Avancier Reference Model

Business Architecture (ESA 4)

4. Business architecture

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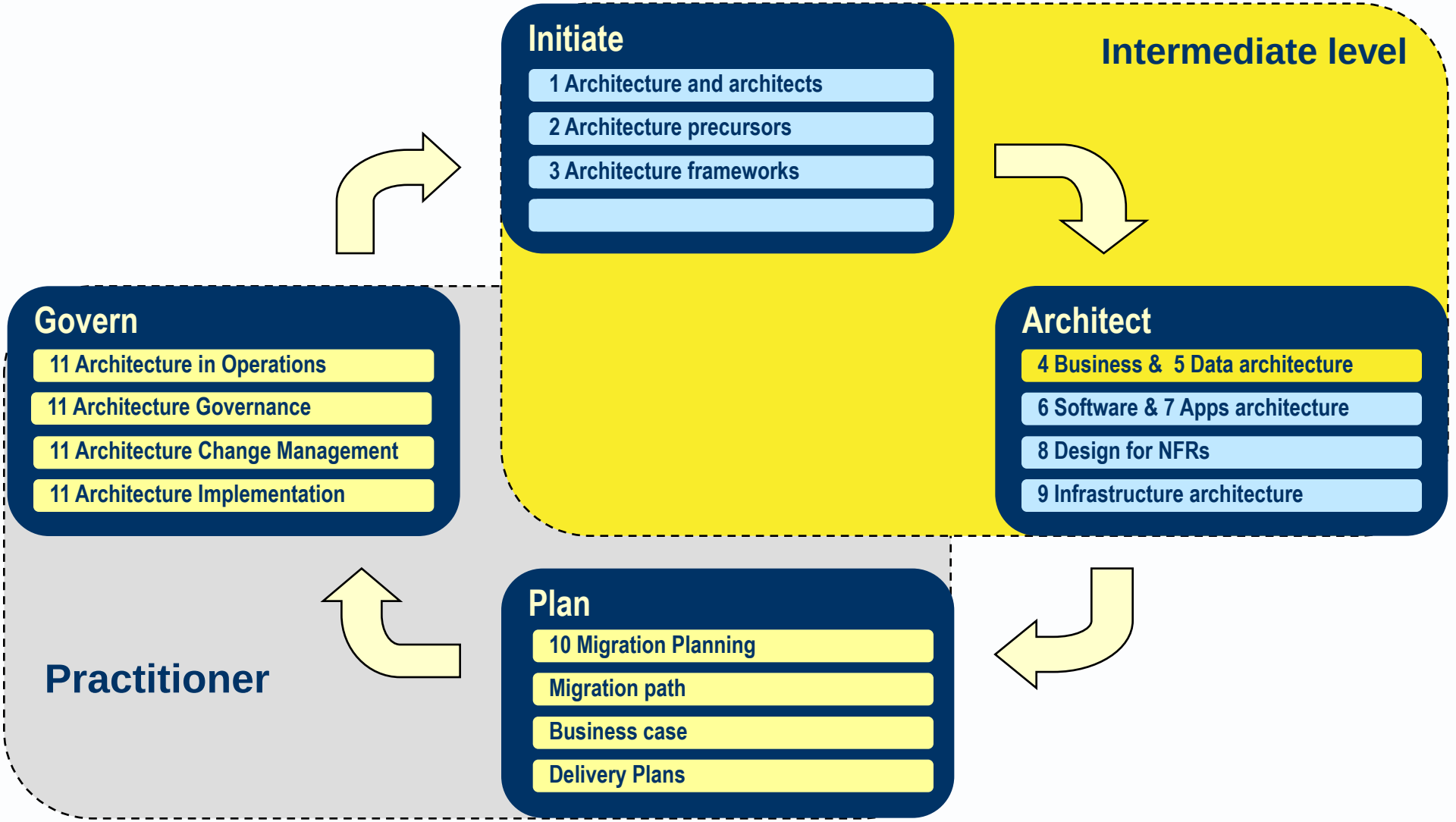


4.1: Foundation (not to be examined)

- Fig. 4.1a Base business architecture concepts

Required behaviours	Logical structures	Physical structures
Business service Business process	Business function Role	Organisation unit Actor

Enterprise

- [A system] a human-led organisation with shared goals and budget.
- It is usually the highest level, spanning several organisation units.
- It may be a segment of an organisation.
- It may be in the public or private sector.

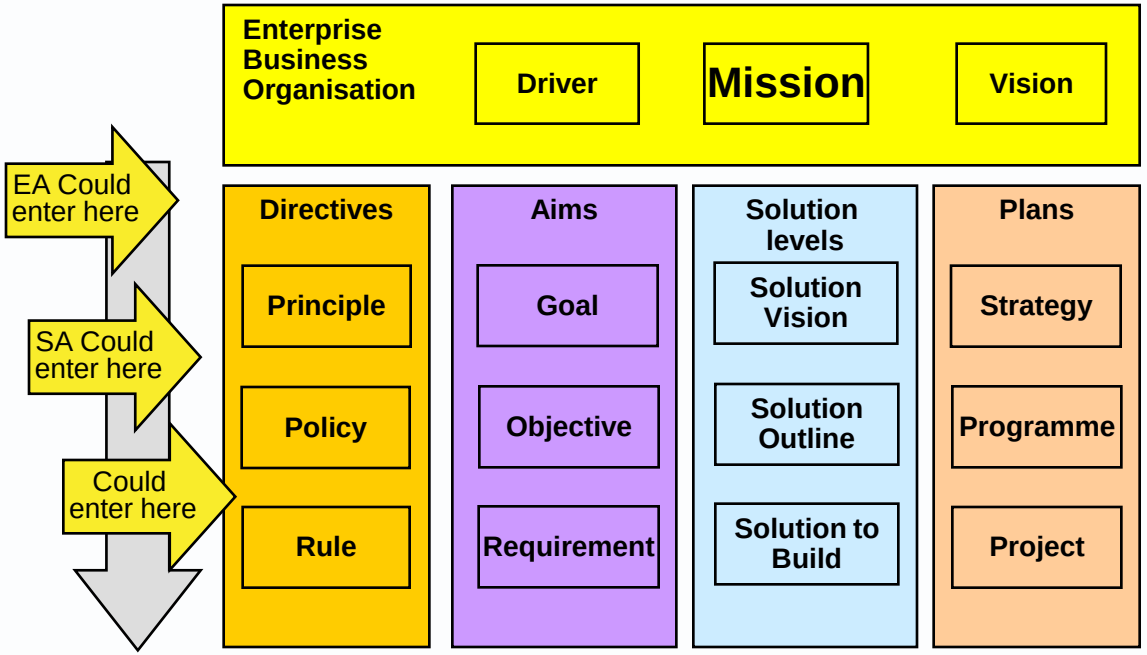
Business domain

- A class of organisation, or segment thereof, based on the services it offers.

- (E.g. law, employment law, telesales, insurance, airline operation, airline maintenance, security, emergency response.)

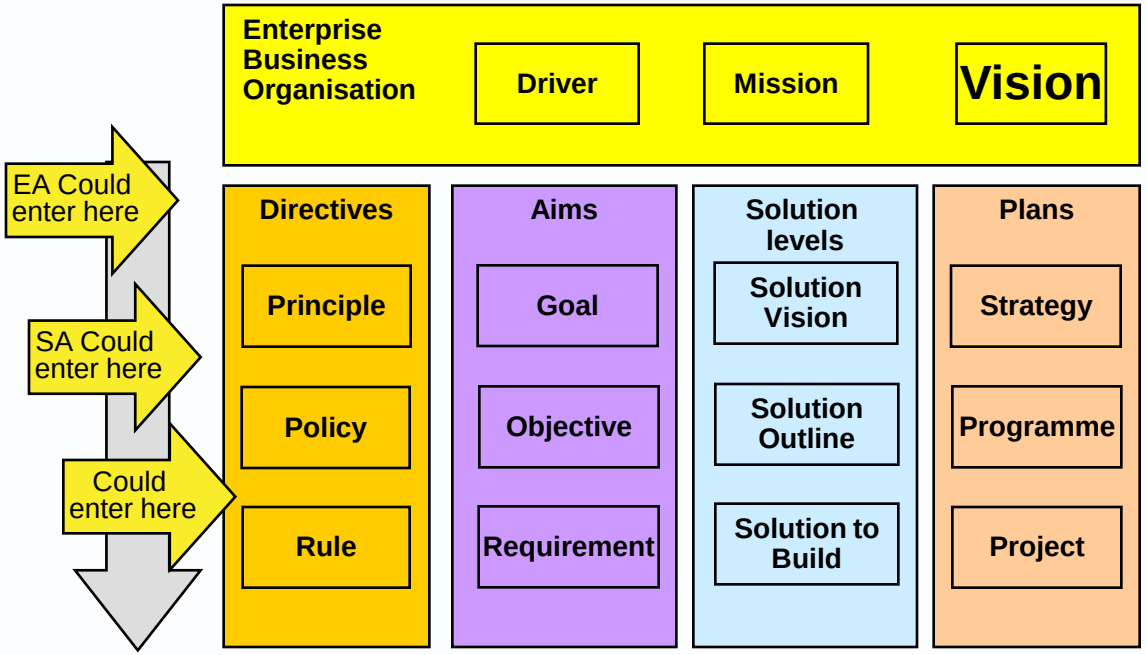
Mission

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



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.
- There may be measurable aims, or only a general direction for planners to follow.



Business analysis concepts mapped to E&SA concepts

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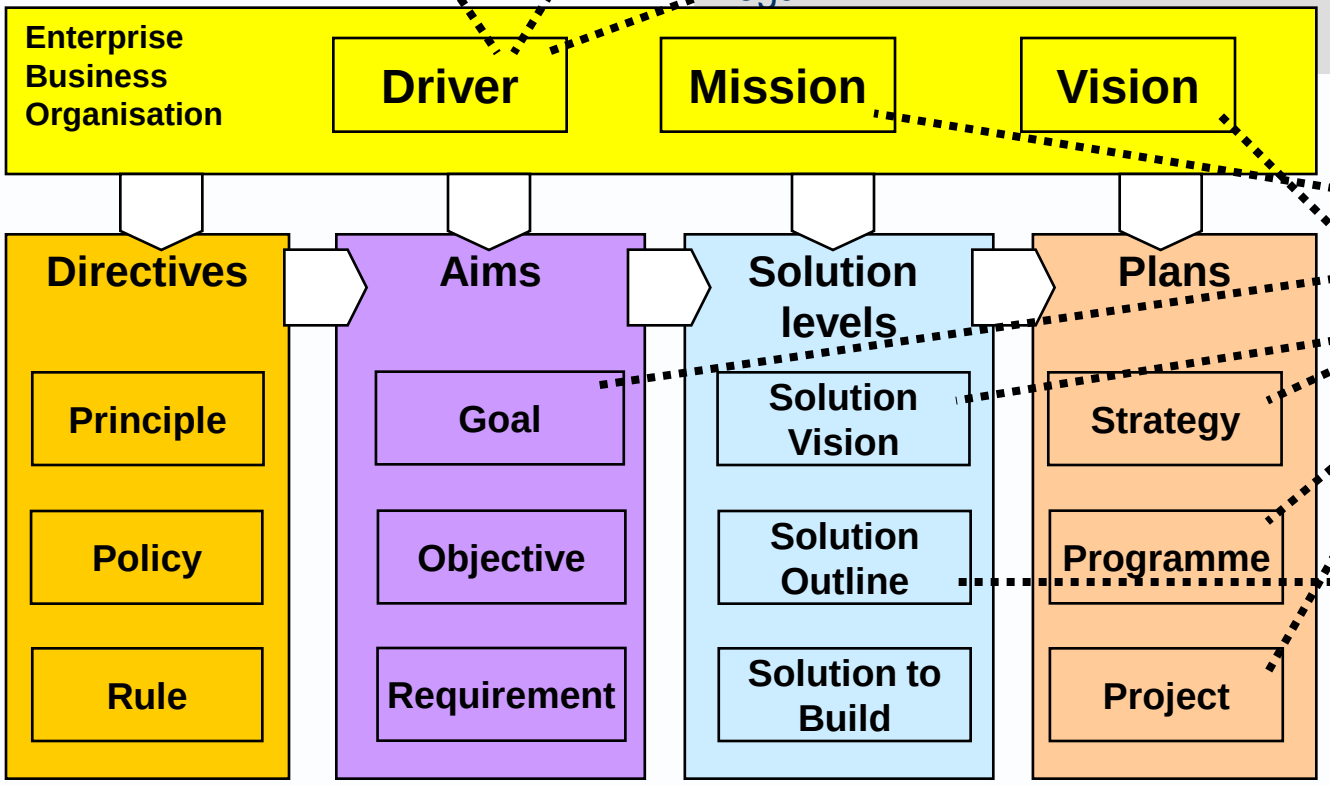
SWOT
Strengths (internal)
Weaknesses (internal)
Opportunities (external)
Threats (external)

