FH JOANNEUM

Semantic-ontological combination of Business Rules and Business Processes in IT Service Management

Alexander Sellner[1], Christopher Schwarz[1], Erwin Zinser[1]

[1]FH JOANNEUM University of Applied Sciences, Graz, AUSTRIA

Focusing on IT Service Management (ITSM)

- **ITSM: Alignment of IT Services with business processes and organizational requirements**
- **IT Service**
  - Any expendable IT-based activity
  - Composition of hardware & software
  - Usually decomposable into multiple components
- **Goals:**
  - Establish measurable IT performance indicators
  - Improve manageability of IT systems
- **Benefits:**
  - Agile and adaptive systems (competitive advantage)
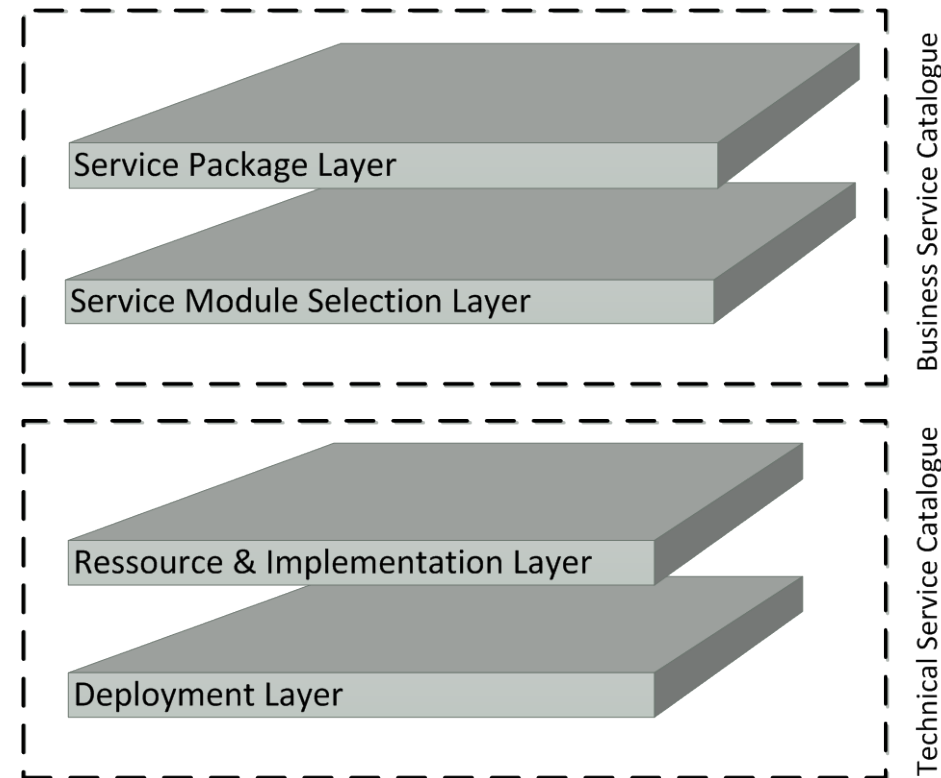 - Transparency in chargeability

FH | JOANNEUM

IT Service Catalogue – a famous example for „the gap"

- **Business-IT gap**
  - Management perspective vs. IT perspective
  - Seamless integration of business processes
- **Service Catalogue Management**
  - Process of managing IT-related services
  - Contains various elements
  - Based on ITIL v3
- **Elements**
  - Request for Change (RFC)
  - Service Instances (SI)
  - Service Level Agreement (SLA)
  - Maintenance Contract (MTC)
 - All items contained in the Configuration Management Database (CMDB)

Borders of the IT service catalogue

- **Business Service Catalogue**
  - Customer-facing list of services
  - Facilitated selection & composition
- **Technical Service Catalogue**
  - Internal resource description
  - Specifications & technical details

