ACROBA

connect & produce through agile production

D1.3 ACROBA Platform Access

WP1.

Lead Beneficiary DEUSTO

Delivery Date 2021/12/31

Dissemination Level: Confidential

Version V1

Deusto

Universidad de Deusto

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

Approval Status

	Name and Surname	Role in the Project	Partner(s)
Author(s)	Borja Sanz	WP1 Leader	DEU
Reviewed by	Alberto Tellaeche	WP1 Leader	DEU
Approved by	Norman U. Baier	Project Coordinator	BFH

History of Changes

Version	Date	Description of Changes	By
0.1	2021.12.08	First Draft	Borja Sanz
1.0	2021.12.22	Final Version	Borja Sanz and Alberto Tellaeche

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

Disclaimer:

The work described in this document has been conducted within the ACROBA project. This document reflects only the ACROBA consortium view, and the European Union is not responsible for any use that may be made of the information it contains.

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

Table of Contents

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

List of Figures (always in the report if applicable)

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

Executive Summary

The purpose of this document is to help the user to get familiar with Docker and ACROBA Architecture uploaded in the project´s Github repository.

It provides a clean and ready to use platform following the standards specified in the ACROBA architecture, and also some examples and tutorials for users to get started with their first application.

1.1 Audience

This document is intended for future customers, partners, and employees using ACROBA architecture repository to develop advanced robotics applications

1.2 Previous knowledge

This document expects that you are familiar with basic server, storage, and networking concepts and also ROS and FIWARE basic configurations.

1.3 System Requirements for running ACROBA Platform

Easiest and safest to set up, but depending on the PC, may or may not run effectively. Running ROS, Gazebo (simulator) and Rviz (visualizations) is very graphics card, RAM, and processor-intense. The minimum recommended system requirements are:

- Dedicated Hardware(computer):
    - I9 8x8 5.0 GHz procesor cores or superior processor
    - 16 GB Ram memory
    - 1TB GB of free hard drive space
    - Minimum NVIDIA 940M or similar embedded Graphics
    - Network access
- Ubuntu 20.04.3 LTS 64-bit

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

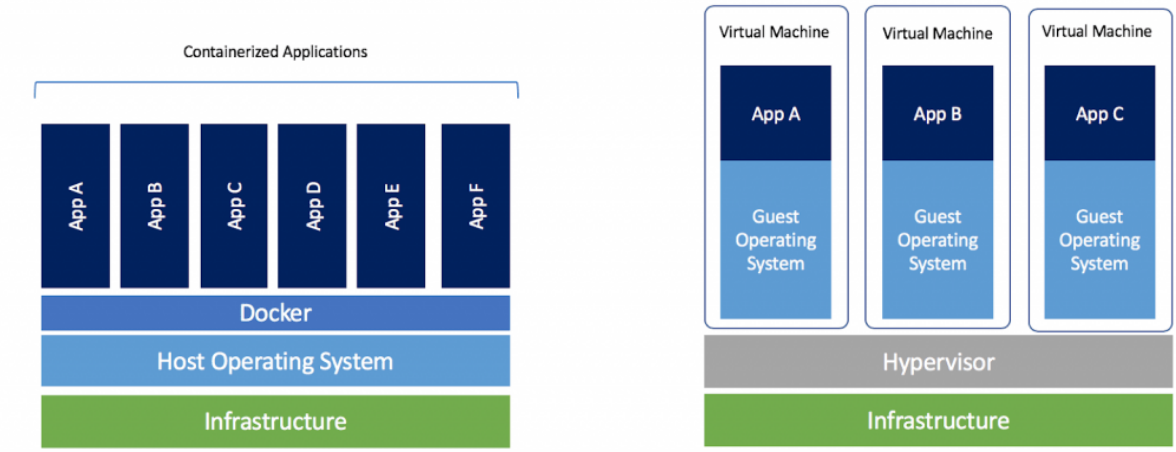
2 Getting Started

2.1 Overview

2.1.1 What Is Docker?

Docker is an open-source OS-level virtualization platform that allows users to develop, deploy, and run applications in independent containers.

Figure 1 - Docker Overview



The Docker platform powered by ACROBA Architecture comes with a graphic user interface (GUI) through a VNC client inside the Docker container. The GUI not only streamlines for quick deployment, but also features the launch of ROS graphical applications like RVIZ or GAZEBO.

