IBM WBI Monitor

Deployment Guide

Version 4.2.4 (Fix Pack2)

Note !

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This edition applies to Version 4, Release 2, Modification 4 of IBM WebSphere Business Integration Modeler and Monitor products (5724-E46) and to all subsequent releases and modifications until otherwise indicated in new editions.

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About This Guide

The IBM® WebSphere® Business Integration (WBI) Monitor™ Deployment guide will guide you through the steps for deploying WBI Monitor. It also provides a technical background about the WBI Monitor client-server architecture.

Introduction: Provides an introduction to the WBI Monitor architecture and a description of the steps necessary to deploy the WBI Monitor in order to use it for monitoring business processes.

Part 1 IBM WBI Monitor Architecture and Requirements

Chapter 1: *WBI Monitor Architecture* is intended for technical IT personnel interested in learning about the client-server architecture of the WBI Monitor. In this chapter, you learn about the WBI Monitor's main components, their communications flows and their communications with other related applications.

Chapter 2: *Necessary Requirements before Deployment* lists the needed Hardware, Software and System requirements in order to deploy WBI Monitor.

Part 2 IBM WBI Monitor Deployment on Windows, AIX® and Solaris Platforms

Chapter 3: *Database Configuration* describes the general steps for creating the Monitor database and configuring both the Monitor and EventQueue databases.

Chapter 4: *WBI Monitor Deployment on Windows, AIX and Solaris Platforms* describes the steps for deploying WBI Monitor on IBM WebSphere Application Server automatically using the automated deployment wizard on Windows, AIX and Solaris platforms.

Appendix A: *Manual Deployment of WBI Monitor on WebSphere 4.0.2* describes the manual steps of deploying WBI Monitor on IBM WebSphere 4.0.2.

Appendix B: *Manual Deployment of WBI Monitor on WebSphere 5.0* Describes the manual steps of deploying WBI Monitor on IBM WebSphere 5.0 for both editions Application Server and Network Deployment.

Appendix C: *IBM DB2® 7.2 Database Server Configuration* describes the detailed steps for creating the Monitor database and configuring both the Monitor and EventQueue databases on IBM DB2 Universal Database™ v7.2 as an example of the Database configuration's detailed steps.

Appendix D: *Controlling the Logging Service in IBM WBI Monitor v4.2.4* describes the detailed steps for controlling the logging service and setting the debugging level in order to determine the message types that should be recorded in the log files.

Part 3 IBM WBI Monitor Deployment on OS/390® and z/OS™ Platforms

Chapter 5: *WBI Monitor Deployment on OS/390 and z/OS Platforms* describes the steps for creating the Monitor database and deploying WBI Monitor on IBM WebSphere on OS/390 and z/OS platforms.

Part 4 Upgrading your Existing Version of WBI Monitor to the Recent Version

Chapter 6: *Upgrading your Existing Version of WBI Monitor to the Recent Version* Describes the steps required for upgrading your existing version of WBI Monitor to the recent version

Glossary: Includes detailed definitions of the terms mentioned in this guide.

Introduction

Efficient business process management and continuous process improvement require managers to monitor their business processes regularly. Competitive pressures require management to effectively identify and rigorously assess process changes that are needed to meet the demands of market changes. Assessment of the effectiveness of changes in business strategies requires monitoring of business processes.

The WBI Monitor has been built to fulfill these requirements. WBI Monitor is a Java-based and Web-based client/server application that allows operation on virtually any platform. The following sections give a brief introduction to the WBI Monitor architecture and a description of the steps necessary to deploy the WBI Monitor in order to use it for monitoring business processes.

