RViz – The tale of a migration to ROS 2.0

TNG TECHNOLOGY CONSULTING

Andreas Holzner, andreas.holzner@tngtech.com

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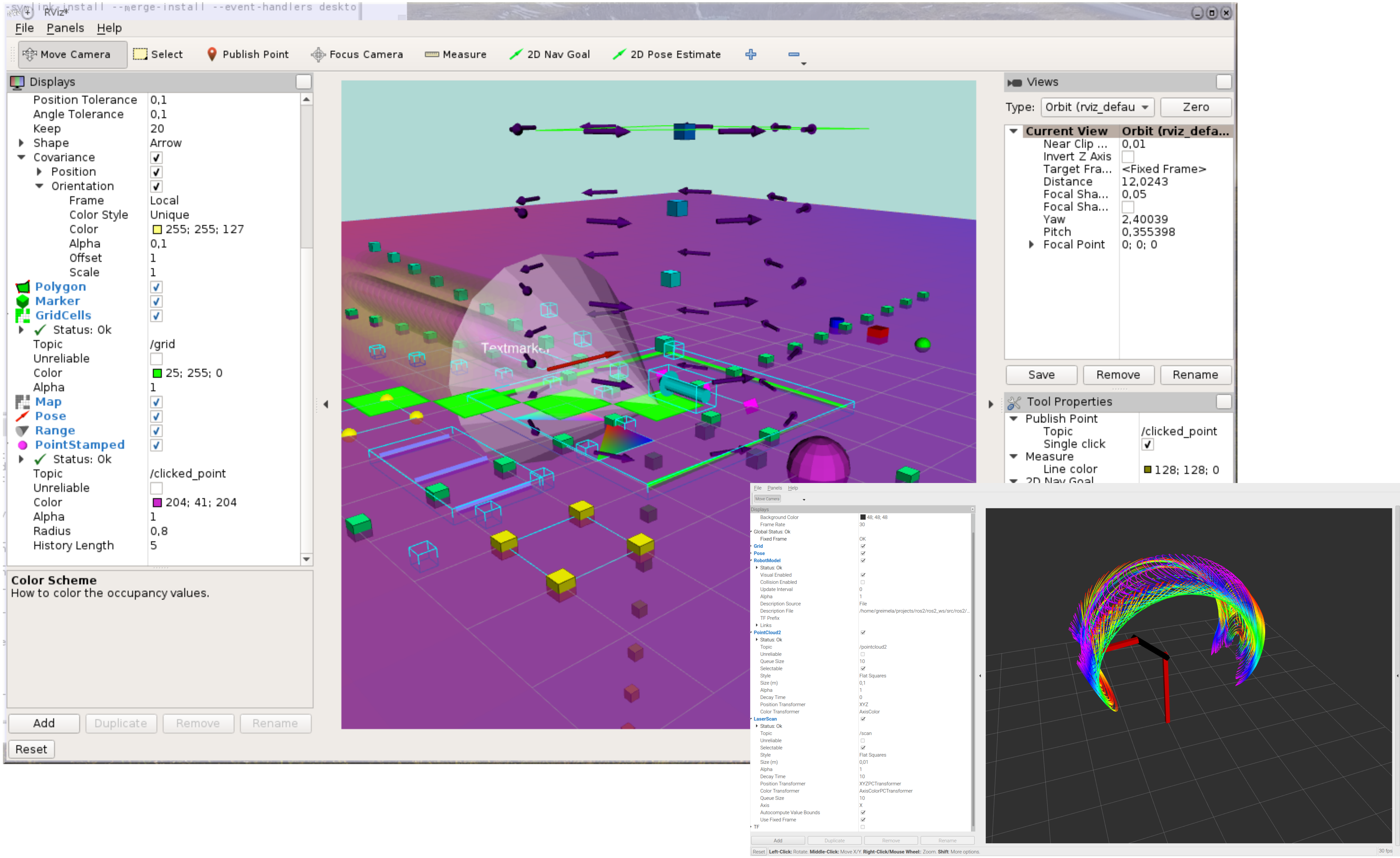

