Model-Driven Validation Approach (MDVA) workflow process

The following design methodology defines the steps that need to be taken in order to adopt the MDVA:

STEP 1: Determine the aspects of the Business Layer that needs to be validated

- **a)** Identify artefacts
- **b)** Identify relationships between artefacts
- **c)** Identify the perspectives to be modelled (Stakeholders and Roles)

STEP 2: Define Motivation for the Proposition

- **a)** Define the values, policies, events, contents that are involved.
- **b)** Define the constraints, principles, assessment criteria, goals and requirements
- **c)** Relate the 2a to 2b to conceptualise Business Behaviour.

STEP 3: Design models with Validation Extension based on perspectives

a) Model required may be based on aspects, stakeholder or any of following;
   i. Motivation models
   ii. Process models
   iii. Business Models
   iv. Organizational model
   v. Information Model
   vi. Functional and Service model

STEP 4: Developing Behaviour Driven Modelling Constraints Specification

- **a)** Develop Assumptions
- **b)** Develop Features
- **c)** Develop Scenarios based on constraints and criteria
- **d)** Develop Test Data
- **e)** Develop Triples (Subject, predicate,Object)

STEP 5: Mapping Artefacts of the Model to Ontology Elements

- **a)** For each artefact, identify corresponding ontology element
- **b)** Create all ontology classes and subclasses
- **c)** Create all ontology properties
- **d)** Associate properties to classes and subclasses
- **e)** Establish Domains and Ranges

STEP 6: Determine how the ontology will be queried and traceability achieved.

- **a)** Discover key stages of business behaviour.
- **b)** Transform BDD test specifications for the business behaviour to SPARQL queries
- **c)** Query the RDFS created by the ontology
- **d)** Query the RDF Graph using Reasoners to establish Traceability

STEP 7: Compare the Results of the query and Traceability Graph

- **a)** Affirm that Constraints are implemented
- **b)** Affirm that artefacts associated with Goals are realized in the traceability graph
- **c)** Affirm that Goals are aligned with associated requirements

