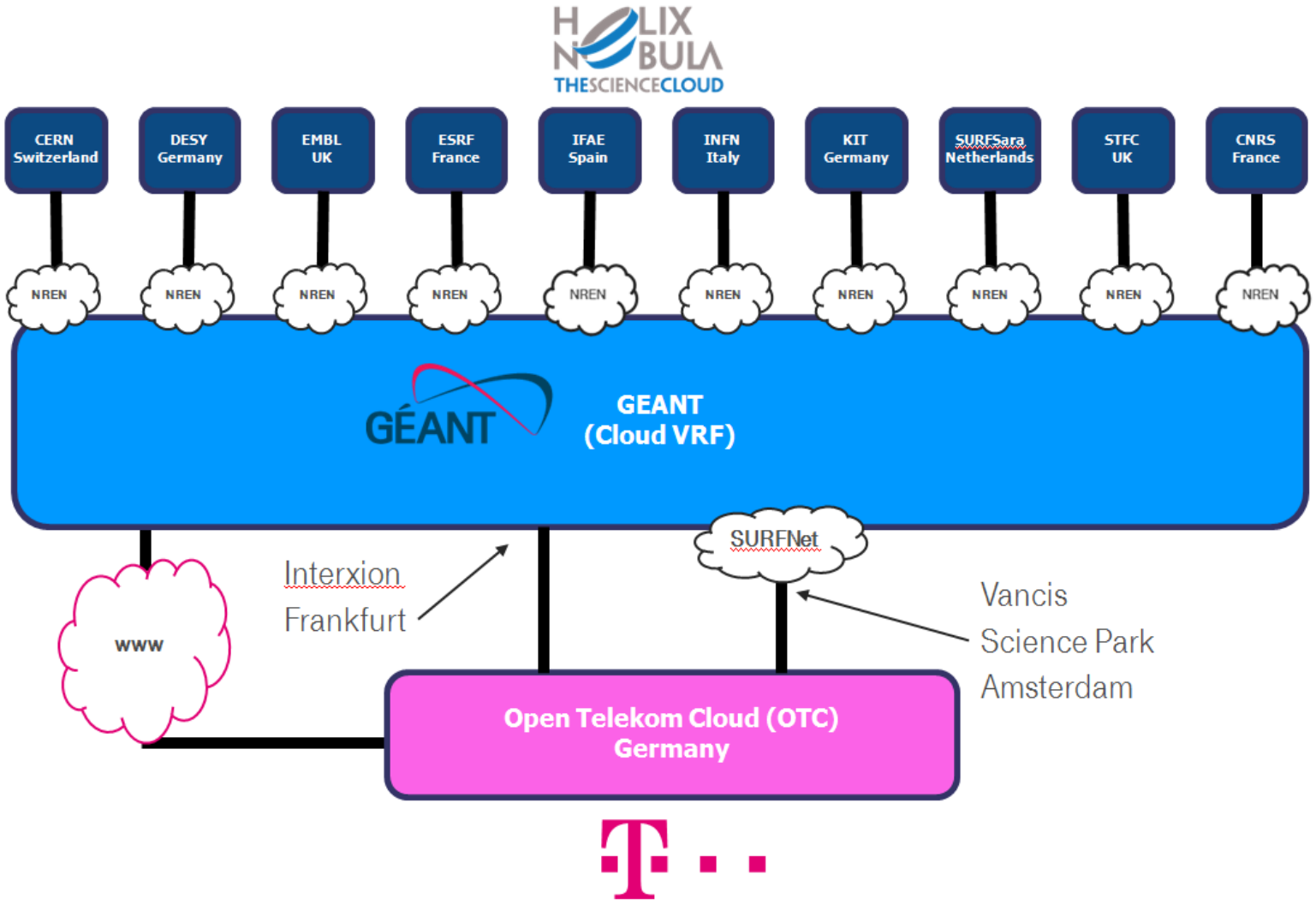
ADMIN RIGHTS MANAGEMENT

ONEDATA INTEGRATION

WEB UI, CLI AND API

AUTOMATED METADATA UPDATES

HNSCICLOUD - NETWORK CONNECTIVITY



HIGHLIGHTS

40 GBPS ACCESS

PHYSICAL DIVERSITY

PERFSONAR MONITOR

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LARGE-SCALE CONTAINER-BASED PROCESSING

