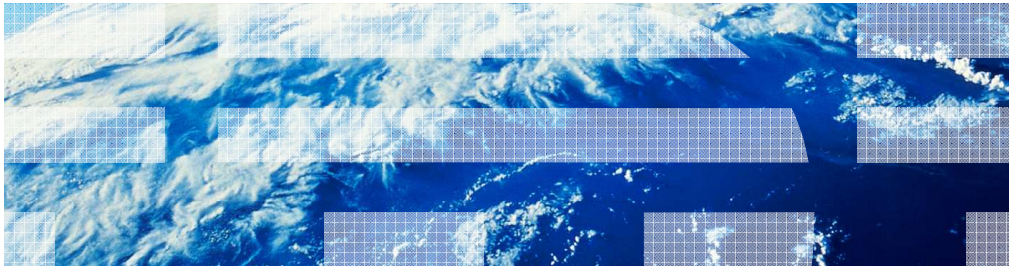


Business Process Management IBM Business Process Manager V7.5.1

BPMN 2.0 notation update



This presentation will cover three newly introduced BPMN 2.0 features for modeling business processes using asynchronous events.

Agenda

- Business Process Model and Notation (BPMN) 2.0 updates
- Events
 - Message
 - Gateway
 - Event sub-process (EVSP)



There have been significant improvements in the way the information is displayed in the business process definition. These improvements come with the adoption of the Business Process Model and Notation standard, version 2.0.

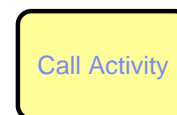
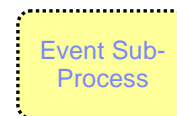
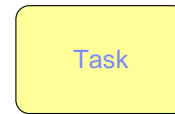
The BPMN 2.0 standard encompasses a wide range of modeling concepts. Not all of them are implemented in BPM V7.5.1. This is an evolving process. The standard features are implemented as they become relevant in the context of the IBM Business Process Management Suite.

As part of the BPMN 2.0 update the event messaging features have been expanded to provide a richer, more complete and consistent modeling paradigm. With this release, BPM V7.5.1 supports, the send message, event gateway and the event sub-process.

These new event features are discussed in detail in subsequent slides.

BPMN 2.0: Activities

- There are four kinds of activities
 - Task
 - a unit of work, the job to be performed.
 - Transaction
 - a set of activities that logically belong together;
 - it might follow a specified transaction protocol.
 - Event Sub-process
 - A special Sub-process that is activated by an event.
 - It is activated when its start event gets triggered
 - It can interrupt the higher level process context or
 - run in parallel (non-interrupting) depending on the start event.
 - Call Activity
 - a globally defined Sub-Process or Task that is reused in the current process.



With BPMN 2.0 there are four kinds of activities; task, transaction, event sub-process, and the call activity.

The most commonly used kind of activity is the task. It is the unit of work to be performed. It is the basic building block in a business process flow.

The next kind of activity is the transaction. It provides a way to group a set of related tasks together. This activity is shown in gray here, because it is not supported by BPM V7.5.1.

The event sub-process represents a group of activities that are run when an event occurs. A typical example might be when there is an error or when a step in the process is taking too long. In either case an event can be triggered which will activate the sub-process. The sub-process can be interrupting or non-interrupting. If it is non-interrupting, then it will run in parallel with the containing Business Process Definition. The interrupting behavior is determined by the type of start message used. This is discussed more in subsequent slides.

The 'call activity' represents a link to a globally defined business process. In the case of BPM V7.5.1, this is a business process definition. The call activity provides a way to reuse a business process definition in a different context.

The transaction activity is not implemented in BPM V7.5.1

BPMN 2.0: Gateways

Listed here are the BPMN 2.0 gateways that are supported by BPM V7.5.1

No new symbols have been introduced, but there are three terminology changes.

The decision gateway is now the exclusive gateway,

The simple split or join gateway is now the parallel gateway,

and the conditional split or join gateway is now the inclusive gateway.

All of the gateways except the event gateway, are dual purpose. That is, they are used to split the flow and then the same kind of gateway is used to join the flow back together.

