

Business Process Modelling

Historical View of BP Modelling

- Work Process Flow (early to mid 1900s)
 - + Frank Gilbreth & his 'Flow Process Charts' (= *flowcharts*)
 - + First structured method for documenting process flow
- Work Flow (mid-1970s)
 - + Motivation was disenchantment with the above
 - + Acted as a genesis for BP Modelling
- Business Process Modelling (2000s)
 - + Trend towards new manuf'ing paradigm - Virtual Enterprise
 - + VE=distributed & parallel BP execution from each VE entity
 - + Need effective process modelling with strict model analysis

Business Process Modelling- The “What?”

- Business process modelling (BPM) is the activity of representing processes of an enterprise, so that the current process may be analyzed and improved.
- Typically performed by business analysts & managers seeking to improve process efficiency and quality.
- The process improvements identified by BPM may or may not require IT involvement, although that is a common driver behind modelling a business process.

Business Process Modelling- The “Why?”

- Business process modelling (BPM) helps companies in the following ways:
 - + To become more process-oriented
 - + To optimise business processes thro *Process Change Mgmt*: long term planning, execution & control of processes
 - + To document and manage processes on an ongoing basis
 - + To simulate processes using, i.a. Monte Carlo simulation & Discrete Event Simulation

Business Process Modelling Notation

- Why BPM Notation (BPMN)?
 - + => a notation that can be understood by all business users.
 - + i.e. business analysts (creating initial drafts of processes)
 - + & technical developers (implementing technology performing those processes).
- Where does BPMN fit in with tools so far (WF/PNs)?
 - + swimlanes/WF not flexible for VE/whole organisations so BPMN encapsulates WF models thro use of swimlane diagrams
 - + process is sound = for each state reachable from the initial state, a firing seq exists leading system to the final state. In a process model with formal execution semantics, these types of properties can be defined precisely & verified automatically by tools.
 - + BPM Diagrams can be translated to PNs for analysis & verification.
 - + Can be mapped to UML.

BPMN – Yet Another Bloody Standard??

- *Business Process Management Initiative* (www.bpmi.org)
 - + established to promote & develop use of Business Process Management (BPM) through the use of standards for process design, deployment, execution, maintenance, and optimization of processes.
- BPMI has developed three standards to facilitate BPM
 - + *BPMN*, as a standard for modelling business processes,
 - + *Business Process Modelling Language (BPML)*, as the standard business execution language, &
 - + *Business Process Query Language (BPQL)*, a standard management interface for the deployment & execution of e-Business processes.

BPMN: Business Process Diagrams

- BPMN specifies one Business Process Diagram (BPD).
- Diagram designed to do two things well:
 - + easy to use and understand, used to quickly & easily model business processes, & easily understandable by non-tech users (usually mgmt).
 - + offers expressiveness to model very complex business processes & can be naturally mapped to business execution languages.
- Steps:
 - + model the events that occur to start a process, processes that get performed, & end results of the process flow.
 - + business decisions and branching of flows is modelled using gateways.
 - + process can contain sub-processes, shown by another BPD connected via a hyperlink to a process symbol.
 - If a process is not decomposed by sub-processes, considered a task - the lowest-level process.
 - A '+' mark in the process symbol denotes that the process is decomposed; if it doesn't have a '+' mark, it is a task.

BPMN: Business Process Diagrams

Pools & Lanes

- Pools
 - + a basic BPMN element setting the BP boundaries.
 - + it contains at most one business process.
 - + i.e. two processes must be modelled in two different pools.
 - + must create a pool first of all in a tool like Signavio.
- Lanes
 - + a sub-partition within a pool, is used to categorize BP activities.
 - + usually, a denotes an org role (developer, analyst and manager).
 - + however, may also be used for e.g first phase, second phase
 - + a lane is just a "activity-classifying mechanism"

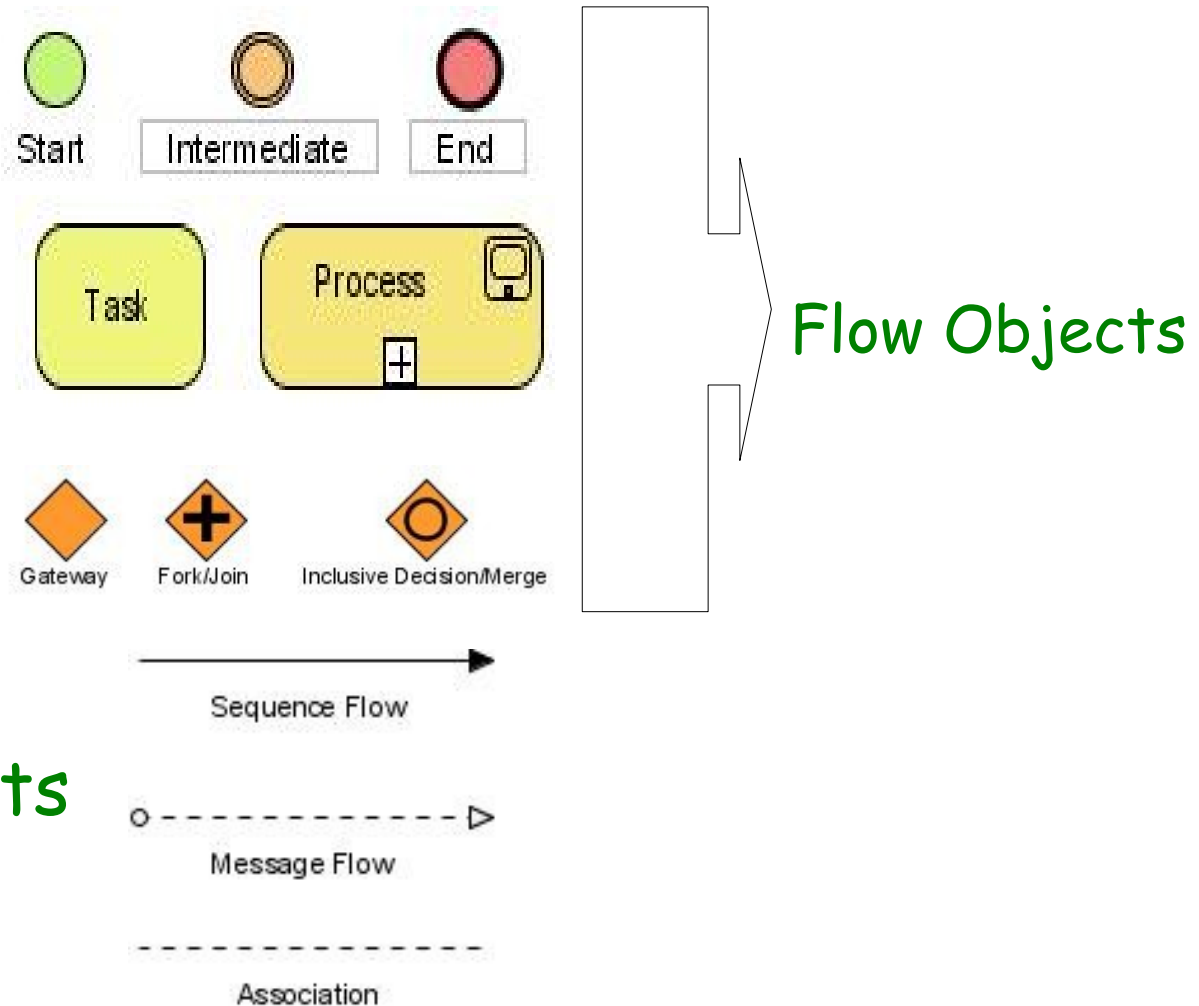
BPMN: Business Process Diagrams

The 4 basic categories of elements in BP Diagrams are:

- + Flow Objects
- + Connecting Objects
- + Swimlanes
- + Artifacts

BPM Notation: Flow Objects & Connecting Objects

- Events
- Activities
- Gateways
- Connecting Objects



BPM Notation: Flow Objects: Events

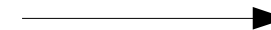
- Represented with a circle
- Denotes something that happens (rather than Activities which are something that is done).
- Icons within the circle denote type of event (e.g. envelope for message, clock for time).
- Events are also classified as
 - + *Catching* (ie catch an incoming message to Start process) or
 - + *Throwing* (ie throw a message at End of process).
- Types: Start, Intermediate, End

BPM Notation: Flow Objects: Events

- **Start event:**
 - + triggers process;
 - + indicated by a single narrow border;
 - + can only be *Catch*, so shown with open (outline) icon.
- **End event:**
 - + represents result of a process;
 - + indicated by a single thick/bold border;
 - + can only *Throw*, so shown with a solid icon.
- **Intermediate event:**
 - + something happening btw start & end events;
 - + indicated by a tramline border;
 - + can *Throw* or *Catch* (using solid/open icons as appropriate) - eg, task could flow to an event throwing a message to another pool & a subsequent event waits to catch the response before continuing.

