Adding AUTOSAR Communications to GENIVI Linux

GENIVI All Members Meeting

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Why should I care about AUTOSAR?

Q: “I care about IVI. AUTOSAR excludes IVI. Why should I care?”

A: Auto manufacturers are seeing the need to interface their complex ECUs, like IVI , into an AUTOSAR environment. This presentation focuses on this need.

Automotive Industry Direction

Electrification – EV/PHEV

Autonomous Driving

Domain Consolidation: Mature Functionality Moves to Powerful ECUs

Focal Areas – Increase Productivity

Time to Market

More Like Mobile Phones

Standardized Software

AUTOSAR

GENIVI

Engineering Process

Platform Reuse

AUTOSAR Methodology

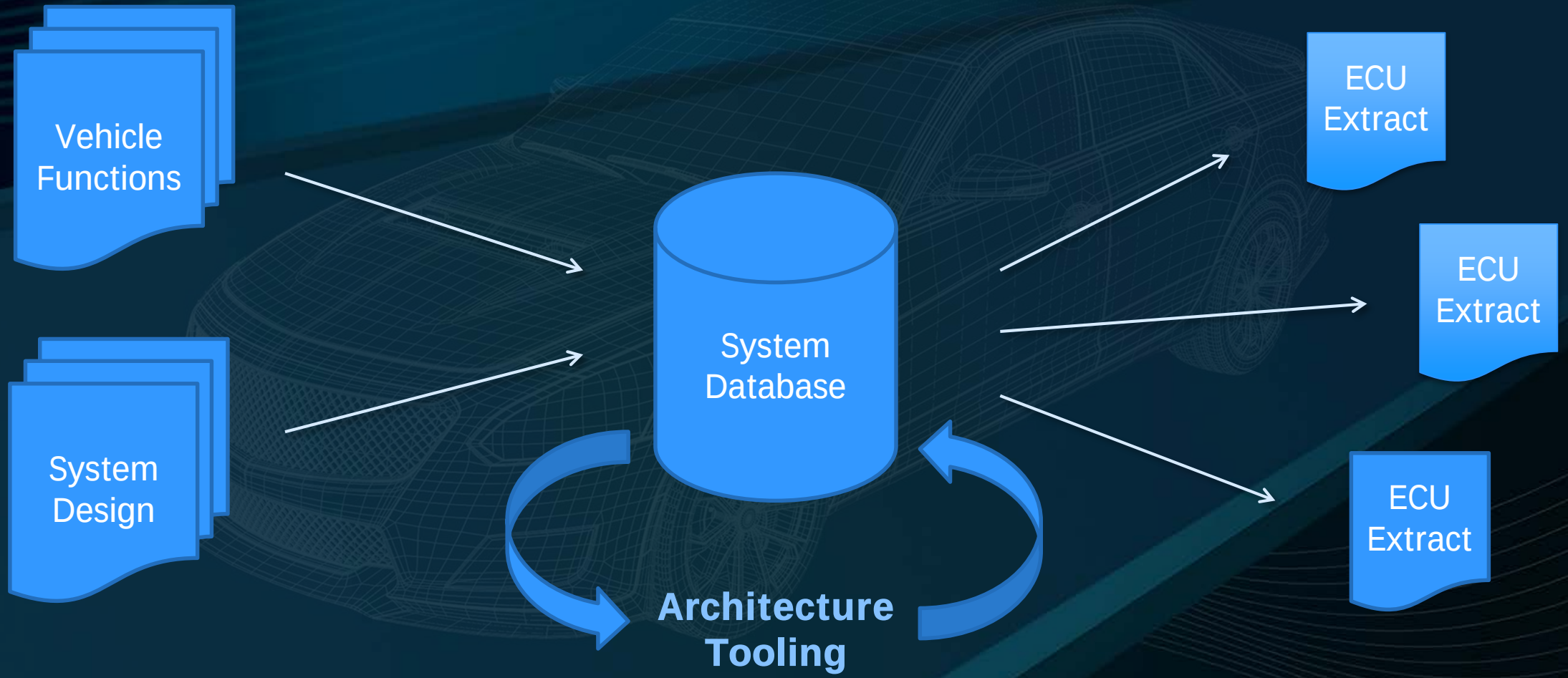
Briefly – What is AUTOSAR?

