Mandatory standardizations for deploying a data management system

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science + computing ag

IT-Services and Software in complex computing environments

Tübingen | München | Berlin | Düsseldorf

Experience in complex computing

- **IT-Services and Software in complex computing environments**
  - CAE more than 20 years
  - CAT more than 12 years
- **Long lasting commitment to the automotive sector**

⇒ We know the
CAE- und CAT-Processes
of the automotive industry

⇒ Data management is our
core competence

More than 20 years in Tübingen
Munich, Ingolstadt, Düsseldorf, Berlin

Expert knowledge in ASAM-ODS

- **Running ASAM-ODS based environments since 2000**
    - Various ASAM-ODS server
    - Database support
    - Fileserver support
    - Client support
    - Application support

- **Experience in ASAM-ODS standard starting pre-3.0**
    - Migrations to new versions of the standard
    - Migrations to new versions of ASAM-ODS server
    - Migrations to different ASAM-ODS server

Expert knowledge in ASAM-ODS

- **Software Solutions based on ASAM-ODS**
  - Client-Server
  - Web-based
  - MDM (3.x, 4.x) based

- **ASAM-ODS Consulting**
  - Conceptual designs
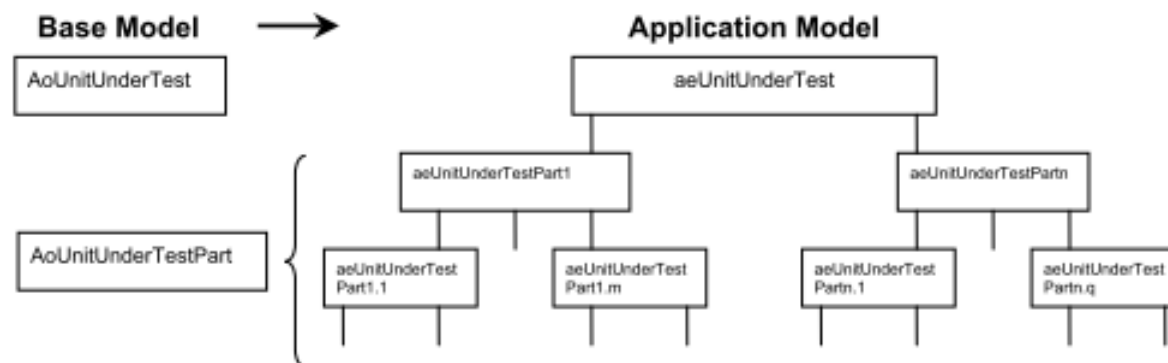 - Requirement specifications
  - Pilot definitions

ASAM-ODS 5.2
Base Model – The Standard
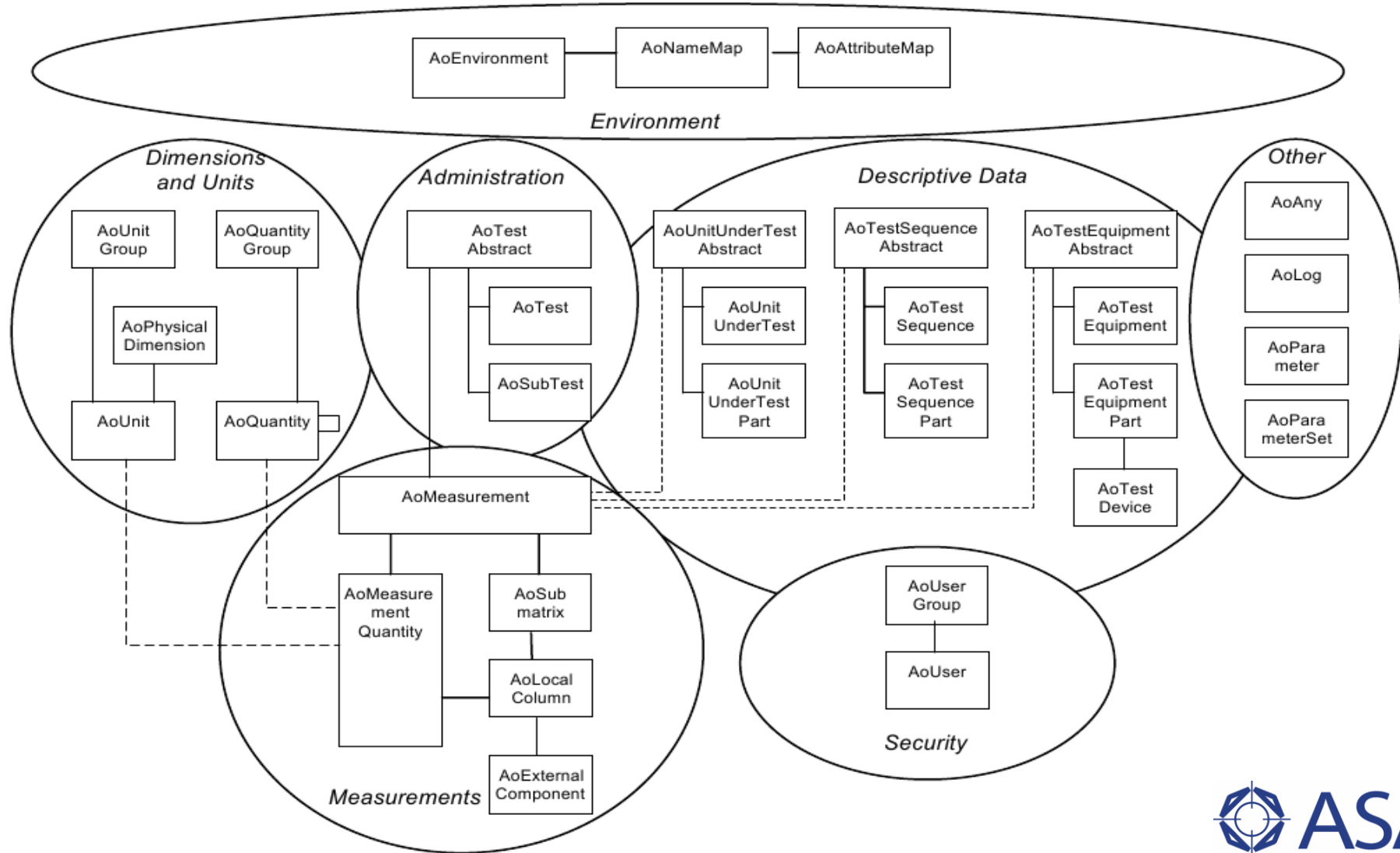
Application Model vs Base Model

