

POLY-VERIFICATION USER GUIDE

This document contains the information on how to run the simulation through the Poly-Verification Suit. Once the installation and setup is completed you are ready to use the PolyVerif framework.

If you have not setup and installed the pre-requisites then for reference please follow **Setup_And_Installation** document.

This framework uses predefined metrics for the validation of the stacks which will be calculated after running the test cases. On the basis of metrics threshold the success/failure of the stack is validated. Any user can set their own values by modifying the config.ini file in **adehome/Poly_Suite/config.ini**.

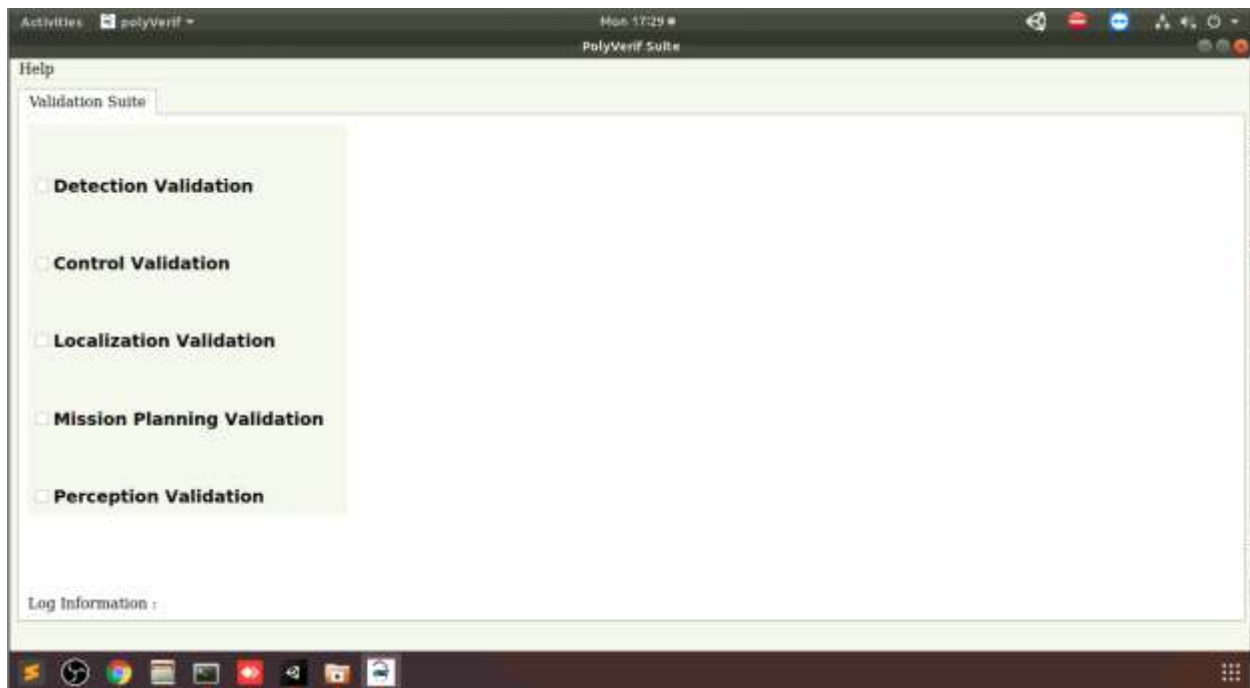
Below is the config.ini file parameters-

```
[autonomous_stack_config]
  detection_max_threshold=40      #MAX value for detection
validation
  detection_min_threshold=30      #MIN value for detection
validation
  control_collion_count=0        #Collision count
  localize_max_threshold=5        #MAX value for localization
validation
  localize_min_threshold=1        #MAX value for localization
validation
  planner_goalpose_max_deviation=5 #MAX value of goal
position deviation
  planner_goalpose_min_deviation=2 #MIN value of goal
position deviation
```

