Public Transit Analytics Reference Implementation

Version: 2021.1 Published: 12/09/2021

Last Updated: 01/28/2022

Overview

Public Transit Analytics demonstrates how to use Edge Insights for Fleet middleware and delivers deep learning models, computer vision algorithms, OpenVINO™ and other software. In this example, the model outputs counts of passengers on public transport, potentially for use in public transportation route planning. The results are available for the bus driver and the bus fleet operators via a cloud dashboard. The application also temporarily stores relevant video images for validating the accuracy of detections.

Select **Configure & Download** to download the reference implementation and the software listed below.

Configure & Download

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Time to Complete	Approximately 60 minutes
Programming Language	Python*
Available Software	Intel® Distribution of OpenVINO™ toolkit 2020 Release

Recommended Hardware

The below hardware is recommended for use with this reference implementation. See the Recommended Hardware page for other suggestions.

- ADLINK MXE-5500 Series

- NEXCOM VTC 7252-7C4IP

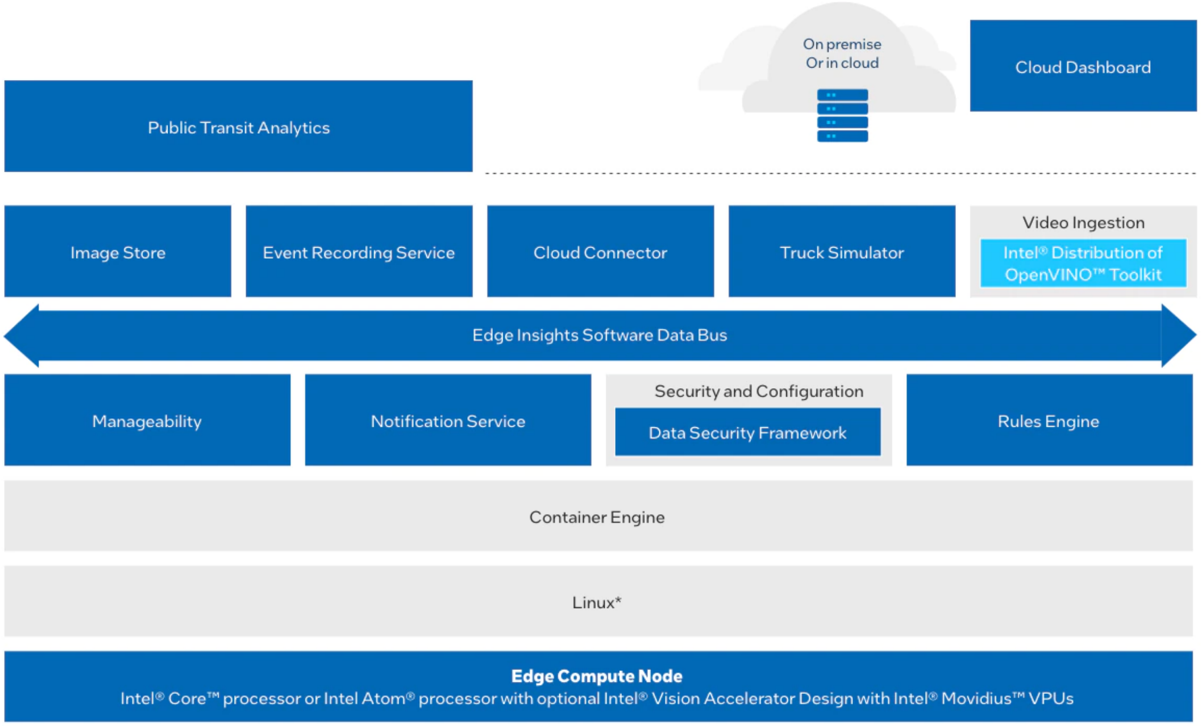
Target System Requirements

- Ubuntu* 18.04.3 LTS
- 6th to 10th Generation Intel® Core™ processors with Intel® Iris® Plus graphics or Intel® HD Graphics

How It Works

The reference implementation contains a full pipeline of analytics on video streams from IP cameras mounted inside a bus in the passenger area with an Intel® Core™ or Intel Atom® processor-based computer onboard the bus. Pretrained models are used to inference and calculate the number of passengers.

This reference implementation contains a notification subsystem which includes a local dashboard for the bus driver, and a cloud dashboard for the bus operator and fleet manager.



Get Started

Step 1: Install the Reference Implementation

Select **Configure & Download** to download the reference implementation and then follow the steps below to install it.

> **NOTE:** The images provided in the reference implementation are ONLY to be used for validating the accuracy of detection events.

Configure & Download

> **NOTE:** If the host system already has Docker* images and containers, you might encounter errors while building the reference implementation packages. If you do encounter errors, refer to the Troubleshooting section at the end of this document before starting the reference implementation installation.

1. Open a new terminal, go to the downloaded folder and unzip the downloaded RI package.

```
public_transit_analytics.zip
```

2. Go to the `publictransitanalytics/` directory.

```
cd public_transit_analytics/
```

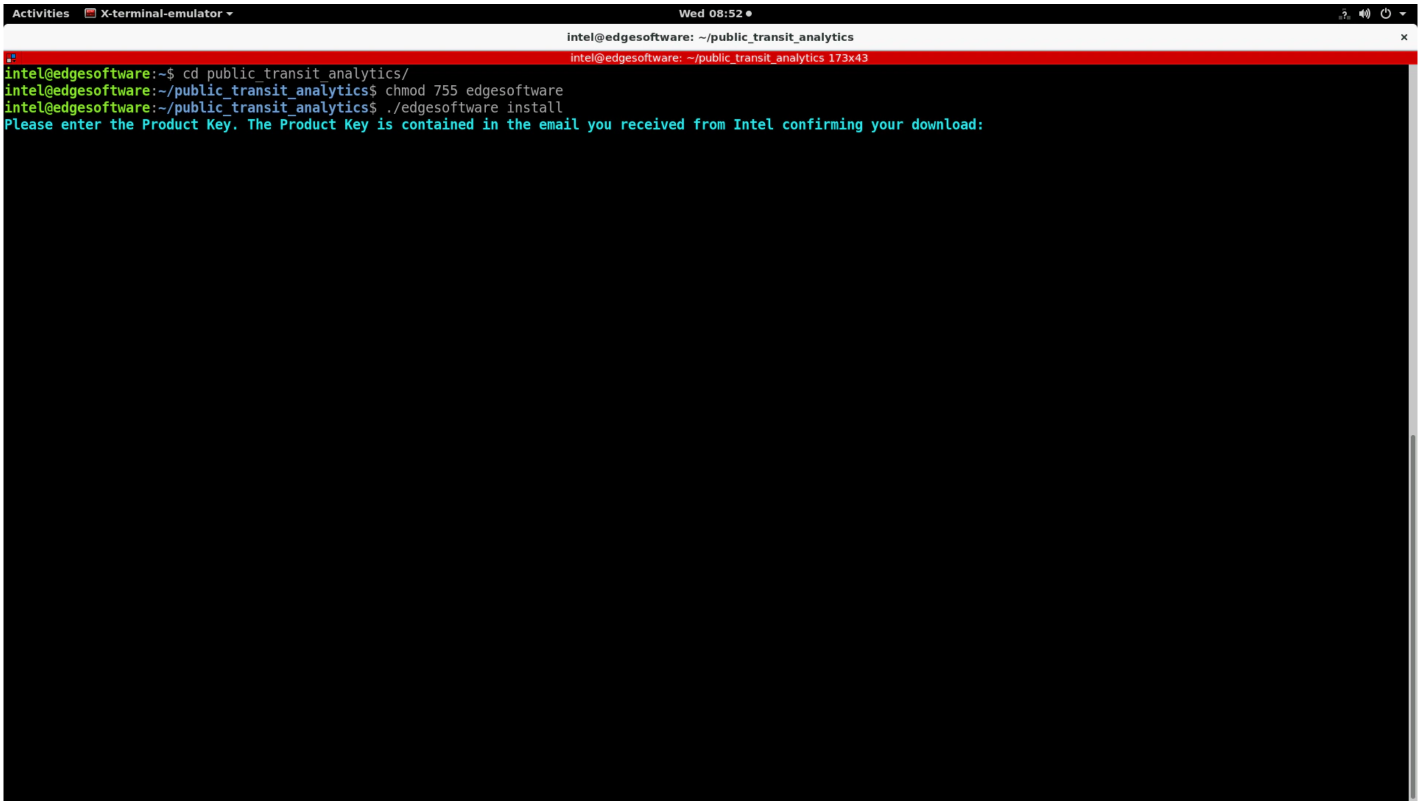
3. Change permission of the executable edgesoftware file.

```
chmod 755 edgesoftware
```

4. Run the command below to install the Reference Implementation.

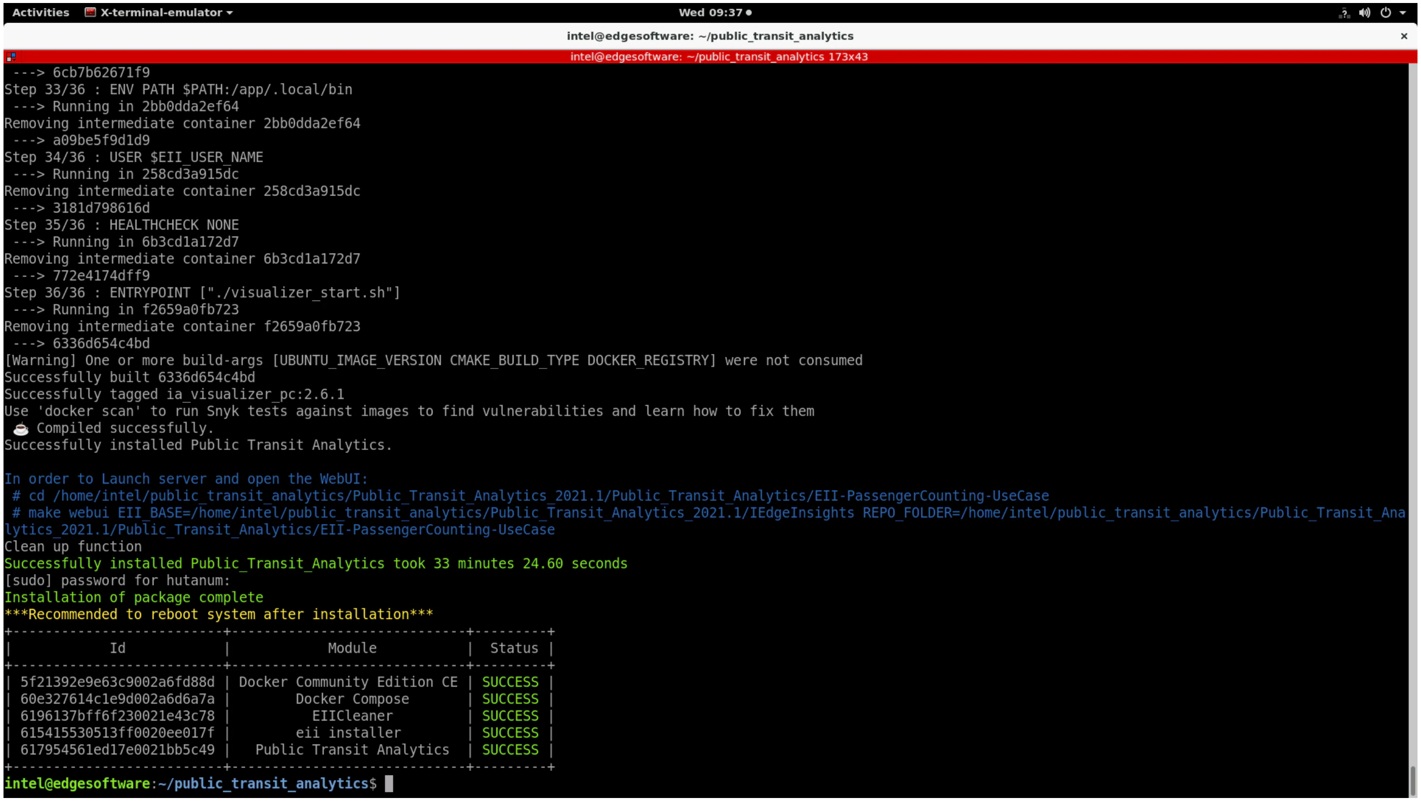
```
./edgesoftware install
```

5. During the installation, you will be prompted for the **Product Key**. The **Product Key** is contained in the email you received from Intel confirming your download.


