



CERNBox Horizon 2030

EOS Workshop 2021

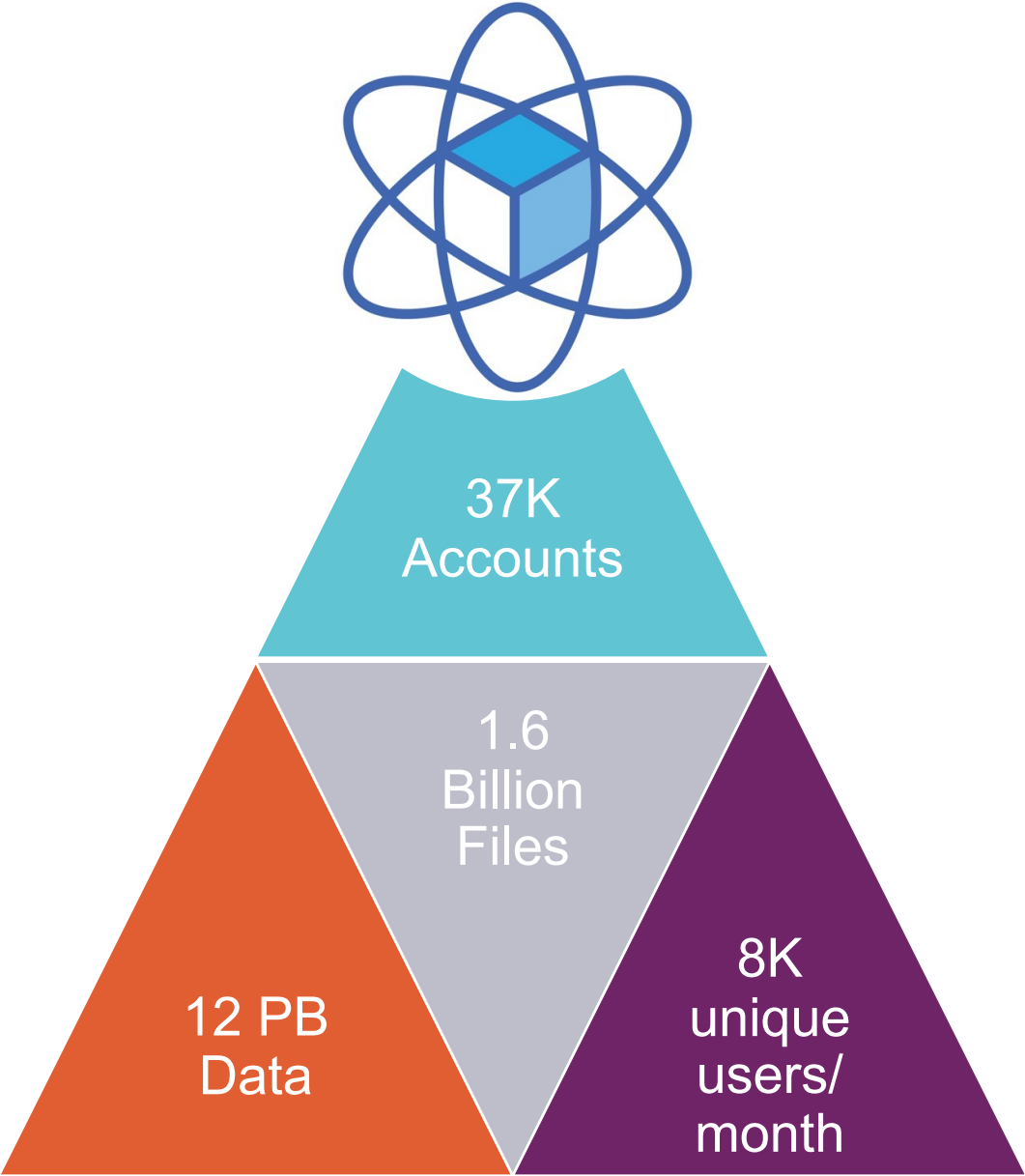
Hugo Gonzalez & Ishank Arora

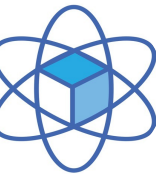
(CERN IT Storage)

3rd March 2021

CERNBox in a nutshell

Sync and Share	<ul style="list-style-type: none">• Dropbox-like use-case• Offline access to data• Universal access to data
Web Apps	<ul style="list-style-type: none">• Real time collaboration• Office documents
Online filesystem access	<ul style="list-style-type: none">• SAMBA (Windows)• FUSEX (Linux)
Physics integration	<ul style="list-style-type: none">• ROOT• SWAN• LXPLUS/LX BATCH





Behind the curtains

Universal access
Real time collaboration



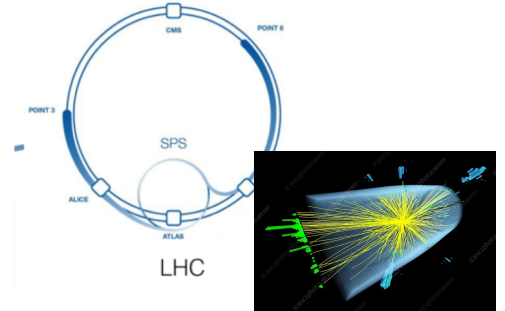
Offline access
(mobile, desktop, tablet)



