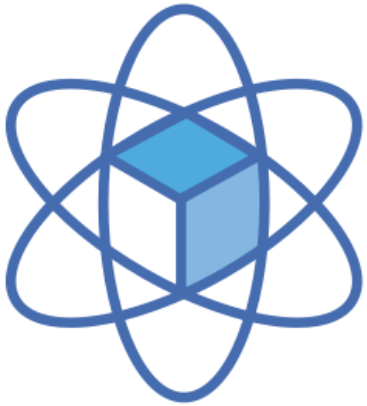

CERN



CERNBox

Cloud Storage for Science

Luca Mascetti
CERN - IT Storage

Outline

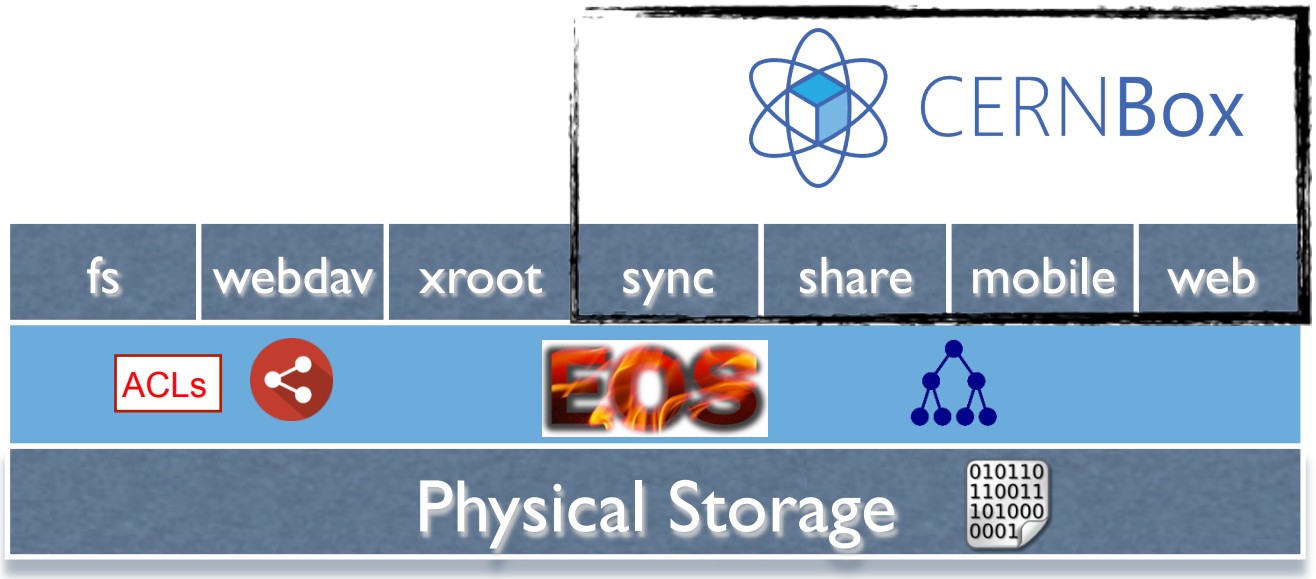
- Description and Architecture
- User Community and Service Numbers
- Success Stories & Future Use-cases
- Overview and Summary

Description and Architecture

What is CERNBox ?

CERNBox provides a cloud synchronisation service

- Available for all CERN users (1TB/user)
- Synchronise files (data at CERN) and offline data access
- Easy way to share with other users
- All major platforms supported
- Based on **ownCloud integrated with EOS**



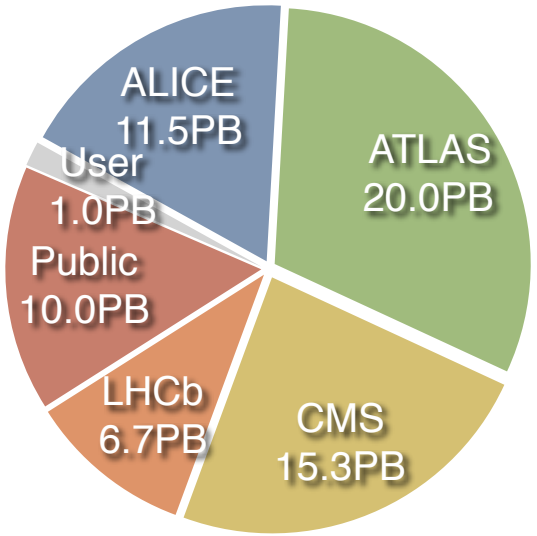
EOS is the CERN disk storage for physics data

140 PB raw deployed
(50% in Budapest)

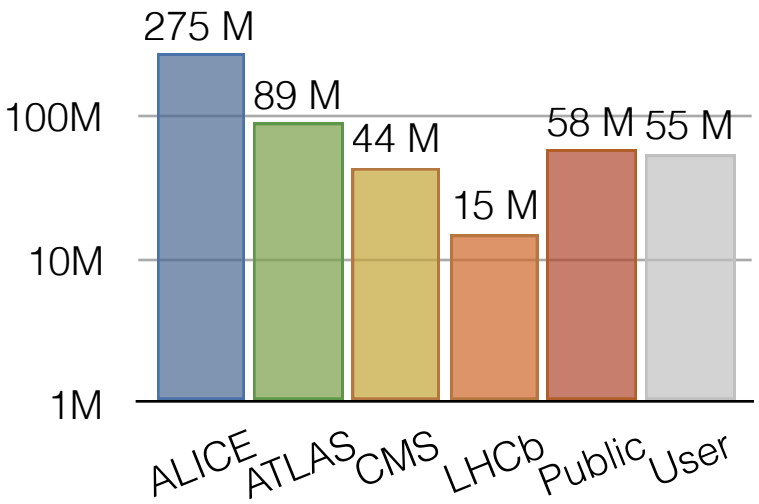
1'300 storage nodes

40'000 disks

Usable Capacity (2-replica)