Activities
X-terminal-emulator ▾
Wed 08:52 ●
intel@edgesoftware: ~/public_transit_analytics
×
intel@edgesoftware: ~/public_transit_analytics 173x43

```
intel@edgesoftware:~$ cd public_transit_analytics/
intel@edgesoftware:~/public_transit_analytics$ chmod 755 edgesoftware
intel@edgesoftware:~/public_transit_analytics$ ./edgesoftware install
Please enter the Product Key. The Product Key is contained in the email you received from Intel confirming your download:
```

6. When the installation is complete, you see the message "Installation of package complete" and the installation status for each module.


Activities
X-terminal-emulator
Wed 09:37
intel@edgesoftware: ~/public_transit_analytics
intel@edgesoftware: ~/public_transit_analytics 173x43

```
 ---> 6cb7b62671f9
Step 33/36 : ENV PATH $PATH:/app/.local/bin
 ---> Running in 2bb0dda2ef64
Removing intermediate container 2bb0dda2ef64
 ---> a09be5f9d1d9
Step 34/36 : USER $EII_USER_NAME
 ---> Running in 258cd3a915dc
Removing intermediate container 258cd3a915dc
 ---> 3181d798616d
Step 35/36 : HEALTHCHECK NONE
 ---> Running in 6b3cd1a172d7
Removing intermediate container 6b3cd1a172d7
 ---> 772e4174dff9
Step 36/36 : ENTRYPOINT ["./visualizer_start.sh"]
 ---> Running in f2659a0fb723
Removing intermediate container f2659a0fb723
 ---> 6336d654c4bd
[Warning] One or more build-args [UBUNTU_IMAGE_VERSION CMAKE_BUILD_TYPE DOCKER_REGISTRY] were not consumed
Successfully built 6336d654c4bd
Successfully tagged ia_visualizer_pc:2.6.1
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
 ☕ Compiled successfully.
Successfully installed Public Transit Analytics.

In order to Launch server and open the WebUI:
 # cd /home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
 # make webui EII_BASE=/home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/public_transit_analytics/Public_Transit_Ana
lytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
Clean up function
Successfully installed Public_Transit_Analytics took 33 minutes 24.60 seconds
[sudo] password for hutanum:
Installation of package complete
***Recommended to reboot system after installation***
+--------------------------+----------------------------+---------+
|            Id            |           Module           |  Status |
+--------------------------+----------------------------+---------+
| 5f21392e9e63c9002a6fd88d | Docker Community Edition CE | SUCCESS |
| 60e327614c1e9d002a6d6a7a |       Docker Compose       | SUCCESS |
| 6196137bff6f230021e43c78 |         EIICleaner         | SUCCESS |
| 615415530513ff0020ee017f |       eii installer        | SUCCESS |
| 617954561ed17e0021bb5c49 |  Public Transit Analytics  | SUCCESS |
+--------------------------+----------------------------+---------+
intel@edgesoftware:~/public_transit_analytics$ 
```

> **NOTE:** If you encounter any issues, please refer to the Troubleshooting section at the end of this document. Installation failure logs will be available at the path: `/var/log/esb-cli/Public_Transit_Analytics_2021.1/output.log`

7. In order to start the application, you need to change the directory using the cd command printed at the end of the installation process:

```
cd <INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
```

Step 2: Run the Application

Prerequisites

- Set Up ThingsBoard* Local Cloud Data
- Set Up Amazon Web Services* Cloud Storage

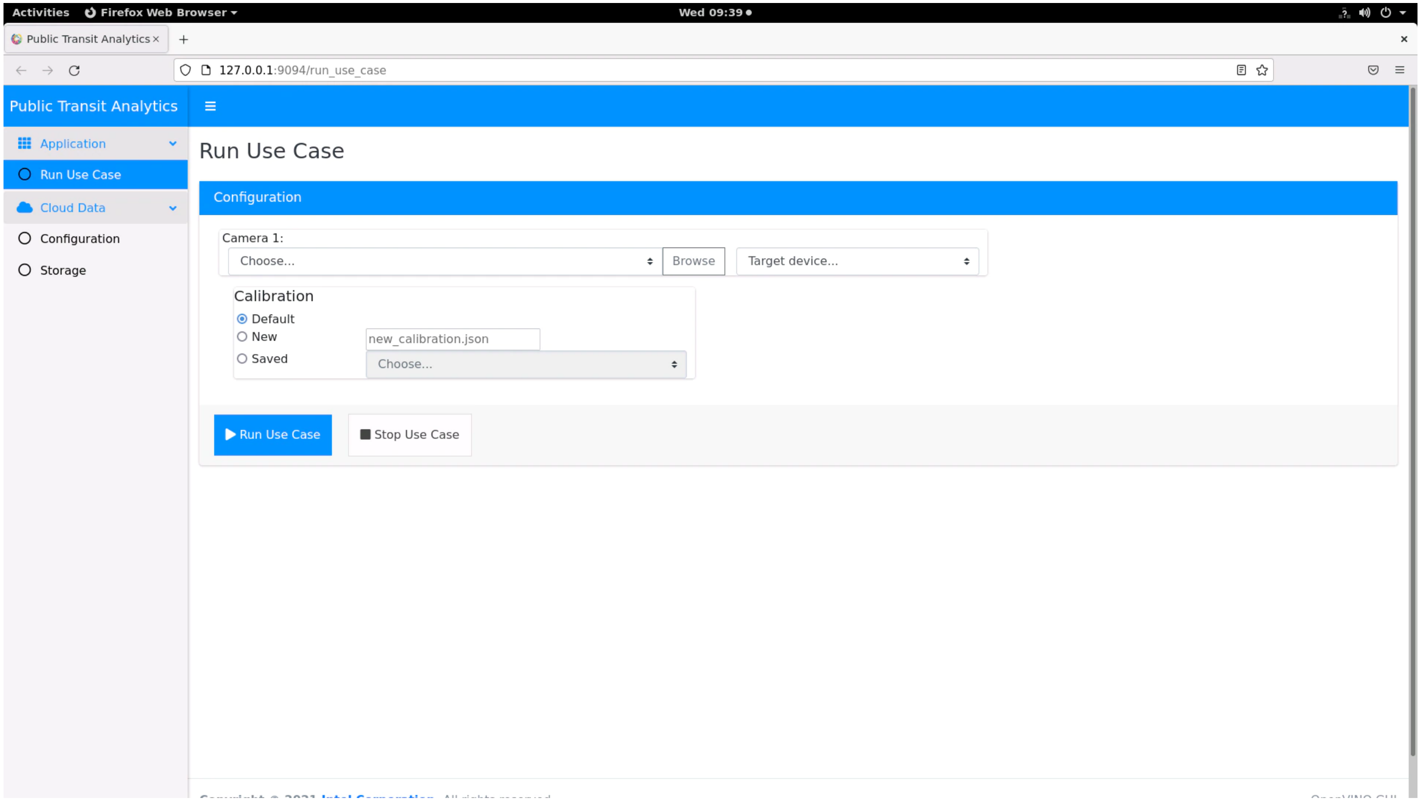
1. Run the application. Copy and run the `make webui` command from the end of the installation:

```
make webui EII_BASE=<INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/IEdgeInsights REPO_FOLDER=
<INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
```

For example:

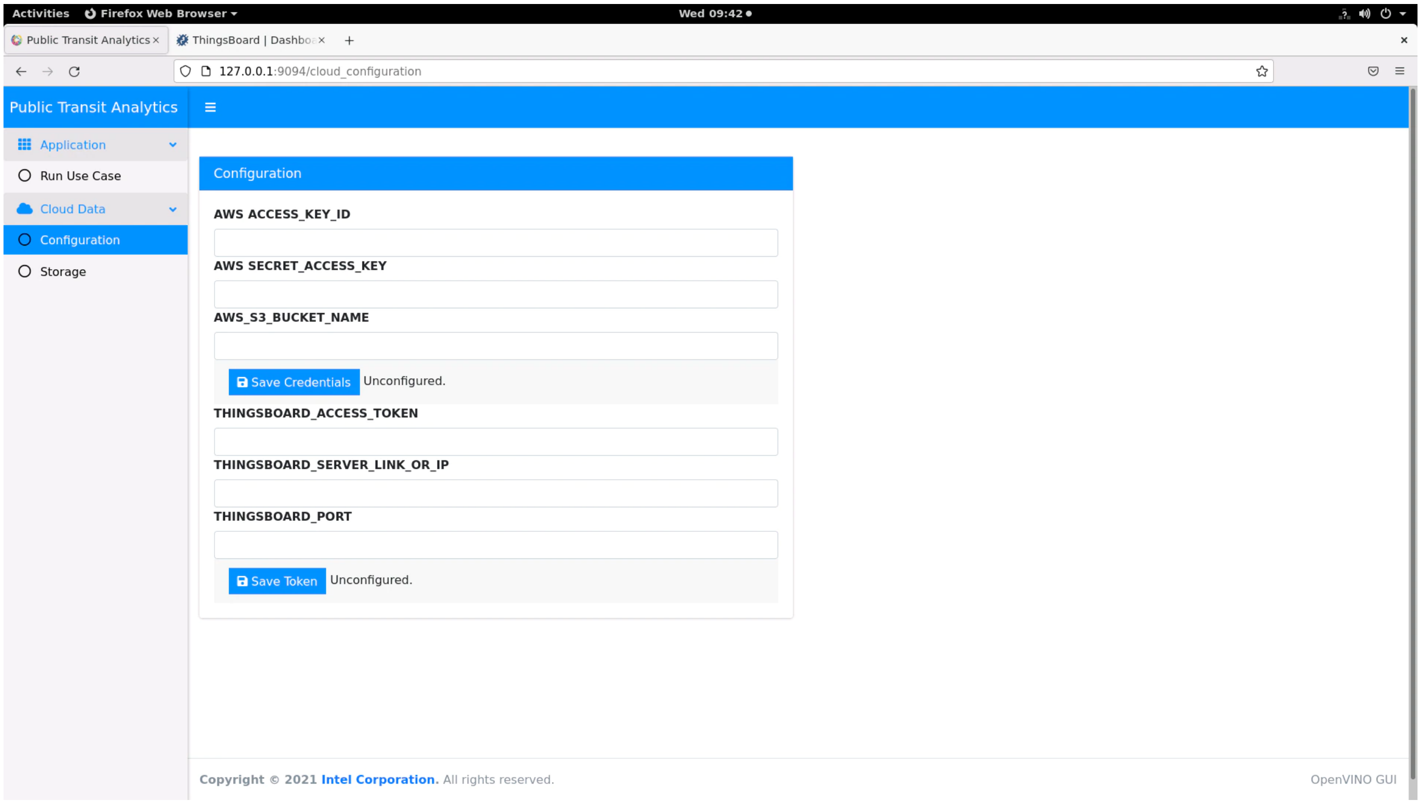
```
make webui EII_BASE=/home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
```

2. Open the Web UI: Go to **127.0.0.1:9094** on your web browser.



3. If you installed your ThingsBoard Local Cloud Server and you have enabled S3 Bucket Server on your AWS account, you can provide your configured **AWS Access Key ID**, **AWS Secret Access Key**, **Thingsboard IP**, **Thingsboard Port** and **Thingsboard Device token** on the **Cloud Data Configuration** tab. After you complete the Cloud configuration, make sure you click on the **Save Credentials** and **Save Token** buttons. Now you can import the ThingsBoard dashboard as described at the end of the Set Up ThingsBoard* Local Cloud Data

   to enable all dashboard features, including the cloud storage.



