

||POLY-VERIFICATION USER GUIDE

Welcome to PolyVerif

This user guide provides a detailed walkthrough for seamlessly conducting simulations with the Poly-Verification Suite utilizing the powerful PolyVerif framework. Before diving into the simulation process, make sure to refer to the comprehensive "polyverif_setup_and_installation_doc" for successful installation and configuration of the PolyVerif framework.

Configuration and Metric Defaults

Key configuration parameters are defined in the "config.ini" file, offering a glimpse into the default settings that govern the behaviour of the PolyVerif framework during simulations. These settings, ranging from detection thresholds to collision counts, play a vital role in the validation metrics that determine the success or failure of the simulation.

config.ini

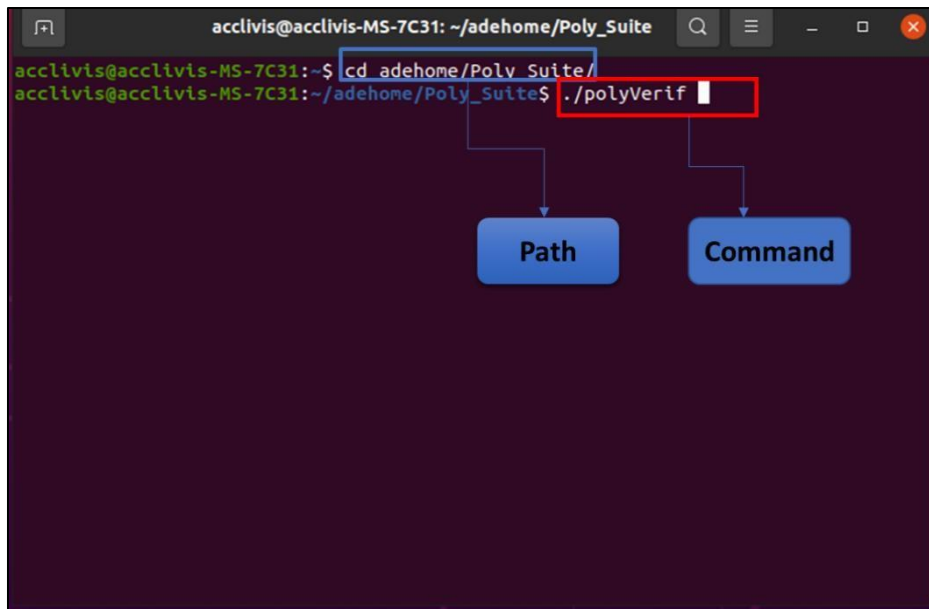
```
Autonomous_stack_config  
Detection_max_threshold = 40  
Detection_min_threshold = 30  
Control_collision_count = 0  
Localize_max_threshold = 0  
Localize_min_threshold = 1  
Planner_goalpose_max_threshold = 10  
Planner_goalpose_min_threshold = 2
```

Navigating the Simulation Landscape

Navigate to Poly_Suite Directory:

Go to the Poly_Suite directory located at adehome/Poly_Suite and execute the following command:

```
$ ./polyverif
```



This command will initiate the PolyVerif framework for further configuration and execution

Select Validation Types for Detection and Control

Four validation options await your exploration:

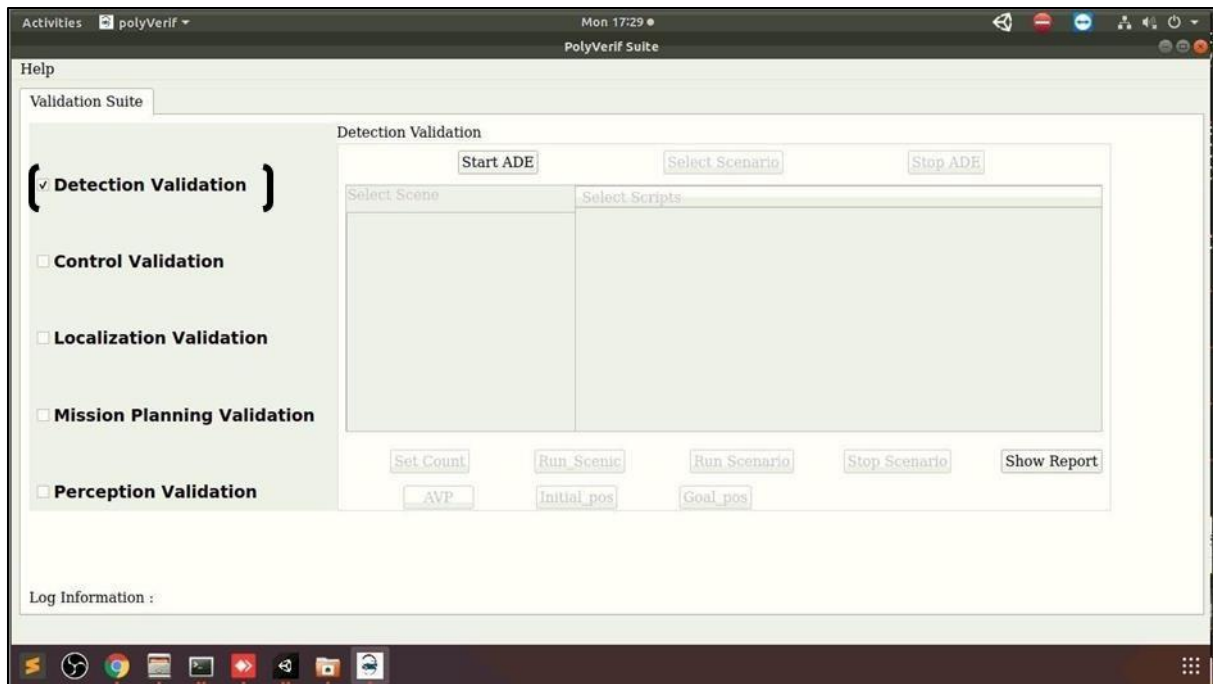
- Detection Validation
- Control Validation
- Localization Validation
- Mission Planning Validation



For the purpose of this guide, direct your focus towards Detection and Control Validation.

