



SOFTWARE TEAM OVERLORD100

* Mobile platform is not a mobile application, it is a robot

MOTIVATION

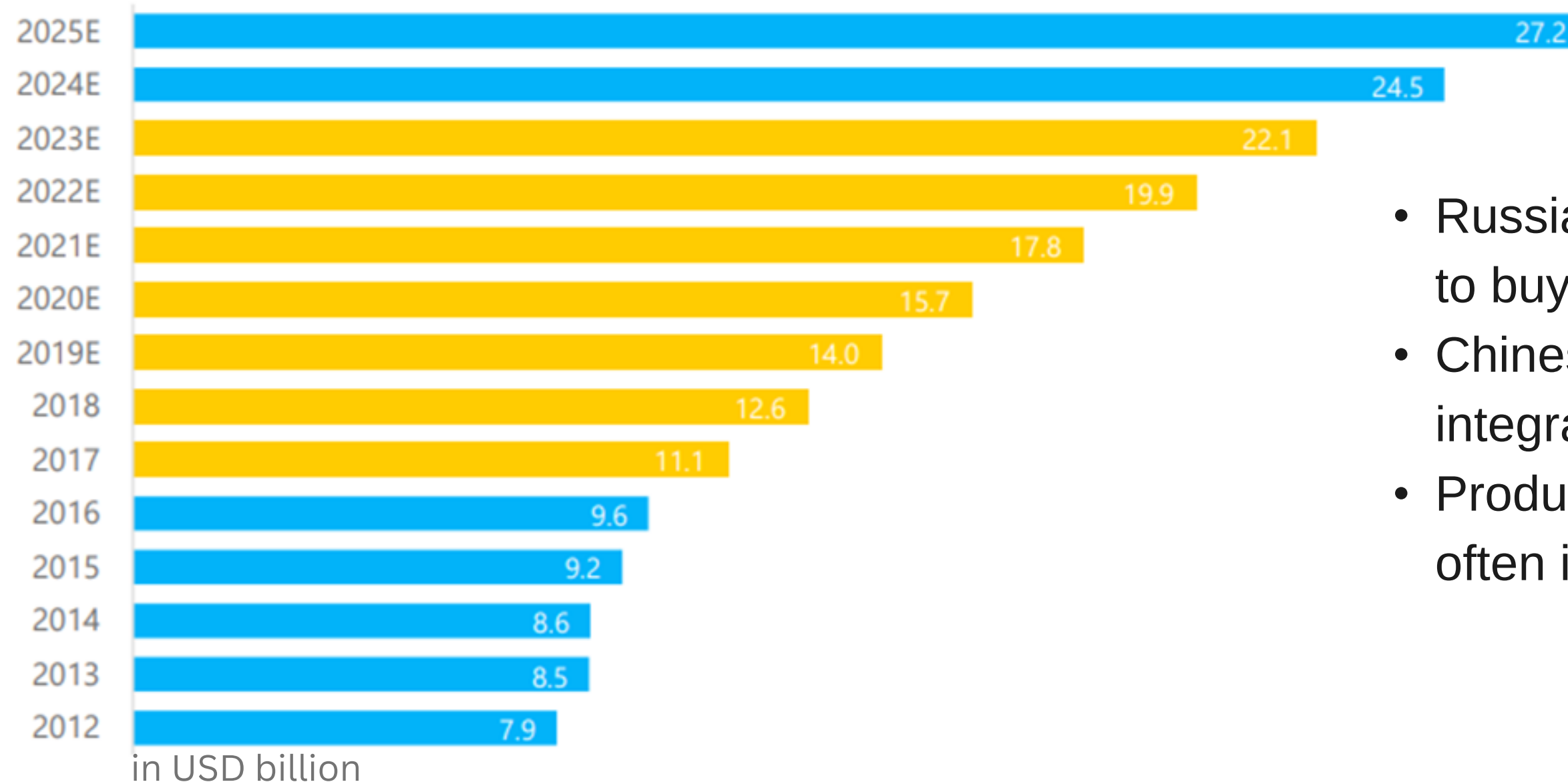
Warehouse automatization in Russia is not widespread

- High cost of robots
- High cost of integration
- Problems with components from other countries
- Not many solutions for industrial settings



MARKET RESEARCH

Global warehouse automation market



- Russian mobile platforms are hard to buy
- Chinese solutions are hard to integrate
- Products from Europe and USA are often inaccessible

OUR SOLUTION

Cheap **mobile platform** from components, available in Russia.

Features:

- web application with friendly UI
- virtual simulation



OUR TEAM

Ali Hamdan (Data management and API)

Yehia Sobeh
(API, Frontend and Backend)

Anastasiia Shvets
(Reports and documentation)

Saveliy Khlebnov
(DevOps)



Iurii Podkorytov
(SLAM developer)

Ekaterina Mozhegova (team lead, ROS developer)

Mukhammadrizo Maribjonov
(Path Planner developer)

