

Avancier Methods Enterprise Architecture Hierarchies

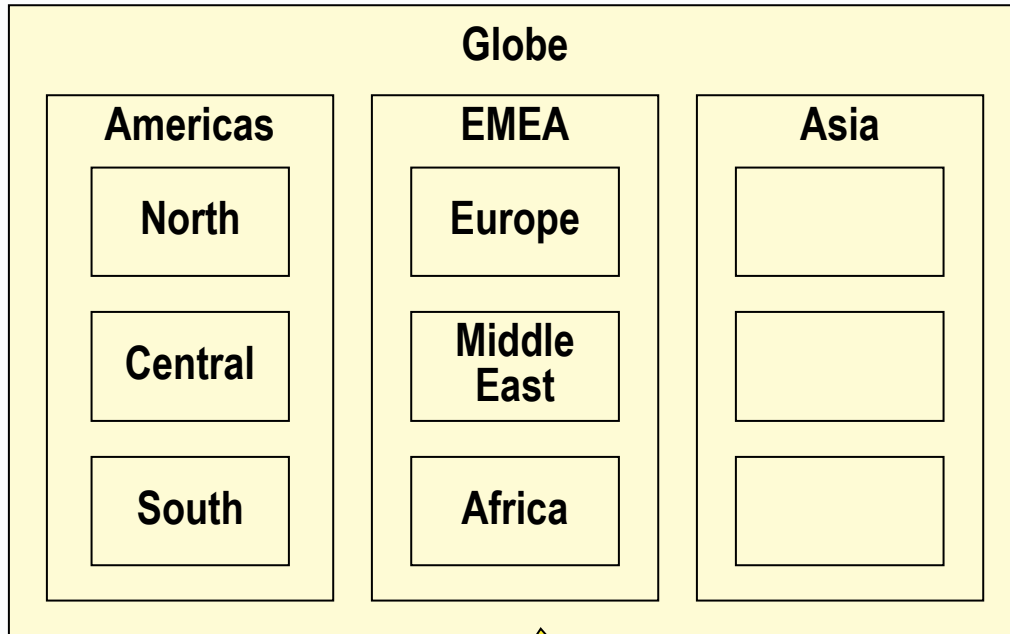
An introduction to *behavioural* decomposition
used in Enterprise Architecture

The graphics illustrate this article

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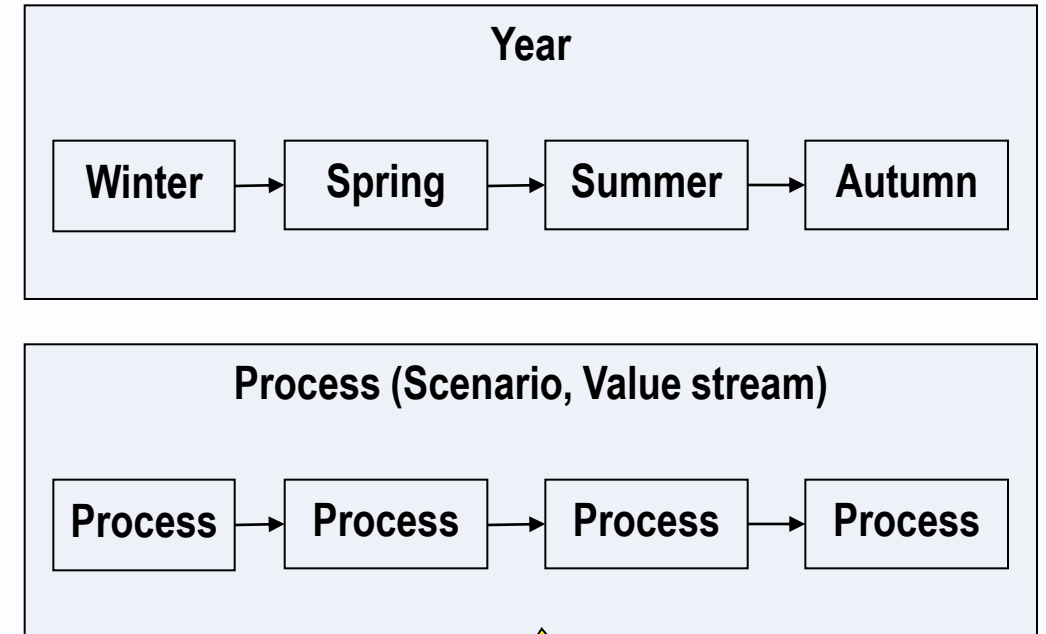
Two kinds of decomposition

Structural/system decomposition



results in smaller components

Behavioral/process decomposition

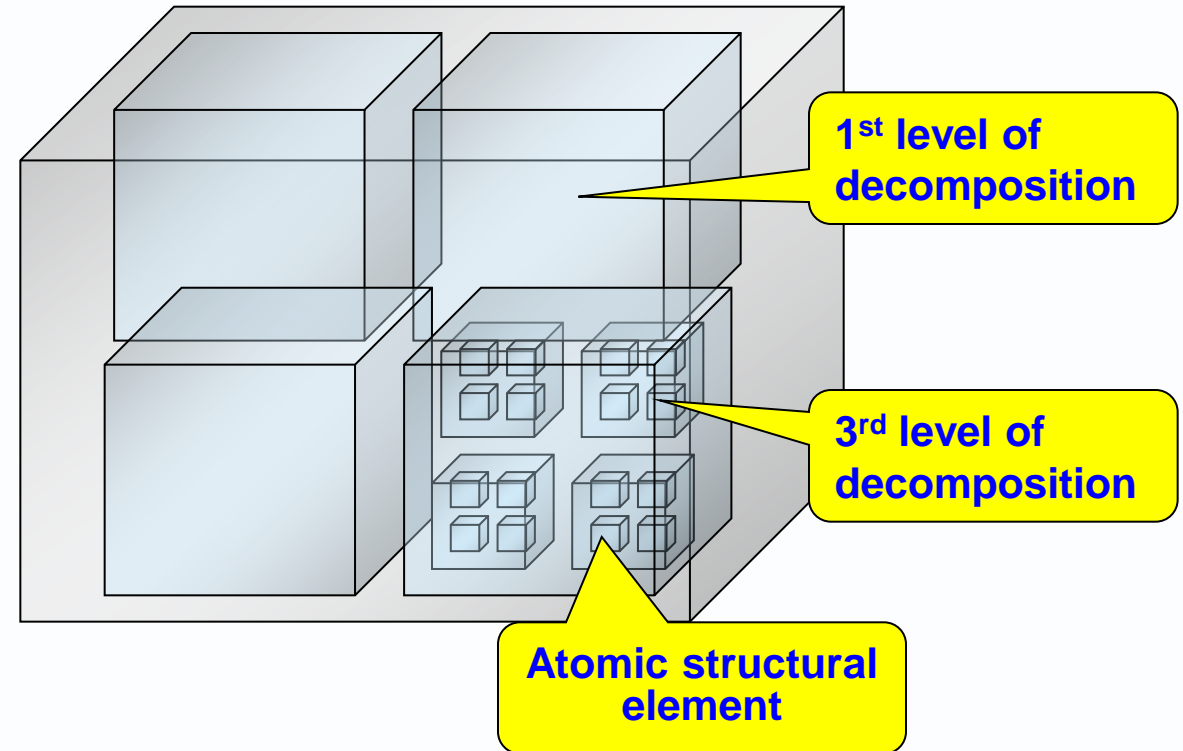


results in shorter processes

Structural decomposition

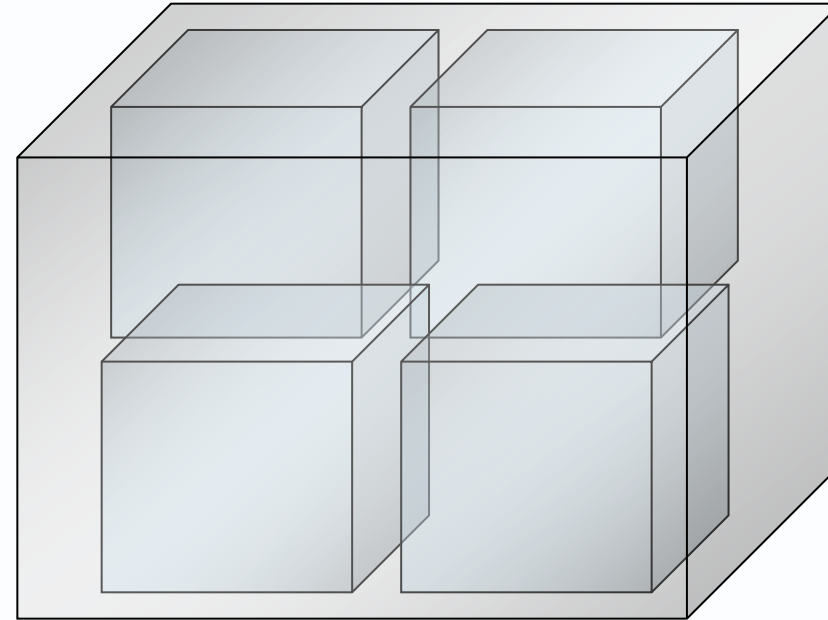
Structural hierarchies

- ▶ Structures can be
 - ▶ composed into larger ones and
 - ▶ decomposed into smaller ones.
-
- ▶ “A building block may be
 - ▶ assembled from other building blocks;
 - ▶ a subassembly of other building blocks” TOGAF



