TOGAF diagrams mapped to ArchiMate 2.1 and 3.0 Viewpoints

Explanatory comments

Challenging comments

Including diagrams and definitions edited from the TOGAF 9.1 and ArchiMate 2.1 and 3 standards.

TOGAF diagrams mapped ArchiMate viewpoints

Avancier

TOGAF diagram	ArchiMate v3	ArchiMate v2.1
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Communications Engineering	Technology Viewpoint	

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TOGAF: Goal/Objective/Service Diagram (goals to services)

- The purpose of a Goal/Objective/Service diagram is to define the ways in which a service contributes to the achievement of a business vision or strategy.
- Ser vices are associated with the drivers, goals, objectives, and measures that they support, allowing the enterprise to understand which services contribute to similar aspects of business performance.
- The Goal/Objective/Service diagram also provides qualitative input on what constitutes high performance for a particular ser vice.

Goal realization viewpoint (goals to requirements)

The focuses on refining the initial, high-level goals into more concrete (sub-)goals using the aggregation relationship, and finally into requirements and constraints using the realization relationship.

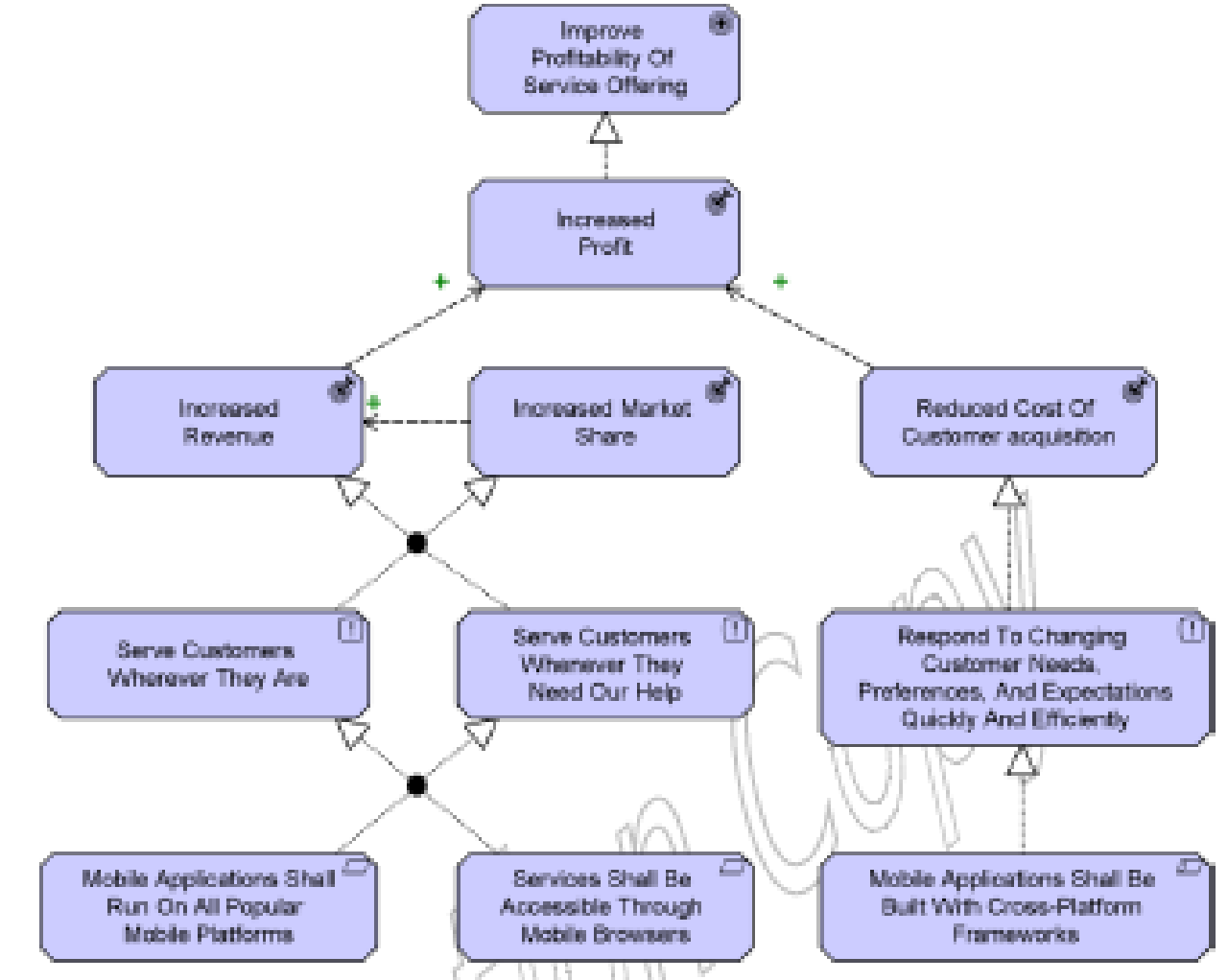
Goal: A high-level statement of intent, direction, or desired end state for an organization and its stakeholders.

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.



Example 19: Goal, Outcome, Principle, Requirement, and Constraint

TOGAF: Business Footprint Diagram

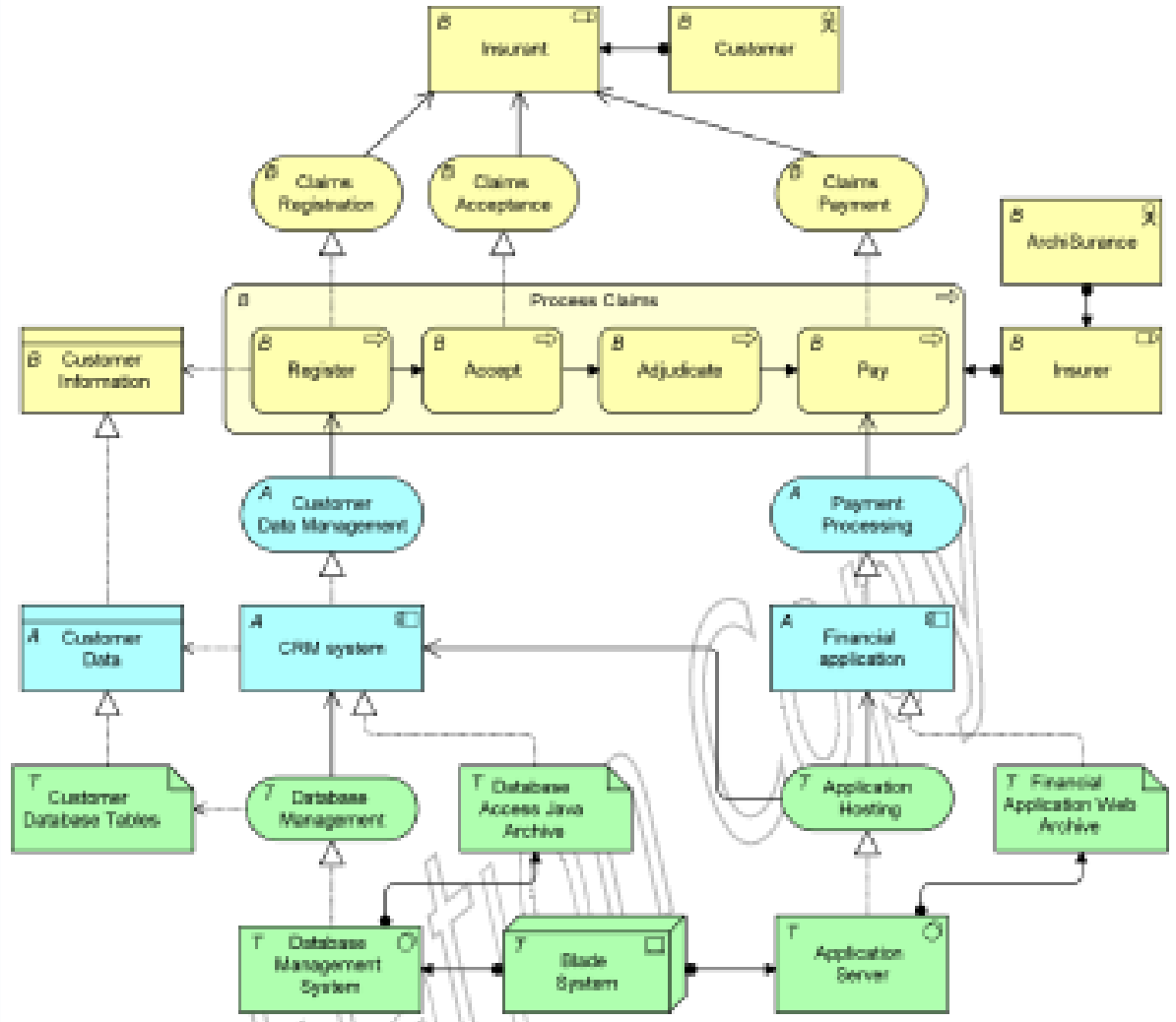
- describes the links between business goals, organizational units, business functions, and services,
- maps these functions to the technical components delivering the required capability.

- provides a clear traceability between a technical component and the business goal that it satisfies
- demonstrates ownership of the services identified.

- demonstrates only the key facts linking organization unit functions to delivery services and is utilized as a communication platform for senior-level (CxO) stakeholders.

Layered viewpoint v3

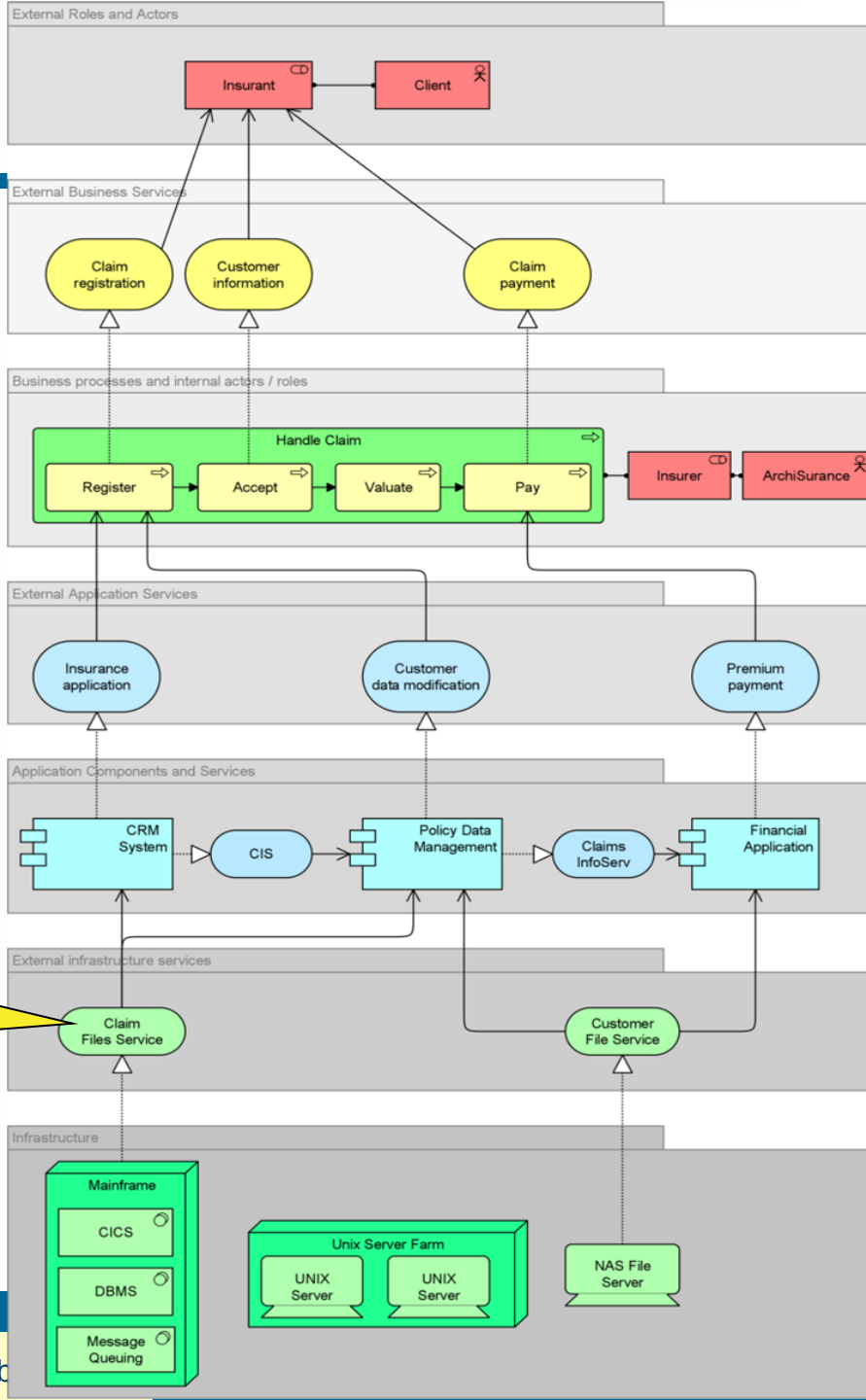
- This example is by no means intended to be prescriptive.
- The main goal of the layered viewpoint is to provide an overview in one diagram.



Example 33: Cross-Layer Relationships

Layered viewpoint v2.1

- Stakeholders: Enterprise, process, application, infrastructure, and domain architects
- Concerns: Consistency, reduction of complexity, impact of change, flexibility



Look like application services rather than platform services

ArchiMate 2.1: Landscape Map Viewpoint

No corresponding definition in TOGAF?

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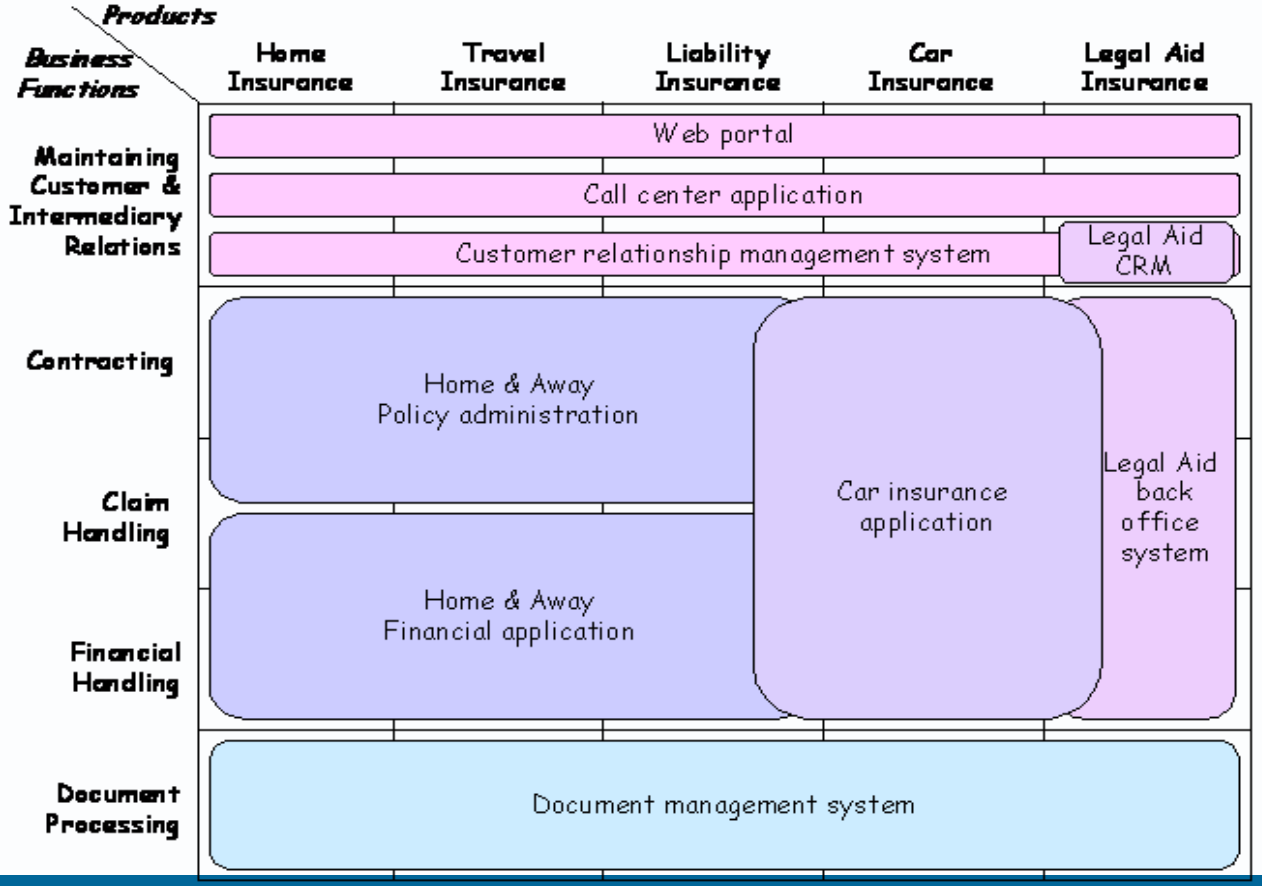
- Stakeholders: Enterprise architects, top managers: CEO, CIO
- Concerns: Readability, management and reduction of complexity, comparison of alternatives



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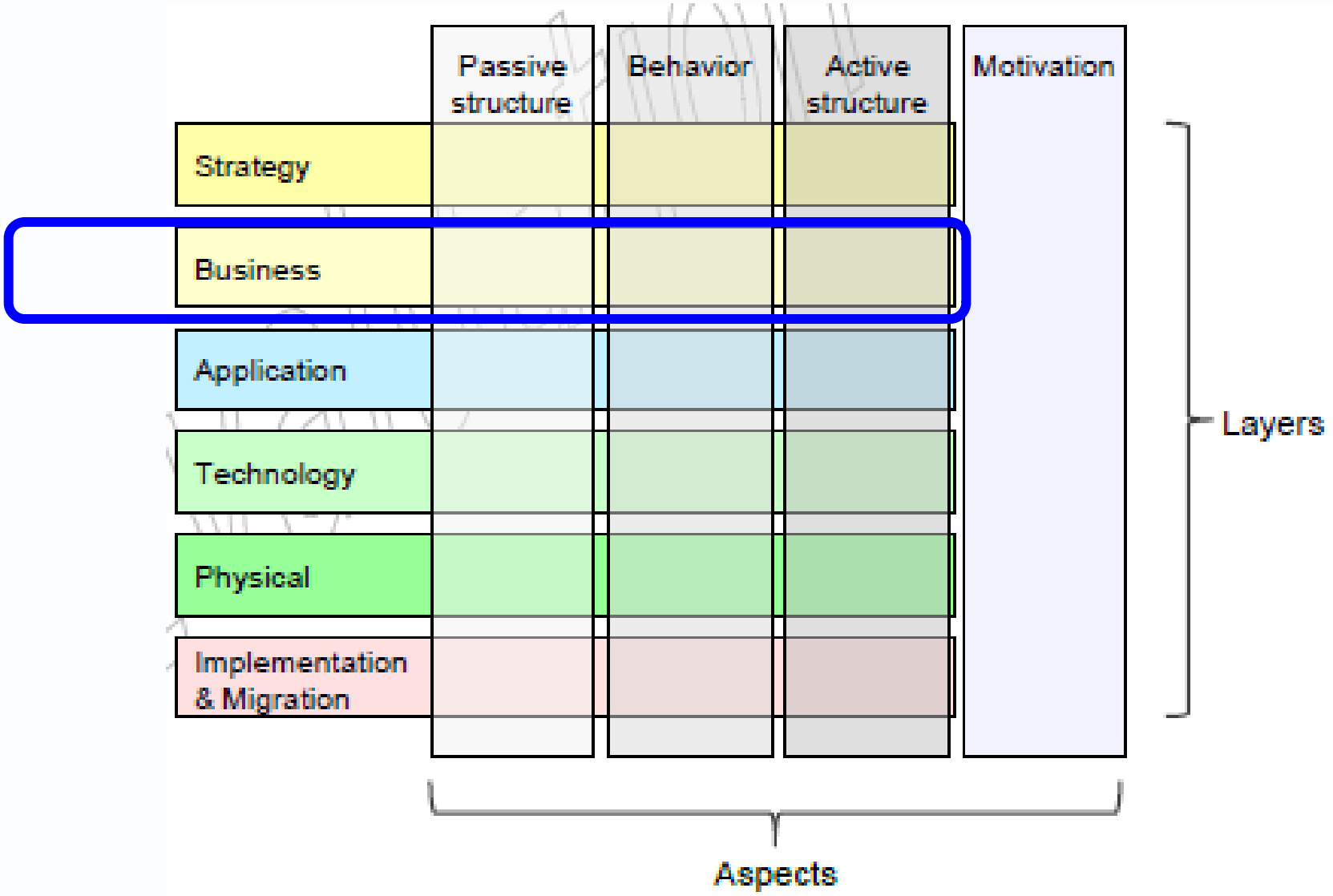

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TOGAF: Functional Decomposition Diagram