TECHNOLOGICAL STACK

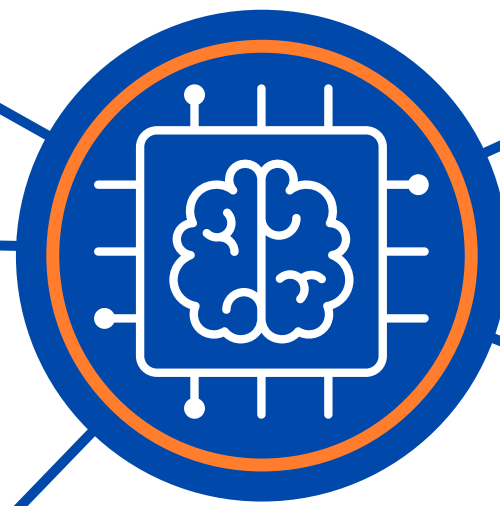
 ROS2 Humble



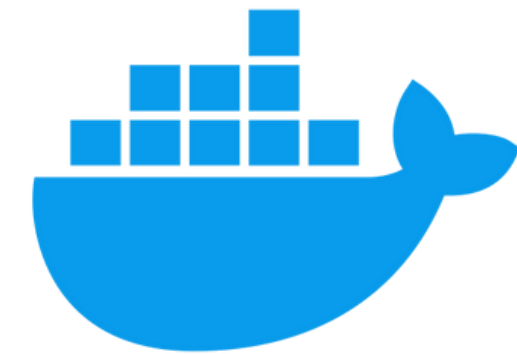
C++



Python



Docker



MongoDB

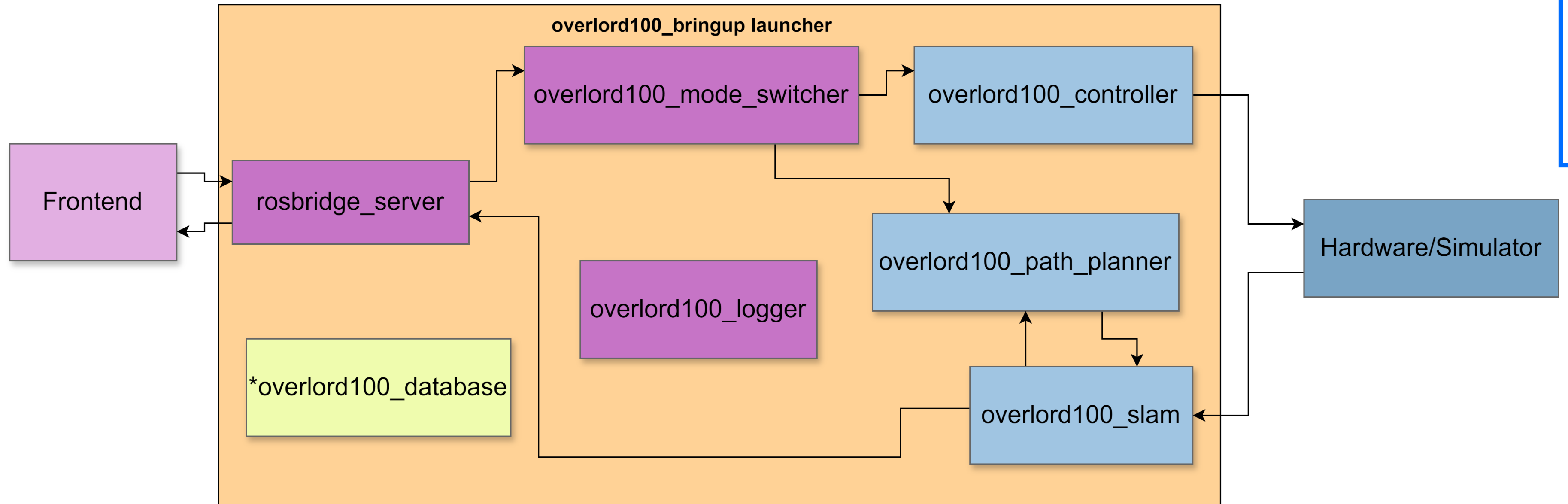


ROS2

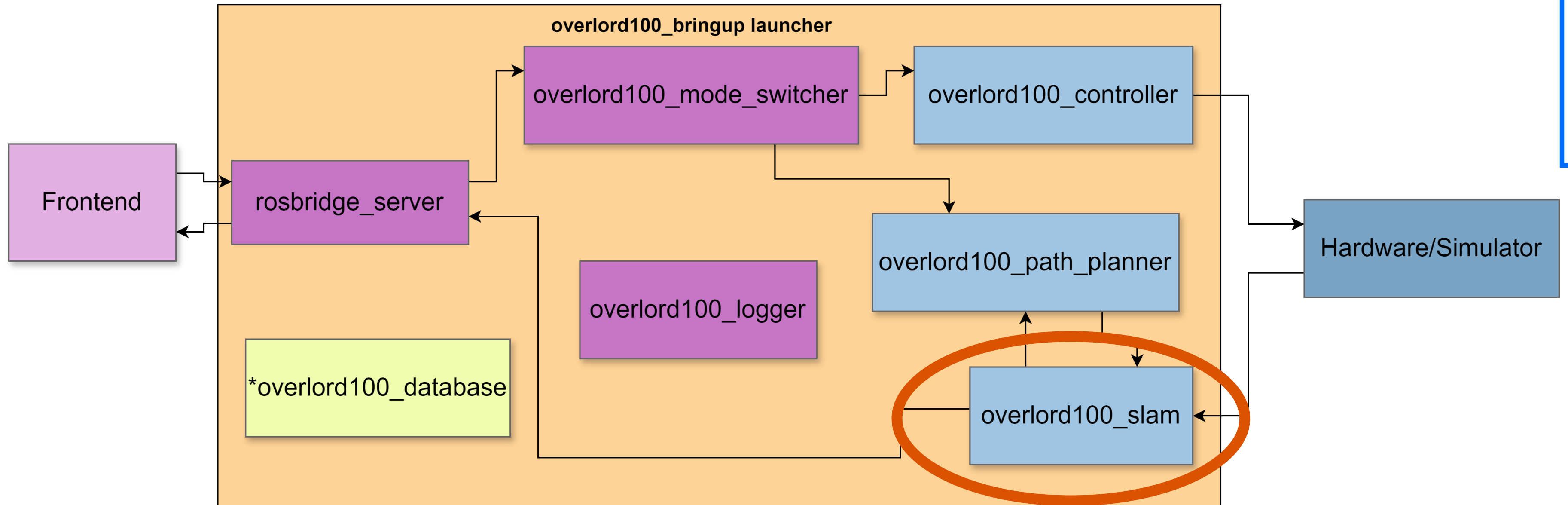
- Open-source Robotics middleware suite
- Divides system into Nodes that exchange data
- Provides services for package management



