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UNIVERSITÀ DI PISA
Corso di Laurea in Informatica

PIER

DOCKER ORCHESTRATOR PER WEB HOSTING

RELAZIONE DI TIROCINIO

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AIM OF THE INTERNSHIP

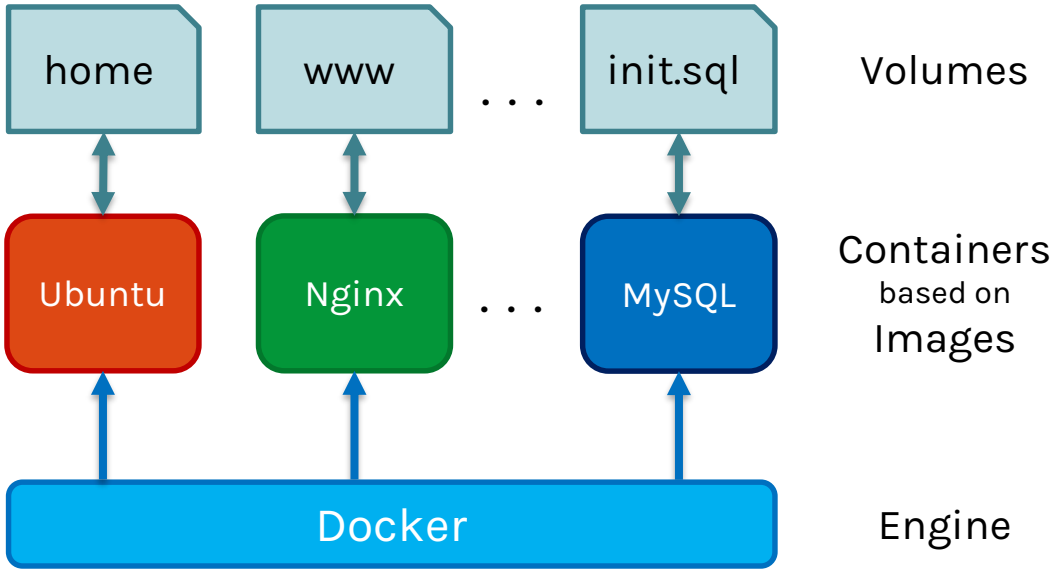
Automatize the creation of web spaces through Docker containers by providing a specific orchestrator for site hosting.

AIM OF THE INTERNSHIP

The orchestrator must:

- have a simple and useful interface
- create and manage all the necessary containers
- offer FTP and database

ABOUT DOCKER



ABOUT DOCKER

Secure
thanks to containers isolation

Scalable and Reusable
with different containers running the same image and snapshots

Extensible and Customizable
with custom images, container interconnections, volumes and ports

