IBM Business Process Manager
Version 8 Release 5

Hiring Tutorial
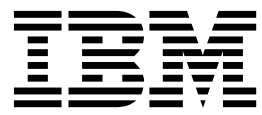
IBM

This edition applies to version 8.5 of IBM Business Process Manager.

Contents

Hiring tutorial

In this tutorial, you will use the tools in IBM® Process Designer to re-create the Standard Hiring Sample process application that is in IBM Process Center.

This tutorial gets you started with aspects of the Process Designer tool by having you iteratively model and test a hiring process instance. As you complete the lessons, you will learn about Process Designer so that you can build your own processes.

Note: This tutorial is a learning exercise that describes one way of modeling, implementing, and testing a process. Depending on your process and process application, other techniques might be more appropriate.

This tutorial is broken down into the following five modules:
- "Model the process" on page 2
- "Implement the process" on page 31
- "Create the user interface" on page 46
- "Integrate the process with services" on page 77
- "Conduct the final playback" on page 88

After you complete this tutorial, you will be able to do the following tasks:
- Model a process that is based on the process requirements.
- Implement the process, including data variables and services that are required by the process.
- Create the user interface for the process.
- Conduct playbacks at each phase to validate the work that you completed.
- Run and review the process.

Each module in this tutorial contains lessons and builds on the previous module so that you can work with the tutorial from beginning to end. To skip a lesson, you can copy the required artifacts from the Standard Hiring Sample process application that is in Process Center.

Note: The process application you are creating in this tutorial is called the My Hiring Sample, and the process application that is included in Process Center is called the Standard Hiring Sample.

Copy the required artifacts:
1. Start Process Designer. Enter your user name and password and click **Login**. When Process Designer opens, the Process Apps window displays the list of process applications that are available in Process Center.
2. Open the Standard Hiring Sample process application in the Designer.
3. From the library, click **All** to view the list of artifacts.
4. Right-click each artifact that you want to copy and select **Copy item to** > **My Hiring Sample**.
5. Review any artifacts that refer to the copied artifacts in the My Hiring Sample and fix any errors that are caused by copying. These errors occur because the copied artifacts are not the same as the artifacts in the My Hiring Sample even though they have the same name. For example, if you copied the *Person* business object, check all bindings or references to this business object. If you see an error, clear the binding or reference and then reselect the business object from the list that opens.

1

Process requirements

The process that you are going to model is called the Standard HR Open New Position process. This process covers how to fill a job position by submitting, approving, and routing a job requisition to the Human Resources (HR) department to search for job candidates.

The Standard HR Open New Position process includes the following requirements:

- The hiring manager must either fill a new position or replace a departing employee in an existing position.
- The hiring manager must determine the position requirements and prepare a job requisition to be submitted to the HR department. For a new position, the hiring manager can provide the following information:
  - An ID for the job requisition
  - Name of the hiring manager
  - Title of the position
  - Name of the department that requires the job requisition
  - Number of employees that are required to fill the position
  - Whether the job requisition is for a new or existing position
  - Whether the job is part-time, full-time, or contract
  - When the position starts
  - Where the position is located

  For an existing position, the hiring manager must provide the following information about the person who will be replaced:
  - First name
  - Last name
  - The person's manager or supervisor
  - The person's pay grade or level
  - The person's classification for taxation
  - Comments regarding the person
- The hiring manager reviews and approves the job requisition before the hiring procedure starts.
  - If the job requisition is to fill an existing position, it must be routed directly to HR.
  - When HR receives the job requisition, they search for candidates.
- If the job request is to fill a new position, the job requisition must be routed to the general manager (GM) for approval.
- The GM must evaluate the job requisition and either approve or reject it.
  - If the GM approves the job requisition, it must be routed to HR so that HR can find job candidates.
  - If the GM rejects the job requisition, the hiring manager is notified and the job requisition process must be terminated.
  - If the GM does not handle the request by the due date, the GM is notified.

Model the process

In this module, your goal is to use the process requirements to model the Standard HR Open New Position process, and then conduct a playback called Playback Zero. During Playback Zero, you uncover new requirements and review the process with the business stakeholders.

Learning objectives

After you complete the lessons in this module, you will understand the concepts and know how to do the following tasks:
- Create a process application.
- Create a business process definition (BPD).
- Model teams by adding lanes and assigning teams to the BPD.
- Add activities, events, and gateways to the BPD.
- Add sequence flows to connect the activities, events, and gateways.
- Add a timer intermediate event to the BPD.
- Create process variables.
- Run Playback Zero.

Prerequisites

You must have Process Designer installed and running on your computer. You also understand the process requirements.

Create the process application

In this lesson, you create the process application to hold the Standard HR Open New Position process.

You must create the process application before you create the Standard HR Open New Position process. The process application is stored in the Process Center repository, which you can access from Process Designer.

Remember: Ensure that you are connected to Process Center whenever you work with Process Designer because there is no workspace or repository on your local system. All the work that you do is stored in Process Center.

This lesson uses the following concepts:

Concept	Description
Process application	A container in the Process Center repository that stores process models and supporting implementations. A process application includes process models that are created in Process Designer, services to implement activities, and items that are required to run the processes.
Process Center	A central repository for all project assets that are created in Process Designer. When multiple Process Designer clients connect to Process Center, users can share items, such as processes and services. Users can also see changes that other users make as they happen.
Process Designer	Tools to model and implement your business processes and demonstrate a process design and flow during development.

Create the process application:

1. Start Process Designer. Enter your user name and password and click **Login**. When Process Designer opens, the **Process Apps** page displays the list of process applications that are available within Process Center.

   The following Standard Hiring Sample process application is the one that is shipped with the product. You are creating your own process application for this tutorial.
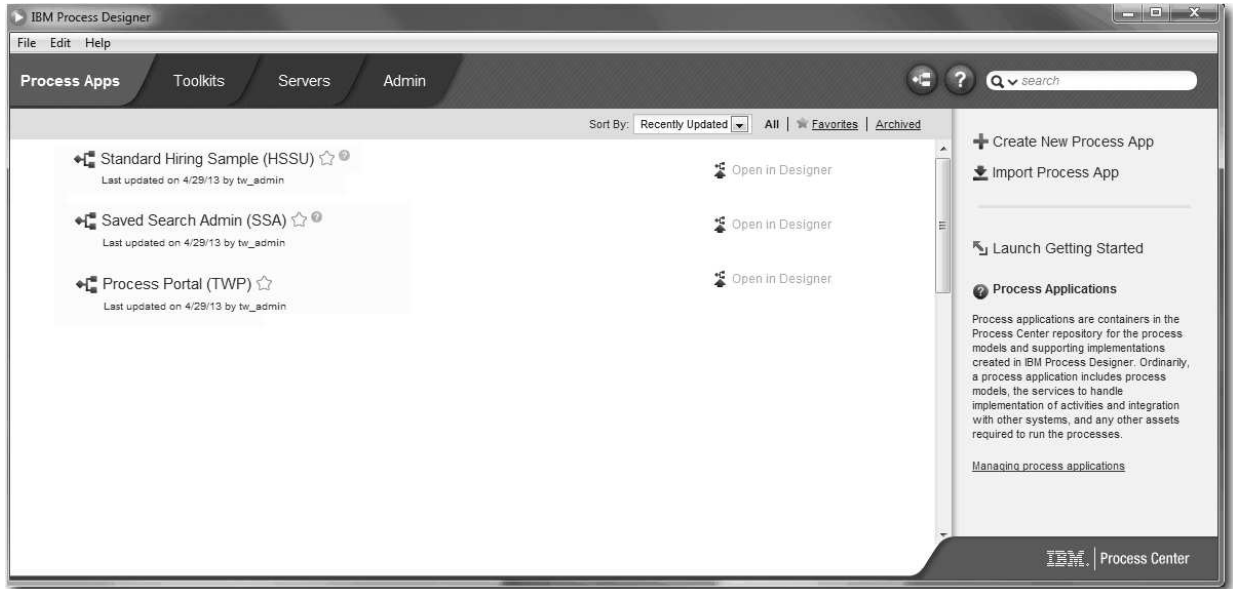
2. Click the **Create New Process App** link on the right panel of Process Center.
3. Enter the following information:
   - Process App Name: `My Hiring Sample`
   - Acronym: `MHS`
   - Description: `Contains the process for filling a position.`

4. Click **Create**. The process application is now in your list of process apps.
5. To open the My Hiring Sample process application, locate the process application in Process Center and click **Open in Designer**. A Process Designer page opens, displaying the **Process App Settings**.
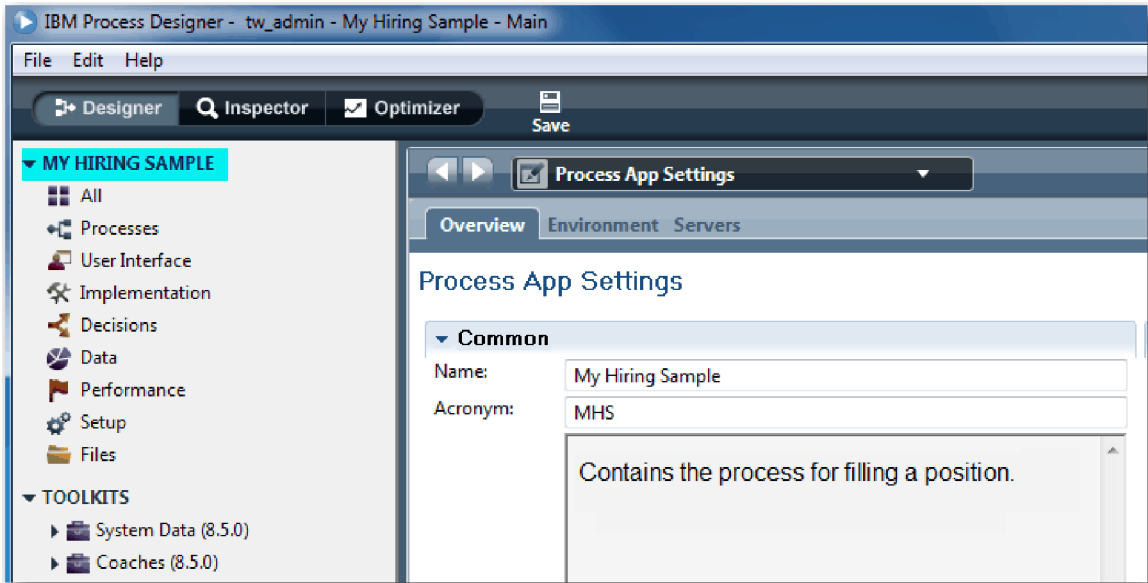
The highlighted area shows the process application that you are editing. Notice that this page gives you the opportunity to edit the process application settings, such as the name, acronym, and description. For now, leave the settings as they are and continue on with your process-modeling tasks.

Lesson checkpoint

You created a process application to hold the Standard HR Open New Position process.

In this lesson, you learned
- How to start Process Designer
- How to create a process model container, which is known as the process application in Process Center
- That your workspace is in Process Center
- That the process application contains the process model that is created in Process Designer

In the next lesson, you will create a business process definition.

Related Links
- Process applications: Overview

Create the business process definition (BPD)

In this lesson, you create a business process definition (BPD) for the Standard HR Open New Position process.

To create a model in the My Hiring Sample process application, you must create a BPD for the Standard HR Open New Position process. After you name the BPD, you model it by defining lanes and teams, and then adding flow objects such as activities, events, and gateways.

This lesson uses the following concept:

| Concept	Description
Business process definition (BPD)	A reusable process diagram or model that defines what is common to all runtime instances of that process model.

Create the Standard HR Open New Position BPD:

1. Make sure that the My Hiring Sample (MHS) process application is open in Process Designer.
2. In the Designer library, click the plus sign next to **Processes** and select **Business Process Definition**.
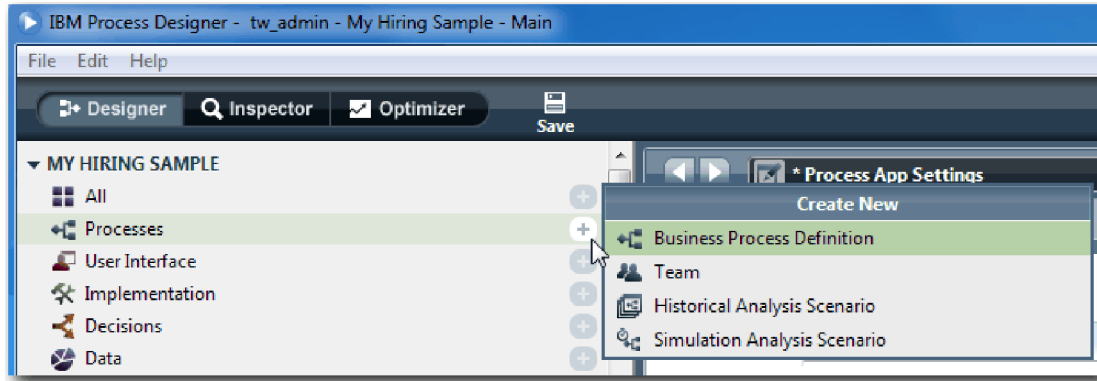
3. Type `Standard HR Open New Position` and click **Finish**. The BPD is created and the process diagram opens showing the following modeling constructs:
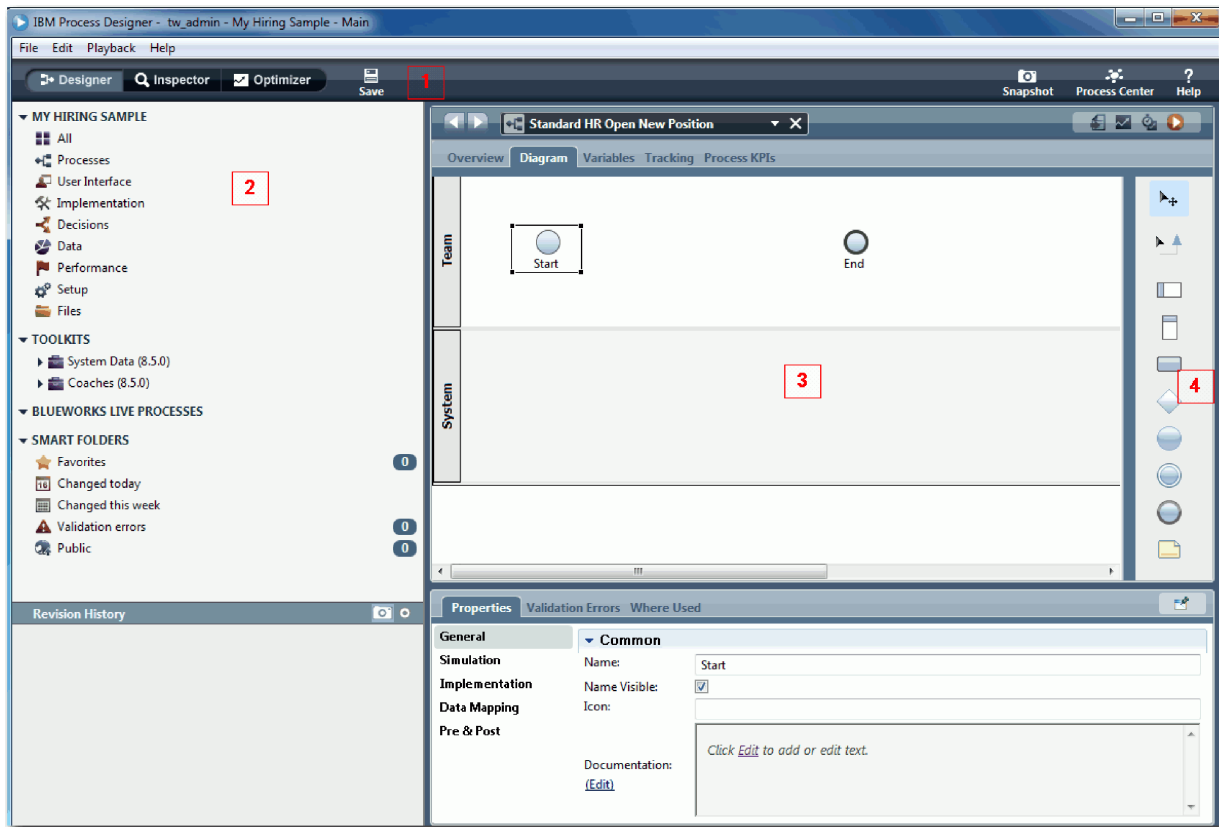
Number	Area	Description
1	Main toolbar	Provides access to Designer, Inspector, Optimizer, and Process Center. The main toolbar is also where you go to save all open editors, take a snapshot, and view web help.
2	Library	Provides access to the library items for the current process application.
3	Main canvas	The area in which you can graphically model your process. Each BPD automatically includes a start event and an end event. Two default lanes are included for user and system tasks.

Number	Area	Description
4	Palette	Provides elements that you can use to model your process. You can hide the palette by clicking the colored border to the left of the available elements. To restore the palette and view the available components, click the same border.

Lesson checkpoint

You created the Standard HR Open New Position BPD.

In this lesson, you learned
- About the Process Designer user interface
- How to create a BPD

In the next lesson, you will model teams.

Related Links
- Business process definitions (BPDs)

Model teams

In this lesson, you model the teams that participate in the Standard HR Open New Position process.

Based on the process requirements, you must create a team for each of the identified user roles: hiring manager, general manager, and human resources manager. To model the teams, you add lanes and assign teams to the BPD. Each lane contains the activities that the associated team or system performs. You also define the teams by specifying the cost per hour, members, and managers.

When you create a BPD, Process Designer generates two lanes: Team and System. For the Standard HR Open New Position BPD, you must have the following lanes and teams:

Lane	Team title	Team properties
Hiring Manager	Hiring Managers	Cost per Hour: 65.00, Members: Standard Members (tw_allusers), Managers: Managers of All Users
General Manager	General Managers	Cost per Hour: 75.00, Members: Standard Members (tw_allusers), Managers: Managers of All Users
Human Resources	Human Resource Managers	Cost per Hour: 50.00, Members: Standard Members (tw_allusers), Managers: Managers of All Users
System	System	Since the activities in the system lane are performed by the system, there is no associated team.

The system lane contains the activities that IBM Business Process Manager completes.

This lesson uses the following concepts:

Concept	Description
Lanes	Provide context for a process model. Each lane contains a series of activities that are assigned to a specific team or system.
Teams	Contain the members who complete the runtime activities that are modeled in each lane.
Members	User groups or individual users that are part of a team.

| Concept	Description
Managers	The team whose members can use the Team Performance dashboard in Process Portal to manage this team and its tasks.

Model the teams:

1. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
2. Click the **Team** lane and, in the **Properties** tab, change the name to `Human Resources`.
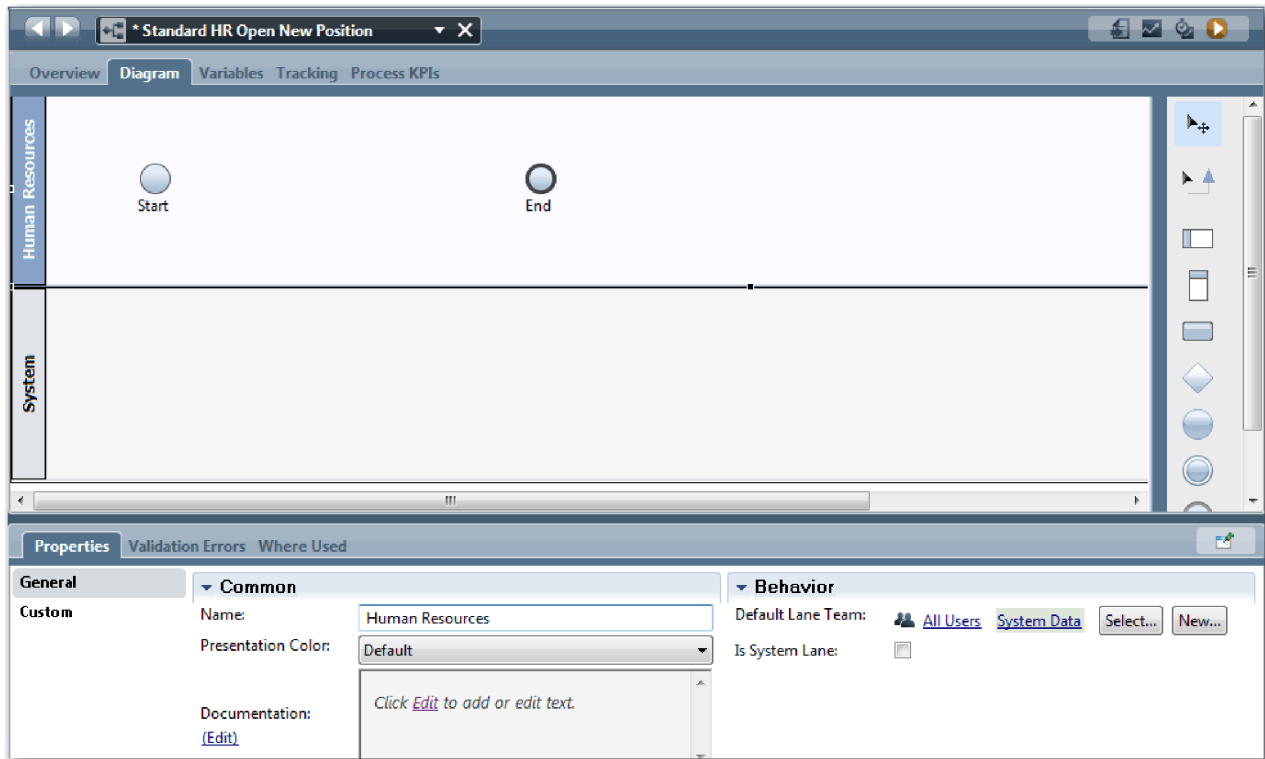
3. Create the HR Managers team:
   a. In the Behavior section, for **Default Lane Team** click **New**.
   b. Type `HRManagers` for the name and click **Finish**.
   c. In the Simulation Properties section, for **Cost per Hour** type `50.00`.
   d. In the Members section, click the list to select **Standard Members**.
   e. Click **Add group** and select **tw_allusers**.

      Note: The group tw_allusers is created automatically when you install IBM Business Process Manager. All registered users are part of tw_allusers.
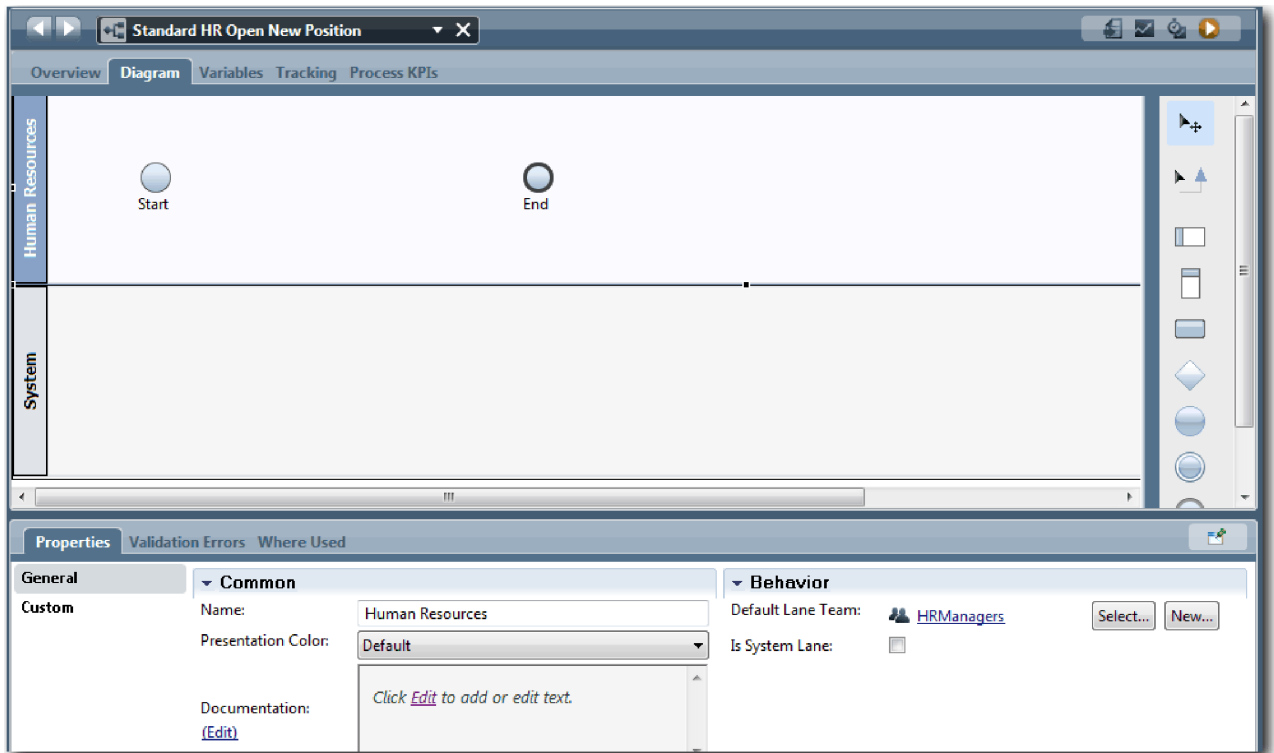   f. In the Managers section, click **Select** and select **Managers of All Users**.
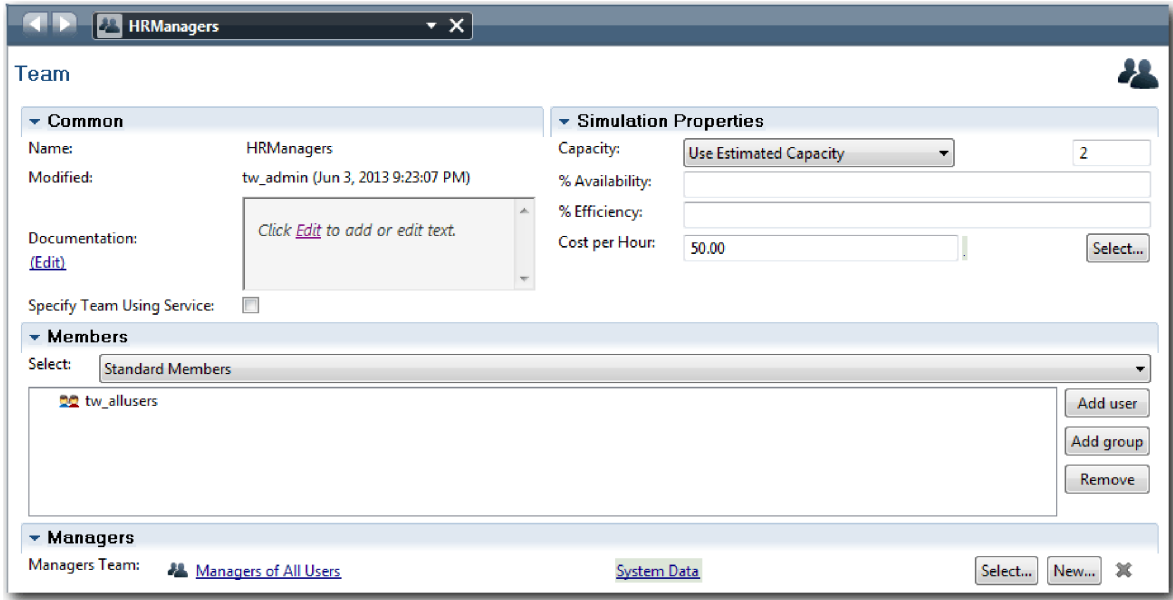
4. Click the back arrow to return to the Standard HR Open New Position process.
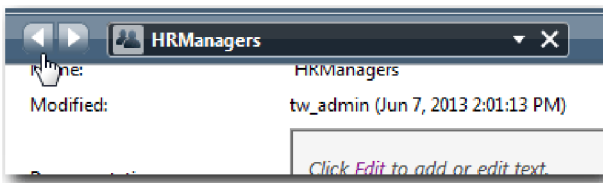
Tip: You can also click the drop-down list in the **HRManagers** field to view the artifacts that are open.

You are now back in the main canvas of the Standard HR Open New Position process.

5. Add a General Manager lane:
   a. Drag a lane from the palette onto the diagram.
   b. Name the lane General Manager.
   c. In the **Properties** tab, select **Blue** from the **Presentation Color** list.

6. Create the General Managers team that is associated with the General Manager lane. Include the following properties:
   - Name: GeneralManagers
   - Cost per Hour: 75.00
   - Members: Standard Members (tw_allusers)
   - Managers: Managers of All Users
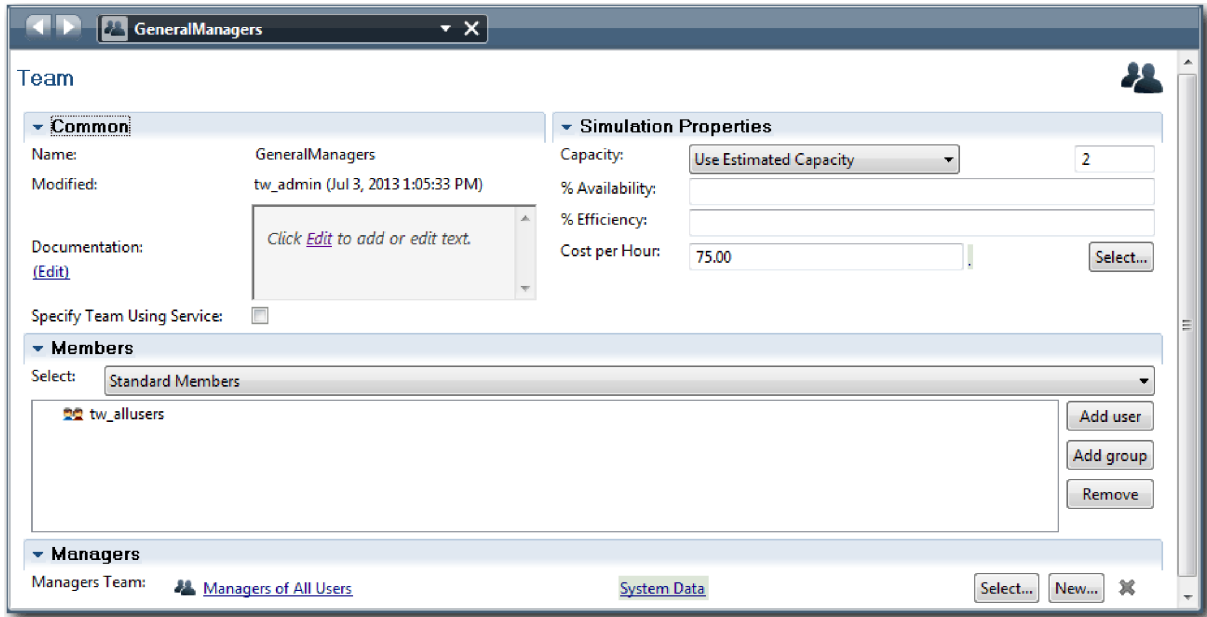
7. In the Standard HR Open New Position diagram, add a Hiring Manager lane. Select **Green** from the **Presentation Color** list.

8. Create the Hiring Managers team that is associated with the Hiring Manager lane. Include the following properties:

   • Name: HiringManagers

   • Cost per Hour: 65.00

   • Members: Standard Members (group tw_allusers)

   • Managers: Managers of All Users
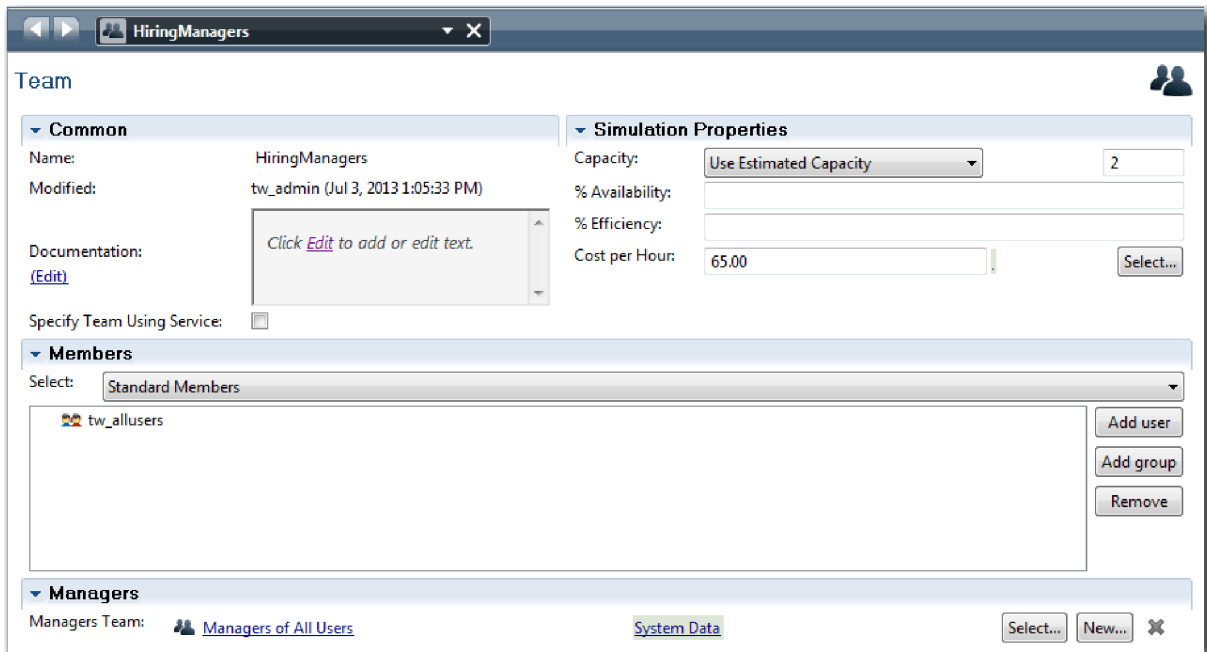
9. In the Standard HR Open New Position diagram, click the **System** lane. In the **Properties** tab, select **Purple** from the **Presentation Color** list.