EOSC-hub

Resources Management with DODAS

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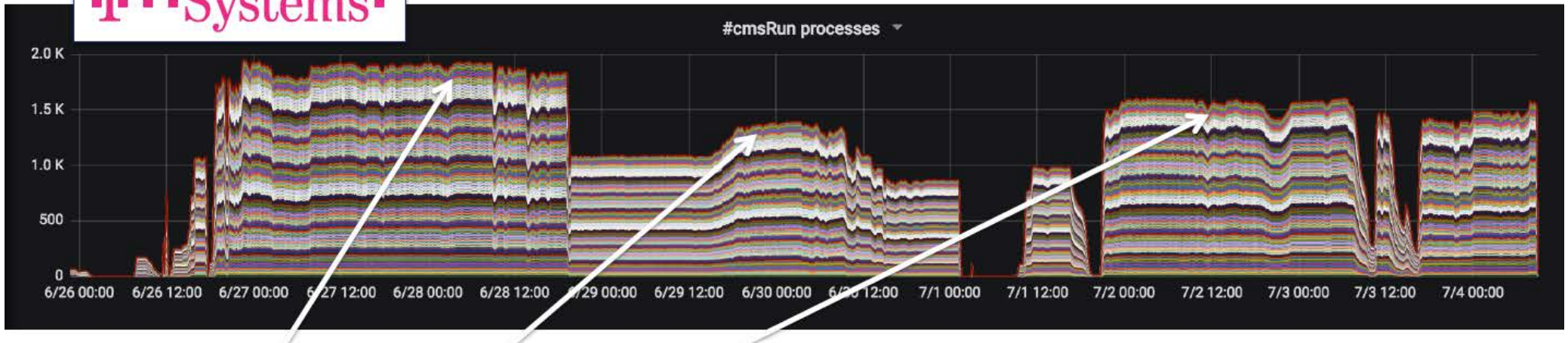

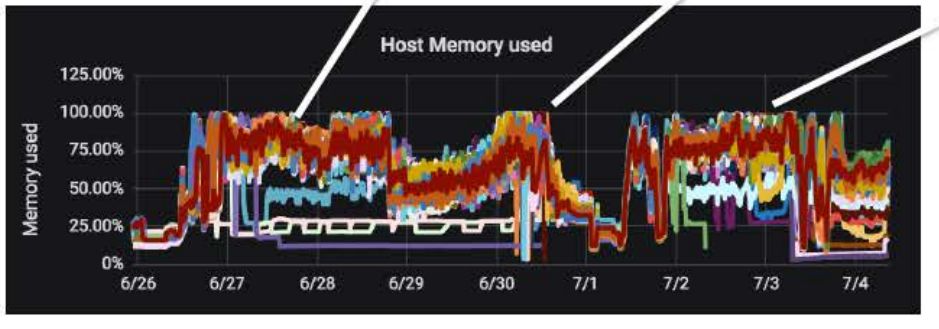

- Elasticity and self-healing
- Handling "special requirements" high memory jobs
- Stability over days/weeks (120k jobs)

→ Work done in conjunction with
Thanks to Andrea Chierici

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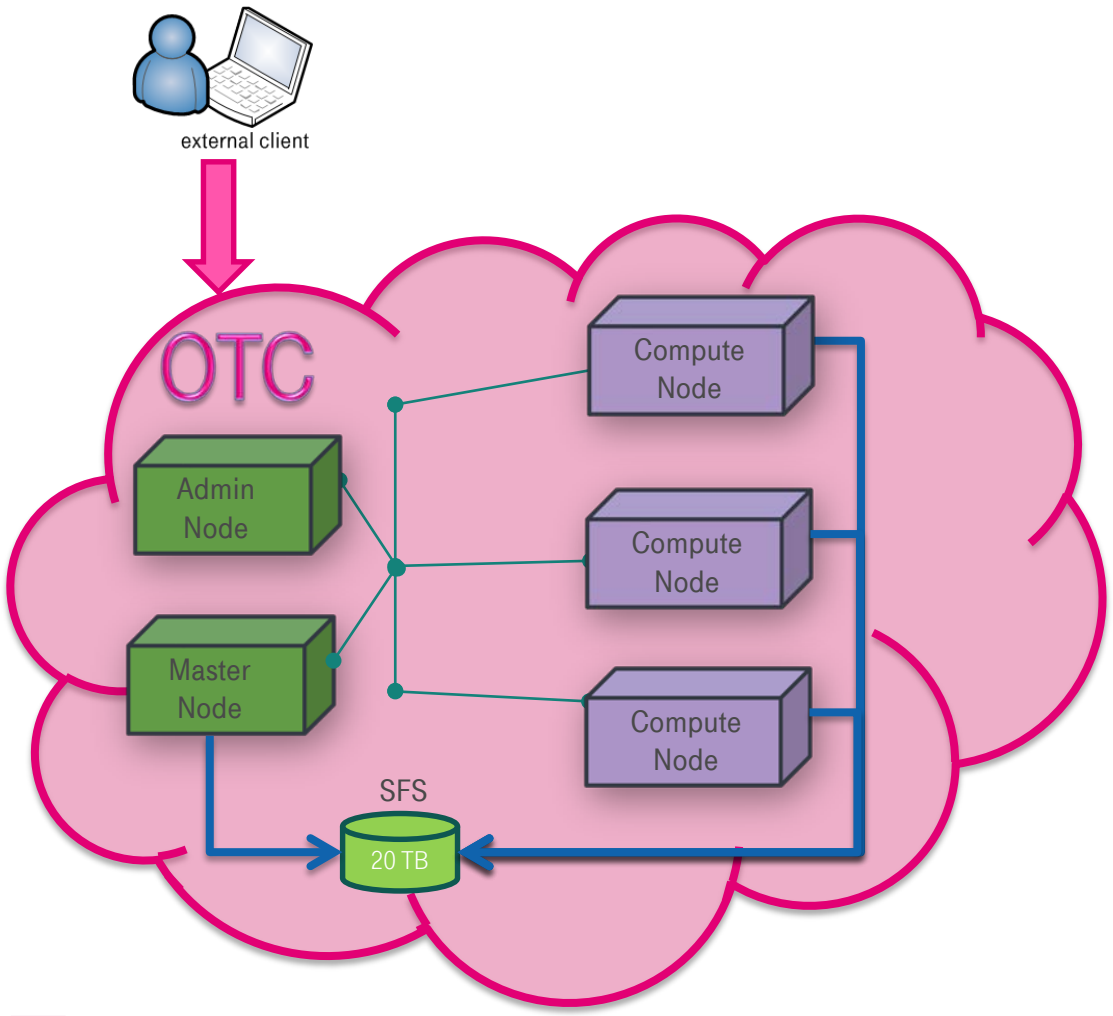
HPC AS A SERVICE



