Indian Health Service

Business Process Model and Notation (BPMN) 2.0: An Introductory Overview

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Session Objectives

This session aims to create an awareness of Business Process Modeling and Notation (BPMN)

Topics covered:
◦ What is Modeling?
◦ What is BPMN?
◦ How to is BPMN used?
◦ Introduce the visual notation.

Learning Objectives

At the end of this session, attendees will:
◦ Identify a BPMN model instance.
◦ Have a basic understanding of how to read a BPMN model instance.

This is not a BPMN or Modeling tutorial, nor a complete description of the entire language.

A Few Definitions

BPM – Business Process Management

◦ A discipline that uses various methods to discover, model, analyze, measure, improve and optimize business processes

BPMN – Business Process Modeling & Notation

◦ A specific visual process modeling language, built on open standards published by the Object Management Group (OMG)

WRAP – Workflow Research and Alignment Plan

◦ The IHS "brand" for how we are using BPM/BPMN to understand, document, and socialize our shared best practices in clinical and administrative areas in preparation for health IT modernization

The WRAP Project in IHS

- IHS has a lot of divergence in common processes because RPMS is highly configurable

- Transition to a new system will be smoother if current processes are well understood and aligned

- Develop a series of business process diagrams that describe preferred workflows for a variety of common, critical, and high-risk processes

- Use these workflows to inform configuration of current systems, even before migration to new EHR
    - Compliance with RPMS standardization could be a selection factor for migration

- Use these diagrams to inform change management, training, and configuration of the new systems

- Experience gained doing process modeling can be leveraged further to model more cognitive workflows, e.g. clinical decision support

Prioritization and Categorization of Process Models

Models are prioritized based on 4 distinct criteria, and categorized into 22 service lines, of which 16 are in progress
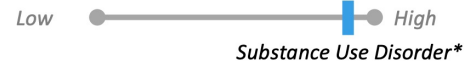
Criteria for Prioritizing BPM Process Models (via Service Lines)

1 Core Functionality

Low ———————●———|——— High
Hospitalization*

- Essential service to the organization?
- Apart of the core business operations?
- Necessary to fulfill mission?

2 Uniqueness to IHS

Low ———————●———|——— High
Substance Use Disorder*

- Specialized program or focus area?
- Special configuration required in the EHR?

3 Volume

Low ———|———————●——— High
Community Health Aide*

- Number of patients impacted?
- Processes that consume staff time?
- Frequently performed procedures or services?

4 High Risk

Low ———————————|●——— High
Medication Management*

- Potential for harm to patient or impact to business operations?
- Increase of incidents or errors?
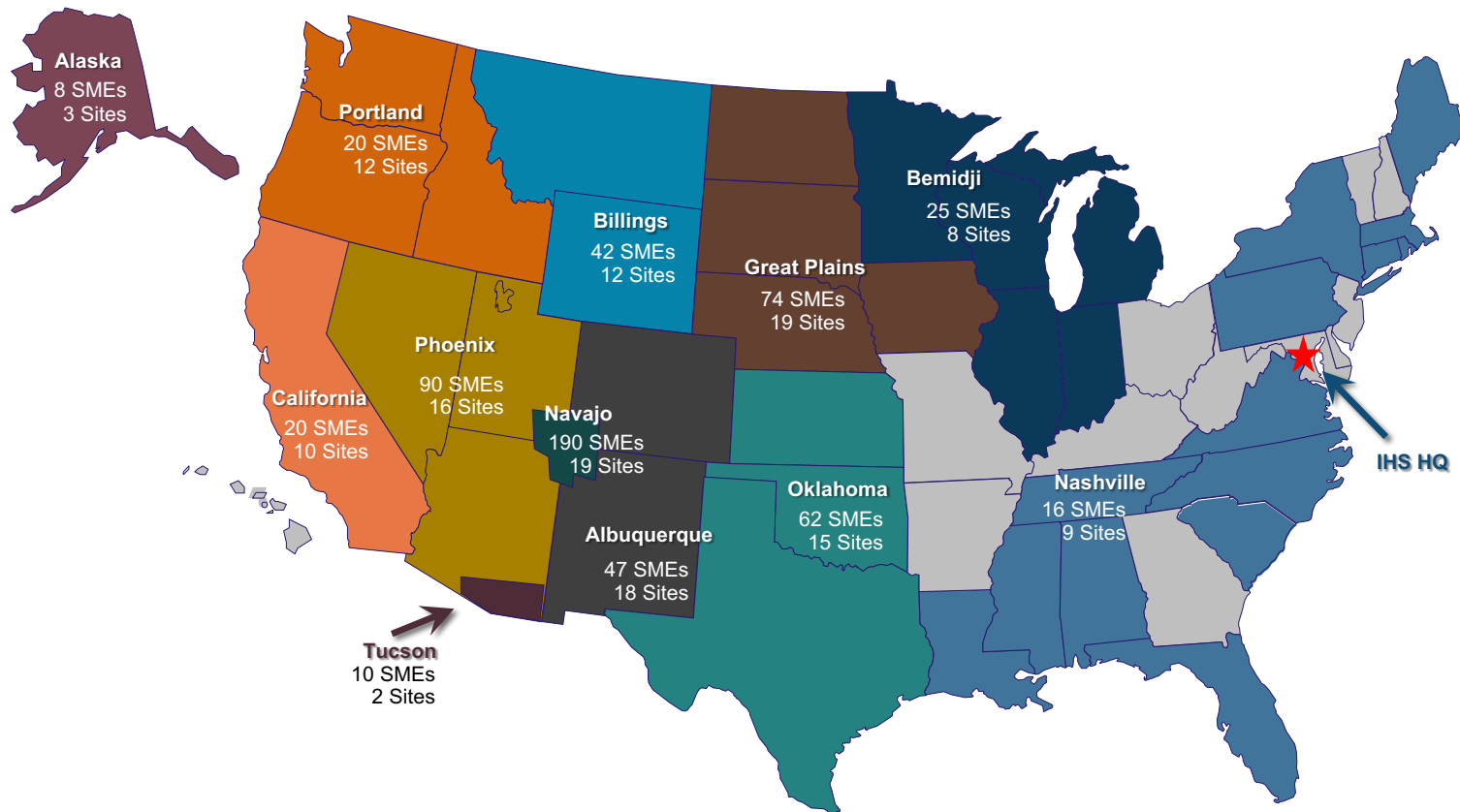- Complexity of service?

Total Service Lines

22

- 10 — 8 in progress
- 8 — 6 in progress
- 4 — 2 in progress

- **Emergency Department***
- **Hospitalization***
- **Labor Delivery Recovery Postpartum***
- **Primary Care***
- **Residential Treatment Centers***
- Swing Beds
- **Substance Use Disorder***
- **Surgery***
- **Telemedicine***
- Urgent Care

Support Services

- **Community Health Aide Program***
- **Employee Health***
- Imaging
- **Laboratory***
- **Medication Management and Administration***
- **Nutrition***
- **PAMPI***
- Referral Management

Business Services

- Population Health
- **Public Health***
- Reporting
- **Revenue Cycle Management***

WRAP by the Numbers

WRAP-related engagement with I/T/U SMEs across the country has been strong and steady

As of August 1, 2023

Alaska
8 SMEs
3 Sites

Portland
20 SMEs
12 Sites

Billings
42 SMEs
12 Sites

Bemidji
25 SMEs
8 Sites

Great Plains
74 SMEs
19 Sites

Phoenix
90 SMEs
16 Sites

California
20 SMEs
10 Sites

Navajo
190 SMEs
19 Sites

Oklahoma
62 SMEs
15 Sites

Nashville
16 SMEs
9 Sites

Albuquerque
47 SMEs
18 Sites

Tucson
10 SMEs
2 Sites

IHS HQ

201 — WRAP Work - Sessions held between Sept. 2021 and July 2023

22 — Service Lines

12 — Areas Participating plus IHS HQ)

204 — Sites of Care Participating (Station, Center, Clinic, Hospital)

1300+ — Unique SMEs Participating

5300+ — Participant Encounters

6

WRAP Summary

80 Process Models Identified

~ 68% models in progress
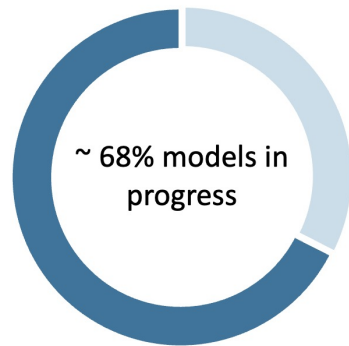
- In progress
- Not Started

NUMBER OF MODELS IN PHASE

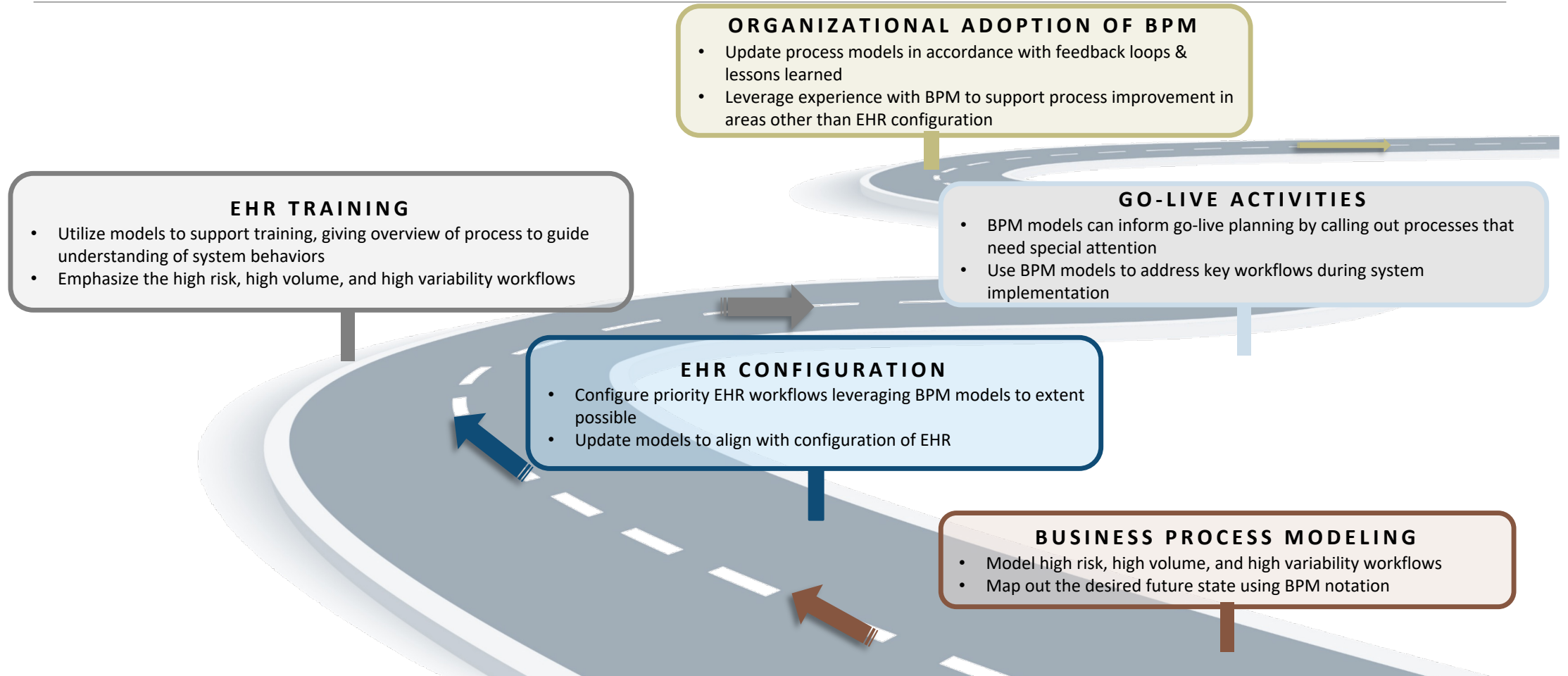| Phase	Number
Environmental Scan	21
Conceptual	5
Design and Decide	28
Quality Review	15
Approval	11
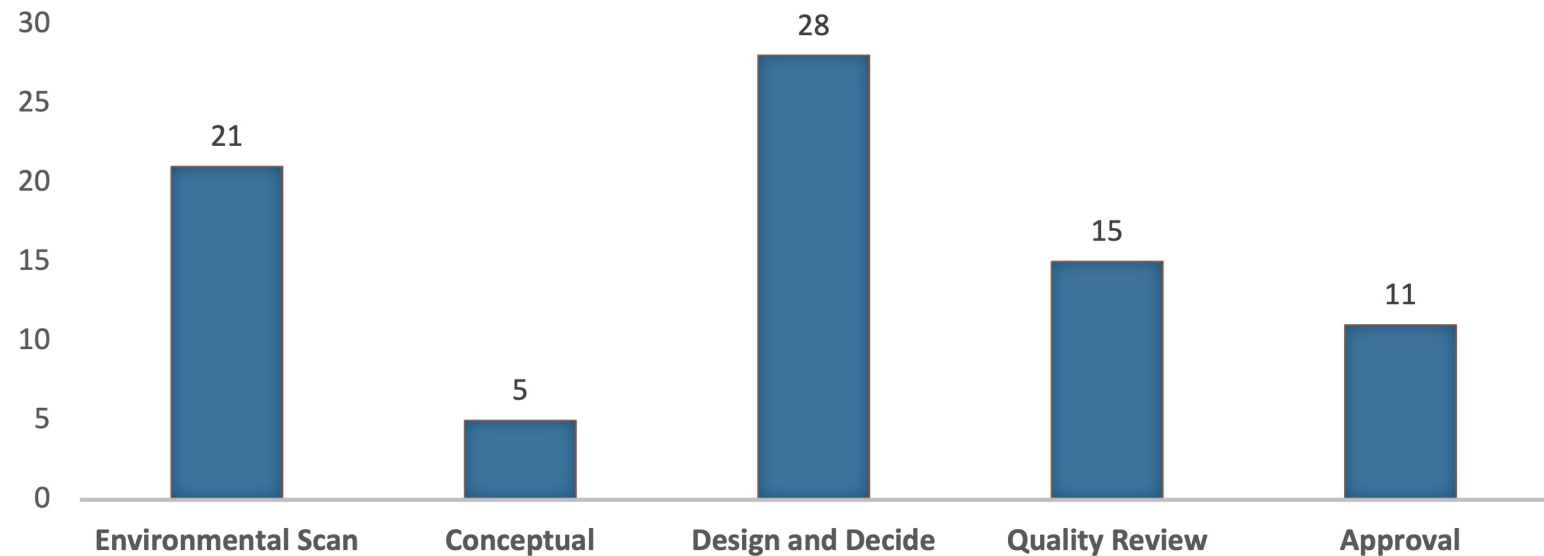
The Path Ahead with WRAP

*WRAP lays the groundwork for configuration, training, implementation, and optimization of the new EHR*

ORGANIZATIONAL ADOPTION OF BPM
- Update process models in accordance with feedback loops & lessons learned
- Leverage experience with BPM to support process improvement in areas other than EHR configuration

EHR TRAINING
- Utilize models to support training, giving overview of process to guide understanding of system behaviors
- Emphasize the high risk, high volume, and high variability workflows

GO-LIVE ACTIVITIES
- BPM models can inform go-live planning by calling out processes that need special attention
- Use BPM models to address key workflows during system implementation

EHR CONFIGURATION
- Configure priority EHR workflows leveraging BPM models to extent possible
- Update models to align with configuration of EHR

BUSINESS PROCESS MODELING
- Model high risk, high volume, and high variability workflows
- Map out the desired future state using BPM notation

Why This Presentation?

- WRAP will be very important in preparing for health IT modernization, but . . . .

- Business Process Modeling isn't specific to clinical processes

- BPM can be a tool for translating ambiguous written process documents (e.g., policies/procedures), or processes with no documentation into models that are:
  - Visually accessible
  - Unambiguous
  - Sharable

- Many have shown an interest in what is going on with WRAP, so we thought we could go into a little more depth for those who want to learn more . . . enjoy

BPMN Discussion

ROBERT LARIO, PH.D., MSE, MBA
IHS BUSINESS PROCESS MODELING CONSULTANT
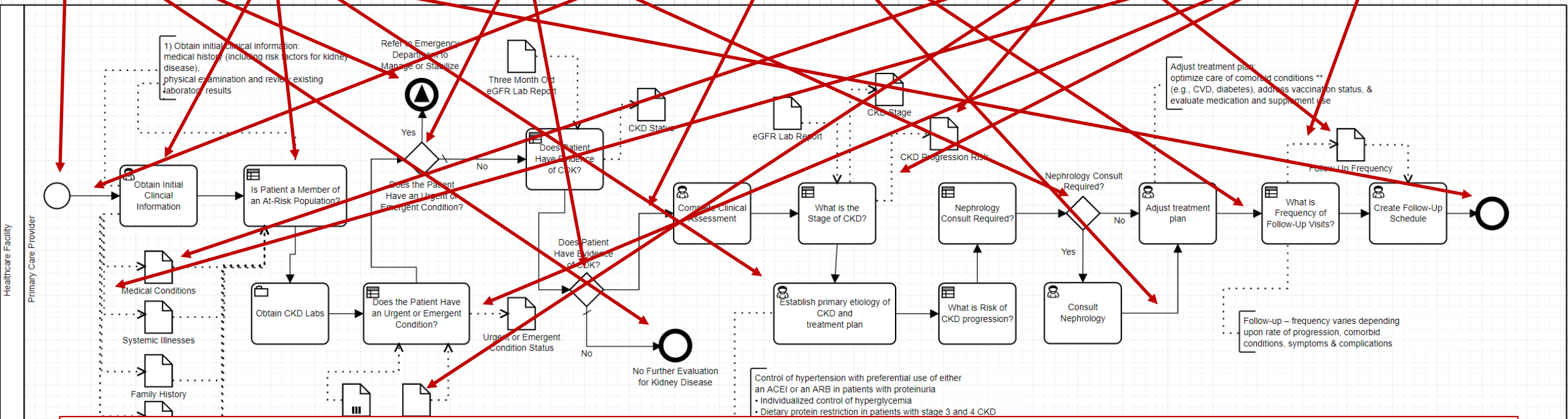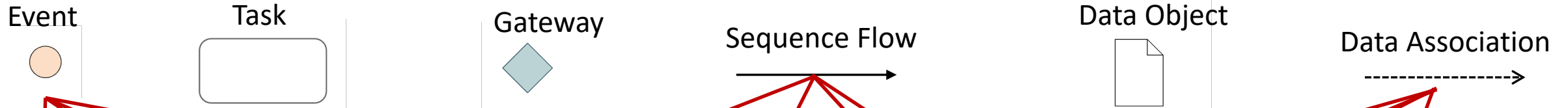
Connects data to activities (like tasks or events) and other artifacts. It illustrates how data flows into and out of process elements, showing how information is used or generated.

What is a Business Process?

A series of interrelated activities, tasks, or steps an organization performs systematically to achieve specific business objectives or produce desired outputs.

Designed to create value by transforming inputs into valuable outputs, goods, or services.

Fundamental to how organizations operate and achieve their goals efficiently.

