ORACLE

Connected Car

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I've always been asked, „What is my favorite car?” and I've always said „The next one”.

Carroll Shelby

Source: Wikipedia

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Connected Car or Autonomous Car

Connected vehicles can exchange information wirelessly with other vehicles and infrastructure, but also with the vehicle manufacture or third-party service providers.

Automated vehicles, on the other hand, are vehicles in which at least some aspects of safety-critical control functions occur without direct driver input.

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The Race is On to Capture In-Vehicle Commerce

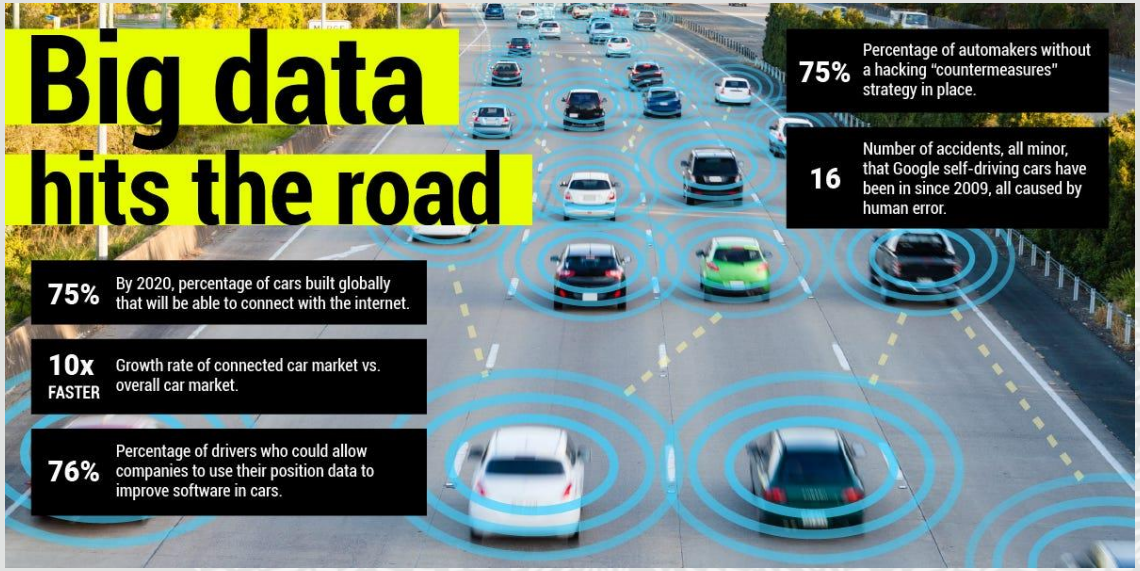
By 2020, there will be 250 Million connected vehicles on the road globally
Gartner & Connected Vehicle Trade Association

82% of new cars will be connected to Internet in 2021
Business Insider

Connected car commerce will zoom to $265 billion by 2023
Juniper Research

Automakers align with tech firms

Voice technology will prevail



Source: Business Insider

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Car Data Facts

- What are the risks of allowing direct access to car data?
- How do vehicle makers and third party providers protect my personal data and privacy?
- Why share car data?
- What is the safest and most secure way to share car data?
- Will vehicle data be available to all service providers and under the same conditions?
- What kind of data can my car share?

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Car Data

- Diverse data types
  - Speed, Engine RPM, Throttle, Load, Pressure, Gear, Braking, Torque, Steer, Wheels rotations and many more (eg. ODB-II describes ~150 parameters)
  - Location data
  - Video streams
  - Infotainment systems
- Source
  - ECU, CAN Bus, OBD-II
  - Cameras
  - On board custom devices
  - Manufacturers specific protocols

25 GB

per hour per car

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Bloodhund – Powering the 1000 MPH car with data

MOVIE

https://www.youtube.com/watch?v=P-FfbCGWn7Y

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Let’s connect it .....