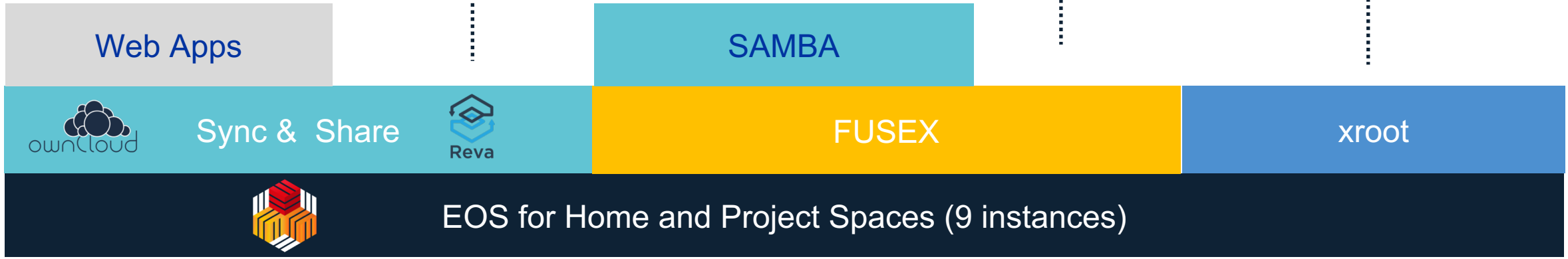
POSIX online filesystem



Physics analysis



Windows online filesystem



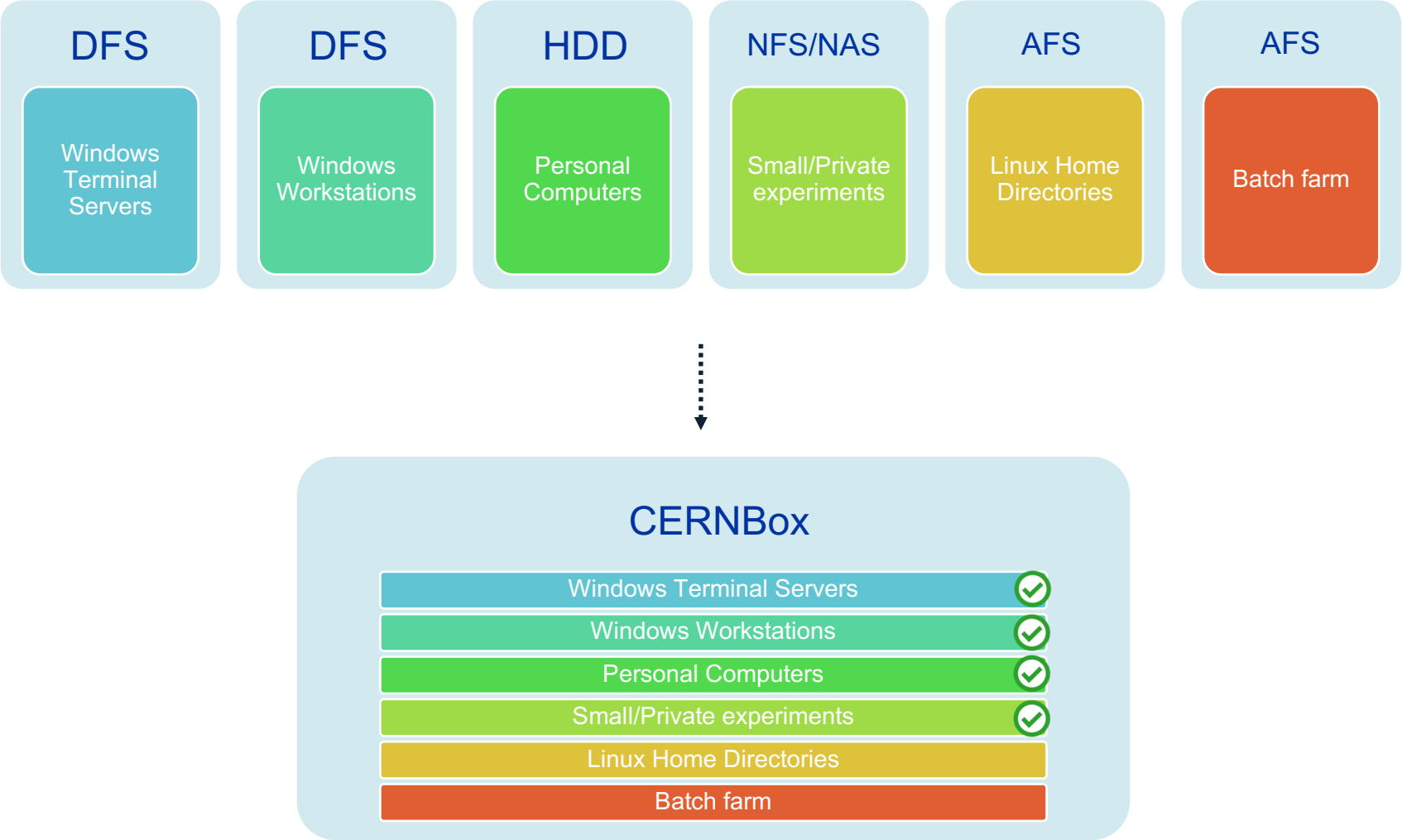
Deep dive into specific components

- EOS for CERNBox report - Roberto - Wed @ 15:00
- SAMBA: lessons learned - Aritz - Wed @ 15:40
- Multi-lock support for Office offline and online applications in CERNBox - Giuseppe - Wed @ 16:40
- Making Reva talk to EOS: ultimate scalability and performance for CERNBox - Frabrizio - Wed @16:50
- OCIS meet Reva: hands-on - Samuel - Tue @ 17:10



Major Working Areas: Unified Spaces

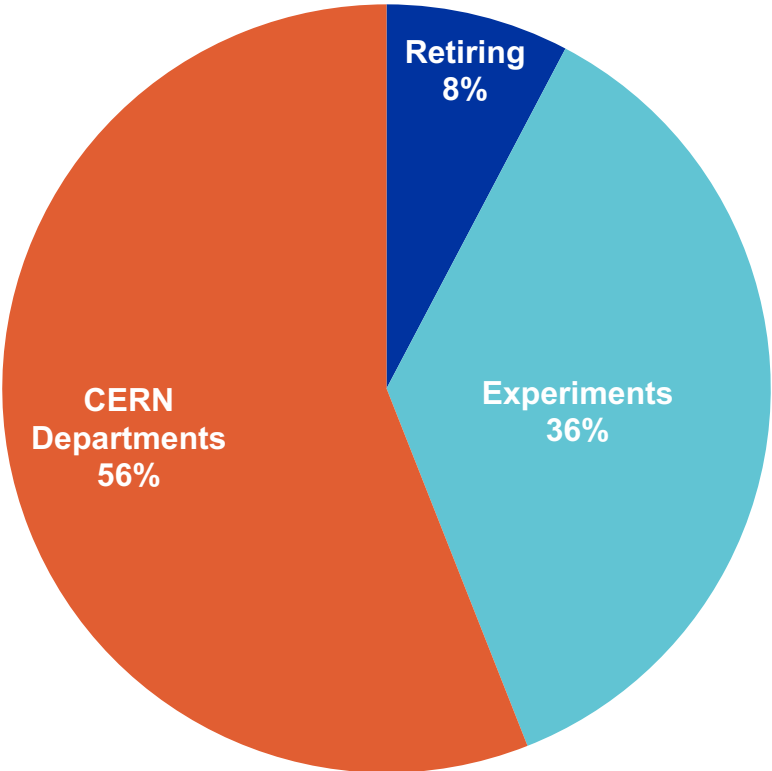
Unified Spaces: Homes and Workspaces



Distribution of Spaces

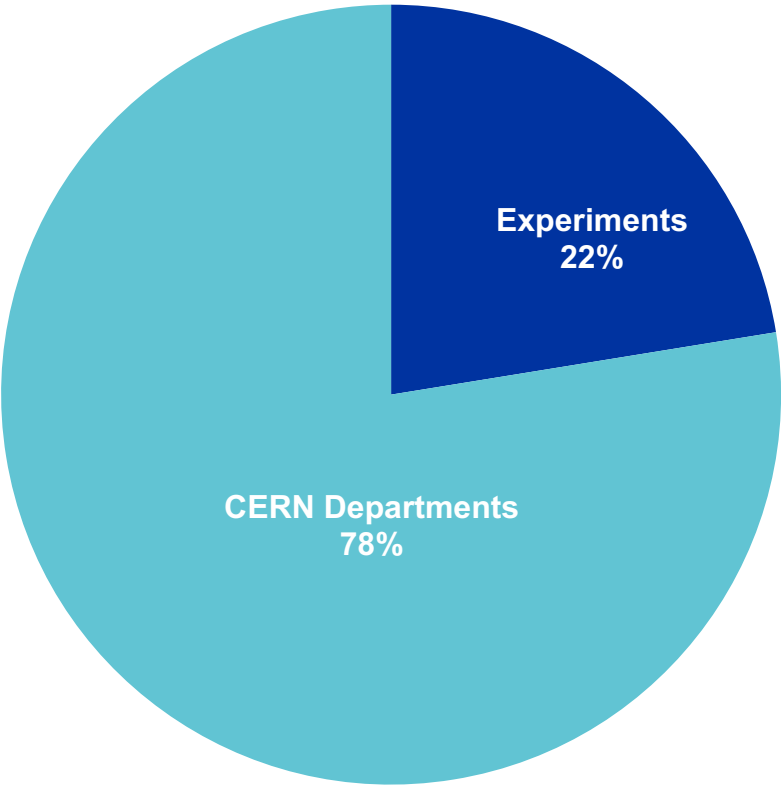
HOME SPACES (37K)

■ Retiring ■ Experiments ■ CERN Departments



PROJECT SPACES (700)

