

The DESY Storage Cloud



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remember

Log in

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The DESY Storage Cloud
Hamburg, 26/3/2015

for the DESY CLOUD TEAM



- > Motivation
 - > Preparation
 - > Collaborations and publications
 - > What do you get right now ?
 - > Who is involved, how is it integrated ?
 - > How is the system implemented ?
 - > How do you get access ?
-
- > The bigger picture. (The Scientific Storage Cloud) □



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What is this about ... ?

*It's about on how modern
scientists (people) want to
manage their data.*





> New requirements from DESY users :

- New model in accessing data
 - Anytime from everywhere
 - From mobile devices
 - Bidirectional sync'ing between your cloud space and your local devices

- New model in sharing data
 - Fine grained sharing with individuals and groups.
 - Sharing via intuitive Web 2.0 mechanisms (Apps or Browser)
 - Sharing with 'public' with or w/o password protection
 - Sharing of free space (upload)
 - Expiration of shares





- > Request for unlimited, indestructible storage space including data life cycle management.
- > Request for different quality of services (SLA), coming with different price tags and controlled by customer.
 - Data Loss Protection (non-user introduced), e.g.:
 - One copy.
 - Two copies on independent systems.
 - Two copies in different buildings.
 - Two copies at different sites (e.g. Hamburg and Zeuthen)
 - Some of above plus 'n' tape copies.
 - Access latency and max data rate, e.g.:
 - Regular sync and web access.
 - Worker-node access: High throughput
 - Low latency (e.g. on SSD) for HPC.





- > But all this should be just one huge repository. Not split into different systems.
- > Access should be possible with different credentials
 - Username / password
 - X509 Certificates
 - SAML (Single Sign On)
 - Kerberos



Big Data, Qos Part



IT is doing this for decades. ~ 10 PetaBytes

Web 2.0



Here we need some help



- > For the web 2.0 interface we needed some experts.
- > We went for the most popular solution: Own Cloud
 - Reduce likelihood for 'product disappearing'
 - Possibly building a user-community (like today)
 - TU-Berlin, FZ-Jülich, TU-Dresden ****
 - CERN, United Nations
 - CERN is evaluating a similar approach and we are in contact anyway (WLCG)





- > Collaboration with HTW Berlin (LSDMA)
- > Pre-evaluation of cloud solutions by “InFa” -> Q3/2013
 - Erarbeiten und Umsetzen eines firmeninternen Online-Speicherdienstes in einer Teststellung. (Quirin Buchholz)
- > Presenting the concept at HEPIX.
- > Information exchange with CERN. (CHEP’13) Oct 13
- > Berlin Cloud Event, (mostly OwnCloud and PowerFolder) in Mai 14 (we published first paper)
- > Participating the CERN Cloud Event (Nov ‘14) including a presentation of our proposed solution.
- > Various papers submitted and accepted at ISGC in Taipei in March and CHEP’15 in Japan.





Last Preliminary Remark

- > The DESY Storage Cloud is NOT in the CLOUD.
- > Your data is stored on DESY premises and is regulated by DESY agreements. (German and EU law).
- > We only provide interfaces to/into your storage space, which are similar to those provided by Cloud Providers.





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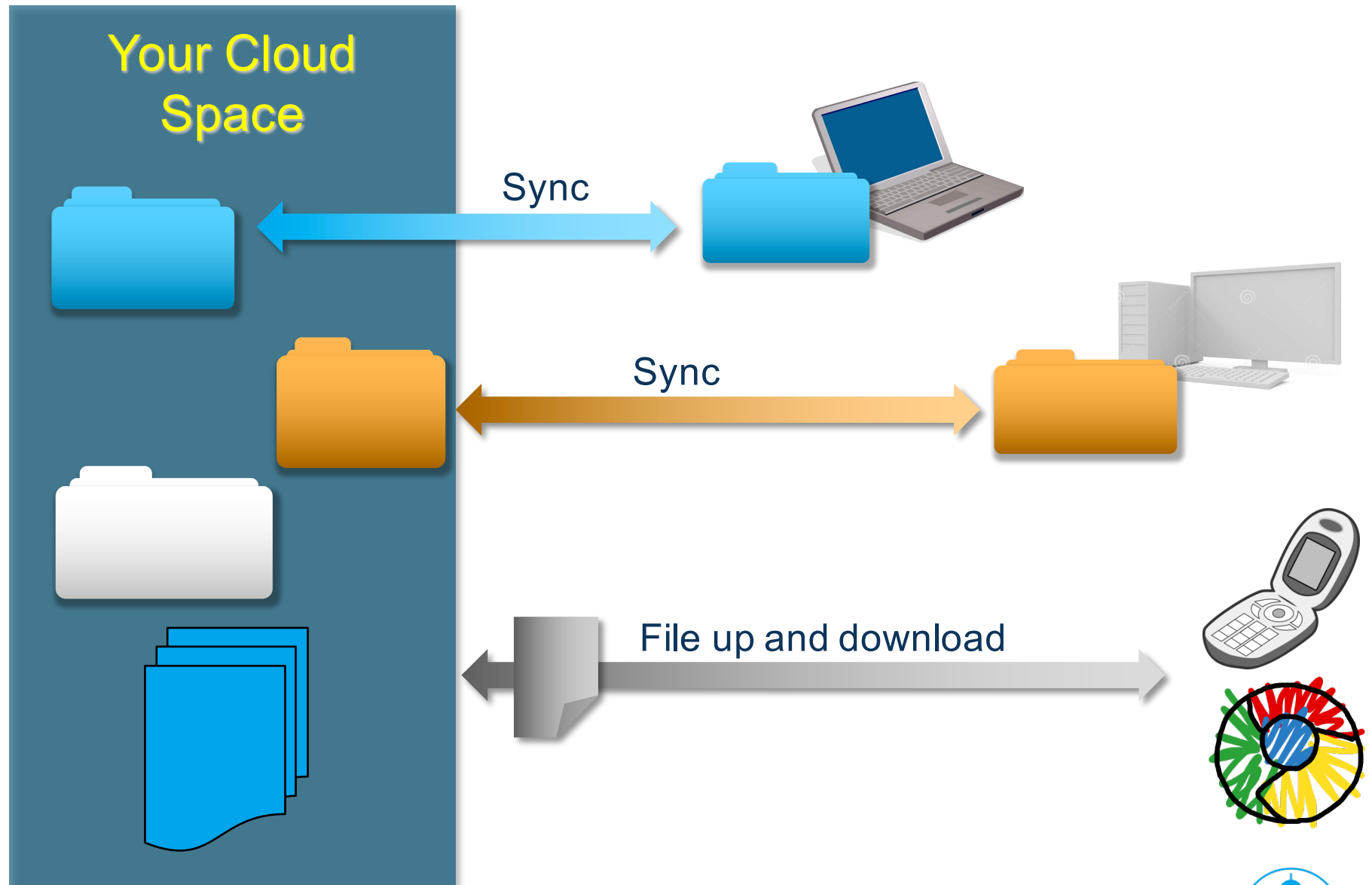
So, what do you get right now ?