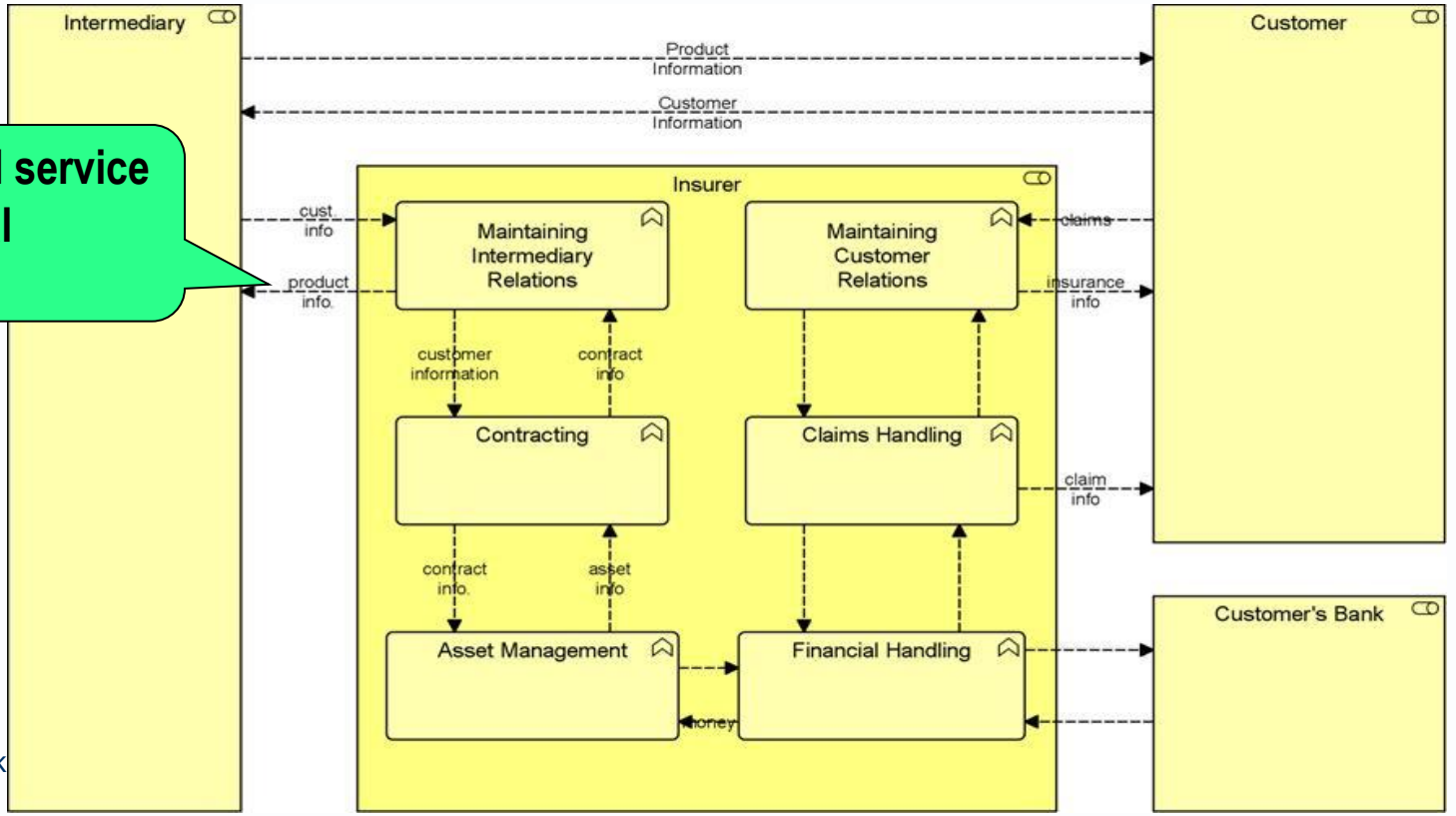
- to show on a single page the capabilities of an organization that are relevant to the consideration of an architecture.
- By examining the capabilities of an organization from a functional perspective, it is possible to quickly develop models of what the organization does without being dragged into extended debate on how the organization does it.

- Once a basic Functional Decomposition diagram has been developed, it becomes possible to layer heat-maps on top of this diagram to show scope and decisions.
- For example, the capabilities to be implemented in different phases of a change program.

Capability map viewpoint

- Provides an overview of the capabilities of the enterprise.

Can show goods and service flows between logical business functions



TOGAF: Organization Decomposition Diagram

- describes the links between actor, roles, and location within an organization tree.
- should provide a chain of command of owners and decision-makers in the organization.
- Although it is not the intent to link goal to organization, it should be possible to intuitively link the goals to the stakeholders from the Organization Decomposition diagram.

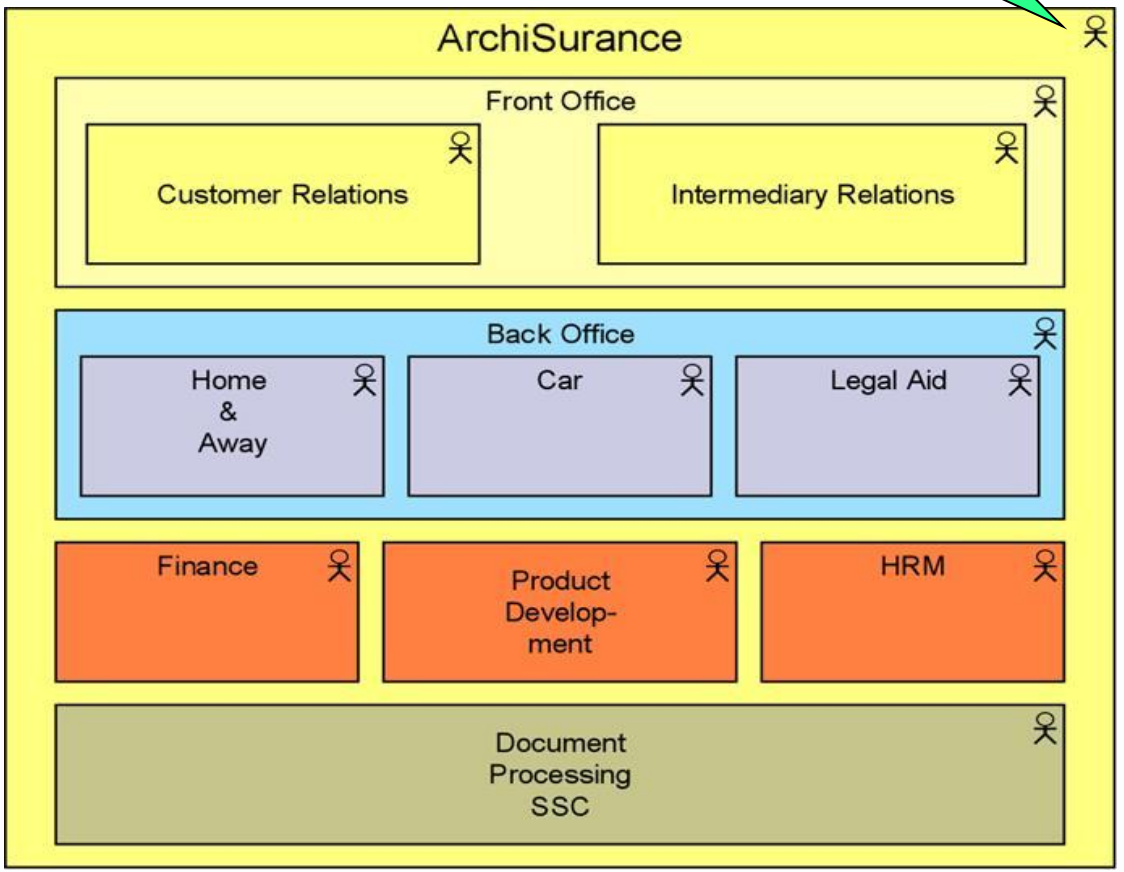
Organization Viewpoint

TOGAF organisation decomposition

Avancier

- focuses on the (internal) organization of a company, department, network of companies, or of another organizational entity.

Actor = Org Unit



Organization Viewpoint (Actor Cooperation in 2.1)

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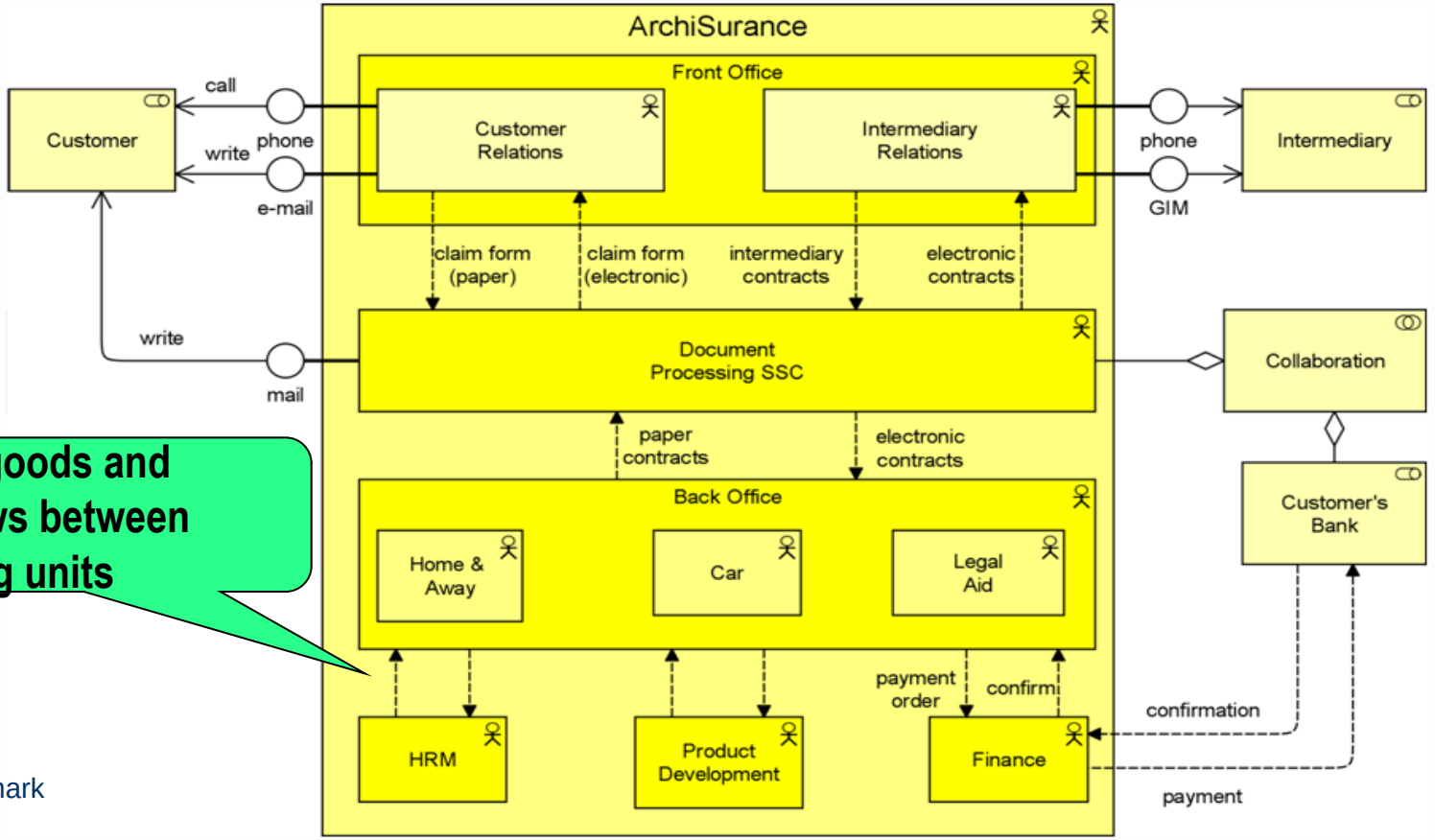

Organization viewpoint – actors and roles

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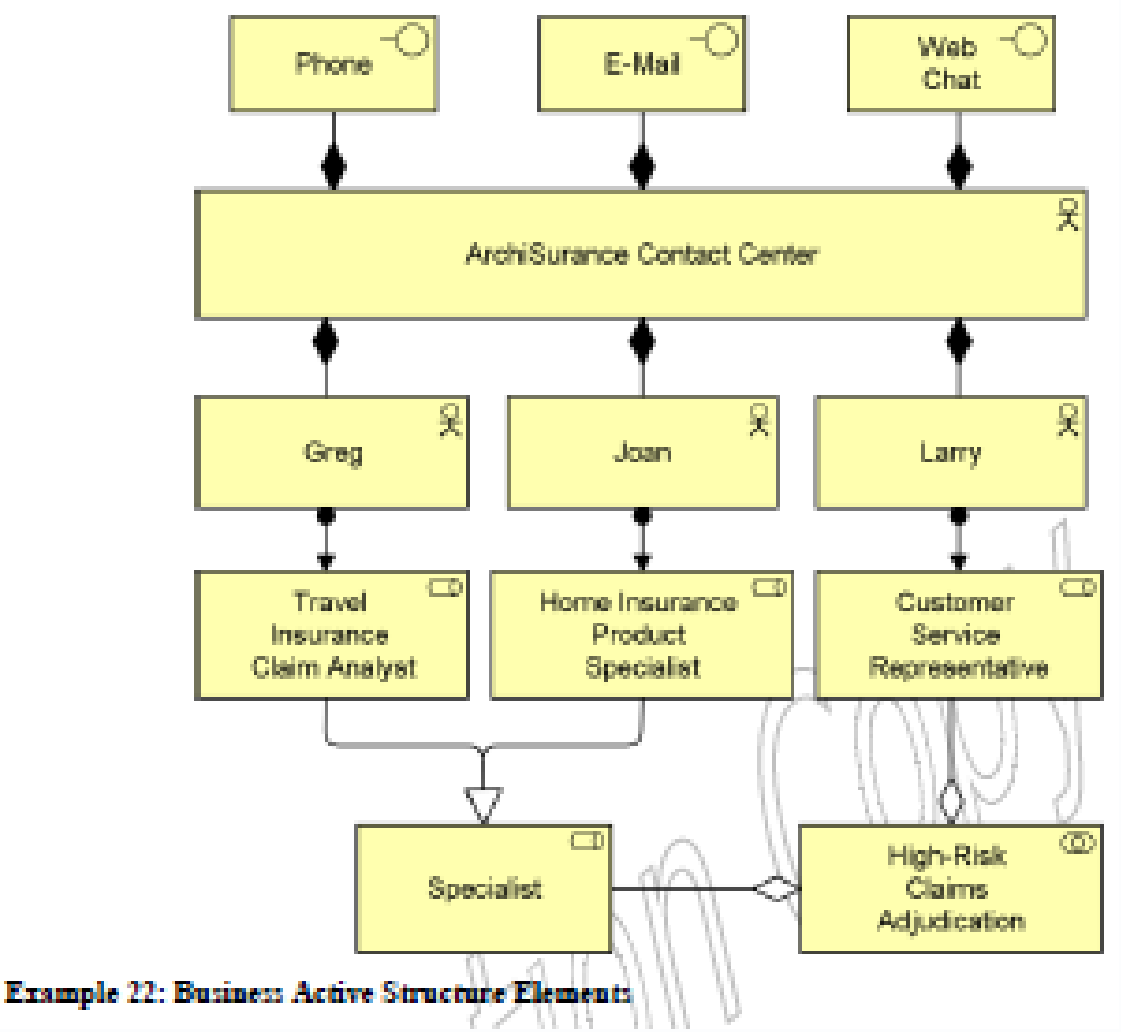


Example 22: Business Active Structure Elements

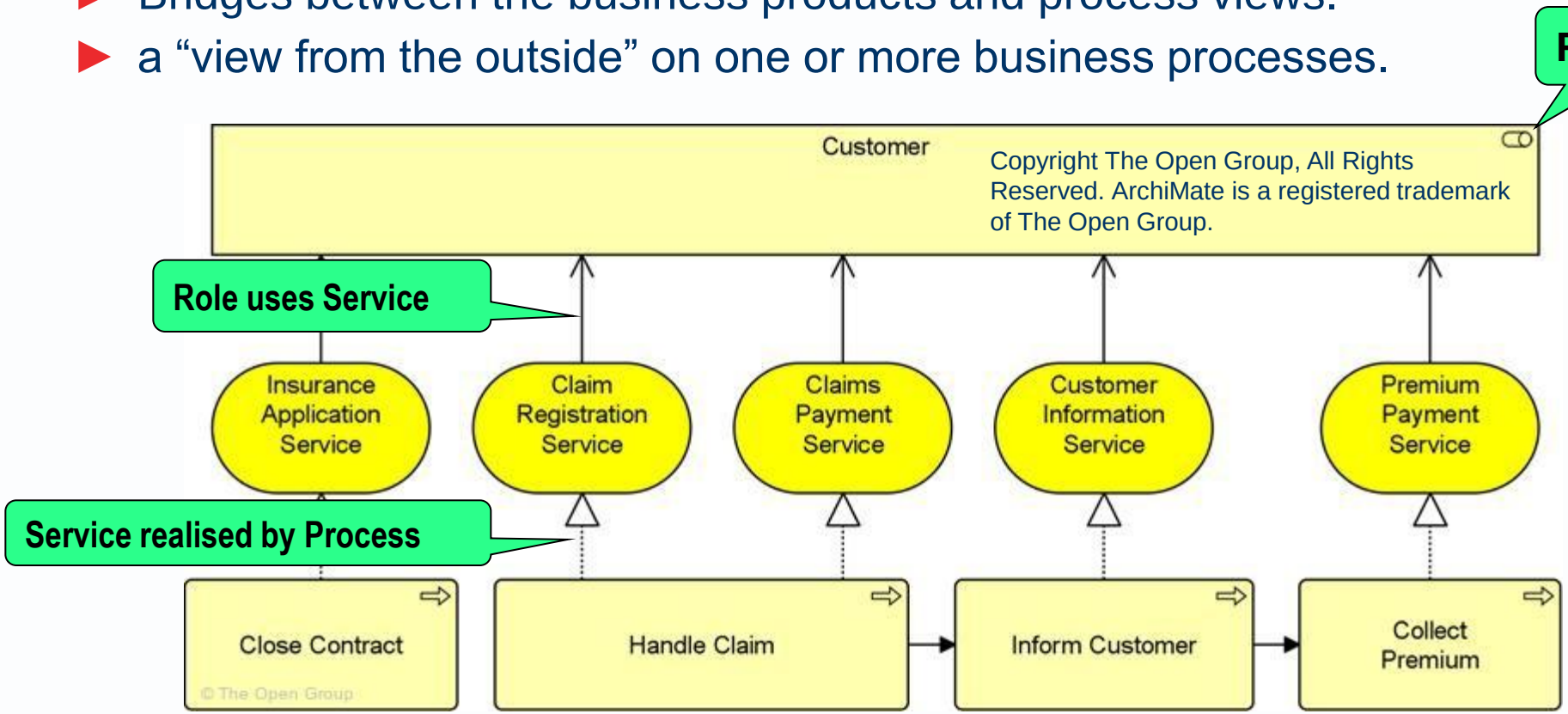
TOGAF: Business Use-case Diagram

- displays the relationships between consumers and providers of business services.
- Business services are consumed by actors or other business services
- The diagram provides added richness in describing business capability by illustrating how and when that capability is used.
- The purpose is to help to describe and validate the interaction between actors and their roles to processes and functions.
- As architecture progresses, use-cases can evolve from the business level to include data, application, and technology details.
- Architectural business use-cases can also be re-used in systems design work.

Akin to TOGAF Business Use Case diagram

Service realization viewpoint

- shows how one or more business services are realized by the underlying processes (and sometimes by application components).
- Bridges between the business products and process views.
- a “view from the outside” on one or more business processes.

