Harmonising two conceptual frameworks for EA

Mapping TOGAF® to ArchiMate®

AKA Terminology Torture

Including some slides from Avancier's training to
BCS Enterprise and Solution Architecture Certificates

What do we want for EA?

- What is needed for the architectural design and planning of large-scale changes to business systems?

- Processes
- Products
- People

Processes and products

- **TOGAF** best known for its process
  - the Architecture Development Method (ADM)
- Also offers a menu of lightly-defined products
  - Deliverables
  - Artifacts
    - Catalogs
    - Matrices
    - **Diagrams**

- **ArchiMate** more limited
  - a modelling language for drawing diagrams

- A perfect marriage?

TOGAF 9.2 artifact types – diagram types in the handout

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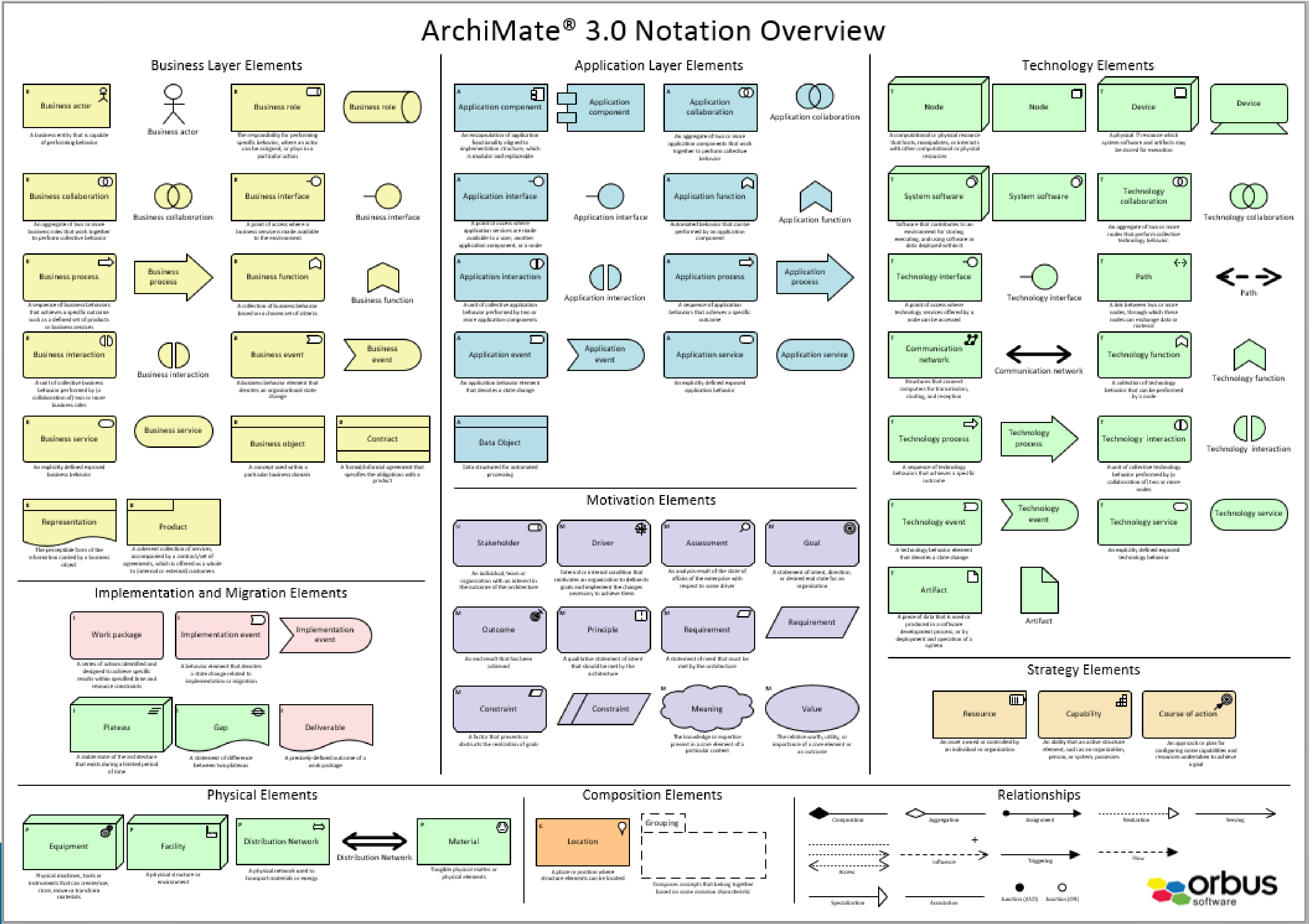
PRELIMINARY	VISION	REQUIREMENTS	PLANNING
Principles Catalog Driver/Goal/Objective Catalog Value Chain Diagram Business Model Diagram	Stakeholder Catalog Solution Concept Diagram **Business Footprint Diagram**	Requirements Catalog Requirements Traceability Matrix	**Project Context Diagram** Benefits Diagram
BUSINESS			
Capability view	People view	Process view	Business data view
Goal/Objective/Service Diagram Contract Measure Catalog **Functional Decomposition Diagram** Business Service/Function Catalog Business Interaction Matrix **Node Connectivity Diagram**	**Organization Decomposition Diagram** Function/Organization Matrix Role Catalog Organization/Role Catalog Actor/Role Matrix Location Catalog	Process Catalog **Business Use Case Diagram** **Process Flow Diagram** **Event Diagram** Product Lifecycle Diagram	Conceptual Data Diagram Data Entity/Business Function Matrix Business Service/Information Dgrrm
Business Capabilities Catalog Strategy/Capability Matrix Business Capability Map	Organization Map Capability/Organization Matrix	Value Stream (Stages) Catalog Value Stream/Capability Matrix Value Stream Map	**Parallel vocabulary and artifacts**
DATA	APPLICATIONS	TECHNOLOGY	IMPLEMENTATION
Data Entity/Data Component Catalog Application/Data Matrix Logical Data Diagram Data Dissemination Diagram Data Security Diagram Data Migration Diagram Data Lifecycle Diagram	Application Portfolio Catalog Interface Catalog Application/Func/Org/Role Matriices Information Exchange Matrix **Application Communication Diagram** **Process Application Realization Diagram** **Application and User Locations Diagram** **Application Use Case Diagram** Application Migration Diagram	Technology Portfolio Catalog Technology Standards Catalog Application/Technology Matrix Environment Locations Diagram **Platform Decomposition Diagram**	Software Engineering Diagram **Software Distribution Diagram** **Enteprise Manageability Diagram** **Processing Diagram** **Networked Computing Hardware Dgrm** **Communications Engineering Dgrm**

ArchiMate diagram symbols



ArchiMate® 3.0 Notation Overview

Business Layer Elements

Business actor
A business entity that is capable of performing behavior

Business role
The responsibility for performing specific behavior, where an actor can be assigned, or plays in a particular action

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

Business process
A sequence of business behaviors that achieves a specific outcome such as a defined set of products or business services

Business function
A collection of business behavior based on a chosen set of criteria

Business interaction
A unit of collective business behavior performed by (a collaboration of) two or more business roles

Business event
A business behavior element that denotes an organizational state change

Business service
An explicitly defined exposed business behavior

Business object
A concept used within a particular business domain

Contract
A formal/informal agreement that specifies the obligations with a product

Representation
The perceptible form of the information carried by a business object

Product
A coherent collection of services, accompanied by a contract/set of agreements, which is offered as a whole to (internal or external) customers

Implementation and Migration Elements

Work package
A series of actions identified and designed to achieve specific results within specified time and resource constraints

Implementation event
A behavior element that denotes a state change related to implementation or migration

Plateau
A stable state of the architecture that exists during a limited period of time

Gap
A statement of difference between two plateaus

Deliverable
A precisely-defined outcome of a work package

Application Layer Elements

Application component
An encapsulation of application functionality aligned to implementation structure, which is modular and replaceable

Application collaboration
An aggregate of two or more application components that work together to perform collective behavior

Application interface
A point of access where application services are made available to a user, another application component, or a node

Application function
Automated behavior that can be performed by an application component

Application interaction
A unit of collective application behavior performed by two or more application components

Application process
A sequence of application behaviors that achieves a specific outcome

Application event
An application behavior element that denotes a state change

Application service
An explicitly defined exposed application behavior

Data Object
Data structured for automated processing

Motivation Elements

Stakeholder
An individual, team or organization with an interest in the outcome of the architecture

Driver
External or internal condition that motivates an organization to define its goals and implement the changes necessary to achieve them

Assessment
An analysis result of the state of affairs of the enterprise with respect to some driver

Goal
A statement of intent, direction, or desired end state for an organization

Outcome
An end result that has been achieved

Principle
A qualitative statement of intent that should be met by the architecture

Requirement
A statement of need that must be met by the architecture

Constraint
A factor that prevents or obstructs the realization of goals

Meaning
The knowledge or expertise present in a core element of a particular context

Value
The relative worth, utility, or importance of a core element or an outcome

Technology Elements

Node
A computational or physical resource that hosts, manipulates, or interacts with other computational or physical resources

Device
A physical IT resource which system software and artifacts may be stored for execution

System software
Software that contributes to an environment for storing, executing, and using software or data deployed within it

Technology collaboration
An aggregate of two or more nodes that perform collective technology behavior.

Technology interface
A point of access where technology services offered by a node can be accessed

Path
A link between two or more nodes, through which these nodes can exchange data or material

Communication network
Structures that connect computers for transmission, routing, and reception

Technology function
A collection of technology behavior that can be performed by a node

Technology process
A sequence of technology behaviors that achieves a specific outcome

Technology interaction
A unit of collective technology behavior performed by (a collaboration of) two or more nodes

Technology event
A technology behavior element that denotes a state change

Technology service
An explicitly defined exposed technology behavior

Artifact
A piece of data that is used or produced in a software development process, or by deployment and operation of a system

Strategy Elements

Resource
An asset owned or controlled by an individual or organization

Capability
An ability that an active structure element, such as an organization, person, or system, possesses

Course of action
An approach or plan for configuring some capabilities and resources undertaken to achieve a goal

Physical Elements

Equipment
Physical machines, tools or instruments that can create/use, store, move or transform materials

Facility
A physical structure or environment

Distribution Network
A physical network used to transport materials or energy

Material
Tangible physical matter or physical elements

Composition Elements

Location
A place or position where structure elements can be located

Grouping
Composes concepts that belong together based on some common characteristic

Relationships

This presentation

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- Not about diagrams!
- See the handout for examples

- Rather, about the *concepts in the diagrams*

- Because communication requires that
  - Speakers and hearers share an understanding of the concepts spoken words represent.
  - Drawers and readers share an understanding of the concepts the diagrams symbols represent.

The perfect marriage?

- The bride and groom come from different families, with different cultures.

- ArchiMate
  - tries to present a coherent and consistent conceptual framework
  - using a tightly controlled language.

- TOGAF
  - tends to embrace all words and concepts its authors have found useful in practice.
  - leading to incoherence
  - e.g. new authors undermined
    - “Building Block” and “Service” in v 9
    - “Function” in v9.2

Nevertheless

- If you know the history of TOGAF, you can find a coherent conceptual framework in it

- This presentation compares and contrasts
  - the conceptual framework of TOGAF
  - the conceptual framework of ArchiMate.

The initial direction to EA

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1. **The initial direction to EA**
2. What is a business system?
3. Service-orientation in the TOGAF standard
4. Abstraction in TOGAF
5. The generic meta model that underpins ArchiMate
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7. What is the function/process distinction?
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Motivations and context for EA

- *“Business planning at the strategy level provides the initial direction to Enterprise Architecture”. (Ch. 5)*

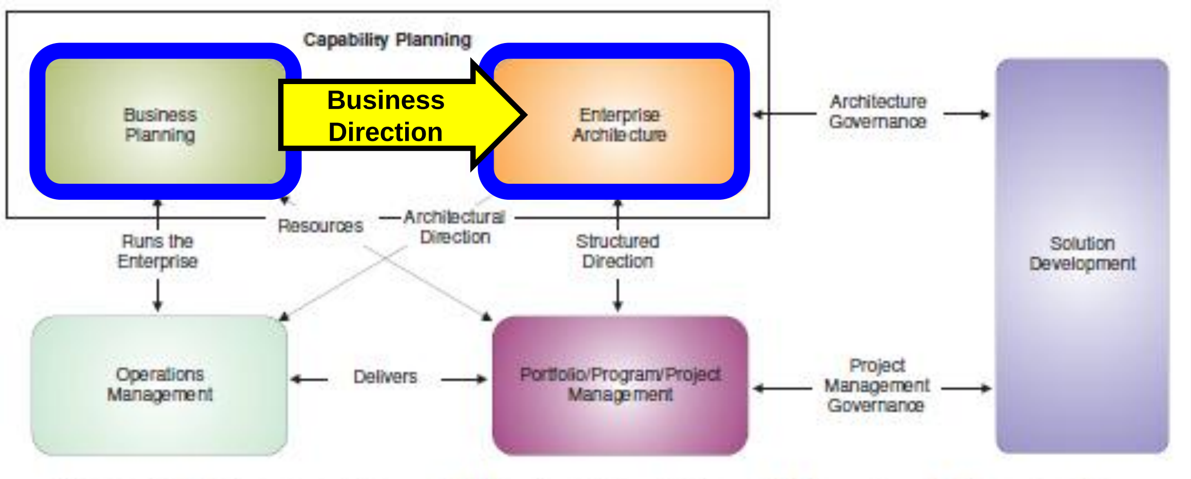


Figure 5-3 Interoperability and Relationships between Management Frameworks

Business direction words used in TOGAF 9.2

Business Driver

Mission Statement

Business Vision

Business Principle

Goal

Strategy

Objective

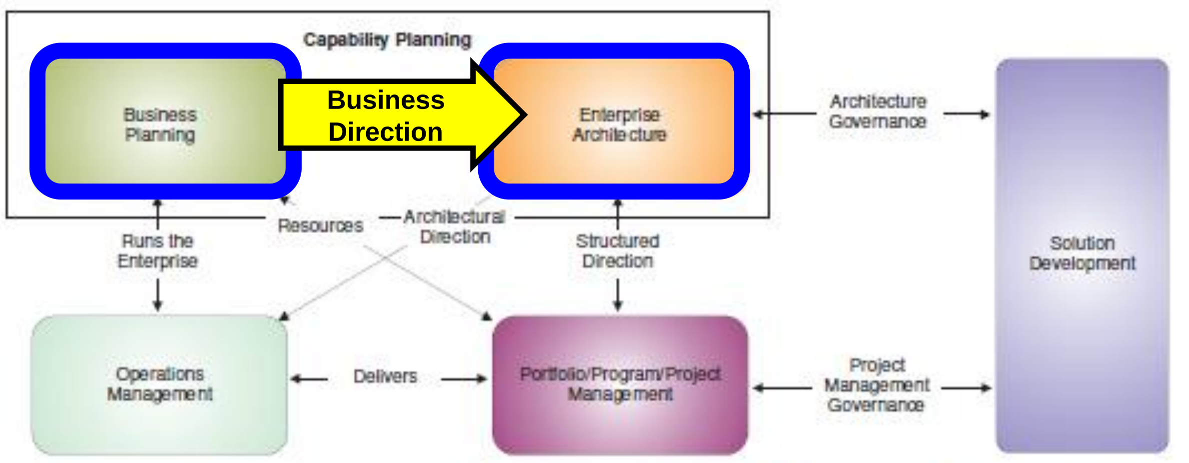
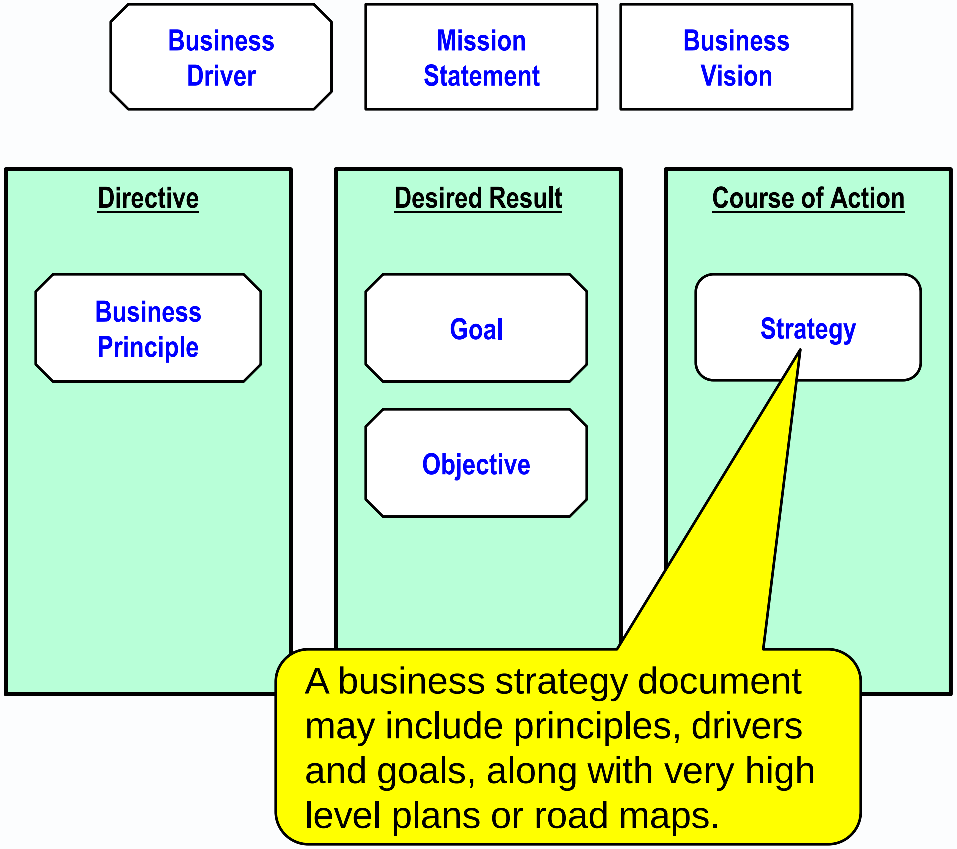


Figure 5-3 Interoperability and Relationships between Management Frameworks

In the OMG’s Business Motivation Model

- TOGAF’s Principles are “Directives”
- TOGAF’s Goals and Objectives are “Desired results”
- “Course of action” is a plan, high or low level, to achieve those desired results.

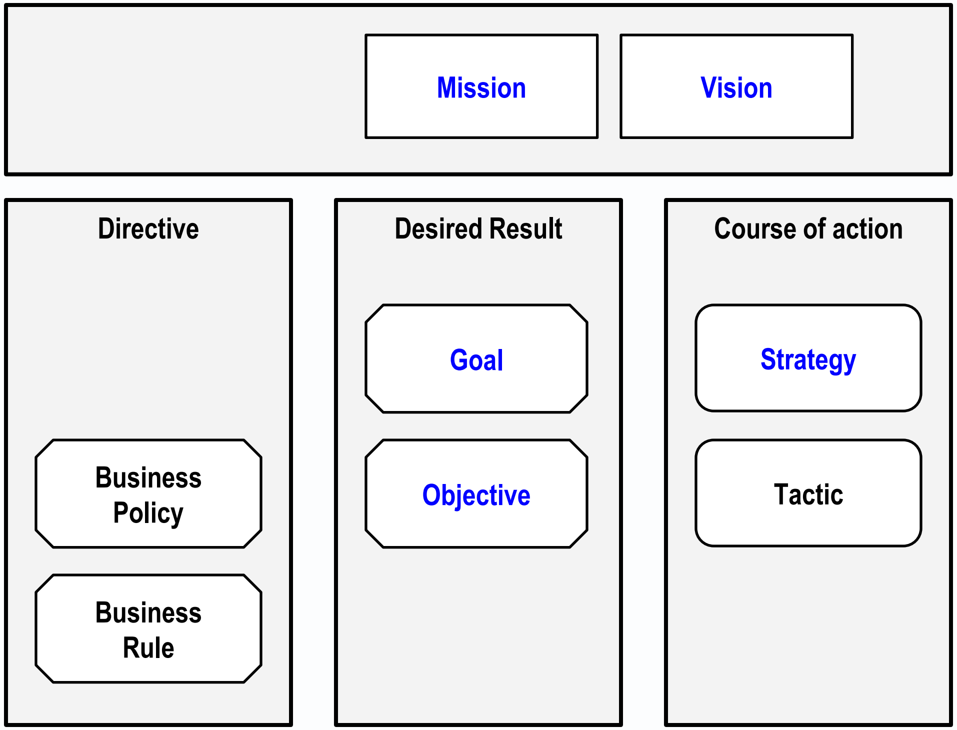
Contents of “Business Direction” in TOGAF 9.2



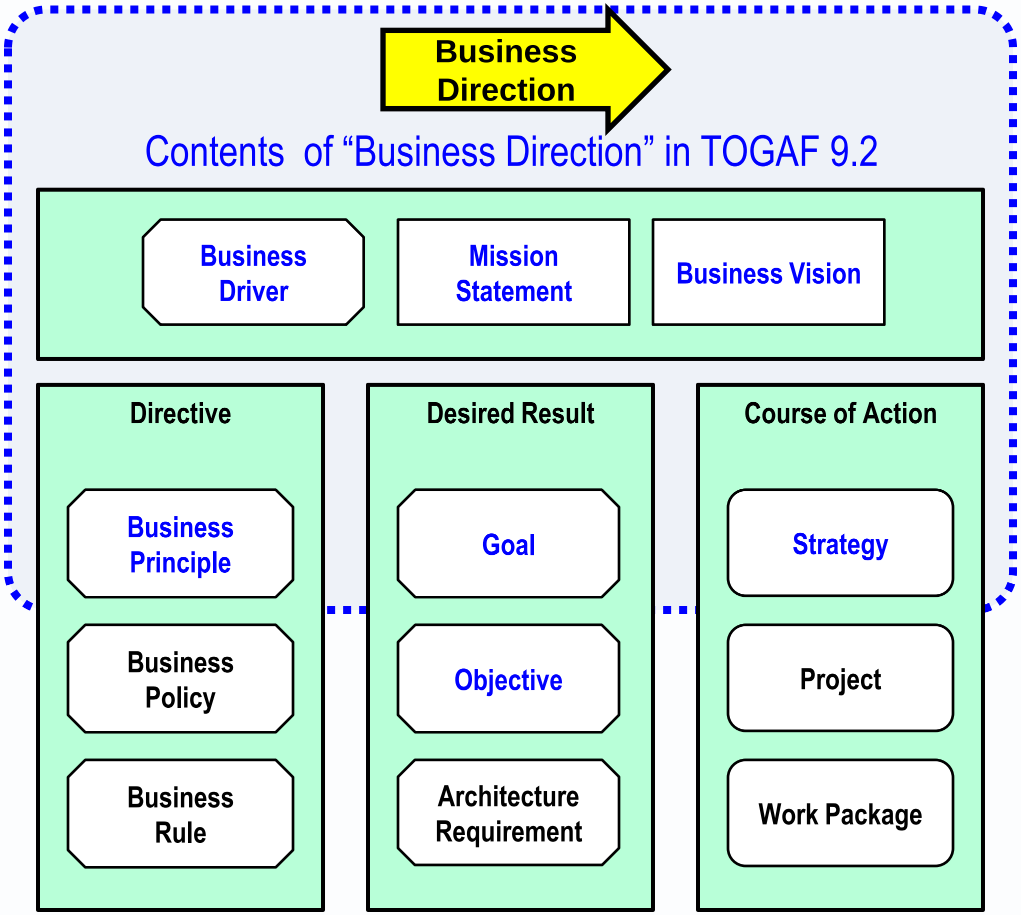
A business strategy document may include principles, drivers and goals, along with very high level plans or road maps.

