

Business Integration Management using WebSphere BI Modeler and Monitor: A real world case study

Modeling business processes with the
Modeler Workbench

Deployment from Modeler
Workbench to Workflow run time

Run time monitoring and
historical analysis



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Redbooks



International Technical Support Organization

**Business Integration Management using
WebSphere BI Modeler and Monitor: A real world
case study**

March 2004

Note: Before using this information and the product it supports, read the information in "Notices" on page vii.

First Edition (March 2004)

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Preface

Integrating distributed business applications is no easy task. Managing a heterogeneous distributed real-time environment is equally challenging. Integrated business environments can process huge volumes of messages per day. Messages are published, routed, transformed and consumed. The integrated environment has to deal with exception handling, performance bottlenecks and changes in the participating systems. Components are distributed across different machines in different locations. A Business Integration Management System addresses these requirements and provides the best approach or set of approaches that can be followed to manage an integrated business environment.

This redbook is a case study of a real-life business process re-engineering exercise. We follow the pilot phase of this exercise from the design of a solution to modeling of the complex business processes, building these processes and deploying them to a run-time environment. We also address many of the issues that surround an undertaking such as this and follow up on the success of the pilot. We also provide some hints and tips to avoid getting 'stuck'.

Important: This redbook is a case study of a real-life, business process re-engineering exercise. All references made to IBM WebSphere Business Integration Monitor Version 4.2.3 are provided for illustrative purposes only. They are not intended to be a comprehensive overview of the full functionality and capabilities of the current or future versions of the product.

The team that wrote this redbook

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Overview

Before we discuss our case study, it is necessary to talk about Business Process Management. A business process integration solution is fully profitable if it is imbedded in a company which has a clear vision of what a Business Integration Management System is. The first stepping stone to that, is a good understanding of some theoretical elements around business processes. In this chapter we will discuss some of the broad concepts of Business Integration Management, we will then move on to our case study - an exercise in Business Integration Management and re-engineering carried out using the WebSphere Business Integration products - specifically targeting the modelling and monitoring capabilities.

1.1 Business process definition and theory elements

"A process is a set of activities that taken together, produce a result of value to the customer" as stated in *Reengineering the Corporation - A Manifesto for Business Revolution*, Michael Hammer & James Champy,

Starting from this well-known definition, let introduce some basic business process notions we will apply in the redbook.

1.1.1 Business process environments

Using the previous definition of a process, we can assume that a business process is independent, as much as possible, of the enterprise organization structure. It horizontally crosses the organization, triggered by the Customer request (for example) and providing the expected value back to him.

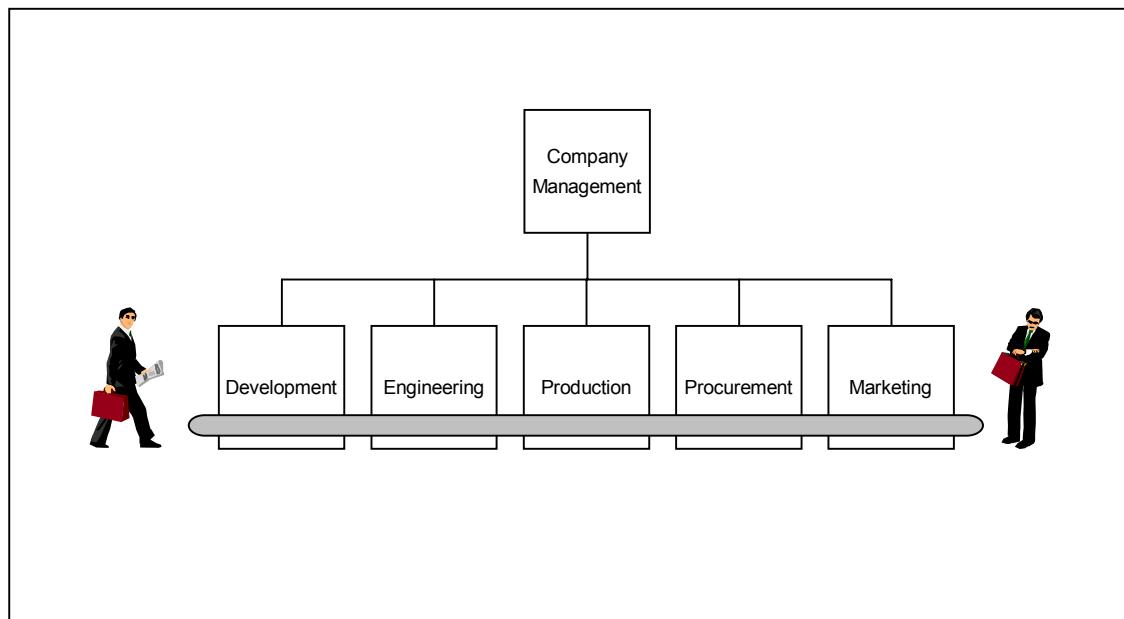


Figure 1-1 A business process is a horizontal work

A business process undergoes permanent changes of 2 main levels of environment:

1. Internal environment: containing all the elements that a company can keep under control.

- External environment: all the elements which change outside company range of control.

The following diagram is a summarized representation of the main elements of these 2 levels:

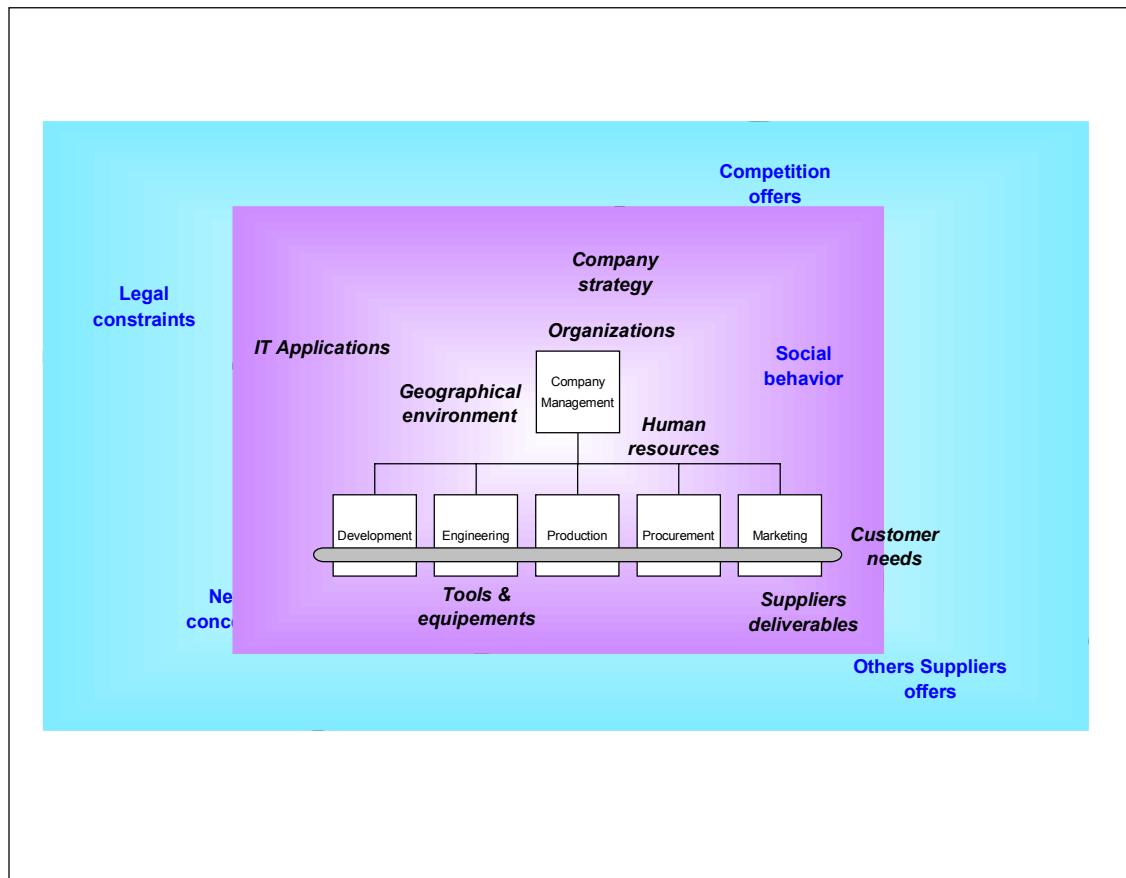


Figure 1-2 Business process environments elements

All the components of these environment levels are constantly changing, forcing the company to react and adapt business processes by keeping its resources optimized. Permanent adaptation and optimization is one of the most difficult problem to solve. That means a good knowledge is required of the activities all along the organizations, who perform them, when, with what, and, in the mean time, a good set of measurements have to be in place to help the company management system to take the right decisions to adapt business processes.

1.1.2 Business processes characteristics

We have now a good idea of what is a business process but it's more complex when we start to analyze it, specifically because a business process it's not working alone, it interacts with other processes, requesting data and receiving answers from others.

Business processes: a network of processes

A company is also a network of processes which are deeply interconnected.

Which employee is able to answer to a simple question like that: what are the list of business processes you are part of? People are doing a job, but in fact they are in a network of processes. Very few people are able to answer to this question for a good reason - that is, that a clear mapping of processes doesn't exist obviously at company level.

Employees have difficulties expressing clearly in terms of their value add performed in different end to end business processes crossing their workplace. They are able to answer about their tasks but not completely in terms of business processes. Sometimes they don't have a clear idea of their position in the business processes.

For companies ISO certified (International Organization for Standardization) since ISO 9000 version 2000, the requirements are very business processes oriented. To be compliant with ISO, a company has to develop a clear mapping of the business processes with their designations, their interactions, and, at the same time, clarifying in all the organizations the employees positions in the business processes. So, inputs/outputs, and their associated mechanisms, at any level of a business process, will have to be known, described, and analyzed carefully. Business process knowledge with a continuous improvement practice is easy to wish but hard to do, it's a company culture challenge.

By implementing a Business Integration Management System, it helps to bring up this culture as well as it is totally supporting a quality management system such ISO.

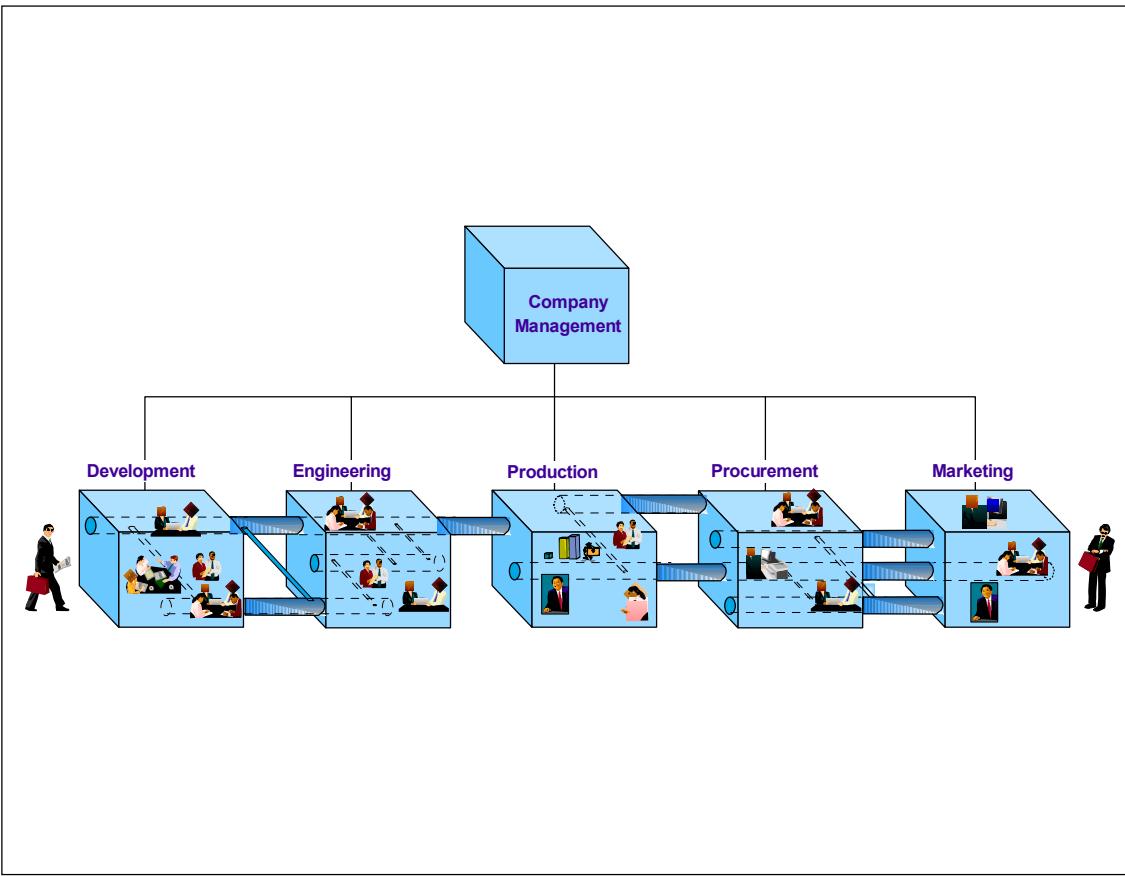


Figure 1-3 A company is a network of business processes interacting between them

Business processes: a flow of interactions

So, we are now facing a network of business processes but another layer is adding complexities to the environment: it's the company information flow and the information technology environment. IT architecture and applications are bringing another dimension to business processes. With the development of IT, it is common to have employees using several applications to support their activities. It will be essential in the As-Is and the To-Be studies to list the interactions between people, activities and IT applications.

Business integration is also an automating, in fact more than that, an optimization of these 3 elements. The business analyst in charge of a business integration study will have first to make a clean-up, a re-engineering of the business process, and, supported by the company management, to implement changes for employees in preparation for this automation.

The following diagram shows now the main elements to deal with business process and business integration:

- ▶ A business process end to end view
- ▶ A set of activities as well as a chain of employees
- ▶ A flow of different nature of interactions between business processes and IT

As you can see - it is a complex job.

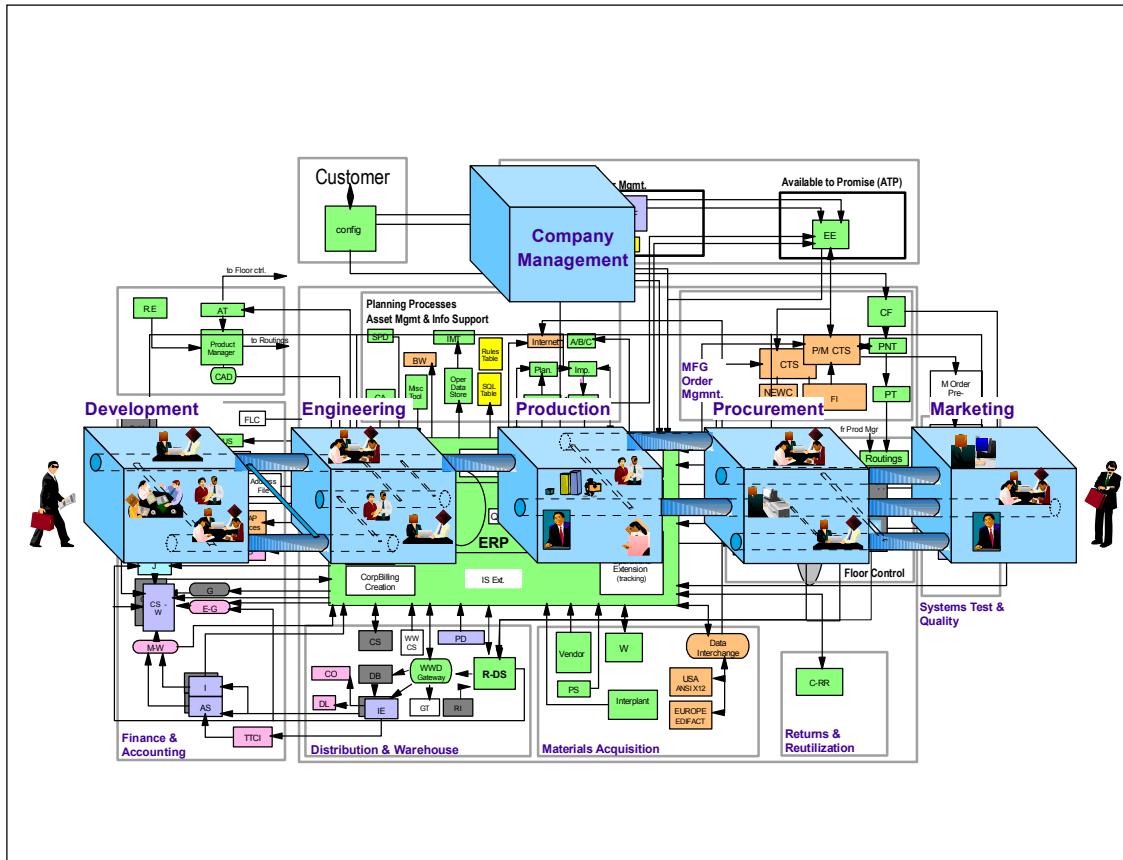


Figure 1-4 Business process network and associated IT architecture

Business processes: a chain of systems

The last notion we need to introduce is the system notion. Business processes can be modeled through a system approach. A company business process is a complete system by itself, as well as each of its components until the most elementary element. For example, a manufacturing production line is a complete

system, containing departments which are systems, containing people which are systems, and, people performing elementary tasks, which are, for each of the activities a system. We don't intend to develop an entire theory on a system approach, but just to introduce some notions to understand the basic of a chain of systems, receiving inputs, generating outputs, and the associated measurements to keep the business process under control as it intends to be done by implementing a Business Integration Management System.

The process representation we use in the redbook for our end-to-end business process case study is based on a simplified set of activities represented as a simplified model of a chain of systems.

The following diagram explains the activity system convention we use.

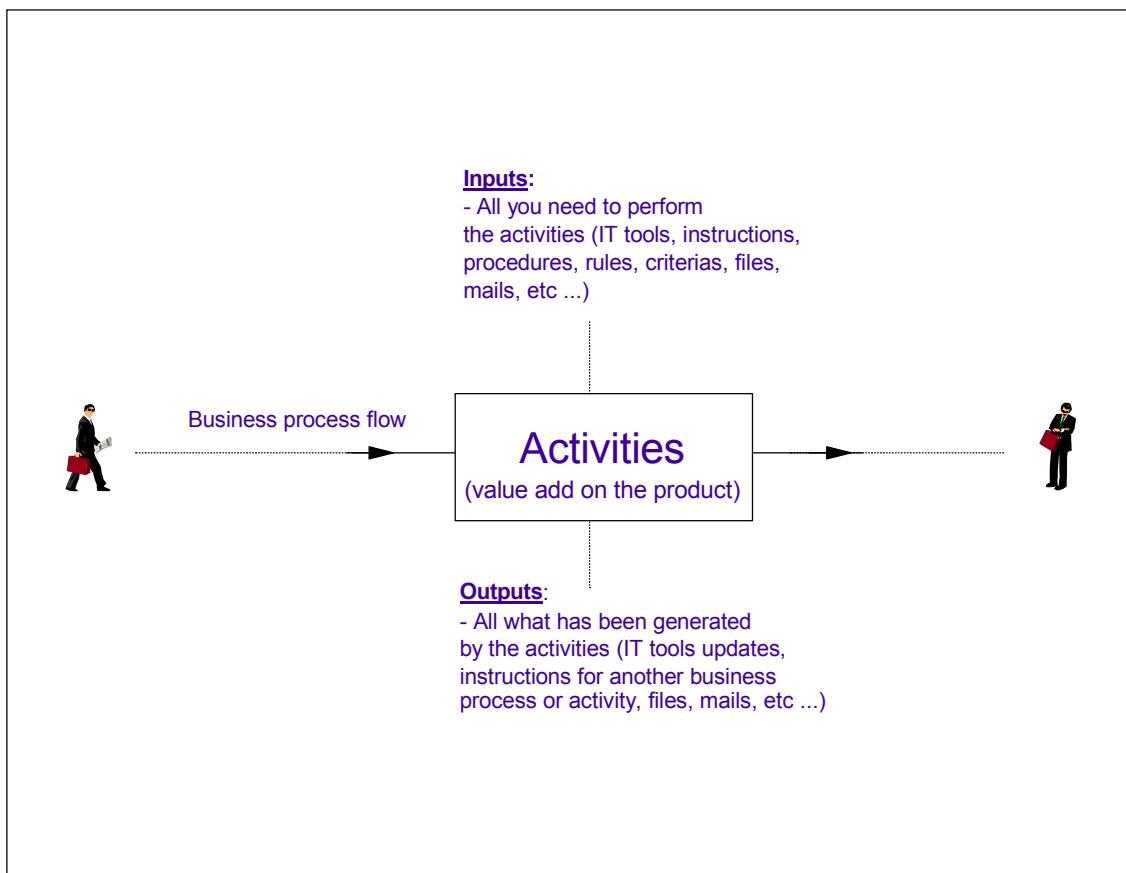


Figure 1-5 A simple way to model business process activities as a system with a mapping of different nature of interactions

So, a set of systems taken together can be built to show an end to end business process walkthrough across the organizations with a mapping of interactions.

The following diagram shows an example on how a representation of such chain can simply represents activities performed by employees and what is interacting as inputs and outputs at each step of the business process. A notion of time flowing from the left to the right is naturally obtained.

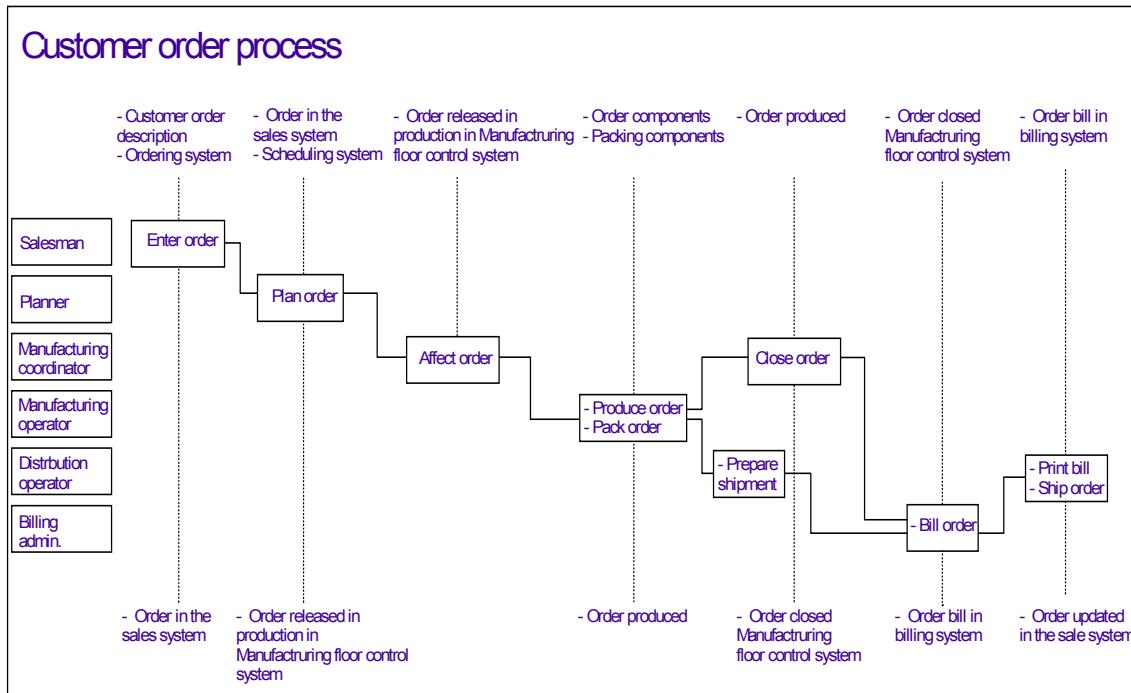


Figure 1-6 Example of a business process end to end chain

To be a complete system, the business process needs to have a feedback loop through monitoring. This is the key to tuning and also to making breakthroughs in the way the business process works. One of the major activities involved in implementing a successful Business Integration Management System has to be the building of the associated monitoring.

On the previous customer order process example the following diagram shows what a business integration management system means:

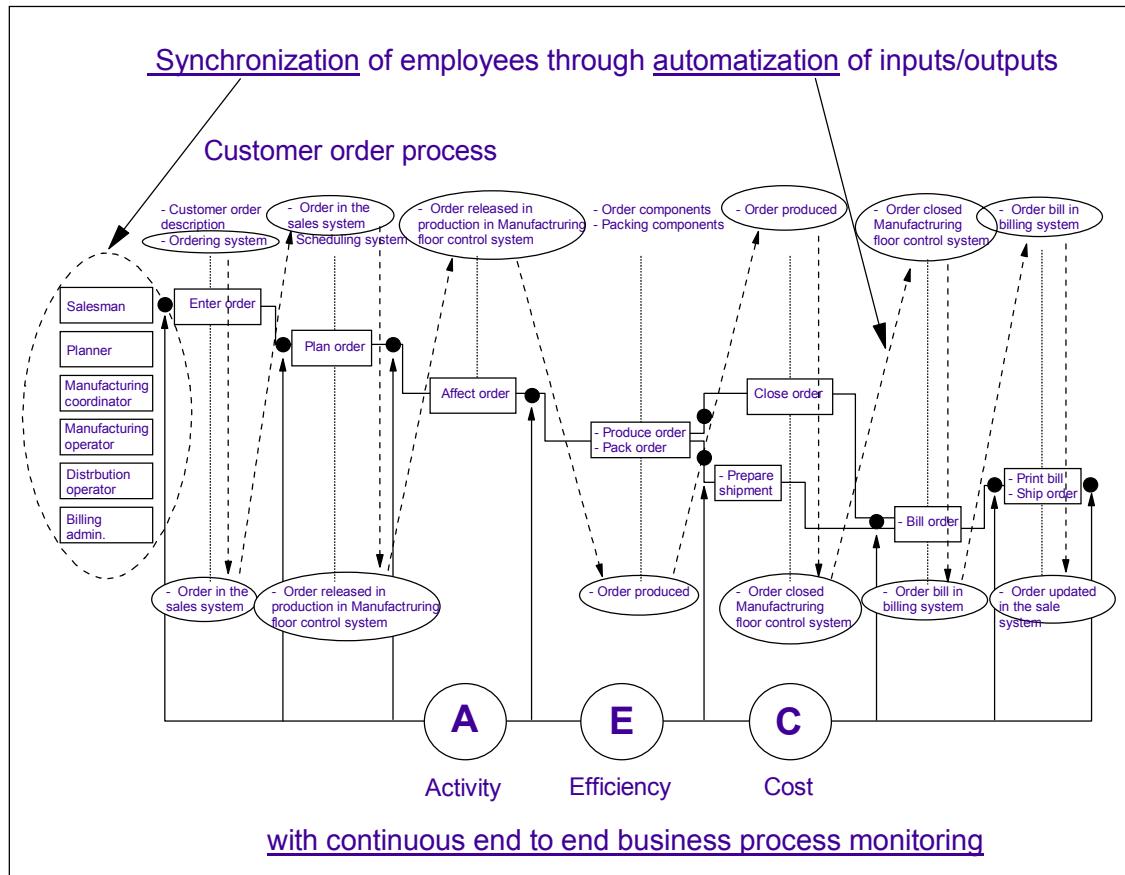


Figure 1-7 Business process as a complete system under control with a business integration management system

So, to summarize these elements of theory, independently the method you want to use, you will have to follow the following steps:

1. Perform an As-Is description of your business process with all the characteristics: who is doing what, when with what inputs/outputs and with which mechanism
2. Analyze, simplify, re-engineer your process, get all data to quantify your business process parameters (i.e: volumes, organization structure, number of people, tasks/process timing, criteria, case percentage...) and validate your To-Be with business integration simulation capability.
3. Get management support to manage changes.

4. Communicate and educate people, implement the To-Be, automate through MQWorkflow, and measure your business process through a strong management system using business integration monitoring capability.

1.2 The case study

The case study we describe here is based on a re-engineering performed internally in a manufacturing plant. As we have seen into the previous chapter, since the beginning of *Business Process Re-engineering (BPR)* in the 90's, Companies have more or less succeeded in their projects depending on their capacity to deal with BPR critical success factors, such as:

- ▶ Strong management involvement
- ▶ Clear re-engineering and business process objectives definition
- ▶ Rigorous re-engineering project management
- ▶ Continuous focus to achieve business process transformation according Re-engineering recommendations.

These critical success factors highlight, in fact, that human resource and change management are the backbone to a re-engineering success. What brings re-engineering first is a human resource adaptation from an As-Is process to a To-Be. All the other type of actions which support re-engineering recommendations, will complete and sustain the robustness, the repeatability and the adaptability of the process. What we demonstrate in this redbook through a real case, is the capacity of business integration to run the business process accurately by automatizing process events associated to an on-line management system through continuous monitoring capability.

Hence, the adaptability of a process to its environment changes can be achieved in a permanent pro-active re-engineering mode, putting the company in the condition to continuously be a world class player on its market.

The case study concerns a manufacturing company of used IT Servers. These materials are returned back to the manufacturing plant following an end of lease or a repurchase. On arrival, materials are verified and stored until a customer order will re-use it after to be re-configured, tested and shipped back.

During the last 10 months this activity has undergone a lot of environment changes affecting the business process:

- ▶ 2 new products to manage
- ▶ A customer demand increase

- ▶ An internal organization change with a separation of the activities in 3 buildings, previously grouped in 1 location in 1 building
- ▶ A loss of skilled resources.

Consequently the industrial performances were degrading until management decided to launch a re-engineering, end to end, from the customer order receiving, to the product ready to be shipped. The goal was obviously to recover indicators targets and process operations stability, but also to take the opportunity to make a breakthrough and optimize resources.

After the As-Is study, the re-engineering team has mainly concluded the following:

- ▶ Information management:
 - Difficult communication between people physically located in different buildings through intensive usage of internal mails and phone
 - Manual materials tracking through numerous paper forms
 - Incomplete end-to-end process monitoring through different local tracking tools
 - Incomplete execution of disposition information on materials to optimize materials usage.
- ▶ Priority management
 - Rules differently applied depending on product types for parts to be purchased to complete order
 - Capacity conflicts, specifically for test cells resources
 - Limited skills set of operators impacting production line capacity.

The complete detailed migration plan from the As-Is to the To-Be contains, in fact, more than several dozens of actions planned to be implemented in a 3 month time frame. In this case study, we have only considered the conclusions which have driven the team to look for a solution to combine people communication simplification and end-to-end business process monitoring. This is obviously the first phase of a much larger and more complex project than we are able to address in a single redbook.

In this case, business integration fits the need and can play a significant role in information structuring, and, in the same time, providing to management a close monitoring of events helping them to adjust process resources on line and detect process improvement opportunities.

1.3 The case study business process description

The following drawings illustrate from the higher view to the most detailed all the business process elements we are working on for this case study. We start first with the high level view of the main elements.

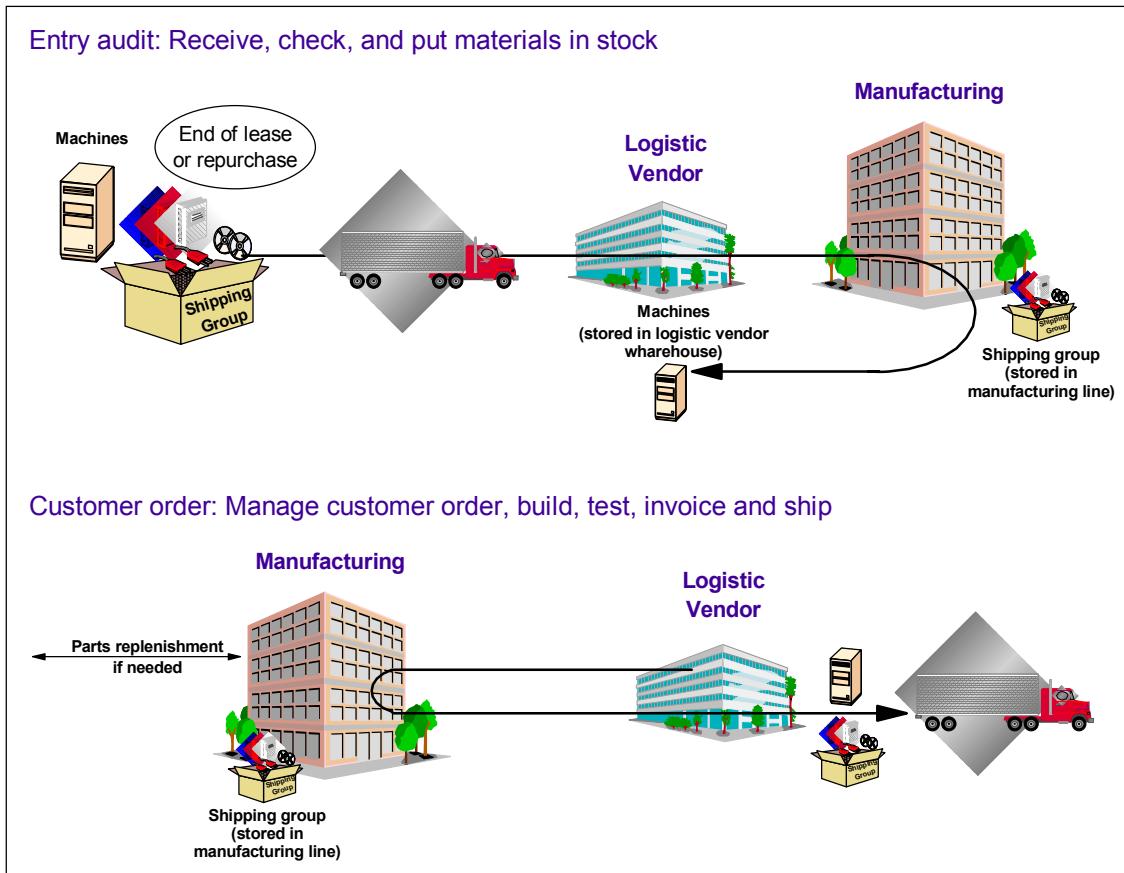


Figure 1-8 High level view of the real case business process

Figure 1-9 on page 13 shows the business process as a flow of main functions. We have numbered the processes and some functions, as we move along we will keep these numbers for reference.

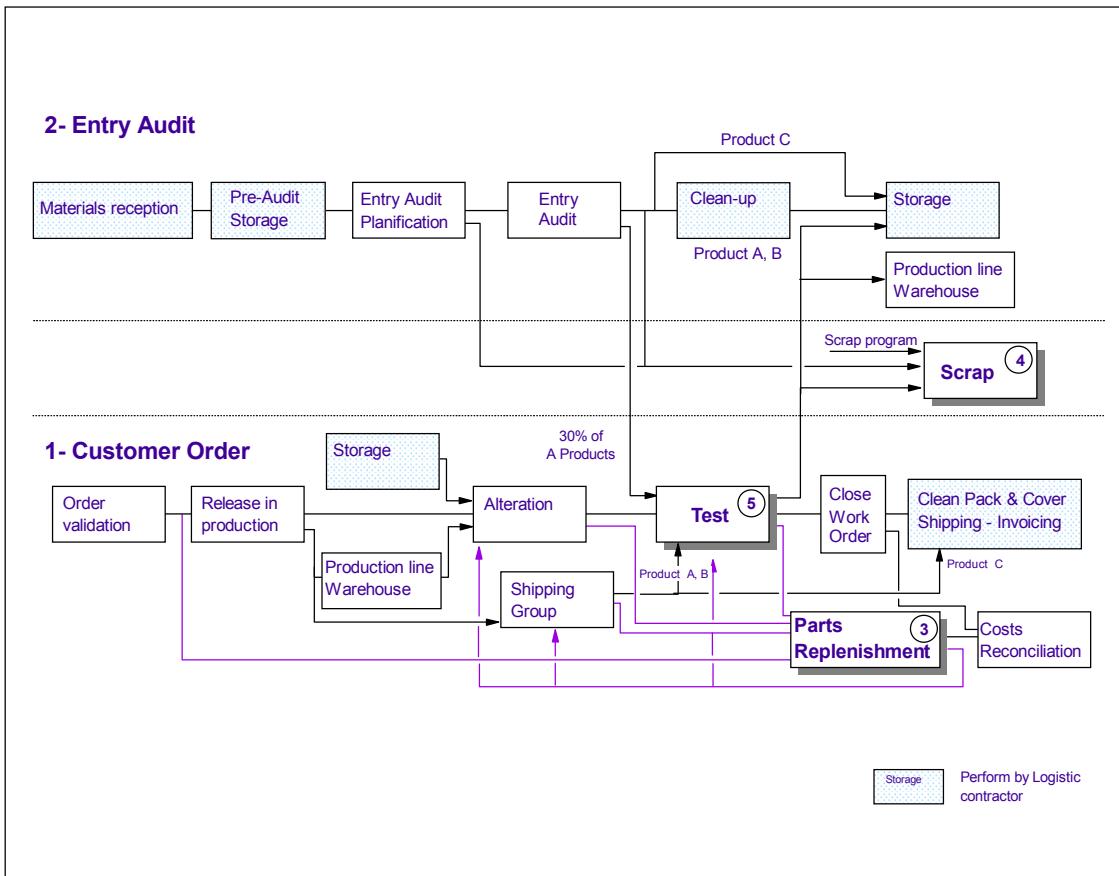


Figure 1-9 Chain of functions overview

1.3.1 Customer order process

The customer order business process starts when an order comes in from an SAP system. This is the business process trigger. Orders are validated in terms of machine configuration and supply in stock is checked before to release order in production. If the order is valid and supply is available in used stock, the production line receives machines, feature codes (that is - memory, power supplies, channel cards...) and configures the order. Alteration performs hardware operations by adding and/or removing feature codes. Feature codes removed are stored in the production line warehouse.

In parallel, the production line warehouse produces the shipping group which is dependent of the order configuration. Then, the machine is tested, the order is closed, and sent out to the logistics vendor which makes some machine

finalization (clean, pack and cover) if it is a product C, and, in any case, proceeds to shipping and invoicing activities. The business process ends when the SAP sales system is updated after shipping and invoicing.

Orders can be on feature codes only when the customer requires a configuration upgrade of an existing machine he owns already.

If the used inventory doesn't have all the parts available to build the machine, or if alteration and shipping group detect missing parts, or also, if test detects a defective parts, parts can be replenished from a external source according to price and replenishment time rules. On parts arrival, the order is completed at the step it was stopped and can proceed to the end of the business process.

1.3.2 Entry audit process

Entry audit is in fact the first process in this business and consists of storing materials in warehouses and record them in the inventory system.

Materials are received in the logistic vendors warehouse and pre-stored until manufacturing calls for the machine to check the configuration. At this time, if disposition instructions are available for the machine, meaning that only some feature codes are interesting to keep, the machine is delivered the test. The feature codes with disposition instructions are tested, removed from the machine, and stored in the production line warehouse. This is the case for 30% of the machines of the product A. This allows the customer order process to respond very quickly to an order on feature codes only, especially if they are already tested. In this case, all that is needed is to pack the tested feature codes and they are ready to be shipped without having to perform any other operations. The rest of the machine is sent out directly to scrap as well as the defective parts detected during test operations.

When materials configuration is checked they are stored in two different locations:

- ▶ In logistics vendor for machines (large dimension)
- ▶ In the production line warehouse for feature codes and shipping group.

1.3.3 Sub-processes

Parts replenishment

It is a very critical processes to allow the manufacturing to fulfill the customer orders. It has to be very responsive in less than 0.5 days to be able to assess order feasibility. Parts can be replenished from 4 different locations which are for some, internal to the plant, and for some in other countries. Shipment tracking of

these parts to accomplish the completion of customer orders is stopped while waiting for them, but it is key with respect to the manufacturing cycle time committed target. This is where the business integration associated with workflow management was perceived to be very necessary to monitor and closely manage the completeness of the business process.

Scrap

It is a common process to the 2 processes customer order and entry audit. It is triggered by the entry audit process after advance testing of feature codes and by the customer order process when parts are found to be defective during test operations. It has also its own scrap program based on yearly financial decisions and inventory analysis. Scrap operations are approved by different people in different organizations and it is also an opportunity for implementing a business integration management system with a workflow to track the scrap progress and keep archives for audit purpose.

Test

Test is a common process to the 2 processes customer order and entry audit. Capacity conflicts can occur at this step as seen during the re-engineering study. A close monitoring of this process will help production line management to deal with solving capacity issues.

1.3.4 The case study business process details

As mentioned previously, to implement a Business Integration Management System, a good knowledge of the set of activities and the interactions must be mapped.

We have chosen some conventions in the next process flows as follow:

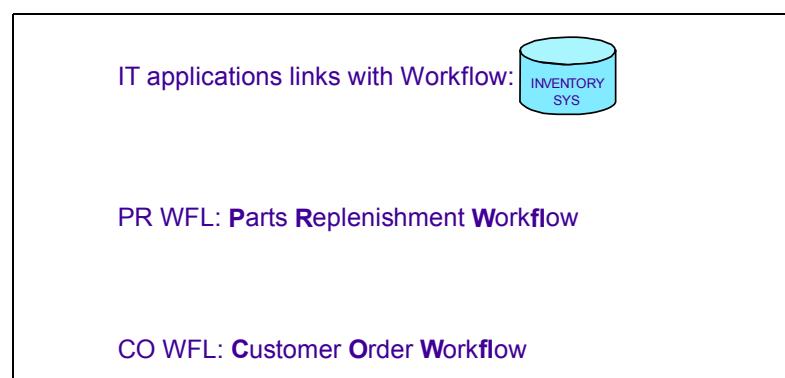


Figure 1-10 IT application and Workflow graphic and naming convention

Figure 1-11 on page 16 and Figure 1-12 on page 17 using these conventions show the who is doing what, when, with what in the customer order process.

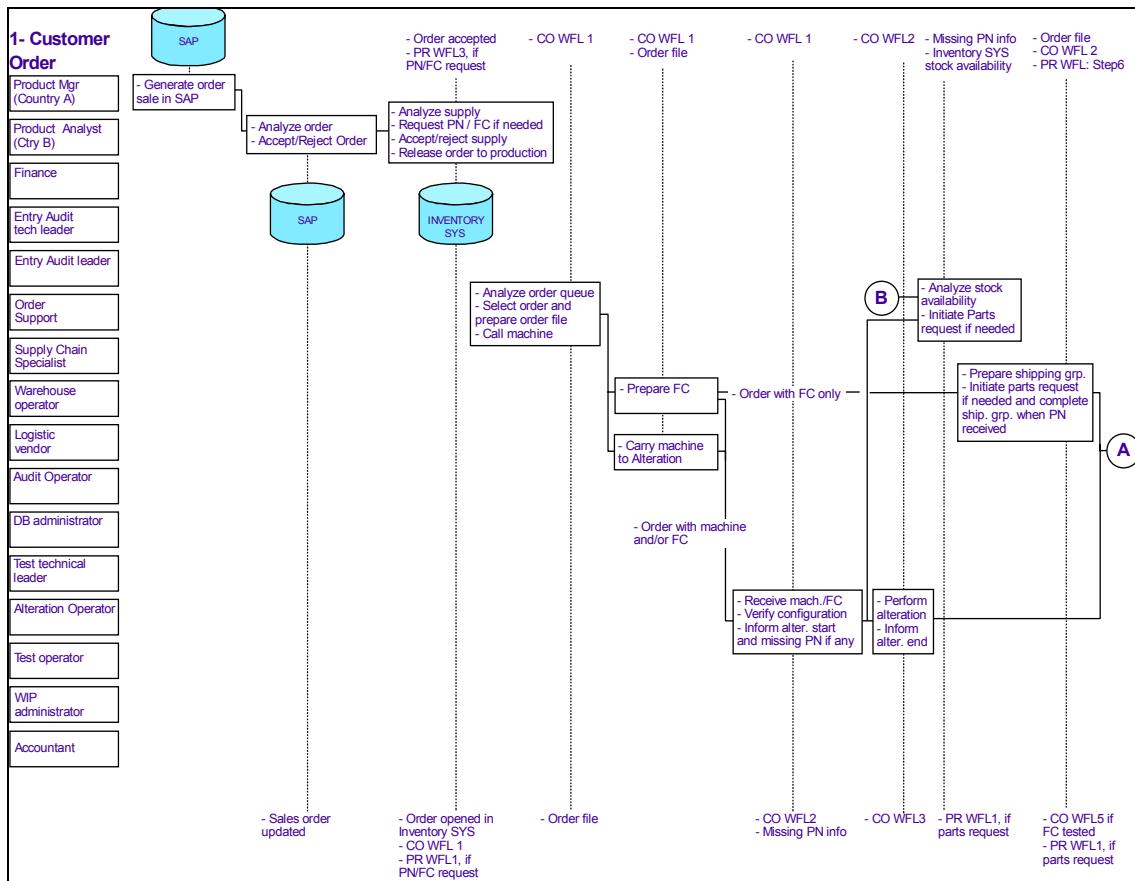


Figure 1-11 Customer order process - Part 1

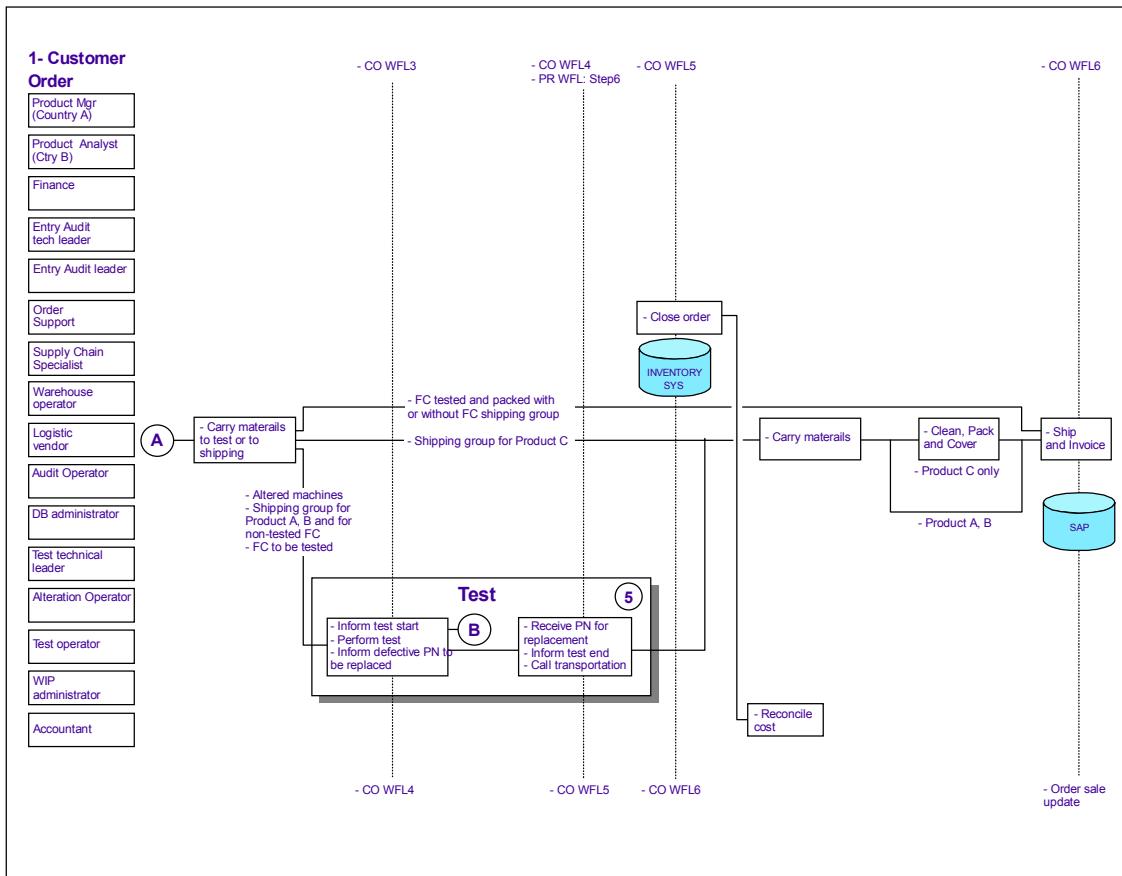


Figure 1-12 Customer order process - Part 2

The customer order process will be supported in the future by a WebSphere MQ Workflow (CO WFLx inputs and outputs) this will enable the monitoring of the customer orders from end-to-end all along the business process activities.

Figure 1-13 on page 18 and Figure 1-14 on page 19 show the entry audit process details. It will be also monitored through a future MQWorkflow (WFLx inputs and outputs).

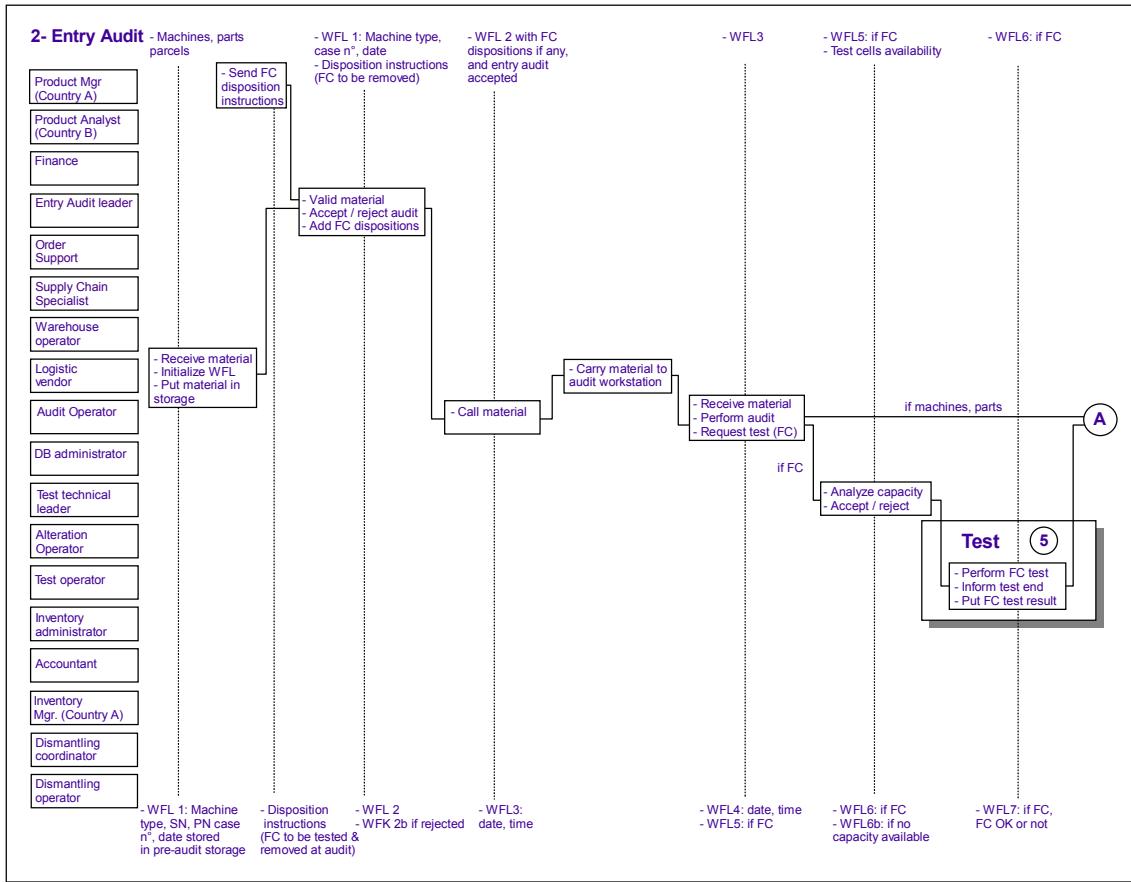


Figure 1-13 Entry audit process - Part 1

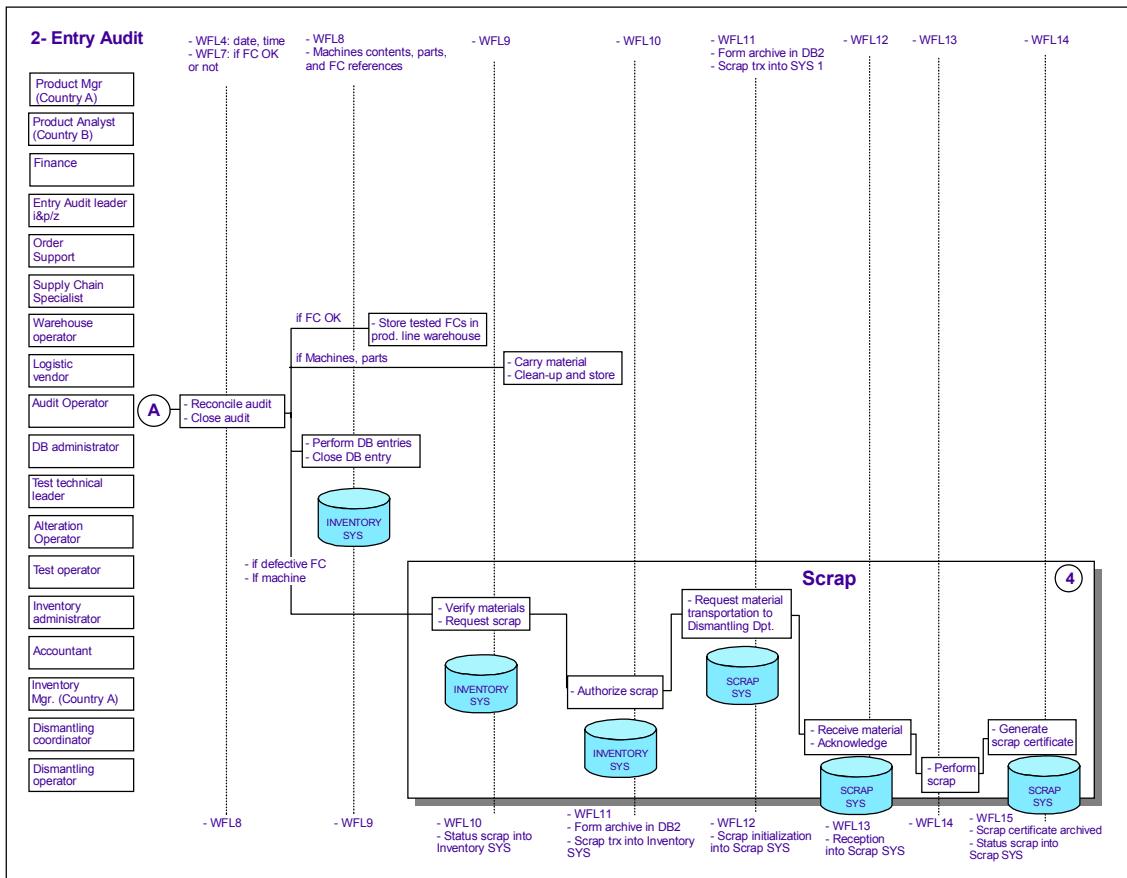


Figure 1-14 Entry audit process - Part 2

Figure 1-15 on page 20, Figure 1-16 on page 21 and Figure 1-17 on page 22 show the parts replenishment process details. This process will be the case study used for this redbook from the modeling phase to the business process monitoring in the real production environment.

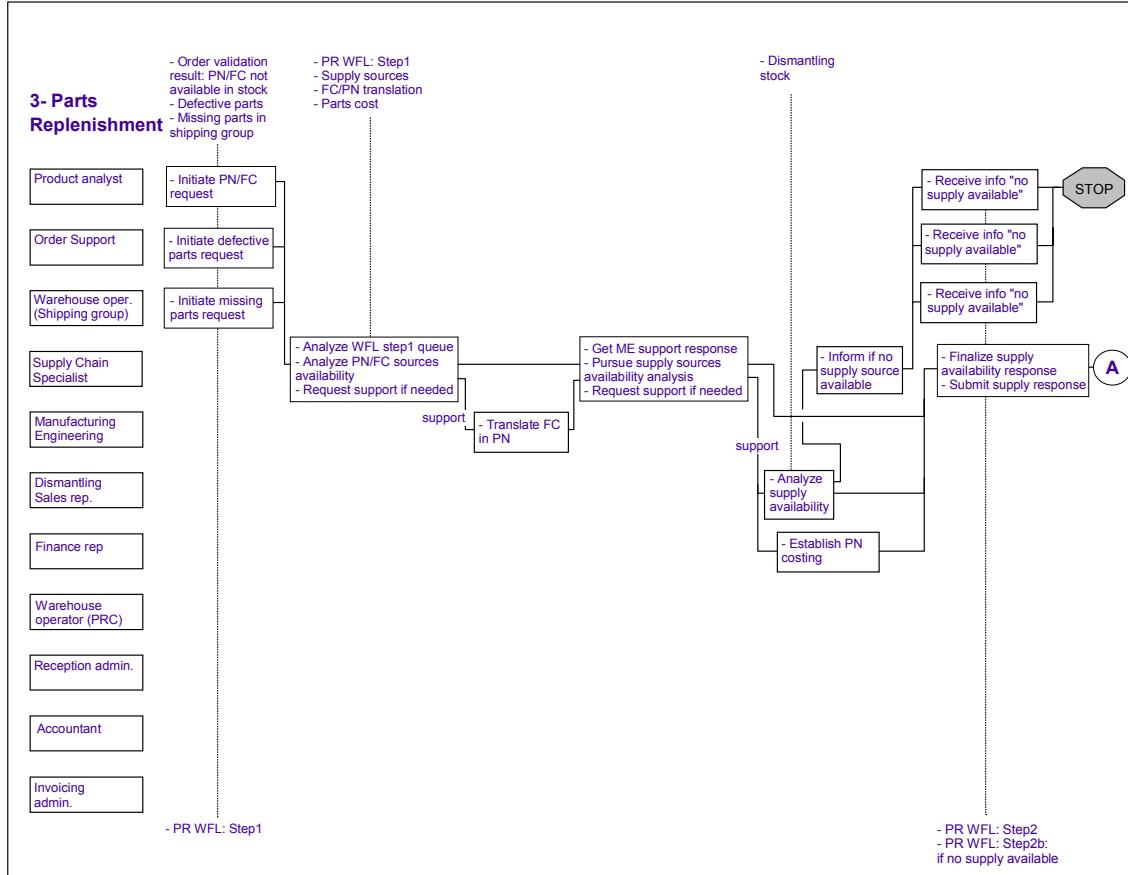


Figure 1-15 Parts Replenishment process - Part 1

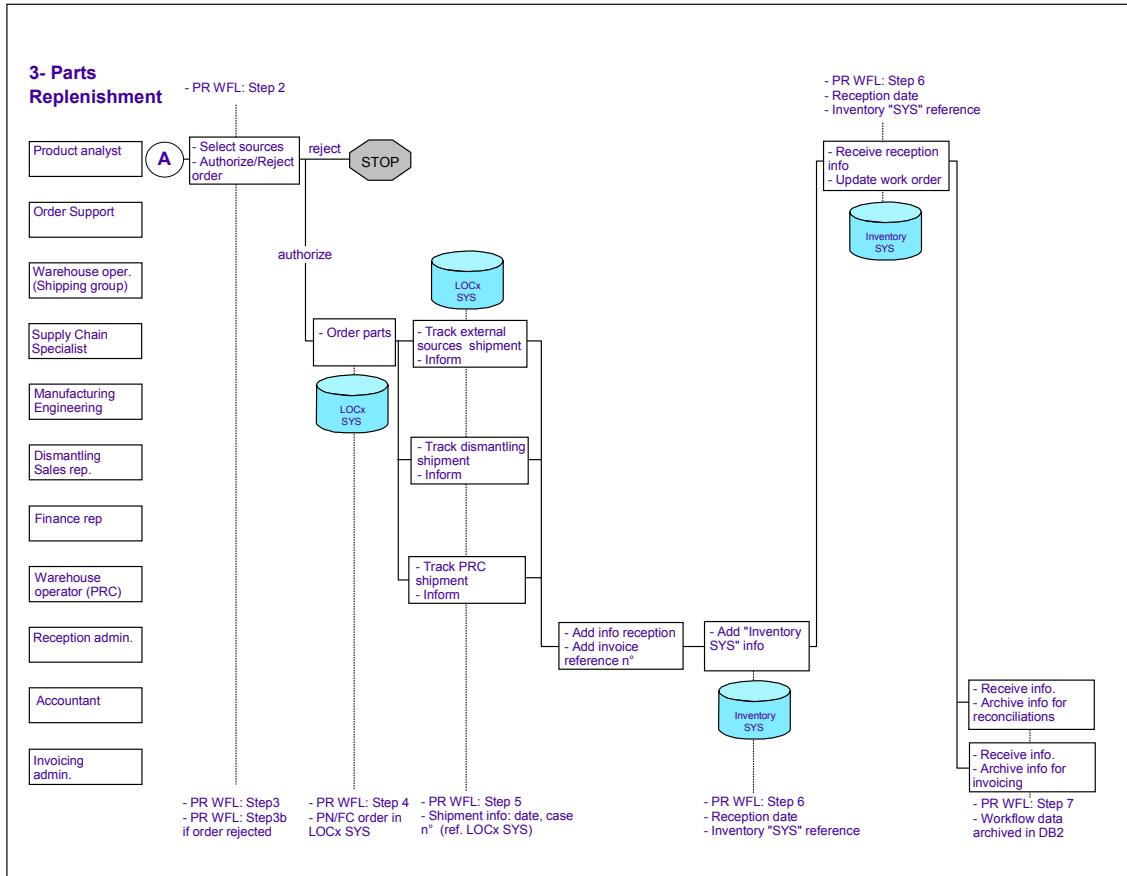


Figure 1-16 Parts replenishment process - Part 2

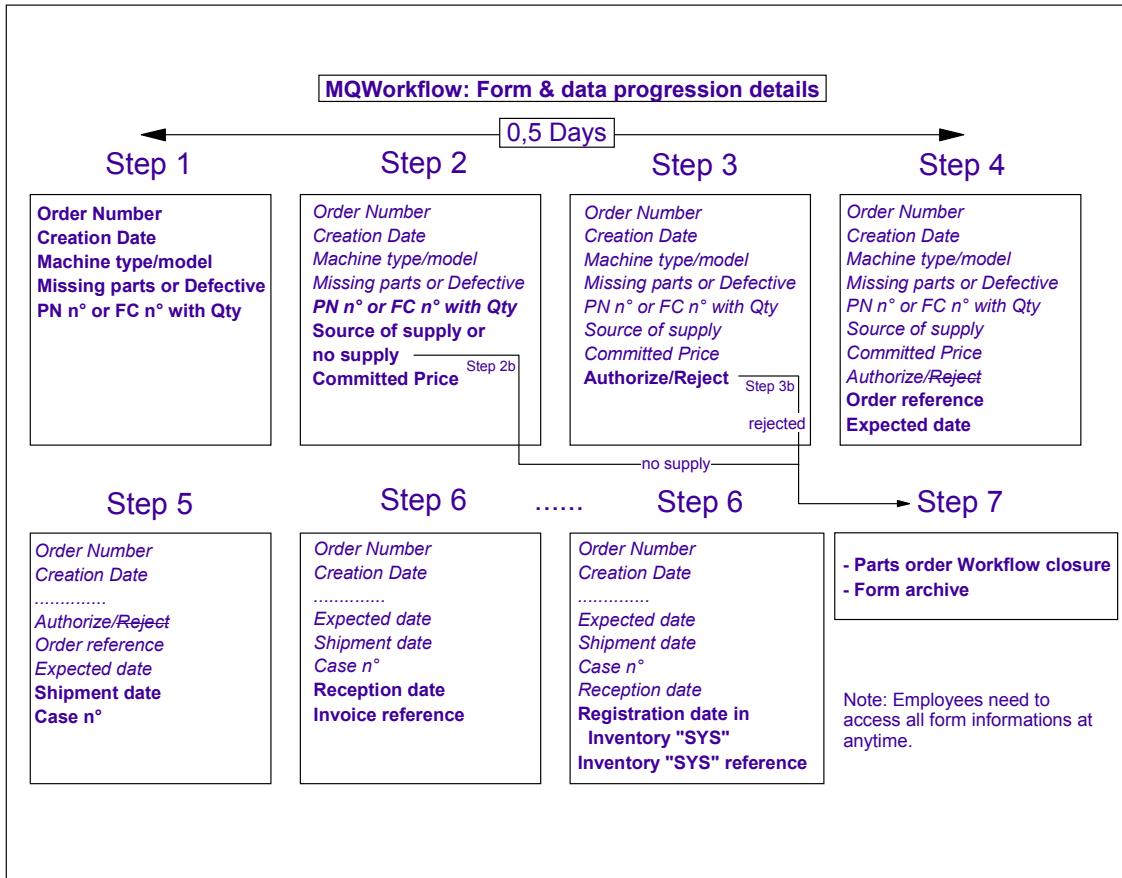


Figure 1-17 Parts replenishment process - Part 3 (data structure details)

Figure 1-17 shows in more detail, the information content of the form handled by the workflow between employees for parts replenishment (PR WFL).

Steps 1 to 4 are the steps from parts request generation to parts ordering if approved by the authorized people (product analyst).

From step 1 to 4, a cycle target has been set up to 0.5 days. It is the committed time to not jeopardize customer order shipment and to take disposition on supply solving.

Steps 5 to 7 are the steps to track parts replenishment: shipping from the source, receiving by the logistics vendor, delivery to the reception area in the production line.

At step 7, the form contains all the information that accounting and invoicing administrative employees will use for accounting journals reconciliation.

1.4 Some comments on case study selection

The parts replenishment process was chosen to be the pilot business process for a number of reasons:

- ▶ It is sufficiently complex (although not the most complex of the manufacturing business processes), to enable the team (of both business process specialists and IT specialists) to evaluate the technology tools and to get a feel for what they are capable of providing.
- ▶ This process is currently problematic due to the nature and amount of human intervention and interaction required, much of which went undetected or was delayed.
- ▶ Many users of this process were unhappy with the process itself and the lack of visibility that was inherent in a paper and email based process. As such, the automating of this process and the user reaction and level of buy-in to a “new way of doing things” is a valuable place to start.
- ▶ This optimization and automation of this process was seen to have the potential to provide immediate tangible results in the form of shorter turnaround times.

To this end, the automating of the human interaction within the process (and not yet the connectivity of the IT systems) is the focus of this case study.

If is envisaged that, should this pilot be successful, a follow-up will address the IT systems connectivity by extending and automating the reach of these initial processes.



The technology components

In this chapter, we provide an overview of the infrastructure components of our case study.

The software used for our case study includes:

- ▶ DB2 v8.1 with FixPack 2
- ▶ WebSphere Application Server V5.0
- ▶ WebSphere MQ V5.3 with CSD3
- ▶ WebSphere MQ Workflow V3.4 with ServicePack 4
- ▶ WebSphere BI Workbench Server V4.2.4 with FixPack 1 and FixPack1 HotFix
- ▶ WebSphere BI Workbench V4.2.4 with FixPack 1 and FixPack 1 HotFix
- ▶ WebSphere BI Monitor V4.2.4 with FixPack 1 and FixPack 1 HotFix.

2.1 Overview

To achieve the modeling and monitoring capabilities for our case study we used WebSphere BI Modeler and Monitor which consists of:

- ▶ WebSphere BI Workbench Server
- ▶ WebSphere BI Workbench
- ▶ WebSphere BI Monitor

For the runtime execution of our business processes we used WebSphere MQ Workflow.

We will now outline each of these major components of the solution.

The WebSphere BI Modeler and Monitor provide software tools to help you model, simulate, analyze, automate and monitor complex business processes quickly and effectively. Business managers and business analysts can more easily design and develop process flows that improve the end-to-end business process. As mentioned earlier in this book, this is the approach that was taken with our case study. The people with the in-depth knowledge of the business processes themselves were able to use the tools to maximize their business effectiveness by optimizing processes in a complex environment. The business processes were then implemented using WebSphere MQ Workflow (a component of WebSphere Business Integration) using a method that separated the business flows from the underlying organizational and IT considerations allowing for process independence. After deployment, the processes were then able to be monitored in real-time to allow for enhancement of the model and on-going optimization of the real-life business process.

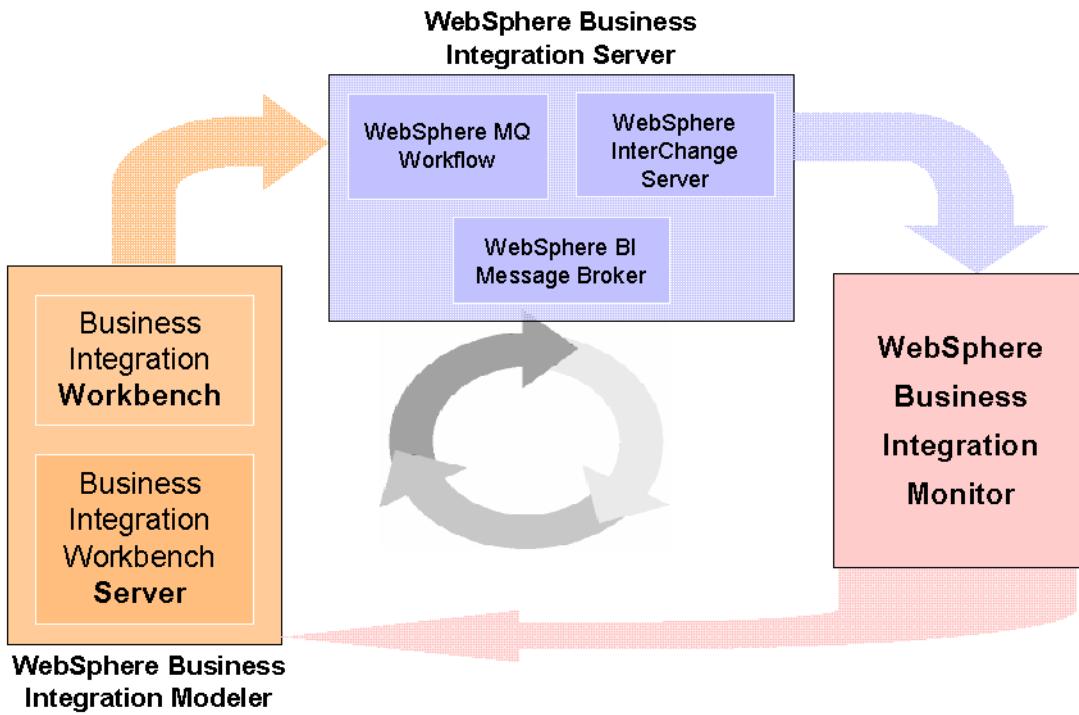


Figure 2-1 Product set

2.1.1 Model: WebSphere BI Workbench

WebSphere BI Workbench (which was previously known as IBM Holosofx) is an application that provides business process modeling, enterprise modeling, business process analysis and workflow translation.

Business process analysis is one of the critical and most useful capabilities of the Workbench. Much business process modeling effort stops at developing flow diagrams. However, using the Workbench the effort is extended to business process redesign and automation. The Workbench helps you model a process and design GUIs, analyze the process and translate the process for workflow runtime.

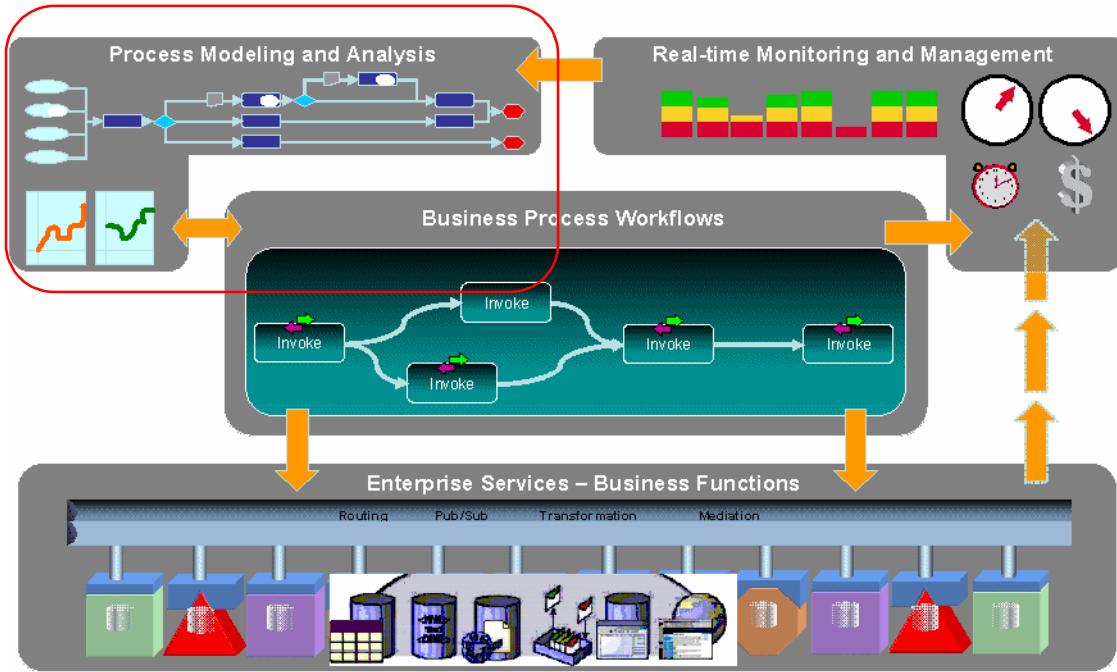


Figure 2-2 Process modeling and analysis

The key features of the Workbench:

- ▶ The Workbench is an easy-to-use process modeling tool that lets you test, analyze, simulate, and validate business processes and software models
- ▶ Allows you to import and export business process model definitions to and from WebSphere MQ Workflow for automation
- ▶ Allows you to model WebSphere MQ Integrator Broker V2.1 and WebSphere Business Integration Message Broker V5 flow activities
- ▶ Provides a shared workspace environment and collaboration abilities for business and IT departments
- ▶ Offers a full range of business process models, from the creation of process flow diagrams to the validation of process outcomes
- ▶ Allows data structures to be exported into WebSphere MQ Workflow.

