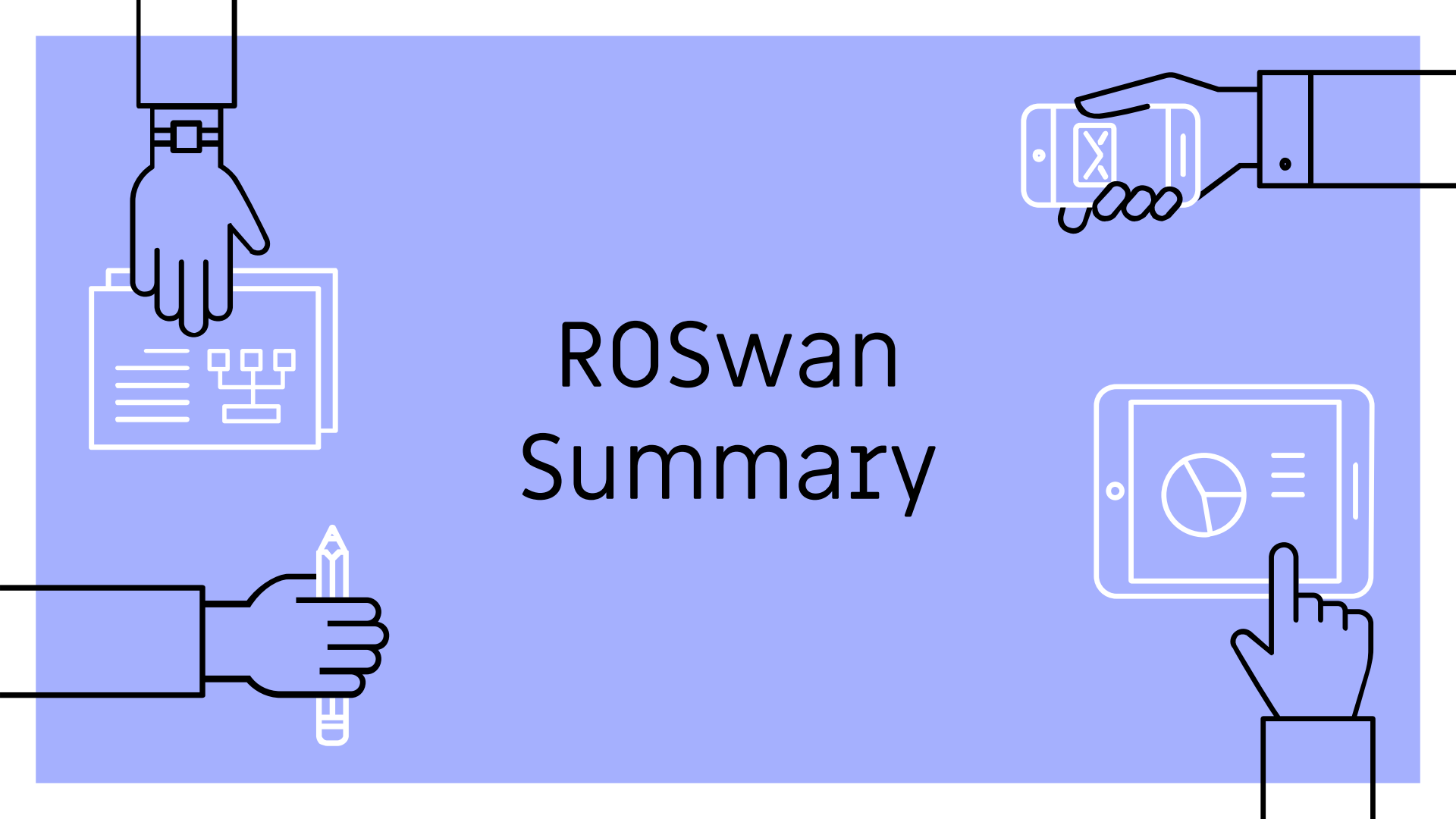
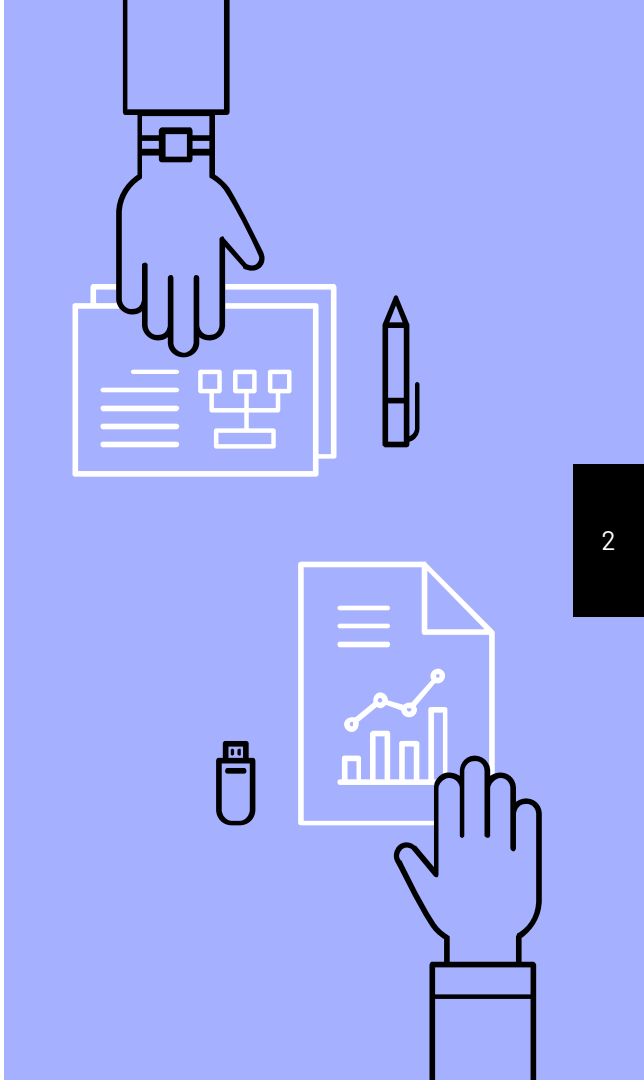


