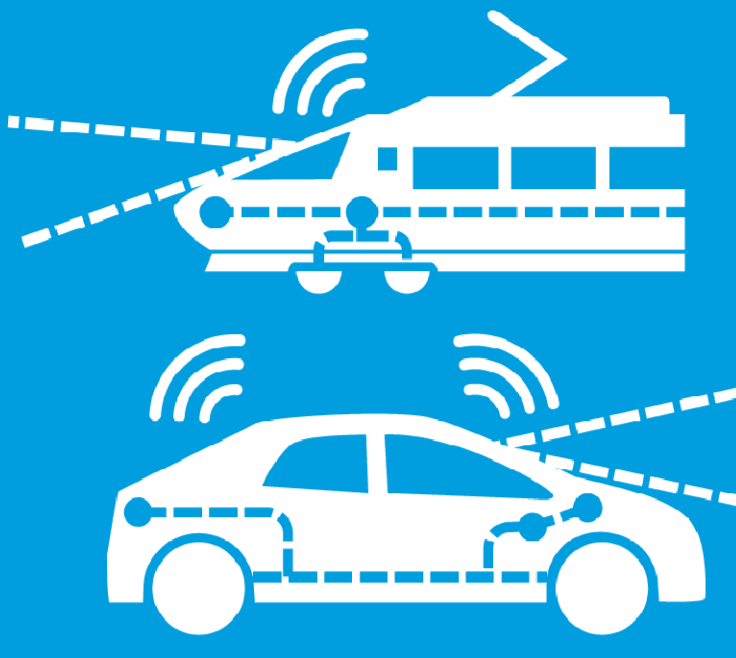


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N°5.3

## Automotive Electronics and Software



In the automotive business today, the embedded architectures are constantly evolving. Thus, the ambition is to support technological and economic challenges generated by the connected car market and the advanced driver assistance systems (ADAS).

### 1. Context and Issues

#### Opportunities

**Car and its usage evolution:** electrification, ADAS popularization (e.g. active safety, autonomous driving), car sharing & multi-modal trip deployment, legal requirement strengthening (e.g. eCall, car2car)

**ICT technology affordability:** onboard computing power, embedded networking and sensors, broadband mobile communication

#### Issues

**Design & validation complexity:** new architectural paradigms, e.g. resource sharing, asynchronous, concurrent or massively parallel treatments, cooperative/communicating ADAS

**Security & safety:** Internet proximity, multiplication of car radio interfaces, architecture complexity, asynchronous execution flows

### 3. Innovation

#### Project work-packages

- Real-time virtualization
- Embedded image processing for ADAS
- Multi-core & parallel real-time algorithms
- Cybersecurity
- Networking
- Design processes and tools, validation and integration
- Demonstration & dissemination

