

Policy-based Device and Mobility Management

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Outline

- Motivation
- Policy Management architecture
- Handover Scenarios supported by Policy Management
 - Terminal Mobility
 - Session Mobility
 - Role of the Policy Management
- Component architecture
- Testbed
- Outlook/Conclusion

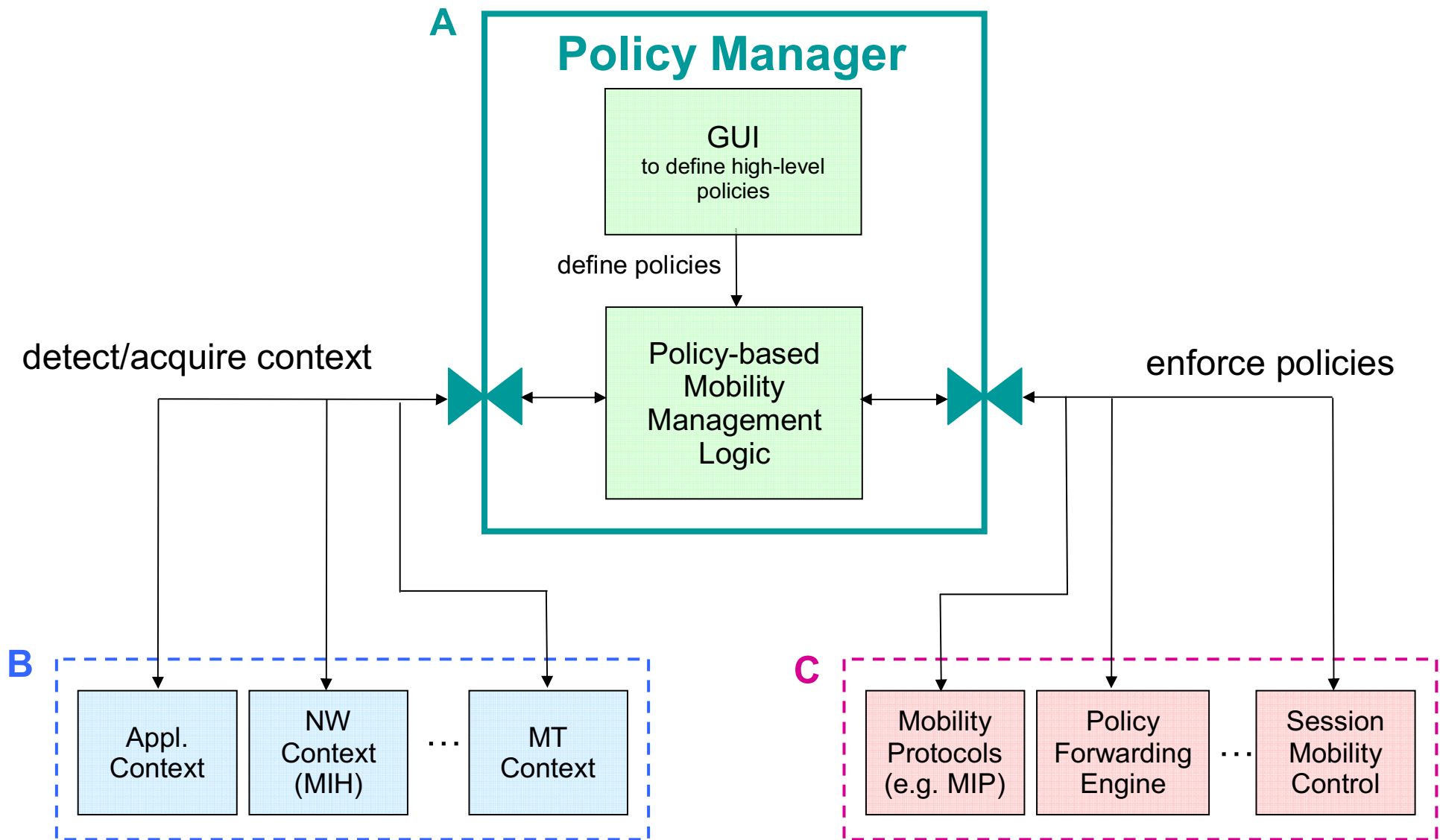
Motivation (1/2)

