CERN

EOS Data Lake

Luca Mascetti, Massimo Lamanna

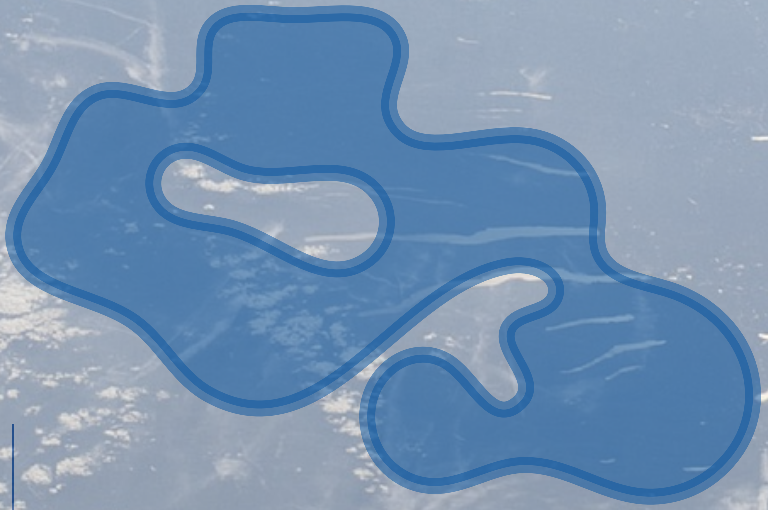
“WLCG” DATA LAKE

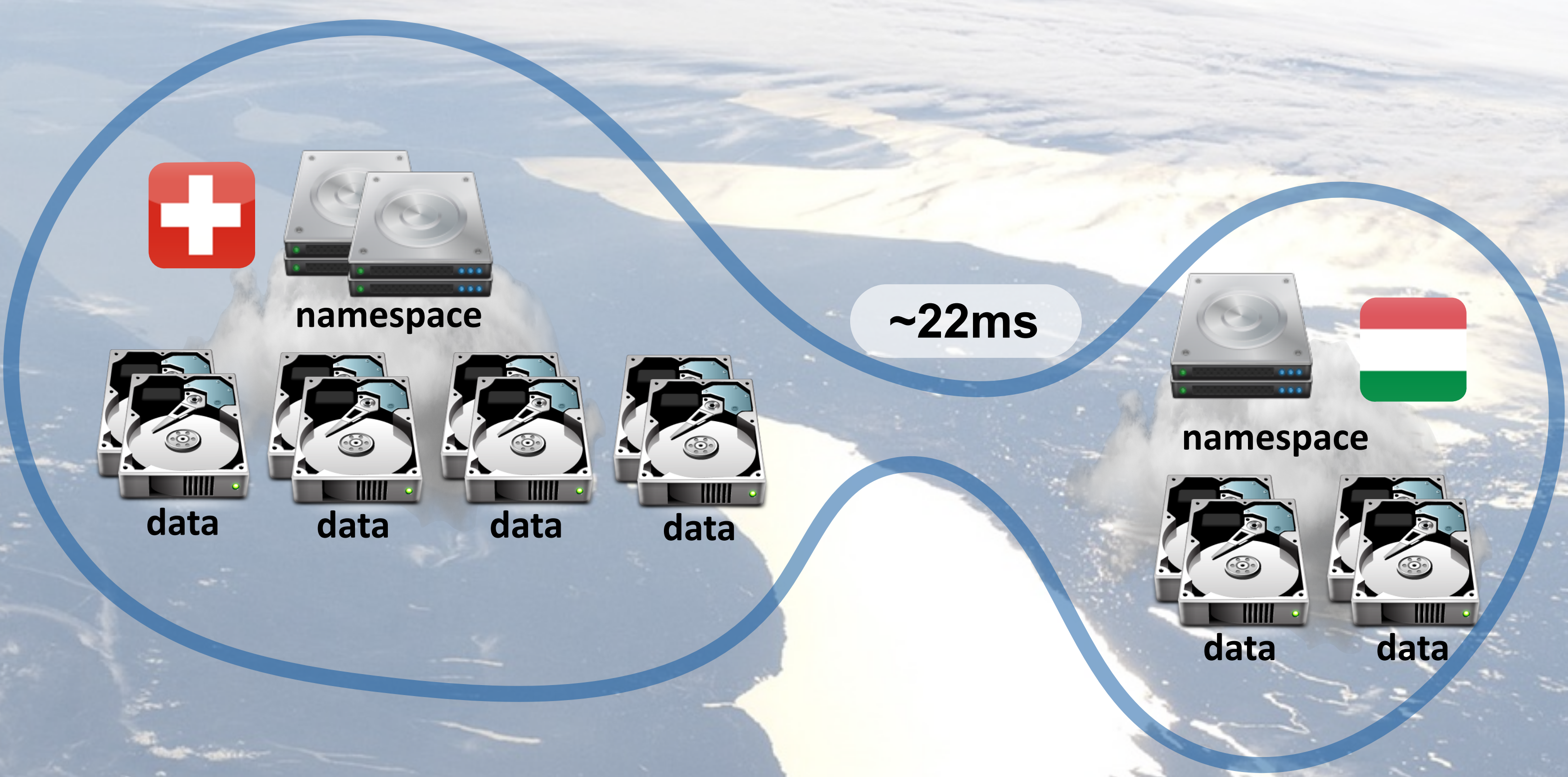
n sites

k replicas

k<<n

latency > 1ms





namespace

data

data

data

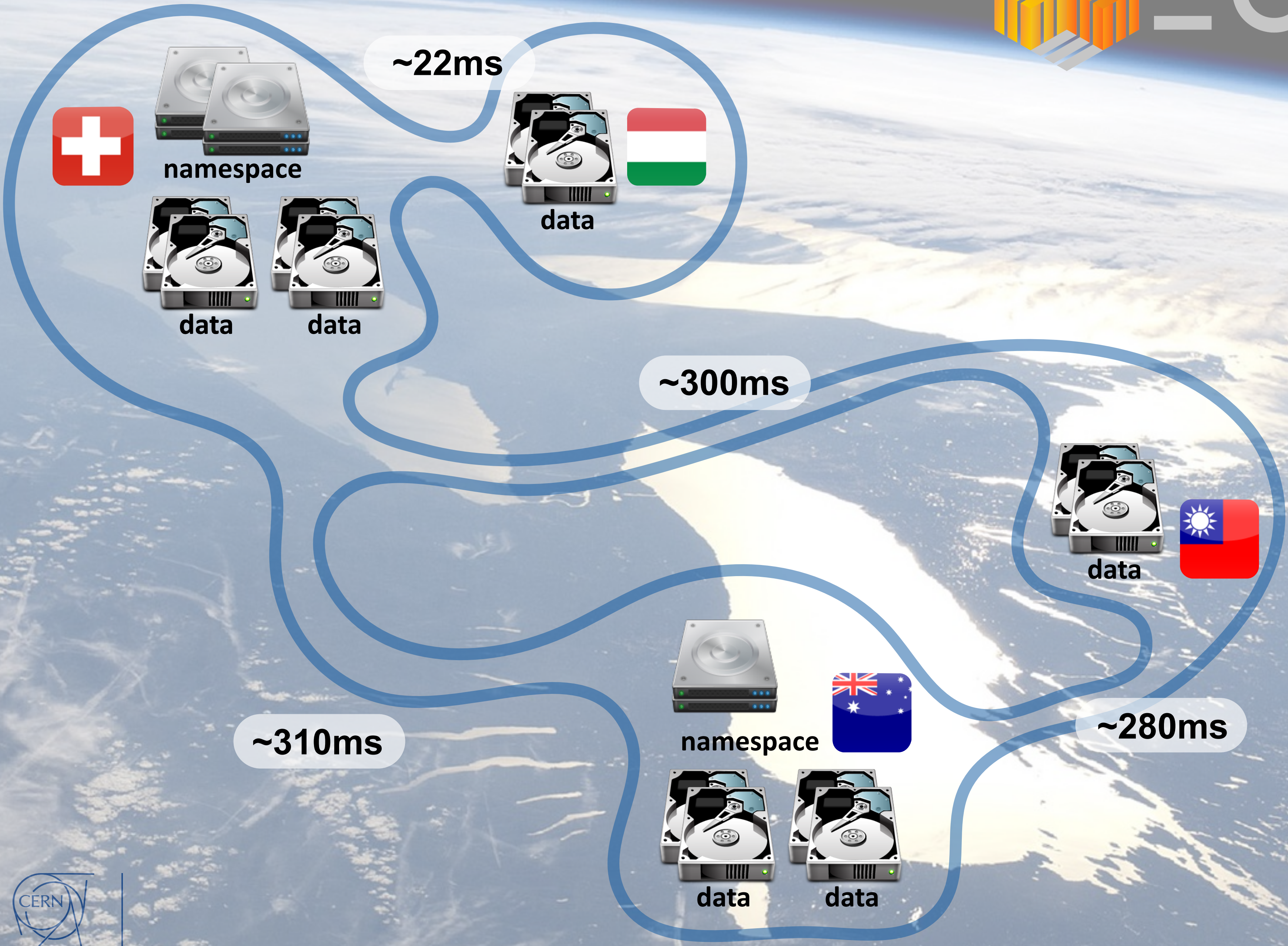
data

~22ms

namespace

data

data



~22ms