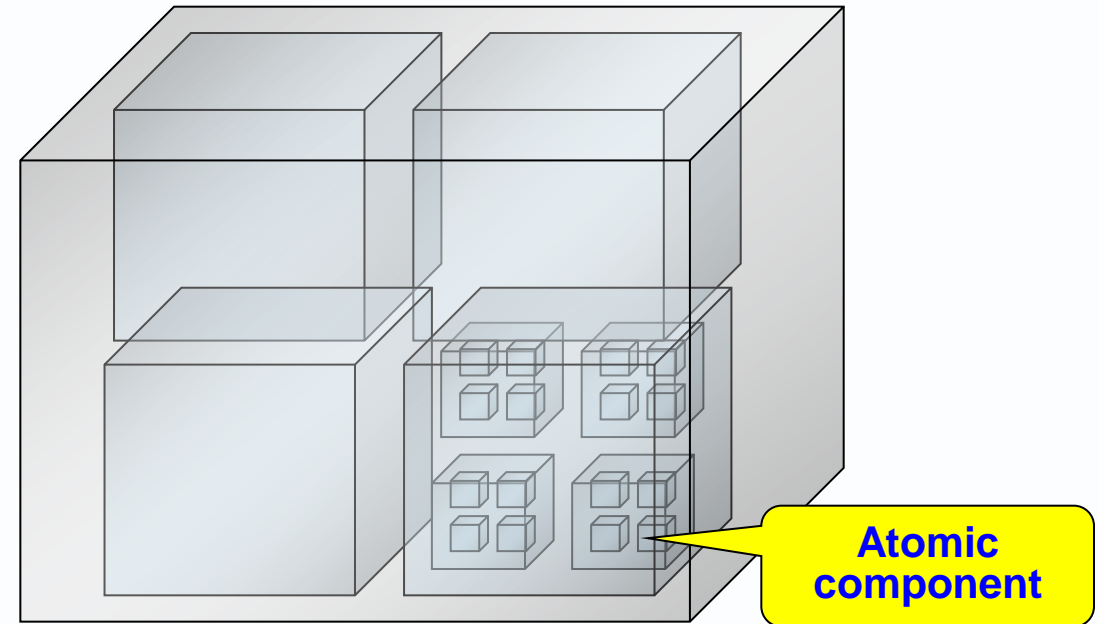
System decomposition – into component subsystems

- ▶ [A technique] that divides a larger system into smaller components.
- ▶ A large component may characterised as a «subsystem».
- ▶ “A component represents a modular part of a system that encapsulates its contents.
- ▶ A component is a self-contained unit that encapsulates [internal] state and behavior.“ UML



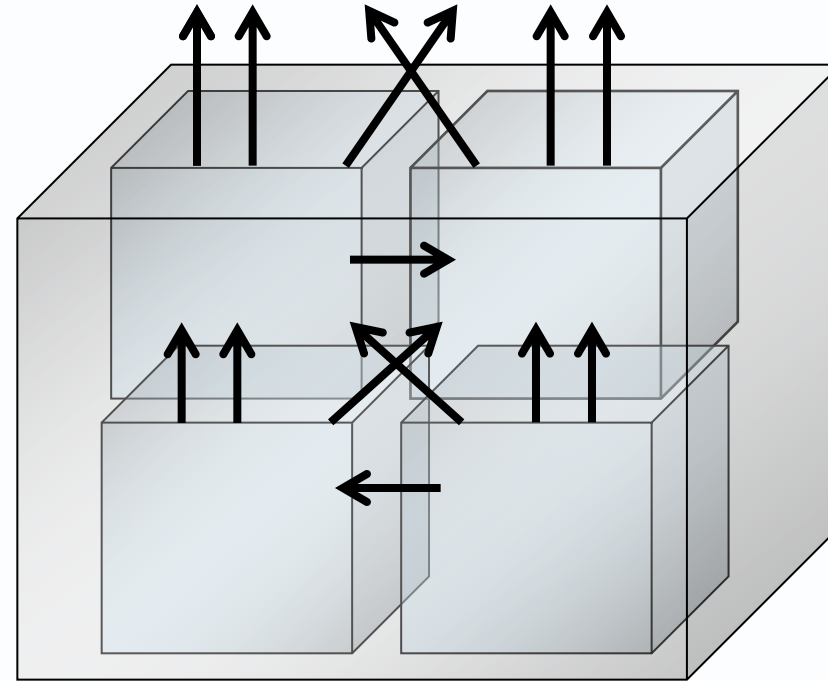
System decomposition – atomic components

- ▶ You can further subdivide subsystems until you reach the level of atomic components.
- ▶ **Atomic component:** [A component] not decomposed into smaller components.



Defining an encapsulated component by its behavior

- ▶ The required **behavior** can be defined in the form of one or more interface definitions.
- ▶ A component can be replaced by any other component with the same
 - interface(s) provided
 - interface(s) required
- ▶ Where interfaces are defined in terms of services provided or operations performed

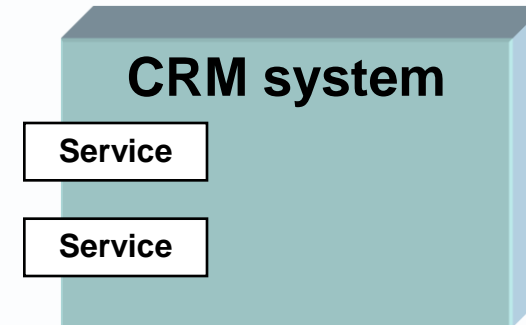


Architecture building block / logical component

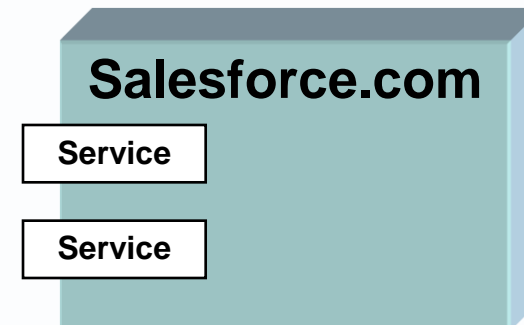
- ▶ [A component] that is abstract in the sense it is vendor and technology independent.
- ▶ It may be specified by services provided and resources (notably data) needed.
- ▶ And thus specifies the capability one or more physical components.

Solution building block / physical component

- ▶ [A component] that is vendor-specific and/or can realise a logical component.



A building block is a package of functionality defined to meet the business needs across an organization.” TOGAF



Behavioral/process decomposition

“Service”

- ▶ Some people define a service as
 - an output or product, or
 - a facility, or
 - a state change or effect

- ▶ It isn't!

