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TUTOR

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Converting Process Diagrams to Tutor Procedures

Audience

This is an extract from the Tutor Business Process Converter manual intended to assist those who are learning to import process model diagram content intoTutor. Converting diagrams to text based task lists presents challenges which this document hopes to address.

For more information about Tutor, visit Oracle.Com , or the Tutor Blog. Post your questions at the Tutor Forum.

Overview

The business process conversion capability provided by Tutor 14 provides for the translation of process diagrams into Tutor Procedures, which are text based task lists. The complexity inherent in BPMN models, as well as in Visio models created without BPMN templates, creates a significant conversion challenge. Symbols used in process models can be simple or difficult to interpret depending on the symbol and the rigor by which it is being used. With formal tools such as Oracle's BPA or BPM Suite, and other tools such as Bizagi or ProVision, the tool itself uses a subset of the formal process modeling standard BPMN (Business Process Modeling Notation), and enforces rules in symbol usage. Process models built with Visio can be much more inconsistent in use of symbols.

Tutor 14 supports import of Visio diagrams and XPDL files. It also supports content exchange with BPA and BPM, and import of Visio and XPDL into BPA and BPM. When diagram based models are converted to diagrams in other tools, symbols may change, but the basic symbol use and process layout remains consistent from source to target. When diagrams are converted to Tutor text based procedures, validating the conversion can be difficult. For this reason, conversion notes are provided at the top of each target procedure which explain certain conversion rules.

A list of BPMN elements mapped to Tutor text structures is used to create an accurate text model in Tutor. For example, a parallel join in a diagram will result in the following task in the Tutor Procedure: "Verify all parallel tasks are complete and continue." For access to more detailed descriptions of BPMN, see the resources section at the end of this document. As an introduction, the following types of symbols are used in BPMN:

- **Events**. An event is something that happens, often described as the receipt of a message. While neither Start Events nor End Events are currently translated into Tutor, Intermediate events are translated as tasks.
- **Activities**. Tasks or SubProcesses: Units of Work. In Tutor, tasks are numbered and shown in the task list.
- **Gateways**. A fork or merge in the path. Forks are typically decisions, and are represented in Tutor as If statements. Some gateways are initiated by more than one flow, in which case a task is created with the gateway name in Tutor, since a Goto in Tutor can only point to a task.
- **Flows**. Show the path, by connecting events, activities, and gateways. Message flows are converted to sequence flows in Tutor since pools are merged.
- **Swimlanes**. Pools or Lanes. Pools represent different organizations, lanes are different roles within an organization. Pools are merged in conversion to Tutor. Lanes become Roles.
- **Artifacts**. Not converted to Tutor.

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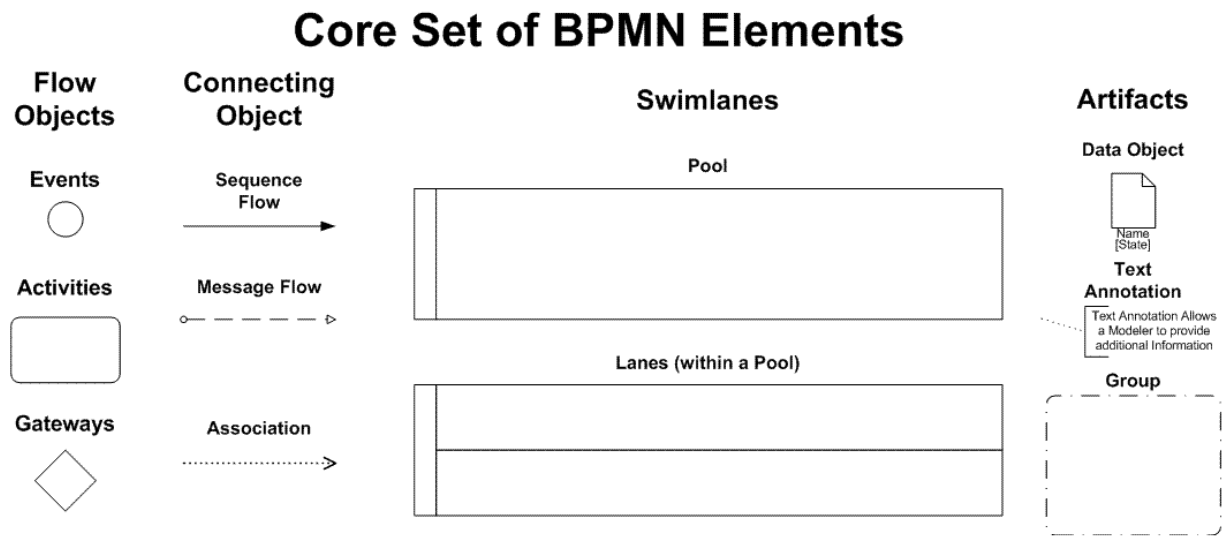