namespace

data

data

data

~300ms

data

namespace

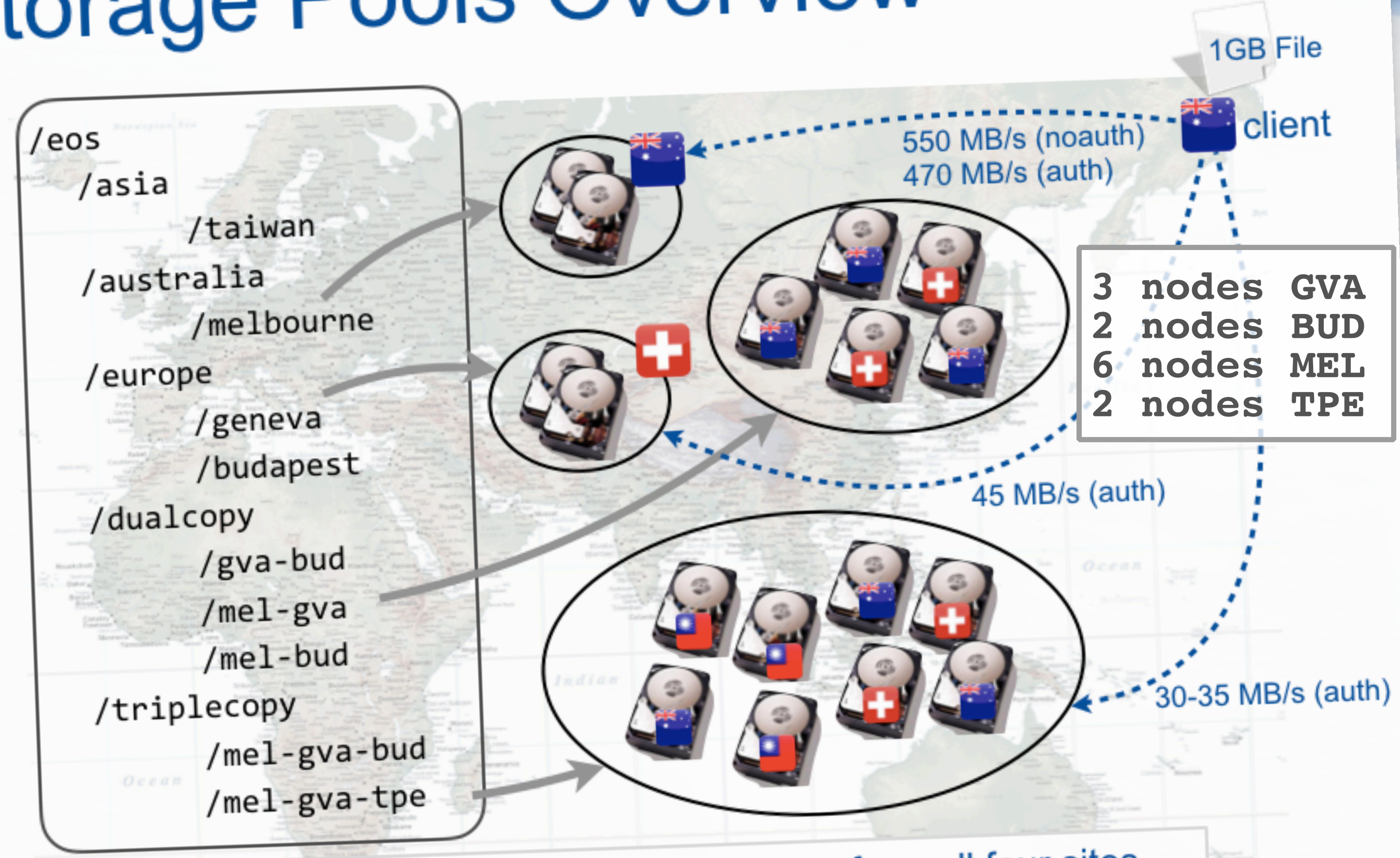
~310ms

~280ms

data

data

Storage Pools Overview



```
/eos
    /asia
         /taiwan
    /australia
         /melbourne
    /europe
         /geneva
         /budapest
    /dualcopy
         /gva-bud
         /mel-gva
         /mel-bud
    /triplecopy
         /mel-gva-bud
         /mel-gva-tpe
```

```
3 nodes GVA
2 nodes BUD
6 nodes MEL
2 nodes TPE
```

Storage pools were created with filesystems from all four sites.
Files were replicated according to the different configured policy
(e.g. 3 replicas: MEL-GVA-TPE).

