

ONE≡**DATA**

**ONEDATA - MANAGING DATA AND
METADATA IN HYBRID CLOUDS**

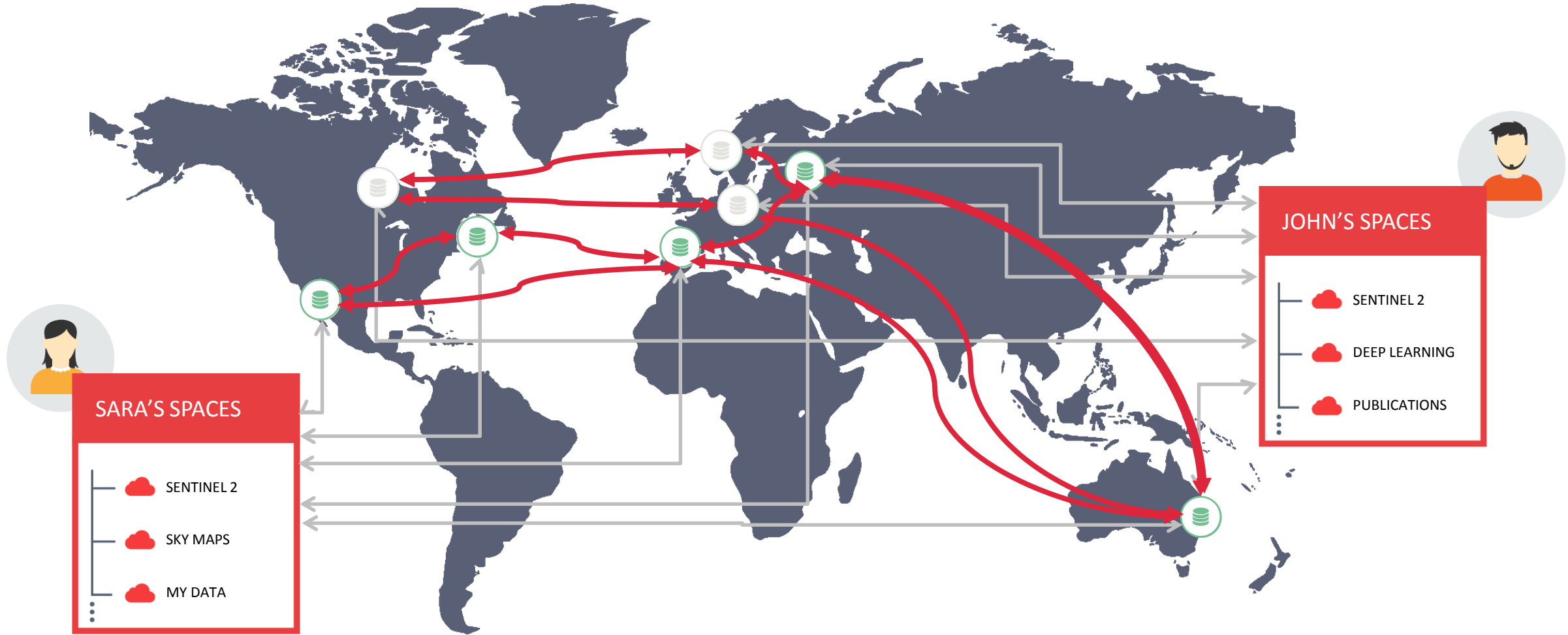
Presented by: Lukasz Dutka

WHO WE ARE?

- Group of developers bringing hybrid cloud open source platform to life
- 6+ years devoted development
- Our main goal is:
 - to deliver data management platform for large scale and distributed problems
 - to make the solution decentralized and eventually consistent in order build a mesh of data sources
 - to deliver virtual file system for hybrid cloud
- The work is supported by:



DATA IN HYBRID CLOUD ENVIRONMENTS



MAIN PROBLEMS ADDRESSED BY ONEDATA PLATFORM

1 Lock-in data collection available only locally on local POSIX file system – should be available in multi cloud hybrid environments

