Integration of ArchiMate and UML

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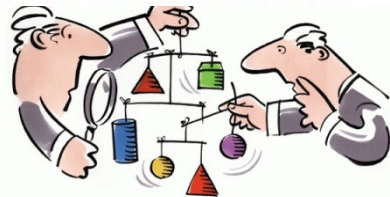
What is UML?

- The Unified Modeling Language (UML®) is a visual language for specifying, constructing, and documenting the artifacts of systems
  - most widely used modeling notation in software industry
  - an Object Management Group (OMG) standard
  - covering system requirements, application architecture, software and infrastructure design, and deployment models

Diagrams in UML

- Part I – Structural Diagrams: to define static architecture, consisting of static constructs such as classes, objects, and components
  - Package Diagrams, Class Diagrams, Object Diagrams, Composite Structure Diagrams, Component Diagrams and Deployment Diagrams.

- Part II – Behavioral Diagrams: to represent dynamic architecture, comprising behavioral constructs such as activities, states, timelines and the messages exchanged.
  - Use Case Diagrams, Activity Diagrams, State Machine Diagrams, Communication Diagrams, Sequence Diagrams, Timing Diagrams and Interaction Overview Diagrams.
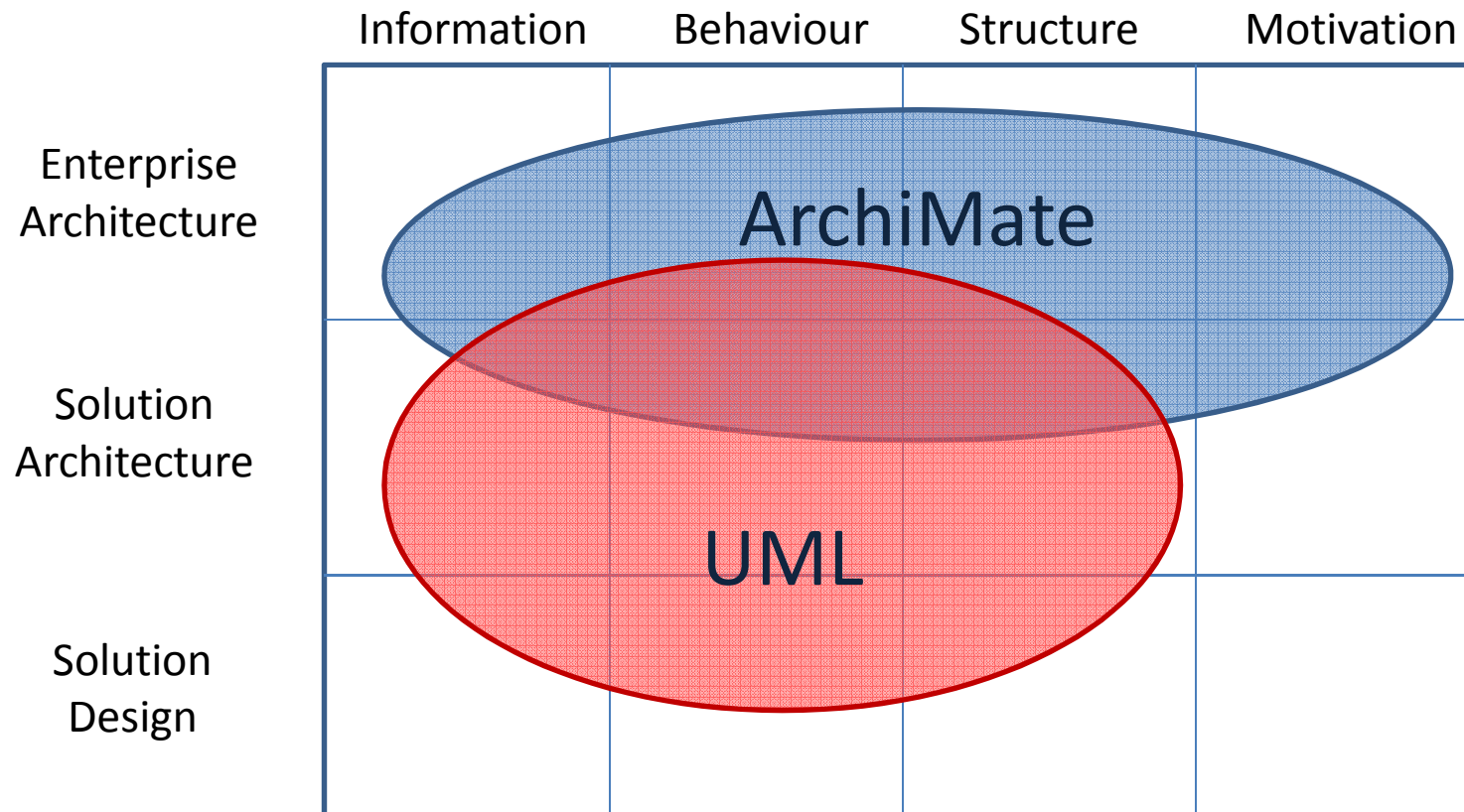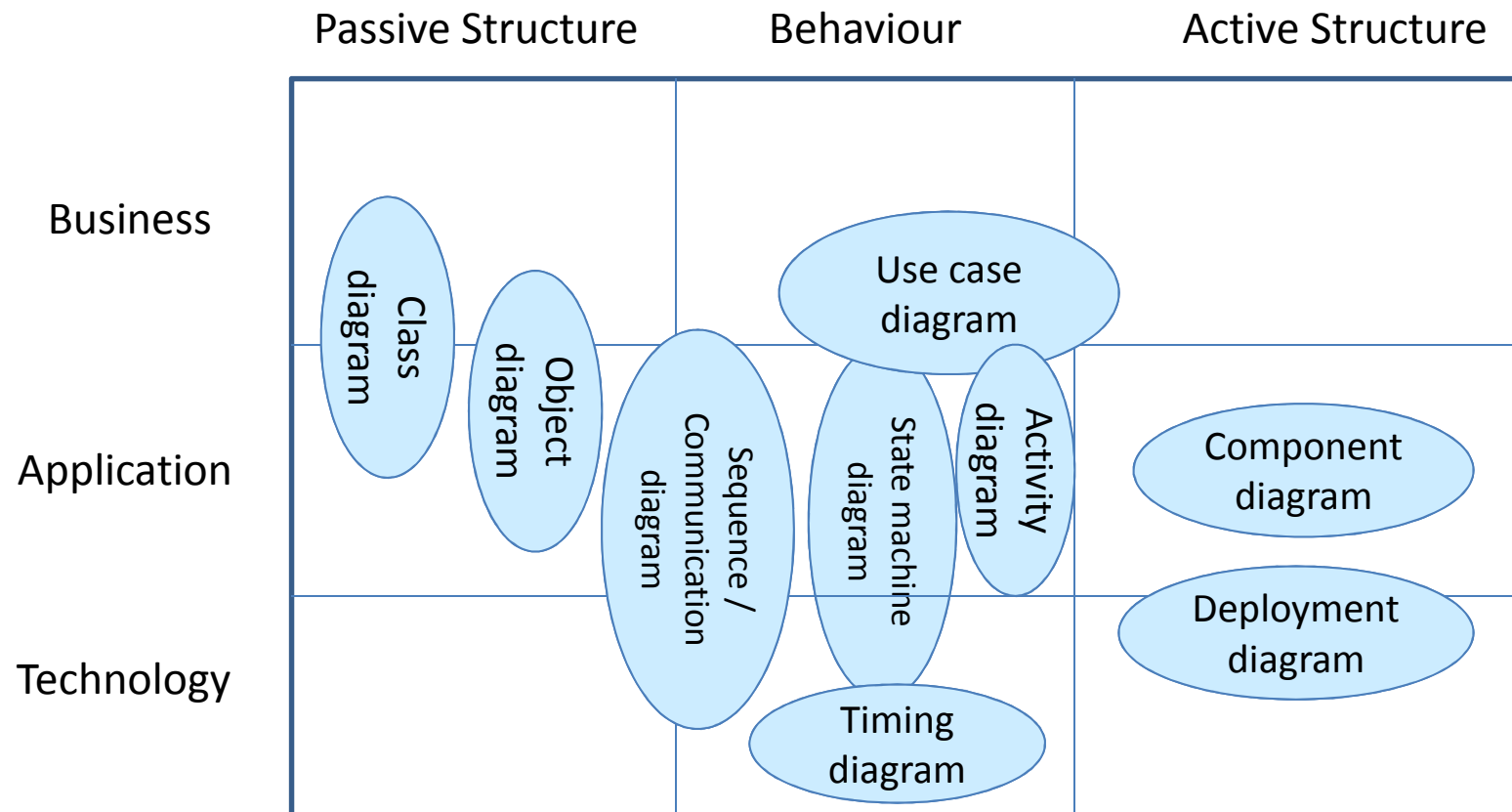
Diagrams in UML
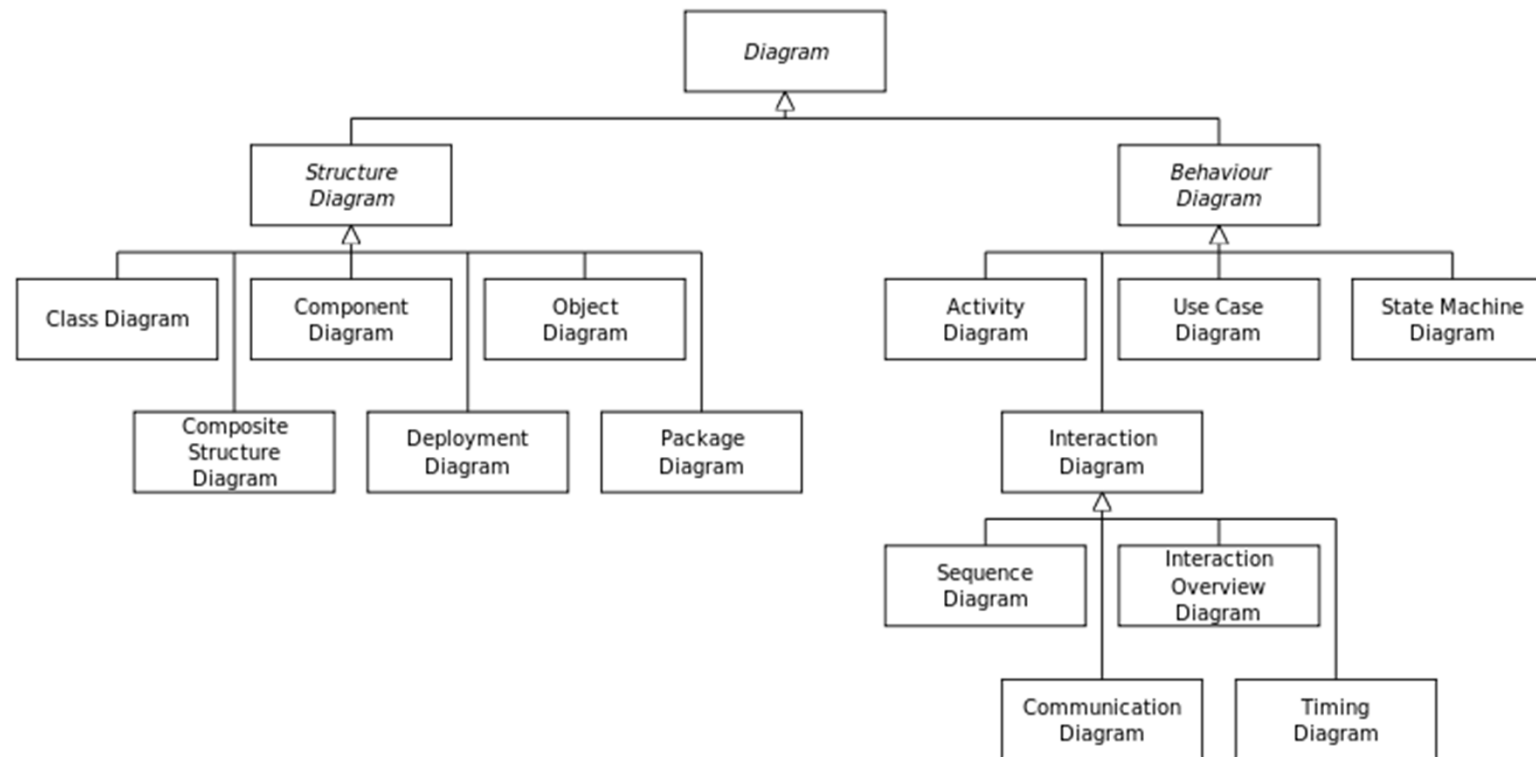
Some examples…
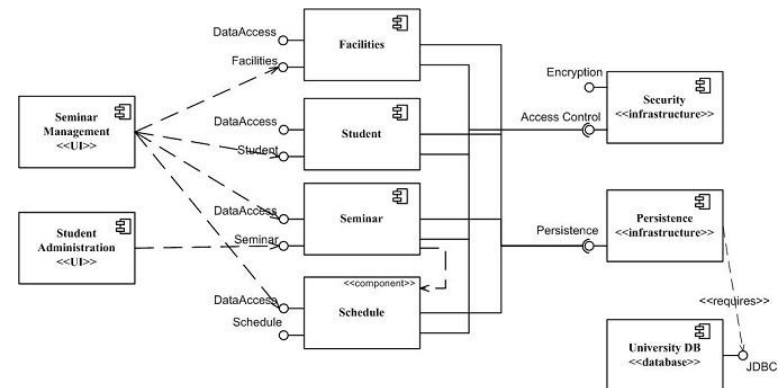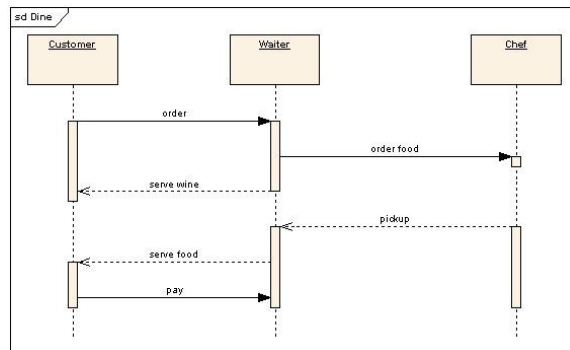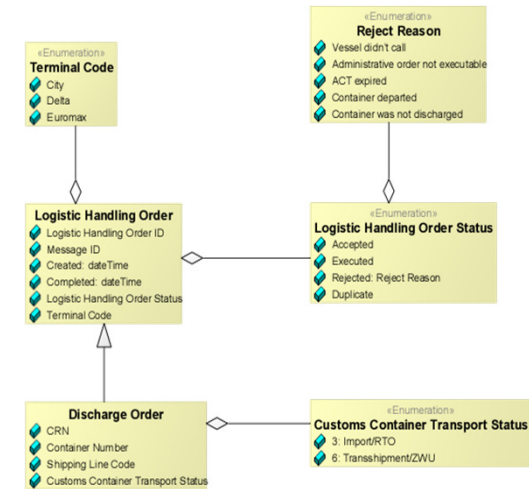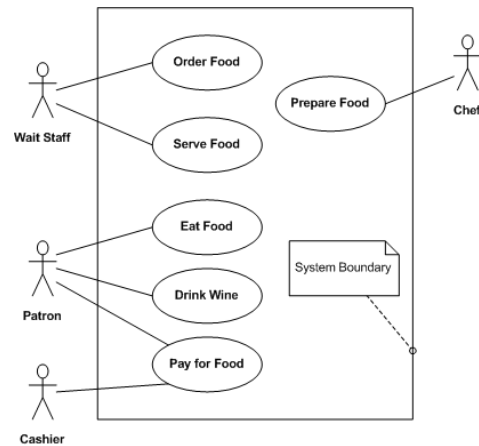
Benefits of ArchiMate-UML Integration