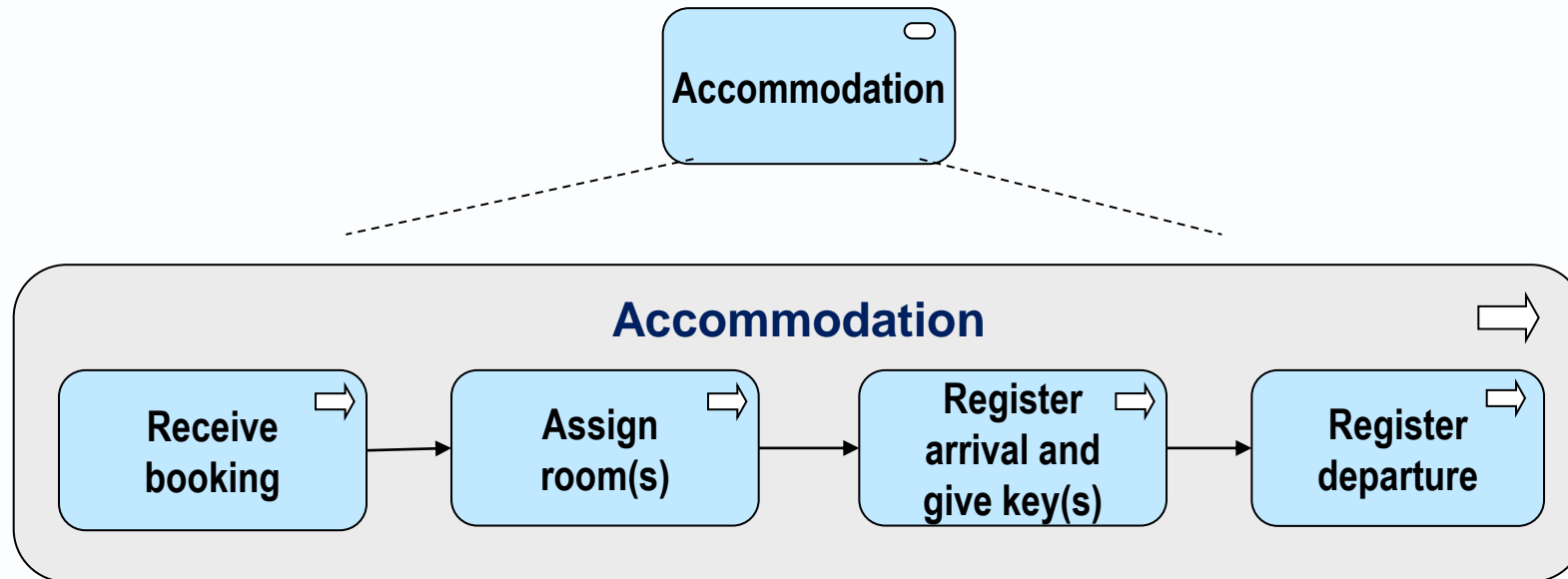
- ▶ Service: an act performed for another (The Open Group).
- ▶ A service is *the act to provide*
 - an output or product, or
 - a facility, or
 - a state change or effect
- ▶ A service is in 1-1 correspondence with what it provides

- ▶ Service: an act performed for another (The Open Group).
- ▶ The act of providing a product, facility or state change

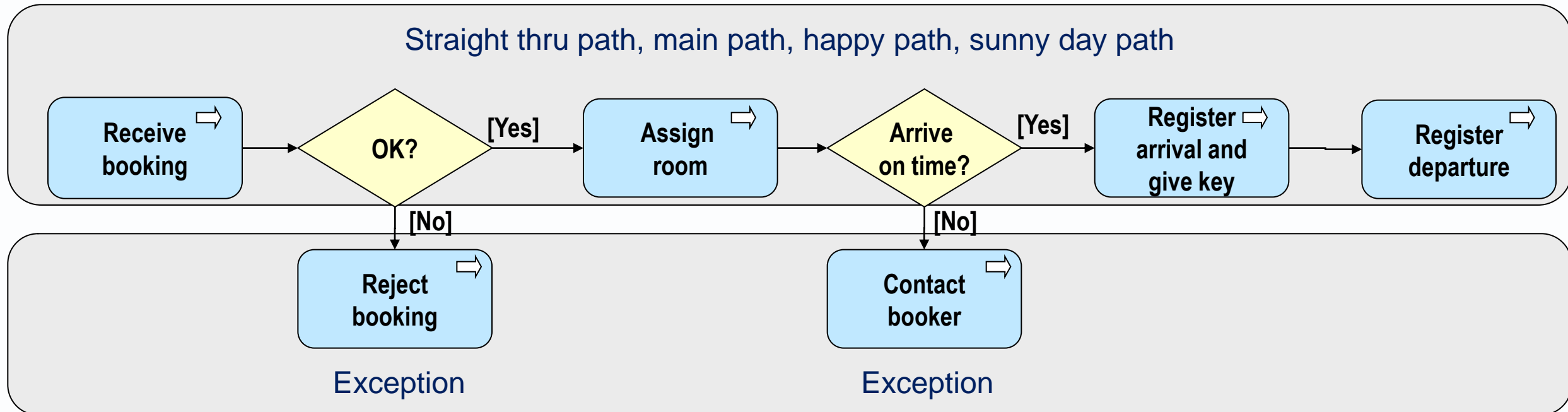
- ▶ E..g., A hotel provides coarse-grained and fine-grained services to its customers
 - Accommodation
 - Internet connection
 - Bed changing
 - Laundry
 - Room cleaning
 - Luggage storage
 - Appliance use
 - Room service
 - Meeting room

Services encapsulate processes

- ▶ The act of providing a product, facility or state change encapsulates the process(es) to do it
- ▶ E..g., Accommodation is a coarse-grained service that encapsulates an end-to-end process

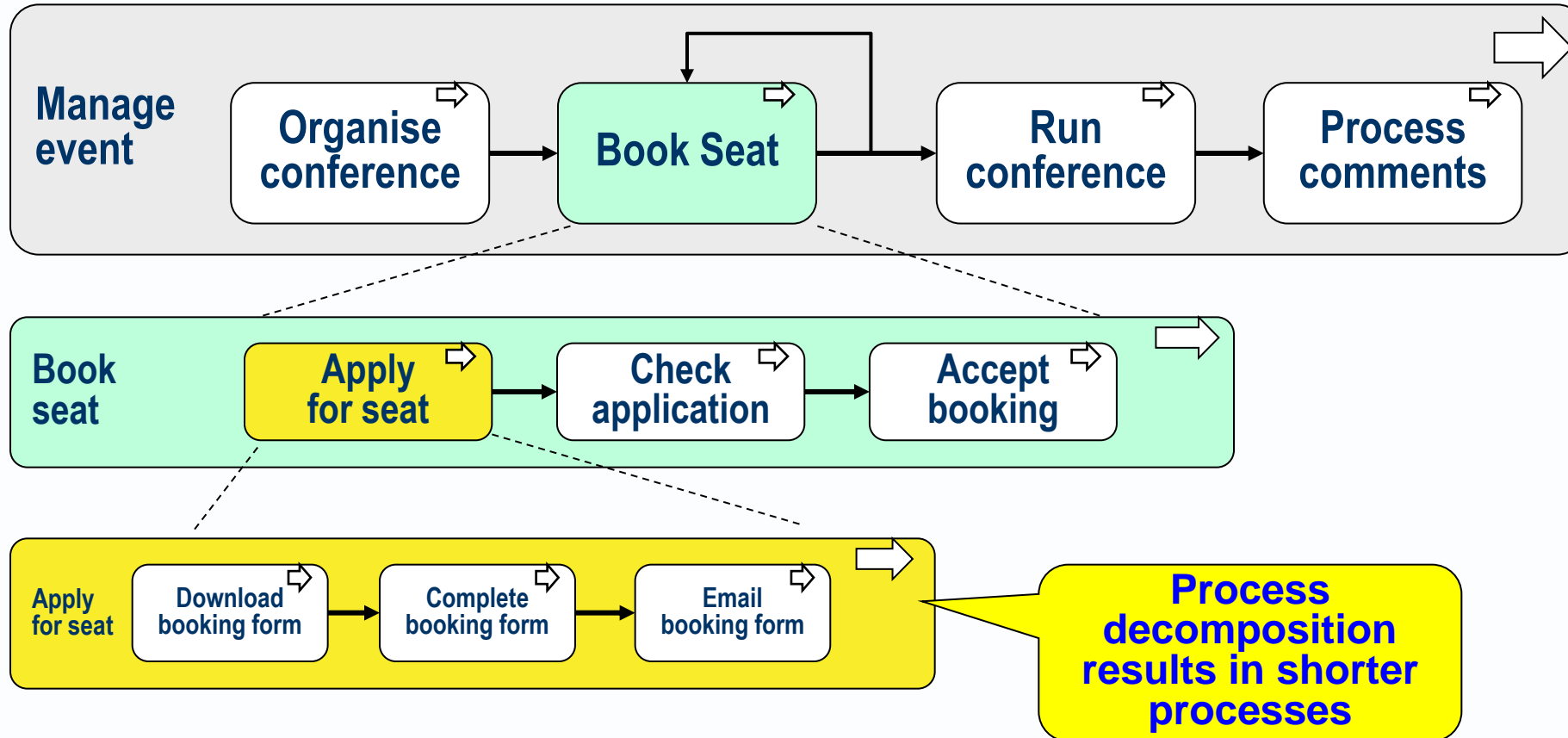


- ▶ Process: a sequence of activities that produce a result of value, meet an aim.
- ▶ Such as deliver package, check credit, provide weather data, and consolidate reports.