2 Multi-protocol transparent access to data “[...] but we want POSIX”

3 High Throughput Data Transfers and Replication

4 **On-the-fly remote data delivery**

5 Replication on demand

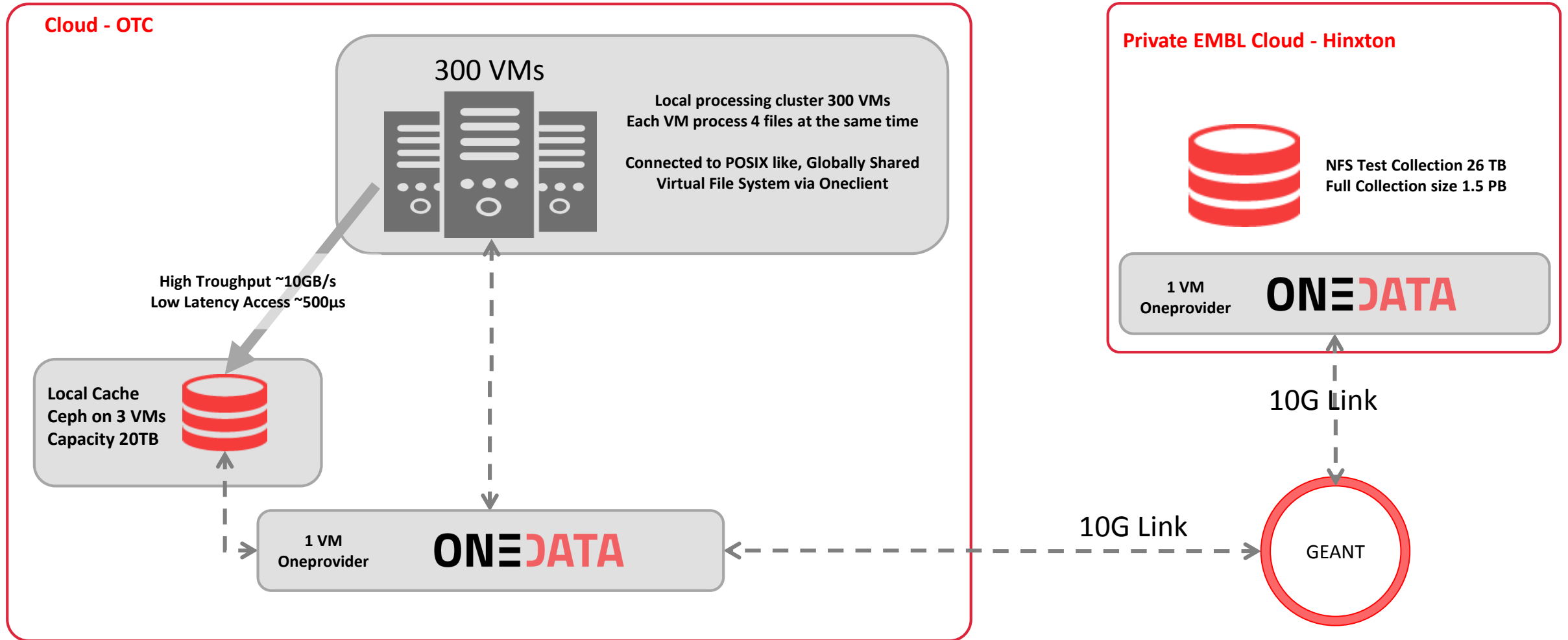
6 Heterogeneity of storage technologies

7 **Cache Management**

8 **High-throughput data processing**

9 Authentication and authorization integrated with EDUGAIN

EXAMPLE - EMBL-EBI APPLICATION DEPLOYMENT



REAL DATA TRANSFERS BETWEEN HINXTON – OTC – ON THE FLY DATA DELIVERY FOR 24H OF DATA PROCESSING BY 1200 PARALEL JOBS ON 300 VMs

Experiment Specs:

- DNA Sequences processing
- 1046 Input Files ~ 15 – 50 GB
- Files represent DNA sequence data that's compared in turn to each of 24 reference human genes
- $24 \times 1046 = 25104$ Jobs in the experiment
- No Local Data on OTC Before Experiment starts
- 24 times of processing the same input fie makes caching very important
- Data pre-staging before the experiment is possible but not needed, system automatically delivers needed blocks and optimize access