--symlink-install --merge-install --event-handlers deskto
RViz*
File
Panels
Help
Move Camera
Select
Publish Point
Focus Camera
Measure
2D Nav Goal
2D Pose Estimate
Displays
Views
Tool Properties
Textmarker
Add
Duplicate
Remove
Rename
Reset
Save
Zero

Position Tolerance	0,1
Angle Tolerance	0,1
Keep	20
Shape	Arrow
Covariance	☑
Position	☑
Orientation	☑
Frame	Local
Color Style	Unique
Color	255; 255; 127
Alpha	0,1
Offset	1
Scale	1
Polygon	☑
Marker	☑
GridCells	☑
✓ Status: Ok	
Topic	/grid
Unreliable	☐
Color	25; 255; 0
Alpha	1
Map	☑
Pose	☑
Range	☑
PointStamped	☑
✓ Status: Ok	
Topic	/clicked_point
Unreliable	☐
Color	204; 41; 204
Alpha	1
Radius	0,8
History Length	5

Color Scheme
How to color the occupancy values.

Type: Orbit (rviz_defau

Current View	Orbit (rviz_defa...
Near Clip ...	0,01
Invert Z Axis	☐
Target Fra...	<Fixed Frame>
Distance	12,0243
Focal Sha...	0,05
Focal Sha...	☐
Yaw	2,40039
Pitch	0,355398
Focal Point	0; 0; 0

Publish Point	
Topic	/clicked_point
Single click	☑
Measure	
Line color	128; 128; 0
2D Nav Goal	

Background Color	48; 48; 48
Frame Rate	30
Global Status: Ok	
Fixed Frame	OK
Grid	☑
Pose	☑
RobotModel	☑
Status: Ok	
Visual Enabled	☑
Collision Enabled	☐
Update Interval	0
Alpha	1
Description Source	File
Description File	/home/greimela/projects/ros2/ros2_ws/src/ros2/...
TF Prefix	
Links	
PointCloud2	☑
Status: Ok	
Topic	/pointcloud2
Unreliable	☐
Queue Size	10
Selectable	☑
Style	Flat Squares
Size (m)	0,1
Alpha	1
Decay Time	0
Position Transformer	XYZ
Color Transformer	AxisColor
LaserScan	☑
Status: Ok	
Topic	/scan
Unreliable	☐
Selectable	☑
Style	Flat Squares
Size (m)	0,01
Alpha	1
Decay Time	10
Position Transformer	XYZPCTransformer
Color Transformer	AxisColorPCTransformer
Queue Size	10
Axis	X
Autocompute Value Bounds	☑
Use Fixed Frame	☑
TF	☐

Left-Click: Rotate. **Middle-Click:** Move X/Y. **Right-Click/Mouse Wheel:**: Zoom. **Shift**: More options.

30 fps

Who was involved?

TNG TECHNOLOGY CONSULTING

BOSCH

open robotics

Goal

- ROS 1 -> ROS 2
- Linux, Windows, Mac C

Where did we start?

- Initial design discussions
- William prepared a minimal skeleton application
- Old code base: 40k loc
- Almost no tests, some manual tests with unknown expectations

Migration steps

- Extend initial skeleton
- Cross platform support
- Migrate each display
- Add tests for migrated/ new code
- Introduce end-to-end tests

ROS 1 vs ROS 2

From the RViz point of view

- No conceptual changes
- Node and tf2 API works more or less the same
- Tf2 in ROS 2 has less features
- Types have slightly different names

End-to-end tests?