PESTLE (external forces)
Political
Economic
Social
Technological
Legal

5-forces analysis (external forces)
Buyers
Suppliers
Competitors
New entrants
Substitute products



MOST
Mission
Objectives
Strategy
Tactics

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

Business model

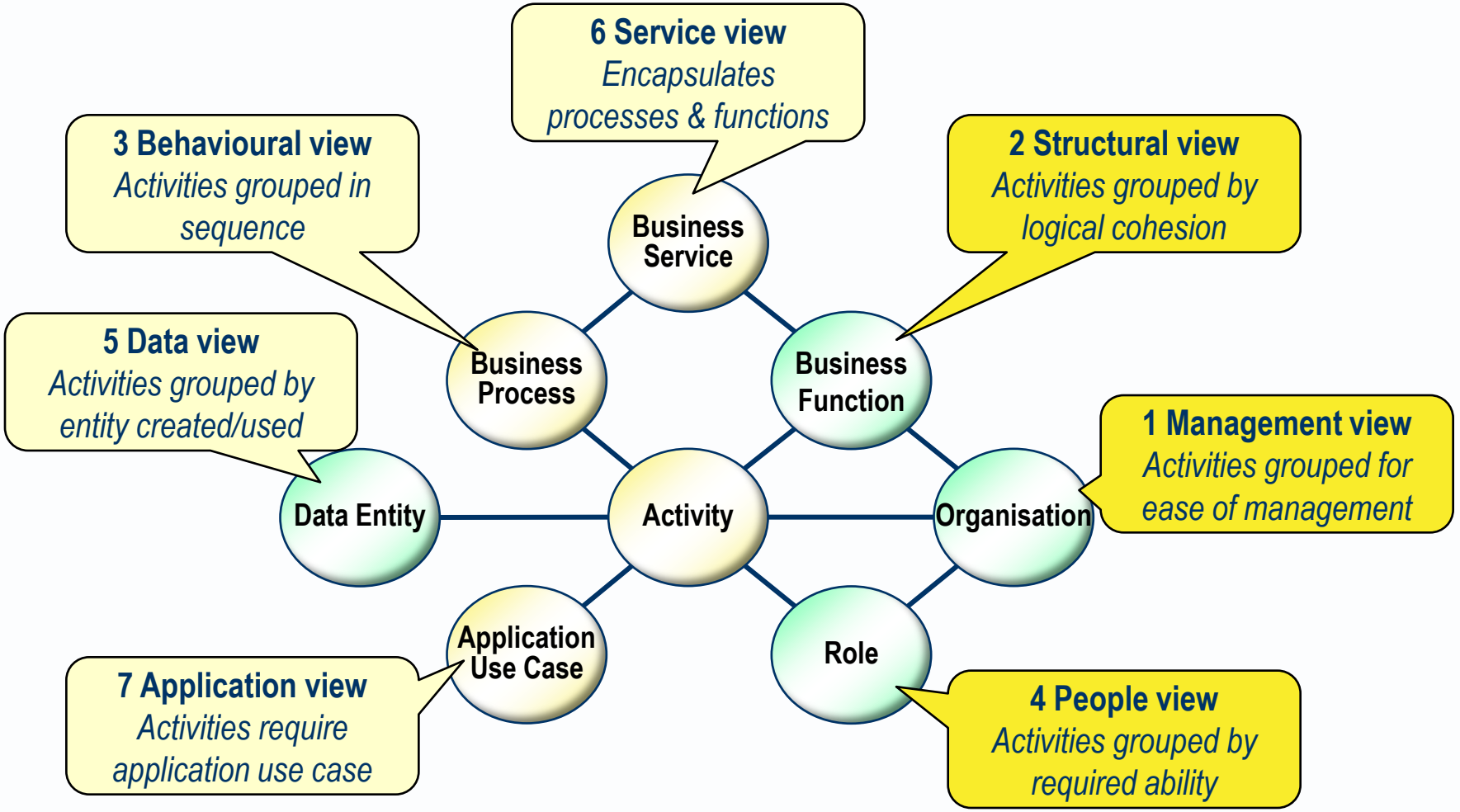
- [A description] that commonly means a top-level summary document or diagram showing how an enterprise delivers value to its owners or sponsors, of which there are several varieties.

Strategic coordination view

- [A description] that shows the degree to which an organisation aims to standardise and/or integrate business processes and business data.
- It is presented as two-by-two grid of process standardisation against integration.
- (“EA as Strategy” by Ross, Weill and Robertson).

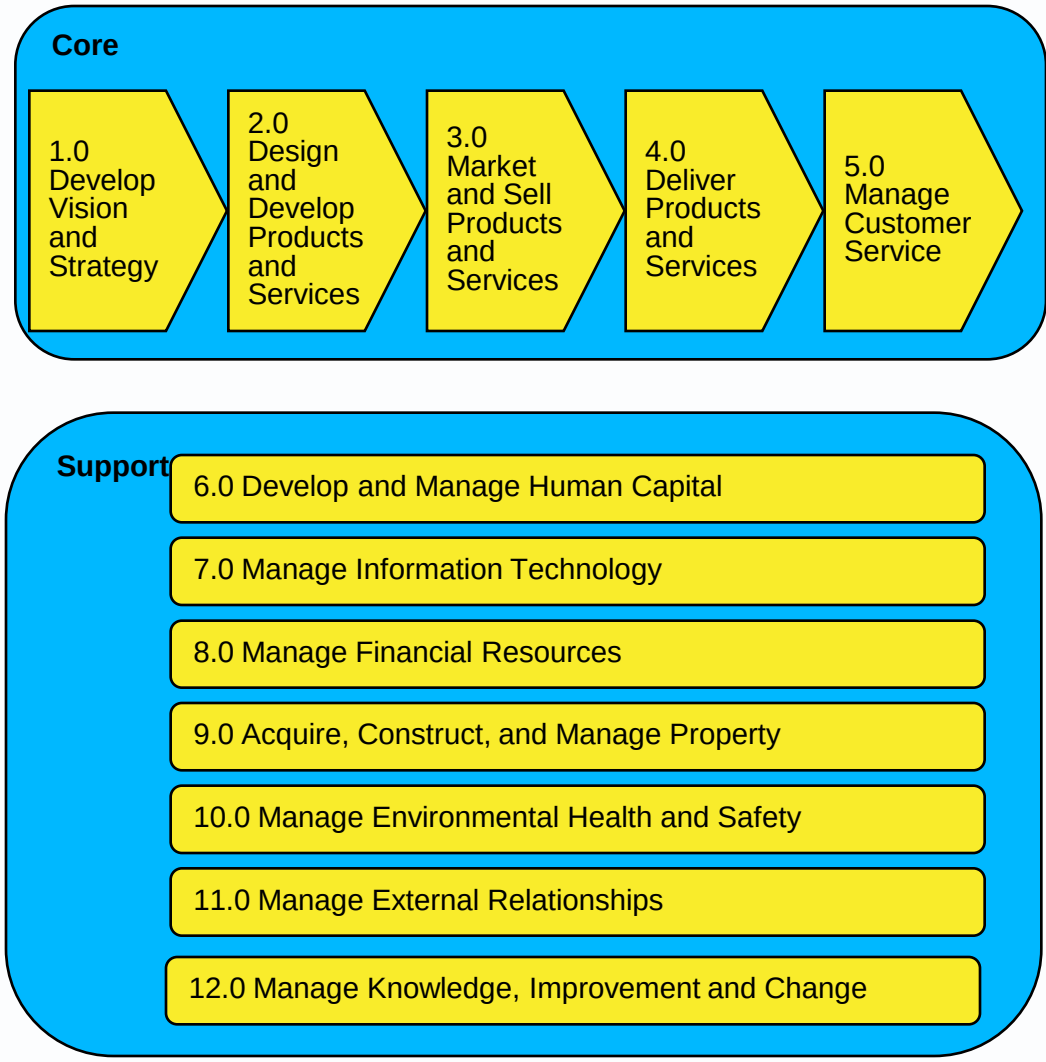
High Integration	**Coordinated**	**Unified**
Low Integration	**Diversfied**	**Replicated**
	Low Integration	**High Standardisation**

4.2 Business structure concepts



Business component

- A division of a business; a node in a structural view of business operations.
- Core divisions develop, market, sell and deliver business-specific products and services.
- Support divisions (such as personnel or facilities management) are similar in different businesses, and are therefore candidates to be out-sourced.



Business function

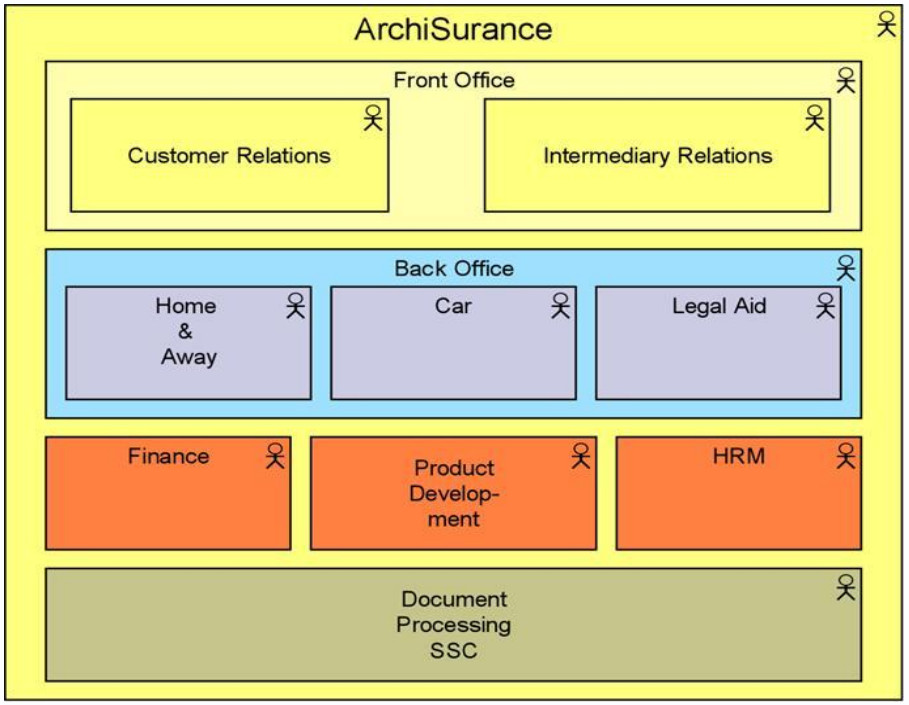
- A logical business component. It typically groups activities with one higher level aim or cohesive aims.

Capability

- The ability to perform some activity or achieve some aim.
- Some define “business capability” as the ability to realise a “business function”.
- More generally, a capability (e.g. skill development) may cross business functions.

Organisation unit

- A physical business component.
- It typically groups roles or actors into a manageable group
- It is expected to have goals and objectives, a manager, and a budget.



Role and actor

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Role

- A logical business component
- It groups behaviours performable by an actor.
- E.g. loan applicant, expense claimant, expense claim approver.
- It may define abilities required to play the role.

Actor

- A physical entity able to play one or more roles.
- The entity may be person, an organisation, a natural, mechanical or information system.