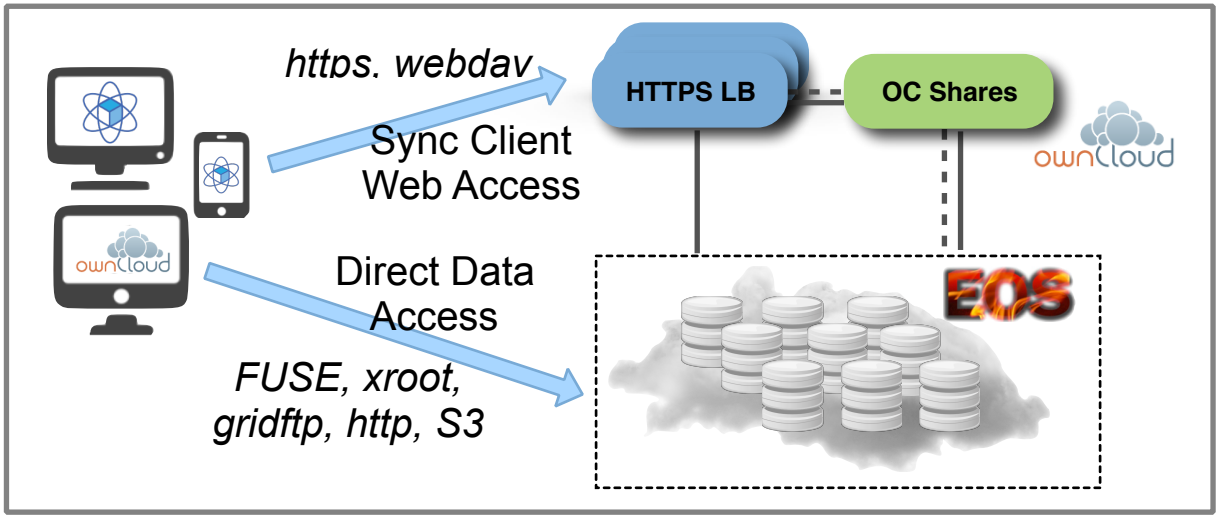


Files Stored



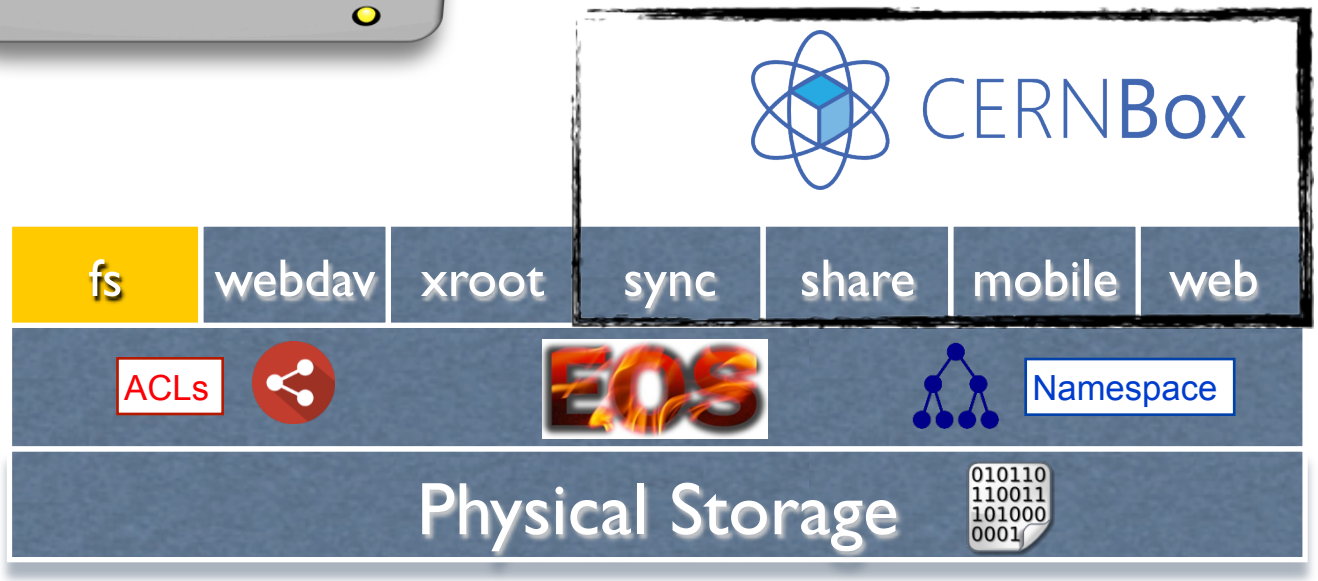
CERNBox = EOS + ownCloud

- EOS offers “virtually unlimited” cloud storage for end-users
- Full solution compatible with **ownCloud clients**
- **Remove dependency** on the ownCloud Database
  - EOS has a very fast i**n-memory namespace**
- Integrate **web-access** and **sharing**, **versions**, **trash bin**
- Significant improvement of the external storage concept
  - **Great scalability**, as good as the underlying backend
- **Great performance**, efficient hardware usage

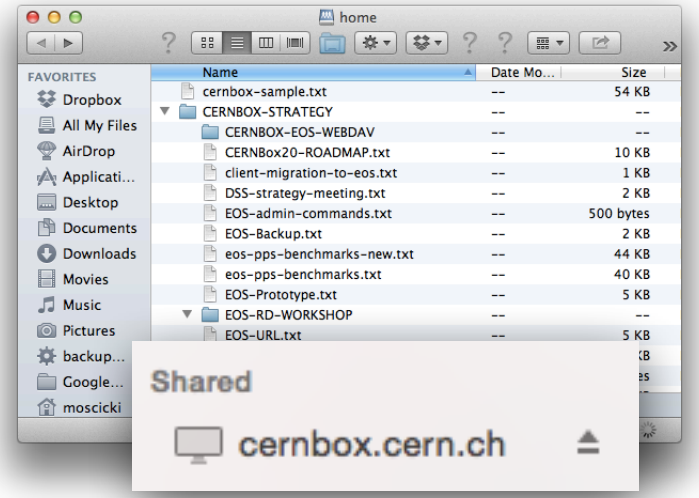


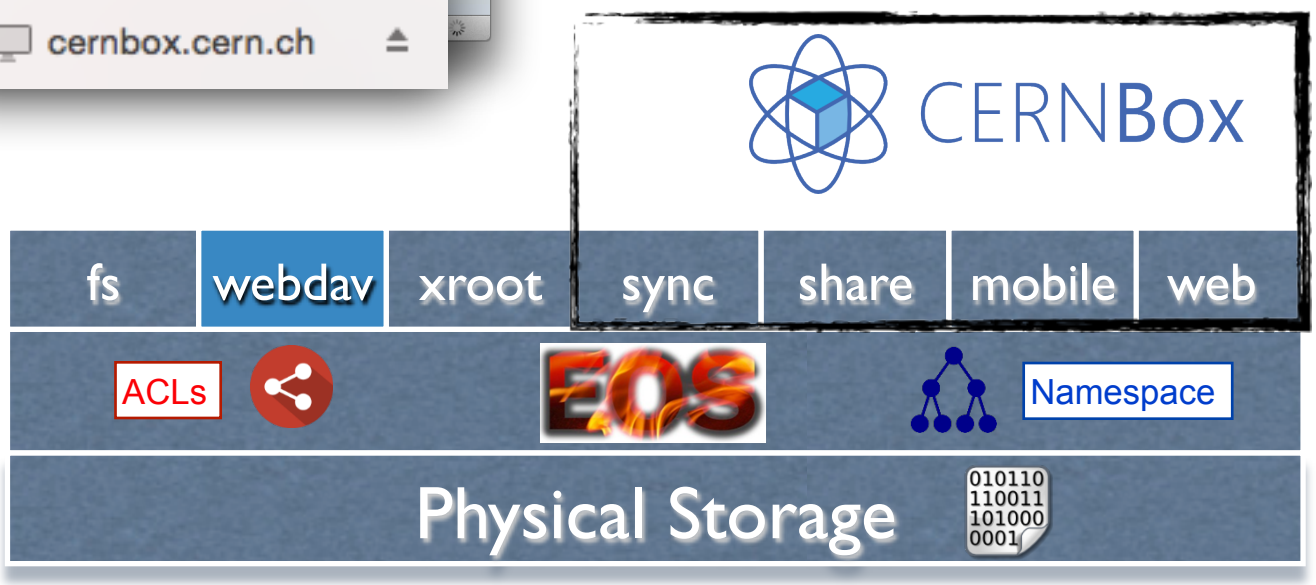
Access Methods: FUSE


```
[lmascett@lxplus2015 ~]#
[lmascett@lxplus2015 ~]# df -H -t fuse
Filesystem      Size  Used Avail Use% Mounted on
eosuser         506T   70T  437T  14% /eos/user
eosatlas         36P   17P   20P  45% /eos/atlas
eosalice         20P   11P  8.5P  57% /eos/alice
eoscms           28P   14P   15P  49% /eos/cms
eoslhcb          13P  7.6P  4.6P  63% /eos/lhcb
eospublic        16P  5.8P   11P  36% /eos/public
[lmascett@lxplus2015 ~]#
[lmascett@lxplus2015 ~]# ls -lc /eos/user/l/lmascett/
total 6644
drwx------. 1 lmascett c3       5 Dec 10 15:58 CERN
drwx------. 1 lmascett c3       0 Jan 26 18:18 debug
drwx------. 1 lmascett c3       0 Dec 11 09:43 download
drwx------. 1 lmascett c3       0 Oct 31 18:24 pdf
drwx------. 1 lmascett c3       1 Dec 11 09:44 personal
drwx------. 1 lmascett c3       8 Dec 10 12:11 pictures
```