PART

I

IBM WBI Monitor Architecture and Requirements

Chapter 1: WBI Monitor Architecture

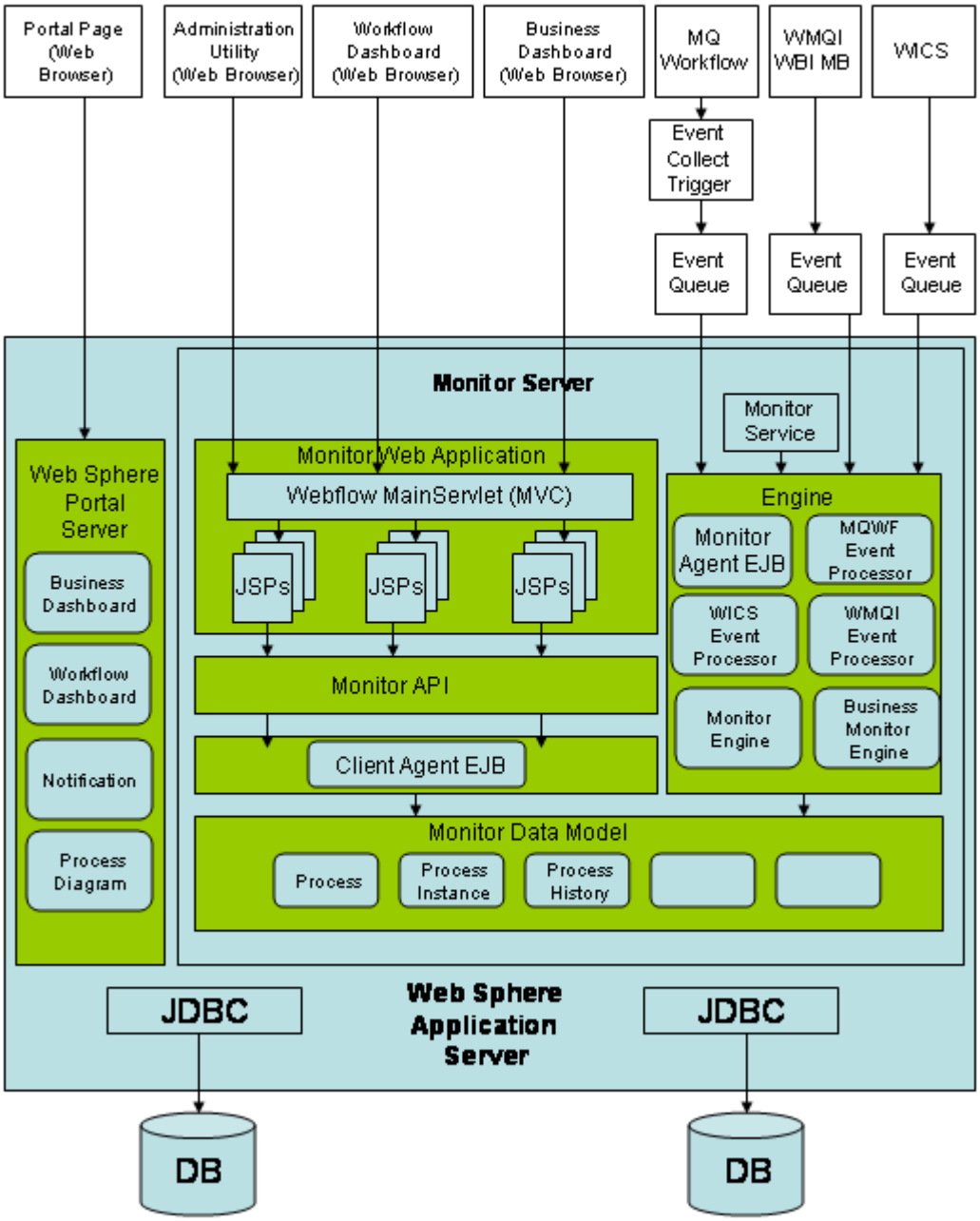
The **WBI Monitor** consists of the Monitor Server, which is hosted on an *application server* such as IBM WebSphere, and the following four distinct user clients:

- Administration Utility
- Workflow Dashboard
- Business Dashboard
- Notifications
- Monitor Portlets

