

# Roadmap Update: Ignition & ROS 2

August 2021

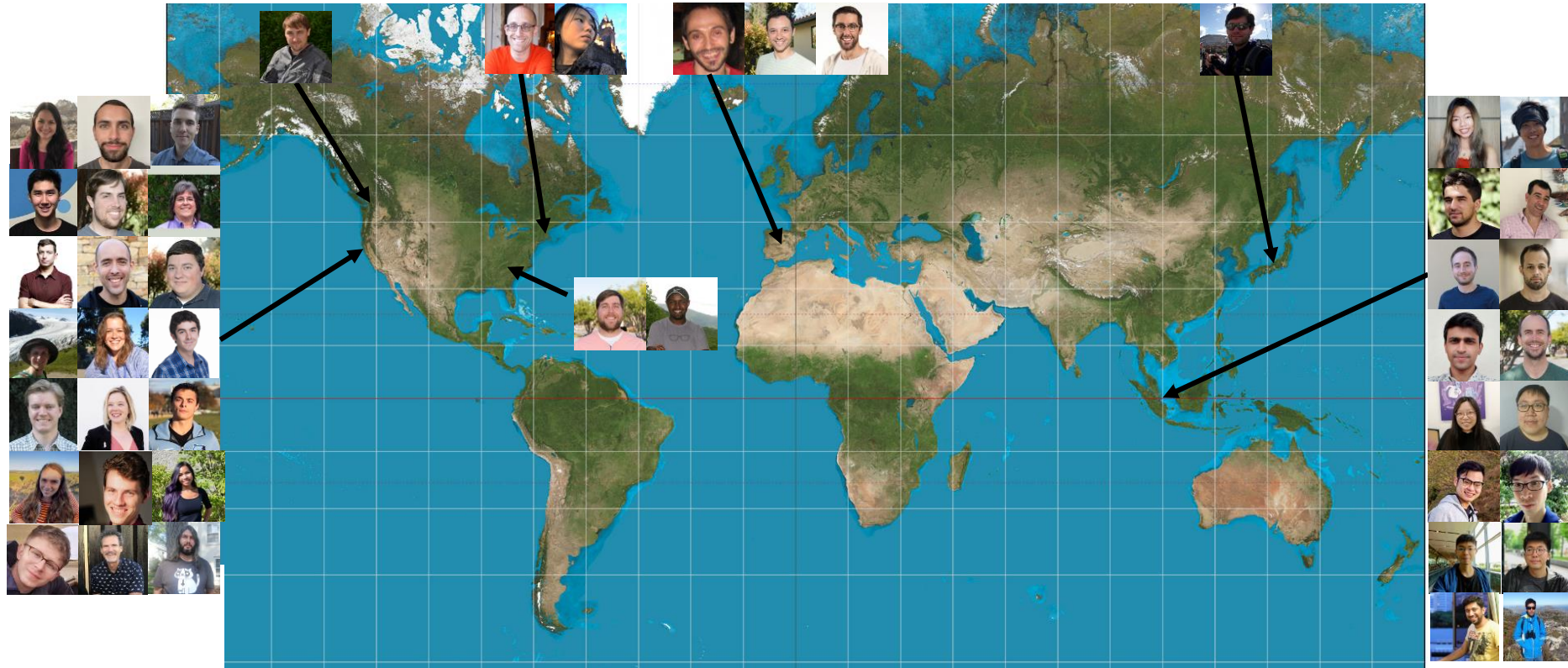
Marco A. Gutiérrez

# Who we are

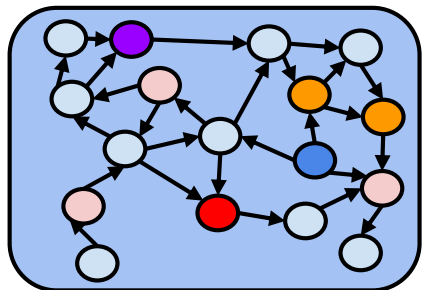


**We create open software and hardware  
platforms for robotics. We use those  
platforms to solve important problems and  
we help others to do the same.**