2.1.2 Features of ACROBA Architecture Docker

Docker provides an easy way to develop and deploy applications for different type of users:

- For ACROBA customers**:** You can deploy a ACROBA Platform container image by downloading it from ACROBA github repository and get it working in a few simple steps.

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

- **For ACROBA Partners:** You can pull a standardized and modular ACROBA Platform with the benefit of tested skills and modules that provide functionality for different use cases, that reduces developer and deploy time in Projects.
- **For software developers:** You can create and test modules and skills for ACROBA Platform in a ready-to-go environment.

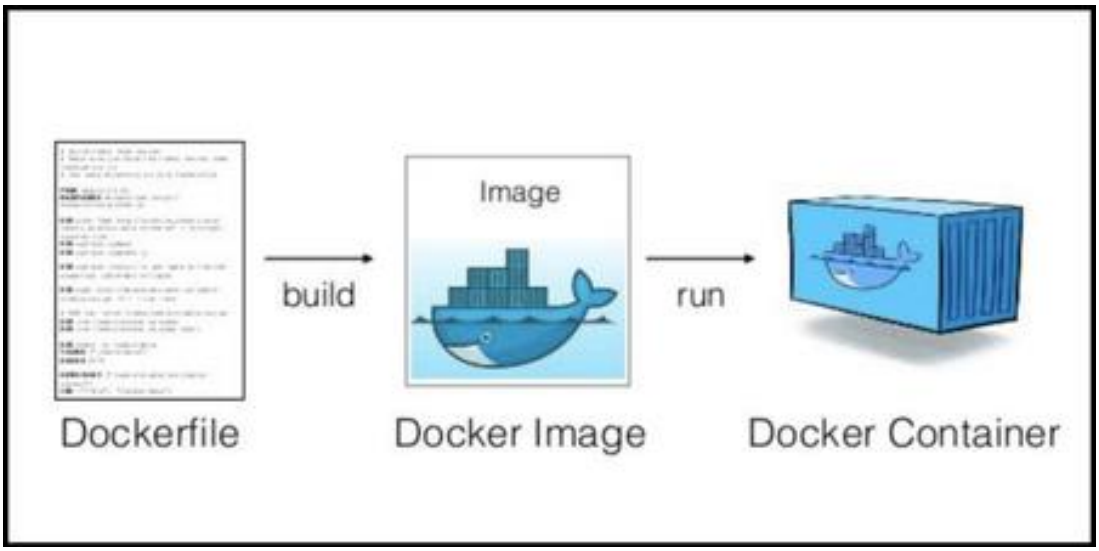
2.2 Docker Architecture

2.2.1 Docker Registries

Online storage for Docker container images that stores and shares Docker images. Main public storage is Docker Hub.

2.2.2 Container Images

A container image is a read-only file with instructions for creating a specified container. Inside this container, an application runs in the runtime environment with a specified configuration.



The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

2.2.3 Docker Containers

Runtime instance of an image that includes all the software needed to be successfully executed on Docker engine.

2.2.4 Docker Engine

Container runtime environment that supports tasks and workflows involved to build, ship and run container-based applications, it can be executed on different operating systems like Debian, MacOS, Windows …

The engine creates a server-side daemon process that hosts images, containers, networks and storage volumes.

2.2.5 ACROBA Platform Docker Overview

ACROBA PLatform is created with Docker-compose tools that helps to define and run multi-container Docker applications in one file. In this file is defined:

- ROS1 Ubuntu 20.04 based service with noVNC client that provides graphical access to the container. This container complies with ACROBA architecture specifications.
- A FIWARE implementation trough Mongo & Orion services

3 Steps to Launch the ACROBA Docker Platform

We need to have git and docker engine installed on the system.