Business interface definition

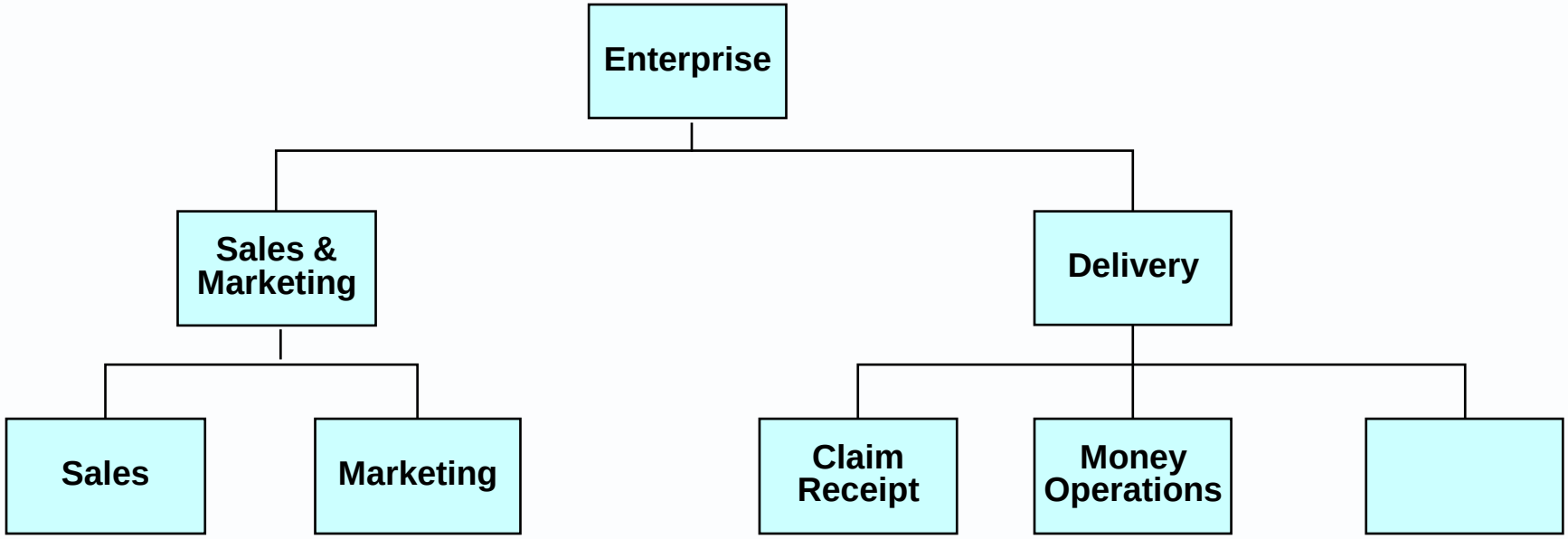
- [An interface definition] a collection of business behaviors accessible by an external entity.
- It hides processes and resources need to deliver the service.

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

4.3 Business structure decomposition (technique)

- [A technique] that successively divides an enterprise into smaller divisions.
- It is used a basis for business analysis, heat mapping and classification of other architectural entities.



Functional decomposition

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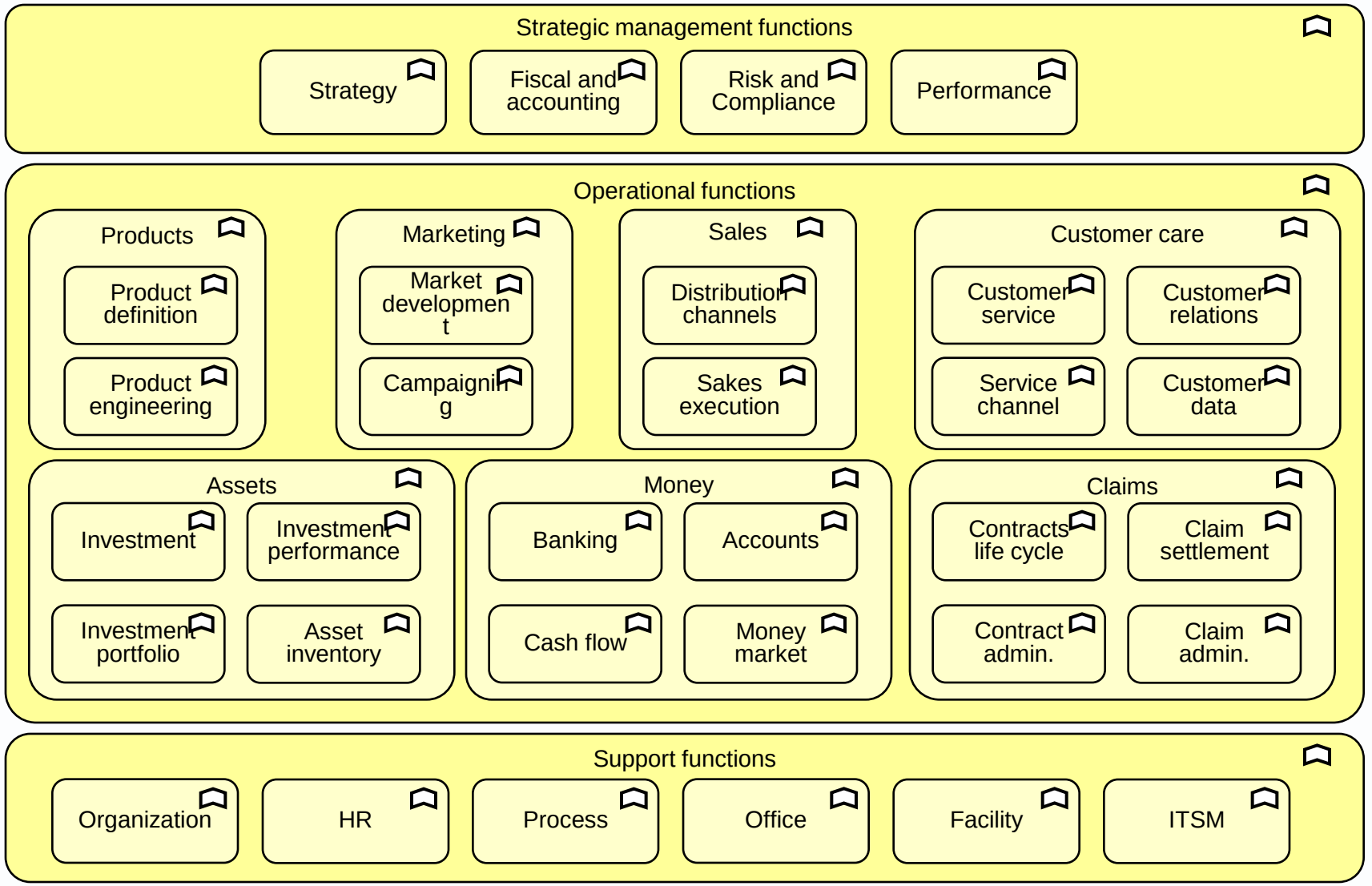
- **Functional decomposition**
- A hierarchy of functions, typically down 3rd or 4th level.

- **Functional decomposition diagram**
- A diagram that relates business functions to each other in a logical organization structure.
- It decomposes the topmost functions into smaller functions.
- It typically stops at a third or fourth level of decomposition, though this varies.
- It should be stable and ideally contains no duplicate elements.
- It is commonly used as a base artifact for enterprise architecture, especially where the organization's physical management structure is unstable and/or not "functional".

Functional Decomposition Diagram (logical organization structure)



- 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.

Business capability map/diagram

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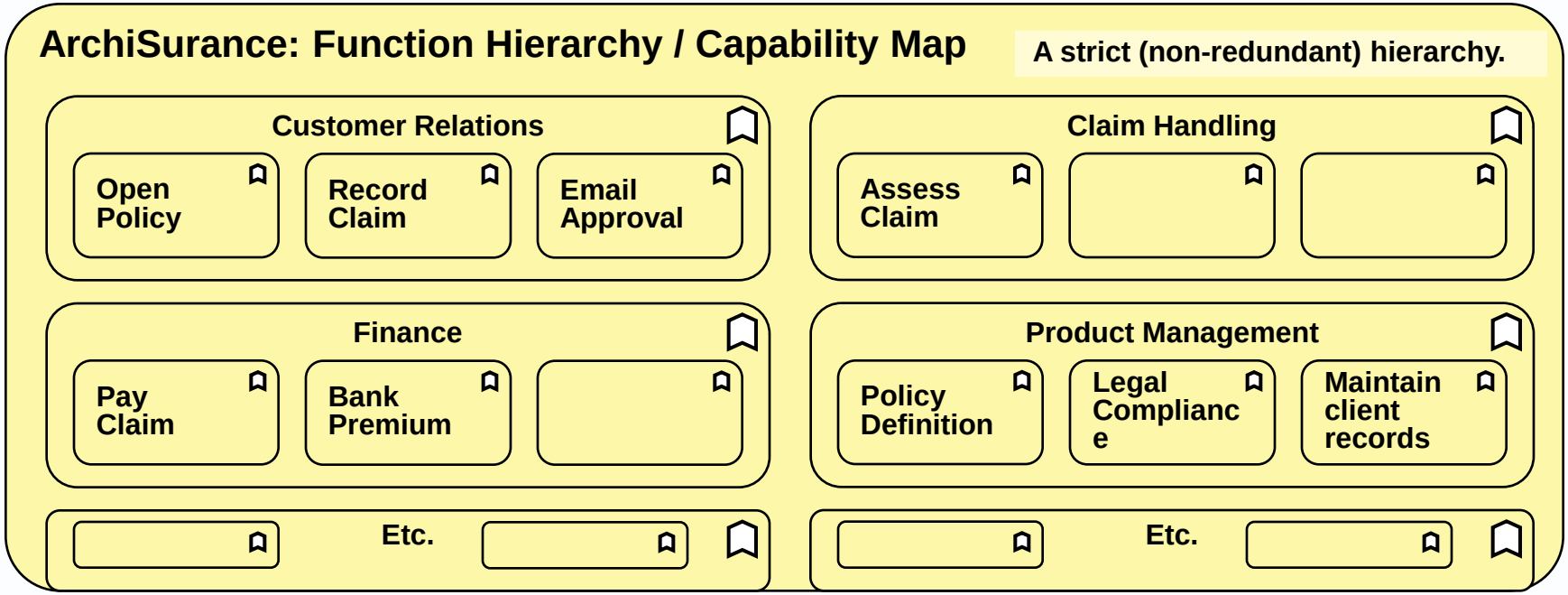
- A diagram that shows the logical capabilities that a business needs to meet its purposes.
- Most if not all examples correspond to a functional decomposition diagram.
- More generally, a capability (e.g. skill development) may cross business functions.

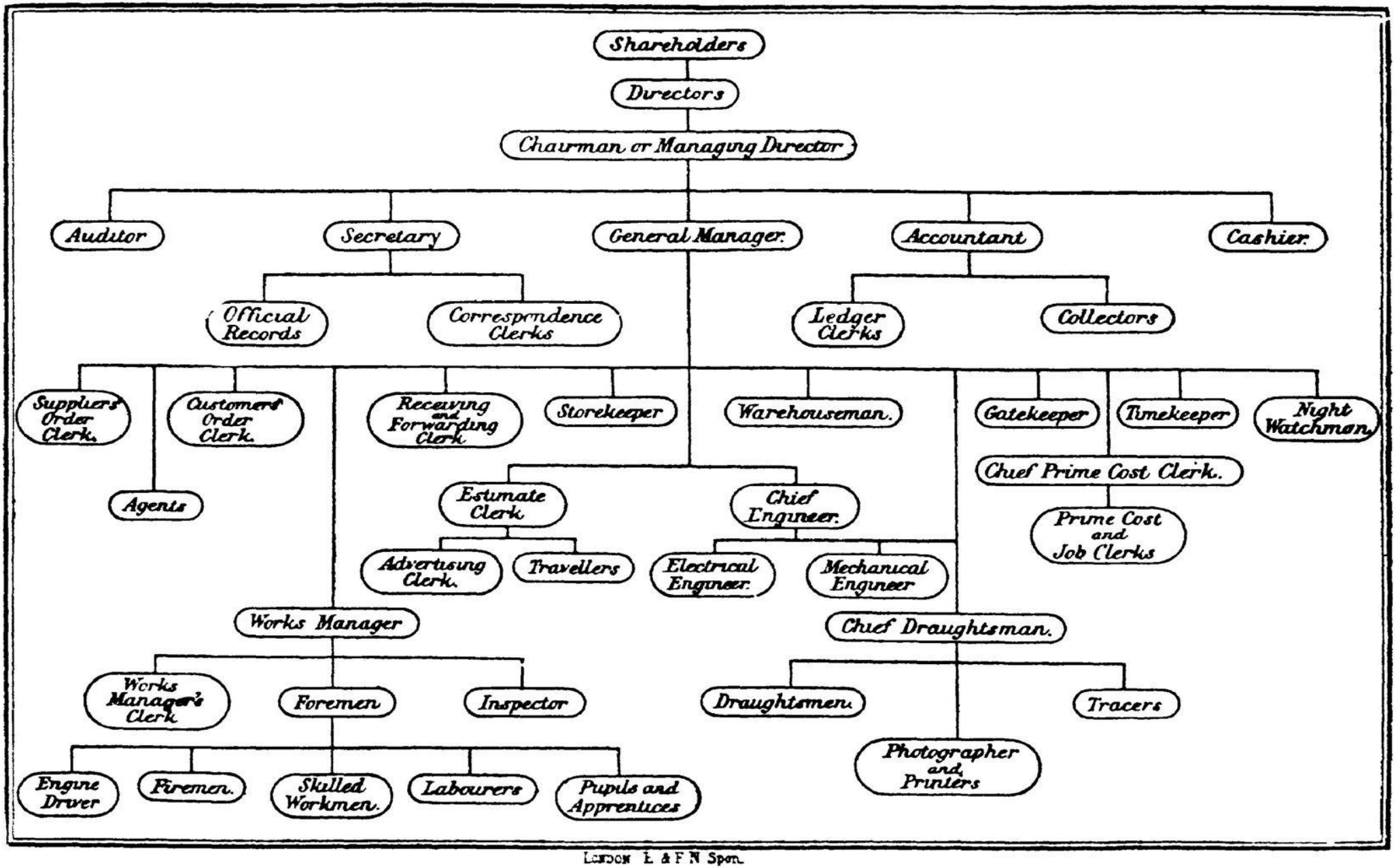


Organisation decomposition

- A structure of organisation units, which stops at the level of human actors. It usually shows reporting lines between unit managers.

