

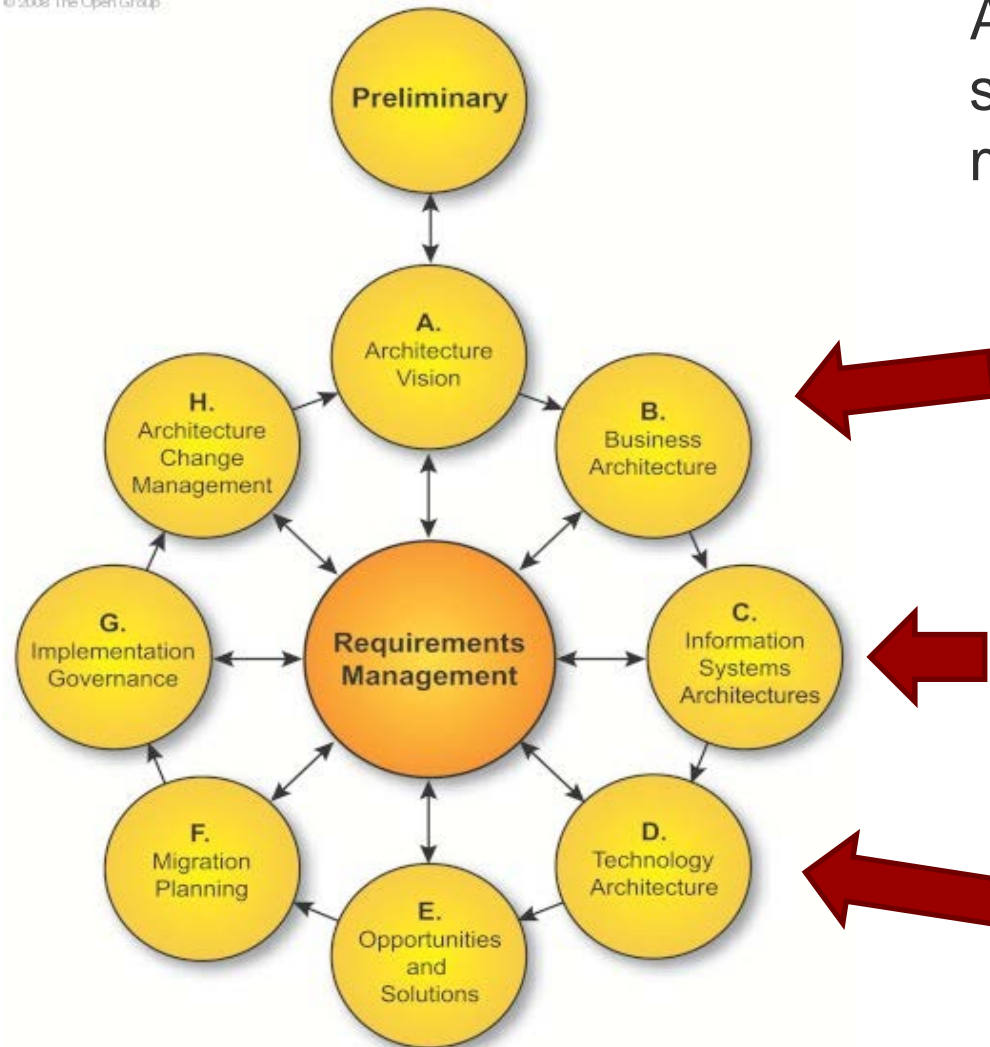
# Enterprise Architecture Modelling with ArchiMate

Source: <http://pubs.opengroup.org/architecture/archimate2-doc/>



# TOGAF Architecture Views

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ArchiMate is a modeling language that supports the TOGAF content metamodel and the TOGAF ADM

