SSi

Syntell

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An Elaboration of Service Views within the UAF

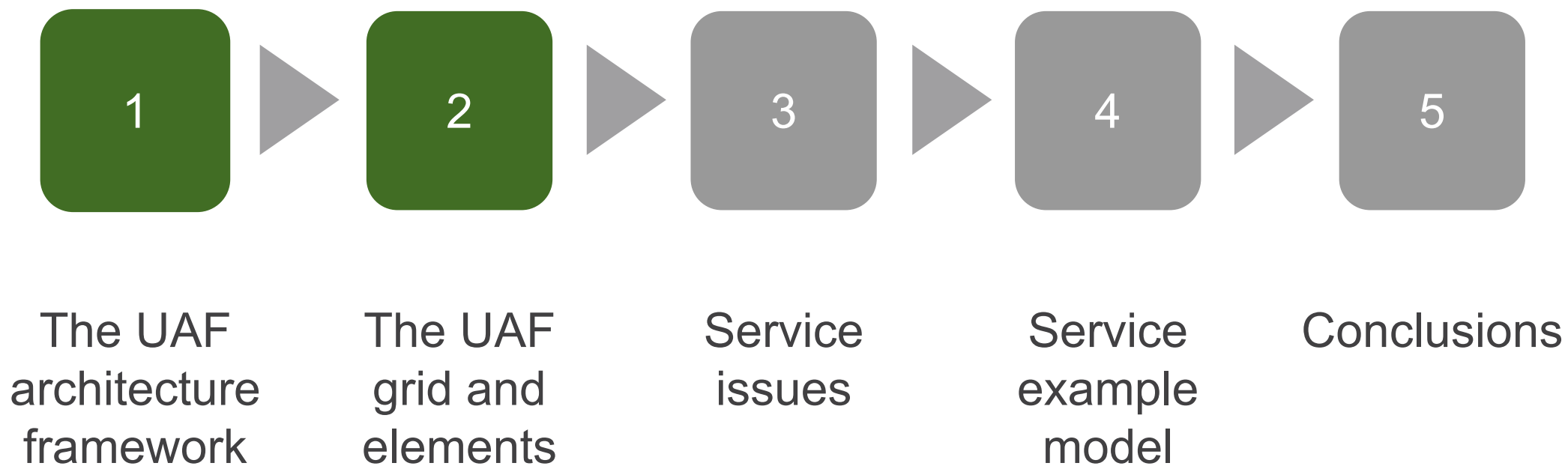www.incose.org/symp2021

Presenters

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Agenda

1	2	3	4	5
The UAF architecture framework	The UAF grid and elements	Service issues	Service example model	Conclusions

The Unified Framework Architecture Grid

- Looking at the architecture of an enterprise in a grid was originally defined by Zachmann.

- The importance of aspects such as What needs to be done, How and Why and When were used in his grid but has an even older use.

I KEEP six honest serving-men
(They taught me all I knew);
Their names are What and Why and When
And How and Where and Who.
I send them over land and sea,
I send them east and west;
But after they have worked for me,
I give them all a rest.

The Elephant's Child

Rudyard Kipling

	Taxonomy Tx	Structure Sr	Connectivity Cn	Processes Pr	States St	Interaction Scenarios Is	Information If	Parameters Pm	Constraints Ct	Roadmap Rm	Traceability Tr
Metadata Md	Metadata Taxonomy Md-Tx	Architecture Viewpoints [a] Md-Sr	Metadata Connectivity Md-Cn	Metadata Processes [a] Md-Pr	-	-	Conceptual Data Model,	Environment Pm-En	Metadata Constraints [a] Md-Ct		Metadata Traceability Md-Tr
Strategic St	Strategic Taxonomy St-Tx	Strategic Structure St-Sr	Strategic Connectivity St-Cn	-	Strategic States St-St	-			Strategic Constraints St-Ct	Strategic Deployment, St-Rm / Stategic Phasing St-Rm	Strategic Traceability St-Tr
Operational 0p	Operational Taxonomy Op-Tx	Operational Structure Op-Sr	Operational Connectivity Op-Cn	Operational Processes Op-Pr	Operational States Op-St	Operational Interaction Scenarios Op-Is			Operational Constraints Op-Ct	-	-
Services Sv	Service Taxonomy Sv-Tx	Service Structure Sv-Sr	Service Connectivity Sv-Cn	Service Processes Sv-Pr	Service States Sv-St	Service Interaction Scenarios Sv-Is			Service Constraints Sv-Ct	Service Roadmap Sv-Rm	Service Traceability Sv-Tr
Personnel Pr	Personnel Taxonomy Pr-Tx	Personnel Structure Pr-Sr	Personnel Connectivity Pr-Cn	Personnel Processes Pr-Pr	Personnel States Pr-St	Personnel Interaction Scenarios Pr-Is	Logical Data Model,		Competence, Drivers, Performance Pr-Ct	Personnel Availability, Personnel Evolution, Personnel Forecast Pr-Rm	Personnel Traceability Pr-Tr
Resources Rs	Resource Taxonomy Rs-Tx	Resource Structure Rs-Sr	Resource Connectivity Rs-Cn	Resource Processes Rs-Pr	Resource States Rs-St	Resource Interaction Scenarios Rs-Is	Physical schema, real world results	Measurements Pm-Me	Resource Constraints Rs-Ct	Resource evolution, Resource forecast Rs-Rm	Resource Traceability Rs-Tr
Security Sc	Security Taxonomy Sc-Tx	Security Structure Sc-Sr	Security Connectivity Sc-Cn	Security Processes Sc-Pr	-	-			Security Constraints Sc-Ct	-	-
Projects Pj	Project Taxonomy Pj-Tx	Project Structure Pj-Sr	Project Connectivity Pj-Cn	-	-	-			-	Project Roadmap Pj-Rm	Project Traceability Pj-Tr
Standards Sd	Standard Taxonomy Sd-Tx	Standards Structure Sd-Sr	-	-	-	-			-	Standards Roadmap Sr-Rm	Standards Traceability Sr-Tr
Actuals Resources Ar		Actual Resources Structure, Ar-Sr	Actual Resources Connectivity, Ar-Cn	Simulation [b]					Parametric Execution/Evaluation [b]	-	-

Dictionary * Dc

Summary & Overview SmOv

Requirements Rq

Agenda

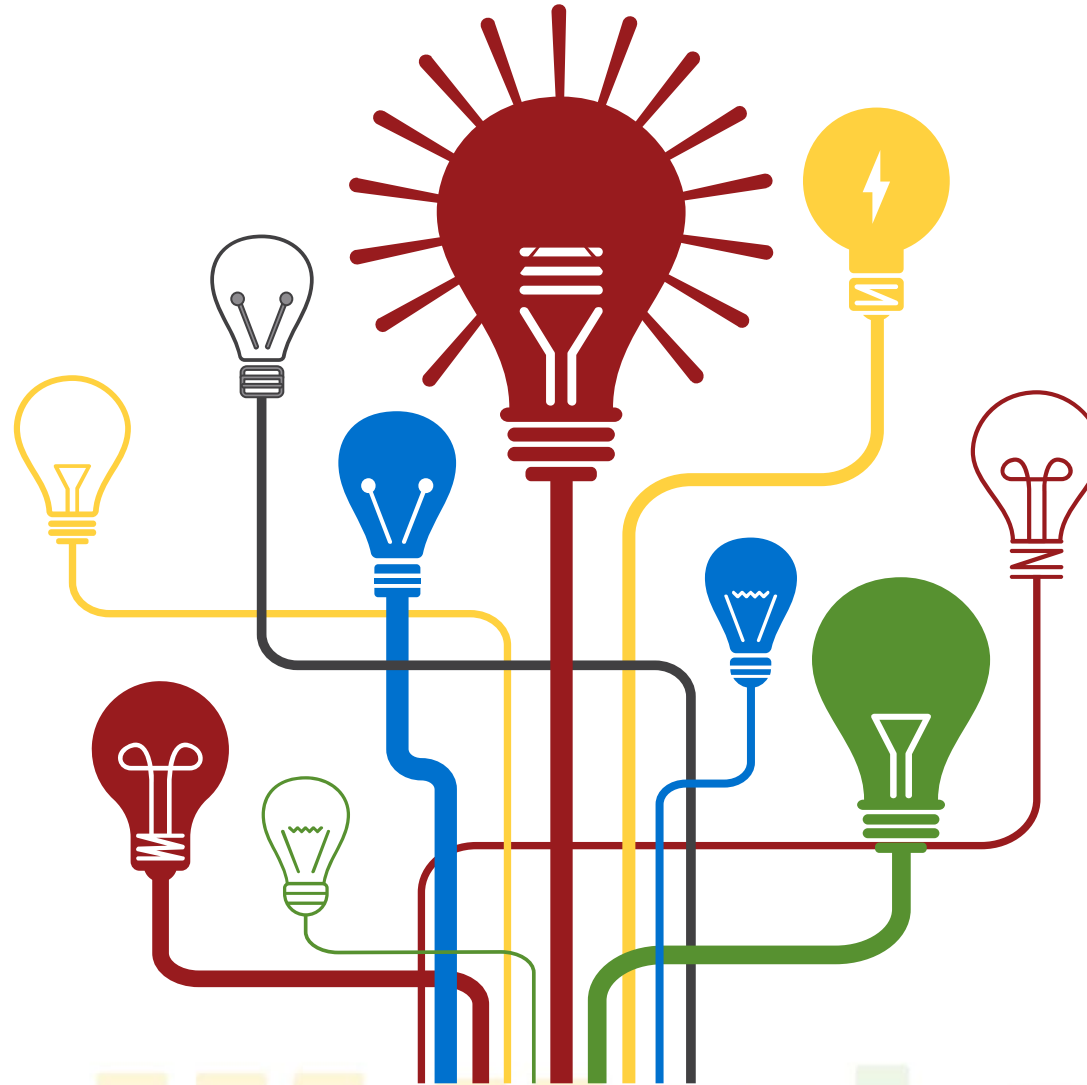| 1	2	3	4	5
The UAF architecture framework	The UAF grid and elements	Service issues	Service example model	Conclusions

Service Issues

- The service concept entered the military architecture frameworks as part of as part of the NATO architecture framework 3.0 (NAF) as well as Ministry Of Defence Architecture Framework (MODAF) and later made a part of the Department of Defense Architecture Framework (DoDAF).