- **Organisation decomposition diagram**
- A diagram that shows the (physical) management structure of an organisation.
- Typically, the organisation units are hierarchically decomposed
- The diagram stops short of the individual actors employed.

- Purposes: to help architects identify/show where business functions/capabilities are or should be realised.



London E. & F. N. Spon.

Atomic business component

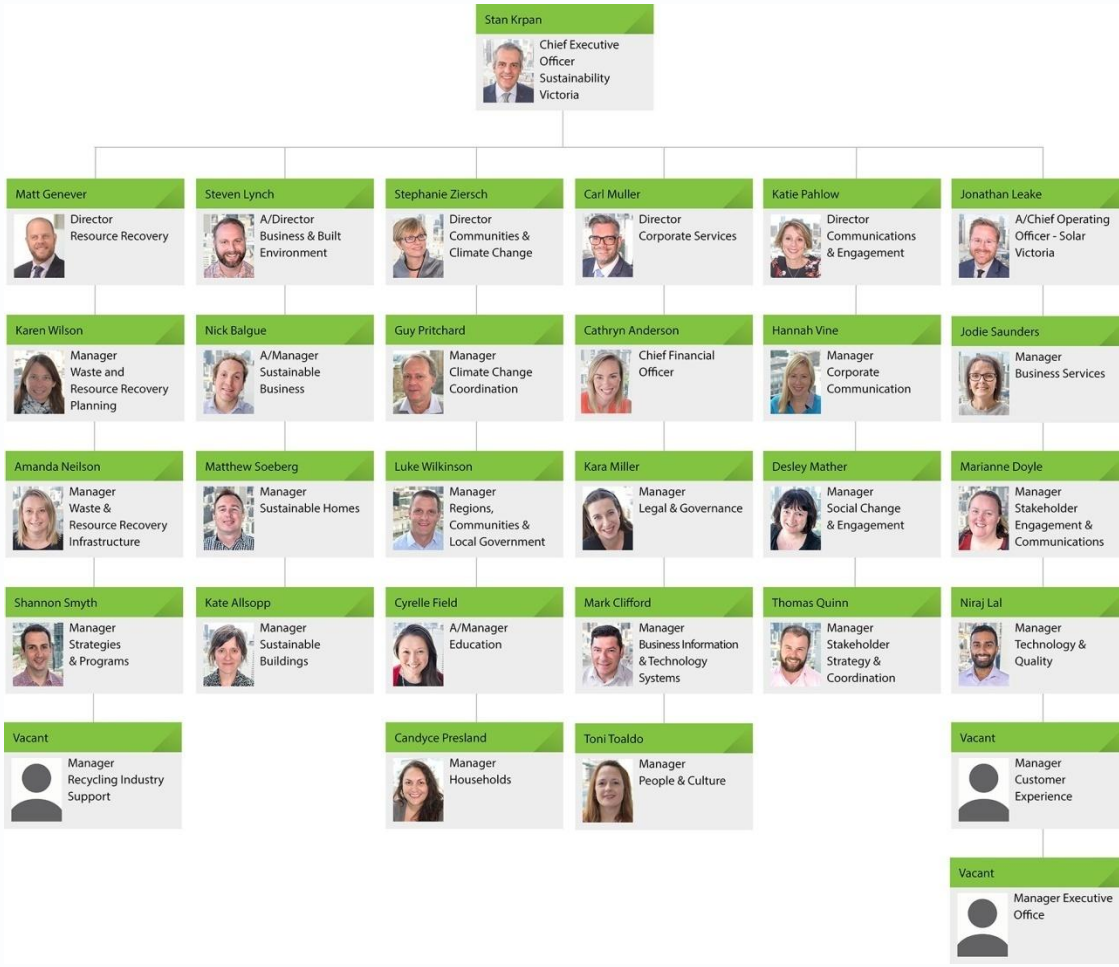
- An elementary business component, not further subdivided.
- E.g.
- A node at the bottom of a functional decomposition (a group of atomic activities).
- Or an actor at the bottom of an organisation decomposition.

4.4 Other business structure artifacts and techniques

- Organisation/actor catalogue
- Organisation/Business function matrix
- Functional organisation
- Non-functional organisation
- Business communication diagram
- SLA: Service Level Agreement
- Location catalogue
- Business data model
- Cluster analysis
- Affinity analysis

Organisation/actor catalogue

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



Organisation/Business function matrix

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- [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

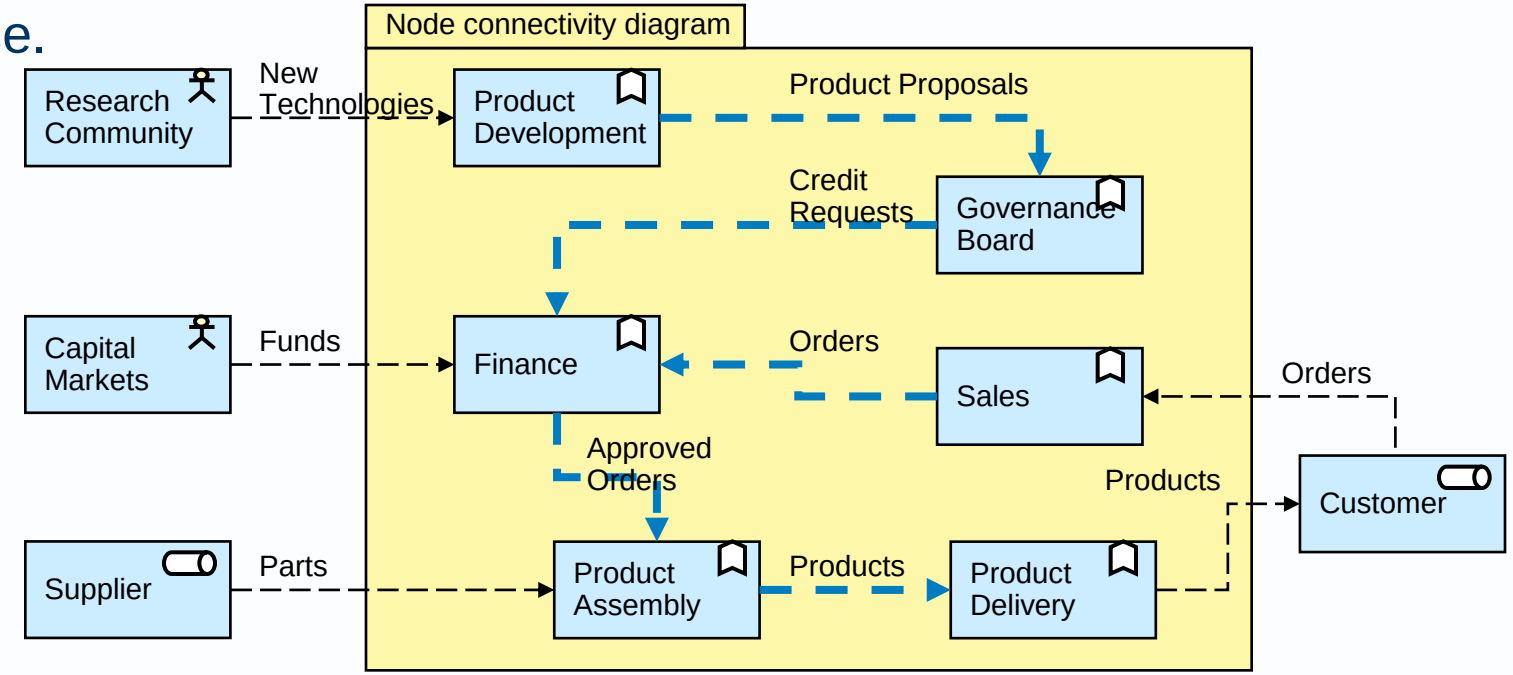
- Non-functional organisation

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

Product?
Customer?
Location?

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.

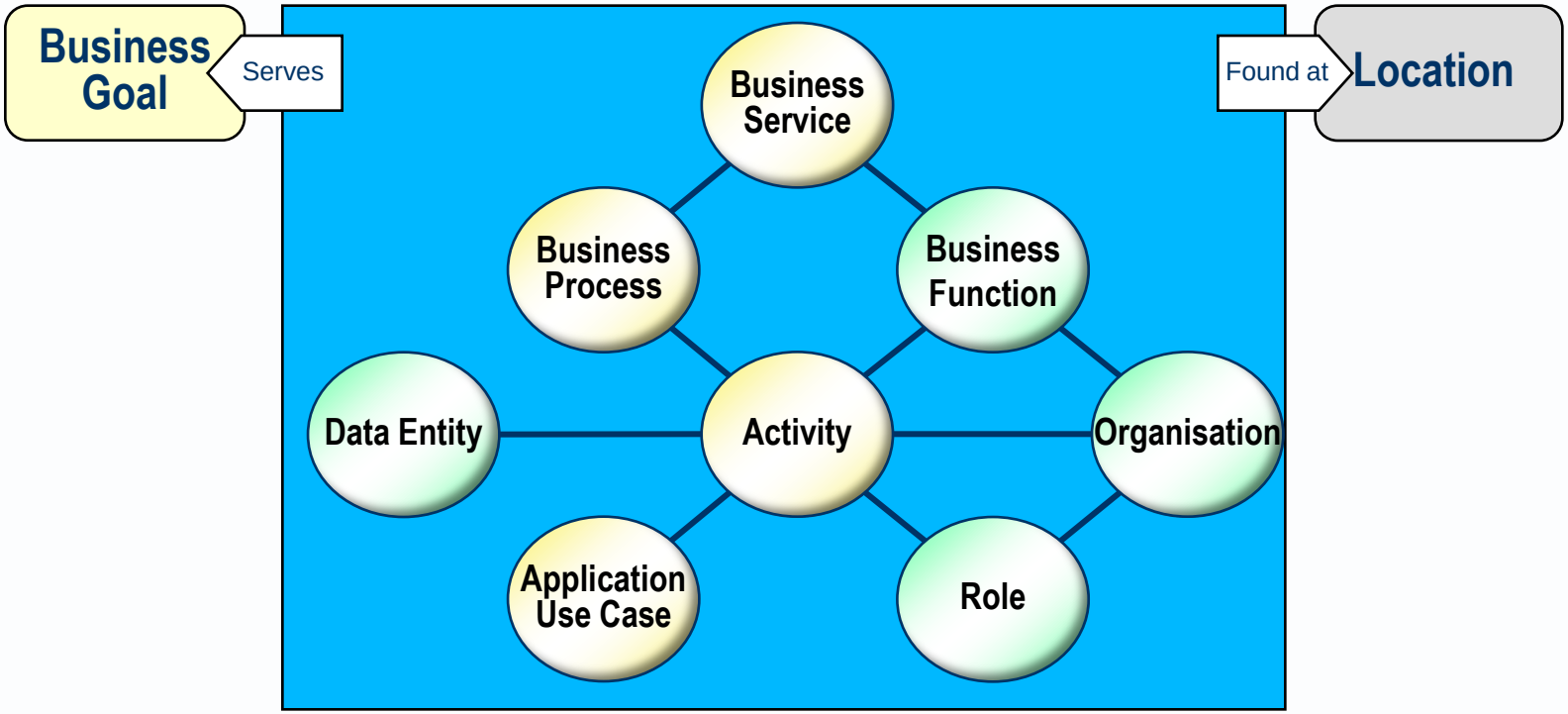


SLA: Service Level Agreement

- [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.