Business Architecture

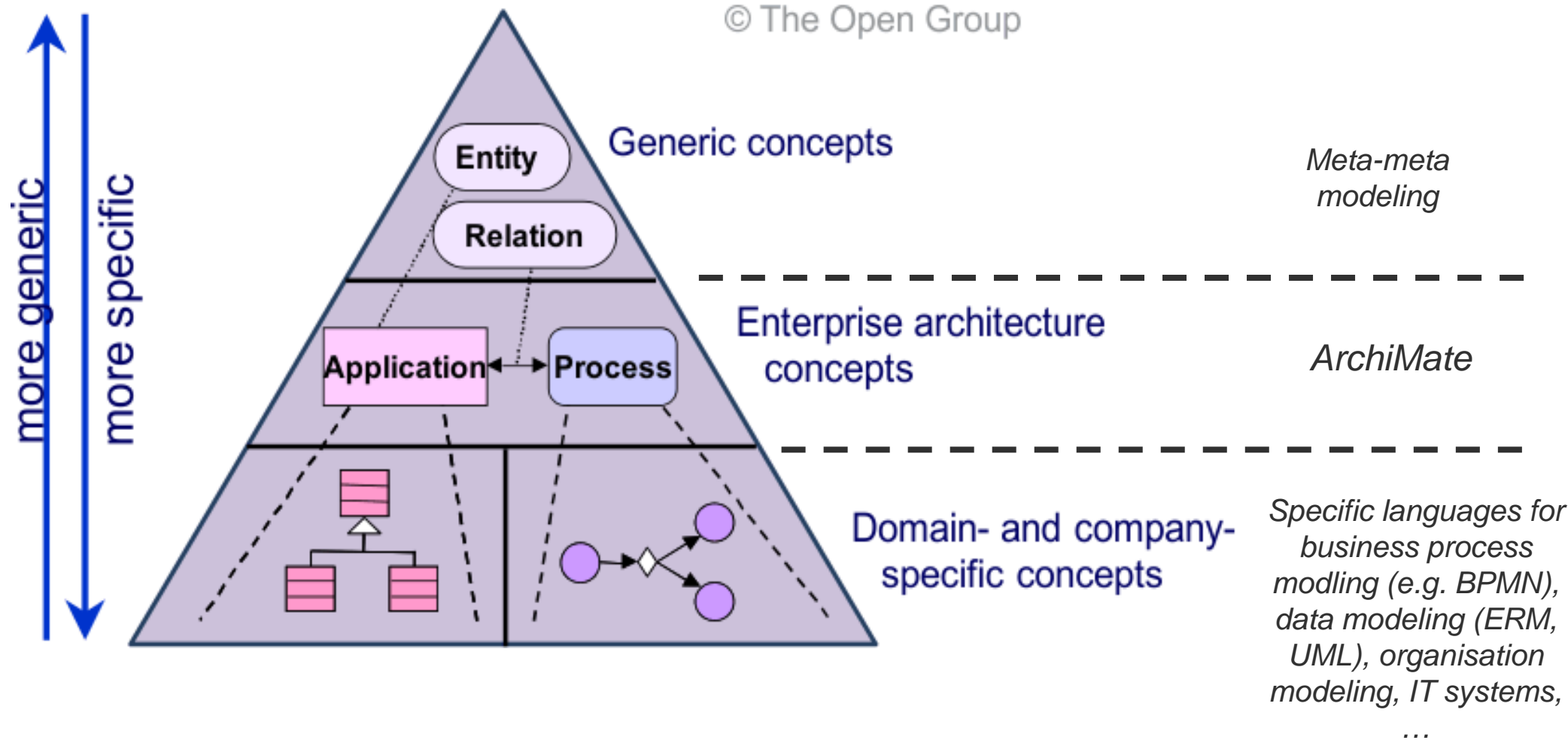
Data Architecture

Application Architecture

Technology Architecture

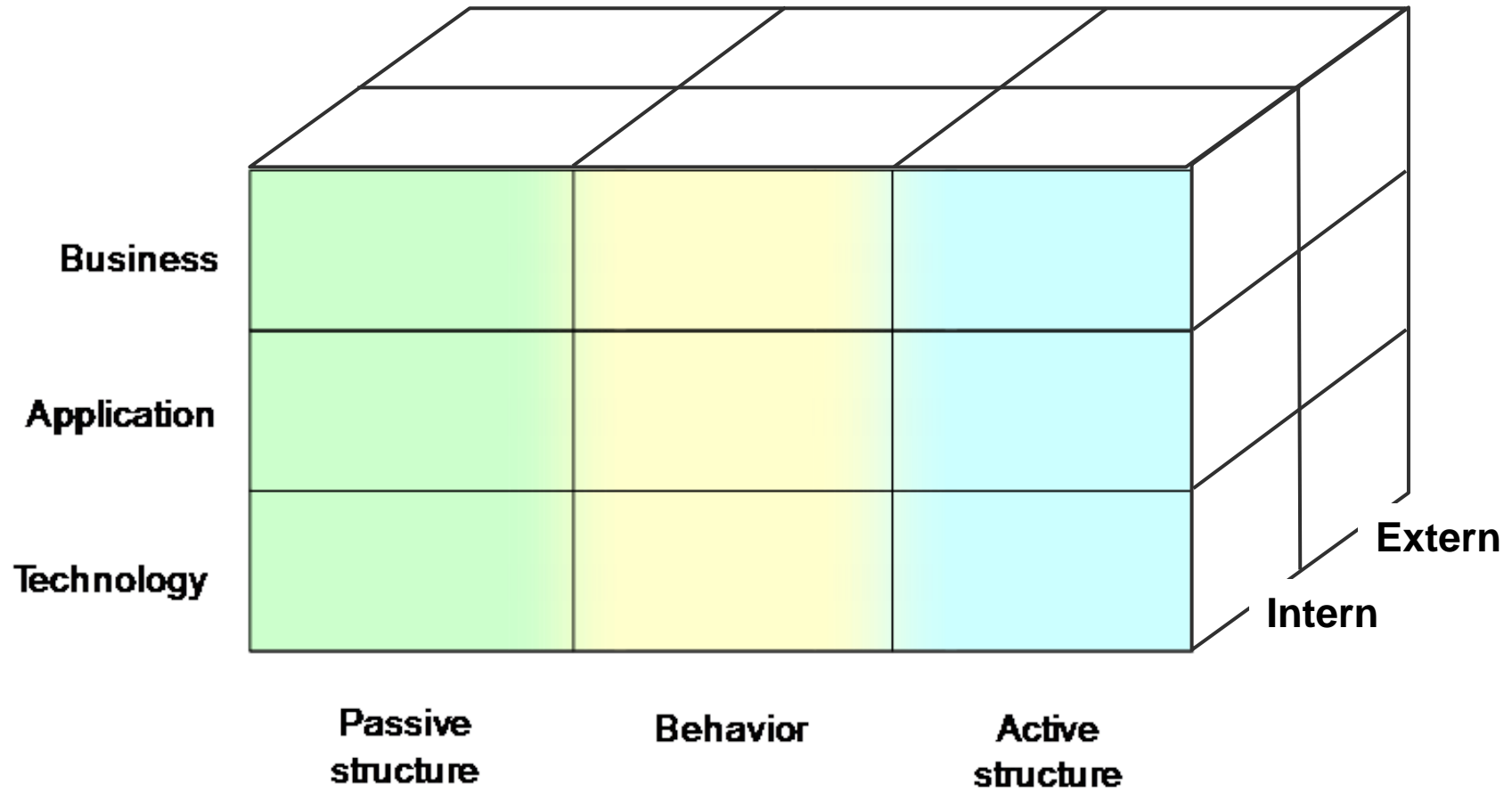


# Metamodel Structure of ArchiMate



Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap02.html>

# The ArchiMate Framework



# Dimensions of ArchiMate

## ■ Three architecture layers:

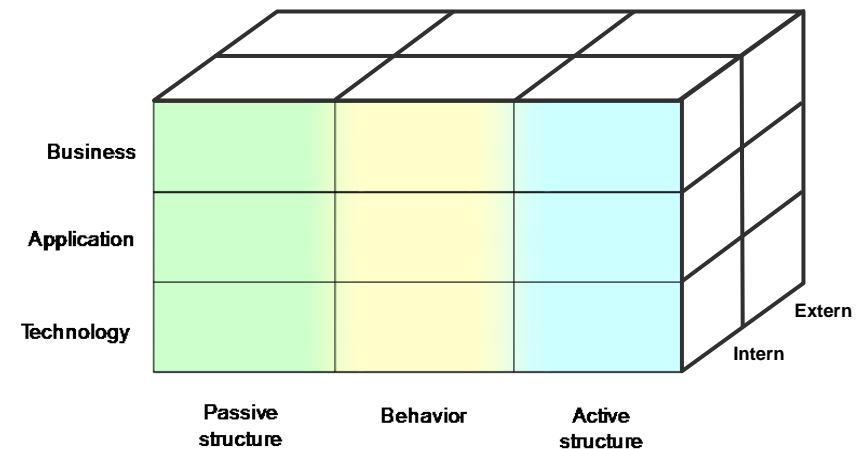
- ◆ *Business*
- ◆ *Application*
- ◆ *Technology*

## ■ Three main types of elements:

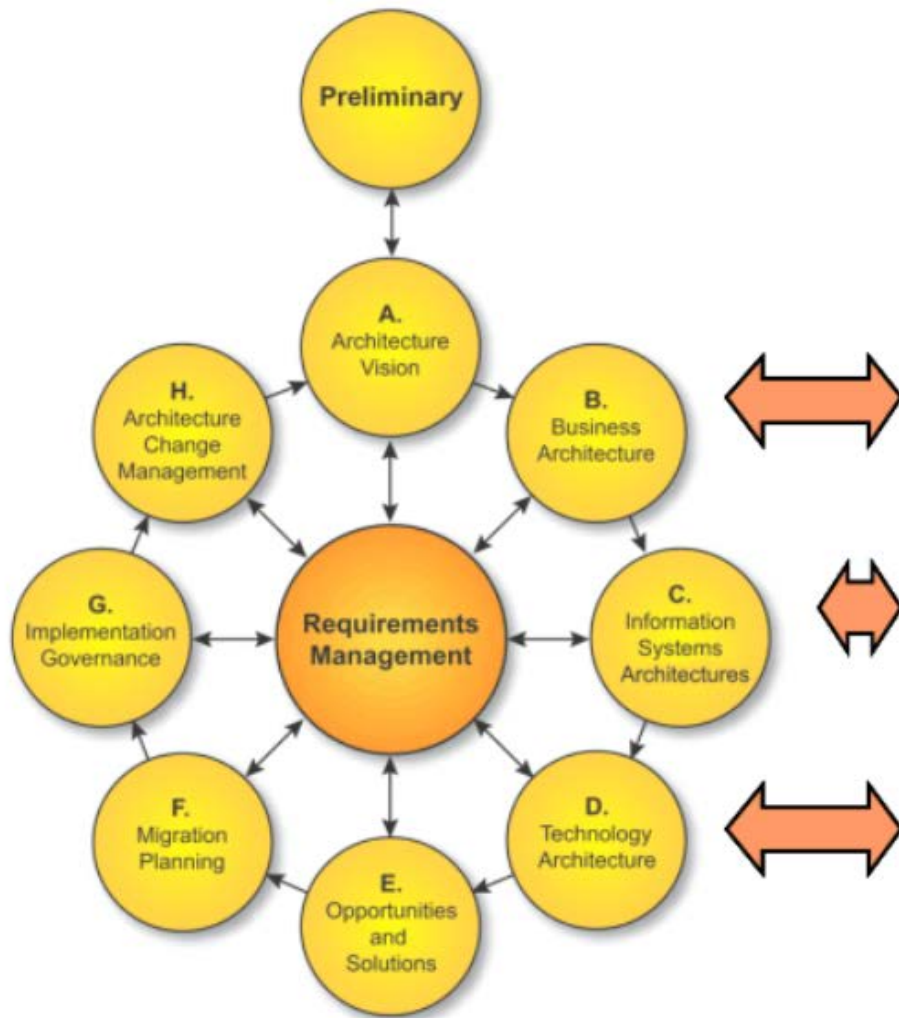
- ◆ *Active structure* element: an entity that is capable of performing behavior.
- ◆ *Behavior* element: a unit of activity performed by one or more active structure elements.
- ◆ *Passive structure* element: an object on which behavior is performed.