Figure 1: From OMG (www.bpmn.org)

In addition, automated activities in any diagram are not converted into the Tutor procedure, as they are transparent to the end user, and so do not typically appear in an end user oriented procedure. This may result in directives in Tutor created from gateways in the model which have no apparent meaning in the Tutor procedure, since gateways in the middle of a long sequence of automated tasks are converted. Any human or system supported tasks which follow the automated tasks will show up in the Tutor procedure as if they directly followed the last task before any automated activities.

Converting from tools supporting BPMN

The conversion of symbols to Tutor Text follows the rules defined in the table below. While the representation or icon of the symbol may change from tool to tool, the meaning does not. The table shows standard BPMN icons, their definition, and the Tutor text which is generated during the conversion.

BPMN Name	BPMN Symbol	Tutor Text
Events		
Start Events		Start events are not converted into Tutor as there is no analog for a start event.
Intermediate Events		Intermediate events of all types are converted to tasks in Tutor. The name or description of the event becomes the text in the Tutor task.
End Events		End events are converted as End of Activity Directives in Tutor.
Tasks		
Task		All Tasks are converted to Tutor Tasks. The name or description of the task becomes the text in the Tutor Task.

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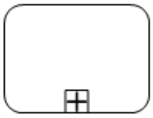
SubProcess		SubProcesses performed by actors in a separate Pool at the start of a process are converted to body text in the Prior Activity Section of the Tutor Procedure. SubProcesses found in line are converted to Stop and Complete Directives in Tutor, with the name or description placed after the phrase Stop and Complete. SubProcesses performed by actors in a separate Pool at the end of a process are converted to Goto Directives at the end of the Tutor Procedure, with the name or description placed after the phrase Goto.
Pools & Lanes		
Pools		Pools are not converted into Tutor Text. Elements are merged into a single virtual pool.
Lanes		Lanes are converted into Actor Bars in Tutor, and the name becomes the Actor name in the Bar.
Gateways		
Data Gateway		Data Gateways are converted to If Directives in Tutor.
Exclusive Or Gateway		Exclusive Gateways are converted to If Directives in Tutor.
Inclusive Or Gateway		Inclusive Gateways are converted to If Directives in Tutor.
Complex Gateway		Complex Gateways are converted to If Directives in Tutor.
Event Based Gateway		Event Based Gateways are converted to If Directives in Tutor.

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Parallel Gateway		Parallel Gateways are converted to If Directives in Tutor.
Gateway Naming Rules		If the Gateway has text, it is used in the If Statement. If the Gateway has no text, the text associated with the sequence flows is used in the If Statement. If the Gateway & Sequence flows have no text, ???? is used in the If Statement.

Some symbols which are BPMN 2.0 compliant will not be converted, especially if they are dropped on tasks to turn them into different types of tasks or subprocesses. Excluded Master symbols which map to null currently include:

- Ad Hoc processes
- Loop processes
- Detail
- Title Block
- Guide
- Activity Looping
- Multiple Instance

Converting from Visio Diagrams

Visio diagrams provide the greatest opportunity for time saved in redeveloping BPM oriented content into Oracle Tools because there are so many of them in the organizational environment. At the same time, Visio diagrams are the greatest challenge to convert because templates may not resemble BPMN or may not be used at all, and the flexibility inherent in Visio allows for non standard model development. A customer maintained mapping file has been provided which improves the ability to map from non-standard symbols used in Visio diagrams, but models to be converted should be reviewed carefully to assure a clean and efficient conversion.

Source Model Preparation

Make sure the Visio Model (*.vdx) conforms to the following rules:

- Ungroup all model symbols
- Flow connectors are placed between all appropriate model objects, and are connected to the symbol
- Symbol text is associated with the symbol and is not a Text Box grouped to the symbol
- Symbols created with non-standard templates have been mapped
- All process symbols contain text
- Swimlanes contain named roles or actors
- Each page of a multi-page Visio model will be converted to one Tutor Procedure. Cross-page connections will not be recognized.