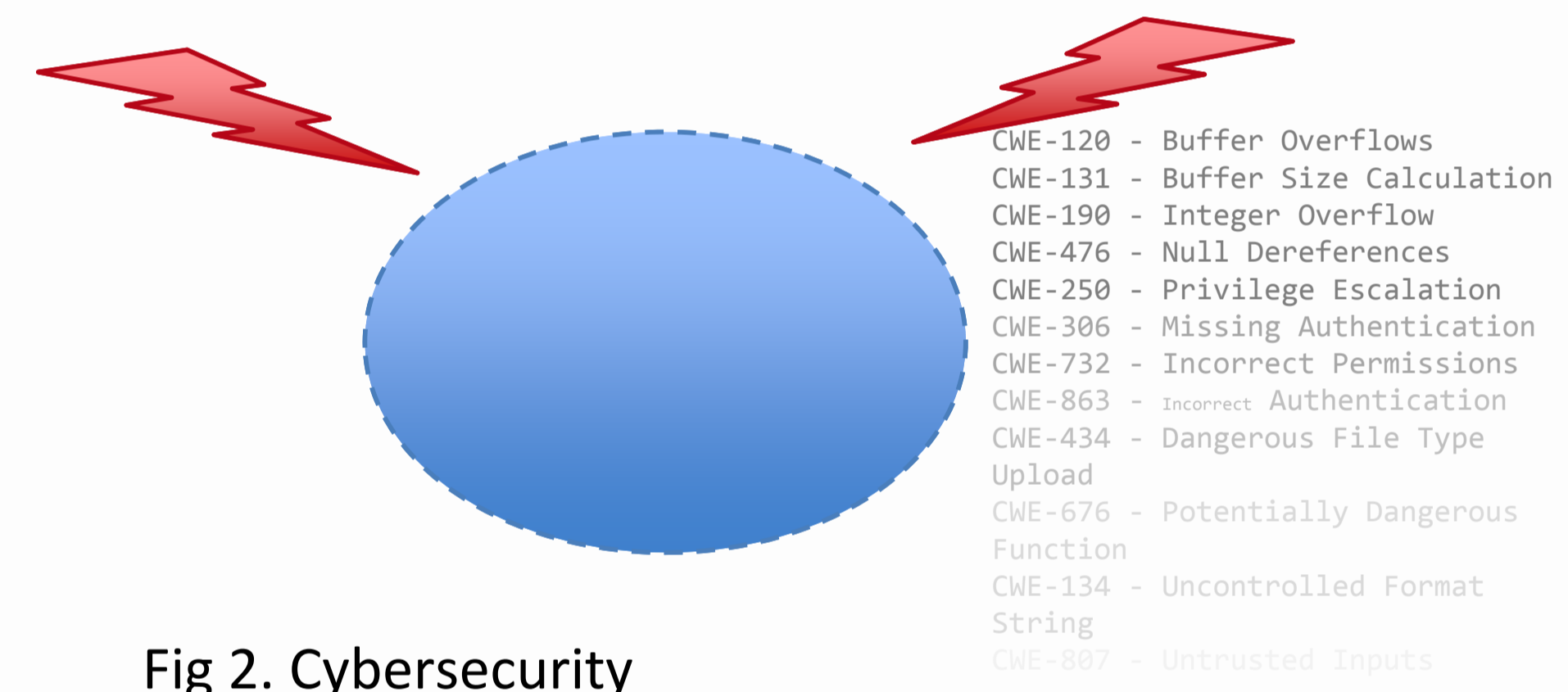


Fig 2. Cybersecurity

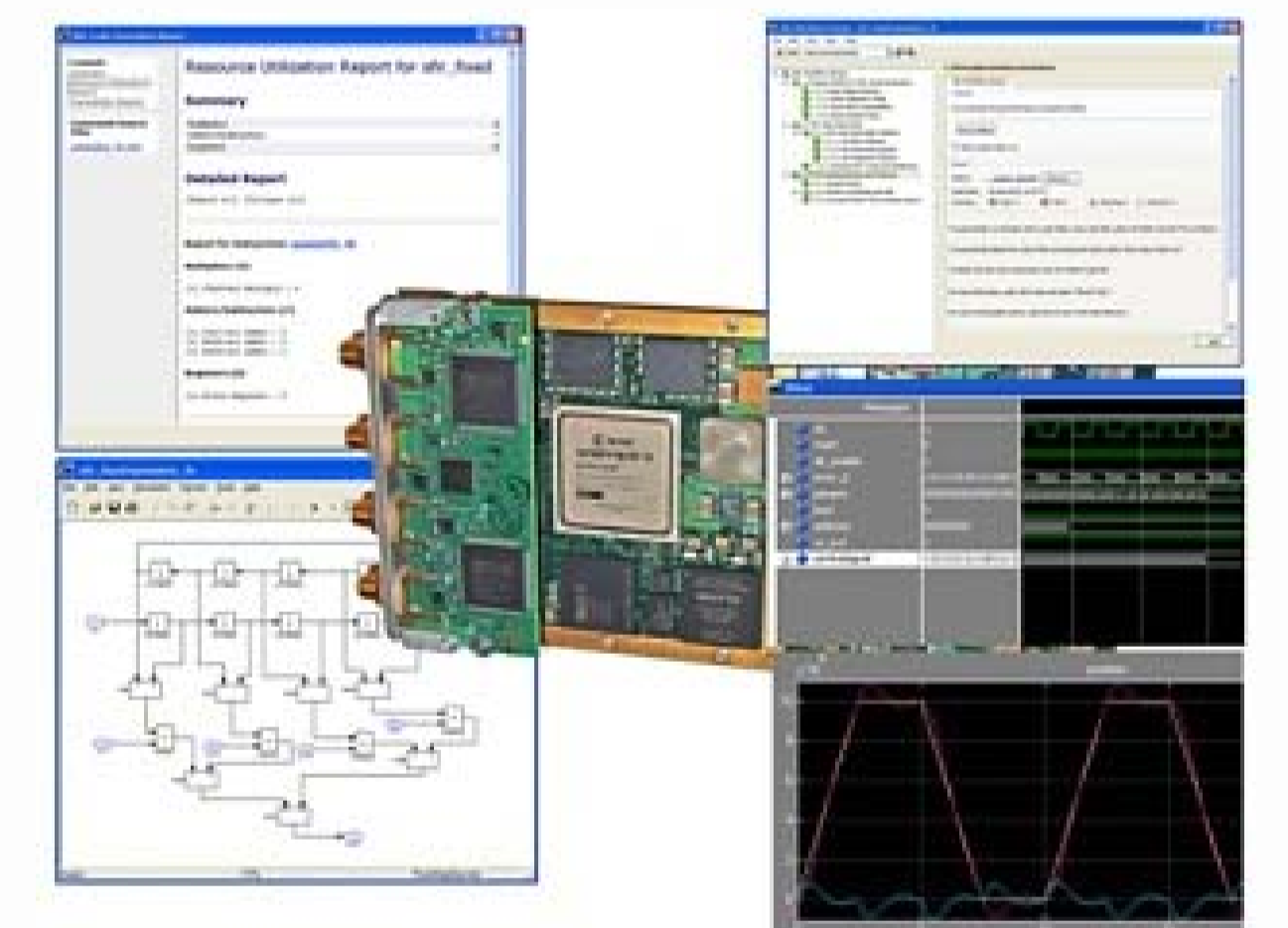


Fig. 3 – Design Processes and tools, validation and integration

### 2. Challenges

- Definition of **architectural patterns**, choice and/or development of associated components
- Design **methodology** definition, choice and/or development of necessary **tools**

