# Empowering digital services

## VISS API towards Android Automotive OS

AMM April 2024 in Gothenburg

COVESA

Accelerating the future of connected vehicles

# Speakers

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remotiveLabs

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VOLVO

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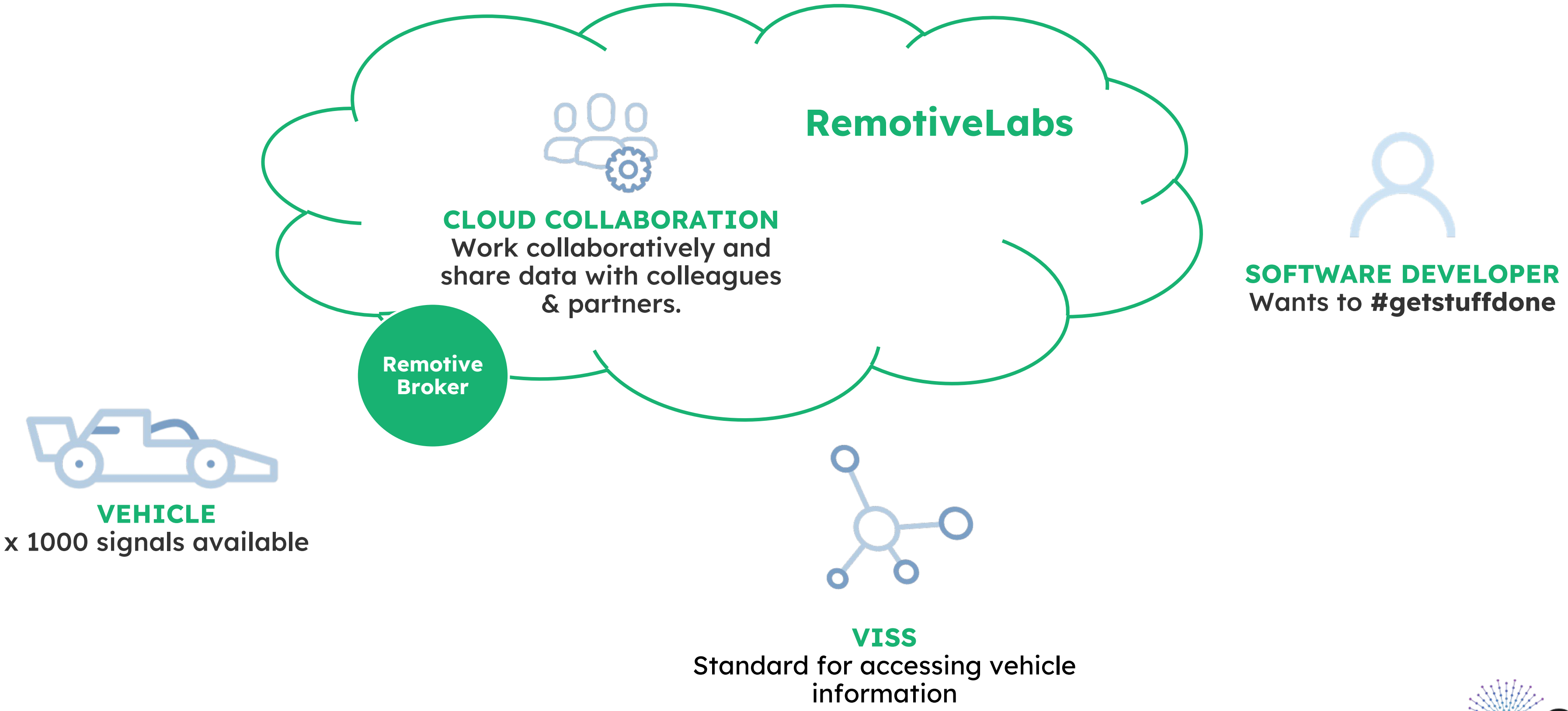
# Things to solve

- Enable access to signals from a vehicle - both Android, no need for slow recompile, and non-Android
- Easy to add new use case - e.g. insurance that need access to new data for driver behavior

