



Technische
Universität
Braunschweig

Institute of Operating Systems
and Computer Networks



Integration of an „Environments for Aging“-Platform in SOHO-Routers

Felix Büsching, Michael Doering, Lars Wolf

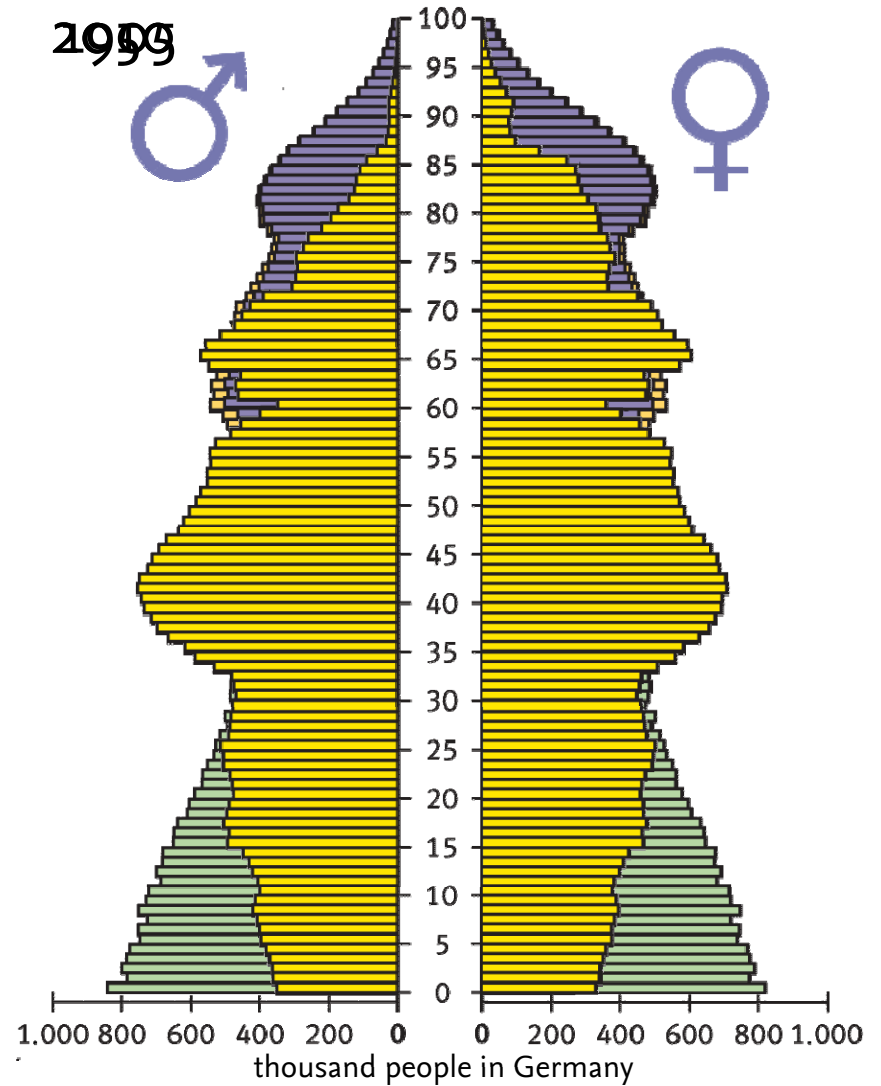
{ buesching | doering | wolf } @ibr.cs.tu-bs.de

Integration of an „Environments for Aging“-Platform in SOHO-Routers - Agenda

- Motivation
- Introduction: Research Network
“Design of Environments for Aging”
- Use Cases
- Environments for Aging Platform
- Integration
- Limitations
- Future Work
- Summary & Conclusion

Motivation

- Society is growing older
- Stay in familiar surroundings (as long as possible)



Research Network “Design of Environments for Aging”

Objective:

Quality of Life in the Aging Society

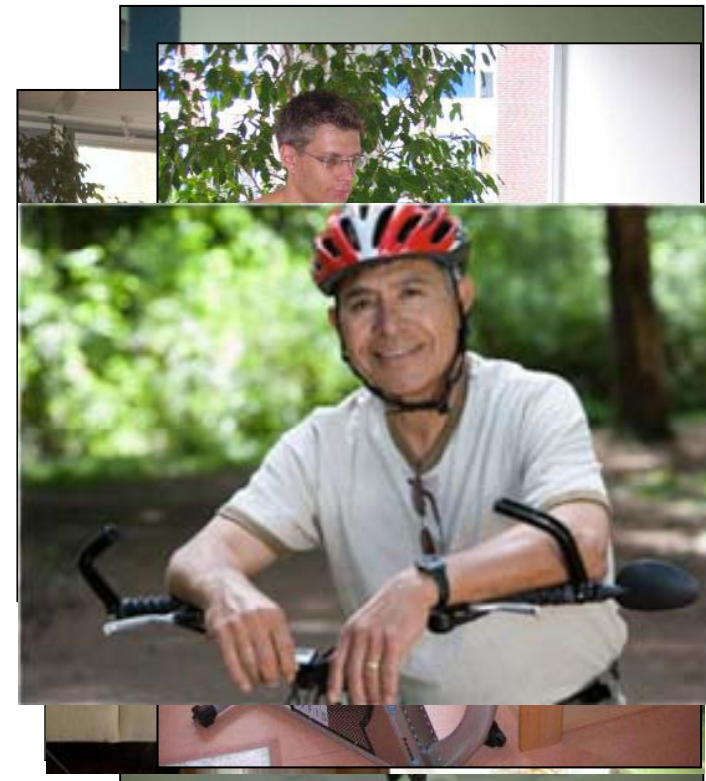
- Independence within One’s own Residence
- Identification of Threats
- Development of Systems for Assisting
 - Elderly People
 - Relatives
 - Caregivers
- Support of Care Structures



