Contract Based Late Security Binding

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Multimedia Car Platform

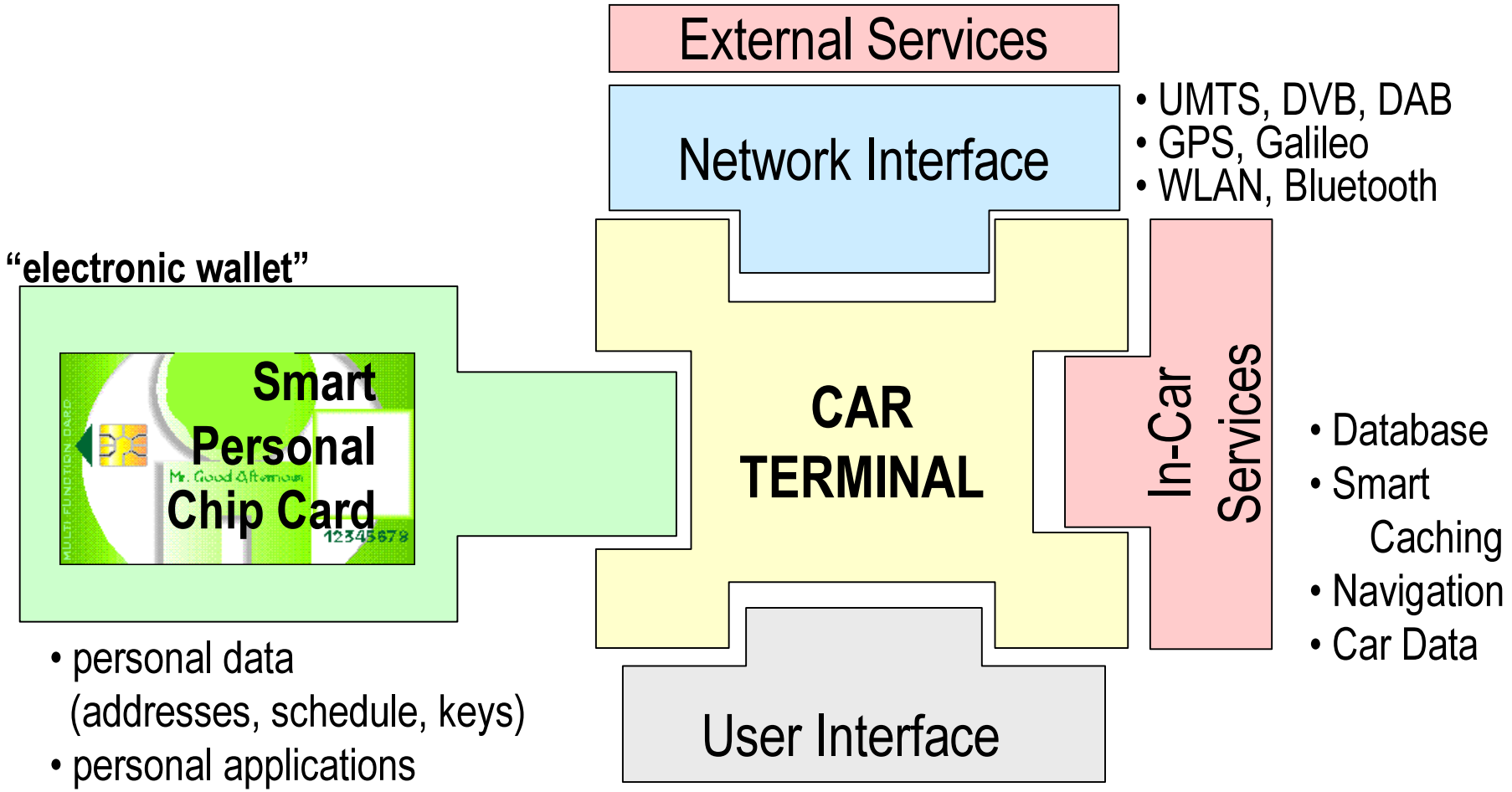
- MCP: Multimedia Car Platform, EU-Project 2000-01, since 2002: MCP Forum, MHP/DVB
- Open platform: Open for applications of any provider
- Security model by certification authority
- Vendor (car or terminal) implements own Look&Feel
- Uses any available network
- Terminal is open for any input/output technology (MMI; e.g. voice controlled input, video output etc.)
- Definition of APIs for integration of network, navigation, car data - bus, phone

