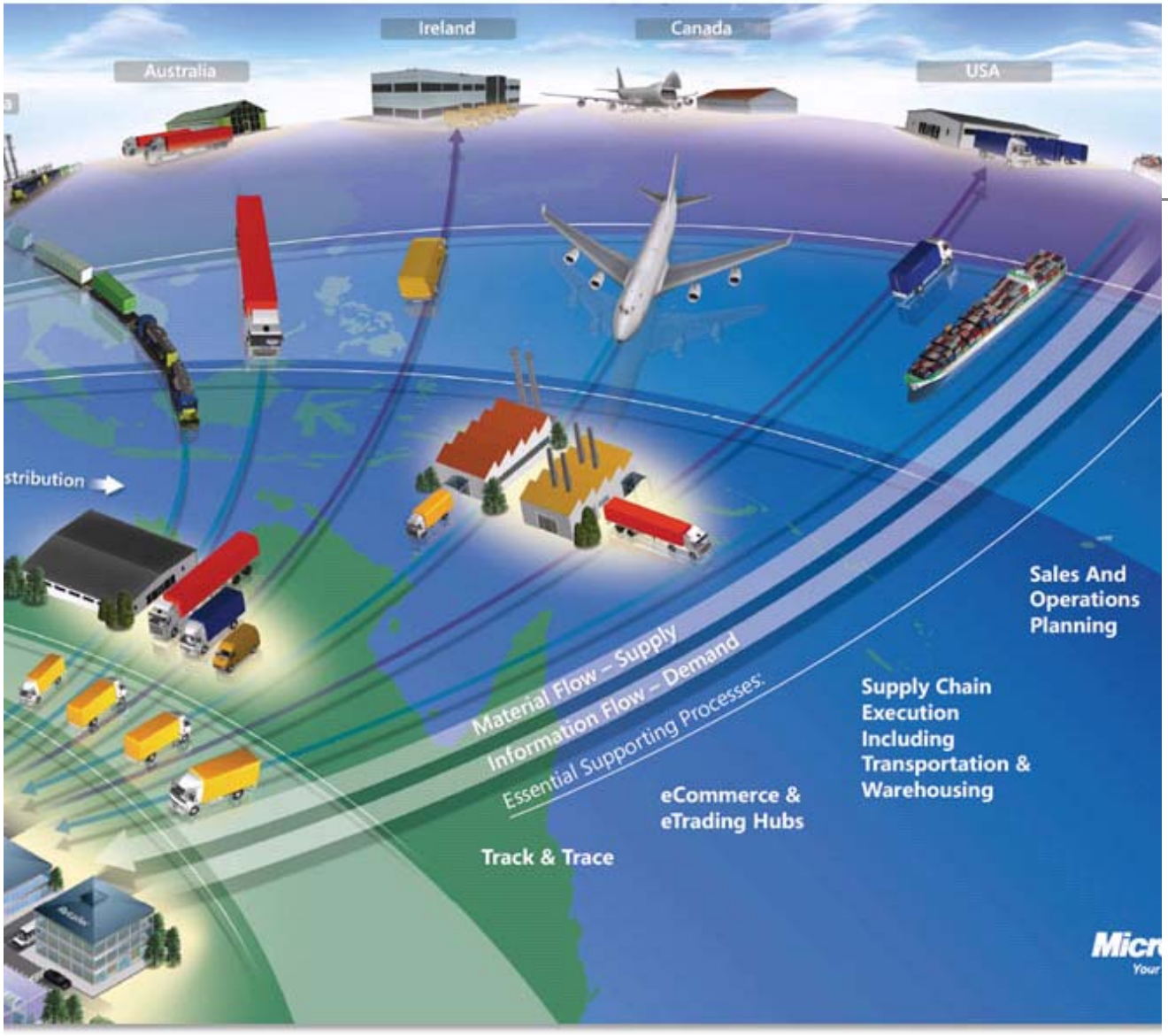


A Pragmatic Approach for Analysis and Design of Service Inventories

Patricia Lago, Maryam Razavian

VU University Amsterdam

Outline

- Motivation and background
- Description of methodology
- Why yet another methodology

Service Orientation: a Paradigm

SO paradigm introduced a **shift**
in the way we conceive a
software system

Large
system

small pluggable
elements

Service Orientation: a Paradigm

SO paradigm introduced a **shift** in the way we conceive a "software system"

SO methodologies should be in-line with such **shift** and support both service (pluggable elements) and SBA

Large system

small pluggable elements

Ingredients for Service Orientation Methodology

I. Support both service- and application development

II. Focus on SOA as an architectural style (service publication, dynamic discovery and composition)

III. Aim at software services (logical representation of repeatable activity, self-contained, compostable).

IV. Embrace the “open world assumption"

[Gu & Lago 2011]

SO methodology

- All ingredients are essential

- Major problem in current methodologies: to support both service- and application development [Gu&Lago 2011]

Service Provider: identify the essential business functions without knowing the business logic of the system that will reuse it

Service Consumer: identify the characteristics of services to be reused in the SBA

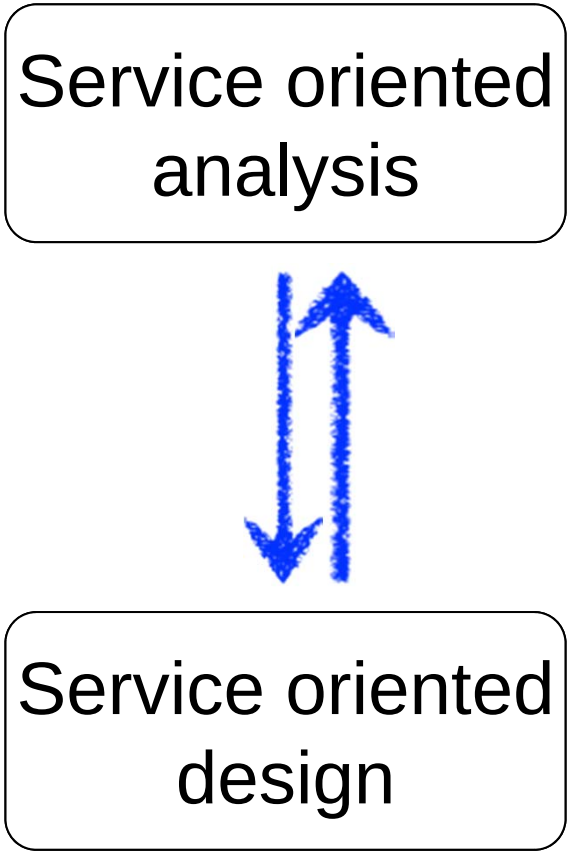
Terminology /1

- Business service
  - is an (ideally) self-contained, stateless business function that accepts one or more requests and returns one or more responses through a well-defined, standard interface.
- Service candidate
  - conceptual service identified during analysis and candidate for software design
- Software service

Terminology 2

- Service types
  - task service: service that mainly executes a functionality
  - entity service: service that mainly manages, and offers access to, a (complex) data resource
  - utility (or infrastructure) service: Domain- or application independent service offering access to generic functions or generic data resources.
  - hybrid service: mix of task service and entity service

