

# Test report - 60km/h localization

## Device Info

Dell precision 3561

## System Info

```
$ uname -a
Linux cynthia-liu 5.15.0-56-generic #62~20.04.1-Ubuntu SMP Tue Nov 22
21:24:20 UTC 2022 x86_64 x86_64 x86_64 GNU/Linux
```

## Test Road

Point cloud map of the test road:



## Localization evaluation

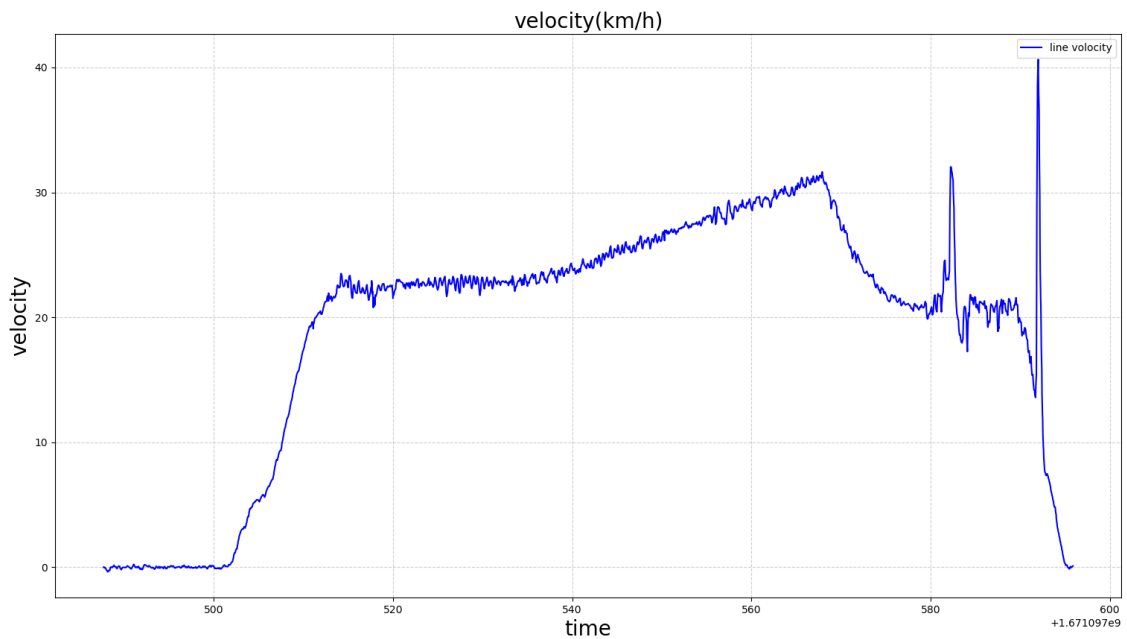
1. Localization evaluation using bag1

- Bag Info

```
$ ros2 bag info rosbag2_2022_12_15-17_44_42_0.db3
[INFO] [1671441762.760501447] [rosbag2_storage]: Opened database
'rosbag2_2022_12_15-17_44_42_0.db3' for READ_ONLY.

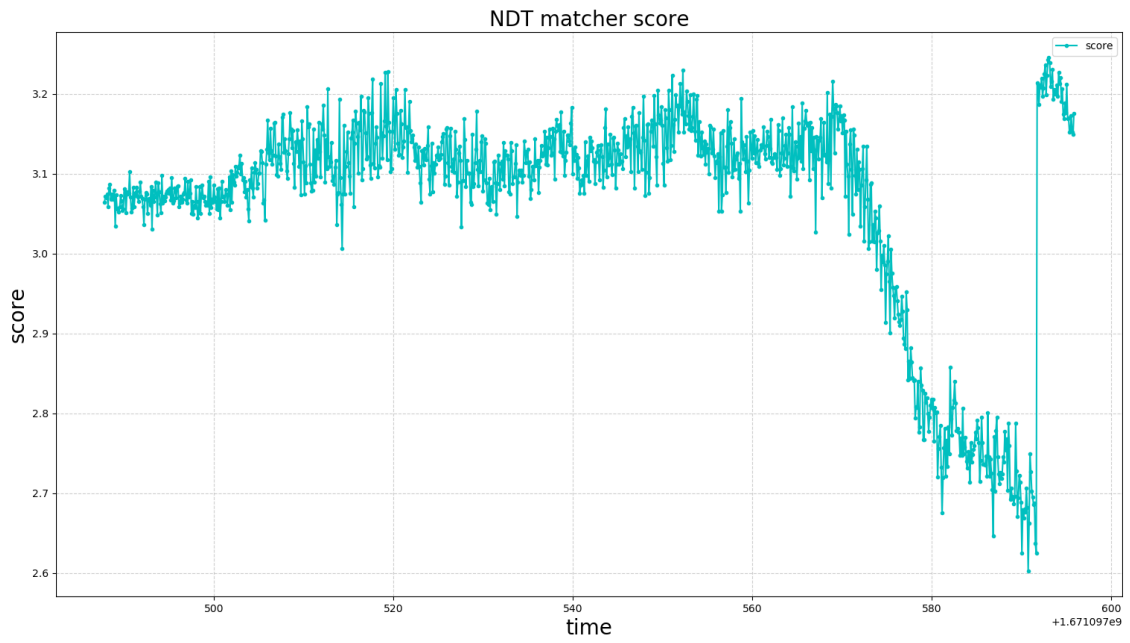
Files:          rosbag2_2022_12_15-17_44_42_0.db3
Bag size:       3.3 GiB
Storage id:     sqlite3
Duration:       113.199s
Start:          Dec 15 2022 17:44:42.681 (1671097482.681)
End:            Dec 15 2022 17:46:35.880 (1671097595.880)
Messages:       1133
Topic information: Topic: /sensing/lidar/top/rectified/pointcloud |
Type: sensor_msgs/msg/PointCloud2 | Count: 1133 | Serialization Format:
cdr
```

