

UNIK 4750

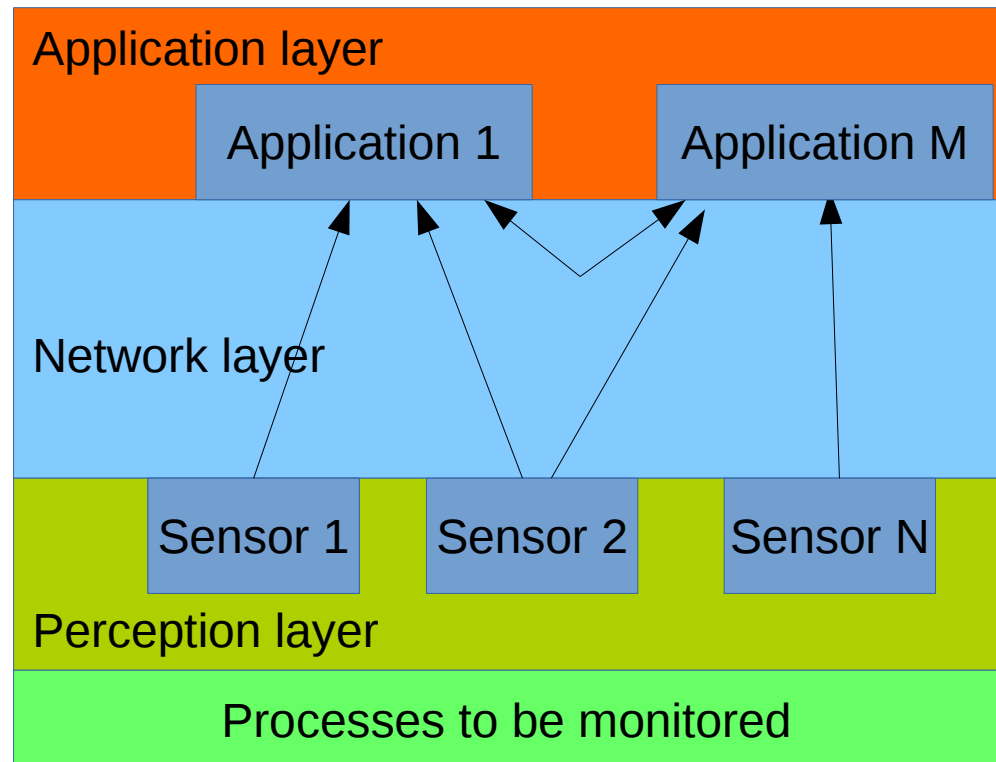
A Survey on the Internet of Things Security
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Introduction

- Survey of IoT Security, different aspects, no details.
- Definition of IoT
 - Information sensing technologies
 - Real time operation
- Purpose of IoT; To enable machine to machine, machine to man an man to man communication.
- Paper has 3 main sections:
 - IoT Security architecture and features
 - The security problems of IoT.
 - The IoT security measures.

IoT Security architecture

- In this paper IoT is divided into 3 layers



My visualization of IoT model

IoT Security Features

- Wanted characteristics
 - Comprehensive perception layer
 - Reliable transmission
 - Intelligent processing
- Typical issues
 - Tradeoff cost ↔ security
 - Heterogeneity of sensors
 - Traditional attacks in the network layer

The Security problems in the IoT

- Perception layer security problems
 - Network problems
 - Denial of Service
 - Fake node and malicious data
 - Routing threats
 - Replay attacks
 - Cryptographical problems
 - Timing attack
 - Side Channel Attacks
 - Mass authentication problem
 - Physical problems
 - Node capture

The Security problems in the IoT

- Network layer security problems:
 - Traditional network problems (my opinion: not unique to IoT):
 - DoS, MitM, virus, exploits
 - Compatibility issues
 - Privacy
- Application layer security problems
 - Traditional problems (my opinion: not unique to IoT):
 - Access permissions, Identity authentication
 - Data protection and recovery
 - Ability of dealing with mass data.
 - Application SW vulnerabilities.

The IoT Security Measures

- Perception layer:
 - Cryptographic measures
 - Data encryption, IPSec, Protocol
 - Authentication, Integrity
 - Access control – to prevent that information is not read.
 - Key management (not trivial, Not in paper: example pacemaker)
 - Secure routing protocol
 - Physical security scheme – to prevent side channel attacks.
 - Physical security design
 - IDS Intrusion Detection System

The IoT Security Measures

- Network layer
 - Authentication mechanisms
 - PKI
 - Secure routing
 - Intrusion detection
- Application Layer
 - Network authentication and key agreement across different networks.
 - Protection of private information
 - Increase awareness of safety(Security)
 - Strengthen information security management

Conclusion

- IoT: new problems/issues are in the perception layer.
- Problems in the other layers are not unique to IoT.
- Good overview of information security if you have no previous knowledge in information security.
- Good partition of the IoT, makes it easy to understand and to address different issues.
- Paper focuses on wireless devices (WIFI and RFID) however problems are valid in other settings.

Missing topics

- No considerations which resources are available, what resources are critical.
- Trade off cost \leftrightarrow resources.
- Missing control path from application to sensor.
- Missing effector \rightarrow results shall end up in some kind of actions.
- Privacy/personvern