  → controlled access to any resource by any application

In-Car Services

- **Classic Services**
  - **radio, phone, (TV, WWW)**
- **Car-specific Services**
  - **Navigation, Location Based Services**
  - **Device Control (Heater, Properties, Bordcomputer)**
  - **Emergency Services**
- **New and Combined Services**
  - **combination of navigation and information dynamic routing, traffic control,...**
  - **local services and local information by short range networks (10m – 1km; Bluetooth, WLAN, DVB-T short range)**
  - **automatic drive-through-payment (toll, parking,...)**
  - **remote diagnostics, remote garage service**
  - **car as sender/relay station as part of the network**

Modular Car Terminal



Security Requirements

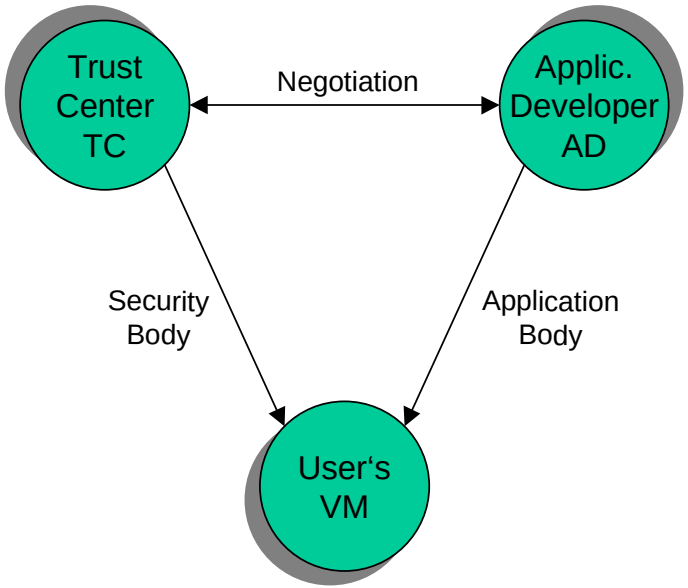
High security requirements on a car multimedia terminal:

- **Data protection**: personal data, car data, context (e.g. current location)
- **Authentification** of application developer and trust center
- **Usability**: *Driver must not be distracted!*
  - terminal is responsible for (automatic) application control: priorities, access rights
  - legal restrictions (country dependent) must be considered
  - robust runtime behaviour
  - car manufacturer must be able to give selective access to car ressources

    → MCP designed **security architecture** for **spatio-temporal distributed authentication and authorisation**