- **Broken down into Layers**
- **Loosely coupled elements**
- **Multitude of legal agreements**
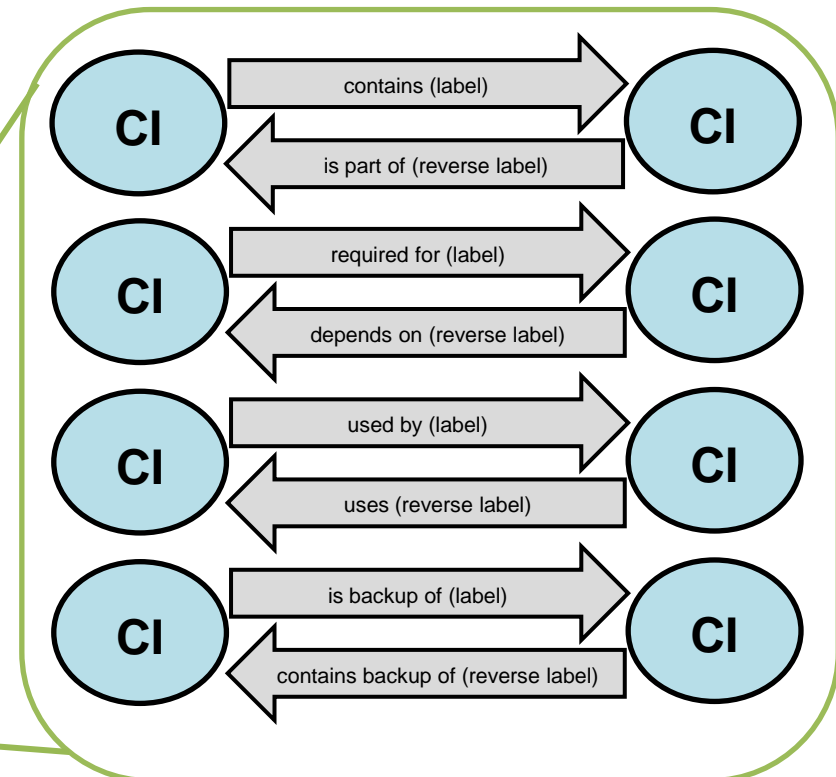- **Paradigm of inheritance**

Service Package Layer

Service Module Selection Layer

Business Service Catalogue

Ressource & Implementation Layer

Deployment Layer

Technical Service Catalogue

Establishing a multi-layer perspective

- **Package Layer**
  - Overall service package
  - Aggregrated financials
  - Categorization
- **Module Layer**
  - SLAs & MTCs
  - "Levels of Quality"
- **Resource Layer**
  - Operating Level Agreement
  - Underpinning Contract
  - Service Instances
- **Deployment Layer**
  - Deployment Processes
  - Tracking & Automation