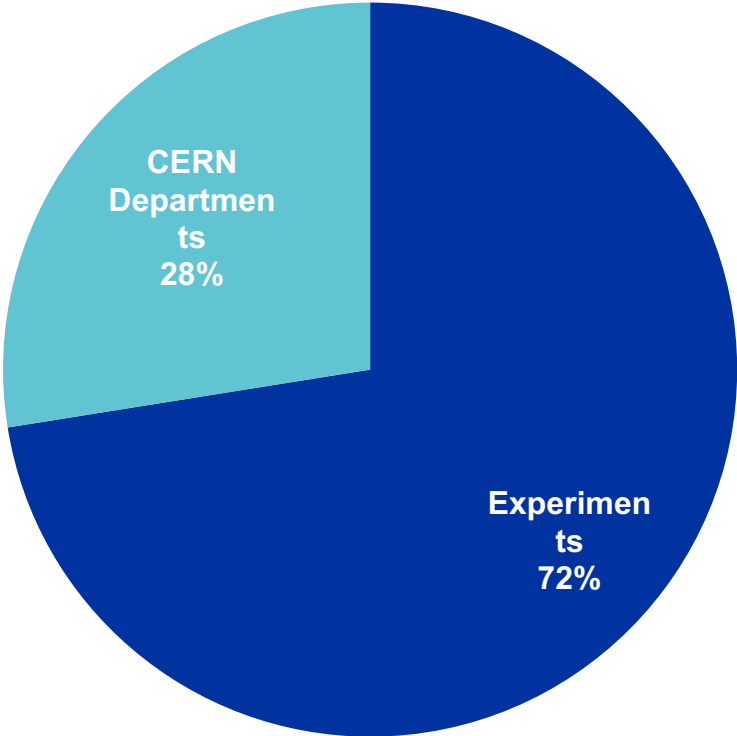
■ Experiments ■ CERN Departments



Distribution of Spaces by Volume

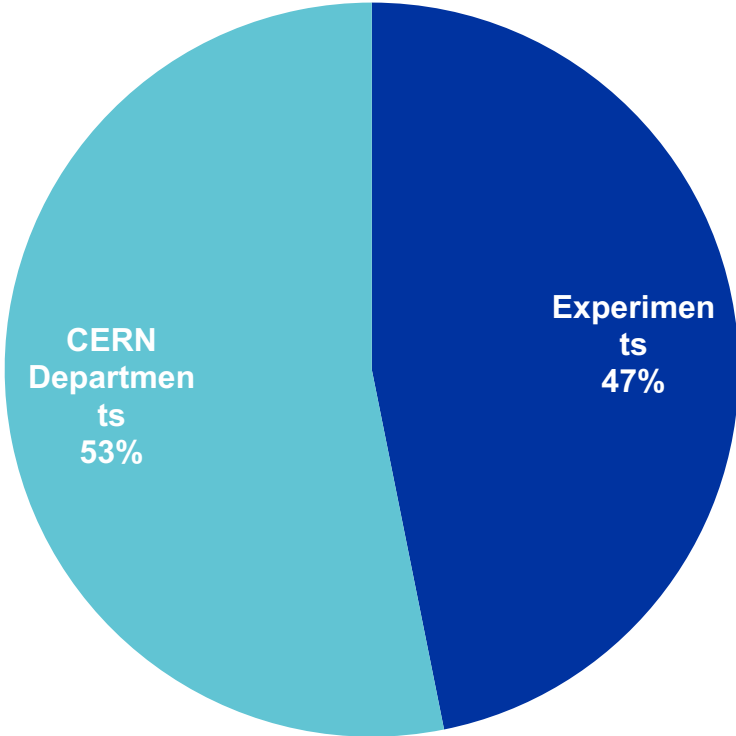
HOME SPACES (3.4 PB)

■ Experiments ■ CERN Departments

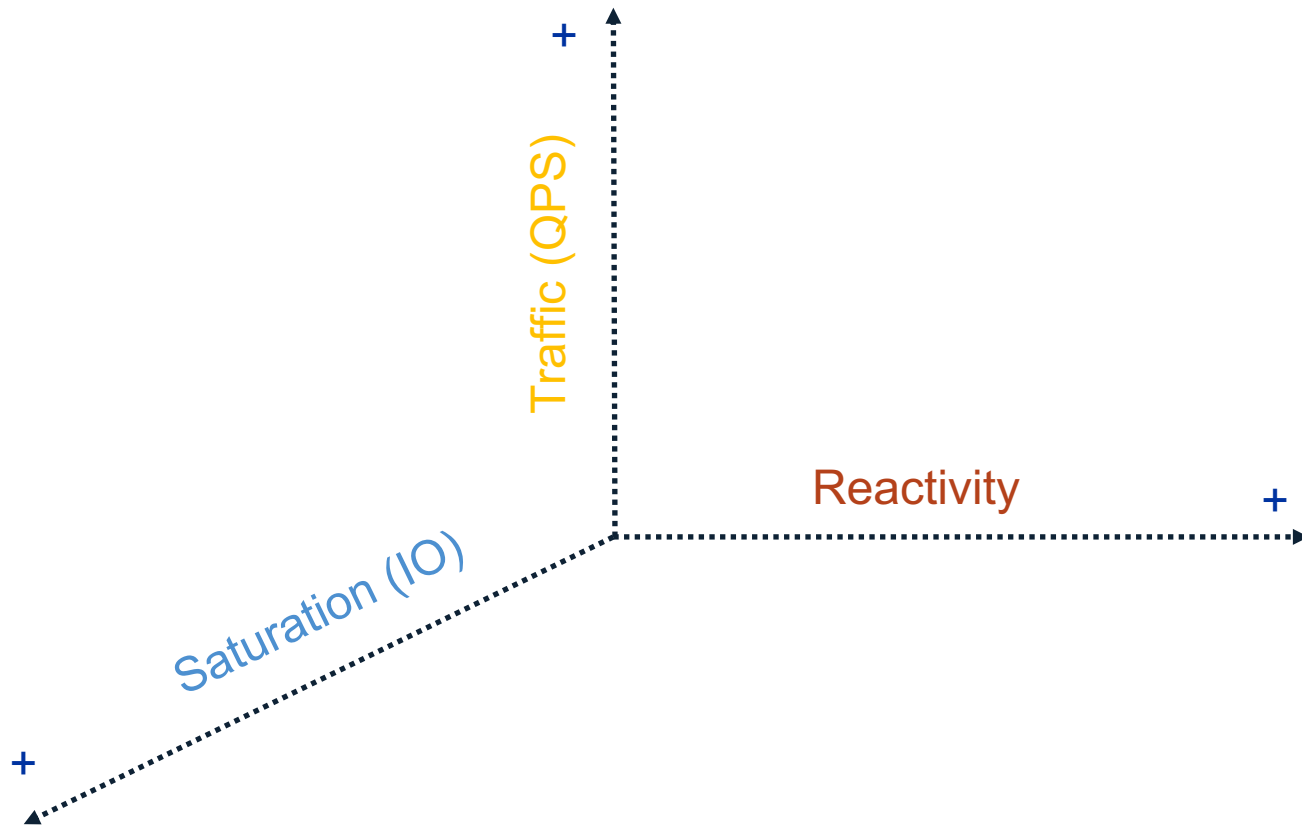


PROJECT SPACES (2.2 PB)

■ Experiments ■ CERN Departments



Challenges: Symbiosis of extreme use-cases



	Saturation	Reactivity	QPS
Offline Traffic (sync)	Some	No	Some
Online FS Access (SAMBA, FUSE)	No	Yes	Yes
Data Injection (LHC)	Yes	Yes (for write)	No
Browser Traffic	No	Yes	No