Methodology and its Supporting Models

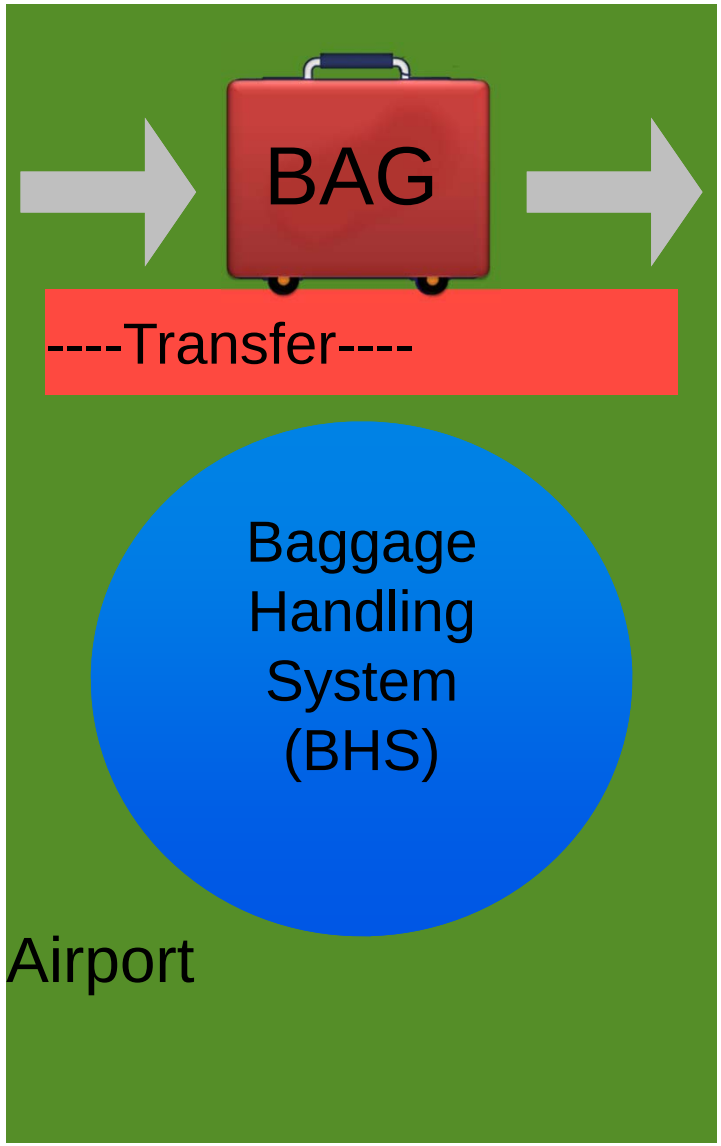


- The process of determining how business requirements can be represented through services

- The process of modeling a service inventory and/or reusing it to compose a service oriented application

Running Example: Baggage Handling System

Arrival

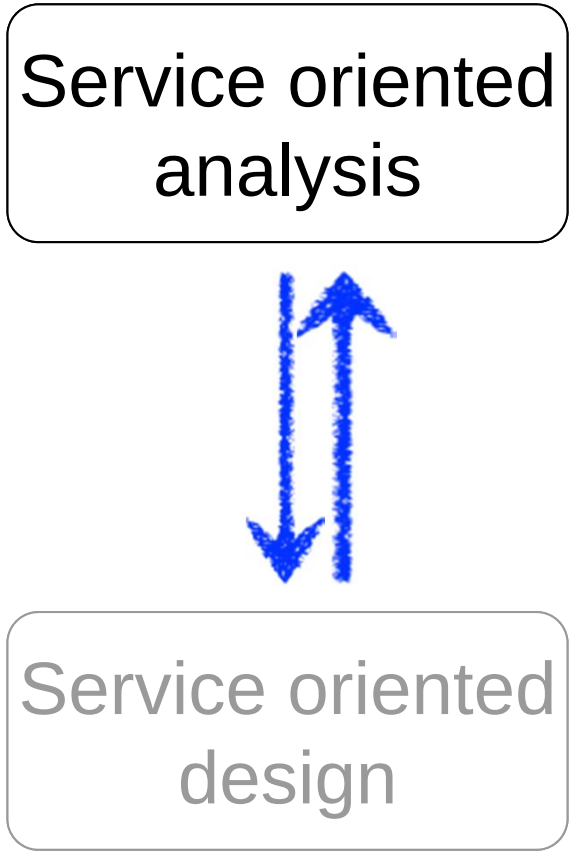


Departure

Check-in

Reclaim

Methodology and its Supporting Models



- The process of determining how business requirements can be represented through services

- The process of modeling a service inventory and/or reusing it to compose a service oriented application