Tip: To reorder lanes, you can right-click a lane and select **Move Lane Down** until it is positioned where you want it.

Your diagram matches the following image:
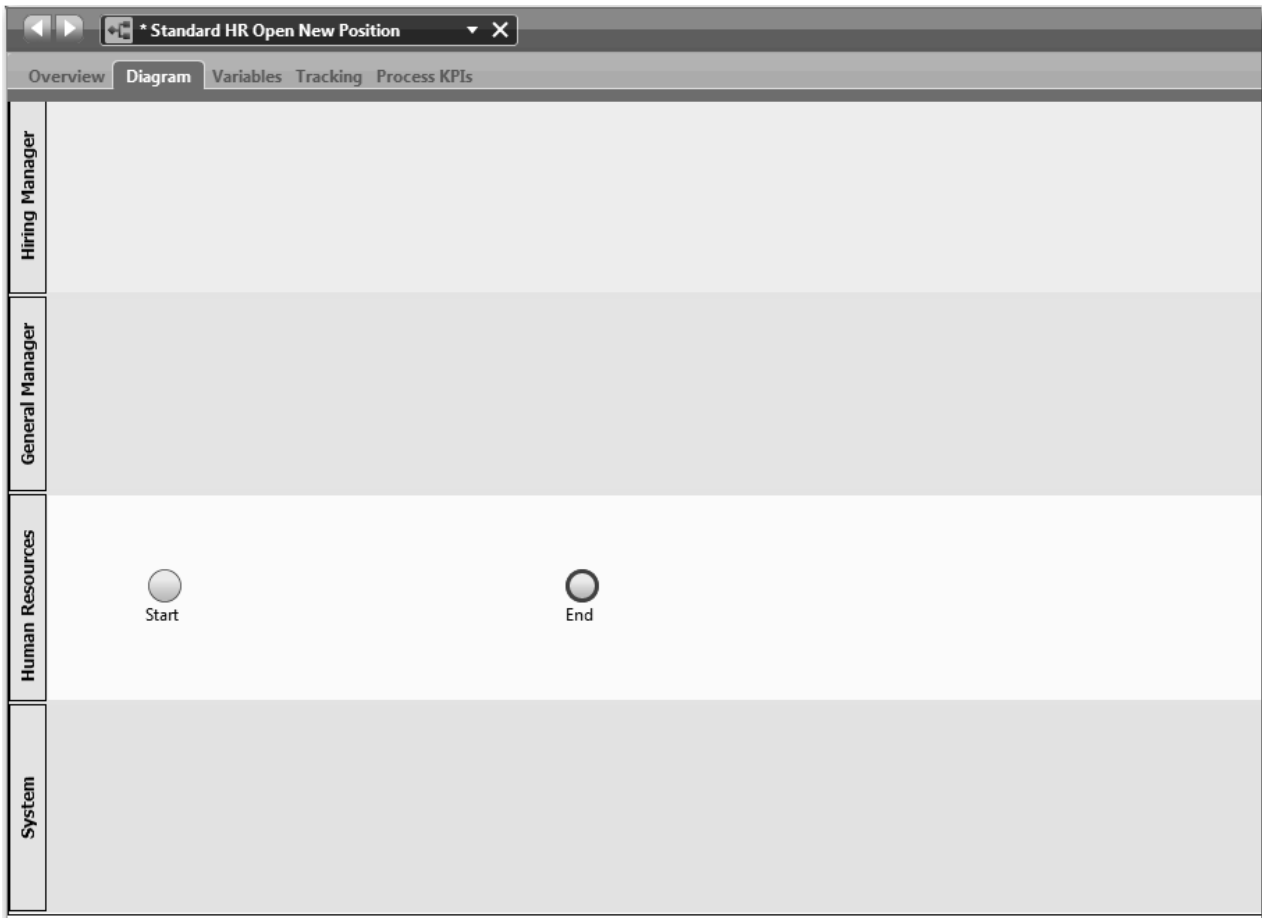
10. In the main toolbar, click **Save**.

11. To view the teams you created, click **Processes** in the library.
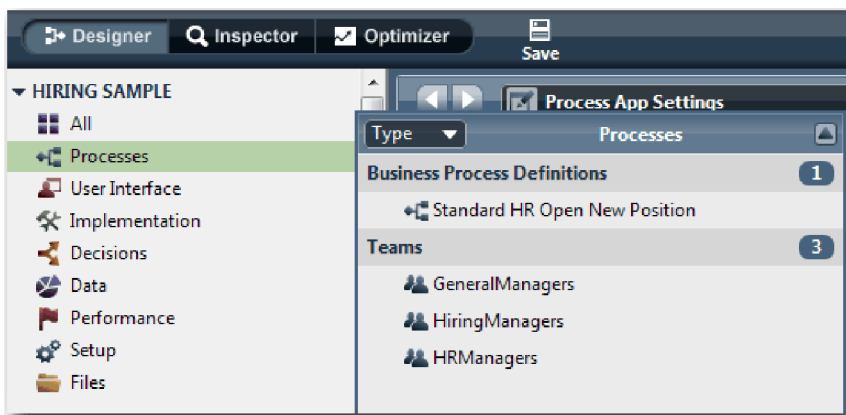
Lesson checkpoint

You modeled the teams and created the foundation for the BPD by adding the appropriate lanes and associating and defining teams.

In this lesson, you learned
- How to add lanes to a BPD
- How to associate a team to a lane
- How to define a team

In the next lesson, you will use sequence flows to connect the activities and events to establish the process flow.

Related Links
- Creating a team

Add activities and events

In this lesson, you add activities and events to the lanes in the Standard HR Open New Position BPD to establish the correct process flow.

To model the activities and events, use the process requirements.

When you add activities and events, follow these guidelines:
- Ensure that activities represent logical units of work that are assigned to a process participant.
- Convert multiple concurrent workflow steps that are assigned to one responsible role into one activity or task.
- Use verb-noun statements to label activities, such as Submit job requisition.
- Apply a top-down, left-to-right flow to your BPD so that it is easier to read.

This lesson uses the following concepts:

| Concept	Description
Event	Controls flow objects for a process model. An event is something that occurs during a process.
Start event	Triggers the initiation of the process through a manual or automatic input. There are three types of start events: standard, message, and ad hoc. In a BPD, a standard start event is created automatically and only one instance is allowed in the model. To start a process when an external signal is received, add a message or ad hoc start event to the BPD.
End event	Occur in a process when a final decision from all activities or a partial set of activities is reached. There are four types of end events: standard (none), message, error, and terminate. You can have multiple standard end events.
Activity	A single work task that a participant, whether the participant is a person or a system, accomplishes from beginning to end during a process. There are five types of activities: none, user task, system task, script, and decision task.
None activity	An activity that has no implementation. A none activity can be useful when you are unsure of the implementation of an activity. For example, the Find job candidates is a none activity.
User task	An activity is implemented as a user task when a user or human starts or completes the activity. For example, the Submit job requisition is a user task.
System task	An activity is implemented as a system task when an automated system or service completes an activity. For example, the Notify hiring manager activity is a system task.
Script task	An activity that uses JavaScript to access and manipulate data.
Decision task	An activity with a decision or condition in a business rule to determine which process implementation is started.

Add the activities and events:

1. Determine which team conducts each of the four activities: Submit job requisition, Approve or reject requisition, Find job candidate, and Notify hiring manager. See the following table for the activities and events that are associated with each lane:

| Lane	Activities, color, and description	Events
Hiring Manager	Submit job requisition Presentation Color: Default Description: The hiring manager submits a job requisition.	Start
General Manager	Approve or reject requisition Presentation Color: Purple Description: The GM evaluates the submitted job requisition and either approves or rejects it.	
Human Resources	Find job candidates Presentation Color: Yellow Description: HR searches for job candidates.	End
System	Notify hiring manager Presentation Color: Orange Description: If the GM rejects the job requisition, the hiring manager is notified of the rejection and the job requisition is terminated.	Requisition terminated (End event)

2. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
3. Drag the **Activity** from the palette into the **Hiring Manager** lane and type `Submit job requisition` in the text box that displays over the activity.
4. In the **Properties** tab, select **Default** as the **Presentation Color** and click **Edit** under **Documentation** to add a description of the activity.
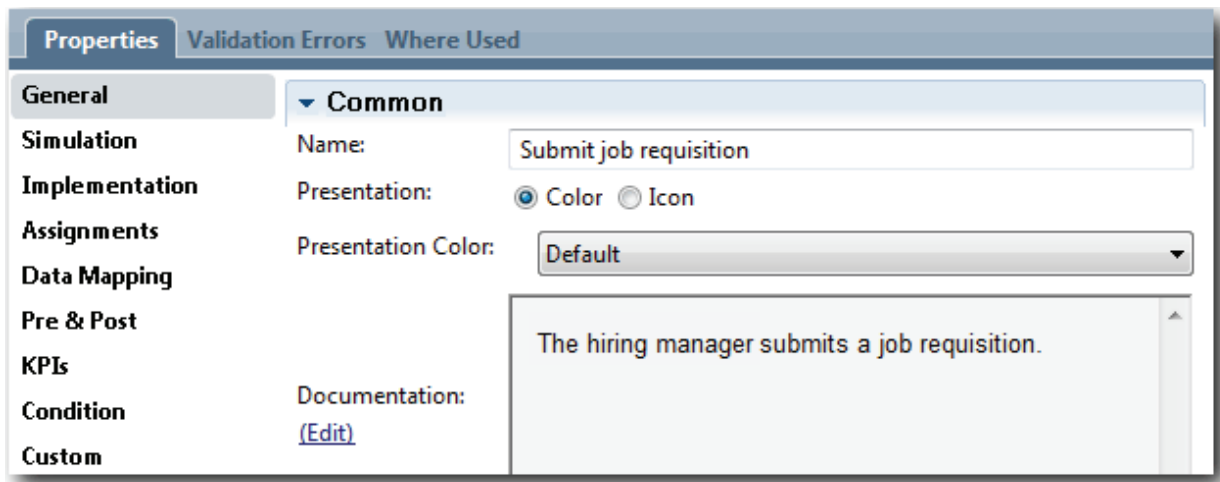
5. Add the remaining activities that are listed in the table in step 1 to the process diagram. Your diagram matches the following image:
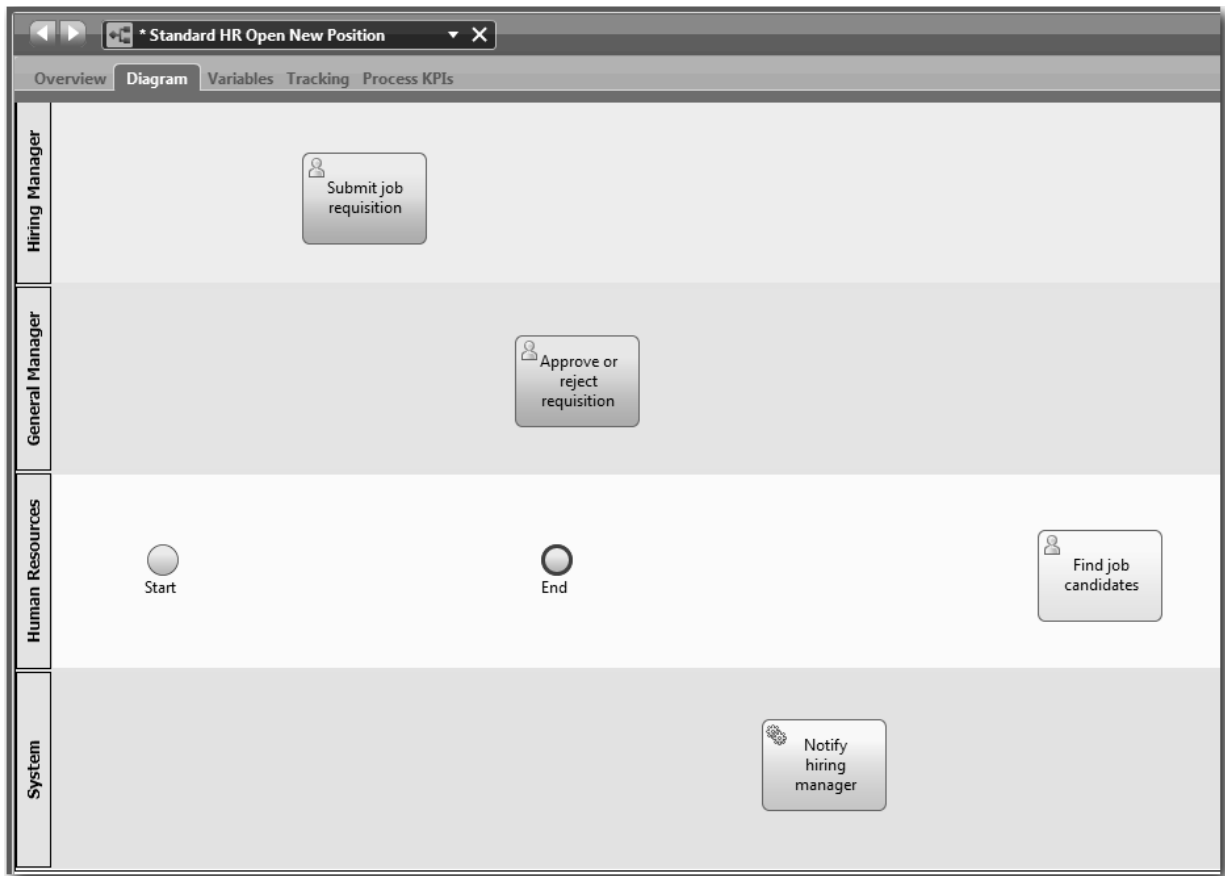
6. Move the **Start** event to the left of the first activity, **Submit job requisition**.

7. Move the **End** event to the right of the **Notify hiring manager** activity. Your diagram matches the following image:
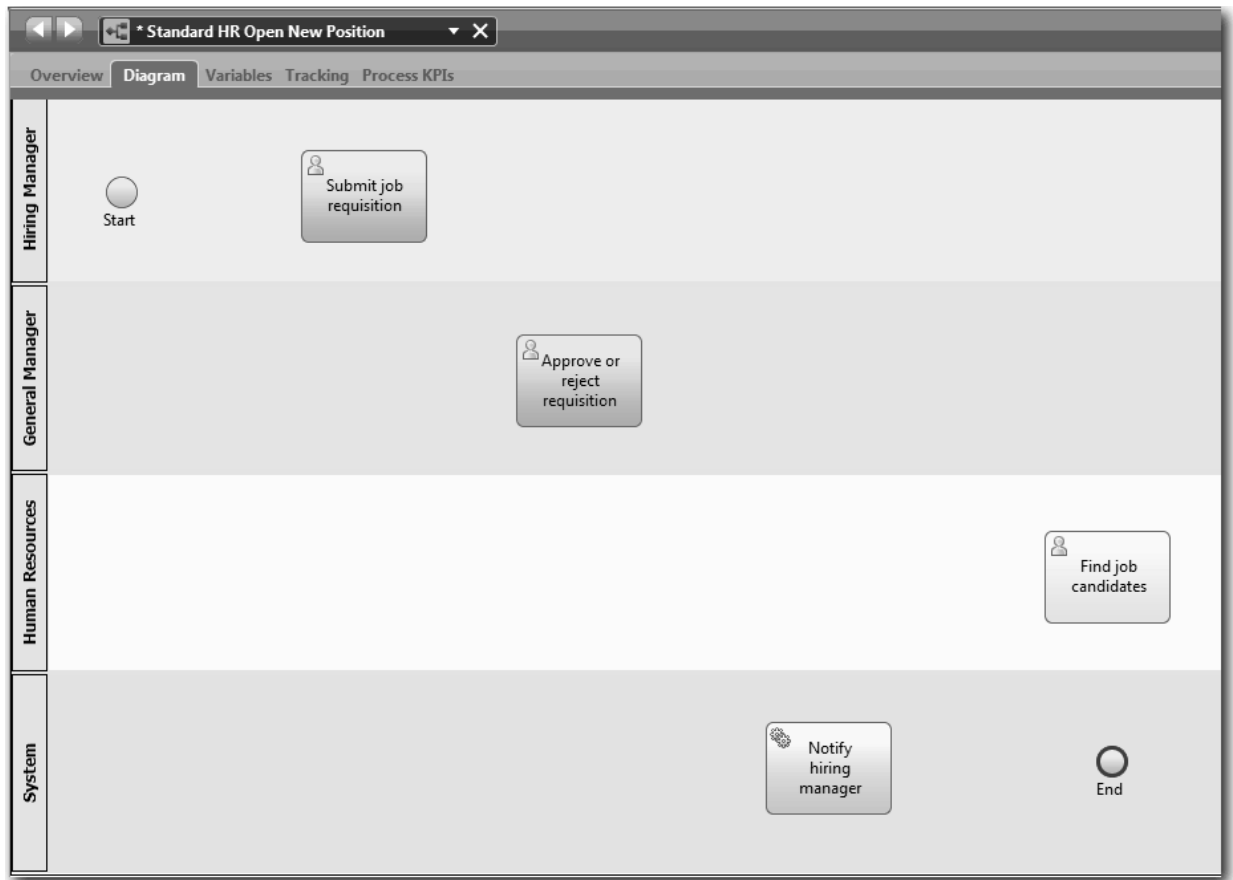
Tip: To facilitate testing, start the process with a Script task in the **System** lane to initialize your data.

8. Save your work.

Lesson checkpoint

You added activities and events to the Standard HR Open New Position BPD.

In this lesson, you learned

- How to translate process requirements into activities
- How to add activities and events to a BPD

In the next lesson, you will sequence the activities and events to establish the process flow.

Add sequence flows

In this lesson, you use sequence flows to connect the activities and events to establish the process flow in the Standard HR Open New Position BPD.

Now that activities and events are in the process model, you must provide the basic control and flow from these objects. This type of diagram provides communication about how the process flows from one activity to another, and who completes these activities.

At this stage of the process model, it is necessary only to sequence the expected flow of the process from the start to the end events.

Note: If more than one sequence flow leaves the same flow object, the first one that you add is the default sequence flow. Subsequent sequence flows that originate from the same object are followed only under certain conditions. For an example, see the sequence flows that originate from the Submit job requisition activity.

Typically, you add process flow controls, which are known as *gateways* when there is more than one flow out of an activity. In this lesson, you will sequence only the activities and events. In the next lesson, you will add the gateways.

This lesson introduces the following concepts:

Concept	Description
Normal sequence flow	A plain arrow that indicates that the BPD progresses to the next step in the process as soon as the first step is completed.
Conditional sequence flow	A plain arrow that indicates conditional expressions are evaluated to determine which path the flow is going to take. Conditional sequence flows are followed only when the conditions are met.
Default sequence flow	A plain arrow with a slash at the beginning of the flow line. A default sequence flow is required and is automatically created when there is a conditional sequence flow. The default sequence flow indicates a processing path to follow when none of the conditions on the conditional sequence flows are true, ensuring that there is at least one processing path (the default path) for the business process to follow.

Add sequence flows:
1. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
2. Select the **Sequence Flow** tool in the palette.

   Tip: The **Sequence Flow** tool remains active so that you can connect all of your activities and events quickly. To deactivate the **Sequence Flow** tool, select the **Selection Tool** or press **Esc**.
3. In the process diagram, move your mouse to the **Start** event and click a selection point to place the beginning of the flow arrow.
4. Move your mouse to a selection point on the **Submit job requisition** activity and click again.
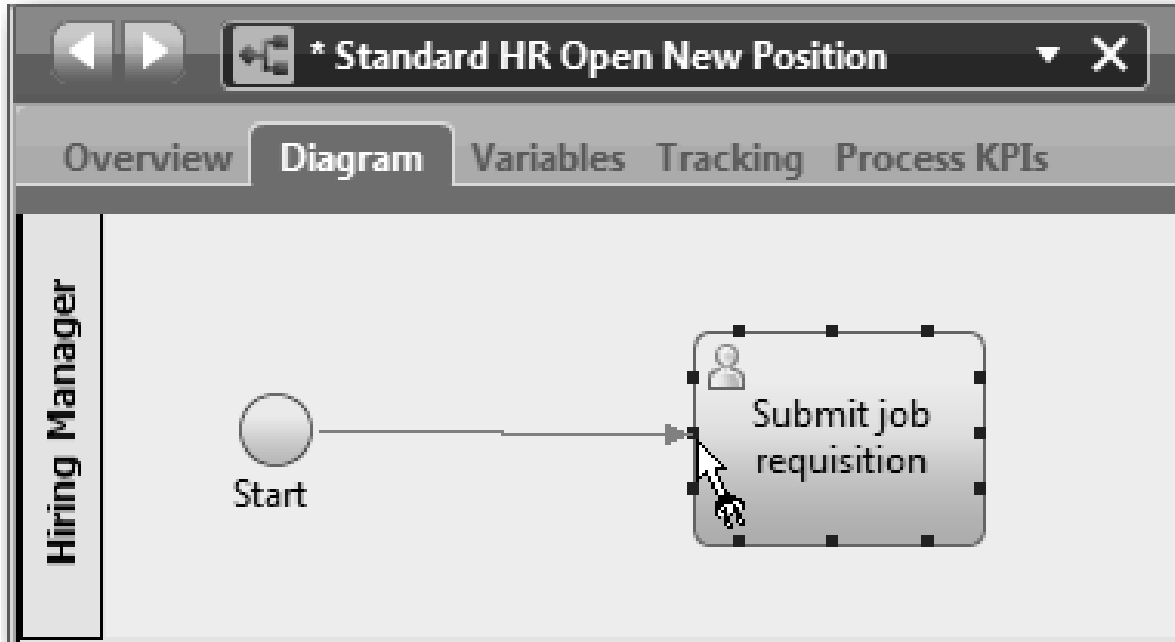
5. Connect the **Submit job requisition** activity to the **Find job candidates** activity and then to the **Approve or reject requisition** activity.

Notice that the flow line that goes to the **Find job candidates** activity is marked as the default flow line.

Tips:

- If more than one sequence flow leaves the same flow object, the first one that you add is the default sequence flow.
- If you sequence incorrectly and have the wrong default line, delete all the sequence flow lines from the activity, and redo them.
- To straighten flow lines, you can realign an activity or event on the diagram by selecting it and holding down **Ctrl** press the arrow keys.
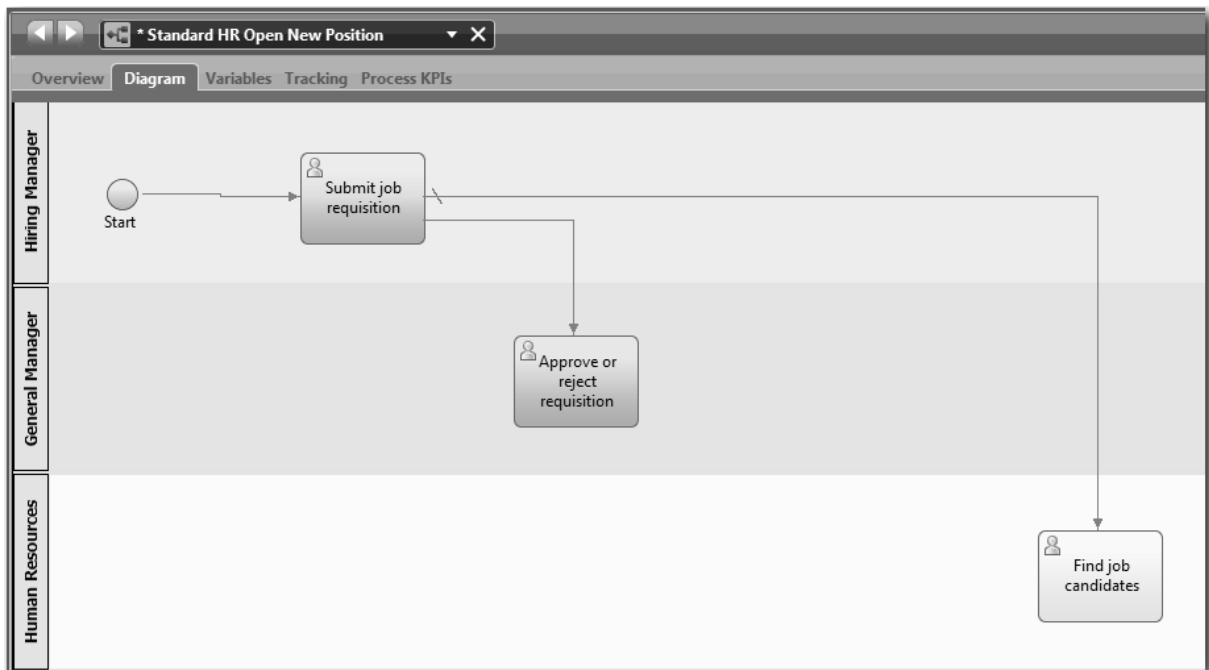
6. Connect the **Find job candidates** activity to the **End** event.

7. Connect the **Approve or reject requisition** activity to the **Notify hiring manager** activity and to the **Find job candidates** activity.

8. Connect the **Notify hiring manager** activity to the **End** event.
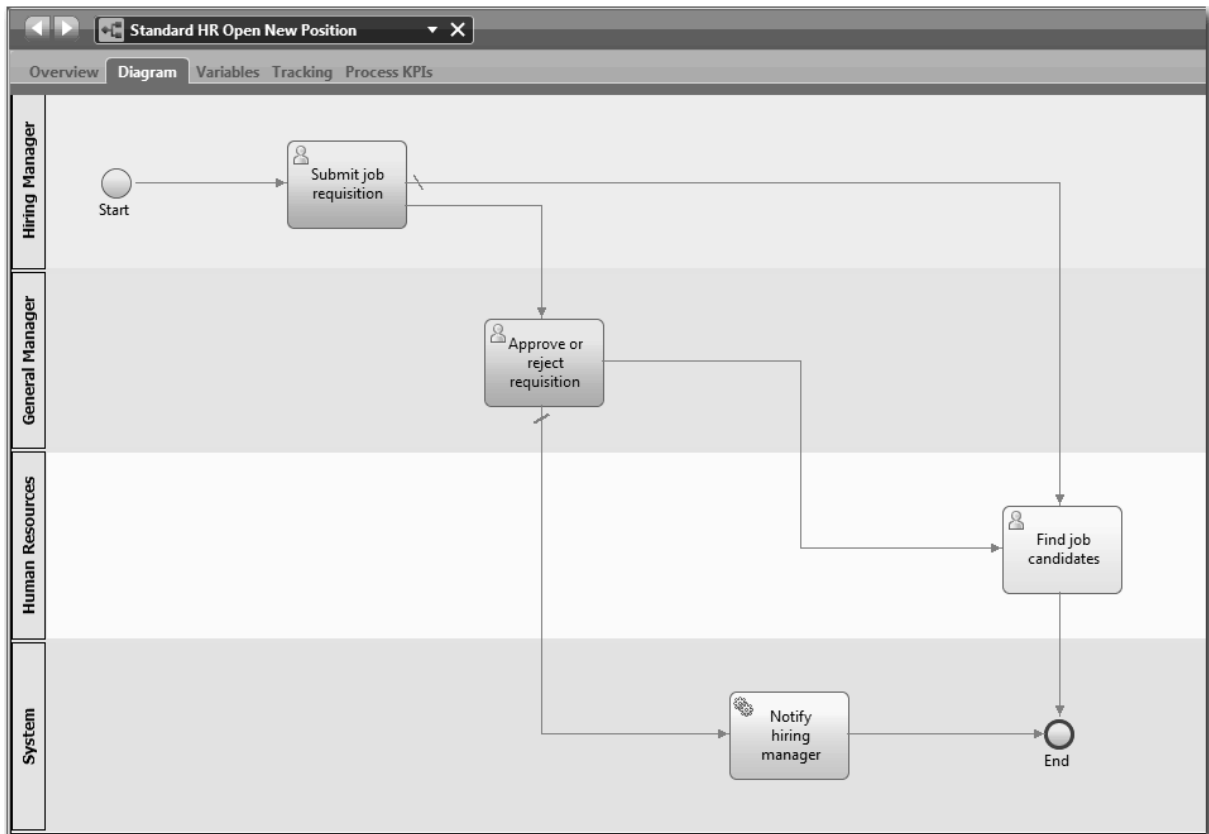
9. Click the **Selection Tool** in the palette or press **Esc** to switch back to the normal selection mode in the process diagram.
10. Save your work.

Lesson checkpoint

You established the process flow in the Standard HR Open New Position BPD.

In this lesson, you learned
- About process flow
- How to communicate the expected flow of the process from the start event to the end events
- About types of sequence flows

In the next lesson, you will add gateways to model points in the process execution.

Related Links
- Modeling process execution paths by using sequence flows

Add event gateways

In this lesson, you create two event gateways to model points in the Standard HR Open New Position process execution.

In the previous lesson, you added a sequence flow line for each potential path from an activity. If you model your sequence flows individually (as you did in this tutorial), you must check the condition logic for each flow line. Using gateways is more efficient.

An event gateway represents a branching point in a process execution where only one of several flows can be followed, depending on the events that occur. To simplify the diagram, the gateway is labeled in the form of a question, and the outgoing flows are labeled with a response. For the Standard HR Open New Position BPD, you need the following gateways:

- **Need GM approval?**: If the job request is to fill an existing position, the requisition is routed directly from the hiring manager to HR. If the request is to fill a new position, the requisition is routed to the General Manager (GM) for approval.
- **GM approved?**: The GM evaluates the requisition and either approves or rejects it. If the GM approves the requisition, it is routed to the HR manager, who can then search for job candidates. If the GM rejects the requisition, the hiring manager is notified and the requisition is terminated.

This lesson uses the following concepts:

Concept	Description
Gateway	Controls the flow of a process, such as the divergence and convergence of sequence lines, determining, branching, and merging the flows that a process can take. There are two gateway modes: *split* and *join*. A gateway can split an incoming flow into multiple outgoing flows, or it can join incoming flows into one outgoing flow. There are two types of gateways: exclusive and parallel. This tutorial uses exclusive gateways.
Exclusive gateway	Sends the process through only one of the available flows. After a process condition is met, only one conditional sequence flow is followed, and evaluation of subsequent outgoing sequence flow conditions stop. If no conditions are met, the default processing flow is followed.
Parallel gateway	Has split modes that are called *parallel split* and *parallel join*. Parallel split gateways direct the process flow along every sequence flow in parallel. There are no conditional or default flows. With a parallel join gateway, you can model any number of incoming sequence flows. After all incoming sequence flows reach the parallel join, the outgoing sequence flow is followed.