QPS = queries per second
 Reactivity as opposite of latency

Challenges: ACL Semantics

Consistent views

With great power comes great responsibility

This collage illustrates various access methods to the EOS system. It includes: a Windows 'Documents Properties' dialog box for 'Windows Online FS Access'; terminal windows showing 'CLI Access' with commands like 'eos acl --list' and 'getfacl'; a terminal window showing 'Linux Online FS Access' with 'getfacl' output; a 'Documents' folder view with 'Desktop/Mobile sync clients' and 'Web Access' callouts; and a 'Documents' sharing interface showing 'Web Access'.

```
gonzalhu@iota:~  
gonzalhu@iota:~ (ssh)  
Linux>eos acl --user u:iarora:rx!w!d!mui /eos/user/g/gonzalhu/  
[0] 0:root@eoshome-ns-101-00:~*Z "iota.cern.ch" 14:29 02-Mar-21
```

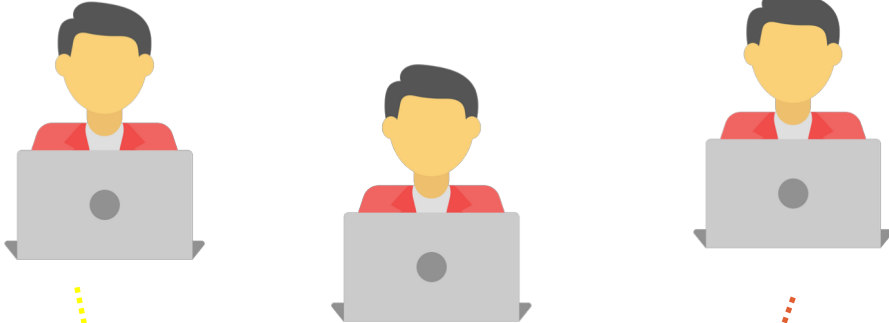
This block shows the consequences of ACL misconfiguration. It features: a Windows file explorer error message: 'You don't have permission to upload or create files here'; a 'Network Error' dialog box stating: 'Windows cannot access \\cernbox-smb\eos\user\iarora. You do not have permission to access \\cernbox-smb\eos\user\iarora. Contact your network administrator to request access. For more information about permissions, see Windows Help and Support'; and an ownCloud notification: 'Synchronizing with local folder ownCloud5 Documents (2)/Try: Not allowed because you don't have permission to add subfolders to that folder'.



Major Working Areas: Real Time Collaboration

Real Time Collaboration

- Upload
- Folder
- Diagram
- Text file
- Document
- Spreadsheet
- Presentation
- CodiMD file (md)
- Document (odt)
- Spreadsheet (ods)
- Presentation (odp)



ONLYOFFICE File Home Insert Collaboration Plugins rfid_to_production_ocis_cernbox.pptx Hugo Gonzalez Labrador (gonzalhu)

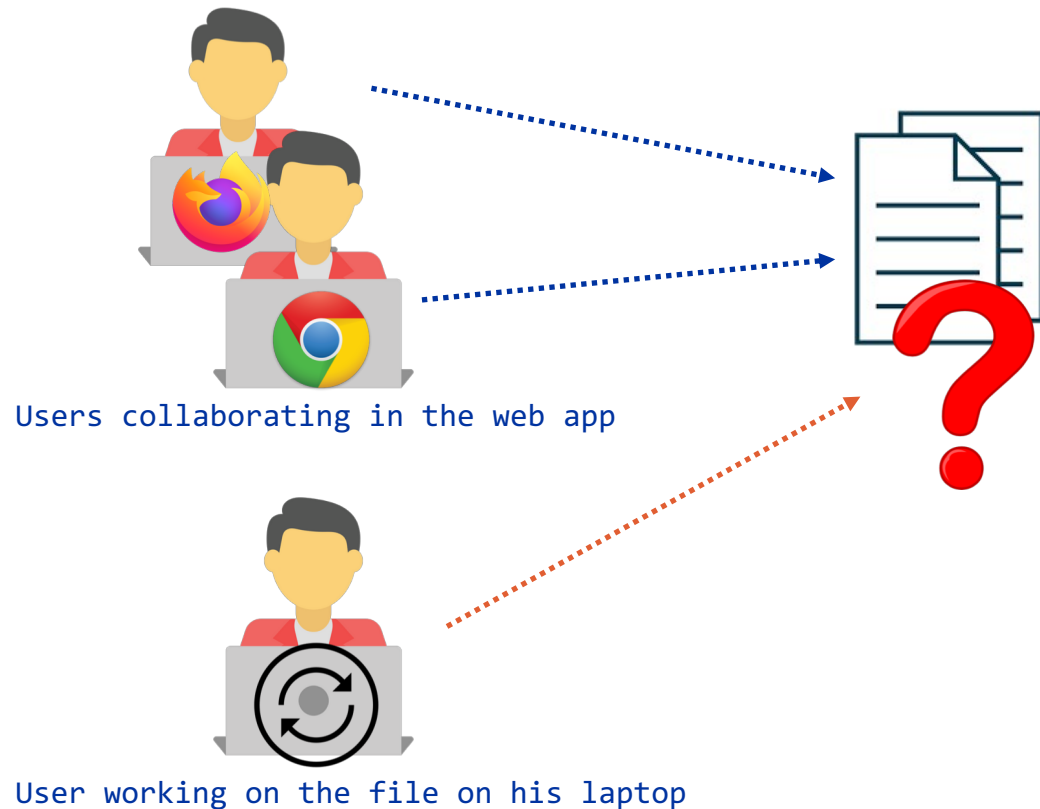
Users who are editing the file:

- Anonymous
- Hugo Gonzalez Labrador (gonzal...

Effect: None
Duration: 2 s
Start On Click:
Delay: 10 s
Apply to All Slides:
Show Slide Number:
Show Date and Time:

Road to production
OCIS for CERNBox (Q1)

Challenges: Collaboration from any device



- Unfortunately, most applications do not consider these scenarios because they believe they have the ownership of the data
- Multi-lock support for Office offline and online applications in CERNBox – Giuseppe – Wed @ 16:40