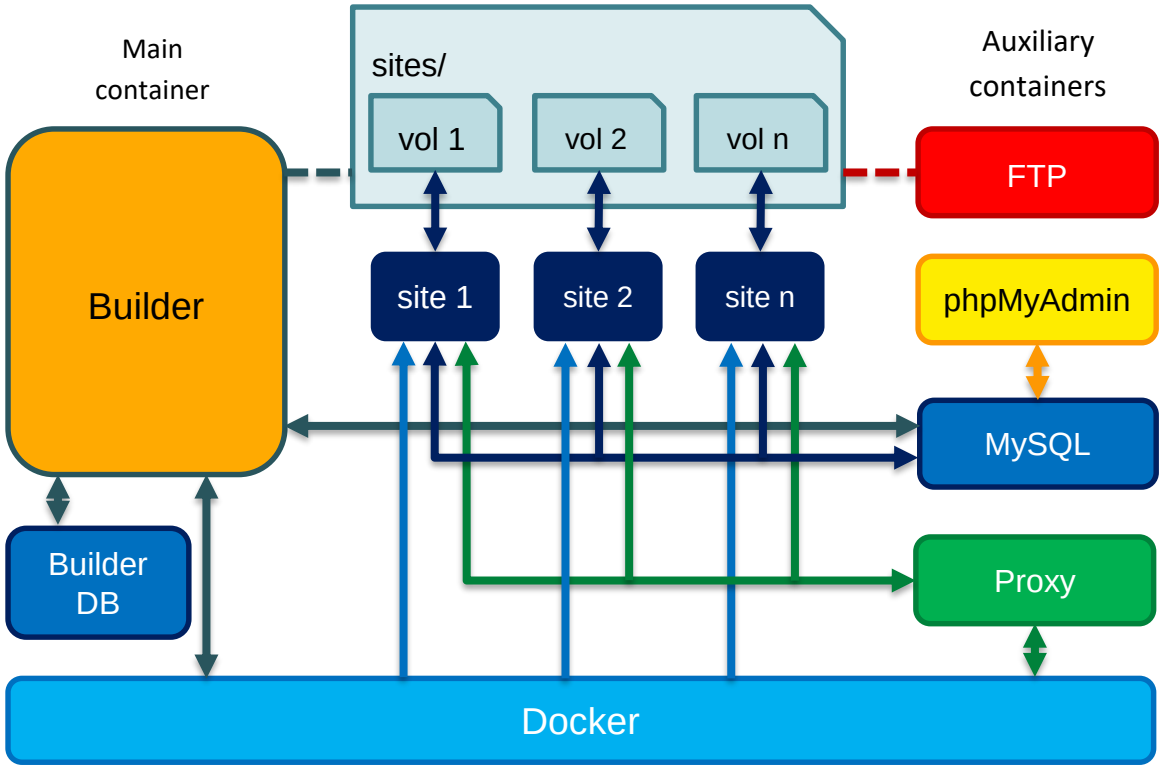
Nginx • Httpd • MySQL
Among the most used images

