Domain Interaction Strategy
Implications for GENIVI Tech and Marketing Work

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Philippe Robin – PMO Lead

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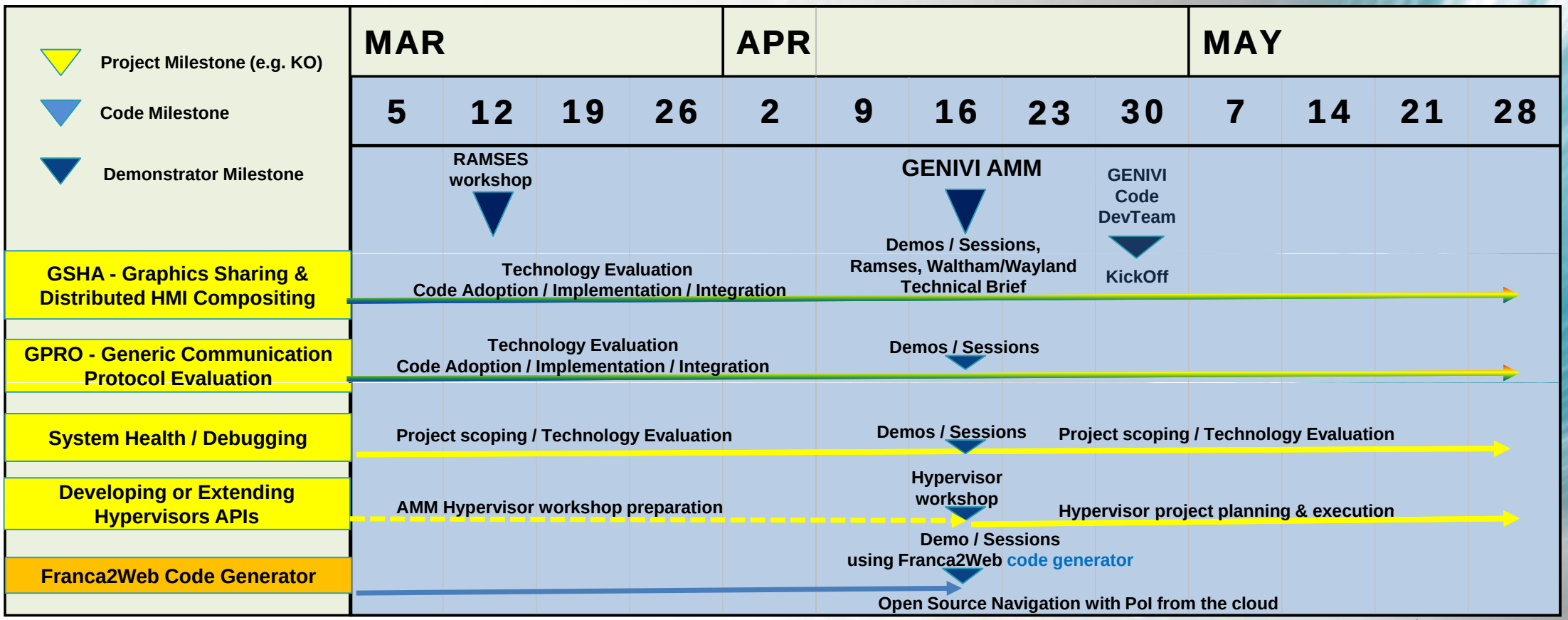
AMM Munich - 17 April

Domain Interaction Strategy - Timeline



DIRO – Launched projects

GSHA – Graphics Sharing & Distributed Compositing

- Wiki: https://at.projects.genivi.org/wiki/x/p4T0
- Participants: BMW, ADIT, Alpine, Bosch, Harman, LGE, Luxoft, Mentor, Qt, Renesas
  - Collabora: Are very busy with graphics work currently
- Leader: (GENIVI acting) Luxoft has confirmed they will lead GSHA project
- Key decision: BMW made the decision to open source Ramses
  - Mentor will serve as maintainer of Ramses
- Technical brief: Harman will release a technical brief on synchronized rendering ("Digital Cockpit HMI Distribution Using Shared State Independent Rendering") at the AMM
- QNX:
  - Pursuing participation to DIRO