Adding more words

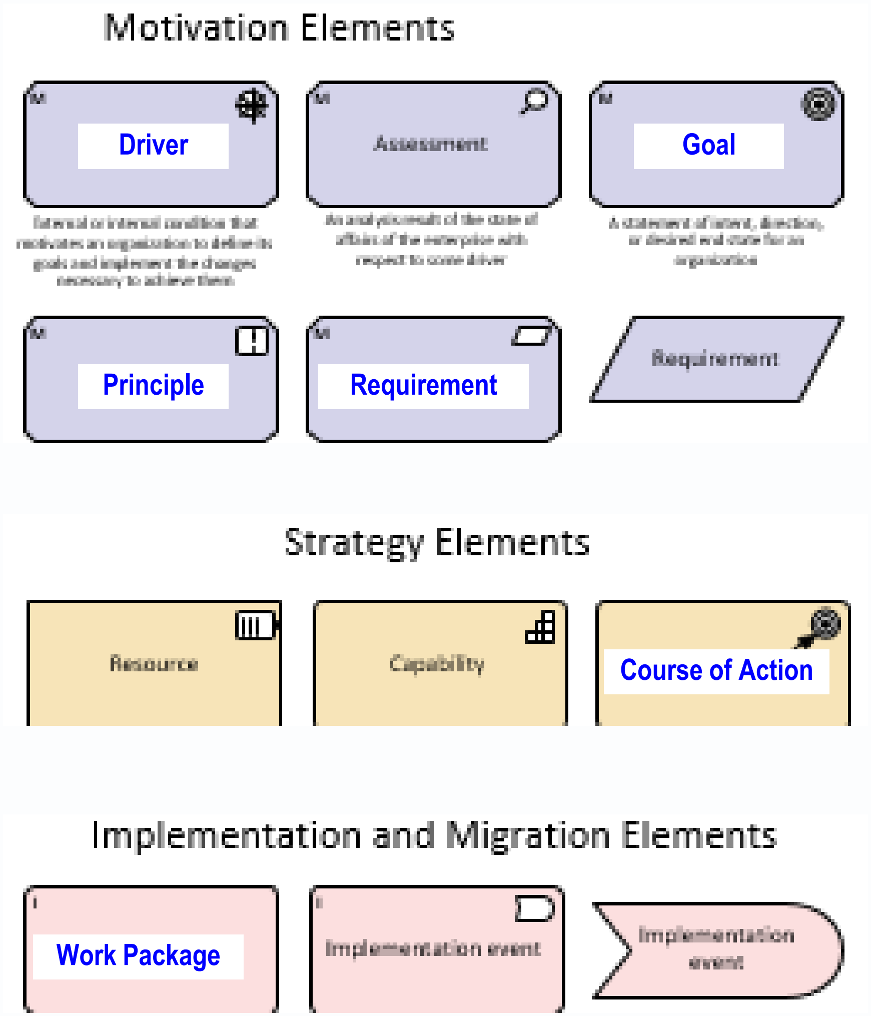
“Means” and “End” words in the Business Motivation Model from the OMG

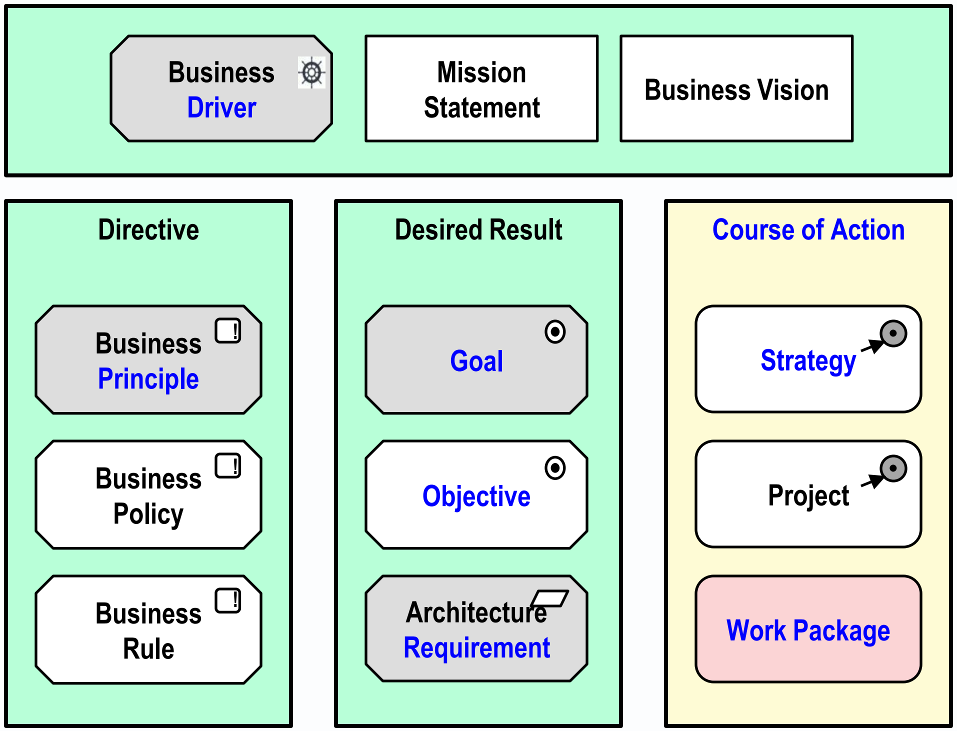


Contents of “Business Direction” in TOGAF 9.2



ArchiMate has symbols for some of these words (and more)

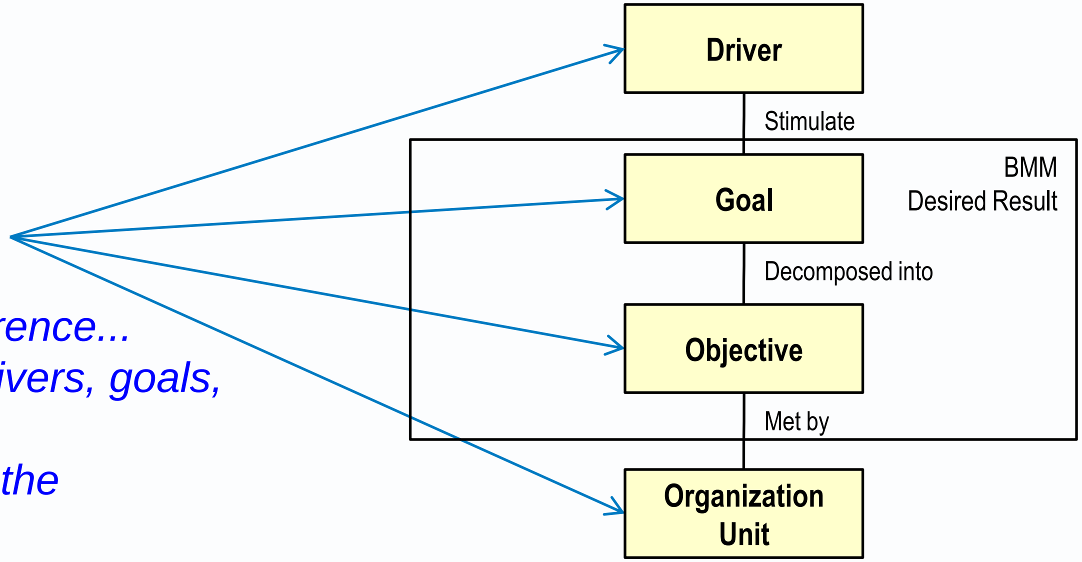

Motivation Elements
M
Driver
External or internal condition that motivates an organization to define its goals and implement the changes necessary to achieve them
M
Assessment
An analytical result of the state of affairs of the enterprise with respect to some driver
M
Goal
A statement of intent, direction, or desired end state for an organization
M
Principle
M
Requirement
Requirement
Strategy Elements
Resource
Capability
Course of Action
Implementation and Migration Elements
I
Work Package
I
Implementation event
Implementation event



TOGAF’s primary Business Direction artifact

Driver/Goal/Objective catalog

*“a cross-organizational reference...
a definitive breakdown of drivers, goals, and objectives...
to identify synergies across the organization”*



What is a business system?

1. The initial direction to EA
2. **What is a business system?**
3. Service-orientation in the TOGAF standard
4. Abstraction in TOGAF
5. The generic meta model that underpins ArchiMate
6. Mapping terms in the two standards
7. What is the function/process distinction?
8. Data architecture in TOGAF
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From business planning to business system planning

- *“EA structures the business planning into an integrated framework that regards the enterprise as a system or system of systems.” (Ch. 5)*

EA is about business *system* planning.

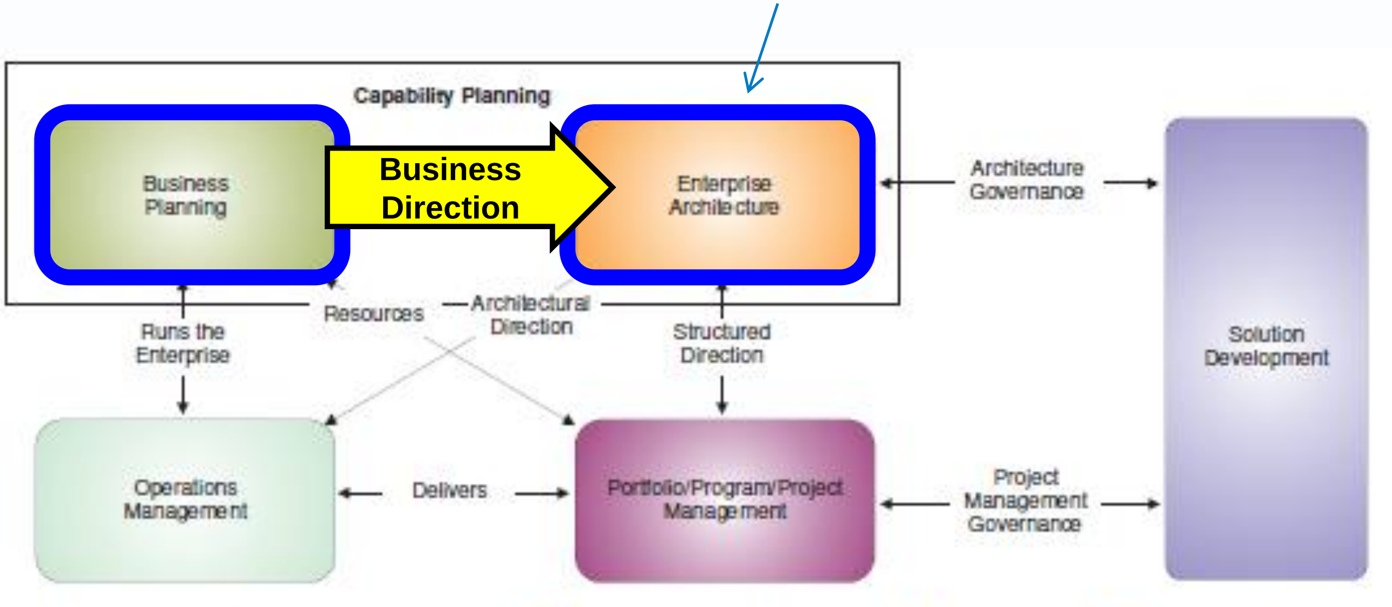


Figure 5-3 Interoperability and Relationships between Management Frameworks

What is a business system?

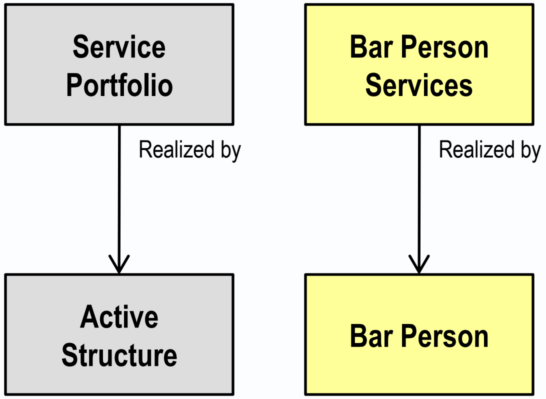
- One or more business operations that we can model as

- A discrete event-driven system in which
  - **events** trigger
  - **active structures** (actors) to perform
  - **behaviors** (repeatable activities)

Active structures

- Active structures
  - Actor
  - Organisation unit
  - Component
  - Module
  - Node

- Subsystems or components that can be encapsulated by the services they perform, in response to events.

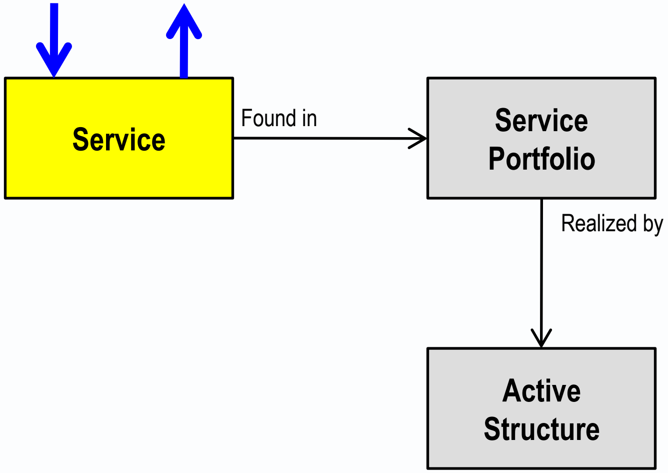


Barperson services

- Serve customer
  - Take Order
  - Serve Product
  - Take Payment
- Open doors
- Close doors
- Clean up

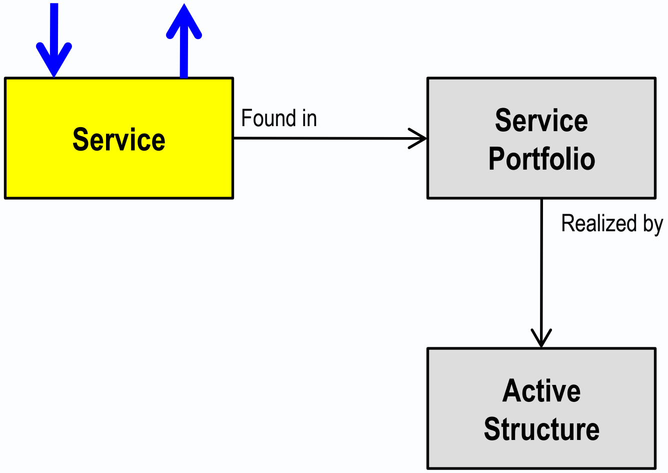
Service

- A behavior exposed at the interface of a system or component.
- It may
  - update the internal state of the system
    - “add value” to an artifact or activity.
  - consume and produce I/O flows
    - flows of data and sometimes materials



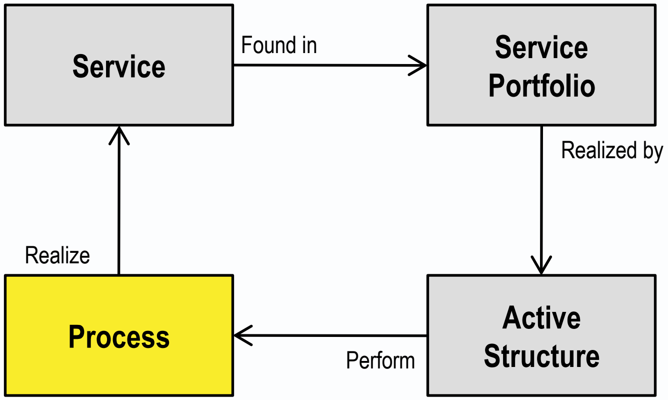
A service is definable by a contract

- A service contract comprises
  - Name
  - Inputs
  - Outputs
  - Rules
  - Quality measures



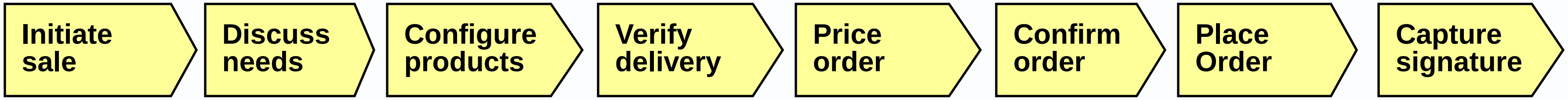
Services encapsulate processes

- one or more processes are needed to complete a service.



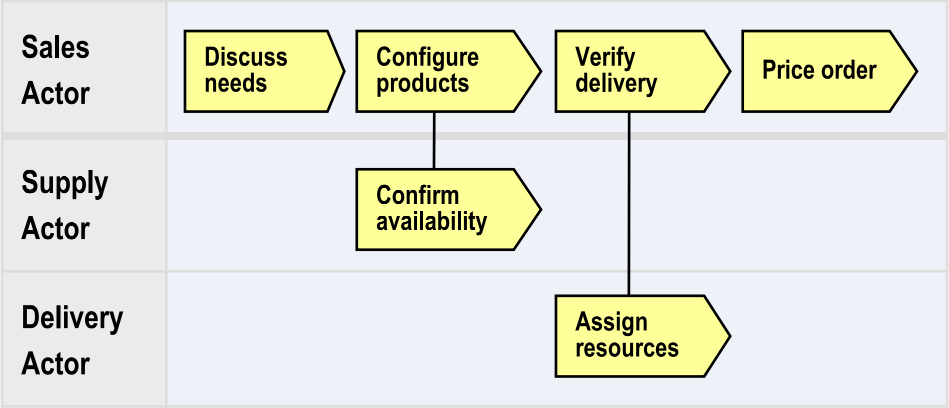
Process flow

- A sequence of sub processes (stages, steps or activities)
- Terminates in the production of a flow or other result of value.



Behaviors cannot perform behaviors!

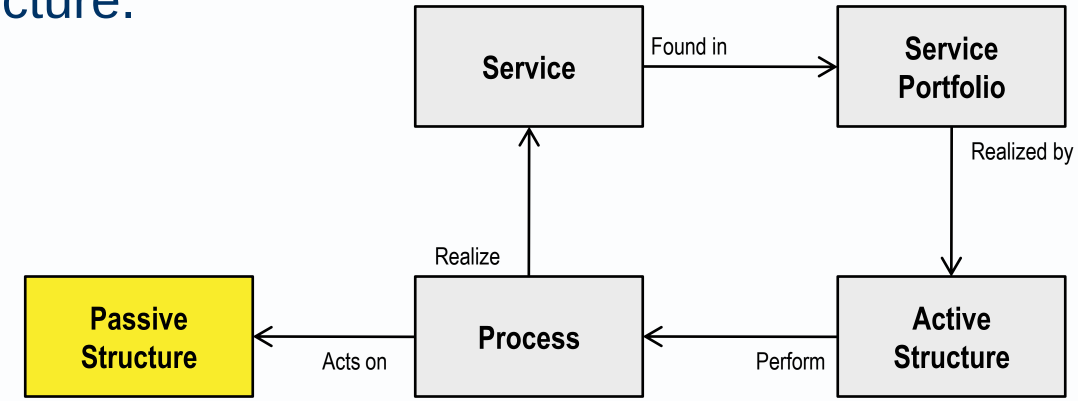
- Two behaviors can collaborate
  - one can invoke the other.



- A behavior cannot *perform* another behavior; you need an
  - actor to perform an activity (aka)
  - active structure to perform a behavior

A passive structure

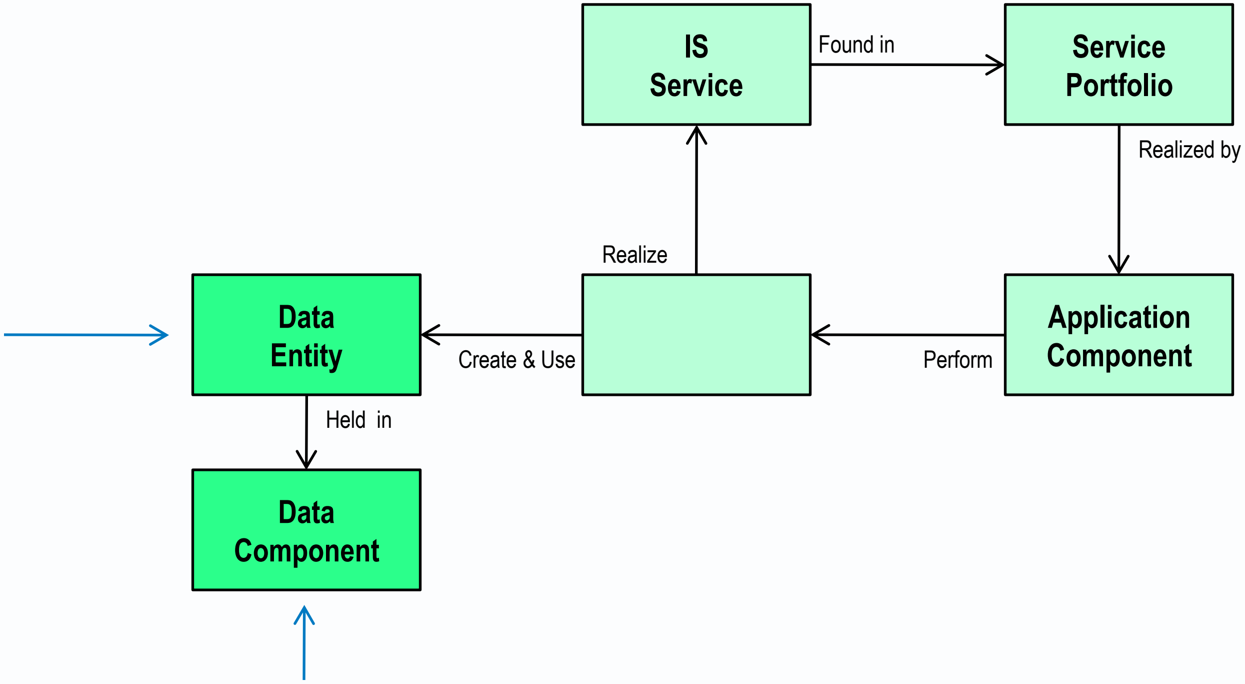
- A structure that does not act, but is acted on.
- It can be a material or data structure.



Data entities and components in TOGAF

Data entity

- A unit of data recognized by a domain expert
- identified with a thing or concept of importance in their domain,
- part of a data component.

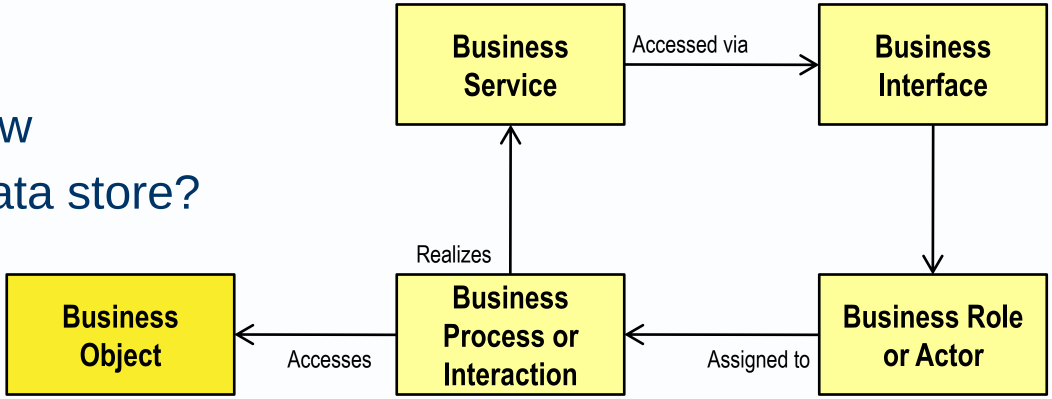


Data component

- A data structure composed of data entities

Business objects in ArchiMate

- Business Object
  - a material thing?
  - a data representation of it?
  - a data sent/received in a data flow
  - a data entity created/used in a data store?
  - any of the above?



Service-orientation in the TOGAF standard

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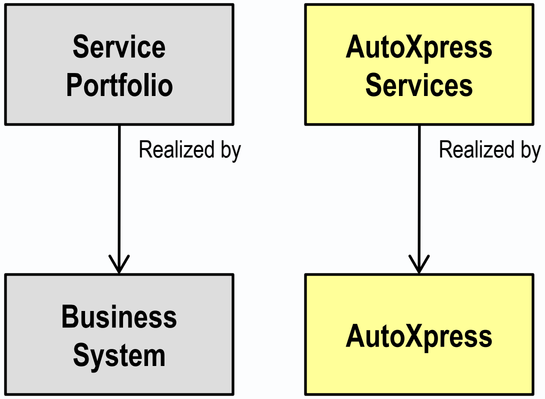
The Open Group's general principle

- Standards should be based on "executable specification".
- Specify a system by defining the behaviors it is required to perform, and their results.
- TOGAF applies this principle to the specification of business systems as well as IT systems.



