

System Health/Debugging/Analysis (incl. Log & Trace)

★ *What is this?* Please refer to the [projects overview page](#) for a quick introduction, the [slides of the kick-off meeting](#), and perhaps the overall [Domain Interaction Kickoff slides and recording](#).

WATCH OUT: project is restarting

At the Spring AMM, several participants indicated their interest for System Health, Debugging & Analysis in the context of multi-OS integration. After the launching of new activities since the AMM (Android Automotive SIG, Cloud & Connected Services), it is now time to consider the launching of another project about seeking out, evaluating, consolidating and recommending Tools and Standards that support development of distributed systems with multi-OS integration & cross-domain interaction.

Project Purpose

Seeking out, evaluating, consolidating and recommending **Tools** and **Standards** that support *development* of **distributed systems** with **multi-OS integration & cross-domain interactions**.

Next Call

Thursday 19 September - 3pm CEST (TBC)

[Join Zoom meeting](#)

- Agenda
 - Problem Statements/Possible Solutions for
 - Time synchronization between ECUs (Torsten) - feedback on TSN and IEEE standards on time sync, Adaptive Autosar time synchronization work
 - How to trace the interaction between ECUs (inter-partition calls; inter-node calls) (Torsten)
 - Presentation of saving logs to disc using DLT Daemon & Viewer

Concerning the DLT demo, I would recommend that you look first at the following materials which are available on the public GENIVI wiki (please look at them in the following order) and even try out DLT as explained in [1] below

[1]- <https://at.projects.genivi.org/wiki/display/PROJ/Diagnostic+Log+and+Trace>

looking at github is recommended

<https://github.com/GENIVI/dlt-viewer>
<https://github.com/GENIVI/dlt-daemon>

[2]- MultiNode DLT - Collect Data from Multiple Car Software Domains https://at.projects.genivi.org/wiki/download/attachments/16027368/GENIVI_MultiNode_DLT.pdf?version=1&modificationDate=1524202727000&api=v2

[3]- Latest News and planned new development for DLT (ADIT) https://at.projects.genivi.org/wiki/download/attachments/38895853/GENIVI_AMM_DLT_protocol_proposal.pdf?version=1&modificationDate=1558599862000&api=v2

[4]- EB Solys tool with DLT support (Systemticks) https://at.projects.genivi.org/wiki/download/attachments/38895853/Genivi_AMM_2019_EB_solys.pdf?version=1&modificationDate=1559727338358&api=v2

Future Topics

- Present again multi-node DLT, and discuss DLT evolution (TBC)
- TBD
- ★ *Make sure* you report your interest in this project, for example via the project registration/survey – see [strategy home page](#).

[SHDA Meeting Minutes](#) use link

Definitions (from kick-off slides)

• **System Health**

Automated monitoring and remedy of problems, wrongful behavior and warning signs during normal operation (product is deployed)

• **Debugging**

Finding and fixing software defects, once the effect of the defect has been noticed. (During product development).

• **Logging**

Reporting of internal state using potentially free form, for the purpose of understanding the system (development, sometimes in deployed product)

• **Tracing**

Structured and detailed logging of internal system state, such that it enables automated processing (development, sometimes deployed)

Investigation Areas

- Efficient debugging of ECU communication and connected services
- Diagnostics, Tracing and Logging in a multi-ECU distributed and heterogeneous system
- Formal or automated verification of communication interfaces
- Technologies and strategies for system health evaluation
- ~~Debugging consolidated virtualized/hypervisor systems~~ - this topic moved to be discussed primarily in [Hypervisor project](#) instead


Technologies to investigate

- OpenADx
 - <https://wiki.eclipse.org/OpenADx>
 - **OpenADx is focused on the AD tool chain.** The goal is to accelerate AD development through open collaboration and open source.
 - **OpenADx' vision** is to ensure transparency and make the complex AD tool landscape more easily accessible for enterprise users.
 - Vision is to unify on interfaces between (tracing, ...) tools to allow better compatibility. Current proposals centre around ROS2 interfaces over DDS.
 - Renesas produces a camera test bed PoC
 - Renesas presentation about OpenADx, Eclipse and E2 Studio (Renesas Eclipse-based IDE) ([video](#), [youtube](#))
- App4MC
 - <https://www.eclipse.org/app4mc/>
 - Previously named Amalthea.
 - Platform allows users to distribute data and tasks to the target hardware platforms, with the focus on optimization of timing and scheduling.
- Trace Compass
 - <http://tracecompass.org/>
 - It provides a extensible framework for trace.
 - Developed extensively for Linux. Some Linux-specific standards (tracing formats).
 - Renesas have also provided views for our ARM CoreSight trace support using these components as the base.
- EclipseCon presentation [The Importance of Open Source Tooling for ADAS and Automated Driving](#) which lists various interesting oss tooling projects.
- Data logging with [DLT](#) to add more network/multi-node features.
- Franca IDL protocol state machines.
- [Elektrobit Solys](#)
- **Car-Data Logger** project
- **Guider**

Similar projects and how SHDA relates to them

- [OpenADX](#) (see above).
 - Discussions have been had and contacts set up. Certain aspects definitely overlap, but we agreed that the focus on the simulation of sensor data needed for working with autonomous driving algorithms was not the scope of GENIVI/SHDA.
- [DiaMon](#). Discussion group under LF umbrella focused on open-source tooling including LTTng, TraceCompass and similar tools. From 2012, seem to have lost activity around 2016.
 - GENIVI group could try to breathe life into LTTng/TC/related scope, but also to complement by focusing on in-car development tools and informing about the whole spectrum of open- and non-open-source commercial available solutions.

Presentation opportunities

Topic	Additional links	Presentation by:	First presentation (planned length)	Additional deep dive? 
App4MC	<i>see above</i>			
DLT	Github: daemon , viewer	Christoph? (TBD)	<ul style="list-style-type: none"> • Protocol history & usage (AUTOSAR)? • Future plans / multi-node 	

Car-Data Logger	<i>see above</i>			
Franca IDL (protocol verification with PSM)	GitHub			
OpenADx	<i>see above</i>			
Trace Compass	<i>see above</i>			
Guider	<i>see above</i>	Peace Lee	Full presentation	(no)