Sync'ing and Web access



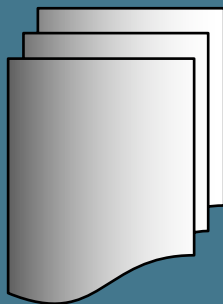
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Your Cloud Space



File shared with you by others



Share files/folders with individuals



Share files/folders with 'desy groups'



Share with 'public' with and w/o password
(Shares can expire)



Share space(s) with others for upload



Others sharing data with you (in your home)



- > Each file in your space has two copies on a completely distinct hardware setup.
 - Different disks
 - Different controller
 - Different host system.
- > Checksum is calculated on arrival of backend storage.
- > Continuous 'scrubbing' of disks to detect wrong checksums.





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Who do we do that ?



Integration into the DESY infrastructure



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User Management
Registry
LDAP



Monitoring



Accounting



Virtualization

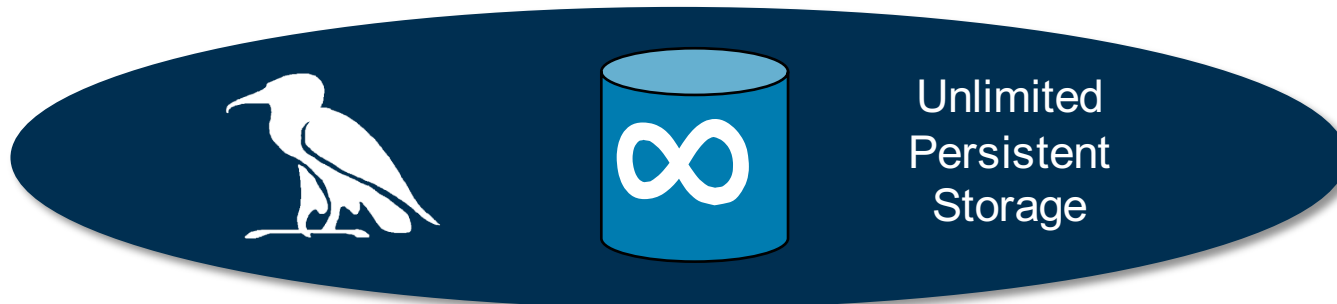
vmware®



Authentication
Kerberos



Local and Wide
Area Network
Load Balancing
Firewalls





> Almost all IT groups are involved (See Design Picture)

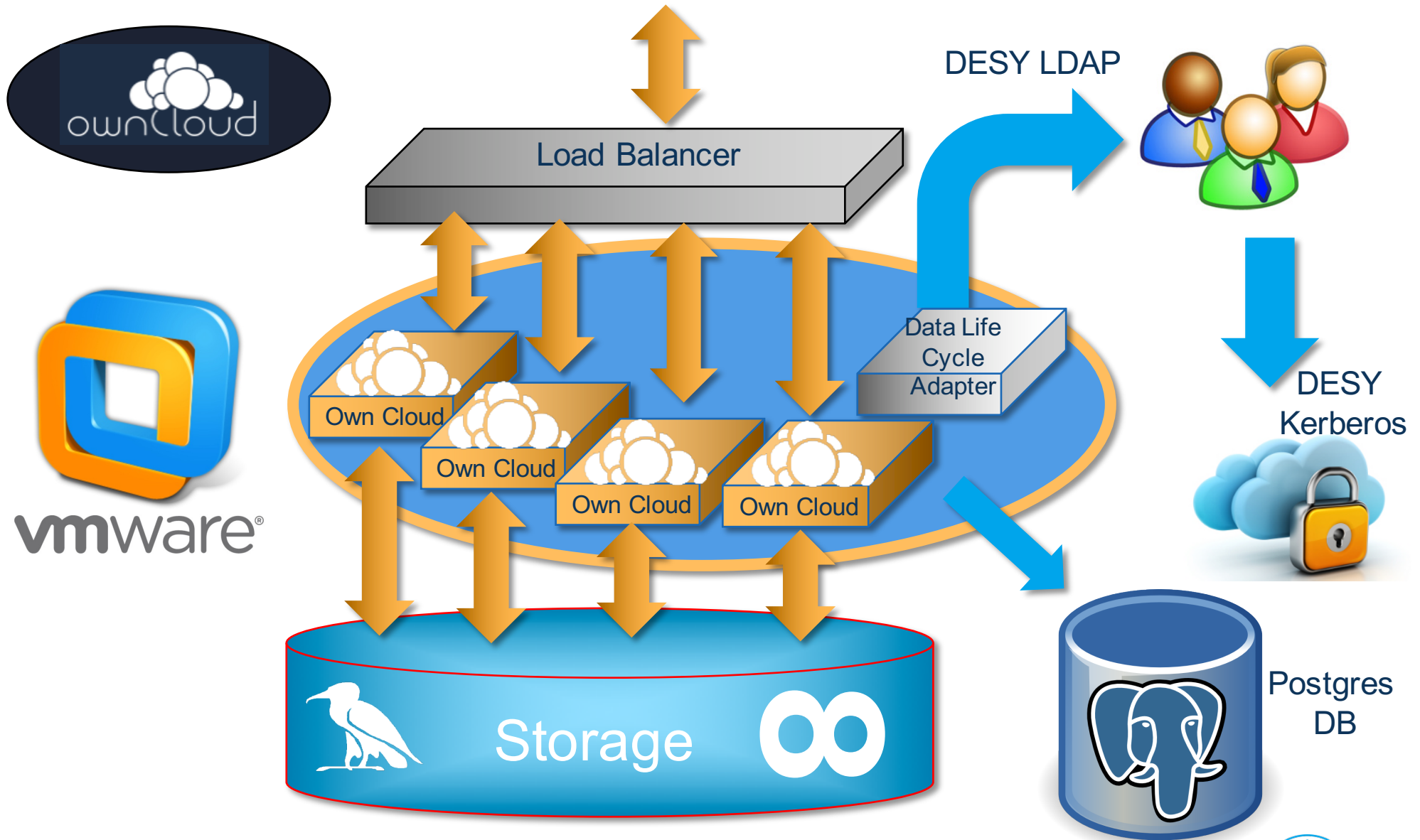
- Technical Coordination OwnCloud : Quirin
- Technical Coordination DOT: Lusine and Ralf
- Technical Coordination dCache.org : Tigran
- And many more In Network, VM Management, Web Office ...
- Please don't contact those people directly, use weboffice@desy.de to report issues.