3.1.1 GIT

Install git (Ubuntu 20.04):

Source: https://git-scm.com/download/linux

From linux terminal:

```
$ sudo apt update
$ sudo apt install git
$ git --version
```

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

3.1.2 Docker

Install Docker & docker compose (ubuntu 20.04):

Source: https://docs.docker.com/engine/install/

From linux terminal:

```
$sudo apt update

    $sudo apt-get install \

         apt-transport-https \

         ca-certificates \

         curl \

         gnupg \

         lsb-release

    $ curl -fsSL https://download.docker.com/linux/ubuntu/gpg | sudo gpg --dearmor -o /usr/share/keyrings/docker-archive-keyring.gpg

    $ echo \

         "deb [arch=amd64 signed-by=/usr/share/keyrings/docker-archive-keyring.gpg] https://download.docker.com/linux/ubuntu \

    $(lsb_release -cs) stable" | sudo tee /etc/apt/sources.list.d/docker.list > /dev/null

    $ sudo apt-get update

    $ sudo apt-get install docker-ce docker-ce-cli containerd.io

    $ sudo docker run hello-world
```

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

```
$ sudo groupadd docker
$ sudo gpasswd -a $USER docker
$ sudo service docker restart
```

Source: https://docs.docker.com/compose/install/

```
$ sudo curl -L
"https://github.com/docker/compose/releases/download/1.29.2/docker-compose-
$(uname -s)-$(uname -m)" -o /usr/local/bin/docker-compose
$ sudo chmod +x /usr/local/bin/docker-compose
$ docker-compose –version
$ sudo chmod a+x /usr/local/bin/docker-compose
```

3.1.3 GIT Clone ACROBA Platform Repository

For now, this is in a private repository. In order to access, it is necessary to add a GitHub user to the project (project coordinator can do that). Once the access is granted, the following command should be executed.

```
$ git clone https://github.com/ACROBA-Project/ACROBA-Architecture
```

3.2 Build & Launch

```
$ cd ACROBA-Architecture\
$ docker-compose up
```

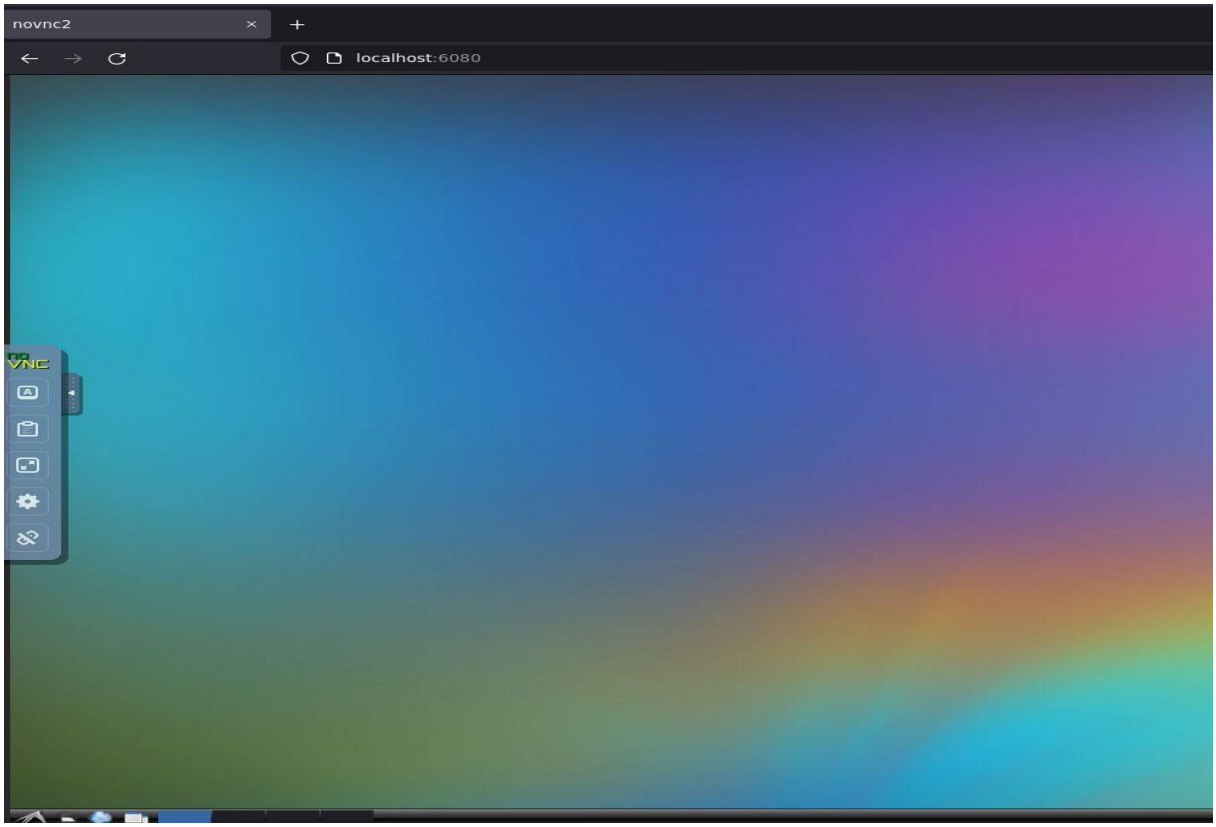
The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