AUTOSAR is a **partnership**, not unlike GENIVI: 202 members: core, premium, associate and development partners.

AUTOSAR addresses increasing complexity and R&D costs through well defined interfaces, abstractions and software reuse.

Cooperate on standards, compete on implementation

Vehicle Design Engineering Process
AUTOSAR Methodology at OEMs



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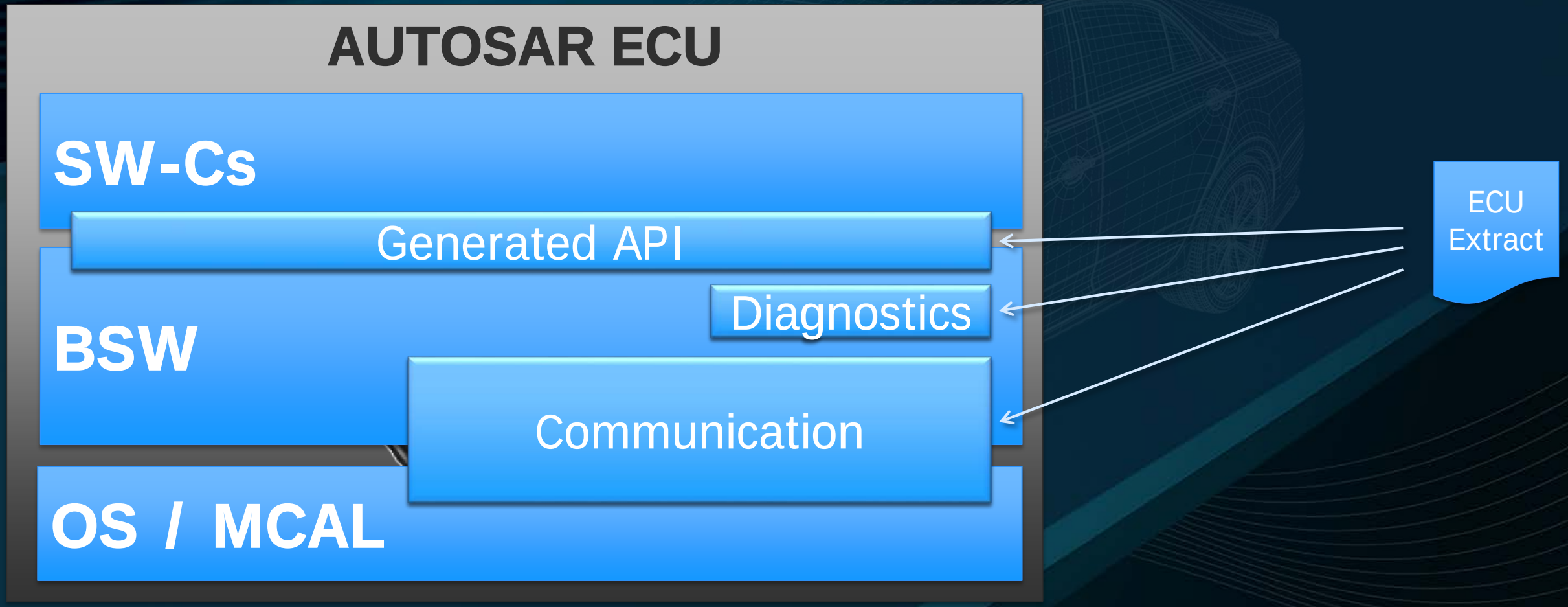
ECU Design Engineering Process
Configuring an AUTOSAR 4.2 ECU