- **Vehicle speed Info**

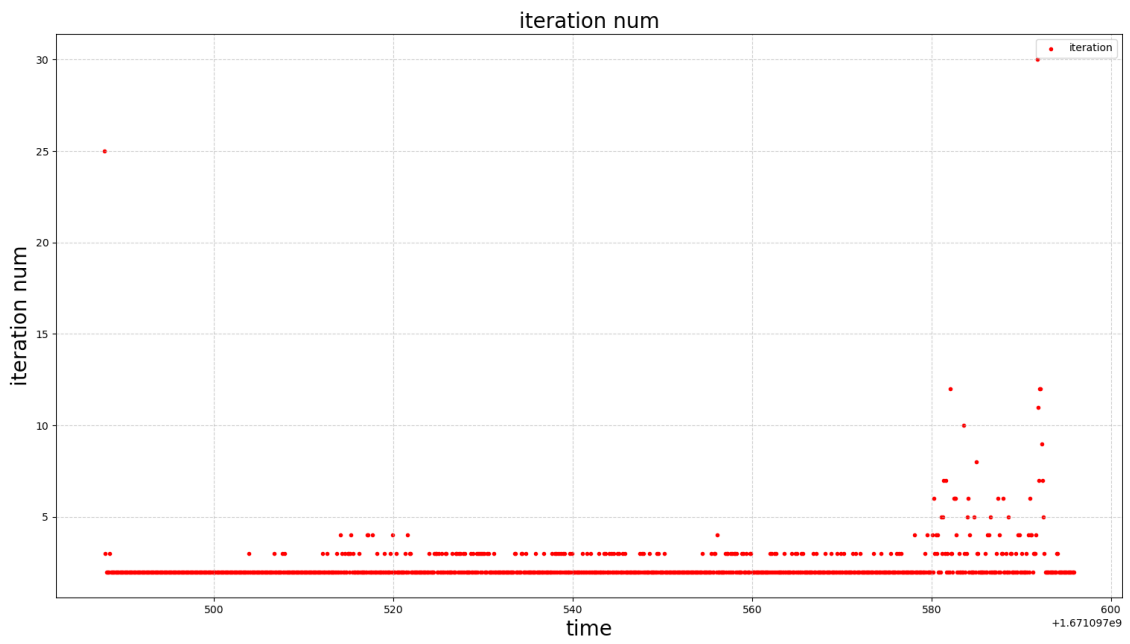


- **Localization performance**

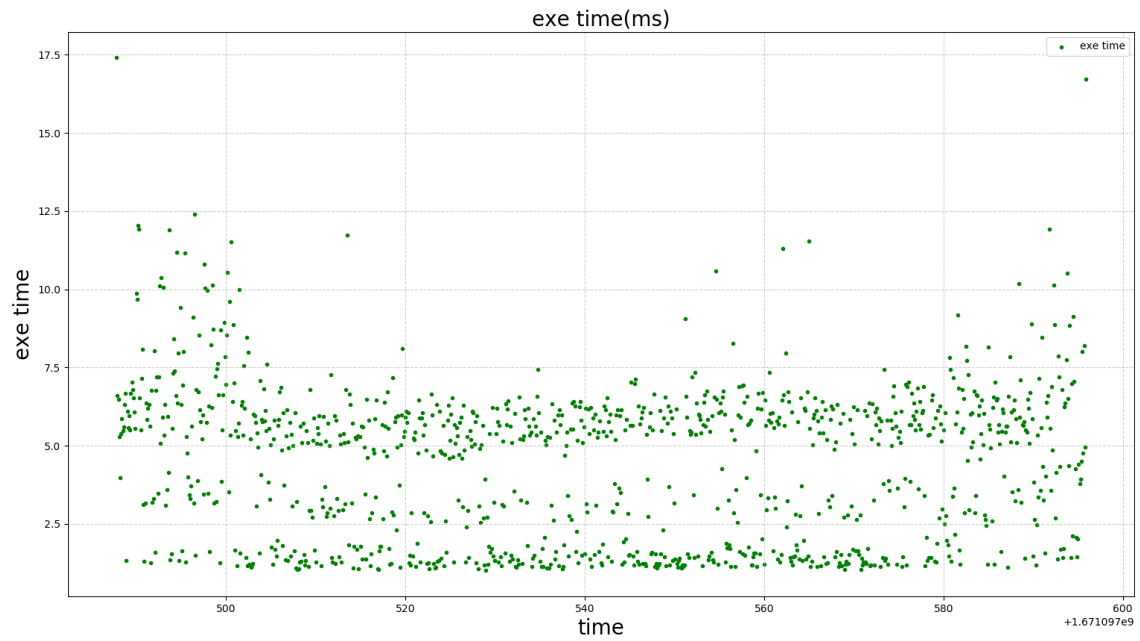
NDT matching score(nearest\_voxel\_transformation\_likelihood):



