CNRS - DSI

My CoRe - ownCloud at CNRS

Content

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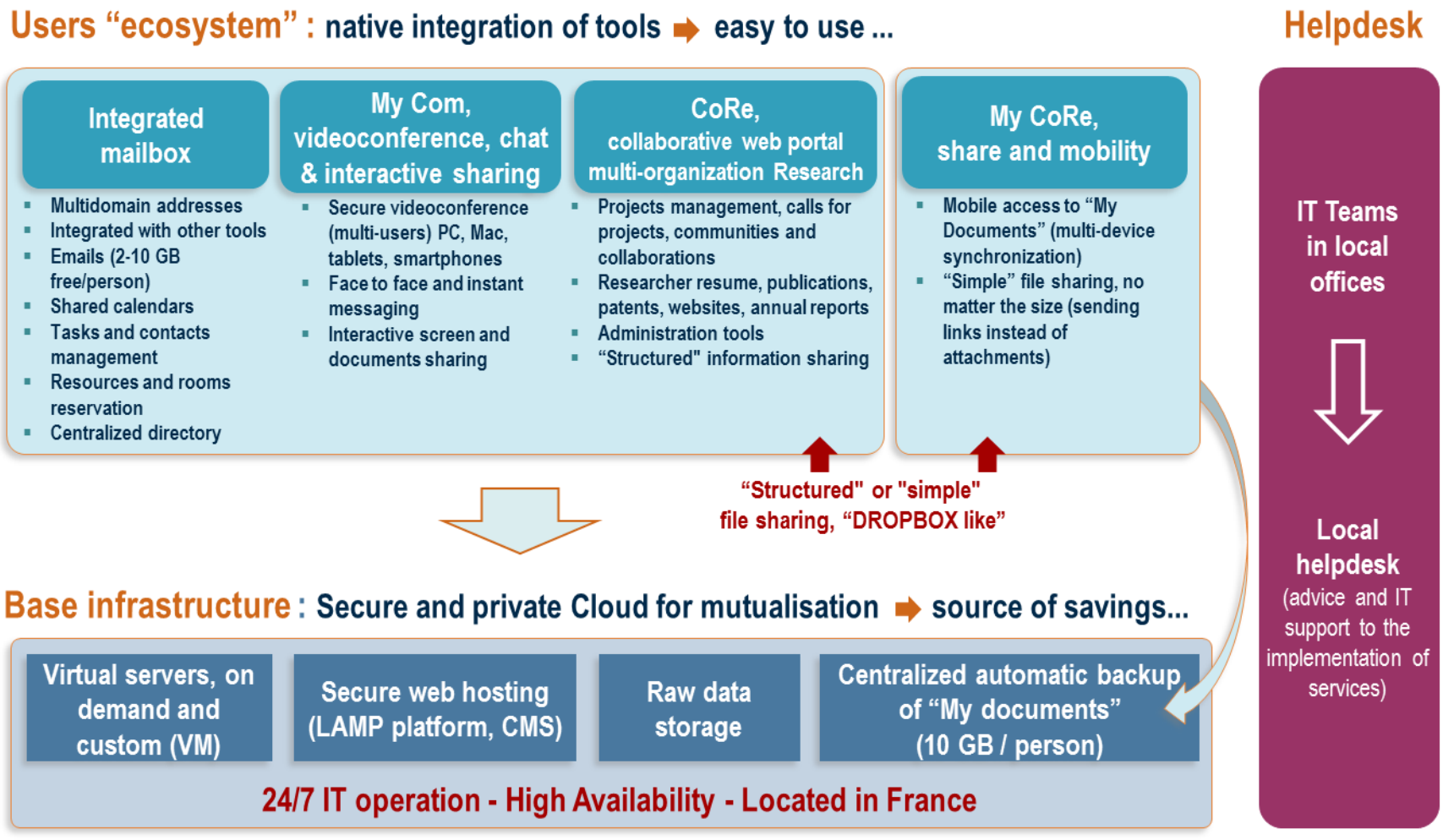
Background and context (1/3)



* *Laboratories, administrative units and functional departments can benefit from these services*

Background and context (2/3)

Business needs

- Synchronization and sharing service to provide a secure alternative to Dropbox for CNRS users
- Target (on the long term) = 100.000 end users with 10GB per user

Solution

- ownCloud (community edition), because it has the required functionality and it is open source
- New technical infrastructure located under CNRS' IN2P3 Computing Center

Background and context (3/3)

Schedule and deployment steps

- January to August 2013 : market survey
- September 2013 to April 2014 : ownCloud technical evaluation (in collaboration with Linagora)
- May to ~~June~~November 2014 : implementation and test
- ~~July to August 2014~~December 2014 to January 2015 : beta service for end users, 2.000 users / 5 GB per user
- ~~From September 2014 to end 2015~~From February 2015 to end 2015 : deployment to other CNRS laboratories

Content

Service summary (1/3)

Status :	Planned
Number of users (target) :	30.000
Default and Maximum quota :	10GB
Linux/Mac/Win user ratio :	(estimated) 20/20/60
Desktop clients-Mobile clients-Web access ratio :	Unknown yet
Technology :	ownCloud with Galera-MariaDB and Scality backend storage
Target communities :	CNRS members
Integration in your current environment :	None (except our existing Shibboleth SSO backend)
Risk factors :	Load on DB
Most important functionality :	ownCloud core only with some custom apps (see below)
Missing functionality :	App to send large files via email (see below)