ROSwan Summary

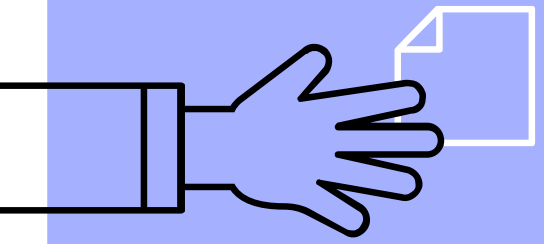
Agenda

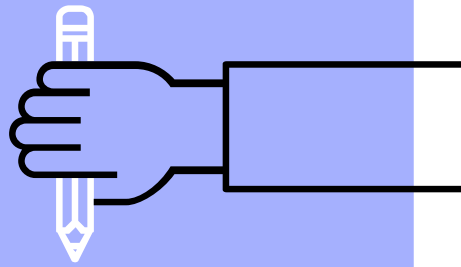
- Project Overview
- Code Structure Explanation
  - Node & Topics
  - TF Tree
- Trouble encountered
- Proposed Solution & Future development

More info on how to setup the ROSwan on Beaglebone Black please refer to https://github.com/subnero1/roswan/tree/develop/BBB#setup-guide



Project Overview





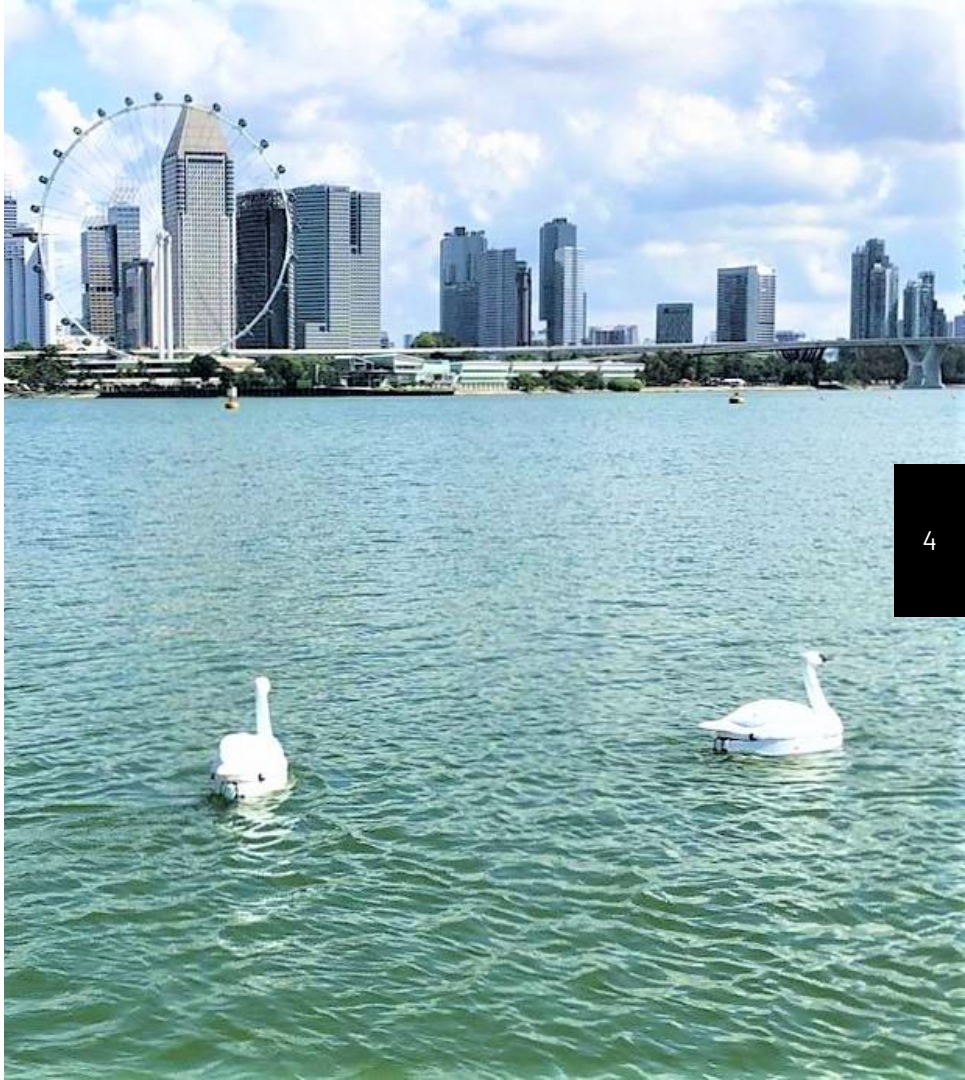
ROSwan

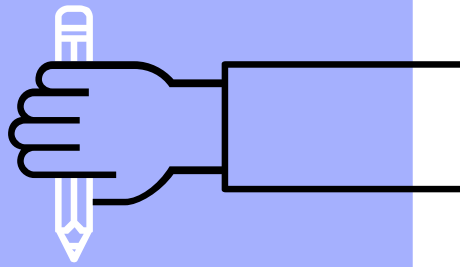
Goals

- Implementing ROS on SWAN.
- Test and optimize ROS configuration for SWAN's dynamics.