NDT matching iteration number:



NDT matching execute time:



- Evaluation video

20km. mp4

<https://www.bilibili.com/video/BV1tW4y1T7LP/>

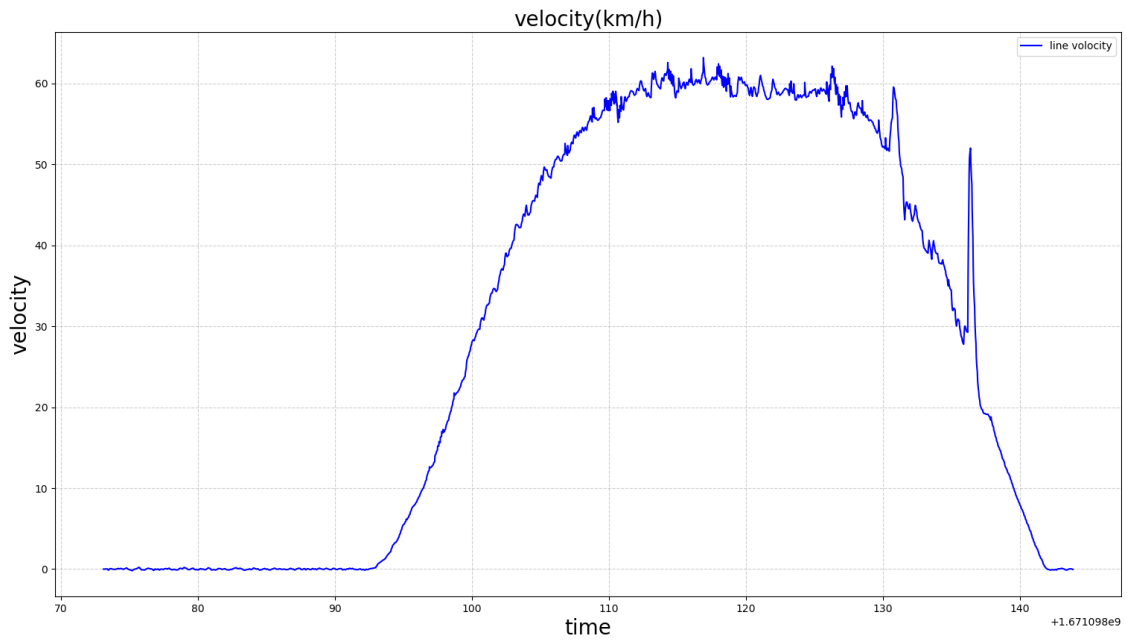
## 2. Localization evaluation using bag2