# Where we are



# What do we do



ROS  
2



GAZEBO

IGNITION



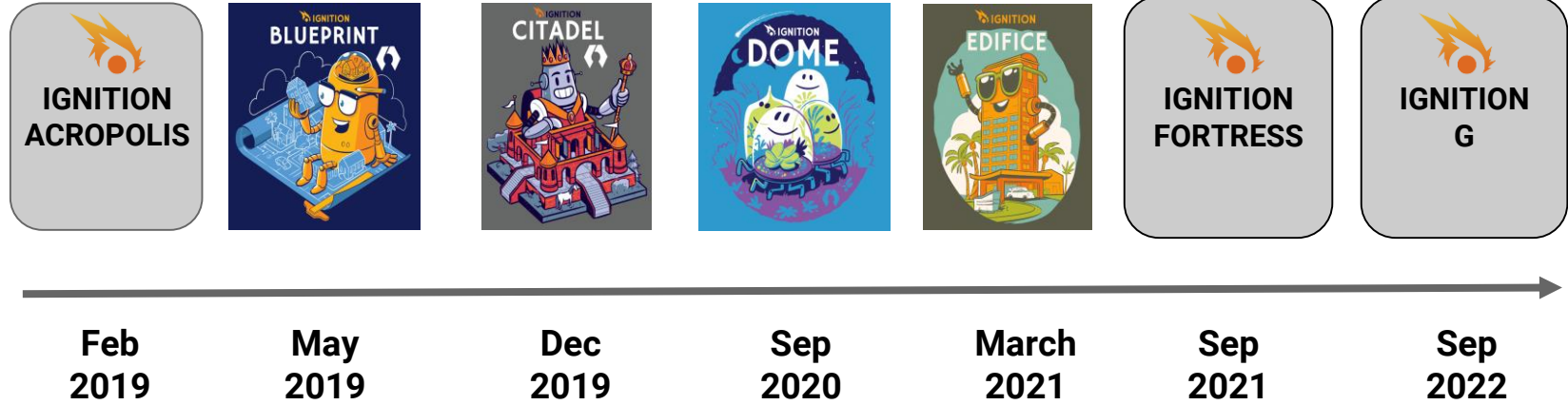
Open-RMF

# Ignition





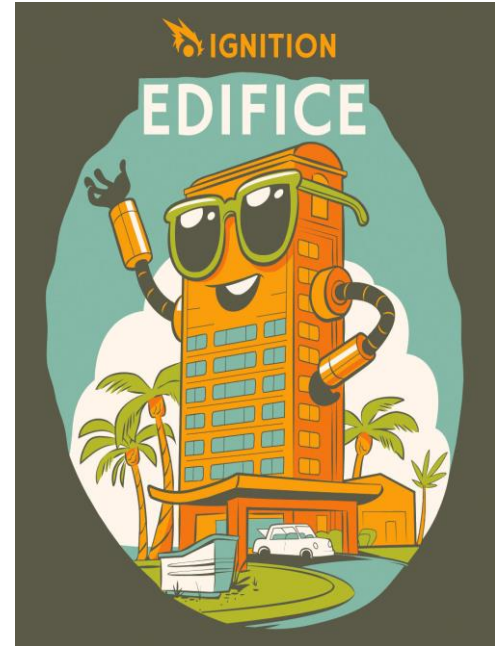
# Releases: past and upcoming





# 2021/22 Roadmap: Edifice

- Improved Mac and Windows support
- Mesh level of detail support
- Design for Enhanced distributed simulation