40%
Growth of Docker in the last year

15%
Hosts use Docker

Source: Datatdog 2018

THE ARCHITECTURE

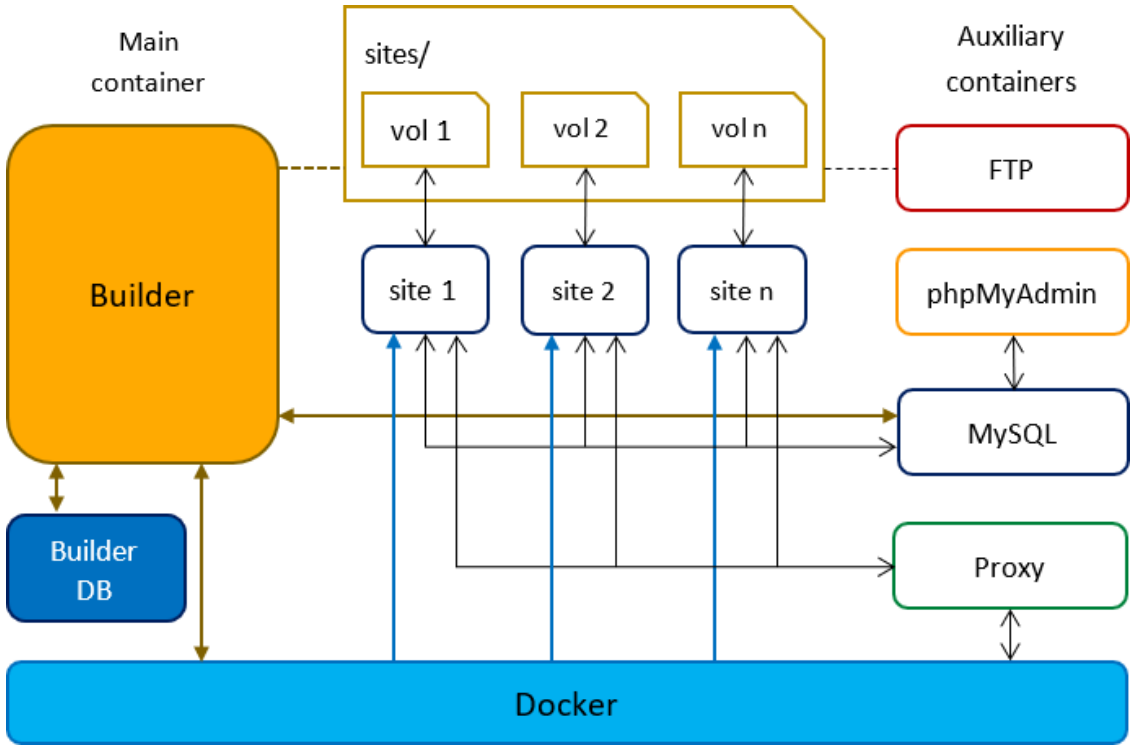


PIER ARCHITECTURE

WEBSITE CREATION

The Builder

- Creates the site folder (volume)
- Creates the database on MySQL container if required
- Runs the website through Docker

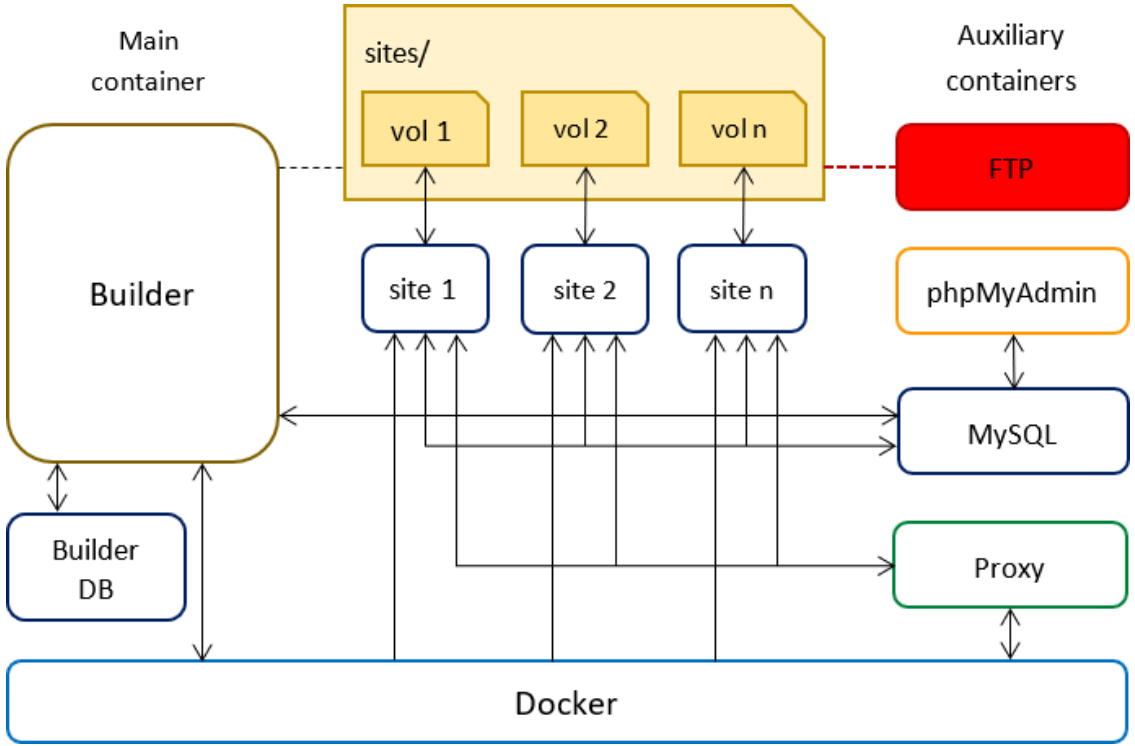


PIER ARCHITECTURE

FILE MANAGING

Through the FTP container it is possible to manage their own files.

