E-Process Suite

WORKFLOW·BPR

Analysis Guide

Version 3.4
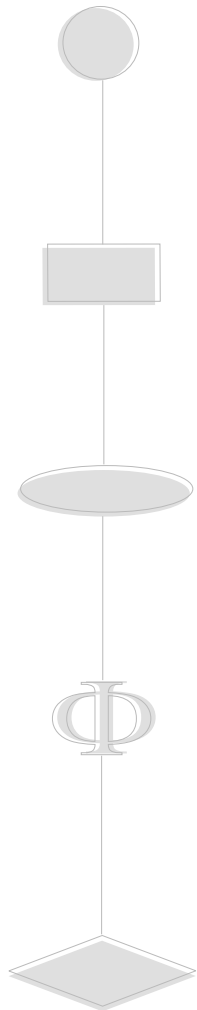
HOLOSOFX

Analysis Guide

Workflow·BPR

Version 3, Release 4

HOLOSOFX, Inc.

1. About This Analysis Guide

Information required to use Workflow•BPR™ in the context of Business Process Representation is provided in this document.

The chapters in this Analysis Guide are functionally organized, focusing on the main functions of process modeling and the use of Workflow•BPR.

> **Chapter 1**: Introducing Workflow•BPR Analysis describes how to perform Case Analysis.
>
> **Chapter 2**: Weighted Average Analysis describes how to perform Weighted Average Analysis.
>
> **Chapter 3**: Simulation describes how to run and review Simulations of Processes.
>
> **Index**: Provides an index of key words that are used throughout the User's Guide.

1.1 Related Guides

Getting Started provides installation information, a tour of the Workflow•BPR application, and a short tutorial to assist you in quickly becoming familiar with Workflow•BPR.

User's Guide provides a general introduction to Workflow•BPR, a description of the contents of the Repository, and information about how to customize the Workflow•BPR application.

Modeling Guide provides information about the objects used to create Process Models and how to handle specific situations in a Process Model.

Reporting Guide provides information about how to generate and use the many tables, charts, and reports produced from analysis of Workflow•BPR Processes.

Tutorial provides a "hands-on" practice session that will familiarize you with the basic components of Workflow•BPR and how to use the software for BPR. The Tutorial takes approximately four to six hours to complete.

Integration with Workflow Applications Guide provides documentation for capturing and exporting additional modeling data that can be used by the workflow products that Workflow•BPR supports.

1.2 Document Conventions

This User's Guide uses the typographic conventions as shown in the following table:

Example	Description
File menu	Within instructions, items that appear in a Workflow•BPR window or dialog box appear in **bold**.
⌐ Choose	Instructions, which specify user actions that involve using the mouse, are preceded by a mouse symbol.
⌨ Type	Instructions, which specify user actions that involve using the keyboard, are preceded by a keyboard symbol.
Ctrl+V	A plus sign (+) between key names indicates a combination of keys. For example, Ctrl+V means to ⌨ hold down the **Ctrl** key while ⌨ pressing the **V** key.
Task	Words that refer to Workflow•BPR data objects (e.g., Task) are capitalized. The same words used in a generic sense (e.g., "…the tasks performed by the organization…") are not capitalized.
✎ Note:	Throughout the document, points of emphasis will be highlighted and marked with a hand holding a pen icon.
☞ Pointer:	Throughout the document, tips or pointers will be highlighted and marked with hand and index finger pointing icon.

Table of Contents

Table of Contents

Chapter 1: Introducing Workflow•BPR Analysis

A nalyzing a Process Model is one of the major steps in the cycle of developing a Process Model. There are three major types of analysis that can be performed for a Process Model:

- Case Analysis

- Weighted Average Analysis

- Process Simulation Analysis

This chapter will cover Case Analysis, Chapter 2 will cover Weighted Average Analysis, and Chapter 3 will cover Process Simulation Analysis.

1.1 Case Analysis

In general, Process Case Analysis starts with a Process Model. The Process Model is expanded so that all objects in its hierarchical structure (if there is one) are brought up to one level. Then the individual Cases are identified and separated. These individual Cases can be generated for further analysis.

1.1.1   How the Cases of a Process are Determined by Workflow•BPR

A Business Process is never performed the same way every time. There are variations in which activities are performed, who will perform them, and when they are performed. These variations are caused by the conditions that exist when the Process is performed. Such conditions might include the type of product ordered, the amount of the transaction, or the credit status of the customer. In Workflow•BPR, these business conditions are modeled by Decisions and Choices. For example, a Decision might be "Product X or Y?" and the two Choices of the Decision would be "Product X" and "Product Y." In the Process Model, the Decision and its Choices would be connected to the appropriate activities (see the figure below). Thus, the variations of the Process are determined by the Choices of the Decisions.
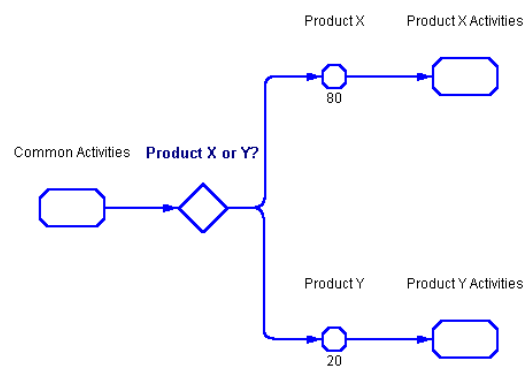
If you were to trace through the path of the Process and stop the Process before the Decision was reached, then you would have only one Case. There would be a 100% probability that this one Case could occur. At the point of the Decision, the one Case is divided into as many Cases as there are Choices for the Decision (i.e., the path of the Process will branch into as many paths as there are Choices). In the figure above, there would be two Cases. If you were to trace through the paths of each of the two Cases individually, you would start at the beginning for both Cases. Thus, they both will contain all the objects that occurred in the original Case until the Decision object was reached. This means that "Common Activities" will be a part of both Cases (see the figure above).

From the point of the Decision forward, the two Cases will contain a different sequence of objects, depending upon what lies ahead in their respective paths. Thus, "Product X Activities" will be a part of Case 1 and "Product Y Activities" will be a part of Case 2 (see the figure above). The two Cases will also divide the probability of occurrence. The 100% probability of the original Case will be multiplied by the probability associated with the Choices that lead to the two Cases. In our example, if the "Product X" Choice had an 80% probability and the "Product Y" Choice a 20% probability, then the two Cases would have an 80% and 20% probability, respectively.

Case #	Probability	"Product X or Y?" Decision Choice
1	80%	"Product X"
2	20%	"Product Y"

If we continue to trace the path of Case 1 (in our example), we find that there is another Decision later on (see the figure below). Product X is painted with two (2) colors: red and green. Product Y only comes in one color (blue) and so it will not affect the activities of the Process.
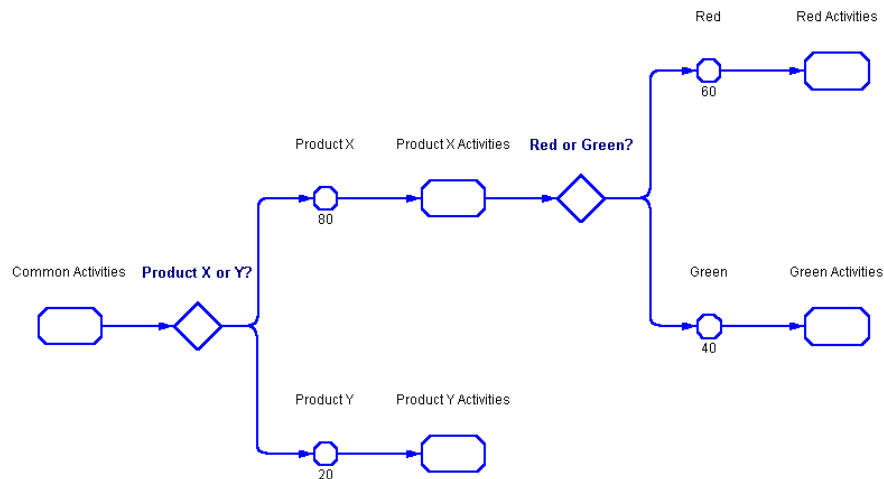
At the point of this Decision, Case 1 will be divided into two new Cases and there would now be a total of three Cases for the Process. The "Red" Choice for the "Red or Green?" Decision has a probability of 60% and the "Green" Choice a probability of 40%. The original 80% for the Case, before the division, will be multiplied by the percentages of the two Choices to determine the probability for each of the two new Cases. For the Case from the "Red" Choice, the probability would be 80% multiplied by 60%, which equals 48%. For the "Green" Choice, the probability would be 80% multiplied by 40%, which equals 32%. The total for all three Cases will still equal 100%.

Case #	Probability	"Product X or Y?" Decision Choice	"Red or Green?" Decision Choice
1	48%	"Product X"	"Red"
2	32%	"Product X"	"Green"
3	20%	"Product Y"	

This procedure will continue until all paths through the Process have come to an end.

> ✍ **There should be only one entry point (beginning) into a Process. Should more than one exist, the Case determination may not proceed correctly. If more than one way to enter the Process exists, then you should precede the entry points with a Decision to create a separate path (Case) for each entry point.**

1.1.2   The Expanded Process Window

Once your Process Model has been verified, Case Generation and Process Simulation are possible, depending upon the type of analysis you want to perform. It is necessary to go through the Expanded Process window in order to perform Case Generation or Process Simulation analysis. You can access the Expanded Process by using the Expand Process tool from the ADF Toolbar. When you use this tool, Workflow•BPR opens the Expanded Process window, which displays an expanded version of your Process. If that Process contains Process Objects that represent other, lower-level Processes, all the objects in the lower-level Processes will be placed at one level. This is the bottom level of the Process. If the Process does not contain Process Objects, then the top and bottom-level will be the same.

The Expanded Process window uses Workflow•BPR layout algorithms to arrange objects properly, with minimal user intervention. The expanded drawing can now be printed. The Expanded Process window toolbar allows movement to the Process Cases window and to the Process Simulation window.

> ✍ **The Role objects of a Line of Visibility ADF or DesignFlow ADF do not appear in the Expanded Process. The Expanded Process will always have the characteristics of a Standard ADF.**

To access the Expanded Process window:

1. Open a **Process** file.

2. ⌐ Click the Expanded Process tool button on the ADF Toolbar. The Expanded Process window appears.

1.1.3   The Process Cases Window

The Process Cases window allows for reviewing all, or a selected range, of the Cases for a Process. The Process Cases window displays each Case, one at a time, plus the set of Decision Choices that lead to it. In addition, it allows you to select and generate a Case.

1.1.3.1   Examining and Reviewing Cases

The Process Cases window is divided into two sections. The upper part of the window displays the Process Case View. This is a passive view in which you can only move and rearrange icons, but you can not edit or perform analyses on its contents. The figure below is a sample of the Process Case View:
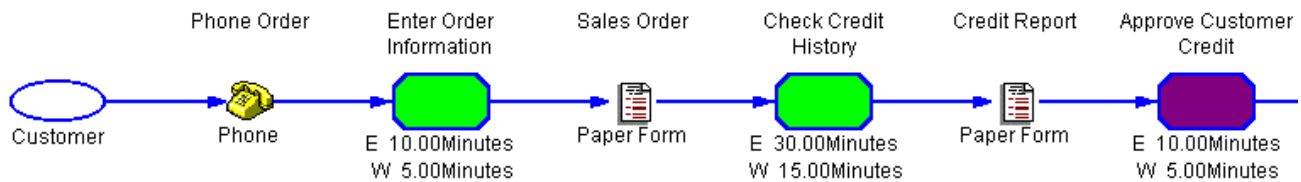
There are no decisions in the Process Case View; they have been filtered out. The lower part of the Process Cases window displays the Process Case table. The first column displays the Case number and the second column displays the percent probability that each Case will occur (the Cases are sorted from highest to lowest probability). The remaining columns display the Decisions in the column headings and the Choices that were selected for each Case in the rows. Not all Decisions occur for each Case; therefore, there would be no listing of a Choice. The figure below is a sample of the Process Case table.

	Percent	Customer on file?	Order Approved?
1	52.50000	Yes	Yes
2	22.50000	No	Yes
3	17.50000	Yes	No
4	7.500000	No	No

To open the Process Cases window, it is necessary to first go through an intermediate window. This intermediate window, the Expanded Process window, displays an expanded version of your Process. If that Process contains Process Objects which represent other, lower-level Processes, all the activities in the lower-level Processes will be brought up to the top-level.

To access the Process Cases window:

1. ⑭ Click the **Expanded Process** tool button 🔲 on the ADF Toolbar. The **Expanded Process** window appears.