Semantic-ontological combination of BR and BP in ITSM – Sellner, Schwarz, Zinser

5
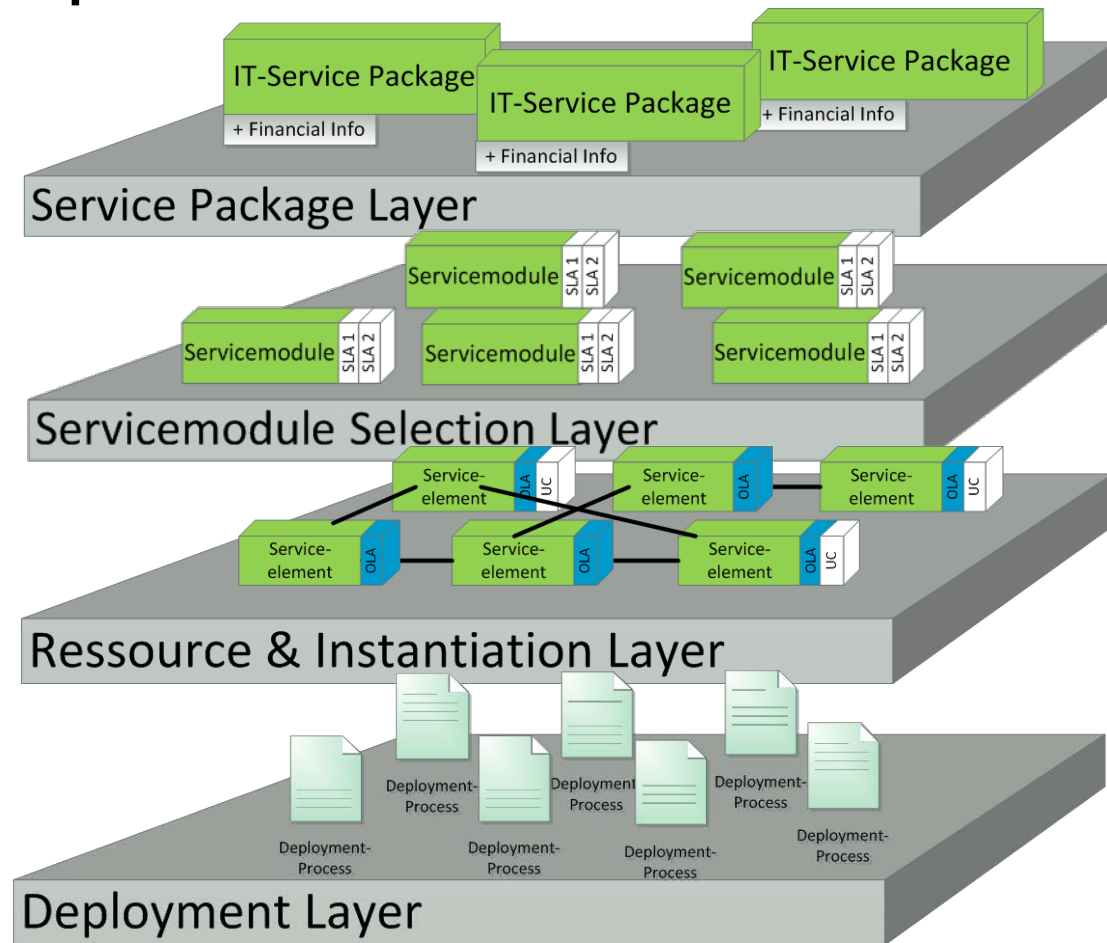
Semantic ITSM

- **Relations between configuration items (CIs)**
    - Parent-child relations
    - Bidirectional wording
- **Organizational dictionary**
    - Semantic ITSM environment
    - Basis for transition to ontologies
    - Impact on data model

Organizational dictionary

| CI | contains (label) → | CI |
| | ← is part of (reverse label) | |

| CI | required for (label) → | CI |
| | ← depends on (reverse label) | |

| CI | used by (label) → | CI |
| | ← uses (reverse label) | |

| CI | is backup of (label) → | CI |
| | ← contains backup of (reverse label) | |

FH | JOANNEUM

Utilizing semantic queries

- **Goals**
  - Make services machine-discoverable
  - Ensure consistency within service tree
  - Express restrictions
  - Extend data schema
  - Basis for "ITSM ontology"

RDF statement

ci = (http://cmdb.fh-joanneum.at/ima/ci#)

ci : host rdfs : subClassOf ci : system

OWL Statement

object : nt a owl : Class; rdfs : subClassOf
        [a owl : Restriction;
        owl : allV aluesF rom   object : hostresource;
        owl : onProperty link : container_f]:

Topic map

topics:
 Commands::
   "rmdir„
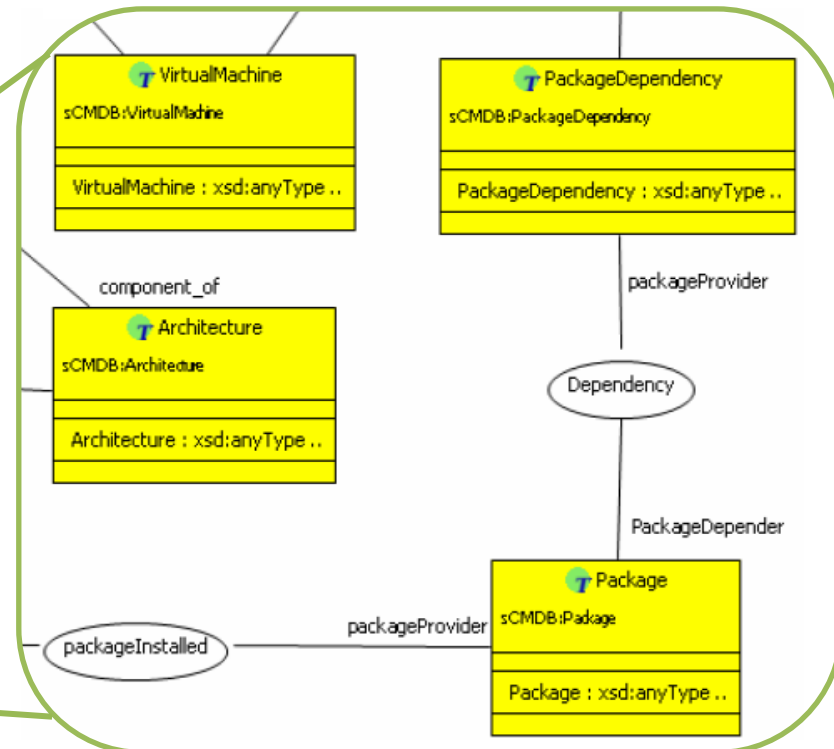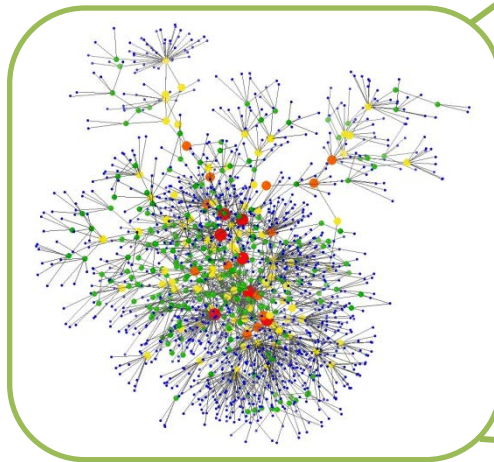   association => a("is command of", "Unix", "has command");
 System_Function::
   "rmdir„
   association => a("is system call in", "Unix", "has system function");

Incorporating Ontologies

- **Bottom up approach (utilize already existing database model)**
  - Add semantic expressions as relationship attributes
  - No severe modifications to Db model
- **Mapping**
  - Relational Db <-> Topic Map
- **→ CMDB as Ontology**

