Our project was to develop a smart city intersection for the model intersection in the ORBIT lab, where there is a model replica of the intersections of 120th and Amsterdam Avenue and 120th and Broadway in New York. The simulation is a testbed for self-driving research and we hope to emulate human driving.

To create a realistic simulation we used three main programs, the first is SUMO - Simulation of Urban Mobility, which was used to create our traffic models. Secondly we used gazebo, a robotic simulator to build the entire world which shows the roads and cars. We wanted to connect this world to SUMO so we can have the traffic models built in sumo be seen in Gazebo, so we used ROS to communicate between SUMO and Gazebo.

To create this stoplight we had to draw up a model, create a publisher node, a gazebo plugin, and ros topics. A node is an executable that uses ROS to communicate with other nodes. As you saw The publisher node took keyboard commands, and the plugin allowed us to see the lights change in Gazebo. Topics bridge the gap between both the publisher node and the plugin. The overall purpose of making this was to show that we can add more variables within this simulation such as people and that we would be able to feed the simulation more accurate data about the intersection.

In the future we hope to create a more detailed, such as including street parking and pedestrians. Adding these would prove useful in generating more realistic simulations and gathering more accurate data. We would also like to incorporate the Self-Driving Car from another project into our simulated world.

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References
https://github.com/marioney/hybrid_simulation
https://github.com/CPFL/osrf_citysim