Configuration

AWS_ACCESS_KEY_ID

AWS_SECRET_ACCESS_KEY

AWS_S3_BUCKET_NAME

Save Credentials Unconfigured.

THINGSBOARD_ACCESS_TOKEN

THINGSBOARD_SERVER_LINK_OR_IP

THINGSBOARD_PORT

Save Token Unconfigured.

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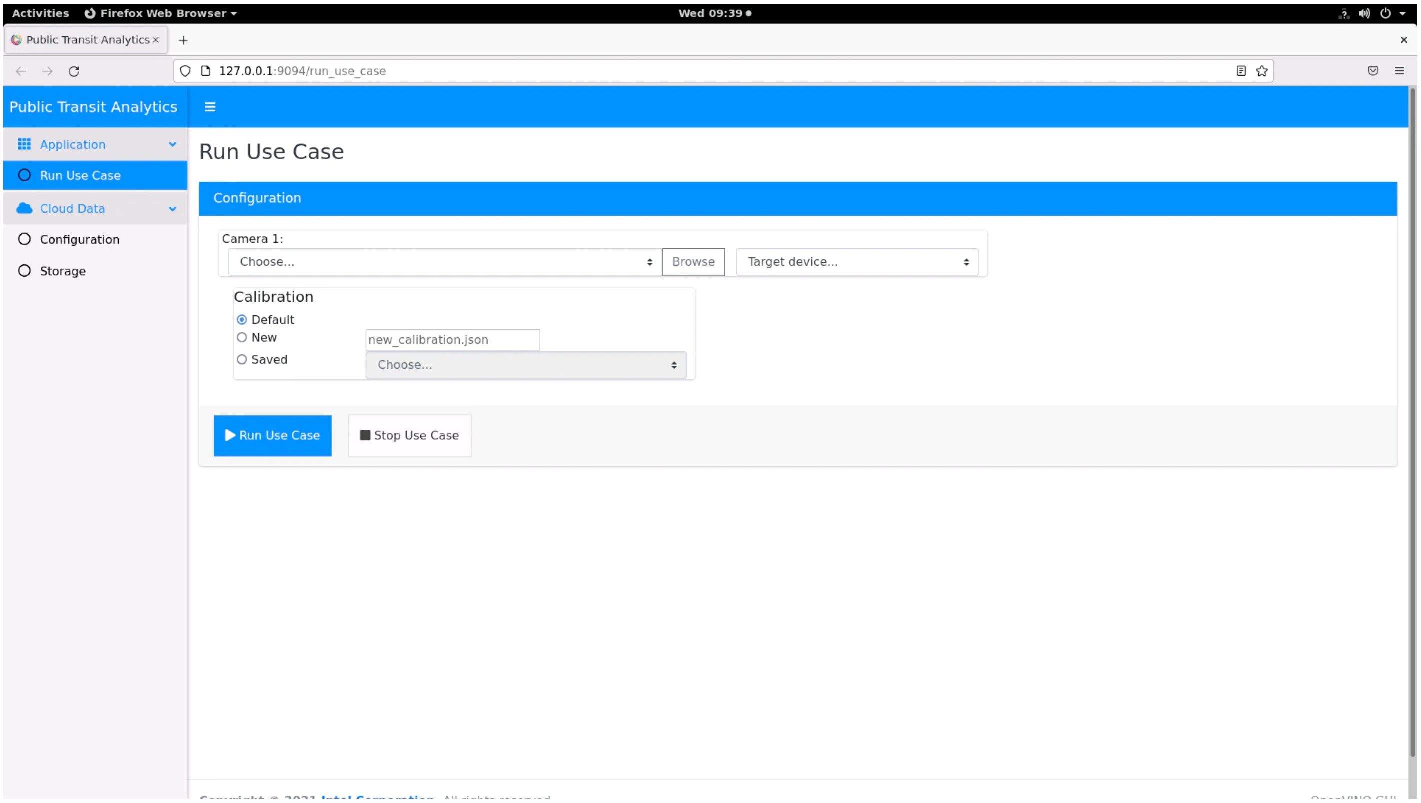
OpenVINO GUI

> **NOTE:** If you don't have an AWS account, you can still enable the ThingsBoard Cloud Data.

4. Access the Public Transit Analytics Dashboard with the following steps.

- Go to sidebar and select **Run Use Case**.



Run Use Case

Configuration

Camera 1: Choose... Browse Target device...

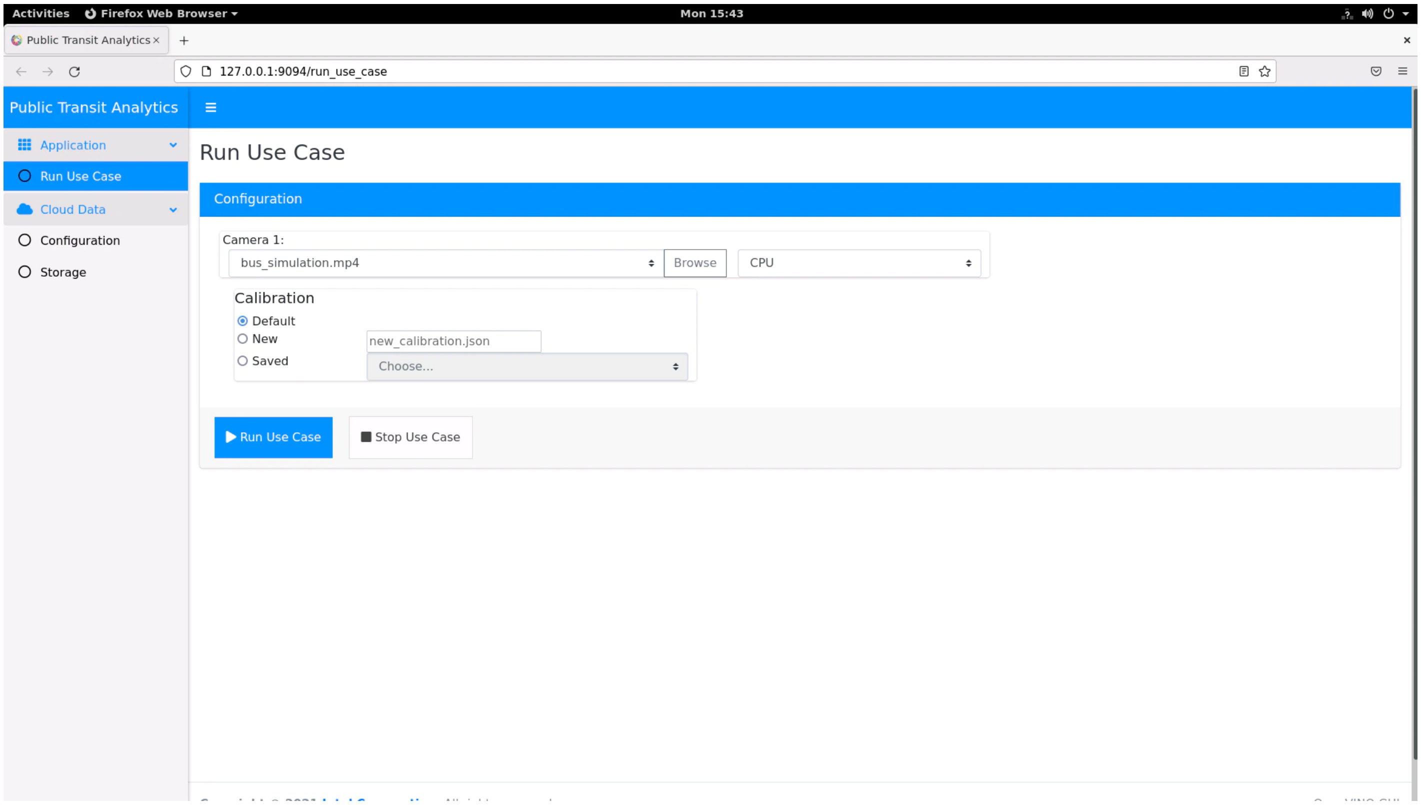
Calibration

● Default

○ New new_calibration.json

○ Saved Choose...

- Configure the use case. Select video sample and the CPU or GPU device to run on it.



