23. Software Ecosystems

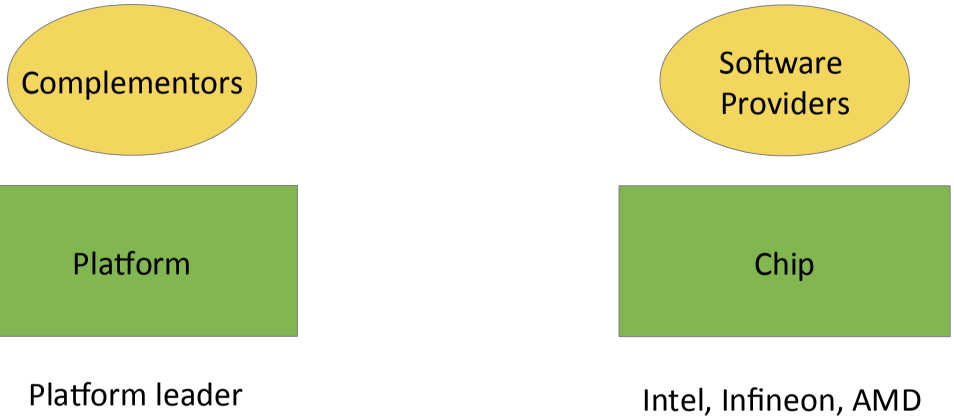
Prof. Dr. Uwe Aßmann
Technische Universität Dresden
Lehrstuhl Softwaretechnologie
Version 13-0.1 - 02.01.14

1) Software Platforms and Ecosystems
2) Software Ecosystems for Cyber-Physical Systems

23.1. Software Platforms and Software Ecosystems

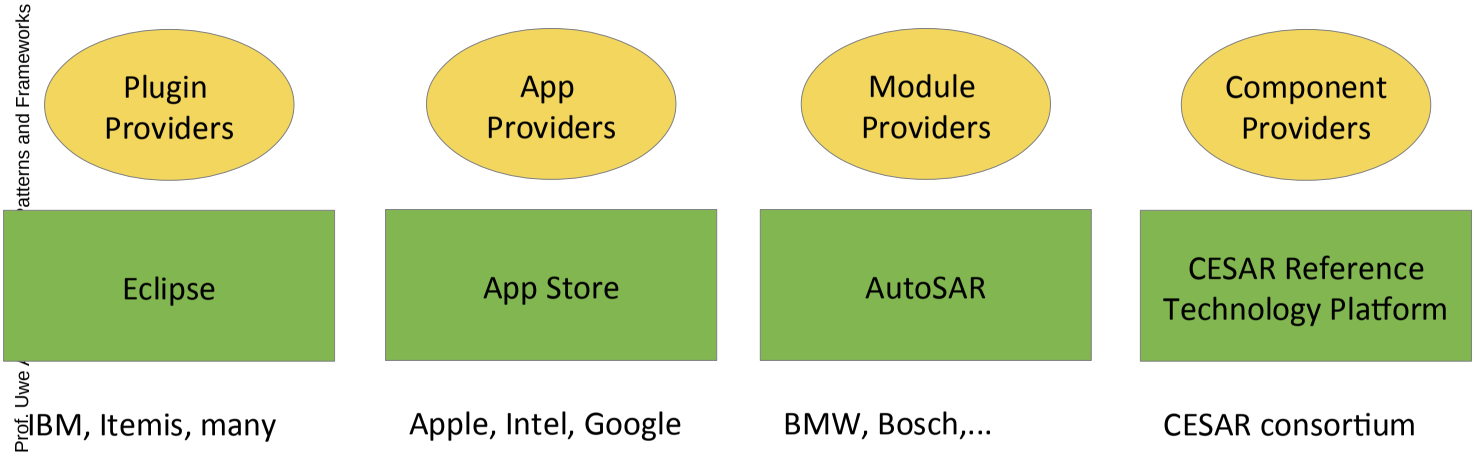
Platforms and Ecosystems

- „Platforms, not only products“ (Buch „Staying Power“ Michael Cusumano)
- Marktplätze brauchen Marktplattformen
  - Mit Vendor Lock-In