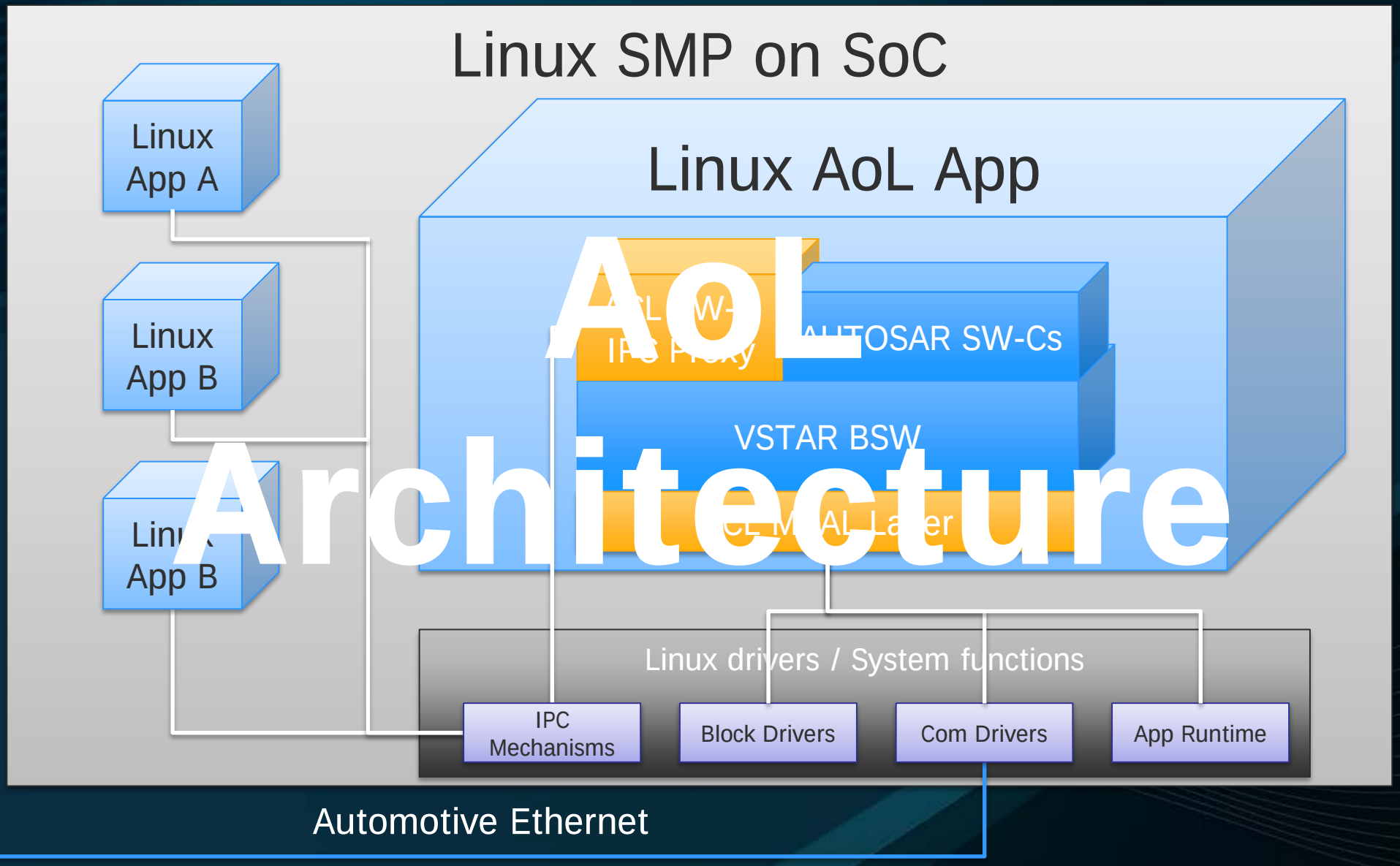


AUTOSAR on Linux

Reuse Standardized Software

Vehicle System Enabler