The Monitor Server consists of the following six modules:

- Client Agent EJB
- Monitor Engine
- Monitor Service
- Monitor Web Application
- Monitor Data Model
- Monitor API

The Monitor Server communicates with IBM MQSeries® Workflow, IBM WebSphere MQ Integrator (WMQI) (or IBM WBI Message Broker), and IBM WebSphere InterChange Server (WICS) through the Event Collector Triggers. Those triggers are installed on the MQSeries Workflow runtime database in case of using the MQSeries Workflow as the engine, or installed on the Monitor database in case of using WMQI or WICS as the engine. These triggers copy the events with the container data to the Monitor Event Queue tables. The data in the tables stay in the database waiting for processing by the Monitor Engine. The Monitor Server polls those tables to retrieve, process, and finally delete these events from the Monitor Event Queue tables when processing is done.


Portal Page (Web Browser)
Administration Utility (Web Browser)
Workflow Dashboard (Web Browser)
Business Dashboard (Web Browser)
MQ Workflow
WMQI WBI MB
WICS
Event Collect Trigger
Event Queue
Event Queue
Event Queue
Monitor Server
Monitor Service
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Monitor Web Application
Webflow MainServlet (MVC)
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JSPs
JSPs
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Client Agent EJB
Engine
Monitor Agent EJB
MQWF Event Processor
WICS Event Processor
WMQI Event Processor
Monitor Engine
Business Monitor Engine
Monitor Data Model
Process
Process Instance
Process History
JDBC
Web Sphere Application Server
JDBC
DB
DB

1.1 Monitor Server

The server works behind the scene to handle all the operations of the four user clients. As mentioned before, it consists of six components:

- Client Agent EJB
- Monitor Engine
- Monitor Service
- Monitor Web Application
- Monitor Data Model
- Monitor API

These components are responsible for:

- Cleaning up the Monitor database tables
- Providing Data Security
- Importing the XML (modeling data) created in **IBM WebSphere Business Integration** (**WBI**) **Workbench**™
- Handling the communication with user clients
- Handling the events coming from **MQ Workflow**, **WebSphere MQ Integrator (WMQI)**, **WebSphere Business Integration Message Broker**, or **WebSphere InterChange Server (WICS).**
- Encapsulating the SQL statements for data access.

1.1.1 Client Agent EJB

This Session Enterprise Java Beans (EJB) is responsible for administering the Monitor Server, and the communication between the Monitor Server and the Monitor Clients. It handles the WBI Monitor database tables cleanup, data security, and importing the XML file created in WBI Workbench.

1.1.2 Monitor Engine

This module handles events coming from MQ Workflow, WebSphere MQ Integrator (WMQI), WBI Message Broker or WebSphere InterChange Server (WICS). The Monitor Engine picks up the events, processes them, and stores the output in the database for later retrieval by the clients. The processed events are deleted after processing.

1.1.3 Monitor Service

The Monitor Service runs as a continuously running servlet, to asynchronously call the Monitor Agent EJB to fetch the MQ Workflow, WMQI and WICS events

and process them. It is loaded at application startup from inside the Bootstrap servlet.

1.1.4 Monitor web application

The Monitor web application contains all necessary web resources to run the Monitor clients. These include JSP pages, servlets, HTML pages, images, etc…

1.1.5 Monitor Data Model

The Monitor Data Model is the database access layer of the Monitor Server. The Monitor server uses Java Database Connectivity (JDBC). All Database SQL statements are encapsulated in this layer.

1.1.6 Monitor API

The Monitor API is the Application Programming Interface layer of WBI Monitor. It hides the details of the server implementation, and gives any developer the capability to develop a customized user interface on top of the Monitor.

