CNRS - DSI

CNRS and Vienna university meeting on ownCloud service

Content

Content

Background and context

Business needs

- Synchronization and sharing service to provide a secure alternative to Dropbox for CNRS users
- Beta service (since 2015 January) with 2.000 end users, 5GB per user - Target (on the long term) with 100.000 end users, 10GB / user

Solution

- ownCloud 7 community edition with a few apps (see annex 5)

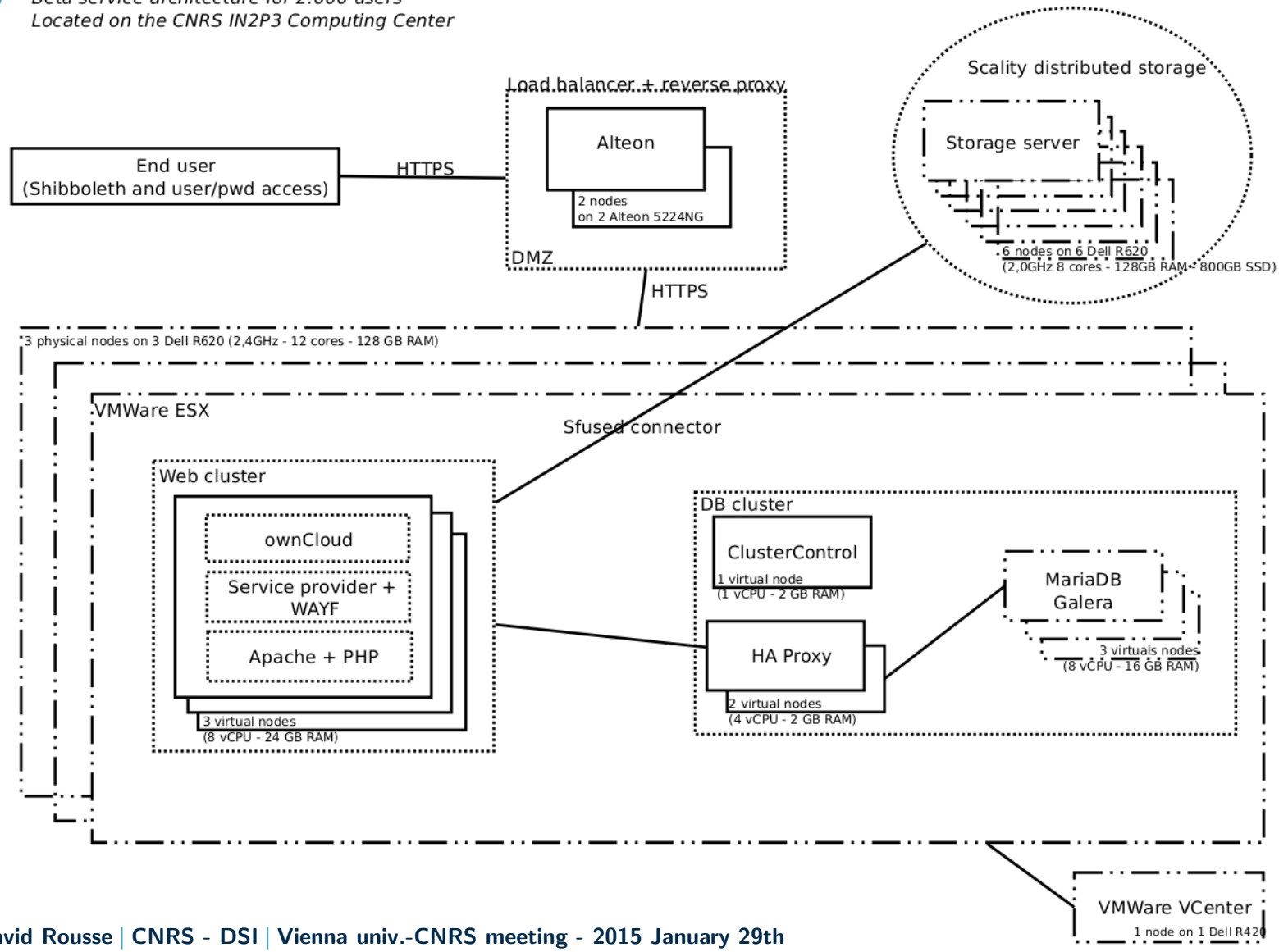
Schedule and deployment steps

- 2013 : market survey
- 2014 : implementation
- 2015 : beta service (from January to March) and then production

