Use Case OAS

Use Case No 6

_OAS AG / Karl Krone_

OAS AG

- Privately owned SME

- Headquarters in Bremen, Germany

- 250 employees in 5 subsidiaries over Germany.

- OAS' main products include:
  - Turn-key solutions for process control in food, concrete, chemical and other process industries
  - Process control systems and process visualisation systems for highly automated processes
  - Yard Management solutions and Truck Scales
  - Weighing data processing systems

- Involved partners:
  - OAS A.G
  - With the support of ATB-Bremen

Use case UC6 - OAS

- The use case focus: OAS Yard Management:
  - Yard management, plant logistics, and dispatch automation covers the planning, organisation, control, processing, and supervision of the entire flow of materials and goods.
  - Yard automation aims at automation of access to areas and management of vehicles.
    - Assignment of parking spaces in coordination with the operations required in the warehouse to take stock in and out and management of the gates (docks) and waiting areas for lorries

- Main point of Use case scope:
  - Site (HW/SW) Configuration,
  - Service Customisation and Configuration (Yard management, logistic process definition service)
  - Decision making in service design

- Involved actors:
  - Service Designer (yard designer, project manager in OAS)
  - SW designer
  - Customers (and their clients implicitly)
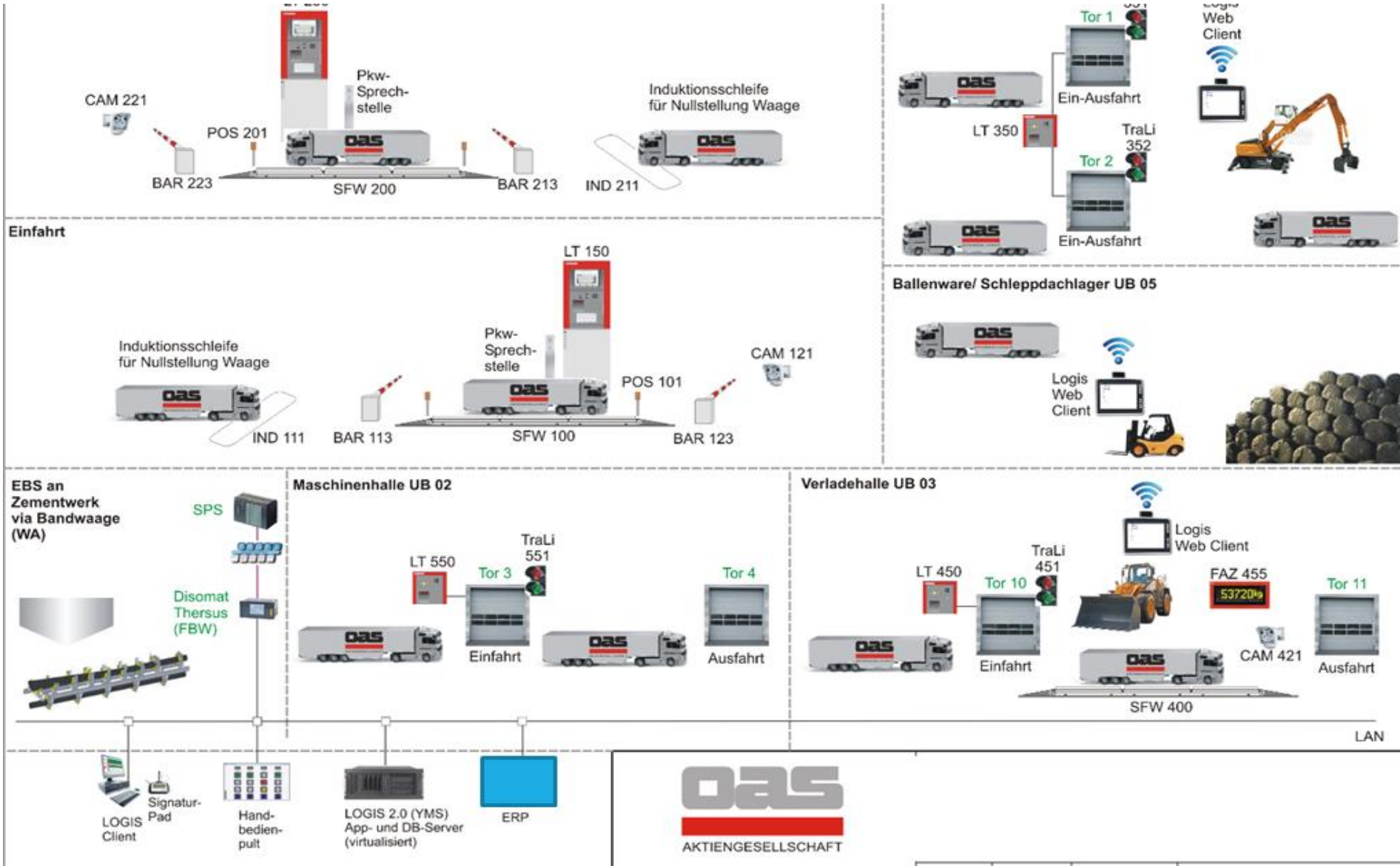
Ontology use in the UC6 (1)

