

# Table of Contents

1. Software Architecture .....	4
1.1. Standpoints .....	4
1.2. Design .....	4
1.3. ROS Master .....	5
2. ROS topics .....	7

## Welcome

### Project Willy

- [History of Willy](#)
- [Project Willy](#)
- [Publicity](#)
- [Sponsors](#)

### Getting started

- [Introduction to ROS](#)
- [Development Guide](#)
- [Driving Willy](#)
- [Manual](#)
- [Wiki Manual](#)

### Build of Willy

- [Design history](#)
- [Hardware](#)

### Architecture

- [Software Architecture](#)
- [ROS topic design](#)

### Raspberry Pi's

- [Sensor node](#)
- [Social Interaction node](#)
- [Power node](#)

### Components

- [ROS master](#)
- [New ROS master on Ubuntu](#)
- [Sonar](#)
- [Lidar](#)
- [Kinect](#)

- [Localization and navigation](#)
- [Motor controller](#)
- [Joystick](#)

## **Lessons learned**

- [Todo & Advice](#)
- [Lessons Learned](#)

## **Archive**

- [Previous Groups](#)
- [Research Archive](#)
- [Skylab Architecture](#)
- [Skylab](#)
- [Multi master](#)
- [WillyWRT](#)
- [Realisation](#)
- [Hardware](#)
- [Brain](#)
- [Design Guild](#)
- [Social interaction](#)
- [Speech](#)
- [Speech recognition](#)
- [IMU](#)
- [Human Detection](#)
- [Radeffect App](#)

## **Welcome**

### **Project Willy**

- [History of Willy](#)
- [Project Willy](#)
- [Publicity](#)
- [Sponsors](#)

### **Getting started**

- [Introduction to ROS](#)
- [Development Guide](#)
- [Driving Willy](#)
- [Manual](#)

- [Wiki Manual](#)

## **Build of Willy**

- [Design history](#)
- [Hardware](#)

## **Architecture**

- [Software Architecture](#)
- [ROS topic design](#)

## **Raspberry Pi's**

- [Sensor node](#)
- [Social Interaction node](#)
- [Power node](#)

## **Components**

- [ROS master](#)
- [New ROS master on Lubuntu](#)
- [Sonar](#)
- [Lidar](#)
- [Kinect](#)
- [Localization and navigation](#)
- [Motor controller](#)
- [Joystick](#)

## **Lessons learned**

- [Todo & Advice](#)
- [Lessons Learned](#)

## **Archive**

- [Previous Groups](#)
- [Research Archive](#)
- [Skylab Architecture](#)
- [Skylab](#)
- [Multi master](#)
- [WillyWRT](#)
- [Realisation](#)
- [Hardware](#)
- [Brain](#)
- [Design Guild](#)

- [Social interaction](#)
- [Speech](#)
- [Speech recognition](#)
- [IMU](#)
- [Human Detection](#)
- [Radeffect App](#)

