Introduction to Adaptive AUTOSAR

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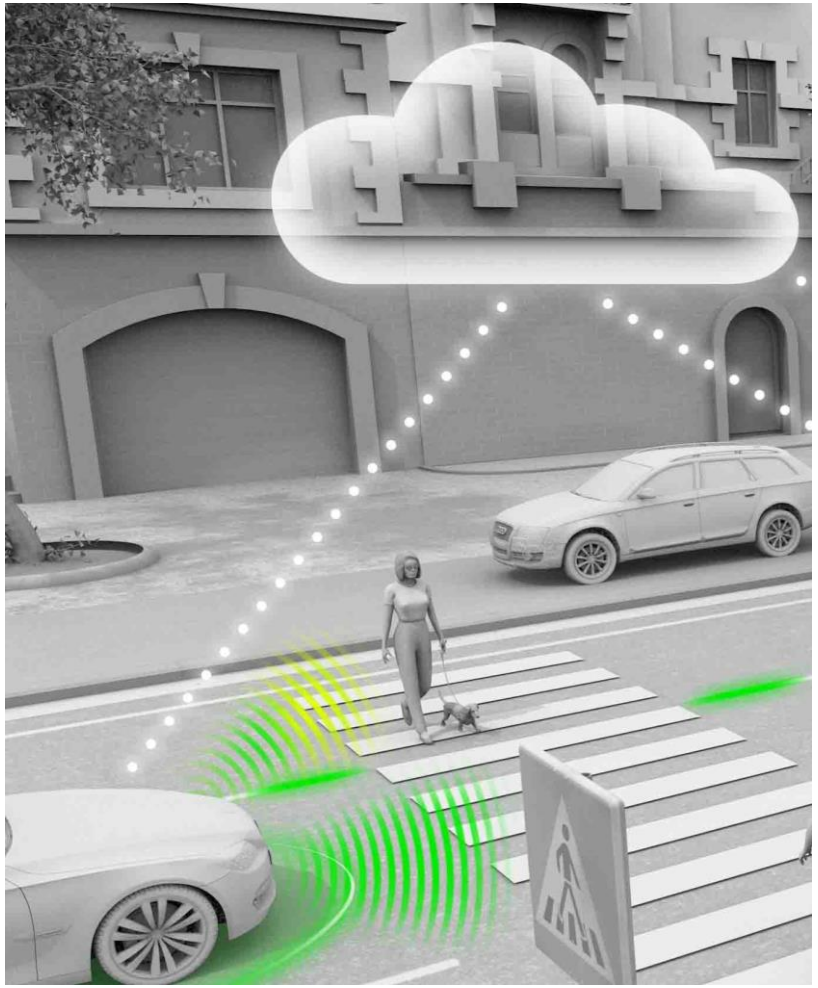
Overview

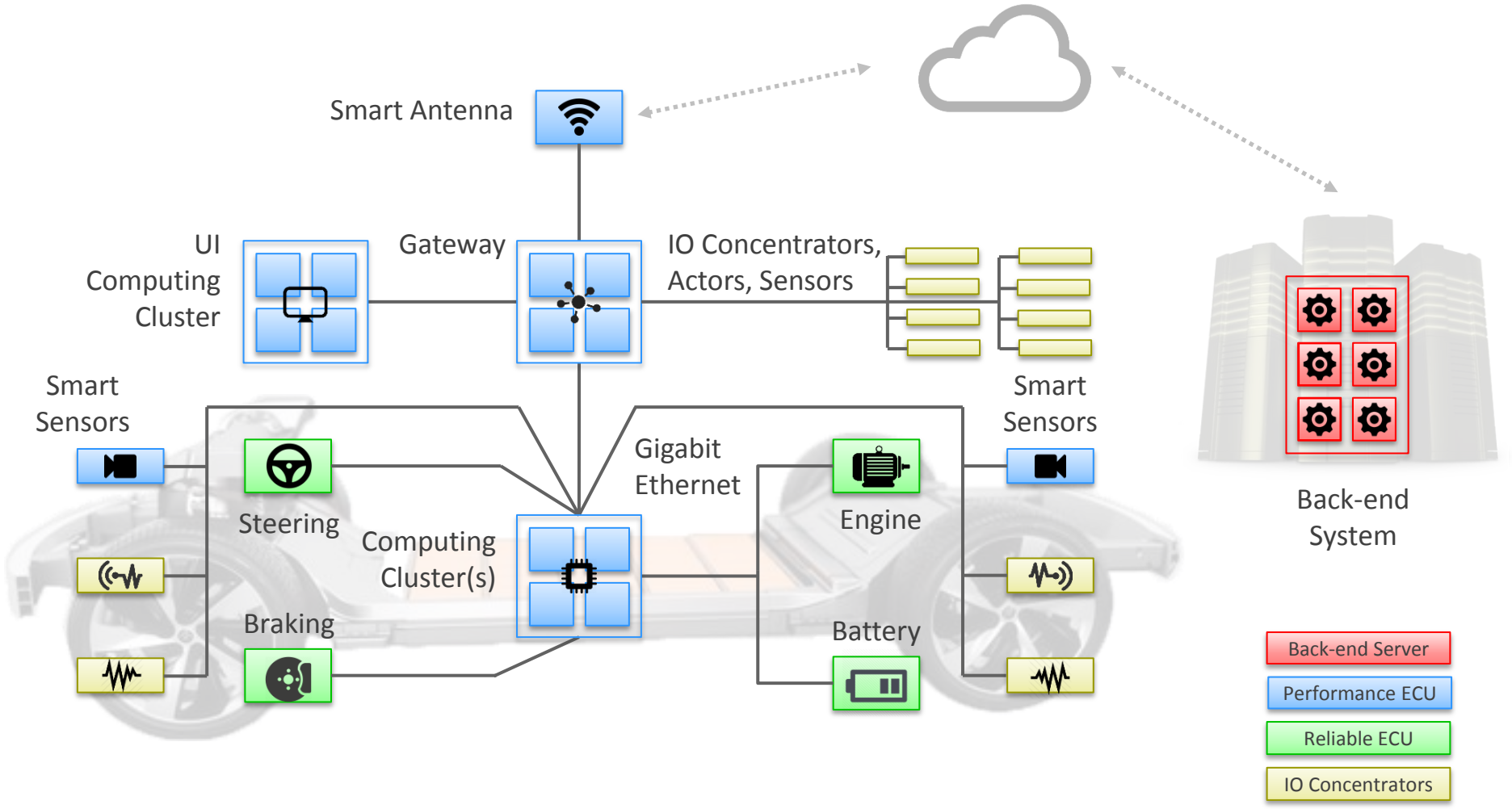
- **Software Platform and scope of Adaptive AUTOSAR**
- Adaptive AUTOSAR architecture and roadmap
- EB Adaptive Platform and Prototyping solution