ARCHITECTURE



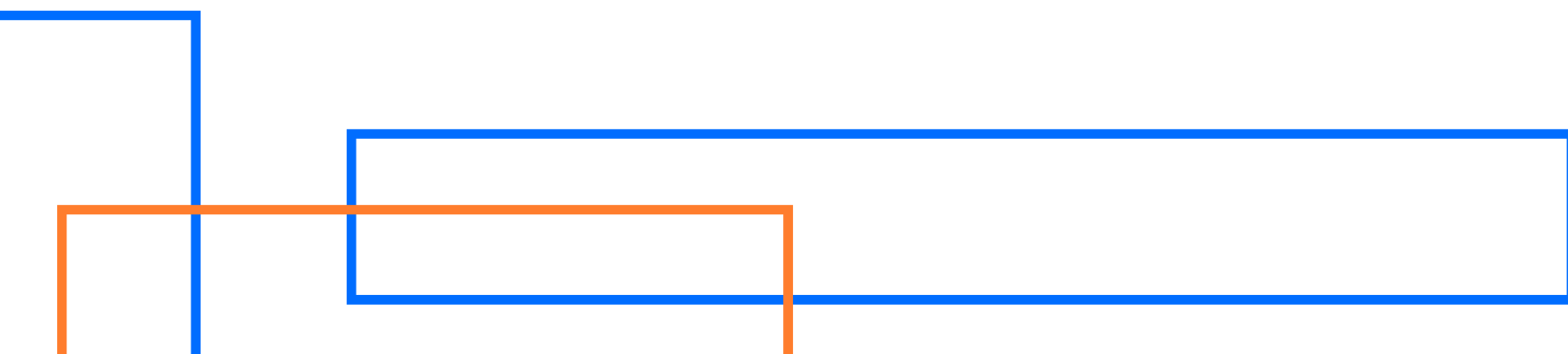
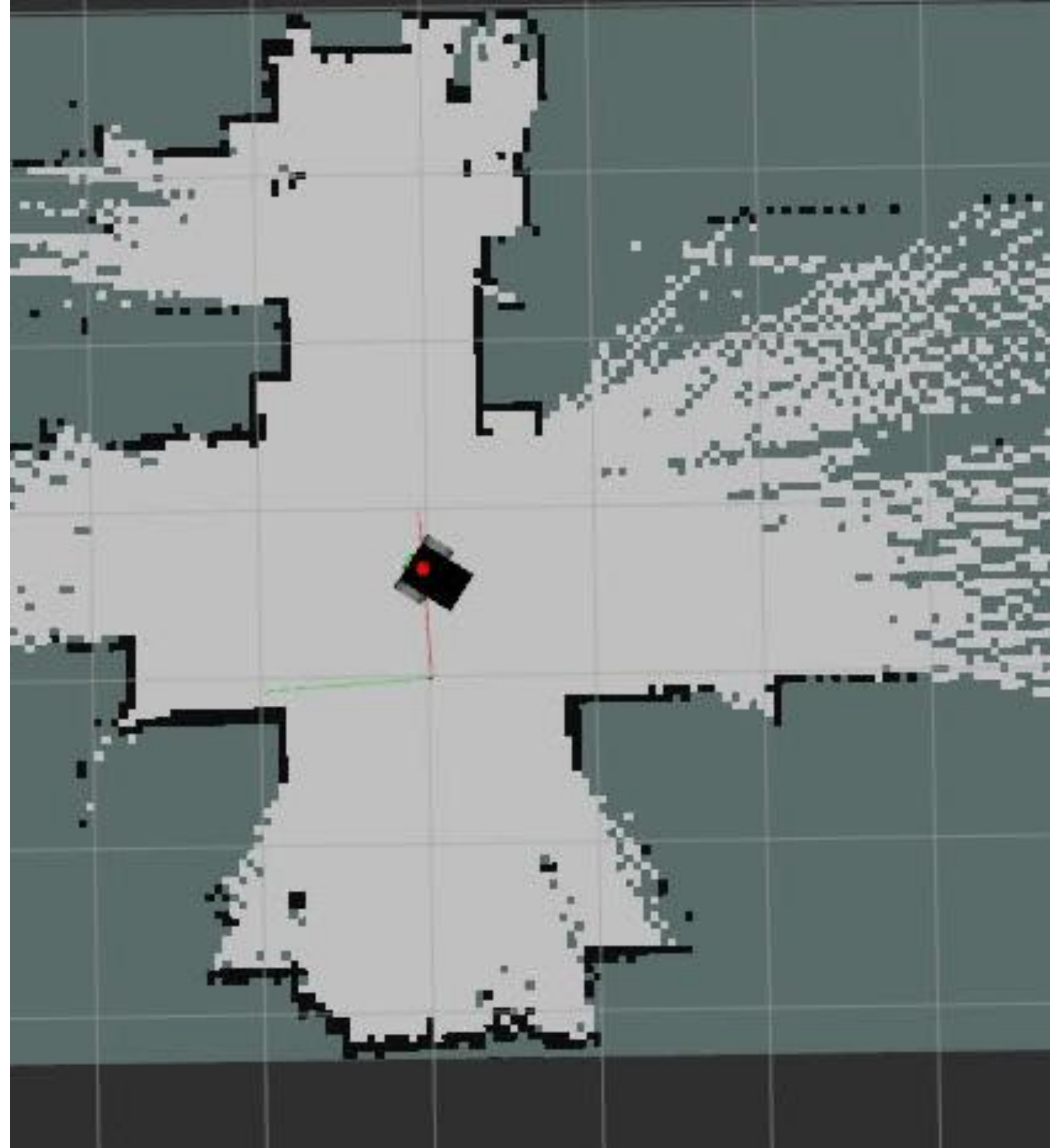
SLAM