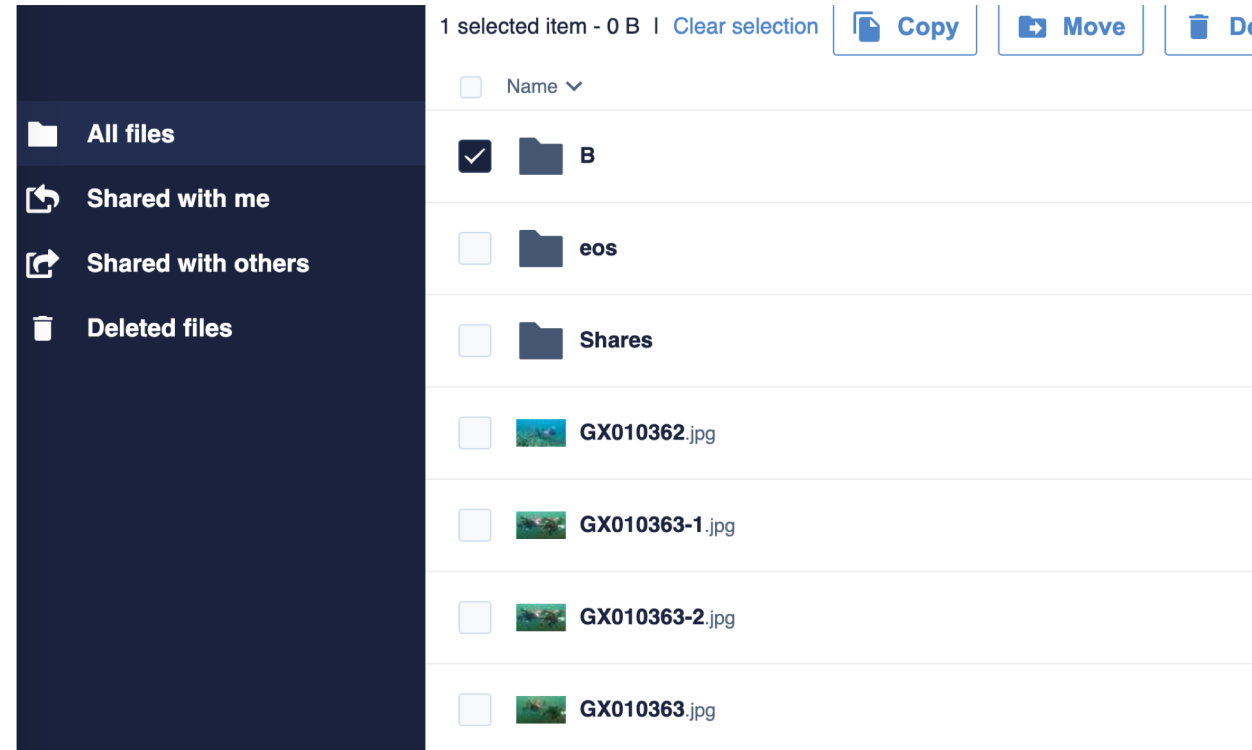


Major Working Areas: Usability

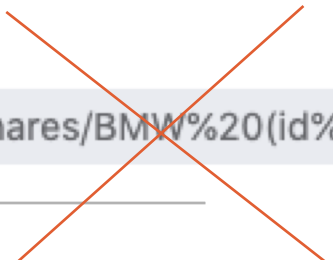
Main focus for 2021 is increasing usability



- New UI with more functionalities
- Global URLs
- Automatic synchronization of shares and projects
- Single File Sharing
- Restrictive ACLs
- Lightweight/Guest accounts
- Better management for Project Spaces



Uniform Global URLs

 [cernbox.cern.ch/index.php/apps/files/?dir=/__myshares/BMW%20\(id%3A37024\)&](https://cernbox.cern.ch/index.php/apps/files/?dir=/__myshares/BMW%20(id%3A37024)&)

← → ↻  https cernbox.cern.ch/#/files/list/eos/user/g/gonzalhu



🏠 / eos / user / g / gonzalhu

+ New

Name ▾

```
[gonzalhu@lxplus700 ~]$ ls -l /eos/user/g/gonzalhu
total 4075
drwx-----. 2 gonzalhu it      4096 Feb 19 15:12 A
drwx-----. 2 gonzalhu it      4096 Feb  9  2020 B
drwx-----. 2 gonzalhu it      4096 Dec 14 18:44 C
```

📁 | 📁 | gonzalhu

File Home Share View

← → ↻ 📁 > This PC > EOS (H:) > user > g > gonzalhu >

Name	Date modified	Type	Size
📁 A	2/19/2021 3:12 PM	File folder	
📁 B	2/9/2020 7:00 PM	File folder	
📁 C	12/14/2020 6:44 PM	File folder	

Automatic sync of shares and projects

WEB

Home / My Shares

+ New

Name ▾

MALT Coordination

ownCloud Roadmap 2021

DESKTOP

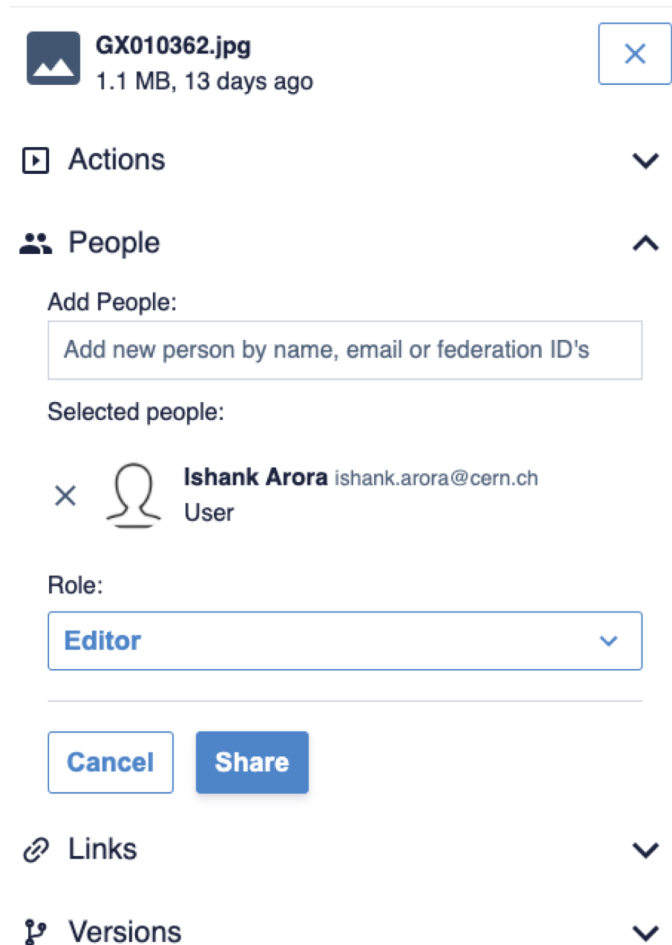
Connected to <https://cernbox.cern.ch/cernbox/desktop> as Hugo Gonzalez Labrador (gonzalhu). Account ▾

50 GB of 955 GB in use

- home**
Synchronizing with local folder CERNBOX
- myprojects**
Synchronizing with local folder myprojects
- myshares**
Synchronizing with local folder myshares
 - MALT Coordination** (0 B)
 - ownCloud Roadmap 2021** (0 B)

```
[root@eoshome-canary-st12 (mgm:master mq:master) ~]$ eos ls -lah /eos/test/reva/users/.shadow/g/gonzalhu/Shares
drwxrws--+  1 gonzalhu it      0 Mar  3 13:40 .
drwxrws--+  1 gonzalhu it      0 Feb  2 11:42 ..
drwxrws--+  1 gonzalhu it      0 Mar  3 13:38 MALT Coordination
drwxrws--+  1 gonzalhu it      0 Mar  3 13:38 ownCloud Roadmap 2021
```

Single File Sharing



The screenshot shows a file sharing interface for a file named **GX010362.jpg**, which is 1.1 MB and was shared 13 days ago. The interface includes several sections:

- Actions:** A dropdown menu icon.
- People:** A section for adding and managing users. It includes an "Add People:" label, a text input field with the placeholder "Add new person by name, email or federation ID's", and a "Selected people:" section. One user, **Ishank Arora** (ishank.arora@cern.ch), is listed as a "User".
- Role:** A dropdown menu currently set to **Editor**.
- Buttons:** "Cancel" and "Share" buttons.
- Links:** A dropdown menu icon.
- Versions:** A dropdown menu icon.

EOS recently added support to define ACLs on files also.

