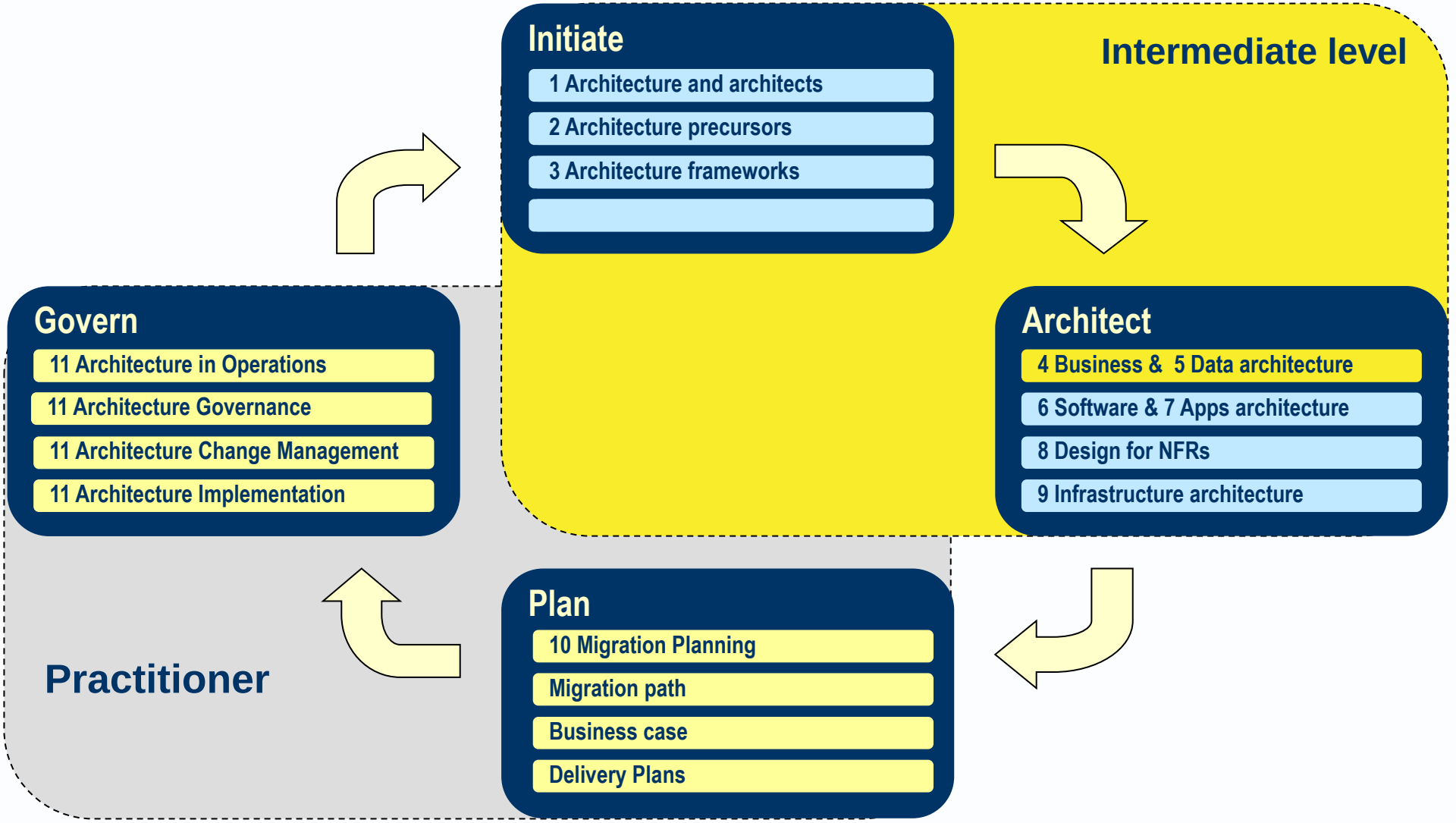
# Avancier Reference Model

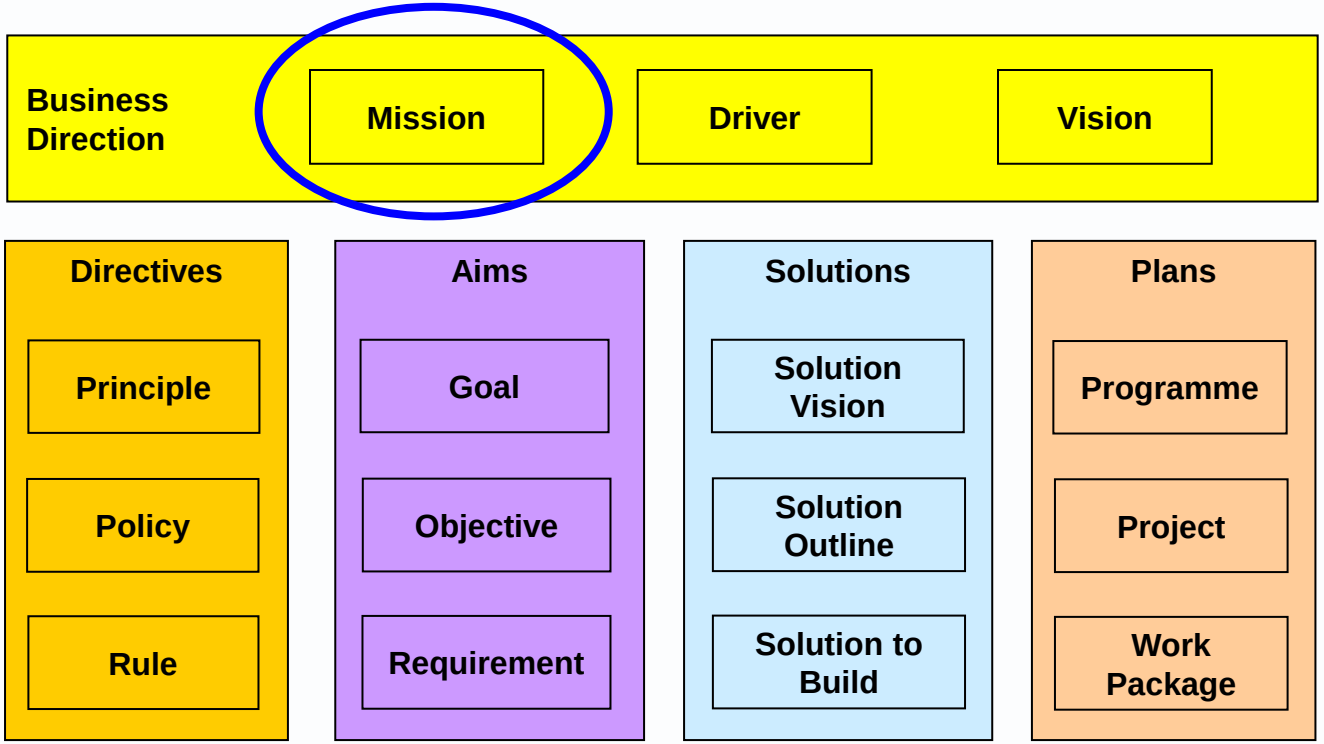
## Business Architecture (ESA 4)

# 4. Business architecture



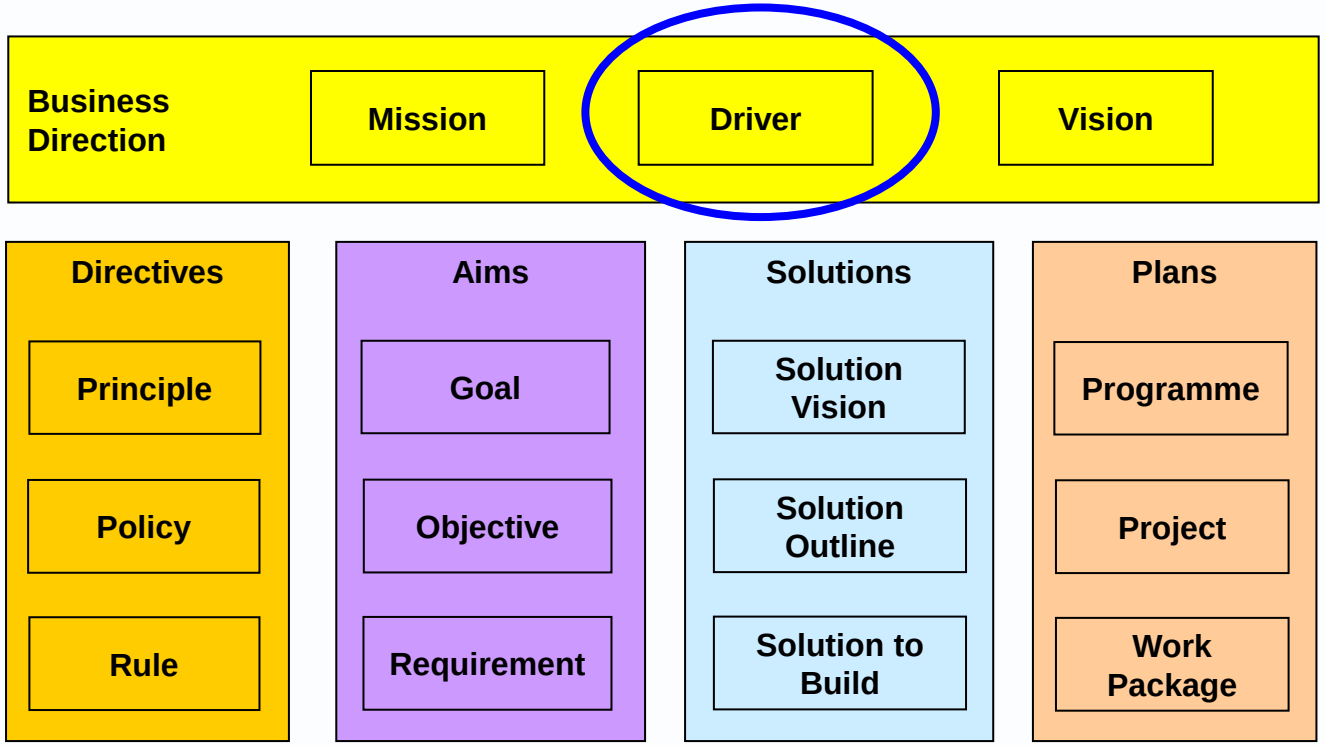
# Mission

- A statement that declares what an enterprise, business or organisation is about.
- That is, its reasons for being; the essential products and services it offers.



# Driver

- An influence that shapes the directives and aims of a business.
- Drivers are sometimes classified as Political, Economic, Social, Technical, Legal and Environmental (PESTLE), or as Strengths, Weaknesses, Opportunities and Threats (SWOT).



# Business Analysis concepts mapped to E&SA concepts

Avancier

**SWOT**
Strengths (internal)
Weaknesses (internal)
Opportunities (external)
Threats (external)

**PESTLE**
Political
Economic
Social
Technological
Legal
Environment

**5-forces analysis**
Buyers
Suppliers
Competitors
New entrants
Substitute products

**MOST**
Mission
Objectives
Strategy
Tactics

**Business Direction**

**Mission**

**Driver**

**Vision**

**Directives**

**Principle**

**Policy**

**Rule**

**Aims**

**Goal**

**Objective**

**Requirement**

**Solutions**

**Solution Vision**

**Solution Outline**

**Solution to Build**

**Plans**

**Programme**

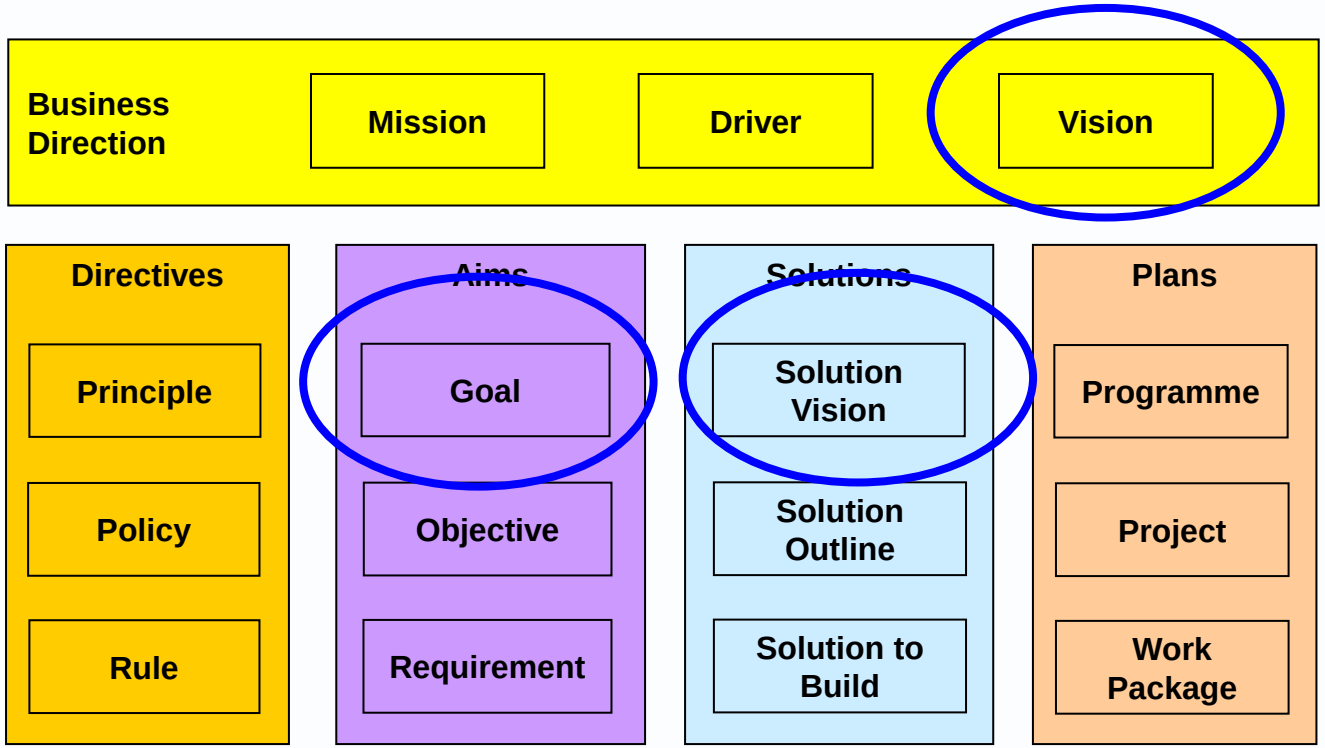
**Project**

**Work Package**

**Business activity model**
Control activities
Monitoring activities
Doing activities
Enabling activities
Planning activities

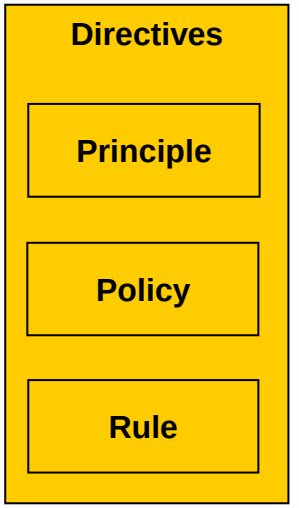
# Vision

- [An aim] that declares what an organisation wants to be or become.
- An outline of an aspirational target state for an enterprise or business.
- It may be defined in terms of measurable aims, or only a general direction to follow.



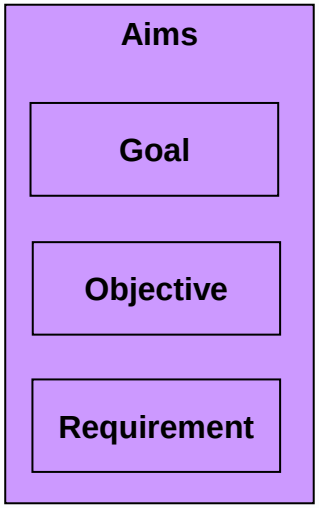
# Directive

- An influence or guideline, enduring and seldom amended, that steers or constrains behaviour or choices.
- Directives may be arranged in a hierarchical structure.
- **Principle**
  - [A directive] that is strategic and not-directly-actionable.
  - Such as: Waste should be minimised. Data security is paramount.
- **Policy**
  - [A directive] that supports a principle.
  - Such as: The public have minimal access to business data. USB ports are disabled. Messages at security level 3 are encrypted.
- **Business Rule**
  - A directive] that embeds a policy in data processing.
  - (Such as: Access Level = Low if User Type = Public.)