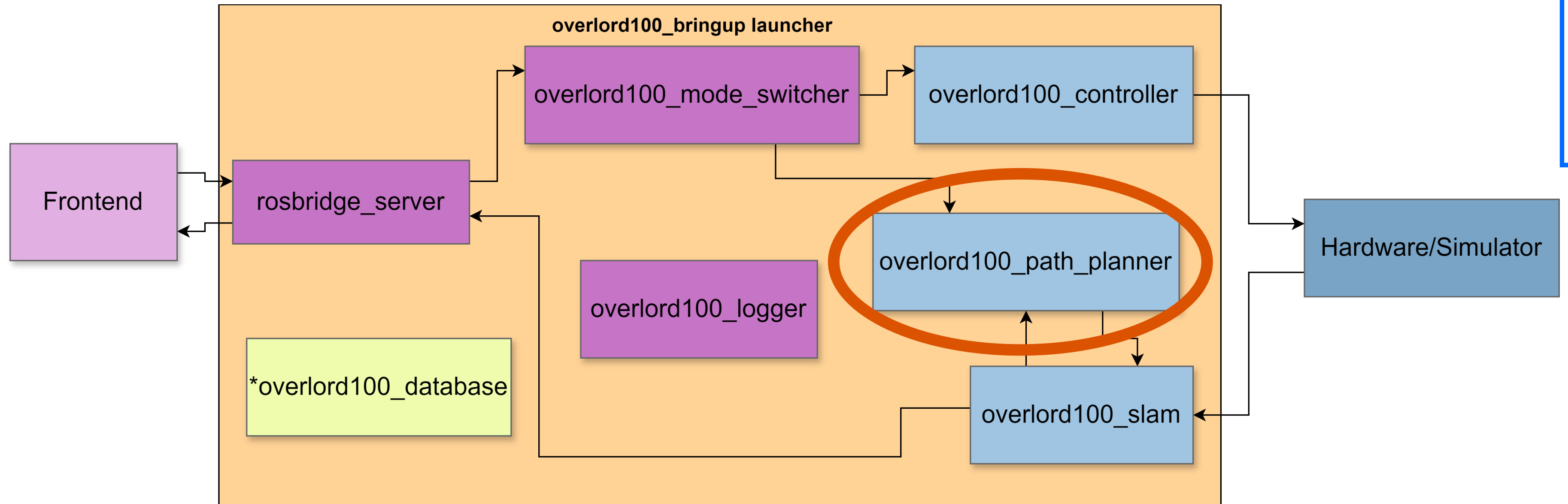
SLAM

Slam_toolbox package:

- Creates a map
- Locates the robot within the map



PATH PLANNER



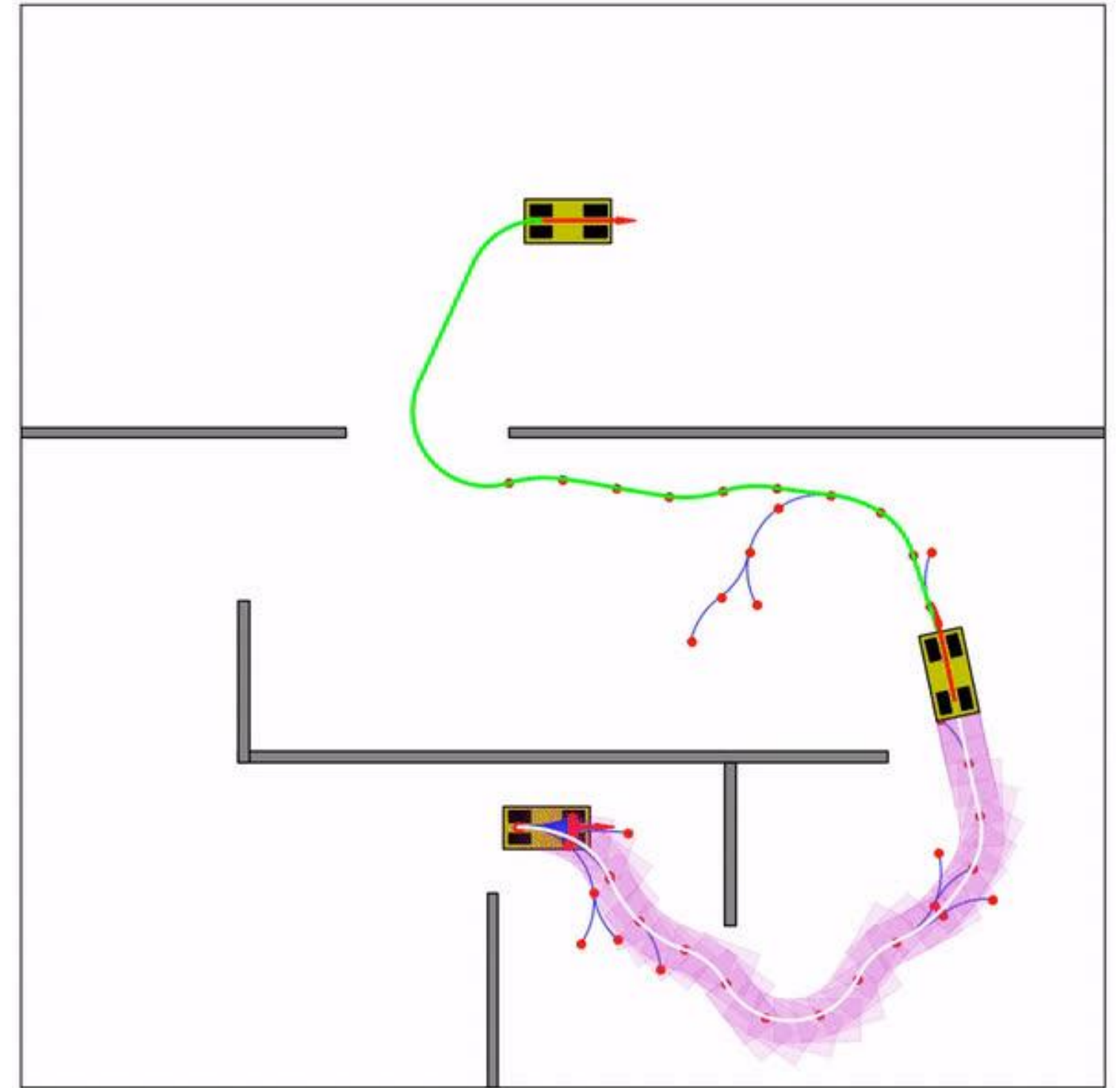
PATH PLANNER

Using Nav2 stack

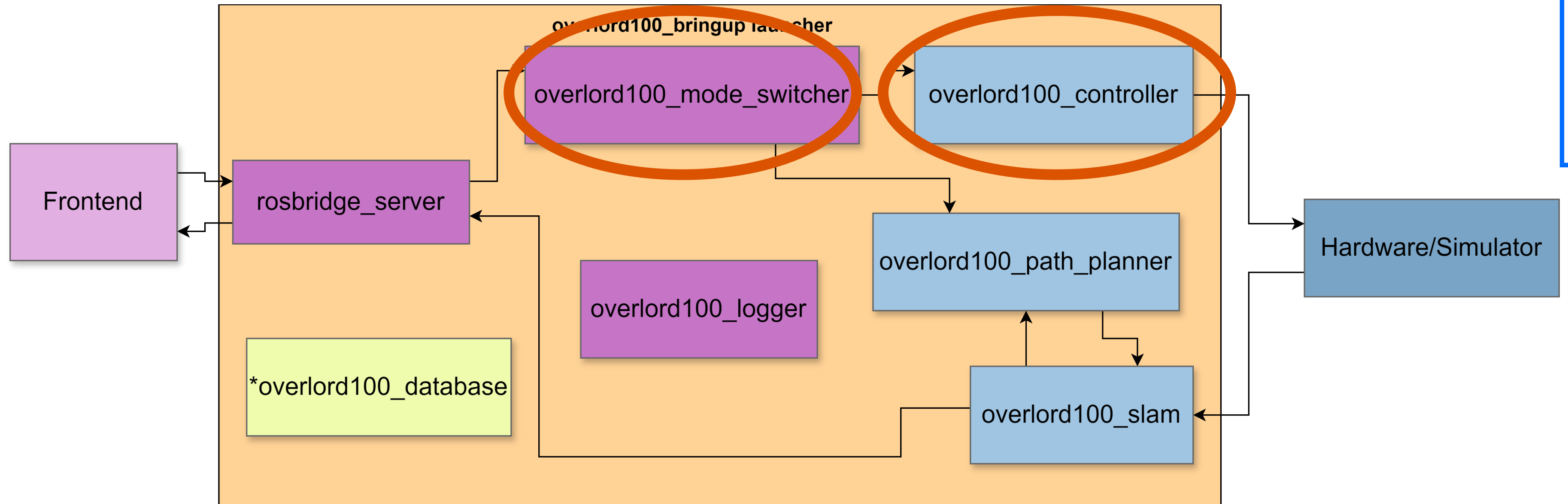
- Creates a path to a given orientation within a map
- Outputs needed velocity