Service summary (2/3)

ownCloud community edition 7 with few apps

- ownCloud core = `https://github.com/owncloud/core;v7.0.2`
- Antivirus app = `http://apps.owncloud.com/CONTENT/content-files/157439-files_antivirus.tar.gz`
- Activity app = `https://github.com/owncloud/activity;v7.0.2`
- Without Versions app

Service summary (3/3)

And some apps developed by CNRS

- App for metrics on service usage = `https://github.com/ppaysant/dashboard`
- App for managing a lot of groups = `https://github.com/ppaysant/lotsofgroups`
- App for end users group management = `https://github.com/ppaysant/group_custom`
- App for password policy enforcement = `https://github.com/ppaysant/password_policy`
- App for GTU online agreement = `https://github.com/marcdexet-cnrs/gtu`
- App for filtering access depending on end user groups = `https://github.com/marcdexet-cnrs/gatekeeper`
- App for end users authentificate and account provisionning = `https://github.com/marcdexet-cnrs/user_servervars2`
- A specific theme = `https://github.com/CNRS-DSI-Dev/mycore`

User feedback

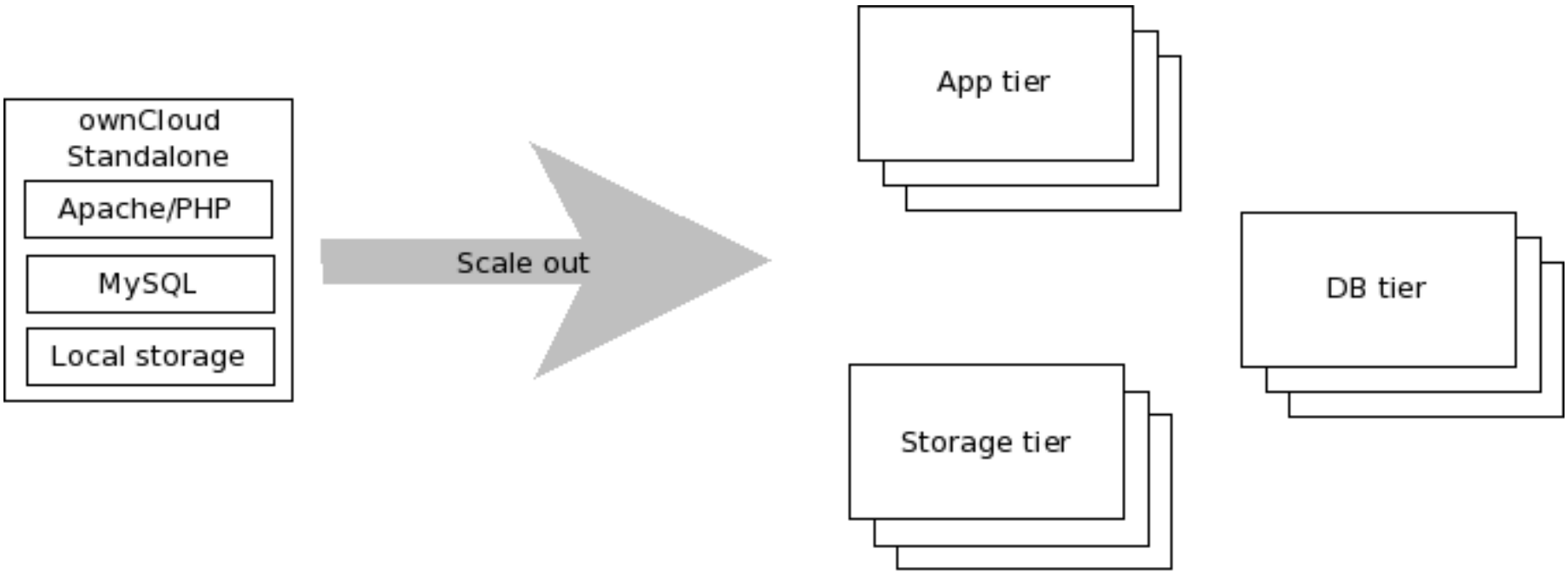
User feedback

Service not deployed yet !