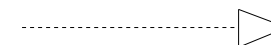
BPM Notation: Connecting Objects

- **Sequence Flow:**



- + represented by a solid line with a solid arrowhead
- + used to show order (sequence) that activities will be performed in a Process.

- **Message Flow:**



- + represented by a dashed line with an open arrowhead
- + used to show flow of messages btw 2 separate Process Participants (business entities/business roles) that send & receive them.
- + in BPMN, 2 separate Pools in Diagram will represent two Participants.

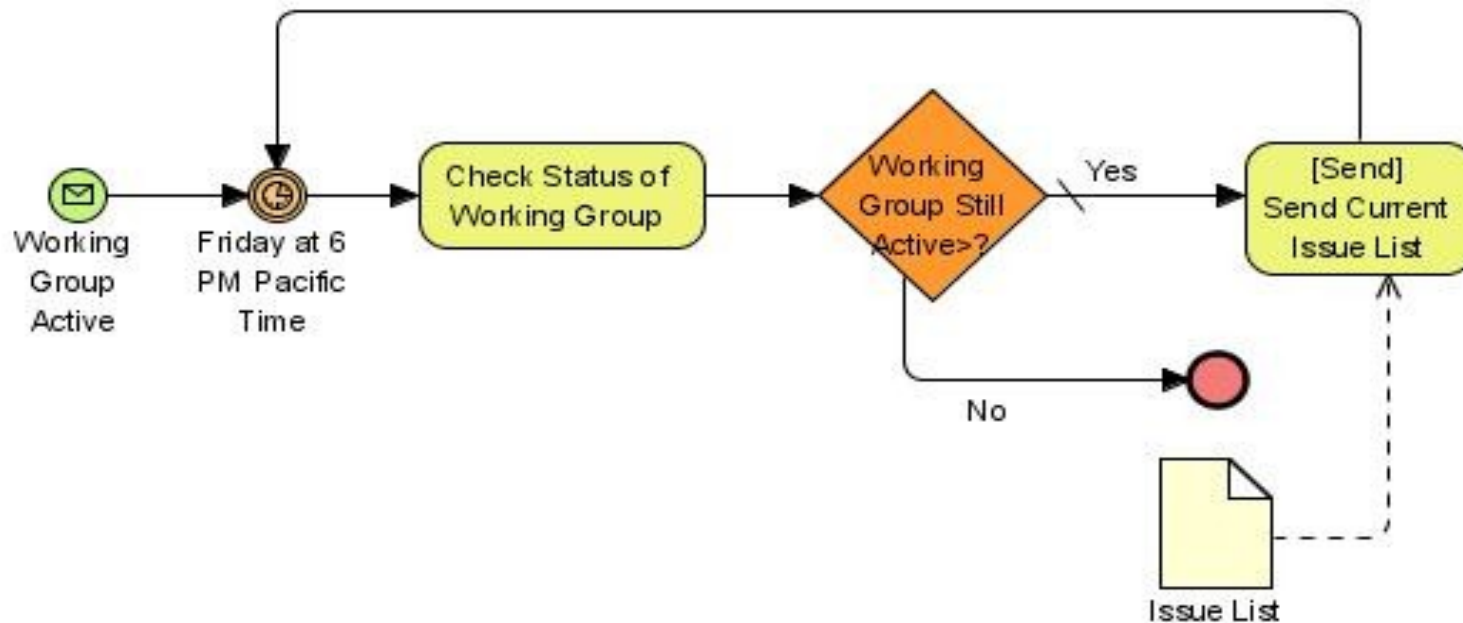
- **Association:**



- + represented by a dotted line with a line arrowhead
- + used to associate data, text, & other Artifacts with flow objects.
- + used to show inputs & outputs of activities..

BPMN Notation: Example 1

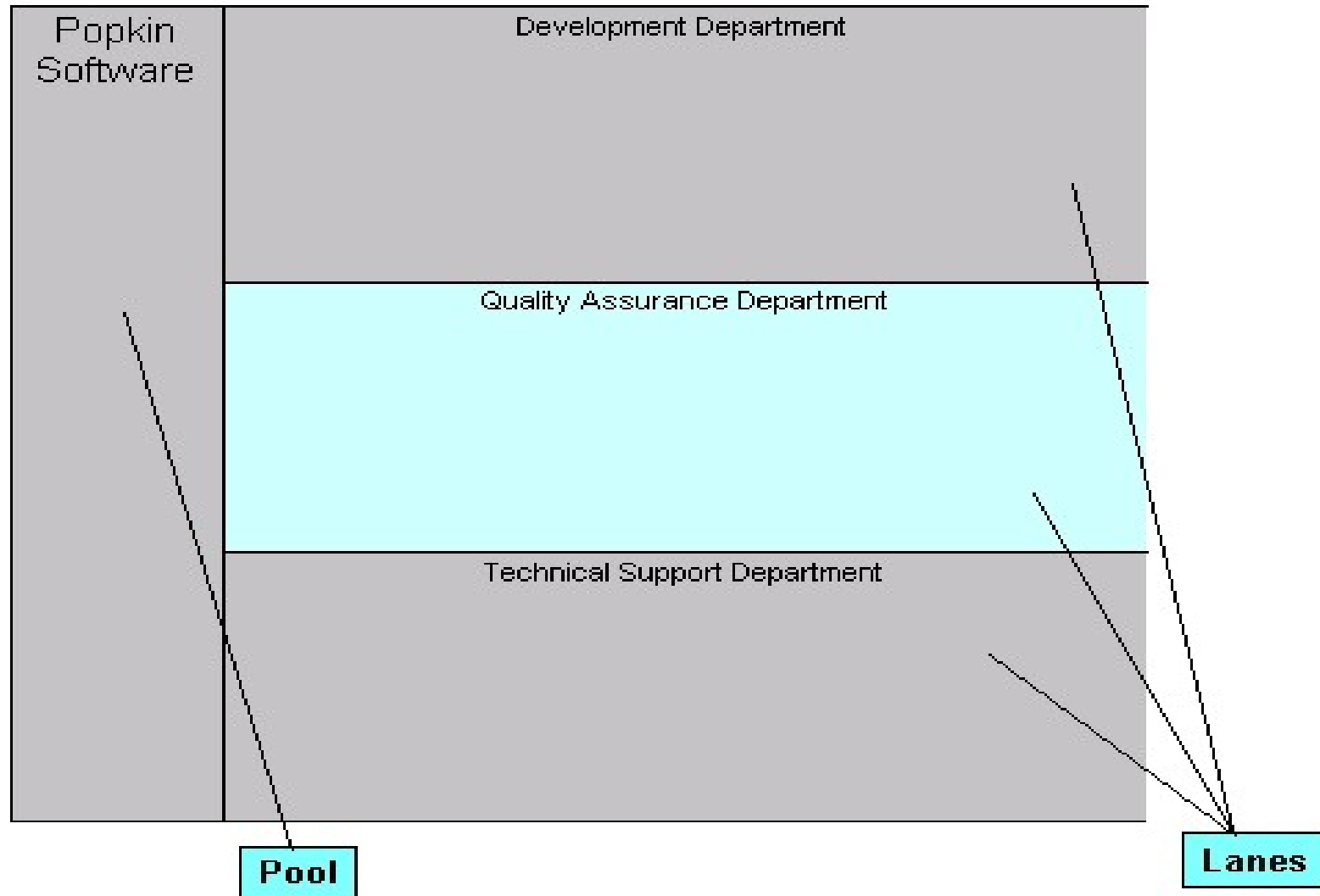
- Example: A process with a normal flow with the Business Process Modeling Notation.