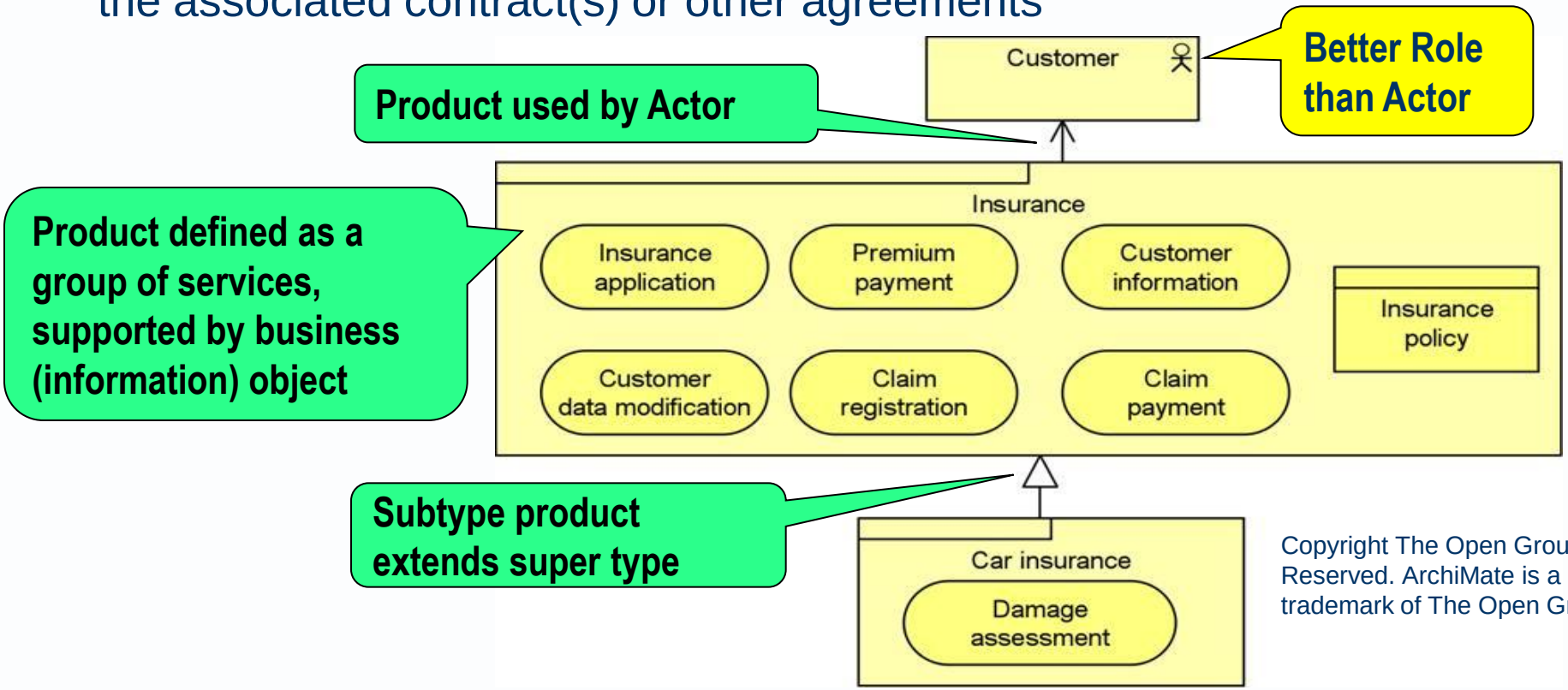


Akin to TOGAF Business Use Case diagram

Product Viewpoint 2.1

Avancier

- Shows the value that products offer to the customers or other external parties involved, and shows the composition of one or more products in terms of the constituting (business, application, or technology) services, and the associated contract(s) or other agreements



Product viewpoint

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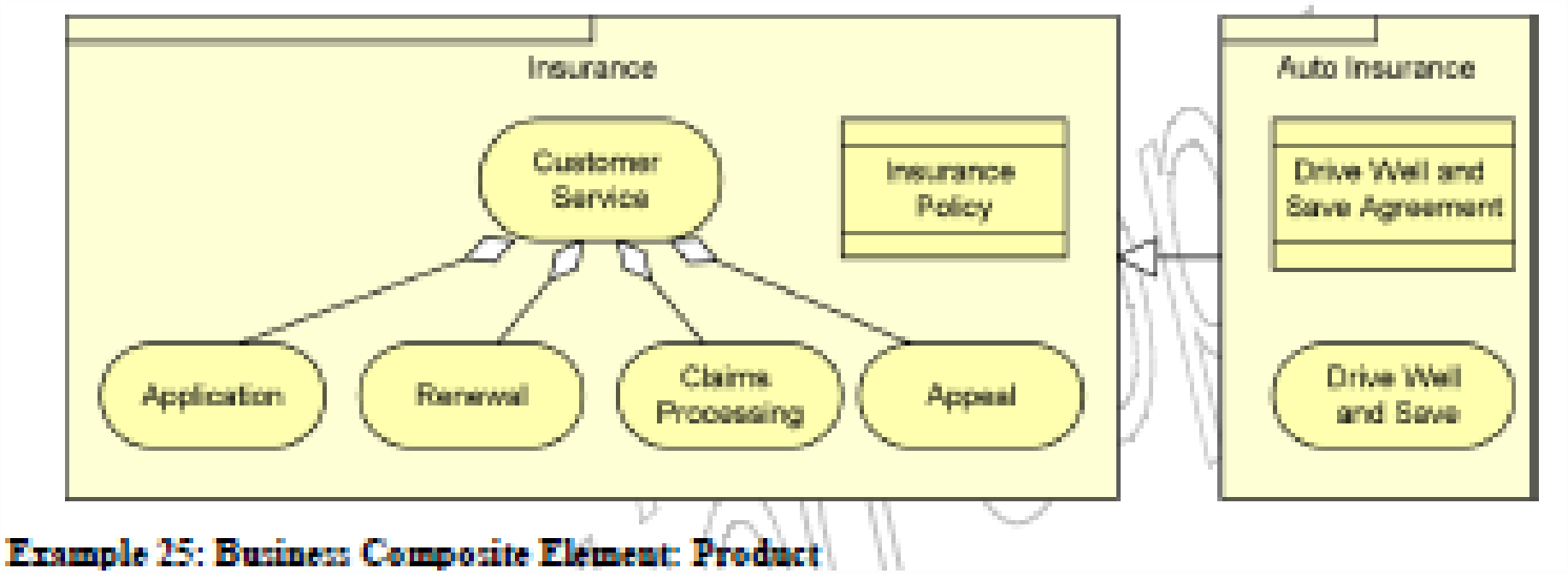


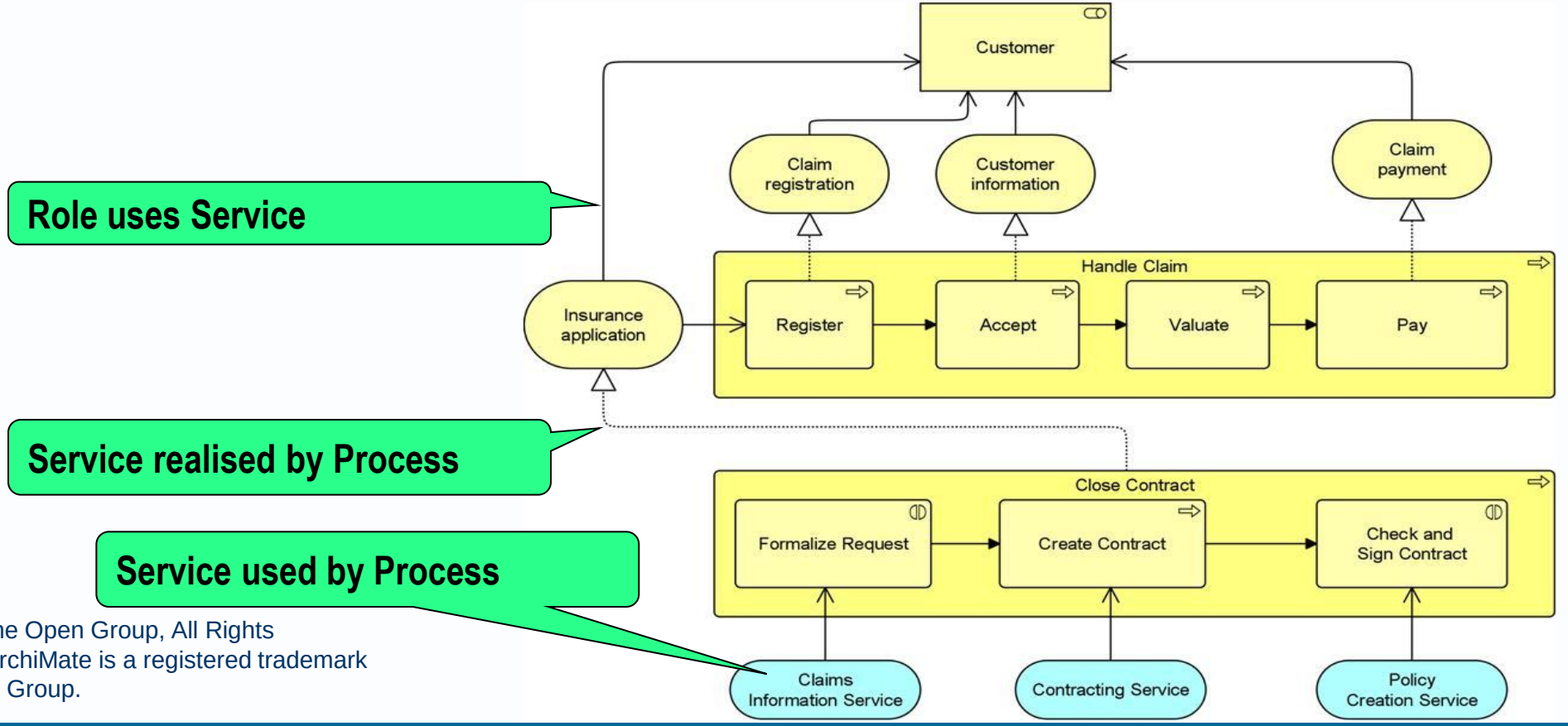
Example 25: Business Composite Element: Product

TOGAF: Process Flow Diagram

- to depict all models and mappings related to the process metamodel entity.
- show sequential flow of control between activities
- may utilize swimlane techniques to represent ownership and realization of process steps. can be used to detail the
  - controls that apply to a process,
  - events that trigger or result from of a process
  - products generated from process execution.
- useful in elaborating the architecture with subject specialists, as they allow the specialist to describe ‘‘how the job is done’’ for a particular function.
- each process step can become a more fine-grained function and can then in turn be elaborated as a process.

Business Process Co-operation Viewpoint 2.1

- show the relationships of one or more business processes with each other and/or with their environment.



Business Process Cooperation Viewpoint

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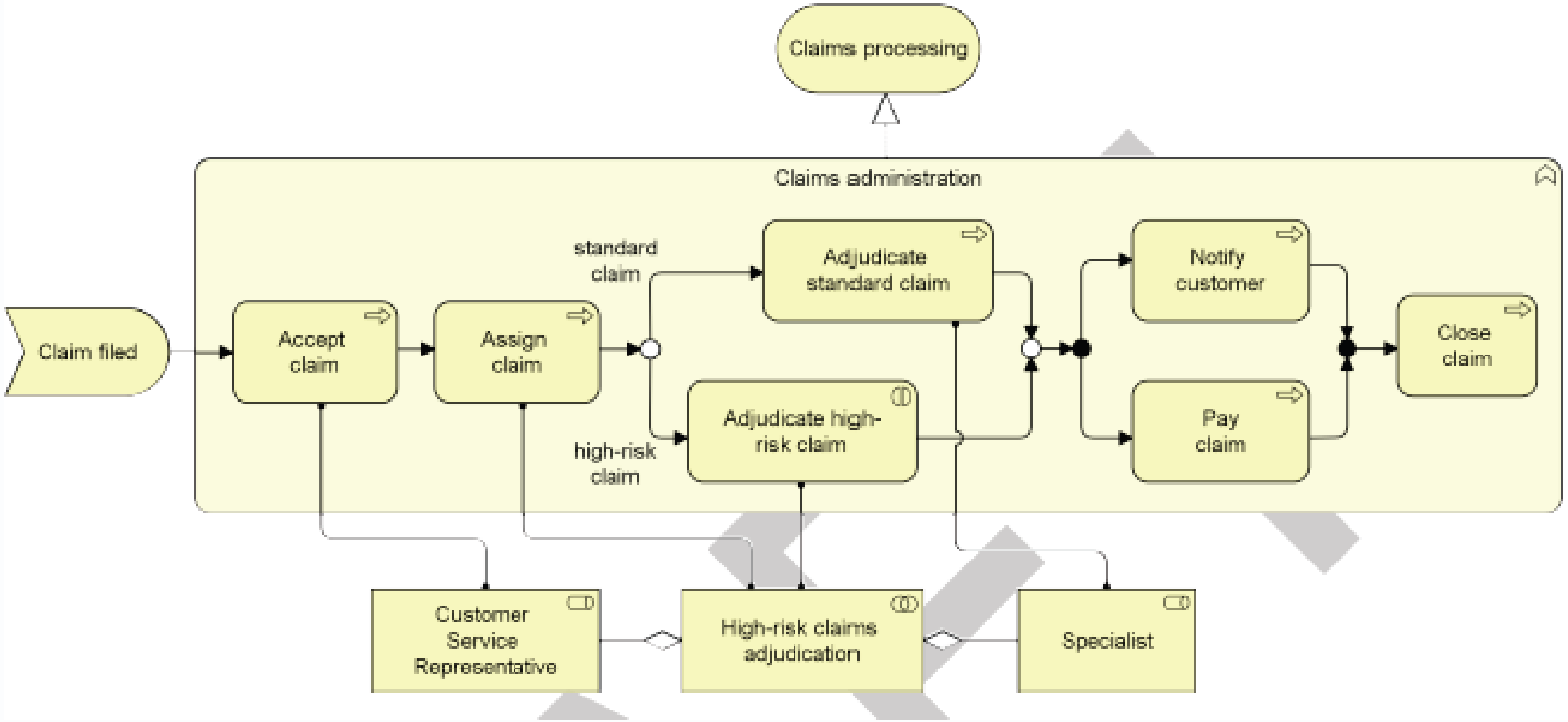

TOGAF: Business Service/Information Diagram

- shows the information needed to support one or more business services.
- shows what data is consumed by or produced by a business service and may also show the source of information.
- shows an initial representation of the information present within the architecture and therefore forms a basis for elaboration and refinement within Phase C (Data Architecture).

2.1 Business Process Viewpoint

Cf. Business Service/Information Diagram

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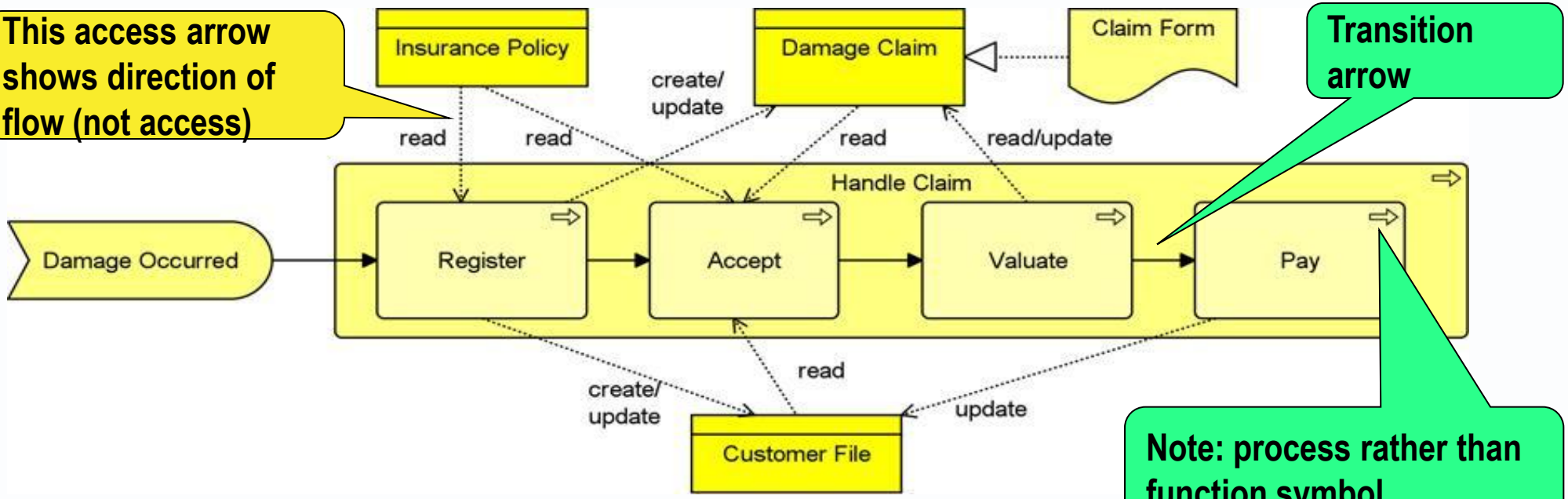
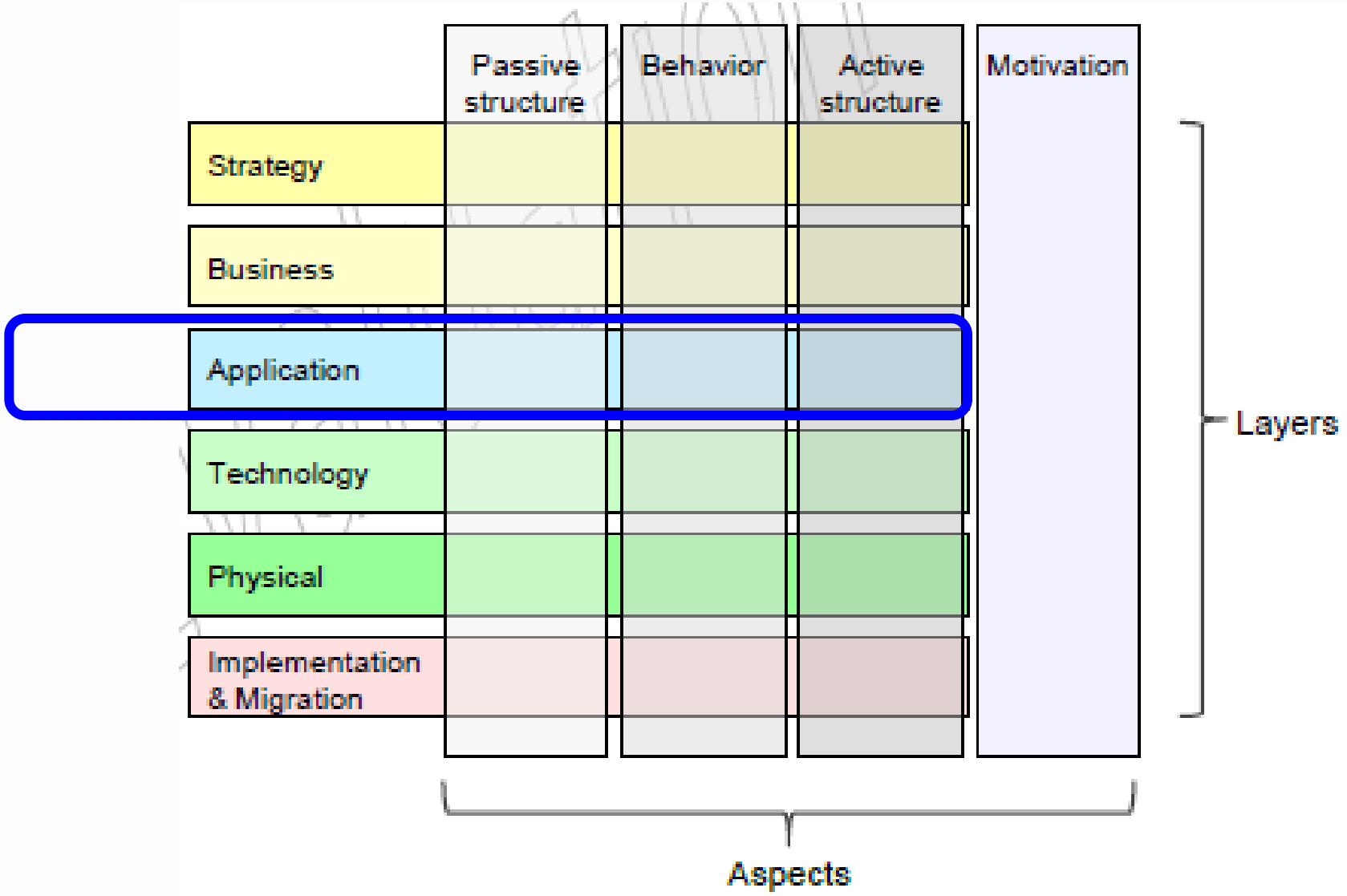
- Stakeholders: Process and domain architects, operational managers
- Concerns: Structure of business processes, consistency and completeness, responsibilities



ArchiMate FULL framework



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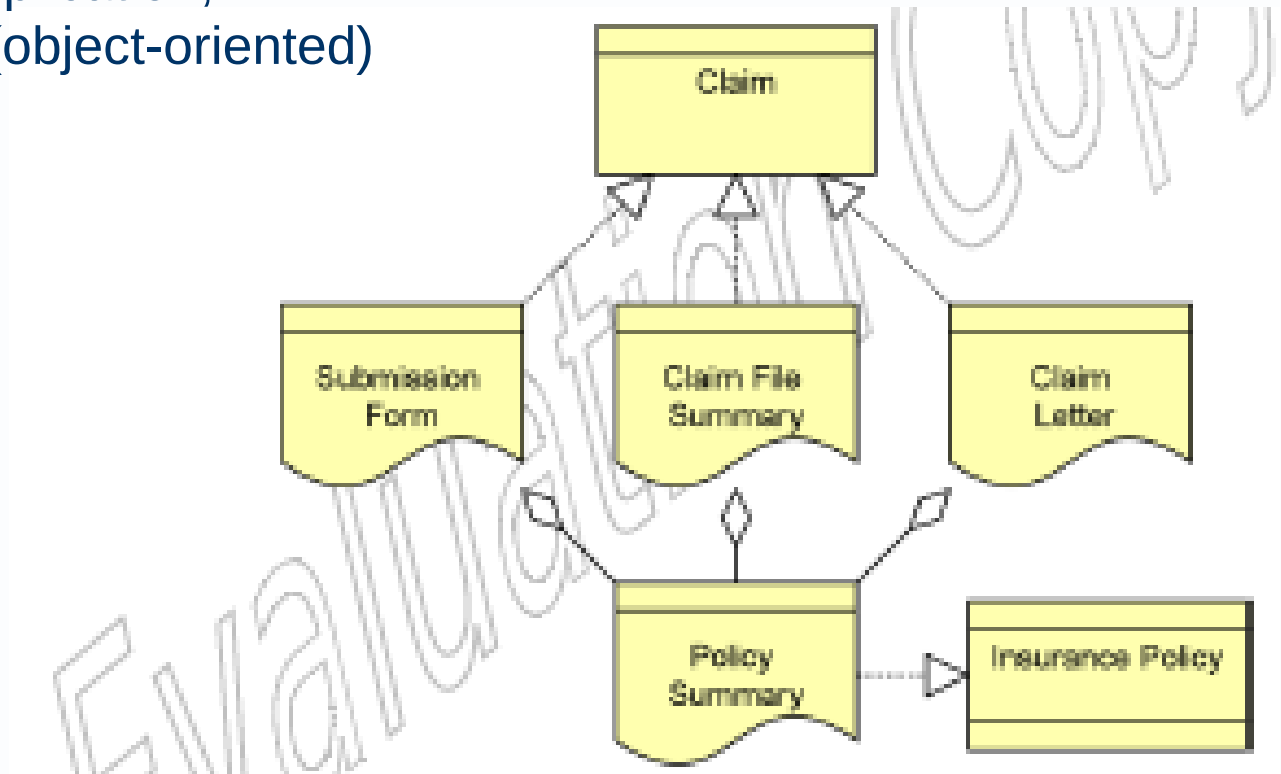
TOGAF: Conceptual Data Diagram (aka business data model)

- to depict the relationships between critical data entities within the enterprise.
- developed to address the concerns of business stakeholders.