DIRO – Launched projects

GSHA – Graphics Sharing & Distributed Compositing

- Purpose: Negotiate automotive-wide standards for graphics interaction between domains
- Including different HMI tools & frameworks, OS and hardware capabilities.
- We identified 5 different technical solution categories
  - Surface sharing
  - API Remoting
  - Shared state, independent rendering
  - GPU sharing (through virtualization)
  - Display sharing
- For surface sharing, studying technical API mapping between Android & Wayland (Linux)
- Opportunity: HMI Framework/Tool vendors engage in the standardization

AMM: Wednesday, 11:45am Short Introduction followed by presentation of Harman's work on Shared state – independent rendering

AMM: Wednesday, 3:45pm From Separated ECUs to Display Cluster (RAMSES)

AMM: Wednesday, 4:00pm Wayland-IVI-Extension / Waltham Usage in Shared Graphics Environment

DIRO – Launched projects

GPRO – Generic Communication Protocols Evaluation

- Wiki: https://at.projects.genivi.org/wiki/x/u4T0
- Participants: Alpine, Bosch, BMW, Conti, Itemis, LGE, Mentor, PSA, Renault, Visteon
- Leader: Visteon
- Renault delivered a presentation on Adaptive Autosar ara::com middleware
  - ARA::COM overlapping into Common API to some extent
- Discussion continues on the alignment on preferred protocols
  - REST does not cover all use cases
  - JOYNR (BMW) open source project can be a way forward
  - How to make progress on shared implementation of vehicle-to-cloud communication protocols
- Google Android Automotive – related topic identified
  - Vehicle Interface to Android

DIRO – Launched projects

GPRO – Generic Communication Protocols Evaluation

Purpose:

- Investigate and *reduce* the proliferation of generic communication technologies
- ...through evaluation, recommendation, and consolidation

- **AMM: GPRO Introduction and Working Session**: Wednesday 18th, 10:15 AM
  AMM: JOYNR framework: Wednesday 18th, at 16:00

DIRO – Launched projects

SHDA - System Health / Debugging / Analysis

- Wiki : https://at.projects.genivi.org/wiki/x/joX0
- Participants: Alpine, BMW, Bosch, Elektrobit, IVIS, LGE, Mentor, Renesas
- Leader: (GENIVI acting)
- Simulation for ADAS is not in scope
- Focus is on everything else than simulation
  - Efficient debugging of ECU communication and connected services
  - Debugging consolidated virtualized/hypervisor systems.
  - 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
- Opportunity: Leader, need for a driving force

DIRO – Launched projects

SHDA - System Health / Debugging / Analysis

- Purpose: Manage the domain-interaction integration challenge through better tools
- What do we have? What do we still need?
- Basic definitions:
  - System Health
  - Debugging
  - Logging
  - Tracing

DIRO – Launched projects

SHDA - System Health / Debugging / Analysis

- **At the heart of managing integration complexity**
- Challenges:
  - Tools are diverse, partly overlapping, incomplete, incompatible, operating-system specific, …
- Call to action: Come and talk to us about this!!
  - What do you use?
  - What do you recommend?
  - What do you need?
  - What's the overall challenge?
- Get **other departments involved** (testing, QA, (security), market-local)

AMM: Intro and Working Session: Wednesday at 14:00

DIRO – Launched projects

Developing or Extending Hypervisors APIs

currently instantiated as “Hypervisor Workshop Preparation Team”

- Wiki : https://at.projects.genivi.org/wiki/x/roP0
- Participants: ADIT, Conti, EPAM, Mentor, Opensynergy, Perseus (Korea), Sysgo, TataElxsi, Valeo, Visteon
  - Green Hills, Bosch and Harman will attend the Hypervisor workshop
- Leader: Perseus (Korean start-up)
- Deliverable:
  - Hypervisor workshop agenda
  - Perseus, Opensynergy, EPAM and Sysgo will do intros / presentations in the workshop
  - Results from AMM workshop will go into defining an actual project. More info on deliverables might be possible once the project goals are defined.
- Sessions at AMM
  - Domain Interaction – Hypervisors API’s Workshop (one-day workshop)

DIRO – Launched projects

Developing or Extending Hypervisors APIs

currently instantiated as “Hypervisor Workshop Preparation Team”

Thursday 09:00 AM – 4:30 PM

Workshop Setup:

- Introduce Topic. Discuss Topic. Repeat.