HIGHLIGHTS

FULL INTEGRATION

INFINIBAND FABRIC

MPI LIBRARIES

HPC IMAGES

JOB SCHEDULERS

CUSTOM JOB AUTOMATION

HPC CONSULTING

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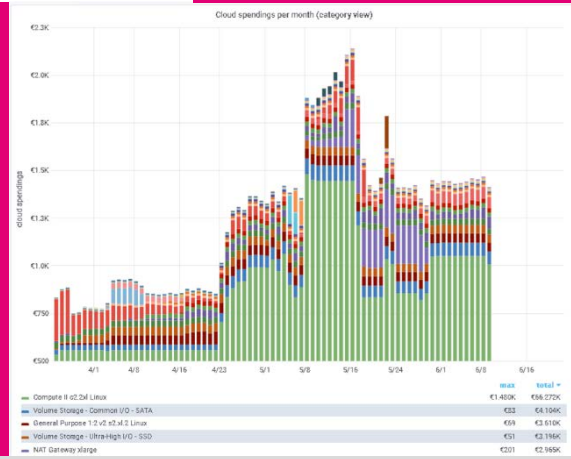
OPEN TELEKOM CLOUD ENTERPRISE DASHBOARD

- CREATE AND EXPLORE METRICS
- BUDGET TACHOMETER
- CLOUD SPENDING
- RESOURCE USAGE
- DAILY UPDATES

WHATS MY BENEFIT?



VISUALISATION

- HEATMAPS
- HISTOGRAMS
- GRAPHS
- GEOMAPS
- AD-HOC FILTERS

ALERT & NOTIFICATION

- CUSTOM METRIC ALERTS
- EMAIL AND OTHER NOTIFICATIONS

ORGANISATION

- VIEW MULTIPLE TENANTS
- USER MANAGMENT

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TCO STUDY RESULTS

- Detailed study of CERN and EMBL use cases, including analysis of existing and future cloud costs
- Avoid lift-and-shift, migration to cloud-native applications and automation creates significant value
- Depending on I/O character and dataset sizes, remote processing approaches can be a viable option
- Real-world performance benchmarking an important element to define baselines
- TCO studies can be a business driver,
  T-Systems will extend its TCO support for customers

Recommendations

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COMMERCIALISATION PLAN – OUTCOME AND IMPACT

- Commercial cloud services can be seamlessly integrated with e-Infrastructures
- Scientist are provided with more choice, flexibility and scalability
- Hybrid Cloud models leverage past e-Infrastructure investment and reduce TCO

Key Innovations/enablers from the PCP:

- Data management in hybrid clouds
- HPCaaS on public clouds
- Financial transparency and management