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Connected Car project

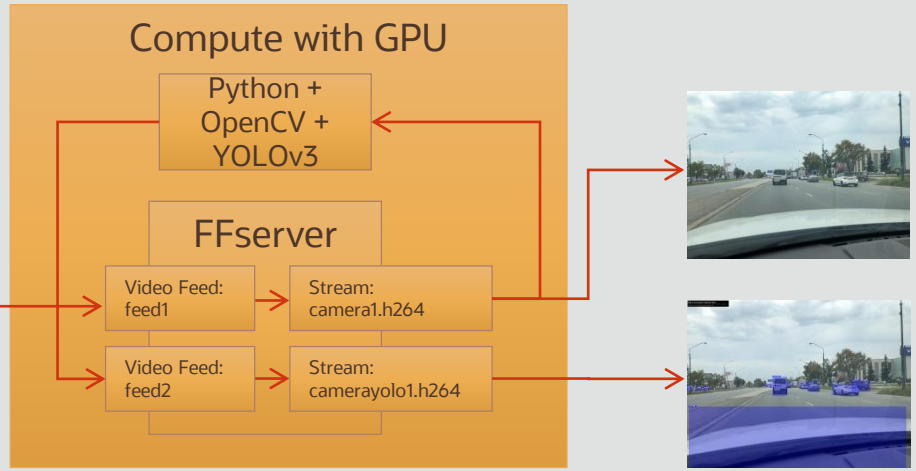
Camera video feed (rtsp) FFmpeg

OBD2 telemetry data

GPS data

GSM network

Oracle Cloud Infrastructure



kafka

Online dashboards

Oracle Stream Analytics

Autonomous Data Warehouse

IoT + Fleet Management

Reporting

Oracle Data Visualization

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Connected Car – hardware & software in vehicle