Business Process

Key characteristics

- ➢ Clear Objective
- ➢ Sequence of Activities
- ➢ Inputs and Outputs
- ➢ Cross-functional
- ➢ Measurable
- ➢ Repeatable and Scalable
- ➢ Time and Resource Constraints

Examples

- ➢ Order Fulfillment Process
- ➢ Customer Service Process
- ➢ Hiring Process
- ➢ Care Delivery Process
- ➢ Telehealth Process

What is Modeling?

Thought or Reference
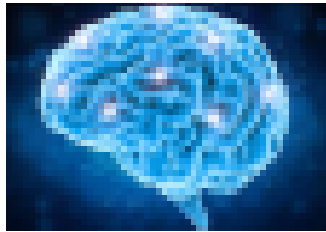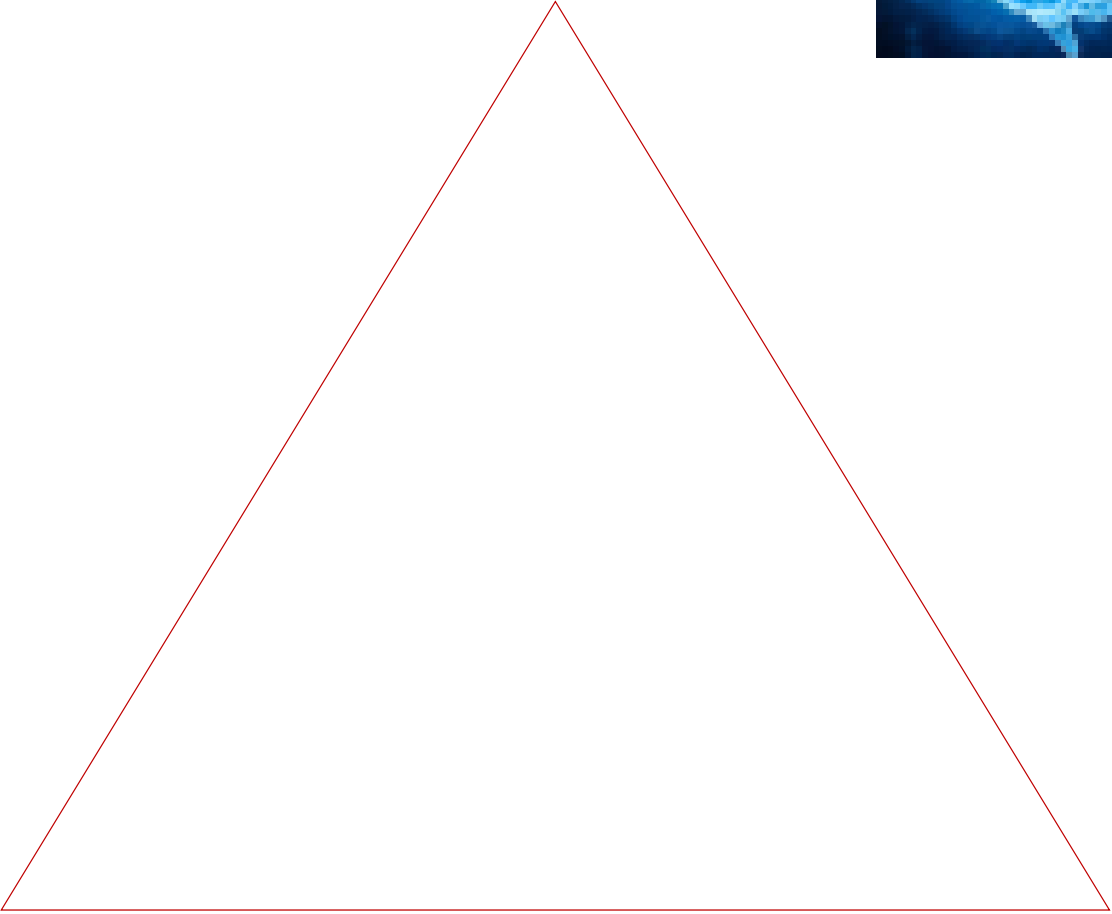
Symbol

Referent

C. K. Ogden and I. A. Richards (1923) *The Meaning of Meaning*

Visual Analog Scale (VAS) pain scores and observational
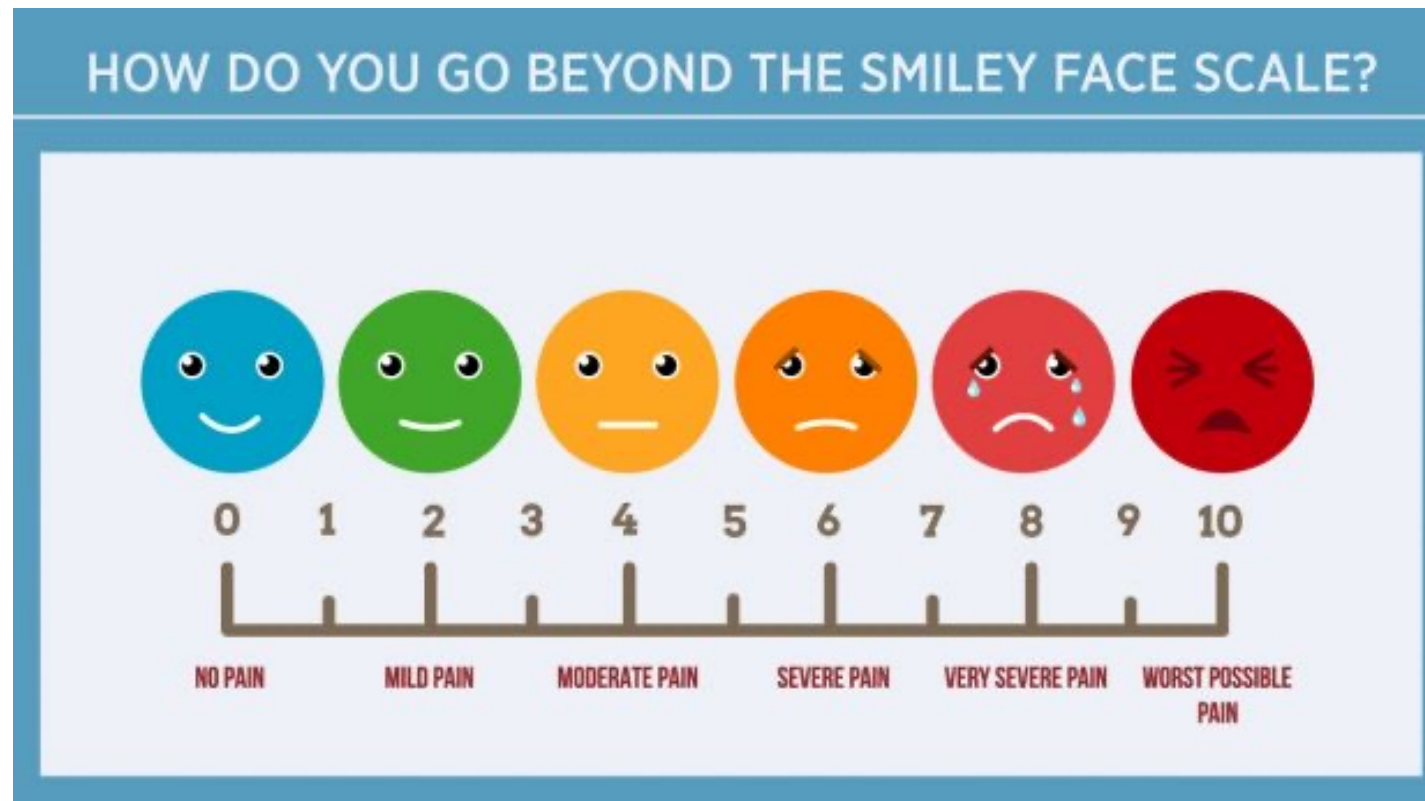
A Picture is Worth a Thousand Words

Key characteristics

➢ Immediate Understanding

➢ Inputs and Outputs

➢ Cross-functional

➢ Measurable

➢ Repeatable and Scalable

➢ Time and Resource Constraints
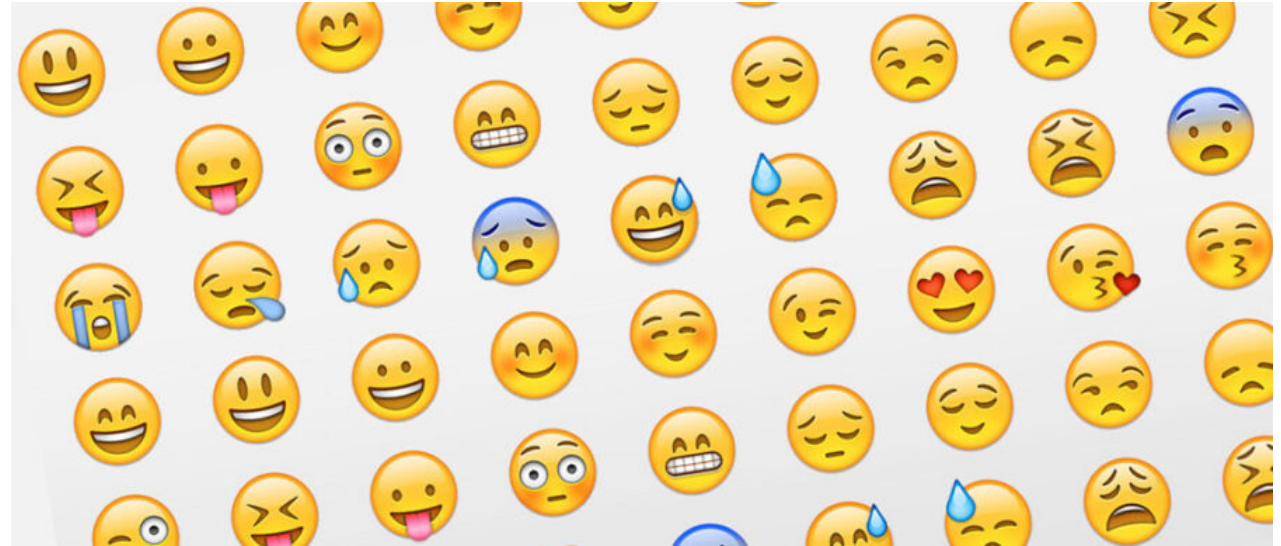
What is Modeling and Why do It?

Delivery of Care is Complex

Modeling Helps

To manage complexity

To understand the problem, expectations & requirement

To detect errors and omissions early in the lifecycle

To communicate and share with stakeholders

To evolve our understanding

To understand the impact of change

To ensure that resources are utilized efficiently

Business Process Model and Notation (BPMN) is a Visual Language to Depict Processes

Key characteristics

➢ **Visual Representation:** BPMN uses symbols, shapes, and arrows to create diagrams that visually represent the flow and logic of a business process.

➢ **Standardized Notation:** BPMN is an industry-standard notation, meaning it follows specific rules and conventions.

➢ **Process Elements:** BPMN defines a set of elements or symbols to represent various components of a business process.

➢ **Process Flow:** BPMN diagrams show the sequence of activities and events in a process, as well as the conditions and decisions that determine how the process progresses.

➢ **Collaboration:** BPMN can be used to model both individual processes and complex collaborations involving multiple participants or organizations.

➢ **Process Analysis and Improvement:** BPMN diagrams are valuable tools for analyzing and improving business processes.

www.omg.org/spec/BPMN/2.0.2/PDF

BPMN Origins

In 2000, the Business Process Management Institute (BPMI—now merged into the OMG) started developing the Business Process Modeling Language (BPML - an XML process execution language) and recognized the need for a graphical representation.

In August 2001, the Notation Working Group was formed. The group was composed of 35 companies, organizations, or individuals.

BPMN 1.0
- May 2004, the BPMN 1.0 specification was released to the public.
- February 2005, BPMN 1.0 was adopted as an OMG standard.

BPMN 2.0
- January 2011, BPMN 2.0 was adopted as an OMG standard.
- July 2013, BPMN 2.0 was adopted as an ISO standard (ISO/IEC 19510:2013).

Business Process Model and Notation™ provides businesses with the capability of capturing their internal procedures

OBJECT MANAGEMENT GROUP®

OMG

1989
founded

249
specifications

325
member organizations worldwide

13
specifications ratified as ISO standards

One of the largest and longest-standing not-for-profit, open-membership consortia developing and maintaining computer industry specifications.

Long-term maintenance of proven standards

Who is the BPM+ Health Community

30
Member Organizations & Growing

- Professional Societies
- Software Vendors
- Academia
- Government
- Health Organizations

- Officially launched in September 2019
- Not-for-Profit non-SDO
- Membership-based, open community
- Calls are open
- Actively collaborating with others, including HL7

- Work products are open and available without cost
- No usage restrictions or limitations
- Focus on advancing the discipline; best-practices

Field Guide to Shareable Clinical Pathways
BPMN, CMMN & DMN in Healthcare
Version: 1.0

OMG Healthcare Domain Taskforce
healthcare@omg.org
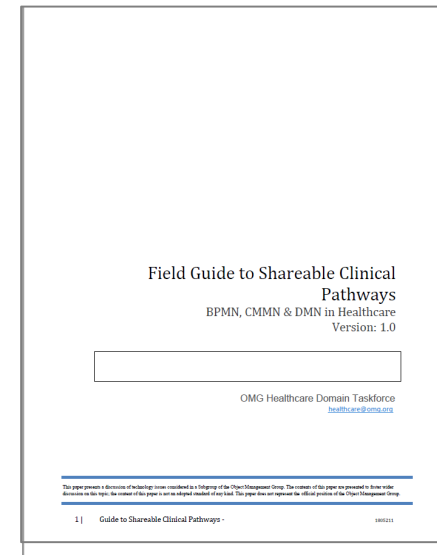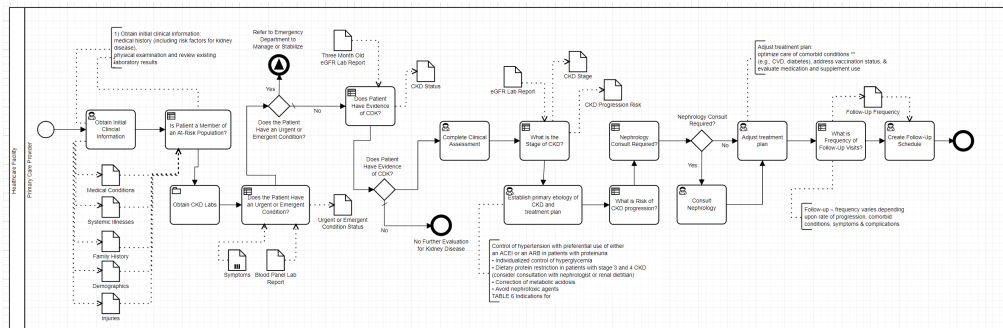
Who is the BPM+ Health Community

Category	Details
Authoring	• Focus on writing/distributing content • Healthcare practice patterns
Organizational Adoption & Change Management	• Bringing pathways into institutional use • Intersect between pathways, HIT, and human resources
Process Automation and Enablement	• Approaches for IT implementation (tooling and execution) • Ingesting and using externally sourced pathways
Methodology	• Maintain expression formalisms • Develop/maintain authoritative guidance; feedback to SDOs
Academic and Professional Education	• Develop curriculum for accreditation • Workforce development
Policy Committee	• Policy implications • Outreach
Tooling	• Tooling solutions • Empowering our community

READ THE FIELD GUIDE FOR SHAREABLE CLINICAL PATHWAYS

Field Guide

Access the community's seminal publication, Field Guide for Shareable Clinical Pathways.

The guide applies three Object Management Group® (OMG®) business process standards to represent clinical pathways that define distinct aspects of care workflow and decision-making, including:

- Business Process Model and Notation™ (BPMN™)
- Case Management Model and Notation™ (CMMN™)
- Decision Model and Notation™ (DMN™)

An OMG Managed Community
BPM+
Health

Key BPMN Elements

Flow Objects

Events

Gateways

Activity / Tasks

Connecting

Sequence Flow

Message Flow

Association
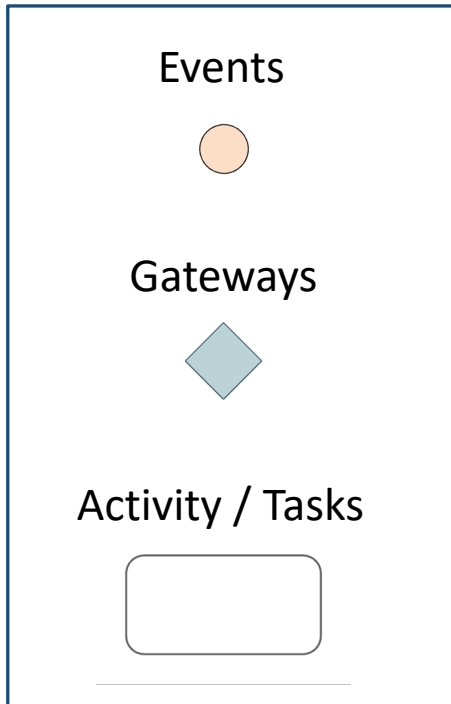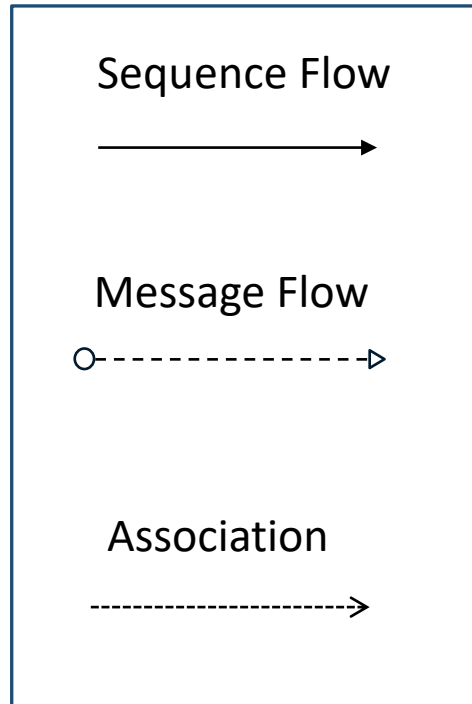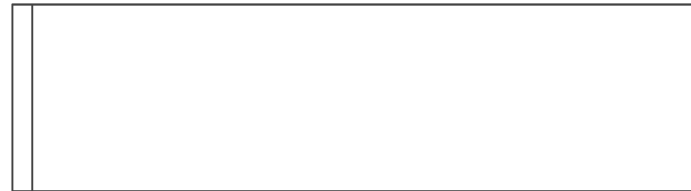
Pool

Data Object

Lanes with a Pool
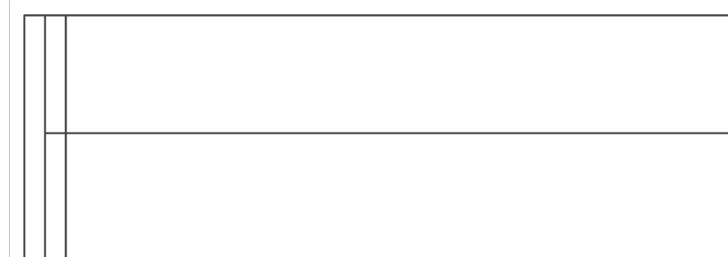
Text Annotation

Events

Represent specific points in a business process where something significant happens or triggers a change in the flow of the process.