The main components of the Workbench are:

- ▶ Business Modeler
- ▶ UML Modeler
- ▶ XForm Designer.

Business Modeler

The Business Modeler consists of the following components:

- ▶ **Enterprise modeling**

Capture, store, and share important organization information in a common database, or repository.

Create an accurate representation of the factors that shape each outcome of your business processes.

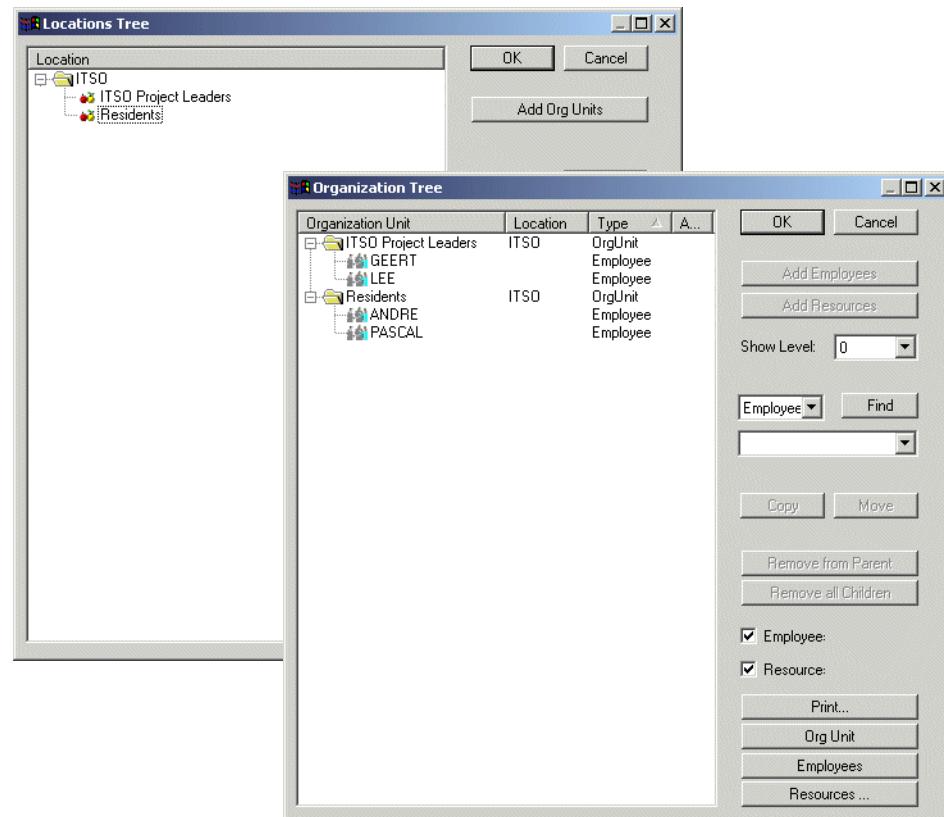


Figure 2-3 Simple organizational information

- ▶ **Process modeling**

Use drag-and-drop features to convert complex business processes into easy-to-use flow diagrams.

Review business processes in cascading detail levels - from a high-level summary view down to granular detailed tasks.

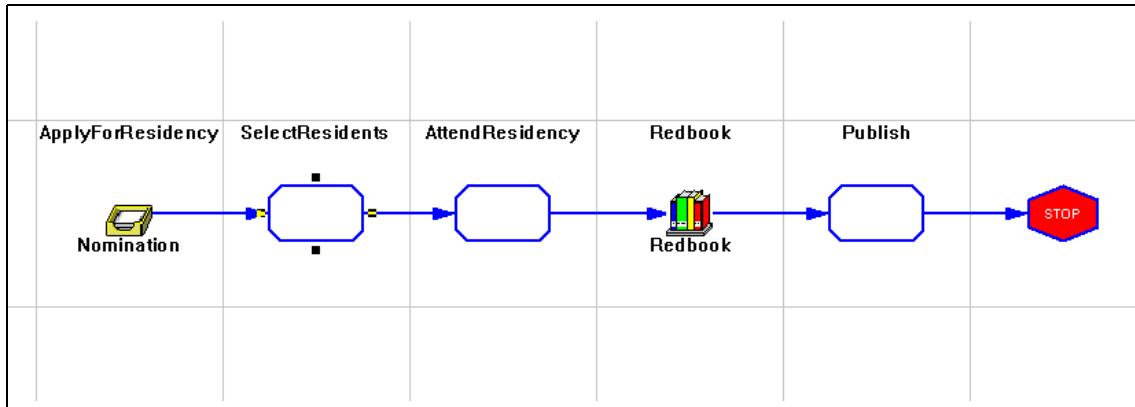


Figure 2-4 Simple model

► **Performance simulation**

Simulate how your new processes will perform with a variety of environmental factors, such as time and cost, so you can project outcomes before implementation.

► **Business analysis**

Analytical tools, including weighted-average analysis and reporting, to choose optimal business processes.

► **Workflow integration**

Convert process models into Flow Definition Language (FDL) and export into WebSphere MQ Workflow for automation.

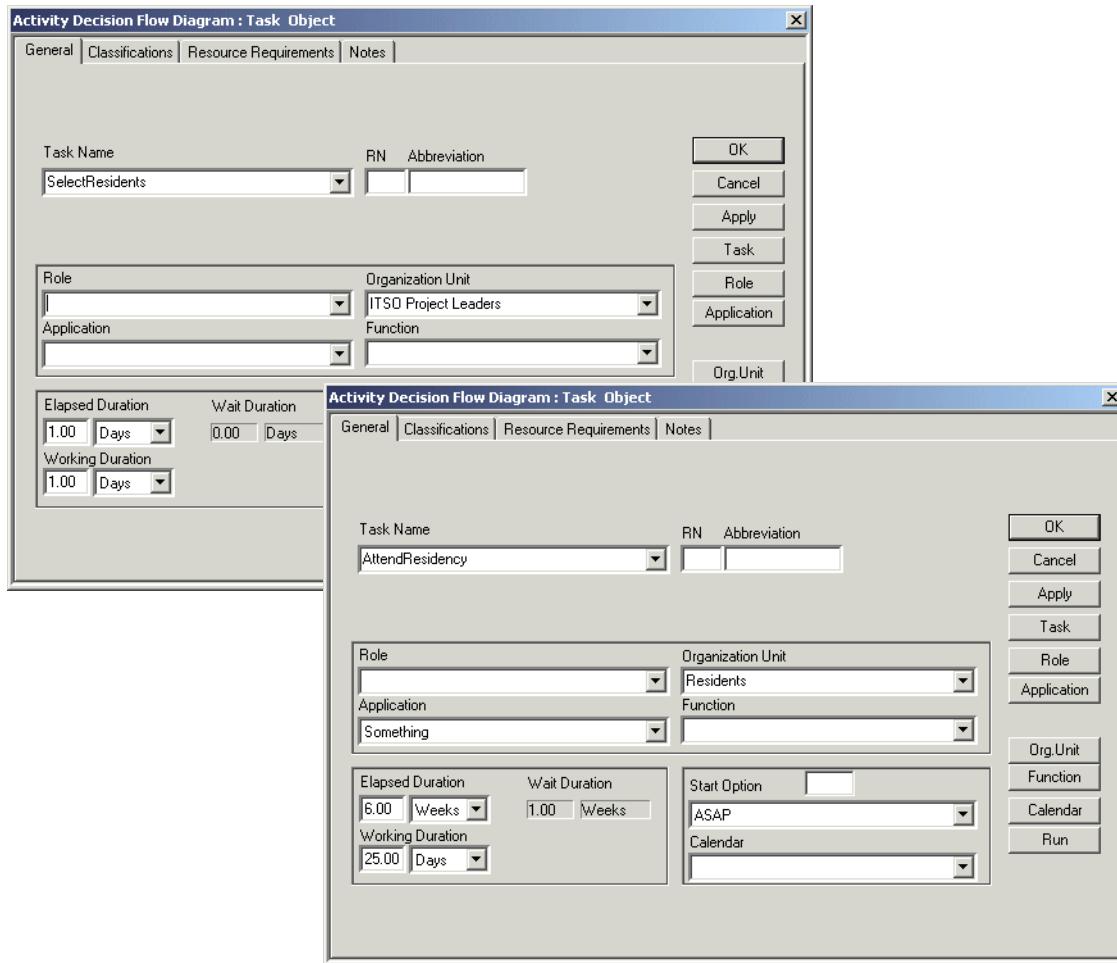


Figure 2-5 Activity properties

UML Modeler

UML (Unified Modeling Language) Modeler acts as a bridge that spans the gap between business users and IT professionals. With the UML Modeler, business users can export UML output (with business data) into rapid development IT tools such as Rational Rose and XDE.

This is accomplished by transforming repository and process data into UML formats. In contrast, object models created in an IT environment can be imported into the UML Modeler.

Various types of standard UML diagrams that can be created by the UML Modeler include:

- ▶ Use Case: shows the interactions between business users and the application or among applications
- ▶ Sequence: shows object interactions as a function of time
- ▶ Collaboration: shows required object interactions
- ▶ Class: shows the relationships among Classes
- ▶ Activity: states the essential sequencing rules that should be followed
- ▶ State: describes the possible states that a particular object can have and how state changes
- ▶ Component: shows a set of components and the relationships among them.

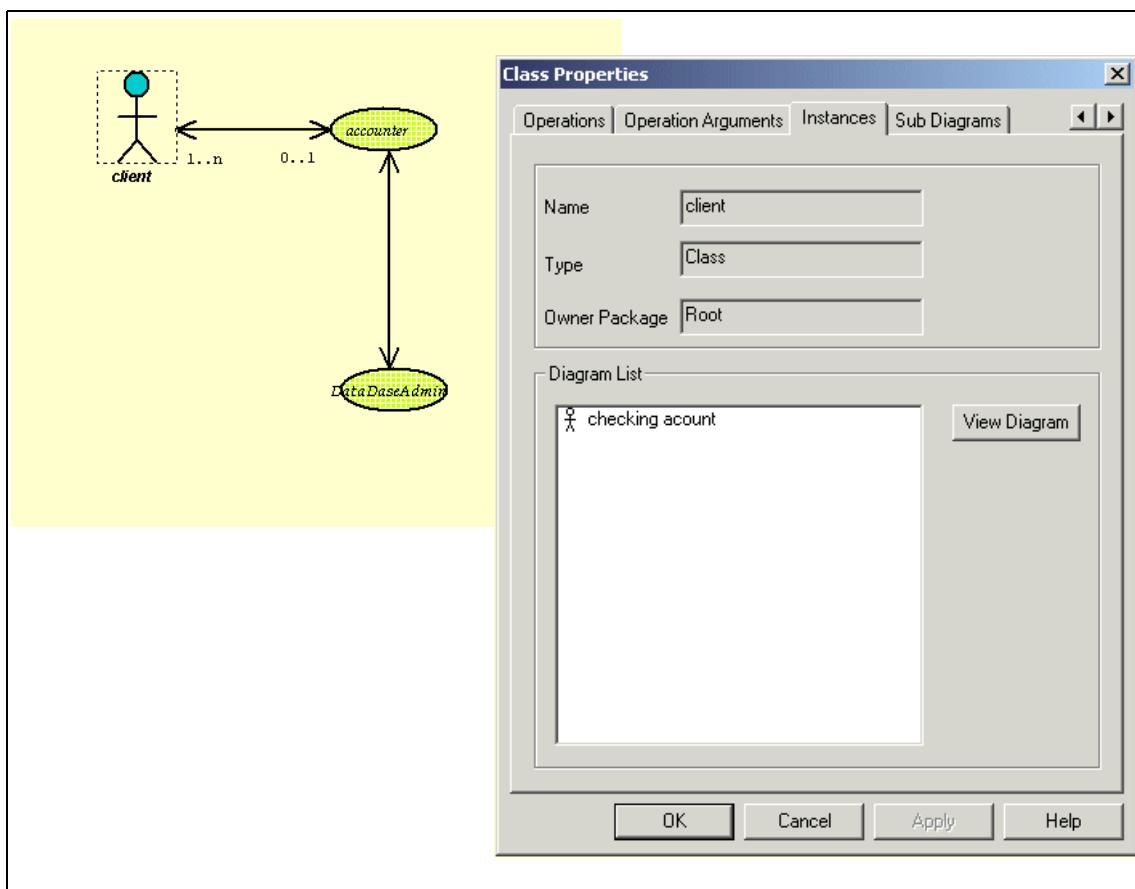


Figure 2-6 Use case diagram and class properties

For more information on using the UML Modeler see:

IBM WBI Workbench UML Modeler User Guide Version 4.2.4

XForm Designer

The XForm Designer allows users to design graphical user interfaces (GUIs) that meet their requirements for application interfaces and forms. It provides screen mock-ups of the required interfaces and forms to the IT team.

It can also convert interface mock-ups to XML for use in other software development applications.

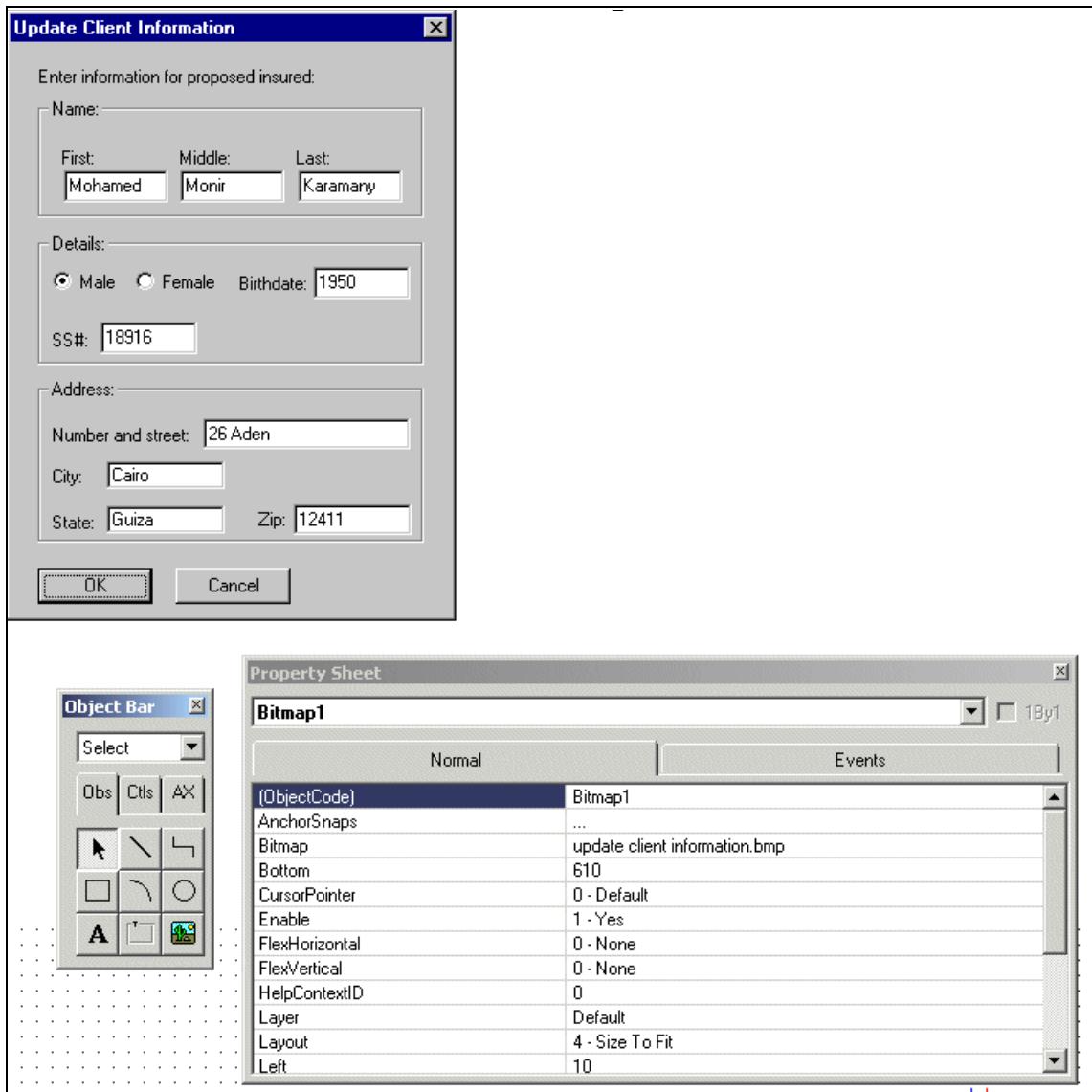


Figure 2-7 Components within the XForm Designer

2.1.2 Model: WebSphere BI Workbench Server

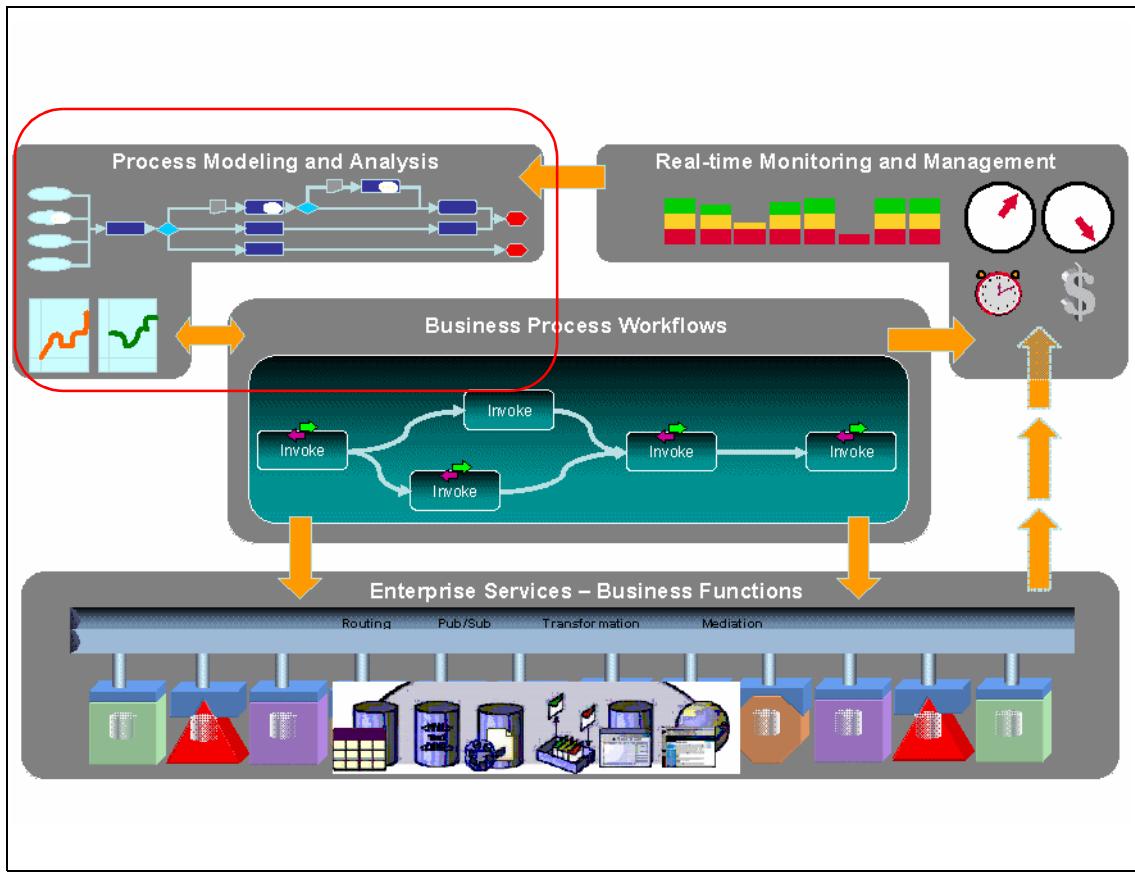


Figure 2-8 Step 1: modeling

WebSphere BI Workbench Server (which was previously known as IBM Holosofx) addresses the needs of users who work in a highly collaborative environment. It provides repository management and Web publishing capabilities, facilitating process design collaboration and Web access to process models, policies, procedures and business rules. The Workbench Server consists of two components:

- ▶ Repository
used to consolidate and standardize process models.
- ▶ Web Publisher
used to view process models, procedures and business rules.

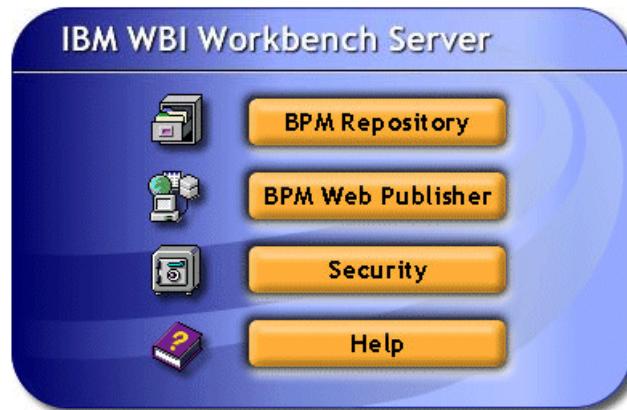


Figure 2-9 After logon to the Workbench Server

Repository

The Repository is a content management component that provides centralized storage of business process models. It is a Web-based application that permits teams to collaborate, it enables users to share and manage organization files and permits authorized users to save and share organization files with their processes in a shared database. This database acts as a library for controlling files that are being checked out or checked in. All users may then work collaboratively on Organization files in order to accomplish their tasks.

The main features of the Repository are:

- ▶ Multi-user support
- ▶ Specification of user access rights to control user actions
- ▶ Addition of organization files to the database
- ▶ HTML-based user interface
- ▶ Secure (database) storage of organization data and business processes
- ▶ Check-in and check-out facilities
- ▶ Version management with the ability to switch from one version to another
- ▶ Search tools for locating specific repository data.

Check-in an Organization:

Upload a zip file:

If organization is V.423 please select a codepage:

Add as a new Organization
Org. name:

Add to an Existing Organization
Existing Orgs:

Check-out an Organization:

Select an Organization:

Figure 2-10 Import an organization into the repository

Web Publisher

The Web Publisher helps manage and disseminate information about business processes by publication of the models and associated information via the Web.

The main features of the Web Publisher are:

- ▶ Users can browse organization files which contain information about processes, policies, procedures and Lines of Value (LOVs).
- ▶ It is a Web-based delivery which enables the easy distribution of reports, policies, processes and documentation.
- ▶ Can be used as a tool to train staff on business processes and business rules.
- ▶ Provides organization charts (including employees by organization).

Please select an organization to view:		
<input type="button" value="ITSO ▾"/>		
Organization Unit Report		
Name :	Residents	
Description :		
Line/Staff :	Line	
Head Organization Unit :		
Manager :	NA	
Location :	ITSO	
Goals :		
Employees :	Pascal ,Durazzi Andre ,Marleau	
Resource	Organization Unit Report	
Name :	ITSO Project Leaders	
Description :		
Line/Staff :	Line	
Head Organization Unit :		
Manager :	JOHN	
Location :	ITSO	
Goals :		
Employees :	Lee ,Gavin Geert ,Van de Putte	
Resource Name :	Type :	Number Available :

Figure 2-11 Organization information in the repository

- ▶ Provides detailed information about tasks (within processes), the inputs, outputs and external entities
- ▶ Tracks procedures by:
 - The use and status of each
 - Where they are used
 - Who uses them and who is affected by them
 - Associated business rules
- ▶ Provides a J2EE-based application designed for deployment on WebSphere Application Server.

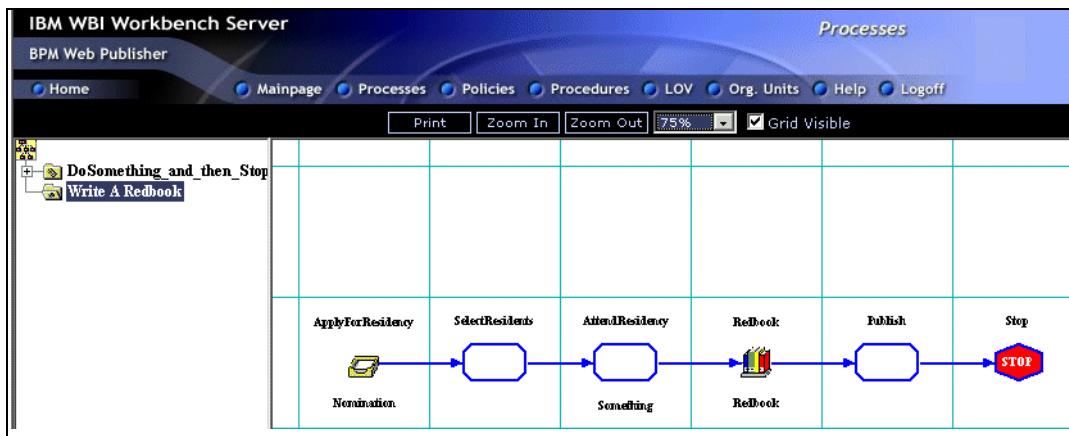


Figure 2-12 Process information in the repository

The screenshot shows a Microsoft Internet Explorer window titled 'AttendResidency - Task Report'. The task report details are as follows:

Task Report	
Task Name :	AttendResidency
Task Description :	None
Reference Number :	0
Process Owner :	Write_A Redbook
Elapsed Duration :	6 week
Working Duration :	25 day
Organization Unit :	Residents
Function :	None
Role :	
Application :	Something
Classifications :	Real Value Added Quality Control Potential Workflow NA NA

Figure 2-13 Task properties

2.1.3 Integrate: WebSphere MQ Workflow

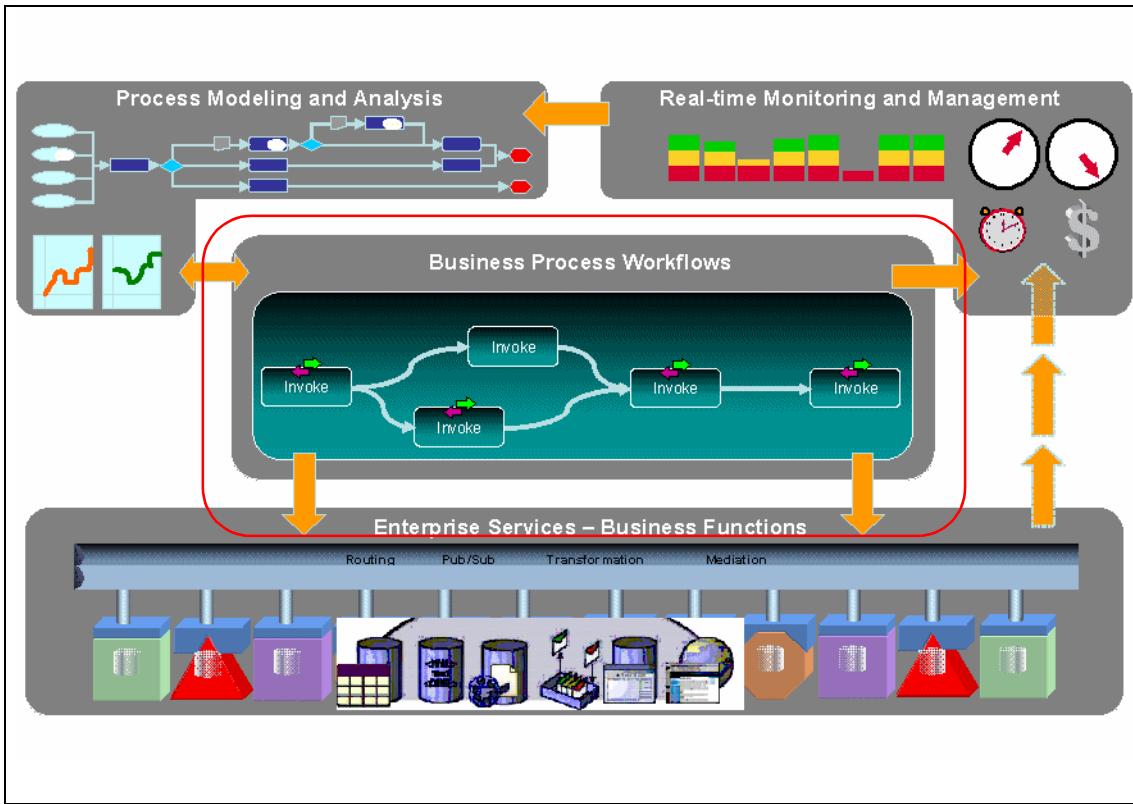


Figure 2-14 Step 2: implementation and runtime

WebSphere MQ Workflow (which was previously known as MQSeries Workflow) is the core process engine to automate business processes that span different systems, applications and people. In this case study, the support for integrating processes with many human interactions was key to the solution. For more detailed information on and sample applications using WebSphere MQ Workflow, please see the following IBM Redbooks:

MQSeries Workflow for Windows NT for Beginners, SG245848

Intra-Enterprise Business Process Management, SG246173

An EAI Solution using WebSphere Business Integration, (V4.1) SG246849

2.1.4 Monitor and manage: WebSphere BI Monitor

The WebSphere BI Monitor (which was previously known as IBM Holosofx) helps track processes, events, business performance measures and generates statistical reports for analysis, based on actual data. The Monitor facilitates completion of the cycle of business process improvement by feeding actual information back the Workbench for further analysis and process improvement. This provides the basis for business process management, which turns the process into a continuous cycle.

The basic function is to track data generated from a variety of sources and environments and to correlate that information to the process models that were designed using the Workbench. The process models serve as the basis for visualizing the performance of the process as it happens. You are then able to see what activities are being performed, by whom and where there are any bottlenecks. The Monitor is able to process data from sources other than WebSphere MQ Workflow, such as the WebSphere BI InterChange Server (formerly known as IBM CrossWorlds) and the WebSphere BI Message Brokers (formerly known as WebSphere MQ Integrator).

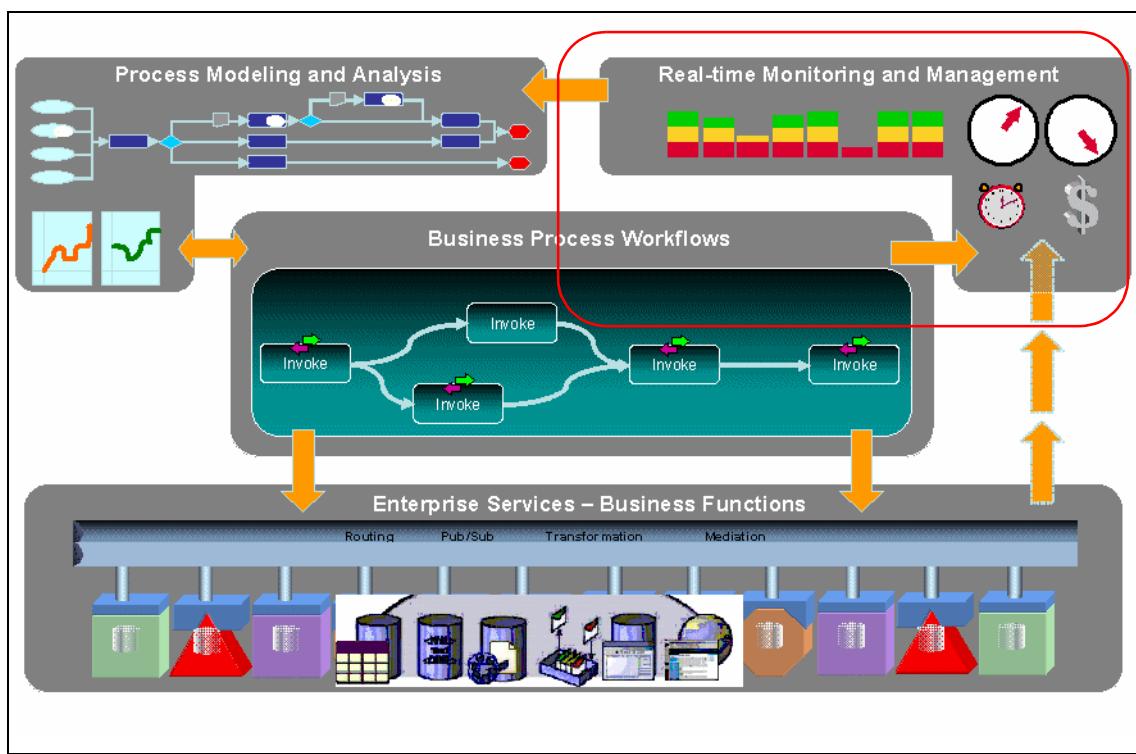


Figure 2-15 Step 3: monitoring

WebSphere BI Monitor consists of two components:

- ▶ Workflow Dashboard
 - which enables you to track processes, work items and business performance measures which were modelled in the Workbench, in real-time and take any necessary corrective actions.
- ▶ Business Dashboard
 - which is used to generate reports based on historical data, using a set of analytical tools such as trend analysis.

Workflow Dashboard

The Workflow Dashboard enables you to:

- ▶ Track a process and its business performance in real-time
- ▶ View process instances and activity instances
- ▶ Perform administrative functions and corrective actions (such as suspending, terminating and load balancing and redirecting)
- ▶ Monitor current processes and identify their performance metrics in real-time
- ▶ Export data to process models for use in the Workbench
- ▶ Enhance your workflow alerts and monitoring based on user-defined business measure
- ▶ Use LDAP for user authentication
- ▶ Monitor non-process data by retrieving information from external sources (such as databases)
- ▶ Monitor events from WebSphere BI Message Brokers and the WebSphere BI Server

The Workflow Dashboard is provided as a J2EE-based application for deployment using WebSphere Application Server.

Business Dashboard

The Business Dashboard enables you to:

- ▶ Generate detailed, customized statistics based on the historical process data
- ▶ Produce performance-oriented data to enable proactive business process management
- ▶ Provide user-defined performance measures that include financial, cost, time and utilization measures
- ▶ Export actual data to the Workbench for analysis
- ▶ Use actual versus statistical information for analysis and redesign.

The Business Dashboard is provided as a J2EE-based application for deployment using WebSphere Application Server.

For more information on the basics of using the Modeler and the Monitor please see IBM Redbook:

Continuous Business Process Management with HOLOSOFX BPM Suite and IBM MQSeries Workflow, SG24-6590



Using WebSphere BI Modeler for WebSphere MQ Workflow

This chapter introduces the terms and concepts that are relevant for WebSphere BI Modeler and contrasts them with terms and concepts that are used in WebSphere MQ Workflow and its modeling component, the Buildtime.

We also describe some of the precautions that you have to take when using WebSphere BI Modeler for deploying process models in WebSphere MQ Workflow.

3.1 Overview

WebSphere BI Modeler, also called WebSphere BI Workbench, is the process modeling tool within the WebSphere Business Integration family of products. It can be used to model processes that can be deployed in multiple run time environments. One of those run time environments is WebSphere MQ Workflow. Other possible run times for a process model or a portion of a process model include WebSphere InterChange Server and WebSphere BI Message Broker. But the modeling tool can also be used to model processes for non-IBM runtime environments.

For people that are familiar with the modeling tool of WebSphere MQ Workflow, called Buildtime, it is worthwhile to review a number of concepts and terms that are used within WebSphere BI Modeler and link them to their equivalent terms and concepts within Buildtime.

3.2 Terminology

The world of business process management uses many terms that do not always mean the same thing for everybody. Every vendor or product uses definitions for concepts as a business process, or a task. Sometimes these definitions are not even sharply described. In this section, we will review a number of terms and concepts that are commonly used in WebSphere BI Modeler and in Buildtime.

3.2.1 A business process

A business process is considered to be a set of activities that represent all the alternative methods of performing the work needed to achieve a business objective. It is represented in the WebSphere BI Workbench as a process object that contains tasks, other process objects, flows, and decisions. This definition of a business process relies on the definition of other terms that we describe later in this chapter.

When the term business process is used in the context of WebSphere MQ Workflow, it is normally defined as consisting of activities or subprocesses. Subprocesses themselves consist of one or more activities. For the various activities in a process, you specify the control flow, the data flow, the application programs that implement that activity, and the user that needs to perform that activity.

3.2.2 An activity

The term activity within WebSphere BI Modeler is considered to be a generic term that represents a piece of work performed in a business process. Processes and tasks are activities performed within the organization.

In the world of WebSphere MQ Workflow, an activity is a step within a process that represents a piece of work assigned to a person who can complete that step by executing an application program. An activity can also be a block of activities or a process. A process was earlier already defined as a set of activities. A block is also a set of activities. However, it is different from a process. A block will execute as part of a process until a certain exit condition is reached. A block can not be executed on itself. A process can either be executed as part of another process or on its own.

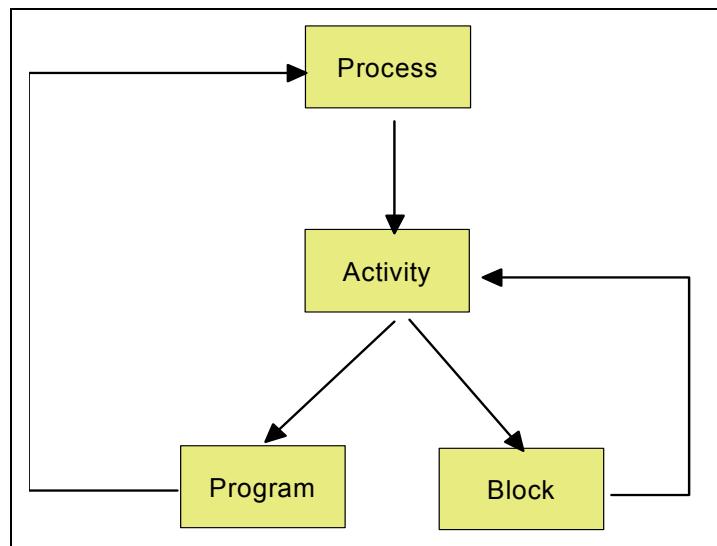


Figure 3-1 Structure of a process in WebSphere MQ Workflow

As can be seen in Figure 3-1, an activity at its lowest level is always a program activity, which is mapped on to an application program executed by a user.

3.2.3 A task

A task in WebSphere BI Modeler is an activity in a process object that is the responsibility of a specified resource. Tasks represent the lowest level of work that you can model in a process.

While at first glance, a task in WebSphere BI Modeler seems to be very similar to a program activity in WebSphere MQ Workflow, there are some fundamental differences.

Within WebSphere BI Modeler, the business analyst will usually model tasks at a very low level. This will result in situations where a sequence of tasks are equivalent to the execution of an application and performing several smaller steps (tasks) within that application. That sequence of tasks will be governed by a number of rules that you can model in WebSphere BI Modeler. But the actual implementation of those rules is not always performed in WebSphere MQ Workflow. It may be implemented in the business application that is used to execute a number of tasks (such as a series of message flows or a collaboration which interacts with back-end applications).

Figure 3-2 provides a schematic overview of such a situation. A decision is first being taken. Based on the outcome, the process will continue with Task 1 or Task 2. When Task 1 is executed, another decision needs to be taken after which either Task 2 or Task 5 are executed. Task 1, 2, 3, and 5 are implemented in a single application. Decision B is a decision that is taken during the execution of that single application. That means the application design has to respect the logic governing that decision. However, Decision A is not implemented in an application program. It will be mapped on a condition in WebSphere MQ Workflow.

This seems to suggest that you should build two models. A detailed model that contains all possible tasks and decisions and a model where tasks map to applications. However, maintaining such a dual model is impractical and unnecessary. Tasks and decisions that correspond with a single application can be grouped and then exported as a single activity for the WebSphere MQ Workflow model.

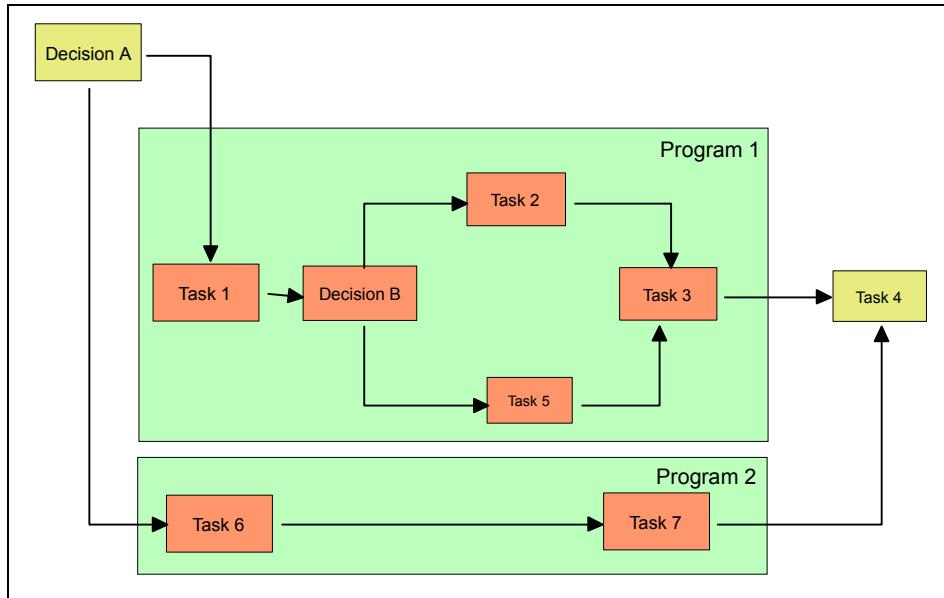


Figure 3-2 Schematic view contrasting tasks and programs

3.2.4 Flows and flow diagrams

A process model is drawn as an Activity Decision Flow Diagram, which is a diagram that represents the flow of work for a Process. The objects within an Activity Decision Flow Diagram are Tasks, Process Objects, Decisions, Decision Choices, Phis, External Entity/Process, Go To Objects, Stops, and Connectors.

We've introduced tasks and process objects earlier. Let us have a look at the other objects.

Decisions and decision choices

A Process performed by an organization is rarely performed in exactly the same way every single time. The Process will have variations that are determined by the conditions that apply to the input to the Process, the organization and its Resources, or external factors. In WebSphere BI Workbench, these conditions are modeled with Decisions that have a set of Choices. A choice is possible answer for the question modeled in the Decision. Also, Choices have a probability of occurrence in the context of the other Choices of that Decision. Thus, the total percentage of all the Choices of a Decision must be 100%. Each Choice that exists for a Process creates a variation of that Process (a variation is called a Case). The activities that are connected to a Choice will only occur when the conditions specify that the Choice is correct. Consequently, activities that are

connected to other Choices of a Decision will not occur when the conditions specify that the first Choice is correct. There are two versions of the Decision object: Binary and Multiple.

When deployed in WebSphere MQ Workflow, a Decision object is translated into a transition condition.

Figure 3-2 on page 49 shows a model where the first action is a decision. This would imply that the workflow model starts with a transition condition. This is not possible. A transition condition always has to originate from an activity. So, the schematic overview in Figure 3-2 on page 49 needs to be altered to add a null activity so that the schematic overview can be implemented in WebSphere BI Modeler and translated into a correct workflow model.

Note: This is known as a NOOP and is an empty activity program which, in Workflow, will have the name FMCINTERNALNOOP. We will talk more about NOOPs and their use later in the book when we discuss the case study process model.

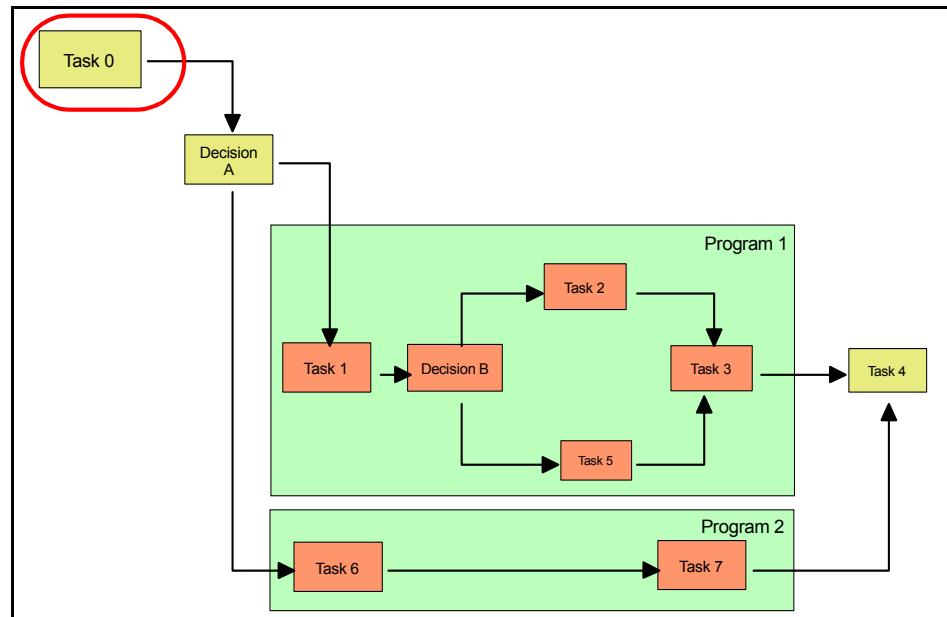


Figure 3-3 Decision prefixed by a task

Loops and Go To objects

When a task in the flow should be followed by another task in another location within the flow, you can use the Go To object. Go To Objects can only be connected to objects in one direction and are used in pairs; the pair of Go To Objects consist of a Source Go To Object and a Target Go To Object. Source Go To Objects can only be connected from an object that is behind it (to the left) in the drawing. Target Go To Objects can only be connected from an object that is in front of it (to the right) in the drawing.

A Loop is a subset of the Go To feature in which the target Go To Object lies in the same “downstream” Process path as the source Go To Object. A loop is basically a Go To object of type Rework. Figure 3-4 shows the use of Rework Go To objects. The decision **Task 1 OK?** is connected to a Go To object ACT. The target Go To object is connected back to the task **Task 1**. As such a loop is created around Task 1.

in the same way, the decision **Process finished?** is connected to a source Go To object PRC. The target Go To object is connected to Task 1 again. As such a loop is created around Task 1 and Task 2.

In WebSphere MQ Workflow, there is no equivalent for a Go To object. The only use of a Go To object that will result in a logically equivalent workflow model is the Rework type, as shown in Figure 3-4.

However, within WebSphere MQ Workflow, a loop can only be modeled as an exit condition. Basically, a loop connects the end of an activity to the start of that same activity. Thus, the loop around Task 1 in Figure 3-4 is easily mapped to a single activity with an exit condition that matches the decision in the model within WebSphere BI Modeler.

The loop around Task 1 and Task 2 in Figure 3-4 is mapped to a block that has an exit condition matching the decision logic for **Process finished?**.

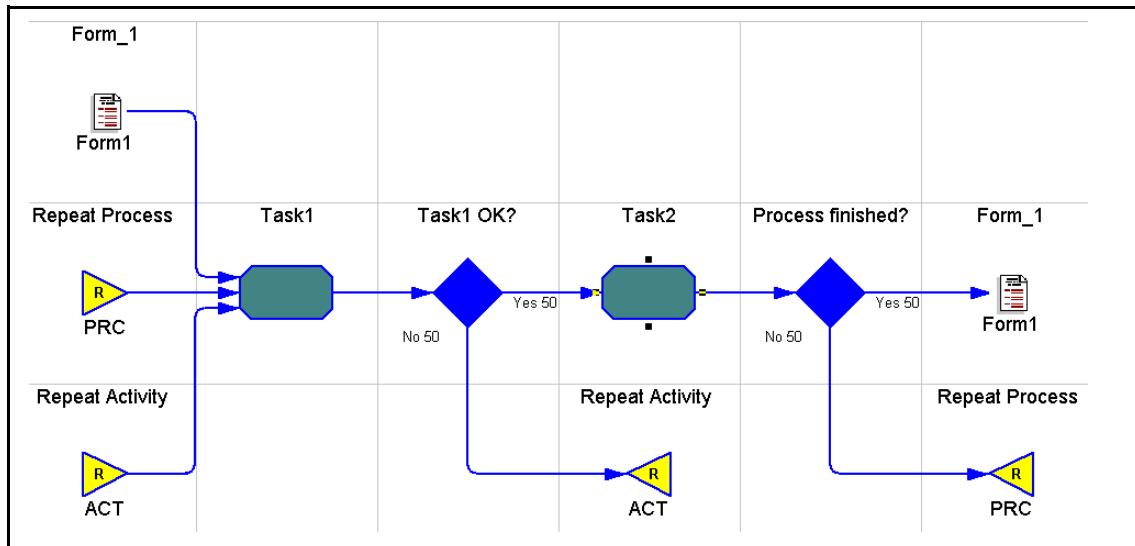


Figure 3-4 the use of Go To objects to model a loop

Figure 3-5 shows an example of the use of Go To objects that can not be directly translated to a logically equivalent workflow model. The Go To objects labeled **Skip Task 2** are correctly used in WebSphere BI Modeler. However, they will not pass the WebSphere MQ Workflow validation. For this example, the solution is easy. The outgoing No connector for the decision **Task 1 OK?** should be connected directly to **Task 3**.

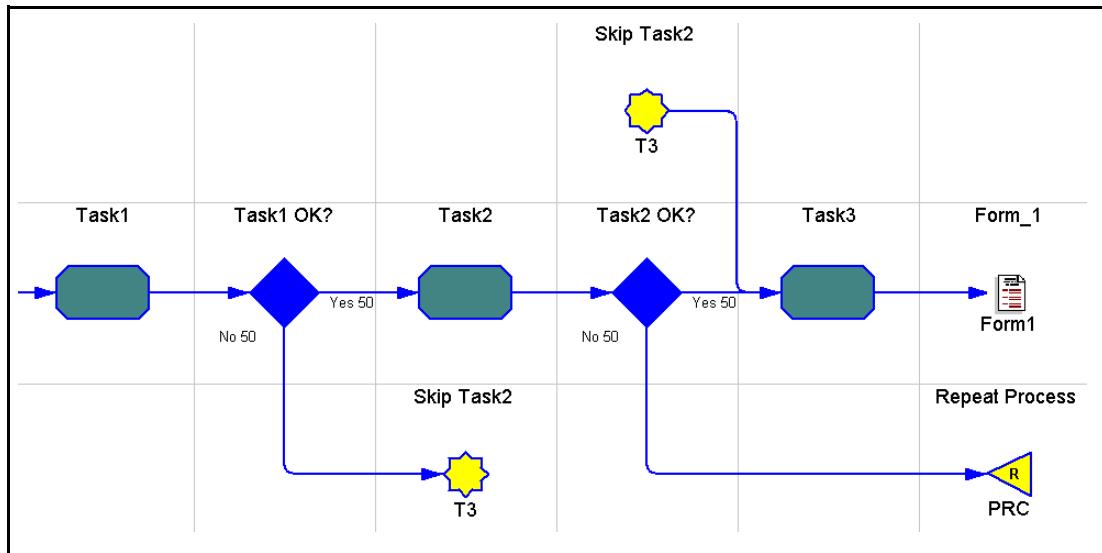


Figure 3-5 Incompatible use of Go To objects

3.2.5 Data structures and Phis

When modeling a task, you can also model the input and the output for that task. Modeling data transfer is done by using a Phi object. Note however that a Phi object is broader than just a data flow and data mapping in WebSphere MQ Workflow. A Phi object is also used to model physical objects that move between tasks and executors of a task, such as a paper form.

Activity B1 and C1 in Figure 3-6 have an associated data structure. By connecting B1 to C1 via a Phi, you have effectively defined a data connector as it is known in WebSphere MQ Workflow. The blue connectors in Figure 3-6 are the standard flow connectors in WebSphere MQ Workflow.

By connecting B1 through the Phi with Activity C2, you have modeled an explicit data connector for WebSphere MQ Workflow.

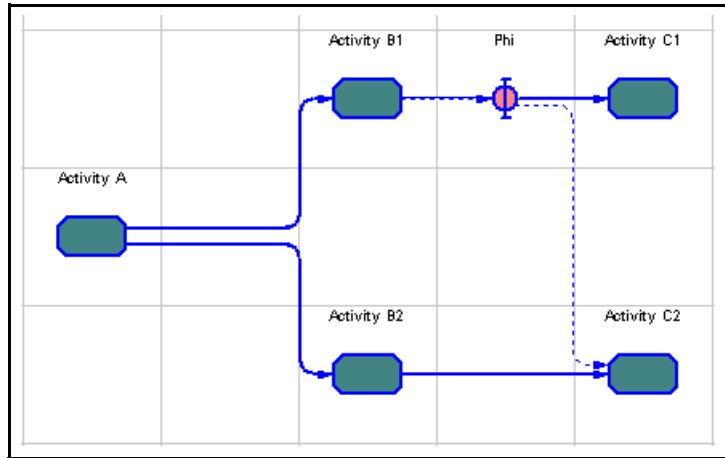


Figure 3-6 Phis and data flow

When modeling sub-processes, you should be careful to use correct Phis at the start and end of the sub-process and when invoking the subprocess. Figure 3-7 shows a simple process with a Phi called Fields as output and input.

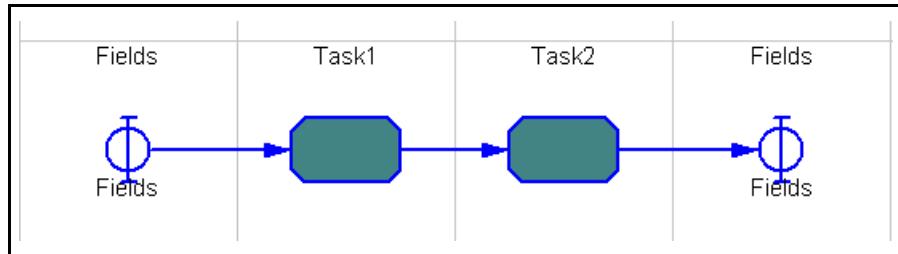


Figure 3-7 A simple sub-process with a start and end Phi

When adding this sub-process as a task in a super-process, you need to add again the Phi Fields before and after the sub-process.

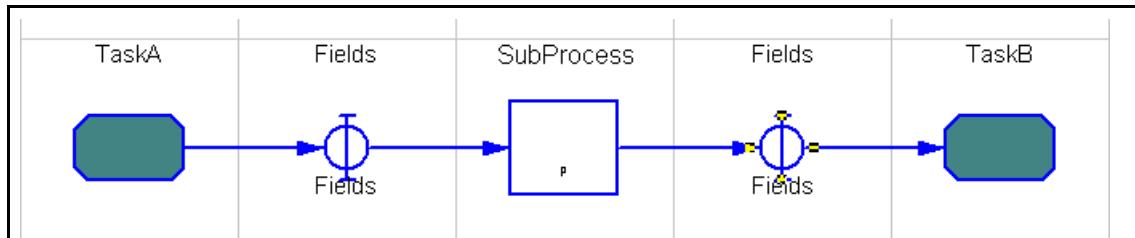


Figure 3-8 Using a sub-process with Phis

3.2.6 Some limitations

When using the WebSphere BI Modeler, you need to make sure that a number of text fields contain names that consist of English language characters only. This limitation finds its origin in similar limitations in WebSphere MQ Workflow itself. Since those names only appear in the Modeler in WebSphere MQ Workflow specific areas, it should not pose any difficulties.

Similarly, when providing names for tasks of processes, you should keep in mind that these names may appear in Workflow XML messages. It is wise to select names that do not have spaces which will make it easier to use the process models via XML messages.

Names for tasks and processes can be the same within WebSphere BI Modeler. However, this is not the case for WebSphere MQ Workflow. More specifically, when a process with name ABC is added as a sub-process to a process that has an activity ABC, then a name clash will occur. To avoid this problem, name tasks and processes within the Modeler differently.

During the modeling of the business processes that are discussed in this redbook, we came across a number of other limitations, such as:

- ▶ Maximum level of nesting for data structures. The Modeler only allows for five levels of nesting. This limitation is not immediately obvious when defining a data structure. As you can see in Figure 3-9, the modeler does allow you to define a structure with six levels.

Data Structures Tree						
Data Structure	Type	MQ Workf...	System M...	Array	M	
Default Data Structure	Structure					
└ idStruct	Structure					
└ Struct_A	Structure					
└ Struct_B	Structure	Struct_B	Struct_B	0		
└ Struct_C	Structure	Struct_C	Struct_C	0		
└ Struct_D	Structure	Struct_D	Struct_D	0		
└ Field_D_1	Long	Field_D_1	Field_D_1	0		
└ Struct_E	Structure	Struct_E	Struct_E	0		
└ Field_E_1	Long	Field_E_1	Field_E_1	0		
└ Struct_F	Structure	Struct_F	Struct_F	0		
└ Field_F_1	Long	Field_F_1	Field_F_1	0		

Figure 3-9 Data structure with six levels

However, when building a decision expression, you will receive an error message that explains the limitation, as shown in Figure 3-10.

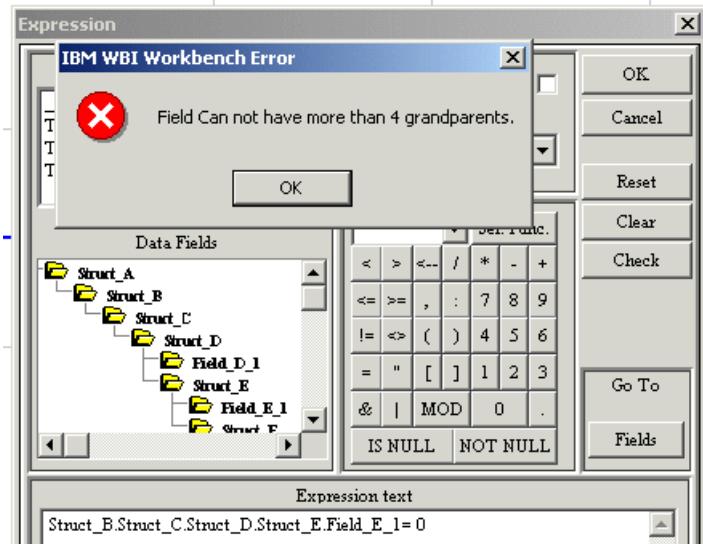


Figure 3-10 Error when using a data structure with too many levels

You should also keep in mind that when a task is modeled to have two sources of input, a new structure is required that merges the two structures into one. The easiest way to do this is to add an extra level with two child structures matching the structure of the two inputs of the task. As such, an extra level of nesting is being added, which could be sufficient to hit the maximum level of nesting.

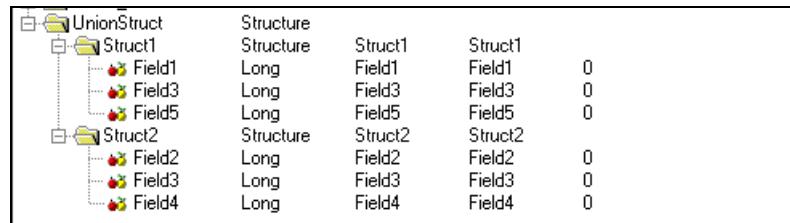


Figure 3-11 Merging multiple input structures into a single structure

- ▶ When using complex forms with several levels of nesting and building complex decision logic, you may hit another limit. An expression in the Modeler can only have 497 characters, as demonstrated by the error message in Figure 3-12.

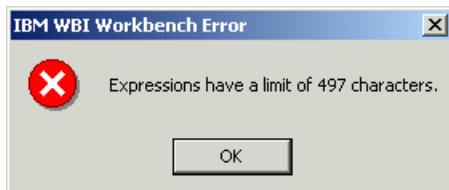


Figure 3-12 Maximum length for an expression in the Modeler

3.3 Preparing and validating a workflow process object

To simplify the modeling of a business process, you can distinguish five steps:

1. Creating a Model of the As-Is Process
2. Performing Baseline Analysis on the As-Is Process
3. Modifying the As-Is Model based on a Vision of the To-Be Model (Creating a To-Be Model)
4. Optimizing the To-Be Process to meet Re-engineering Goals
5. Preparing the To-Be Process for Integration with Workflow

In most situations, the fact that the runtime engine is WebSphere MQ Workflow plays little or no role in the first four steps.

The first step to prepare a process for deployment in WebSphere MQ Workflow, is setting the editing mode to integration. This is done by selecting **Format -> Editing Mode** from the main menu bar. Select Integration Mode to activate dialogs and settings that are pertinent for WebSphere MQ Workflow.

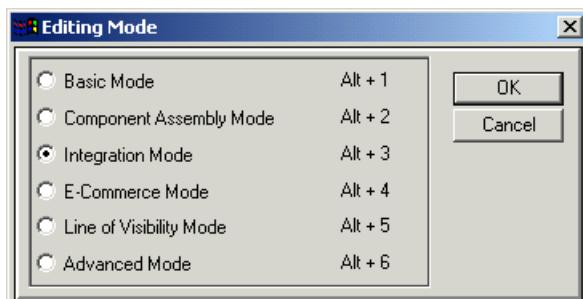


Figure 3-13 Selecting the editing mode for integration

The active editing mode is available in the status bar near the bottom of the window.

When you are preparing your first process modeled in WebSphere BI Modeler to be deployed to WebSphere MQ Workflow, you need to perform a number of tasks:

- ▶ Expand the organization modeled in WebSphere BI Modeler for use in WebSphere MQ Workflow. This information is required for WebSphere MQ Workflow to make sure that activities are assigned to appropriate workflow users that have the right role and/or level.
- ▶ Define the Workflow runtime environment settings:
 - Domain
 - System Group
 - System
 - Node
 - Queue Manager

Other settings are usually process specific. Input and output for programs and processes are defined in data structures. Mapping for data structures need to be created so that the output of one task can be mapped onto the input of the next task. Applications that are executed by users as part of their interaction with the workflow engine need to be added.

Most of this work could be performed in Buildtime as well. However, this would mean a dual process model, one without WebSphere MQ Workflow specifics in WebSphere BI Modeler and one with those specifics in Buildtime. Such an approach is not recommended because you would need to synchronize manually definitions in both environments. It is even better to move definitions from Buildtime into WebSphere BI Modeler so that existing and new process models can take advantage of WebSphere BI Modeler features such as simulations and cost analysis.

To make sure that a process model in WebSphere BI Modeler adheres to all rules that are specific for WebSphere MQ Workflow, the Modeler provides a verification tool that generates an MQ Workflow validation report.

To start this validation process, select Process -> Process Validation -> MQ Workflow Model. The validation report will verify:

- ▶ Names of fields, the length of the name, the characters, duplicate names for objects that must not have the same name within MQ Workflow
- ▶ Data mapping
- ▶ Expressions that are used for control connectors and exit conditions
- ▶ Organizational structures, such as having a manager for each organizational unit
- ▶ Input structure references for sub-processes

- ▶ Activity and process settings, for example settings about staff assignment

In general, when a process model has passed the MQ Workflow validation, the exported FDL can be imported directly into the runtime without any further customization or changes in the Buildtime.



4

Modeling the business process in WebSphere BI Workbench

This chapter describes the steps to get the business process modeled in the WebSphere BI Workbench. For the purposes of this case study, two modeling exercises have been performed. One is an end to end process model encompassing customer order, parts replenishment, alteration, test operations for a simulation exercise. The second is the Parts Replenishment process which has been modeled, exported, run and monitored in a real production environment.

4.1 Set up organization data

The first task in the modeling is to set up the data that defines the organization.

4.1.1 Prepare Organization data

We start with the modeling of the end to end process for the simulation exercise. All of the steps described will be applicable for the Parts Replenishment case study in the real environment.

The organization structure can be easily created by using the template provided in WebSphere BI workbench.

1. Open your explorer and go to **C -> BPM -> Samples -> BPM Workbench Samples**.
2. In this folder you will find a template called: Import_Employee_Template.xls. Double click on it to start to work with Microsoft Excel.
3. First, save this file under another name, for our example:
Import_Realcase_Employee.xls, the screen will show this template:

A	B	C	D	E	F	G	H	I	J	K	L	
		User ID	Password	email Address	Organization (Team)	Job Title (role)	Last Name	Middle Name	First Name	Phone Area code	Phone prefix code	Phone Line #
1												
2	1											
3	2											
4	3											
5	4											
6	5											
7	6											
8	7											

Figure 4-1 *Organization data template*

4. As we know who is doing what in our business process we just need to fill in the fields we are interesting in, starting in the following columns order:
 - ▶ E: Organization (Team); the Department Name
 - ▶ F: Job Title (role); the roles we have in our business process description
 - ▶ G, H, I: Last name, Middle name, First name of the employees performing the roles
 - ▶ N: Head OrgUnit is the Department unit

- B: Gives now an userid to each employee; it must be in upper case letter with or without a number

Note: Don't be alarmed by the gaps in the sequencing for column A. It has no effect on the import process.

5. At the end, the list of the organization employees involved in the business processes customer order and parts replenishment is reflected as follow:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
			P e a m s a s A w dd or re	User ID	e m ail s A w dd or re	Organization (Team)		Last Name	M id dl e N a m	P h o n e e A p L r i	P h o n e e A p L r i	P h o n e e A p L r i	P h o n e e A p L r i	Head OrgUnit
1	1	VRODA			Country Sales	Manager	Roda	Vic						Sales
2	2	GOGH			Country Sales	Product Manager	Gogh	Pat						Sales
3	3	HERMAN			Country Sales	Product Manager	Herman	Georges						Sales
4	4	RIBELLO			Country Sales	Product Manager	Ribello	Gigi						Sales
5	5	BLIC			Entry Audit Alteration	Manager	Blic	Erik						Manufacturing
6	6	MENNA			Entry Audit Alteration	Order Support	Menna	Alain						Manufacturing
7	7	GOT			Entry Audit Alteration	Order Support	Got	Henry						Manufacturing
8	8	PLANT			Entry Audit Alteration	Order Support	Plant	Bernard						Manufacturing
9	9	GEORGE			Entry Audit Alteration	Audit Operator	George	Gerald						Manufacturing
10	10	BARTEL			Entry Audit Alteration	Audit Operator	Bartel	Henry						Manufacturing
11	11	VAL			Entry Audit Alteration	Audit Operator	Val	Jack						Manufacturing
12	12	GARN			Entry Audit Alteration	Warehouse Operator	Garn	Jack						Manufacturing
13	13	SATER			Entry Audit Alteration	Warehouse Operator	Sater	Michael						Manufacturing
14	14	LABOR			Entry Audit Alteration	Warehouse Operator	Labor	Mike						Manufacturing
15	15	BURKETT			Entry Audit Alteration	Alteration Operator	Burkett	Alan						Manufacturing
16	16	GREESE			Entry Audit Alteration	Alteration Operator	Greese	John						Manufacturing
17	17	LOFFAT			Entry Audit Alteration	Alteration Operator	Loffat	Ron						Manufacturing
18	18	BITAS			Test	Manager	Bitas	Kim						Manufacturing
19	19	DELICH			Test	Test Technical Leader	Delich	Mary						Manufacturing
20	20	PROZ			Test	Test Operator	Proz	Tom						Manufacturing
21	21	CLAVETH			Test	Test Operator	Claveth	Luc						Manufacturing

Figure 4-2 Organization data in XLS file - Part 1

6. For our case, we don't need to fill in more information. Leave the password blank, it will be setup as "password", as generic for all the employees.
7. For the managers of Sales, Manufacturing, Materials Management, Business Management and Logistic Vendor organizations, who are second line managers, put at the end of the list their references as follows without filling in column O:

	A	B	C	D	E	F	G	H	I
33	32	CHAN			Accounting	Accountant	Chan		Amy
34	33	DBERG			Warehouse	Manager	Berg		Deny
35	34	CAR1			Warehouse	Carrier	Carrier1		
36	35	CAR2			Warehouse	Carrier	Carrier2		
37	36	CPC1			Warehouse	CPC Operator	CPC1		
38	37	CPC2			Warehouse	CPC Operator	CPC2		
39	38	FFURY			Distribution	Manager	Fury		Fred
40	39	SHIP1			Distribution	Shipping Operator	Ship_Inv1		
41	40	SHIP2			Distribution	Shipping Operator	Ship_Inv2		
42	41	RSHARP			Sales	Manager	Sharp		Ron
43	42	JMARCH			Manufacturing	Manager	March		Joe
44	43	PWANG			Materials Mgt	Manager	Wang		Peter
45	44	DDELORME			Business Mgt	Manager	Delorme		Dan
46	45	BHALL			Logistic Vendor	Manager	Hall		Bob
47	46								
48	47								
	49								

Figure 4-3 Organization data Part 2 in XLS file

8. **File -> Save** your xls file without closing it, and then, perform a second save using **File -> Save as** and by choosing in the **Save as type** box the **Text (Tab delimited) (*.txt)** format.
9. Click, **Save** and respond **OK** to the message to save only the active sheet.
10. Answer **No** to the second message, then click on **Cancel** when the **Save as** window appears again.
11. **File -> Exit** to exit from Microsoft Excel application by answering **No** to the last message.

4.1.2 Import organization data

Once Microsoft Excel is closed, perform the following steps:

1. Open WebSphere BI Workbench
2. Choose **Create A New Organization -> OK**
3. Enter a name for a new organization in the field file name: for example, **REALCASE.org** for our purpose, then click **Save**
4. Go to **File -> Import/Export -> Import Employees...**
5. Go up one directory level to find and select the **Import_Realcase_Employee.txt** file and click on **Open**.

At this step, the data import is done and we have to verify that the data has been imported correctly.

1. Go to **Repository -> Organization Data -> Organization tree...** the following screen shows you the organization structure at head unit level.

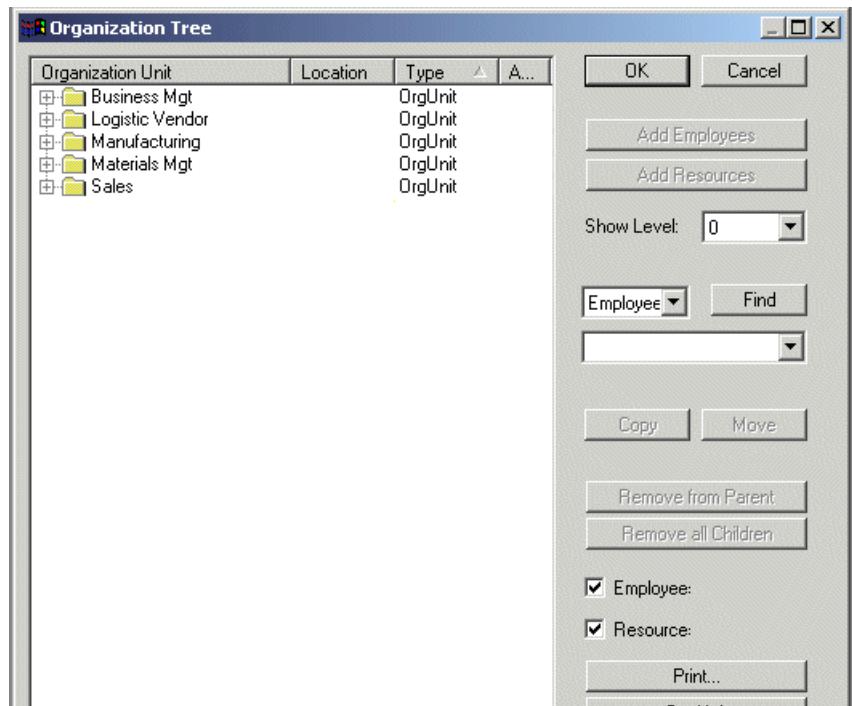


Figure 4-4 Organization structure imported in WebSphere BI Workbench

2. Select **Show level** and change the value to 2, all the employees names with their department attachments will show up as follows:

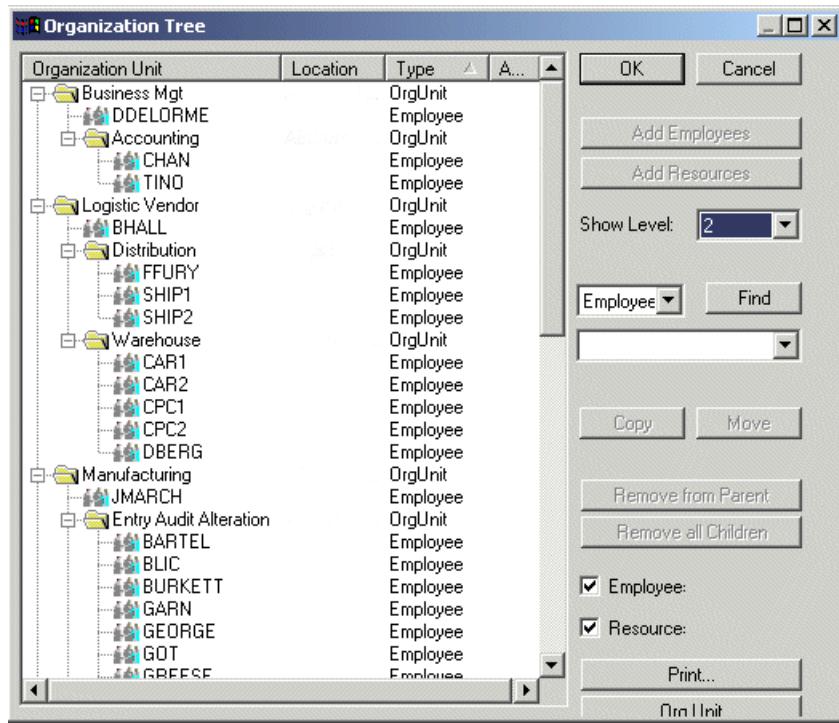


Figure 4-5 *Organization data detailed imported in WebSphere BI Workbench*

3. Scroll down to verify all the employees in each department and click **OK** to close the window.

4.1.3 Create the companies locations

In the real case we have two main locations, the company and the logistics vendor.

