

AASIG (Audio-HAL) Workshop at 20th All Member Meeting

Workshop agenda for: [GENIVI 20th All Member Meeting a Digital Experience](#)

Wednesday 28 October (one track)

Status report & Workshop timeplan

9:00 AM - 9:30 AM CET	AASIG - Audio HAL	Status report	Piotr	9:00 AM - 9:30 AM
9:30 AM - 9:45 AM CET	Networking break	—		15min
9:45 AM - 11:15 AM CET		Agenda and intro	Suhasini, Wassim	5 min 9:45 AM - 9:50 AM
	Assessment of proof-of-concept		Piotr	5 min --:-- AM - --:-- AM
		Q&A		10 min
	Role of Android in Car audio system		Suhasini, Wassim	20 min --:-- AM - --:-- AM
		Q&A		5 min
	Use cases to be covered with Android		Suhasini, Wassim	20 min --:-- AM - --:-- AM
		Q&A		5 min
	Audio transport in the car network		Suhasini, Wassim	20 min --:-- AM - --:-- AM
		Q&A		5 min
11:15 AM - 11:30 AM CET	Networking break	—		15min
11:30 AM - 13:00 AM CET	Virtualization & Containerization		Suhasini, Wassim	10:30 AM - 10:40 AM
		Q&A		5min
	Latency & performance		Nadim, Suhasini, Wassim	10:45 AM - 10:55 AM
		Q&A		5min
	Using Linux components with Android (AGL, Linux Audio Manager)		Gunnar	11:00 AM - 11:10 AM
		Q&A		5min
	First session recap	Follow-up on questions on topics from the first block	Suhasini, Wassim	11:30 AM - 11:40 AM
	Bluetooth device control and support		Suhasini, Wassim	11:40AM - 11:50 AM
		Q&A		5min
	Interaction of Android with external safety signals		Suhasini, Wassim	11:55 AM - 12:05 PM
		Q&A		5min
	Testing	Lava Test Farm status	Stephen	12:10 AM - 12:20 PM
		Q&A		5min
	TBA			12:25 AM - 12:35 PM
		Q&A		5min

	Outlook	Discussion and closing topics to plan next activities	All	12:40 PM - 13:00 PM
--	---------	---	-----	---------------------

Here follows historical planning information, higher level abstract, etc.
For most people it is enough that you to refer to the detailed table above. ^^^

Wednesday 28 October (one track)

Times are in CET (= UTC + 1) (note, that is now "winter time", not daylight savings time)

(AM) 9:00-9:30	Report	30	Android Automotive SIG #2 - Audio HAL "Status Report" <ul style="list-style-type: none"> introduction what we want to do <ul style="list-style-type: none"> Why AASIG does investigation into the Audio subsystem This is good to have. This is sort of an intro to what the aim of this group is. Should this come here, or before, in the status report? Would it be an abrupt flow, if we talk about who we are and what we do after demonstration? <ul style="list-style-type: none"> Here is also where the marketing impact slide from Nadim will be useful what we have achieved and what we want to add in the future demo architecture and demo itself <p>Presenter: Piotr Krawczyk (Tieto) Pre-recorded?</p> <p>Supporting presentation material: Wassim Filali</p>
9:30-9:45	Break	15	Sponsors' Videos
9:45-11:15	Working Session	90	Android Automotive SIG #2 - Audio HAL Moderators: Raghuram, Suhasini / Filali, Wassim Abstract: Audio management is one important aspect and constraint for the utilization of Android Automotive for the IVI unit. During Q2 2020, the AASIG AUDIO HAL project team has undertaken the design and implementation of a proof-of-concept demonstrator focusing on the routing and control of external data streams. The AASIG AUDIO HAL project team will present a status report of the proof-of-concept implementation and explain the design choices made. The following next steps will be then comprehensively debated: <ul style="list-style-type: none"> Proof of concept : Assessment of proof-of-concept demo implementation TRL (Technical Readiness Level) <ul style="list-style-type: none"> Assumption (to confirm with Piotr) that demo is presented before starting with this section Topics priorities : Update of the list of prioritized topics for audio management and identification of other proof-of-concepts implementation based on this list Contact with Google - Ensure project participants have opened, or are planning, a discussion to achieve synchronization of activities with Google's Android team <ul style="list-style-type: none"> might be subject to misunderstanding as ongoing work is connected to the daily Android development (directly or indirectly) neutral question about interaction channels <ul style="list-style-type: none"> interaction with Google's events (Bootcamps,...) contributions to AOSP features request
11:15-11:30	Break	15	Sponsors' Videos
11:30-13:00	Working Session	90	Android Automotive SIG #2 - Audio HAL Moderator: Raghuram, Suhasini / Filali, Wassim Abstract: continuation of the working session