The exclusive gateway is the easiest to understand and work with. It will split the incoming flow into two or more branches, but only one branch can be taken. When used as a join, it will wait until the branch taken completes.

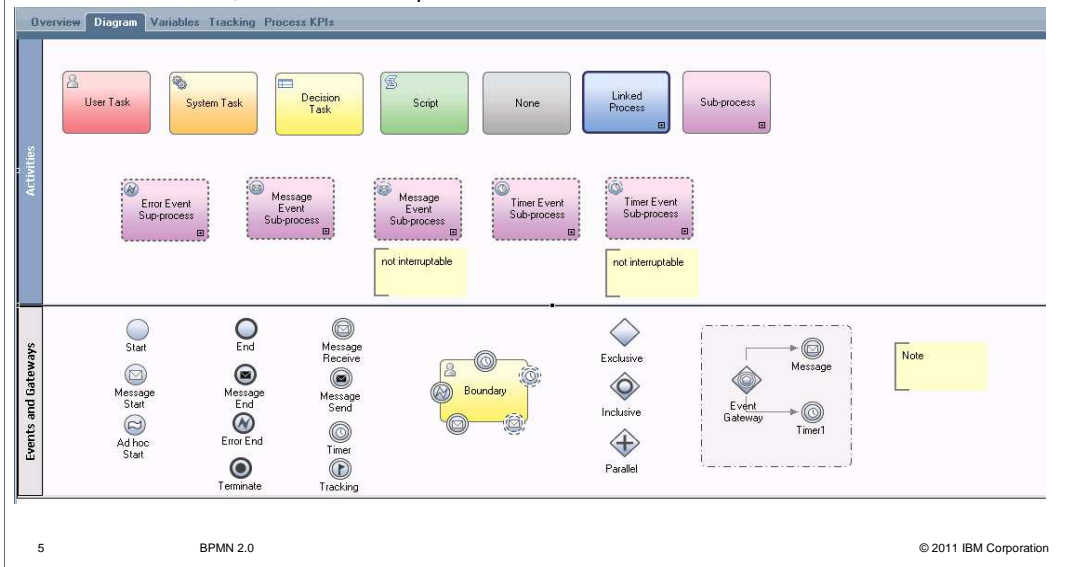
The inclusive gateway splits the flow into one or more branches and all of the active branches must be completed before the inclusive join will continue.

The parallel gateway also splits the flow into one or more branches but in this case all of the defined branches are activated at the same time. The parallel join will wait for all of the branches to complete before continuing.

The event-based gateway will wait for one or more events, each event corresponds to an outgoing branch. The first event received determines the path that is taken in the flow.

BPMN 2.0 notation update

- Notation has been updated
 - Icons that identify the element types
 - Activities, events and sub-processes



The modeling elements now display informative icons that help you quickly understand their purpose or behavior in the context of the business process flow. Having the icons means fewer trips to the property sheets in order to understand the flow.

Starting from the top left with the “User Task”. The icon is a representation of a person, which signifies that the activity will require human interaction.

Based on knowledge of the BPM architecture, you know that the implementation associated with this activity is a human service.

The next one to the right, uses the gears to signify an automated system task. An automated task can be implemented as a general service, integration service or an advanced integration service.

A decision task, sometimes known as a business rule, uses the spreadsheet table for the icon. A decision task is implemented by a decision service which can be simple if-then rules, using the business application language, or calls to a rule server such as iLog.

The next one to the right is the script icon, represented by the stylized S. In BPM 7.5, script tasks are implemented using JavaScript.

The last of the task types is, ‘none’. This is one for which the implementation decision has not been made yet.

The next two as you move to the right are activities. The first one called ‘linked process’, is the ‘call activity’ that was presented in the general discussion of the BPMN 2.0 notation. Notice the dark border and the plus sign in the lower right. The plus sign is the sub-process indicator and the darkened border signifies that it is a ‘global’ sub-process. This particular element can be know by three different names. A called activity, a linked process, or a global sub-process. They’re all the same thing. If you double click the element it will open the business process definition in the Process Designer editor.

The last element in this row is the sub-process, also known as a local sub-process. The local sub-process has the plus sign in the lower right, with a normal border.