Requirements for a future car infrastructure

- Main drivers
  - Automated Driving
  - Car-2-X applications
- Requirements
  - High computing power
  - High data rates
  - High availability, fail-operational systems
  - Update over the air



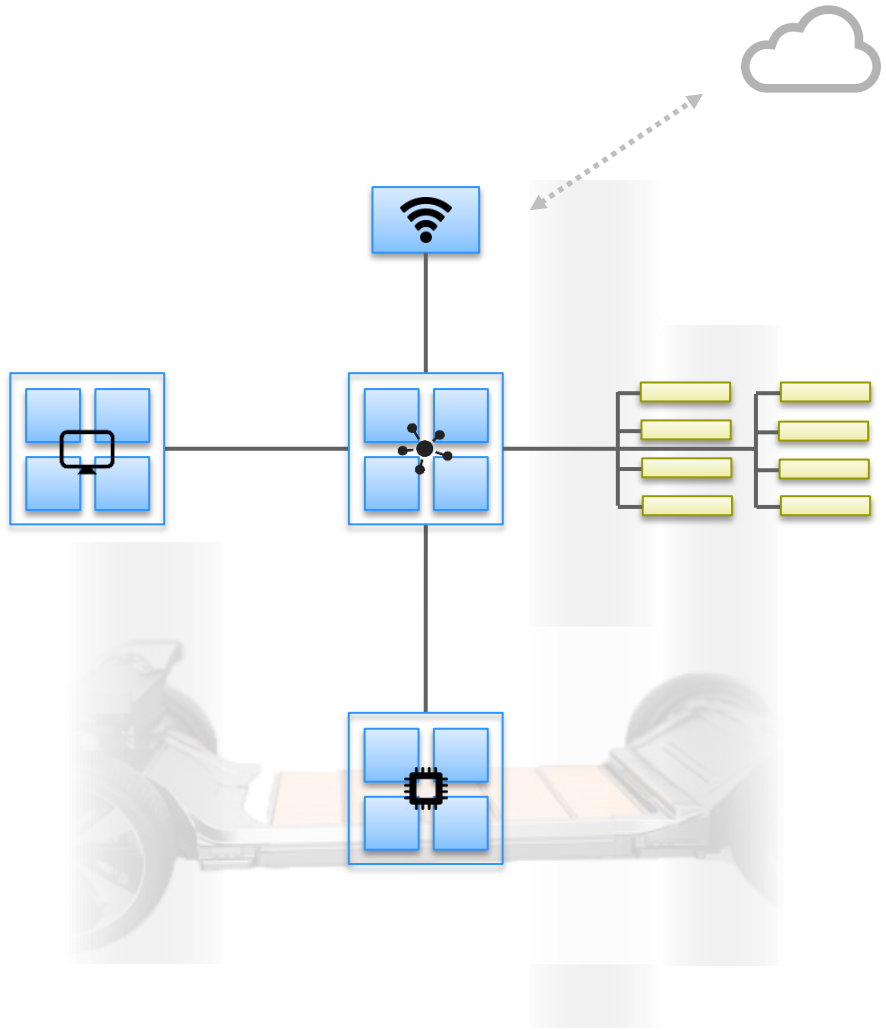
Consolidated E/E architecture



Future architecture of car infrastructure

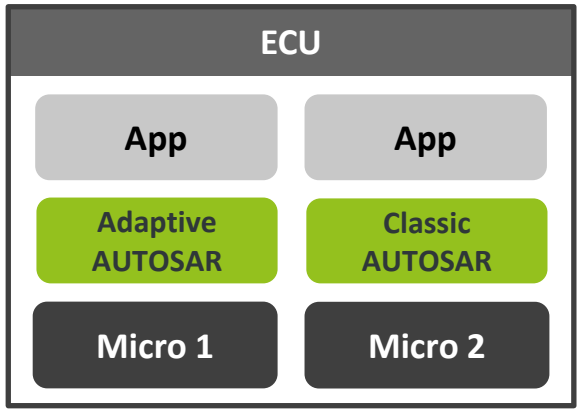
- Split up ECUs in low performance IO Controller and high performance controller
- Establish a service-oriented architecture (SOA)