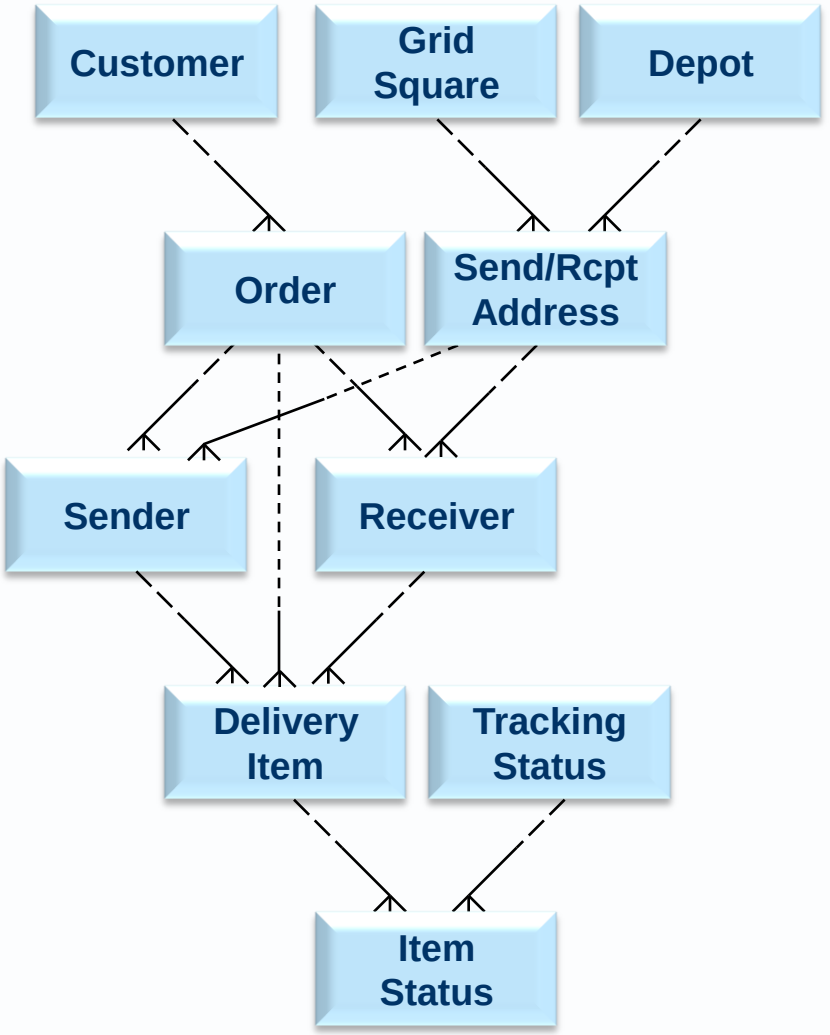
Location catalogue

- [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 Data Entity	Sales	Delivery	Finance
Customer	Create	Use	Use
Order	Create	Use	Use
Invoice		Use	Create

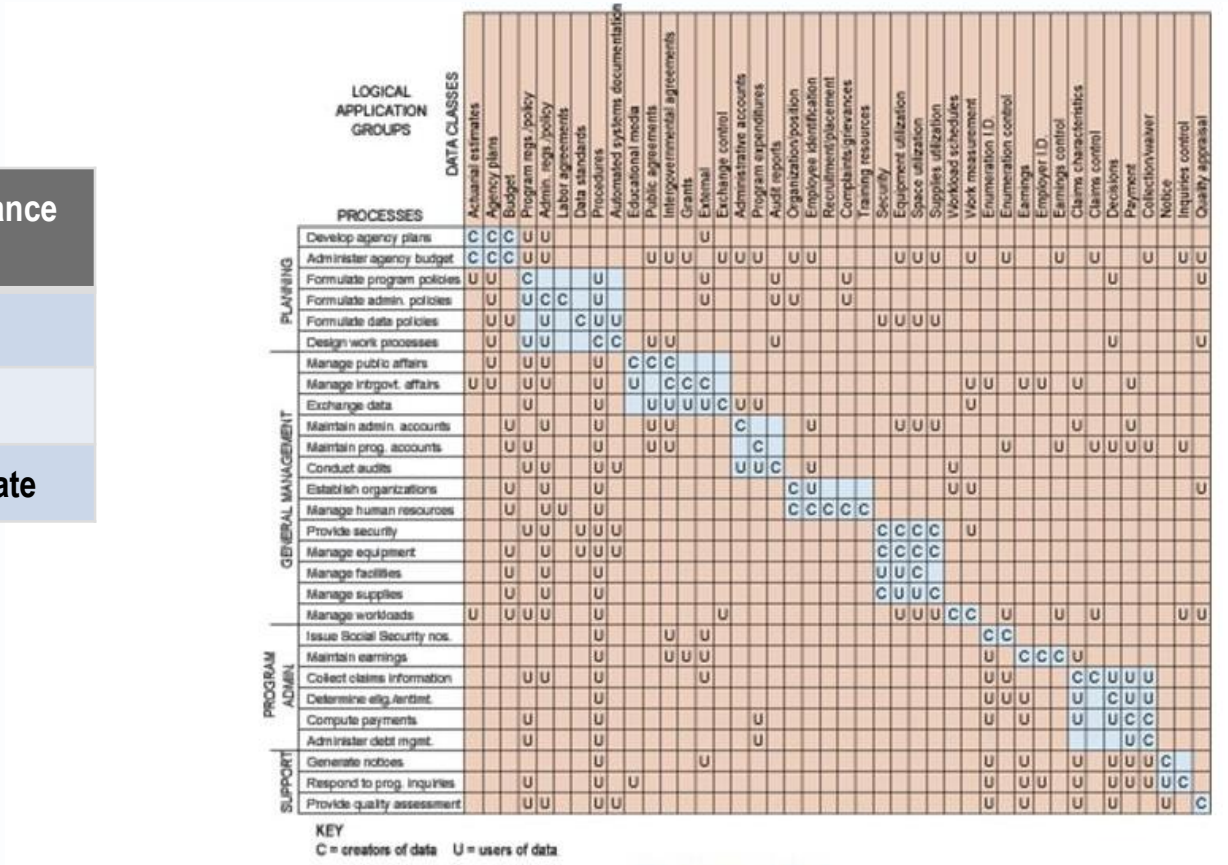


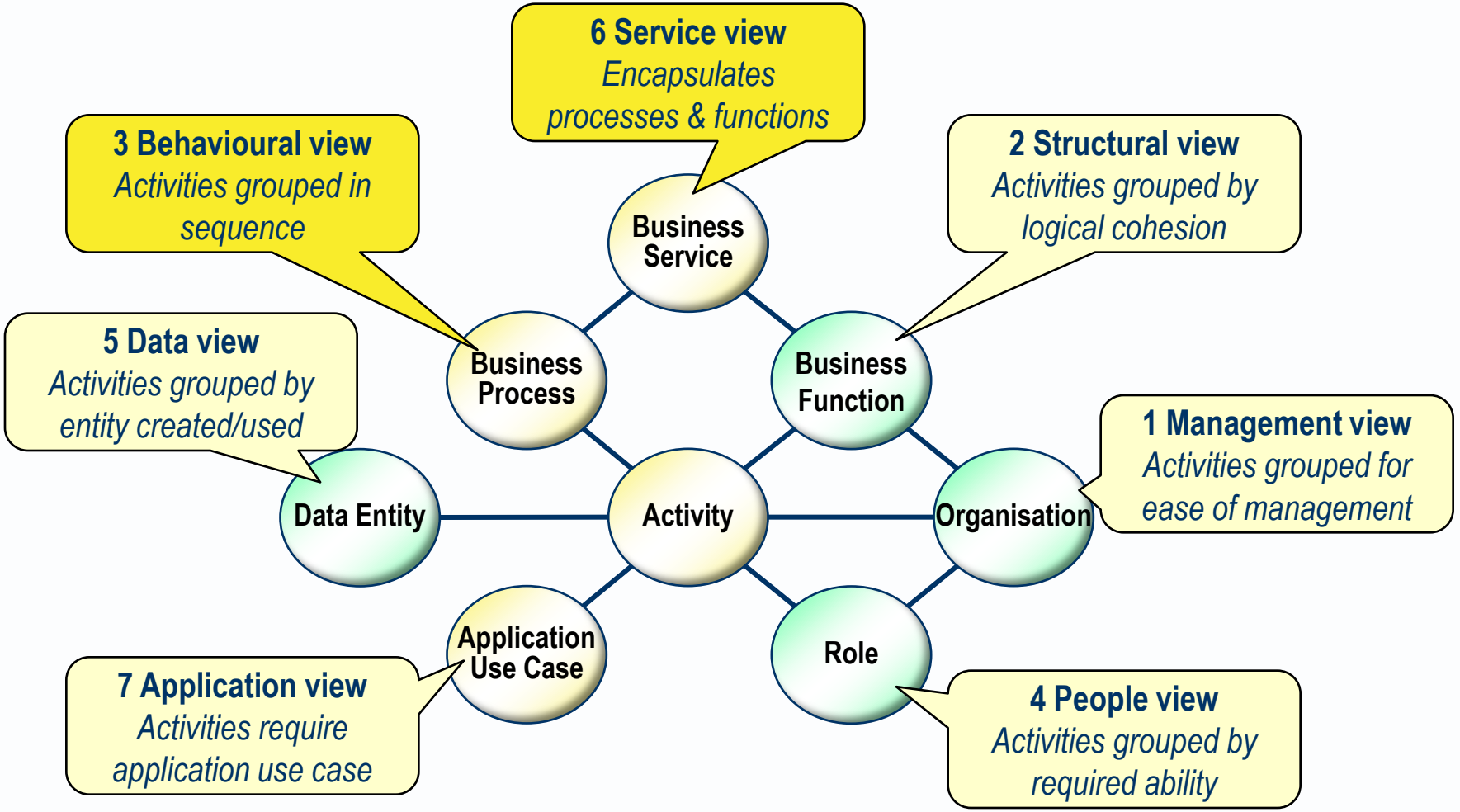
Figure 12-1

Enterprise Ar

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.