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ONEDATA
ebi-otc

ONGOING TRANSFERS MAP

PROVIDERS THROUGHPUT

All Jobs On-the-fly

Minute Hour Day Month

INPUT

OUTPUT

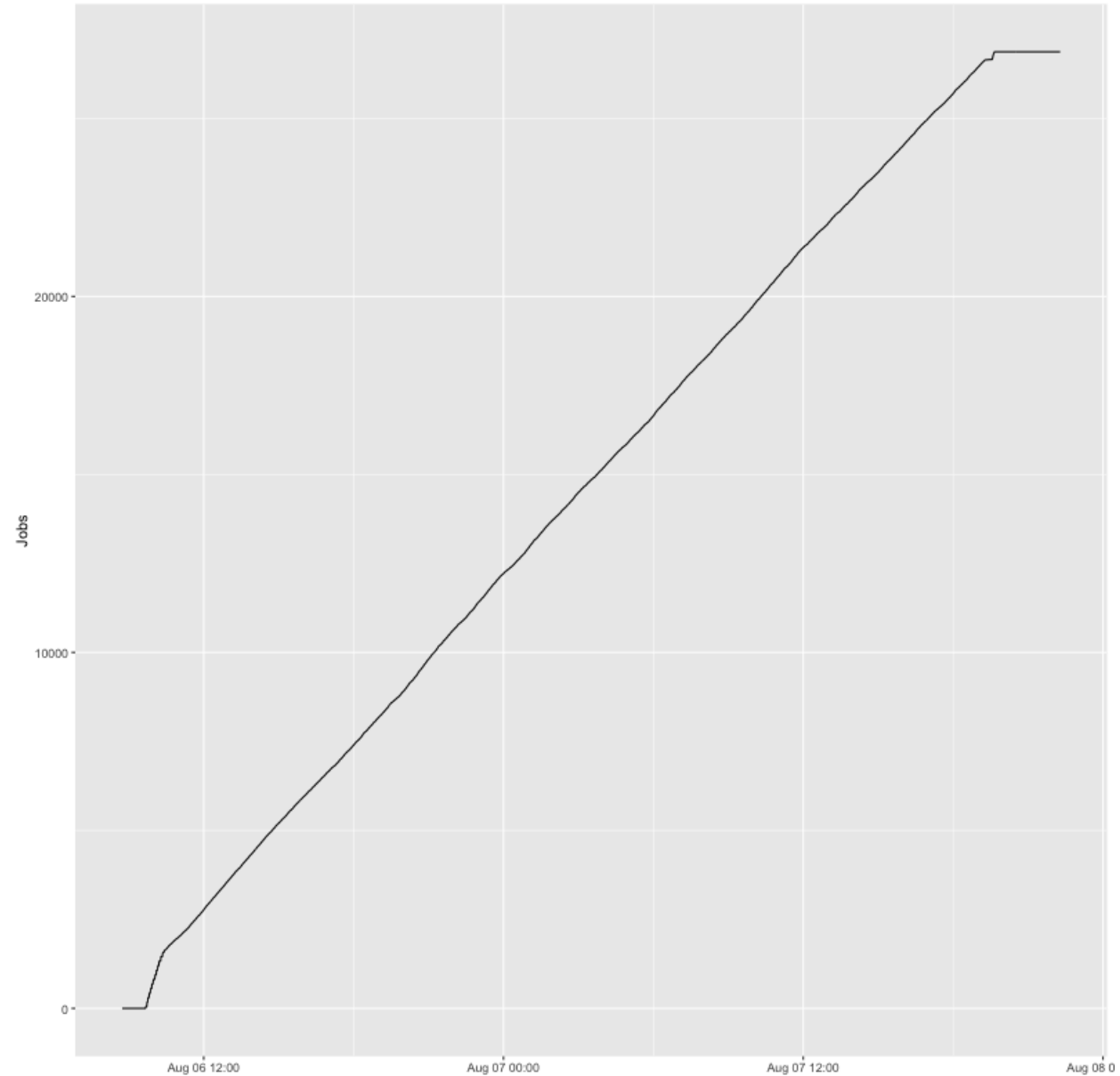
Throughput

Time (last update: 22:50:24)