- **Performance Controller**
  - High computation power with heterogeneous computing
  - Widespread, POSIX-like Operating System (e.g. Linux), Adaptive AUTOSAR
  - Extensive update capabilities
  - Safe & Secure
- **IO Controller**
  - Provide Sensor and Actuator Services
  - Deeply embedded, real-time Operating System (e.g. Classic AUTOSAR)
  - Limited (non-standardized) support for partial updates

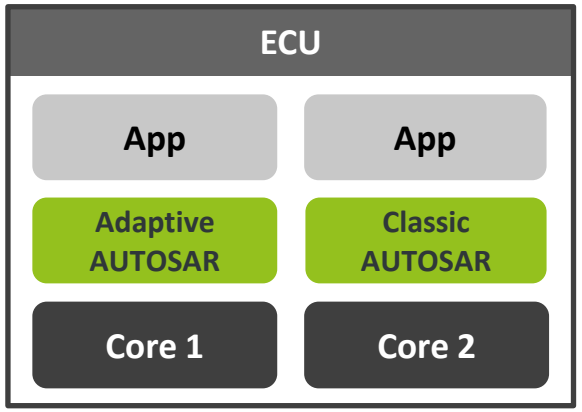


Major Types of Adaptive Platforms

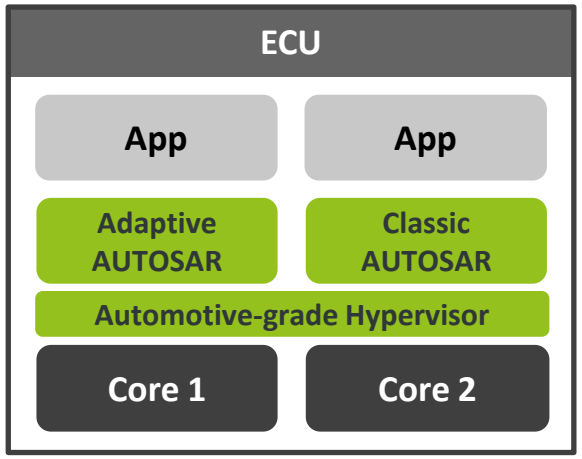
Type1: µC Partitioning



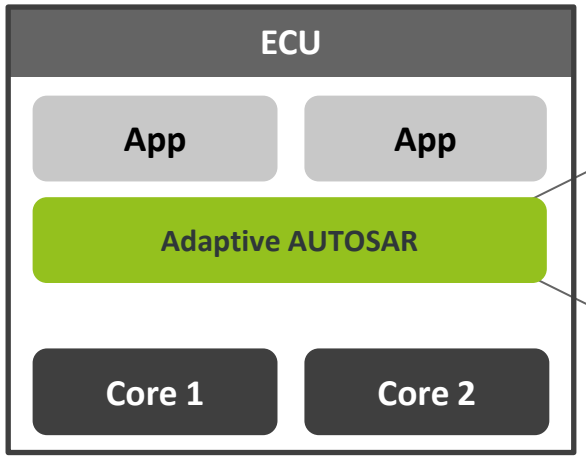
Type2: Core Partitioning



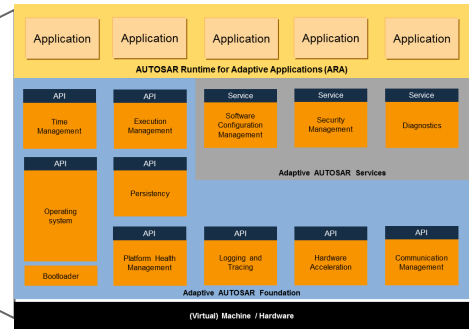
Type3: Virtual Resource Partitioning



Type4: Performance, MultiCore



Adaptive AUTOSAR (ARA)