Process decomposition

- ▶ Behaviors can be composed into longer ones and decomposed into shorter ones.



A process is a process is process

Processes appear in systems analysis and design methods under different names

Value stream

Process, Procedure

Activity, Action

Use case, Epic,

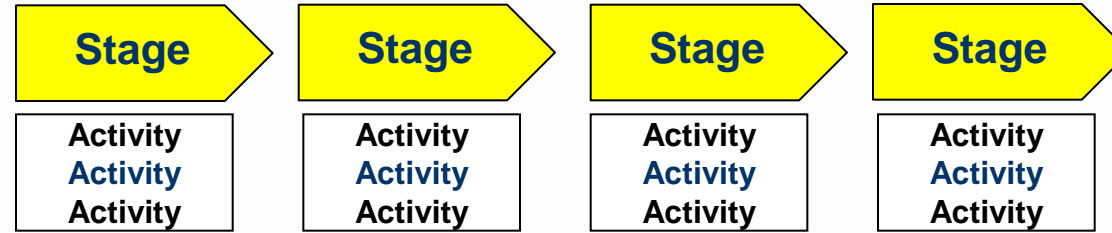
User story

Operation, Method

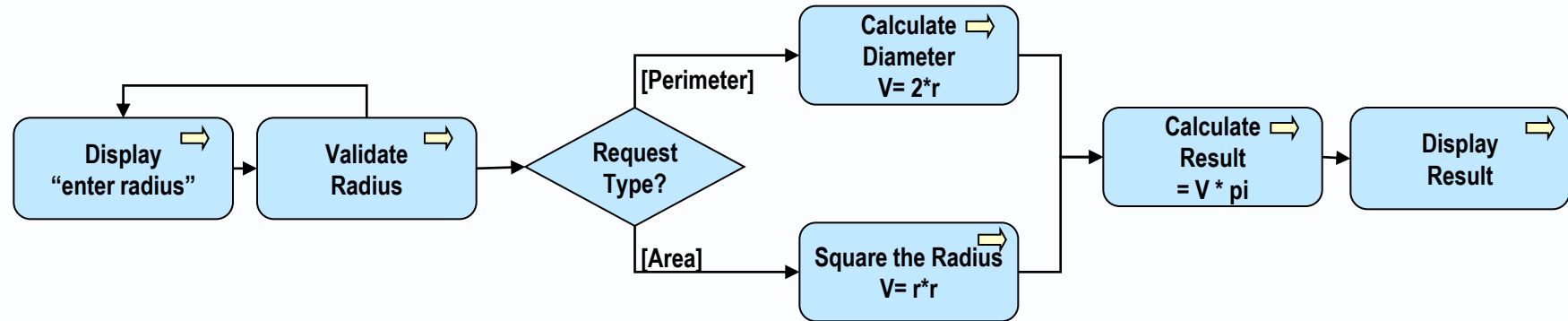
Processes are represented in various kinds of diagram - such as →

Some ways to represent a process

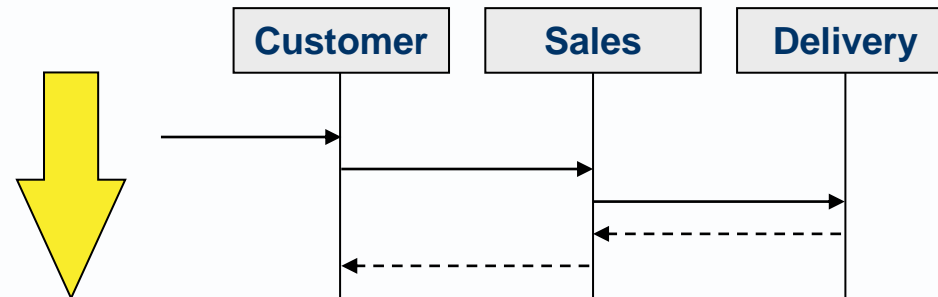
▶ Value stream diagram



▶ Flow chart



▶ Sequence diagram



Process as a state chart

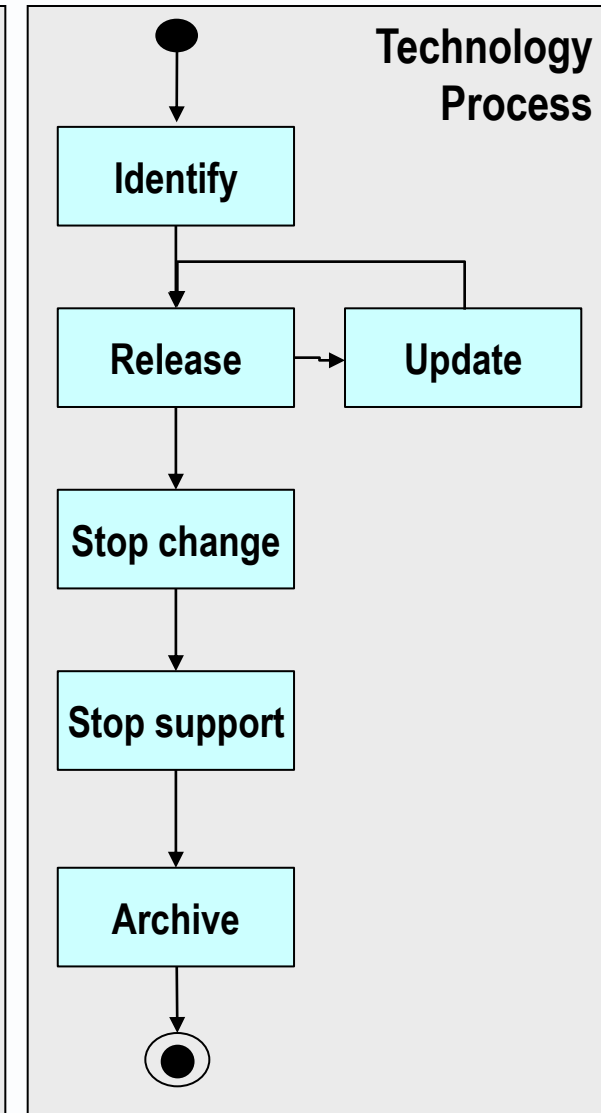
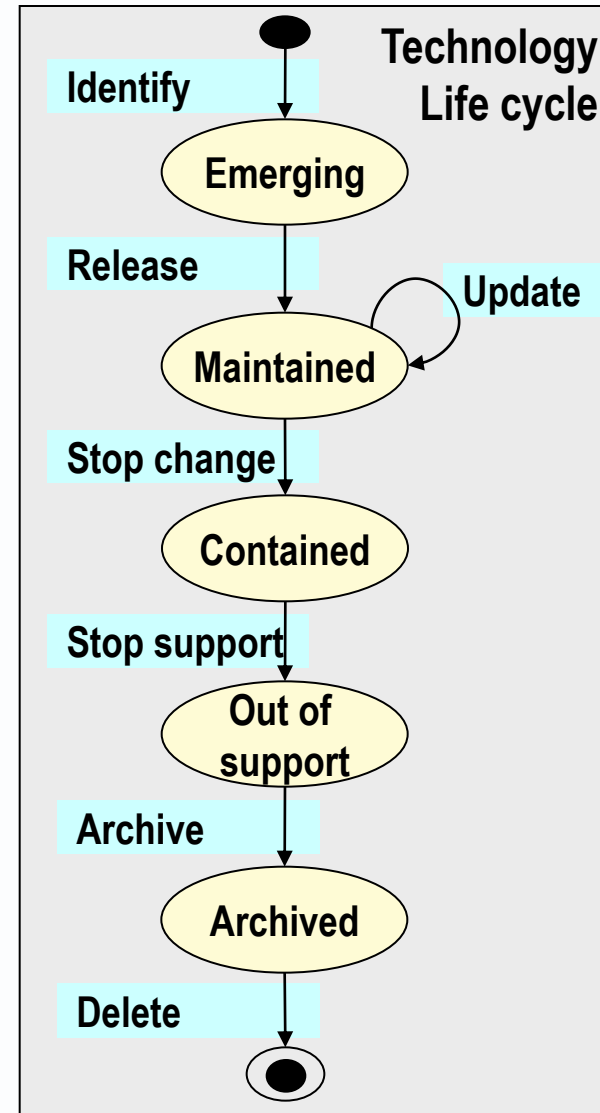
Life cycle: a process from birth to death of a thing

