
Course of

# Robot Programming with ROS 2

## Day 3

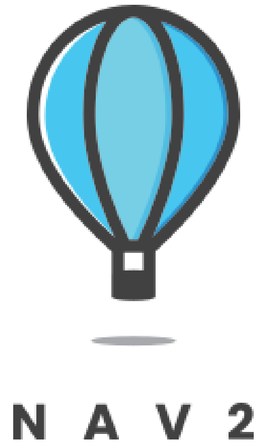
## 3. Nav2

ikerlan

Universidad Rey Juan Carlos

Intelligent Robotics Lab

# Description




ROS2 navigation system designed to be:

- Modular
- Configurable
- Scalable

It aspires to be the modst widely used navigation sofware, it supports major robot types:

- Holonomic, differential-drive, legged and Ackermann

# Description

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# Main Goal

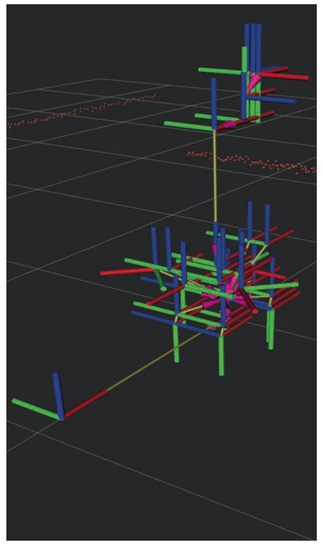
A- Origin

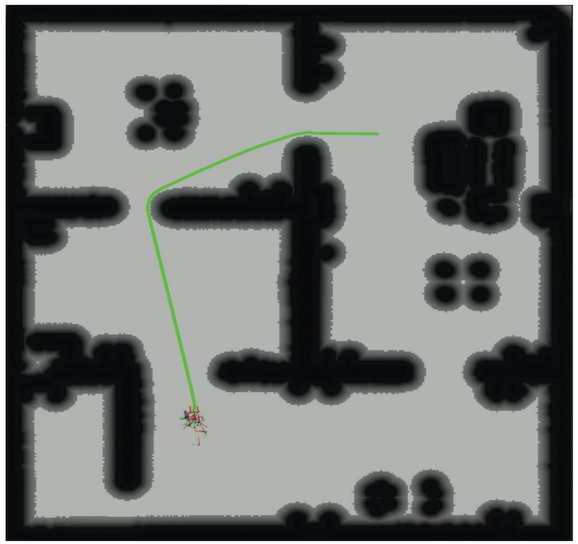
B- Destination

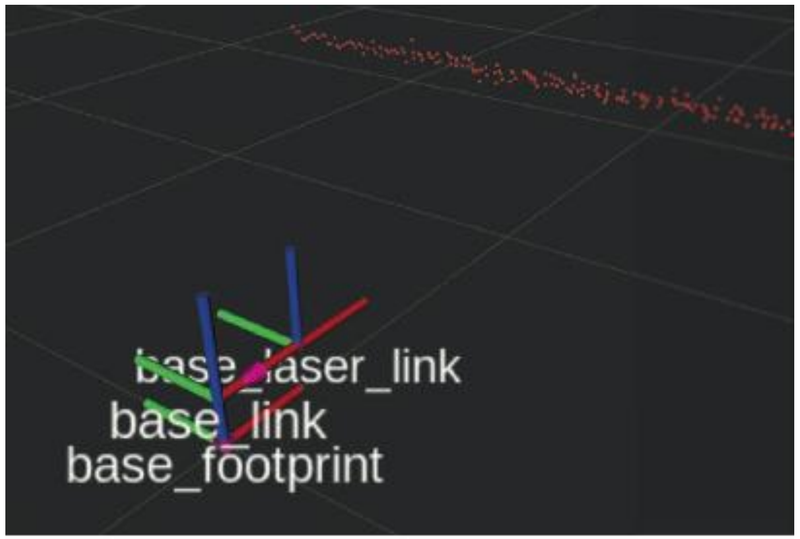
- Move the robot from point A to point B in a safe way