Add event gateways:

1. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
2. Drag a gateway from the palette to the right of the **Submit job requisition** activity on the process diagram. Type `Need GM approval?` in the text box that displays over the gateway.
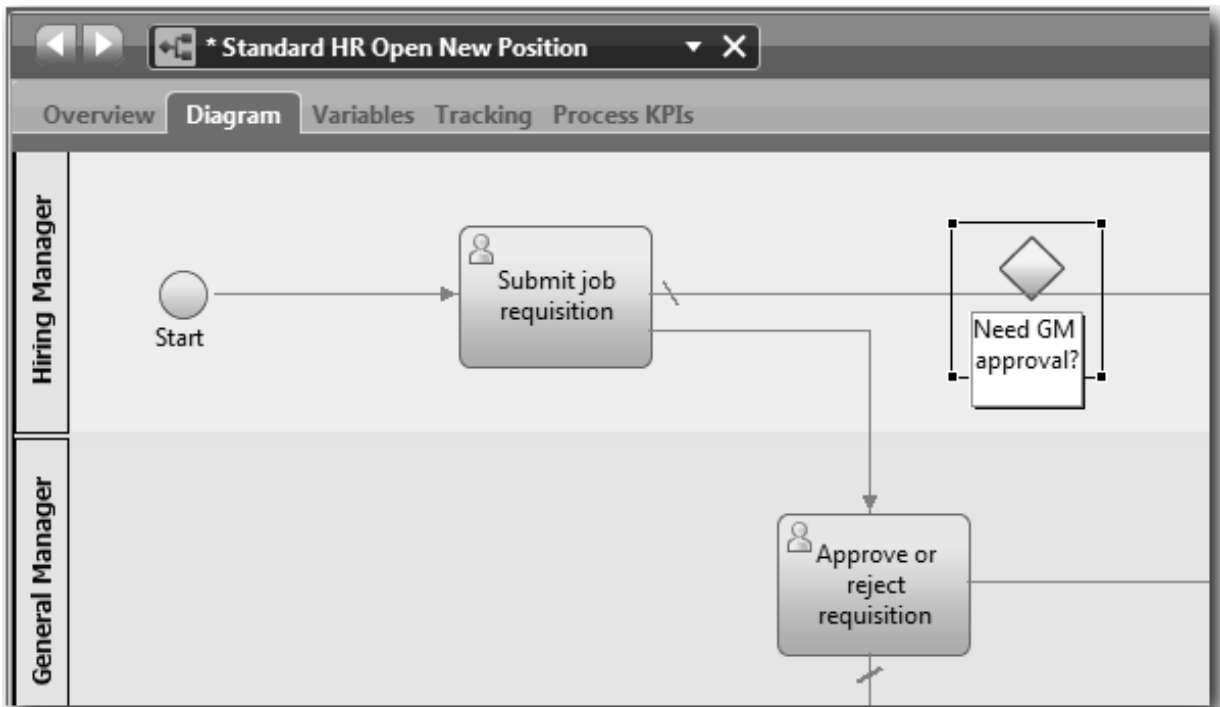

3. In the **Properties** tab, make sure that the **Name Visible** box is selected and verify that **Exclusive Gateway** is the gateway type. Click **Edit** under **Documentation** to add a description of the gateway.
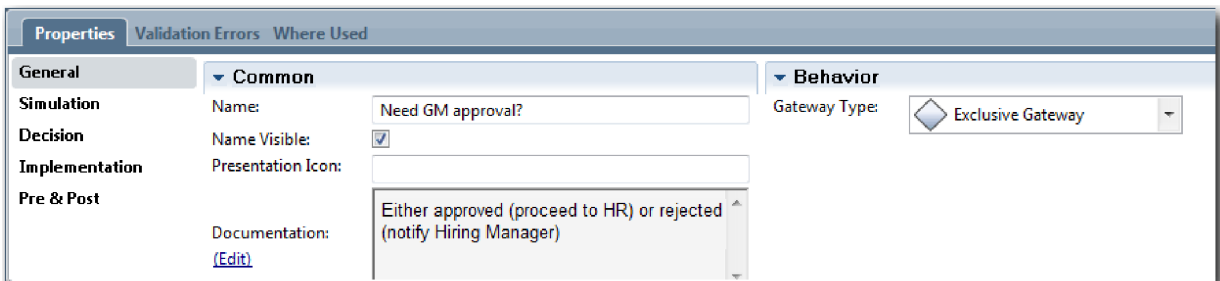

   **Tip:** You can click any activity or event to move it around in the diagram.
4. Connect the gateway:
   a. Click to select the sequence flow between the **Submit job requisition** and the **Find job candidates** activities and press the **Delete** key (or right-click and select **Edit > Delete**).
   b. Delete the sequence flow between the **Submit job requisition** and **Approve or reject requisition** activities.
   c. Select the sequence flow icon form the palette.
   d. Connect the **Submit job requisition** activity to the **Need GM approval?** gateway.
   e. Connect the **Need GM approval?** gateway to the top of the **Find job candidates** activity and then to the top of the **Approve or reject requisition** activity.
   f. Click the **Selection Tool** in the palette or press **Esc** to switch back to the normal selection mode in the process diagram.
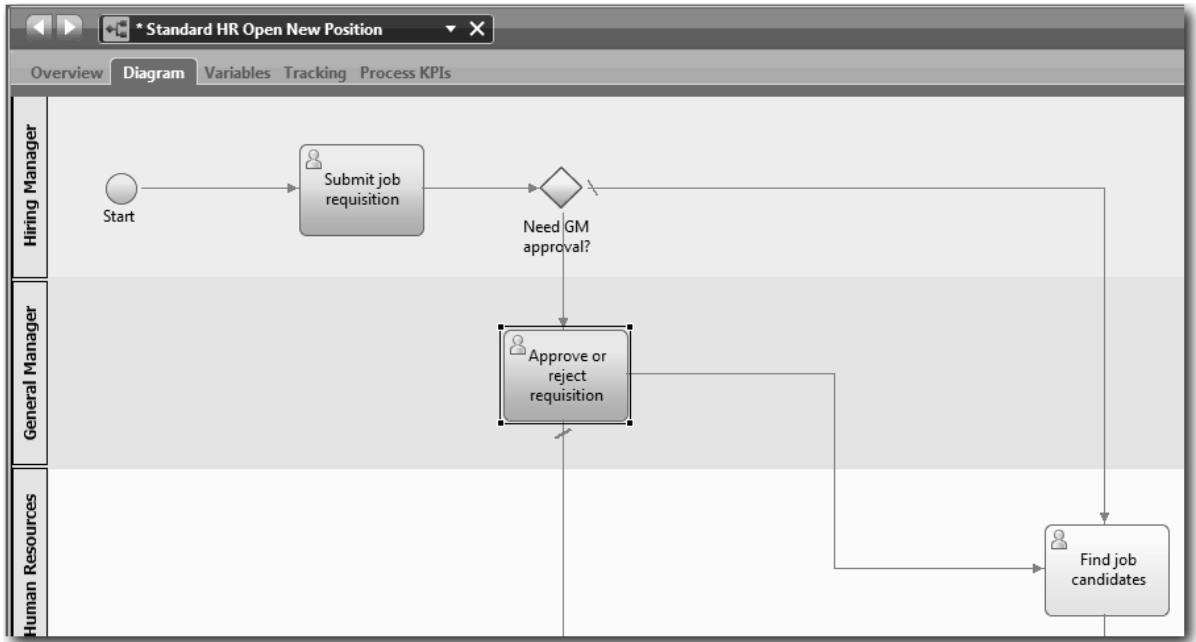
5. Name the sequence flow lines:

   a. Click the sequence flow between the **Need GM approval?** gateway and the **Find job candidates** activity.

   b. In the **Properties** tab, type `No approval needed --> proceed to HR` as the name, and select the **Name Visible** box.
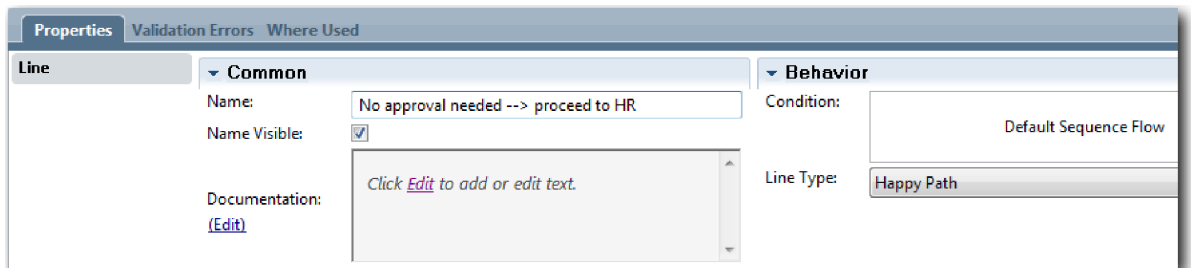
   c. Click the sequence flow between **Need GM approval?** and **Approve or reject requisition**.

   d. In the **Properties** tab, type `Approval required` as the name, and select the **Name Visible** box.

6. Repeat steps 1 and 2 to create a **GM approved?** gateway to the right of the **Approve or reject requisition** activity with the same properties selected as the first gateway. For the documentation, type `Either approved (proceed to HR) or rejected (notify Hiring Manager)`.

7. Connect the **GM approved?** gateway to the **Notify hiring manager** activity and the **Find job candidates** activity. Name the sequence flow lines to `Rejected` and `Approved --> proceed to HR`. Your process model matches the following image:
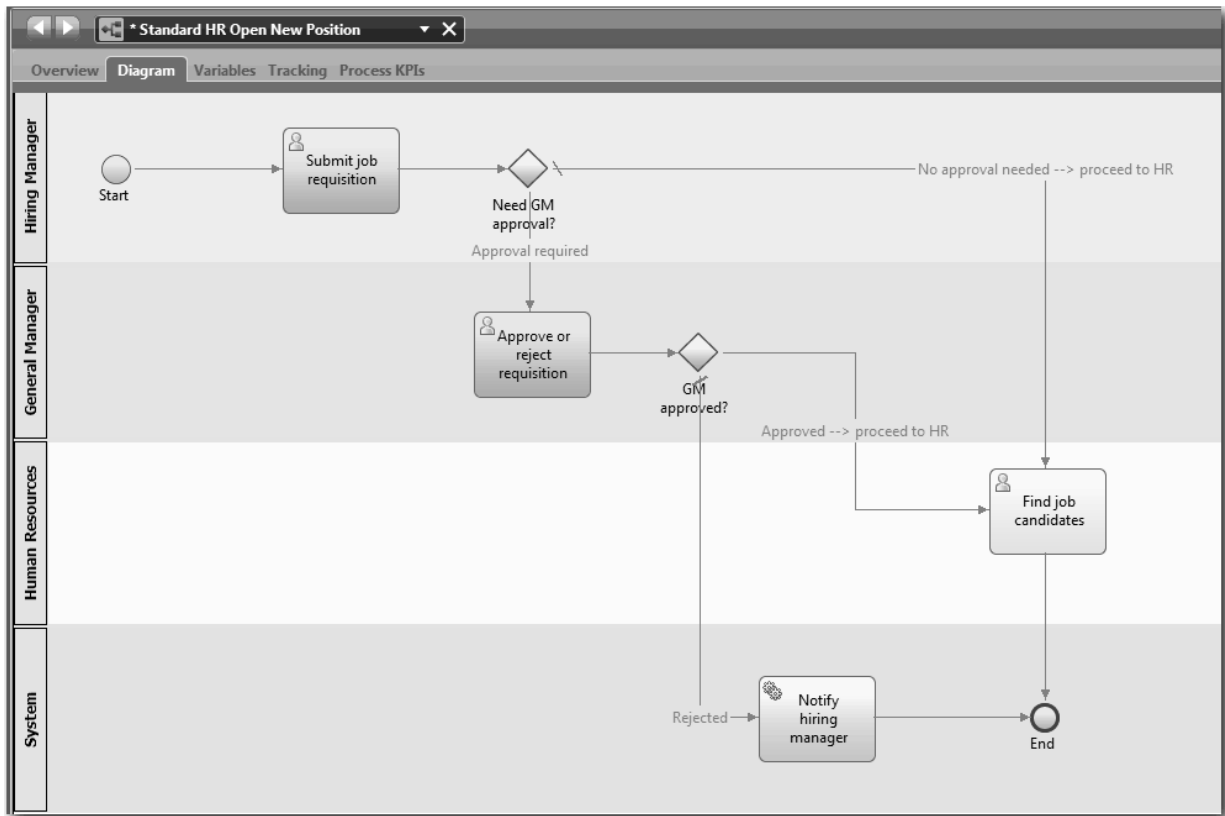
8. Save your work.

Lesson checkpoint

You added event gateways to the Standard HR Open New Position BPD.

In this lesson, you learned
- How to add event gateways
- How to model appropriate sequence flows for each gateway
- How to name sequence flow lines

In the next lesson, you will add a timer intermediate event.

Related Links
- Modeling event gateways

Add a timer intermediate event

In this lesson, you model an escalation path with an attached timer intermediate event to satisfy process requirements for the Standard HR Open New Position BPD.

Based on the process requirements, the GM evaluates the submitted job requisition and either approves it or rejects it. If the job requisition is not handled by the due date, the timer intermediate event is triggered and the system sends an escalation notice to the GM. In this lesson you add the timer intermediate event, and in the "Implement the process" on page 31 module, you will implement the timer intermediate event.

This lesson uses the following concepts:

Concept	Description
Intermediate event	Occurs between a start event and end event in the BPD. There are three types of intermediate events: timer, message, and error. Use the intermediate event to indicate a point in a service when you want Process Designer to capture the runtime data for reporting purposes. Intermediate events can be in a sequence flow or attached to the boundary of an activity.
Timer intermediate event	Use a timer intermediate event to specify a time before or after an activity occurs. Timer intermediate events, which are used to model escalation paths or delays in the BPD, can occur either between activities or attached to an activity
Attached timer intermediate event	When a running process instance reaches an activity with an attached timer intermediate event, a timer starts. The interval for the timer is calculated according to the configuration that you specify in the implementation properties for the timer intermediate event. When the specified interval elapses, the process follows the path from the attached timer intermediate event to the subsequent activity.
Message intermediate event	Used to model a message that is received or sent while a process is running.
Error intermediate event	Used to identify exceptions that occur while a process runs and handle those exceptions by using an error handler activity, sub process, or flow.

Add a timer intermediate event:

1. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
2. Drag an intermediate event from the palette onto the lower-left boundary of the **Approve or reject requisition** activity and type Overdue approval as the name.
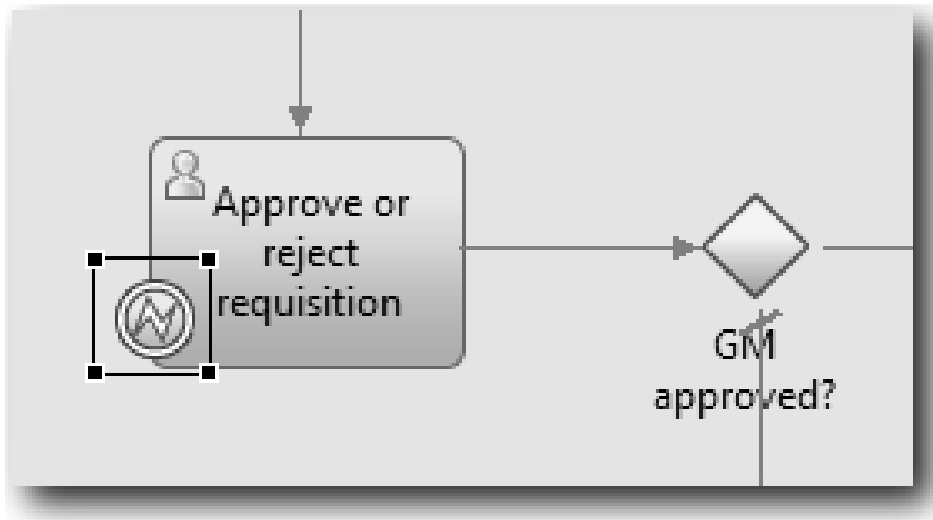

3. In the **Properties** tab, select **Implementation**. In the Boundary Event Details section, select **Timer** and clear **Interrupt activity**. Keep **Repeatable** selected.
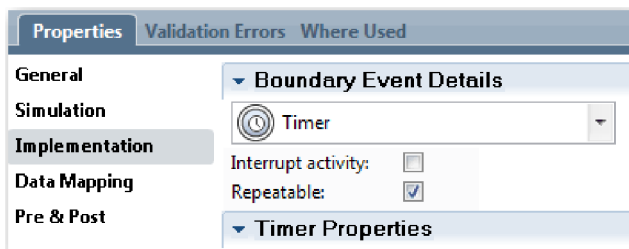

   Note:

- If the Interrupt activity is selected, the attached activity is closed when the timer event is triggered. For this tutorial, you clear **Interrupt activity** because the GM completes the activity upon receiving the escalation notice.
- If **Repeatable** is not selected, the escalation notice is sent only once. When the timer is set to Repeatable, an escalation notice is sent each time the specified interval elapses until the activity is completed.

You set the other properties during implementation. Notice how the intermediate event icon on the Approve or reject requisition activity now shows a timer.
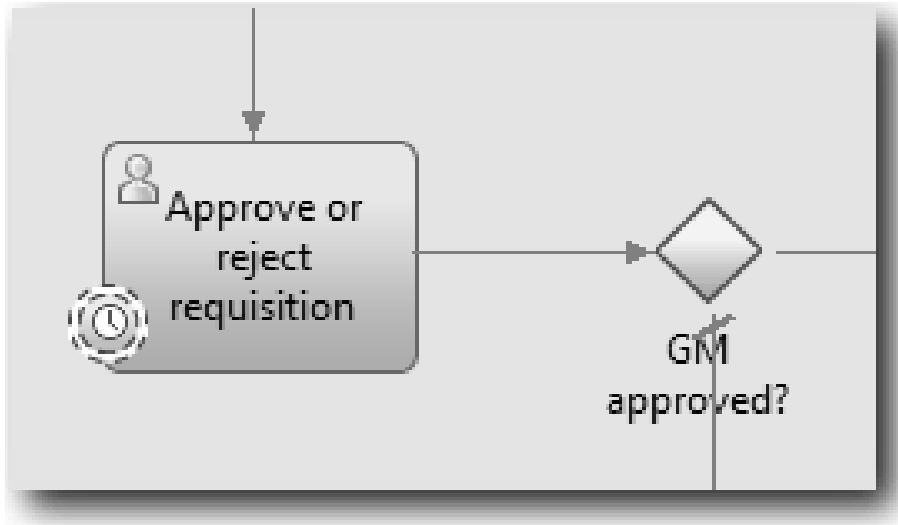
4. Add the Send escalation activity:
   a. Drag an activity from the palette to the **System** lane to the left of the **Notify hiring manager** activity.
   b. Name the activity `Send escalation notice`.
5. Connect the attached timer intermediate event to the Send escalation notice activity:
   a. Select the sequence flow icon from the palette.
   b. Connect the **Overdue approval** timer intermediate event to the **Send escalation notice** activity.
   c. Click the **Selection Tool** in the palette or press **Esc** to switch back to the normal selection mode in the process diagram.
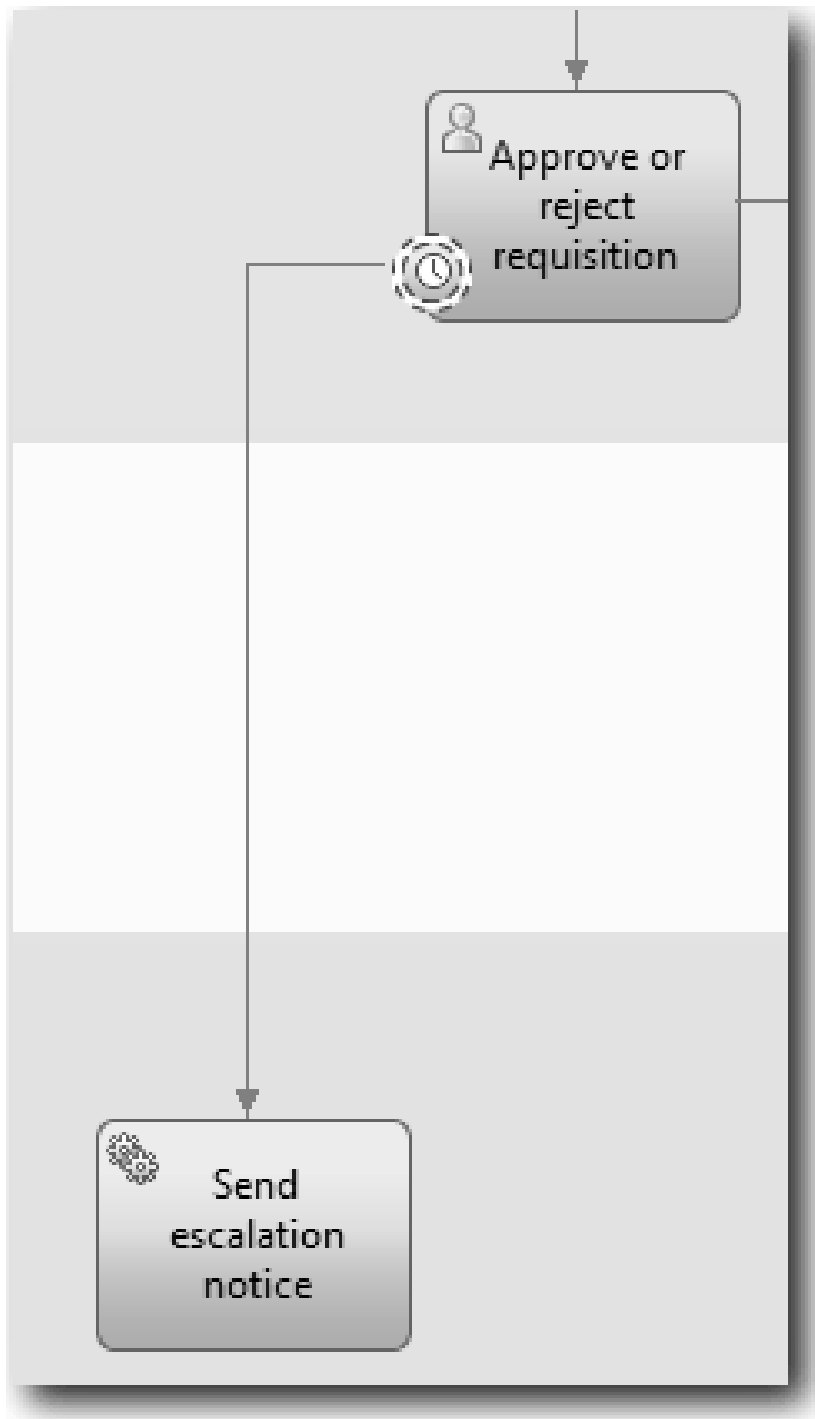
6. Name the sequence flow line:
   a. Click the sequence flow between the **Overdue approval** timer intermediate event and **Send escalation notice** activity.
   b. In the **Properties** tab, type `Missed due date` as the name and select **Name Visible** box.
   c. In the **Behavior** section, for **Line Type** select **Exception Path**.
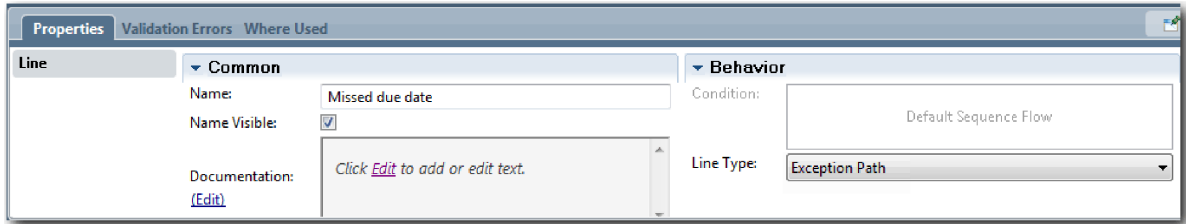
7. Add an End event to the end of the sequence flow. Drag an **End** event from the palette onto the canvas to the right of **Send escalation notice** and type `End escalation`.

8. Connect the **Send escalation notice** activity to the **End escalation** event.

   Tip: You can complete the escalation path by building an underlying service to implement the **Send escalation notice** activity. Typically, this activity is implemented as a send and chase design pattern that is modeled in a separate BPD.
   Your diagram matches the following image:
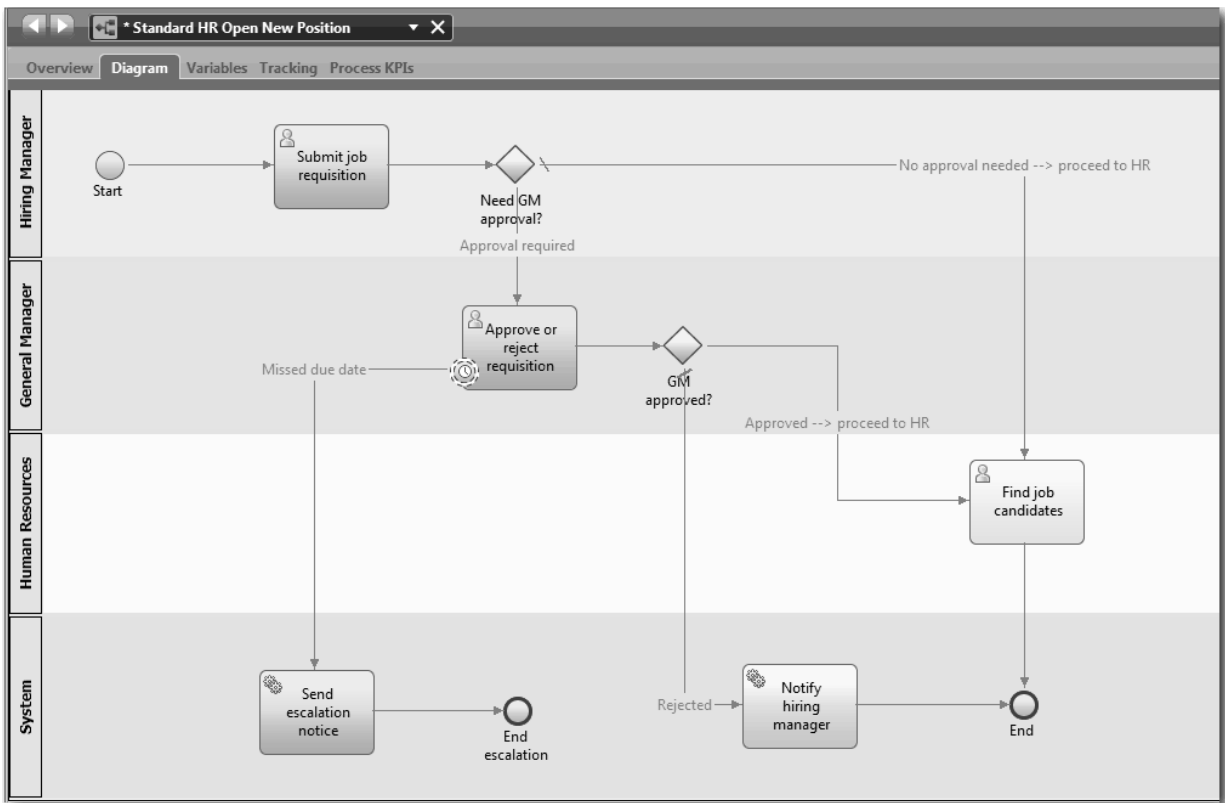
9. Save your work.

Lesson checkpoint

You added an attached timer event to the Standard HR Open New Position BPD.

In this lesson you learned

- How to attach a timer intermediate event to an activity
- How to model an escalation path in a BPD
- How to add a system activity
- How to add an end event

In the next lesson, you will create process variables.

Related Links

• Modeling timer events

Create process variables

In this lesson, you create the process variables to implement the gateway logic.

To implement the two gateways in the Standard HR Open New Position BPD, you need two private variables:

• *requisition*
• *currentPosition*

You select private variables because these variables are used only by this BPD and possibly passed to linked BPDs.

In this lesson, you create the two private variables and assign a variable type called *placeholder* to each of them. This is a temporary variable type. When you implement the process, you associate the variables *requisition* and *currentPosition* with business objects that you will create.

When you create variables, follow these guidelines:

• Create variable names that begin with a lowercase letter.
• Capitalize the first letter of a variable type.
• If the variable name is only one word, spell that word in all lowercase letters.
• If the variable name consists of more than one word, capitalize the first letter of each subsequent word.
• Remember that variable names are case sensitive.

This lesson uses the following concepts:

| Concept	Description
Variables	Data that provides the business context to a running process. Using variables, the business process passes data from one step to another. There are three kinds of variables: private, input, and output.
Private variables	Values that the current BPD or service requires.
Input variables	Values that pass into the current BPD or service.
Output variables	Values that are passed from a BPD to a parent BPD or service.

Create the variables:

1. Click the **Variables** tab in the main canvas of the Standard HR Open New Position process.
2. In the Variables section, click **Add Private** and type currentPosition for the name.
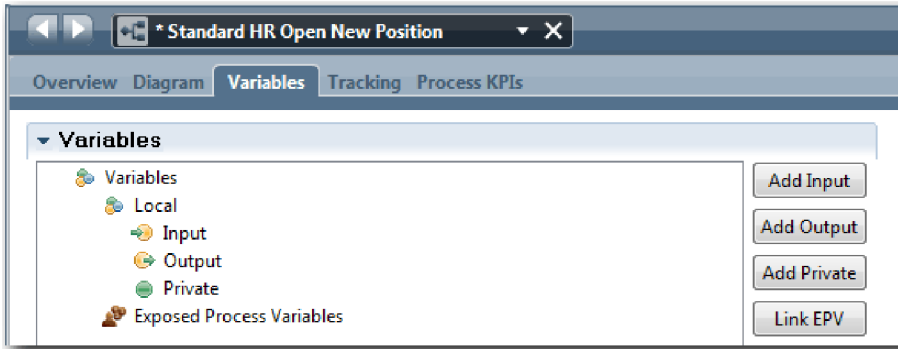
3. In the Details section, click **New** and type `Placeholder` for the business object.
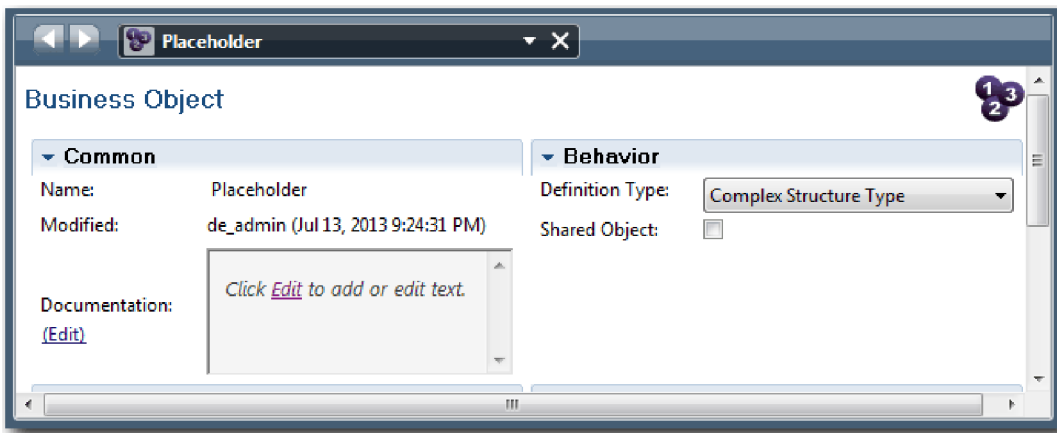
4. Click the back arrow to return to the Standard HR Open New Position process.
5. Click **Add Private** and type `requisition` for the name.
6. In the Details section, click **Select** to select the **Placeholder** for the variable type. Your private variables match the following image:
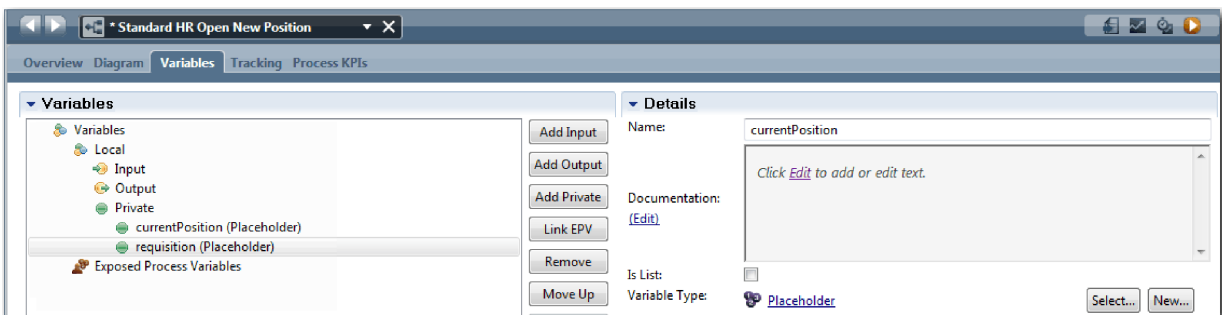
7. Save your work.
8. Click the **Diagram** tab in the main canvas of the Standard HR Open New Position process to return to the model.

Lesson checkpoint

You added process variables to the Standard HR Open New Position BPD.

In this lesson, you learned

• How to add private variables to a BPD
• How to create a simple placeholder variable type

In the next lesson, you conduct Playback Zero.

Related Links
* Variable scope in Process Designer

Conduct Playback Zero

In this lesson, you learn about playbacks, conduct Playback Zero by reviewing the process model with the stakeholders, and take a snapshot of the process.

During playback for business stakeholders, users, and development, the process model is demonstrated at a designated development phase to establish process goals, achieve consensus about an activity, collaboratively improve the process model, and, ultimately, approve the process model. Playbacks enable you to develop a process application iteratively. For the My Hiring Sample process application, there are four playbacks. Here are some examples of what happens during these playbacks:
* Playback Zero: Reviewing the process model
* Playback One: Using the Inspector to validate paths in the process that flow from the decision gateways
* Playback Two: Checking that the individual human services are working as expected
* Playback Three: Checking that the services are running correctly
* Final Playback: Following one instance of the process from beginning to end in Process Portal

Playback Zero is an important milestone in a Business Process Manager project-development lifecycle because it is during Playback Zero that a business process is identified and analyzed as a good candidate for a business process management project. During Playback Zero, the business process is defined, modeled, refined, and reviewed through discussion, discovery, and process analysis.

Typically, the process-analysis phase that precedes Playback Zero takes two to three weeks. If the review is complete and the process model is approved, refining the process requirements can occur during the implementation playbacks. Even if your team decides not to proceed with the development of the process, you have a documented process.

After you complete a playback, take a snapshot of the process. Snapshots record the state of library items in a process application at a specific time. You can use a snapshot to return to a previous state in the project; therefore, take snapshots often. You can also compare two snapshots to identify changes. When you finish your project, you create a final snapshot that you deploy.

This lesson introduces the following concepts:

Concept	Description
Playback	The act of demonstrating or running a process. A development team can use the Inspector in Process Designer to demonstrate the current process design and implementation in playback sessions. Playback sessions help capture important information from different stakeholders in a process, such as management, users, and business analysts.
Snapshot	Records of the state of library items in a process application or track of a process at a specific time. You can create snapshots in the Process Center console or in the Designer view. Snapshot management, such as installing, exporting, and archiving, is done in the Process Center console.