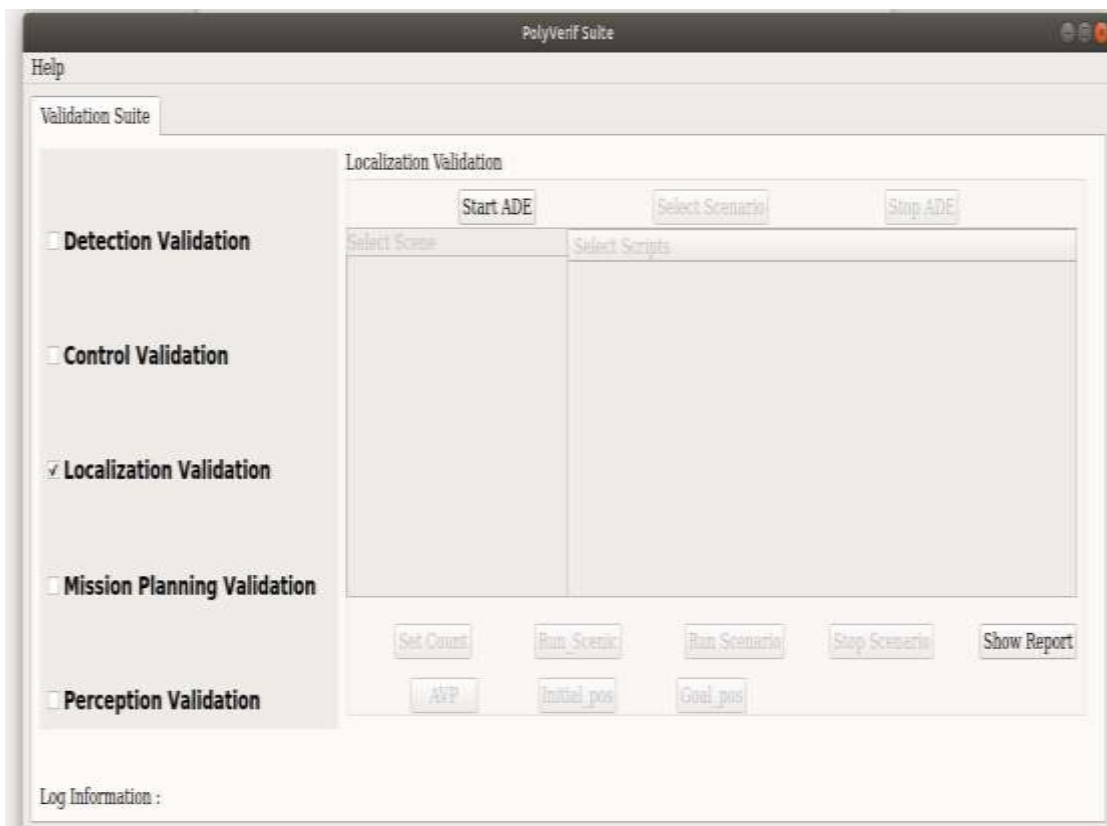
Follow the steps provided below-

- Go to the Poly_Suite directory and run
\$./polyVerif
- It will start the polyVerif framework
 - As of now four validations are working-
 - Detection Validation
 - Control Validation
 - Localization Validation
 - Mission Planning Validation