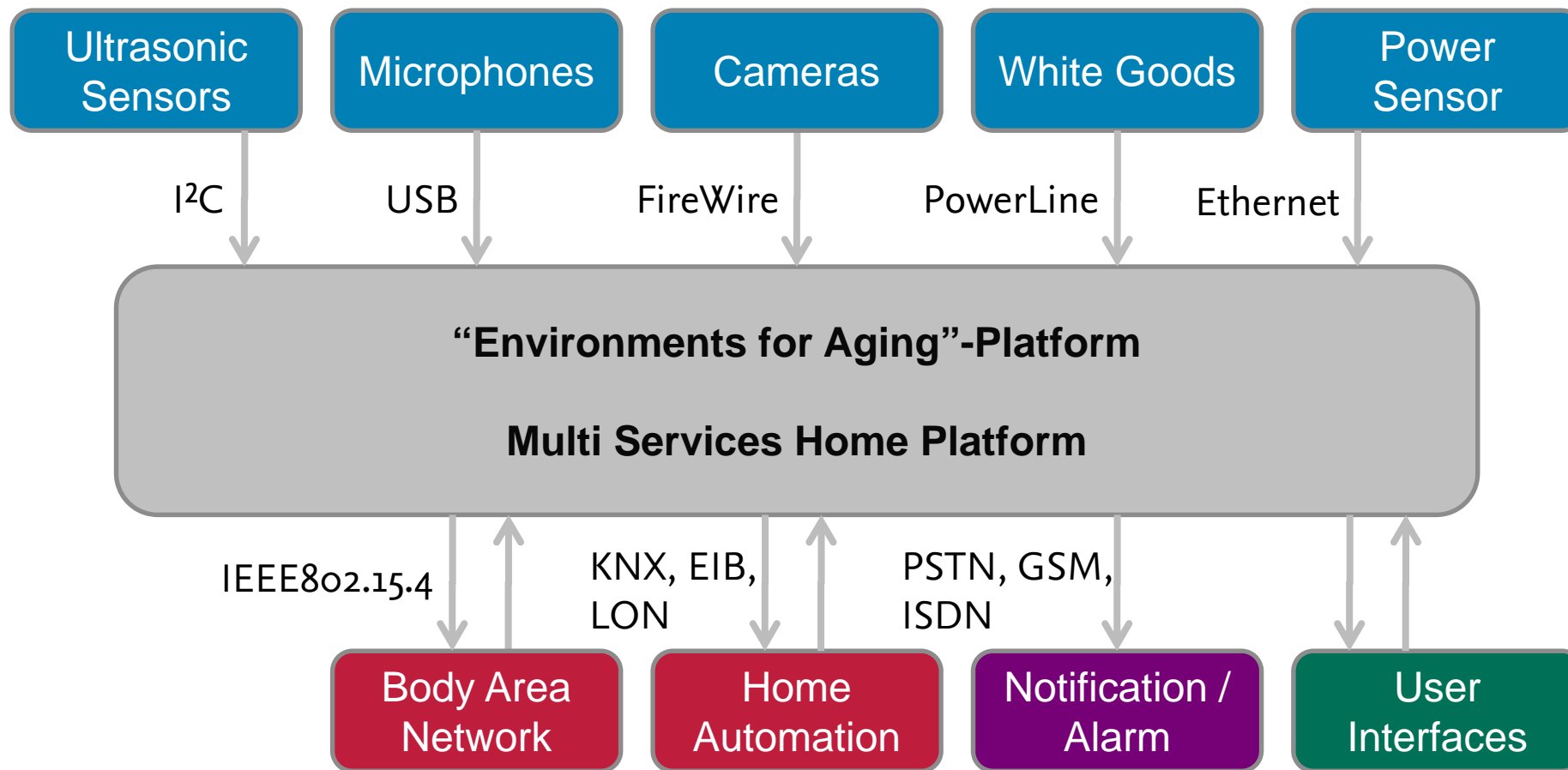
Use Cases / Scenarios

Exemplary Assisting Systems

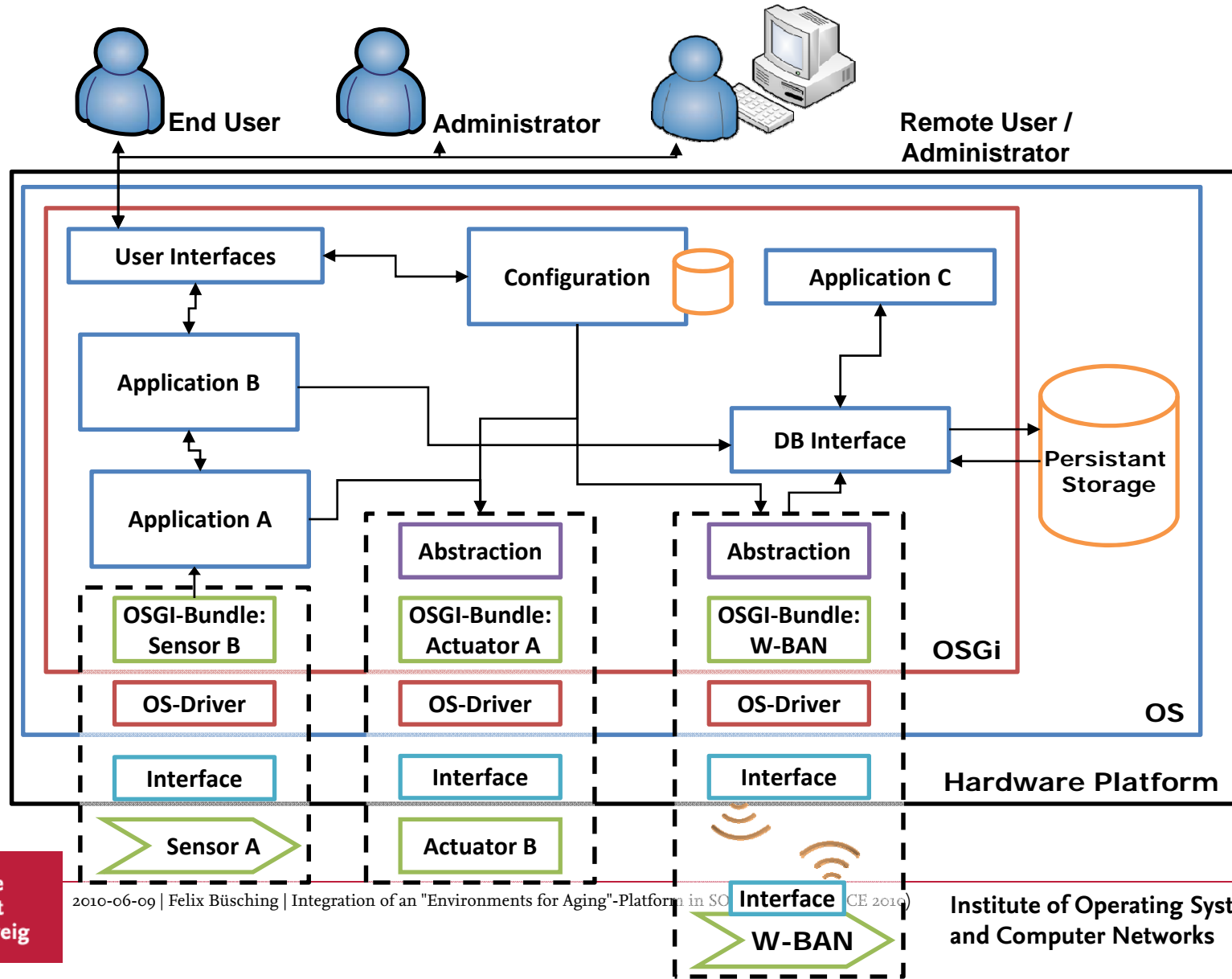
1. Personal Activity and Household Assistant
2. Sensor-based Activity Determination
3. Sensor-based Fall Prevention and Fall Recognition
4. Monitoring of Sports Activities in Prevention and Rehabilitation
5. Delay Tolerant Acquisition of Training Data



Environments for Aging Platform: Multi Services Home Platform (MSHP)



Inside the MSHP: System Architecture



How can we carry this in your home?

Suggestions:

- Standalone Device?
- TV-Set-Top-Box?

In a SOHO-Router!