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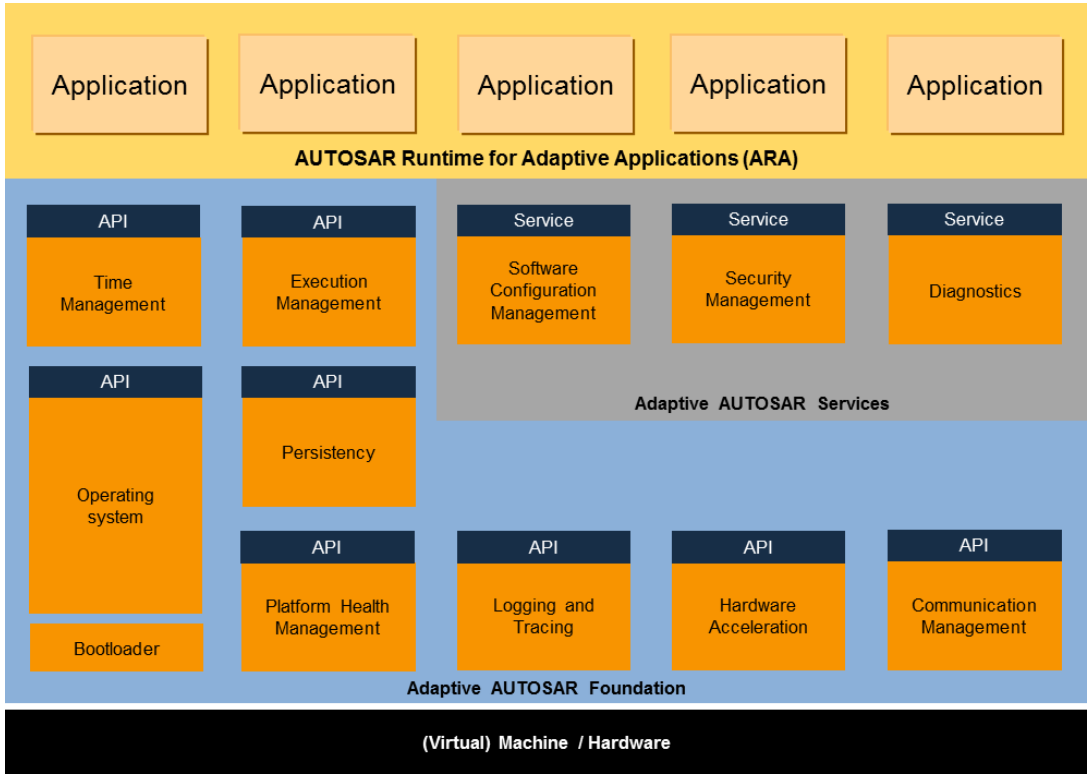
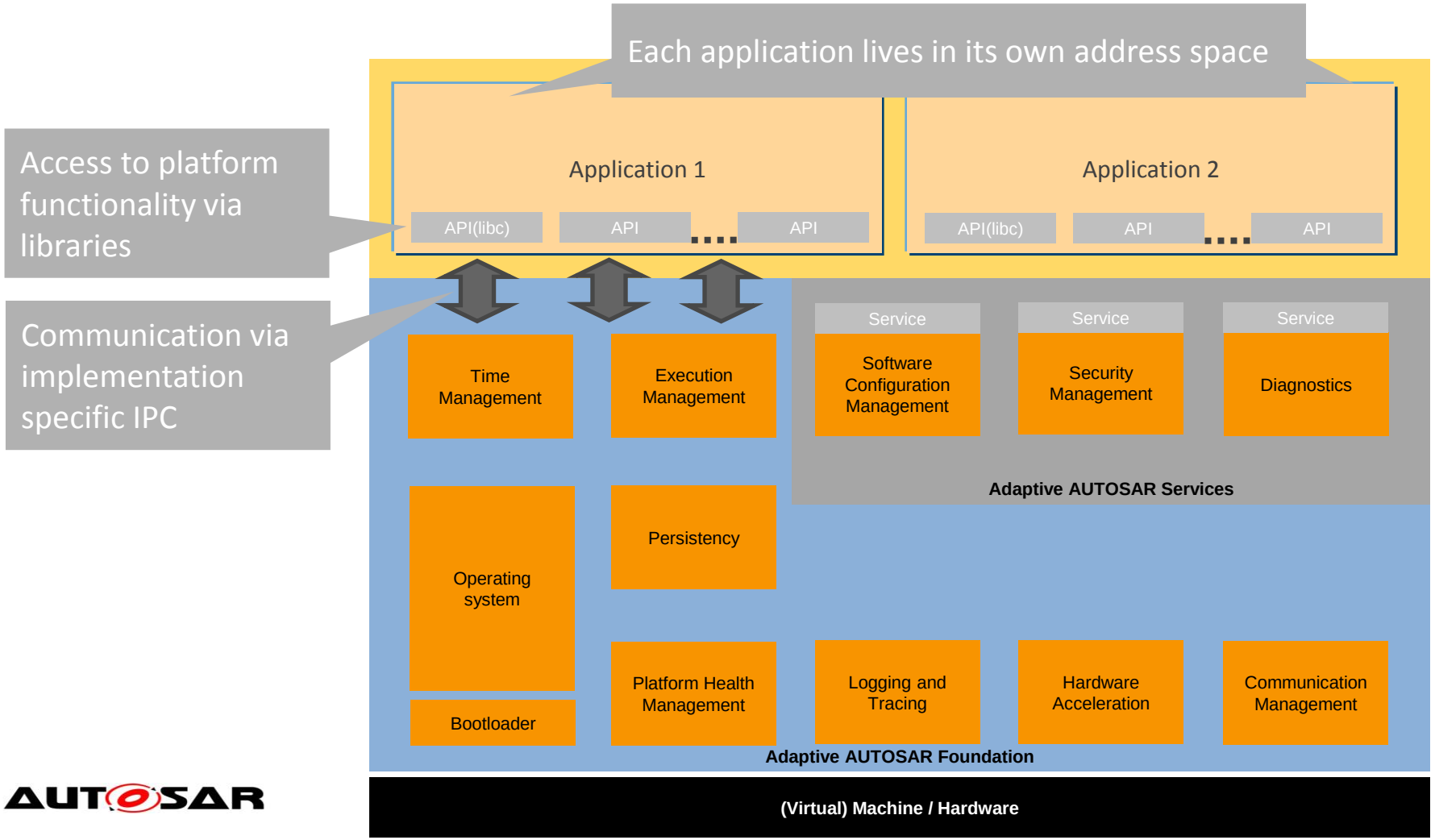