Click any one of them-

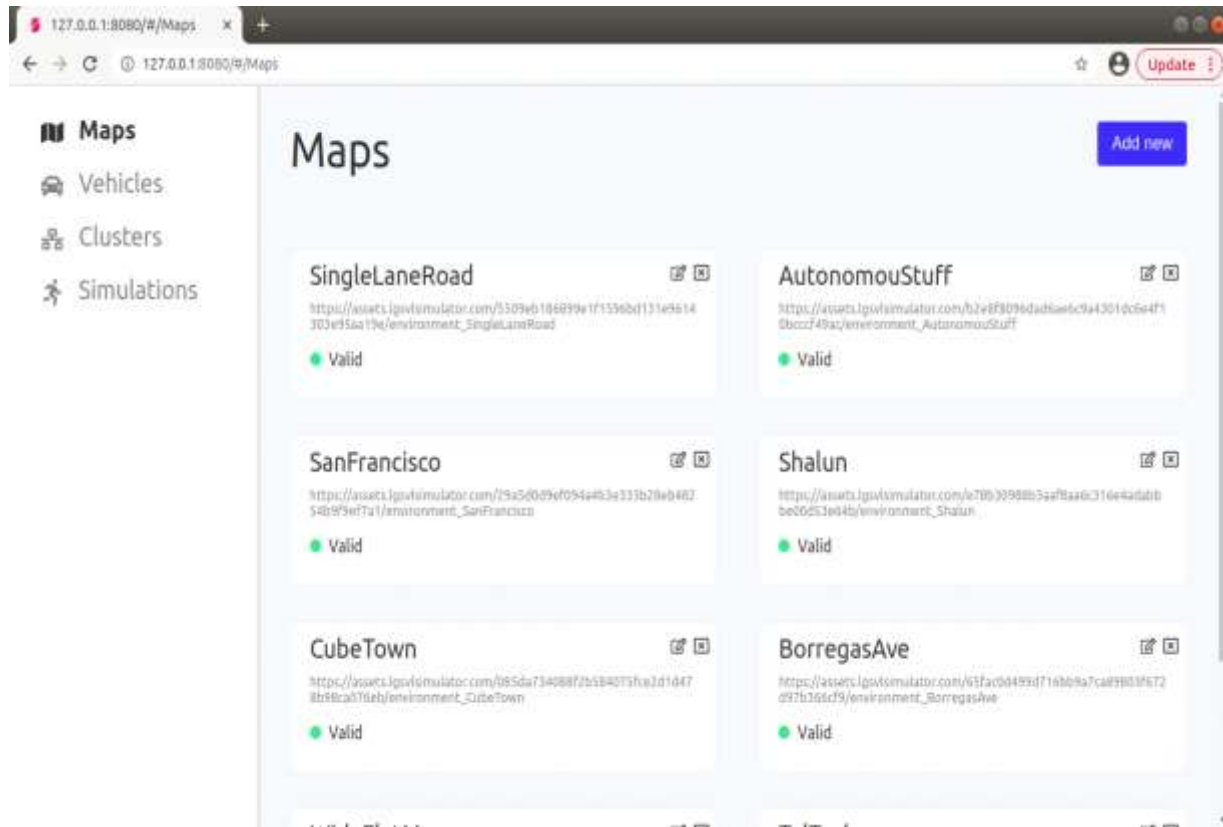


- Detection Validation is for detecting the vehicle from perception stack.
 - Click on the **Start ADE** button, it will start all the required modules.
 - AutowareAuto
 - Perception Stack
 - Lgsvl simulator
 - Rviz
 - Ros2-lgsvl-bridge



It will take some time to start the ADE docker and other components, please wait for a while.

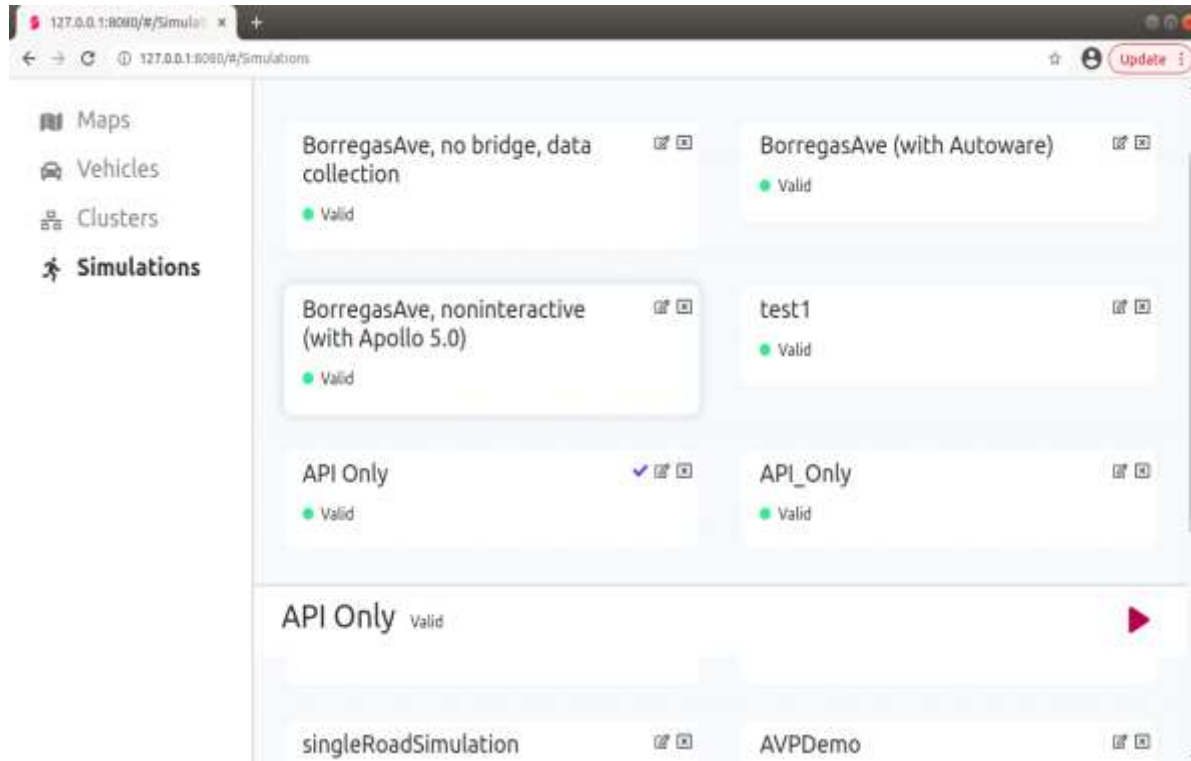
- Enter localhost:8080 on address bar and hit enter.