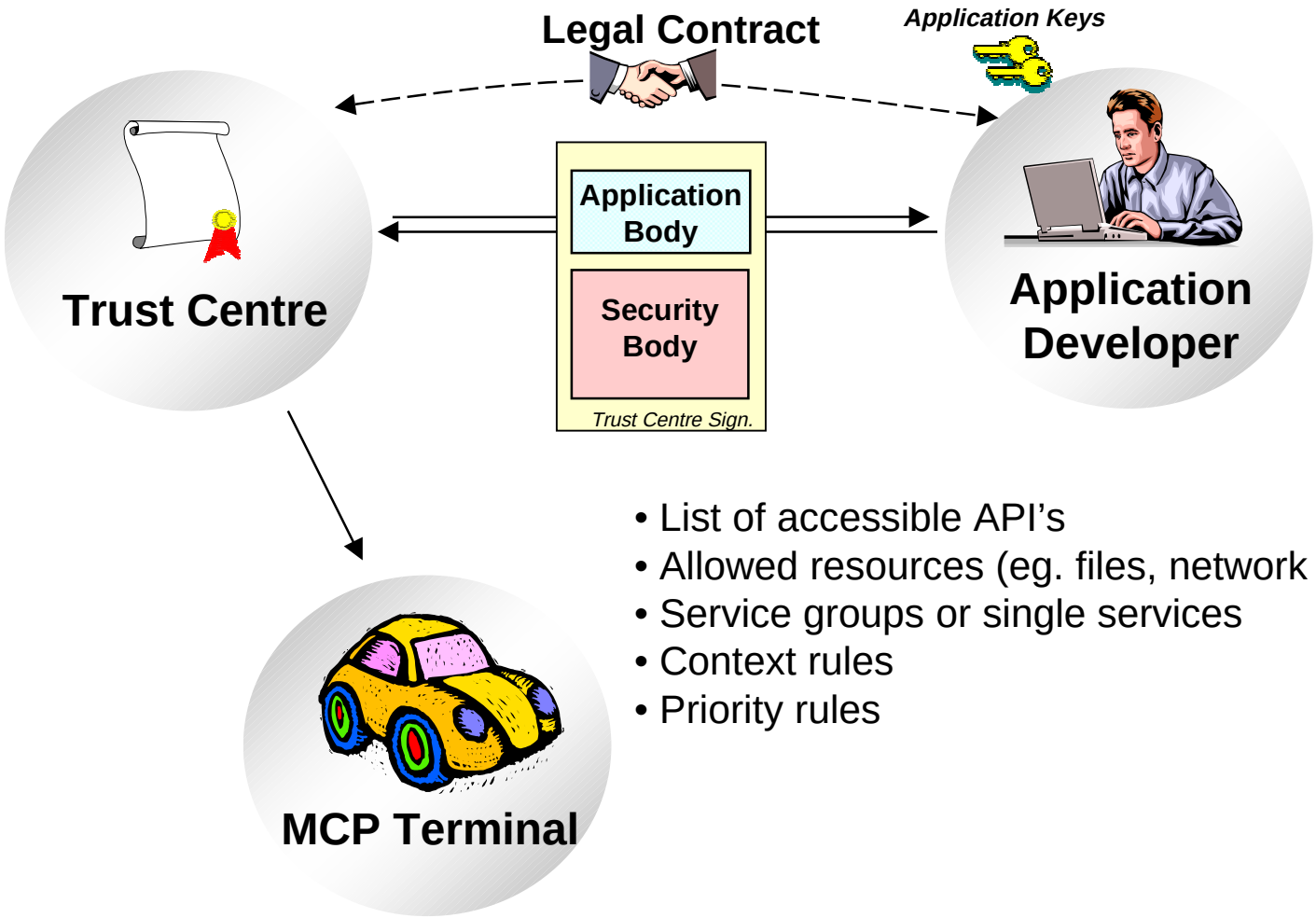
Certification Procedure

Trust Center issues keys and certificates after negotiation of a legal contract with application provider