API Access



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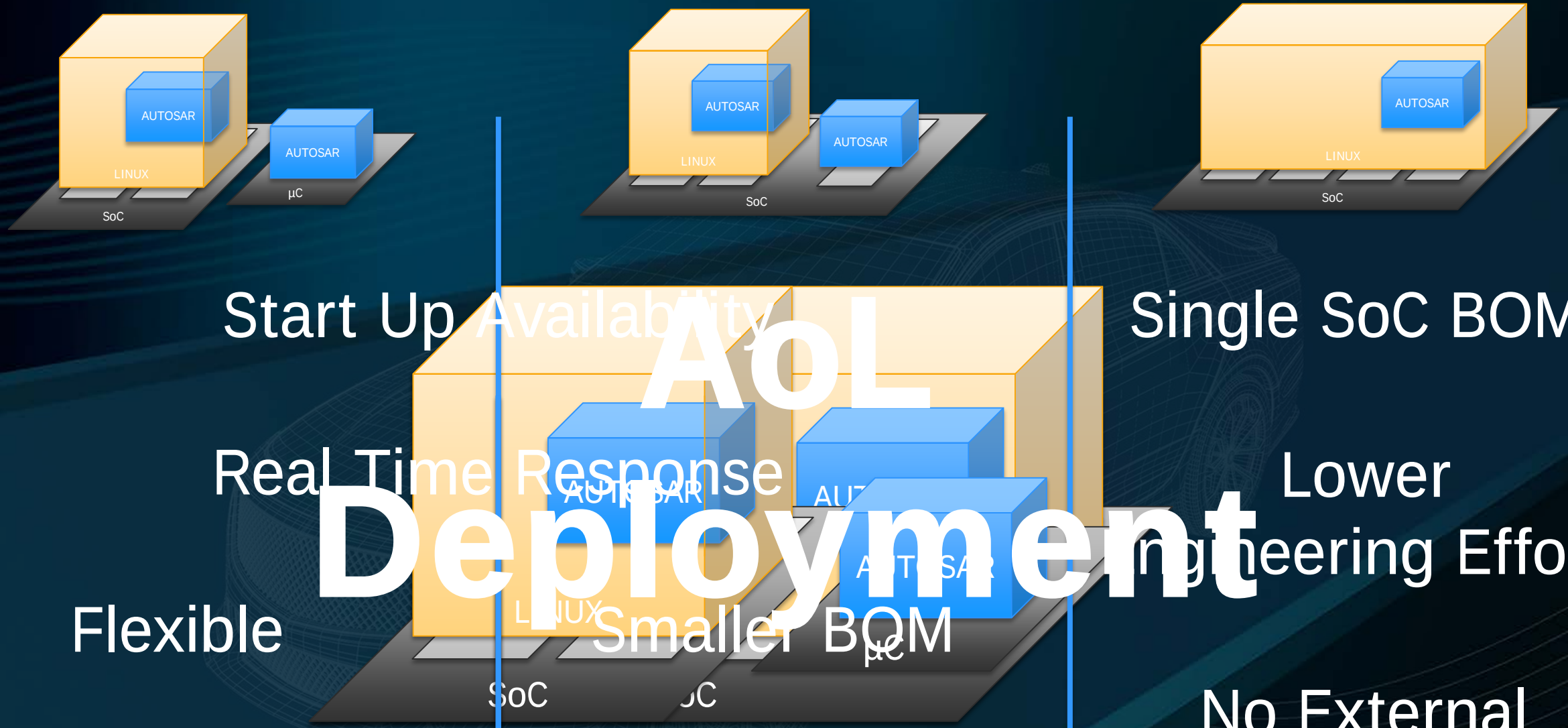