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General Conversion Issues

Incoming Visio models may contain undefined symbols which appear to map to process objects but do not. If these objects are placed within the sequence flow they will be converted to tasks. If these objects are erroneously converted to tasks, the customer can add the objects to the mapping file. If the customer has licensed BPA or BPM, a more efficient approach is to import the Visio files into BPA or BPM, clean up the resulting models to valid BPMN standards, and then export them to Tutor.

Tutor does not support all of the activity types that can be used to model a process in BPA or BPM. Therefore, when exporting a model to Tutor, a subset of the full model is generated to allow it to be represented in Tutor. Below is a table showing the mapping of the basic elements from BPMN to Tutor. Following that, those activities that require further processing will be described.

BPMN Activity or Element	Attribute	Tutor
Lane	n/a	Actor
Task	[Non-automated]	Task
Gateway		
	Exclusive Data	“If [condition], goto task #n” directive
	Inclusive	A Task "Perform one of more of the following" is inserted, followed by an "If condition, goto task #n" directive for each outflow.
	Parallel	“In parallel: goto task #n, goto Task #m, …”
	OR (Join)	Task inserted: "Verify active parallel tasks are complete and continue."
	AND (Join)	Task inserted: "Verify all parallel tasks are complete and continue."
Subprocess	Collapsed	“Stop and complete [../]” directive
	Expanded	Subprocess is removed, objects inside the subprocess are incorporated into the flow of the document. Nested Start and End are removed.
Event	Start	Tutor has no Start event equivalent, so Start events are removed.

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		However, when converting multiple pools, a labeled Start event may be converted into a task or a gateway.
	End	“End of activity” directive. However, when merging pools, an end event may be removed or converted to a task.
	Attached Intermediate	Attached intermediate events are converted to directive conditions.
SequenceFlow	ConditionType:None	Ignored. (Should point to next activity in sequencial document flow.)
	ConditionType:Default	Will be formatted as an “Otherwise goto task #n” directive segment.
	ConditionType:Expression	Will create a “If [Expression], goto task #n”, where ‘#n’ is based on evaluation of expression
MessageFlow		If merging pools, they are converted to SequenceFlows. Otherwise they are removed.

Additional Conversion Details

Events

Most intermediate events will be converted to a task.

One throwing link event and one catching link event with matching names is converted to direct sequence flow.

Two throwing link events and one catching link event with matching names is converted to Inclusive-Or merge.

One throwing link event and two catching link events with matching names is converted to parallel directive.

Events following an event-based gateway will be converted into flow labels. However, if events have additional incoming sequence flows, they will be converted to tasks.

If the event has multiple outflows, it may be converted into a parallel directive.

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Activities: Tasks

Automated Tasks are removed. This includes tasks with a BPMN type of SERVICE and SCRIPT. If a task has multiple outflows, it will usually create a parallel directive.

Activities: Subprocesses

Nodes contained in a collapsed Subprocess are removed when the subprocess is converted to a Stop and complete directive.

Tasks are inserted before subprocesses as needed to provide a destination for a goto directive.

Tasks inside an Ad-hoc subprocess are converted to a series of tasks in top left to bottom right order.

Gateways

Decisions that do not affect user activities are removed.

If an automated task is removed, but one of its flows lead to an exclusive or inclusive gateway, a Parallel merge may be inserted before the gateway.

If an automated task has multiple outflows, it may be converted to a parallel directive.

Exclusive merge gateways are removed.

Tasks are inserted before gateways as needed to provide a destination for a goto directive.

Flows

Flows that are not connected on both ends are removed.

Pools

Tutor does not have a concept of a Pool. The Task segment of a Tutor document is equivalent to the main pool of a multi-pool diagram.

However, Tutor documents do support activities referenced as “Prior Activities”, and activities may be referenced as follow up actions to an End of Activity directive.

Generally, multi-pool models will be merged into a single pool during export to Tutor. When exporting a BPMN model containing multiple pools from BPA to Oracle Tutor, the converter will ask you whether to export all pools or a single pool. If you choose all pools, the converter will merge them. If you choose a single pool, you can specify the pool and only the process defined in the pool you specify will be exported to Tutor.

In some circumstances, when merging pools, flows might create parallel directives in the Tutor document that are unnecessary. These are removed when detected.

