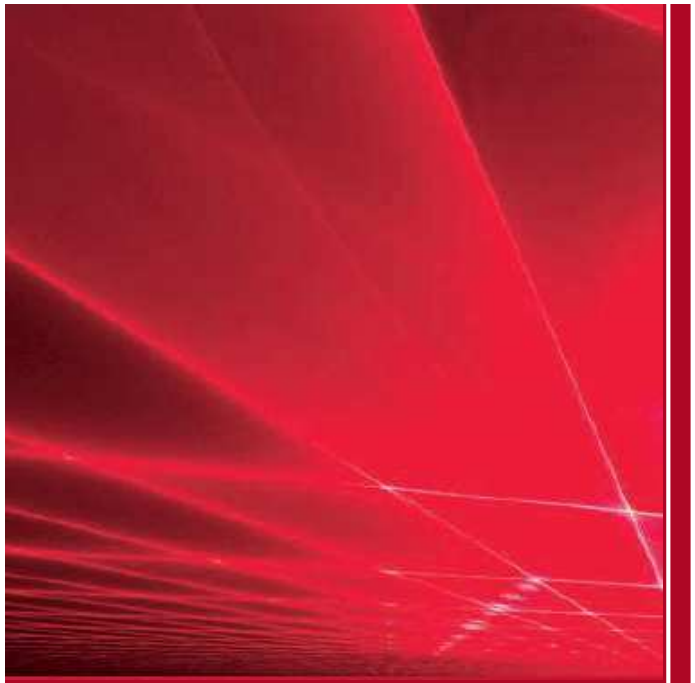


SAFety and secURity by dEsign for interconnected mixed-critical CPS

Carolina Reyes, TTTech Computertechnik AG

ARTEMIS Spring Event
14th April 2016
Vienna, Austria

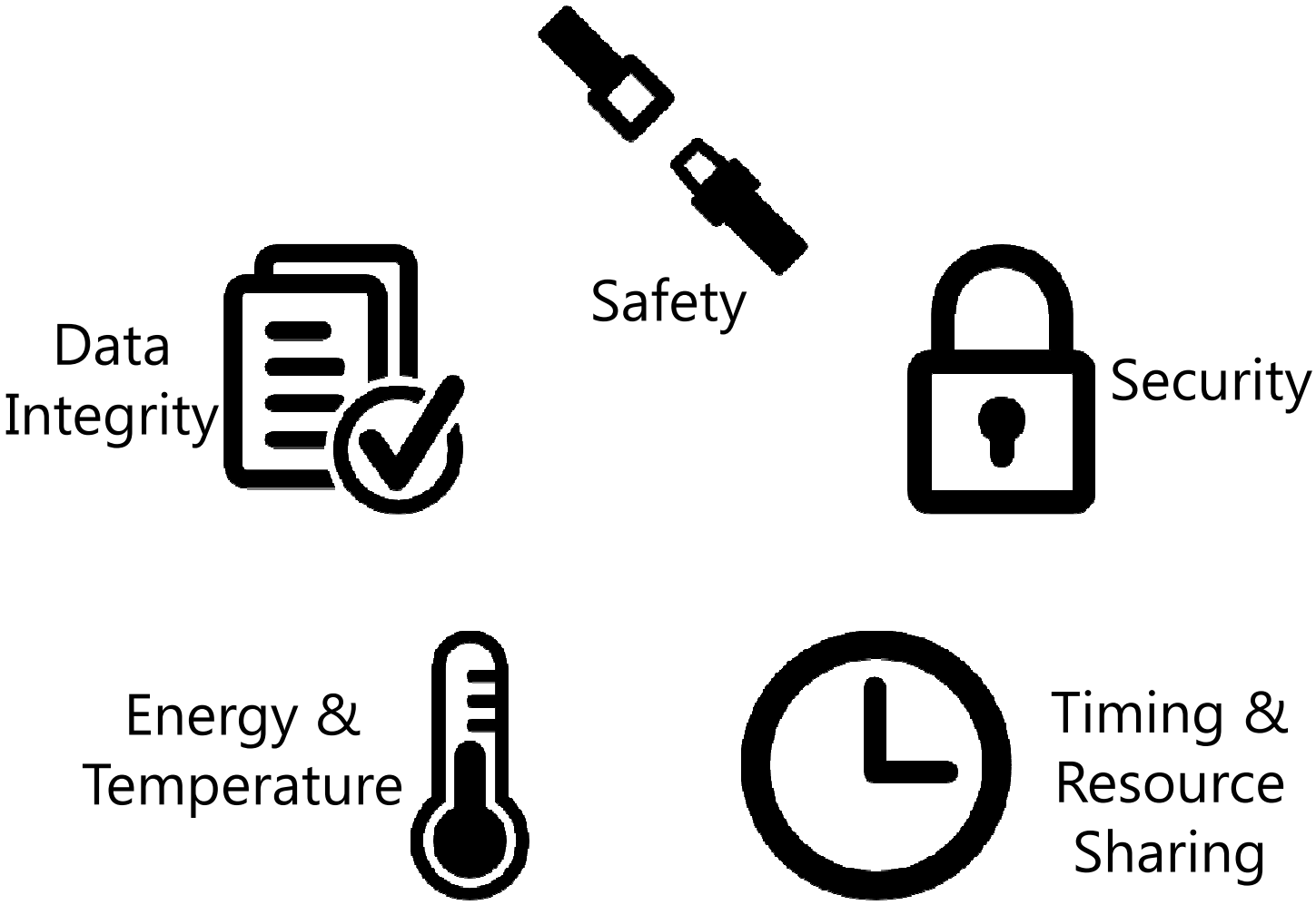
SAFURE

SAFety and secURity by dEsign for interconnected mixed-critical cyber-physical systems

Introduction

- Current trends in embedded systems:
  - **Multi-core** architectures
    - Energy efficiency
  - **Networking**
    - TTEthernet, WiFi, Bluetooth LE
  - **Real-time** response
  - **Safety-critical** functions
    - Medical devices (insulin pumps)
    - Automotive (crash avoidance, driver assistance)

Criticalities



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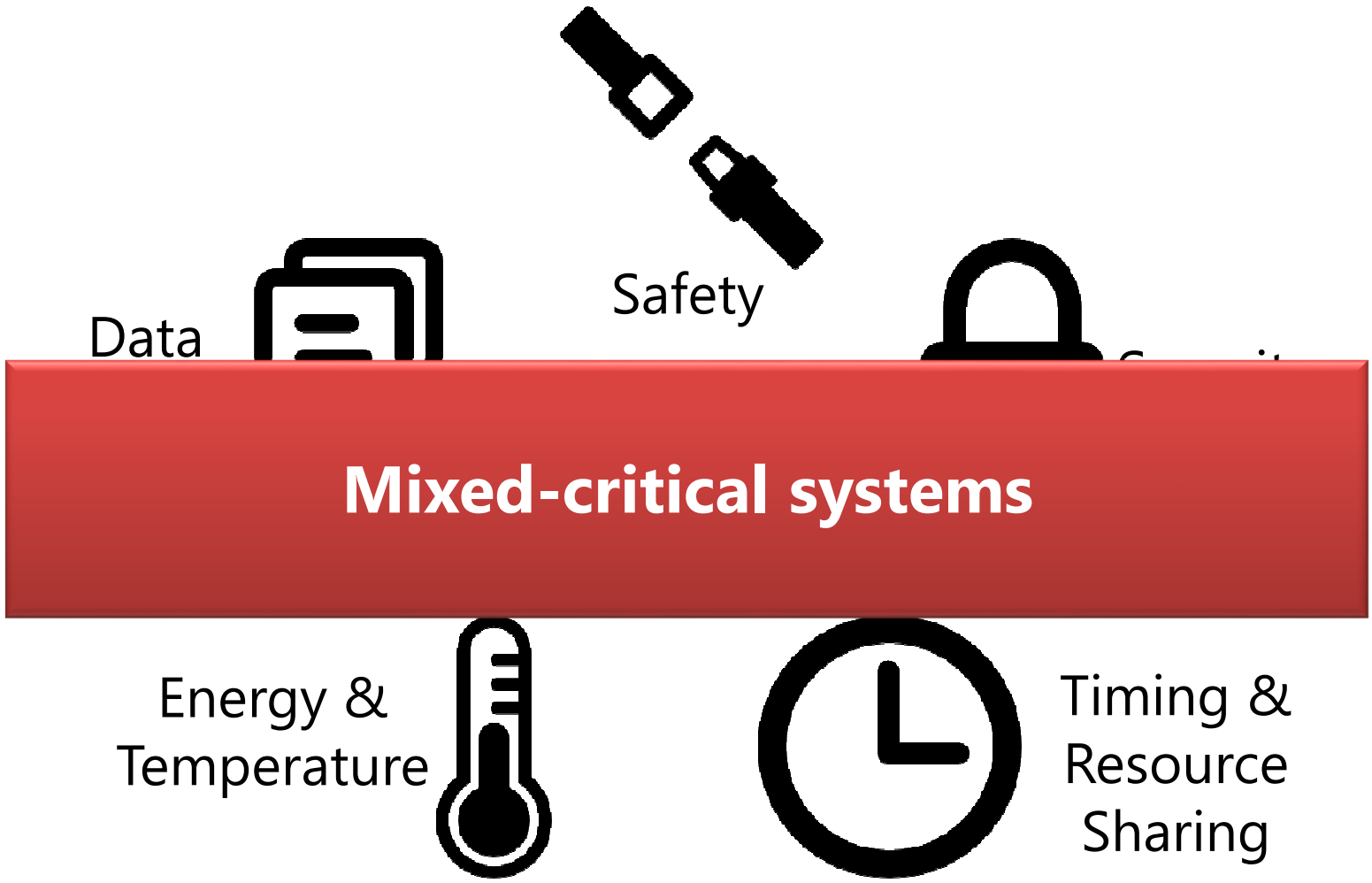
Criticalities