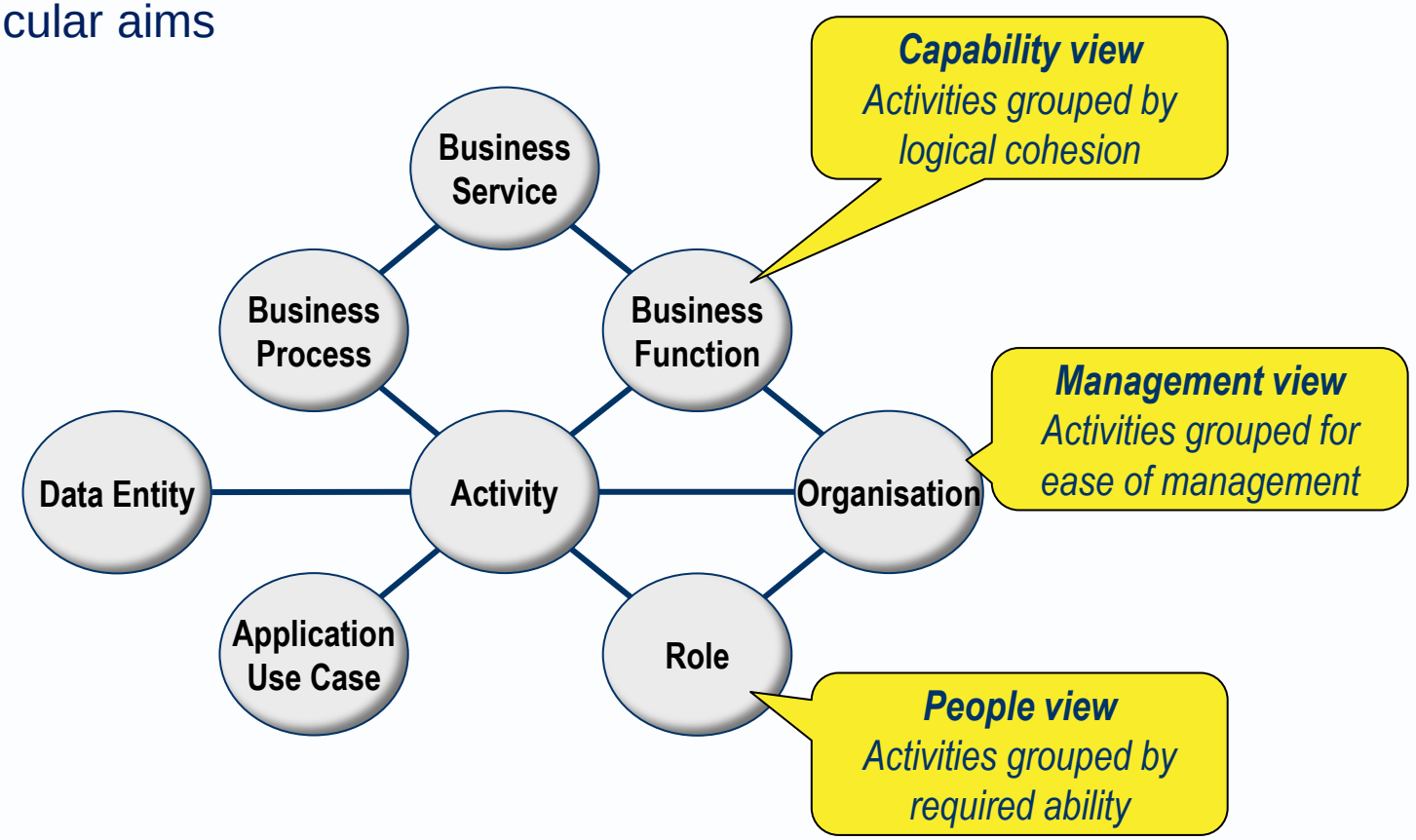
# Aim

- A desired result or outcome declared or recognised by business system stakeholders.
- It should be SMART (Specific, Measurable, Actionable, Realistic and Time-bound.).
- Aims may be arranged in a hierarchical structure.
- **Goal:** [An aim] that is strategic.
  - It may be quantified using Key Goal Indicators.
  - It may be decomposed into lower-level goals or objectives.
- **Objective:** [An aim] that is more tactical than a goal.
  - It should be quantified using Key Performance Indicators.
  - It may be decomposed into lower-level objectives or seen as a high-level requirement.
- **Requirement:** [An aim] a statement of need against which the outcomes of a system or work package can be tested.
  - It should have acceptance tests and an acceptance authority.
  - It may be captured in a requirements catalogue, service contract or use case.
  - It should be traceable to higher level concerns, aims, directives or strategies.



## 4.2 Business structure concepts

- Organisation units, roles, functions and capabilities may all be seen as structural business components, that group some actors or activities to meet some particular aims



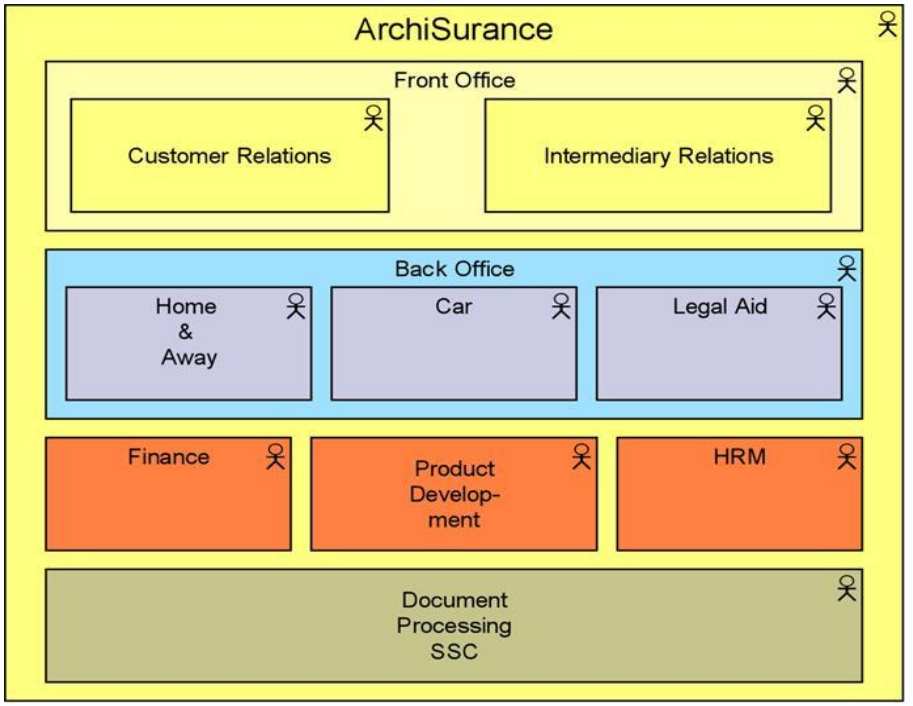
# Management view

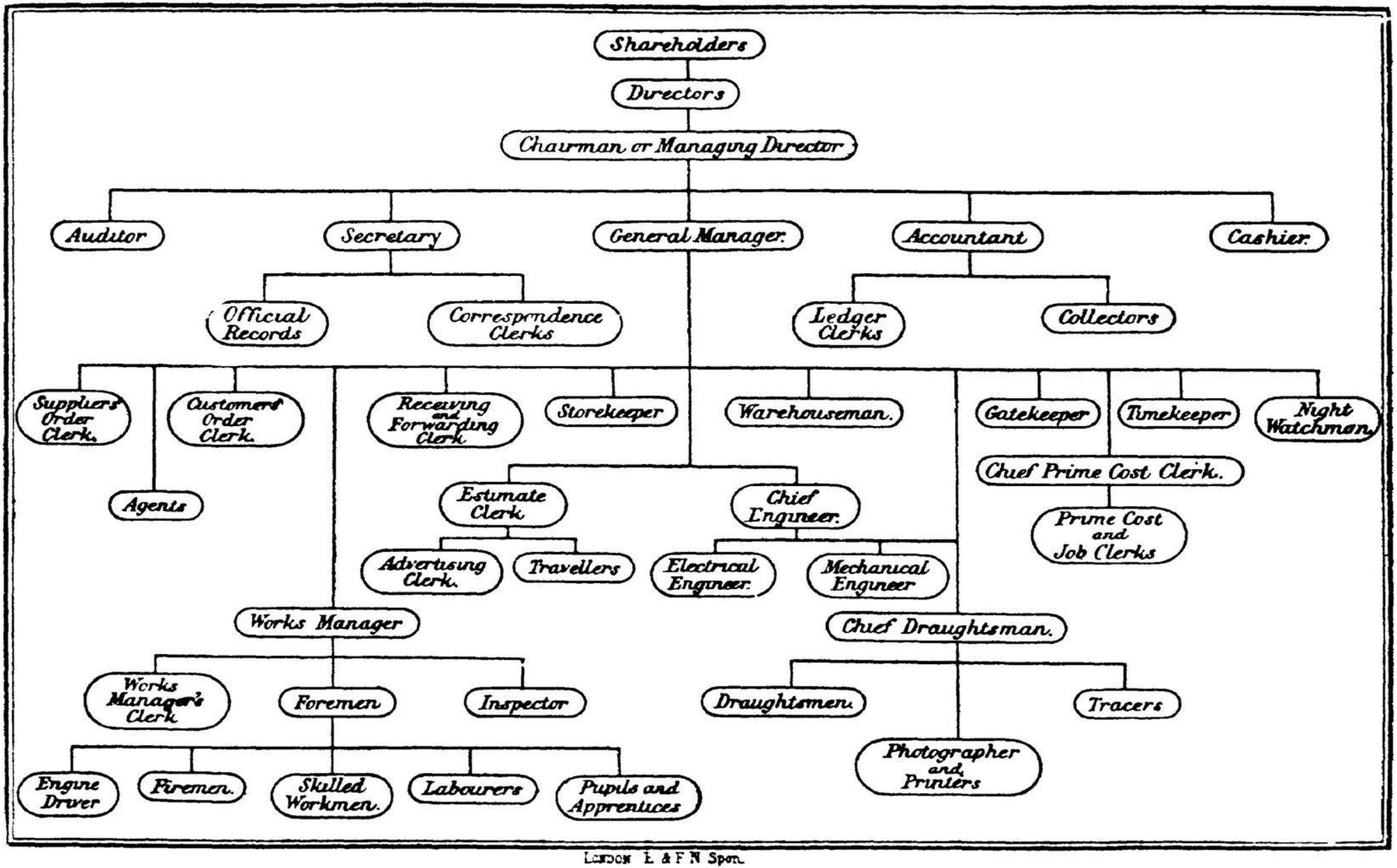
## Organisation unit

- A division or department that gathers roles or actors into a manageable group.
- It usually has goals/objectives, a manager, and a budget.

## Organisation structure

- The structure of units under which human actors are employed.
- It is usually hierarchical, and shows the reporting line from a bottom-level unit to directors.






London E. & F. N. Spon.

# People view

## Role

- A logical business component that groups activities performable by one or more actors.
- Such as: loan applicant, expense claimant, expense claim approver.
- It may define abilities required to play the role.

## Actor

- An entity able to play one or more roles.
- Usually a person or organisation, sometimes an information system or technology.

# Logical organization hierarchy

Avancier

A common starting point for enterprise architecture.

A structure that successively divides a business into smaller business components

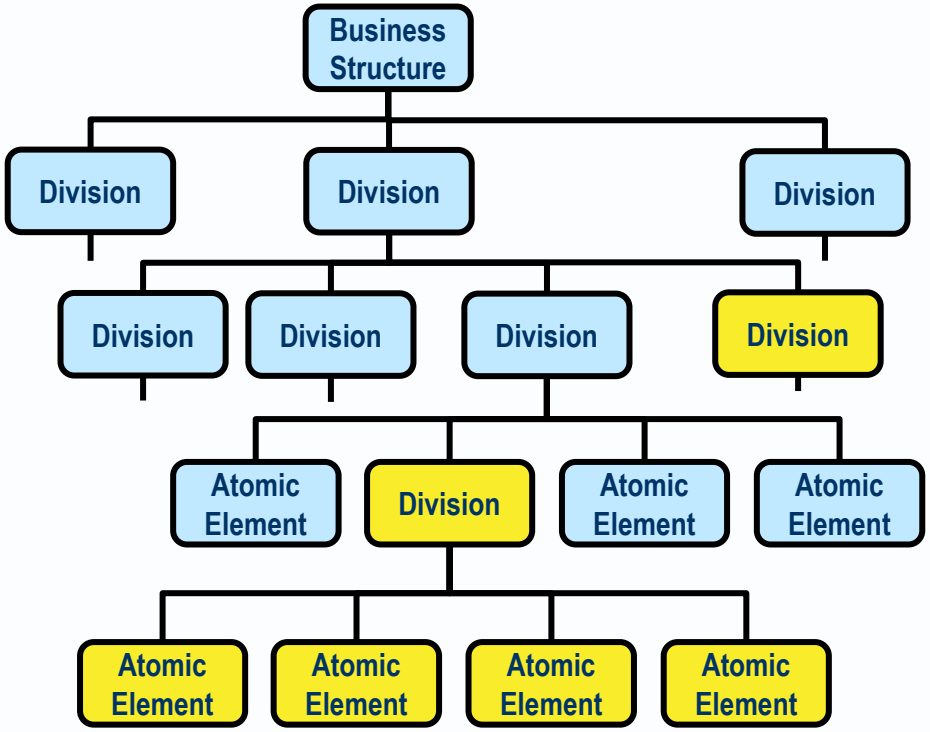
It typically stops at a 3rd or 4th level of decomposition.

It should be reasonably stable and contain no duplicate elements.

It structures a business regardless of who does what (actors) and how it's done (processes).

The structure is used to catalogue other architecture entities.

Heat-mapping may be applied to show where changes are needed, or to prioritise phases in a change program.



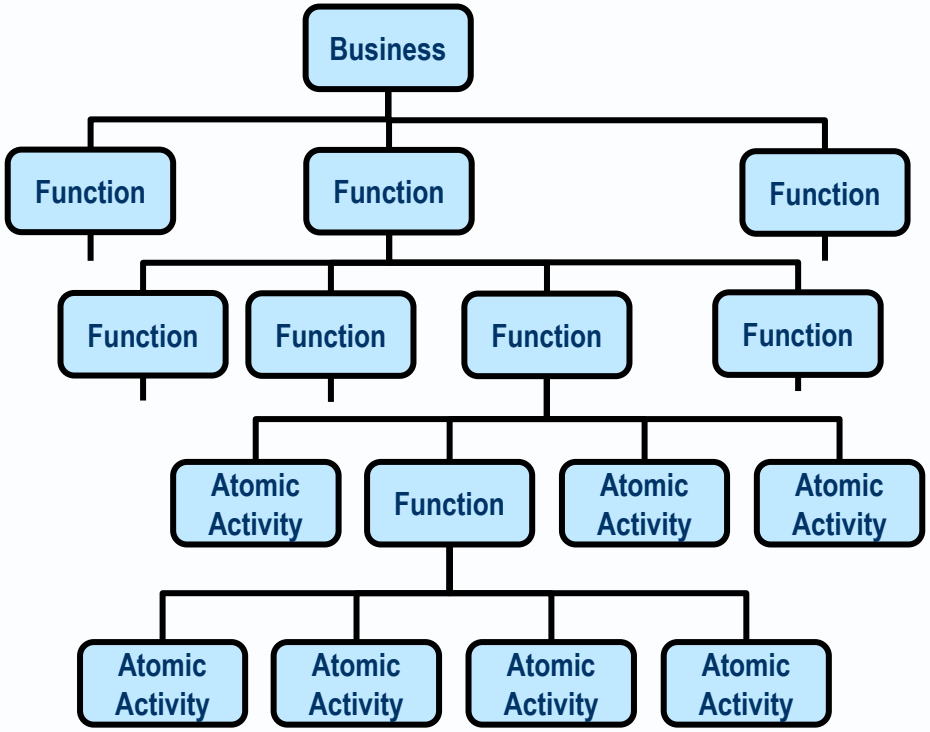
# Purposes

- To show what a business does regardless of who does it (management structure) and how it's done (process flows).
- To name, classify and structure business activity domains that are supportable by IT.
- To enable heat-mapping (color coding) to show where changes are needed or proposed, or priorities or phases in a change program.
- To provide a structure for cataloguing other architecture entities.