Information structure viewpoint – conceptual level

- shows the structure of the information used in the enterprise or in a specific business process or application, in terms of data types or (object-oriented) class structures.

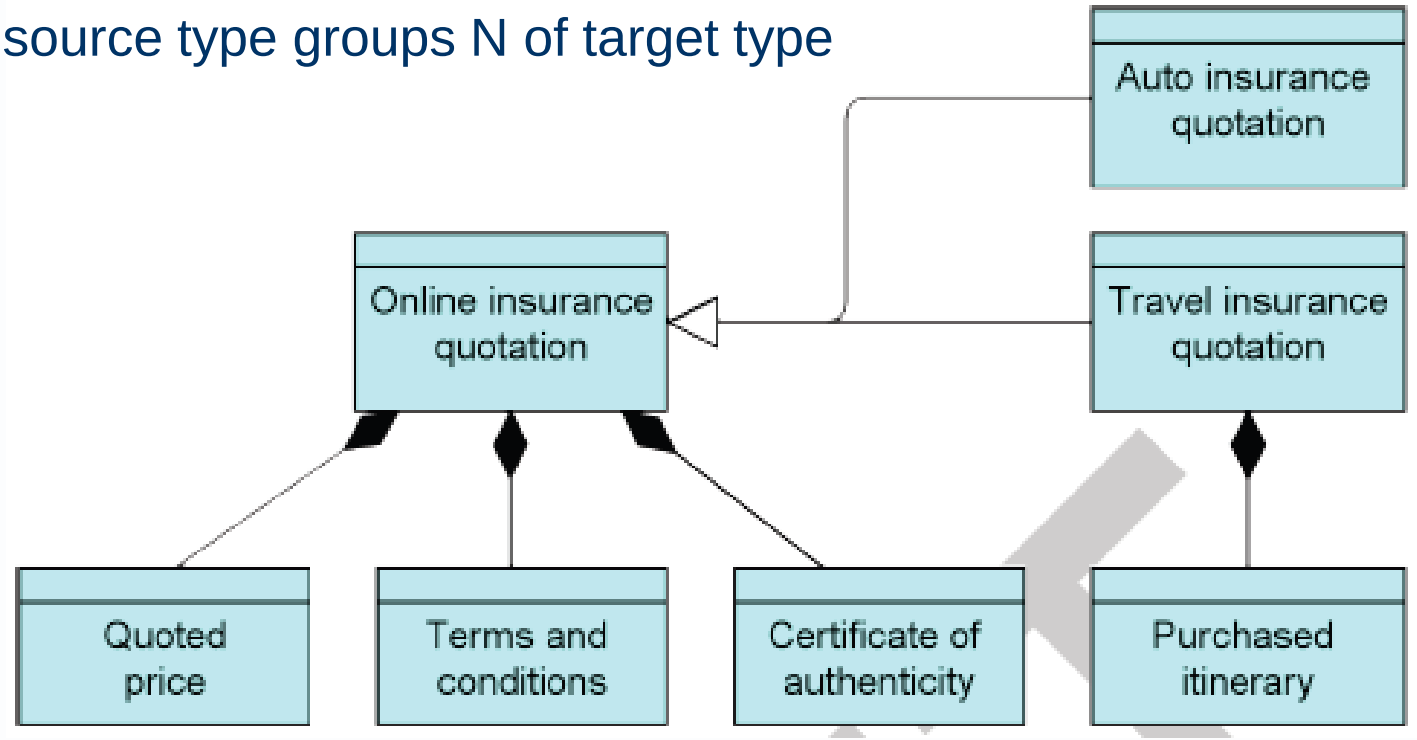


Example 24: Business Passive Structure Elements

Information structure viewpoint – logical level

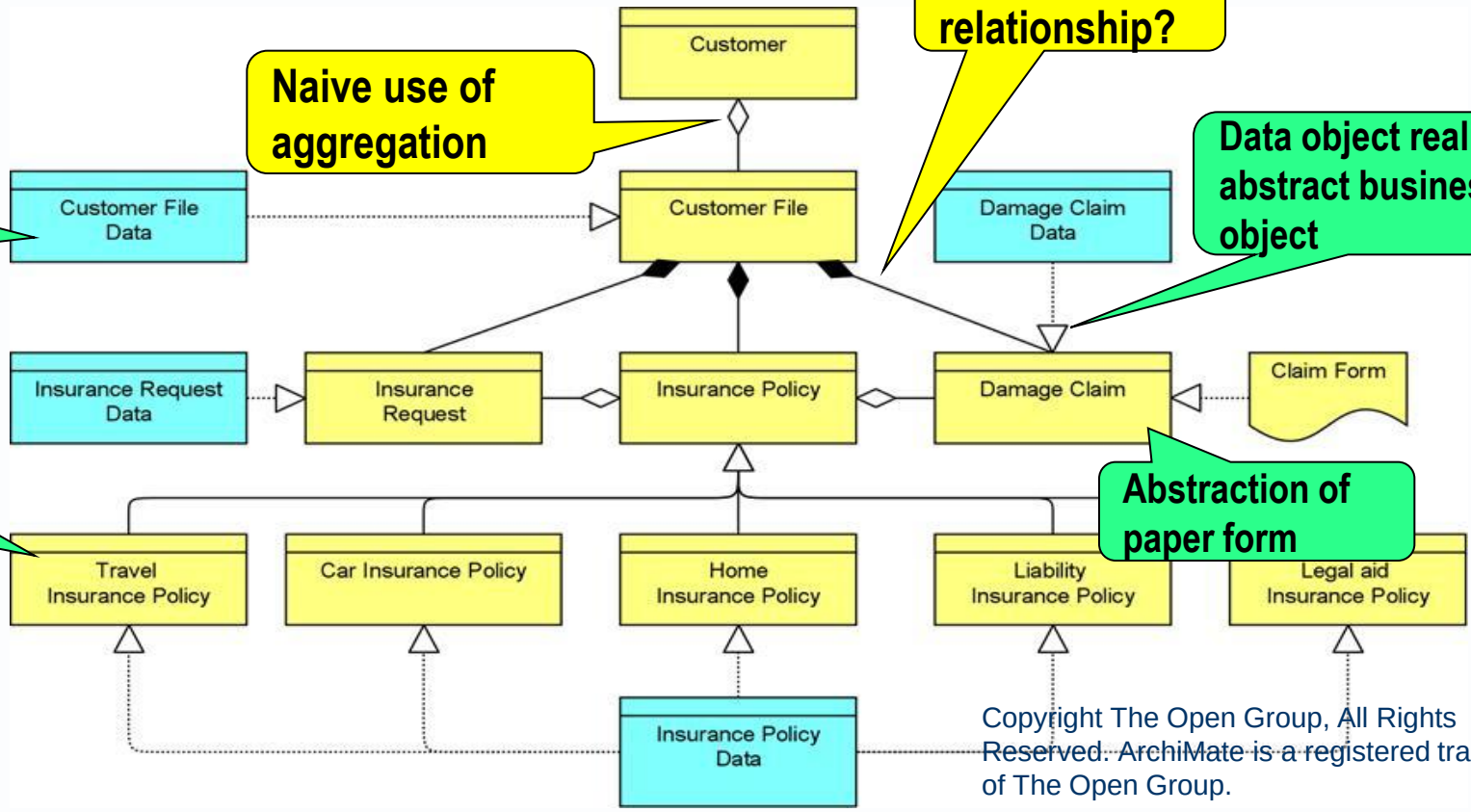
- shows how the information at the business level is represented at the application level in the form of the data structures used there

- Composition – 1 of source type contains 1 or more of target type
- Aggregation – N of source type groups N of target type

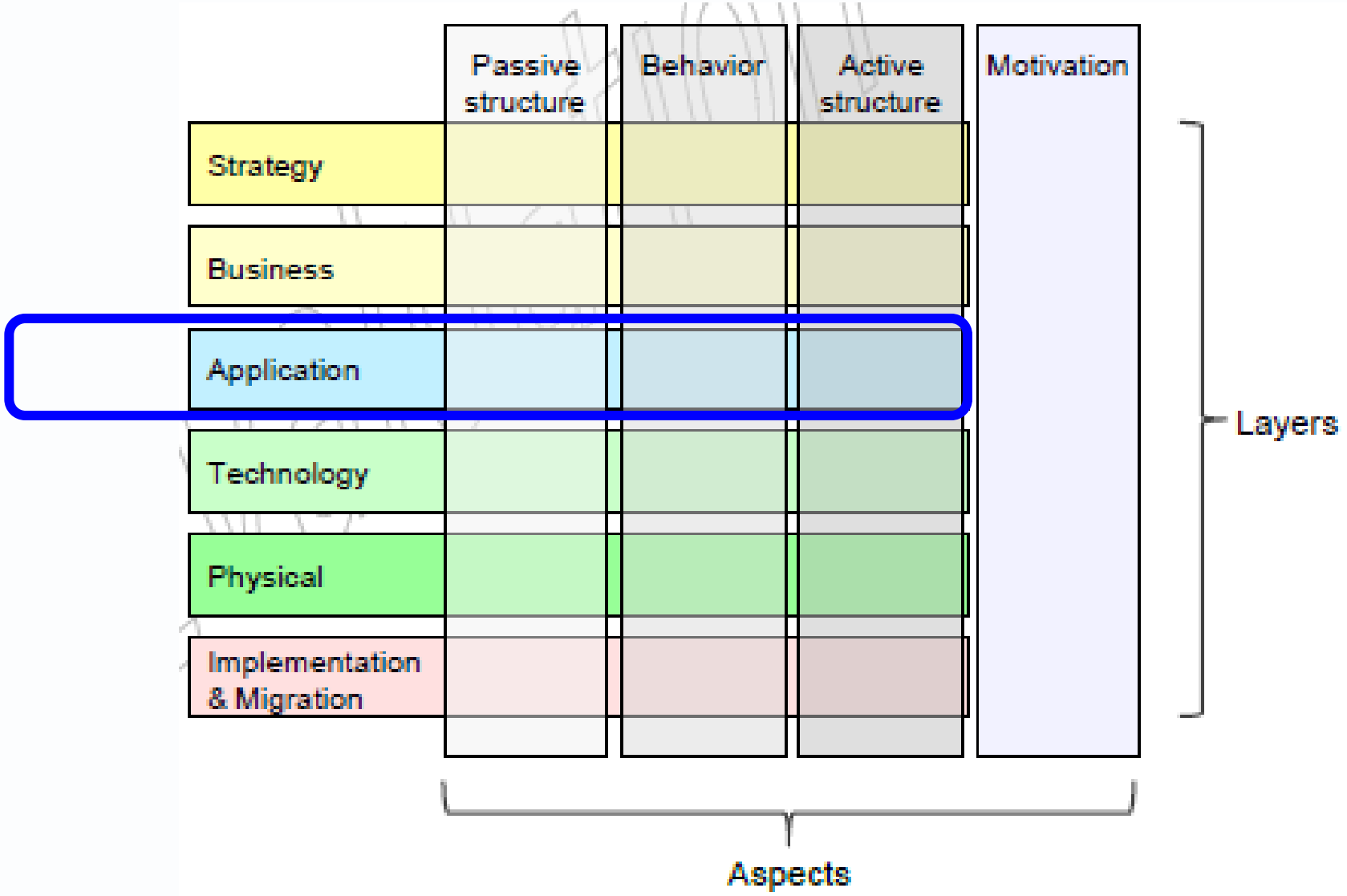


Information Structure Viewpoint 2.1

A strange kind of Business Data Model



ArchiMate FULL framework



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TOGAF: Application Communication Diagram

- to depict all models and mappings related to communication between applications in the metamodel entity.
- shows application components and interfaces between components.
- Interfaces may be associated with data entities where appropriate.
- Applications may be associated with business services where appropriate.
- Communication should be logical and should only show intermediary technology where it is architecturally relevant..

Application Co-operation Viewpoint

TOGAF Application communication diagram

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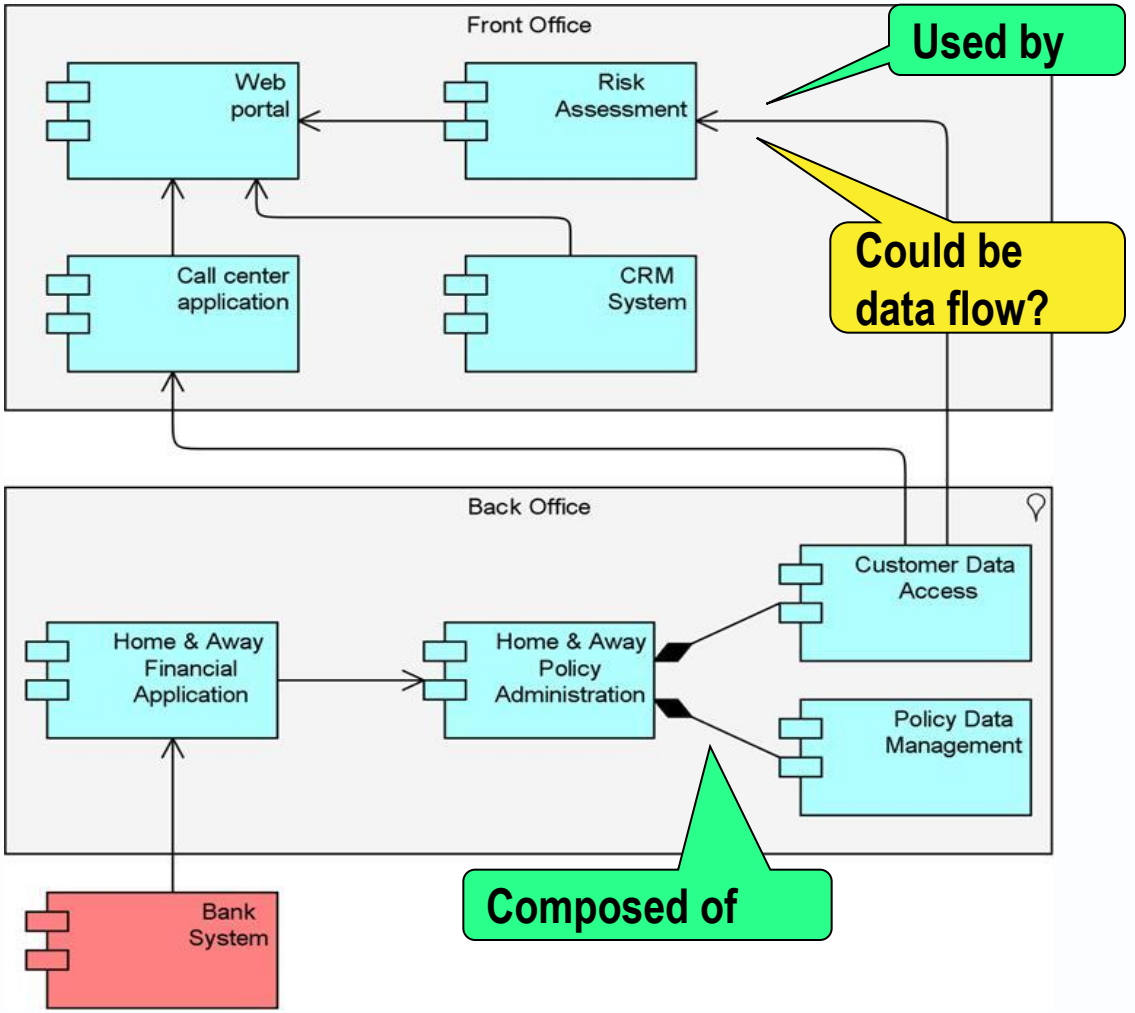
- describes the relationships between applications components in terms of the **information flows** between them, or in terms of the **services** they offer and use
- typically used to create an overview of the application landscape of an organization
- also used to express the (internal) cooperation or orchestration of services that together support the execution of a business process.



TOGAF: Application Use Case Diagram

Find UML examples on the web!

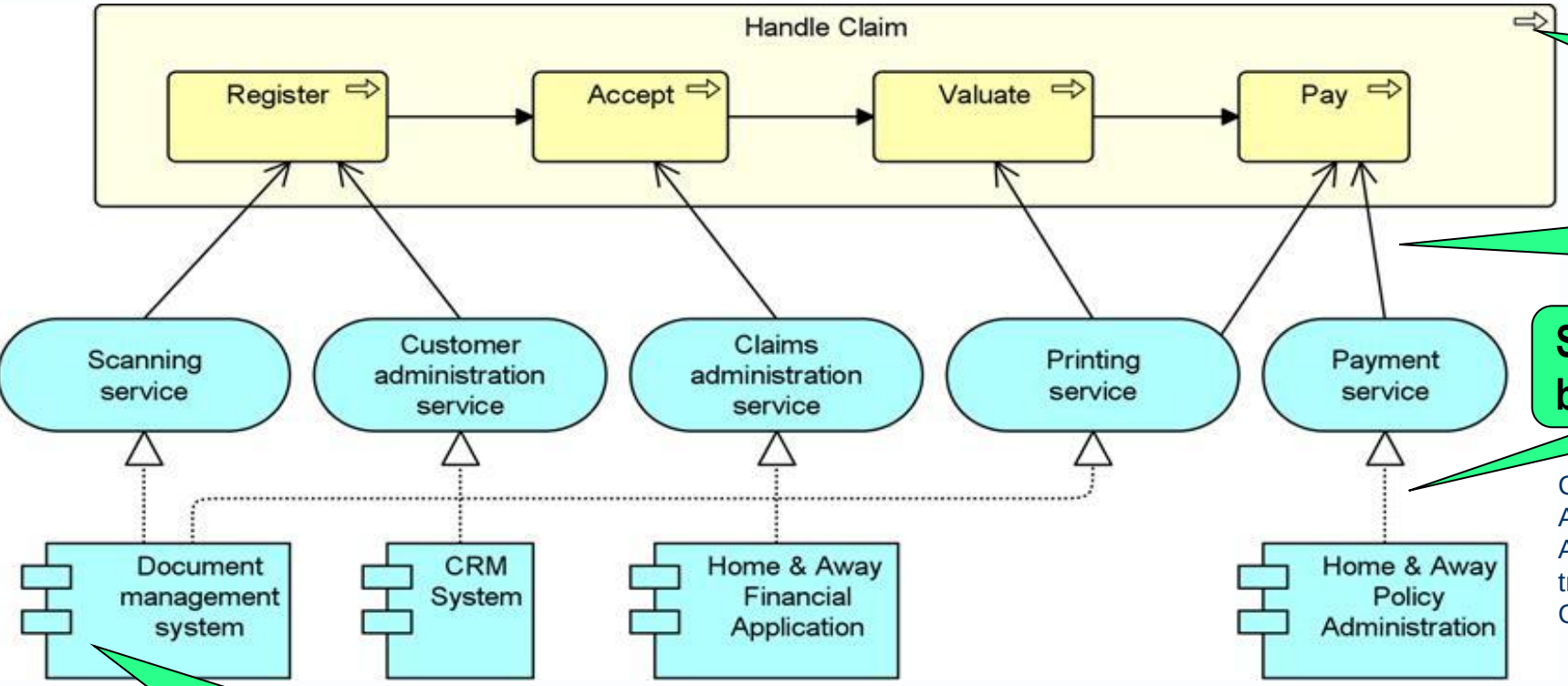
Avancier

- displays the relationships between consumers and providers of application services.
- Application services are consumed by actors or other application services and the Application Use-Case diagram provides added richness in describing application functionality by illustrating how and when that functionality is used.

- to help to describe and validate the interaction between actors and their roles with applications.
- As the architecture progresses, the use-case can evolve from functional information to include technical realization detail.
- Application use-cases can also be re-used in more detailed systems design work.

Application Usage Viewpoint

- describes the relationships between applications components in terms of the information flows between them, or in terms of the services they offer and use - typically used to create an overview of the application landscape of an organization - also used to express the (internal) cooperation or orchestration of services that together support the execution of a business process.