Recommendations :

- provide open questions

- enhance with a presentation

(Wassim - draft)

Slide templates

Please fetch a template here. For the virtual tech summit 16:9 version is likely the best.
[GENIVI Standard Presentation Documents](#) (you may need to log in to the Wiki to view this page).

TODO

- The Demonstration needs to be planned – set up a separate call with Piotr + interested people (Wassim, Suhasini, Nadim). 30 minutes may be enough. [Gunnar](#)

Timed Agenda

Session 1 (90 min)

- (30 min) The Demonstration
 - demo presentation
 - Assessment of proof-of-concept demo implementation TRL (Technical Readiness Level)
- ☐ needs to be planned – set up a separate call with Piotr + interested people (Wassim, Suhasini, Nadim). 30 minutes may be enough. [Gunnar Andersso](#)
- Topics priorities : Update of the list of prioritized topics for audio management and identification of other proof-of-concepts implementation based on this list
- ~~Contact with Google : Ensure project participants have opened, or are planning, a discussion to achieve synchronization of activities with Google's Android team~~
 - might be subject to misunderstanding as ongoing work is connected to the daily Android development (directly or indirectly)
 - neutral question about interaction channels
 - interaction with Google's events (Bootcamps,...)
 - contributions to AOSP
 - features request

(Suhasini - draft)

Timed Agenda

Session 1 (90 min)

(30 mn) Role of Android in Audio System (Car Audio System)

- Audio systems in automotive and where android fits in.
 A small intro to what the audio system in cars is today might be useful to drive the discussion. We can then bring in the following options :
 - * android as audio router - routing different streams?
 - * android as a audio control master - master controller that controls the overall audio system.
 - * Mention of an alternative and question if anyone would consider usage of android as a source only ?

(30 mn) Use cases to be covered with Android

- what are the most prominent use cases for infotainment headunit and how does android help/ hinder that as compared to linux / QNX / custom OS?
 - What are the applications ?
 - Telephony
 - Voice assistance
 - Multichannel video streaming

- Importance of Audio zones (is it important or possible to play two music at the same time on cabin speakers, or are zones rather for headphones, or rather only to restrict to telephony in one zone)
- what if two androids are working in the system? (how do we sync between the two?)

(30 mn) Audio transport in the car network

This discussion will also serve as an intro to Networked audio devices (which is a specific use case of when Android is just used for routing various streams throughout the network in the car.)

- Supporting and controlling external audio devices - - how android would handle this?
 - transporting protocols (AVB, A2B, MOST)
 - trunk amp / Rear seat entertainment units
 - encryption - decryption for content protected streams (netflix / spotify streaming services)

Session 2 (90 min)

