



# ANDROID™ AUTOMOTIVE SIG

All-Hands - 26 November 2019



# Android Automotive SIG – Objectives of the tech summit sessions



- Report on the technical summit and project status
- Vehicle HAL / Vehicle Data Capturing Architectural Design
- Return of experience from production projects
  - Prioritization of topics to be tackled next

# GENIVI Technical Summit ~ Troy, MI



## **On-line Program:**

<https://www.eventleaf.com/TechSummit19>

## Slide decks

<https://at.projects.genivi.org/wiki/x/-QDYAg>

3 sessions on Android Automotive SIG

- **Android Automotive SIG Workshop Session One - Vehicle HAL design**
  - Workshop moderated by BMW and Mercedes-Benz Research NA –Today at 1:45pm-4:15pm
  - Abstract: Active discussions in the Android Automotive SIG have centered around an expanded view of the vehicle hardware abstraction layer (HAL). This session will explore HAL properties, report on the details of work already done by the SIG and engage in design discussions around a vehicle software system architecture including the vehicle HAL.
  
- **Android Automotive SIG Workshop Session Two - Additional Challenges to Address when Adopting Android Automotive**
  - Workshop moderated by Windriver &Tieto – To-morrow at 8:30am-10:00am
  - Abstract: The first OEM production programs that adopted Android Automotive are done or soon to be over. What lessons were learned from these programs and what other issues are adopting OEMs facing in their planning and early deployment projects? Two experienced suppliers will present output from their respective production programs. Following the presentations, an open dialog on ways collaboration within the SIG can ease future adoption challenges will complete the session.
  
- **AASIG Activities Review & Planning Session**
  - Birds-Of-a-Feather kind of session – To-morrow at 1:30pm-4:00pm
  - Moderated by technical leads & GENIVI staff

# PROJECT CHARTER

## Android™ Automotive Special Interest Group (SIG)

Legend: [Work items addressed or in progress](#)



### Opportunity Statement

Automotive OEMs are increasingly adopting Android Automotive (embedded) as a solution for their IVI stack. This adoption has introduced a series of challenges around integrating the Android Automotive embedded solution into existing legacy software and into other systems present in the vehicle (security, vehicle data, etc.).

Through a GENIVI-hosted Android Automotive SIG project, OEMs, their suppliers and the broader cockpit software ecosystem can discuss requirements, identify gaps and provide an aligned, community voice for discussion with the Google Android Automotive team.

### Intended Deliverables:

- Requirements definition documents for specified areas of focus
- [Architecture/API definitions \(models, diagrams\)](#) ← [AASIG Vehicle HAL project](#)
- Reference code for identified APIs
- Tech Briefs to inform the automotive industry

### Proposed Areas of Project Focus

Current project focus areas include:

- Preliminary list of extensions required for Android in an automotive environment (additional extensions to be identified during project):
  - [audio management](#) ← [AASIG Audio HAL project](#)
  - lifecycle, diagnosis and health monitoring
  - [multi-display support](#) ← [existing GSHA project on graphics sharing](#)
  - [cluster integration](#) ← [existing GPRO project on generic communication protocol and interface with Autosar](#)
- Platform requirements
  - [Access to vehicle information](#) ← [AASIG Vehicle HAL project](#)
  - [Security](#) ← [existing GPRO project](#)
  - Non-OEM validated 3rd party applications downloaded to the vehicle
- Responsibility for long-term maintenance
  - Defining boundaries where Tier 1s/OEMs must take primary responsibilities over Google Android Automotive team support
  - Keeping an automotive system updated to support new versions of Android
    - On software level (Treble)
    - On hardware level ("cartridge" concept).

# Android Automotive SIG – where are we after 6 months ?



## Management Report

- SIG was launched at the Spring AMM in Munich, Germany
- AASIG “All-hands” calls : monthly report delivered on last Tuesday of each month at 5pm CET
  - Minutes: <https://at.projects.genivi.org/wiki/x/SIFoAg>
- Vehicle HAL project calls: every other week on Tuesday at 5pm CET
  - OEMS, Tiers, software vendors, integrators
  - Minutes: <https://at.projects.genivi.org/wiki/x/HYVoAg>
- Audio HAL project calls: every other week on Thursday at 11:30am CET
  - OEMs, Tiers, integrators, silicon vendors
  - Minutes: <https://at.projects.genivi.org/wiki/x/ugDYAg>
- 3 active threads of work
  - Reference Platform / Build Infrastructure
  - Vehicle HAL project
  - Audio HAL project
- 1 completed thread of work
  - App Ecosystem

# Android Automotive SIG – where are we after 6 months ?

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## Reference Platform – Technical Report