Vehicle CAN data bus

ODB2 dongle

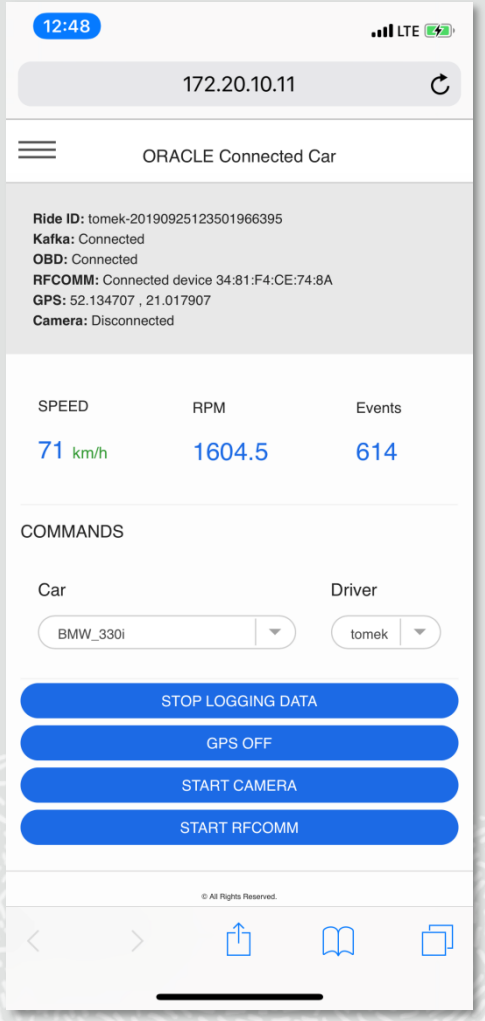
Raspberry PI with
GSM/GPS module

Bluetooth

USB

WIFI

Vehicle control center



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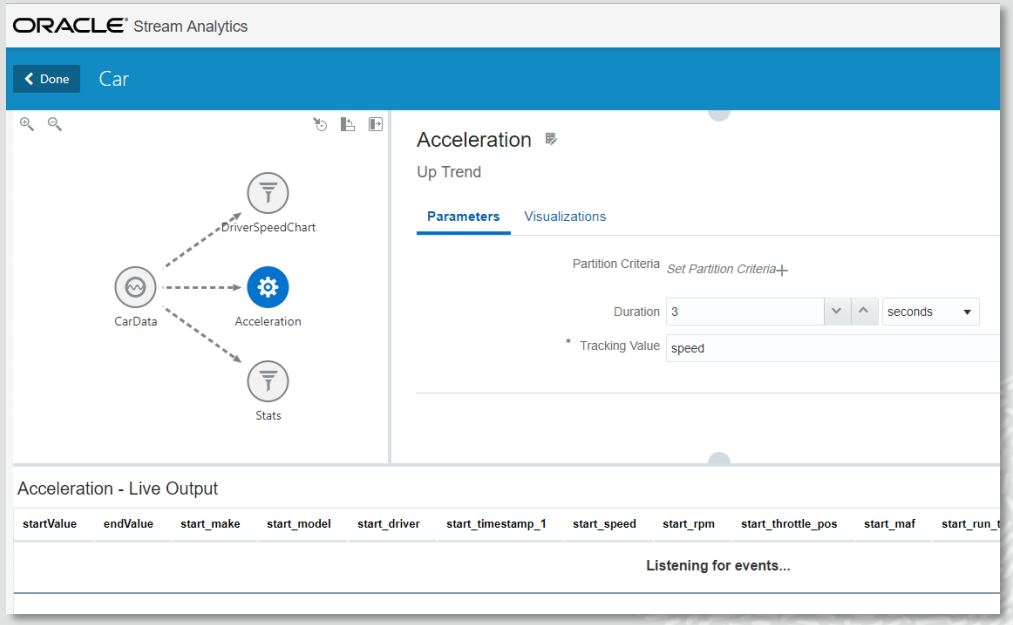
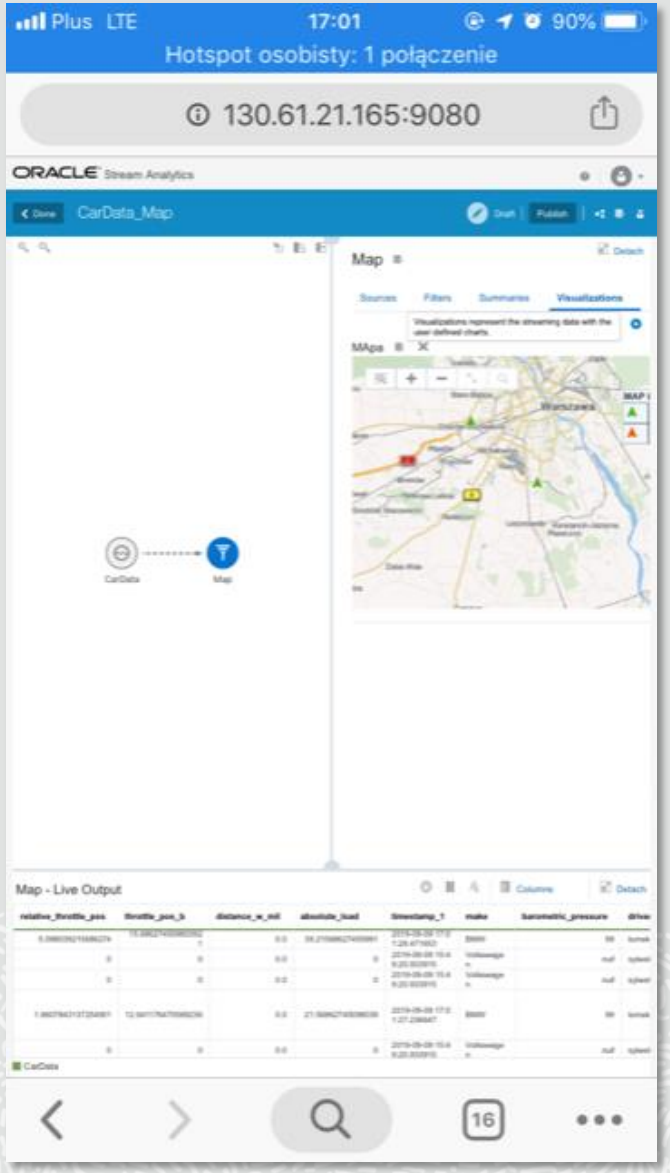
Live data in Oracle Stream Analytics

- Real Time Dashboards
- Visalizations
- Event detection
- Patterns – good/bad driver
- KPI calculations