2. ⑭ Click on the **Cases** tool button 🔲 on the Expanded Process toolbar. The **Number of Cases** dialog box appears (see the figure below as an example).
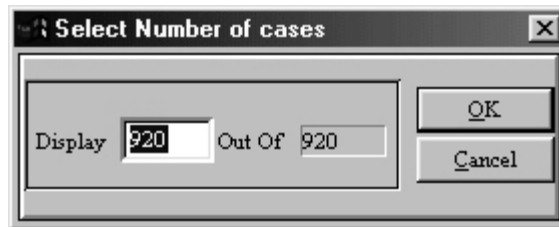
? **The maximum number of Cases that can be processed by Workflow•BPR is 32,000.**

3. ⌨ Enter the number of Cases that you want to display out in the text box.

4. The maximum number is the default value.

5. ⑭ Click **OK**. The **Process Cases** window appears.

? **When you open the Process Case View, a temporary file is created to display the Cases. Processes that contain a large number of Cases will generate a large temporary file. If you plan to perform extensive analysis on large Processes, allow sufficient disk space (e.g., from 50MB to 100MB).**

1.1.3.2 Process Cases Window Toolbar

There is a toolbar for the Process Cases window below the title. The Process Cases toolbar contains the tools required to control the window elements. The Process Cases toolbar contains the Pointer, Zoom-Out, Zoom-In, Generate, Export, and Exit tools.

The tools of the toolbar are:

- **Pointer Tool:** This button resembles a pointing hand. When the tool is selected, the cursor will also look like a pointing hand. Use the Pointer tool to select or move single objects in a diagram, and to insert and delete columns or rows in your diagrams.

- **Zoom-Out Tool:** This button resembles a magnifying glass with a minus sign within it. Use this tool to reduce the scale of your Activity Decision Flow Diagram. Each time the Zoom-Out tool is ⍟ clicked, the scale of your diagram is reduced by one increment.

- **Zoom-In Tool:** This button resembles a magnifying glass with a plus sign within it. Use this tool to increase the scale of your Activity Decision Flow Diagram. Each time the Zoom-In tool is ⍟ clicked, the scale of your diagram is increased by one increment.

- **Generate Tool**: This button has a letter "G" printed on it. Use this tool to create an Activity Decision Flow Diagram for a selected Case in the Process Cases table.

- **Export Tool:** This button has the image of a floppy disk with a red arrow. This tool is utilized to export the table of Cases (with their Decision Choices) that is presented in the lower half of the Process Cases window. The table can be exported in a Microsoft Excel 4.0 (*.xls) format or a Formula One format (*.vts).

- **Exit Tool:** This button has a picture of an arrow pointing to an open door. This tool is used to close the Process Cases window and to return to the Expanded Process window.

Generating a Case Activity Decision Flow Diagram

In order to generate a Case, it is necessary to be in the Process Cases window.

To generate a Case:

1. ⌐🖰 Click on a row from the **Process Cases** table to select a Case. The diagram appropriate to the selected Case will appear in the **Process Cases View**.

2. ⌐🖰 Click the **Generate** tool button [G→] on the **Process Cases** toolbar. The **Process Name** dialog box appears (see figure below).
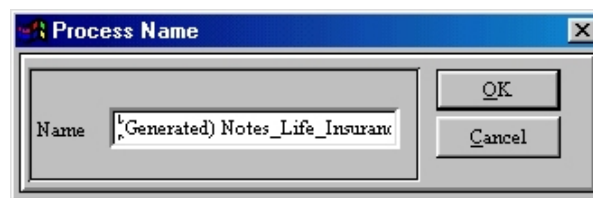
3. Type the name of the Case in the **Name** edit box.

4. Click **OK** or ⌨ press **Enter**. The **Generated Case** window for the selected Case appears.

1.1.4   Working with Generated Case Activity Decision Flow Diagrams

Activity Decision Flow Diagrams for Generated Cases are very similar to Activity Decision Flow Diagrams for Processes. The only difference between the two types of diagrams is the absence or presence of the Decision objects and their associated Choice objects. The diagram for a Process may or may not include Decisions, Choices, Go To objects, and Process objects; the diagram for a Generated Case can not include these objects.

The environment inside the Activity Decision Flow Diagram window resembles a drawing board. Workflow•BPR formats the drawing area of the Activity Diagram Window with a grid, dividing the drawing area into columns, rows, and cells. The ADF toolbar is located just below the title bar. The ADF toolbar holds all the tools required to manipulate your Generated Cases diagrams. Workflow•BPR allows for positioning of the toolbar along the sides or anywhere inside of the drawing area. Below the ADF toolbar is the drawing area. Workflow•BPR automatically formats your drawing area into grid rows and columns and permits you to place one object inside each grid cell.

1.1.4.1   The Generated Case ADF Toolbar

A list of the tools appearing in the ADF Toolbar for a Generated Case (with their detailed descriptions and main usage) includes:

- **Pointer Tool**: This button resembles a pointing hand. When the Pointer tool is selected, the cursor will also resemble a pointing hand. Use the Pointer tool to select or move single or multiple objects in a diagram. When you double-click on an object using the Pointer tool, Workflow•BPR opens the dialog box for that particular object. The object dialog box is where definition objects are connected with the information in the Repository. You can also use the Pointer tool to insert and delete columns or rows in your diagrams.

  ✍ **If you have selected a drawing object tool, you can switch to the Pointer tool by performing a right mouse click on the drawing.**

- **Connector Tool:** This button looks like an arrow. When you select the Connector tool, the cursor will resemble a plus sign with an arrow in the upper right-hand quadrant. Use this tool to link sequentially the objects in your Activity Decision Flow Diagrams. Objects can only be connected from left to right in a diagram.

- **Task Tool:** This button resembles a rounded rectangle. When you select the Task tool, the cursor will look like a plus sign with a rounded rectangle in the upper right-hand quadrant. Use the Task tool to insert a Task into your Activity Decision Flow Diagrams.

- **Phi Tool:** This button looks like a Greek letter Phi (ϕ). When you select the Phi tool, the cursor will resemble a plus sign with the Greek letter Phi (ϕ) in the upper right-hand quadrant. Use the Phi tool to insert a Phi—the input/output between activities—in your Activity Decision Flow Diagrams.

- **External Entity Tool:** This button looks like an oval. When you select the External tool, the cursor will resemble a plus sign with an oval in the upper right-hand quadrant. Use the External Entity tool to insert External Entities and External Processes into your Activity Decision Flow Diagrams.

- **Zoom-Out Tool:** This button resembles a magnifying glass with a minus sign within it. Use this tool to reduce the scale of your Activity Decision Flow Diagram. Each time the Zoom-Out tool is clicked, the scale of your diagram is reduced by one increment.

- **Zoom-In Tool:** This button resembles a magnifying glass with a plus sign within it. Use this tool to increase the scale of your Activity Decision Flow Diagram. Each time the Zoom-In tool is clicked, the scale of your diagram is increased by one increment.

- **Undo Tool:** This button resembles a curved arrow. Use the Undo tool to cancel your last action. Workflow•BPR has one level of undo.

- **Mini-View Tool:** This button resembles a magnifying glass. Use the Mini-View tool to open a window containing a miniature view of your open Activity Decision Flow Diagram.

- **Validate Tool:** This button resembles a checkmark. Use this tool to validate whether or not you have constructed an Activity Decision Flow Diagram.

- **Info Tool:** This button looks like a ruler. Use this tool to obtain information about the selected diagram.

- **Print Tool:** This button looks like a printer. Use this tool to open the **Print** dialog box for printing. Refer to Section 6.7.4 of Chapter 6 of the *User's Guide*.

- **Print Preview Tool**: This button resembles sunglasses. Use the Print Preview tool to access the **Print Preview** window. The toolbar on the Print Preview screen is described in the next section. Refer to Section 6.7.4 of Chapter 6 of the *User's Guide*.

1.1.4.2 Working with Generated Cases Statistical Information

Once an Activity Decision Flow Diagram has been created for a Generated Case, a quick summary of its basic general and statistical information can be viewed by choosing the Info command from the Process menu.

The attributes used to define a Generated Case are divided into eight (8) categories. These eight (8) categories are separated into tabs in the dialog box used to define a Case. The Editing Mode will affect the appearance of the Info dialog box. The following table shows the tabs of the Info dialog box and which Editing Modes the tabs will appear.

Tab/ Editing Mode	Basic	IBM FlowMark	IBM MQ Workflow	FileNet Visual WorkFlo	Line of Visibility	E-Commerce	Advanced
General	✓	✓	✓	✓	✓	✓	✓
Details	✓			✓	✓	✓	✓
Cost	✓			✓	✓	✓	✓
Schedule	✓	✓	✓	✓	✓	✓	✓
Fields		✓	✓	✓	✓	✓	✓
Process Settings				✓			
Activity Settings				✓			
Notes	✓	✓	✓	✓	✓	✓	✓

The eight (8) tabs of the Info dialog box for a Generated Case are:

- **General**: *This tab is present in all Editing Modes* and allows you to select a Task from the Repository or to create a new Process. You can also add or update Process Attribute - Locked.

- **Details**: *This tab is not available in the FlowMark and MQ Workflow Editing Modes*. It displays statistics about object frequency in the Process, allows you to assign a Procedure to the Process, allows you to define the frequency that the Process is performed by the organization (Process Volume), and displays the Roles that are used in the Generated Case. For each Role in the table you can specify:

  ∗ The percentage of allocated Employees who work on the Process, and

  ∗ The number of Hours per Year that the Role is available for work.

- **Costs**: *This tab is not available in the FlowMark and MQ Workflow Editing Modes*. It displays Weighted Average cost information and allows you to enter new data. The items that are displayed are as follows:

∗ **Process Cost**: This is the Weighted Average Process Cost of the Process. A calculation of the averages must be performed before this field displays data. Refer to Chapter 2 for more information about Weighted Averages.

∗ **Indirect Cost**: This displays the Indirect Cost associated with the Process. This is calculated from the itemized list of Additional Costs that can be entered in this tab (see below). The Additional Cost Items of Type Indirect are factored by the Number Required and the Burden Percentage assigned to them. The total amount is then divided by the Process Volume—as entered in the Details tab of the Info dialog box.

∗ **Total Cost**: This is the total of Process Cost plus Indirect Cost.

∗ **One-Time Cost**: This displays the One-Time Cost associated with the Process. This is calculated from the itemized list of Additional Costs that can be entered in this tab (see below). The Additional Cost Items of Type One-Time are factored by the Number Required and the Burden Percentage assigned to them. The total amount is then displayed.

∗ **Burden Percentage**: This value is calculated by factoring the amount of Resource time required vs. the amount of Resource time available. Refer to the Glossary of the *User's Guide* for the exact formula for the Burden Percentage. This number can be used as a reference for the Burden Percentage assigned to One-Time and Indirect Cost items in the Additional Costs table.

∗ **Discount Rate**: This value is used for calculating the Net Present Value and Internal Rate of Return for the Process. These two calculations appear in the Process Redesign Report (refer to Chapter 6 of the *Reporting Guide* for more information on the Process Redesign Report).

∗ **Payback Duration**: This value is used for calculating the Net Present Value and Internal Rate of Return for the Process. These two calculations appear in the Process Redesign Report (refer to Chapter 6 of the *Reporting Guide* for more information on the Process Redesign Report).

∗ **Additional Costs**: This table allows you to enter an itemized list of additional costs that should be applied to the Process.

   – **Number Required**: Specifies the number of the Resource that should be assigned to the Process. The cost of the Resource will be multiplied by the Number Required.

   – **Burden (%)**: Specifies the percentage that the Process utilizes the Resource (in relation to other Processes) and therefore should be burdened with the cost of the resource. The Cost of the resource will be multiplied by this percentage.

   – **Type**: There are two types of Additional Costs: One-Time and Indirect. These two types of items will be separated for display in One-Time Cost and Indirect Cost sections of this dialog box.

- **Schedule**: *This tab is present in all Editing Modes, but is only available for Generated Cases*. The tab displays the Process type, Process name, and schedule information about the critical path. It allows you to change both the start date of the Process and the basis for calculating the schedule (Elapsed Duration or Working Duration). In addition, the Choices that were made to create the unique path of that Generated Case.

- **Fields**: *This is not available in the Basic Editing Mode* and it allows you to define the Input Container and Organization Chart Data Structures for IBM FlowMark or MQ Workflow, and allows you to define a list of Data Fields for the Process that can be used for either application development or workflow engines such as FileNet Visual WorkFlo.

- **Process Settings**: *This is only available in the MQ Workflow Editing Mode*.

- **Activity Settings**: *This is only available in the MQ Workflow Editing Mode*.

- **Notes**: *This tab is present in all Editing Modes* and displays the Process type and name. It also contains a text box for adding notes concerning the Process.

1.1.4.3   Using the Information Dialog Box

To access the Information dialog box of an active diagram:

1. ☝ Choose **Info** ⬛ from the **Process** menu or ☝ click the **Info** tool button on the **ADF** toolbar. Workflow•BPR displays the **Info** dialog box.

2. Continue in one of the eight (8) available tabs, which are available depending on the Editing Mode you are currently using. The tabs are described in the next eight (8) sections.

