



Direction des systèmes d'information

## ownCoRe project CERN-CNRS meeting

-  
May 13th, 2014

*More information on these slides, please contact :*

- [gvalentin@linagora.com](mailto:gvalentin@linagora.com) (Linagora)
- [pvlararem@linagora.com](mailto:pvlararem@linagora.com) (Linagora)
- [david.rousse@dsi.cnrs.fr](mailto:david.rousse@dsi.cnrs.fr) (CNRS)
- [gilian.gambini@dsi.cnrs.fr](mailto:gilian.gambini@dsi.cnrs.fr) (CNRS)






# Content

- ☐ **ownCloud CNRS' project : overview**
- ☐ **Is ownCloud scalable ? The way we worked**
- ☐ **ownCloud load estimate**
- ☐ **ownCloud load tests**
- ☐ **Our sizing results**
- ☐ **Our target architecture**
- ☐ **What's next ?**
- ☐ **Questions & answers**



# ownCloud CNRS' project : overview

- (already said) Our project ? a **new service** for a **secure synchronization and share service** :
  - **ownCoRe** (project name)
  - Target audience is the whole CNRS members : **100.000 users**
  - Estimated number of active users : **between 15% and 50%**
  - Target quota per user is **10GB** (in the short term)
  - Main business need is to provide a **secure alternative to Dropbox** for CNRS users
  - ownCloud EE was chosen mainly because it has the **required functionality** and it is **open source**  
→ **but we have to deploy the solution as a beta service in order to confirm this point !**
- **Schedule and deployment steps** :
  - **January to August 2013** : sync. & share market survey
  - **September 2013 to April 2014** : ownCloud technical evaluation (in collaboration with )
    - *Architecture*
    - *Functional test*
    - *Load test*
  - **May to June 2014** : implementation
  - **June 2014** : final test
  - **July to August 2014** : beta service for end users, 2.000 users / 5 GB per user
  - **From September 2014 to end 2015** : deployment to other CNRS units



# Content

- ❑ ownCloud CNRS' project : overview
- ❑ Is ownCloud scalable ? The way we worked
- ❑ ownCloud load estimate
- ❑ ownCloud load tests
- ❑ Our sizing results
- ❑ Our target architecture
- ❑ What's next ?
- ❑ Questions & answers



# Is ownCloud scalable ? The way we worked

- P. 5
- **First, we tried to build 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
  - **Then we made an estimate based on these hypothesis :**
    - Hypothesis on MariaDB (8 cores, 16GB RAM) :
      - SELECTs : max 3857 / sec
      - INSERTs : max 22000 / sec
      - UPDATEs : max 3857 / sec
    - Hypothesis on Apache (8 cores, 16GB RAM) :
      - Simultaneous requests : 530
  - **And finally run load tests to check our estimate :**
    - With a simple architecture :
      - 2 reverse proxies (Apache/mod\_proxy)
      - 2 load balancing servers (Piranha)
      - 2 ownCloud servers (Apache/ownCloud 6)
      - 1 MariaDB server



# Content

- ❑ ownCloud CNRS' project : overview
- ❑ Is ownCloud scalable ? The way we worked
- ❑ ownCloud load estimate
- ❑ ownCloud load tests
- ❑ Our sizing results
- ❑ Our target architecture
- ❑ What's next ?
- ❑ Questions & answers

# ownCloud load estimate

- **Based on theoretical approach :**

- Required MariaDB servers :

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

- Required Apache servers :

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



# ownCloud load estimate

P. 8

- **Based on theoretical approach :**
  - Required network bandwidth

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





# Content

- ❑ ownCloud CNRS' project : overview
- ❑ Is ownCloud scalable ? The way we worked
- ❑ ownCloud load estimate
- ❑ ownCloud load tests
- ❑ Our sizing results
- ❑ Our target architecture
- ❑ What's next ?
- ❑ Questions & answers