**March  
2021**



# 2021/22 Roadmap: Fortress

- GUI tools
- Sensors
- SDFFormat
- Rendering
- Performance



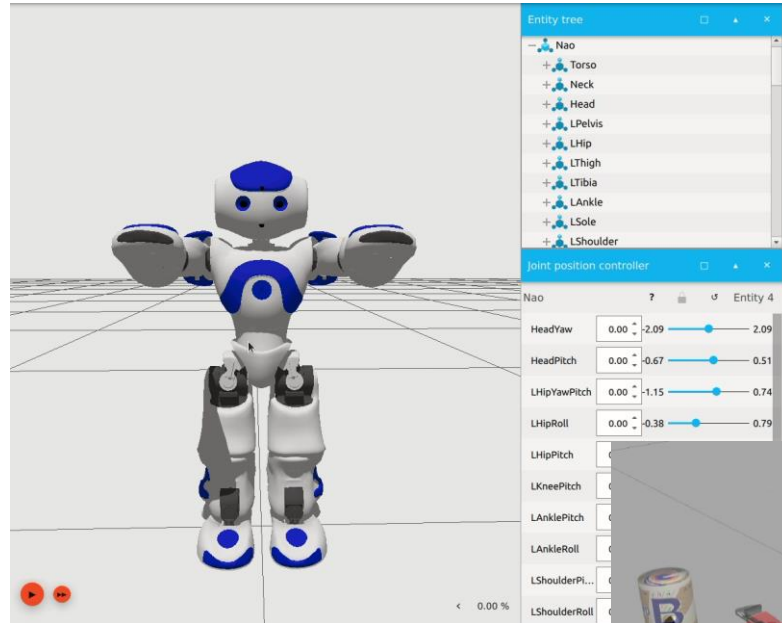
Sep  
2021





# GUI tools: Visualize

- Wireframes
- Transparent
- Inertia
- Center of mass
- Joints





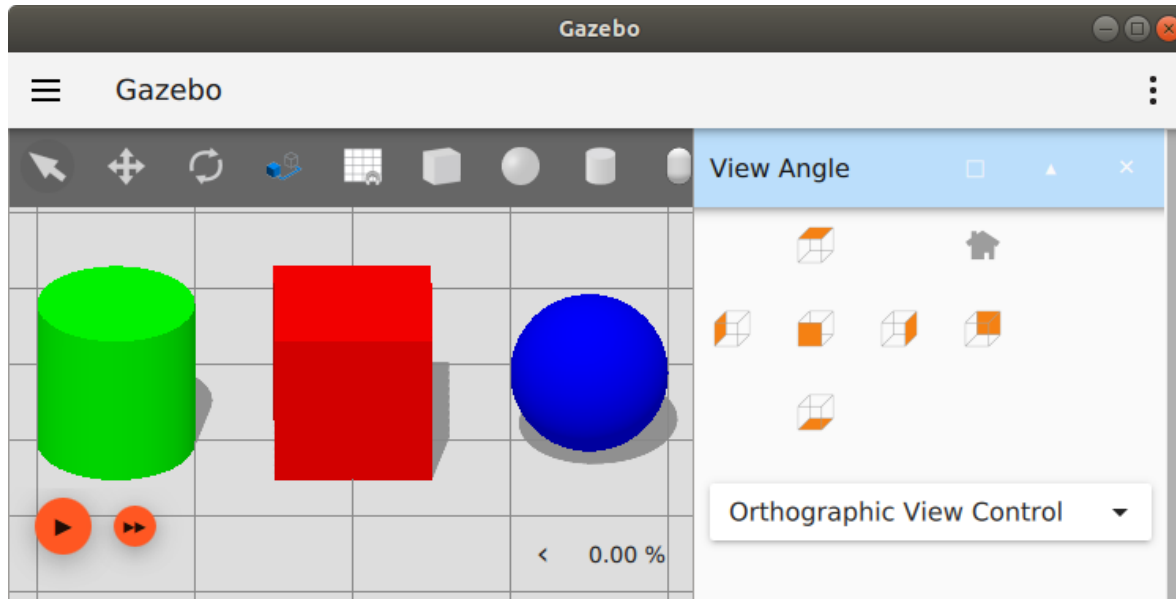
# GUI tools: Scene Plugins

- **Currently:**
  - 2 separate scene plugins:
    - Ign-gui
    - Ign-gazebo
- **Goal:**
  - Combine them into a single plugin
  - Consolidate all gazebo-independent features into ign-gui
  - Less duplication



# GUI tools: perspective vs orthographic views

- Toggling perspective and orthographic views





# GUI tools: Model Editor

- Cloning entities
- Scaling tool
- Pose components editable
- Insert system plugins form GUI
- Create sensors from GUI
- Create joints from GUI
- Import 3D meshes from GUI
- Semantic view
- Undo / redo
- Copy /paste entities from GUI

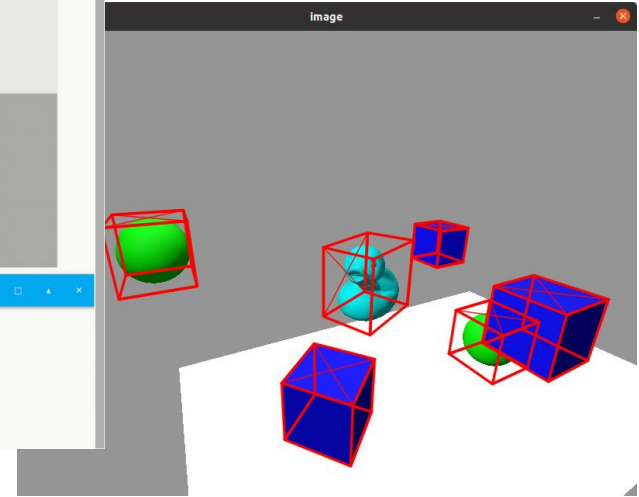
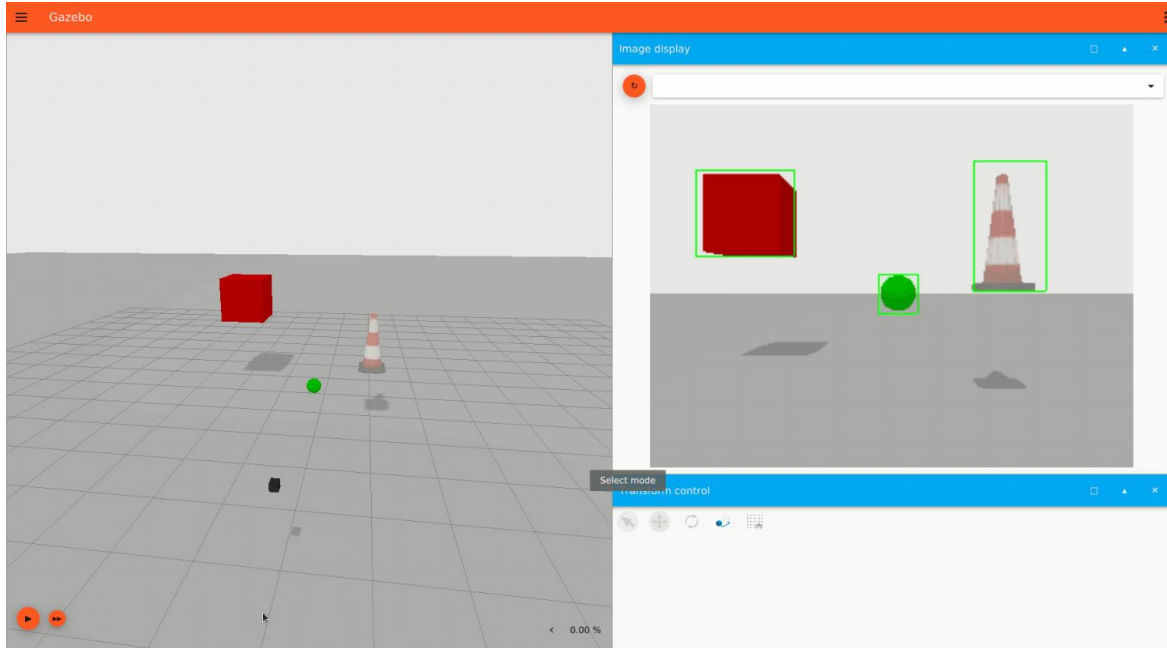