1. Go to Repository -> Organizations Data -> Locations... and enter for the company the following information:

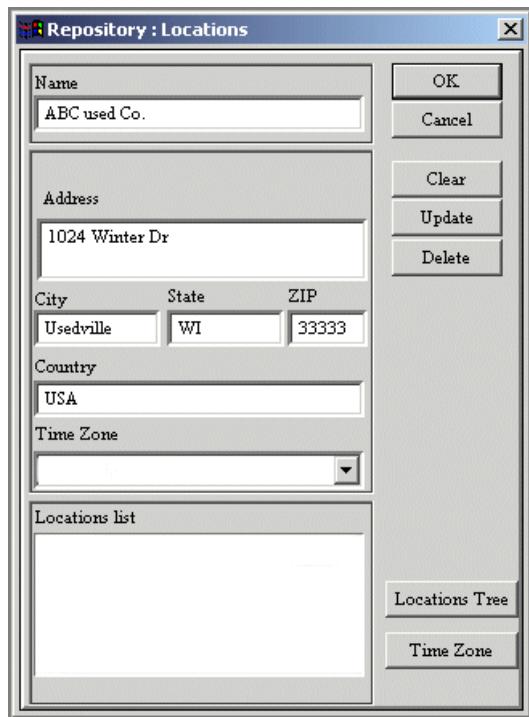


Figure 4-6 Set up company location informations

Before adding the company, it is mandatory to setup an associated time zone.

2. To do so, click on **Time Zone** and enter the following information:

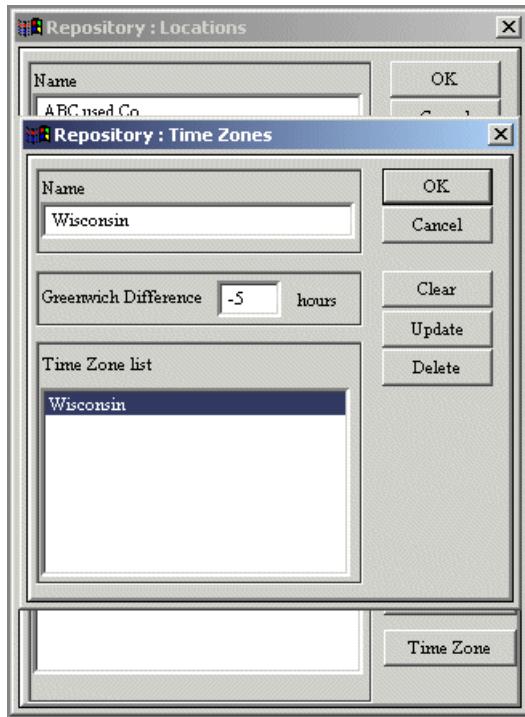


Figure 4-7 Create the company time zone

3. Then click on the **Update** button followed by the **Close**.
4. Use this time zone for the ABC company and click on the **Add** button.
5. Once done, create the second location for the logistics vendor. The logistics vendor owns a building on the ABC company site connected to the manufacturing building. Its address is slightly the same except for the street number (1024b Winter Dr).
6. Click on the **Add** button then on **OK** to finish this step.

4.2 Finalize organization structure data

We now need to finalize the additional components of the organization structure.

4.2.1 Units management

This operation creates the link between organization units, head units, managers and locations.

1. Go to **Repository -> Organization data -> Organization tree...**, click on the **Org Unit** button.
2. In the **Repository: Organization Units** window, select the first organization in the organization unit list and select the manager and the location.
3. Click the **Update** button to take into account the records.
4. Repeat the steps for all the organization units, and head units.

We assume that the sales and the country sales managers are located on the ABC company site but their product managers are in 3 different countries.

Also we have set up a color for the different organizations, it will help to differentiate the activities when we will perform the modelling in WebSphere BI Workbench.

The following figure shows an example:

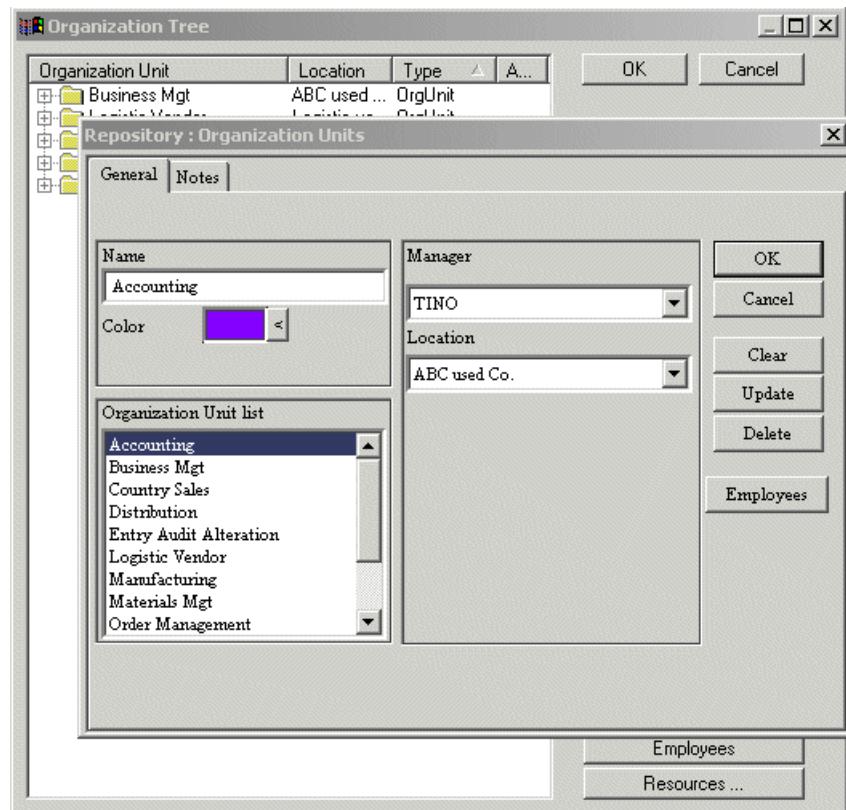


Figure 4-8 Finalize organization data

In the organization tree view the location column will be updated with the location name.

4.2.2 Cost

This operation enters the employee salaries. You can do that by entering these costs the role menu.

1. Go to **Repository -> Organization data -> Employees...** and click on the **Role** button on the right.
2. Select the first role, accountant in this case, and in the Standard cost box enter 6,000 per month and choose the currency as U.S Dollar.
3. Click on the Update button to record the data.

The screen is as follows:

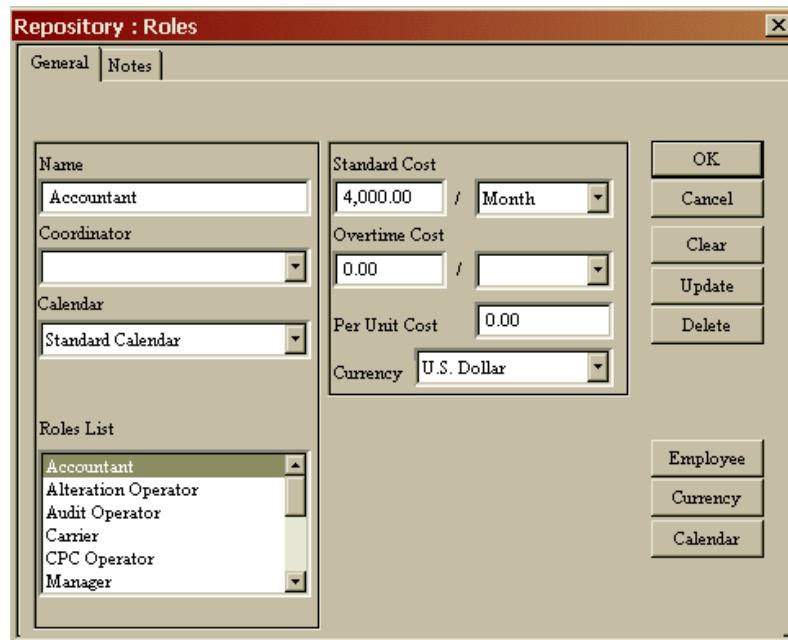


Figure 4-9 Set up roles costs

4. Repeat the steps for each role. We have entered the following cost for each role:

Role	Cost (USD / month)
Accountant	4,000
Alteration Operator	2,500
Audit Operator	2,000
Carrier	1,800
CPC Operator	1,900
Manager	7,000
Order Support	2,700
Product Analyst	2,900
Product manager	3,500
Shipping Operator	2,000
Supply Chain Specialist	2,950
Test Operator	2,800
Test Technical Leader	2,950
Warehouse Operator	2,000

4.2.3 Calendars

The organization structure is now imported. We need to setup the working time used by the employees depending if they are in standard or in shifts as it is the case for some of them in manufacturing or in the logistics vendor structures.

When you have gathered the data from your business process study, you know which different calendars are used for the working hours and the weekly hours. You can also taken into account the non-working days you can have in the next months, WebSphere BI Workbench can handle a complete yearly calendar.

1. Go to **Repository -> Organization Data -> Calendars... a Repository: Calendar** window opens and in the **Name** box, enter **Manufacturing Shift** which will cover the morning and evening shifts time frame.
2. Select **M** as monday in the month calendar window and, in the **Working Hours** window, put the following times in the **From To** boxes as follow:
 - 6:30am to 11:00am
 - 11:45am to 7:00pm

- 7:45pm to 10:00pm

It means that the employees working in this shift have 45 minutes break, one in the morning shift another one in the evening shift.

3. Repeat the steps for the following days of the week by selecting **T, W, T, F**, assuming they are working from monday to friday, 14 hours per day, 70 hours per week.
4. At the end, click on the **Add** button on the right, **Manufacturing shift** is now part of your business process model parameters.

The screen should be as follows:

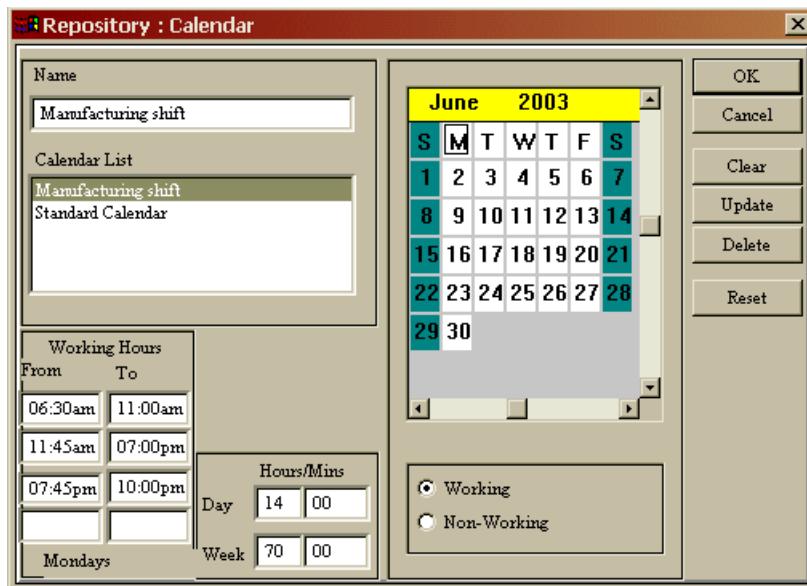


Figure 4-10 Create a calendar

5. If you click one of the week days in the month like June 10th for example, you will see that the working hours you have set up are taken into account.
6. When you click on a day under Saturday or Sunday columns, the **Working Hours** boxes are blank as they are considered as **Non-Working** hours.
7. You need also to verify if the Standard Calendar matches your business process case.
8. We have changed the **01:00pm** time in the second frame boxes line, to **12:45pm** to reflect the company policy of a 45 minute break.
9. Also, the starting time of employees working in standard calendar is **08:15am**.

10. Make the changes from Monday to Friday and then click the **Update** button to record them.

11. You can close the **Repository: Calendar** window when your calendars list is completed according your business process needs by clicking **OK**.

You can attach these calendars to each employee if you want to add more detail to your organization data in the repository. To do so:

12. Go to **Repository -> Organization Data -> Employees....**

13. Select the first name in the list, **AYELLA**, and open the **Details** folder.

14. We need to associate him with the **Manufacturing shift**.

15. Select this calendar in the list to replace the pre-selected **Standard Calendar**.

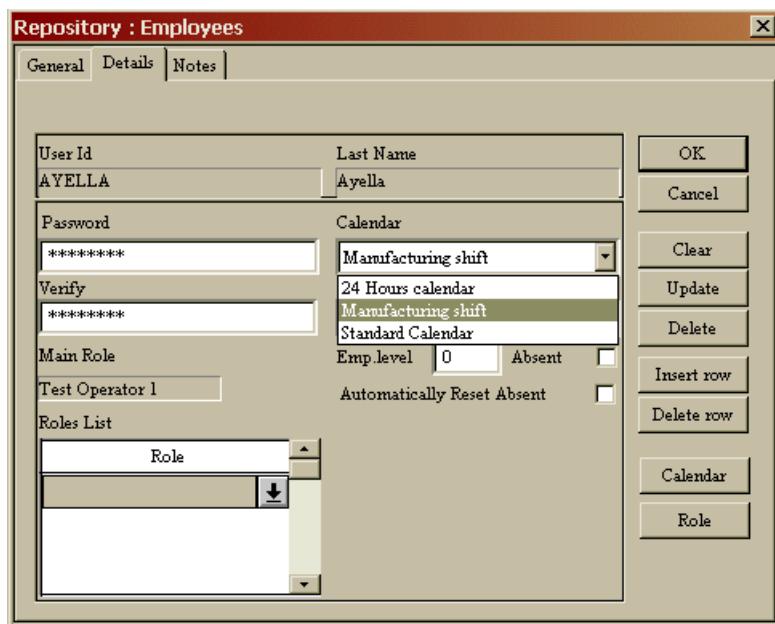


Figure 4-11 Associate a calendar with an employee

16. Click on update to come back to the **Repository: Employees** window in the **General** folder.

17. Choose **BAREN**, as you can see his role is a manager and he is working in a standard calendar.

18. Click on the **Details** folder, the **Standard Calendar** is already pre-selected, don't change it.

19. Click on **Update** to come back to the **General** folder.

20. Choose **BARTEL**, his role is an audit operator, he is working in shift, go to the **Details** folder to associate him with the **Manufacturing Shift** calendar and click on **Update** to record the change.

21. Repeat these steps for all employees to associate them with the correct calendars.

In the following figure you will find the complete calendar association we have applied to our employees structure. We have assumed that managers are working in a standard calendar.

1	User ID	Organization (Team)	Job Title (role)	Head OrgUnit	CALENDAR
2	AYELLA	Test	Test Operator	Manufacturing	Manufacturing Shift
3	BAREN	Order Management	Manager	Materials Mgt	Standard
4	BARTEL	Entry Audit Alteration	Audit Operator	Manufacturing	Manufacturing Shift
5	BETH	Order Management	Product Analyst	Materials Mgt	Standard
6	BITAS	Test	Manager	Manufacturing	Standard
7	BLIC	Entry Audit Alteration	Manager	Manufacturing	Standard
8	BURKETT	Entry Audit Alteration	Alteration Operator	Manufacturing	Manufacturing Shift
9	CAR1	Warehouse	Carrier	Logistic Vendor	Manufacturing Shift
10	CAR2	Warehouse	Carrier	Logistic Vendor	Manufacturing Shift
11	CASTANO	Procurement	Supply Chain Specialist	Materials Mgt	Standard
12	CHAN	Accounting	Accountant	Business Mgt	Standard
13	CIBERT	Order Management	Product Analyst	Materials Mgt	Standard
14	CLAVETH	Test	Test Operator	Manufacturing	Manufacturing Shift
15	CPC1	Warehouse	CPC Operator	Logistic Vendor	Manufacturing Shift
16	CPC2	Warehouse	CPC Operator	Logistic Vendor	Manufacturing Shift
17	DELICH	Test	Test Technical Leader	Manufacturing	Standard
18	DELLA	Order Management	Product Analyst	Materials Mgt	Standard
19	GARN	Entry Audit Alteration	Warehouse Operator	Manufacturing	Standard
20	GEORGE	Entry Audit Alteration	Audit Operator	Manufacturing	Manufacturing Shift
21	GOGH	Country Sales	Product Manager	Sales	Standard
22	GOT	Entry Audit Alteration	Order Support	Manufacturing	Standard
23	GREESE	Entry Audit Alteration	Alteration Operator	Manufacturing	Manufacturing Shift
24	HERMAN	Country Sales	Product Manager	Sales	Standard
25	LABOR	Entry Audit Alteration	Warehouse Operator	Manufacturing	Standard
26	LENGLE	Order Management	Product Analyst	Materials Mgt	Standard
27	LOFFAT	Entry Audit Alteration	Alteration Operator	Manufacturing	Manufacturing Shift
28	MENNA	Entry Audit Alteration	Order Support	Manufacturing	Standard
29	PARECH	Procurement	Manager	Materials Mgt	Standard
30	PLANT	Entry Audit Alteration	Order Support	Manufacturing	Standard
31	PROZ	Test	Test Operator	Manufacturing	Manufacturing Shift
32	RIBELLO	Country Sales	Product Manager	Sales	Standard
33	SATER	Entry Audit Alteration	Warehouse Operator	Manufacturing	Standard
34	SHIP1	Distribution	Shipping Operator	Logistic Vendor	Manufacturing Shift
35	SHIP2	Distribution	Shipping Operator	Logistic Vendor	Manufacturing Shift
36	TICHI	Test	Test Operator	Manufacturing	Manufacturing Shift
37	TINO	Accounting	Manager	Business Mgt	Standard
38	VAL	Entry Audit Alteration	Audit Operator	Manufacturing	Manufacturing Shift

Figure 4-12 Employees calendars

4.2.4 Set up data structure

We now need to set up our data structures.

Phi Types

The data structure we have to handle all along the customer and parts replenishment processes is based on two objects:

- ▶ The customer order
- ▶ The parts replenishment order.

These two objects will be modeled in the Workbench as two data structures. The detailed data contained in each structure will be explained in Chapter 5, “Taking the model to run time” on page 121 when we will start the MQWorkflow model. For the Workbench model purpose we will create the corresponding phis which handle the data structures in the Workbench.

To do this:

1. Go to **Repository -> Process data -> Phi Types...**
2. type O_Form as the name and select **Electronic Document** as a category as shown as follow:



Figure 4-13 Set up Phi Type

3. To assign an icon to the Phi, click on **Bitmap**.

4. A window will appear and if it is empty of icons, click on **Add** and open the **Icons** folder in the **BPM** parent folder.

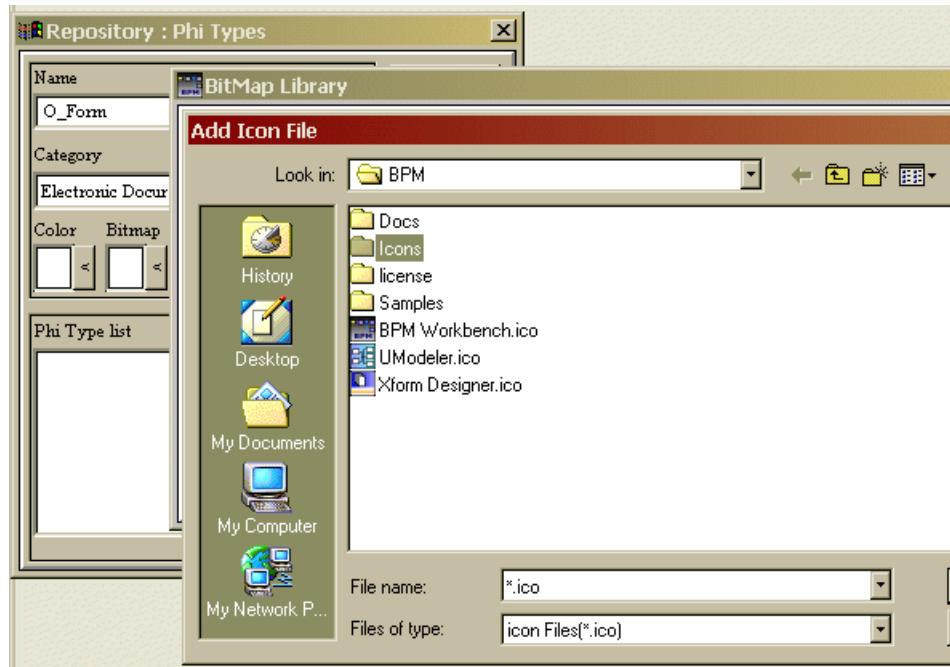


Figure 4-14 Set up Phi icons

5. When you have opened the **Icons** folder, a file list of icons will appear, select all the icons available and click on **Open**.
6. All the icons will be available in the bitmap library for future use.
7. Choose an icon for the O_Form and click on Select to associate it to the phi object.
8. Repeat this process to create the PR_Form relative to the parts replenishment process and select an icon from the bitmap library.

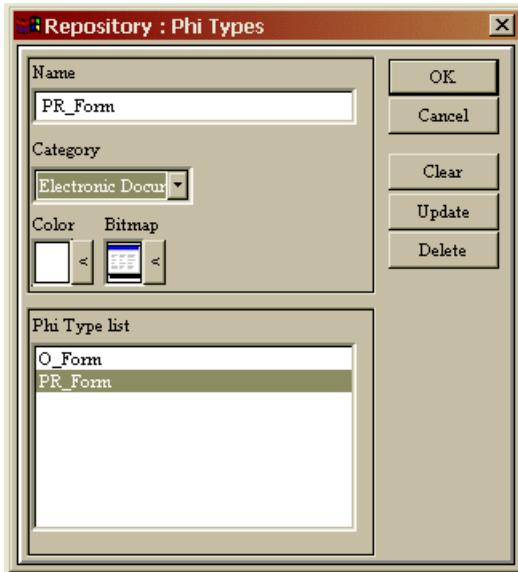


Figure 4-15 Set up Phi Type

4.3 Build the logic flow

Based on the business description we have shown in Section 1.3, “The case study business process description” on page 12, we need to draw a logic flow before modeling it in WebSphere BI Workbench.

In the following diagrams, the business process flow is translated with decisions to drive customer orders and parts orders objects all along the process. Also, decisions are used to handle business allow to keep as closest as possible the ability of the model to simulate the real case behavior.

This part of the modeling process is critical. Modeling is always a reduction of the real life. The business analyst in charge of the modeling has the responsibility to find the most appropriate logic and associated key parameters to be able to simulate real behaviors without translating all possible cases. The quality of the modeling will directly affect the quality of the recommendations provided to the company management and, obviously, the quality of their decisions to tune the business process through monitoring.

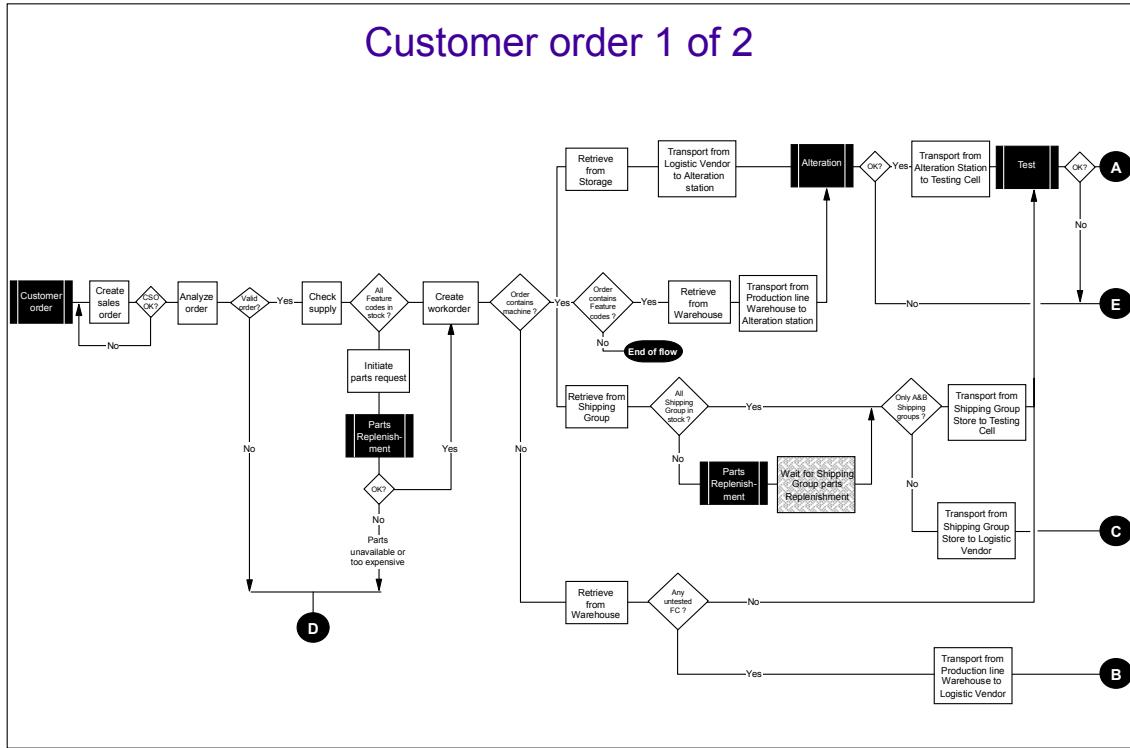


Figure 4-16 Customer order logic flow - Part 1

As mentioned earlier, parts replenishment, alteration and test are sub processes. They will be created as processes in the Workbench.

In the following figures you will find the logic flow of each of these subprocesses.

Parts Replenishment

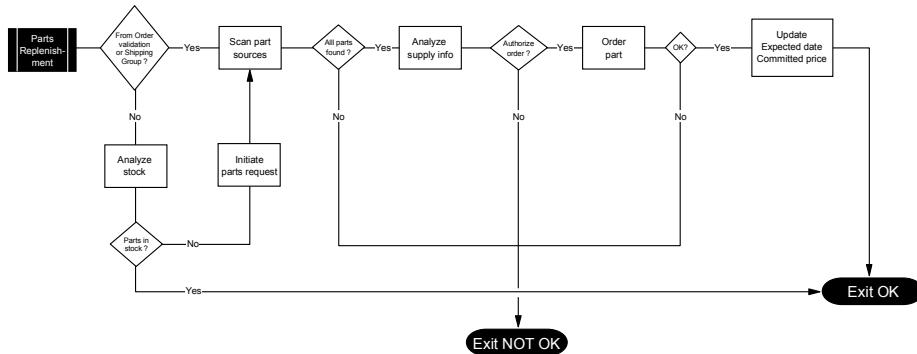


Figure 4-17 Parts Replenishment subprocess

Alteration

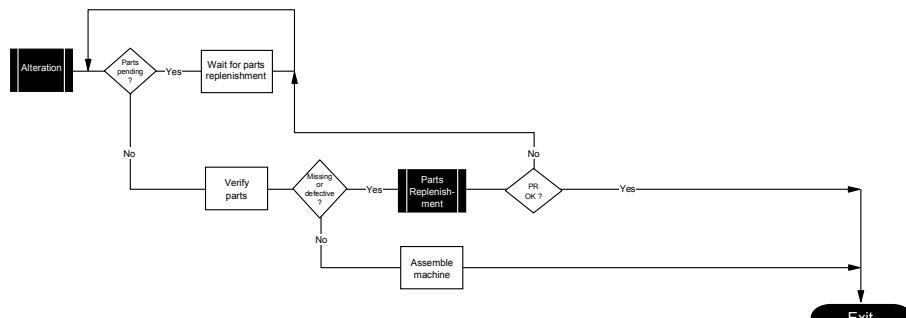


Figure 4-18 Alteration subprocess

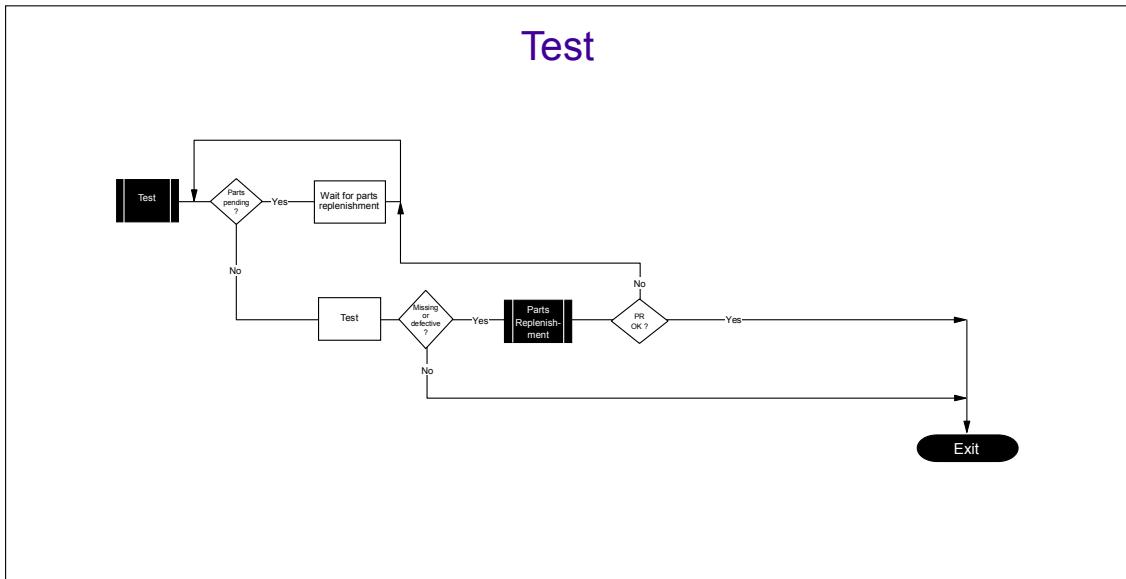


Figure 4-19 Test subprocess

Parts replenishment is a subprocess of customer order and also of alteration and test. The parts replenishment process is called in customer order at the order validation stage to ensure the parts supply prior to releasing a customer order in production. When an order is released in production at alteration and test steps, and also during shipping group processing - parts replenishment is used to replace broken or defective parts or to complete shipping group.

4.4 Build the Workbench model

Now all the elements to model the business process in the workbench are available:

- ▶ The business process flow with who is doing what and when.
- ▶ The organization reflected in the Workbench through the business units, employees, roles, costs, calendars, locations etc.
- ▶ Business objects created through phis O_Form and PR_Form.
- ▶ Logic flows translating business process tasks and rules.

All the following steps are done in basic editing mode, go to:

1. **Format -> Editing Mode** and select **Basic Mode**
2. Click **OK**.

3. **Basic mode** must appear in the bottom bar in the left corner.

4.4.1 Build the tasks lists

Based on the business process flow and the logic flows, the tasks list can be built in the Workbench. To do so:

1. Go to **Repository -> Process Data -> Tasks....**
2. In the window opened, the first activity of the customer order process is **Create Sales Order**. It will be entered in the name window of the **Tasks** menu.
3. In this task menu, the task can be attached to an organization unit and to a role. The elapsed time and the working time can be also set up in the corresponding windows.
4. Click on **Add** to create the task when all these parameters have been entered.

See the following figure which summarizes the creation of this first activity.

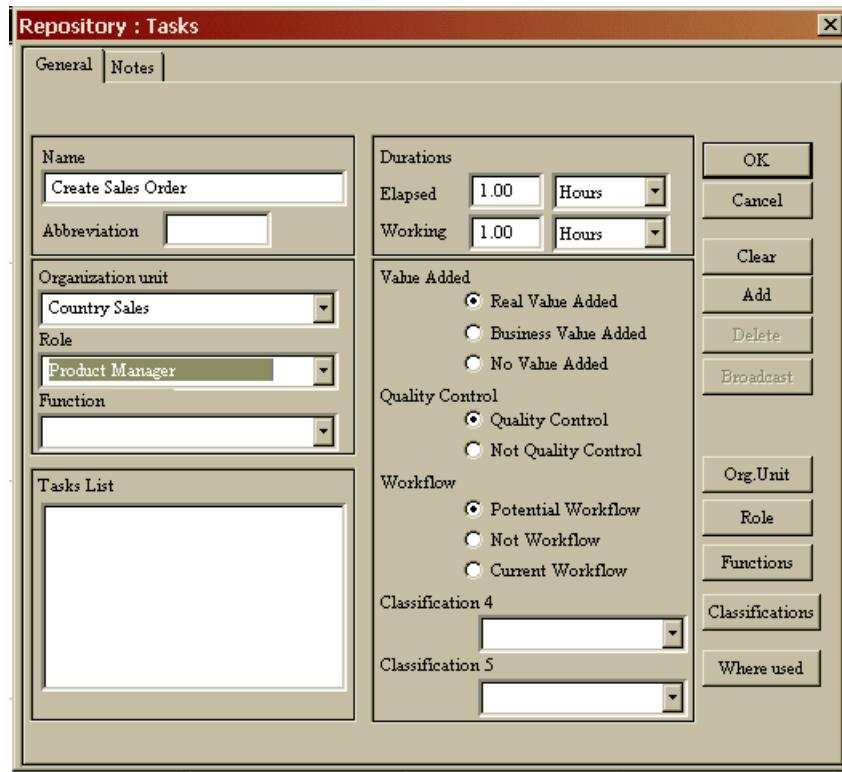


Figure 4-20 Set up a task

In fact, different ways can be used to model the business process in the Workbench. The logic flow can be drawn directly in the Activity Decision Flow Diagram window and the parameters of the task can be created each time a task is created.

A second way is to create the tasks list first in the repository before drawing the model and then selecting the task in the list when you draw one.

The way chosen here is to create the tasks and associated parameters prior to drawing the flow.

So, by following the same steps as described for the first task, the next picture shows the tasks list and the associated parameters to be initialized for the customer order process and all the sub processes.

Task name	Organization	Role	Elapsed time	Working time	Comment
Analyze Order	Order Management	Product Analyst	1 h	1 h	
Analyze Stock	Entry Audit Alteration	Order Support	2 h	1 h	
Analyze supply information	Order Management	Product Analyst	1 h	20 min	
Assemble machine	Entry Audit Alteration	Alteration Operator	1 h	1 h	
Check Supply	Order Management	Product Analyst	2 h	2 h	
Clean Pack and Cover	Warehouse	CPC Operator	5 h	5 h	
Close Work Order	Entry Audit Alteration	Order Support	1 h	1 h	
Create Sales Order	Country Sales	Product Manager	1 h	45 min	
Create Work Order	Order Management	Product Analyst	1 h	1 h	
Initiate PR Order	Order Management	Product Analyst	15 min	15 min	
Initiate PR Order	Order Management	Product Analyst	15 min	15 min	
Invoicing and shipping	Distribution	Shipping Operator	1 h	1 h	
Not OK	Procurement	Supply Chain Specialist	1 sec	1 sec	Used for this connection
Notify Accountant	Accounting	Accountant	1 min	1 min	Done automatically by the system
OK	Procurement	Supply Chain Specialist	1 sec	1 sec	Used for this connection
Order part	Procurement	Supply Chain Specialist	1 h	20 min	
Reject Order	Order Management	Product Analyst	1 h	1 h	
Retrieve From Storage	Warehouse	Carrier	2 h	1 h	
Retrieve From Warehouse	Entry Audit Alteration	Warehouse Operator	1 h	30 min	
Retrieve Shipping Group	Entry Audit Alteration	Warehouse Operator	2 h	1 h	
Scan For Parts	Test	Test Operator	1 h	1 h	
Transport from AS to TC	Warehouse	Carrier	1 h	15 min	
Transport from LV to AS	Warehouse	Carrier	2 h	30 min	
Transport from SG to LV	Warehouse	Carrier	1 h	20 min	
Transport from SG to TC	Warehouse	Carrier	30 min	15 min	
Transport from TC to LV	Warehouse	Carrier	1 h	20 min	
Transport from WH to AS	Warehouse	Carrier	1 h	1 h	
Transport from WH to LV	Warehouse	Carrier	1 h	15 min	
Update PR form	Procurement	Supply Chain Specialist	1 h	1 h	
Update Sales Order	Country Sales	Product Manager	1 sec	1 sec	Done automatically by the system
Verify parts	Entry Audit Alteration	Alteration Operator	20 min	20 min	
Wait for Parts Replenishment	Entry Audit Alteration	Alteration Operator	10 h	1 h	

Figure 4-21 Tasks list in the Workbench repository

The previous figure is based on a spreadsheet file which shows all tasks in one shot.

The Workbench has capabilities to show similar tables by selecting: **Table -> Repository Process Data -> Tasks**. Figure 4-22 on page 84 shows an example. In fact the **Table** menu allows us to access and view all the characteristics of the model in different views when all the modeling is completed, such as:

- ▶ Organization unit
- ▶ Employees
- ▶ Resources, including a calculation of a hourly cost per role.

	Name	Organization Unit	Role	Fu	Elapse	Workin	Value-Added	Q
1	Analyze Order	Order Management	Product Analyst		1.00h	1.00h	Real Value Added	Q
2	Analyze Stock	Entry Audit Alteration	Order Support		2.00h	1.00h	Real Value Added	Q
3	Analyze supply info	Order Management	Product Analyst		1.00h	0.33h	Real Value Added	Q
4	Assemble machine	Entry Audit Alteration	Alteration Operator		1.00h	1.00h	Real Value Added	Q
5	Check Supply	Order Management	Product Analyst		2.00h	2.00h	Real Value Added	Q
6	Clean Pack and Co	Warehouse	CPC Operator		5.00h	5.00h	Real Value Added	Q
7	Close Work Order	Entry Audit Alteration	Order Support		1.00h	1.00h	Real Value Added	Q
8	Create Sales Orde	Country Sales	Product Manager		1.00h	0.75h	Real Value Added	Q

Figure 4-22 Table menu view of task model data

4.4.2 Draw the model in Workbench

Starting with the customer order process, go to:

1. **File -> New Process**
2. An activity decision flow window opens.
3. Select **File -> Save Process as...**, enter **Customer Order** in the **Process Name** window.
4. Click **OK.t**.

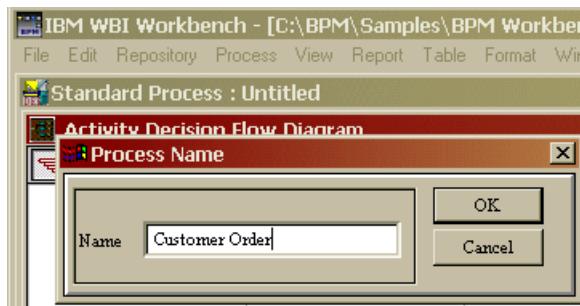


Figure 4-23 Create a new process

The following figure shows the beginning of the process.

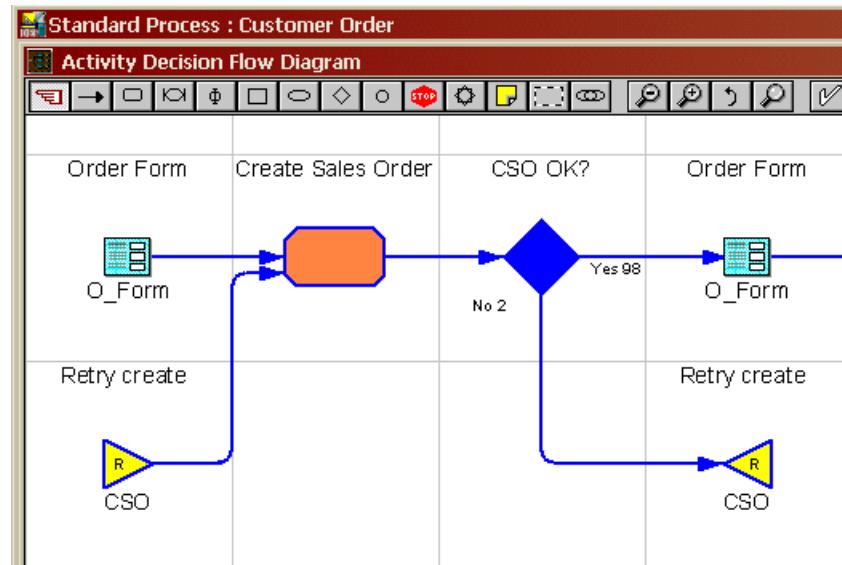


Figure 4-24 Customer order process beginning

A customer order is initialized through a phi type O_Form. This customer order is processed into the create sales order task by a product manager. When the task icon is selected and the icon is drawn in the ADF window, a double click will open a property window. As the data has been previously created in the repository, the name and all the associated parameters can be attached to the object by a simple selection of the parameters. For a task, the following can be set up in the **General** folder:

- ▶ Task name
- ▶ Role
- ▶ Organization Unit
- ▶ Elapsed and working duration
- ▶ Calendar.

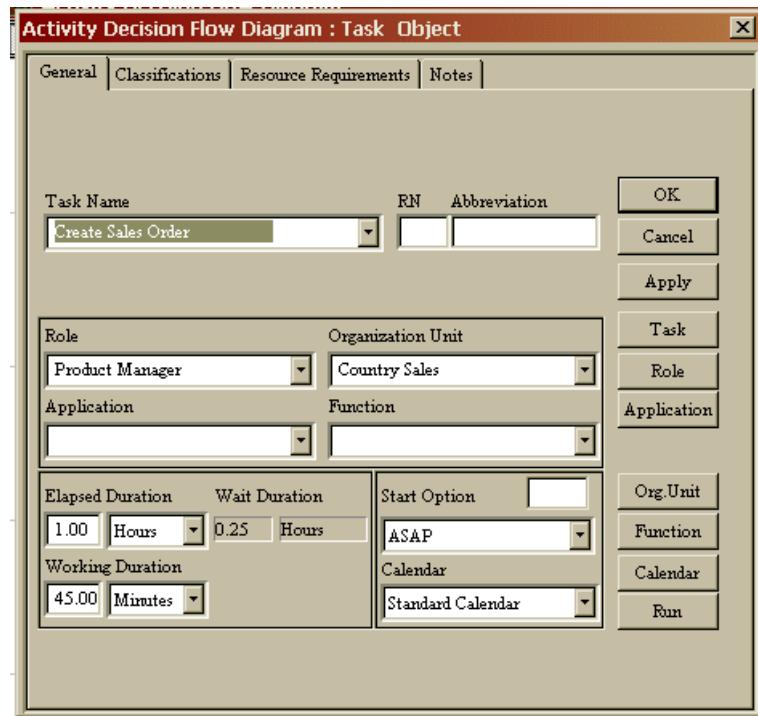


Figure 4-25 Set up the general parameters of a task

When this first task is drawn and completely set up, the process can be continued.

The ordering system checks some of the elements of the order configuration and rejects it if it is not correct. It is the case for 2% of the total orders generated. If rejected, the order has to be processed again. A decision named **CSO OK?** has been created as follows to model the order rejection.

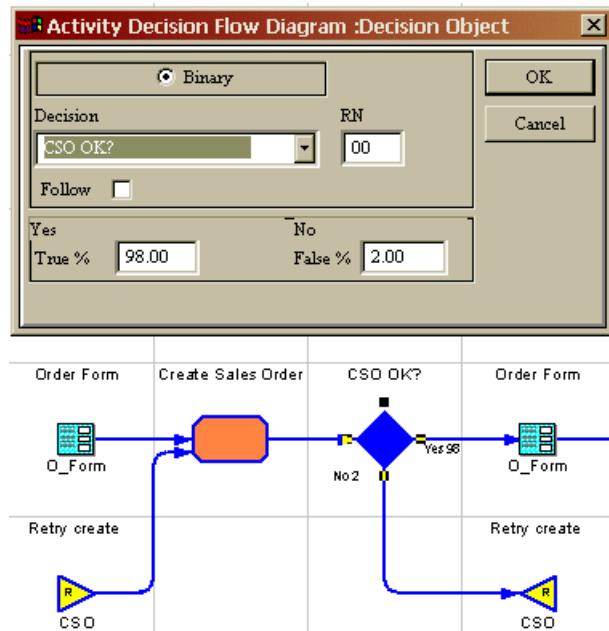


Figure 4-26 Set up a decision

When the order is rejected it has to be processed again by the product manager who has to correct it and re-submit it into the ordering system. To model this rework, a go to object has been created as shown in Figure 4-27 on page 88.

1. A name has been entered in the **Go To** window, as **CSO**, and a brief description, as **Retry create**, in the **Description** window.
2. Check mark the **Rework** box and click **OK** to record it.
3. Then, as the order has to be processed again, draw a second go to on the left of the flow.
4. Select the previous go to initialized y and connect it to the create sales order task for rework.

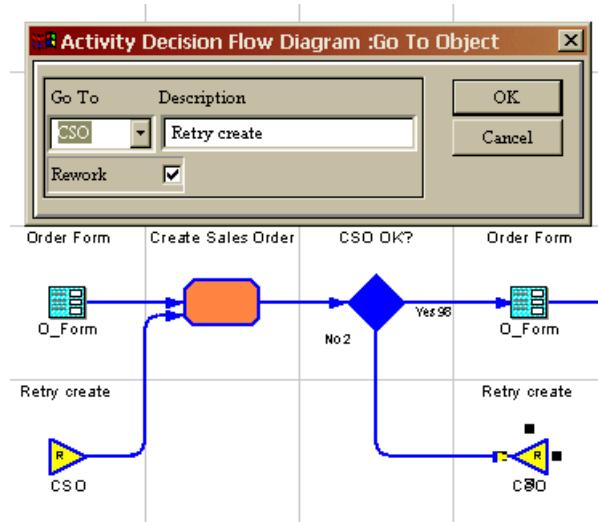


Figure 4-27 Set up a Go To with rework

In 98% of the cases the orders can be processed by the next task.

1. Create an O_Form phi.
2. Connect it to the decision object, and draw the next task **Analyze Order**.
3. The parameters of this task will be set up from the repository in the same way as explained for the first task.

The customer order process contains sub processes. To draw the sub processes:

1. Select the process icon, draw it in the ADF.
2. Double click on it to give it a name.
3. Click **OK** to record it.

The redbook will not describe all of the model drawing in the workbench. With the combination of the descriptions of the business data reflected in the repository, the business process and the logic flows drawings, all the models should be able to be recreated easily. We will concentrate on pointing out how to perform new tasks as they occur. The following figures intend to show you the final results for the customer order process and the alteration, test, and parts replenishment sub processes.

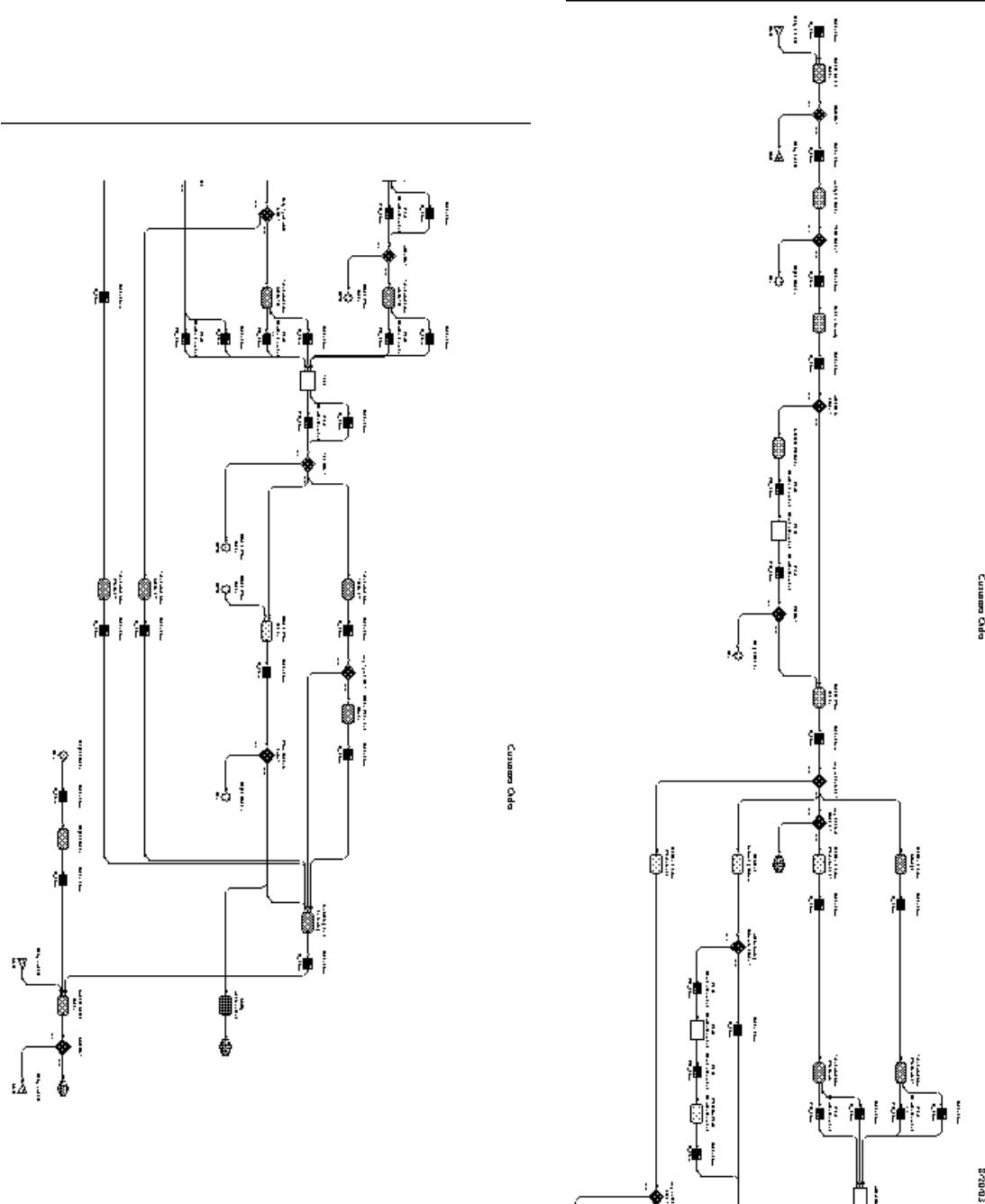


Figure 4-28 Customer order process model

When the customer order is modeled, go to:

File -> New Process

Enter **Parts Replenishment** as a name and click **OK**.

A new ADF blank window will appear.

By using the same method used for customer order process, the final results in the ADF are shown as in Figure 4-29 on page 90 and Figure 4-30 on page 91.

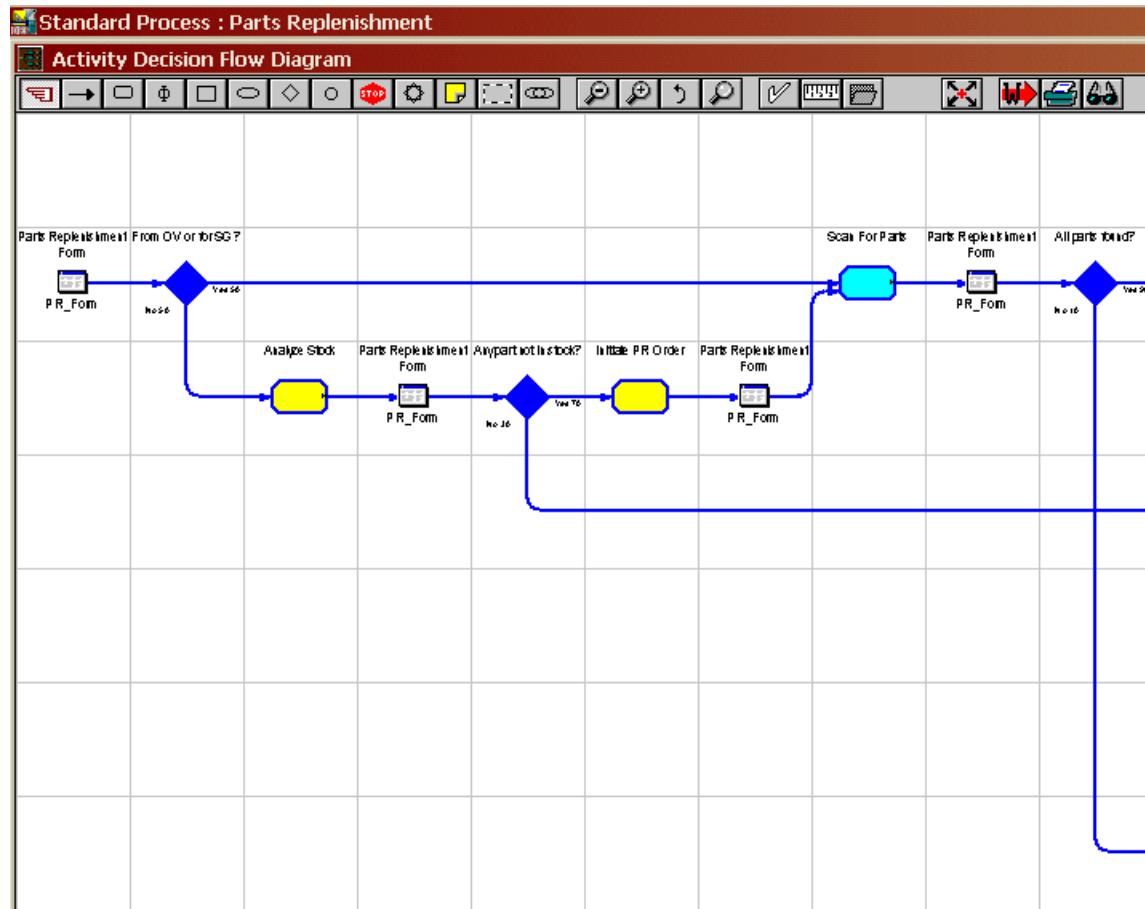


Figure 4-29 Parts Replenishment subprocess - Part 1

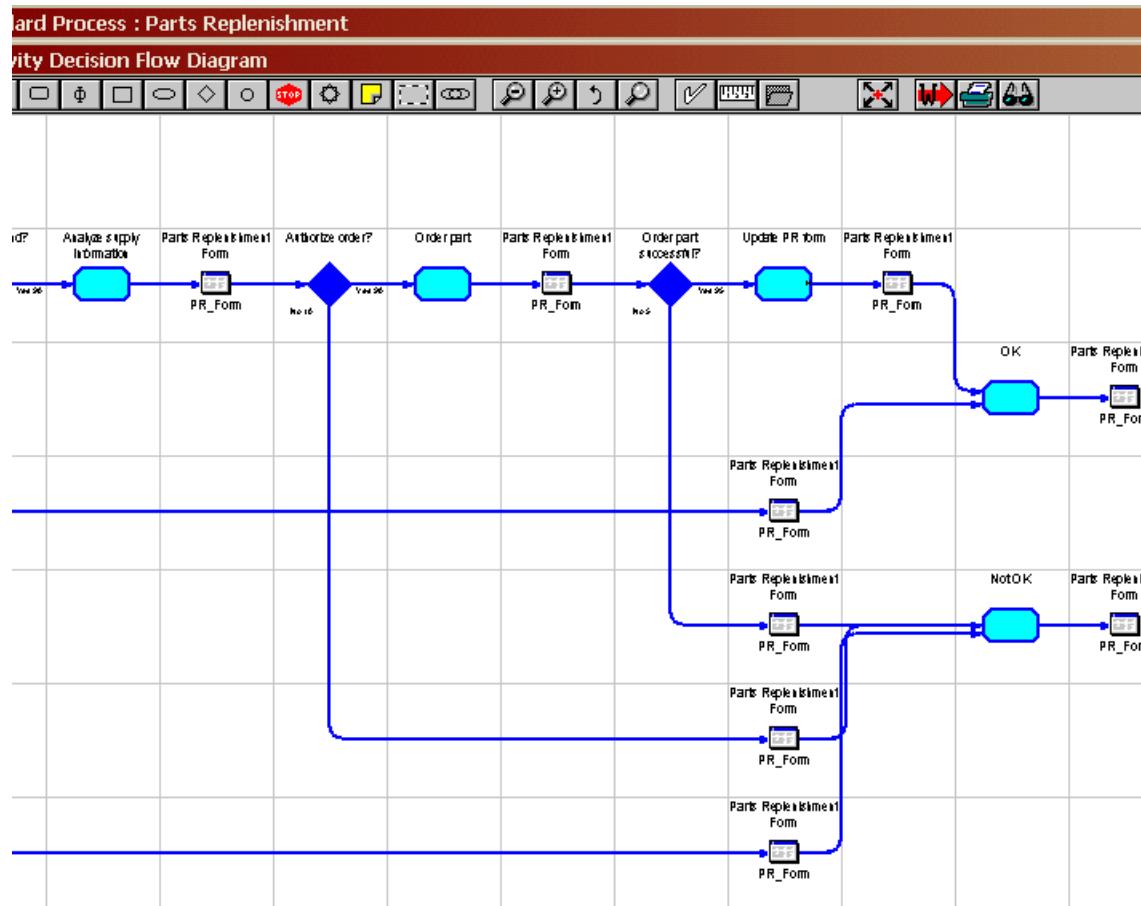


Figure 4-30 Parts Replenishment subprocess - Part 2

This parts replenishment subprocess will be also used in the alteration and test subprocesses when parts will be detected as broken or defective and will need to be replaced. A parts request will be generated using a parts replenishment form, modeled by a phi PR_Form.

Figure 4-31 on page 92 shows the alteration subprocess:

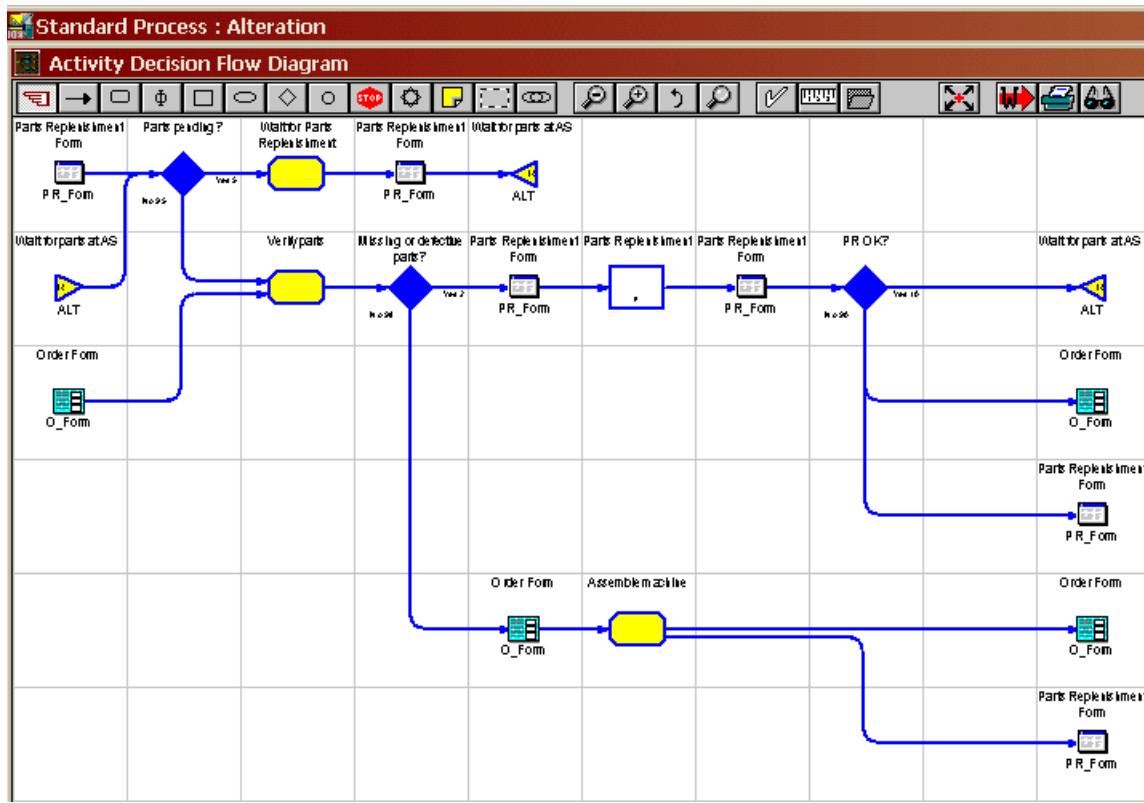


Figure 4-31 Alteration subprocess

In the same manner, the test subprocess will be modeled as follows:

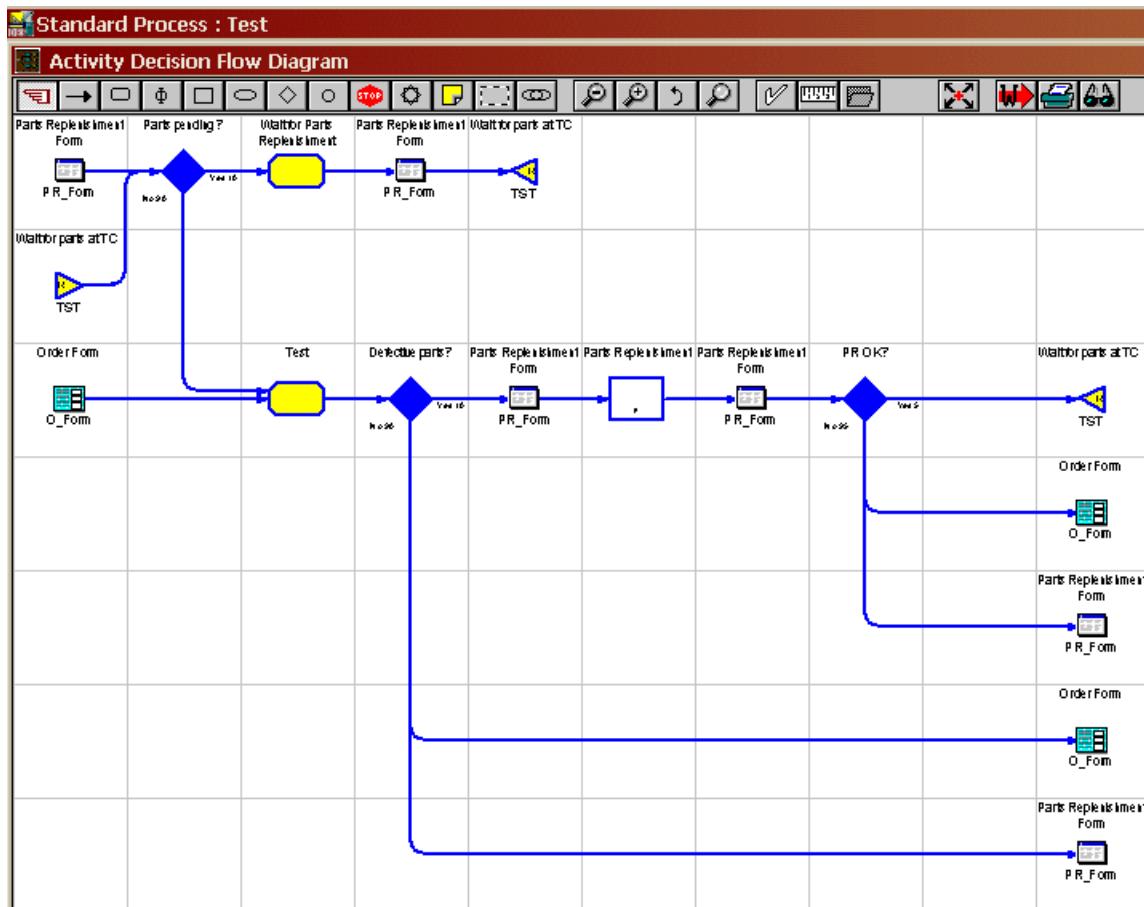


Figure 4-32 Test subprocess

All of the real case is now modeled in the Workbench.

During the drawing of all these processes you can run a model validation at any time. Go to:

1. **Process -> Process Validation**
2. Click on **Process Model Validation** or use the **Validate** button in the tool bar.
3. If no validation errors are detected, a window similar to that shown in Figure 4-33 on page 94 will appear.

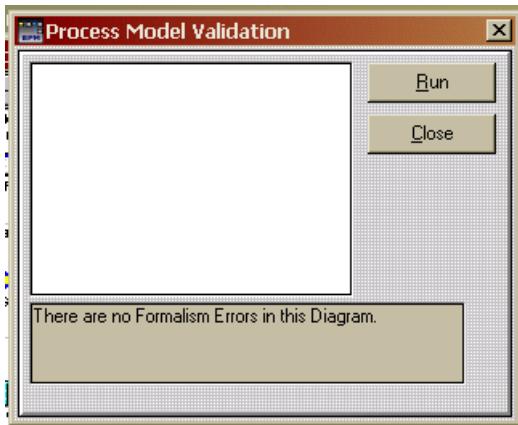


Figure 4-33 Process formalism validation

If not, read the errors messages and correct the errors in the model.

That closes the modeling part in the Workbench of the process used for the simulation exercise. Section 6.2, “What if analysis” on page 204 shows how to perform scenario simulations to get some dynamic behaviors and some numeric results which will help to set up business process baseline. The simulation is helpful, for example, to design the right business measures and objectives, as well as to validate re-engineering recommendations on parameters like business rules and employees resources.

4.5 Model the case study

We will now describe specifically the parts replenishment case study modeling which has been exported to WebSphere MQ Workflow for the run time, then monitored through the Monitor in a real production environment.

4.5.1 Parts Replenishment model structure

We will discuss the various components involved in the model - starting with the assessment of the model itself.

Collaboration limitation assessment

If a model is designed for process collaboration purpose with WebSphere MQ Workflow, the way to structure the model in the Workbench is influenced by some Workflow restrictions. Even if it is not necessary to have WebSphere MQ Workflow expertise to implement a business process connecting people and

applications, these restrictions must be known by the business process analyst who will be responsible for designing and modeling the process in the Workbench.

The most important constraint in WebSphere MQ Workflow is the size of the data structure you will have to handle from a task to another.

In WebSphere MQ Workflow, the data structure can have up to 512 data structure members of the basic type or other data structures. In fact, WebSphere MQ Workflow will calculate with the following restrictions: 4MB max length of the container size and no more than 512 members.

The following table, as the result of the detailed analysis performed during the re-engineering project and shows the detailed data needed to be handled during the execution of the end-to-end process between the employees.

It will help to determine if the WebSphere MQ Workflow restriction will be reached. If yes, the process model structure in the workbench will have to be based on processes and sub processes instead of having all the process activities in one activity decision flow diagram. By splitting the process in a hierarchy of processes and sub-processes, the WebSphere MQ Workflow restriction will hopefully be avoided not be reached.

Note: Many applications will not have this as a limitation, as much of the data will be stored in back-end databases. This allows for only key values to be passed between activities and database lookups utilized to enrich and add to the container data when needed. For our case study this is not the case, the back-end applications are not currently available to be accessed as part of this exercise - hence the need for strict attention to the size of the data containers.

At the same time, by establishing such table, it is a necessary step to set up the data structure into the Workbench.

The column data type will allow us to verify if the 4MB restriction is reached.

Table 4-1 Data object description

Object data	Object data content	Data type	Object max quantity	Comment
Work Order	Work order number	Char		A work order number is the customer order reference number.
	Request creation date	Char		

Object data	Object data content	Data type	Object max quantity	Comment
	Requester name	Char		
	Machine series	Char		
	Machine type	Char		
	Machine model	Char		
	Comment	Char		A comment field is requested by the employees to add specific information regarding the replenishment request
	Cancel order	Char		To handle the case when the parts replenishment request is no longer necessary
	Cancel reason	Char		
	Urgent flag	Char		To highlight high priorities request
Parts Replenishment request	Parts number (PN) or feature code (FC) number	Char	up to 20 by work order	A workorder is the customer order giving the detailed machine configurations at feature code or part number level according machine configuration. Employees have requested to be able to request until 20 PN or FC missing by work order
	PN or FC number	Char		The material reference in the product bill of materials.
	PN or FC designation	Char		
	PN or FC quantity requested	Char		
	PN or FC replenishment reason	Char		Three different type of replenishment reasons: missing (not available in used stock), defective (parts failing in test) or loose/shipping (warehouse kanban meaning preventive stock to replenish). According to this reason code, the request will be processed specifically.

Object data	Object data content	Data type	Object max quantity	Comment
	PN or FC of substitution	Char	up to 4 by PN or FC number	A PN or a FC can be substituted by another compatible materials. It is mainly true for logic materials like cards, power supplies, modules etc.... Employees experience has demonstrated that they can have up to 4 substitution references for one PN or FC
Supplier source	Source name	Char	up to 7 different sources	For each PN or FC, and for each substitution PN or FC, 7 different sources exists
	Available quantity	Char		
	Expected unit price	Char		The PN or FC cost information known when supply is investigated
	Currency	Char		PN or FC cost currency
	Expected delivery date	Char		
	Source selected	Char		The source selected by the requester in charge to authorize to order. This selection will be the best compromise between cost and delay to get the PN or FC
	Quantity to order	Integer		Quantity to order to a source depends of available quantity at each source.
	Order date	Char		
	Order reference	Char		Order reference is given by the ordering system corresponding to the source (different IT applications)
	Committed unit price	Float		The PN or FC cost as seen in the source ordering shipment when material shipped from the source
	Shipment date	Char		Source shipment date
	Case number	Char		Materials parcels number to track shipments
	Reception date	Char		The date when the material parcel arrives at the entrance of the used production line

Object data	Object data content	Data type	Object max quantity	Comment
	Invoice import number	Char		Invoice reference used further in the process by Accounting or Finance organizations to reconcile accounts
	Remark (InventorySYS) number	Char		The inventory SYS record number corresponding at a reception operation performed at the used production line
	Remark (InventorySYS) PN or FC	Char		The inventory serial number of the PN and FC given by the inventory SYS

Having identified all the required objects, we can calculate the potential size of the data container based on the maximum size of the fields and the maximum cardinality of any repeating fields or field groups.

4.5.2 Build the model structure

In an attempt not encounter problems due to WebSphere MQ Workflow container size restriction, the workbench model has been split into three processes:

1. A Work Order process: starting with the parts request.

The parts request can contain up to 20 different parts. This first level of process splits the request by PN. Each PN will be processed in a Parts Replenishment process. So, the Work Order process contains 20 Parts Replenishment processes.

2. A Parts Replenishment process: for each PN requested.

This process is the same until a source of supply has been selected. Then, the PN ordering, the shipment tracking, and the reception, will be grouped in an Order process. So, the Parts Replenishment process contains 7 Order processes corresponding to the 7 possible sources.

3. An Order process: for each PN requested.

This process contains the generic set of activities from the PN order to the physical reception in the production line.

The following figures show the Workbench model structure. To ease the understanding on what main business process activities are covered by each process in the workbench, the activities in the business process flow in Section 1.3.4, “The case study business process details” on page 15 are shown in parallel.