Models with Extended Archi

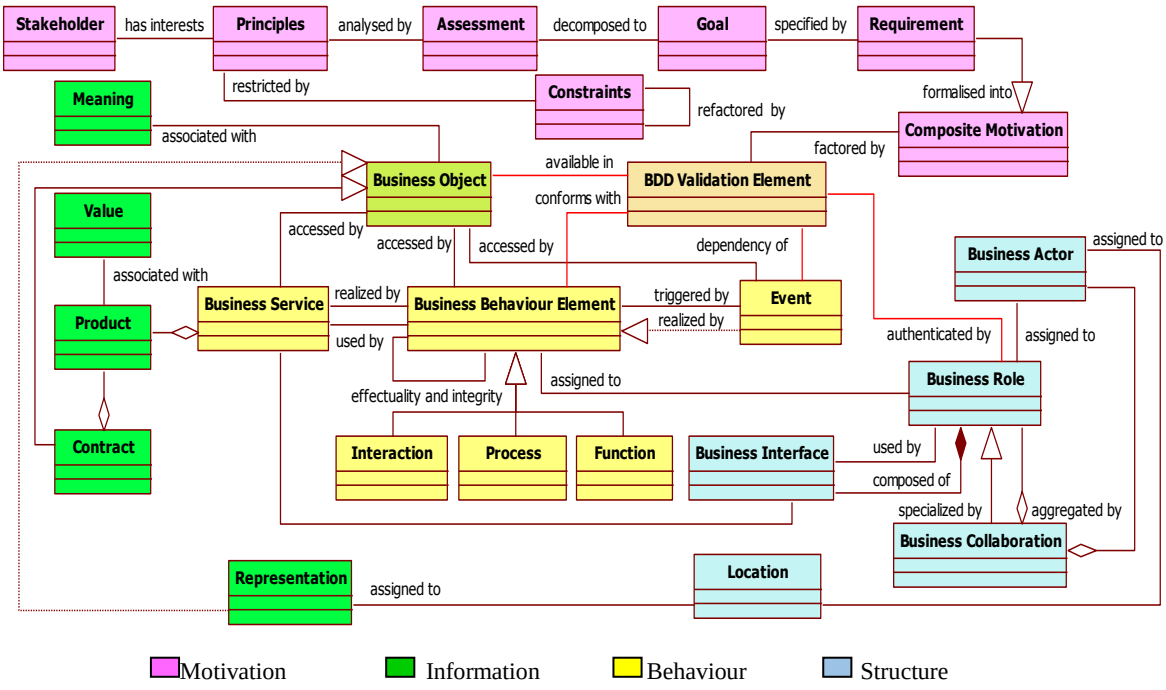

Figure 5-11: ArchiMate Business Layer MM extension with Validation Elements

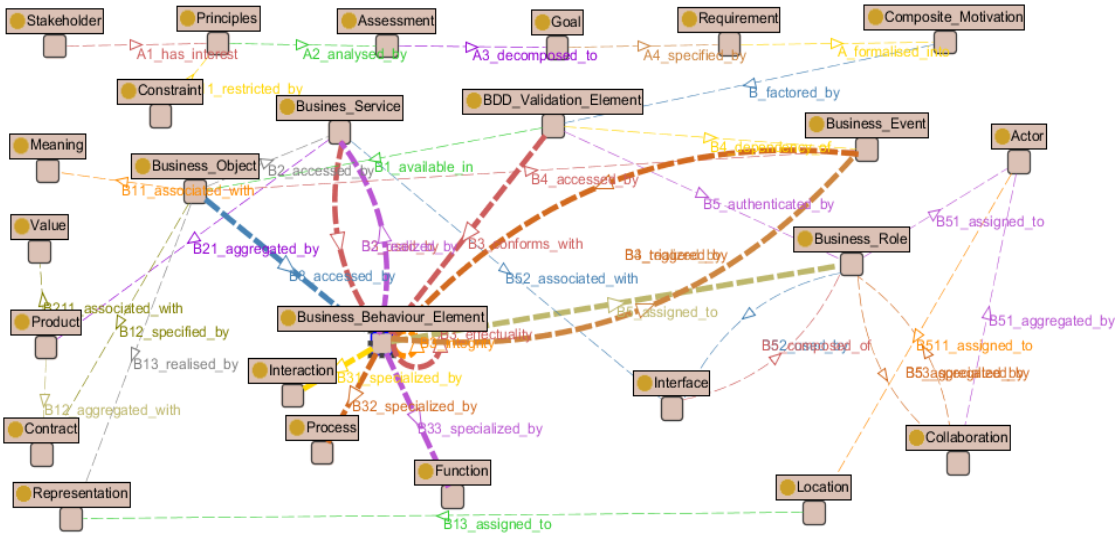

Figure 6-14: RDFS of the ontology showing exact representation of the Metamodel

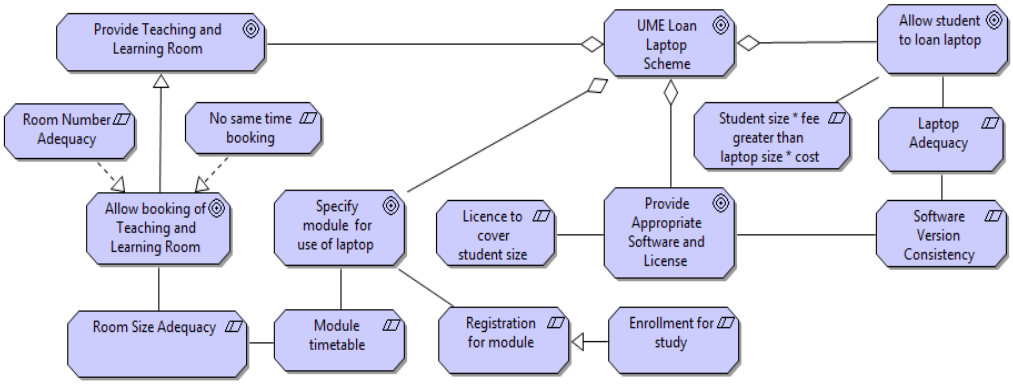