Conduct playback zero:

1. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
2. Review the process model by checking that yours matches the following image:
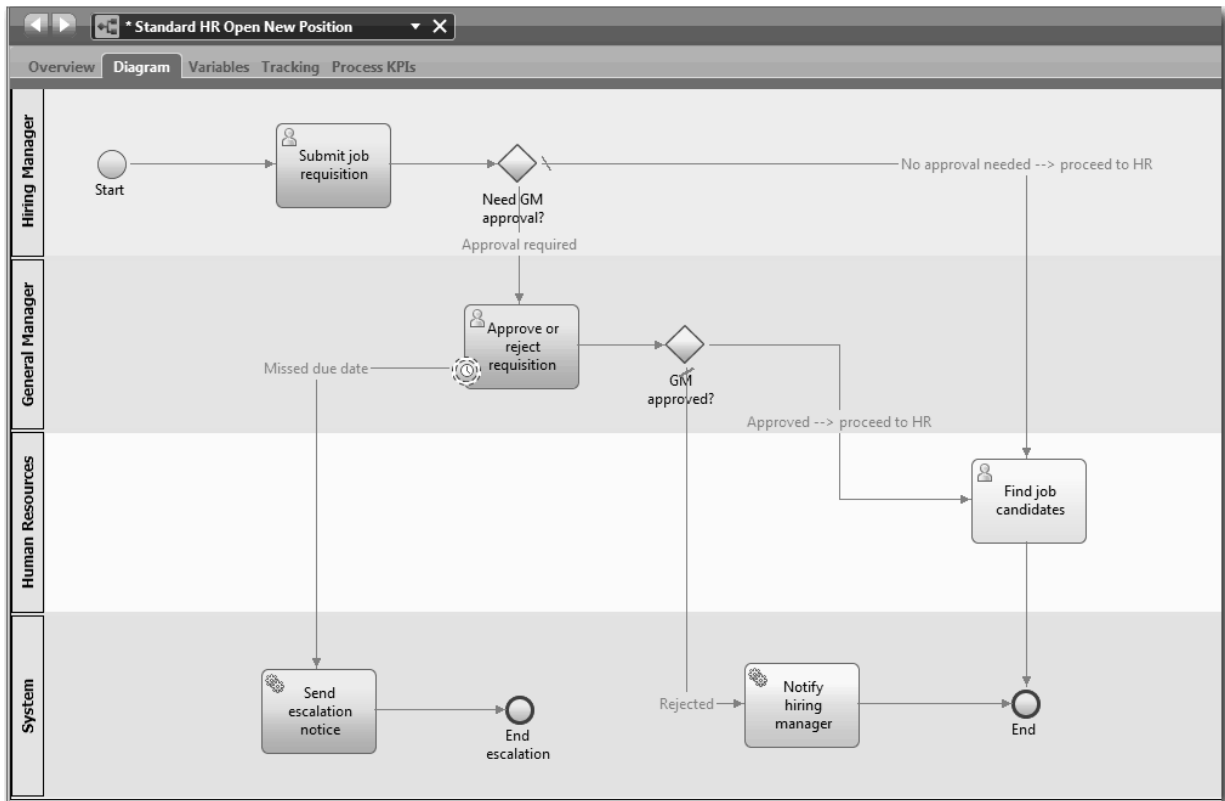
3. Walk through the process to simulate a playback, explaining your model to a colleague.

4. Add new process requirements to the Standard HR Open New Position BPD. For this tutorial, there are no additional requirements to go into the BPD. The process model is now ready for implementation.

5. Create a snapshot of your process application:

   a. In Process Designer, click the [Snapshot] icon in the main toolbar.
   b. Type `Playback Zero` as the snapshot name and click **OK**.
   c. For the description, type `This is a snapshot of the process application up to Playback zero.`

Lesson checkpoint

You reviewed the process model with playback zero and took a snapshot of the process application. In the next module, you will implement the process.

In this lesson, you learned
- How to describe the playback zero validation goals and requirements
- How to check that the business process reflects the requirements
- How to implement playback feedback and new process requirements
- How to take a snapshot of the process application

Related Links
- Managing snapshots

Implement the process

In this module, you implement the Standard HR Open process BPD that was validated in playback zero.

Learning objectives

After you complete the lessons in this module, you will understand the concepts and know how to do the following tasks:
- Create custom business objects to organize your process specific data
- Implement timer intermediate events
- Implement gateways
- Run Playback One in the Inspector

Prerequisites

You must complete all the lessons in the "Model the process" on page 2 module.

Create business objects

In this lesson, you create custom business objects to organize your process-specific data for the Standard HR Open New Position BPD.

Business objects represent the business data that is relevant to the BPD. For this lesson, you need three custom business objects:
- *Person*
- *Position*
- *Requisition*

For each business object, you define parameters to specify the data structure. A parameter is assigned a variable type that can be a simple type or a business object. In this lesson, you create the business objects that are required for this model. Later when you create the user interface, you *bind* elements of the user interface to these business objects.

When you create business objects, follow these guidelines:
- Start business object names with an uppercase letter.
- If the name of the business object consists of more than one word, capitalize the first letter of each word, for example *firstName*.
- Remember that the names of business objects are case sensitive.
- Add documentation details to business objects and parameters to clarify their use to other users. These details display in the context-sensitive help pop-up windows when someone selects the business objects for use with variables.

This lesson uses the following concepts:

Concept	Description
Business objects	A variable that represents business data that is relevant in the context of a BPD.

Create the business objects:
1. Create a *Person* business object:
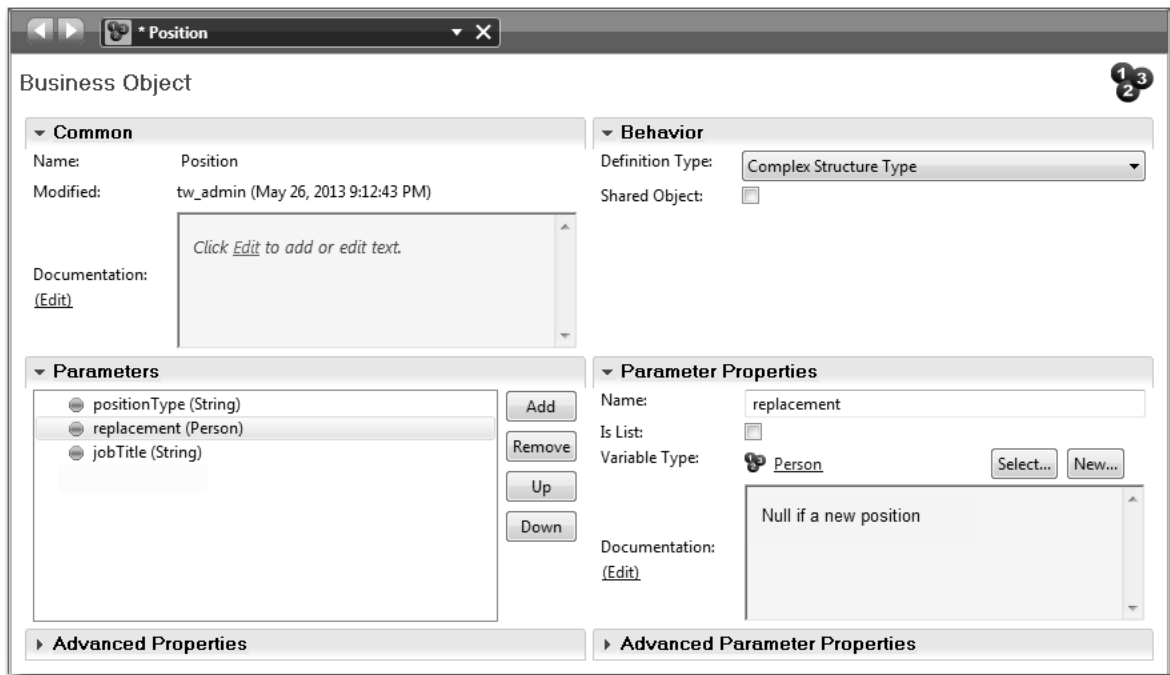   a. In the Designer library, click the plus sign next to **Data** and select **Business Object**.
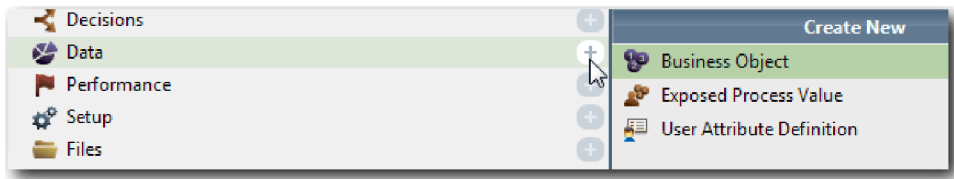
b. Type `Person` for the business object name and click **Finish**.

c. In the Parameters section, click **Add**.

d. Type `lastName` for the parameter name and keep the variable type as **String**. To change the variable type, click **Select** next to **Variable Type** to select one of the variable types in the system toolkit.

e. Continue to add the following parameters:

- **firstName (String)**
- **supervisor (String)**
- **startDate (Date)**
- **payLevel (String)**
- **payType (String)**
- **notes (String)**
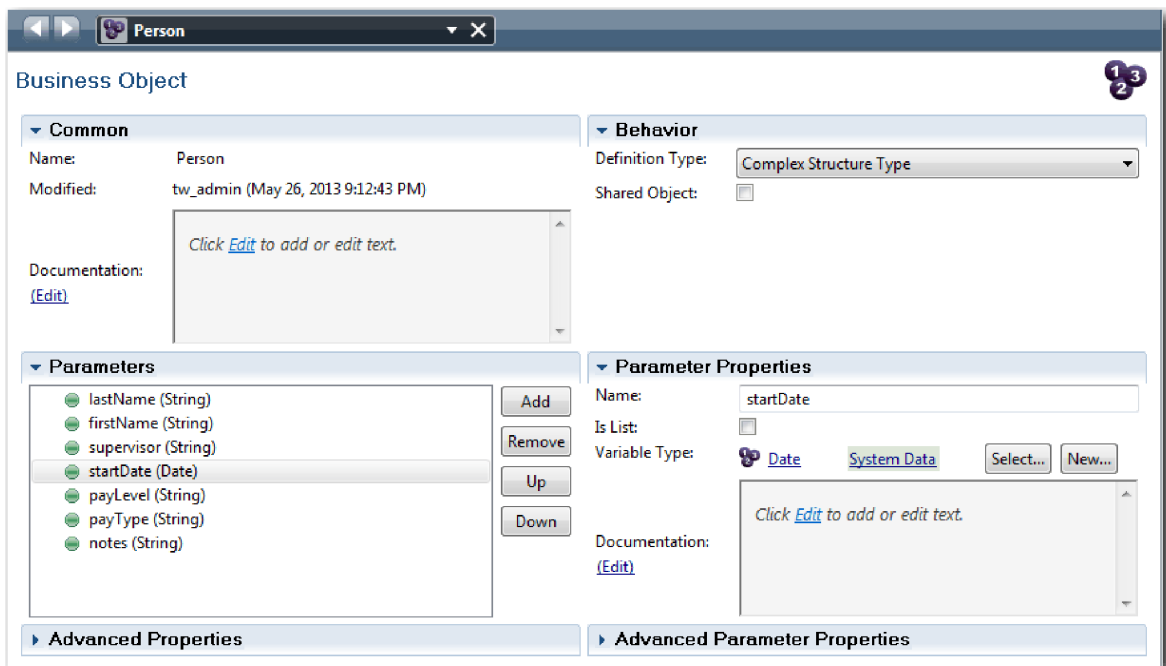
2. Save your work.

3. Create a *Position* business object:

a. In the Designer library, click the plus sign next to **Data** and select **Business Object**.

b. Type `Position` for the business object name and click **Finish**.

c. In the Parameters section, click **Add**.

d. Type `positionType` for the parameter name and keep the variable type as **String**.

e. Click **Edit** under **Documentation** and type `New or existing position`.

f. Continue to add the following parameters:

- **replacement (Person)**, Documentation: **Null if a new position**

- **jobTitle (String)**

4. Save your work.
5. Create a *Requisition* business object type:
   a. In the Designer library, click the plus sign next to **Data** and select **Business Object**.
   b. Type Requisition for the business object name and click **Finish**.
   c. In the Parameters section, click **Add**.
   d. Type reqNum for the parameter name and keep the variable type as **String**.
   e. Continue to add the following parameters:
      - **requestor (String)**
      - **status (String)**
      - **approvalNeeded (Boolean)**
      - **date (Date)**
      - **department (String)**
      - **location (String)**
      - **empNum (Integer)**
      - **gmApproval (String)**, Documentation: **Approved or rejected**
      - **gmComments (String)**
      - **instanceId (String)**
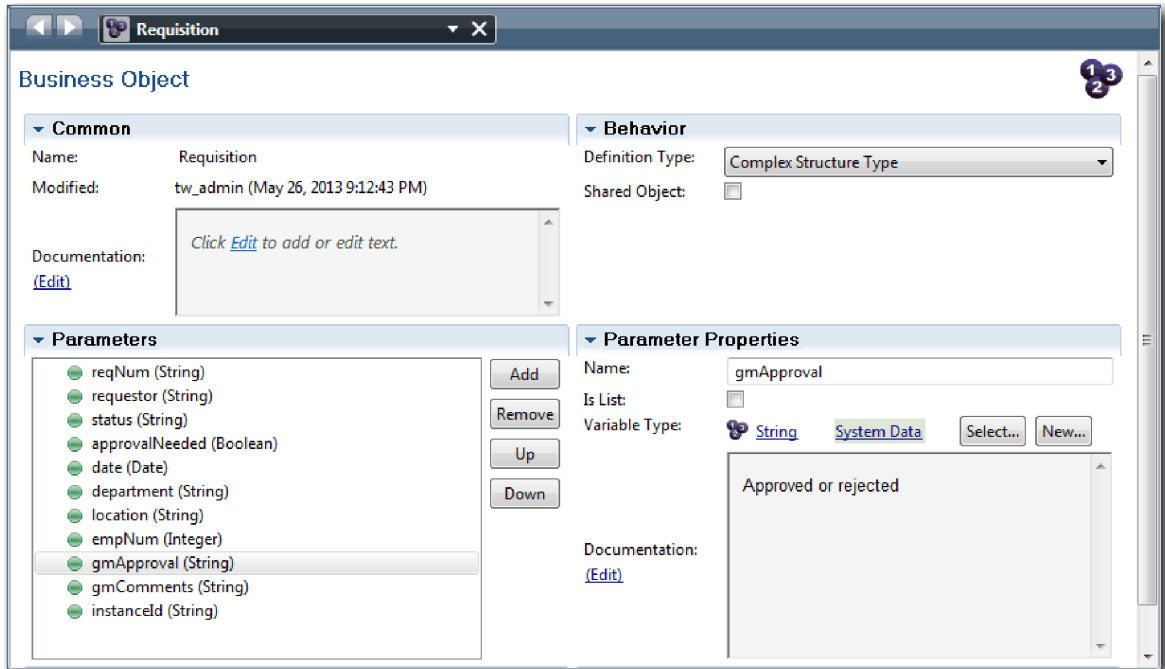
6. Save your work.

7. Click the back arrow until you return to the Standard HR Open New Position process. When you modeled the process, you created variables to model the decision gateway logic, and associated the variables to a temporary type called placeholder. Now, change the type of these variables to the types of the business objects that you created.

8. In the main canvas of the Standard HR Open New Position process, click the **Variables** tab.

9. Change the variable type of the *currentPosition* private variable from *Placeholder* to *Position* by clicking **Select** and then **position**.

10. Change the variable type of the *requisition* private variable from *Placeholder* to *Requisition* by clicking **Select** and then **requisition**.

    Your private variables match the following image:
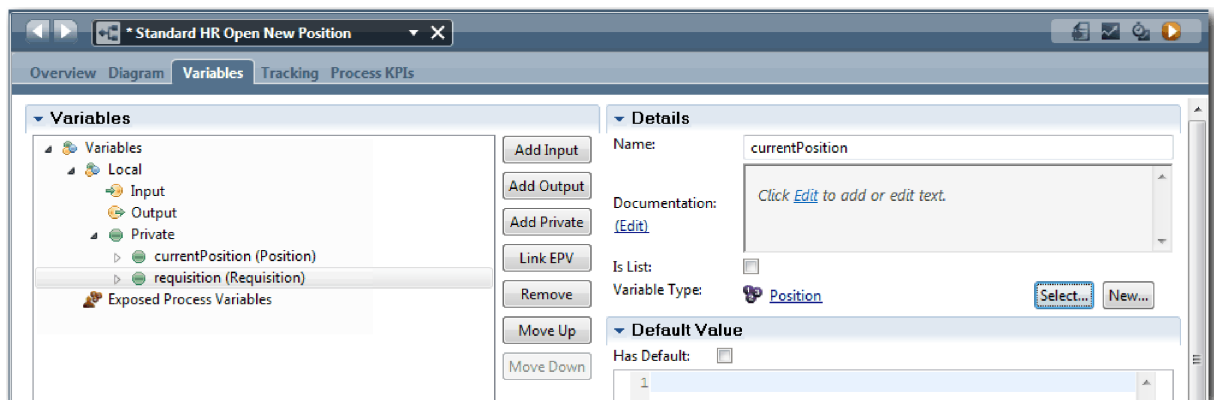
11. Save your work.

12. Click the **Diagram** tab to return to the Standard HR Open New Position process diagram.

Lesson checkpoint

You created business objects and replaced the placeholder variables with the business objects.

In this lesson, you learned

- How to add business objects
- How to set a variable's type to a particular business object

In the next lesson, you will implement the timer intermediate event.

Related Links
- Business objects
- Constructor Design Pattern
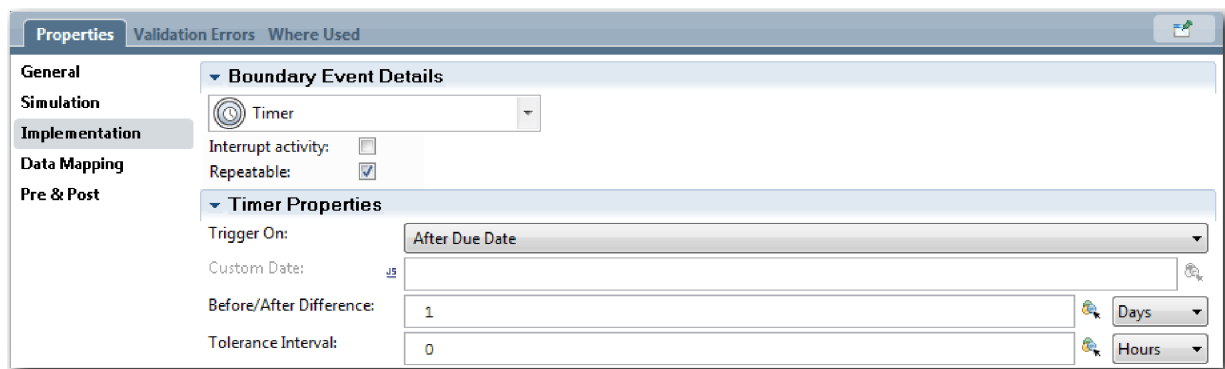
Implement the timer intermediate event

In this lesson, you implement the timer intermediate event that you modeled in the Standard HR Open New Position BPD.

When you implement the timer intermediate event that you attached to the boundary of the **Approve or reject requisition** activity, you can set the following details:
- Trigger on - Specifies when the timer intermediate event starts.
- Before or After difference - Specifies the amount of time that is allowed to pass after the due date before the timer is activated.

Implement the timer intermediate event:
1. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
2. Click the timer intermediate event that is attached to the **Approve or reject requisition** activity.
3. In the **Properties** tab, select **Implementation**.
4. Make sure that **Interrupt Activity** is not selected and **Repeatable** is selected.
5. In the Timer Properties section, specify the following values:
   - **Trigger On** - After Due Date. This selection causes the event to trigger after the due date for the activity.
   - **Before/After Difference** - 1 Day. This selection causes the event to trigger one day after the due date.

6. Save your work.

Lesson checkpoint

You implemented the timer intermediate event that was modeled in the Standard HR Open New Position BPD.

In this lesson you learned
- How to implement a timer intermediate event

In the next lesson, you will implement the gateways.

Related Links
• Modeling timer events

Implement gateways

In this lesson, you implement the exclusive gateways that you modeled in the Standard HR Open New Position BPD.

You can implement the two exclusive gateways **Need GM approval** and **GM approved** by using the process variables that you created earlier in this tutorial.

When you specify the implementation for a gateway, you define conditions that control whether a path is followed during the running process.

Implement the gateways:
1. Make sure that the Standard HR Open New Position process is open and the **Diagram** tab is selected.
2. Implement the **Need GM approval?** gateway:
   a. Click the **Need GM approval?** gateway.
   b. In the **Properties** tab, select **Implementation**.
   c. In the Decisions section, make sure that the order of the sequence flow starts with **Approval required** at the top and **No approval needed --> proceed to HR** at the bottom. You can reorder the up and down arrows on the right.
   d. In the first box to the right of **Approval required**, click the **Select a variable** icon.


   e. Select **positionType** under **currentPosition**.
   f. Change the list item to ==.
   g. In the last box type "New".

   Note: You must include quotation marks because the *positionType* is a string.
   The implementation matches the following image:

3. Save your work.
4. Implement the **GM approved?** gateway:
   a. Click the **GM approved?** gateway.
   b. In the **Properties** tab, select **Implementation**.
   c. In the Decisions section, make sure that the order of the sequence flow starts with **Approved --> proceed to HR** at the top and **Rejected** at the bottom.
   d. In the first box to the right of **Approved --> proceed to HR**, click the **Select a variable** icon.
   e. Select **gmApproval** under *requisition* variable.
   f. Change the list item to ==.
   g. In the last box type "Approved".
   The implementation matches the following image:
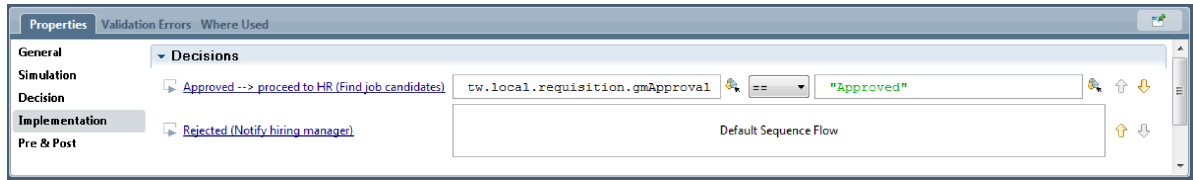
5. Save your work.

Lesson checkpoint

You implemented the gateways that were modeled in the Standard HR Open New Position BPD.

In this lesson you learned
- How to implement gateways

In the next lesson, you will conduct playback one.

Related Links
- Modeling event gateways

Conduct Playback One

In this lesson, you conduct Playback One in the Inspector by validating the different paths in the process, and take a snapshot of the process.

In Playback One, you validate the process as defined in Playback Zero and demonstrate changes to the business stakeholders. During this playback, you uncover errors in the process flow or in the logic that is used to evaluate the data.

In this lesson, you validate the following paths in the Inspector:
- The hiring manager submits a job requisition to fill a new position:
  - After submission, the job requisition is routed to the General Manager (GM) for approval.
    - The GM does not complete the task on time.
    - The GM approves the requisition and it is routed to HR.
- The hiring manager submits a requisition to fill an existing position.
  - After submission, the requisition is routed to HR.

This lesson introduces the following concepts:

Concept	Description
Inspector	A tool in Process Designer that is integral to an iterative approach to process development. Using the Inspector, developers can run processes and services on the Process Center server or remote runtime process servers. You can also step through and debug a process instance in the Inspector.
process instance	A specific instance of a process. For example, when you run a BPD, Business Process Manager creates a default name for the process instance. This name is visible to business users in Process Portal, allowing them to distinguish between different instances of a process as they complete their work.
task	A step or activity in a process.
token	A marker that progresses through a process instance and indicates which element is currently running. A process instance can generate several tokens. A token can take only one path. In the Inspector, a red balloon 🎈 indicates a token.

| Concept	Description
snapshot	A record of the state of library items in a process application or track at a specific point in time. You can create snapshots in the Process Center console or in the Designer view. You install, export, and archive snapshots by using the Process Center console.

Start the process instance

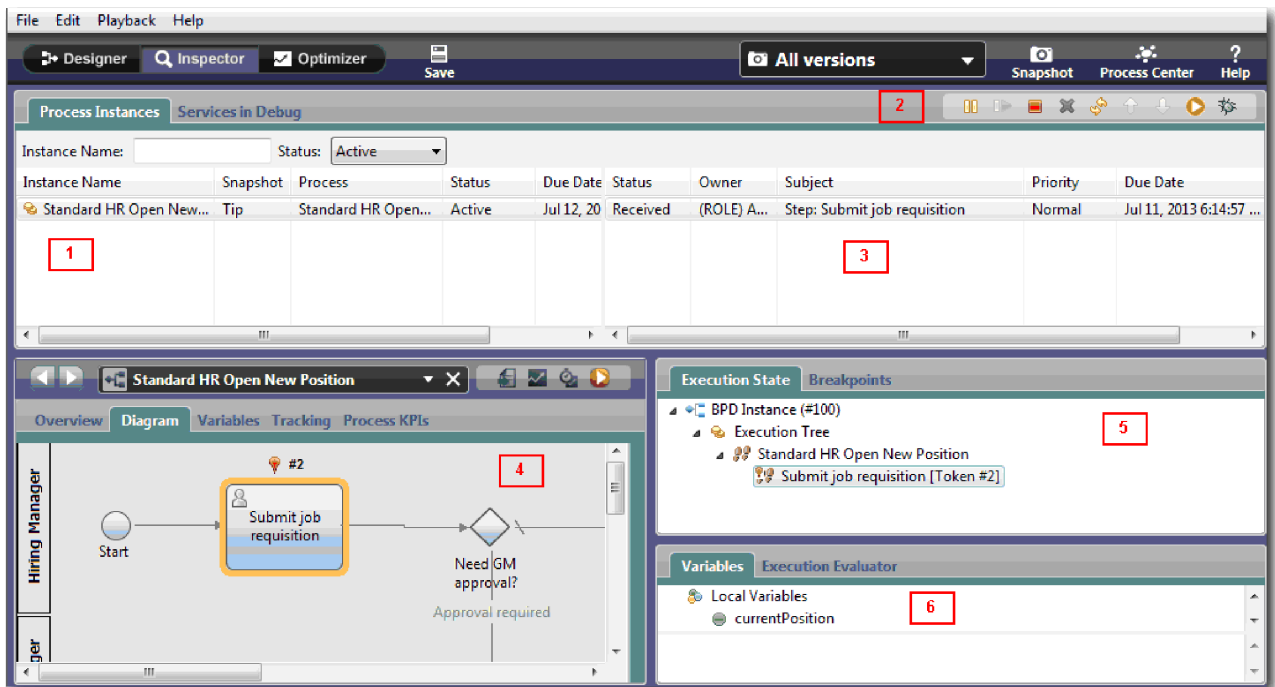Set up the playback by starting the process instance:

1. Make sure the Standard HR Open New Position process is open on the **Diagram** page.

2. To test the event, reset the due in field and the timer on the Approve or reject requisition activity. The due in field for the activity is set to one hour by default. The timer intermediate event in the process is set to trigger one day after the job requisition is submitted by the hiring manager. You must accelerate the activity and the timer for the test.

   a. In the process diagram, click the **Approve or reject job requisition** activity and switch to the Properties Implementation page.

   b. Under Priority Settings, change the value of **Due In** to one minute.

   c. Click the timer intermediate event on the **Approve or reject job requisition** activity and switch to the Properties Implementation page.

   d. Under Timer Properties, change the value of **Before or After Difference** to one minute.

   e. Save your changes.

   Note: Because the timer is set to be repeatable, an event is created every minute until the Approve or reject job requisition activity is completed.

3. To run an instance of the process, click the **Run Process** icon.
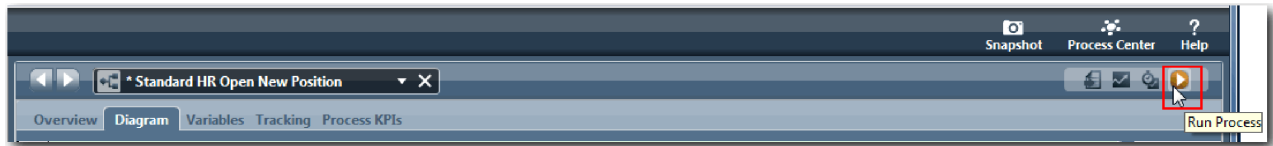
4. When you are prompted to switch to the Inspector, click **Yes**. The process diagram displays in the Inspector:

| Number	Description
1	Shows the currently active and previously run process instances on the Process Center server or on a connected Process Server. The highlighted instance is the currently selected instance. Your actions and data that is shown in the other areas of the Inspector apply to this instance.
2	Use the toolbar icons to manage process instances, run tasks, or debug services.
3	Tasks for the selected process instance. In this case, the current task is the first task in the BPD called Submit job requisition. You can click the task to select it and then run the task so that you can step through the entire BPD.
4	The BPD diagram for the selected instance. The current task is highlighted so that you know where you are in the execution of the process. To view other information about the BPD for the selected instance, click the other available tabs, such as Overview and Variables.
5	The navigation tree of the execution progress for the selected instance. In this lesson, you can see the first step in the instance (the start event) and the active second step, indicated by the red token. The navigation tree continues to expand when you run the task and step through the entire process in the Inspector.
6	The variables that are used in the current step. To view and manipulate variable values, right-click a variable and then select **Show In Execution Evaluator**.

Test the path for filling a new position

You are now ready to test the path in which the user selects to fill a new position, which requires GM approval.