This allows for unified view across platforms as we currently do with folders

Lightweight Account Support

×  **Ishank Arora** ishank.arora@cern.ch
User

Role:

Editor ▾



×  **Ishank Arora** ishank@iit.in
User

Role:

Editor ▾

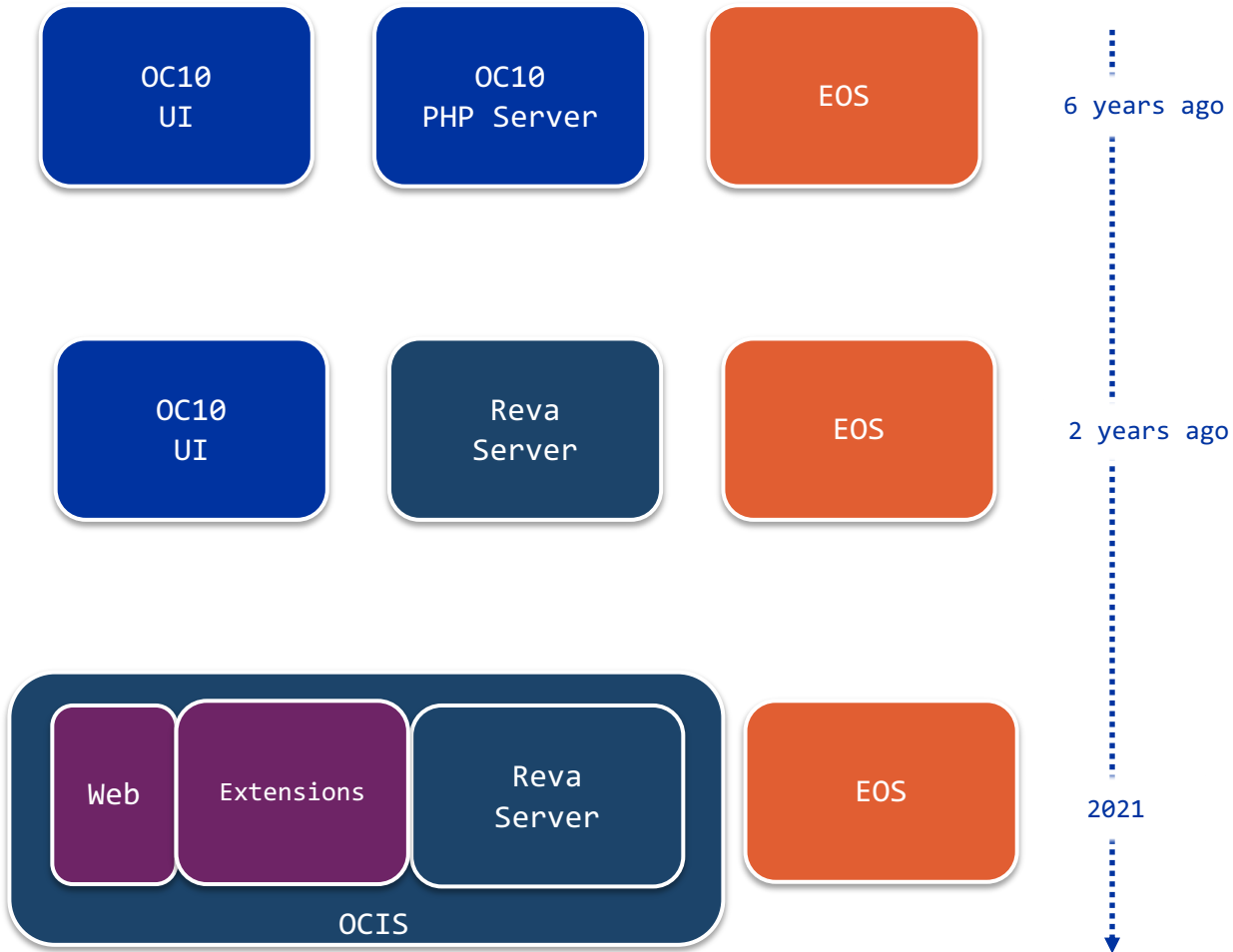
Collaboration at CERN spawns beyond CERN boundaries, involving many external institutions

Users currently use public links to collaborate with external entities but this model does not scale up after a few links

CERN allows end-users to create a lightweight account using EduGain or Social logins.

EOS integration with lightweight accounts and OAUTH2 is to be explored

ownCloud Infinite Scale (OCIS)



OCIS is a more flexible system that will allow us to bring to life these usability improvements

OCIS uses the Reva framework (used at CERN since 2 years) so OCIS should cope with our current production loads





Horizon 2030

Roles for Authorization

Name	Role Identifier	Description	Required?
CERN Personnel	cern-personnel	CERN Personnel - Members and Associate Members	✓
CERNBox Admins	cernbox-admins	Users with admin privileges	
Default Allowed Users	default-role	Users must be from CERN or eduGAIN to have access	✓

People

Add People:

Add new person by name, email or federation ID's

Role:

- Viewer
 - Download and preview
- Editor
 - Upload, edit, delete, download and preview
- Advanced permissions
 - Set detailed permissions

