

# 22b Software Ecosystems

# 22b.1. Software Platforms and Software Ecosystems

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## Platforms and Ecosystems



## Plattform Leadership

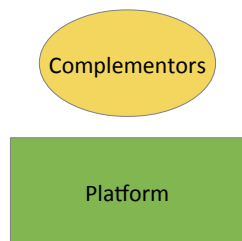


Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

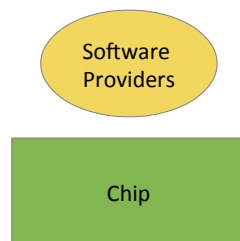
Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

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

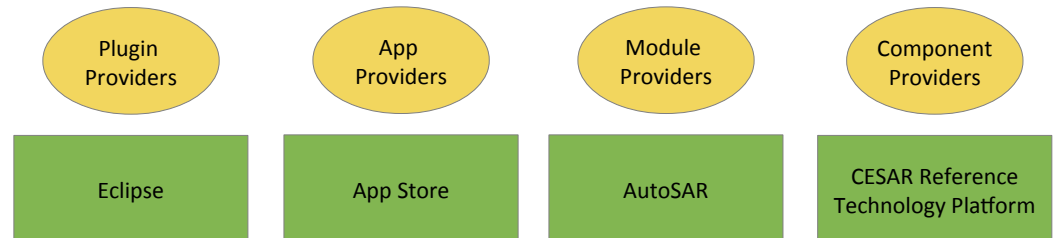
- Platform leadership und „platform wannable“
- Platform can be open or closed
- Platform can be for end users or for developers



Platform leader



Intel, Infineon, AMD



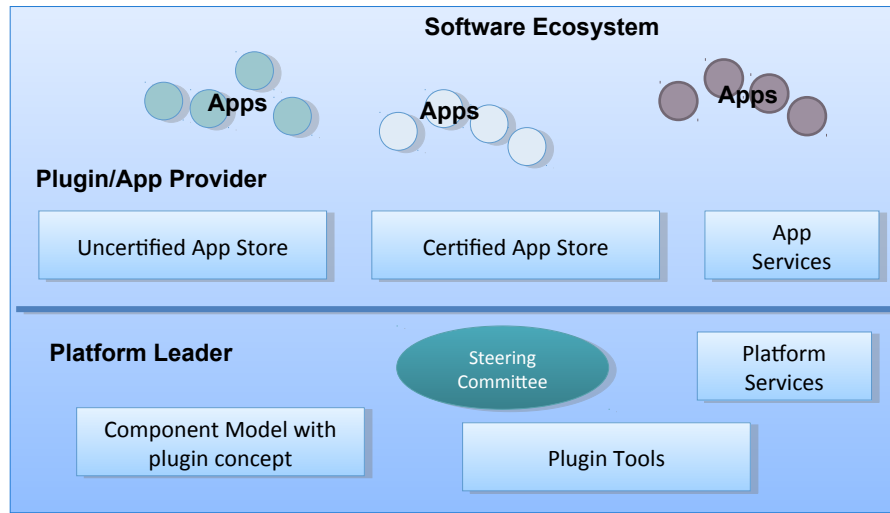
IBM, Itemis, many

Apple, Intel, Google

BMW, Bosch,...

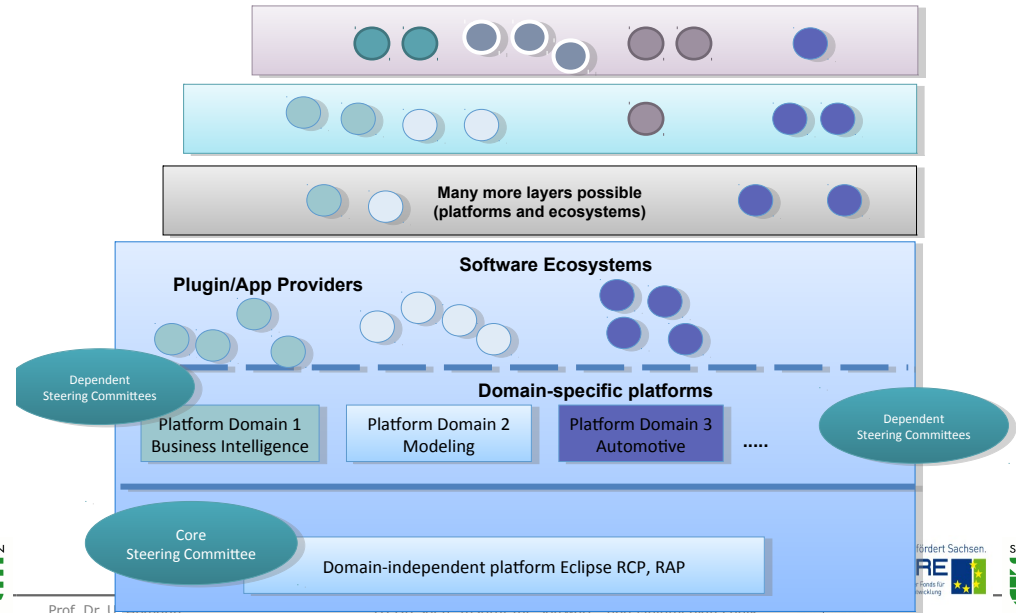
CESAR consortium





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## Pay per Membership of the Foundation