Make data access easy
Make Analysis simple
Facilitate Science

aarnet

Australia's Academic and Research Network

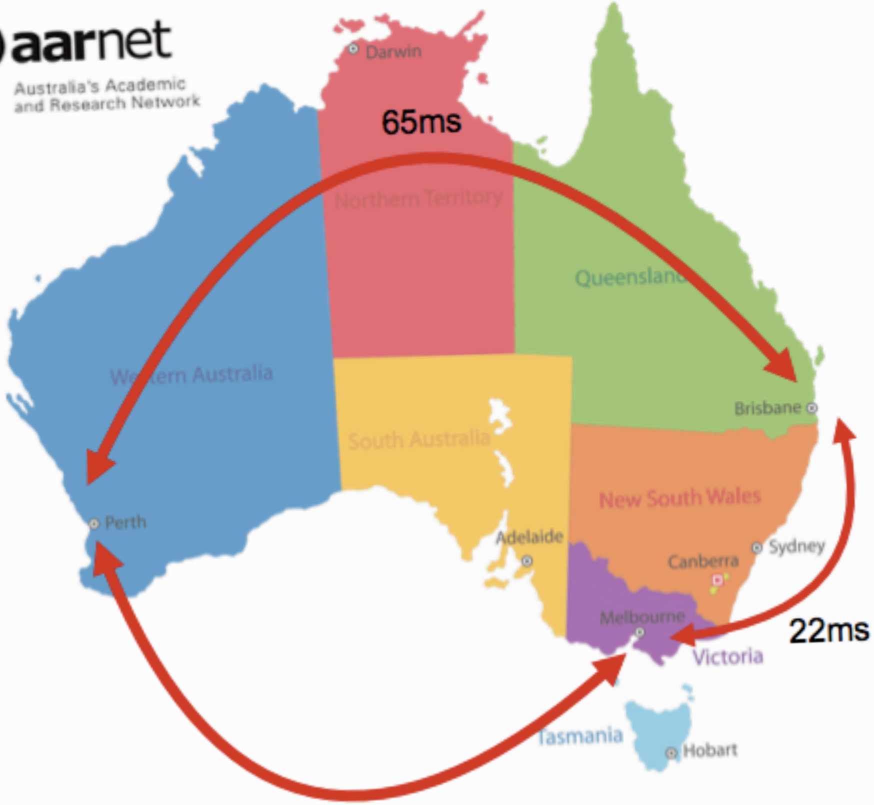
- Scale-out filesystem underneath the ownCloud app, using the eosd fuse interface for file IO

aspera RSYNC

- Geo-distributed setup: Brisbane, Melbourne, Perth
  - ~1PB (scale to ~20PB next year)