- Provide a common, shared understanding and communication medium to describe how the organization will pursue an initiative to develop capabilities

- Create different, unique viewpoints for each stakeholder that correspond to their own concerns with regard to supporting the initiative

- Ensure that the solution architecture can be traced to the enterprise architecture and create reuse opportunities for enterprise artifacts and patterns

- Verify that changes to the enterprise architecture can be formally traced to the solution design that implements it

- Define a standard means for organizations to communicate with other external groups to improve collaboration
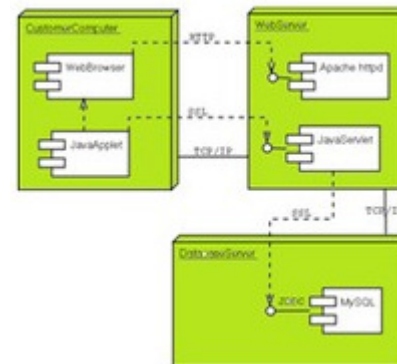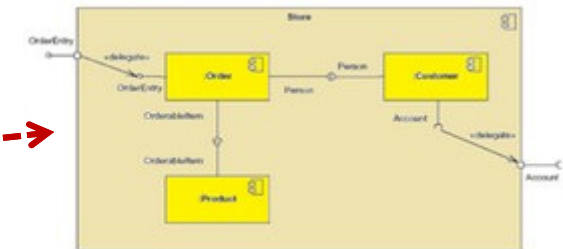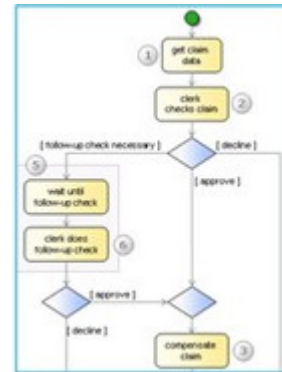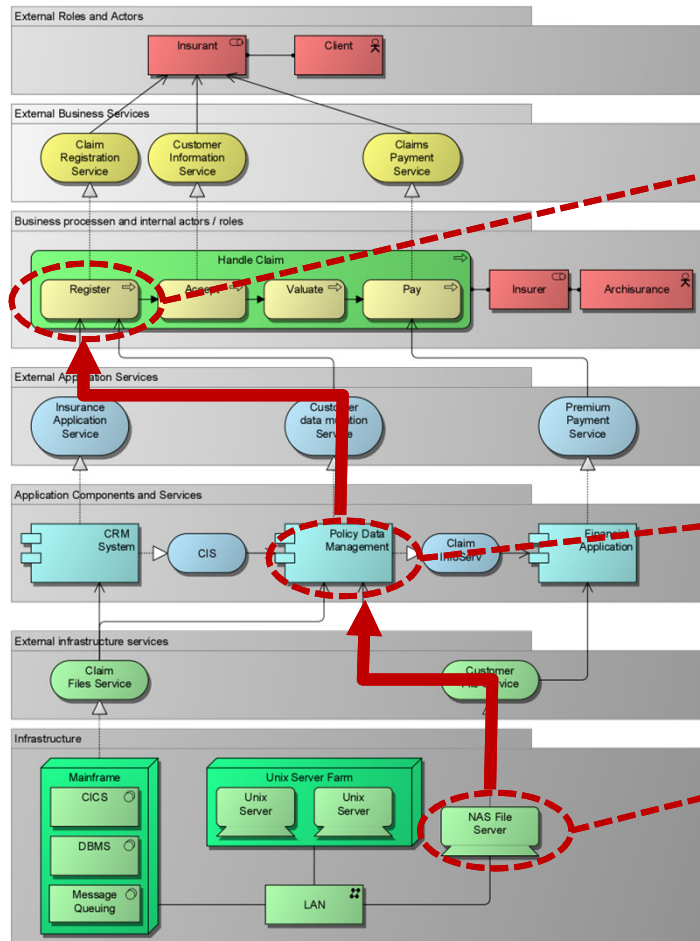
Scope of ArchiMate and UML

	Information	Behaviour	Structure	Motivation
Enterprise Architecture		ArchiMate		
Solution Architecture				
Solution Design		UML		