The second row contains the different kinds of sub-process events. You can tell it is an event sub-process by the dashed border and the sub-process icon in the lower right. Additional information about the nature of the sub-process is also displayed using the icon in the upper left. This icon indicates the kind of event to be used to initiate the sub-process. More details on this are presented in subsequent slides.

The yellow boxes with the border on the left and text inside, are annotations. They cannot be linked to a particular activity or task.

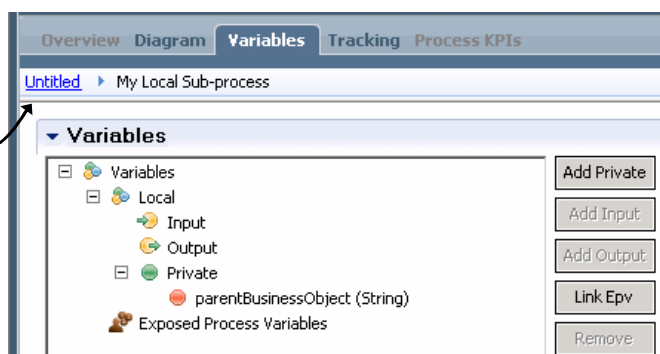
The group of buttons on the left are the different event types. The User Task in the center is used to illustrate that the tasks shown can be attached to activities.

Next are the gateways and on the far right is another annotation.

The events, event gateway and event sub-processes are discussed in detail in subsequent slides.

Sub-process (local)

- No parameters passed in or out
- Cannot create new variables
 - Notice the buttons are disabled
- Sub-processes can change the value of the parent data elements
- Breadcrumb navigation is used to return to the parent



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BPMN 2.0

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A sub-process exists within the containing process and is a way of grouping process steps to reduce diagram complexity and clutter by collapsing multiple steps into one activity.

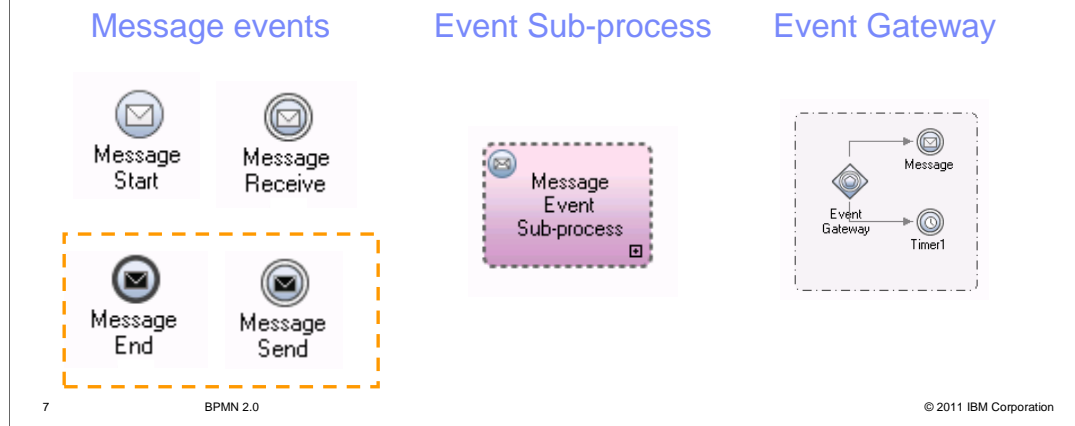
The sub-process can only be seen by the process in which it is defined. Double clicking on the sub-process element or selecting the implementation in the properties will open a business process flow editor on a new or existing business process definition. You can tell that you are in a local sub-process by the 'breadcrumb' trail in the upper left and the add input and add output buttons are disabled in the variables view.

A sub-process exists within the scope of its caller and has access to all the variables within that environment.

There is no parameter passing in and out of the embedded sub-process but the sub-process can change the values of the parent variables.

Message Event, Event Sub-process, and Event Gateway

- Three new and powerful BPMN 2.0 modeling constructs for event modeling are supported
- Fully executable in the Process Center Server using the *Inspector*
- Can be used with optimization, simulation and critical path analysis



Asynchronous events are a very powerful way to design business processes. Sometimes an activity just needs to be notified that something has occurred.