- It was intended to ensure the following:
  - The operational logic of an enterprise could be modified without impacting on the supporting systems provided the interfaces to the services were unchanged since the operations were consumers of services.
  - The resources supporting the enterprise could be modified as needed as long as the service interfaces provided to the operational layer was kept in place.
  - The open group has also looked at services and have defined them as a "logical representation of a repeatable business activity that has a specified outcome, a self-contained element that may **contain** other services and is considered as a **"black-box"** to consumer of the service."

Is a service the specification of a service or the actual implementation of the service?

In order to fix this, UAF Group renamed the service element in the service layer to "ServiceSpecification".
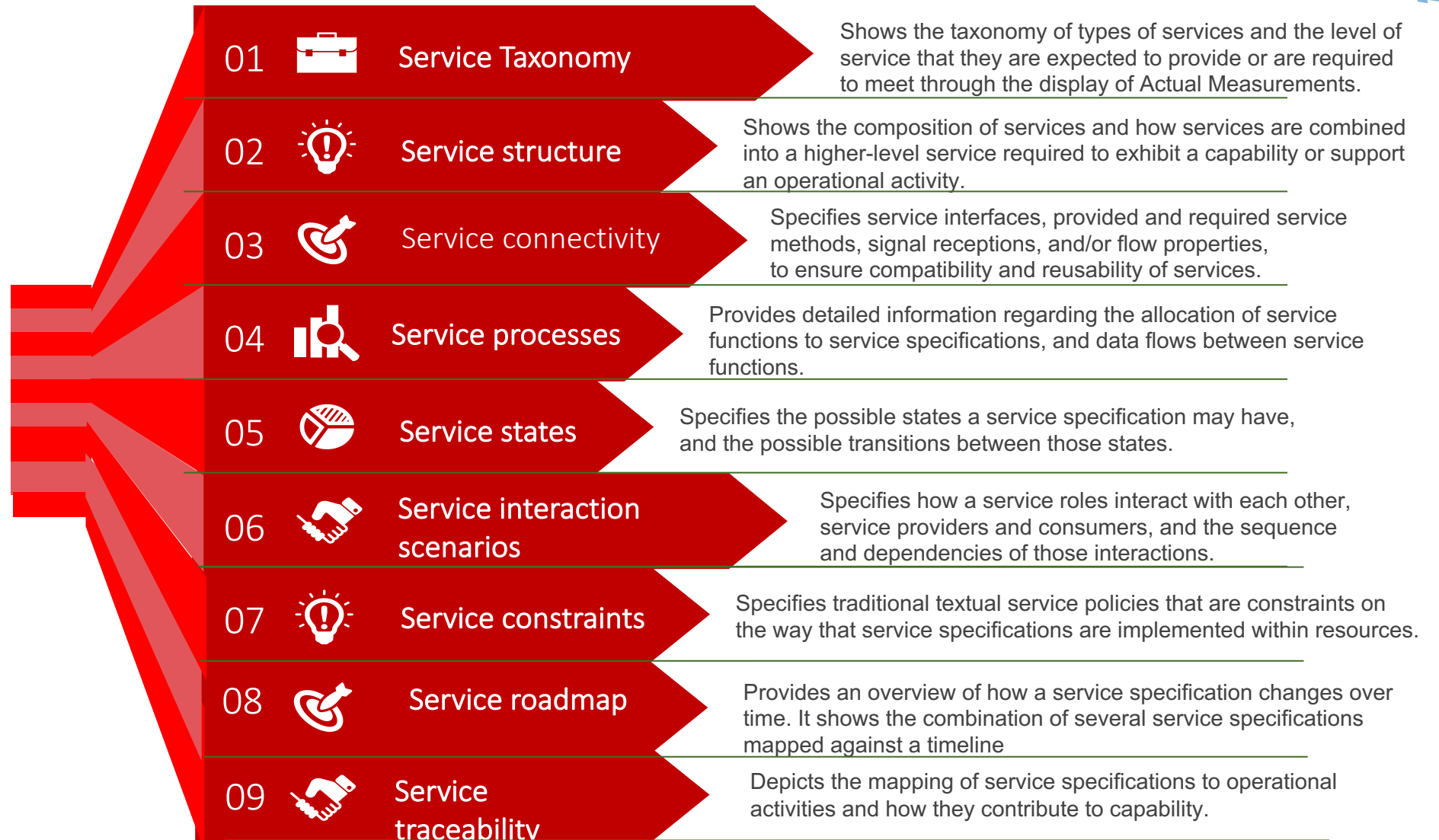
This still caused confusion and was unique since the word "specification" was not used anywhere else in the UAF to qualify elements.

In UAF version 1.2 several additions to the service layer will be introduced and ServiceSpecification will be renamed to Service.

Service Views in UAF

Service views within the UAF

01	Service Taxonomy	Shows the taxonomy of types of services and the level of service that they are expected to provide or are required to meet through the display of Actual Measurements.
02	Service structure	Shows the composition of services and how services are combined into a higher-level service required to exhibit a capability or support an operational activity.
03	Service connectivity	Specifies service interfaces, provided and required service methods, signal receptions, and/or flow properties, to ensure compatibility and reusability of services.
04	Service processes	Provides detailed information regarding the allocation of service functions to service specifications, and data flows between service functions.
05	Service states	Specifies the possible states a service specification may have, and the possible transitions between those states.
06	Service interaction scenarios	Specifies how a service roles interact with each other, service providers and consumers, and the sequence and dependencies of those interactions.
07	Service constraints	Specifies traditional textual service policies that are constraints on the way that service specifications are implemented within resources.
08	Service roadmap	Provides an overview of how a service specification changes over time. It shows the combination of several service specifications mapped against a timeline
09	Service traceability	Depicts the mapping of service specifications to operational activities and how they contribute to capability.