- Bag Info

```
$ ros2 bag info rosbag2_2022_12_15-17_54_28_0.db3
[INFO] [1671442080.519048745] [rosbag2_storage]: Opened database
'rosbag2_2022_12_15-17_54_28_0.db3' for READ_ONLY.

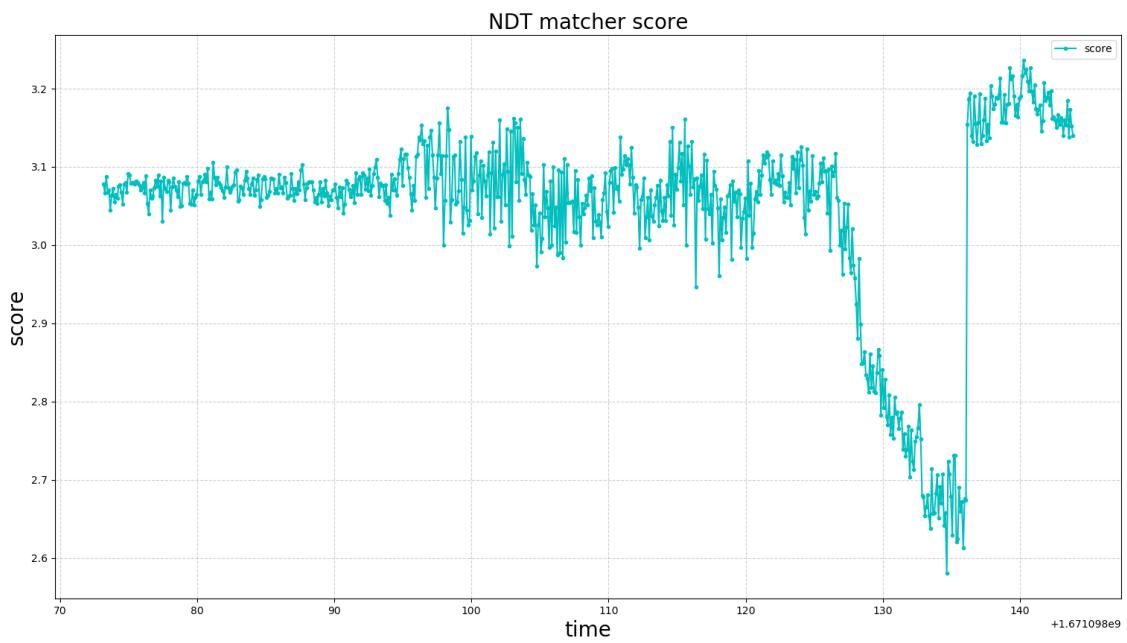
Files:                rosbag2_2022_12_15-17_54_28_0.db3
Bag size:             2.2 GiB
Storage id:          sqlite3
Duration:            75.684s
Start:               Dec 15 2022 17:54:28.185 (1671098068.185)
End:                 Dec 15 2022 17:55:43.870 (1671098143.870)
Messages:           758
Topic information:   Topic: /sensing/lidar/top/rectified/pointcloud |
Type: sensor_msgs/msg/PointCloud2 | Count: 758 | Serialization Format:
cdr
```