# Inputs

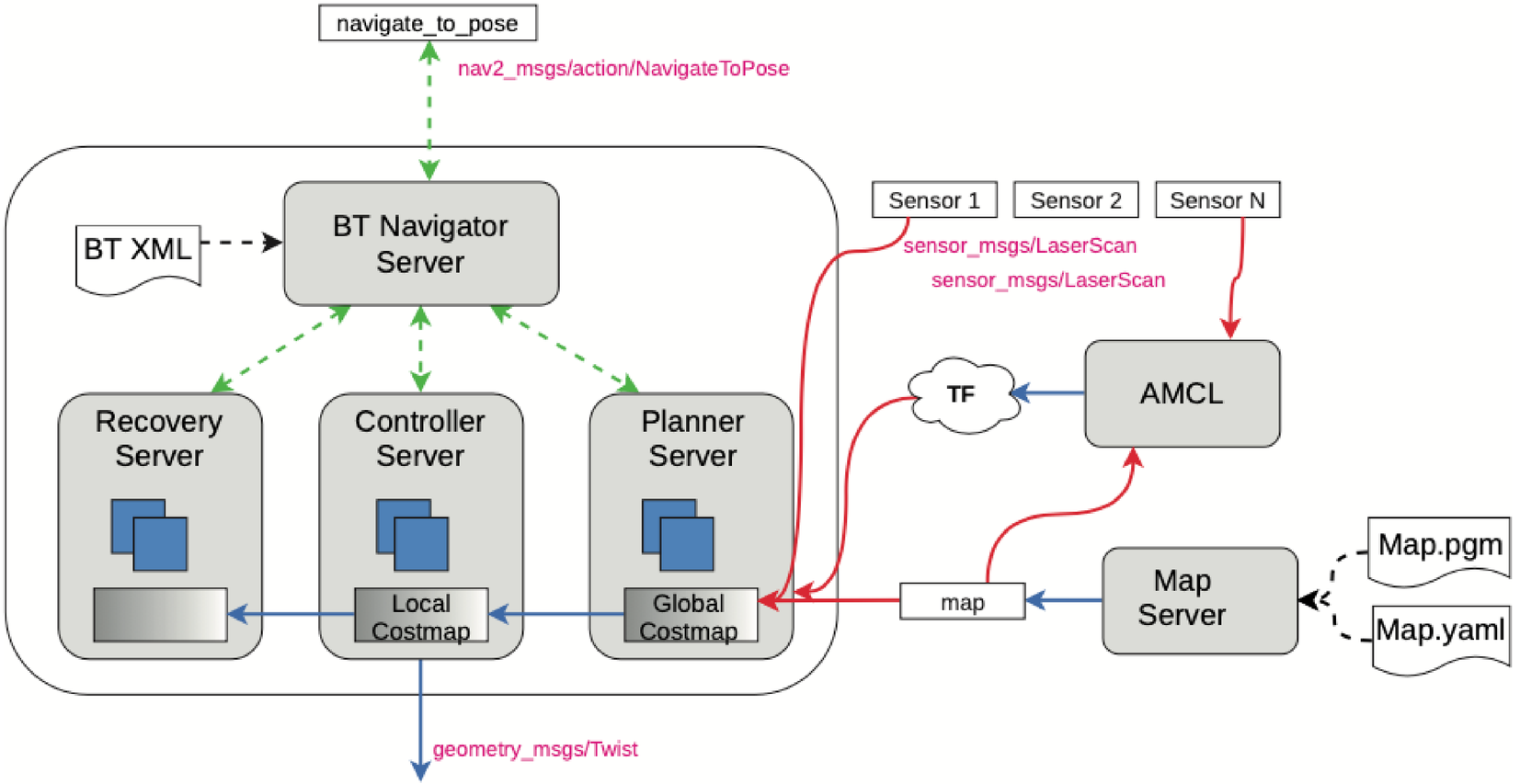
- TF transformations
- Map
- Relevant sensor data sources
- Navigation logic codede as a Behavior Tree XML file coded