# The different pieces of the puzzle



RemotiveLabs

**CLOUD COLLABORATION**
Work collaboratively and share data with colleagues & partners.

Remotive Broker

**SOFTWARE DEVELOPER**
Wants to **#getstuffdone**

**VEHICLE**
x 1000 signals available

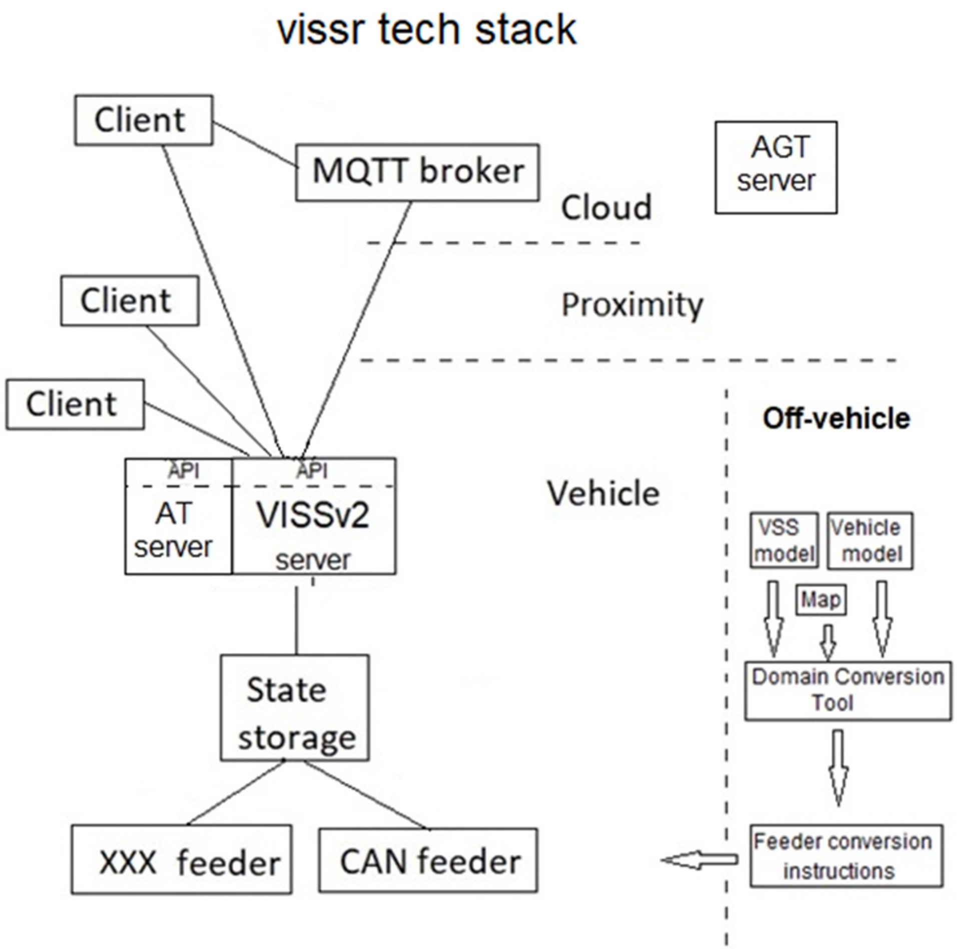
**VISS**
Standard for accessing vehicle information