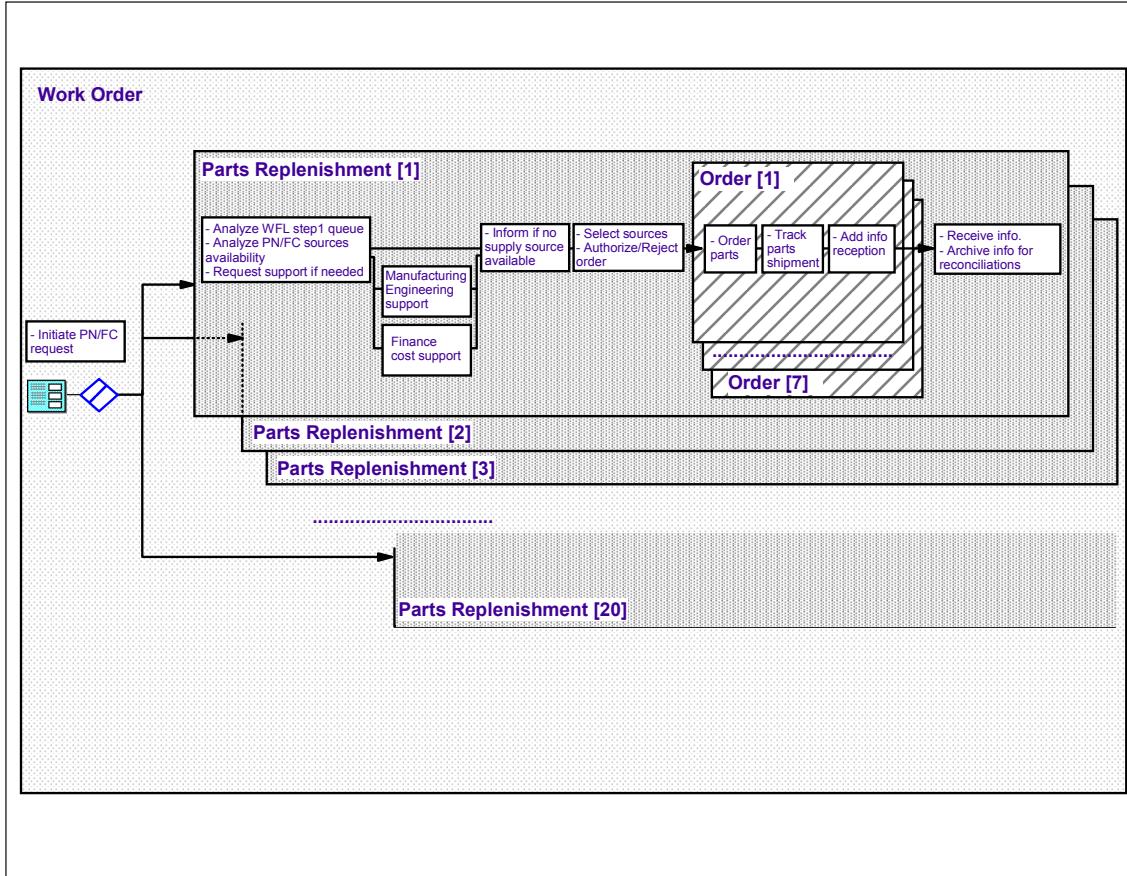


Figure 4-34 Workbench model structure

4.5.3 Build the case study model in the workbench

It is assumed that all the following modeling steps are done in the editing Integration Mode in workbench

Organization data

The data setup (organization structure, company location, calendars, phis and so on...) has been done following the same process described at the beginning of this chapter and will not be described again specifically for this parts replenishment.

However, to better understand the staff assignment for the tasks during the model drawing, the following pictures show the organization data setup into the

model according the roles in the business process flow described in Section 1.3.4, “The case study business process details” on page 15.

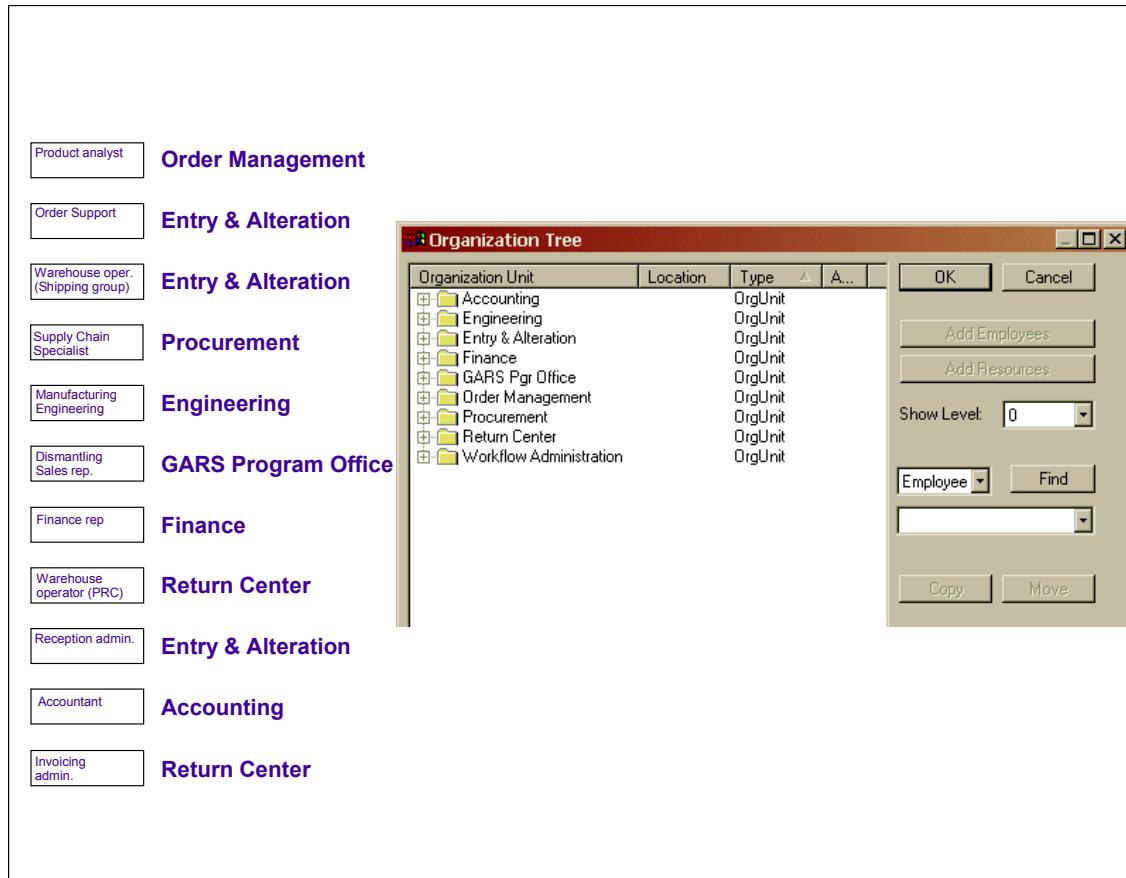


Figure 4-35 Organization tree in workbench according the business process case study

The next figures show the employees involved in the business process. As this modeling in workbench will be the basis for the run-time, the organization must have:

- ▶ A manager employee role for each organization. It is mandatory for WebSphere MQ Workflow.
- ▶ An employee name convention. These names will be the userids used to logon in the run-time environment. In the case study the convention is to start employee name by the first letter of their first name.
- ▶ A Workflow Admin organization and employee for the workflow administration. This employee will have a specific set of privileges and capabilities to perform

users support activity during the run-time. It is generally a userid used by a specialist in the IT organization in charge of support for users as well as to insure the run-time application and server environment availability.

In the workbench, the organization has been expanded by going to **Repository -> Organization Data -> Organization tree...** and by requesting to show **All** level in the right menu of the pop up screen. The next figure shows the entire list of all employees involved in the case study process. At the end of the list the administrator employee appears.

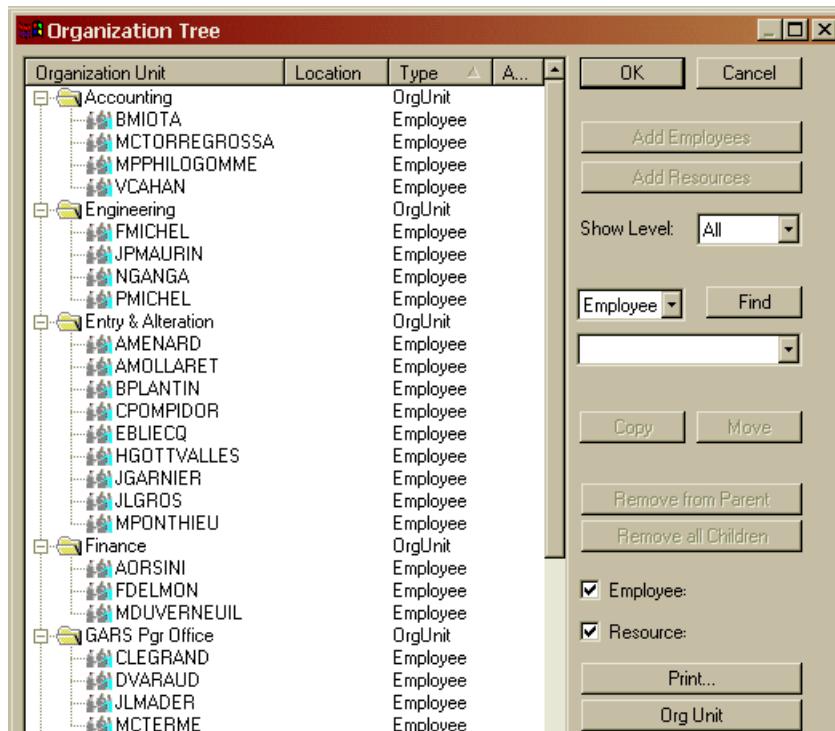


Figure 4-36 Case study employees - part 1

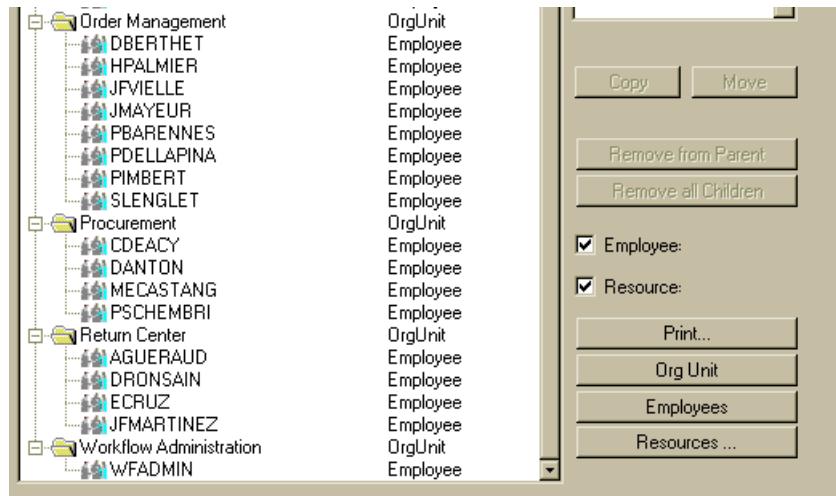


Figure 4-37 Case study employees including an administrator - part 2

1. To setup specific access and privileges to the WFADMIN employee, go to **Repository -> Organization Data -> Employees...**,
2. The General tab appears.
3. Select the WFADMIN employee in the **Employees List** window, and click on the **Details** tab.
4. In this tab you can setup a specific password different from the generic password.
5. **Password**, setup automatically by workbench for each employee.
6. For the other employees, the generic password is used to logon the first time in the run time application.
7. Then, they will have to change their password directly in the run-time application.
8. It is not needed to manage all employees passwords into the workbench.

Furthermore, it will be more practical to perform the run-time WebSphere MQ Workflow tests. By using the generic password for everybody it will be easier simulate employees logon, role after role, to verify that the workflow and data transmission is working properly.

Repository : Employees

General Details Authorization PEA Notes

User Id WFADMIN	Last Name Administrateur				
Password xxxxxx	Calendar Standard Calendar				
Verify xxxxxx	Substitute				
Main Role	Emp.level 0 Absent <input type="checkbox"/> Automatically Reset Absent <input type="checkbox"/>				
Roles List	<table border="1"><tr><td>Role</td><td>Workflow Administration</td><td><input type="button" value="Up"/></td><td><input type="button" value="Down"/></td></tr></table>	Role	Workflow Administration	<input type="button" value="Up"/>	<input type="button" value="Down"/>
Role	Workflow Administration	<input type="button" value="Up"/>	<input type="button" value="Down"/>		

Figure 4-38 Set up a specific password

9. Go to the **Authorization** tab to set up the administrator privileges.
10. Check mark all the possible authorizations you have on this tab as shown in the following figure.

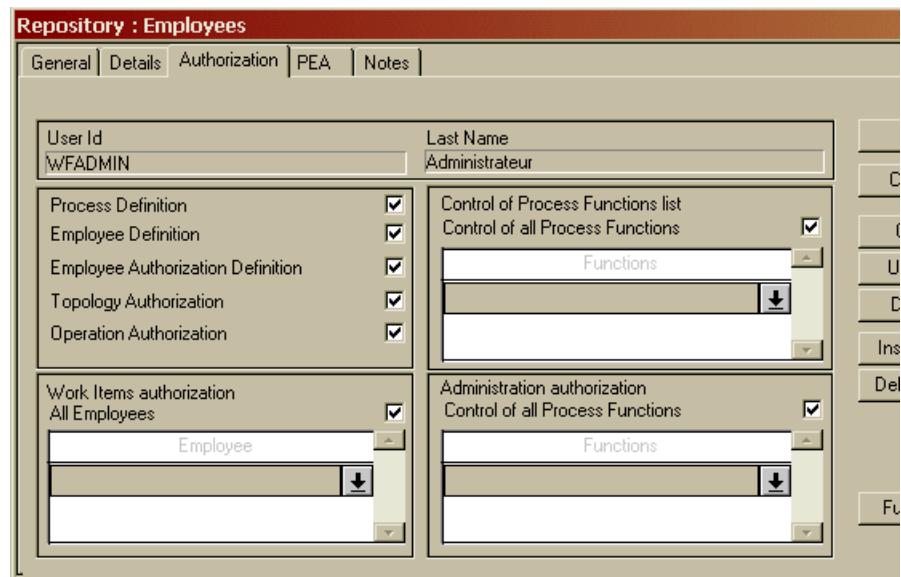


Figure 4-39 Set up administrator privileges

When the organization data is set up in workbench, roles need to be created. Roles will be the link between the task to be performed and the employees. (see Figure 4-40 on page 105).

11. Go to Table -> Repository organization Data -> Employees Roles...

12. The following data will be shown in a Employees Roles window.

Employees Roles				
User ID	Org Unit	Job Title	Role	
1 WFADMIN	Workflow Administration		Workflow Administration	
2 DANTON	Procurement		Supply Chain Specialist	
3 PBARENNES	Order Management		Manager	
4 OBERTHET	Order Management		Product Analyst	
5 EBLIECO	Entry_Alteration		Manager Entry_Alteration	
6 EBLIECO	Entry_Alteration		Manager	
7 VCAHAN	Accounting		Accountant 1	
8 MECASTANG	Procurement		Supply Chain Specialist	
9 ECRUZ	Return Center		RMER	
10 CDEACY	Procurement		Manager	
11 PDELLAPINA	Order Management		Claim Management	
12 PDELLAPINA	Order Management		Product Analyst	
13 FDELMON	Finance	Manager	Manager	
14 MDUVERNEUIL	Finance	Cost Specialist	Cost Specialist	
15 NGANGA	Engineering	ME	ME	
16 JGARNIER	Entry_Alteration		Warehouse Operator	
17 HGOTTVALLES	Entry_Alteration		Order Support	
18 JLGRROS	Entry_Alteration		Product Analyst	
19 AGUERAUD	Return Center		Manager	
20 PIMBERT	Order Management		Product Analyst	
21 CLEGRAUD	GARS Pgr Office		Manager	
22 SLENGLET	Order Management		Product Analyst	
23 JLMADER	GARS Pgr Office		Sales	
24 JFMARTINEZ	Return Center		RMER	
25 JPMAURIN	Engineering	Manager	Manager	
26 JMAYEUR	Order Management	Product Analyst	Product Analyst	
27 AMENARD	Entry_Alteration		Order Support	
28 FMICHEL	Engineering		ME	
29 PMICHEL	Engineering	ME	ME	
30 BIMIOTA	Accounting		Accountant 1	
31 AMOLLARET	Entry_Alteration		DB Admin	
32 AOORSINI	Finance	Cost Specialist	Cost Specialist	
33 HPALMIER	Order Management	Product Analyst	Product Analyst	
34 MPPILOGOMME	Accounting	Manager	Manager	
35 BPLANTIN	Entry_Alteration		Order Support	
36 CPOMPIDOR	Entry_Alteration		DB Admin	
37 MPONTHEIU	Entry_Alteration		DB Admin	
38 DRONSAIN	Return Center	PRC Admin	PRC Admin	
39 PSCHEMBRI	Procurement		Supply Chain Specialist	
40 MCTERMIE	GARS Pgr Office		Sales	
41 MCTORREGROSSA	Accounting		Accountant 2	
42 DVARAUD	GARS Pgr Office	Business Champion	Business Champion	
43 JFVIELLE	Order Management		Entry Audit Leader	

Figure 4-40 Employees roles

Data structure

The data structure is based on the details in Table 4-1 on page 95. For each process an associated data structure is created in the workbench:

- ▶ Work Order: S_Work_Order.
- ▶ Parts Replenishment: S_Parts_Replenishment.
- ▶ Order: S_Order_Supply.

To create a data structure:

1. Go to **Repository -> Process Data -> Data Fields...**
2. Type a name in the Name field.
3. Set the type to **Struct**.

4. Click on the double arrows >> at the end of MQ Name and System Manager fields. The structure name is automatically updated in these fields with the same name as entered. These names will be used by WebSphere MQ Workflow in the run time; you can change it if it is required.
5. Then click on **Add** and the data structure is added to the Fields list.

The Table 4-41 on page 106 shows an example for the creation of the S_Order_Supply data structure.

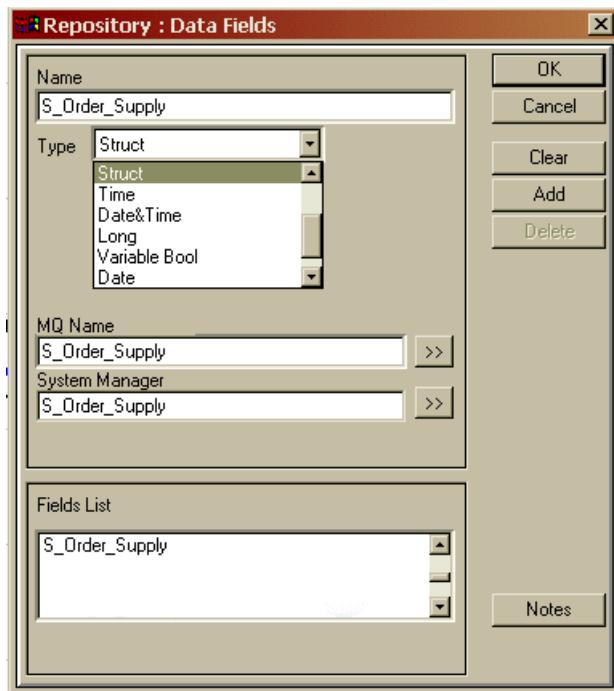


Figure 4-41 Example to create a data structure

The same process is used to create the data fields.

For each data field, the **Type** has to be selected regarding the data field nature (character, date & time, integer and so on...).

Note: Before setting up the data structure, another limitation should be checked - the data fields cannot have more than 4 grandparents. If the limit is reached an error message will show up as shown in the following example:

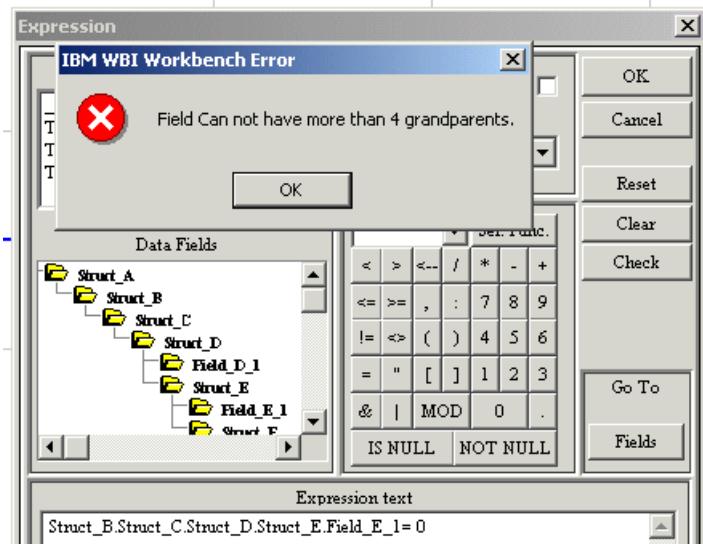


Figure 4-42 Maximum data structure grandparents in workbench

Go to **Repository -> Process Data -> Data Structures...** to access the window where all the detailed fields can be shown.

1. Work Order: S_Work_Order

Data Structure	Type	MQ Name	System M...	Array
Default Data Structure	Structure			
S_Order_Supply	Structure			
S_Parts_Replenishment	Structure			
S_Work_Order	Structure			
PR_Work_Order	Char	PR_Work_...	PR_Work_...	0
PR_Creation_Date	Char	PR_Creatio...	PR_Creatio...	0
PR_Requester	Char	PR_Reques...	PR_Reques...	0
PR_Server_Series	Char	PR_Server_...	PR_Server_...	0
PR_Machine_Type	Char	PR_Machin...	PR_Machin...	0
PR_Model	Char	PR_Model	PR_Model	0
PR_Comment	Char	PR_Comment	PR_Comment	0
PR_Cancel_Order	Char	PR_Cancel...	PR_Cancel...	0
PR_Cancel_Reason	Char	PR_Cancel...	PR_Cancel...	0
PR_Urgent_Flag	Char	PR_Urgent...	PR_Urgent...	0
S_PNFC	Structure	S_PNFC	S_PNFC	20
PNFC_Number	Char	PNFC_Num...	PNFC_Num...	0
PNFC_Designation	Char	PNFC_Desig...	PNFC_Desig...	0
PNFC_Qty_Requested	Int	PNFC_Qty_...	PNFC_Qty_...	0
PNFC_Replenishment_Reason	Char	PNFC_Repl...	PNFC_Repl...	0

Figure 4-43 Work order process detailed data structure

As is shown in the **Array** column, 20 part numbers or feature codes can be requested for one work order (machine level).

2. Parts Replenishment: S_Parts_Replenishment

Data Structure	Type	MQ Name	System M...	Array
S_Parts_Replenishment	Structure			
PR_Work_Order	Char	PR_Work_...	PR_Work_...	0
PR_Creation_Date	Char	PR_Creatio...	PR_Creatio...	0
PR_Requester	Char	PR_Reques...	PR_Reques...	0
PR_Order_Approver	Char	PR_Order_...	PR_Order_...	0
PR_Server_Series	Char	PR_Server_...	PR_Server_...	0
PR_Machine_Type	Char	PR_Machin...	PR_Machin...	0
PR_Model	Char	PR_Model	PR_Model	0
PR_Comment	Char	PR_Comment	PR_Comment	0
PR_No_Possible_Sourcing	Char	PR_No_Po...	PR_No_Po...	0
PR_Cancel_Order	Char	PR_Cancel...	PR_Cancel...	0
PR_Cancel_Reason	Char	PR_Cancel...	PR_Cancel...	0
PR_Want_ME_Support	Char	PR_Want_...	PR_Want_...	0
PR_Want_Cost_Support	Char	PR_Want_...	PR_Want_...	0
PR_Want_SALES_Supply	Char	PR_Want_...	PR_Want_...	0
PNFC_Number	Char	PNFC_Num...	PNFC_Num...	0
PNFC_Designation	Char	PNFC_Desig...	PNFC_Desig...	0
PNFC_Qty_Requested	Int	PNFC_Qty_...	PNFC_Qty_...	0
PNFC_Replenishment_Reason	Char	PNFC_Repl...	PNFC_Repl...	0
PNFC_Possible_PN_FC	Int	PNFC_Poss...	PNFC_Poss...	0
PR_Urgent_Flag	Char	PR_Urgent...	PR_Urgent...	0
PR_ME_Question	Char	PR_ME_Qu...	PR_ME_Qu...	0
PR_ME_Response	Char	PR_ME_Re...	PR_ME_Re...	0
PR_Wait_Needed	Char	PR_Wait_N...	PR_Wait_N...	0
PR_Wait_Reason	Char	PR_Wait_R...	PR_Wait_R...	0
S_PN_OF_Substitution	Structure	S_PN_OF_S...	S_PN_OF_S...	4
PS_PN_FC_Number	Char	PS_PN_FC...	PS_PN_FC...	0
S_Supplier_Source	Structure	S_Supplier_...	S_Supplier_...	7
SS_Name	Char	SS_Name	SS_Name	0
SS_Available_Qty	Char	SS_Availabl...	SS_Availabl...	0
SS_Expected_Unit_Price	Float	SS_Expect...	SS_Expect...	0
SS_Currency	Char	SS_Currency	SS_Currency	0
SS_Expected_Delivery_Date	Char	SS_Expect...	SS_Expect...	0
SS_Source_Selected	Char	SS_Source...	SS_Source...	0
SS_Qty_To_Order	Int	SS_Qty_To...	SS_Qty_To...	0
SS_Order_Date	Char	SS_Order_...	SS_Order_...	0
SS_Order_Reference	Char	SS_Order_...	SS_Order_...	0
SS_Committed_Unit_Price	Float	SS_Committ...	SS_Committ...	0
SS_Shipment_Date	Char	SS_Shipme...	SS_Shipme...	0
SS_Case_BR_Number	Char	SS_Case_B...	SS_Case_B...	0
SS_Reception_Date	Char	SS_Recepti...	SS_Recepti...	0
SS_Invoice_Import_Number	Char	SS_Invoic...	SS_Invoic...	0
SS_Remark_Needed	Char	SS_Remark...	SS_Remark...	0
SS_Remark_Number	Char	SS_Remark...	SS_Remark...	0
SS_Remark_PN_OF_FC	Char	SS_Remark...	SS_Remark...	0

Figure 4-44 Parts Replenishment detailed data structure

As is shown in the **Array** column, for each part number or feature code requested, 4 part numbers of substitution can exist and, for each, 7 possible sources of supply can be found.

3. Order: S_Order_Supply

Data Structure	Type	MQ Name	System M...	Array
Default Data Structure	Structure			
S_Order_Supply	Structure			
PR_Work_Order	Char	PR_Work_...	PR_Work_...	0
PR_Creation_Date	Char	PR_Creatio...	PR_Creatio...	0
PR_Requester	Char	PR_Reques...	PR_Reques...	0
PR_Order_Approver	Char	PR_Order_...	PR_Order_...	0
PR_Server_Series	Char	PR_Server_...	PR_Server_...	0
PR_Machine_Type	Char	PR_Machin...	PR_Machin...	0
PR_Model	Char	PR_Model	PR_Model	0
PR_Comment	Char	PR_Comment	PR_Comment	0
PNFC_Number	Char	PNFC_Num...	PNFC_Num...	0
PNFC_Designation	Char	PNFC_Desig...	PNFC_Desig...	0
PNFC_Qty_Requested	Int	PNFC_Qty_...	PNFC_Qty_...	0
PNFC_Replenishment_Reason	Char	PNFC_Repl...	PNFC_Repl...	0
PNFC_Possible_PN_FC	Int	PNFC_Poss...	PNFC_Poss...	0
PR_Urgent_Flag	Char	PR_Urgent...	PR_Urgent...	0
S_OS_PN_Of_Substitution	Structure	S_OS_PN_...	S_OS_PN_...	4
PS_PN_FC_Number	Char	PS_PN_FC...	PS_PN_FC...	0
S_Supplier_Source	Structure	S_Supplier_...	S_Supplier_...	1
SS_Name	Char	SS_Name	SS_Name	0
SS_Available_Qty	Char	SS_Availabl...	SS_Availabl...	0
SS_Expected_Unit_Price	Float	SS_Expect...	SS_Expect...	0
SS_Currency	Char	SS_Currency	SS_Currency	0
SS_Expected_Delivery_Date	Char	SS_Expect...	SS_Expect...	0
SS_Source_Selected	Char	SS_Source...	SS_Source...	0
SS_Qty_To_Order	Int	SS_Qty_To...	SS_Qty_To...	0
SS_Order_Date	Char	SS_Order_...	SS_Order_...	0
SS_Order_Reference	Char	SS_Order_...	SS_Order_...	0
SS_Committed_Unit_Price	Float	SS_Committ...	SS_Committ...	0
SS_Shipment_Date	Char	SS_Shipme...	SS_Shipme...	0
SS_Case_BR_Number	Char	SS_Case_B...	SS_Case_B...	0
SS_Reception_Date	Char	SS_Recepti...	SS_Recepti...	0
SS_Invoice_Import_Number	Char	SS_Invoice...	SS_Invoice...	0
SS_Remark_Needed	Char	SS_Remark...	SS_Remark...	0
SS_Remark_Number	Char	SS_Remark...	SS_Remark...	0
SS Remark PN Of FC	Char	SS Remark...	SS Remark...	0

Figure 4-45 Order detailed data structure

As is shown in the **Array** column, for each order of a part number or a feature, 4 part numbers of substitution can exist, and, for each, 7 possible sources of supply can be found.

This ends the initialization of the organization data and the data structure for the case study. The next sections describe how to draw the case study model in the workbench.

4.5.4 Work Order model

The first step done by an employee in this process, is to initialize a parts request through a form. The employee will enter in the form fields the information needed

to process a request. This information will be captured in the S_Work_Order data structure.

To model this form, create a phi with the characteristics shown in the next picture:

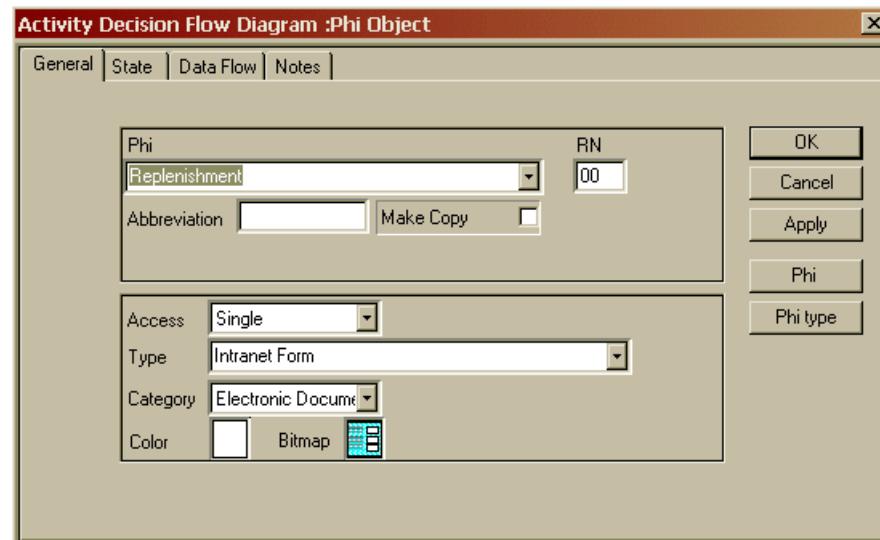


Figure 4-46 Work order phi

Then, in the Work Order process ADF, draw a Phi, double click on it, attach it to a Replenishment Phi and click on OK, it shows up in the ADF as follow:

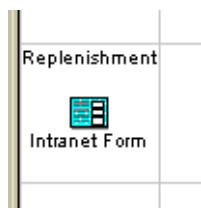


Figure 4-47 Draw Work Order Phi

This form as the model source will be sent out to a Parts Replenishment process target according to a test on the number of part number references requested (up to 20). Before setting up the test on this reference, create a multiple decision called PNs, and connect it to the previous Replenishment phi.

The ADF screen shows the following drawing:

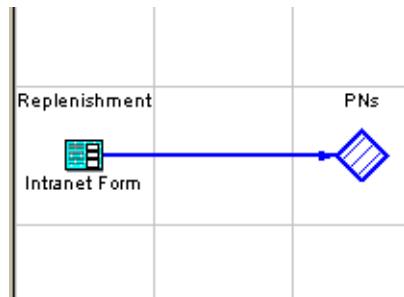


Figure 4-48 Draw Work order process

1. Draw a choice by selecting the choice icon in the ADF icon bar.
2. Connect it to the multiple decision.
3. Go to **Repository -> Process Data -> Choices...**
4. Select the PN1 decision, and enter PN1 in the Choice field.
5. Click on **Add** to record the choice,
6. Click **OK** to close the Choices window.
7. Back to the ADF window
8. Double click on the previous choice drawn, and attach it to PN1.
9. On the same row of the PN1 choice, draw a Replenishment phi then a process by using the Process icon in the ADF icon bar.
10. Double click on it, enter Parts Replenishment as the name in the Process field of the General tab window.
11. Click **OK** to record this process.
12. Link the PN1 choice to the Replenishment Phi
13. Then to the Parts Replenishment process.
14. Finally end the first part request process among the 20 by a STOP icon linked to the Parts Replenishment process.
15. The first branch for the PN1 has been created and shows the following drawing.

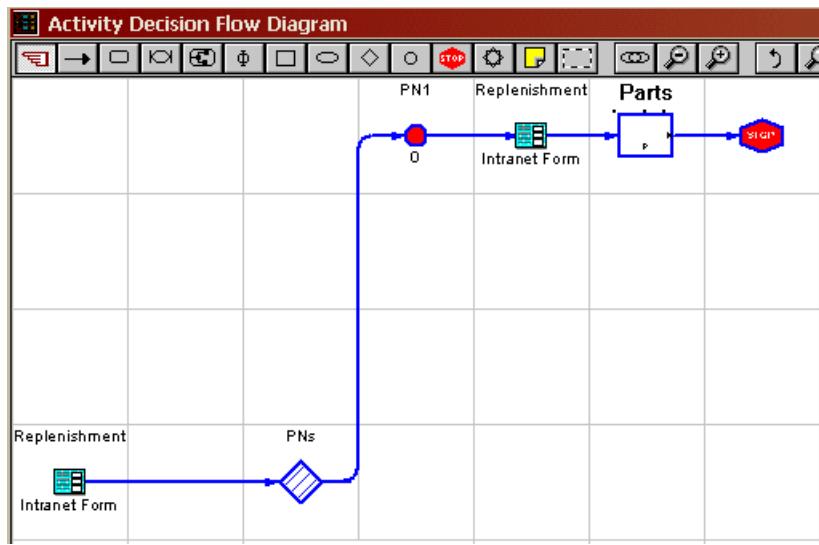


Figure 4-49 First branch in Work Order process

16. Reproduce the drawing steps by creating PN2 to PN20 choices linked to a Parts Replenishment process and finishing by a STOP.
17. At the end, we have the 20 branches to process from part number 1 up to part number 20, the maximum PN requests authorized for a workorder.

The Work Order process is modeled as follows:

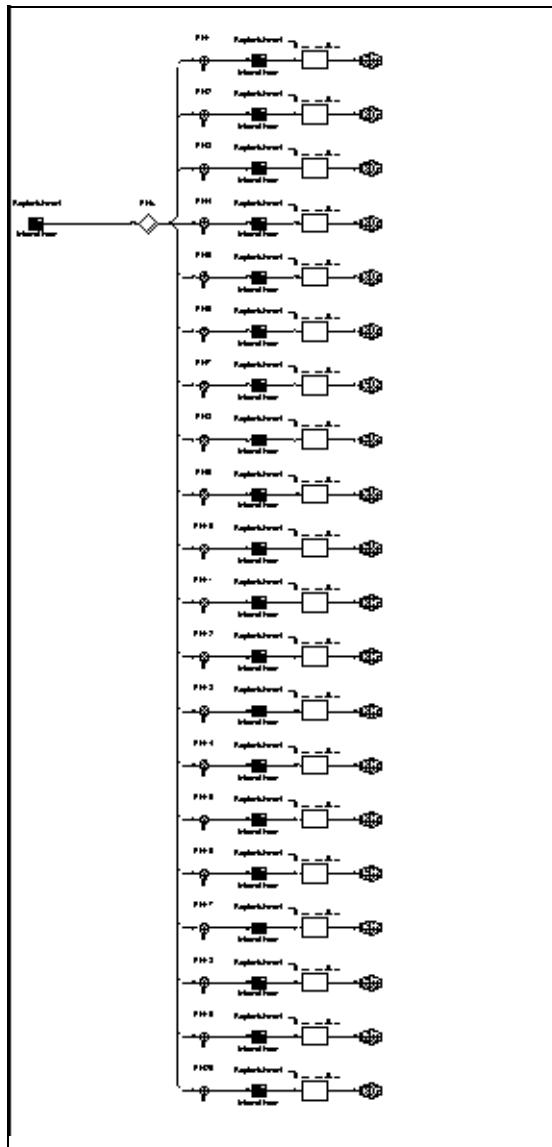


Figure 4-50 Work Order process with the 20 branches for each PN request

4.5.5 Parts Replenishment model

The Parts Replenishment process is the main chain of activities reflecting the business practice and rules. At this stage of the case study, we will assume a basic knowledge of how to draw the process in the Workbench based on the previous descriptions on how to draw a model in the workbench.

Figure 4-51 shows the workbench model overwritten with business practice explanations. Also, the employees roles are mapped.

To assure continuity between the figures, letters (A, B, C, D...) have been added to the workbench screen shots to allow to follow the model from a figure to another.

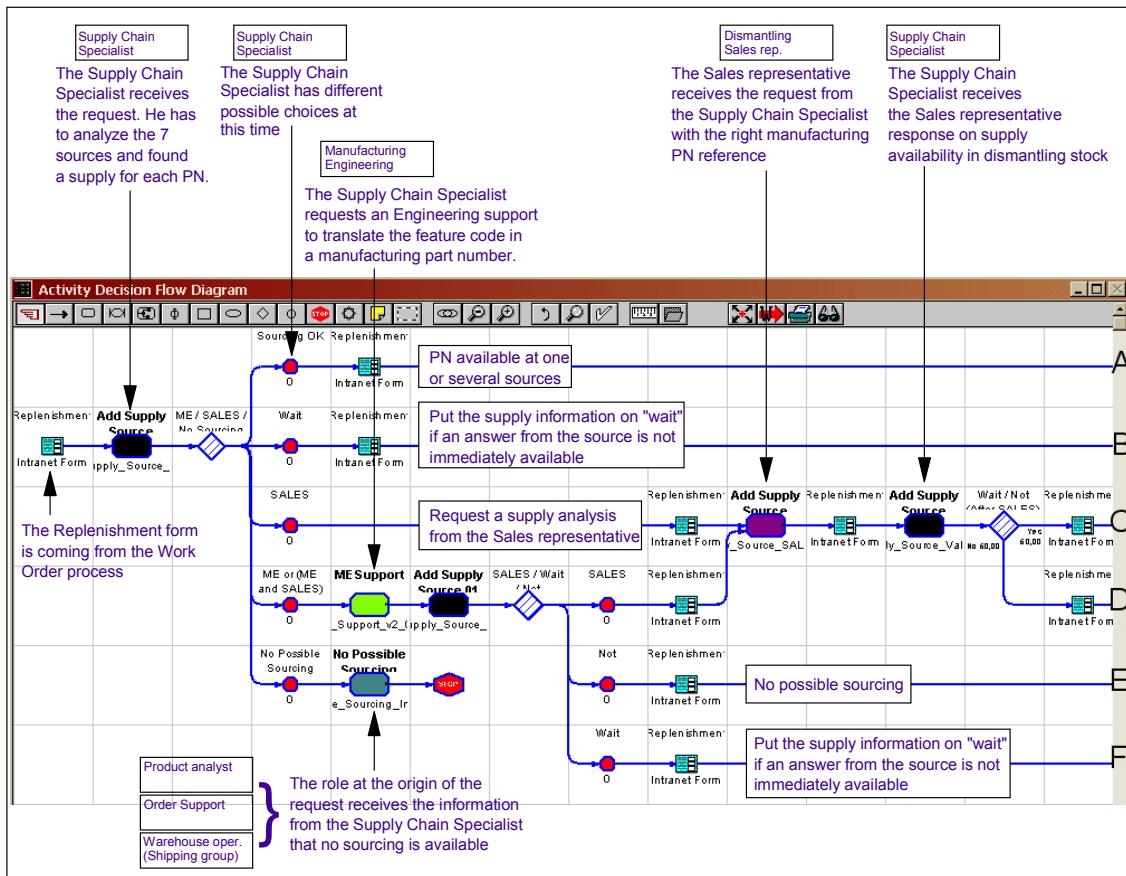


Figure 4-51 Parts Replenishment detailed process - Part 1

On this figure all the names used for tasks, multiple decisions and choices are easily readable and can be reproduced as such. Staff assignment for tasks are in line with the employees roles set up in the previous chapter.

To assign a staff role to a task:

1. Double click on the Add Supply Source task, for this example, in the ADF window.

2. Select the Staff Assignment tab.
3. If several employees have the same role and can work in parallel, select Dynamic Assignment for the Staff Assignment field.
4. Select Members Only.
5. Select Supply Chain Specialist for the role.
6. All employees set up in this role will have the capability to perform this task.

See on the next figure these parameters setting for the task Add Supply Source.

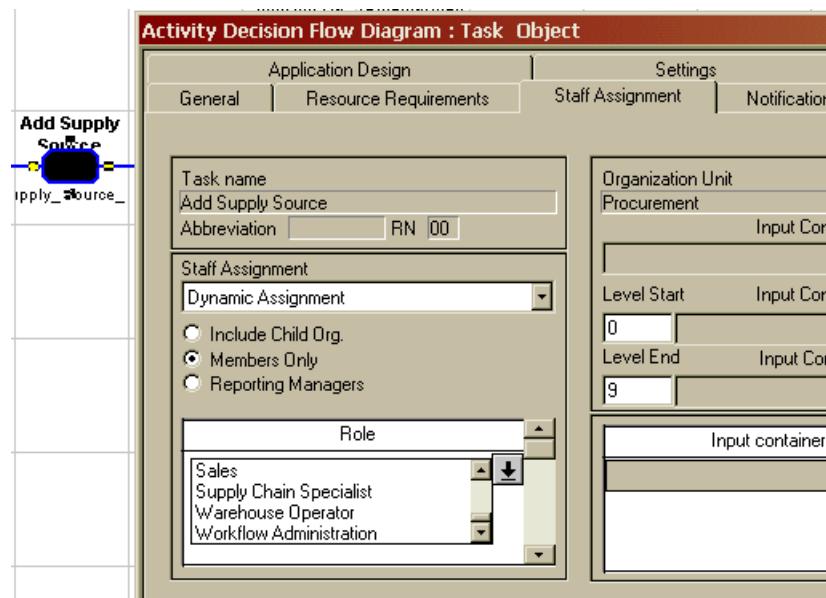


Figure 4-52 Assign a staff role to a task

7. For the No Possible Sourcing task in the flow, the staff member to assign is the Process Starter.
8. During the workflow run time the employee at the origin of the parts request will be automatically detected and this task will be assigned to the right person.
9. To do the setting in workbench, double click on the task and go to the Staff Assignment tab.
10. Set the Process Starter for the Staff assignment field as shown in the next figure.

Activity Decision Flow Diagram : Task Object

Application Design		Settings		Notes	
General	Resource Requirements	Staff Assignment	Notification	Automation	
Task name No Possible Sourcing Info Abbreviation <input type="text"/> RN 01		Organization Unit <input type="checkbox"/> Input Container			
Staff Assignment Process Starter Manager of Process Starter Starter of Activity Manager of Starter of Activity Not Starter of Activity Assigned Employees All People Data from Predefined members					

Figure 4-53 Set a process starter role for a task

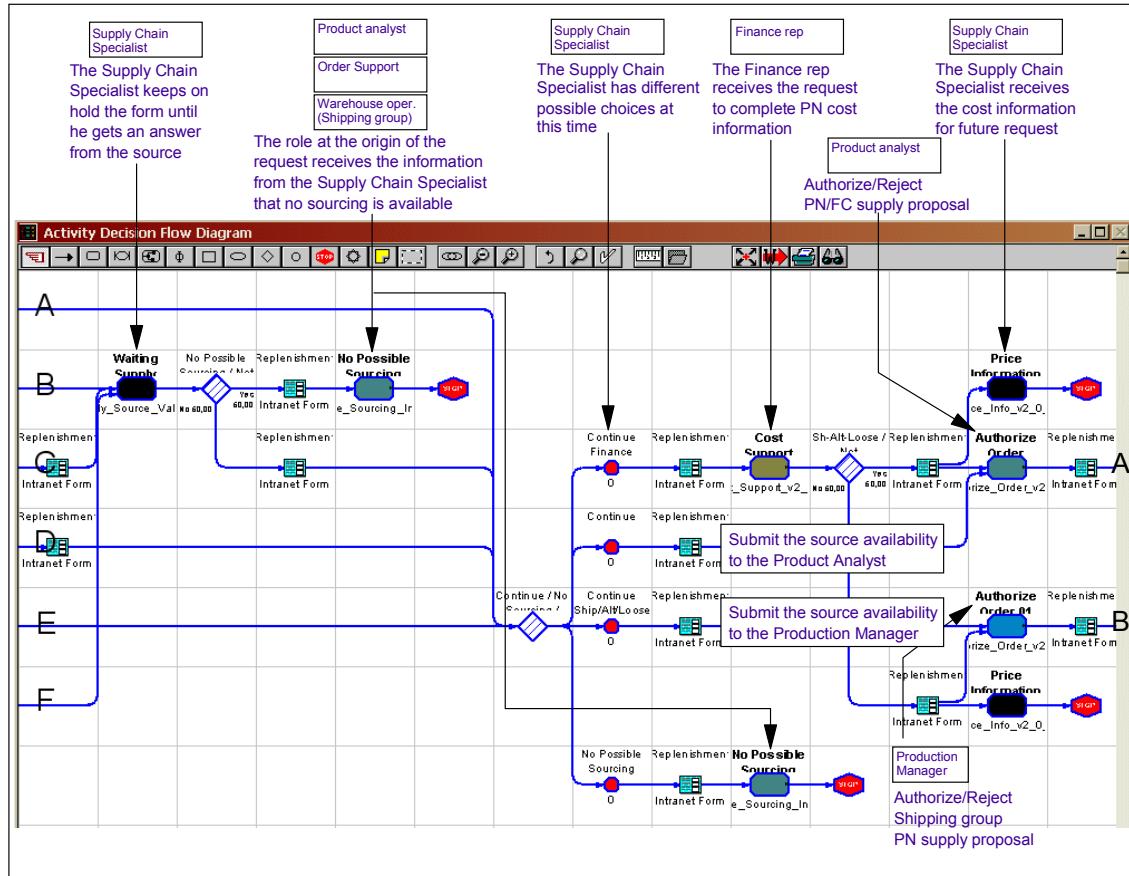


Figure 4-54 Parts Replenishment detailed process - Part 2

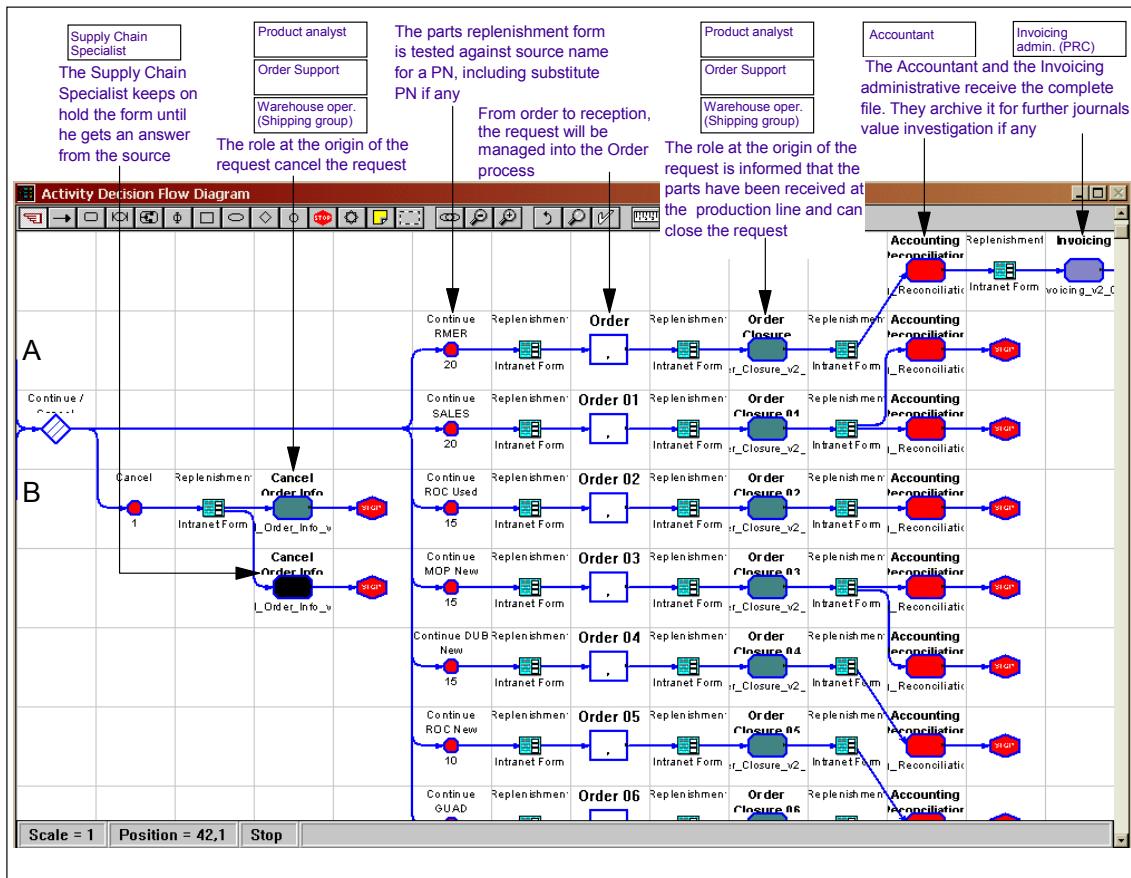


Figure 4-55 Parts Replenishment process - Part 3

11. The Cancel Order and the Order Closure tasks have to be assigned to the Process Starter.
12. The branch after the Invoicing has to be terminated by a STOP icon like the other branches in order to end the workflow.

4.5.6 Order model

This process is the generic set of tasks to track the parts from part order step until physical reception in the production line with appropriate records in the inventory system. It is called 7 times corresponding to the possible sources of supply.

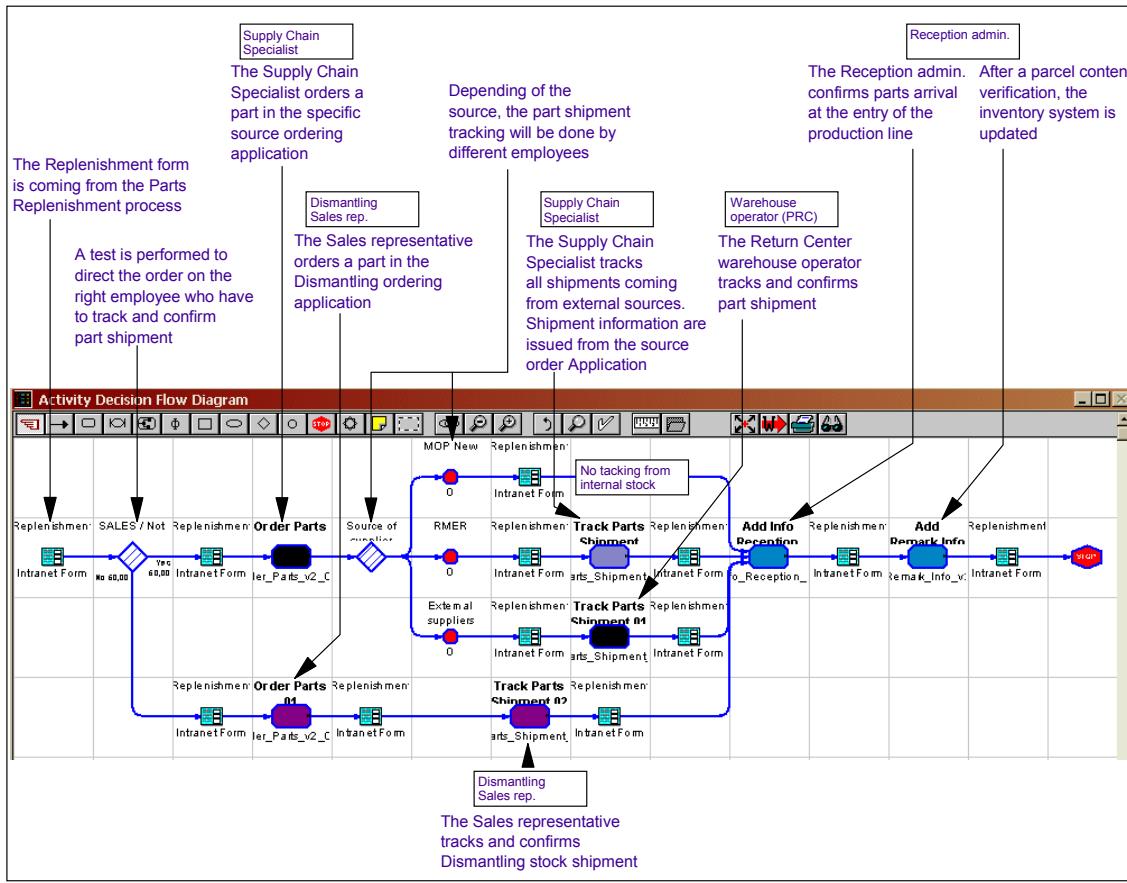


Figure 4-56 Order process

Now, the three processes have been modeled in the workbench. Organization data (employees names, employees roles, managers), and real business processes practices, rules and mechanisms, have been translated into the model.

This modeling is done by the Business Analyst. The next chapter will show how to complete the model to be exported to WebSphere MQ Workflow without any additional steps from Workbench to WebSphere MQ Workflow run-time. The Business Analyst needs to be helped by an IT specialist to take the model to the run-time and to set up the server where the application will be hosted in a production environment.



Taking the model to run time

This chapter describes the steps to complete the model in the workbench to be ready to be exported to WebSphere MQ Workflow without any modifications in the export file either in WebSphere MQ Workflow build or run time. Also, we discuss the design and build of the all important users interfaces.

5.1 Finalize process model

All the steps described in this chapter are performed in Integration Mode editing mode in Workbench.

It is necessary to highlight some architecture items used for the case study run-time environment. The architecture influences the parameter settings described in this chapter.

- ▶ The run time server runs on a Windows NT server
- ▶ WebSphere MQ Workflow Version 3.4
- ▶ The Workflow WEB client is used.

5.1.1 Create an ‘Empty activity’

A specific task has to be added in the model to allow for correct execution by WebSphere MQ Workflow. This extra task, named FMCINTERNALNOOP, will replace the Workbench process source in WebSphere MQ Workflow and has to be added just after a source in the model.

Two processes are impacted in the case study, the Work Order and the Order processes. Each of them starts with a source modeled by the Replenishment Intranet Form which goes directly to a multiple decision. Between the source and the decision, an empty activity, also called ‘NOOP’, has to be added.

Create a FMCINTERNALNOOP task

First, create a NOOP task.

1. Go to **Repository -> Process Data -> Tasks...**
2. Set the task name as FMCINTERNALNOOP without any other specific settings.
3. Click on **Add** to record this entry.

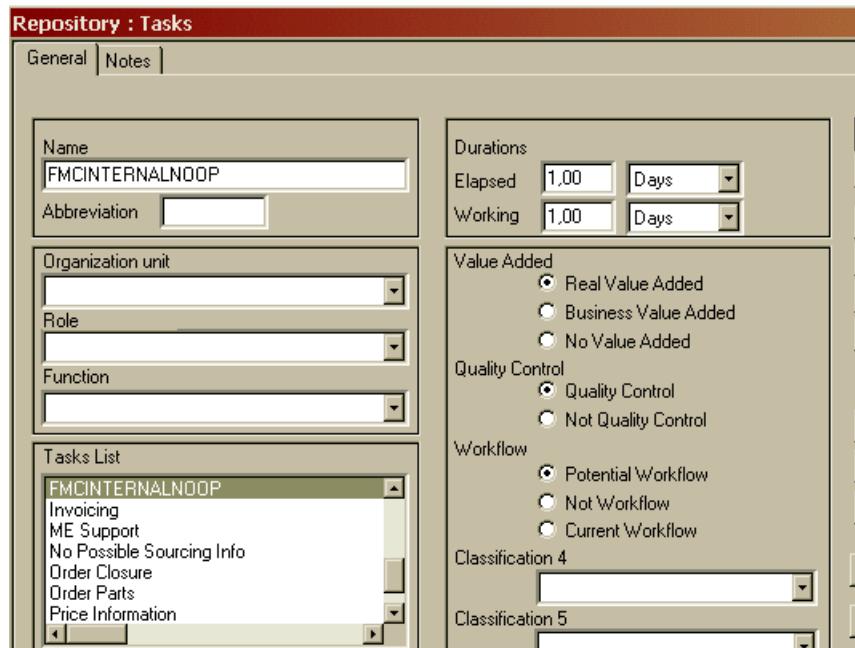


Figure 5-1 Create a NOOP task

Create a FMCINTERNALNOOP application

4. Go to Repository -> Process Data -> Tasks...
5. Set the application name to **FMCINTERNALNOOP**.
6. As Windows NT will be the operating system for the run time environment, select Windows NT for the **Active Platform**.
7. Check mark the **Run Unattended** box.
8. Click on **Add** to record this entry in the repository.

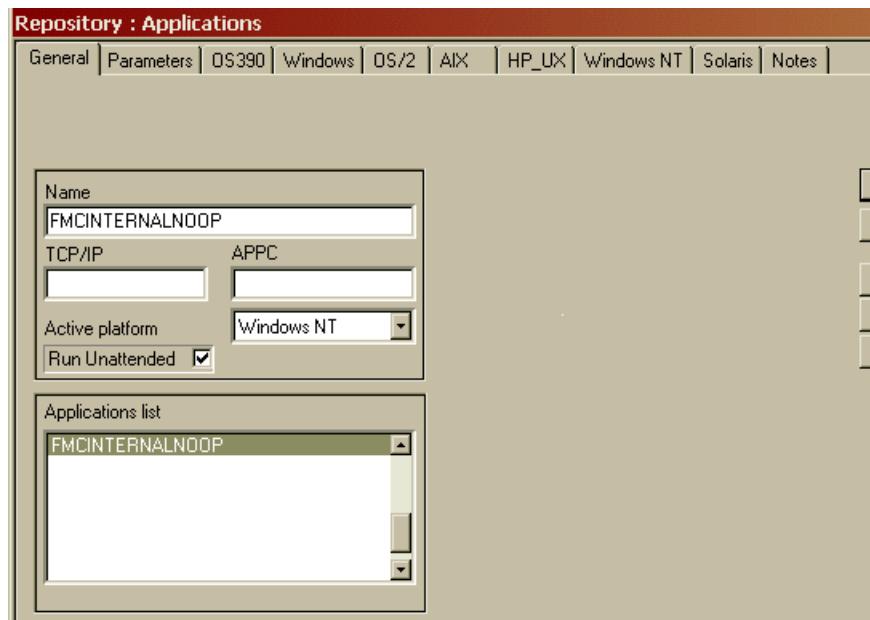


Figure 5-2 Set General tab for a NOOP application

9. Select the Parameters tab
10. De-select the **Program requires These** box

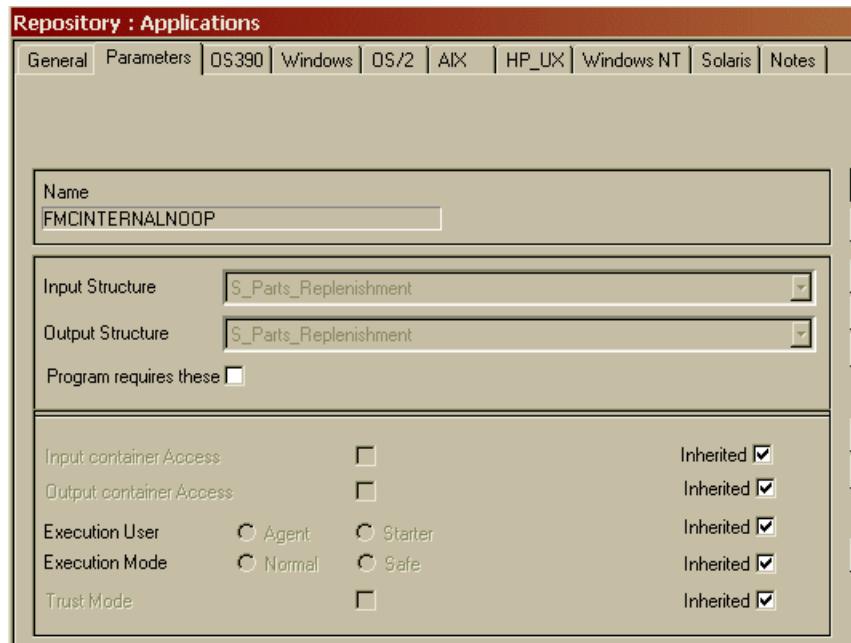


Figure 5-3 Set the Parameters tab for a NOOP application

11. The last parameter to set up for this application is the tab corresponding to the production server environment. In the case study it is Windows NT, open this tab and set the following:

- For **Path**, enter: **null.bat**

In fact this path should be let empty because the case study production environment uses a WebSphere MQ Workflow WEB client. This kind of environment doesn't need a path, but from a practical point of view, when the FDL is imported into the WebSphere MQ Workflow run time, WebSphere MQ Workflow generates warning messages. If this field is let empty, a warning message will be generated for each application and it will be difficult to detect real functional problems among a long list of messages.

- For **Type**, select: **BAT** for this dummy path

12. For **Visibility Type** and **Inherit environment**, leave the default settings

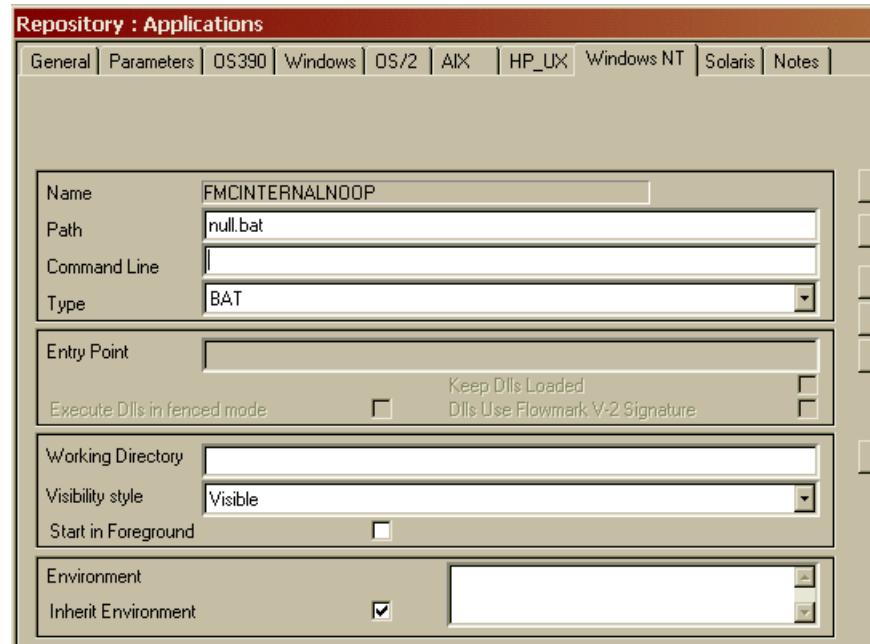


Figure 5-4 Set the Windows NT tab for NOOP

Create a dummy server

For this application and NOOP task, we need to create a dummy server.

13. Go to **Repository -> Organization Data -> System...**
14. In the **General tab** select the FMCSYS.
15. In the **Systems list**, leave the default identifier to 1.
16. Select the **Version** to 3.4 as the corresponding to the WebSphere MQ Workflow run time version used for the case study.
17. For the **Parent System Group**, default **Node** and **Queue Manager** has to be set in the **General tab**.

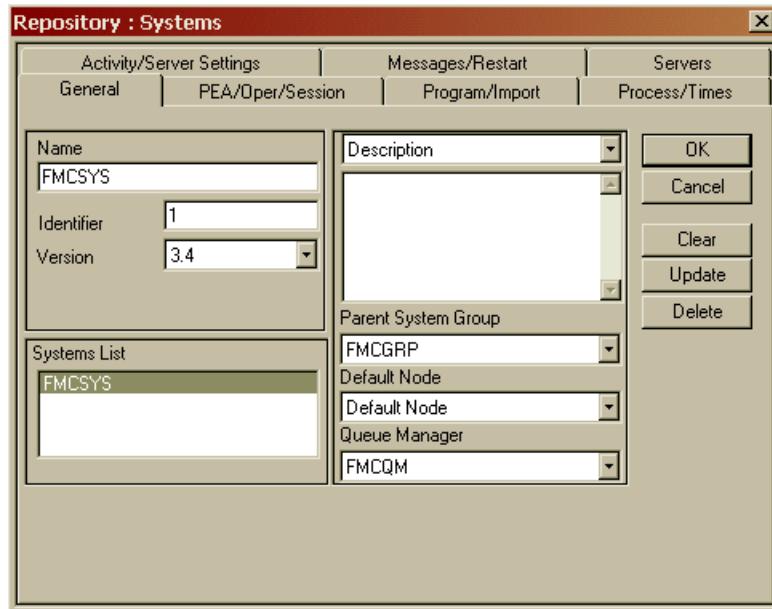


Figure 5-5 Set Systems General tab for NOOP server

18. Go to the **Servers** tab to create the dummy NOOP server.
19. Click on **New** in the **User Program Execution Server** and enter a server name

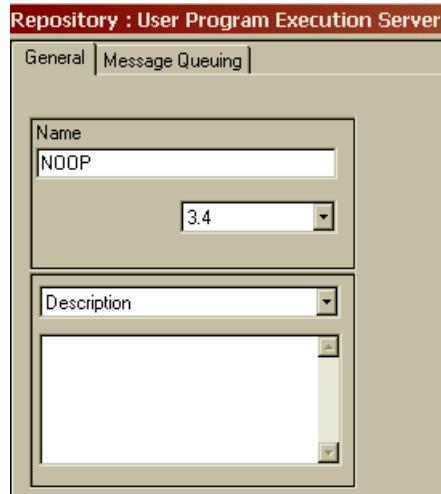


Figure 5-6 Set a NOOP server name

- 20.The version of the NOOP server is the version of the WebSphere MQ Workflow run time.
- 21.Select the **Message Queuing** tab and set as shown in the figure below.
- 22.Click on **OK** to record these entries.

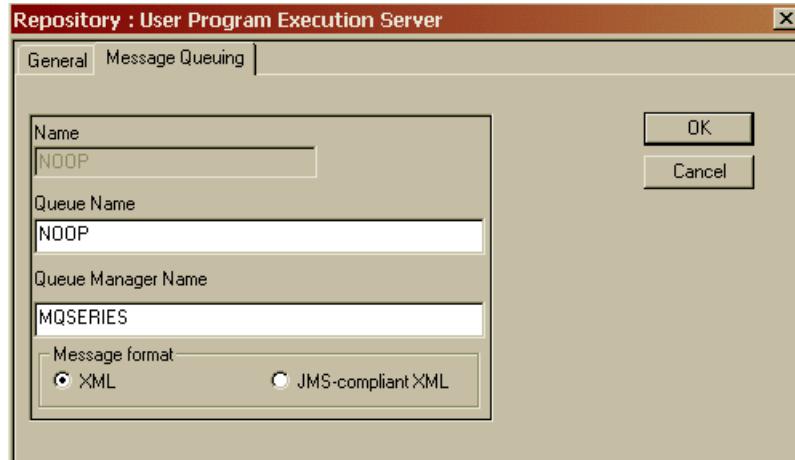


Figure 5-7 Set NOOP queues server names

When the NOOP server name is created, the **Server tab** shows the NOOP name in the **User Program Execution Server** box as shown in Figure 5-8.

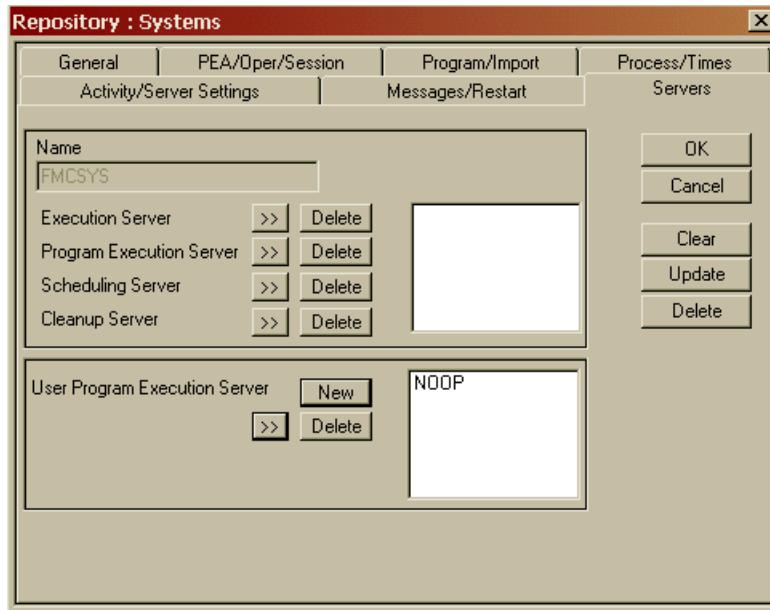


Figure 5-8 Set a NOOP Server

All the pre-requisite settings are now done for the ‘Empty activity’. Once the settings for an ‘Empty activity’ are completed, the next step is to add it to the model.

Add the ‘Empty activity’ to the model

1. Go to the Work Order ADF.
2. Remove the connector between the Replenishment phi coming from the model source to the multiple decision.
3. Insert a task, and double click on the task to set the parameters as follows:
4. NOOP task General tab settings:
 - a. The **Task Name** and the **Application Name** are now available for setting.
 - b. For the **User Program Execution Agent**, deselect the check marked box and select **Server** with the radio button.
 - c. Select FMCSYS and NOOP in the associated fields.
 - d. The **Mode** has to be set to **Asynchronous**, meaning that for this task, there is no need to wait an event to end the program.
 - e. Click on **Apply** to record the general tab settings.

See Figure 5-9 summarizing all the previous settings:

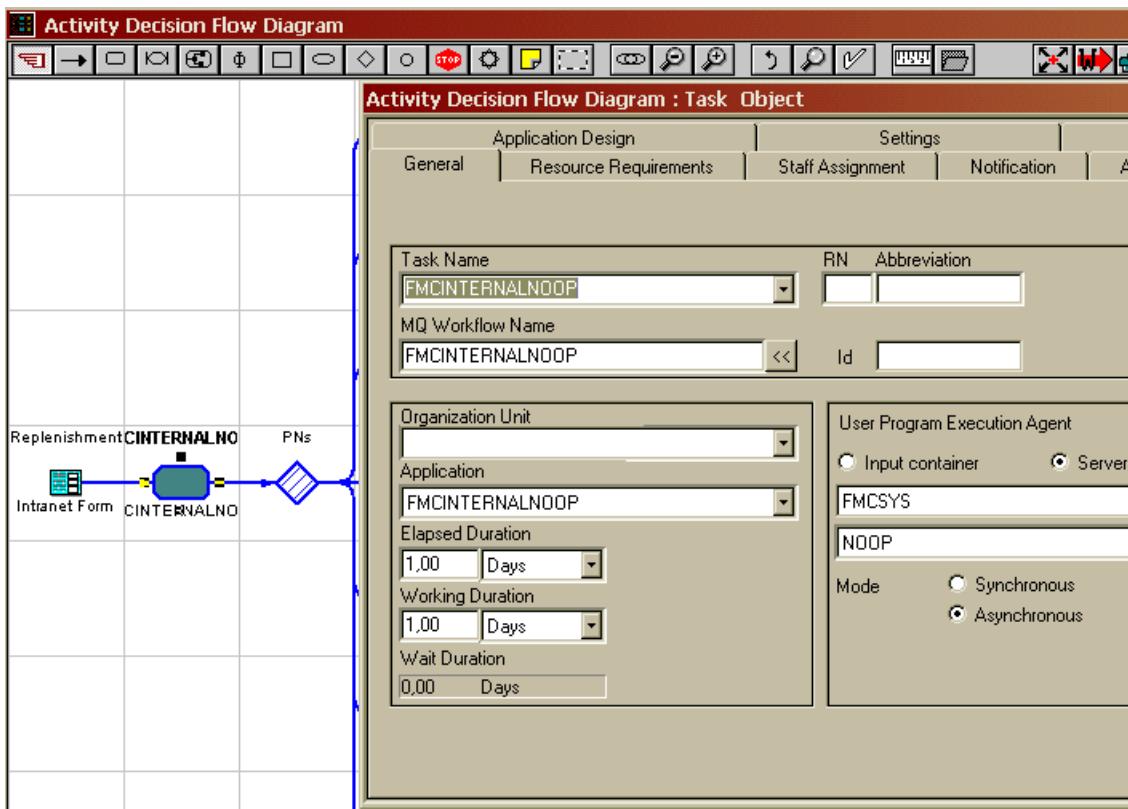


Figure 5-9 Add a NOOP task in the workbench model - General tab

5. NOOP task Staff Assignment tab settings:
 - a. The next tab to set is the **Staff Assignment**.
 - b. Set the Staff Assignment to Assigned Employees.
 - c. Select the administrator employee, WFADMIN, in the employees list.
 - d. Click on **Apply** to take into account the staff assignment setting.