Agenda

1 — The UAF architecture framework

2 — The UAF grid and elements

3 — Service issues

4 — Service example model

5 — Conclusions

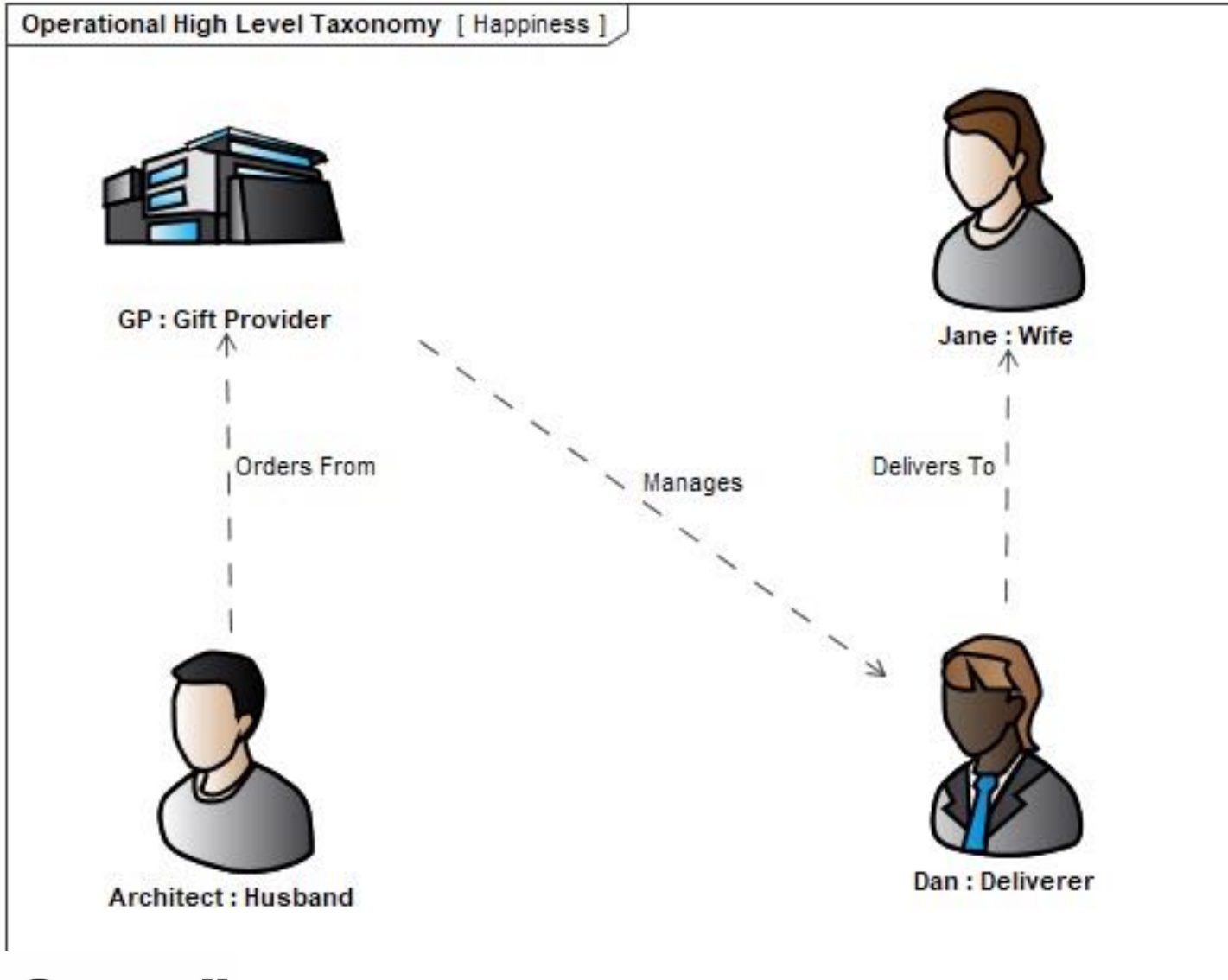# Example Model Problem Statement

- A young enterprise architect notices that Valentine's Day is fast approaching and wants to do something that will make his wife feel happy and appreciated.

- Being a romantic person, he immediately starts to build a UAF model of the stakeholder wishes, requirements, and detailed views of what he calls the Happiness Enterprise.

Happiness Formula

- Martin Seligman (2002) gave the world its first authentic formula for happiness: H=S+C+V, where
    - (H) stands for happiness. It is the sum of three factors:
    - one's genetic set-range for happiness (S),
    - their life circumstances (C), and