Indicating a process's start, intermediate steps, and end points.

Depict the timing and sequence of a process's activities, decisions, and interactions.

Start Events: Initiation points of a process or a particular sequence of activities. They signify when the process begins. For example, a "Receive Order" start event could mark the beginning of an order processing process when a customer places an order.

Circle with a single outline:
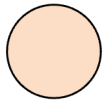
Intermediate Events: Occur during a process, indicating a specific occurrence influencing the process flow. For example, an "Approval Required" intermediate event might indicate a point where an approval decision is needed before proceeding with the next steps of the process.

Circle with two thin outlines:
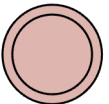
End Events: Mark the conclusion of a process or a specific sequence of activities. They signify when the process has been completed or terminated. For example, a "Delivery Complete" end event could represent the successful completion of a delivery process.

Circle with single bold outlines:

Start – Events (Catch)
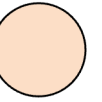
○ None Start Event

✉ Interrupting - Message Start Event

✉ Non-interrupting - Message Start Event

🕐 Interrupting - Timer Start Event

🕐 Non-interrupting - Timer Start Event

▤ Interrupting - Conditional Start Event

▤ Non-interrupting - Conditional Start Event

△ Interrupting - Signal Start Event

△ Non-interrupting - Signal Start Event

⬠ Interrupting - Multiple Start Event

⬠ Non-interrupting - Multiple Start Event

✚ Interrupting - Parallel Multiple Start Event

✚ Non-interrupting - Parallel Multiple Start Event

△ Interrupting - Escalation Start Event

△ Non-interrupting - Escalation Start Event

Ⓝ Interrupting - Error Start Event

⏪ Interrupting - Compensation Start Event

Intermediate – Events (Throw and Catch)
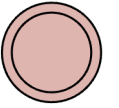
Interrupting - None Intermediate Event

Catch - Message Intermediate Event

Interrupting - Boundary - Catch - Message Intermediate Event

Non-interrupting - Boundary - Catch - Message Intermediate Event

Throw - Message Intermediate Event

Timer Intermediate Event

Interrupting - Boundary - Timer Intermediate Event

Non-interrupting Boundary - Timer Intermediate Event

Conditional Intermediate Event

Interrupting - Boundary - Conditional Intermediate Event

Non-interrupting - Boundary - Conditional Intermediate Event

Catch - Escalation Intermediate Event

Interrupting - Boundary - Catch - Escalation Intermediate Event

Non-interrupting - Boundary - Catch - Escalation Intermediate Event

Throw - Escalation Intermediate Event

Boundary - Catch - Error Intermediate Event

Boundary - Catch - Compensation Intermediate Event

Throw - Compensation Intermediate Event

Catch - Link Intermediate Event

Throw - Link Intermediate Event

Boundary - Catch - Cancel Intermediate Event

Intermediate – Events (Continued)
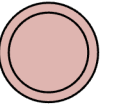
- Catch - Signal Intermediate Event

- Interrupting - Boundary - Catch - Signal Intermediate Event

- Non-interrupting - Boundary - Catch - Signal Intermediate Event

- Interrupting - Boundary - Throw - Signal Intermediate Event

- Catch - Multiple Intermediate Event

- Interrupting - Boundary - Catch - Multiple Intermediate Event

- Non-interrupting Boundary - Catch - Multiple Intermediate Event

- Throw - Multiple Intermediate Event

- Catch - Parallel Multiple Intermediate Event

- Interrupting - Boundary - Catch - Parallel Multiple Intermediate Event

- Non-interrupting Boundary - Catch - Parallel Multiple Intermediate Event

End – Events (Throw)
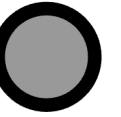
None End Event

Message End Event

Signal End Event

Multiple End Event

Escalation End Event

Error End Event

Compensation End Event

Cancel End Event

Terminate End Event

Example to Discuss

When I get hungry, I'll order a pizza online. However, my building has electrical issues, so if I lose power while ordering, I'll opt for a peanut butter and jelly sandwich and discuss the situation with the landlord. Once I finish placing the order, I'll patiently wait for the pizza to arrive, and after that, I'll thoroughly enjoy eating it. Occasionally, my Mom might visit with some cookies, and I'll happily indulge in them too. Regardless of the scenario, I'll definitely need a nap once I'm finished.

Events
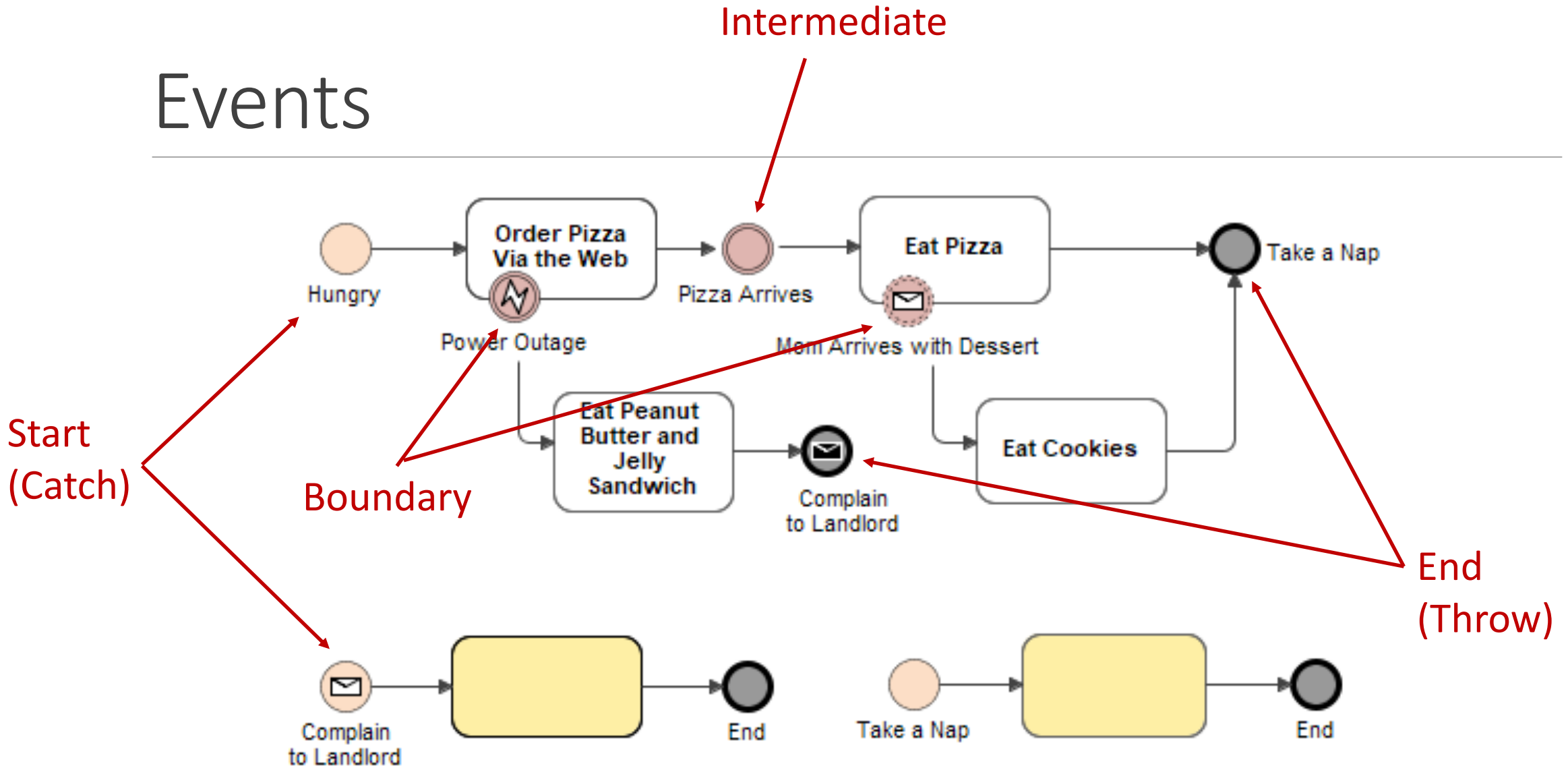
Events (Throw & Catch)
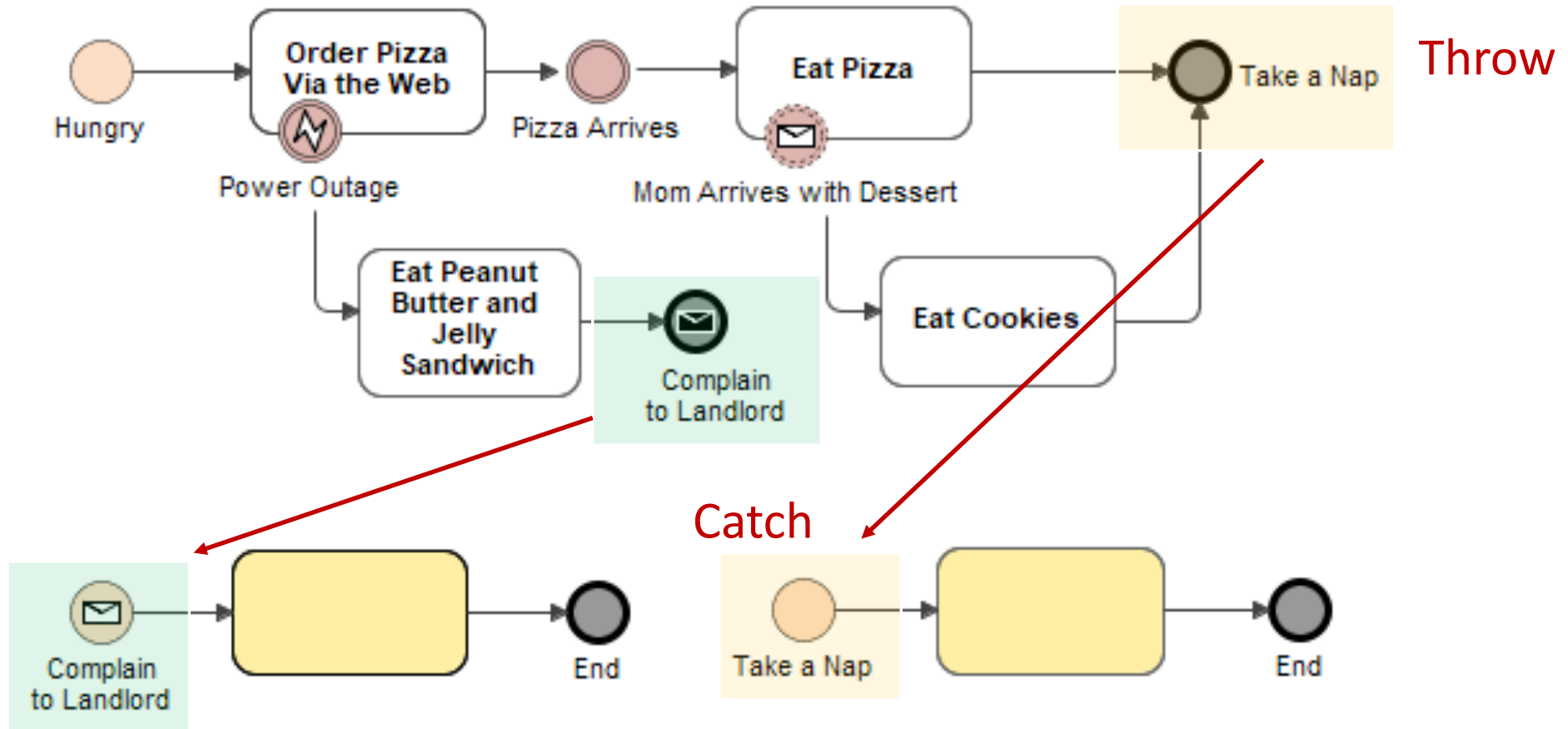
Conditional Events

Start Conditional Events
- Once the condition becomes true, the process will start.

Intermediate Conditional Event
- Pauses process and waits until the condition becomes true.

Boundary Conditional Event
- On the edge of an Activity.
- When the condition becomes true, triggers off the task
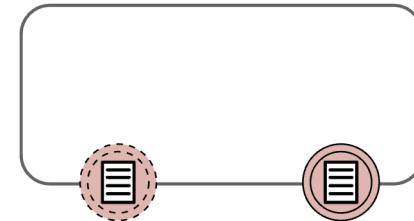
NOTE: There is no End (Throw)

Link Events

Specialized Intermediate Events used to connect two sections of a process, creating a clear and logical flow.

They can be thought of as "go to" statements, linking one part of the process to another within the same level or diagram

NOTE: Only Intermediate Events.
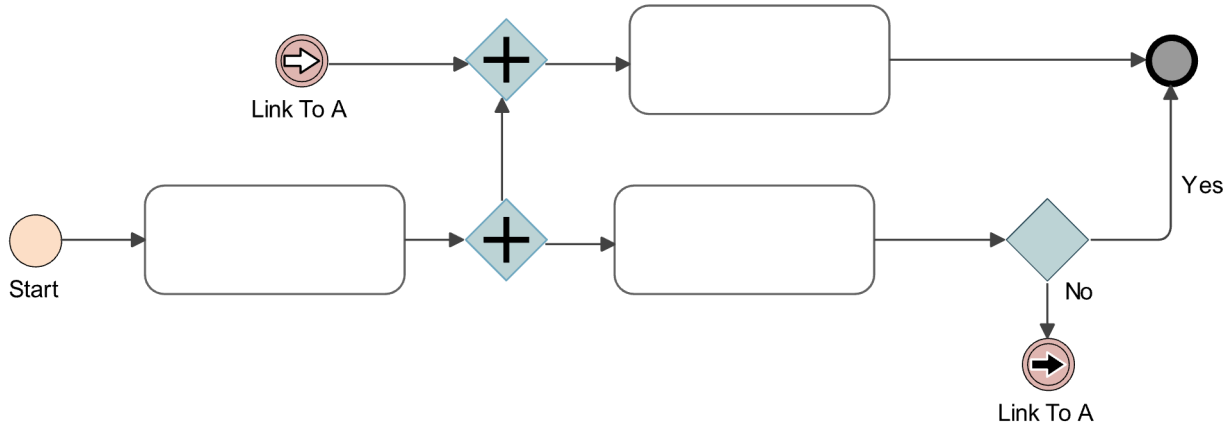
Types	Start			Intermediate				End
	Top-Level	Event Sub-Process *Interrupting*	Event Sub-Process *Non-Interrupting*	Catching	Boundary *Interrupting*	Boundary *Non-Interrupting*	Throwing	
None	○						○	○
Message	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
Timer	⊙	⊙	⊙	⊙	⊙	⊙		
Error		Ⓝ			Ⓝ			Ⓝ
Escalation		Ⓐ	Ⓐ		Ⓐ	Ⓐ	Ⓐ	Ⓐ
Cancel					⊗			⊗
Compensation		⦉			⦉		⦉	⦉
Conditional	▤	▤	▤	▤	▤	▤		
Link				▭			▭	
Signal	△	△	△	△	△	△	△	△
Terminate								◉
Multiple	⬠	⬠	⬠	⬠	⬠	⬠	⬠	⬠
Parallel Multiple	⊕	⊕	⊕	⊕	⊕	⊕		

www.omg.org/spec/BPMN/2.0.2/PDF

Business Process Model and Notation (BPMN), v2.0.2

Page : 259

Flow Elements - Activities

Activity / Task

A <u>Task</u> is an atomic activity that represents a single unit of **work** or action that must be performed as part of a process.

<u>Tasks</u> are the fundamental building blocks of a process model and represent specific actions or **work** items that need to be accomplished to achieve the process's objectives.

Undefined Task with no marker, often used during the early stages of Process development or with simple methodologies
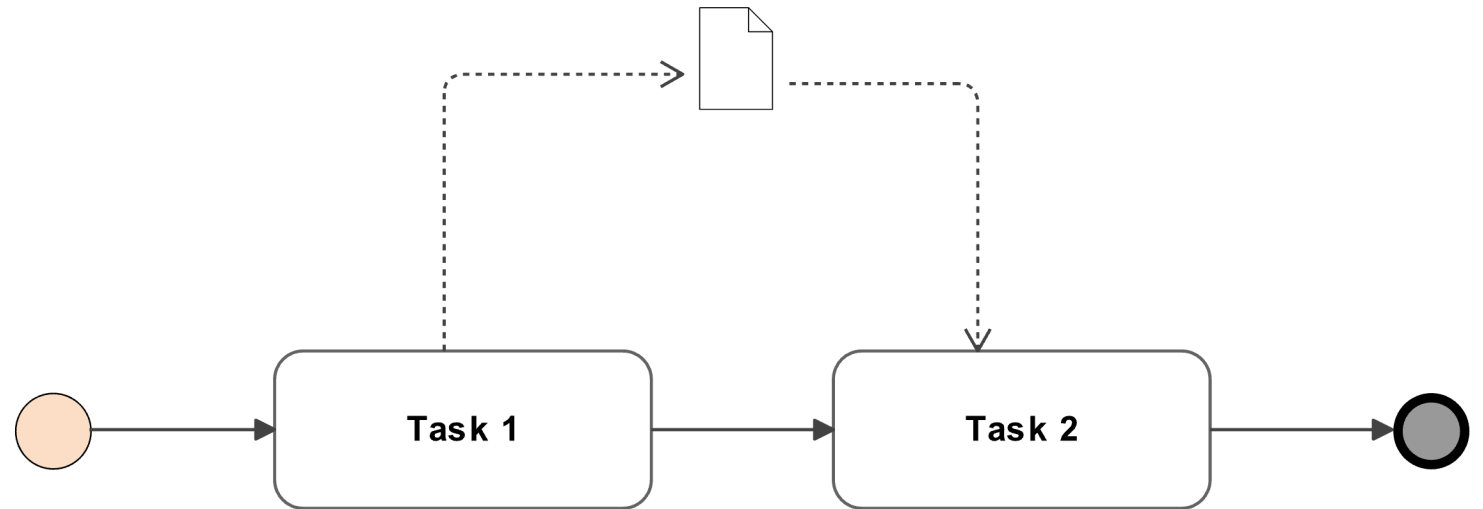
Healthcare Examples of Tasks

- **Administer Medication:** A nurse administers prescribed medications to patients based on their treatment plan.

- **Perform Blood Test:** A phlebotomist draws blood samples from a patient for diagnostic testing.

- **Change Dressings:** A nurse changes wound dressings for a patient to prevent infection and promote healing.

- **Physical Therapy Session:** A physical therapist guides patients through rehabilitation exercises to regain mobility and strength.

- **Provide Patient Education:** A healthcare professional educate patients about their condition, treatment options, and self-care practices.
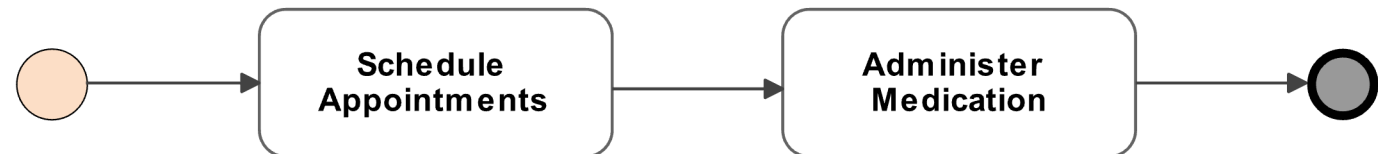
Task Types

User Task requires human interaction or intervention.