BPM Notation: Swimlanes

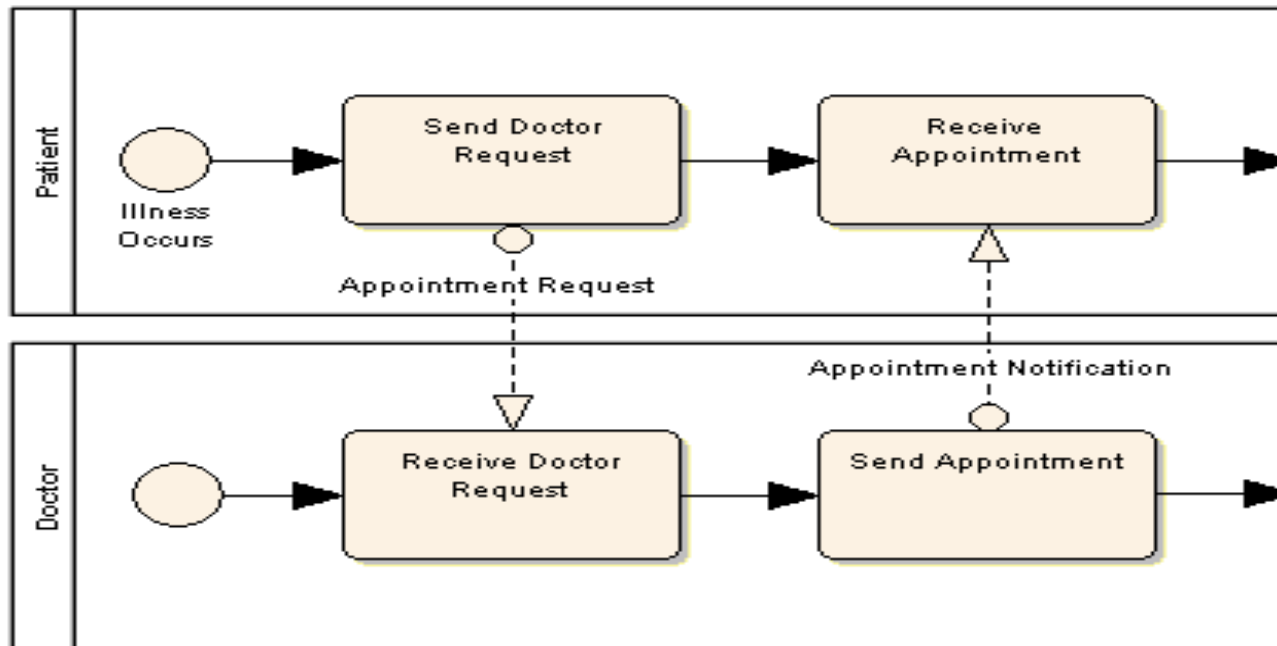
- As seen, swimlanes are a mechanism to organize activities into separate visual categories to illustrate different functional capabilities or responsibilities. BPMN supports swimlanes with two main constructs. The two types of BPD swimlane objects are:
 - Pool:
 - + represents a participant in a process.
 - + also acts as a graphical container for partitioning a set of activities from other Pools usually in the context of B2B situations.
 - Lane:
 - + a sub-partition within a Pool extending entire length of the Pool, either vertically or horizontally.
 - + used to organize & categorize activities.

BPM Notation: Swimlanes cont'd



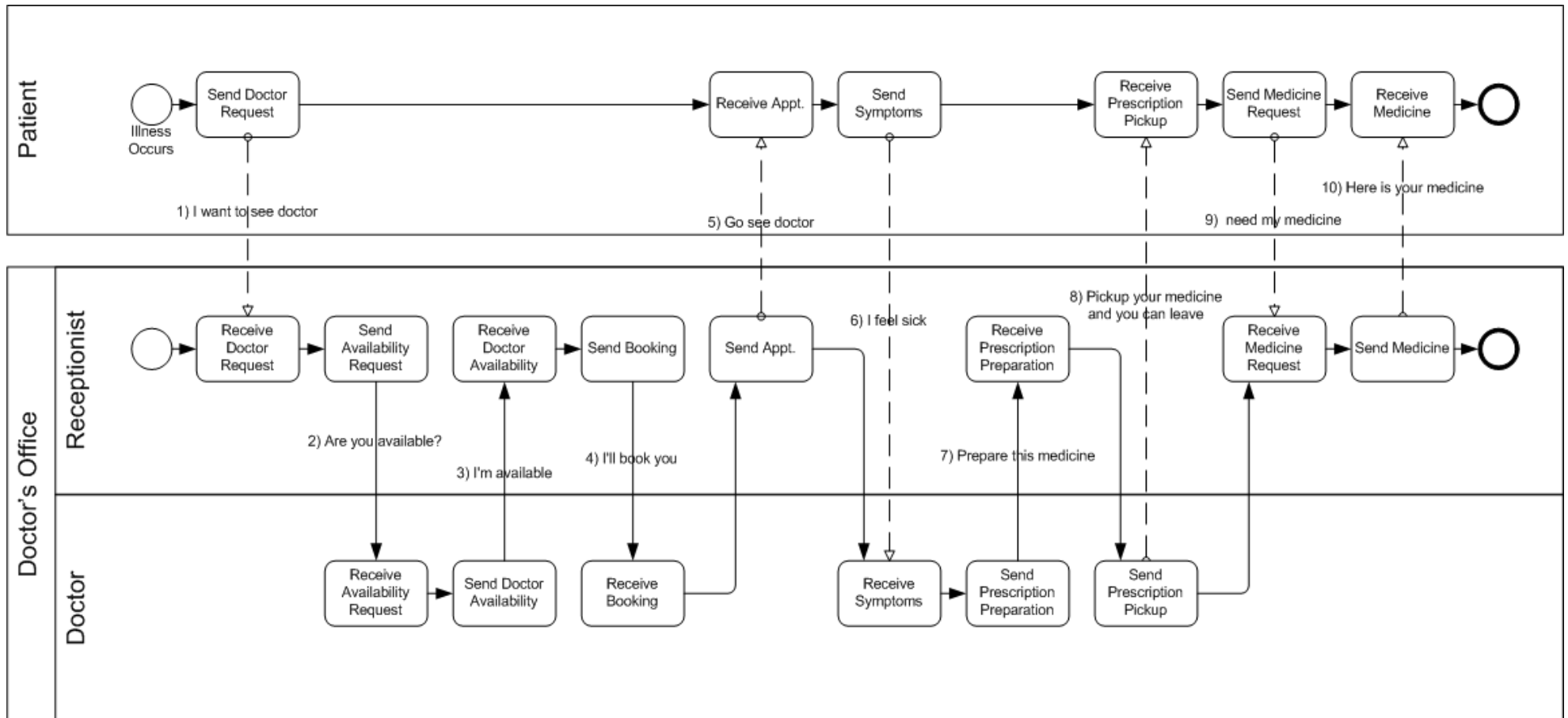
BPM Notation: Example 2(a): Swimlanes

- Pools are used when diagram involves 2 separate business entities or participants & are physically separated in the diagram.
- The activities in separate Pools are considered self-contained Processes.
 - + => Sequence Flow may not cross a Pool boundary.
 - + Message Flow is defined as the mechanism to show communication between 2 participants, & thus, must connect between 2 Pools (or the objects in the Pools).