Application of rules - Inheritance within Service Trees

- **Inheritance of SLAs and MTCs**
- **Service items used multiple times within different RFCs**
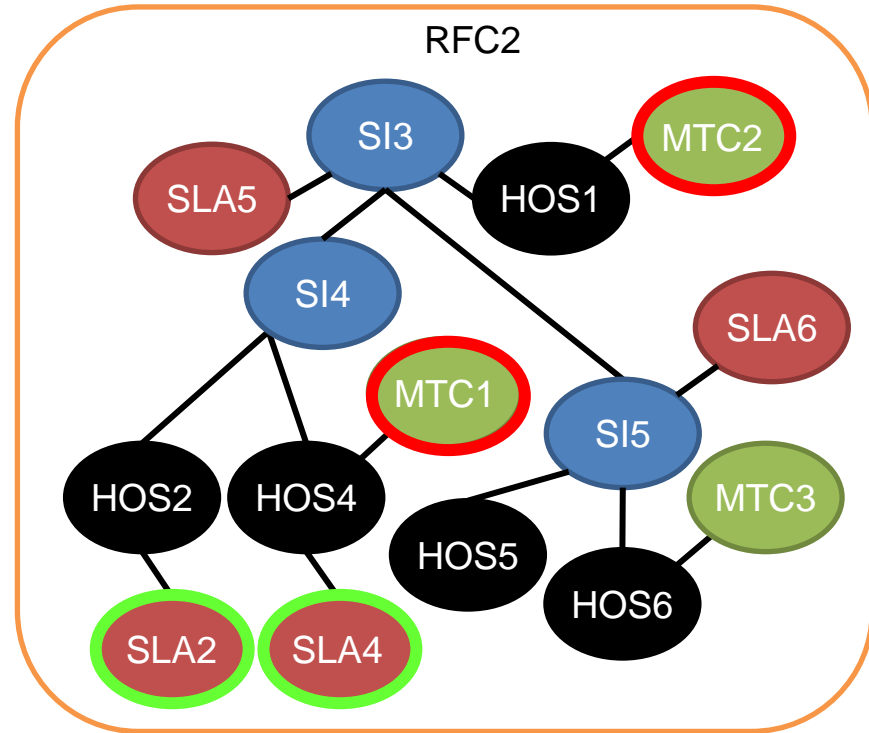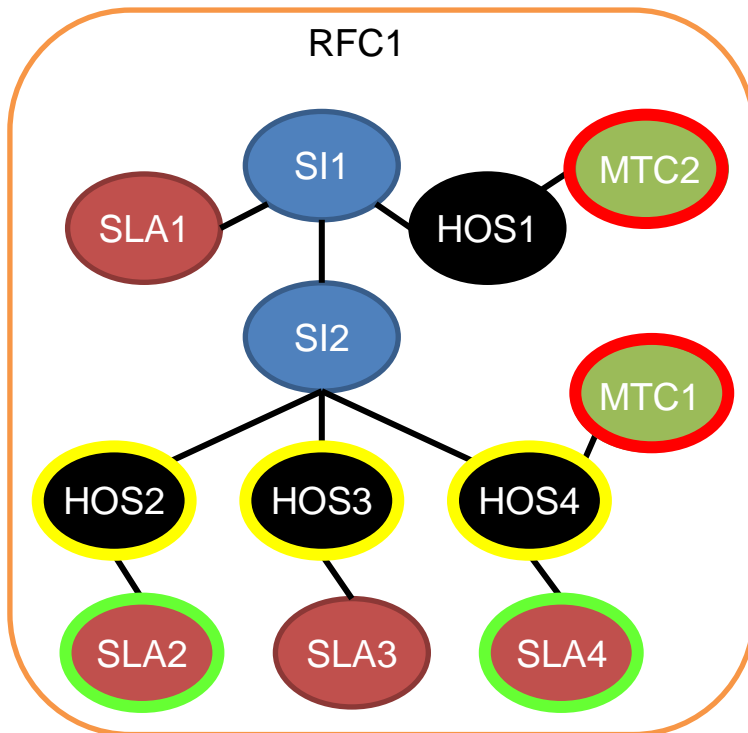
Integrating SBVR-based rules using DBMS triggers for execution

- **Three types of rules within complex ITSM service trees:**
    - 1. Prevent adding new SLAs or MTCs (inconsistencies or negative business impacts)
    - 2. Analyze and improve existing SLA and MTC structure
    - 3. SLAs definitions (legal statements)

- **Event-Condition-Action rule "in a box"**

Structured English statement:	**SQL expression:**

T:SLA
T:SVC
T:total fines
F: SLA has total fines
F:SLA is linked to SVC
NR: For an SLA that is linked to an SVC it is obligatory that the total fines of the new SLA are less than the total fines of the old SLA.
	CREATE TRIGGER "NR1" BEFORE UPDATE OF "SLA_id"
	ON "SLA-is_linked_to-SVC"
	WHEN NOT
	(SELECT "total fines" from "SLA" where id=new.SLA_id)<
	(SELECT "total fines" from "SLA" where id=old.SLA_id)
	BEGIN
	SELECT RAISE(ABORT, „Requirement of NR1 not met");
	END;

Challenges

Layered ITSM service tree

- Procedure for SLA prioritization (use of business intelligence?)
- Close investigation of paradigm regarding ITSM service tree inheritance
- Optimization of complex service trees (customer's vs. IT provider's perspective)

Involvement of semantics

- Challenge towards the underlying data model
- Verbalizing MTC/OLA/UC-related statements
- Requirements of SBVR must be met by database models
- SBVR to SQL conversion requires strongly controlled natural language