Service Task is performed by an automated system or external service.

Script Task is where a script or code is executed as part of the process.

Business Rule Task that applies predefined business rules or decision logic.

Manual Task is performed manually by a human.

Receive Task waits for a specific message or signal to be received.

Send Task sends a message or signal to another process or participant.

User Task	Service Task	Script Task	Business Rule Task

Manual Task	Receive Task	Send Task
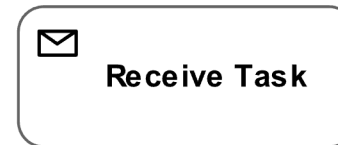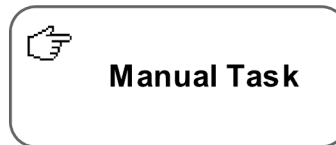
1) The **process starts** when a patient is admitted to the hospital for a medical condition.

2) A **script task** calculates the appropriate dosage of medication based on the patient's weight and medical history.

3) A **service task** requests the processing of blood tests for the patient's condition. It interacts with the laboratory information system (LIS) to initiate the tests.

4) A nurse (**user**) is assigned to administer the prescribed medication to the patient.

5) A healthcare provider **manually reviews** the patient's medical history, including allergies, previous treatments, and conditions. This information is crucial for treatment decisions.

Admit Patient → Prescription Dosage Calculation → Lab Test Processing → Nurse Medication Administration → Patient Medical History Review

Treatment Plan Approval → Patient Appointment Reminder → Patient Survey Response → ●

Admit Patient → Prescription Dosage Calculation → Lab Test Processing → Nurse Medication Administration → Patient Medical History Review → Treatment Plan Approval → Patient Appointment Reminder → Patient Survey Response → (end)

9) process concludes when the patient's treatment is successfully **completed** and all necessary tasks have been executed.

8) A **receive task** waits for the patient to submit a post-treatment survey. Once the survey is received, the process continues.

7) An automated **send task** triggers the sending of an appointment reminder to the patient's phone via SMS.

6) A **business rule** task evaluates the proposed treatment plan against established medical guidelines.
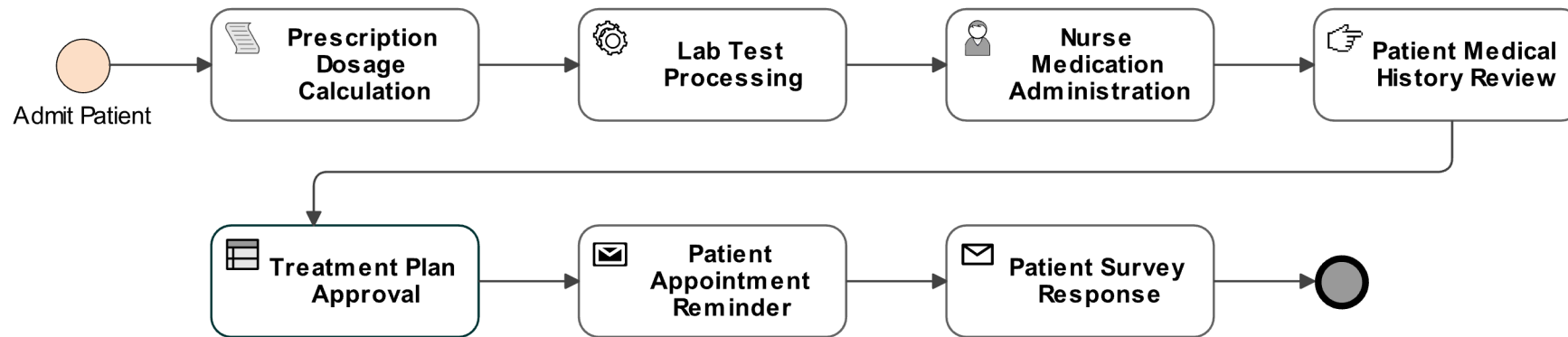
Tasks Markers

Multi Instance Task: a type of task that represents a task that needs to be executed multiple times, possibly concurrently, for a collection of items. It is used when the same task needs to be performed for multiple instances of data, often in parallel, rather than iteratively. Each instance of the task is executed independently but follows the same process logic.

Loop Task: loop task is a type of activity that represents a task or sub-process that is repeated multiple times based on a defined condition or iteration. It allows for a specific set of actions to be executed repeatedly until a particular condition is met or a predetermined number of iterations are completed. Loop tasks are valuable for representing scenarios where a certain task needs to be performed iteratively within a process.
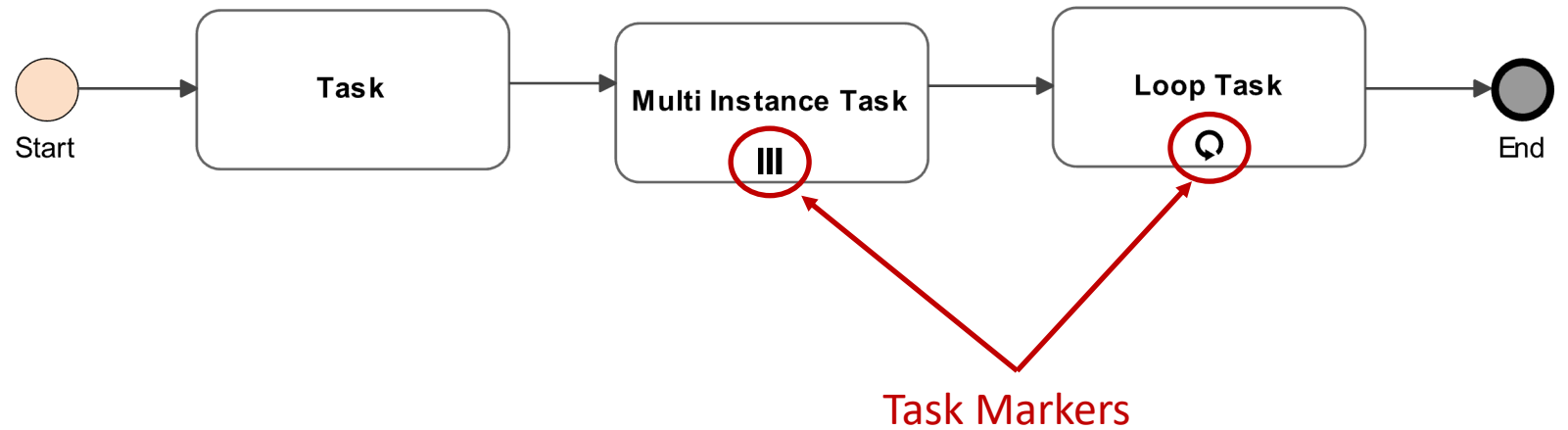
Example

Tasks

NOT COVERED
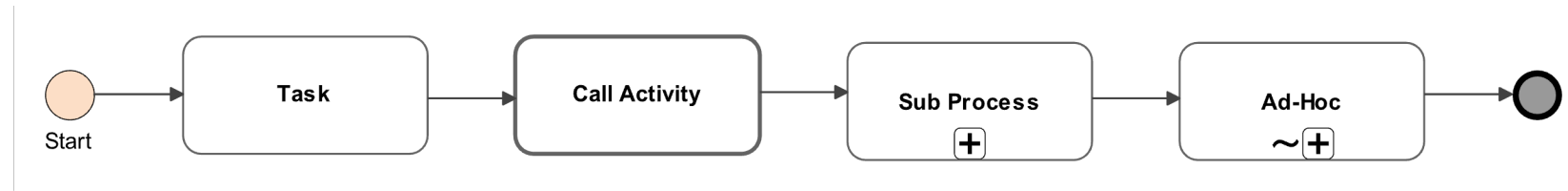
Flow Elements - Gateways

Role of Gateways

Control Flow Management: Controls the sequence and direction of flow in a process.

Decision Points: Act as decision points where the process evaluates conditions or rules to determine which sequence of tasks or activities to execute next.

Parallelism and Synchronization: Facilitate parallel execution of tasks or activities.

Merge and Convergence: Used to merge or converge parallel flows back into a single flow.

Conditional Routing: Gateways allow for conditional routing, where the process follows specific paths based on conditions or data values.

Exclusive and Inclusive Decision-Making: Different types of gateways (exclusive, inclusive, and complex) support various decision-making scenarios.

Gateways

Exclusive (XOR Gateway): Mutually exclusive choices where only one of the outgoing paths is taken.

Inclusive: Multiple valid paths where more than one outgoing sequence flow can be taken.

Parallel: Split a process flow into multiple parallel paths that are executed concurrently.

Event-Based: Handle events that can trigger different paths in a process.

Complex: Complex decision logic that cannot be directly captured using other gateway types.

Parallel Event-Based: Split a process flow into multiple parallel paths that are executed concurrently.

Exclusive

Inclusive

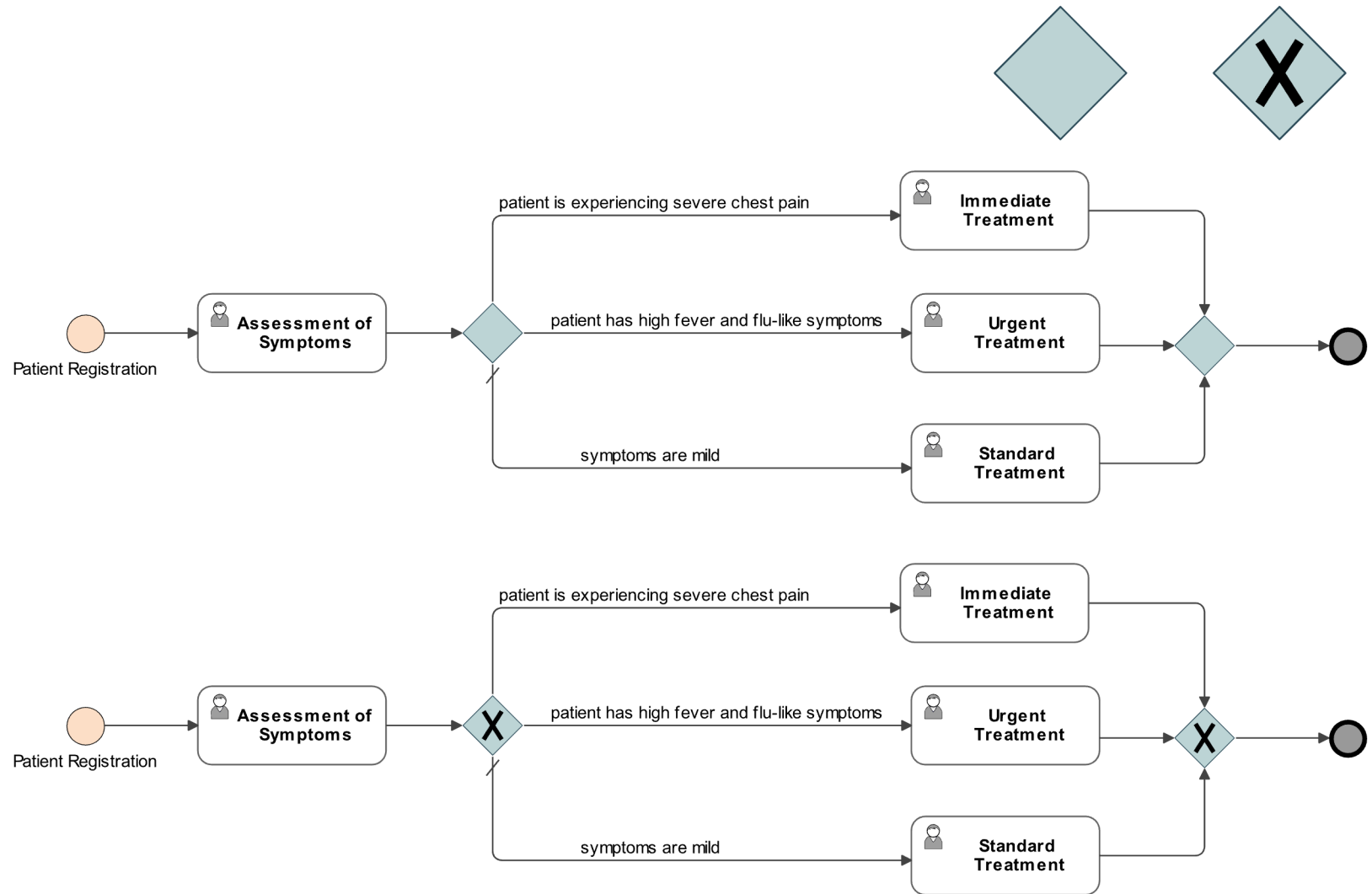Parallel

Event-Based

Complex

Parallel Event-Based

Exclusive Gateway (Split)

XXX : XXXX

In a hospital's emergency department, patients are triaged to determine the urgency of their medical condition. The triage process involves assessing the patient's symptoms and assigning them to different levels of priority for treatment.
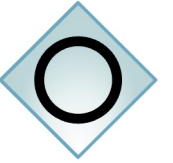
Inclusive Gateway

Multiple Valid Paths: The Inclusive Gateway defines multiple outgoing paths, each associated with a condition.

Evaluation of Conditions: When the process reaches the Inclusive Gateway, the conditions of all outgoing flows are evaluated simultaneously.

Concurrent Processing: If multiple conditions are evaluated to be true, the process follows all corresponding paths concurrently.

Parallel Gateway (Split)

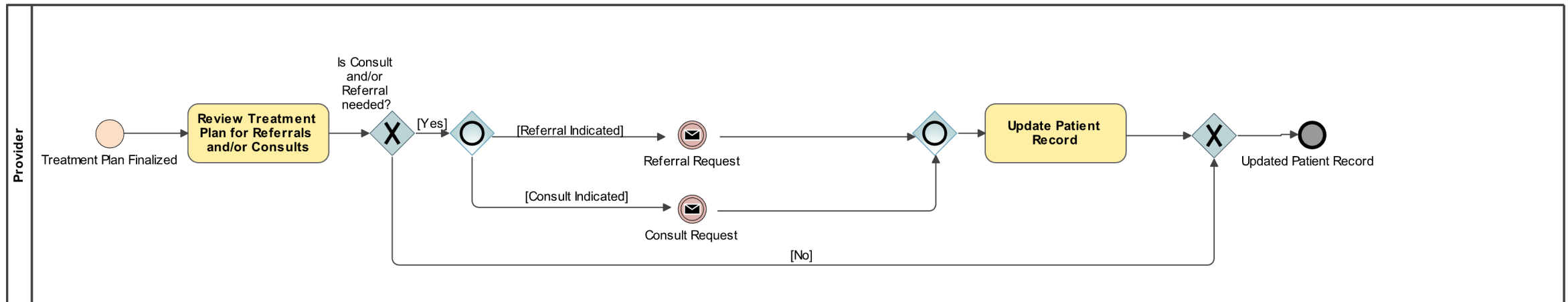**Parallel Split**: Defines multiple outgoing paths. When the process reaches the gateway, it splits into these parallel paths simultaneously.

Concurrent Execution: The tasks or activities along each parallel path are executed concurrently, allowing for parallel processing without dependencies.

Parallel Paths: Each path represents a specific task or activity that can be performed independently of the others.

Parallelism: Facilitates efficiency by enabling tasks to be executed in parallel, which can result in faster process execution.

Connectors

Connectors

Sequence Flow: Establishes sequence and order the flow will progress.

Conditional Sequence Flow: Used to model splitting decision points in a process.

Default Sequence Flow: Ensure that there is always a valid path for the process to follow, even when none of the specific conditions associated with other Sequence Flows are met.

Message Flow: Used to model the communication and information exchange between different participants or processes in a business process.
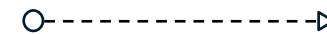
.

Association:.

Sequence Flow

Conditional
Sequence Flow

Default Sequence
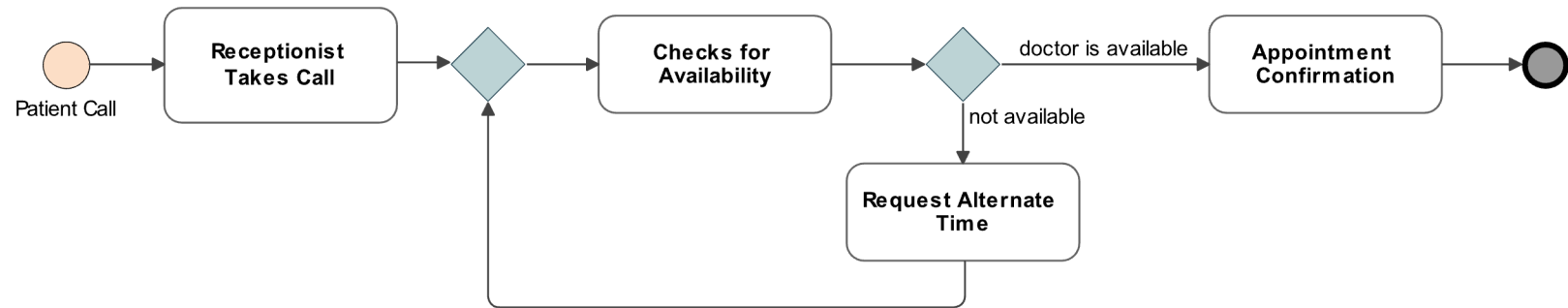Flow

Message Flow

Association

Sequence Flow

Show the chronological order in which activities, tasks, and events are executed in a process.

Captures the logical progression of the process from one element to another.

Connect **two flow objects**, such as tasks, events, or gateways.

The source flow object represents the element from which the flow originates, and the target flow object represents the element to which the flow leads.

Direction indicates the sequential movement of the process from the source element to the target element.

A clinic is managing patient appointment scheduling. Patients call the clinic to book appointments with doctors based on their availability.

Conditional Sequence Flow

Used to model **splitting** decision points in a process.

Defines a condition that is evaluated when the process reaches a certain element, and based on the condition's outcome, the process takes different paths.

Connects a source element (e.g., a decision point) to a target element (e.g., a task or another decision point).