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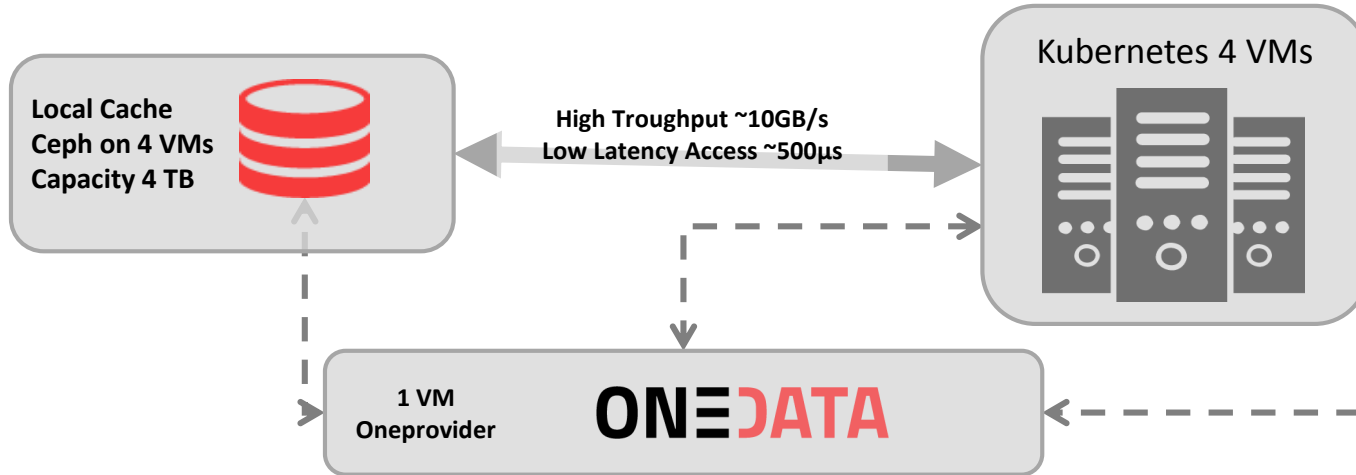
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JOBS PROCESSING RATE WHEN DATA DELIVERED ON THE FLY