All that is required is a simple message with no need to wait for a response.

BPMN 2.0 provides a way to model event based interactions.

BPM V7.5.1 has expanded the modeling palette and the runtime to use three of the most commonly used event modeling patterns. They are the message event, the event gateway, and the event sub-process.

Events: Interruptible and non-interruptible

- Events
 - Can be in the main flow of the BPD
 - Associated with a task
 - Boundary event
 - Associated with a sub-process
 - Event Sub-process
- Boundary event and event sub-processes
 - interruptible – stops the activity or parent process
 - non-interruptible – creates a parallel path



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By default, a boundary event interrupts the activity that it is attached to.

When the event is triggered, the activity stops and the token continues down the outgoing sequence flow attached to the event.

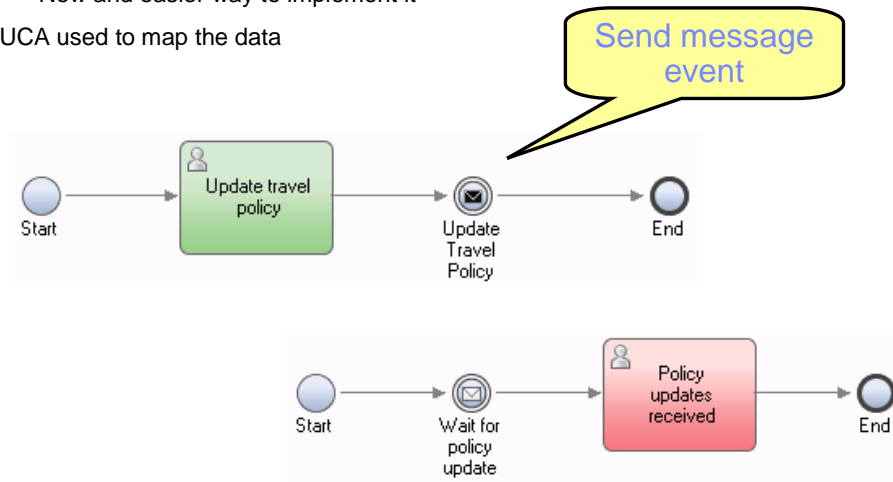
If the event is set as non-interrupting, when the event is triggered the attached activity continues in parallel and a new token is generated and is passed down the outgoing sequence flow of the event.

A non-interrupting event is represented by an icon with a dashed border. This is shown in the non-interrupting timer event in the picture above.

For the event sub-process, the icon represents the event that will start the sub-process. If it is non-interrupting, then the border is dashed also.

Message event

- Existing functionality
 - New and easier way to implement it
- UCA used to map the data



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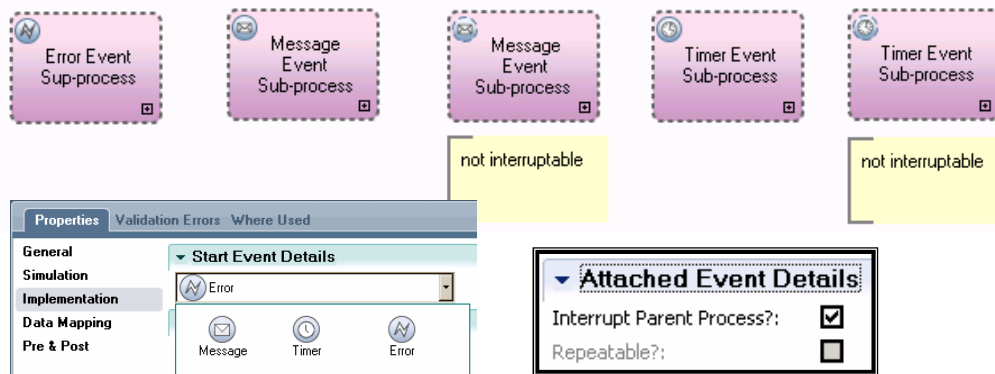
The send message event is new.