DIRO – Launched projects

Developing or Extending Hypervisors APIs

currently instantiated as “Hypervisor Workshop Preparation Team”

- **Workshop Topics (preview)**

  - Workshop introduction and intention
  - History of Hypervisors
  - Market Overview
  - Requirements gathering
  - Performance comparison between open source software hypervisors on ARM SoC
  - HV design and implementation
  - Virtualization for Multi-core, SoC peripheral hardware and special- purpose CPUs
  - Standardization of hypervisor APIs
  - (Cyber-)Security enhancements based on virtualization
  - Audio system design with HVs
  - Graphics/GPU Sharing *(in relation to GSHA project)*
  - Health/Debugging/Analysis/Logging *(in relation to SHDA project)*

Establish a pipeline of members internal projects findings into GENIVI DIRO projects

- How to bring those results into the GENIVI community - Examples
  - BMW presented RAMSES comprehensively and LGE will show it in the show case
  - Harman introduced their way to synchronize rendering with Android
  - ADIT & Bosch are digging in Wayland v.s. Android API comparison in the open

Implications for GENIVI Marketing - Trends

- Domain interaction strategy was in part based on **industry trends** that promoted **new functionality** desired by OEMs/T1s
  - System-on-a-Chip (SoC) consolidation
  - Multiple displays sharing messaging from multiple domains

- GENIVI Marketing is chartered to **identify and document other industry trends** related to in-vehicle software features / functionality
  - GENIVI Trend Reports are the preferred method
  - GENIVI welcomes input on trends (sent to mikenunnery@comcast.net)

Implications for GENIVI Marketing - Publication

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cloakware™
for connected transport

TECHNOLOGY BRIEF

FEBRUARY 2018

Category: Security

Certificate Pinning

Summary

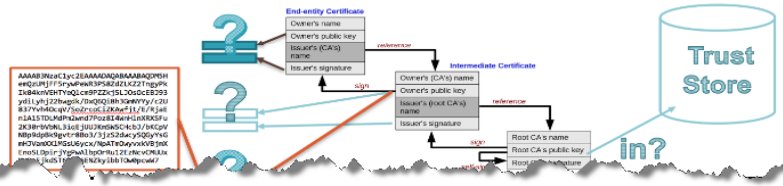
Recommended for ensuring that applications built to perform secure communications to a trusted server continue to do so even in the presence of attached with physical access; where they can easily interpose between the app and server.

Key Characteristics

- Mitigates MITM
- Protects communications from PII disclosure
- Protects communications from reverse-engineering

Description

Attackers have many means available to them to intercept and potentially modify communications. One of the powerful ways they can do this is to use MITM proxies that can dynamically issue new, fake, SSL/TLS certificates. This way, these proxies can impersonate the expected servers to an application. Unless an application is developed with specific checks against the presence of an MITM proxy, the results could be compromised by PII or reverse engineering of the protocol. The latter could begin a further series of attacks into the remote services of the application.



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TECHNOLOGY BRIEF

APRIL 2018

Category: Vehicle Domain Interaction

Digital Cockpit HMI Distribution Using Shared State, Independent Rendering

Summary

A holistic digital cockpit HMI with seamless user experience across IVI and Instrument Cluster displays can be implemented using different approaches:

- Display Sharing
- GPU Sharing (virtualization)
- Surface Sharing
- API Remoting
- Shared State, Independent Rendering

Using shared state, independent rendering approach a multi-domain system performs cross-domain HMI/services data sharing and local HMI rendering within each domain.

Key Characteristics

Advantages to the Shared State, Independent Rendering approach are:

- Low inter-domain data channel bandwidth usage
- Applicability to mid/low performant SoC
- Operating System - agnostic approach

Description

The Automotive industry requires in-car HMI to appear and act as a single user-experience. This requirement must hold true for numerous combinations of the underlying architectures and technologies: single or distributed SoC-based platforms, real-time OS-based Instrument Clusters, GENIVI Linux-based or Android-based infotainment systems, etc.

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Implications for GENIVI Marketing - Trends

- GENIVI Marketing is also responsible for awareness and publication of domain interaction deliverables

- GENIVI welcomes additional technical briefs co-branded with other members
  - Discuss with Gunnar Andersson or Mike Nunnery at this event
  - Next major opportunity upcoming at TU-Automotive Detroit on 6 June
  - Also opportunities for other future events in Europe and Asia

- Output from domain interaction projects will be disseminated via newsletters, webinars, blogs, briefs, wiki pages, at industry events and in the press as appropriate

- Make GENIVI Marketing aware through Steve Crumb (scrumb@genivi.org) or Mike Nunnery (mikenunnery@comcast.net)

Thank you!

Visit GENIVI at http://www.genivi.org or http://projects.genivi.org

Contact us: help@genivi.org

Backup