AutoXpress Services

- Fit tyres
- Check-up and oil change
- Full annual service
- Check brakes
- Repair brakes
- Check exhaust
- Replace exhaust
- Inspect battery
- Replace battery
- Align wheels
- Replace windscreen wipers
- Fit bulbs
- Replace shock absorbers

The unit of behavior - a service

- a required behavior or unit of work
- defined as a service requester sees it.
  - hides how a system works.
- may be short or long
  - depending on what the requester wants and the resources available to the service provider.
- realised by one or more components performing one or more processes.

AutoXpress Services

- Fit tyres
- Check-up and oil change
- Full annual service
- Check brakes
- Repair brakes
- Check exhaust
- Replace exhaust
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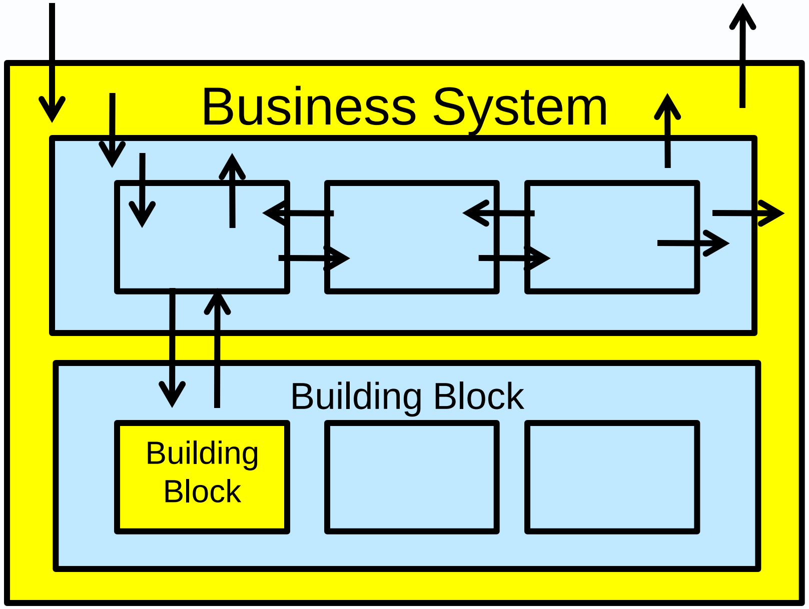
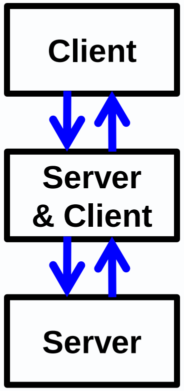
The unit of structure - a “building block” (or component)

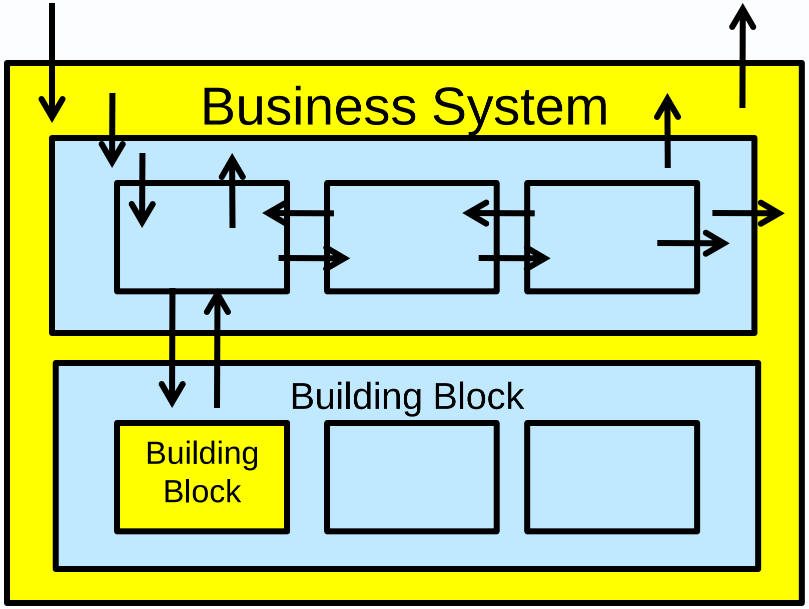
- a subsystem or actor of any kind, including human and computer actors.
- may be coarse-grained or fine-grained
- can realise one or more services
  - on its own or in collaboration with others
- can play the
  - client role of service requester and/or
  - server role of service provider.





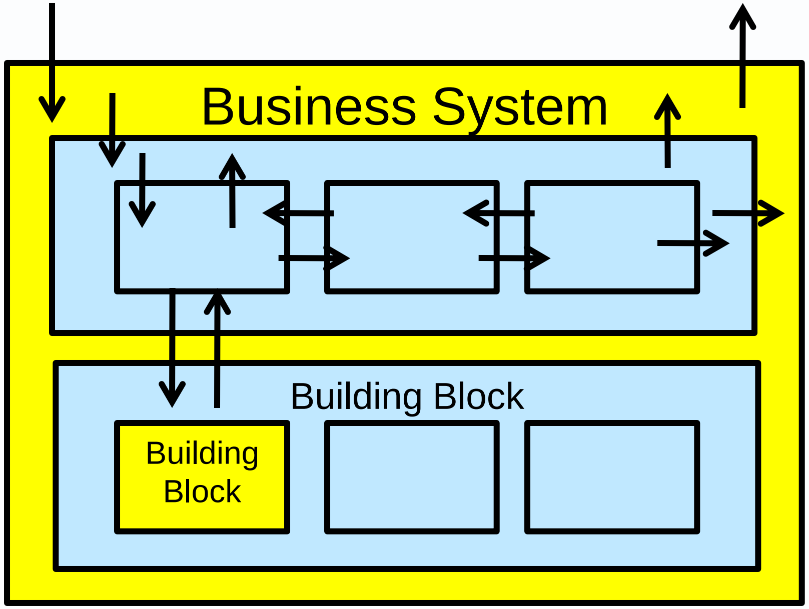
Service or Building Block? Which is bigger?

- Services may be long or short
  - One long service (e.g. package delivery) may require the participation of very many BBs.



The trouble with “building block” and “service”

- Changes in successive versions of the standard have left the terms ambiguous.
- In this presentation
- **building block** and **component** are synonyms
- **service** is an *external view* of processes



Abstraction in TOGAF

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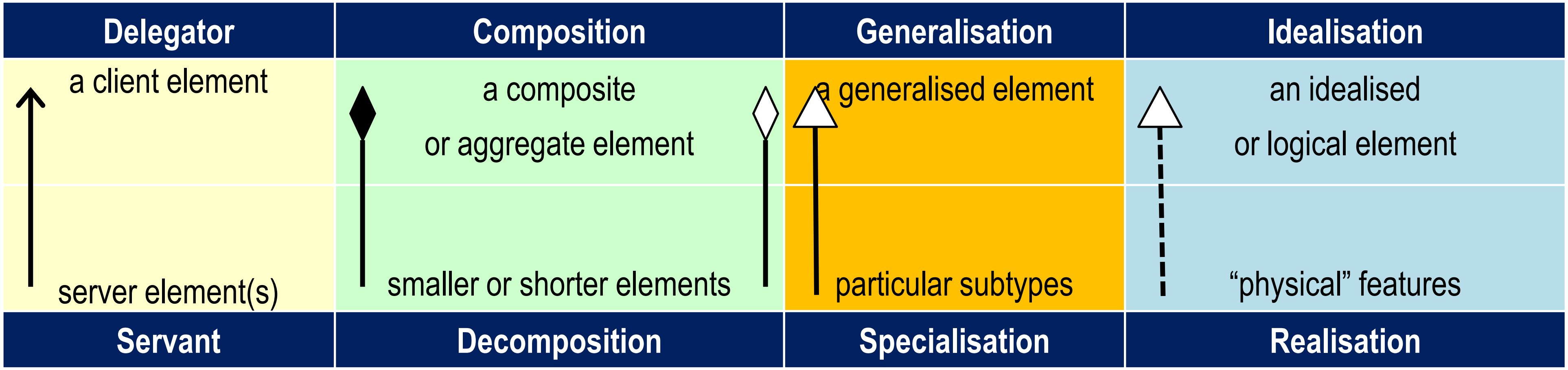
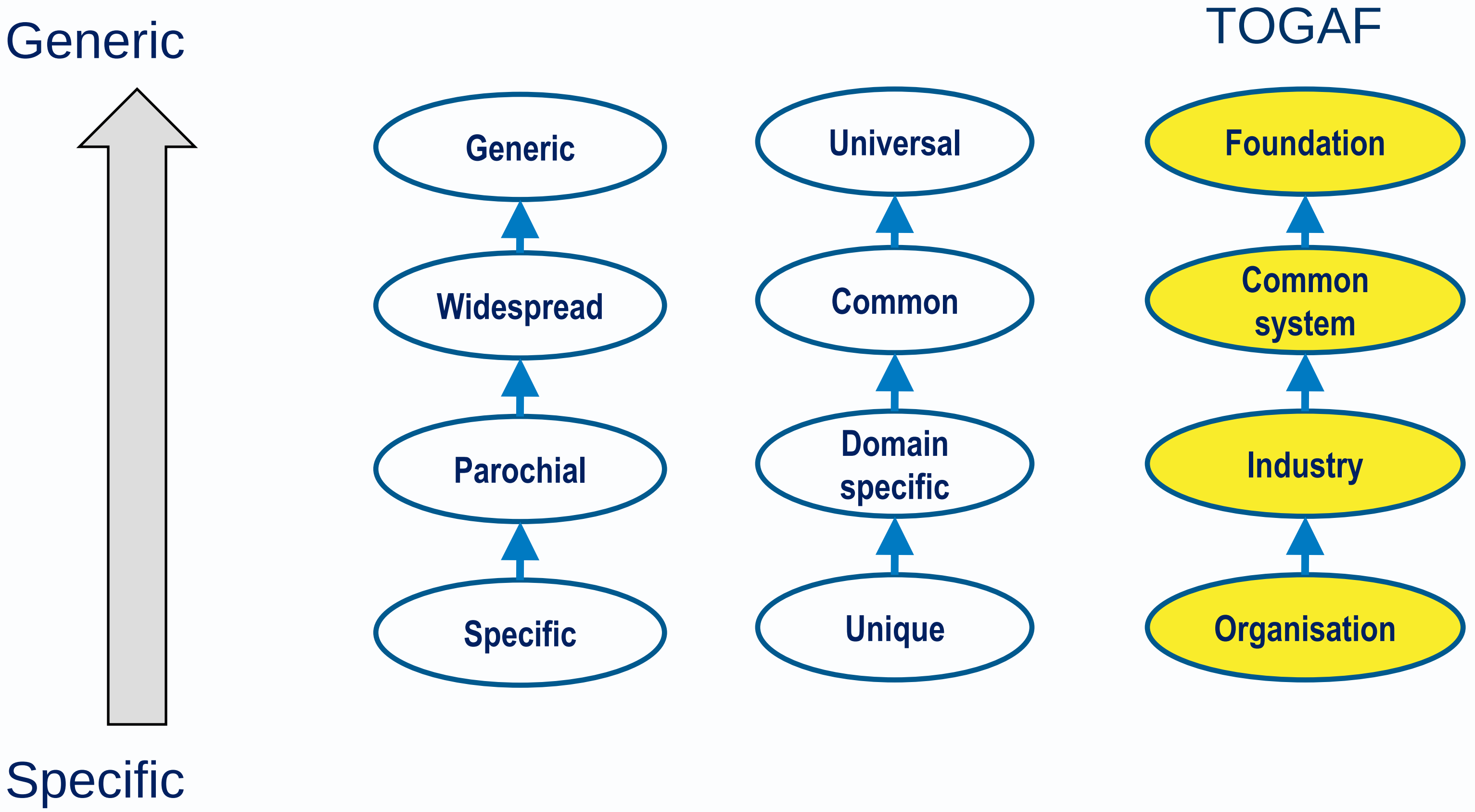
Abstraction in ArchiMate and TOGAF

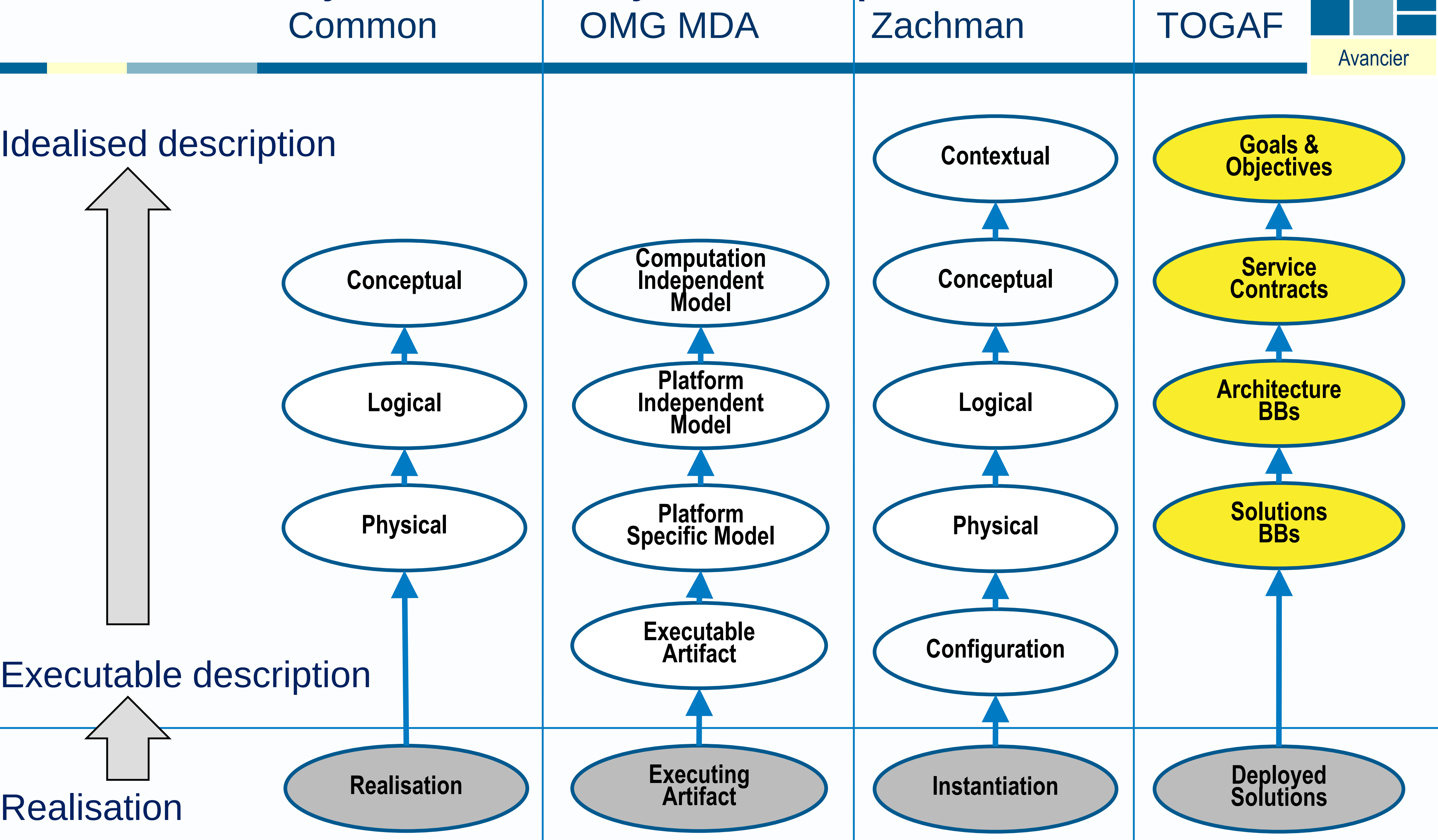


Delegator	Composition	Generalisation	Idealisation
a client element	a composite or aggregate element	a generalised element	an idealised or logical element
server element(s)	smaller or shorter elements	particular subtypes	“physical” features
Servant	Decomposition	Specialisation	Realisation

Abstraction by generalisation of system description



Abstraction by idealisation of system description



TOGAF’s Enterprise Continuum

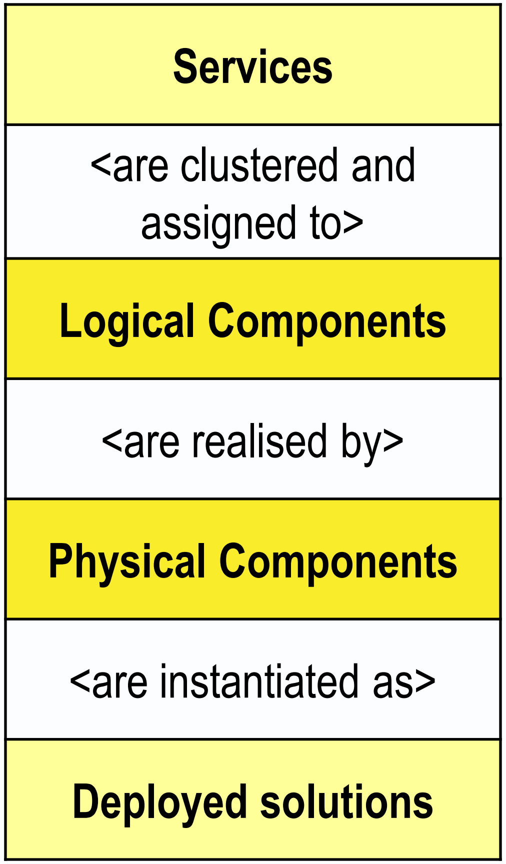
Generalisation Idealisation	Foundation	Common system	Industry	Organisation
Requirements and context Service Contracts				
Architecture continuum Architecture BBs				
Solution continuum Solutions BBs				
Deployed solutions Deployed Solutions				

Level of idealisation in TOGAF’s Enterprise Continuum

Generalisation Idealisation	Foundation	Common system	Industry	Organisation
Requirements and context Service Contracts	Architecture Requirements Specification includes Business and Application/IS **Services contracts.**			
Architecture continuum Architecture BBs	**Logical** Components are defined by the services they provide to each other and to external entities, also by the abilities and data resources they need.			
Solution continuum Solutions BBs	**Physical** Components are procurable; they can be hired, bought or built to realise Logical Components, and so deliver the required Services.			
Deployed solutions Deployed Solutions	**Real world** components are employed or deployed to do work at run-time (might be called Operational Components).			

The content framework is based on a generic relation

Idealised description



Services

<are clustered and assigned to>

Logical Components

<are realised by>

Physical Components

<are instantiated as>

Deployed solutions

Realisation

- Logical: “An implementation-independent definition" , portable and supplier-neutral.
- Physical: “A description of a real-world entity”, still “considerably abstracted from implementation“.

TOGAF generic relation

			Logical ABBs		Physical SBBs
	Services	<are clustered and assigned to>	Logical Components	<are realised by>	Physical Components
Business Service/ Function catalog	Business Services		Functions		Organization Units
Role catalog + Actor/Role matrix	Activities		Roles		Actors
Application portfolio catalog	IS Services		Logical Application Components		Physical Application Components
Technology portfolio catalog	Technology Services		Logical Technology Components		Physical Technology Components

The service to component relationship

- TOGAF encourages architects
- to assign the responsibility for one service to one component and
- to minimise duplication of service provision by different components.

N Business Services	**<are clustered and assigned to>**	**1 Function**
N IS Services	**<are clustered and assigned to>**	**1 Logical Application Component**
N Technology Services	**<are clustered and assigned to>**	**1 Logical Technology Components**

- However, a component can delegate work to other components. So,
- one component may perform many services, and
- one service may be performed by many components.

The logical component to physical component relationship

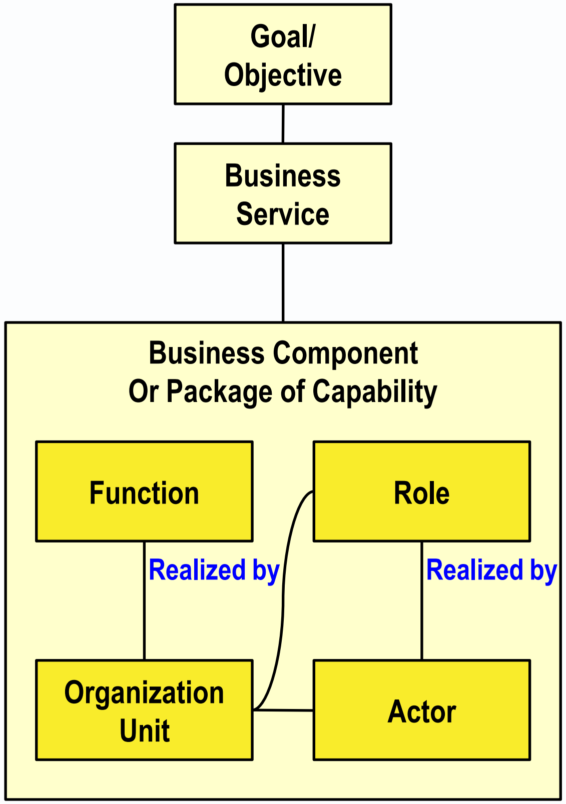
- In the application and technology domains, the ideal is a 1-to1 relation

1 Logical Application Component	IDEALLY <realised by>	1 Logical Application Component
1 Logical Technology Components	IDEALLY <realised by>	Logical Technology Component1

- In practice, the relationships may be more complex, or logical components may be reverse-engineered to keep the relationship simple.

