Final Basic Cloud Assigment

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21st march 2024

About the assignment

The goal of the Exercise was to deploy a Cloud based file storage system, using containerization, in particular Docker and Docker-compose, with the following requirements:

- Seamless implementation of file storage for users;
- Role Authentication policy
- Testing of the platform
- Discuss security measures
- Assess scalability

Nextcloud approach

I approached the problem using Nextcloud, an application software that allows for an out-of-the-box implementation of almost all the requirements of the project, such as:

- Flexible storage solution, allowing for both Object Based and NFS Storage System.
- Custom backend database solutions
- Esaye implementation of caching system
- Role based access
- Wide range of customizable security features
- Docker image for simple dockerized deployement

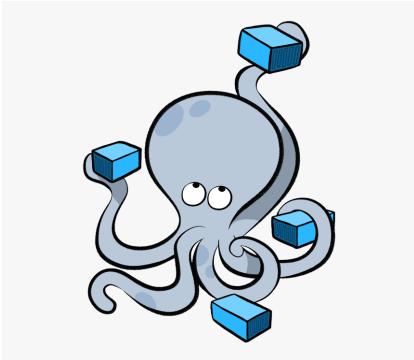
Security features

Nextcloud offers by default a great number of customizable features regarding security, such as:

- Server Side Encryption
- Personalizable Password settings
- Two-Factor authentication
- Seamless proxy integration

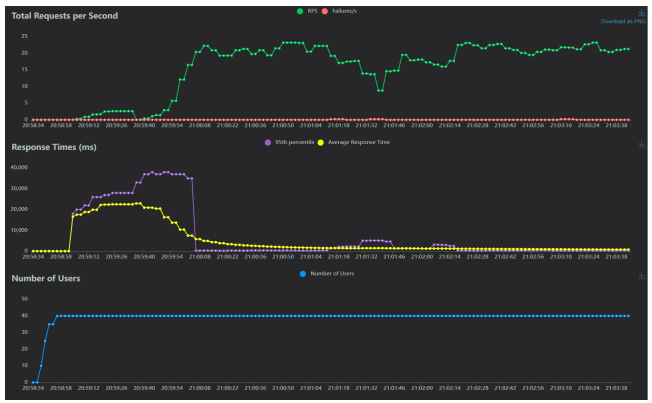
Deployement

- The deployement of this enivronment is done using Docker-compose
- All features are manageable from the UI, including a basic but quite complete monitoration of the system
- Vast ecosystem of applications that enable for huge personalization of the service.



Testing

To test the deployement I used the library Locust, written in Python.



(a) Load test for medium-sized files, 40 users.

(b) Load test for large size files, 20 users.

Scalability analysis

In this section, I analyzed two possible scalable deployements solutions, namely:

- On-premise deployement on a NFS or Storage Server.
- Cloud deployement, with authomatic scaling.

Deployement on exixting infrastructure

Deployement of Nextcloud on an existing centralized or distributed File System.

Main aspects

- Infrastructure control
- Personalization
- Cost
- Security
- Data location

Cloud deployement

Deployement of Nextcloud using a Cloud Object Storage System (Amazon S3).

- Cloud database solution
- Scalability
- Service management
- World Wide Availability
- Cost efficiency

Cost efficiency evaluations

Deployement on existing infrastructure

- Higher initial costs, but lower maintenance and operational costs
- Affordable if you know in advance what you traffic will be, managin the infrastructure accordingly

Cloud Deployement

- Almost zero initial costs, with operational costs depending on the demand
- Convenient for little installations and for situations with fluctuating traffic