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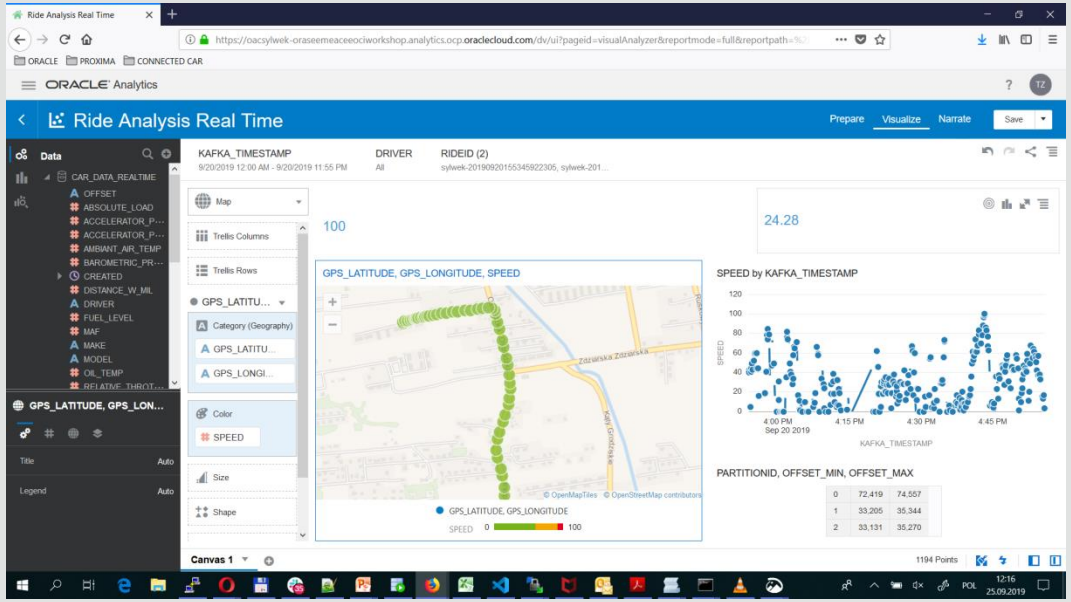
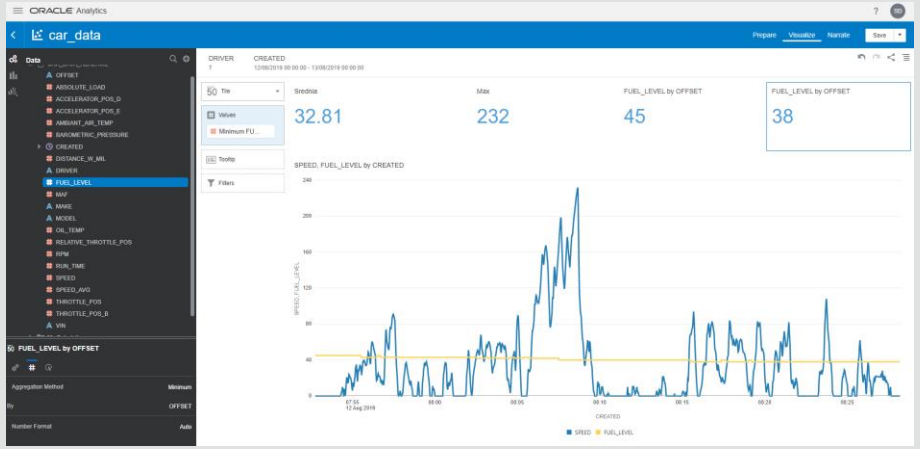
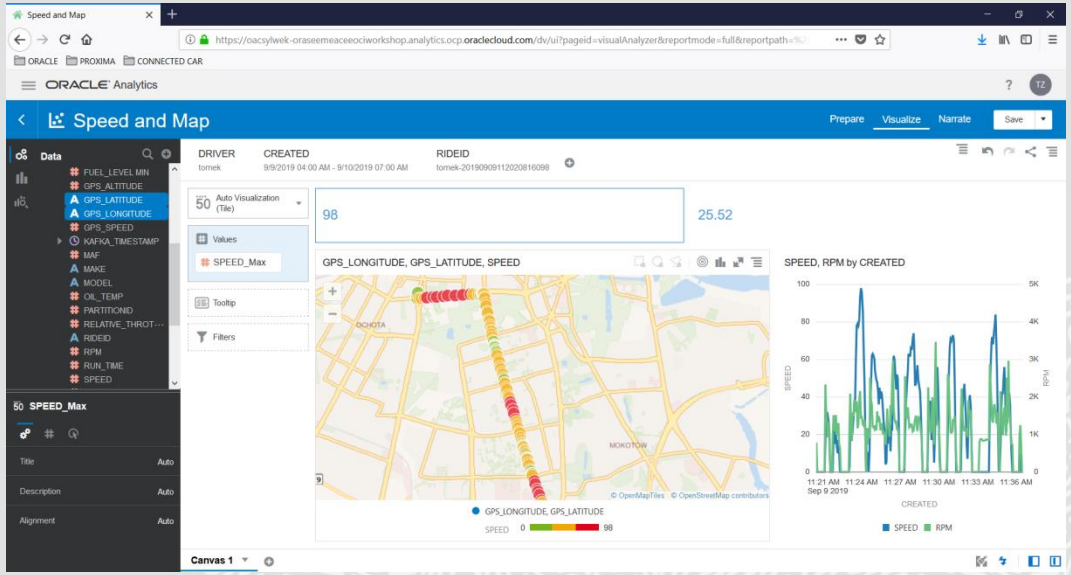
Historical data anaysis in Oracle Data Visualization