The Own Cloud Part



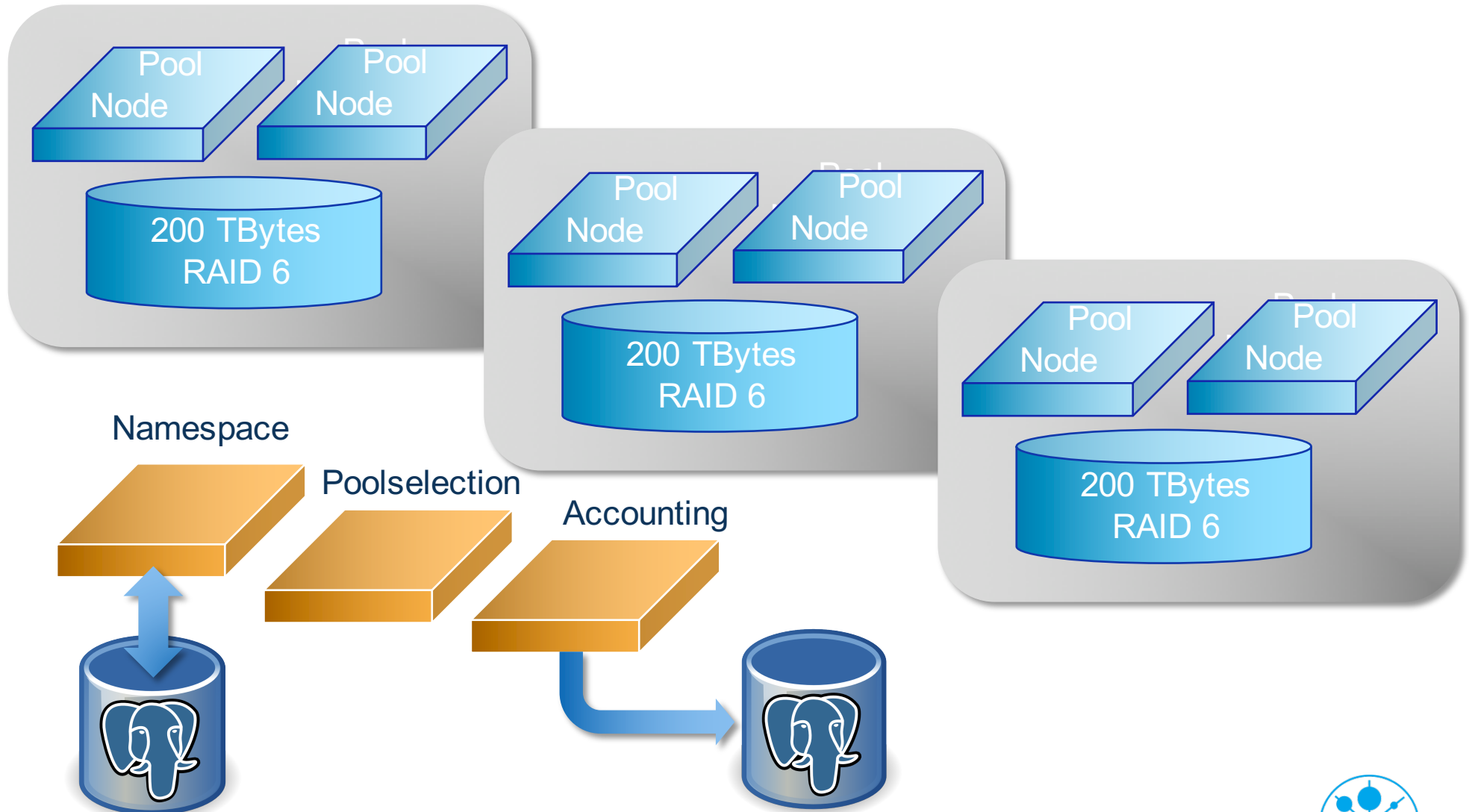
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The dCache backend



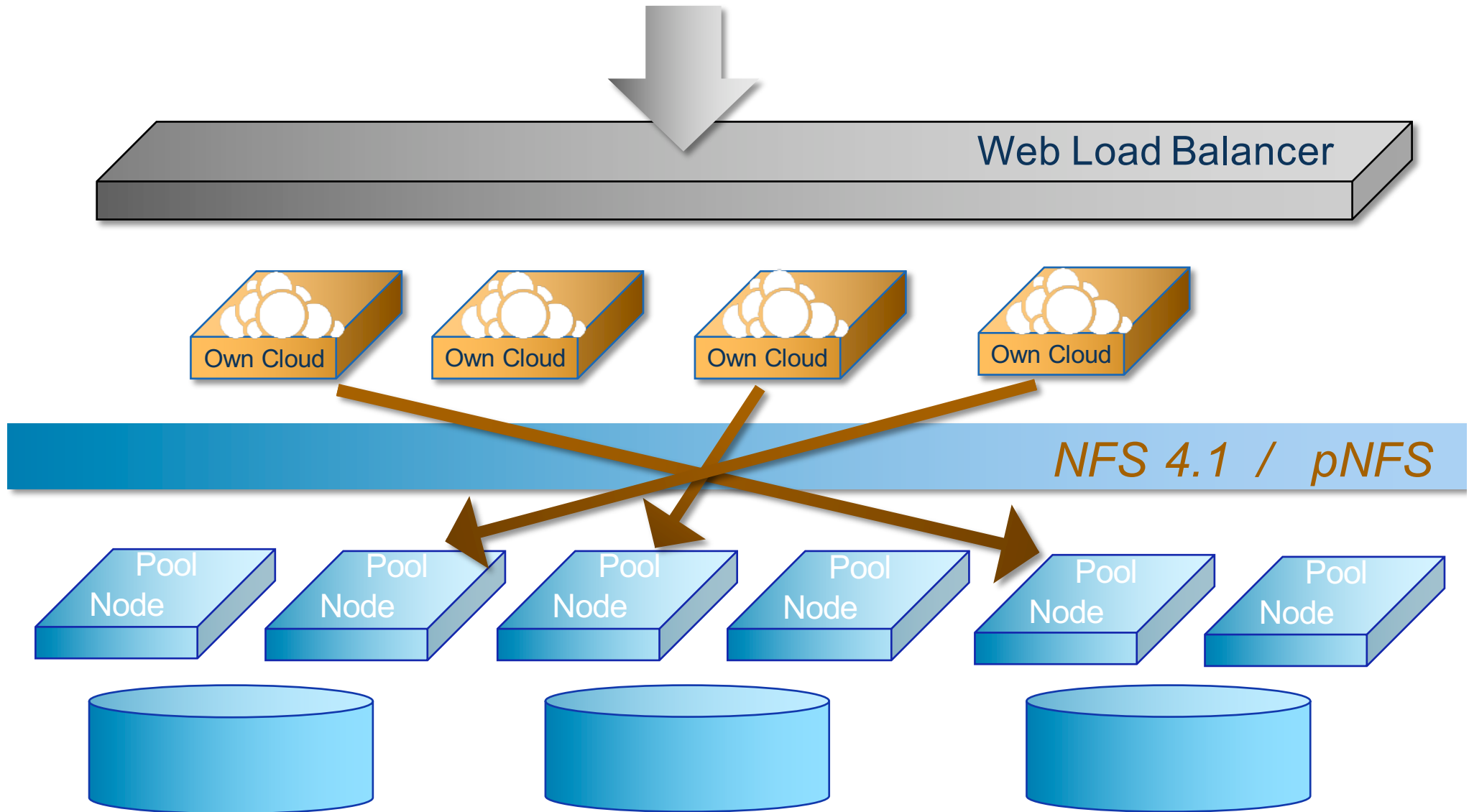
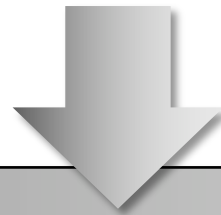
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Horizontal Scaling