Defines the criteria that determine whether the flow is taken or not. The expression can be a logical statement, a comparison, or any rule that can be evaluated to true or false.
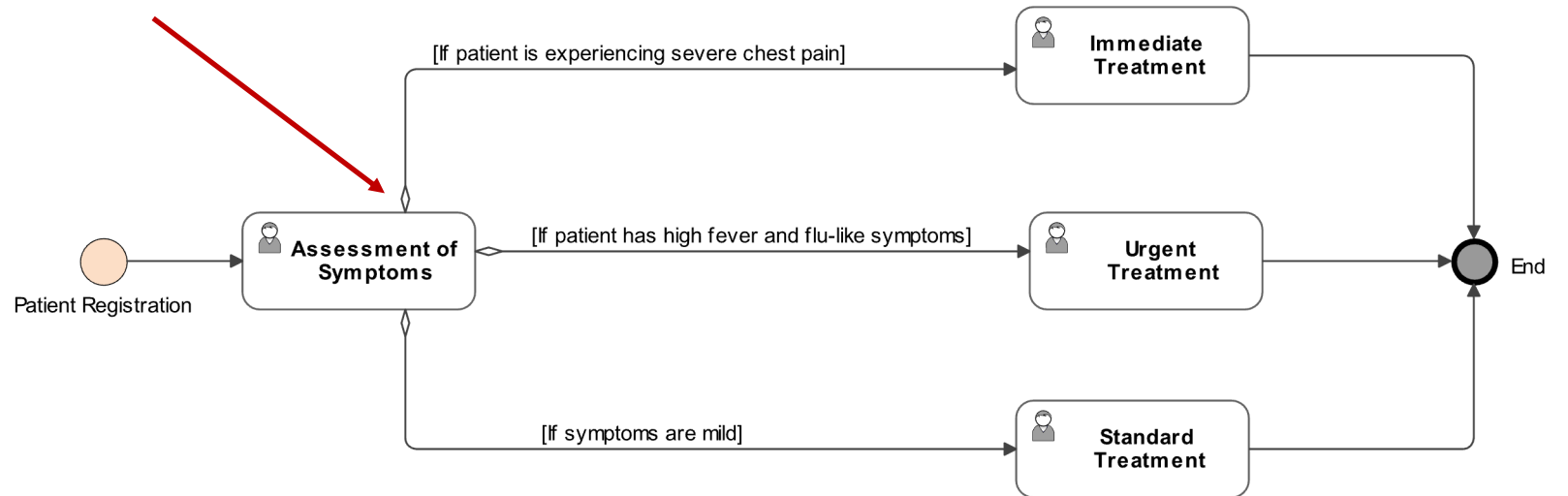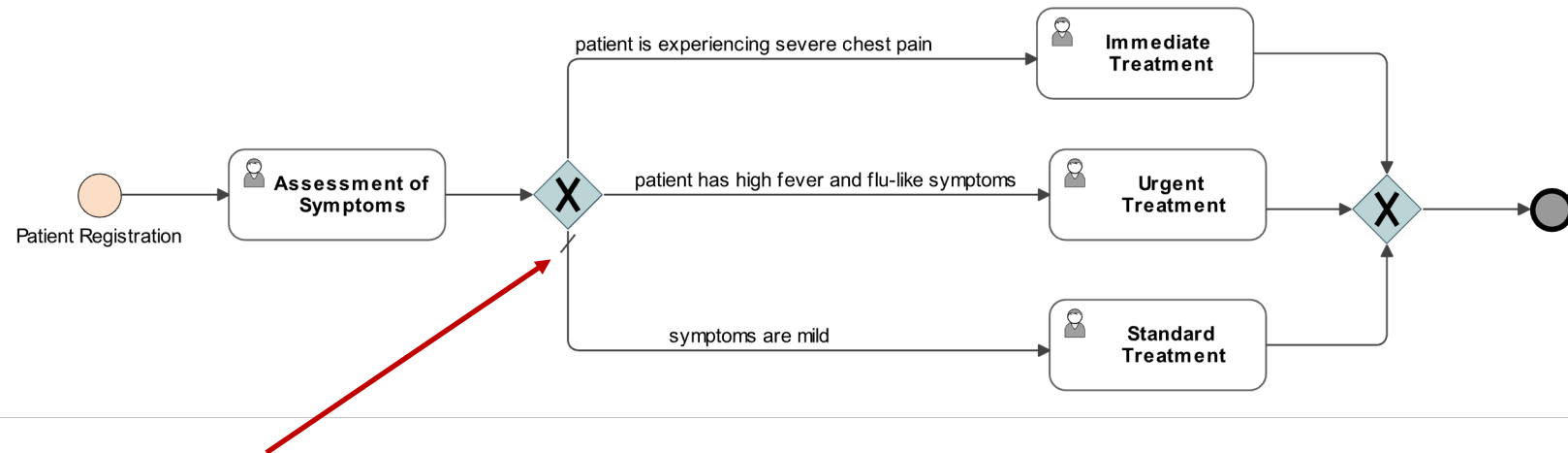

In a hospital's emergency department, patients are triaged to determine the urgency of their medical condition. The triage process involves assessing the patient's symptoms and assigning them to different levels of priority for treatment.

Default Sequence Flow

Represents a transition that is taken when **none** of the conditions associated with other Sequence Flow connectors leading from a decision point evaluate to true.

Provides a fallback path for the process to follow when no specific conditions match the criteria for other outgoing flows.
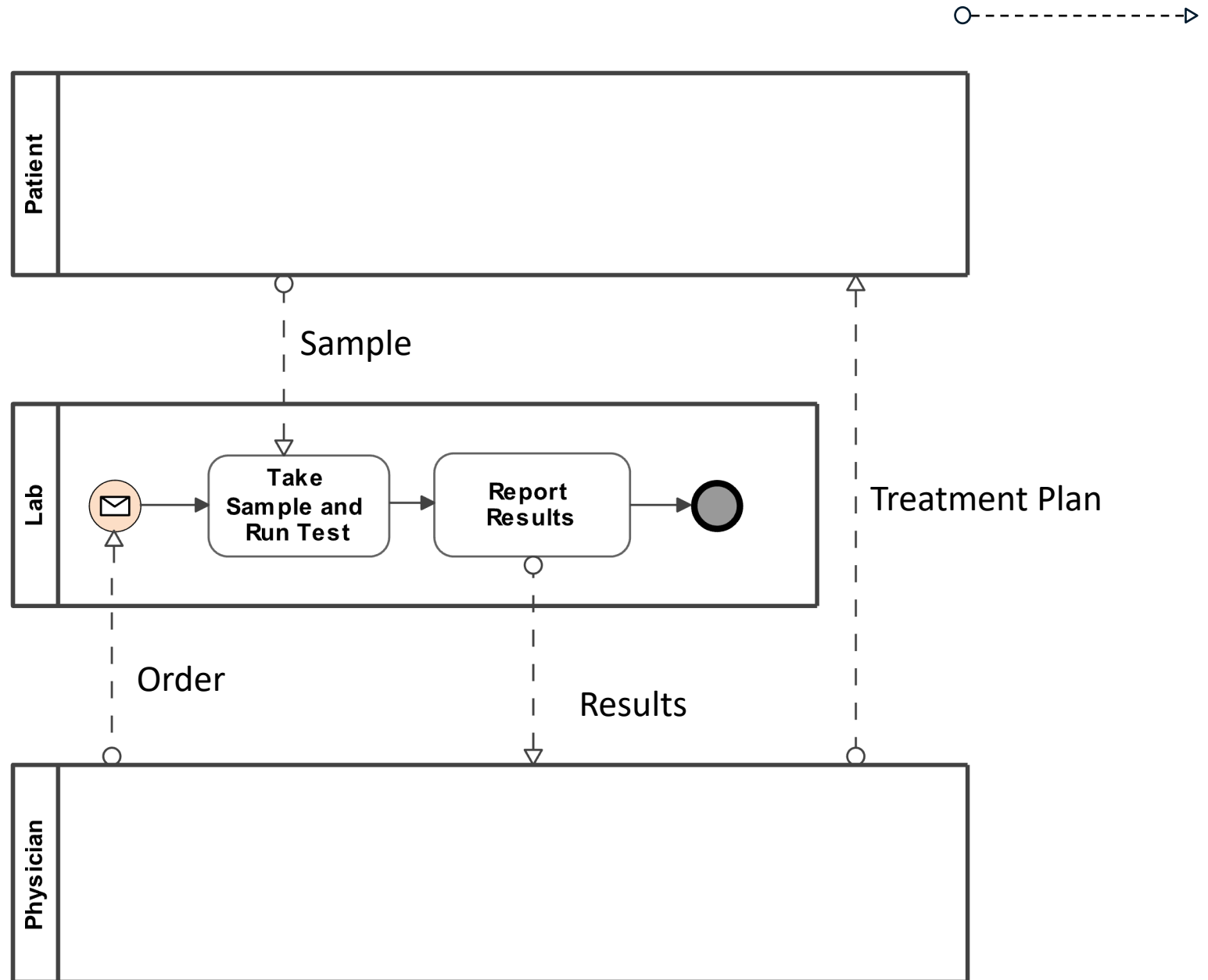

In a hospital's emergency department, patients are triaged to determine the urgency of their medical condition. The triage process involves assessing the patient's symptoms and assigning them to different levels of priority for treatment. Standard treatment is the default treatment.

Message Flow

Used to model the communication and information exchange between different participants or processes in a business process.
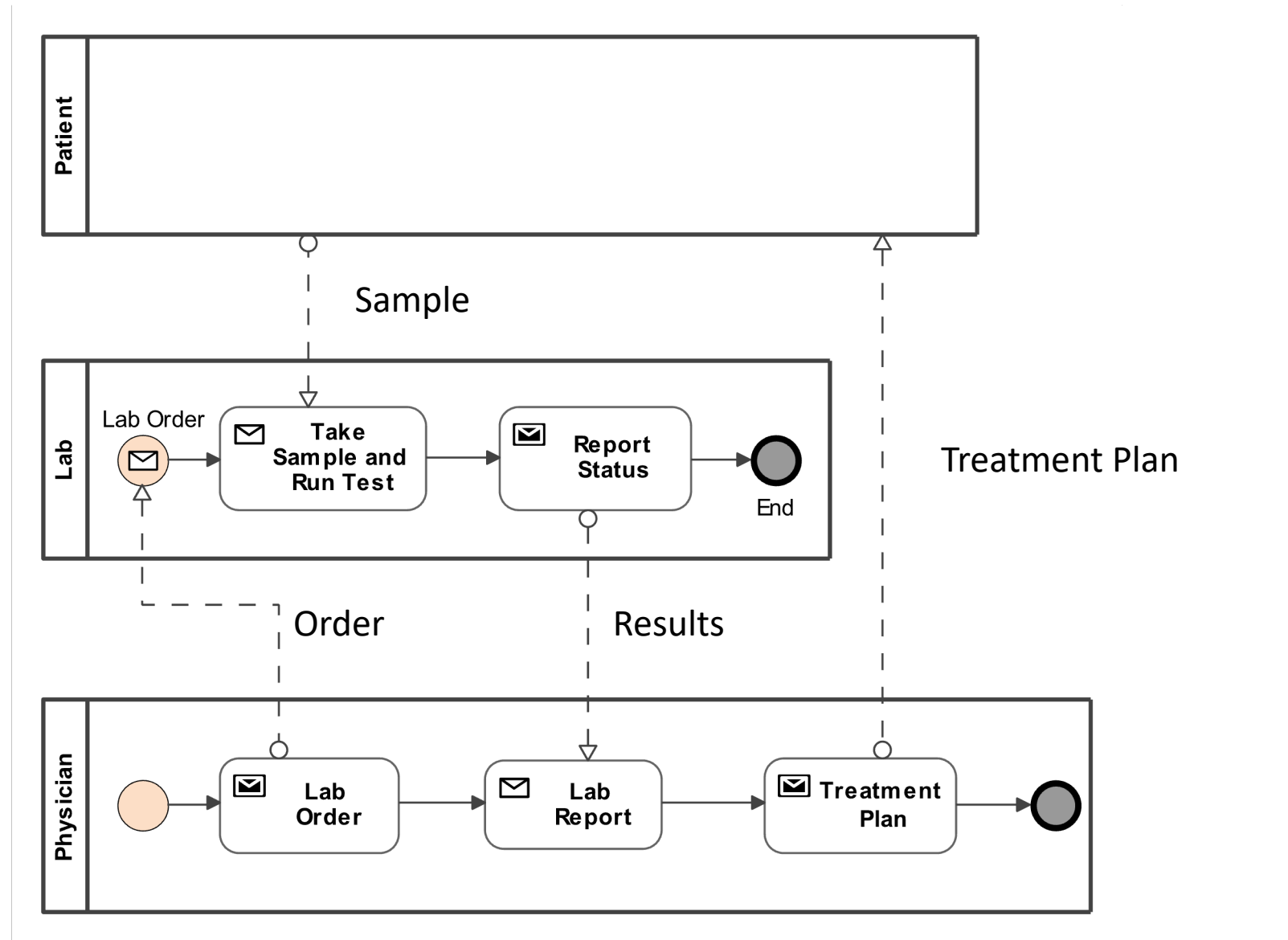
Provide a clear visualization of how messages are transmitted.

Connects two separate entities, such as pools or participants. One entity is the sender, and the other is the receiver of the message.
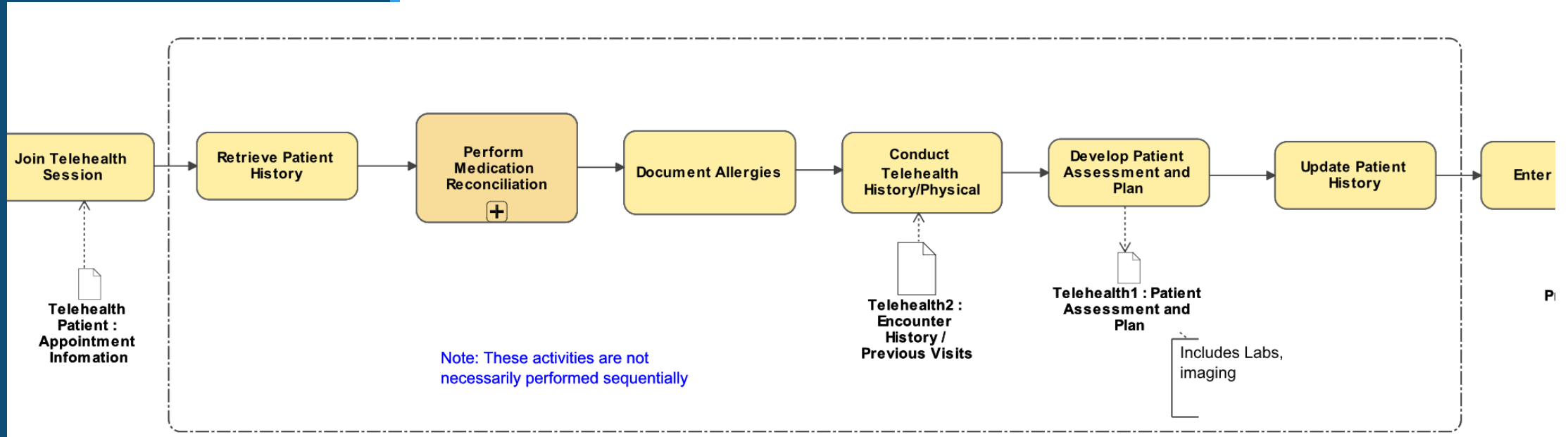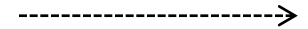

Patient

Lab

Sample

Take Sample and Run Test

Report Results

Treatment Plan

Order

Results

Physician

Message Flow

Help hide details and focus attention on the "Collaboration"

Association

Swimlanes

Pools and Lanes

A Pool is a graphical container used to represent the involvement of different organizational entities or participants in a business process.

Pools provide a high-level view of how multiple participants interact and collaborate to execute the process.

In essence, a pool represents a swim lane in a BPMN diagram. Swim lanes are used to visually separate and categorize activities or tasks based on the participant responsible for their execution.

Each pool represents a specific participant or organizational entity involved in the business process. Participants can be individuals, departments, teams, organizations, or even external entities such as suppliers or customers.
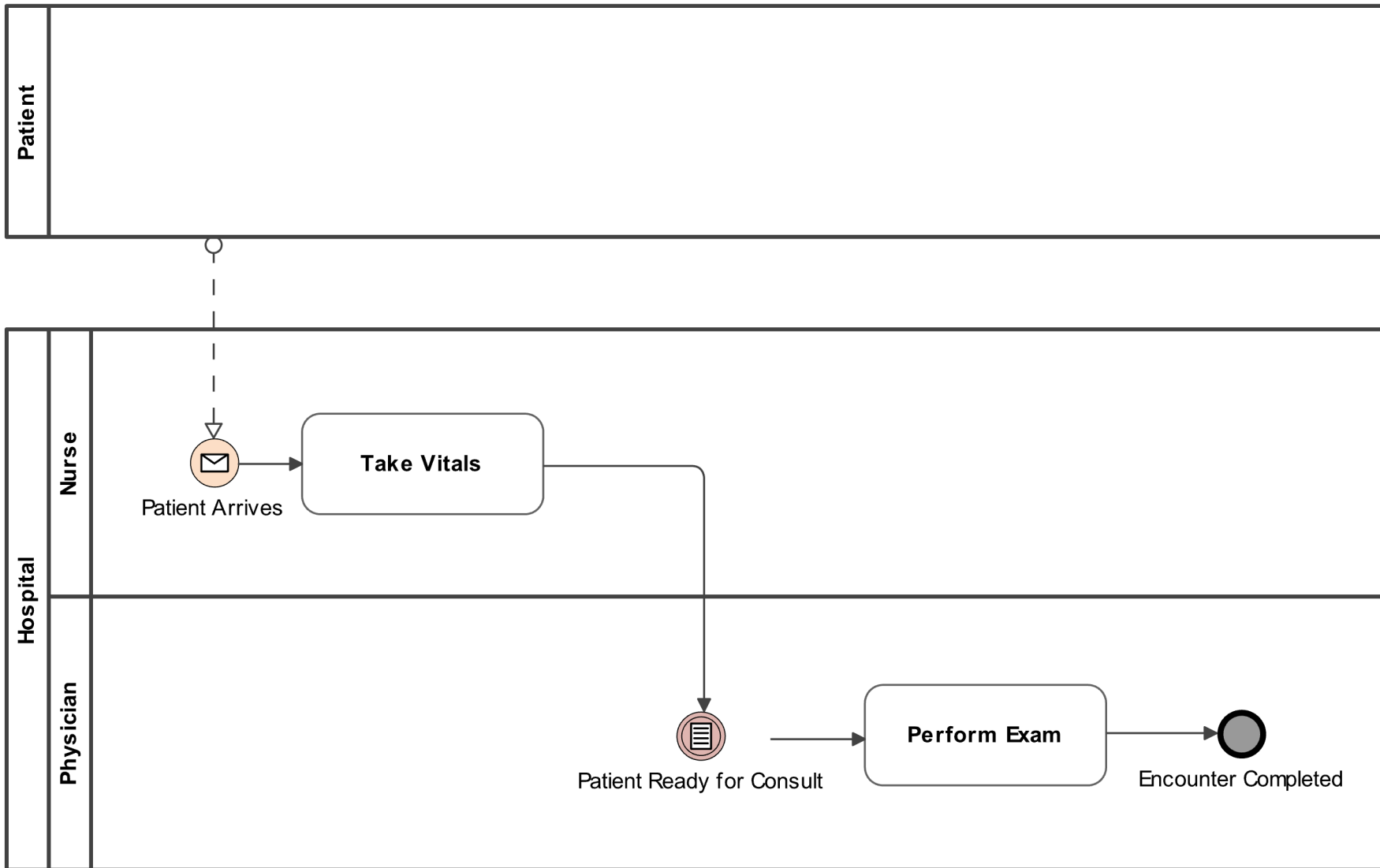
Inside each pool, there can be one or more lanes. Lanes are used to further divide the process into subcategories or functional areas, assigning specific tasks or activities to different subgroups within the participant
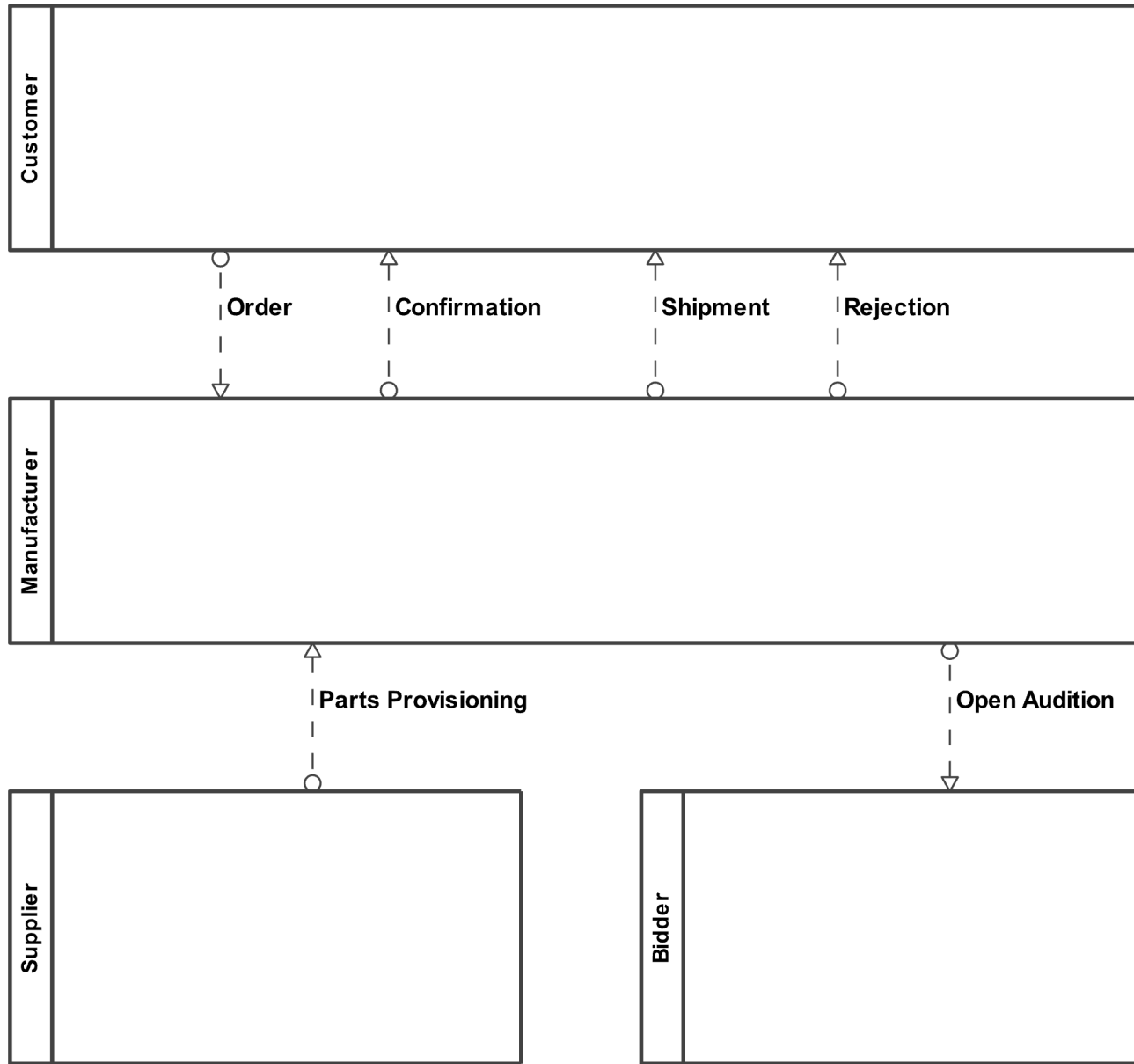
Single Pool: Represents an Entity in a Process