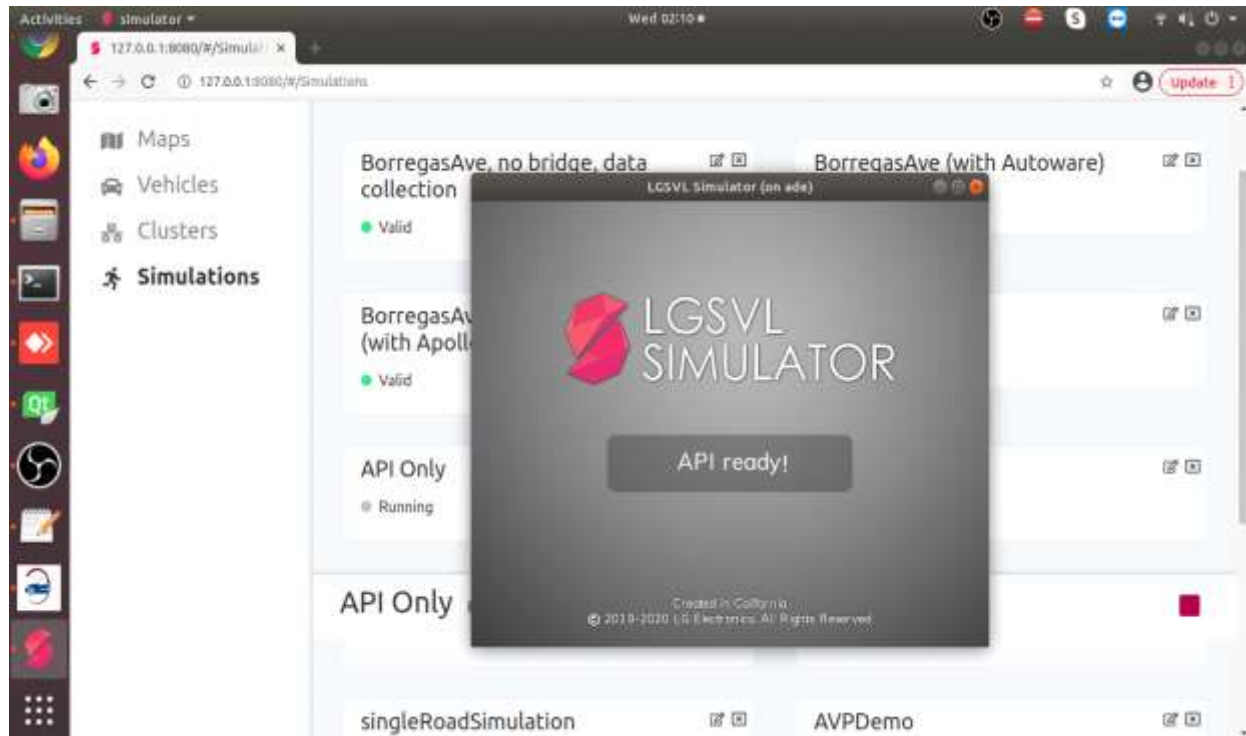
Note: - If the LG web page does not open then try entering the below address -