Content

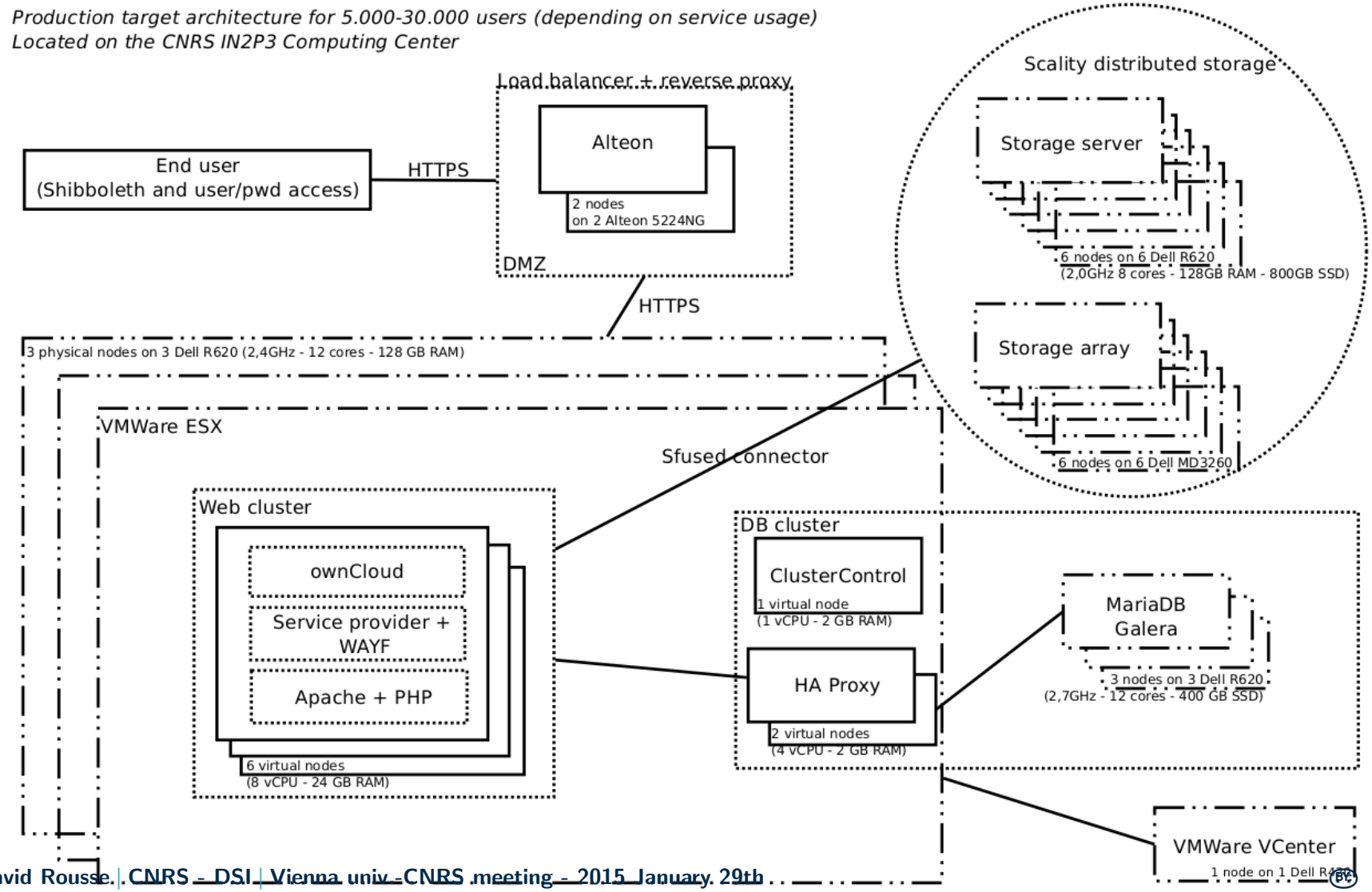
Beta service architecture

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



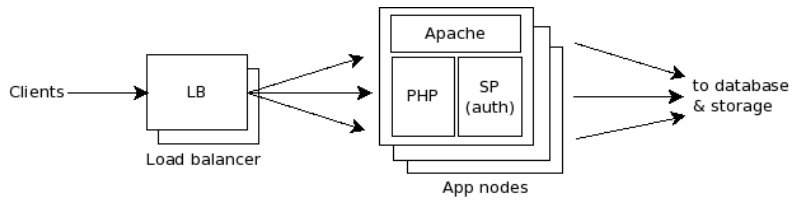
Content

Global questions

Global questions

- Community or Enterprise editions ? We use community edition at CNRS
- Users accounts storage ? We store users accounts in the SQL database, do you use LDAP storage ? If so, don't you have an SQL overhead ?
- Using the "Server to server sharing" ownCloud function to reduce global load : with more than one instance to handle the load. Do you plan to use this feature ?
- Automatizing end users tests : with CERN's smashbox ?
- Improving the Versions, Activity and Antivirus apps : do you use these apps ? do you have troubles with these apps ?

