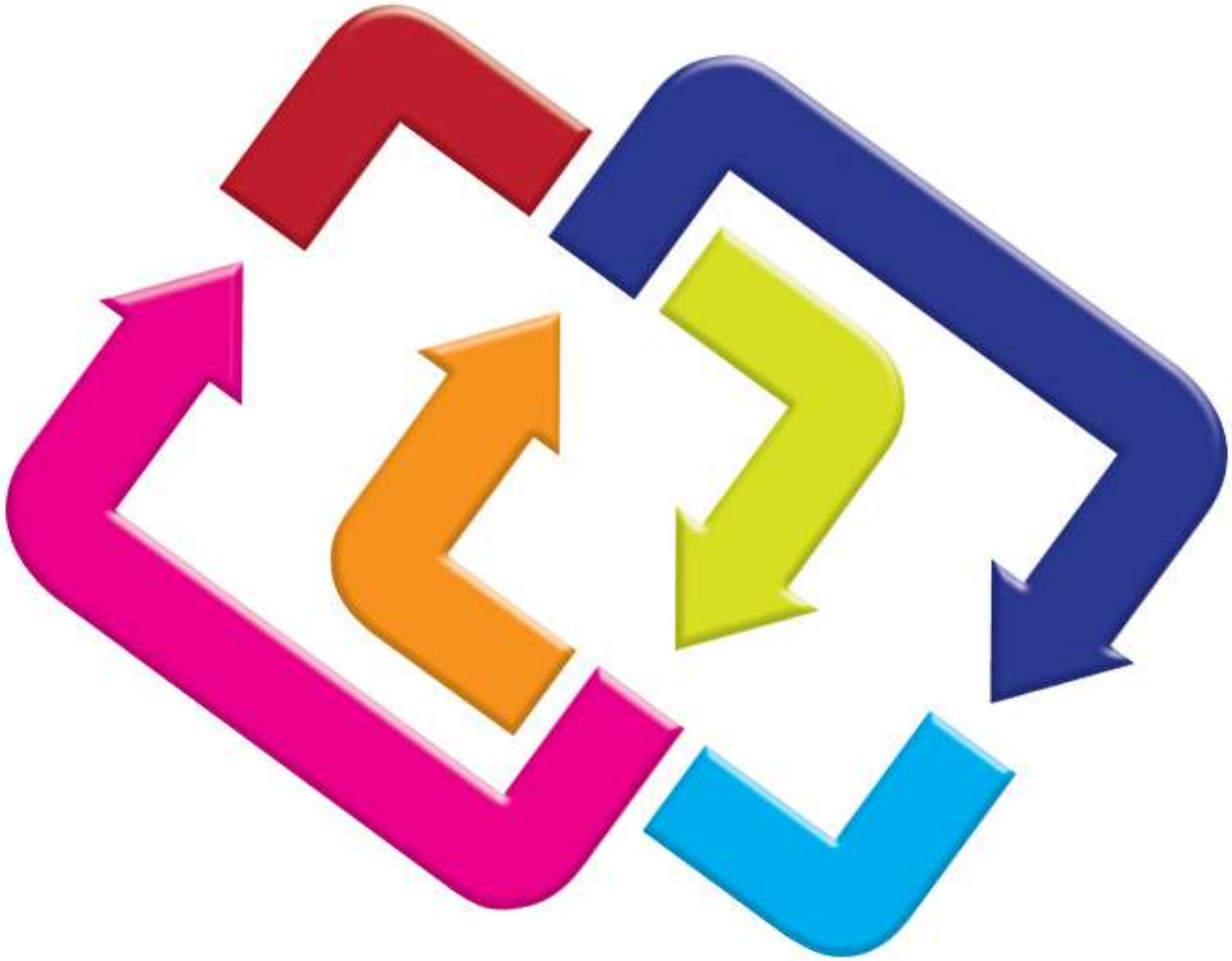

FIspace B2B
NetFutures 2015

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Moti Nisenson
IBM Research – Haifa

Overview

- High level Architecture
- Capability Model
- Overview of Event Processing Module
- Business Collaboration Module
- Testing (Experimentation)