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How do you get access ?



What you need to do, to get access



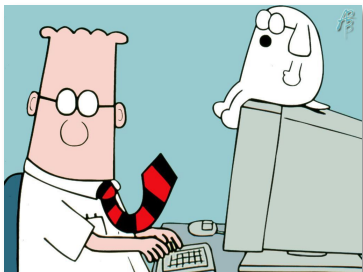
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Get the OwnCloud resource from the DESY registry.
(Here vdR wanted to say something.)

Read the intro @

It.desy.de -> Dienste -> StorageDienste -> DesyCloud



1. Log into desycloud.desy.de with your DESY account credentials
2. Install the OwnCloud client for your preferred OS
3. Configure your sync's and shares

Report issues to weboffice@desy.de





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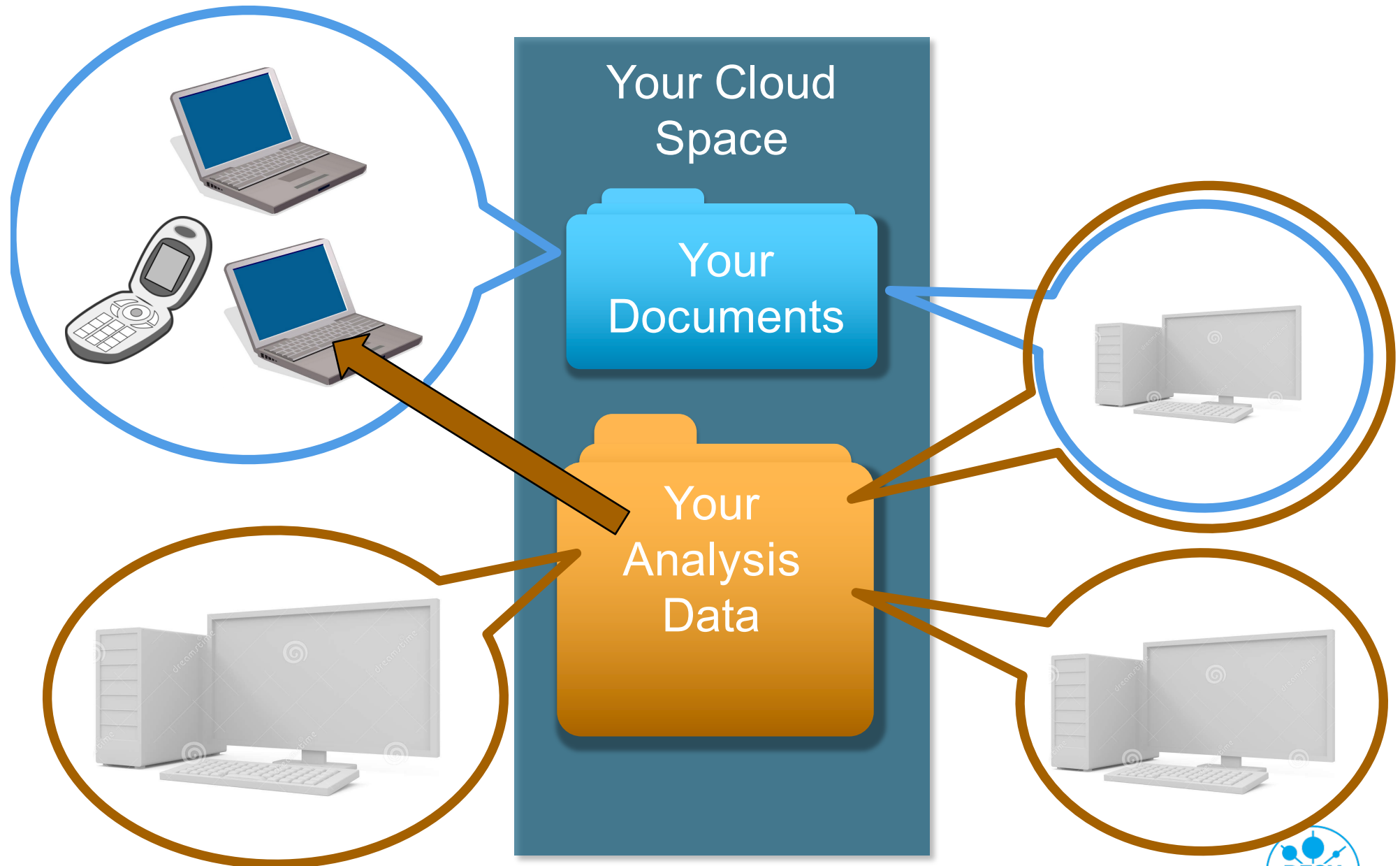
Things you might want to consider



Syncing might need some thinking



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Watch OUT !