Detection Validation:

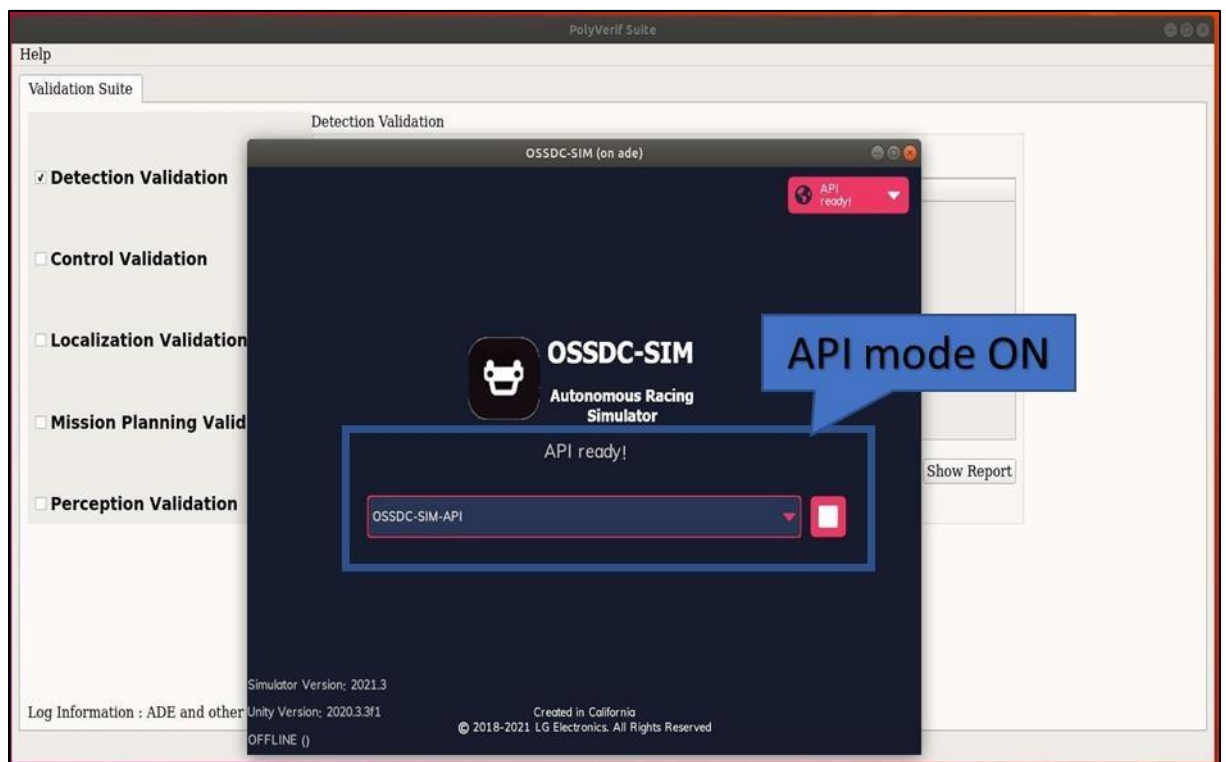
Begin by clicking "Start ADE" to initialize modules, which includes AutowareAuto, the Perception Stack, OSSDC simulator, Rviz, and Ros2-ignsvl-bridge. Allow some time for the ADE Docker and components to start.

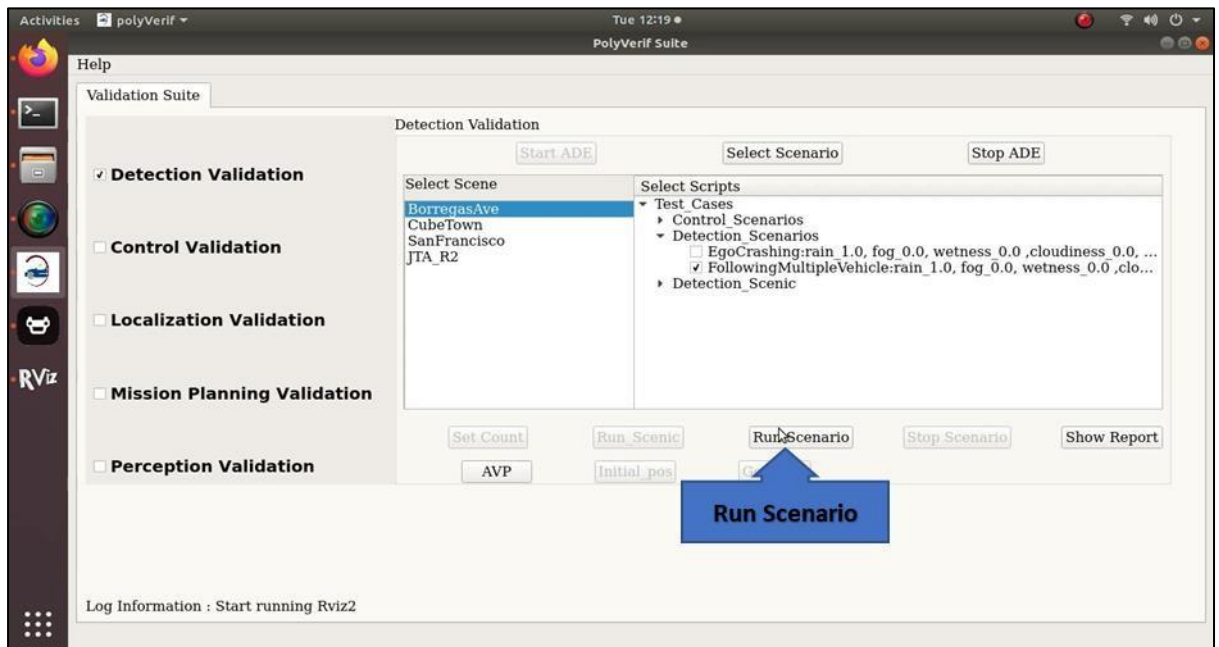
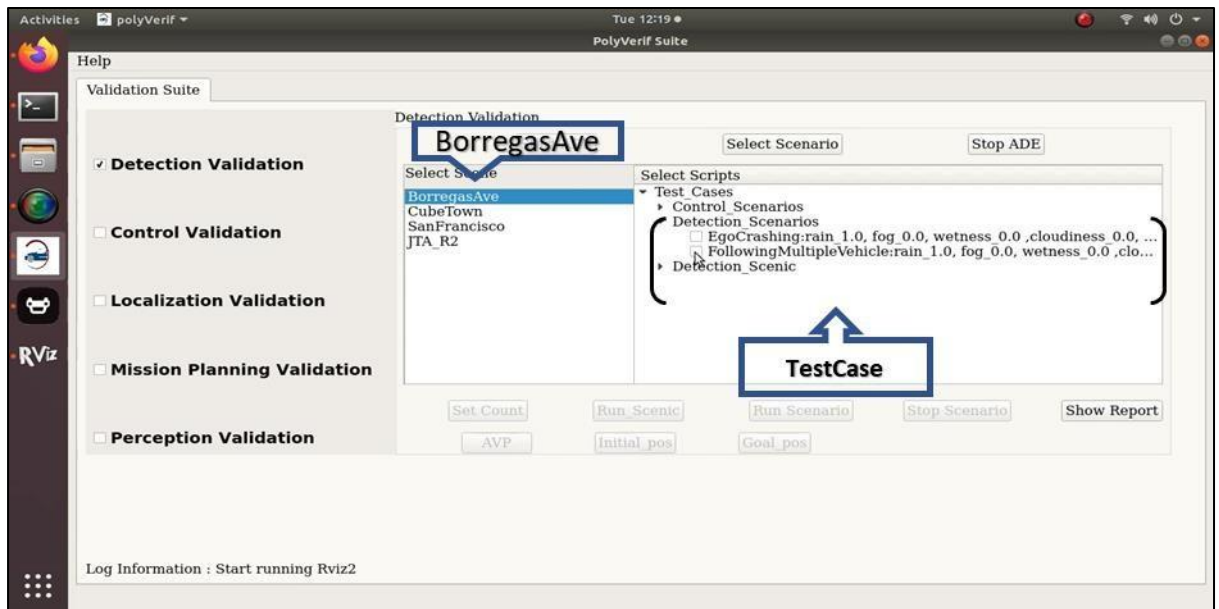