WBI Monitor client is actually built on top of this API. It has a published documentation in the form of Javadoc HTML format. It can be used to:

- Develop customized reports user Interfaces
- Extract data from WBI Monitor, whether current or historical, to be used in data warehousing for example.
- Access WBI Monitor Administrative functions

1.2 WBI Monitor Administration Tools

The WBI Monitor Administration Tools allow users to perform all the necessary steps to import the modeled business processes with their associated Business Measures. It also provides the capability to maintain the Event Queue and Monitor Database through managing the creation and dropping of these databases' tables, starting and stopping the event queue triggers, and cleaning up unnecessary data.

1.2.1 WBI Monitor Administration Utility

The WBI Monitor Administration Client is a Web-based client that allows users to do the following:

- Stop/restart the Event Queue triggers and create / Drop the Monitor and Event Queue database tables.
- Import WBI Workbench's XML files that contain the organizations and their processes and the Business Measures defined in WBI Workbench.
- Delete the unnecessary process instances and history data that were stored cumulatively in the monitor database after monitoring business processes. This enables users to automatically clean up the WBI Monitor database periodically as specified by a user-defined interval.

1.3 Monitor User Clients

The Monitor User Clients allow users to monitor the modeled business processes and their associated Business Measures.

1.3.1 Workflow Dashboard

The Workflow Dashboard is an HTML-based client that allows users to monitor the business processes at run time. The Workflow Dashboard allows users to view the:

- Built-in and user-defined Business Measures.
- Status of Process, Activity, Work Item, and Employee Instances for the whole Organization or for a particular Organization Unit.

1.3.2 Business Dashboard

The Business Dashboard is an HTML-based client that allows users to retrieve and view the historical data of the monitored business processes and to view and keep track of aggregated historical business measures.

1.3.3 Notifications

The Notifications is an HTML-based client that allows users to view all notifications sent from process instances of a process at run time. A notification is created and sent to specific user(s) according to the result of evaluating a specific Boolean business measure.

1.3.4 Monitor Portlets

There are four WBI Monitor Portlets:

- Workflow Dashboard Portlet.
- Business Dashboard Portlet.
- Notification Portlet.
- Process Diagram Portlet.

Chapter 2: Necessary Requirements before Deployment

The following chapter describes the requirements for deploying the **WBI Monitor**. It lists the hardware, system, and software requirements for the Monitor Server and Web Clients.

2.1 Monitor Server Requirements

2.1.1 Hardware Requirements

2.1.1.1 Windows Server

- Pentium III 650 MHz or higher
- 512 MB RAM or higher (1 GB RAM recommended)
- 50 MB Disk space, in addition to sufficient disk space for database

2.1.1.2 AIX Server

- IBM RS/6000®
- 1 GB RAM or higher
- 50 MB Disk space, in addition to sufficient disk space for database.

2.1.1.3 Solaris Server

- Sun server machine
- 1 GB RAM, or higher
- 50 MB Disk space, in addition to sufficient space for database.

2.1.1.4 z/OS or s/390 Server

- IBM zSeries 900 or S/390 system
- 1 GB RAM, or higher
- 50 MB disk space, plus sufficient space for database

2.1.2 System Requirements

2.1.2.1 Windows Server

- MS-Windows NT 4.0 (with Service Pack 4 or Higher) or MS-Windows 2000 Server

2.1.2.2 AIX Server

- AIX 4.3.3 or AIX 5.1 or later

2.1.2.3 Solaris Server

- Solaris 8, maintenance level August 2001 or later

2.1.2.4 z/OS or s/390 Server

- OS/390 Version 2.8, Version 2.9, Version 2.10, or
- z/OS Version 1.1 or Version 1.2