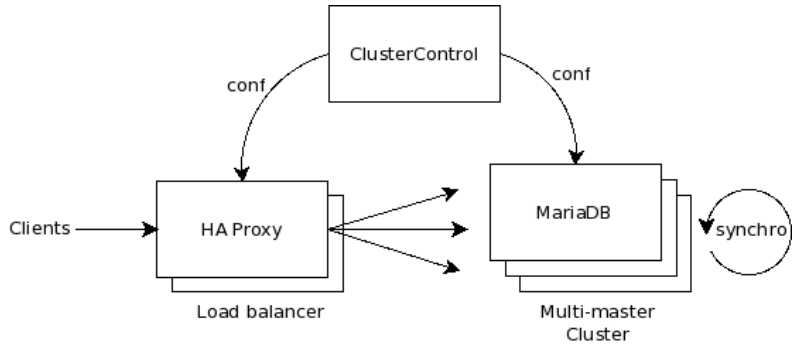
App tier : ownCloud, PHP, SP, Apache



Questions

- Do you use Shibboleth for SSO with ownCloud desktop client ? We only use Shibboleth for browsers access
- How many Apache/PHP nodes do you plan to deploy ? See annex 2 for our estimate

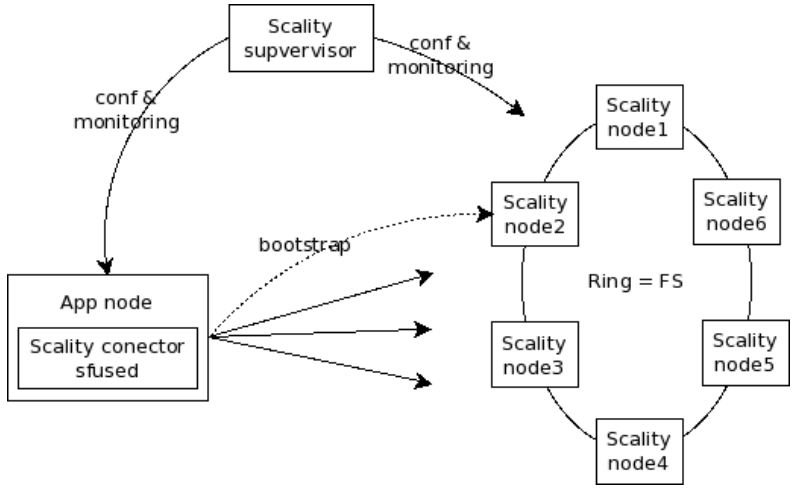
DB tier : Galera/MariaDB cluster



Questions

- What do you thing about our SQL estimate in annex 2 ? According to us, this is the major technical risk for the ownCloud deployment
- Improving the DB performance ? The usage of physical MariaDB nodes instead of virtualized nodes is our idea, what about you ?
- Reducing the load with CERN solution (ocfilecache table on file system) ? Possible with Scality ?

Storage tier : Scality distributed storage



Questions

- ARC configuration ? We choose 9+3 ARC with only 6 physical servers
- Using the ring to store PHP /tmp folder ?
- Using object storage instead of sfused connector ?
- Deploying the storage service over more than one site ? We "only" have one ring on a single site yet at CNRS

Content

Contacts

Contacts at CNRS

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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)