127.0.0.1:8080

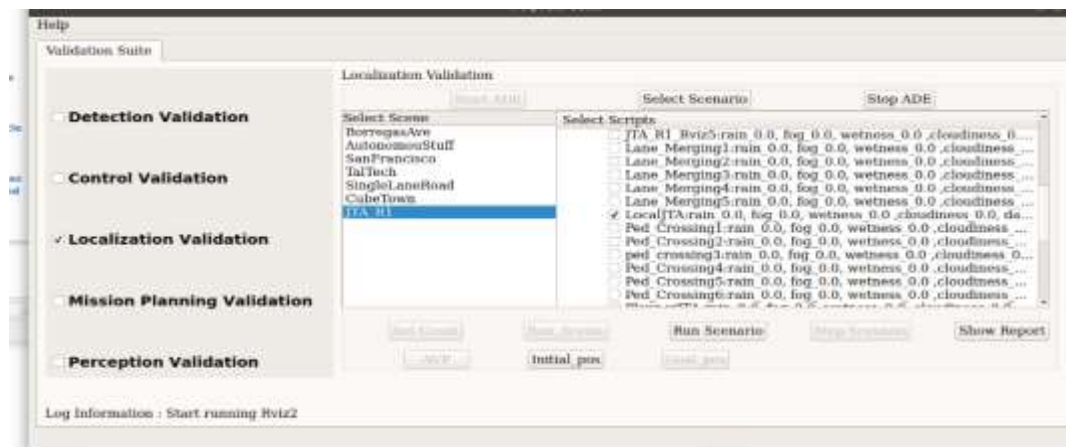
- Click on the **Simulations** tab and select the **API_Only**.
- Click on the **Play** button



- Now the simulator is in the **API_Mode**



- Now click on the **Select Scenario** button
 - Select **JTA_R1** map from the **Select Scene**
 - Select **LocalJTA** scenario from the **Select Scripts** list



- Once you select script from the list it enables the respective button to run.
- Now click on the AVP button which will start the autoware_auto_avp demo.

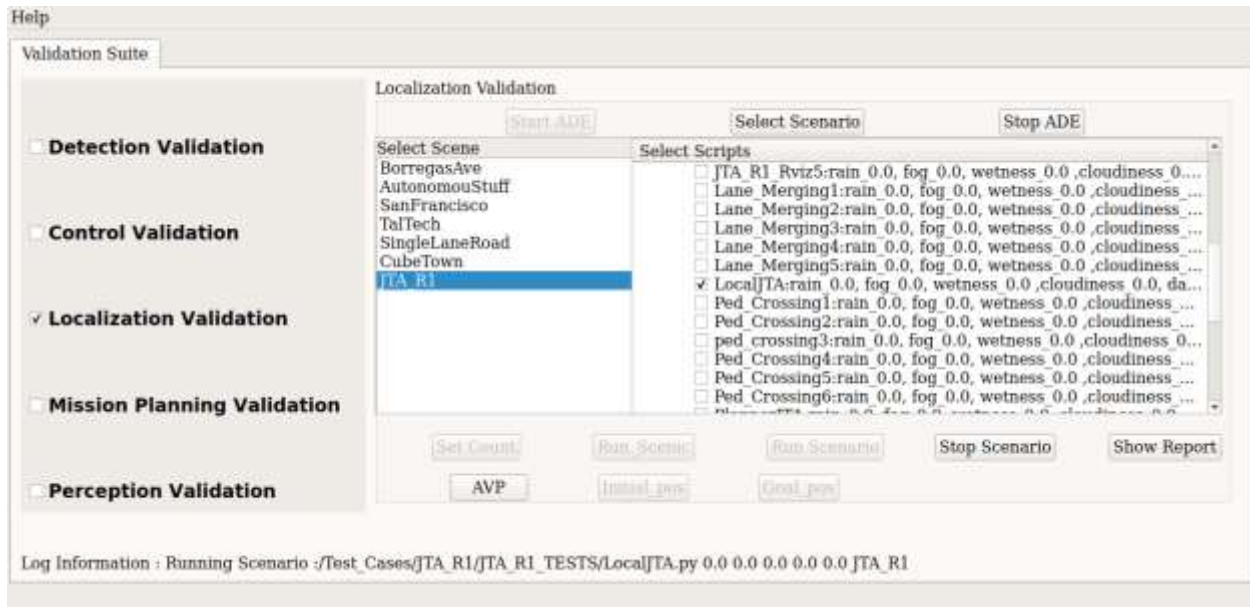
We have modified the demo to run with JTA_R1 map. The link provided below is demo of AutowareAuto–

