

23. Software Ecosystems

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 Version 13-0.1 - 02.01.14

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



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23.1. Software Platforms and Software Ecosystems

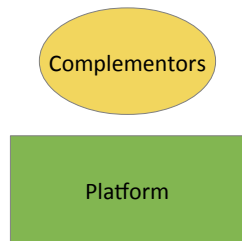
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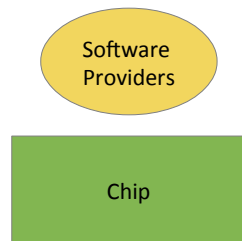
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Platforms and Ecosystems

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



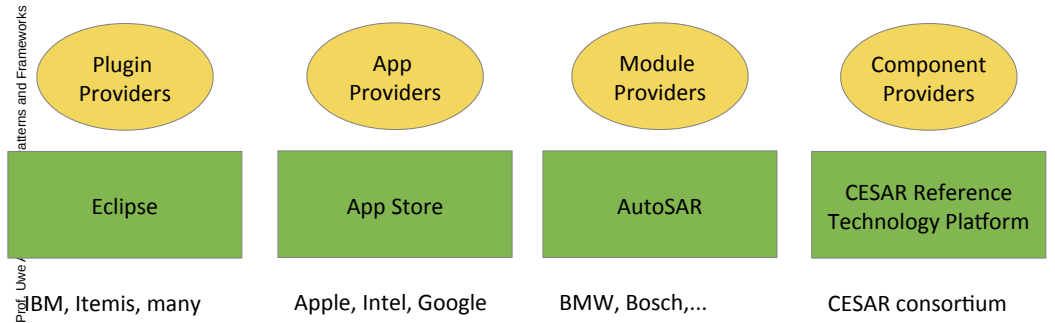
Platform leader



Intel, Infineon, AMD

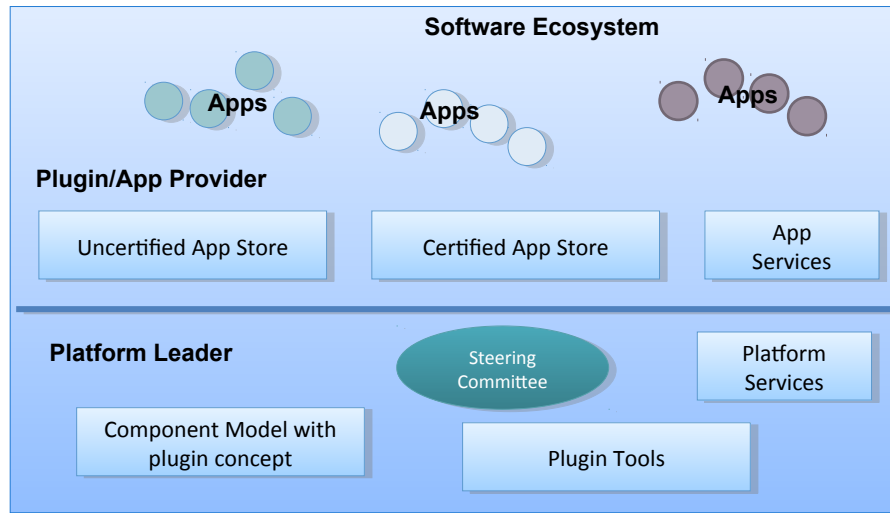
Plattform Leadership

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



Software Ecosystems a la iPad, AutoSAR, GENIVI

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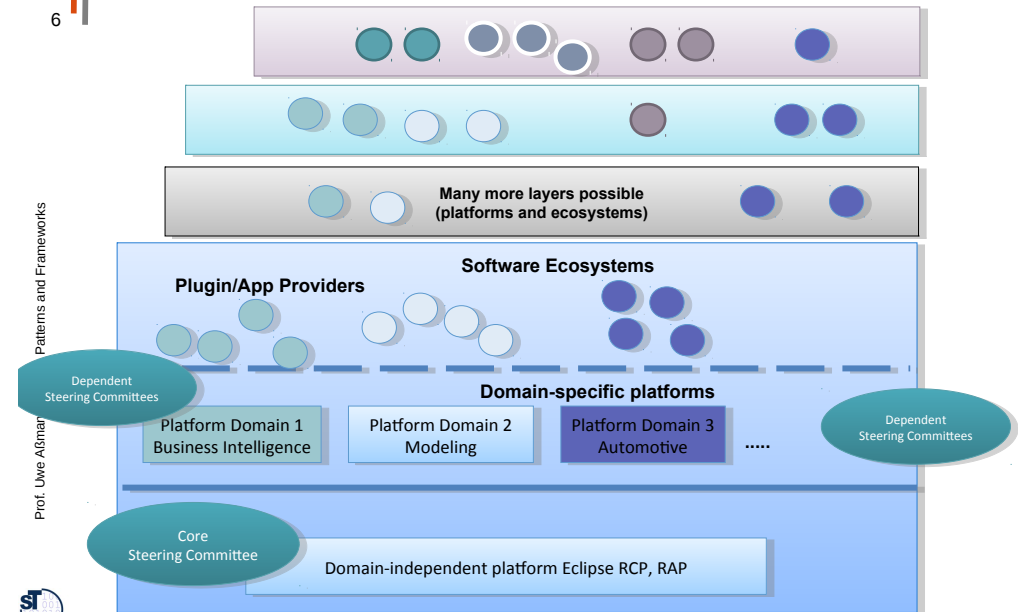