# Function hierarchy

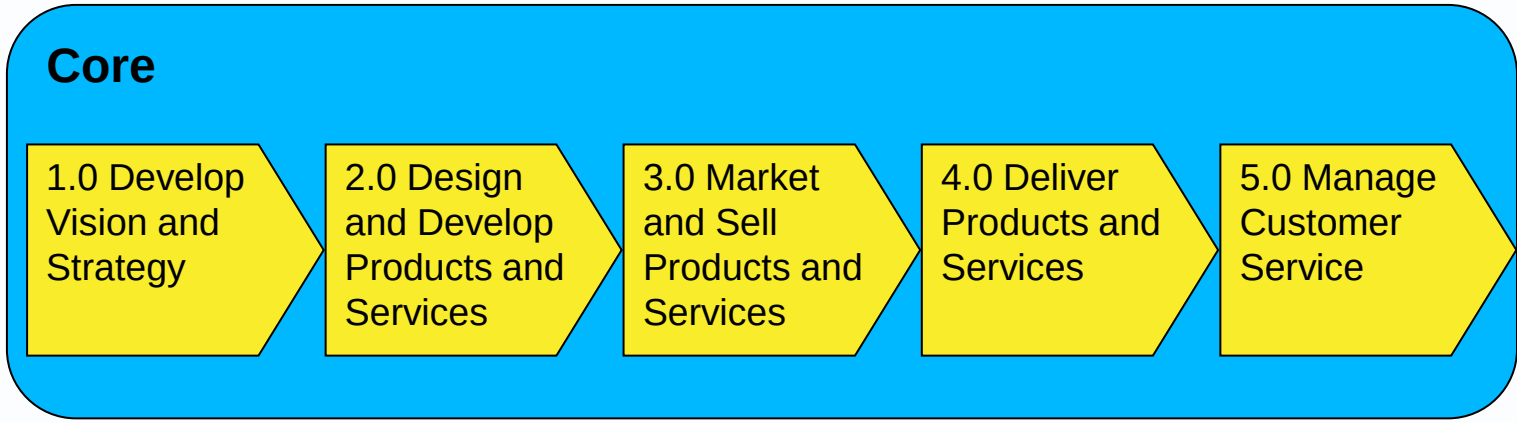
- A logical organization structure composed of functions.

- A business function groups lower-level functions or atomic activities that are cohesive, typically to meet an aim



# Business component

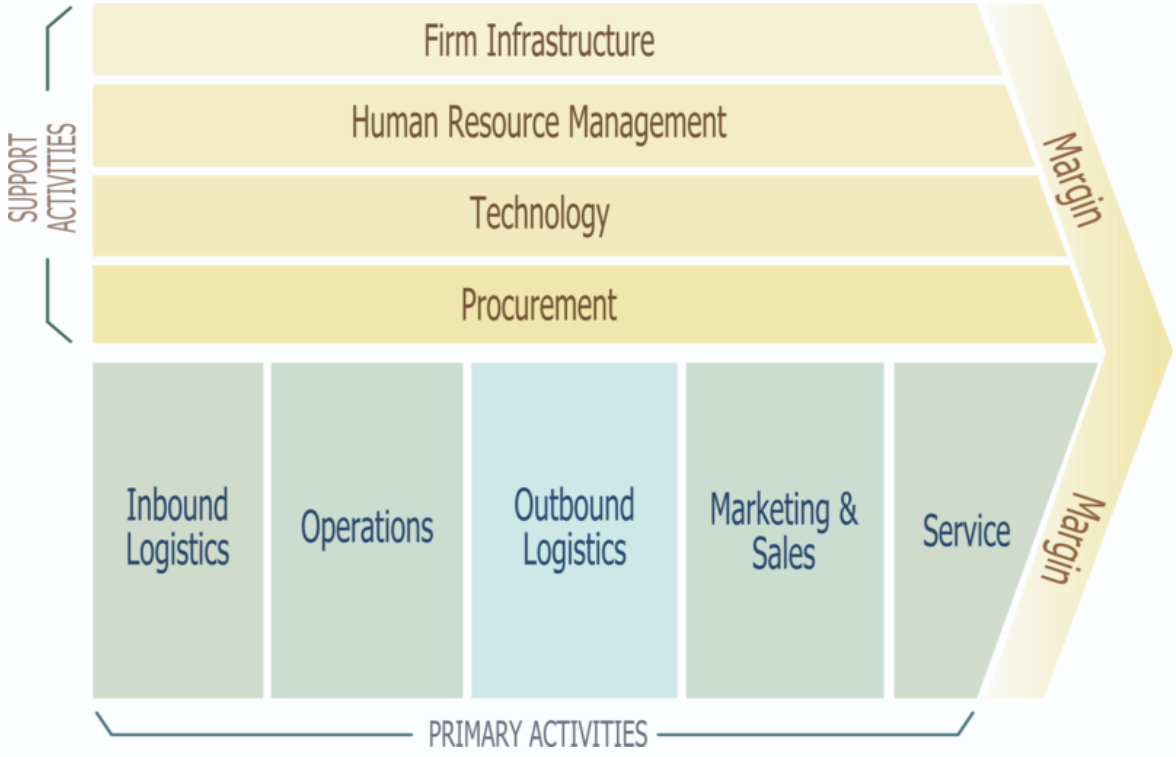
- Core functions develop, market, sell and deliver business products and services.




- Support functions are similar in different businesses, and candidates to be out-sourced.

# Value chain diagram

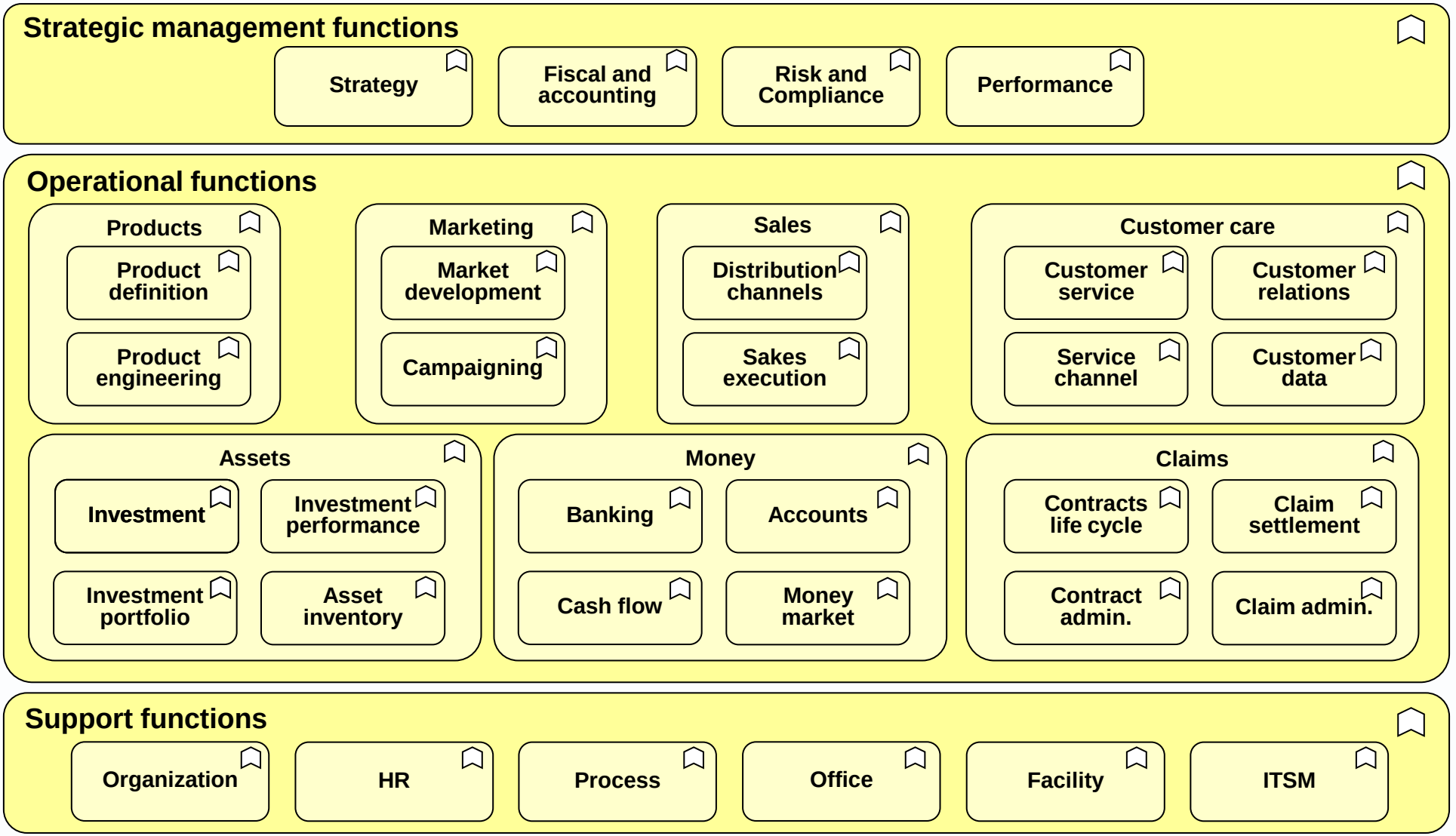
- indicates how business segments or functions deliver value.
- divides business into core and support segments or functions.
- suggests a flow of materials and/or data between core segments or functions.
- may show relationships to entities outside of the enterprise.




- Wikipedia commons

# **Functional Decomposition Diagram** (logical organization structure)

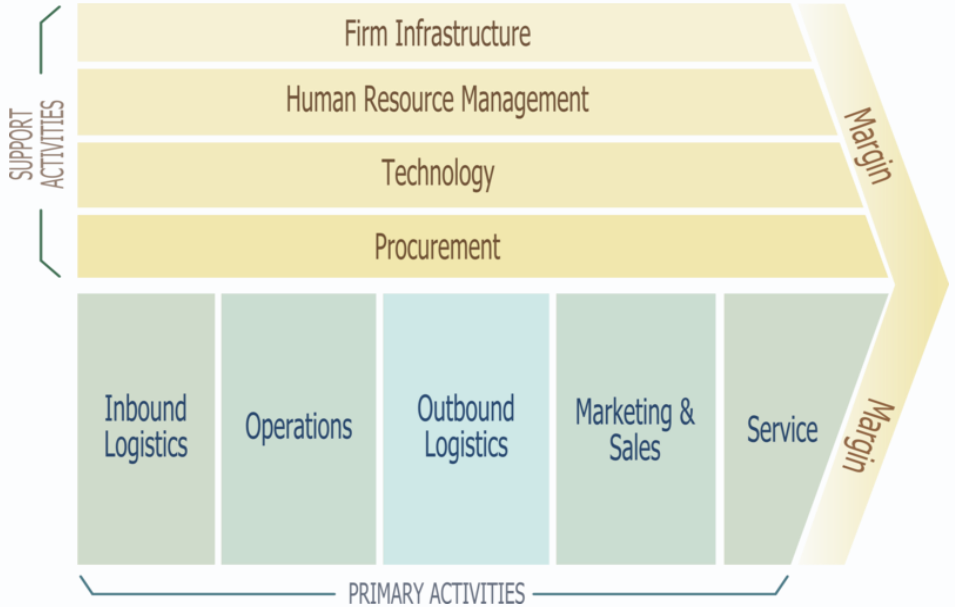
Avancier



# Value chain diagram



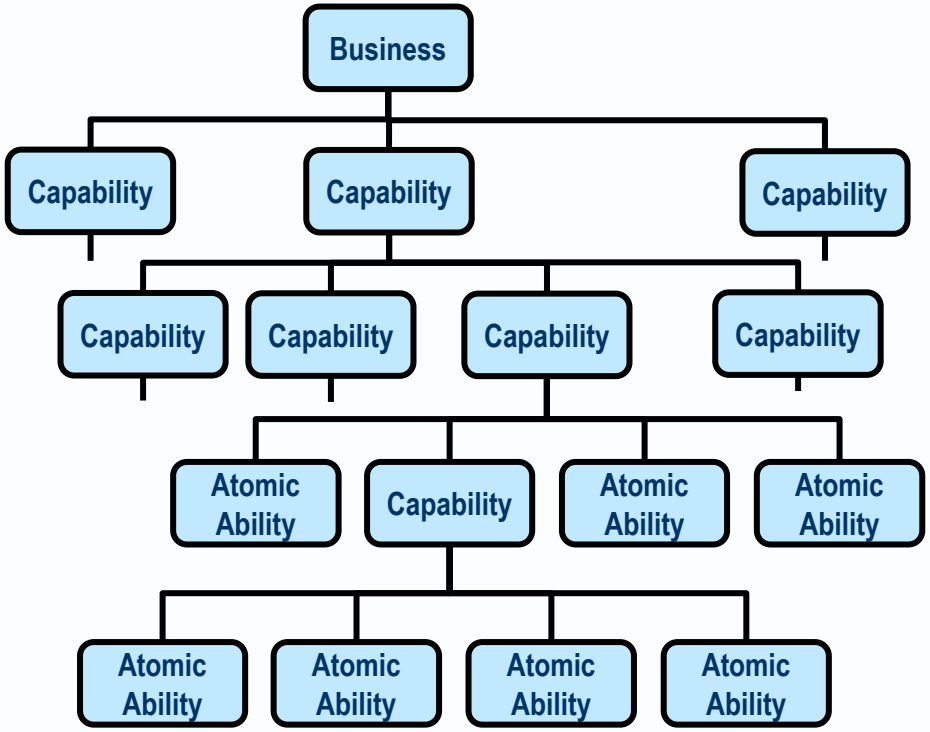
- [An artifact] that indicates how business segments or functions deliver value.
- A top-level view that divides business into core and support segments or functions.
- It suggests a flow of materials and/or data between core segments or functions.
- It may show relationships to entities outside of the enterprise.
- It shows on one page how core business segments or functions relate to each other and generate “value”.




- Wikipedia commons

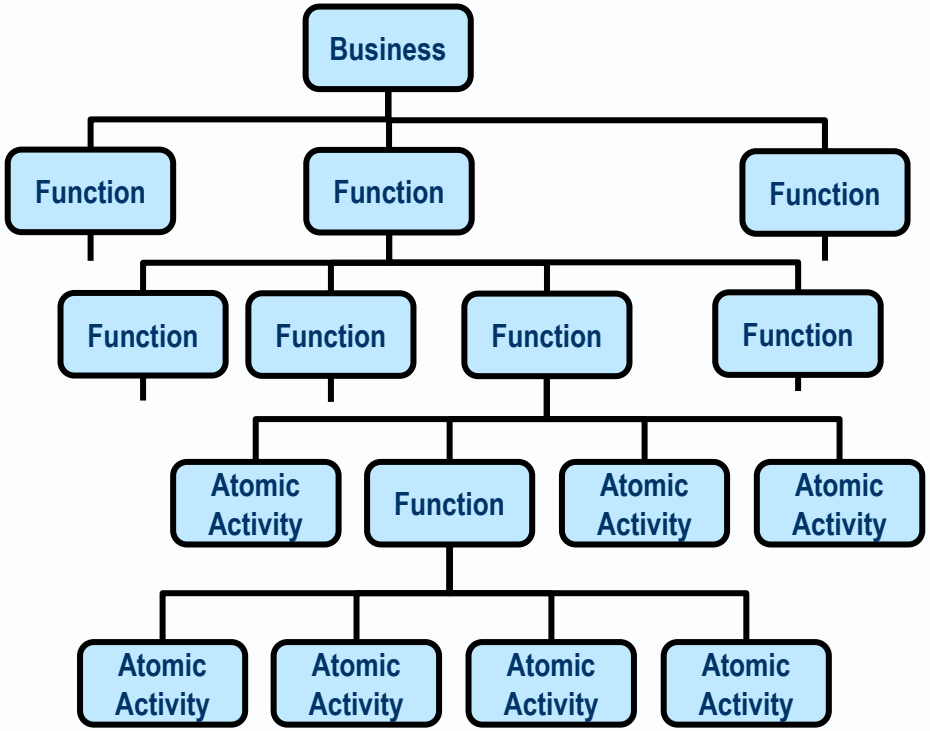
# Business capability hierarchy (or map)

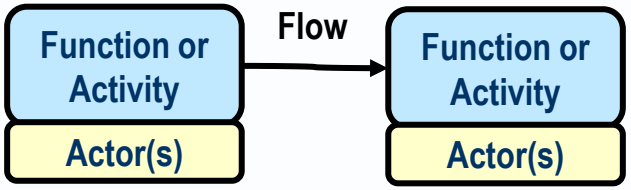
- A logical organization structure composed of capabilities.
- A business capability groups lower-level capabilities or atomic abilities that are cohesive, typically meet an aim.
- It may correspond to a function in a function hierarchy (such as sales), or to a stand-alone function (such as skill development).



# Structured analysis

- [A technique] that divides a business into logical functions or capabilities, which may be:
  - mapped to organizations, roles or activities
  - related by information and/or material flows
  - sequenced in processes or value streams.