- Vehicle speed Info

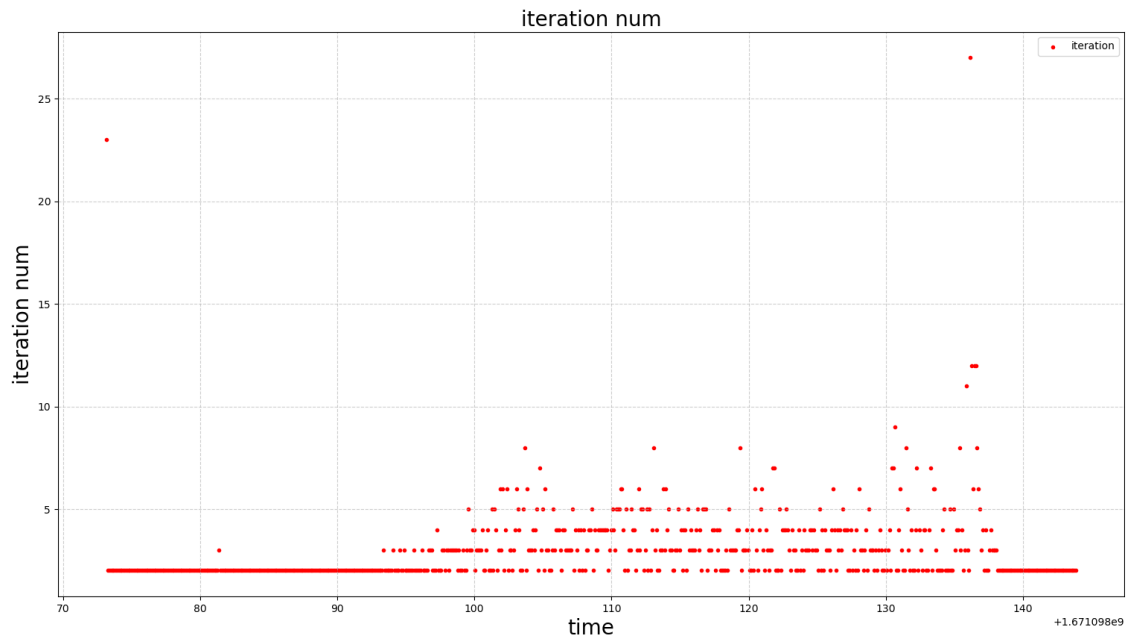


- Localization performance

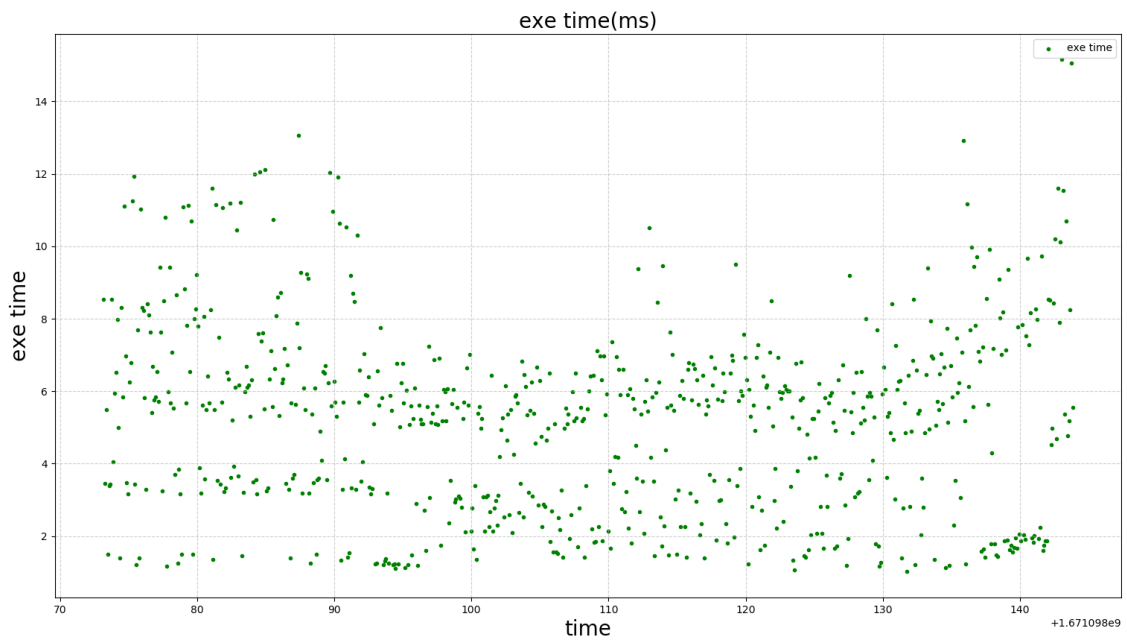
NDT matching score(nearest\_voxel\_transformation\_likelihood):