- **Base Model**
  - Standardizes the most basic aspects
  - Very generic
  - All possible applications use the same base model

- **Application Model**
  - Applies the Base Model for specific needs
  - Less generic
  - Some standardization is necessary

NVH Application Model

- **Standardized in chapter 11 of the ASAM-ODS specification**

  - Mime-types to describe the type of data

  - Standard storage of multidimensional data

  - Storage and description of the origin of the data
    - How were the data measured or calculated?

  - Storage of filtering and windowing functions

  - Storage of special NVH data structures,
    like MTL, TAL or rainflow data

  - Standard set of quantities

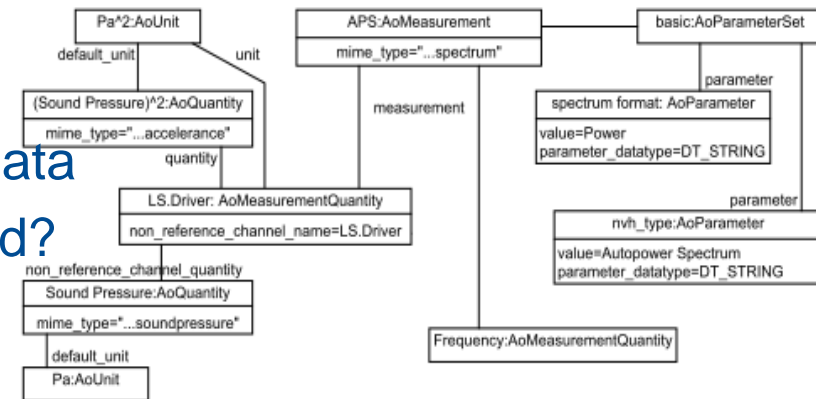 - Standard set of units and the associated physical dimensions

Figure 10 - Auto Power Spectrum

openMDM Application Model

- The openMDM application model aims to standardize further:
  - The structure of the model
  - Names of application elements and their semantics

- openMDM implements:
  - The discrimination between
    - Measurements as ordered
    - Measurements as executed
  - A system of templates and components to handle application specific attributes in a dynamic but comprehensible way
- openMDM brings you best practices and tools

  check: **http://www.openmdm.org**

Does all this help?