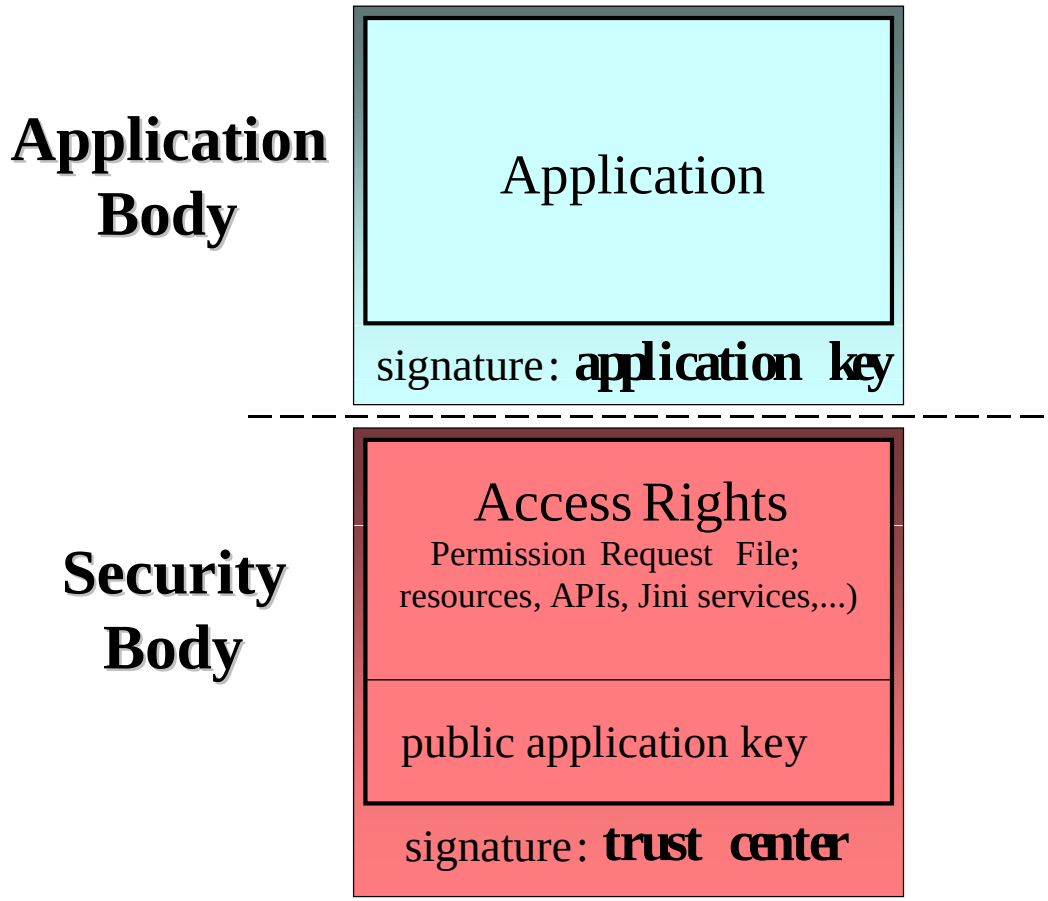
- **Access rights** of applications on the terminal; priorities (*authorisation*)
- **Automatic identification** of applications by the terminal (*authentification*)
- **Responsibility** for application can be traced back to the application developer based on a legal contract
- **Applications** may be, but are not required to be tested or analysed on conformance to the legal contract
- **Several levels of security** are possible