# Sensors: Custom sensors

```
<sensor name="custom_sensor" type="custom" ignition:type="custom_sensor">  
  <always_on>1</always_on>  
  <update_rate>30</update_rate>  
  <visualize>true</visualize>  
  <topic>custom</topic>  
  <ignition:custom_sensor>  
    <noise type="gaussian">  
      <mean>0.2</mean>  
      <stddev>0.1</stddev>  
    </noise>  
  </ignition:custom_sensor>  
</sensor>
```

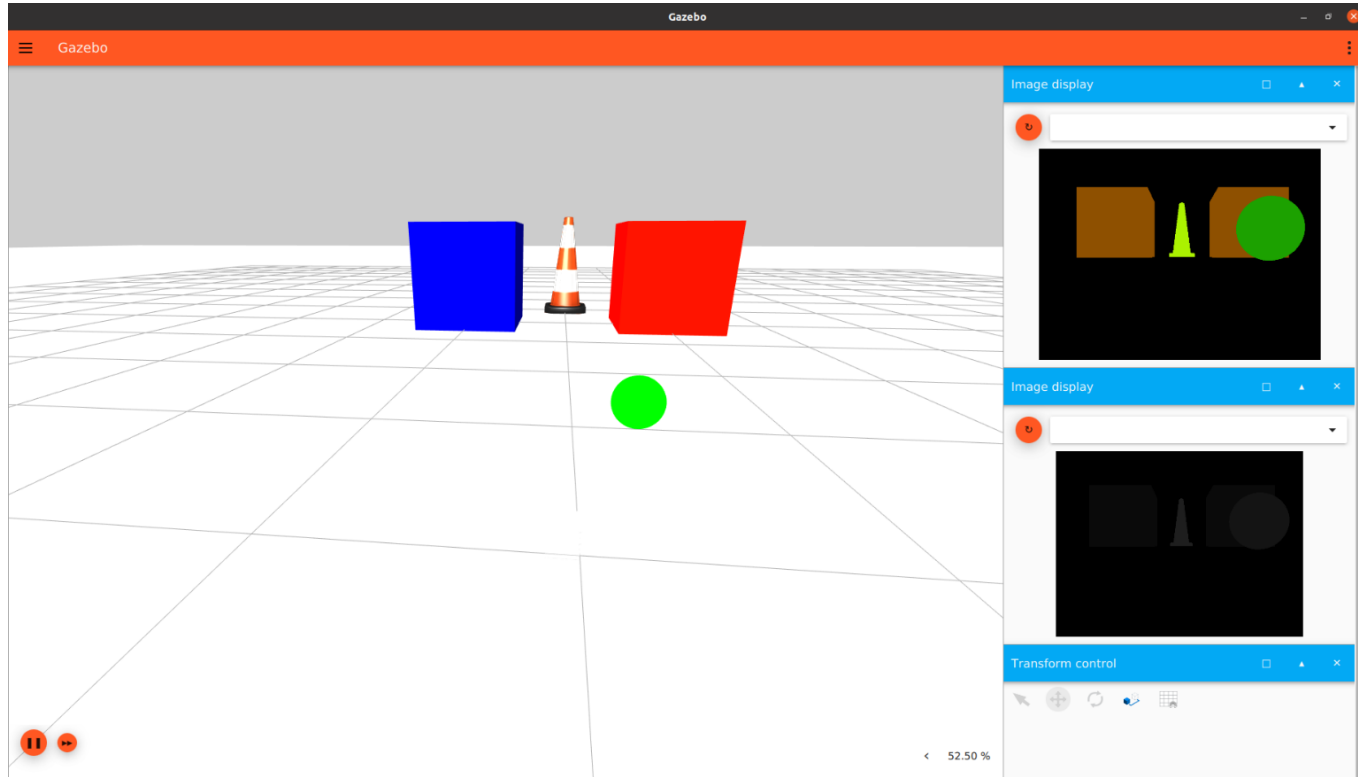


# Sensors: Bounding box sensor





# Sensors: Segmentation sensor





# SDFFormat: Improve <pose> (Option A)

```
<pose>{xyz} {rpy_radians}</pose> <!-- Original format -->
```

```
<pose>
```

```
  <translation>{xyz}</translation>
```

```
  <rotation type="rpy_degrees">{rpy_degrees}</rotation>
```

```
</pose>
```

```
<pose>
```

```
  <translation>{xyz}</translation>