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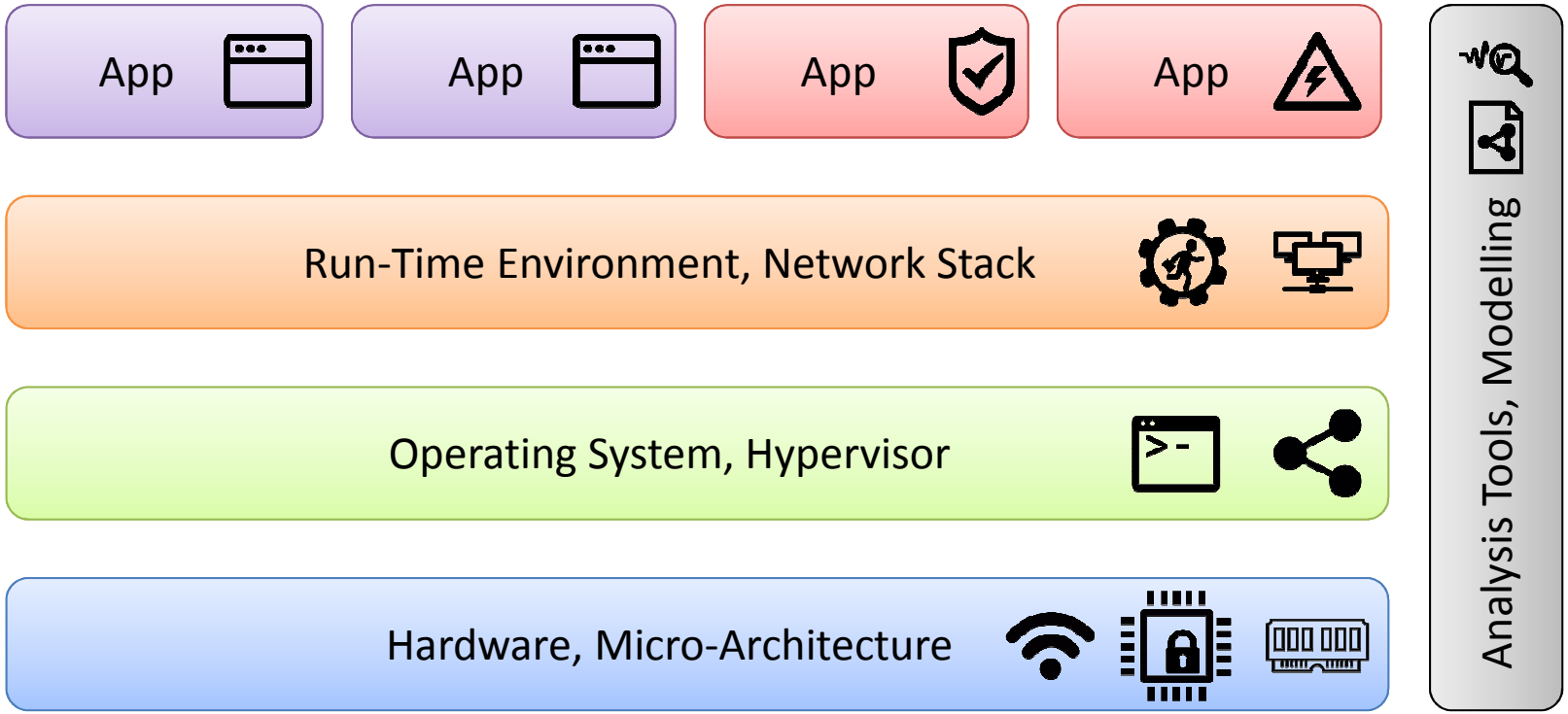
SAFURE Project

