Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin
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IT security standards applicable for legal Metrology

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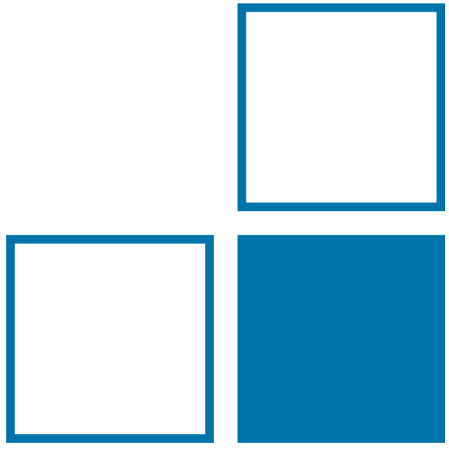
WG 8.52 Metrological ICT-systems



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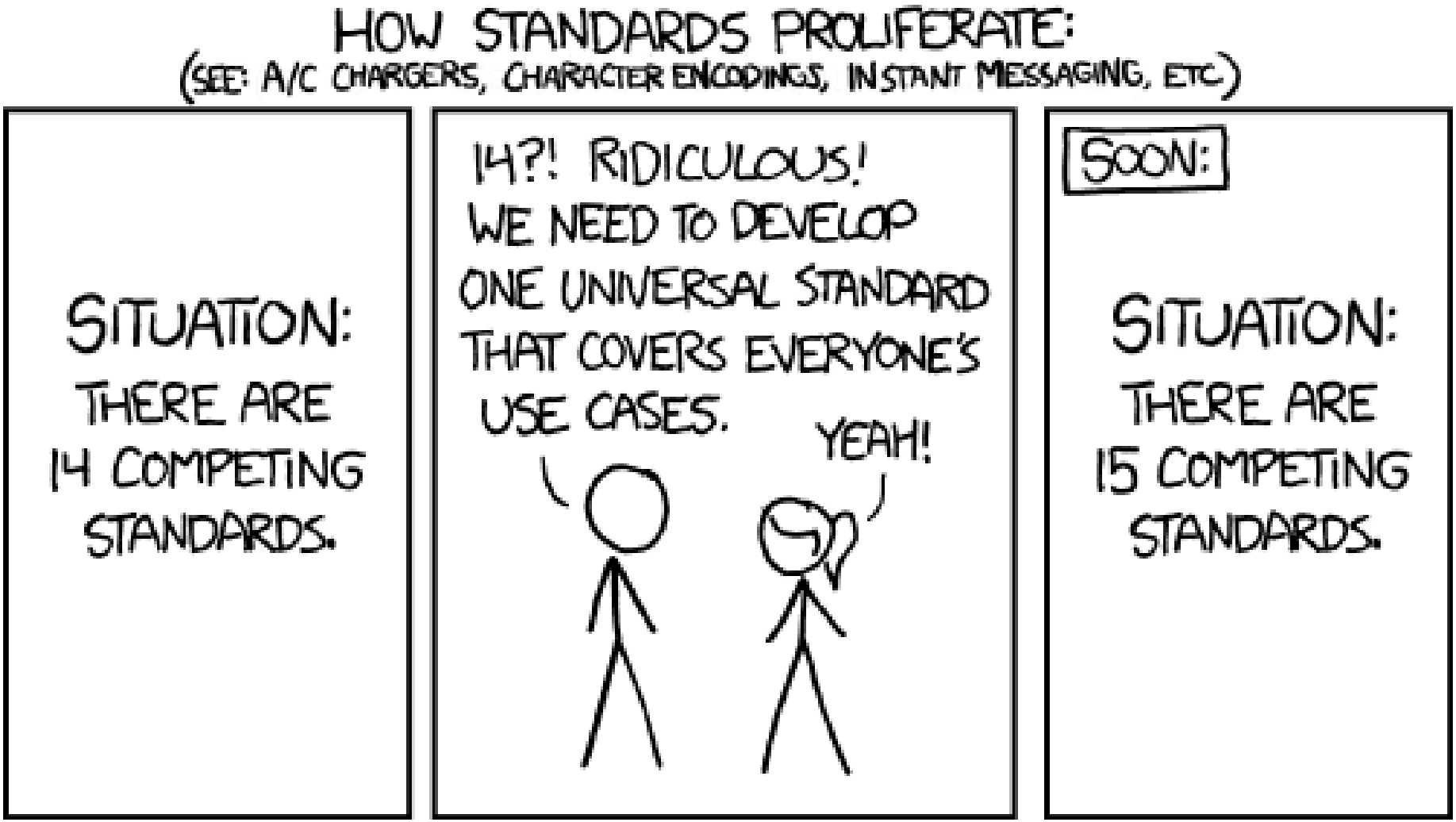
Introduction