2.1.3 Software Requirements

2.1.3.1 Windows, AIX, and Solaris Platforms

- IBM DB2 Universal Database version 7.2 with Fixpack 10, or IBM DB2 UDB V8.1
- Oracle 8i Database Server release 8.1.7.1 or Oracle 9i Database Server release 9.0.1
- IBM WebSphere Application Server 4.0.2 Advanced Edition.Or
- IBM WebSphere Application Server v5.0 fixpack 1. Or
- IBM WebSphere Deployment Manager (Network Deployment) v5.0 fixpack 1.
- IBM MQSeries® Workflow 3.3.2 or IBM WebSphere MQ Workflow V3.4
- IBM MQSeries Workflow 3.3.2 Web Client or IBM WebSphere MQ Workflow V3.4 Web Client.
- IBM WebSphere MQ Integrator (WMQI) v2.1 or IBM WBI Message Broker v5.0
  * For WMQI v2.1:
    - WMQI v2.1 CSD 6, or
    - WMQI v2.1 CSD 5 with fix for APAR PQ77984, or
    - WMQI v2.1 CSD 4 with fix for APAR PQ77984
  * For WBI Message Broker v5.0:
    - WBI Message Broker v5.0 CSD 1 (CSD 2 recommended).

To monitor WebSphere Business Integration Message Broker and WebSphere MQ Integrator Broker event flows, the WebSphere Business Integration Message Broker MonitorEmitter node SupportPac is required. This SupportPac named IB01 and can be downloaded free of charge from the WBI Message Broker support Website.

- IBM WebSphere InterChange Server 4.2.2.1 Fix Pack.
- IBM WebSphere Portal Enable 4.2.0
- Java-enabled browser (IE 5.5 or higher).

2.1.3.2 z/OS and OS/390 Platforms

- IBM DB2 Universal Database for OS/390, Version 7.1 or higher
- IBM WebSphere Application Server V4.0.1 for z/OS and OS/390
- IBM MQSeries Workflow V3.3.2 SP3 or IBM WebSphere MQ Workflow V3.4
- IBM MQSeries Workflow 3.3.2 Web Client or IBM WebSphere MQ Workflow V3.4 Web Client.
- IBM WebSphere MQ Integrator (WMQI) v2.1.0 for z/OS:
  * WMQI v2.1 CSD 6, or
  * WMQI v2.1 CSD 5 with fix for APAR PQ77984, or
  * WMQI v2.1 CSD 4 with fix for APAR PQ77984

To monitor WebSphere Business Integration Message Broker and WebSphere MQ Integrator Broker event flows, the WebSphere Business Integration Message Broker MonitorEmitter node SupportPac is required. This SupportPac named IB01 and can be downloaded free of charge from the WBI Message Broker support Website.

2.2 Monitor Clients Requirements

2.2.1 Hardware Requirements

- Pentium III 650 MHz or higher
- 128 MB RAM or higher (256 MB RAM is recommended)

2.2.2 System Requirements

- Windows 98, Windows NT 4.0, Windows 2000, or Windows XP

2.2.3 Software Requirements

- Java-enabled browser (IE 5.5 or higher)

PART

II

IBM WBI Monitor Deployment on Windows, AIX and Solaris Platforms

Chapter 3: Database Server Configuration

This chapter provides you with the configuration parameters and steps needed for configuring your database server by creating the Monitor database and configuring both the Monitor database and the Event Queue database (the IBM MQSeries Workflow or the IBM WebSphere MQ Workflow database).

The instructions in this chapter assume that you are creating the WBI Monitor database for the first time. If you have an earlier version of WBI Monitor and there is an existing Monitor database that already contains data stored in its tables, then you need to upgrade your database to adhere to the latest modification in the current version of WBI Monitor 4.2.4 database, and migrate the stored data to the upgraded database. Please refer to the chapter entitled: Upgrading your Existing Version of WBI Monitor to the Recent Version for details about the database migration.

The sections below will guide you through creating and configuring the databases for IBM DB2 and Oracle database servers using all supported versions in Windows, AIX and Solaris platforms. Please refer to the IBM DB2 and Oracle documentation for the required steps of creating and configuring the databases.

You can refer also to Appendix C of this guide for an example of the detailed steps of creating the Monitor database and configuring both the Monitor database and the Event Queue database using IBM DB2 7.2 with fixpack 5 on Windows platform.