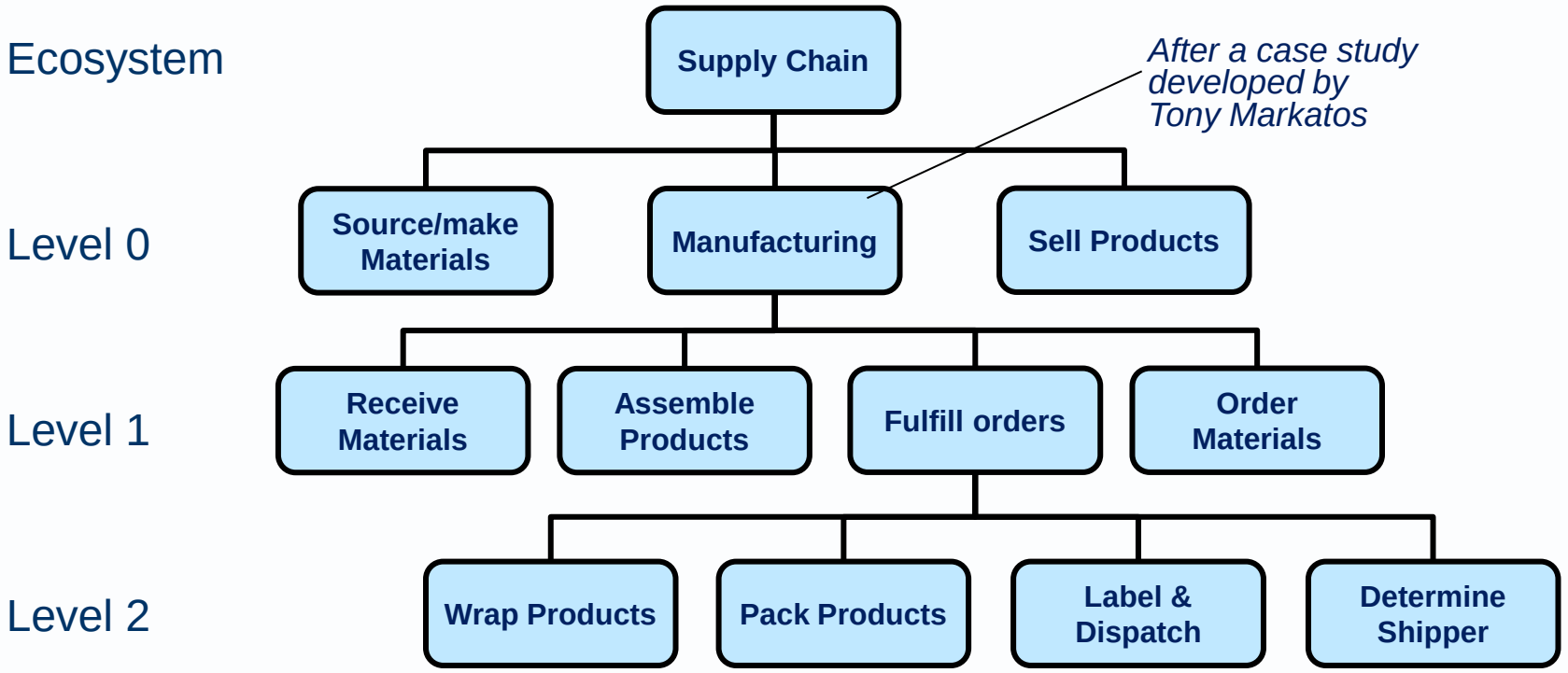


# E.g., A Supply Chain Ecosystem



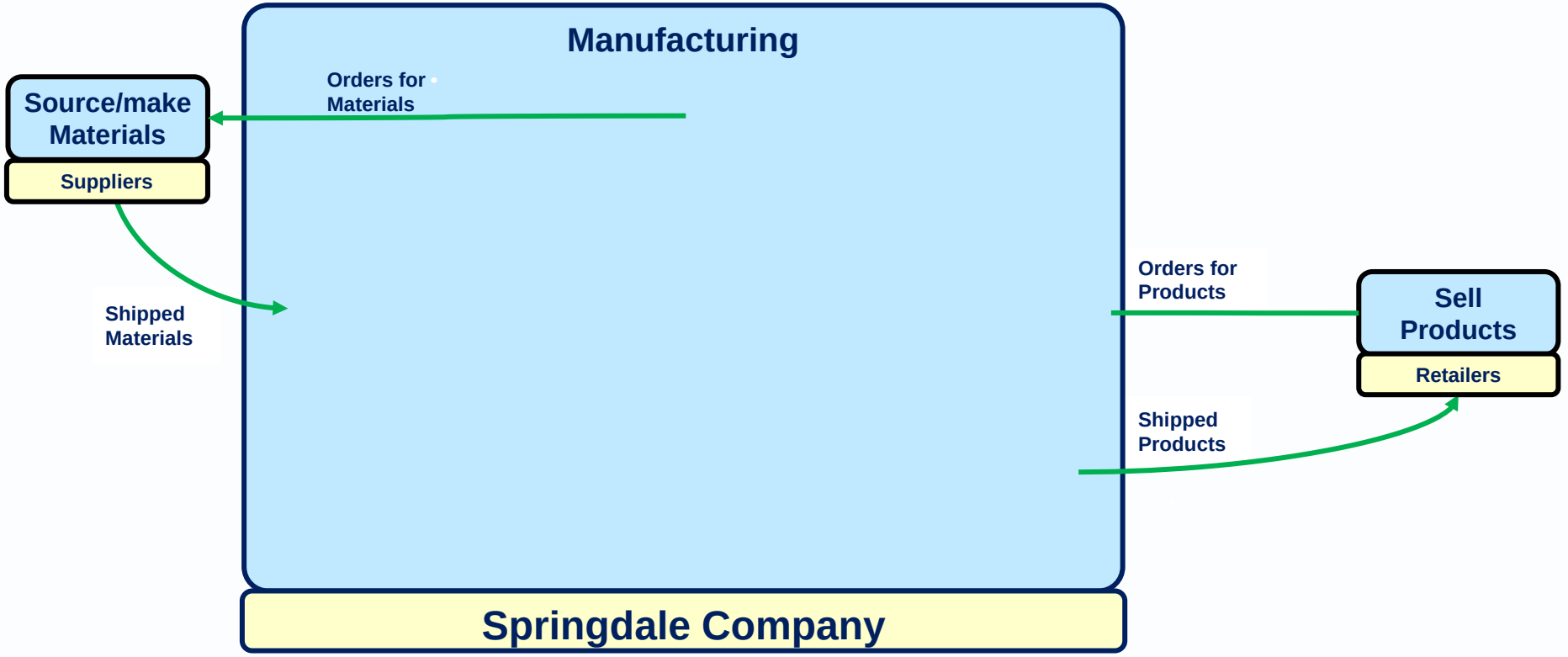
This function (or capability) hierarchy is a useful overview, but tells us little. Business architects want to know what each activity consumes and produces, and how they are related to each other.



# Manufacturing – level 0 diagram

Avancier

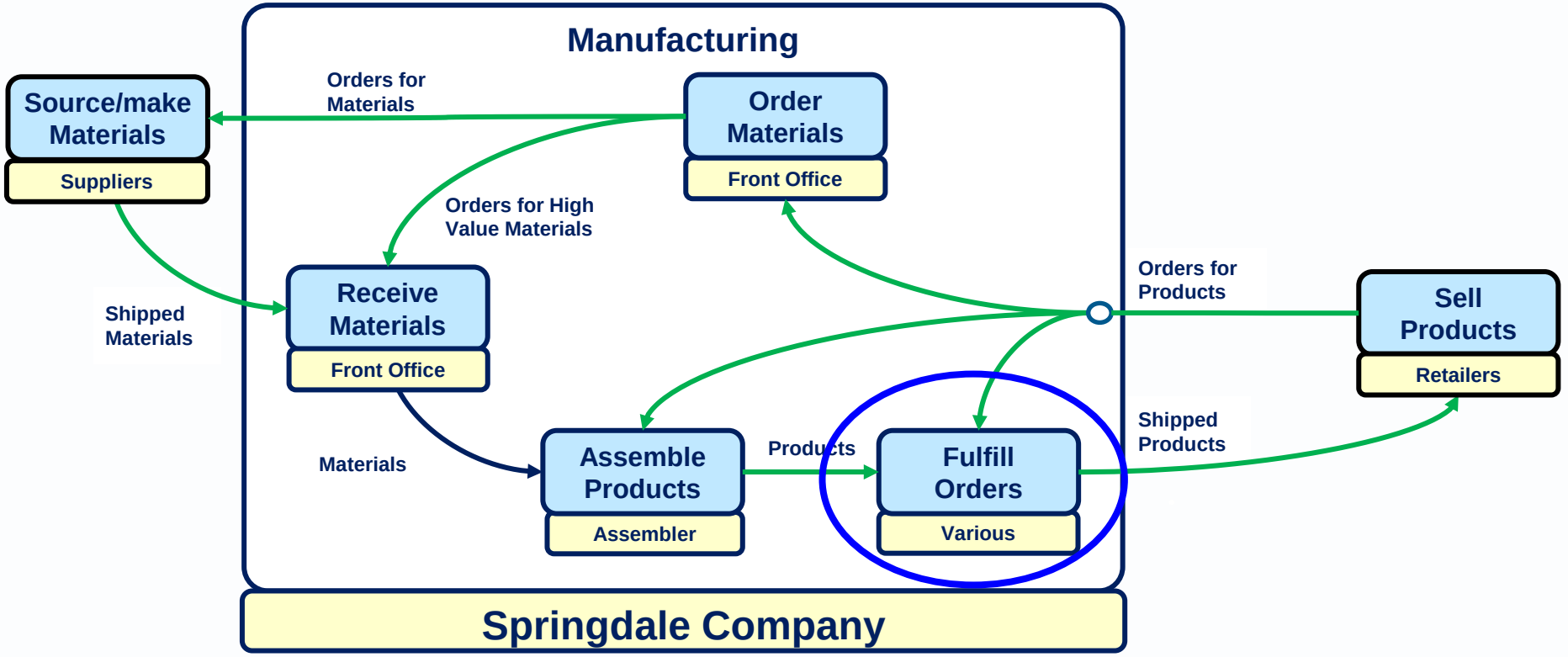
This **encapsulates** the activities of the Manufacturing function and defines it by inputs and outputs to/from external entities



# Manufacturing – level 1 diagram

Avancier

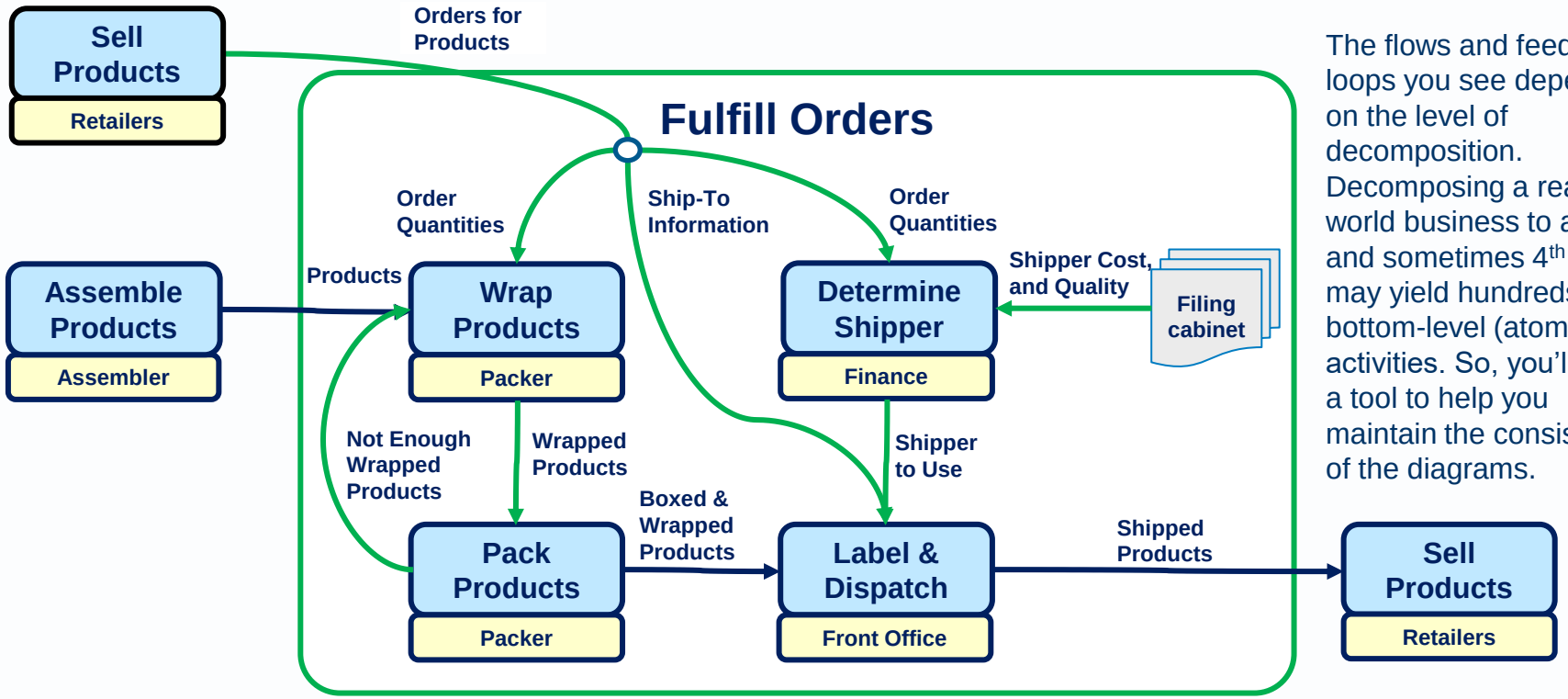
This slide decomposes the level 0 diagram, including the same I/O flows.
Let's look inside the Fulfill Orders function.



# Fulfill orders – a level 2 diagram

Avancier

This slide decomposes the Fulfill Orders function of the level 1 slide, including the same I/O flows.

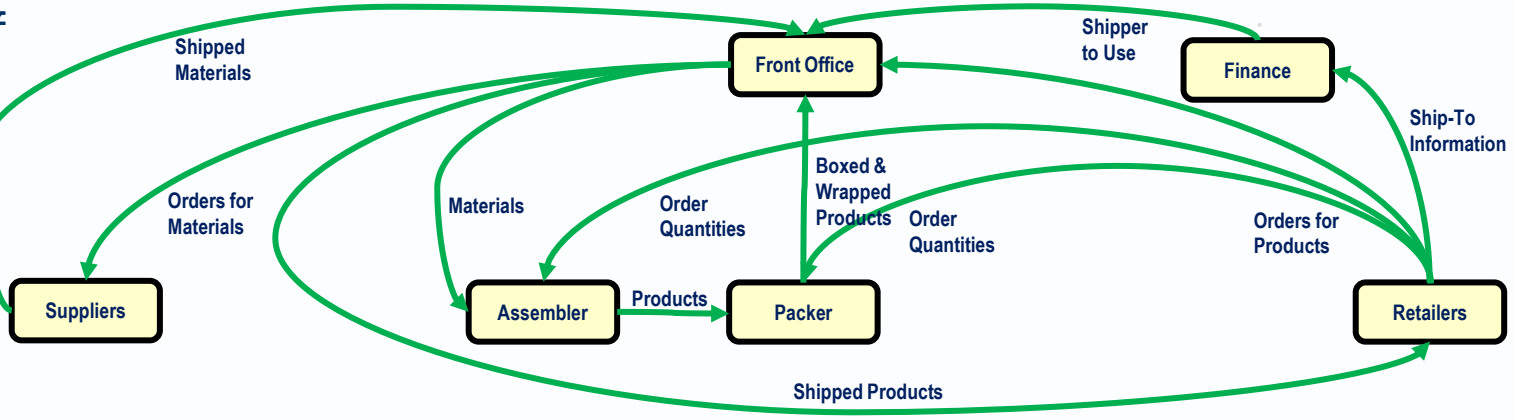



The flows and feedback loops you see depend on the level of decomposition. Decomposing a real world business to a 3rd and sometimes 4th level may yield hundreds of bottom-level (atomic) activities. So, you'll need a tool to help you maintain the consistency of the diagrams.