General

This tab is present in all Editing Modes. To access the General tab of the
Information dialog box of an active diagram (shown below in the Basic Editing
Mode):

1. ✆ Click the **General** tab at the top of the **Info** dialog box (see the figure
    below). This tab displays the Process name and allows you to set an
    Organization Unit, Role, Function, and Owner settings for the Process. If
    you are in an Editing Mode other than the Basic Editing Mode, additional
    settings will be available as needed. These settings are documented below.
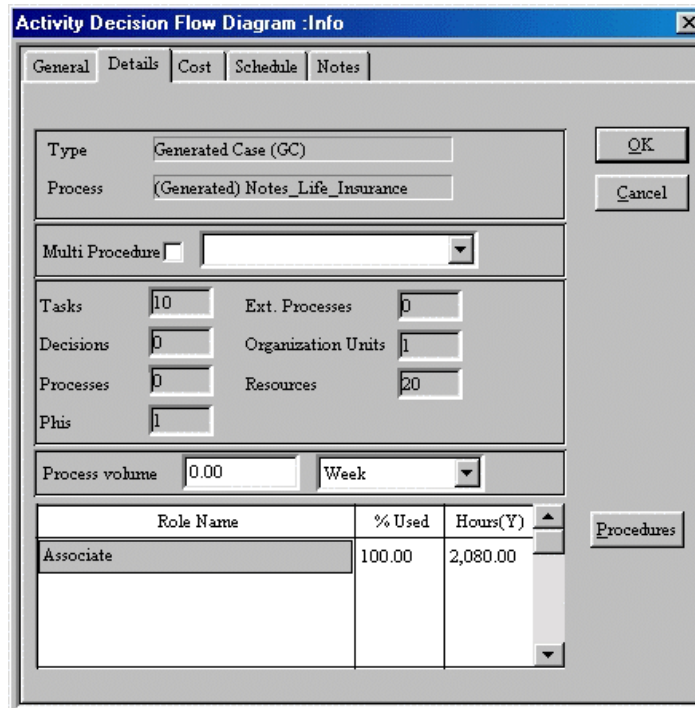

2. To rename a Process, ⌨ edit the Process name in the **Process** text box.

3. To lock-out the Process from accepting Repository data during a broadcast,
    ✆ click on the **Lock** check box.

4. ✆ Select the Organization Unit responsible for the Process from the
    Organization Unit selection box.

    *   If the unit you want is not included on the list, then you need to create it.
        ✆ Click the **Org. Unit** Go To button to access the Repository
        Organization Units dialog box in order to create the item (refer to the
        section entitled "Organization Units" in Chapter 2 of the *User's Guide*).
        Upon returning to the **Info** dialog box, the new item(s) will be included
        on the list.

5. ⊕ Select the Role responsible for overseeing the Process from the **Role** selection box.

    ∗   If the Role you want is not included on the list, then you need to create it. ⊕ Click the **Resources** Go To button to access the Repository **Resources** dialog box in order to create the item (refer to the section entitled "Resources" in Chapter 2 of the *User's Guide*). Upon returning to the **Info** dialog box, the new item(s) will be included on the list.

6. To add or change the Function associated with the Process, ⊕ choose a Function name from the **Function** combo box.

    ∗   If the Function you want is not included on the list, then you need to create it. ⊕ Click the **Function** Go To button to access the Repository **Functions** dialog box in order to create the item (refer to the section entitled "Functions" in Chapter 4 of the *User's Guide*). Upon returning to the Info dialog box, the new item(s) will be included on the list.

7. To add or change the Owner associated with the Process, ⊕ choose an Owner name from the **Owner** combo box.

8. The settings for **Process ID**, **Administrator**, **Endless Duration, Input Container**, **Audit Trail**, **Staff Inherited**, **Prompt at Start, Terminate on Error**, **Return Code Setting**, **Staff Predefined**, and **Input Container** are used only for workflow engines. These items do not apply to a Generated Case.

✍ **These settings are not available in the Basic Editing Mode.**

9. When finished with this tab, ⊕ click OK or ⌨ press Enter to close the dialog box or you can continue in another tab.

Details

This tab is not available in the FlowMark and MQ Workflow Editing Modes. To access the **Details** tab of the Information Dialog Box of an active diagram (shown below in the Basic Editing Mode):

1. ⏚ Click the **Details** tab at the top of the **Info** dialog box (see the figure below). This tab displays details about the Process (e.g., the number of Tasks within the Process).

2. If the Process contains Tasks that appear in more than one (1) Procedure, then ⏚ select the **Multi-Procedure** check box.

3. If the Process is designed to document the activities of a single Procedure, then ⏚ select the Procedure from the selection box next to the Multi-Procedure check box.

    ∗ If the Procedure you want is not included on the list, then you need to create it. ⏚ Click the **Procedures** Go To button to access the Repository **Procedures** dialog box in order to create the item (refer to the section entitled "Procedures" in Chapter 4 of the *User's Guide*). Upon returning to the Info dialog box, the new item(s) will be included in the list.

4. To change the Process Volume of the Process, ⌨ type the appropriate value in the **Process Volume** text box, and then ⌂ select the appropriate time unit from the **Process Volume** selection box.

5. To modify data for the Roles listed in the Role Table (the Roles in the list are derived from the activities in the Process and do not have to be entered):

   * In **Line 1** of the **Role** table, ⌂ click on the cell within the **% Used** column. ⌨ Modify the % Used value if some of Employees allocated to the Organization Unit do not work on the Process. This basically creates the number of Full-Time Equivalents Employees working on the Process.

     – The default value is 100%.

   * ⌂ Click on the cell within the **Hours(Y)** column. ⌨ Modify the Hours per Year value if the Role works more or less than 2080 hours per year.

     – The default value is 2080 hours per Year.

✍ **You can use the Shift+Arrow keys to navigate the editing cursor through the Role table.**

6. Repeat Step 5 to modify the data associated with other Roles in the Roles table.

7. When finished with this tab, ⌂ click **OK** or ⌨ press **Enter** to close the dialog box, or continue in another tab.

Cost

This tab is not available in the FlowMark and MQ Workflow Editing Modes. To access the Costs tab of the Information dialog box of an active diagram (shown below in the Basic Editing Mode):

1. 🖑 Click the **Costs** tab at the top of the **Info** dialog box (see the figure below). It displays the Process type, Process name, Per process cost, Total cost, Discount Rate, and Payback Duration.

2. The **Costs** tab allows you to include **Additional costs**, in the overall process.

   ∗ A calculation of the Weighted Averages must be performed for the Process that was the source of the Generated Case. 🖑 Click the **Calc.Ave.** button to bring up the **Calculate Averages** dialog box. Refer to Chapter 2 for more information about calculating averages.

   ∗ If the Weighted Averages have not been calculated, the letters "N.A." will appear in the **Process Cost**, **Indirect Cost**, **Total Cost**, and **Burden Percentage** sections of the dialog box.

3. If you want to enter a Burden Percentage other than the one calculated through the Weighted Averages, then ⌨ type the Burden Percentage in the **Burden Percentage (Weighted Average)** text box.

   ∗ To reset the Burden Percentage back to the one calculated through the Weighted Averages, click the **Reset** button.

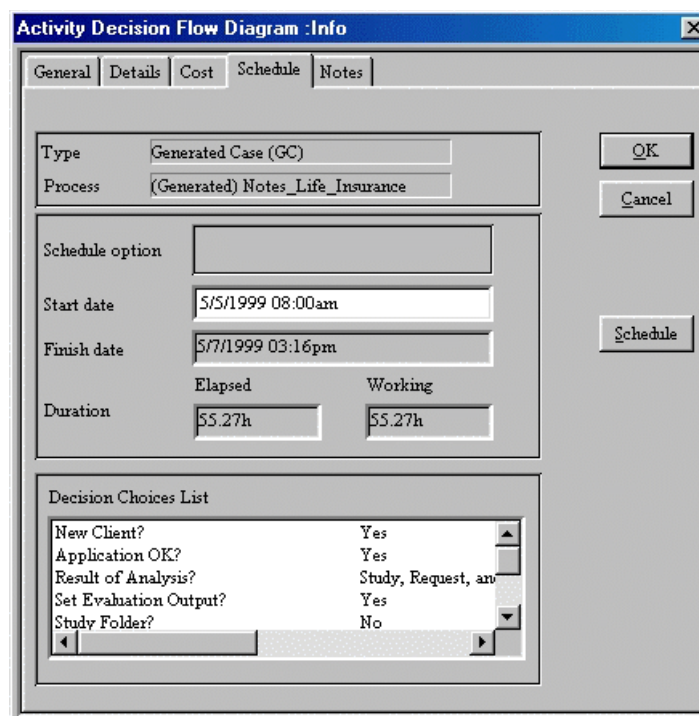4. To change the Discount Rate of the Organization, ⌨ type the new value in the **Discount Rate** text box.

    ∗   This value can also be entered in the Organization Info dialog box (refer to the section entitled "Organization Info" in Chapter 2 of the *User's Guide*).

5. To change the Payback Duration of the Process, ⌨ type the appropriate value in the **Payback Duration** text box, and then 🖰 select the appropriate time unit from the **Payback Duration** selection box.

6. To add Additional Cost Items for the Process:

    ∗   In **Line 1** of the **Additional Costs** table, 🖰 click on the **Arrow** button that is on the right side of the **Resource Name** column. A list of Resources and Applications will appear.

    ∗   🖰 Select the appropriate **Resource** or **Application**.

        –   If the Resource you want is not included in the list, then you need to create it. 🖰 Click **Resource** to go to the **Resources** dialog box (refer to the section entitled "Resources" in Chapter 2 of the *User's Guide*). Upon returning to the **Info** dialog box, the new item(s) will be included on the list.

        –   If the Application you want is not included in the list, then you need to create it. 🖰 Click **Application** to go to the **Applications** dialog box (refer to the section entitled "Resources" in Chapter 2 of the *User's Guide*). Upon returning to the **Info** dialog box, the new item(s) will be included on the list.

    ∗   ⌨ Type in a number of the Resource or Application that is utilized by the Process in the **Num.Req.** column.

        –   The default value is 1.

    ∗   ⌨ Type a Burden Percentage for the Resource or Application in the **Burden(%)** column.

        –   The default value is 100%.

    ∗   🖰 Click on the cell within the **Type** column. A list selection box will appear in the cell.

    ∗   🖰 Click on the **Arrow** button that is on the right side of the **Type** column. A list of the Additional Cost types and will appear.

    ∗   🖰 Select either Indirect or One-Time for the type of the Additional Cost.

✍ **You can use the Shift+Arrow keys to navigate the editing cursor through the Additional Costs table.**

7. 🖰 Repeat step 6 to add other Resources or Applications to the list.

    ∗   Use the **Delete Row** button to delete Resource Name entries.

8. When finished with this tab, 🖰 click **OK** or ⌨ press **Enter** to close the dialog box, or you can continue in another tab.


Schedule

This tab is present in all Editing Modes but is only available for Generated Cases.
To access the Schedule tab of the Information dialog box of an active diagram
(shown below in the Basic Editing Mode):

1. ⤳ Click the **Schedule** tab at the top of the **Info** dialog box (see the figure
    below). *This tab is available only for Generated Cases.* It displays the
    Process type, Process name, and schedule information about the critical path.
    The tab also allows you to change the start date of the Process and the basis
    for calculating the schedule (Elapsed Duration or Working Duration). It also
    displays the Decisions Choices that were made to create the unique path of
    that Generated Case.

2. To use the Elapsed Duration of the Tasks to generate the length of the critical
    path, ⤳ click the **Elapsed** radio button. This is the default setting.

    ∗   Not available in the **Basic Editing Mode**

3. To recalculate the duration of the critical path and update schedule
    information (Finish Date, Elapsed Duration, and Working Duration), ⤳ click
    the **Schedule** button.

4. When finished with this tab, ⤳ click **OK** or ⌨ press **Enter** to close the
    dialog box, or you can continue in another tab.

Fields

This is not available in the Basic Editing Mode. To access the Fields tab of the Information Dialog Box of an active diagram (shown below in the Advanced Editing Mode):

1. 🖰 Click the **Fields** tab at the top of the **Info** dialog box (see the figure below). It displays the Process type, Process name, and schedule information about the critical path. The tab also allows for changing the start date of the Process and the basis for calculating the schedule (Elapsed Duration or Working Duration).

2. In **Line 1** of the **Data Field** box, 🖰 click on the Arrow button that is on the right side of the **Data Field** column. A list of Data Fields and Structures will appear.

   * 🖰 Select the appropriate Data Field or Data Structure.

   * If the Data Field you want is not included in the list, then you need to create it. 🖰 Click **Fields** to go to the **Data Fields** dialog box (refer to the section entitled "Data Fields" in Chapter 3 of the *User's Guide*). Upon returning to the **Info** dialog box, the new item(s) will be included on the list.

   * ⌨Type in an initial value for the Data Field in the Value column.