In the Inspector, all active, completed and currently running instances of your process are shown on the Process Instances tab. You can see that a new, active process instance is started.
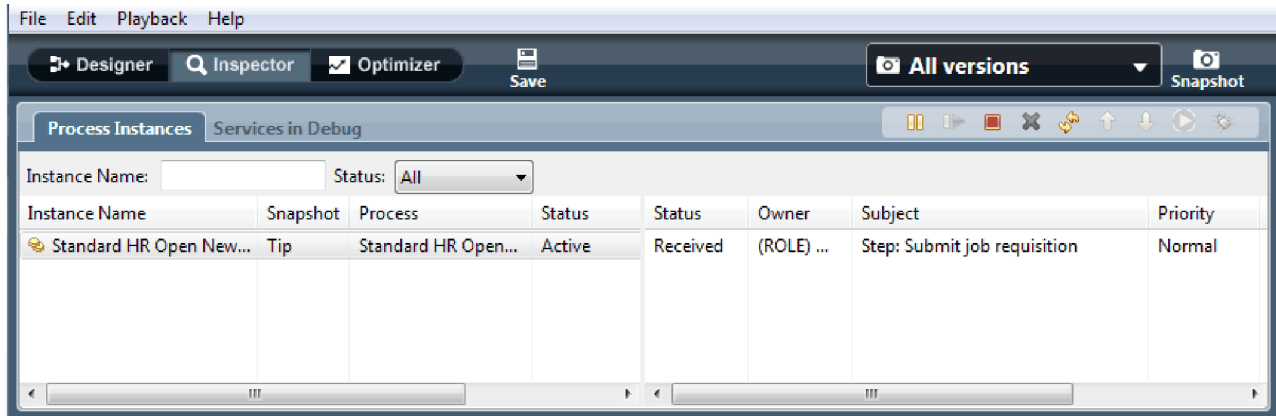
To test the path for a new position requisition:

1. To run the path, you must enter data. In the lower left window that shows the process, switch to the **Variables** tab:

   a. Click the **currentPosition** variable.

   b. Select **Has Default**.

   c. For **positionType**, enter the value "New", including the quotation marks.
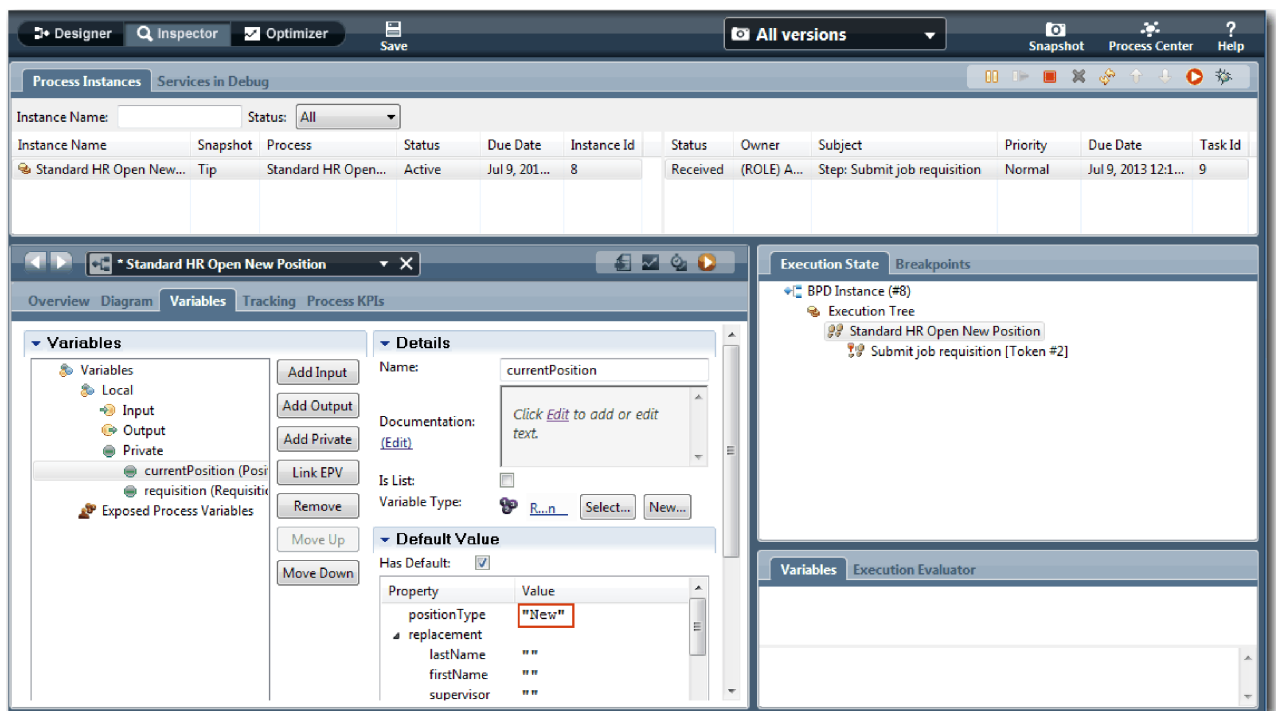
   d. Similarly, click the **requisition** variable and select **Has Default**. For **gmApproval**, enter the value "Approved", including the quotation marks.
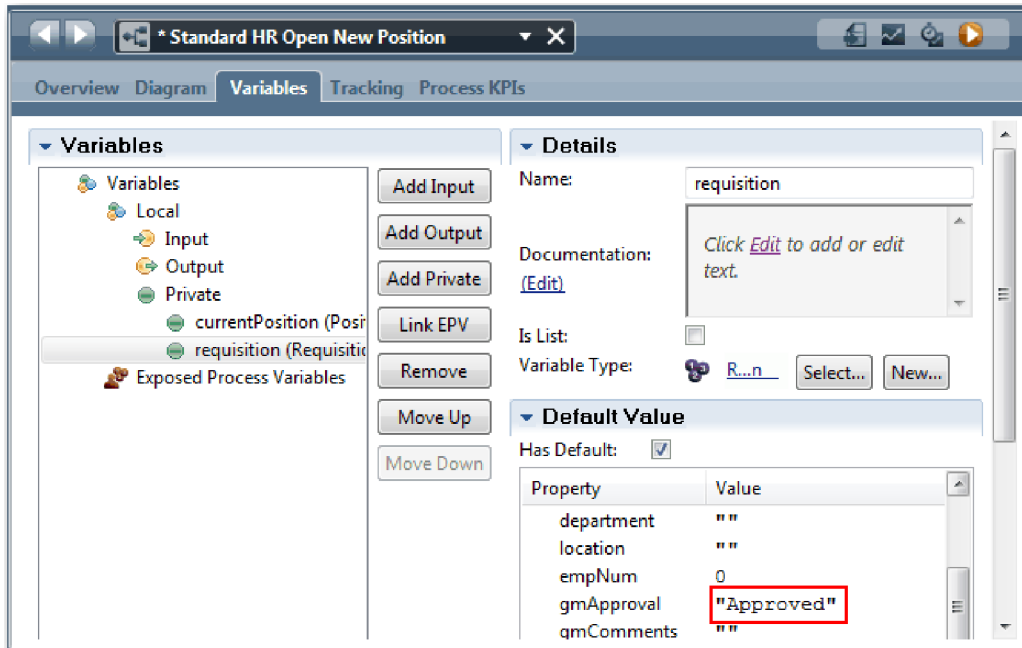
e. Save your changes.

Note: Typically, you do not enter test data here. You start the process with a script activity in the System lane to initialize your data. You also have a test script to test your data that the user interaction coach elements eventually capture. Because this sample does not have a script activity, you must enter mock data so that you can run playback one and validate the process flow.

2. To display the new Submit job requisition task, click the active instance of the Standard HR Open New Position process.
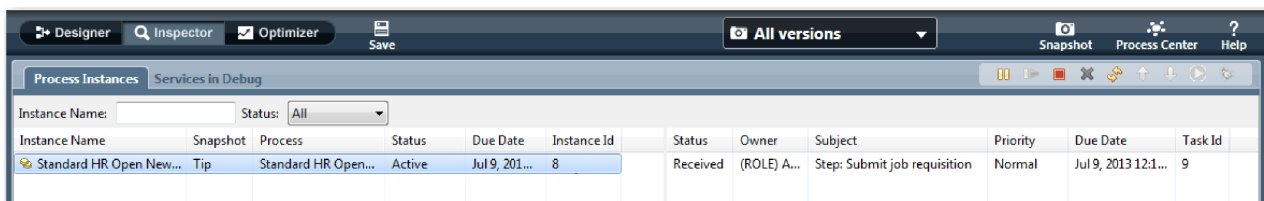
3. Click the **Submit job requisition** task to make the task runnable. The **Run the selected task** icon becomes available.

4. Click the **Run the selected task** icon in the toolbar.
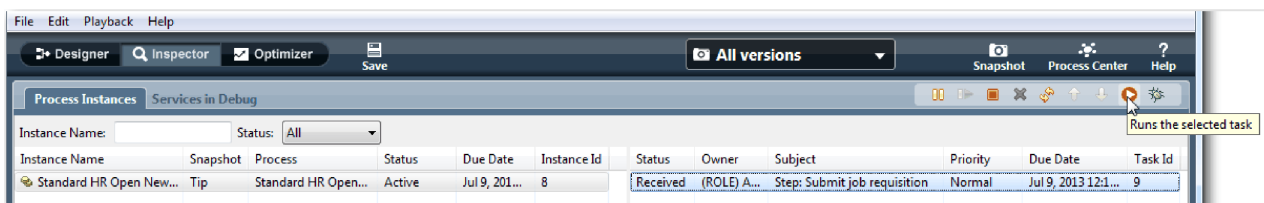
Note: If you are prompted for a user account or password to run the task, select a user name and click **OK**. Because you modeled the group tw_allusers to run all the tasks, all users are included in the list of available user names.

A generated Submit job requisition page opens in a web browser, so that you can proceed with your

test even though the user interface for the tasks is not created yet. You create the user interface later, in the "Create the user interface" on page 46 module.
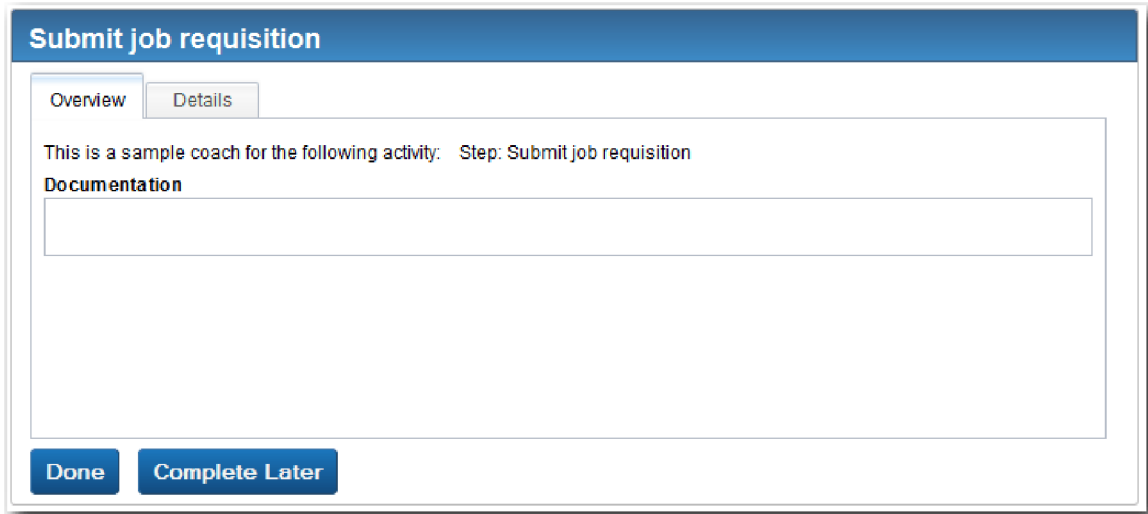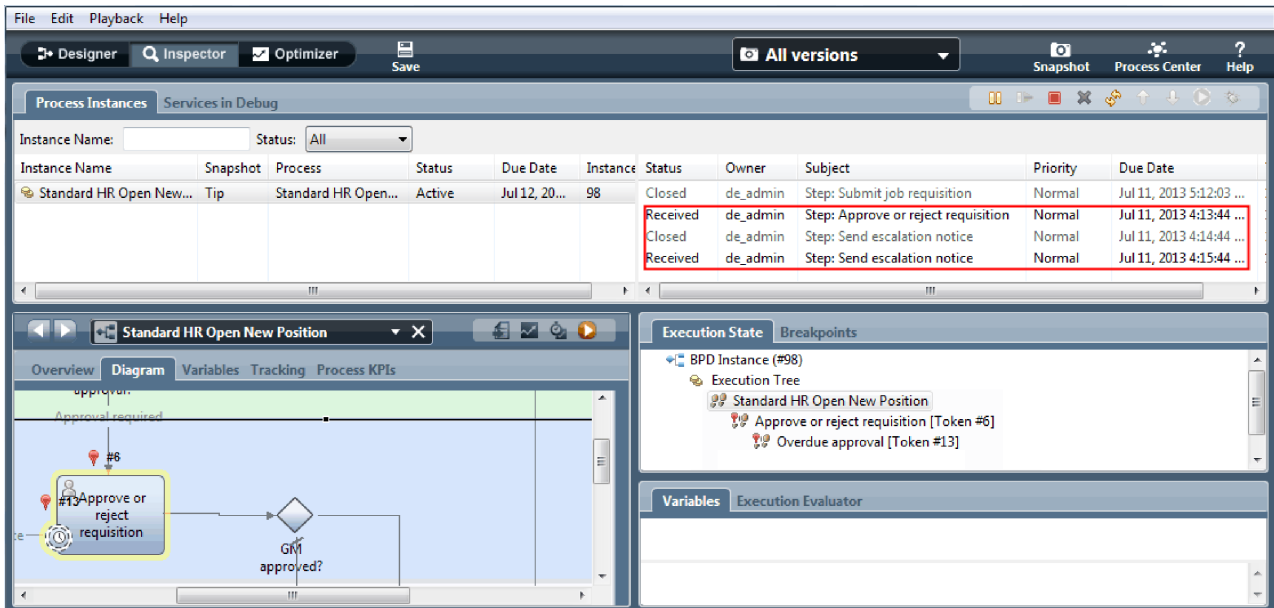

5. Acting as the hiring manager, click **Done** on the Submit job requisition page in the web browser. The web browser now displays the text `The service has finished`, indicating that the hiring manager's task is complete. Close the web browser.

6. Switch to the Inspector and click in the toolbar to update the Process Instances view. You can see that the Submit job requisition task is now closed. Because the position type was set to `New`, simulating a request to fill a new position, the GM must approve the job requisition before it is routed to HR. The process instance moves to the next activity, and generates the Approve or reject requisition task for the GM.
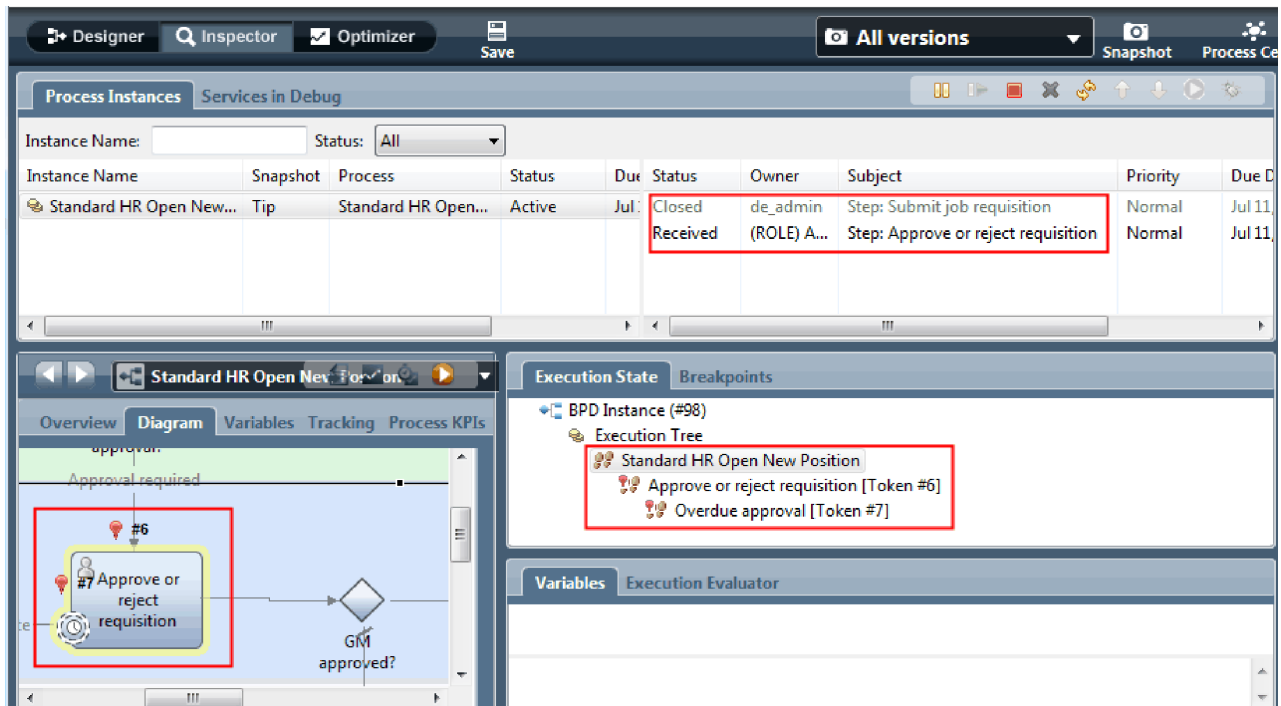

Notice that the token is now on **Approve or reject requisition** in the process diagram and in the execution tree.

7. Allow a few minutes to elapse, and then run the Approve or reject requisition task. Refresh the Inspector view.


Notice that the task list shows a **Send escalation notice** system task for each minute that elapsed since the task became overdue.

8. In the web browser, acting as the GM, click **Done** on the Approve or reject requisition page. The web browser now displays the text `The service has finished`, indicating that the GM's task is complete.

9. Return to the Inspector, and then refresh the page.
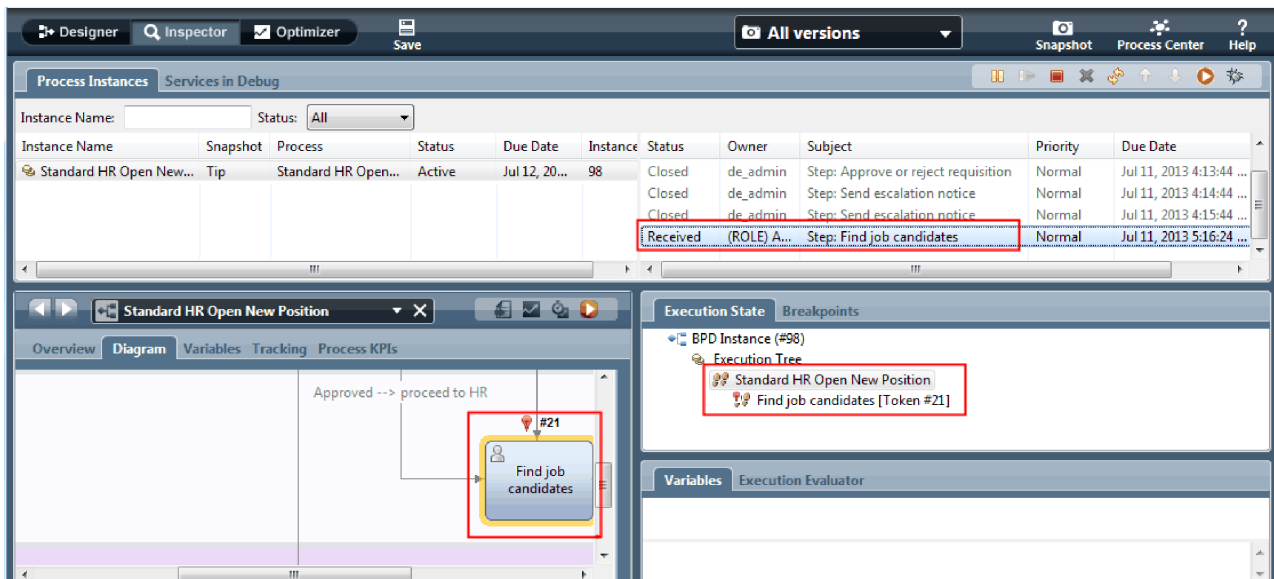
You can see the Approve or reject requisition task and escalation task are closed and the Find job candidates task is active.

10. Run the Find job candidates task, and complete the task in the web browser.

11. In the Inspector, refresh the page.
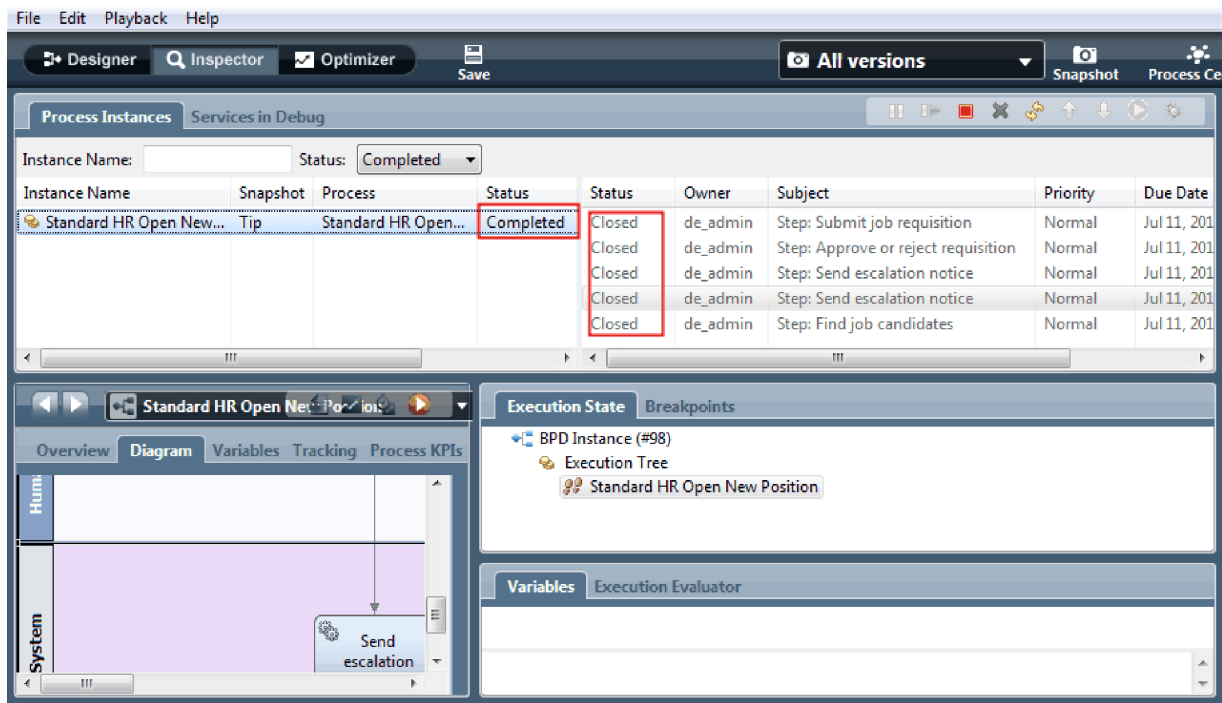
The process instance is now complete.

Now that you tested one path in the Inspector, you can test the other path.

Test the path for filling an existing position

You are now ready to test the path in which the user selects to fill an existing position, which does not require GM approval.

Using the method that is described in testing the path for a new position, test the second work flow:

1. Start a new instance of the Standard HR Open New Position process.
2. In the *currentPosition* variable, set the default value of **positionType** to **Existing**.
3. Run the Submit job requisition task. Complete the task in the web browser.
4. Return to Inspector and then refresh the page.
5. Run the Find job candidates task, and complete the task in the web browser.
6. Return to Inspector and then refresh the page. You can see that the process instance is now complete.
7. Take a snapshot of the process application by clicking the [Snapshot] icon in the main toolbar.
8. Type `Playback One` as the snapshot name and click **OK**.
9. For the description, type `This is a snapshot of the process application up to Playback One`.

Summary

For a real project, you run and test all the scenarios that you modeled in the process to ensure that all the flow paths are correct. You can determine the test scenarios from the number of decision gateways, events, and timers that are unique to a specific flow.

Because of its two decision gateways, which have two possible outcomes each, the Standard HR Open New Position process has four possible outcomes. It also has one timer. Therefore, you need at least the following five scenarios to test the possible flow pathways through the process. You also need different user accounts as members of the different teams to confirm that the correct users can access the correct tasks.

The test scenarios would be:

1. The hiring manager creates a job requisition that does not need GM Approval, and the requisition is sent to HR.
2. The hiring manager creates a job requisition that needs GM Approval. The request is approved by the GM and sent to HR.
3. The hiring manager creates job requisition that needs GM Approval. A "send and chase" timer is triggered to create a notification a defined number of times in a specific period. The request is approved by the GM after the third notification and the job requisition is sent to HR.
4. The hiring manager creates a job requisition that needs GM approval. The request is not approved by the GM, and the hiring manager is notified.
5. The hiring manager creates a job requisition that needs GM Approval. A "send and chase" timer is triggered to create a notification a defined number of times in a specific period. The request is not approved by the GM and the hiring manager is notified.

Lesson checkpoint

You validated the paths of the process and the decision gateways with playback one. You also took a snapshot of the process application.

In this lesson, you learned
- How to run process instances and tasks in the Inspector
- How to follow a process by looking at tokens
- How to test timer events
- How to take a snapshot of the process application

In the next module, you will create the user interface.

Create the user interface

In this module, you create the user interface that the hiring manager and the general manager (GM) use to interact with the process.

A user interface is a set of coaches in one or more human services. A human service is the implementation of a BPD activity in which a user interacts with the system.

Learning objectives

After you complete the lessons in this module, you will know how to do the following tasks:
- Create coach views.
- Create human services.
- Create the flow in a human service from one coach to another.

Prerequisites

You must complete all lessons in these modules:
- "Model the process" on page 2
- "Implement the process" on page 31

Plan the user interface

In this lesson, you use the process requirements to determine the user interface elements that you need and which ones you can reuse.

At the beginning of the tutorial, you reviewed the process requirements. In this lesson, you use the process requirements to plan your user interface pages.

In the process requirements, the hiring manager must prepare a job requisition. In the first page of the job requisition, the hiring manager enters information that is common to both a new and existing position. This data includes information about the requisition and the position that must be filled.
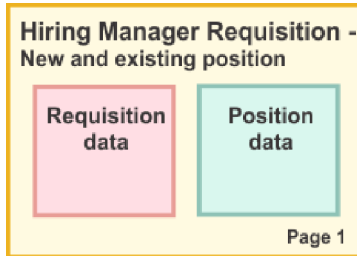

The hiring manager then goes to the next page of the job requisition. If the job requisition is for a new position, the hiring manager does not need to enter further data. This page contains the same data as the first page, but is read only so that the hiring manager can review it before submitting the request. If the data is incorrect, the hiring manager goes to the previous page to correct the data and submit the request again.
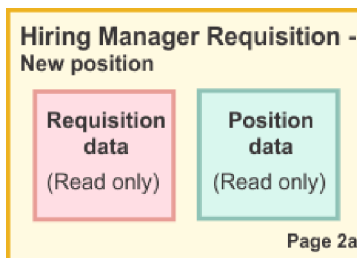
If the job requisition is for an existing position, the hiring manager confirms only the position data and enters the data of the person who currently holds the existing position.
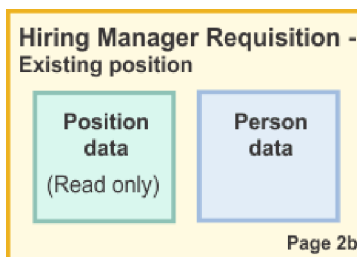
The GM reviews the requisition if it is for a new position. All of the requisition information is read only. The GM must approve or reject the requisition. The GM can also add comments.
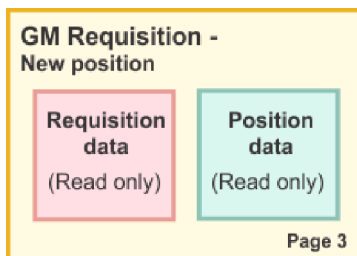
Now that you have the pages planned, you can examine them to determine whether you can reuse parts of the user interface. You also want to see how the user interface compares to the business objects that you have. The following list describes what you can reuse:

- In the requirements, the position type (new or existing) and position title are on every page. This information is the position data part of the requisition. The Position business object contains the information for this part of the user interface.
- The remaining requisition information displays only when a job requisition is created or when the hiring manager or GM reviews a new position requisition. This information is the job requisition data part of the job requisition. The Requisition business object contains the information for this part of the user interface.
- For existing positions, the hiring manager also enters data about the person. This information is the person data part of the requisition. The Person business object contains the information for this part of the user interface.

Lesson checkpoint

You analyzed the process requirements to identify the parts of the user interface. You also identified the elements that can be reused.

In this lesson, you learned

- How to create the user interface that is based on process requirements

In the next lesson, you will create the coach views for job requisition data.

Create the coach view for job requisition data

In this lesson, you create the coach view that displays requisition data, such as the hiring manager, the department, and the starting date.

The coach view in this lesson binds to the *Requisition* business object. For information about this business object and how to create it, see "Create business objects" on page 32.

This lesson uses the following concepts:

Concept	Description
Coach view	A reusable piece of user interface that users use to interact with a business object or service. Coach views can contain other coach views to build a rich user interface.
Stock control	A coach view that is provided in the coaches toolkit. Stock controls include basic user interface artifacts, such as buttons and text fields.
Configuration option	The options that you define in a coach view definition so users can customize an instance of the coach view. When users add an instance to a coach or coach view, they see these configuration options as configuration properties.

The previous lesson, "Plan the user interface" on page 46, identified that the My Hiring Sample process can use a set of coach views. The following table lists these coach views and their implementation names:

| Label	Name
Position data	Position CV
Job requisition data	Requisition CV

Label	Name
Person data	Person CV

This lesson describes how to create the Requisition CV coach view.

The Requisition CV coach view consists of a horizontal section that provides the title for the form. Inside the horizontal section, there are three vertical sections that create three columns. The titles of the vertical sections are the titles for the columns. Each column contains two or three stock controls, which are also coach views.


Create the Requisition CV coach view:

1. Make sure that the My Hiring Sample process application is open in Process Designer.

2. In the library, click the plus sign next to **User Interface** and select **Coach View**.
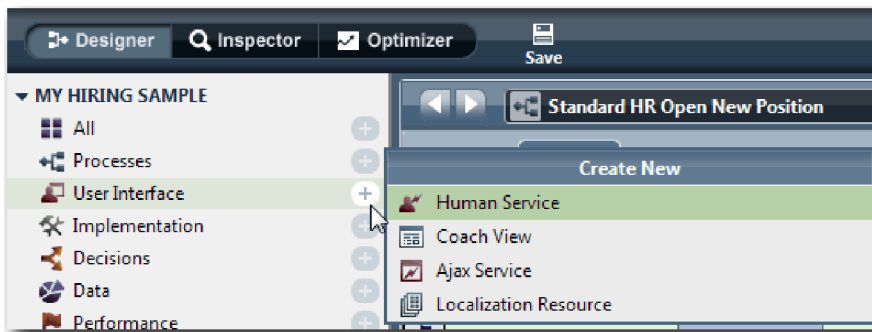
3. Type Requisition CV as the name and click **Finish**. You can now edit the coach view that you created.

4. Bind the coach view to the *Requisition* business object by creating a Requisition variable and assigning the Requisition business object as its type:

   a. Select the **Variables** tab.

   b. Click the plus sign next to **Business Data**.

   c. Type Requisition as the name.

   d. For the variable type, click **Select** and then select the **Requisition** business object.

5. Add configuration options so that you can customize this coach view when you add it to a coach:

   a. Click the plus sign next to **Configuration Options**.

   b. Type `EmpStatusList1` as the name. For now, leave the type as **Object** and the variable type as **String**. You change the type to **Service** and specify the service later in "Create Ajax services" on page 77.

   c. In the same way, add the **LocationList1** and **DepartmentList1** configuration options.
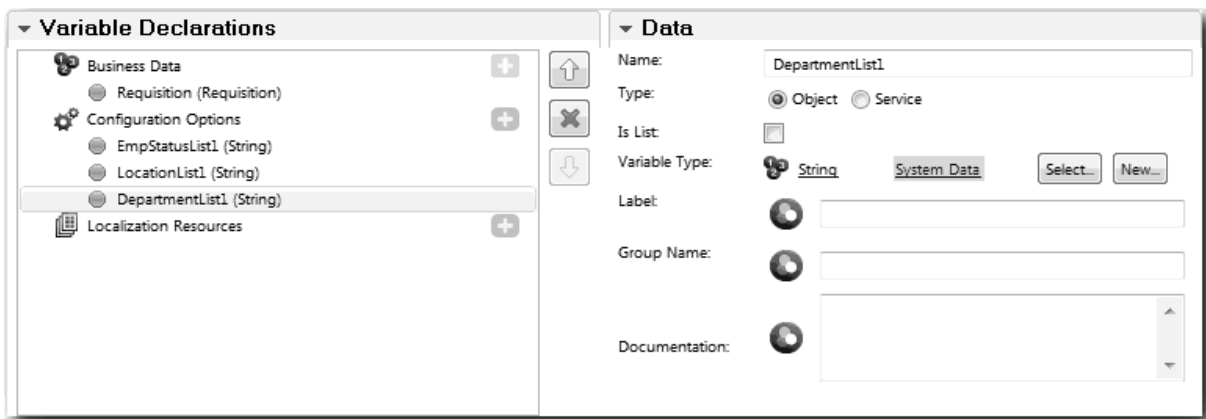
6. Click the **Layout** tab and then, from the palette, add a horizontal section to the layout canvas and change the label to `Requisition data`. By using a horizontal section, you can create side-by-side columns of information. Your diagram matches the following image:
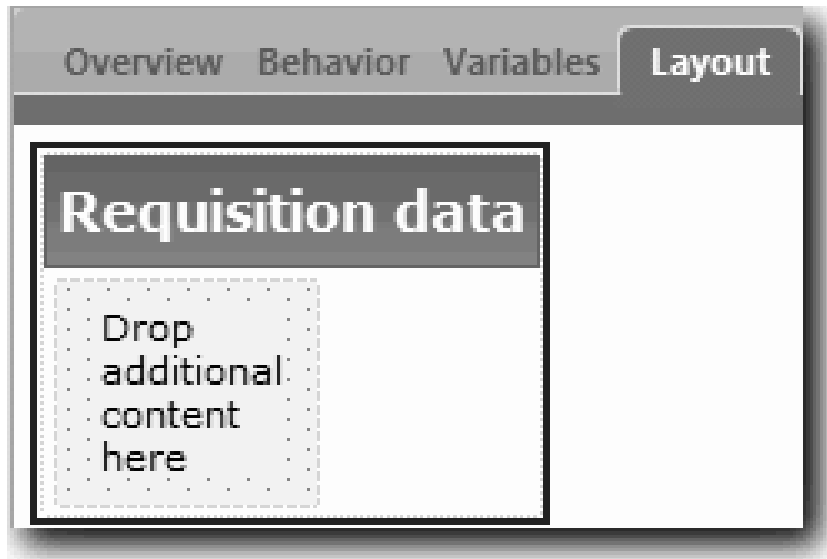
7. Create the **Requester** column:

   a. Drop a vertical section onto the **Drop additional content here** area of the requisition data section. Rename the vertical section to `Requester`.

   b. In the vertical section, add an output text control and a text control. Rename the output text control to `Requisition number` and the text control to `Hiring manager`.

      Tip: When you add a control to a section that already has a control, drop the new control onto an existing control instead of beside it. The Designer adds the new control under or to the right of the existing control, depending on the section type.
      Your diagram matches the following image:

   c. Select the requisition number control. In its general properties, click **Select** for its binding and then select **reqNum** from the list. The control is now bound to the **reqNum** parameter of the *Requisition* business object.
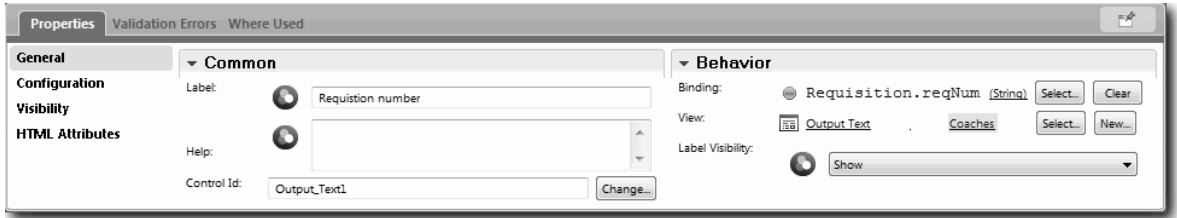
d. In the same way, bind the hiring manager control to the *Requisition.requestor* parameter.