- **Purpose of ontology application in the use case**

  - Business planning/communication – collaborative development of services around OAS products (systems "logis" and "pylod" and yard automation hardware solutions)

  Yard management service definition:

  The service designer – project manager in OAS needs to create a new service (e.g., site configuration for yard management and logistics on warehouse, good/material transportation and fleet monitoring, automation opportunity for e.g. access control of a vehicle)

  Use the ontology to identify what modules and actors need to be considered for new service (search functionalities):

  1. Devices (including functional and structural links)
  2. Software,
  3. Stakeholders/Actors,
  4. Customer Sites and infrastructure

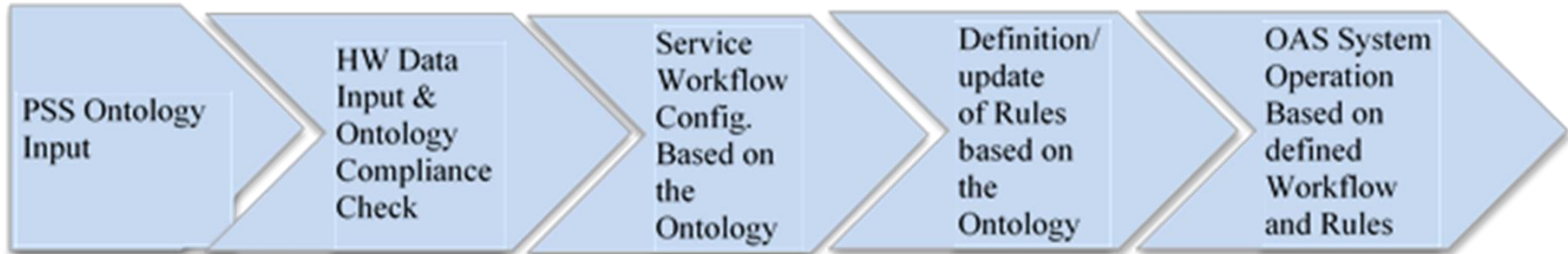 **Domain ontologies**: Product Service System (PSS)

  Other ontologies: Material ontology, Logistic ontology, Supply chain ontology

Ontology use in the UC6 (2)

- Purpose of ontology application in the use case:

  - Software customisation at sites (Including SW/HW configuration, process workflow definition/customisation at site, hardware and communication workflow definition, etc.)
  - When the yard management has to be applied at specific site, HW has to be configured and workflow has to be defined.

PSS Ontology Input → HW Data Input & Ontology Compliance Check → Service Workflow Config. Based on the Ontology → Definition/ update of Rules based on the Ontology → OAS System Operation Based on defined Workflow and Rules

UC6 Requirements – main requirements

- Use/application of ontologies
  - The ontologies shall allow for easy adding/updating of application specific rules among the entities
  - The ontologies should be possible to apply in combination with other ontologies (e.g. combine material and logistics ontologies as type of materials may influence work flow)
  - The ontologies shall be usable by non-ontology experts. The natural language definitions of entities and relations shall be understandable by domain experts without knowledge on ontology science
  - The ontologies shall allow to structure and document data related to yard management services
  - The ontologies should allow for efficient standardisation of processes and communication among HW/SW entities across sites (processes at diverse sites often very individual)
  - …

UC6 Requirements – main requirements

- Development of ontologies
  - The ontology documentation should define how the reuse and harmonisation of different ontologies could be achieved
  - The ontology should be with minimum number of levels in hierarchy to allow for easy processing and for understanding by non-ontology experts

- Maintaining/extension of ontologies
  - The non-ontology experts (e.g. SW engineers) should be able to maintain the ontology (e.g. adding lower level terms, additional relations, etc.)

- Tools for ontologies
  - The tool for edition and maintenance of the ontologies shall be able to edit the OWL files.
  - The tool for edition and maintenance of the ontologies shall be able to import and reuse existing ontologies.
  - …

UC6 Requirements - challenges/highlights

- Challenge is to allow for flexibility in the definition of rules and take dependencies of rules into account

- Ontologies from different domains need to be used and work together harmonised

- Different hardware/software systems need to be able to process the ontologies used

- Finding the most optimal abstraction level for ontologies

- Actors with different skills (e.g., software engineers, hardware maintenance experts, project managers, etc.) or domain expertise (e.g., logistics, machine or material manufacturing, business management/administration etc.) need to be able to use the ontology

- Allowing (on mid-term) that services may self-learn and adapt to site specific dynamically changing conditions.

Main expected benefits

- Ontologies should support standardisation of yard management services; yard sites do differ from each other leading to very individual solution for each site
    - Create "standardized" building blocks on services and hardware components
    - Use ontologies to model structure and workflows of a yard based on such building blocks
- Collaborative aspects – ontology to allow for effective work together with the customers and their clients to find the best definition of workflow and rules (common terminology and rules)
- More time/cost effective development of OAS YM systems
- More time/cost effective development of services around OAS products

Thank you very much
for your attention!

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OAS AG