- Ambition:
  - Create & apply **methodology** to develop Cyber-Physical Systems
  - Consider mixed criticalities
- Problem:
  - Criticalities are often **not considered jointly**, or
  - applied **one on top of the other**
- Idea:
  - Integrate mixed criticalities **by design** into development process

SAFURE Project – Approach

- Enable criticalities **"by design"** across all levels



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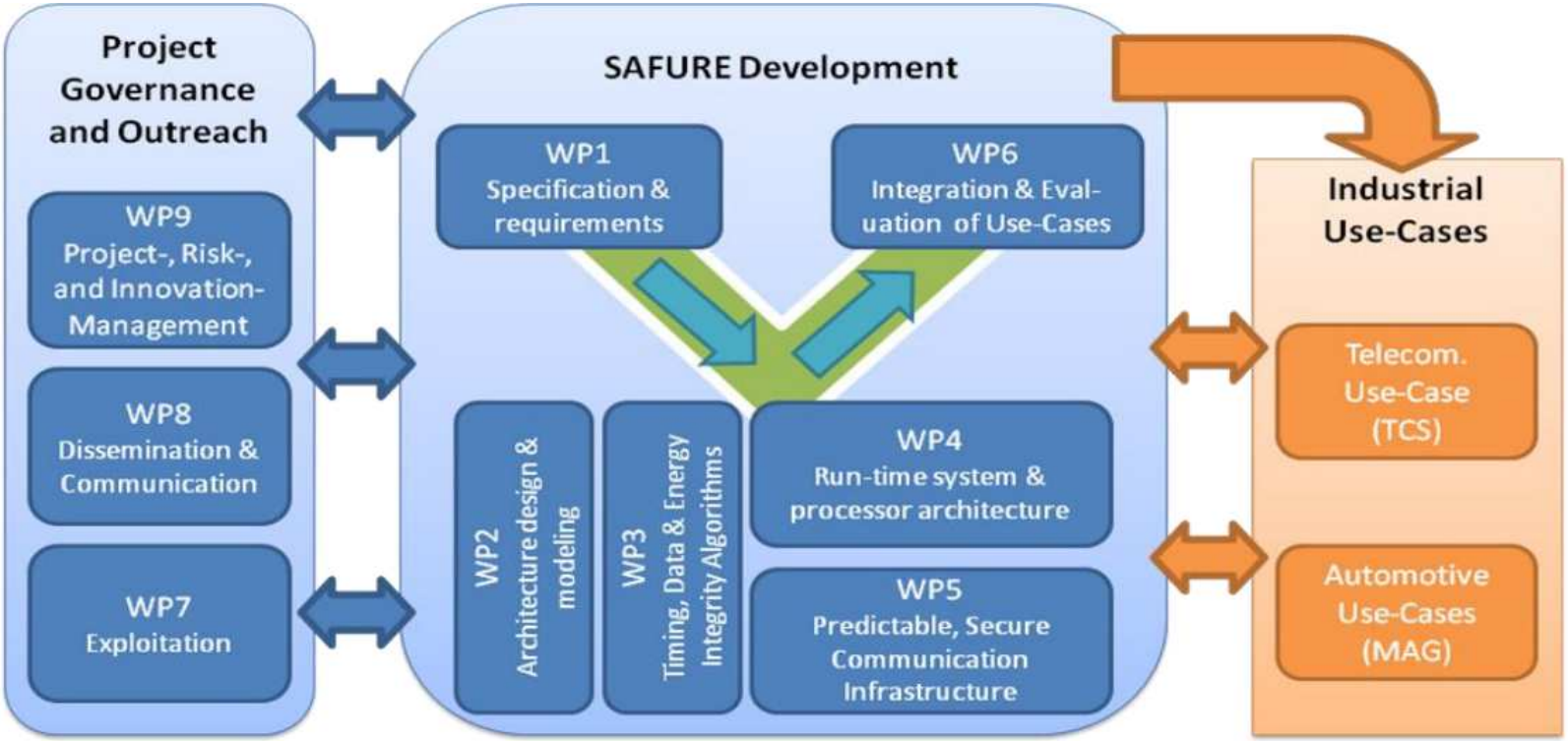
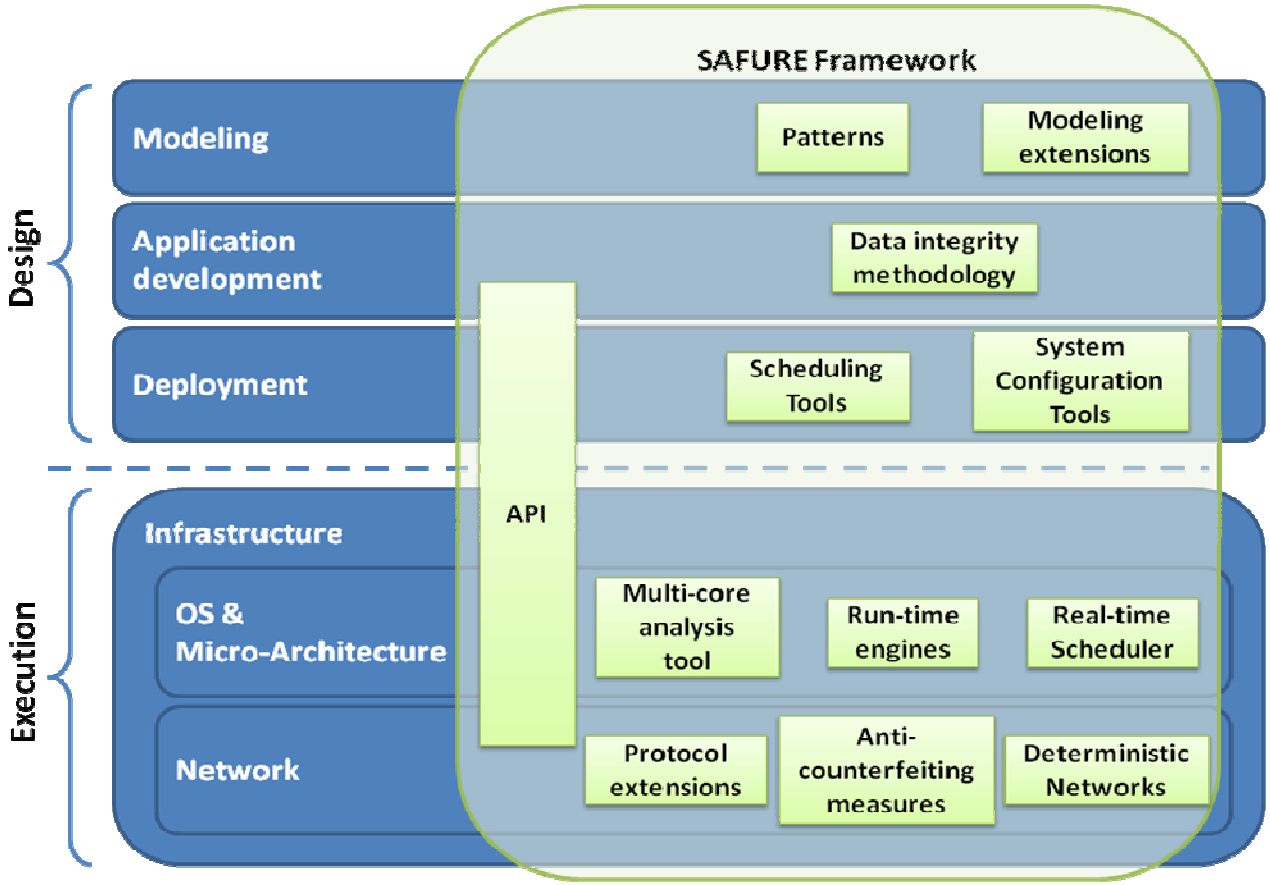
SAFURE Project – WP Structure