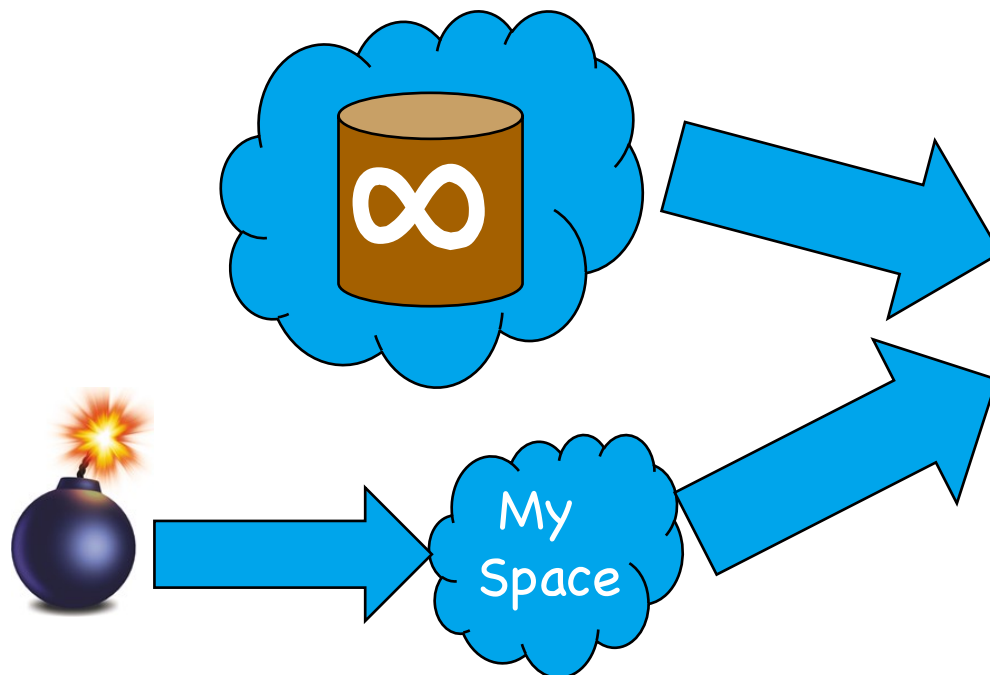


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> !!! Do not sync your entire Own Cloud Space with your laptop -> chose a subdirectory instead.

- Own Cloud Space is potentially unlimited ... your laptop isn't
- Everything someone else shares with you would be sync'ed to your laptop. Shares always end up in our home first.



Watch out !!!



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Account to Synchronize

Connected to <https://desycloud.desy.de> as patrick.

ownCloud
Remote path: sync
/Users/patrick/Desktop/ownCloud

LOGOS
Remote path: LOGOS
/Users/patrick/Desktop/LOGOS

Buttons: Add Folder..., Pause, Remove, Choose What to Sync

Storage Usage

3.7 GB (0%) of 90 TB server space in use.

Note: Some folders, including network mounted or shared folders, might have different limits.

Account Maintenance

Buttons: Edit Ignored Files, Modify Account

Folder	File Name	Status
WORKSHOPS	20150325-LSDMA-...DMA-CF-2015.xlsx	File is listed on the ignore list.
WORKSHOPS	20141014-Paris-KM...4-v2-nc.pptx.part	File is listed on the ignore list.
WORKSHOPS	20131018-chep/Prev...wu LinkedIn".pdf	File is listed on the ignore list.
WORKSHOPS	20130612-cnaf-revi...tion Resources.pdf	File contains invalid characters that can not be synced cross platform.
WORKSHOPS	20130506-msst-long...Siebers-2.pdf.part	File is listed on the ignore list.
WORKSHOPS	20101102-HEPIX-Co...n/NFS threads.pdf	File contains invalid characters that can not be synced cross platform.
WORKSHOPS	2000-x-OlderWorks...and_ACLS.pdf.part	File is listed on the ignore list.

File is listed on the ignore list.

File contains invalid characters that can not be synced cross platform



Inspired by Stefan Klepser

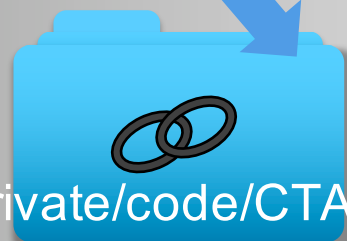


Your very **private** folder



Actively Created public link

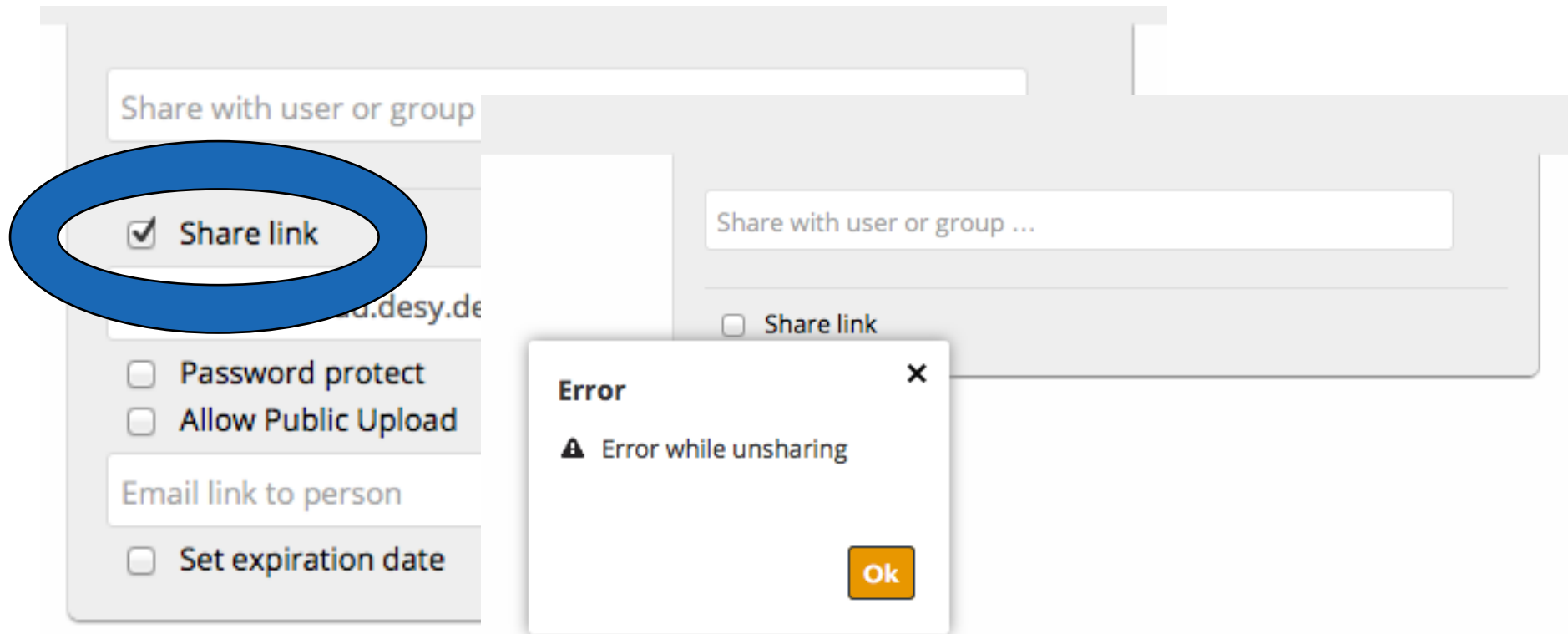
<https://desycloud.desy.de/public.php?service=files&t=3bd49ff864c465d362d697a54584a6e3>



Implicitly Created public link

<https://desycloud.desy.de/public.php?service=files&t=3bd49ff864c465d362d697a54584a6e3>

Try to remove the share link 'checkbox' for public subfolder





We'll try to keep the documentation up to date on issues we find.