```

```
  <rotation type="q_wxyz">{wxyz}</rotation>
```

```
</pose>
```





# SDFFormat: Improve <pose> (Option B)

```
<pose>{xyz} {rpy_radians}</pose>
```

```
<pose rotation_type="rpy_radians">{xyz} {rpy_radians}</pose>
```

```
<pose rotation_type="rpy_degrees">{xyz} {rpy_degrees}</pose>
```

```
<!-- Not yet confirmed -->
```

```
<pose rotation_type="q_wxyz">{xyz} {q_wxyz}</pose>
```



# Rendering: OGRE 2.2

- Ignition-rendering updated to use OGRE 2.2
  - Updated APIs for OGRE 2.2
  - EGL Support
    - EGL Headless Support
    - Run Ogre in cloud and VMs
    - No need for X11



## Performance:

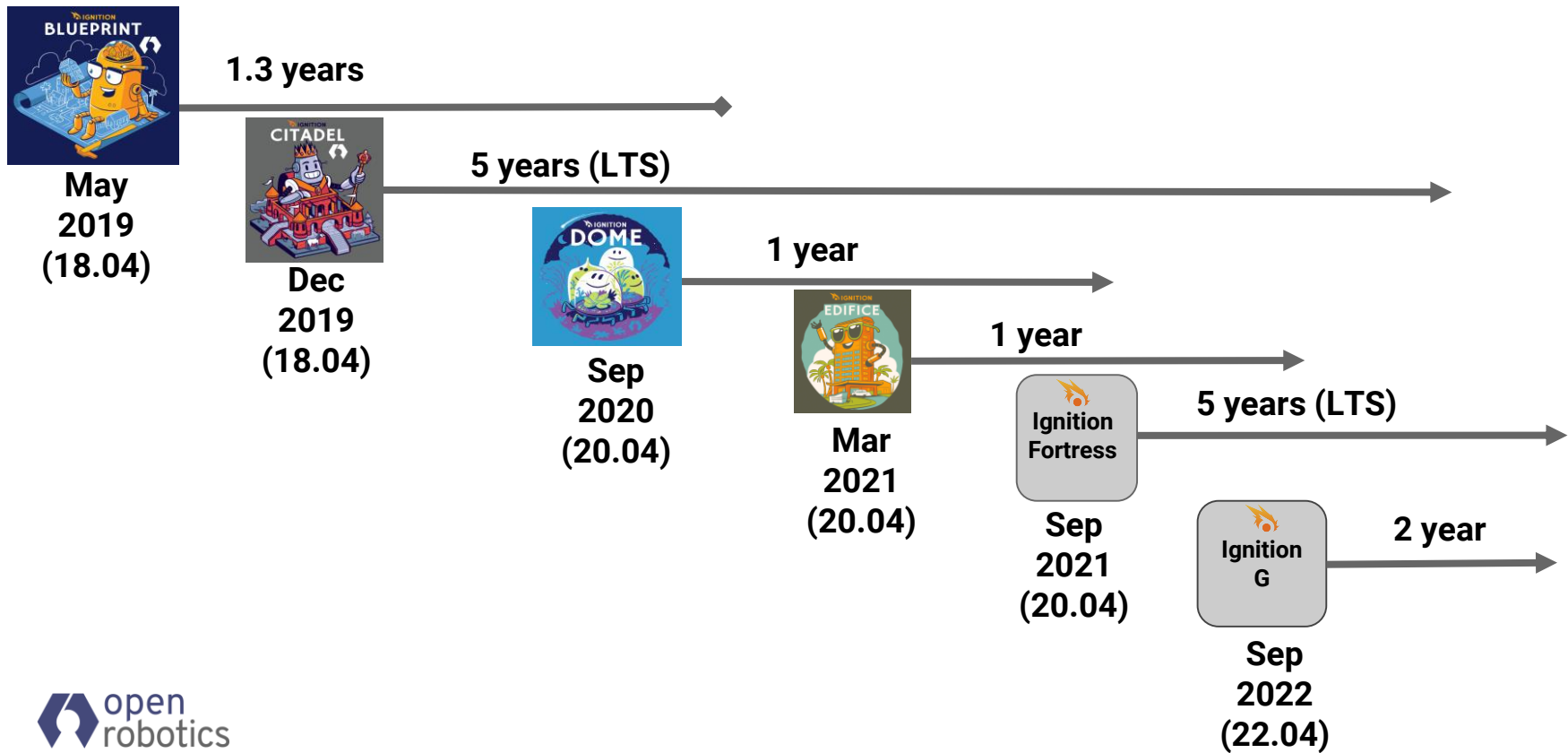
- **Run server and client in the same process:**
  - Avoids cost of GUI sync with server

```
$ ign gazebo -r --same-process shapes.sdf
```