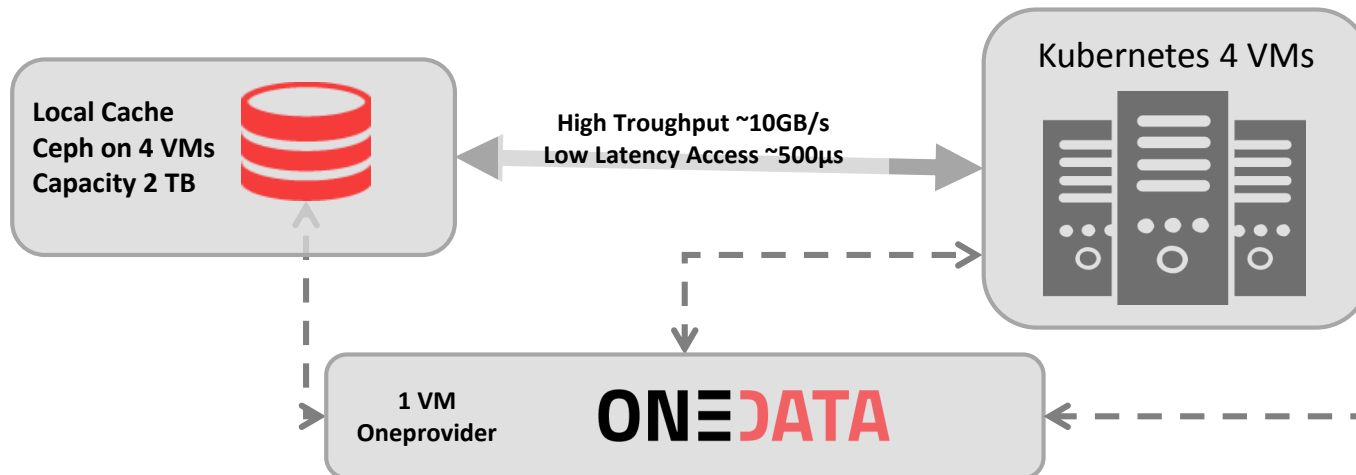


MULTI-CLOUD ENVIRONMENT

Cloud - OTC



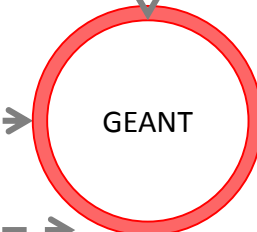
Cloud - EXOSCALE



Private Cloud – INFN BARI

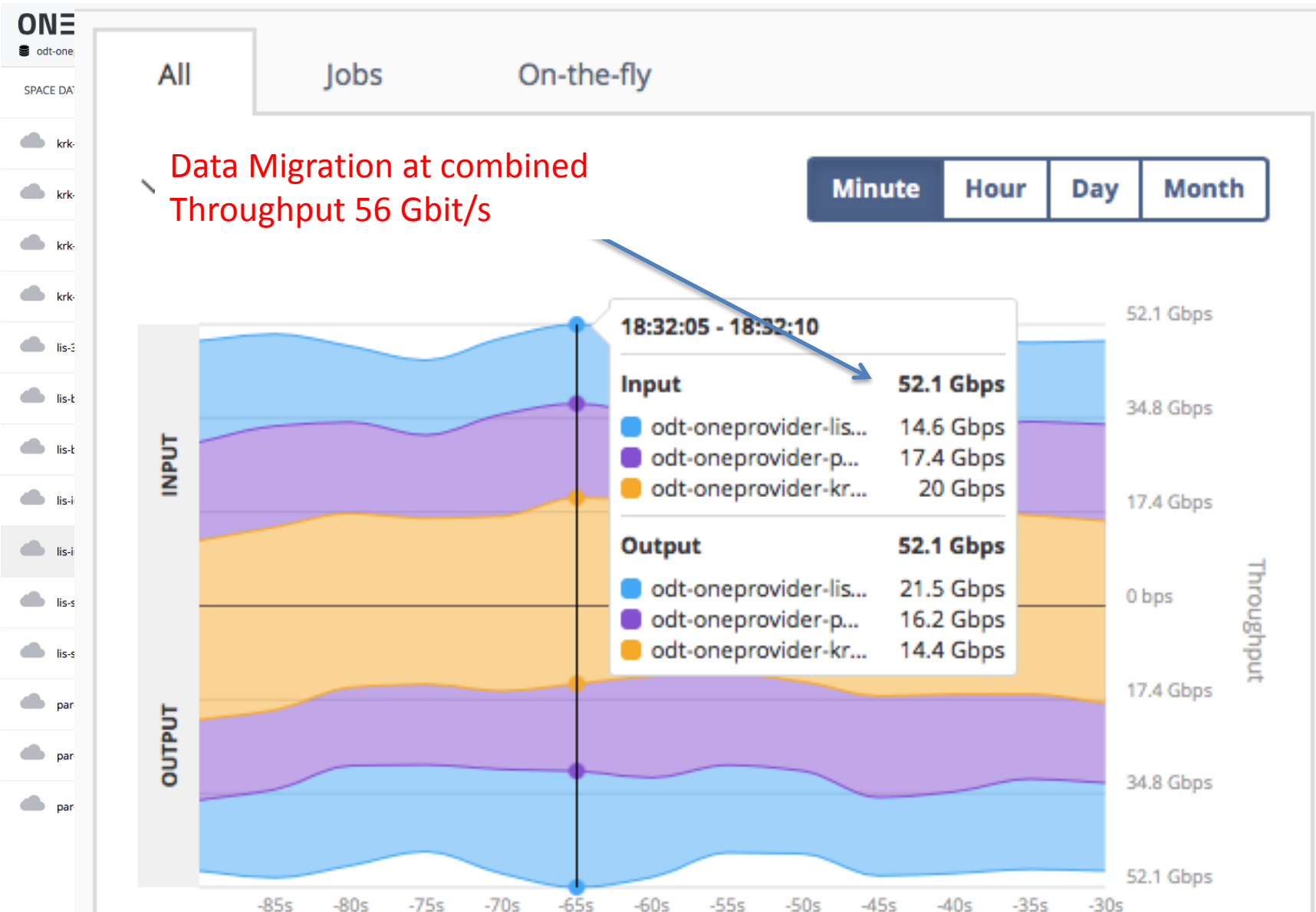


NFS Test
Collection 2.5 TB



10G Link

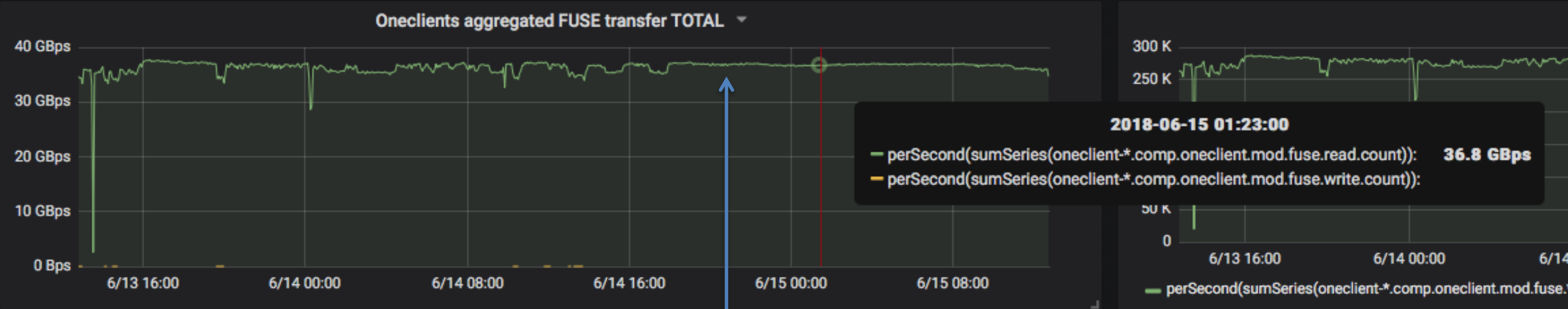
HIGH THROUGHPUT DATA MIGRATION IN PEER TO PEER MESH



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

ONEDATA HIGH THROUGHPUT DATA PROCESSING ON HNSC

Oneclients



Onedata Transparent POSIX File System
Processing transparently cached data - 37GBytes/sec

ONEDATA FILE POPULARITY AND SMART CACHING

The screenshot displays the Onedata Onepanel interface for a cluster named 'krk-n-par-3'. The left sidebar shows the 'CLUSTERS' section with a search bar and a list of clusters, including 'release17060-rc8-oneprovider-paris'. The main content area shows the cluster details, including its name, ID, and mount in root status. A donut chart indicates the total storage capacity of 1.9 GiB, with 953.7 MiB used by the provider 'VIFF-T'. The 'Auto cleaning' tab is active, showing the 'AUTO CLEANING' toggle is turned on. The 'CLEANING BOUNDARIES' section includes a progress bar showing the current state of the cleaning process, with a 'Start cleaning now' button. The 'CLEANING REPORTS' table shows the history of cleaning operations.

CLUSTERS

Search...

release17060-rc8-oneprovider-paris

Nodes

Provider

Storages

Spaces

krk-n-par-3

Name: krk-n-par-3

Providers support (total 1.9 GiB)

Chart Table

Id: IHa7SuFLUjm-3XEAPGogxWSQR_tixPIMwqMuf950rn4

Mount in root:

This provider storage: s3

release17060-rc8... 953.7 MiB

Provider#VIFF-T 953.7 MiB

1.9 GiB

Storage synchronization Files popularity **Auto cleaning**

AUTO CLEANING

CLEAN REPLICATED FILES Saving...