Run Use Case

Configuration

Camera 1: bus_simulation.mp4 CPU

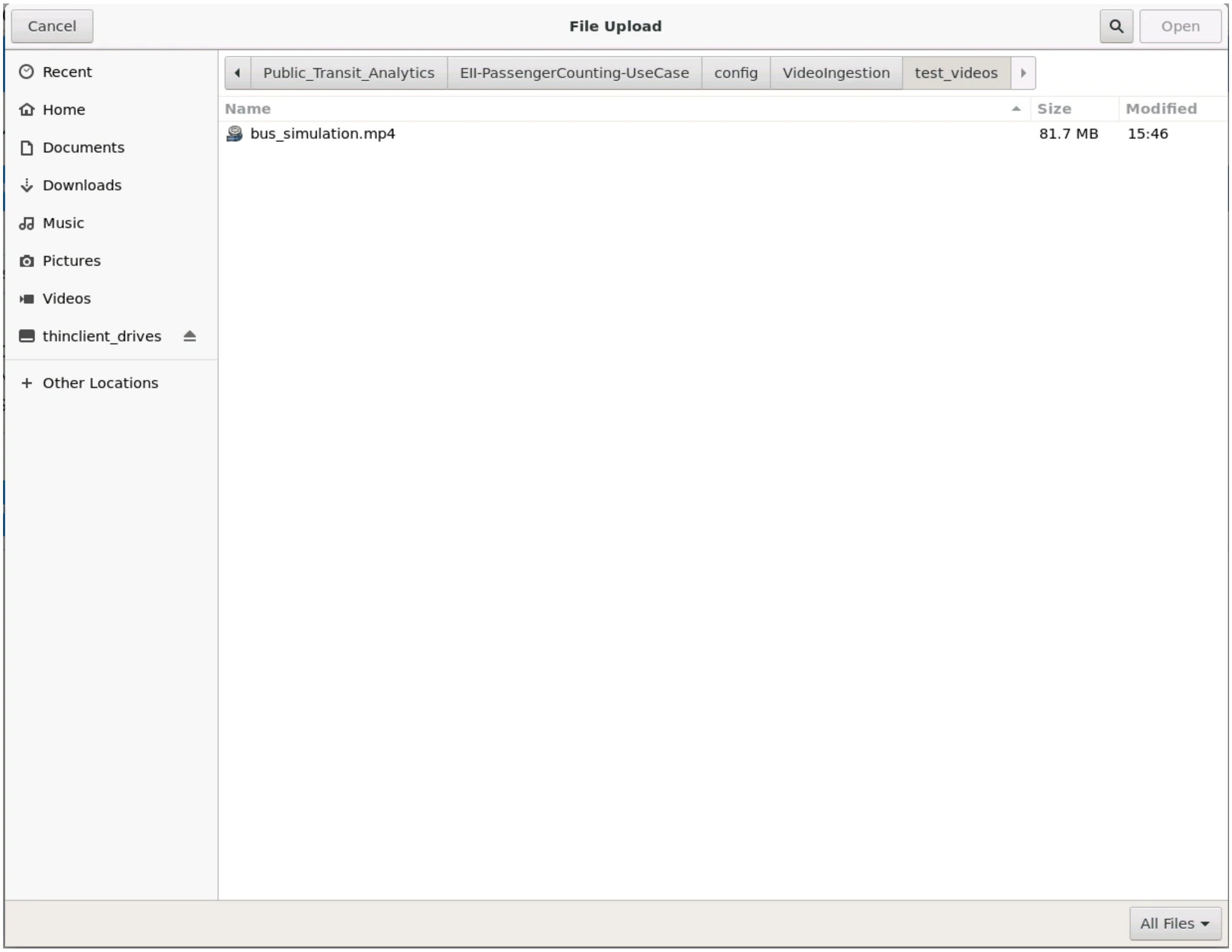
Calibration

● Default

○ New new_calibration.json

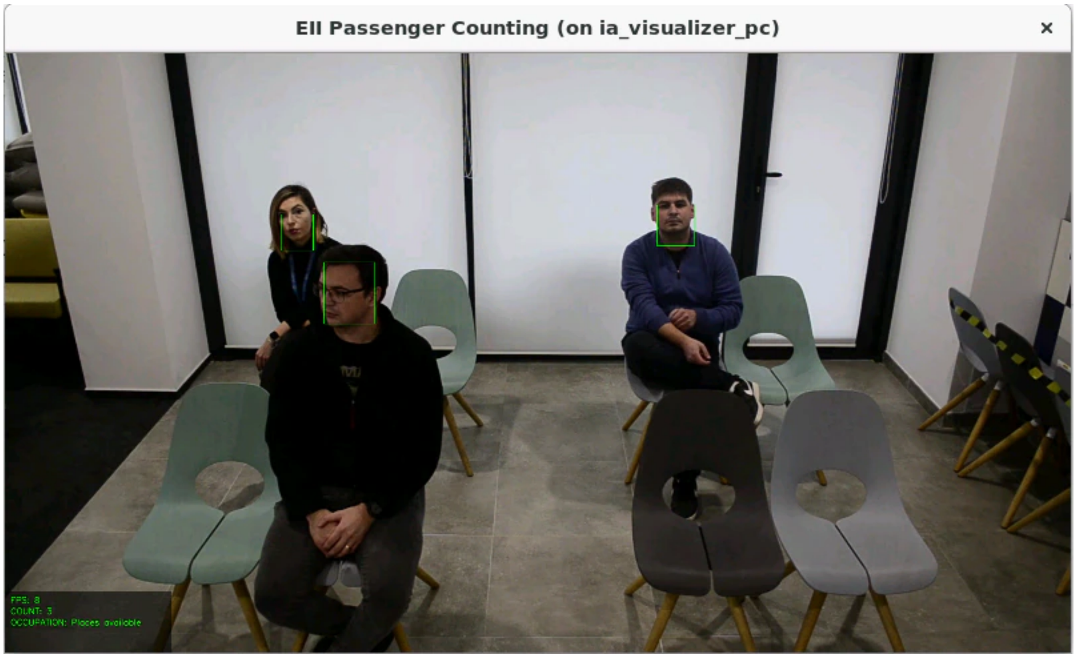
○ Saved Choose...

- Click on the **Browse** button and search for the sample video delivered with the application at the following path:
`<INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase/config/VideoIngestion/test_videos/`
and select the one available.
NOTE: These images are ONLY to be used for validating the accuracy of detection events.

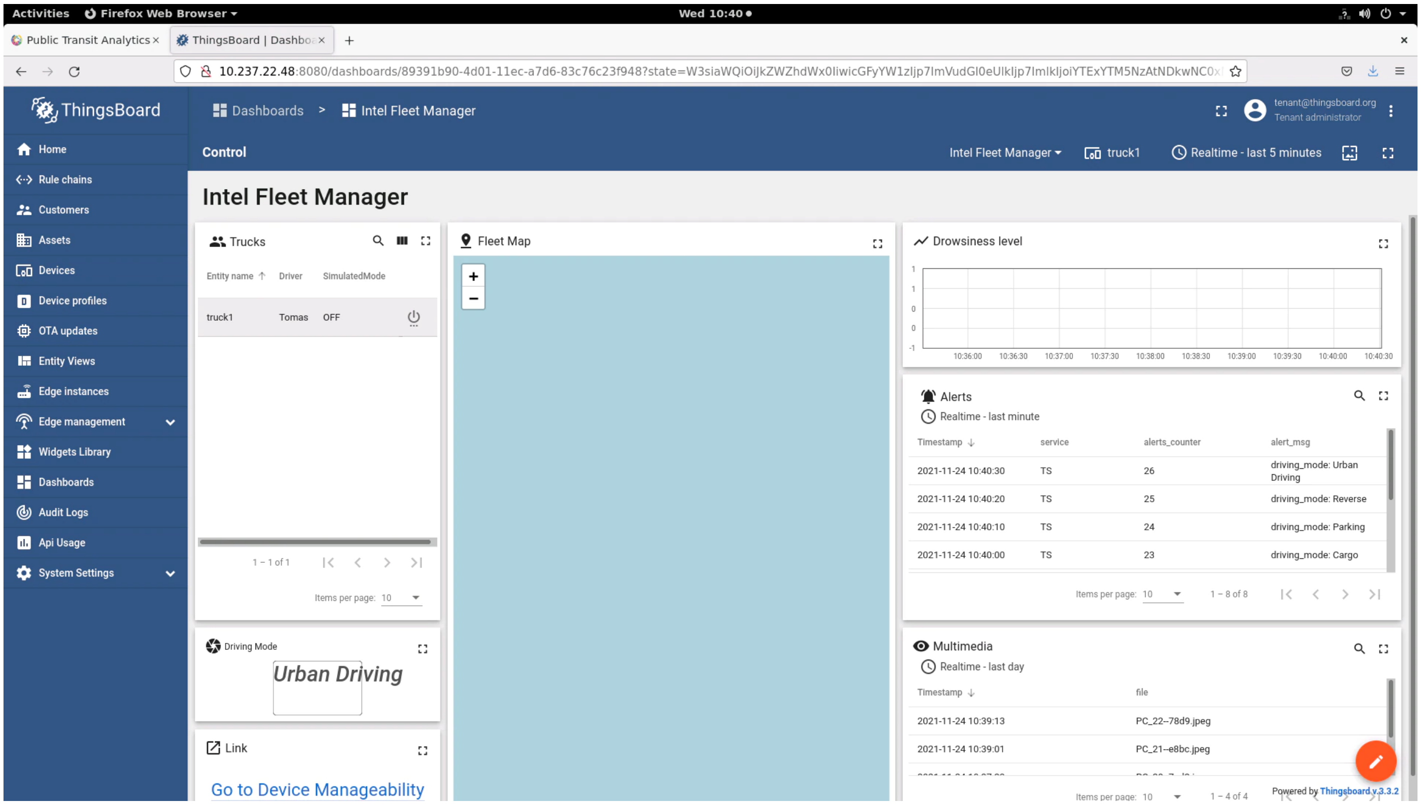


Name	Size	Modified
bus_simulation.mp4	81.7 MB	15:46

- After selecting the video sample, select the target CPU or GPU and click on **Run Use Case.**
- The application will start the Visualizer App that will detect yawns, blinks, drowsiness and distraction status as in the following image:
  NOTE: These images are ONLY to be used for validating the accuracy of detection events.


EII Passenger Counting (on ia_visualizer_pc)
×
FPS: 8
COUNT: 3
OCCUPATION: Places available

4. After the visualizer starts, you can go to the ThingsBoard link and check the alerts sent by the reference implementation. If you configured the AWS credentials, you will also have access to pictures taken by the application on the video stream.



Intel Fleet Manager

Trucks

Entity name	Driver	SimulatedMode
truck1	Tomas	OFF

1 – 1 of 1

Items per page: 10

Alerts

Realtime - last minute

Timestamp	service	alerts_counter	alert_msg
2021-11-24 10:40:30	TS	26	driving_mode: Urban Driving
2021-11-24 10:40:20	TS	25	driving_mode: Reverse
2021-11-24 10:40:10	TS	24	driving_mode: Parking
2021-11-24 10:40:00	TS	23	driving_mode: Cargo