- Spatial Visalizations
- Offline Dashboards
- Drivers Statistics







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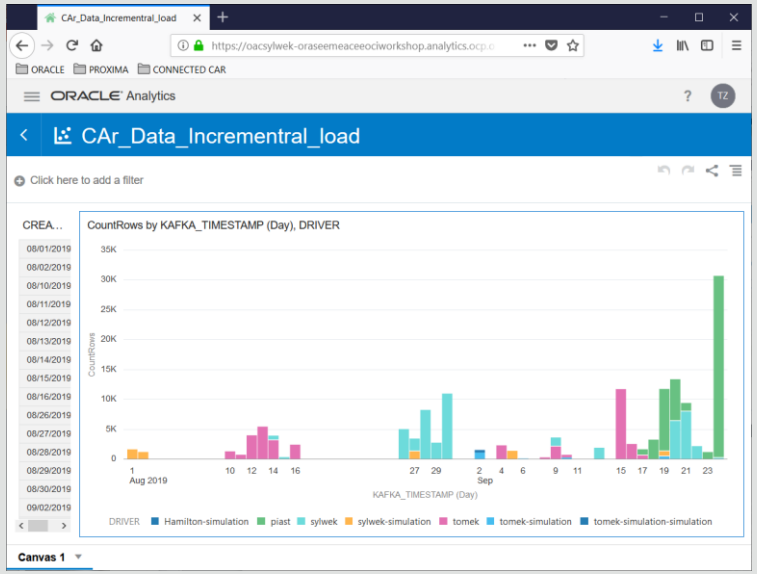
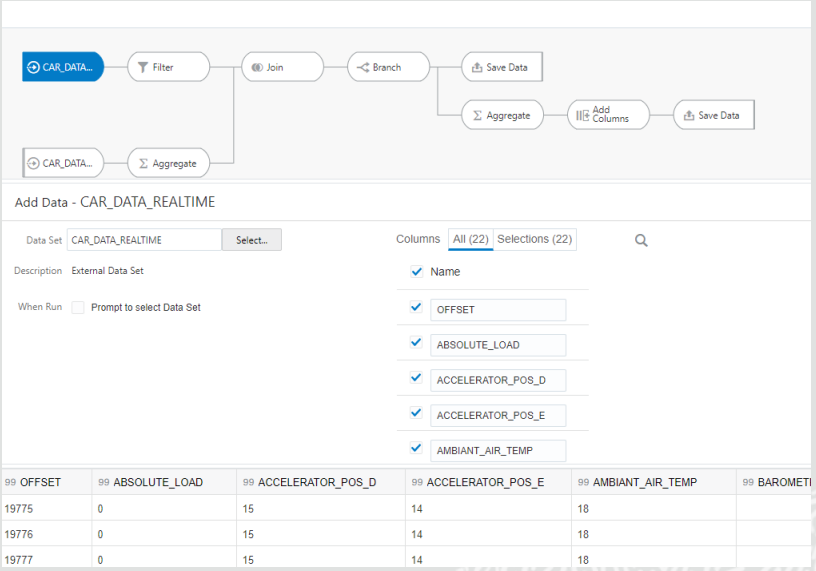
Data integration and loading