Roles In AAI

uid:1234:rwx!d!m

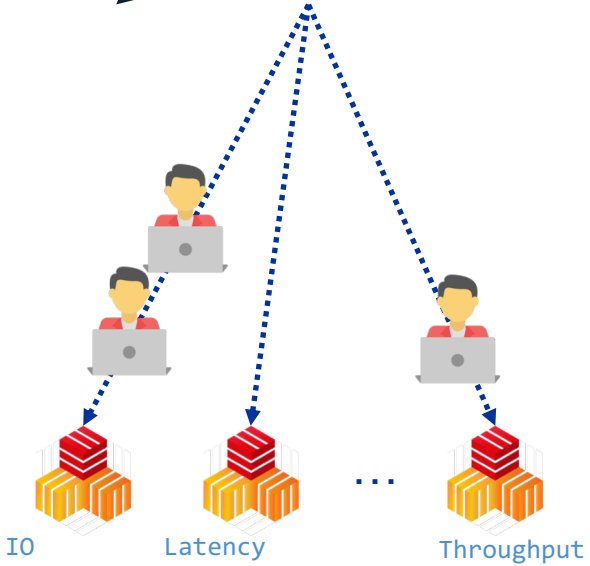
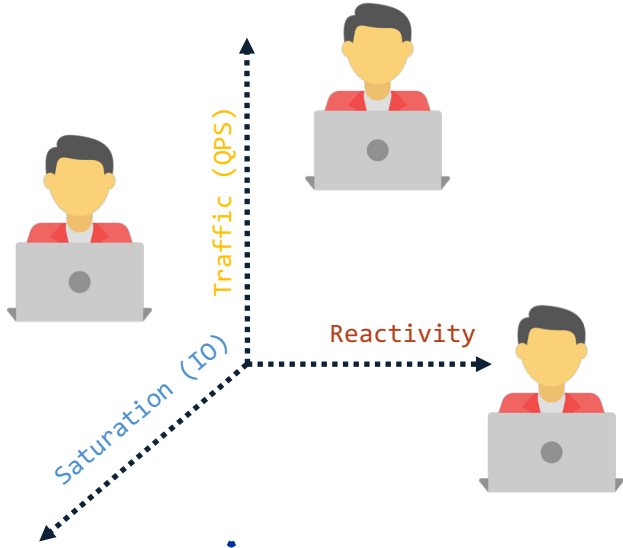
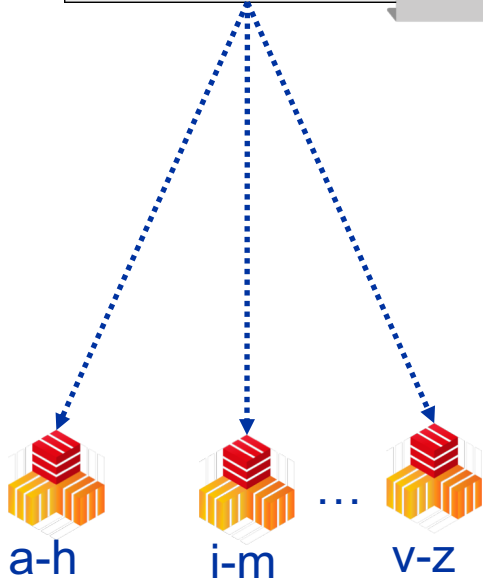
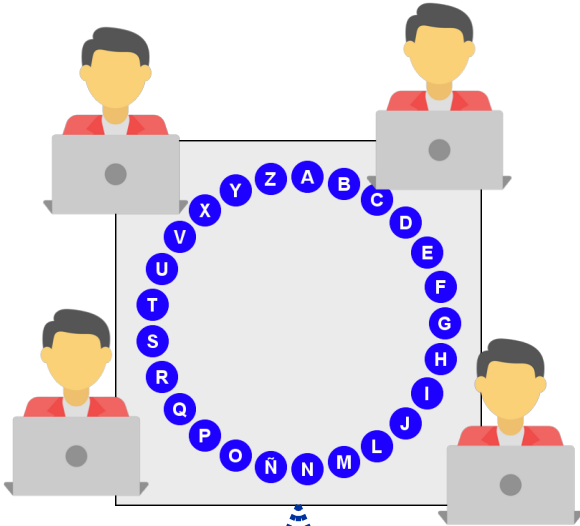
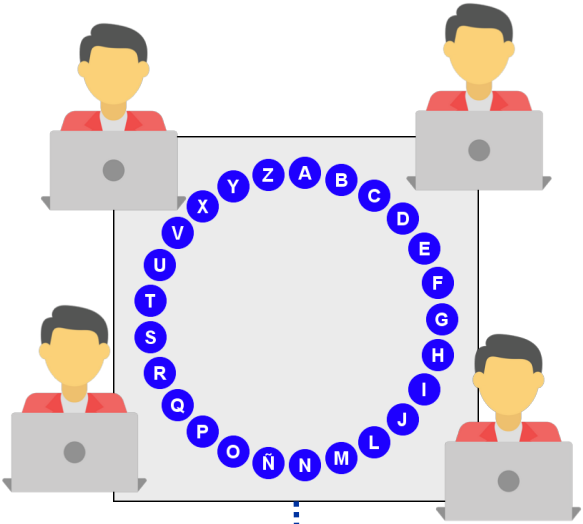


```

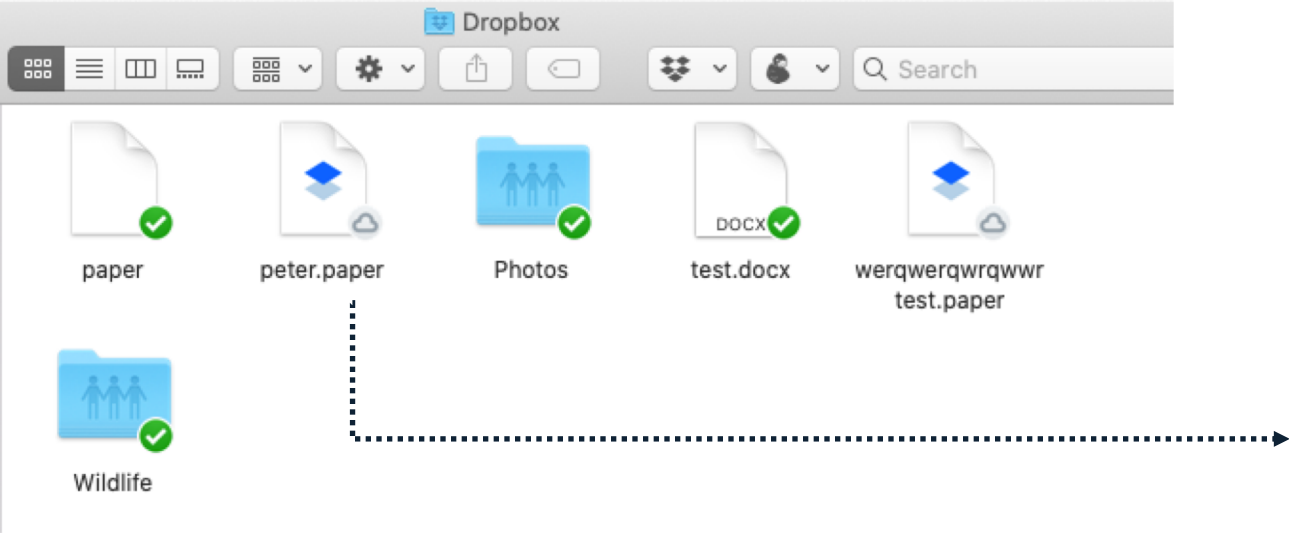
gonzalhu@iota:~
gonzalhu@iota:~ (ssh)
eosadmin> #eos new-role editor --permissions 'rwx!d'
eosadmin> #eos share -role editor -user iarora /eos/user/g/gonzalhu/Documents
eosadmin>
[0] 0:root@eoshome-ns-i01-00:~* "iota.cern.ch" 10:30 03-Mar-21
  