It is defined in terms of:

- ▶ states
- ▶ events that trigger state transitions
- ▶ events that happen while in a state.

E.g.

- ▶ A thing from birth to death
- ▶ A system from deployment to removal
- ▶ A project from initiation to completion
- ▶ A data entity from creation to deletion



- ▶ At the base of a business activity system model is the atomic activity,
- ▶ performable by an actor (human, computer or machine) without further explanation.

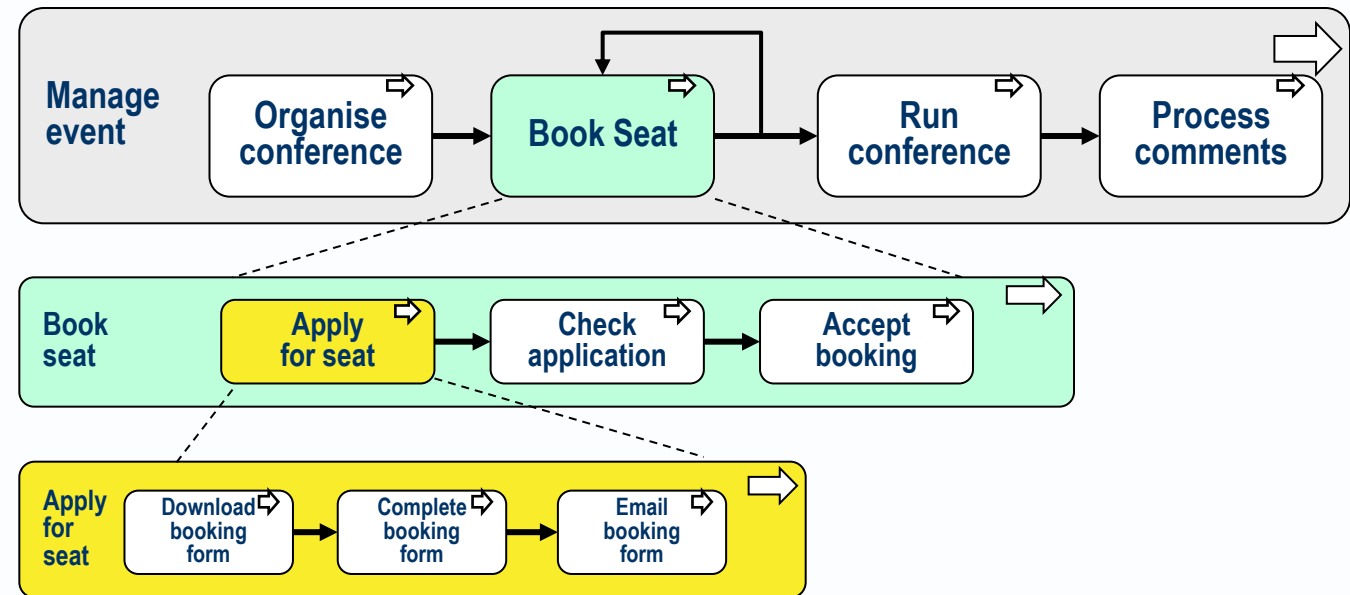
- ▶ In business architecture
 - the “elementary process” (think OPOPOT)

- ▶ In software architecture (UML)
 - the “action”.(think programmable instruction)

Remember

In modeling a business you can represent several aspects of the business in several ways, and at different levels of granularity

You have to decide which aspects which ways at which level of granularity and which atomic elements you include

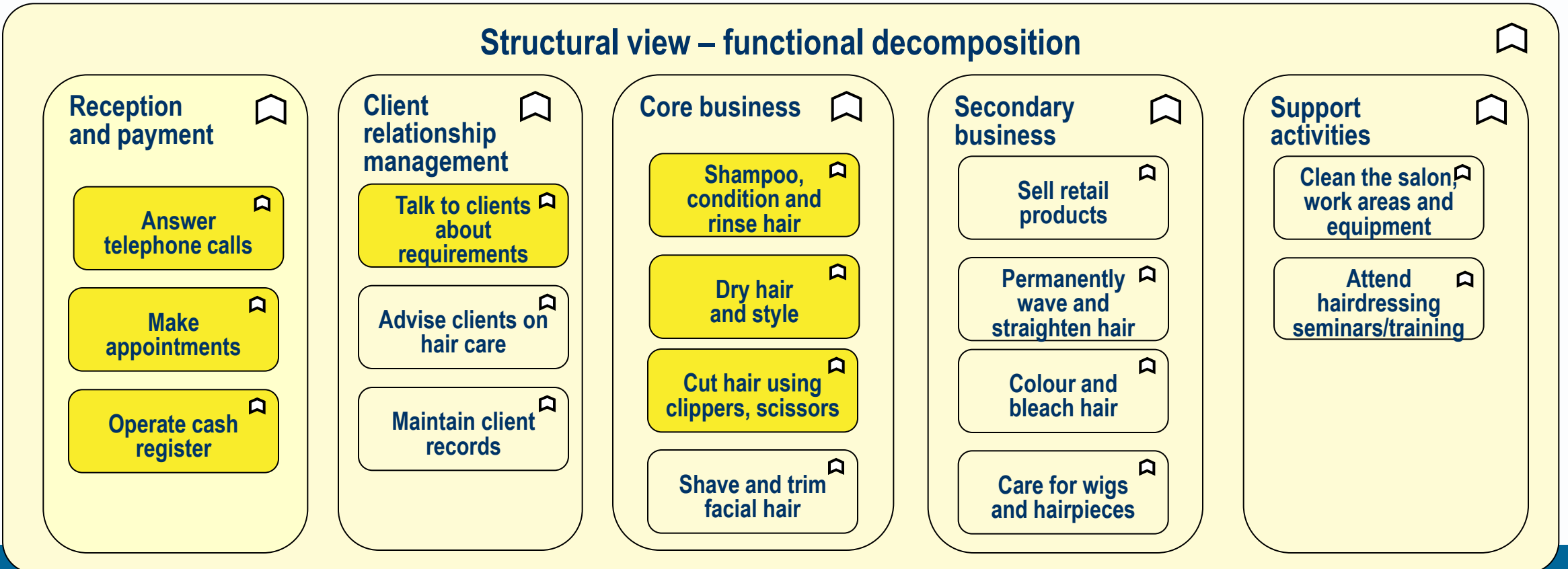
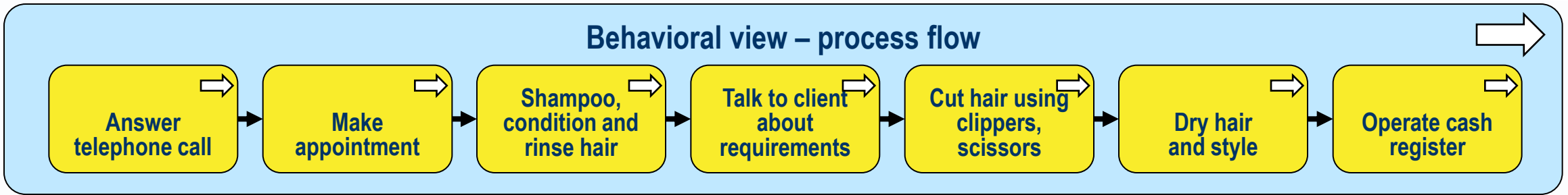