# ownCloud load tests

- **Based on theoretical approach :**

- 100 Apache servers / 60 MariaDB servers should be necessary for 50.000 users
- On the test platform, servers are half sized compared to target (4 cores, 8GB RAM)
- So the limit for 2 Apache servers and 1 MariaDB should be around 500 users
- Basic scenario for a file update : 1 upload then 4 downloads (average file size 5 MB)
- 1 user generates 50 basic scenarios per day, so 0,0006 scenario / sec
- So on the tested platform, the limit should be around : **0,3 scenario / sec**

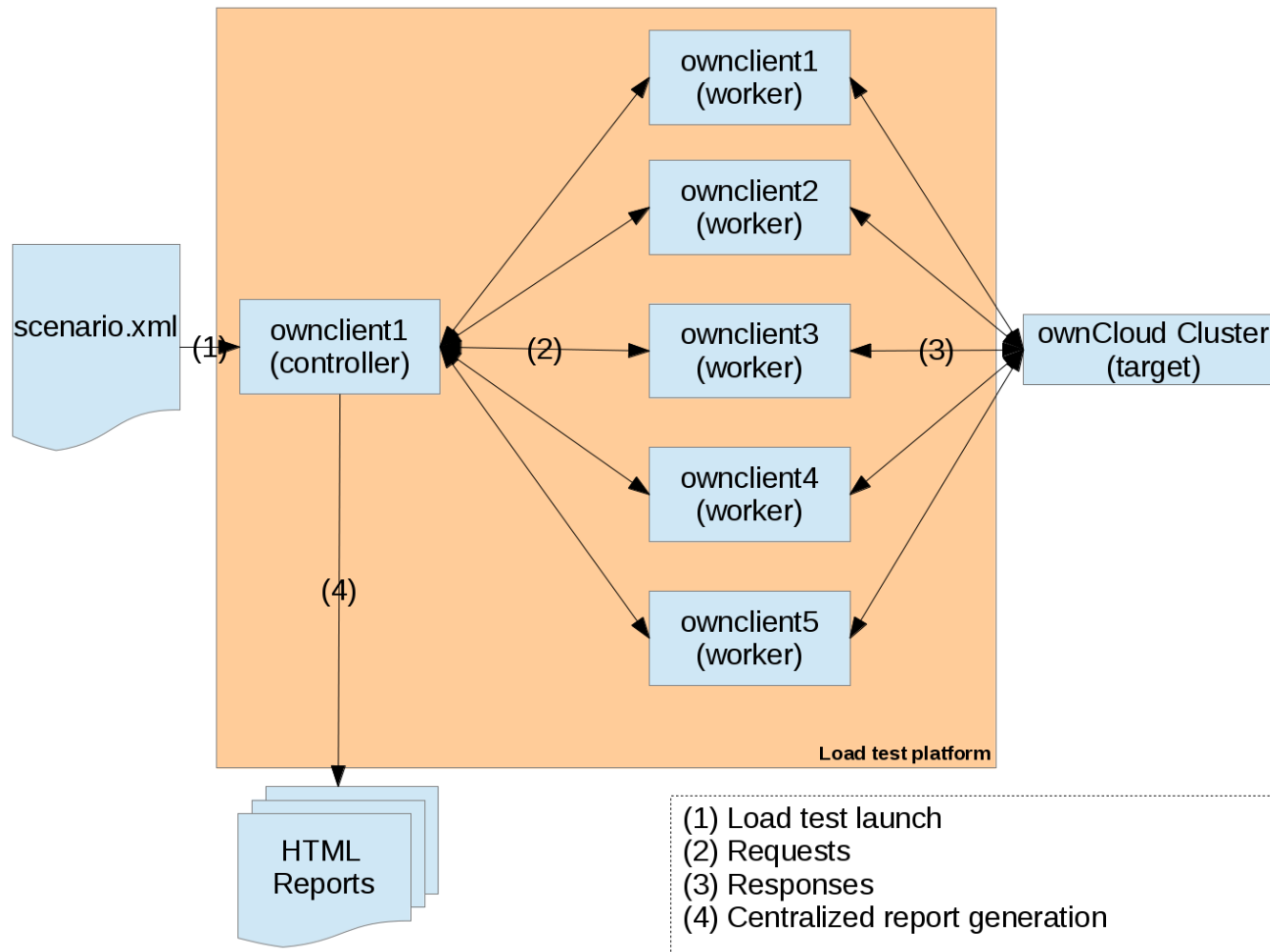
- **Test campaign :**

- 4 hours session, with :
  - 1 hour : 0,1 scenario / sec
  - 1 hour : 0,2 scenario / sec
  - 2 hours : 0,4 scenario / sec