- Mobile Subscribers can benefit from a variety of services
 - Device Mobility, Session Mobility, Flow Mobility
 - Device mobility benefits from heterogeneous radio access technologies
 - Mobility enablers are Mobile IP, SIP, cellular technologies
- Users shouldn't be bothered with complex interactions, decisions and manual actions, e.g. ...
 - Selection of current and preferred radio technology
 - Selection of mobility/handover type
 - Selection of the preferred terminal
- Decisions depend on
 - Availability of network and devices
 - QoS/performance and needs of the application(s),
 - Cost
 - Environment
 - Load balancing and other needs of the operator

Motivation (2/2)

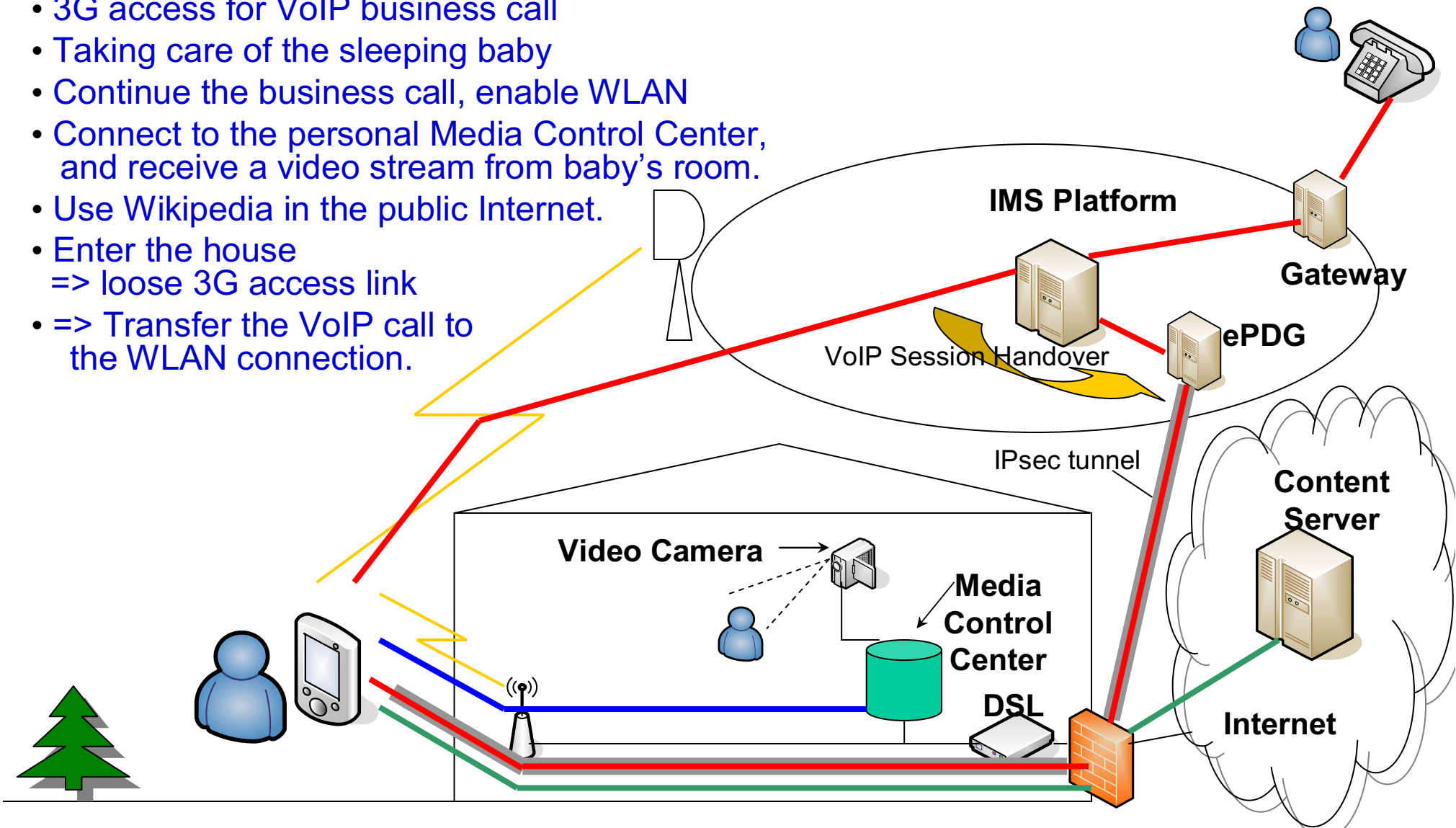
- Preferred is automatic control, based on
 - Profiles
 - Discovery of best choices (costs, performance, environment, application,...)
 - Policy rules
 - ...
- => User, Network, and Vendor define policies and a policy decision engine reacts on received events