Results

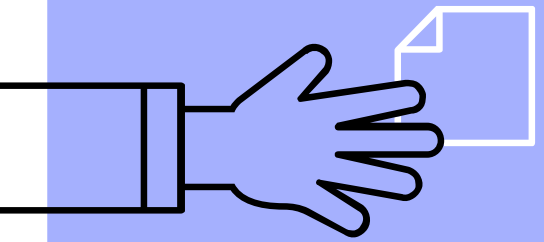
- Developed a minimal ROS platform on Beaglebone Black.
- Capable of running loiter and simple point mission.



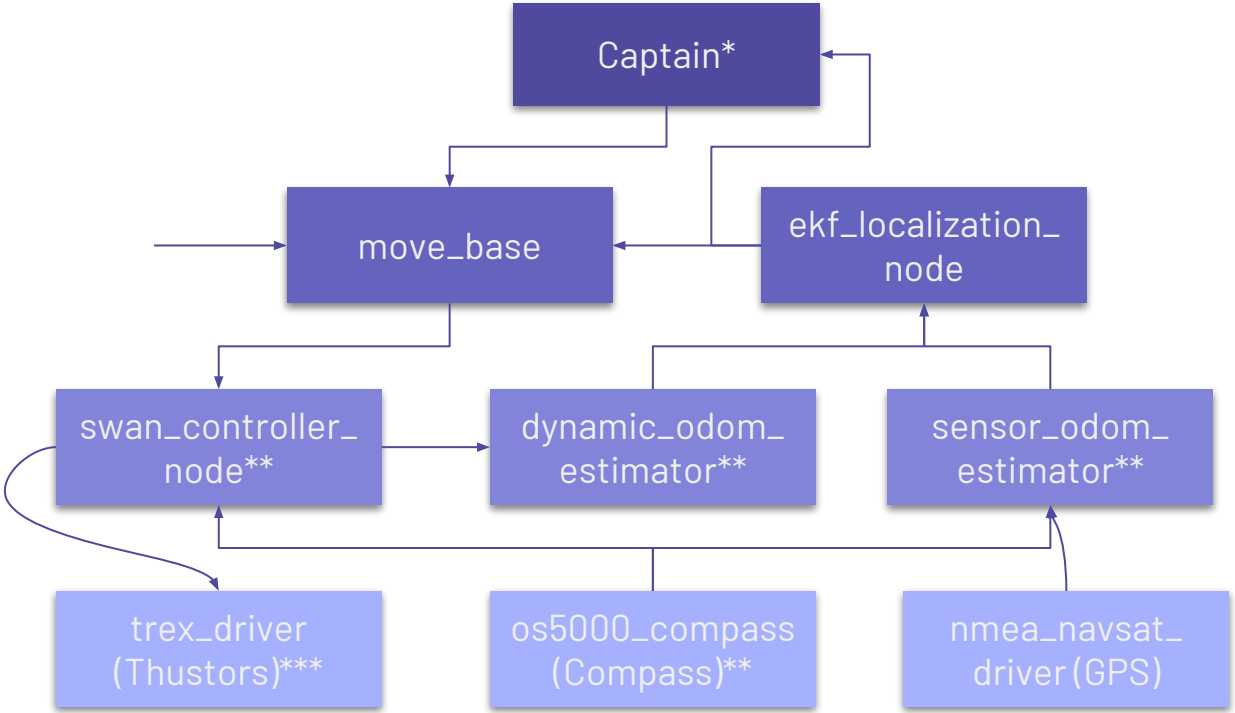


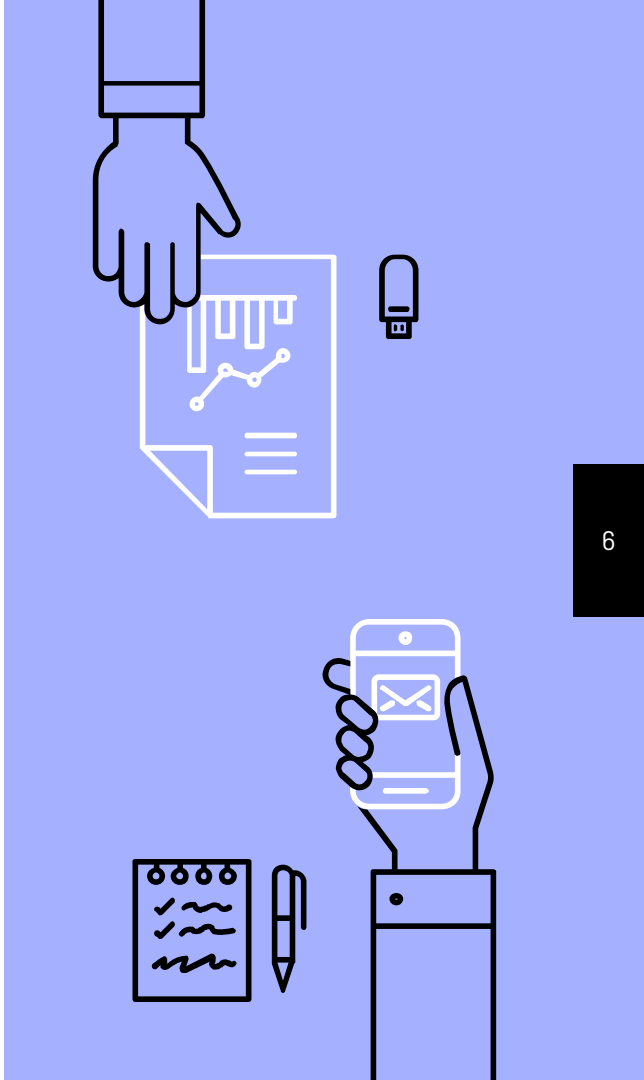