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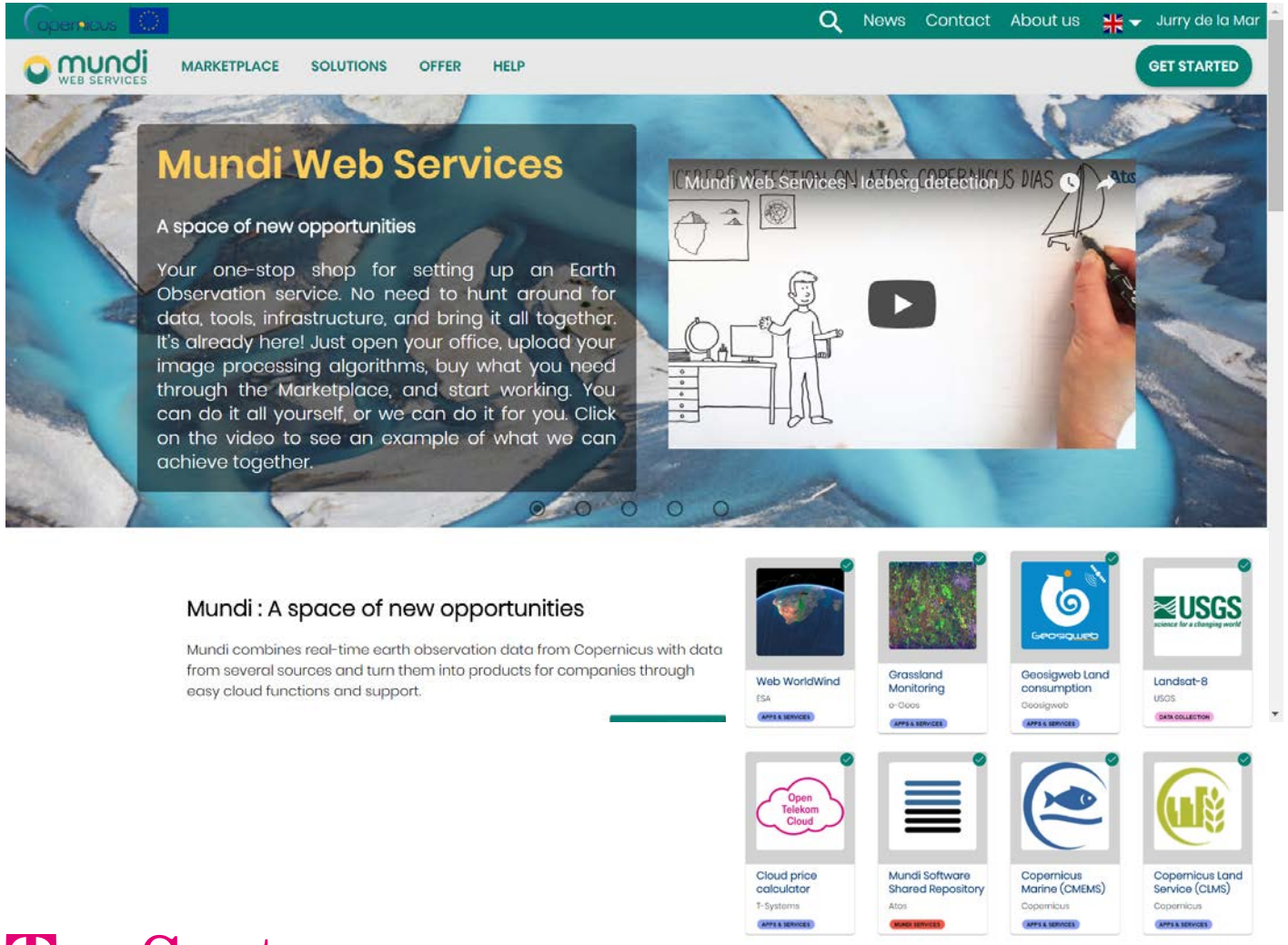
SUCCESS STORY - COPERNICUS DIAS ON OTC (EU/ESA)



HIGHLIGHTS

GEOANALYTICS ON-DEMAND

DATA EXPLOITATION IN SCIENCE AND INDUSTRY

CLOUD-NATIVE

40 PB FREE-TO-USE

NEW ECOSYSTEM

INNOVATIVE BUSINESS MODELS

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DOCUMENTATION AND LINKS

Helix Nebula: https://www.hnscicloud.eu/

OTC service specification: https://cloud.telekom.de/fileadmin/CMS/Shop/Cloud_Infrastruktur/OpenTelekomCloud/pdf/OTC_Service_Specifications.pdf

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

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

MyWorkplace: https://myworkplace.t-systems.com/MyWorkplace/Login.aspx

OTC console login: https://console.otc.t-systems.com

Price calculator: https://cloud.telekom.de/en/infrastructure/open-telekom-cloud/price-calculator/

First steps: Create a new virtual private cloud:
https://cloud.telekom.de/fileadmin/CMS/Shop/Cloud_Infrastruktur/OpenTelekomCloud/erste-schritte/first-steps-with-open-telekom-cloud.pdf

Video tutorials: https://docs.otc.t-systems.com/en-us/video/index.html

Help Center: Documentation, **API documentation**: https://docs.otc.t-systems.com/

An example HPC Cloud Solution user guide: https://docs.otc.t-systems.com/en-us/hpc/doc/download/20171010/20171010162823_05e727f16e.pdf

THANK YOU.