## Software Ecosystems

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

„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

### »Business model:

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

Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

- 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

Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

- 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

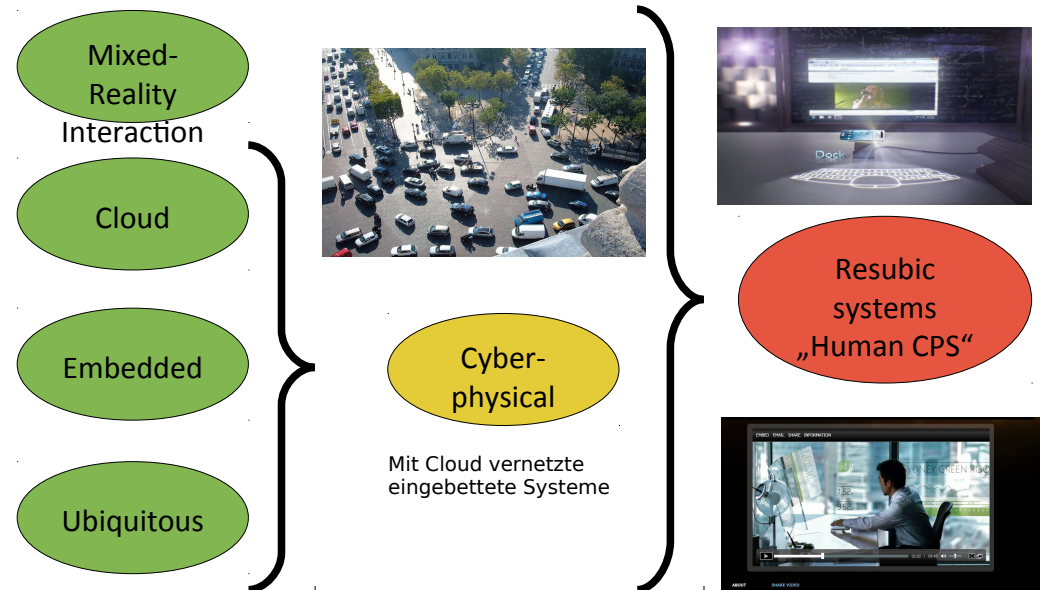


## What are Cyber-Physical Systems (Resubic Systems)?



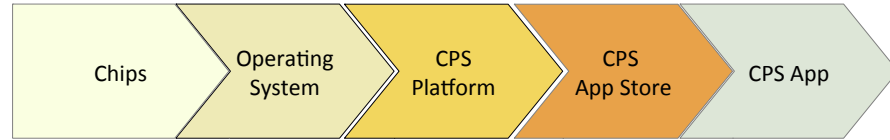
### 22b.2. Software Platforms and Software Ecosystems for CPS

Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)



Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

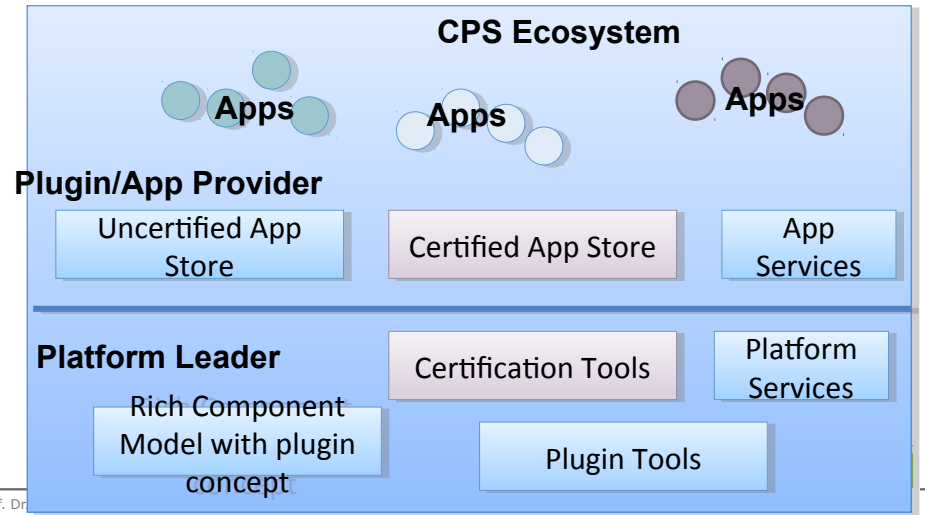
- In einer längeren Wertschöpfungskette kann jede Ebene eine *Plattform* sein



Wer hat die CPS-Plattformen in der Hand?

Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

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

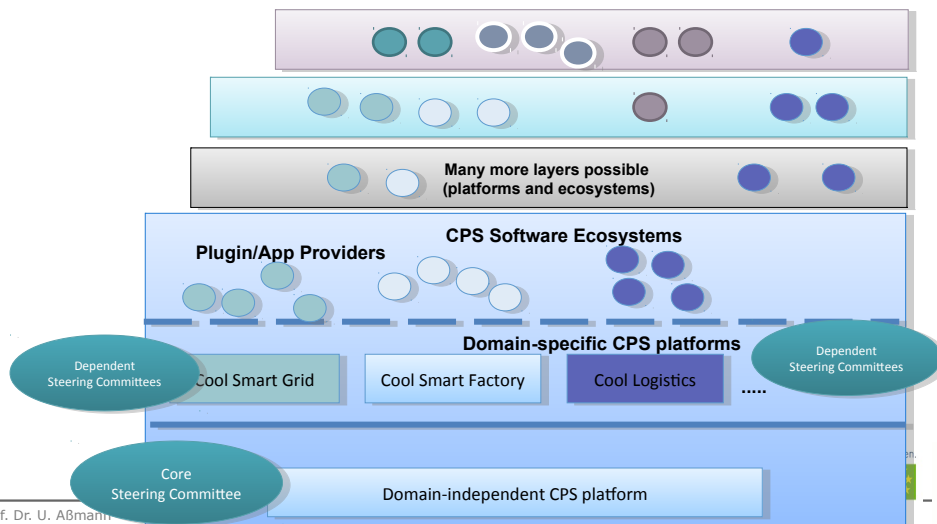


## Layered CPS Software Ecosystems

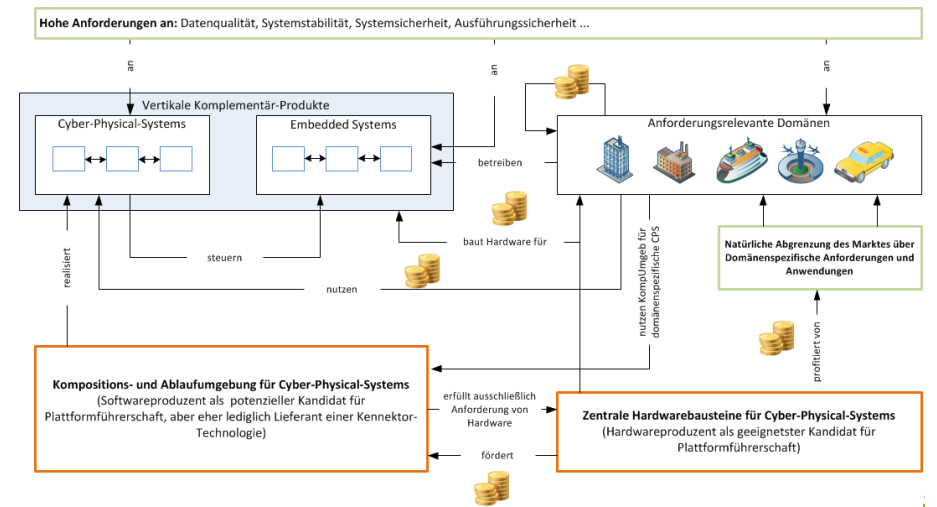
## Plattform-Bildung

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

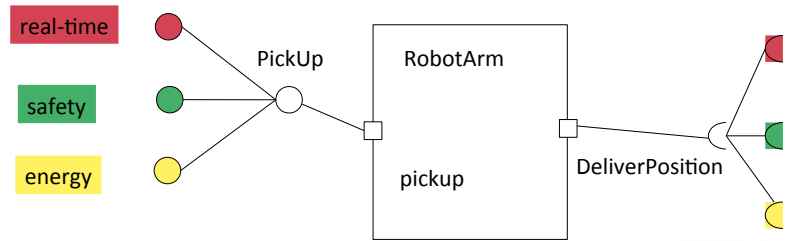


Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)



## Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

- Komponentenmodell, das die Verifikation von sicherheitskritischen Anwendungen unterstützt
  - Lösung: Qualitätssichten auf Schnittstellen
  - Hier: HyperQCS
- Software-Framework, das erweiternde Plugins erlaubt
- Erweiterung muss zertifiziert und durch das Komponentenmodell verifiziert werden



## Forschungscampus Teil: Cyber-Physical Software Ecosystems (CyPSE)

- Exploring cyber-physical systems (res ubiqu)
- ESF Nachwuchsforschergruppen
  - ZESSY: safety-critical cyber-physical systems
  - EDYRA: seamless interaction, personal info services
  - FLEXCLOUD: cloud management
- 4,5 Mio € 2011-13, 19 Forscher, ESF, SMWK
- Focus „Smart Office“