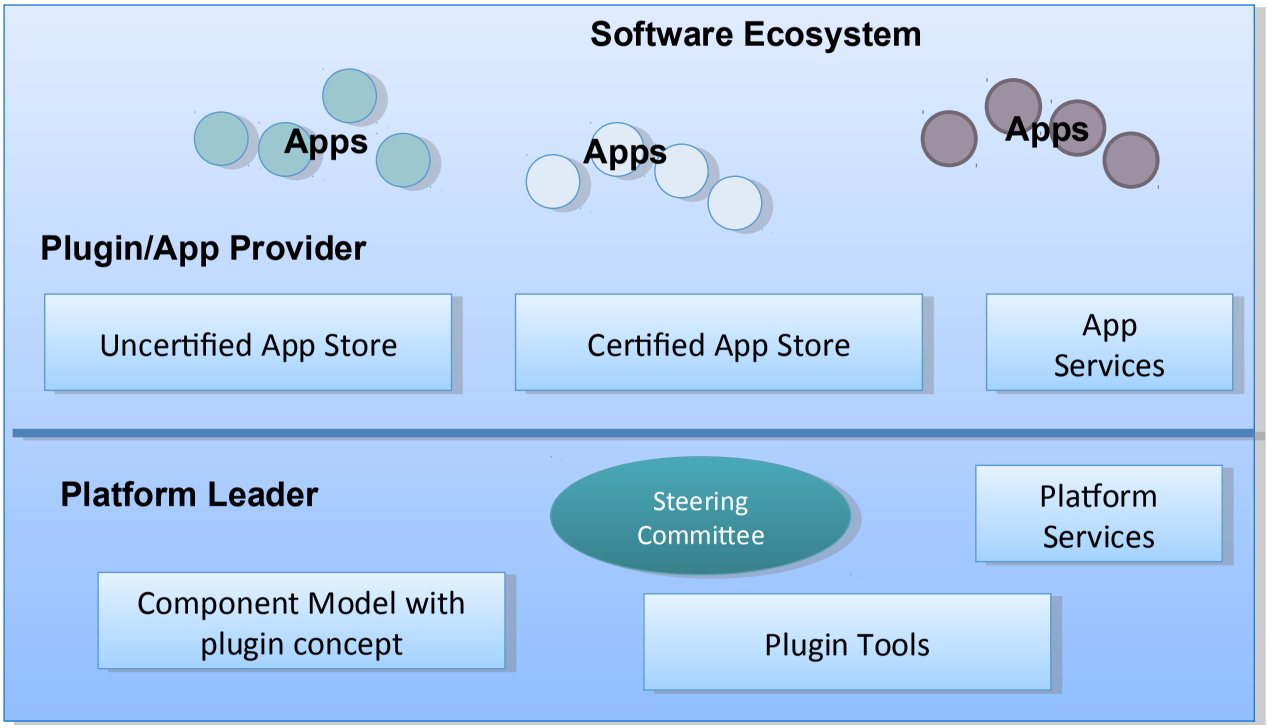


Plattform Leadership

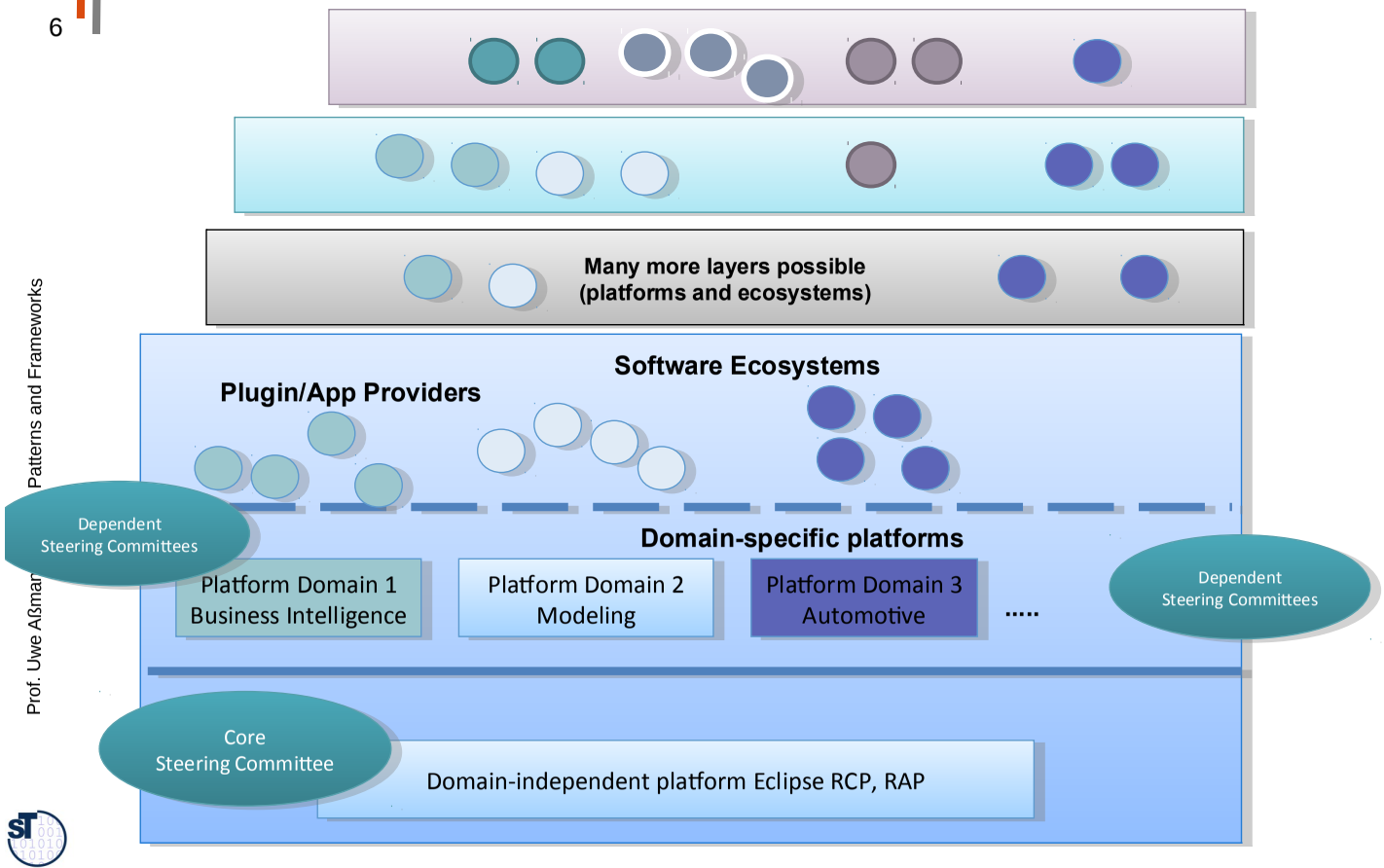
- Platform leadership und „platform wannabie“
- Platform can be open or closed
- Platform can be for end users or for developers



Software Ecosystems a la iPad, AutoSAR, GENIVI



Layered Platforms and Layered Ecosystems (Eclipse.org)



Pay per Membership of the Foundation

- Determined by bylaws of the foundation
- 1 vote costs
  - labor money: e.g. 1 py per vote
  - travel money, rent,..
- Votes can be splitted

Software Ecosystems

„An Eclipse-like software ecosystem relies on a modularity technology and business model“

Modularity Technology:

- Rich component model with plugin concept and non-functional verification
- Framework extension language

»Business model:

- Steering committees control the platforms and pay fees for their votes

Business Value for a Member of the Core Platform Steering Comittee

- Right to set
  - Standards for the future CPS ecosystems
  - Share a part of the markets
- Right to vote
  - Decision about dependent domain-specific platforms
  - Decision about dependent domain-specific projects
  - Decision about VIP-push projects for third parties
- Right to get transfer projects
  - Tailored, non-exclusive VIP-push projects
  - Tailored, exclusive Cell-pull projects
    - Student cell projects
  - Research rotation projects
  - Industry PhD projects
  -
-

Vendor-Lock-in-Mechanisms

- Creation of service markets on the platforms („Marktrecht“)
- Certification right (admission of applications)
- Deployment right (Installation right)
- Sales right, Distribution right (see Apple AppStore)
- Licensing for interfaces, tools, infrastructure

23.2. Software Platforms and Software Ecosystems for CPS

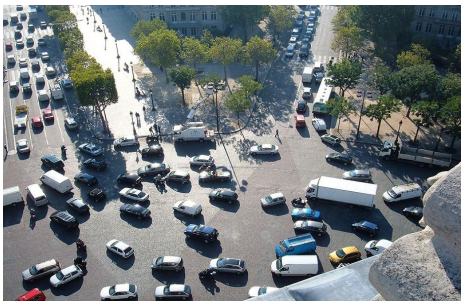
What are Cyber-Physical Systems (Resubic Systems)?