BPMN Notation: Example 2b: Swimlanes

- The BPMN Diagram below shows a more pedantic form of 2(a)
- In this, the interaction between Patient & Doctor's Office is by means of requests which have to take the form of messages.



BPM Notation: Artifacts

- BPMN designed to allow modellers and modelling tools flexibility in extending basic notation & in providing ability to add additional context appropriate to a specific modelling situation.
- Any number of Artifacts can be added to a diagram as appropriate for the context of the business processes being modelled.
- Current version of BPMN specification pre-defines only 3 types of BPD Artifacts:

BPM Notation: Artifacts cont'd

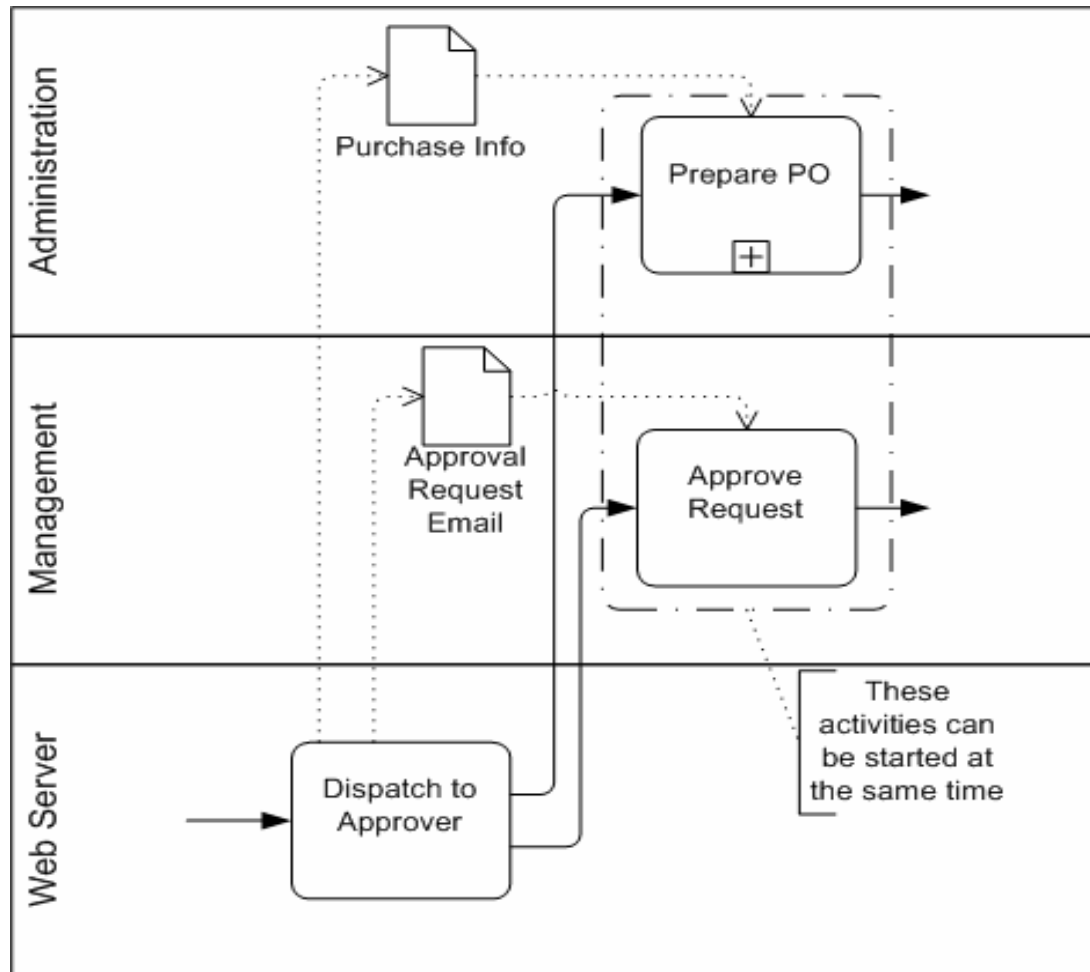
- BPMN specification pre-defines only 3 types of BPD Artifacts:
- Data Objects:
 - + mechanism to show how data is required or produced by activities.
 - + connected to activities through Associations.
- Group:
 - + repr'ted by a rounded corner rectangle drawn with a dashed line
 - + can be used for documentation or analysis purposes, but does not affect the Sequence Flow.
 - + used to organize & categorize activities.
- Annotations:
 - + repr'ted by an open rectangle containing annotation text.
 - + mechanism for a modeller to provide additional text info for reader of a BPMN Diagram



Text Annotation Allows a Modeler to provide additional Information

BPM Notation: Example 2

- A Segment of a Process with Data Objects, Groups, and Annotations



BPMN Software

- Every org'n has their very own distinct bps which differentiate them from their competitors.
- Some have predefined processes, some have processes which are defined by the employees themselves.
 - + (eg Customer Support: Imagine what would happen if cs rep had his/her way of managing a customer. Need a proper bp to handle cs)
- Every org'n needs a practical step by step BPM approach which works together with BPM solutions.
- Lately, with advanced web-based solutions, bps & wfs can be managed through BPMgmt solutions.

BPMN Software cont'd

- These BPMgmt solutions can be used to easily create applications to automate processes such as:
 - + Change management
 - + Quality control
 - + Customer service
 - + Claims management
 - + Complaint management
 - + Procurement
- There are many BPM / WF solutions out there. Will look at some *open source* solutions to evaluate before looking at the proprietary/commercial ones.

BPMN Software cont'd:

- ProcessMaker: open source, BPMgmt & WF s/w designed for SMEs.
- User friendly solution to manage WF effectively and efficiently.
- Business users & process experts without programming experience can design & run WFs, automate processes across systems ie HR, finance & operations.
- Can easily create WF maps, design custom forms, extract data from external data sources to optimize WF mgmt & bus. ops.
- one advantage is online library with process templates to download & edit to reduce learning curve. Process templates include:
 - + Credit card application
 - + Expense report process
- **Review at** <http://www.wareprise.com/2009/04/12/an-initial-review-of-processmaker-open-source-bpm/>

BPMN Software cont'd:



- Bonita Open Solution is an intuitive & powerful open source BPMgmt solution applicable to simple & complex processes.
- The Bonita Studio which meets BPMN is part of the Bonita Open Solution including Bonita Execution Engine & Bonita User Experience.
- One strong point about Bonita Open Solution is its great user experience which is quite similar to standard email Inbox to easily and quickly organize your work, follow up on tasks / cases and collaborate with colleagues.