Positioning of UML Diagrams in the ArchiMate Framework

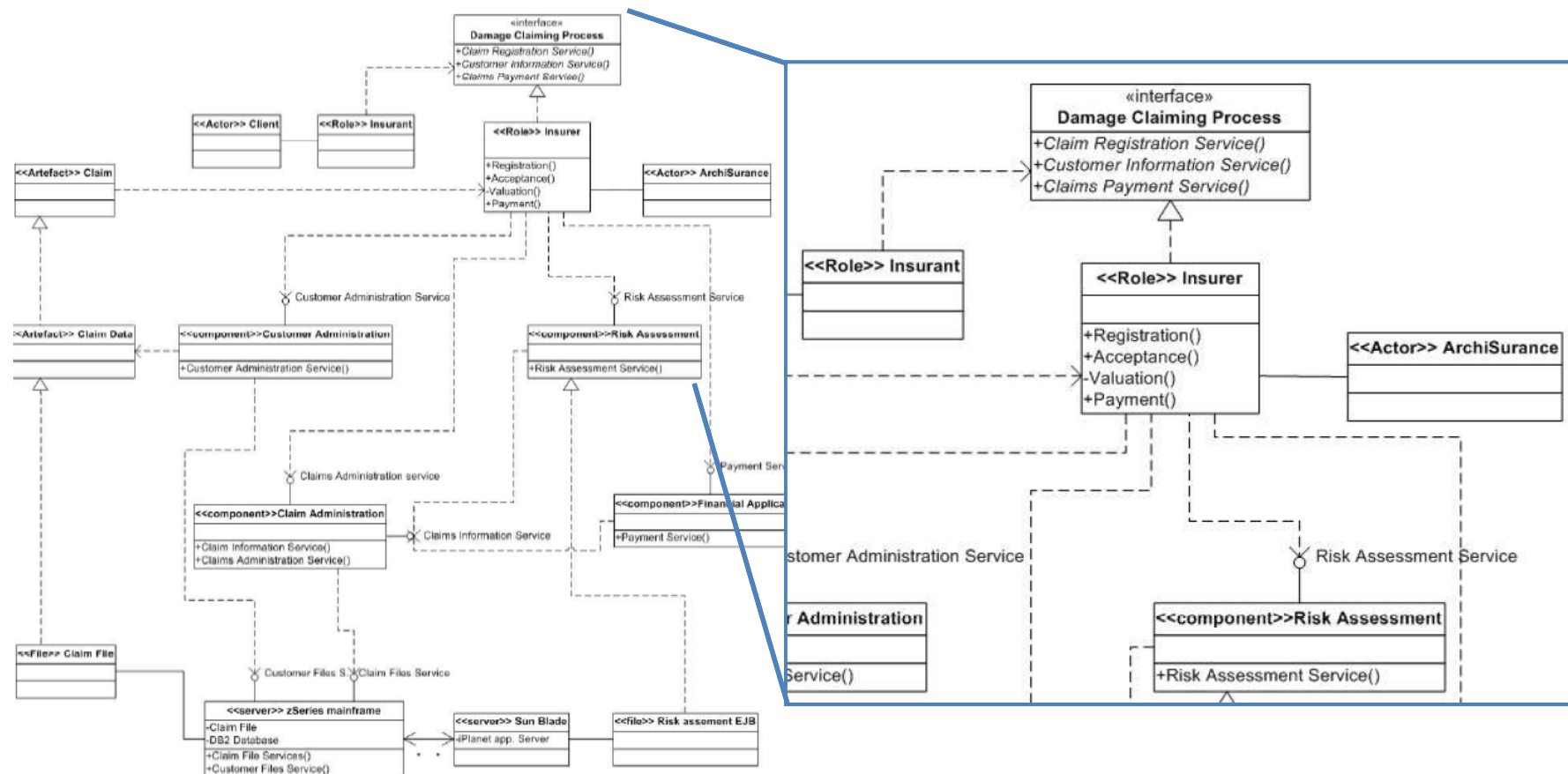|	Passive Structure	Behaviour	Active Structure
Business	Class diagram, Object diagram	Use case diagram	
Application	Object diagram, Sequence / Communication diagram	State machine diagram, Activity diagram	Component diagram
Technology	Sequence / Communication diagram	Timing diagram	Deployment diagram

Informal Integration

Formal Integration

- Definition of a UML profile for ArchiMate concepts
  - Stereotyping of UML concepts and relationships to represent ArchiMate concepts and relationships

- Definition of a formal transformation
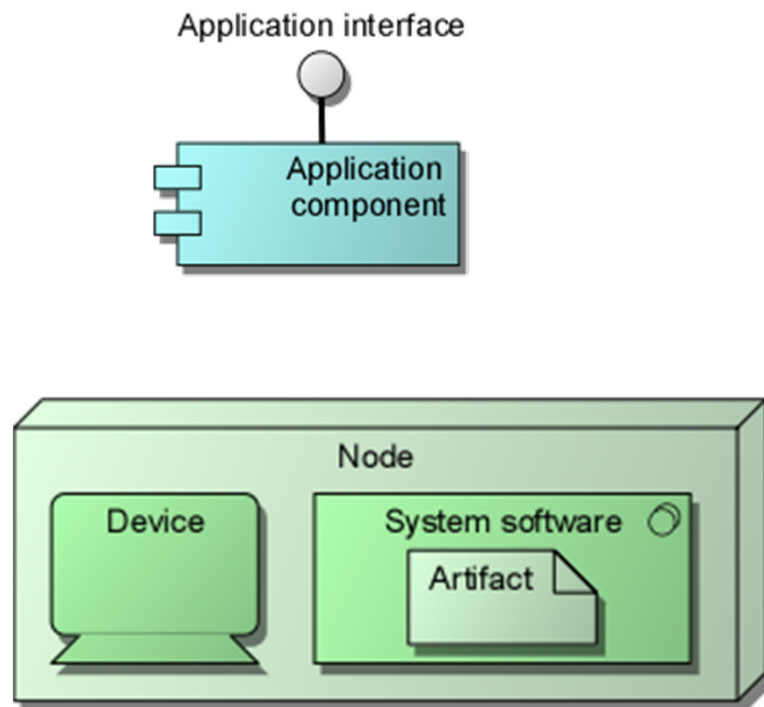 - Unidirectional or bidirectional mappings between concepts and relationships in the two languages