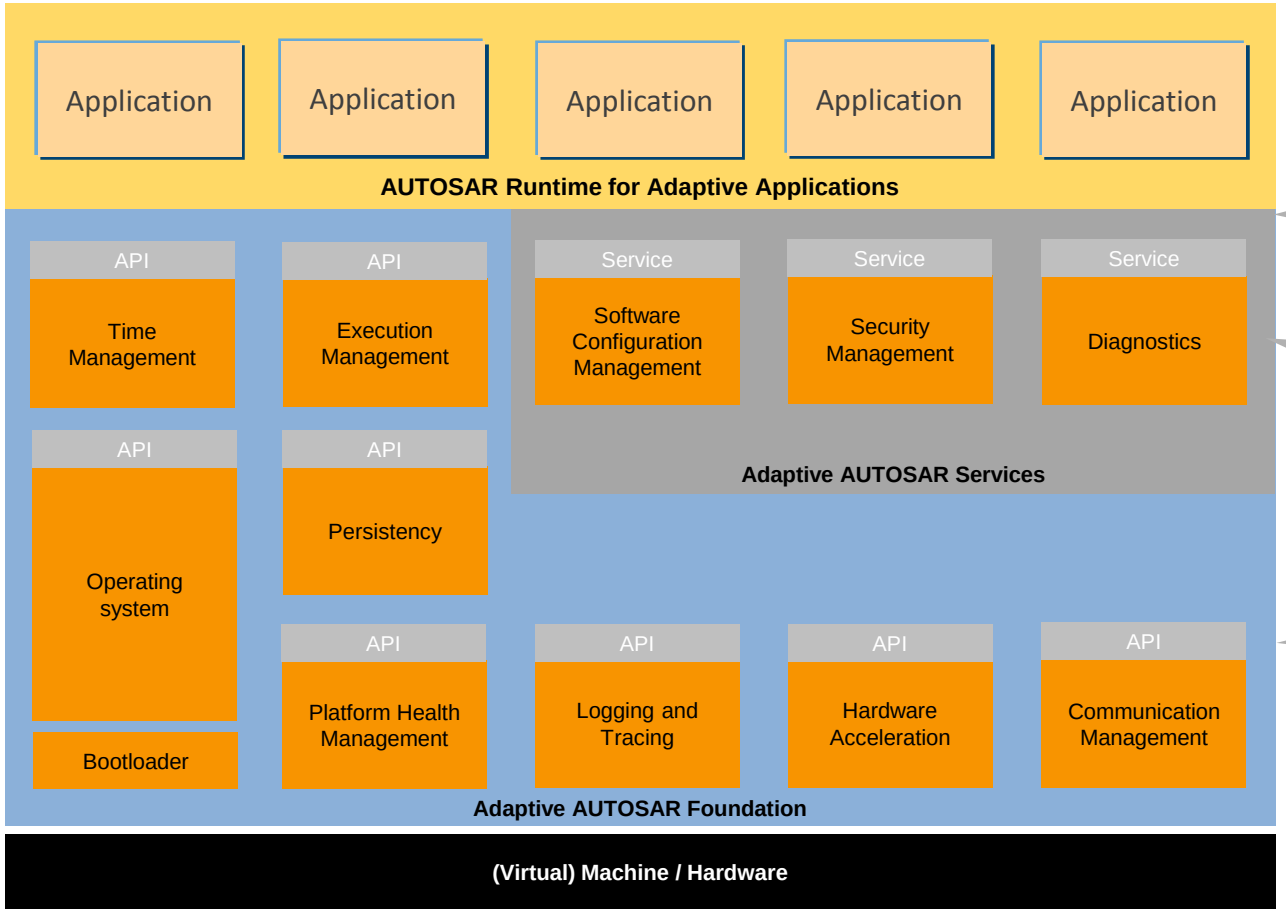
- Developed in C++ (C14)
- OS will provide POSIX PSE51 interfaces to the application but Adaptive Platform will require further features

- **Execution Management**
  - Lifecycle management of platform (machine) and application (process) incl. privileges of access control and machine states
- **Persistency**
  - Load data from persistent storage and store data over boot and ignition cycle
- **Communication Management**
  - SOME/IP based including serialization and service discovery
  - Publish/subscribe mechanism for intra- and inter-ECU communication
- **Platform Health Management**
  - Alive Supervision
- **Diagnostics**
  - Event memory management and diagnostic service handling