RViz in a nutshell

Given a point cloud message
when I activate the point cloud display
then the point cloud is rendered according to the display properties

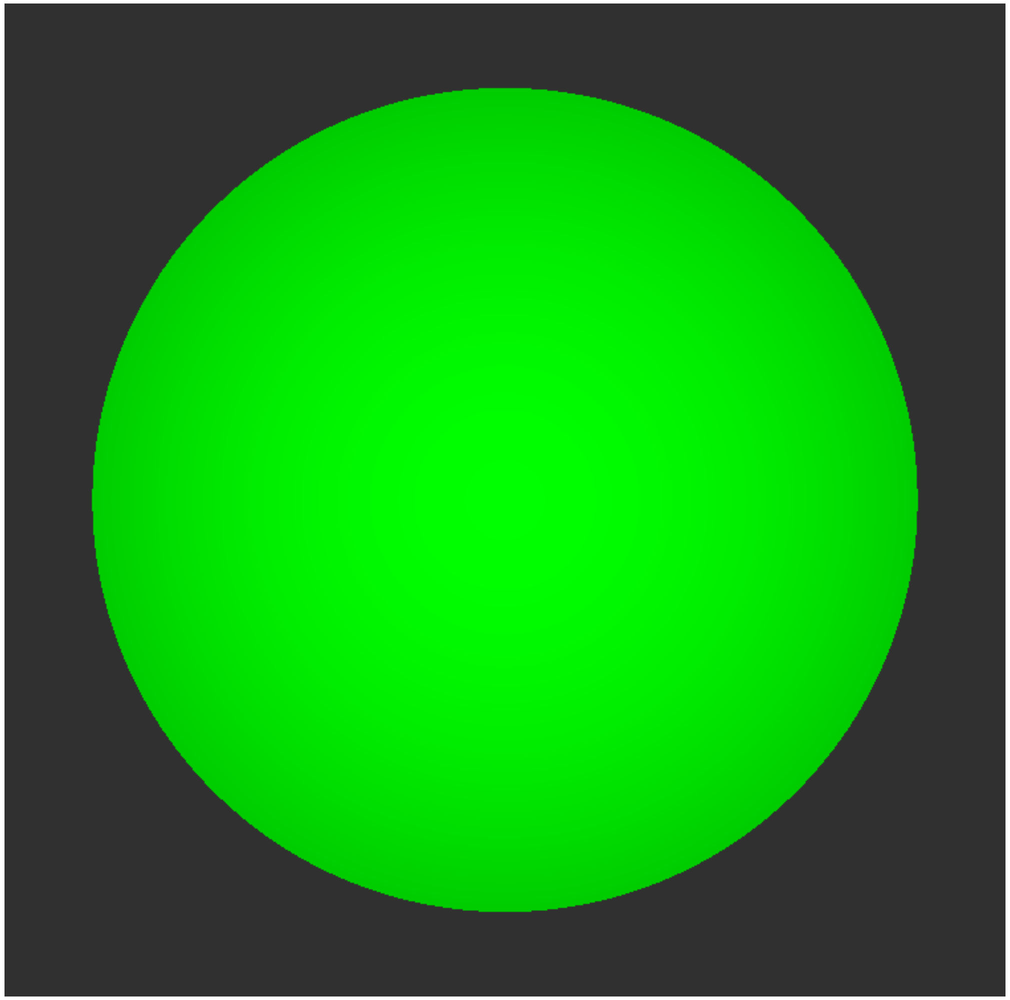
Conclusion

- 3D rendering must be included
- Assertion with an image

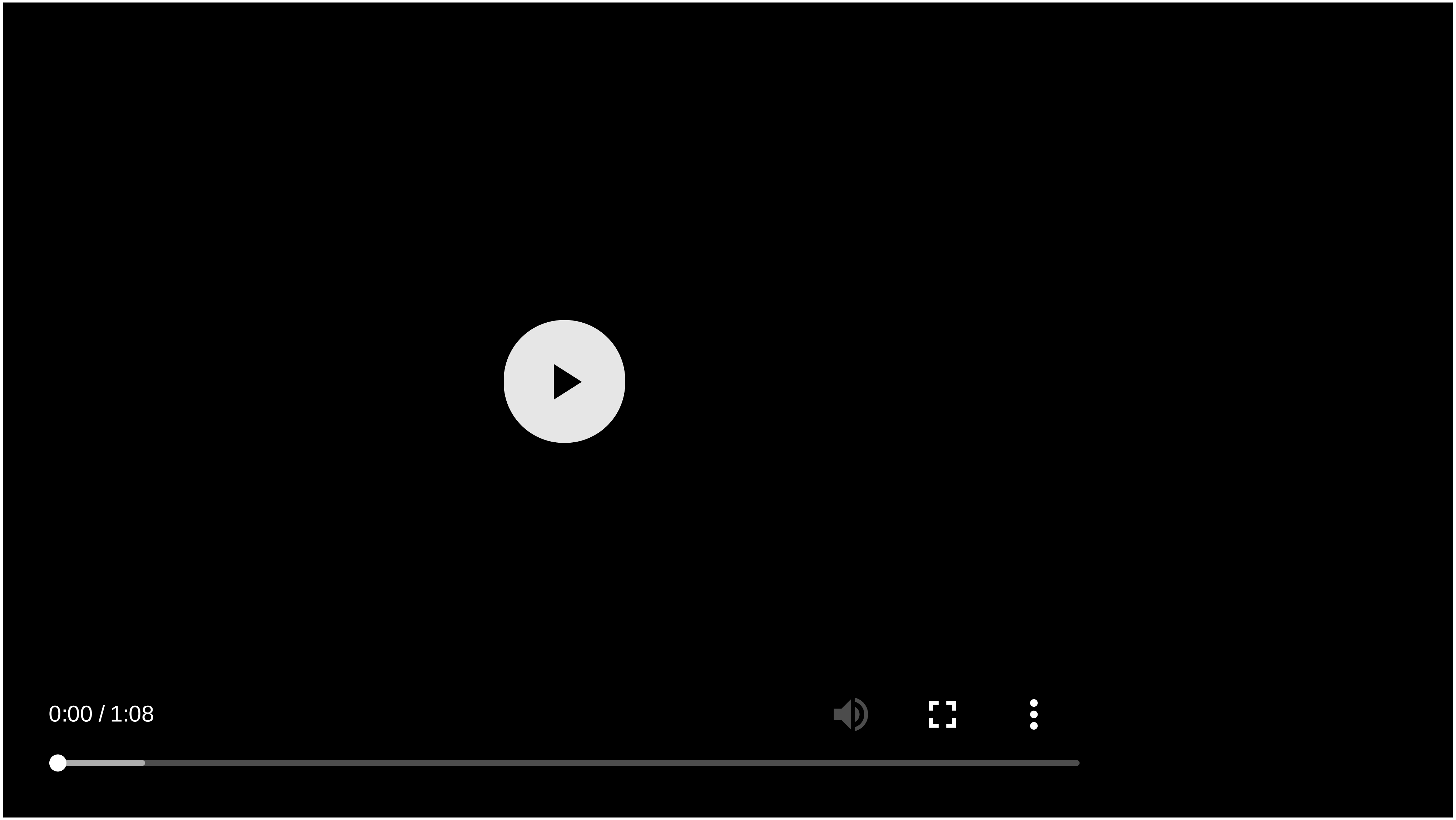
rviz_visual_testing_framework

```
TEST_F(VisualTestFixture, pointcloud2_containing_one_big_point) {
  auto pointcloud2_publisher =
    std::make_unique<VisualTestPublisher>(
    std::make_shared<nodes::PointCloud2Publisher>(), "pointcloud2_frame");

  setCamPose(Ogre::Vector3(0, 0, 16));
  setCamLookAt(Ogre::Vector3(0, 0, 0));

  auto pointcloud2_display = addDisplay<PointCloud2DisplayPageObject>();
  pointcloud2_display->setTopic("/pointcloud2");
  pointcloud2_display->setStyle("Spheres");
  pointcloud2_display->setSizeMeters(11);
  pointcloud2_display->setColor(0, 255, 0);

  assertMainWindowIdentity();
}
```