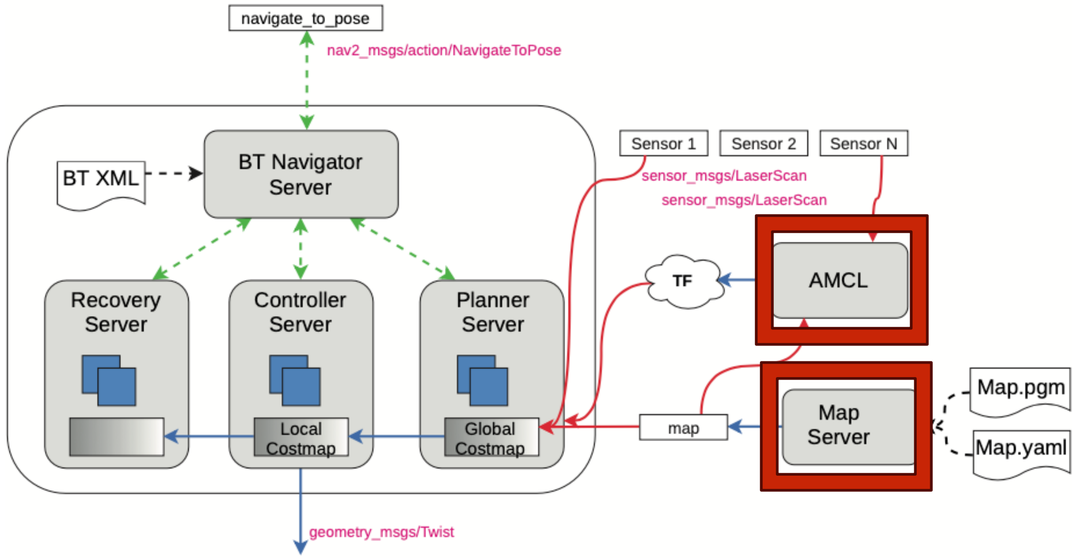


# Architecture



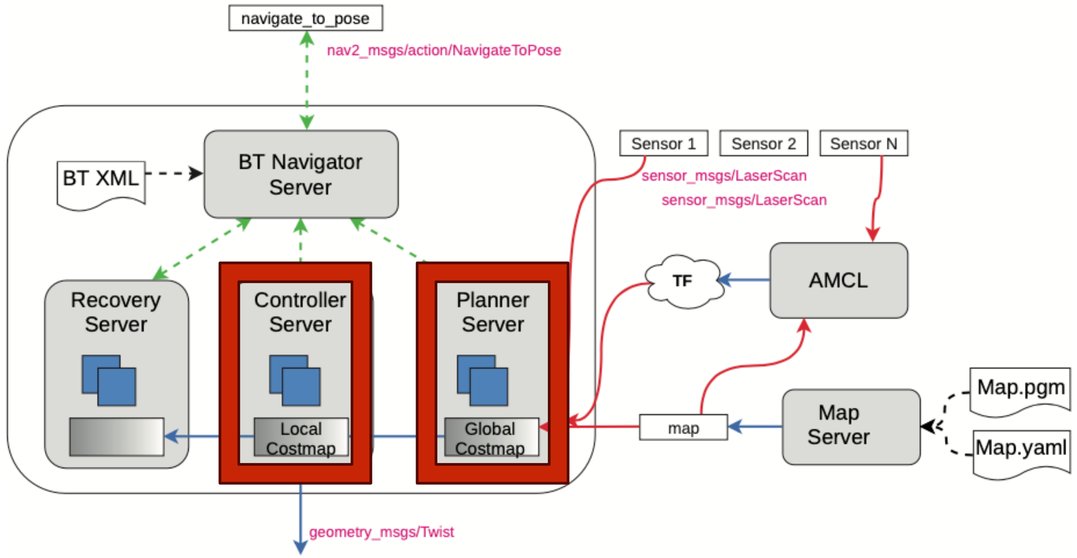
# Architecture

- Map Server: This component reads a map from two files and publishes it as a nav_msgs/msg/OccupancyGrid,
- AMCL: This component implements a localization algorithm based on Adaptive Monte-Carlo (AMCL). It uses sensory information, primarily distance readings from a laser and the map, to calculate the robot's position.



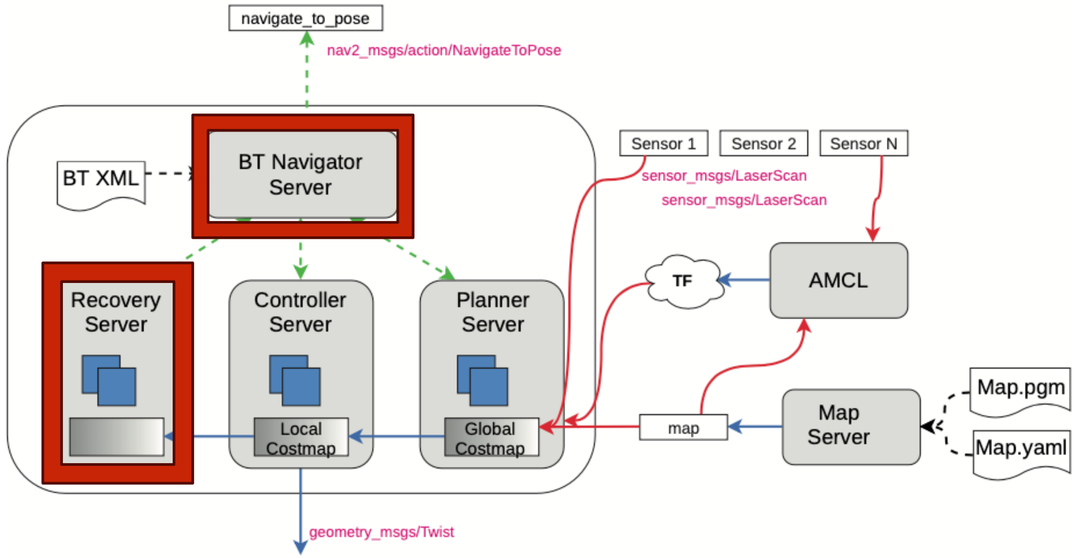
# Architecture

- Planner Server: The function of this component is to calculate a route from the origin to the destination
- Controller Server:This component receives the route calculated by the Planner Server and publishes the speeds sent to the robot base



# Architecture

- Recovery Server: This component has several helpful recovery strategies.
- BT Navigator Server: This is the component that orchestrates the rest of the navigation components.



# Nav2 in practice: Marathon2

- The robots successfully navigated over 60 kilometres in under 23 hours in a Dynamic campus environment
- Neither the robot suffered a collision o dangerous situation requiring an emergency stop.