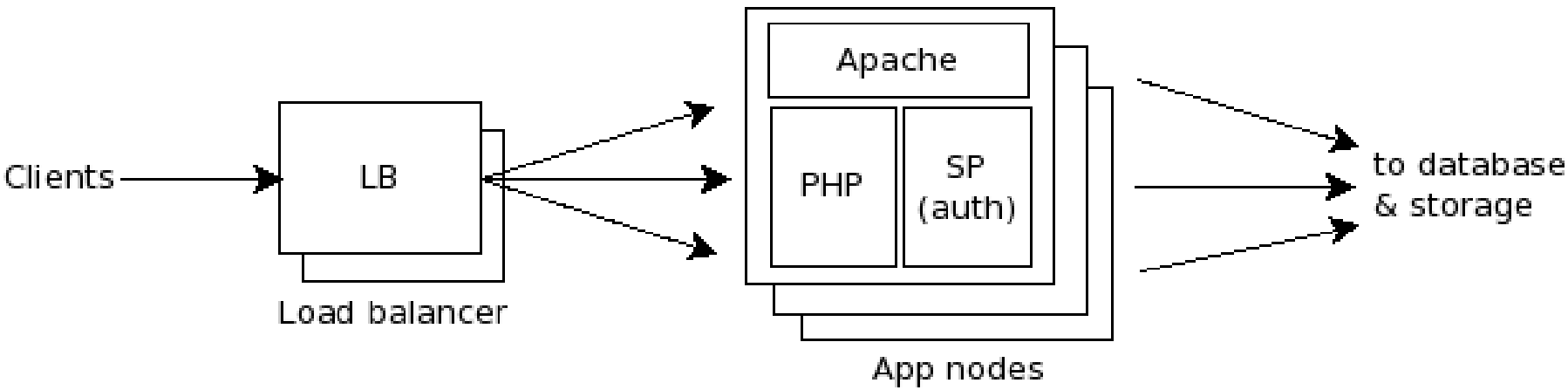
- But end users ask for such a service !
- Some local implementations of ownCloud exist at CNRS (for a single laboratory typically)
- Users often use Dropbox, Google Drive, ... for business, when no solution is provided internally