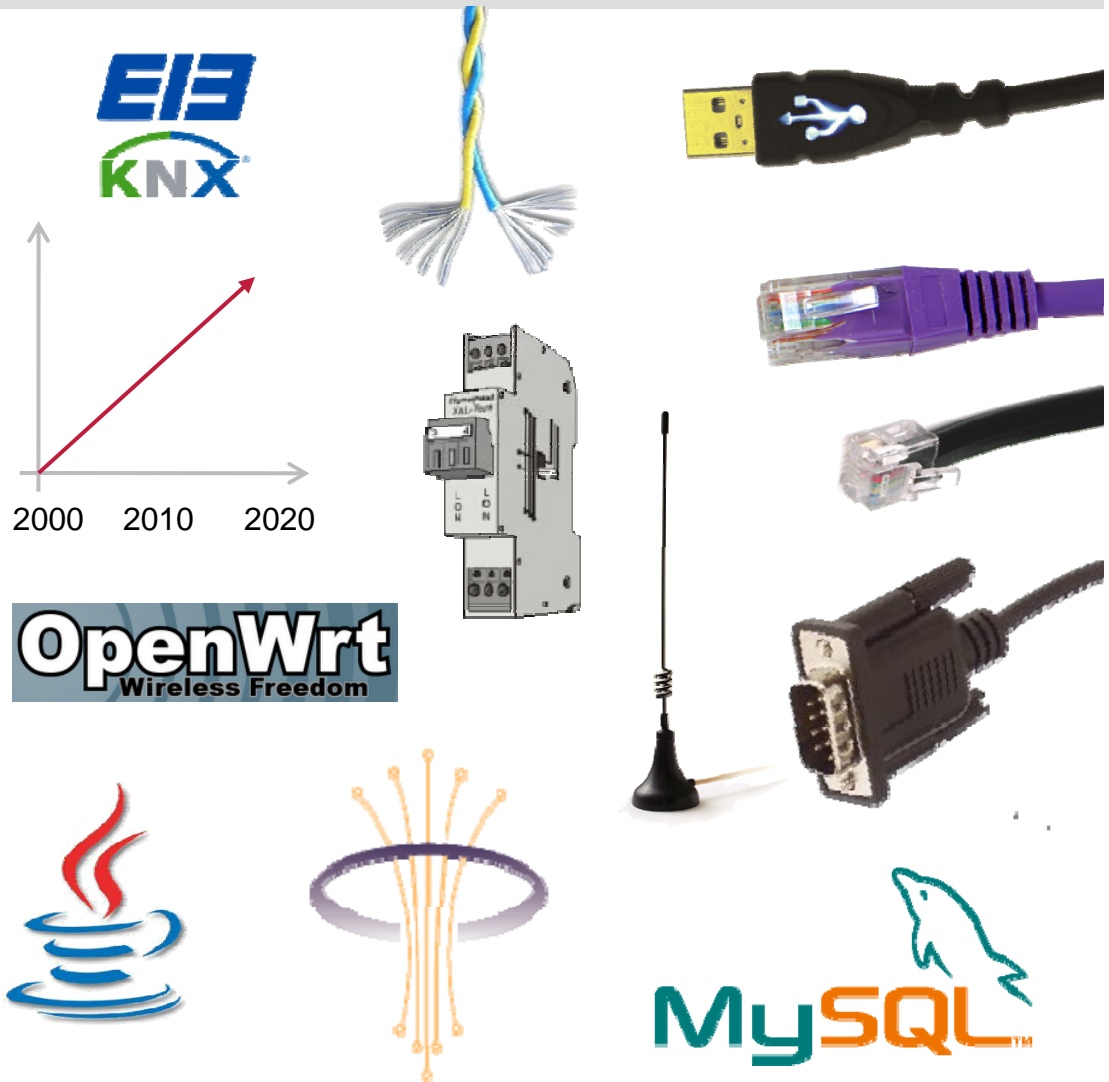
Integration in a SOHO-Router - Requirements

Hardware

- Interfaces
 - Sensors
 - Actuators
 - Outside World
- Processing Power

Software

- Operating System
- JAVA
- OSGi
- Database



OpenWrt

Benefits

- Operating System for Routers
- Open Source Project
- > 25 Supported Hardware Platforms
- ~ 100 Supported Devices