## ■ External vs. internal behavior and view on systems:

- ◆ *Service*: externally visible *behavior* of a system. A service is a unit of *functionality* that a system exposes to its environment, while hiding internal operations
- ◆ *Interface*: external *view* on service provider. An interface is *a point of access* where one or more services are made available to the environment



# TOGAF Architecture Views



**TOGAF ADM**

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	<b>Business</b>	
	<b>Application</b>	
	<b>Technology</b>	

Passive structure

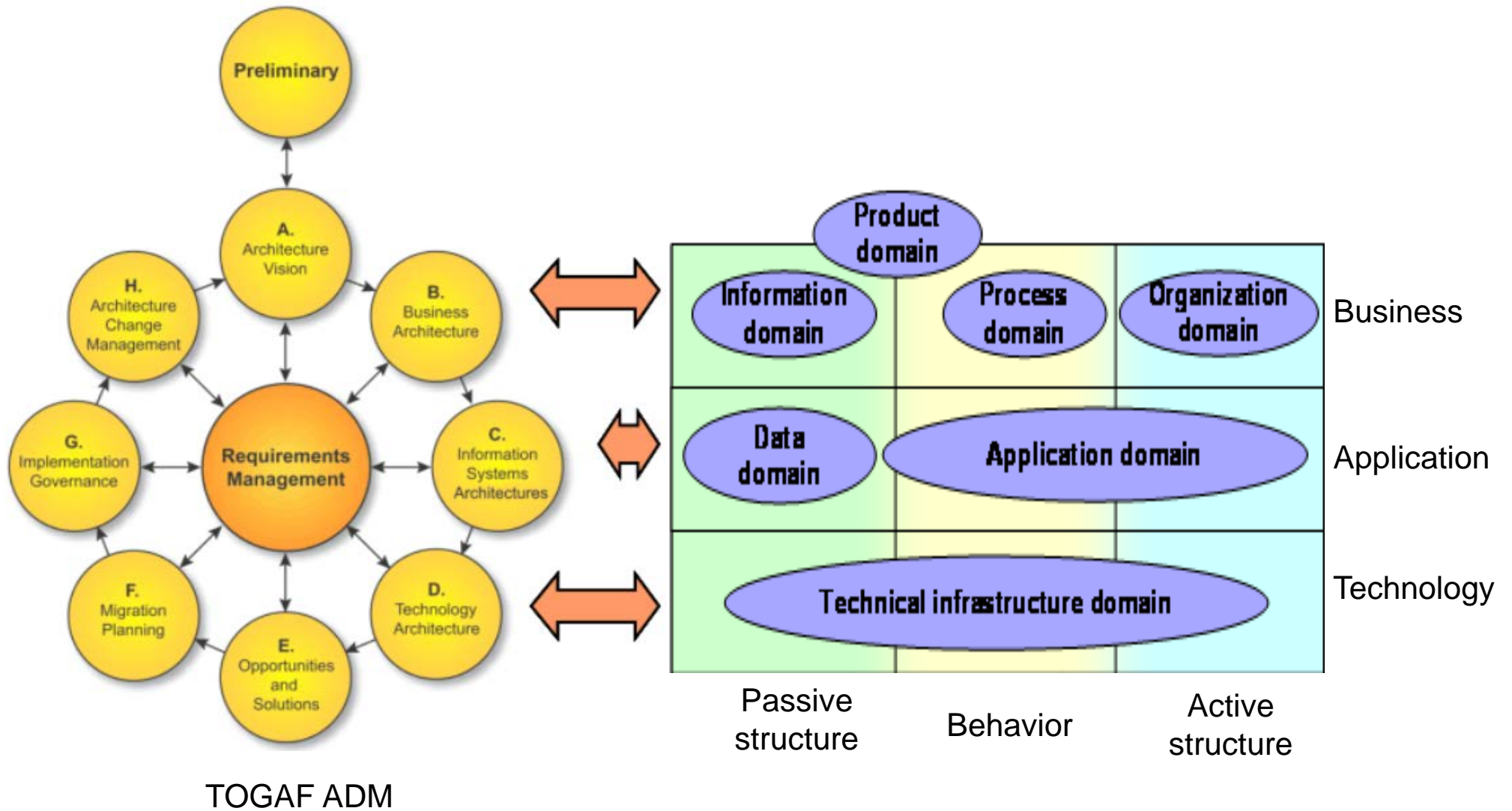
Behavior

Active structure

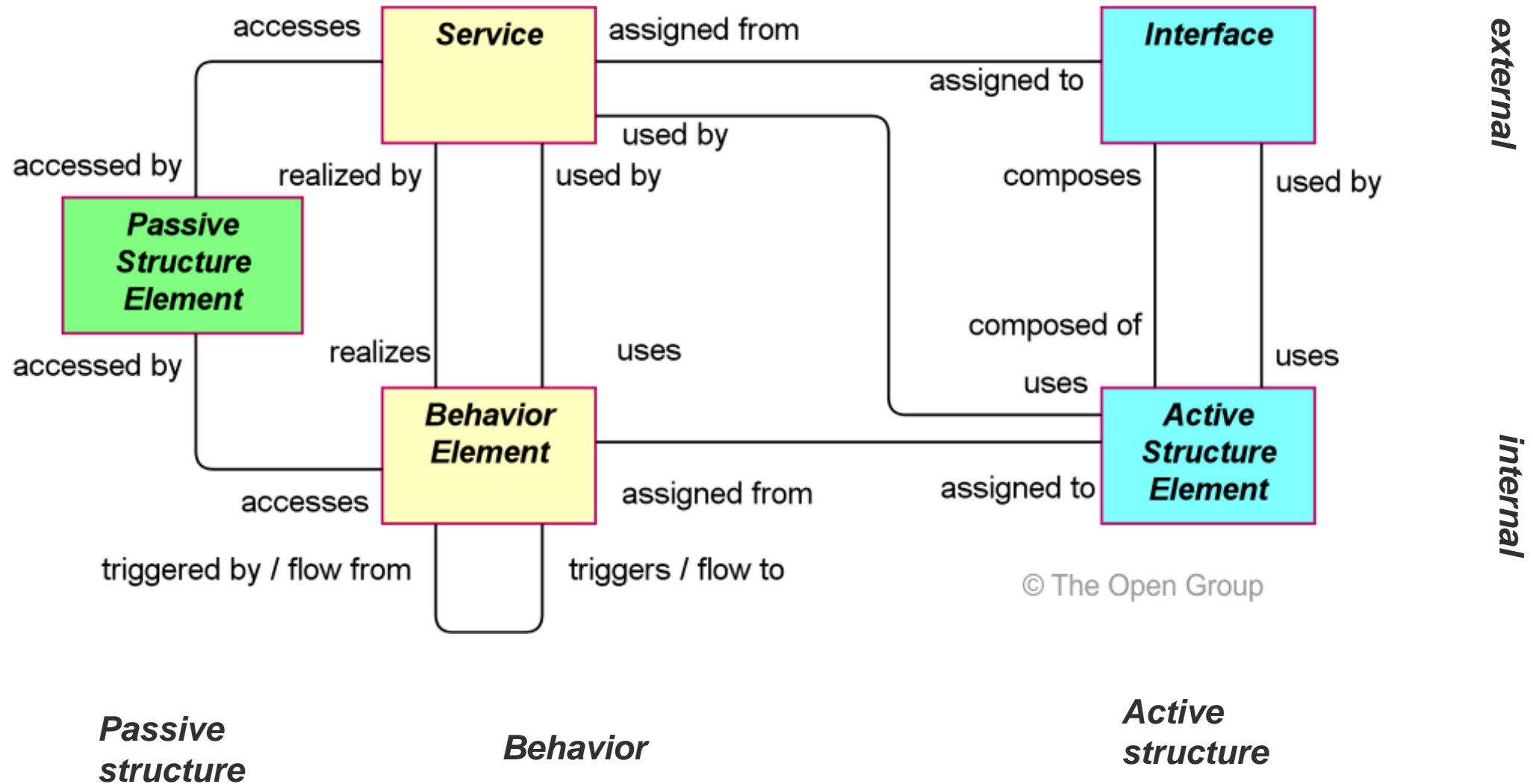
**ArchiMate**



# ArchiMate and TOGAF



# Core Concepts and Relations

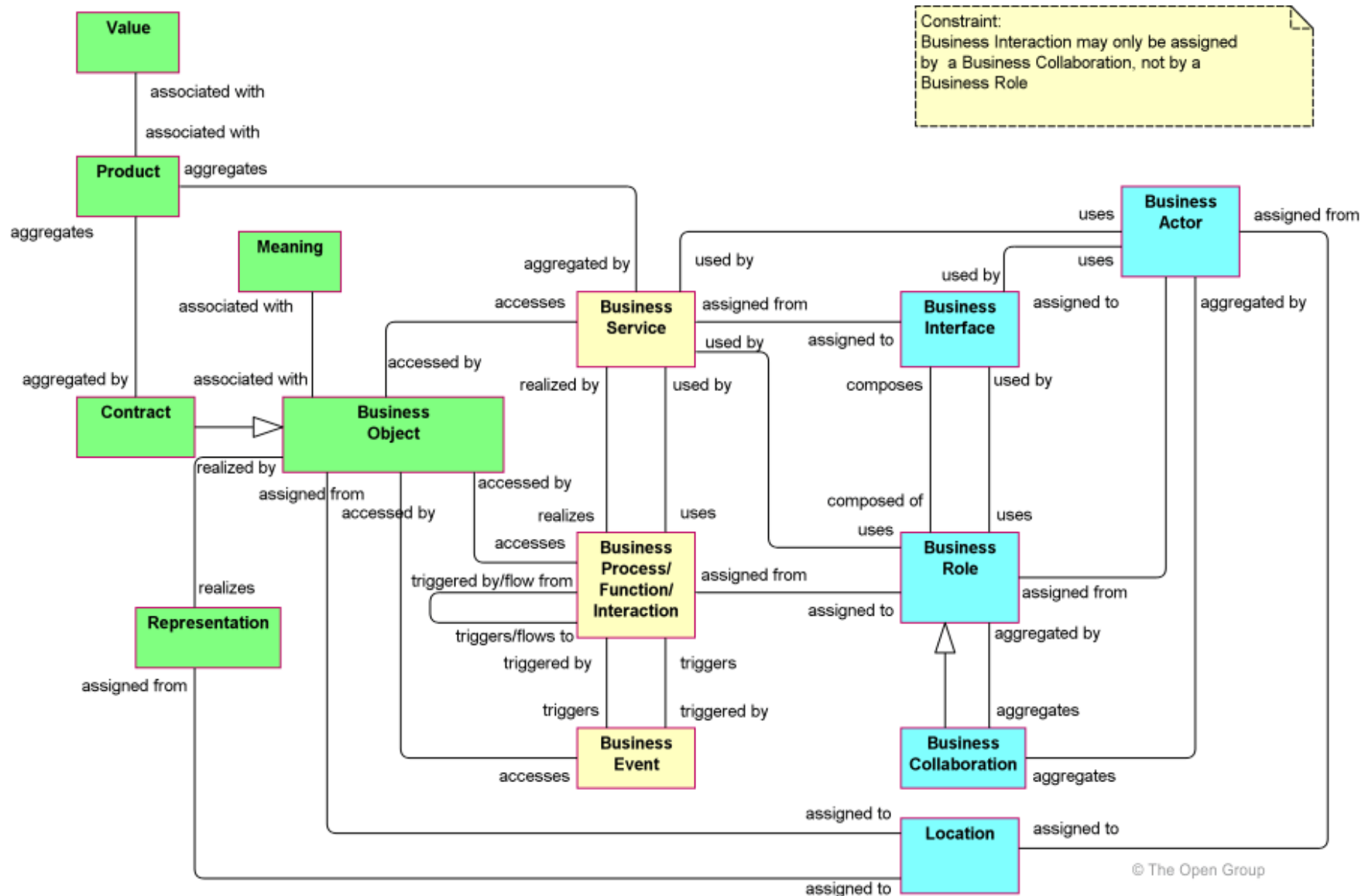


Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap02.html>