Items per page: 10 1 – 8 of 8

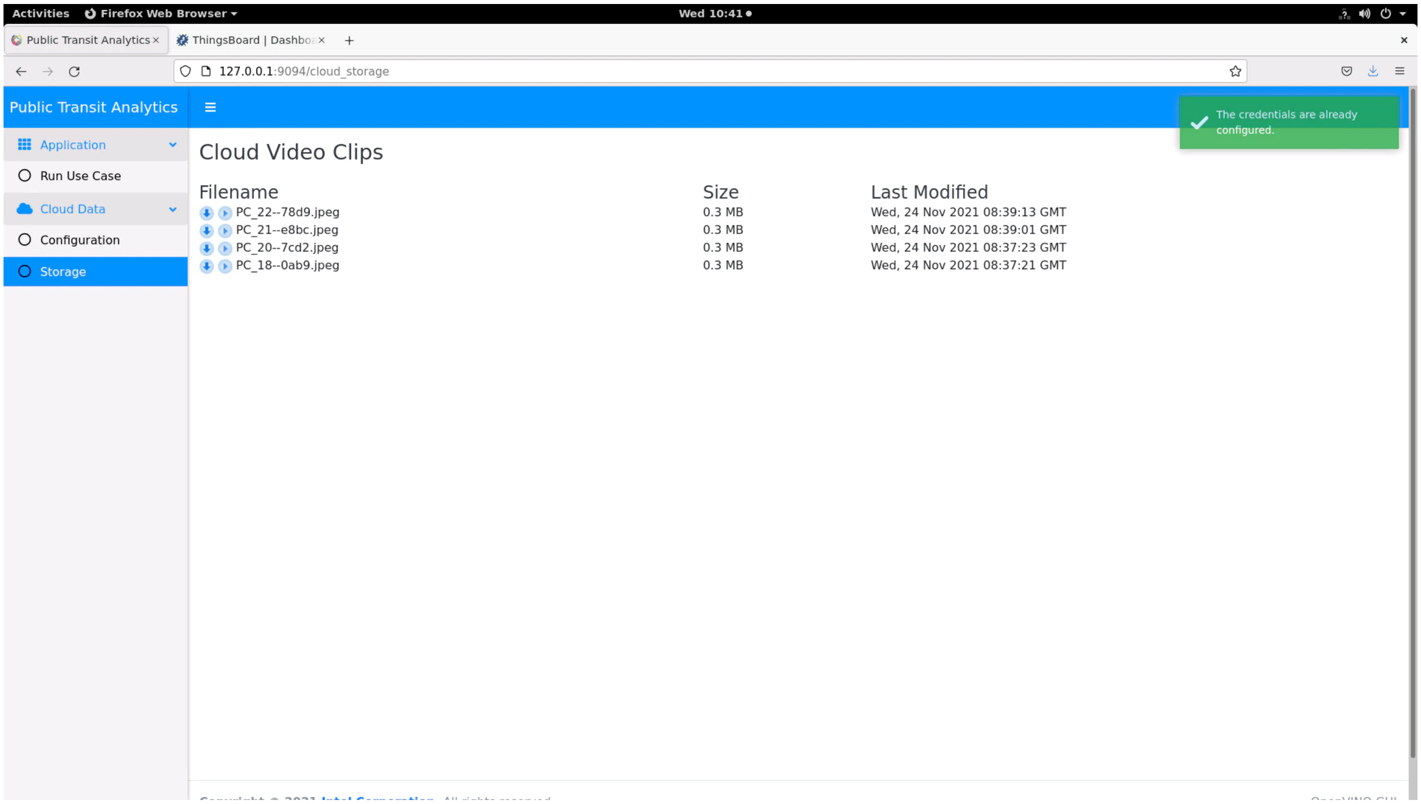
Multimedia

Realtime - last day

Timestamp	file
2021-11-24 10:39:13	PC_22--78d9.jpeg
2021-11-24 10:39:01	PC_21--e8bc.jpeg

Items per page: 10 1 – 4 of 4

5. You can also check the cloud storage from the Reference Implementation **Storage** tab.
NOTE: These images are ONLY to be used for validating the accuracy of detection events.



The credentials are already configured.

Cloud Video Clips

Filename	Size	Last Modified
PC_22--78d9.jpeg	0.3 MB	Wed, 24 Nov 2021 08:39:13 GMT
PC_21--e8bc.jpeg	0.3 MB	Wed, 24 Nov 2021 08:39:01 GMT
PC_20--7cd2.jpeg	0.3 MB	Wed, 24 Nov 2021 08:37:23 GMT
PC_18--0ab9.jpeg	0.3 MB	Wed, 24 Nov 2021 08:37:21 GMT

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Run in Parallel with Automated License Plate Recognition Reference Implementation

To run this task you will need to download and install Automated License Plate Recognition Reference Implementation.

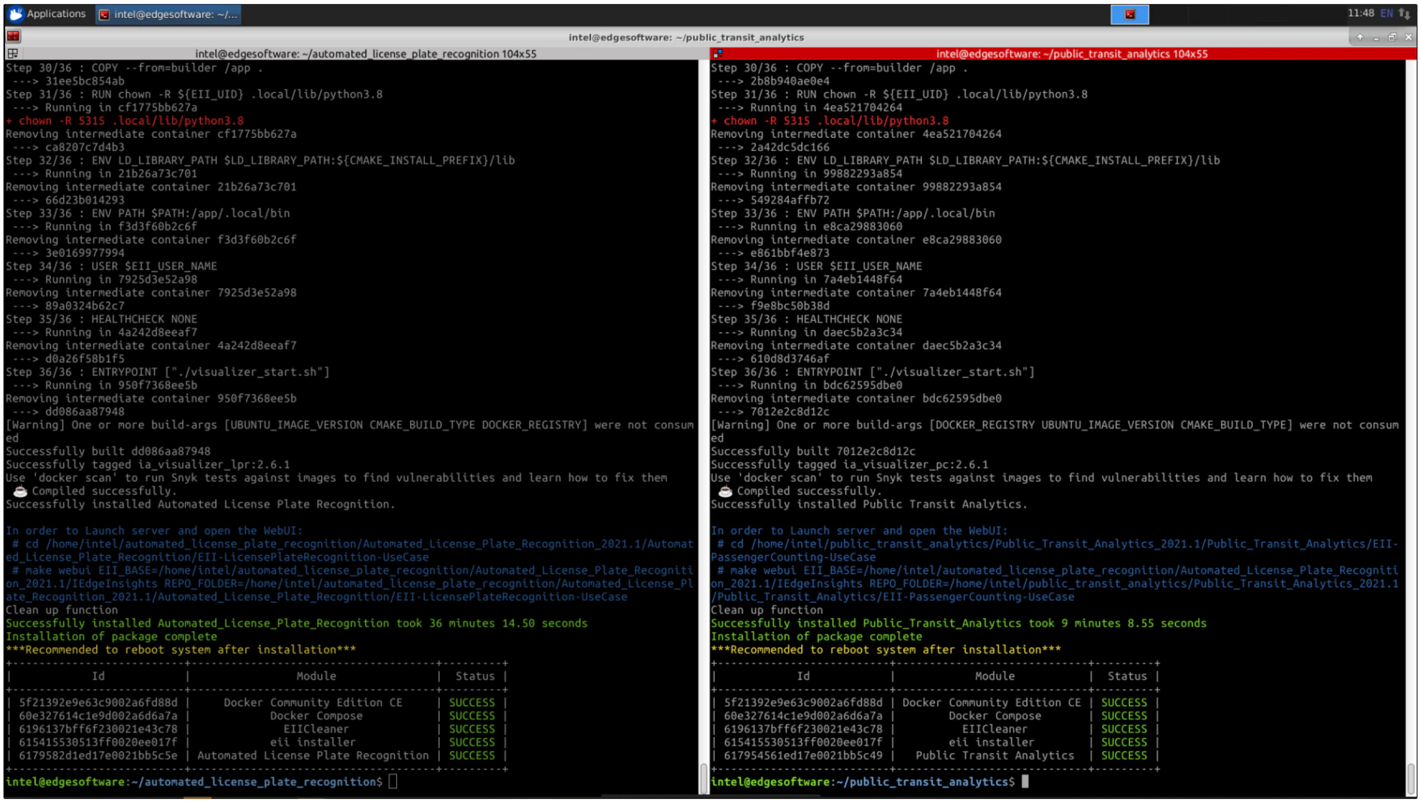
Prerequisites

- Two terminals
- Follow the steps to install Automated License Plate Recognition after installing Public Transit Analytics

Steps to Run the Application

1. Change directory to **Public Transit Analytics Use Case** path on terminal 1:

```
cd <INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
```