Code Structure

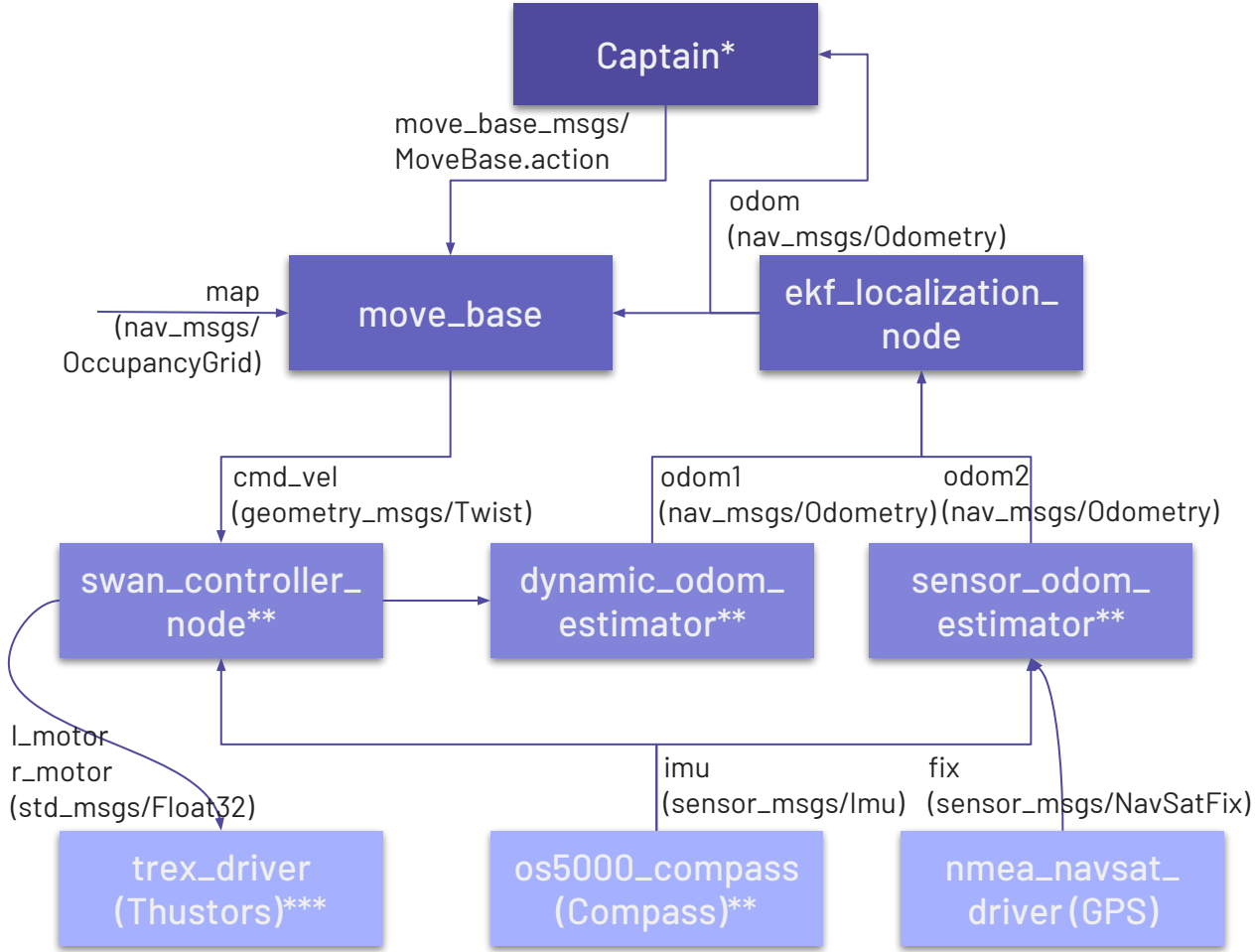
Node & Topics
TF Tree



Overall Node Structure







More details on topics and messages

Format:
topic (message type).

Parameters and more info:

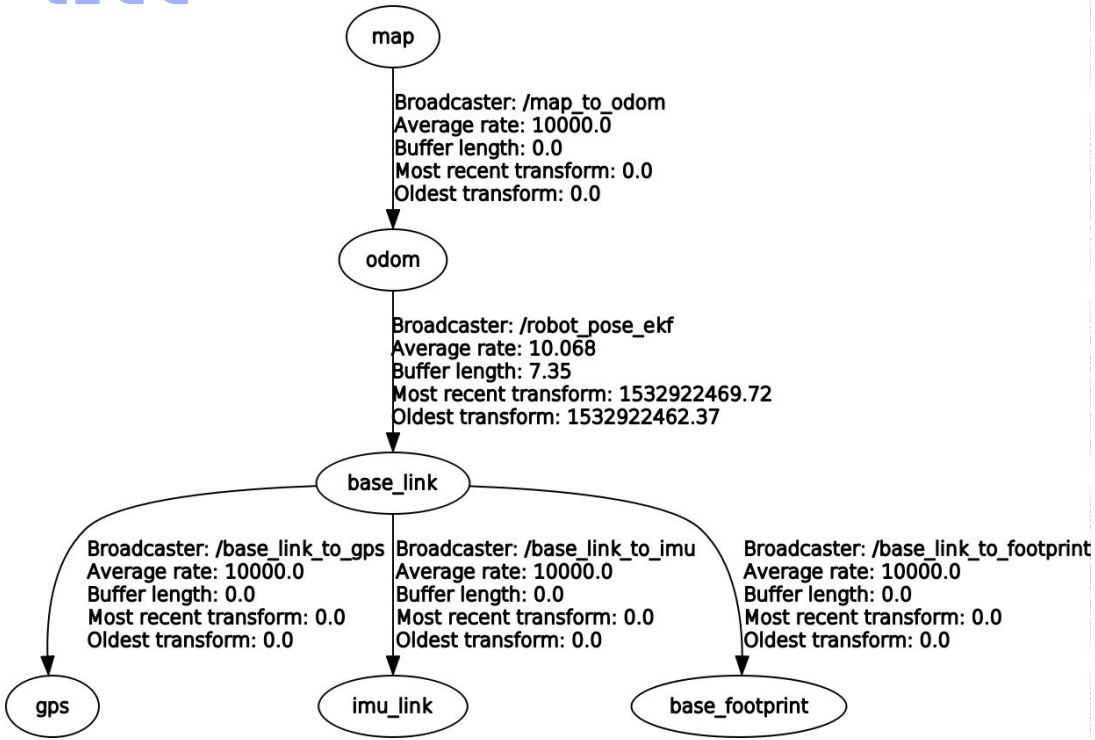
https://github.com/subnero1/roswan/tree/develop/BBB#file-structure-explained.

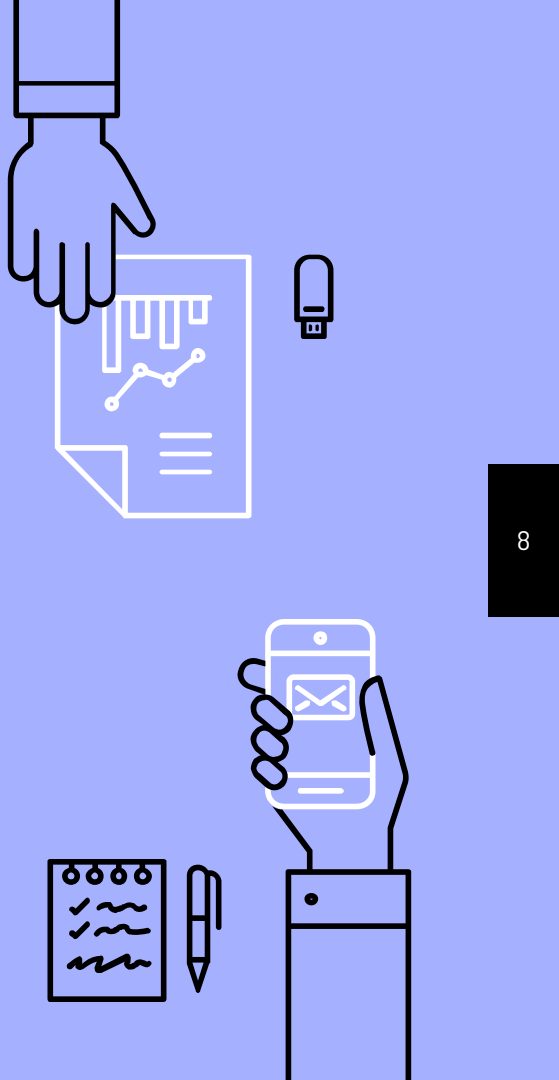
* Temporarily for testing.

** Written by me.

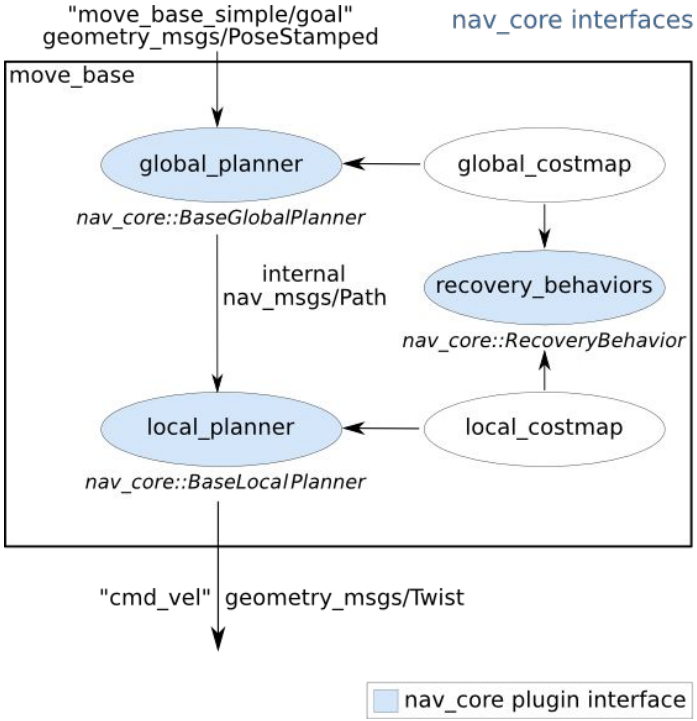
*** Written by community, not from officially maintained git repo.