# VISS reference implementation overview

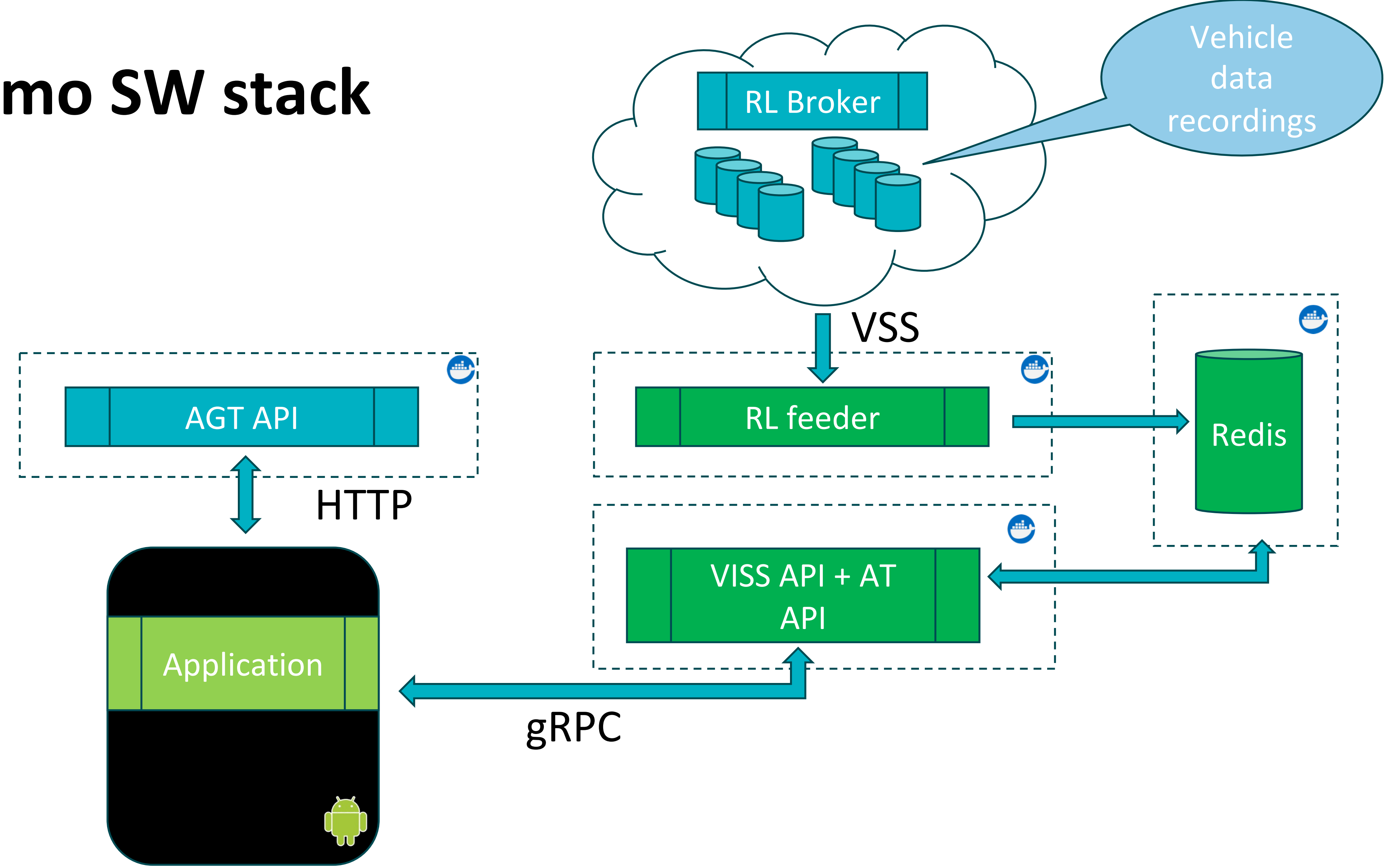
- The Vehicle Information Service Specification development was started at W3C
  - https://github.com/w3c/automotive
- Where it was discontinued and in March 2024 migrated to
  - https://github.com/COVESA/vehicle-information-service-specification
- VISSv2 features
  - Supported transport protocols: HTTP / Websocket / MQTT
  - Methods: Get / Set / Subscribe (Unsubscribe)
  - Subscription filters: Timebased / Change / Range / Paths / Curve logging / History
  - Access control: Token based, OAuth2 inspired, RBAC support, single node granularity
  - Consent support: Obtaining consent delegated to an External Consent Framework, acts as firewall

# VISS reference implementation overview

- The VISS reference implementation (vissr) is after migration found at
  - https://github.com/COVESA/vissr
- vissr features
  - Complete VISSv2 feature support, plus
  - gRPC
  - SwCs to realize a complete tech stack:
    - Data store: SQLite / Redis / IotDB / ..
    - Feeder: Template where only the vehicle interface client needs implementation / RL-feeder / EVIC-feeder / …
    - Client: JS based: AGT, AT, HTTP, WS, integrated access control,.. / Go-based: MQTT, curve log to CSV file, …
    - Domain Mapping Tool: creates feeder conversion instructions from YAML input