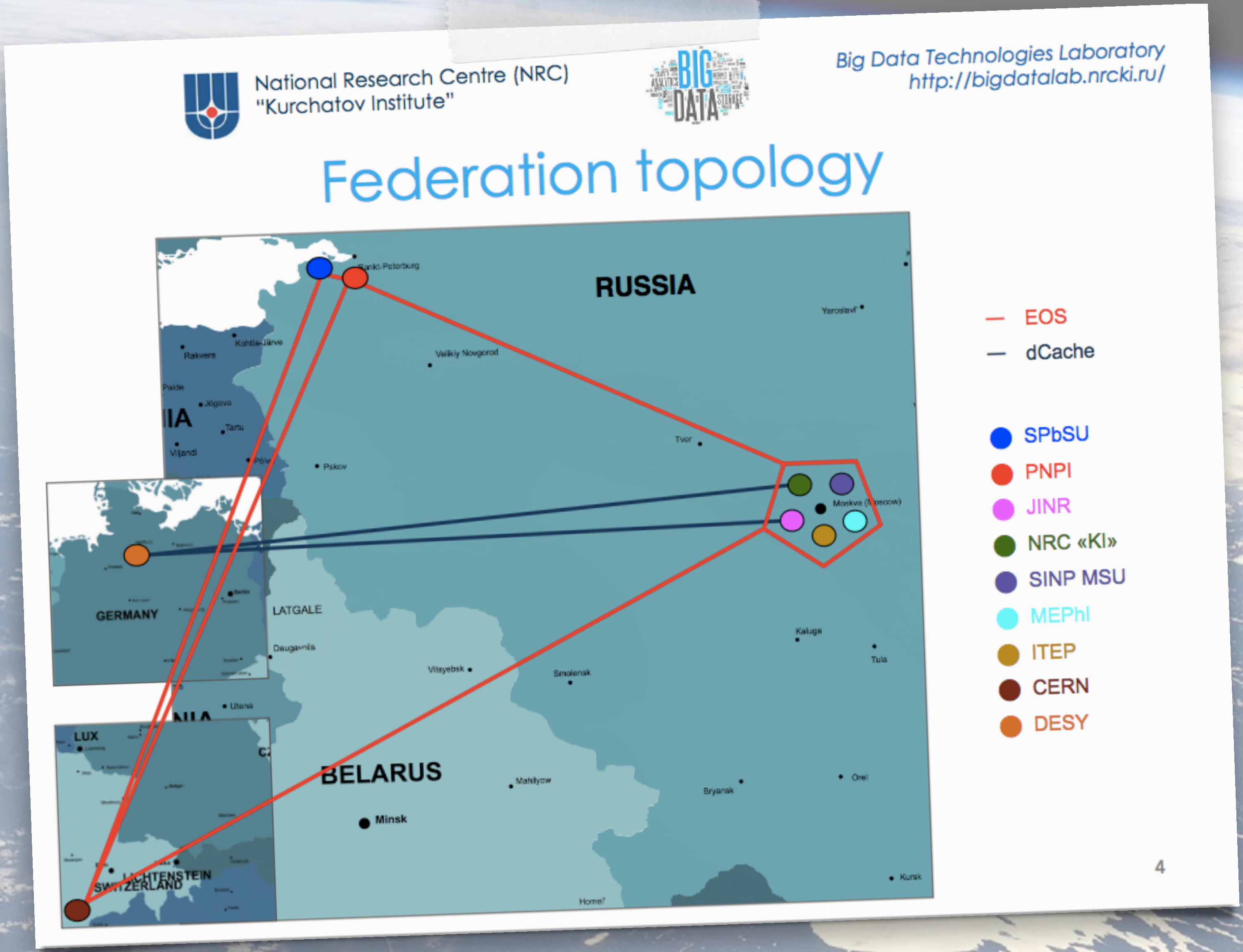
Australian National University

- Australian National University, in Acton Canberra: mirror archives of both genome sequences and open or freely available software distributed among three sites



"This system is presently running 0.3.187, and has been so trouble free that I keep forgetting it's there." David Jericho -AARNetSolutions Architect

Background image: Shutterstock



National Research Centre (NRC)
"Kurchatov Institute"

Big Data Technologies Laboratory
http://bigdatalab.nrcki.ru/

Federation topology

— EOS

— dCache

● SPbSU

● PNPI

● JINR

● NRC «KI»