     – If the Data Field is of type Float, then the Data Field can be used as a Financial Variable for a Financial Transaction in one of the Tasks of the Generated Case.
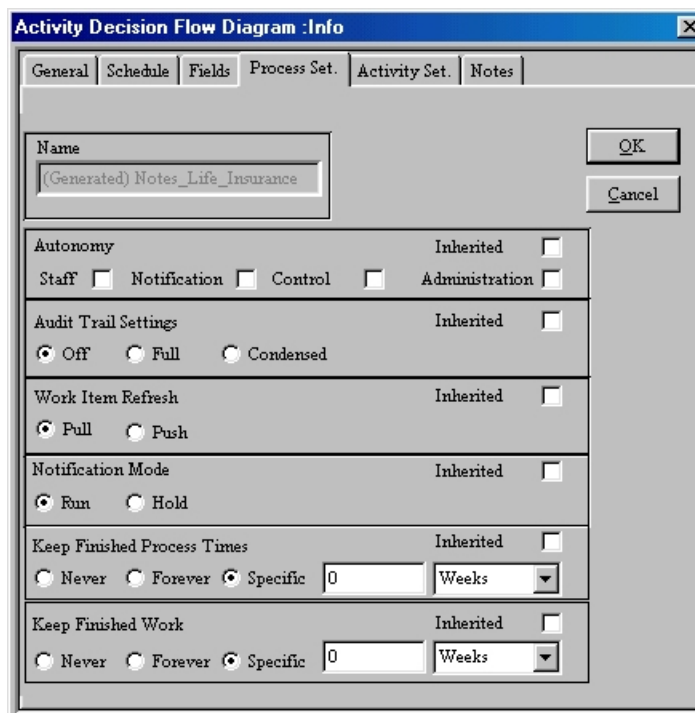
3. ✋ Select a Currency from the selection box in the **Currency** column.

4. ✋ Repeat step 2 to add other Data Fields or Data Structures to the list.

   ∗   Use the **Delete Row** button to delete Data Field entries.

5. The settings for **Export Type**, **Application**, **Input Structure**, and **Output Structure** are used only for workflow engines. These items do not apply to a Generated Case.

6. When finished with this tab, ✋ click **OK** or ⌨ press **Enter** to close the dialog box, or you can continue in another tab.

Process Settings

This tab is only available in the MQ Workflow Editing Mode. To access the Process Settings tab of the Information dialog box of a Generated Case (shown below in the IBM MQ Workflow Editing Mode):

1. ✋ Click the **Process Set.** tab at the top of the **Info** dialog box (see the figure below). This tab allows you to specify settings that apply to the Process control functions that exist in MQ Workflow (refer to Chapter 3 of the *Integration with Workflow Applications Guide* for more information).

2. When finished with this tab, ✋ click **OK** or ⌨ press **Enter** to close the dialog box, or you can continue in another tab.

Activity Settings

This tab is only available in the MQ Workflow Editing Mode. To access the Activity Settings tab of the Information dialog box of a Generated Case (shown below in the IBM MQ Workflow Editing Mode):

1. ⅊ Click the **Activity Set.** tab at the top of the **Info** dialog box (see the figure below). This tab allows you to specify settings that apply to the Activity control functions that exist in MQ Workflow (refer to Chapter 3 of the *Integration with Workflow Applications Guide* for more information).

2. When finished with this tab, ⅊ click **OK** or ⌨ press **Enter** to close the dialog box, or you can continue in another tab.

Notes

This tab is present in all Editing Modes. To access the Notes tab of the Information dialog box of a Generated Case (shown below in the Basic Editing Mode):

1. ⊕ Click the **Notes** tab at the top of the **Info** dialog box (see the figure below). This tab displays the Process type and the Process name. It also contains a text box for adding notes about the Process.
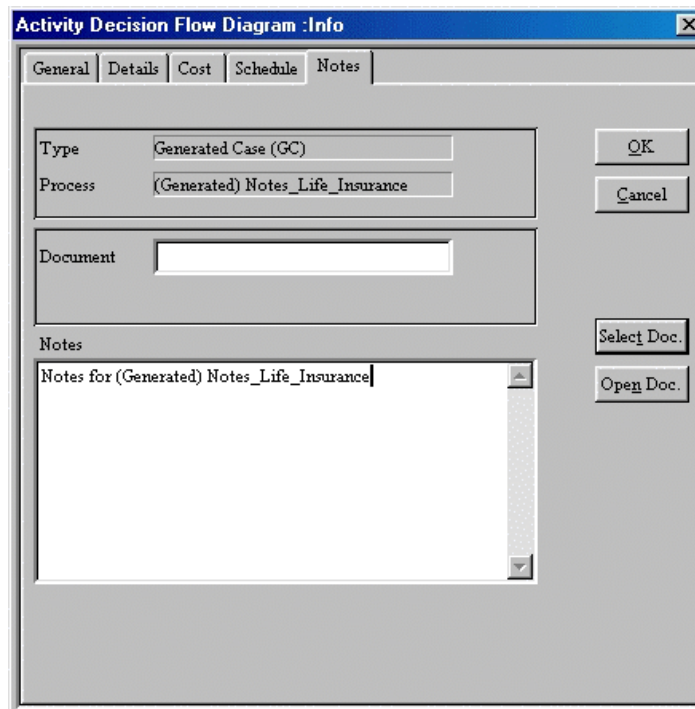
2. To identify a word processing document that you want associated with the Generated Case, ⊕ click the **Select Doc**. button. The **Select Path** dialog box is opened.
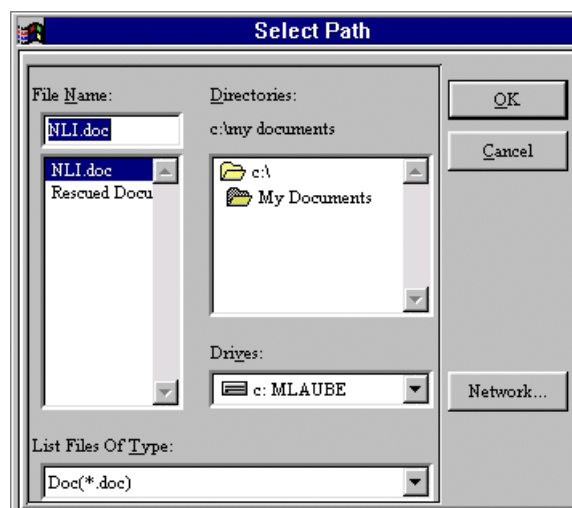
∗ Click **OK** after you locate the document. When you return to the **Info** dialog box, the selected filename will be placed in the **Document** text box.

3. To open the document associated with the Process, ⌐ click the **Open Doc**. button.

∗ The document will be opened with your default word processing application.

4. To add or update notes about the Generated Case, ⌨ type in the Notes text box.

∗ If you want to add a **Carriage Return** to the text of your Notes, then ⌨ type **Ctrl+Enter**.

5. When finished with this tab, ⌐ click **OK** or ⌨ press **Enter** to close the dialog box, or you can continue in another tab.

# Chapter 2: Weighted Average Analysis

W eighted Average Analysis is one of the two major methods of analyzing a Process. The other method is Process Simulation, which is discussed in Chapter 5. Weighted Average Analysis averages the time and cost data from each Case of the Process. This analysis takes into account every possible Case that can occur as the Process is performed over time (refer to the section entitled "Case Analysis" on page 1-1). A Weighted Average Analysis does not take into account the variations in the rate of input or in Resource Allocations. Also, a Weighted Average Analysis does not provide information about the loading of Queues. Process Simulation does take into account the variations in the rate of input or in resource allocations and also provides analysis of the loading of queues. However, Process Simulation only provides results based on a limited set of Cases that were simulated through a random selection of Choices.

A *Weighted* Average is created because the data from each Case is not treated equally. Cases that have a high probability of occurrence will have a greater weight than Cases that have a low probability of occurrence. In fact, the probability itself is the weight of the Case. That is, the time and cost of the individual Cases are multiplied by the percentage of the Case to give a weighted value for the time and cost. Then the weighted values of all the Cases are added up to give a Weighted Average for the time and cost of the whole Process.

Weighted Average Analysis

To make this clearer, we can follow the example that was used in the section entitled "How the Cases of a Process are Determined by Workflow•BPR" in Chapter 1. That example described a company that had two products: Product X and Product Y. Product X came in two colors: red and green. Thus, there are three (3) possible ways of fulfilling a customer order for a product (i.e., there are three Cases). To fill an order for Product X (either color) costs the company $20. To fill an order for Product Y costs the company $15. The company wants to know how much this Process will cost on average, over time. The table below presents the three Cases. It shows the probability of the Cases and how much they cost.

Case #	Probability	"Product X or Y?" Decision Choice	"Red or Green?" Decision Choice	Cost	Weighted Cost
1	48%	"Product X"	"Red"	$20.00	$9.60
2	32%	"Product X"	"Green"	$20.00	$6.40
3	20%	"Product Y"		$15.00	$3.00
Total/Weighted Average	**100%**				**$19.00**

The last column shows the weighted cost of the three (3) Cases. For Case 1, which is a red version of Product X, the weighted cost is the percentage (48%) multiplied by the cost ($20.00) to give a value of $9.60. The weighted costs of the other two (2) Cases are calculated the same way. The Weighted Average cost of the Process is equal to the sum of the weighted cost for each Case. In this example, taken from the last column of the table, it would be $9.60 plus $6.40 plus $3.00, which equals $19.00.

Another way to calculate the Weighted Average is to assume you have a set number of orders for the company (we will use 100 orders). Using the percentages of the Cases, we can determine how many of the 100 orders will be for each Case. Of the 100 orders, 48 of them will be for Case 1—the red version of Product X, 32 will be for Case 2—the green version of Product X, and 20 will be for Case 3—Product Y. Case 1 costs $20 each time and 48 orders will cost a total of $960. Case 2 costs $20 each time and 32 orders will cost $640. Case 3 costs $15 each time and 20 orders will cost $300. Therefore, the total cost of 100 orders will be $960 plus $640 plus $300, which is equal to $1900. Divide the total cost by the number of orders ($1900 divided by 100), then you will get an average cost of $19 per order.

In Workflow•BPR, you can view the results of a Weighted Average Analysis with the Reports feature. The Reports are tables that present weighted value of a set of attributes (e.g., cycle times) for each individual Case of the Process and/or the Weighted Average of the attributes for the entire Process. Before you can view the Reports, Workflow•BPR will have to run the calculations for the Weighted Averages. You can initiate the calculations of the Weighted Averages through the Calculate Averages dialog box.

2.1   The Calculate Averages Dialog Box

The following fields are present in the Calculate Averages dialog box:

- **Process Name:** If a Process is active when the Create Report dialog box is opened, then that Process will be selected from the list. Otherwise, a Process can be selected and the report created will apply to that Process.

- **Start Time:** This will set the time and date for the schedules that will be created for the Cases and used to calculate the cycle times.

- **Cumulative Percentage:** To restrict calculating averages to a certain set of Cases, a percentage of the Cases you want to select can be ⌨ typed in, given that the Cases are in descending order with respect to Case probability. For example, 90% means that Workflow•BPR will choose the Cases that have a combined probability of 90%. Because the Cases are in descending order, the Cases that are chosen will have the highest probability and the Cases that are not chosen (the bottom 10%) will have the lowest probability. This feature is useful if your Process has many Cases and you want a quick estimate of the Weighted Averages. Usually there are many Cases with a very low percentage; by not selecting these Cases, the calculation of the averages will proceed much faster.

2.2   Calculating Averages

To calculate the Weighted Averages of a Process:

1. ⌐ Choose the **Calculate Averages** command from the **Reports** menu. The **Calculate Averages** dialog box appears (see the figure below).
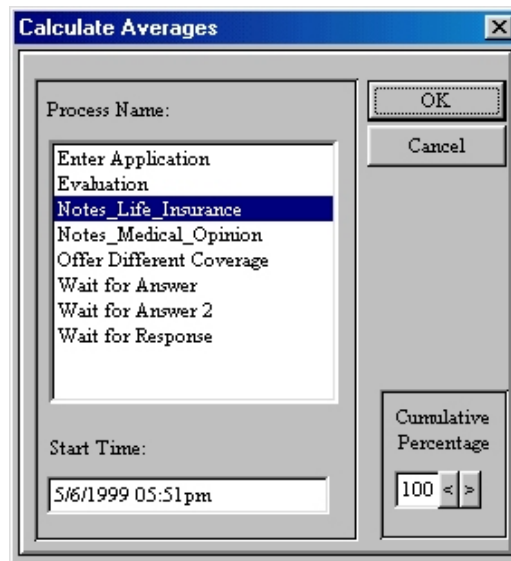

2. ⌐ Select a Process from the **Process Name** list.

    ∗   More than one Process can be selected. Each ⌐ click on a Process name on the list will select or deselect that Process.