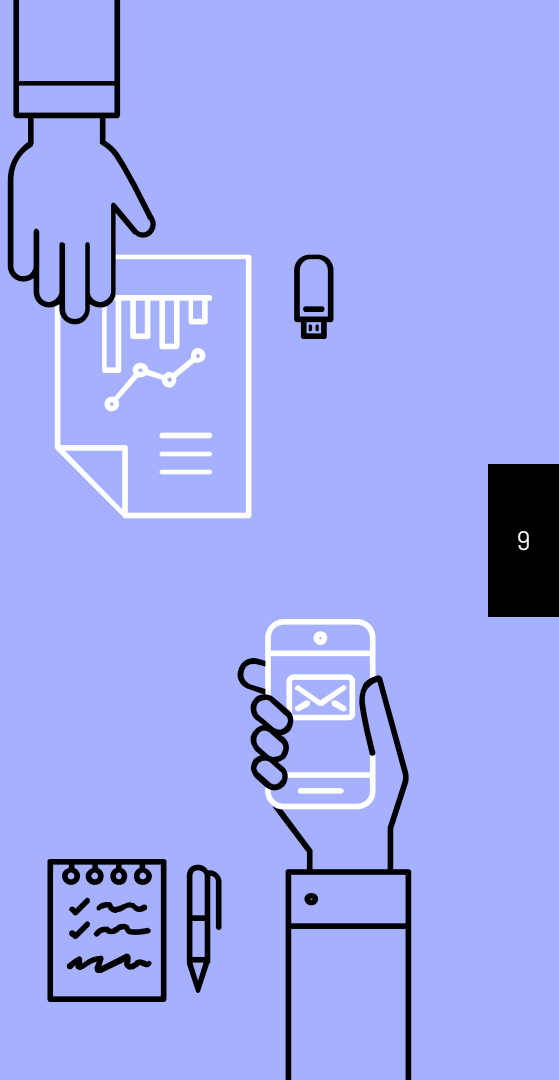
TF tree


map
Broadcaster: /map_to_odom
Average rate: 10000.0
Buffer length: 0.0
Most recent transform: 0.0
Oldest transform: 0.0
odom
Broadcaster: /robot_pose_ekf
Average rate: 10.068
Buffer length: 7.35
Most recent transform: 1532922469.72
Oldest transform: 1532922462.37
base_link
Broadcaster: /base_link_to_gps
Average rate: 10000.0
Buffer length: 0.0
Most recent transform: 0.0
Oldest transform: 0.0
Broadcaster: /base_link_to_imu
Average rate: 10000.0
Buffer length: 0.0
Most recent transform: 0.0
Oldest transform: 0.0
Broadcaster: /base_link_to_footprint
Average rate: 10000.0
Buffer length: 0.0
Most recent transform: 0.0
Oldest transform: 0.0
gps
imu_link
base_footprint

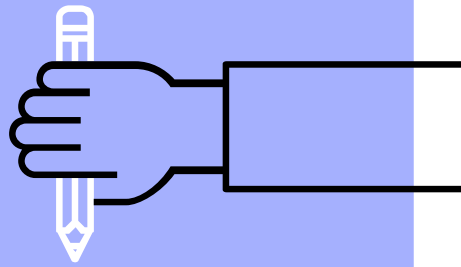


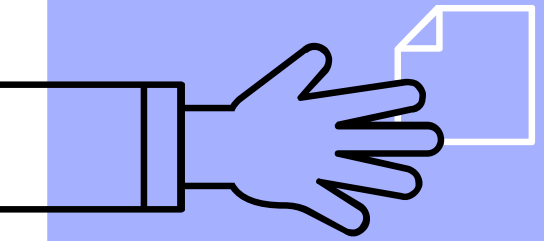
Nav stack


"move_base_simple/goal"
geometry_msgs/PoseStamped
nav_core interfaces
move_base
global_planner
global_costmap
nav_core::BaseGlobalPlanner
internal
nav_msgs/Path
recovery_behaviors
nav_core::RecoveryBehavior
local_planner
local_costmap
nav_core::BaseLocalPlanner
"cmd_vel" geometry_msgs/Twist
nav_core plugin interface