3.3 Access GUI

Open web browser and type : http://localhost:6080/

If all is working successfully now we can access GUI like picture below

Figure 2 - ACROBA Platform GUI

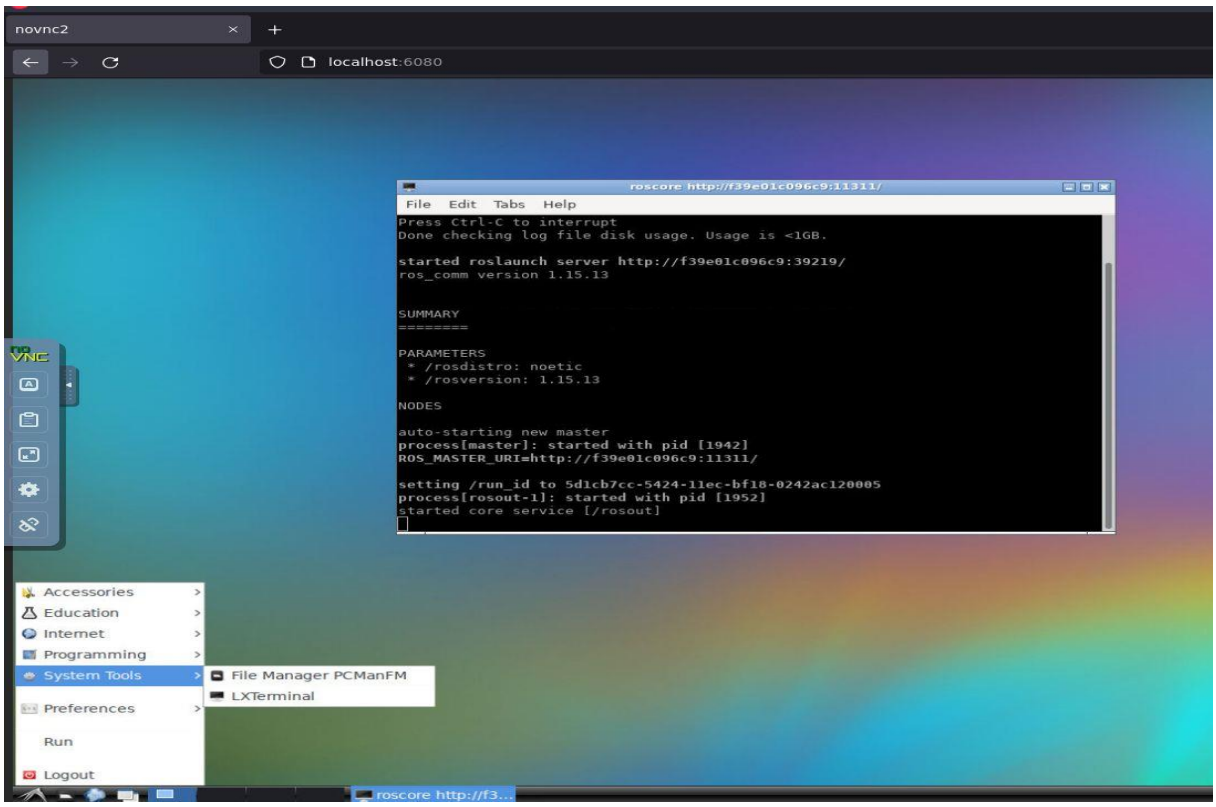


3.3.1 First Steps With GUI Environment

Before running any existing example or creating a new project it is needed to execute roscore command in linux terminal:

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

Figure 3 - Screenshot of ACROBA Platform GUI Launching ROSCore



Now the system is ready to execute an example, or to create new projects based on ACROBA architecture.