It replaces the call to the undercover agent that was used in the BMP 7.5.0 programming model.

An undercover agent and service are still used for the implementation. The undercover agent is specified in the properties of the send and receive events. As of version 7.5.1 there is a consistent programming model for specifying the send and the receive implementations and associating the sender with the receiver.

Event Sub-process

- On event....
 - Error interruptible
 - Message interruptible or non-interruptible
 - Timer interruptible or non-interruptible
- Can be used to create a general error handler
- Wait for expected or possible interrupts
- Encapsulate complex interactions that need to be done when an event occurs



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Event sub-processes are sub-processes that are triggered by an event that occurs in the parent process.

Event sub-processes are like other sub-processes in that they are contained within a parent process, and are not reusable outside of that process.

They are unlike other sub-processes in that they are not connected to other activities in the process by incoming or outgoing connections, and are triggered by events.

The triggering event can be an error, a timer that has expired or a message that was explicitly sent. The error event, can only be interrupting. This makes sense when you consider the nature of an error handler. The other two kinds of events can be either interrupting or non-interrupting.

The event type is set in the implementation properties for the event and if it is a timer or a message event the interrupting behavior is specified in the event details.

For error events, the error code is not part of the event. It is embedded in the error data. The error code must be parsed in the context of the error event sub-process and then it can be used for handling the error according to the error code.

Since the business process has already been instantiated, any incoming messages must be correlated in order to match the message to the proper business process instance. This is evident in the data mapping for start message event.

Event sub-processes – noteworthy facts

- Boundary events cannot be attached to event sub-processes
- Interrupting
 - terminate all activities in the parent process when triggered
- Non-interrupting
 - Activities in an event sub-processes with a non-interrupting start event run in parallel with the parent process
 - A parent process cannot complete until all active event sub-processes have completed,
 - unless the parent is terminated by a terminate end event.
 - A terminate end event in an event sub-process will terminate the entire business process instance.
 - **Note:** in the next release this is changed so that it will only terminate the event sub-process and its immediate parent



A few noteworthy points about event sub-processes.

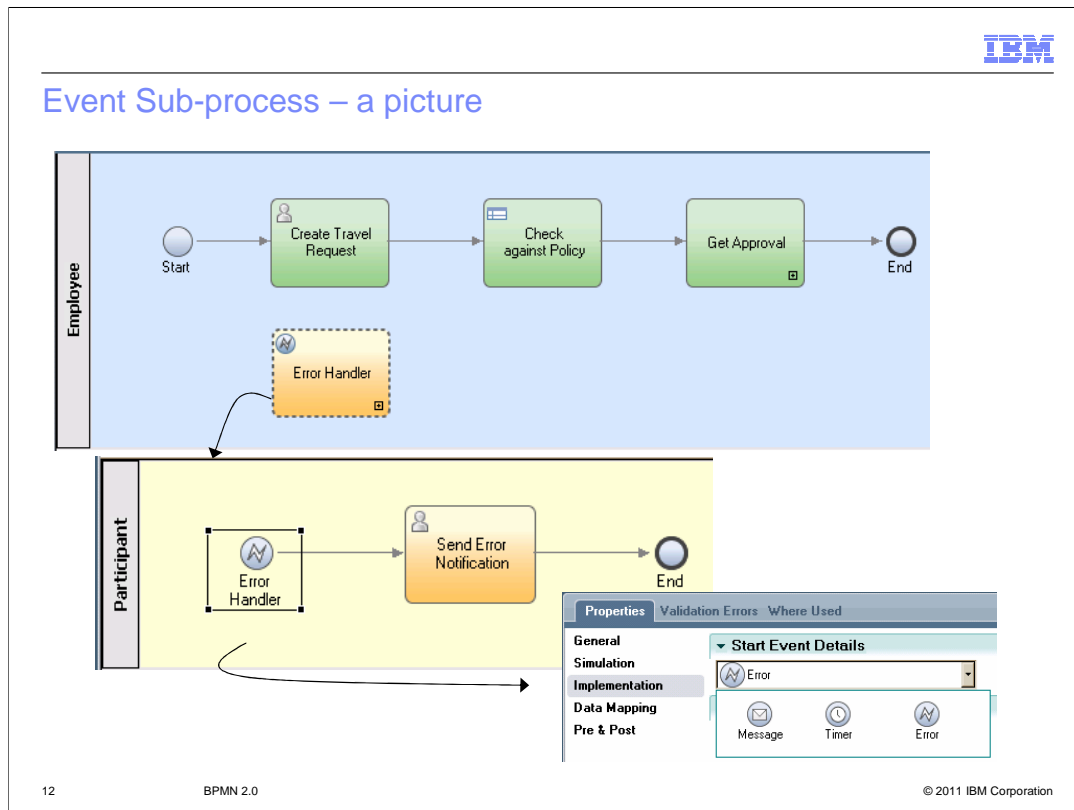
You cannot attach boundary events to an event sub-process.