Organization 1

Single Pool with Two Lanes: Lanes Represent a Role Played in the Process

Organization 2

Role Lane 2

Role Lane 1

Customer

Order

Confirmation

Shipment

Rejection

Manufacturer

Parts Provisioning

Open Audition

Supplier

Bidder

Artifacts

Data Object: Represent information flowing through the process, showing how data is required or produced by activities. They provide a clear understanding of what data is consumed or generated within a specific task or process.

Annotation: Optional labeling to explain the type, format, or usage of the data.
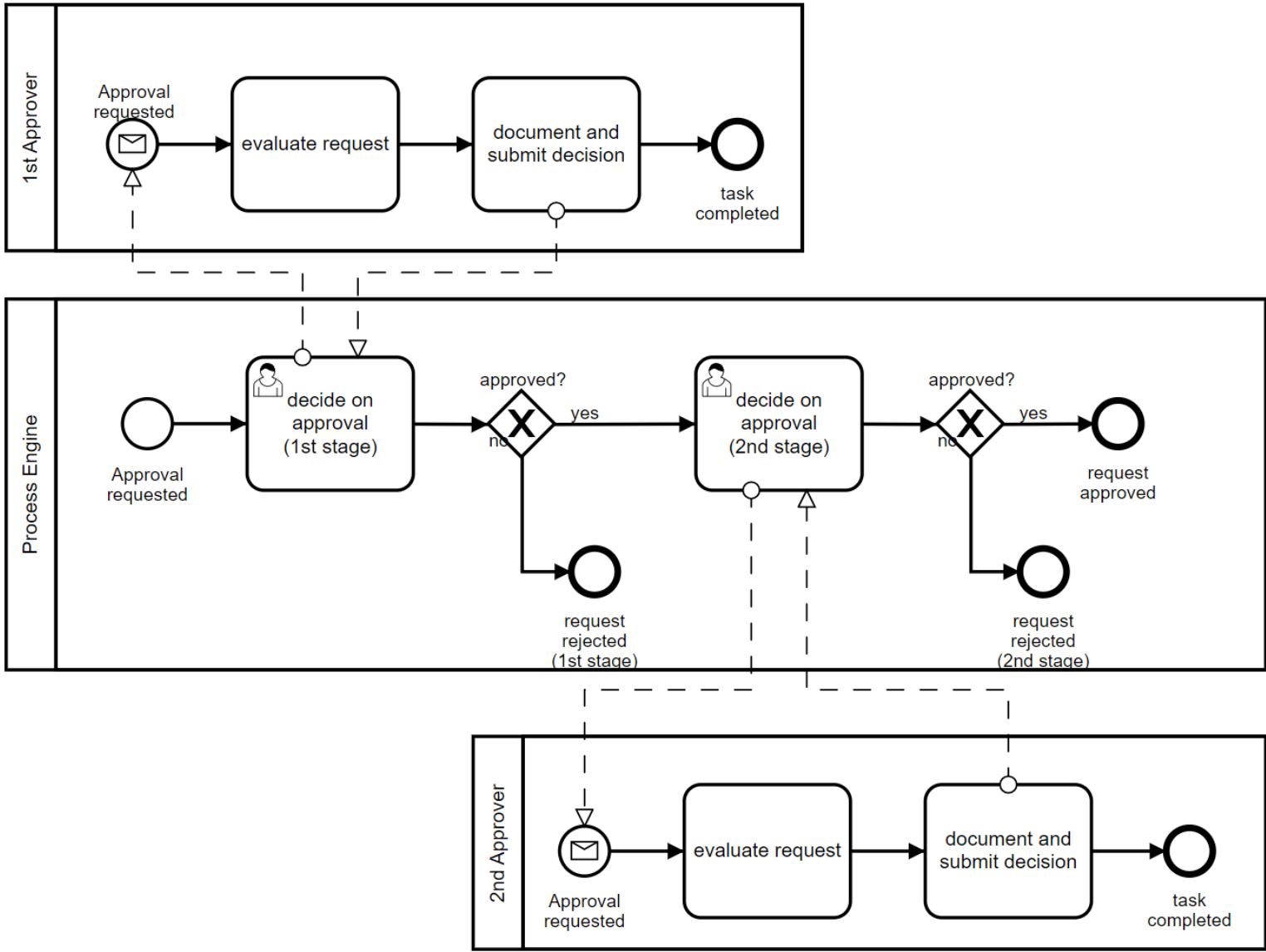
Group: Visual mechanism used to categorize and document parts of a process diagram. It doesn't affect the flow or behavior of the process but adds clarity and understanding.
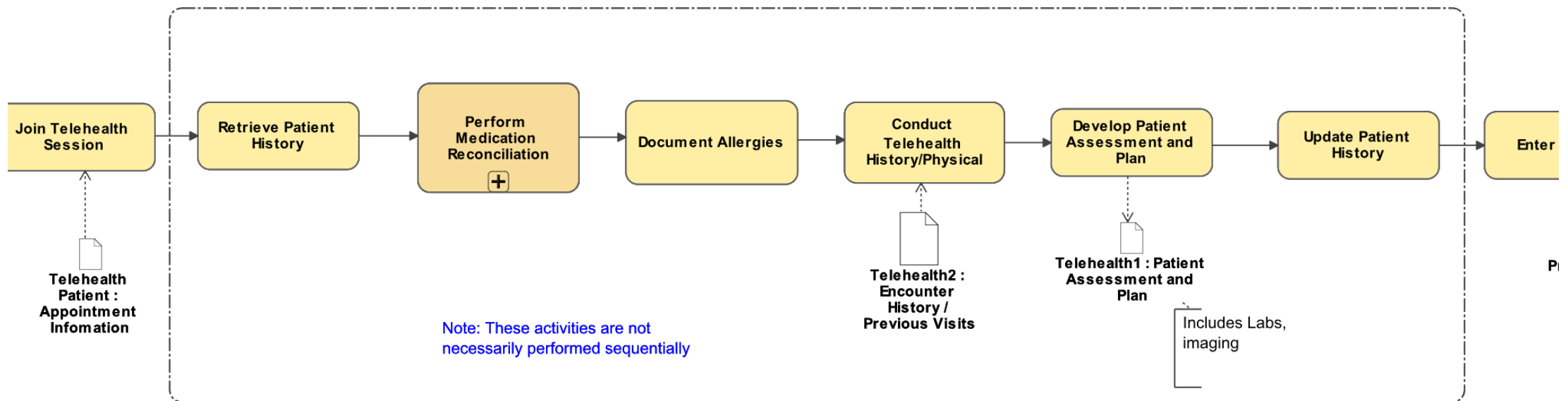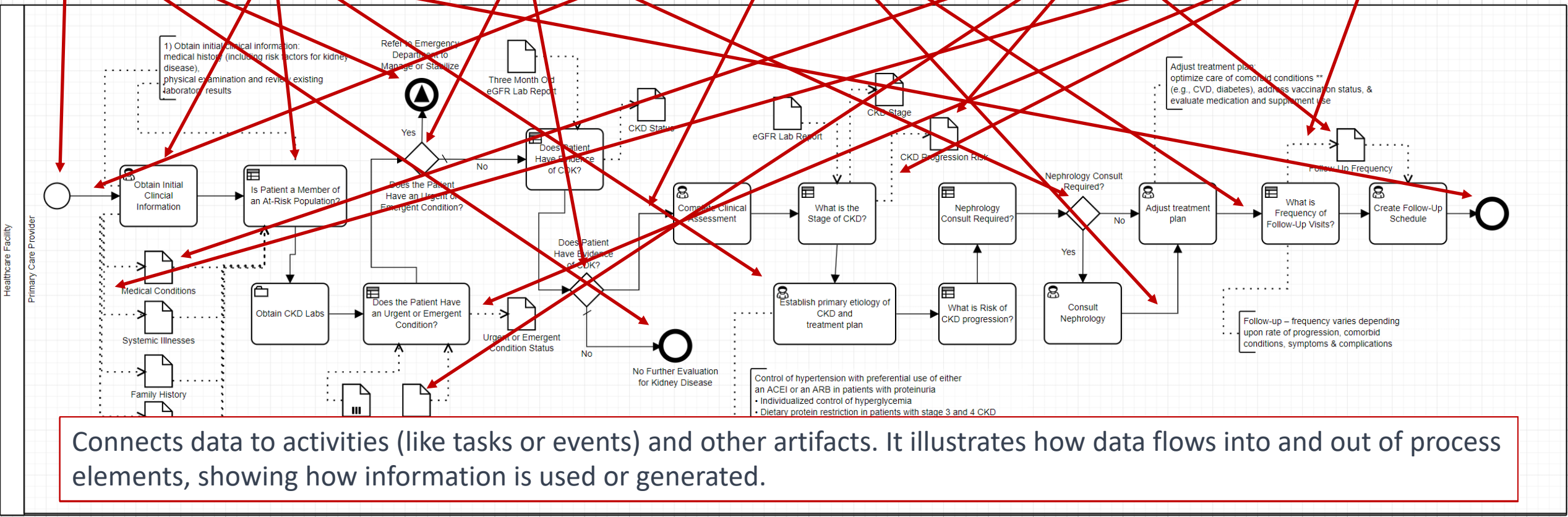
Connects data to activities (like tasks or events) and other artifacts. It illustrates how data flows into and out of process elements, showing how information is used or generated.
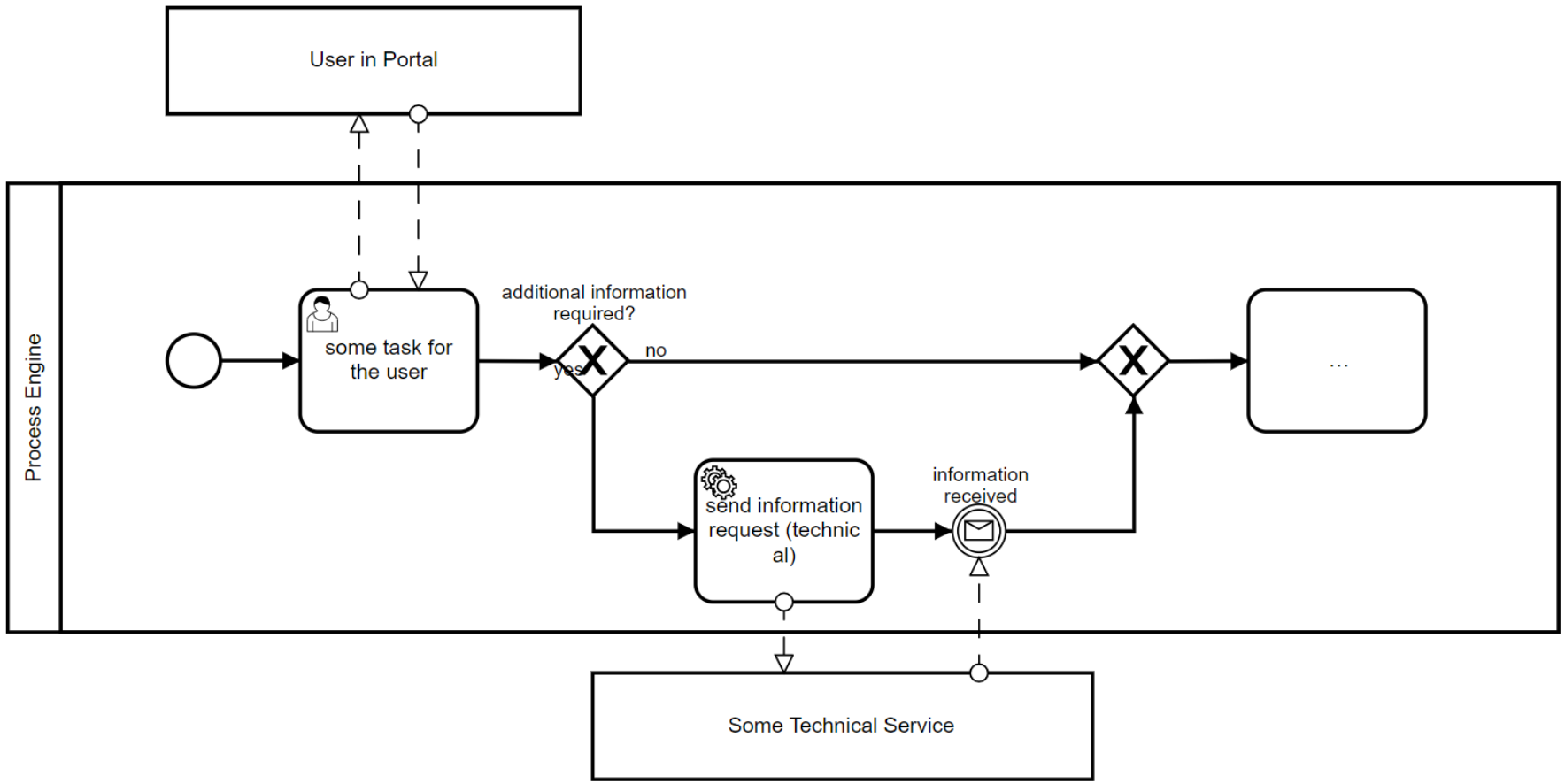
We want to model the following situation using BPMN 2.0. For a request (e.g., a payment) two approvals of two different people are needed. A Process Engine should ensure that both approvals are fulfilled before the request is approved. The manual steps that are performed by the two approvers should also be modeled in the BPMN diagram. The approval decision is performed using a portal with a Tasklist.