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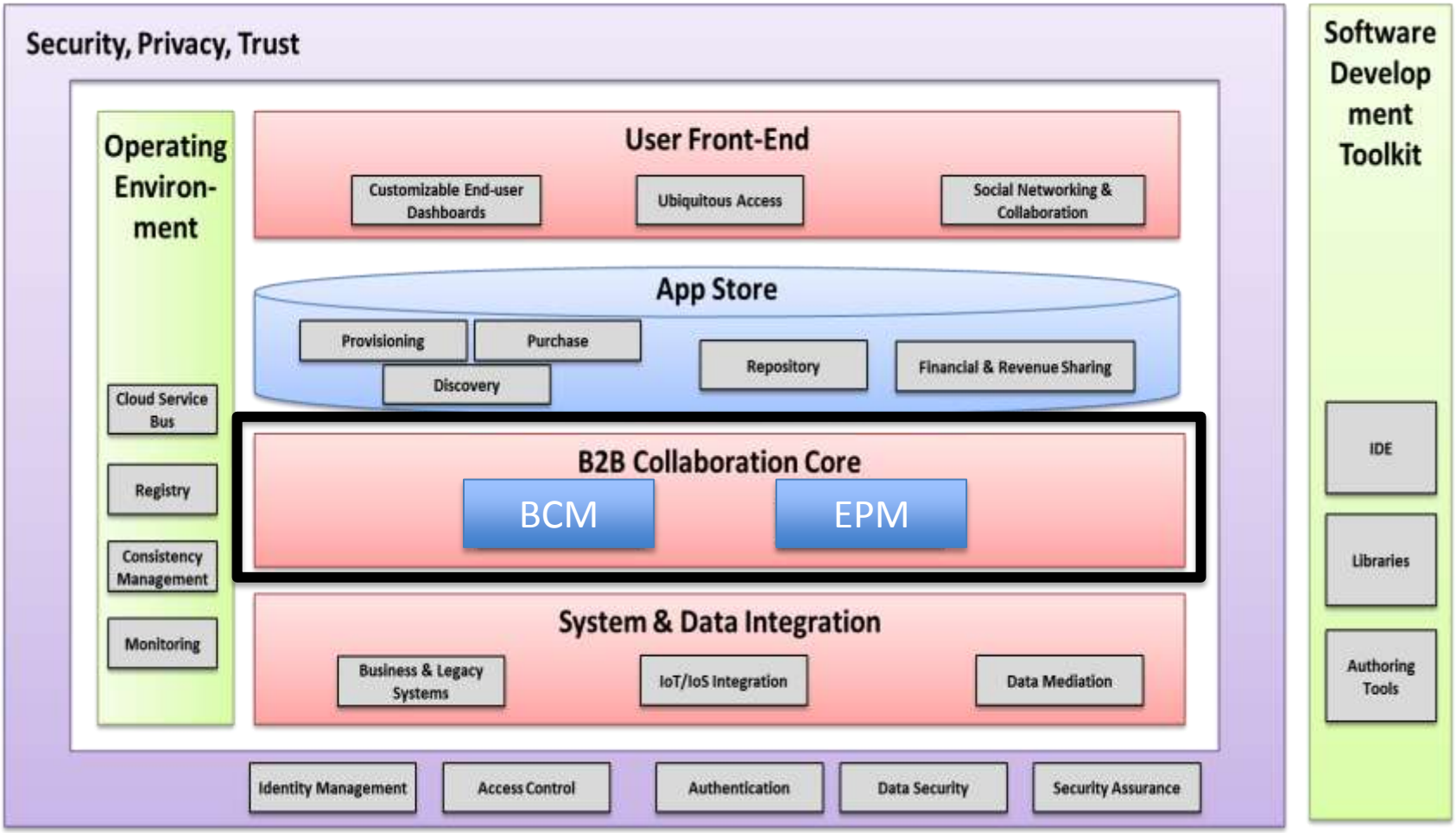
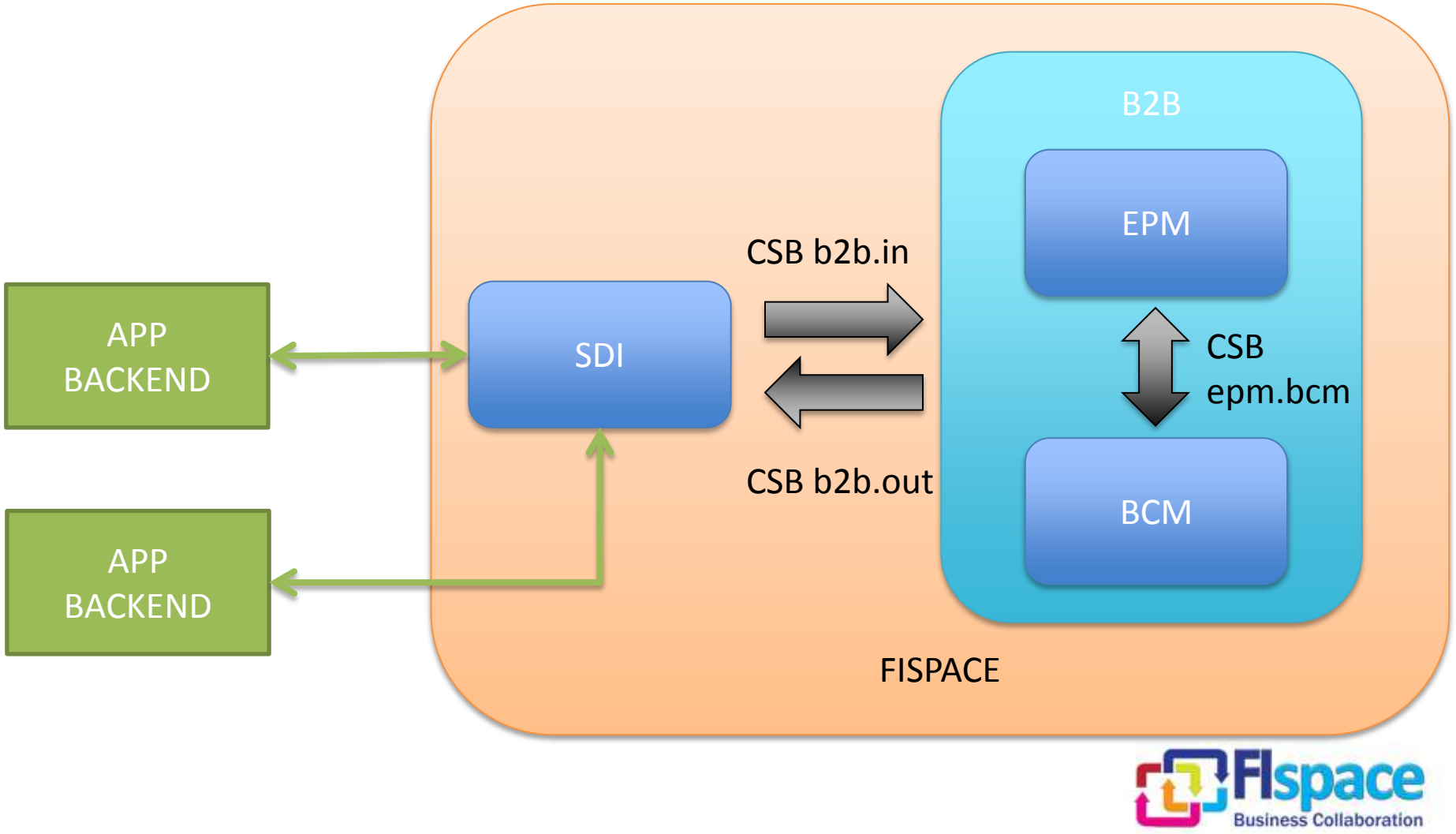
B2B Core Modules – Position in FIspace platform



High Level Runtime Architecture



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Modeling Reusable Services

- In order to facilitate **reuse**, and to enable **differentiation** between backend/application services, *capability types* are used
  - A *capability type* defines a message interface (request and response message types)
  - A *capability type* has an id
- A *capability* is a concrete instance; specifically it defines a URI end-point which implements the message interface
- Can have different implementations for the same capability type (e.g., from different companies)