● SINP MSU

● MEPhI

● ITEP

● CERN

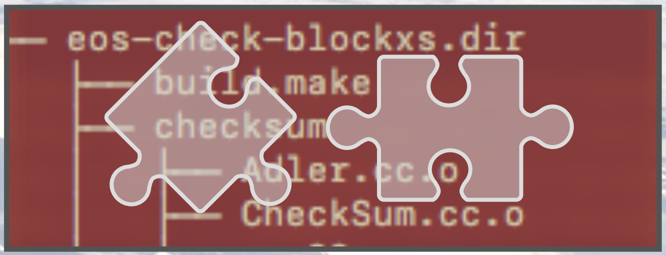
● DESY

4

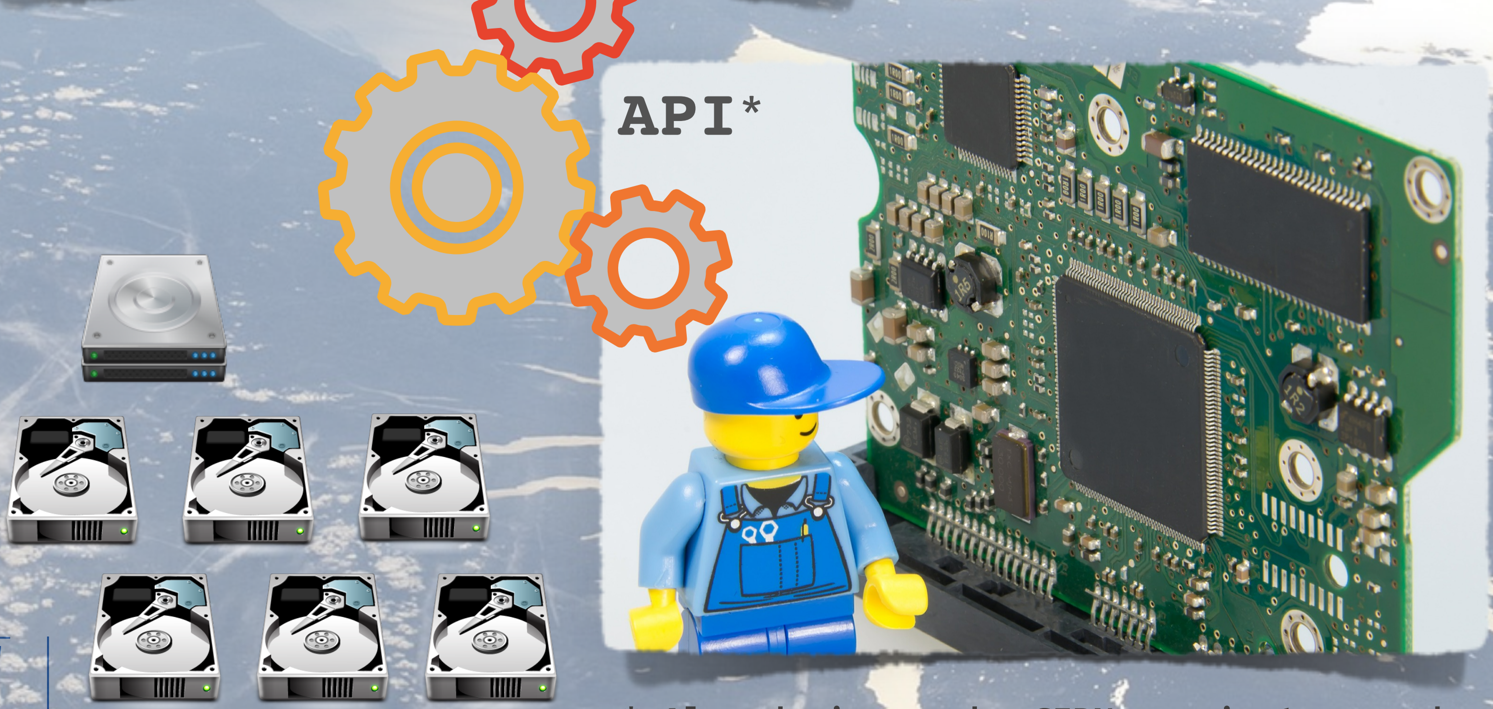
Storage Management

Are we able to reduce the complexity
and the expertise globally required?

Decoupling storage software and hardware maintenance

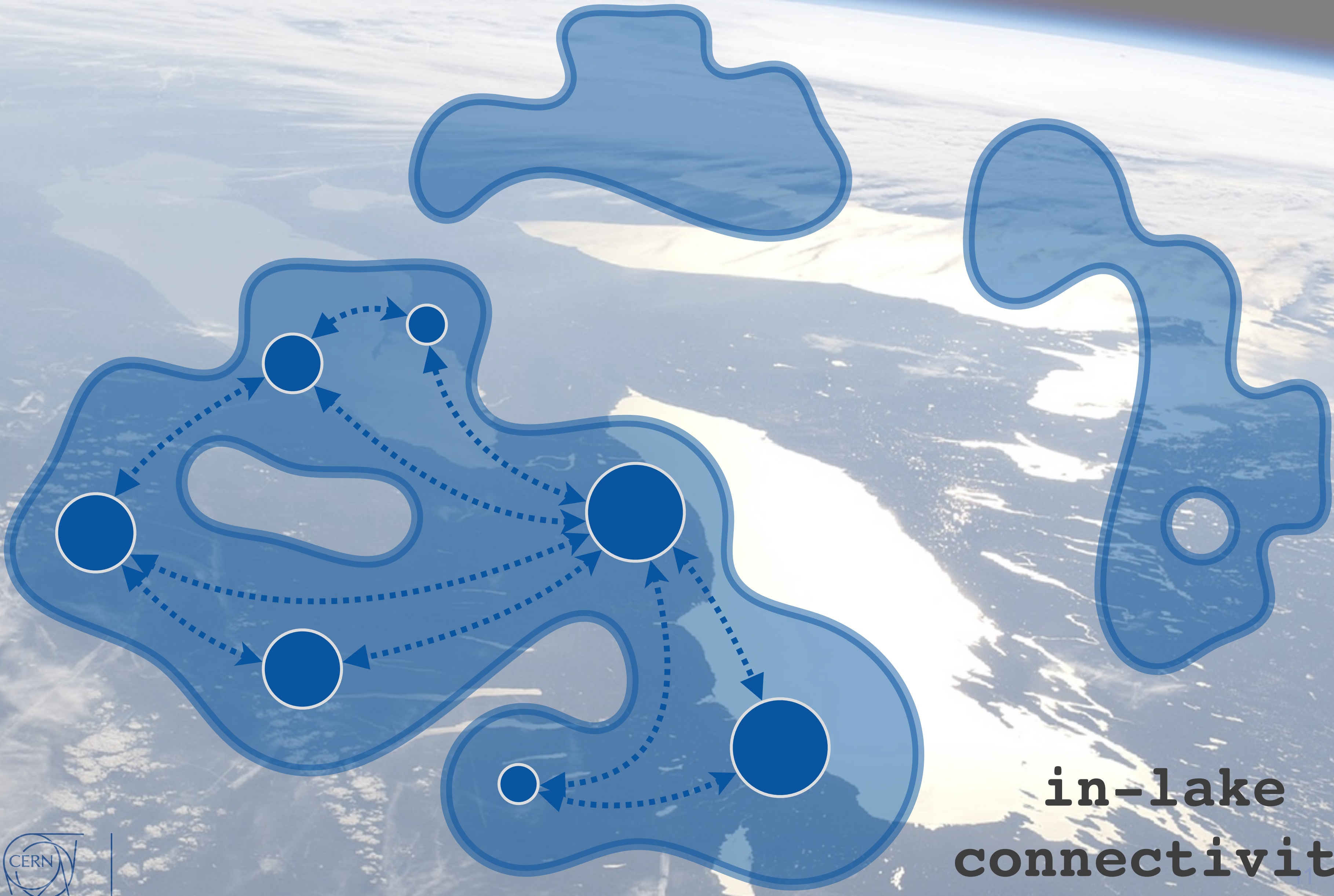


```
— eos-check-blockxs.dir
  ├── build.make
  ├── checksum
  │   ├── Adler.cc.o
  │   └── CheckSum.cc.o
```