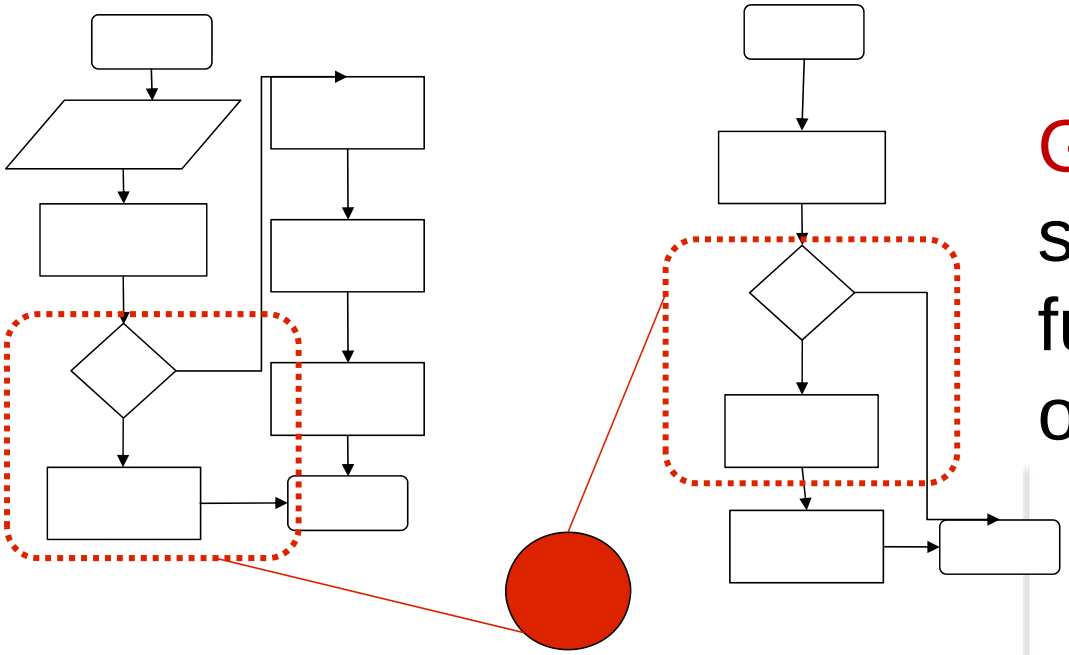
Steps of SO Analysis: Overview

Step 1: Business service identification

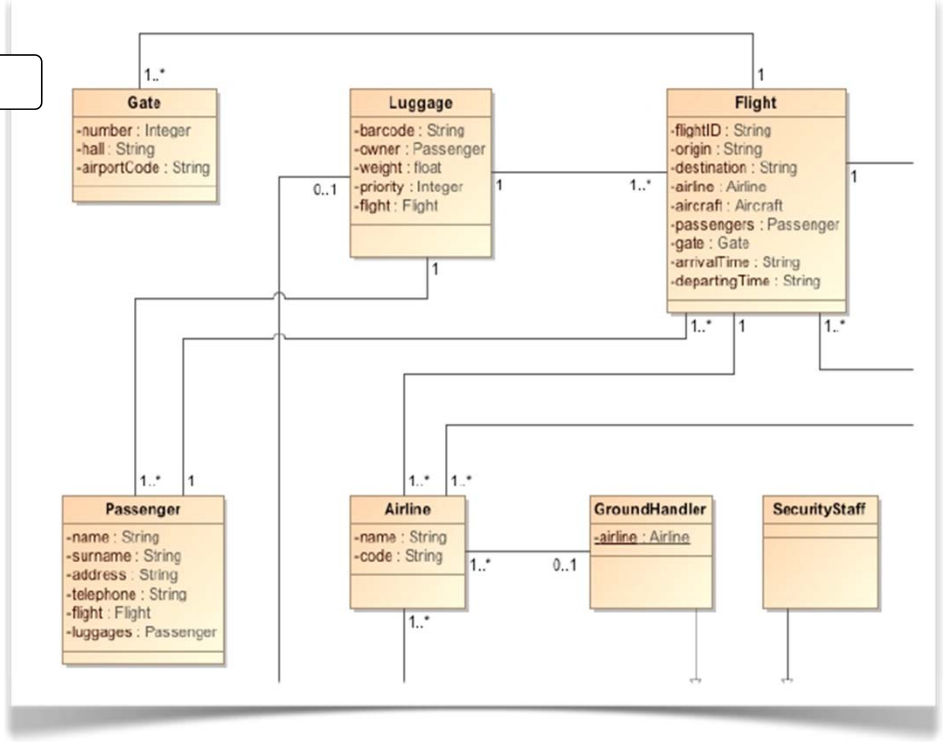
Step 2: Context identification

Step 3: Business service decomposition

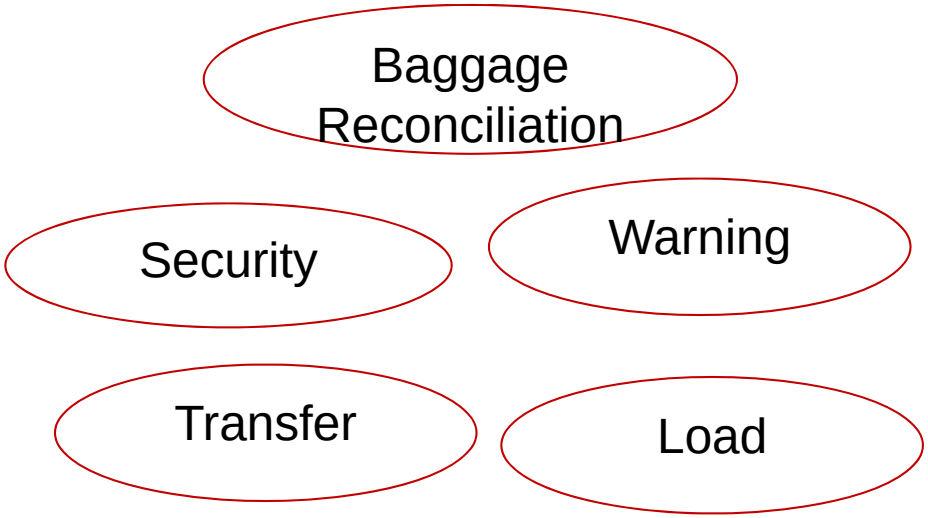
Step 1: Business Services Identification

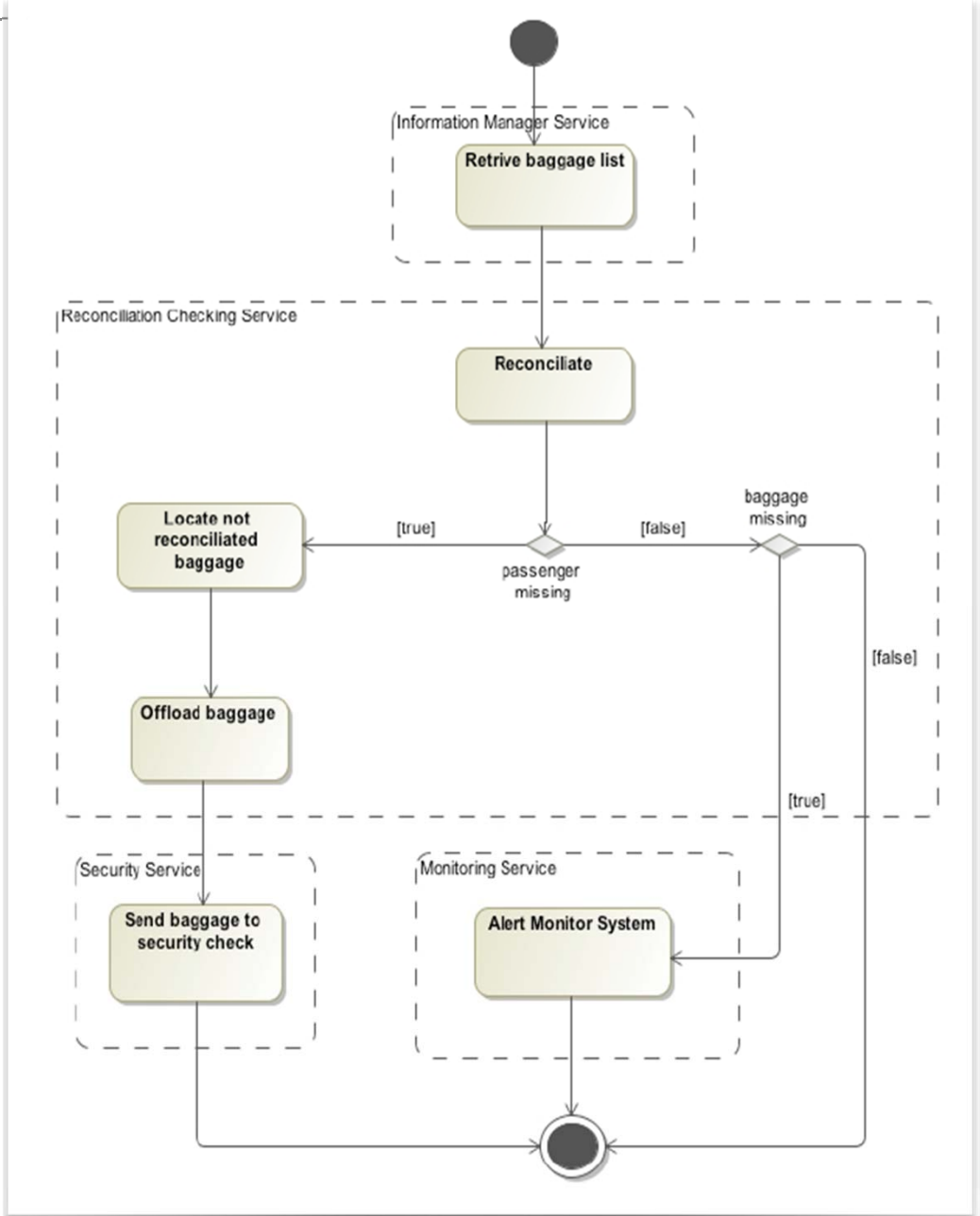


Goal: identify reusable self-contained business functionalities from sets of requirements.