Loading statistics



Incremental ADW Loading



Oracle Big Data SQL

APACHE kafka®

HORTONWORKS®

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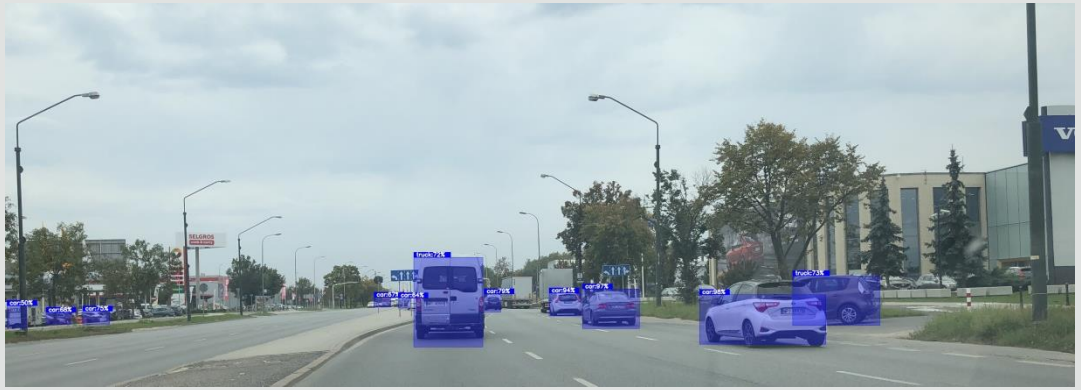
Video streaming and object recognition using deep learning



From THIS to THAT but on a live video

ffmpeg tools + h264 video codecs + Python + OpenCV + YOLOv3 detector

Still struggling with:

- Overall stability of video streams over LTE network
- Low FPS due network bandwidth

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Demo time ....

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Modern Cloud Day 2019 - Oracle Racing Challenge Demo

Forza Motorsport
- Live data feed – 60 events/sec
- Broad telemetry data

Gamification:
- Top driver on the event
- Personal dashboard

Paddock situation room:
- Live data
- Post race analysis

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Connected Car project

Camera video feed (rtsp) FFmpeg

OBD2 telemetry data

GPS data

GSM network

Forza Motorsport telemetry data

Forza Motorsport telemetry data

Oracle Cloud Infrastructure

Compute with GPU

Python + OpenCV + YOLOv3

FFserver

Video Feed: feed1 → Stream: camera1.h264

Video Feed: feed2 → Stream: camerayolo1.h264

kafka

kubernetes

Racing Challenge Dashboard

Online dashboards

Oracle Stream Analytics

Autonomous Data Warehouse

IoT + Fleet Management

Reporting

Oracle Data Visualization

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Forza Motorsport data feed

Car Data:

- 60 messages per second
- No of attributes/sensors is huge

JSON Raw Data Headers

Save Copy


```
suspensionTravelMetersFrontLeft:        -0.004699952900409698 5
suspensionTravelMetersFrontRight:       -0.006441030651330948
suspensionTravelMetersRearLeft:         0.0055103600025177
suspensionTravelMetersRearRight:        0.00566621869802475
carOrdinal:                             3072
carClass:                               5
carPerformanceIndex:                    772
drivetrainType:                         1
numCylinders:                           6
positionX:                              65.73220825195312
positionY:                              836.0448608398438
positionZ:                              -836.4375
speed:                                  20.48522186279297
power:                                  -129943.53125
torque:                                 -155.72686767578125
tireTempFrontLeft:                      170.275146484375
tireTempFrontRight:                     170.09283447265625
tireTempRearLeft:                       220.33682250976562
tireTempRearRight:                      220.33682250976562
boost:                                  0
fuel:                                   1
distanceTraveled:                       12242.2412109375
bestLap:                                132.27001953125
lastLap:                                711.7963256835938
currentLap:                             250.1649627685547
currentRaceTime:                        1114.035888671875
lapNumber:                              2
racePosition:                           1
accel:                                  255
brake:                                  0
clutch:                                 0
handBrake:                              0
gear:                                   1
steer:                                  0
normalizedDrivingLine:                  16
normalizedAIBrakeDifference:            0
```