4.5 Business behaviour concepts and artifacts



Business behaviour elements

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External behaviour

Business Service

Business Service | Business Service | Business Service

Internal behaviour

Process

Process: Activity, Activity, Activity, Activity, Activity, Activity, Activity, Activity

CRUD matrix

	Activity	Activity
Data entity		
Data entity		
Data entity		

Logical structure

Business Function

Ent

B Fnctn | B Fnctn | B Fnctn

Activity | Activity | Activity | Activity | Activity | Activity

Organisation – function matrix

	Function	Function
Org Unit		
Org Unit		
Org Unit		

Physical structure

Organisation Unit

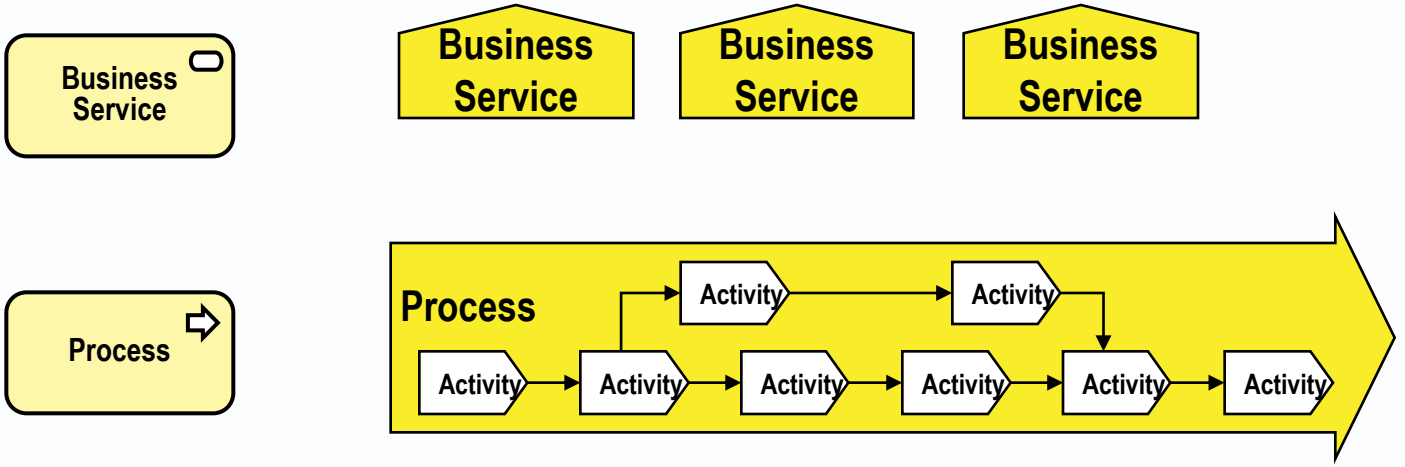
Ent

Org | Org | Org

Activity | Activity | Activity | Activity | Activity | Activity

Business behaviour

- A repeatable activity that (if successful) produces result(s) of value to the consumer of those result(s).



Business service

- [A service] that 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.

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

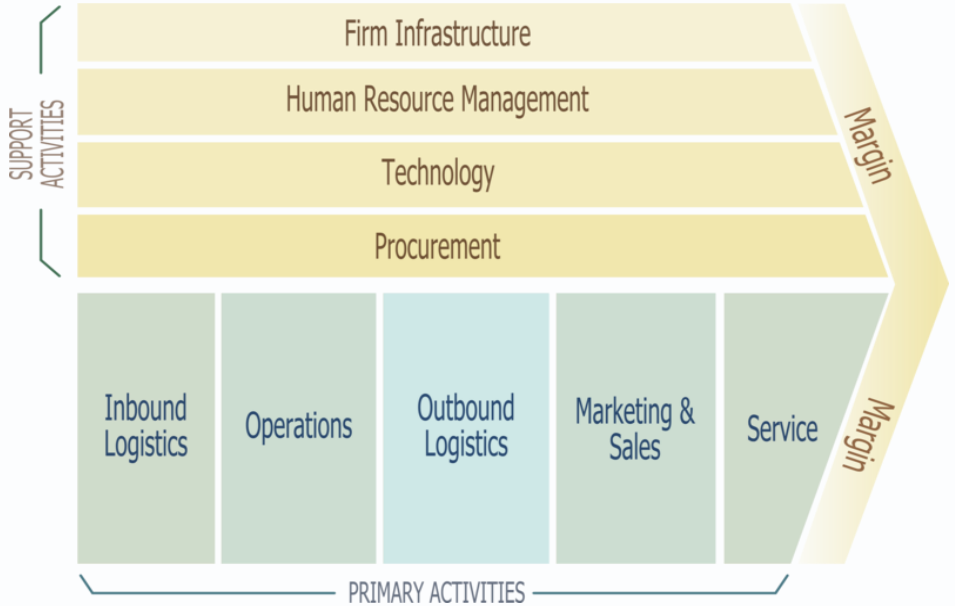
- **Business service contract**
- (See the general service contract earlier)

Business process

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

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

Top-level Value chain – in IT4IT

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- After Michael Porter's pattern

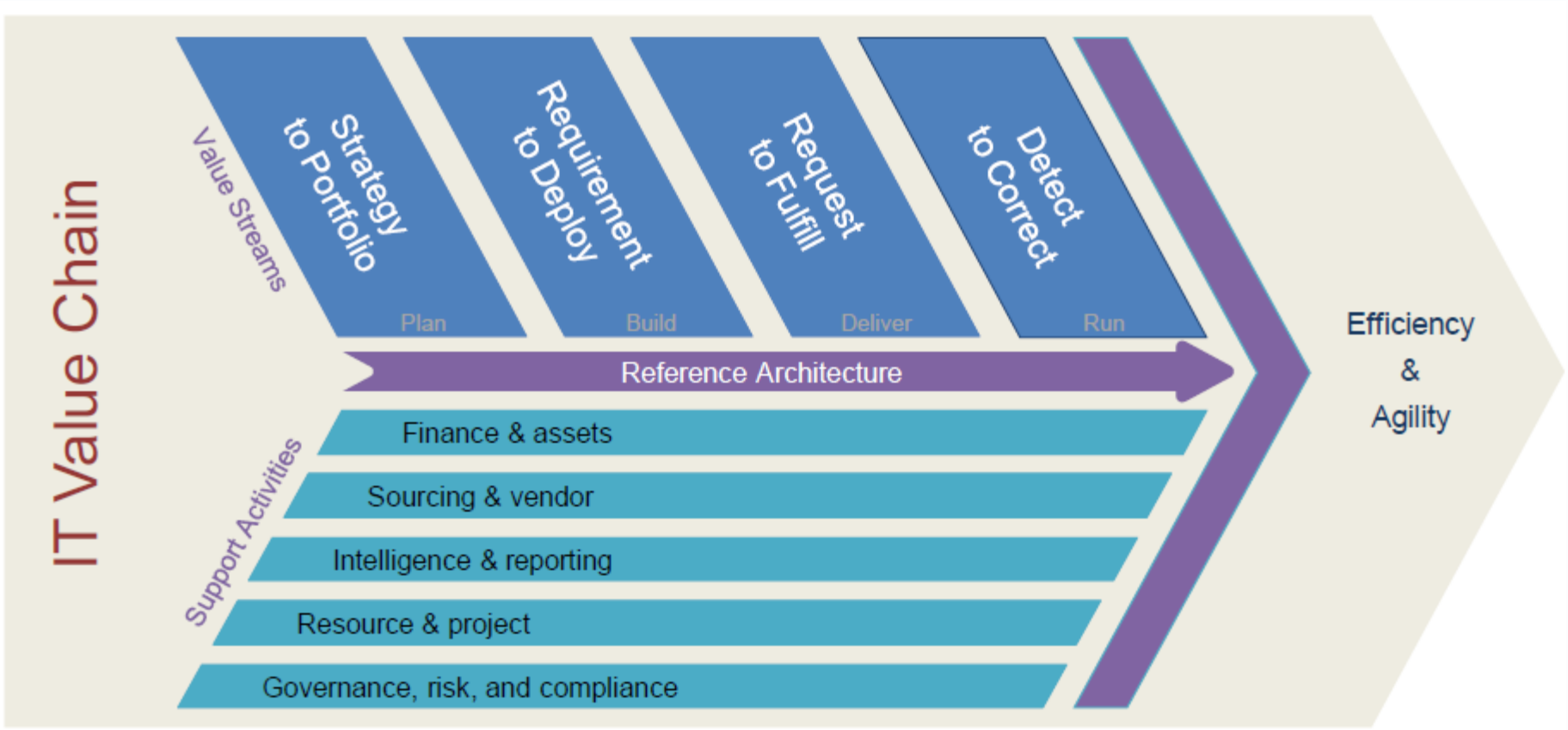
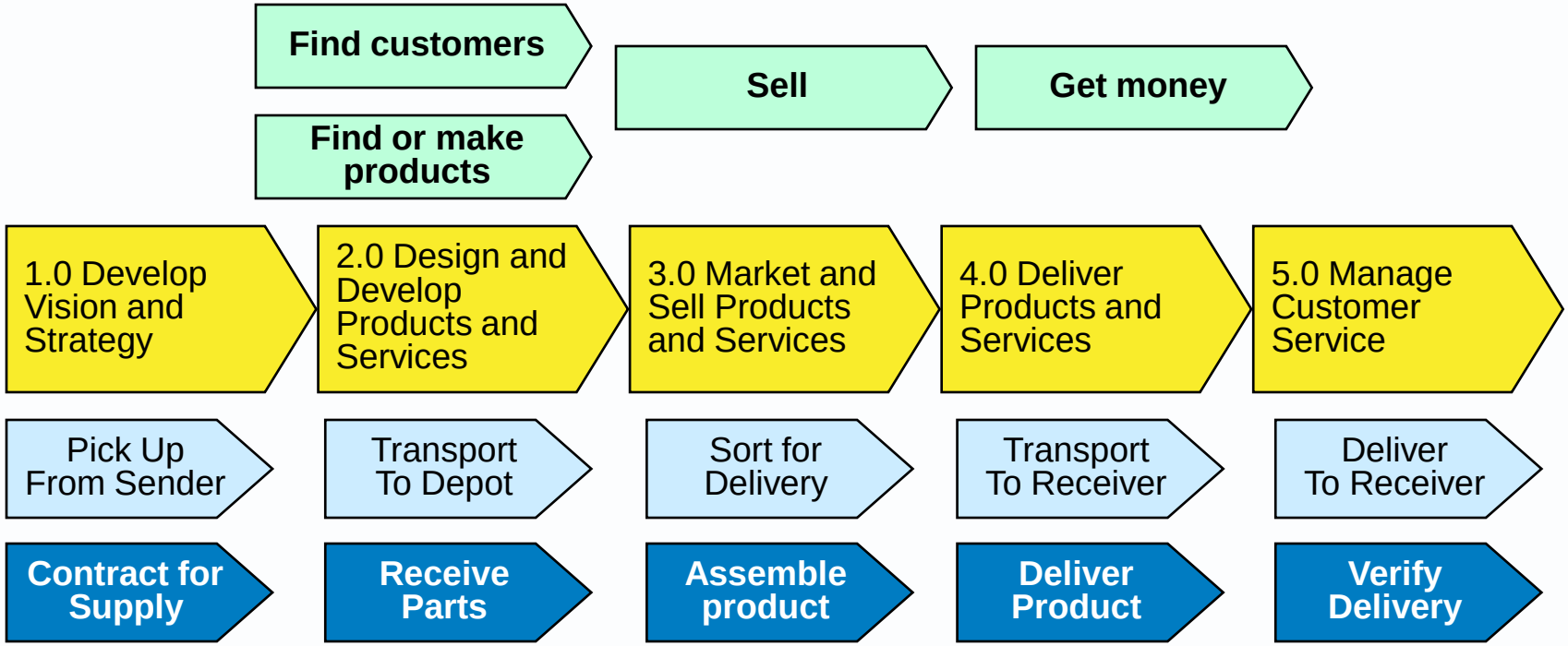


Figure 1: IT Value Chain

Process diagram (generalities)

- [An artifact] that represents activities in a process from start to end.
- The process may complete within a function or cross function boundaries.
- Initially, architects focus on what is called the main, straight-thru, happy or sunny day path.
- However 80% of the complexity lies in the 20% of exception paths.