    - factors under their voluntary control (V).
    - There is a percentage allocation for each.
- Our engineer's actions will hopefully increase "V" for the engineer and his wife.

Enterprise Concepts

Operational High Level Taxonomy [Happiness]

GP : Gift Provider

Jane : Wife

Orders From

Manages

Delivers To

Architect : Husband

Dan : Deliverer

- Defines major concepts in the enterprise
- Also defines context and relationships

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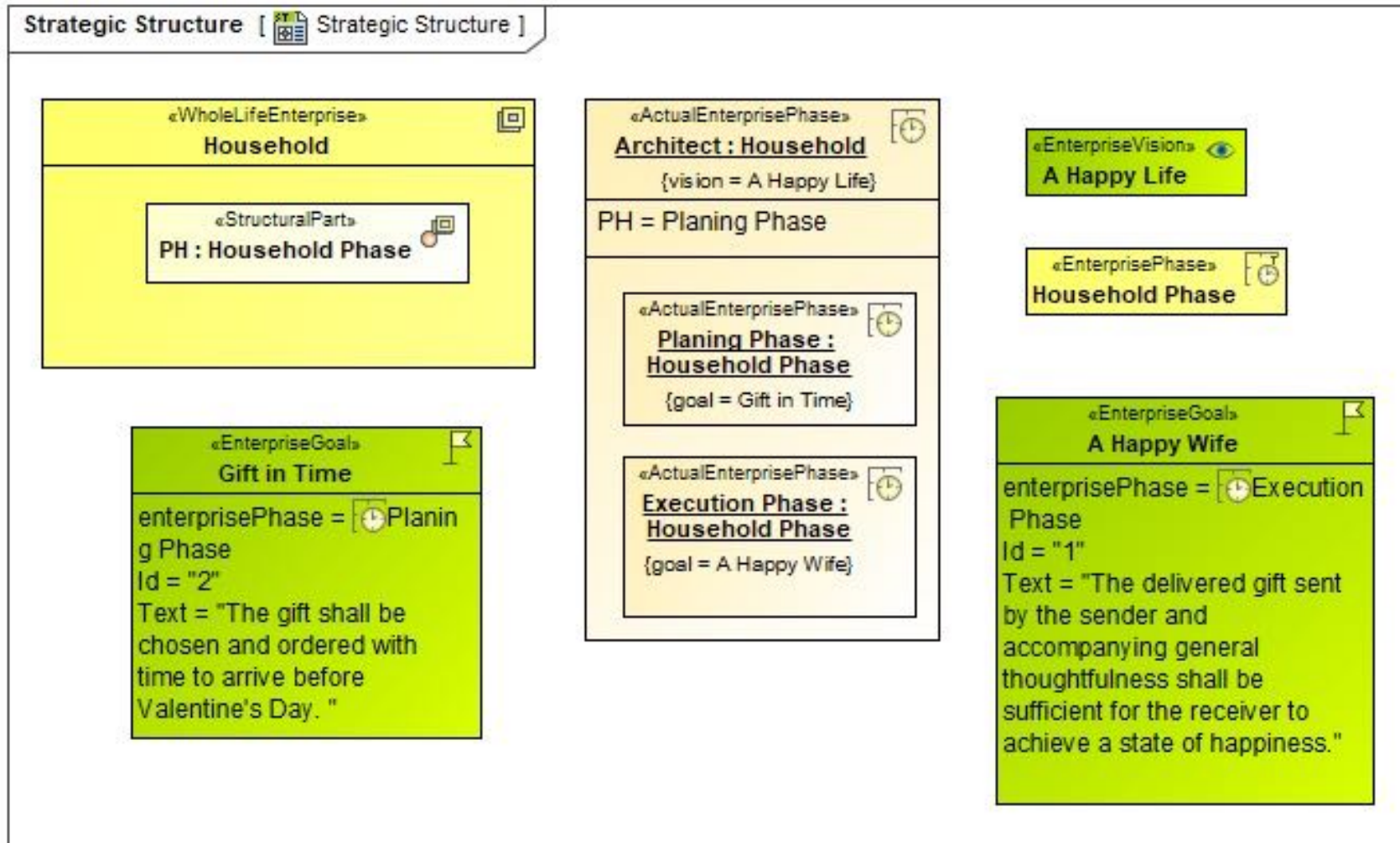
- Enterprise Goals and Visions define motivation.
- The whole life enterprise vision is a happy life.
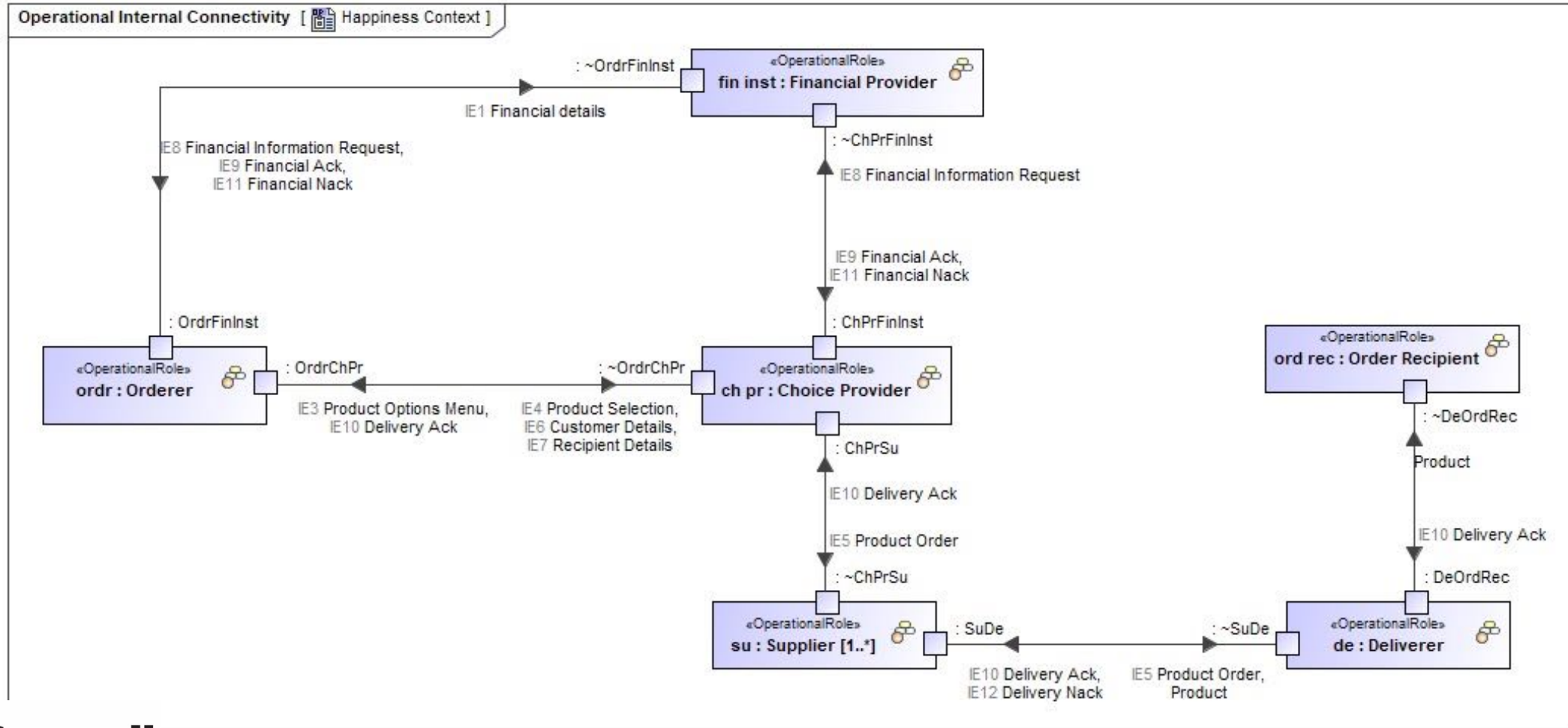- Phase I goal is to buy a gift in time
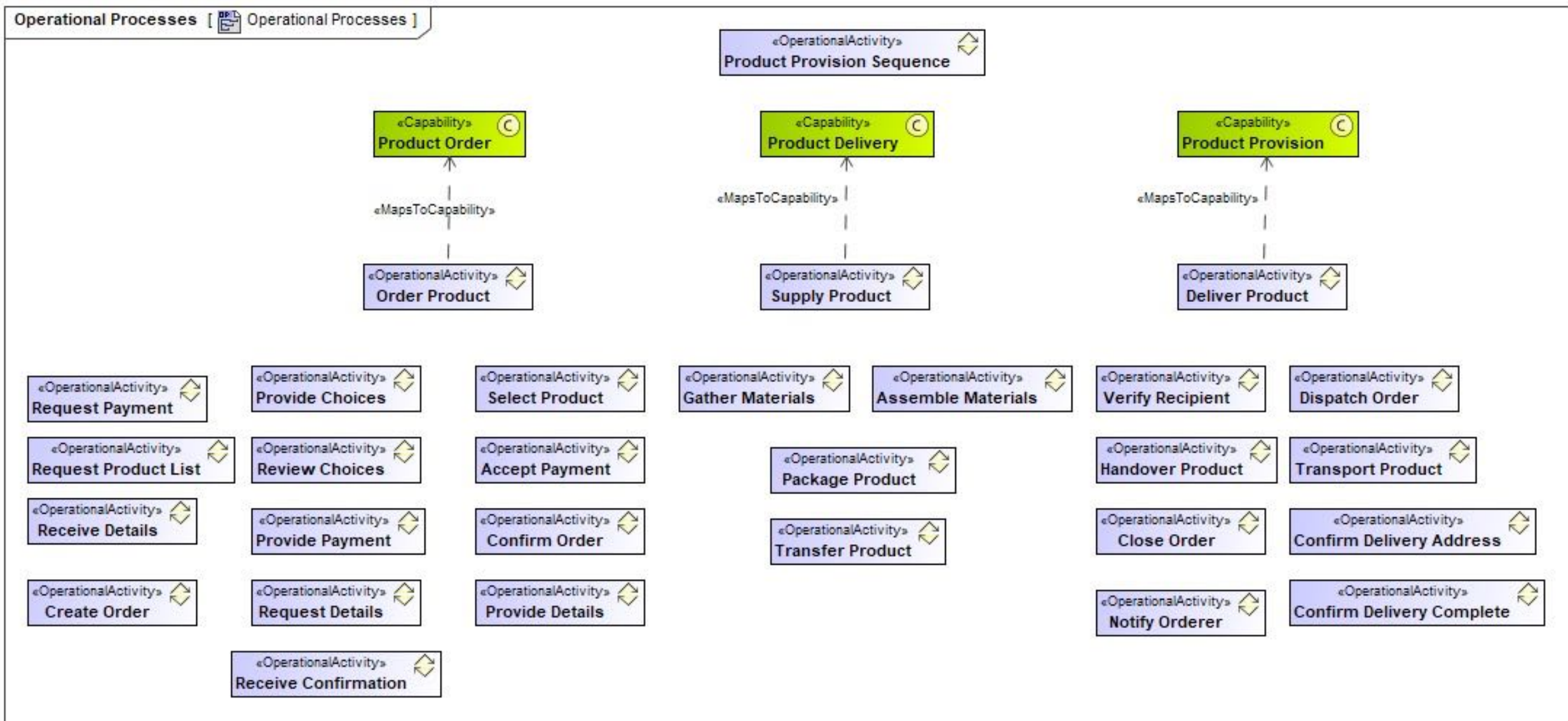- Phase II goal is a happy wife.