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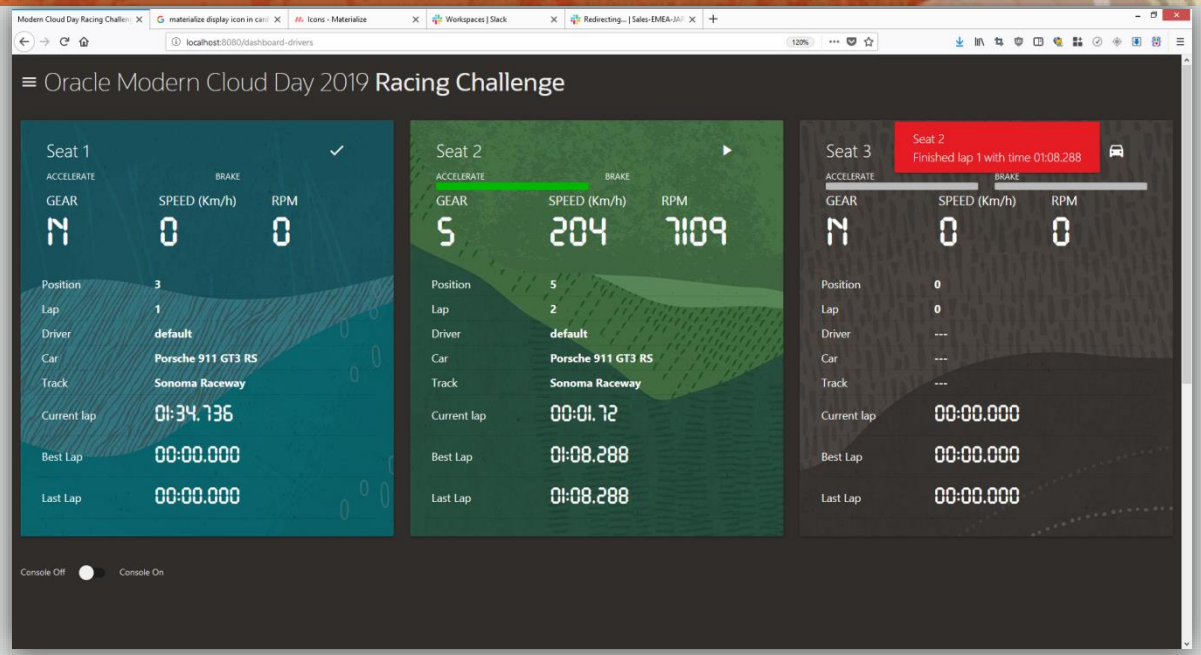