<https://autowarefoundation.gitlab.io/autoware.auto/AutowareAuto/avpdemo.html>

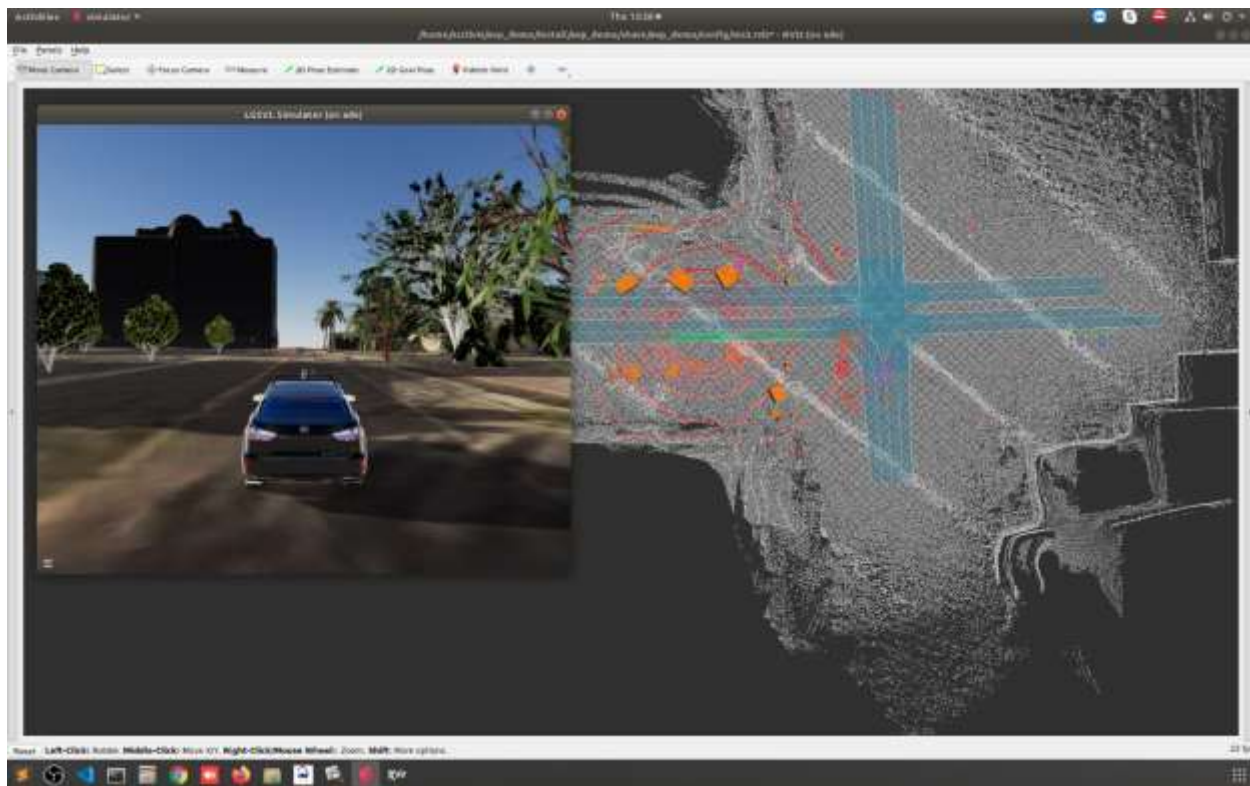
- Once the rviz starts then click on the **Run Scenario** button followed by the **Initial pos** and **Goal pos** button, it will start the simulation in lgsvl simulator which will be controlled by the AutowareAuto decisions.

Note: - Initial pos and goal pos values are static which is set specifically for the JTA_R1 map. If you try these values in a different map then it will not be accurate.