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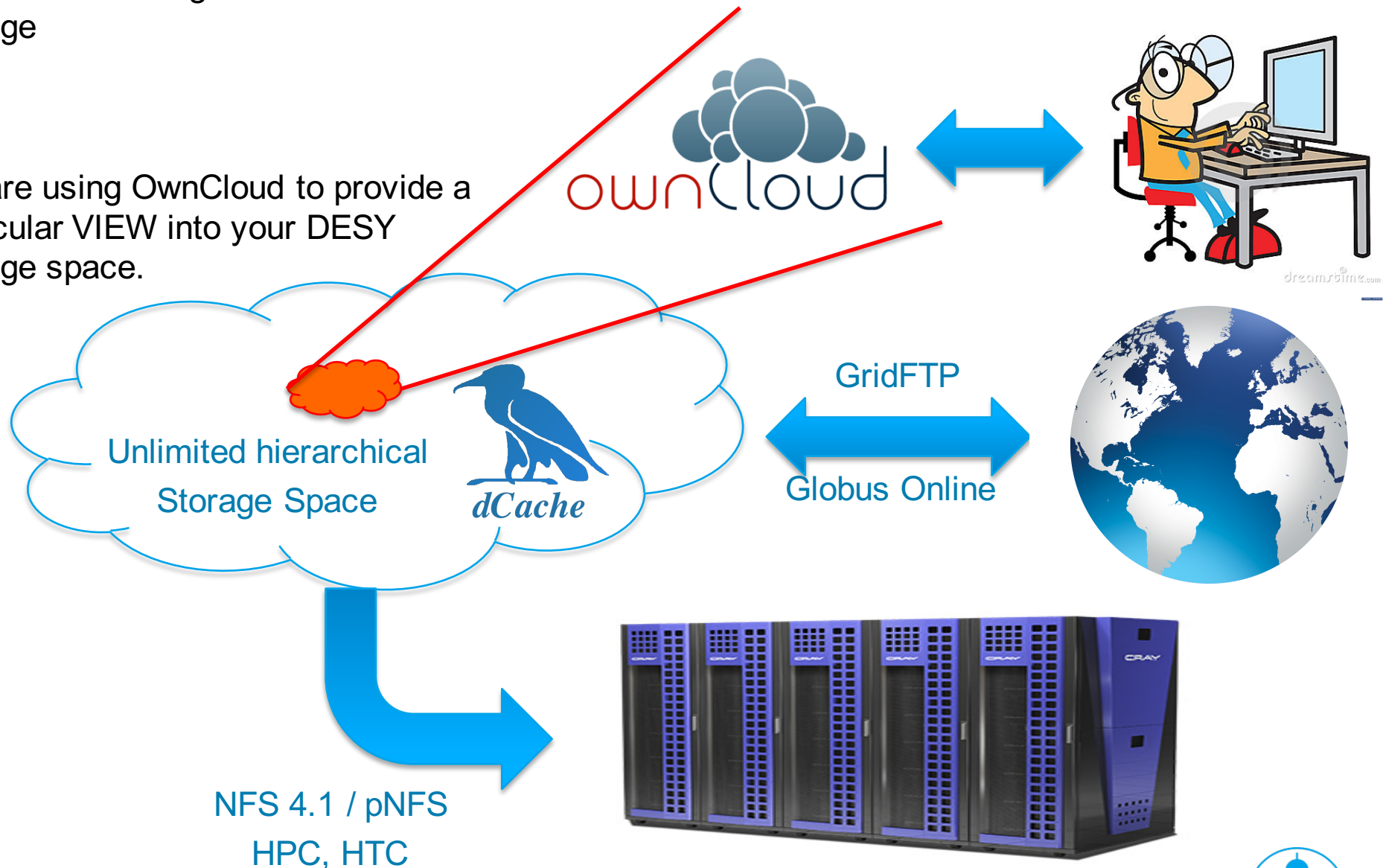
Towards the scientific storage cloud



We are not running OwnCloud storage

BUT

We are using OwnCloud to provide a particular VIEW into your DESY storage space.



My dCache XXL Home



Sync
Share
Web 2.0

NFS 4.1/pNFS
GridFTP
WebDAV
SRM
(some private
Grid Protocols)
dCap
xRootD

High performance access



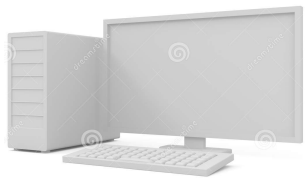
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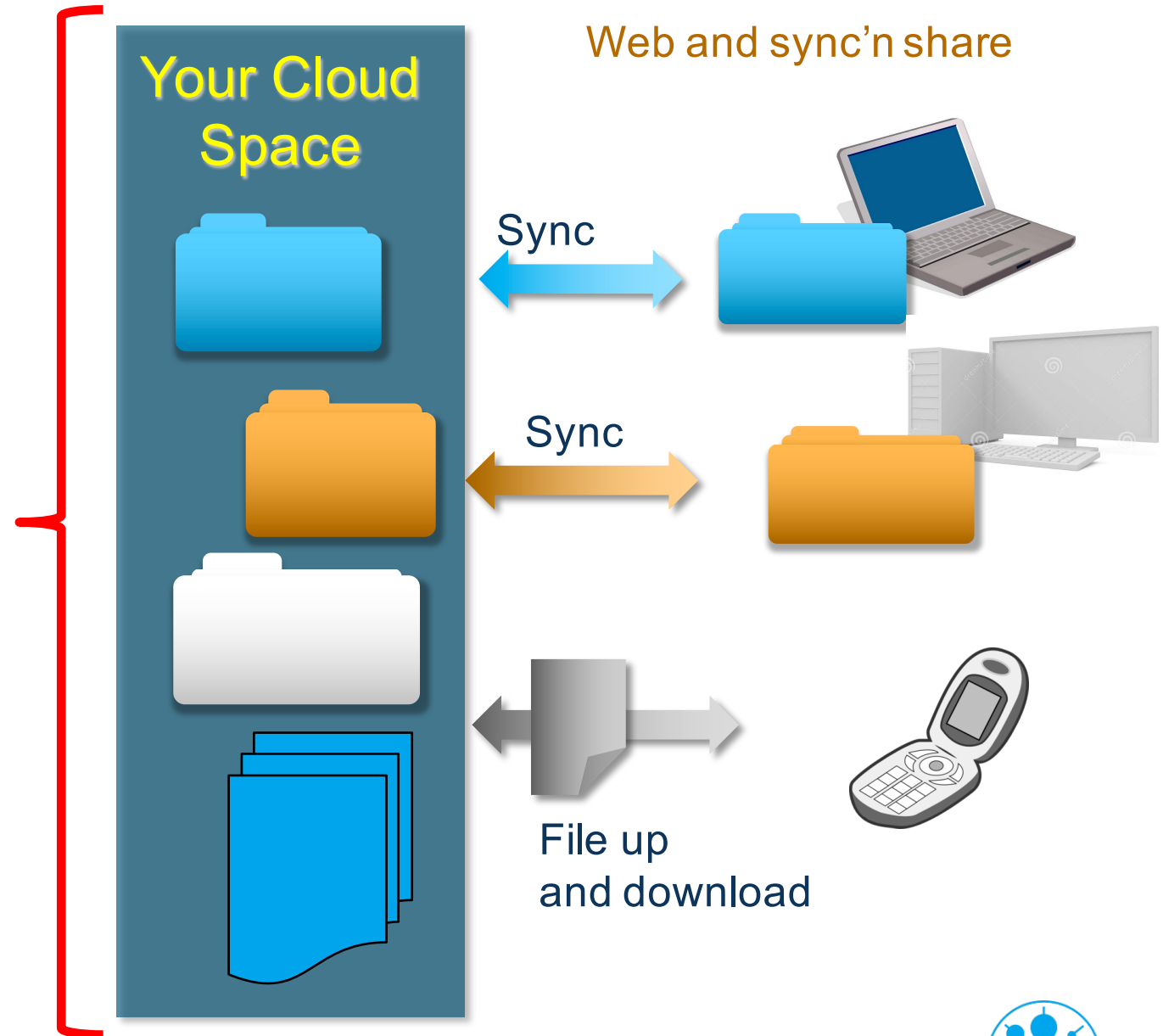
NFS mounted,