Content

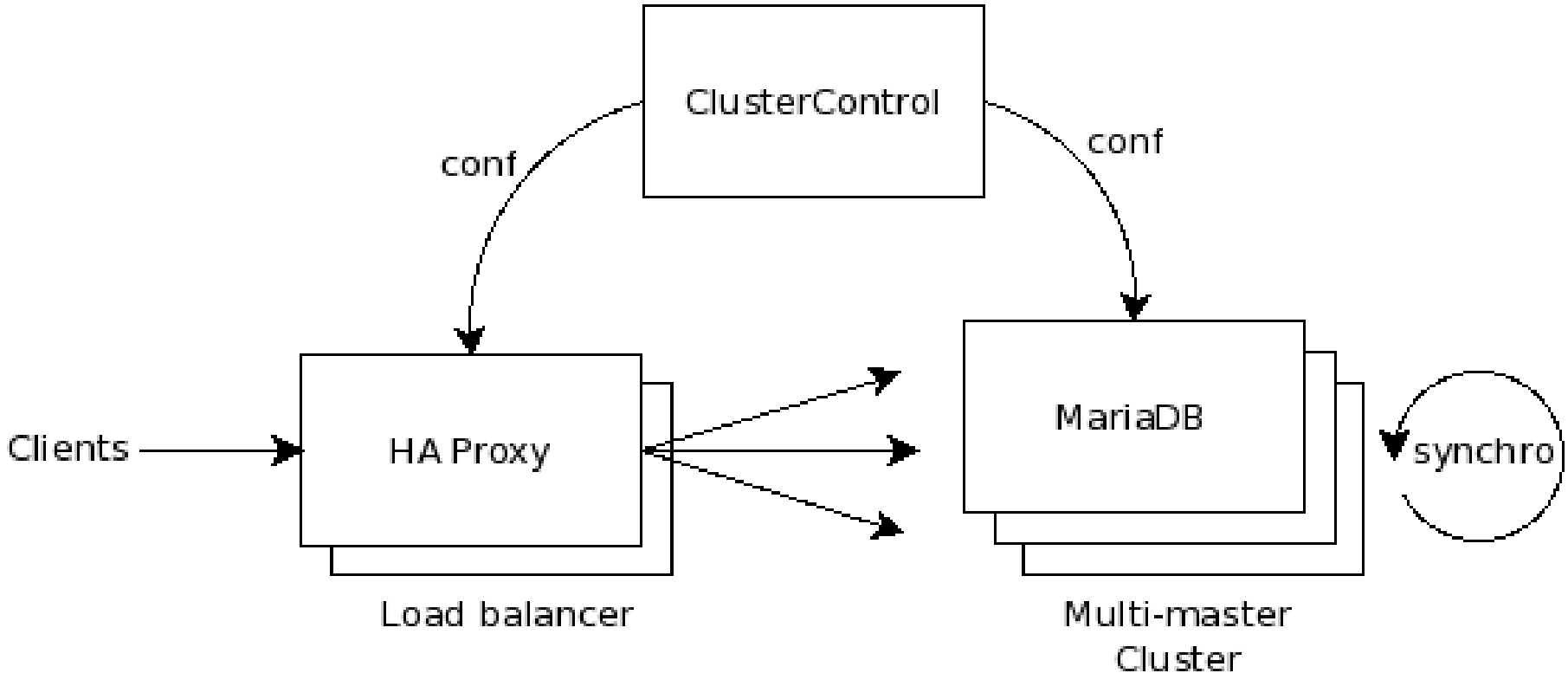
Architecture overview



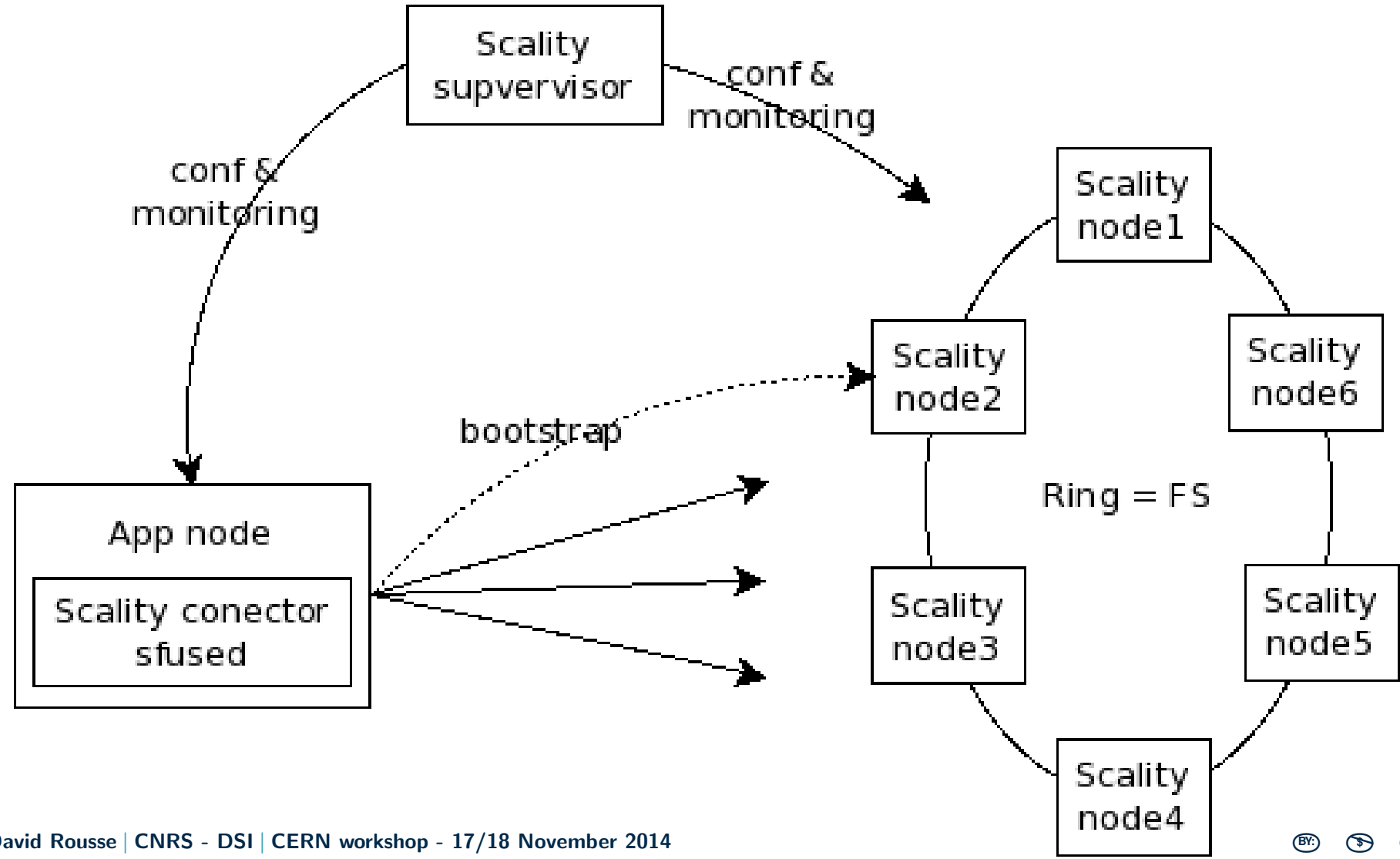
App tier : ownCloud, PHP, SP, Apache



DB tier : Galera/MariaDB cluster

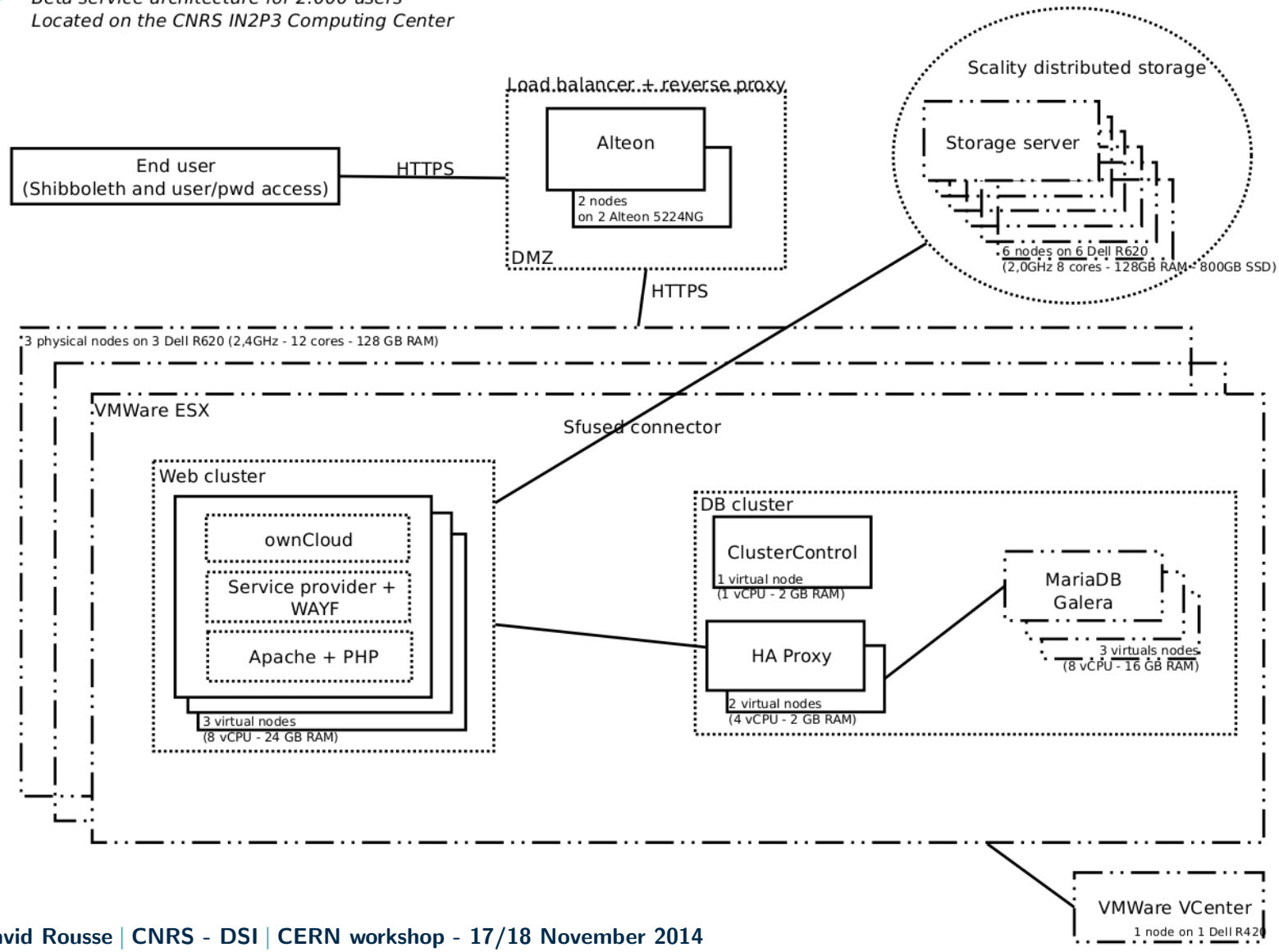


Storage tier : Scality distributed storage



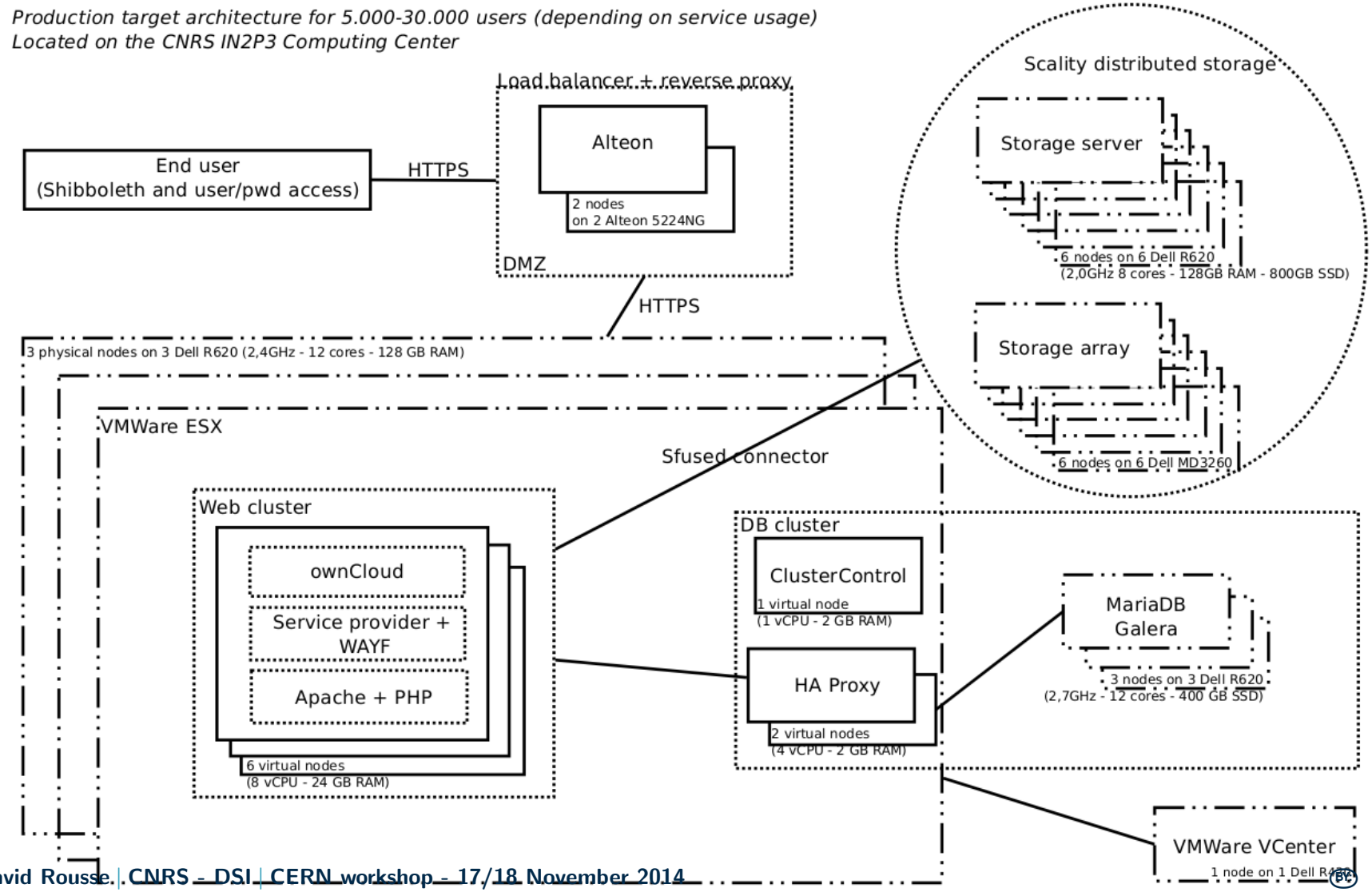
Beta service architecture

P. 18 *Beta service architecture for 2.000 users*
Located on the CNRS IN2P3 Computing Center



Production service architecture

Production target architecture for 5.000-30.000 users (depending on service usage)
Located on the CNRS IN2P3 Computing Center



Content

Next steps

Deploy the beta service for 2.000 CNRS users

- Get a real feedback from end users
- Check the way the architecture works live !

Technical improvments

- Reducing the DB load
- Using object storage instead of sfused connector
- Deploying multiple instances of the service and use the "Server to server sharing" ownCloud function (if previous solutions are not enough)
- Automatizing end users tests (if possible with `https://github.com/cernbox/smashbox`)
- Improving the Versions apps

Questions ?

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Annexes' content

Annex 1 : load test method (1/2)

Functional hypothesis on the service usage