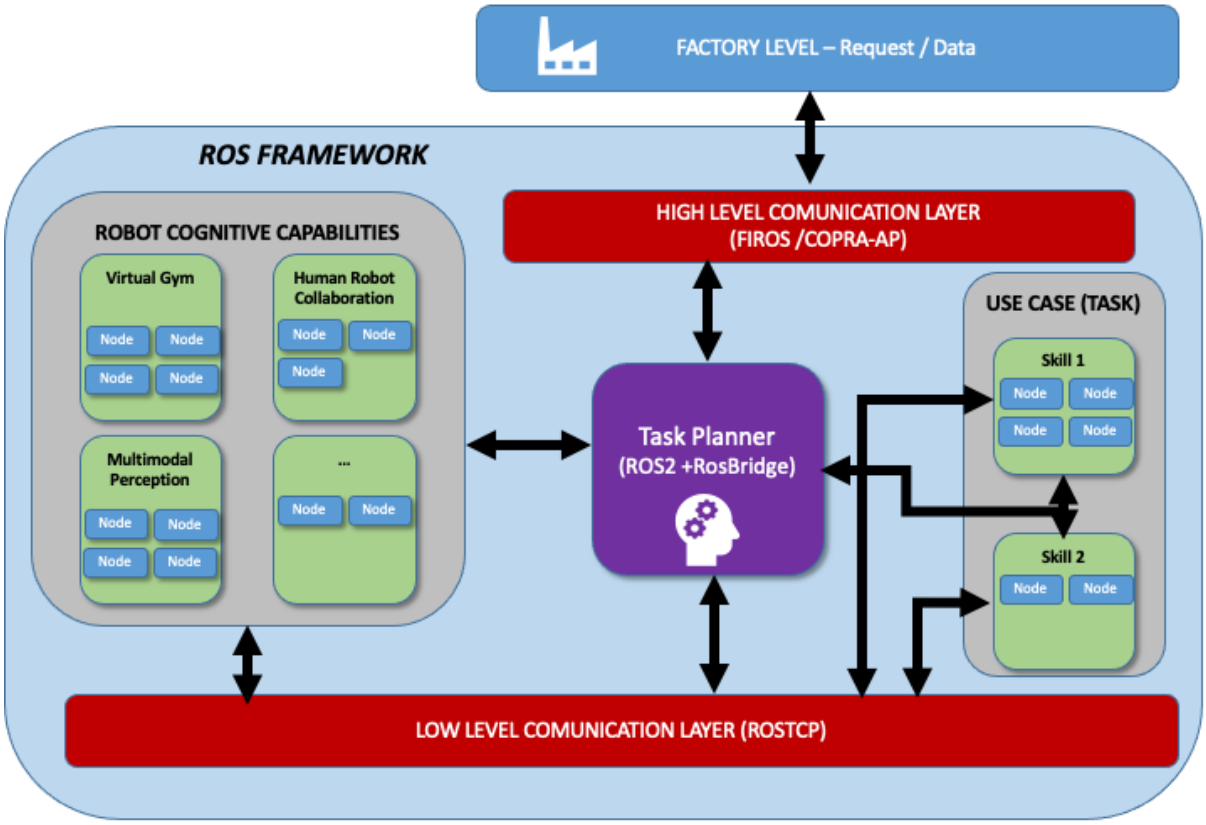
4 Understanding ACROBA Architecture

ACROBA aims to provide a robust and modern robotics architecture to face in an efficient way robotics developments nowadays demanded by the factories of the future. https://github.com/ACROBA-Project.

ACROBA microservices architecture is structured as a set of modules that implement more precise capabilities with an orchestration layer that manages all modules working together. Ultimately ACROBA has a testing driven layer to ensure a reliability scalable platform.

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.

Figure 4 - ACROBA Platform Diagram



Due to these features each module of microservice can be developed self-contained with different solutions for every requirement.

5 Conclusion

This document provided a guide for the installation and familiarization of the ACROBA platform.

The ACROBA project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101017284.