AoL Deployment

Start Up Availability

Single SoC BOM

Real Time Response

Lower Engineering Effort

Flexible

Smaller BOM

No External IPC Delay

COM Buses in µC

On Chip IPC

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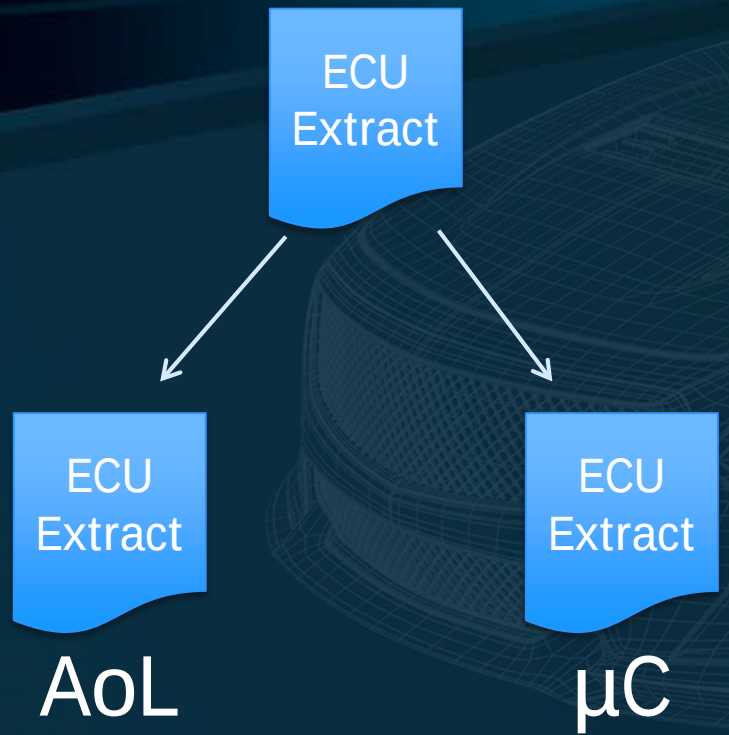
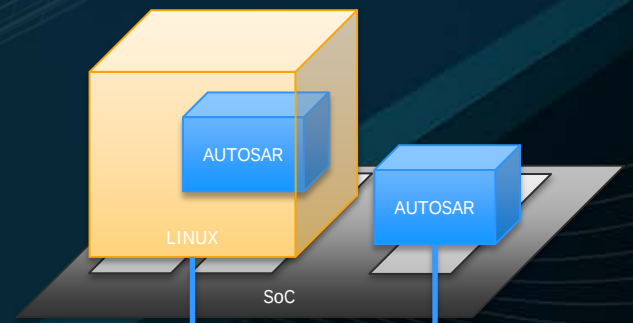
AoL Architecture Solutions

Splittable ECU Extract



Diagnostics Proxy

Routable Communication Buses



Ethernet

CAN

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OEM Benefits

Inclusion of Linux nodes in AUTOSAR methodology

- Standardized interface for inter-connecting ECUs
- Standard ECU definition and information exchange with Tier 1 suppliers