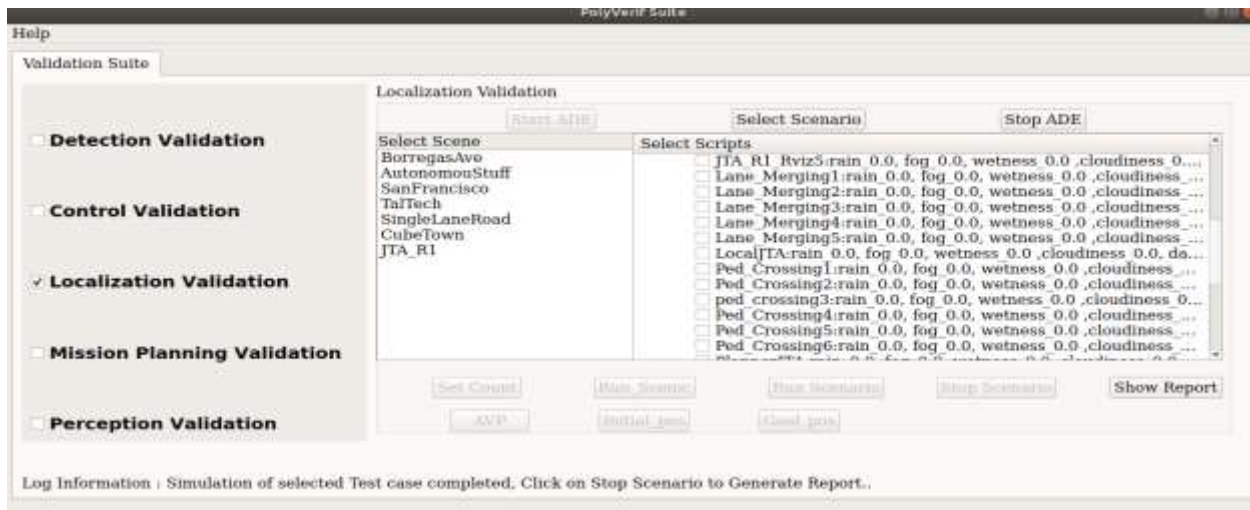




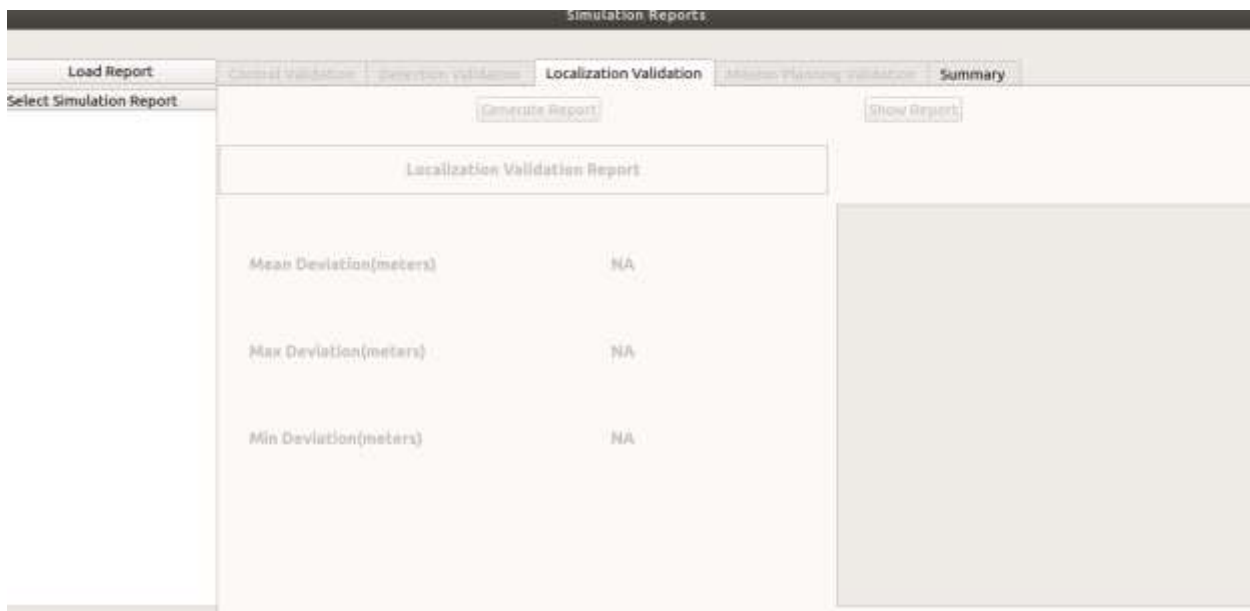
- Below is the screenshot of trajectory followed from the AutwareAuto.



