GENIVI Hypervisor Project

Automotive Virtual Platform Specification - A standards-based approach to virtualization
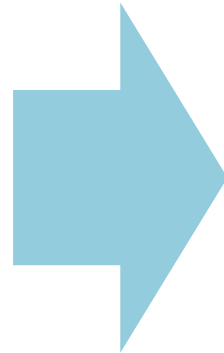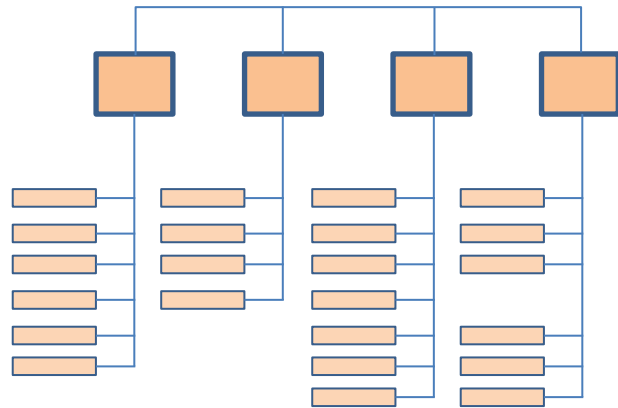
Adam Lackorzynski, Kernkonzept
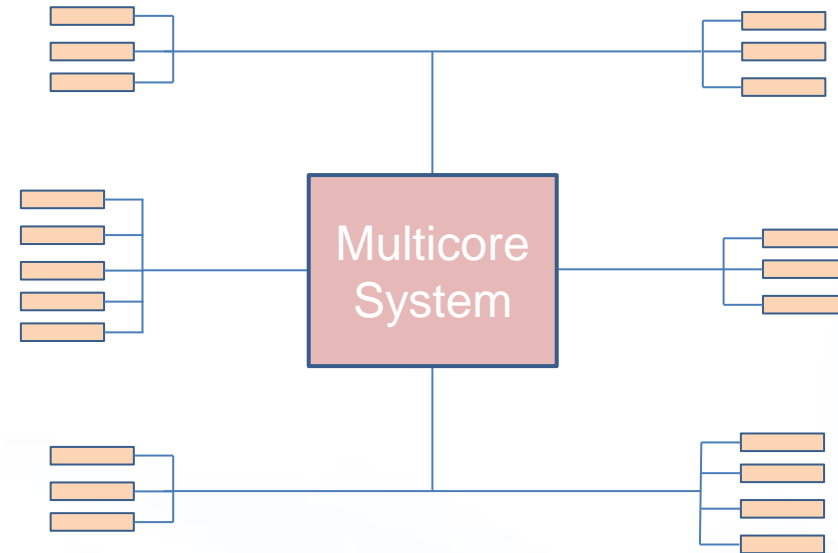
GENIVI Virtual Tech Summit | May 2021