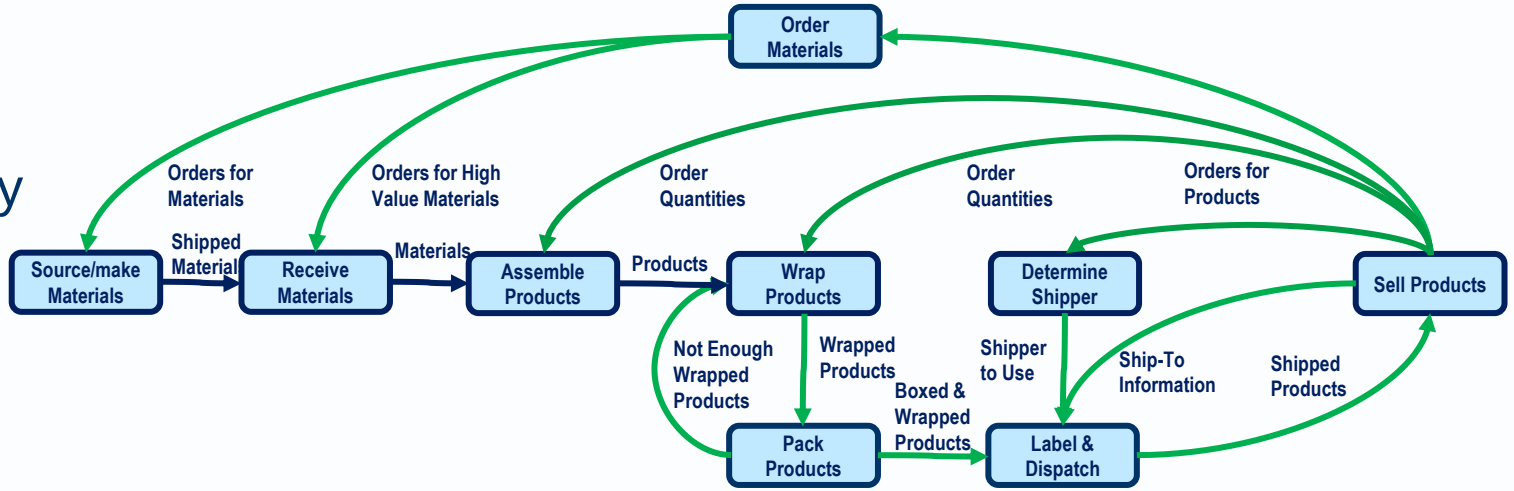
# Actor-oriented and activity-oriented views of a busines



- A network of **actors** who interact in particular activities.

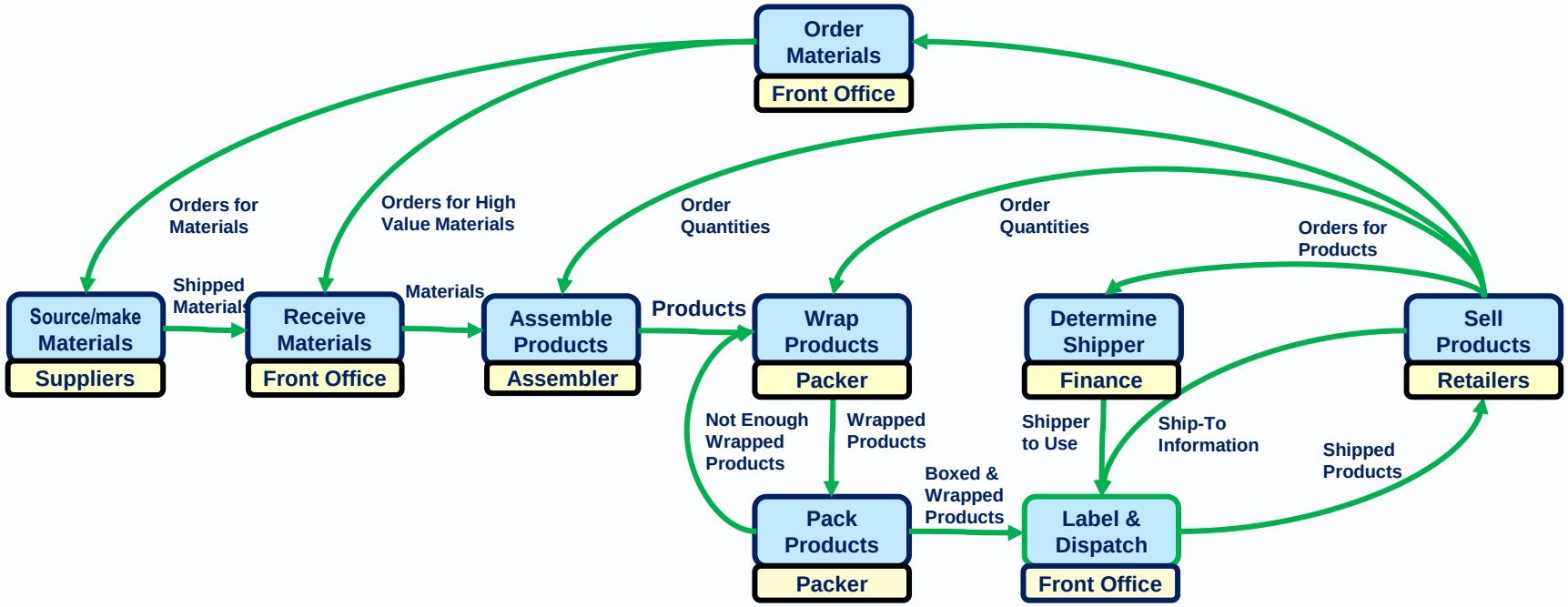



- A network of particular **activities** performed by actors.



# A business can be seen as either or both

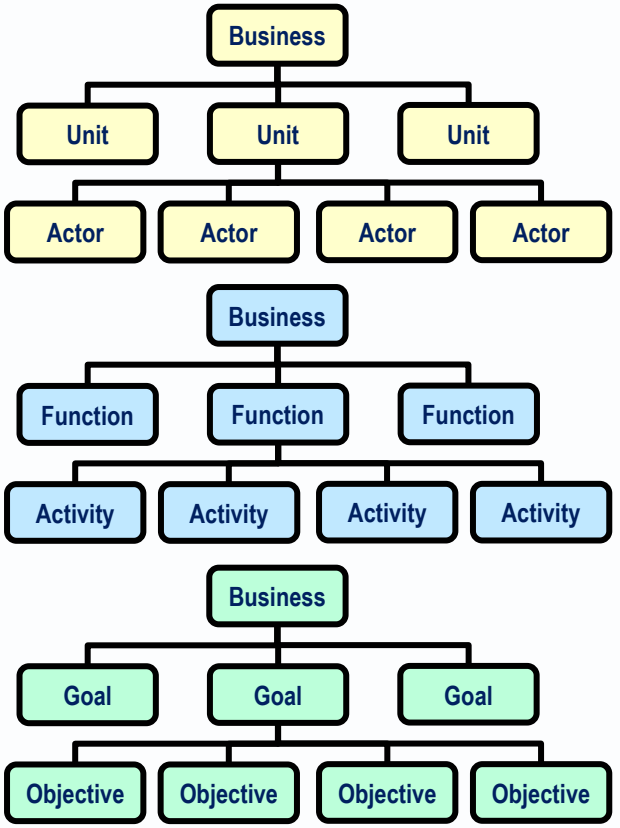
- A network of particular **activities** performed by **actors.**
- A network of **actors** who interact in particular **activities.**



# How do we understand and manage those networks?



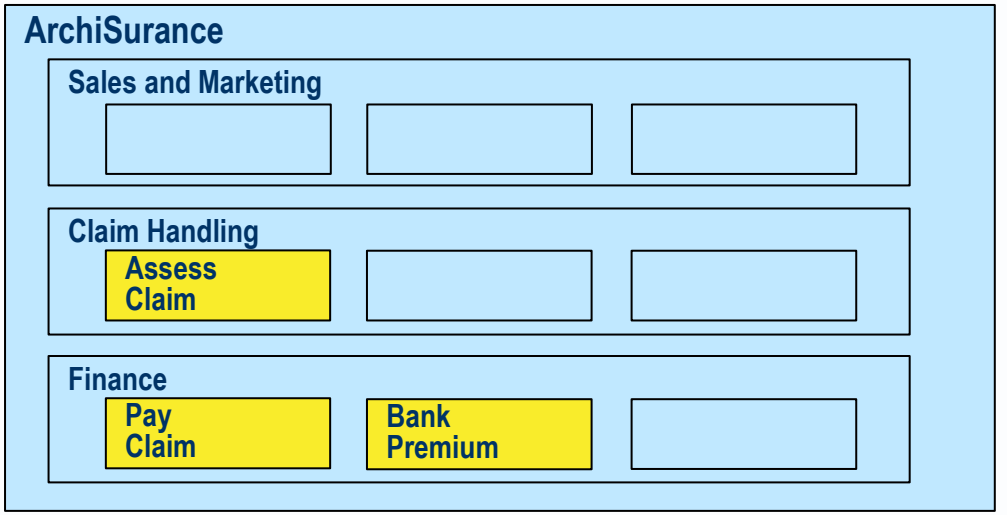
- We impose hierarchies on them
- **Actor** hierarchy
  - Management hierarchy.
- **Activity / ability** hierarchies
  - Function hierarchy
  - Capability hierarchy.
- **Aim hierarchy**
  - Goal/objective cascade.

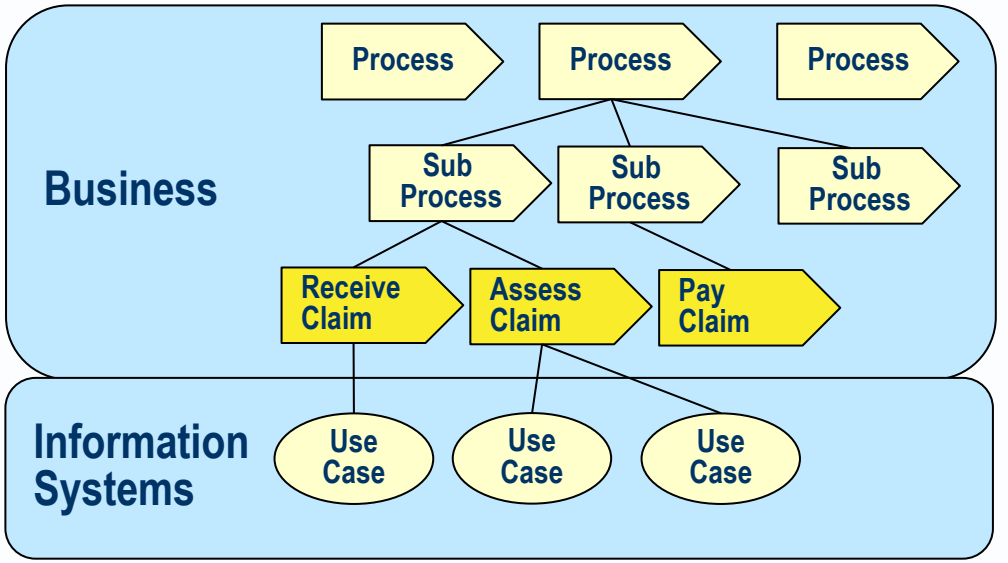



- Any two of these hierarchies may be drawn to match each other (in 1-1 correspondence), or not, as befits the business of interest.

# Structured analysis verification

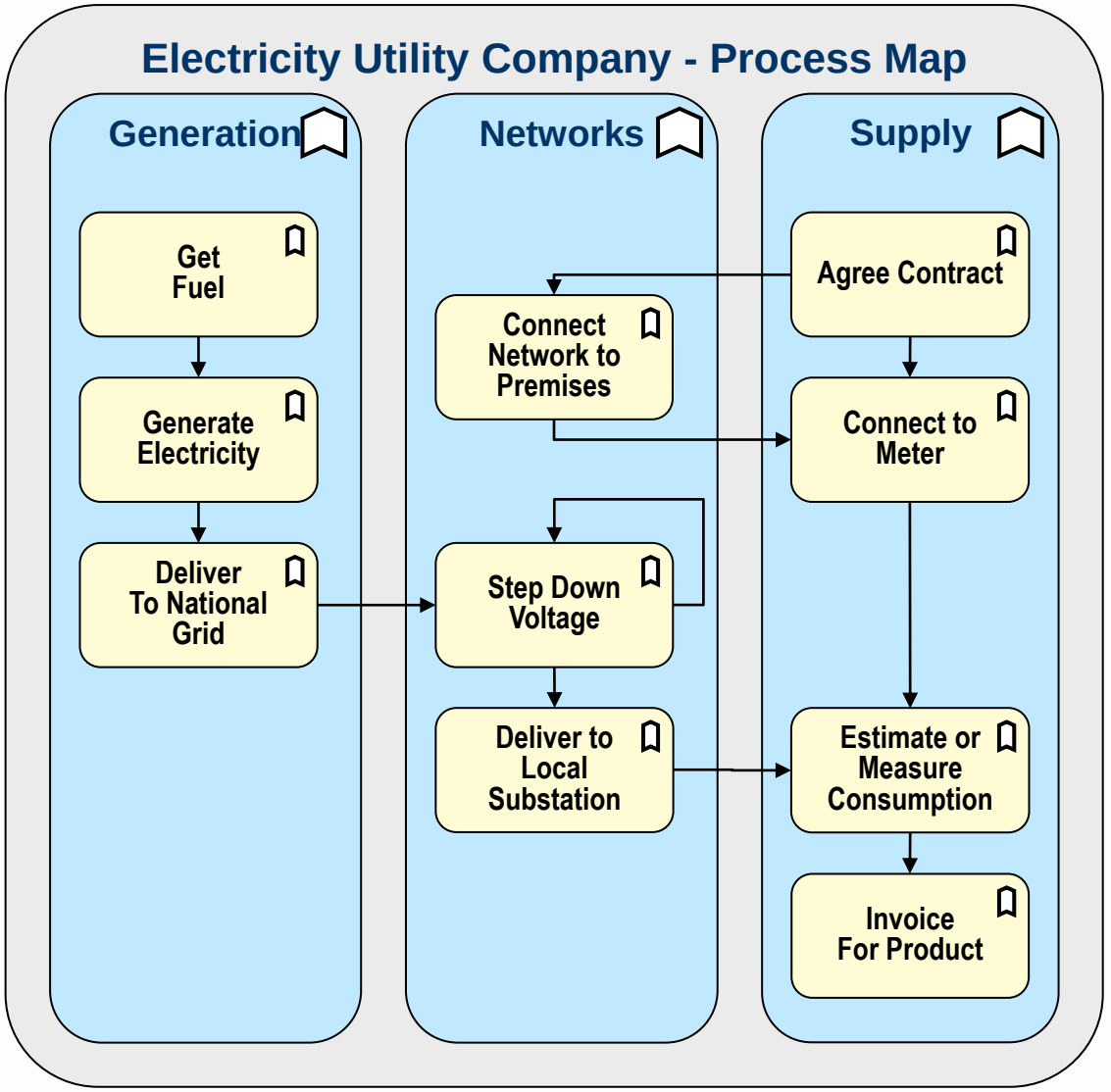
- [A technique] to ensure a business architecture is comprehensive and consistent.
- It should be possible to map every *atomic* activity in a business process model to a higher-level business function or capability.
- And to map every atomic business function or capability to a stage in a higher-level value stream, scenario or process.



# Structured analysis verification

- Every atomic activity found in a business process model should be locatable under one or more business functions.