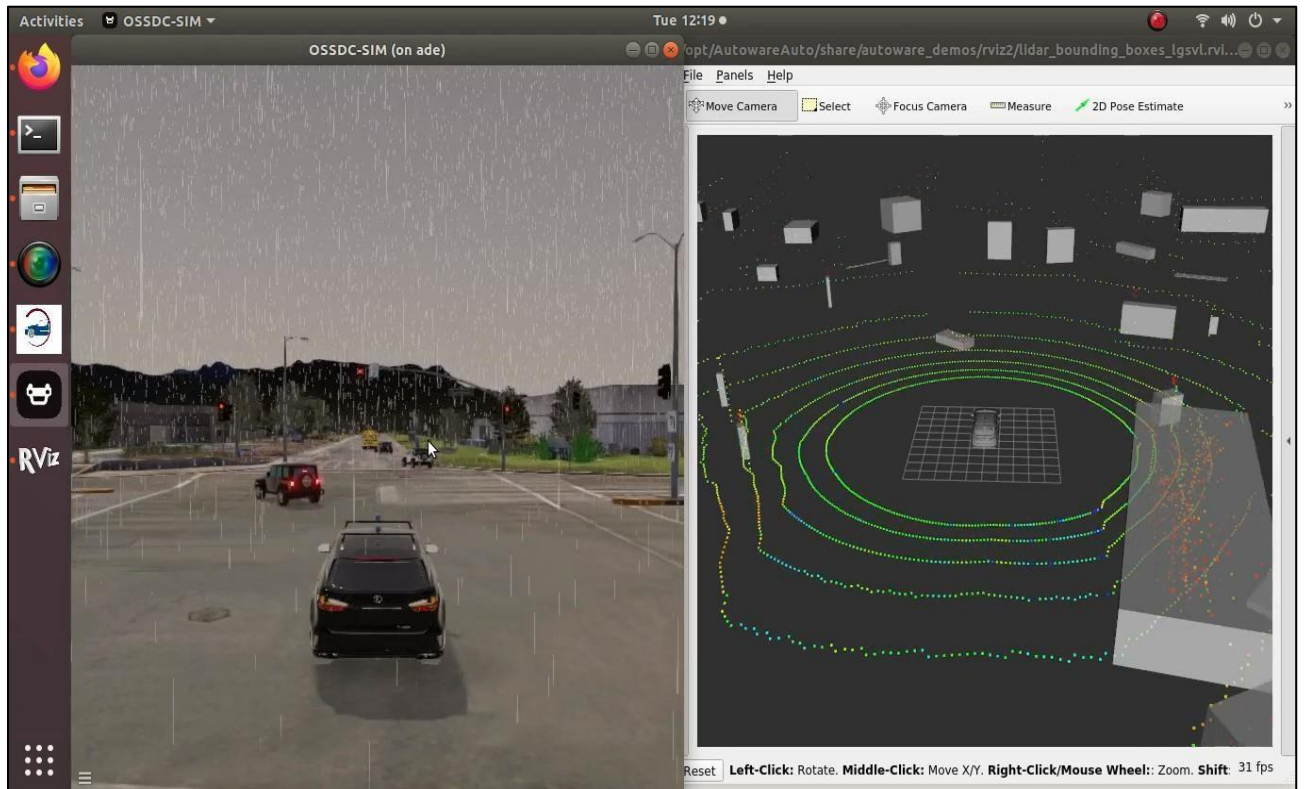
Scenario Setup:

In API_Mode, select a scenario:

- Choose the BorregasAve map.
- Pick a scenario from the list.
- Click "Run Scenario" to execute the Python script.