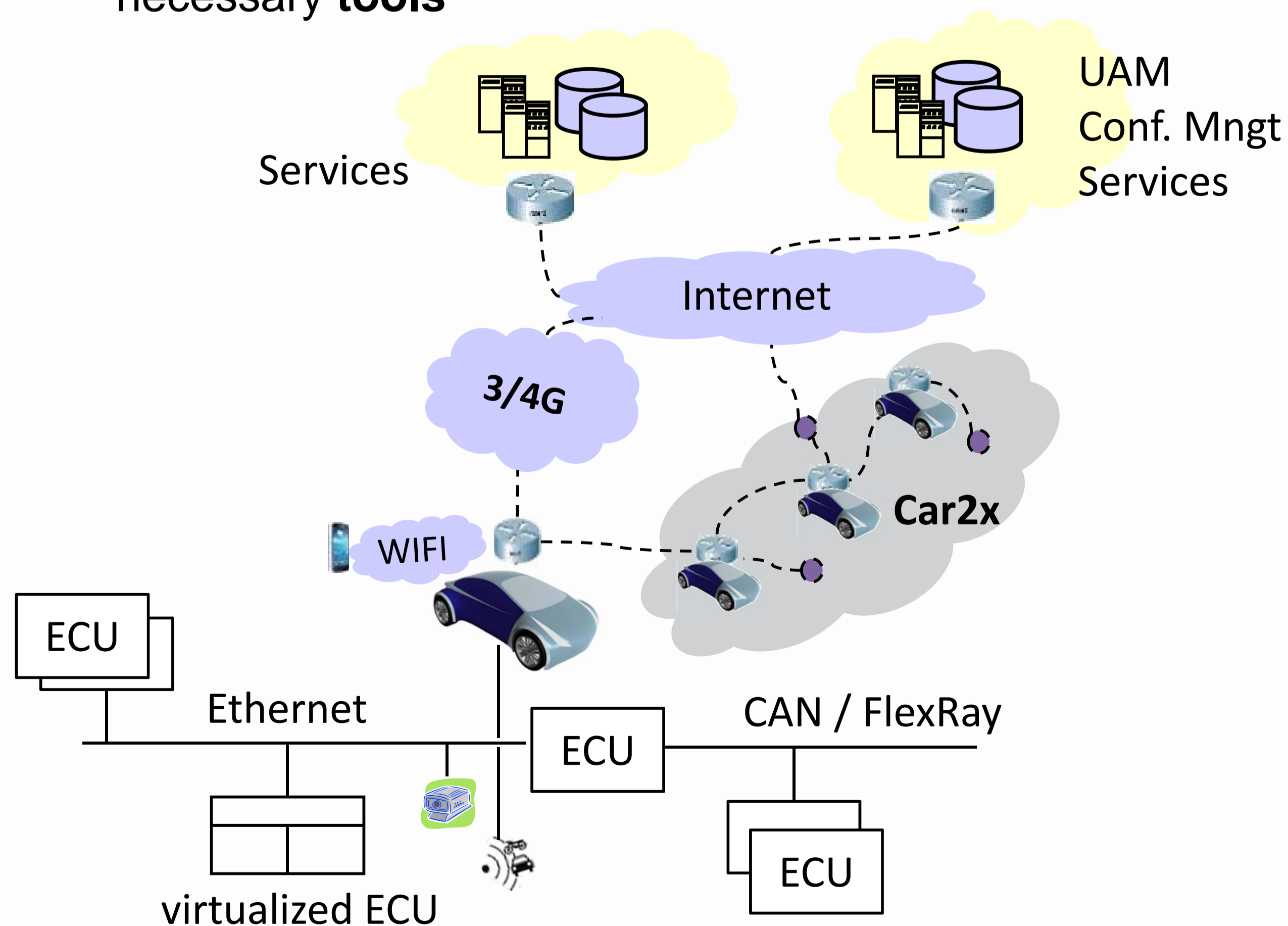


Fig 1. Car ecosystem

### 4. Expected Results

	1980	1990	2000	2010	2020	+	
<b>PERFORMANCE EXPECTATIONS</b>	<ul style="list-style-type: none"> <li>• Electronic injection</li> <li>• ABS braking</li> <li>• ORB system</li> </ul>	<ul style="list-style-type: none"> <li>• Automotive air conditioning</li> <li>• ESP stability programme</li> </ul>	<ul style="list-style-type: none"> <li>• Cruise control/speed limiter</li> <li>• « Hands-free" access and start-up</li> </ul>	<ul style="list-style-type: none"> <li>• Multiplication of Advanced Driver Assistance Systems (ADAS)</li> <li>• Connected cars</li> <li>• Back-up cameras</li> <li>• 360-degree view</li> <li>• Ultrasound technology</li> </ul>	<ul style="list-style-type: none"> <li>• Automated Driving</li> </ul>		
<b>TECHNOLOGICAL BRICKS</b>	<ul style="list-style-type: none"> <li>➢ Electronic sensors</li> <li>➢ Microcontrollers</li> </ul>	<ul style="list-style-type: none"> <li>➢ Multiplexing (VAN, CAN)</li> </ul>	<ul style="list-style-type: none"> <li>➢ Real-time embedded software architecture (Autosar)</li> <li>➢ Car safety (ISO26262)</li> </ul>	<ul style="list-style-type: none"> <li>➢ Infotainment embedded software architecture (GenIVI)</li> <li>➢ High speed broadband</li> <li>➢ Multicore processing</li> <li>➢ Virtualization</li> <li>➢ Software safety</li> </ul>			

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