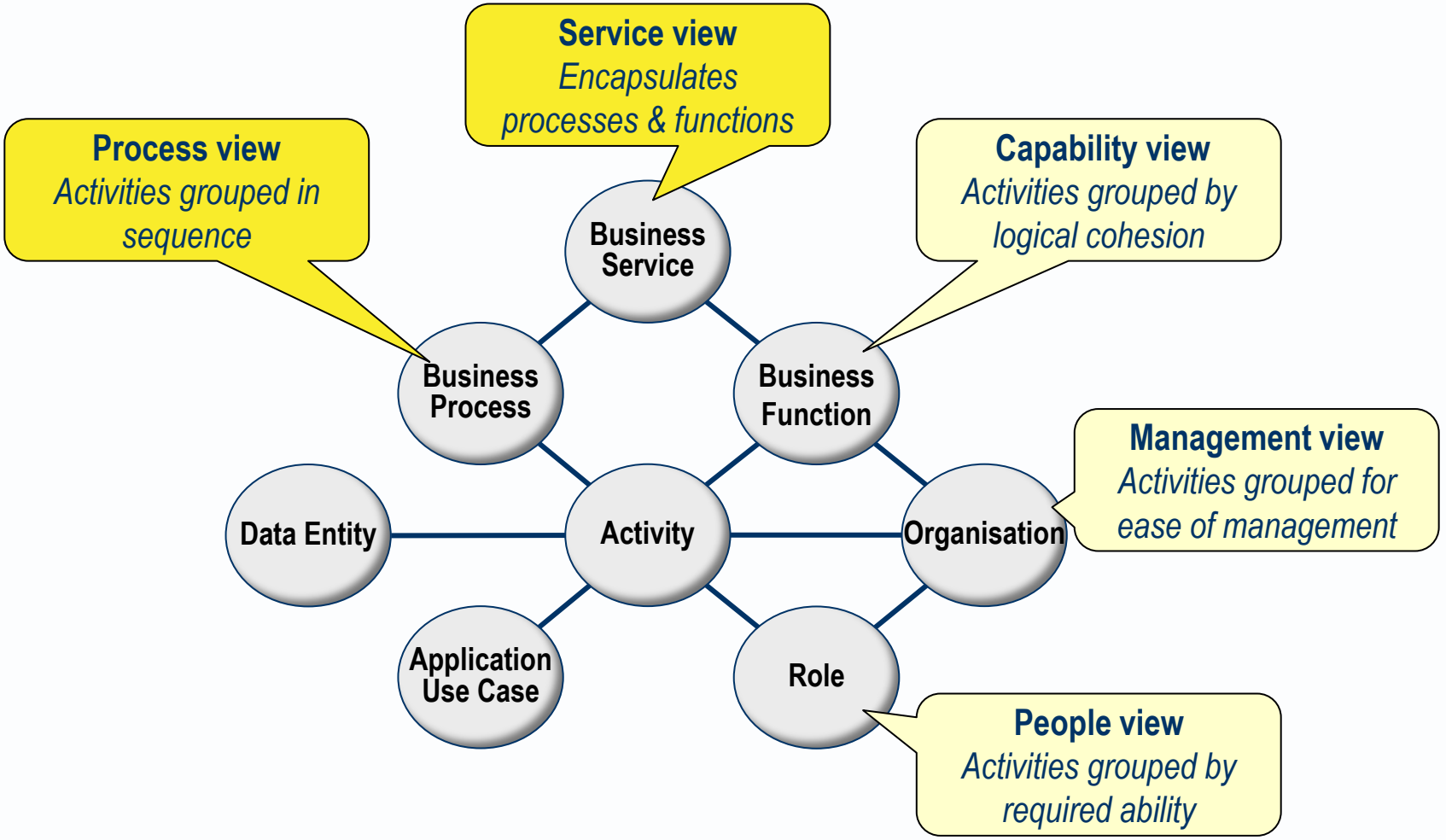
# Conversely: mapping functions/capabilities to a value stream

Avancier

- Every atomic business function/capability may be mapped to one or more stages in a high level value stream, scenario or process


**Figure 1.4: The Business Architecture Value Stream**

# 4.3 Business behaviour concepts and artifacts



# Business interface



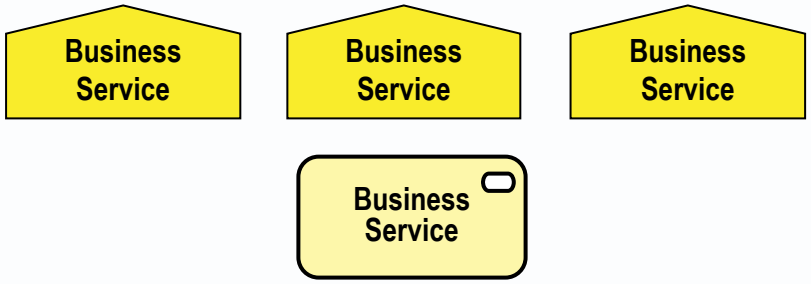
- [An interface definition] a collection of business behaviors accessible by an external entity.
- It hides processes and resources needed to deliver the service.

**AutoXpress Services**

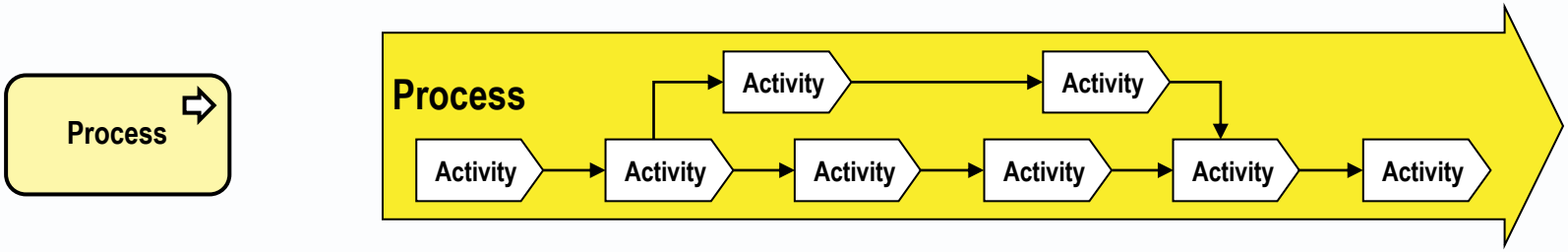
- Fit tyres
- Check-up and oil change
- Full annual service
- Check brakes
- Repair brakes
- Check exhaust
- Replace exhaust
- Inspect battery
- Replace battery
- Align wheels
- Replace windscreen wipers
- Fit bulbs
- Replace shock absorbers

# Business behavior

- **Business service**
  - [A service] a business component is required to perform for an external entity
  - It is definable in a contract that encapsulates whatever process(es) are need to deliver the desired results.

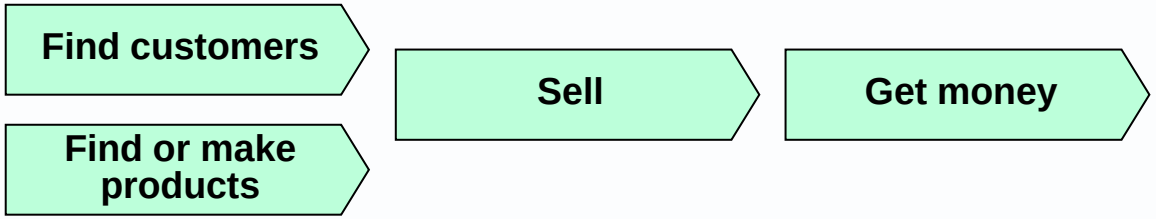



- **Business process**
  - [A process] performed by business actors in delivering a business service.
  - It may occur within one organisation or function, or coordinate activities in several.



# Process diagram

- [An artifact] that represents activities in a process from start to end.
- The process may occur within a function or cross function boundaries.





- Initially, architects focus on what is called the main, straight-thru, or happy path.
- However, 80% of the complexity lies in the 20% of exception paths.

# Value stream diagram



- [A process diagram] that shows stages in an end-to-end business process and lists the activities in each stage.

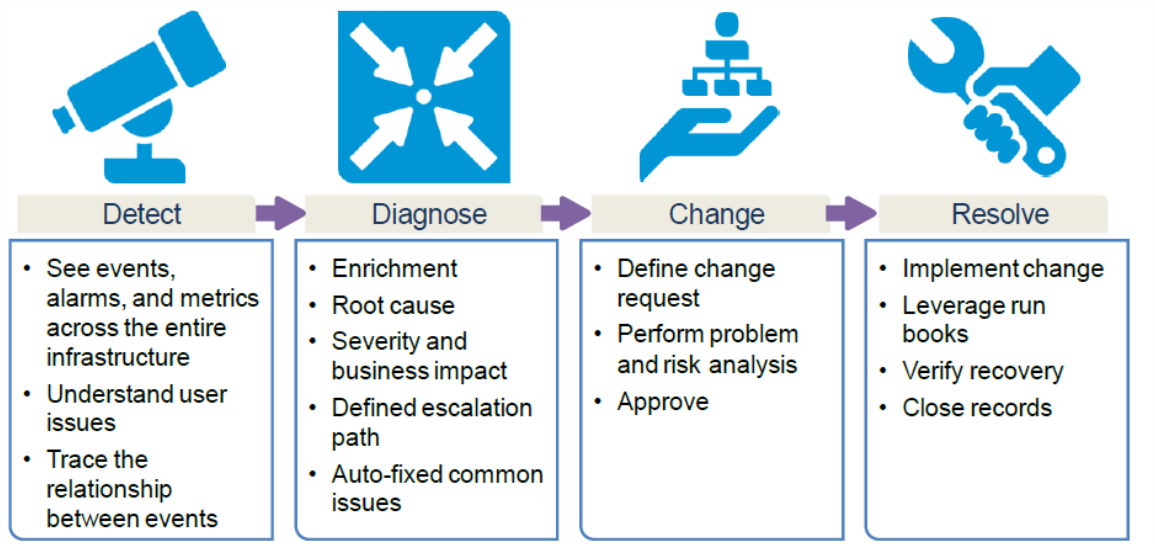



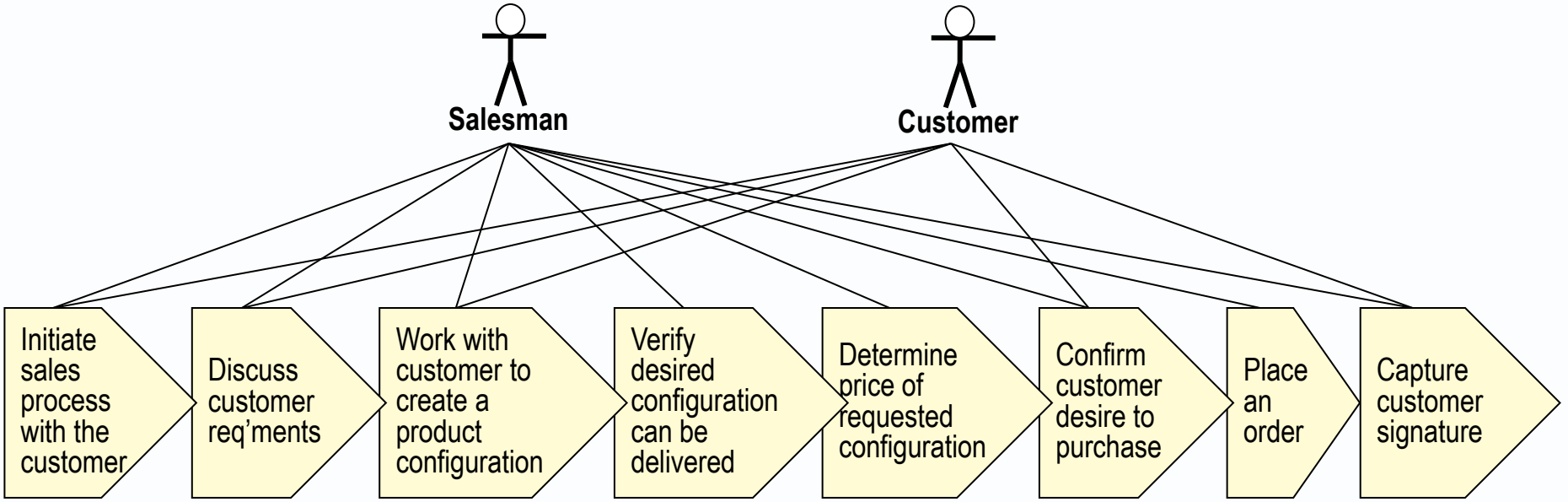

**Figure 7: Detect to Correct Activities**

- Functions, capabilities or resources may also be mapped to the stages.

# Business scenario diagram

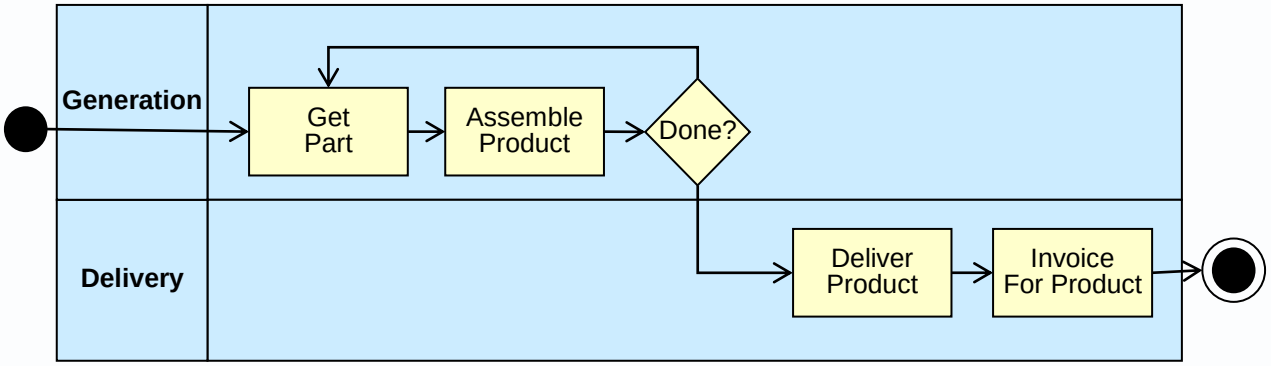


- [A process diagram] that shows steps in an end-to-end business process, and maps them to the roles played by human and computer actors in each process step.



# Process flow diagram

- [A process diagram] that shows the control logic of activities in a process, and may include exception paths.



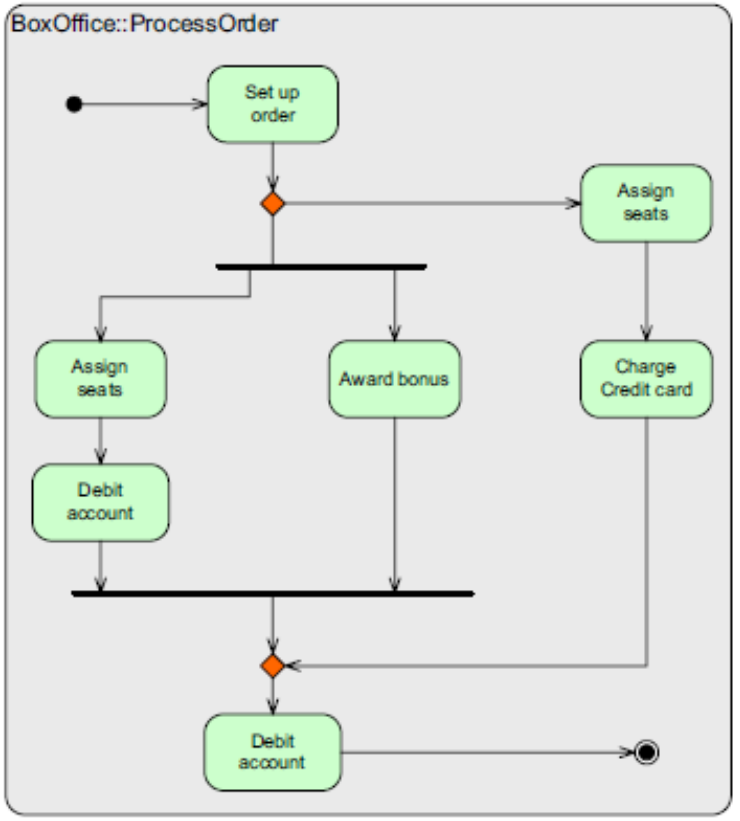




Figure 3-11, Processes (UML Activity diagram)

# Service decomposition

- A technique that divides longer services into shorter ones, such that one service is composed of dependent on subordinate services.

**Full Annual Service**

- 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

# Process decomposition

Avancier

- A technique that divides longer processes into shorter ones, such that one activity in a longer process is composed of several lower-level activities.