BPMN Software cont'd:

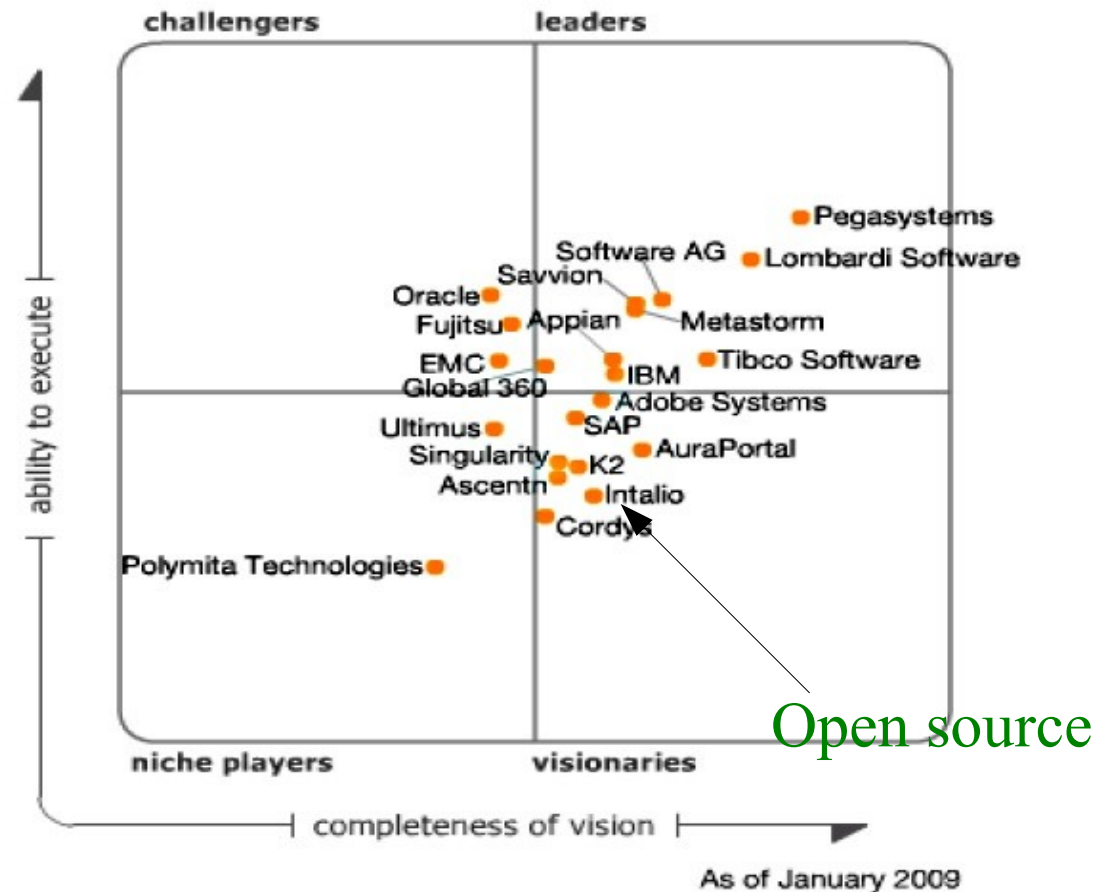


- Unlike ProcessMaker, CuteFlow is a web based open source document circulation & workflow system.
- Users able to define "documents" for sending step by step to every station/user in a list.
- Cuteflow helps to automate document circulation process within office internal environment.
- All operations like starting a WF, tracking, WF-definition or status observation done within a comfortable and easy to use web interface.
- Some key features of Cuteflow include:
 - + Integration of workflow documents in e-mail message
 - + Unlimited amount of sender, fields, slots, receiver...
 - + Workflows can attach data and files
 - + Flexible user management with substitutes
 - + Wide user base

BPMN Software cont'd: Commercial

- Figure 1 (from Gartner) evaluated on:
 - + Implementation of a Specific Process-Based Application
 - + Support for a Continuous Process Improvement Mentality
 - + Redesign for a Process-Based SOA
 - + Business Transformation Initiatives

Figure 1. Magic Quadrant for Business Process Management Suites



Source: Gartner (February 2009)