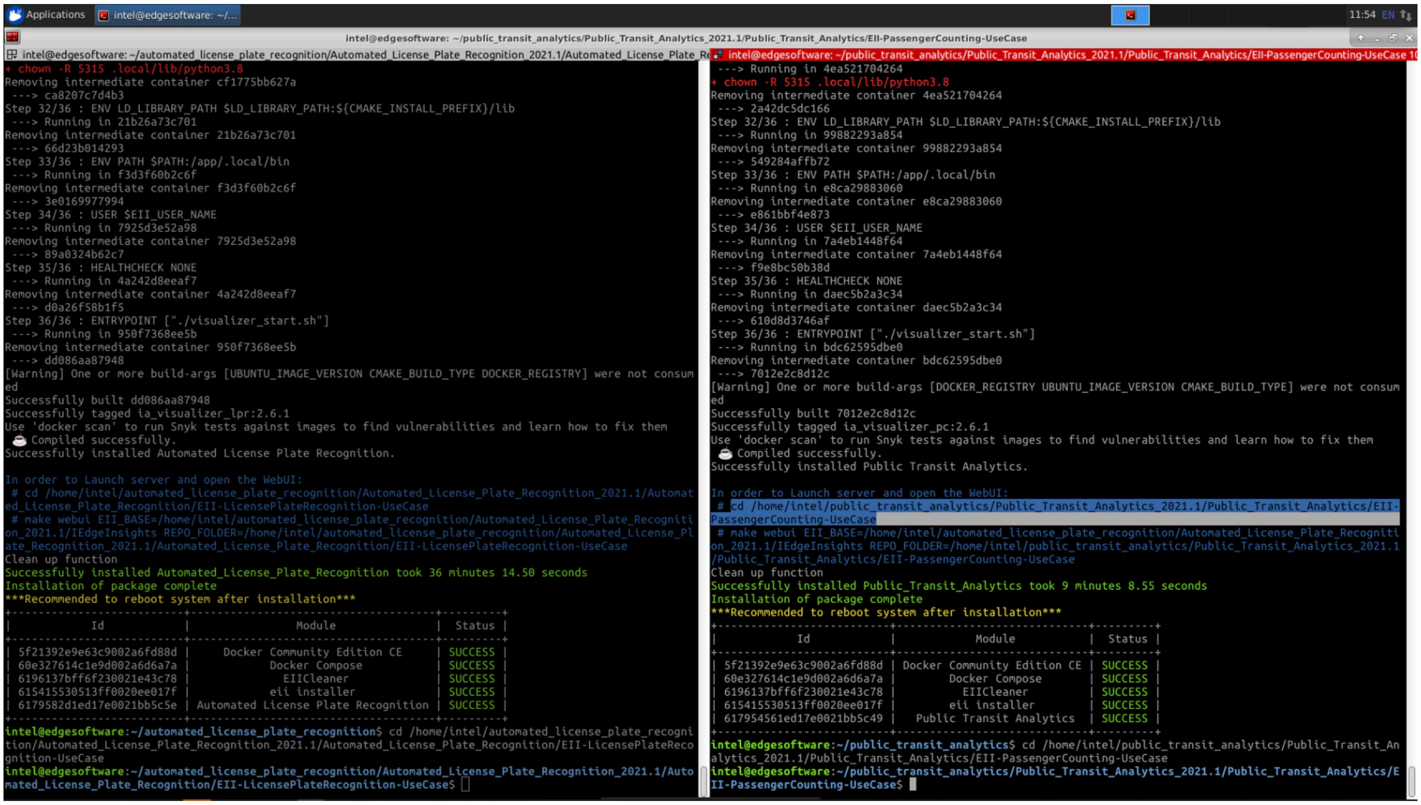

Applications
intel@edgesoftware: ~/...
11:48 EN
intel@edgesoftware: ~/public_transit_analytics
intel@edgesoftware: ~/automated_license_plate_recognition 104x55
intel@edgesoftware: ~/public_transit_analytics 104x55

```
Step 30/36 : COPY --from=builder /app .
 ---> 31ee5bc854ab
Step 31/36 : RUN chown -R ${EII_UID} .local/lib/python3.8
 ---> Running in cf1775bb627a
+ chown -R 5315 .local/lib/python3.8
Removing intermediate container cf1775bb627a
 ---> ca8207c7d4b3
Step 32/36 : ENV LD_LIBRARY_PATH $LD_LIBRARY_PATH:${CMAKE_INSTALL_PREFIX}/lib
 ---> Running in 21b26a73c701
Removing intermediate container 21b26a73c701
 ---> 66d23b014293
Step 33/36 : ENV PATH $PATH:/app/.local/bin
 ---> Running in f3d3f60b2c6f
Removing intermediate container f3d3f60b2c6f
 ---> 3e0169977994
Step 34/36 : USER $EII_USER_NAME
 ---> Running in 7925d3e52a98
Removing intermediate container 7925d3e52a98
 ---> 89a0324b62c7
Step 35/36 : HEALTHCHECK NONE
 ---> Running in 4a242d8eeaf7
Removing intermediate container 4a242d8eeaf7
 ---> d0a26f58b1f5
Step 36/36 : ENTRYPOINT ["./visualizer_start.sh"]
 ---> Running in 950f7368ee5b
Removing intermediate container 950f7368ee5b
 ---> dd086aa87948
[Warning] One or more build-args [UBUNTU_IMAGE_VERSION CMAKE_BUILD_TYPE DOCKER_REGISTRY] were not consum
ed
Successfully built dd086aa87948
Successfully tagged ia_visualizer_lpr:2.6.1
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
 ☕ Compiled successfully.
Successfully installed Automated License Plate Recognition.

In order to Launch server and open the WebUI:
 # cd /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Automat
ed_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase
 # make webui EII_BASE=/home/intel/automated_license_plate_recognition/Automated_License_Plate_Recogniti
on_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/automated_license_plate_recognition/Automated_License_Pl
ate_Recognition_2021.1/Automated_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase
Clean up function
Successfully installed Automated_License_Plate_Recognition took 36 minutes 14.50 seconds
Installation of package complete
***Recommended to reboot system after installation***
+--------------------------+--------------------------------------+---------+
|            Id            |                Module                | Status  |
+--------------------------+--------------------------------------+---------+
| 5f21392e9e63c9002a6fd88d |      Docker Community Edition CE     | SUCCESS |
| 60e327614c1e9d002a6d6a7a |            Docker Compose            | SUCCESS |
| 6196137bff6f230021e43c78 |              EIICleaner              | SUCCESS |
| 615415530513ff0020ee017f |             eii installer            | SUCCESS |
| 6179582d1ed17e0021bb5c5e | Automated License Plate Recognition  | SUCCESS |
+--------------------------+--------------------------------------+---------+
intel@edgesoftware:~/automated_license_plate_recognition$
```

```
Step 30/36 : COPY --from=builder /app .
 ---> 2b8b940ae0e4
Step 31/36 : RUN chown -R ${EII_UID} .local/lib/python3.8
 ---> Running in 4ea521704264
+ chown -R 5315 .local/lib/python3.8
Removing intermediate container 4ea521704264
 ---> 2a42dc5dc166
Step 32/36 : ENV LD_LIBRARY_PATH $LD_LIBRARY_PATH:${CMAKE_INSTALL_PREFIX}/lib
 ---> Running in 99882293a854
Removing intermediate container 99882293a854
 ---> 549284affb72
Step 33/36 : ENV PATH $PATH:/app/.local/bin
 ---> Running in e8ca29883060
Removing intermediate container e8ca29883060
 ---> e861bbf4e873
Step 34/36 : USER $EII_USER_NAME
 ---> Running in 7a4eb1448f64
Removing intermediate container 7a4eb1448f64
 ---> f9e8bc50b38d
Step 35/36 : HEALTHCHECK NONE
 ---> Running in daec5b2a3c34
Removing intermediate container daec5b2a3c34
 ---> 610d8d3746af
Step 36/36 : ENTRYPOINT ["./visualizer_start.sh"]
 ---> Running in bdc62595dbe0
Removing intermediate container bdc62595dbe0
 ---> 7012e2c8d12c
[Warning] One or more build-args [DOCKER_REGISTRY UBUNTU_IMAGE_VERSION CMAKE_BUILD_TYPE] were not consum
ed
Successfully built 7012e2c8d12c
Successfully tagged ia_visualizer_pc:2.6.1
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
 ☕ Compiled successfully.
Successfully installed Public Transit Analytics.

In order to Launch server and open the WebUI:
 # cd /home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-
PassengerCounting-UseCase
 # make webui EII_BASE=/home/intel/automated_license_plate_recognition/Automated_License_Plate_Recogniti
on_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1
/Public_Transit_Analytics/EII-PassengerCounting-UseCase
Clean up function
Successfully installed Public_Transit_Analytics took 9 minutes 8.55 seconds
Installation of package complete
***Recommended to reboot system after installation***
+--------------------------+-----------------------------+---------+
|            Id            |            Module           | Status  |
+--------------------------+-----------------------------+---------+
| 5f21392e9e63c9002a6fd88d | Docker Community Edition CE | SUCCESS |
| 60e327614c1e9d002a6d6a7a |        Docker Compose       | SUCCESS |
| 6196137bff6f230021e43c78 |          EIICleaner         | SUCCESS |
| 615415530513ff0020ee017f |         eii installer       | SUCCESS |
| 617954561ed17e0021bb5c49 |   Public Transit Analytics  | SUCCESS |
+--------------------------+-----------------------------+---------+
intel@edgesoftware:~/public_transit_analytics$
```

2. Change directory to **Automated License Plate Recognition Use Case** path on terminal 2:

```
cd
<INSTALL_PATH>/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Automated_License
LicensePlateRecognition-UseCase
```



intel@edgesoftware: ~/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase

intel@edgesoftware: ~/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Automated_License_Plate_Re

```
+ chown -R 5315 .local/lib/python3.8
Removing intermediate container cf1775bb627a
 ---> ca8207c7d4b3
Step 32/36 : ENV LD_LIBRARY_PATH $LD_LIBRARY_PATH:${CMAKE_INSTALL_PREFIX}/lib
 ---> Running in 21b26a73c701
Removing intermediate container 21b26a73c701
 ---> 66d23b014293
Step 33/36 : ENV PATH $PATH:/app/.local/bin
 ---> Running in f3d3f60b2c6f
Removing intermediate container f3d3f60b2c6f
 ---> 3e0169977994
Step 34/36 : USER $EII_USER_NAME
 ---> Running in 7925d3e52a98
Removing intermediate container 7925d3e52a98
 ---> 89a0324b62c7
Step 35/36 : HEALTHCHECK NONE
 ---> Running in 4a242d8eeaf7
Removing intermediate container 4a242d8eeaf7
 ---> d0a26f58b1f5
Step 36/36 : ENTRYPOINT ["./visualizer_start.sh"]
 ---> Running in 950f7368ee5b
Removing intermediate container 950f7368ee5b
 ---> dd086aa87948
[Warning] One or more build-args [UBUNTU_IMAGE_VERSION CMAKE_BUILD_TYPE DOCKER_REGISTRY] were not consum
ed
Successfully built dd086aa87948
Successfully tagged ia_visualizer_lpr:2.6.1
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
 ☕ Compiled successfully.
Successfully installed Automated License Plate Recognition.

In order to Launch server and open the WebUI:
 # cd /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Automat
ed_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase
 # make webui EII_BASE=/home/intel/automated_license_plate_recognition/Automated_License_Plate_Recogniti
on_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/automated_license_plate_recognition/Automated_License_Pl
ate_Recognition_2021.1/Automated_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase
Clean up function
Successfully installed Automated_License_Plate_Recognition took 36 minutes 14.50 seconds
Installation of package complete
***Recommended to reboot system after installation***
+-------------------------+-----------------------------------+---------+
|           Id            |              Module               | Status  |
+-------------------------+-----------------------------------+---------+
| 5f21392e9e63c9002a6fd88d |    Docker Community Edition CE    | SUCCESS |
| 60e327614c1e9d002a6d6a7a |          Docker Compose           | SUCCESS |
| 6196137bff6f230021e43c78 |            EIICleaner             | SUCCESS |
| 615415530513ff0020ee017f |           eii installer           | SUCCESS |
| 6179582d1ed17e0021bb5c5e | Automated License Plate Recognition | SUCCESS |
+-------------------------+-----------------------------------+---------+
intel@edgesoftware:~/automated_license_plate_recognition$ cd /home/intel/automated_license_plate_recogni
tion/Automated_License_Plate_Recognition_2021.1/Automated_License_Plate_Recognition/EII-LicensePlateReco
gnition-UseCase
intel@edgesoftware:~/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Auto
mated_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase$ 
```

intel@edgesoftware: ~/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase 10