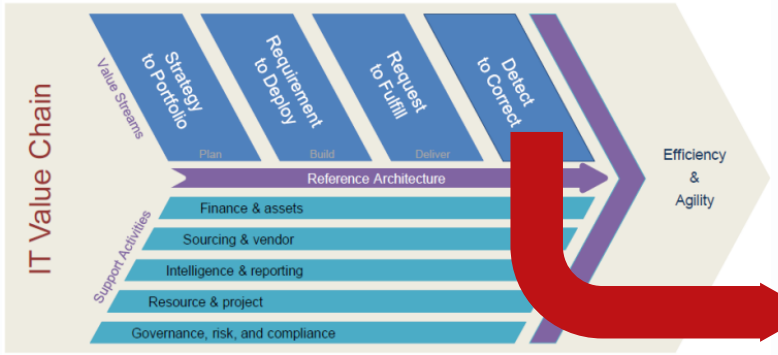



Figure 1: IT Value Chain

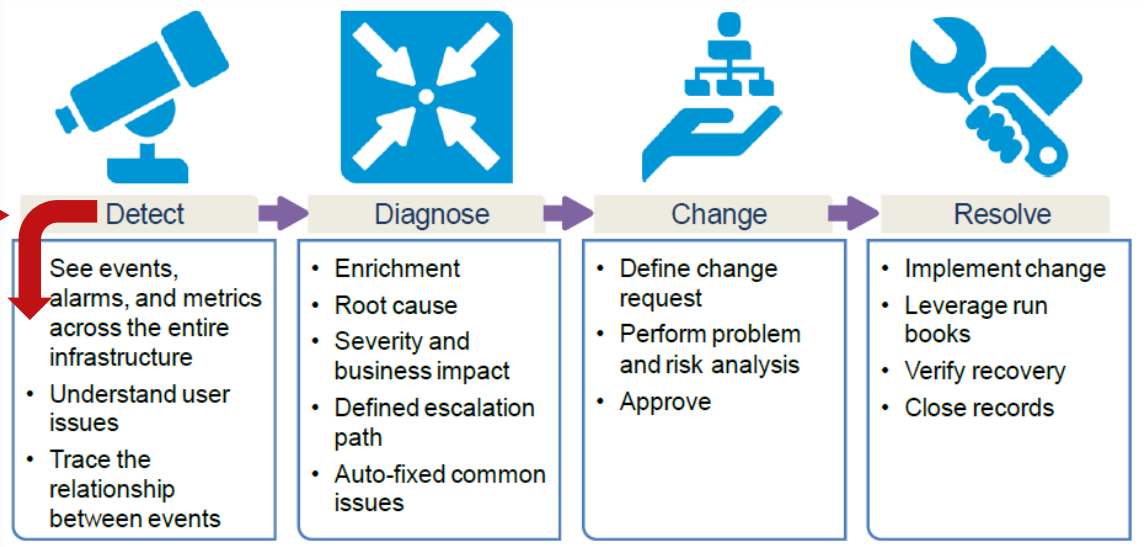
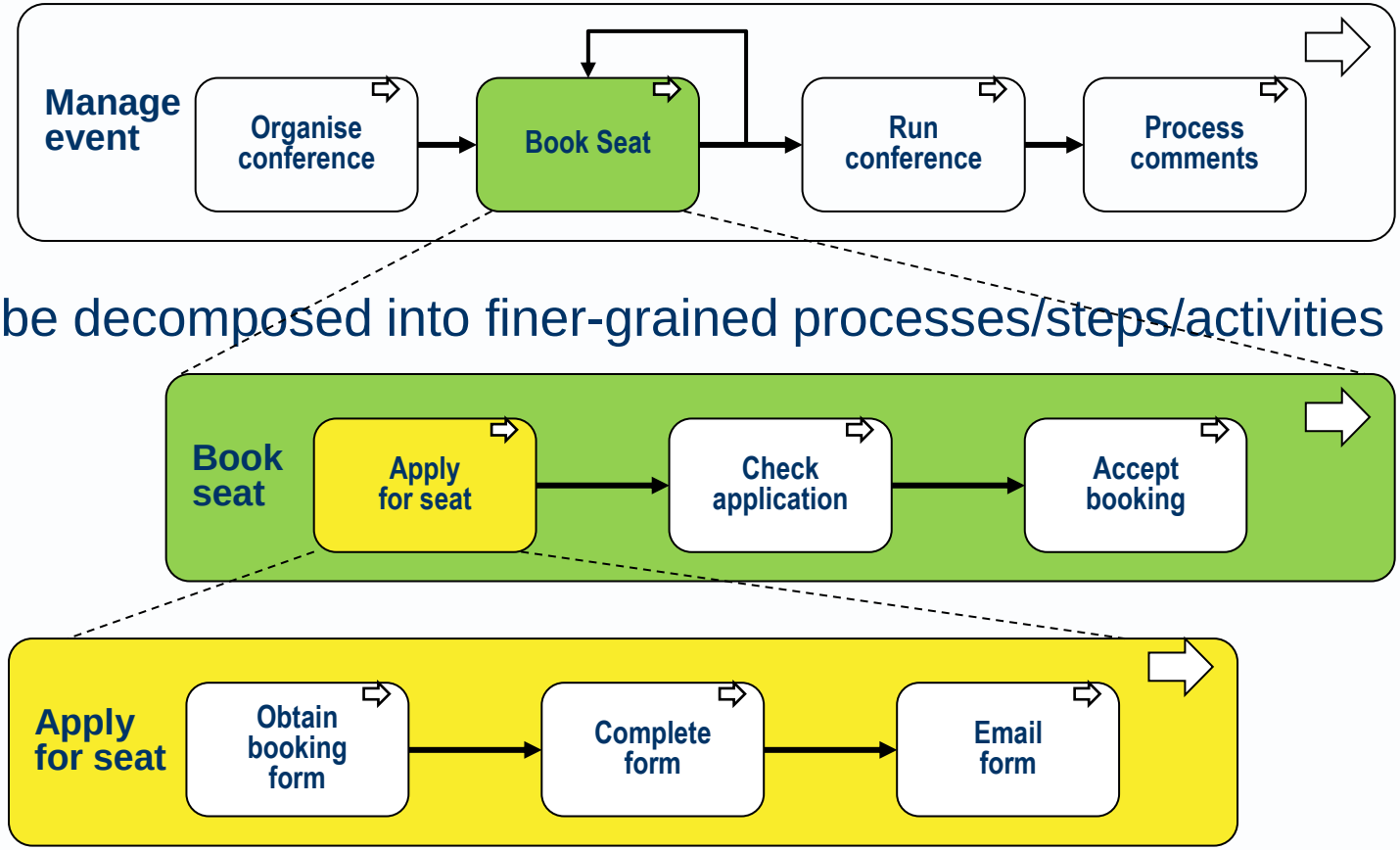



Figure 7: Detect to Correct Activities

# Process decomposition

- A process of coarse-grained processes/steps/activities

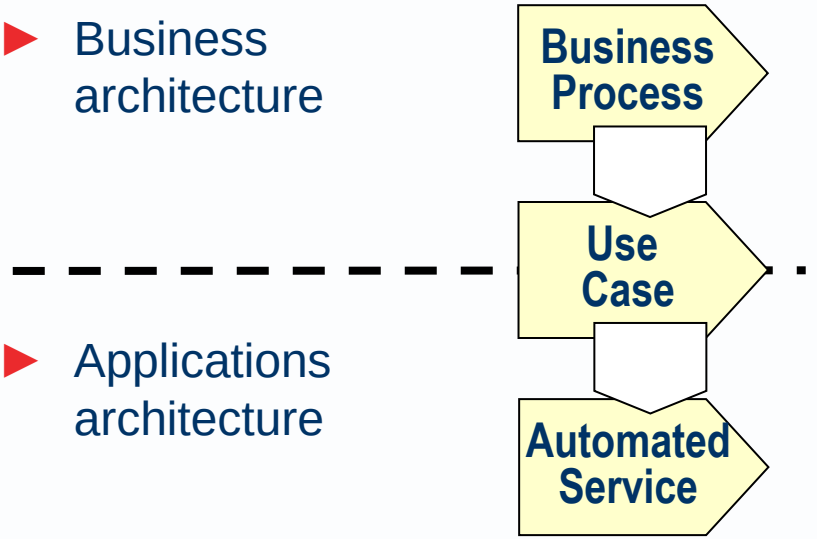



- Can be decomposed into finer-grained processes/steps/activities
- OPOPOT

# Process automation hierarchy

- [A technique] that decomposes a business process into steps,
- identifies application use cases needed at each step,
- and may go on to identify automated services required by a use case.

- Business architecture
- Applications architecture



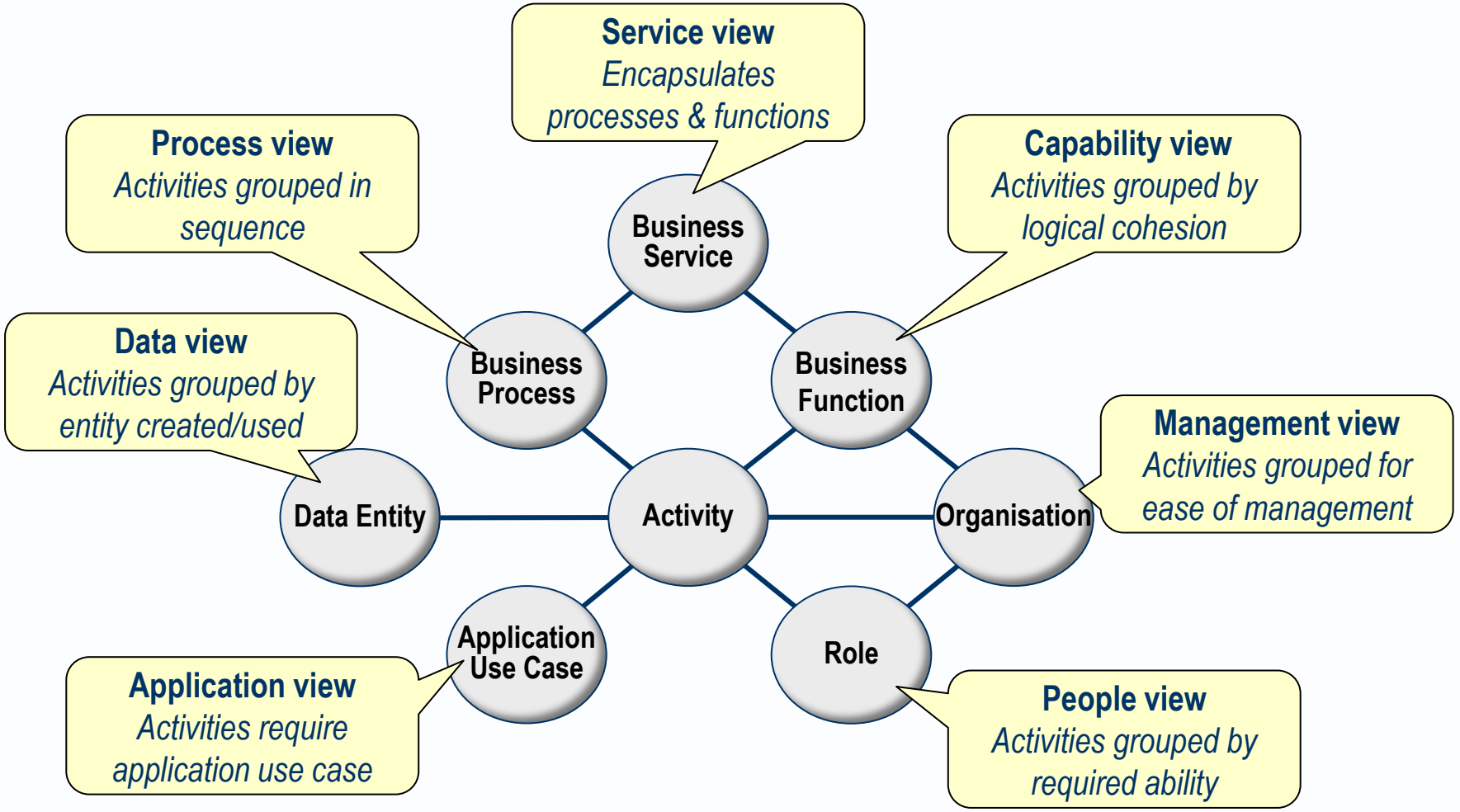
# Lean

Avancier

- A collection of ideas for ensuring value-adding activities in the flow of a value stream run smoothly, quickly and without waste.

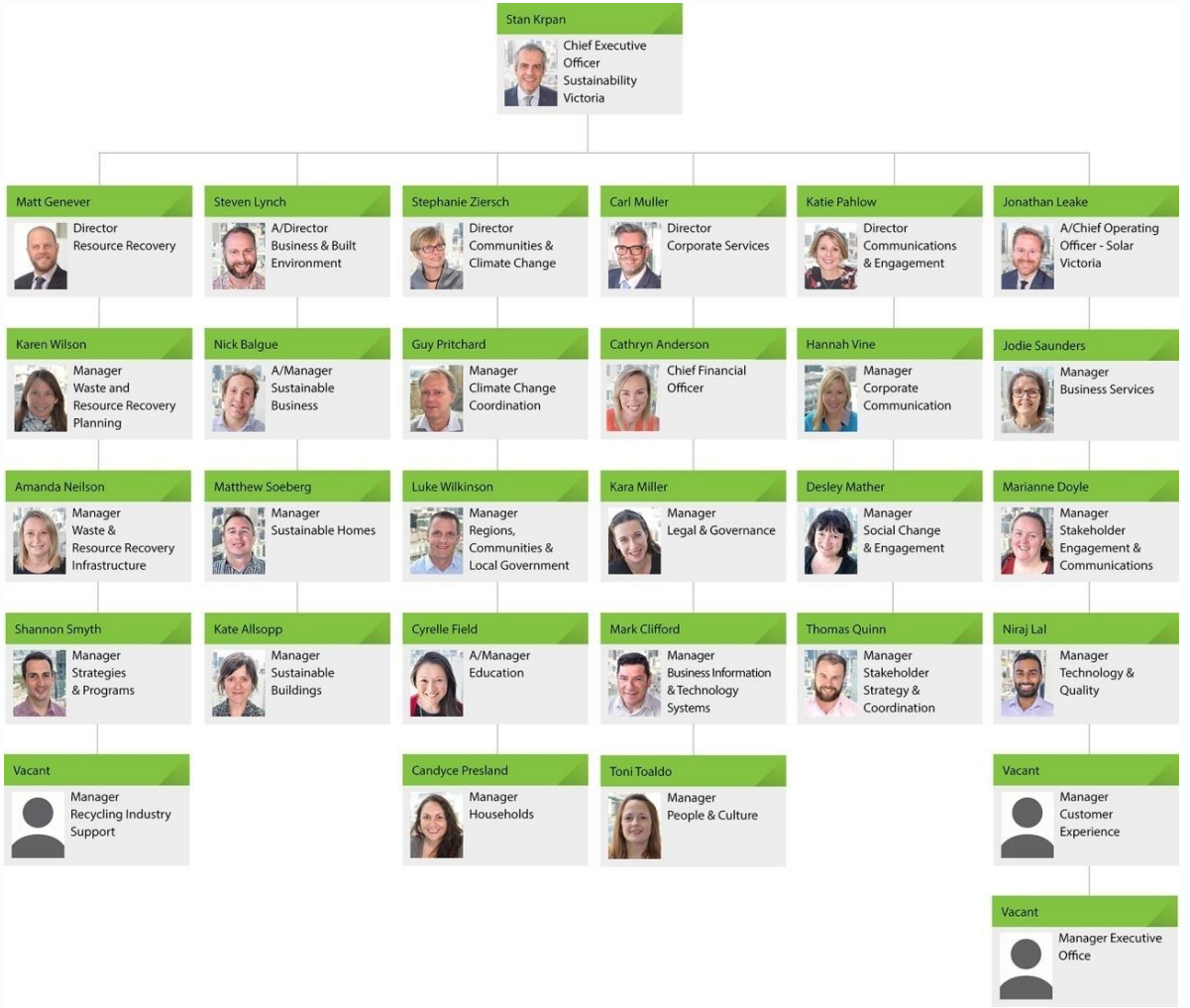
- Those and related ideas (pull and perfection) were developed for application to processes for manufacturing hardware, and have been adapted for application to processes in human and computer activity systems.

# 4.4 Other business architecture artifacts and techniques



# Organisation/actor catalogue

- A list of the actors who pay roles in a enterprise, which associates the actors with organization units.
- Purposes: to help architects identify and contact stakeholders with concerns or requirements. To define actors named in other artifacts.



# Organisation/business function matrix

Avancier

- [An artifact] that maps organisation units to business functions, at whatever level of granularity suits its purpose.