Terminal Architecture for Policy Management

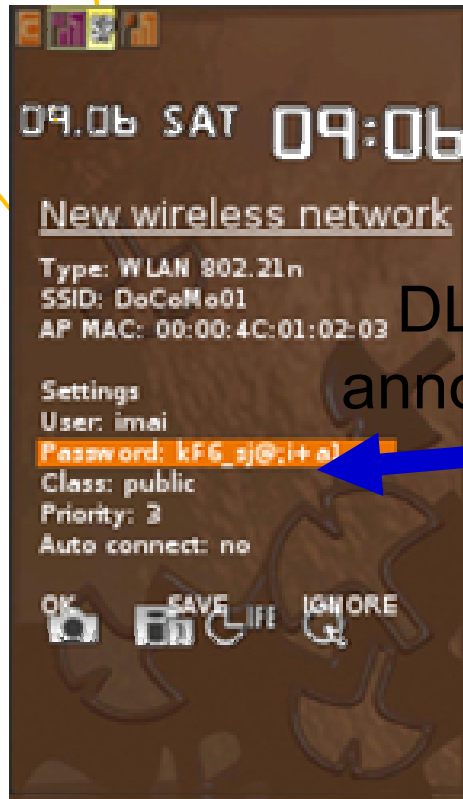
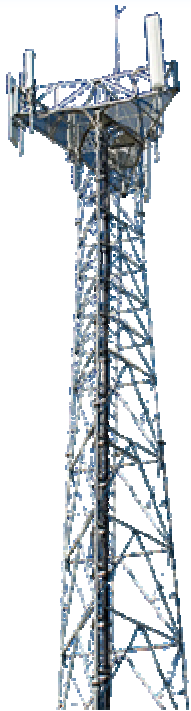


Scenario 1: Multi-Access and Policy Routing

- 3G access for VoIP business call
- Taking care of the sleeping baby
- Continue the business call, enable WLAN
- Connect to the personal Media Control Center, and receive a video stream from baby's room.
- Use Wikipedia in the public Internet.
- Enter the house
=> loose 3G access link
- => Transfer the VoIP call to the WLAN connection.



Scenario 2: Session handover (learning)



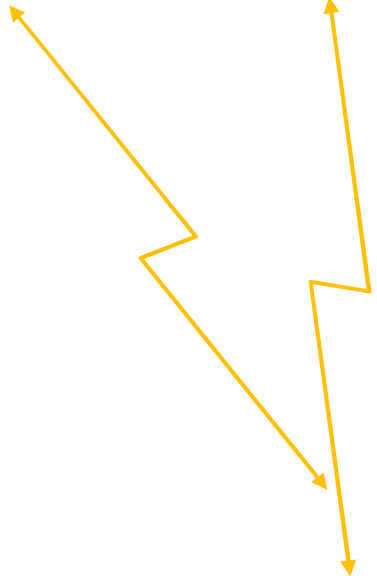
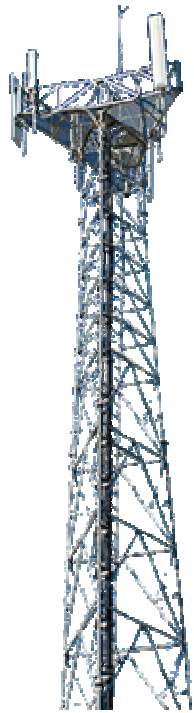
DLNA
announce