- Service accessible to all CNRS population : target 100.000 (end of 2015)
- 50% of population will actually use the service
- Quota per user : 10GB
- Average files per user : 1.000
- Average file size : 5MB
- File updates per day per user : 50
- Each file updated is replicated to 4 different devices :
  - Number of devices per user : 3
  - 15% of files are shared, to 5 other users

Annex 1 : load test method (2/2)

Estimate based on these hypothesis

- Hypothesis on Apache (8 cores, 16GB RAM) : 530 simultaneous requests
- Hypothesis on MariaDB (8 cores, 16GB RAM) :
  - SELECTs : max 3857 per sec
  - INSERTs : max 22000 per sec
  - UPDATEs : max 3857 per sec

Load tests to check our estimate, under a simple architecture

- 2 reverse proxies (Apache with modproxy)
- 2 load balancing servers (Piranha)
- 2 ownCloud servers (Apache, ownCloud 6)
- 1 MariaDB server

Annex 2 : DB load estimate

Required MariaDB servers, based on theoretical approach

SQL servers	*Number of SQL nodes (~ VM) for the estimated SQL load (8 cores/16GB RAM per node)*						
	Number of users (N)						
% of active users	1	1000	5000	30000	50000	70000	100000
5,00%	1	1	1	3	5	7	10
10,00%	1	1	1	6	9	12	18
15,00%	1	1	2	8	13	18	25
20,00%	1	1	2	11	18	24	35
30,00%	1	1	3	16	27	38	54
50,00%	1	1	3	18	30	41	59

Annex 2 : Web load estimate