The Use Cases
The use cases for this pattern are numerous. Here are some examples:
•Payment Approval
•Invoice Approval
•Contract Approval
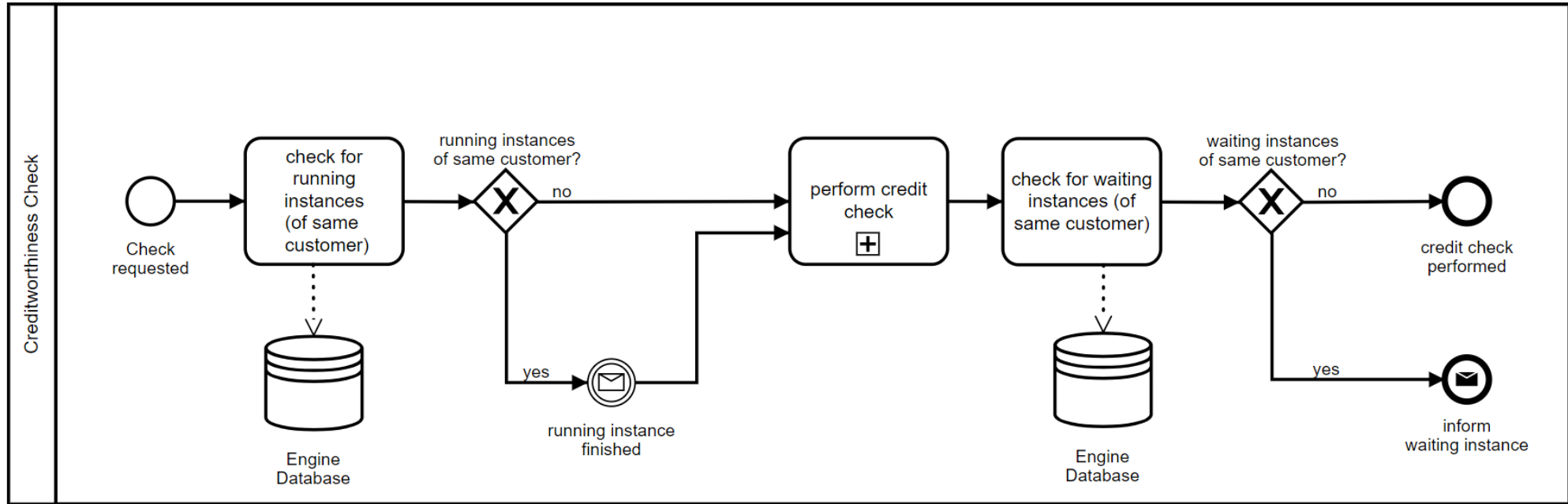
This solution is a bit more complex, since you need to determine the recipient (a single instance) of the message. That induces a second data request before the end of the instance. However, this is the correct way to solve the problem that occurs in the signal event solution.
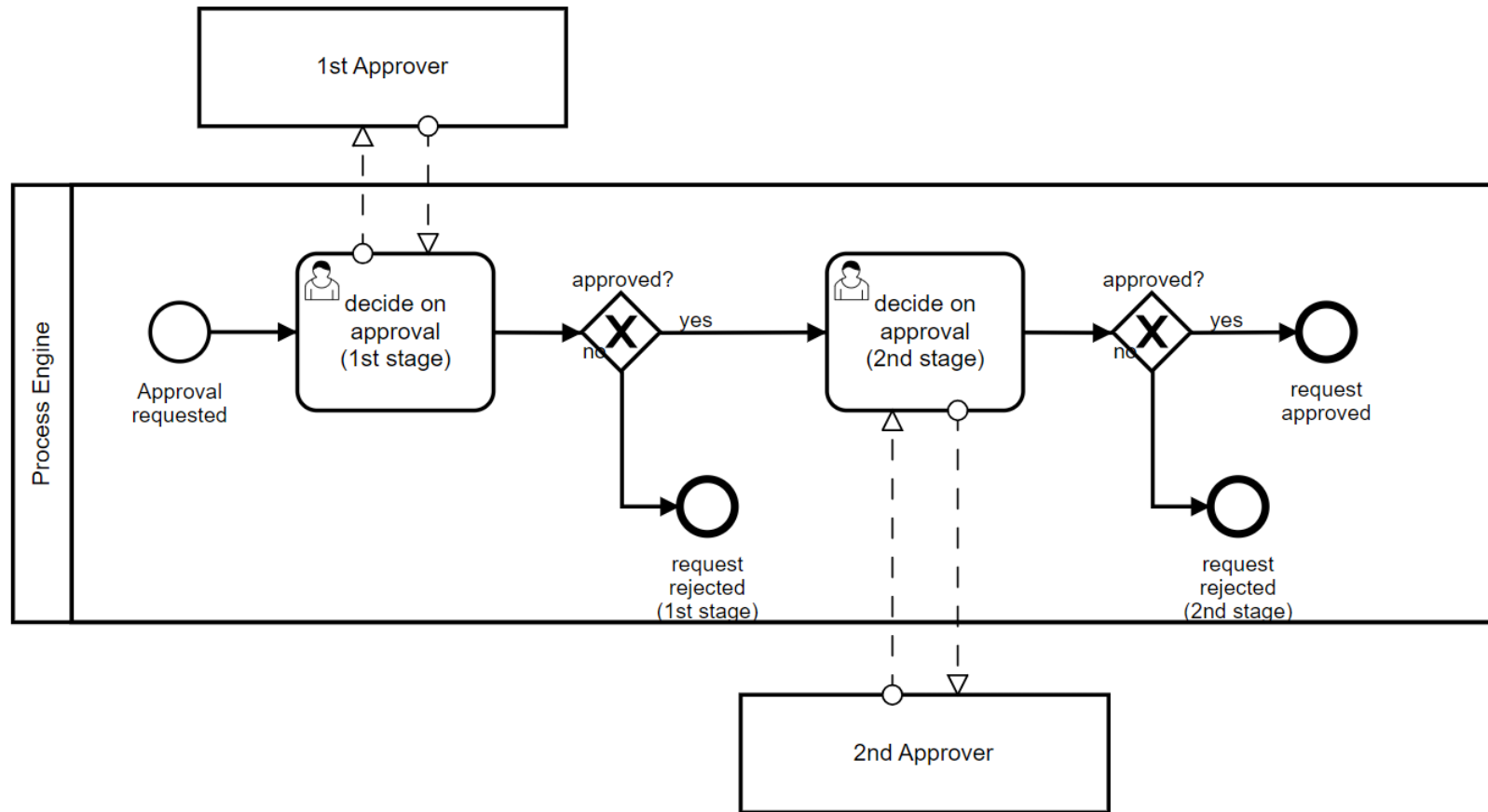
We will use the example of creating a bill. To create the bill, a discount needs to be computed. The sum of the order and the customer type are the relevant criteria to compute the discount.
This is a very simple example that will show us where to apply BPMN and where not to.
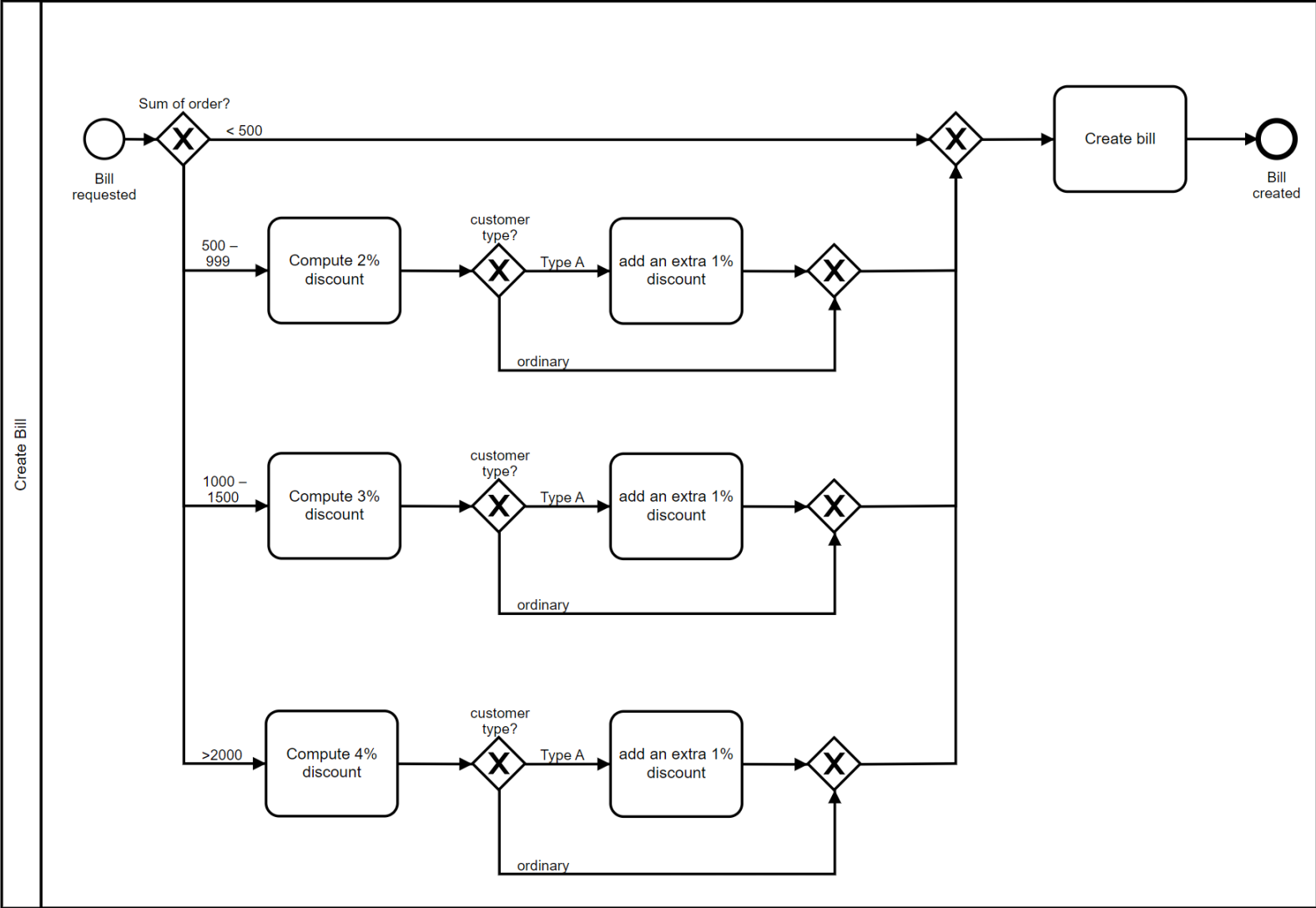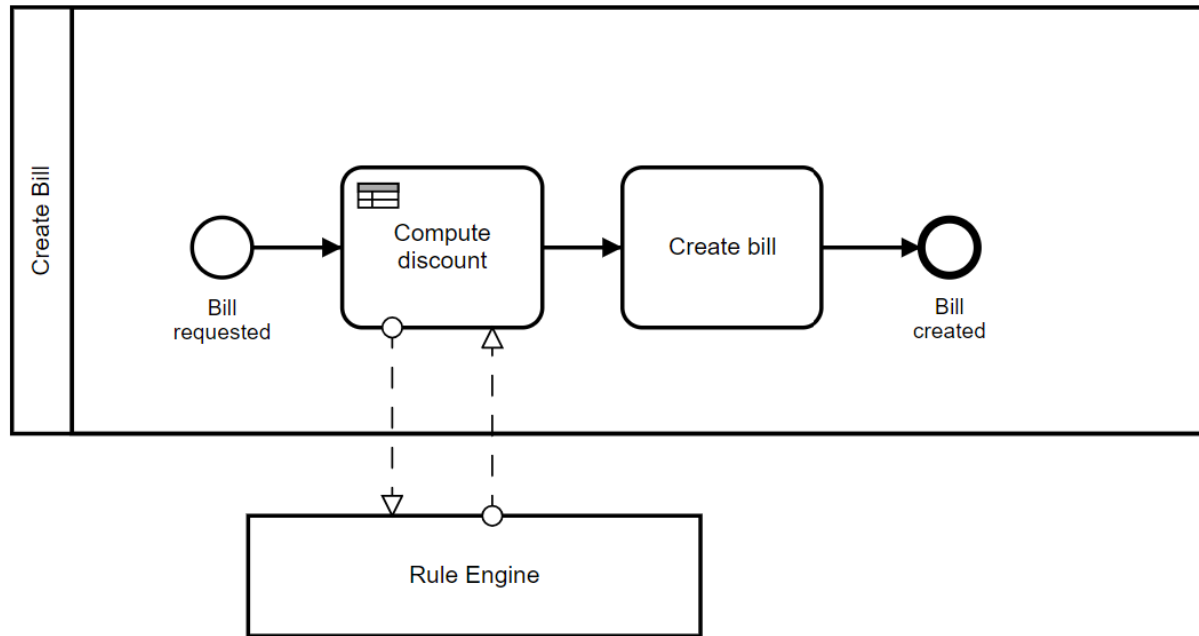
Indian Health Service
Questions & Discussion

HOWARD HAYS, MD, MSPH, FAAFP, FAMIA
CHIEF MEDICAL INFORMATION OFFICER (CMIO)