Business process

Process uses App Service

Service realised by Component

1 component provides > 1 service

You can find plenty of UML sequence diagram examples on the web

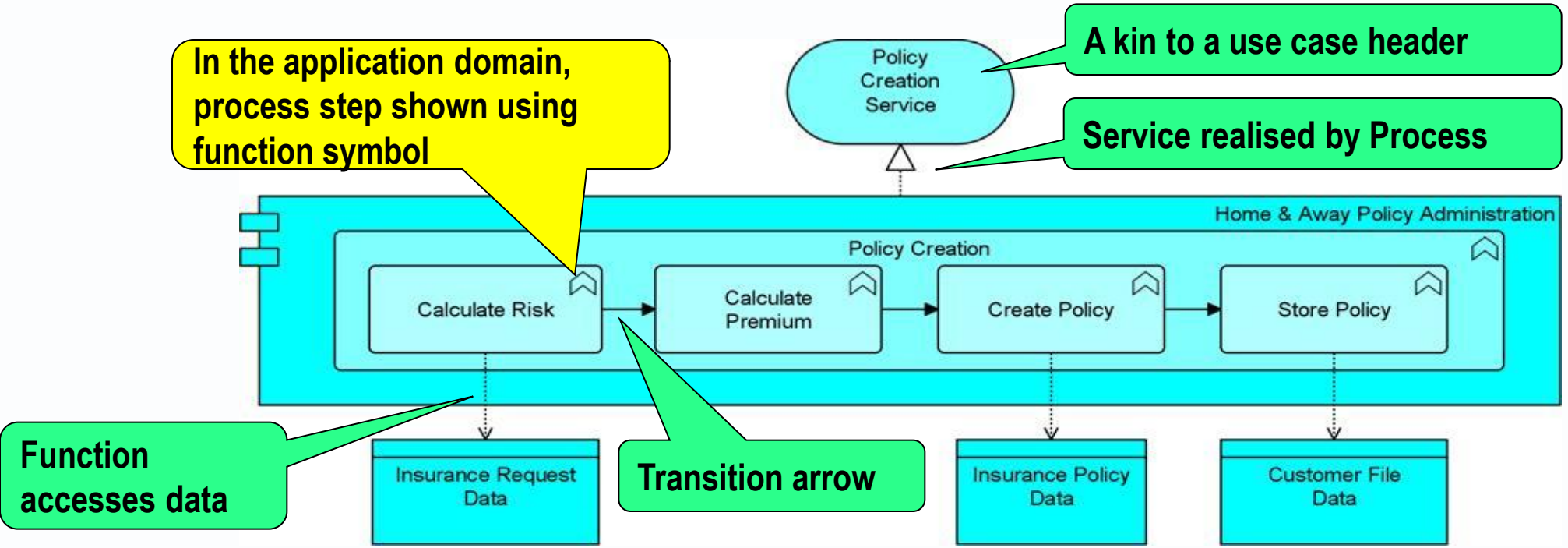
TOGAF: Process/Application Realization Diagram

- to clearly depict the sequence of events when multiple applications are involved in executing a business process.
- enhances the Application Communication diagram by augmenting it with any sequencing constraints, and hand-off points between batch and real-time processing.
- It would identify complex sequences that could be simplified, and identify possible rationalization points in the architecture in order to provide more timely information to business users. It may
- also identify process efficiency improvements that may reduce interaction traffic between applications.

Cf. Process/Application Realization diagram?

2.1 Application Behavior Viewpoint

- Stakeholders: Enterprise, process, application, and domain architects
- Concerns: Structure, relationships and dependencies between applications, consistency and completeness, reduction of complexity



Software Engineering Diagram

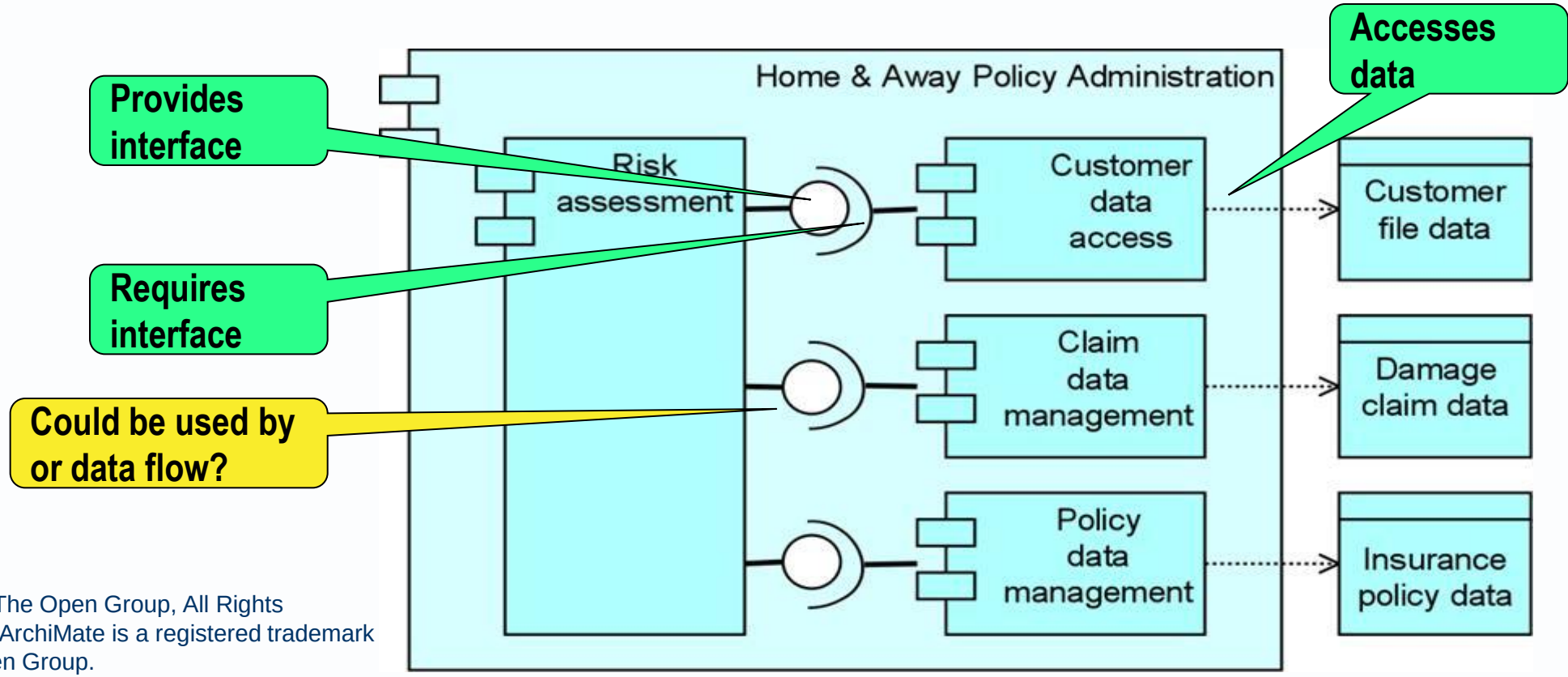
- breaks applications into packages, modules, services, and operations from a development perspective.
- enables more detailed impact analysis when planning migration stages, and analyzing opportunities and solutions.
- ideal for application development teams and application management teams when managing complex development environments.

2.1 Application Structure Viewpoint

Cf. SW engineering OR Application communication diagrams

Avancier

- Stakeholders: Enterprise, process, application, and domain architects
- Concerns: Application structure, consistency and completeness, reduction of complexity



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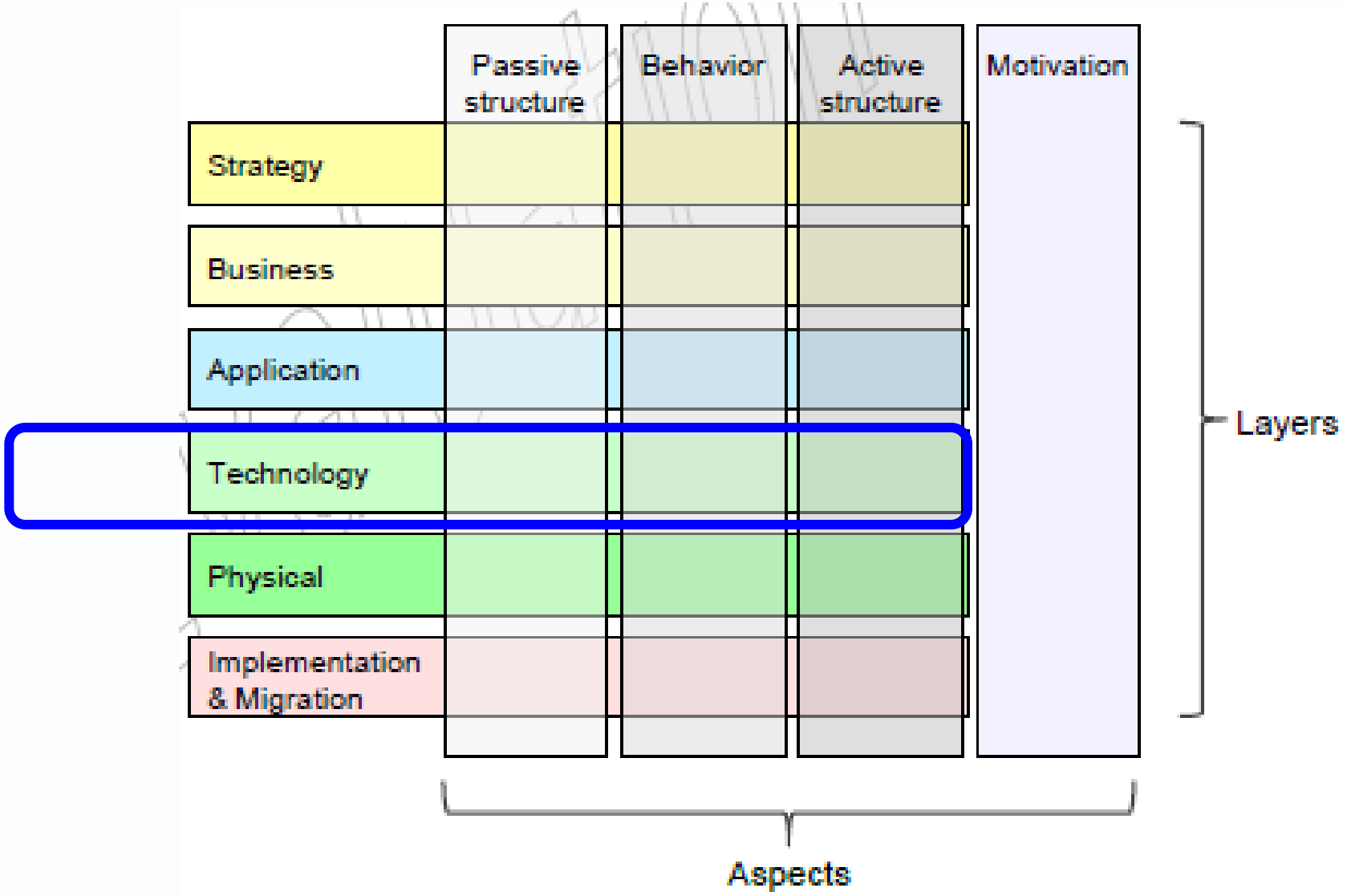

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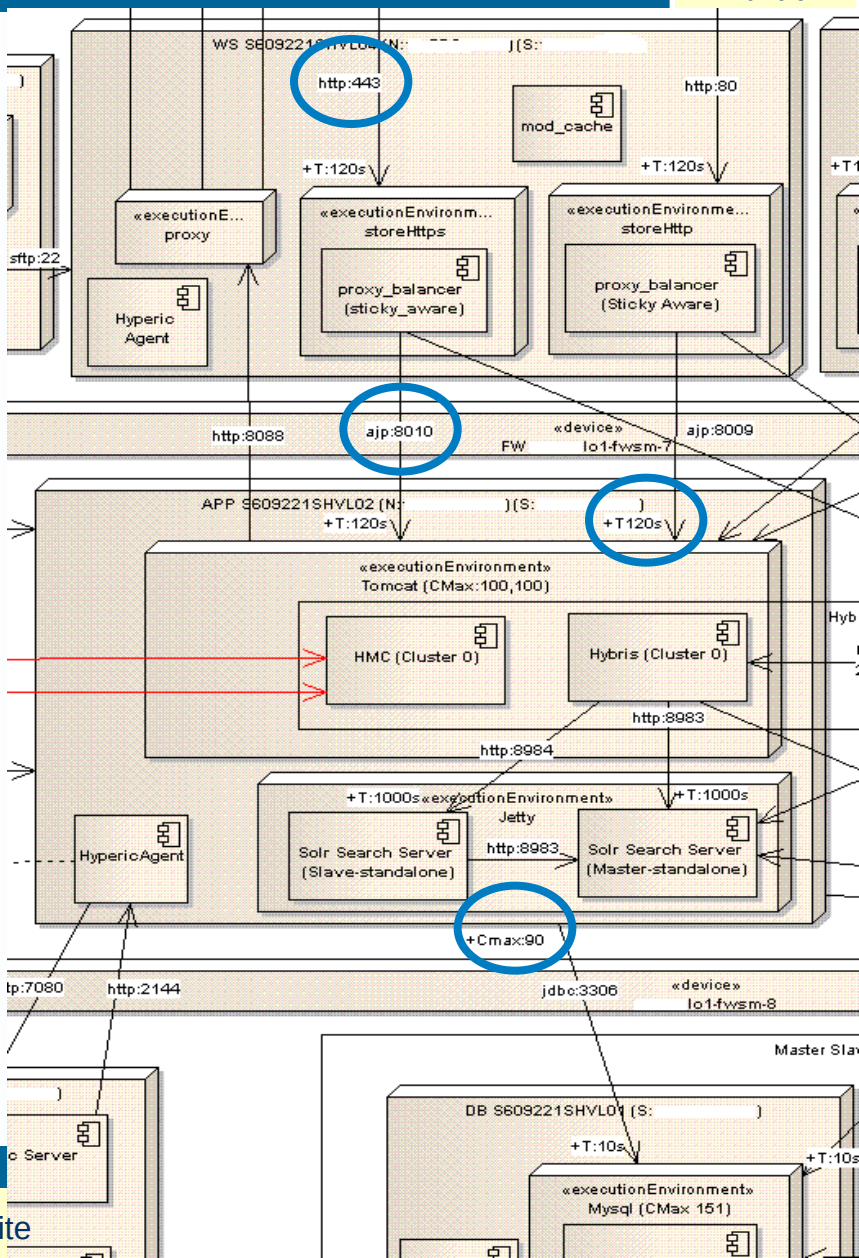
TOGAF: Network Computing Hardware Diagram

- to show the "as deployed" logical view of logical application components in a distributed network computing environment.

- The diagram is useful for the following reasons:
  - Enable understanding of which application is deployed where
  - Establishing authorization, security, and access to these technology components
  - Understand the Technology Architecture that support the applications during problem resolution and troubleshooting
  - Isolate performance problems encountered and perform necessary upgrade to specific physical technology components
  - Identify areas of optimization
  - Enable application/technology auditing and prove compliance
  - Serve as an important tool supporting effective change management

TOGAF: Processing Diagram

- focuses on deployable units of code/configuration and how these are deployed onto the technology platform.
- addresses the following:
  - Which set of application components need to be grouped to form a deployment unit
  - How one deployment unit connects/interacts with another (LAN, WAN, and the applicable protocols)
  - How application configuration and usage patterns generate load or capacity requirements for different technology components
- The organization of deployment units depends on separation concerns of the presentation, business logic, and data store layers and service-level requirements of the components.



Implementation and Deployment Viewpoint

TOGAF Networked Computing Hardware Diagram Or Process Diagram?

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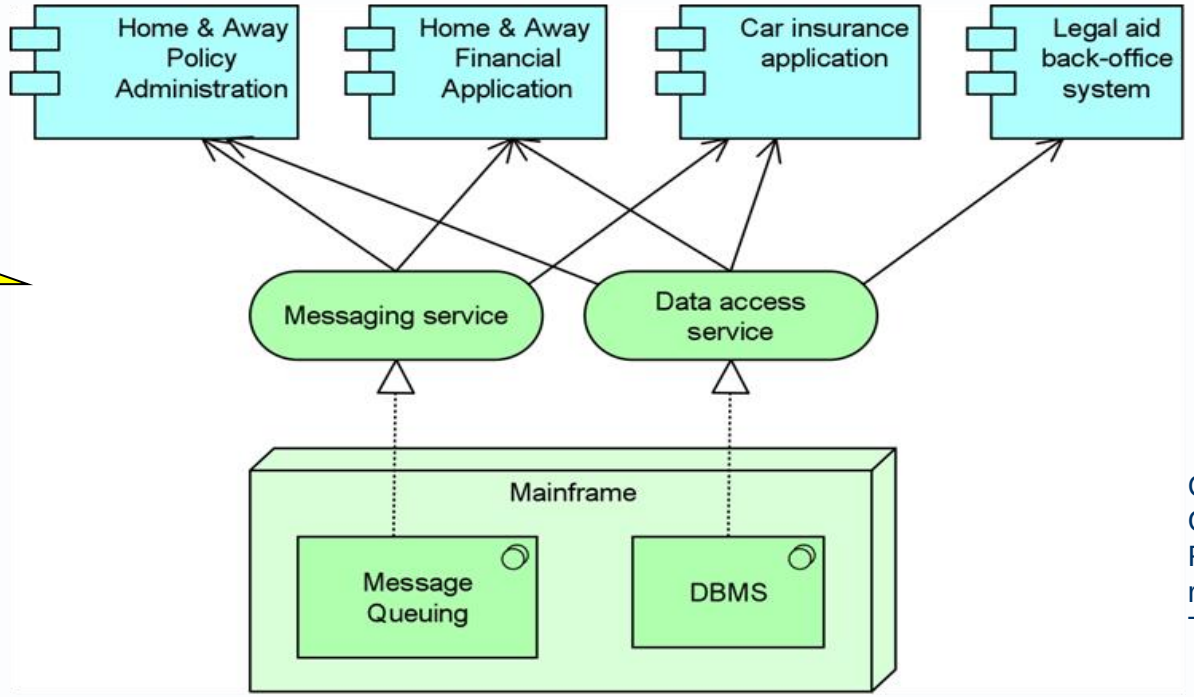
- shows how one or more applications are realized on the infrastructure - mapping of applications and components onto artifacts - mapping of the information used by these applications and components onto the underlying storage infrastructure

Dodgy v 2.1 diagram



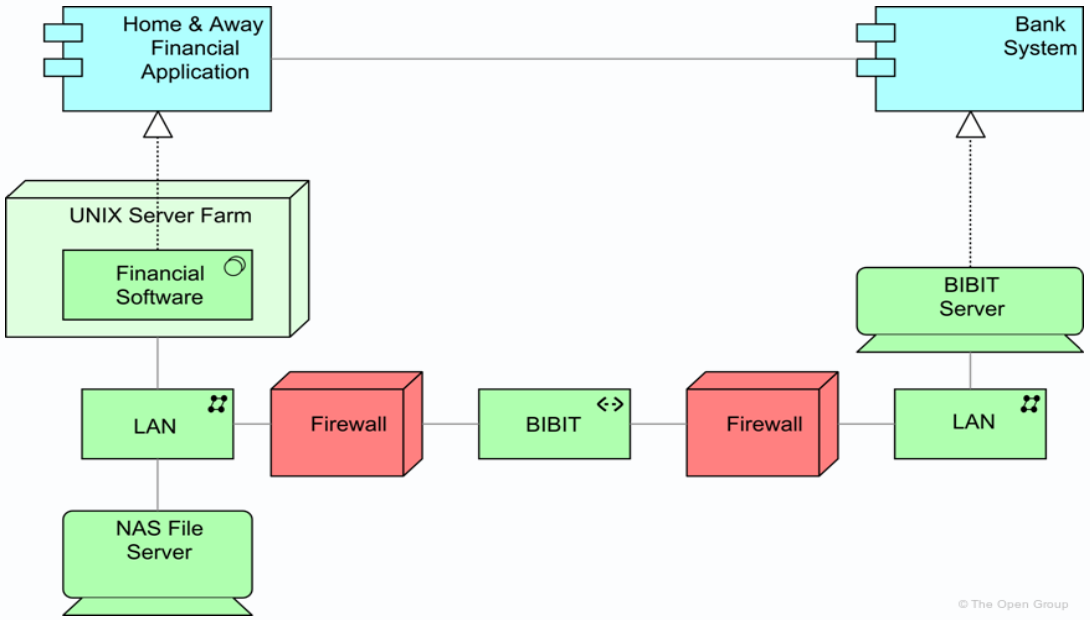
Technology Usage Viewpoint

TOGAF Networked Computing Hardware Diagram Or Process Diagram?