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Modeling Reusable Business Processes

- A *business process template* (*BPT)* is used to describe the collaboration between several *capability types*
- It is implemented in B2B; this is a specification of what to do when receiving different messages (e.g., forward to a capability type)
- A *business process* specifies the actual *capabilities* participating in a collaboration
- Each *business process* has its own runtime state, but they share the same logic at the *BPT* level

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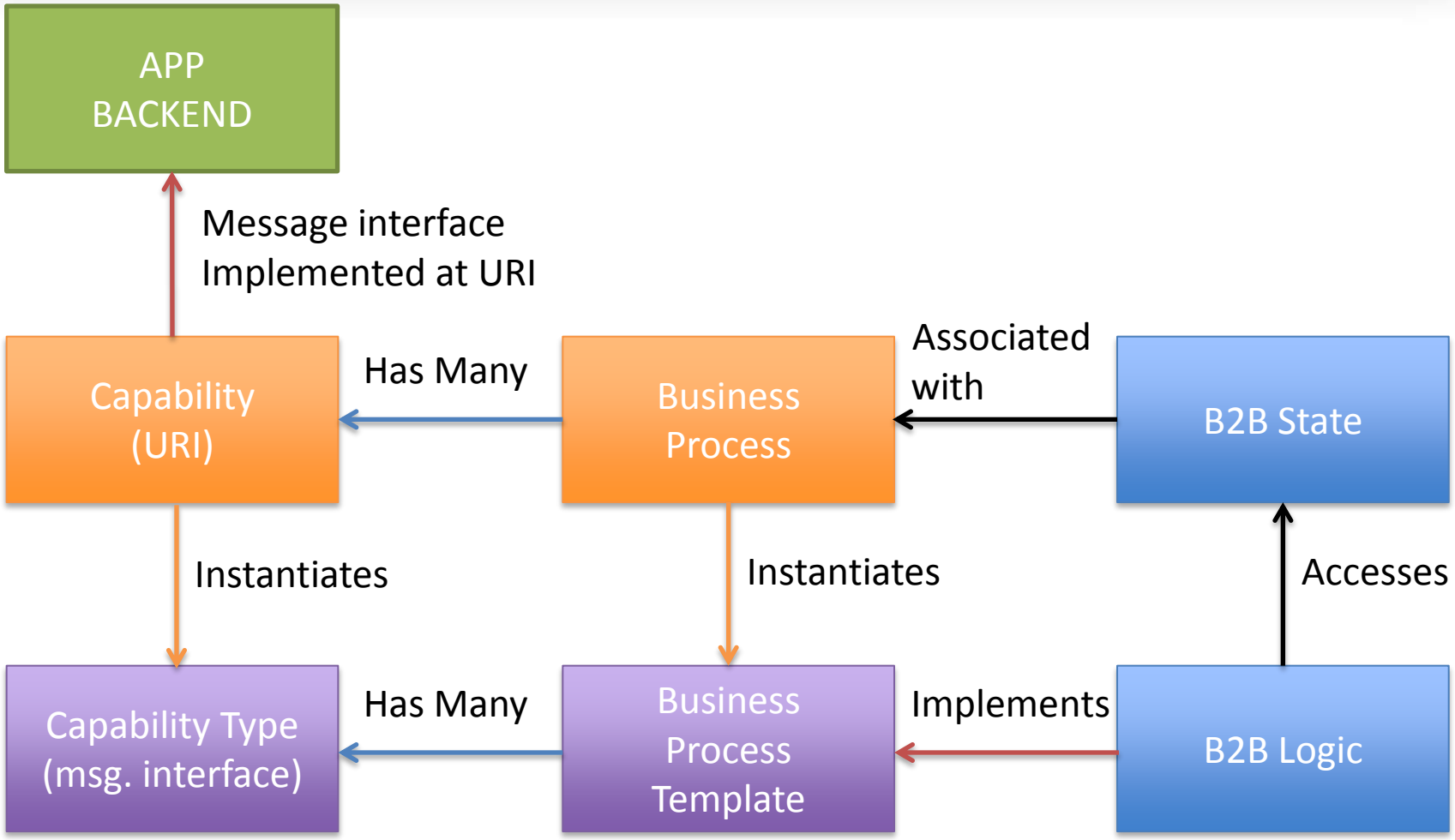
Capabilities – Business Processes – B2B