- Yes – it does, but

  - Applying the ASAM-ODS (and NVH and openMDM) standard is not enough!
  - Additional "internal" standardizations
    - Are needed
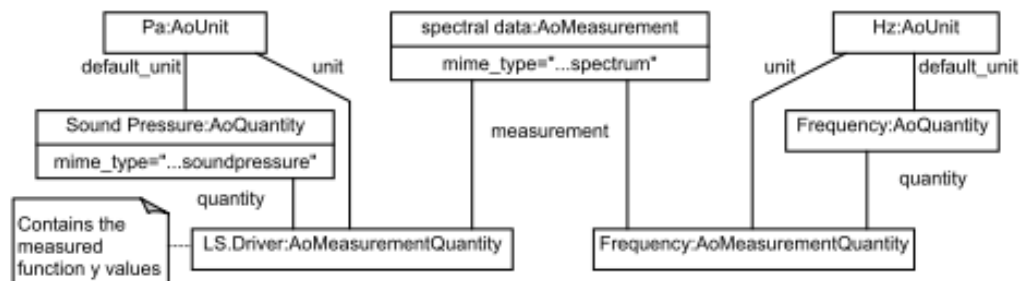   - Are the basis for a successful implementation of these standards

Figure 8 -   Spectrum

Necessary internal standardizations

- Objects and attributes that will be used for searching or navigating through data

- Measurement quantities

- Should other standards (like the NVH application model) not be sufficient:
  - Additional Quantities
  - Additional Units
  - Additional Physical Dimensions

Pitfalls without internal standards

- **Descriptive data not standardized**
  - Difficulties in finding data when not standardized

- **Measurement quantities not standardized**
  - Wrong interpretation or even complete lack of understanding
  - Typos increase the difficulties for automated interpretation and comparison

Are they all the same measurement quantities?

Rotational Speed.nMot	88738
Rotational Speed.Nmot	10783
Rotational Speed.nMOT	3515
Rotational Speed.NMOT	1020
Rotational Speed.nmot	286
Rotational Speed.n-MOT	5401
Rotational Speed.N-Mot	245
Rotational Speed.n-mot	57

Pitfalls without internal standards

- **Quantities not standardized**
  - Different names for the same issue make comparisons difficult
    - E.g. „Force" and „Kraft"

- **Units not standardized**
  - Wrong conversion factor may lead to wrong calculation results
  - Wrong Physical Dimension might be completely misinterpreted in automatic tools

- **Physical Dimension not standardized**
  - Wrong factors lead to a complete misinterpretation
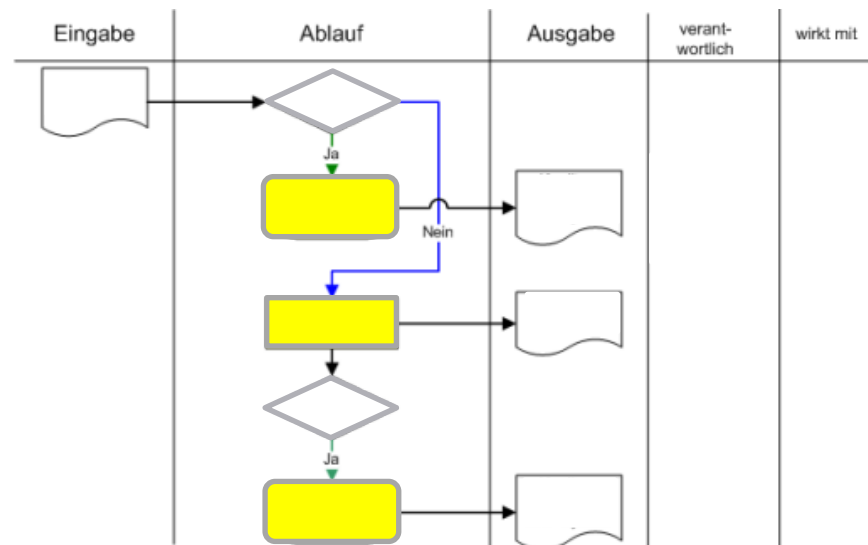
Recommendations

- **Implement conventions for measurement quantities**
  - Acronyms
  - Key words
  - Separators
  - Language
  - Notation and diction

Table 1 - Application attributes for coordinate_system

Name	DataType enum name	Obligatory in instances
origin_1	DT_DOUBLE	no
origin_2	DT_DOUBLE	no
origin_3	DT_DOUBLE	no
x_axis_1	DT_DOUBLE	no
x_axis_2	DT_DOUBLE	no
x_axis_3	DT_DOUBLE	no
xz_plane_1	DT_DOUBLE	no
xz_plane_2	DT_DOUBLE	no
xz_plane_3	DT_DOUBLE	no
coordinate_system_type	DT_ENUM / enumeration name is coordinate_system_types	yes
id	DT_LONGLONG	yes
name	DT_STRING	yes
version	DT_STRING	no

Recommendations

- **Definition of processes**
  - Definition and release of new objects
    - e.g. Measurement quantities, units, quantities or physical dimensions
  - Each object type may need it`s own process

- **Support and secure the processes through the application logic**

Recommendations

- **Definition of mappings**
  - Different use-cases may need different representations of the data
  - There should be **one** highly standardized "master"-source
  - There may be many secondary representations of the "master"-source
  - Possible export formats for:
    - Different languages
    - Different unit sets (US, ISO)
    - …

Thank you for your attention

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