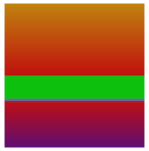
rviz_visual_testing_framework



rviz_visual_testing_framework

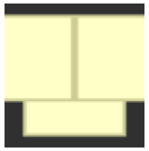


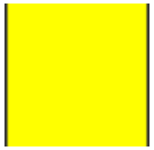
rviz_visual_testing_framework


costmap_scheme_ref.png

default_color_scheme_ref.png

empty_scene_ref.png


grid_cells_display_visual_test_ref.png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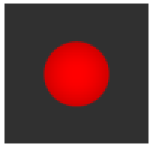
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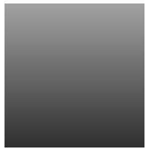
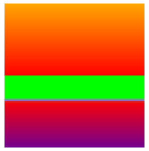

map_color_scheme_ref.png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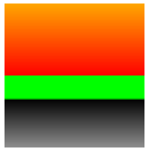
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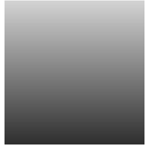
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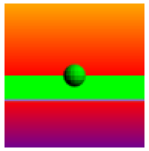
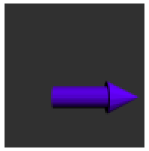
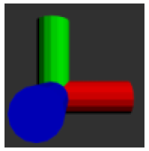

map_display_rendered_below_other_objects_ref.png


odometry_arrow_ref.png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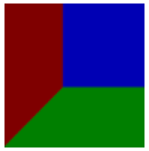
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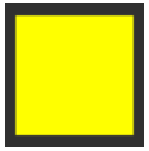
odometry_covariance_position_ref.png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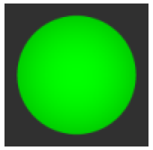
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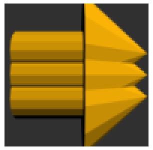
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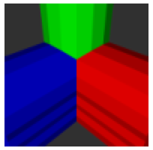
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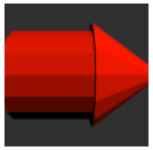
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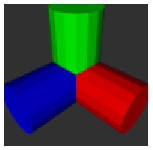
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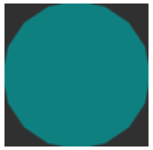
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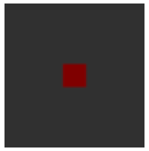
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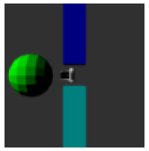
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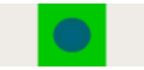
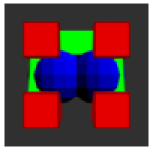

test_camera_display_with_published_image_secondary_win...

test_image_display_with_published_image_ref.png

test_image_display_with_published_image_secondary_wind...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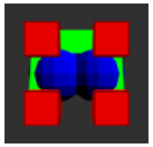
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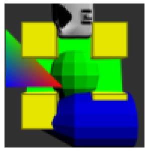
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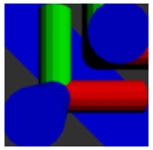
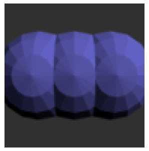
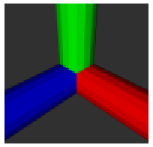
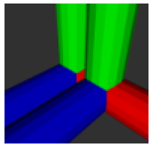

test_with_path_ref.png


test_with_three_points_ref.png


tf_display_frame_disabled_ref.png


tf_display_ref.png

Is the migration complete?

- Most features are migrated
- Documentation for plugins and migration

What is missing?

- A few trivial displays (temperature, ...)
- Depth cloud display (requires image_transport)
- Interact tool/ interactive markers
- Stereo (Oculus display)

Thank you!

Contact: andreas.holzner@tngtech.com
Repository: github.com/ros2/rviz