Step 1: Business Services Identification

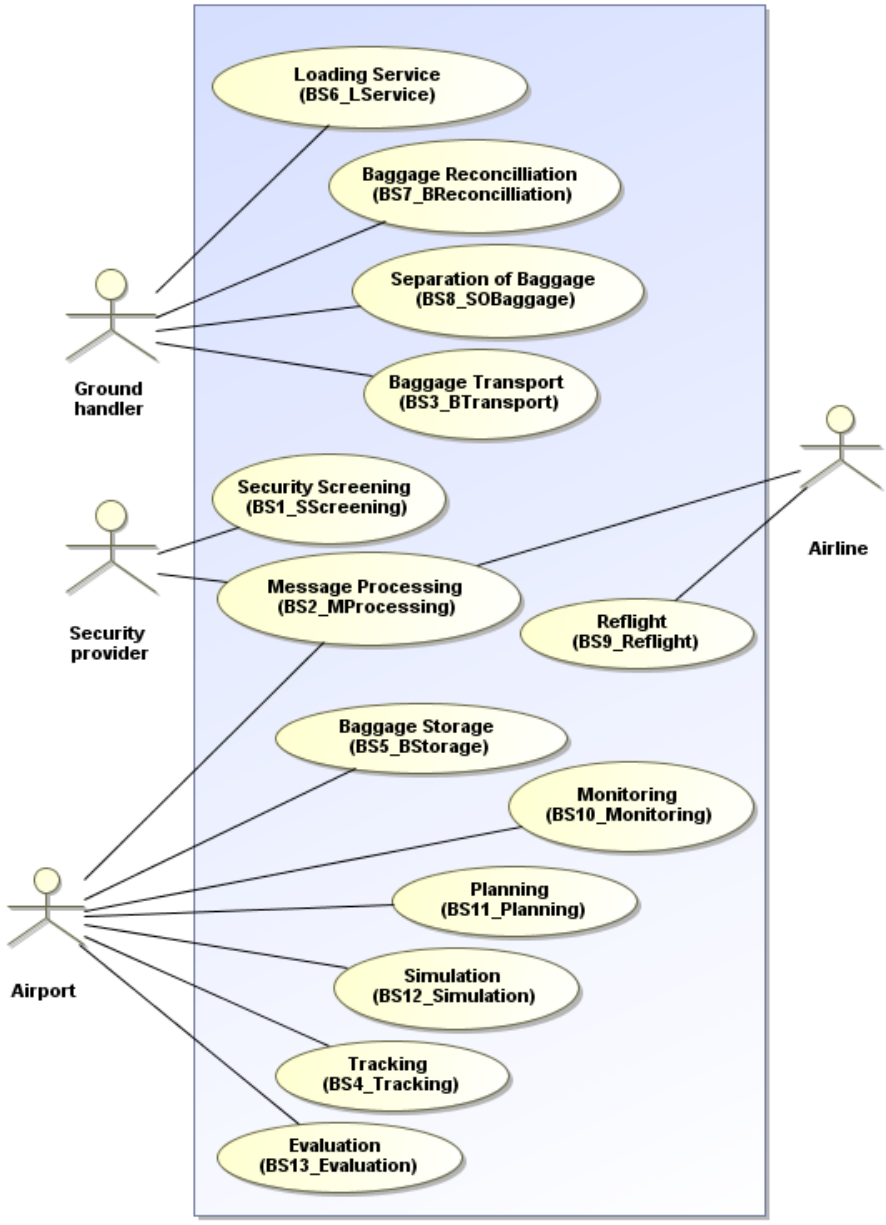




Step 2: Context Identification

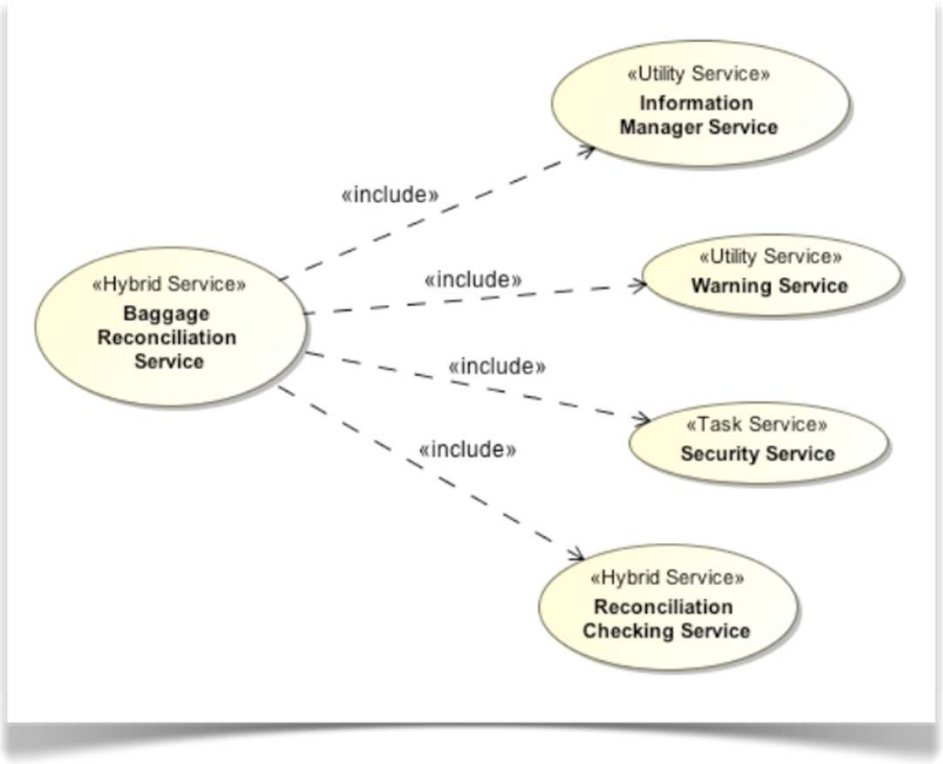
Goal: to identify of the set of participants and external elements that the service inventory interacts with