Trouble &
Possible Solution





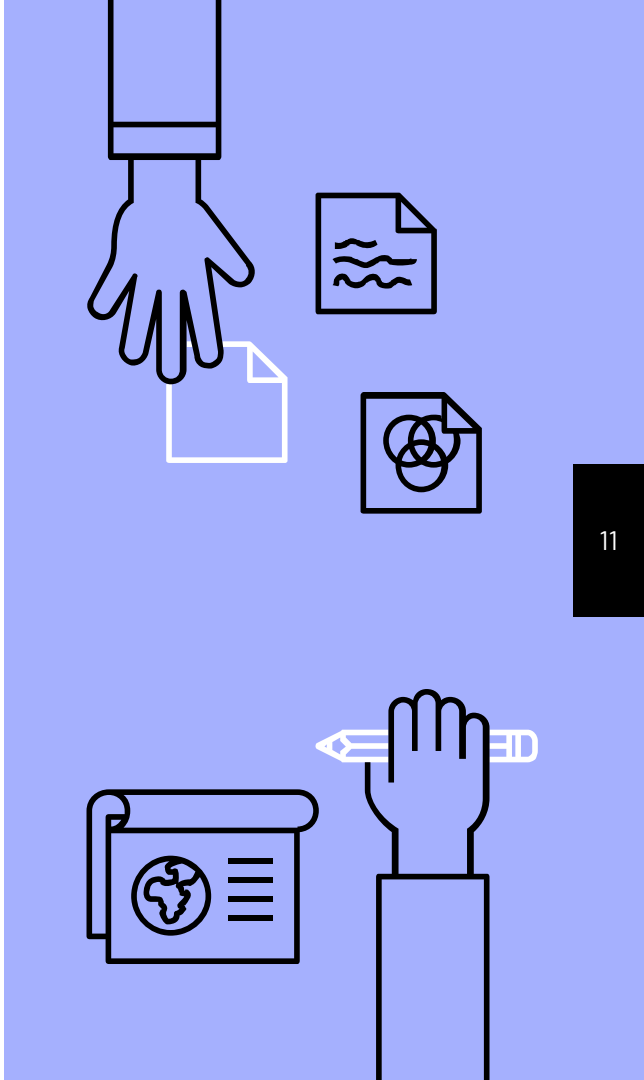
Trouble

Beaglebone Black

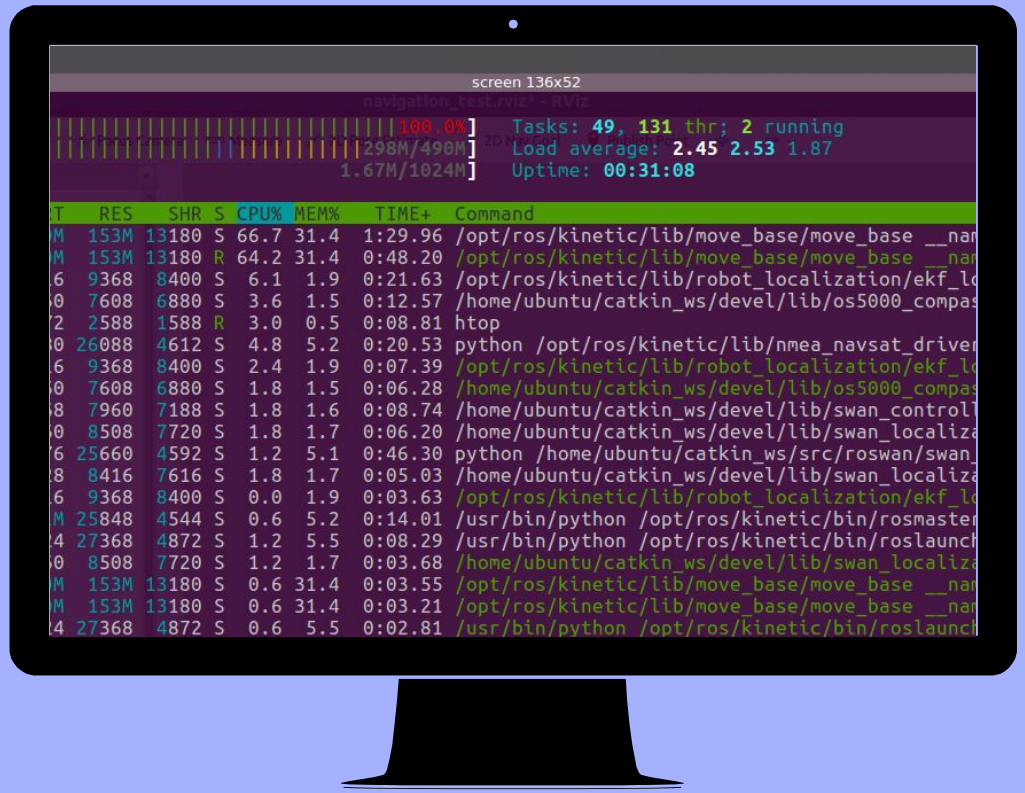
- Low processing power.
- Problems of Beaglebone Ubuntu (cape-manager, ethernet, speed etc.)

ROS

- base_local_planner takes up unnecessary processing power.
- costmap_2D needs a static map to initiate.
- Local planner and EKF's parameters requires more fine tuning.
- Rviz crashes on field and lacks plugins.



Beaglebone Black Process view



Proposed solution

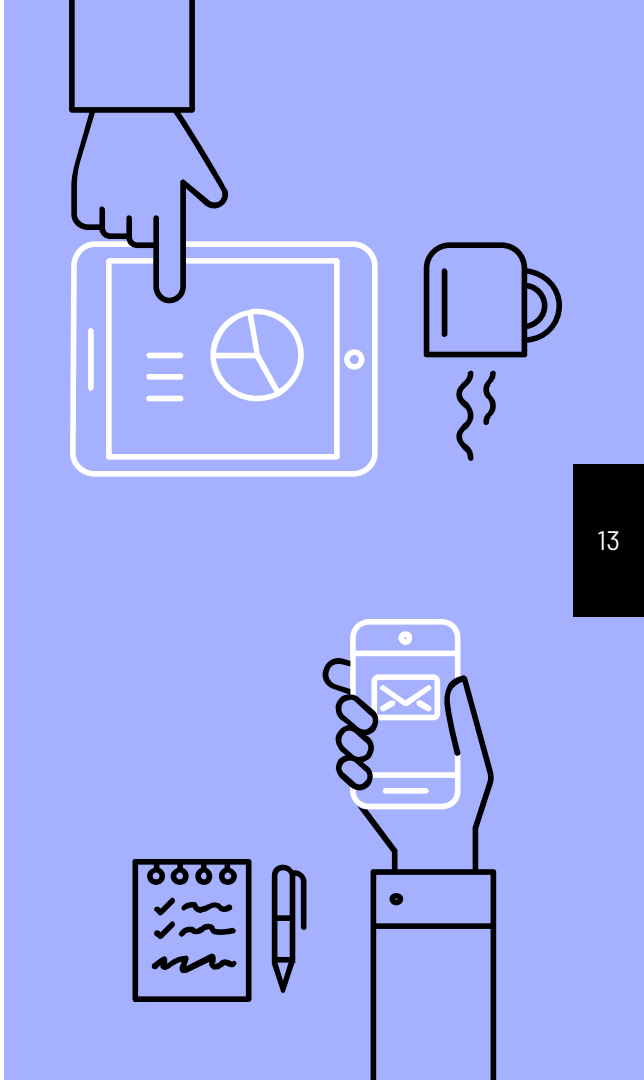
1) Custom costmap and local planner plugin