Note: It is recommended to assign this NOOP task to the administrator employee previously created in the organization data. In case of problems during the execution of this task in the run time environment, this task will be automatically assigned to the administrator and it will be transparent to the users.

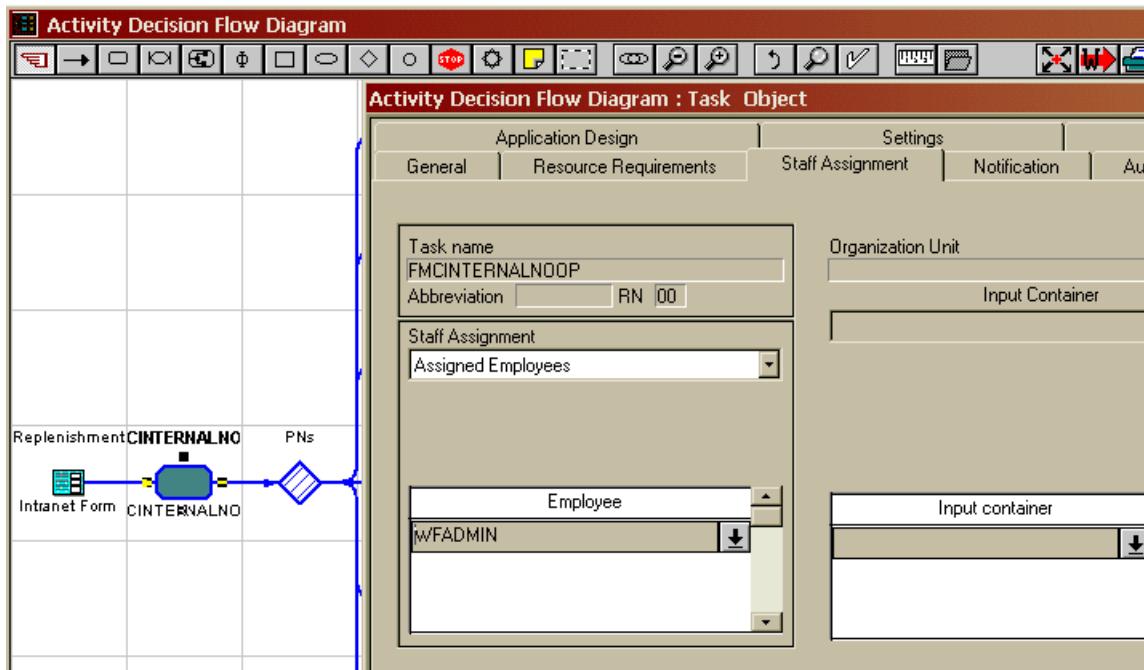


Figure 5-10 Add a NOOP task in the workbench model - Staff Assignment tab

6. NOOP task Data tab settings:

- The first setting is the **Input** and **Output** structure. As we are in the Work Order process, the structure to select is the **S_Work_Order**.
- When this tab is opened, the **Loop** radio button is marked as default.
- Click on the **Default** radio button and set the **Source** and the **Target** as **_STRUCT** by clicking this item in the structure tree on the right.
- Click on **Apply**, then on **OK** to end the NOOP task integration in the workbench model.

See Figure 5-11 showing the **Data tab** final screen.

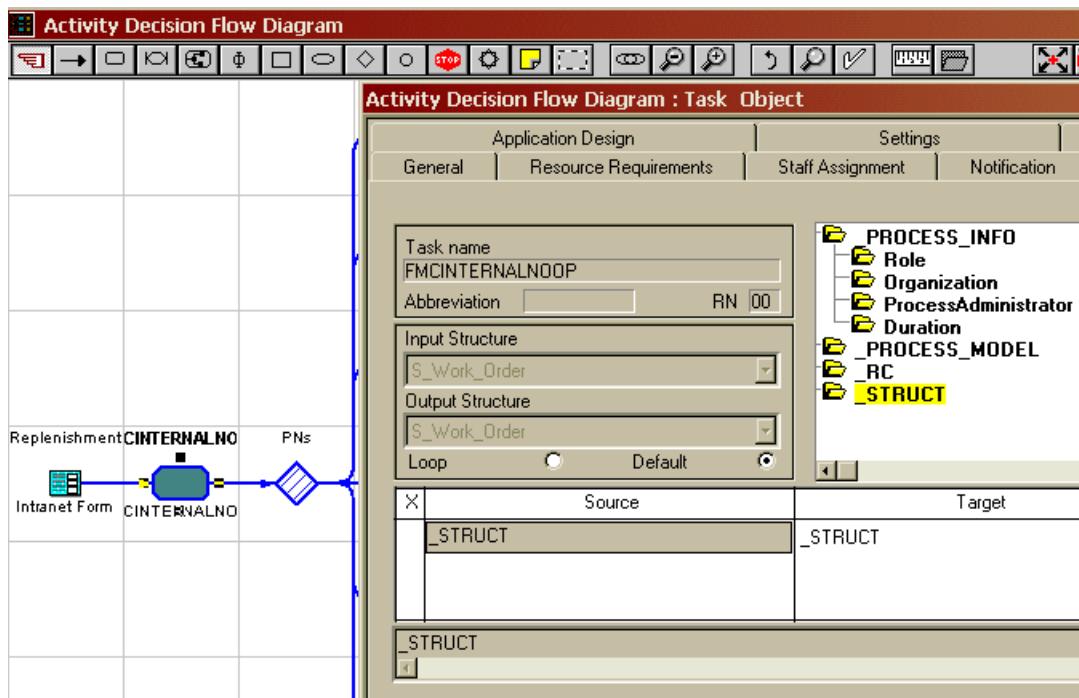


Figure 5-11 Add a NOOP task in the workbench model - Data tab

7. Repeat these steps to add the NOOP task to the Order process.

The Order Process as modified is shown in the Figure 5-12.

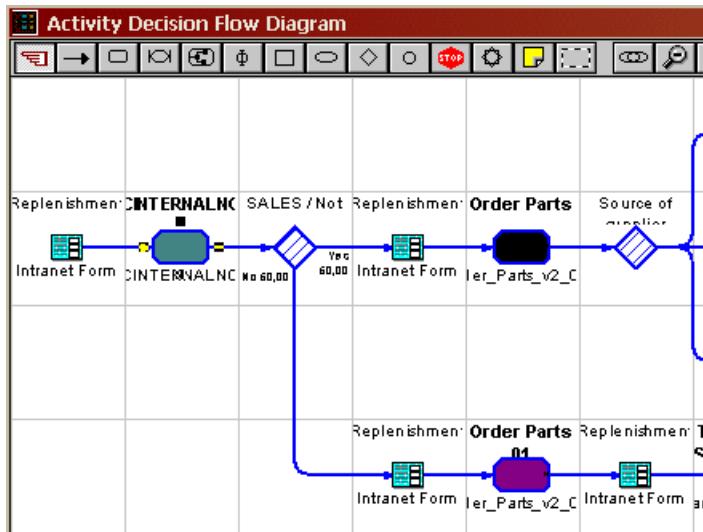


Figure 5-12 NOOP task added to the Order process

5.1.2 Create applications

All the others tasks need also to be associated to an application to be executed in a WebSphere MQ Workflow run time environment. In the case study, as it is oriented around connecting people by handling structured information through a form, the application will be the user screen interface that will be shown for a defined task to be performed. The name of the application, in this case, will be the filename of a JSP which will be called at run time. This will present a form with structured fields to be filled by the employee responsible for performing the task. The fields of the form correspond to the data structure initialized in the workbench modeling exercise.

To create an application:

1. Go to **Repository -> Organization Data -> Applications...**
2. Enter a name in the Name field in the General tab of the window.

The **Active platform** is that of your server architecture. The case study production run time server will run on a Windows NT operating system.

3. Select Windows NT for this parameter.
4. Click on **Add** to record these new entries in the repository.

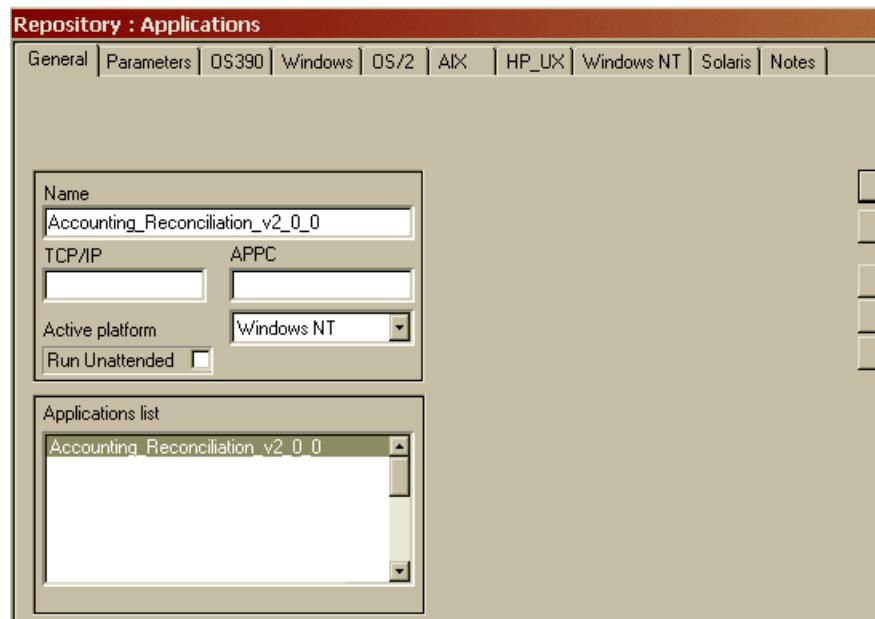


Figure 5-13 Create an application

Note: The convention we used for the application names is a name corresponding to the task name following by a version numbering (_v2_0_0) for further maintenance or change management purpose. This convention helps to complete the model when the application has to be set up for each task.

Open the **Parameters tab** to set up specific parameters associated with the application.

5. For **Input** and **Output** fields in this tab, the application has to be associated to the data structure processed at the Accounting Reconciliation task. In this case, this is the structure is the one providing by the Order process which is the **S_Order_Supply** data structure. Select this one among the list of structures initialized in the data structure.
6. Check mark **Programs requires these**, meaning that this application will take this structure as parameter.
7. Check mark **Inherited** for **Input container Access**, **Output container Access** and for **Execution User** to take WebSphere MQ Workflow default program settings.
8. Set the **Execution mode** to **Normal**.

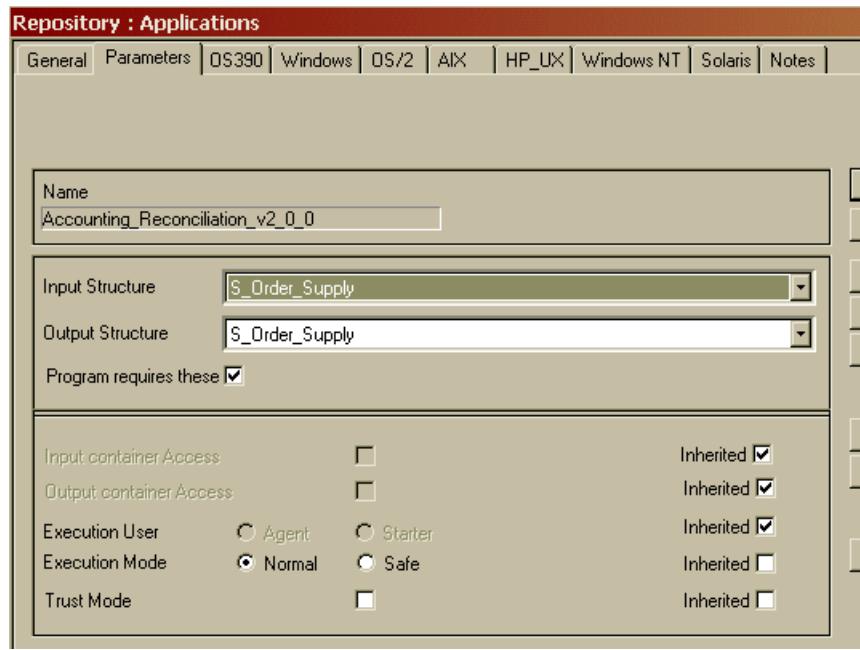


Figure 5-14 Set Parameters tab for an application

The last parameters to set up for an application are in the tab corresponding to the production server environment. In the case study it is Windows NT, so open this tab and set the following:

9. For **Path**, enter: **null.bat**

In fact this path should be let empty because the case study production environment uses a WebSphere MQ Workflow WEB client. This kind of environment doesn't need a path, but from a practical point of view, when the FDL is imported into the WebSphere MQ Workflow run time, WebSphere MQ Workflow generates warning messages. If this field is let empty, a warning message will be generated for each application and it will be difficult to detect real functional problems among a long list of messages.

10. For **Type**, select: **BAT** for this dummy path

11. For **Visibility Type** and **Inherit environment**, leave the default settings.

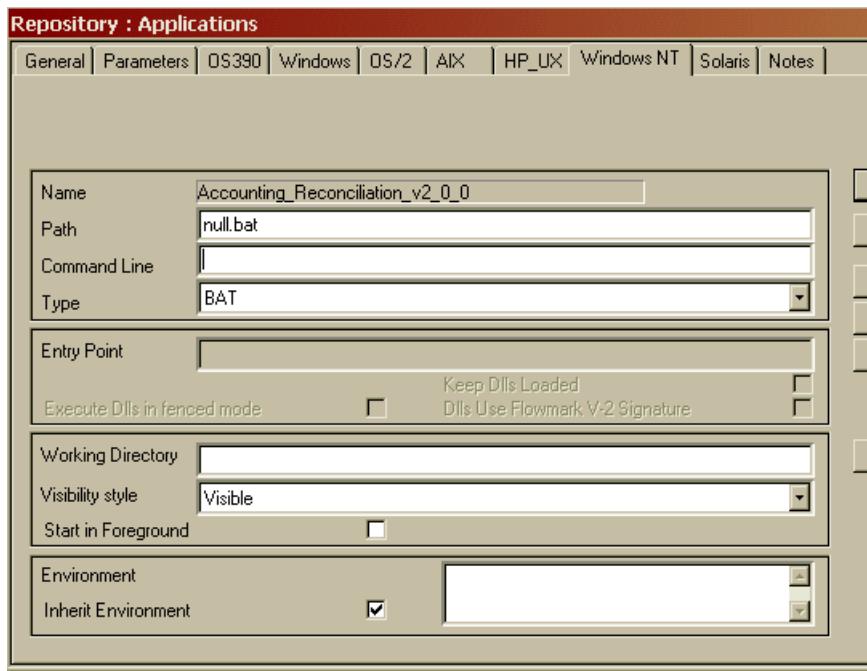


Figure 5-15 Set Windows NT tab for an application

Repeat the previous steps for each application to be associated to a task.

The following table shows the complete list of the applications created for the case study with their associated data structures.

Table 5-1 Applications and associated structures

Application	Input / Output structure
Accounting_Reconciliation_v2_0_0	S_Order_Supply
Add_Info_Reception_v2_0_0	S_Order_Supply
Add_PNFC_v2_0_0	S_Parts_Replenishment
Add_Remark_Info_v2_0_0	S_Order_Supply
Add_Supply_Source_SALES_v2_0_0	S_Parts_Replenishment
Add_Supply_Source_v2_0_0	S_Parts_Replenishment
Add_Supply_Source_Valid_v2_0_0	S_Parts_Replenishment
Authorize_Order_v2_0_0	S_Parts_Replenishment

Application	Input / Output structure
Cancel_Order_Info_v2_0_0	S_Parts_Replenishment
Cost_Support_v2_0_0	S_Parts_Replenishment
FMCINTERNALNOOP	No structure
Invoicing_v2_0_0	S_Order_Supply
ME_Support_v2_0_0	S_Parts_Replenishment
No_Possible_Sourcing_Info_v2_0_0	S_Parts_Replenishment
Order_Closure_v2_0_0	S_Order_Supply
Order_Parts_v2_0_0	S_Order_Supply
Price_Info_v2_0_0	S_Parts_Replenishment
Track_parts_Shipments_v2_0_0	S_Order_Supply

5.2 Finalize general process settings

We also need, for each of the three processes to set some general conditions for appropriate execution in the run time:

- ▶ To have the Process Starter to be prompted to initialize data into the request form: Prompt at start
 - ▶ To keep an history: Keep finished process forever (this is a requirement for our business process archives for audit purpose)
 - ▶ To define what information will be shown in the designation of the tasks in the all task view in the run time environment.
1. Open the Work Order ADF window and click on the info button in the ADF Tool Bar.

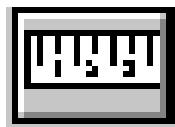


Figure 5-16 Info button

2. In the **General** tab, check mark the **Prompt at start** box as shown in the following figure:

Activity Decision Flow Diagram :Info

General Fields Process Set. Activity Set. Global Container Notes

Process	Work Order	DB	<input type="text"/>
Abbreviation	<input type="text"/>		
MQ Workflow	Work Order_	<>	
Process Id	<input type="text"/>	Staff Predefined	<input type="checkbox"/>
Administrator	<input type="text"/>	Input Container <input type="checkbox"/>	
Org.Unit	<input type="text"/>	Input Container <input type="checkbox"/>	
Role	<input type="text"/>	Input Container <input type="checkbox"/>	
Function	<input type="text"/>		
Valid From	12/12/03 08:00:00		
Endless Duration	<input checked="" type="checkbox"/>	<input type="text"/>	<input type="button"/>
Input Container	<input type="checkbox"/>	<input type="text"/>	
Staff Inherited	<input checked="" type="checkbox"/>	Prompt at start	<input checked="" type="checkbox"/>
		Terminate On error	<input type="checkbox"/>

Figure 5-17 General Process info setting - General tab

3. In the **Process Set.** tab enable the Forever radio button to keep finished process data.

Activity Decision Flow Diagram :Info

General	Fields	Process Set.	Activity Set.	Global Container	Notes																		
<table border="1"> <tr> <td>Name Work Order</td> <td>Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Autonomy Staff <input type="checkbox"/></td> <td>Notification <input type="checkbox"/></td> <td>Control <input type="checkbox"/></td> <td>Administration <input type="checkbox"/></td> </tr> <tr> <td>DB Audit Trail <input type="radio"/> Off <input checked="" type="radio"/> Full <input type="radio"/> Condensed <input type="radio"/> Filter</td> <td>Inherited <input type="checkbox"/></td> </tr> <tr> <td>MQ Audit Trail <input type="radio"/> Off <input checked="" type="radio"/> Full <input type="radio"/> Condensed <input checked="" type="radio"/> Filter</td> <td>Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Work Item Refresh <input type="radio"/> Pull <input checked="" type="radio"/> Push</td> <td>Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Notification Mode <input type="radio"/> Run <input checked="" type="radio"/> Hold</td> <td>Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Keep Finished Process <input type="radio"/> Never <input checked="" type="radio"/> Forever <input type="radio"/> Specific <input type="text"/> Seconds <input type="button"/></td> <td>Inherited <input type="checkbox"/></td> </tr> <tr> <td>Keep Finished Work <input type="radio"/> Never <input checked="" type="radio"/> Forever <input type="radio"/> Specific <input type="text"/> Weeks <input type="button"/></td> <td>Inherited <input checked="" type="checkbox"/></td> </tr> </table>						Name Work Order	Inherited <input checked="" type="checkbox"/>	Autonomy Staff <input type="checkbox"/>	Notification <input type="checkbox"/>	Control <input type="checkbox"/>	Administration <input type="checkbox"/>	DB Audit Trail <input type="radio"/> Off <input checked="" type="radio"/> Full <input type="radio"/> Condensed <input type="radio"/> Filter	Inherited <input type="checkbox"/>	MQ Audit Trail <input type="radio"/> Off <input checked="" type="radio"/> Full <input type="radio"/> Condensed <input checked="" type="radio"/> Filter	Inherited <input checked="" type="checkbox"/>	Work Item Refresh <input type="radio"/> Pull <input checked="" type="radio"/> Push	Inherited <input checked="" type="checkbox"/>	Notification Mode <input type="radio"/> Run <input checked="" type="radio"/> Hold	Inherited <input checked="" type="checkbox"/>	Keep Finished Process <input type="radio"/> Never <input checked="" type="radio"/> Forever <input type="radio"/> Specific <input type="text"/> Seconds <input type="button"/>	Inherited <input type="checkbox"/>	Keep Finished Work <input type="radio"/> Never <input checked="" type="radio"/> Forever <input type="radio"/> Specific <input type="text"/> Weeks <input type="button"/>	Inherited <input checked="" type="checkbox"/>
Name Work Order	Inherited <input checked="" type="checkbox"/>																						
Autonomy Staff <input type="checkbox"/>	Notification <input type="checkbox"/>	Control <input type="checkbox"/>	Administration <input type="checkbox"/>																				
DB Audit Trail <input type="radio"/> Off <input checked="" type="radio"/> Full <input type="radio"/> Condensed <input type="radio"/> Filter	Inherited <input type="checkbox"/>																						
MQ Audit Trail <input type="radio"/> Off <input checked="" type="radio"/> Full <input type="radio"/> Condensed <input checked="" type="radio"/> Filter	Inherited <input checked="" type="checkbox"/>																						
Work Item Refresh <input type="radio"/> Pull <input checked="" type="radio"/> Push	Inherited <input checked="" type="checkbox"/>																						
Notification Mode <input type="radio"/> Run <input checked="" type="radio"/> Hold	Inherited <input checked="" type="checkbox"/>																						
Keep Finished Process <input type="radio"/> Never <input checked="" type="radio"/> Forever <input type="radio"/> Specific <input type="text"/> Seconds <input type="button"/>	Inherited <input type="checkbox"/>																						
Keep Finished Work <input type="radio"/> Never <input checked="" type="radio"/> Forever <input type="radio"/> Specific <input type="text"/> Weeks <input type="button"/>	Inherited <input checked="" type="checkbox"/>																						

Figure 5-18 General Process info setting - Process Set. tab

4. Select the **Notes** tab to define the WebSphere MQ Workflow run time description in the **All Process instances view**.

The data will be shown in the following order:

- An urgent flag
- An icon symbol for the server machine series
- The name of the requester employee for a part request
- The Work Order number

This definition can be a HTML command text as followings:

```
&nbsp;<IMG SRC="../images/urg%PR_Urgent_Flag%.gif">&nbsp;<IMG  
SRC="../images/%PR_Server_Series%Series.gif">&nbsp;%PR_Requester% -  
%PR_Work_Order%
```

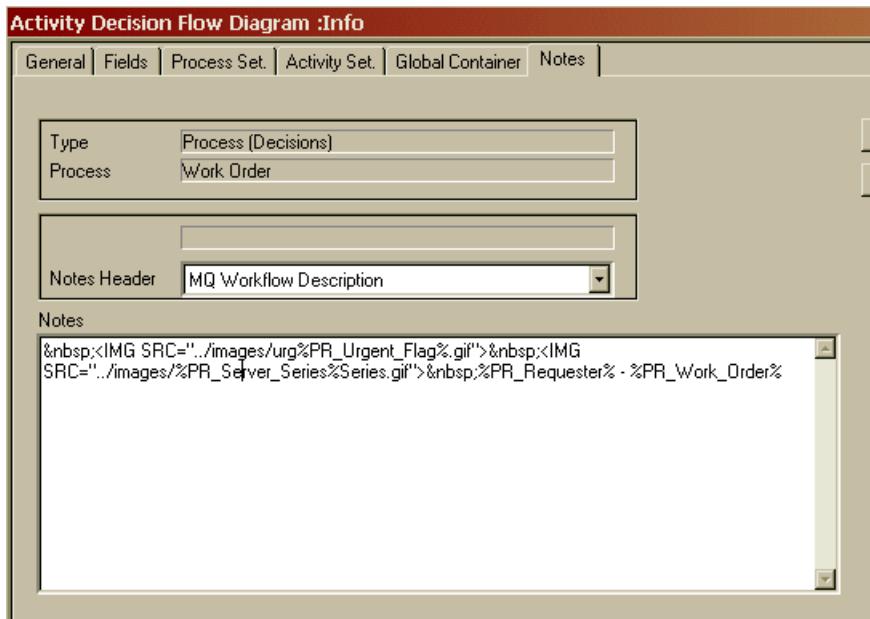


Figure 5-19 IGeneral Process info setting - Notes tab

5. Click **OK** to record the setting.
6. Repeat the same steps for the Parts Replenishment and the Order processes, except that in the **General tab**, the **Staff Inherited** and **Prompt at start** boxes do not need to be check marked due to the fact that these processes will never been started manually. All this initialization is done in the Work Order process.
7. For Parts Replenishment, the **Fields** tab must contain an initial value of an input string for the substitution part number to 1. This initial value of 1 is tested during the run time through the JSP to display the fields corresponding to the substitution parts numbers. This means that when the process starts, only 1 substitution part number set of fields will show up until an employee changes this value.

In the following figure, see the specific settings in the Fields tab of the Parts Replenishment process.

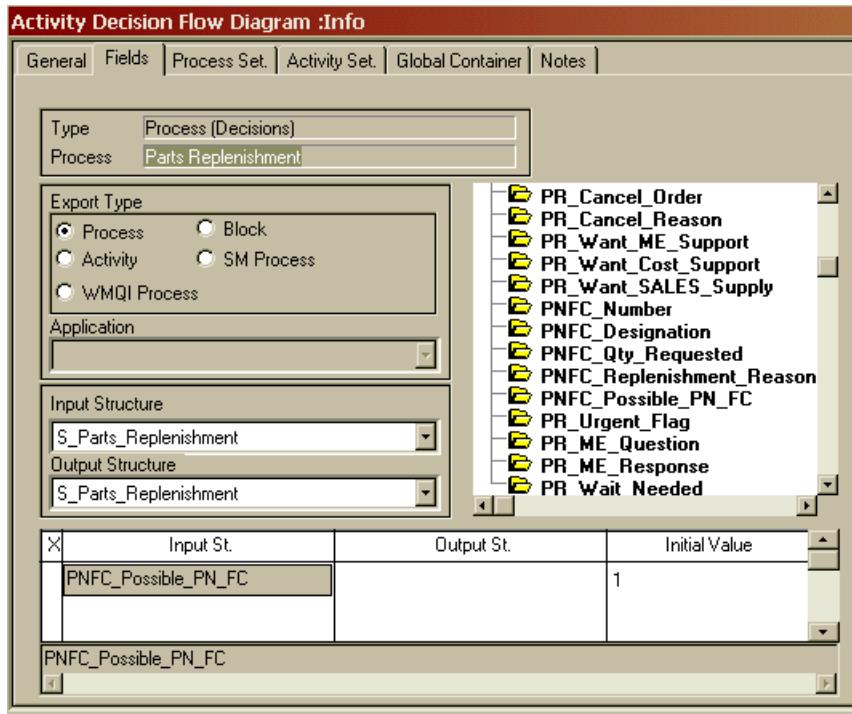


Figure 5-20 Specific Fields tab setting for the Parts Replenishment process

8. Click **OK** to record the setting.

5.3 Finalize tasks settings

For each task it is necessary to complete their settings to be executed properly in the run time environment. We need to define several parameters in the different tab of parameters.

The example taken for this exercise is the setting for the task Track Parts Shipment in the Order process.

5.3.1 Task General tab

In this tab we need to set up the Organization Unit and the Application. Select the appropriate data for each field as follows:

Activity Decision Flow Diagram : Task Object

Application Design		Settings		N																			
General	Resource Requirements	Staff Assignment	Notification	Automation																			
<table border="1"> <tr> <td>Task Name Track Parts Shipment</td> <td>RN 01</td> <td>Abbreviation</td> </tr> <tr> <td>MQ Workflow Name Track Parts Shipment Ext Supp</td> <td colspan="2">Id</td> </tr> <tr> <td colspan="3"> Organization Unit Procurement Application Track_Parts_Shipment_v2_0_0 </td> </tr> <tr> <td>Elapsed Duration 1,00 Days</td> <td colspan="2"> User Program Execution Agent <input checked="" type="checkbox"/> Input container <input type="checkbox"/> Server Mode <input checked="" type="radio"/> Synchronous <input type="radio"/> Asynchronous </td> </tr> <tr> <td>Working Duration 1,00 Days</td> <td colspan="2"></td> </tr> <tr> <td>Wait Duration 0,00 Days</td> <td colspan="2"></td> </tr> </table>						Task Name Track Parts Shipment	RN 01	Abbreviation	MQ Workflow Name Track Parts Shipment Ext Supp	Id		Organization Unit Procurement Application Track_Parts_Shipment_v2_0_0			Elapsed Duration 1,00 Days	User Program Execution Agent <input checked="" type="checkbox"/> Input container <input type="checkbox"/> Server Mode <input checked="" type="radio"/> Synchronous <input type="radio"/> Asynchronous		Working Duration 1,00 Days			Wait Duration 0,00 Days		
Task Name Track Parts Shipment	RN 01	Abbreviation																					
MQ Workflow Name Track Parts Shipment Ext Supp	Id																						
Organization Unit Procurement Application Track_Parts_Shipment_v2_0_0																							
Elapsed Duration 1,00 Days	User Program Execution Agent <input checked="" type="checkbox"/> Input container <input type="checkbox"/> Server Mode <input checked="" type="radio"/> Synchronous <input type="radio"/> Asynchronous																						
Working Duration 1,00 Days																							
Wait Duration 0,00 Days																							

Figure 5-21 Set Task General tab

Click **Apply** to record the setting.

5.3.2 Task Staff Assignment tab

For this task, set the **Staff Assignment** field to Dynamic Employees, check mark Members only and select in the Role box the Supply Chain Specialist as shown in the following next figure:

Activity Decision Flow Diagram : Task Object

Application Design		Settings		Notes	
General	Resource Requirements	Staff Assignment	Notification	Automation	
Task name <input type="text" value="Track Parts Shipment"/> Abbreviation <input type="text" value="RN"/> <input type="text" value="01"/>		Organization Unit <input type="text" value="Procurement"/> <input type="checkbox"/> Input Container <input type="text" value="0"/> <input type="checkbox"/> Input Container Level Start <input type="text" value="0"/> <input type="checkbox"/> Input Container Level End <input type="text" value="9"/> <input type="checkbox"/> Input Container			
Staff Assignment <input type="text" value="Dynamic Assignment"/> <input checked="" type="radio"/> Include Child Org. <input checked="" type="radio"/> Members Only <input type="radio"/> Reporting Managers Role <input type="text" value="Supply Chain Specialist"/> <input type="button" value="▼"/>		Input container <input type="text" value=""/> <input type="button" value="▲"/> <input type="text" value=""/> <input type="button" value="▼"/>			

Figure 5-22 Set Task staff assignment

Click **Apply** to record the setting.

5.3.3 Task Automation tab

The parameters to set up are:

- ▶ **Start Execution to Manual**
- ▶ **Automatic Execution Wait for to All inputs**
- ▶ **End Execution to Automatic**

See the next figure to illustrate this setting:

Activity Decision Flow Diagram : Task Object

Application Design		Settings		Not	
General	Resource Requirements	Staff Assignment	Notification	Automation	
Task name Track Parts Shipment Abbreviation <input type="text"/> RN 01					
Start Execution <input checked="" type="radio"/> Manual <input type="radio"/> Automatic		End Execution <input type="radio"/> Manual <input checked="" type="radio"/> Automatic		Automatic Execution Wait for <input checked="" type="radio"/> One Input <input type="radio"/> All Inputs	
				End Condition <input type="text"/>	
Expiration <input type="checkbox"/> <input type="text"/> <input type="button"/>		Input Container <input type="checkbox"/> <input type="text"/> <input type="button"/>			

Figure 5-23 Set Task Automation tab

Click **Apply** to record the setting.

5.3.4 Task Application design tab

In this tab, at the right of the Task name, the associated Application has to be selected in the list as shown in Figure 5-24.

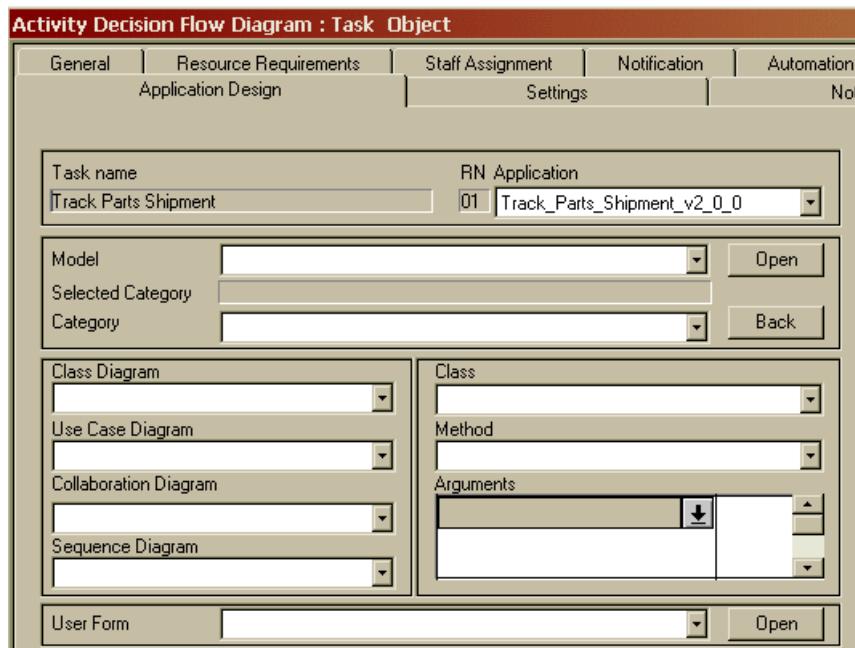


Figure 5-24 Set Task Application Design tab

Click **Apply** to record the setting.

5.3.5 Task Settings tab

The **Inherited** boxes need to be all check marked in this tab as follows:

Activity Decision Flow Diagram : Task Object

General	Resource Requirements	Staff Assignment	Notification	Automation																																								
Application Design		Settings		Not																																								
<table border="1"> <tr> <td>Task name</td> <td>Track Parts Shipment</td> </tr> <tr> <td>Abbreviation</td> <td>RN 01</td> </tr> <tr> <td colspan="2">Program Activity can be checked out</td> </tr> <tr> <td colspan="2"> <input type="checkbox"/> Inherited <input checked="" type="checkbox"/> </td> </tr> <tr> <td colspan="5"> Staff assignment <table border="1"> <tr> <td>Include Process Assignment</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Prefer Local Users</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Prefer Not Absent Users</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Assign Substitute if user is absent</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> </table> </td> </tr> <tr> <td colspan="5"> Notification <table border="1"> <tr> <td>Assign Substitute for notification if user is absent</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Send second Notification for same User</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> </table> </td> </tr> <tr> <td>Priority</td> <td>From Predefined Members</td> <td><input type="checkbox"/></td> <td colspan="2"></td> </tr> <tr> <td>0</td> <td>From Input Container</td> <td><input type="checkbox"/></td> <td colspan="2"><input style="width: 100px; height: 20px;" type="button" value="..."/></td> </tr> </table>					Task name	Track Parts Shipment	Abbreviation	RN 01	Program Activity can be checked out		<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>		Staff assignment <table border="1"> <tr> <td>Include Process Assignment</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Prefer Local Users</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Prefer Not Absent Users</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Assign Substitute if user is absent</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> </table>					Include Process Assignment	<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>	Prefer Local Users	<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>	Prefer Not Absent Users	<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>	Assign Substitute if user is absent	<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>	Notification <table border="1"> <tr> <td>Assign Substitute for notification if user is absent</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> <tr> <td>Send second Notification for same User</td> <td><input type="checkbox"/> Inherited <input checked="" type="checkbox"/></td> </tr> </table>					Assign Substitute for notification if user is absent	<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>	Send second Notification for same User	<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>	Priority	From Predefined Members	<input type="checkbox"/>			0	From Input Container	<input type="checkbox"/>	<input style="width: 100px; height: 20px;" type="button" value="..."/>	
Task name	Track Parts Shipment																																											
Abbreviation	RN 01																																											
Program Activity can be checked out																																												
<input type="checkbox"/> Inherited <input checked="" type="checkbox"/>																																												
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0	From Input Container	<input type="checkbox"/>	<input style="width: 100px; height: 20px;" type="button" value="..."/>																																									

Figure 5-25 Set Task Settings tab

Click **Apply** to record the setting.

5.3.6 Task Notes tab

For each task we can customize the description field which will be shown in the run time environment to the employees.

This task setting will be taken into account in the all **Activity or Task instances view** available in the WebSphere MQ Workflow run time.

For this task the data will be shown in the following order:

1. An urgent flag
2. An icon symbol for the server machine series
3. The name of the requester employee for a part request
4. The Work Order number
5. The Part number reference
6. The source of supply name.

The following figure shows an example of a screen in the run time environment. The rectangle locates the task designation field which can be customized for the users.

Work Order			BPLANT - nx5527	Task designation field 01.0
--> Parts Replenishment			BPLANT - nx5527 - 6548	01.0
--> Order			BPLANT - nx5527 - 6548 - RMER	04.0
--> Parts Replenishment			BPLANT - nx5527 - 6553	01.0
--> Order			BPLANT - nx5527 - 6553 - RMER	04.0

Figure 5-26 Task designation field in run time

Note: For the limitation on the length this text - for more details see the WebSphere MQ Workflow Web Client documentation.

This definition can be a HTML command text as shown below:

```
&nbsp;<IMG SRC="../images/urg%PR_Urgent_Flag%.gif">&nbsp;<IMG  
SRC="../images/%PR_Server_Series%Series.gif">&nbsp;%PR_Requester% -  
%PR_Work_Order% - %PNFC_Number% -  
%$_OS_PN_Of_Substitution[0].S_Supplier_Source[0].SS_Name%
```

The fields enclosed in % will be dynamically filled at run time with the values from the data container.

Activity Decision Flow Diagram : Task Object

General	Resource Requirements	Staff Assignment	Notification	Automation	Notes
Application Design			Settings		

Task name

Abbreviation RN 01

Document Notes Header

Notes

```
&nbsp;<IMG SRC="../images/urg%PR_Urgent_Flag%.gif">&nbsp;<IMG  
SRC="../images/%PR_Server_Series%Series.gif">&nbsp;%PR_Requester% - %PR_Work_Order% -  
%PNFC_Number% - %$_OS_PN_Of_Substitution[0].S_Supplier_Source[0].SS_Name%
```

Figure 5-27 Set Task Notes tab

Repeat for all the tasks in the three processes the previous steps.

For the applications, in the case study there are Java Server Pages to be linked to a task. We name the JSP as closely as possible to that of the task name.

Note: For the WebSphere MQ Workflow description coded in HTML in the Notes tab, we first found out from the employees what type of data they want to see in the description field. It is important to know what they want at this time, because the description field has a limited length and needs to be tailored. This tailoring is dependent on the employee requirements at the task. For example, a Product Analyst is more interested in seeing the Work Order number than a DB Admin at the entrance of the production line. The DB admin is more interested in the Part number and the source of supply name.

5.4 Finalize phi settings

In terms of activities the process flow is now complete. The next step is to set the data flow to be handled through the phis and to set test expressions for the choices.

To do this:

1. Go to the Work Order ADF screen and double click on the first Replenishment phi.
2. Select the Data Flow tab.
3. The Source Task is the process Source and the Target Task is the FMCINTERNALNOOP task will have been added in the previous sections.
4. The structure is the S_Work_Order structure.
5. In the bottom window, in the Source and the Target columns _STRUCT has to be set up. That means that the all fields in the structure tree in the right box are passed.

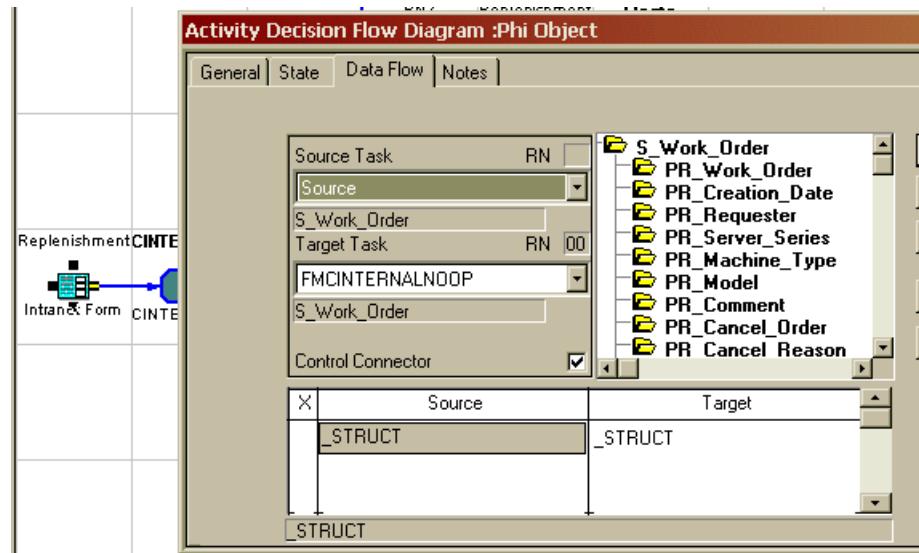


Figure 5-28 Phi data flow tab

The next item to be set is the phi following the PN1 choice.

6. Double click on the Replenishment phi, and open the **Data Flow** tab. For this one, the structure to be passed to the Parts Replenishment process has to be customized as follows.
7. The PR_Cancel_Order and the PR_Cancel_Reason are not to be passed as no cancel information are used yet at this step of the process. It is the beginning of the process where the parts request is just initialized, consequently the request cancellation is inappropriate.
8. On the first branch, we need to customized the information regarding the array [0] of the 20 maximum possible parts to be requested for one machine work order.
9. At this time, the information needed to initialize a request are the part or feature code reference, the material designation, the quantity requested and the replenishment reason.
This has to be reflected between the two data structures: the S_Work_Order, as the source, and the S_Parts_Replenishment as the target.
10. When the **Data Flow** tab is opened, a grey box is located in the **Source** column.
11. To select the data filed to be passed to the target, go into the right window where the data fields tree is, the arrow will change to a cross.

12. Click on the field PR_Work_Order, the field name is copied in the grey box of the **Source** column.
13. Click at the opposite of this first entry in the **Target** column, the grey box moves in this column, and, in the same time, the structure tree will change to the S_Parts_Replenishment one.
14. Click on the PR_Work_Order data field in the tree to copy it in the **Target** column. The information of this field will be passed from the S_Work_Order structure to the S_Parts_Replenishment structure.

Repeat the same steps for the other fields for the **Source** and **Target** columns as shown in the table below.

Table 5-2 Source and target mappings

X	Source	Target
	PR_Requester	PR_Requester
	PR_Server_Series	PR_Server_Series
	PR_Machine_Type	PR_Machine_Type
	PR_Model	PR_Model
	PR_Comment	PR_Comment
	PR_Urgent_Flag	PR_Urgent_Flag
	S_PNFC[0].PNFC_Number	PNFC_Number
	S_PNFC[0].PNFC_Designation	PNFC_Designation
	S_PNFC[0].PNFC_Qty_Requested	PNFC_Qty_Requested
	S_PNFC[0].PNFC_Replenishment_Reason	PNFC_Replenishment_Reason
	PR_Work_Order	PR_Work_Order
	PR_Creation_Date	PR_Creation_Date

15. Click on **Apply**, then **OK** to record the settings.

A second set of phis have to be set up with the same type of approach.

These are the phis at the entry of the Order processes instances called in the Parts Replenishment process. The structure at this time contains the 4 possible substitution parts numbers references (S_PN.Of_Substitution[0] to [3]) including the complete structure of all their associated possible sources of supply (S_Supplier_Source[], meaning passing all the array ([0] to [7]) for the 7 sources).

For these phis, the **Source** and **Target** columns will be as shown in the following table.

Table 5-3 Source and target mappings

X	Source	Target
	PR_Work_Order	PR_Work_Order
	PR_Requester	PR_Requester
	PR_Order_Approver	PR_Order_Approver
	PR_Server_Series	PR_Server_Series
	PR_Machine_Type	PR_Machine_Type
	PR_Model	PR_Model
	PR_Comment	PR_Comment
	PNFC_Number	PNFC_Number
	PNFC_Qty_Requested	PNFC_Qty_Requested
	PNFC_Replenishment_Reason	PNFC_Replenishment_Reason
	PNFC_Possible_PN_FC	PNFC_Possible_PN_FC
	PR_Urgent_Flag	PR_Urgent_Flag
	S_PN_Of_Substitution[0].PS_PN_FC_Number	S_OS_PN_Of_Substitution[0].PS_PN_FC_Number
	S_PN_Of_Substitution[0].S_Supplier_Source[]	S_OS_PN_Of_Substitution[0].S_Supplier_Source[]
	S_PN_Of_Substitution[1].PS_PN_FC_Number	S_OS_PN_Of_Substitution[1]
	S_PN_Of_Substitution[1].S_Supplier_Source[]	S_OS_PN_Of_Substitution[1].S_Supplier_Source[]
	S_PN_Of_Substitution[2].PS_PN_FC_Number	S_OS_PN_Of_Substitution[2]
	S_PN_Of_Substitution[2].S_Supplier_Source[]	S_OS_PN_Of_Substitution[2].S_Supplier_Source[]
	S_PN_Of_Substitution[3].PS_PN_FC_Number	S_OS_PN_Of_Substitution[3]
	S_PN_Of_Substitution[3].S_Supplier_Source[]	S_OS_PN_Of_Substitution[3].S_Supplier_Source[]

X	Source	Target
	PR_Creation_Date	PR_Creation_Date

For all others phis in the Work Order, Parts Replenishment and Order processes, the setting is a complete structure propagation from one step to the next.

The source and target settings will be the complete structure, _STRUCT to _STRUCT, as shown in the following figure.

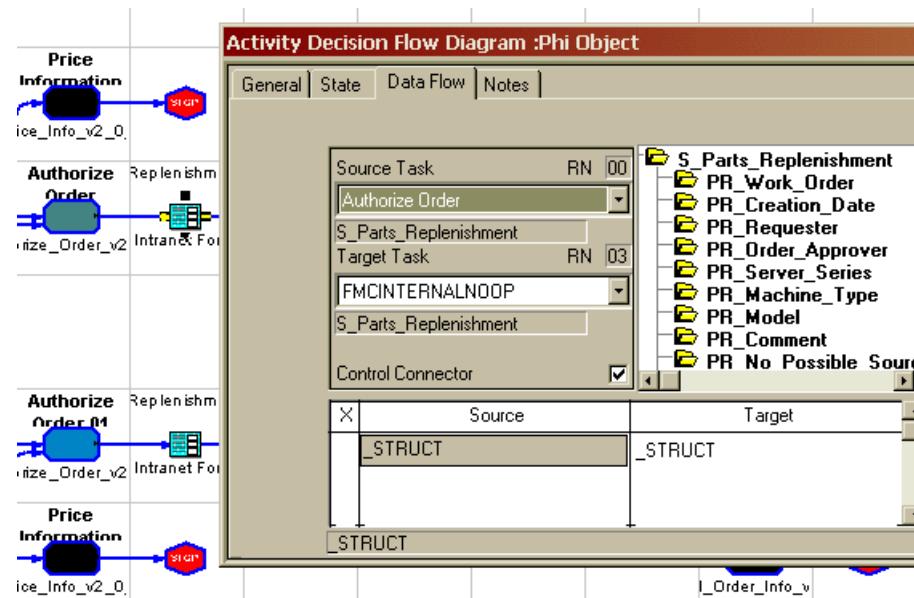


Figure 5-29 Phi data flow for entire structure

5.5 Finalize choices settings

By following the connectors, the next objects to complete the settings are the phis.

1. Go to the Work Order model ADF and locate the PN1 choice on the first branch.
2. Double click on it and click on the **Expression** button to customize the test done by the choice on the data fields values.

3. For PN1, the choice will test the an existing part number 1 requested among a maximum of 20 for one machine work order.

Note: At this point it is important to know that the **Expression text** may not exceed 497 characters in length. An error message appears if limitation is reached:

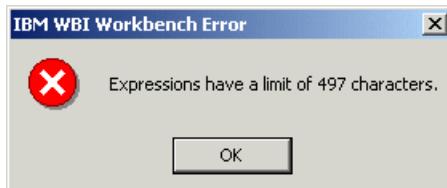


Figure 5-30 Decision object text expression limitation

The test will be done on a value of the array number [0], which is the first part number or feature code requested.

The concerned field in the S_Work_Order structure is the PNFC_Number field value of the S_PNFC[0]. The test verifies that this value is different of no value which can be translated by this mathematical expression:

S_PNFC[0].PNFC_Number<>""

(**where:** <> is for different, ““of a blank entry in this field, equivalent in fact to a no value).

4. To write this expression in the workbench model, double click on the PN1 choice and click on the **Expression** button to access the expression window allowing to customize the test done by the choice on the data fields values.
5. In the **Data Fields** box is shown the data tree.
6. To access the PNFC_Number of the array [0] of the S_PNFC, go down in the data tree until the folder S_PNC[].
7. To expand this folder, **click right** on it. The tree shows as follows:

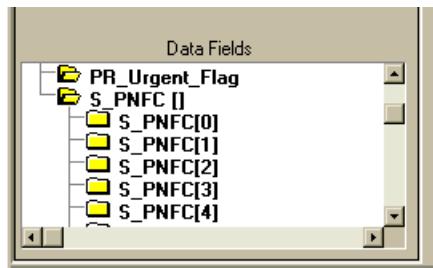


Figure 5-31 Choice

8. Click right on S_PNFC[0] to expand the first occurrence corresponding to the first part request. The tree shows as follows:

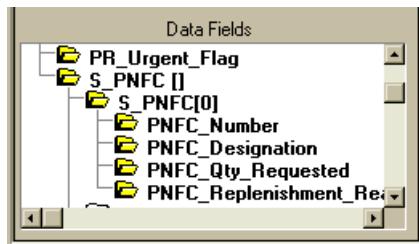


Figure 5-32 Expanded

9. To write the expression in the **Expression text** box, click left the S_PNFC[0] data field, it is copied in the text box as shown:

S_PNFC[0]

10. Type a “.” just after this field name, the text becomes: *S_PNFC.*

11. Click left on the PNFC_Number field, the text becomes:

S_PNFC.PNFC_Number

12. Type the mathematical expression *<>”* just at the end of the text.

13. The expression is now complete and the text is:

S_PNFC.PNFC_Number<>”

Note: To use the keyboard to type the expression into the **Expression text** box, the **Function Selection** pad at the right of the window can be used by clicking on it.

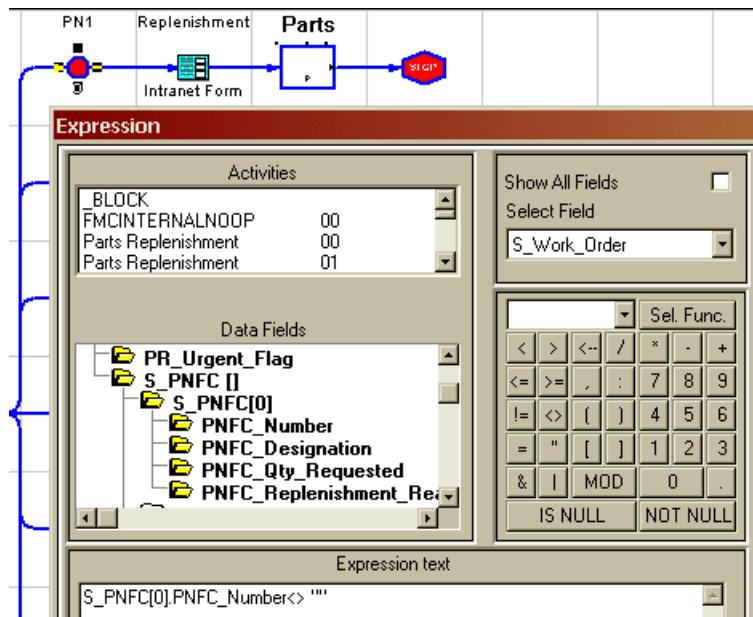


Figure 5-33 Set a choice expression

14. When we exit from the Expression window, the **Choice Object** screen shows the following figure.

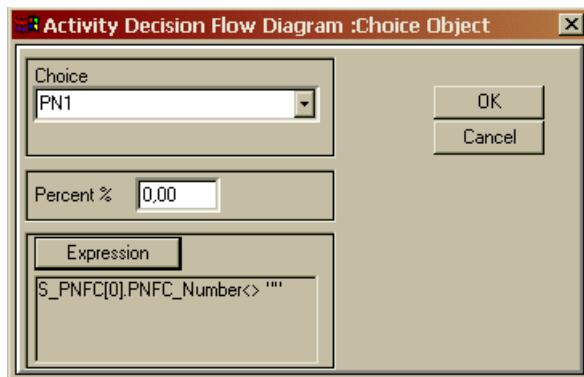


Figure 5-34 Choice

15. Repeat the same steps to set up the choices from PN1 to PN20 in the Work Order process by selecting the right array folder from [0] to [19].

In the next table the expression settings for the phis in Parts Replenishment and Order process are summarized. The sequence of the phis in the table are following the process models connectors.

Parts Replenishment process

Choice name	Expression
Sourcing OK	OTHERWISE
Wait	PR_Wait_Needed= "Y"
SALES	(PR_Want_SALES_Supply= "Y") AND (PR_Want_ME_Support<> "Y") AND (PR_No_Possible_Sourcing<> "Y") AND (PR_Wait_Needed<> "Y")
ME or (ME and Sales)	(PR_Want_ME_Support= "Y") AND (PR_No_Possible_Sourcing<> "Y") AND (PR_Wait_Needed<> "Y")
No possible sourcing	PR_No_Possible_Sourcing= "Y"
SALES	(PR_Want_SALES_Supply= "Y") AND (PR_Wait_Needed<> "Y")
Not	OTHERWISE
Wait	PR_Wait_Needed= "Y"
Continue Finance	PR_No_Possible_Sourcing<> "Y" AND PR_Want_Cost_Support= "Y"
Continue	PR_No_Possible_Sourcing<> "Y" AND PR_Want_Cost_Support<> "Y" AND PNFC_Replenishment_Reason<> "Shipping/Alter/Loose"
Continue SHip/Alt/Loose	PR_No_Possible_Sourcing<> "Y" AND PR_Want_Cost_Support<> "Y" AND PNFC_Replenishment_Reason= "Shipping/Alter/Loose"
No possible sourcing	PR_No_Possible_Sourcing= "Y"
Cancel	PR_Cancel_Order= "Y"

Choice name	Expression
Cointinue RMER	PR_Cancel_Order<> "Y" AND ((S_PN_Of_Substitution[0].S_Supplier_Source[0].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[1].S_Supplier_Source[0].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[2].S_Supplier_Source[0].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[3].S_Supplier_Source[0].SS_Source_Selected= "Y"))
Continue Sales	PR_Cancel_Order<> "Y" AND ((S_PN_Of_Substitution[0].S_Supplier_Source[1].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[1].S_Supplier_Source[1].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[2].S_Supplier_Source[1].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[3].S_Supplier_Source[1].SS_Source_Selected= "Y"))
Continue ROC used	PR_Cancel_Order<> "Y" AND ((S_PN_Of_Substitution[0].S_Supplier_Source[2].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[1].S_Supplier_Source[2].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[2].S_Supplier_Source[2].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[3].S_Supplier_Source[2].SS_Source_Selected= "Y"))
Continue MOP new	PR_Cancel_Order<> "Y" AND ((S_PN_Of_Substitution[0].S_Supplier_Source[3].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[1].S_Supplier_Source[3].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[2].S_Supplier_Source[3].SS_Source_Selected= "Y") OR (S_PN_Of_Substitution[3].S_Supplier_Source[3].SS_Source_Selected= "Y"))

Choice name	Expression
Continue DUB new	$\text{PR_Cancel_Order} <> \text{"Y"} \text{ AND } \\ ((\text{S_PN_Of_Substitution}[0].\text{S_Supplier_Source}[4].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[1].\text{S_Supplier_Source}[4].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[2].\text{S_Supplier_Source}[4].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[3].\text{S_Supplier_Source}[4].\text{SS_Source_Selected} = \text{"Y"}))$
Continue ROC new	$\text{PR_Cancel_Order} <> \text{"Y"} \text{ AND } \\ ((\text{S_PN_Of_Substitution}[0].\text{S_Supplier_Source}[5].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[1].\text{S_Supplier_Source}[5].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[2].\text{S_Supplier_Source}[5].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[3].\text{S_Supplier_Source}[5].\text{SS_Source_Selected} = \text{"Y"}))$
Continue GUAD	$\text{PR_Cancel_Order} <> \text{"Y"} \text{ AND } \\ ((\text{S_PN_Of_Substitution}[0].\text{S_Supplier_Source}[6].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[1].\text{S_Supplier_Source}[6].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[2].\text{S_Supplier_Source}[6].\text{SS_Source_Selected} = \text{"Y"}) \text{ OR } \\ (\text{S_PN_Of_Substitution}[3].\text{S_Supplier_Source}[6].\text{SS_Source_Selected} = \text{"Y"}))$

Order process

Choice name	Expression
MOP new	$\text{S_OS_PN_Of_Substitution}[0].\text{S_Supplier_Source}[0].\text{SS_Name} = \text{"MOP New"} \text{ OR } \\ \text{S_OS_PN_Of_Substitution}[1].\text{S_Supplier_Source}[0].\text{SS_Name} = \text{"MOP New"} \text{ OR } \\ \text{S_OS_PN_Of_Substitution}[2].\text{S_Supplier_Source}[0].\text{SS_Name} = \text{"MOP New"} \text{ OR } \\ \text{S_OS_PN_Of_Substitution}[3].\text{S_Supplier_Source}[0].\text{SS_Name} = \text{"MOP New"} \text{ OR }$

Choice name	Expression
RMER	S_OS_PN_Of_Substitution[0].S_Supplier_Source[0].SS _Name= "RMER" OR S_OS_PN_Of_Substitution[1].S_Supplier_Source[0].SS _Name= "RMER" OR S_OS_PN_Of_Substitution[2].S_Supplier_Source[0].SS _Name= "RMER" OR S_OS_PN_Of_Substitution[3].S_Supplier_Source[0].SS _Name= "RMER"
External suppliers	OTHERWISE

5.6 Validate the model

We need to validate the model before using it for the next steps.

1. Go to **Process -> Process Validation -> MQ Workflow Model**, a window must appear with the following message:

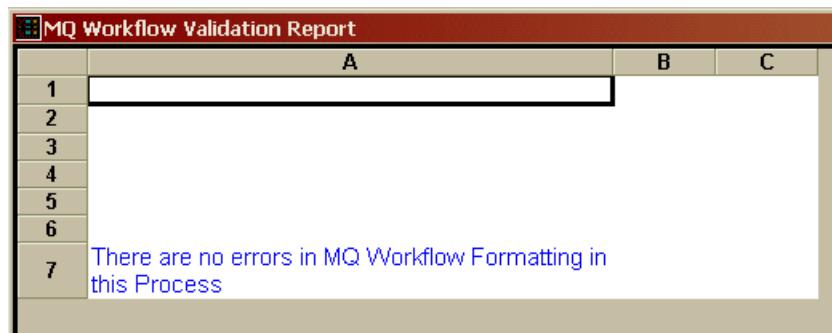


Figure 5-35 MQ Workflow Workbench validation

2. Repeat this validation for the all three processes and correct the model if errors are detected by the validation run.

This ends the workbench model settings. The model is now ready to be exported to WebSphere Studio Application Developer to design users screens and then to WebSphere MQ Workflow for run time.

5.7 Export the model

To export the entire model we need to be in the Work Order ADF window. The Work Order model is the master model calling in cascade Parts Replenishment and Order models.

1. Open the Work Order ADF window is opened.
2. Click on the Workflow button in the ADF icon bar



Figure 5-36 Workflow button

3. On the next window select **WebSphere MQWorkflow 3.4** with the **Export NOOP** box check marked as shown in the next figure:

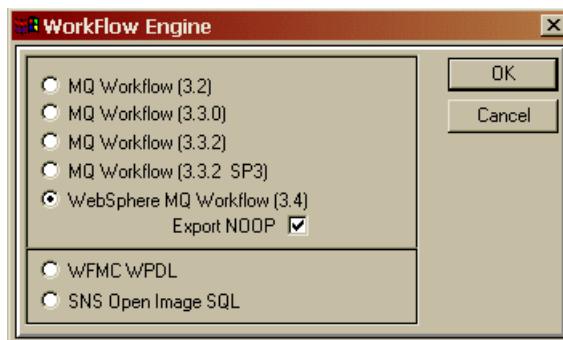


Figure 5-37 Workflow engine

4. Click **OK** to start the export process. It can takes several minutes.
5. When the MQ expansion is finished successfully as stated by the message, click **OK**.
6. Then click on the **Export** button on the top icon bar.

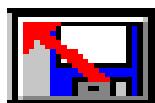
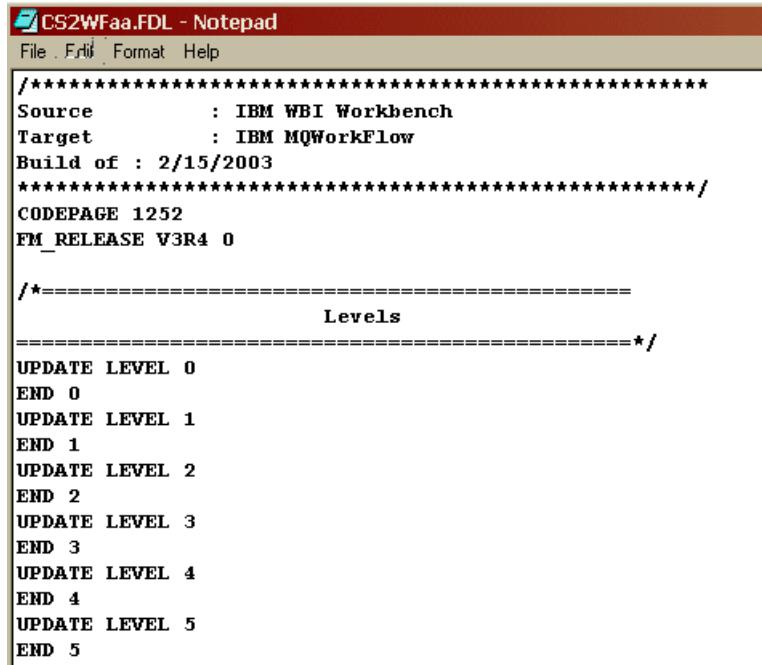


Figure 5-38 Export button

7. Click **OK** on the **Export FDL options** window without changing the default options setting.
8. A **Notepad** window will show up editing the FDL text (similar to Figure 5-39 on page 161).



```

CS2WFaa.FDL - Notepad
File Edit Format Help
=====
Source      : IBM WBI Workbench
Target      : IBM MQWorkflow
Build of   : 2/15/2003
=====
CODEPAGE 1252
FM_RELEASE V3R4 0

=====
          Levels
=====
UPDATE LEVEL 0
END 0
UPDATE LEVEL 1
END 1
UPDATE LEVEL 2
END 2
UPDATE LEVEL 3
END 3
UPDATE LEVEL 4
END 4
UPDATE LEVEL 5
END 5

```

Figure 5-39 FDL export file

9. Go to **File -> Save As** and file it in a folder.
10. Then click on the **Exit** button to quit the **MQ Series Workflow** window and return to the ADF window of the Work Order process model.

5.8 Create the user interface

To introduce this part, we need to explain the IT architecture used for the case study. We have already mentioned some elements of the architecture such as the Web Client and Java Server Pages.

Figure 5-40 on page 162 shows the architectural overview with all the suite of tools used to build the entire case study solution.

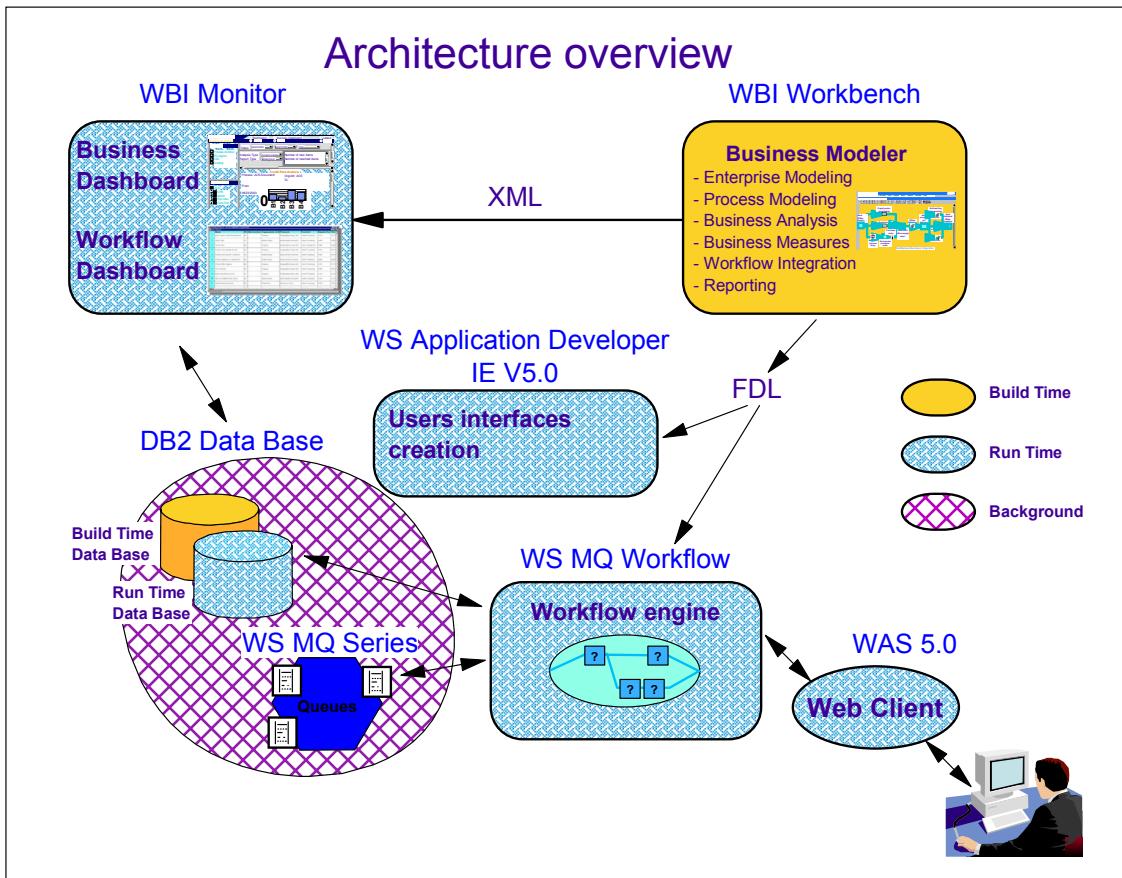


Figure 5-40 IT Architecture overview

Employees will access the application through a Workflow Web Client running in a WebSphere Application Server. Basically, the Web Client has default screens that can be used as is, but we discovered during our initial investigations that the users were not entirely happy with them. Employees will use the application all day, and it was decided to provide an interface that the users would be happy with and would be willing to use.

For the case study, specific screens have been developed for each task. These applications have been set up for each task in the workbench model. They are Java Server Pages and to create these, the first thing to do is to perform an export of the model from the Workbench to Workflow.

5.8.1 Create a project and install Rapid Deployment Wizard

Before using the **FDL** file, the first step is to create a project in WebSphere Studio. Also, for easy generation of the Java Server Pages containing HTML code, we will be using the Java Wizard.

Note: To get JSP Wizard plug-in go the following address:

www.ibm.com/software/integration/wmqwf

Click on the **Tools and components** section to select **JSP Wizard for rapid process deployment**. Download the file and follow the instructions for installation.

Once installed, start your Studio workspace.

1. Select **File -> New -> Project...**
2. Select project type as **Simple**.
3. Click on **Project** on the right window then **Next>**.
4. Enter a name in the **Project Name** field (Workflow for the case study).
5. Deselect **Use default** option for project content.
6. Click on **Browse** to choose the directory in which the project needs to be created. This directory is in fact the root directory of the Web Client created during the WebSphere MQ Workflow configuration. In our case study, in the WebSphere Application Server directory as with other installed applications.
7. Select **Finish** to end the project creation.

Once finished, the **Navigator** window shows the Workflow folder project.

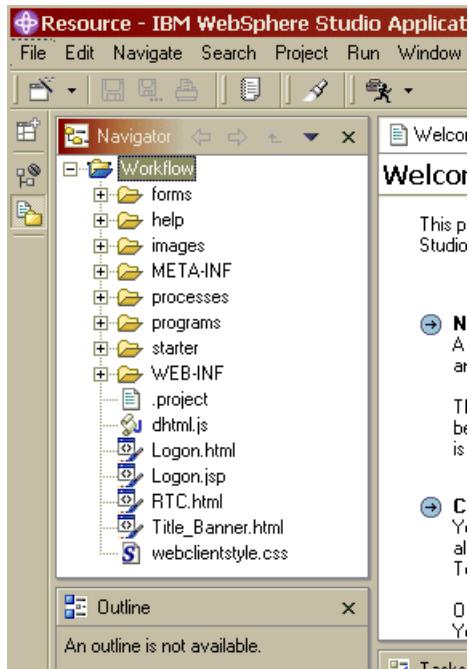


Figure 5-41 Workflow project created

This project will contain all the applications corresponding to our task applications in the workbench model.

5.8.2 Generate Java Server Pages

1. Go to **File -> New -> Other...**
2. Select **MQWF Rapid Deployment** type.

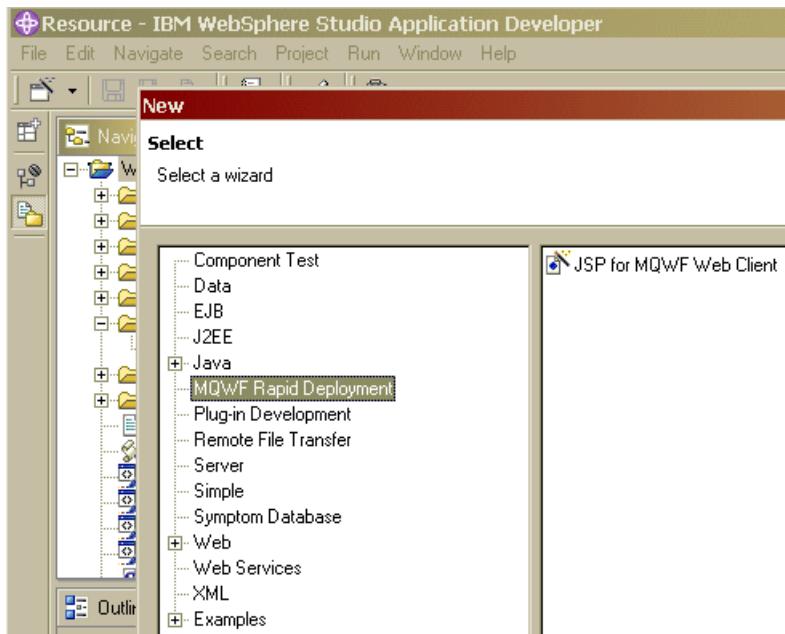


Figure 5-42 Create a JSP application file

3. Browse to find the FDL we have previously exported.
4. Select the target Web project where the JSP files will be created.
5. Click on **Next**.
6. A new window appears showing the 3 processes.
7. Select the WorkOrder process and remove the check mark **Generate JSP for the activity**. By doing that we are creating the first page corresponding to the work order request.