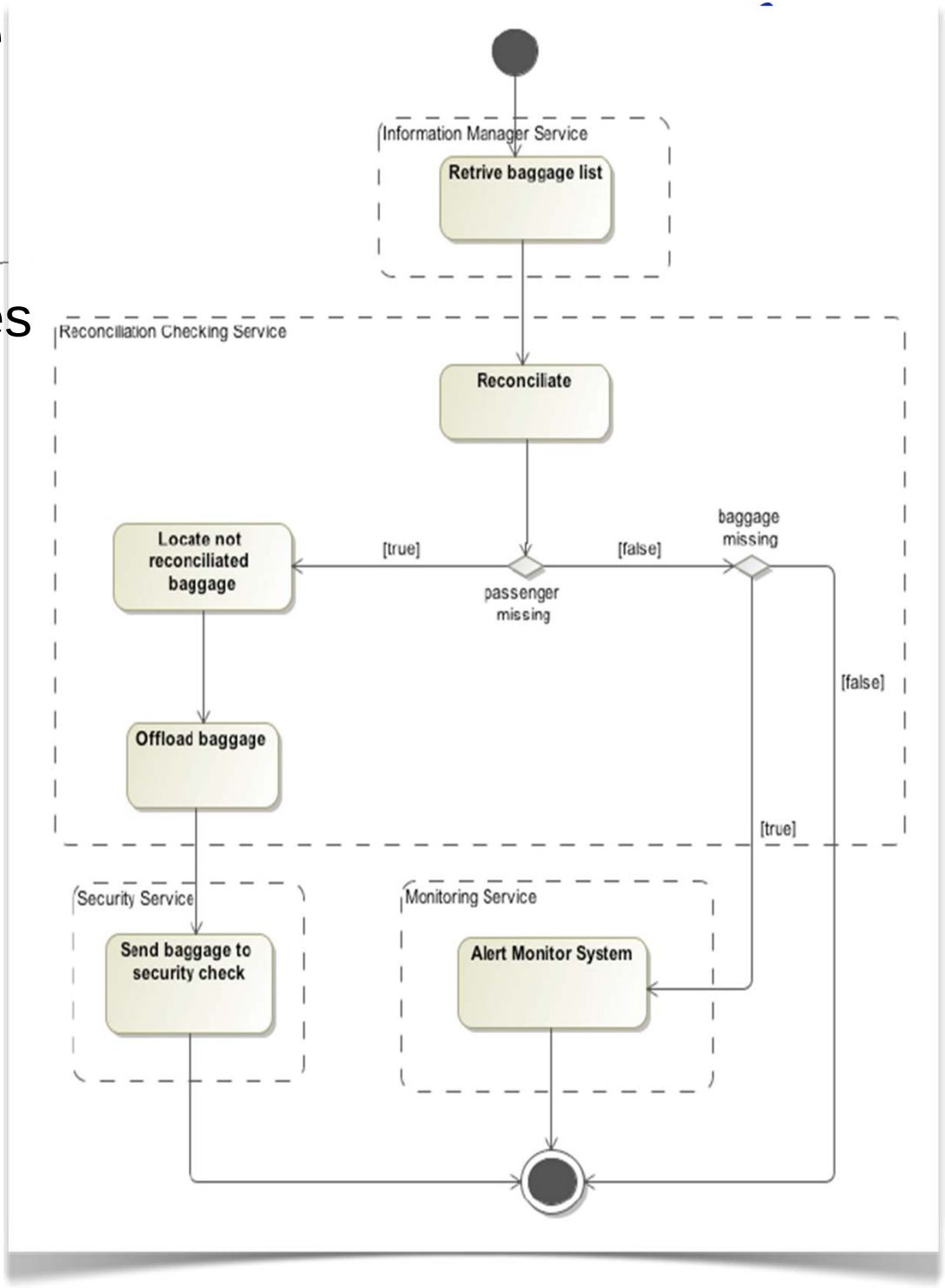
Participants: service providers, SBAs, or end-users



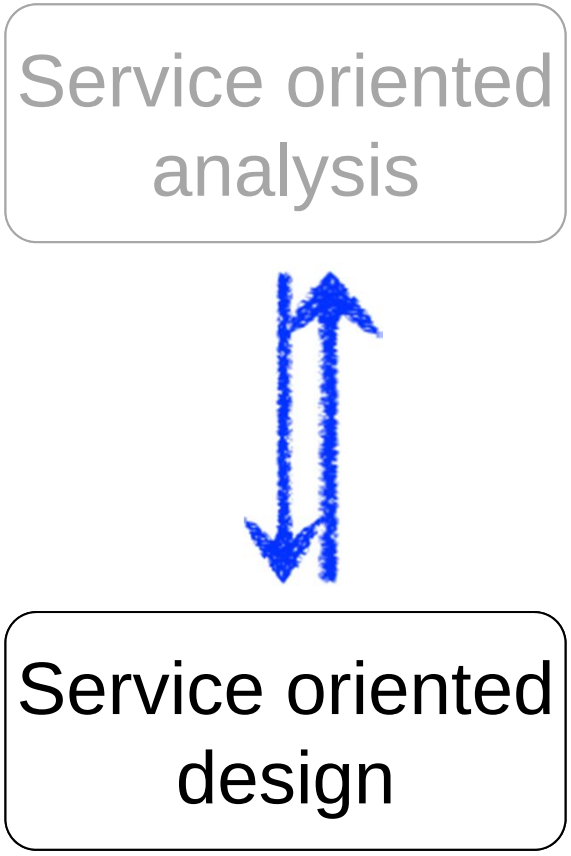
Step 3: Business Service Decomposition

Goal: to identify candidate services and their constituent service operations





Methodology and its Supporting Models



- The process of determining how business requirements can be represented through services

- The process of modeling a service inventory and/or reusing it to compose a service oriented application

Steps of SO design - overview

Step 1: Software service candidate definition

Step 2: Service inventory identification

Step 3: Service contract definition

Step 4: Service network modeling

Step 5: Service choreography modeling

Step 1: Software Service Candidate Definition

Goal: By identifying the service types the scope of reuse (i.e. domain-specific vs. domain-generic) of the services is identified.