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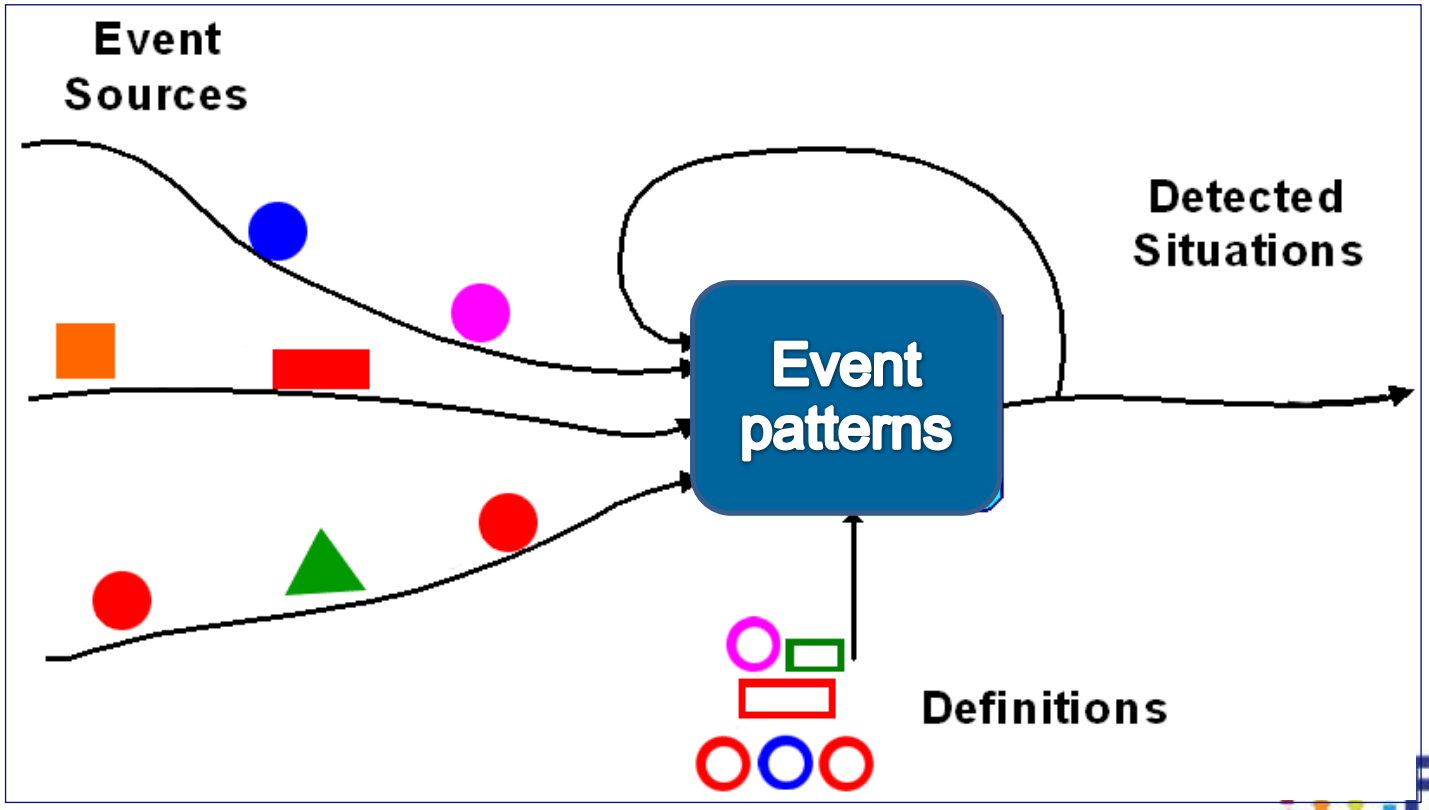
Event Processing Module (EPM) – What is event processing?

Event processing is a form of computing that performs operations on **events**

Example of a situation: A temperature increase trend in a container is detected whenever the temperature in the permitted range constantly increases within the last 5 minutes



Event Processing Module Quick Overview

- EPM is based on Proton, the FIWARE Complex-Event Processing GE
- EPM is used for “pattern detection” – examples:
  - Detect when a sensor value first passes a threshold
  - Warn if the contents of a truck are getting warmer over time
  - If a shipment hasn’t arrived within 3 days, then take some action
- Often, the action will involve communicating with BCM which handles the collaboration (such as notifying the responsible system)

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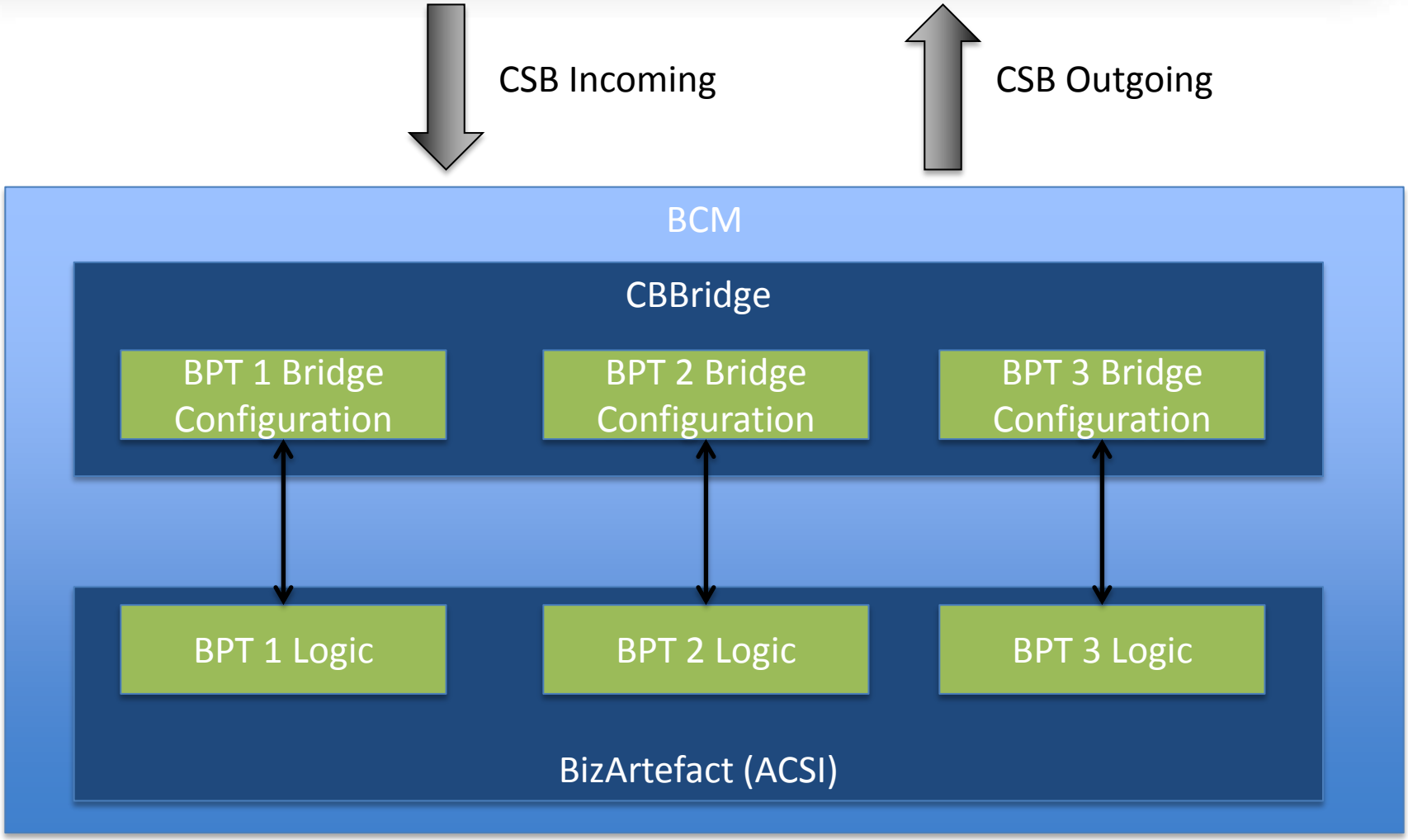
Business Collaboration Module Architecture



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BCM Concepts

- Business Entity
  - Represents a concept with relevance for the execution of the business process (e.g., Shipment, Order)
  - This defines state and logic (like a class in OO)
  - During runtime, instances are created by the bridge
- Events
  - Incoming messages which logic handles
- Lifecycle
  - The implementation of the logic
- External Services
  - What capability types should messages be sent to?