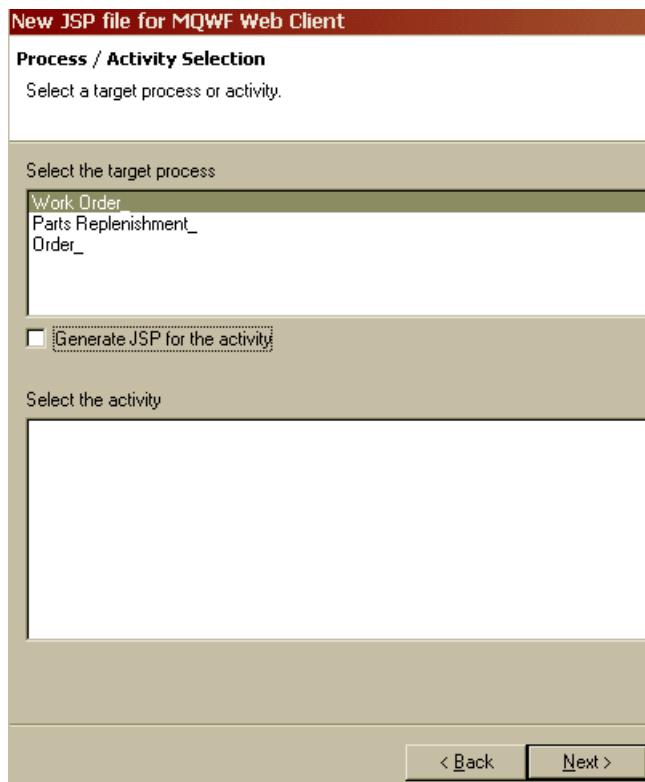


Figure 5-43 Create JSP process page - Part 1

8. Click on **Next**.
9. In the next dialog box we need to choose the output folder corresponding to a process folder.
10. Click on **Browse** and expand the **Workflow** project tree to select the folder **processes** as shown in the following figure.

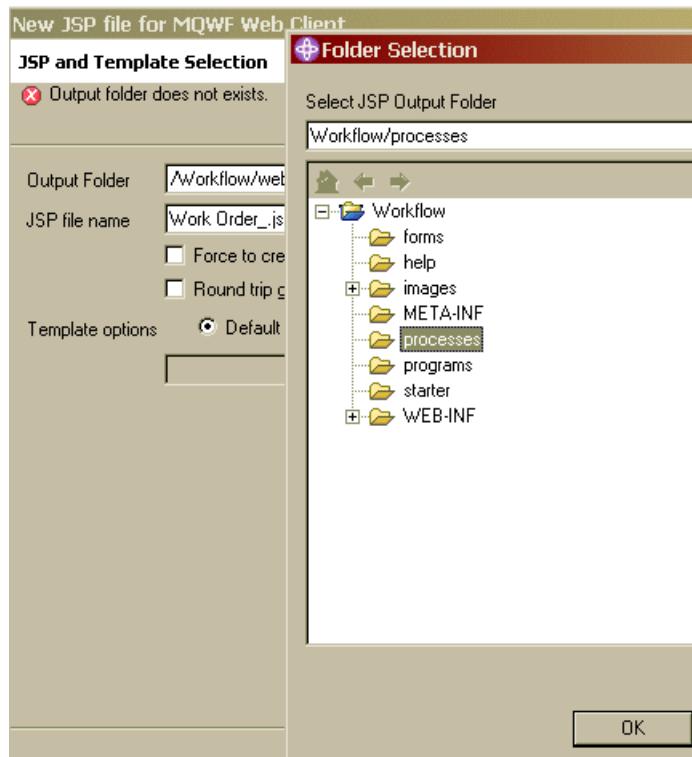


Figure 5-44 Create JSP process page - Part 2

11. Click **OK** then **Next**.
12. In the next window, all the data structure appears in the **Container Member** panel.
13. As we need to have all the fields shown at the beginning of the process, the **Output this field** check mark in the **Field Properties panel** must be selected.
14. Then for each field select in the Field Type the one corresponding to the nature of the data.
15. At this step, options for this field type can be set by opening the Options... window. _

Figure 5-45 shows an example for the **PR_Creation_Date** where the field type is a **Text field** and the options are 10 for **Columns** and 10 for **Max Length**.

10 is in fact the number of characters for a date format: mm/dd/yyyy including slash characters.

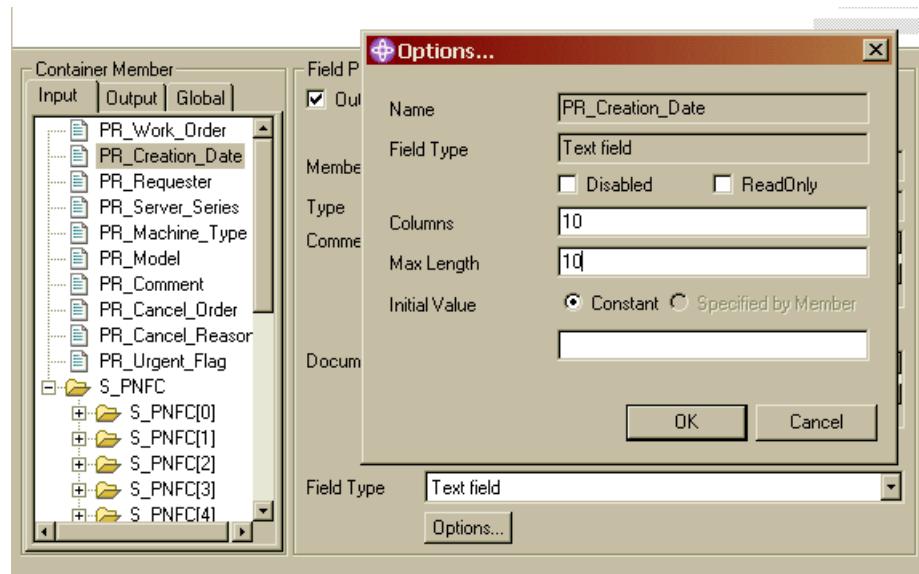


Figure 5-45 Create JSP process page - Part 3

16. Click **OK**.

17. In field type we can select several possibilities (such as **Drop Down list**, **Radio button**, **Check Box**....)

In Figure 5-46 we see an example of the field PR_Urgent_Flag. It can be set up as a **Check box** type with a **Yes** value in the options.

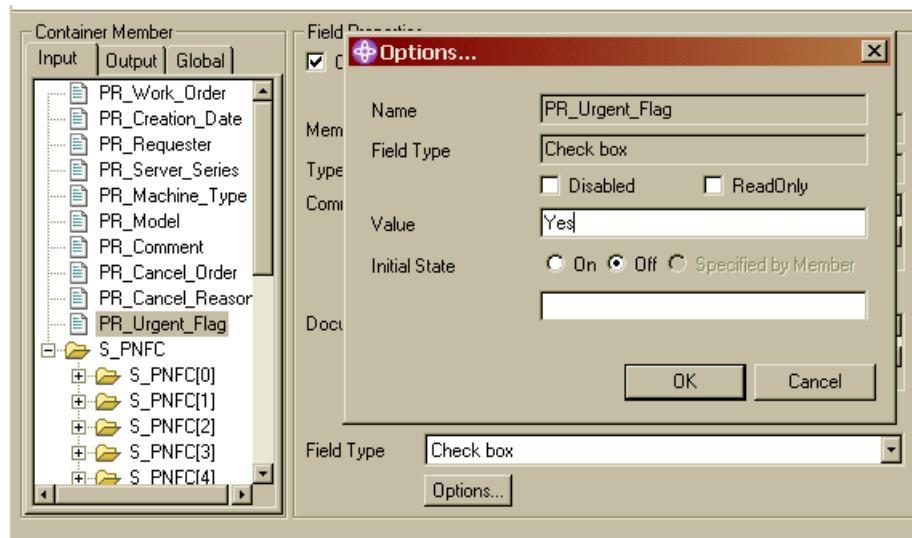


Figure 5-46 Create JSP process page - Part 4

18. Repeat the previous steps for each field you want to display. In our case study, at this step of the process we don't want to display the PR_Cancel_Order and the PR_Cancel_Reason, so the corresponding Output this field check mark has been deselected.
19. The next step is to do the same for the fields corresponding to the part number data details. The fields are in the arrays in the yellow folders S_PNFC[0] to S_PNFC[19] and have to be set up after expanding each array folder.
20. When all the fields of all the arrays have been set up, click on **Next**.
21. In the next window, the display order of the fields can be changed by using the **Up** and **Down** buttons as shown in Figure 5-47.

New JSP file for MQWF Web Client

Output Order

Change output order.

Fields to be generated.

Name	Field Type	Container
PR_Work_Order	Text field	Output
PR_Creation_Date	Text field	Output
PR_Requester	Text field	Output
PR_Server_Series	Drop down list	Output
PR_Machine_Type	Text field	Output
PR_Model	Text field	Output
PR_Comment	Text area	Output
PR_Invent_Flan	Check box	Output

Up **Down**

Fields to be overwritten.

Name	Field Type	Container

Fields to be erased.

Name	Field Type	Container

< Back **Next >** **Finish** Cancel

Figure 5-47 Create JSP process page - Part 5

22. When the fields order selection is done, click on **Next**.
23. The next panel allows us to setup the action buttons of the form, specifically the main default buttons **Submit** and **Clear**.
24. Click **Finish** to create this process page.
25. A **Work_Order_.jsp** file has been created in the **processes** folder. By double clicking on this file, a panel appears showing the **Design** tab displaying a view of the page. Modifications can be done in this tab.

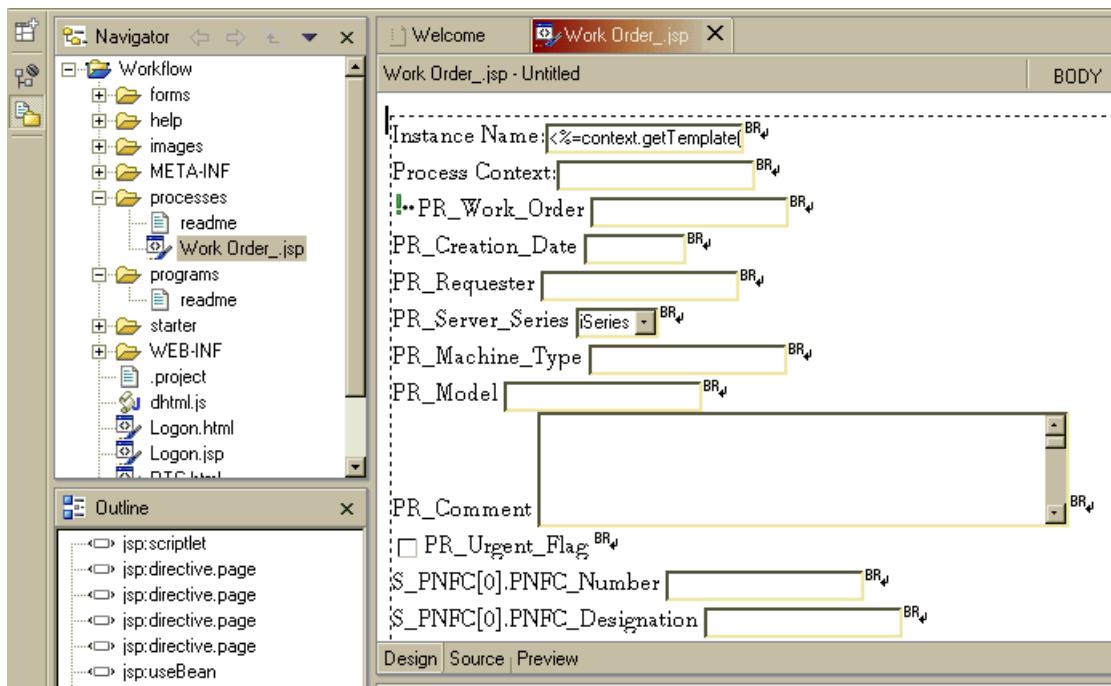


Figure 5-48 Create JSP process page - Part 5

26.By selecting the **Source** tab, the source page code is shown and can be modified as well.

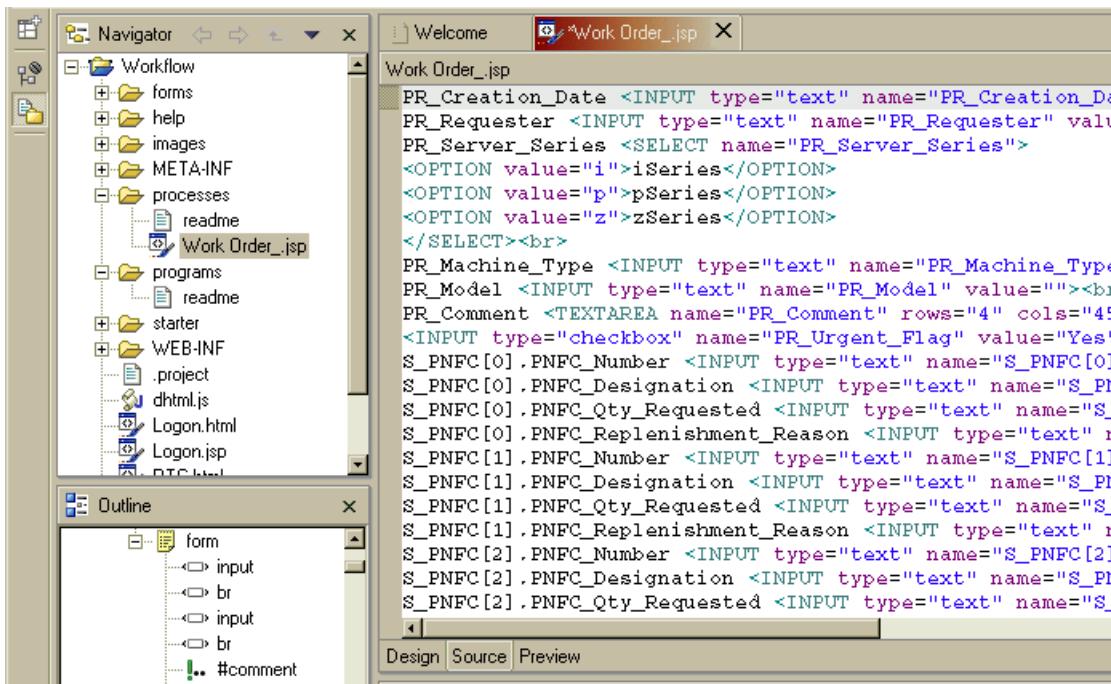


Figure 5-49 Create JSP process page - Part 5

27. With these two tabs all the modifications can be done to improve users screens interfaces until the final look is reached.
28. A display test can be done by selecting the **Preview** tab.
29. All the previous steps have to be repeated for each activity of the Parts Replenishment and the Order processes.
30. Go to **File -> New -> Other**.
31. Select the process, then the first activity of the process.

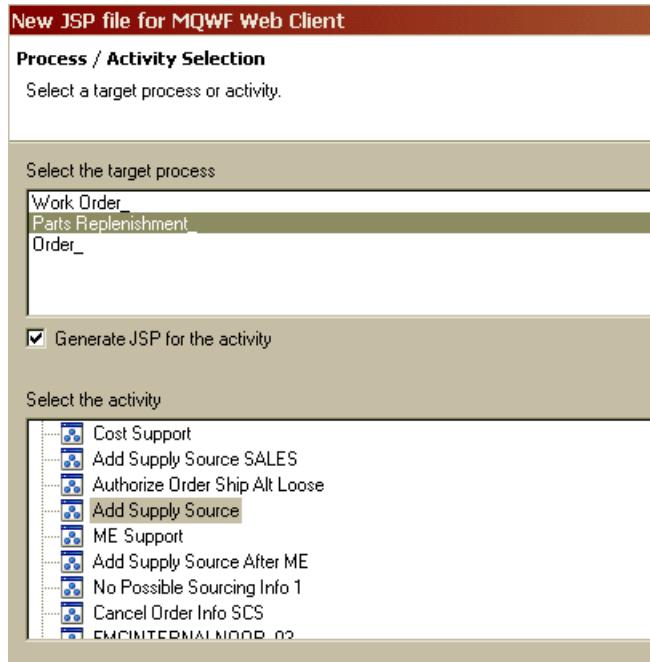


Figure 5-50 Create JSP activity page - Part 1

It is recommended to follow the process from the first task to the last one. It allows you to control the fields to be displayed depending of what information the employee has to update at a task.

32. The first task of the **Parts Replenishment_** process is **Add_Supply_Source**.
33. Click on **Next**, the folder where the activity page will have to be stored is the **programs** folder of the **Workflow** project.

Tip: As shown in Figure 5-51, you will notice that the name of the program in the **JSP file name** field, for the **Add_Supply_Source** task, is **Add_Supply_Source_v_2_0_0.jsp** - this is the same name as the one previously set up into the workbench model.

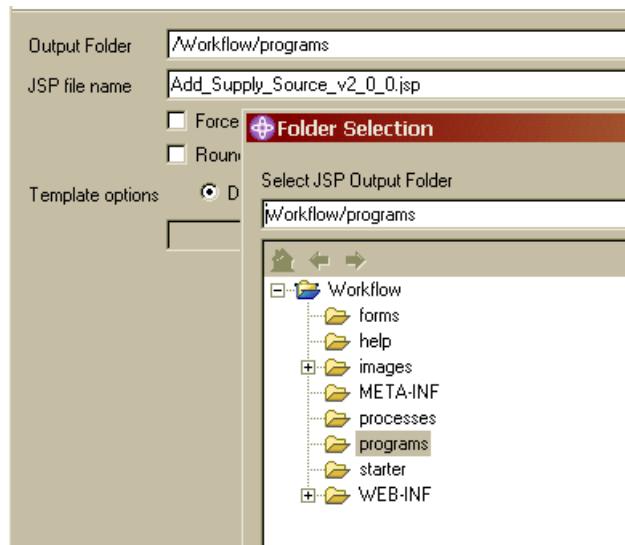


Figure 5-51 Create JSP activity page - Part 2

Figure 5-52 and Figure 5-53 show examples of the final look of the screens as shown when an employee is logged on the Workflow Web client and performing different tasks.

So to summarize what we have done now:

- ▶ The JSP file page corresponding to the form to request a part has been stored in the process directory of the Web client. In the workbench the **Prompt at start** option has been initialized in the general process settings of the work order process meaning that when the process is be started, the Web Client will start this specific JSP file page stored in the process directory.
- ▶ For the next tasks, after process starting, the JSP files pages have been developed and stored in the **programs** directory of the Web client. These pages will be called automatically by the Web Client when the user has to perform an activity that uses this program.

Note: The fact that the application names setup into workbench have the same filenames that the Web Client JSP files for process and programs means that nothing else has to be done to ‘connect’ the WebSphere MQ Workflow run time with the JSPs for the Web Client.

Work Order

Creation Date 15/03/2004

Requester PDELLAPINA

<p>Urgent <input type="checkbox"/></p> <p>Work Order <input type="text"/></p> <p>Server Type <input type="radio"/> ① iSeries <input type="radio"/> ② pSeries <input type="radio"/> ③ zSeries <input type="radio"/> ④ SSD</p> <p>Machine Type <input type="text"/></p> <p>Model <input type="text"/></p> <p>Comment </p>	<p>Qty of PN and/or FC <input type="button" value="1"/></p> <table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 15%;">PN or I</th><th style="width: 40%;">Designation</th><th style="width: 15%;">Qty</th><th style="width: 30%;">Replenishment Reason</th></tr></thead><tbody><tr><td>1</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value="Missing"/></td></tr><tr><td>2</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr><tr><td>3</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr><tr><td>4</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr><tr><td>5</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr><tr><td>6</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr><tr><td>7</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr><tr><td>8</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr><tr><td>9</td><td><input type="text"/></td><td><input type="text"/></td><td><input type="button" value=""/></td></tr></tbody></table> <p><input type="button" value="Validate Form"/> <input type="button" value="Reset Form"/> <input type="button" value="Cancel"/></p>	PN or I	Designation	Qty	Replenishment Reason	1	<input type="text"/>	<input type="text"/>	<input type="button" value="Missing"/>	2	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>	3	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>	4	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>	5	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>	6	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>	7	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>	8	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>	9	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>
PN or I	Designation	Qty	Replenishment Reason																																						
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3	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>																																						
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9	<input type="text"/>	<input type="text"/>	<input type="button" value=""/>																																						

Figure 5-52 Example of a final user screen: Work Order form

Authorize Order

Creation Date	18/02/2004
Requester	DBERTHET
Work Order	EA9AZF
Machine Type	9406 
	Model 720
Replenishment Reason	Missing
	PN and/or FC 6714
	Designation DISK
Requested Qty	10
Comment	Dan, FC 6714 = 97H7384 ou 21P4650 ASM Dasd Order 863WTN

Cancel Order

Possible PN and/or FC of Substitution 1

<input checked="" type="checkbox"/> Possible PN and/or FC of Substitution #1	6714		
Available Qty	Expected Unit Price	Expected Date	Select and Qty to Order
ROC Used 10	XXXXX dollars	<input type="checkbox"/> Select Source	

Figure 5-53 Example of a final user screen: Authorize Order

When all the programs have been defined in this **programs** folder, the model is ready to be imported in the MQWorkflow run time.

5.9 Import model in MQ Workflow run time

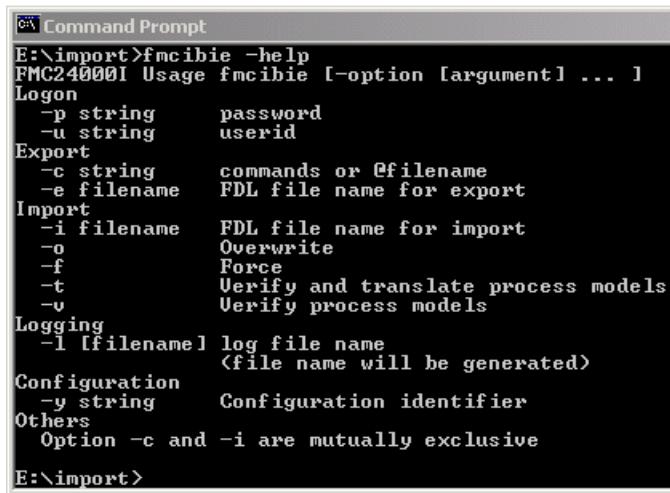
The first step involved in taking the model to the run time environment is to import the FDL.

5.9.1 Import FDL

1. Open a **DOS Command prompt** window.
2. Navigate to the directory where the FDL file is stored.

The executable to perform the FDL importation is **fmcibie.exe**, for the case study the directory used is **import**.

Figure 5-54 shows the parameters for the FDL import utility.



```
E:\import>fmcibie -help
PMC24000I Usage fmcibie [-option [argument] ... ]
Logon
  -p string      password
  -u string      userid
Export
  -c string      commands or @filename
  -e filename    FDL file name for export
Import
  -i filename    FDL file name for import
  -o             Overwrite
  -f             Force
  -t             Verify and translate process models
  -v             Verify process models
Logging
  -l [filename]  log file name
                 (file name will be generated)
Configuration
  -y string      Configuration identifier
Others
  Option -c and -i are mutually exclusive
E:\import>
```

Figure 5-54 Import model in MQWorkflow - Part 1

3. Enter the command as follows:

```
fmcibie -u admin -p password -o -t -f -i process.fdl
```

This will verify and translate the process models (to a usable run time form) using the input file names process.fdl.

4. Check the output of the command and verify that the import has finished without error.

```

FMC25100I REPLACE PROCESS 'Work Order_' finished.
FMC25100I REPLACE PROCESS 'Parts Replenishment_' finished.
FMC25100I REPLACE PROCESS 'Order_' finished.
FMC20510I Finished parsing process.fdl.
FMC21500I Begin verification of process 'Work Order_'.
FMC21510I End verification of process 'Work Order_' <0 errors, 0 warnings>.
FMC26500I Begin translation of process 'Work Order_'.
FMC26510I End translation of process 'Work Order_' <0 errors, 0 warnings>.
FMC21500I Begin verification of process 'Parts Replenishment_'.
FMC21510I End verification of process 'Parts Replenishment_' <0 errors, 0 warnings>.
FMC26500I Begin translation of process 'Parts Replenishment_'.
FMC26510I End translation of process 'Parts Replenishment_' <0 errors, 0 warnings>.
FMC21500I Begin verification of process 'Order_'.
FMC21510I End verification of process 'Order_' <0 errors, 0 warnings>.
FMC26500I Begin translation of process 'Order_'.
FMC26510I End translation of process 'Order_' <0 errors, 0 warnings>.
FMC24560I fmcibie finished and found 0 errors 0 warnings. RC = 0
E:\import>

```

Figure 5-55 Import model in MQWorkflow - Part 2

The next step is to check that the import has been successful by creating the views.

1. Start the workflow run time client

Start -> Programs -> IBM WebSphere MQ Workflow -> WebSphere MQ Workflow Runtime - FMC

Note: Remember to start the workflow service (MQSeries Workflow 3.4 - FMC)

2. Log on as the workflow Administrator

Note: The users of our case study will always be using the Web client for their daily work - not the run time Client and will be setting up their lists from there. We show the set up of the lists here using the run time client as we have not completed the deployment of all of the components for the Web application to our Application Server.

The process is the same - it is merely the tool which differs.



Figure 5-56 Tree view

5.9.2 Create the process template list

1. Right click on **Process Template List**.
2. Click on **Create New Process Template List...**
3. Enter a list name, such as **All processes**.
4. Leave the default **Public List Type** selected.
5. Enter a description **Description** field.

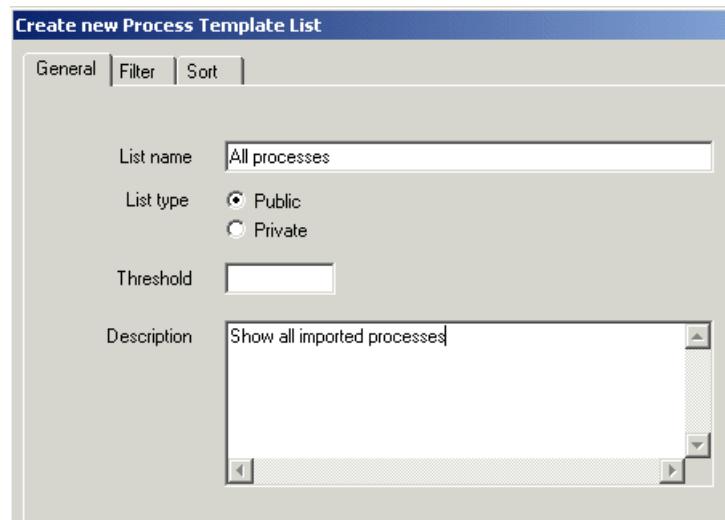


Figure 5-57 Create process template list - Part 1

6. The template list created is shown as follows:

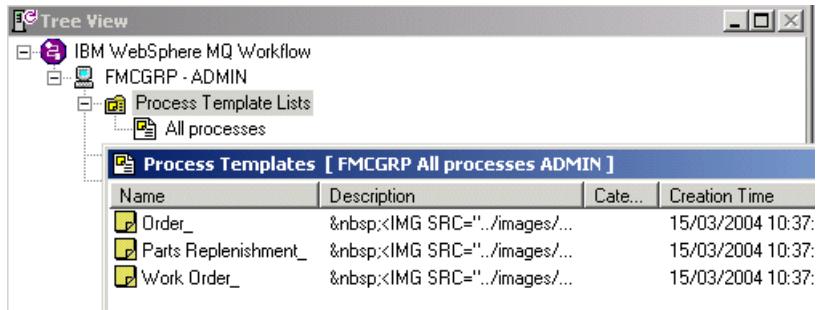


Figure 5-58 Create process template list - Part 2

5.9.3 Create process instance list

1. Right click on **Process Instance List**.
2. Click on **Create Process Instance List...**
3. Give the list a name, such as **All works**.
4. Type a **Description**.

This view will display all the process instances started and not yet finished in the three processes: Work Order, Parts Replenishment and Order.

A screenshot of the 'Create new Process Instance List' dialog box. It has tabs at the top: 'General' (selected), 'Filter', and 'Sort'. The 'General' tab contains fields for 'List name' (set to 'All works'), 'List type' (radio buttons for 'Public' (selected) and 'Private'), 'Threshold' (empty input field), and a 'Description' text area (containing 'Show all processes started').

Figure 5-59 Create process instance list - Part 1

Tip: What follows is not essential - it is done for usability reasons - the correct data will always be shown, however displaying the listings in a user-friendly form goes a long way to achieving the buy-in from the user community that you require and encourages the users to actively use the new application.

For usability reasons in the run time environment, we need to display the parts replenishment instances and the orders relative to a specific Work Order grouped all together. If not, each orders relative to a part will be displayed separately from the others and if ten parts are needed it will be difficult for the user to look at each part and finally make a work order status manually on a separate piece of paper.

To avoid this we must create the grouping of all items in order to give a quick status view on each work order and their associated parts coming from several sources.

To do this, the information common to the three processes displayed in the **Designation** field will have to be sorted by ascending description to provide a logical grouping:

- Work Order: Requester name - Work Order n°
 - Parts Replenishment: Requester name - Work Order n° - PN/FC
 - Order: Requester name - Work Order n° - PN/FC - Source
1. Click on the **Sort** tab.
 2. Click **Add**.
 3. Select in **Description**.
 4. The **Ascending** setting as shown in the following figure.

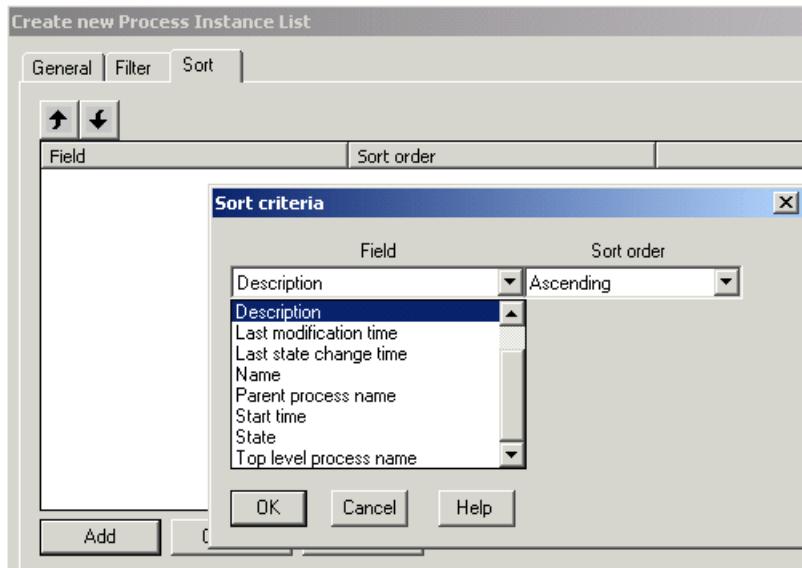


Table 5-4 Create process instance list - Part 2

5.9.4 Create work list

The last step is to create the work list. This work list will display only the tasks to be performed by a role or a person instead of having all items on the screen. This allows employee to only have on their screen the list of task they have to perform.

1. Click on **Create New List**,
2. Give it a name, such as **My Task**,
3. Set as describe previously a **Ascending Sort** description.

At the end the view trees shows the following:

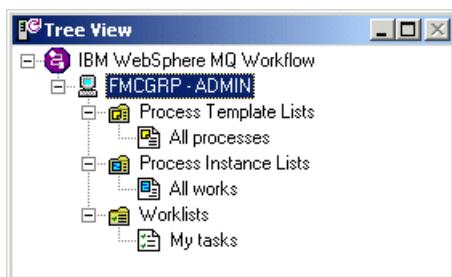


Figure 5-60 List of lists

Important: Users will only see the tasks in their lists that they are authorized to but the workflow Administrator has visibility of all activity in the system.



Simulation

Once the details of the first major business process (the case study - Parts Replenishment process) have been completed successfully, the next of the business processes were modeled at a very high level. To test the effectiveness of the models prior to embarking on a major modelling effort, where the business measurements are to be applied, a series of simulations were performed using the tools available in the modeler.

This chapter describes the simulation of the customer order process. It will allow us to understand the business process behavior and it will be the basis for the set up business process measurements and indicators for monitoring requirements.

6.1 Validate the model

Validate a model consists in several steps, to verify if the dynamic behavior is in keeping with the real business process based on the following characteristics:

- ▶ The model diagram properly handles the jobs in all the paths according processes, subprocesses, rules, decisions and quantities.
- ▶ The resources and the different calendars (task, resource and simulation calendars) are properly managed by the simulation.
- ▶ Times values obtained are realistic: cycle time, queue time...

To do so, we will show in this chapter a way to validate a model through Workbench facilities and a test simulation template. Each business analyst can develop his own way to validate his model depending of his style to model a business process. However, the three previous behavior characteristics will have to be checked anyway.

6.1.1 Validate process modeling with Workbench

Workbench offers some validations you have to run to detect model structure errors:

- ▶ As already described in previous chapters you can validate the formalism of the process and subprocesses model as follow:

Process -> Process Validation -> Process Model Validation

a screen will appear with errors messages if any, or a message saying that the diagram has no formalism errors.

- ▶ A second validation can be ran to validate the model for a future use on a Workbench Server

Process -> Process Validation -> Workbench Server Validation

The errors must be fixed before starting simulation.

6.1.2 Validate the model with a simulation test scenario

Before starting a validation and simulation study, the process needs to be compiled.

Compile process and subprocesses

To do so, when you are in the ADF (Activity Decision Flow) window of the customer order process, which is the end to end business process to assess,

click on the **Expand Process** icon located at the right of the ADF bar. A fast succession of screens with a red progression bar appears during the compilation. At the end of the compilation, the simulation window called **Expanded process** will show an aggregate layout of all the process and subprocesses.

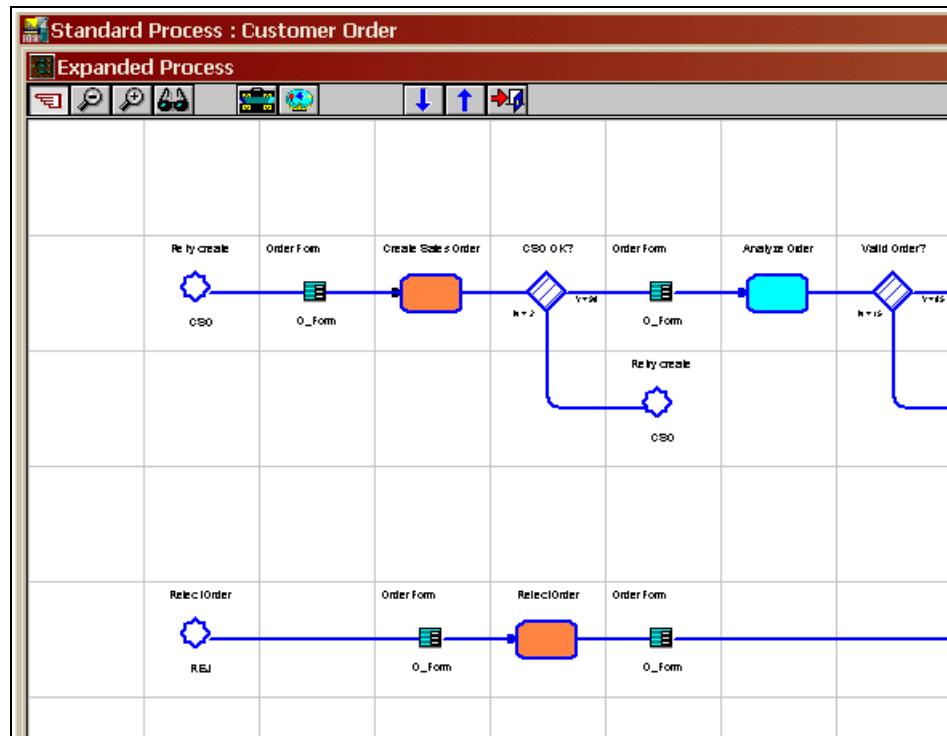


Figure 6-1 Customer order process expanded in the simulation screen

Create a test simulation template

A simulation template is a set of data to reflect a scenario. A first template called Template 1, will reflect a test scenario to validate the model.

1. To create this test template in the **Expand Process** window, click on the **Simulation** button in the tool bar.
2. The **Expand Process** window changes to a **Process Simulation** window with new buttons available in the tool bar.
3. Click on the **Simulation Setup Templates** button in the tool bar and, in the pop up window appearing, type **Template 1** in the template name field and click **Add** to create it.

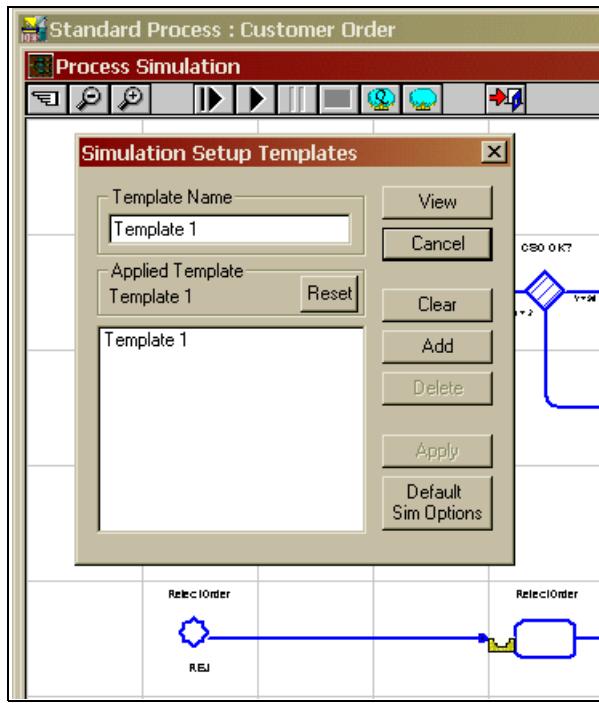


Figure 6-2 Create a simulation template

4. To set up the data in the template, click on the **Setup** button in the tool bar.
5. A **Simulation Setup** window appears with several folders starting by a **General Folder**.

General folder

In this folder, the set of data concerns the simulation time data in terms of starting date and calendar. For the test purpose, we have set up:

- ▶ 04/01/2003, as the starting date of the second quarter of production.
 - ▶ Manufacturing shift calendar, which covers the 2 shifts time frame.
1. We leave the two last boxes selected, meaning that we want to generate jobs only during the working hours, and, at the end of the simulation, the job detail results will be shown for each job.
 2. The maximum duration box is let to disable, the simulation will end when all the 300 jobs will be completely processed through all the paths of the process model.
 3. Click on the **Update Template** button to record the changes.

The **General** folder should be as follow:

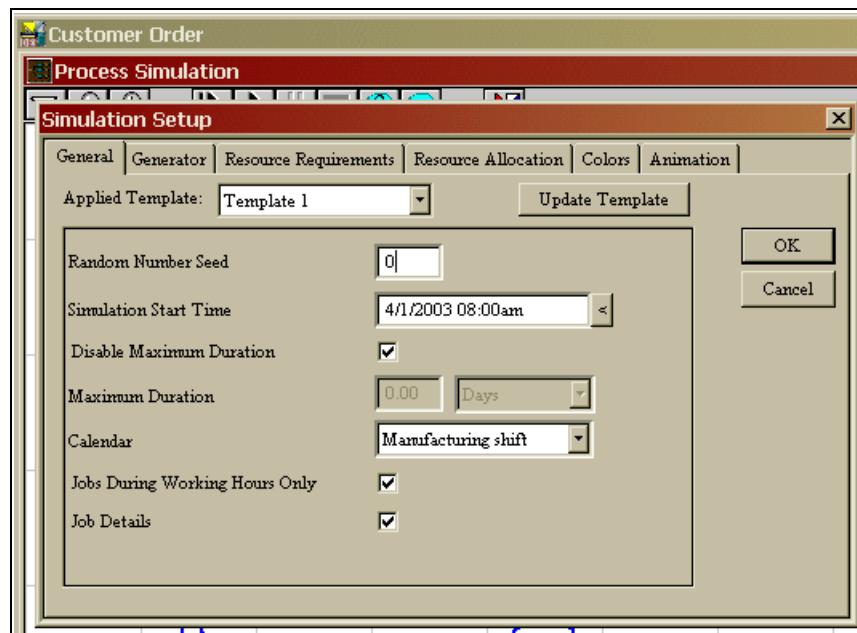


Figure 6-3 Simulation test template: General folder data

Generator folder

This second folder concerns the way the jobs will be generated in the model in terms of quantity (300 for the second quarter) and time between job (1.30 hours) on average, meaning that the jobs will be introduced into the model according to a statistic distribution around this average. This generation of jobs around an average is a way to introduce a random behavior reflecting no realistically the life of a business process.

The random seed is a number which drives the algorithm used to simulate dynamic random numbers for time distribution, decision percentage and so on.... It is usually changed when “what if” analysis is performed as the way to validate one scenario hypothesis behavior against different random situations. For the test template purpose, the random number seed is let to 0.

1. Click on the **Update Template** button to record the changes.
2. The **Generator** folder should be as follows:

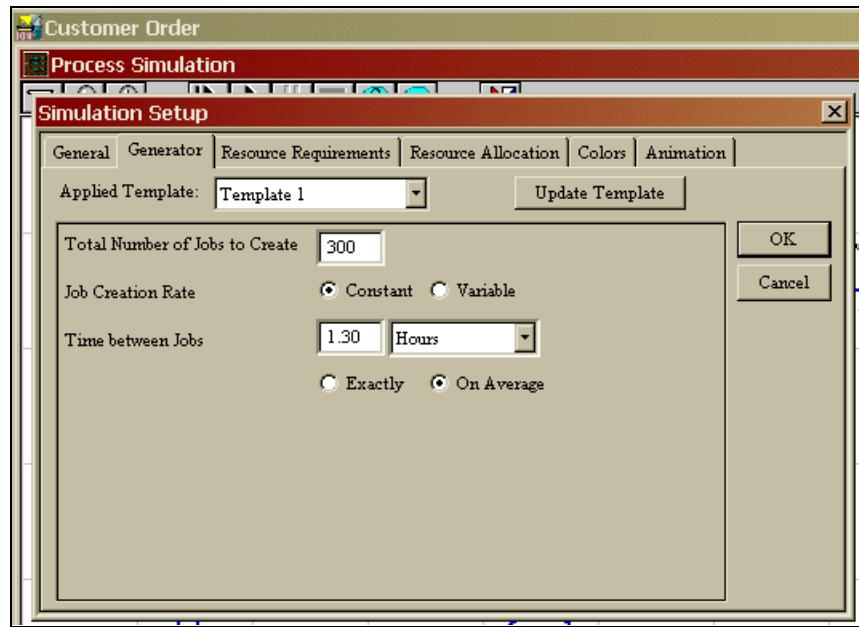


Figure 6-4 Simulation test template: Generator folder data

Resource Requirements folder

This folder shows the tasks allocated to an organization unit and the resource required to perform a task. The duration unit to perform the task is also shown.

For example, if we select the organization unit **Order Management**, the task list appears as follow:

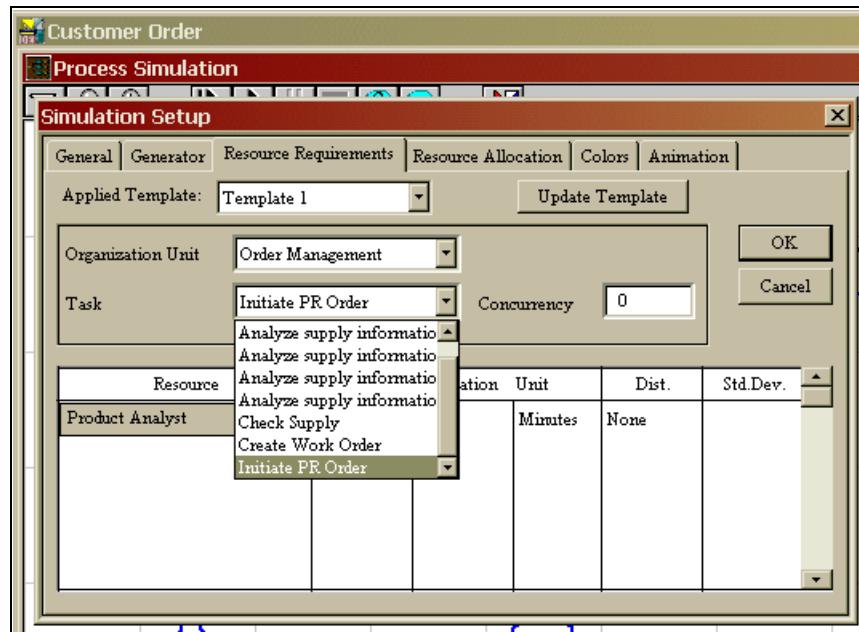


Figure 6-5 Simulation test template: Resource Requirements folder data

The **Analyze supply information** task is repeated four times. This is due to the fact that the parts replenishment subprocess, containing this task, has been compiled four times in the customer order process during the expand operation:

- ▶ twice at the level of the customer order process
- ▶ once in the alteration subprocess
- ▶ once in the test subprocesses.

Alteration and test subprocesses are called once each in the customer order process.

Hence, for each task, the resource type, the resource quantity, and the duration unit, which will be used during the dynamic simulation, can be checked. The values of the resource quantity and the duration unit can be changed, if needed, by clicking directly the numbers in the concerned column. For the test purpose, nothing is changed: all the resources required for one task are set to 1 and the duration unit times are left with the values recorded during the drawing of the process in the ADF window.

The concurrency number in this folder represents the maximum quantity of task instances performed simultaneously related to the resource available. It can be changed to the maximum quantity of resource desired to perform in parallel a

task on different jobs. For example, we have four product analysts, if we want for the check supply task to limit to two people to process the jobs queue, we have to set up the concurrency number to two for this task.

If this parameter is at 0, that means that all the resources available at a time will be automatically used to process the jobs in the queue.

Click on the **Update Template** button to record the changes.

Resource Allocation folder

This folder shows the number of resources available for each resource type. It is the reflection of the resources available in the organizations units. Accordingly, the real case organization units description recorded in the repository and the manufacturing shift calendar, the quantities must be set up as follows by clicking on the number to be changed in the **Allocated** column:

Table 6-1 Resource allocation

Organization	Resource	Allocated
Country Sales	Product Manager	3.00
Order Management	Product Analyst	4.00
Warehouse	Carrier	1.00
Warehouse	CPC Operator	1.00
Distribution	Shipping Operator	1.00
Entry Audit Alteration	Order Support	3.00
Entry Audit Alteration	Warehouse Operator	3.00
Entry Audit Alteration	Alteration Operator	1,50
Accounting	Accountant	1.00
Procurement	Supply Chain Specialist	1.00
Test	Test Operator	2.50

For resources working in manufacturing shifts, the allocated resources have been setup to the quantities available for a two shift coverage.

For example, the organization unit Warehouse has 2 carriers, one in the morning shift and one in the evening shift. As we have only one manufacturing shift calendar in the model, that means the quantity of carriers available for the simulation during this calendar time frame is 1.00. The same applies for alteration operators, where there are three employees: the quantity resources

allocated has to be set up to 1.50. For the same reason, the four test operator employees, helped by a test technical leader during the standard calendar, are setup to a quantity of 2.50.

Half people resource will not be really taken into account in the simulation because we have set up in the previous folder that to perform the tasks, that one resource is needed. But here we want to strictly reflect the regular employee structure described in the repository. It will be the reference before to modify resources in the “what if” analysis.

For all the resources working in a standard calendar, the quantities are the exact number of employees described in the repository organization data.

The screen of this folder is shown in the next picture.

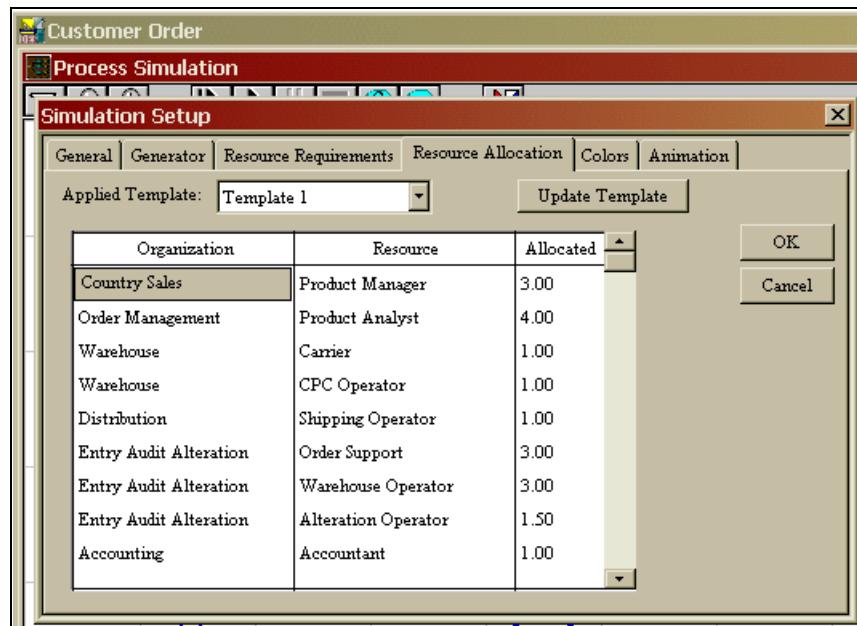


Figure 6-6 Simulation test template: Resource Allocation folder data

Click on the **Update Template** button to record the changes.

Colors folder

In this folder we can affect specific colors for some dynamic simulation states about tasks and jobs. We will leave the default colors.

Animation folder

This last folder is useful for the first validation step which will check, by running the model step by step, if dynamic model behaviors are consistent with the main characteristics of the environment set up in the model such as:

- ▶ Calendars management according tasks and resources
 - ▶ Jobs paths.
1. To do so, deselect the **No Animation** tick, reduce the animation speed by pushing back to the left (slowing animation) the marker on the speed bar, and finish the settings by selecting **One by One** the **Phi Flow** option.
 2. The **Animation** folder shows the following settings:

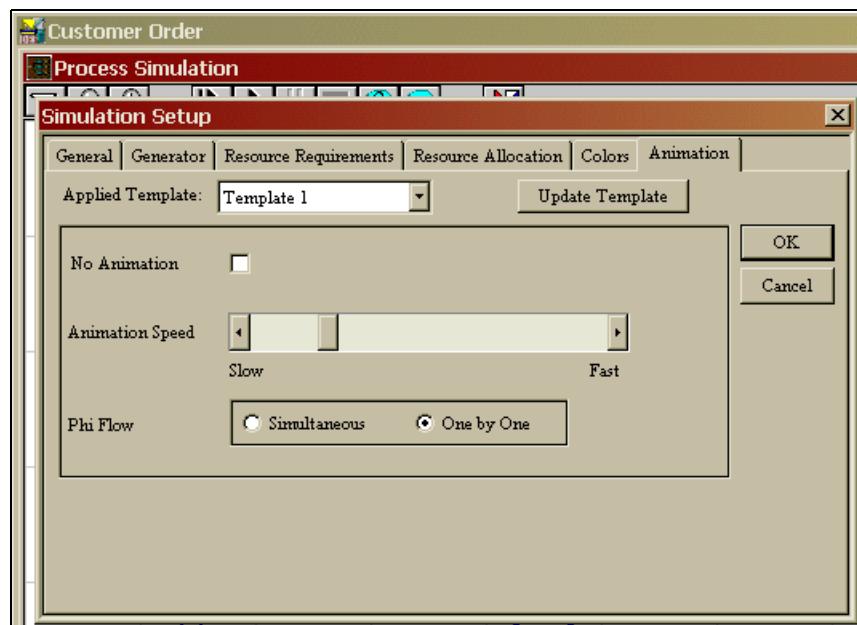


Figure 6-7 Simulation test template: Animation folder data

3. Click on the Update Template button to record the changes and OK to exit of the simulation setup window.

Validate model through test simulation study

We will now walk through the various validation methods for the simulation.

Step by step validation

1. Once the test template is ready to be used, the calendar management can be roughly checked by pushing the **Step** button.

- At the first push, the screen shows the following dynamic state:

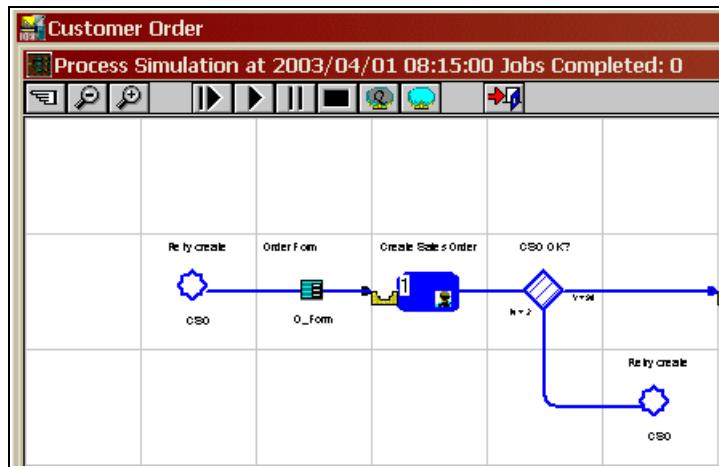


Figure 6-8 Simulation validation by running in step mode: step 1

2. At the top of the window the following values and their corresponding states are shown and describe the following situation:
 - Process simulation at 2003/04/01: meaning that the simulation has started the first day of the production quarter, as set in the general folder
 - 08:15:00: is the time of the first job generated in the model, during the working hour only starting at 06:00 am, and processed by the first resource. The product manager has started his first task, create sales order, when he arrived at his office according the standard calendar starting at 08:15 am for this role. The create sales order task is in blue, with a number 1 in the high left corner and a people icon is in the right corner reflecting that the first job is in working process in the create sales order task by the product manager resource.
 - Jobs completed 0, meaning that no job have been yet completely processed and exited of the end to end customer order process
3. By pushing the **Step** button a second time, the number of jobs in the left corner of the create sales order task is changing to 2 at 08:40 am, meaning that a second job has been generated and immediately processed by the second product manager available among a total of 3 as set up in this scenario.
4. By pushing the **Step** button a third time, the simulation time is at 09:00 am. A animated phi is moving out the create sales order task, after the 45 minutes of the working duration of this task. The phi is sent out to the second task, analyze order, where the product analyst processes it immediately.

See Figure 6-9 on page 196 showing the simulation state at 09:00am:

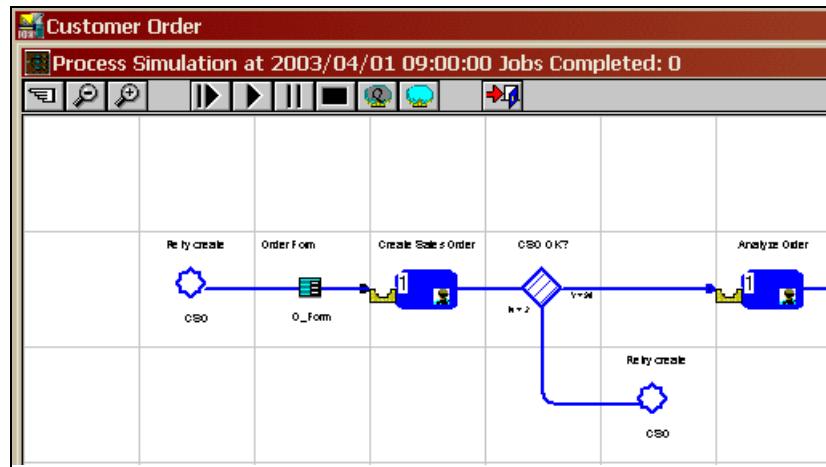


Figure 6-9 Simulation validation by running in step mode: step 2

5. At the fourth step at 09:25 am, the second job has ended, processed by the product manager: $09:25 - 08:40 = 45$ minutes working duration. The second corresponding phi is moving out to analyze order task and immediately processed by the second product analyst available among a total of 3 as set up in this scenario. No new job has been generated, and the create sales order task has became blank because nothing is in working process in this task.

See Figure 6-10 to reflect this simulation state:

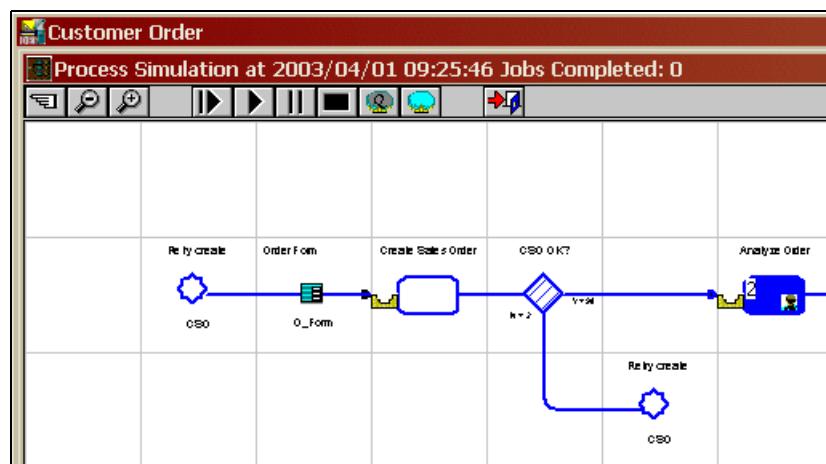


Figure 6-10 Simulation validation by running in step mode: step 4

6. By again pushing the **Step** button, you will be able to verify the following states all along the process:
 - ▶ People in the standard calendar stop their value add during the break times between 12:00 pm and 12:45 pm and are out after 05:00 pm.
 - ▶ People in manufacturing shift are working until 22:00 pm and their breaking times are respected.
 - ▶ This are moving between tasks following statistical percentage distributions applied to decisions.
7. When you are confident on how the model reacts and on the fact that the behavior is consistent with the environment of the business process description in the Workbench, close the step by step simulation by clicking on the **Exit** button.

Test simulation validation

Before running the entire simulation of 300 jobs, the test template needs to be updated to not show an animation which will take too long to perform the processing of all the jobs.

1. Click on the **Simulation -> Simulation Setup** buttons to go back to the test template 1.
2. Select the **Animation** tab and select **No Animation**.
3. Click on the **Update Template** button to record the changes.
4. Click **OK** to exit of the simulation setup window.
5. Push the **Run** button in the tool bar to launch the simulation of the 300 jobs.
6. The days dates, the days hours and the number of job processed, will changed quickly (the simulation duration is less than one minute) until a message **Simulation Completed** pops up.
7. The simulation screen shows the following state:

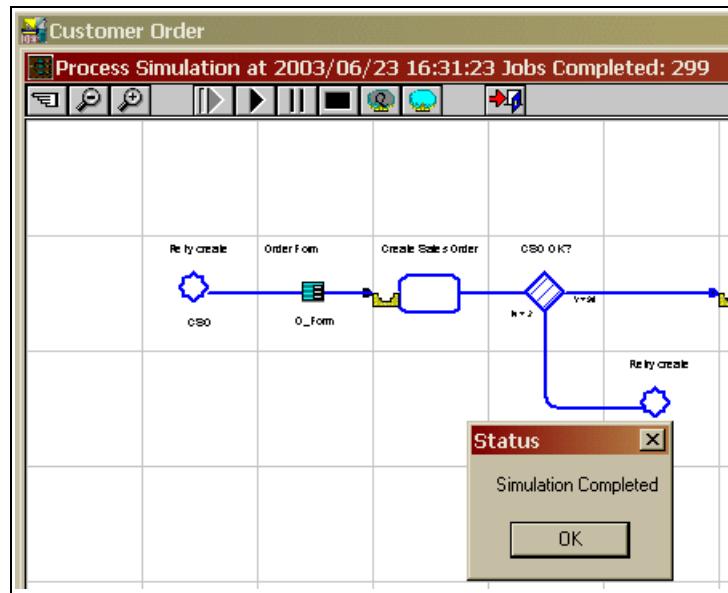


Figure 6-11 Simulation validation by running the test template

8. The process simulation state at this step is that 299 jobs have been processed and out of the model. The 300 jobs have been processed between 2003/04/01 to 2003/06/23 at 16:31:23.
9. Click on **OK** of the message pop up box to access to the simulation results.
10. The next screen shows the jobs details for all the 300 jobs as set up in the general folder of the test template 1.

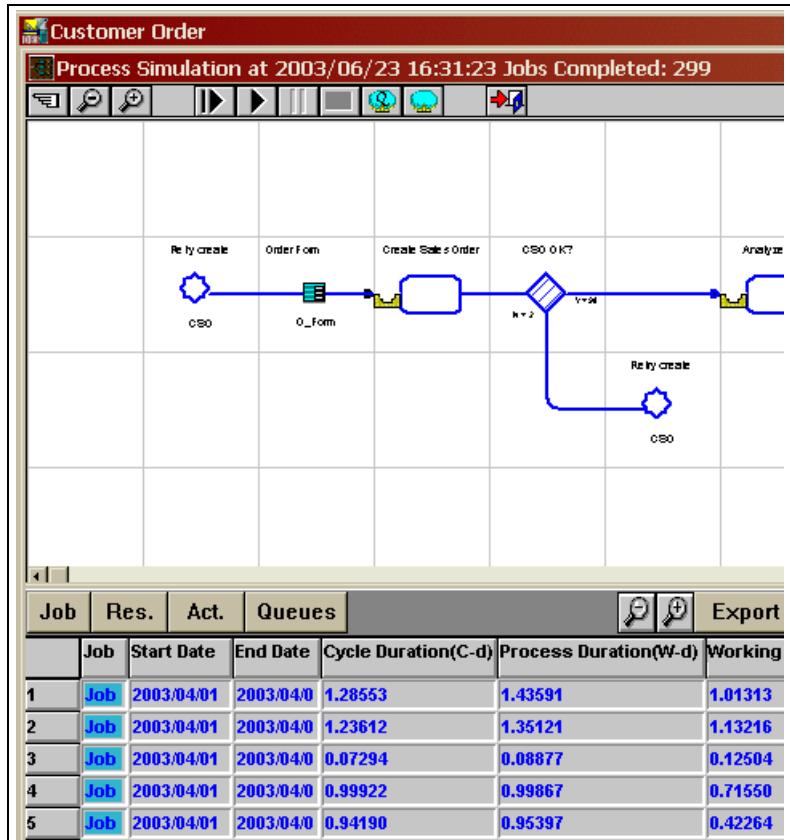


Figure 6-12 Simulation validation by running the test template: jobs details

11. Scroll down the jobs, they are all in blue (meaning that all the jobs have been completely processed by all the paths).
12. If some jobs are in yellow, that means that the jobs in this color have been blocked somewhere in the model due to a logic or resource problem.
13. In the general folder we have not set up a maximum duration, so the expected result is to have all the jobs processed.
14. The yellow jobs cases, if any, must be carefully analyzed to understand the cause and fix the model to handle them properly until their completion.
15. If you set up a maximum duration less than August 11th for this simulation, you may have yellow jobs if the model capacity is not sufficient to process all the 300 jobs in the duration set up.
16. When you scroll down the rows, the last row shows average calculation as follow:

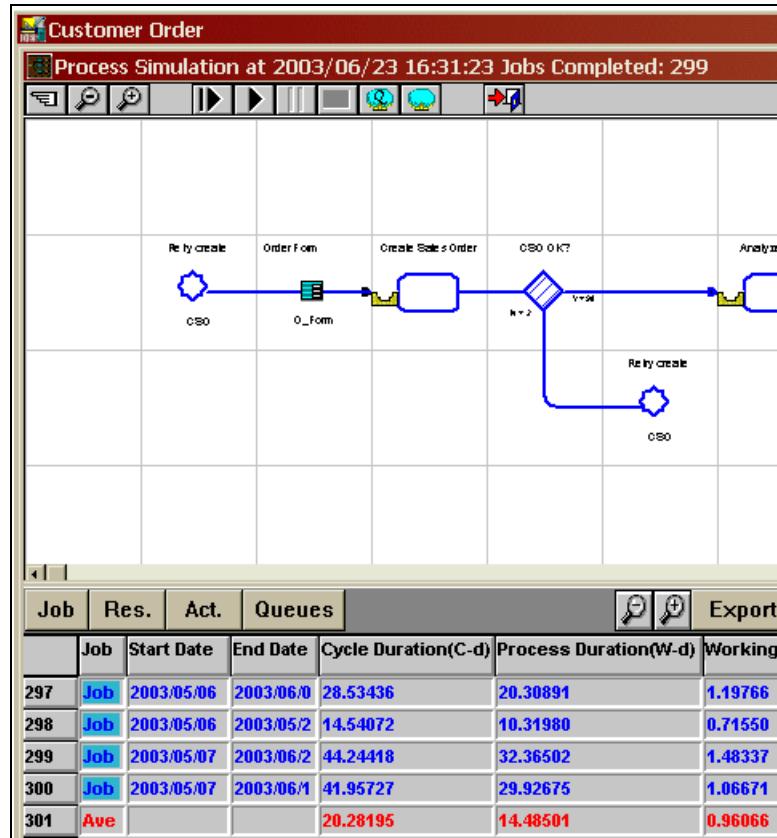


Figure 6-13 Simulation validation by running the test template: jobs details average

17. The cycle duration average is 20.28 days for one job. It is not realistic because the quantity of resources affected to perform the task doesn't take into account temporary resources hired to increase the customer order process capacity depending of quarter peak of production.
18. The organization described and recorded in the repository reflects only the regular people of the company.

We will see further in this chapter how to adapt the resources to calibrate the process to the right capacity to meet its industrial performances and objectives.

To come back to the model validation, we are not too concerned by the values but more by the fact that the model behavior is consistent.

19. In the same screen of job details, on the right, the **Total Costs (\$)** column contains cost value for each job depending of their resource consumption during their dynamic paths in the model.

That means that roles salaries have been taken into account.

20. Select the **RES** tab to see more in details if the model has correctly managed the set of parameters.

Figure 6-14 shows the details.

Job	Res.	Act.	Queues			Export	Preference			
				Name	Orga	Avail	Max. N	Busy Dura	Idle Time(d)	% Utilization
1	Product Manager	Coun	3.00	3.00000	16.34639	86.40855	15.90813	6.17010	17641.746	3337.40894
2	Order Support	Entry	3.00	3.00000	19.80220	82.95274	19.27129	1.39062	13065.056	3118.84692
3	Warehouse Operator	Entry	3.00	3.00000	26.96428	75.79066	26.24135	11.93046	11052.803	3932.28198
4	Product Analyst	Orde	4.00	4.00000	80.47024	56.53635	58.73458	993.41315	9564.0654	13612.81836
5	Supply Chain Specialist	Proc	1.00	1.00000	27.28248	32.27274	45.81039	998.06189	3173.4858	2682.77563
6	Accountant	Acco	1.00	1.00000	0.26310	33.98855	0.76812	0.06024	7930.6621	61.38902
7	Carrier	War	1.00	1.00000	19.34524	40.20998	32.48286	229.51141	2412.5988	1160.71326
8	Alteration Operator	Entry	1.50	1.00000	21.00000	68.33282	23.50760	58.83381	5694.4023	1750.00037
9	CPC Operator	War	1.00	1.00000	17.14286	42.41236	28.78481	22.44506	2686.1162	1085.71484
10	Shipping Operator	Distr	1.00	1.00000	7.55952	51.99569	12.69330	2.02020	3466.3796	503.96881

Figure 6-14 Simulation validation by running the test template: resources details

This screen allows to verify that the number of resources set up in the template has been used and that the maximum of resources, reference the 4th column, has been used to process the jobs queue of the tasks.

A very useful column in this screen is the **RST (d)** one. It is the resource shortage time in days which represents the total of time that tasks were pending for this resource for all paths of all jobs. This is due to resource shortage or difference between task, simulation and resource calendars.

The RST low value 0.06024 for the Accountant is coherent because only one task, called notify accountant, consumes one accountant resource and, furthermore, the working duration for this task has been set up to 1 minute because done automatically by the system.

We will come back later on how to use this column to detect bottlenecks and to perform “what if” analysis by changing resources quantities or calendars.

Pursuing the analysis to check if the model handle properly the jobs dynamic, go to the **Act.** (activity) tab to access the following screen.

Job	Res.	Act.	Queues			Export	Preference	
	Name	Total Du	Working	A-Block	R-Block	Total Cost (\$)	Number Completed	Throughput
1	Create Sales Order	0.16306	0.05357	0.09339	0.01607	3335.93750	305.00000	5.04000
2	Analyze Order	1.26512	0.07143	0.19518	0.99851	3624.99219	300.00000	4.03200
3	Reject Order	0.00353	0.00002	0.00113	0.00236	0.19039	47.00000	0.50400
4	Initiate PR Order	1.44012	0.01786	0.30530	1.11696	280.93741	93.00000	1.00800
5	Create Work Order	1.24470	0.07143	0.25599	0.91726	3057.07935	253.00000	2.01600
6	Transport from SG to LV	0.57609	0.01786	0.27359	0.28462	30.00000	28.00000	0.00000
7	Transport from AS to TC	0.43250	0.00595	0.19492	0.23163	42.50003	119.00000	1.00800
8	Transport from SG to TC	0.60288	0.00595	0.25964	0.33728	35.00002	98.00000	0.50400
9	Update Sales Order	0.00683	0.00002	0.00310	0.00371	1.25984	311.00000	2.01600
10	Transport from TC to LV	0.57671	0.02385	0.30651	0.24631	307.85693	215.00000	1.51200

Figure 6-15 Simulation validation by running the test template: activities details

First, we are concerned by the quantities of jobs processed and the corresponding inputs and outputs at different level in the model.

For that we will closely analyze the **Number Completed** column associated to the tasks.

- ▶ In this column we can see that the first task, create sales order (row 1), has processed a total of 305 jobs.
- ▶ This is right because 2% of the orders are rejected and, through the “go to” path, submitted again to the product manager. 2% of 300 is 6 or 5 depending of the calculation rounding.
- ▶ Then, the next task, analyze order, has processed 300 valid jobs as expected.
- ▶ The invoicing and shipping task (row 12) has processed 254 jobs.
- ▶ The sum of the the 98% of the jobs processed by the close work order task (row 13) with the jobs processed by the transport from WH to LV task (row 18) should be equal to these 254 jobs.
- ▶ The calculation gives: 220 (98% of 224) + 35 = 255, which is consistent (allowing for calculation rounding).
- ▶ You will notice that rows were added to reflect what quantity of jobs the invoicing and shipping task have processed. The tasks are on independent paths, meaning that if you count all the paths coming in the invoicing and shipping task is wrong.
- ▶ However, the jobs coming from the transport from WH to LV task (row 18) are the feature codes (not machines) already tested. All the other jobs are going to the test task and generate a work order to be closed in parallel. For example, it is the case of the jobs from the clean pack and cover task and the

close work order task; they are included in the close work order task jobs and represent the physical C machines with their associated administrative work orders to be processed in parallel.

- ▶ Another verification can be done with the check supply task (row 23) which has processed 258 jobs.
- ▶ The jobs processed by the create work order task (row 5) plus 5% (reference to the PR OK? decision) of the jobs processed in the first utilization of the parts replenishment subprocess, should be equivalent to these 258 jobs.
- ▶ The create work order task (row 5) has processed 253 jobs. To find the quantity processed in the first utilization of the parts replenishment subprocess, one way is to add the jobs processed by the first OK and NOT OK (rows 30 and 31) tasks you will find in the tasks list, which gives: $81 + 12 = 93$. 5% of 93 is 4 to be added to 253, giving 257 jobs.
- ▶ These numbers are consistent when taking into account the statistical distributions and rounding calculations in the details results.
- ▶ Also, the 93 jobs, as the sum of the jobs processed by the OK and NOT OK (row 30 and 31) tasks, are equal to the initiate PR order task (row 4) quantity.

The parts replenishment subprocess logic is valid.

We stop the verifications for quantities here.

Important: Other checks can be done but the message is to spend time to be sure of the numbers produced by the simulation. A business analyst has to be confident with his model and the numeric results obtained prior to engaging company decision makers by using the results issued from the tool calculations.

It is a very critical step and it must never be bypassed.

The last tab, **Queues**, shows the queue behavior for each task measured by the maximum and the average numbers.

Job	Res.	Act.	Queues				Ex
	Task		Max. Queue	Avg. Queue	Avg. Queue Duration(C)		
1	Create Sales Order		8.00000	2.00000	0.05907		
2	Analyze Order		39.00000	18.00000	0.56413		
3	Reject Order		1.00000	1.00000	0.05587		
4	Initiate PR Order		15.00000	6.00000	0.58032		
5	Create Work Order		27.00000	12.00000	0.56190		
6	Transport from SG to LV		3.00000	1.00000	0.13740		
7	Transport from AS to TC		5.00000	2.00000	0.15228		
8	Transport from SG to TC		10.00000	2.00000	0.18260		
9	Update Sales Order		4.00000	1.00000	0.03302		
10	Transport from TC to LV		13.00000	3.00000	0.19984		

Figure 6-16 Simulation validation by running the test template: queues details

This tab is useful to quickly detect bottlenecks characterized by a high number in the queue. Here we have the analyze order task with an average of 17 jobs in the queue for the product analyst.