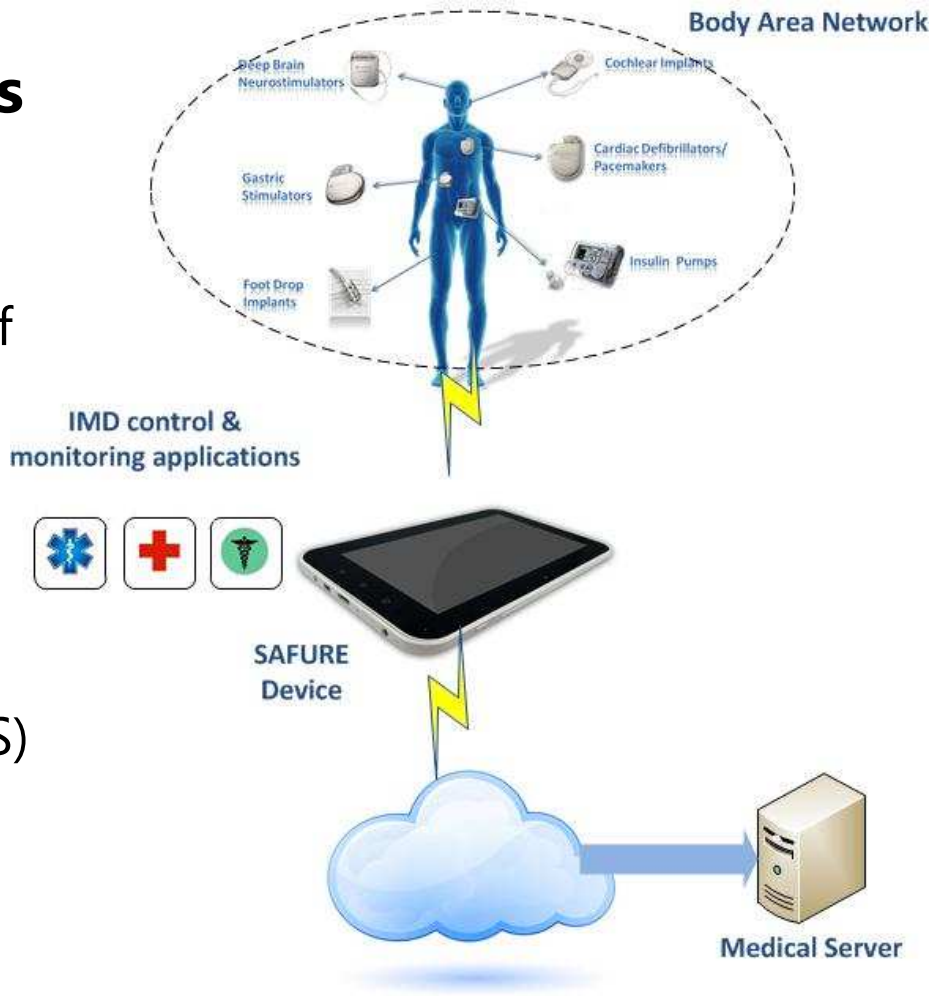


SAFURE Framework



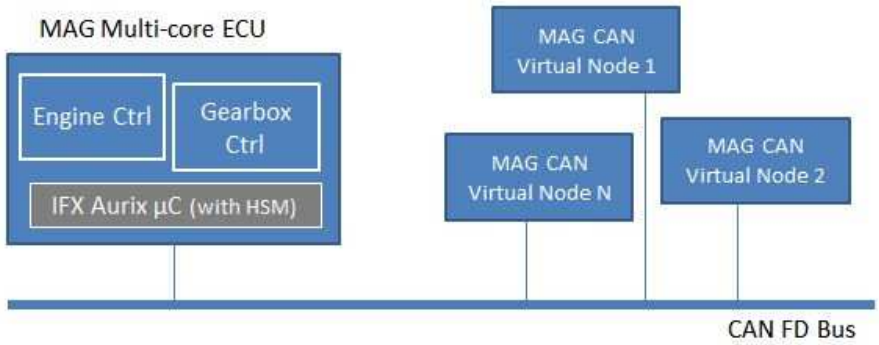
SAFURE Industrial Use Cases (I)

