



CEBE eHealth Roundtable 09.10.2014

Biomedical engineering platform for e-Health solutions

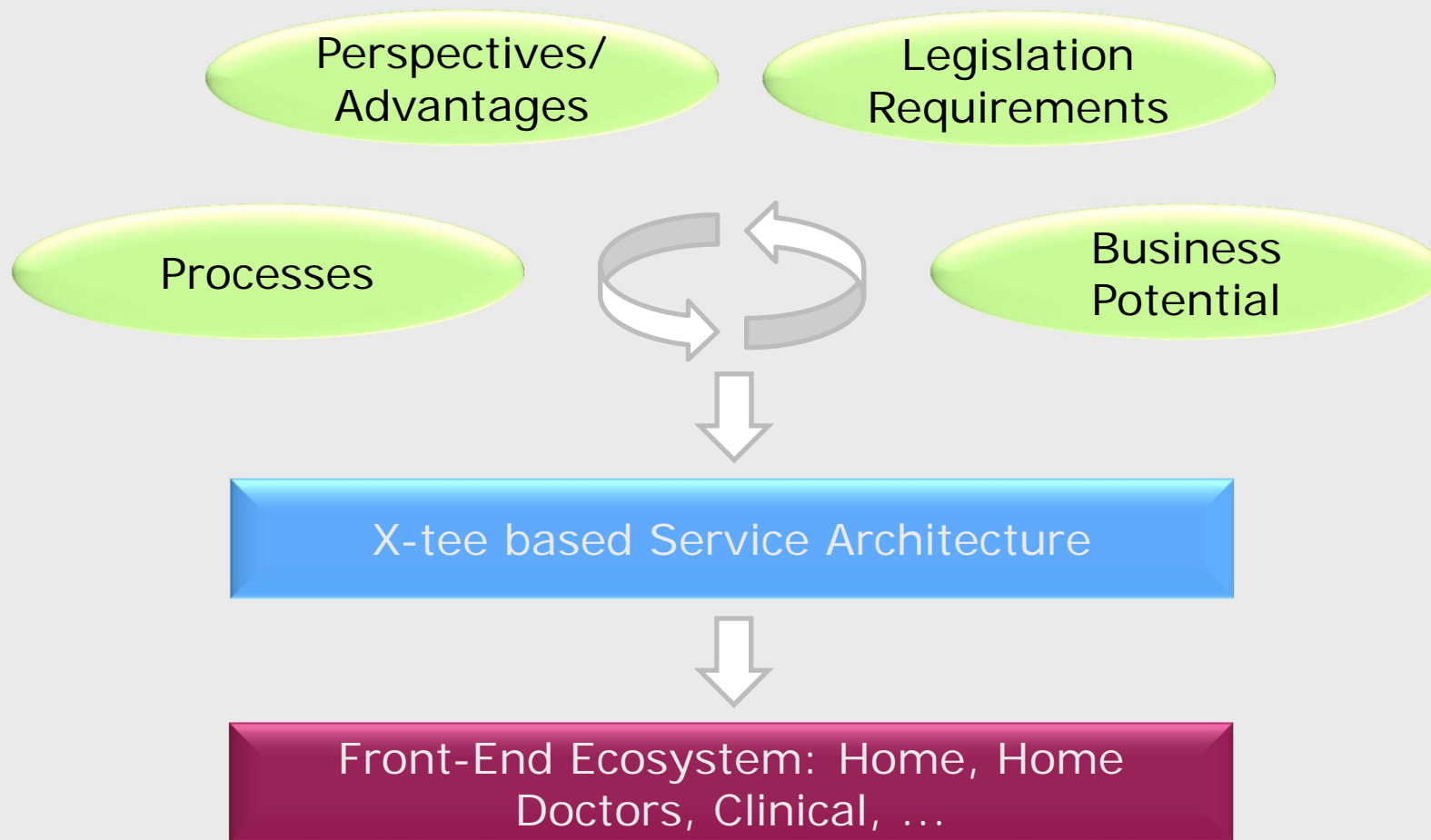
Thomas Hollstein

Tallinn University of Technology
Department of Computer Engineering

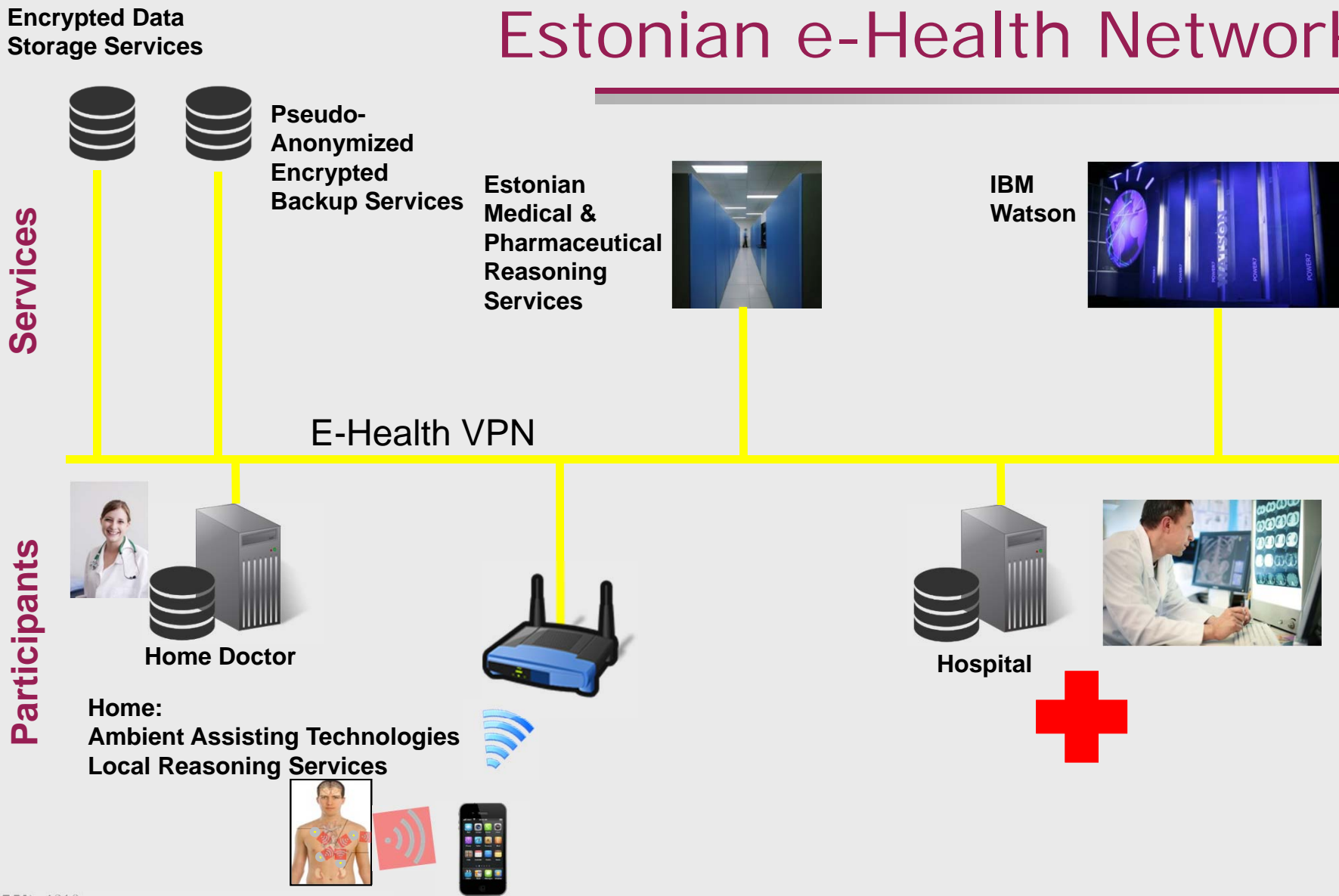
eHealth Requirements

- ✓ **Patient-owned data:** patient determines, who can have access (x-tee)
- ✓ **Requirements (Add-on value for):**
 - **Persons:** prevention, patient-centered care, reduced examination procedures, home environment instead of hospital
 - **Home doctors:** time savings, reduced home visit effort, situation alerts, context-aware systems, pharmaceutical consultancy
 - **Clinical environments:** complete treatment history
 - **Health insurance:** avoidance of double analysis cost, transfer of certain medical and care procedures to the home environment (reduction of staff costs)
- ✓ **Encrypted Data Storage** (double security against intrusion – IT system security is relative), self-expiring working copies
- ✓ **Seamless integration of data acquired at home:**
 - Integrity check if required additional telemedicine procedures
- ✓ **Scalability and Interoperability (Standards)**