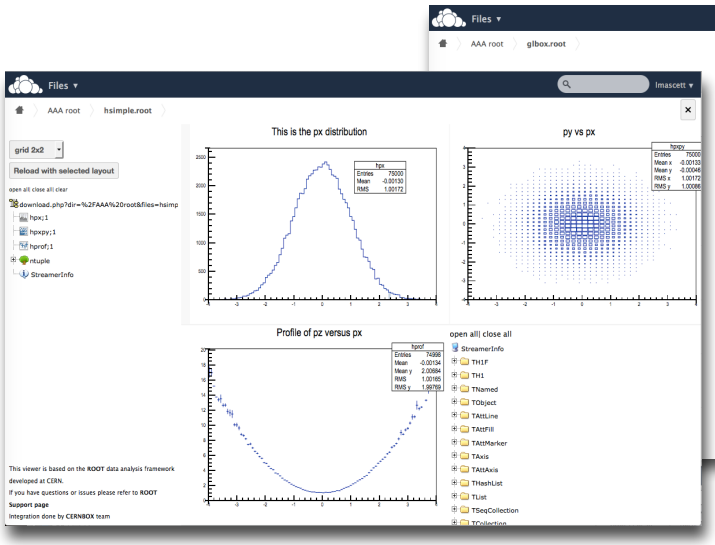


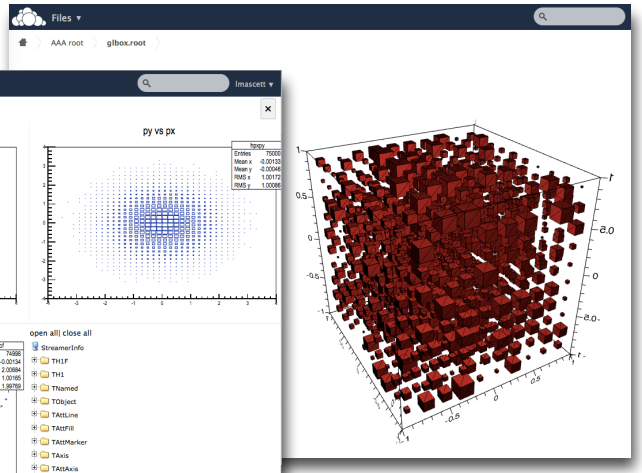
Access Methods: WebDAV

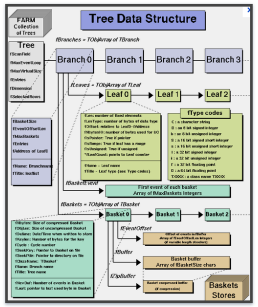


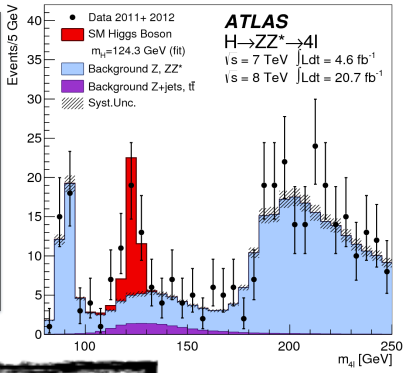


Access Methods: xroot & ROOT

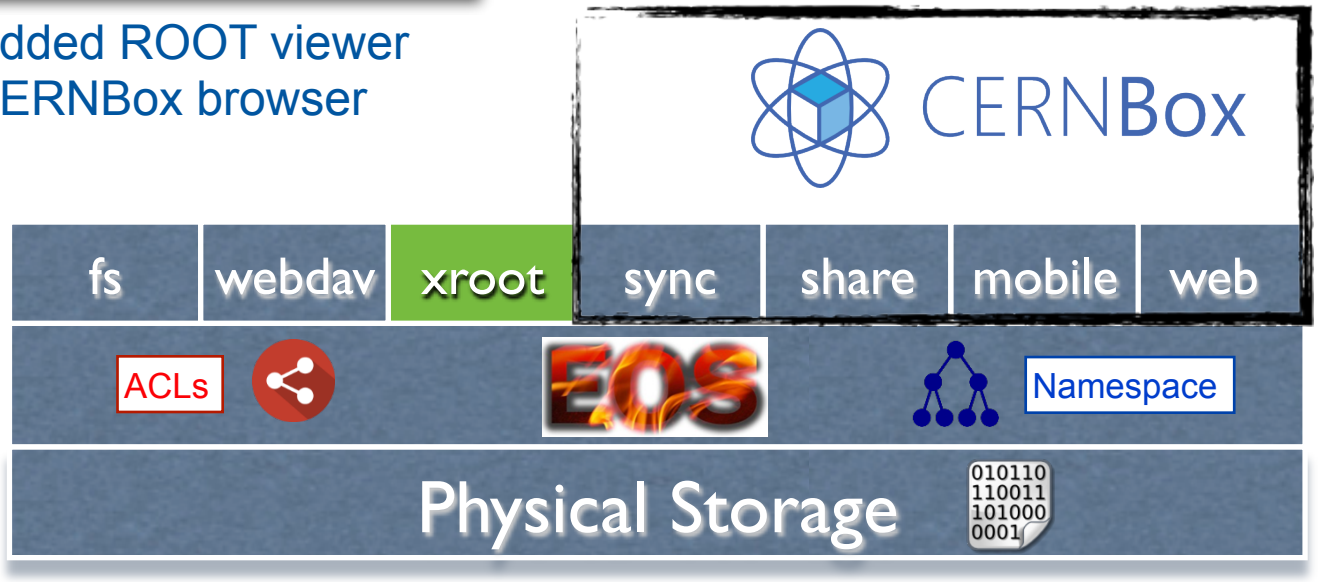




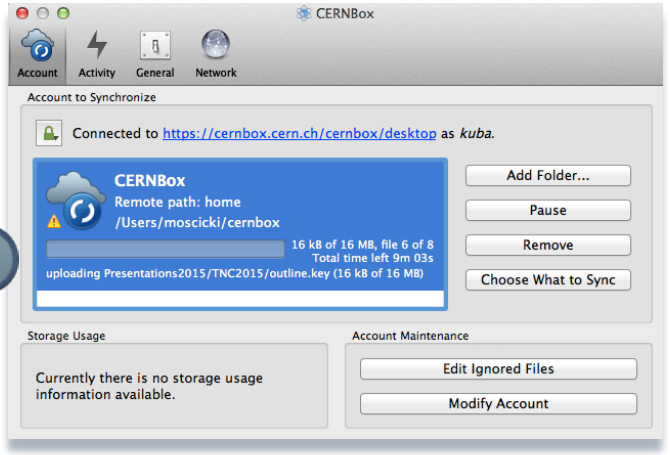


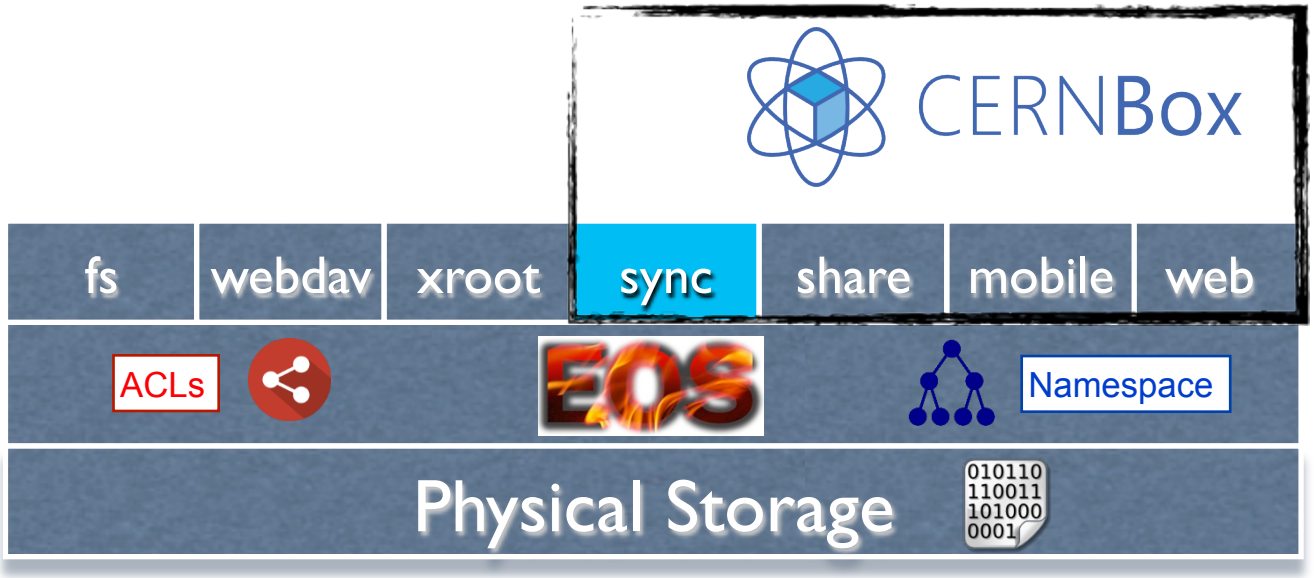


Embedded ROOT viewer
in CERNBox browser

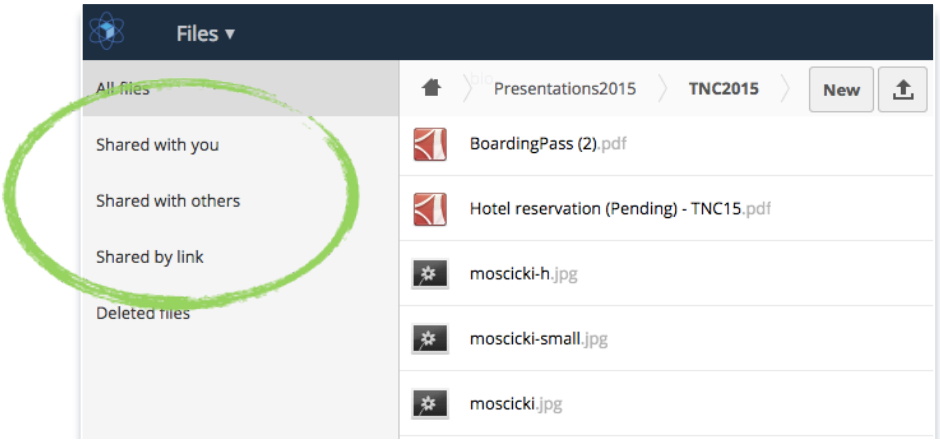