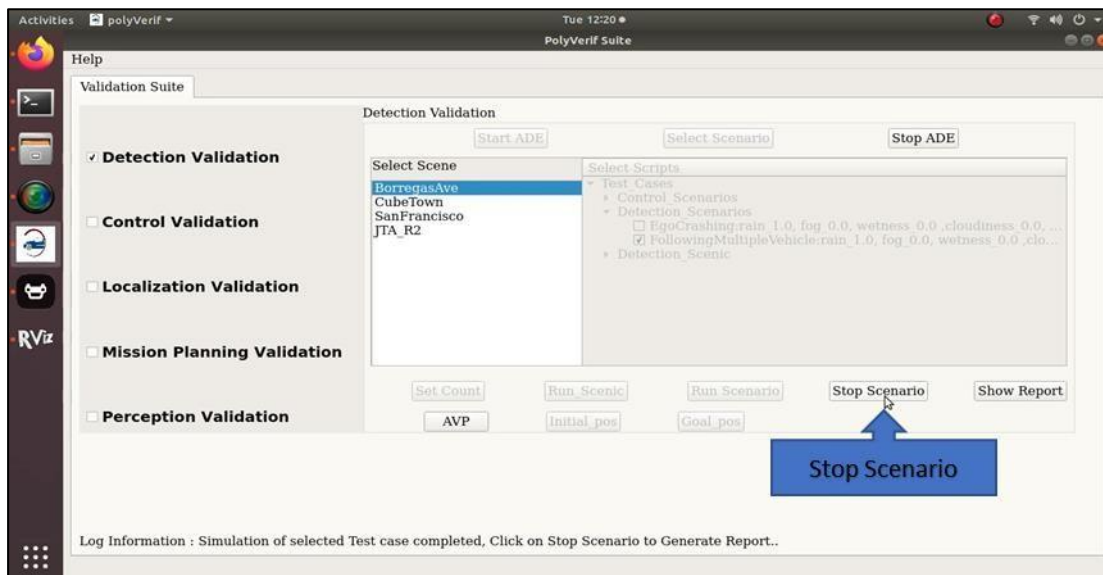




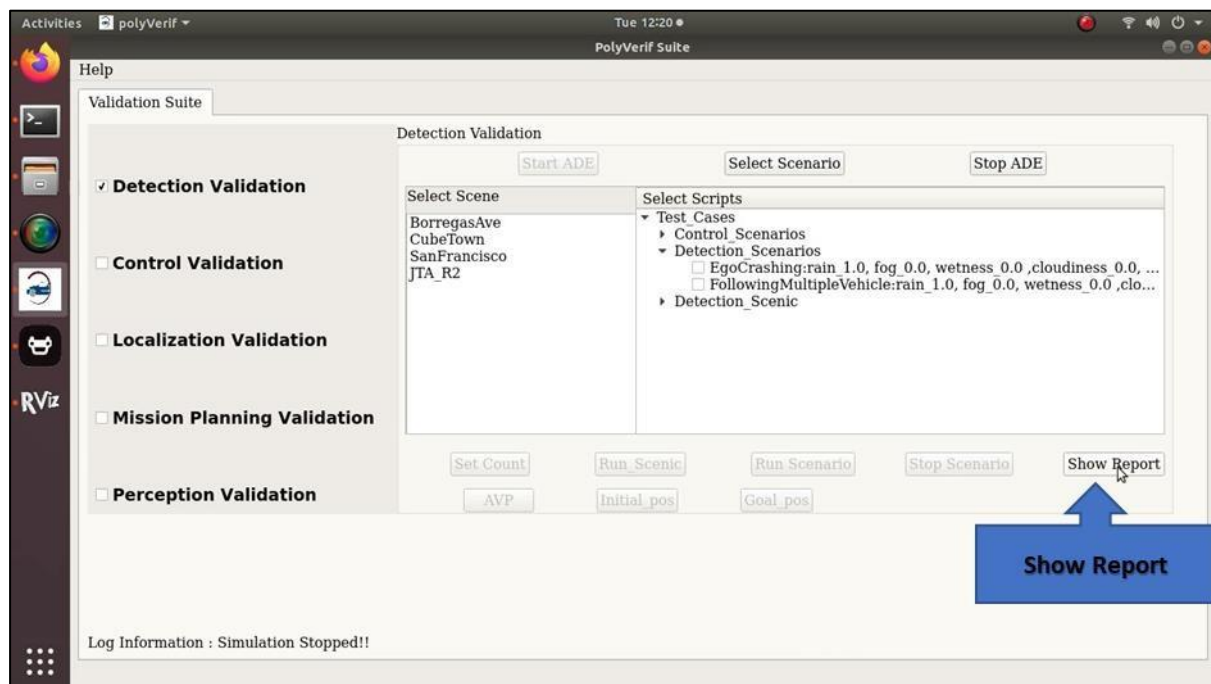


Simulation Management:

Utilize "Stop Scenario" to conclude the simulation.



Access the detailed report through "Show Report."



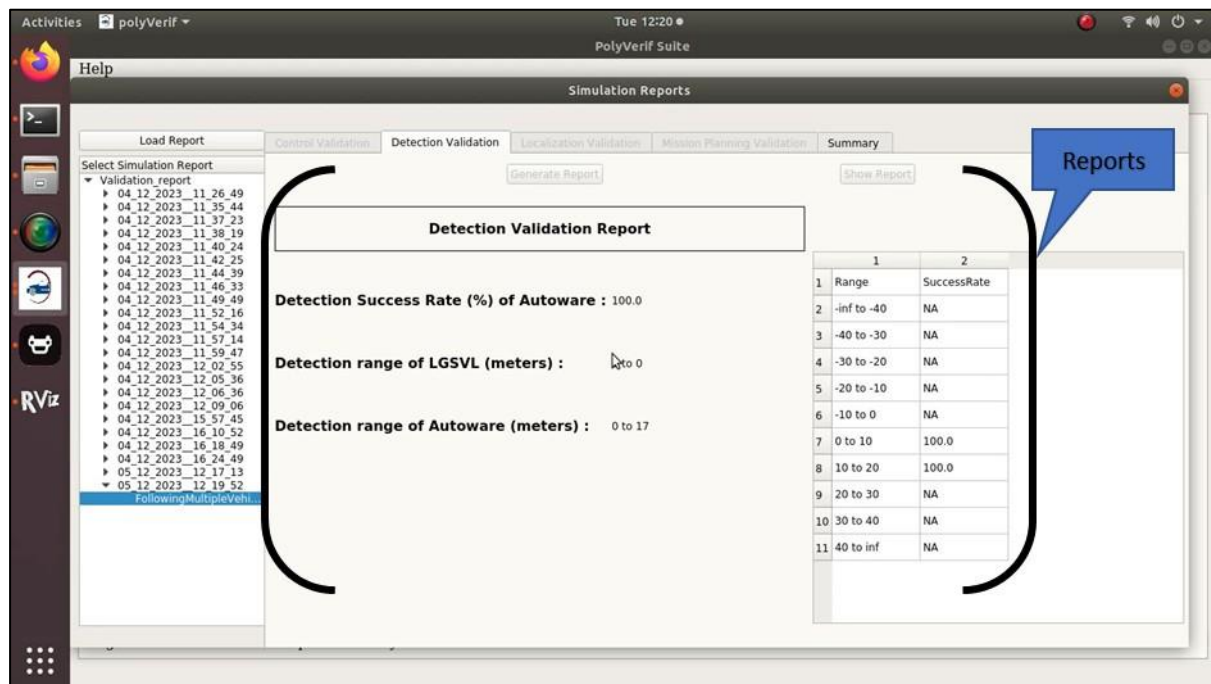
Report Insights:

Explore simulation reports with the "Load Report" and "Generate Report" buttons. Check timestamp for selecting report. Report generation will take 2-3 minutes, so wait for background process.