Process Model



Functional Clusters

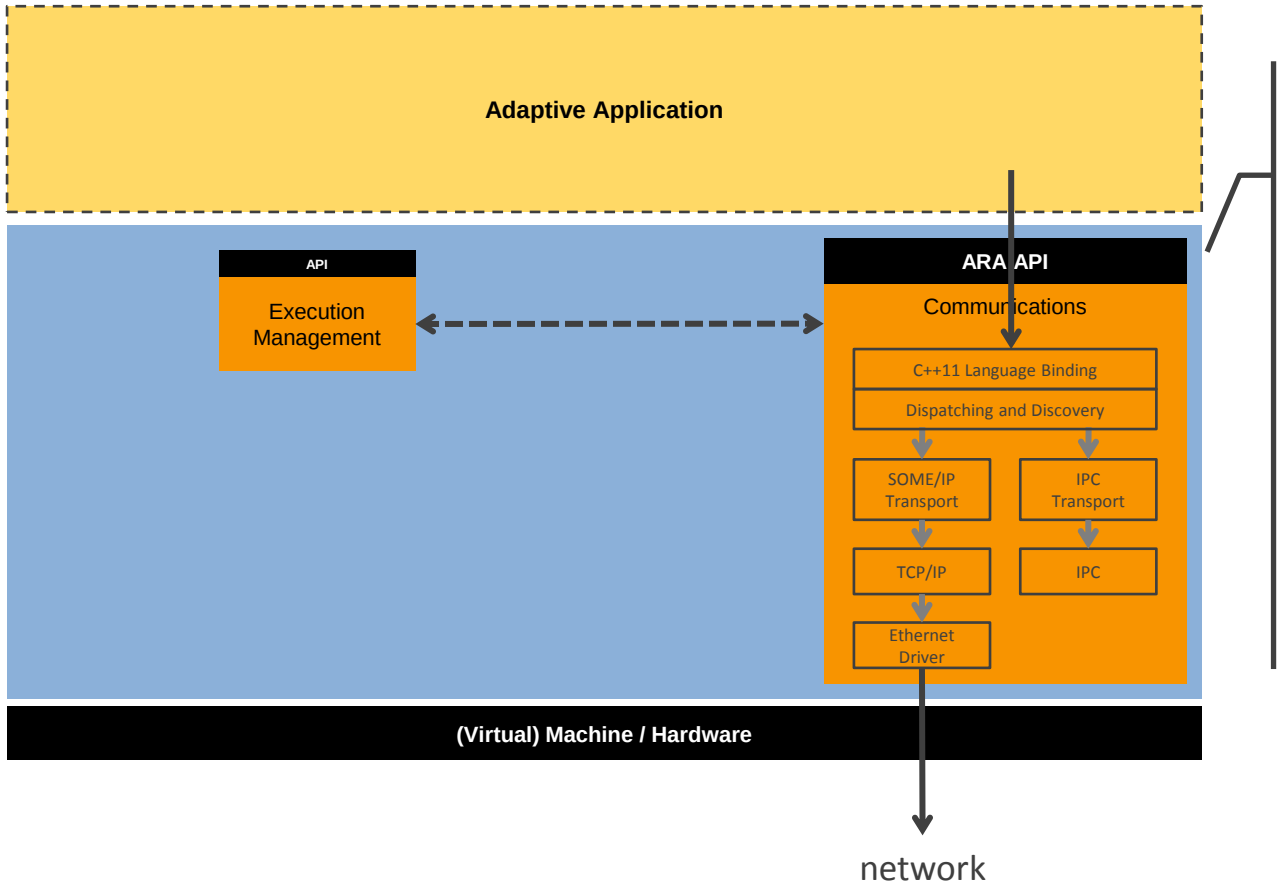


APIs and services exposed to applications by functional clusters

Services provided via Communication ARA API

Language specific APIs as part of ARA

Service Interface



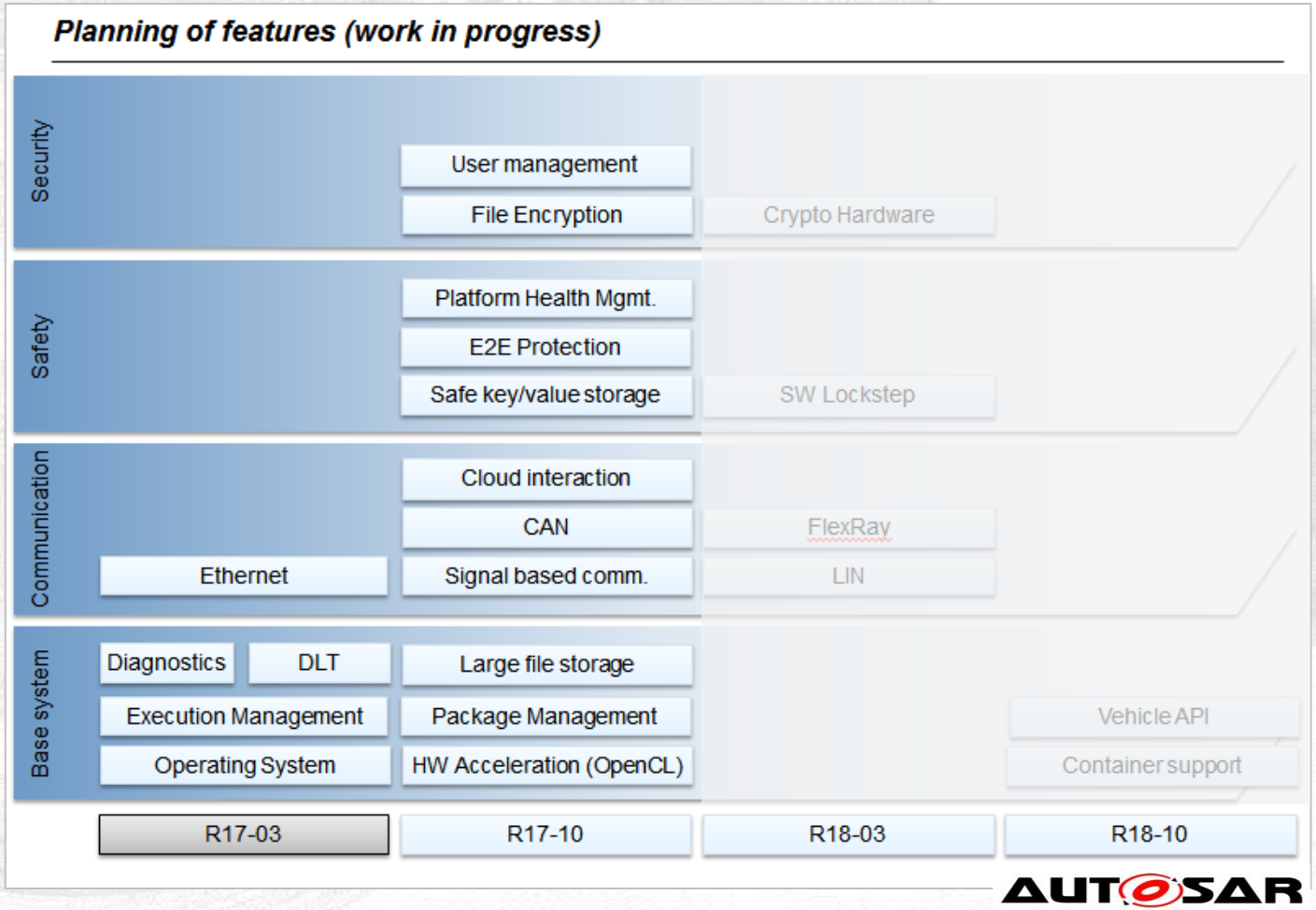
Public Interface
Part of the adaptive AUTOSAR API and specified in the SWS.