The Logical/Physical distinction in the business domain

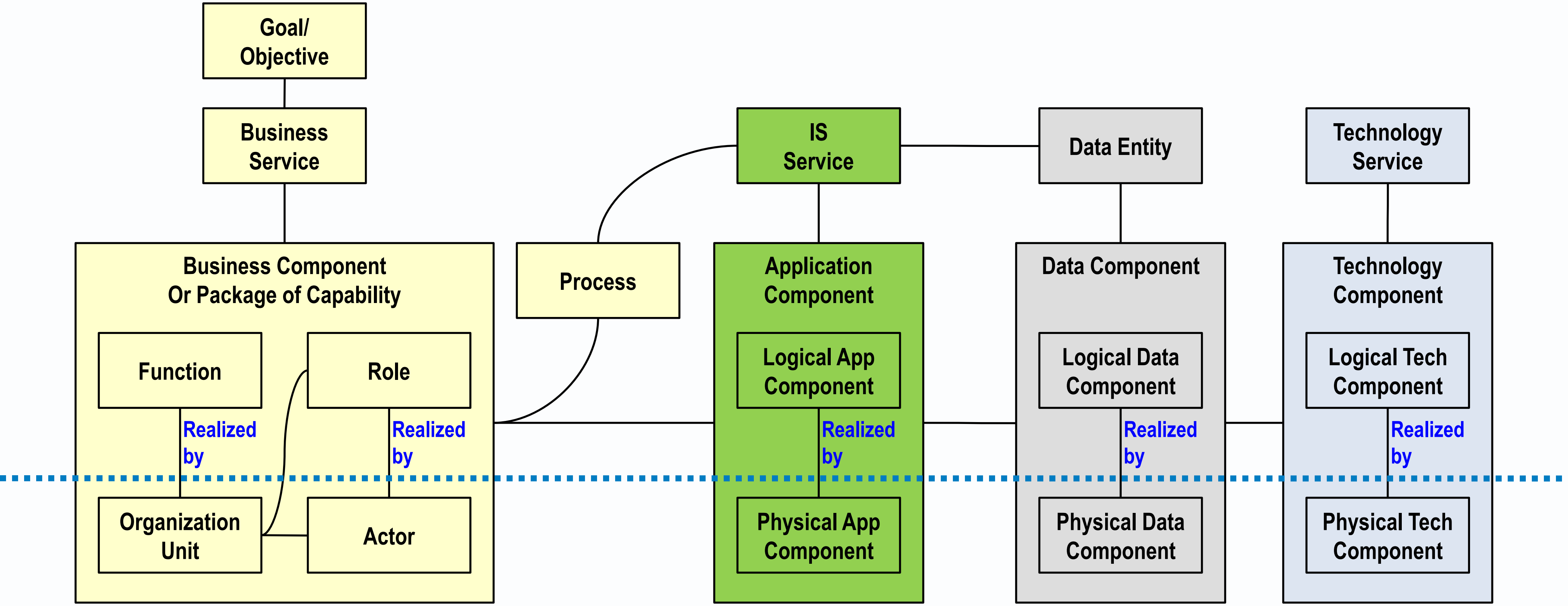
- Functions are logical organization units
- Organization units realize Functions



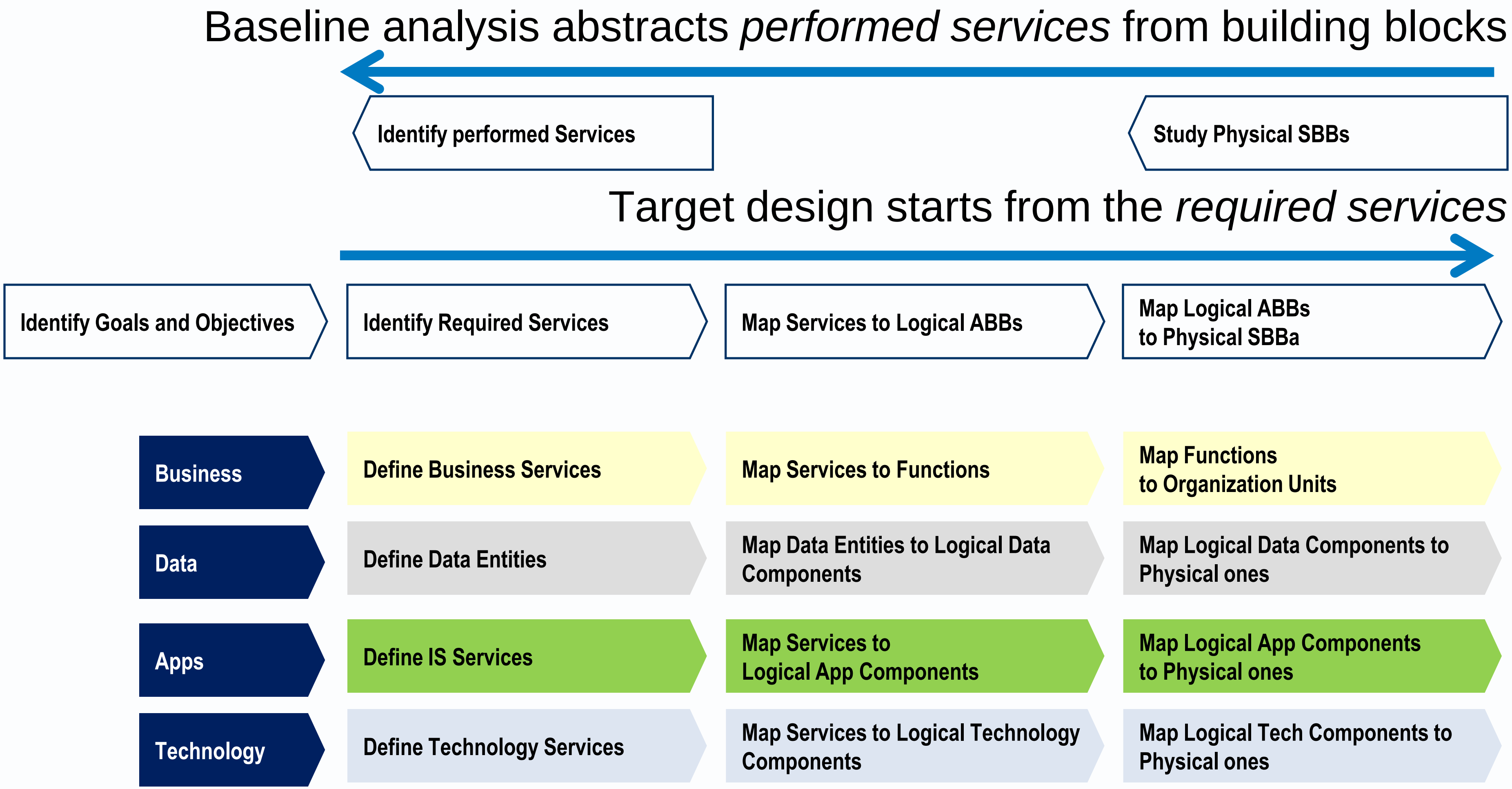
- Roles are logical Actors
- Actors realize Roles

The Logical/Physical distinction in other domains

- Strictly, Architecture BBs don't perform Processes or deliver Services.
- They specify Solution BBs that can do those things, and realize the Architecture BBs



The general approach in TOGAF



Baseline analysis abstracts *performed services* from building blocks

Identify performed Services

Study Physical SBBs

Target design starts from the *required services*

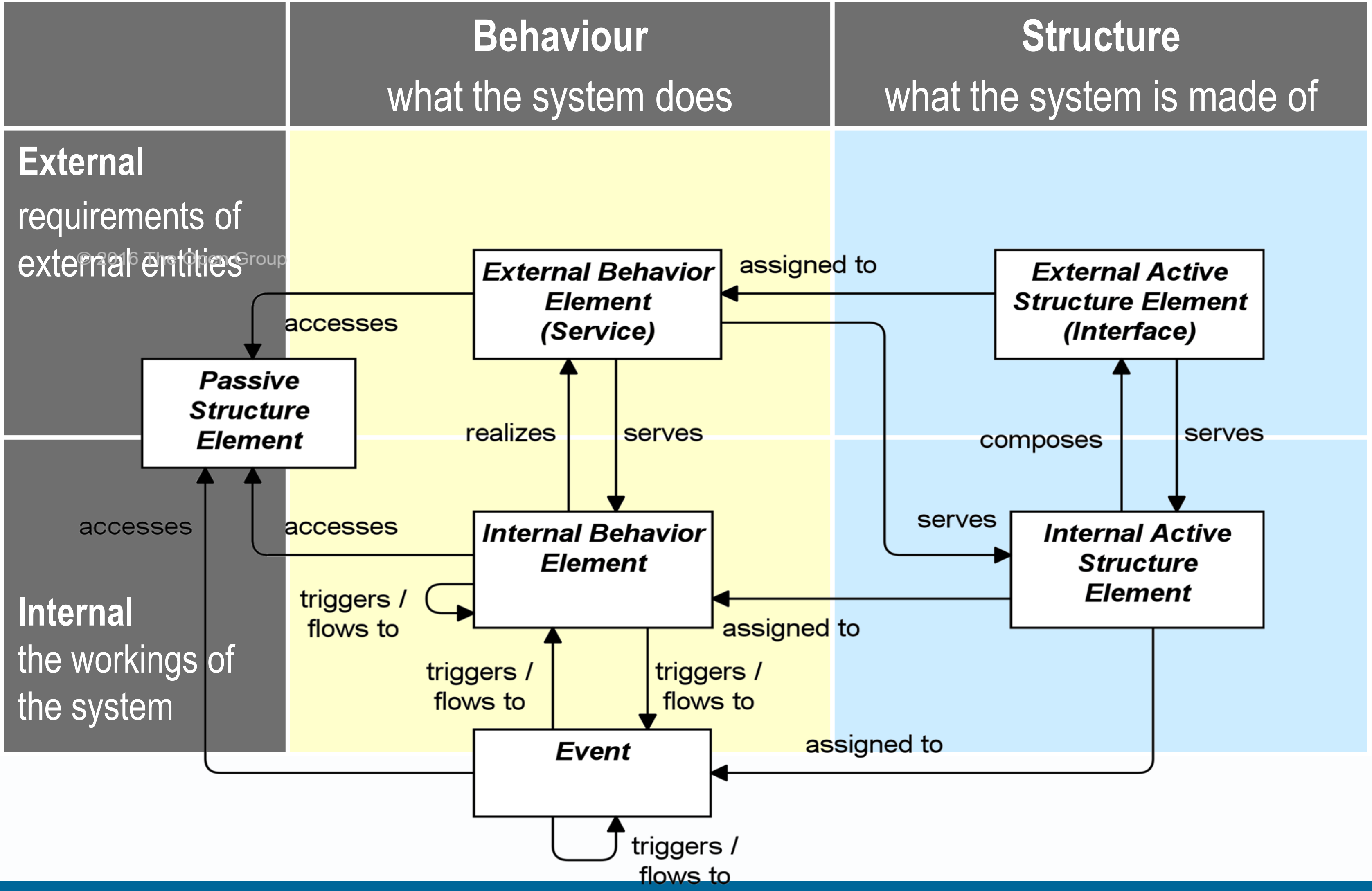
Identify Goals and Objectives	Identify Required Services	Map Services to Logical ABBs	Map Logical ABBs to Physical SBBa
Business	Define Business Services	Map Services to Functions	Map Functions to Organization Units
Data	Define Data Entities	Map Data Entities to Logical Data Components	Map Logical Data Components to Physical ones
Apps	Define IS Services	Map Services to Logical App Components	Map Logical App Components to Physical ones
Technology	Define Technology Services	Map Services to Logical Technology Components	Map Logical Tech Components to Physical ones

The generic meta model that underpins ArchiMate

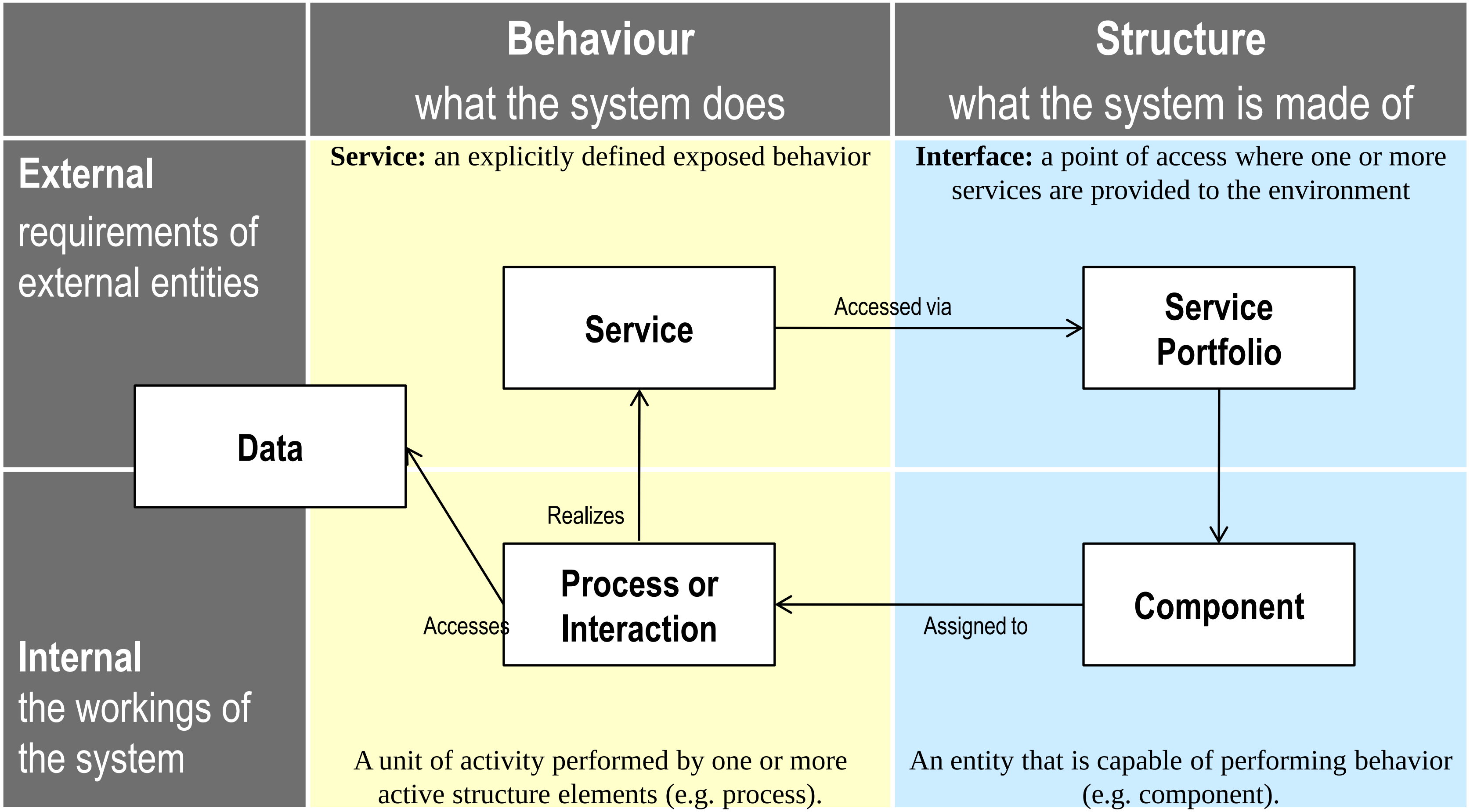
1. The initial direction to EA
2. What is a business system?
3. Service-orientation in the TOGAF standard
4. Abstraction in TOGAF
5. **The generic meta model that underpins ArchiMate**
6. Mapping terms in the two standards
7. What is the function/process distinction?
8. Data architecture in TOGAF
9. Mapping the concepts to TOGAF artifacts
10. An alternative Business Architecture approach

ArchiMate generic meta model

Avancier


Behaviour
what the system does
Structure
what the system is made of
External
requirements of external entities
Internal
the workings of the system
External Behavior Element (Service)
External Active Structure Element (Interface)
Passive Structure Element
Internal Behavior Element
Internal Active Structure Element
Event
assigned to
accesses
realizes
serves
composes
serves
serves
accesses
accesses
triggers / flows to
assigned to
triggers / flows to
triggers / flows to
assigned to
triggers / flows to

ArchiMate generic meta model - simplified



Behaviour
what the system does

Structure
what the system is made of

External
requirements of external entities

Internal
the workings of the system

Service: an explicitly defined exposed behavior

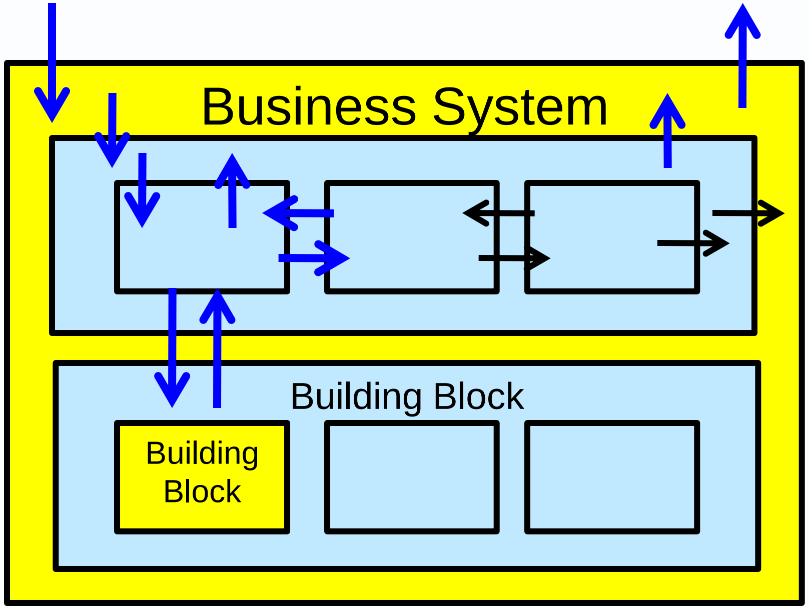
Interface: a point of access where one or more services are provided to the environment

A unit of activity performed by one or more active structure elements (e.g. process).

An entity that is capable of performing behavior (e.g. component).

Recursive architecture description

- Both building blocks and services are recursively composed
- One building block perform many services
- One service may require many building blocks (be they nested or sequential).



Mapping terms in the two standards

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7. What is the function/process distinction?
8. Data architecture in TOGAF
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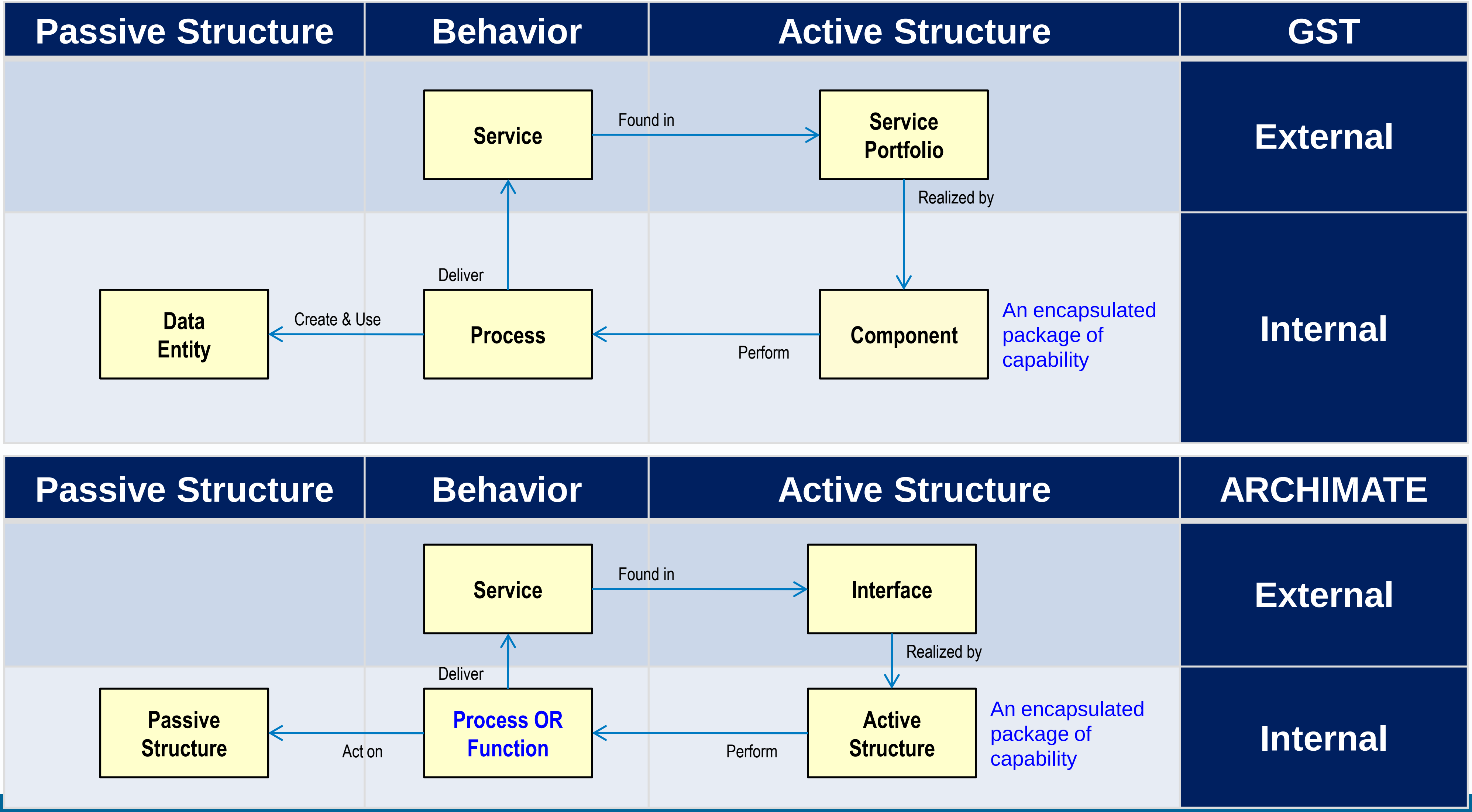
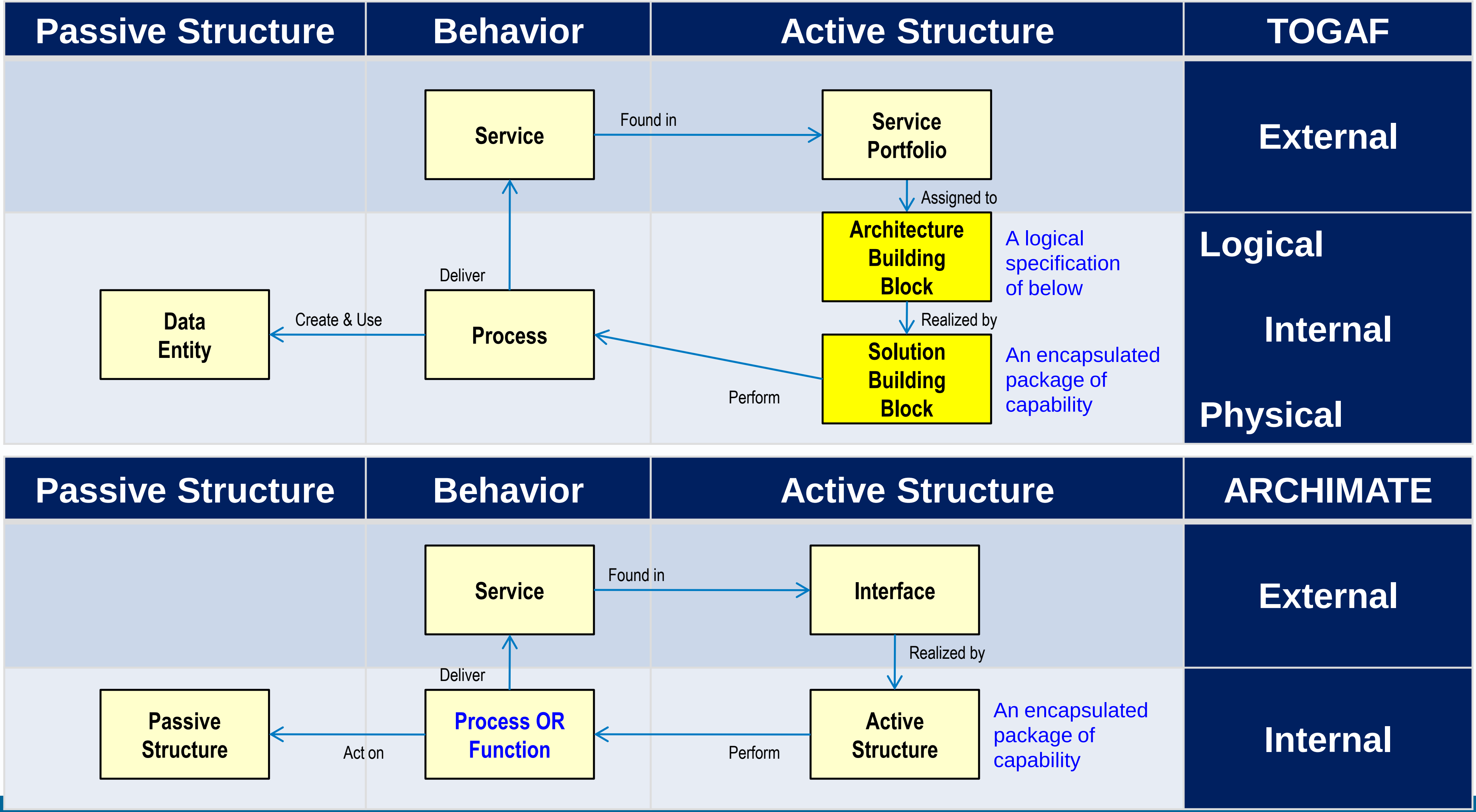
Mapping ArchiMate to General System Theory



Passive Structure	Behavior	Active Structure	GST
	Service	Service Portfolio	External
Data Entity	Process	Component An encapsulated package of capability	Internal

Passive Structure	Behavior	Active Structure	ARCHIMATE
	Service	Interface	External
Passive Structure	Process OR Function	Active Structure An encapsulated package of capability	Internal