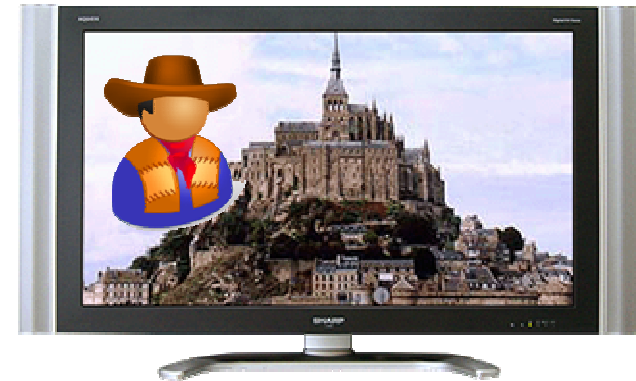
Scenario 2: Session handover (new state)

- Policy Management learned now:
 - The detected WLAN-AP is the home AP
 - Voice calls should be automatically transferred to this home AP when available
 - The TV detected via DLNA is the living room TV
 - The video stream of a video call should be automatically transferred to this TV when available

Scenario 2: Session handover (automatic)



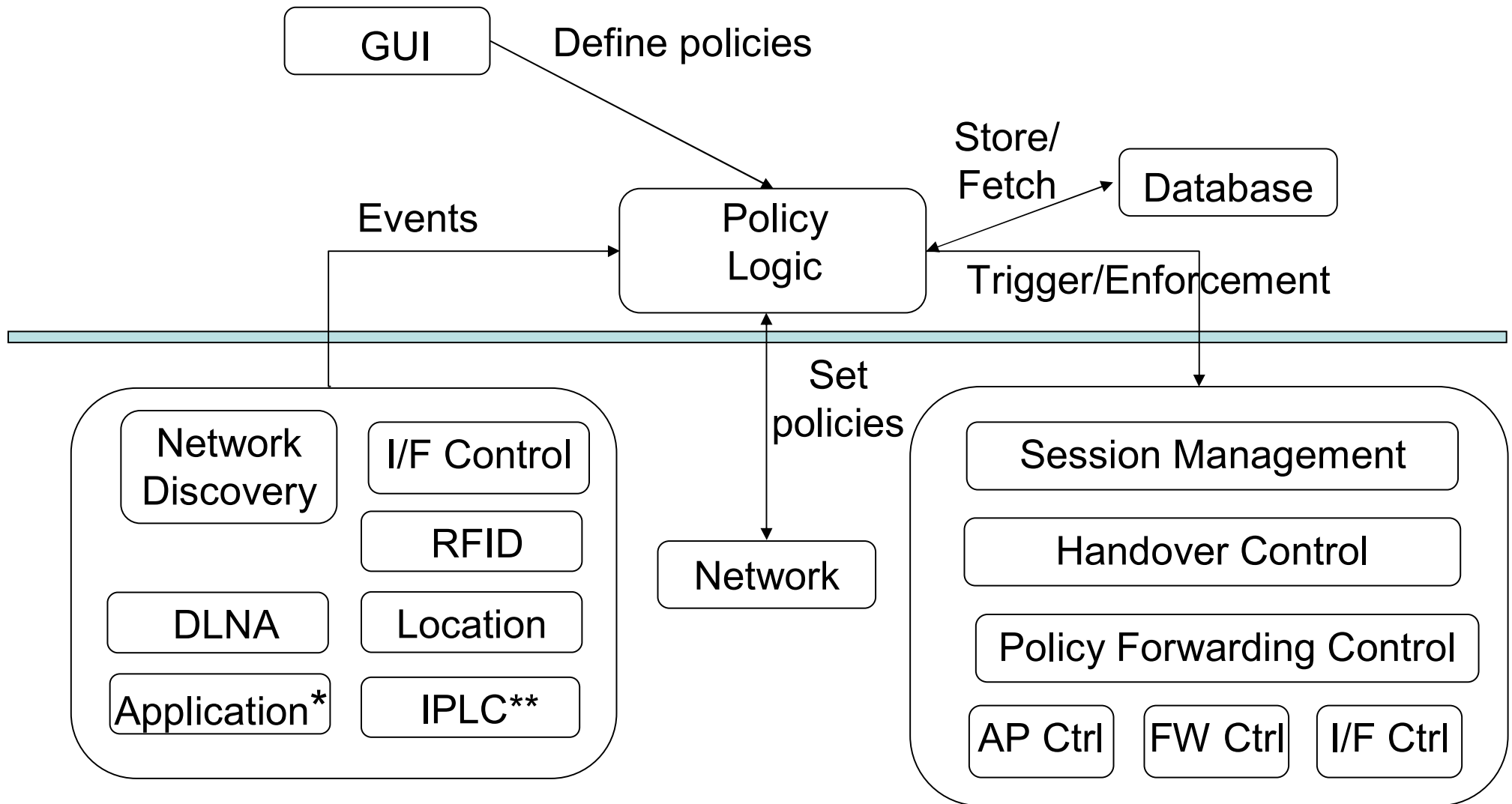
Session
handover
DLNA
announce



Role of the Policy Management

- Identify WLAN as preferred technology
- Initiate a scan when in home 3G cell
- Select the home WLAN access point for association
- Configure forwarding rules
- Use an IPsec tunnel for VoIP call via WLAN/DSL
- Ask the user for certain preferences
- Move the terminal from 3G to WLAN
- Move a video stream to the home TV