Contract Negotiation

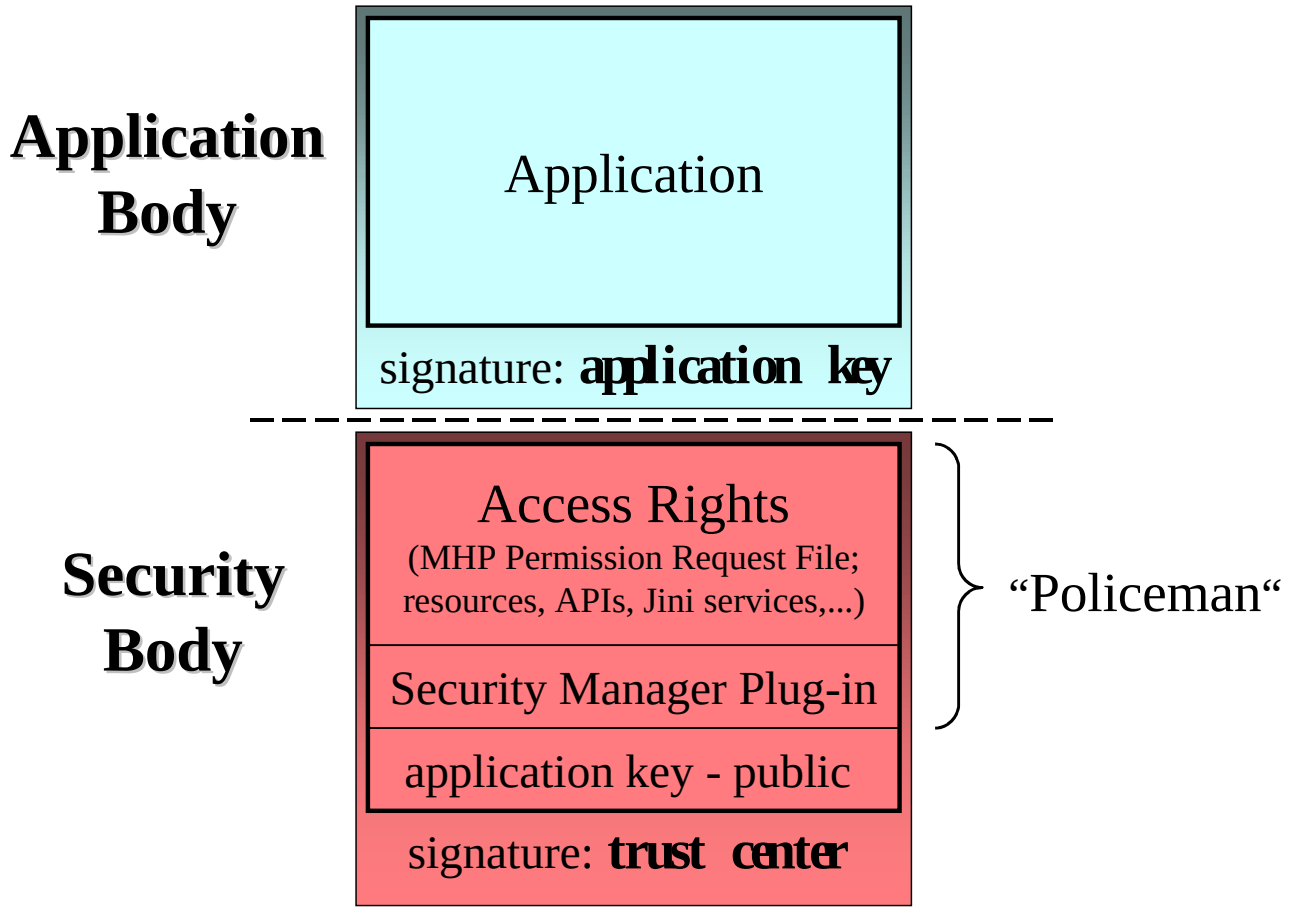


- List of accessible API's
- Allowed resources (eg. files, network connections)
- Service groups or single services
- Context rules
- Priority rules