Avancier Methods

Structured analysis verification

Aligning structural and behavioral views of atomic acts

Aligning structural and behavioral views of atomic acts: hairdresser

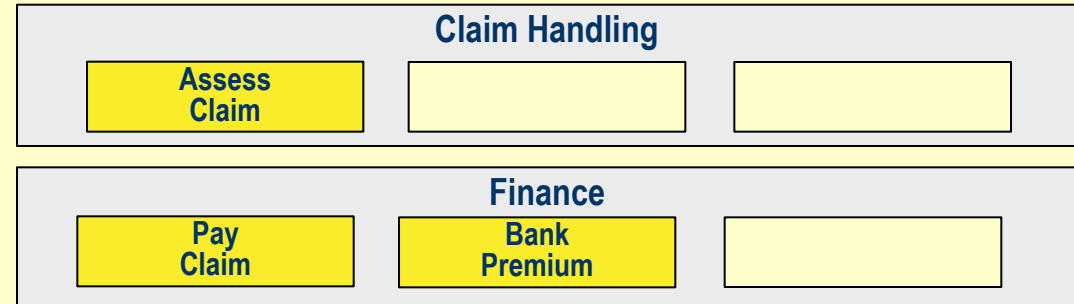


Aligning structural and behavioral views of atomic acts: Insurance

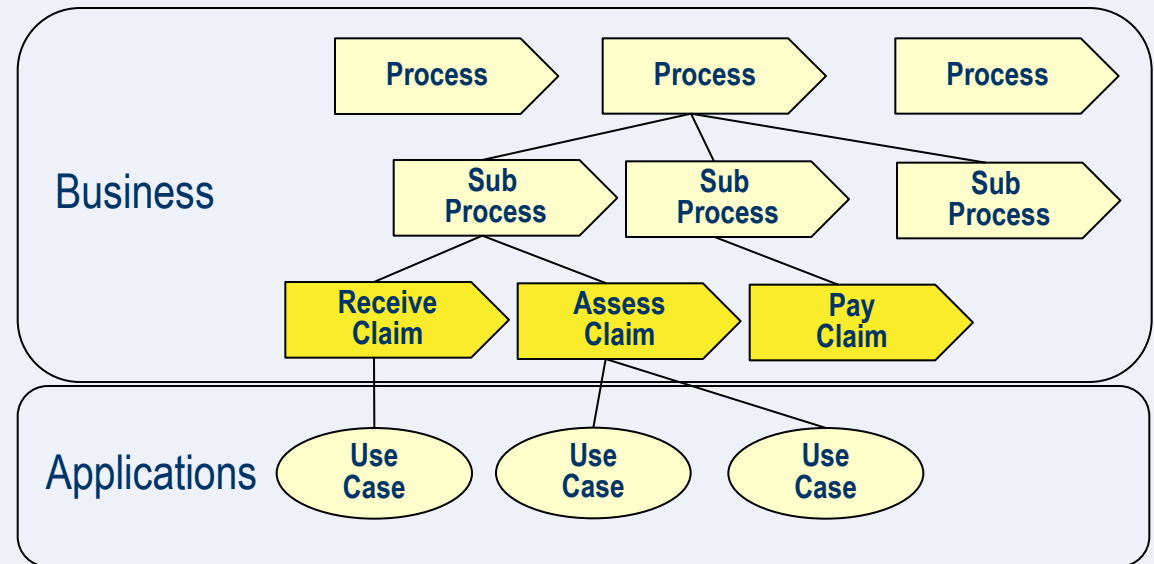
▶ [A technique] to ensure a business architecture is comprehensive and consistent.

▶ *Every fine-grained activity found in a business process model should be locatable under one or more coarser-grained business functions.*

Structural decomposition: usually stops at a 3rd or 4th level.



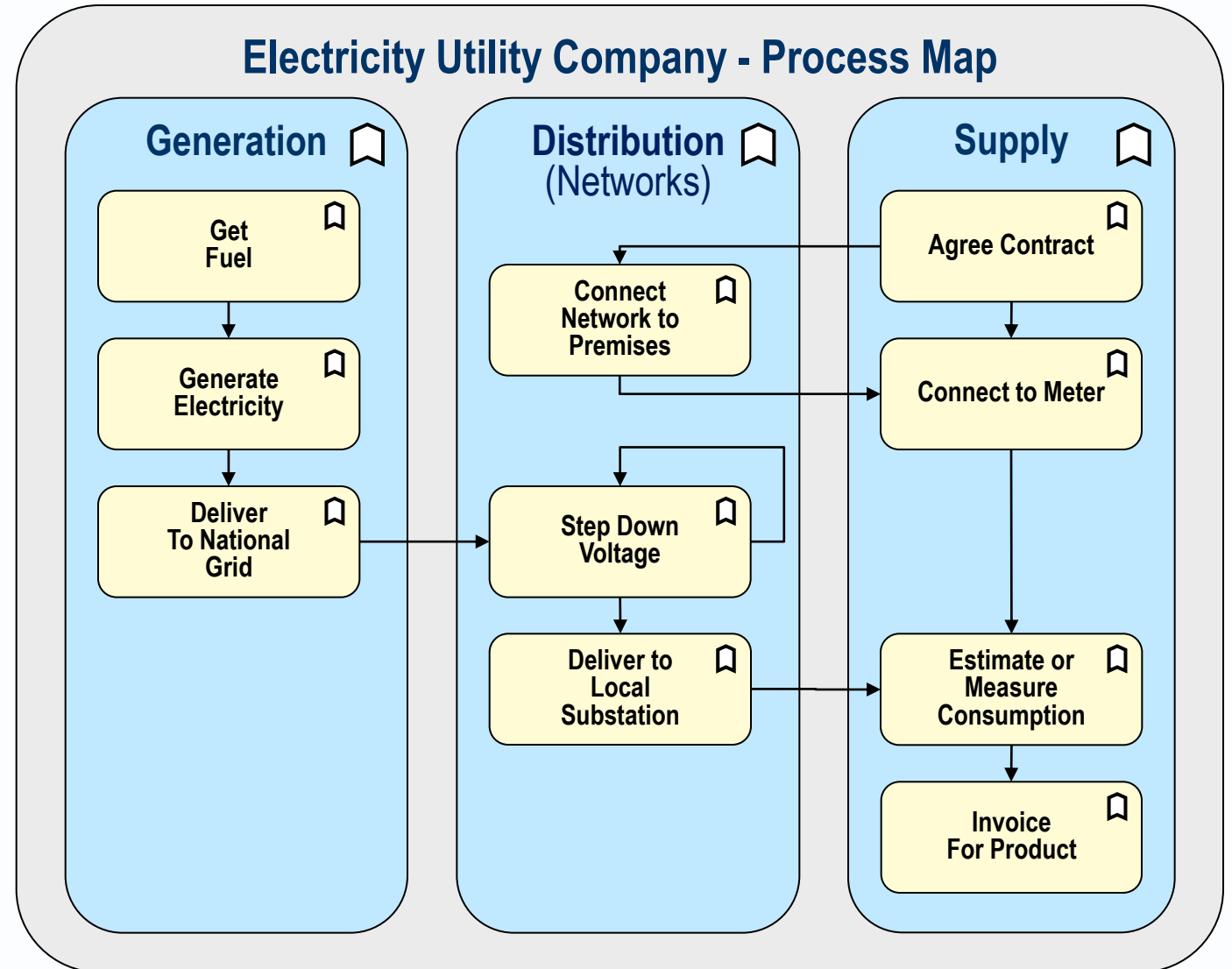
Behavioural decomposition: may descend to 5th, 6th or 7th level