3. To define a cumulative percentage of the Cases you want to consider for calculation, ⌨ type a percentage in the **Percent** text box (the default is 100% of the Cases).

4. ⌐ Click **OK** or ⌨ press **Enter**.

    ∗   When there are previously calculated averages on a selected Process, Workflow•BPR presents a warning that displays the time and date that the calculation was performed. ⌐ Click Yes to continue or No to cancel the calculation.

∗   A **Calc. Average of Process** dialog box appears which displays a
    thermometer showing the progress as the Cases are added to the
    calculation (see the figure below). To terminate the calculation, ⊕ click
    Cancel.
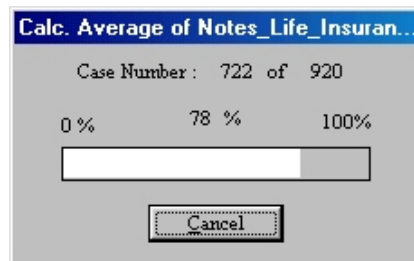
∗   If there are Cases that have 0%, after Calculate Averages has been
    completed, a message box will appear that will indicate the number of
    Cases that are skipped due to Cases that have 0% (see the figure below).
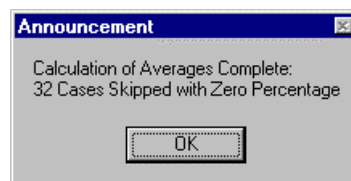
∗   Cases can have 0% because there are Choices in the model that are 0%,
    or there are Cases that have very low probability (less than
    0.0000000001%).

∗   If you select less than 100% of the cumulative percentage of the Cases,
    after Calculate Averages has been completed, a message box will appear
    that will indicate the number of Cases that were used and the total
    percentage that those Cases represent (see the figure below).
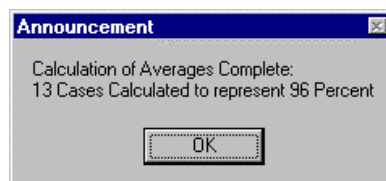
? **The data calculations may require extended time (from a few seconds to
   30 minutes or more). The more Cases that apply to a Process, the longer
   it will take.**

2.3   Reviewing Weighted Average Reports

Workflow•BPR generates reports that summarize the measurements which can be made on the representation of a Process. Workflow•BPR generates 37 reports that are grouped into five (5) categories: Time, Costs, Classifications, Indices, and General. These categories group the Reports by content, as indicated by the name of the category (e.g., Time, Costs). Refer to the Glossary for more details on the formulas used to create these reports.

A report is represented by a table. The columns of the table represent a set of measurable attributes; e.g., Elapsed Cycle Time, Transfer Time, and Cost. In the majority of the reports, the rows represent either the Cases or the Process itself. The type of attribute depends on which report is selected.

To open a report:

1. ⌐ Choose a report type (**Time, Costs, Classifications, Indices**, or **General**) from the **Reports** menu. A sub-menu appears.

2. ⌐ Choose a report (e.g., **Cases Cycle Times**). The **Weighted Average Reports** dialog box appears (see the figure below).

3. ☝ Select a Process from the **Process Name** list (if it has not already been selected).

    ∗   If the **Averages Were Calculated On** box says "No Report File," ☝ click **Calc. Averages** and follow the instructions in the previous section.

4. To open more than one report, ☝ click to select another report from the **Report Name** list.

    ∗   More than one Report can be selected. Each ☝ click on a Report name on the list will select or deselect that Report.

5. ☝ Click **OK** or ⌨ press **Enter**. The Report(s) will be opened.

Chapter 3: Simulation

P rocess Simulation is one of the two major methods used to analyze a Process. The other method is by means of a Weighted Average Analysis, which is discussed in Chapter 3. Weighted Average Analysis provides a static, long-term view of the Process, while Process Simulation captures a dynamic, short-term view. The two types of analysis compliment each other and give you a whole (holo) understanding (sofx) of the Process.

3.1 The Process Simulation Window

The Process Simulation window is where the Simulation of a Process is run and animated and where the results of the Simulation are reviewed. This window is divided into two parts: The Simulation view and the Simulation table.

Process Simulation enables you to view and examine how the Process would be performed in response to variations of input to the Process, just as in a real-life work environment. Process Simulation also enables the user to understand how the Process handles the volume of inputs based on the number of Resources that are allocated to perform the Process. The output of a Simulation provides detailed information regarding Resource Utilization Levels and Cost and Cycle Time calculations. The results change according to the length of the Simulation or the number of entries completed by the Process. You can set the initial conditions.

During a Simulation, Workflow•BPR dynamically generates a number of inputs into the Process. These inputs traverse the Process through one of its possible paths (variations). A Job is defined as the performance of the Process based on the receipt of one input. The number of Jobs is equal to the number of inputs. Throughout the performance of the Process during a Simulation, Resources are assigned to each Task as needed.

Workflow•BPR is also able to animate these events, as they occur, on the model that you have designed. The Simulation component of Workflow•BPR is designed to enhance your ability to analyze Process performance based on the variation of inputs over time and the availability of Resources to perform the Tasks as determined by the Resource allocation. With this type of analysis, you will be better able to improve Processes, since the results of the Simulation provide an enhanced understanding of the interaction between different events occurring in the Process simultaneously.

Simulation

A Simulation tracks the status of Jobs as they pass through the Process. A Job is begun either by a set of inputs (Phis), an External Entity, or by a Task performed by the organization that creates Phis. As Phis move through the Process, they are placed into "In-Baskets," or Task Queues, when the Resource needed to act upon them is busy with another Task or Job. If the required Resources are not available, then the inputs of this Task will accumulate in the Queues. The detection of a large number of items in the Queues helps in determining potential bottlenecks and the circumstances surrounding them. If there is nothing ahead of the Job in the Queue and the Resources that are assigned to the Task are available, then the Phis are pulled out of the Queue and are moved to the Task to be worked on. In reality, the Queue resides at the Resource even though it is displayed next to each Task. Phis from many different Tasks, and from many different Jobs, can be in the Queue of the Resources. The Resource will choose the Phi that has been in the Queue the longest (First In, First Out) and, thus, begins and ends the Task for that item. From the perspective of the Process, the output of the Task is then sent to the next Task in the sequence as they were connected (and will be placed in the Queue). The activities of a Process will continue until a Decision is reached; then a Choice is randomly selected based on the user-defined probabilities of the Choices. The Job continues until there are no more activities to be performed on the Phis associated with the Job.

You can control the availability of Resource for activities by changing how they are distributed to the Organization Units. For example, if the Sales Order Activity uses one Resource clerk, and the activity takes place in the Sales Department, a particular number of clerks can be allocated to the Sales Department. In addition, if many Sales Orders come in simultaneously, you may wish to allocate a larger number of clerks to the Sales Department in order to avoid bottlenecks and under-staffing. However, if Sales Orders decline, the number of clerks allocated to the Sales Department can then be decreased in order to avoid over-staffing.

During the Simulation period, Workflow•BPR gathers data related to the Jobs, Queues, and Resources involved in performing the Tasks. As the data is gathered, a summary of useful information is provided during run-time that can be viewed in several tables. These outputs are exportable to MS-Excel for further analysis.

Performing effective Process Simulation Analysis involves four steps. First, the Process Simulation window is accessed. Then, the initial conditions of your Process Simulation session are set, although the initial default conditions are sufficient to run a Simulation. Then, when the Simulation is completed, the Simulation Analysis results can be reviewed. The last step involves performing a "What-If" Analysis by changing the initial conditions and re-running the Simulation until a satisfactory condition is met.

To open the Process Simulation window, it is necessary to go through an intermediate window first. This intermediate window, called the Expanded Process window, displays an expanded version of your Process. The Process is expanded if it contains Process Objects. All the activities in the lower-level Processes (as represented by the Process Objects) will be brought up to the top-level.

To open the Process Simulation window:

1. ⊕ Click on the **Expand Process** tool button on the **Process ADF** toolbar. The **Expanded Process** window appears.

2. ⊕ Click on the **Simulation** tool button on the **Expanded Process** window toolbar. The **Process Simulation** window appears.

3.1.1   The Process Simulation View

The upper section of the Process Simulation window is the Process Simulation view, which displays the expanded Process (the same view that appears in the Expanded Process window, except that "In Basket" icons are placed in front of the Tasks to represent the Task Queues). This window section provides a passive view in which icons can only be moved and rearranged; the content of this section can neither be edited nor analyzed. The toolbar for the Process Simulation view controls the starting, pausing, stopping, and initial conditions of the Simulation.

You can watch an animated view of the Process while the Simulation is running. You can see the status of inputs throughout the Simulation by watching the bitmaps that represent inputs moving from one activity to another. You can also see when a Resource begins to work on a Task by watching the bitmaps that represent the Resources descending down to Task Objects. You can see the Queues build-up as inputs enter the "In-Baskets" of Tasks. The number of Queue Items in the Queue is presented below the "In-Basket." Finally, you can see the status of a Task by its color as it changes from Waiting for a Resource to Working to Done. In the upper left-hand corner of the Task Object, you can see the number of inputs that the Task is working on simultaneously.

3.1.1.1 The Process Simulation View Toolbar

The Process Simulation view toolbar contains, in order, the following tools: Pointer, Zoom-Out, Zoom-In, Step, Run, Pause, Stop, Simulation Setup, Down, Up, and Exit.

The tools of the toolbar are:

- **Pointer Tool:** Resembles a pointing hand. When the tool is ⌐ᵇ selected, the cursor will also look like a pointing hand. Use the Pointer tool to ⌐ᵇ select or move single Objects in a Diagram. You can use the Pointer tool to insert and delete columns or rows in your Diagrams.

- **Zoom-Out Tool:** Resembles a magnifying glass with a minus sign within it. Use this tool to reduce the scale of the drawing in the Process Simulation view. Each time the Zoom-Out tool is ⌐ᵇ clicked, the scale of your Diagram is reduced by one increment.

- **Zoom-In Tool:** Resembles a magnifying glass with a plus sign within it. Use this tool to increase the scale of the drawing in the Process Simulation view. Each time the Zoom-In tool is ⌐ᵇ clicked, the scale of your Diagram is increased by one increment.

- **Step Tool:** Resembles an arrowhead to the right a vertical line. Use the Run Step tool to run the Simulation step-by-step. Each time the tool is ⌐ᵇ clicked, the Simulation is advanced by one step.

- **Run Tool:** Resembles an arrowhead. Use the Run tool to run the Simulation continuously without user intervention. The Run tool will also continue a Simulation that has been placed in Pause or is in the Step mode.

- **Pause Tool:** Resembles two vertical lines. Use the Pause tool to pause a Simulation. If it is used a second time, the Simulation will start again. If the Pause tool is used after a Simulation has been stopped with the Stop tool, the Simulation can be re-started by the Run or Step tools.

- **Stop Tool:** Resembles a rectangle. Use the Stop tool to stop the Simulation. If this tool is used a second time, the Simulation data will be cleared.

- **Simulation Setup Tool:** Resembles a crystal ball. Use the Simulation Setup tool to set the initial conditions of the Simulation.

- **Exit Tool:** Has a picture of an arrow pointing to an open door. Use the Exit tool to leave this window and return to the Process Activity Decision Flow Diagram.
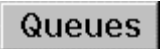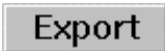
3.1.2   The Process Simulation Table

The lower part of the Process Simulation window is the Process Simulation table. The Process Simulation table toolbar has five buttons that allow for displaying different types of tables of simulated analyses: Jobs, Resources, Activities, Queues, and the Audit Trail. The tables can also be exported using a tool on the toolbar.

3.1.2.1   *The Process Simulation Table Toolbar*

The Process Simulation table toolbar contains tools in the following order: Jobs, Resources, Activities, Queues, Zoom-Out, Zoom-In, Export, and Preferences.

Job	Res.	Act.	Queues			🔍 🔍	Export	Preference

A list of the definitions for these tools follows:

- **Jobs Tool:** `Job` Has the word "Job" printed on it. Use this tool to view the Jobs table created during a Simulation session.

- **Resources Tool:** `Res.` Has the word "Res." Printed on it. Use this tool to view the Resources table created during a Simulation session.

- **Activities Tool:** `Act.` Has the word "Act." Printed on it. Use this tool to view the Tasks table created during a Simulation session.

- **Queues Tool:** `Queues` Has the word "Queues" printed on it. Use this tool to view the Queues table created during a Simulation session.

- **Zoom-Out Tool:** 🔍 Resembles a magnifying glass with a minus sign within it.   Use this tool to reduce the scale of the table in the Process Simulation table. Each time the Zoom-Out tool is 🖱 clicked, the scale of your table is reduced by one increment.

- **Zoom-In Tool**: 🔍 Resembles a magnifying glass with a plus sign within it. Use this tool to increase the scale of the table in the Process Simulation table. Each time the Zoom-In tool is 🖱 clicked, the scale of your table is increased by one increment.