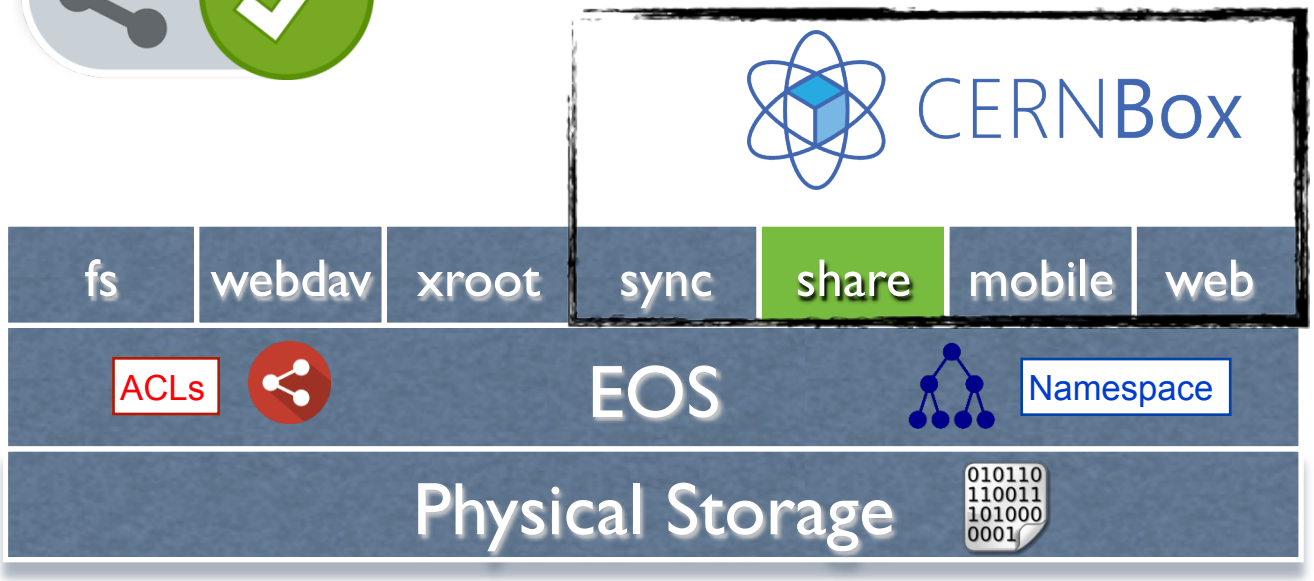
Access Methods: Sync



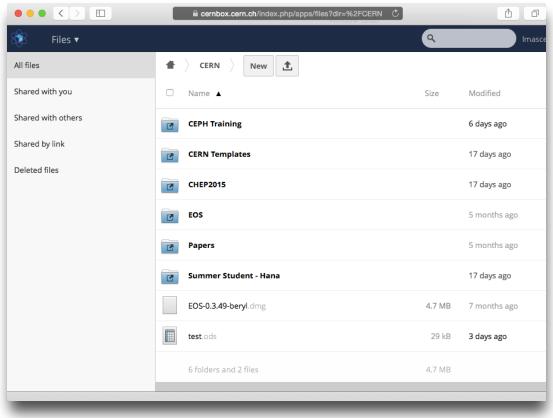


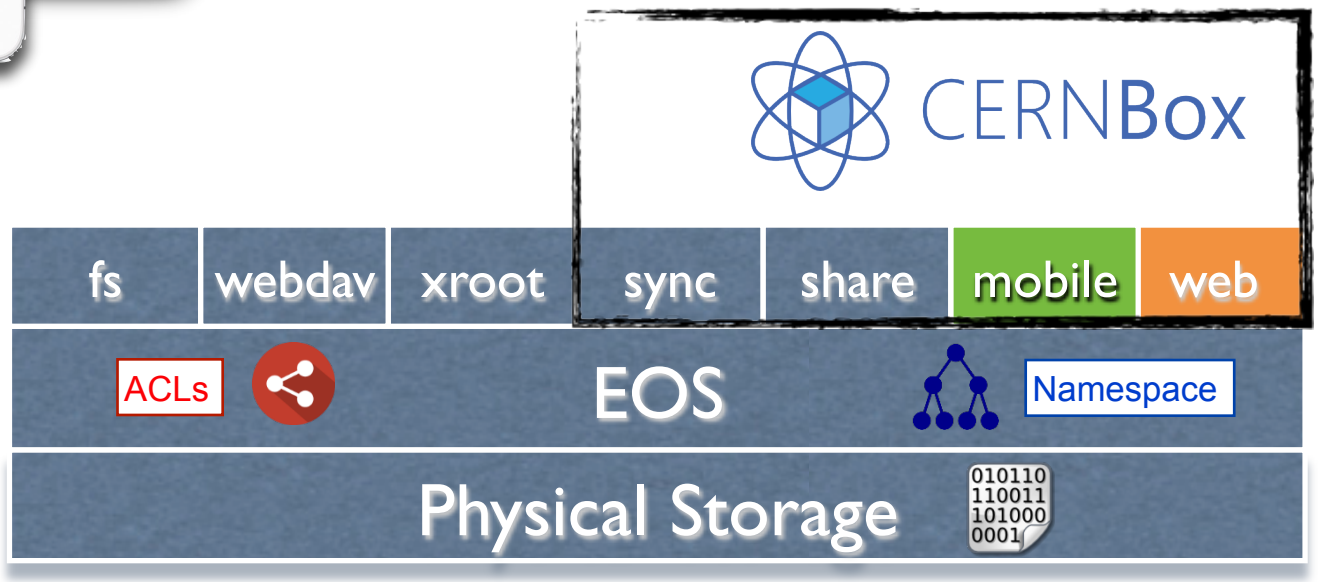
Access Methods: Sharing





Access Methods: Mobile & Web



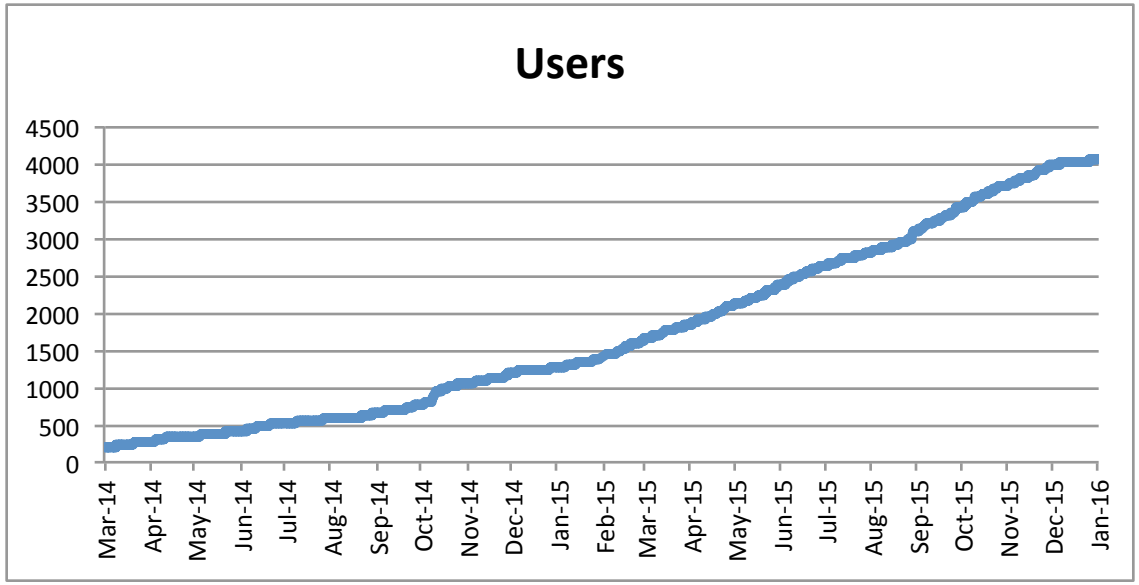


User Community and Service Numbers

CERNBox Service Numbers

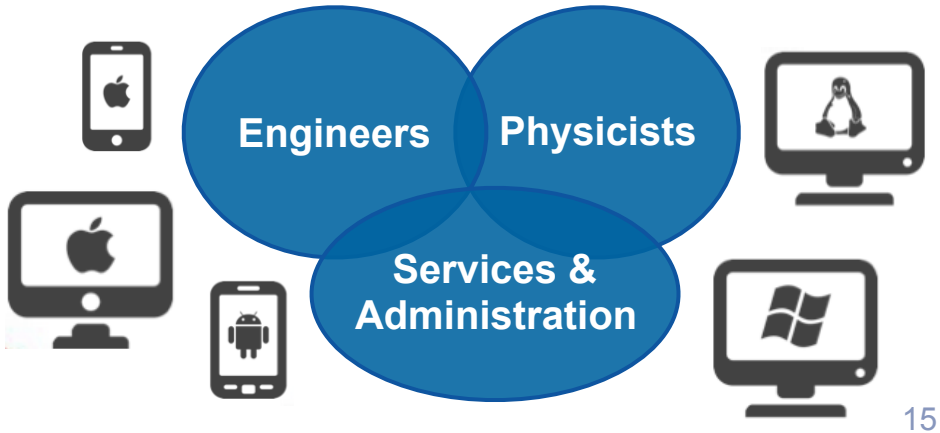
EOS offers “virtually unlimited” cloud-storage for our end-users