- Capabilities define the ability to achieve a desired effect
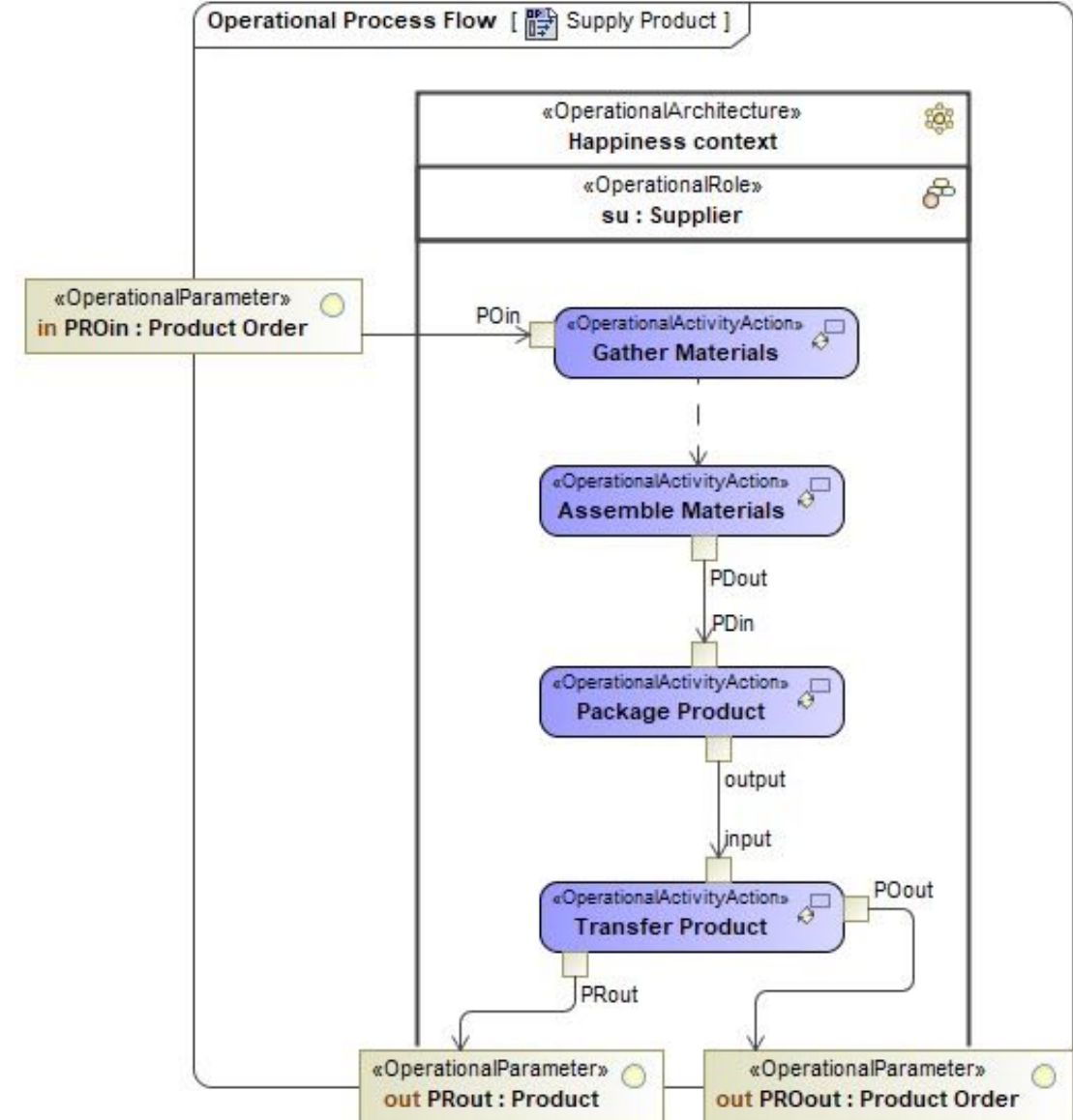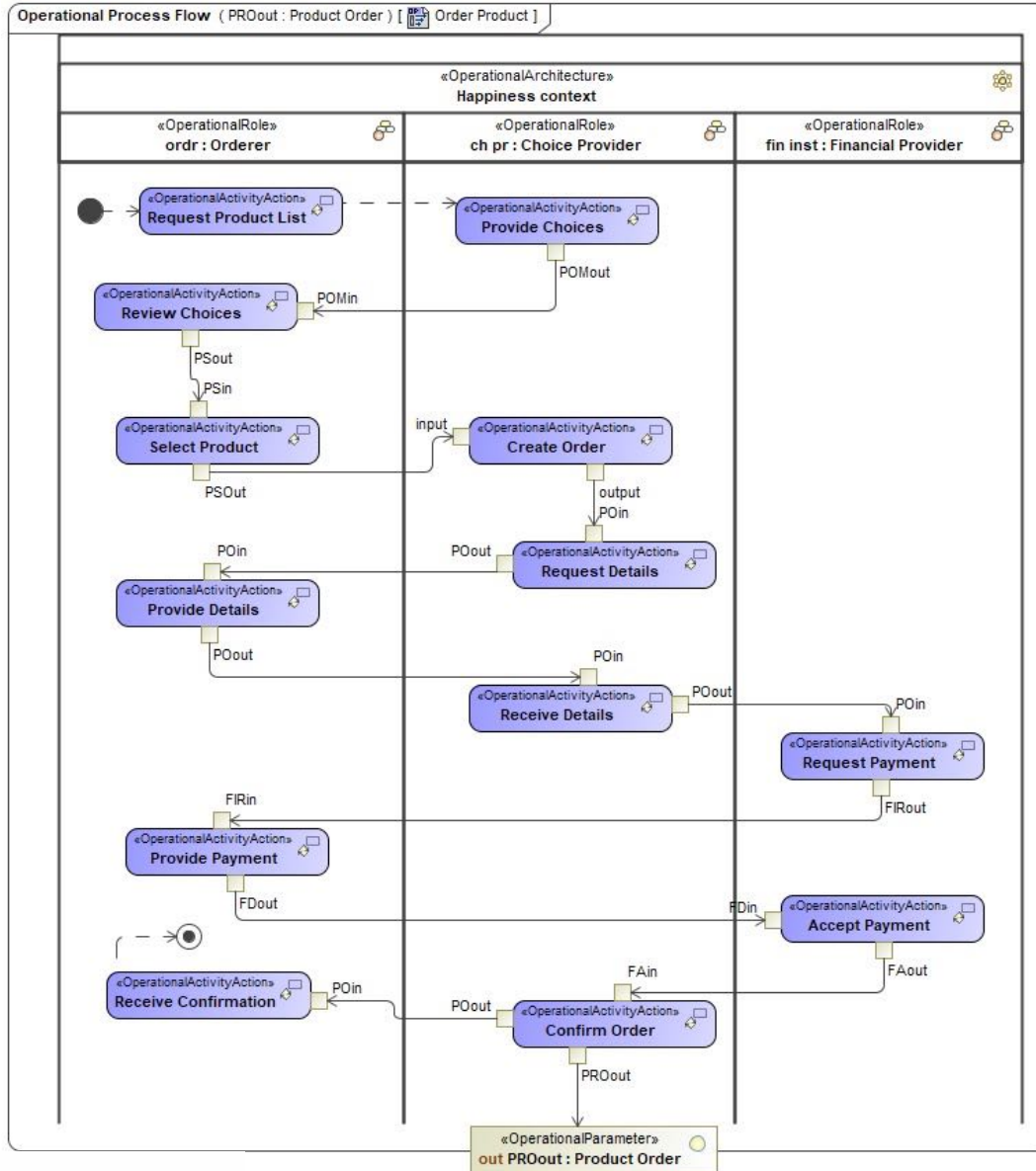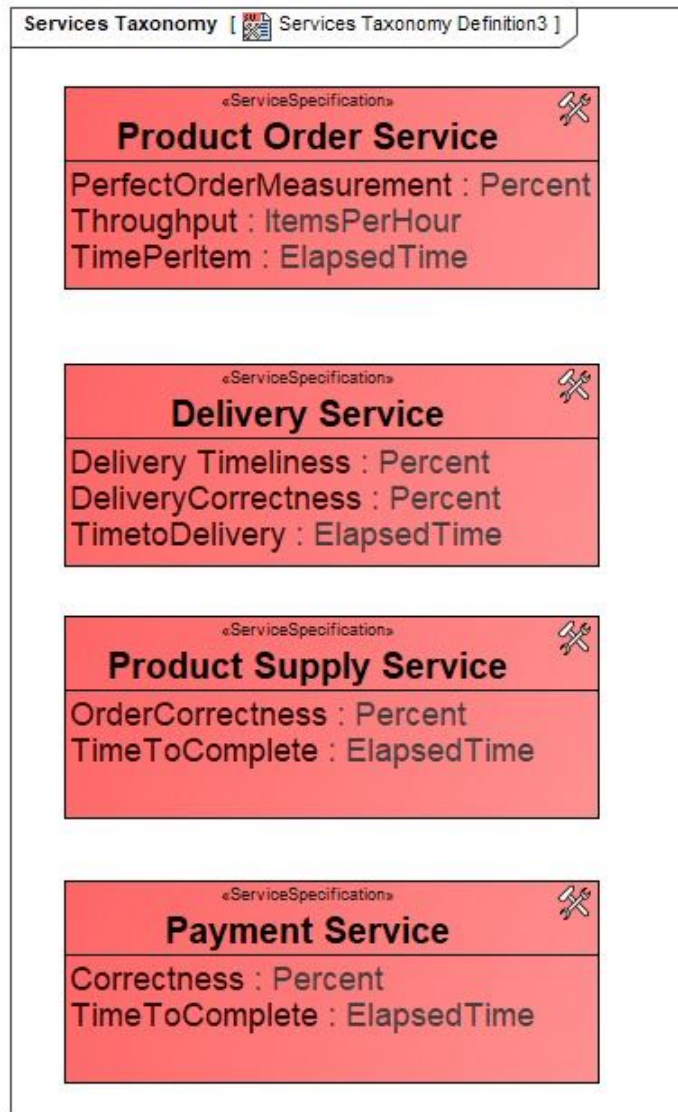
Operational Context
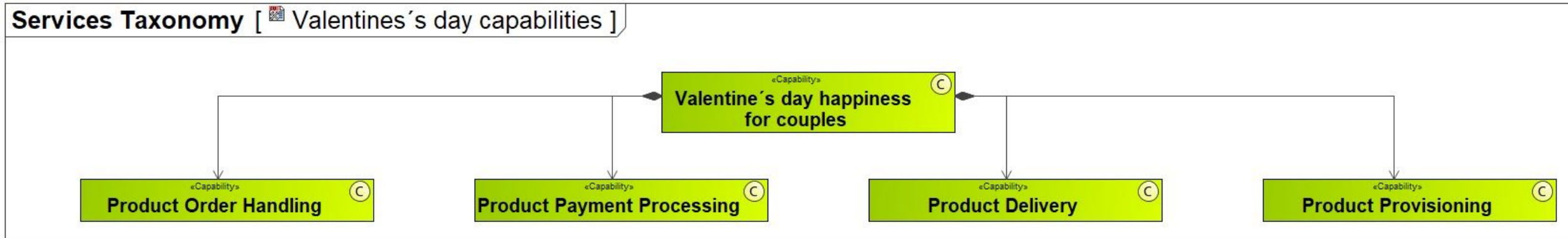
- Defines what needs to take place and NOT how
- Defines required interactions between performers
- Does not assume the existence of services to be consumed by operational activities