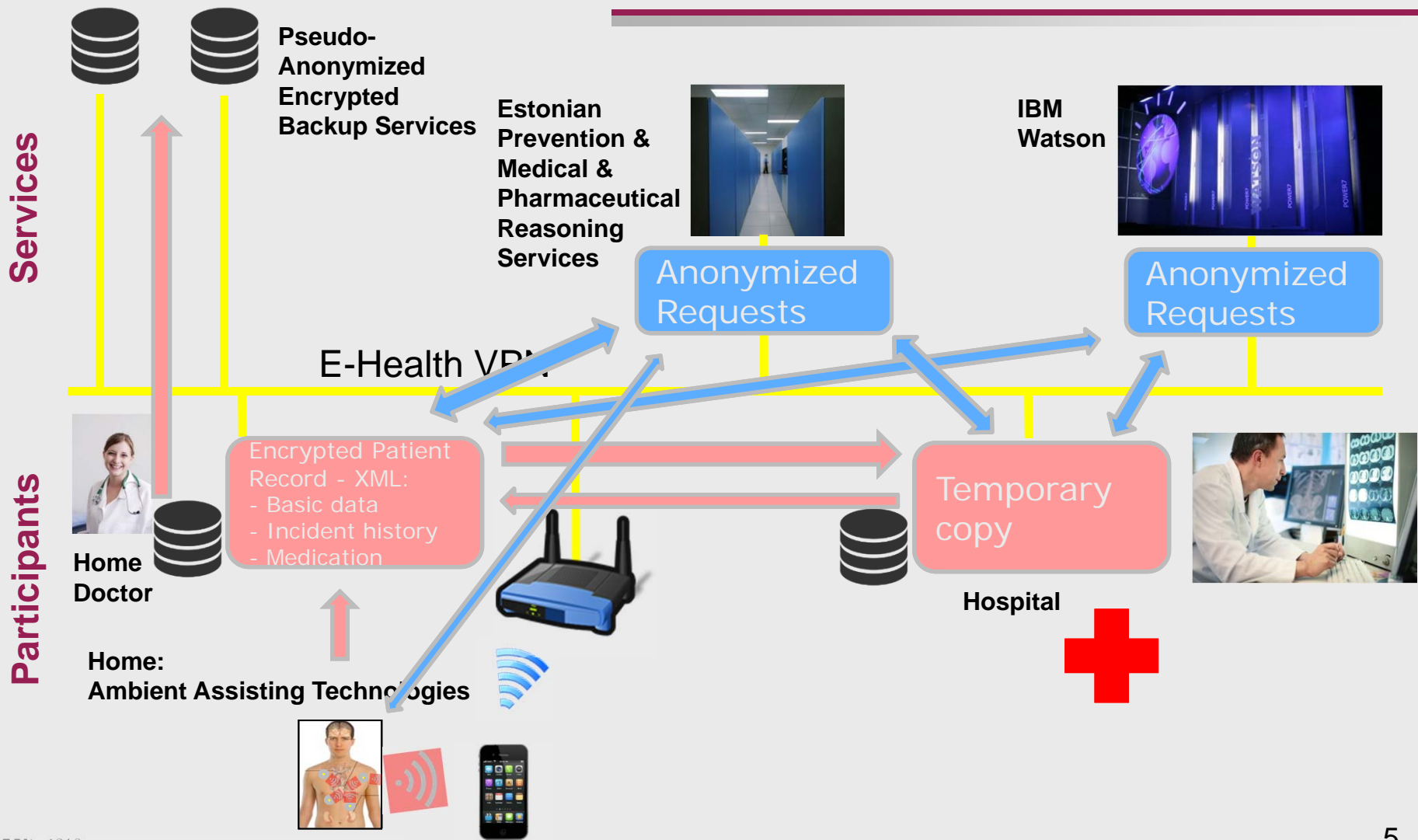
eHealth: Successful Architecture Derivation



Estonian e-Health Network



Data Structures and Data Flow

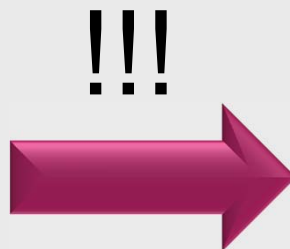


Secure Frontends for x-tee: Mandatory

Get rid of the **weakest chain link**:



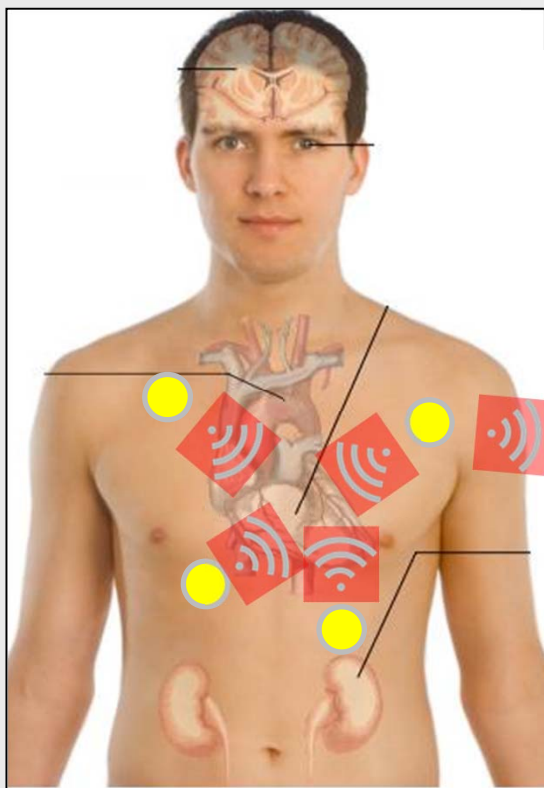
Source: Swedbank



Source: Reiner-SCT

Generic Distributed Emb. Sys. Arch.

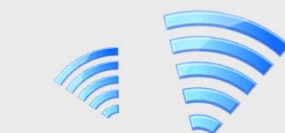
Ambient Assisting Technologies



Internet Gateway



eHealth
Middleware



Local Data
Concentrator

Generic Platform Architecture

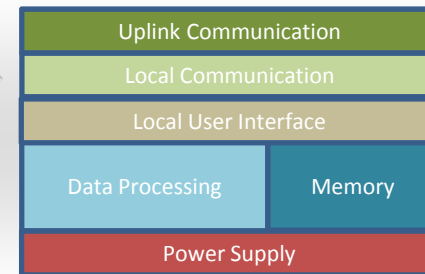
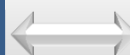
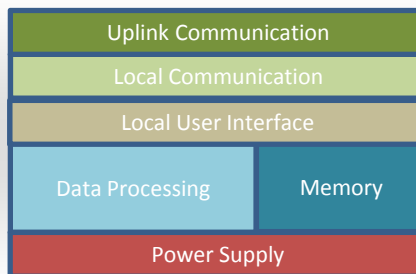
Medical Services



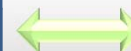
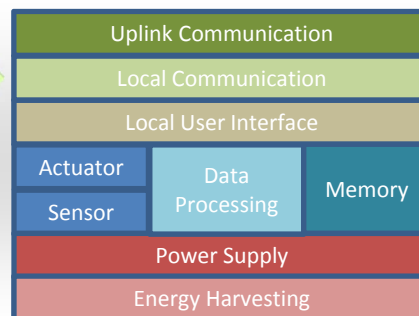
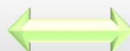
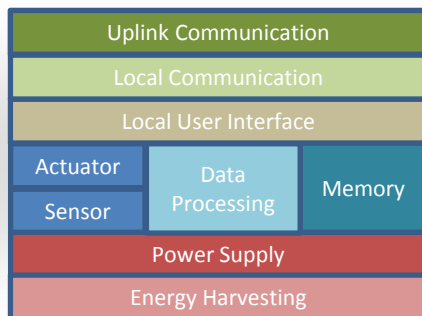
Data Services



Smart In-house infrastructure



Smart Personal Environment.



Generic Platform Architecture

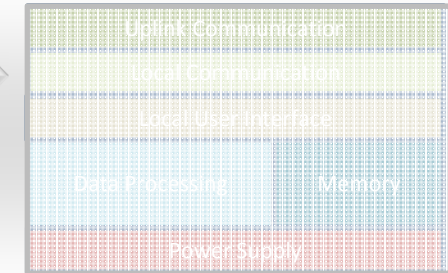
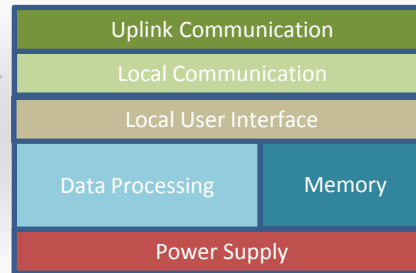
Medical Services