Support for

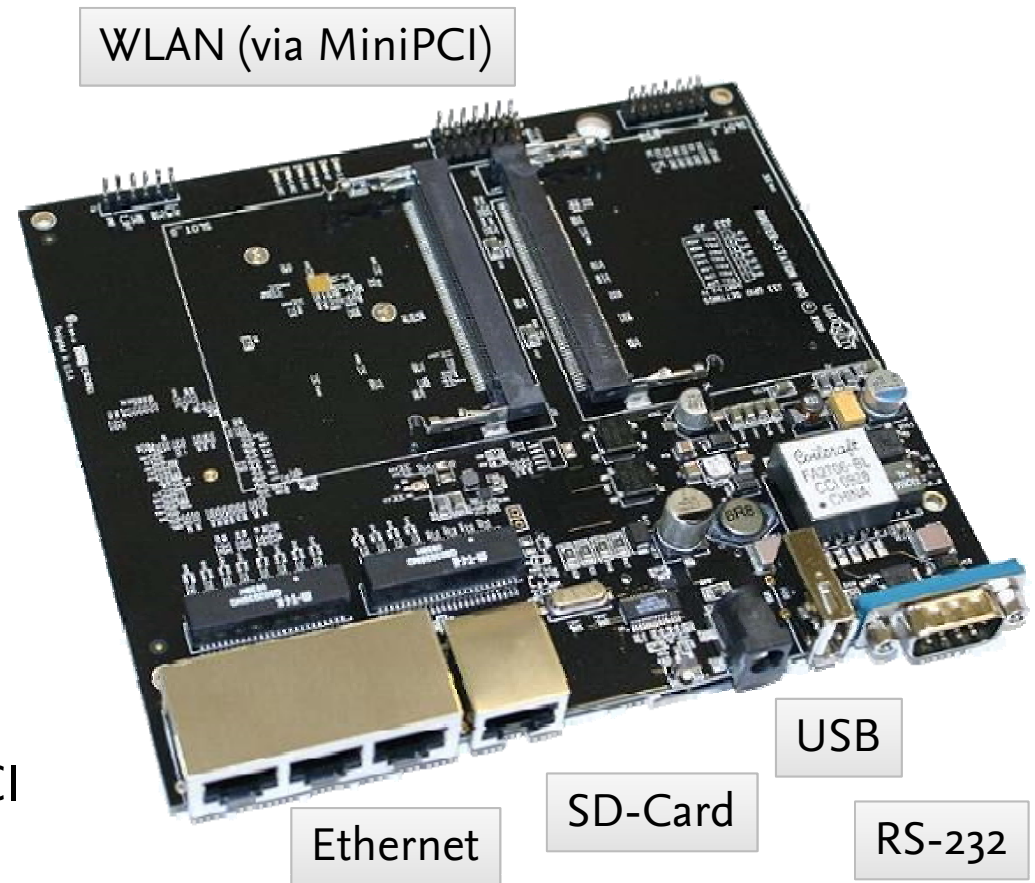
- Java (and OSGi)
- SQL-Databases (e.g. MySQL)
- Delay Tolerant Networking
- Asterisk (Telephony for Emergency Calls)
- ... and many more



Hardware Integration

- Many Hardware Interfaces exist on current Router Platforms
- E.g. “Ubiquiti RouterStation Pro”

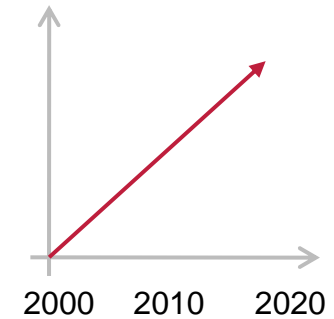
- Texas Instruments AR-7 (MIPS)
- 680MHz CPU
- 128MB RAM
- 16MB Flash
- 4-Port Gigabit Ethernet
- USB 2.0



- Other needed Interfaces
 - Adapt via USB, RS-232 or miniPCI

Limitations

- Current Processing Power of SOHO-Routers
 - Limited Capability for Video and Audio Processing
 - → More efficient Implementations needed
- Java Versions
 - Current PC V1.6
 - Embedded Versions @ V1.3
 - → Reimplementation of some Functionalities
- Not yet implemented Interfaces
 - E.g. FireWire Cameras
 - → Do not use!



Future Work

Today

- Heterogeneous Connections
- (Mostly) wired Interfaces

Future

- Develop and provide homogeneous and wireless Interfaces
- Define a suitable Set of Sensors

Summary and Conclusion

- SOHO-Routers can be used to integrate an “Environments for Aging Platform”
- Fewer Devices
 - Reduces Costs
- OpenWrt is a suitable Operating System
 - Needed Functionality already present, including
 - DTN
 - IPv6
 - Easy Integration of Future Developments

Thank you for your Attention!

buesching@ibr.cs.tu-bs.de