Abstract Processes

Services Taxonomy [Services Taxonomy Definition3]

«ServiceSpecification»
Product Order Service

PerfectOrderMeasurement : Percent
Throughput : ItemsPerHour
TimePerItem : ElapsedTime

«ServiceSpecification»
Delivery Service

Delivery Timeliness : Percent
DeliveryCorrectness : Percent
TimetoDelivery : ElapsedTime

«ServiceSpecification»
Product Supply Service

OrderCorrectness : Percent
TimeToComplete : ElapsedTime

«ServiceSpecification»
Payment Service

Correctness : Percent
TimeToComplete : ElapsedTime

- One can consider the introduction of an order service, a delivery service a supply service and a payment service.

- In order to determine the quality of these services a set of measurements can be created to assess quality.

Services Taxonomy [Services Taxonomy Actuals]

«RequiredServiceLevel»
Required Order : Product Order Service

PerfectOrderMeasurement : Percent = 95.0
Throughput : ItemsPerHour = 150.0
TimePerItem : ElapsedTime = 180.0

«RequiredServiceLevel»
Required Payment : Payment Service

Correctness : Percent = 99.99
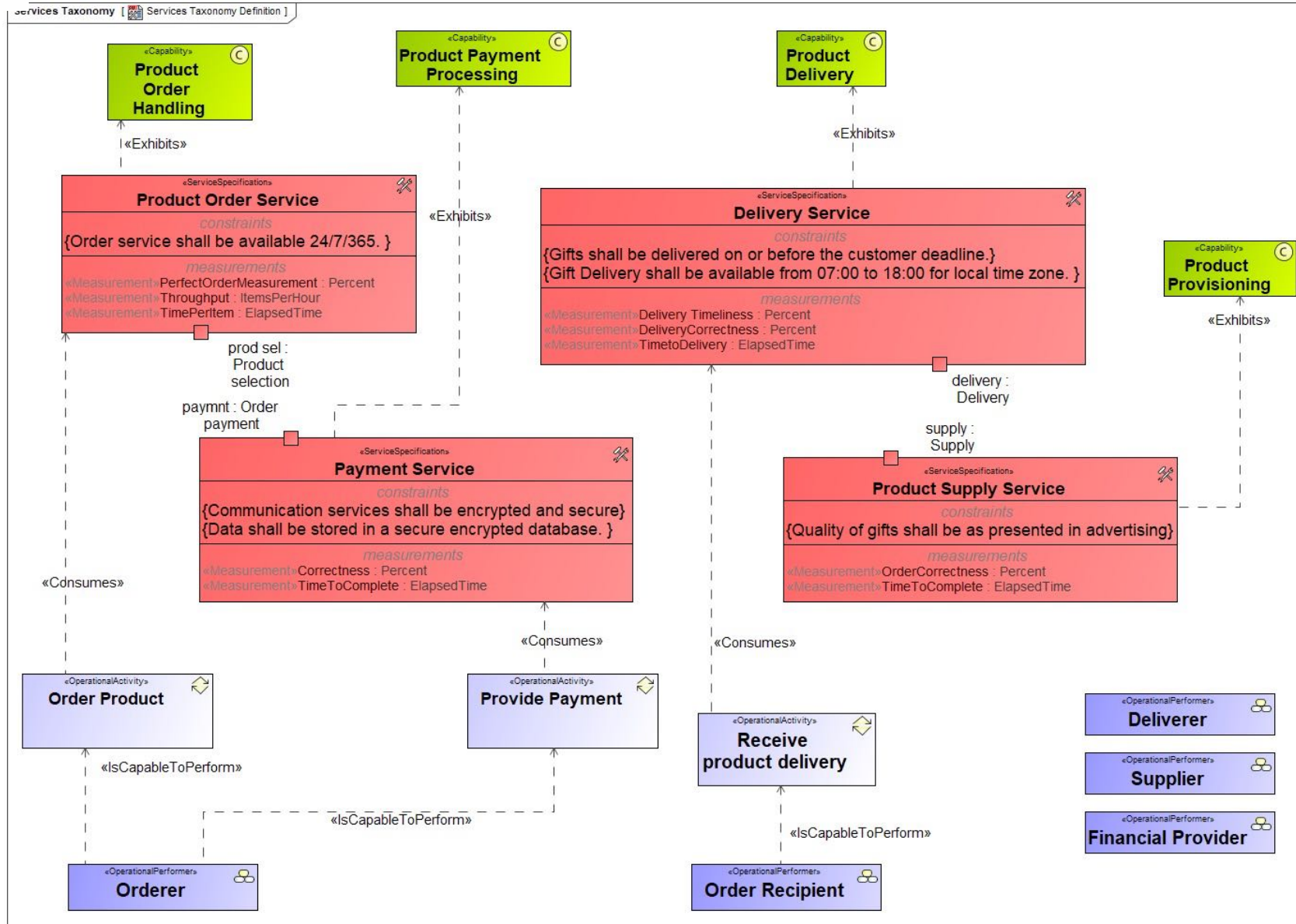TimeToComplete : ElapsedTime = 1.0

«RequiredServiceLevel»
Required Supply : Product Supply Service

OrderCorrectness : Percent = 99.9
TimeToComplete : ElapsedTime = 3600.0

«RequiredServiceLevel»
Required Delivery : Delivery Service

Delivery Timeliness : Percent = 98.0
DeliveryCorrectness : Percent = 98.8
TimetoDelivery : ElapsedTime = 3700.0

«ProvidedServiceLevel»
Provided Order : Product Order Service

PerfectOrderMeasurement : Percent = 99.0
Throughput : ItemsPerHour = 180.0
TimePerItem : ElapsedTime = 110.0

«ProvidedServiceLevel»
Provided Payment : Payment Service

Correctness : Percent = 99.99
TimeToComplete : ElapsedTime = 0.9

«ProvidedServiceLevel»
Provided Supply : Product Supply Service

OrderCorrectness : Percent = 99.99
TimeToComplete : ElapsedTime = 3400.0

«ProvidedServiceLevel»
Provided Delivery : Delivery Service

Delivery Timeliness : Percent = 99.0
DeliveryCorrectness : Percent = 97.0
TimetoDelivery : ElapsedTime = 3600.0

- The required service levels set the levels required.
- The providers can indicate what they are able to accomplish with the service realization that they are offering.

What can these Service do?

- The consumer would access the product order service to decide on the gift to purchase.

- Possible suppliers would have submitted a list of what can be ordered from them to the service such that the service would be able to present these to actual customers.

- Once a selection has been made and address and time of delivery has been defined, the service would check to see that the selected supplier can deal with the order and that a delivery can be made.

- When this has been done, the service would hand over control to the payment service to finalize payment. Once this has been successfully completed, the payment service hands back control to the product order service that indicates completion of the order.

- The service issues a confirmation of delivery of gift if the consumer desires this to be done.

Service Taxonomy

Trace Table

Service Constraints

- Defines service policies that apply to implementations of service specifications.

- Specifies traditional textual service policies that constrain the way that service specifications are implemented.

#	Name	Rule Kind	Applies To	Rule Specification
1	Gift Quality	Constraint	Product Supply Service	Quality of gifts shall be as presented in advertising
2	Availability	Constraint	Delivery Service	Gift Delivery shall be available from 07:00 to 18:00 for local time zone.
3	Delivery Deadline	Contract	Delivery Service	Gifts shall be delivered on or before the customer deadline.
4	Availability	Constraint	Product Order Service	Order service shall be available 24/7/365.
5	Secure Comms	Constraint	Payment Service	Communication services shall be encrypted and secure
6	Secure Data	Constraint	Payment Service	Data shall be stored in a secure encrypted database.

«ServiceInterface»
Product ordering
operations
- reqd Order confirmation request(order : Product Order) : OrderConfirmation
- prov Provide Gift List(customer : Customer Details) : Product Options Menu
- prov Gift selection(selection : SelectedGift, continue : Boolean)
- reqd Payment Request(order : Product Order, customer details : Customer Details)
- reqd Order supply confirmation(order : Product Order, confirmation : Supply confirmation)
- reqd Supply availability check(order : Product Order) : Supply Availability
- reqd Delivery availabiliy check(customer : Customer Details, order : Product Order) : Delivery availability
- reqd Delivery of order confirmation(customer : Customer Details, order : Product Order)
- prov Payment completion(order : Product Order, customer details : Customer Details, payment completeion : PaymentCompletion)
- prov Order delivery to receiver confirmation(order : Product Order, customer details : Customer Details)
- prov Order transfer to deliverer confirmatiion(order : Product Order, customer details : Customer Details)
- reqd Supply part of order confirmation(order : Product Order, confirmation : Supply confirmation)
- prov Order transfer to deliverer confirmed(order : Product Order, customer details : Customer Details)
- reqd Delivery in progress(order : Product Order)
- prov Confirmation of gift delivery(order : Product Order, customer details : Customer Details)
- reqd Gift delivered to intended receiver(order : Product Order)

«ServiceInterface»
Receiver consumer
operations
- prov Confirmation of delivery to receiver(gift : GiftToBeDelivered) : GiftDeliveryConfirmation

«ServiceInterface»
Order consumer
operations
- reqd Provide Gift List(customer details : Customer Details) : Product Options Menu
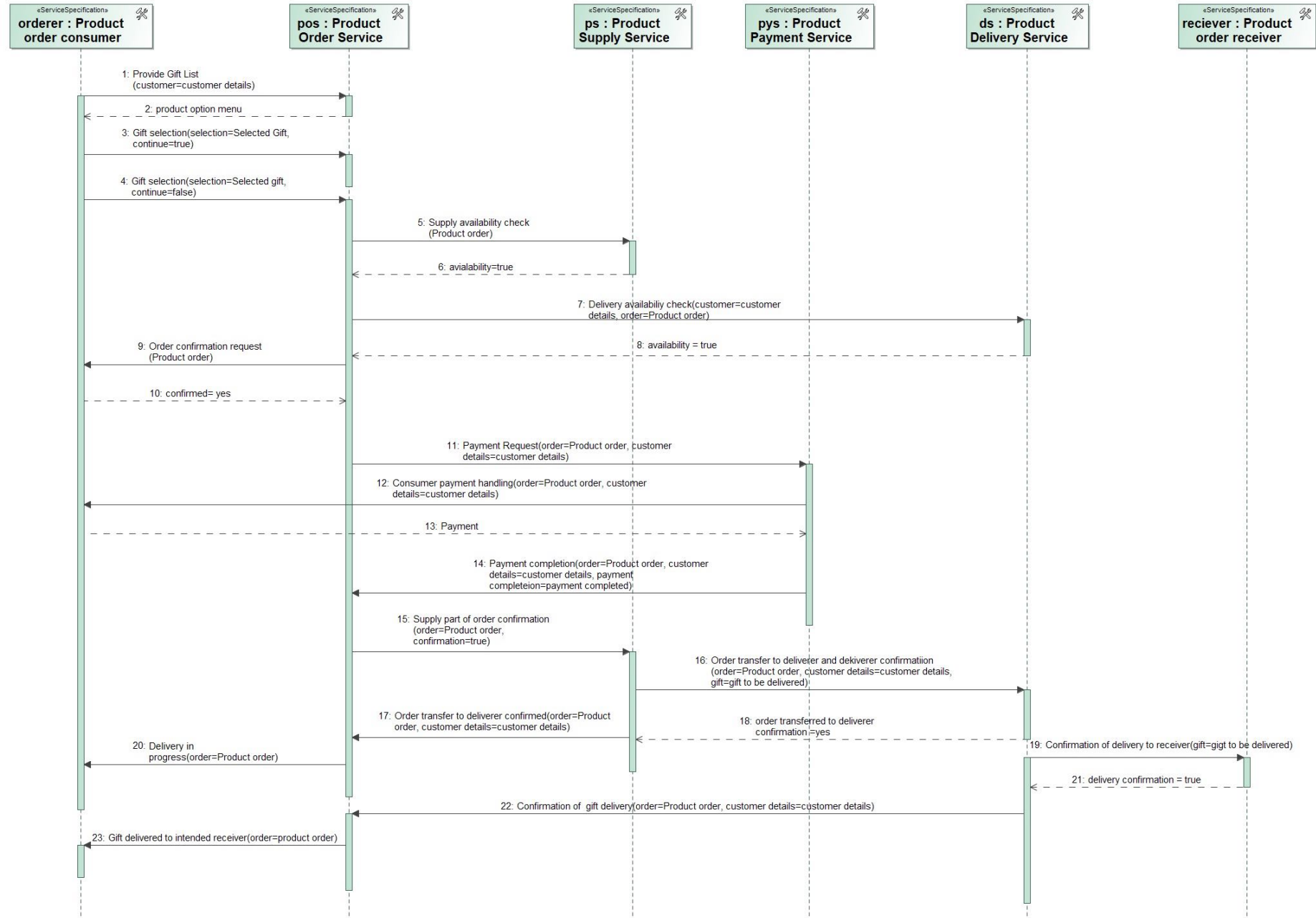- reqd Gift selection(selection : SelectedGift, continue : Boolean)
- reqd Order confirmation(order : Product Order) : order confirmation or rejection
- reqd Consumer payment handling(order : Product Order, customer details : Customer Details) : PaymentOfOrder
- prov Order confirmation request(order : Product Order) : OrderConfirmation
- prov Delivery in progress(order : Product Order)
- prov Gift delivered to intended receiver(order : Product Order)