Evolution of Automotive Architectures

Domain Architecture

Central Architecture

Multicore System

Consolidation of functions into a single system

Virtualization-based ECU

Virtual ECU

Adaptive Autosar VM

Virtual ECU

Linux VM

Virtual ECU

Android IVI VM

Virtual ECU

Classic Autosar VM

Safe, Secure and Real-Time Hypervisor

Multi-core Performance Platform
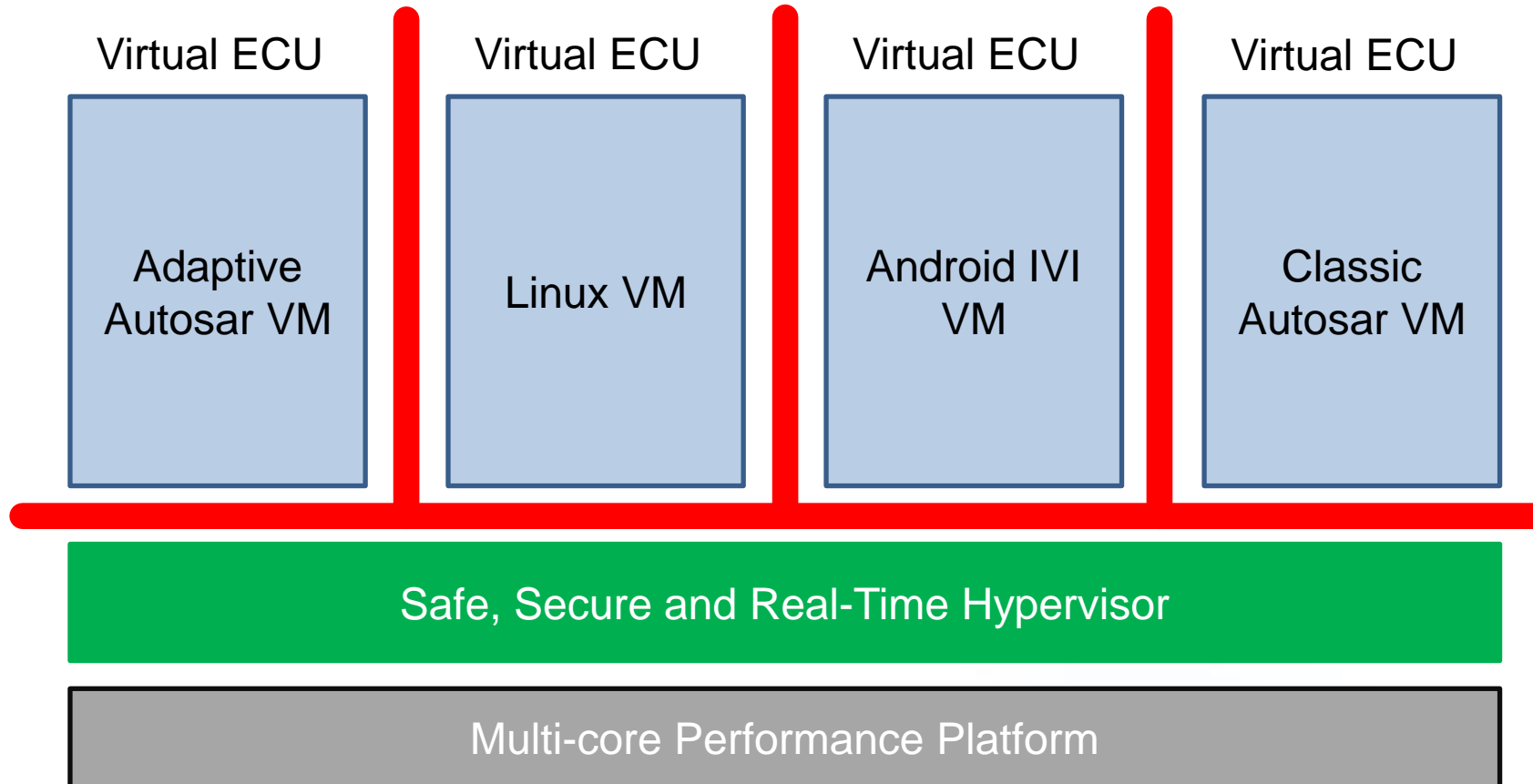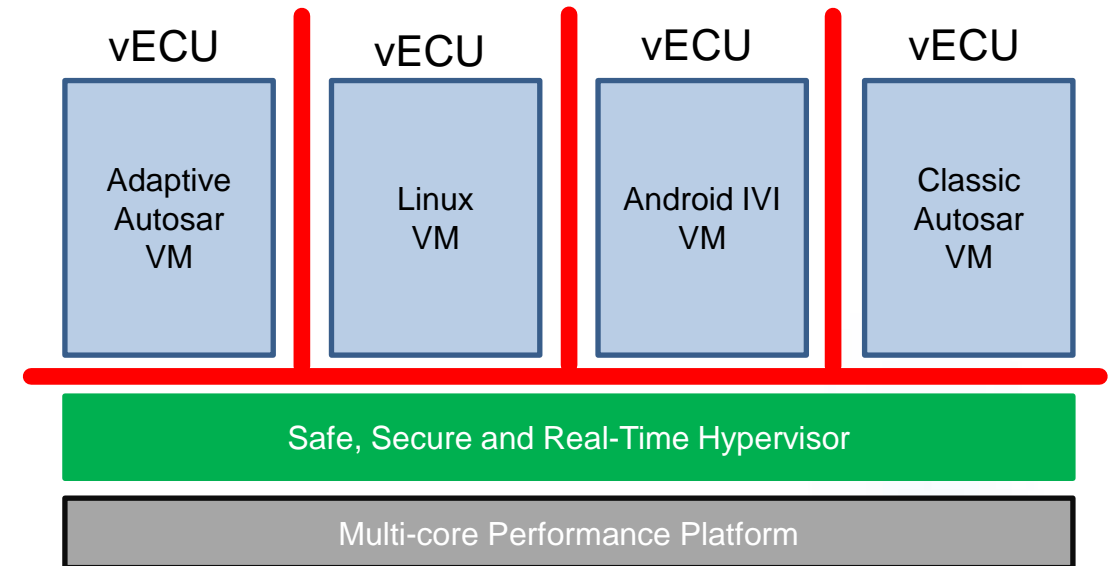
Virtualization Benefits