Mixed-Reality Interaction

Cloud

Embedded

Ubiquitous



Cyber-physical

Mit Cloud vernetzte eingebettete Systeme

Resubic systems „Human CPS“

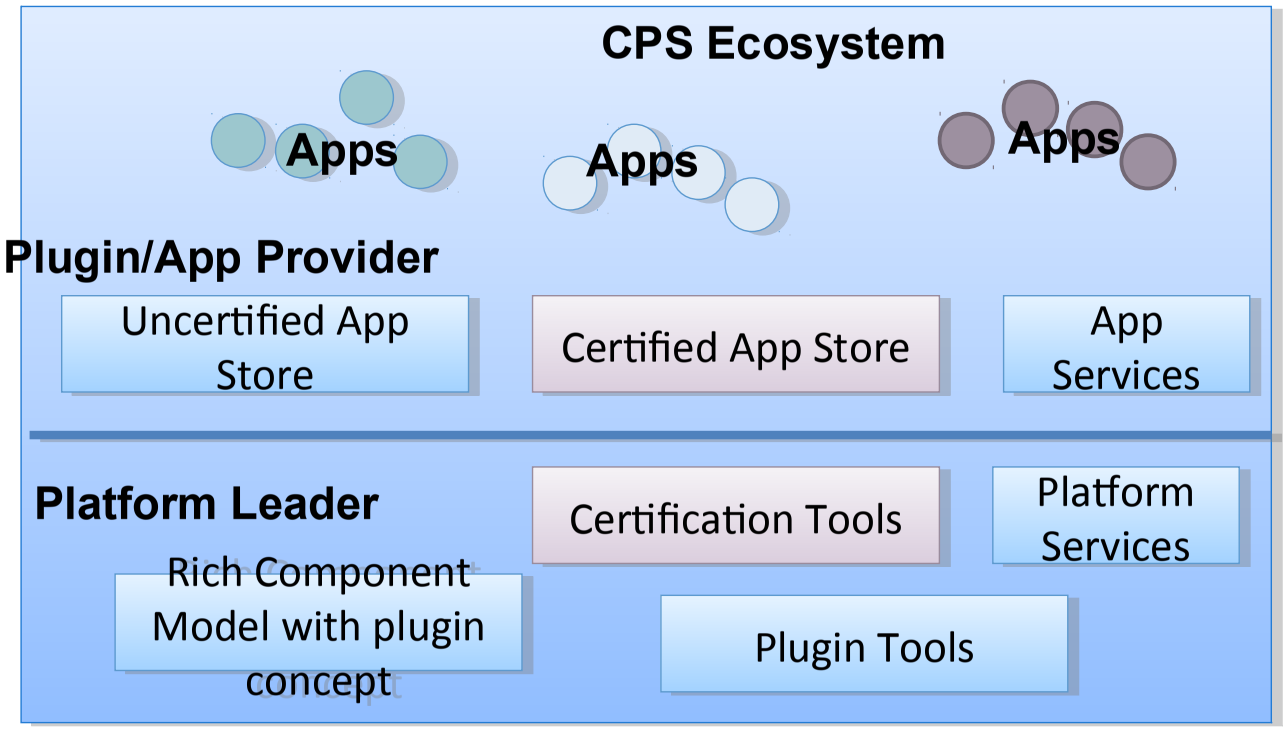
CPS-Plattform-Leadership

- In a supply chain or value chain, each level can form an ecosystem on its own, with specific platform

Who is going to own the CPS platforms?

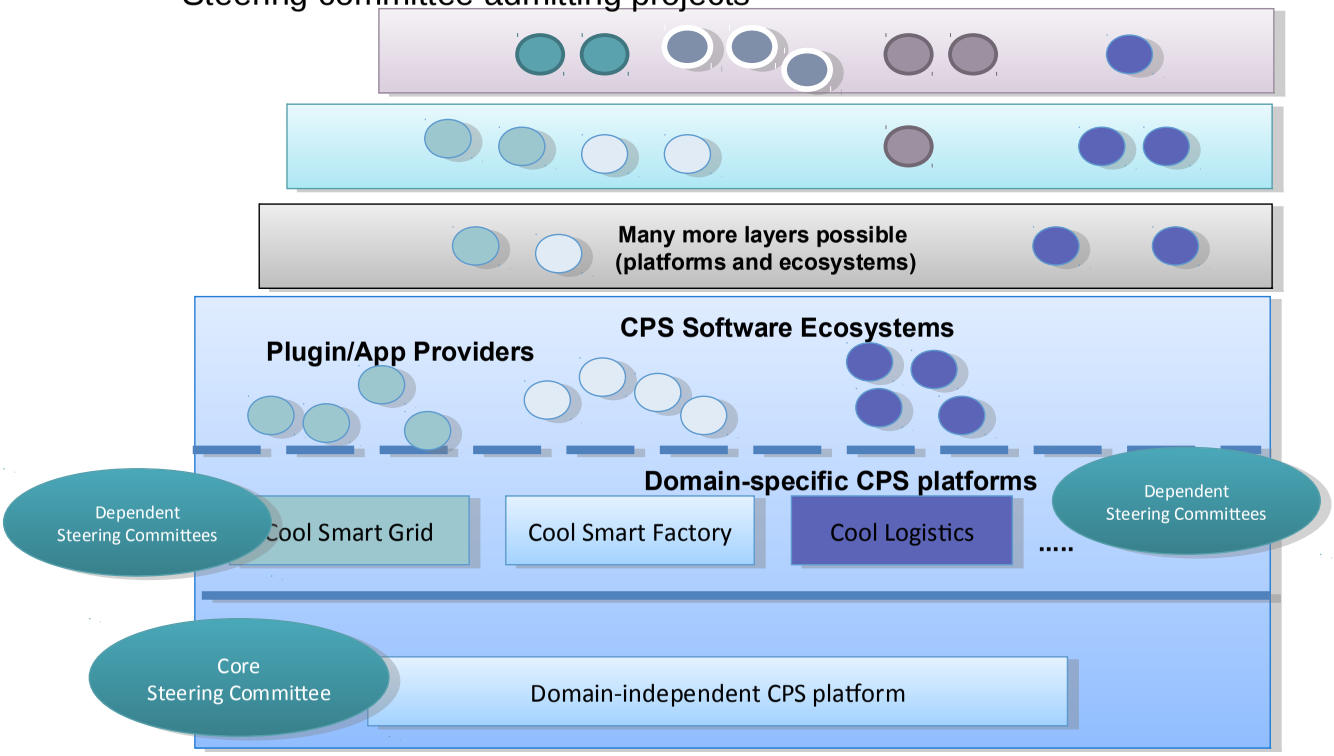
Basic CPS Software Ecosystems

- Divided by platform leader and App provider
- Apps are safety-critical and must be certified