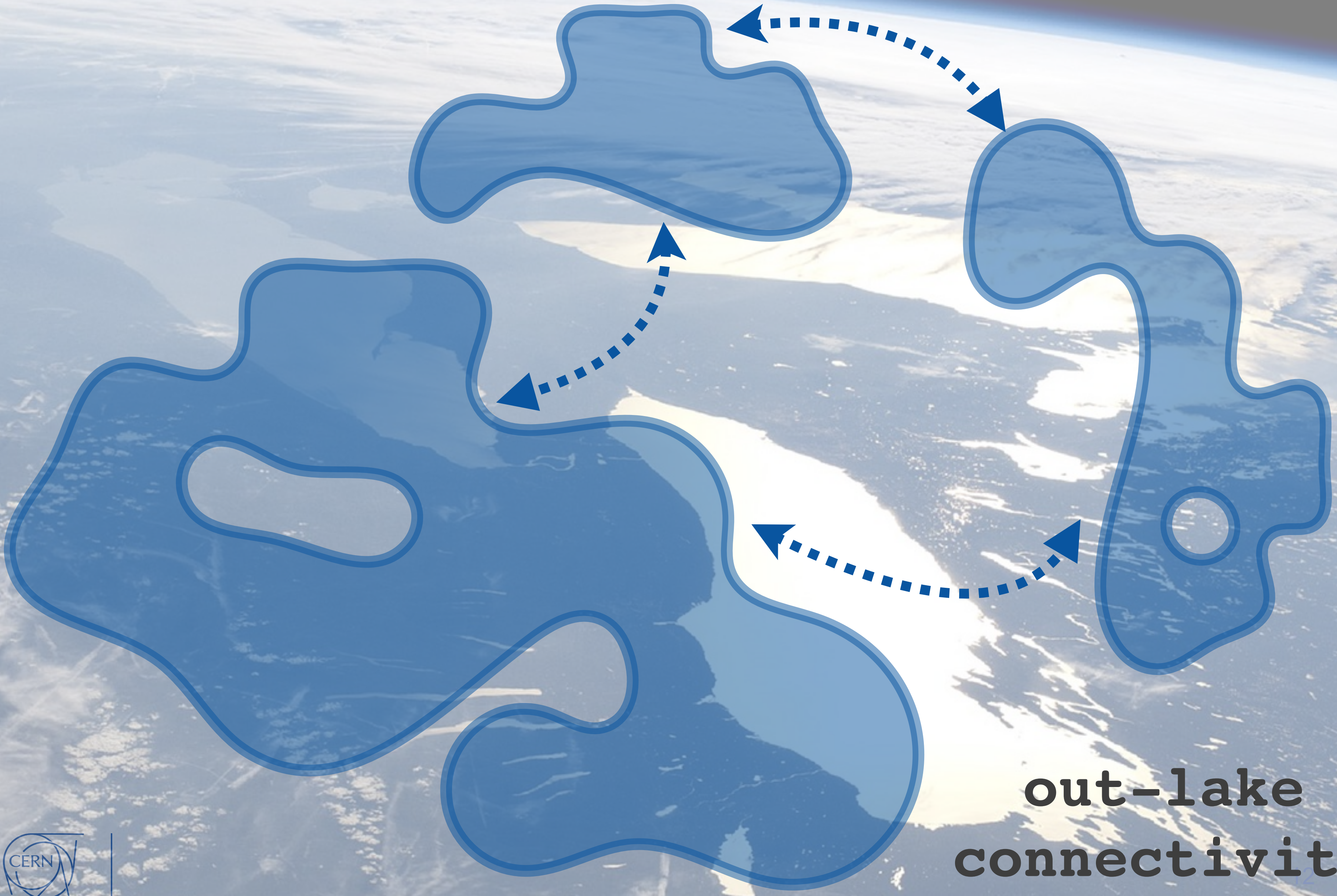
* Already in use by CERN repair team and sysadmins team