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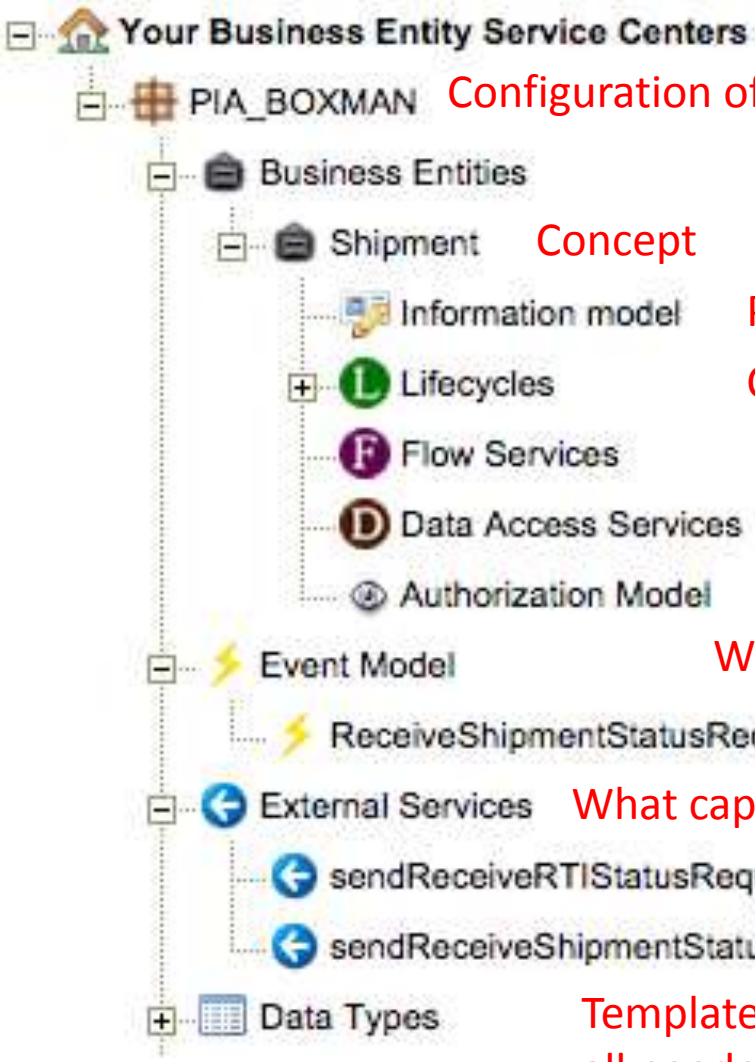
ACSI Configuration



Configuration of BCM Runtime State and Logic for a BPT

Concept

Per instance state

Common Logic

Which incoming messages are handled?

What capability types are messages sent out to?

Templates provide the definitions of all needed data types for each domain

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What is GSM? (I)

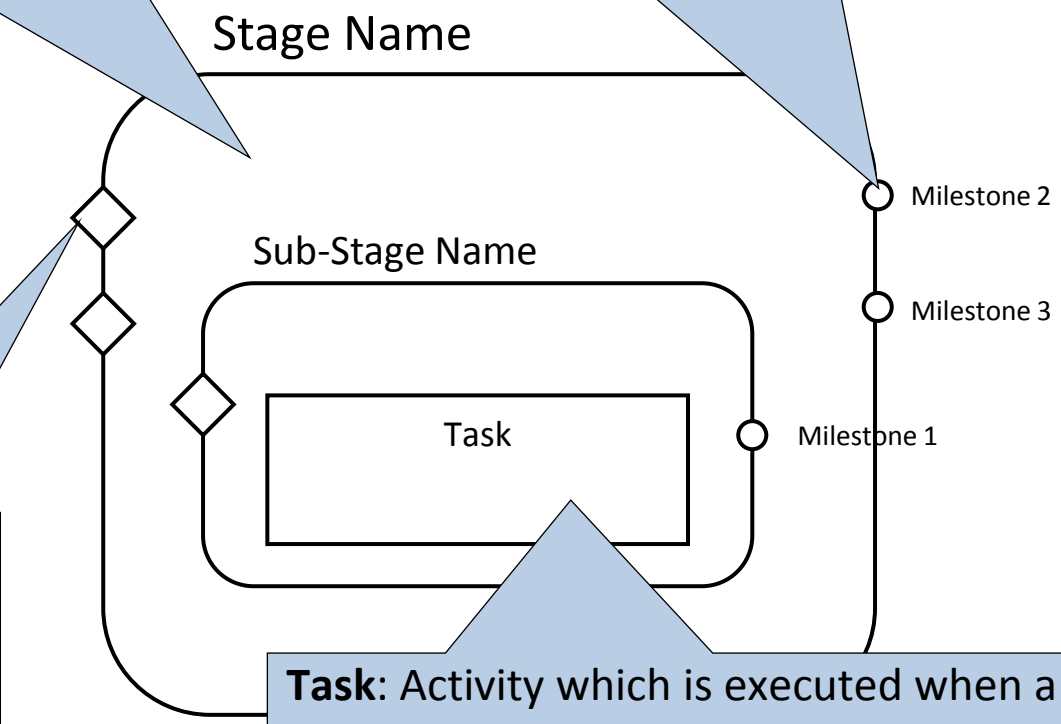
- GSM is a declarative language for describing data driven workflows
- Elements:
  - Guards
  - Stages
  - Milestones
  - Tasks

What is GSM? (II)

Stage: Cluster of activity intended to achieve milestones. Stages can contain sub-stages.

