ECU Software Development

The focus is on Software Development Process

ECU - Electronic Control Unit

An Electronic Control Unit (ECU) is any embedded system in automotive electronics that controls one or more of the electrical systems or subsystems in a vehicle.

# Type of ECU

Today Types of ECU include:
- Engine Control Module (ECM)
- Powertrain Control Module (PCM)
- Transmission Control Module (TCM)
- Brake Control Module (BCM or EBCM)
- Central Control Module (CCM)
- Central Timing Module (CTM)
- General Electronic Module (GEM)
- Body Control Module (BCM)
- Suspension Control Module (SCM)

# We are going to develop **ECUng** that controls our mechanical subsystem

ECUng include underlined ECUs:

- ***<u>Engine Control Module (ECM)</u>***
- ***<u>Powertrain Control Module (PCM</u>***)
- ***<u>Transmission Control Module (TCM)</u>***
- ***<u>Brake Control Module (BCM or EBCM)</u>***
- Central Control Module (CCM)
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- General Electronic Module (GEM)
- Body Control Module (BCM)
- ***<u>Suspension Control Module (SCM)</u>***

ECUng Software Architecture
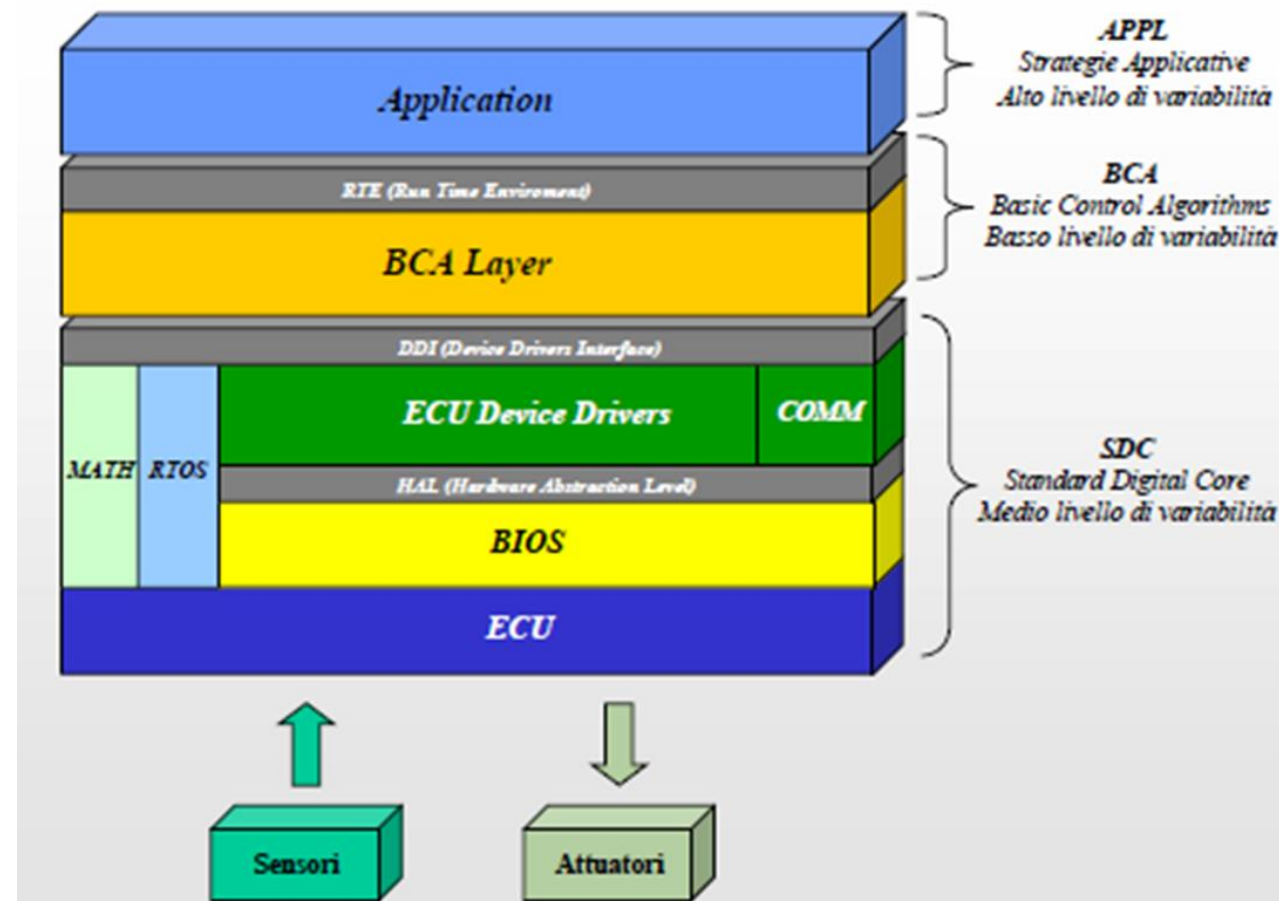
ECUfoo Implementation (Live Demo)