Avancier

- shows how applications are supported by the software and hardware technology: the technology services are delivered by the devices; system software an networks are provided to the applications - plays an important role in the analysis of performance and scalability, since it relates the physical infrastructure to the logical world of applications - very useful in determining the performance and quality requirements on the infrastructure based on the demands of the various applications that use it

Dodgy v 2.1 diagram



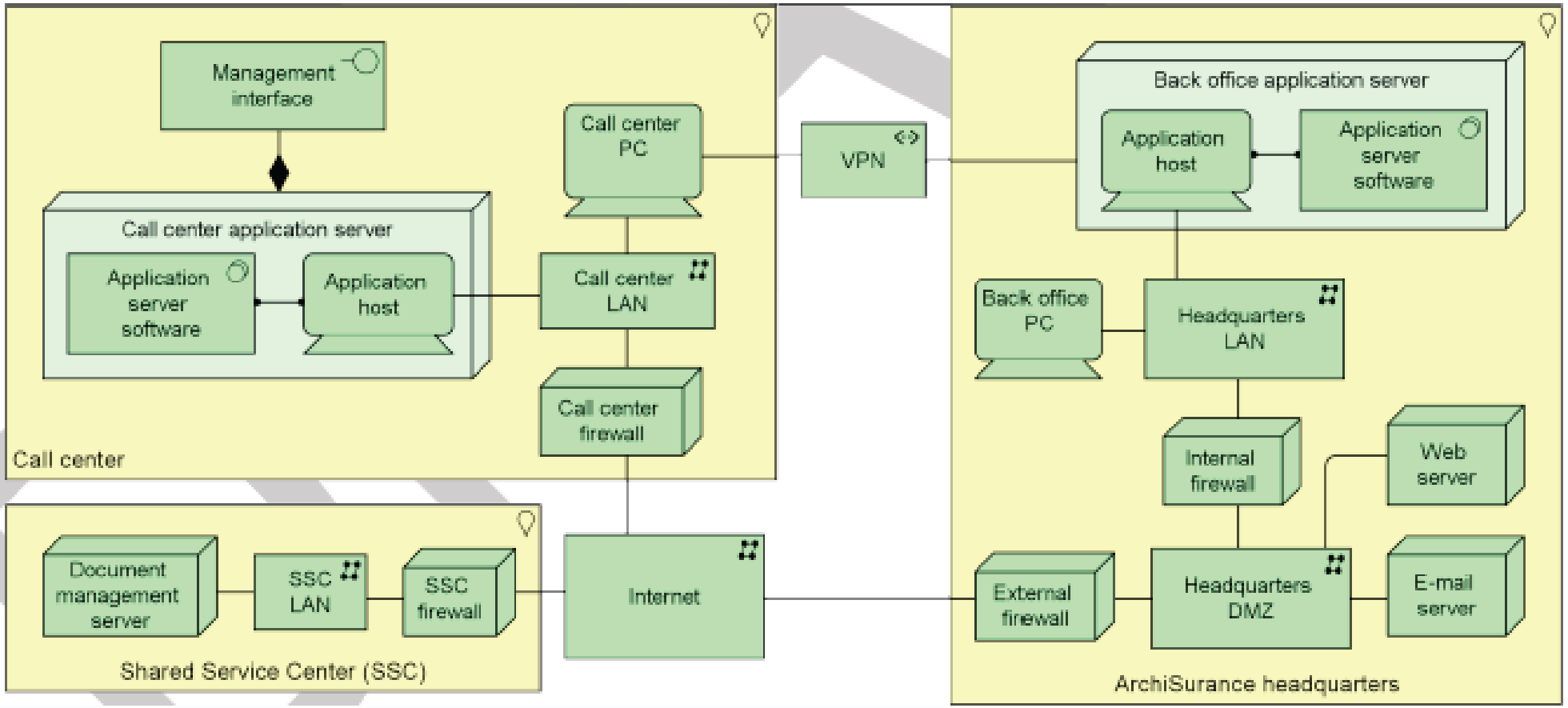
TOGAF: Platform Decomposition Diagram

- depicts the technology platform that supports the operations of the IS Architecture.
- covers all aspects of the infrastructure platform
- an overview of the enterprise's technology platform
- can be expanded to map the technology platform to appropriate application components within a specific functional or process area.
- may show details such as product versions, number of CPUs, etc.
- or simply an informal ‘‘eye-chart’’ - an overview of the technical environment.

TOGAF: Communication Engineering Diagram

Technology Viewpoint

- contains the software and hardware technology elements supporting the Application Layer, such as physical devices, networks, or system software (e.g., operating systems, databases, and middleware).



Technology Viewpoint

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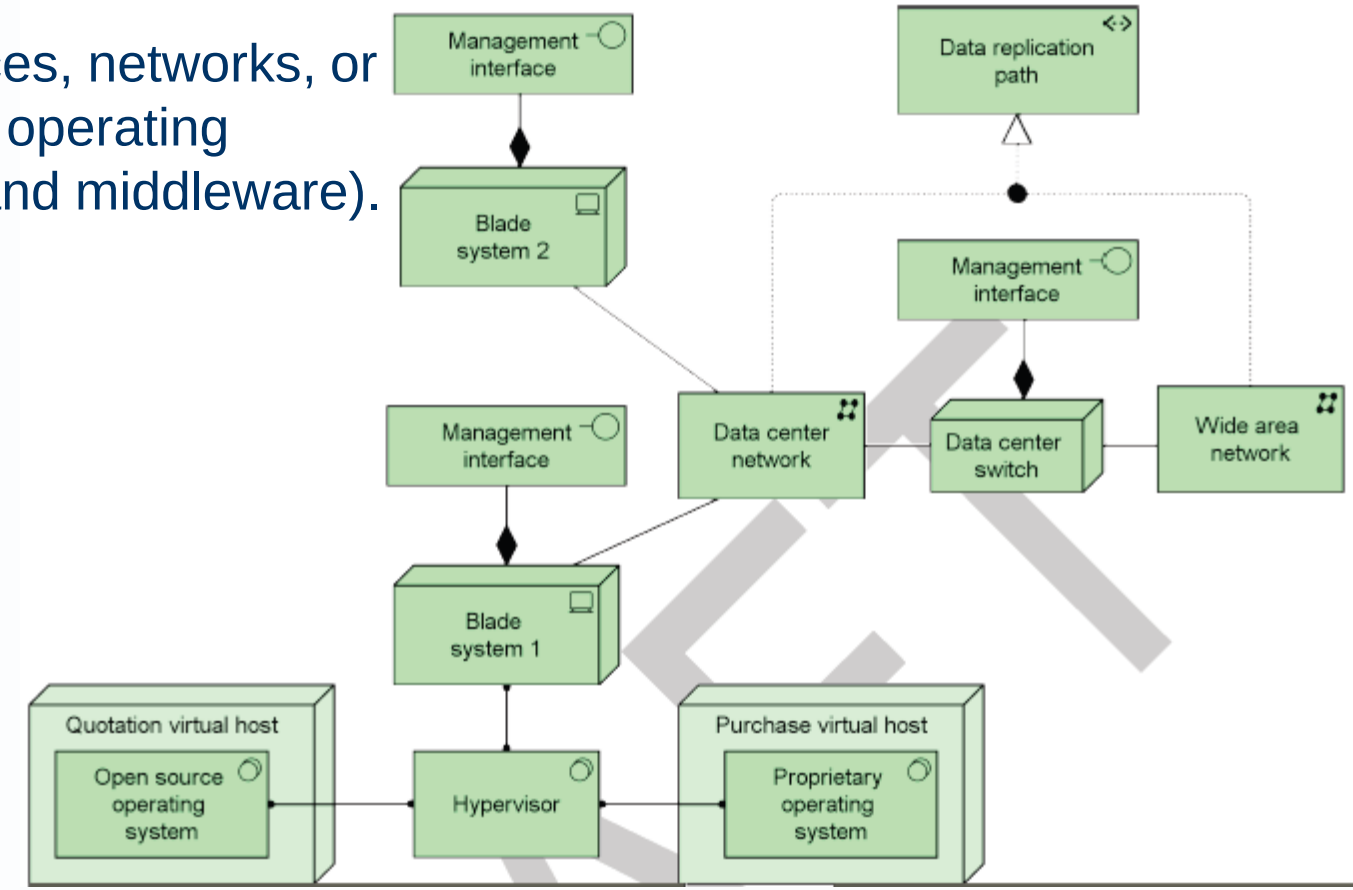
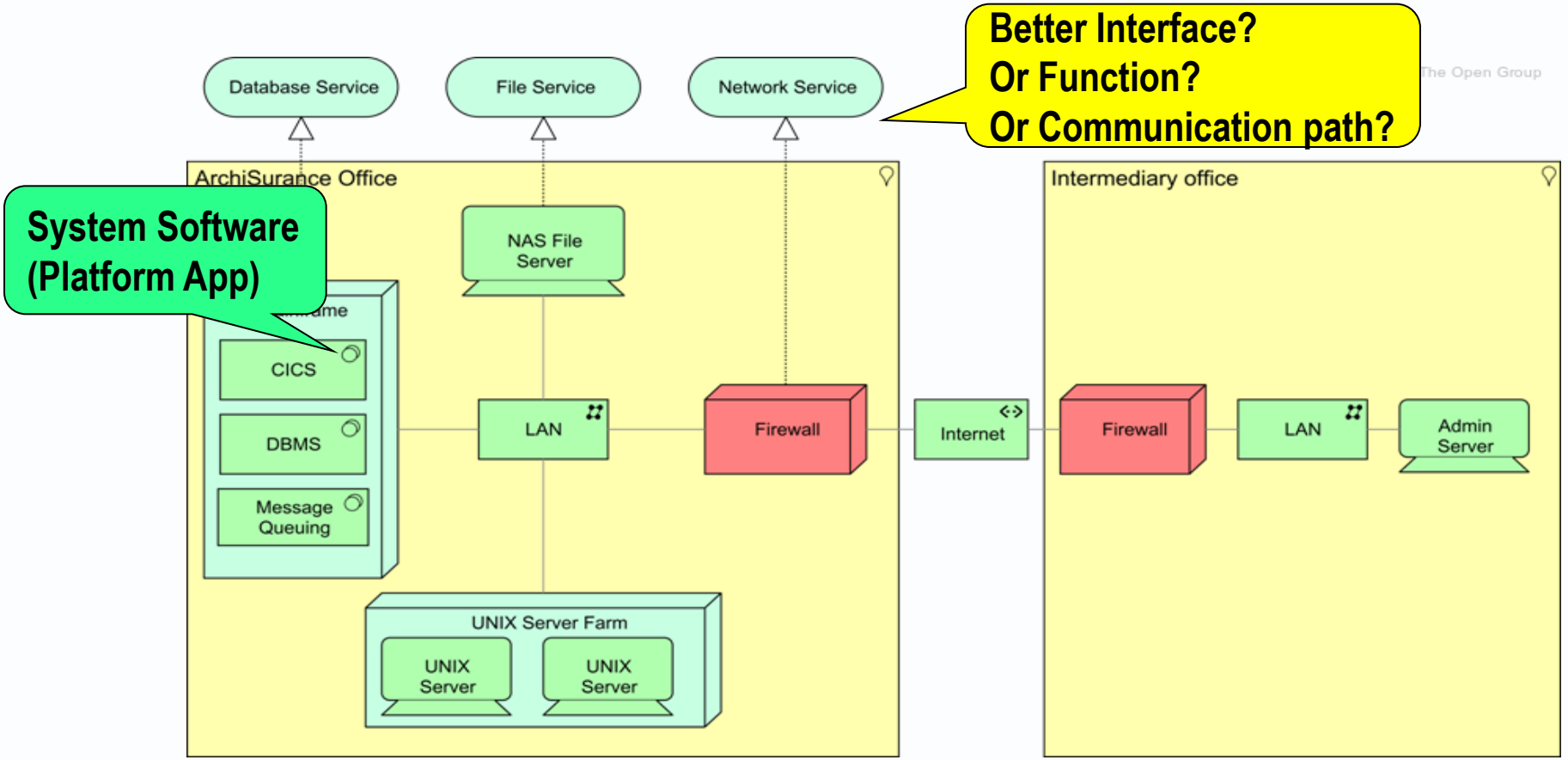


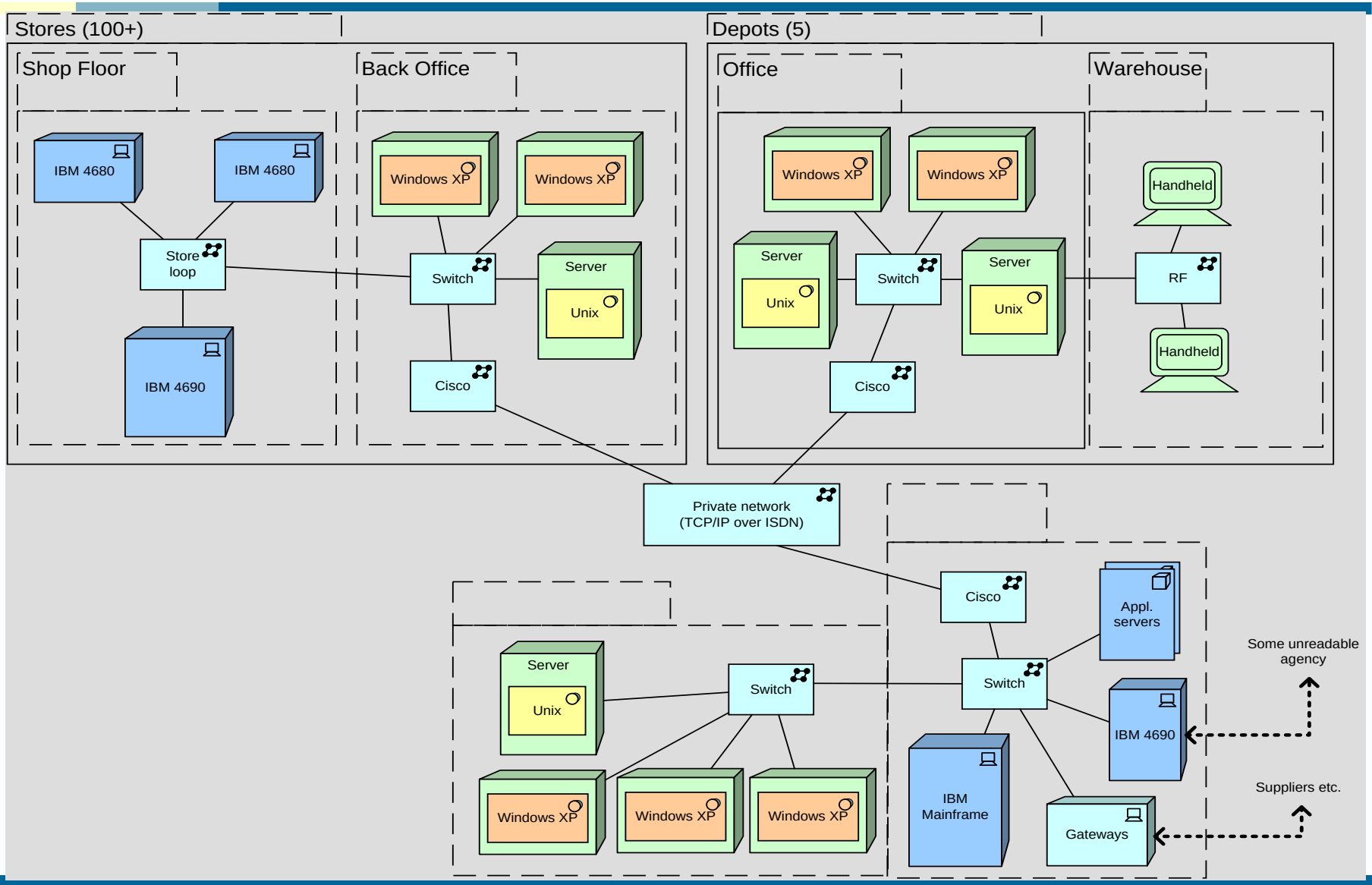
Technology Viewpoint 2.1

- Stakeholders: Infrastructure architects, operational managers
- Concerns: Stability, security, dependencies, costs of the infrastructure



TOGAF Platform Decomposition Diagram

Technology Viewpoint

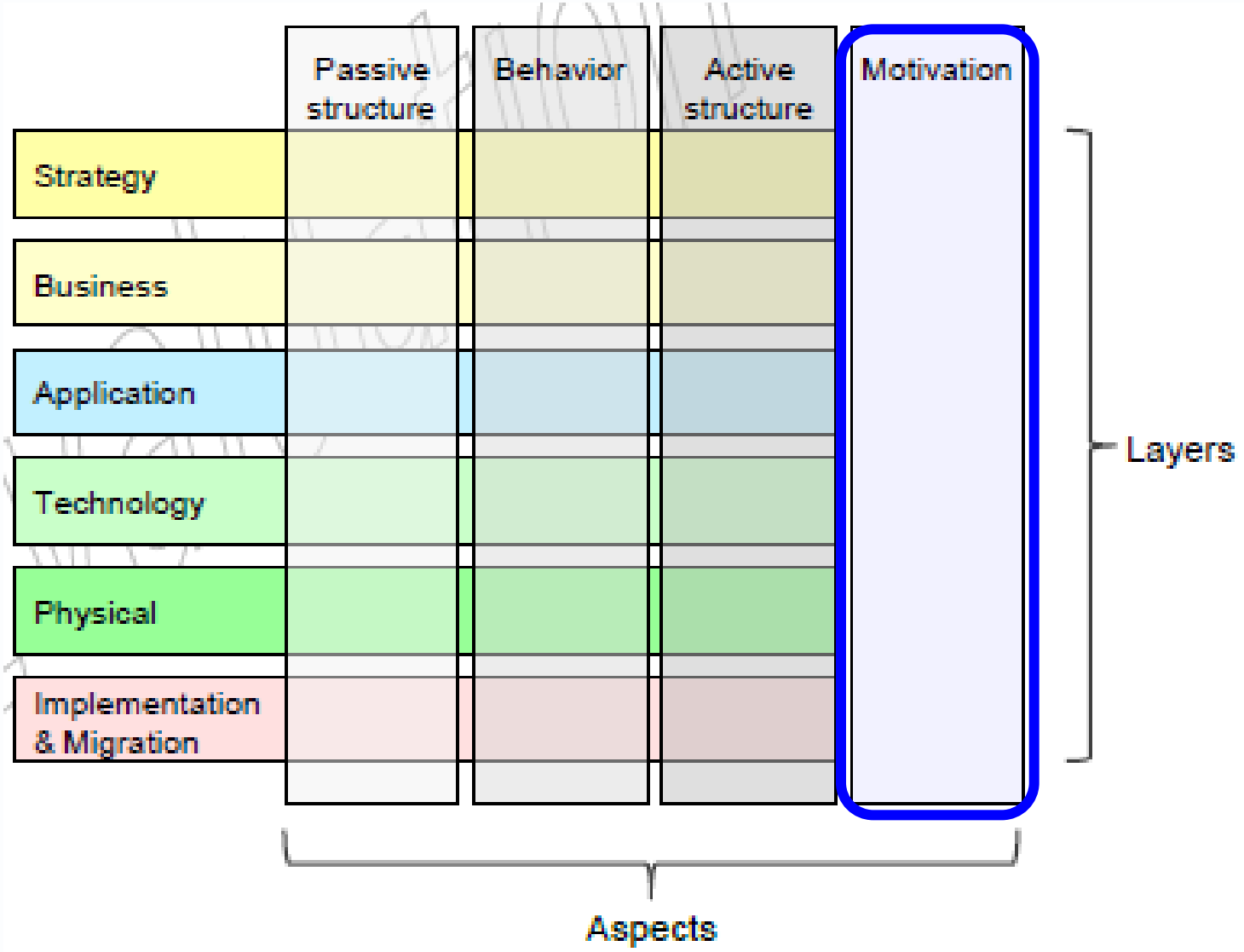


More ArchiMate viewpoints

Avancier

	2 Motivation Viewpoints	
	Stakeholder Viewpoint	
	Requirements Realization Viewpoint	
	Motivation Viewpoint	
	3 Strategy Viewpoints	
	Strategy Viewpoint	
	Outcome Realization Viewpoint	
	Resource Map Viewpoint	
	4 Implementation and Migration Viewpoints	
	Project Viewpoint	
	Migration Viewpoint	
	Implementation and Migration Viewpoint	

ArchiMate FULL framework



2 Motivation Viewpoints

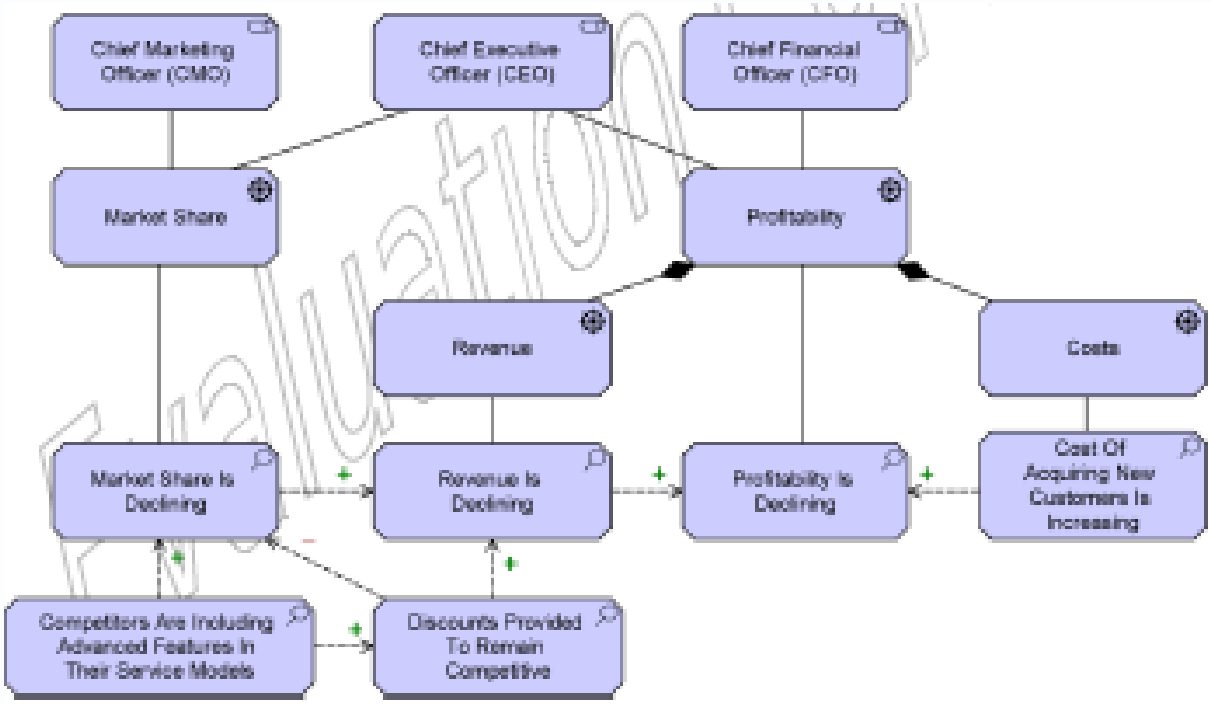
- **Stakeholder Viewpoint >**
- **Goal Realization Viewpoint >**
- **Requirements realization viewpoint:** focuses on modeling the realization of requirements and constraints by means of core elements, such as actors, services, processes, application components, etc.
- **Motivation viewpoint:** covers the entire motivational aspect and allows use of all motivational elements.