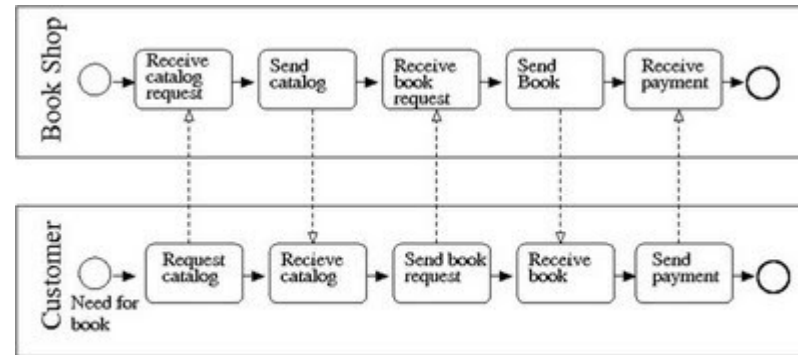
BPMN Software cont'd: Lombardi

<http://www.youtube.com/watch?v=GEGdEiQ2WvM>

More BPMN Examples

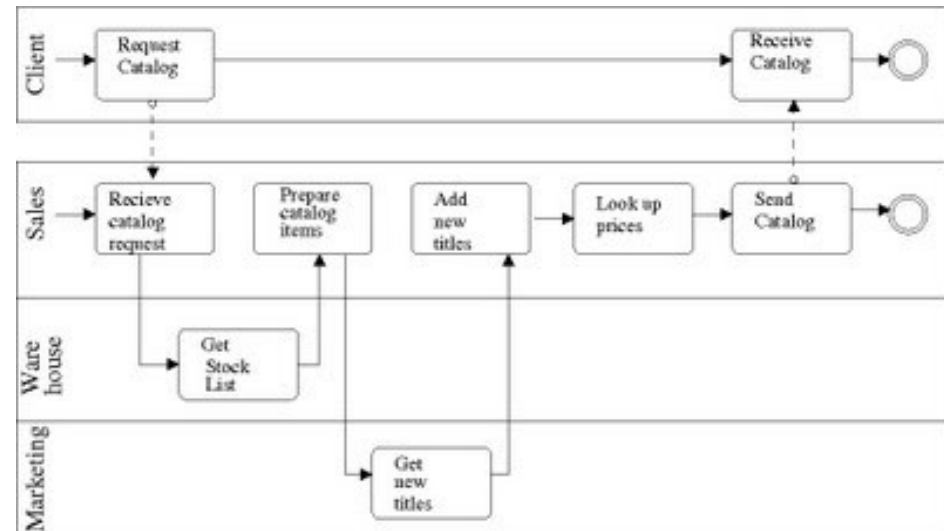
Example 3: Buying a Book

(a) Some conversation between 2 pools



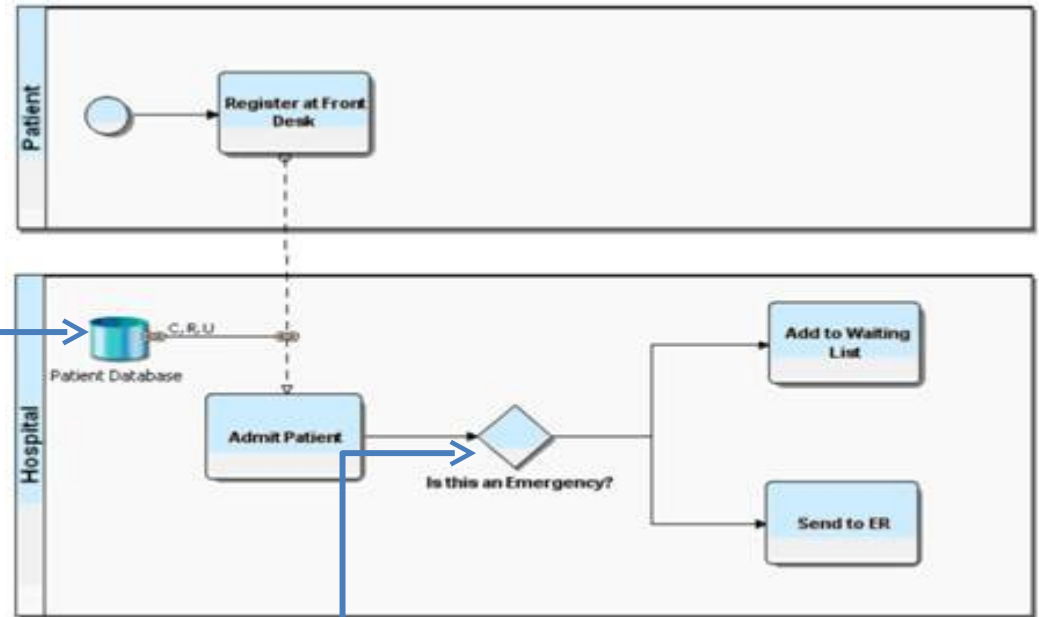
Example BPD with pools

(b) A more complex version of (a) involving more interplay in one pool



Example 4: Hospital Admission

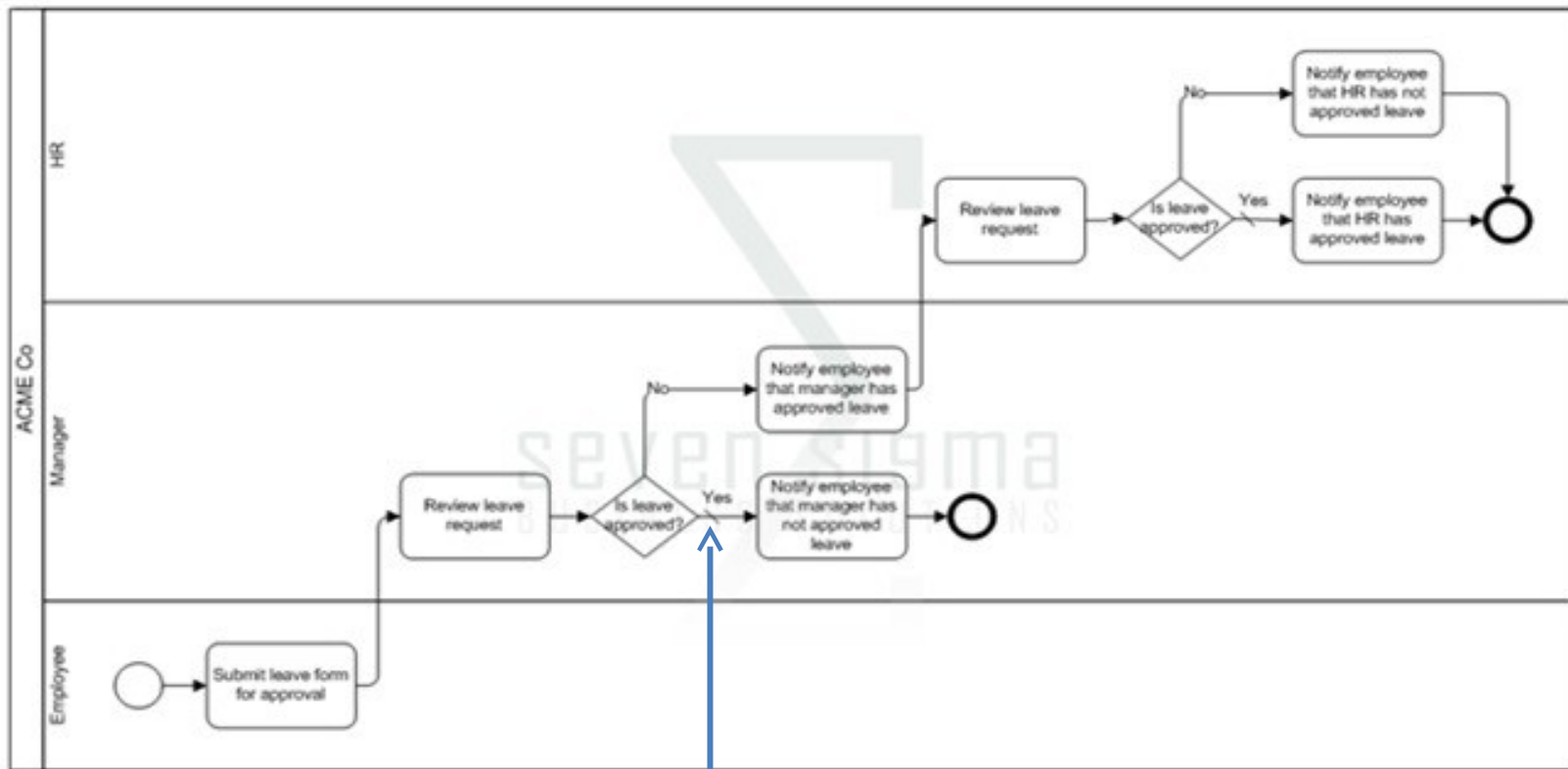
Note the way that Registration Details are handled. This could also be done using a data object representing the patient's details:



Note the exclusive gateway where sequence diverges. This can also be represented with an X, e.g.:



Example 5: Applying for Leave

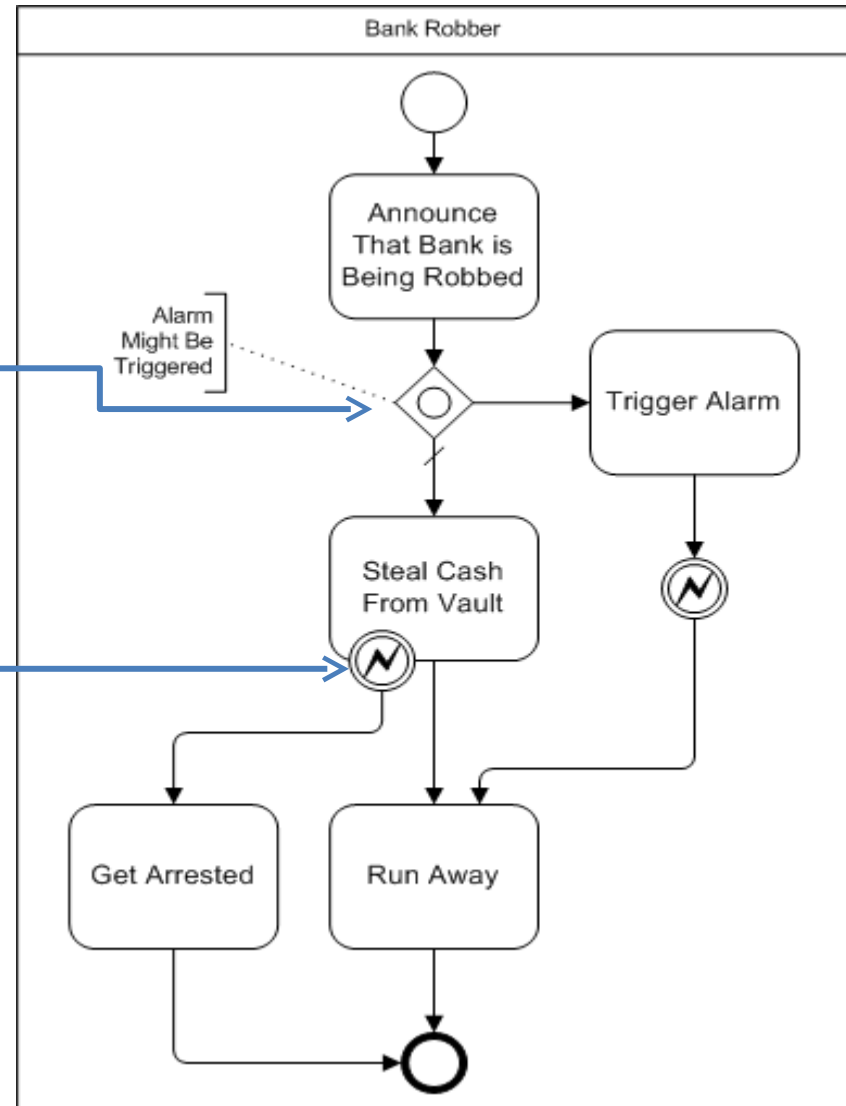


Note the tic to represent default option

Example 6: The Bank Robber

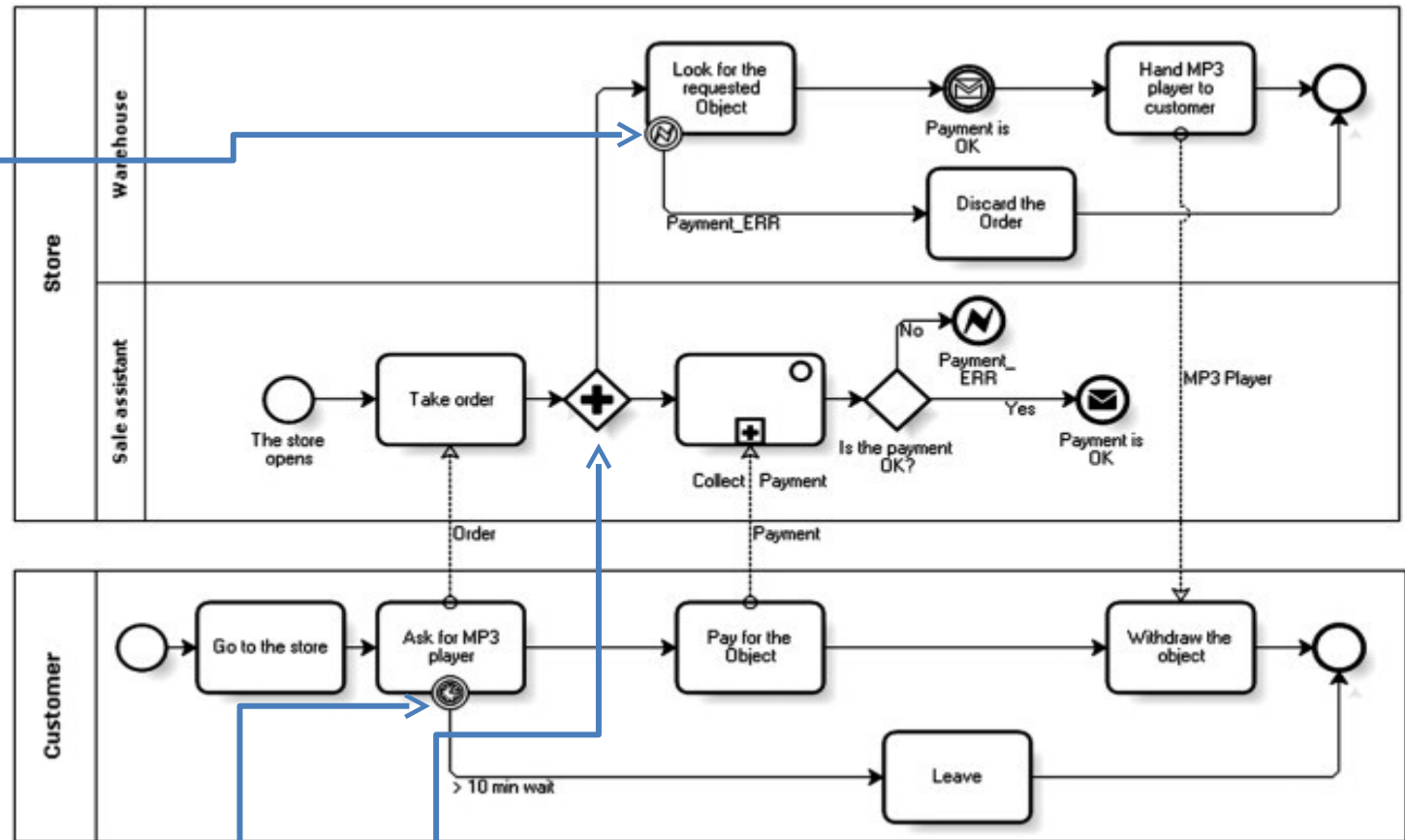
Note the inclusive gateway.
This is used to represent a decision where one, some or all options are valid.