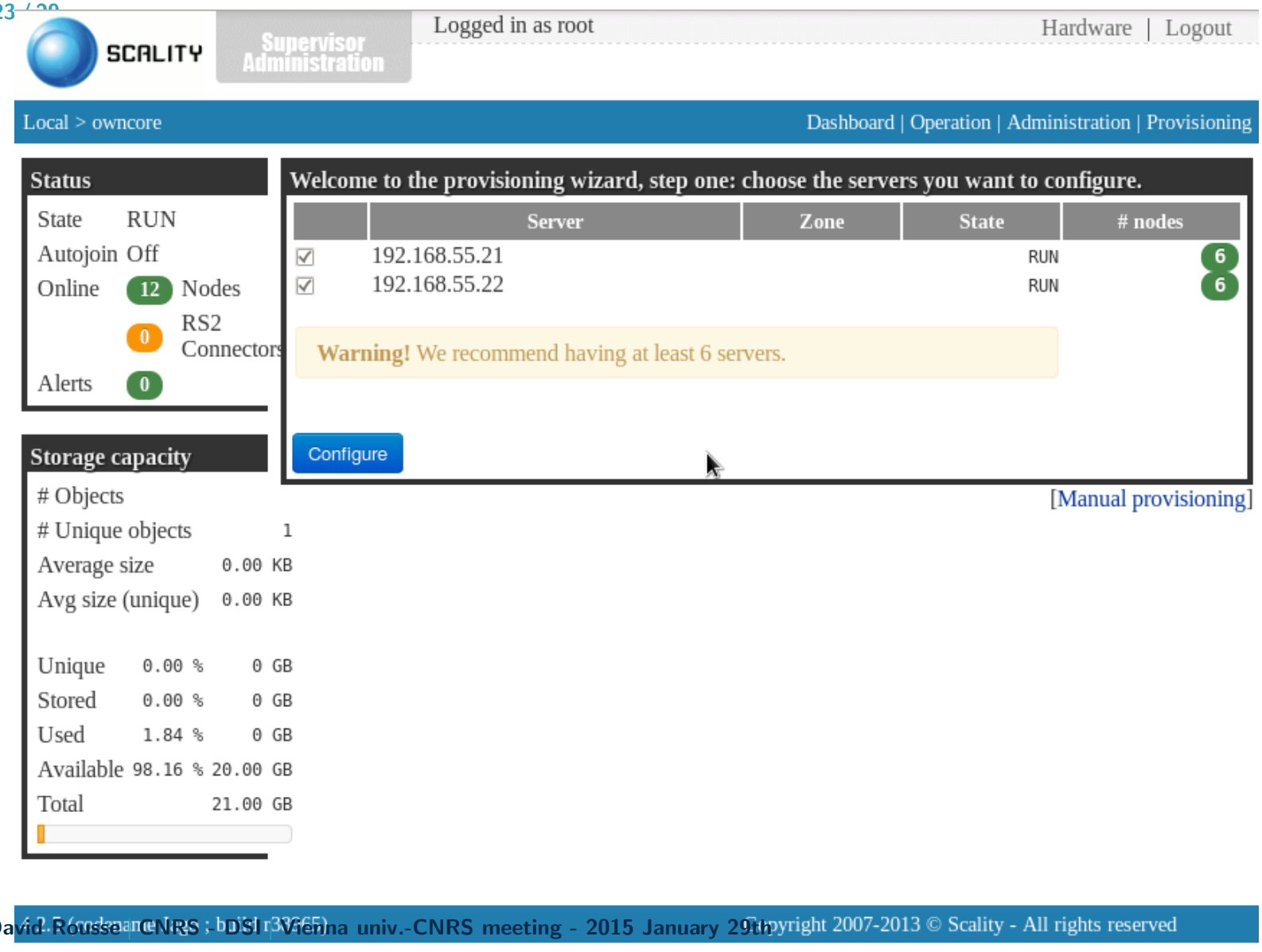
Software-defined storage solution

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

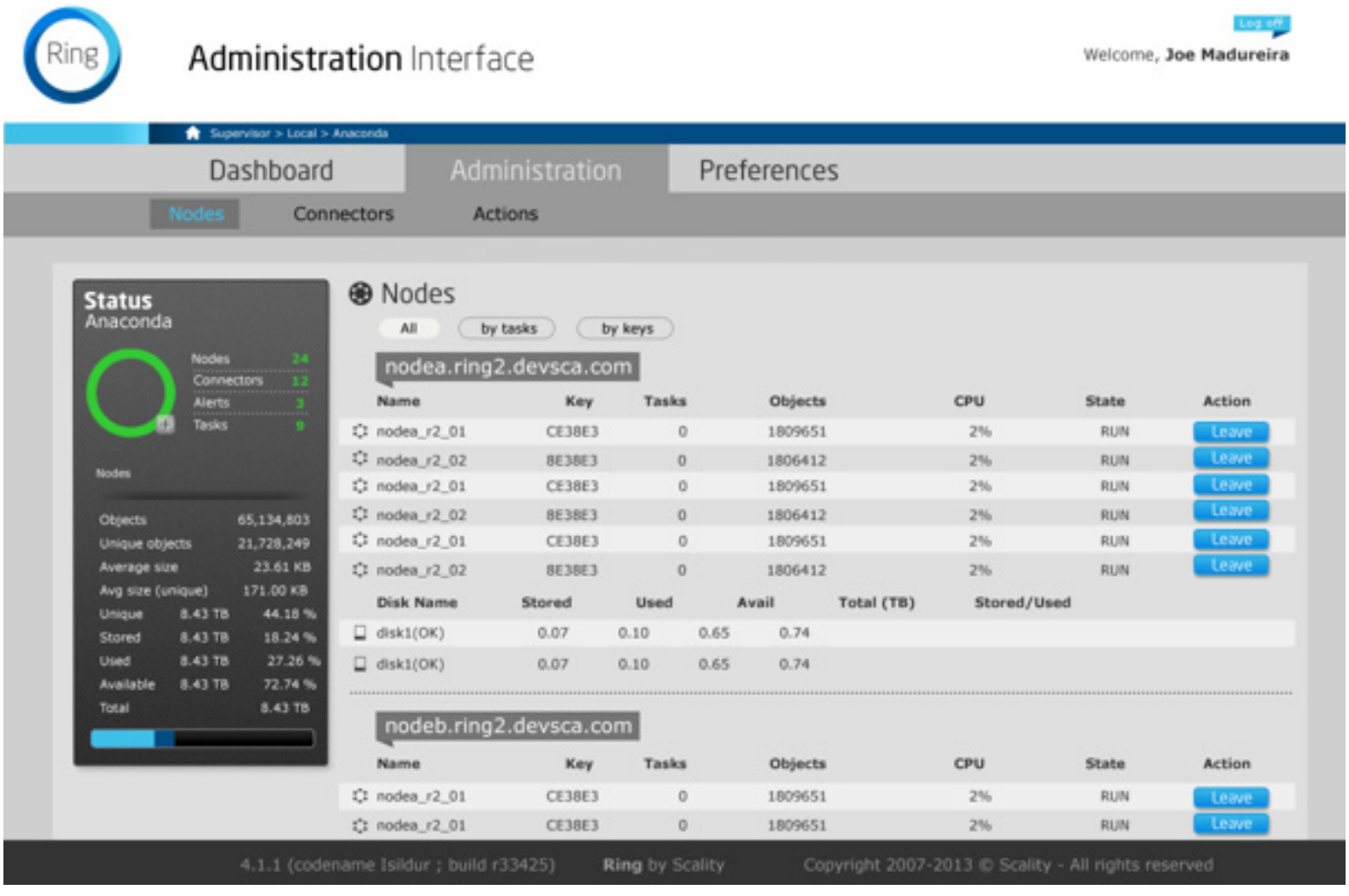
What we like

- 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/CNRS-JoSy-20140519.pdf
- Scality in detail, press made for the CNES (in French) = https://github.com/CNRS-DSI-Dev/mycore_press/blob/master/CNES-CNRS-Scality-20140619.pdf
- CERN workshop = https://github.com/CNRS-DSI-Dev/mycore_press/blob/master/CERN-CNRS-meeting-20141117.pdf
- My CoRe, how is it buid ? = https://github.com/CNRS-DSI-Dev/mycore_build
- Other My CoRe press to come = https://github.com/CNRS-DSI-Dev/mycore_press

Annex 5 : service summary (3/3)

Status :	Planned
Number of users (target) :	30.000 for end 2015 (100.000 (?) on the long term)
Default and Maximum quota :	10GB
Linux/Mac/Win user ratio :	(estimated) 20/20/60
Desktop/mobile/web clients access ratio :	Unknown yet
Technology :	ownCloud with Galera-MariaDB and Scality backend storage
Target communities :	CNRS members
Integration in current environment :	None (except our existing Shibboleth SSO backend)
Risk factors :	Load on DB
Most important functionality :	ownCloud core with custom apps (see below)
Missing functionality :	Share files temporary and then delete the shared files, once downloaded (see below)

Annex 5 : service summary (2/3)

ownCloud community edition 7 with few apps

- ownCloud core = `https://github.com/owncloud/core;v7.0.3`
- Antivirus app = `http://apps.owncloud.com/CONTENT/content-files/157439-files_antivirus.tar.gz`
- Activity app (disabled during beta service) = `https://github.com/owncloud/activity;v7.0.2`
- Without Versions app

Annex 5 : service summary (3/3)

And some apps developed/forked 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`