Figure 7-1: Business Goal and Constraint model for the UME-LLS to-be

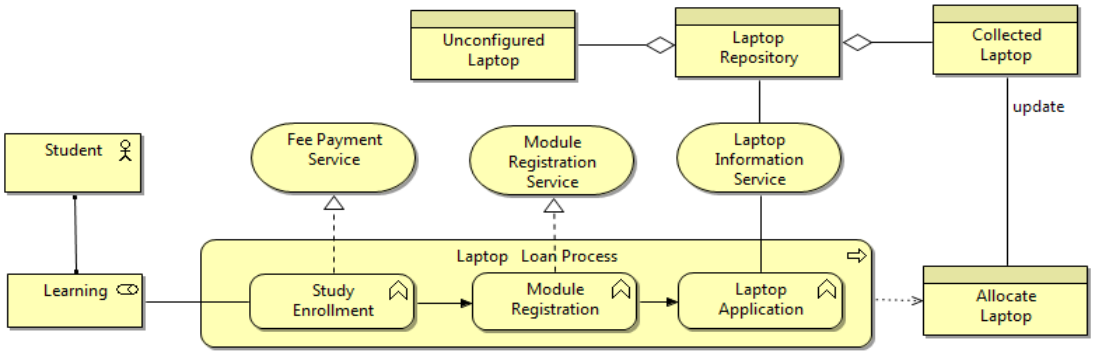

Figure 7-4: Modelling of the Process for Laptop Request for the UME-LLS to-be

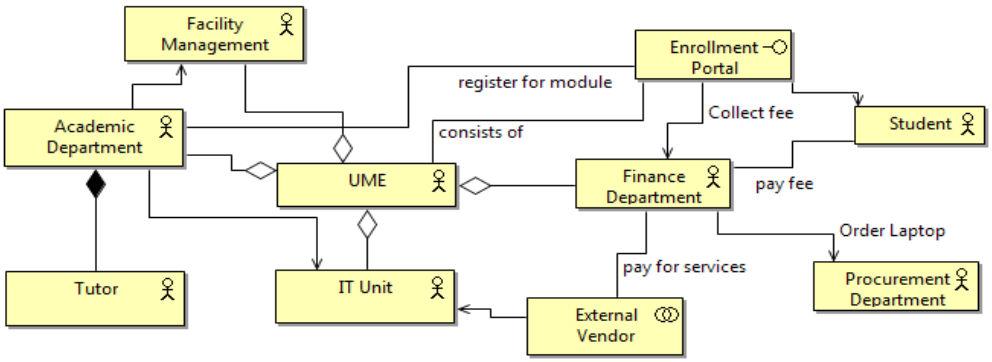

Figure 7-7: Organisational model of the UME-LLS from Business Perspective

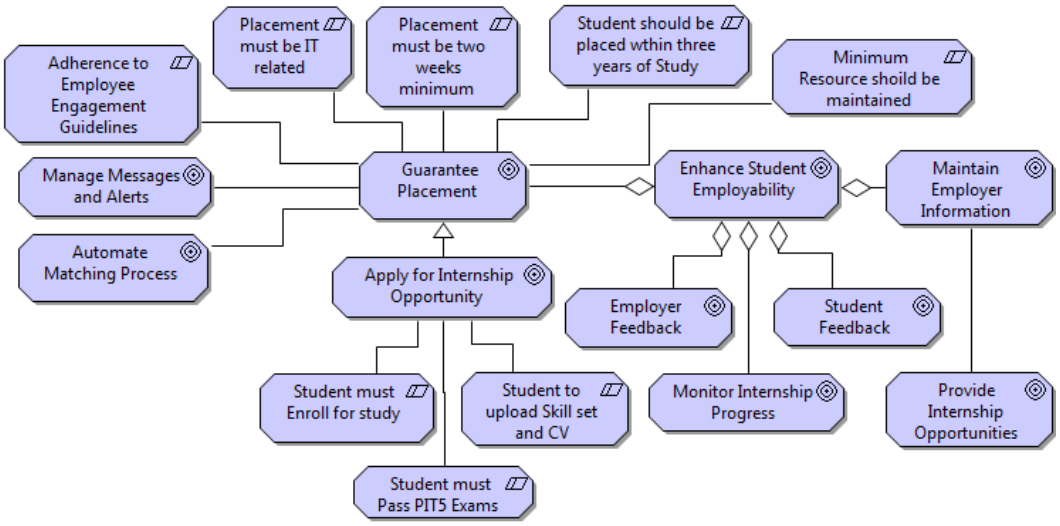