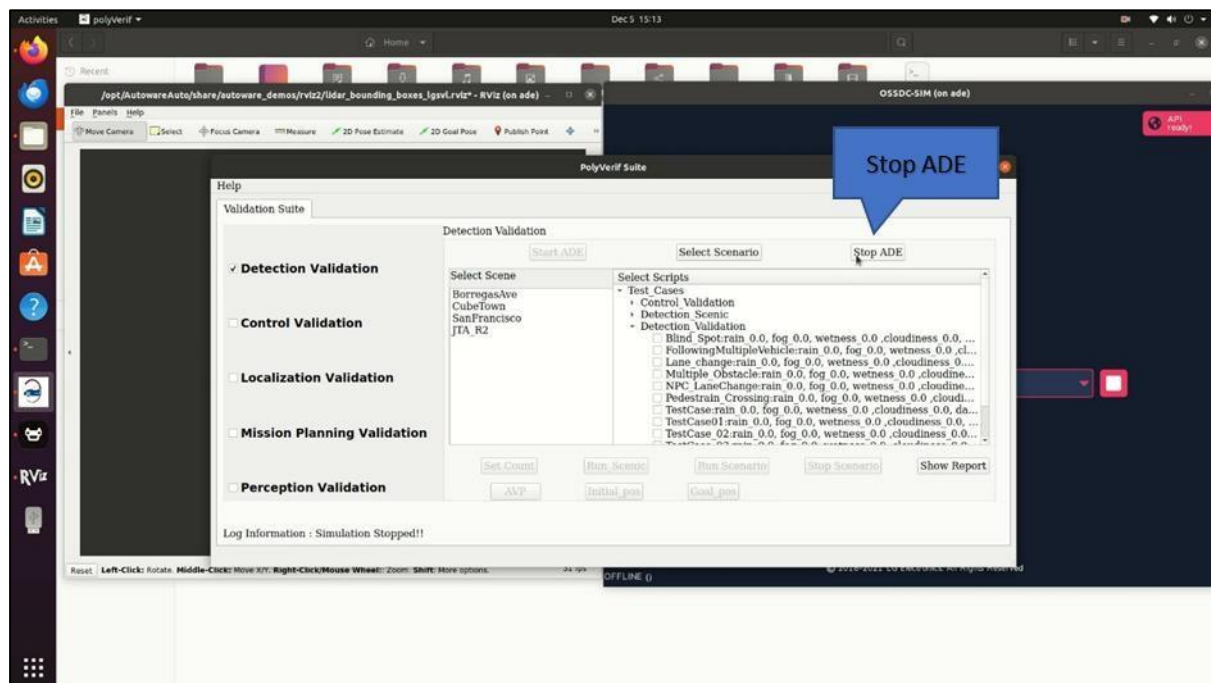
Report Management:

Explore simulation reports



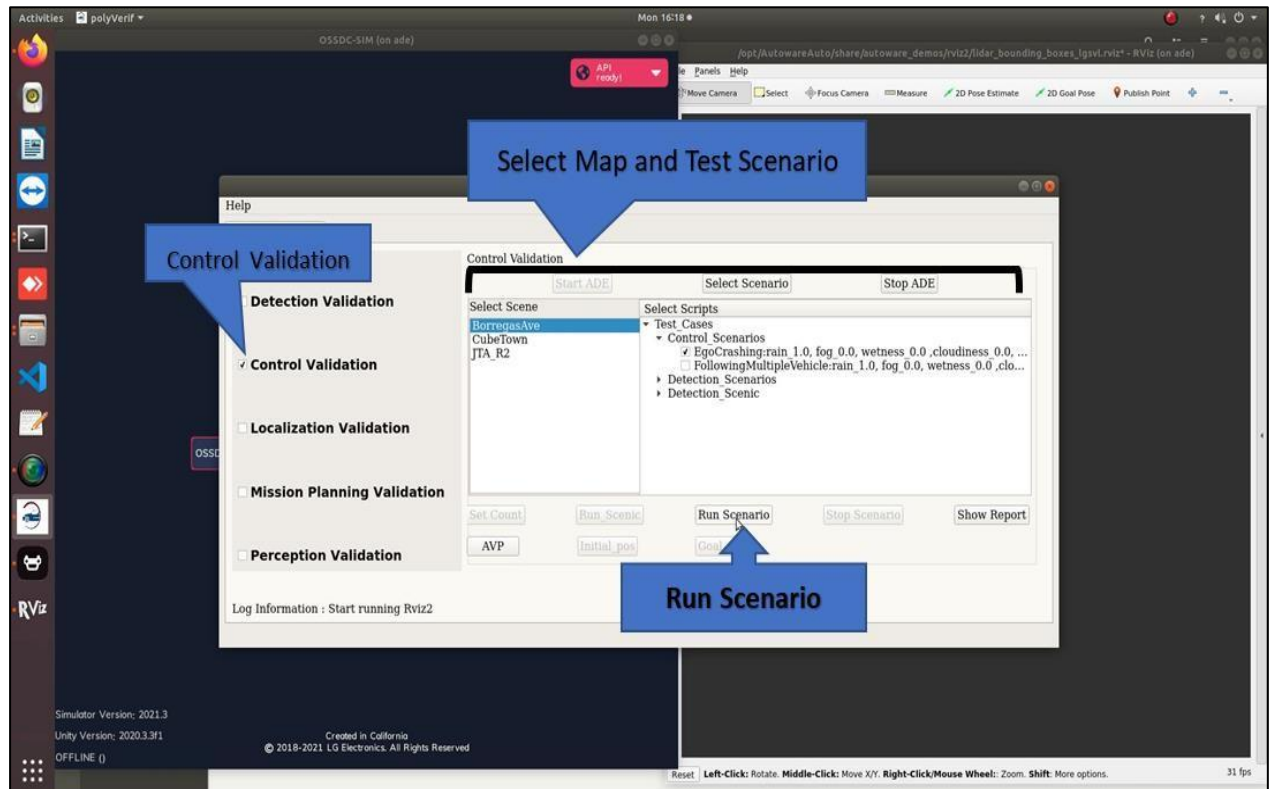
Stopping ADE:

After completing the test case runs, click on "Stop ADE" to halt the PolyVerif framework and then close the terminal.



Proceeding with Control Validation

Follow the previously detailed steps, making sure to first stop then start ADE and specifically choose "Control Validation" when integrating it into your simulation. Keep applying this standardized approach consistently across different maps for an organized and uniform method of managing simulations. Additionally, remember to choose the suitable testcase directory for control validation, ensuring a tailored simulation that meets your specific requirements.