Also

- **Goal contribution viewpoint:** focuses on modeling and analyzing the influence relationships between goals (and requirements).
- **Principles viewpoint:** focuses on modeling the relevant principles and the goals that motivate these principles.
- **Capability map viewpoint:** provides an overview of the capabilities of the enterprise.

Stakeholder viewpoint

focuses on modeling the stakeholders, drivers, the assessments of these drivers, and the initial goals to address these drivers and assessments.



Example 18: Stakeholder, Driver, and Assessment

Stakeholder: The role of an individual, team, or organization (or classes thereof) that represents their interests in the outcome of the architecture.

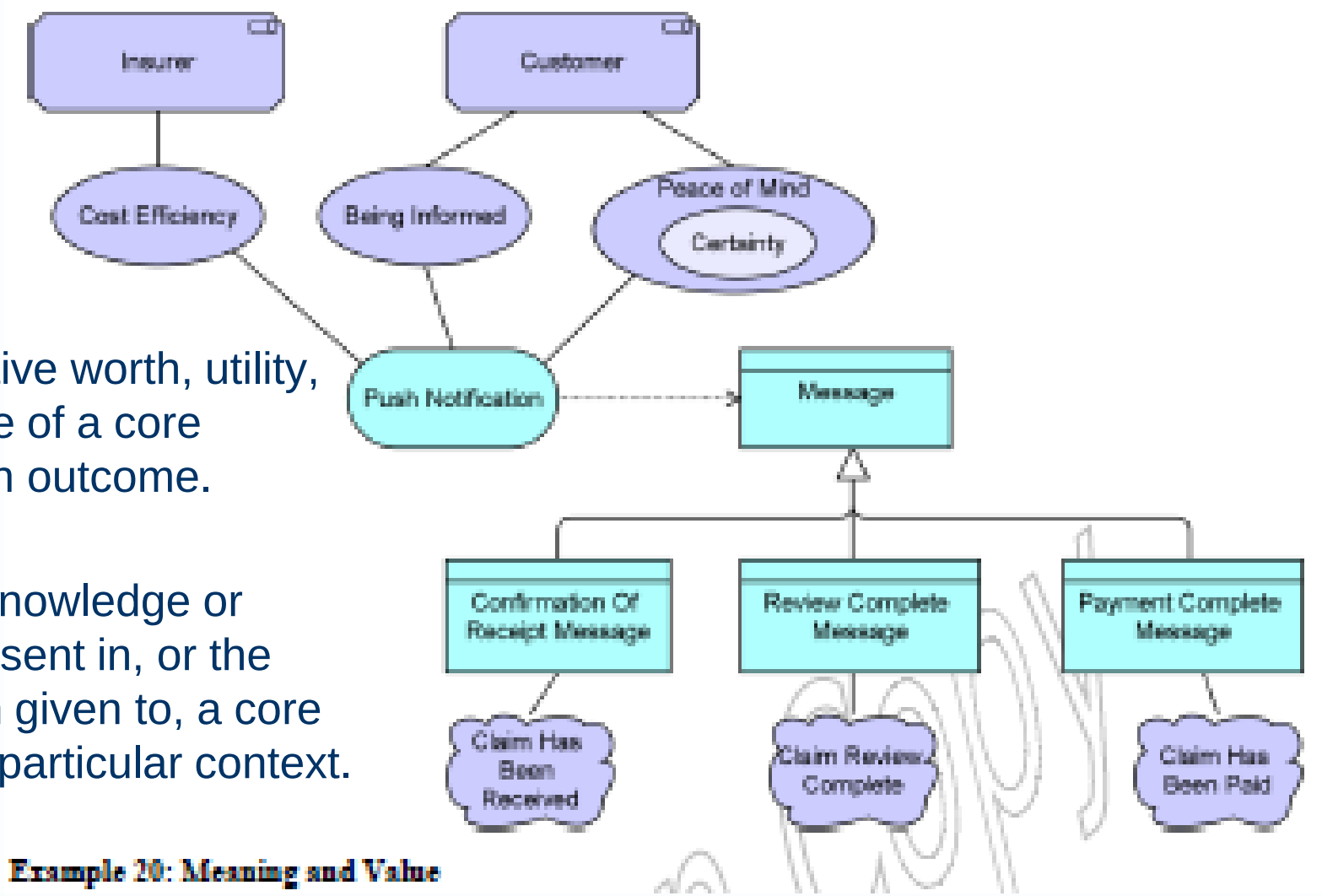
Driver: An external or internal condition that motivates an organization to define its goals and implement the changes necessary to achieve them.

Assessment: The result of an analysis of the state of affairs of the enterprise with respect to some driver.

Motivation

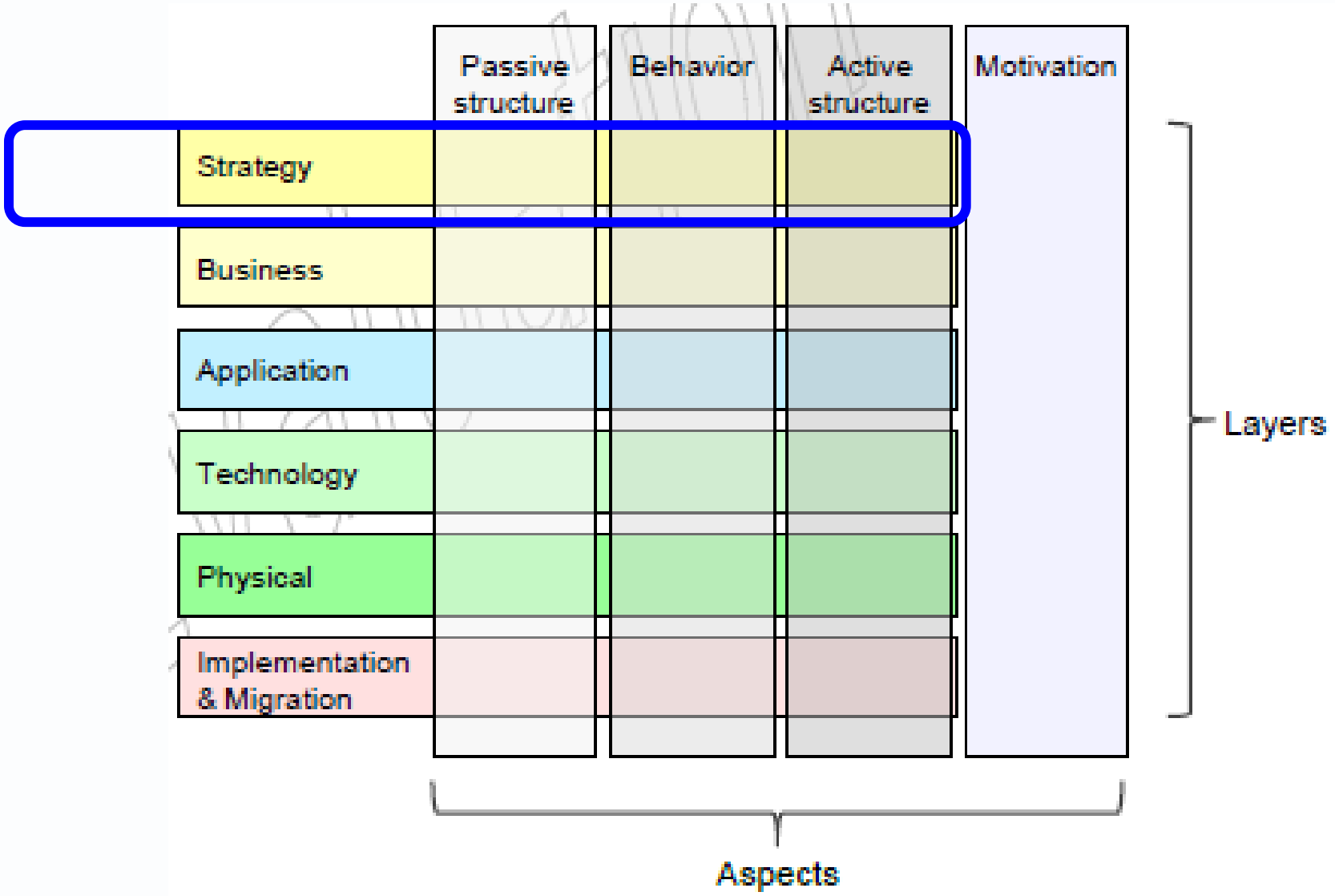
Value: The relative worth, utility, or importance of a core element or an outcome.

Meaning: The knowledge or expertise present in, or the interpretation given to, a core element in a particular context.



Example 20: Meaning and Value

ArchiMate FULL framework



3 Strategy Viewpoints

- **Strategy Viewpoint:** allows the business architect to model a high-level, strategic overview of the strategies (courses of action) of the enterprise, the capabilities and resources supporting those, and the envisaged outcomes.

- **Capability map viewpoint:** provides an overview of the capabilities of the enterprise.

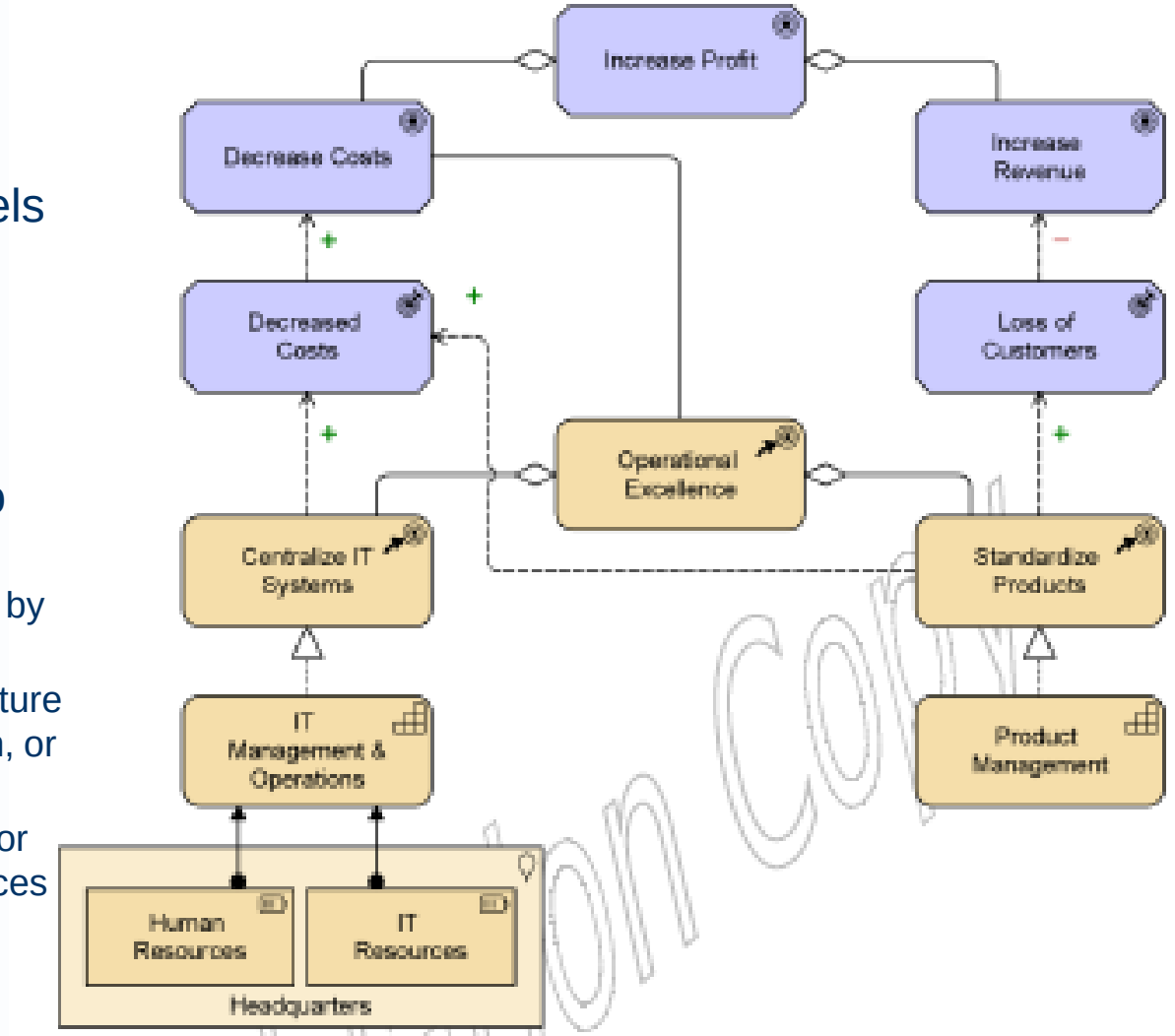
- **Outcome realization viewpoint:** describes how high-level, business-oriented results are produced by the capabilities and resources of the enterprise.

- **Resource Map Viewpoint >**

Resource map viewpoint

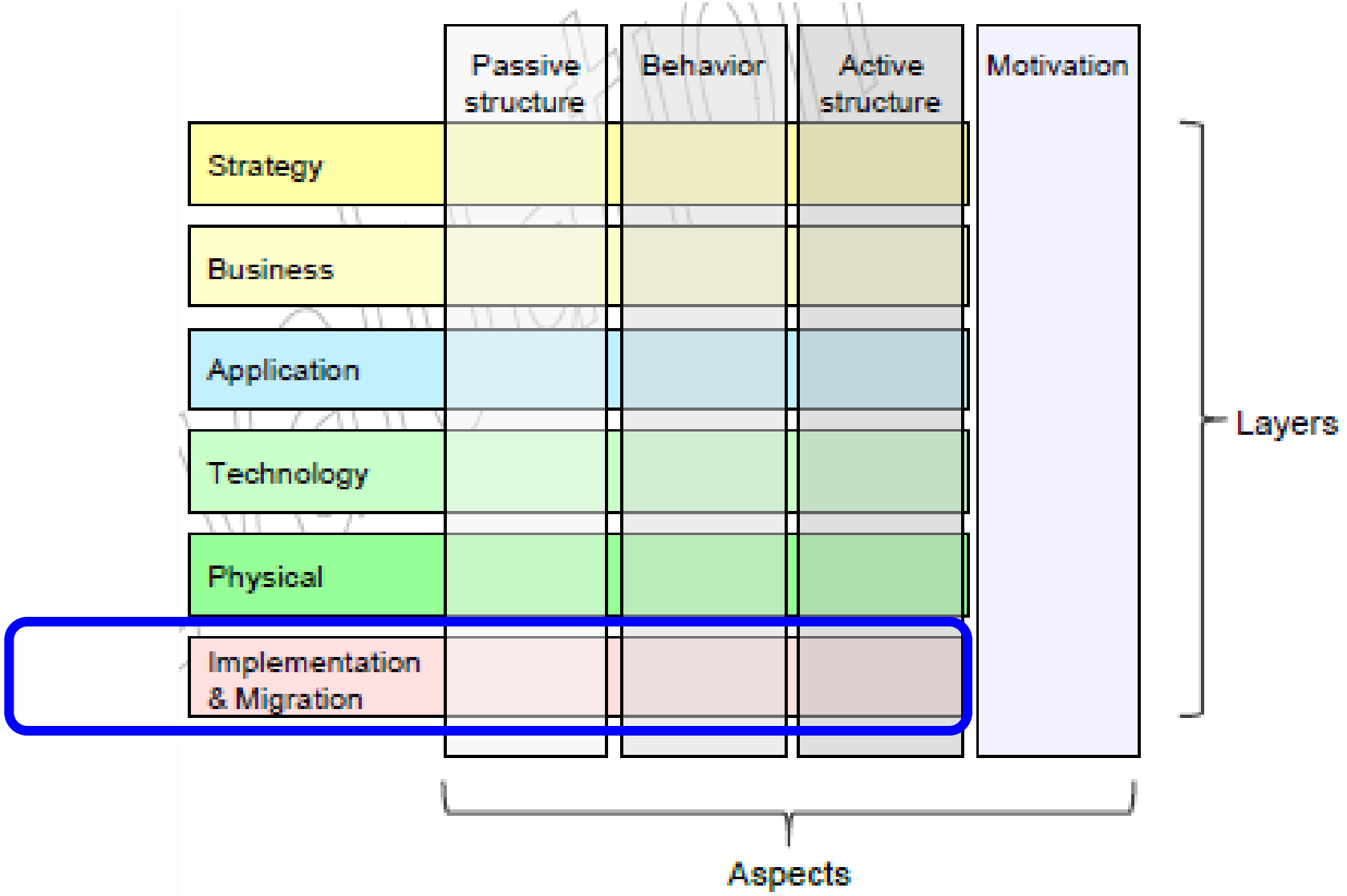
- a structured overview of the resources of the enterprise.
- typically shows two or three levels of resources across the entire enterprise.
- may also show relationships between resources and the capabilities they are assigned to

- **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 of the enterprise, undertaken to achieve



Example 21: Strategy Elements

ArchiMate FULL framework



TOGAF: Project Context Diagram

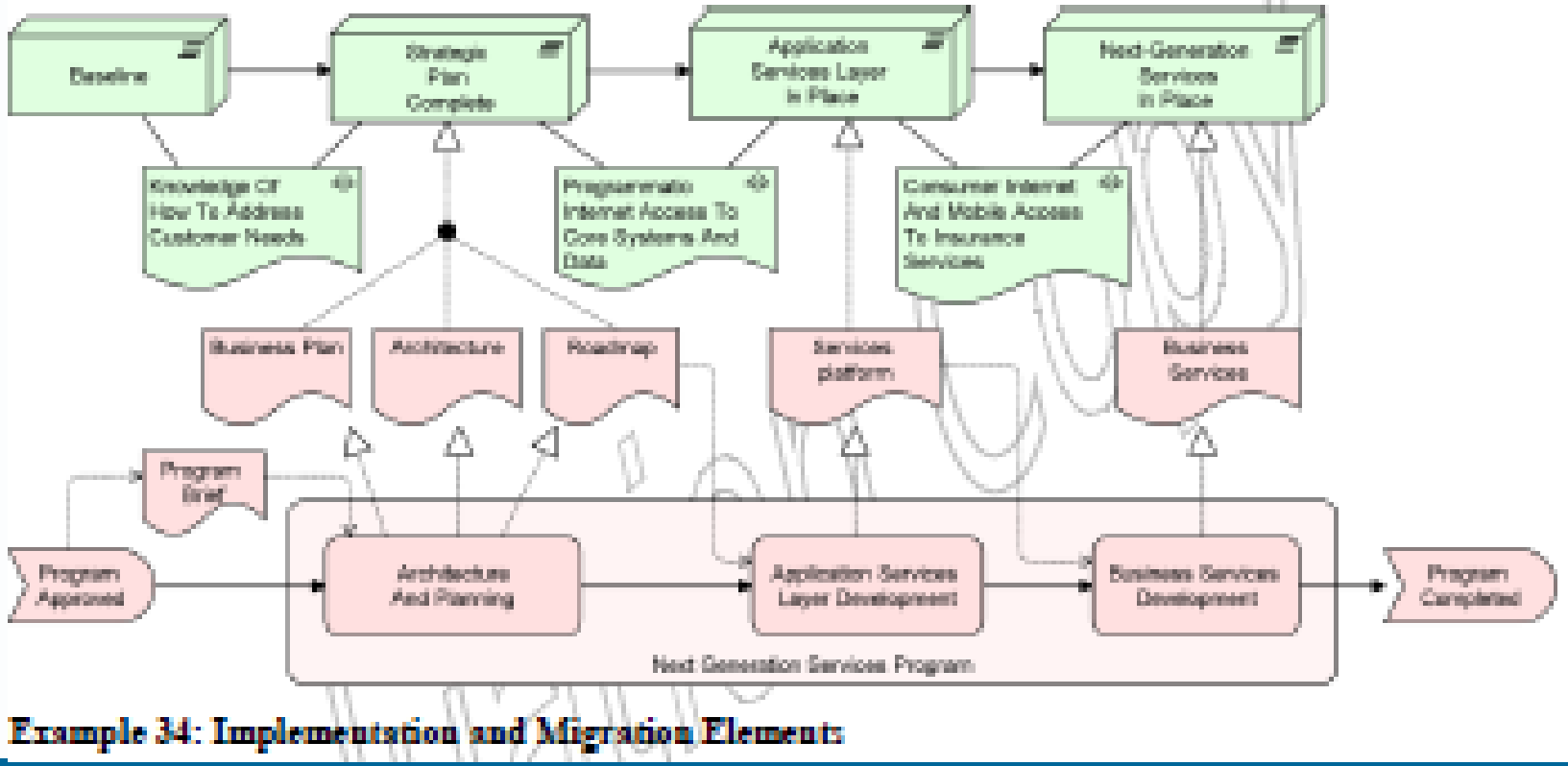
- A Project Context diagram shows the scope of a work package to be implemented as a part of a broader transformation roadmap.
- The Project Context diagram links a work package to the organizations, functions, ser vices, processes, applications, data, and technology that will be added, removed, or impacted by the project.
- The Project Context diagram is also a valuable tool for project portfolio management and project mobilization.