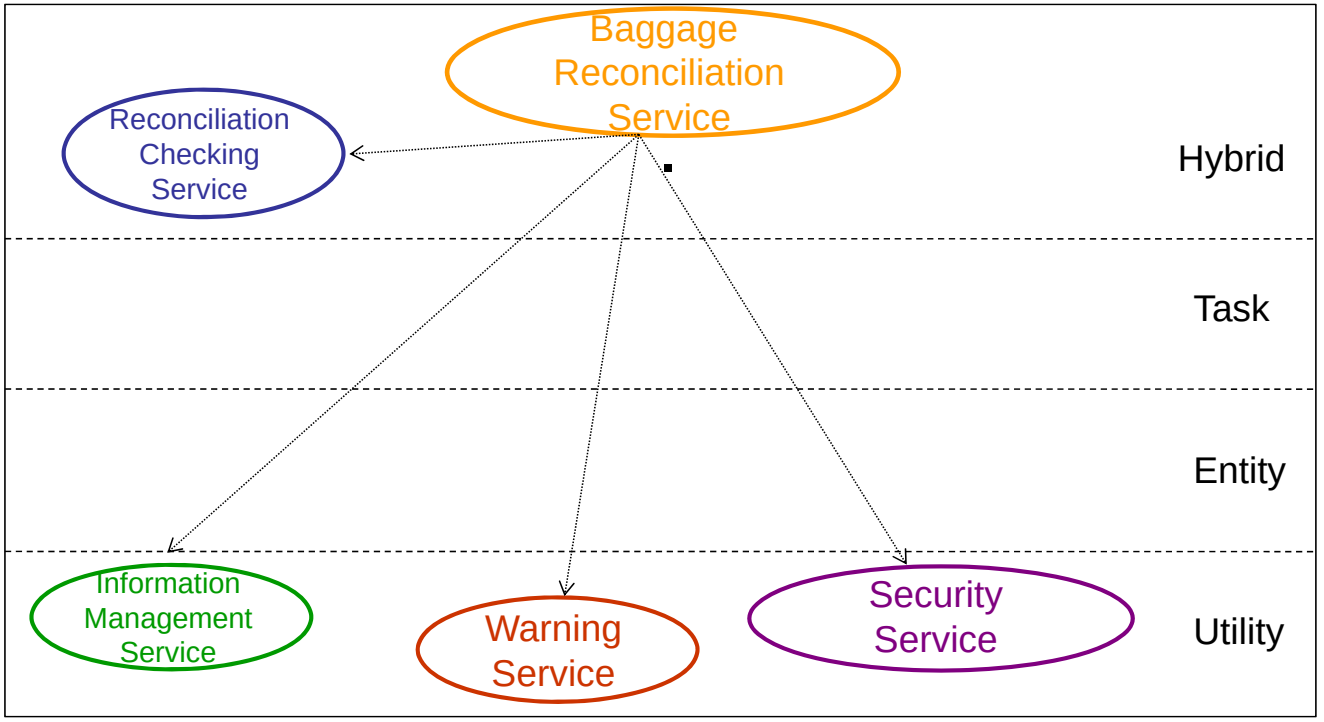
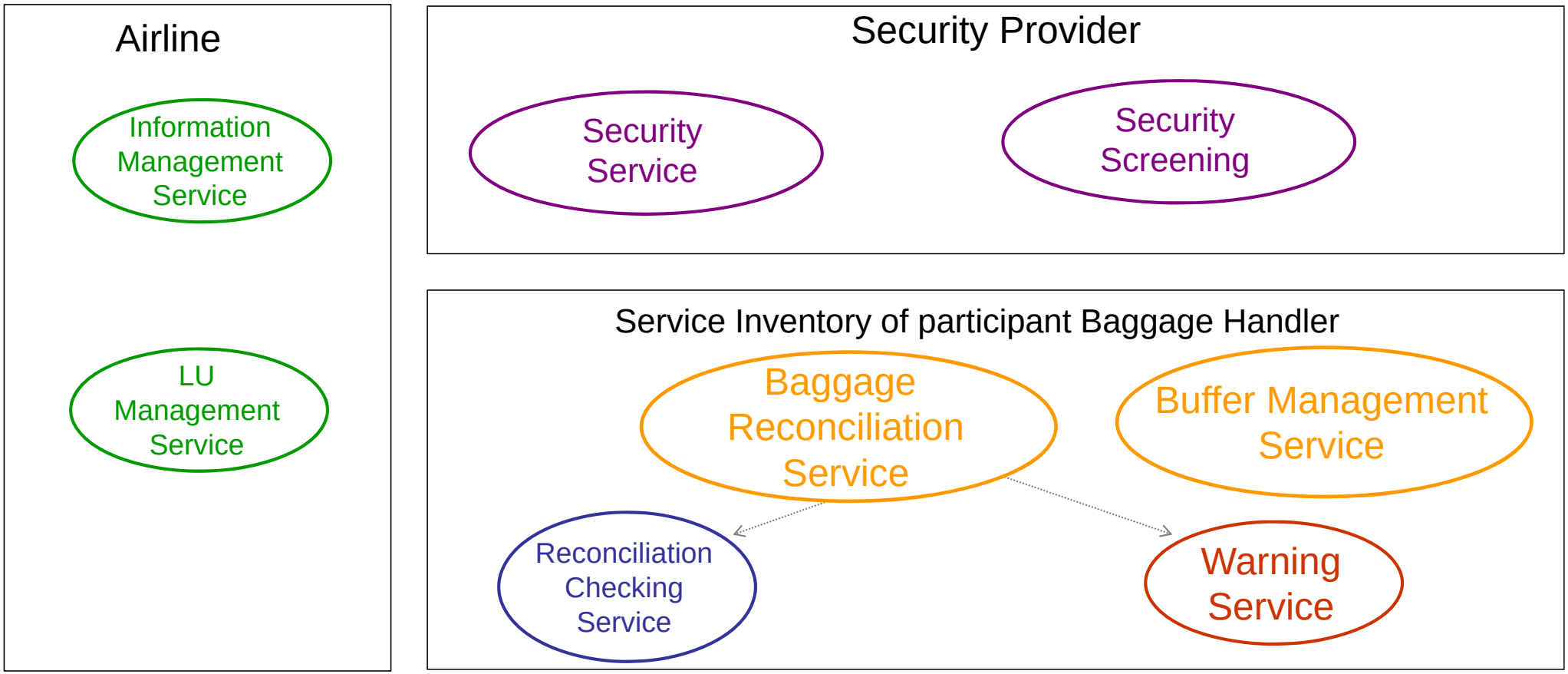


Figure 1: Decomposition of BS 'Baggage Reconciliation Service'