Mapping TOGAF to ArchiMate



Passive Structure

Behavior

Active Structure

TOGAF

Service

Found in

Service Portfolio

External

Assigned to

Architecture Building Block

A logical specification of below

Logical

Internal

Deliver

Data Entity

Create & Use

Process

Realized by

Solution Building Block

An encapsulated package of capability

Perform

Physical

Passive Structure

Behavior

Active Structure

ARCHIMATE

Service

Found in

Interface

External

Realized by

Deliver

Passive Structure

Act on

Process OR Function

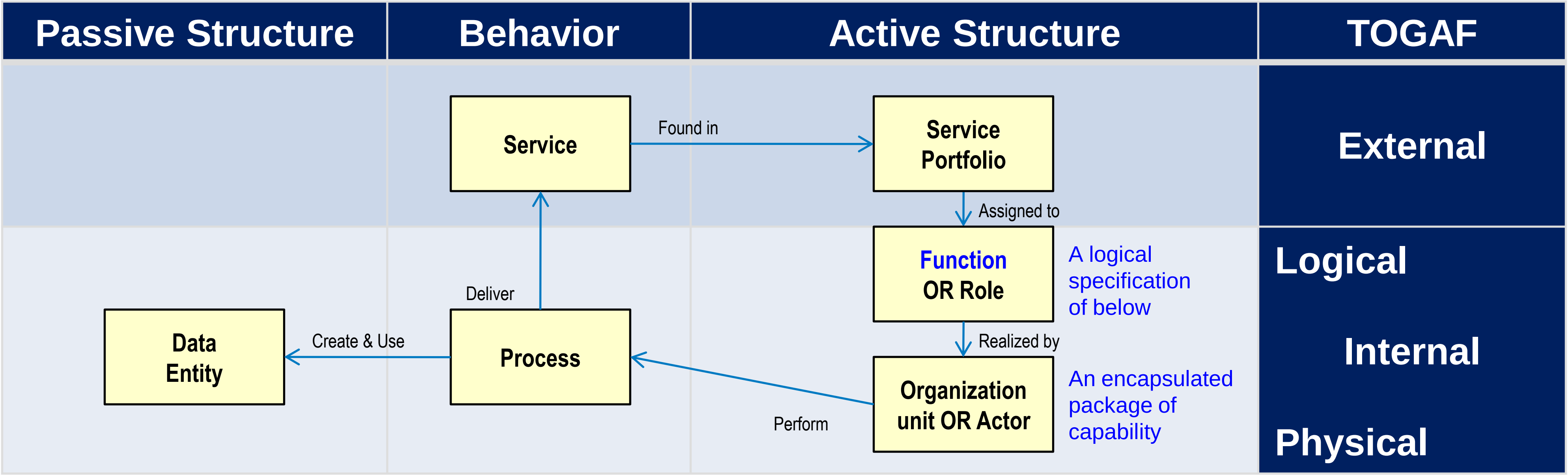
Perform

Active Structure

An encapsulated package of capability

Internal

Putting Function in its rightful place



Passive Structure | Behavior | Active Structure | TOGAF

Service —Found in→ Service Portfolio

Service Portfolio —Assigned to→ Function OR Role

Function OR Role —Realized by→ Organization unit OR Actor

Process —Deliver→ Service

Process —Create & Use→ Data Entity

Organization unit OR Actor —Perform→ Process

Function OR Role: A logical specification of below

Organization unit OR Actor: An encapsulated package of capability

External

Logical

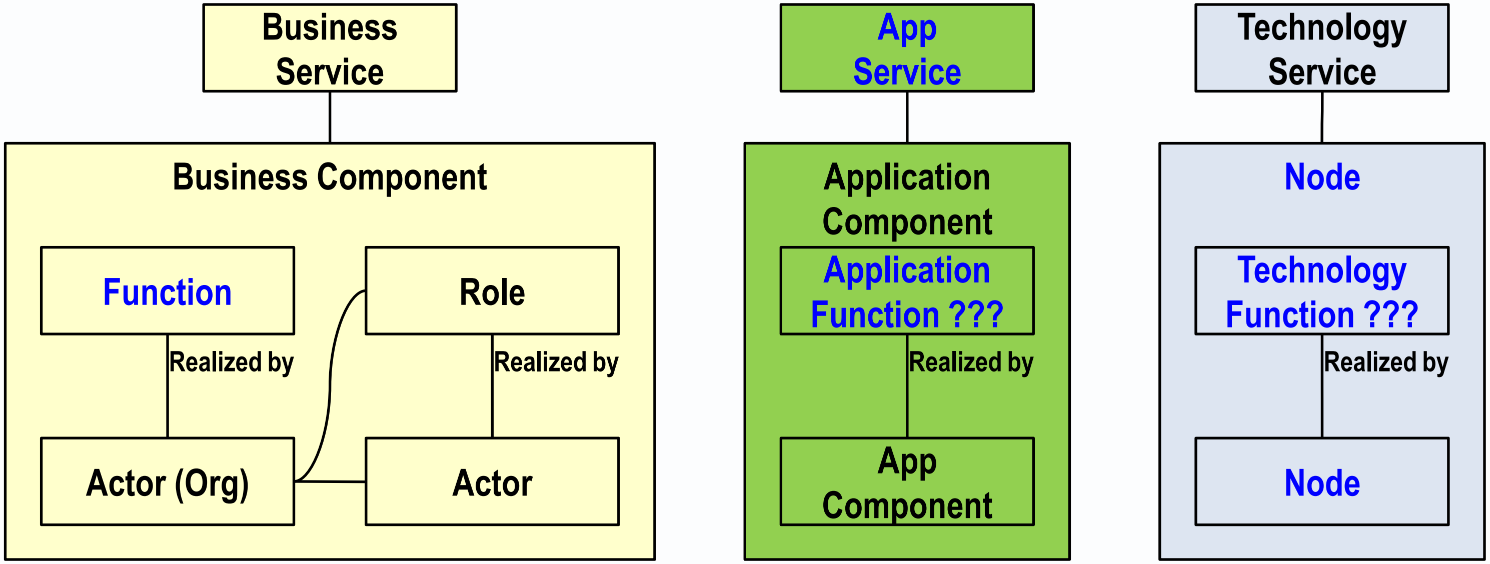
Internal

Physical

- ArchiMate’s structure/behavior distinction is peculiar
- The standard examples and users often apply the Function symbol to a Process (which can confuse, since Functions are more like Roles than Processes).

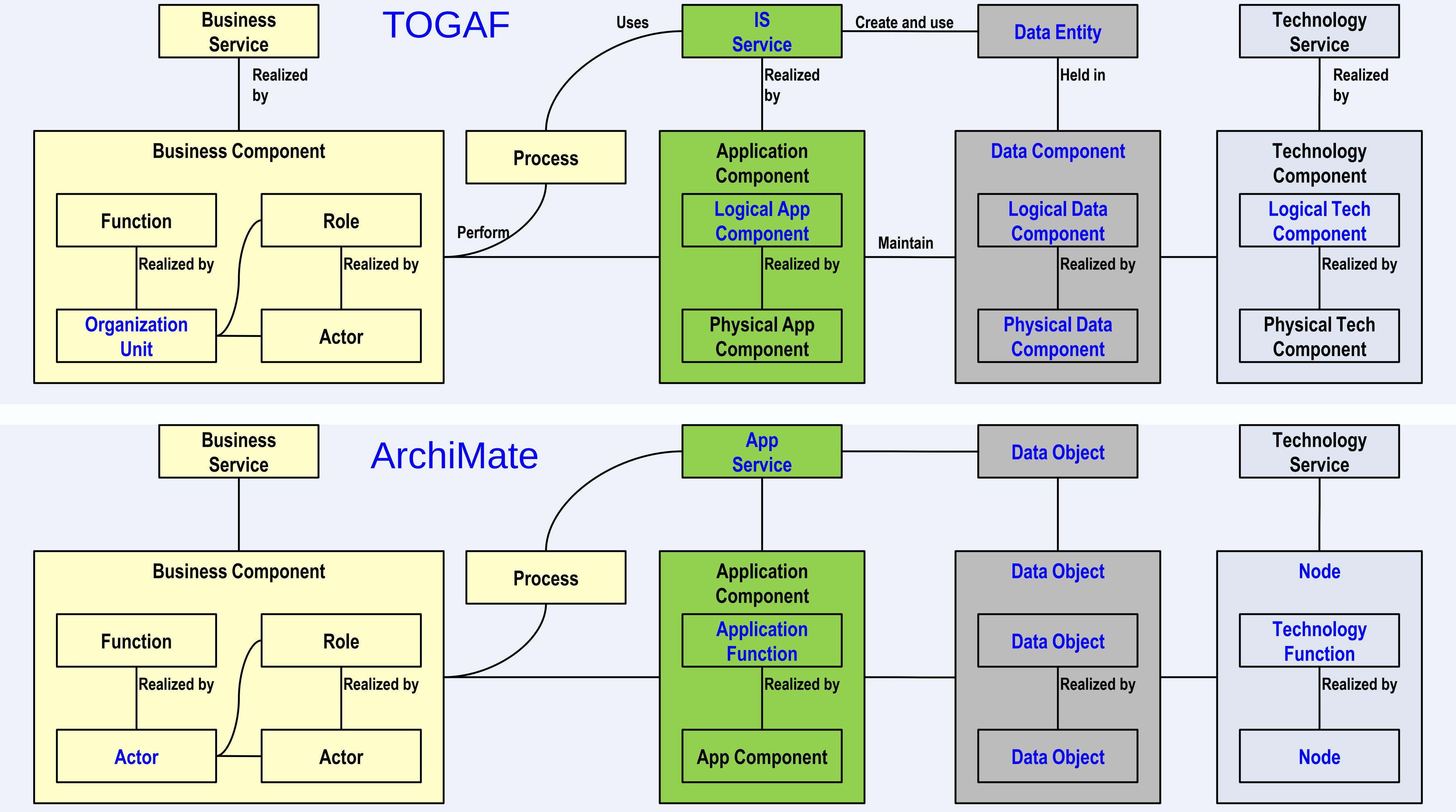
Mapping ArchiMate to TOGAF

- Label Logical Components using ArchiMate's "Function" symbol?



- OK. Provided this caveat is understood
  - ArchiMate standard and users use the Function symbol for a Process instead
  - Logical components in TOGAF (defined by service portfolios) might be seen as closer to ArchiMate's Interface.

Mapping ArchiMate to TOGAF



Terminology torture – aargh!

Generic	Behavior Units	Logical Active Structures	Physical Active Structures
Human	Activities	Roles	Actors
TOGAF	**Services**	Logical Components	Physical Components
UML	Operations	Interfaces or **Services**	Components
WSDL	Operations	Web **Services**	Components
Fashion	Operations	APIs	Micro**Services**

What is the function/process distinction?

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6. Mapping terms in the two standards
7. **What is the function/process distinction?**
8. Data architecture in TOGAF
9. Mapping the concepts to TOGAF artifacts
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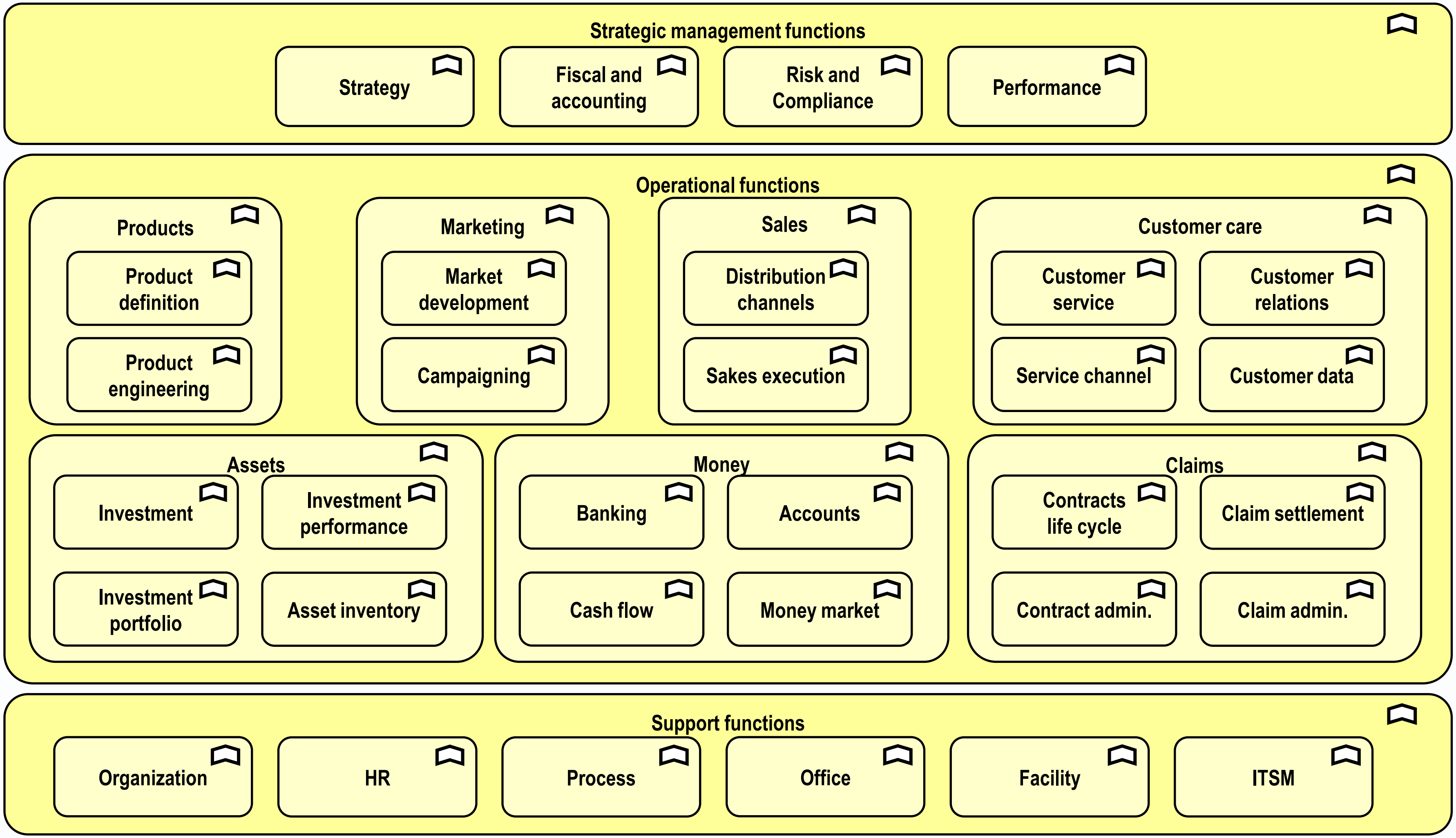
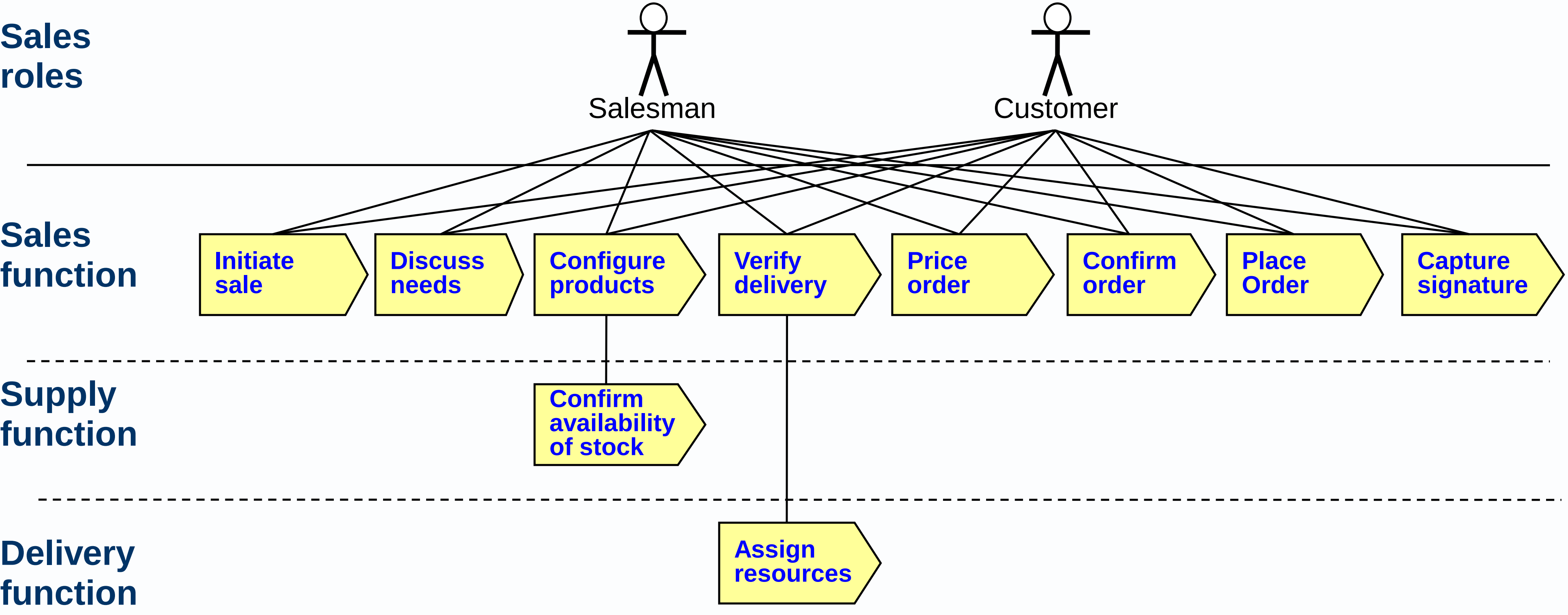
A 3 level Functional Decomposition Structure

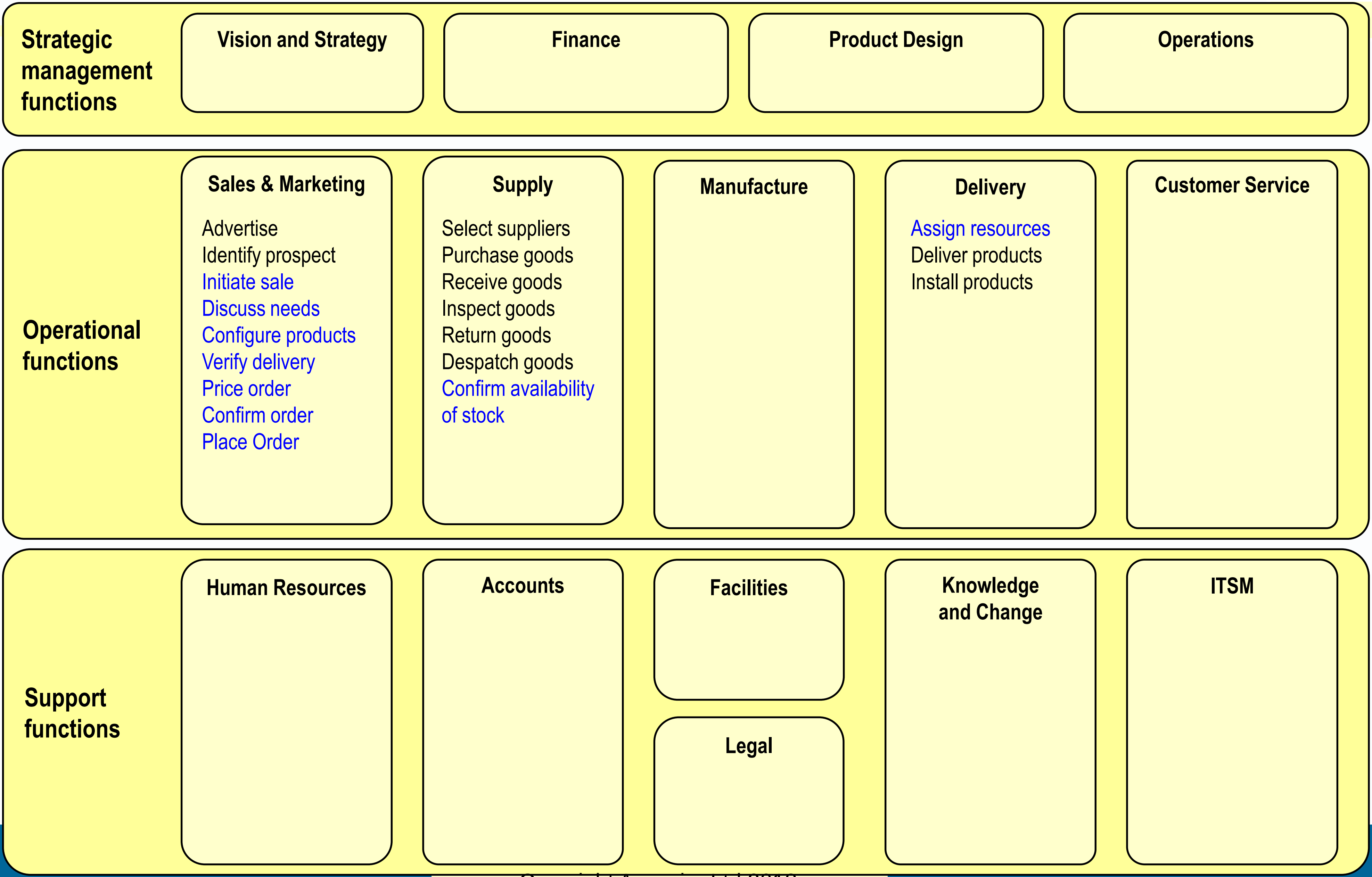


This diagram uses ArchiMate symbols

A process – sequencing atomic activities in a flow



Mapping atomic activities to 2nd level nodes of a functional decomposition



Strategic management functions

- **Vision and Strategy**
- **Finance**
- **Product Design**
- **Operations**

Operational functions

Sales & Marketing

Advertise
Identify prospect
Initiate sale
Discuss needs
Configure products
Verify delivery
Price order
Confirm order
Place Order

Supply

Select suppliers
Purchase goods
Receive goods
Inspect goods
Return goods
Despatch goods
Confirm availability of stock

Manufacture

Delivery

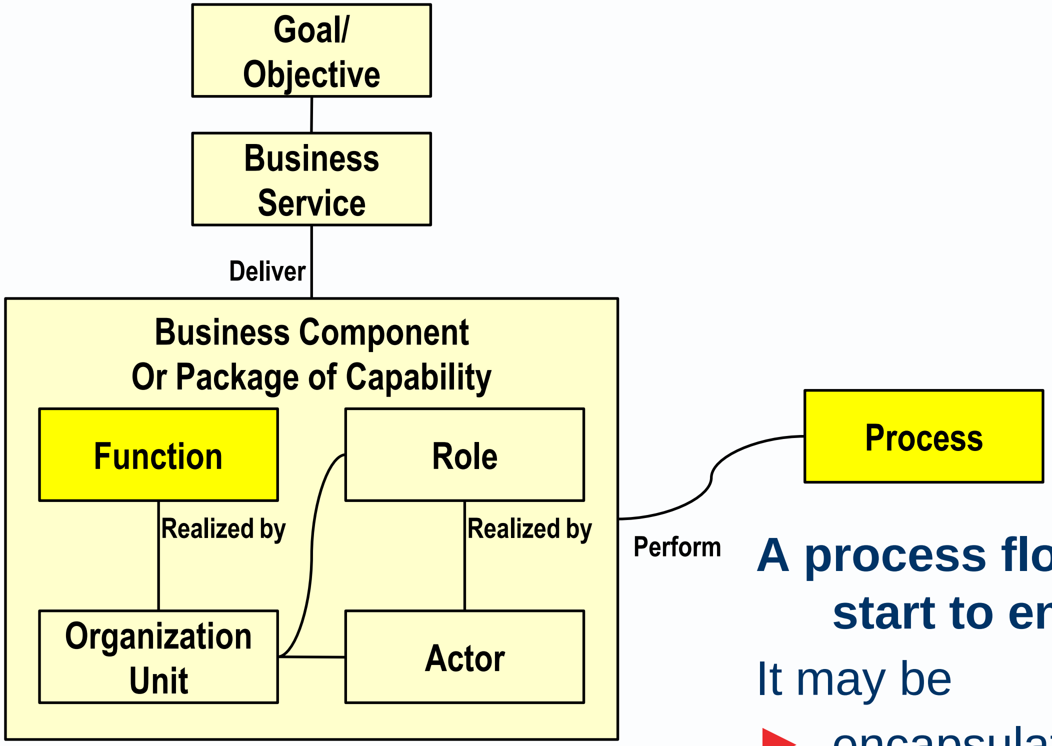
Assign resources
Deliver products
Install products

Customer Service

Support functions

- **Human Resources**
- **Accounts**
- **Facilities**
- **Legal**
- **Knowledge and Change**
- **ITSM**

The Function/Process distinction



A function is a package of capability

It can be bounded by a service portfolio

A process flows over time from start to end.