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Layered Platforms and Layered Ecosystems (Eclipse.org)

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Pay per Membership of the Foundation

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

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Software Ecosystems

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„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

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Business Value for a Member of the Core Platform Steering Committee

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- ▶ 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
 -



23.2. Software Platforms and Software Ecosystems for CPS

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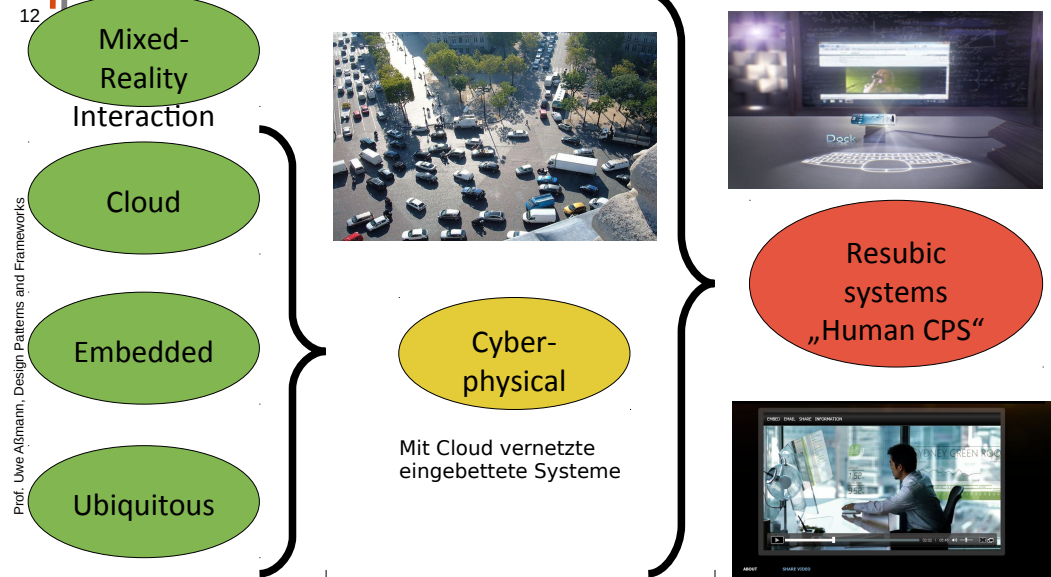


Vendor-Lock-in-Mechanisms

- 10
- ▶ 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

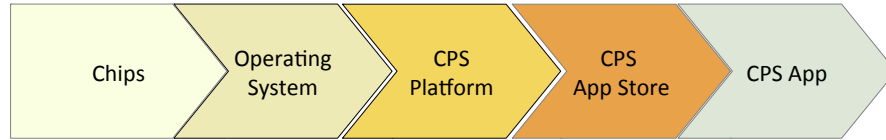


What are Cyber-Physical Systems (Resubic Systems)?



CPS-Plattform-Leadership

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

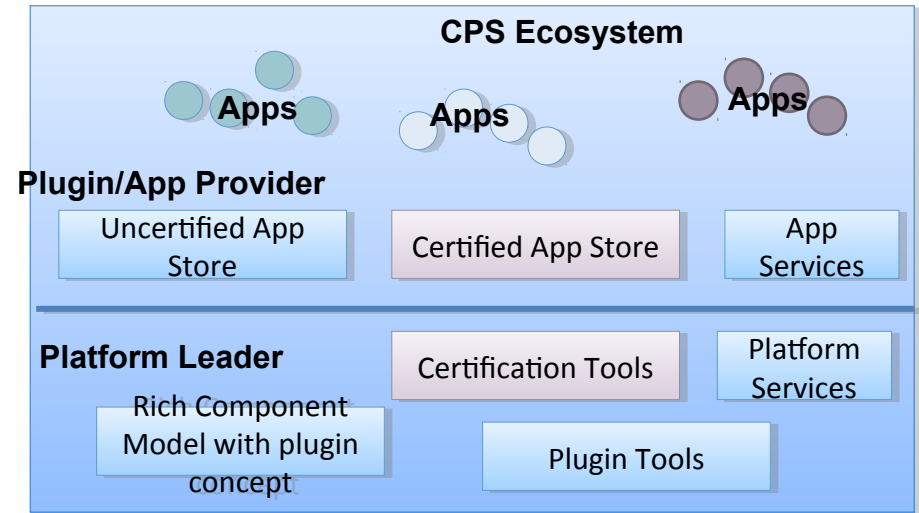


Who is going to own the CPS platforms?