Network Evolution

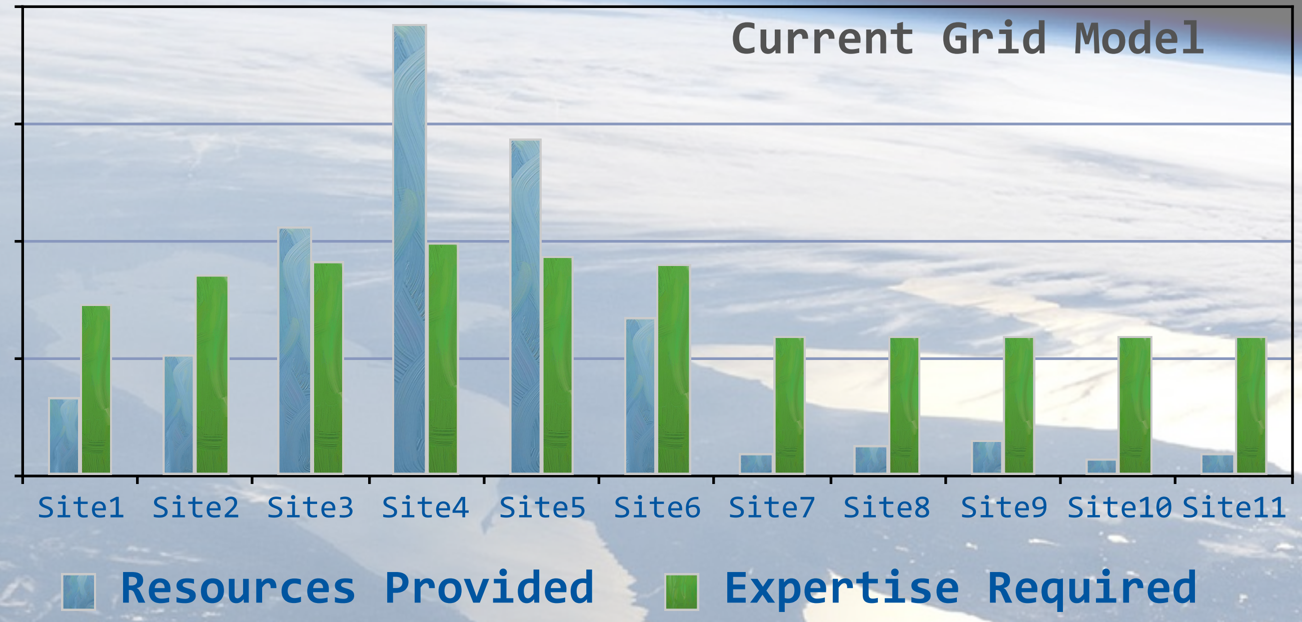


in-lake connectivity

Network Evolution

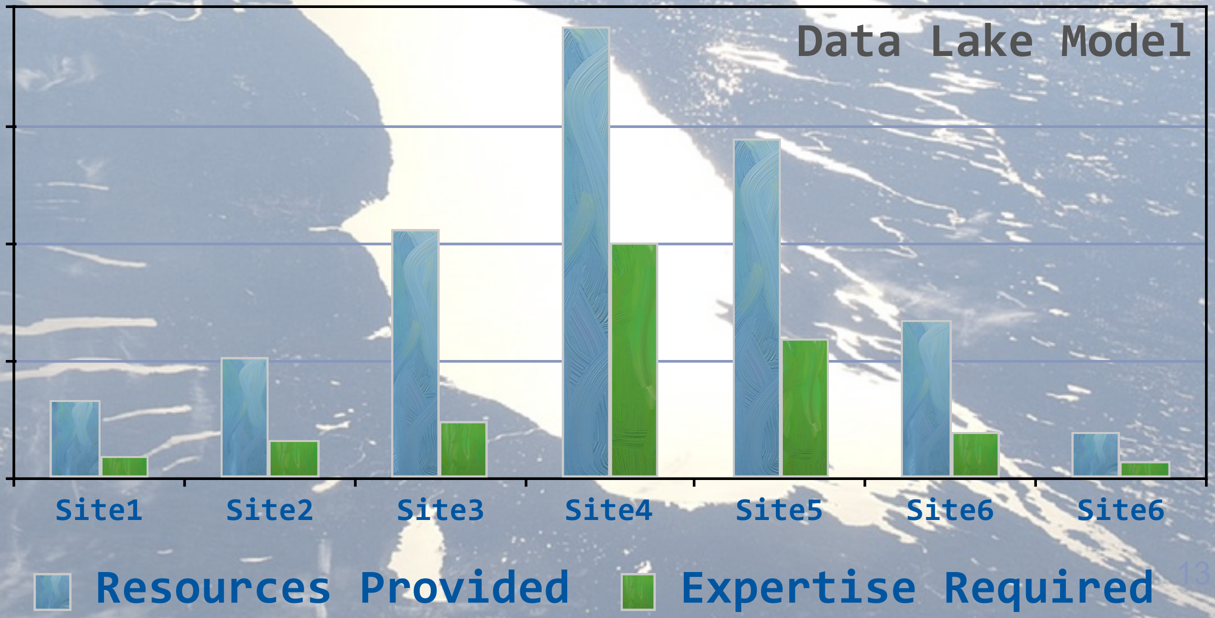


out-lake connectivity



Current Grid Model

Resource and Manpower Consolidation



Data Lake Model

Thanks for the attention!

www.cern.ch