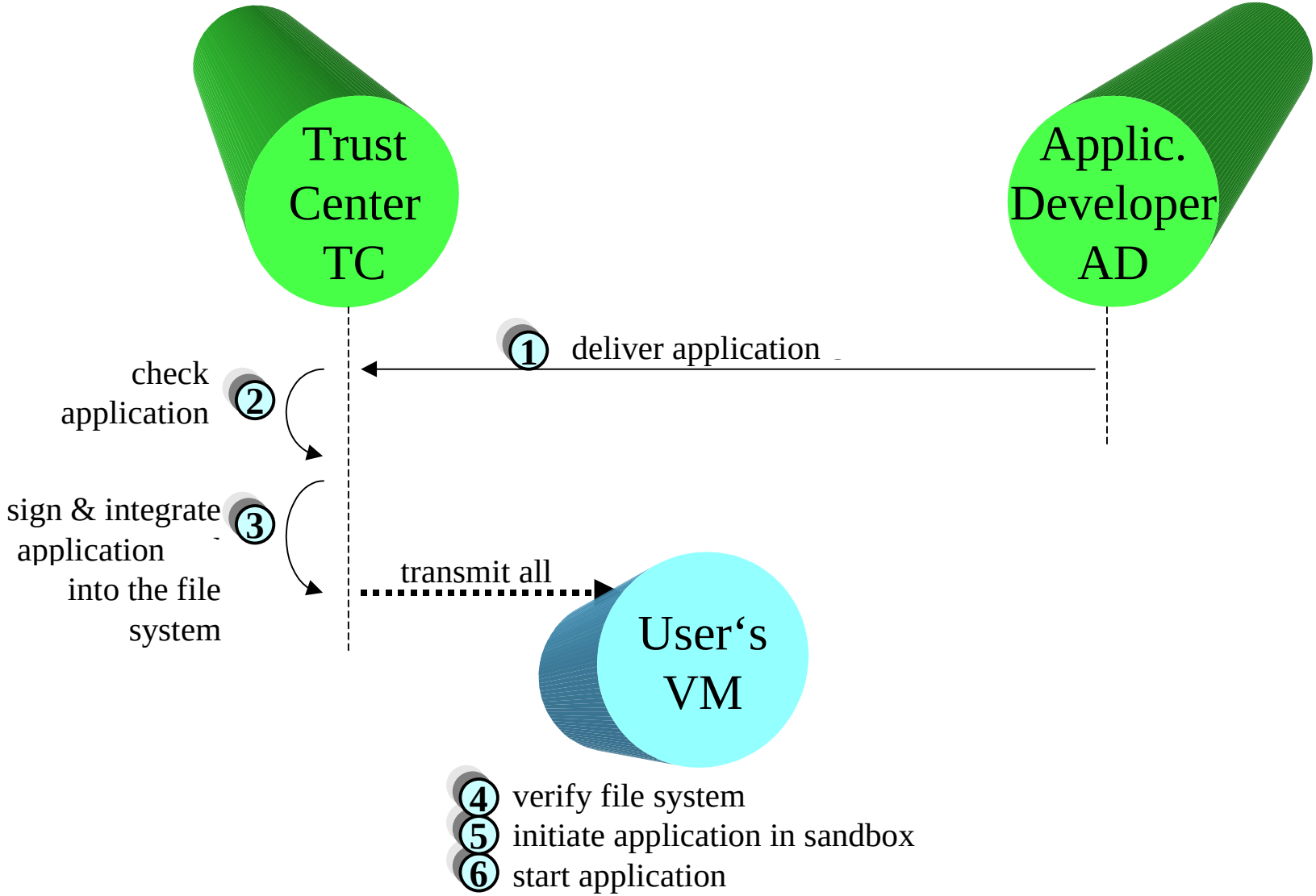
Passive Security Body



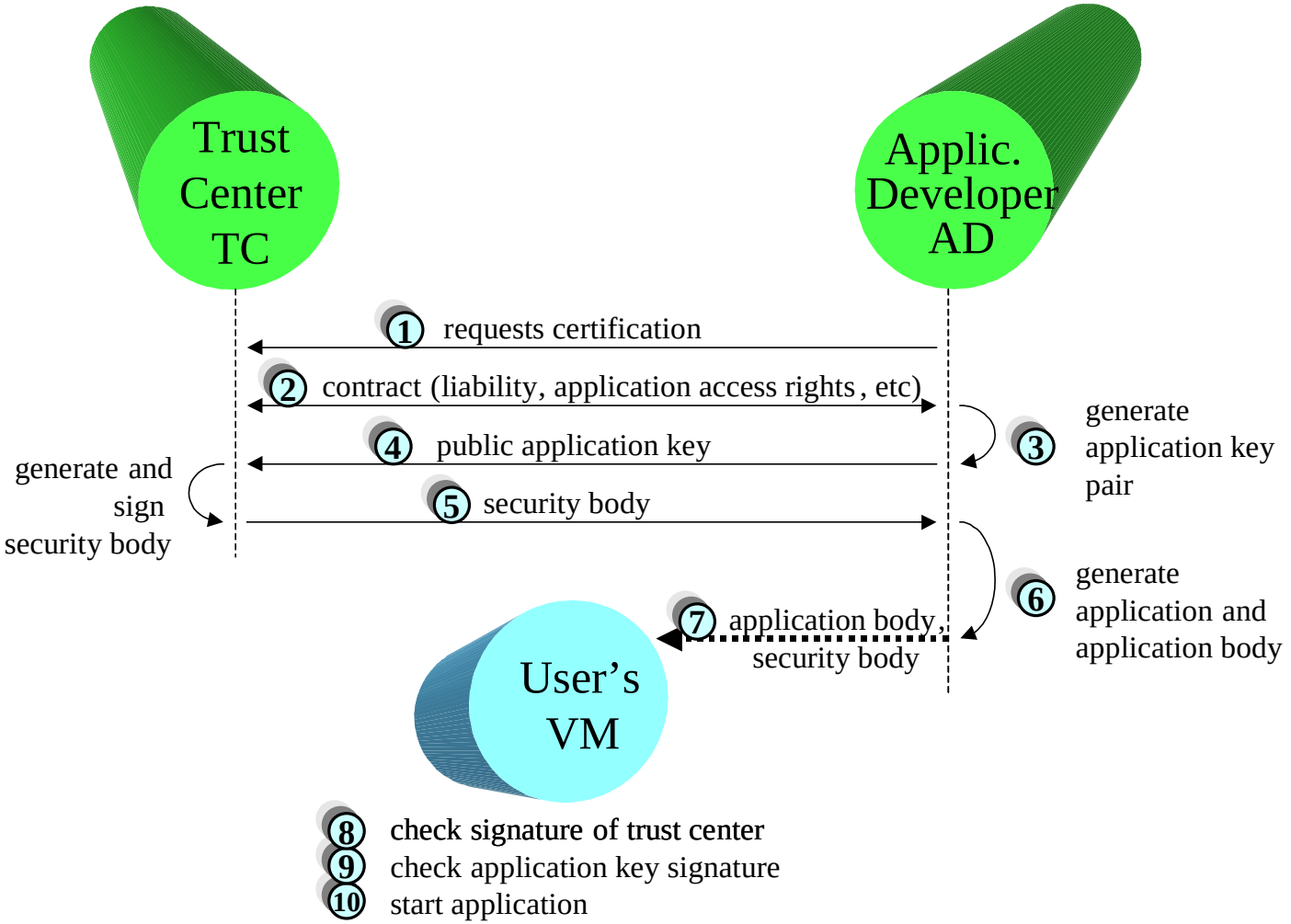
Active Security Body



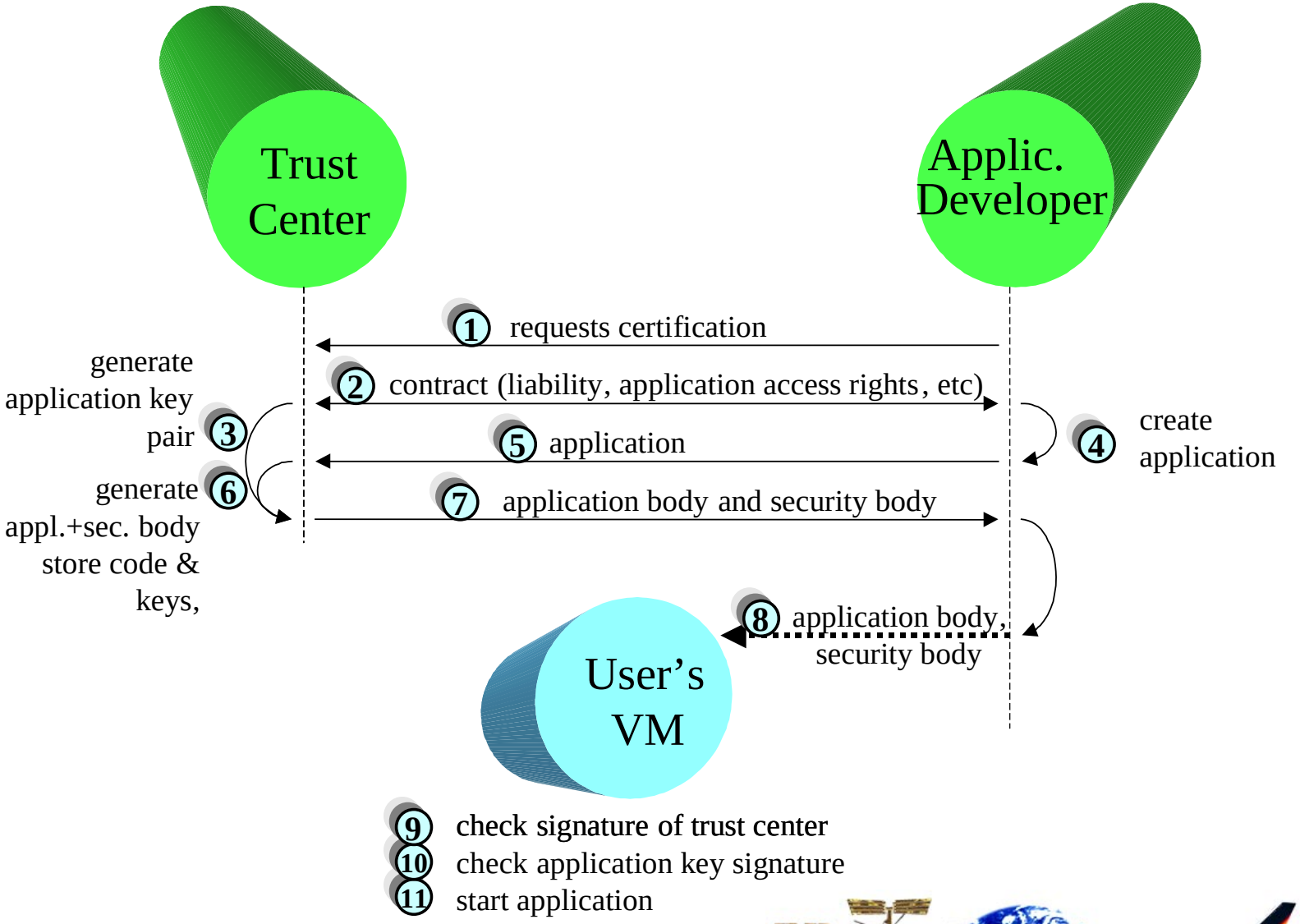
Classic Java Signing



Our Approach 1: Lax Certification Procedure



Our Approach 2: More Restrictive Certification Procedure



Certification Procedure Comparison

Lax Procedure

- One *reusable* basic security body per application provider (can be reused for each updated version of the application)
- Security depends more on the legal binding to avoid misuse
- Private application key is owned by the application developer

Restrictive Procedure

- Every application must be passed to Trust Center
- A new security body for each application version
- Private application key is owned by the trust centre

Summary

Experiences from **MCP**

- New Services
- Context Awareness
- Car terminal has high security requirements

  → **spatio-temporal distributed authentication and authorisation**

Architecture enables **contract based security**

Late Security Binding by independent distribution of application body and security body

Thank you!

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Demand Oriented App. Classification

Application Descriptor

org.mcp-applications

- emergency
  - automatic
  - manual
- car-service
  - safety-report
    - automatic
    - manual
  - breakdown-support
  - telematics
    - remote-controlling
    - tracking-information
  - customer-care
    - guiding
    - special-service
    - membership-info
    - online-car-manual
- getting-somewhere
  - guide-me
  - plan-a-route
  - feeling-comfortable
    - sit-comfortable
    - nice-climate
    - sound
- communicate
  - delayed
    - email
    - sms
    - fax
    - transfer-data

- Former application classification **device oriented** (radio, video, navigation,...)
- MCP: **Demand oriented classification**: Feeling Comfortable, Having Fun, Being Informed, Getting Somewhere,....