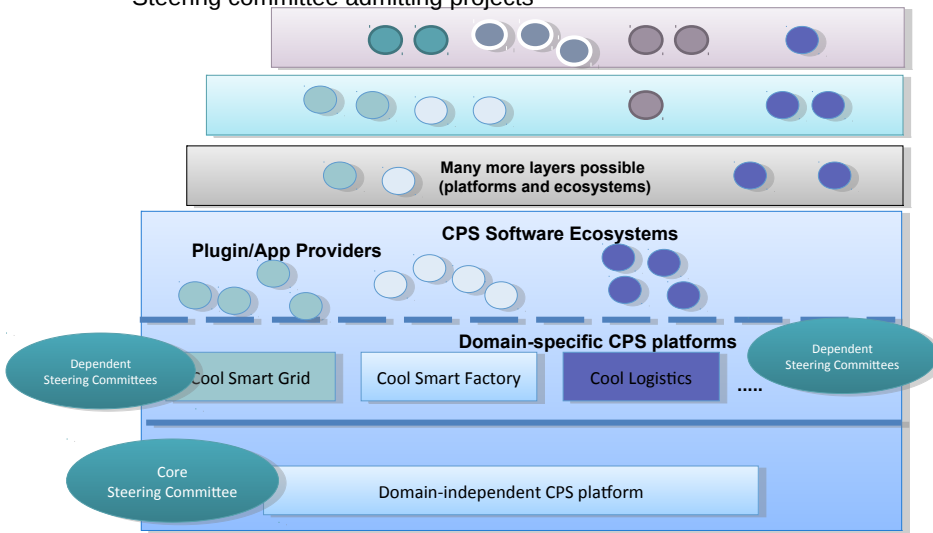
Basic CPS Software Ecosystems

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

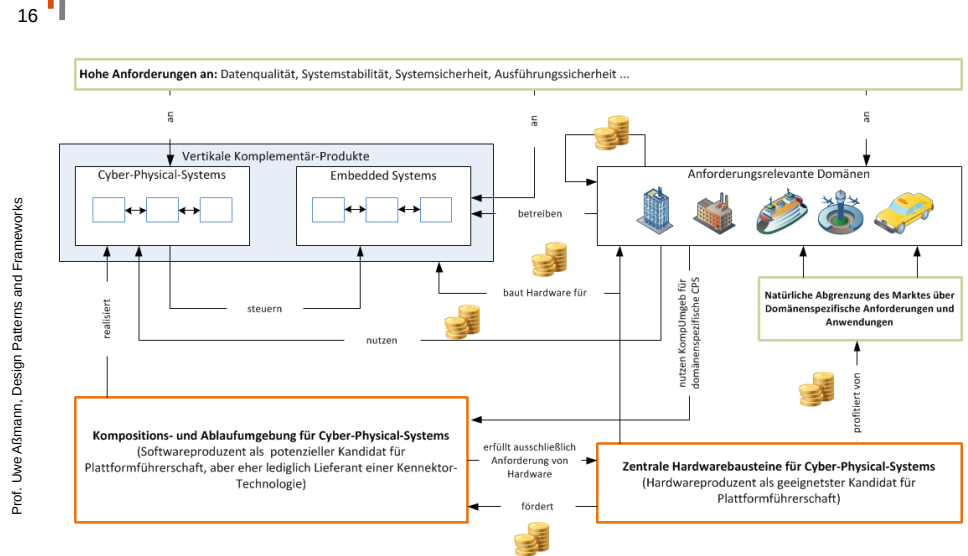


Layered CPS Software Ecosystems

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

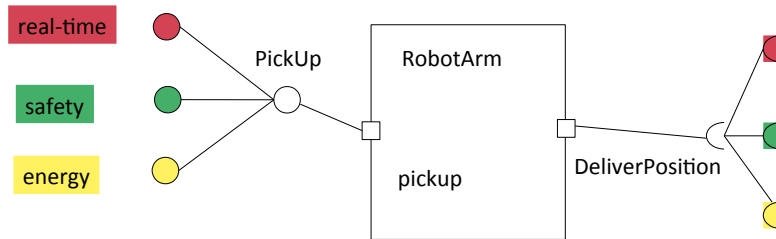


Platform Building



Prerequisites for a CPS Platform

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- ▶ 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

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- 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“