- (30m) Virtualization (need to research more to get specific questions to drive discussion)
 - Communication between host and guest (hypervisor or container?)
 - Performance vs practicality ? Shared memory ? TCP/IP ?
 - VirtIO? (Android 11 is pointing to this)
 - Depends on system design - do we really need to virtualize?
 - Audio transport and communicating between containers / vms ?
 - if a virtualized Ethernet supports AVB ?
 - Containerization (need to research more to get specific questions to drive discussion)
 - Partitioning of Audio HAL and vendor development
 - Preference over virtualization
 - Transport mechanism
 - How to control effects?
 - using different OS, one for infotainment and one for safety
- (15m) Latency & performance
 - Latency
 - Audio latency is quite an important aspect for some advanced applications/ processing in audio (Telephony, Speech).
 - * How is latency measured today (Testing ITU).
 - * How can we support low latency applications with Android? (AAudio,...)
 - CPU offloading
 - Low latency framework ? the framework is not directly one layer above HW. What do we do when there are many other layers above HW? (Gaming, AAudio)
 - << need diagrams on slide >>
- (30m) Should we be looking at using some Linux components with Android? (AGL, Linux Audio Manager)
 - Example : use Audio control from Android and audio routing transport libraries from AGL
 - Any designs that can be adapted, (if possible to add design picture to explain the intention)
 - counter example (bad example) : mixing two audio managements concepts in the same system, one in Android and one in Linux
 - integration complexities
 - Are there any features in Linux which is already adapted to automotive use cases that can be brought in directly into Android.
 - is there scope for maybe making this more similar in design to AGL (for specific features)
- (15m) Use case supports -
 - Bluetooth device control and support (more research)
 - bluetooth control to android makes most sense now.
 - << Present our analysis and get feedback >>
 - (10m) Safety implementation in Audio?
 - interaction of Android with external safety signals (or in general with external sources)
 - assumptions : Android Audio subsystem is developed only for infotainment purposes. Safety-related features need to be implemented in another RTOS
- (15 min) Testing ?
 - Stephen can present 10-15 minutes (including Q&A) on the Lava Test Farm status
- (15m) Open questions to what Android did not solve yet ?
 - <<need to brainstorm / prepare leading questions>>
- (5m) Question audience to find out who are all involved with google and try to connect that with AA-SIG work and get them to drive things from within AA-SIG also
 - how to improve interactions and feedback to AOSP and future versions of Android

-
- Put together the slide deck for AMM - [Unknown User \(wassim.filali\)](#)
 - Slide content -
 - What we've done so far
 - What we plan to do next
 - Demo on HW?

- Marketing of project - invitation to collaborate - [Unknown User \(niskandar\)](#) IN REVIEW : ppt slides sent on 20.10.2020, need to review and decide if we include them
- Invite colleagues - @all
- Participants for workshop -
 - [Unknown User \(wassim.filali\)](#)
 - [Suhasini Raghuram](#)
 - [Piotr Krawczyk](#)
 - [Unknown User \(niskandar\)](#)
 - [Henric Carlsson](#)
- [Gunnar Andersson](#) to post the GENIVI template slides to members

Ideas for detailed agenda:

- System Design options
 - Overview system design options
 - Why AASIG does investigation into the Audio subsystem
 - Android as "audio master"? (Not recommended by Google - <https://source.android.com/devices/automotive/audio#android-sounds-streams>)
 - Android as only audio source – audio master externally?
 - External amplifier and/or mixer. Connection technologies, AVB, A2B, ...
 - Virtualization
 - Containerization
 - Latency issues (How to work on low latency, how to measure latency in containers, virtualization)
 - Is there a design investigation to be made for using AGL components + Android?
 - Networked Audio Devices
 - What problems are we facing where just android is not sufficient?
- Raw-stream extration [Piotr Krawczyk](#) (slides already there)
 - Design of PoC
 - **DEMO of PoC**
- Audio Latency [Unknown User \(niskandar\)](#) IN REVIEW : ppt slides sent on 20.10.2020, need to review and decide if we include them
 - Explain problem statement, possible investigations
- Bluetooth [Henric Carlsson](#)
 - Slides: Explain current situation, problem-statement, possible investigations
- External audio system – more details [Suhasini Raghuram](#)
 - Explain possible investigations
- Original list of prioritized topics?
 - Clean up list
 - Ask for audience participation, possibly new priorities...
- **Testing**
 - Stephen can present 10-15 minutes (including Q&A) on the Lava Test Farm status