Value stream diagram

- [A process diagram] that shows the end-to-end stages in a business process..
- It may decompose each stage into a list of activities.
- The control logic governing activities is usually not shown.
- It may show the exit conditions of the process.
- Including a result of value to a customer, stakeholder or end user

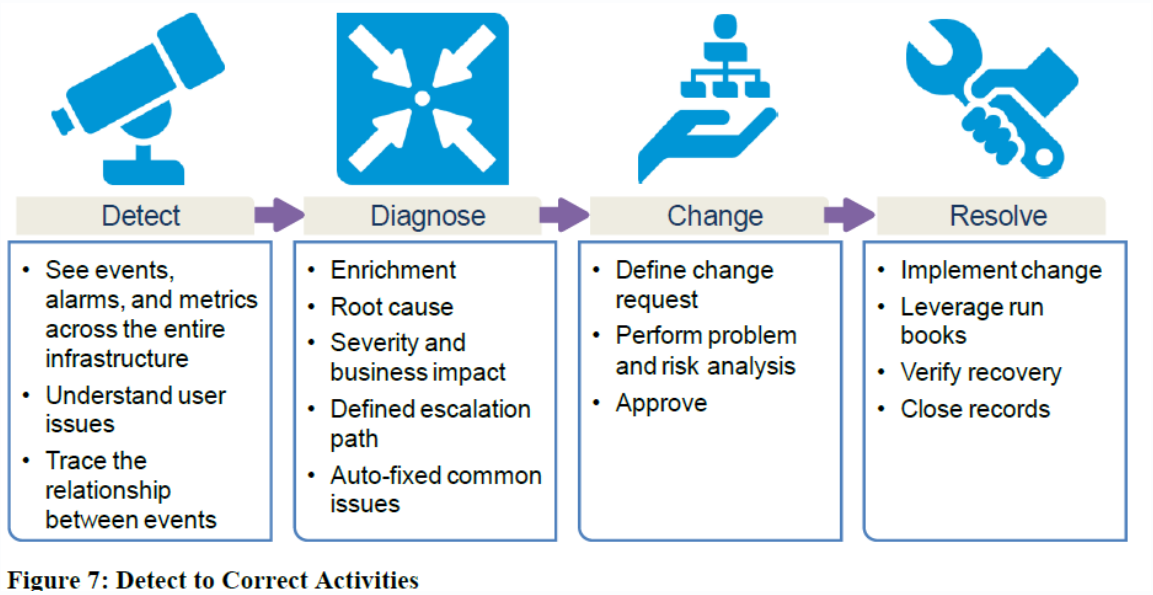
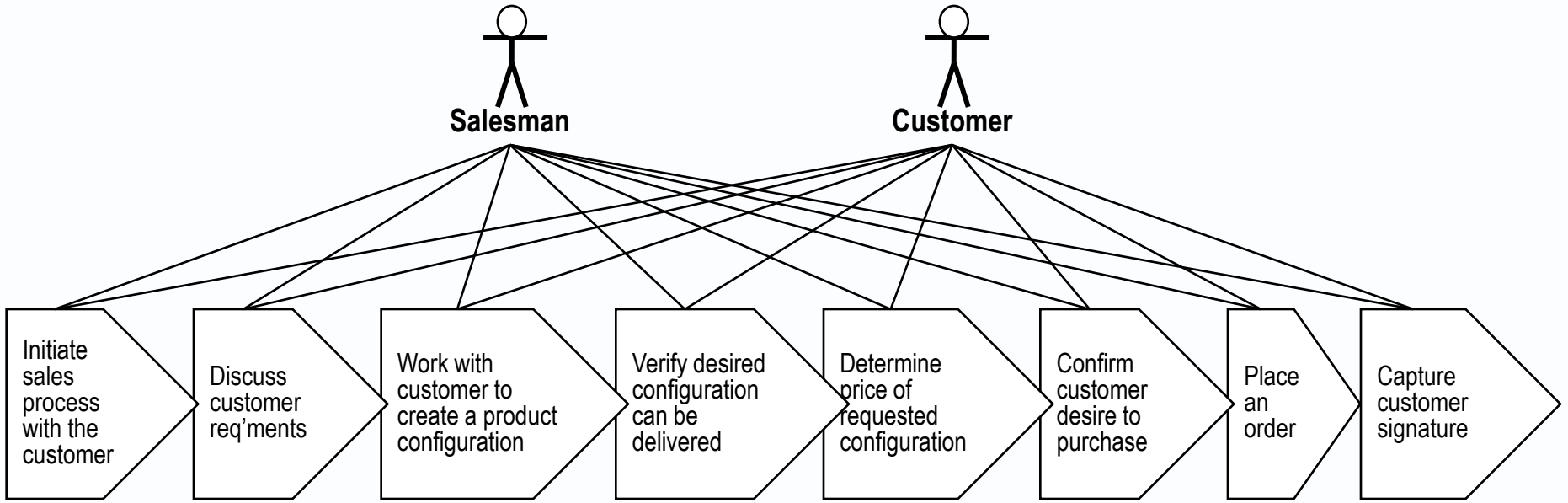


Figure 7: Detect to Correct Activities

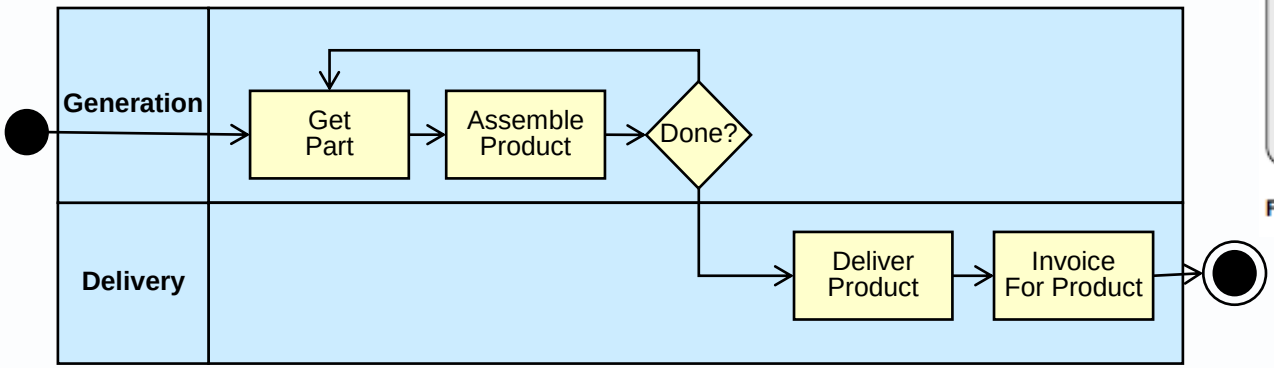
Business scenario diagram

- [A process diagram] that shows how a process meets a business aim.
- It shows also roles played by human and computer actors in each process step.
- It is a common way to identify and clarify architecture requirements.



Process flow diagram

- [A process diagram] that shows the control logic of activities in a process.
- It relates the stage or steps of a process in a sequence that yields results of value.
- It may show business components involved in performing process steps.
- It may include exception paths.



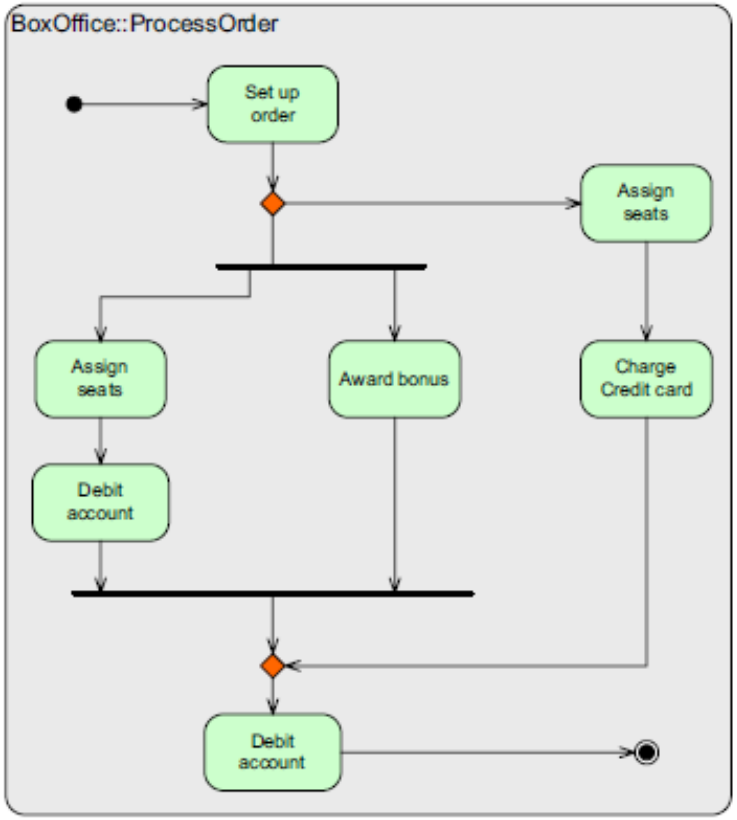


Figure 3-11, Processes (UML Activity diagram)

Lean

- 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.

4.6 Business behaviour decomposition

- A technique that successively divides longer behaviours into shorter ones.
- Architects use this both to capture requirements and design business operations.

- **Service decomposition**
- Showing one service as dependent on subordinate services.

Process decomposition

- Showing one step/activity in a longer process as a lower-level process of several activities.