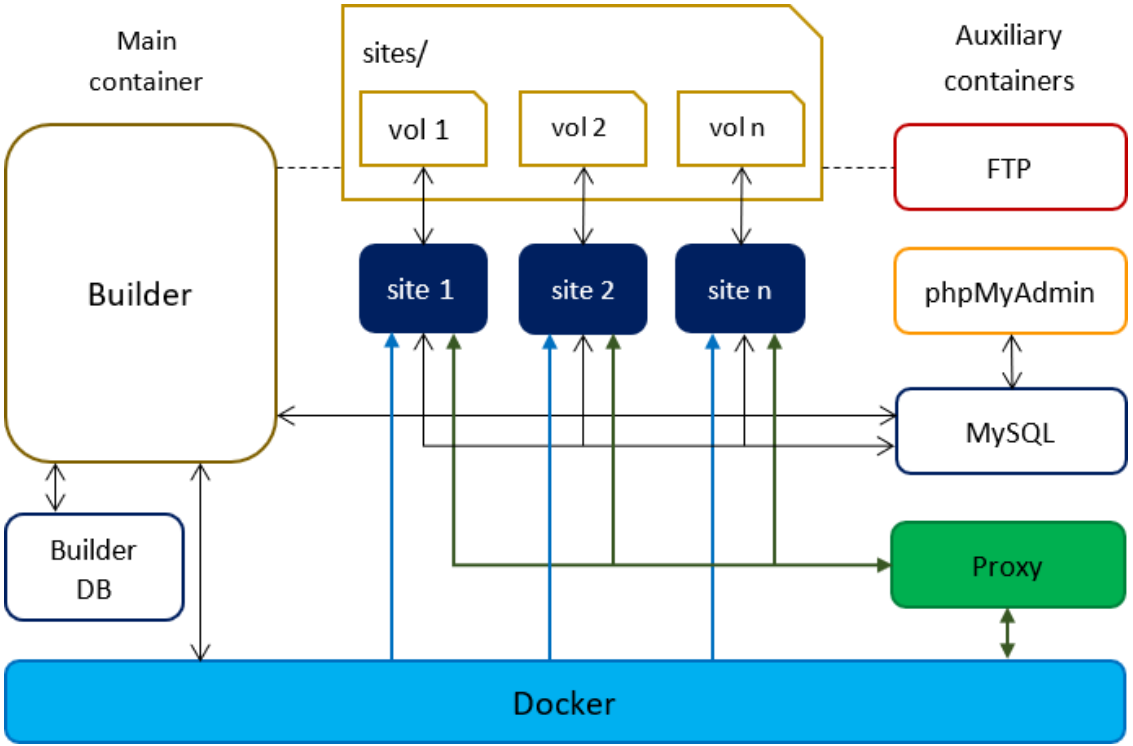
Here the user can see the files of his sites and modify them.



PIER ARCHITECTURE

PROXY

All sites are accessible at the same IP address.
The proxy takes care to check which site is associated with a given domain and redirects the user to the right container.