«ServiceInterface»
Delivery
operations
- prov Delivery availabiliy check(customer : Customer Details, order : Product Order) : Delivery availability
- prov Order transfer to deliverer and dekiverer confirmatiion(order : Product Order, customer details : Customer Details, gift : GiftToBeDelivered) : OrderTransferredToDeliverer
- reqd Confirmation of delivery to receiver(gift : GiftToBeDelivered) : GiftDeliveryConfirmation
- reqd Confirmation of gift delivery(order : Product Order, customer details : Customer Details)

«ServiceInterface»
Order payment
operations
- prov Payment Request(order : Product Order, customer details : Customer Details)
- reqd Consumer payment handling(order : Product Order, customer details : Customer Details) : PaymentOfOrder
- reqd Payment completion(order : Product Order, customer details : Customer Details, payment completeion : PaymentCompletion)

«ServiceInterface»
Supply
operations
- prov Supply availability check(order : Product Order) : Supply Availability
- prov Supply part of order confirmation(order : Product Order, confirmation : Supply confirmation)
- reqd Confirmation of transfer be delivery()
- reqd Order transfer to deliverer and dekiverer confirmatiion(order : Product Order, customer details : Customer Details, gift : GiftToBeDelivered) : OrderTransferredToDeliverer
- reqd Order transfer to deliverer confirmed(order : Product Order, customer details : Customer Details)

- Service Specifications & Service Methods
- Provided & Required

A Sequence Diagram

Services to Resources Trace
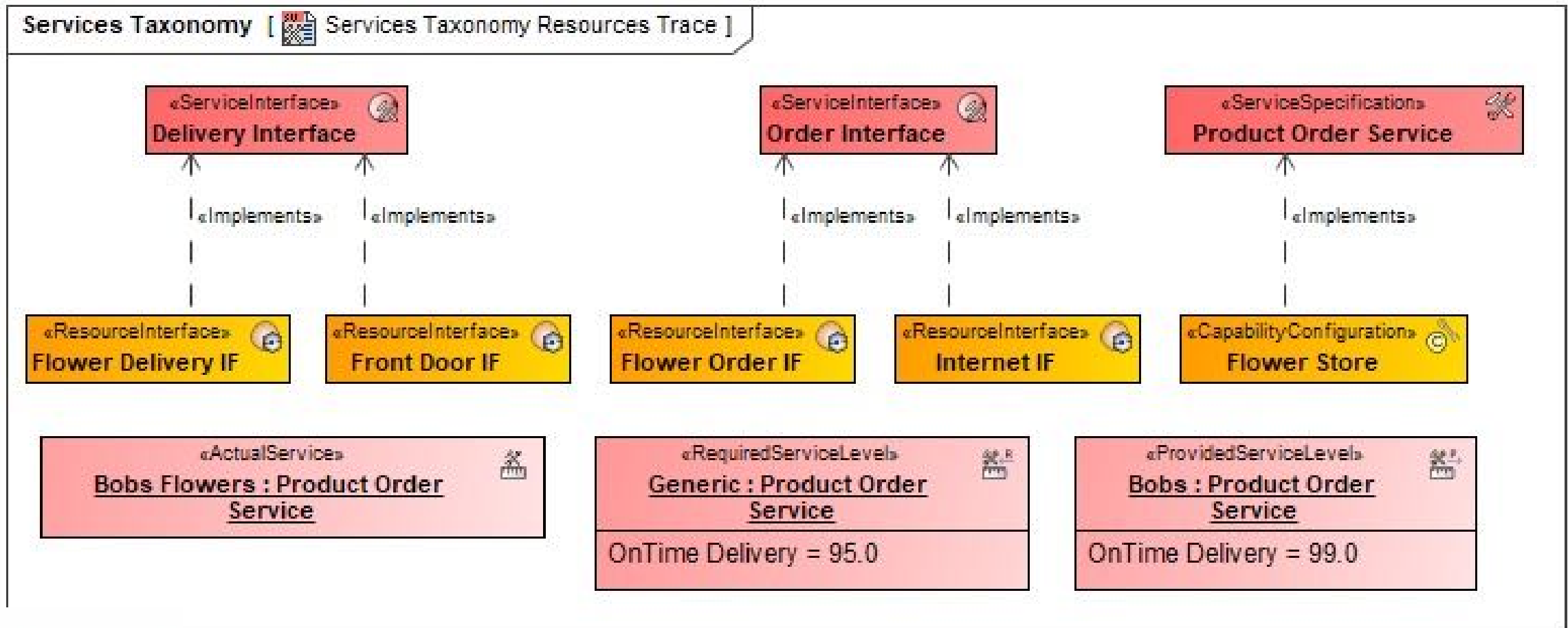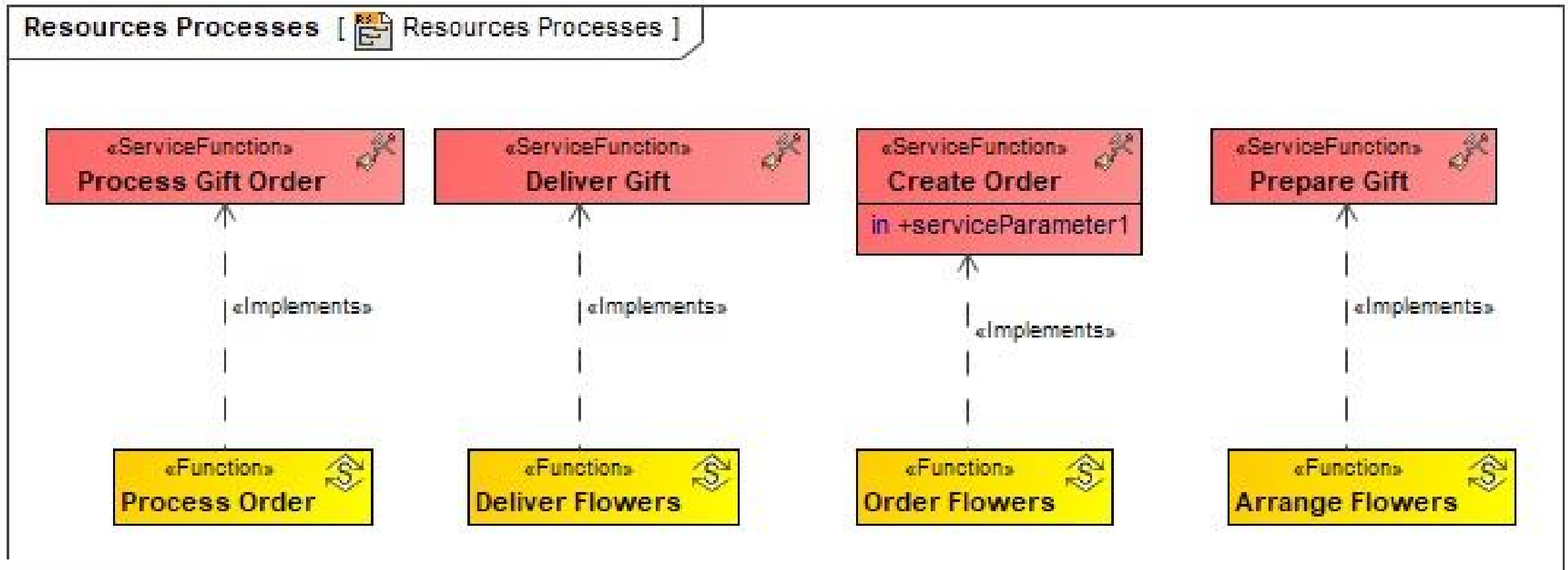
- Defines traceability to implementing resources
- Also defines required service performance
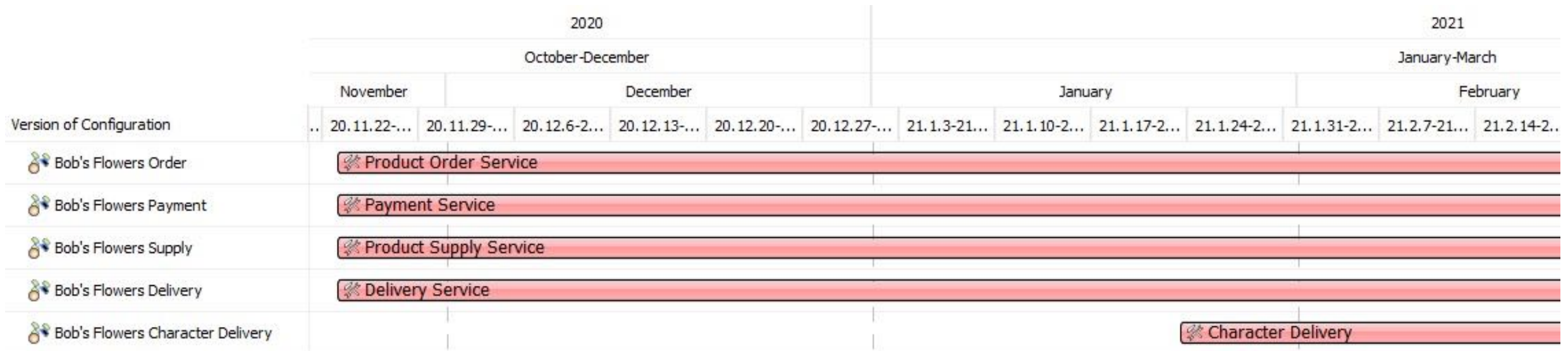
Service Processes