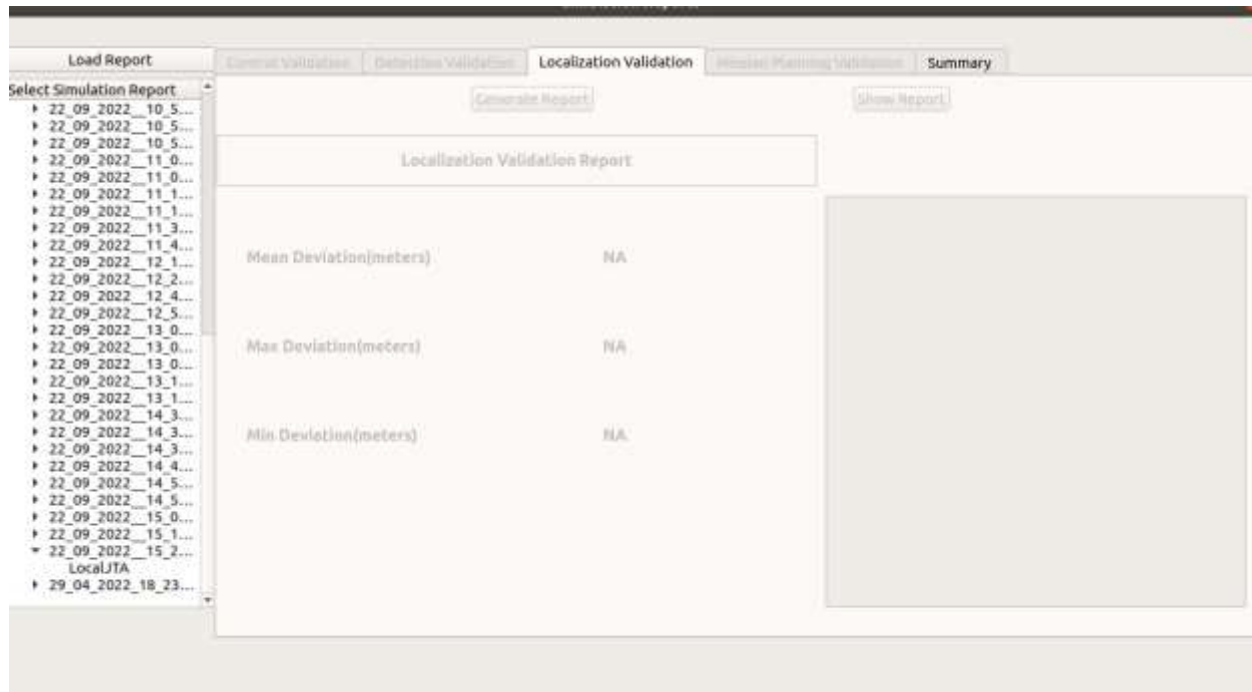
- Once the simulation is completed or if you want to stop the simulation. Click on the **Stop Scenario** button and click on the **Show Report** button. It will redirect to another form where you can see the respective simulation reports.



- This form contains reports of the respective simulation. Since we ran **Localization Validation** so it will generate and show the **Localization report**.
- Click on the **Load Report** button, it will list all the simulation reports with date and time.



- The last completed simulation report is set at the end of the list. Select and click on the **Generate Report** button. It will take some time to generate the report. Once report is generated. It will enable the **Show Report** button. By clicking on **Show Report** button you will see few respective parameters on the UI.



Assumptions/Issues:

- AVP demo is tested with test cases (LocalJTA and PlannerJTA) for the JTA_R1 map .
- You can modify Test Cases (Python and scenic script) as per your map environment.
- If there is only ego vehicle in the simulation then data will not compute.
- Sometimes rviz crashes but the perception stack is running in the back ground
- While running scenario using scenic, it hangs while connecting to Ros2 Bridge. So you need to forcefully terminate using Ctrl+C and start again.
- Offset for lanelet map should be set correctly in order to run AVP demo. Otherwise map will not load successfully

References:

- Lgsvl Simulator - <https://github.com/lgsvl/simulator/releases/tag/2020.06>
- Scenichttps://scenic-lang.readthedocs.io/en/latest/syntax_guide.html?highlight=facing#specifier_s
- PythonAPI - <https://www.svl simulator.com/docs/python-api/python-api/>
- AutowareAuto avp demo - <https://autowarefoundation.gitlab.io/autoware.auto/AutowareAuto/avpdemo.html>