Pools that contain no lanes are converted to a lane.

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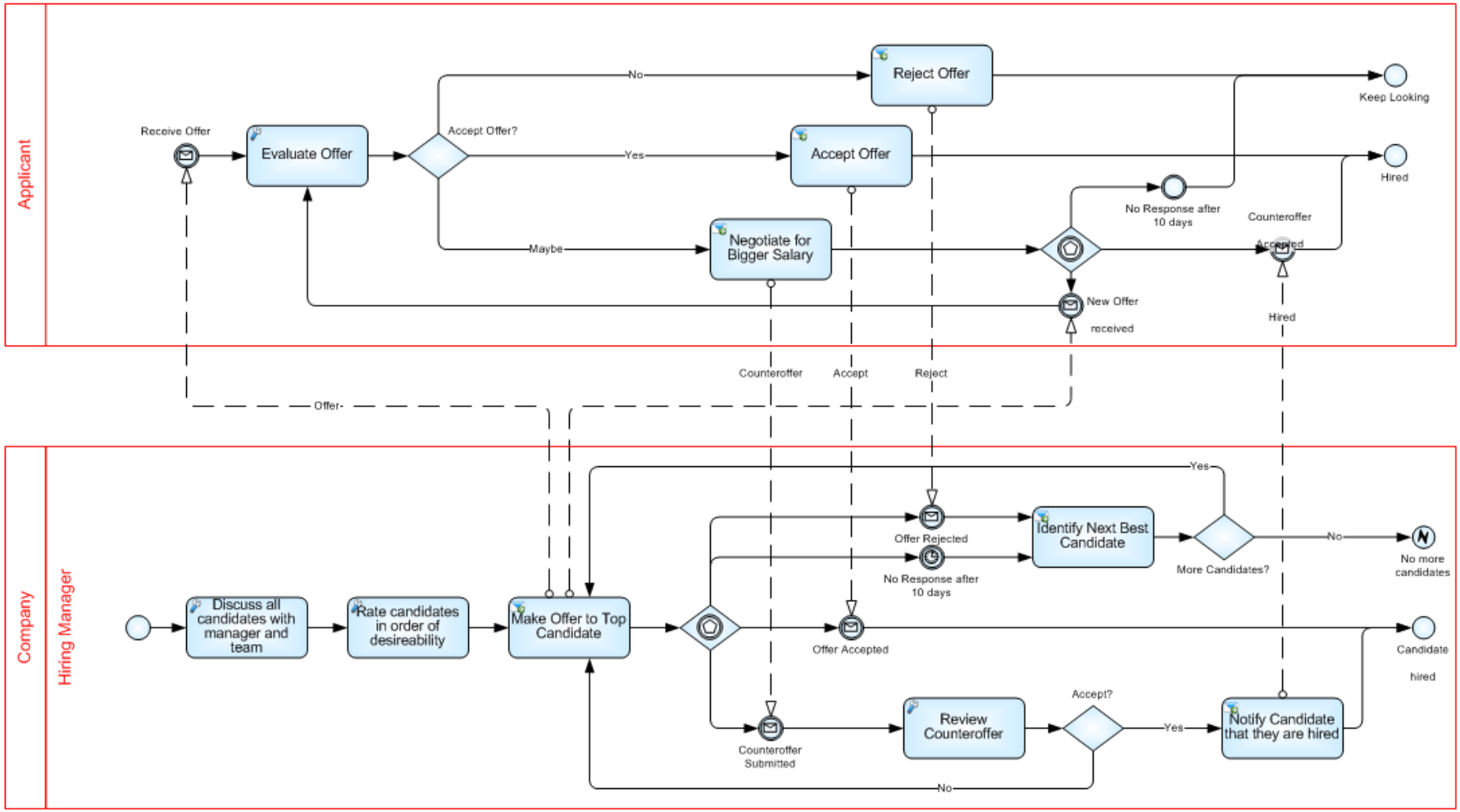
Conversion Example with Annotation

The following Visio diagram will be converted to a Tutor Procedure and the Conversion notes explained. This model is quite rigorous in its adherence to BPMN standards, and is a stand-in for XPDL or BMA/BPM models.



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Tutor Conversion

What follows is the Tutor Conversion Notes and Procedure as converted, followed by an annotated version of the same content.