# ownCloud load tests

## • Test tools :

- Based on Tsung for WebDAV support





P. 12

# Content

- ❑ ownCloud CNRS' project : overview
- ❑ Is ownCloud scalable ? The way we worked
- ❑ ownCloud load estimate
- ❑ ownCloud load tests
- ❑ Our sizing results
- ❑ Our target architecture
- ❑ What's next ?
- ❑ Questions & answers

# Our sizing results

## • Load test results

- Average scenario per second : 0,261

Campaign	Shot	Theoretical limit	Result (scenario/sec)	Errors (limit reached)	Comment
1	1	0,075	N/A	Yes	
1	2	0,075	0.067	No	
1	3	0,075	0.108	Yes	
2	1	Between 0,225 and 0,300	0.261	Yes	Tuning
3	1	~ Between 0,225 and 0,300	0.149	Yes	Reverse proxies activation

## • Sizing

- This confirms the results of theoritical approach
- Performance limit is on MariaDB servers
  - To be optimized
- Remarks : campaign done with missing items on target architecture :
  - Reverse Proxies (for campaigns 1 and 2)
  - Anti-virus
  - LDAP directory
  - MariaDB/Galera cluster

# Content

- ❑ ownCloud CNRS' project : overview
- ❑ Is ownCloud scalable ? The way we worked
- ❑ ownCloud load estimate
- ❑ ownCloud load tests
- ❑ Our sizing results
- ❑ Our target architecture
- ❑ What's next ?
- ❑ Questions & answers