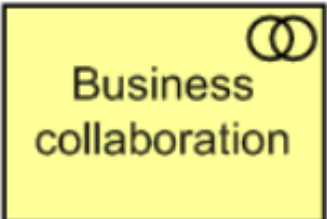
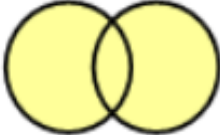
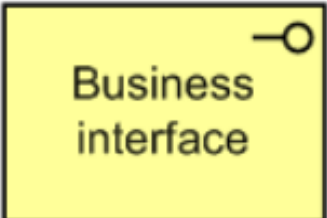
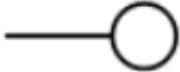


# Business Layer Metamodel





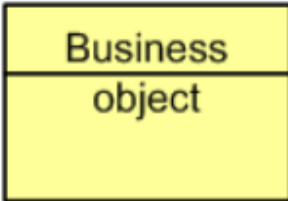

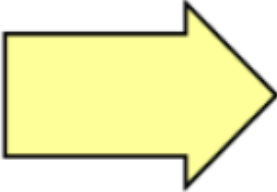


Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap03.html>

# Business Layer Concepts (I)

Concept	Description	Notation
Business actor	An organizational entity that is capable of performing behavior.	 
Business role	The responsibility for performing specific behavior, to which an actor can be assigned.	 
Business collaboration	An aggregate of two or more business roles that work together to perform collective behavior.	 
Business interface	A point of access where a business service is made available to the environment.	 

Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap03.html>

# Business Layer Concepts (II)

Location	A conceptual point or extent in space.	 
Business object	A passive element that has relevance from a business perspective.	
Business process	A behavior element that groups behavior based on an ordering of activities. It is intended to produce a defined set of products or business services.	 
Business function	A behavior element that groups behavior based on a chosen set of criteria (typically required business resources and/or competences).	 


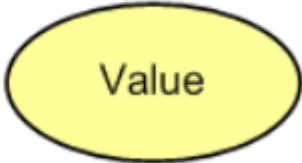
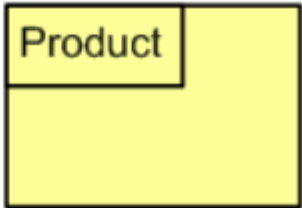
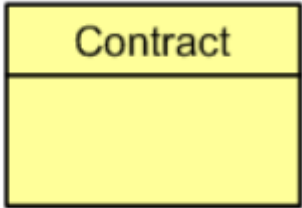
Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap03.html>

# Business Layer Concepts (III)

Business interaction	A behavior element that describes the behavior of a business collaboration.		
Business event	Something that happens (internally or externally) and influences behavior.		
Business service	A service that fulfills a business need for a customer (internal or external to the organization).		
Representation	A perceptible form of the information carried by a business object.		

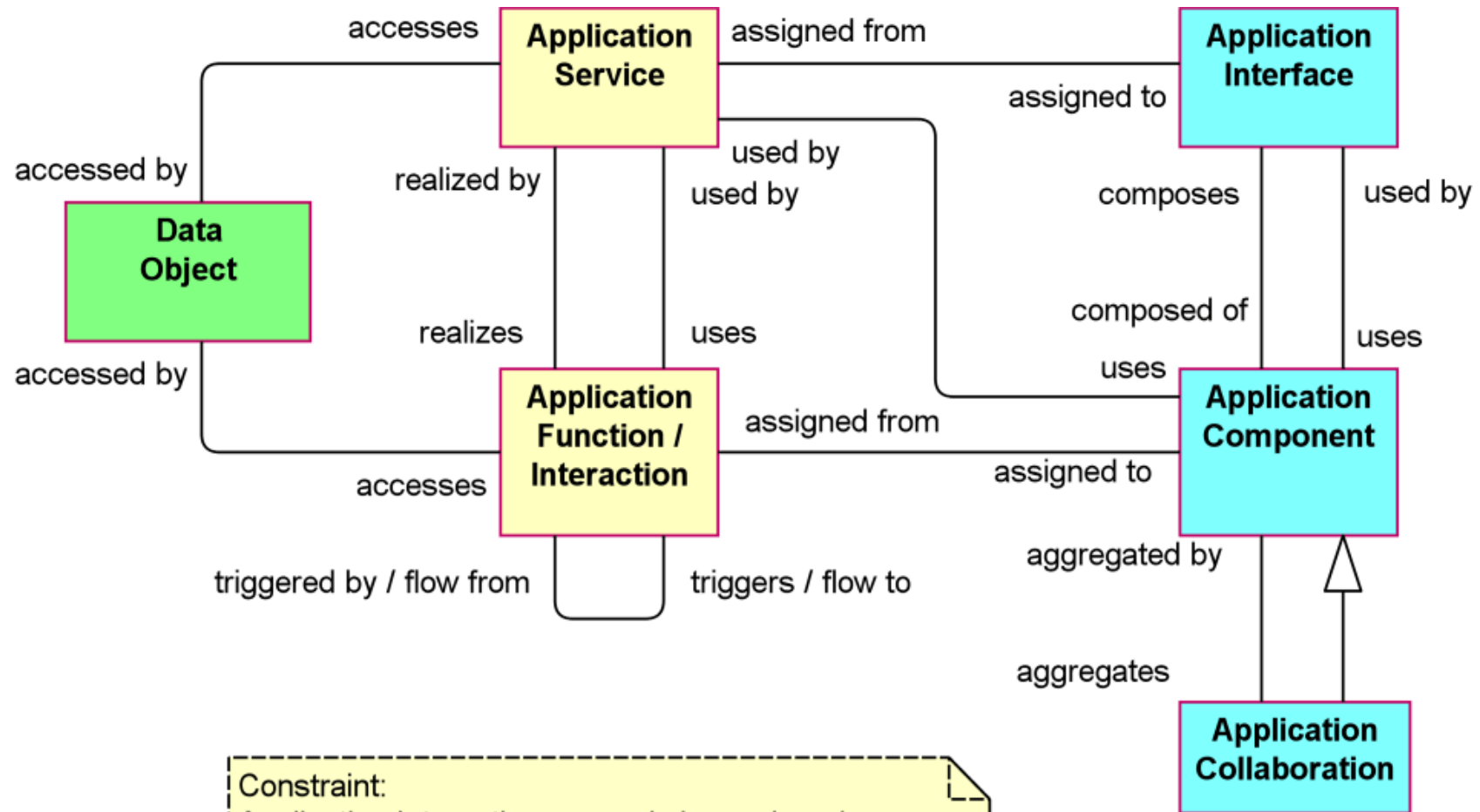
Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap03.html>

# Business Layer Concepts (IV)

Meaning	The knowledge or expertise present in a business object or its representation, given a particular context.	
Value	The relative worth, utility, or importance of a business service or product.	
Product	A coherent collection of services, accompanied by a contract/set of agreements, which is offered as a whole to (internal or external) customers.	
Contract	A formal or informal specification of agreement that specifies the rights and obligations associated with a product.	

Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap03.html>

# Application Layer Metamodel




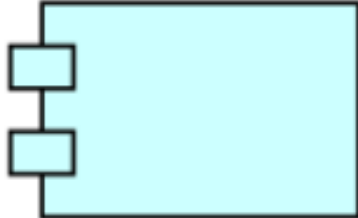
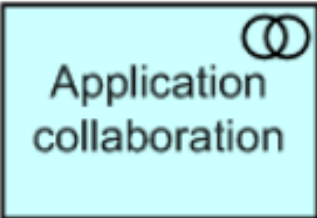
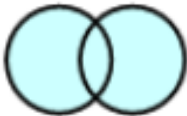

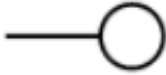

Constraint:  
Application Interaction may only be assigned by an Application Collaboration, not by an Application Component.

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Source: ArchiMate 2.1 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap04.html>



# Application Layer Concepts (I)

Concept	Definition	Notation
Application component	A modular, deployable, and replaceable part of a software system that encapsulates its behavior and data and exposes these through a set of interfaces.	 
Application collaboration	An aggregate of two or more application components that work together to perform collective behavior.	 
Application interface	A point of access where an application service is made available to a user or another application component.	  

Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap03.html>

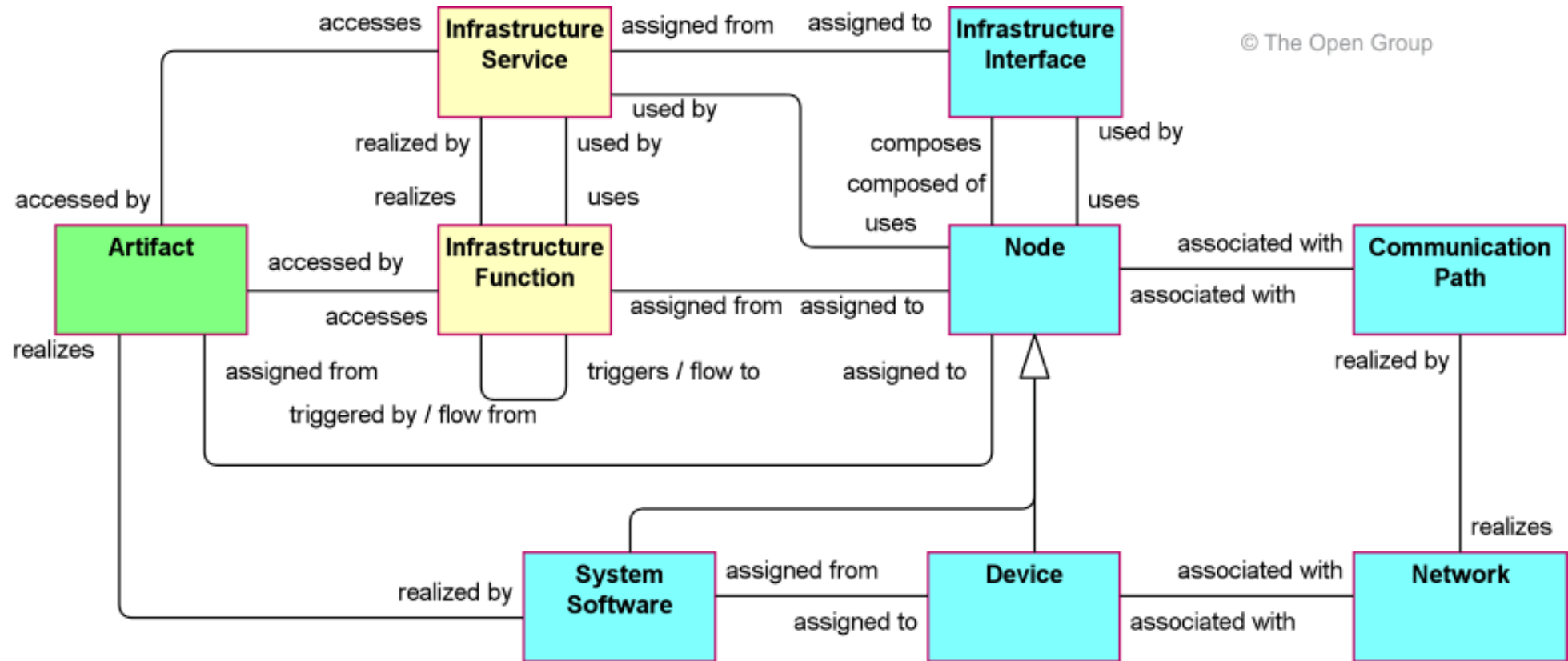
# Application Layer Concepts (II)

Data object	A passive element suitable for automated processing.	
Application function	A behavior element that groups automated behavior that can be performed by an application component.	
Application interaction	A behavior element that describes the behavior of an application collaboration.	
Application service	A service that exposes automated behavior.	

Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap03.html>



# Technology Layer Metamodel



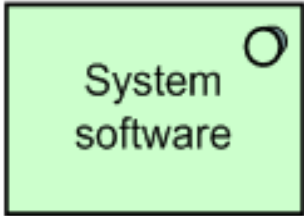
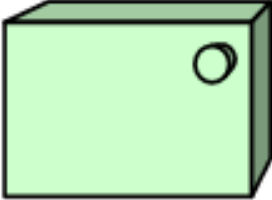
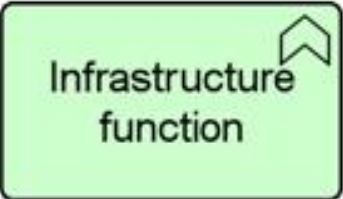
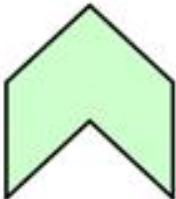
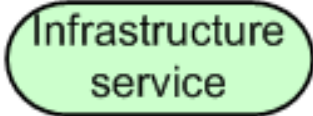

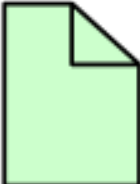
Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap05.html>

# Technology Layer Concepts (I)

Concept	Definition	Notation	
Node	A computational resource upon which artifacts may be stored or deployed for execution.		
Device	A hardware resource upon which artifacts may be stored or deployed for execution.		
Network	A communication medium between two or more devices.		
Communication path	A link between two or more nodes, through which these nodes can exchange data.		
Infrastructure interface	A point of access where infrastructure services offered by a node can be accessed by other nodes and application components.		

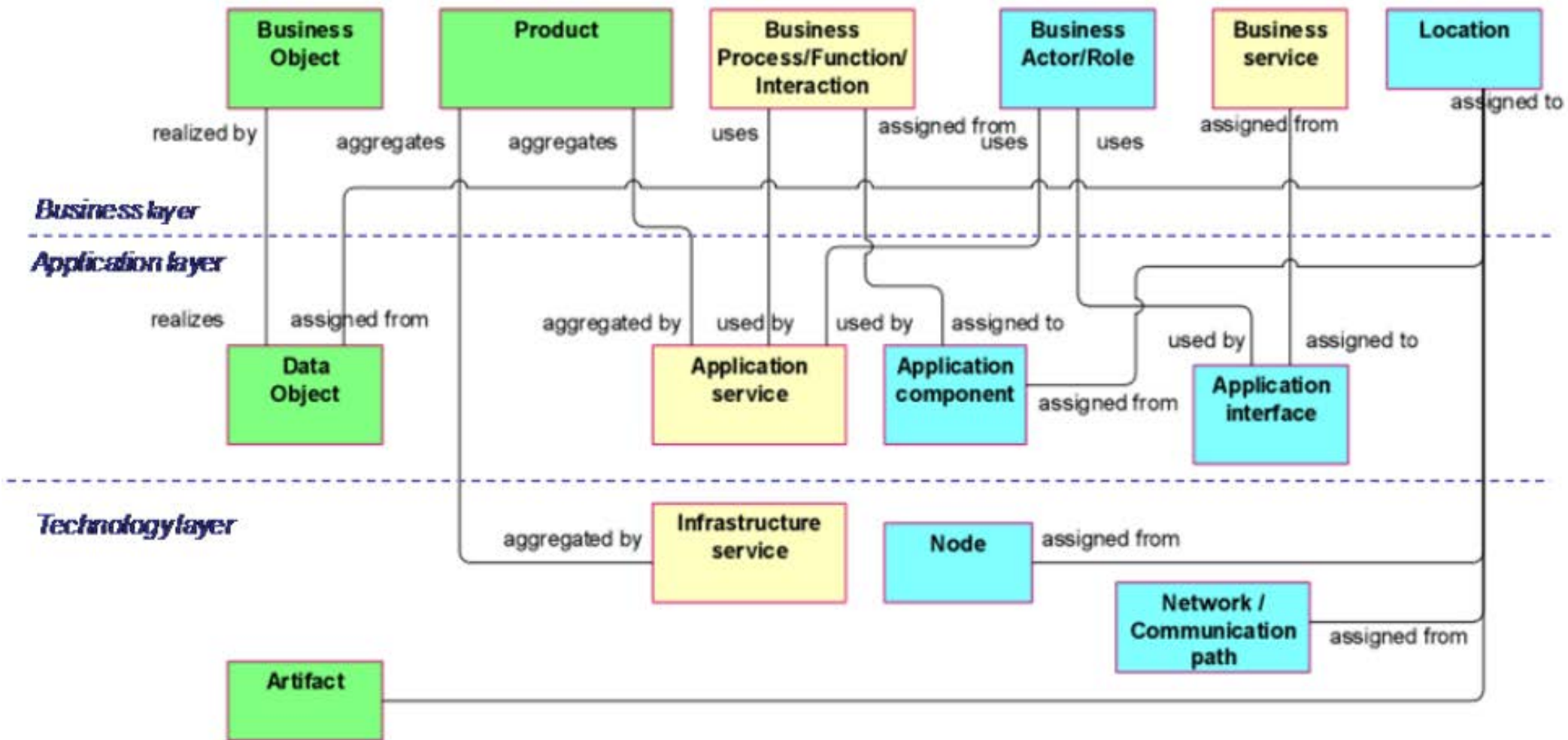
Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap05.html>