- Functional organisation

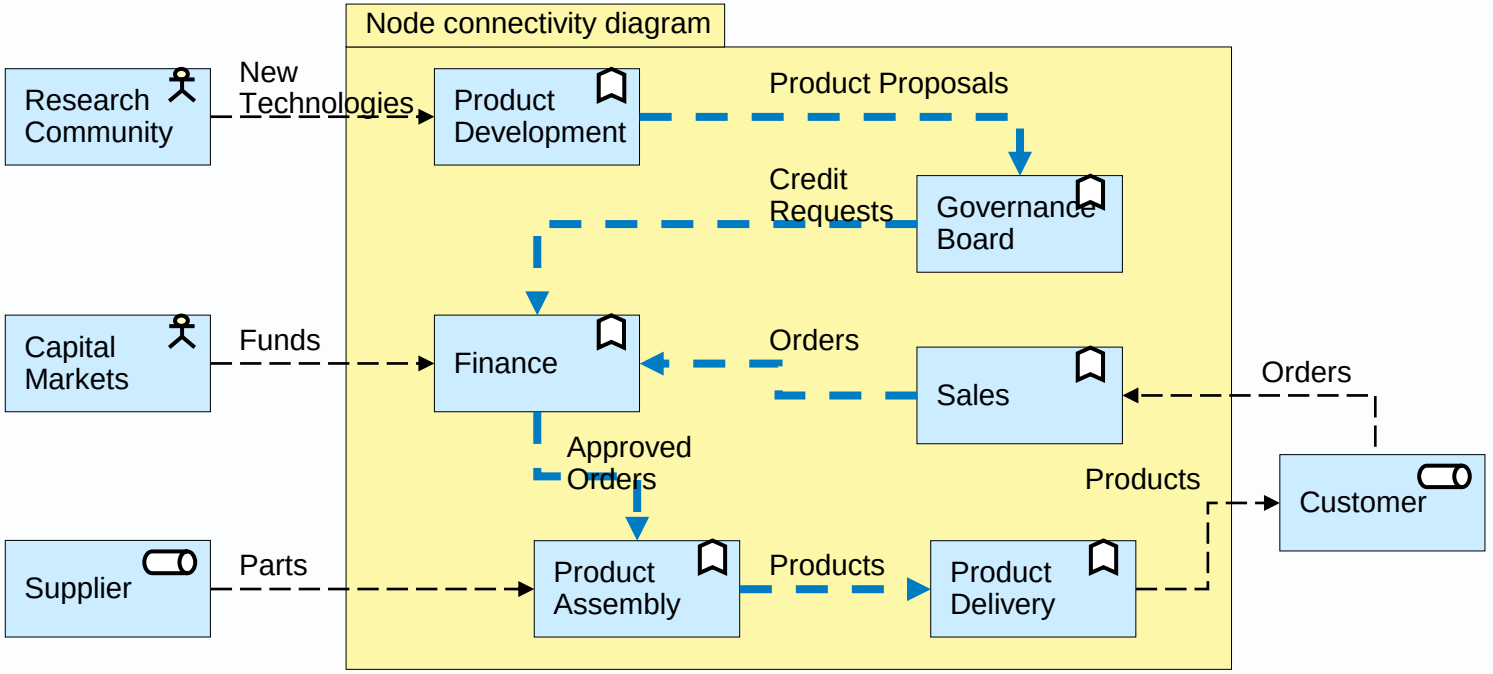
| Organisation Function | Marketing | Sales | Delivery |
|---|---|---|---|
| Marketing | Activity | | |
| Sales | | Activity | |
| Delivery | | | Activity |

- Non-functional organisation
- Might be divided by Product type, Customer type or Location.

| Organisation Function | Petrol | Paints | Plastics |
|---|---|---|---|
| Marketing | Activity | Activity | Activity |
| Sales | Activity | Activity | Activity |
| Delivery | Activity | Activity | Activity |

# Business communication diagram

- [An artifact] that shows where business components interoperate.
- Components interoperate by requesting and providing flows or services.
- Each service delivers one or more results of value to the service requester or receiver.
- The components and services can be modelled at any level of abstraction you choose.



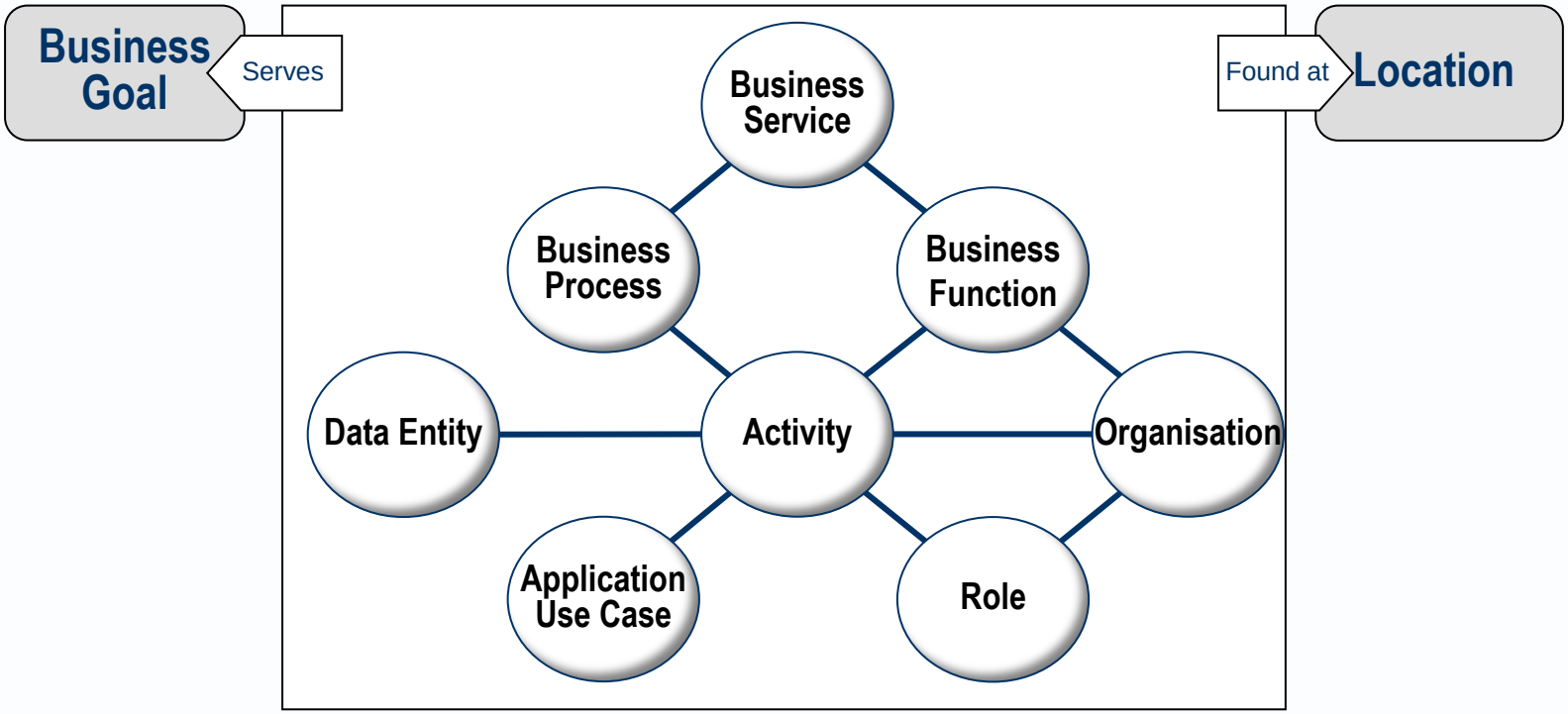
# SLA: Service Level Agreement



- [A document] that records a business interface definition
- A contract between a service provider and its customer(s).
- It defines the legal context for delivery of services to the end consumers.
- It lists services to be delivered, with performance levels as consumers see them.

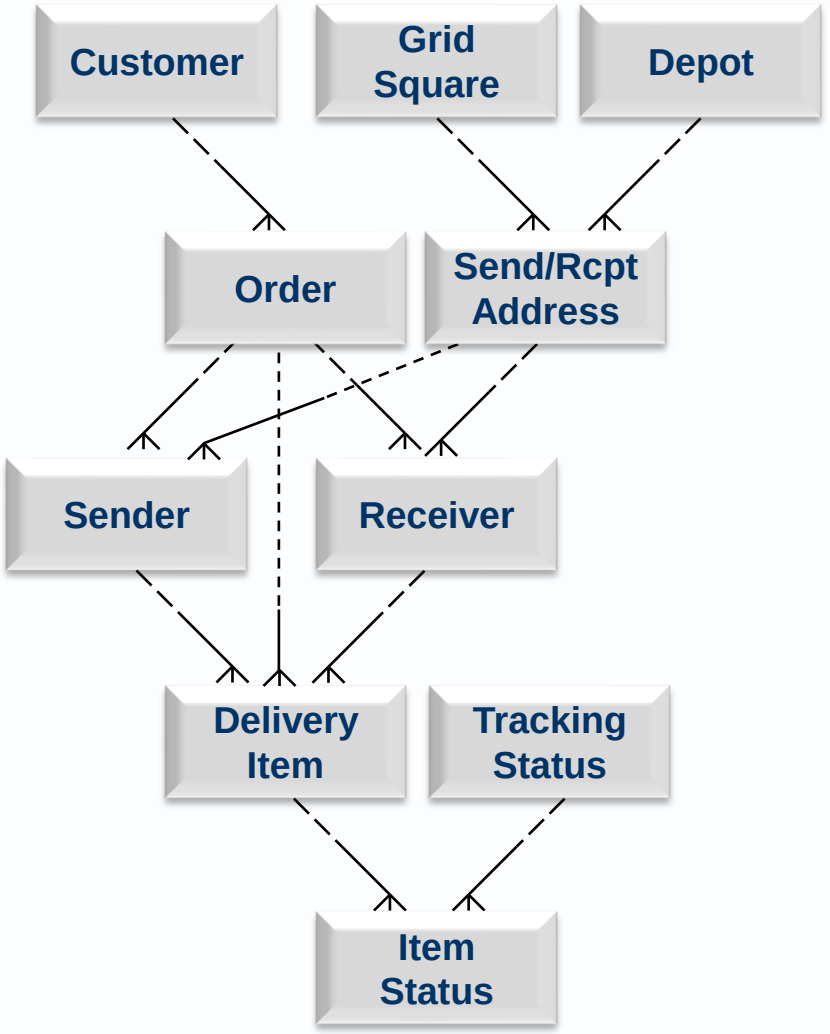
# Location catalogue

- [An artifact] that lists the locations at which business activities are performed.
- Sometimes represented graphically.



# Business data model

- See the data domain section.



# Cluster analysis



- [A technique] for gathering related items into a group.
- It is used to group functions and processes, and used in exploratory data mining.

| Function<br>Data Entity | Sales | Delivery | Finance |
|---|---|---|---|
| Customer | Create | Use | Use |
| Order | Create | Use | Use |
| Invoice | | Use | Create |

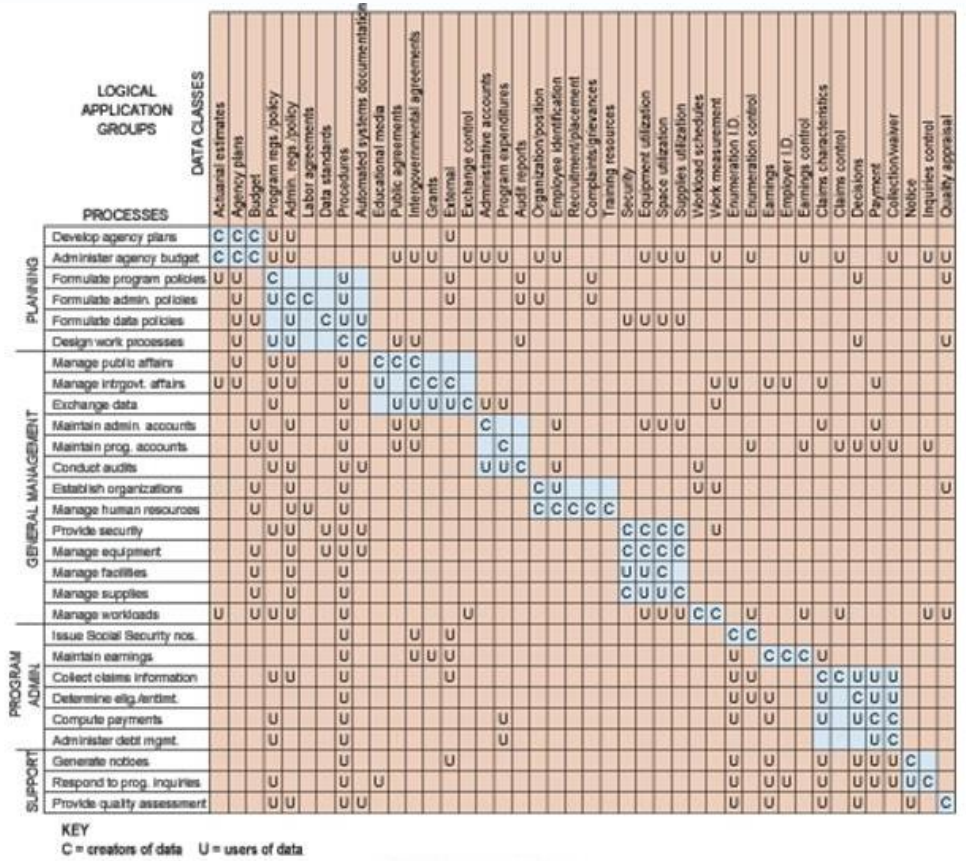





Figure 12-1

Enterprise Arch

## Affinity analysis

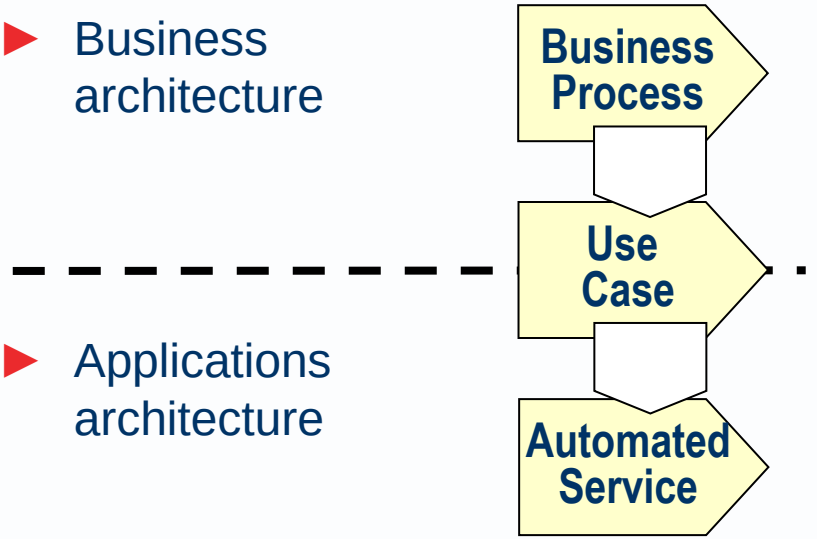


- [A technique] that looks for relationships between services requested or activities performed.
- It is used by retailers to perform market basket analysis.
- This information can be used for purposes of cross-selling and up-selling, influencing sales promotions, loyalty programs, store design, and discount plans.

# Process automation hierarchy

- [A technique] that decomposes a business process into steps,
- identifies application use cases needed at each step,
- and may go on to identify automated services required by a use case.

- Business architecture
- Applications architecture



# Application use case = process flow inside a service contract

Avancier

| | | |
|---|---|---|
| **Signature** | Name | Withdraw cash |
| | Input | Card details, pin number, cash amount |
| | Output | Cash, receipt |
| **Trigger event** | | Enter card |
| **Functional rules** | Preconditions | Valid pin number, sufficient cash in account |
| | Post conditions | Account balance reduced by cash amount |
| **Process flow** | | 1 Enter card<br>2 Enter pin number<br>3 Select amount<br>4 Press OK<br>5 Withdraw card |
| **Non-functional requirements** | Response time | 30 seconds |
| | Throughput | 100 per second |
| | Availability | etc |
| | Integrity: | |
| | Scalability: | |
| | Security | |
| | Other... | |

Service Contract

Process Flow

Service Contract

# Automated service

Avancier

| | | |
|---|---|---|
| Signature | Name | Calculate Area |
| | Input | Radius |
| | Output | Area |
| Trigger event | | Service invocation |
| Functional rules or semantics | Preconditions | Radius is numeric |
| | Post conditions | Area = pi * Radius squared |
| Non-functional requirements | Response time | 0.1 second |
| | Throughput | n/a |
| | Availability | 100% of time the calculator is switched on |
| | Integrity: | 100% accuracy |
| | Scalability: | n/a |
| | Security | n/a |
| | Other... | |

# Automated Service



- Usually,
  - a service provided by a server-side component,
  - invoked from a user interface or data flow consuming process,
  - supports and progresses a use case,
  - applies an input message to stored business data.
- The server-side component might be code
  - on an app server or a data server under our control,
  - on a server under somebody else's control,
  - a 3rd party component of any kind – accessed via a web service perhaps
- Ideally atomic
  - So transaction management can be applied.
  - It can be rolled back if any precondition is violated.
- Typically an **ACID** transaction

Next slide

# ACID database transactions



- **Atomic**
  - All operations in a transaction complete, or none do *(roll back)*
- **Consistent**
  - Data is in a consistent state before and after the transaction
- **Isolated**
  - No parallel transaction can affect the data this transaction acts on
- **Durable**
  - Upon completion, system will move from one state to the next

- Forces **consistency** (aka integrity) at the end of a transaction
- Greatly **simplifies** the job of the developer

- Limits **availability**
  - A transaction reading two 99.9% available databases will be only 99.8% available (43 minutes **more downtime** per month)

# Remember



- Business processes steps and use cases may be scoped as
  - OPOPOT: One Person, One Place, One Time

- Use cases may be supported by automated services that are
  - Ideally ACID (that is, roll-backable)