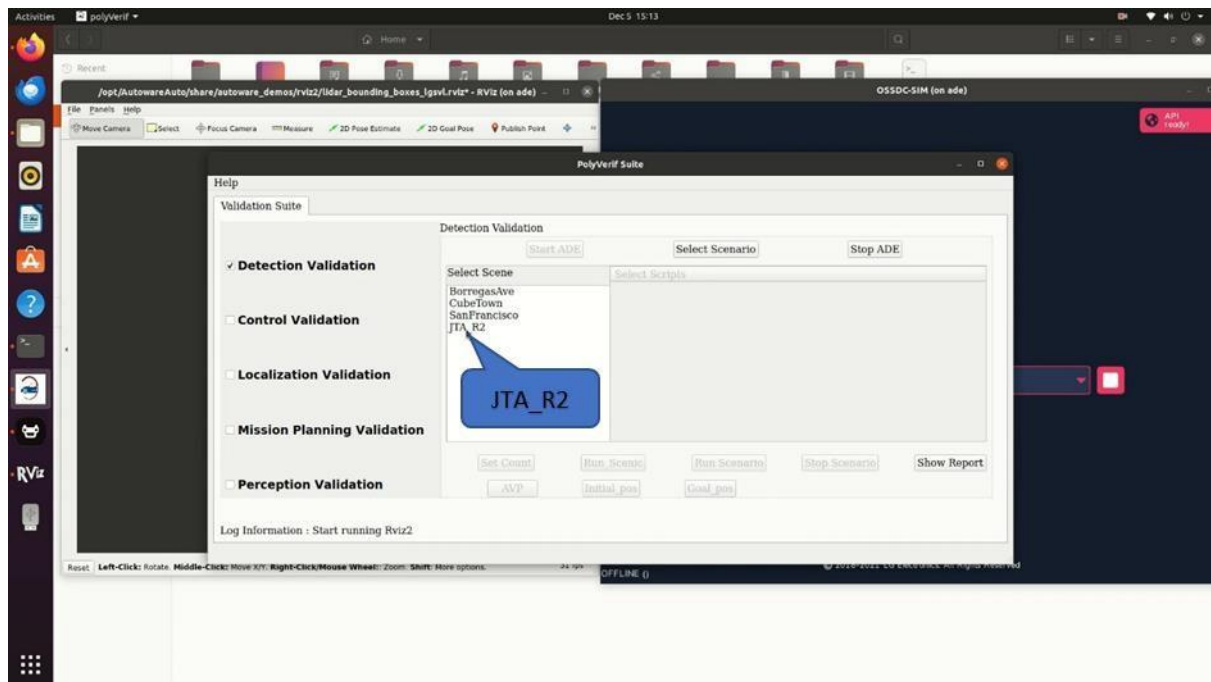


Custom Map Addition: JTA_R2 (Jacksonville Transportation Authority)

Enhance your simulation experience with our custom-designed map, JTA_R2 from the Jacksonville Transportation Authority. To seamlessly run scenarios on this unique map, carefully follow these steps, accompanied by corresponding screenshots:

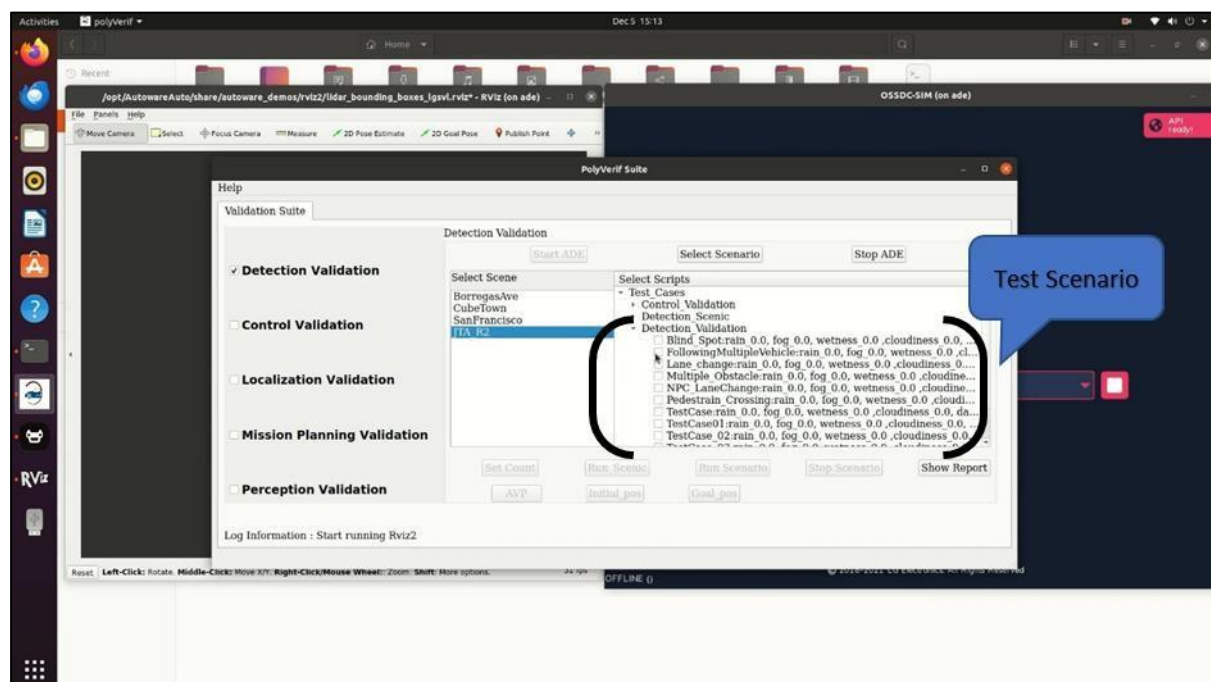
Standard Processes:

Initiate the standard processes for running scenarios until you reach the "Select Scenarios" tab for both the detection and control nodes.



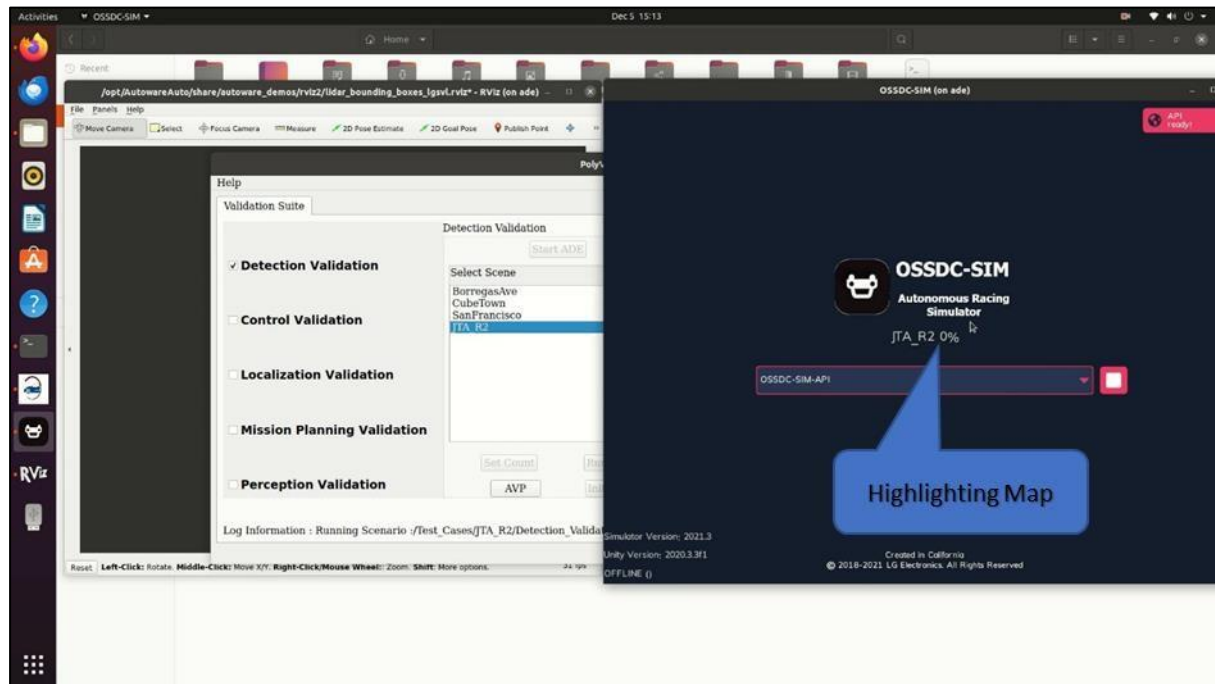
Choosing JTA_R2 Map:

Click on the JTA_R2 map, and specifically select the appropriate test case based on whether you are conducting a detection or control validation scenario.