Step 2: Service Inventory Identification

Goal: decide which services are going to be provided by the inventories



Step 3: Service Contract Identification

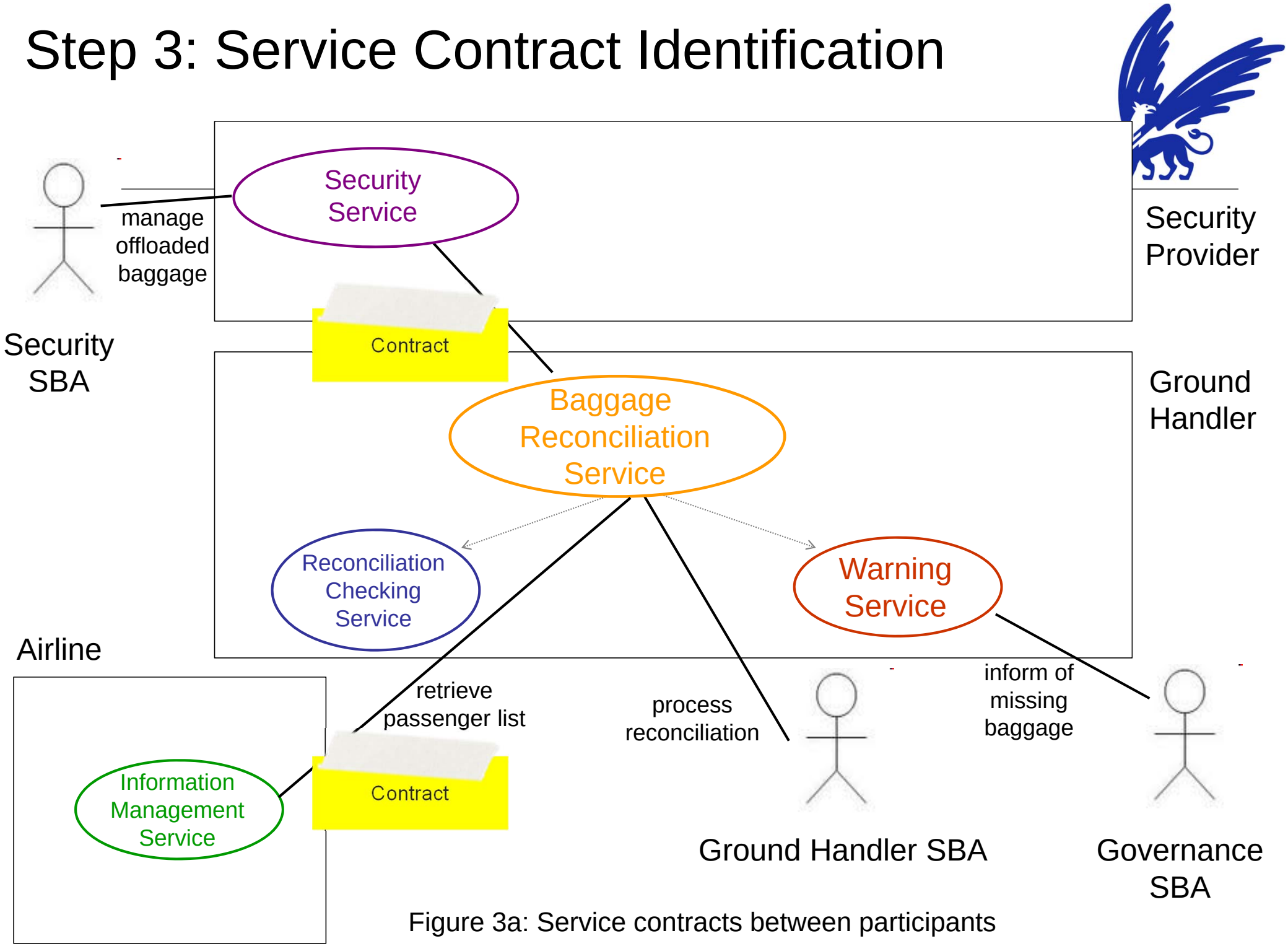
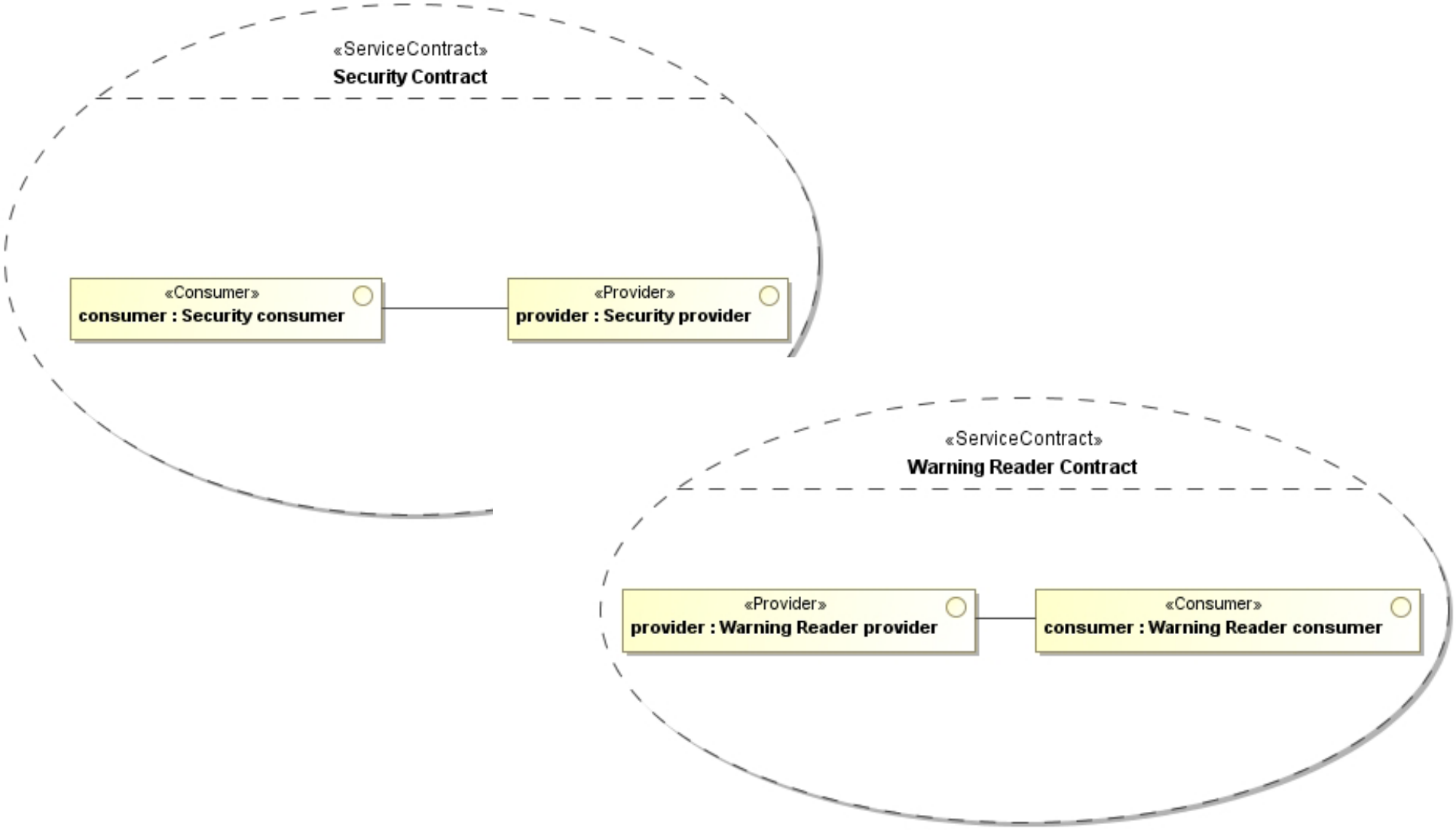