# 1. Software Architecture

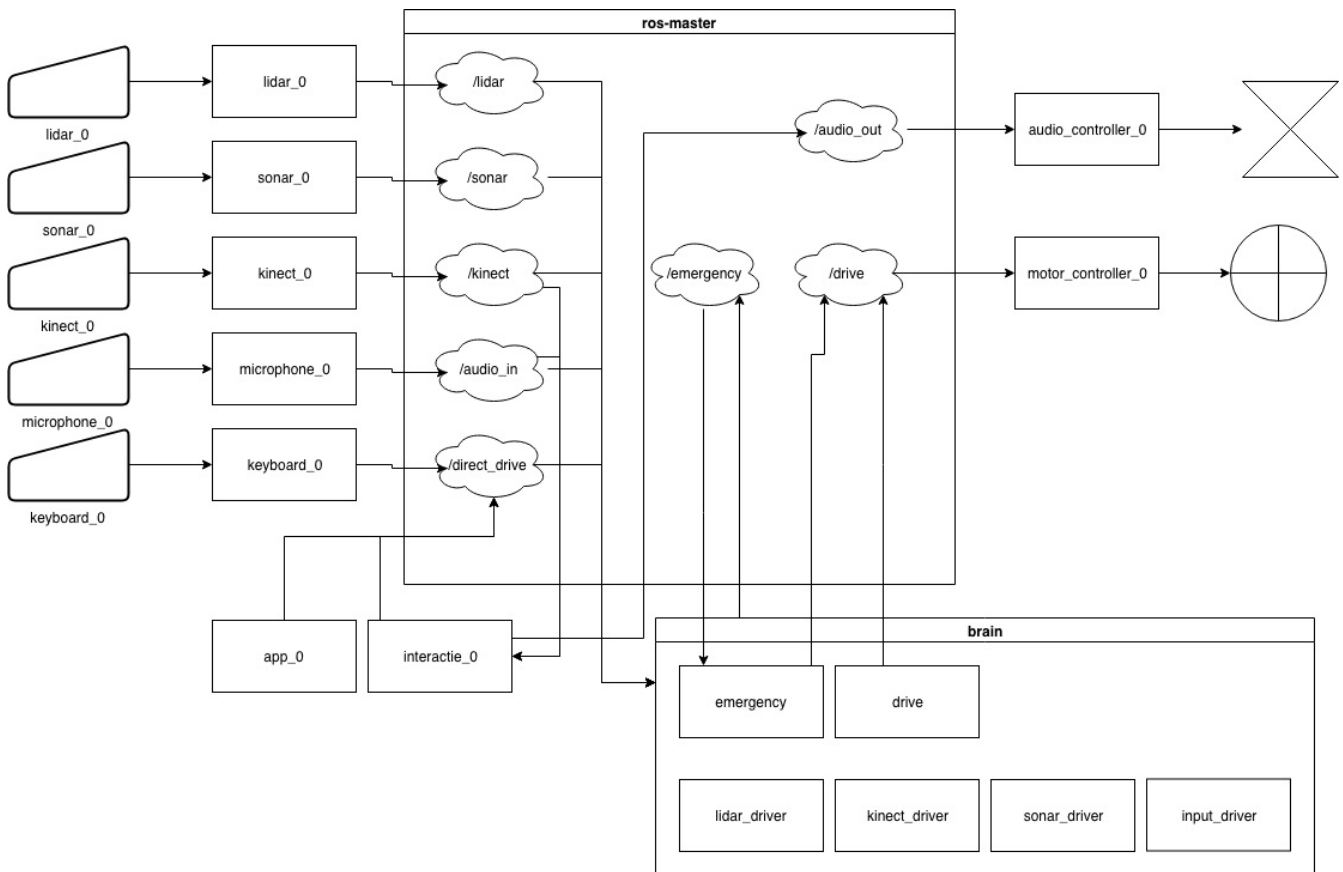
## 1.1. Standpoints

The software architecture needs to be compartmented for development purposes. To make sure the development does not compromise the system as a whole the following standpoints are defined to fortify the design.

- Each separate function gets a separate repository
- Each separate function has no dependency to another
- The Git process is applied for every repository
- Every function is hardware independent
- Every function is OS independent

## 1.2. Design

Embedding these standpoints into the Robotic Operating System (ROS) resulted in the following architecture design.



## 1.3. ROS Master

A key feature of ROS is the topic communication. Separation of each function in the ROS master, which facilitates the topics, is a key component. Every function communicates according to a topic and therefore ROS master functions as a service bus for each current and future feature.



Designing this architecture and keeping it up to date can be done by importing/editing the xml files in <https://www.draw.io/>. Draw.io is free of charge to use and requires no client, but any XML editor can be used.

### Welcome

#### Project Willy

- [History of Willy](#)
- [Project Willy](#)
- [Publicity](#)
- [Sponsors](#)

#### Getting started

- [Introduction to ROS](#)
- [Development Guide](#)
- [Driving Willy](#)
- [Manual](#)
- [Wiki Manual](#)

## **Build of Willy**

- [Design history](#)
- [Hardware](#)

## **Architecture**

- [Software Architecture](#)
- [ROS topic design](#)

## **Raspberry Pi's**

- [Sensor node](#)
- [Social Interaction node](#)
- [Power node](#)

## **Components**

- [ROS master](#)
- [New ROS master on Lubuntu](#)
- [Sonar](#)
- [Lidar](#)
- [Kinect](#)
- [Localization and navigation](#)
- [Motor controller](#)
- [Joystick](#)

## **Lessons learned**

- [Todo & Advice](#)
- [Lessons Learned](#)

## **Archive**

- [Previous Groups](#)
- [Research Archive](#)
- [Skylab Architecture](#)
- [Skylab](#)
- [Multi master](#)
- [WillyWRT](#)
- [Realisation](#)
- [Hardware](#)
- [Brain](#)
- [Design Guild](#)
- [Social interaction](#)

- [Speech](#)
- [Speech recognition](#)
- [IMU](#)
- [Human Detection](#)
- [Radeffect App](#)

## 2. ROS topics

These are the topics at the ROS master of Willy. There are several communication protocols defined in ROS, but in Willy only the topics system is used. The topics are shown in the next table.

Topic name	Purpose	Publisher	Subscriber	Message type	Message protocol
/willy/health	Is Willy healthy or is there an issue?	All nodes	All nodes	Int32	<ul style="list-style-type: none"> <li>• 1 = healthy</li> <li>• 2 = non-critical issue</li> <li>• 3 = critical issue</li> </ul>
/willy/health_reason	If Willy is not healthy, the reason for that is published in clear text here	All nodes	All nodes	String	Clear text
/willy/activity	What is Willy doing?	Brain SI	All nodes	Int32	<ul style="list-style-type: none"> <li>• 1 = cruising</li> <li>• 2 = conversation</li> <li>• 3 = enquête</li> <li>• 4 = driving with a defined target</li> </ul>
/interaction/is_active	If the social interaction is busy?	Social interaction speech recognition	All nodes	Int32	<ul style="list-style-type: none"> <li>• 0 = not active</li> <li>• 1 = active</li> </ul>

Topic name	Purpose	Publisher	Subscriber	Message type	Message protocol
/interaction/clear_text	The unprocessed text what the person said	Social interaction speech recognition	All nodes	String	Who are you?
/move_action	Move actions for willy	Navigation brain	SI	String	<ul style="list-style-type: none"> <li>turn_around = Turn Willy around</li> </ul>
/human_detect	Is there a human in front of Willy?	Power node	Brain	String	<ul style="list-style-type: none"> <li>1 = id</li> <li>2 = accuracy</li> <li>3 = distance</li> </ul>