It may be

- encapsulated by one service.
- one of several processes needed to deliver one service.
- contribute to the delivery of more than one service

Data architecture in TOGAF

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7. What is the function/process distinction?
8. **Data architecture in TOGAF**
9. Mapping the concepts to TOGAF artifacts
10. An alternative Business Architecture approach

Data architecture in TOGAF

- Data architecture is about
  - data at rest (in store)
  - data in motion (in flows).

- What TOGAF classifies under data architecture are artifacts that record the creation and use of data entities in persistent data components.

Data entity/data component catalog	Data entities	<are related together in>	Logical Data Components	<are realised by	Physical Data Components

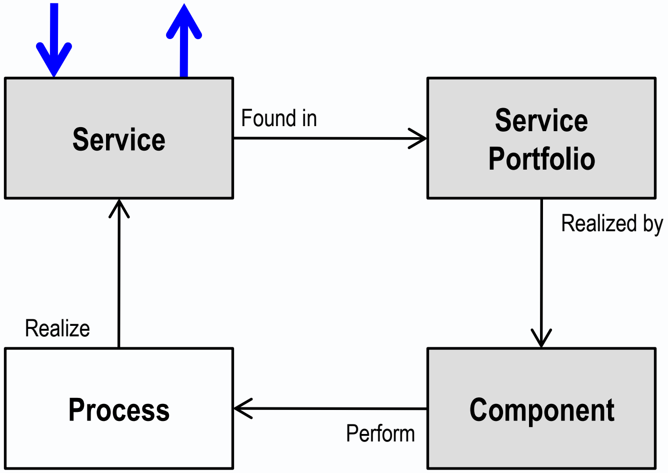
- What about data flows?

The Flow concept implicit in TOGAF artifacts

- Service
  - *“can be defined in a logical service contract that defines input and output flows and/or state changes.”*

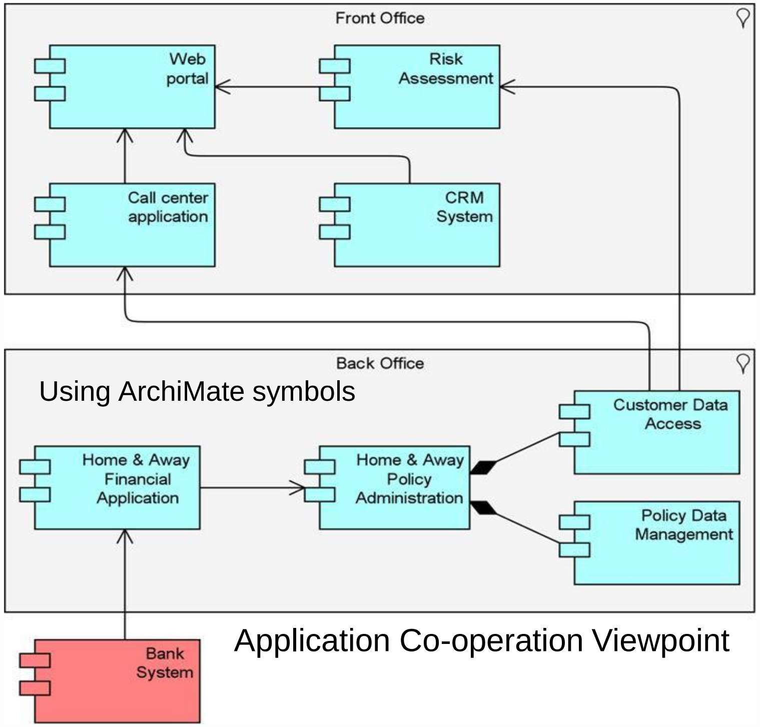
- Flow
  - □ A movement of a data and/or material structure between sender and receiver components.

- Q) What about flows that architects choose not specify in service contracts?



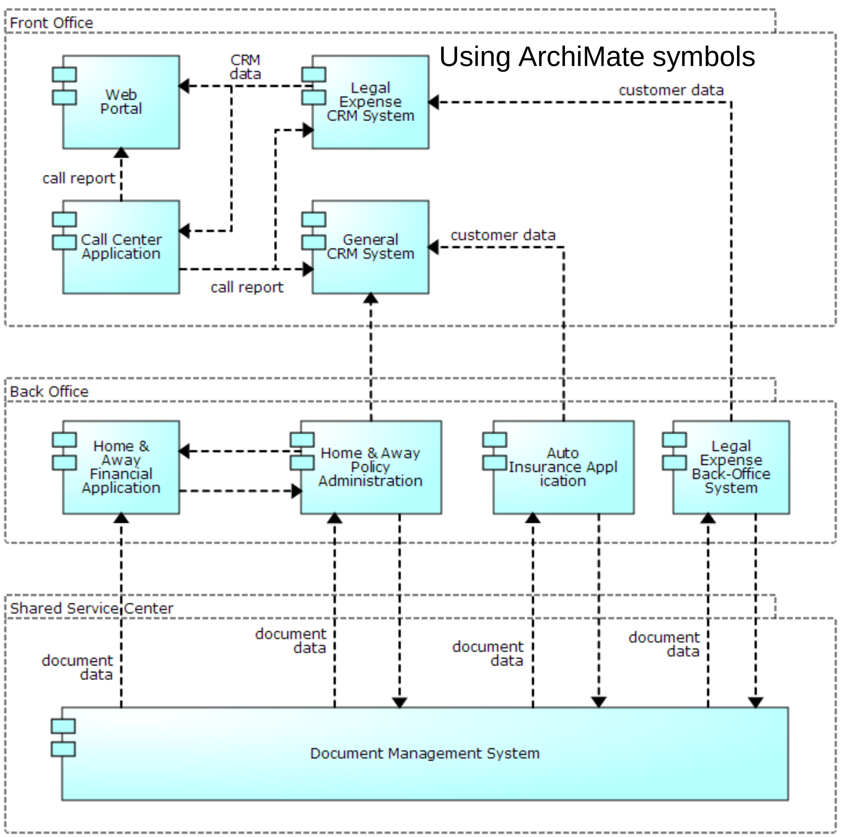
Services v data flows in architecture artifacts

- Different concepts, related, but difficult to combine in an artifact



Using ArchiMate symbols

Application Co-operation Viewpoint



Using ArchiMate symbols

Mapping the concepts to TOGAF artifacts

Avancier

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8. Data architecture in TOGAF
9. **Mapping the concepts to TOGAF artifacts**
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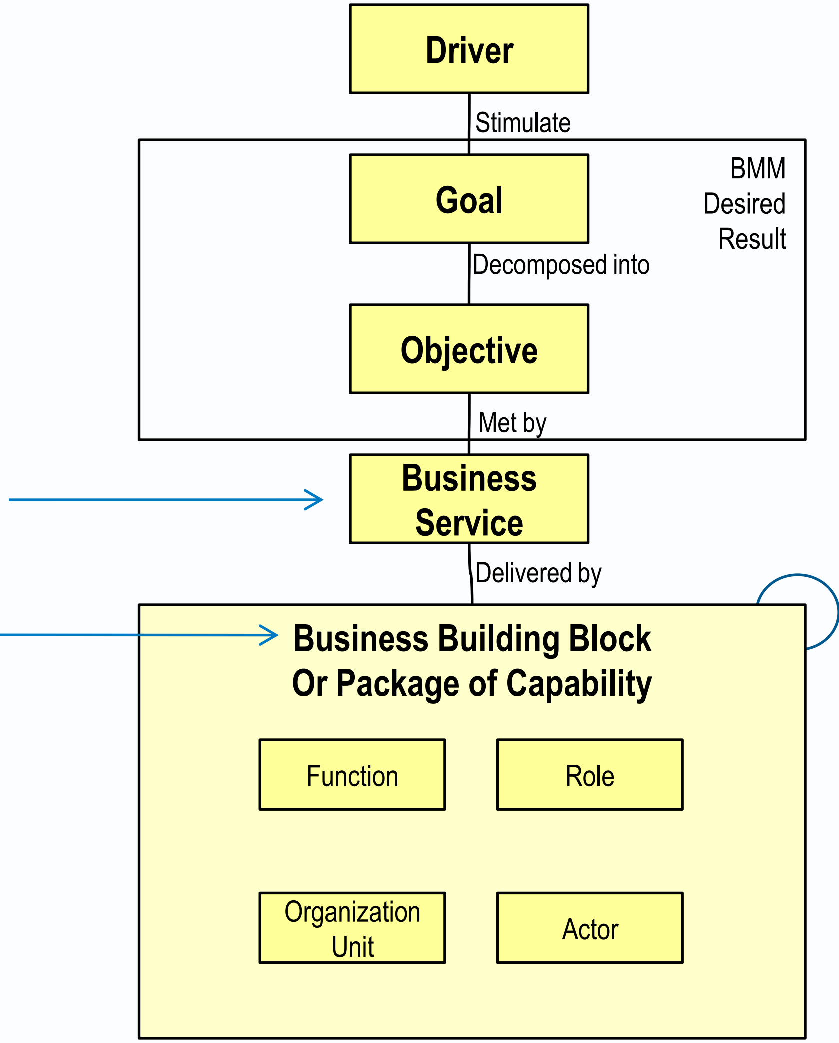
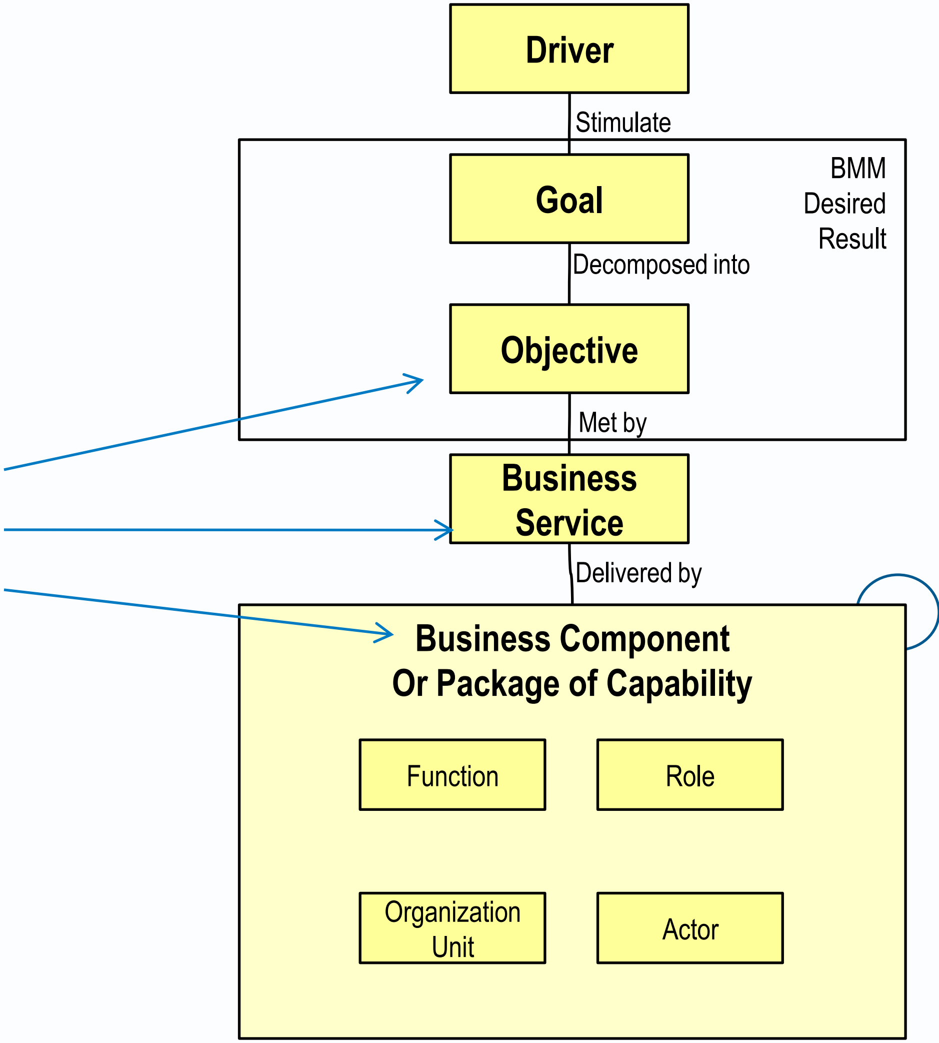
Remember terminology torture

- Cap Gemini call services building blocks
- Some call building blocks services

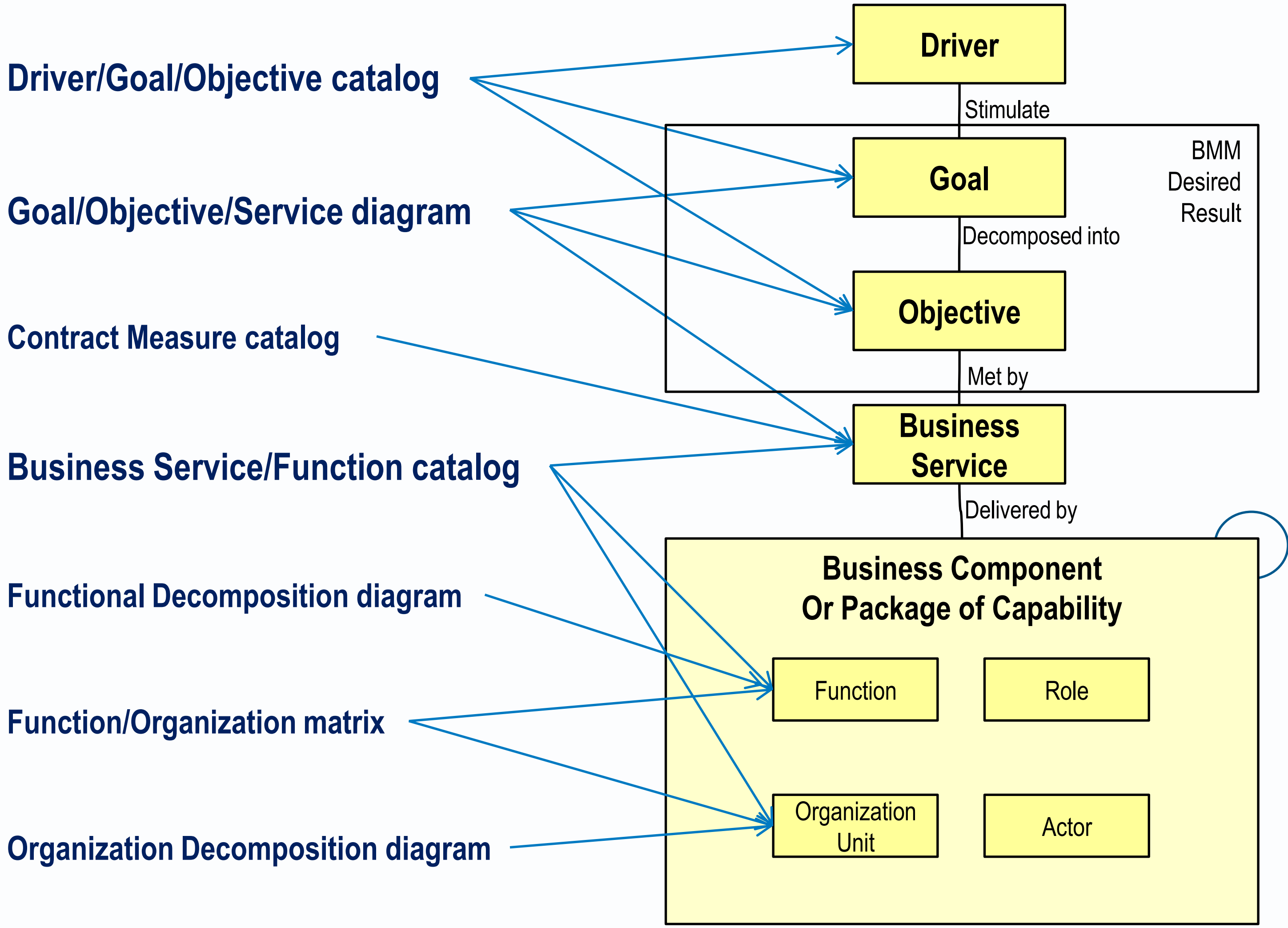


A service-oriented view of business building blocks

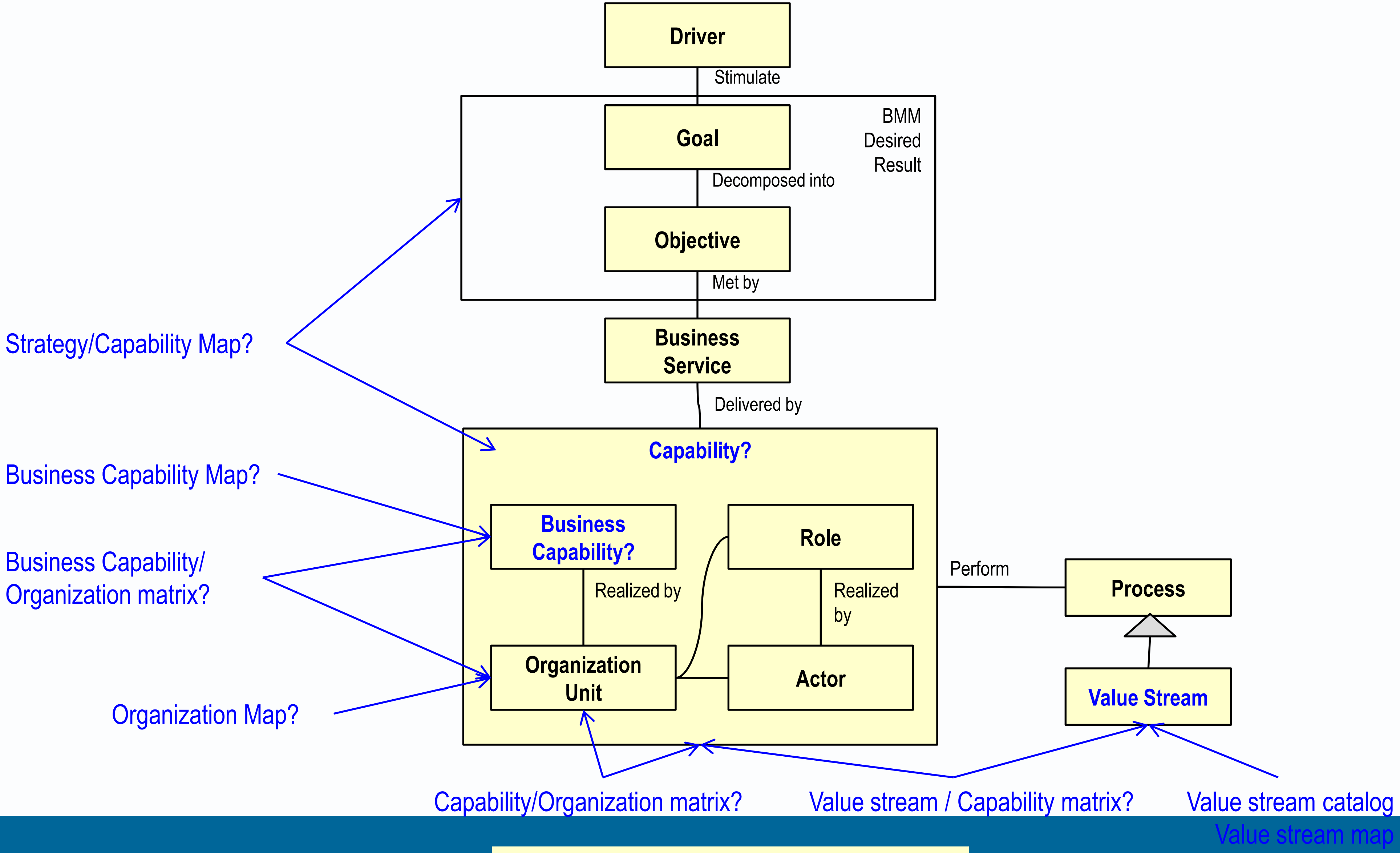
Objectives
met by services
performed by components



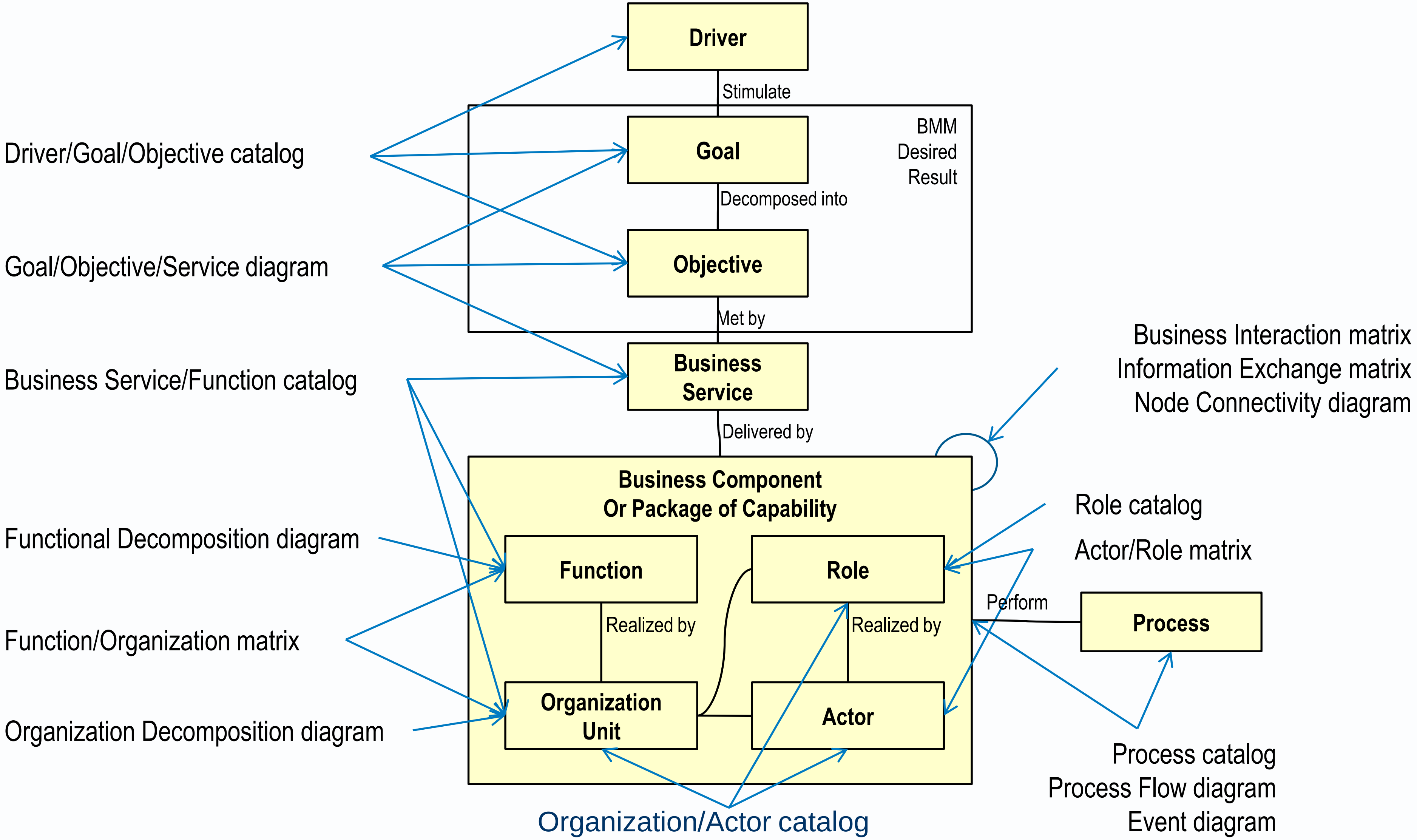
The start of a Business Architecture artifact map



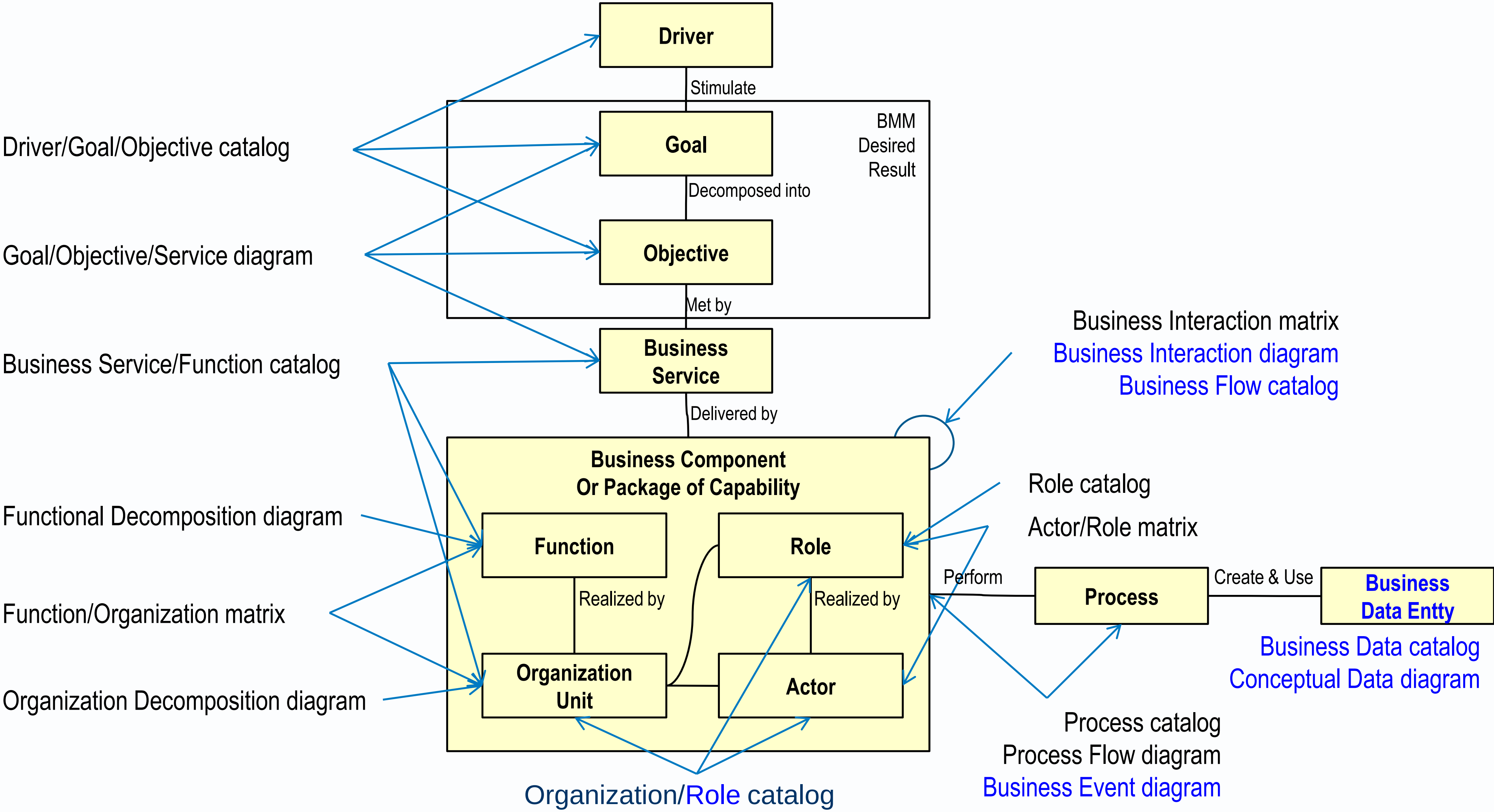
A BA artifact map with Capability and Value Stream artifacts?