- Independent software modules, new and old, different domains
- Minimize influence
- Maximize parallel and independent development
- Safety and security domains

vECU | vECU | vECU | vECU

Adaptive Autosar VM | Linux VM | Android IVI VM | Classic Autosar VM

Safe, Secure and Real-Time Hypervisor

Multi-core Performance Platform

Key Role of Virtualization

Virtualization is the key enabler for exploiting the performance of today's and future high-performance automotive systems in a **safe** and **secure** way
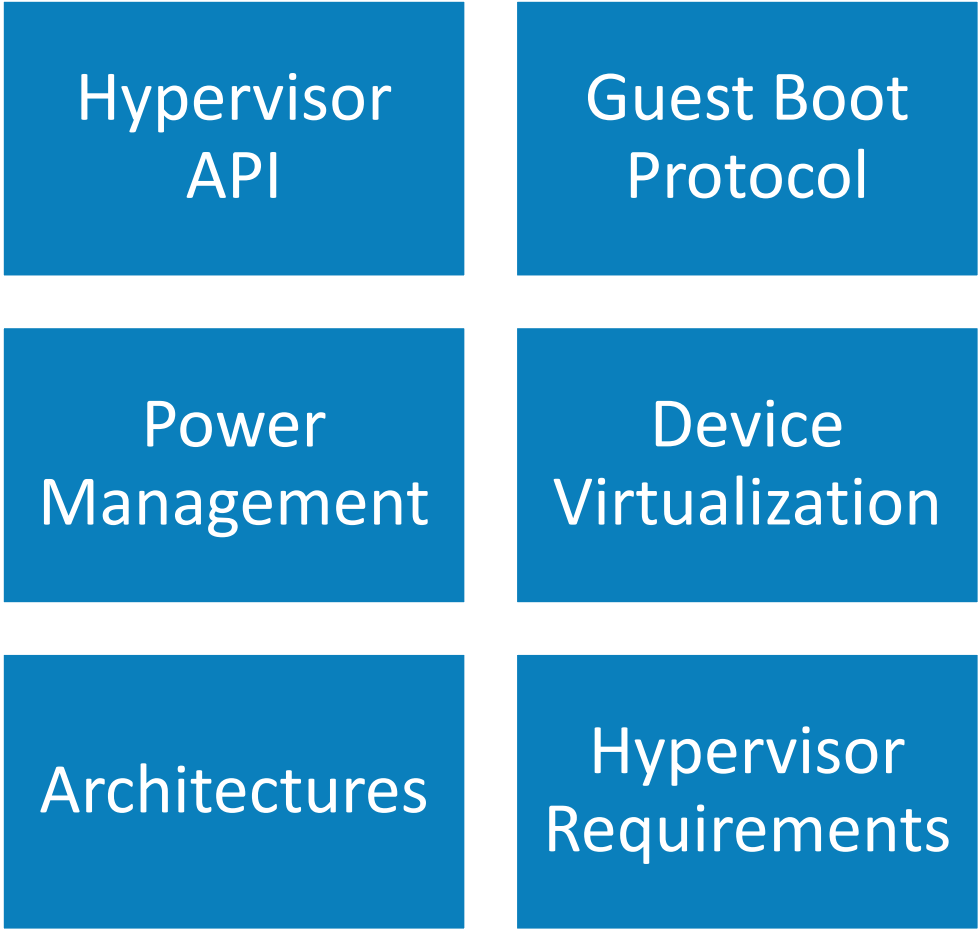
Interoperability and Standardization

Cross-vendor virtual machine and hypervisor interoperability is a key capability to make virtualization easily deployable in automotive environments.

Align the whole automotive community on common requirements with an open licensed specification:

AVPS – Automotive Virtual Platform Specification

Effects of Standardization

Hypervisor API

Guest Boot Protocol

Power Management

Device Virtualization

Architectures

Hypervisor Requirements

- Virtual machines can be ported across hypervisors
- Common code (drivers, etc.)
- Shared validation tests
- Easier multi sourcing
- Standards can be referenced in OEM specifications
- Shortened development cycle
- Software/system re-use

AVPS and Virtio

- AVPS is largely based on Virtio
  - Community and industry approved standard for virtual devices
- AVPS selects and specifies the most appropriate parts for automotive of Virtio
- AVPS covers the whole platform, including boot, power management, and other general requirements for an automotive virtual platform
  - In some areas dedicated drivers take advantage over virtualized devices, e.g., graphics
- Others are taking the same approach: Android Trout, an Android for a fully virtualized platform

AVPS Update

- Version 2 is nearing release, with updates on IOMMU, graphics, audio and other areas.

AVPS Project

- Align with automotive community on common automotive requirements for virtualization

- AVPS is an open licensed specification

- Weekly call every Monday at 10am CET/CEST
  - US-friendly call time is possible (let us know your interest)

- **Looking for more contributors and automotive requirements!**
- **OEMs, suppliers, OS and Hypervisor vendors**
                You are welcome!

All documented on GENIVI Public Wiki: [Hypervisor Project](#)

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