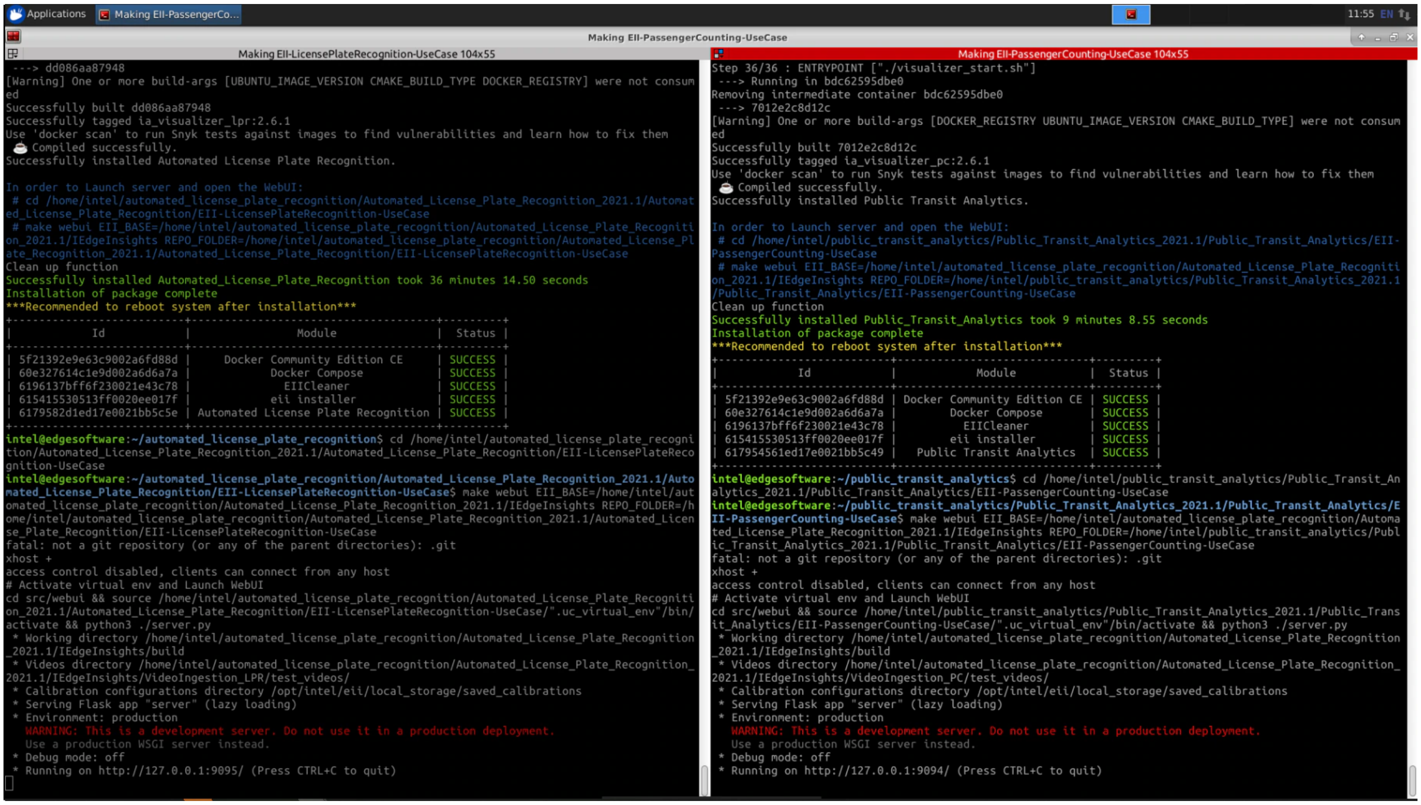
```
 ---> Running in 4ea521704264
+ chown -R 5315 .local/lib/python3.8
Removing intermediate container 4ea521704264
 ---> 2a42dc5dc166
Step 32/36 : ENV LD_LIBRARY_PATH $LD_LIBRARY_PATH:${CMAKE_INSTALL_PREFIX}/lib
 ---> Running in 99882293a854
Removing intermediate container 99882293a854
 ---> 549284affb72
Step 33/36 : ENV PATH $PATH:/app/.local/bin
 ---> Running in e8ca29883060
Removing intermediate container e8ca29883060
 ---> e861bbf4e873
Step 34/36 : USER $EII_USER_NAME
 ---> Running in 7a4eb1448f64
Removing intermediate container 7a4eb1448f64
 ---> f9e8bc50b38d
Step 35/36 : HEALTHCHECK NONE
 ---> Running in daec5b2a3c34
Removing intermediate container daec5b2a3c34
 ---> 610d8d3746af
Step 36/36 : ENTRYPOINT ["./visualizer_start.sh"]
 ---> Running in bdc62595dbe0
Removing intermediate container bdc62595dbe0
 ---> 7012e2c8d12c
[Warning] One or more build-args [DOCKER_REGISTRY UBUNTU_IMAGE_VERSION CMAKE_BUILD_TYPE] were not consum
ed
Successfully built 7012e2c8d12c
Successfully tagged ia_visualizer_pc:2.6.1
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
 ☕ Compiled successfully.
Successfully installed Public Transit Analytics.

In order to Launch server and open the WebUI:
 # cd /home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-
PassengerCounting-UseCase
 # make webui EII_BASE=/home/intel/automated_license_plate_recognition/Automated_License_Plate_Recogniti
on_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1
/Public_Transit_Analytics/EII-PassengerCounting-UseCase
Clean up function
Successfully installed Public_Transit_Analytics took 9 minutes 8.55 seconds
Installation of package complete
***Recommended to reboot system after installation***
+-------------------------+-----------------------------+---------+
|           Id            |           Module            | Status  |
+-------------------------+-----------------------------+---------+
| 5f21392e9e63c9002a6fd88d | Docker Community Edition CE | SUCCESS |
| 60e327614c1e9d002a6d6a7a |       Docker Compose        | SUCCESS |
| 6196137bff6f230021e43c78 |         EIICleaner          | SUCCESS |
| 615415530513ff0020ee017f |        eii installer        | SUCCESS |
| 617954561ed17e0021bb5c49 |   Public Transit Analytics  | SUCCESS |
+-------------------------+-----------------------------+---------+
intel@edgesoftware:~/public_transit_analytics$ cd /home/intel/public_transit_analytics/Public_Transit_An
alytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
intel@edgesoftware:~/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/E
II-PassengerCounting-UseCase$ 
```

3. Run the following command on terminal 1 to start the webserver application. Copy and run the `make webui` command from the end of the installation:

```
make webui EII_BASE=<INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/IEdgeInsights
REPO_FOLDER=
<INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-
PassengerCounting-UseCase
```

4. Run the following command on terminal 2 to start the webserver application. Copy and run the `make webui` command from the end of the installation:

```
make webui EII_BASE=<INSTALL_PATH>/public_transit_analytics/Public_Transit_Analytics_2021.1/IEdgeInsights
REPO_FOLDER=
<INSTALL_PATH>/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Automated_License
LicensePlateRecognition-UseCase
```


Applications
Making EII-PassengerCo...
11:55 EN
Making EII-PassengerCounting-UseCase
Making EII-LicensePlateRecognition-UseCase 104x55
Making EII-PassengerCounting-UseCase 104x55

```
 ---> dd086aa87948
[Warning] One or more build-args [UBUNTU_IMAGE_VERSION CMAKE_BUILD_TYPE DOCKER_REGISTRY] were not consum
ed
Successfully built dd086aa87948
Successfully tagged ia_visualizer_lpr:2.6.1
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
 ☕ Compiled successfully.
Successfully installed Automated License Plate Recognition.

In order to Launch server and open the WebUI:
 # cd /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Automat
ed_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase
 # make webui EII_BASE=/home/intel/automated_license_plate_recognition/Automated_License_Plate_Recogniti
on_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/automated_license_plate_recognition/Automated_License_Pl
ate_Recognition_2021.1/Automated_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase
Clean up function
Successfully installed Automated_License_Plate_Recognition took 36 minutes 14.50 seconds
Installation of package complete
***Recommended to reboot system after installation***
+--------------------------+-------------------------------------+---------+
|            Id            |                Module               |  Status |
+--------------------------+-------------------------------------+---------+
| 5f21392e9e63c9002a6fd88d |     Docker Community Edition CE     | SUCCESS |
| 60e327614c1e9d002a6d6a7a |            Docker Compose           | SUCCESS |
| 6196137bff6f230021e43c78 |              EIICleaner             | SUCCESS |
| 615415530513ff0020ee017f |            eii installer            | SUCCESS |
| 6179582d1ed17e0021bb5c5e | Automated License Plate Recognition | SUCCESS |
+--------------------------+-------------------------------------+---------+
intel@edgesoftware:~/automated_license_plate_recognition$ cd /home/intel/automated_license_plate_recogni
tion/Automated_License_Plate_Recognition_2021.1/Automated_License_Plate_Recognition/EII-LicensePlateReco
gnition-UseCase
intel@edgesoftware:~/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Auto
mated_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase$ make webui EII_BASE=/home/intel/aut
omated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/IEdgeInsights REPO_FOLDER=/h
ome/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition_2021.1/Automated_Licen
se_Plate_Recognition/EII-LicensePlateRecognition-UseCase
fatal: not a git repository (or any of the parent directories): .git
xhost +
access control disabled, clients can connect from any host
# Activate virtual env and Launch WebUI
cd src/webui && source /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recogniti
on_2021.1/Automated_License_Plate_Recognition/EII-LicensePlateRecognition-UseCase/".uc_virtual_env"/bin/
activate && python3 ./server.py
 * Working directory /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition
_2021.1/IEdgeInsights/build
 * Videos directory /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition_
2021.1/IEdgeInsights/VideoIngestion_LPR/test_videos/
 * Calibration configurations directory /opt/intel/eii/local_storage/saved_calibrations
 * Serving Flask app "server" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: off
 * Running on http://127.0.0.1:9095/ (Press CTRL+C to quit)
```

```
Step 36/36 : ENTRYPOINT ["./visualizer_start.sh"]
 ---> Running in bdc62595dbe0
Removing intermediate container bdc62595dbe0
 ---> 7012e2c8d12c
[Warning] One or more build-args [DOCKER_REGISTRY UBUNTU_IMAGE_VERSION CMAKE_BUILD_TYPE] were not consum
ed
Successfully built 7012e2c8d12c
Successfully tagged ia_visualizer_pc:2.6.1
Use 'docker scan' to run Snyk tests against images to find vulnerabilities and learn how to fix them
 ☕ Compiled successfully.
Successfully installed Public Transit Analytics.

In order to Launch server and open the WebUI:
 # cd /home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-
PassengerCounting-UseCase
 # make webui EII_BASE=/home/intel/automated_license_plate_recognition/Automated_License_Plate_Recogniti
on_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1
/Public_Transit_Analytics/EII-PassengerCounting-UseCase
Clean up function
Successfully installed Public_Transit_Analytics took 9 minutes 8.55 seconds
Installation of package complete
***Recommended to reboot system after installation***
+--------------------------+-----------------------------+---------+
|            Id            |            Module           |  Status |
+--------------------------+-----------------------------+---------+
| 5f21392e9e63c9002a6fd88d | Docker Community Edition CE | SUCCESS |
| 60e327614c1e9d002a6d6a7a |        Docker Compose       | SUCCESS |
| 6196137bff6f230021e43c78 |          EIICleaner         | SUCCESS |
| 615415530513ff0020ee017f |        eii installer        | SUCCESS |
| 617954561ed17e0021bb5c49 |   Public Transit Analytics  | SUCCESS |
+--------------------------+-----------------------------+---------+
intel@edgesoftware:~/public_transit_analytics$ cd /home/intel/public_transit_analytics/Public_Transit_An
alytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
intel@edgesoftware:~/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Transit_Analytics/E
II-PassengerCounting-UseCase$ make webui EII_BASE=/home/intel/automated_license_plate_recognition/Automa
ted_License_Plate_Recognition_2021.1/IEdgeInsights REPO_FOLDER=/home/intel/public_transit_analytics/Publ
ic_Transit_Analytics_2021.1/Public_Transit_Analytics/EII-PassengerCounting-UseCase
fatal: not a git repository (or any of the parent directories): .git
xhost +
access control disabled, clients can connect from any host
# Activate virtual env and Launch WebUI
cd src/webui && source /home/intel/public_transit_analytics/Public_Transit_Analytics_2021.1/Public_Trans
it_Analytics/EII-PassengerCounting-UseCase/".uc_virtual_env"/bin/activate && python3 ./server.py
 * Working directory /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition
_2021.1/IEdgeInsights/build
 * Videos directory /home/intel/automated_license_plate_recognition/Automated_License_Plate_Recognition_
2021.1/IEdgeInsights/VideoIngestion_PC/test_videos/
 * Calibration configurations directory /opt/intel/eii/local_storage/saved_calibrations
 * Serving Flask app "server" (lazy loading)
 * Environment: production
   WARNING: This is a development server. Do not use it in a production deployment.
   Use a production WSGI server instead.
 * Debug mode: off
 * Running on http://127.0.0.1:9094/ (Press CTRL+C to quit)
```