As Converted Conversion Notes of Hiring Process.vdx

Conversion Notes

Message flow between 'Notify Candidate that they are hired' and 'Counteroffer Accepted' converted to a sequence flow. (task #15)

Message flow between 'Negotiate for Bigger Salary' and 'Counteroffer Submitted' converted to a sequence flow. (task #9)

Message flow between 'Accept Offer' and 'Offer Accepted' converted to a sequence flow. (task #8)

Message flow between 'Reject Offer' and 'Offer Rejected' converted to a sequence flow. (task #7)

Message flow between 'Make Offer to Top Candidate' and 'Receive Offer' converted to a sequence flow. (task #3)

Start event 'Receive Offer' converted to an intermediate event.

Message flow between 'Make Offer to Top Candidate' and 'New Offer received' converted to a sequence flow. (task #3)

Superfluous flow between 'Notify Candidate that they are hired' and 'Candidate hired' removed. (task #15)

Superfluous flow between 'Accept Offer' and 'Hired' removed. (task #8)

Superfluous flow between 'Reject Offer' and 'Keep Looking' removed. (task #7)

Superfluous flow between 'Negotiate for Bigger Salary' and 'Counteroffer Submitted' removed. (task #9)

Pool 'Applicant' converted to a lane.

Multiple pools merged into single pool.

Event 'Counteroffer Accepted' converted to task. (task #16)

Event 'New Offer received' converted to task. (task #5)

Event 'No Response after 10 days' converted to directive condition.

Event 'Offer Rejected' converted to task. (task #11)

Event 'Offer Accepted' converted to task. (task #13)

Event 'Counteroffer Submitted' converted to directive condition.

Event 'No Response after 10 days' converted to directive condition.

Event 'Receive Offer' converted to task. (task #4)

Task 'Evaluate the following conditions.' added before directive. (task #10)

Delete this block after verifying conversion.

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Hiring Process: As Converted

Distribution

Hiring Manager*

Applicant*

Unknown*

Ownership

The job title [list@YourCompany.com?Subject=Hiring Process: Hiring Process.docx] is responsible for ensuring that this document is necessary, reflects actual practice, and supports corporate policy.

Hiring Manager

1. Discuss all candidates with manager and team
2. Rate candidates in order of desirability
3. Make Offer to Top Candidate

In parallel: Goto Task #4, Goto Task #5, Goto Task #10.

Applicant

4. Receive Offer

Goto task #6.

5. New Offer received
6. Evaluate Offer

If Accept Offer is No, Goto task #7.

If Accept Offer is Yes, Goto task #8.

If Accept Offer is Maybe, Goto task #9.

7. Reject Offer

Goto task #11.

8. Accept Offer

Goto task #13.

9. Negotiate for Bigger Salary

If No Response after 10 days, End of activity.

If Counteroffer Accepted, Goto task #16.

If New Offer received, Goto task #5.

Hiring Manager

10. Evaluate the following conditions.

If Offer Rejected, Goto task #11.

If No Response after 10 days, Goto task #12.

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If Offer Accepted, Goto task #13.

If Counteroffer Submitted, Goto task #14.

11. Offer Rejected
12. Identify Next Best Candidate

If More Candidates is No, End of activity.

If More Candidates is Yes, Goto task #3.

13. Offer Accepted

End of activity.

14. Review Counteroffer

If Accept is No, Goto task #3.

If Accept is Yes, Goto task #15.

15. Notify Candidate that they are hired

Applicant

16. Counteroffer Accepted

End of activity.

Unknown

17. Hiring Process

End of activity.

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Annotated Conversion Notes of Hiring Process.vdx

Annotation follows statement(s) being explained. Note that this is just an example, and every conversion will have its own issues. The best approach to deciphering conversion notes is to compare the incoming model, the resulting procedure, and the notes.

Conversion Notes

Message flow between 'Notify Candidate that they are hired' and 'Counteroffer Accepted' converted to a sequence flow. (task #15)

Message flow between 'Negotiate for Bigger Salary' and 'Counteroffer Submitted' converted to a sequence flow. (task #9)

Message flow between 'Accept Offer' and 'Offer Accepted' converted to a sequence flow. (task #8)

Message flow between 'Reject Offer' and 'Offer Rejected' converted to a sequence flow. (task #7)

Message flow between 'Make Offer to Top Candidate' and 'Receive Offer' converted to a sequence flow. (task #3)

Message Flows only exist in BPMN between Pools (which represent separate organizations). Since Tutor Procedures merge the pools, all message flows become sequence flows, or are eliminated if redundant.