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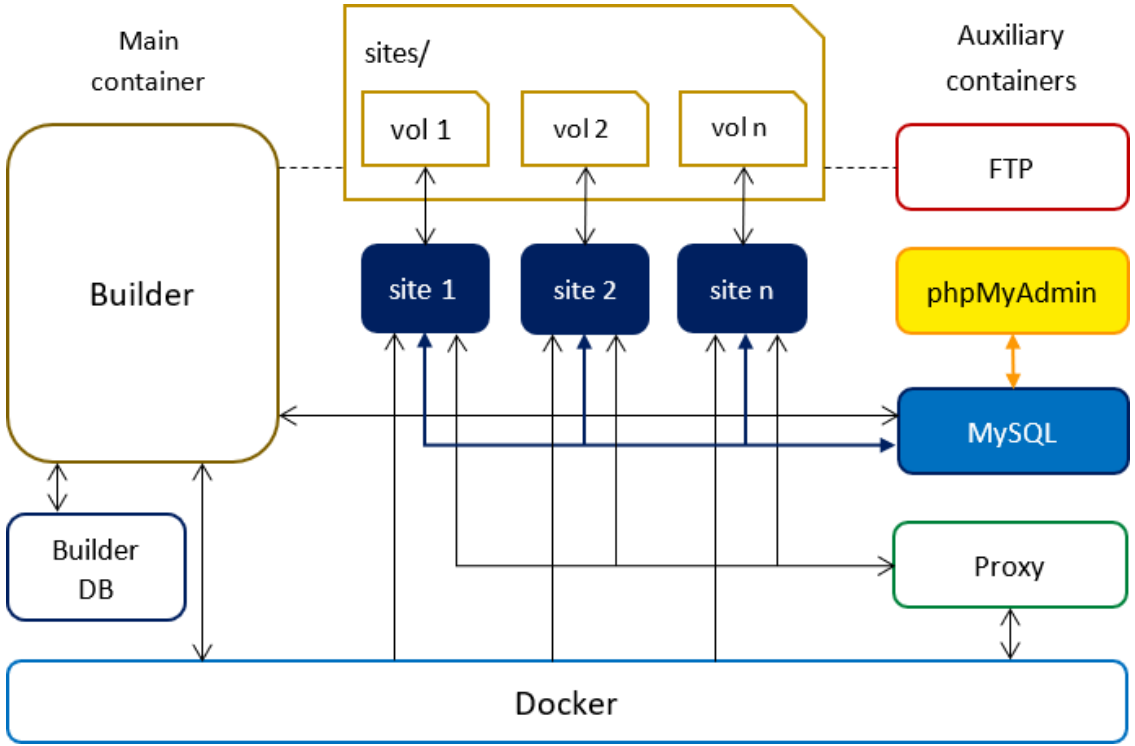
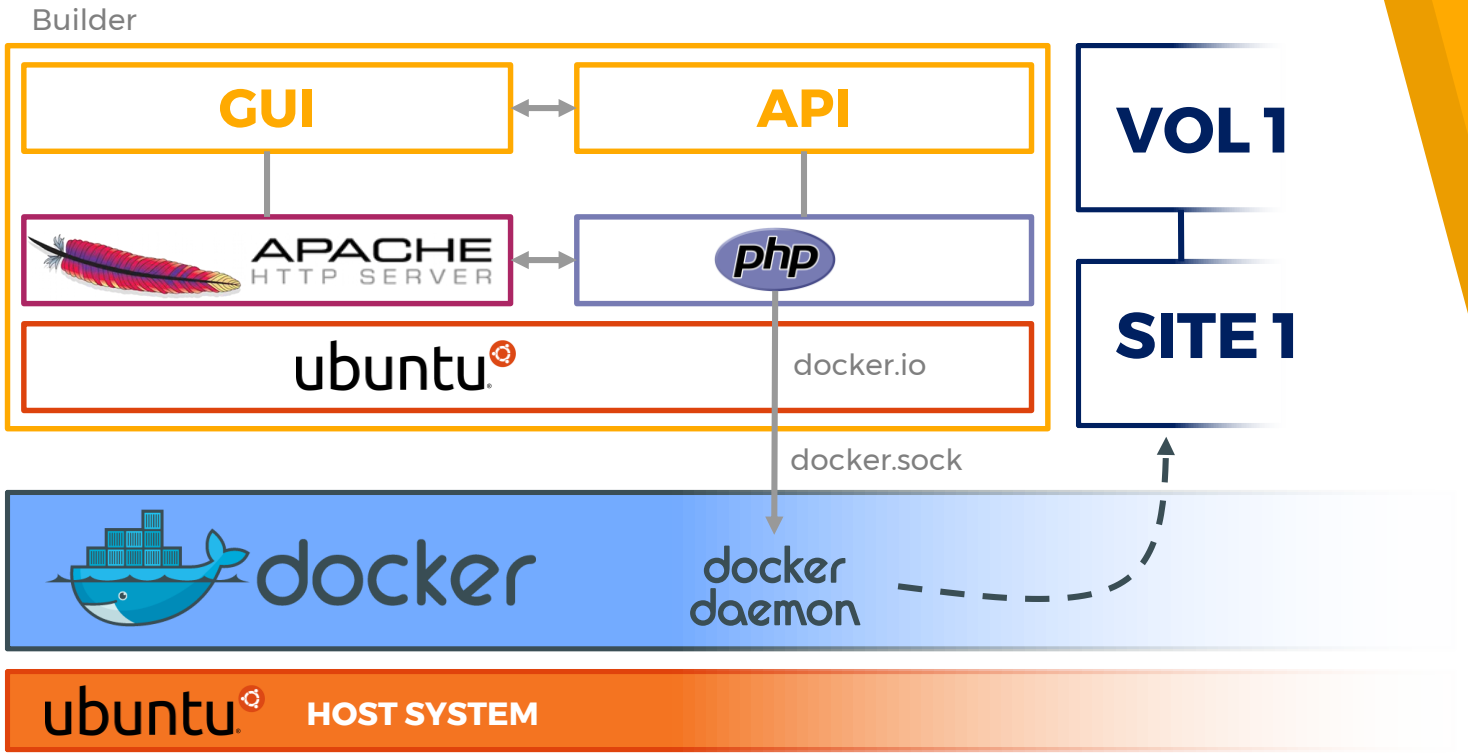
DATABASE