Also, other tasks related to the order support or the supply chain specialist are high. We will see in the next section some “what if” analysis to solve bottlenecks.

We can conclude on the model validation. The flow of the jobs, the logic, the resource consumption, the calendars and the results, are coherent.

The customer order process can be considered as ready to be used for “what if” scenarios analysis.

6.2 What if analysis

Before we start simulation scenario analysis, create a second template, called template 2, following the same steps described previously for the test template. First, set up in this template the exact same parameters of the first template

- ▶ Starting date April, 1st 2003
- ▶ 300 jobs to process
- ▶ Same resource quantity (resource allocation tab).

6.2.1 Capacity baseline

Before we test different scenarios, we can ask the model to give us, with the resources in place, what is the capacity of the end-to- end business process in

terms of quantity of products shipped for a production quarter. The idea is to saturate the model by generating a very high number of jobs for a production quarter.

To do so, after we have created the template 2:

1. Click on the **Simulation Setup** button on the tool bar and set the parameters as follows:
2. In the **General** folder:
 - Deselect Disable Maximum Duration
 - Set the Maximum Duration at 13.00 Weeks, to reflect the second production quarter duration

The screen shows the following:

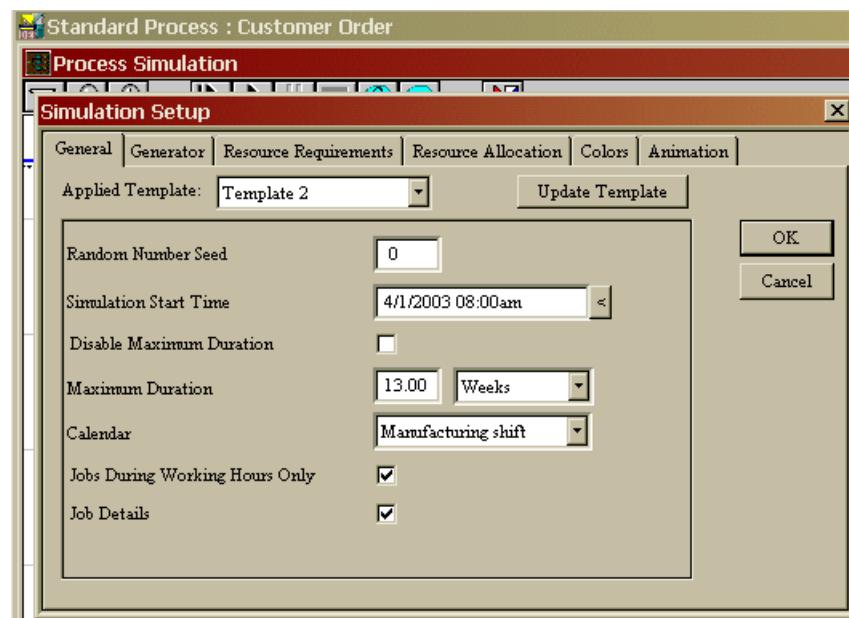


Figure 6-17 What is analysis: maximum capacity general tab

3. Click on the **Update Template** button to record the changes.
4. In the **Generator** folder set up:
 - Total Number of Jobs to Create: 1500.

This number is widely over the business process capacity because in the previous sections with the test template 1, the simulation ended in June.

If we multiply by 5 the quantity of jobs to be processed, we are sure to generate more jobs than the process is able to complete in a quarter. Hence, we will get the maximum number of jobs completed by the last task (invoicing and shipping) meaning the maximum of machines really shipped.

5. Click on the **Update Template** button then **OK** to record the changes.
6. We run the simulation and click on the **Act.** tab to access the details on the number completed jobs by task as shown in the following figure.

Job	Res.	Act.	Queues			Export	Preference	
	Name	Total Du	Working D	A-Block	R-Blocked	Total Cost (\$)	Number Completed	Throughput(
5	Create Work Order	1.86438	0.06685	0.09048	1.70704	3890.82373	344.00000	2.01600
6	Transport from SG to	0.11220	0.01786	0.00000	0.09435	34.28571	32.00000	0.00000
7	Transport from AS to	0.03105	0.00544	0.00000	0.02560	58.57148	179.00000	1.00800
8	Transport from SG to	0.05671	0.00546	0.00000	0.05125	47.85718	146.00000	1.00800
9	Update Sales Order	0.04060	0.00002	0.03379	0.00679	1.74191	430.00000	3.02400
10	Transport from TC to	0.04976	0.02377	0.00000	0.02597	380.98843	267.00000	1.51200
11	Clean Pack and Cover	0.40192	0.35714	0.00000	0.04478	1266.66577	56.00000	0.50400
12	Invoicing and shipping	0.03831	0.02966	0.00000	0.00865	638.88977	323.00000	2.01600
13	Close Work Order	0.18429	0.07159	0.10901	0.00367	3078.75000	273.00000	2.01600
14	Notify Accountant	0.00470	0.00119	0.00323	0.00028	73.61128	265.00000	1.51200

Figure 6-18 What if analysis: maximum capacity

The maximum of products that the customer order process is able to produce in one quarter, with the regular employees available, is deducted from the number of jobs completed by the shipping and invoicing task (row 12), which is: 323.

6.2.2 Cycle time and resources baseline

In this section we have to adjust the resources, and some business rules if any, to get product shipments and associated cycle time consistent with the real operations.

Current situation analysis

As we have seen in the previous simulation with the test template 2 saturating the process, the cycle time duration with the current regular employees structure in place is around 14 days.

In fact, the industrial performance objectives for this production of used machines is at 5 days for products C and 7 days for products A and B.

If we analyze the simulation test template 2 outputs we have done with 1500 jobs, and specifically the outputs regarding the resources, the RST (resource shortage time) for the roles product analyst and supply chain specialist are in a ratio of 10 to 1000 compare to the other RST resources. See the following figure of the resource folder showing these results on rows 4 and 5.

Job	Res.	Act.	Queues			Export	Preference			
	Name		Organization Unit	Avail	Max. Nu	Busy Durati	Idle Time(d)	% Utilizati	RST(d)	Idle Tim
1	Product Manager		Country Sales	3.00	3.00000	39.08702	72.34155	35.07810	17.07710	14769.7
2	Order Support		Entry Audit Alter	3.00	3.00000	25.11905	86.30952	22.54273	1.48966	13593.7
3	Warehouse Operator		Entry Audit Alter	3.00	3.00000	38.00000	73.42857	34.10257	5.18607	10708.3
4	Product Analyst		Order Managem	4.00	4.00000	147.81915	0.75228	99.49366	3415.12915	127.2609
5	Supply Chain Specialist		Procurement	1.00	1.00000	32.91681	32.10105	50.62733	1089.33167	3156.60
6	Accountant		Accounting	1.00	1.00000	0.31548	36.82738	0.84936	0.07690	8593.05
7	Carrier		Warehouse	1.00	1.00000	27.07006	37.94780	41.63481	62.09891	2276.86
8	Alteration Operator		Entry Audit Alter	1.50	1.00000	31.23809	66.28669	32.03027	22.61994	5524.05
9	CPC Operator		Warehouse	1.00	1.00000	20.06548	44.95238	30.86148	2.50869	2846.98
10	Shipping Operator		Distribution	1.00	1.00000	9.61310	55.40476	14.78532	2.79460	3693.65
11	Test Operator		Total	2.50	2.00000	65.72502	86.00002	49.44470	44.20222	8032.40

Figure 6-19 What if analysis: Resources RST

The average queue of jobs confirms also, for the tasks performed by these roles, that they are overloaded.

Scenarios simulations

To find the right resources settings, we need to test several scenarios.

All the following simulations will be performed with the same time frame and job parameters to be able to compare the results:

- ▶ Second production quarter start date: 04/01/2003
- ▶ Maximum duration: 13 weeks, to end on 06/30/2003
- ▶ 1500 jobs

Then we will analyze the jobs cycle average duration and the resource shortage time (RST) of the following main roles:

- ▶ PA: Product Analyst
- ▶ SCS: Supply Chain Specialist
- ▶ Carrier
- ▶ Alteration operator
- ▶ Test operator.

The other roles RST (CPC, Invoicing and shipping operators) will be checked if their RST increased enough to be considered as a bottleneck.

Then, the RST will be analyzed against the number of jobs completed at the invoicing and shipping task representing the number of machines shipped.

See the next table showing the results of the first scenario results with the current scenario:

Table 6-2 First scenario results

	Cycle duration (average)	PA (RST)	SCS (RST)	Carrier (RST)	Alter. (RST)	Test (RST)	Shipments (Invoicing & shipping)
Scenario 1	14,98	3415	1089	62	22	11	323

The product analyst has the higher RST and can be considered a bottleneck.

The second scenario is to allocate 5 resources instead of 4 to this role. To do so:

1. Click on the **Simulation Setup** button
2. Click on the **Resource Allocation** tab and change the value to 5 in the **Allocated** column of the product analyst resource.
3. Click on the **Update Template** button to record the change and then **OK** to close the simulation setup window.
4. We then run the simulation, the simulation results give:

Table 6-3 Second scenario results

	Cycle duration (average)	PA (RST)	SCS (RST)	Carrier (RST)	Alter. (RST)	Test (RST)	Shipments (Invoicing & shipping)
Scenario 2 - PA=5	5,44	278	2161	95	22	11	384

The product analyst RST falls down and the supply chain specialist becomes the next bottleneck.

The third scenario will increase the SCS to 2 instead of 1 in the current organization. That will have to effect, in conjunction with the setting of the product analysts to 5, to free more jobs into the customer order process.

Proceed with the same steps described previously to change the resource allocation of the SCS and run the simulation for what we will call the third scenario.

Table 6-4 Third scenario results

	Cycle duration (average)	PA (RST)	SCS (RST)	Carrier (RST)	Alter. (RST)	Test (RST)	Shipments (Invoicing & shipping)
Scenario 3 - PA=5 - SCS=2	5,01	898	315	292	67	195	526

Shipments have increased of 30%, but as we have more jobs to process by the production resources, the carrier RST is showing that. The third scenario will effect the manufacturing people resources. As already said, temporary people are hired to allow to improve capacity peak during the quarter.

The fourth scenario will set the allocated resources as follow:

- ▶ Carrier: 2
- ▶ Alteration operators: 2.50
- ▶ Test: 3.5

The fourth scenario gives the following results:

Table 6-5 Fourth scenario results

	Cycle duration (average)	PA (RST)	SCS (RST)	Carrier (RST)	Alter. (RST)	Test (RST)	Shipments (Invoicing & shipping)
Scenario 4 - PA=5 - SCS=2 - Carrier= 2 - Alter. op.=2.5 - Test op.=3.5	4,81	679	123	31	11	29	551

The customer order process is now able to process the jobs in an average cycle under 5 days, which is the target objective for performance.

The product analyst has again the higher RST. We can test a scenario with six resources allocated to this role, but we have to consider that it is a high skill and certainly not so easy to find or to educate. It is a costly solution, but simulation will help us to find the right level of resources we will have to recommend to management and we need to verify the impact of six people in this role.

So, the fifth scenario is the same as the fourth, with a PA resource set up to six. The fifth scenario gives the following results:

Table 6-6 Fifth scenario results

	Cycle duration (average)	PA (RST)	SCS (RST)	Carrier (RST)	Alter. (RST)	Test (RST)	Shipments (Invoicing & shipping)
Scenario 5 - PA=6 - SCS=2 - Carrier= 2 - Alter. op.=2.5 - Test op.=3	3,03	107	191	30	14	44	507

Cycle duration is now around 3 days but shipment quantity has decreased. If we check the queues, we can see the clean pack and cover operator having now an average of 21 jobs waiting to be processed. What we have improved with the fourth scenario has been affected with the 5 hours duration for CPC operations on products C.

Based on these five scenario results, it seems that the fourth scenario is the most representative business process resource configuration between resources allocations and maximum shipments.

But we can try another strategy to solve the capacity problem by changing the resource allocation combined with a calendar change for certain categories of employees. If we consider the supply chain specialist activities, he is receiving parts replenishment forms from the product analysts but also from the production line working in manufacturing shifts. As the goal of his role is to provide parts to complete the customer orders, his working calendar should be synchronized with his final internal customers: alteration, test and warehouse operators. Also, the supply chain specialist RST is always at a three digit number level and we can surmise that the PR forms issued by the operators early in the morning and late in the evening, are waiting on the supply chain specialist resource to be processed. So we can try a sixth scenario by setting back the product analyst resource to four, but with one supply chain specialist working in shifts (meaning 2 people).

To do so, we go back to the ADF window, open the parts replenishment subprocess to change the calendars of the supply chain specialist tasks. Double click on the following tasks and change the calendar setting to manufacturing shift:

- ▶ Scan for parts
- ▶ Order parts
- ▶ Update PR form
- ▶ OK and NOT OK

The sixth scenario gives the following table of results:

Table 6-7 Sixth scenario results

	Cycle duration (average)	PA (RST)	SCS (RST)	Carrier (RST)	Alter. (RST)	Test (RST)	Shipments (Invoicing & shipping)
Scenario 6 - PA=4 - SCS=1 (shift) - Carrier= 2 - Alter. op.=2.5 - Test op.=3	14,21	3390	126	9,8	4,25	8	386

Compare this to the third scenario, when the supply chain specialist resource has been set up to two people, the supply chain specialist RST is three times lower. The shift calendar for this role seems a good strategy but we need to increase the product analysts resources to verify it. and to be able to have the cycle duration around the five days objective.

The seventh scenario gives the following with PA set up at 5:

Table 6-8 Seventh scenario results

	Cycle duration (average)	PA (RST)	SCS (RST)	Carrier (RST)	Alter. (RST)	Test (RST)	Shipments (Invoicing & shipping)
Scenario 7 - PA=5 - SCS=1 (shift) - Carrier= 2 - Alter. op.=2.5 - Test op.=3	4,91	702	281	25	11	49	549

It shows that this scenario gives the same shipments rate as the fourth scenario.

Management will have two possibilities to manage the business process capacity between increasing of resources and working calendar changes on certain employees categories.

The next picture summarizes all the scenario results on one curve chart to better illustrate the results and the capacity solving.

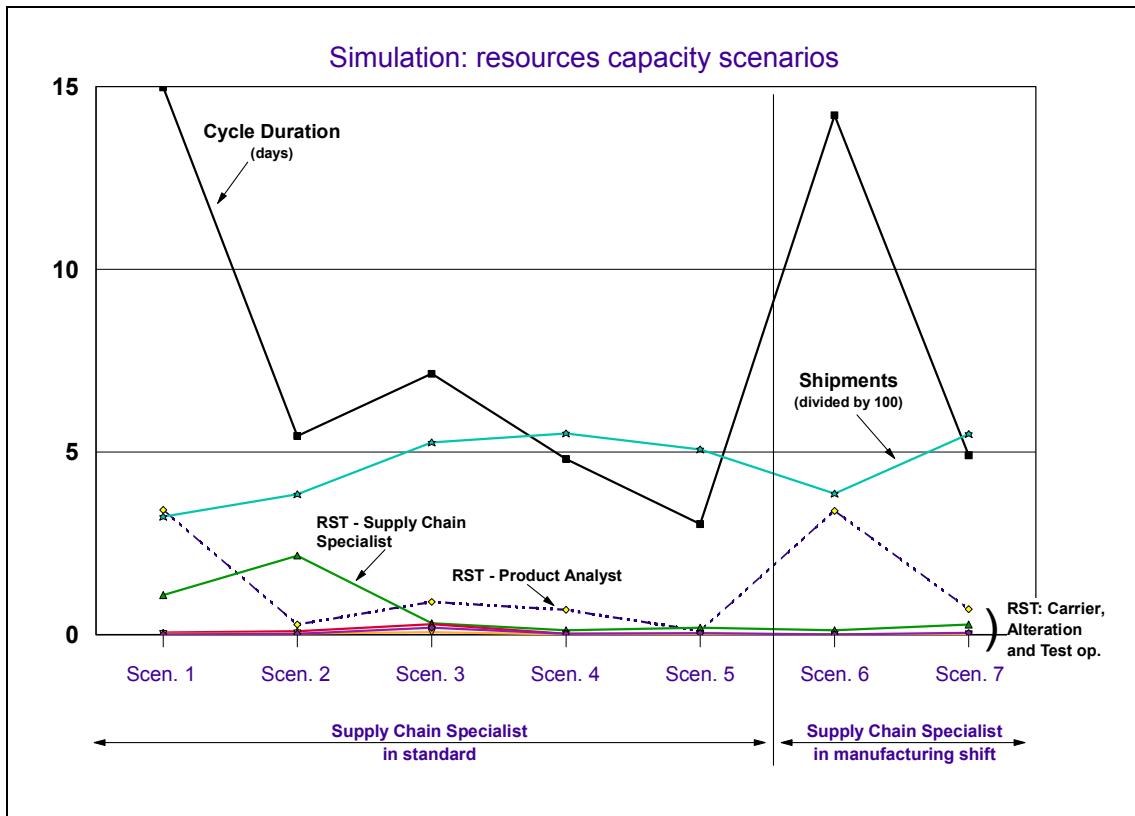


Figure 6-20 Simulations scenarios results

6.3 Simulation conclusions

We have seen in this chapter the steps to validate a business process from the process model validation in the Workbench to the dynamic behavior through simulation scenarios.

This step is very important before we enter in the automation phase and specifically in the design of the business measures and the overall flow of the more complex flows. Validation and simulations give a preview on how the parameters of the model interact with others. It will be the basis for defining what type of indicators the management will need to monitor through the monitoring module to adapt their process to environment changes.



Business measures

This chapter describes the steps to define business needs measurements, set them up into the workbench model, until their realization through the Monitor based on real case study execution data.

7.1 Understand business measurements needs

A business process deployment is fully achieved only if an associated feedback loop exists. When we talk about a feedback loop, it is not only necessary to trace an indicator, but also to set a target versus business objectives and to insure that a business process owner has implemented a management system to perform the following activities on a regular basis:

1. Review the results
2. Analyze the trend, and detect out of target situation
3. Assign responsible to develop plan of actions to recover the performance
4. Verify process correction efficiency
5. Translate problems in business process practice to be improved, in fact, to maintain a permanent re engineering movement

All these ingredients are necessary to perform business process adaptability to environment changes and take maximum benefits from the investment spent in a such an exercise.

The Monitor allows us to define and build indicators and will greatly support the first two activities activities of the management system. It automates indicators in real time. Hence, this business process behavior measurement capability enables the feedback loop and gives the right visibility to management to take decisions and decide process improvement.

Consequently, it is necessary to meet the management team involved in the business execution and discuss with them what type of indicators they want to keep for their business.

The following table summarizes a list of measurements agreed by the managers operating the business process case study.

The measurements starting and ending points into the process are expressed with the workbench wording.

Measurement cycle	Process
Global cycle: all products, all sources	- From “Add Supply info” before starting - To “Parts closure” (by requester) before finishing

Measurement cycle	Process
Global cycle: internal sources	- From “Add Supply info” before starting - To “Parts closure” (by requester) before finishing
Global cycle: external sources	- From “Add Supply info” before starting - To “Parts closure” (by requester) before finishing
Analyze Supply cycle	- From “Add Supply info” before starting - To “Authorize Order” (by Product Analyst) before starting including “no possible sourcing” responses)
Replenishment cycle: all products, all sources	- From “Order” (by Supply Chain Specialist and Sales rep.) after finishing - To “Add reception info” (by DB admin) before finishing
Replenishment cycle: external sources	- From “Order” (by Supply Chain Specialist and Sales rep.) after finishing - To “Add reception info” (by DB admin) before finishing
Activity measurement	- Quantity per day of new and closed items

When measurements have been established between the operational managers and the business analyst, they can be set up into the workbench model.

7.2 Set up a simple measurements

The main process containing most of the activities is the Parts Replenishment process, so we will start there. Open the ADF of this process.

In the previous list of measurements agreed with managers, we start with a simple cycle to measure between two activities, the **Analyze Supply cycle**, starting from the beginning of the process when a parts request is initialized, until the supply has been ordered by the Supply Chain Specialist. As previously described in the table first we need to set up the starting and ending points of this measure.

The method used in the case study is to perform the following steps:

- ▶ Set up the two locations corresponding to a metric.

- ▶ Set up data to be captured through a business measure for each location. This measure will be used as a metric.
- ▶ Associate business measure / metric to its corresponding location.
- ▶ Build the cycle measurement by associating the two previous business measures / metrics through an expression.

7.2.1 Set up business measure / metric and associated locations

The first point of measure is the beginning of the process. Due to pre-defined metrics and locations available in the workbench to capture this event, the first business measure / metric of the **Analyze Supply cycle** can be fully set up in the Business Measure dialog box.

1. Go to **Process -> Business Measures -> Business Measures**.
2. In the dialog box, as the name, enter **Process_Start_Date_Time**.
3. Check mark the **Use As Metric** box.
With this parameter on, this starting point will be common to several cycle measurement as the starting point of the process and will be available for expressions to calculate cycles.
4. Choose the **CURRENT_TIME** in the Metric field, and, for the location, select **PROCESS_START**, they are pre-defined **Metric** and **Location**.
This business measure / metric will capture the current time of the initialization of a parts request. Figure 7-1 shows all the settings in the **Business Measures** dialog box. Notice that the business measure **Type** changes to **DATE&TIME** in the top grey field.

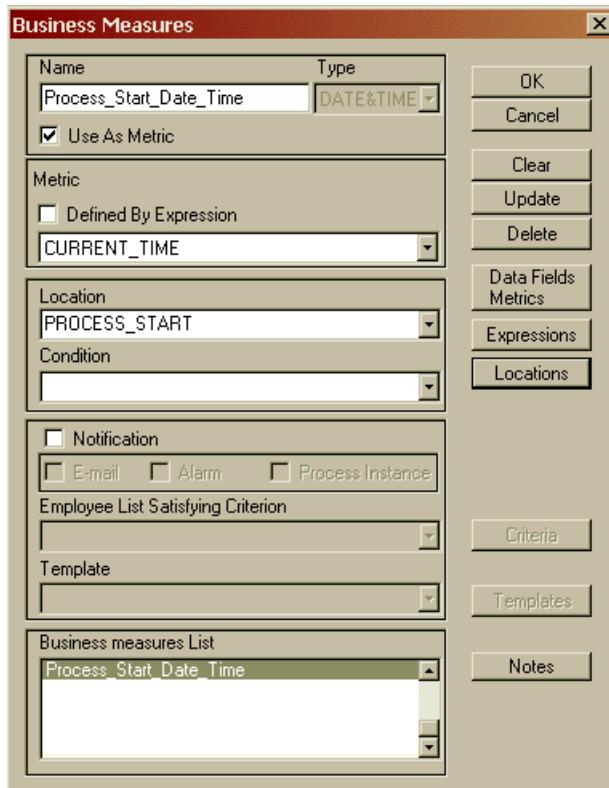


Figure 7-1 Set up a simple measurement - Part1

5. Click **OK** to record this measure.

For the second part of the cycle measurement, we need to set up a business measure / metric and a specific location in the process. First, we start with the location setting.

1. Go to **Process -> Business Measures -> Locations**
2. Enter **Before_Authorize_Order_PA** as a **Name**.
3. Check mark the **Specify** box to specify exactly where the location is in the process.
4. In the **Name** column select the **Authorize Order--00** in the list of activities. The **Authorize Order -00** (not 01) activity corresponds to the activity allocated to Product Analyst, the one we are interested in for this measurement.
5. Click in the **State** column and select **Before starting**.

Figure 7-2 shows this location setting.



Figure 7-2 Set up a simple measurement - Part 2

6. Click on **OK**.

Associated with this location, it is now possible to set up a metric to capture the current time at this point.

7. Go to **Process -> Business Measures -> Business Measures**.
8. Enter **Authorize_Order_PA_Time** as the name of the business measure / metric.
9. Check mark **Use As Metric**, choose **CURRENT_TIME** pre-defined metric in the **Metric** window.
10. Select the **BEFORE_AUTHORIZE_ORDER_PA** location.

Figure 7-3 shows the settings for this measure.

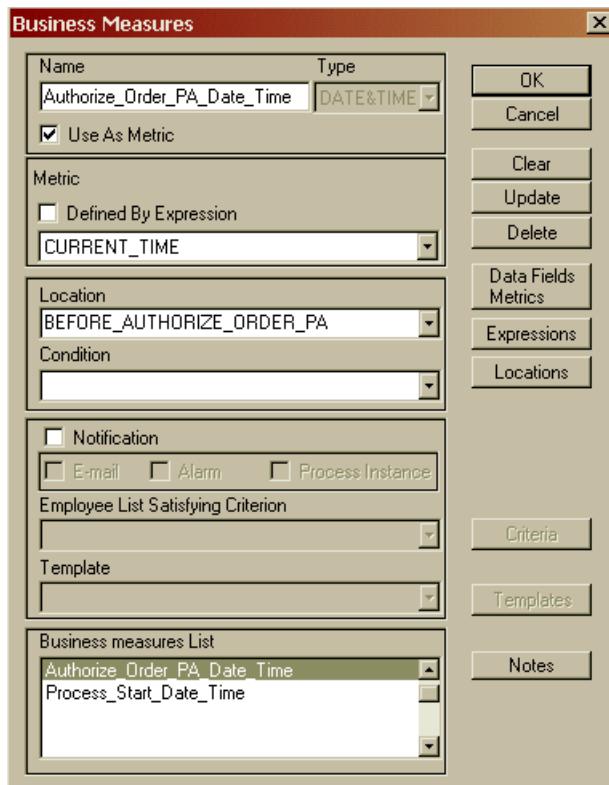


Figure 7-3 Set up a simple measurement - Part 3

The two business measures / metrics to calculate the **Analyze Supply cycle** measurement points are now defined. The cycle time **Analyze Supply cycle** can be calculated between them.

First, we need to set up an expression.

11. Go to **Process -> Business Measures -> Expressions**.
12. Enter **Exp_Analyze_Supply_Cycle** as the expression name.
13. In the **User Defined Metrics** window the two metrics previously set up are listed.
14. Put the cursor in the bottom **Expression** box and double click on the **Authorize_Order_PA_Date_Time** in the User Defined Metrics to copy it into the bottom box.
15. Then type the minus sign “-” .
16. Double click on the **Process_Start_Time** metric.

Figure 7-4 shows the expression.

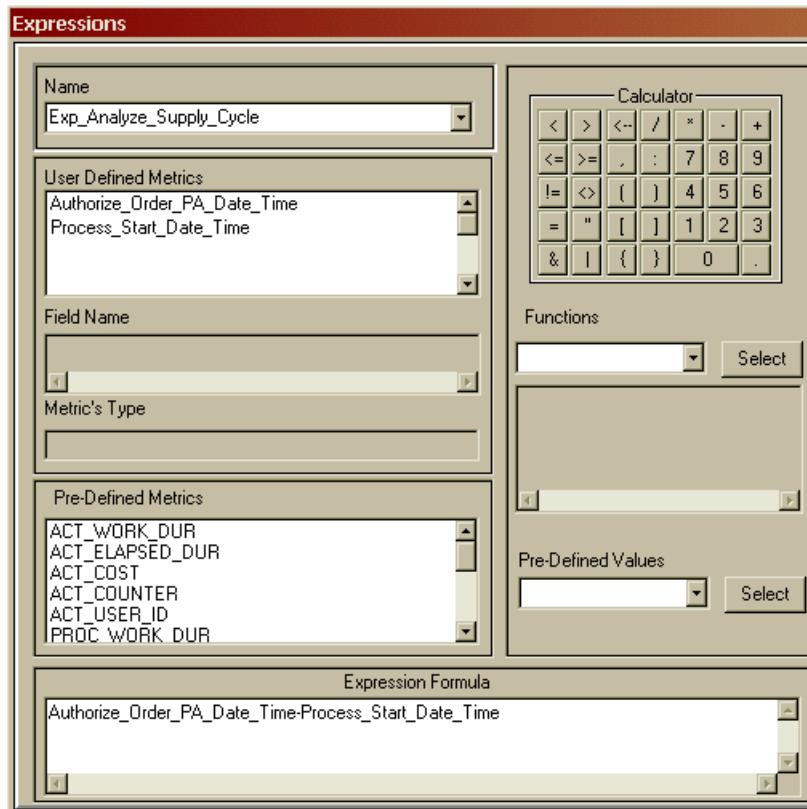


Figure 7-4 Set up a simple measurement - Part 4

7.2.2 Set up final business measure

The cycle time **Analyze Supply** will use the previous expression and will be the difference between the current time when a part will be ready to be ordered and the parts request initialization.

Now all the elements are present to finalize the setting of this cycle time.

1. Go to **Process -> Business Measures -> Business Measures**.
2. Enter **Analyze_Supply_Cycle** as the name of the measurement.
3. Check mark the **Defined By Expression** box.
4. Select the expression **Exp_Analyze_Supply_Cycle**.
5. In the **Location** field, select **PROCESS-END** in the list.

By choosing this last parameter means that the measurement will be calculated at the end of the process, when the process instance in WebSphere MQ Workflow has completely finished. Notice that the business measure **Type** has changed to **DURATION** in the top right grey field.

The following figure shows the finalization of the **Analyze Supply cycle** business measure setting.

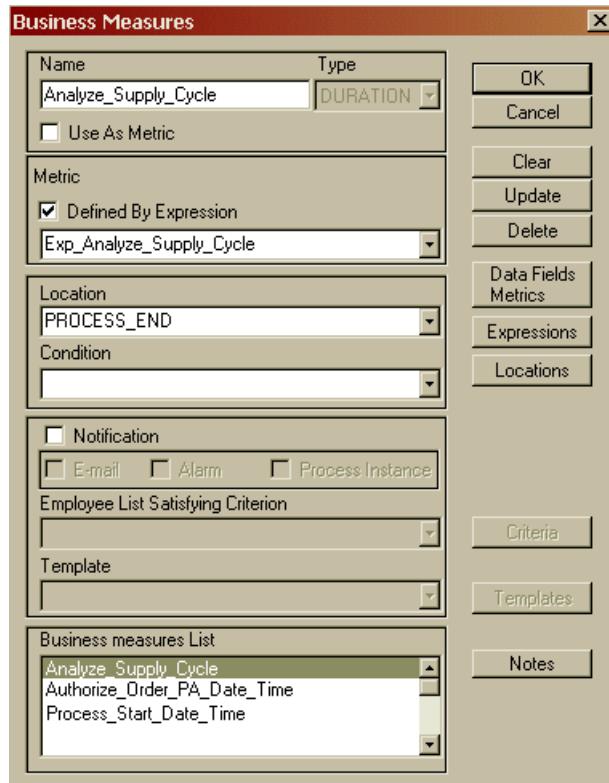


Figure 7-5 Set up a simple measurement - Part 5

7.3 Set up a complex measurement

For complex measurements, we need to understand that we will need to assemble several simple business measures to build one complex measure.

It is the case for the **Global cycle** measurements which will be the maximum time spent by a part request among the different parts to be replenished to

complete a work order. We don't need to include accounting and invoicing reconciliations in these cycles.

Also, as we need to measure the global cycles for internal and external sources, the global cycle will be a combination of the two. The following expression will be the final one for the **Global cycle all products, all sources**:

Max (Global_Cycle_External , Global_Cycle_Internal)

For each of the internal and external cycles we apply the same logic. They will be the maximum cycle of a part to be replenished among the parts requested for a work order. They have to be specific to locations corresponding to internal and external sources.

7.3.1 Set up the global internal and external cycles

The steps are the same used to set up a simple measurements except that we have to define the specific locations needed for the internal and external cycles measurements:

- ▶ Set up the two locations corresponding to a metric.
- ▶ Set up data to be captured through a business measure for each location. This measure will be used as a metric.
- ▶ Associate business measure / metric to its corresponding location.
- ▶ Build the cycle measurement by associating the two previous business measures / metrics through an expression.

Locations

The internal sources are RMER, SALES and MOP. For these, three locations need to be setup.

1. Go to **Process -> Business measures -> Locations**.
2. Set the locations with the parameters shown in Table 7-1.
3. Repeat for ROC used, ROC new, DUB and OTHER for those relative to the external sources.

Table 7-1 New locations

Location Name	Activity name	Activity state
Global internal cycle		
AFTER_ORDER_CLOSURE_RMER	Oder closure--00	Before finishing
AFTER_ORDER_CLOSURE_SALES	Oder closure--01	Before finishing

Location Name	Activity name	Activity state
AFTER_ORDER_CLOSURE_MOP_NEW	Order closure--03	Before finishing
Global external cycle		
AFTER_ORDER_CLOSURE_ROC_USED	Order closure--02	Before finishing
AFTER_ORDER_CLOSURE_DUB_NEW	Order closure--04	Before finishing
AFTER_ORDER_CLOSURE_ROC_NEW	Order closure--05	Before finishing
AFTER_ORDER_CLOSURE_OTHER	Order closure--06	Before finishing

When the locations are defined, metrics to capture the current time at the locations is the next step. These metrics don't need specific expressions to capture the event, the **CURRENT_TIME** pre-defined metric is the one needed for this parameter.

Metrics

1. Go to **Process -> Business Measures -> Business Measures**
2. Set the following items as shown in Table 7-2.

Table 7-2 Business measure / metric name

Business measure / metric name	Use As Metric	Metric	Location
Global internal cycle			
Order_Closure_RMER_New_Date_Time	on	CURRENT_TIME	AFTER_ORDER_CLOSURE_RMER
Order_Closure_SALES_Date_Time	on	CURRENT_TIME	AFTER_ORDER_CLOSURE_SALES
Order_Closure_MOP_New_Date_Time	on	CURRENT_TIME	AFTER_ORDER_CLOSURE_MOP_NEW
Global external cycle			
Order_Closure_ROC_Used_Date_Time	on	CURRENT_TIME	AFTER_ORDER_CLOSURE_ROC_USED

Business measure / metric name	Use As Metric	Metric	Location
Order_Closure_DUB_New_Date_Time	on	CURRENT_TIME	AFTER_ORDER_CLOSURE_DUB_NEW
Order_Closure_ROCB_New_Date_Time	on	CURRENT_TIME	AFTER_ORDER_CLOSURE_ROC_NEW
Order_Closure_OTHER_Date_Time	on	CURRENT_TIME	AFTER_ORDER_CLOSURE_OTHER

Expressions

All the elements are set up to allow expressions to be written to calculate the two cycles.

For the internal cycle:

1. Go to **Process -> Business Measures -> Expressions**.
2. Give **Exp_Global_Cycle_Internal** as the name.
3. Enter the following expression in the **Expression** box:

```
Max ( Max ( ( Order_Closure_RMER_Date_Time - Process_Start_Date_Time
) , ( Order_Closure_SALES_Date_Time - Process_Start_Date_Time ) ) ,
( Order_Closure_MOP_New_Date_Time - Process_Start_Date_Time ) )
```

Tip: The function **Max** has been applied twice because it cannot be applied to three variables; only two is allowed.

The longest cycle of all the possible branches that a part request can follow will be captured. It is worth noticing that the previous business measure / metric **Process_Start_Date_Time** is used for starting point of all the branches.

4. Repeat for the global external cycle for the expression **Exp_Global_Cycle_External**.

The function Max has to be set up three times to get the maximum duration among the four variables.

```
Max ( Max ( Max ( ( Order_Closure_DUB_New_Date_Time -
Process_Start_Date_Time ) , ( Order_Closure_OTHER_Date_Time -
Process_Start_Date_Time ) ) , ( Order_Closure_ROC_New_Date_Time -
Process_Start_Date_Time ) ) , ( Order_Closure_ROC_Used_Date_Time -
Process_Start_Date_Time ) )
```

Once done, set the global internal and external cycles business measures as shown in the Figure 7-6 and Figure 7-7.

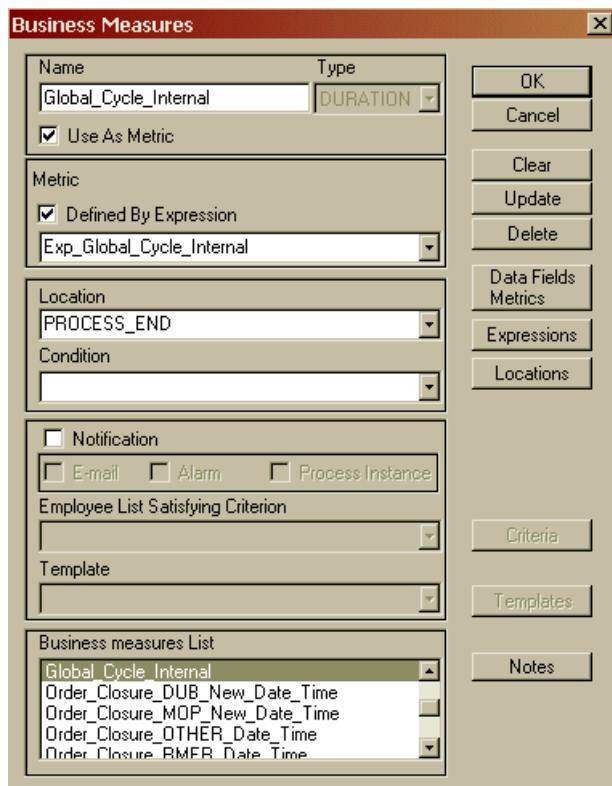


Figure 7-6 Global internal sources cycle business measure

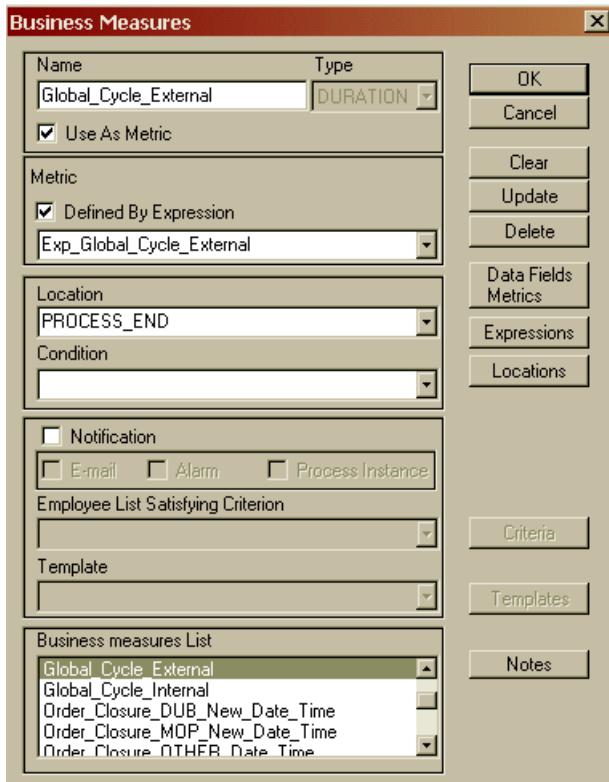


Figure 7-7 Global external sources cycle business measure

Figure 7-8 and Figure 7-9 show the expression and the final setting for the global cycle.

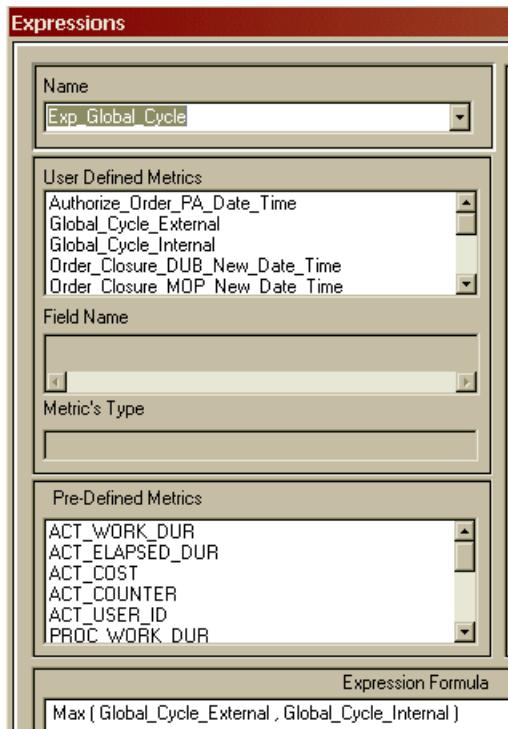


Figure 7-8 Expression for the Global cycle

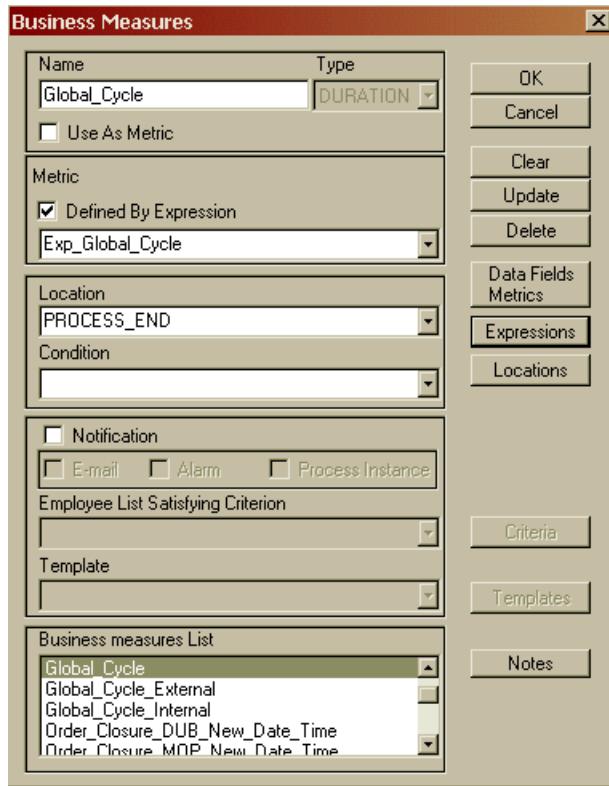


Figure 7-9 Global cycle business measure settings

7.4 Export business measures from Workbench

1. To do this, we do not need to open a process, simply open the organization file.
2. Go to **File -> Import/Export -> Import/Export XML -> Export to Monitor...** of the process.
3. In the dialog box, give a name to the exported file.
4. Click on **Save**.
5. A dialog box appears in which the three processes of the model have to be selected as shown in the next figure.

Process name	Monitor	Process valid from
Order	<input checked="" type="checkbox"/>	12-01-2003 08:00 AM
Work Order	<input checked="" type="checkbox"/>	12-12-2003 08:00 AM
Parts Replenishment	<input checked="" type="checkbox"/>	12-17-2003 08:00 AM
	<input type="checkbox"/>	

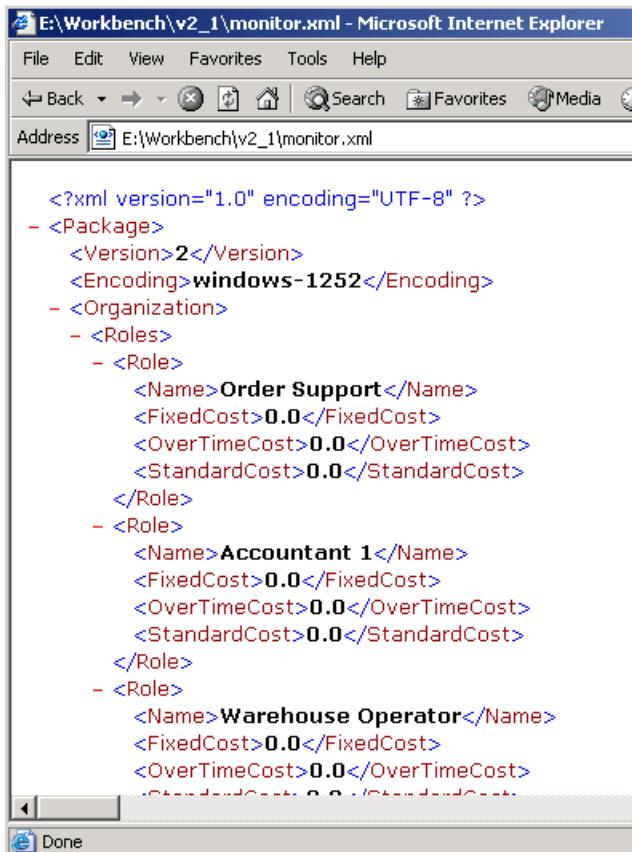
Figure 7-10 Export business measures to Monitor - Part 1

6. Then select the **Export organization Units** tab.
7. Expand all organizations and check mark all the employees.



Figure 7-11 Export business measures to Monitor - Part 2

8. Click on **Save**.
- The XML file created is displayed in a browser window.



The screenshot shows a Microsoft Internet Explorer window displaying an XML document titled "monitor.xml". The XML code defines a package version 2 for windows-1252 encoding, containing an organization with three roles: Order Support, Accountant 1, and Warehouse Operator. Each role has fixed, overtime, and standard costs all set to 0.0.

```
<?xml version="1.0" encoding="UTF-8" ?>
- <Package>
  <Version>2</Version>
  <Encoding>windows-1252</Encoding>
- <Organization>
  - <Roles>
    - <Role>
      <Name>Order Support</Name>
      <FixedCost>0.0</FixedCost>
      <OverTimeCost>0.0</OverTimeCost>
      <StandardCost>0.0</StandardCost>
    </Role>
    - <Role>
      <Name>Accountant 1</Name>
      <FixedCost>0.0</FixedCost>
      <OverTimeCost>0.0</OverTimeCost>
      <StandardCost>0.0</StandardCost>
    </Role>
    - <Role>
      <Name>Warehouse Operator</Name>
      <FixedCost>0.0</FixedCost>
      <OverTimeCost>0.0</OverTimeCost>
      <StandardCost>0.0</StandardCost>
    </Role>
  </Organization>
</Package>
```

Figure 7-12 Export business measures to Monitor - Part 3

9. Close the window.

The export process from workbench is finished.

7.5 Import business measures to Monitor

Before performing this operation, verify that the WebSphere Application Server is started and the Monitor application is running. If you have not already done so, you will first have to create and initialize the database tables for the Monitor. Open a browser and logon using the administrator userid and password.

1. Click on **Create database**.

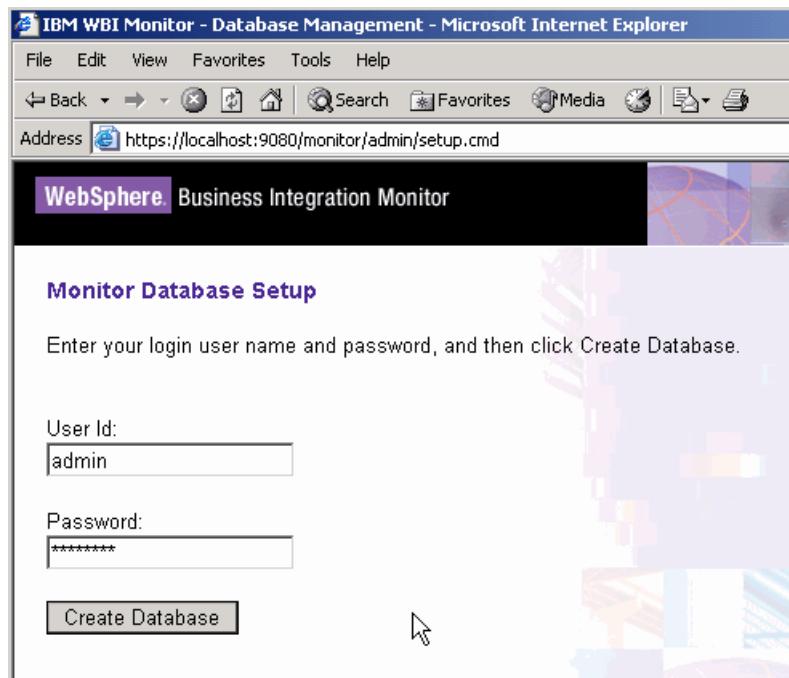


Figure 7-13 Import business measure to Monitor - Part 1

2. Once completed the Monitor administration menu appears.

Tip: It is strongly recommended to stop all Monitor Services before performing any administration action that affects the database or the processes and organization units' definition. Such as:

- ▶ Dropping the database tables.
- ▶ Importing organization xml files
- ▶ Deleting Organization Units, Users or Processes Versions.

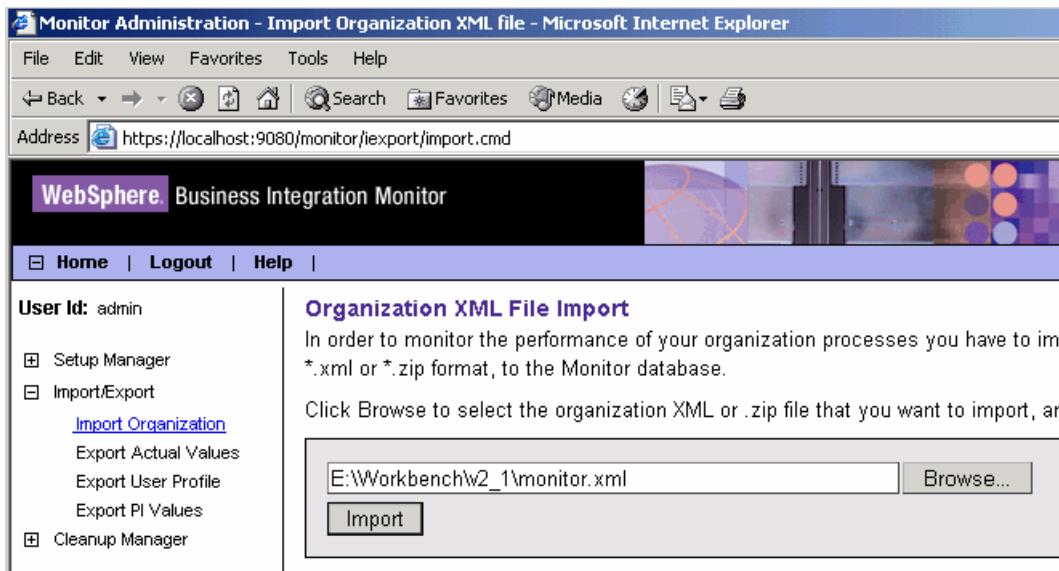


Figure 7-14 Import business measures to Monitor - Part 2

3. Go to **Import/Export -> Import Organization**.
4. Locate the directory to select the XML file previously exported from Workbench.

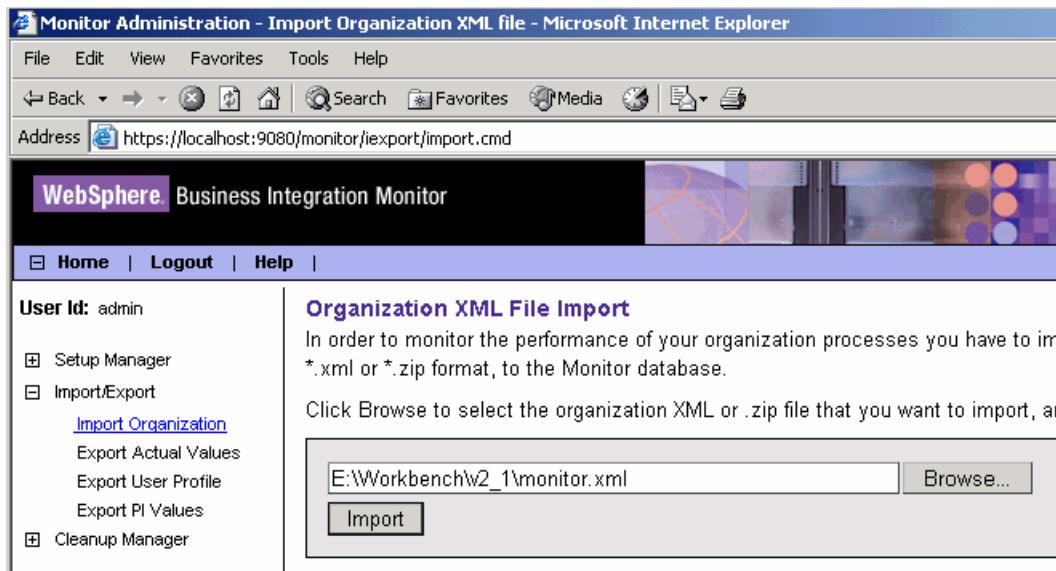


Figure 7-15 Import business measures to Monitor - Part 3

5. Click on the **Import** button.
6. When the following message appears, the import process is completed.

Organization XML File Import

In order to monitor the performance of your organization processes you have to import *.xml or *.zip format, to the Monitor database.

Click Browse to select the organization XML or .zip file that you want to import, an

Status

File import successfully completed.

Figure 7-16 Import business measures to Monitor - Part 4

7. Log off from the Monitor.

We now have the business measures in the Monitor. In the next chapter we will look at these measures in the Monitor and look at some real time monitoring.



Monitoring the runtime

Important: This redbook is a case study of a real-life, business process re-engineering exercise. All references made to IBM WebSphere Business Integration Monitor Version 4.2.3 are provided for illustrative purposes only. They are not intended to be a comprehensive overview of the full functionality and capabilities of the current or future versions of the product.

In this chapter we will start by verifying that the business measures have been successfully imported to the Monitor.

In the run time environment there are different methods available for monitoring current activity, we will have a look at these.

We will also look at some of the historical data that has been collected for analysis using the Business Dashboard (this has been collected since the deployment of the case study application to the user community).

8.1 Verify the business measures

We start by verifying that the import performed in the previous chapter has been successful and what we now see in the Monitor as a result.

1. Logon again to the Monitor and the following menu appears.

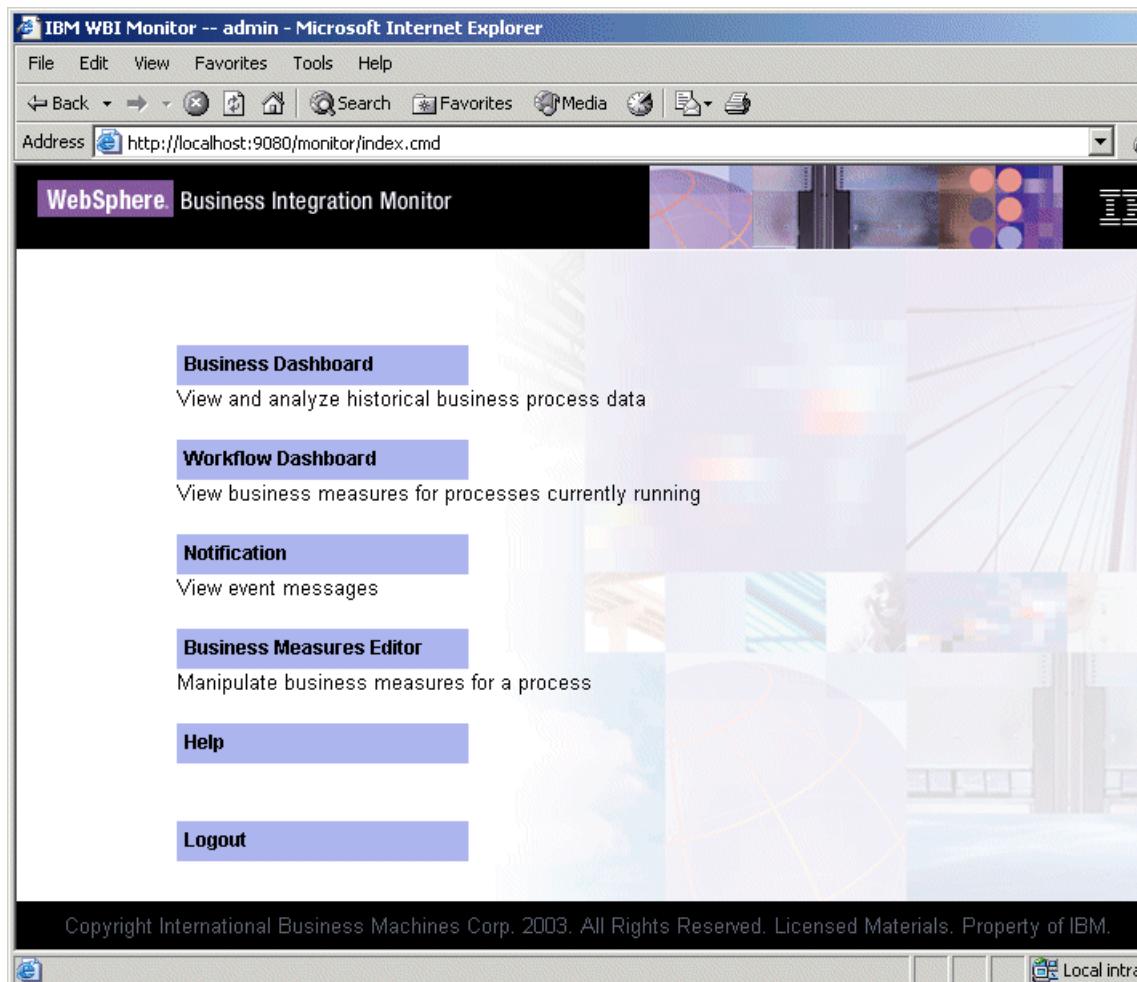


Figure 8-1 Monitor home screen

To verify if all the business measures are available:

1. Click on **Business Measures Editor**.
2. Select the Parts Replenishment process.

3. Click on **Saved business measures**.
4. All the measurements defined into the Workbench are shown.

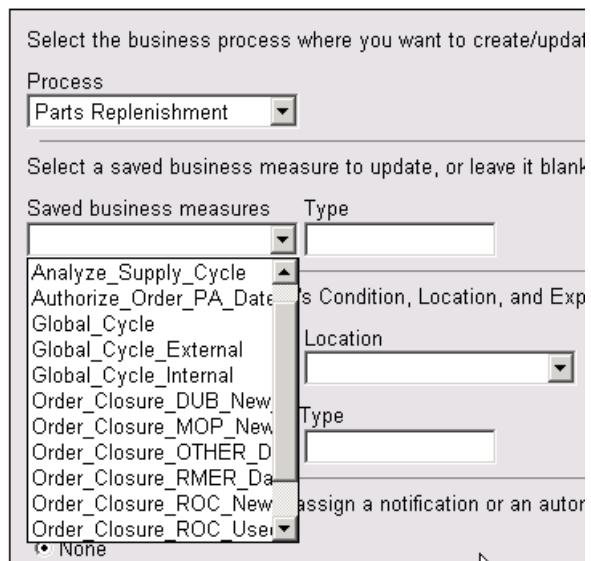


Figure 8-2 Use business measures in Monitor

5. Close the window and by clicking on **Home**.
6. Go back to the Monitor menu and select **Business Dashboard**.
7. Select the Parts Replenishment process.
8. Click on the right button **Business Measures**.
9. All the measures now appear in a window.
10. Select the Analyze_Supply_Cycle business measure

User Id: admin

- Business Dashboard
 - Configuration
 - Views
- Workflow Dashboard
- Notification
- Business Measures Editor
 - [Business Measures](#)
 - Expressions
 - Criteria
 - Data Field Metrics
 - Database Metrics
 - Locations
 - Templates

Business Measures Configuration

Use this page to supply all the data required to define a business measure. You need to define the process where it should be evaluated, and Condition (the condition under which the business measure is to be evaluated).

Select the business process where you want to create/update business measures.

Process

Select a saved business measure to update, or leave it blank to create a new one.

Saved business measures **Type**

Select the business measure's Condition, Location, and Expression/Metric.

Condition	Location
<input type="text"/>	<input type="text" value="PROCESS_END"/>

Expression/metric **Type**

Specify whether you want to assign a notification or an automatic corrective action to the measure.

None

Automatic corrective action
Template

Notification
 Email Alarm
Criteria

Template

Save **Save As**

Figure 8-3 Configuration of business measures

11. Select the expression that was defined in the workbench.

Home | Logout | Help |

User Id: admin

Business Dashboard
Configuration
Views
Workflow Dashboard
Notification

Business Measures Editor
Business Measures
[Expressions](#)
Criteria
Data Field Metrics
Database Metrics
Locations
Templates

Expressions

Build an expression formula to be used as a business measure metric, or as a condition for

Select the business process where you want to create/update/delete expressions.

Process: Parts Replenishment

Select a saved expression to update/delete, or leave it blank to create a new expression.

Expression name: Exp_Analyze_Supply_Cycle Type: Duration

Expand the tree nodes and select metrics and functions to compose the expression formula.

Metrics and functions:

- + User-defined metrics
- + Data field metrics
- + Database metrics
- + Pre-defined metrics
- + Pre-defined values
- + Functions

Metric type:

Selected function's description

Expression:

Authorize_Order_PA_Date_Time - Process_Start_Date_Time

Validate Clear Save Save As Delete

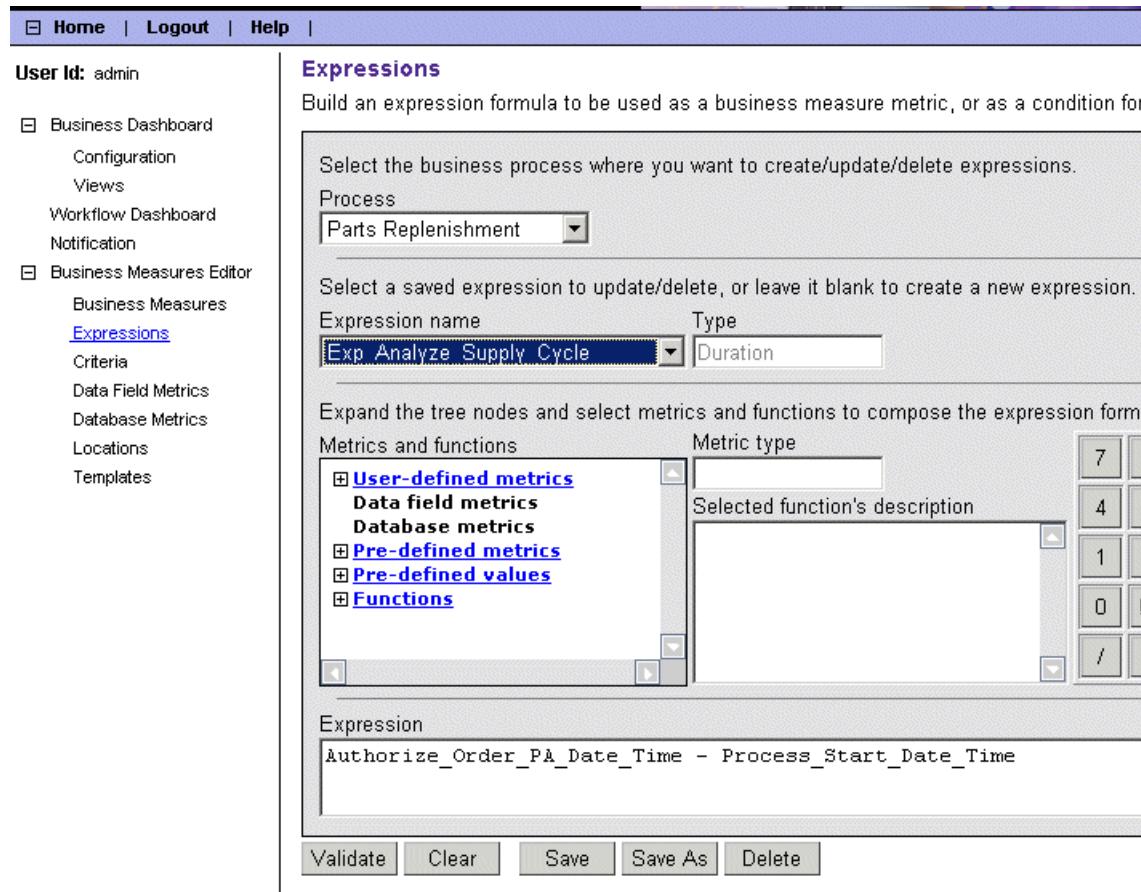


Figure 8-4 Expressions

12. Check that the expression as shown in the bottom box matches what was defined in the workbench.

Expressions

Build an expression formula to be used as a business measure metric, or as a condition for applying a business measure.

Select the business process where you want to create/update/delete expressions.

Process
Parts Replenishment

Select a saved expression to update/delete, or leave it blank to create a new expression.

Expression name Type
Exp_Analyze_Supply_Cycle Duration

Expand the tree nodes and select metrics and functions to compose the expression formula.

Metrics and functions User-defined metrics Data field metrics Database metrics Pre-defined metrics Pre-defined values Completed Ready Running	Metric type String Selected function's description	7 8 9 () 4 5 6 & 1 2 3 < > 0 != = <= >= / * " + -
--	--	--

Expression
Authorize_Order_PA_Date_Time - Process_Start_Date_Time"Completed"

Validate Clear Save Save As Delete

Figure 8-5 Pre-defined values

13. Explore the tool by adding a predefined value to the expression (such as Completed), this shows the ability to obtain even more granularity in the expression (do not save this change).
14. Select the Criteria view

Home | Logout | Help |

User Id: admin

Business Dashboard
Configuration
Views
Workflow Dashboard
Notification

Business Measures Editor
Business Measures
Expressions
Criteria
Data Field Metrics
Database Metrics
Locations
Templates

Notification Criteria

Select the business process where you want to create/update/delete notification criteria.

Process: Parts Replenishment

Select a saved criterion to update/delete, or leave it blank to create a new one.

Criterion name: Type:

Expand the tree nodes and select metrics and functions to compose the criterion.

Metrics and functions:

- Pre-defined metrics:
 - ACTIVITY_COST
 - ACTIVITY_ELAPSED_DURATION
 - ACTIVITY_NAME
 - ACTIVITY_STATE
 - ACTIVITY_USER_ID
 - ACTIVITY_WORKING_DURATION

Metric type: Duration

Selected function's description:

Criterion: ACTIVITY_ELAPSED_DURATION

Buttons: Validate, Clear, Save, Save As, Delete

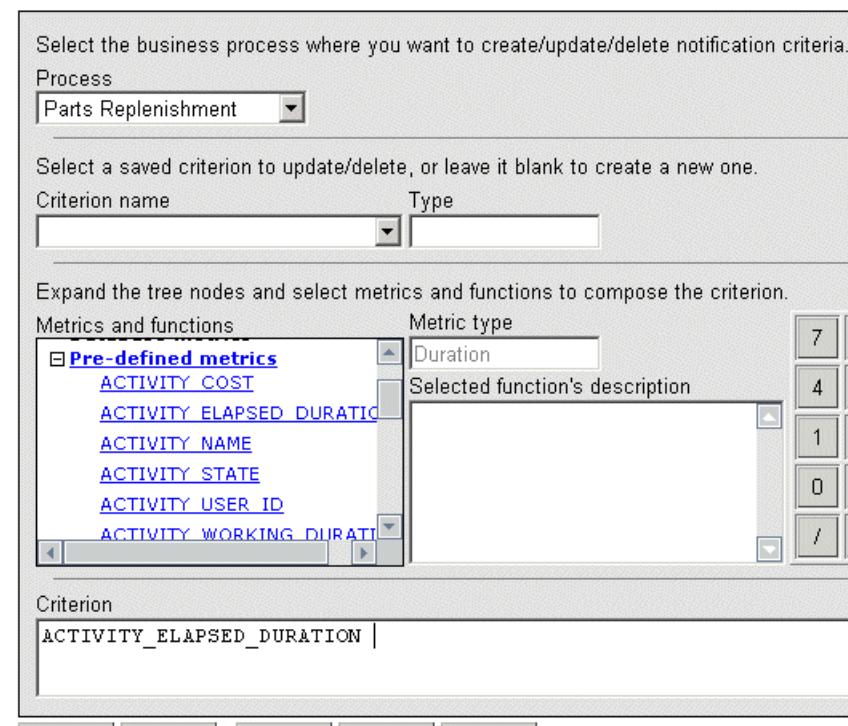


Figure 8-6 Criteria

15. Check that the metrics defined in the workbench are present and correct.
16. Select the Locations view.

User Id: admin

Locations Configuration

Select the business process where you want to create/update/delete locations.

Process: Parts Replenishment

Saved locations: AFTER_ORDER_CLOSURE

PROCESS_END	<input type="checkbox"/>
AFTER_ORDER_CLOSURE	<input checked="" type="checkbox"/>
PROCESS_START	<input type="checkbox"/>
AFTER_ORDER_CLOSURE	<input type="checkbox"/>
BEFORE_AUTHORIZE_ORD	<input type="checkbox"/>
FMCINTERNALNOOP	<input type="checkbox"/>
No Possible Sourcing Info	<input type="checkbox"/>
Waiting Supply Confirmation	<input type="checkbox"/>
Price Information	<input type="checkbox"/>
Price Information	<input type="checkbox"/>

Figure 8-7 Locations

17. Check that the Locations defined in the workbench are present and correct.

Our measures have been successfully imported.

8.2 Run time analysis

For analysis and monitoring of the run time environment we have two separate places that provide valuable information for the administrator and the users:

- ▶ Web client.
- ▶ Monitor Workflow Dashboard.

As we mentioned in Section 5.8, “Create the user interface” on page 161, a considerable amount of thought was put into the design of the user interface for the Web client. This pays off handsomely in the run time environment. We will now look at the information available for monitoring in the Web client. There is no additional work required to set this up as what we use is the default views that have been customized for our own “look and feel”.

8.2.1 Workflow Web client

The Process Template view in the Web client shows which process models have been imported and translated for the run time.

Action	Name	Description
	Order_...	%PR_Requester% - %PR_Work_Order% - %PNFC_Number% - %S_OS_PN_Of_Substitution[0].S_Supplier_S...
	Parts Replenishment...	%PR_Requester% - %PR_Work_Order% - %PNFC_Number%
	Work Order...	%PR_Requester% - %PR_Work_Order%

Figure 8-8 Process template

As we see, the template description shows the data we defined in the model that will be taken at run time from the data containers. We also see that there are possibly one or two icons that will be shown (these are they urgent flag, if required, and the flag depicting the type of machine that is being ordered).

To initialize the Order process the users select the button to create a work order (which is shown here as Creer (Create) and is available from all views at the top of the screen).

Work Order

Creation Date 26/02/2004

Requester ADMIN

Urgent

Work Order

Server Type iSeries pSeries zSeries SSD

Machine Type

Model

Comment

Qty of PN and/or FC 1

PN or FC	Designation	Qty	Replenishment Reason
PN #1	<input type="text"/>	<input type="text"/>	<input type="text"/> Missing

Figure 8-9 Work order form

Action	State	Name	Description	Last Modified
Work Order	Running	BPLANTIN - ct4942	BPLANTIN - ct4942	12.02.2004 19:16:4
--> Parts Replenishment	Running	BPLANTIN - ct4942 - 90h8983	BPLANTIN - ct4942 - 90h8983	12.02.2004 19:16:4
--> Order	Running	BPLANTIN - ct4942 - 90h8983 - RMER	BPLANTIN - ct4942 - 90h8983 - RMER	17.02.2004 11:56:1
Work Order	Running	BPLANTIN - ei664y	BPLANTIN - ei664y	17.02.2004 09:37:5
--> Parts Replenishment	Running	BPLANTIN - ei664y - 04n3821	BPLANTIN - ei664y - 04n3821	17.02.2004 09:37:5
Work Order	Running	DBERTHET - FF8425	DBERTHET - FF8425	10.02.2004 11:25:5
--> Parts Replenishment	Running	DBERTHET - FF8425 - 2435/1524	DBERTHET - FF8425 - 2435/1524	10.02.2004 11:25:5
--> Parts Replenishment	Running	DBERTHET - FF8425 - 2749	DBERTHET - FF8425 - 2749	10.02.2004 11:25:5
--> Order	Running	DBERTHET - FF8425 - 2749 - ROC Used	DBERTHET - FF8425 - 2749 - ROC Used	11.02.2004 15:18:3
--> Parts Replenishment	Running	DBERTHET - FF8425 - 3006	DBERTHET - FF8425 - 3006	10.02.2004 11:25:5
--> Parts Replenishment	Running	DBERTHET - FF8425 - 4778	DBERTHET - FF8425 - 4778	10.02.2004 11:25:5
--> Order	Running	DBERTHET - FF8425 - 4778 - ROC Used	DBERTHET - FF8425 - 4778 - ROC Used	11.02.2004 11:07:5
--> Parts Replenishment	Running	DBERTHET - FF8425 - 5101	DBERTHET - FF8425 - 5101	10.02.2004 11:25:5
--> Parts Replenishment	Running	DBERTHET - FF8425 - 9943	DBERTHET - FF8425 - 9943	10.02.2004 11:25:5
Work Order	Running	HGOTTVALLES - BP9DNN	HGOTTVALLES - BP9DNN	26.01.2004 10:47:5
--> Parts Replenishment	Running	HGOTTVALLES - BP9DNN - 6484	HGOTTVALLES - BP9DNN - 6484	26.01.2004 10:47:5
Work Order	Running	HGOTTVALLES - iI96kd	HGOTTVALLES - iI96kd	05.02.2004 10:39:3

Figure 8-10 Process instance list

In Figure 8-10 above we see a list of active process instances. As we mentioned in Section 5.8, “Create the user interface” on page 161, to allow for a user friendly interface, we sort the process data so that the Orders are shown with their initiating Parts Replenishment process, and the Parts Replenishment requests are shown with their initiating Work Order.