Referring to the procedure model for ontological BPM & BRM

- **Independent modeling of business processes and rules**
- **Establish (reference) enterprise ontology**
- **Allow seamless IT integration**
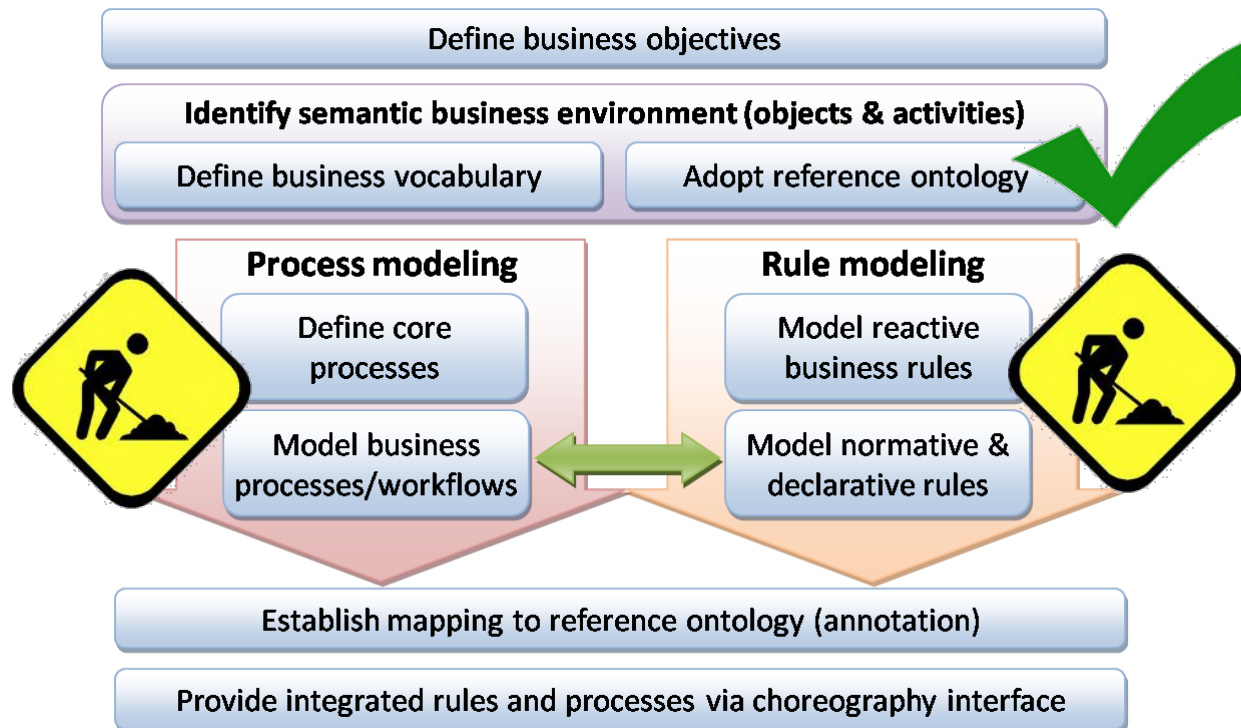
Academic Background

Research group - Enterprise Engineering & Integration

Publication

Establishing conceptual and functional links between S-BPM and business rules (Sellner, Zinser)

A procedure model for combining business rules and processes within ontologies (Sellner, Paschke, Zinser)

PhD Theses

– *Linking BPM and BRM through enterprise ontologies (Alexander Sellner)*

– *Semantic Outsourcing Relationship Management (Christopher Schwarz)*

Student projects/theses

– Implementation of Semantic Outsourcing Relationship Management

– Semantic IT Service Management (Bachelor Thesis - Mathias Schreiner)

FH | JOANNEUM

Thank you!

Semantic-ontological combination of Business Rules and Business Processes in IT Service Management

Alexander Sellner[1], Christopher Schwarz[1], Erwin Zinser[1]

[1]FH JOANNEUM University of Applied Sciences, Graz, AUSTRIA