The database is provided by the MySQL container. Sites can access it on port 3306. Users can manage their own databases through the phpMyAdmin container.

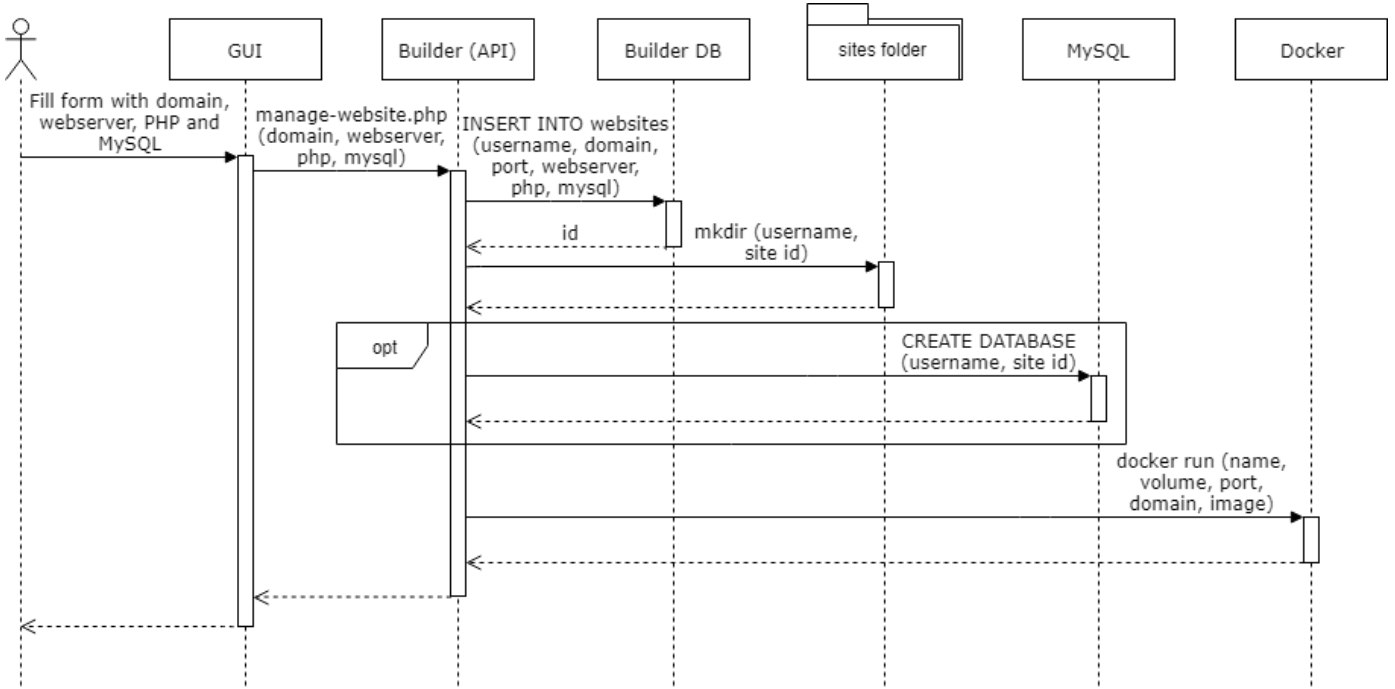


FOCUS ON THE BUILDER



SEQUENCE DIAGRAM

CREATING A WEBSITE



Logout

Welcome back aldodaquino!

Your websites

ID Domain Webserver PHP MySQL Manage

Add new website

Important notice

In order for your site to be visible with the associated domain you need to point your domain at ip address 123.456.78.90 or set pier.aldodaquino.com as CNAME

FTP access

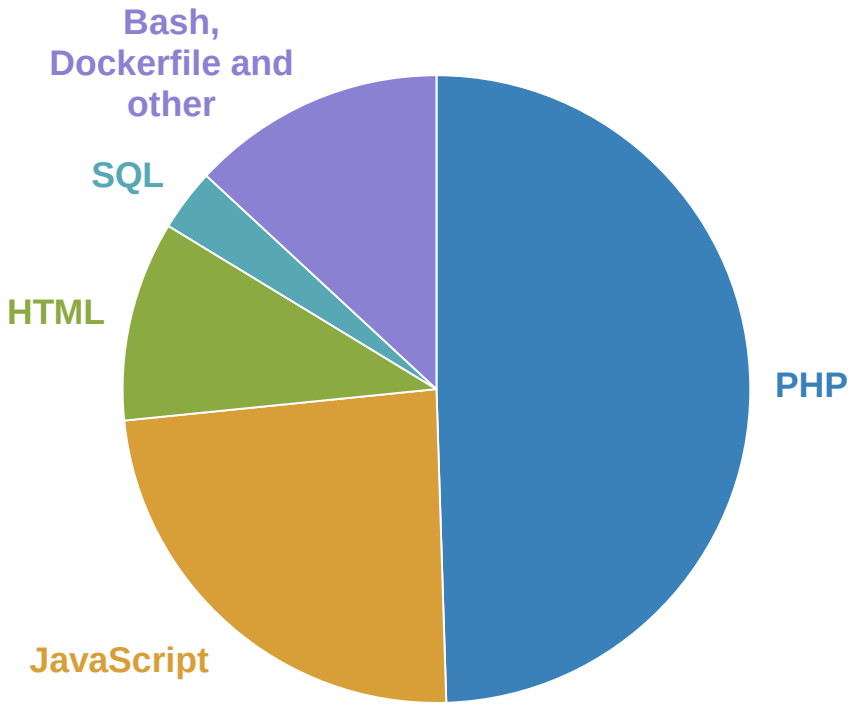
You can manage the files of your sites on your FTP account. You can access it on ftp.pier.aldodaquino.com on the default port 21. Username and password are the same ones you use to access this control panel.

MySQL

You can to your database at mysql.pier.aldodaquino.com on the default port 3306. Username and password are the same ones you use to access this control panel. Database name is the same of the site name and is "site" followed by the site ID, like site123.

DEMO

LANGUAGES USED



CONCLUSIONS

- Easy to use thanks to the GUI
- Easy to extend thanks to the APIs
- Site creation and configuration completely automatized
- Possibility to modify the sites previously created
- Lightweight and clean code

LESSON LEARNED

- Problems in communicating with Docker from a container
- Impossibility of packaging everything inside one container
- Difficulties in make a zero configuration system

FUTURE EXTENSIONS

and what is missing

SSL HTTPS

Backup

More images

More databases and users for each site

NoSQL Database engines

docker

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