- **Export Tool:** `Export` Has the word "Export" printed on it. Use this tool to export the Simulation Analysis tables of one session to Excel files.

- **Preferences Tool:** `Preference` Has the word "Preference" printed on it. Use this tool to set your Preference for the Time Unit reported for the Simulation.

3.2   Running a Simulation

3.2.1   Setting-Up Initial Conditions

Before running a Simulation, the initial conditions for your Simulation session can be set. The initial conditions are parameters such as Simulation Start Time, Job Generation Behavior, Resource Allocation Criteria, etc., which identify the general behavior of your system. These parameters can be set before each Simulation run. The Simulation Setup dialog box is used to modify the initial conditions.

3.2.1.1   The Simulation Setup Dialog Box

In Workflow•BPR, the initial conditions for a Simulation can be defined by using the **Simulation Setup** dialog box. This box contains six tabs, which can be activated by using the Simulation Setup button located on the toolbar.

General

The General tab contains a set of parameters that control specific aspects of the Simulation. The General tab has the following settings:

- **Random Number Seed:** The Simulation engine of Workflow•BPR uses a special Random Number Generator[1], which generates its Process times. This Random Number Generator uses 100 different Seeds to create unique sets of Random Numbers. As a result, it is possible to choose 100 different sets, labeled from zero (0) to 99, to run your Simulations. This will be discussed further in the section entitled "Using Simulation Effectively" on page 3-25.

- **Simulation Start Time:** This is used to identify the start date and time of the Simulation. The Start Time and the calendar will enable Workflow•BPR to calculate the Working and Non-Working Hours, and perform a more realistic Simulation.

- **Disable Maximum Duration:** This is a checkbox that determines whether a Maximum Duration will be set for the Simulation. If the checkbox is checked (the default setting), then there will be no Maximum Duration. If the checkbox is not checked, then the Maximum Duration setting will be available to put an upper limit on the length of the Simulation.

- **Maximum Duration:** The Maximum Duration of Simulation is an optional parameter that can be set. If set, the Simulation will run until all the Jobs are completed or the Maximum Duration is reached, whichever comes first. If disabled, the Simulation will continue running until all the Jobs are complete.

- **Calendar:** This specifies the Calendar that the Simulation will use to generate Jobs and schedule activities.

---

[1] The Random Number Generator used is a *Prime Modulus Multiplicative Linear Congruental Generator (PMMLCG) with m = 231- 1 and a=630,360,016*; from Law & Kelton (1991) --- Simulation *Modeling and Analysis*, 2d ed

- **Jobs During Working Hours Only:** This is a checkbox that determines the time period when new Jobs will be created during Simulation. If the checkbox is checked (the default setting), then new Jobs will be created only during Working Hours. If the checkbox is not checked, new Jobs will be created 24 hours a day. Jobs that are created during Non-Working Hours will build-up in a Queue because there are no Resources available to work on the Job.

- **Job Details:** When this check box is selected then the Job table of the Simulation results will display the details for all the Jobs of the Simulation. Otherwise, the Job table will only display the average results of the Simulation and not the details of each individual Job. This is useful if you are simulating a very large number of Jobs.

To modify the settings of the General tab:

1. ⌐Click on the **Simulation Setup** tool button on the **Process Simulation View** toolbar. The **Simulation Setup** dialog box appears (see the figure below).
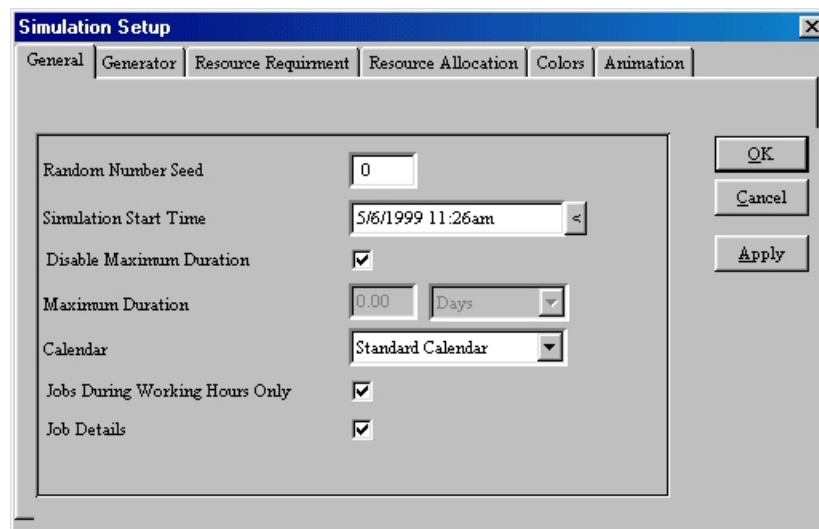
2. ⌐Click on the **General** tab if it is not already selected.

3. If you want to change the Random Number Seed, ⌨ type a value (from zero (0) to 99) in the **Random Number Seed** text box.

4. If you want to change the Simulation Start Time, ⌨ type the date and time in the **Simulation Start Time** text box.

5. If you want to set a Maximum Duration:

    *   ⌐Click on the **Disable Maximum Duration** check box (uncheck it). The **Maximum Duration** text box and selection box will become available.

    *   ⌐Click on the check box again to disable the **Maximum Duration** text box.

    *   ⌨ Type the Duration Value in the **Maximum Duration** text box.

* ✋ Select the Duration Unit from the **Maximum Duration** selection box.

6. If you want to change the Calendar that the Simulation is based on, ✋ select a Calendar from the **Calendar** selection box.

7. If you want Jobs to be created 24 hours a day, ✋ click on the **Jobs During Working Hours Only** checkbox to deselect the option (it is checked by default).

   * ✋ Click on the check box again if you want Jobs only to be created during Working Hours.

8. If you do not want the details of the Jobs to be displayed in the **Job** table after a Simulation has been run, ✋ click on the **Jobs Details** checkbox to deselect the option (it is checked by default).

   * ✋ Click on the check box again if you want Job Details to be displayed.

9. ✋ Click **OK** or ⌨ press **Enter** to close the **Simulation Setup** dialog box, or ✋ click on another tab to continue editing.

Generator

The Generator tab controls the number and rate of Jobs that are generated in the Simulation. The first item is the total number of Jobs that will be generated during the Simulation run-time. The Simulation will end either by processing all the Jobs generated or by reaching the end of the Maximum Duration specified in the General tab, whichever comes first.

The Job Creation Rate radio buttons allow you to specify whether the Time Between Jobs is Constant throughout the Simulation or is Variable. If you ✋ choose Constant, then Jobs will be created in a sequence specified by the Time Between Jobs.

The Time Between Jobs data is used to generate a new Job after a specific time has passed (in the Simulation). First, you enter a value (a number and a unit) for the time between each Job. Then, you can ✋ choose whether the Jobs are created Exactly at the interval you entered or are created On Average near the interval you entered. If you choose On Average, each Job will be generated at a unique time that can be longer or shorter than the time specified for the Time Between Jobs creation rate. Workflow•BPR will randomly select the time based on an exponential distribution.

If you ✋ choose Variable for the Job Creation Rate, then you can specify intervals that each have their own Time Between Jobs. For example, a restaurant may have a different rate of customers arriving for different hours of the day. In this case, you could set up intervals of one (1) or more hours. First, you set the Interval Unit that has the following options: Hour of Day, Day of Week, Day of Month, and Month of Year. Then you set up the individual intervals with a starting point (From), an ending point (To), and a Time Between Jobs. Each row in the Interval table specifies a new interval.

To change the settings in the Generator tab:

1. �🖰 Click on the **Simulation Setup** tool button on the **Process Simulation View** toolbar. The **Simulation Setup** dialog box appears.

2. �🖰 Select the **Generator** tab (see the figure below).
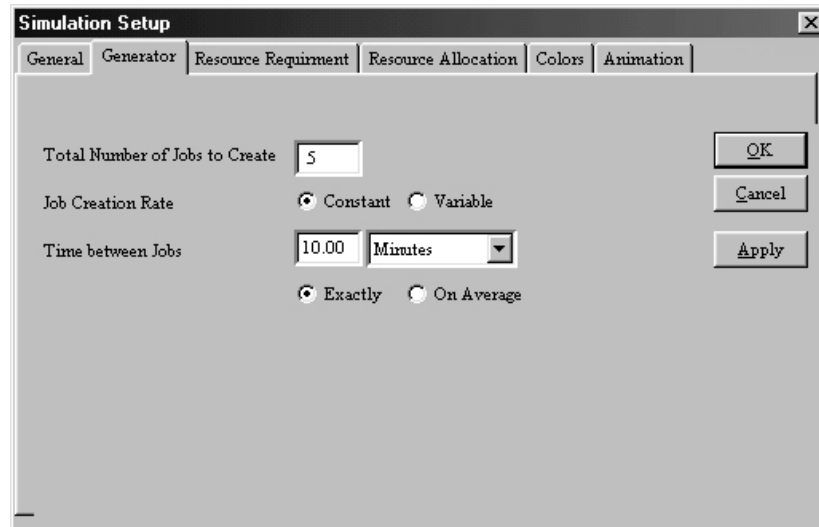
3. ⌨ Type the total number of Jobs to create in the **Total Number of Jobs to Create** text box.

4. If you want the Job Creation Rate to be constant throughout the Simulation, then �🖰 click the **Constant** radio button.

    *   ⌨ Type the number for the Time Between Jobs in the **Time Between Jobs** text box.

    *   �🖰 Select the Time Unit for the Time Between Jobs in the **Time Between Jobs** selection box.

5. If you want the Job Creation Rate to vary within the Simulation, �🖰 click the **Variable** radio button. The **Time Between Jobs** boxes will be removed and a table will be displayed for selecting an interval of times.

    *   �🖰 Select the unit in the Interval Unit selection box.

    *   To specify the starting point of the interval, ⌨ type the value in the From column.

        –   If the **Interval Unit** is **Month of Year**, then the range of **From** values is 1 through 12. If the **Interval Unit** is **Day of Month**, then the range of **From** values is 1 through 31. If the **Interval Unit** is **Day of Week**, then the range of **From** values is 0 through 6 (Sunday is 0). If the **Interval Unit** is **Hour of Day**, then the range of **From** values is 1 through 24 (1 a.m. to 12 a.m.).

        –   The value for **From** is an integer (e.g., for an **Hour of Day** value of 8, the interval will start at 8:00 a.m.).

* To specify the ending point of the interval, ⌨ type the value in the **To** column.

    − The possible values are the same as in the **From** column.

    − The value for **To** is an integer and the interval will end at the end of the unit value (e.g., for an **Hour of Day** value of 10, the interval will end at 10:59 a.m.).

* ⌨ Type the number for the Time Between Jobs in the **Number** column under the **Time Between Jobs** column header.

* ⍟ Select the unit for the Time Between Jobs in the **Unit** column under the **Time Between Jobs** column header.

* Move to the next row to add another interval.

6. If you want the Time Between Jobs to be generated exactly at the time you entered for **Time Between Jobs**, ⍟ click the **Exactly** radio button.

    * This applies for both Constant and Variable Job Creation Rates.

7. If you want the Time Between Jobs to vary between Jobs, ⍟ click the **On Average** radio button.

8. ⍟ Click **OK** or ⌨ press **Enter** to close the **Simulation Setup** dialog box, or ⍟ click on another tab to continue editing.

Resource Requirements

Resource requirements are always an important issue in Simulation models. In the Resources Requirements tab of the Simulation Setup dialog box, you can modify the data regarding the Resources assigned to each Task. A table displays a list of Resources that are assigned to a selected Task. The attributes that you can modify for the Resource Requirements are: the number allocated to the Organization Unit (more easily done in the Resource Allocation tab); the number assigned to the Task; the average duration (Working Duration) of the Task; the distribution for selecting the Working Duration (None, Normal, or Lognormal); and the Standard Deviation, if a Normal or Lognormal distribution is selected.

> ✍ **The time unit for the Standard Deviation of the distribution is always Seconds.**

The time it takes to complete a Task can be exactly the Working Duration of the Task, or it can vary around an Average Duration. If you want the time to remain constant, the Distribution should be set to None. If you want the time to vary from Job to Job, the Distribution should be either Normal or Lognormal.

Because Simulation tracks many Jobs at the same time, a single Task may have many Jobs in its Queue. That is, there are many "copies" of the Task that are ready to begin (if the Resources are available). For example, you might have 10 clerks allocated to a department and then 10 Jobs come in to the department. Theoretically, all 10 clerks can perform one Job each and the Tasks in all 10 Jobs would be performed in parallel. You can specify how many Jobs can be performed simultaneously for each Task. If you specify that only two (2) "copies" of a Task can be performed simultaneously, then only two (2) of the 10 Jobs will be processed at one time for that Task. To do this, you set the Concurrency attribute for the Task.