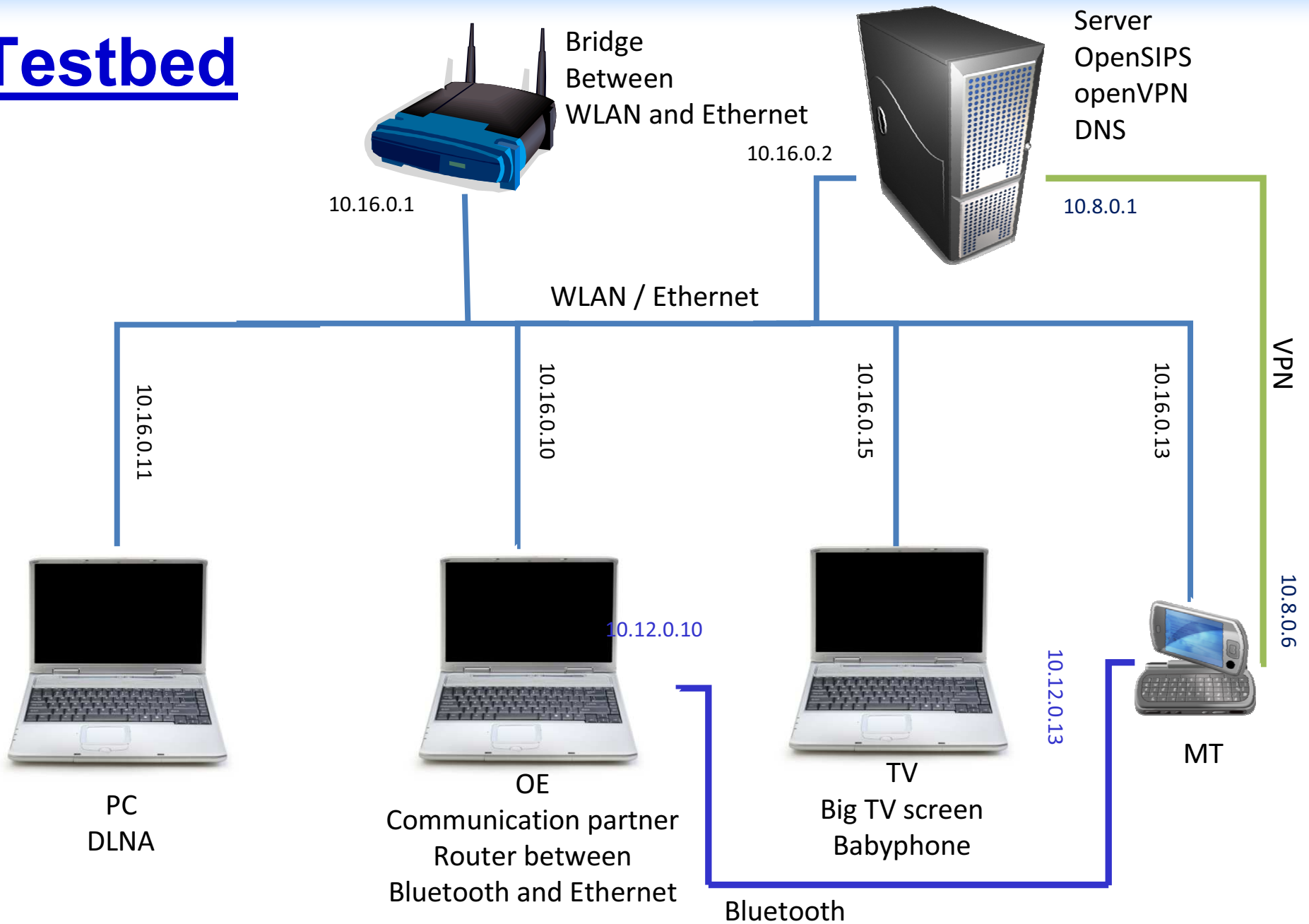
Component Integration for PM



*e.g. phone application

** Policy Logic on another PC

Testbed



Outlook / Open questions

- Potential conflicts between user and network policies.
- Contradicting policy rules on multiple devices with own Policy Management => risk of session ping-pong
- Smart sorting of rules is needed because of interdependencies of rules in one device
- Smarter proposals to the user by applying machine learning capabilities

Conclusions

- The described scenarios show the important role of Policy Management in future mobile devices.
- Policy Management learns while the user interact with the device.
- Users and network can add rules.
- Policy Management enhances the useability.

Questions?

Backup slides

- Details of the role of the Policy Management in the scenarios

Role of the Policy Management

- When the Media Control Centre application on the man's phone is started, the Policy Management identifies Ethernet and WLAN as preferred technology according to the entries in the 'Home Profile' - Home is identified by means of the cell-ID
- Since no Ethernet cable is plugged in, the Policy Management powers the WLAN interface and initiates a scan.
- According to the scan results, the Policy Management selects the home WLAN access point for association.
- Since multiple network interfaces are now active, the Policy Management configures the forwarding rules for outgoing traffic according to pre-defined policies.
 - VoIP traffic uses cellular access by default, if available
 - Local traffic is anyway routed through the WLAN interface (Media Control Software has a pre-configured IP address of the Media Control Center)
 - Public Internet traffic is routed through WLAN by default, if available
- Since the 3G coverage is too low in the house, the VoIP call is moved to a IPsec tunnel via WLAN/DSL

Scenario 2:

Terminal and Session Mobility

1. The user comes home with his brand new Policy Management enabled mobile phone.
2. The phone detects the WLAN, the user is alerted and defines it as his home WLAN. The phone associates with the WLAN.
3. The phone detects DLNA notifications from the TV. The user is alerted and chooses the parameters.
4. Later the user comes home while talking on the phone. The phone detects the home cell-ID and decides to turn on the WLAN interface.
5. The phone detects the WLAN and seamlessly performs terminal handover.
6. The phone then receives the DLNA notifications from the TV and alerts the user. The user decides to handover the video stream to the TV but keep voice and control on the mobile phone.

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