This integration is currently investigated by a working group within The Open Group
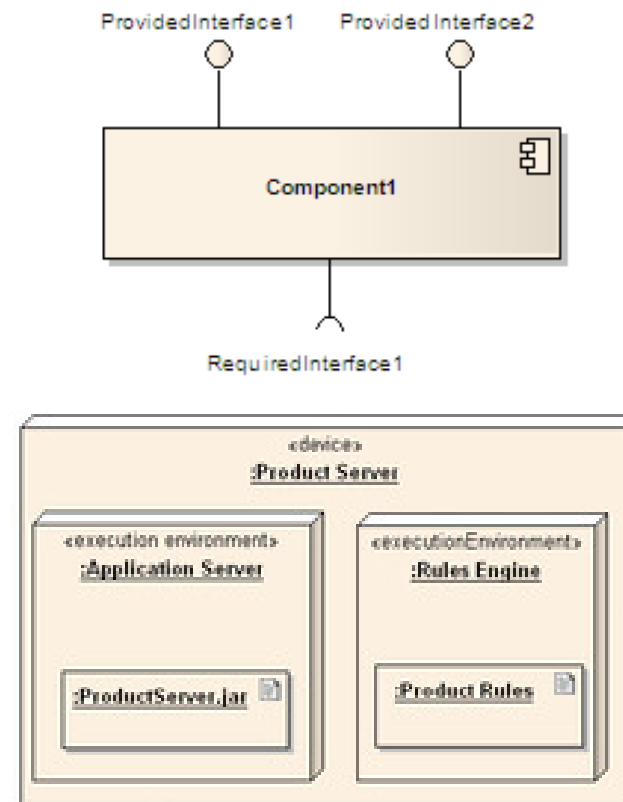
Example of a UML Profile for ArchiMate
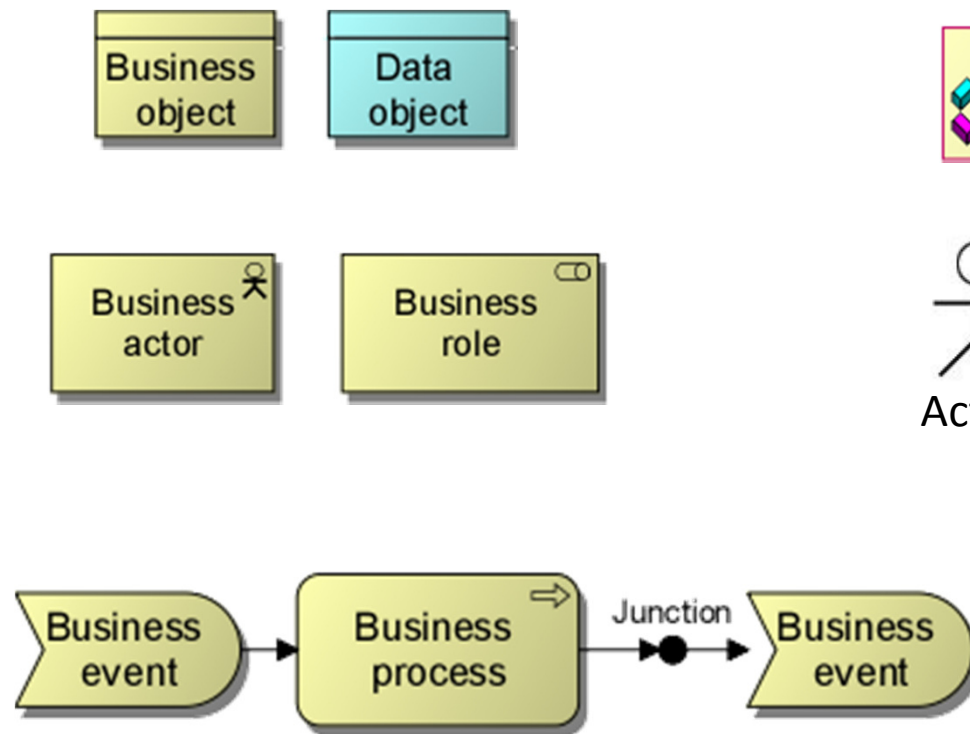
ArchiMate concepts Inspired on UML