Substages can only become active if the parent stage is active.

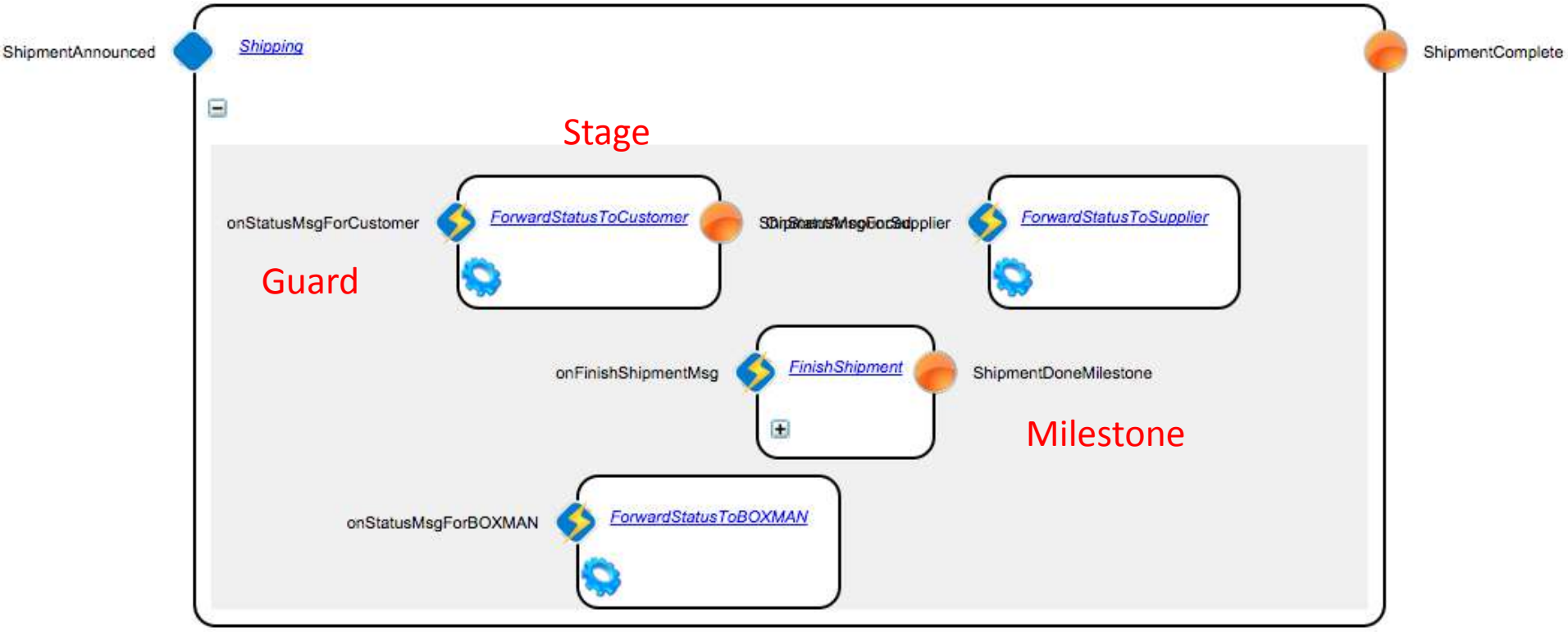
Milestones: Correspond to business relevant objectives and can be achieved from an active stage



Guards: Define conditions under which the stage can become active

Task: Activity which is executed when a stage becomes active. Can be implemented by a service call to a external system.

Example Lifecycle



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GSM Model – Common Cases for FIspace

- Guards:
  - When we receive event of type X containing specific data
  - Require that a milestone has already been achieved
- Tasks:
  - Update state (e.g., save data from a message for later)
  - Invoke an external service (e.g., send a message to a capability type)
- Milestones:
  - Require that certain sub-stage milestones have already been achieved

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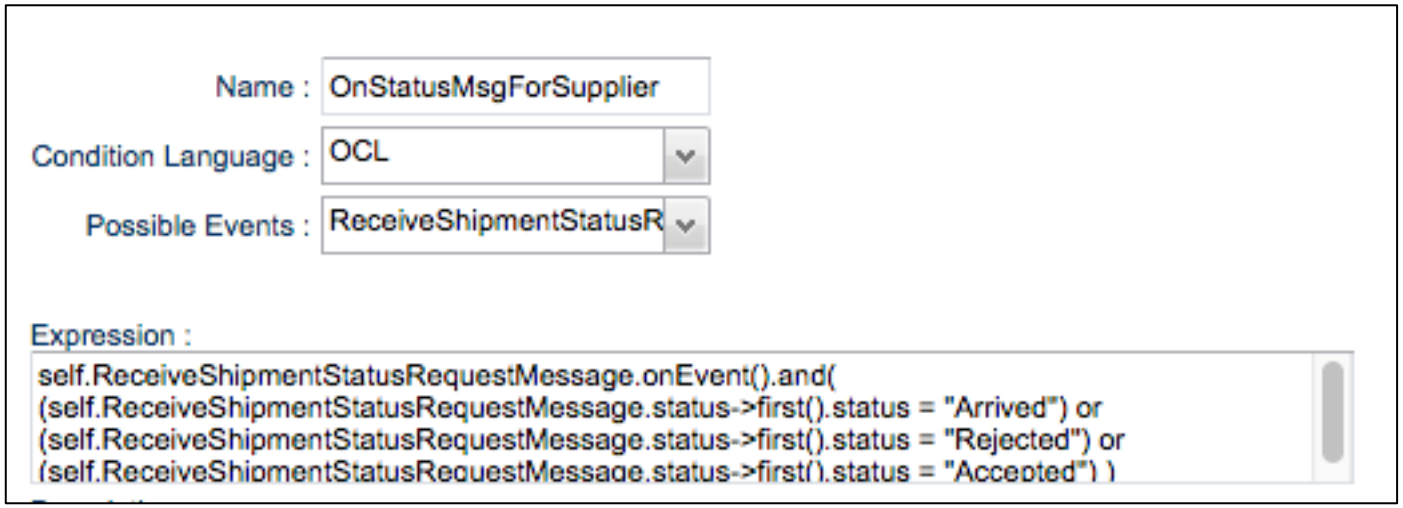
Example: Message Forwarding