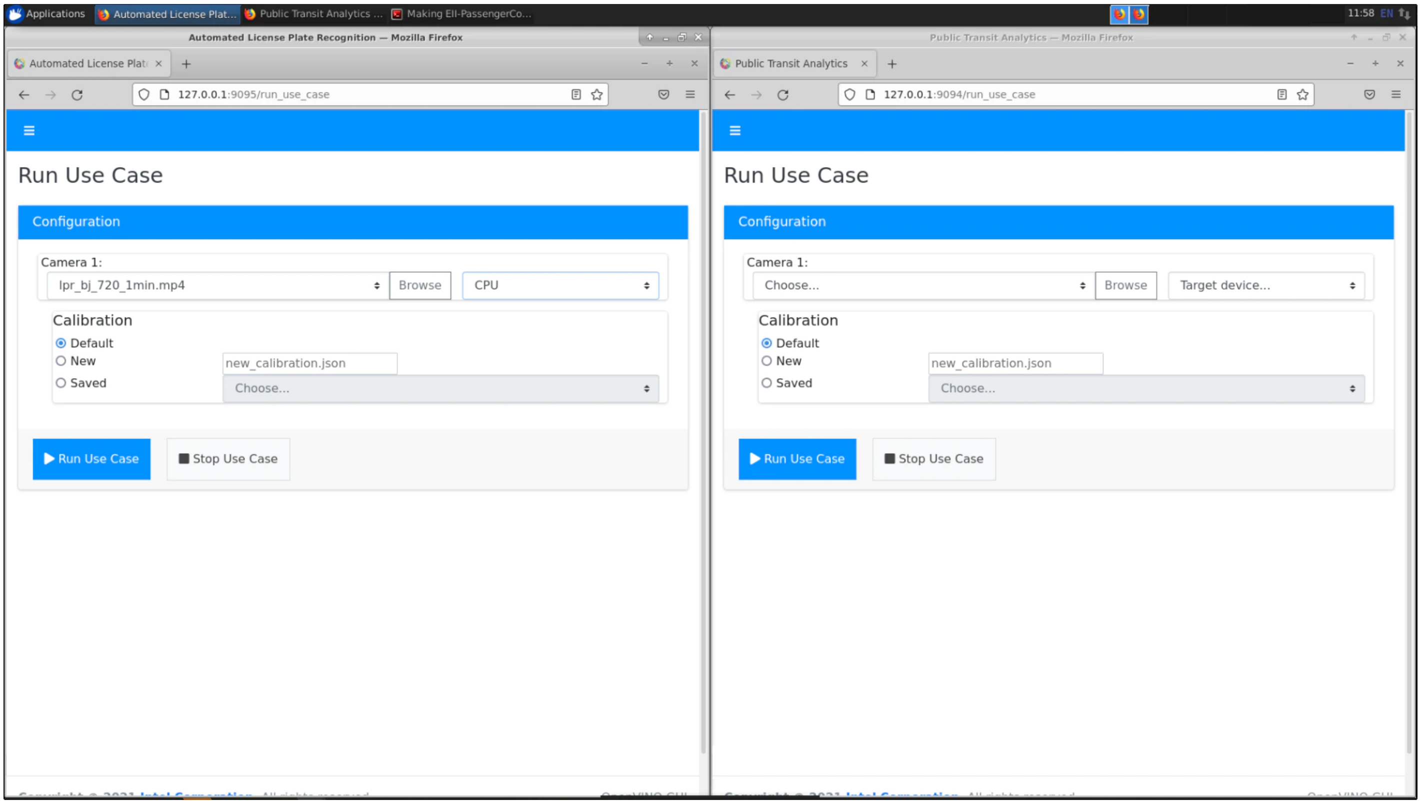
5. Open your browser and go to **127.0.0.1:9094**.

6. Configure Public Transit Analytics by setting the **video source**, the **target** and click on **Run Use Case**.

7. Wait for the Visualizer to get up and running.

8. Open the Automated License Plate Recognition page by going to address **127.0.0.1:9095**.

9. Configure all available cameras with the desired videos and set the target for each one (**CPU** or **GPU**) and click **Run Use Case**.
   NOTE: These images are ONLY to be used for validating the accuracy of detection events.


Applications
Automated License Plat...
Public Transit Analytics ...
Making EII-PassengerCo...
11:58 EN
Automated License Plate Recognition — Mozilla Firefox
Automated License Plat ×
Public Transit Analytics — Mozilla Firefox
Public Transit Analytics ×
≡
Browse
Run Use Case
Stop Use Case
Copyright © 2021 Intel Corporation. All rights reserved.
OpenVINO GUI

127.0.0.1:9095/run_use_case

Run Use Case

Configuration

Camera 1: lpr_bj_720_1min.mp4 | CPU

Calibration
● Default
○ New | new_calibration.json
○ Saved | Choose...

127.0.0.1:9094/run_use_case

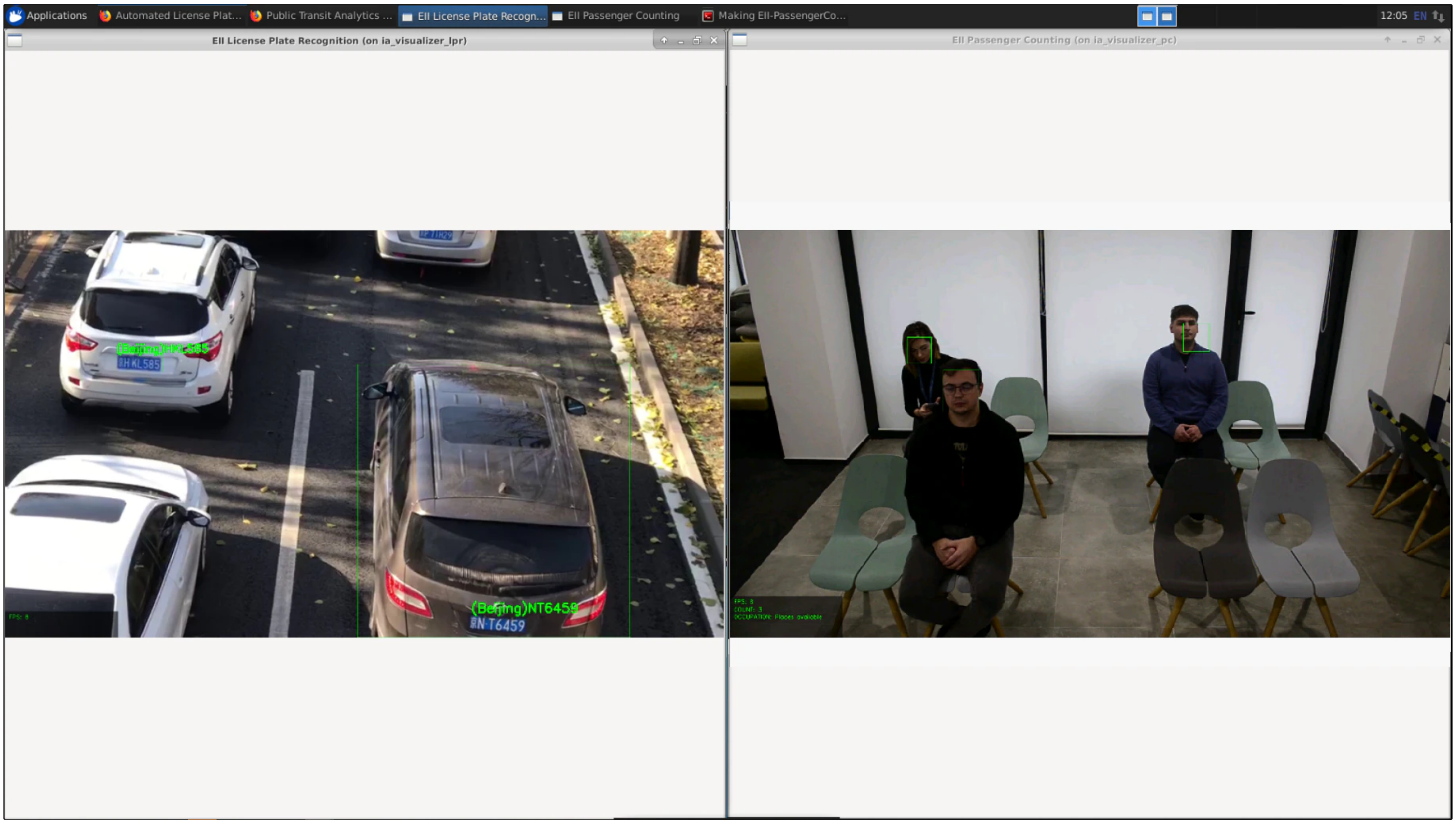
Run Use Case

Configuration

Camera 1: Choose... | Target device...

Calibration
● Default
○ New | new_calibration.json
○ Saved | Choose...

At this point, Public Transit Analytics will close and after that both use cases will start.
NOTE: These images are ONLY to be used for validating the accuracy of detection events.


Applications
Automated License Plat...
Public Transit Analytics ...
EII License Plate Recogn...
EII Passenger Counting
Making EII-PassengerCo...
12:05 EN
EII License Plate Recognition (on ia_visualizer_lpr)
EII Passenger Counting (on ia_visualizer_pc)
(Beijing)HKL585
(Beijing)NT6459

```
FPS: 8
COUNT: 3
OCCUPATION: Places available
```

> **NOTE:** If you reinstall the first RI, you must reinstall the second one.

Summary and Next Steps

This application successfully implements Intel® Distribution of OpenVINO™ toolkit plugins to calculate the number of passengers.

As a next step, try the following:

Extend the RI further to provide support for feed from network stream (RTSP camera), and the algorithm can be optimized for better performance.

Learn More

To continue your learning, see the following guides and software resources:

- Intel® Distribution of OpenVINO™ toolkit documentation

Known Issues

Uninstall Reference Implementation

If you uninstall one of the reference implementations, you need to reinstall the other reference implementations because the Docker images will be cleared.

Troubleshooting

Installation Failure

If the host system already has Docker images and its containers running, you will have issues during the RI installation. You must stop/force stop existing containers and images.

- To remove all stopped containers, dangling images, and unused networks:

  ```
  sudo docker system prune --volumes
  ```

- To stop Docker containers:

  ```
  sudo docker stop $(sudo docker ps -aq)
  ```

- To remove Docker containers:

  ```
  sudo docker rm $(sudo docker ps -aq)
  ```

- To remove all Docker images:

  ```
  sudo docker rmi -f $(sudo docker images -aq)
  ```

Docker Image Build Failure

If Docker image build on corporate network fails, follow the steps below.

1. Get DNS server using the command:

   ```
   nmcli dev show | grep 'IP4.DNS'
   ```

2. Configure Docker to use the server. Paste the line below in the `/etc/docker/daemon.json` file:

   ```
   { "dns": ["<dns-server-from-above-command>"]}
   ```

3. Restart Docker:

   ```
   sudo systemctl daemon-reload && sudo systemctl restart docker
   ```

Installation Failure Due to Ubuntu Timezone Setting

While building the reference implementation, if you see `/etc/timezone && apt-get install -y tzdata && ln -sf /usr/share/zoneinfo/${HOST_TIME_ZONE} /etc/localtime && dpkg-reconfigure -f noninteractive tzdata' returned a non-zero code: 1 make: *** [config] Error 1`

Run the following command in your terminal:

```
sudo timedatectl set-local-rtc 0
```

Installation Encoding Issue

While building the reference implementation, if you see `ERROR: 'latin-1' codec can't encode character '\u2615' in position 3: ordinal not in range(256)`

Run the following command in your terminal:

```
export LANG=en_US.UTF-8
```

Can't Connect to Docker Daemon

If you can't connect to Docker Daemon at http+docker://localhost, run the following command in your terminal:

```
sudo usermod -aG docker $USER
```

Log out and log in to Ubuntu.

Check before retrying to install if group Docker is available for you by running the following command in a terminal:

```
groups
```

The output should contain **Docker**.

Support Forum

If you're unable to resolve your issues, contact the Support Forum.

Product and Performance Information

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