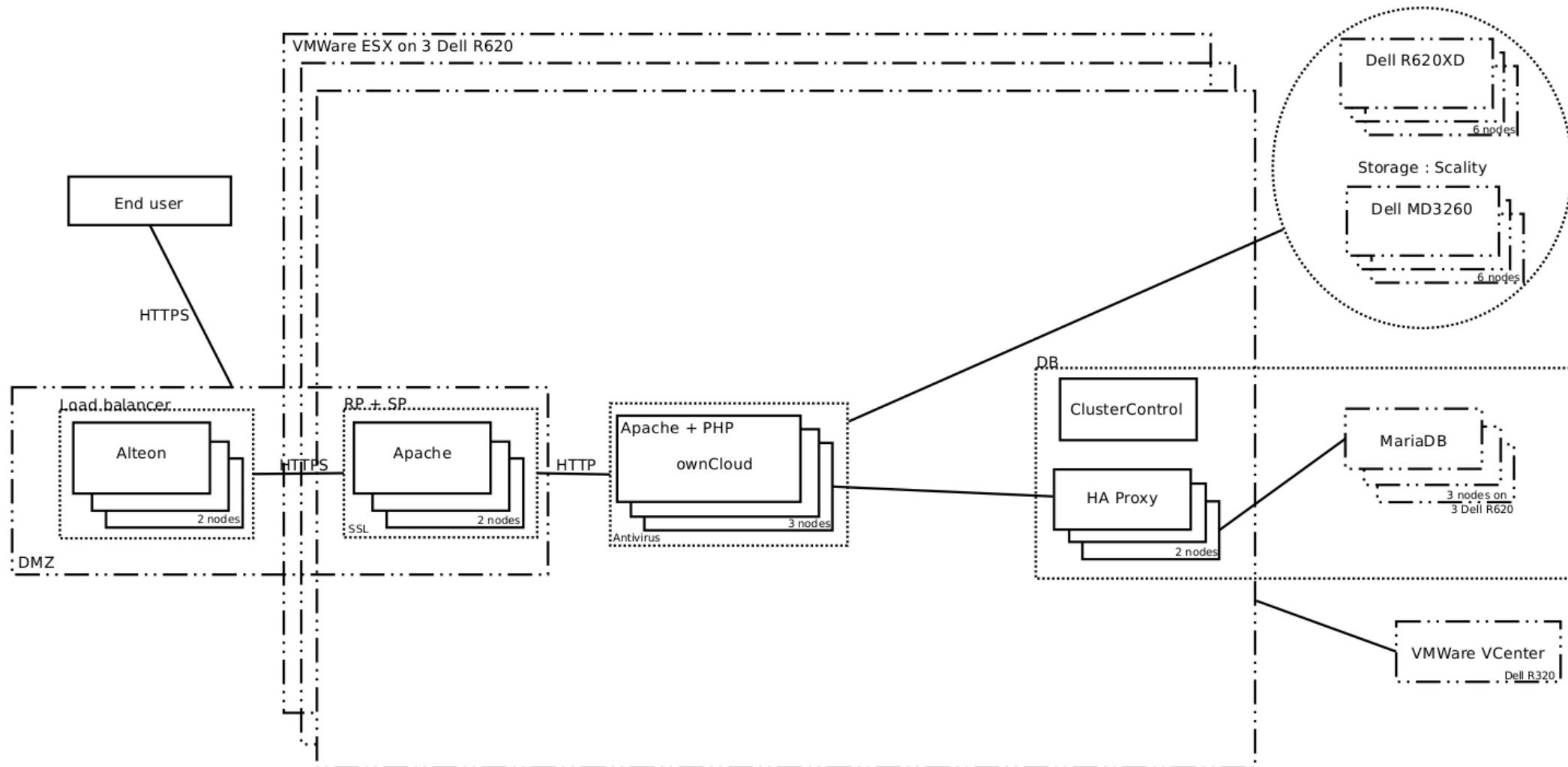
P. 15

# Our target architecture

- Components for final service (work in progress) :
  - Software = **ownCloud** (version 6, EE)
  - Hosting = **IN2P3**
  - Hardware = **DeLL**
  - Web server = **Apache** with **PHP** enabled on **Linux Red Hat EL**
  - Storage = **Scality**
  - Database = **MariaDB (with a Galera cluster)**
  - BDD Load balacing = **HAProxy**
  - HTTP Load balacing = **Alteon**
  - Reverse proxy = **Apache**
  - Virtualization solution = **VMWare**
  - SSO = **Shibboleth**
  - End users devices OS = **Linux, MAC OS, MS Windows, iOS and Android**

# Our target architecture

- Components for final service (work in progress) :





# Content

- ❑ ownCloud CNRS' project : overview
- ❑ Is ownCloud scalable ? The way we worked
- ❑ ownCloud load estimate
- ❑ ownCloud load tests
- ❑ Our sizing results
- ❑ Our target architecture
- ❑ What's next ?
- ❑ Questions & answers



P. 18

## What's next ?

- **Learn from others !**
  - CERN
  - Marseille university
  - ownCloud developers
- **Communicate** on our project
  - Internal CNRS meeting on May 19th
  - ...
- Deploy the **beta service** for 2.000 CNRS users
  - Get a real feedback from end users
  - Check the way the architecture works live !



# Content

- ❑ ownCloud CNRS' project : overview
- ❑ Is ownCloud scalable ? The way we worked
- ❑ ownCloud load estimate
- ❑ ownCloud load tests
- ❑ Our sizing results
- ❑ Our target architecture
- ❑ What's next ?
- ❑ Questions & answers



# Questions & answers

- Questions from CNRS :
  - Situation of CERNbox project ? Beta service deployed ? End users' feedback ?
  - DB optimization at CERN ? Which ones ?
  - ownCloud antivirus app for CERNbox ?
  - Trash bin and versionning apps for CERNbox ? Theses apps are very useful but the way they work is “dangerous” : end users can loose versions of a file without being informed for instance.
  - CERNbox scaling ?
  - Discussions between CERN and OWNCLOUD ? Which improvements were requested, what is the commitment of OWNCLOUD in the product roadmap ?
  - Which features are activated / used in CERNbox ?
  - Which improvements were developed for CERNbox ? (ownCloud and DB, especially for performance optimizations)