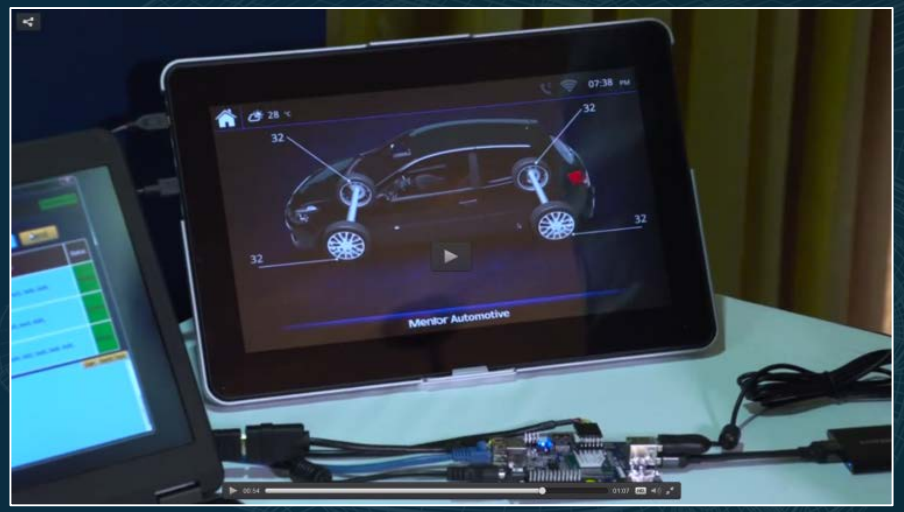
Supplier Benefits

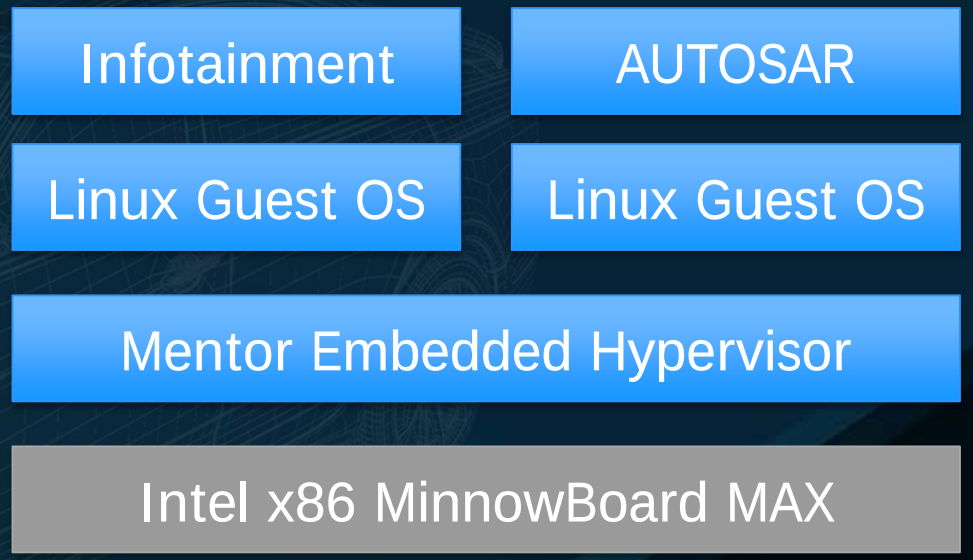
Can cut BOM on SoC

- Standard software platform and methodology for ECU development

Demo: AoL with Diagnostics over IP (DoIP)

- AUTOSAR on GENIVI Linux
- AUTOSAR Ethernet diagnostics
- Linux Infotainment applications
- Type 1 Hypervisor





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AoL: What is the point?

- Preserve **investments** in AUTOSAR
- **Reuse** Software Components (SW-C)
- Ensure **Consistent Behavior**
- Augment Linux with AUTOSAR functionality: diagnostics, vehicle system communication, mode management (Off, Accessory, Ignition)
- Expose standard interfaces between Linux and AUTOSAR
- Increased design flexibility

Adaptive AUTOSAR: Future Directions, Speculative

- 2017 – Expected First Release of Adaptive AUTOSAR
- Targeting V2X and AD – Requires Functional Safety
- Runs on Computational Nodes
- Limited POSIX
- SOME/IP – Service Oriented

Classic AUTOSAR vs Adaptive AUTOSAR

- Classic AUTOSAR
  - XML configuration of System and ECUs
  - Detailed Software specifications
  - Static configuration (once in car, functionality does not change)
- Adaptive AUTOSAR
  - XML configuration of System and ECUs
  - Only interface specifications
  - Will release Implementations
  - Service oriented dynamic behavior

AoL – Compliment to Classic and Adaptive Platforms

AUTOSAR Classic Platform

Standard ECUs

- Real time
- Low Cost

AUTOSAR Adaptive Platform

Computational nodes

- Ethernet/CAN
- Limited POSIX

AUTOSAR on Linux

High end ECUs

- Full Linux/POSIX
- Rich Applications