- **Refactor ECM:Each**
  - Optimize ecm.Each so that performance is the same regardless of components used



# Future releases & support



ROS 2



# Releases: past and upcoming



May 2020 - May 2025

# Releases: past and upcoming



Dec  
2017



Jul  
2018



Dec  
2018



May  
2019



Nov  
2019



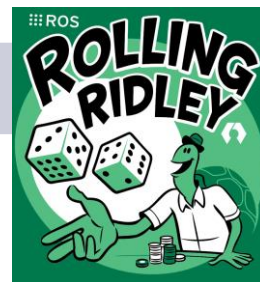
June  
2020



May  
2021

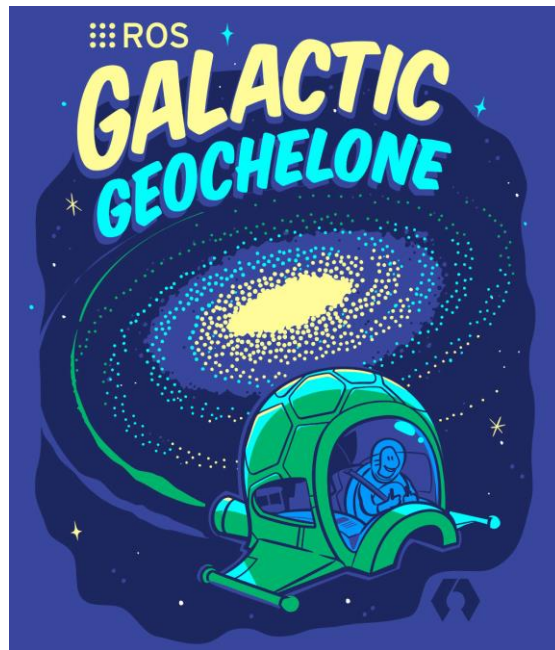


May  
2022



# 2021/22 Roadmap: Galactic

- Middleware
- Tooling
- Quality
- Performance
- Documentation



May 2021



# Galactic: Middleware



- Improve DDS Service Reliability
- Default Middleware Selection
  - Switch to CycloneDDS as default RMW vendor
- Improve DDS fully connected overhead

# Galactic: Tooling

- **Rosbag2**
  - Improve sqlite3 backend performance
  - Separate threads for queueing messages and writing to disk
  - Record `/clock` topic

## Galactic: Quality

- Add code cover checks for QL 1 CI packages
- Keep `ci.ros2.org` and `build.ros2.org` builds green
- Turn on more compiler warnings
- Increase testing coverage of C/C++ packages

## Galactic: Quality

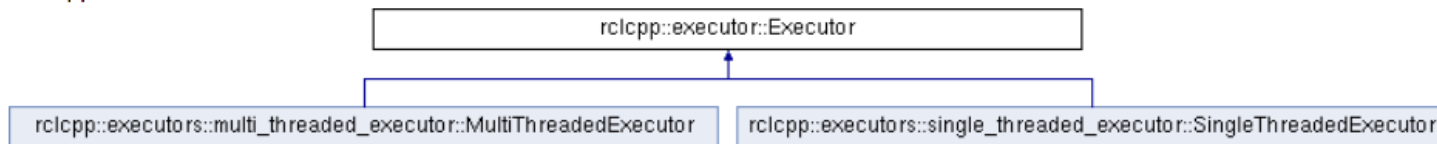
- QL1 declaration up to `rc1cpp`
- Enable scan-build for core package PR builds
- Create and maintain in `ci.ros2.org` for the ROS 2 core packages:
  - Address Sanitizer (ASan) job
  - Thread Sanitizer (TSan) job