Users	***4074***
# files	***55 Million***
# dirs	***7.2 Million***
Quota	***1TB/user***
Used Space	***104 TB***
Deployed Space	***1.3 PB***

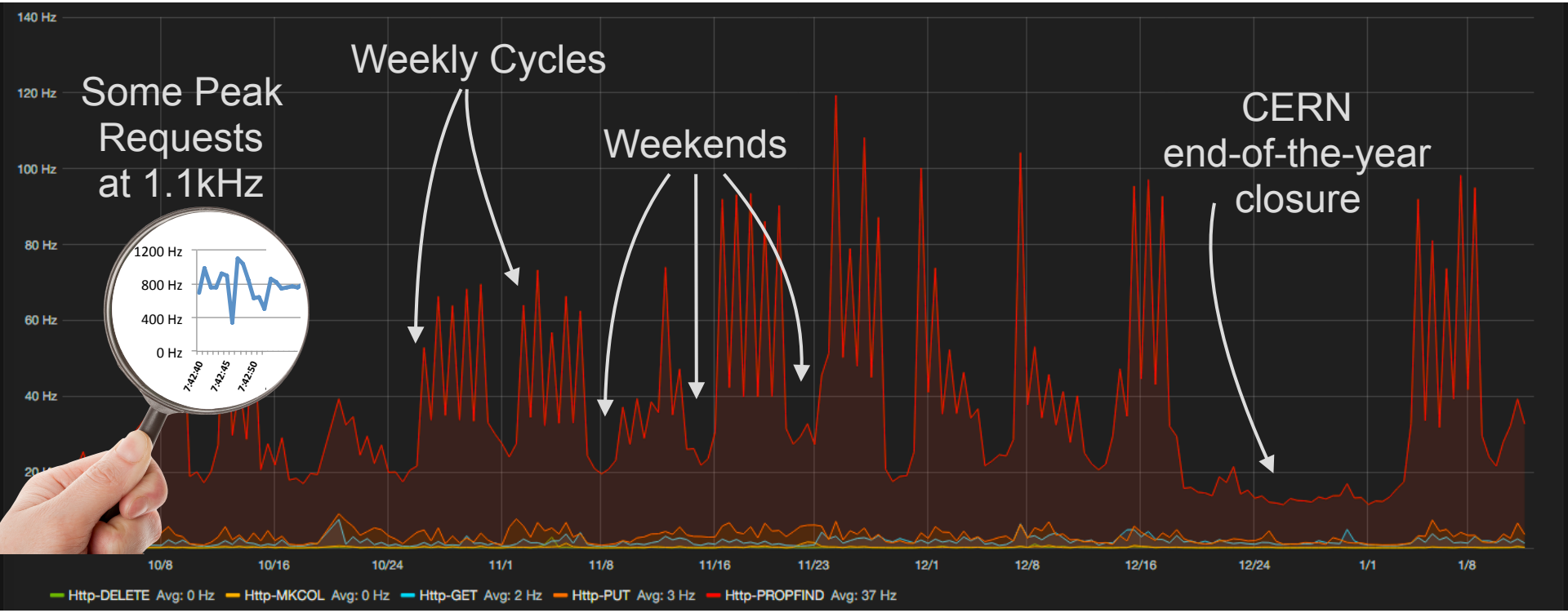


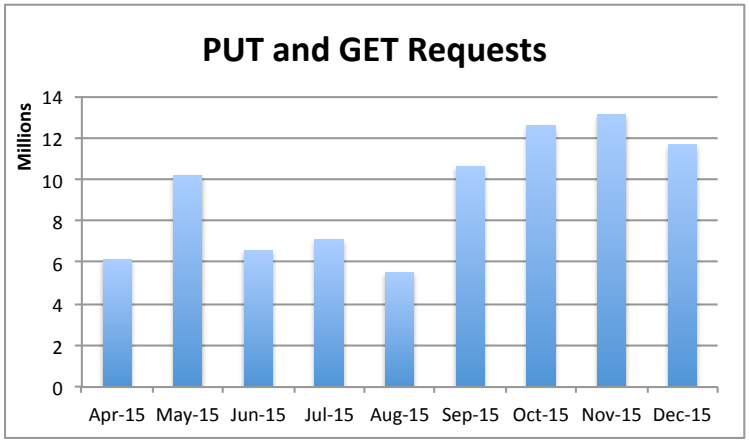
User community very active

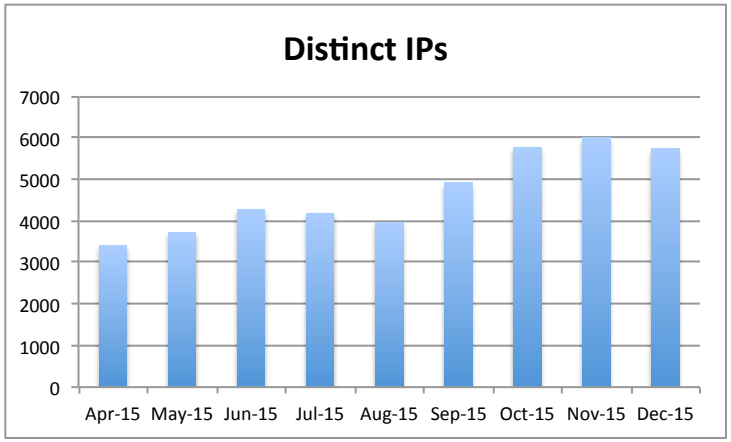
- Very positive feedback
- Several useful suggestions
- Important contributions
- happy to help testing new features