High performance,
Low latency

On workgroup server



Or worker nodes,
Compute servers



Wide area transfers

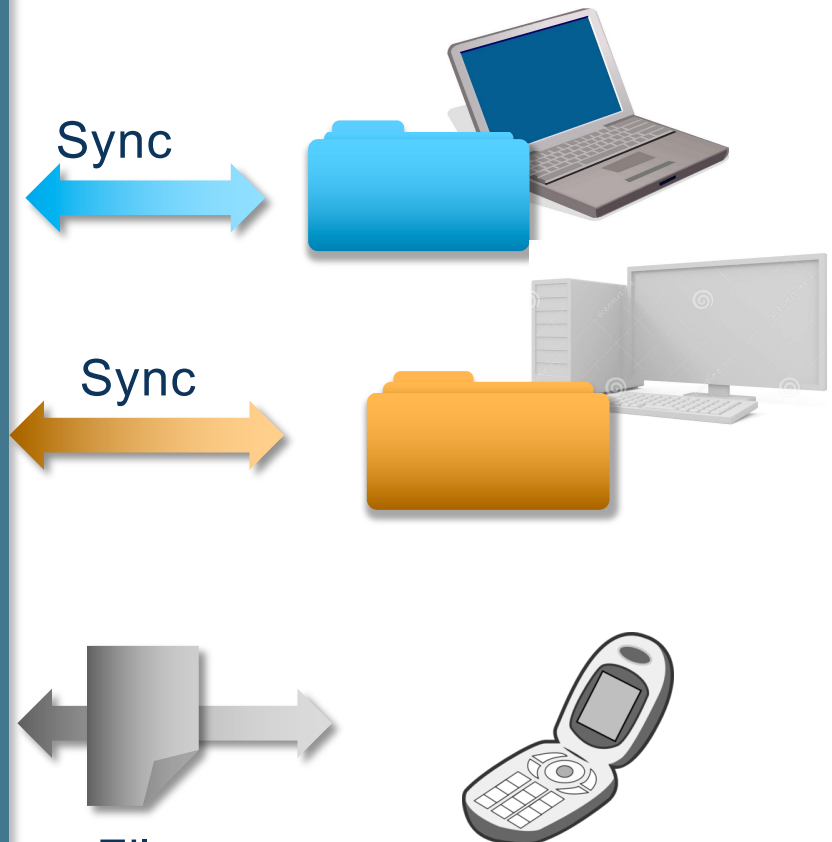


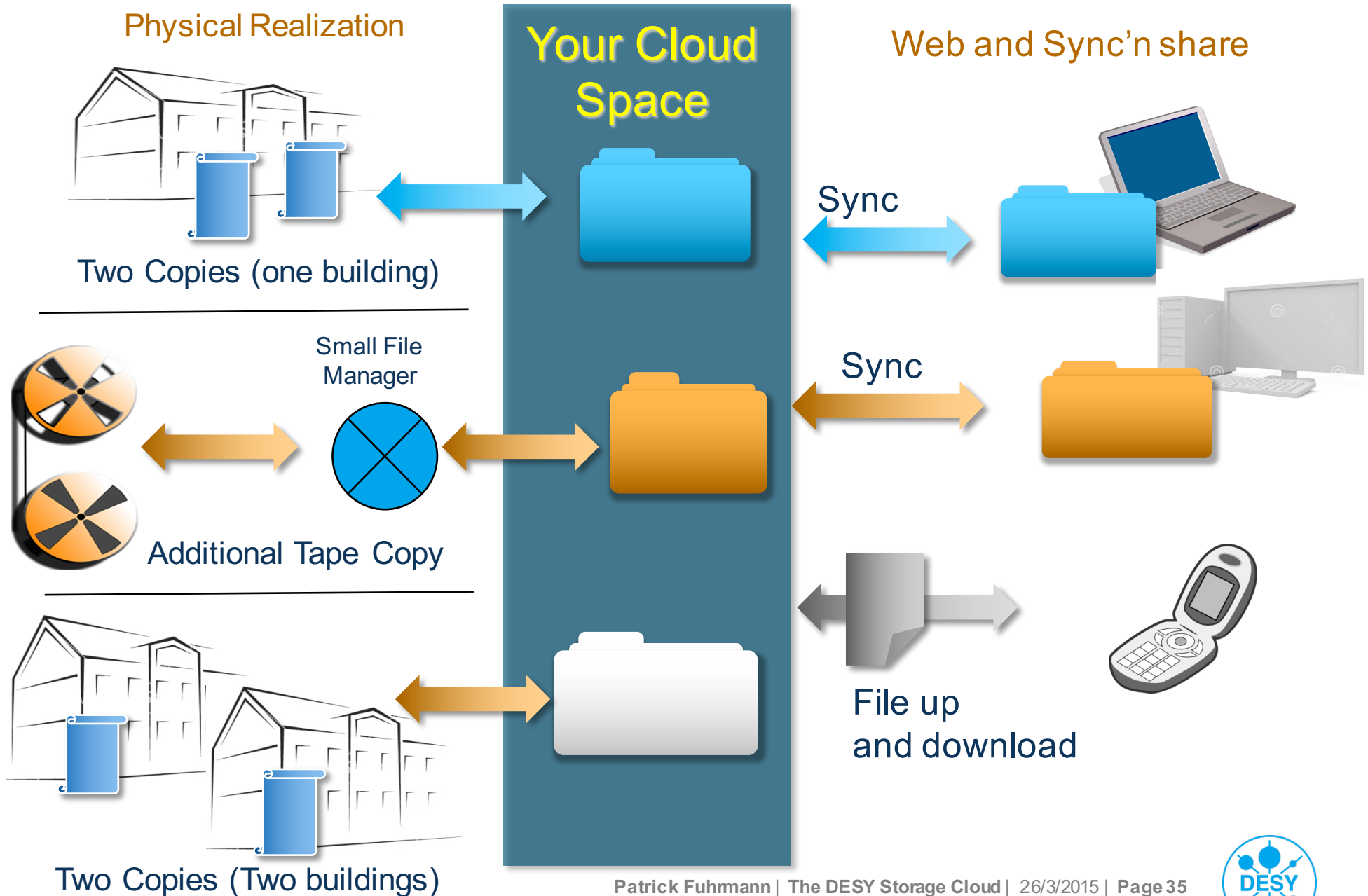
With **Globus Online**
Or WLCG Transfer tools
(using GridFTP)