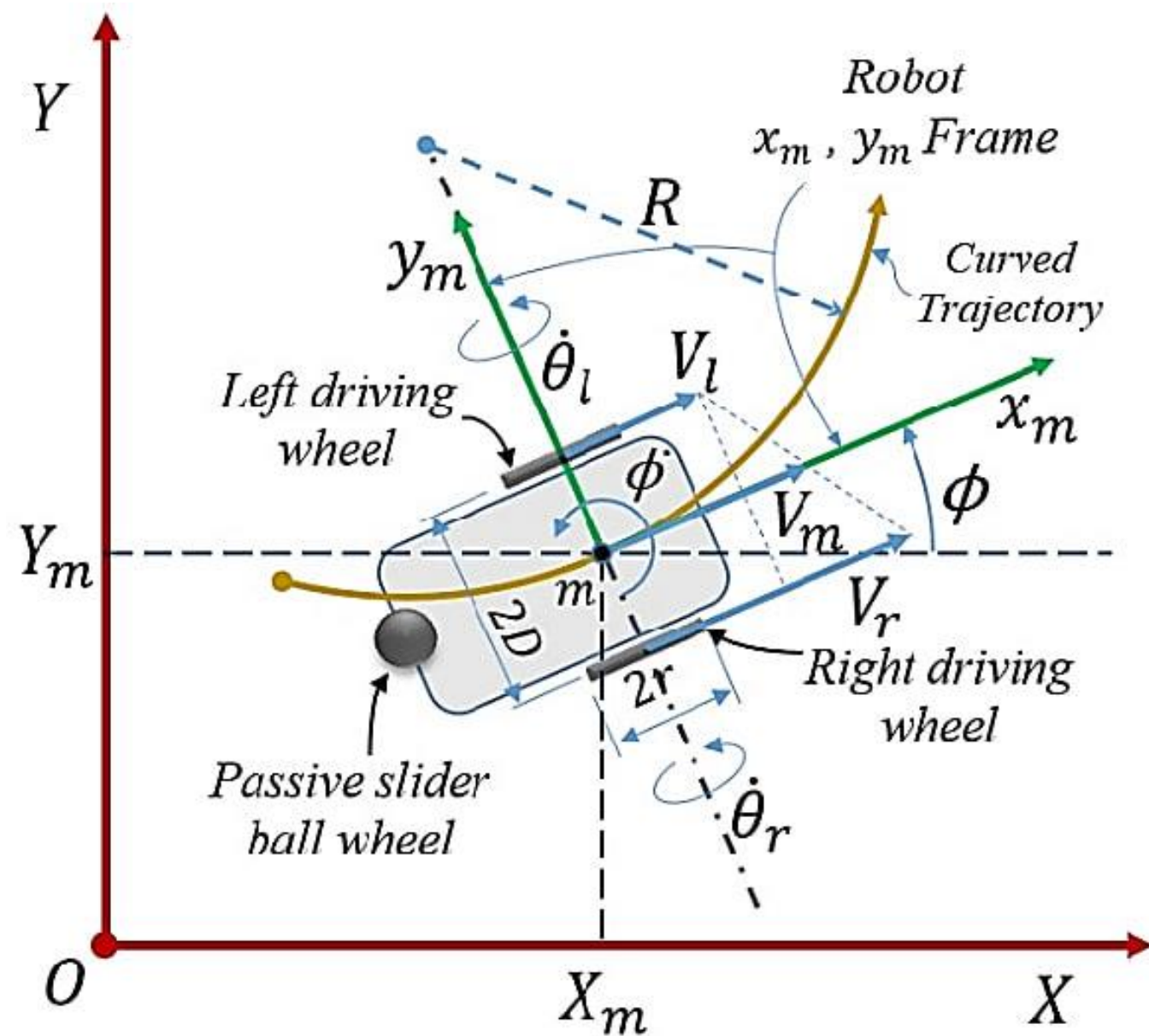
N A V 2



CONTROLLER & MODE SWITCHER



CONTROLLER



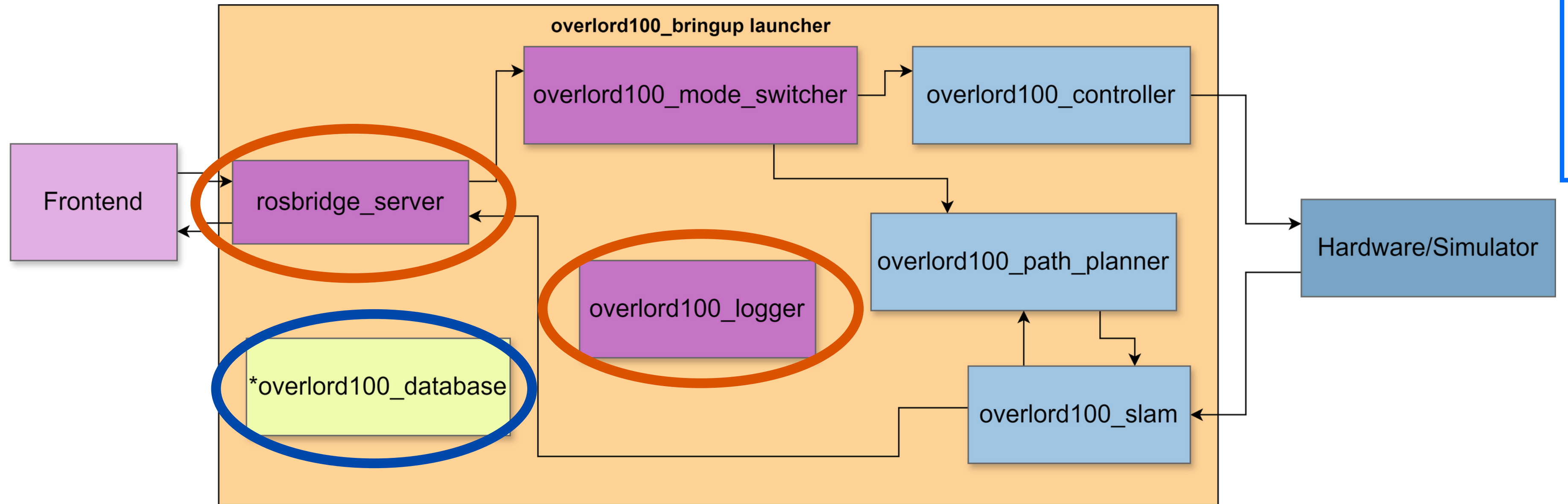
Transforms requests from other components of the project into commands to the hardware/simulation

MODE SWITCHER

AUTO

MANUAL

DATA MANAGEMENT AND API



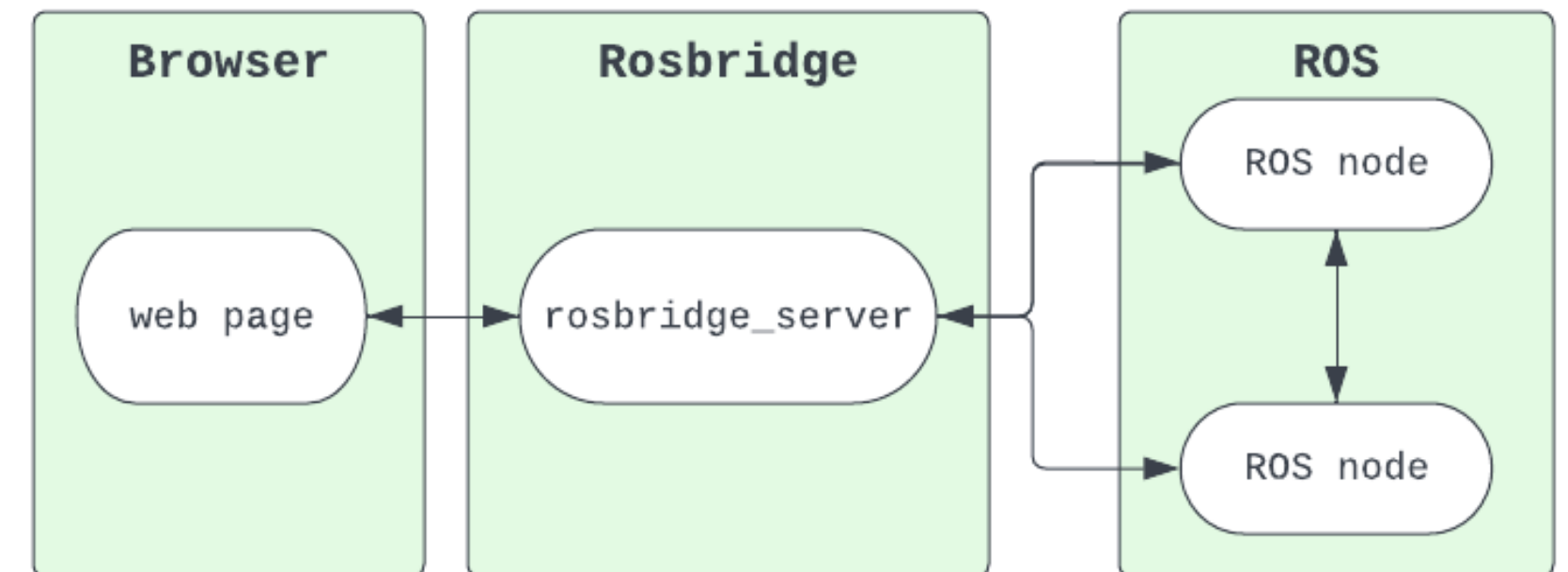
DATA MANAGEMENT AND API

Data Management:

- *MongoDB (implemented, but not integrated)
- ROS
- logger

API:

- Frontend-Backend: rosbridge-server
- Backend-Hardware: same for Hardware and Simulation



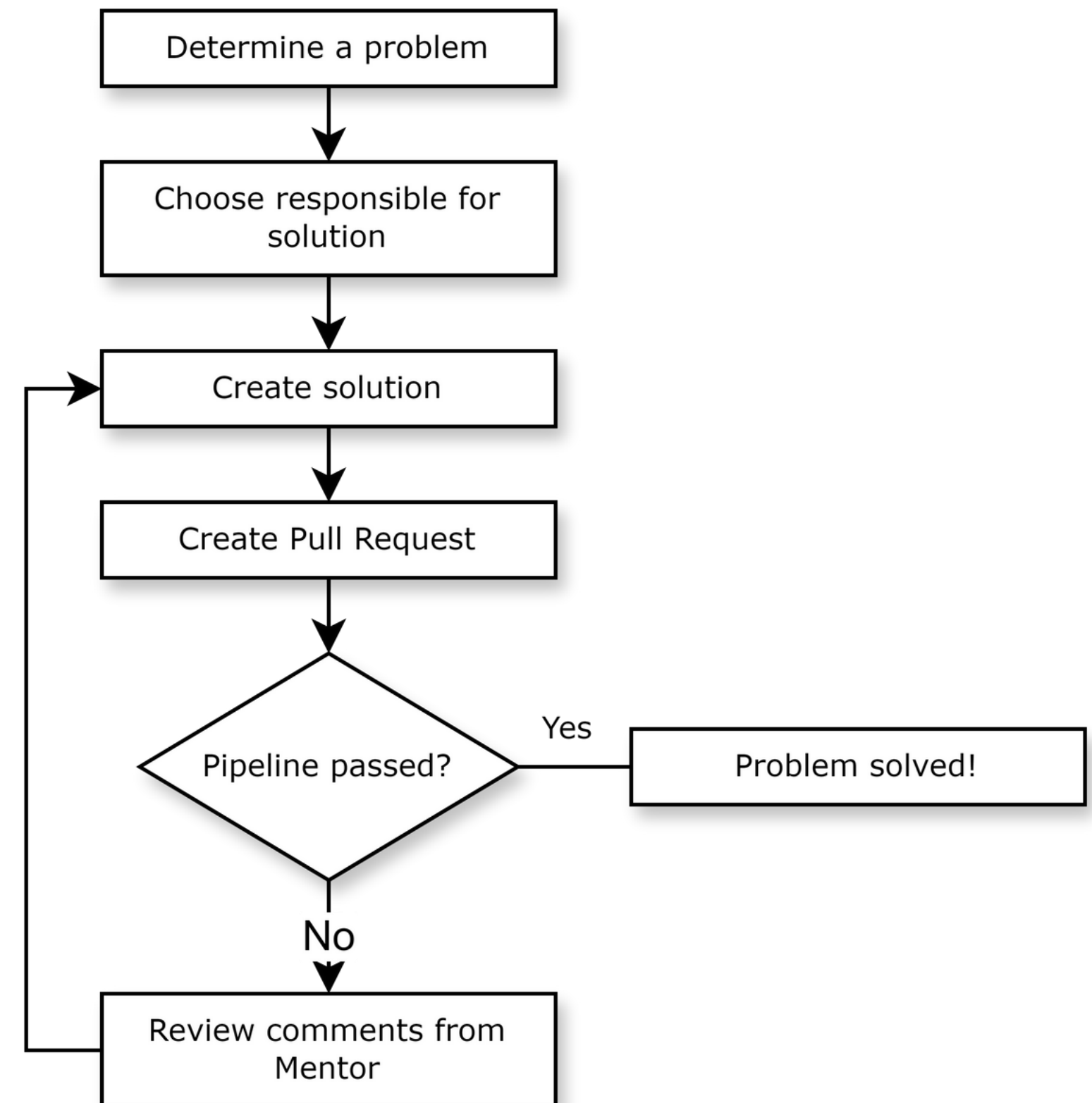
DEMO



[Link to the video](#)

TESTING, WORKFLOW, DOCUMENTATION

- Components tested separately and project tested as a whole
[Test launches](#)
- Github pipeline created to check if code is correct and project builds
- Documentation explaining all components



PROBLEMS



MISCOMMUNICATION

Large team: 4 teams (24 people) In the project. We had to study effective management techniques on the fly