Simplify the local planner and costmap to reduce the use of grid map.

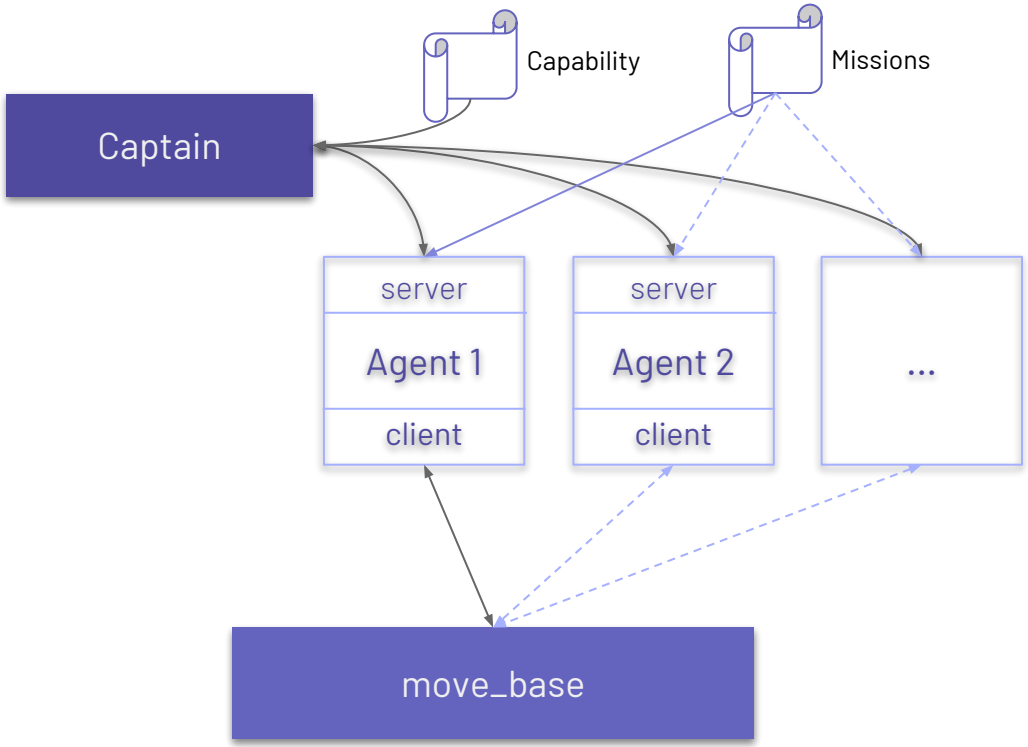
2) More powerful processor

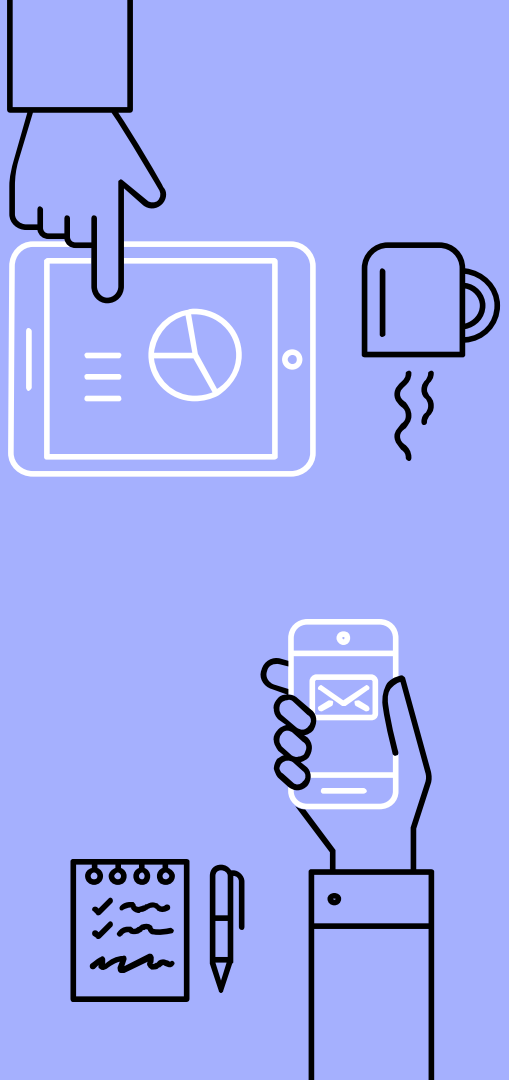
Beaglebone Black is barely able to handle the current setup, but the problem will be less serious after doing the 1.

3) Rviz plugins or alternative visualization tool



R2C2 Structure





THANKS!

Any questions?

Chen Bainian

brian97cbn@gmail.com