They can be interrupting or non-interrupting. In this context the impact of an interrupting event is significantly greater than when a boundary event interrupts a task. In this case all of the activities in the parent process are terminated.

When working with event sub-processes you also need to be aware that once an event sub-process has started, the parent will not end until the sub-process is complete. This can be overridden by explicitly calling the terminate end event from the parent.

The behavior around the terminate end event is a little different than you might expect also. A terminate end event in an event sub-process will terminate the entire business process instance.

Event Sub-process – a picture



The top picture shows what the event sub-process looks like in the context of its parent Business Process Definition.

If you double click the event sub-process you'll be taken to the process flow editor for the sub-process. Notice the start event for the sub-process is the same as the icon on the event sub-process activity in the parent view.

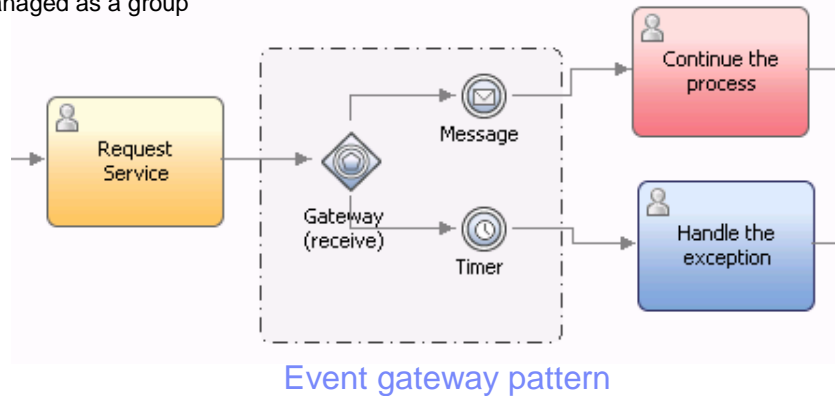
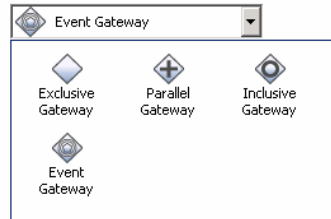
The error event is the default for newly created event sub-processes. To change the type, you select the start element and then edit the implementation in the properties. The picture at the bottom right shows the three possible choices, message, timer and error. Remember that the message and timer event sub-processes can also be non-interrupting.

Event Gateway

- Wait for one or more correlated messages
 - Up to a time-out limit
- Analogous to the BPEL *Receive Choice*
- An implementation pattern
 - Contained in a group
 - Managed as a group

Behavior

Gateway Type:



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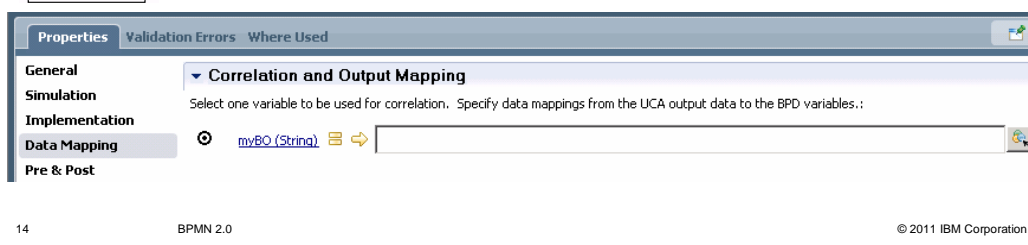
Event gateways provide a way for you to stop the business process flow and wait for a message that you're expecting. It can be that in your flow you send a request to an external service and you need to wait for a reply and you don't know when the reply is returned. It can be minutes, hours or days.