# Galactic: Performance & Tech debt

- Reduce the performance overhead of executors

```
#include <executor.hpp>
```

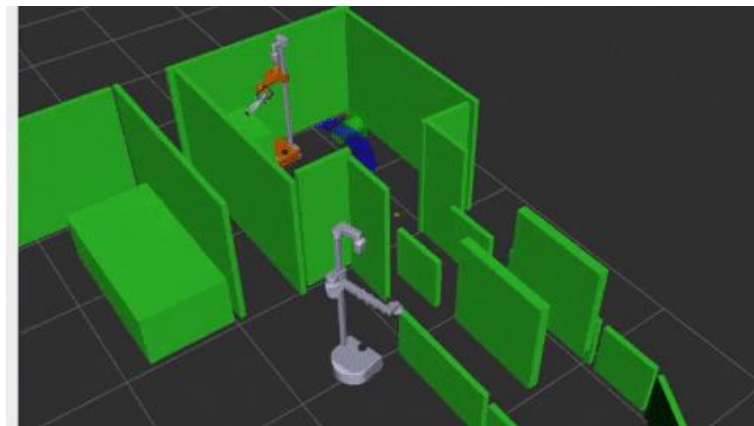
Inheritance diagram for `rclcpp::executor::Executor`:



- Rewrite `rclpy` to use `pybind11`

# Galactic: Documentation

- Consolidate ROS 2 documentation
  - Easy to find/search place
- Auto generation and host per-package doc
- Specific demo to show public adoption of ROS 2
  - PickNik Robotics (with Hello Robot 'Stretch')



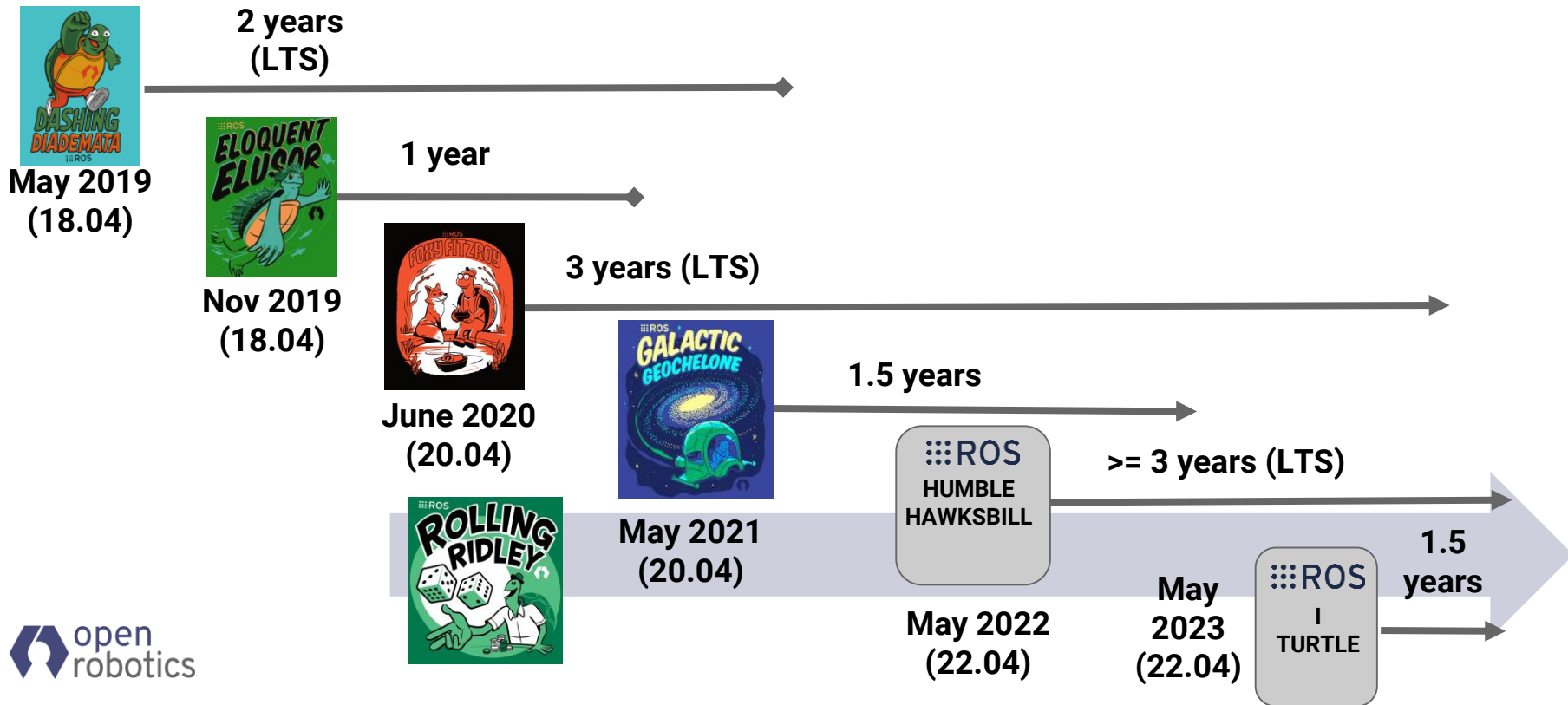
# 2021/22 Roadmap: Humble

- **Middleware**
  - Content Filtering interfaces
  - RMW listener APIs
- **Design**
  - Extend ROS resource addressing
- **Rclpy: Signal handling**
- **CLI test on Windows**