Protected Interface
Interaction between functional clusters. Not normative, intended to make specification more readable and to support integration of SW into demonstrator.

Private Interface
Interaction between elements within a functional cluster. Not used in specifications.

→ normative interface
⇢ informative interface
→ private interface

AUTOSAR Adaptive Roadmap



- Continuous AUTOSAR releases twice a year (March, October)
- Distribution of AUTOSAR Code Base for concept validation
- Adaptive AUTOSAR specifications will be in status “development” until R18-10 (no backward compatibility granted)

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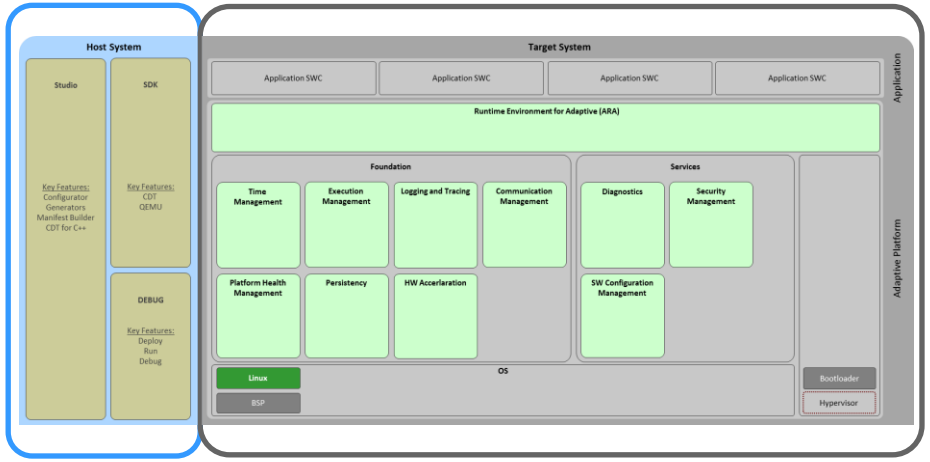
EB tresos AdaptiveCore - System