Required Apache servers, based on theoretical approach

Web servers	*Number of web nodes for the estimated load (8 cores/16GB RAM per node)*						
	Number of users (N)						
% of active users	1	1000	5000	30000	50000	70000	100000
5,00%	1 serv	1 serv	1 serv	3 serv	5 serv	7 serv	10 serv
10,00%	1 serv	1 serv	1 serv	6 serv	10 serv	14 serv	19 serv
15,00%	1 serv	1 serv	2 serv	9 serv	15 serv	20 serv	29 serv
20,00%	1 serv	1 serv	2 serv	12 serv	19 serv	27 serv	38 serv
30,00%	1 serv	1 serv	3 serv	17 serv	29 serv	40 serv	57 serv
50,00%	1 serv	1 serv	5 serv	29 serv	48 serv	67 serv	95 serv

Annex 2 : network bandwidth load estimate

Network bandwidth load estimate, based on theoretical approach

Total DL	*Network bandwith simulation for download [Sync own+Sync share] (global ownCoRe architecture)*						
	Number of users (N)						
% of active users	1	1000	5000	30000	50000	70000	100000
5,00%	0 mb/s	13 mb/s	64 mb/s	382 mb/s	637 mb/s	891 mb/s	1 273 mb/s
10,00%	0 mb/s	25 mb/s	127 mb/s	764 mb/s	1 273 mb/s	1 782 mb/s	2 546 mb/s
15,00%	0 mb/s	38 mb/s	191 mb/s	1 146 mb/s	1 910 mb/s	2 674 mb/s	3 819 mb/s
20,00%	0 mb/s	51 mb/s	255 mb/s	1 528 mb/s	2 546 mb/s	3 565 mb/s	5 093 mb/s
30,00%	0 mb/s	76 mb/s	382 mb/s	2 292 mb/s	3 819 mb/s	5 347 mb/s	7 639 mb/s
50,00%	0 mb/s	127 mb/s	637 mb/s	3 819 mb/s	6 366 mb/s	8 912 mb/s	12 731 mb/s