Mapping finer-grained acts to coarser-grained functions: Electricity supplier

Mapping finer-grained acts to coarser-grained functions

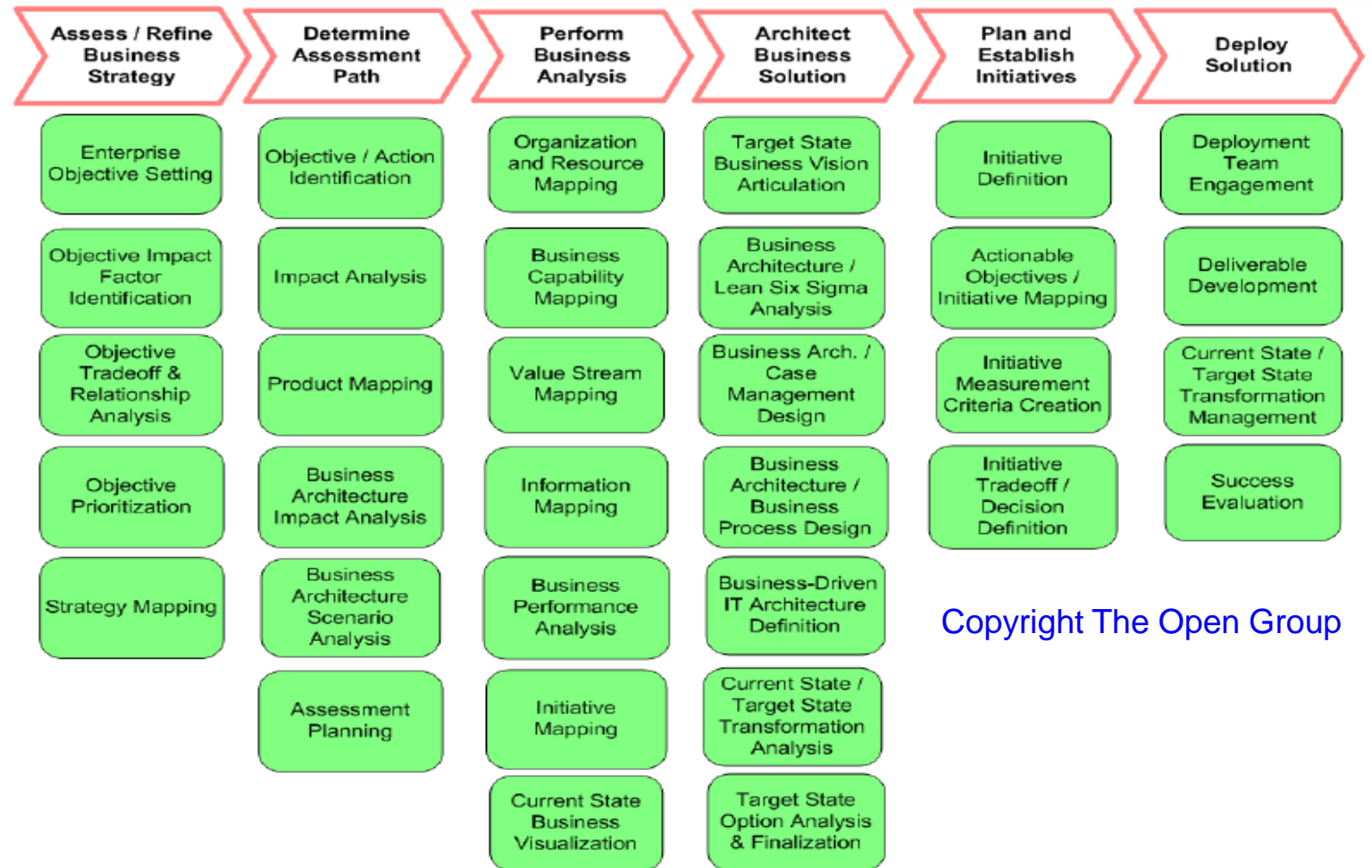
Here, the coarse-grained functions might be called capabilities



Mapping finer-grained functions/capabilities to coarser-grained acts

Mapping finer-grained functions to coarser-grained acts

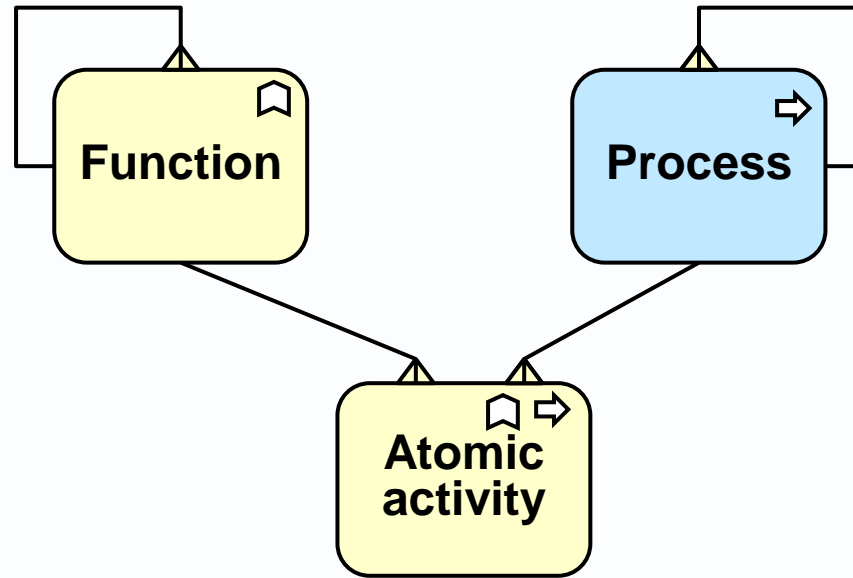
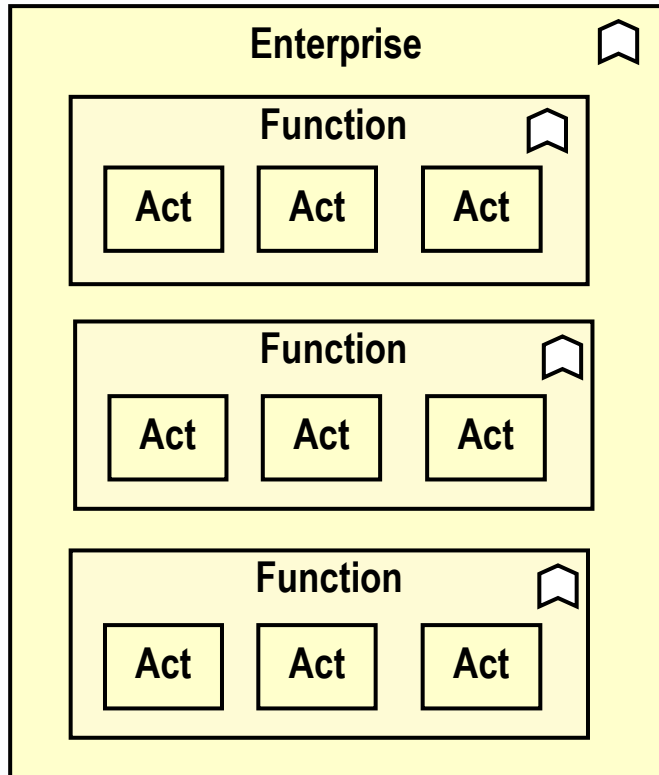
(Here, the fine-grained functions are called capabilities)



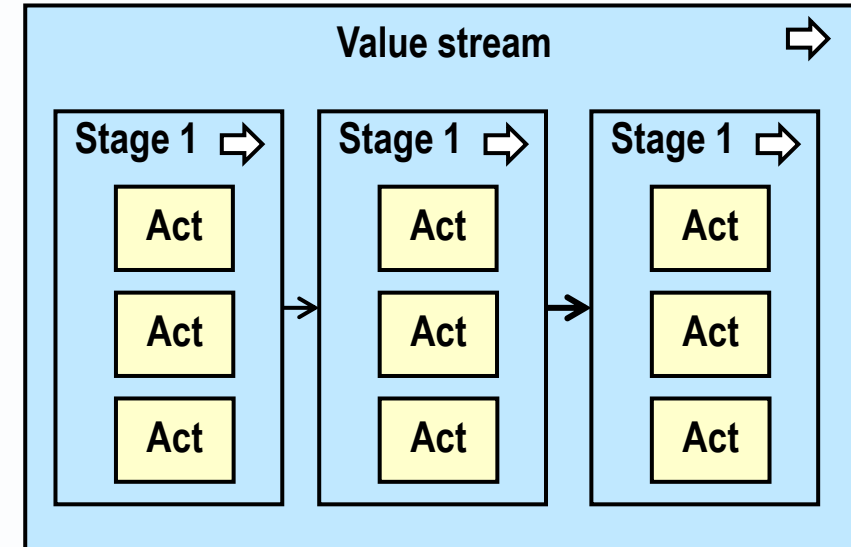
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Figure 1.4: The Business Architecture Value Stream