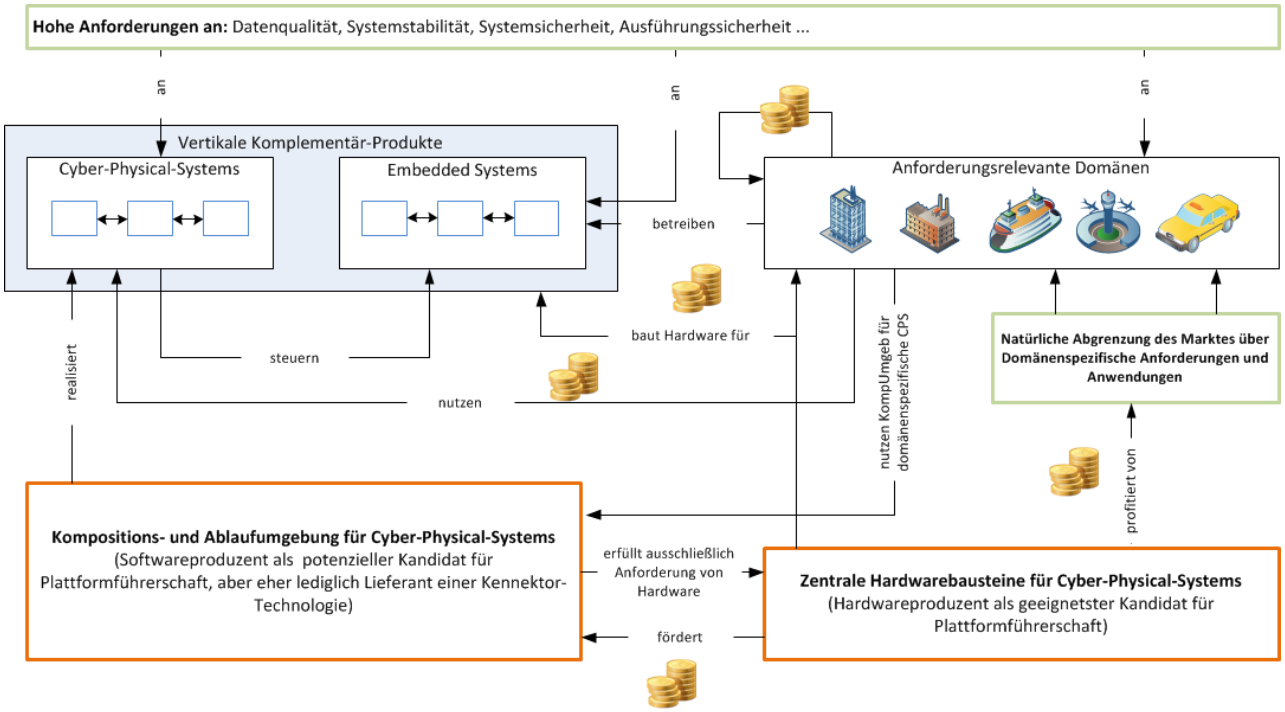


Layered CPS Software Ecosystems

- CPS ecosystems will be structured like the Eclipse ecosystem:
  - Layered platforms, hierarchic ecosystems
  - Steering committee admitting projects