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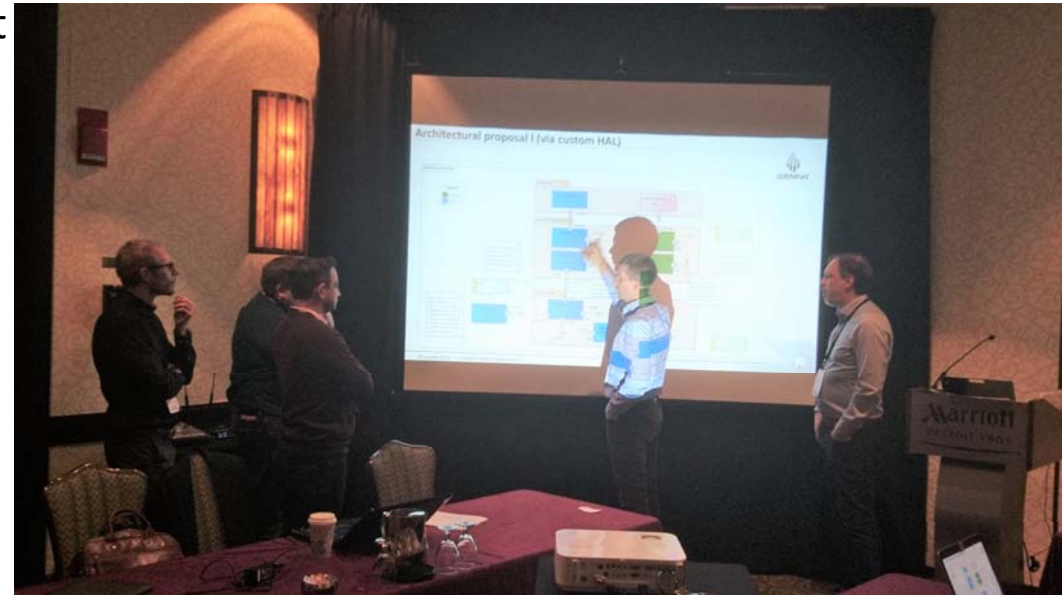
- **Hardware**
    - NXP & Renesas boards are at GENIVI (The Google default embedded board HiKey 960 also available)
  - **BSP / Support**
    - **NXP**: Needed files for i.MX8 for Android Pie/9.0 are available from support site.
    - **Renesas**: Files for 9.0 have been provided to GENIVI after signed agreements, 10.0 available?
    - **Android 10.0** is the target to support next.
    - **Lava-based test farm** up & running at Renesas, tested with Yocto/Linux builds  
→ We are now considering how to set up our Android tests on the same infrastructure
    - **Qualcomm** stopped responding, no actions at this time
  - **Project Repository (reminder)** → [https://github.com/GENIVI/aasig\\_dev\\_platform](https://github.com/GENIVI/aasig_dev_platform)
    - The GitHub repository is now populated with the initial scripts that help to set up, download AOSP source code, and define a shared development version.
    - Container setup (using Docker) is included, to get repeatable tests of build scripts in a stable environment
    - Now is the time for community (AASIG) input – test the scripts, check if the built versions are what you expect, and suggest updates and modifications accordingly.
    - The project is set up to support **Renesas R-Car starter-kit** with **Kingfisher** and **NXP i.mx8 EVK boards**, with potentially HiKey as a low-cost backup.
  - **\*\*Community input! Have you tried it? Have you sent feedback?**
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# Android Automotive SIG

## Vehicle Data APIs - Vehicle HAL – Technical Report



- Vehicle software system level work
- Task force on software architectural design launched at end of September
- Architectural concepts for the vehicle data capturing presented and debated and agreed in the Vehicle HAL Design Workshop (Session One) last week
  - [Link](#)
- New F2F workshop planned before EoY
  - Tieto proposed to host it in Poland
  - dates are TBD



### • Backlog

- Gap analysis between Android 9 & 10
- System properties (e.g. boot sequence)
- Secure access control, e.g. in Some/IP for interfacing with Adaptive Autosar → GPRO
- Signal-to-Service translation (e.g. as specified in the upcoming Adaptive Autosar R19-11), analysis of impact on the architecture → GPRO

# Android Automotive SIG



## Audio HAL

- Participants: Analog Devices, BMW, Bosch, Harman, Tieto
- Introduction to AA audio HAL architecture available in the wiki, [link](#)
- List of questions / problems with Audio HAL gathered, will be prioritized soon
  - Lack of configuration tools to configure the AA system
  - No Audio calibration interface
  - Need for a generic interface for controlling audio effects on HAL level
  - Early audio for RVC (Rear View Camera) or other services
  - Configuration management component for TinyALSA
  - Audio Focus doesn't forbid to interrupt Audio, Android 10 provides additional interface for Automotive to solve this problem
  - BT handsfree audio stream management
  - Audio data transfer / streaming to a co-processor for post processing of audio from the HAL/other Android layers
  - Support for the configuration of networked audio devices..
  - Android does not implement all features required by customer..
  - Android Audio subsystem is developed only for infotainment purposes. Safety-related features need to be implemented in another RTOS
  - Android way of extending its functionality is developing vendor extensions without modification of the framework.



# Android Automotive SIG

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## Return of experience from production projects

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- Delivered by Tieto and Windriver at the tech summit
- Places for improvements in the Audio HAL
  - creation of a common Audio HAL
  - impact of Android 10 (multi-zone, CarAudioFocus)
- Fastboot
- Car API, CarService, Vehicle Network Service, Vehicle HAL
- LBS Framework
- Audio
- Certifications
- Persistent Services
- Voice Recognition
- Logging
  
- How to build from GENIVI assets ?
  
- Technology watch
  - Ascender Technology (Israeli start up) - Android in the Cloud
  - relevance for the AA SIG is TBC

# Thank you!

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<http://www.genivi.org>

<http://projects.genivi.org>

**Contact us:**

[help@genivi.org](mailto:help@genivi.org)