8. Create the requested job position column:

a. Add a vertical section to the requisition data section and rename the new vertical section to `Requested position`.

b. Add the following controls to the column:

Stock control type	Label	Binding
Select	Employment status	None
Select	Department	None
Integer	Number of employees required	*Requisition.empNum*

Your diagram matches the following image:
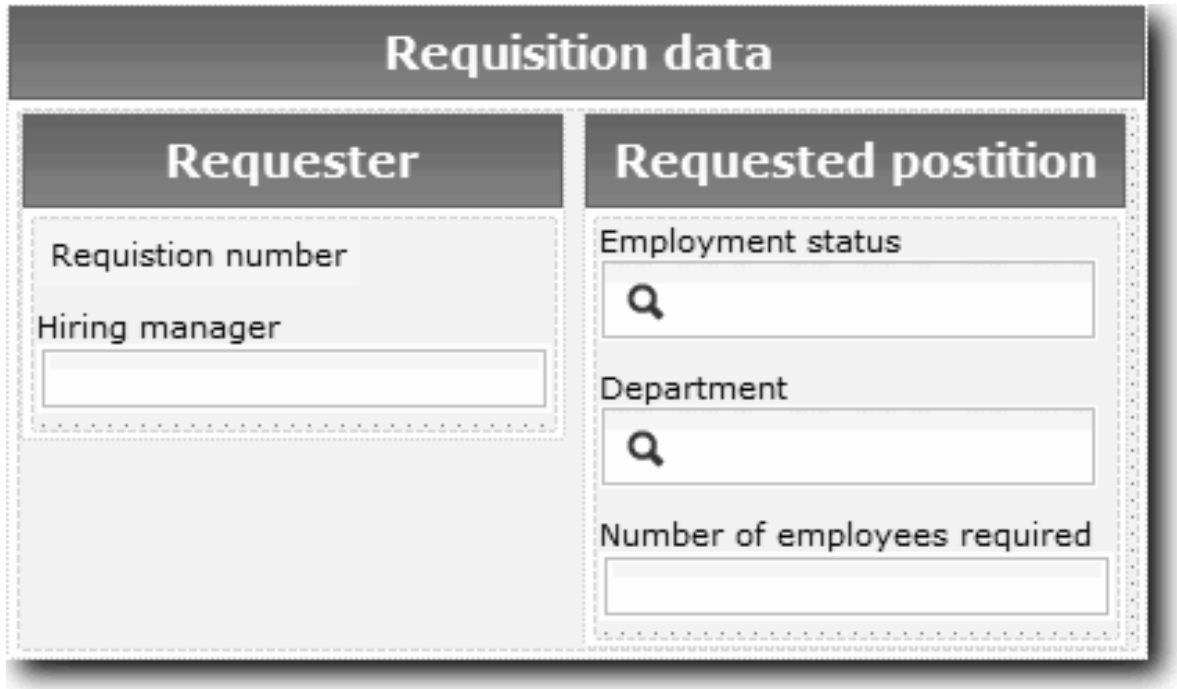
c. Select the **Employment status** control and open its configuration properties. For **Selected Item**, click **Select**. In the window that opens, clear **Show matching variables only**.

. Clearing the check box is necessary because the type for the Selected Item configuration option is **ANY** and does not match the type for *Requisition.status*, which is set to **String**. In this case, the type mismatch is acceptable because this configuration option can be of any type.

Expand **Requisition** and select **status**.
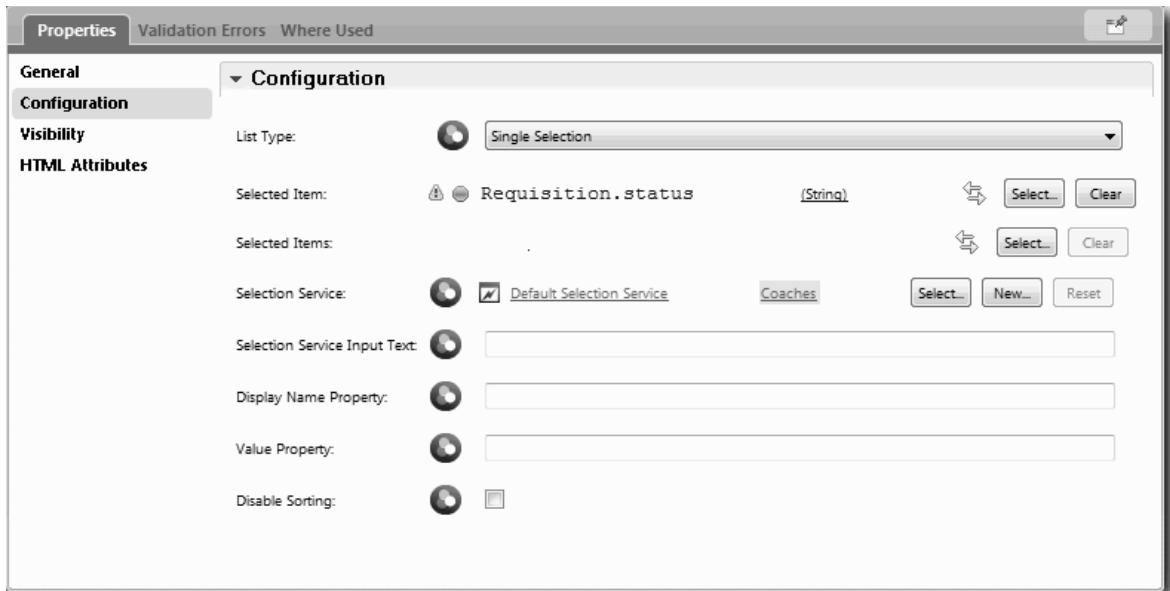
   d. Select the **Department** control and open its configuration properties. Set the **Selected Item** to **Requisition.department**.

9. Create the position date and location column:

   a. Add a vertical section to the requisition data section and rename the new vertical section to `Position date and location`.

   b. Add the following controls to the column:

Stock control type	Label	Binding
Date Time Picker	Planned starting date	Requisition.date

Stock control type	Label	Binding
Select	Location	None

Your diagram matches the following image:

c. Select the **Location** control and open its configuration properties. Set the **Selected Item** to **Requisition.location**.

10. Save the coach view.

Lesson checkpoint

You created the Requisition CV coach view that you use in the job requisition user interface.

In this lesson, you learned
- How to create the UI for the form as a coach view
- How to associate human service data with some of the stock controls that display that data
- How to configure other controls with data

In the next lesson, you will create the coach view for position data.

Create the coach view for position data

In this lesson, you create the coach view that displays position data, such as the position type and title.

The coach view in this lesson binds to the Position business object. For information about this business object and how to create it, see "Create business objects" on page 32.

The "Plan the user interface" on page 46 lesson identified that My Hiring Sample can use a set of coach views. The following table lists these coach views and their implementation names:

Label	Name
Position data	Position CV
Job requisition data	Requisition CV
Person data	Person CV

This lesson describes how to create the position data coach view. It provides basic information for each step. If you want more information, see the equivalent steps in "Create the coach view for job requisition data" on page 48.

The Position CV coach view consists of a horizontal section that provides the title for the form. Inside the horizontal section, there is a vertical section that creates a column. The title of the vertical section is the title for the column. The column contains two stock controls, which are also coach views.
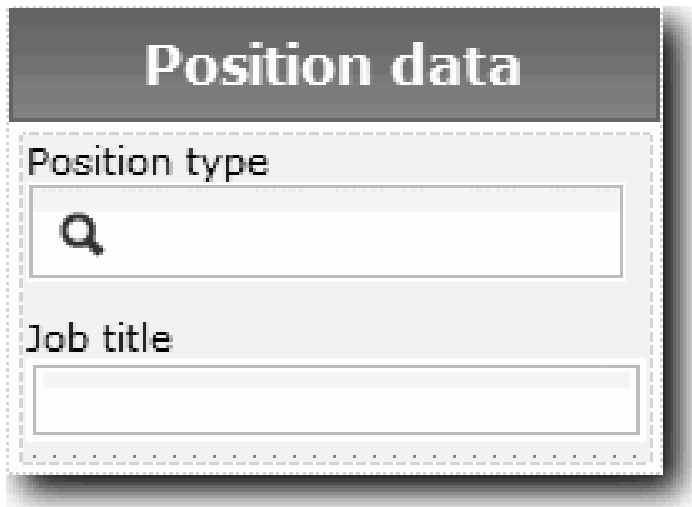
The following table lists the contents of the Position CV coach view, along with their bindings or configuration options. You can use this information to create the coach view or use the steps in the procedure.

Name	Type of Control	Binding	Configuration Options
Position data	Vertical section	*Position*	None
Position type	Select	None	**Selected Item**: Position.positionType **Tip:** You assign the selection service in a later lesson. Use the default service for now.
Job title	Text	*Position.jobTitle*	None

Create the Position CV coach view:

1. Create a coach view.
2. Name the new view `Position CV`.
3. Bind the coach view to business data:
   a. Select the **Variables** tab.
   b. Add the *Position* variable as the business data variable and set its type to the **Position** business object.
4. Add the `PositionList1` configuration option. For now, leave the type as **Object** and the variable type as **String**. You change the type to **Service** and specify the service in "Create Ajax services" on page 77.
5. Click the **Layout** tab and then, from the palette, add a vertical section to the layout canvas and rename it to `Position data`.
6. Bind the vertical section to the **Position** business object.
7. Add the following controls to the vertical section:

Stock control type	Label	Binding
Select	Position type	None
Text	Job title	*Position.jobTitle*

8. Select the **Position type** control and open its configuration properties. Set the **Selected Item** to `Position.positionType`. You have created the Position CV coach view.

9. Save the coach view.

Lesson checkpoint

You created the Position CV coach view.

In this lesson, you learned

- How to create the UI for the form as a coach view
- How to configure other controls with data

In the next lesson, you will create the coach view for person data.

Create the coach view for person data

In this lesson, you create the coach view that displays person data, such as last name and pay level.

The coach view in this lesson binds to the Person business object. For information about this business object and how to create it, see "Create business objects" on page 32.

The "Plan the user interface" on page 46 lesson identified that My Hiring Sample can use a set of coach views. The following table lists these coach views and their implementation names:

Label	Name
Position data	Position CV
Job requisition data	Requisition CV
Person data	Person CV

This lesson describes how to create the coach view for person data. It provides basic information for each step. If you want more information, see the equivalent steps in "Create the coach view for job requisition data" on page 48.

The Person CV coach view consists of a vertical section that contains three text stock controls and a text area stock control.

The following table lists the contents of the Person CV coach view, along with their bindings or configuration options. You can use this information to create the coach view or use the steps in the procedure.

Name	Type of Control	Binding	Configuration Options
Person data	Vertical section	*Person*	None
Given name	Text	*Person.firstName*	None
Family name	Text	*Person.lastName*	None
Manager	Text	*Person.supervisor*	None
Comments	Text area	*Person.notes*	None

Create the Person CV coach view:

1. Create a coach view.
2. Name the new view to Person CV.
3. Bind the view to business data:
   a. Select the **Variables** tab.

b. Add the *Person* variable as the business data variable and set its type to the **Person** business object.

4. Click the **Layout** tab and then, from the palette, add a vertical section to the layout canvas and rename it to `Person data`.

5. Bind the vertical section to the **Person** business object.

6. Add the following controls to the vertical section:

Name	Type of Control	Binding
Given name	Text	*Person.firstName*
Family name	Text	*Person.lastName*
Manager	Text	*Person.supervisor*
Comments	Text area	*Person.notes*

7. Save the coach view.

Lesson checkpoint

You created the Person CV coach view. You now have the coach views that you need for constructing the coaches that are used by the My Hiring Sample.

In this lesson, you learned

* How to create the UI for the form as a coach view
* How to configure other controls with data
* How to associate the coach view to business data

In the next lesson, you create the Submit Requisition HS human service.

Create the Submit Requisition HS human service

In this lesson, you create the human service that contains the user interface that the hiring manager uses for the job requisition.

This lesson builds upon the artifacts that are created in the "Model the process" on page 2 and "Implement the process" on page 31 modules. If you did not complete these modules, copy the following artifacts from the Hiring Sample process application into the My Hiring Sample process application:

* Standard HR Open New Position BPD
* The *Requisition* business object
* The *Position* business object

In the Standard HR Open New Position process, the hiring manager completes a submit job requisition activity. In IBM Business Process Manager, you implement the activities that people complete as a human service. In this sample, the human service must fulfill the following requirements for the Standard HR Open New Position process:

* The hiring manager submits a requisition either to fill a new position or to replace a departing employee in an existing position.
* The hiring manager determines the position requirements and prepares a job requisition for submission to the Human Resources department.

To fulfill these requirements, you must create a human service that has a user interface. This user interface consists of many forms. In IBM Business Process Manager, these forms are created from one or more coaches in the human service. The data that these coaches interact with are variables of the human service. In this lesson, you define the data that is used by the human service and prepare it for the user interface.
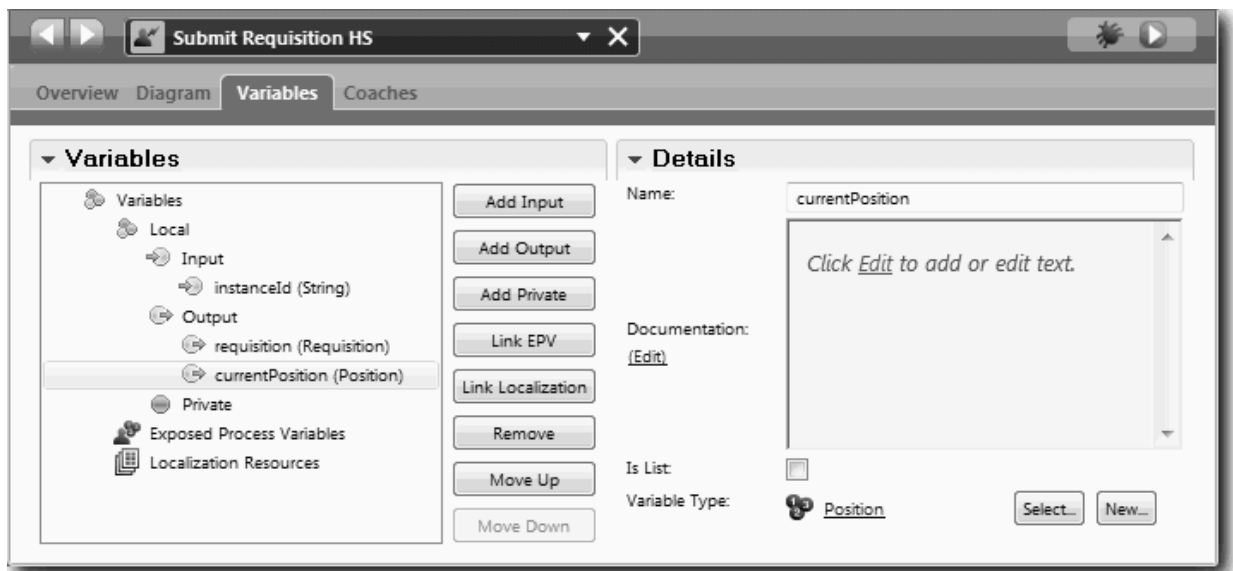
Create the Submit Requisition HS human service:

1. Create the human service for the submit job requisition activity.

   a. Make sure that the My Hiring Sample process application is open in Process Designer.

   b. In the Standard HR Open New Position BPD, select the **Submit job requisition** activity. In the Properties tab, select **Implementation**.

   c. Create the human service by clicking **New**.
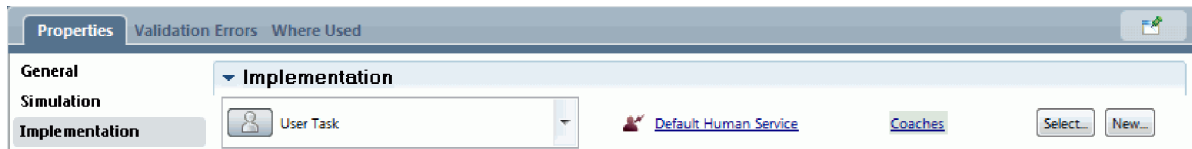
   This action replaces the default human service with the human service that you are creating.

   d. Type `Submit Requisition HS` and then click **Finish**. The Designer opens the Submit Requisition HS human service.

2. Add the data input and output by the human service:

   a. Select the **Variables** tab.

   b. Add **instanceId** as an input variable. Its variable type is **String**, which is the default type.

   c. Add *requisition* and *currentPosition* as output variables. For their type, click **Select** to select the `Requisition` and `Position` variable types that you created in "Create business objects" on page 32. If you open the data-mapping properties of the submit job requisition activity, the maps now list these variables.

3. Add elements to the human service diagram to create its flow:

   a. Select the **Diagram** tab.

   b. To create a script to initialize the variables that the human service uses, drag a server script item from the palette onto the diagram.

   c. Rename the server script to `Initialize Output`.

   d. Select the script item and then add the following code to its implementation properties:

```
tw.local.requisition=new tw.object.Requisition();
tw.local.requisition.date=new tw.object.Date();
tw.local.requisition.instanceId=tw.local.instanceId;

tw.local.currentPosition=new tw.object.Position();
tw.local.currentPosition.replacement=new tw.object.Person();
```

```
tw.local.requisition.reqNum = "1141";
tw.local.requisition.requestor = "Tom Miller";
tw.local.requisition.empNum = 1;
tw.local.requisition.department = "Software Engineering";
tw.local.currentPosition.jobTitle = "Head of Product Development";
tw.local.currentPosition.replacement.lastName = "Smith";
tw.local.currentPosition.replacement.firstName = "Bob";
tw.local.currentPosition.replacement.supervisor = "Ann Fisher";
tw.local.currentPosition.replacement.payLevel = "8";
tw.local.currentPosition.replacement.payType = "Exempt";
```

When you run the sample, the fields in the requisition form contain this data.

Tip: If you see warnings, check for typographical errors in the business object parameters.

e. Add three coaches to the diagram. Rename the coaches with the following names:

- `Create Requisition Coach`
- `Specify Existing Position Coach`
- `Confirm Position Details Coach`

The first coach contains the form that the hiring manager completes to request a new position or to fill an existing position. The second coach contains the form with information about the existing position. The third coach contains the form with the requisition information that the hiring manager reviews.

f. Add a decision gateway to the diagram.

g. Rename the decision to `Position type`. The implementation for the decision does not contain any paths. The Designer adds these paths when you connect the decision to other nodes in the diagram.

4. In the palette, select the **Sequence Flow** icon and make the following connections:

- The Start event to Initialize Output
- Initialize Output to Create Requisition Coach
- Create Requisition Coach to the position type decision
- The top connection point of the position type decision to Specify Existing Position Coach
- The low connection point of the position type decision to Confirm Position Details Coach. Using different connection points for the two paths makes seeing the two flows easier.
- Specify Existing Position Coach to Confirm Position Details Coach
- The Confirm Position Details Coach to the End event

Rearrange the elements in the diagram to make it easier to read. Your diagram resembles the following image:
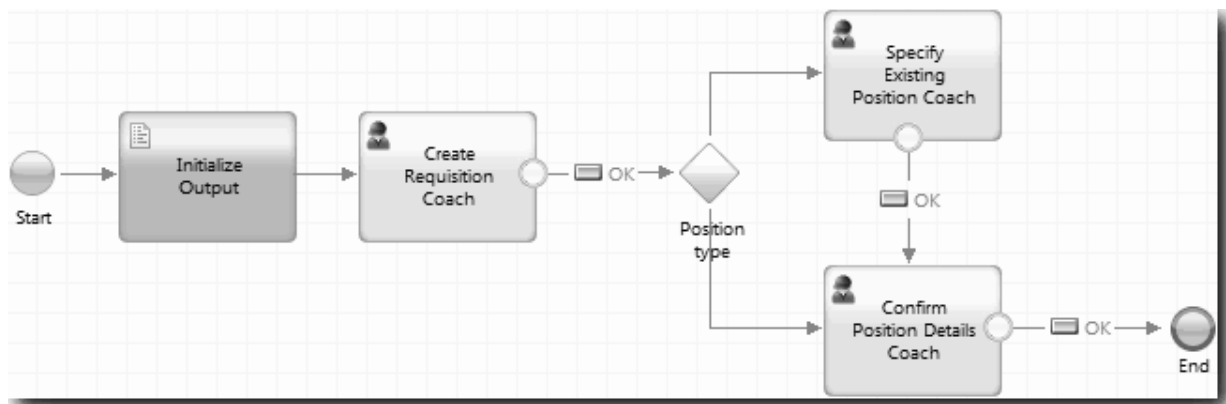

The flow lines that exit from the coaches use the **OK** button that is provided in the default coaches.

5. Define the branches for the decision. In the process requirements, the flow that the job requisition takes depends on whether the position is new or exists. If the position exists, the hiring manager must provide information about the existing position. The hiring manager then reviews the job requisition and submits it. To implement the split paths, you use the decision control.

a. Select the line that flows from the bottom of the decision to the Confirm Position Details Coach. In the line properties, type its name as `New` and select **Name Visible**. Labeling the line helps you identify the branches in the decision and in the diagram.
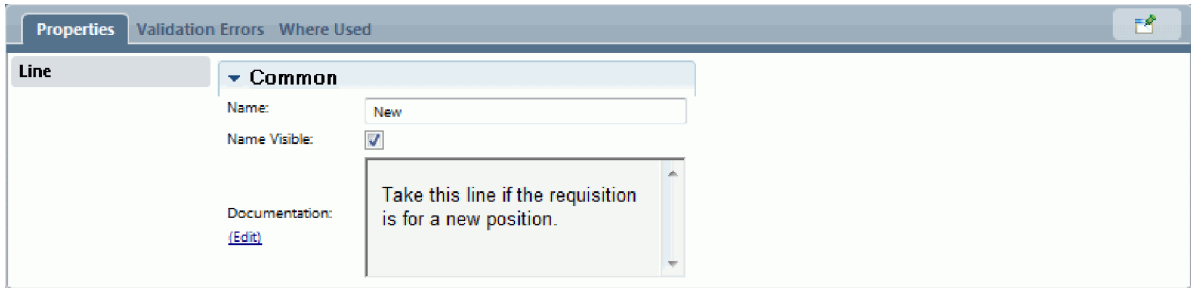
b. In the same way, label the line that flows from the decision to the other Coach to `Existing`. The lines now have labels. Your diagram resembles the following image:
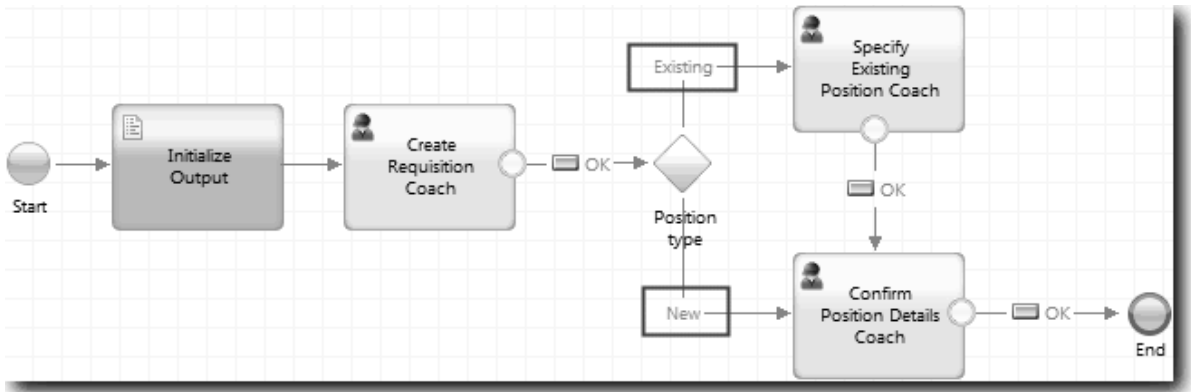
c. Select the **Position type** decision and open its implementation properties.

d. For the New decision branch, which goes to the Specify Existing Position Coach, click the **Select a variable** icon for the first field. A list of the human service variables opens.

e. Because you are basing the decision on whether the position is new or existing, select the *currentPosition.positionType* variable. The first field contains the variable name.
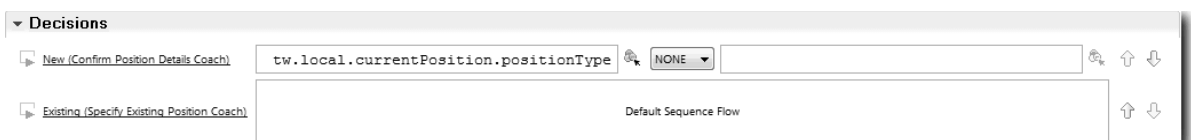
The **tw.local** part of the name is the namespace that the system uses to store values.

f. Because you want the flow to take this line only if the position is new (or
    currentPosition.positionType =="New"), set the operation to == and the second field to "New". Because
    currentPosition.positionType is a string, include the quotation marks to turn the value into a string.

▼ Decisions					
⇒ New (Confirm Position Details Coach)	tw.local.currentPosition.positionType 🔍	== ▼	"New"	🔍	⇧ ⇩
⇒ Existing (Specify Existing Position Coach)		Default Sequence Flow			⇧ ⇩
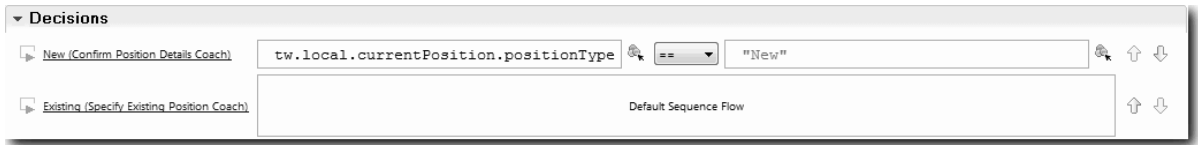
The flow takes the New line when the *positionType* variable has a value of "New". The flow takes
the Existing line when the *positionType* variable has any other value.

6. Save the human service.

You partially created the Submit Requisition HS human service. You are now ready to create the coaches
that are the user interfaces for the human service.

Lesson checkpoint
You created a human service to implement the submit job requisition activity in the BPD. You defined the
data that the human service uses and created most of its flow.

In this lesson, you learned
- How to add data that the human service uses
- How to create the flow for the human service, which includes how to use data to determine the path
  that the flow takes

In the next lesson, you will complete the flow for the Submit Requisition HS human service.

Create the coaches for the Submit Requisition HS human service
In this lesson, you create the user interface that the hiring manager uses to create a job requisition.

You must complete the following actions:
- Created the Submit Requisition activity in the Standard HR Open New Position BPD.
- Created the *Requisition* and *Position* business objects.
- Created the coach views that are used in the user interface.

In the Standard HR Open New Position process, the hiring manager completes the submit job requisition
activity, which is a human service. To enable the hiring manager to complete the activity, you create the
user interface and bind its elements to data. In IBM Business Process Manager,, the user interface is
created by using one or more coaches. The data that these coaches interact with are variables of the
human service.

In this lesson, you start by creating the Create Requisition Coach. This coach is where the hiring manager
enters information about the position. The coach looks like the following image:

Create the coaches for the Submit Requisition HS human service.

1. Create the user interface for the job requisition:

   a. In the Submit Requisition HS human service, select the **Coaches** tab and then select the **Create Requistion Coach**.

   b. Drop two horizontal sections onto the layout area. Rename the first horizontal section to `Create Position Requisition` and rename the second horizontal section to `Make your decision`.

The first section contains the form that the hiring manager reads or enters data about the position. The second section will contain the button that the user clicks to move to the next step in the human service flow.

2. Create the form part of the coach:

   a. From the palette, add the **Requisition CV** coach view to the Create Position Requisition section. When you create a coach view, the Designer automatically adds it to the palette so that you can add it to other coach views.

      Tip: If you cannot see the **Requisition CV** coach view on the palette, it is filtered out. Click **Filter** and then select **Show All**.

The Requisition CV coach view is already bound to the requisition variable.

   b. Add the Position CV coach view to the Create Position Requisition section.

The Position CV coach view is already bound to the *currentPosition* variable.

3. Create the action part of the coach:

   a. Drag the **OK** button onto the **Make your decision** section.

   b. Rename the button to Next.

4. Save the coach.

5. Create the Confirm Position Details Coach.

   The Confirm Position Details Coach is where the hiring manager reviews the requisition. It is similar to the Create Requisition Coach except for the following changes:

   • The label for the horizontal section is Confirm Position Details

   • The action part of the coach has a **Back** and a **Submit** button instead of a **Next** button.

   a. Create the layout to match the following image:

   b. For the controls and bindings to include, consult the following table:

Name	Type of control	Binding
Confirm Position Details	Horizontal section	None
Requisition data	Requisition CV	*requisition*
Position data	Position CV	*currentPosition*

Name	Type of control	Binding
Make your decision	Horizontal section	None
Back	Button	None
Submit	Button	None

    c. In the Confirm Position Details Coach, select the Requisition CV coach view. In the **Visibility** properties, set the source to **Value** and set the value to Read only.
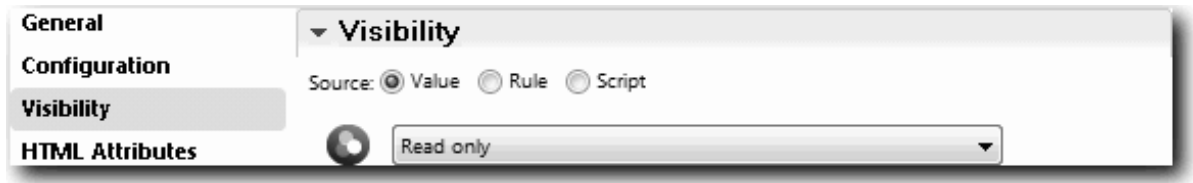
    d. Set the visibility properties in the **Position CV** coach view to Read only.

6. Create the Specify Existing Position Coach. The Specify Existing Position Coach is where the hiring manager enters information about an existing position and the person currently filling that position.

    a. Create the layout to match the following image:

Detail Existing Position

Position data

Position type

🔍

Job title

Person data

Given name

Family name

Manager

Comments

Make your decision

Back   Next

b. For the controls and bindings to include, consult the following table:

Name	Type of control	Binding
Provide details for existing job	Horizontal section	None
Position data	Position CV	*currentPosition*
Person data	Person CV	*currentPosition.replacement*
Make your decision	Horizontal section	None
Back	Button	None
Next	Button	None

Tip: In this case, the Person CV coach view is not automatically bound to a business object. You do the binding yourself.

c. Set the visibility properties in the **Position CV** coach view to Read only.

You created the coaches for the Submit Requisition HS human service.

Lesson checkpoint

You created the user interface that the hiring manager uses to create a position requisition.

In this lesson, you learned
- How to assemble a coach from a set of coach views and stock controls
- How to change the visibility of a coach view.

In the next lesson, you will create the complete the flow for the Submit Requisition HS human service.

Complete the flow for the Submit Requisition HS human service

In this lesson, you enable the hiring manager to return to the editable job requisition form by adding a Back button.

You must created the coaches in the Submit Requisition HS human service.

In the Submit Requisition HS human service, there are three coaches. When you connected the coaches in the human service flow, their default OK buttons provided the boundary event to move the flow to the next step. As part of creating the user interface in the coaches, you renamed the OK buttons to Next or Submit. The human service diagram reflects this change.
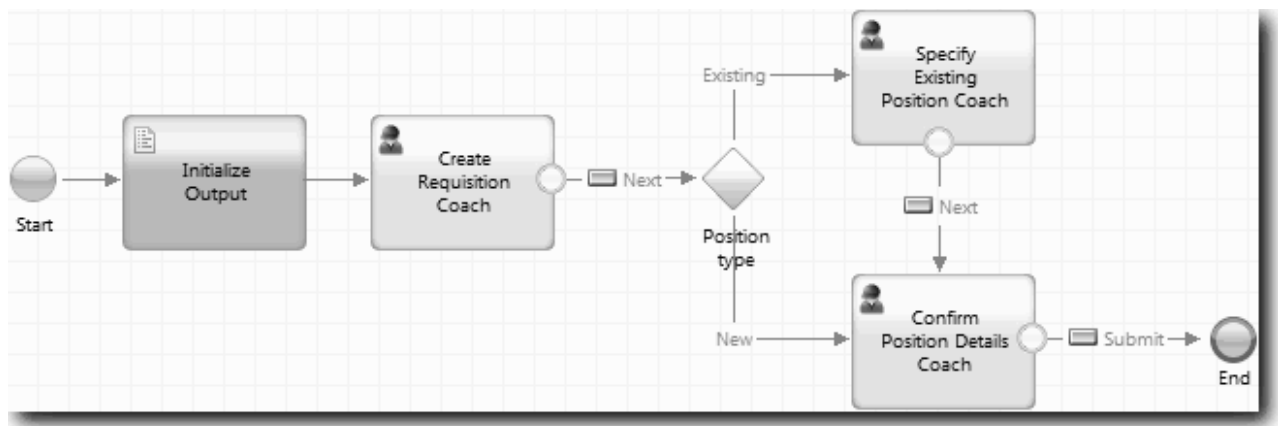
When a user clicks **Next** in the Create Requisition Coach, the flow leaves that coach and enters the decision. The flow then enters one of the other two coaches. The Specify Existing Position Coach contains two buttons. If the user clicks **Next**, the flow goes to the Confirm Position Details Coach. If the user clicks **Back**, nothing happens. In this lesson, you create a boundary event that causes this second flow to go back to the Create Requisition Coach.