Other Examples of Possible Mappings
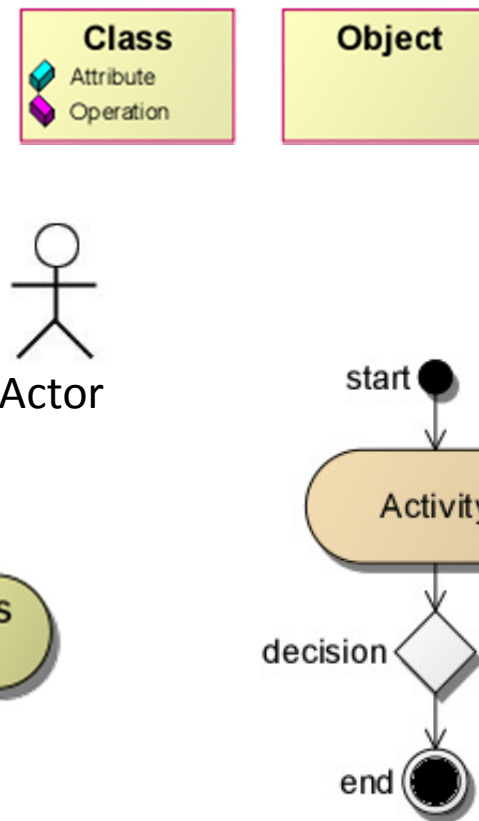
ArchiMate

Business object · Data object

Business actor · Business role

Business event → Business process → Junction → Business event

UML

Class
- Attribute
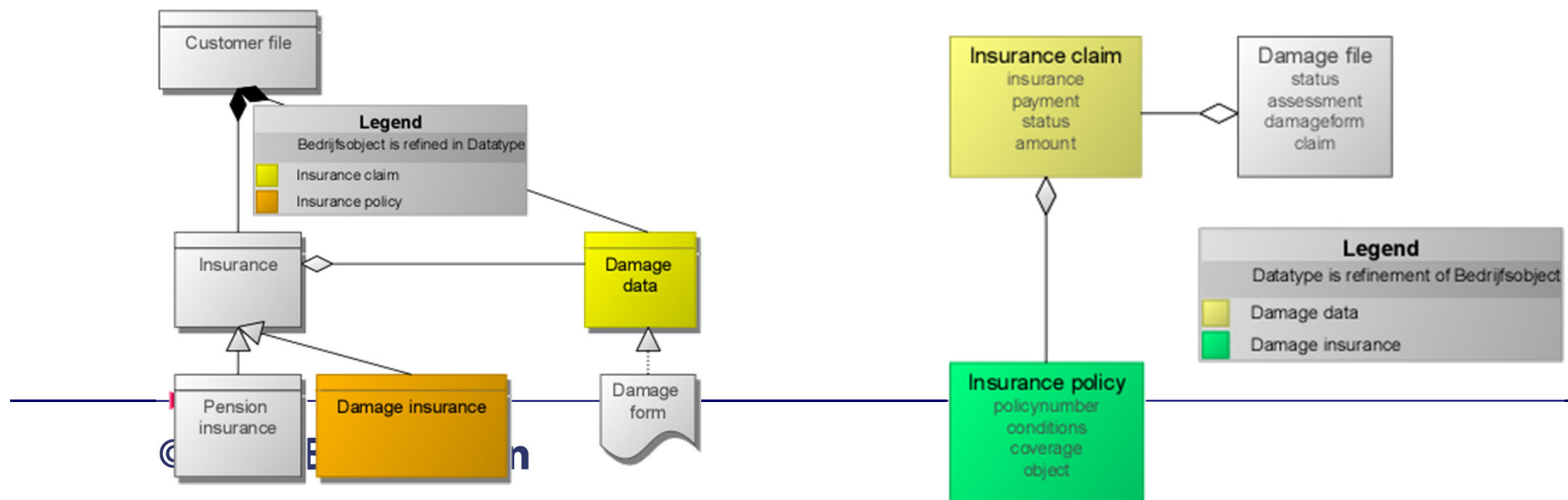- Operation

Object

Actor

start → Activity → decision → end

Tool support

- Different tool vendors may support relating ArchiMate and UML in various ways

- Example BiZZdesign: explicit relations between ArchiMate concepts and UML concepts
    - Business Object can be refined into a UML class

Conclusions

- UML encourages modellers to express technical details, which are irrelevant in an enterprise architecture

- ArchiMate models hide the technical details

- ArchiMate focuses on enterprise architecture, while UML focuses on solution architecture and design

- ArchiMate and UML can be used in combination:
  - ArchiMate concepts at the lower levels of decomposition map onto UML concepts at the higher levels of decomposition
  - ArchiMate as an "umbrella language": an ArchiMate model expresses the relationships between the various UML diagrams
  - The UML diagram types cover most of the "cells" of the ArchiMate framework