Your Cloud Space



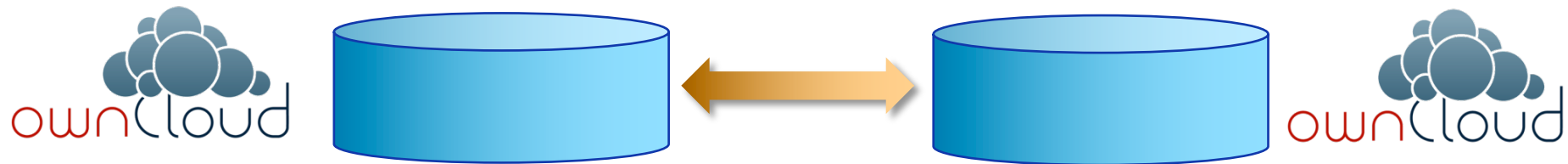
Web and sync'n share





Hamburg

Zeuthen



- > One Namespace -> Transparent Sharing
- > Zeuthen is 'Backup' for Hamburg, Hamburg is 'Backup' for Zeuthen.
- > Zeuthen is 'Cache' for Hamburg storage if accessed in Zeuthen and vice versa.
- > This is based on dCache features. Those setups already exist in North Europe and University of Michigan.



- > All those nice features are already available in the used backend. (dCache)
- > They only need to be enabled.
- > This will happen step by step.
- > More a political issue, concerning resources.





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Just that I don't forget ...



> *The system is still a pilot*

- *Which should only influence the overall availability.*
- *E.g. : Downtimes on short notice.*
- *We already put significant efforts into keeping your data safe.*

> Payment mechanisms for mobile App's not clear.

- Less than 1.00 Euro.

> Sharing with groups

- Only people with the registry "OwnCloud resource" will get access.
- Otherwise you would have to share with public link. □

> In monitoring but not nightalarm yet.

> *WebDAV access.*

- *Due to limitations in the definition of WebDAV and the implementation of some OS clients, we are still trying to find a client which works sufficiently satisfying for everyone.*
- *BTW : With WebDAV, currently 'unlimited storage space' means 90 TBytes.*

> *Issues with the NFS connection between OwnCloud and dCache.*

- *We observe hick-ups. (Remote I/O Errors)*
 - *Currently taken care of by script*
 - *You shouldn't notice*
 - *Will be fixed.*
 - *Side effect: Web interface might ask you to log-in again.*

Scientific Storage Cloud



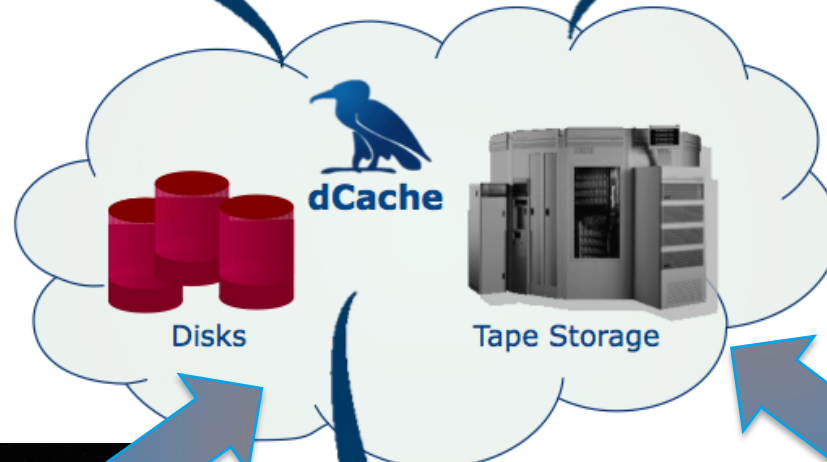
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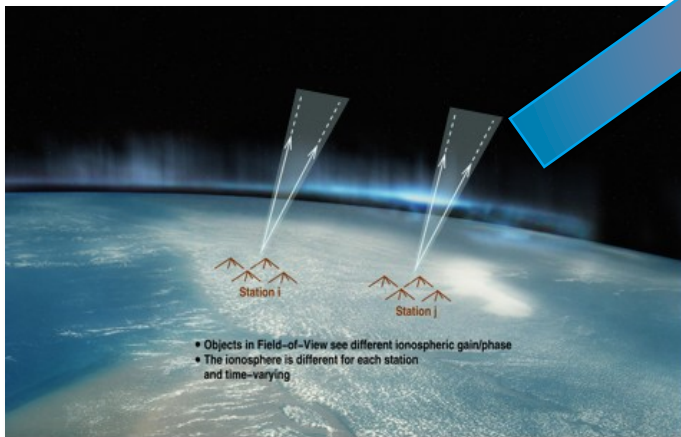
Cloud User

WebDAV
HTTP(S)

Globus Online
Cloud



LOFAR antenna
Huge amounts of data



X-FEL
(Free Electron Lasers)
Fast Ingest



Mounted POSIX FS
(NFSv4.1, pNFS)



Computer farm