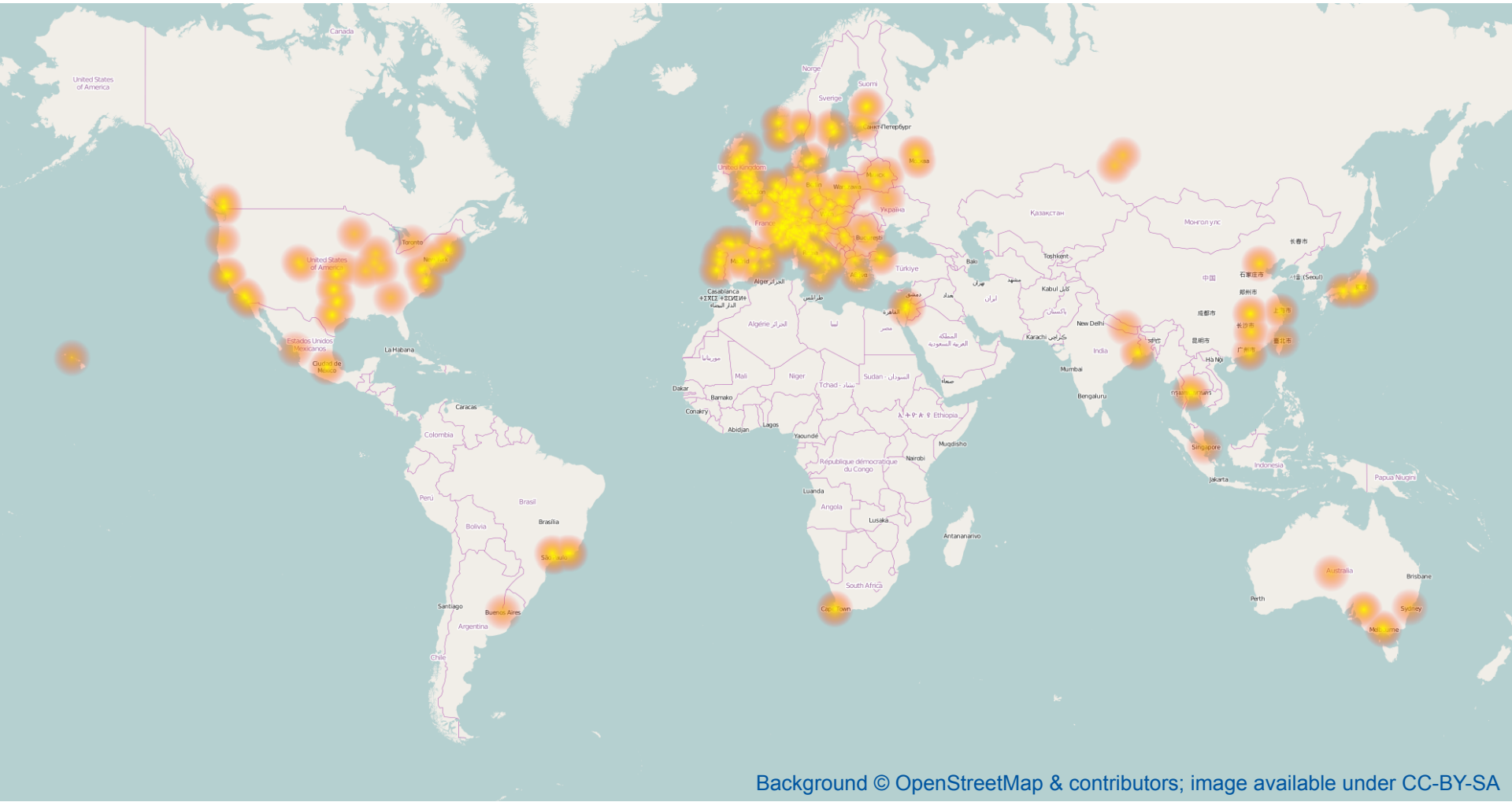
EOS/CERNBox HTTP Operations



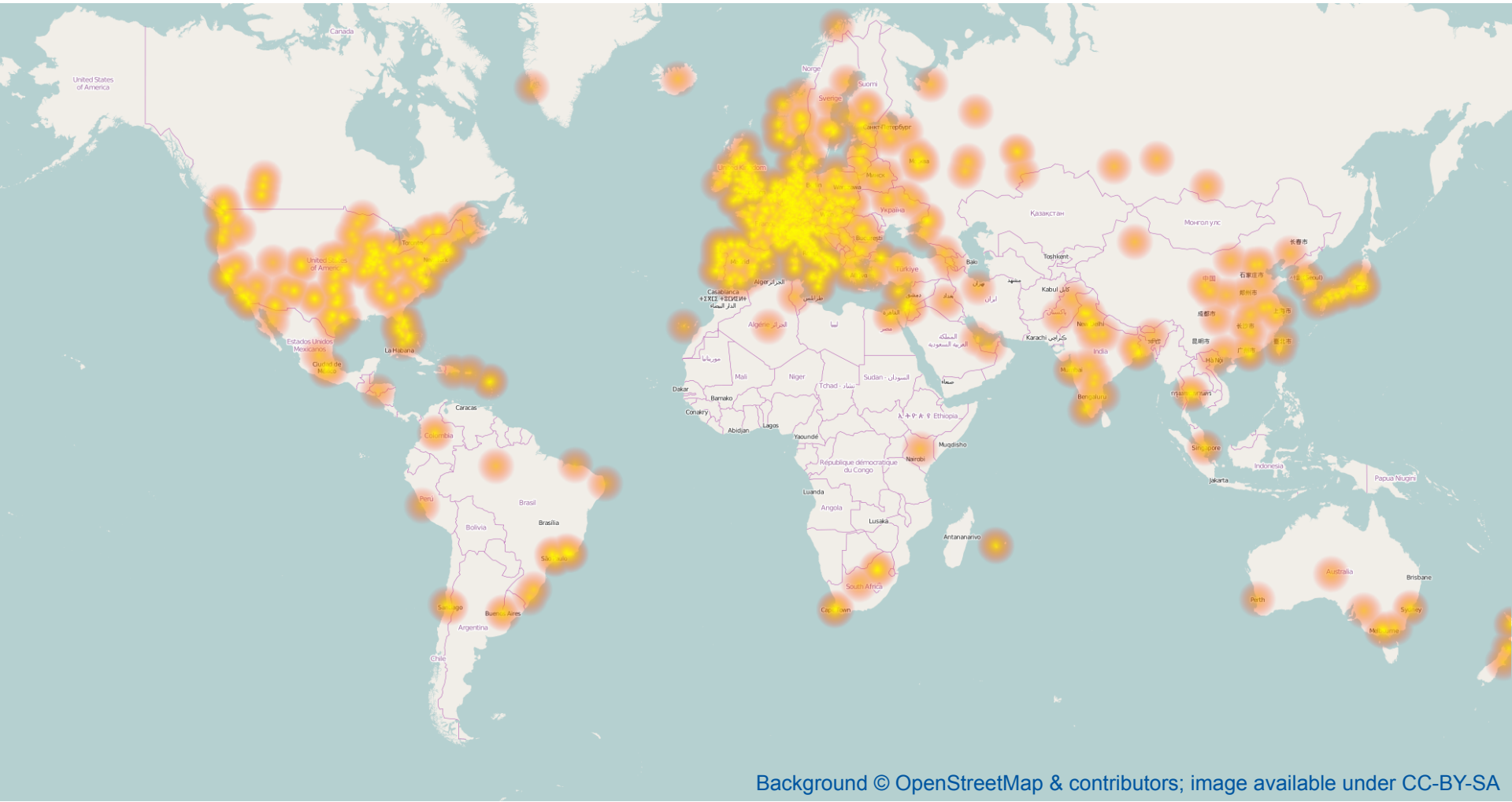


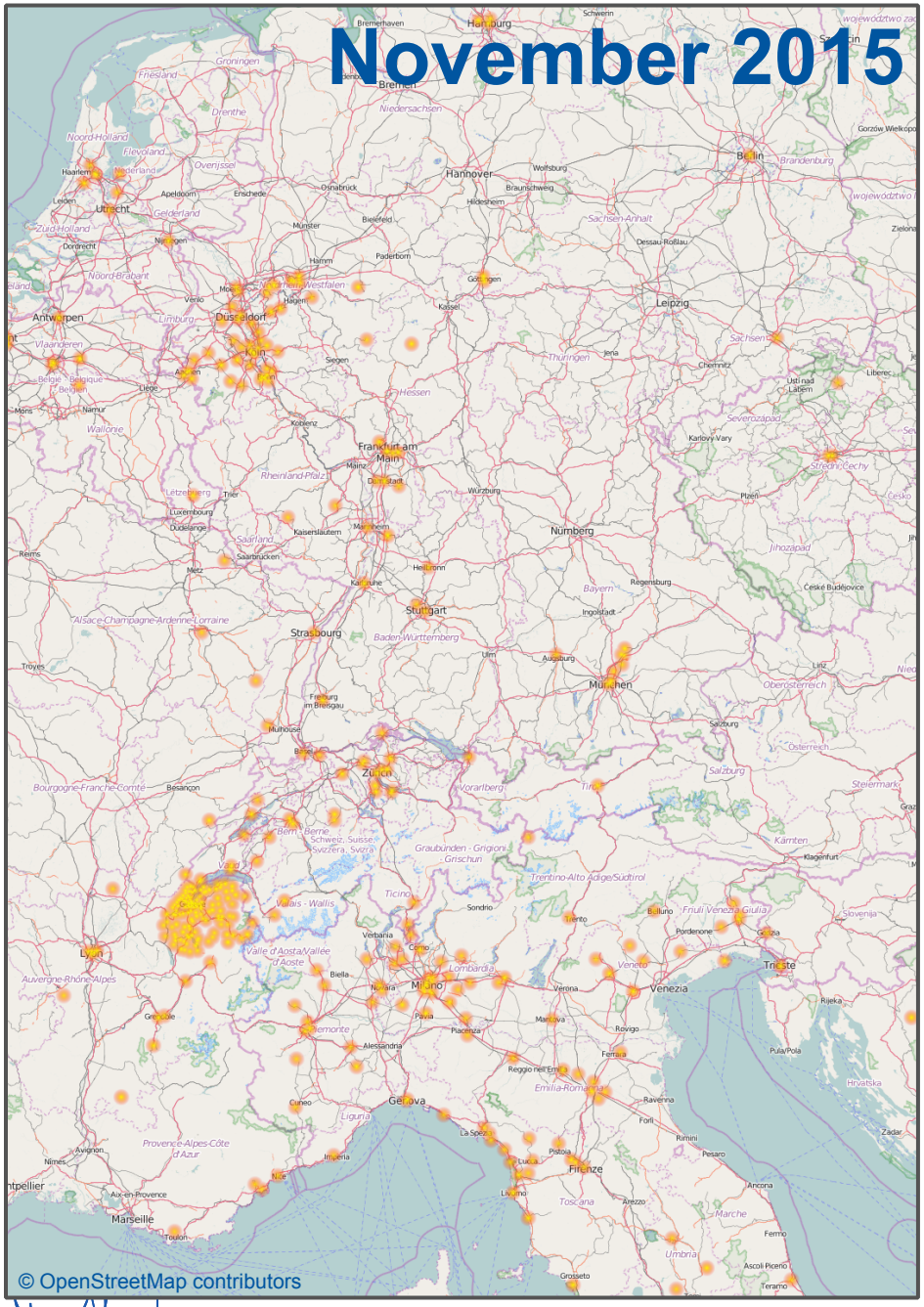


Nov 2015: Geolocation Active Users



Dec 2015: Geolocation Active Users




November 2015
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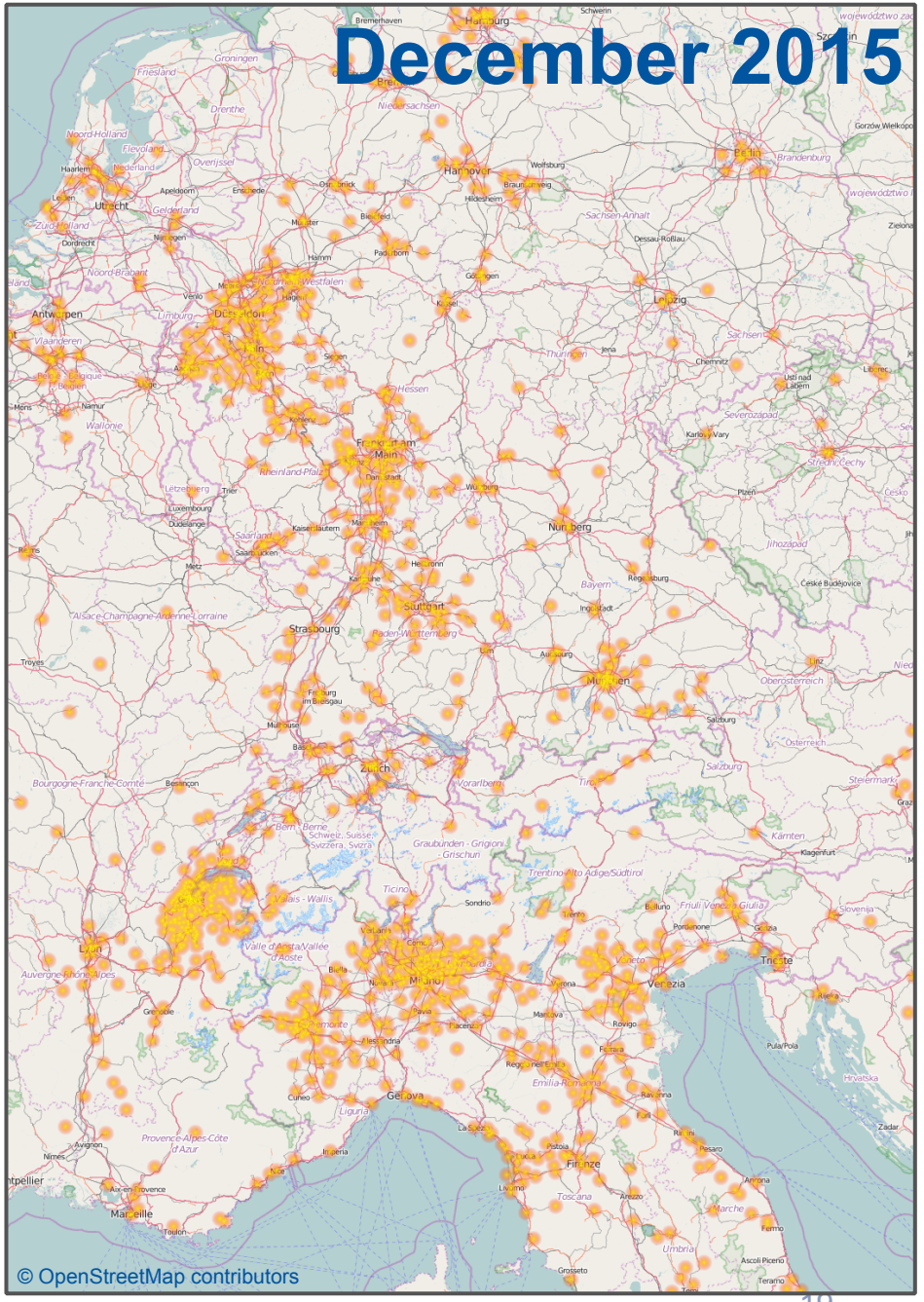
December 2015