# Technology Layer Concepts (II)

<p>System software</p>	<p>A software environment for specific types of components and objects that are deployed on it in the form of artifacts.</p>		
<p>Infrastructure function</p>	<p>A behavior element that groups infrastructural behavior that can be performed by a node.</p>		
<p>Infrastructure service</p>	<p>An externally visible unit of functionality, provided by one or more nodes, exposed through well-defined interfaces, and meaningful to the environment.</p>		
<p>Artifact</p>	<p>A physical piece of data that is used or produced in a software development process, or by deployment and operation of a system.</p>		

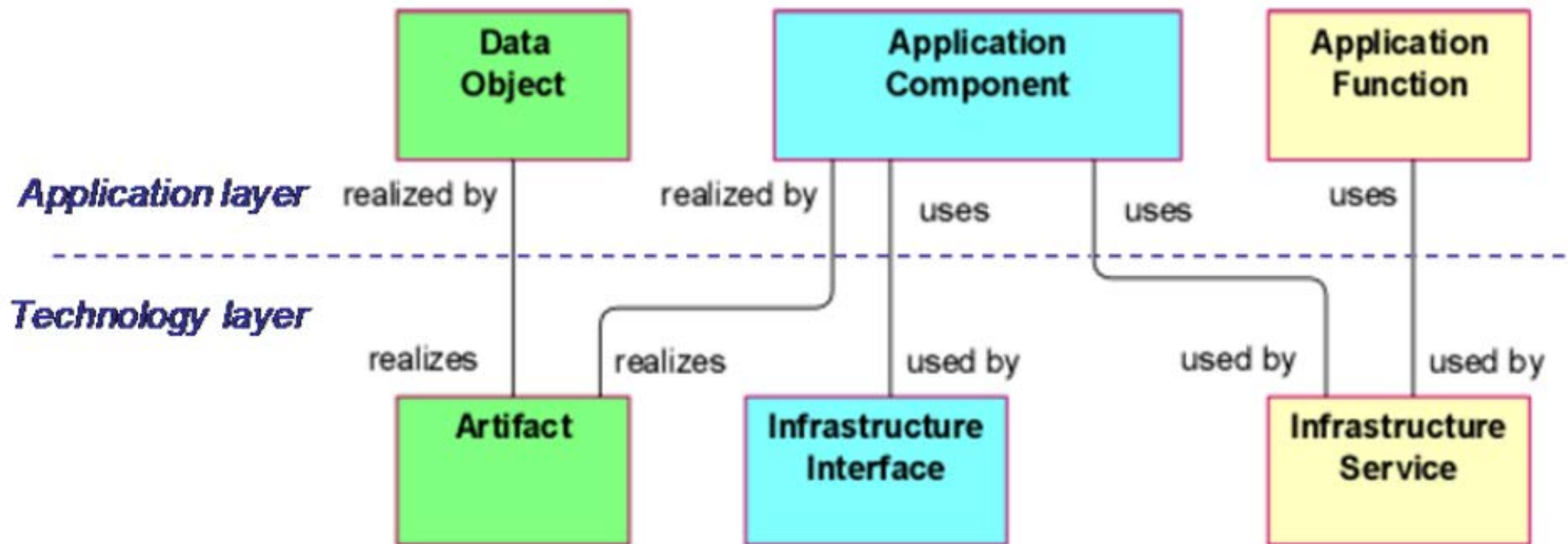
Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap05.html>

# Cross-Layer Dependencies: Business-Application Alignment



Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap06.html>

# Cross-Layer Dependencies: Application-Technology Alignment



Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap06.html>



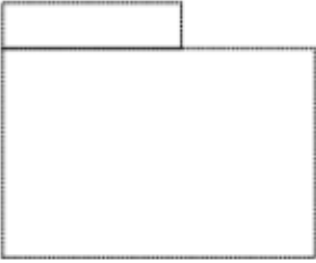




# Relationships (I)

Structural Relationships		Notation
Association	Association models a relationship between objects that is not covered by another, more specific relationship.	
Access	The access relationship models the access of behavioral concepts to business or data objects.	
Used by	The used by relationship models the use of services by processes, functions, or interactions and the access to interfaces by roles, components, or collaborations.	
Realization	The realization relationship links a logical entity with a more concrete entity that realizes it.	
Assignment	The assignment relationship links units of behavior with active elements (e.g., roles, components) that perform them, or roles with actors that fulfill them.	
Aggregation	The aggregation relationship indicates that an object groups a number of other objects.	
Composition	The composition relationship indicates that an object is composed of one or more other objects.	

Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap07.html>

# Relationships (II)

Dynamic Relationships		Notation
Flow	The flow relationship describes the exchange or transfer of, for example, information or value between processes, function, interactions, and events.	
Triggering	The triggering relationship describes the temporal or causal relationships between processes, functions, interactions, and events.	
Other Relationships		Notation
Grouping	The grouping relationship indicates that objects, of the same type or different types, belong together based on some common characteristic.	
Junction	A junction is used to connect relationships of the same type.	
Specialization	The specialization relationship indicates that an object is a specialization of another object.	

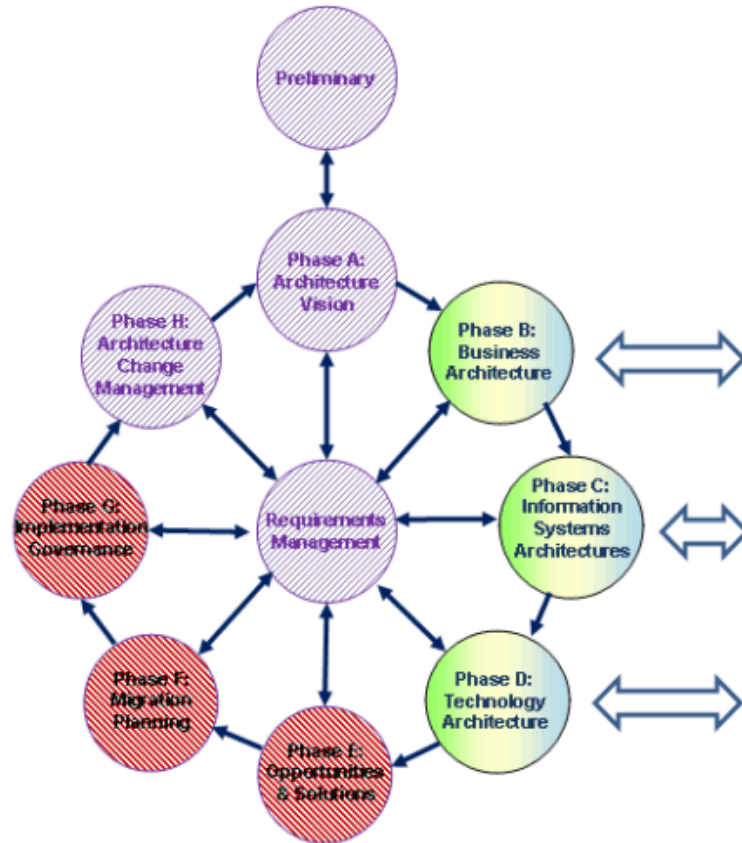
Source: ArchiMate 2.0 Specification, <http://pubs.opengroup.org/architecture/archimate2-doc/chap07.html>