> ✍ **Changes made in the Resource Requirements tab do not affect the values in the Activity Decision Flow Diagram of the Process.**

To change settings in the Resource Requirements tab:

1. ⊕ Click on the **Simulation Setup** tool button on the **Process Simulation View** toolbar. The **Simulation Setup** dialog box appears.

2. ⊕ Select the **Resource Requirements** tab (see the figure below).

3. ⊕ Select an **Organization Unit** in the **Organization Unit** selection box. This will filter the list of Tasks to include only the Tasks assigned to the selected Organization Unit.

    *   ⊕ Select "**All**" so that all the Tasks will be available.

4. ⊕ Select a **Task** in the **Task** selection box. All the Resources assigned to the selected Task will be listed in the table.

5. Within the table, ⊕ click on the row containing **Resource** information.

    *   ⌨ Type a new value in the **Allocated** column to change the number of the selected Resources that are allocated to the selected Organization Unit.

        −   A value of 0 is not a valid allocation.

    *   ⌨ Type a new value in the **Assigned** column to change the number of the selected Resources that are assigned to the Task.

        −   A value of 0 is not a valid assignment.

    *   ⌨ Type in a **Duration Value** and ⊕ select a **Duration Unit** in the **Duration** column to change the Working Duration of the Task.

    *   To choose a different Distribution, ⊕ click in the **Distribution** column and then ⊕ select a new one from the **Dist**. selection box. The Distribution options are *None, Normal*, and *Lognormal*.

    *   ⌨ Type a value in the **Std. Dev**. column to change the Standard Deviation for the Distribution.

−   A Standard Deviation cannot be selected when the Distribution is None.

   ✍ **The Time Unit for the Standard Deviation is always Seconds.**

6. To set the number of "copies" of the Task that can be performed simultaneously, ⌨ type a value in the **Concurrency** text box.

7. 🖰 Click **OK** or ⌨ press **Enter** to close the **Simulation Setup** dialog box, or 🖰 click on another tab to continue editing.

Resource Allocation

The Resource Allocation tab allows you to modify the allocation of Resources to Organization Units. A table displays a list of Resources, the Organization Unit they are allocated to, and the number available for that Unit. If the same Resource (role) is allocated to more than one Organization Unit, there will be a separate listing for each allocation.

   ✍ **Changing the Allocation Values in the Resource Allocation tab does not affect the allocation values stored in the Repository.**

To change the settings in the Resource Allocation tab:

8. 🖰 Click on the **Simulation Setup** tool button on the **Process Simulation View** toolbar. The **Simulation Setup** dialog box appears.

9. 🖰 Click on the **Resource Allocation** tab.

Simulation Setup			
General | Generator | Resource Requirment | Resource Allocation | Colors | Animation			

Organization	Resource	Allocated	
Underwriting	NOTESFORMAcceptRejectI	1.00	OK
Underwriting	Associate	5.00	Cancel
Underwriting	NOTESFORMAcceptReject	1.00	Apply
Underwriting	NOTESFORMMailPolicyDo	1.00	
Underwriting	NOTESFOR...teCustInd	1.00	
Underwriting	CreateCustomerRecord	1.00	
Underwriting	NOTESFORMFindClient	1.00	
Underwriting	OpenDatabase	1.00	
Underwriting	NOTESFORMStudyFolder	1.00	

10. ⌨ Type the Duration Value in the **Available** column.

   ∗   A value of zero (0) is not a valid allocation.

11. Move to another row in the table and repeat Step 3 for any other Resource Allocation you want to modify.

12. 🖱 Click **OK** or ⌨ press **Enter** to close the **Simulation Setup** dialog box, or 🖱 click on another tab to continue editing.
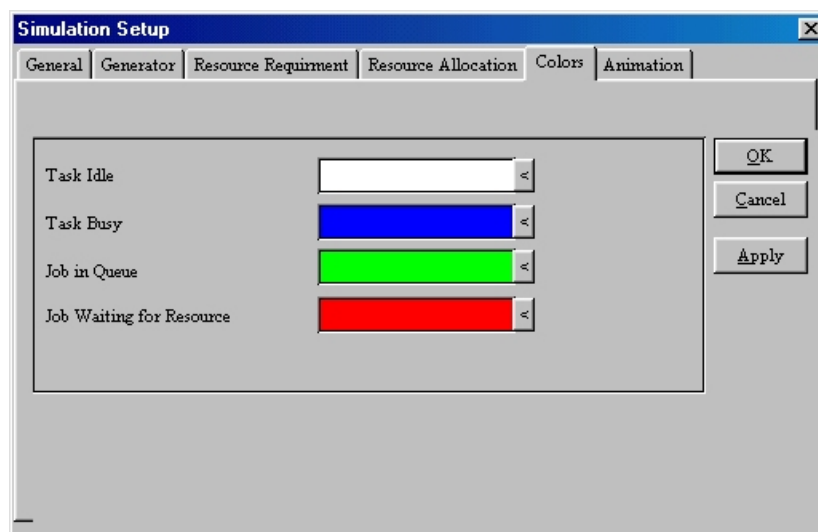
Colors

Workflow•BPR displays different colors, depending on the status of objects in the model. These colors can be customized using the Colors tab. The Colors tab defines four different colors for four different status types. The Task Idle color specifies the color of the Task when it is idle. A Task is idle if there are no Jobs in its Queue to be processed or if there are no Resources available to process the Jobs. When the Task is busy, or at least one Job is being processed, then the color of the activity is specified by the second item, Task Busy.

Jobs can also have different colors, depending on their status. A Job that is in a Queue and waiting to be processed (after the activity has processed the Jobs with a higher priority) is identified by the color specified in Job In Queue. If a Job is ready to begin (i.e., there are no other Jobs ahead of it in the Queue), and is waiting for a Resource to be available to be processed, then its color is specified by Job Waiting For Resource.

To change the settings in the Colors tab:

1. 🖱 Click on the **Simulation Setup** tool button on the **Process Simulation View** toolbar. The **Simulation Setup** dialog box appears.

2. 🖱 Select the **Colors** tab (see the figure below).

3.   🖰 Click on the "arrow" button next to a **Simulation Status** box. The **Color** dialog box appears.

4.   🖰 Select the desired color.

5.   🖰 Click **OK** or ⌨ press **Enter**. Your desired color appears next to the arrow.

6.   Repeat Steps 3 through 5 for the next Status you want to modify.

7.   🖰 Click **OK** or ⌨ press **Enter** to close the **Simulation Setup** dialog box, or 🖰 click on another tab to continue editing.

Animation

The Animation tab sets the parameters for animating the events. If No Animation is 🖰 selected, the Simulation will proceed in the background without the animation of the Resources dropping down in the Tasks and the Phis moving from one Task to another. This is useful for saving time in simulating large Models. If No Animation is 🖰 deselected, then the speed of the animation flow can be determined by using the Animation Speed Bar.

To change the settings in the Animation tab:

1.   🖰 Click on the **Simulation Setup** tool button on the **Process Simulation View** toolbar. The **Simulation Setup** dialog box appears.

2.   🖰 Select the **Animation** tab (see the figure below).
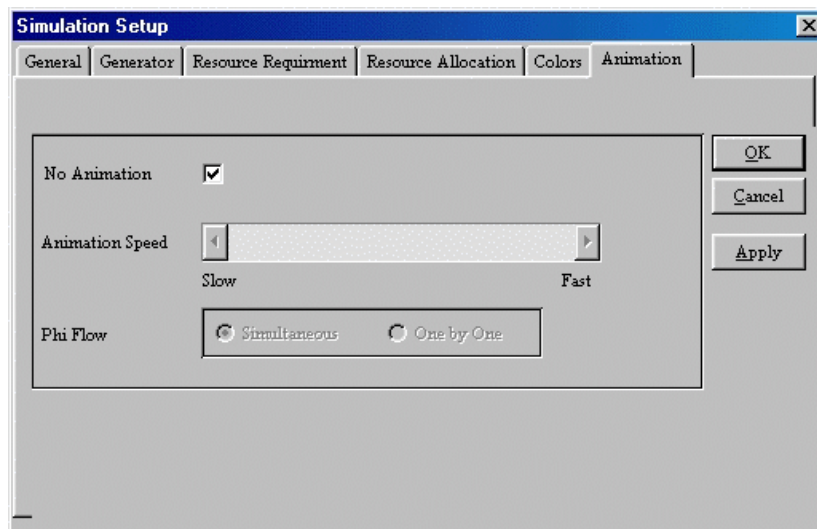
3. If you do not want animation to occur during Simulation, then ⌐⊕ click the **No Animation** check box (check it). This will disable the other items in the tab.

4. If you want Animation to occur during Simulation, then ⌐⊕ click the **No Animation** check box (uncheck it). This will enable the other items in the tab.

5. Set the speed of the animation by ⌐⊕ positioning the scroll bar controller in the desired location.

6. If you want the Phis that travel along the Connectors to do so as a group, then ⌐⊕ select the **Simultaneous** radio button in the **Phi Flow** box.

7. If you want the Phis that travel along the Connectors to do so one-by-one, then ⌐⊕ select the **One-By-One** radio button in the **Phi Flow** box.

8. ⌐⊕ Click **OK** or ⌨ press **Enter** to close the **Simulation Setup** dialog box, or ⌐⊕ click on another tab to continue editing.

3.2.2   Controlling a Simulation

To control the progress of a Simulation, you have four tools that reside on the
Simulation view toolbar: Step, Start, Pause, and Stop. The following sections
describe these controls.

3.2.2.1   Starting a Simulation

To start a Simulation:

1. [⊕] Click the **Start** button ▶ on the **Simulation View** toolbar to begin the
    Simulation.

    *   After the Simulation is completed, a message appears confirming the
        completion. When you [⊕] click **OK**, the **Job** table appears.

3.2.2.2   Pausing a Simulation

To pause a Simulation:

1. [⊕] Click the **Pause** button ❙❙ on the **Simulation View** toolbar to pause
    the Simulation.

3.2.2.3   Restarting a Simulation

To restart a Simulation:

1. After the Simulation has been paused, stopped without being reset, or been
    run in the Step mode, [⊕] click the **Start** button ▶ on the **Simulation
    View** toolbar. The Simulation will continue from the last event run.

3.2.2.4   Stepping Through a Simulation

To step through a Simulation:

1. [⊕] Click the **Step** button ❙▶ on the **Simulation View** toolbar. The
    Simulation will move forward one event.

    *   Continue to [⊕] click the **Step** button to progress the Simulation one event
        at a time.

    *   If you [⊕] click the **Start** button, the Simulation will run continuously.

3.2.2.5   Stopping a Simulation

To stop a Simulation:

1. ⏱ Click the **Stop** button [■] on the **Simulation View** toolbar to stop the Simulation.

   ∗ If you ⏱ click the **Start** button or the **Step** button, the Simulation will continue.

   ∗ If you ⏱ click the **Stop** button again, the Simulation will be reset.

3.2.3   Reviewing Simulation Analysis

As a Simulation is being run, data associated with the events of the Simulation are being collected. These data are displayed in tables in the bottom-half of the Simulation window during Simulation (if animation is active) and after Simulation. The data of the Simulation will reflect only the events that actually occurred during the Simulation and will not necessarily reflect all possible situations that can occur in the performance of the Process. The Simulation reflects a dynamic view of the Process and is very useful for pinpointing bottlenecks in the Process and for testing the effects of Resource Allocation on short-term, high loads, or lulls within normal operations. Additionally, each Simulation run will provide a slightly different set of results for each unique Random Number Seed that is used. Analysis of long-term performance of the Process that takes into account all possible situations is better served by Weighted Average Analysis (refer to the section entitled "Weighted Average Analysis" in Chapter 2).

3.2.3.1   Simulation Analysis Tables

The real value of the Simulation is the information gathered during its run-time. In Workflow•BPR, the result of each Simulation run is displayed in four (4) different tables located at the bottom of the Simulation screen. The four (4) tables are Jobs, Resources, Activities, and Queues. The following sections describe the tables and the data that they contain. Any table can be exported to Microsoft Excel or Formula One for comparison and analysis. For a more detailed description of the Simulation measurements, refer to the Glossary.

Job	Res.	Act.	Queues		🔍 🔍	Export	Preference

Jobs Table

During a Simulation, Jobs will be generated until the Number of Jobs defined in the Simulation Setup dialog box has been reached or the Maximum Duration of the Simulation has been reached. Each Job is listed in a row in the Jobs table, and specific measurements concerning time and cost are presented in the columns of the table. The last row of this table shows the average of each of the columns.

The following is the list of measurements provided by the Jobs table:

- **Job:** The number of the Job.
- **Start Date:** The time and date of the start of the Job.

- **End Date:** The time and date of the end of the Job.

- **Cycle Duration:** The length of the Job. This is (End Date) - (Start Date).

- **Process Duration:** The amount of company working time spent on the Process during the Job. This is Cycle Duration minus Job Non-Working Duration—based on the Standard Calendar selected for the Simulation (in the Generator tab of the Simulation Setup dialog box).