Structural decomposition



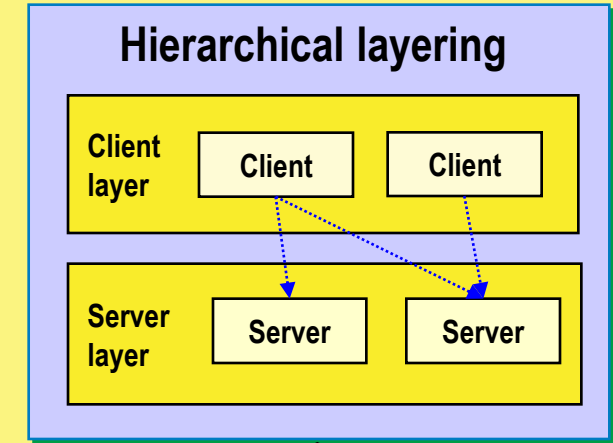
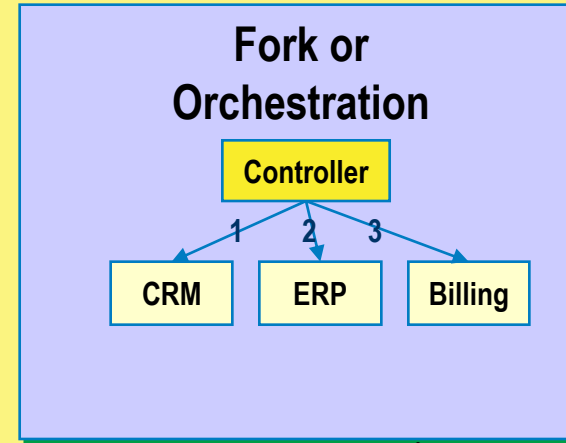
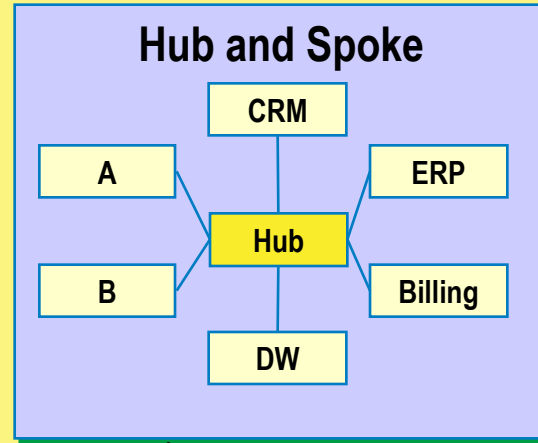
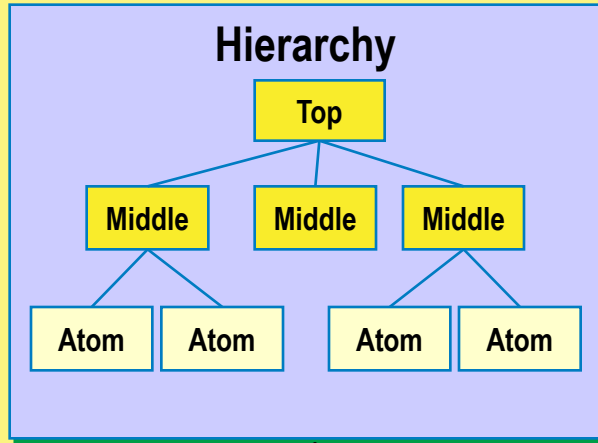
Behavioral decomposition



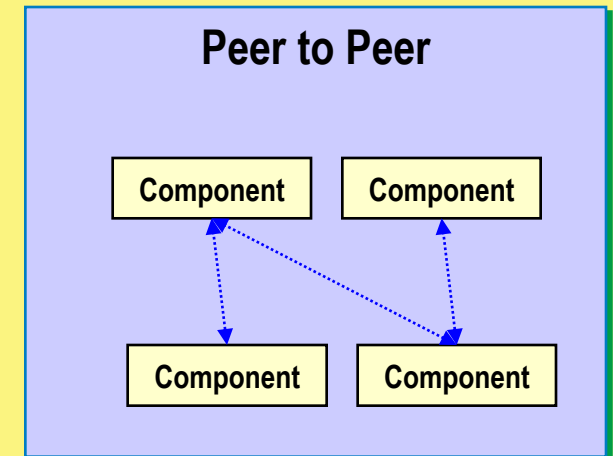
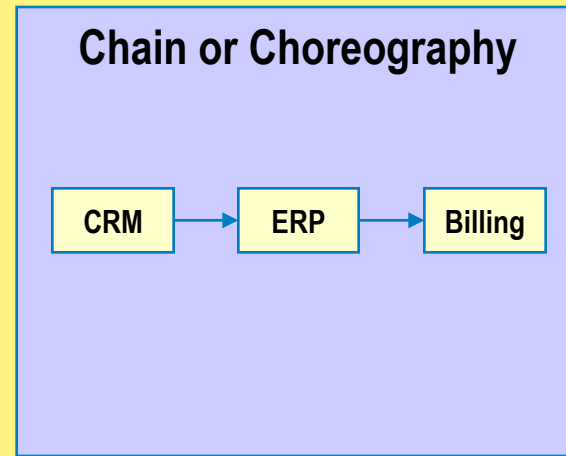
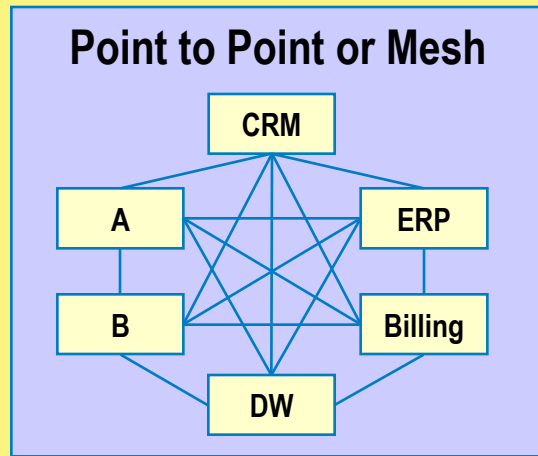
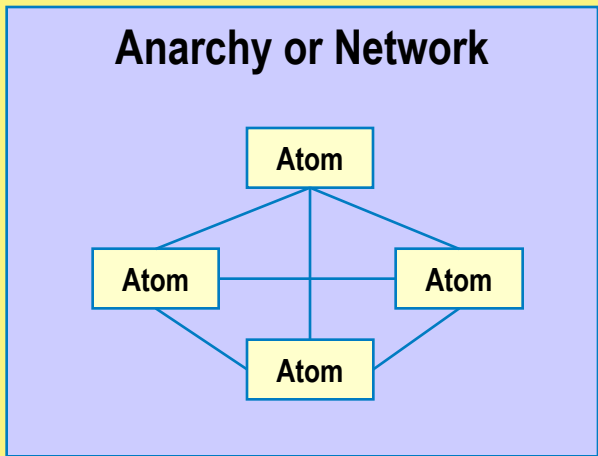
The same atomic activities can appear the bottom of structural and behavioral decompositions

Imposing a hierarchy on a network

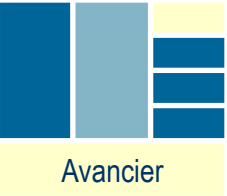
Hierarchical or centralized



Anarchical or distributed



You want to know more?



For training in enterprise and solution architecture

Go to <http://avancier.website>

Structures show what elements exist and how they connect

Behaviors show what happens over time

For more on both structural and behavioral decomposition, attend the training

Avancier Methods Enterprise Architecture Hierarchies

An introduction to *behavioural* decomposition
used in Enterprise Architecture

The graphics illustrate this article

<https://www.linkedin.com/pulse/brief-eaba-history-graham-berrisford>