Guard: When we receive a ReceiveShipmentStatusRequestMessage whose status is Arrived, Rejected or Accepted



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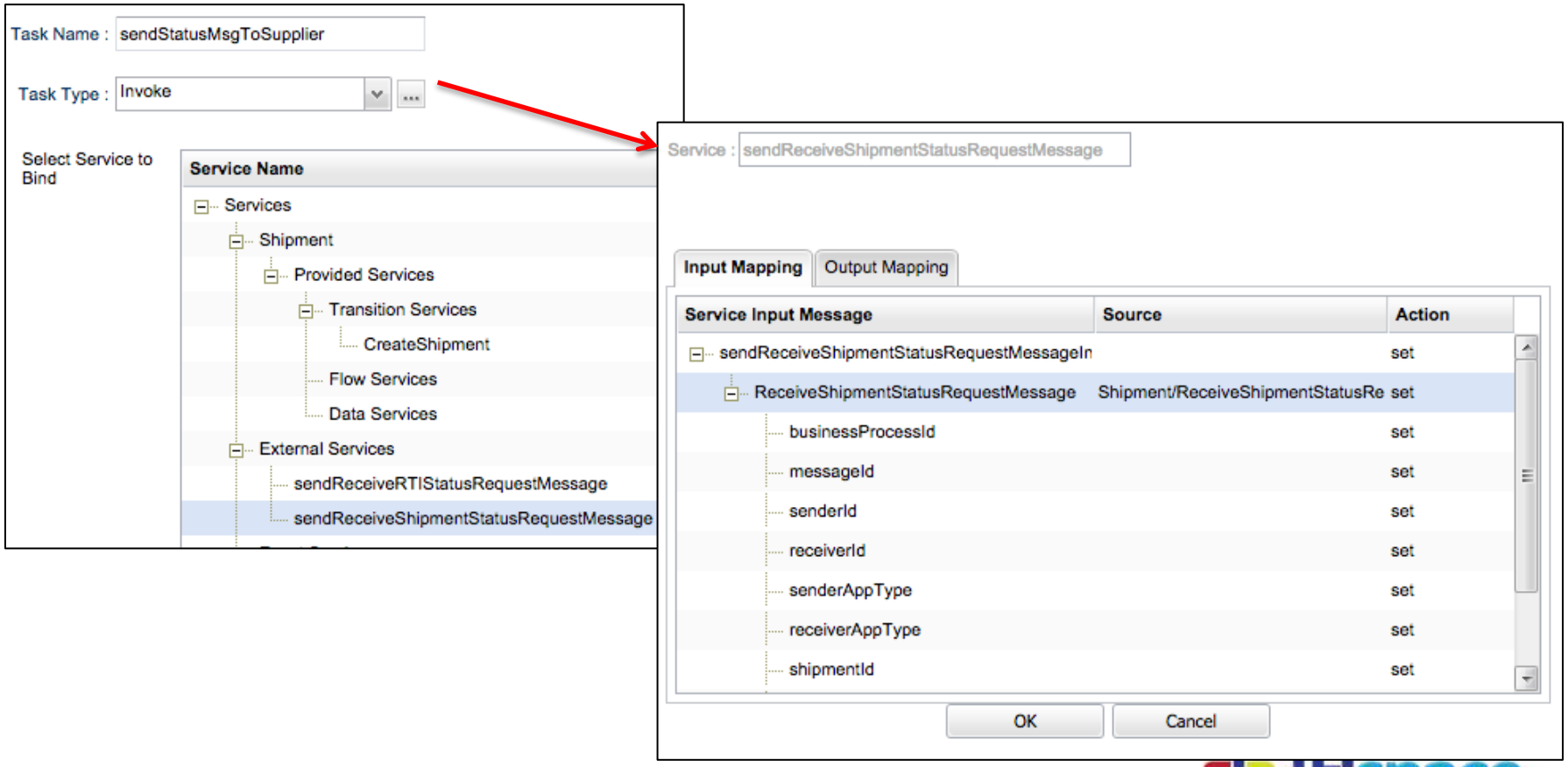
Example: Message Forwarding

Task: Forward the received message

The definition of the external service includes the destination capability type id