Total UL	*Network bandwith simulation for upload [Sync own+Sync share] (global ownCoRe architecture)*						
	Number of users (N)						
% of active users	1	1000	5000	30000	50000	70000	100000
5,00%	0 mb/s	5 mb/s	23 mb/s	139 mb/s	231 mb/s	324 mb/s	463 mb/s
10,00%	0 mb/s	9 mb/s	46 mb/s	278 mb/s	463 mb/s	648 mb/s	926 mb/s
15,00%	0 mb/s	14 mb/s	69 mb/s	417 mb/s	694 mb/s	972 mb/s	1 389 mb/s
20,00%	0 mb/s	19 mb/s	93 mb/s	556 mb/s	926 mb/s	1 296 mb/s	1 852 mb/s
30,00%	0 mb/s	28 mb/s	139 mb/s	833 mb/s	1 389 mb/s	1 944 mb/s	2 778 mb/s
50,00%	0 mb/s	46 mb/s	231 mb/s	1 389 mb/s	2 315 mb/s	3 241 mb/s	4 630 mb/s

Annex 3 : why Scality ? (1/4)

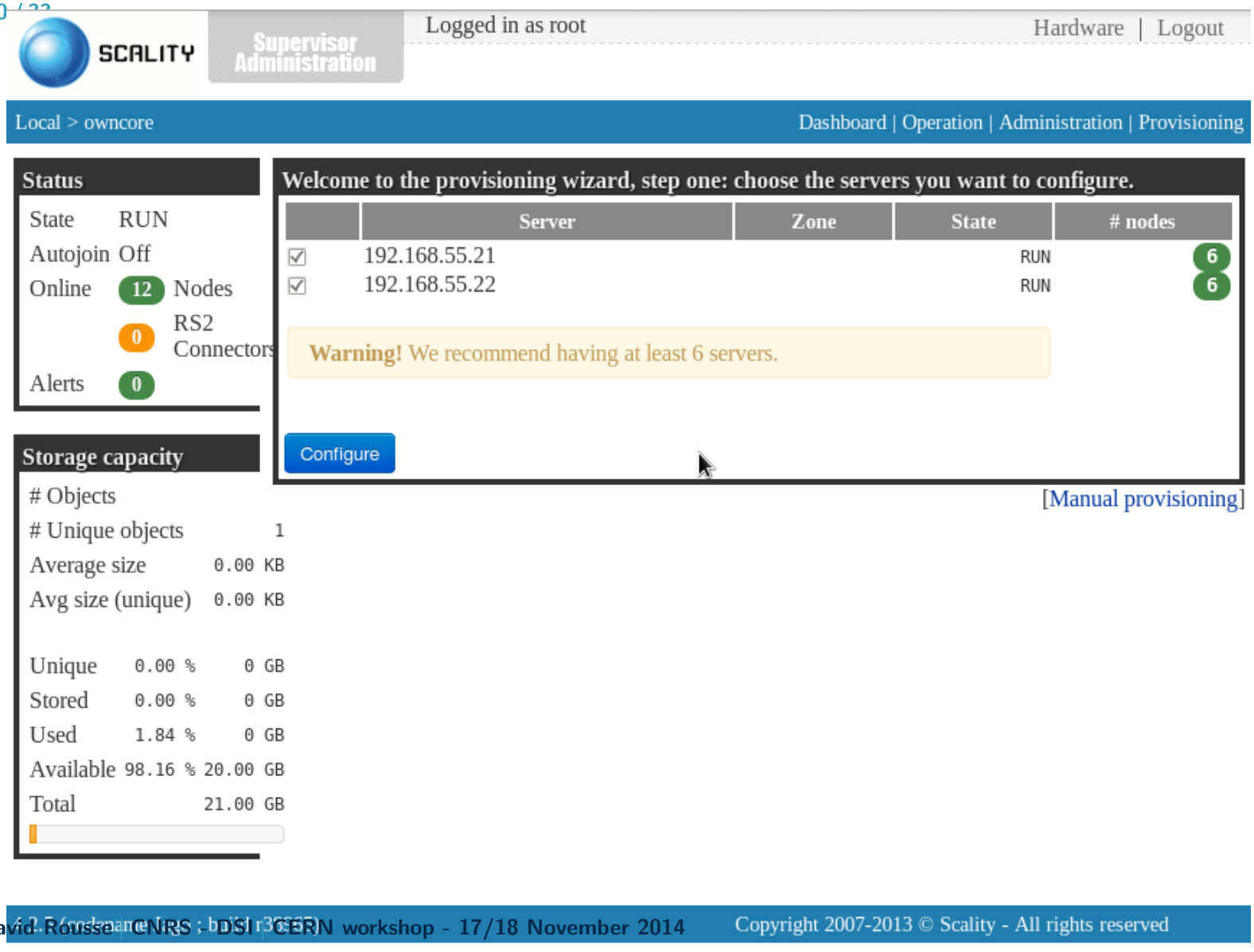
Software-defined storage solution

- Objects storage
- Scale-out storage
- Mutualized storage
- Data protection with ARC technology