With the event gateway you can create the message receive event to catch the expected incoming event. If the event is received, then the flow will follow that branch. If its not received within the expected timeframe, the timer will elapse and that branch is followed.

The event gateway implementation is a pattern using the three basic elements, the gateway, the message, and the timer. They are grouped together with the dashed line and are treated as a single unit. You can add as many message events as you need, but only the branch associated with the first event received will be followed.

Correlation changes

- Properties interface is more explanatory
- Required for events that are waiting for incoming messages
 - Intermediate messages – receive
 - Message event – start (in an event sub-process)
- Start event
 - BPD start does not need correlation; so no radio button in the output mapping
- Moved to the Data Mappings section
- Cannot use complex types



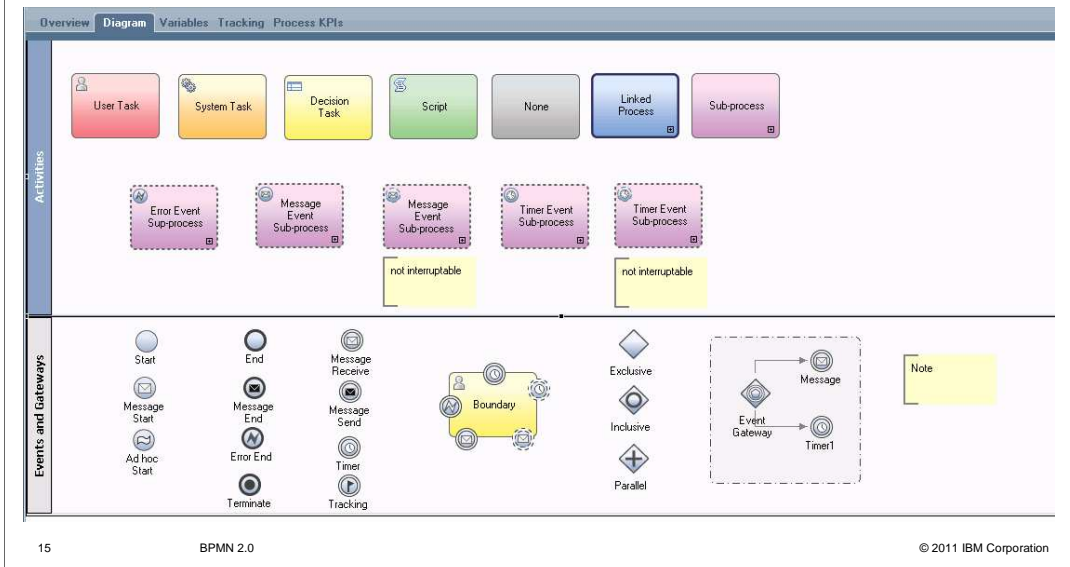
The properties interface for specifying correlation attributes and values is more explanatory. In the data mapping properties of receive or the start message event, the purpose of the radio button is explained. If correlation is necessary then the attribute with the radio button selected becomes the correlation attribute.

When working with correlation attributes you can only have one attribute and the attribute cannot be a complex type. Typically in a business process there is a unique identifier such as the account number, the reservation number, or a confirmation number, that uniquely identifies the process or transaction. This unique identifier can be used for correlating the incoming message with the business process instance.

To start a new business process definition, there is no need for correlation, therefore you will not see the option to select the correlation attribute for a start message event that is starting a business process. You will see it with the start message event of a sub-process event.

Summary

- Notational additions
- Events



BPM V7.5.1 improves readability of business process models with the incorporation of BPMN 2.0 modeling notation.

It is now easier to identify the kind of task or activity with the use of the type specific icons.

Along with the notational improvements, there are three new event driven modeling patterns that have been introduced, the message send-receive, the event sub-process and the event gateway.



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