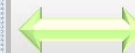
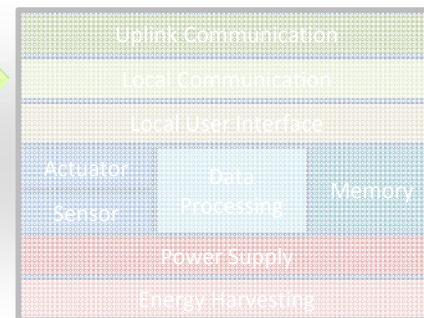
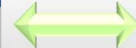
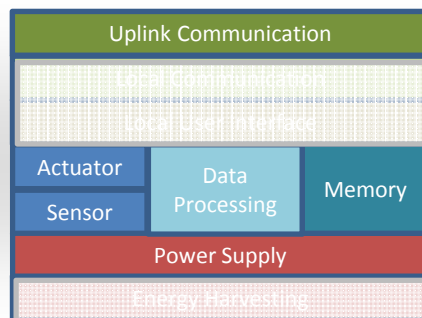
Data Services

Structure Instantiation for Bioimpedance Application

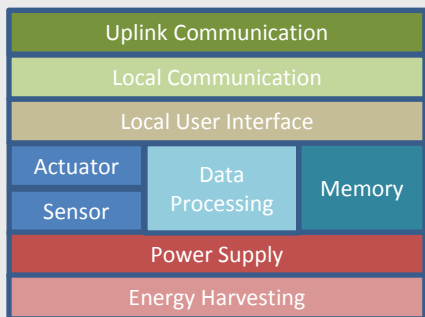
Smart In-house infrastructure



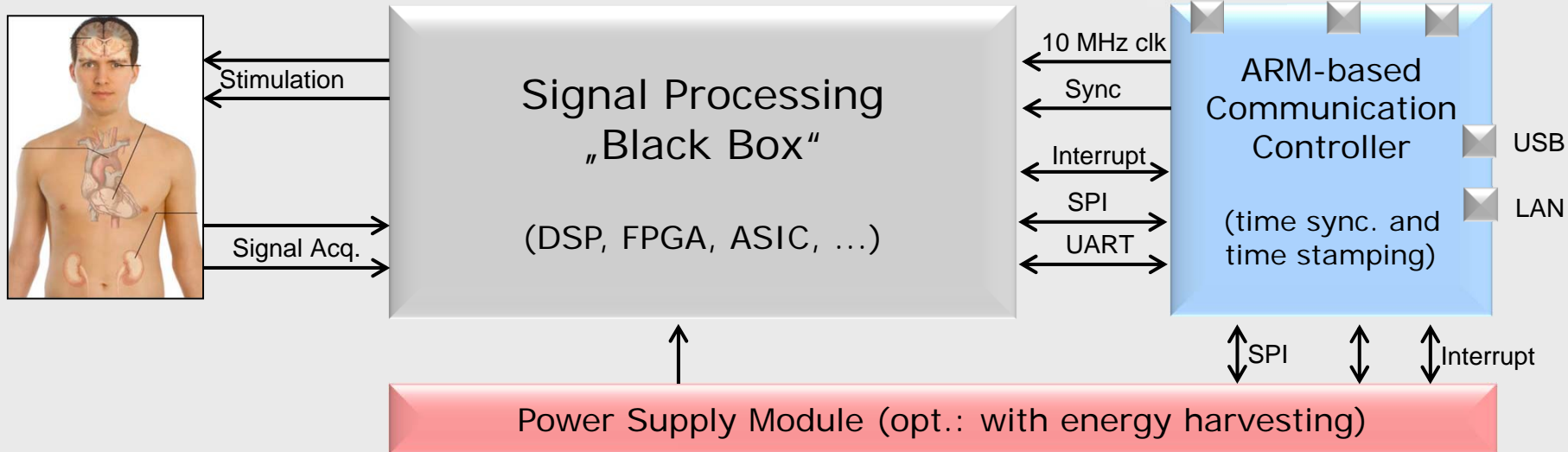
Smart Personal Environment.