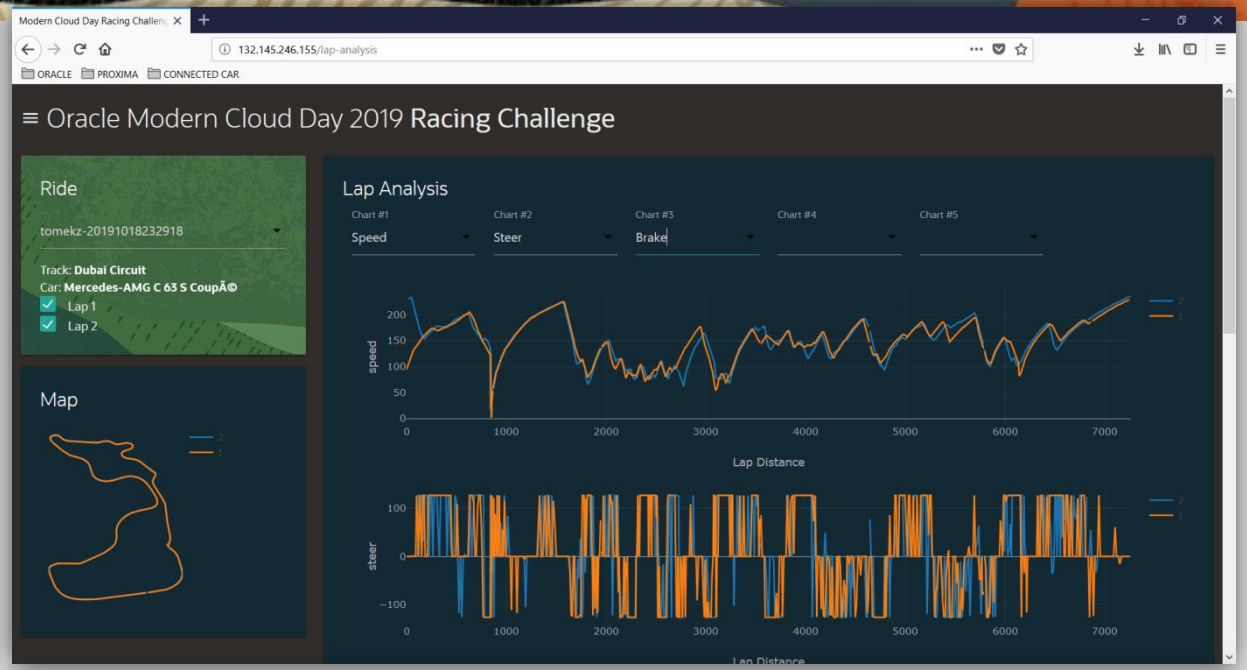

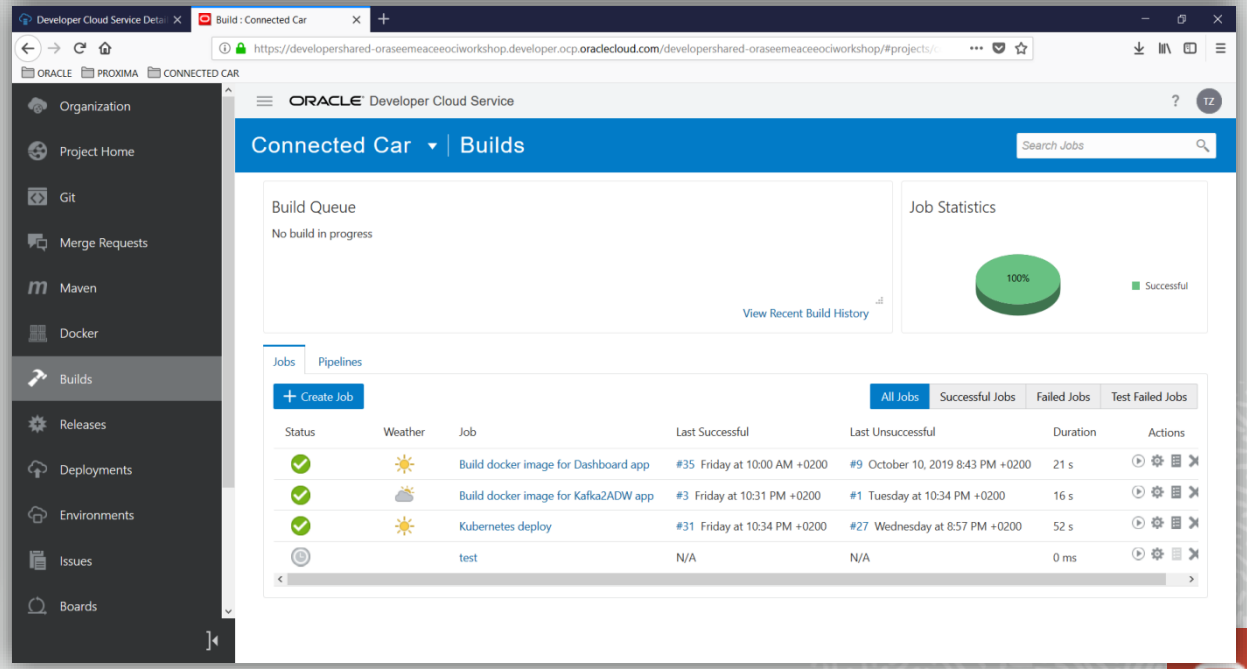

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No matter how good a driver you are, you have to have the right car and the right team behind you in order to succeed.

Nico Rosberg

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