Nora Koch
fortiss GmbH
An-Institut Technische Universität München

Co-funded by the Horizon 2020 Framework Programme of the European Union under grant agreement no 645119
Cyber–Physical Systems that can be extended during operation adding **functionalities** on demand

- Functional extension by **Apps**, as it is already common for mobile and other consumer devices
- Apps (new services and customization features) provided by **3rd parties**

**Extensibility**

**Pro**
- Enables products to keep pace with user expectations and latest technologies (eco-system)

**Cons**
- Apps imply safety, privacy & security risks

Nora Koch – fortiss – Road2CPS – Vienna – April 14, 2016

www.tapps-project.eu
TAPPS Approach: Multiple Layers of Security

1. Verified Apps to ensure correct and secure behavior
   • model-checking, model-based development, toolchain

2. Fine-grained access control to resources of the CPS devices to ensure safety and privacy
   • communication with critical interfaces

3. Tailored Execution Environments (EEs)
   • spatial & temporal isolation of apps through virtualization

4. Special hardware equipped with security mechanisms
   • ARM multi-core processor (normal/secure world)

5. Trusted network
   • virtual end-to-end channels, transfer of mix-critically content
Key Issues of TAPPS Architecture

End-to-end solution

Application Model → Application Container → App Store

trusted toolchain

Execution Environments

Rich EE  Trusted EE  Critical EE

Trusted HW & Networks

Normal World  Secure World

sCAN  TTEth

Nora Koch – fortiss – Road2CPS – Vienna – April 14, 2016

www.tapps-project.eu
Automotive domain
• check trip capability based on traffic conditions and battery status
• sport package changing driving behavior
• braking adjustment depending on environment conditions

Healthcare domain
• automatic drawers for safe drug management
• patient identification
• access to electronic health records
• monitoring of vital signs
Dissemination

- Internet of Things Conference, Berlin, March 2015
- Automotive Linux Summit, Tokyo, June 2015
- Innovative Software Development in Automotive, Munich, Oct. 2015
- Emerging Ideas and Trends in Engineering of CPSs Workshop, Vienna, April 2016

Upcoming Events
- Cyber Security and CPS, Vignola, May 2016
- Industrial Technologies, Amsterdam, June 2016
- Automotive Linux Summit, Tokyo, July 2016
- Automotive Ethernet Congress.de, Munich, Feb. 2017
Thanks for your attention!
nora.koch@fortiss.org