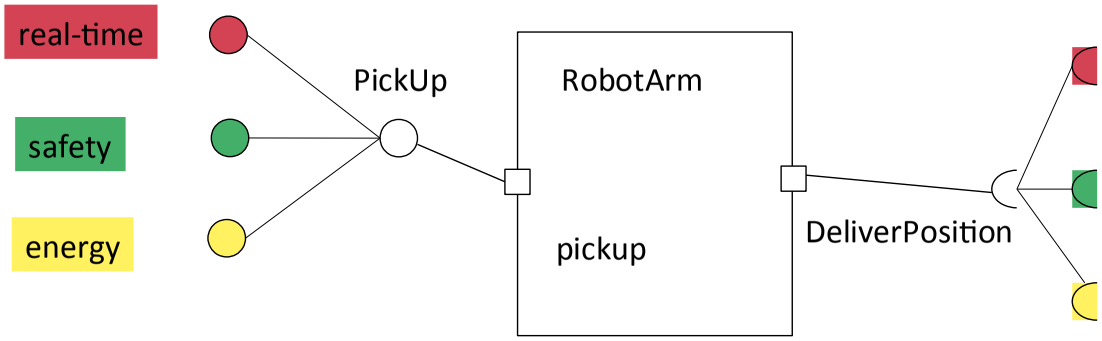
Platform Building



[Prof. S. Strahringer, TU Dresden]

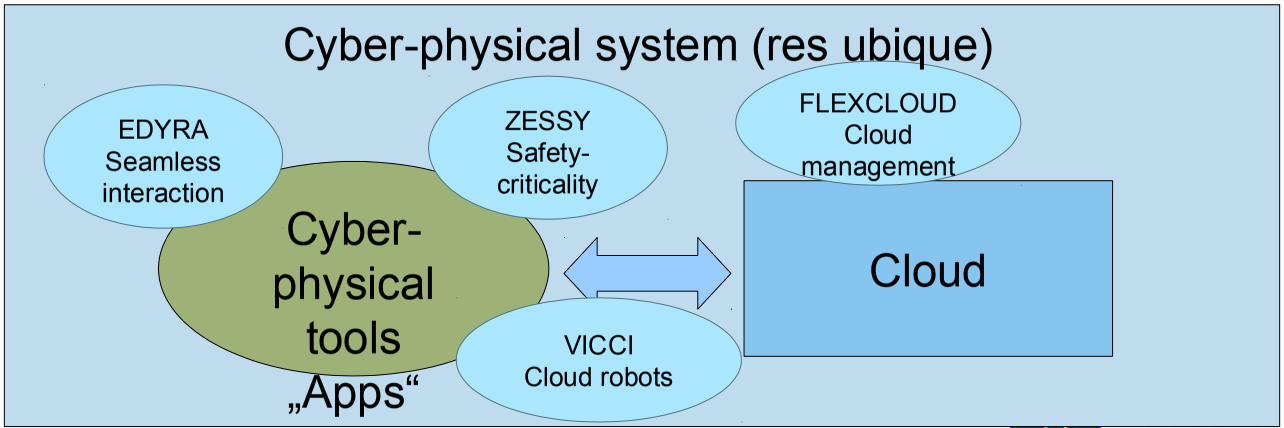
Prerequisites for a CPS Platform

- Component model for verification of safety-critical apps
- Software framework with Plugins/Extensions
- Extensions must be verified and certified
  - for function
  - for qualities
- more in CBSE



ResUbic Lab Dresden
Software Aspects

- Exploring cyber-physical systems (res ubique)
- ESF Young Researcher Groups
  - ZESSY: safety-critical cyber-physical systems
  - EDYRA: seamless interaction, personal info services
  - FLEXCLOUD: cloud management
  - VICCI: CPS control and cloud robots
- 6 Mio € 2011-14, ESF, SMWK
- Focus „Smart Office“



Gefördert aus Mitteln der Europäischen Union
EFRE Europäischer Fonds für regionale Entwicklung
SACHSEN