Lower size limit 200 MiB

Upper size limit MiB

Not opened for Hours

CLEANING BOUNDARIES

Total space: 953.7 MiB Used space: 384.1 MiB Free space: 569.6 MiB To release: 179 MiB

711 MiB

205.1 MiB

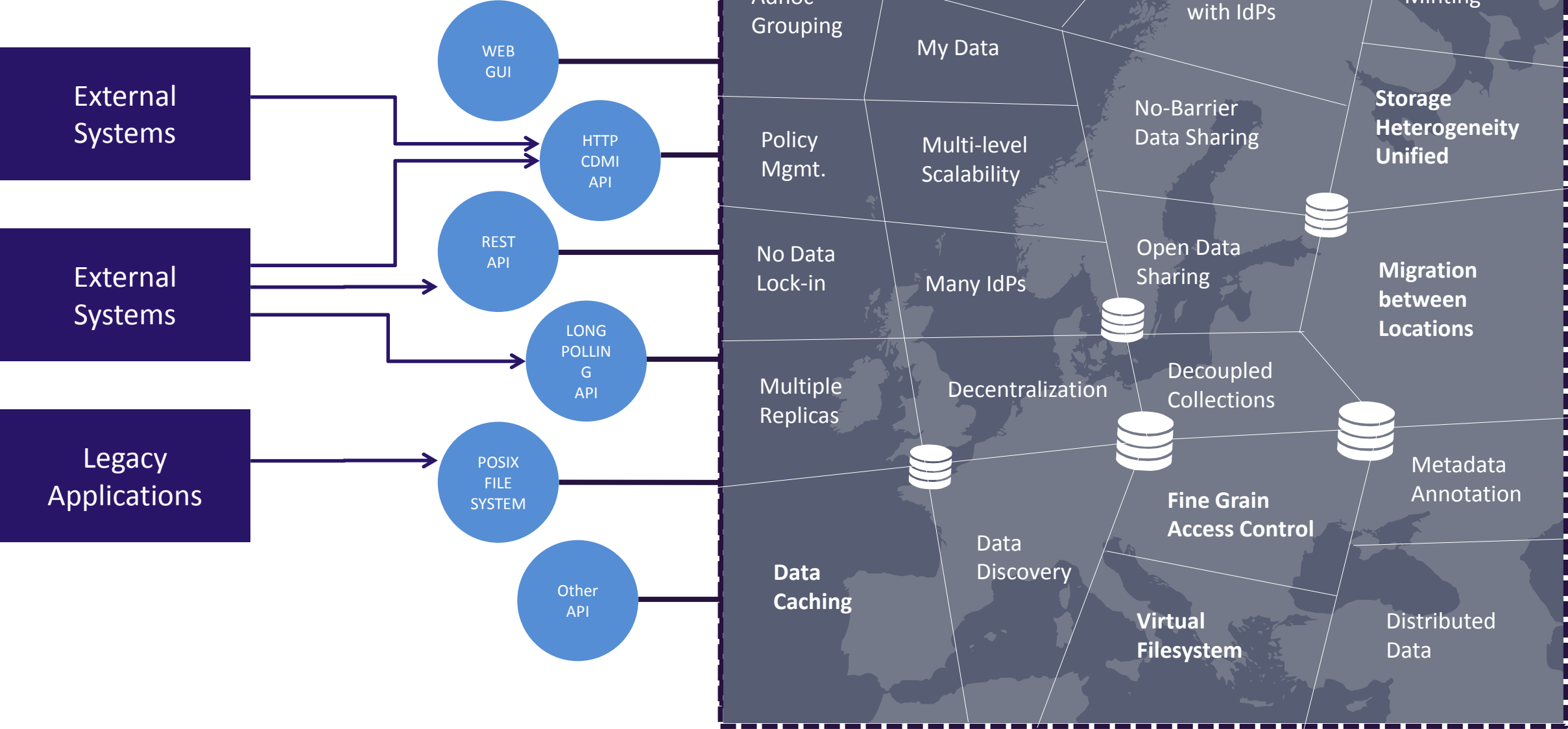
Start cleaning now

CLEANING REPORTS

Start	Stop	Released size	Files number	Status
8 Dec 2017 13:32:13	-	0 B (out of 179 MiB)	0	🔄
8 Dec 2017 13:31:53	8 Dec 2017 13:31:55	448 MiB (out of 565.4 MiB)	1	❌

Onedata can evict least important replicas
Based on file popularity

ONEDATA UNIFIED DATA MANAGEMENT SERVICE



QUESTIONS?

Please visit:
www.onedata.org