

# Perspectives for a Model-driven Service Engineering Discipline

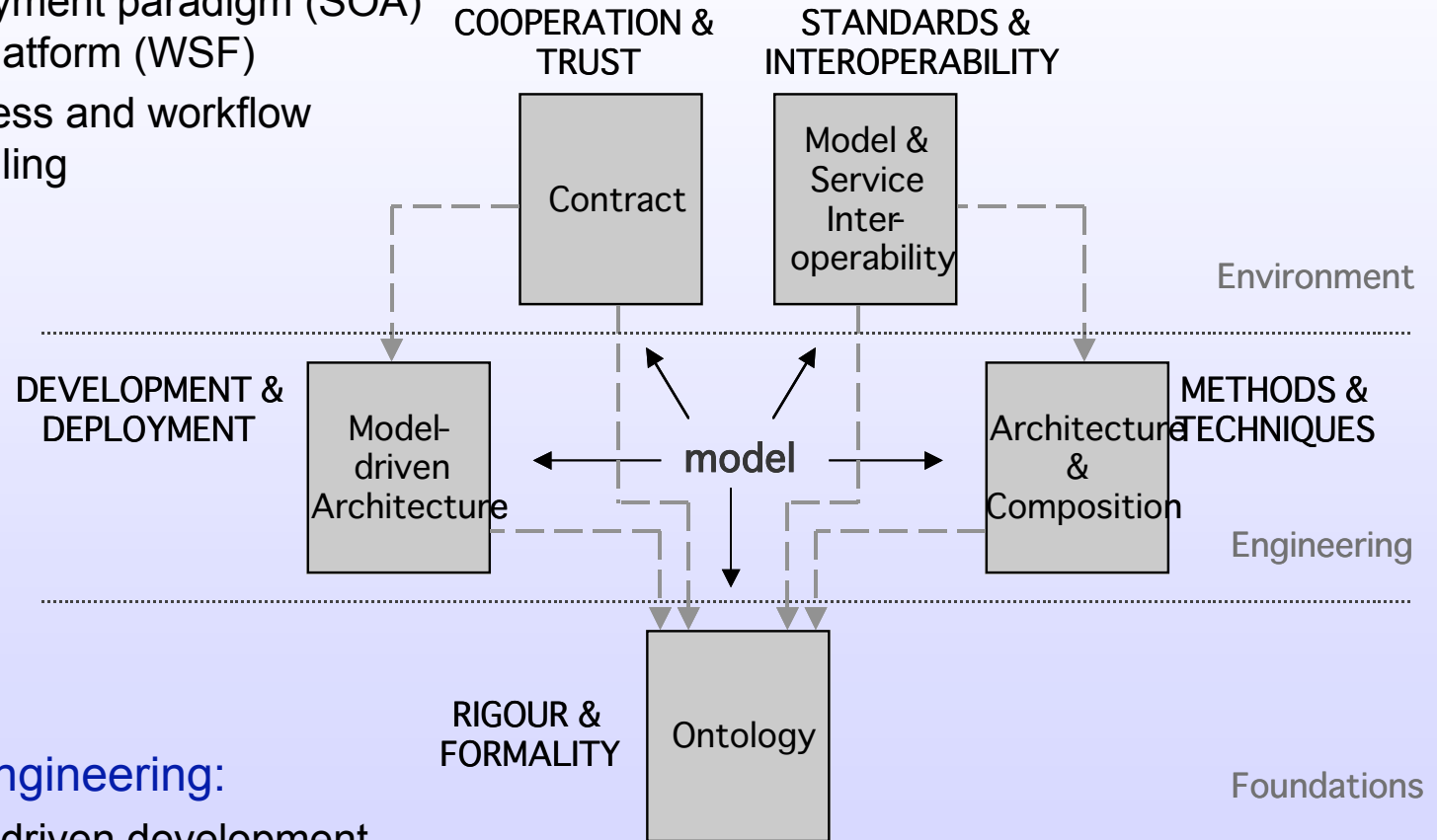
Claus Pahl, Ronan Barrett, Mark Melia

Dublin City University  
School of Computing

# Status Quo and Solution Outline

- Services:

- deployment paradigm (SOA) and platform (WSF)
- business and workflow modelling

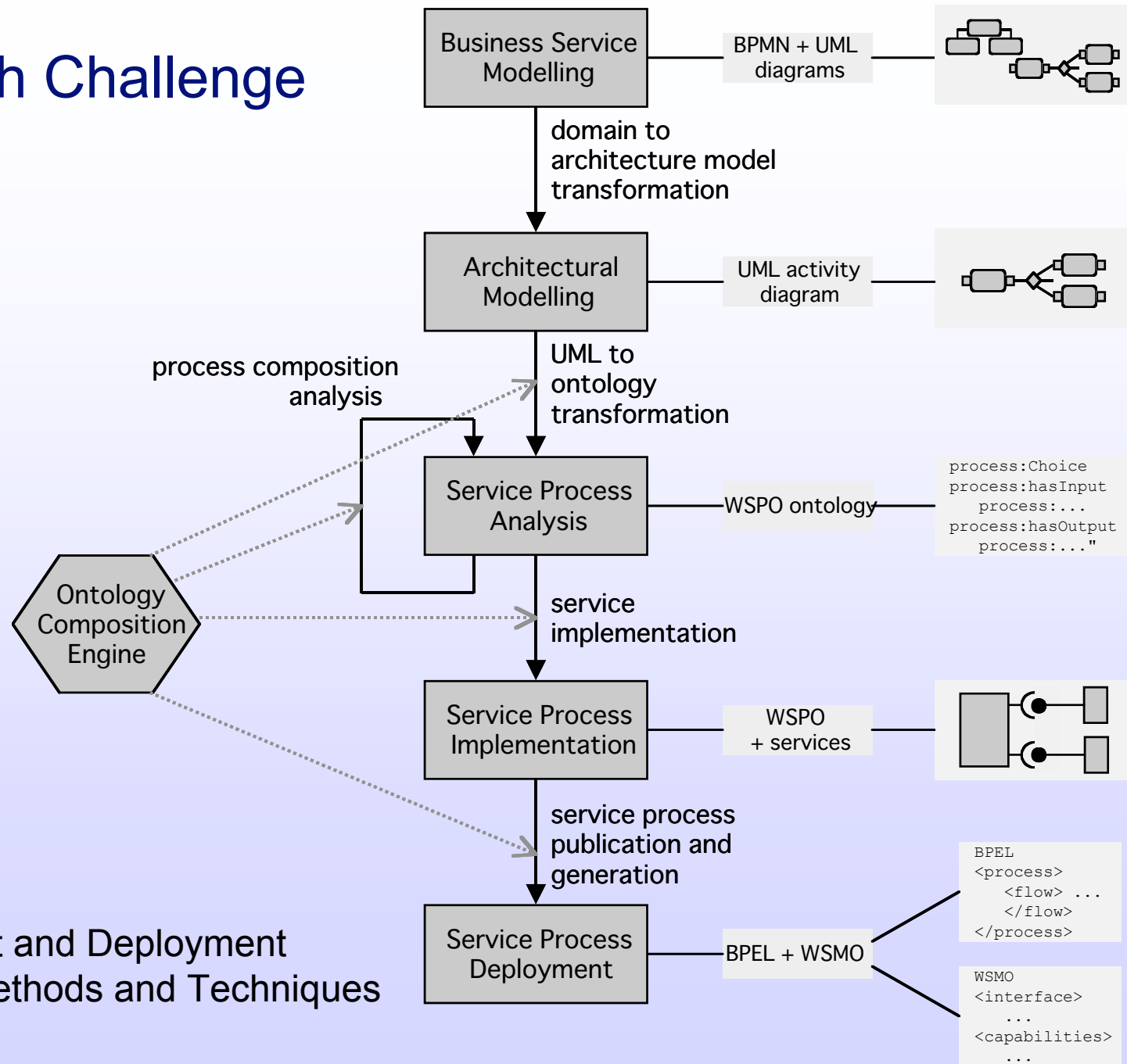


- Service Engineering:

- model-driven development
- ontology-based semantic modelling

---> depends on    —> is central in

# Research Challenge



Development and Deployment Process – Methods and Techniques

# Research Direction – Rigour and Formality

- **Motivation** for formal foundations:
  - modelling for collaboration and exchange of information
  - automation of analyses and code generation
- **Modelling activities:**
  - semantic service description
  - service matching and composition
- **Proposal: ontology-based modelling foundations:**
  - **concepts** representing entities of a domain and relationships between these concepts that explain the properties of concepts,
  - an extended **relationship** subexpression language using process combinators realises process expressions that characterise accessibility relations between states of a system,
  - Additional **extensions** can cover data aspects by introducing names to represent for instance parameters.

with subsumption-based reasoning
- Existing approaches: **OWL-S** and **WSMO** (service ontologies) and **WSPO** (service process ontology)

# Research Direction - Methods and Techniques

- Central **development activities**: description, reasoning, and transformation
- **Description and visual modelling**:
  - layered modelling: business services, architecture, process execution and description
  - UML extensions: service and process semantics
- **Formal Reasoning**:
  - process analysis: abstract composition of individual services to processes
  - process implementation: matching of abstract service requirements and provided services
- **Transformations**:
  - horizontal: UML to ontology representation (and vice versa)
  - vertical: between the layers – ideally automated in a process-centric context

# Discussion and Outlook

- The objectives of **model-driven service engineering**:
  - industry aims of cost reduction through automation and improved maintenanceplus
  - semantic integration and process-orientation focusing on composition and transformation activities
- A **discipline of ontology-based model-driven service engineering** needs to go further. Other relevant perspectives:
  - **Standards and Interoperability**:
    - deployment: SOAP, WSDL, UDDI as core platform [W3C]
    - development: MOF-compliant, ODM-based UML extensions [OMG]
  - **Cooperation and Trust**:
    - models as the basis of contracts
    - certification as the central trust mechanism