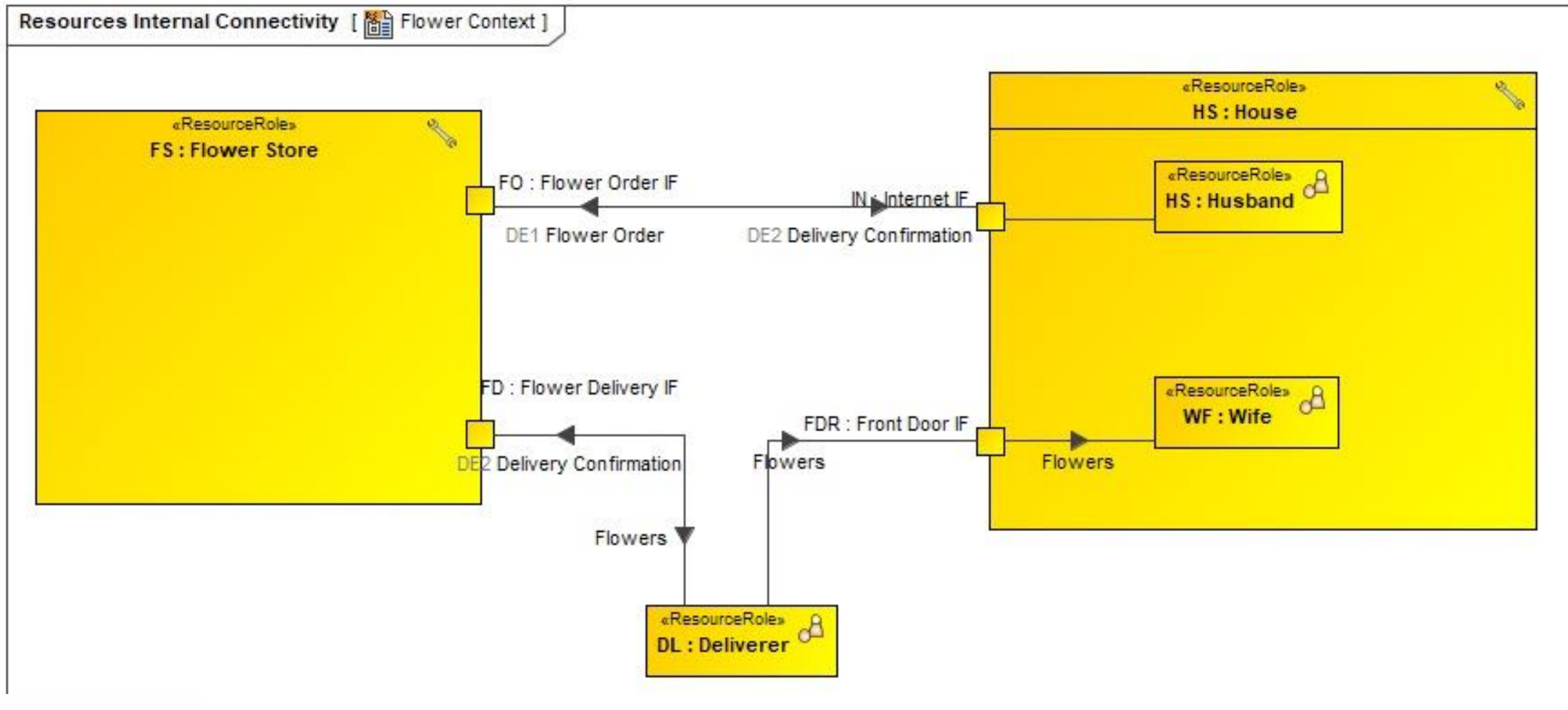- Defined service processes and implementing processes

Services Roadmap

- Roadmap provides an overview of how a service specification changes over time.
- Shows the combination of several service specifications mapped against a timeline.
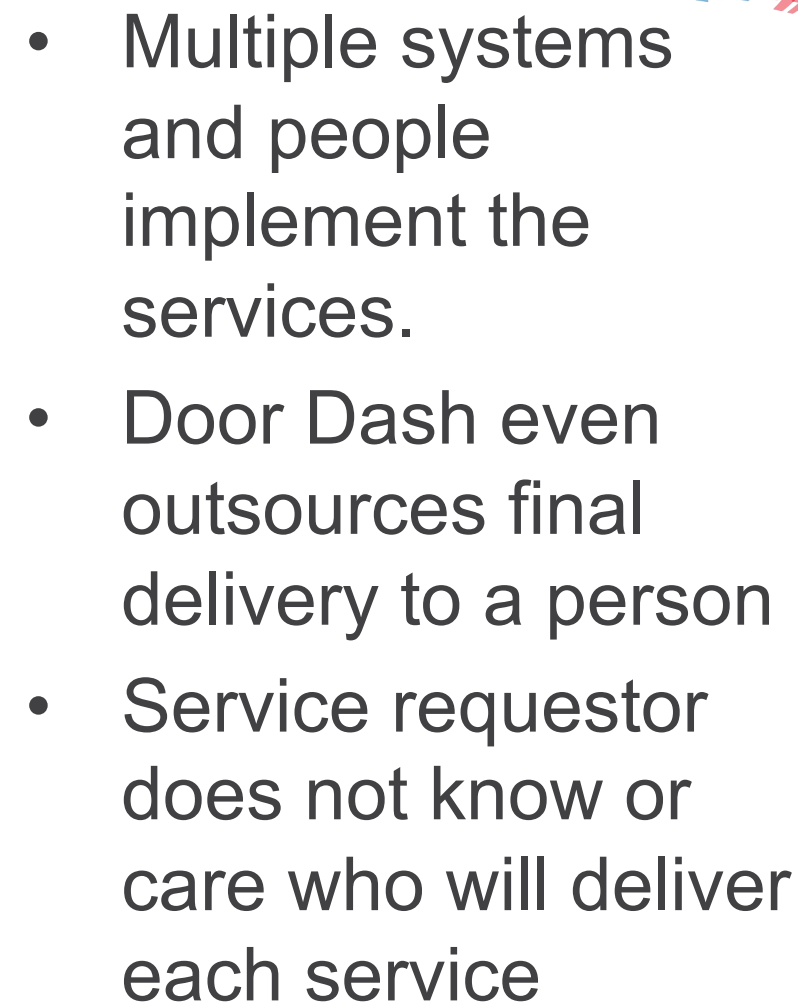
How? Service Providers

- A Single Entity Implements all Services
- Requestor initiates service in person, knows providers

Complex Implementation

- Multiple systems and people implement the services.

- Door Dash even outsources final delivery to a person

- Service requestor does not know or care who will deliver each service

Agenda

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The UAF architecture framework	The UAF grid and elements	Service issues	Service example model	Conclusions

- Services are a misunderstood part of DoDAF/MODAF/UAF

- UAF Services "specify" the value provided by a service implementation and NOT how it is implemented.

Questions and Answers

Thanks for your attention!

Speaker

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