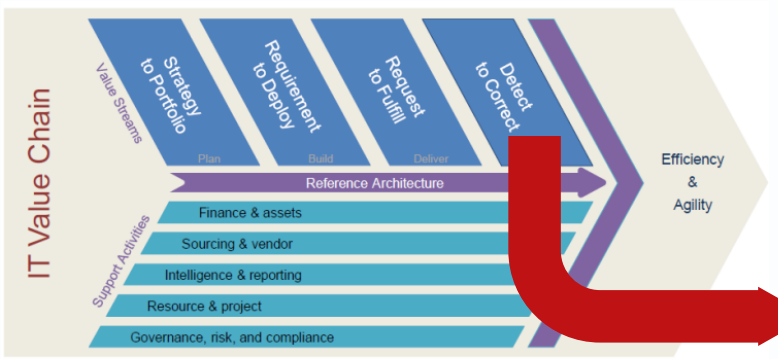


Figure 1: IT Value Chain

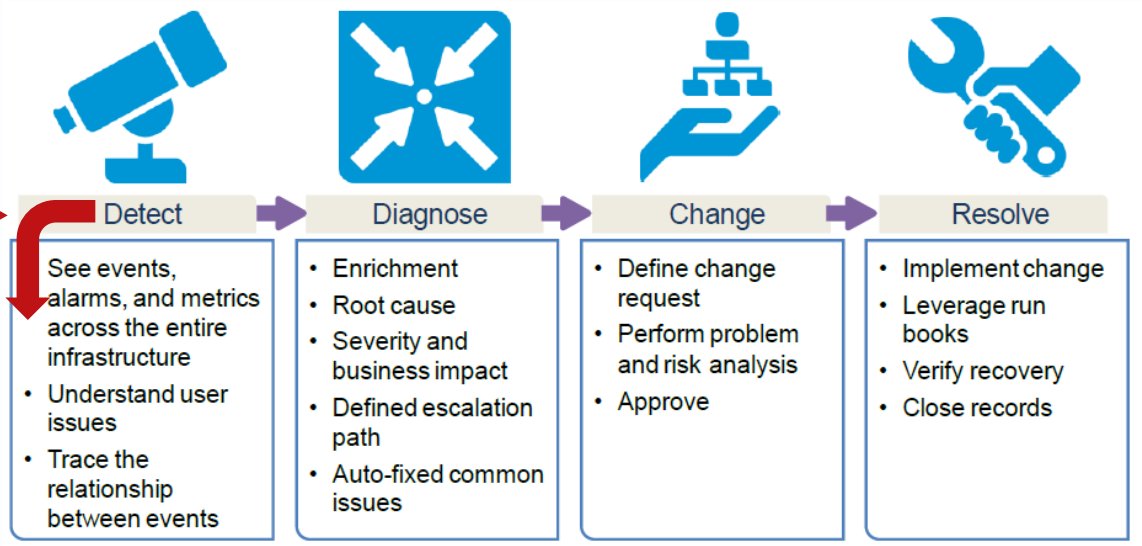


Figure 7: Detect to Correct Activities

Process decomposition

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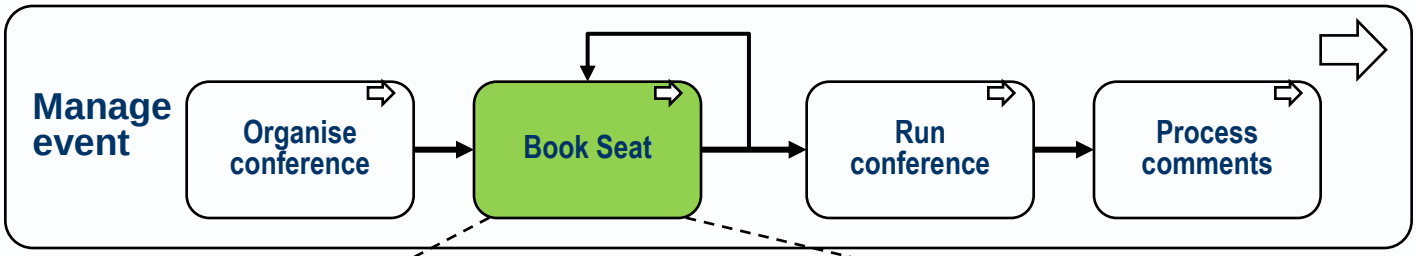
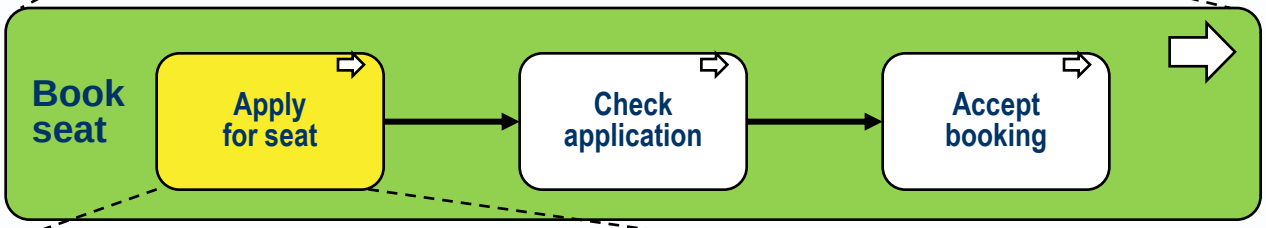
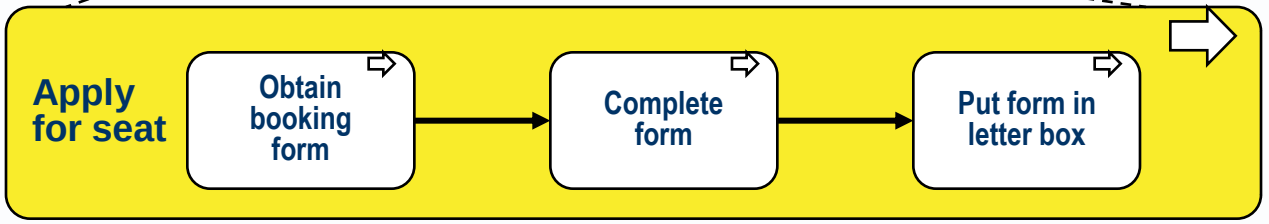
- A process of coarse-grained processes/steps/activities



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





- OPOPOT

Atomic business behaviour

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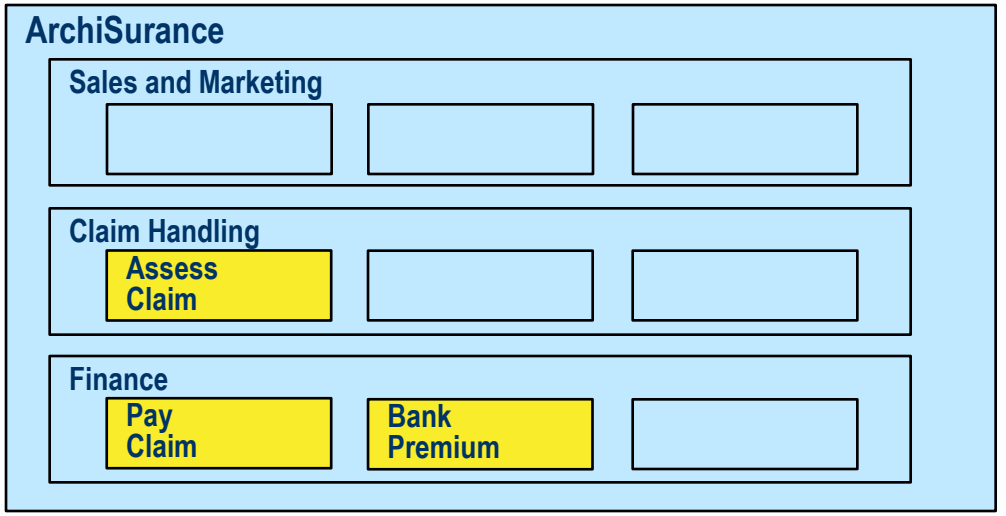
- An elementary behaviour, not further subdivided.

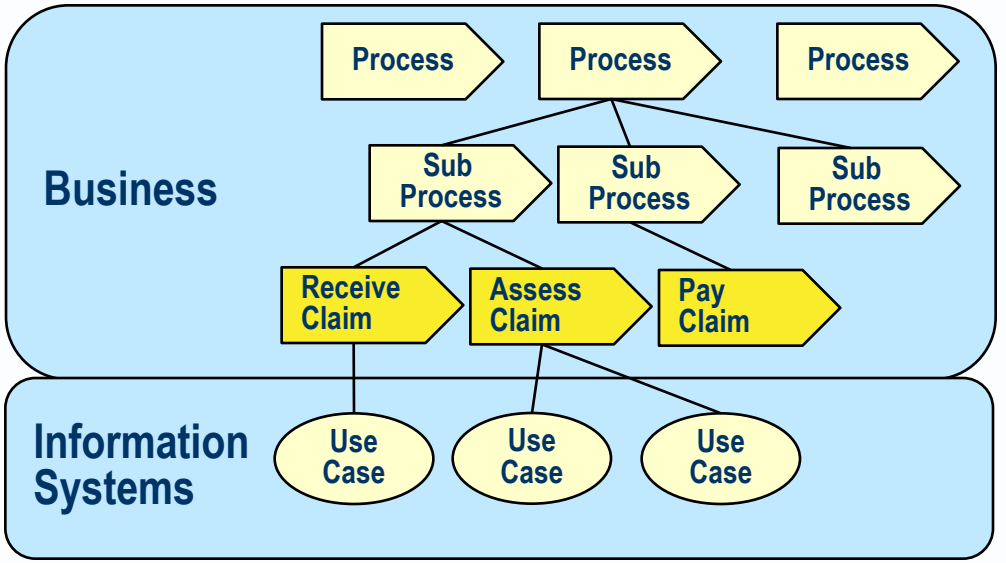
- **Atomic business service**
  - A business service performed by an atomic business component.

- **Atomic business activity**
  - A process step or activity at the bottom of a business process decomposition.
  - It may be at the one person, one place, one time (OPOPOT) level.
  - It may be more coarse-grained – more than one person over an extended time.

Structured analysis verification

- [A technique] to ensure a business architecture is comprehensive and consistent.
- A structural decomposition usually stops at a 3rd or 4th level.
- Activities people perform may be at a much finer-grained, say 6th or 7th level.
- Every atomic activity found in a business process model should be locatable under one or more business functions.





Structured analysis verification

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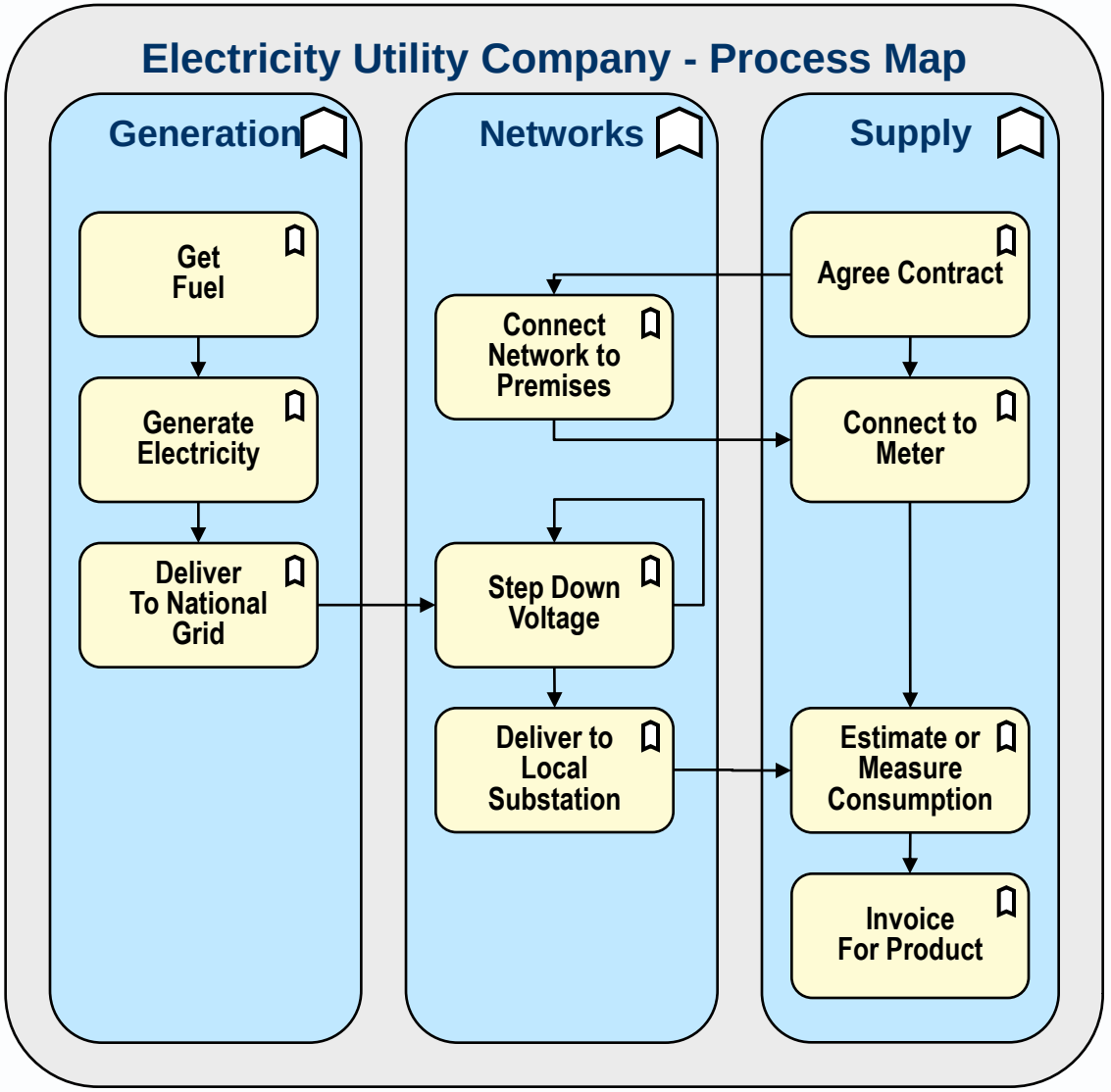
- Every atomic activity found in a business process model should be locatable under one or more business functions.



Conversely: mapping functions/capabilities to a value stream

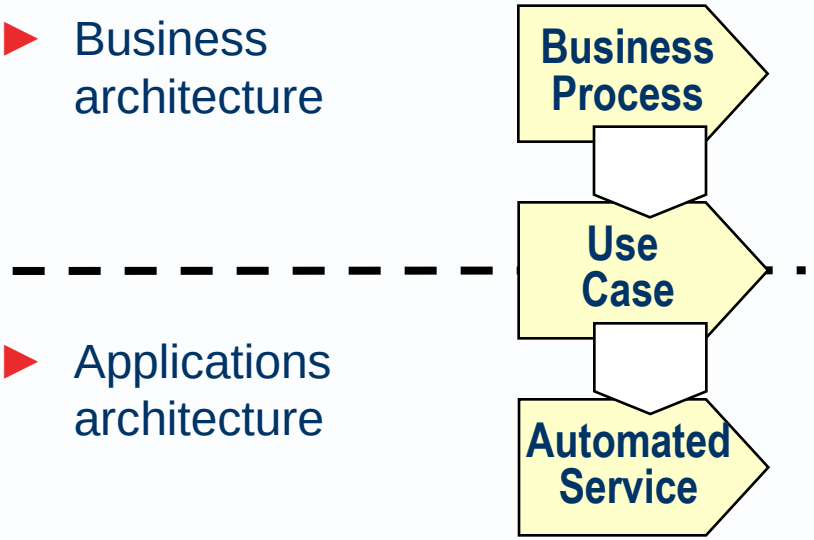
- Every atomic business function/capability may be mapped to one or more stages in a high level value stream, scenario or process

Figure 1.4: The Business Architecture Value Stream

Process automation

- [A technique] that decomposes a business processes into steps and identifies application use cases needed at each step.
- Use cases may be further decomposed to identify automated behaviors needed.

- Business architecture
- Applications architecture



Application use case = process flow inside a service contract

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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 2 Enter pin number 3 Select amount 4 Press OK 5 Withdraw card
Non-functional requirements	Response time	30 seconds
	Throughput	100 per second
	Availability	
	Integrity:	
	Scalability:	
	Security	
	Other...	

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)