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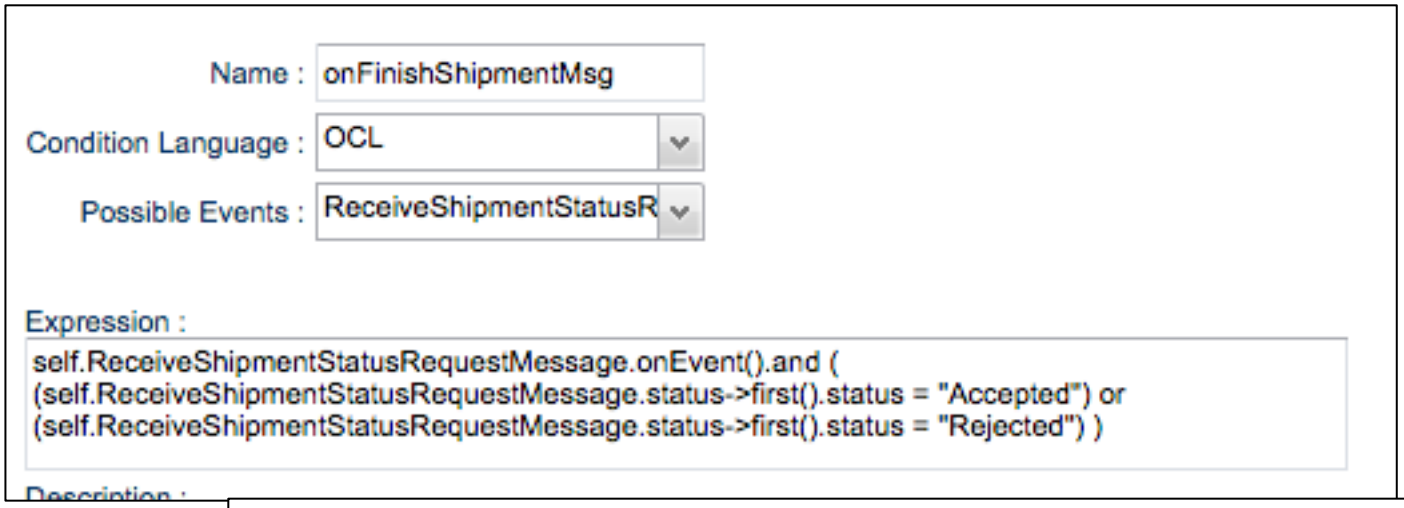
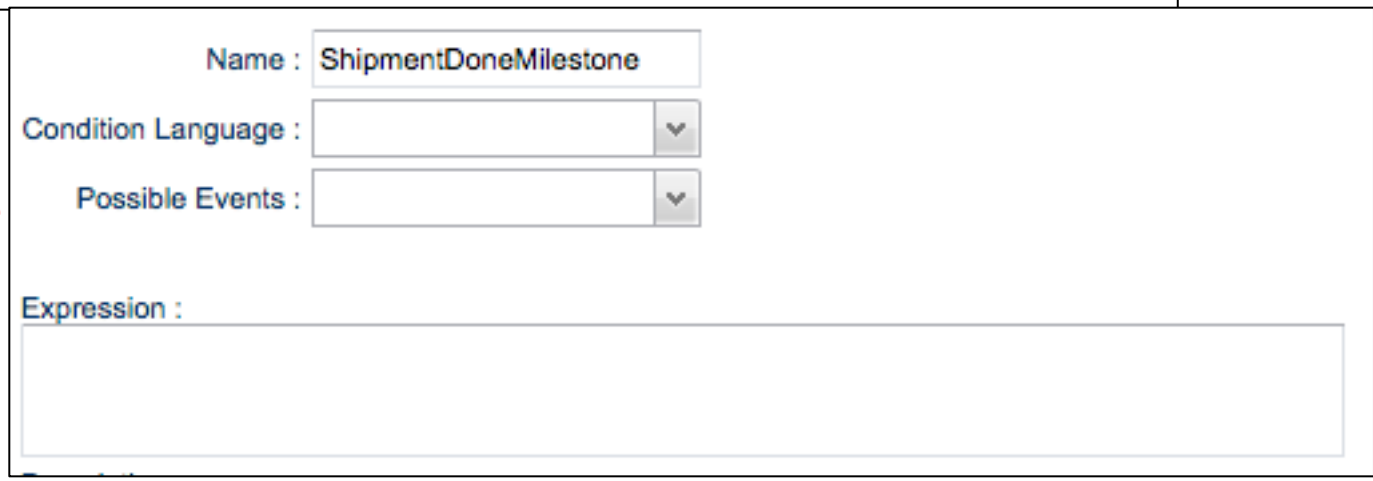
Example: Completing Stages

Guard: When we receive a ReceiveShipmentStatusRequestMessage whose status is Accepted or Rejected



Milestone:
Always set the ShipmentDoneMilestone to true



Correlation Keys

- A *correlation key* is how B2B knows which state to access
- The *correlation key* is built from fields in the messages and should always include the *business process id*
- It can also include further information; in our shipment example, it is <*business process id, shipment id*> - this allows to have separate state for each shipment

BCM Basic Testing

- Within the authoring tool can create Business Entity instances and can simulate sending messages
- This allows testing by checking what stages are active, what tasks get run, and how the state is updated
- When done authoring, can download as a zip and then deploy to a runtime environment

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Advanced Testing – Experiments (Quick Overview)

- FIspace includes Experimentation tooling
- This allows to define Experiments, which include specific steps to be taken (in actual applications), and executes with the actual platform
- The tooling support simulating different apps and systems so tests can be performed in isolation
- KPIs are also gathered during execution

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Questions….

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Backup Slides

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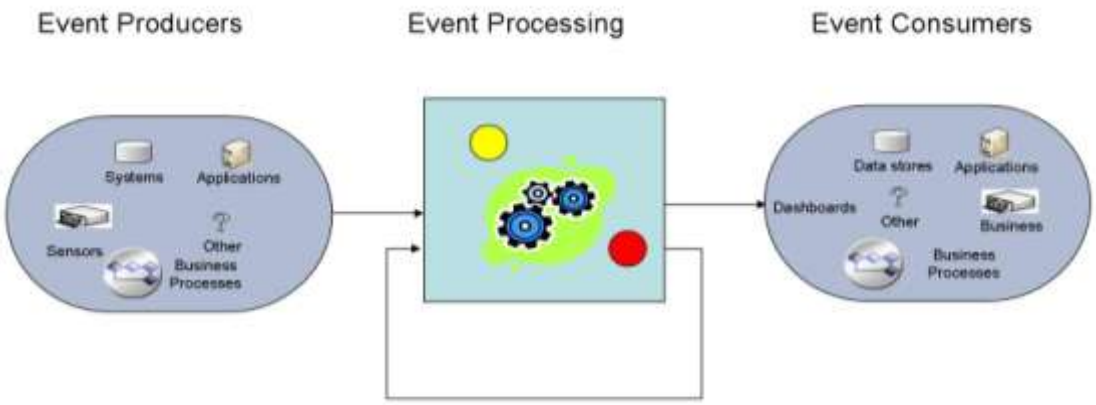
Event Processing Module (EPM)

- Based on the notion of an Event Processing Network (EPN)
  - Collection of Event Processing Agents (EPAs)
  - Collection of Producers
  - Collection of Consumers



Example: Greenhouse scenario

Sensor events are received in the EPM that checks whether all the sensor values are in the permitted range. It emits a notification alert whenever

At least one of the sensor values is not in the permitted range and there is no pending Advice for the specific (farmID and cropID)

Allowed sensor values:

10 ≤ temperature ≤ 33

5 ≤ luminosity ≤ 40

50 ≤ airHumidity ≤ 80

5 ≤ PH ≤ 7

1.5 ≤ EC ≤ 3.5

60 ≤ soilMoisture 90

200 ≤ CO2 ≤ 1000