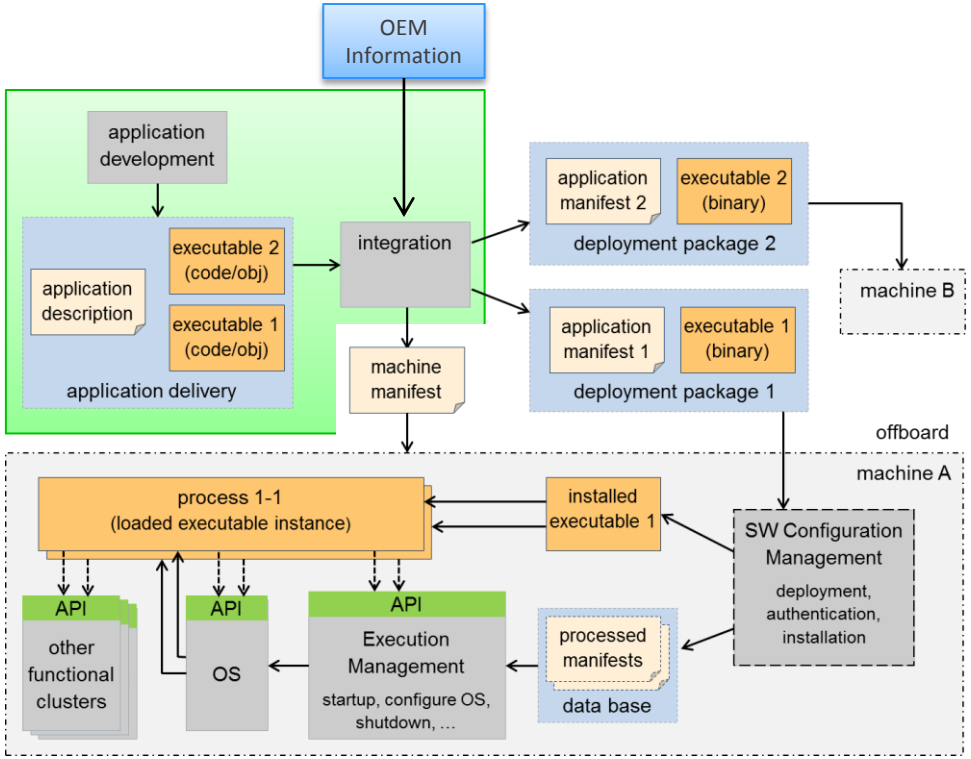
Host

- EB tresos Studio for AdaptiveCore
- EB tresos AdaptiveCore SDK
- EB Build Environment

Target

- ARA Components/Adaptive Platform
- Operating System (incl. BSP)
- 3rd Party Modules

EB tresos Studio for AdaptiveCore



System Configuration Tool

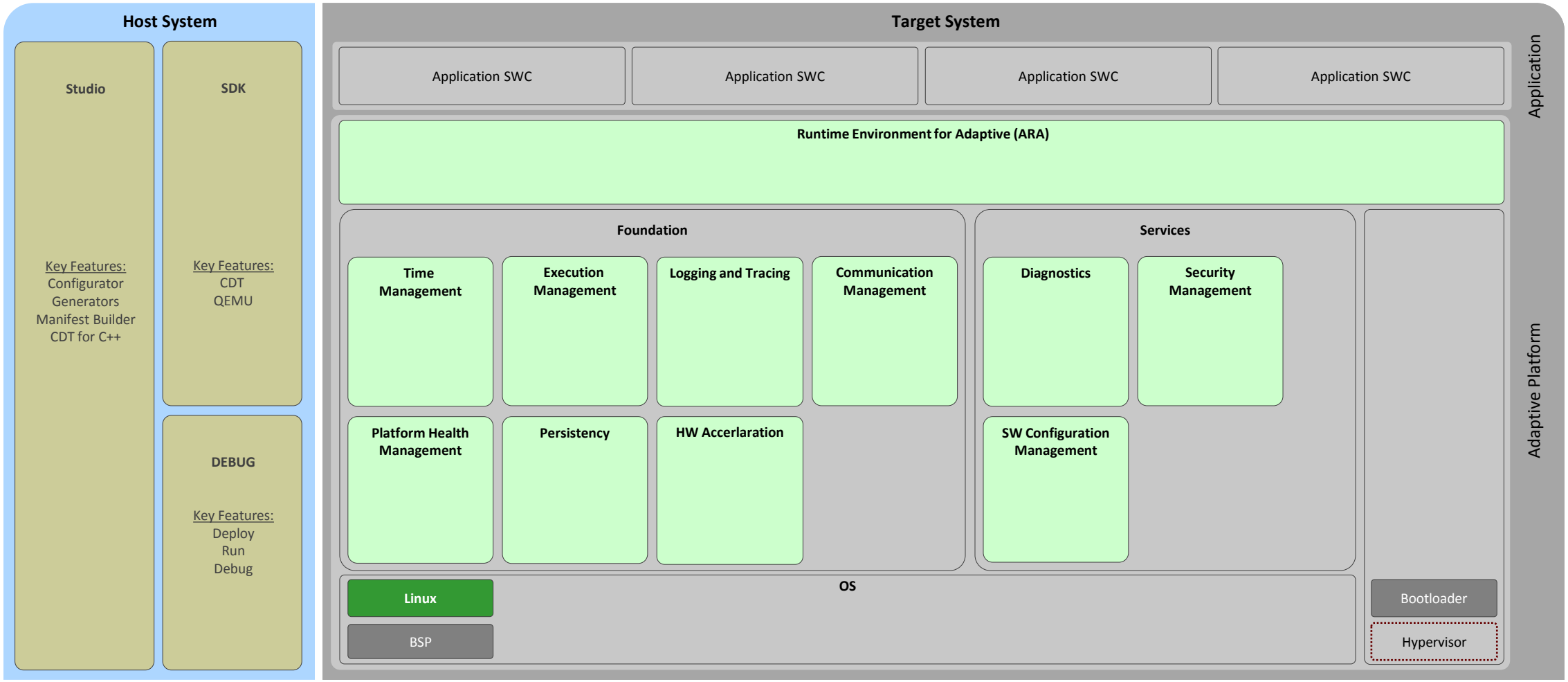
Development

- IDE for construction and qualification of application software components

Integration & Configuration

- Configuration of system manifest and binding of application software components to adaptive platform on machine and application level

EB tresos AdaptiveCore



All **bold** names are licensable items.

Target support

- Lead Target platforms
  - Renesas R-Car H3
- Further support planned for
  - Nvidia DrivePX
  - Intel Denverton
- Further portings on request
  - Please inquire
- Development based on Yocto Linux
  - Development of ASIL-B Linux distribution
- Porting to other operating systems upon request
  - Please inquire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