source: https://xkcd.com/927/

Approach

- summarize IT standards
- reuse existing standards for legal metrology?

Relevant IT standards

- European Standards defined/identified by CEN/CENELEC
- on behalf of EU Mandate M441 (Smart Metering) and M490 (Smart Grid)
- standards can be distinguished into process-oriented and implementation-oriented standards
- Device Language Message specification (DLMS)/COSEM for smart metering (IEC 62056-5-3 / EN 13757-1)
- ISO-15408 Common Criteria and ISO-18045 Methodology for IT security evaluation (risk assesment[1])

[1] M. Esche and F. Thiel, Software Risk Assessment for Measuring Instruments in Legal metrology, submitted to Federated Conference on Computer Science and Information Systems (FedCSIS), (2015)

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Areas to cover according to EU mandate

- prevention of unauthorized disclosures of personal data
- maintenance of data integrity to ensure against unauthorized modification
- effective authentication of the identity of any recipient of personal data
- avoidance of important services being disrupted due to attacks on the security of personal data
- facility to conduct proper audits of personal data stored on or transmitted from a meter
- appropriate access controls and retention periods
- aggregation of data whenever individual level data is not required

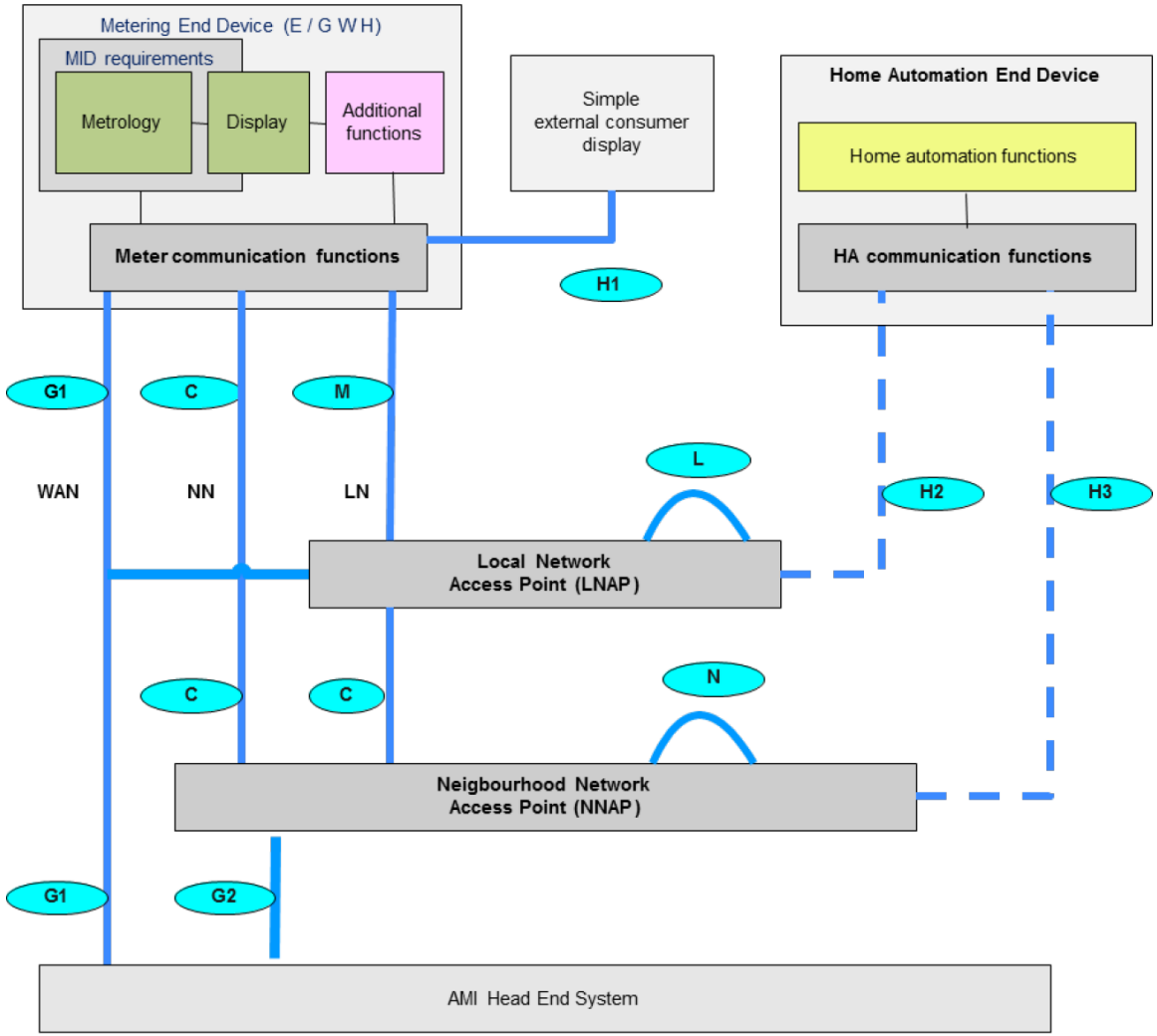
SM-CG Privacy and Security approach – part I