Start event 'Receive Offer' converted to an intermediate event.

Receive offer was a Start Event in the top pool. It is now in a combined pool, and since it has a sequence flow coming into it, it is converted to an Intermediate Event while the Start Event without an incoming flow is recognized as the single Start Event.

Message flow between 'Make Offer to Top Candidate' and 'New Offer received' converted to a sequence flow. (task #3)

Superfluous flow between 'Notify Candidate that they are hired' and 'Candidate hired' removed. (task #15)

Superfluous flow between 'Accept Offer' and 'Hired' removed. (task #8)

Superfluous flow between 'Reject Offer' and 'Keep Looking' removed. (task #7)

Superfluous flow between 'Negotiate for Bigger Salary' and 'Counteroffer Submitted' removed. (task #9)

Message Flows only exist in BPMN between Pools (which represent separate organizations). Since Tutor Procedures merge the pools, all message flows become sequence flows, or are eliminated if redundant.

Pool 'Applicant' converted to a lane.

Multiple pools merged into single pool.

Pools are merged, and become lanes.

Event 'Counteroffer Accepted' converted to task. (task #16)

Event 'New Offer received' converted to task. (task #5)

Event 'No Response after 10 days' converted to directive condition.

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Event 'Offer Rejected' converted to task. (task #11)

Event 'Offer Accepted' converted to task. (task #13)

Event 'Counteroffer Submitted' converted to directive condition.

Event 'No Response after 10 days' converted to directive condition.

Event 'Receive Offer' converted to task. (task #4)

Intermediate Events, which have no exact equivalent in Tutor, are converted to tasks so that If statements can point to them.

Task 'Evaluate the following conditions.' added before directive. (task #10)

Some directives, especially when they have multiple exiting sequence flows, are given preceding explicative tasks.

Delete this block after verifying conversion.

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Hiring Process: Annotated

Distribution

Hiring Manager*

Applicant*

Unknown*

Ownership

The job title [list@YourCompany.com?Subject=Hiring Process: Hiring Process.docx] is responsible for ensuring that this document is necessary, reflects actual practice, and supports corporate policy.

Pools are merged, and all message flows between pools are converted to sequence flows. Since the start event in the original applicant pool is connected by a sequence flow, the start event in the hiring manager lane is task #1.

Hiring Manager

1. Discuss all candidates with manager and team
2. Rate candidates in order of desirability
3. Make Offer to Top Candidate

This task has several exiting sequence flows, which are treated as a parallel set of paths.

In parallel: Goto Task #4, Goto Task #5, Goto Task #10.

Applicant

4. Receive Offer

The intermediate event was translated to a task to allow the Goto to point to it.

Goto task #6.

5. New Offer received

The intermediate event was translated to a task to allow the Goto to point to it.

6. Evaluate Offer

If Accept Offer is No, Goto task #7.

If Accept Offer is Yes, Goto task #8.

If Accept Offer is Maybe, Goto task #9.

Gateway name is used as condition, sequence flow names as options.

7. Reject Offer

Goto task #11.

8. Accept Offer

Goto task #13.

9. Negotiate for Bigger Salary

If No Response after 10 days, End of activity.

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If Counteroffer Accepted, Goto task #16.

If New Offer received, Goto task #5.

Event gateway uses following event names as condition.

Hiring Manager

10. Evaluate the following conditions.

The gateway was translated to a task to allow the Goto after task 3 to point to it.

If Offer Rejected, Goto task #11.

If No Response after 10 days, Goto task #12.

If Offer Accepted, Goto task #13.

If Counteroffer Submitted, Goto task #14.

Event gateway uses following event names as condition.

11. Offer Rejected

The intermediate event was translated to a task to allow the Goto to point to it.

12. Identify Next Best Candidate

If More Candidates is No, End of activity.

If More Candidates is Yes, Goto task #3.

13. Offer Accepted

The intermediate event was translated to a task to allow the Goto to point to it.

End of activity.

14. Review Counteroffer

If Accept is No, Goto task #3.

If Accept is Yes, Goto task #15.

15. Notify Candidate that they are hired

Applicant

16. Counteroffer Accepted

The intermediate event was translated to a task to allow the Goto to point to it.

End of activity.