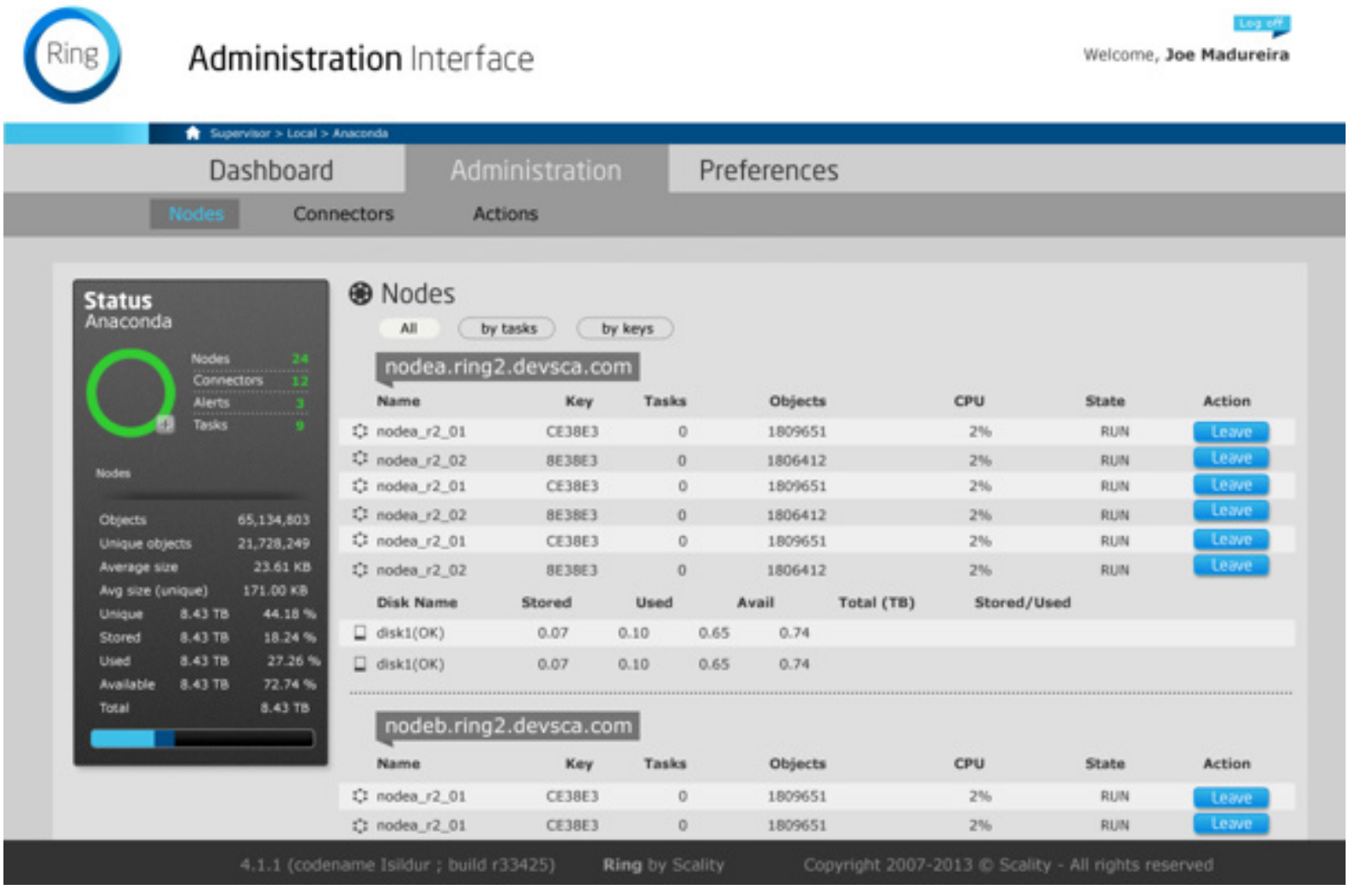
What we like

- Compatible with all x86 servers
- Best ratio between raw data/util data
- Easy to install and administrate
- High available, by design
- Hardware RAID disabled

Annex 3 : why Scality ? (2/4)



Annex 3 : why Scality ? (3/4)



Annex 3 : why Scality ? (4/4)

Annex 4 : some links

URLs in relation with My CoRe

- ownCloud load test in detail = https://github.com/CNRS-DSI-Dev/mycore_press/blob/master/CERN-CNRS-meeting-20140513.pdf
- JoSy conference (in French), Strasbourg 2014 May = https://github.com/CNRS-DSI-Dev/mycore_press/blob/master/Point_JoSy_19052014.pdf
- Scality in detail, made for the CNES (in French) = https://github.com/CNRS-DSI-Dev/mycore_press/blob/master/owncore_scality-cnes.pdf
- My CoRe, how is it buid ? = https://github.com/CNRS-DSI-Dev/mycore_build
- Other resources to come = https://github.com/CNRS-DSI-Dev/mycore_press