ROBERT LARIO, PH.D., MSE, MBA
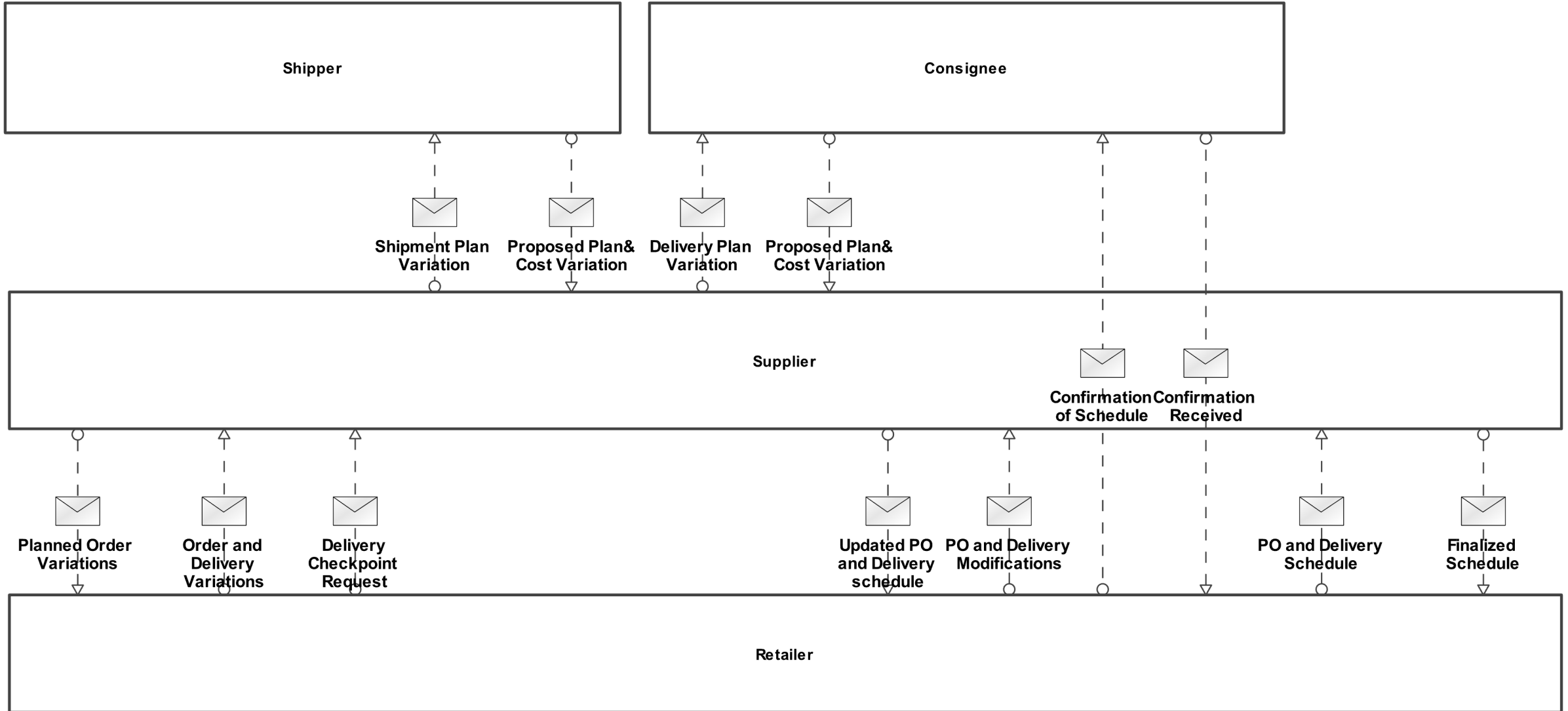IHS BUSINESS PROCESS MODELING CONSULTANT

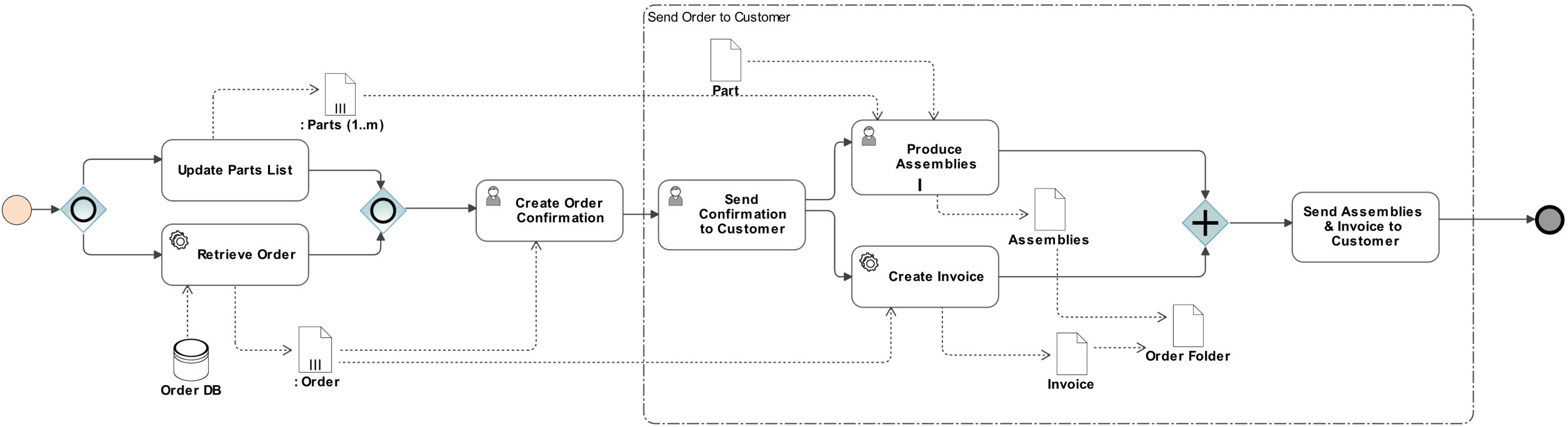11/12/23

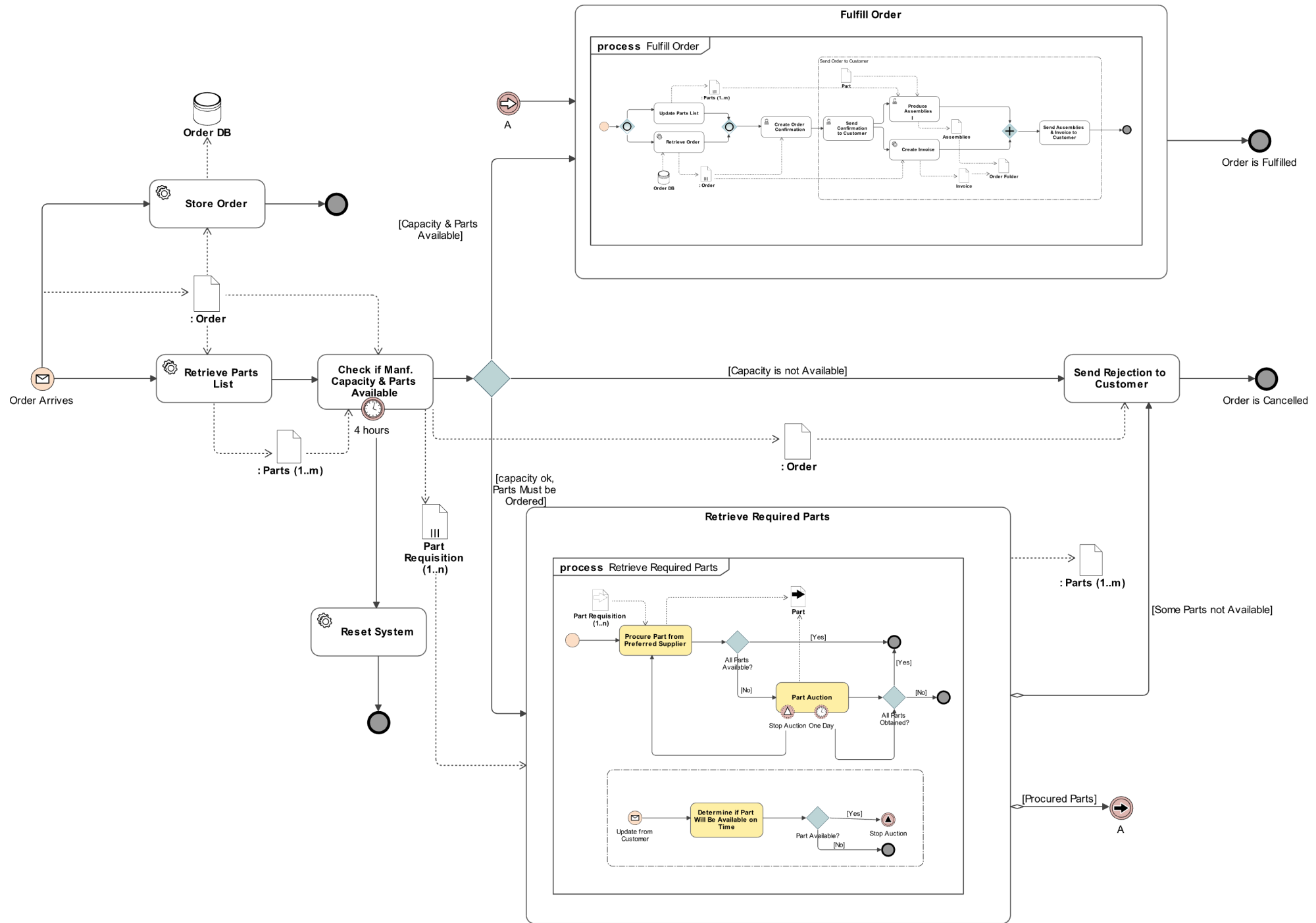# More Information about BPMN

OMG's Business Process Model and Notation Specification

www.omg.org/spec/BPMN/2.0.2/PDF

Collaboration With Pools
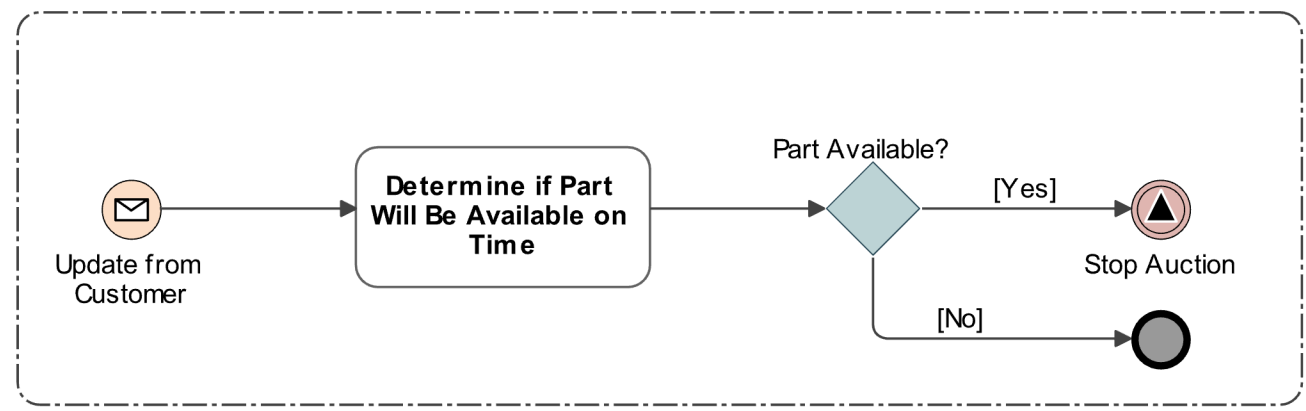
Fulfill Order

process Fulfill Order

Send Order to Customer

Update Parts List

: Parts (1..m)

Retrieve Order

Order DB

: Order

Create Order Confirmation

Send Confirmation to Customer

Part

Produce Assemblies

Assemblies

Create Invoice

Invoice

Order Folder

Send Assemblies & Invoice to Customer

Order is Fulfilled

A

Order DB

Store Order

: Order

Order Arrives

Retrieve Parts List

: Parts (1..m)

Check if Manf. Capacity & Parts Available

4 hours

Part Requisition (1..n)

Reset System

[Capacity & Parts Available]

[Capacity is not Available]

Send Rejection to Customer

Order is Cancelled

: Order

[capacity ok, Parts Must be Ordered]

[Some Parts not Available]

Retrieve Required Parts

: Parts (1..m)

process Retrieve Required Parts

Part Requisition (1..n)

Part

Procure Part from Preferred Supplier

All Parts Available?

[Yes]

[No]

Part Auction

Stop Auction One Day

All Parts Obtained?

[Yes]

[No]

Update from Customer

Determine if Part Will Be Available on Time

Part Available?

[Yes]

Stop Auction
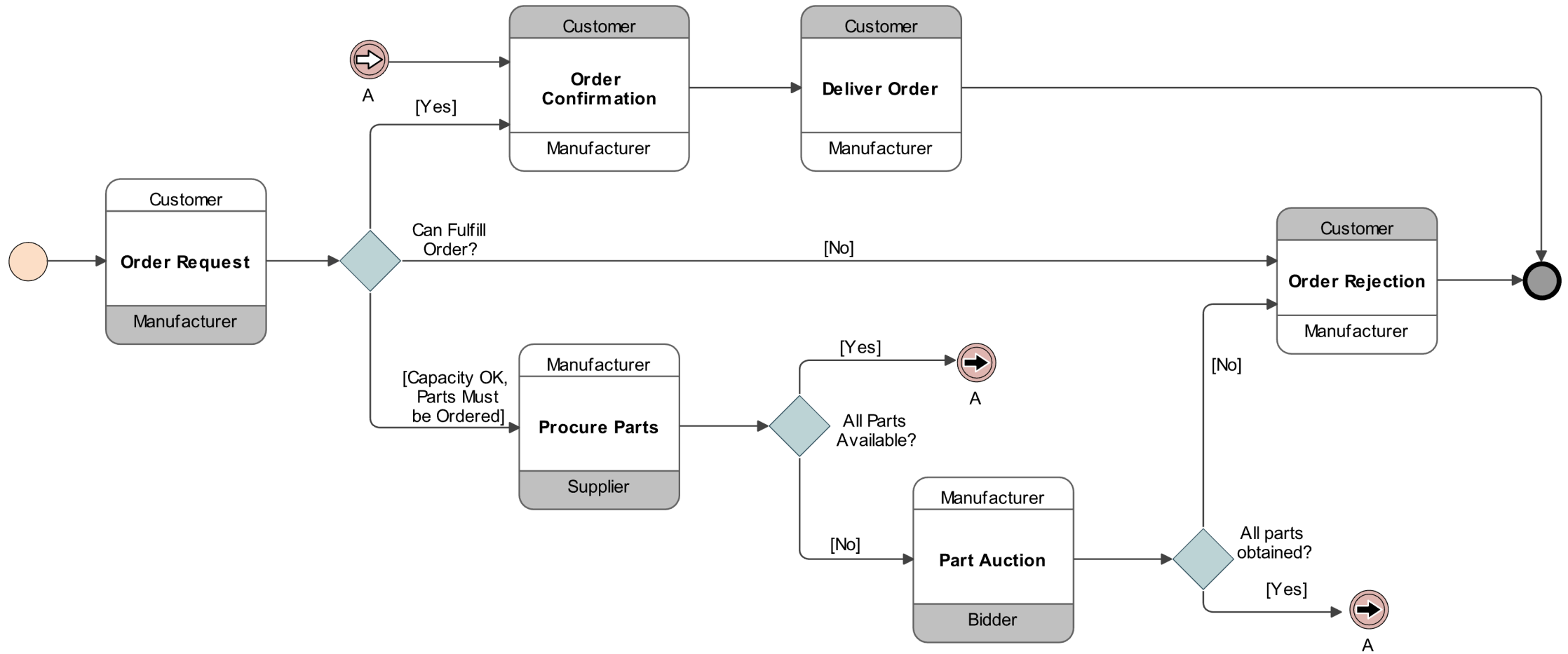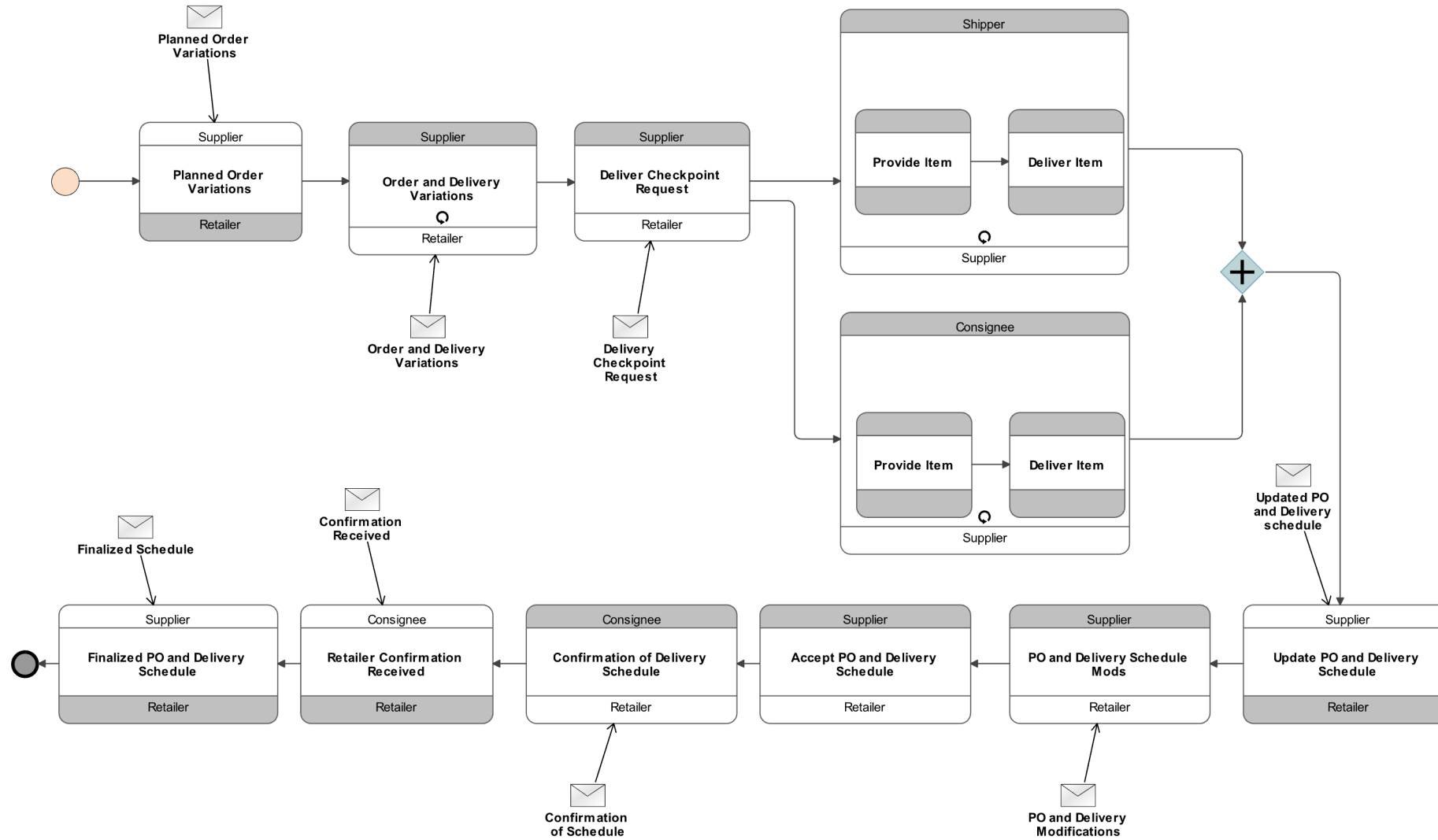
[No]

[Procured Parts]

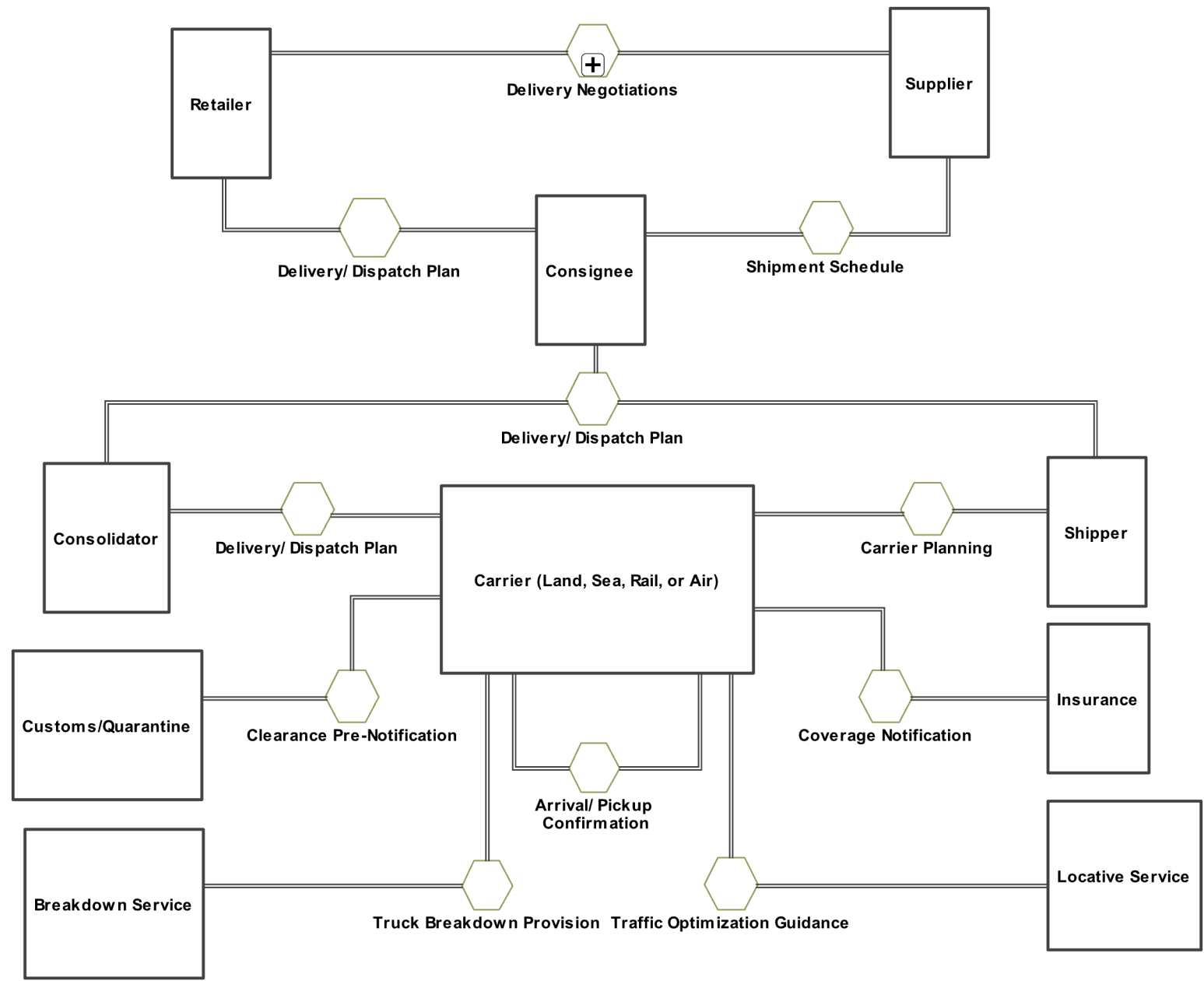A

11

79

Choreography

Source: Dassault Systems - Cameo Enterprise Architect Version 19 Example
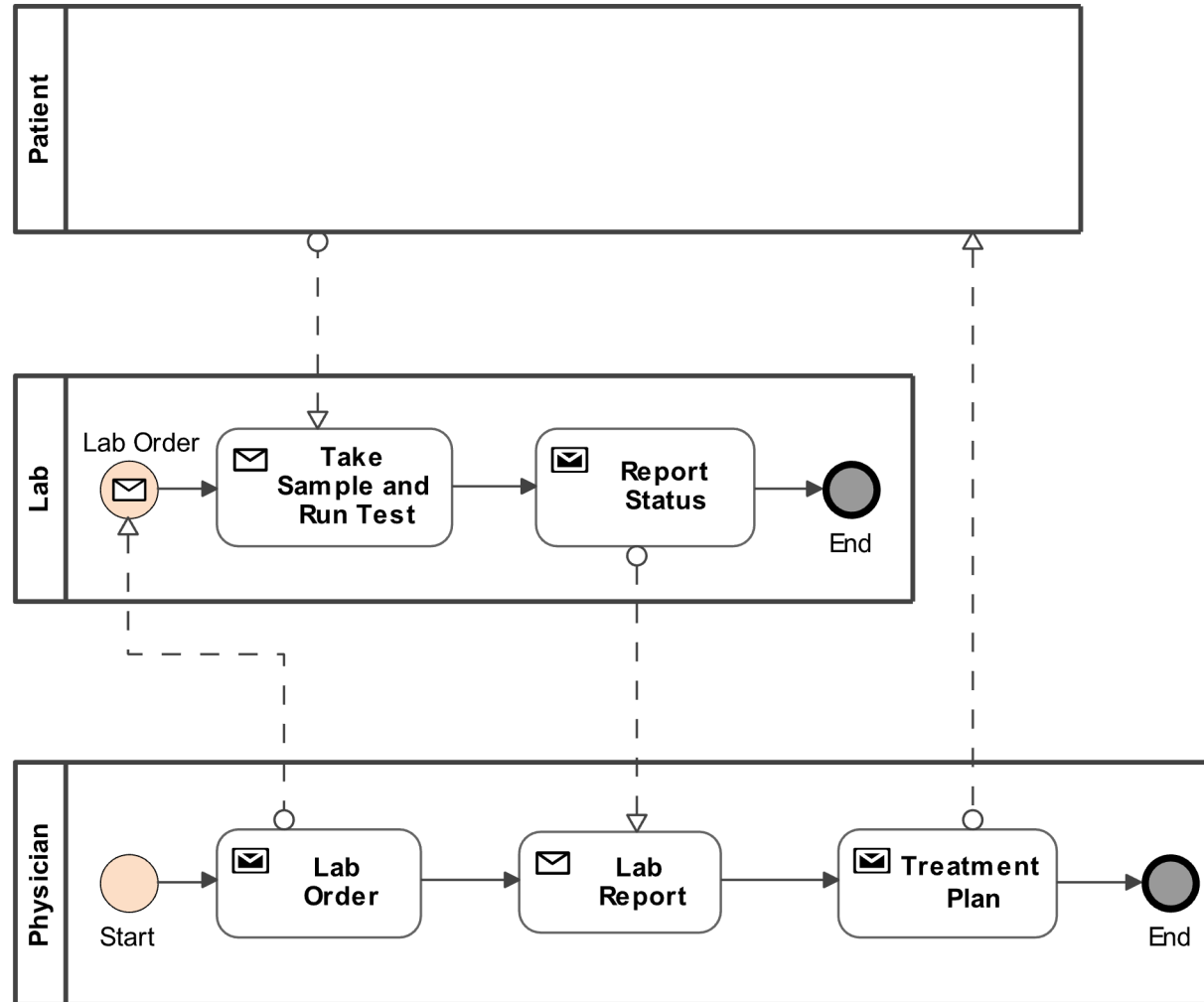
Choreography

Conversation

Source: Dassault Systems - Cameo Enterprise Architect Version 19 Example

Send Task

User Task requires human interaction or intervention.

Receive Task

User Task requires human interaction or intervention.