- **Working Duration:** The total amount of time that the company spends working on the Tasks for this Job. This is the Sum of all the Task Working Durations for all paths of the Job; i.e., the total amount of time that the Task status is Task Busy (blue).

- **A-Blocked Duration:** (Activity Blocked) The total amount of time that Tasks are waiting to begin for all paths of the Job. The Job status is Job In Queue (green). The circumstances that create this status are: (a) Resource Shortage due to a concurrency setting, (b) Task Start Option, and (c) differences between the Task Calendar Non-Working Time and the Simulation Calendar Non-Working Time. This does not include Job Non-Working Duration.

- **R-Blocked Duration:** (Resource Blocked) The total amount of time waiting for Resources after a Task has begun for all paths of the Job. The Job Status is Job Waiting for Resource (red). The circumstances that create this status are: (a) Resource Shortage due to an Organization Allocation Setting, and (b) Resource unavailability due to differences between the Task Calendar, the Resource Calendar, and/or the Simulation Calendar.

- **Total Blocked:** The combination of A-Blocked Duration and R-Blocked Duration. This represents all the waiting time (i.e., Queuing) before a Task is performed.

- **Transfer Duration:** The total amount of time spent on transferring Phis with Media for all paths of the Job. Non-Working Time is not included.

- **External Duration:** The total amount of time spent on External Processes. Non-working time is not included.

- **Total Cost:** The total cost of the Job.

Resources Table

Each Resource used during the Simulation run is listed in a row in the Resources table, and specific measurements concerning time and cost are presented in the columns of the table. If a specific Resource was allocated to more than one Organization Unit, then there will be a separate listing of that Resource for each Organization Unit.

The following is the list of measurements provided by the Resources table:

- **Name:** The name of the Resource.

- **Organization Unit:** The Organization Unit of the Resource that was used.

- **Available:** The number available of that Resource.

- **Max. Number Used:** The number of the available Resources that were actually used.

- **Busy Duration:** The total time that the Resource was busy (working on Tasks) for all paths of all Jobs. This is a summation for all the Resources used (Max. Number Used).

- **Idle Duration:** The total time that that Resource was not working on any Tasks (for each available Resource that was used) for all paths of all Jobs. This is [Resource Process Duration multiplied by Max. Number Used] minus Working Time.

- **% Utilization:** This is Working Time divided by [Working Time + Idle Time].

- **RST (Resource Shortage Time):** The total amount of time that Tasks were pending for this Resource (for each available Resource that was used) for all paths of all Jobs. The circumstances that create this status are: (a) Resource Shortage due to an organization allocation setting, and (b) Resource unavailability due to differences between the Task Calendar, the Resource Calendar, and/or the Simulation Calendar.

- **Total Costs:** The total Cost attributed to that Resource (for each available Resource that was used) for all Jobs. This is a summation for all the Resources used (Max. Number Used).

- **Idle Time Costs:** The cost of having the Resources idle. This is Idle Time multiplied by the Resource Standard Cost.

Activities Table

In this table, you can see the performance of each activity in the Process. Each Task is listed in a separate row and specific measurements concerning time and cost are presented in the columns of the table.

The following is the list of measurements provided by the Activities table:

- **Name:** The name of the activity. Activities include Tasks and Processes.

- **Total Duration:** From the time that the activity starts to the time it ends. This includes Working Duration, Idle Duration, and Non-Working Duration. This does not include Queue Duration. This is the Average Time for the Number Completed for the activity.

- **Working Duration:** The amount of time that an activity is processing a Job. The Task status is Task Busy (blue). This is the Average Time for the Number Completed for the activity.

- **A-Blocked Duration:** (Activity Blocked) The total amount of time that an activity is waiting to begin. The Job Status is Job In Queue (green). The circumstances that create this status are: (a) Resource Shortage due to a concurrency setting, (b) Task Start Option, and (c) differences between the Task Calendar Non-Working Time and the Simulation Calendar Non-Working Time. This does not include Job Non-Working Duration. This is the Average Time for the Number Completed for the activity.

- **R-Blocked Duration:** (Resource Blocked) The amount of time that a Task is pending due to the Resource not being available. The Job Status is Waiting for Resource (Red). The circumstances that create this status are: (a) Resource Shortage due to an Organization Allocation Setting, and (b) Resource unavailability due to differences between the Task Calendar, the Resource Calendar, and/or the Simulation Calendar. This is the Average time for the Number Completed for the activity.

- **Total Cost:** The total Costs associated with the activity. Processes are the summation of the Costs of all its activities.

- **Number of Jobs:** The number of times that the activity was completed. An activity may not be completed in all Jobs or may occur more than once in a single Job because of loops.

- **Throughput:** The number of Jobs processed by a Task or Sub-Process per Unit Time. The Throughput Duration starts when the activity occurs for the first time in the Simulation and ends when the activity is completed in the Simulation. The Throughput Duration is divided by the number of times that the activity was completed.

Queues Table

The Queues table shows the behavior of the Queues attached to the Tasks of the Process. This is useful for identifying the bottlenecks in a Model. Each row specifies a different Task in this table and specific measurements are presented in the columns of the table.
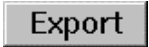
The following is the list of measurements provided by the Queues table:

- **Task:** The name of the Task.

- **Max. Queue:** The maximum number of items in the Queue.

- **Avg. Queue:** The average number of items in the Queue.

- **Avg. Queue Duration:** This is calculated by determining the amount of time that items are in the Queue between each event that changes the Queue (i.e., when an item enters the Queue) for each Task, and then dividing the total amount of time in the Queue by the number of events. Events in which the Queue was emptied are not counted.

3.2.3.2   Exporting Simulation Analysis

Any of the Simulation Analysis tables can be exported to a Microsoft Excel formatted file or to a Formula One formatted file.

To export a Simulation Analysis table:

1. ✛ Select a table that you want to export from the **Simulation Table** toolbar (Jobs, Resources, Activities, or Queues).

2. ✛ Click the **Export** tool button Export from the **Simulation Table** toolbar. The **Export Sheet** dialog box appears (see the figure below).
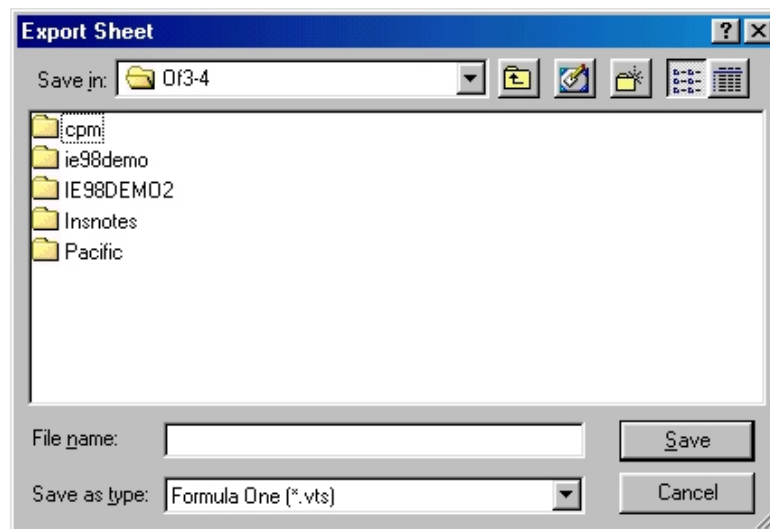
3. ⍉ Select the file type in the **Save as Type** selection box. You can ⍉ select from eight different file types: Formula One (*.vts), Excel 5 or 7 (*.xls), Tabbed Text (*.txt), Tabbed Text Values Only (*.txt), HTML (*.htm), Formula One 2.x (*.vts), and Excel 4 (*.xls). The default is Formula One (*.vts).

4. ⍉ Select the appropriate drive and/or directory where your analysis file is to be saved.

   * ⍉⍉ Double-click a folder in the large box to go down the tree.

   * ⍉ Click the Up One Level button [📁] to go up the tree.

5. ⌨ Type the name of the file where you want your analysis to be saved in the **File Name** text box.

6. ⍉ Click **OK** or ⌨ press **Enter**.

3.2.3.3   Setting Time Units of Simulation Analysis

The Time Unit that is used for time measurements in the Simulation Analysis tables can be set with the Preferences tool.

To export a Simulation Analysis table:

1.   ᗯ Select a table in which you want to have Time Units modified from the **Simulation Table** toolbar (Jobs, Resources, Activities, or Queues).

2.   ᗯ Click on the **Preferences** tool button from the **Simulation Table** toolbar. The **Preferences** dialog box appears.
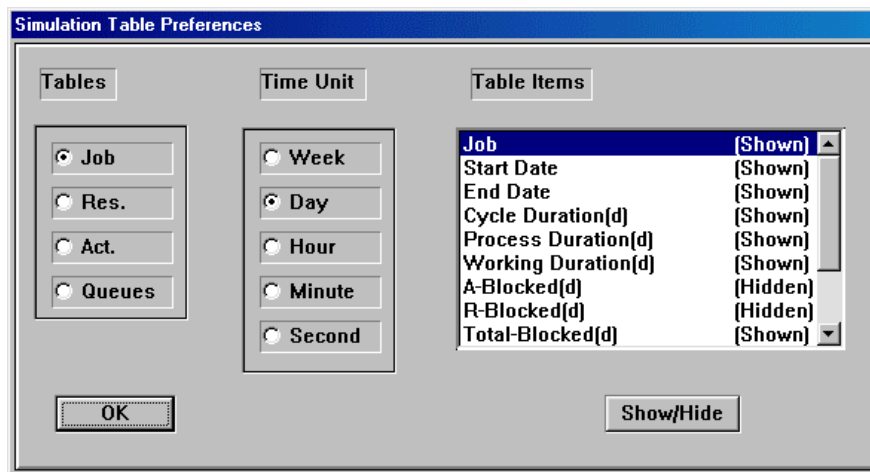
3.   ᗯ Select a table from the set of radio buttons in the **Tables** box.

4.   ᗯ Select the unit of time you want from the set of radio buttons in the **Time Unit** box.

5.   If you don't want a data column to appear in the table, ᗯ select the item from the **Table Items** box, then ᗯ click the **Show/Hide** button. The item will be marked as **Hidden**.

     ∗   If you want to show a data column that was previously hidden in the table, ᗯ select the item from the **Table Items** box, and then ᗯ click the **Show/Hide** button. The item will be marked as **Shown**.

6.   Repeat Steps 3 through 5 for the other tables that you want to modify.

     ∗   The Activities table and the Queues table will always have the same Time Unit.

7.   ᗯ Click **OK** or ⌨press **Enter**.

3.2.4   Using Simulation Effectively

One of the most important features of Simulation is the ability to perform "What-If" Analysis on a Process Model and to discern which variation of the Process Model best suits your needs. In Workflow•BPR, this can be accomplished very easily.

A specific set of Simulation Parameters that are used for a Simulation is called a Scenario. Examples of these Parameters are the rate of inputs (Jobs) or the number of Resources allocated to an Organization Unit. A "What-If" Analysis would consist of running a Simulation under one Scenario, running the Simulation again under a different Scenario, and then comparing the results. If you want to compare two (2) Scenarios directly, then you should run the Simulations for both Scenarios with the same Random Number Seed to make sure the change in performance is due to the change in Parameters and not the Random Number Seed.

The following are Scenario settings that can be modified in the Simulation Setup dialog box:

- The Start Date of the Simulation.

- The Calendar associated with the Simulation (Company Working Calendar).

- Jobs During Working Hours Only (Yes or No).

- The number of Jobs (Inputs into the Process) to be generated.

- The time between Job Generation. This can be constant or have different rates for time intervals

- The allocation of Resources within Organization Units.

- The number of inputs to a Task can be worked on concurrently.

- The number of required Resources for a Task.

- The Working Duration per Resource assigned to a Task.

- The distribution and standard deviation of the variation of Working Duration per Resource.

The following are Scenario settings that can be modified within the Process Model (in the Activity Decision Flow Diagram):

- The Calendar associated with the Tasks.

- The Calendar associated with the Resources.

- The number of times that a Task or Process is repeated.

3.2.4.1 Performing "What-If" Analysis

The following is a procedure to perform a typical "What-If" Analysis using Workflow•BPR:

1. Set the initial conditions for the Simulation within the **Simulation Setup** dialog box and choose one (1) for the Random Number Seed (in the General tab).

2. Run the Simulation under a specific Scenario and record the important results based on your needs.

3. Re-run the Simulation without changing the Seed Number, but change the Scenario in a way that you think will affect your desired results; e.g., change the Resource Allocation for a department.

4. Compare the results of the two Scenarios.

5. Repeat steps 3 and 4 until you find a new Scenario that approximates your desired results (e.g., a reduction in Cycle Time).

6. Perform steps 2, 3, and 4 for 10 different Random Number Seeds.

7. Verify that the desired results occur for most of the Random Number Seeds.

8. Update the Repository to reflect the Scenario that achieved your desired results.

Index

Index