Shanoir NG

Software Design Description

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# Project context

## Project presentation

Shanoir (SHAring NeurOImaging Resources) is an open source neuroinformatics platform designed for sharing, archiving, searching and visualizing neuroimaging data. It provides a user-friendly secure web access and offers an intuitive workflow to facilitate the collecting and retrieving of neuroimaging data from multiple sources and a wizard to make the completion of metadata easy. Shanoir comes along many features such as anonymization of data, support for multi-centers clinical studies on subjects or groups of subjects.

Shanoir allows searchers, clinicians and engineers to carry out local or remote (cloud) research projects.

## Project goals

Shanoir NG (Next Generation) is the new version of Shanoir. It is based on a multi microservices architecture.

## Main functionalities

Shanoir NG main functionalities are:

* User management

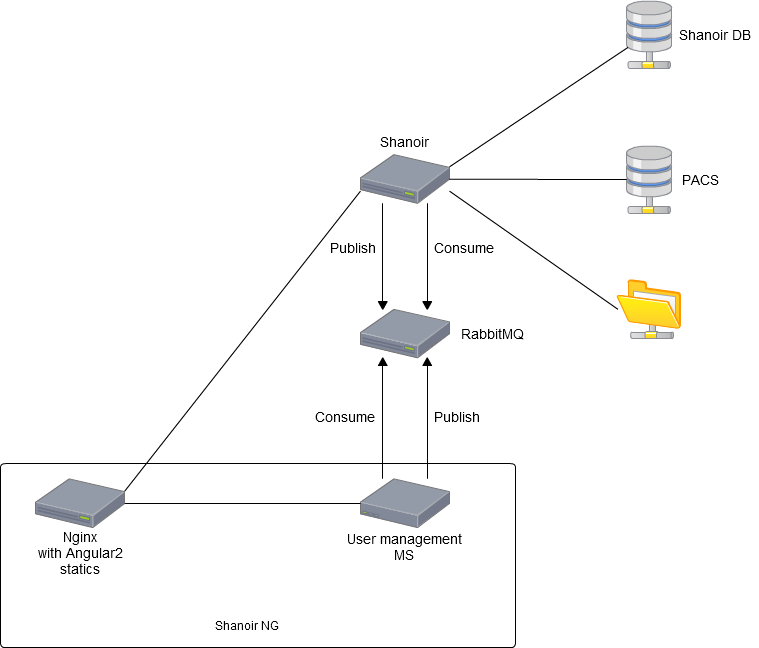
## Application users

Target population is:

* Shanoir administrators

# Functional architecture

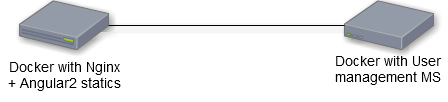
## Interaction with Shanoir



## Flows description

Shanoir NG communicates with Shanoir through RabbitMQ server.

## Functional architecture schema of Shanoir NG



### User management

This microservice goal is to manage all application users. It allows to create, update or remove users and manages rights and access.

# Software architecture

## Software solution

Shanoir NG is based on microservices. One microservice corresponds to backend of one functionality.

Application front end is apart and pages for all functionalities are grouped on Nginx server.

Each microservices and Nginx are embedded in a Docker.

## Software solution

### Frameworks and libraries

Shanoir NG uses following frameworks and libraries:

|  |  |  |
| --- | --- | --- |
| Framework / Library | Version | Description |
| Spring Boot | 1.4.1 | Spring Boot is Spring's convention-over-configuration solution for creating stand-alone, production-grade Spring-based Applications that you can "just run". It takes an opinionated view of the Spring platform and third-party libraries so you can get started with minimum fuss. Most Spring Boot applications need very little Spring configuration. |
| Angular 2 | 2.1 | Development platform for building mobile and desktop web applications. |

### Docker

Docker is an open-source project that automates the deployment of Linux applications inside software containers.

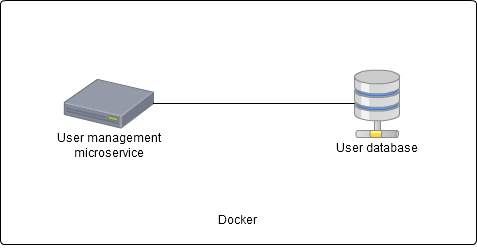
Docker containers wrap up a piece of software in a complete filesystem that contains everything it needs to run: code, runtime, system tools, system libraries – anything you can install on a server. This guarantees that it will always run the same, regardless of the environment it is running in.

## Components

### Front end

Front end is developed with Angular 2 and is placed on Nginx server.

### User management microservice



User management microservice is based on Spring Boot framework. Data are stored in a MySQL database.

# Technical architecture

## Software components

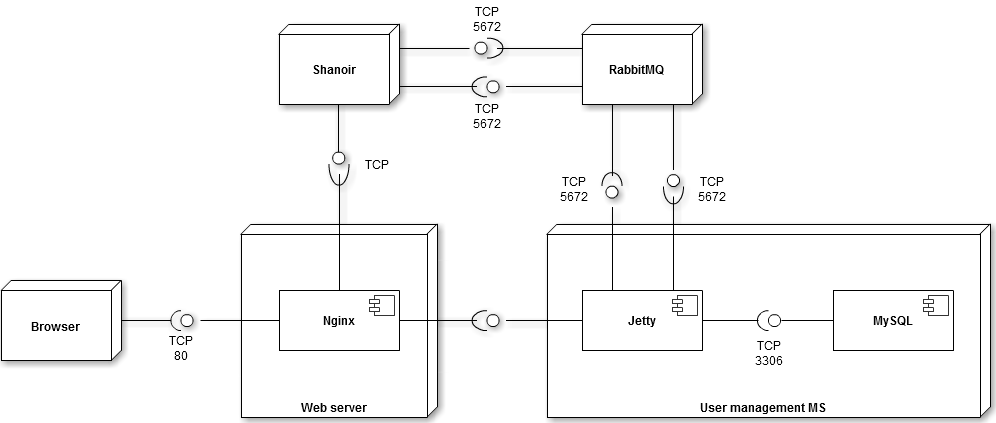
Shanoir NG is based on five software components:

* Docker
* Redis
* Nginx server
* Jetty server
* MySQL database



|  |  |  |
| --- | --- | --- |
| **Component** | **Version** | **Role** |
| Docker |  | Open-source project that automates the deployment of Linux applications inside software containers. |
| Redis |  | Open-source, in-memory data structure store, used as database, cache and message broker. |
| Nginx |  | Nginx is configured as reverse proxy, allowing to isolate application server from internet.  Nginx is also used:   * For TLS certification |
| Jetty |  | Application server hosting microservices |
| MySQL |  | Application database |

## Interactions between components and external systems



|  |  |  |
| --- | --- | --- |
| **Components** | **Exposed interfaces** | **Used interfaces** |
| Nginx | Nginx exposes an http interface to internet, which is used by clients | Port of Jetty server of user management microservice  Shanoir inteface |
| Jetty | Port xxx | MySQL database connector  RabbitMQ interface |
| MySQL | MySQL database connector |  |

## Deployment