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Success Stories and Future use-cases

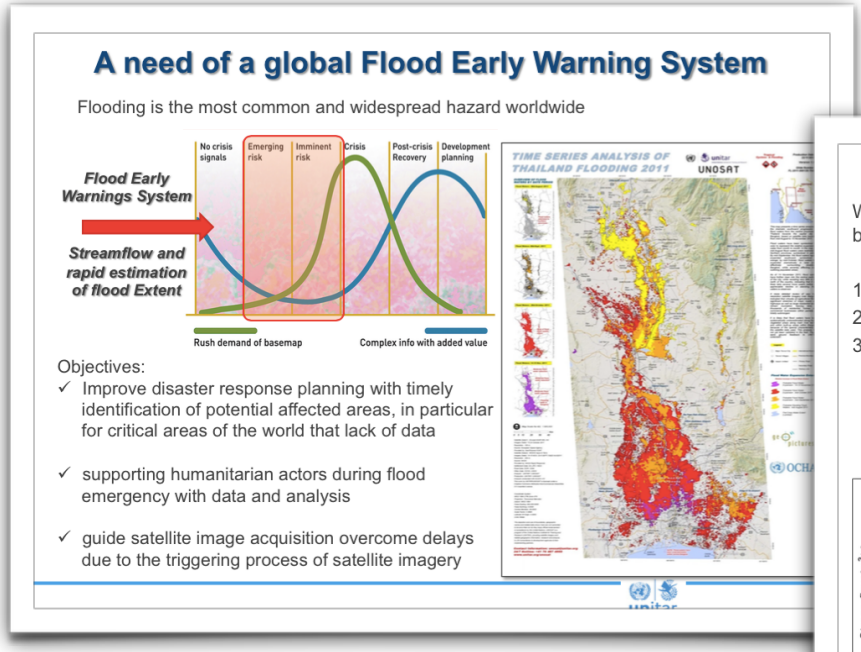
E-Science

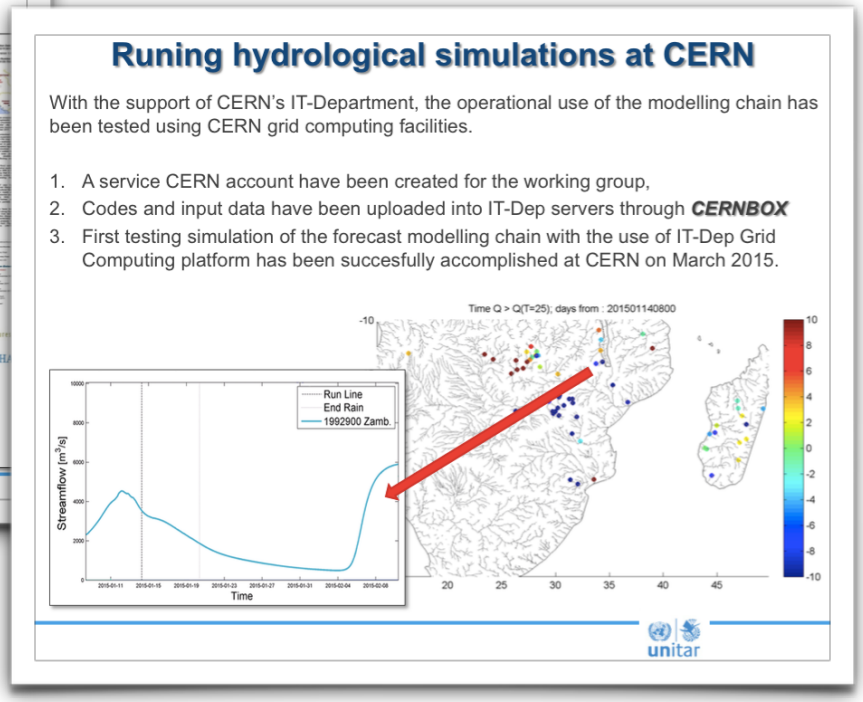
United Nations Institute for Training and Research

UNOSAT
UNITAR Operational Satellite Applications Programme

RESEARCH FOUNDATION
cima
OBSERVE TO PREDICT, PREDICT TO PREVENT.