A BA artifact map for TOGAF 9.1 and 9.2

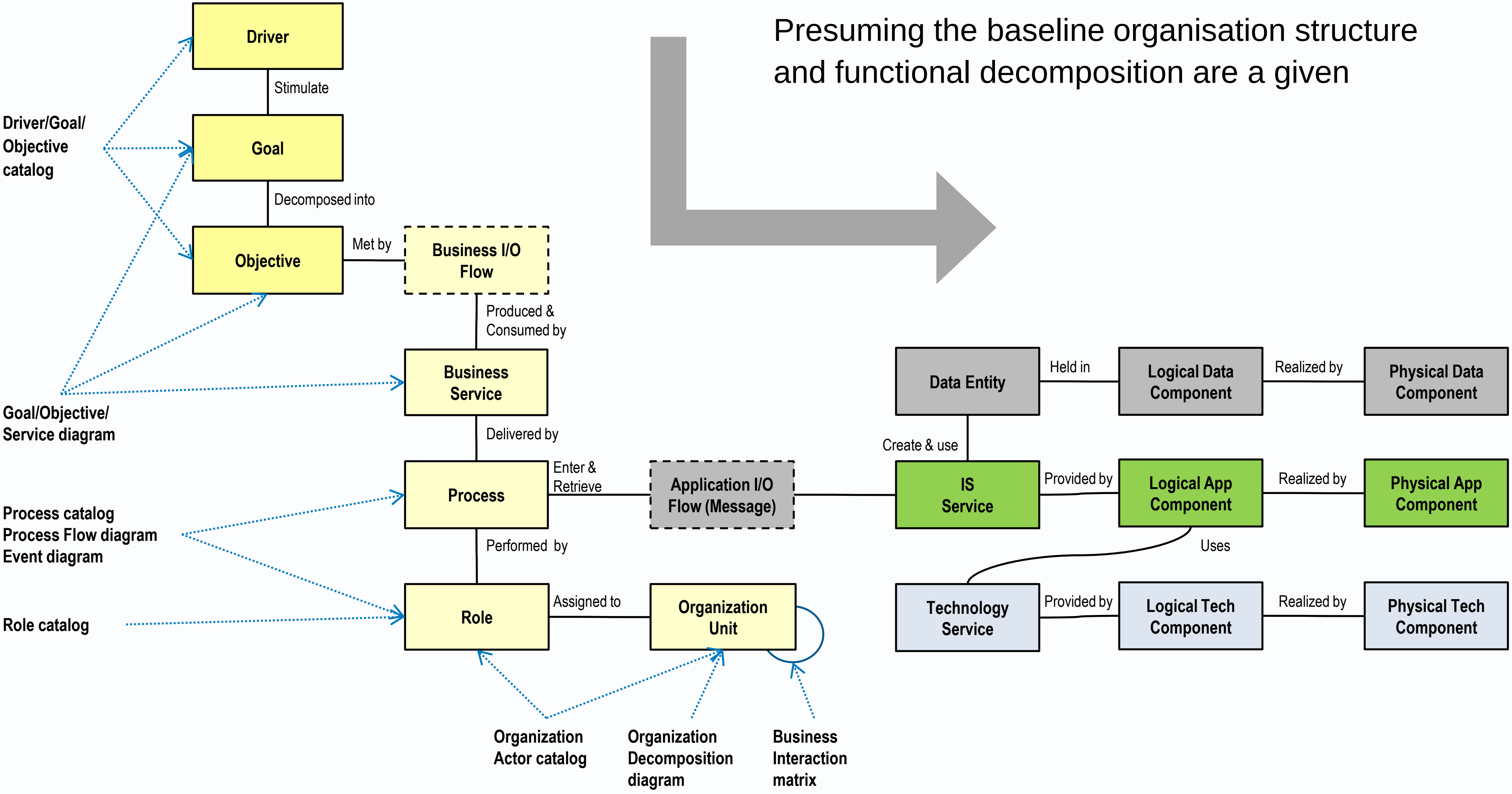

Driver
Stimulate
BMM
Desired
Result
Goal
Decomposed into
Objective
Met by
Business Service
Delivered by
Business Component
Or Package of Capability
Function
Role
Realized by
Realized by
Organization Unit
Actor
Perform
Process
Driver/Goal/Objective catalog
Goal/Objective/Service diagram
Business Service/Function catalog
Functional Decomposition diagram
Function/Organization matrix
Organization Decomposition diagram
Business Interaction matrix
Information Exchange matrix
Node Connectivity diagram
Role catalog
Actor/Role matrix
Process catalog
Process Flow diagram
Event diagram
Organization/Actor catalog

The same BA artifact map after some of the draft CRs



A possible solution design sequence

Presuming the baseline organisation structure and functional decomposition are a given



Read the associated paper for further discussion of

- In TOGAF
  - Architecture v solution building blocks
  - The generic relation
- In ArchiMate
  - Service v Process (same thing in IAF)
  - Service v Interface (same thing in UML)
  - Actor v Role (same thing in UML)
  - Process v Function (same thing in some sources)
  - Structure v Behavior (peculiar in ArchiMate)
  - Data Object v Business Object

Communication requires that

Speakers and hearers share an understanding of the concepts spoken words represent.

Drawers and readers share an understanding of the concepts diagrams symbols represent.

An alternative Business Architecture approach

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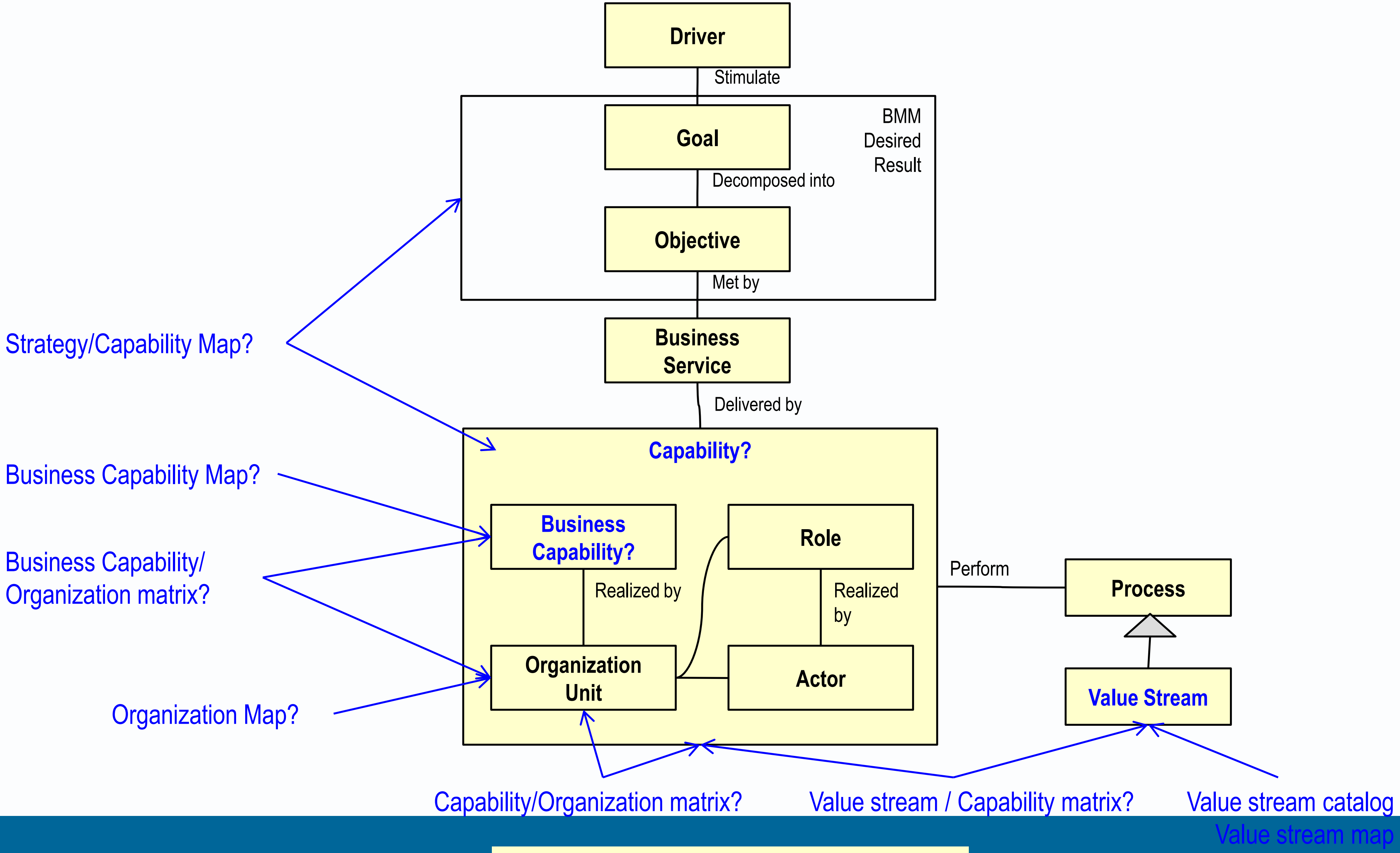
A BA artifact map with Capability and Value Stream artifacts?



Capability-oriented artifacts

- **Business Capabilities Catalog**
  - A definitive listing of particular abilities that a business may possess or exchange to achieve a specific **purpose.**
- **Business Capability Map**
  - A family of diagrams representing a definitive listing of the particular abilities that a business may possess or exchange to achieve a specific purpose.
- **Strategy/Capability Matrix**
  - The purpose of this matrix is to show the capabilities required to support specific strategy statements.
- **Organization Map**
  - A diagram showing the relationships between the primary entities that make up the enterprise, its partners, and stakeholders.
- **Capability/Organization Matrix**
  - The purpose of this matrix is to show the organization elements that implement each capability. The Capability/Organization matrix includes the following metamodel entities:
    - Business Capability, Value Stream, Organization Unit

About Capabilities and Purposes

- In the BMM, **Desired Result** is the catch all for **Goals** and **Objectives**
- In TOGAF, **Business Drivers > Goals > Objectives > Services**

- How does a Capability’s **Purpose** relate to the above?
- Can you have a Purpose without a Capability? Or are they 1 to 1?

About Capabilities and Building Blocks

- To perform its required behaviors, does every Building Block need a Capability?
  - If they are not 1 to 1, why not?
  - Where are Capabilities recorded?

- To perform its required behaviors, does every Business Function need a Business Capability?
  - If they are not 1 to 1, why not?
  - How does a Business Capability Map differ in purpose or use from a Functional Decomposition diagram?

Value stream-oriented artifacts

- **Value Stream Catalog**
  - A definitive listing of end-to-end collections of value-adding activities that create an overall **result** for a customer, stakeholder, or end user.
- **Value Stream Stages Catalog**
  - A definitive listing of end-to-end collections of the different stages for the value-adding activities that create an overall result for a customer, stakeholder, or end user; it includes the following metamodel entities:
  - Business Capability
  - Value Stream
- **Value Stream/Capability Matrix**
  - The purpose of this matrix is to show the capabilities required to support each stage of a value stream.
- **Value Stream Map**
  - A family of diagrams representing a definitive listing of end-to-end collections of value-adding activities that create an overall result for a customer, stakeholder, or end user.
  - The Value Stream map includes the following metamodel entities:
  - Business Capability
  - Value Stream

About Value Streams and Results

- In the BMM, **Desired Result** is the catch all for **Goals** and **Objectives**
- In TOGAF, **Business Drivers > Goals > Objectives > Services**

- How does a Value Stream's **Result** relate to the above?.
- Is a Value Stream's **Result**

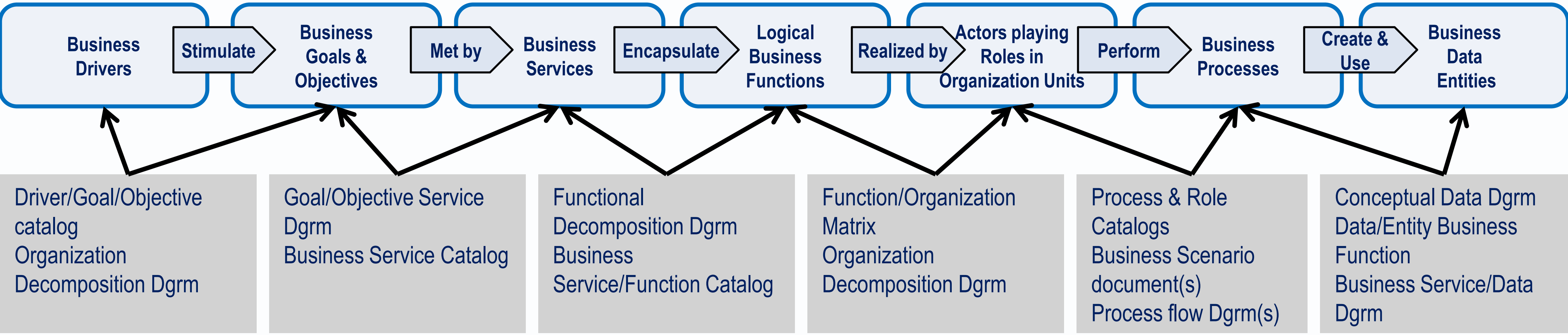
  a) the **exit condition** of the process (output flows and system state changes)?

  b) the desired outcome of those being used by some actor to meet some **goal** or **objective?**

- Can a Value Stream Stage be further decomposed?
- Does the Value Stream/Capability Matrix map to all Capabilities, or only to Business Capabilities?

Connecting artifacts together

- TOGAF does not prescribe which artifacts to produce
- Nor the sequence to produce them
- But the artifacts do connect together



Business Drivers

Stimulate

Business Goals & Objectives

Met by

Business Services

Encapsulate

Logical Business Functions

Realized by

Actors playing Roles in Organization Units

Perform

Business Processes

Create & Use

Business Data Entities

Driver/Goal/Objective catalog
Organization Decomposition Dgrm

Goal/Objective Service Dgrm
Business Service Catalog

Functional Decomposition Dgrm
Business Service/Function Catalog

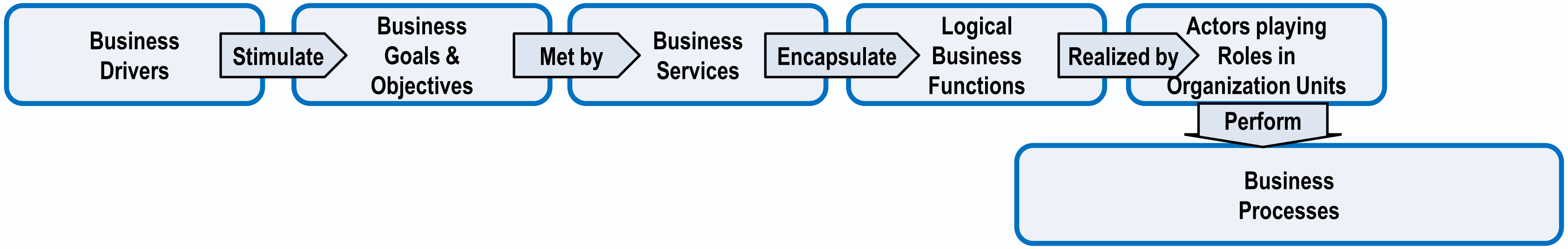
Function/Organization Matrix
Organization Decomposition Dgrm

Process & Role Catalogs
Business Scenario document(s)
Process flow Dgrm(s)

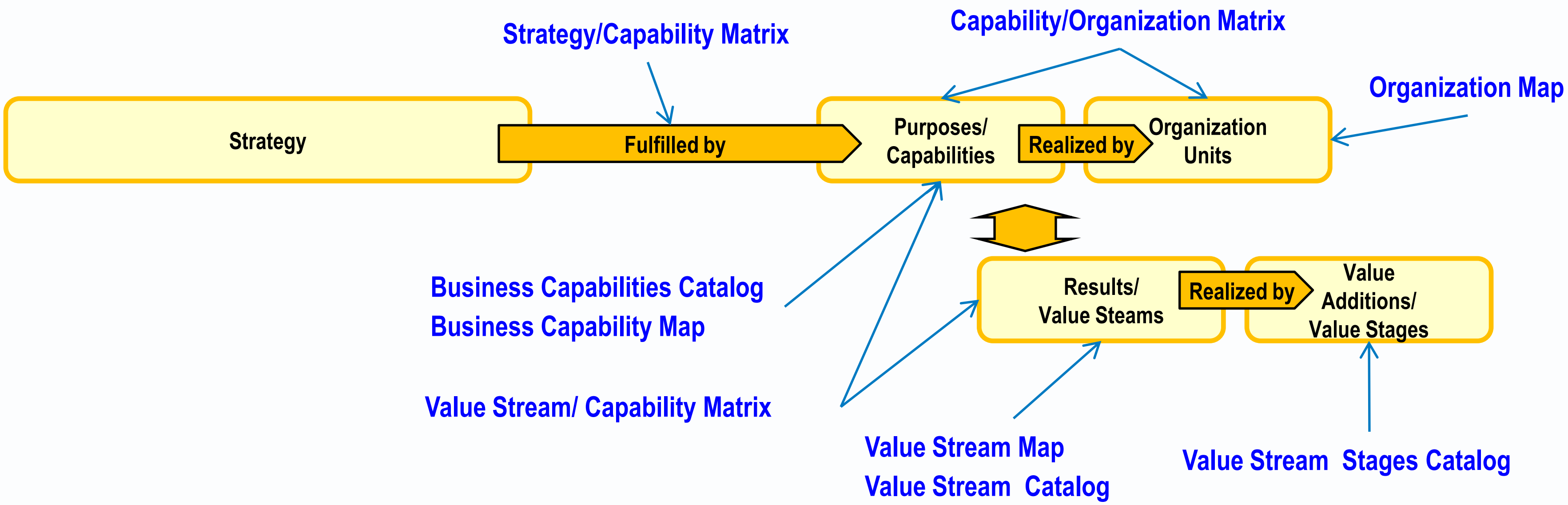
Conceptual Data Dgrm
Data/Entity Business Function
Business Service/Data Dgrm

Alternative business architecture approaches

- BA approach 1


Business Drivers
Stimulate
Business Goals & Objectives
Met by
Business Services
Encapsulate
Logical Business Functions
Realized by
Actors playing Roles in Organization Units
Perform
Business Processes

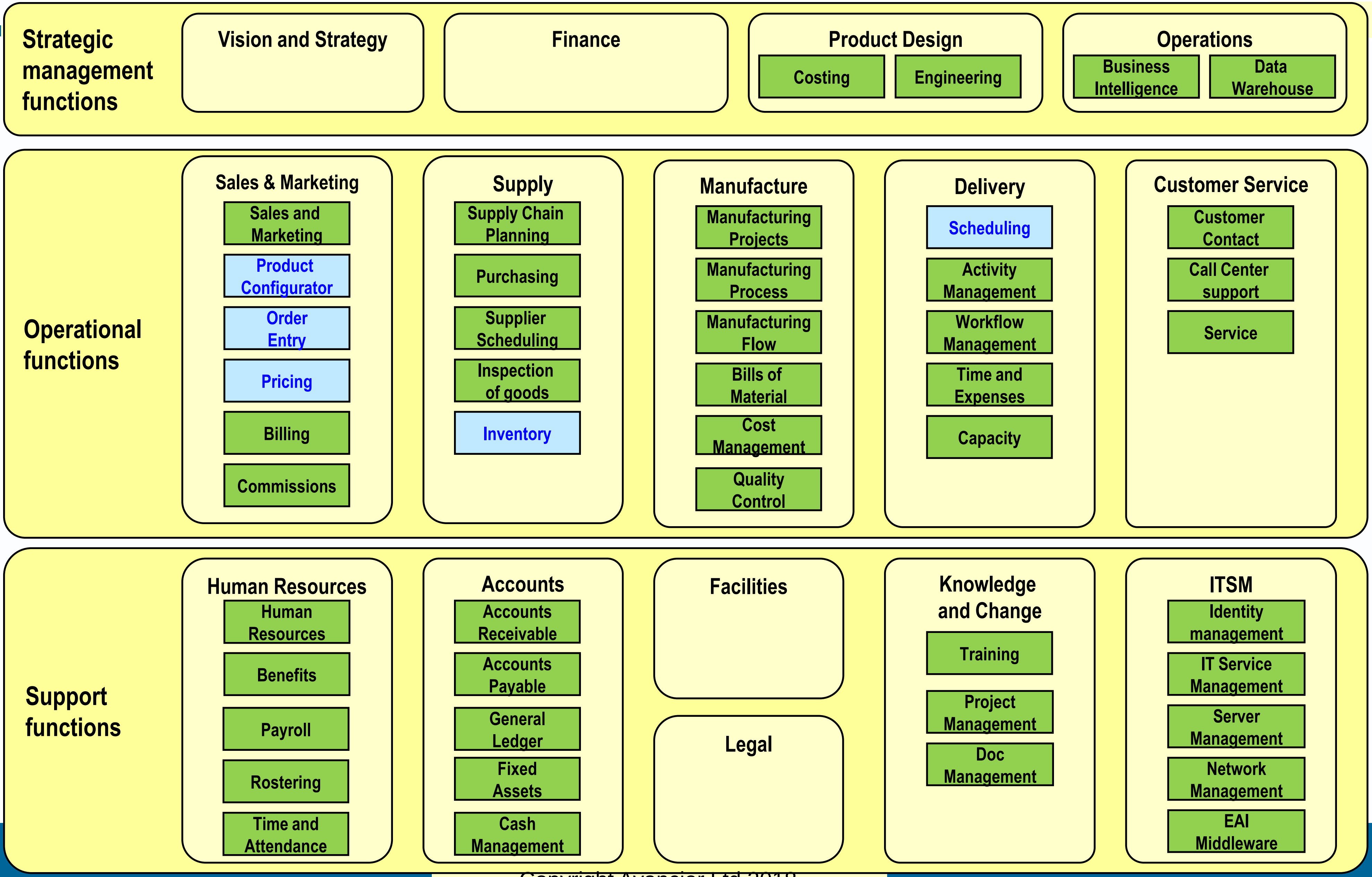
- BA approach 2



Footnotes

- Left overs

Application/Function Matrix drawn as a diagram



Strategic management functions

Vision and Strategy

Finance

Product Design
- Costing
- Engineering

Operations
- Business Intelligence
- Data Warehouse

Operational functions

Sales & Marketing
- Sales and Marketing
- Product Configurator
- Order Entry
- Pricing
- Billing
- Commissions