Create the flow for the Submit Requisition HS human service:

1. In the Submit Requisition HS human service, select the **Diagram** tab.

2. In the palette, select the **Sequence flow** icon and make the following connections:
    - The Specify Existing Position Coach to the Create Requisition Coach
    - The Confirm Position Details Coach to the Create Requisition Coach

    Tip: If the button between two nodes in the diagram is not correct, select the line. In the properties for the line, click **Select** for the end point binding. In the diagram, select the correct button.
    The diagram now has flow lines that return the flow to the Create Requisition Coach when the user clicks **Back**.
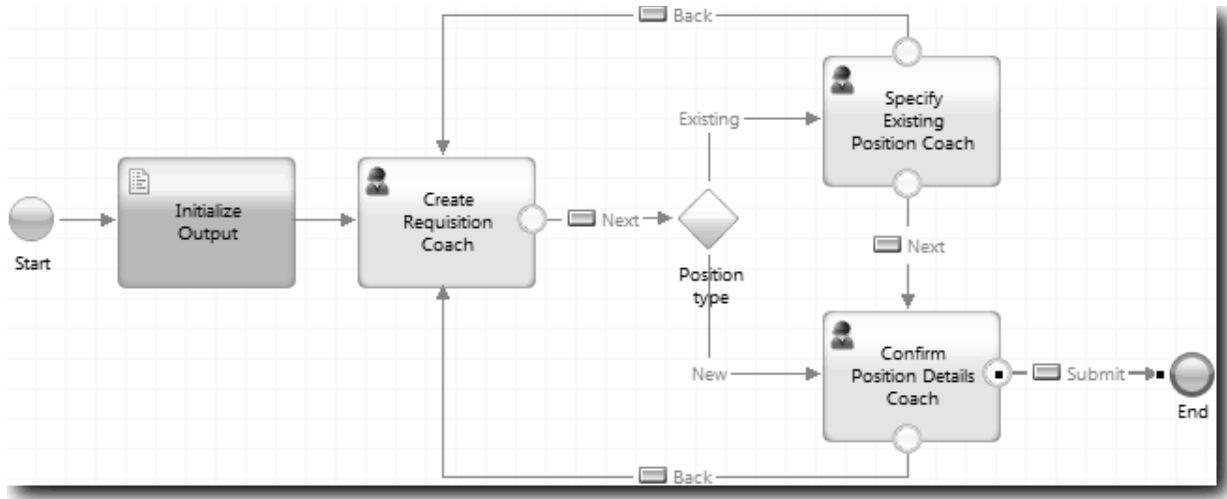
Tip: Both coaches have two coach views that fire boundary events: the **Next** button and the **Back** button. The **Next** button already has a binding for its boundary event. The **Back** button does not have a binding so the Designer automatically uses this button to create the flow.

3. Save the human service.

Lesson checkpoint

You have flow lines that return hiring managers to the editable requisition form when they click **Back** in the coaches.

In this lesson, you learned

- How to create more flow lines to direct the flow according to which button the user clicks

In the next lesson, you will create the GM Approval HS human service.

Create the GM Approval HS human service

In this lesson, you create the human service that the GM uses to review the job requisition. The human service includes one coach that provides the user interface. The GM can then approve or reject the requisition.

This lesson builds upon the artifacts that are created in the "Model the process" on page 2 and "Implement the process" on page 31 modules. If you did not complete these modules, copy the following artifacts from the Hiring Sample process application into the My Hiring Sample process application:

- Standard HR Open New Position BPD
- The *Requisition* business object
- The *Person* business object

In the Standard HR Open New Position process, the GM completes the approve or reject job requisition activity. In IBM Business Process Manager,, you implement activities that people complete as a human service. In this tutorial, the human service must fulfill the requirement that requisitions for new positions are routed to the GM for approval. The GM evaluates each requisition and either approves it or rejects it.

To fulfill this requirement, you must create a human service that has a user interface so the GM can use a form to review the job requisition. The user interface also includes a way for the GM to approve or reject the requisition. In this lesson, you create the GM Approval HS human service and its user interface, the Requisition Approval Coach. The diagram for the human service looks like the following image:

The GM Approval Coach in the human service looks like the following image:

In this lesson, you create the human service and then define its user interface.

Create the GM Approval HS human service:

1. Create the human service for the approve or reject job requisition activity.

   a. Make sure that the My Hiring Sample process application is open in Process Designer.

   b. Select the **Approve or reject job requisition** activity. In the Properties tab, select **Implementation**.

   c. Create the human service by clicking **New**.

   d. Type GM Approval HS and then click **Finish**. The Designer opens the GM Approval HS human service.

2. Add the data input and output by the human service:

   a. Select the **Variables** tab.

   b. Add *requisition* and *currentPosition* as input variables. For their type, click **Select** and then select the Requisition and Position variable types that you created in "Create business objects" on page 32.

   c. Add **requisition** as an output variable. You might notice that an error occurs when you create this variable. You cannot have two variables with the same name and a different type. You fix the error when you click **Select** and then select the Requisition variable type that you created in "Create business objects" on page 32.
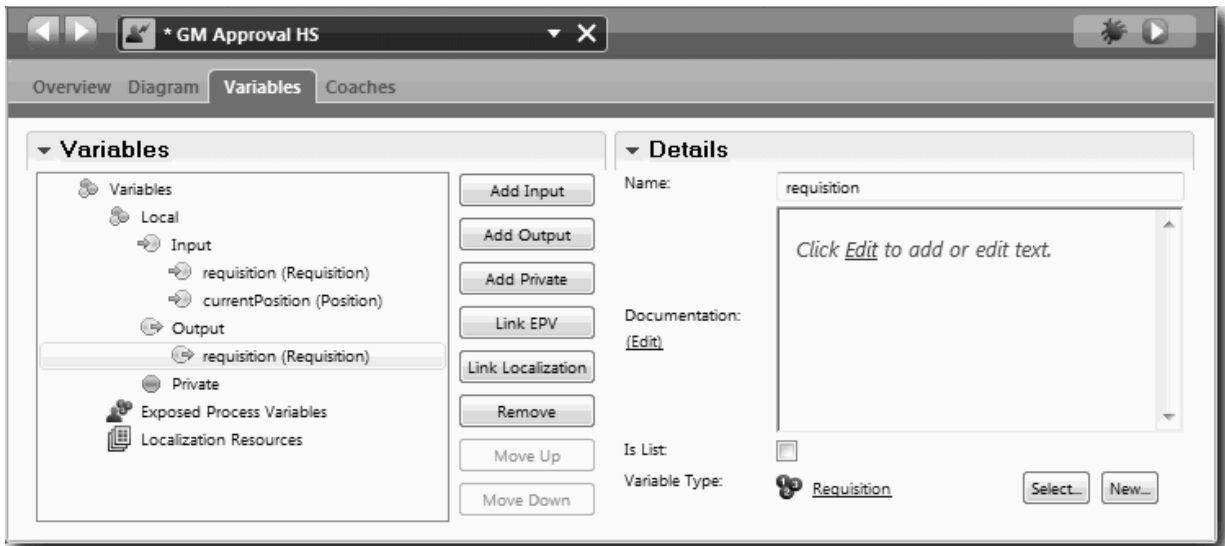
3. Add elements to the human service diagram to create its flow:

   a. Select the **Diagram** tab.

   b. Add a coach to the diagram and rename it to `Requisition Approval Coach`.

4. In the palette, select the **Sequence flow** icon and make the following connections:

   - The Start event to the Requisition Approval Coach
   - The Requisition Approval Coach to the End event

   The diagram for the human service looks like the following image:

5. Create the Requisition Approval Coach. If you need help, use the steps in "Create the coaches for the Submit Requisition HS human service" on page 62 and consult the table later in this step. The layout for the Requisition Approval Coach matches the following image:

For the controls and bindings to include, consult the following table:

Name	Type of control	Binding	Configuration options
GM Approval	Horizontal section	None	No changes
Job requisition data	Requisition CV	*requisition*	No changes
Position data	Position CV	*currentPosition*	No changes
Make your decision	Horizontal section		No changes
Approved	Checkbox	*requisition.approvalNeeded*	• **Show As**=Two Radio Buttons • **True Label**=Approved • **False Label**=Rejected
GM comment	Text area	*requisition.gmComment*	No changes
Submit	Button	None	No changes

6. Select the **Requisition CV** coach view. In the **Visibility** properties, set the source to **Value** and set the value to Read only.

7. Set the visibility property of the **Position CV** coach view to Read only.

You created the GM Approval HS human service and its user interface, the Requisition Approval Coach.

Lesson checkpoint
You created the human service that the GM uses to review information on a new position. The GM then approves or rejects the human service.

In this lesson, you learned

- How to create a human service

In the next lesson, you will conduct Playback Two.

Conduct Playback Two

In this lesson, you conduct Playback Two by checking that the individual human services are working as expected, and that the Coaches display correctly, and you take a snapshot.

You must have completed the following:
- The Submit Requisition HS human service with the Create Requisition Coach
- The Detail Existing Position and Confirm Position Details Coaches
- The GM Approval HS human service with the Requisition Approval Coach

In playback two, you verify all the human services and Coaches in the process by testing the following scenarios:
- The hiring manager requests a replacement for an existing position.
- The hiring manager creates a request for a new position.
- The general manager (GM) approves the request for a new position.
- The GM rejects the request for a new position.

Add temporary test data

Because there is no data yet for the services, you must add test data for the Position type field; adding the data determines the next page that displays in the Create Requisition Coach.
To add test data:

1. Open the **Position CV** Coach View.
2. In the **Variables** tab, add a configuration option for your test data:
   a. Click the plus sign next to **Configuration Options**.
   b. In the Data section, type `testData` for the name.
   c. Select **Is List**.
3. Switch to the **Layout** tab.
4. Click the **Position type** Select control and click Properties. Then in the **General** tab, change the binding to testData.
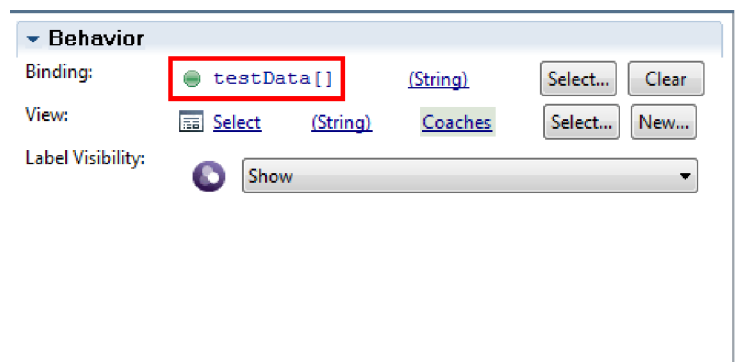
5. Save your changes.
6. Open the **Submit Requisition HS** human service.
7. Double click the **Create Requisition** Coach.
8. In the Coach, click the **Position data** view.
9. Switch to the **Configuration** properties.

10. Expand **testData** and type the values `New` and `Existing` in the Data column.
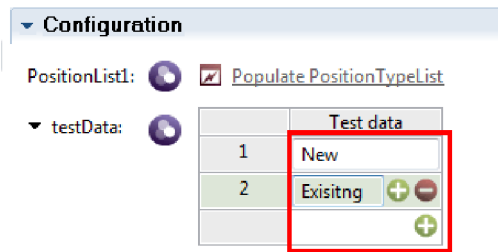
11. Save your changes.

Now you can run the human services in the web browser:

Run the human services

Run the human services in the web browser:

Play back the simplest path, when the hiring manager requests a replacement for an existing position:
1. Double-click the **Submit job requisition** activity, which is implemented as a human service. The human service editor opens.
2. Click **Run Service**.
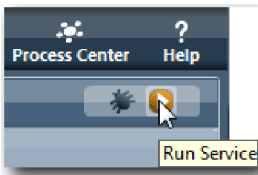
The Job create requisition page opens in your default web browser. Verify that the page matches the following image:

3. From the **Position type** list, select **Existing**.
4. Click **Next**. The Detail Existing Position form opens. Verify that the form matches the following image:

Detail Existing Position

Position data

Position type
Existing

Job title
Head of Product Development

Person data

Given name
Bob

Family name
Smith

Manager
Ann Fisher

Comments

Make your decision

Back   Next

5. Verify that the **Back** button is works correctly, and return to the Detail Existing Position page.
6. Enter data in the fields under Person data and click **Next**. The **Confirm position details** page opens. Verify that the form matches the following image:

Confirm Position Details

Requisition data

Requester

Requisition number
1141

Hiring manager
Tom Miller

Requested position

Employment type
<no selection>

Department
<no selection>

Number of employees required
1

Position date and location

Planned starting date
10/3/2013

Location
<no selection>

Position data

Position type
Existing

Job title
Head of Product Development

Make your decision

Back   Submit

7. Click **Submit**. The web browser shows the message **The service has finished**. You successfully tested the path for an existing job.

Play back the path where the hiring manager requests approval for a new position:

8. In Process Designer, run the **Submit Requisition HS** human service.
9. Enter data in the **Create Requisition** form. In the **Position type** field, select **New**.
10. Click **Next**. The Confirm position details page opens.
11. Click **Submit**. The web browser shows the message **The service has finished**. You submitted the request successfully.
12. Switch to Process Designer and run the **GM Approval HS** service. The **GM approval** page opens in your default web browser. Verify that the page matches the following image:

13. Click **Approved** and then click **Submit**. The web browser shows the message **The service has finished**.

14. Run the service again from Process Designer.

15. In the **GM approval** form in the web browser, click **Rejected** and then click **Submit**. The web browser shows the message **The service has finished**. You successfully tested the path for a new job requisition.

Next, return the **Position CV** Coach View to its original configuration:

Re-configure the Position CV Coach View

To return the **Position CV** Coach View to its original configuration:

1. Open the **Position CV** Coach View and click the **Layout** tab.

2. Click the **Position type** Select control.

3. In the General properties, click Clear to remove the **testData** binding.
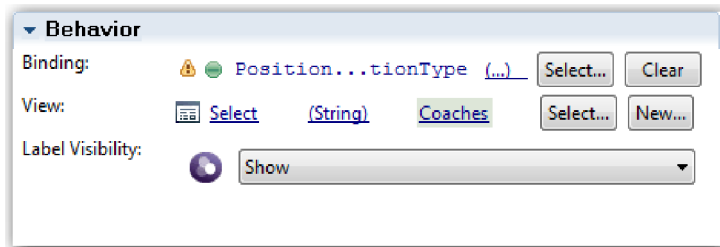
4. Save your changes.

Take a snapshot

Take a snapshot of the process application:

1. In Process Designer, click the icon in the main toolbar.

2. Type `Playback Two` as the snapshot name and click **OK**.

3. For the description, type `This is a snapshot of the process application up to Playback Two.`

Lesson checkpoint

You conducted playback two by checking that the individual human services are working as expected. You also took a snapshot of the process application.

In this lesson, you learned
* How to play back a human service
* How to take a snapshot of the process application

Tip: In this lesson, you tested the services individually. To test the services within the process, you follow the procedure that is described in playback one, with one exception. In playback one, you entered test data in the Inspector. Here, you would enter the data using the coach configuration option as described in this lesson.

In the next module, you will integrate the process application with services.

Integrate the process with services

In this module, you integrate the process with the service components that provide the data that the process uses.

This tutorial uses services that contain scripts. These scripts create the data that the Hiring Sample uses. A proper implementation of a process application could access many different service components. In the Designer, you author services to act as the interface to these service components. The implementation of the services depends on the service component that the process application is accessing and what data or functionality it needs from the service component.

Learning objectives

After you complete the lessons in this module, you will understand the concepts and know how to create a service as an example of integrating service components inside a process.

Prerequisites

You must complete all lessons in these modules:
* "Model the process" on page 2
* "Implement the process" on page 31
* "Create the user interface" on page 46

Create Ajax services

In this lesson, you create a set of Ajax services that create the data that the process uses. You then configure coach views to call these services.

The following coach views use an Ajax service to populate one or more of its controls:
* Person CV
* Position CV
* Requisition CV

The coach views in My Hiring Sample display data to the hiring manager and to the GM. This lesson describes how to create the data and configure the coach view controls to display it.

This lesson uses the following concepts:

Concept	Description
Ajax services	A service that asynchronously sends or retrieves data from a data source, such as a database.

Create an Ajax service:

1. Make sure that the My Hiring Sample process application is open in Process Designer.

2. In the Designer library, click the plus sign next to **User Interface** and select **Ajax Service**.
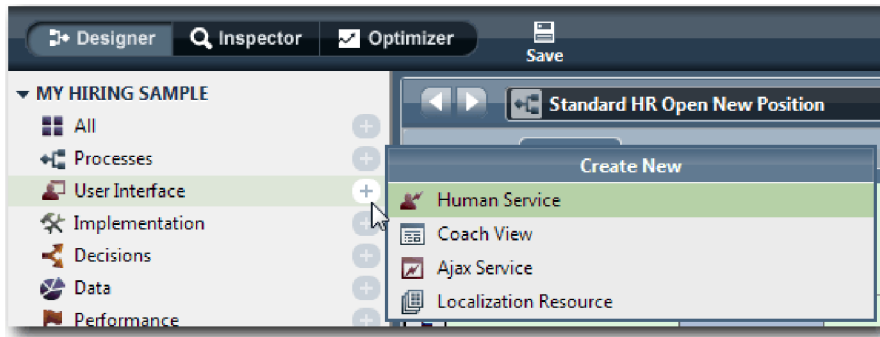
3. Type `Populate DepartmentList` and then click **Finish**. You can now edit the Ajax service that you created.

4. Set the input and output of the service:

   a. Select the **Variables** tab.

   b. Click **Add Input**.

   c. In the **Name** field, type `text`. For the type, use the default type, which is **String**.

   d. Click **Add Output**.

   e. In the **Name** field, type `results`.

   f. For the variable type of the output, click **Select** and then select the **ANY** type from the list. By selecting ANY, you are setting the output to be of any type.

   g. Select **Is List** so that service returns a list of items.
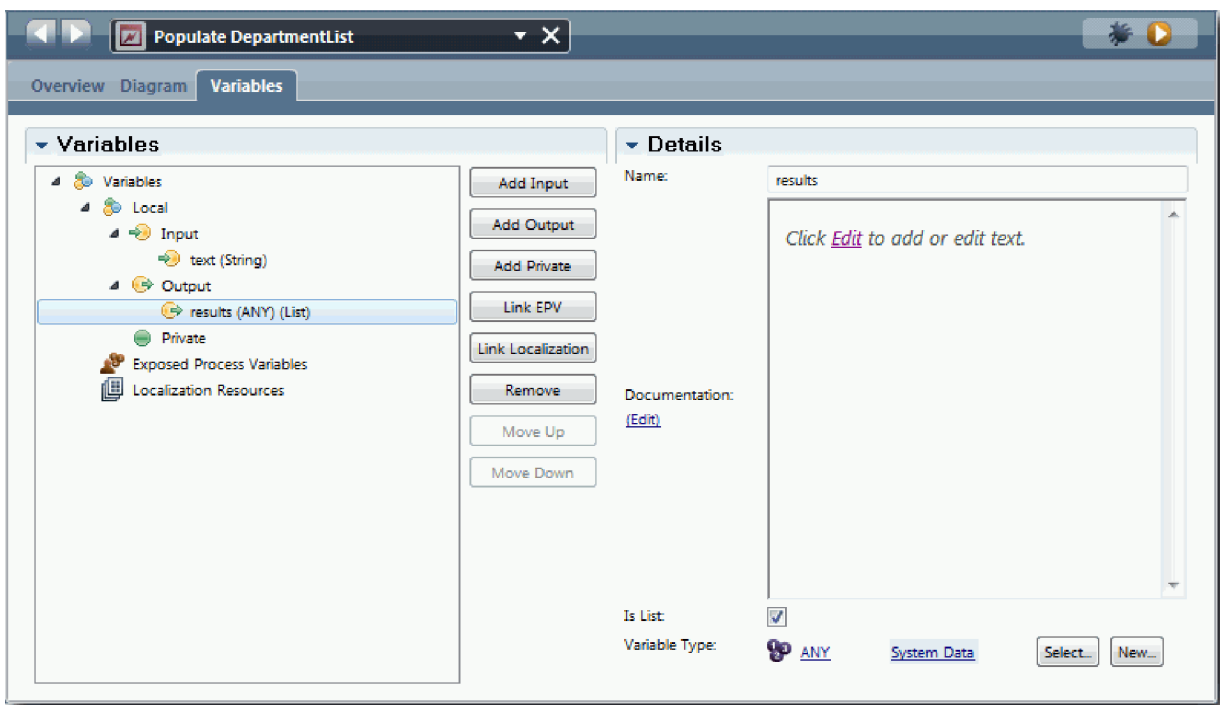
5. Create the service flow:

   a. Click the **Diagram** tab and then, from the palette, add a server script to the process diagram and rename it to `populateDepartmentList`.

b. In the **Properties** tab, select **Implementation** and add the following code:

```
tw.local.results = new tw.object.listOf.String();
tw.local.results[0] = "Finance";
tw.local.results[1] = "Marketing";
tw.local.results[2] = "Product Development";
tw.local.results[3] = "Human Resources";
tw.local.results[4] = "Sales";
tw.local.results[5] = "Customer Service";
tw.local.results[6] = "Business Partner Service";
tw.local.results[7] = "Business Strategies";
tw.local.results.listAddSelected(0);
```

c. In the palette, select the Sequence flow tool icon ▶▲ . Make the following connections:

- Start event to the server script
- Server script to the End event
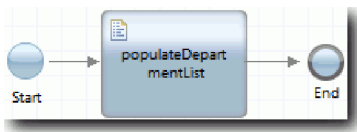
6. Configure the Department stock control so that it uses the Ajax service to get its contents.

   a. Open the Requisition CV coach view and select the **Department** control.

   b. In the Configuration properties, click **Select** for the selection service. Select the **Populate DepartmentList** Ajax service.
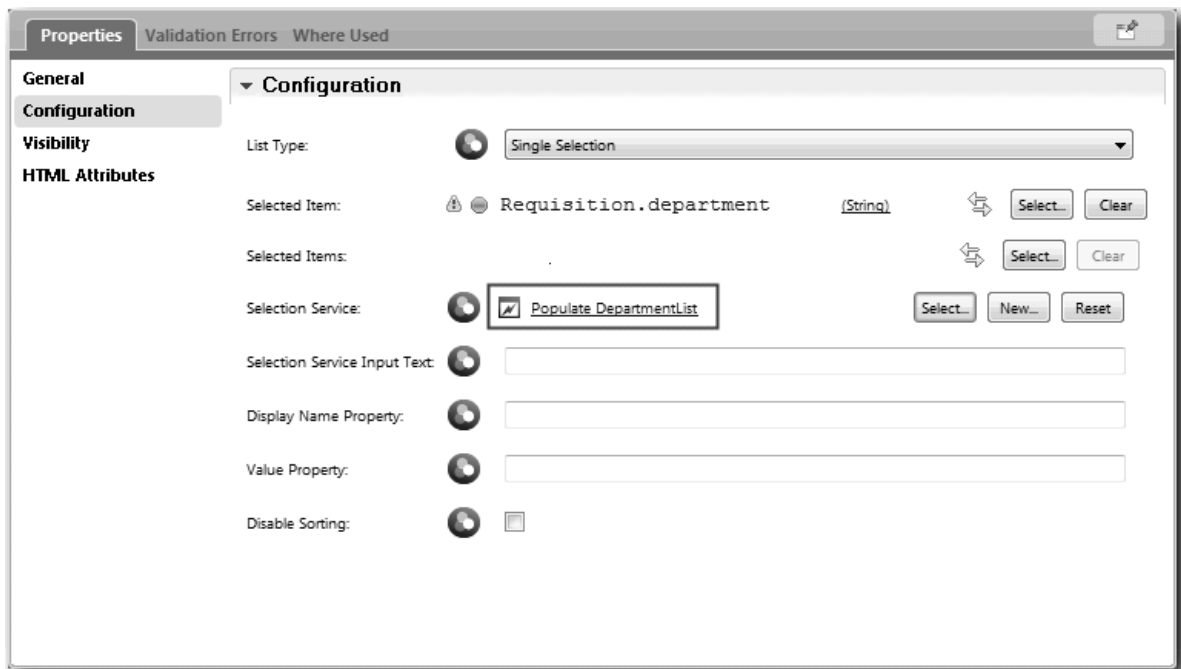
7. Create the other Ajax services with the information in the following table:

Service Name	Script in the service	Script code

Populate EmploymentTypeList	populateStatusList	tw.local.results = new tw.object.listOf.String();
		tw.local.results[0] = "Full-time";
		tw.local.results[1] = "Part-time";
		tw.local.results[2] = "Contract";
		tw.local.results.listAddSelected(0);

Service Name	Script in the service	Script code

Populate LocationList	**populateLocationList**	`tw.local.results = new tw.object.listOf.String();`
		`tw.local.results[0] = "Atlanta";`
		`tw.local.results[1] = "Boston";`
		`tw.local.results[2] = "Chicago";`
		`tw.local.results[3] = "Cincinatti";`
		`tw.local.results[4] = "Dallas";`
		`tw.local.results[5] = "Denver";`
		`tw.local.results[6] = "Des Moines";`
		`tw.local.results.listAddSelected(2);`

Populate PositiontypeList	**populatePositionTypeList**	`tw.local.results = new tw.object.listOf.String();`
		`tw.local.results[0] = "New";`
		`tw.local.results[1] = "Existing";`
		`tw.local.results.listAddSelected(0);`

8. Configure the stock controls that use a service to get their content. The following table lists these stock controls and the Ajax service that you select for the Selection Service configuration option:

Coach View	Stock Control	Service Name
Position CV	Position type	**Populate PositiontypeList**
Requisition CV	Location	**Populate LocationList**
Requisition CV	Employment status	**Populate EmploymentTypeList**

Lesson checkpoint

You created Ajax services and configured the select controls to use the services to get data.

In this lesson, you learned

- How to create an Ajax service
- How to configure a coach view to use that Ajax service

In the next lesson, you will add validation to the Create Requisition Coach.

Add validation to the Create Requisition Coach

In this lesson, you create a validation service to ensure that the Create Requisition Coach contains valid data when the user clicks **Next**.

This lesson builds upon the artifacts that are created in the "Model the process" on page 2 and "Implement the process" on page 31 modules. If you did not complete these modules, copy the Submit Requisition HS human service from the Hiring Sample process application into the My Hiring Sample process application:

The Create Requisition Coach contains a number of fields in which users can enter invalid data or where users must make a choice. The planned starting data field is an example of the former because user should not enter past dates. The position type field is an example of the latter because the service flow depends on whether the user selects a new position or an existing position. You create a validation service to check the data in the coach. The service validates the data in several controls and prevents the flow from leaving the coach until the data in these controls is valid.

Add validation to the Create Requisition Coach:

1. Make sure that the My Hiring Sample process application is open in Process Designer.
2. In the Designer library, click the plus sign next to **Implementation** and select **General System Service**. You can use any service to do the validation. In this case, the sample uses a general system service.
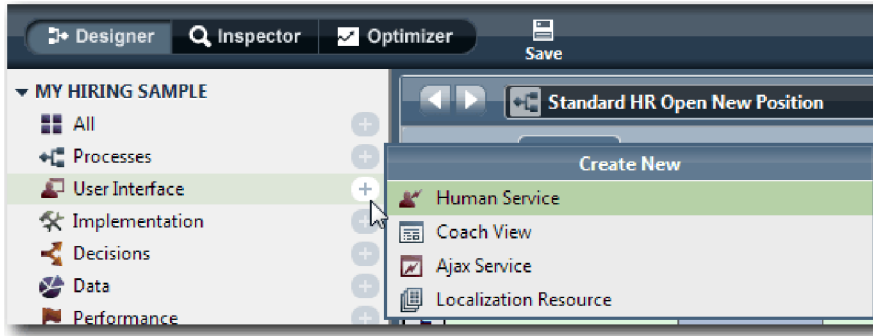
3. Type `Requistion CV Validation` and then click **Finish**. You can now edit the service that you created.

4. Set the input and output of the service: The inputs are the data you want validated and the output is always a **CoachValidation** object.

   a. Select the **Variables** tab.

   b. Click **Add Input**.

   c. In the **Name** field, type `positionDate`. For the type, use the type of the data object that is bound to the control that is being validated. In this case, the planned starting date control is bound to **Requisition.date**, which is a **Date** type.

   d. In the same way, add the following input variables:

   • **positionType (String)**

   • **positionLocation (String)**

   • **positionStatus (String)**

   • **positionDepartment (String)**

   e. Click **Add Output**.

   f. In the **Name** field, type `coachValidation`.

   g. Bind **coachValidation** to the **CoachValidation** type.

5. Create the service flow:

   a. Click the **Diagram** tab and then, from the palette, add a server script to the process diagram and rename it to `Set Data`.

   b. In the **Properties** tab, select **Implementation** and add the following code:

```
      tw.local.coachValidation = new tw.object.CoachValidation();
      tw.local.coachValidation.validationErrors = new tw.object.listOf.CoachValidationError();

      function checkString(value) {
        return value != null && value == "";
      }

      function checkDate(value) {
         var date = new TWDate();
         return value == null || ( date.getTime() > value.getTime() );
      }

      if ( checkString(tw.local.positionType) ){
        tw.system.addCoachValidationError(tw.local.coachValidation, "tw.local.currentPosition.positionType", "You must sel
      }

      if ( checkString(tw.local.positionLocation) ){
        tw.system.addCoachValidationError(tw.local.coachValidation, "tw.local.requisition.location", "You must select a lo
      }

      if ( checkDate(tw.local.positionDate) ){
        tw.system.addCoachValidationError(tw.local.coachValidation, "tw.local.requisition.date", "You must select a date t
      }

      if ( checkString(tw.local.positionStatus) ){
        tw.system.addCoachValidationError(tw.local.coachValidation, "tw.local.requisition.status", "You must select an emp
      }

      if ( checkString(tw.local.positionDepartment) ){
        tw.system.addCoachValidationError(tw.local.coachValidation, "tw.local.requisition.department", "You must select a
      }
```

c. In the palette, select the Sequence flow tool icon ▶▲ . Make the following connections:
   • The Start event to the server script
   • The server script to the End event

6. Add required decorators to the controls that require user input:

   Important: This step only adds the decorators. It does not add any validation support to the field. It is the validation service that performs the validation.

   a. Open the Requisition CV coach view.
   b. Select the employment status control and open its **Visibility** properties.
   c. Set the visibility to Required.
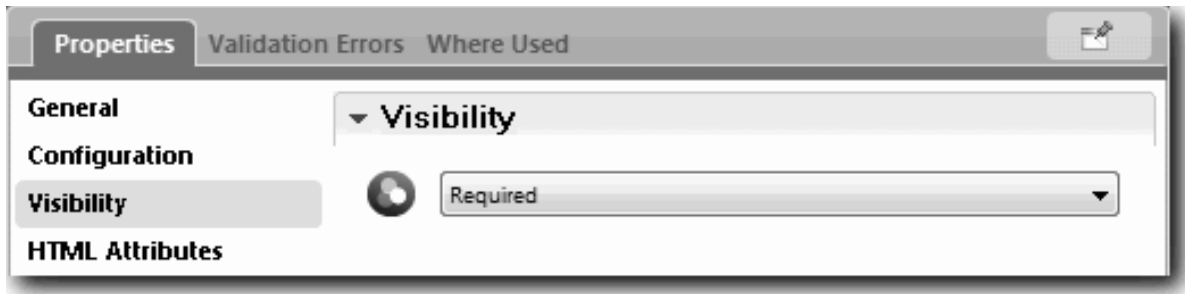
d. In the same way, set the visibility property of the following controls to `Required`:
   - Department
   - Planned starting date
   - Location

e. In the Position CV coach view, set the visibility of the position type control to `Required`.