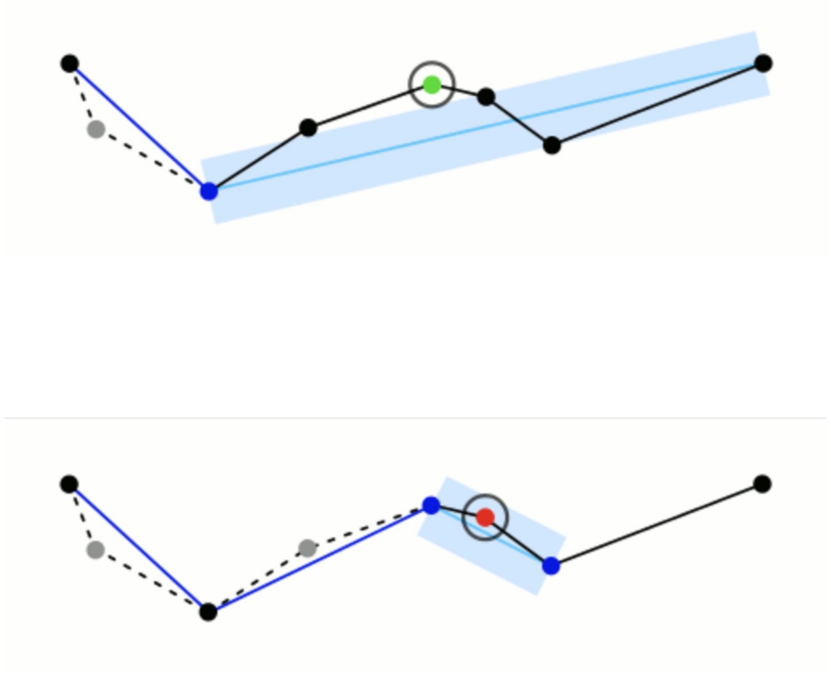


# Demo SW stack



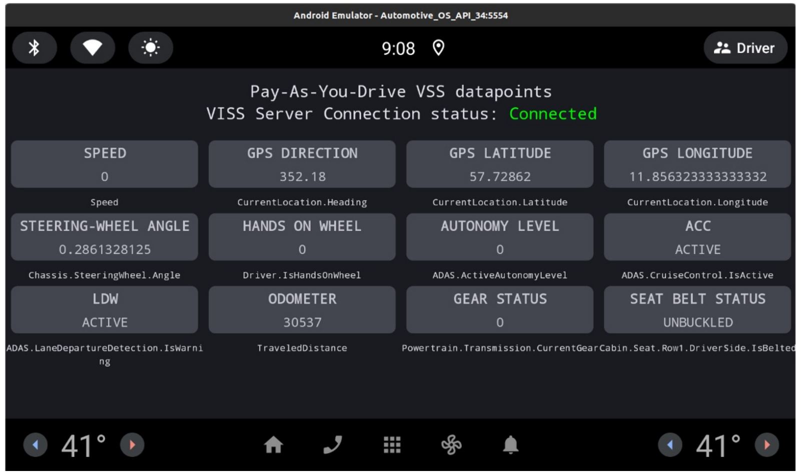
# Curve logging

- A method of moving data efficiently from vehicle to server.
- The purpose of the algorithm is to identify useless points and discard them while preserving the most important information.
- It keeps checking the points of maximum error. If the difference between the predicted and actual position is significant, the points are sent. Throw away the points that, essentially, were not carrying any useful information
- Method developed by GeoTab (based on the Ramer-Douglas-Peucker algorithm).  
  Now part of the VISSv2 specification



# Demo content

- Use case : “How could an OEM enable access to certain Vehicle datasets to digital partner that want to accurately calculate Safety Scores based on driving behavior”
  - Safety Score Android application/service- Runs on AAOS generic emulator
    Request AG token(HTTP) - Authentication/Authorisation
    Request AT token with AG token(HTTP) - Validate access
    Subscribe Multiple VSS data with AT token(gRPC)
  - VISS + AT server - Runs on local host PC as docker container
    VSS datasets tagged with ‘validate’ attribute with access-control mode - “read-write”
  - AGT server - Runs on Local host as docker container
    Authentication & Authorisation of client
  - RemotiveLabs virtual sensor cloud - Runs on cloud
    Pre-recorded real vehicle datasets collected from Volvo XC90 PHEV