3.1 Configuring IBM DB2

The following sections are for the required parameters for configuring IBM DB2 database for both IBM DB2 7.2 and IBM DB2 8.1 on Windows, AIX and Solaris platforms:

Make sure that IBM DB2 Server is configured for JDK 1.2 or higher.

3.1.1 Create the Monitor Database

Create a new Database for Monitor. No specific name is required, though IBM WBI Monitor recommends ***WFMDB*** as the Monitor database name.

3.1.2 Configure the Monitor Database

To enhance the performance and increase the system throughput, you should configure Monitor database as well as the DB2 Instance hosting it by adjusting the following configuration settings with the following values, and then restart the DB2 instance:

Configuring the DB2 Instance Parameters:

Run the following database commands from the command line to set the following instance parameters:

- db2set DB2_RR_TO_RS=YES
- db2set DB2_HASH_JOIN=Y
- db2set DB2_EXTENDED_OPTIMIZATION=ON

Configuring the Monitor database (WFMDB) Parameters:

Adjust the following Database configuration parameters with the following values:

Parameter Name	DB2 Parameter Name	Parameter Location	Value
Maximum Storage for Lock list	LOCKLIST	Performance Tab/ Section	50000
Application Heap Size	APPLHEAPSZ	Performance Tab/ Section	4096
Application Control Heap Size	APP_CTL_HEAP_SZ	Performance Tab/ Section	4096
Maximum Lock per application	MAXLOCKS	Application Tab/Section	50
Lock timeout	LOCKTIMEOUT	Application Tab/Section	60
Group commit count	MINCOMMIT	Logs Tab/Section	3

- **Increasing the minimum commit count requires increasing the size of the transaction log to hold the transactions in the memory.**
- **In order for the above parameters to take effect, you must bounce the DB2 instance for the instance parameters and restart WebSphere Application Server for the database parameters.**

3.1.3 Calculate the Page Size

If one of the business processes in the organization file (.org) contains more than 55 business measures, you should calculate the page size by performing the following steps:

1. From the .org file, calculate the maximum number of business measures in any process of the model
2. Divide the calculated number by 55
3. Round the result number up to the nearest integral value. (e.g. if the result is 1.3 then the you should round it up to 2)
4. Multiply the last value by 4K.
5. Round the result up to the nearest value of 8K, 16K, 32K, etc. This will be the required page size. (E.g. if the result is 12K, then the required page size is 16K)

3.1.4 Create a Buffer Pool

Create one or more Buffer Pools (No specific name is required) to be assigned to the TableSpaces that will be created in the next step. Set the Page Size of each of these new Buffer Pools to be equal to the calculated page size you calculated in the previous step.

The performance of the WBI Monitor client's dashboards depends on the size of the created buffer pool that will be used to create the Monitor TableSpaces. For dashboards reports that aquire large volumes of data, it is strongly recommended to increase the Buffer Pool size to achieve better response time.

- **You must bounce the DB2 instance to be able to use the created Buffer Pool.**
- **If you have created this Buffer Pool before, then you can alter it to increase its size. and in this case you must bounce the DB2 instance in order to use the Buffer Pool with the new size.**

3.1.5 Create the Required TableSpaces

Create the required TableSpaces in both the Monitor Database (WFMDB) and the EventQueue Database (FMCDB). WBI Monitor allows you to control the distribution of the Monitor and the EventQueue Database tables and indices into a number of TableSpaces. The database tables and indices are grouped and categorized so that each category can be assigned to a separate TableSpace.

This number is the maximum number of TableSpaces to which you can assign the database tables and indices. This means you do not have to create all these TableSpaces, but you can create part of them. In this case, during the deployment steps, you can assign more than one group of tables or indices to the same TableSpace.

Please refer to the section named Database Tables and Indexes Allocation with Multiple TableSpaces below for details about the distribution of the Monitor and EventQueue database tables and indexes on multiple TableSpaces.

