ROS 2 On the Browser with WebAssembly for Teaching Robotics

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Introduction
Motivation

Accessibility

Ease of Use

Reproducibility

Maintenance
Target Scenario

- Robotics instructor
- Gait generation for a heptapod
- Simulation
- Shareable with students
02 Methodology
ROS 2 on the Browser with WebAssembly

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Middleware

ROS 2

Interface

Implementation

rmw_wasm_cpp

wasm_cpp

wasm_js

Embind
Build Process

- ROS 2
- WebAssembly
- JS

Build Process:

1. C++
2. Emscripten
3. WebAssembly
4. JS
03 Demos
ROS Topics

Publisher

START
STOP
CLEAR

Publisher initializing.

Subscriber

START
STOP
CLEAR
ROS Services

Server

START
STOP
CLEAR

Server initializing.

Client

START
STOP
CLEAR
LEGO Boost Vernie

- [github.com/DerThorsten/lego-boost-browser](https://github.com/DerThorsten/lego-boost-browser)
- Web Bluetooth API
Conclusion
## Summary

### Pros
- ✓ No installation
- ✓ No setup required by user
- ✓ For anyone with access to a modern web browser
- ✓ Reproducible environment
- ✓ Shareable via link

### Cons
- X Performance
- X Complexity of deployment
- X Missing features
Future Work

- RoboStack (conda packages)
- JupyterLite integration
Contributing

We want your help!
- Package management
- Middleware maintenance
- Front end development

Resources
- ros2wasm.dev
- github.com/ihuicat1/rmw_wasm
- ros2wasm.dev/pages/report/report.pdf

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Thanks!!