Note the new intermediate event representing an error or exception



Example 7: Buying an MP3 at An Argos Store

Note the new intermediate event representing an error or exception

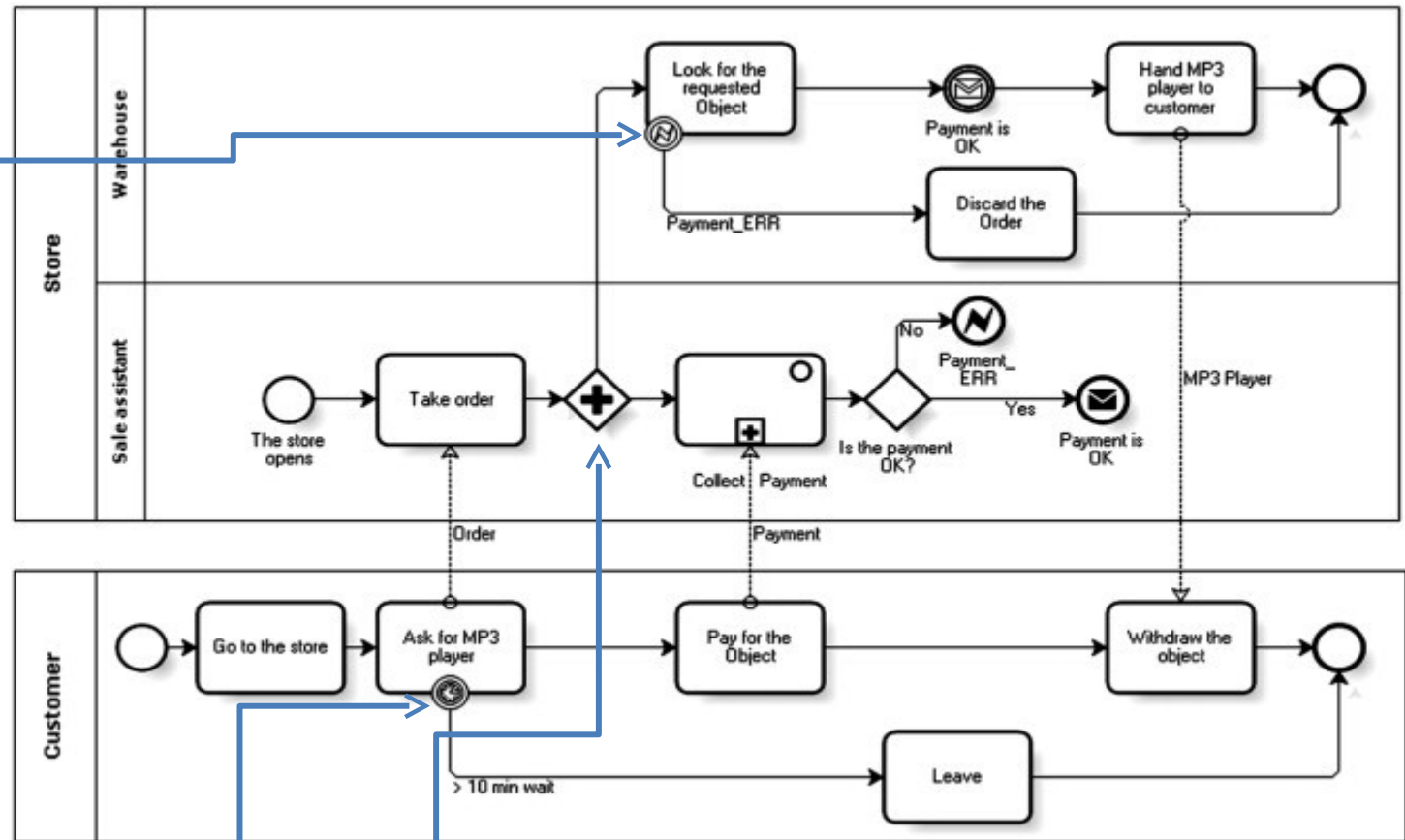


Note the intermediate timer event

Note the parallel gateway representing all sequences happening

Example 8: Buying an MP3 at An Argos Store

Note the new intermediate event representing an error or exception

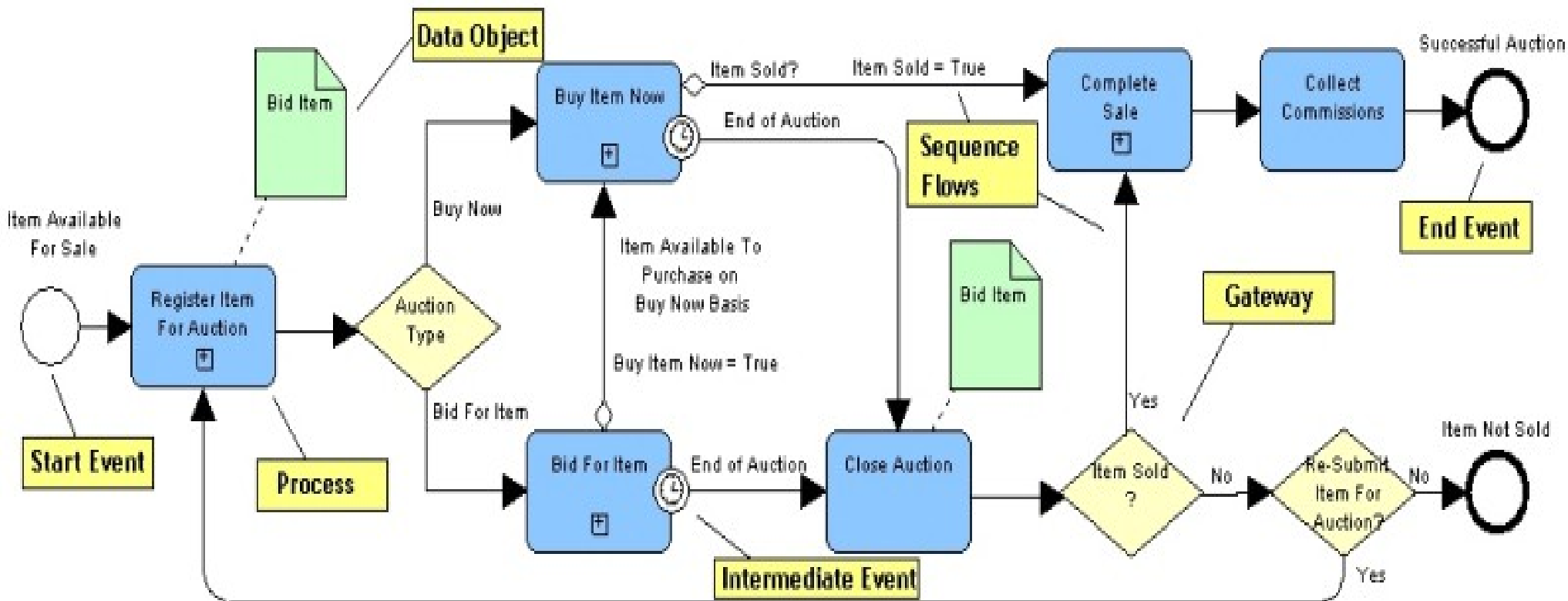


Note the intermediate timer event

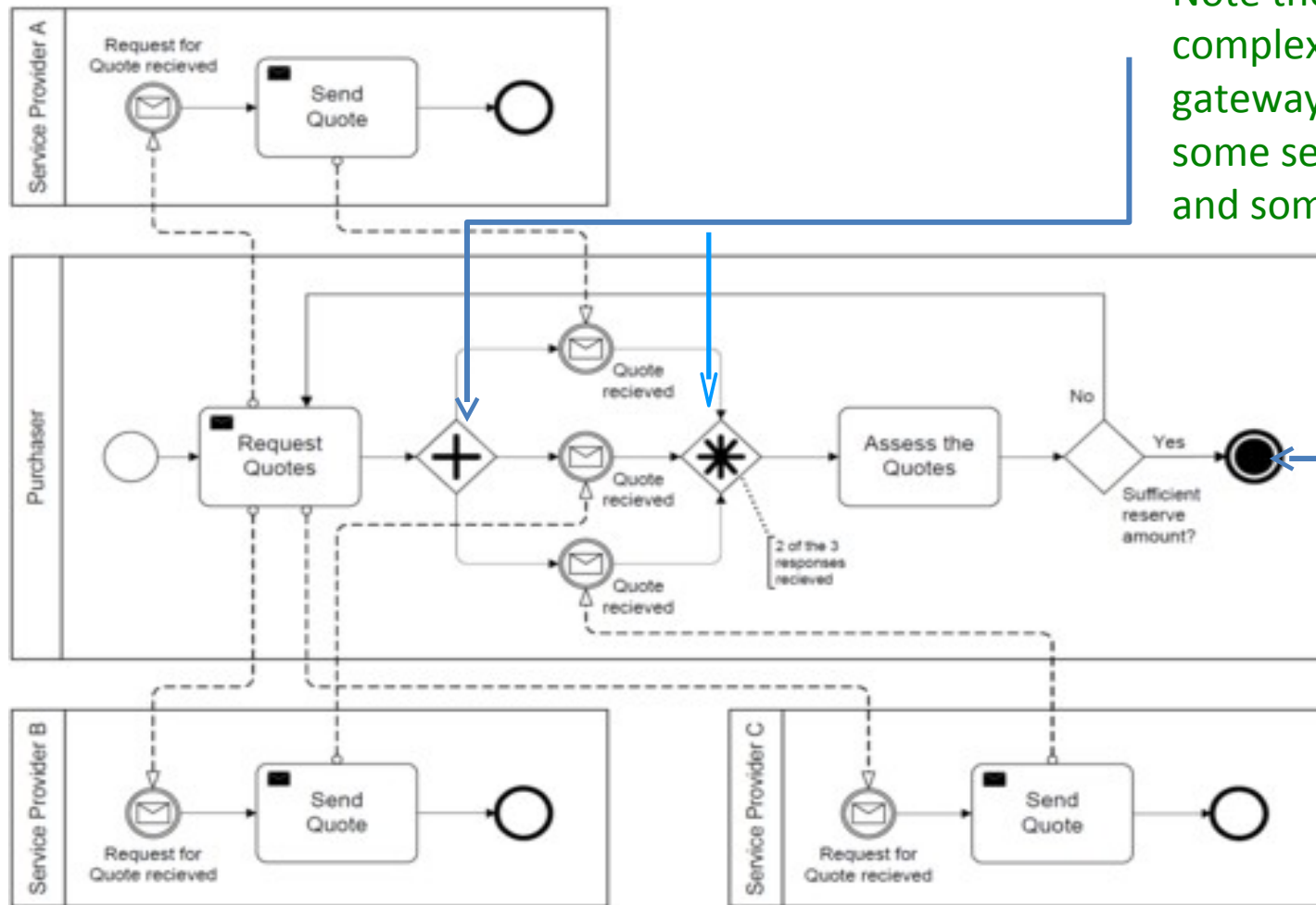
Note the parallel gateway representing all sequences happening

Example 9: An Ebay Auction

“Draw a BPMN diagram for an online auction purchase process. Your diagram does not need to include the “make-offer” components, but should include components for “buy-it-now” and “bid”. Identify the different categories of BPMN elements in your diagram.”



Example 10: Client Getting Quotes (More Complex Stuff)



Note the parallel splitting & complex merging gateways representing some sequences happening and some not.

Note the 'terminate' End event meaning "Stop everything"

References

“Introduction to BPMN”, Stephen A. White, IBM Corporation, available to download on <http://www.bpmn.org/>

“BPMN and Business Process Management: Introduction to the New Business Process Modeling Standard” Martin Owen and Jog Raj, Popkin Software available to download on <http://www.bpmn.org/>

“Process Management, A Guide for the Design of Business Processes”, By Jorg Becker, Martin Kugeler, Michael Roseman, Springer Verlag