# Views and Viewpoints in ArchiMate

- In ArchiMate, architects and other stakeholders can define their own views on the enterprise architecture
- A viewpoint in ArchiMate is a selection of
  - ◆ a relevant subset of the ArchiMate concepts and their relationships
  - ◆ For each viewpoint one model kind exists
- A view is (a set of) models
  - ◆ representing a part of an architecture
  - ◆ using the concepts and relationships of the corresponding viewpoint



# Extensions of ArchiMate to cover the whole TOGAF ADM



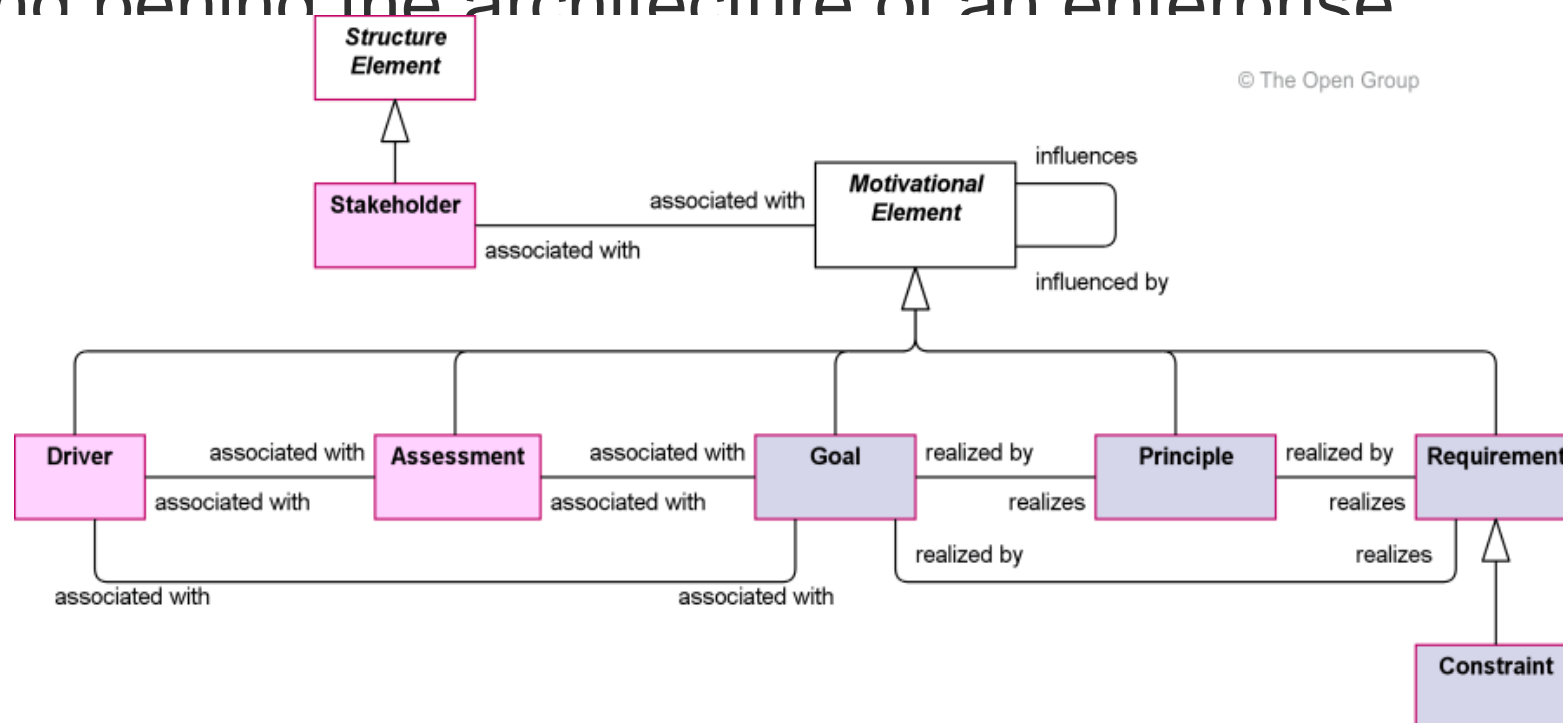
The motivation extension introduces concepts to support requirements management and to support the Preliminary Phase and Phase A (Architecture Vision).

Information	Behavior	Structure	Motivation
	Business layer		
	Application layer		
	Technology layer		
Implementation & Migration			

The Implementation and Migration extension adds concepts to support the late ADM phases: Phase E (Opportunities and Solutions), Phase F (Migration Planning), and Phase G (Implementation Governance).

# Motivation Extension

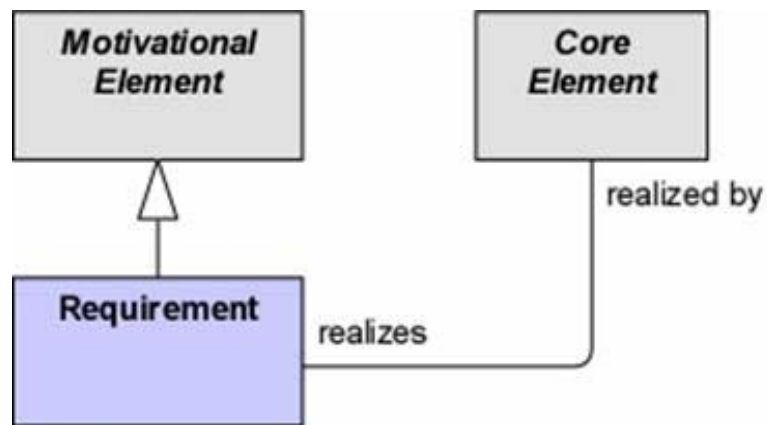
- The motivation extension adds motivational concepts such as goal, principle, and requirement. It corresponds to the “Why” column of the Zachman framework
- A **motivational element** provides the *context* or *reason* lying behind the architecture of an enterprise



# Motivation Extension

- In addition, the Motivation extension recognizes the concepts of stakeholders, drivers, and assessments.
  - ◆ **Stakeholders** represent (groups of) persons or organizations that influence, guide, or constrain the enterprise.
  - ◆ **Drivers** represent internal or external factors which influence the plans and aims of an enterprise.
  - ◆ An understanding of assessments (**strengths**, **weaknesses**, **opportunities**, and **threats**) in relation to these drivers help the formation of plans and aims to appropriately address these issues.

# Relating Motivation Elements to Core Elements



- Core elements of an architectural description are related to motivational elements via requirements.
- Goals and principles have to be translated into requirements before core elements, such as services, processes, and applications, can be assigned that realize them.

# Implementation and Migration Extension

- This extension includes concepts for modeling implementation programs and projects to support program, portfolio, and project management, and a plateau concept to support migration planning