Unknown

17. Hiring Process

Look at the picture below of the entire model in Visio. At the bottom right, there is a box with text functioning as a label. This is rendered as a task, with an Unknown Role as it is not in a lane.

End of activity.

No end events were translated.

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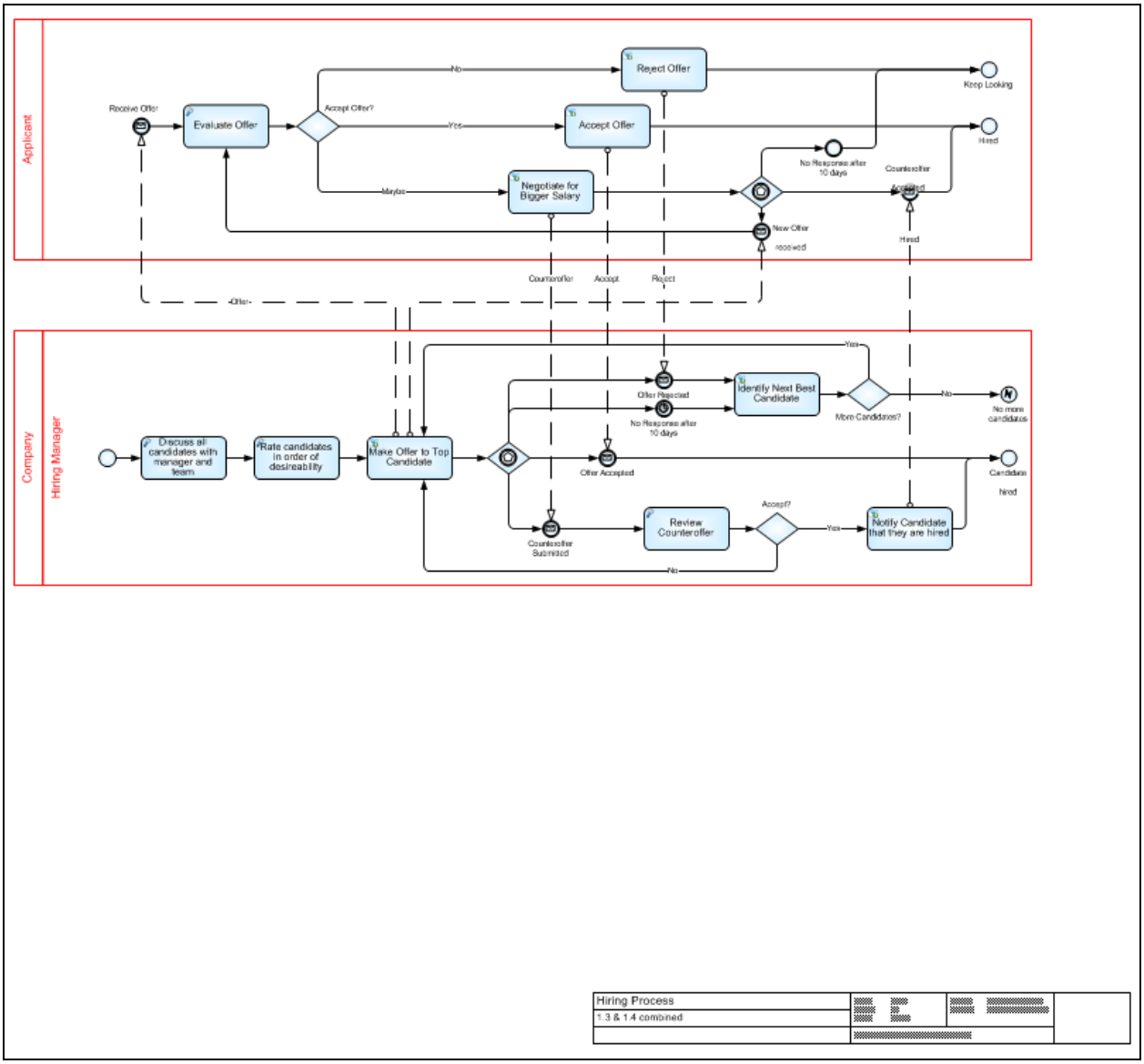

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Resources

BPMN Standards
http://www.bpmn.org/

BPMN Wikipedia
http://en.wikipedia.org/wiki/Business_Process_Modeling_Notation

BPMN 2.0 Poster
http://www.bpmb.de/index.php/BPMNPoster

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