- security requirements for Generic Use Cases
- selected Crypto-algorithms:ECDSA, ECDH, NIST standard Curves P-256 and P-384, AES 128 GCM
- covers unlinkability and unobservability
- IEC 62351 certain security aspects of protocols like TCP/IP, telecontrol in grids, RBAC, Key Management,XML data
- IEC 62443-2-4, IEC 62443-3-3, IEC 62443-4-2 (Industrial communication networks)
- ISO/IEC 15408 + ISO/IEC 18045 Common Criteria

SM-CG Privacy and Security approach – part II

- cover security and privacy within the boundaries of CEN/CLC/ETSI TR 50572

functional reference model



source: SMCG Security and Privacy Report – part II

SM-CG Privacy and Security approach – part II

- cover security and privacy within the boundaries of CEN/CLC/ETSI TR 50572
- approach to define requirements for privacy and security standards
- repository of privacy and security requirements
- application of the European Data Protection Impact Assessment (DPIA)

SM-CG Privacy and Security approach – part IV

- extended security features provide authentication of the communicating entities using:
- a ciphered challenge-response mechanism (High Level Security authentication),
- protection of both DLMS/COSEM application layer messages and COSEM data using symmetric key authenticated encryption (AES-GCM) and digital signature (ECDSA)
- EN 13757-3, Communication systems for meters — Part 3: Application protocols
- EN 13757-7, Communication systems for meters — Part 7: Transport and security services.