7. Insert the validation into the Submit Requisition HS human service flow:

   a. Open the diagram for the Submit Requisition HS human service.

   b. Select the line that flows out of the Create Requisition Coach to the position type decision. The line has a Next label.

   c. In the Line properties, set **Fire Validation** to `Before`.
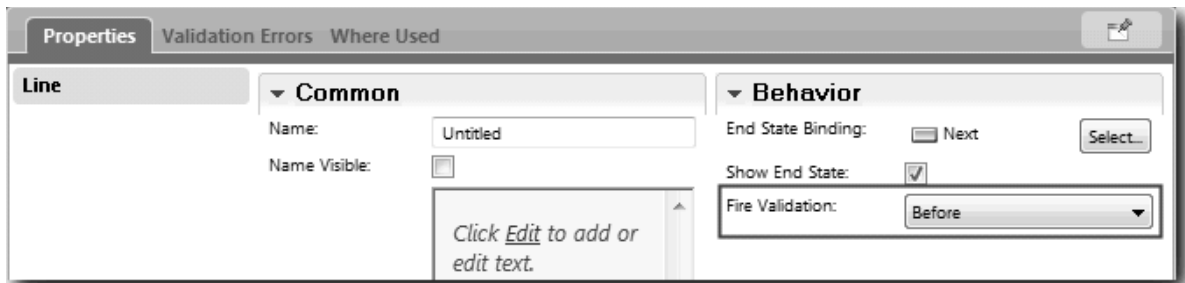
The anchor point of the line now has a validation check mark and the Create Requisition Coach has an anchor point that you can use to connect the coach to the validation service.

   d. From the palette, add a nested service to the Submit Requisition HS diagram. Rename the service to `Validate coach data`.

   e. In the Implementation properties of the nested service, set the attached nested service to `Requisition CV Validation` general system service.
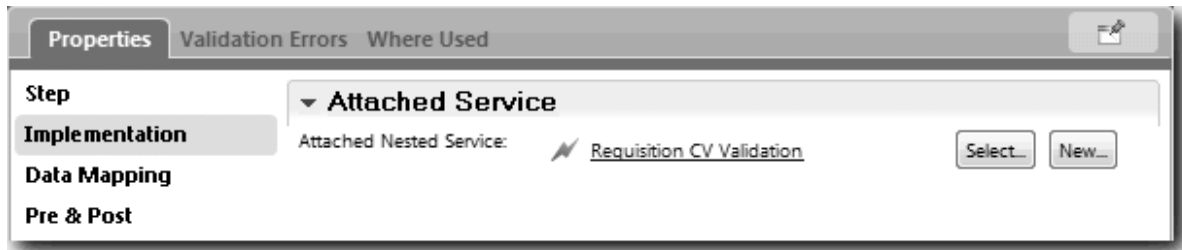
f. Open the Data Mapping properties.

g. For the **positionDate** input mapping, click ⬚ and then select `requisition.date`.

h. Map the other input variables using the information in the following table:

Variable in the human service	Variable in the validation service
tw.local.currentPosition.positionType	positionType
tw.local.requisition.location	positionLocation
tw.local.requisition.status	positionStatus
tw.local.requisition.department	positionDepartment
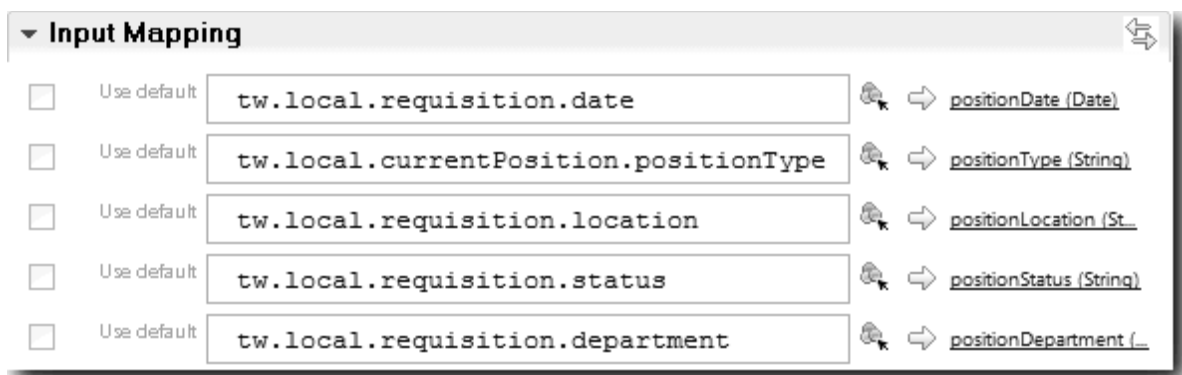
i. For the **coachValidation** output mapping, type `tw.system.coachValidation`. The **tw.system.coachValidation** variable is a system variable designed to support validating coaches.

j. From the palette, add a Stay on Page event to the n the Submit Requisition HS diagram.

k. Select the Sequence flow tool icon ▶. Make the following connections:

   • The validation anchor point of the Create Requisition Coach to the validate coach data service

   • The validate coach data service to the stay on page node.
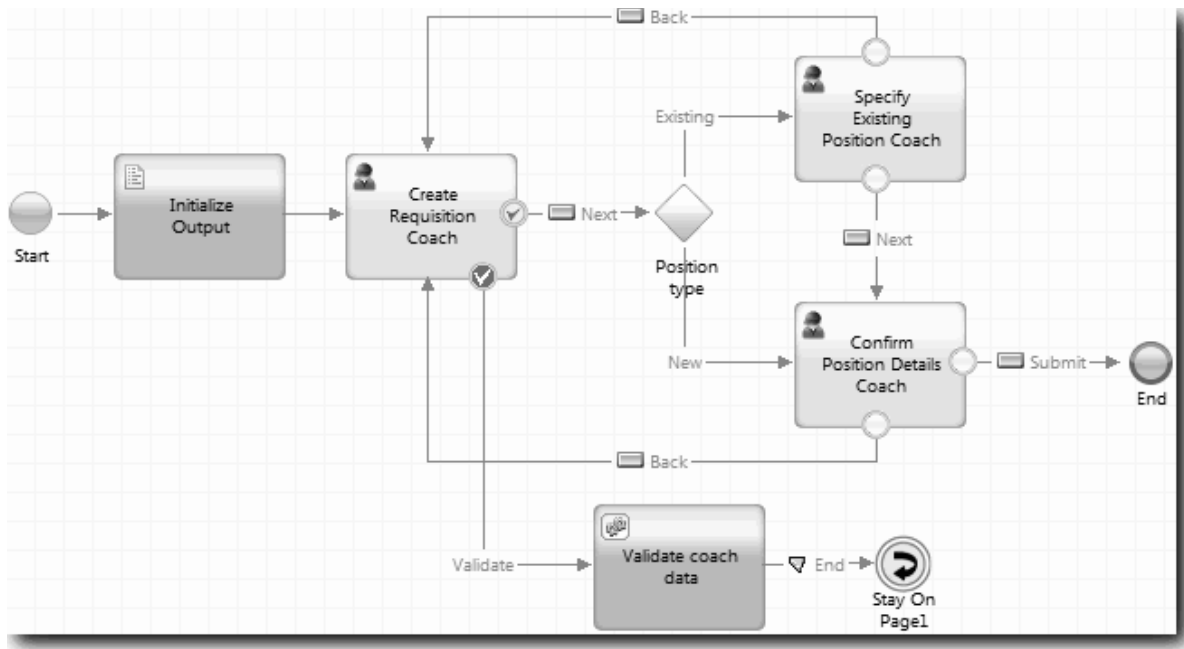
Lesson checkpoint

You created the Requisition CV Validation service and connected the Create Requisition Coach to it.

In this lesson, you learned

* How to create a validation service
* How to indicate to users that they must provide data in a control
* How to connect a coach to the validation service

In the next lesson, you will conduct Playback Three.

Conduct Playback Three

In this lesson, you conduct Playback Three by using the debugger to test the Ajax services, and you test the validation script. Then you take a snapshot of the process.

Typically, you would test services in one of two modes:

* Directly on IBM Process Server by running the services in debug mode to ensure that they run as expected because not all services have a corresponding user interface component.
* Where the service is available to a web browser client, you call the URL directly with input data. Because Ajax services are called in a Coach from a web browser, to troubleshoot any client/server HTTP issues, use a web browser-compatible HTTP sniffer. For example, for Mozilla Firefox use the Firebug add-on. For Internet Explorer 8 and later, use the developer tools that you start by pressing the **F12** key.

To test Ajax services in the debugger:

1. In Process Designer, open the **Populate DepartmentList** Ajax service.
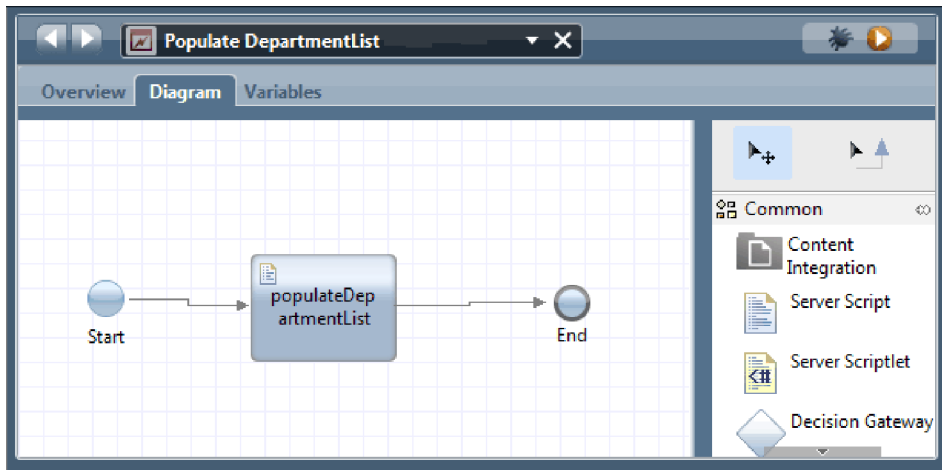
2. Click the **Debug** icon.

3. Switch to Process Designer.

4. At the Switch View window, click **Yes** to switch to the Inspector view. The debug window of the Inspector opens. Notice that the token which indicates the active execution step is at the populateDepartmentList server script.

5. Keep the web browser-based debugger and the Inspector side by side on your screen, and click **Step** at the top of the web browser. This action runs the populateDepartmentList script block in the PopulateDepartmentList Ajax service. In the web browser, you can see that the previously empty results area is now populated.

In the Inspector, the token is now at the End event.

6. In the web browser, click **Step**. The service ends.
7. Similarly, test the other Ajax services:

- Populate LocationList
- Populate EmploymenttypeList
- Populate PositionTypeList

8. Run the **Submit Requisition HS** human service.

9. Click **Next** without entering any information. The required fields are highlighted.

10. Hover over the warning icon next to one of the highlighted fields. The error message displays.

11. Take a snapshot of the process application:

    a. In Process Designer, click the Snapshot icon in the main toolbar.

    b. Type `Playback Three` as the snapshot name and click **OK**.

    c. For the description, type `This is a snapshot of the process application up to Playback Three`.

12. Rerun Playback One. This time, the Coaches are displayed for the submit requisition and approval activities. See Conduct Playback One.

Lesson checkpoint
You conducted Playback Three by checking that the Ajax services run correctly.

In this lesson, you learned
- To test Ajax services by using the web debugger

In the next lesson, you will conduct the Final Playback.

Conduct the final playback

In this lesson, you conduct the final playback to follow the new job requisition path from beginning to end, and take a final snapshot.

Before you begin, ensure that you created teams for the hiring manager and the general manager and added the group tw_allusers as members of both teams in "Model teams" on page 7.

Note: All users in the user registry are added to the tw_allusers group by default.

The instructions in this lesson are written for two separate user IDs, one for the hiring manager, and one for the general manager (GM). You can either use the same user ID for both the hiring manager or the GM, or you can enter in separate user IDs.

In this playback, you run the following paths:
- The hiring manager submits a requisition for a new position.
- The GM does not approve the position within the required time.
- An escalation notice is sent.
- The GM approves the position.

To run the playback:

1. Use a web browser to access Process Portal. The web address has the following format:

   ```
   http://[host_name]:[port]/portal
   ```

   Provide the following details:
   - The name of the host on which IBM Process Center or IBM Process Server is installed, and
   - The port that was designated for the server during IBM Business Process Manager installation. The default port is 9443.

2. Log in to Process Portal as the hiring manager.
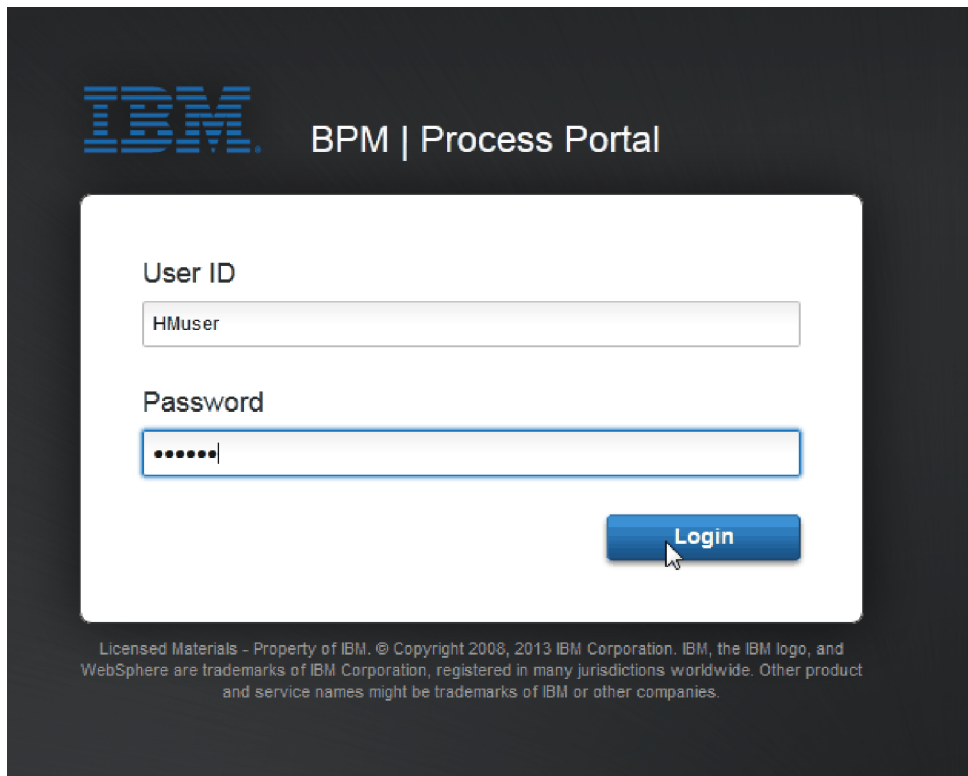
3. Switch to Process Designer.
4. Make sure that the Standard HR Open New Position process is open on the **Diagram** page.
5. To test the event, reset the due in field and the timer on the Approve or reject requisition activity. The due in field for the activity is set to one hour by default. The timer intermediate event in the process is set to trigger one day after the job requisition is submitted by the hiring manager. You must accelerate the activity and the timer for the test.

   a. In the process diagram, click the **Approve or reject job requisition** activity and switch to the Properties Implementation page.
   b. Under Priority Settings, change the value of **Due In** to one minute.
   c. Click the timer intermediate event on the **Approve or reject job requisition** activity and switch to the Properties Implementation page.
   d. Under Timer Properties, change the value of **Before or After Difference** to one minute.

e. Save your changes.

   Note: Because the timer is set to be repeatable, an event is created every minute until the Approve
   or reject job requisition activity is completed.

6. To run an instance of the process, click the **Run process** icon.

7. In the **Switch View** window, click **No** to bypass the Process Inspector.
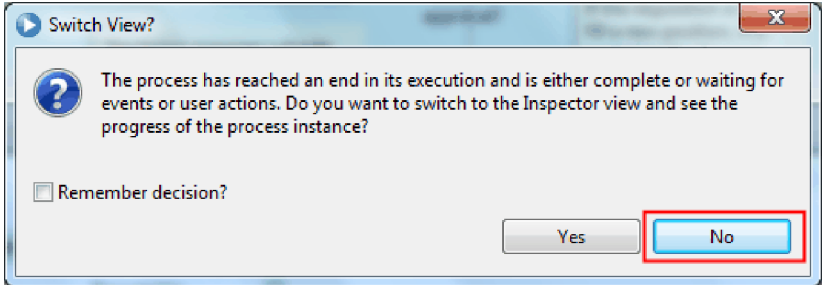
8. Switch to the **My work** page in Process Portal.

9. On the right, click the process instance that you just started:
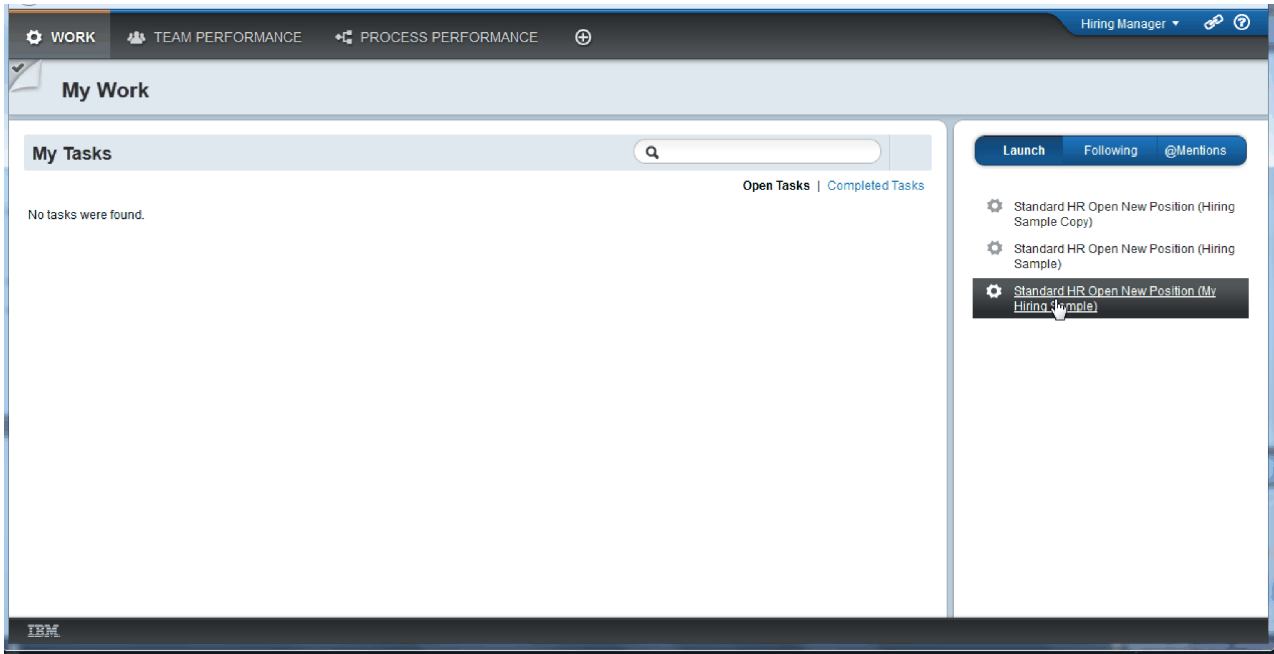
   Process Portal displays the Create Position Requisition Coach. Notice that you are in the Hiring
   Manager mode.
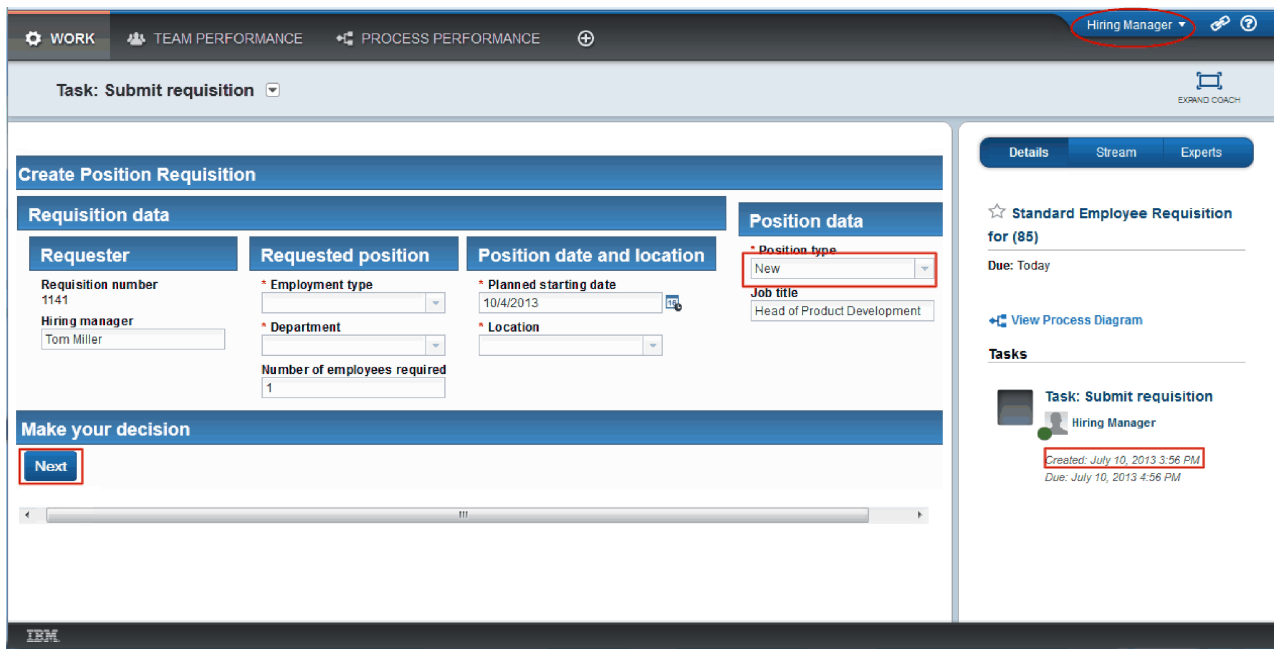
10. Complete the fields, making sure to select **New** as the position type. Click **Next**.

11. If the required fields are highlighted, you do not have valid data in them. This means your validation script is working. Complete all the fields, and click **Next**.

12. The Confirm Position Details Coach is displayed. Review the details and click **Submit**.
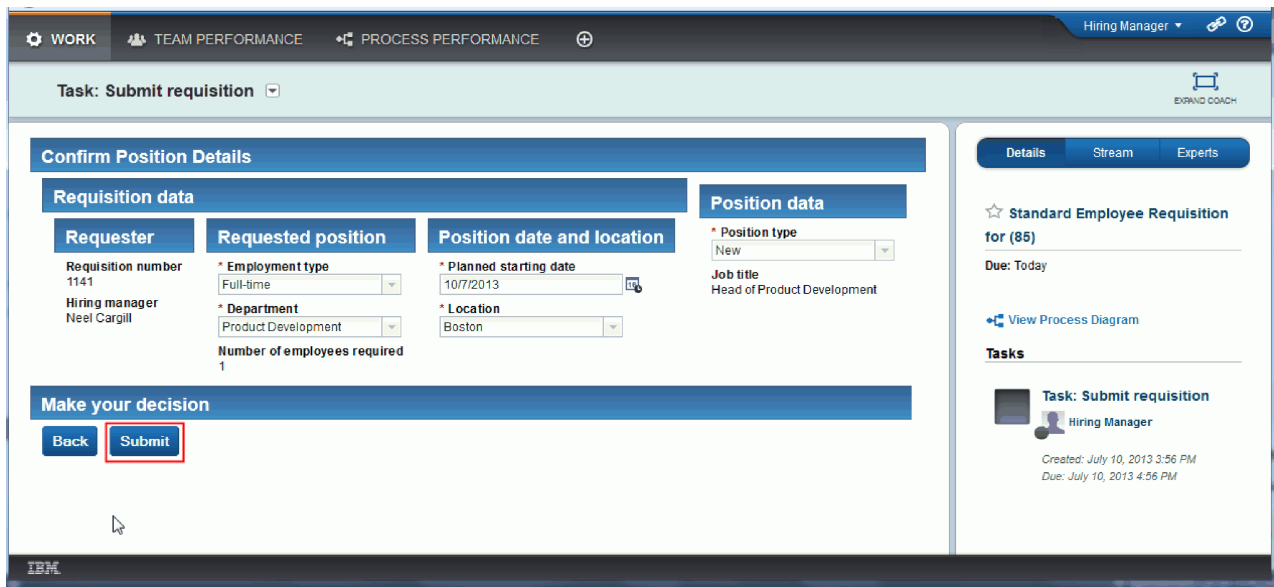
13. Now that you submitted the request, switch to the General Manager mode:

   Note: You can use one user name to complete all the tasks in the playback. In that case, you see the tasks for both the hiring manager and the GM in the **My work** page.

   a. Log out as the hiring manager.
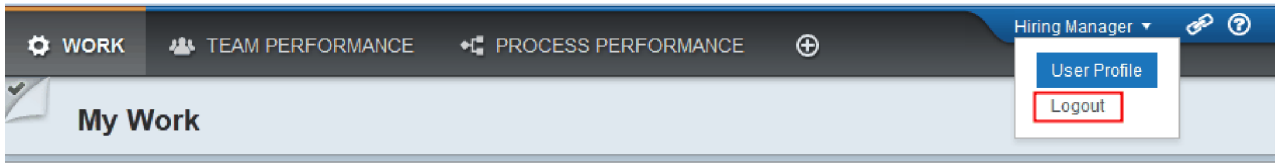
b. Log in as the GM by using a different user name.

c. Switch to the **My work** page.

14. Because the timer is set for 1 minute, the task is displayed almost immediately in the At Risk or Overdue list.
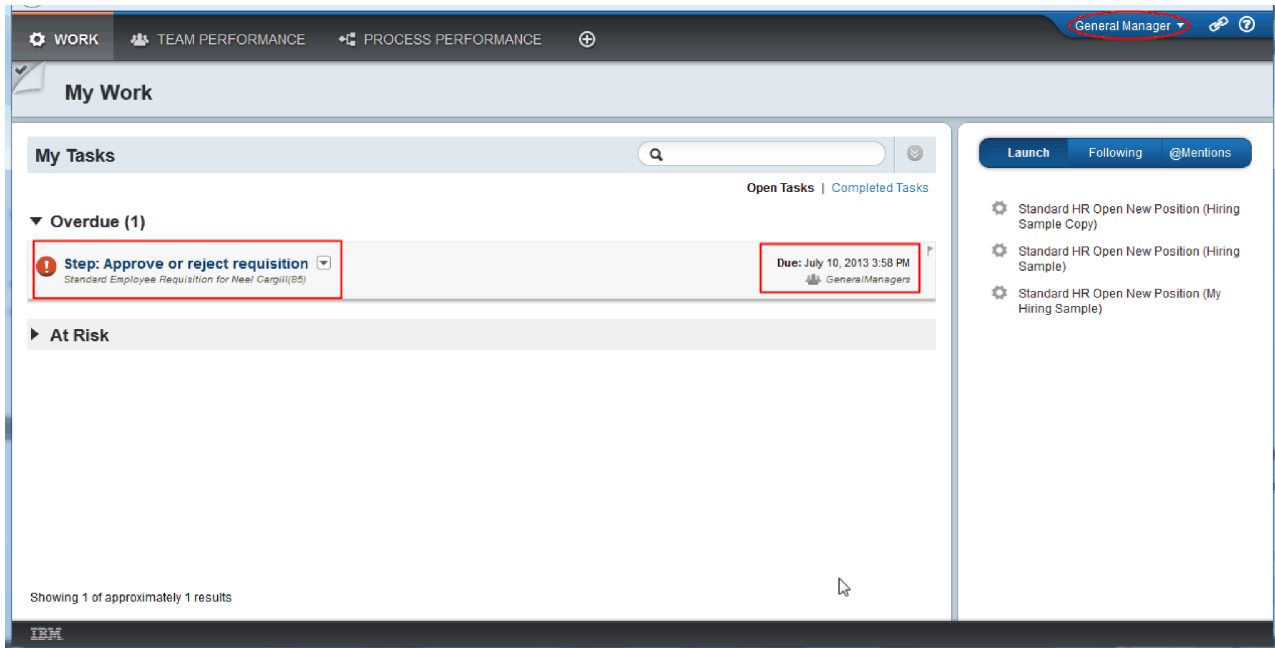
15. Acting as the GM, click the **Step: Approve or reject requisition** task to open it.
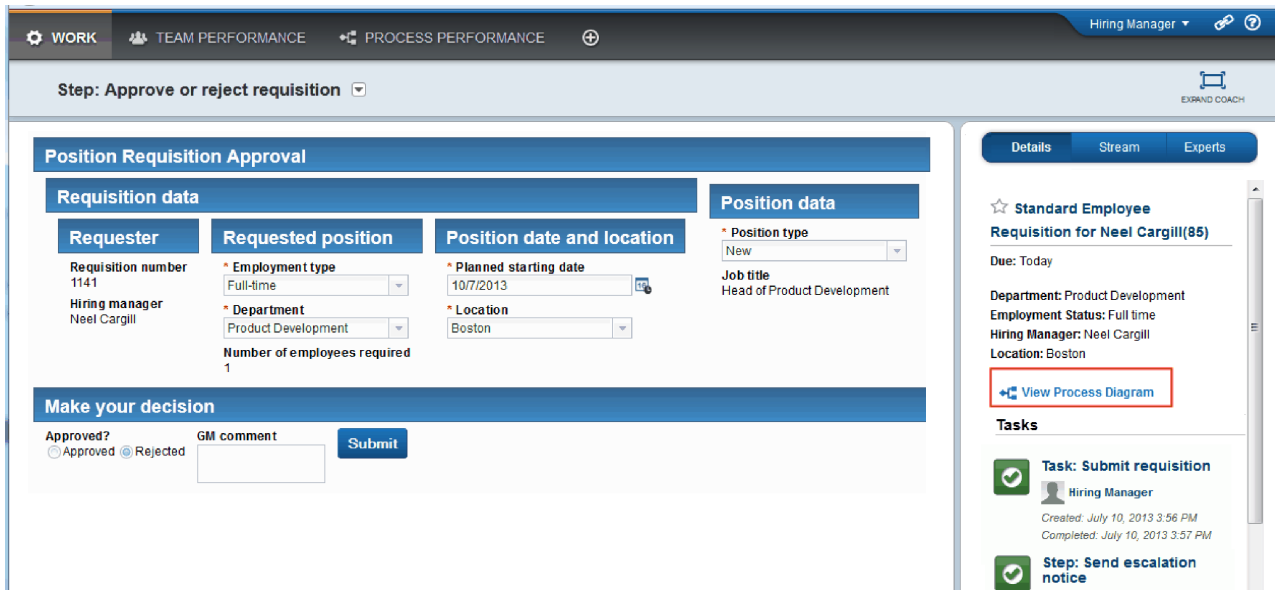
The GM approvals Coach is displayed. To the right of the Coach is a summary of the requisition.

16. Click **View Process Diagram**. The process diagram opens showing the highlighted activity:
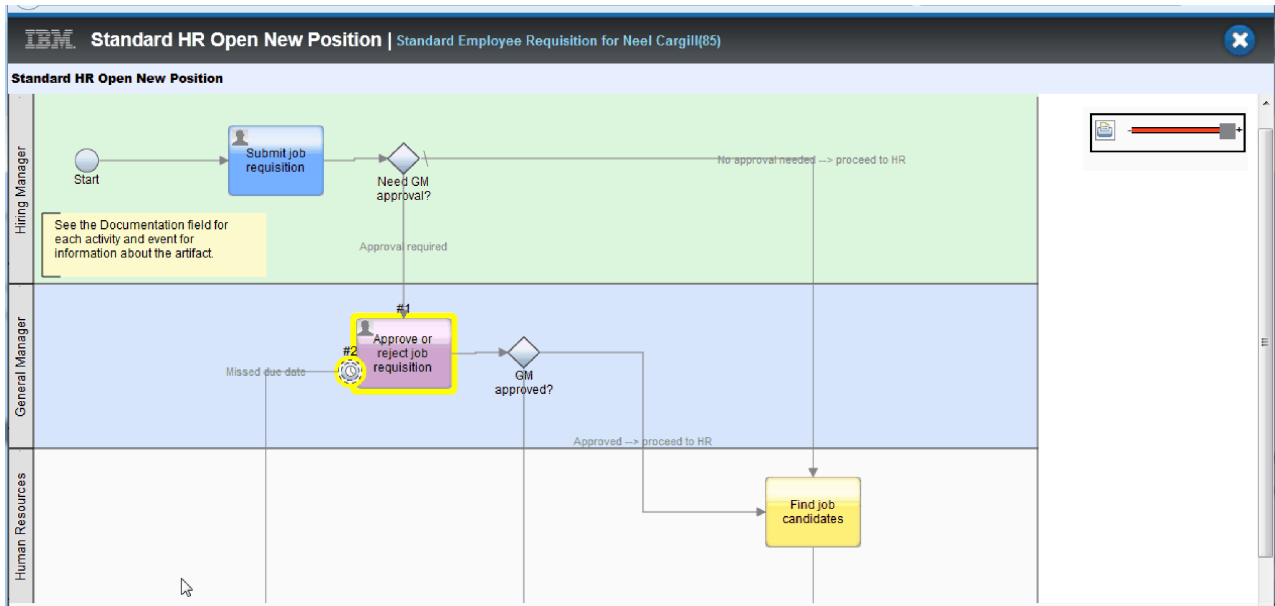
17. Close the process diagram.
18. In the GM approval Coach, scroll down the task list. You can see that an escalation notice step runs every minute past the due date for the Submit requisition activity. The repeated escalations occur because you set the timer as repeatable.

19. In the GM approval Coach, keep the default selection, **Approve**, and click **Submit** to complete the task. The task is no longer displayed in the **My tasks** list.

20. In Process Designer, create a snapshot of your completed process application.

You are now at the end of the Hiring Sample tutorial. This tutorial is a learning exercise that describes one way of modeling, implementing, and testing a process. Depending on your process and process application, other techniques might be more appropriate.

Lesson checkpoint

You conducted the final playback by using Process Portal to follow one instance of the process from beginning to end. You also took a final snapshot of the process application.

In this lesson, you learned

- How to use Process Portal
- How to test a timer escalation event

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IBM Business Process Manager
Hiring Tutorial
Version 8 Release 5

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