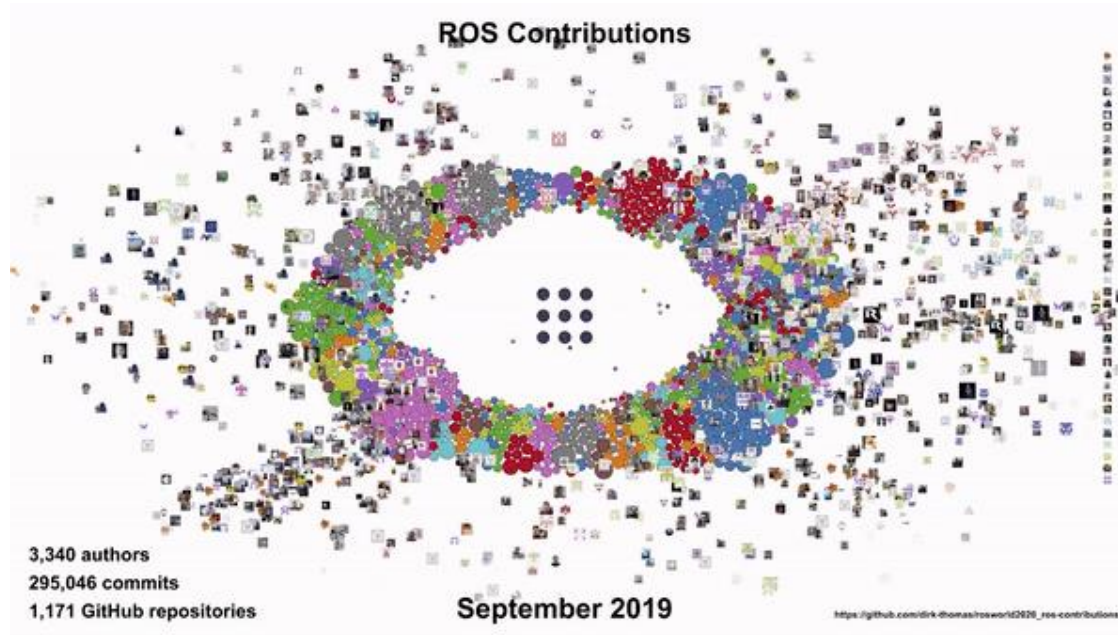
**May 2021**

# Future releases & support

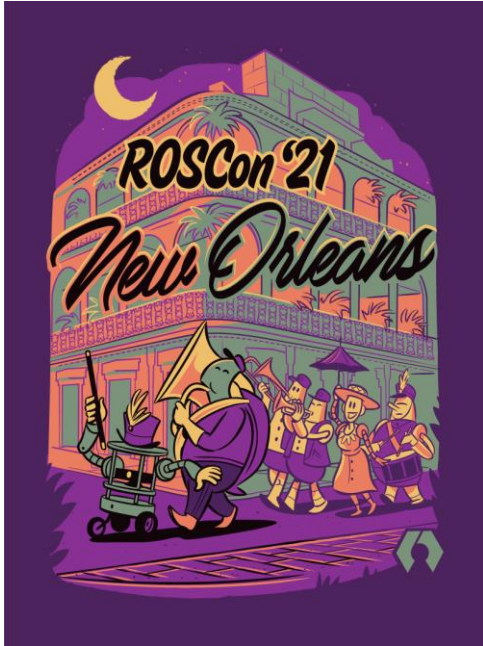




# Community



# (some) Community events:



ROS-I  
Americas @  
Automate

Autoware  
Workshop  
@ IV2019



ROSCon FR

ROS-I EU  
Spring  
Workshop

ROS  
Summer  
School  
China

ROS 2  
Summit @  
IEEE ICPS



ROS  
Summer  
School  
Aachen

ROS  
Summer  
School  
Pretoria

ROS-I Asia  
Pacific  
Workshop

# Thanks!



- [ros.org](https://ros.org)
- [index.ros.org](https://index.ros.org)
- [answers.ros.org](https://answers.ros.org)
- [discourse.ros.org](https://discourse.ros.org)



[marco@openrobotics.org](mailto:marco@openrobotics.org)  
[www.openrobotics.org](http://www.openrobotics.org)



- [gazebosim.org](https://gazebosim.org)
- [ignitionrobotics.org](https://ignitionrobotics.org)
- [answers.gazebosim.org](https://answers.gazebosim.org)
- [community.gazebosim.org](https://community.gazebosim.org)

## Open-RMF

- [osrf.github.io/ros2multirobotbook](https://osrf.github.io/ros2multirobotbook)
- [github.com/open-rmf/rmf](https://github.com/open-rmf/rmf)
- [github.com/open-rmf/rmf\\_demos](https://github.com/open-rmf/rmf_demos)