Figure 3a: Service contracts between participants

Step 3: Service Contract Identification



Step 4: Service Network Modeling

Goal: How participants work together to realize a business service

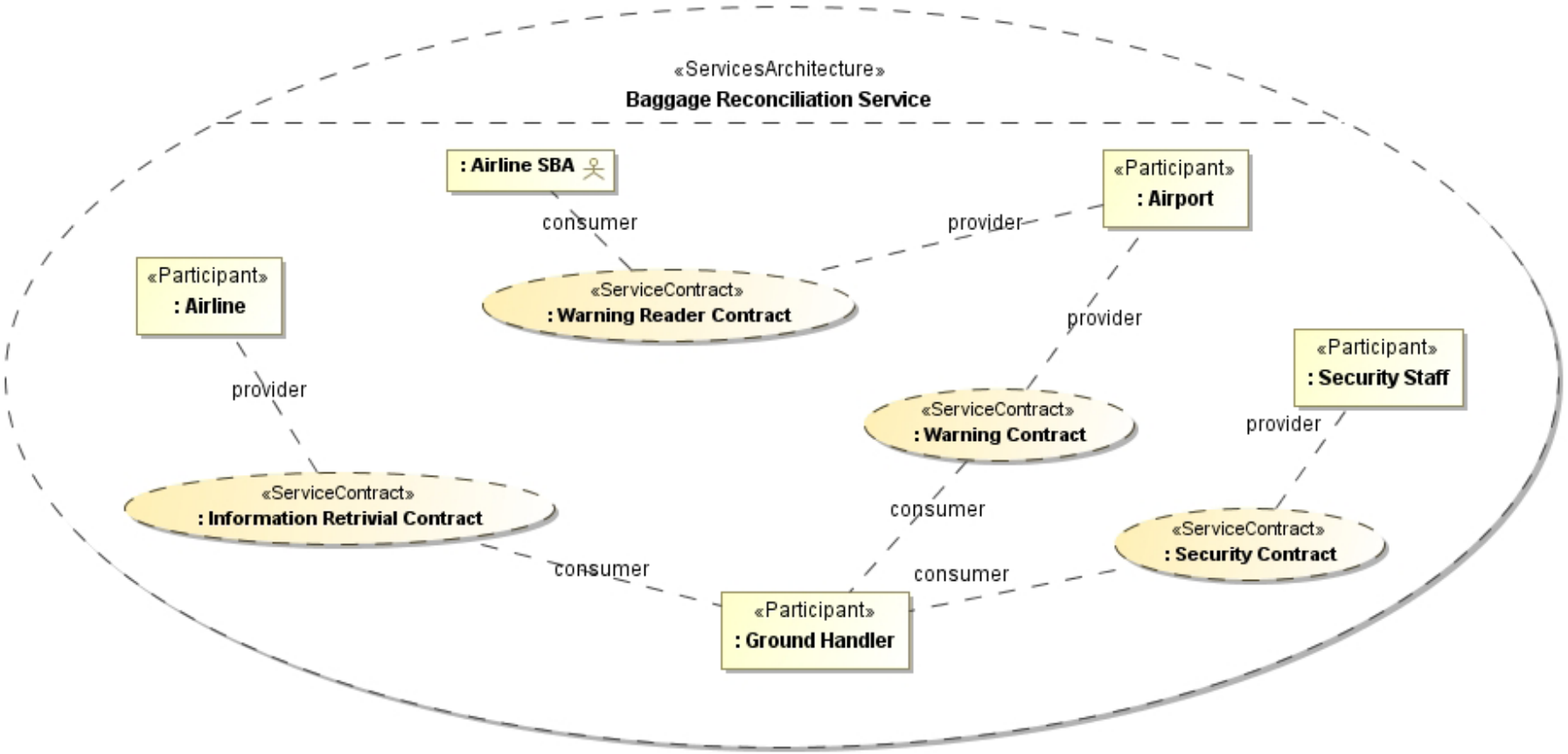
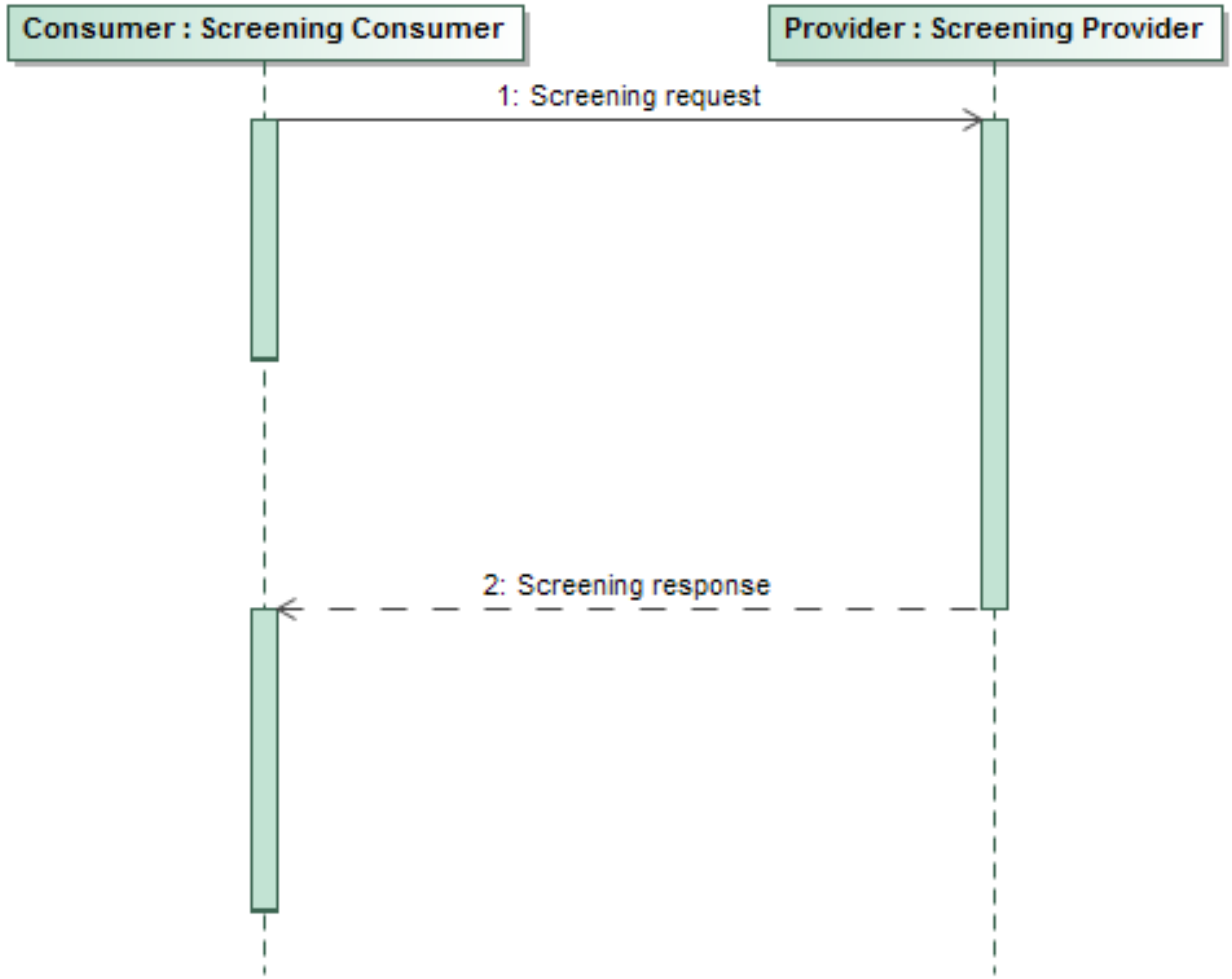


Figure 4: Services Architecture for business service Baggage Reconciliation

Step 5: Service Choreography Modeling

Goal: For each contract what is transmitted between the parties and when



Extensions to UML/SoaML

- Service Types
- Service Inventory Model
- Service Interaction Model
- Internal Service Behavior

Why yet another methodology?

1. Support the essential steps for service inventory design

- 5 years of teaching service oriented master course: students need to be trained in their reasoning
- We observed the problems they were encountering and refined the way we support them in realizing their SO design
- Focus on the reasoning steps that are left implicit

Why yet another methodology?

2. Help the reasoning by better structuring the design problem

- Extra models that bridge the gap between the `description of the artifacts' and `how to create those artifacts’
- For instance, the service interaction model helps to identify and create service contracts

Why yet another methodology?

3. Compel thinking in SO-way

- The methodology centers around first class elements of SO paradigm
  - Services
  - Inventories
  - Participants
  - Contracts

.

Why yet another methodology?

4. Support the points of view of both service provider and service consumer

- Business service driven approach : resulting services expose the right functionality with the desired **business value**
- Supports the provider in analyzing its service inventory and the existing or needed contracts with third-party providers
- Service consumer is helped in identifying , **clustering of business services** and software services and **service types**

Why yet another methodology?

5. Not limited to teaching purposes

- Industrial partners expressed interest in the method to use it for their clients migrating to CC business models.

- We are currently applying it in a 700M Euro project in the field of airlines and airports

In a nutshell …

It is simple, pragmatic, focusing on the essential steps to go from business requirements to a design blueprint

In this way, architects are compelled to think and reason in a SO way and are facilitated in better decision making.

Thank You

m.razavian@vu.nl