Android Emulator - Automotive_OS_API_34:5554

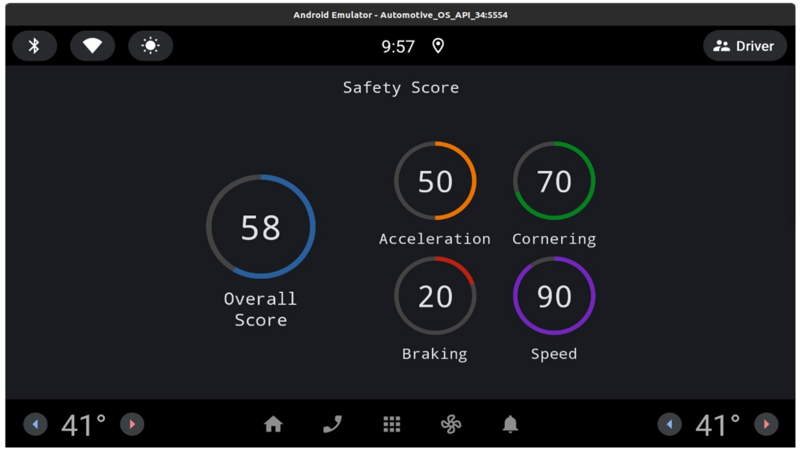
9:08

Driver

Pay-As-You-Drive VSS datapoints
VISS Server Connection status: Connected

| | | | |
|---|---|---|---|
| SPEED<br>0 | GPS DIRECTION<br>352.18 | GPS LATITUDE<br>57.72862 | GPS LONGITUDE<br>11.856323333333332 |
| Speed | CurrentLocation.Heading | CurrentLocation.Latitude | CurrentLocation.Longitude |
| STEERING-WHEEL ANGLE<br>0.2861328125 | HANDS ON WHEEL<br>0 | AUTONOMY LEVEL<br>0 | ACC<br>ACTIVE |
| Chassis.SteeringWheel.Angle | Driver.IsHandsOnWheel | ADAS.ActiveAutonomyLevel | ADAS.CruiseControl.IsActive |
| LDW<br>ACTIVE | ODOMETER<br>30537 | GEAR STATUS<br>0 | SEAT BELT STATUS<br>UNBUCKLED |
| ADAS.LaneDepartureDetection.IsWarning | TraveledDistance | Powertrain.Transmission.CurrentGear | Cabin.Seat.Row1.DriverSide.IsBelted |