CERNBox





- Enable non-experts to easily use CERN Storage resources
- Powerful integration with the batch system
- Simple to share result with collaborators

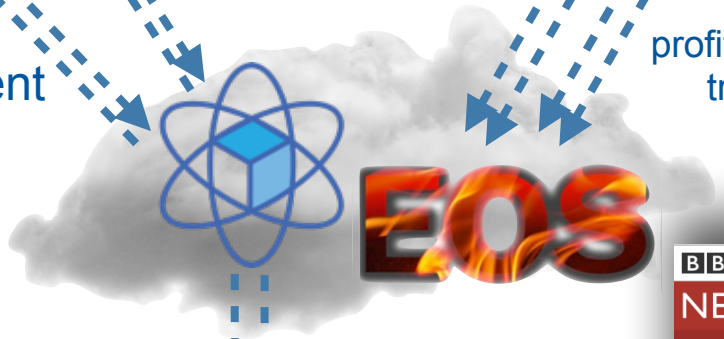
Thanks to Mauro Arcorace, members of **UNITAR/UNOSAT** and **CIMA foundation** for the material provided

CERN Press Office

Desktop Sync Client

native client
(xrdcp)

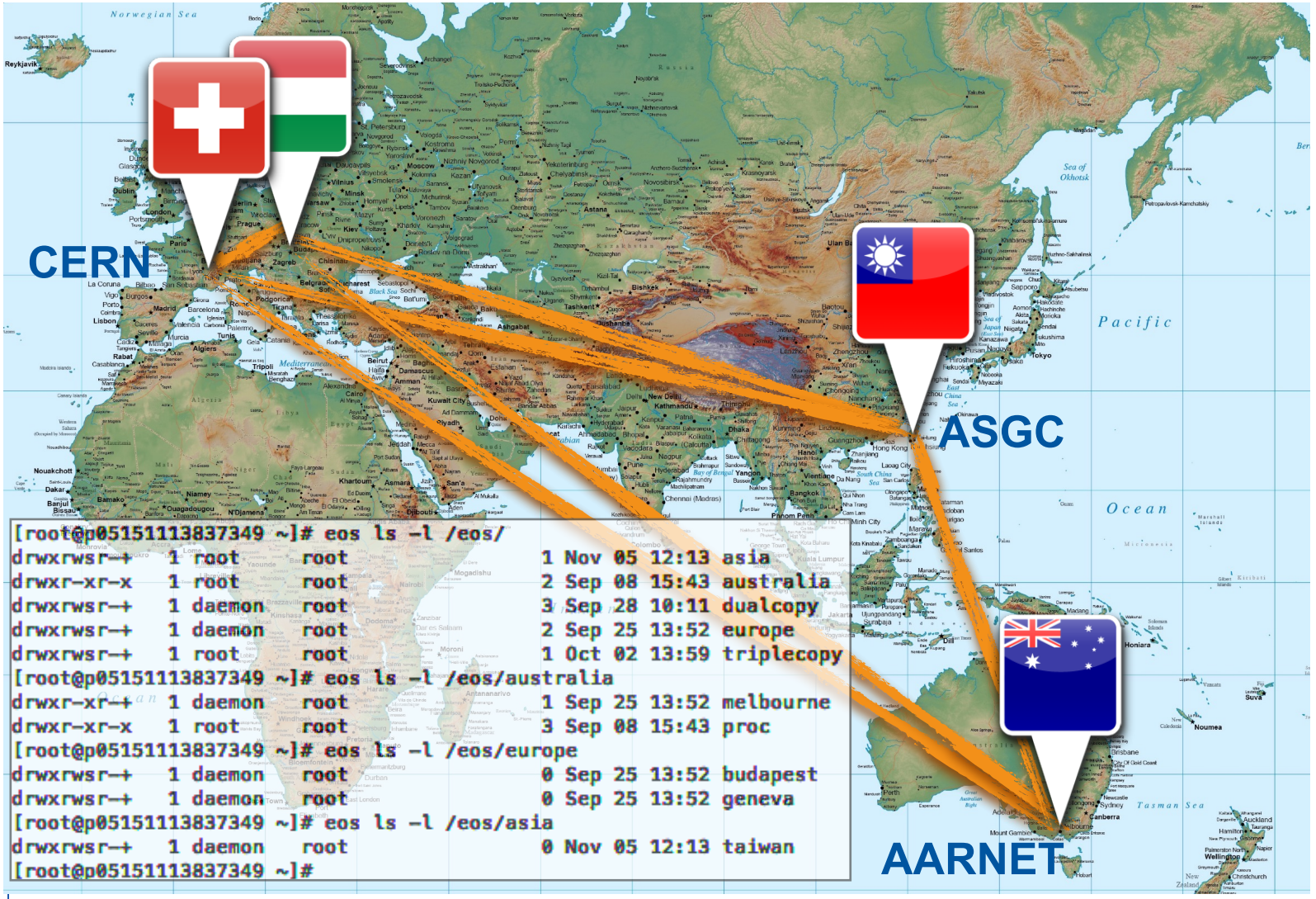
profit from native performance in transferring 30-50GB files



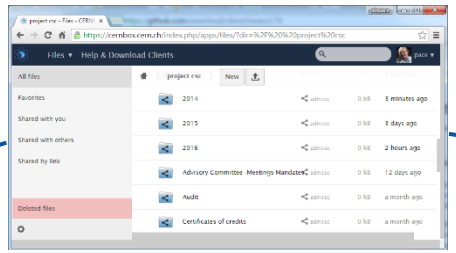
CERNBox used by the **Press Office** to share immediately videos to the media for download

CERNBox share

R&D - EOS World-Wide Deployment



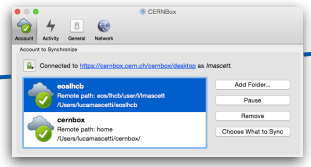
Future Home Directory ($HOME)



Browser and Mobile

web access

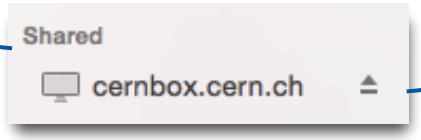
offline access



Sync Client

Laptops, PCs & Mobile devices

online access

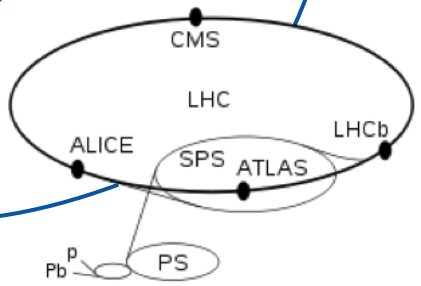


WebDAV & Fuse

direct access

http, webdav, xroot

Batch Service

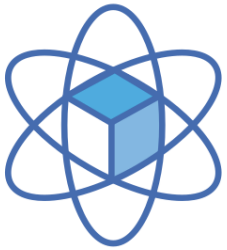


CERNBox + EOS scenarios

- end-user files and sharing
- project spaces
- physics analysis
- future home directory

Overview and Summary

Summary



CERNBox

- Innovative service
  - Fast growing, very good feedback
- Full integration with LHC petabyte storage
  - Integration with existing workflows
- Bring data closer to our users
  - New ways to interact with the data
- CERNBox/EOS is an innovative platform for scientific computing
  - great scalability and performance

CERN

www.cern.ch