ECU for Throttle control
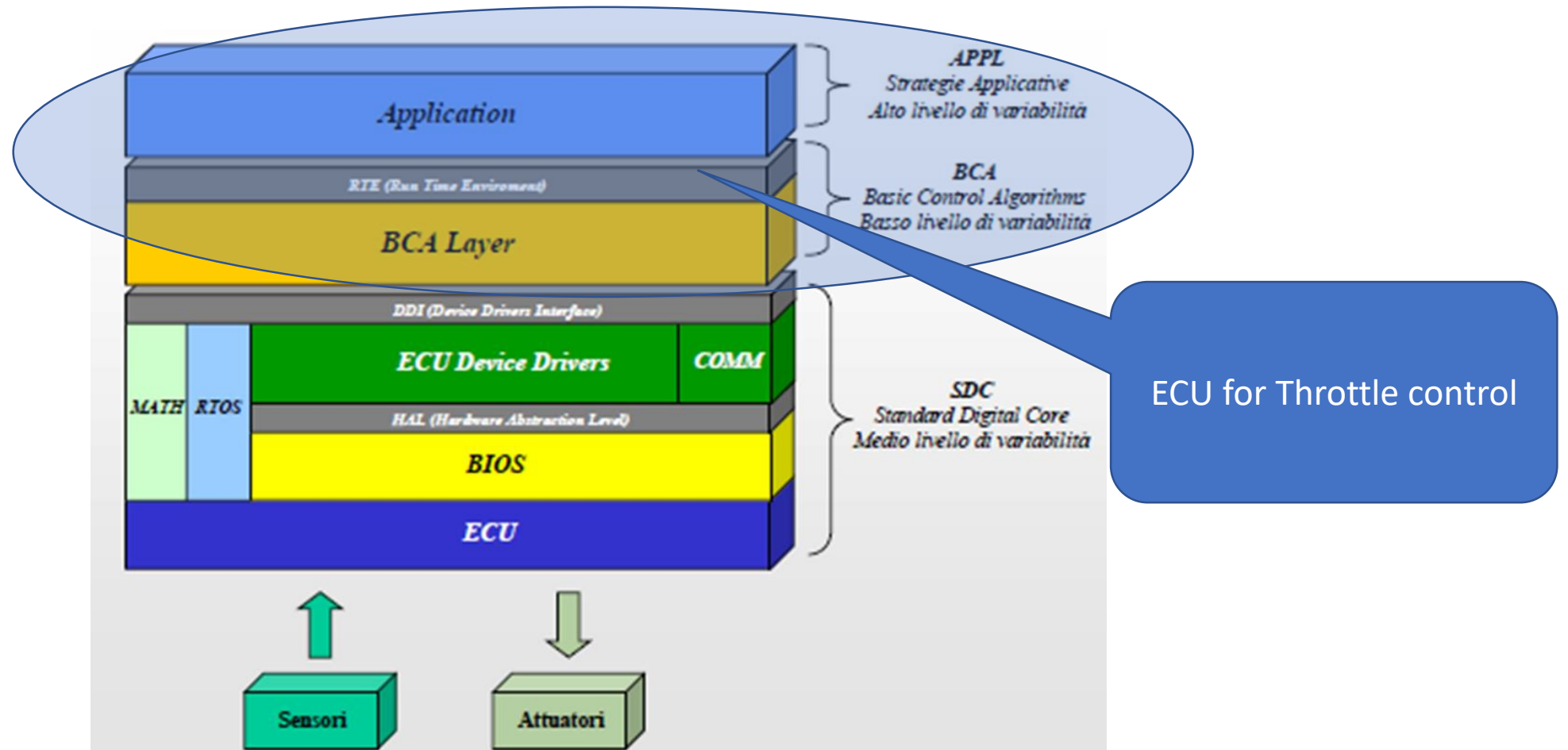
ECU Software Development adopting the ISO/IEC 12207,15504 standards

- **Quality orientated process approaches and standards are maturing and gaining acceptance in many companies**

- Standards emphasize communication and shared understanding

- For example: if one person says, "Testing is complete", will all affected bodies understand what those words mean?

- This kind of understanding is not only important in a global development environment; even a small group working in the same office might have difficulties in communication and understanding of shared issues

- Standards can help in these and other areas to make the business more profitable because less time is spent on non-productive work

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Benefits

- The use of standards has many potential benefits for any organization
- Improved management of software
- Schedules and budgets are more likely to be met
- Quality goals are likely to be reached
- Employee training and turnover can be managed
- **Visible certification can attract new customers or be required by existing one**s
- **Partnerships and co-development, particularly in a global environment, are enhanced**

Importance of standards

- Encapsulation of best practice
- Avoids repetition of past mistakes
- **Framework for quality assurance process (Must be implemented)**
- **It involves checking standard compliance (Must be implemented)**
- Provide continuity
- New staff can understand the organization by the standards applied

ISO/IEC 12207

- Is an international software engineering standard that defines the software engineering process, activity, and tasks that are associated with a software life cycle process from conception through retirement

- The standard has the main objective of supplying a common structure so that the buyers, suppliers, developers, maintainers, operators, managers and technicians involved with the software development use a common language

- It aims to be 'the' standard that defines all the tasks required for developing and maintaining software

ISO/IEC 15504

- ISO/IEC 15504, also known as SPICE (Software Process Improvement and Capability Determination), is a framework for the assessment of processes