41° 41°



Android Emulator - Automotive_OS_API_34:5554

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Driver

Safety Score

58
Overall Score

50
Acceleration

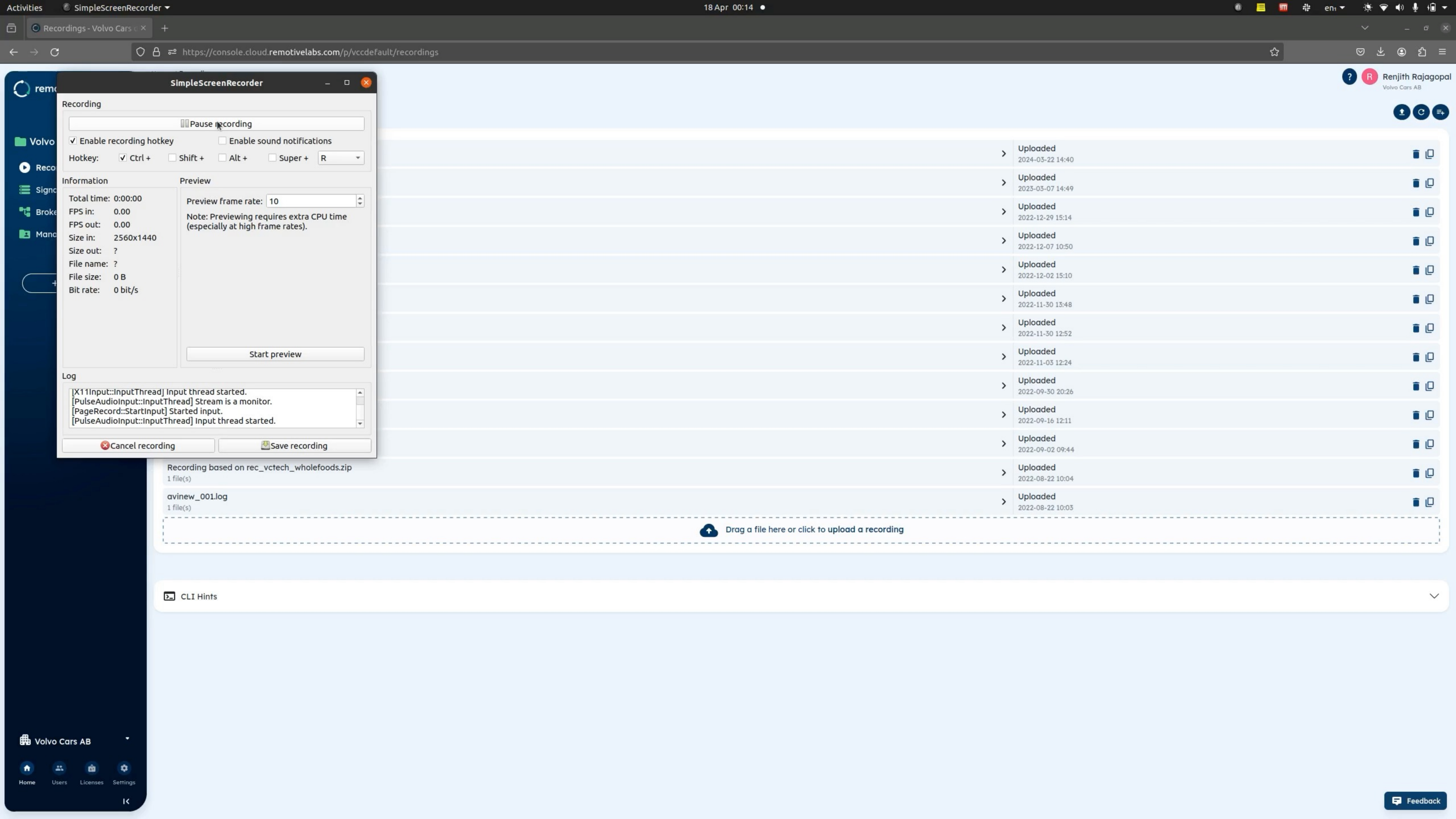
70
Cornering

20
Braking

90
Speed

41° 41°

# Demo time



Recording

☑ Enable recording hotkey □ Enable sound notifications

Hotkey: ☑ Ctrl + □ Shift + □ Alt + □ Super + R

Information

Total time: 0:00:00
FPS in: 0.00
FPS out: 0.00
Size in: 2560x1440
Size out: ?
File name: ?
File size: 0 B
Bit rate: 0 bit/s

Preview

Preview frame rate: 10

Note: Previewing requires extra CPU time (especially at high frame rates).