NDT matching iteration number:



NDT matching execution time:



- Evaluation video

[60km. mp4](#)

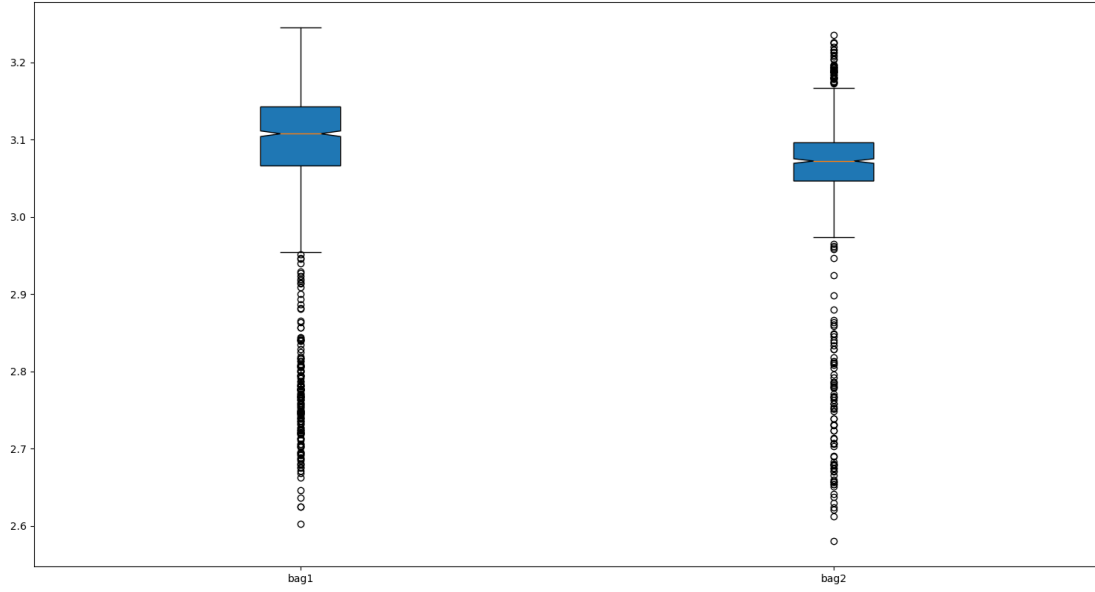
<https://www.bilibili.com/video/BV1sW4y1T7kk/>

## Result

Comparison of the localization performance of the two bags:

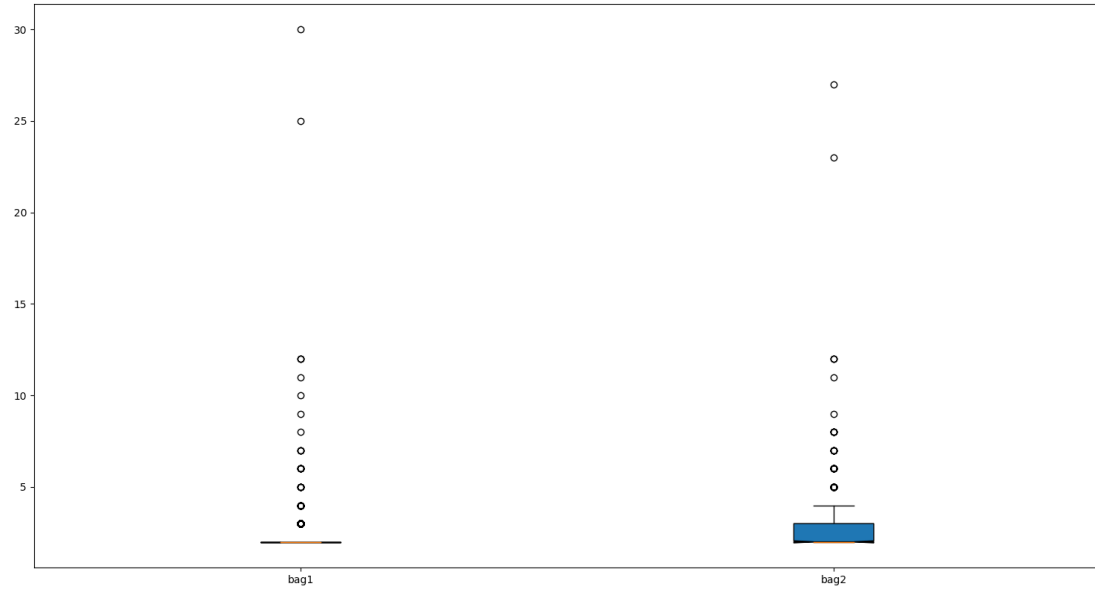
NDT matching score(nearest\_voxel\_transformation\_likelihood):

Distribution of scores

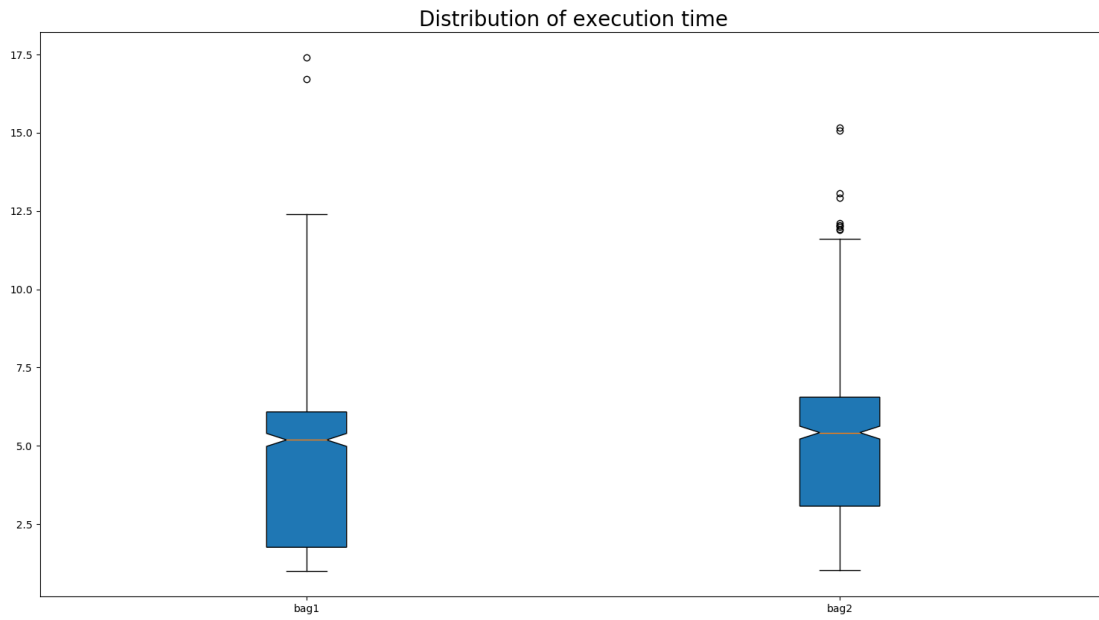


NDT matching iteration number:

Distribution of iterations



NDT matching execution time:



As proven by the above evaluation, current Autoware localization stack is able to handle high speed( $\leq 60\text{km/h}$ ) autonomous driving scenarios.