- **Telecommunications Use Case**
  - Body Area Network
  - Remote monitoring of a patient's health status
  - Device: Qualcomm Dragonboard 810
  - PikeOS (real-time, microkernel-based OS)



SAFURE Industrial Use Cases (II)

- **Automotive Multi-Core Use Case**
  - Engine, valve and transmission control
  - Compliance with ISO-26262 (automotive safety)
  - Data integrity on Intra-ECU / Inter-ECU communications
  - Data protection
  - Timing analysis
  - Infineon Aurix (incl. HSM)
  - ErikaOS (real-time, AUTOSAR-compliant OS)

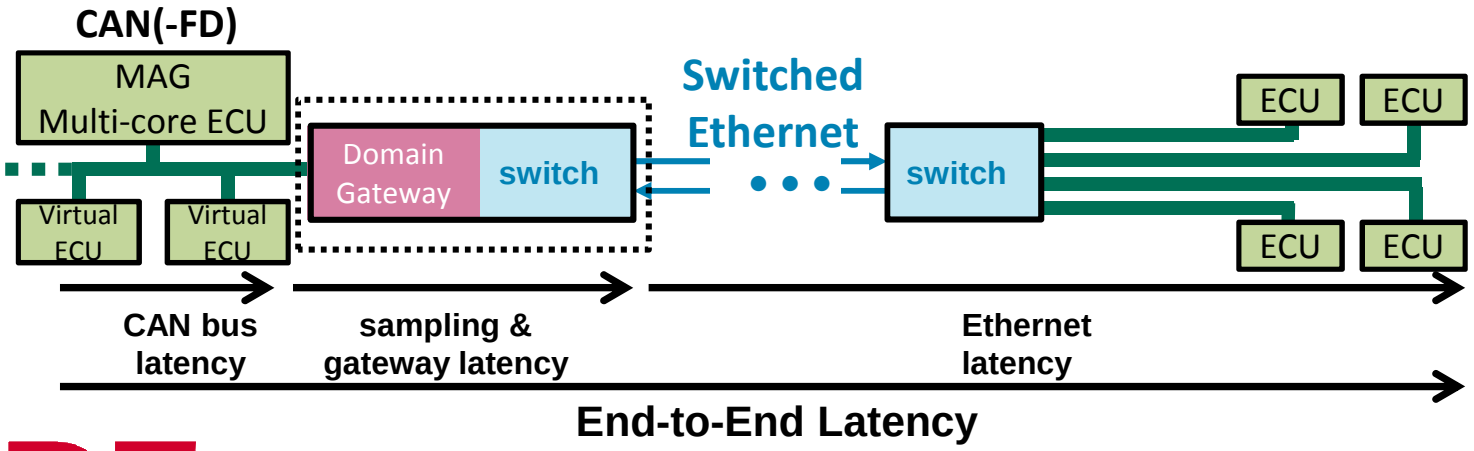


SAFURE Industrial Use Cases (III)

- **Automotive Network Use Case**
  - Ethernet will be the backbone network in future vehicles
  - Fail-operational communication required for highly-automated/autonomous driving
  - Connected vehicles require security to prevent attacks
  - Real demonstrator
    - Time-Triggered Ethernet (TTEthernet)
  - Virtual demonstrator
    - Based on software simulation

SAFURE Industrial Use Cases (IV)

- **Use Case Combination**
  - Demonstrate combination of multi-core and network use cases
  - Inter-domain CAN(-FD) traffic from multi-core ECU to Ethernet (and back)
  - Ensure safety and security requirements by the SAFURE data, timing, and energy integrity solutions



SAFURE Project Partners

More Information

- SAFURE website:
  - https://safure.eu/
- Blog:
  - https://safure.eu/blog
- Twitter:
  - https://twitter.com/SAFURE_H2020
- LinkedIn:
  - https://www.linkedin.com/grps/H2020-SAFURE-Friends-8284939/about

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If you need further information, please contact the coordinator:

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