We also see a place holder for the urgent flag (none of the orders in the figure above are flagged as urgent), the icon for the machine type, the name of the requesting employee, work order number and so on. These are passed from the work order form as shown in Figure 8-9, to the data container.

From this view we can drill down using the monitor function and see the progression of the tasks through the process.

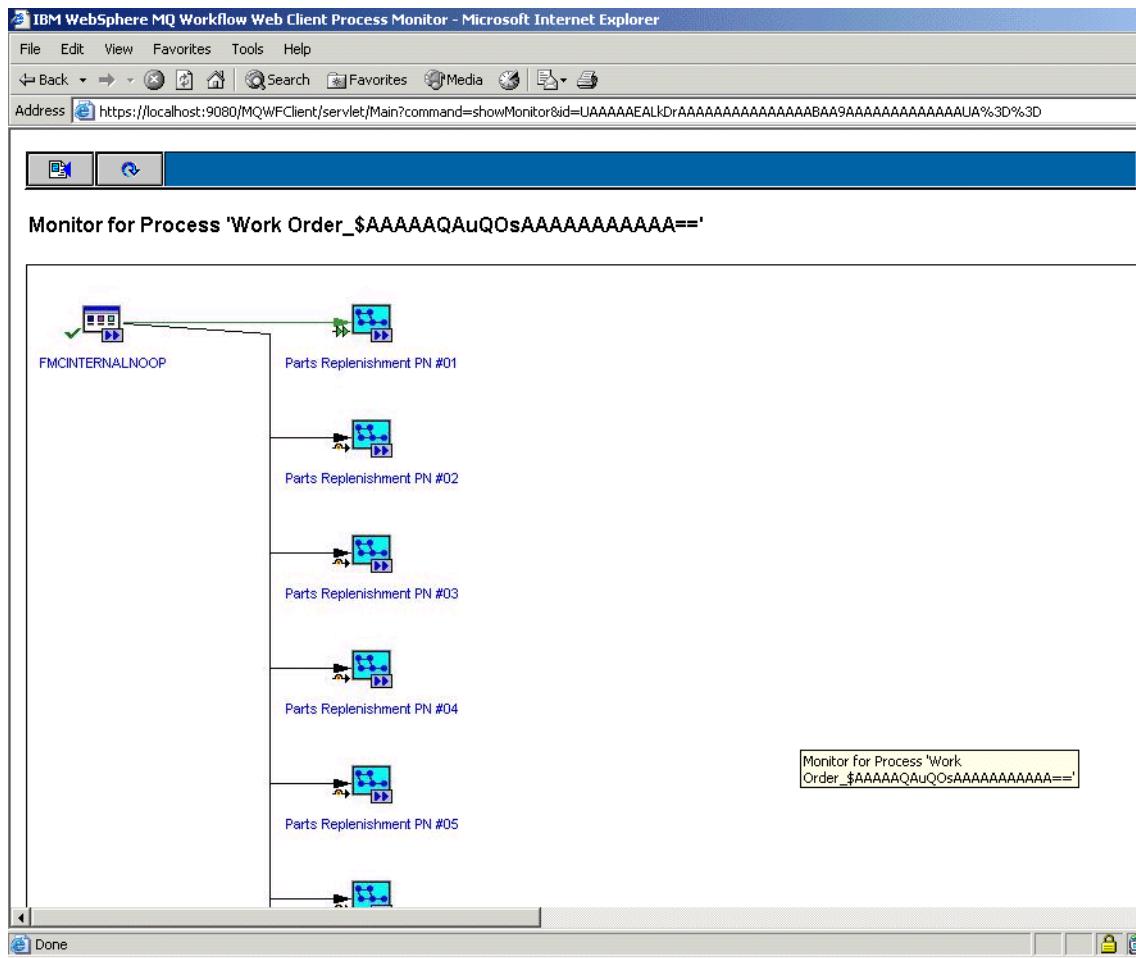


Figure 8-11 Work order process instance

From this monitor view we see that the Work Order process has passed to the first instance of the Parts Replenishment.

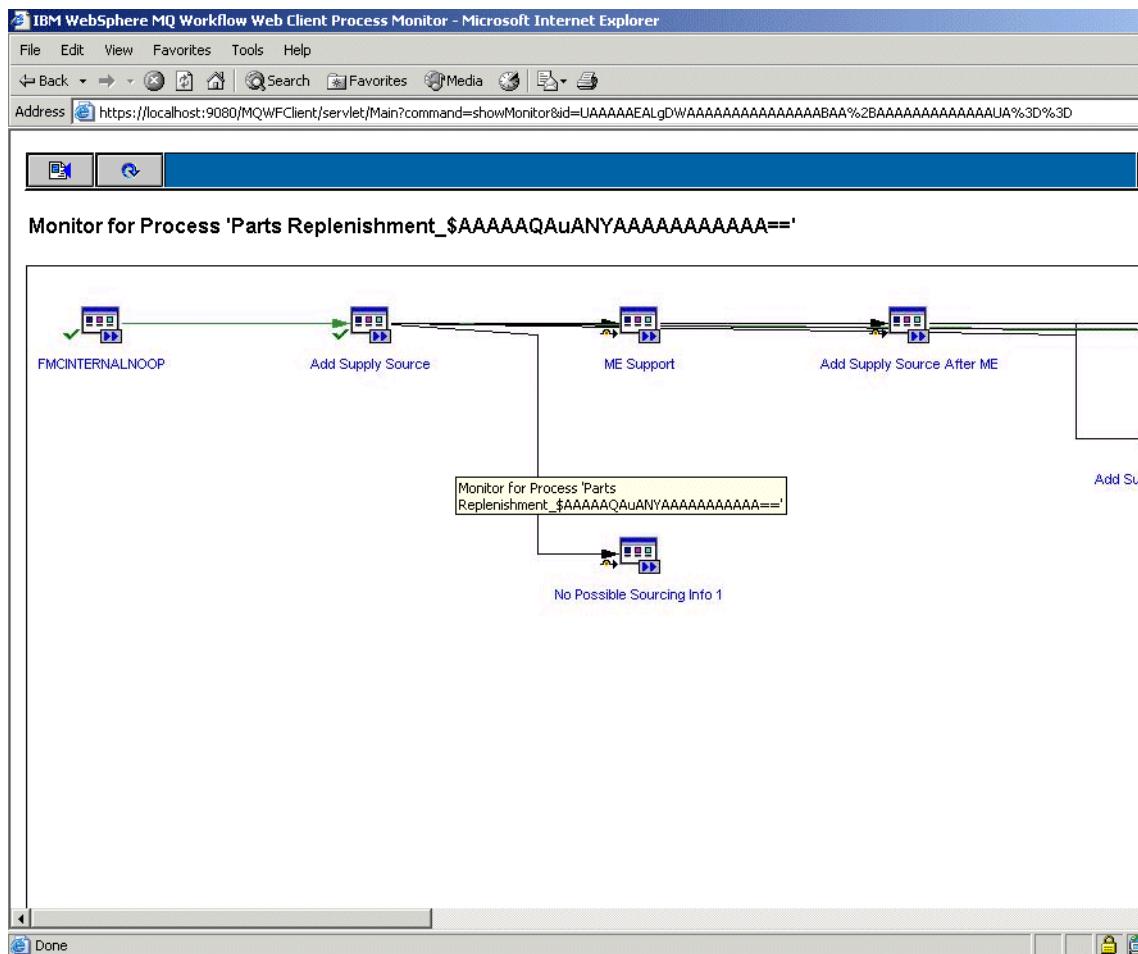


Figure 8-12 Parts replenishment

From the monitor view of the Parts Replenishment process we see that the Add Supply source has been completed successfully.

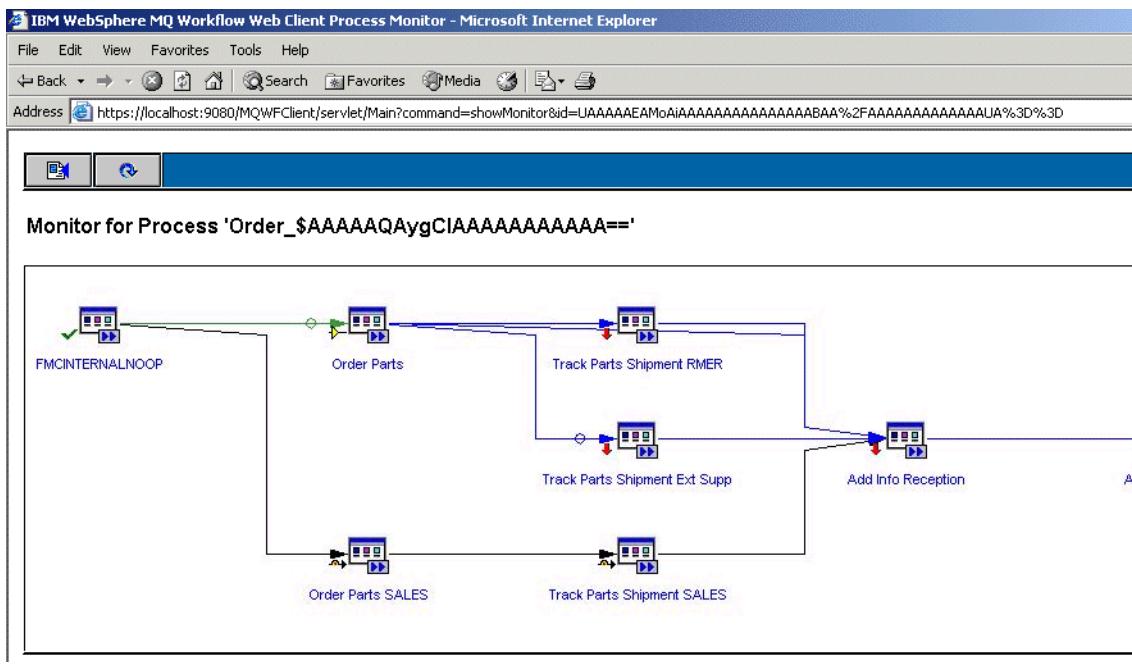


Figure 8-13 Order

From the Order monitor view we see that the Create Order activity has started.

All of this information is available by default in the run time environment to allow users and administrators to monitor the progress of their work tasks. Also available is the task information. By right clicking on a task the user can see the sort of task information as is shown in the following figures.

IBM WebSphere MQ Workflow Web Client Activity Instance - Properties - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Search Favorites Media

Address https://localhost:9080/MQWFClient/servlet/Main?command=showActivityProperties&id=QQAAAAEAMoAiAAAAAAAAAAAAABAAA

Properties of Activity Instance "Order_\$AAAAAAQAYgCIAAAAAAAAAA==.Order Parts"

General Start and Exit Staff Data Structures Documentation History Input Container Output Container

Name	Order_\$AAAAAAQAYgCIAAAAAAAAAA==.Order Parts
Description	BPLANTIN - ct4942 - 90h8983 - RMER
State	Ready
Type	Program Activity
Program Name	Order_Parts_v2_0_0
Process	Order_\$AAAAAAQAYgCIAAAAAAAAAA==
Category	

Figure 8-14 General information

General information such as the current state of the activity.

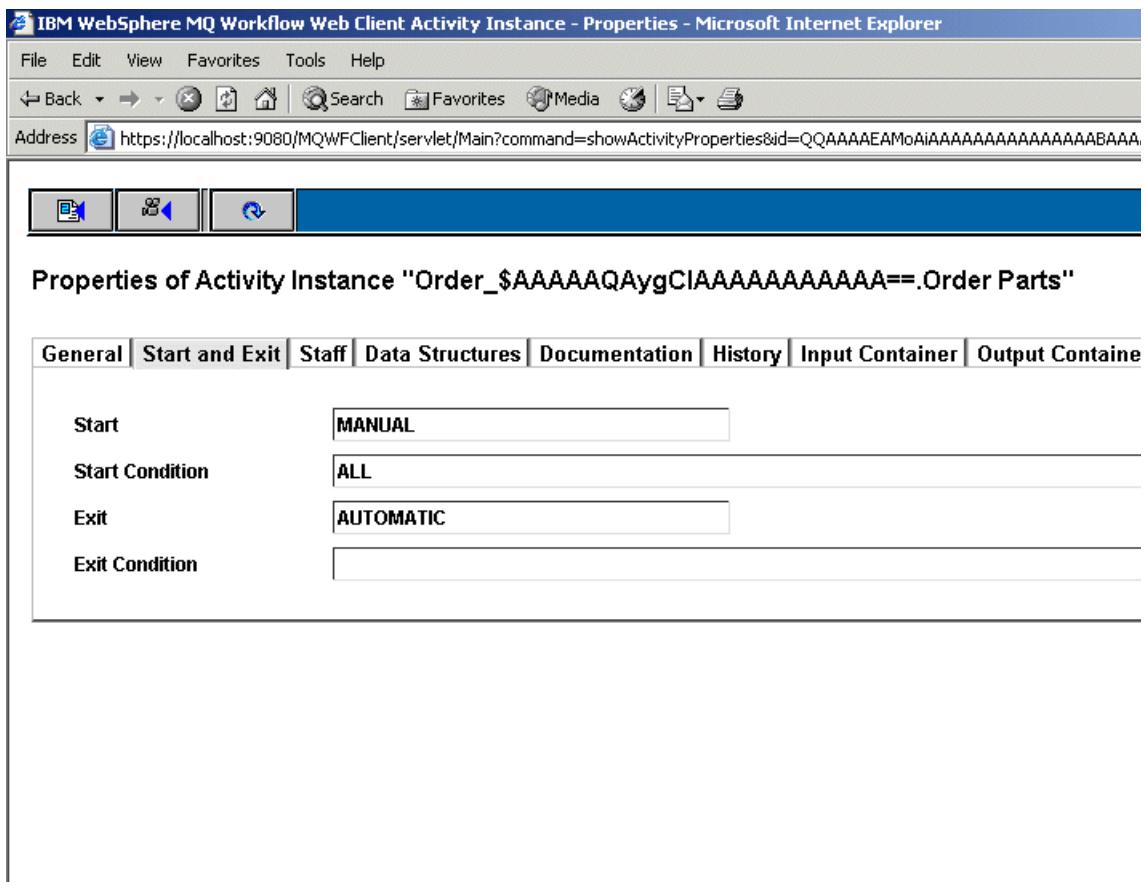


Figure 8-15 Start and exit conditions

Start and exit conditions. In our case study, as the order must be placed manually in an external system, which is not yet incorporated into the automated business process - the start of this activity is set to manual and will be performed by the allocated user after the order has been physically created. This can be easily changed in the model once the external systems are incorporated over time in future roll-outs.

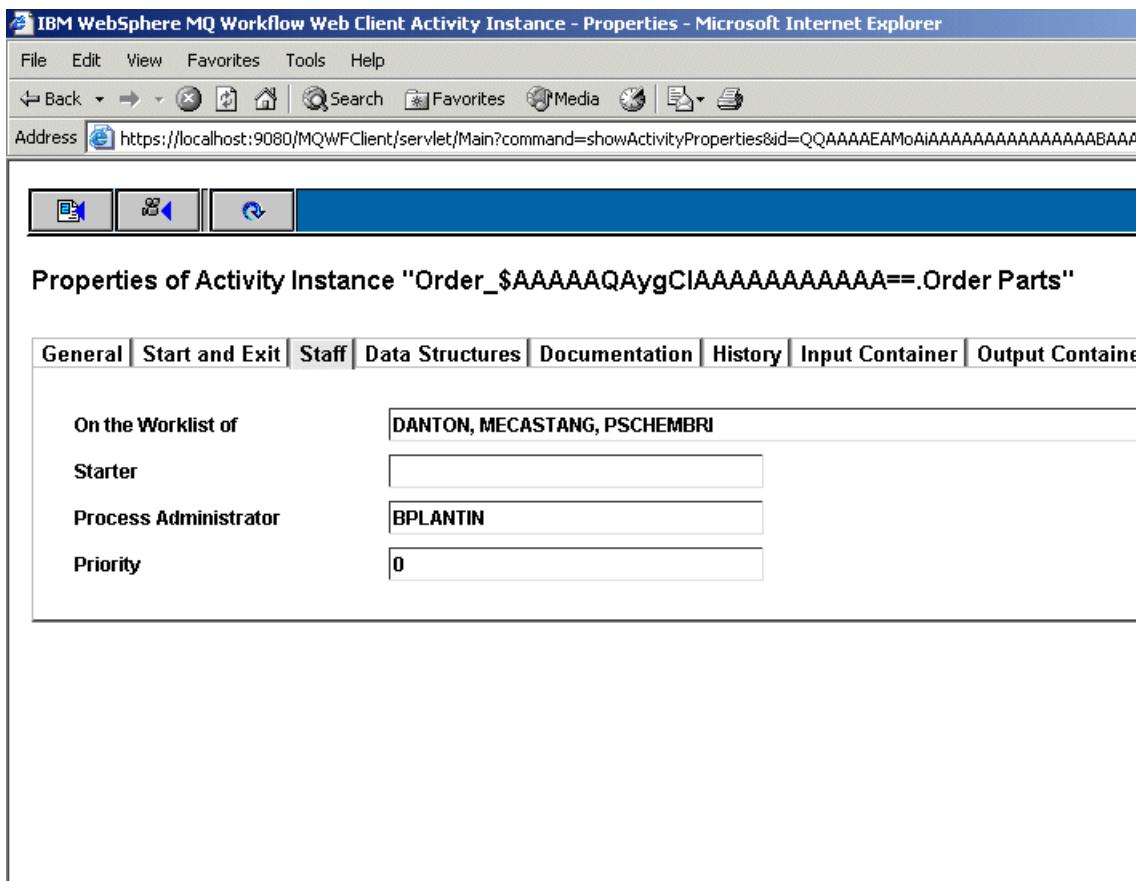


Figure 8-16 Staff

The staff properties show the employee who will see this item on their worklist and who is the nominated Process Administrator. When escalation or notification is required for a delinquent activity, it is usually the Process Administrator, workflow administrator or maybe the process started who will be alerted.

Also available is the contents of the data containers as can be seen from the tabs on the diagrams. This is useful for problem determination, if a flow went off in a direction that was not expected, it may be due to unexpected data in the container that sent the flow down a decision branch.

Work Order		PDELLAPINA - EA9AQK	28.01.2004 10:09:59
✓	--> Parts Replenishment	PDELLAPINA - EA9AQK - 2975	28.01.2004 10:09:59
✓	--> Order	PDELLAPINA - EA9AQK - 2975 - ROC Used	28.01.2004 09:37:47
✓	--> Parts Replenishment	PDELLAPINA - Speculation order LEMOINE - 6184	17.02.2004 09:22:46
✓	--> Parts Replenishment	PDELLAPINA - Speculation order LEMOINE - 6239	17.02.2004 09:22:51
✓	--> Parts Replenishment	PDELLAPINA - Speculation order LEMOINE - 7406	17.02.2004 09:22:57
✓	Work Order	PIMBERT - Bob Hutchinson/ 7026 M80 / Fc5213 qty 3	06.02.2004 11:17:58
✓	--> Parts Replenishment	PIMBERT - Bob Hutchinson/ 7026 M80 / Fc5213 qty 3 - 5213	06.02.2004 11:17:58
✓	--> Order	PIMBERT - Bob Hutchinson/ 7026 M80 / Fc5213 qty 3 - 5213 - ROC Used	02.02.2004 15:54:36
✓	Work Order	PIMBERT - Bob Hutchinson/ 7028 6C1 / Fc4453 qty 1	29.01.2004 15:47:16
✓	--> Parts Replenishment	PIMBERT - Bob Hutchinson/ 7028 6C1 / Fc4453 qty 1 - 4453	29.01.2004 15:47:16
✓	--> Order	PIMBERT - Bob Hutchinson/ 7028 6C1 / Fc4453 qty 1 - 4453 - SALES	27.01.2004 13:58:15
✓	Work Order	PIMBERT - IL96ZI -- 7026 H70	13.02.2004 11:50:31
✓	--> Parts Replenishment	PIMBERT - IL96ZI -- 7026 H70 - 3070	13.02.2004 11:50:31
✓	Work Order	PIMBERT - NX606S -- 7025 6F0 -- Fc5214 qty 1	11.02.2004 16:02:43
✓	--> Parts Replenishment	PIMBERT - NX606S -- 7025 6F0 -- Fc5214 qty 1 - 5214	11.02.2004 16:02:43
✓	--> Order	PIMBERT - NX606S -- 7025 6F0 -- Fc5214 qty 1 - 5214 - RMER	28.01.2004 18:22:00
✓	Work Order	JGARNIER - xxxxxxxxxxxxxxxx	11.02.2004 13:40:33
✓	--> Parts Replenishment	JGARNIER - xxxxxxxxxxxxxxxx - 11p0351	11.02.2004 13:40:33
✓	--> Order	DBERTHET - AB964X - 3043 - RMER	17.02.2004 09:38:53
✓	--> Order	DBERTHET - AC9DZV - 2757 - ROC Used	13.02.2004 08:01:28
✓	Work Order	DBERTHET - BA9XAK	11.02.2004 15:37:45
✓	--> Parts Replenishment	DBERTHET - BA9XAK - 3192	11.02.2004 15:37:45
✓	--> Order	DBERTHET - BA9XAK - 3192 - RMER	06.02.2004 10:55:57
✓	Work Order	DBERTHET - BP9DZC	03.02.2004 14:24:30
✓	--> Parts Replenishment	DBERTHET - BP9DZC - 6817	03.02.2004 14:24:30

Figure 8-17 Historical data

The figure above shows a list of completed process instances, the settings we made in the workbench to retain completed processes allows us to see the history of completed processes.

8.2.2 Workflow Dashboard

Another method of monitoring the run time environment is to use the Workflow Dashboard of the Monitor. From within the Dashboard we are able to set alerts to notify a person when an activity has passed beyond the boundaries of a business measure (such as an activity whose duration is too long), we are also able to set automatic actions to be taken in the same circumstances.

We are also able to see the types of information that is shown in the Web Client, but in a form that gives an immediate form type listing for process instances and the activities (and duration of those activities). This is a format that is extremely

useful for administrators or management to identify bottlenecks in the run time environment.

The screenshot shows a Microsoft Internet Explorer window titled "Monitor Workflow Dashboard - Microsoft Internet Explorer". The address bar shows the URL: https://localhost:9080/monitor/workflowdb/workflowdb.cmd. The page header includes "WebSphere Business Integration Monitor" and navigation links for "Home", "Logout", and "Help". On the left, a sidebar menu displays "User Id: admin" and a tree view with nodes like "Business Dashboard" (selected), "Workflow Dashboard", "Notification", "Business Measures Editor" (expanded, showing "Business Measures", "Expressions", "Criteria", "Data Field Metrics", "Database Metrics", "Locations", "Templates"), and "Export Page". The main content area is titled "Workflow Dashboard" and contains a table listing 10 process instances. The table columns are "Item", "Activity Instance", "Admin Action", "Process Diagram", "Description", and "Status".

Item	Activity Instance	Admin Action	Process Diagram	Description	Status
1	(+)	(+)	(+)	① SLENGLET - CT4942 - 6824	Running 1
2	(+)	(+)	(+)	① SLENGLET - CK9SR2 - 6824	Running 2
3	(+)	(+)	(+)	② ① HGOTTVALLES - BP9DNN - 6484	Running 2
4	(+)	(+)	(+)	③ ④ HGOTTVALLES - CK9RRY - 4137	Running 2
5	(+)	(+)	(+)	⑤ ⑥ JGARNIER - xxxxxxxx - 11H8156	Running 2
6	(+)	(+)	(+)	⑦ PIMBERT - BA9VAR -- 7026 b80 -- Fc2456 qty 2 - 2456	Running 2
7	(+)	(+)	(+)	⑧ ⑨ JGARNIER - NX553A IP7776 29/01/2004 - 04n3393	Running 2
8	(+)	(+)	(+)	⑩ ⑪ JGARNIER - xxxxxxxx - 04N5595	Running 2
9	(+)	(+)	(+)	⑫ PIMBERT - AC985K -- 7025 F80 -- Fc6553 qty 20 - 6553	Running 2
10	(+)	(+)	(+)	⑬ DBERTHET - CK9WR3 - 6484	Running 2

Figure 8-18 Workflow dashboard

The figure above shows a list of currently running process instances.

Monitor Workflow Dashboard - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Home Search Favorites Media Print

Address https://localhost:9080/monitor/workflowdb/workflowdb.cmd

WebSphere Business Integration Monitor

Home | Logout | Help |

User Id: admin

- Business Dashboard [Workflow Dashboard](#)
- Notification
- Business Measures Editor
 - Business Measures
 - Expressions
 - Criteria
 - Data Field Metrics
 - Database Metrics
 - Locations
 - Templates

Workflow Dashboard

Export Page

Item	Activity Instance	Admin Action	Process Diagram	Description	Status
1				SLENGLET - CT4942 - 6824	Running 1
2				NGLET - CK9SR2 - 6824	Running 2
3				TTVALLES - BP9DNN - 6484	Running 2
4				TTVALLES - CK9RRY - 4137	Running 2
5				GRNIER - xxxxxxxx - 11hB156	Running 2
6				PIMBERT - BA9VAR -- 7026 b80 -- Fc2456 qty 2 - 2456	Running 2
7				JGARNIER - NX553A IP7776 29/01/2004 - 04n3393	Running 2
8				JGARNIER - xxxxxxxx - 04N5595	Running 2
9				PIMBERT - AC985K -- 7025 F80 -- Fc6553 qty 20 - 6553	Running 2
10				DBERTHET - CK9WR3 - 6484	Running 2
11				JGARNIER - xxxxxxxx - 11hB156	Running 2
12				SLENGLET - GK9Y38 - 6384	Running 2
13				JGARNIER - xxxxxxxxxxxx - 06H6890	Running 3
14				JGARNIER - xxxxxxxx - 15f8409	Running 3
15				JGARNIER - 831116e - 12K0406	Running 2
16				HGOTTVALLES - NX664W - 5204	Running 2

https://localhost:9080/monitor/workflowdb/workflowdbAction.cmd

Figure 8-19 Workflow dashboard

From this view we see that the administrator can take remedial action on processes that may have run into trouble or may be dormant. There are other options available from this view also.

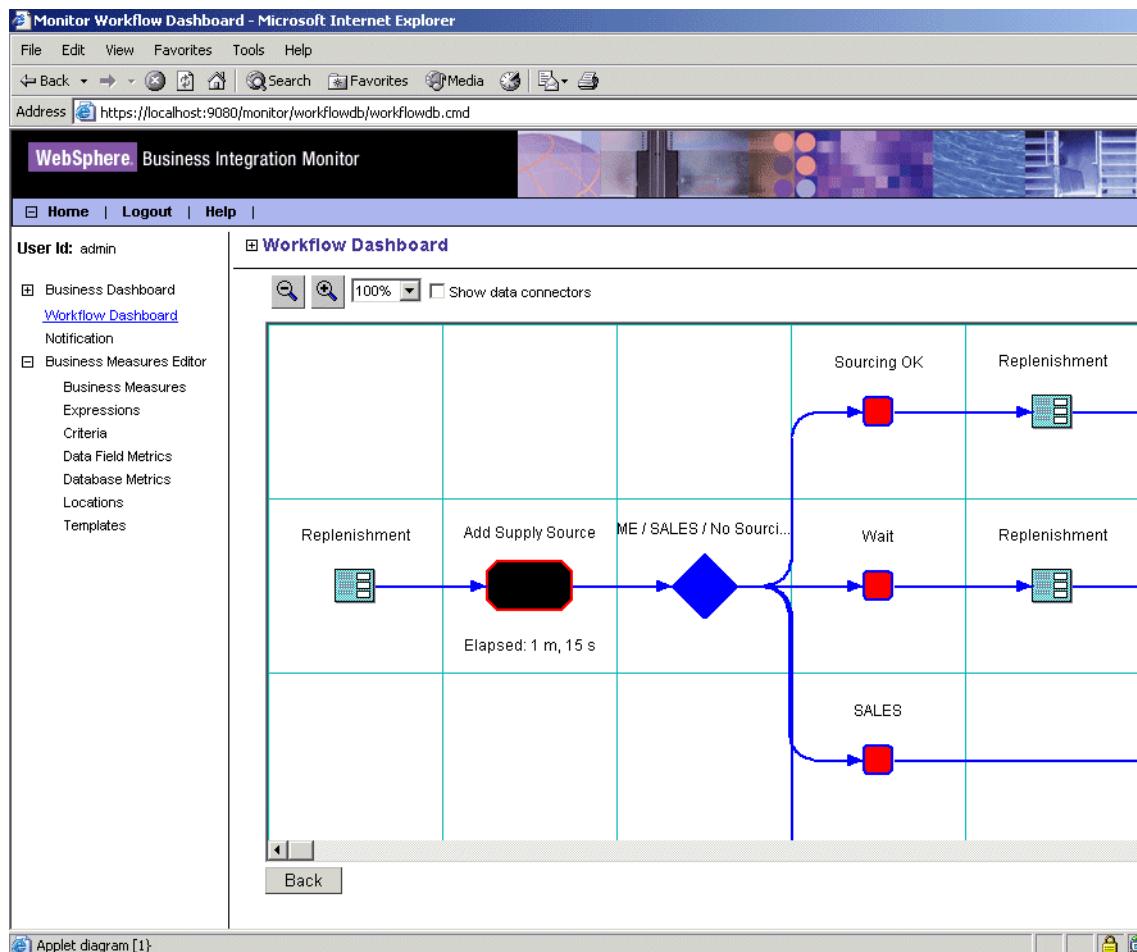


Figure 8-20 Drill down

We are able to drill down into the processes and see the progress of the process itself (in a form that matches that of the workbench process models).

Workflow Dashboard

Process: Parts Replenishment -> Parts Replenishment _\$AAAAAQBDwCwAAAAAAAAAA==

Parent process: Work Order

Parent process instances: [Work Order _\\$AAAAAQBDgCUAAAAAAAAAAA==](#)

Activity Instances Table

Activity Instances Table							
Select Columns		Set Filter		Back			
Transfer	Activity Name	Status	Assigned Employees	Creation Time	Starting Time	Completion Time	Elapse
	Order ROC Used	Running	Berthet, Dominique (DBERTHET)	12 mar 04 10:30:22	12 mar 04 10:30:22	---	7 d, 8 h, 1 m, 0 s
	FMCINTERNALNOOP_03	Completed	Administrateur, Workflow (WFADMIN)	12 mar 04 10:30:22	12 mar 04 10:30:22	12 mar 04 10:30:22	0 s
	Authorize Order	Completed	Berthet, Dominique (DBERTHET)	12 mar 04 09:28:22	12 mar 04 10:29:57	12 mar 04 10:30:22	1 h, 2 m, 0 s
	FMCINTERNALNOOP_04	Completed	Administrateur, Workflow (WFADMIN)	12 mar 04 09:28:21	12 mar 04 09:28:21	12 mar 04 09:28:21	0 s
	Waiting Supply Confirmation	Completed	Anton, Daniel (DANTON)	11 mar 04 18:15:43	12 mar 04 09:27:56	12 mar 04 09:28:20	15 h, 12 m, 0 s
	Add Supply Source	Completed	Anton, Daniel (DANTON)	11 mar 04 10:18:25	11 mar 04 18:12:51	11 mar 04 18:15:43	7 h, 57 m, 0 s

Figure 8-21 Activity instance view

We can also see for any running process, a list of activities and values such as:

- ▶ Who the activity was assigned to.
- ▶ The creation time of the activity.
- ▶ The actual starting time of the activity.
- ▶ Completion time of the activity.

We also see the duration of each of tasks. This view and this value, for instance, are extremely useful in identify or alerting the administrator to bottlenecks. For instance, the order has been place - but it has been waiting for over a week. This is outside the desired metric. Normally, this would be worth of setting a notification. The team for the case study, however, have not set alerts for delinquents activities, as the users are being allowed a certain amount of time to get used to the new way of doing things. This will come in future roll-outs.

The screenshot shows a Microsoft Internet Explorer window titled 'Monitor Notification - Microsoft Internet Explorer'. The address bar shows the URL 'https://localhost:9080/monitor/notification/notification.cmd'. The main content area is titled 'WebSphere Business Integration Monitor' and displays a 'Notification' section. On the left, there is a sidebar with a 'User Id: admin' header and a tree view of menu items under 'Notification'. The main content area has a heading 'Notification' with a descriptive text about notifications. Below it is a table with columns: 'Body', 'Notification Time', 'Subject', and 'Process Instance Name'. A message at the bottom of the table says 'No available notifications.'.

Figure 8-22 Notifications

The notifications view in the Workflow Dashboard shows a list of notifications that have been sent. The figure above shows how the administrator (or any other notified staff member) would check any alerts that have been generated for them.

8.3 Historical data analysis

The Business Dashboard enables us to analyze some of the historical data that has been collected according to the business measures we have defined. For the historical analysis, we use the Business Dashboard. We also look at some of the data available to us by default.

8.3.1 Set up reports

First we will set up some report views for use when we have live data in the system

1. Go to the Business Dashboard
2. Select the configuration view.
3. Select the Parts Replenishment process.
4. Select the Business Measures tab

<input type="checkbox"/>	Fn	Business measures
<input type="checkbox"/>	sum	Number of new items
<input type="checkbox"/>	sum	Number of outstanding items
<input type="checkbox"/>	sum	Number of resolved items
<input type="checkbox"/>	sum	Number of carried over items
<input type="checkbox"/>	avg	Elapsed duration
<input type="checkbox"/>	avg	averageWorkingDurationMeasure
<input type="checkbox"/>	avg	Cost
<input checked="" type="checkbox"/>	avg	Analyze_Supply_Cycle
<input type="checkbox"/>	avg	Global_Cycle_Internal
<input type="checkbox"/>	avg	Global_Cycle_External
<input type="checkbox"/>	avg	Global_Cycle

Back

Figure 8-23 Select business measures

5. Deselect the measurement by default, **Number of new items**, and check mark the **Analyze_Supply_Cycle** measurement.
6. Click on the **Back** button to go back in the previous page.
7. Select the Organization unit/user button.

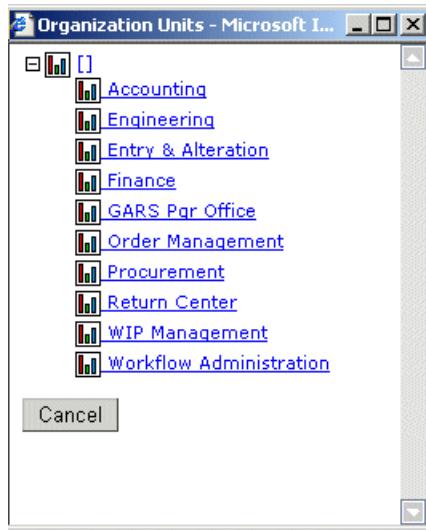


Figure 8-24 Select organization

8. For the organization, select [] on the top of organizations list, meaning that the measurement will concern the entire organization.
9. Do not worry about the Weighting factor as this is only required for trend analysis.

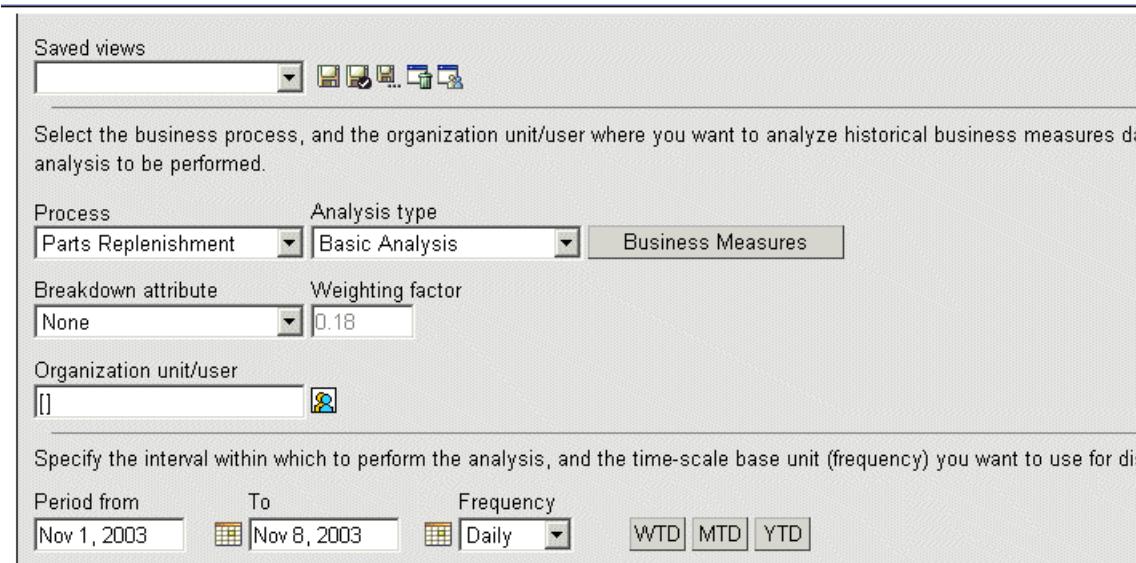


Figure 8-25 Select date range

10. Nominate a date range (this can be changed each time you run the report).
11. Select the type of report format you want (we selected the Table and Graph report graph for the maximum information).

If you select Graph as the report, you will be able to change the chart type of the displayed report. The available types are:

- Area
- Bar
- 3D Bar
- Pie
- 3D Pie
- Plot
- Scatter Plot.

12. Click the **View** button to display the format that the report will take.

Business Dashboard

Daily Basic Analysis Report

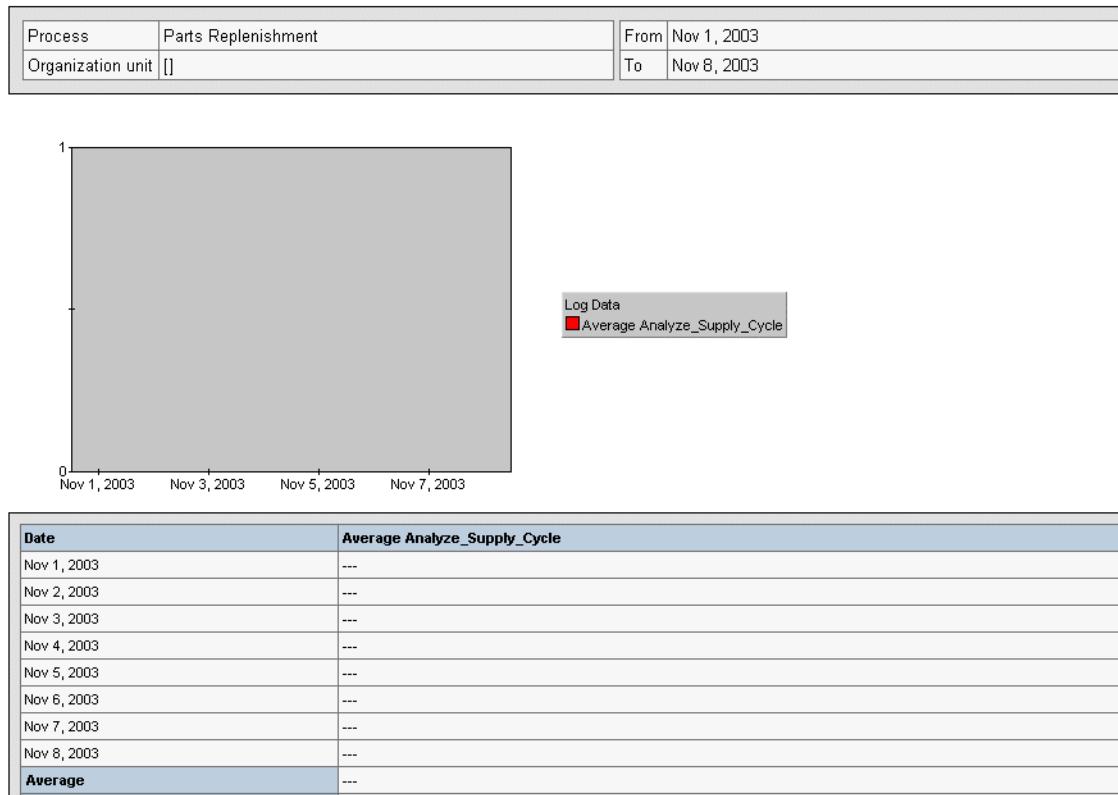


Figure 8-26 Report format sample

We don't expect to see any values at this point, but the preview shows the format that our report will have once populated with data.

13. Go back to the configuration this window.
14. Save this report with a view name for future use.
15. We repeated this to create a report to show numbers of new and resolved items for a daily report and elapsed time on a daily basis.

As our reports are going to be used by administrator, managers and other process owners for monitoring and reporting, it is a good idea to save this report in a view that can be access by others.

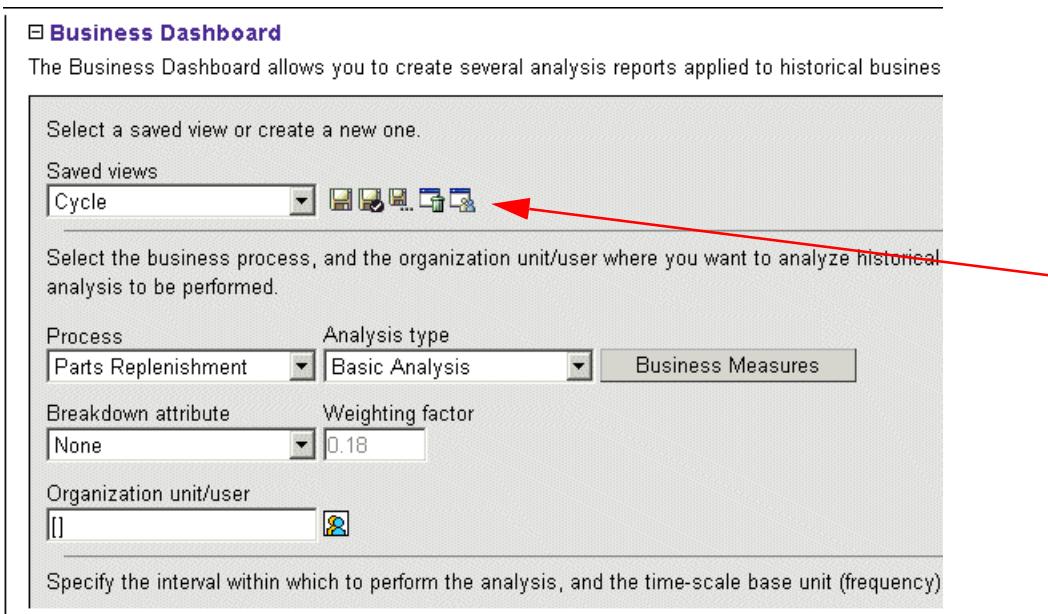


Figure 8-27 Publish report view

1. Select the Publish view icon as shown above.
2. Select the users and/or groups that will require access to this report.

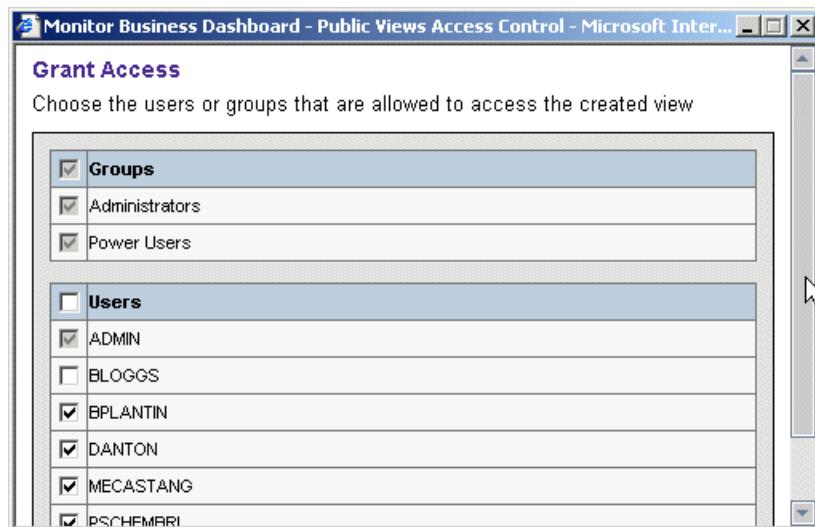


Figure 8-28 Select users

3. Click **OK**.

Repeat the steps above to save any reports that are to be published.

8.3.2 Report on the collected data

Now that our case study application has been running for some time, we are able to perform some reporting and analysis of actual data.

We can run the reports that we have defined previously, however, you can also run reports by defining the required data and views on an ad hoc basis as shown in the previous section.

1. Go to the Business Dashboard.
2. Select Views.
3. Select the required report from the drop-down list of saved views.
4. Select the required date range.

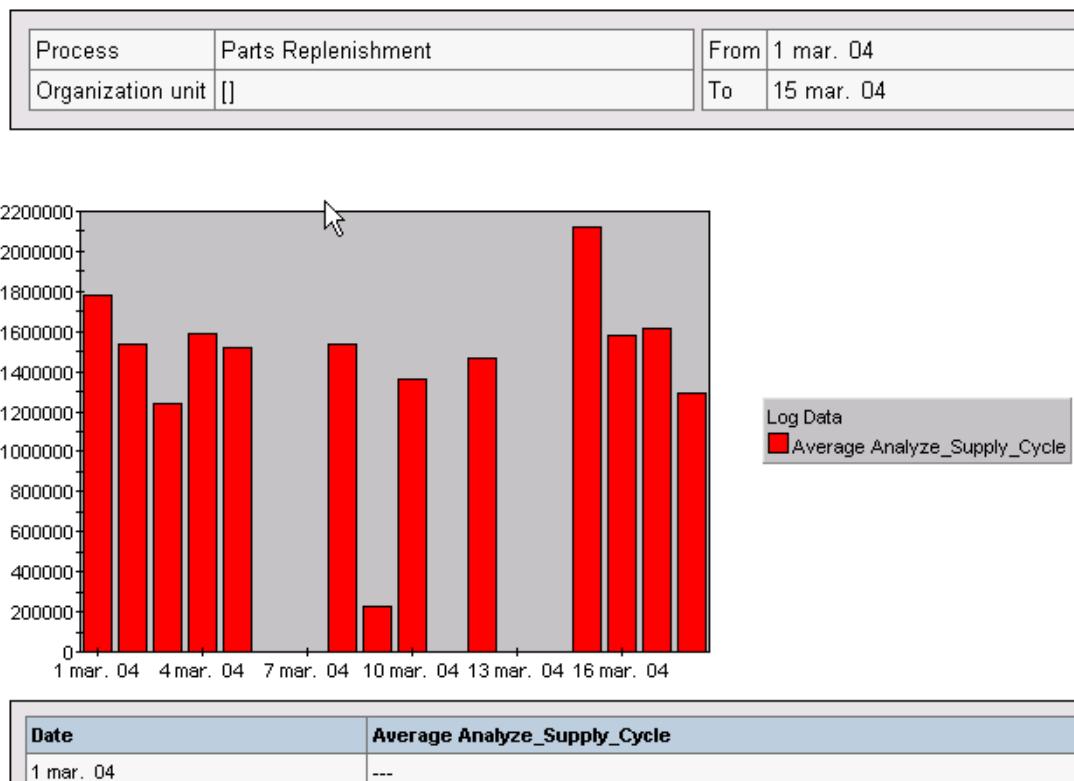


Figure 8-29 Average Cycle analysis

1. Select the Preview button.

The value axis on this graph shows the duration in seconds

2. As can be seen from the figure above, we are presented with both the graph and table view of the results.
3. If you now wish to change the style of graph that is displayed, right click on the graph area.
4. A pop-up box will appear with the different styles of available graphs.

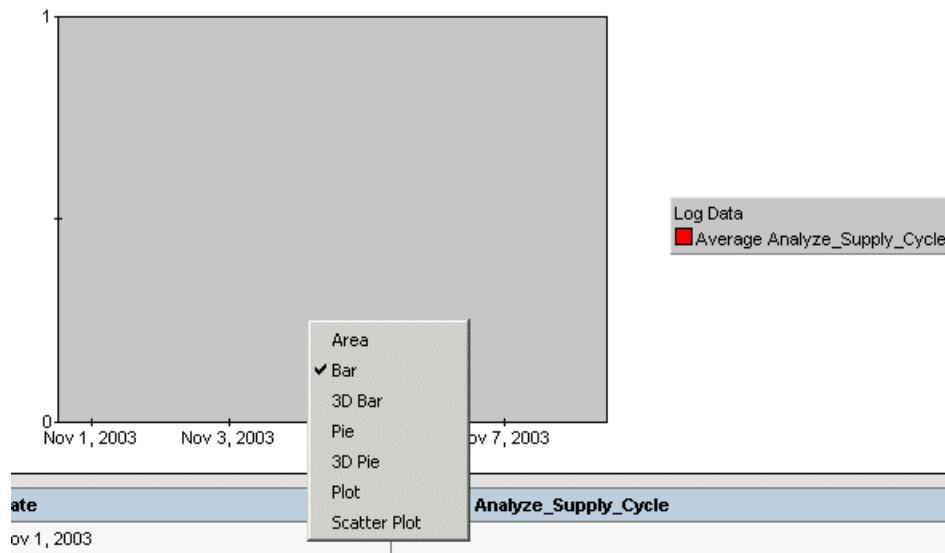


Figure 8-30 New graph type

5. Select the required graph type.

Date	Average Analyze_Supply_Cycle
1 mar 04	20 d, 13 h, 58 m, 2 s
2 mar 04	17 d, 19 h, 41 m, 26 s
3 mar 04	14 d, 9 h, 9 m, 47 s
4 mar 04	18 d, 10 h, 18 m, 15 s
5 mar 04	17 d, 15 h, 3 m, 48 s
6 mar 04	---
7 mar 04	---
8 mar 04	17 d, 19 h, 4 m, 12 s
9 mar 04	2 d, 15 h, 47 m, 13 s
10 mar 04	15 d, 19 h, 19 m, 52 s
11 mar 04	---
12 mar 04	17 d, 29 m, 14 s
13 mar 04	---
14 mar 04	---
15 mar 04	24 d, 12 h, 14 m, 13 s
16 mar 04	18 d, 7 h, 23 m, 35 s
17 mar 04	18 d, 17 h, 20 m, 27 s
18 mar 04	15 d, 9 h, 17 m, 10 s
19 mar 04	---
Average	11 d, 12 h, 41 m, 26 s
Std Dev.	9 d, 6 m, 34 s

Figure 8-31 Daily figures

The figure above shows the average figures for each day in table form. Also at the end of the table we see the average duration for the date range and the standard deviation.

Note: If you wish to download this data into a comma separated file for distributing a report using a tool such as Excel - rather than using the Views view - use the Configuration view and select the Export Page button.

Daily Basic Analysis Report

Process	Parts Replenishment	From	1 febr. 04
Organization unit	[]	To	4 mar. 04

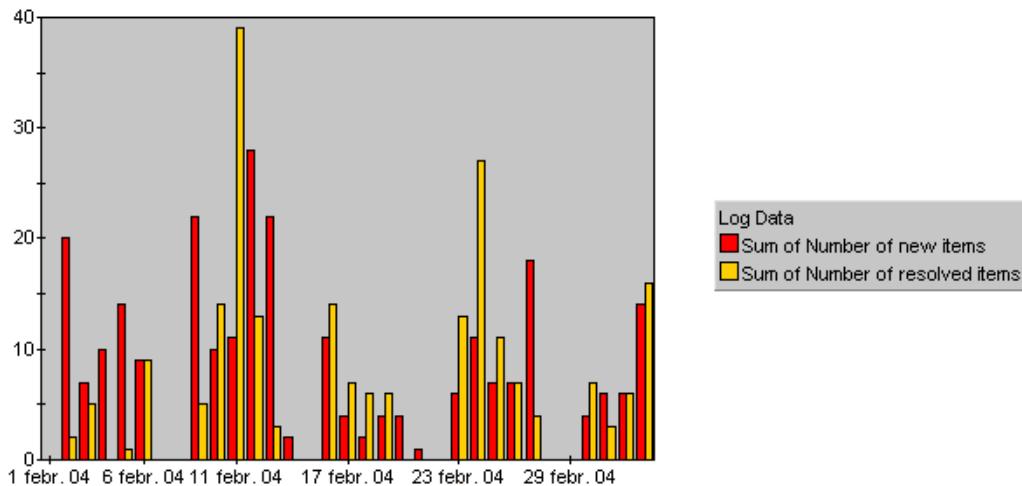


Figure 8-32 Sum of items

The report above shows a report that was defined using some of the predefined business measures - these being the number of new items and number of resolved items for each day.

Daily Basic Analysis Report

Process	Parts Replenishment	From	1 mars 04
Organization unit	[]	To	18 mars 04

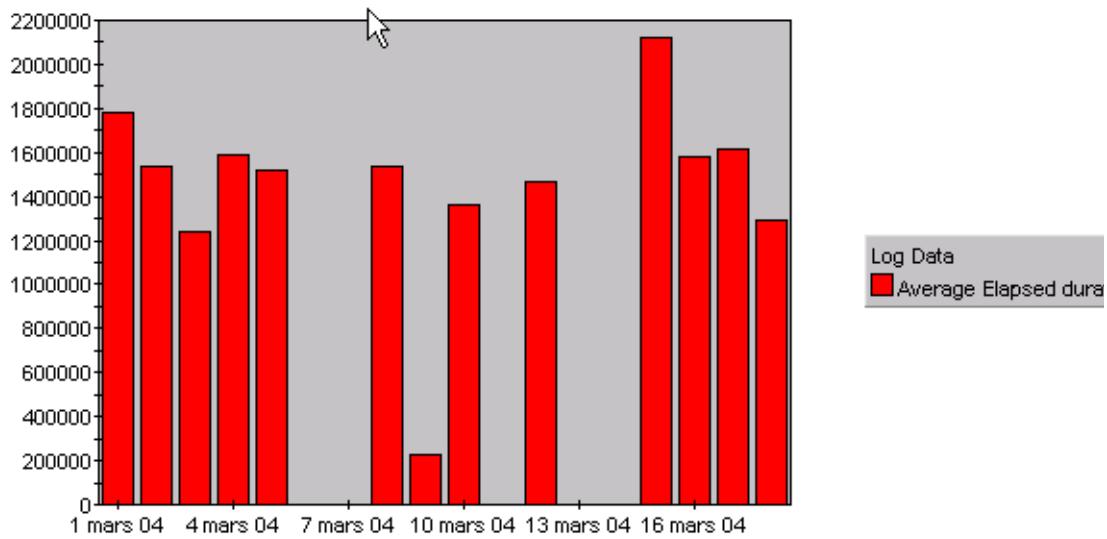


Figure 8-33 Average elapsed duration

Again, this report shows one of the predefined business measures - average elapsed duration.

As can be seen from the examples above, using real data, the reporting functions of the Business Dashboard are flexible and provide the kind of reporting that was necessary for the management to quantify the results of our case study and to provide the basis for trend analysis, workload planning and bottle-neck identification for future roll-outs.



Conclusions, lessons learned and next steps

In this chapter we wrap up the case study. We will discuss the case study and the lessons we have learned from it. We also discuss the factors that we consider were crucial to the success of the case study and where we go from here.

9.1 Case study project analysis

The case study can be seen from two points of view:

- ▶ A success story
- ▶ A first business process integration solution deployment in an overall company strategy

In the company, the case study implementation has been a success story, but it is only a first step towards answering the long term problem.

Business integration is more, and the risk that is faced now is to sit back on our laurels based on our initial success.

The investment required to deploy such end-to-end business integration management system implies a more fundamental approach in the company. Business integration can become the centerpiece of a long term company culture around business process management and must be considered on a long term basis to return a maximum benefit.

So, what the case study has revealed?

First, let us analyze how the case study project was managed.

9.1.1 The cast

During the case study, it became evident that there were several actors which were the key to the success of the case study. The actors we have identified here as the cast are the roles which need to be filled at the very least, for a successful pilot. In most cases, these roles will not even necessarily be fulfilled by a single person, many larger implementations will require teams with these skills. What we have outlined below are our findings, during the case study, as to the roles and their required skills and areas of responsibility.

Company management

Even if the company starts business integration, in the first instance, as a case study or pilot, company management must approve the mission to implement a business integration solution. It has a cost in skills, software and hardware. Nothing must start without having a company management sign-off for the project. It may seem obvious but it cannot be an initiative decided by the IT organization or any other organization alone. It is the company management's responsibility to understand that business integration will change employees jobs and process practices and it will have to sustain it. Business integration is a way to enter in a permanent end-to-end company transformation which crosses all organizational boundaries and focuses on the value-add provided by the

company to their clients. Business integration by its very nature is the company vision translated into business processes practices to bring world class value-add to the clients.

Business Process Analyst

This is the key person. He is delegated by the company management to manage a business integration project. This company specialist must have a high skill in process analysis methodology as well as a wide knowledge of processes practices of the company (i.e: Integrated Supply Chain, Manufacturing, Accounting and so on).

He must be recognized by employees and company management as a skill leader. He must have good communication capabilities to discuss and get practice details from employees as well as to present recommendations to management. His recommendations must be credible to initiate the right decision.

To be more precise about his skills in WebSphere Business Integration, he must be able to model the process into the workbench on the following elements:

- ▶ Business process scope definition and end-to-end mapping of the chain of tasks.
- ▶ Organization data (managers, employees, roles, calendars and so on).
- ▶ Task definition (duration, employee assignment including back-up).
- ▶ Business rules, meaning the expressions and the associated data to be set up into the choice following a decision in the flow.
- ▶ Business process measures, approved by operational managers.
- ▶ Simulation skills, to validate his recommendations to management with “what if” scenario comparisons between “as is” and “to be” business process rules.
- ▶ Generate business case study.

IT Specialist

He supports the Business Process Analyst. He has to be engaged very early in the project and understand the end goal of the integration solution. For our case study we found that he required skills in WebSphere servers platform management, workbench modeling, and Java. His main goal is to make the link from business process modeling activities to business process execution with the minimum of work between the build time workbench environment and the run time. Without this link, the model would difficult to implement in the run time environment and this presents a high risk.

The IT Specialist must be able to:

- ▶ Understand WebSphere MQ Workflow limitations as they relate to the workbench modeler
- ▶ Understand the end-to-end business integration solution and advise the Business Process Analyst on the best way to model the process in workbench.
- ▶ Set up server environment for run time including all the business integration tools suite (DB2, WebSphere MQ, WebSphere MQ Workflow, Workbench, WEbSphere Studio Application Developer, WebSphere Application Server).
- ▶ Finalize workbench model for:
 - This mapping (source and target)
 - Expressions (choices)
 - Applications associated to tasks
 - Business measures.
- ▶ Finalize process run time parameters:
 - Task designation in workflow
 - Process archives capability (for example: **Keep Finished Process** parameter).
- ▶ Design users interfaces (Java Server Page).
- ▶ Export model from build time to run time.
- ▶ Organize and perform tests.

IT Architect

The IT architect is responsible for organizing the project from an IT point of view. He has to manage the project in the following aspects:

- ▶ Define and acquire servers hardware.
- ▶ Organize development, test and run time environment.
- ▶ Manage project planning.
- ▶ Manage changes requirements coming from the Business Process Analyst and the users.
- ▶ Define WebSphere BI IT architecture to support future WebSphere BI deployment.
- ▶ Assure business integration solution compliance to company and legal rules.

9.1.2 The case study development and deployment

Once the project management team is on board, the Business Analyst can start to organize his project. The first thing is to select a team of employees directly involved in the end-to-end process. The business integration success starts here through a participative approach - buy-in is absolutely crucial. We also have to ensure that the employees will accept this new "tool" and utilize it in their daily work when it will be deployed in production. Employee education and acceptance is also crucial.

Process Analysis

At this step the Business Analyst's responsibilities include:

- ▶ Organize meetings with process owners (or participants if the current process crosses business unit or departmental boundaries).
- ▶ Describe the process and associated mechanisms (many business processes exist informally but must now be formally defined).
- ▶ Get data.
- ▶ Solve organizational conflicts with management help.
- ▶ Keep project on track.

Process modeling

With all the elements coming out from the process analysis, the Business Analyst can start to model it in the workbench. The first step is to define, with the IT Specialist, the structure of the model (process, subprocesses). As seen in the previous chapters the data structure size can influence the way to model the defined.

In the case study, the philosophy was to exclusively use the workbench to model all the process aspects without modifying anything in WebSphere MQ Workflow. The IT and Business Analyst staff had neither workflow nor modeling skills at the commencement of the project and it was decided that having to pick-up two new skill sets was not a sensible idea.

The business process models, once developed and deployed, are owned by the Business Process Analyst. The solution is so close of the employee work practices that the business people have to drive the solution evolution - not the IT people. They will support the solution but the ultimate ownership of the processes remains with the business.

So, the workbench model is the reference of all the changes (even if the implementation of the process changes have to be managed outside the workbench. WebSphere MQ Workflow, WebSphere, or any other technical area

of such business integration solution must be transparent for the business analyst (and the users).

For example, the following process changes driven by the Business Analyst have to be reflected into the workbench model:

- ▶ Organization and managers changes.
- ▶ Employees movements (new hired, jobs changes and so on).
- ▶ Process rules and practices.
- ▶ Business measures.

Then, if necessary, when taking the new model to run time, any changes to the user interface, will have to be designed and developed jointly between the Business Analyst and the IT Specialist.

Business integration deployment

Once the model is developed, tested, and ready to be deployed to the users, the users must now be educated to use the new tools. (In addition, we suggest that you write a user guide with screen shots to help them).

In the case study, the education has been done in one session of two hours, grouping in one room all the employees involved in the end-to-end process. The attendee list was in fact the organization tree reflected in the workbench model including their managers.

The education support was the workbench model, projected on a screen, to follow the process task by task and to explain business rules. Alternatively, the run time screens were shown to illustrate the form and the progression of the information all along the process.

As such, for the first time, all the involved employees have seen and understood their value-add in the chain of tasks for the entire process.

This session has greatly improved their knowledge, not only on the process by itself, but also on the job performed by their colleagues. Following this session and based on the participative project management, it was possible to very easily deploy the case study solution. Employees have immediately adopted the tool, by the end of the first week eliminating 95% of the e-mails and all the previous manual tracking to perform the process.

At this stage, business integration is really becoming a collaboration tool, forcing adherence to the process, acceptance of the tool, and understanding of the impact of each in the success of the global process operations.

Business measures deployment

Business measures, and specifically cycle measurements, have been deployed separately to employees managers. On top of how to use the monitor, managers have to define clearly the rules of the management system to be implemented around real time measurements capabilities in the monitor.

Employees know that a monitor is measuring in real time their performance. Hence, managers will have to be careful on how to manage their business, based on monitor data. Employees need to be aware that the monitoring is not being used as a way to evaluate them, but a method to track the performance of the process itself. Here again, the Business Analyst is a key person to help managers to setup the right management system, illustrating for the management the fact that a bad performance has multiple root causes which can be found much more easily through real time measurement.

In the case study, monitor and workflow data has already highlighted organizational problems, employees bottlenecks, bad practices in parts requests. The fact that all these process behaviors are quantified on real data, and the fact that the solution is end- to-end keeping people focused on process goals, meant that conflicts were limited. Managers are more inclined to accept the facts and to work together to find a solution to optimize the process operational results.

Management decisions on process changes is one of the inputs that the Business Analyst has to deal with to change the process and translate it into the workbench model as business needs shift.

9.1.3 After the case study

Now we will discuss some of the initiatives that have happened as a direct result of the case study, and some that are being considered for the next steps.

Automation

The case study business integration solution that was deployed is based only on connecting people to rationalize information transmission, synchronize people and optimize employee practices end-to-end. But, a lot of automation opportunities exist all along the process, the ability to connect not only people but systems, using workflow and a combination of WebSphere Business Integration Adapters and brokers would allow for:

- ▶ Scan automatically the 7 ordering systems to detect potential supply to satisfy the request.
- ▶ Automate ordering transactions in internal and external systems when the supply proposal is approved by the product analyst.

- ▶ Automate transactions in internal systems when parts are delivered from an organization to another.
- ▶ Automate tracking of shipments in external system to update the shipment date.
- ▶ Send messages to mobile phones to alert manufacturing engineering technical support.

For the case study, it was decided to start small, meaning one process without any system automation. As it is a success, it has been agreed by company management to pursue the next step and start system connections.

This will require extending the skill set of the cast members, specifically the IT Specialists and Architects, on how to architecture the other elements of business integration such as adapters, brokers and so on... to be able to connect the processes in a heterogeneous environment of IT applications.

It also requires a new cast member - that is the person with the specialist knowledge of the individual IT applications themselves.

As of today, the current solution benefits are balanced between operational gains and investment in hardware, software and people knowledge.

With automation, the return of investment will take another dimension, 10% to 20% of workload decreasing is expected on the parts replenishment process.

Complex processes

Following the case study project and once the automation knowledge has been acquired, more complex end-to-end processes will be deployed. In fact, processes studies are already started. They are mainly end-to-end processes monitoring across IT applications to avoid manual tracking of operations.

The fact that business integration can allow a mix of automation and people interactions means that business integration can bring active monitoring, meaning minimizing time to react in real time based on business rules instead of getting reports, analyzing them and only then starting corrective action or support. This classical loop is too slow, the end-to-end process goal is already missed.

Also, the start and end points of the end-to-end processes can be extended easily to encompass more activities and systems involved in the overall operations without having to develop costly bridges. The other advantage is that we are able to maintain focus and stay close on business language. Hence process changes are immediately translated into the workbench mode shortening the cycle to deploy a solution in production because it contains already it.

Business integration portal

In the other projects already engaged, as described in Chapter 1, “Overview” on page 1, some employees involved in the case study process will be also involved in the other processes under study. A business portal to allow them to connect from a role to another role in another process is being to be developed through the company intranet.

Others questions are raised and must be solved before we have too many more processes under business integration such as:

- ▶ Processes models standardization.
- ▶ Organizational changes management across workbench models.
- ▶ Employees roles changes across processes.

Business integration can bring a lot of advantages, but, if it is used widely in a company, it has to be under control and deployed carefully to assure company return on investment.

The next section will explain an example of a business process management and transformation to be developed in parallel with business integration deployment.

9.2 Elements of a business process management

This section extrapolates, from the case study project, what type of business process management system a company may implement to really make a difference between a tactical solution versus a strategic permanent transformation system. Managers can take some decisions to tune the process in their department, but they cannot initiate and perform end-to-end business process changes by themselves. They will have to delegate to somebody the permanent business process evolution.

It is the same for the case study collaboration solution, once used in the real environment, the environment has already generated changes to keep it optimized. That means a Business Process Analyst will have to revisit the workbench model to translate these environment changes (after management approval) into a new process (or new version of the process) to be exported in the run time.

A Business Process Analyst may be named on a long term basis to maintain the process. He will keep the contact with the users and the managers, and possibly, he could have also some end-to-end business process performances responsibilities.

If we take the network of processes described in Section 1.2, “The case study” on page 10, the business processes can be split to several business process analysts. Their responsibilities in a certified ISO company become the following:

- ▶ Be the focal point for the users and managers to detect business process changes.
- ▶ Translate business process changes into the workbench model.
- ▶ Interface with IT Architects and IT Specialists to plan business integration versions implementations.
- ▶ Assure employee education to business process changes.
- ▶ Assure business process compliance to ISO and legal rules.
- ▶ Report end-to-end performances (Monitor dashboards) and propose changes to company management.

Also, the Business Process Analysts will have to be helped to integrate the right activities into the business process practice to be compliant to ISO, legal, or company rules. For that, program managers in charge of such compliance area in the company will support the Business Process Analysts. Together they will generate the best and the most economical solution to be implemented into the business process practice to support the programs.

Finally, management meetings will have to take place to review on a regular basis end-to-end business process performances. During these meetings, Business Process Analysts will have the responsibility to present business process adaptability through a plan of actions and recommendations.

Additionally, company management will have to foster a business process culture to keep the business process management system credible.

The following picture shows how an articulation of all these elements of a business process management system.

As you can see, the cast of our case study remains involved in the solution as it evolves and grows.

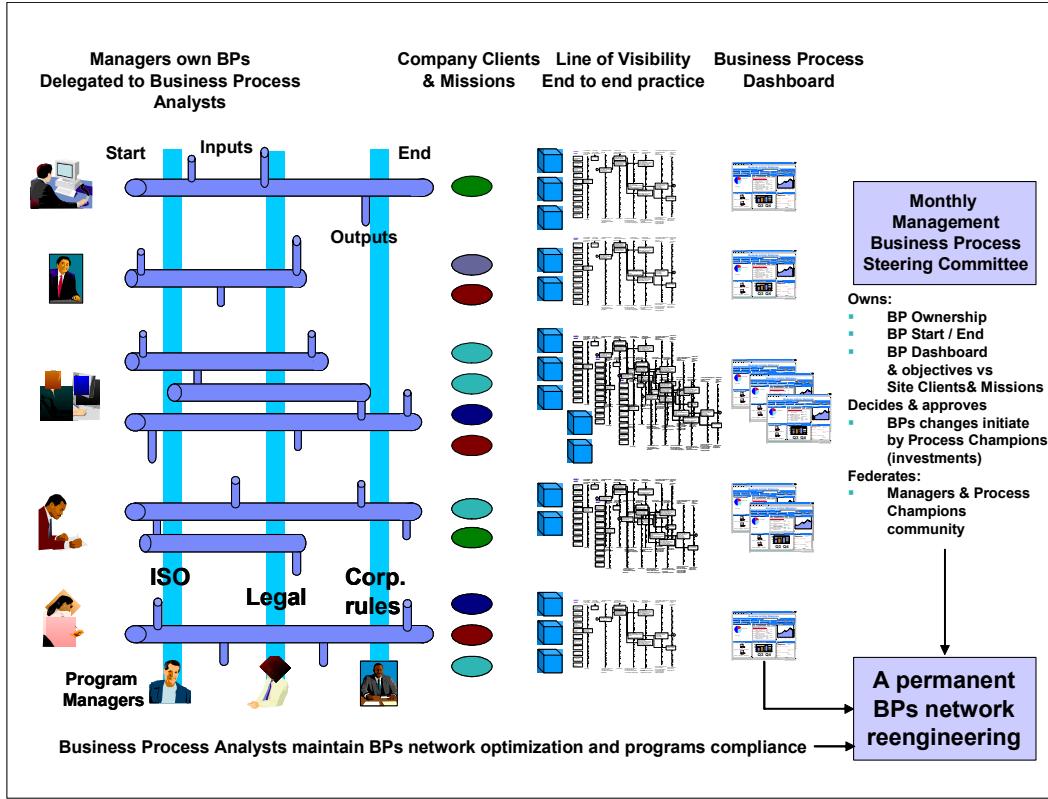


Figure 9-1 Elements of a company business process management system

That ends this redbook. Starting from a re engineering case study and finishing on a permanent transformation system for the company. In the middle, business integration with workbench and WebSphere MQ Workflow has brought a key stone to a new era of company business process management. Technology is there to allow us enter in the next phase in business process optimization. The case study has demonstrated the feasibility and opened the door to other technology elements.

The technology limits are no yet fixed, only one is still and will be always true, the human limit on how to drive culture change and how to use the technology tools to organize people around a common goal - and we have so far been successful. The best is yet to come...

Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

IBM Redbooks

For information on ordering these publications, see “How to get IBM Redbooks” on page 281. Note that some of the documents referenced here may be available in softcopy only.

- ▶ *Continuous Business Process Management with HOLOSOFX BPM Suite and IBM MQSeries Workflow, SG24-6590*
- ▶ *MQSeries Workflow for Windows NT for Beginners, SG245848*
- ▶ *Intra-Enterprise Business Process Management, SG246173*
- ▶ *An EAI Solution using WebSphere Business Integration, (V4.1) SG246849*

Other publications

These publications are also relevant as further information sources:

- ▶ Michael Hammer & James Champy, *Reengineering the Corporation - A Manifesto for Business Revolution*, HarperCollins, 1993, ISBN: 0066621127
- ▶ *IBM WBI Monitor User Guide Version 4.2.4*
- ▶ *IBM WBI Workbench UML Modeler User Guide Version 4.2.4*

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