DEPENDENCIES ISSUE

Incompatible versions of OS and software dependencies



CONFIGURATION MANAGEMENT

- Weekly meetings with mentor
- Meetings on demand with other teams

Ivan Domrachev

Software consult

I hope tomorrow you'll show me some demo 16:11

Which could be launched with 1-2 commands from the docker

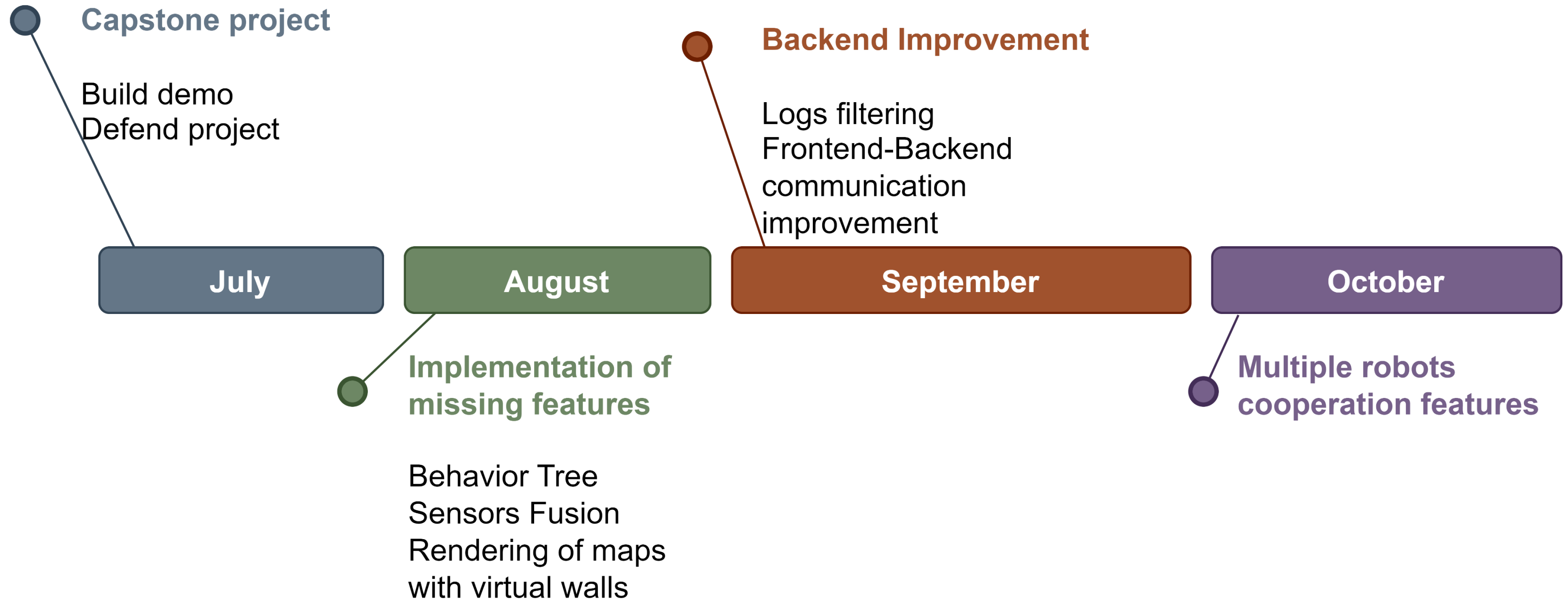
16:11

And which shows how slam+planner+controller work together

16:11

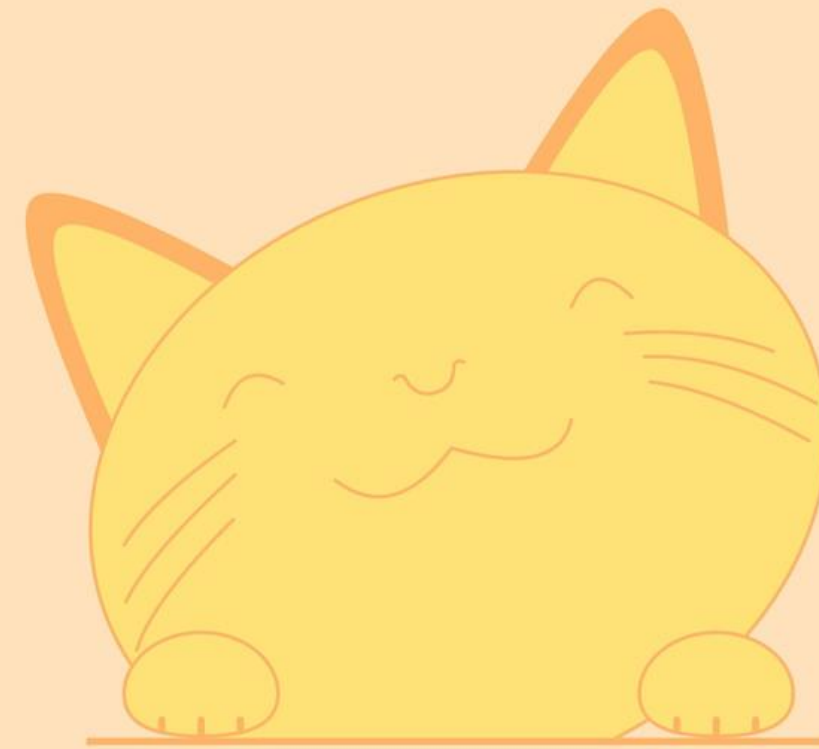


FUTURE PLAN



CONCLUSION

Our goal, as a part of the larger project, was to develop software for a mobile platform. We have successfully developed basic functionality in only 7 weeks, proving that such software does not require huge funding or long-time work.



GOOD
VIBES

ACKNOWLEDGMENTS



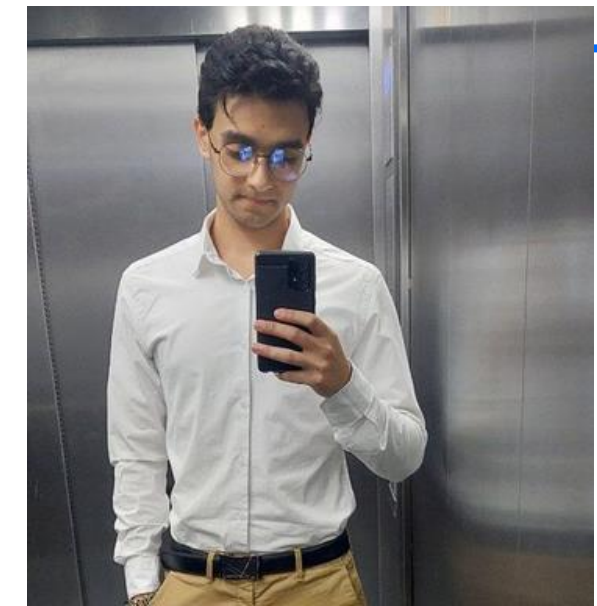
IVAN DOMRACHEV

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KARIM ELDAKROURY

TA

THANK YOU

Follow our IROS club!