Simulator Window Update and Initial Loading Resolution:

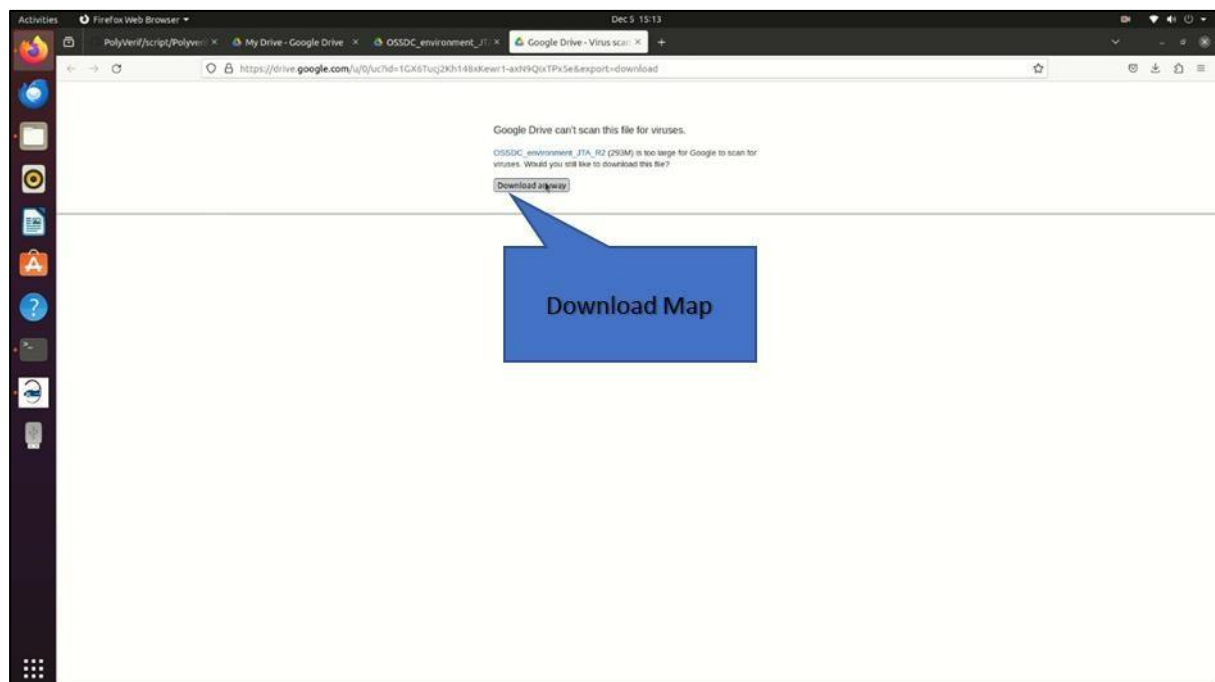
After choosing the JTA_R2 map, head to the simulator window. You'll observe a brief appearance and disappearance of JTA_R2, signaling the map update in the PolyVerif framework's database. If, during the initial loading, it fails to load as it's being uploaded to the database, proceed to the next step for resolution.



Downloading JTA Environment File:

In this step, you need to download the JTA environment file by clicking on the provided link below.

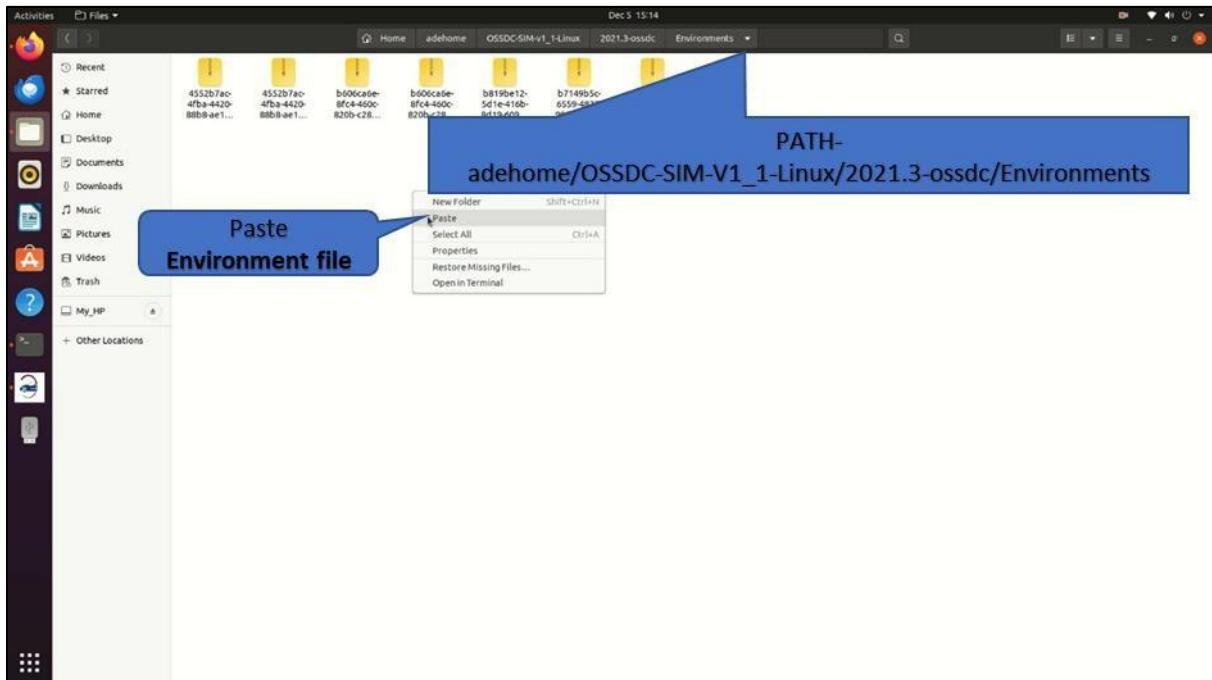
- Download Link: [Click Here](#) (Click by pressing CTRL+Click)



After downloading, place the file in the following path:

- Placement Path:

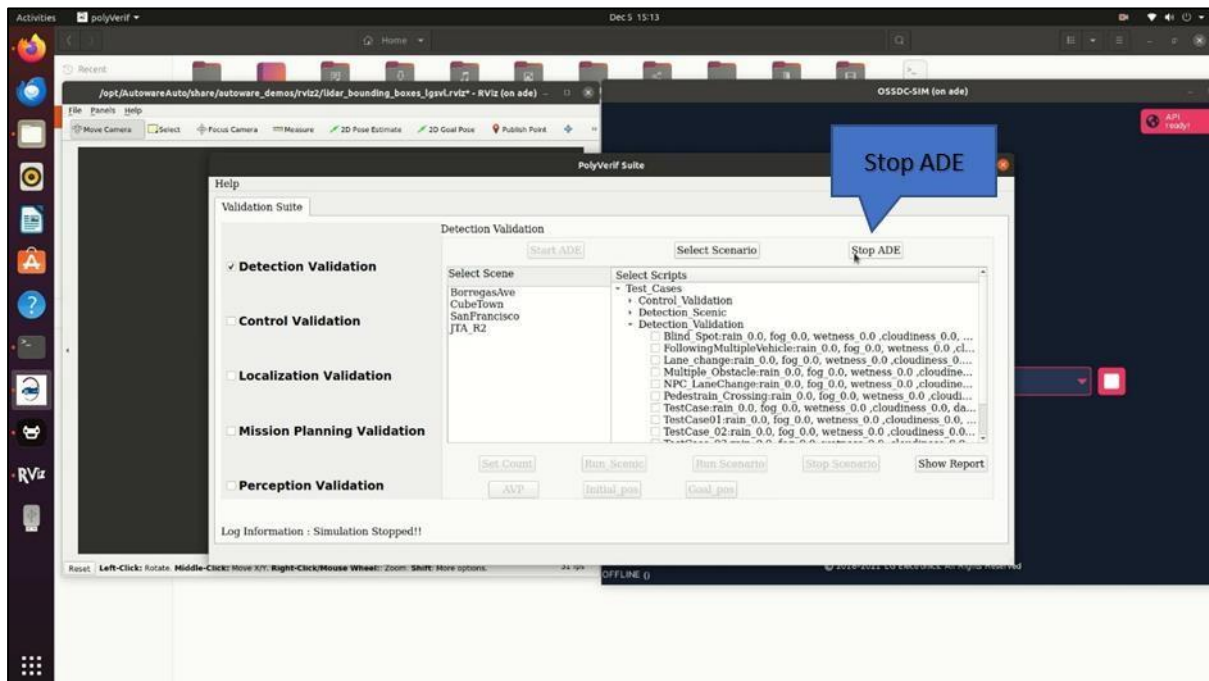
\$ adehome/OSSDC-SIM-V1_1-Linux/2021.3-ossdc/Environments



This ensures the correct placement of the JTA environment file for seamless integration into the specified path

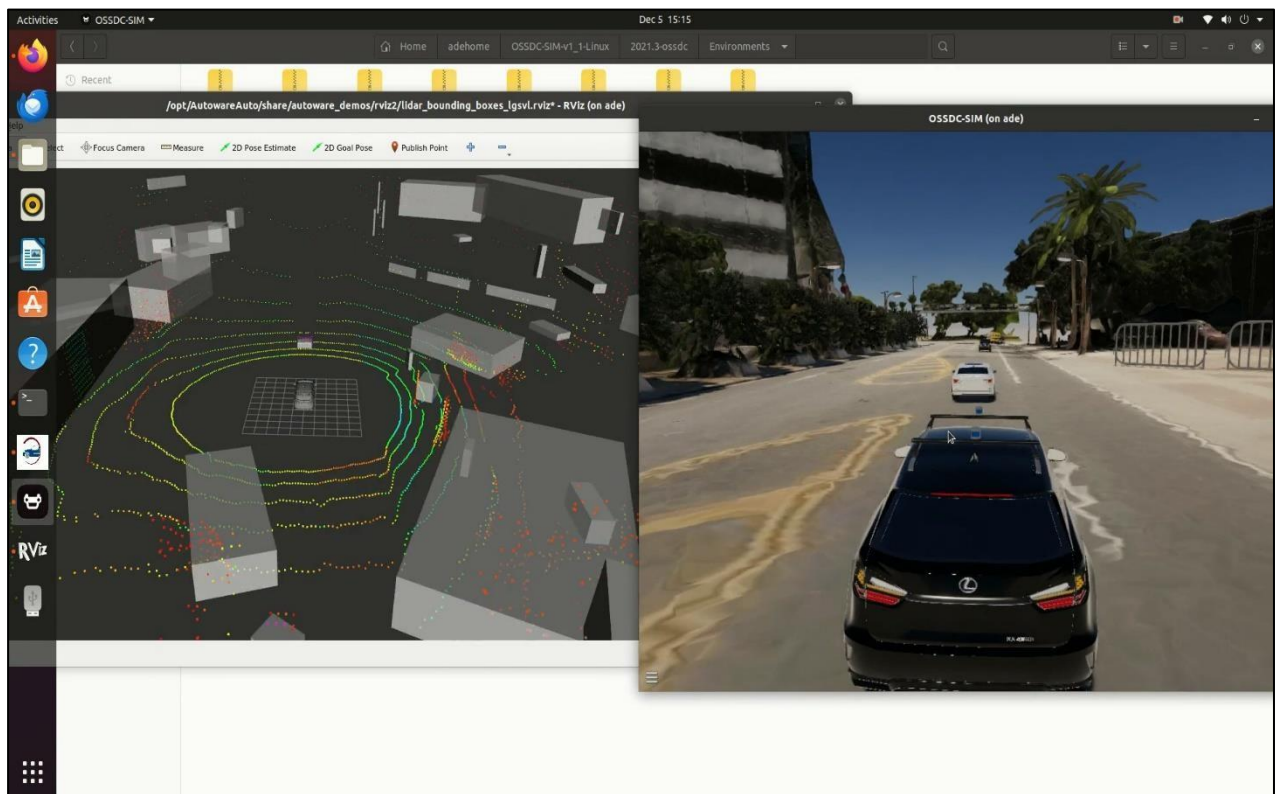
ADE Restart:

Stop ADE and restart it to address the initial loading issue.



Rerun the Scenario:

Follow the same process for running the scene as outlined above. This time, the map will be downloaded successfully, allowing you to run scenarios for JTA_R2.



Assumptions and Challenges

- **Rviz Dynamics:**
Occasional crashes may happen, but rest assured, the perception stack persists.
- **Scenario Hurdles:**
Some scenarios may experience hang-ups while connecting to the Ros2 Bridge, necessitating a restart.
- **System Configurations:**
System hangs may occur based on machine specifications.
- **Network Issues:**
If the network is not functioning properly, you may encounter issues such as scenarios not running or reports not generating. To resolve this, simply restart ADE or the PolyVerif Framework.

Learn More

For further insights and references, explore the provided links:

[OSSDC Simulator](#)

[PythonAPI](#)

[AutwareAuto AVP Demo](#)

Now, let's embark on a journey of seamless simulations with PolyVerif!!