Supply
- Supply Chain Planning
- Purchasing
- Supplier Scheduling
- Inspection of goods
- Inventory

Manufacture
- Manufacturing Projects
- Manufacturing Process
- Manufacturing Flow
- Bills of Material
- Cost Management
- Quality Control

Delivery
- Scheduling
- Activity Management
- Workflow Management
- Time and Expenses
- Capacity

Customer Service
- Customer Contact
- Call Center support
- Service

Support functions

Human Resources
- Human Resources
- Benefits
- Payroll
- Rostering
- Time and Attendance

Accounts
- Accounts Receivable
- Accounts Payable
- General Ledger
- Fixed Assets
- Cash Management

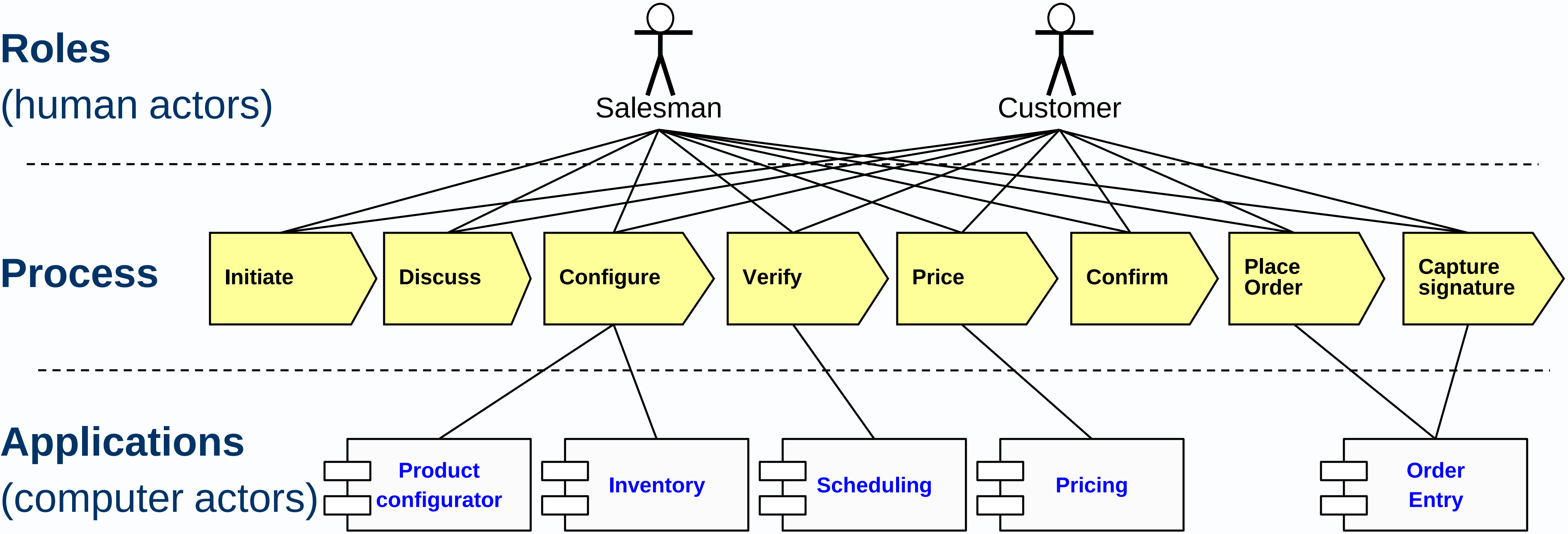
Facilities

Legal

Knowledge and Change
- Training
- Project Management
- Doc Management

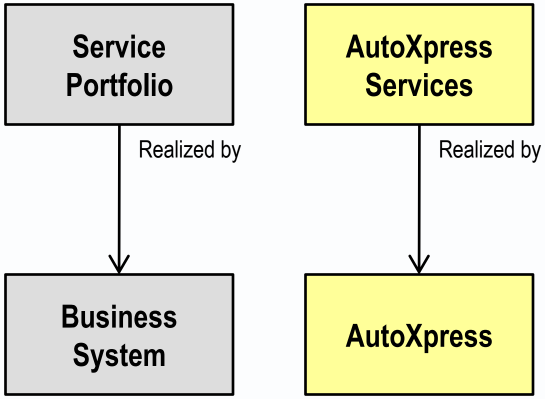
ITSM
- Identity management
- IT Service Management
- Server Management
- Network Management
- EAI Middleware

A Business Scenario (after TOGAF 8 example)



“Service Portfolio”

- *“a collection of services, potentially an interface definition.*
- *“used in the TOGAF framework to define the requirement for a building block or system.” (Ch. 3)*
- *“For each building block, build up a service description portfolio as a set of non-conflicting services.”*



AutoXpress Services

- Fit tyres
- Check-up and oil change
- Full annual service
- Check brakes
- Repair brakes
- Check exhaust
- Replace exhaust
- Inspect battery
- Replace battery
- Align wheels
- Replace windscreen wipers
- Fit bulbs
- Replace shock absorbers

Subdividing a system into subsystems

- The service portfolio of a system may be divided into service bundles assignable to different subsystems.

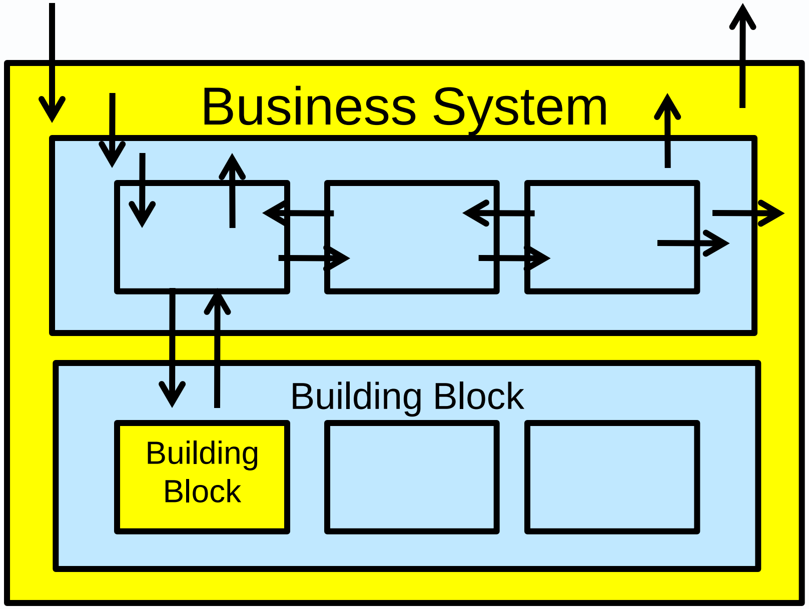
- For Portability, Interoperability and Boundaryless Information Flow[tm].
  - “An architectural framework.. should describe a method for designing an information system in terms of a set of building blocks, and for showing **how the building blocks fit together**.” TOGAF 7

- For IT architecture.
  - “The TOGAF Technical Reference Model ... **contains all possible services**.
  - **Service bundles** are represented .. in the form of "**Building Blocks**".
  - The IT architect must **analyse the services** actually needed [to] define the set of optimal **solution building block.** TOGAF 7

“Systems are built up from collections of building blocks” (Ch. 33)

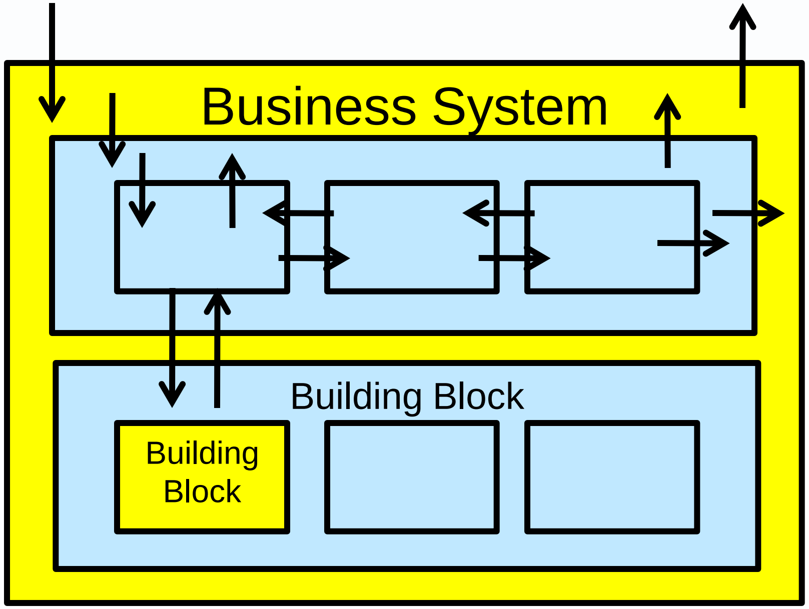
- *... building blocks have to interoperate with other building blocks.”*

- *“An architecture is a set of building blocks depicted in an architectural model,*
- *and a specification of how those building blocks are connected to meet the overall requirements of the business.”*



“Building block” in TOGAF chapter 33

- *“has a defined boundary”*
  - Is encapsulated by IO flows
- *“recognizable as "a thing" by domain experts”*
  - Is a structure rather than a transient behavior
- *“may interoperate.”*
  - Building blocks cooperate in a network
- *“A good building block*
  - *considers implementation and usage, and*
  - *evolves to exploit technology and standards*
    - Is logical, but not divorced from physical reality
  - *may be assembled from other building blocks, and a subassembly of others*
    - may be composed and decomposed in a hierarchical structure
  - *is re-usable and replaceable, and well specified.”*
    - Is a plug and play component

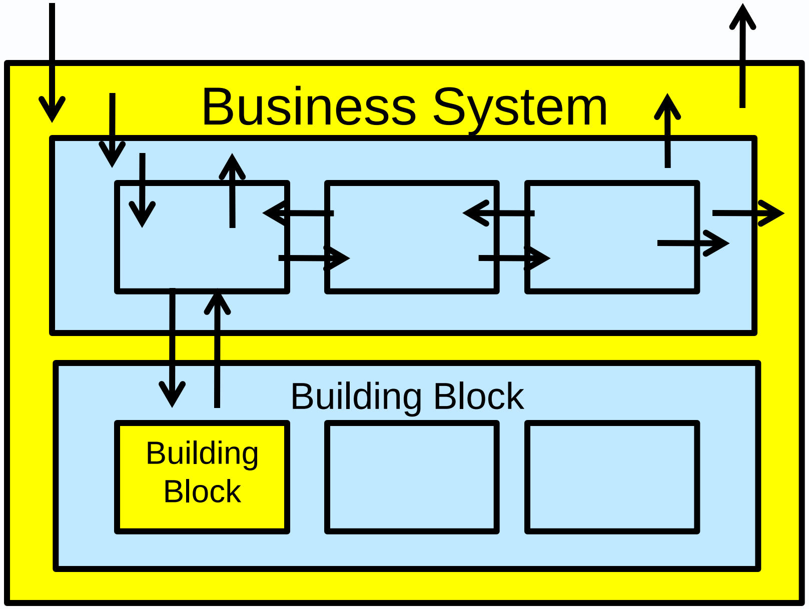


“Building block” in TOGAF chapter 3

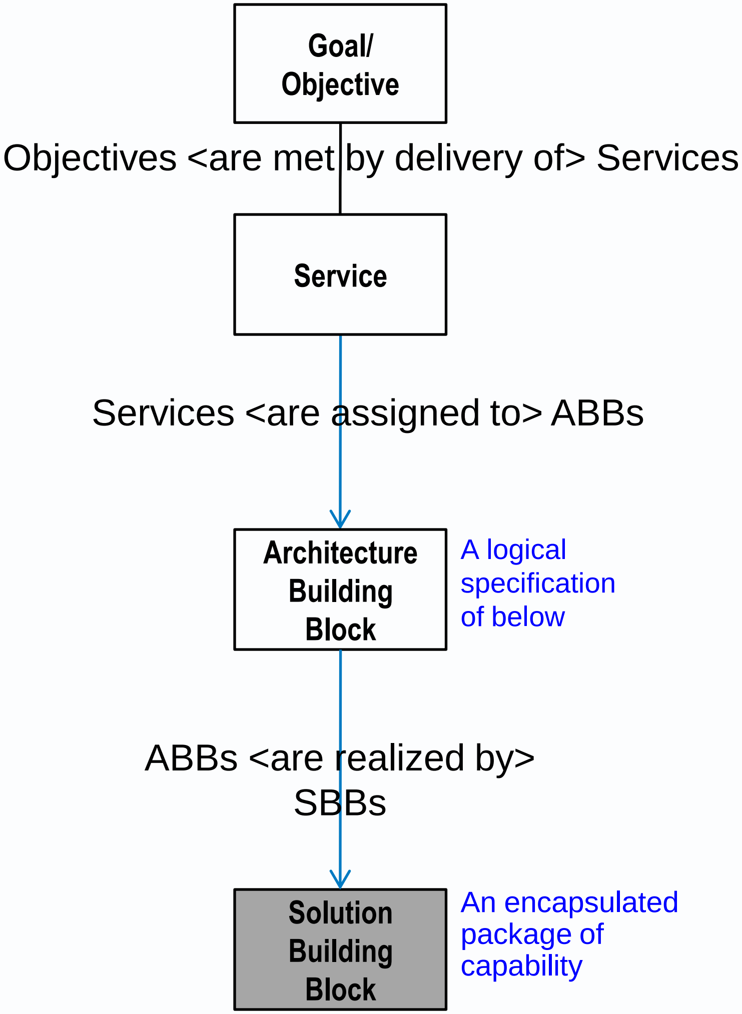
- *“a (potentially re-usable) component of enterprise capability*
- *can be combined with other building blocks to deliver architectures and solutions.”*

- The granularity varies from situation to situation.

- A service can be
- *“coarse-grained (build a house) or*
- *fine-grained (retrieve an address).” (Ch. 3)*



Abstraction by idealisation

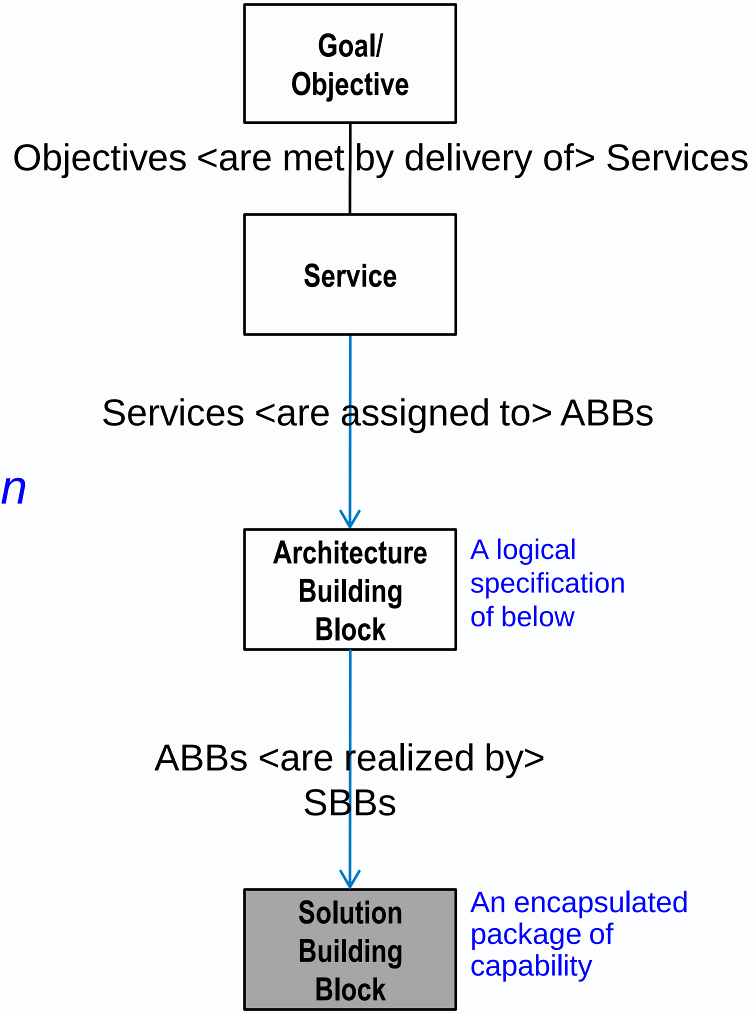

Goal/ Objective
Objectives <are met by delivery of> Services
Service
Services <are assigned to> ABBs
Architecture Building Block
A logical specification of below
ABBs <are realized by> SBBs
Solution Building Block
An encapsulated package of capability

- *"A building block's boundary and specification should be loosely coupled to its implementation." (Ch. 33)*

- *"It should be possible to realize a building block in several different ways without impacting [its] boundary or specification." (Ch. 33)*

Abstraction by idealisation

- *“The major work… consists of identifying the <u>architecture building blocks</u> required to meet the business goals and objectives.*
- *“The selected set of <u>architecture building blocks</u> is then refined in an iterative process....*
- *to arrive at a set of <u>solution building blocks</u> which can either be bought off-the-shelf or custom developed.” (Ch. 33)*
- IOW: you hire, buy or build physical components to perform the required behaviors assigned to the logical components.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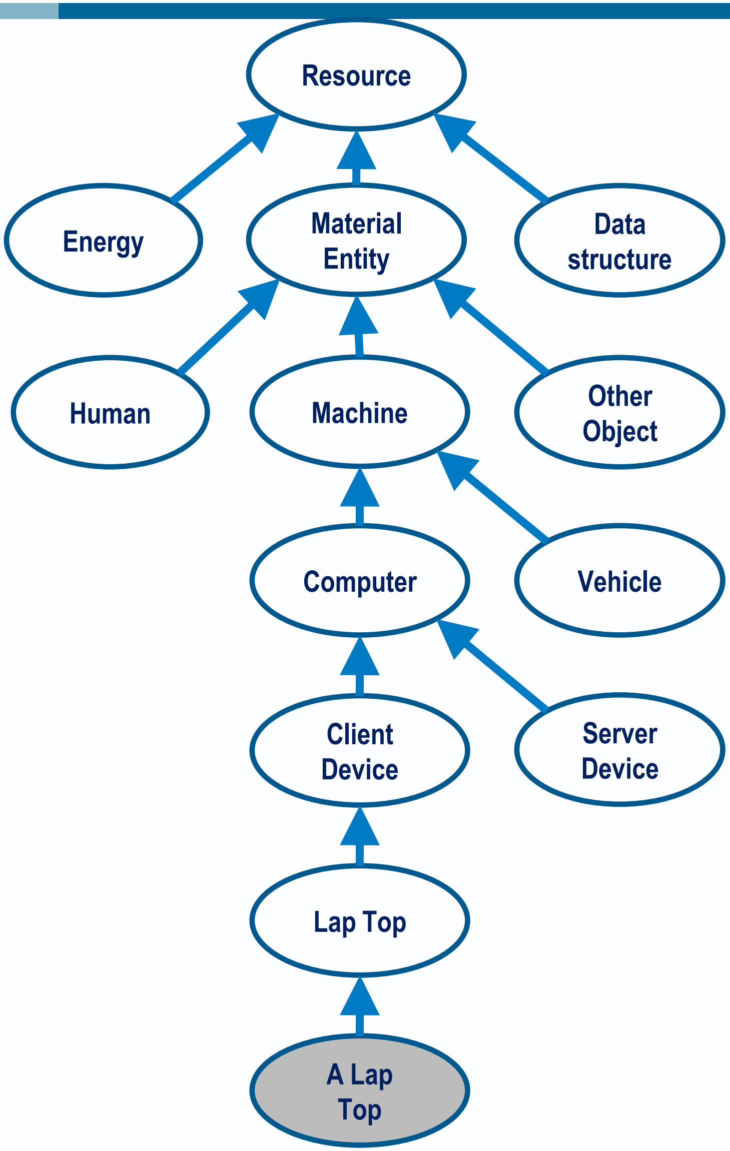
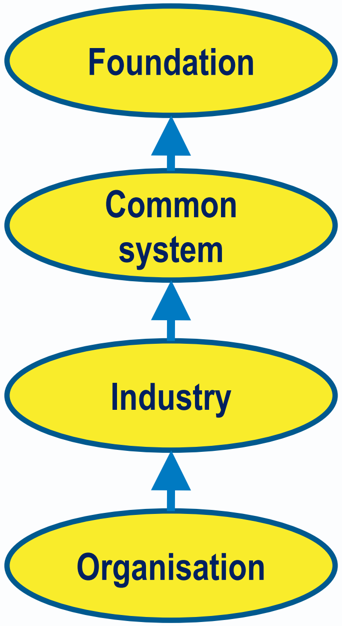
ABBs <are realized by> SBBs
Solution Building Block
An encapsulated package of capability

Abstraction by generalisation

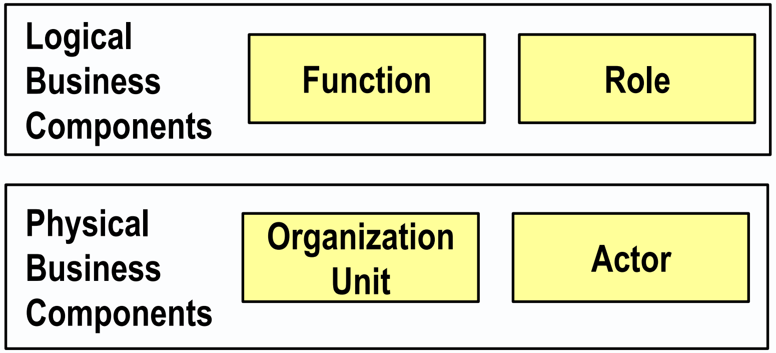


TOGAF

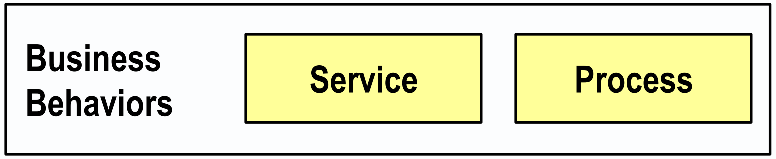


Note

- **Structures perform behaviors**
  - Roles perform Processes? Hmm...
  - Functions perform Services? Hmm...
- Logical structures only *specify what can perform behaviors*



- **Behaviors do not perform behaviors**
  - Processes do not perform processes.
  - Services do not perform services.
- But processes can communicate with each other and access data


Business Behaviors
Service
Process