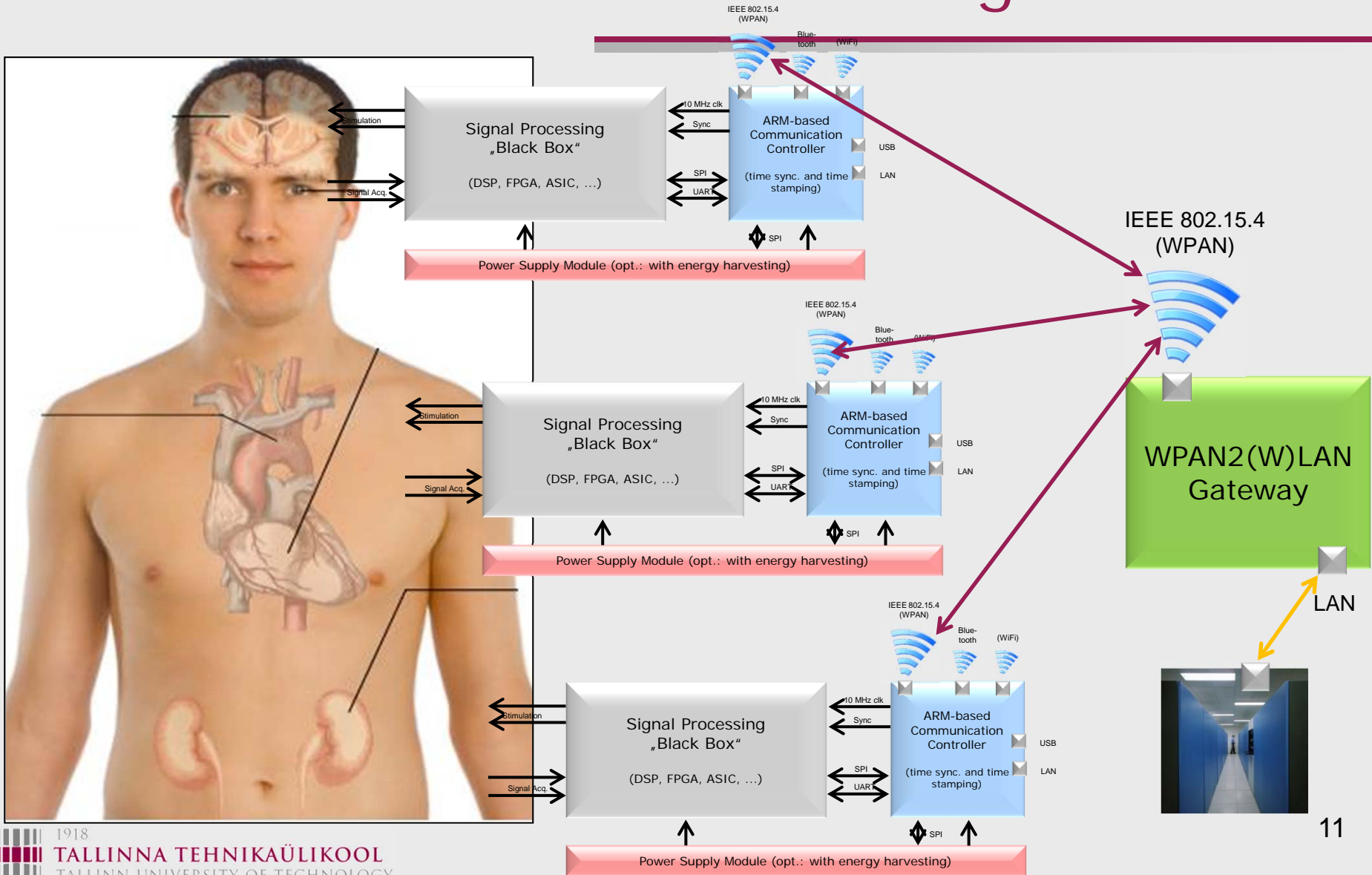
The „Blackbox“ Architecture



=



Scalable Usage Scenario



Usage Scenario: Elderly person Care

- ✓ Home Care: 100% technical surveillance can provide additional degrees of freedom for care personal
- ✓ Detection of critical health and living situations



- ✓ Wireless Sensor Infrastructure (6LoWPAN):
 - Person tracking, location based services (door locking, opening, range surveillance, tumble detection, unusual behaviour, ...)
 - Situation awareness: reasoning
 - Health parameter detection: blood pressure, pulse, decubitus avoidance, diabetes, mobilisation support

Concluding Remarks

eHealth Goals:

- ✓ **Standardisation** of Interfaces and Datastructures
- ✓ **Throughout security and privacy** (no foreign cloud services)
- ✓ **Data services** must be **operated by the state**, applying stringent access control
- ✓ New **business eco-system** combining lifestyle, prevention and care: improved life quality, many opportunities for SMEs
- ✓ **Smart ambient front-ends**
- ✓ **Scalability: marketing towards other states >> revenue**

Thank you!