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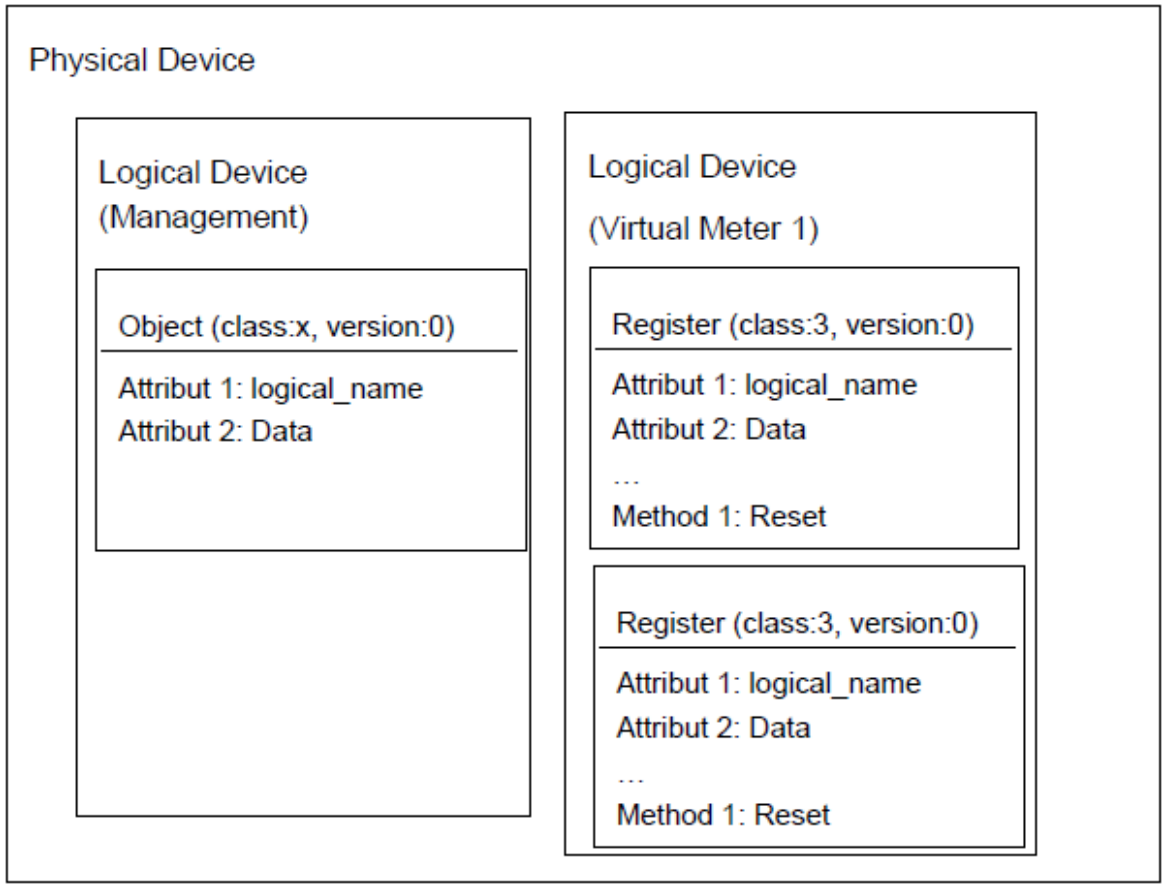
DLMS/COSEM

- based on object modelling of application data and OSI-model
- COmpanion Specification for Energy Metering (COSEM)
- Device Language Message specification (DLMS)
- IEC 62056-5-3,62056-6-1,62056-6-2

COSEM


Physical Device
Logical Device
(Management)
Object (class:x, version:0)
Attribut 1: logical_name
Attribut 2: Data
Logical Device
(Virtual Meter 1)
Register (class:3, version:0)
Attribut 1: logical_name
Attribut 2: Data
...
Method 1: Reset
Register (class:3, version:0)
Attribut 1: logical_name
Attribut 2: Data
...
Method 1: Reset

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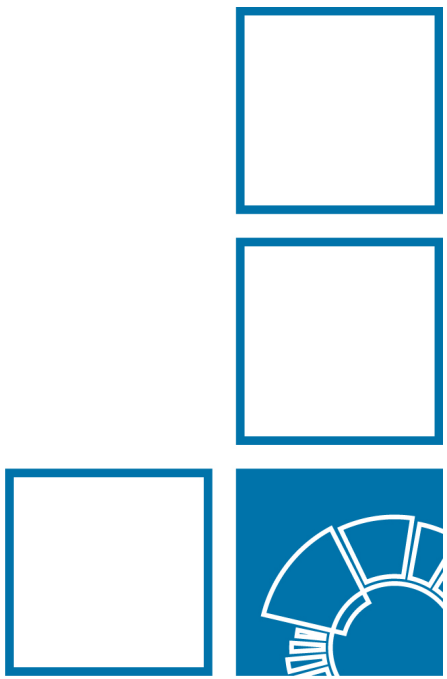
- use of presented implementation-oriented standards could fullfill certain requirments of MID and WELMEC-Guide
  - basic requirements (type U/ type P)
  - data transmission (extension T)
  - longterm storage (extension L)
- if used for conformity assesment the coverage of essential requirements must be shown
- process oriented standards however are not in line with the product oriented approach of MID and can only be considered as a starting point

Any comments?



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