```

Roles in Sync&Share Platforms

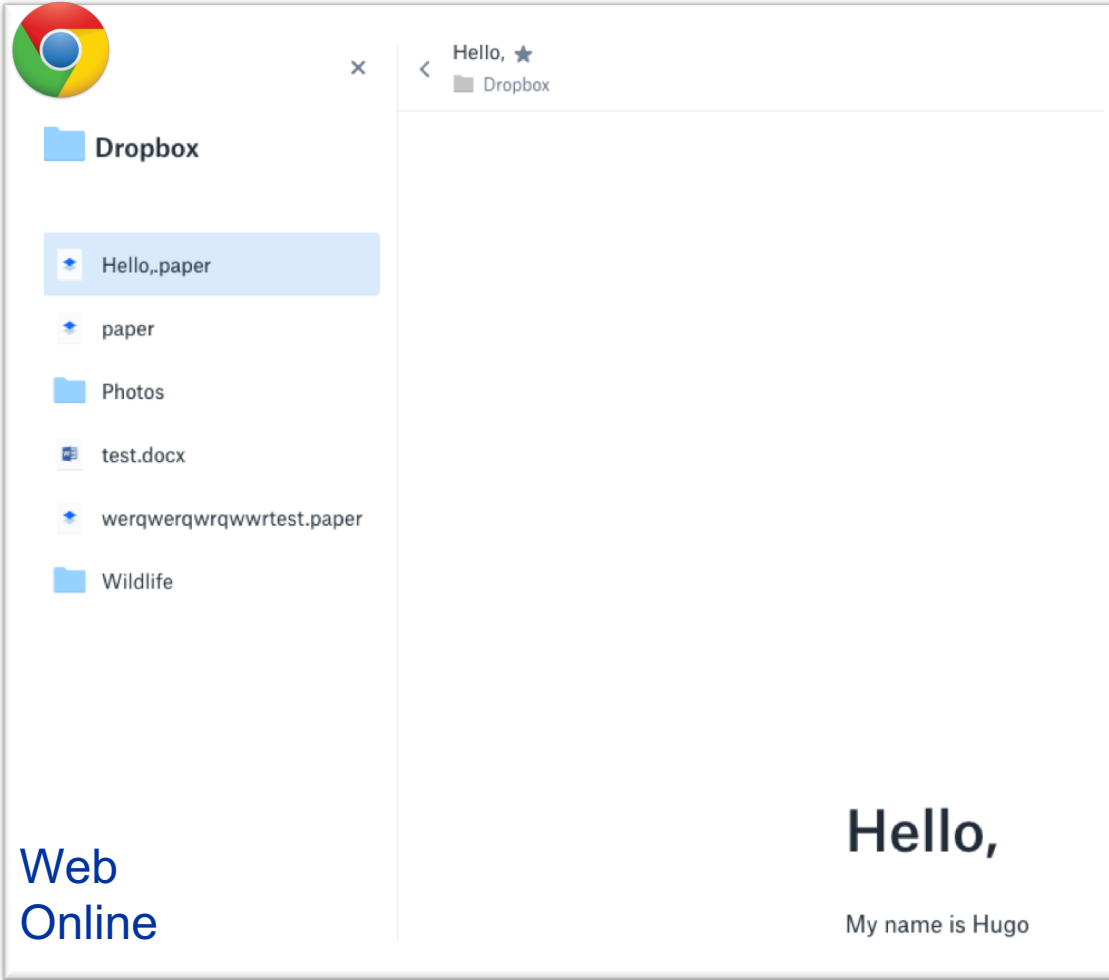
Organic Quality of Service



Blend local/offline with remote/online environments



Local filesystem
Offline

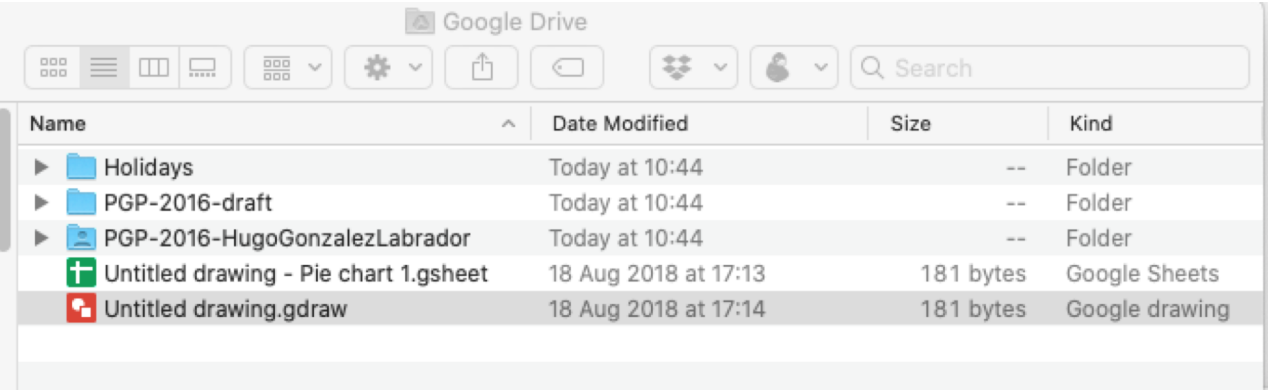


Web
Online

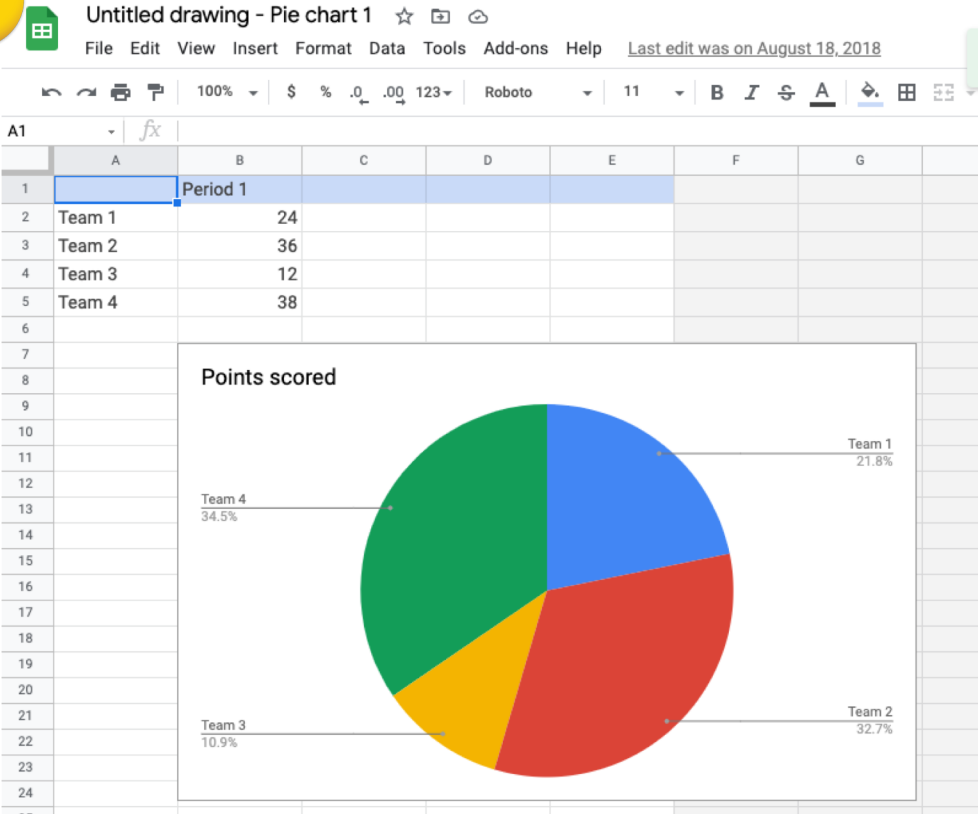
Hello,

My name is Hugo

Blend local/offline with remote/online environments



Local filesystem
Offline



Web
Online

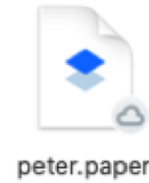
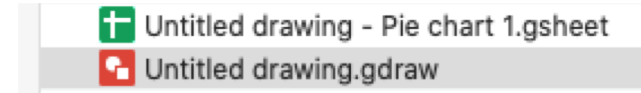
We need a long-term strategy for online collaboration

Traditional formats



200 million users

New formats



2 billion users



600 million users

CERNBox 2030: everything you need in one place

The screenshot displays the CERNBox 2030 workspace interface. At the top left is the CERN logo. The main workspace is titled 'Customer proposal' and contains several elements:

- Navigation and Search:** A search bar at the top with a search icon and the text 'Search'. Below it, a breadcrumb trail reads 'Hanford Inc. > ... > Projects > 2020 > Customer proposal'.
- Task List:** A central task list with two items: a checked checkbox for 'Leadership-approval' and an unchecked checkbox for 'Share final proposal with customer @Angela Zhang'.
- File and Folder View:** Below the task list, there are three items: a document icon labeled 'Final proposal.gslides', a folder icon labeled 'Presentation assets', and a document icon labeled 'Trello.web'.
- Activity Feed:** A section titled 'Daniel Smith updated 2 minutes ago' with a 'Create' button and icons for chat, grid, and menu.
- Activity Panel (Bottom Left):** A panel titled 'Name' and 'Recent activity' showing a 'Reference.pptx' file with a green checkmark and a comment bubble from a user saying 'Sounds good - I'll follow up...' with a timestamp of '2 minutes ago'.
- Collaboration Panel (Bottom Right):** A panel showing 'You, Angela Zhang & 2 other members' with a 'Write a comment' prompt and a comment from a user: 'Sounds good - I'll follow up with the vendor tomorrow and get back to you in more detail!'.
- Left Sidebar:** A dark blue sidebar with 'Hanford Inc.' at the top, followed by 'Starred folders' and 'Suggested for you' sections, each with folder icons.
- Right Panel:** A panel showing a 3D rendering of a modern interior space with furniture and a 'Customer proposal' title.



home.cern