

# Progress Report: Capabilities

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Open Source Robotics Foundation

# Capabilities: Conceptual Overview

*Capabilities* aim to provide a higher level interface on top of standard ROS interfaces, like topics, actions, etc, in order to make robot agnostic applications more portable.

## Some goals of *Capabilities*:

- Describe common robotic capabilities
  - Allow robots to **implement** these capabilities
  - Allow applications to **require** these capabilities
- Provide an **API** for working with these descriptions
- Provide **tools** for running and monitoring the implementations of these capabilities

# Capabilities: Conceptual Overview

*Capabilities* are defined by a **name**, a **description**, and an **interface**. The interface consists of:

- ROS topics
- ROS services
- ROS actions
- ROS parameters

*Capabilities* describe the interface which is used by both the robot and the application, but *Capabilities* are implemented by a *Capability Provider*.

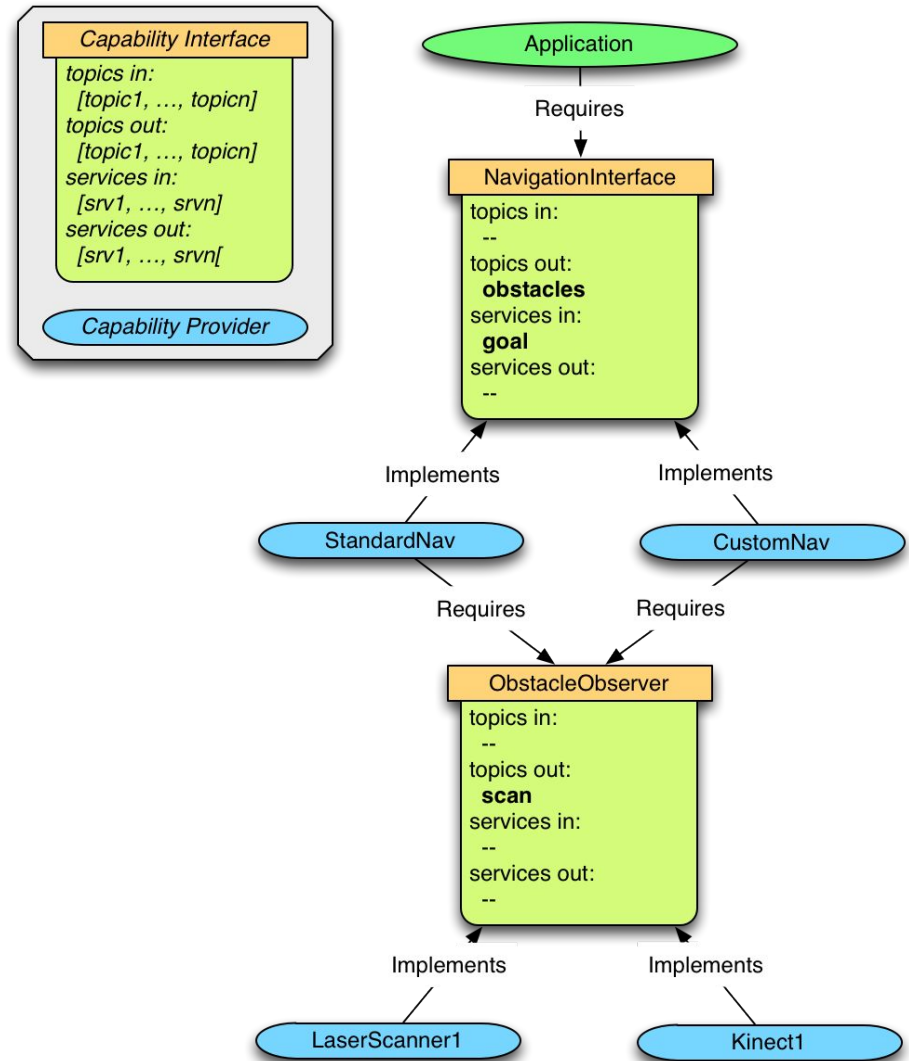
# Capability Providers: Conceptual Overview

## Capability Providers:

- Implement Capabilities
- Depend on other Capabilities

## They consist of a:

- Name
- ROS launch file
- List of dependencies on other Capabilities



# Progress

The design cycle has been completed, and the (unpolished) design artifacts are located here:

[https://github.com/robotics-in-concert/rocon\\_planning/blob/master/capabilities.rst](https://github.com/robotics-in-concert/rocon_planning/blob/master/capabilities.rst)

The first implementation of the design is available here:

<https://github.com/osrf/capabilities>

This implementation is functional and provides:

- Parsing and querying Specification files for *Capabilities*, *Capability Providers* and *Semantic Capabilities*
- ROS interface to query and run *Capabilities*

# Future Work

The next steps for the development of this system are:

- Provide more extensive example systems
  - Later implement on a robot (Turtlebot 2)
- Automated Tests for ROS interface
  - Other API's have complete coverage
- Provide a tool for introspecting the *Capability Server*
  - It should be graphical and can be used for developing capabilities on new robots
- Integrate into the Robots-in-Concert Application Management System