4 Implementation and Migration Viewpoints

- **Project viewpoint:** primarily used to model the management of architecture change.
- **Migration viewpoint:** used to model the transition from an existing architecture to a target architecture.
- **Implementation and Migration Viewpoint >**

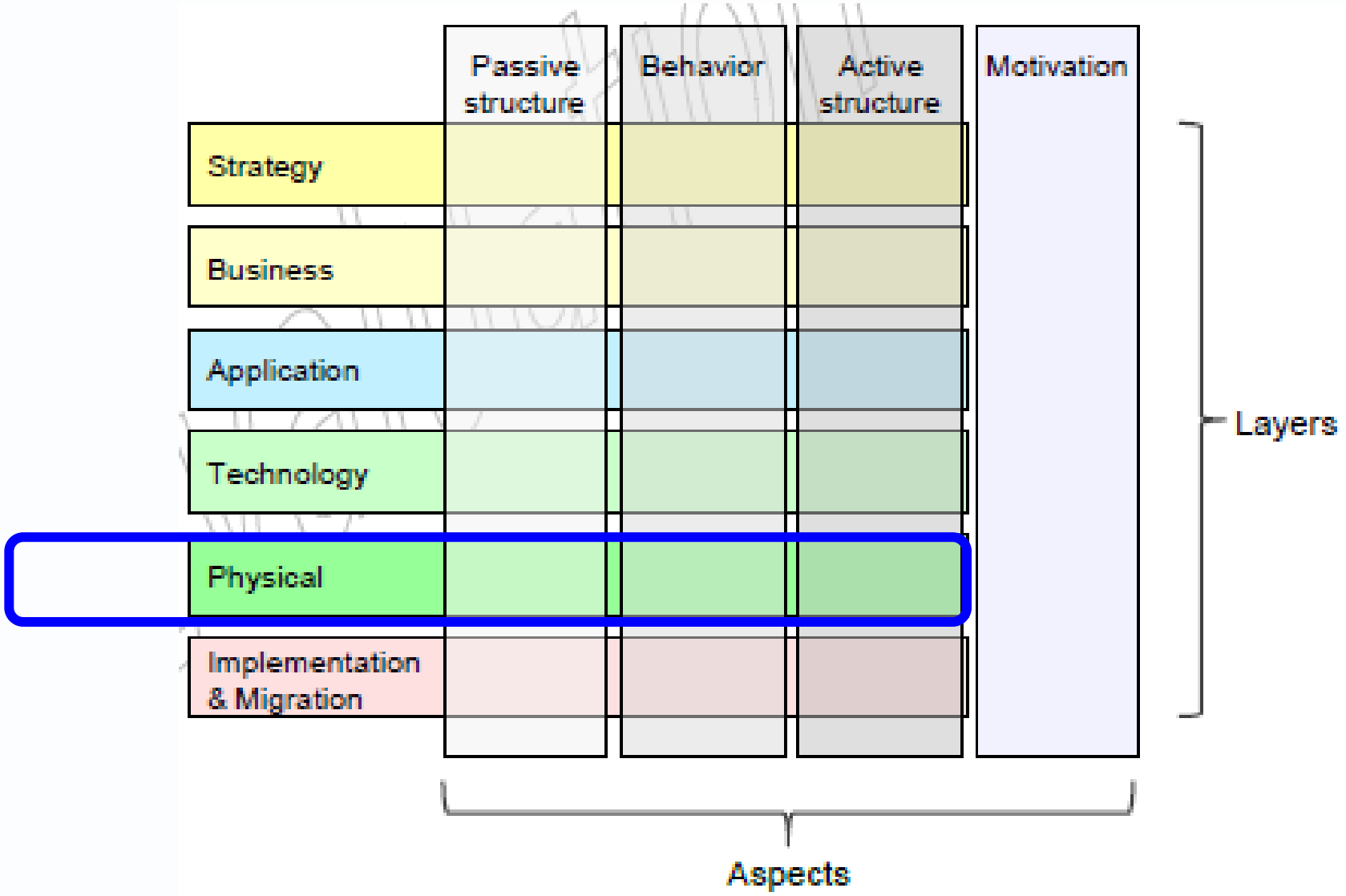
Implementation and migration viewpoint

- relate programs and projects to parts of the architecture they implement.
- allows modeling of the scope of programs, projects, project activities in terms of plateaus realized or architecture elements affected
- how elements are affected may be indicated by annotations



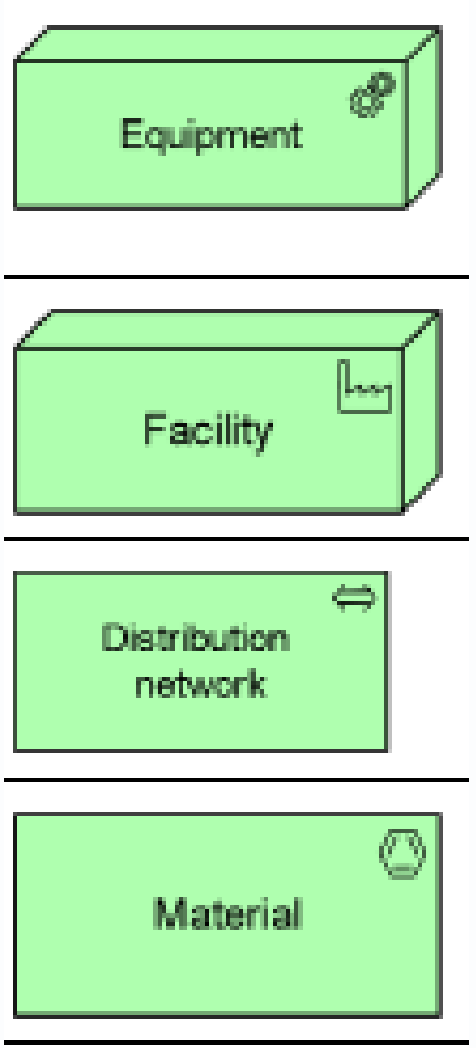
Example 34: Implementation and Migration Elements

ArchiMate FULL framework



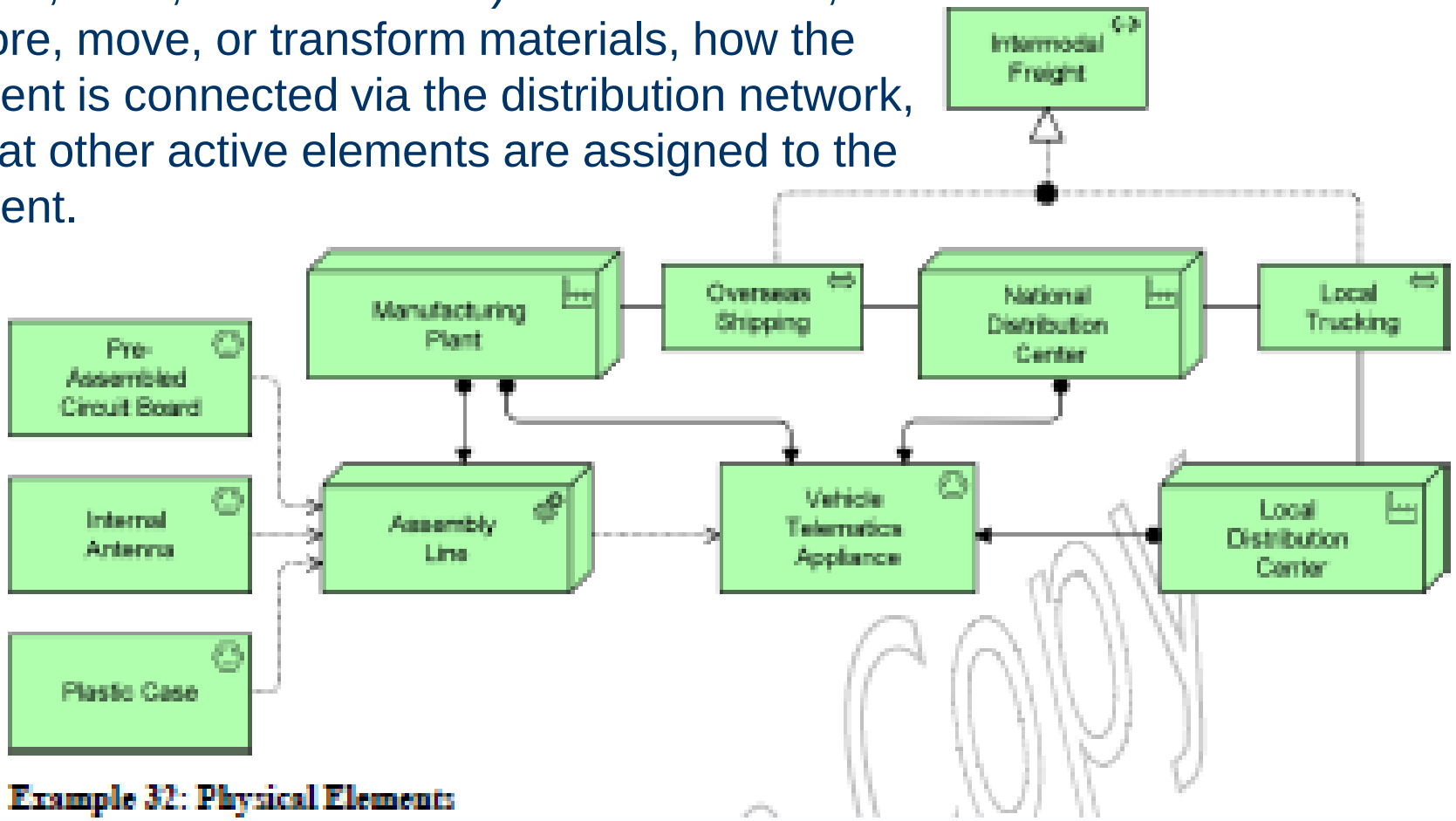
Physical elements

- **Equipment:** One or more 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..



Physical viewpoint

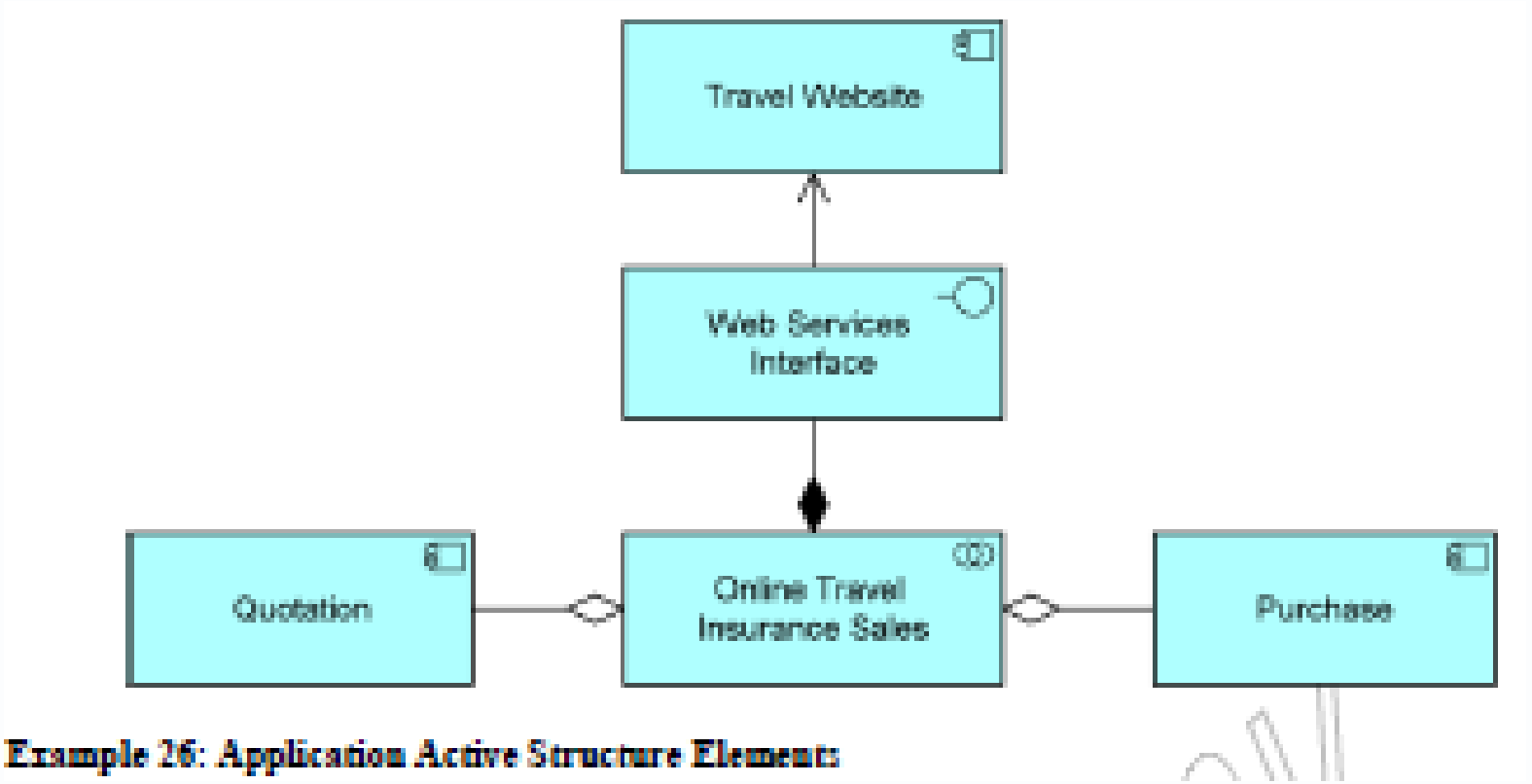
- contains equipment (one or more physical machines, tools, or instruments) that can create, use, store, move, or transform materials, how the equipment is connected via the distribution network, and what other active elements are assigned to the equipment.



Example 32: Physical Elements

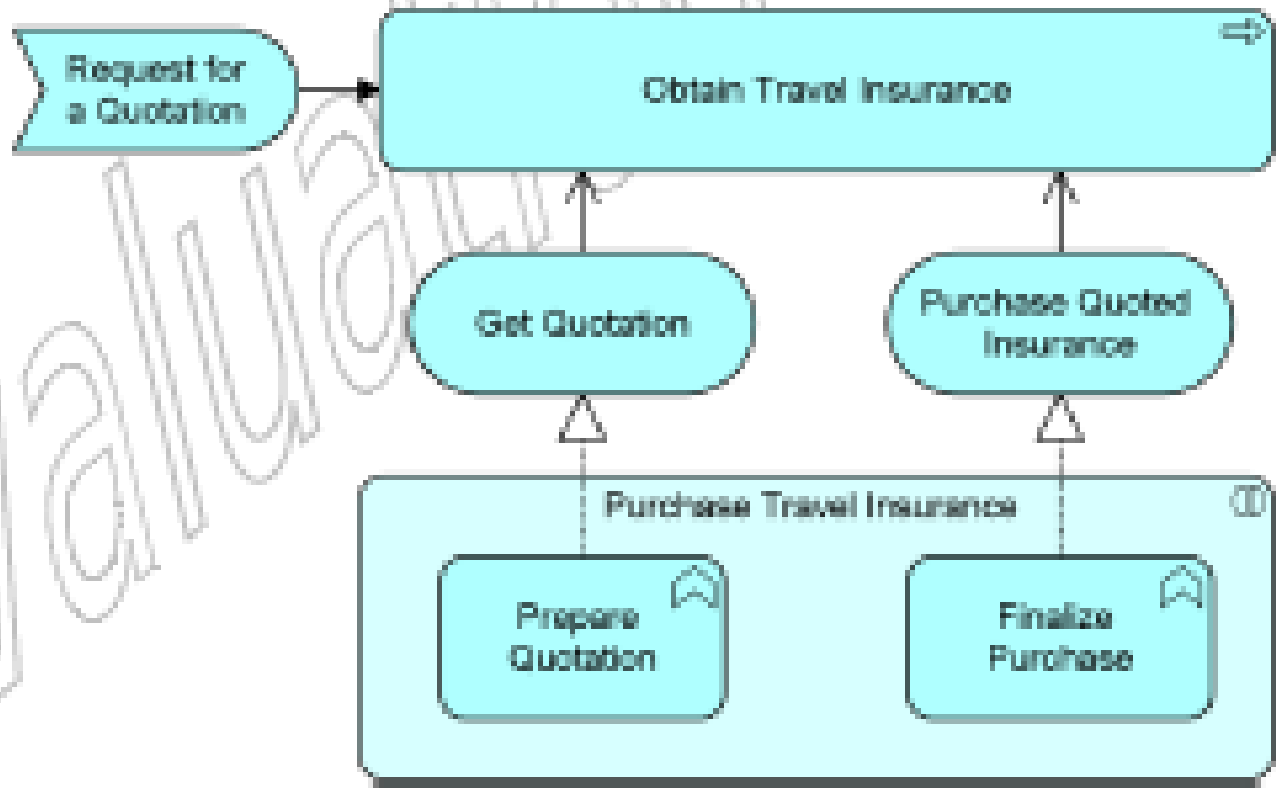
Three more ArchiMate v3 diagrams

Application Active Structure Elements



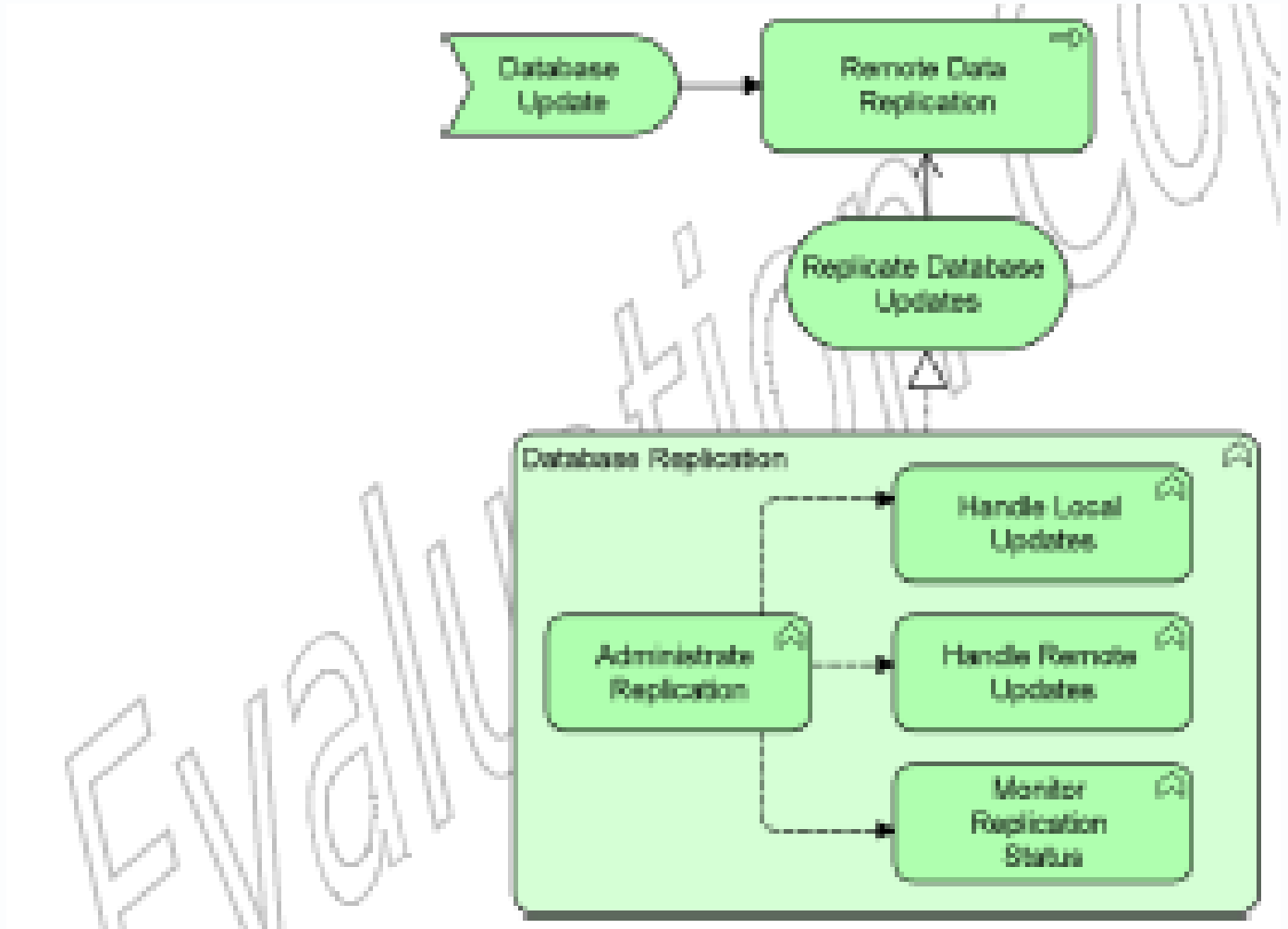
Example 26: Application Active Structure Element:

Application Behavior Elements



Example 27: Application Behavior Elements

Technology Behaviour Elements



Example 30: Technology Behavior Elements

Where to find more example diagrams

- All TOGAF diagram types
- Almost all ArchiMate v3 diagram types

- Go to http://avancier.website
- Click on "AM Products and Techniques"
- Look at the slide shows marked (T&A)

- We not recommend any particular diagram type.
- Some ArchiMate diagrams could be replaced by alternatives
- E.g.
  - BPMN for process flow
  - UML sequence diagrams for process-application realisation
  - Any proper data modelling notation for data model structures
  - Any regular expression notation for data flow structures

You can find more in Avancier Methods

- **Avancier Methods** are useful with all architecture frameworks that share similar domains and entities

- http://avancier.website