Figure 7-26: Business Goals and Constraints Model

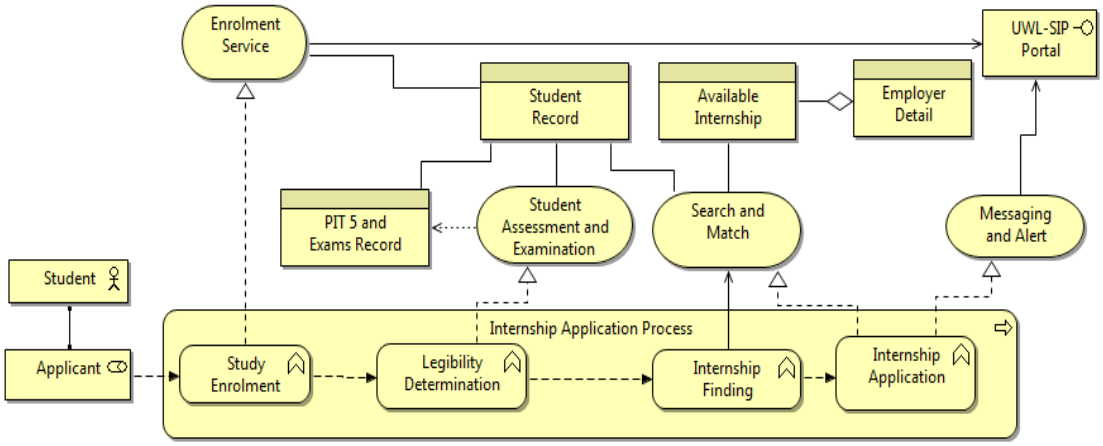

Figure 7-30: Modelling of the Process for Internship Application for the UWL-SIP to-be

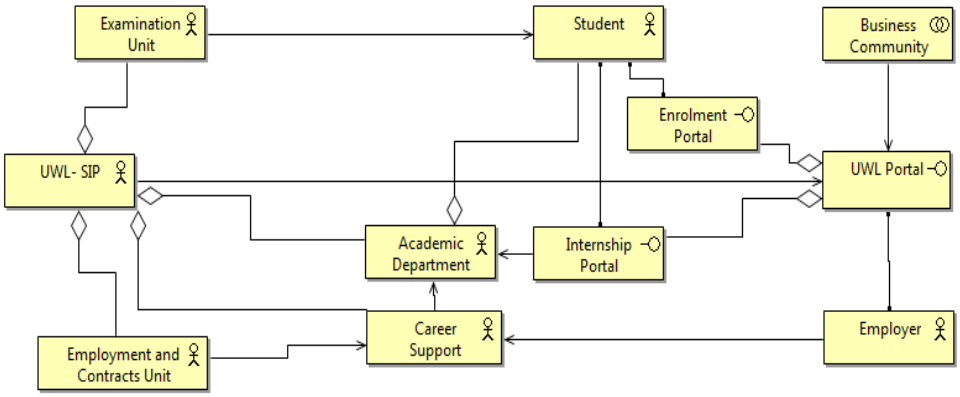

Figure 7-33: Organisational model for the UWL-SIP to-be from Business Perspective