Log

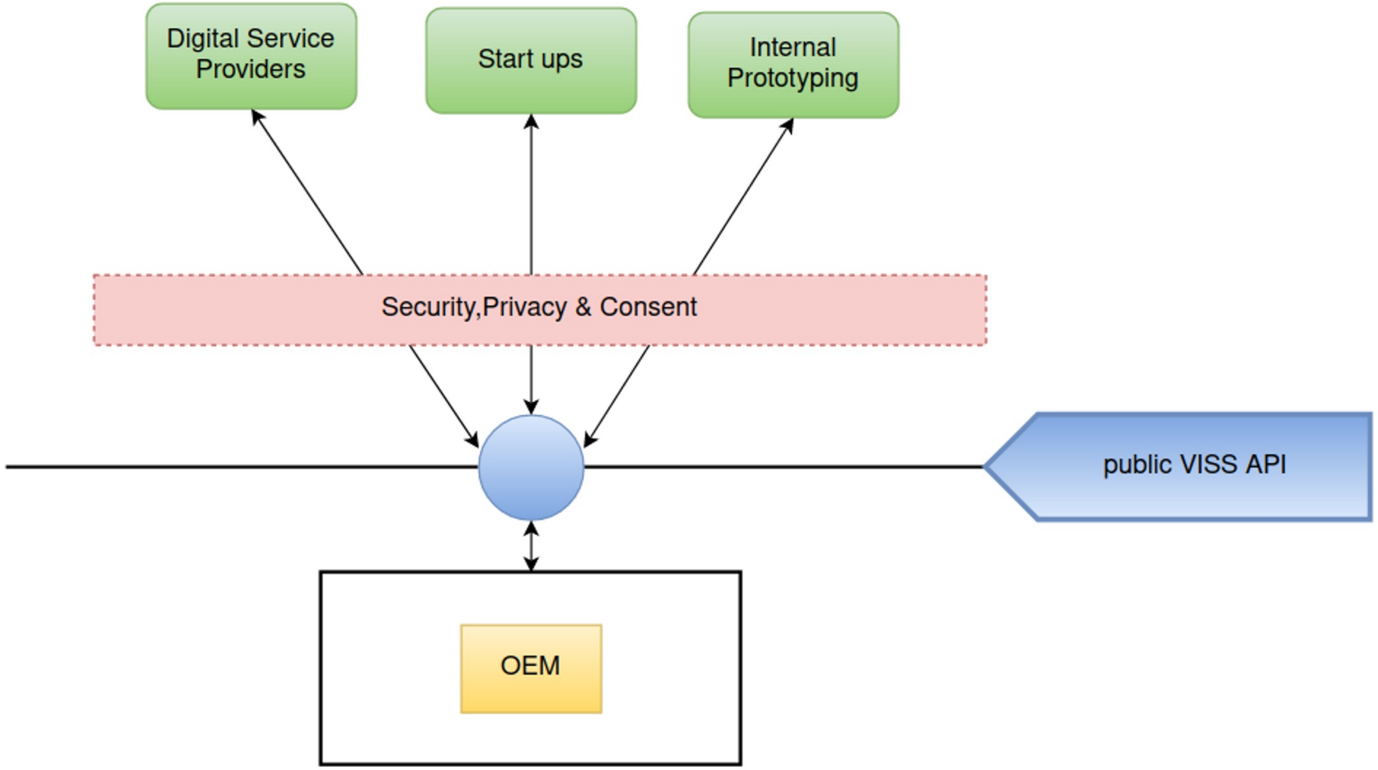
```
[X11Input::InputThread] Input thread started.
[PulseAudioInput::InputThread] Stream is a monitor.
[PageRecord::StartInput] Started input.
[PulseAudioInput::InputThread] Input thread started.
```

| | |
|---|---|
| | Uploaded<br>2024-03-22 14:40 |
| | Uploaded<br>2023-03-07 14:49 |
| | Uploaded<br>2022-12-29 15:14 |
| | Uploaded<br>2022-12-07 10:50 |
| | Uploaded<br>2022-12-02 15:10 |
| | Uploaded<br>2022-11-30 13:48 |
| | Uploaded<br>2022-11-30 12:52 |
| | Uploaded<br>2022-11-03 12:24 |
| | Uploaded<br>2022-09-30 20:26 |
| | Uploaded<br>2022-09-16 12:11 |
| | Uploaded<br>2022-09-02 09:44 |
| Recording based on rec_vctech_wholefoods.zip<br>1 file(s) | Uploaded<br>2022-08-22 10:04 |
| avinew_001.log<br>1 file(s) | Uploaded<br>2022-08-22 10:03 |

Drag a file here or click to upload a recording

# Conclusion

- An expansive, reputable & industry adopted Open Vehicle API ecosystem that respects Security, Privacy & Consent beckons new thinkings & fosters innovations.



# References

More interesting stuff at:

- Sign up for free and test at https://cloud.remotivelabs.com/
- The VISS specification at VISS version 2 - Core (w3.org) , VISS version 2- Transport (w3.org)
- The VISS reference implementation at https://github.com/COVESA/vissr
- Reference android application at Android application
- GeoTab curve logging at curve logging

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## Thank you for your attention