For each created TableSpace, add the TableSpace container and specify its name and directory.

The page size value of the MQ Workflow database table spaces is not affected by the number of business measures in the organization file processes.

3.1.5.1 DMS vs. SMS TableSpaces

In DB2, there is a trade off between low maintenance and high performance regarding the type of the used TableSpaces. System Managed Spaces (SMS) provide low maintenance overheads with low performance, while Database Managed Spaces (DMS) provide high performance but with higher maintenance overheads than SMS TableSpaces.

Splitting a database table and its indices on two different TableSpaces is a feature of DMS TableSpaces only.

For DMS TableSpaces, it is strongly recommended to use the same size for each container of the same tablespace to achive the optimum I/O operation.

Important Note: Please refer to IBM DB2 documentation for details about DMS Maintenance procedure

3.2 Configuring Oracle Database

In case you decide to create a Database Instance for WBI Monitor, follow the coming steps:

1. Create a new Database Instance for Monitor (No specific name is required, but IBM WBI Monitor recommends ***WFMDB*** as the Monitor Database Instance name).
2. Create the required TableSpaces in both the Monitor Database (WFMDB) and the EventQueue Database (FMCDB). WBI Monitor allows you to control the distribution of the Monitor and the EventQueue Database tables and indices into a number of TableSpaces. The database tables and indices are grouped and categorized so that each category can be assigned to a separate TableSpace.

   This number is the maximum number of TableSpaces to which you can assign the database tables and indices. This means you do not have to create all these TableSpaces, but you can create part of them. In this case, during the deployment steps, you can assign more than one group of tables or indices to the same TableSpace.

   Please refer to the section named *Database Tables and Indexes Allocation with Multiple TableSpaces* below for details about the distribution of the Monitor and EventQueue database tables and indexes on multiple TableSpaces.
3. For each created TableSpace, make sure that you allocate enough storage for the expected growth rate of the data size.
4. Enable the Java VM on both the WFMDB instance that you have created as the Monitor database, and the FMCDB database instance (the MQ Workflow Database), which is usually created by the fmczutil configuration utility of MQ-Workflow without the Java VM option.

You need to enable the Java VM option only if you have two separate database instances for the Monitor database and the EventQueue database. In case you are using the FMCDB instance as the Monitor database (Single Instance), then you don't need to perform this step.

5. Create a new user that will be used by the WBI Monitor server to access the Monitor database.
   - Make sure that the UNLIMITED TABLESPACE System Privilege is Granted for this user.

If you decide to use the FMCDB Instance (The MQ Workflow database) as the Monitor database instance (single instance for both), then the WBI Monitor will use the Monitor Connection User (WFM) to access the FMC Schema (the MQ Workflow database schema) in order to perform the following database actions:

- DDL actions

    * CREATE TABLE & DROP TABLE
    * CREATE TRIGGER & DROP TRIGGER
    * CREATE SEQUENCE & DROP SEQUENCE

- DML actions
    * SELECT
    * INSERT
    * UPDATE
    * DELETE
    * EXECUTE TYPE

3.3 Database Tables and Indexes Allocation with Multiple TableSpaces

3.3.1 In the Monitor Database (WFMDB):

- Administration tables and indexes can be assigned to Admin data Tables and Admin Data Indexes TableSpaces respectively. The Monitor database tables that will be associated with the first TableSpace are:
  - SCHEMA_HEADER
  - CONFIG_DATA
  - NEXT_ID
  - SYS_PROPERTIES
  - AGENTS
  - QUEUES
  - EB_SYNC_TABLE
  - MQ_SYNC_TABLE
  - WMQI_SYNC_TABLE
  - ICS_SYNC_TABLE
  - CLEANUP_SYNC_TABLE
  - NOTIFY_SYNC_TABLE

  The indexes of the tables above will be assigned to the second TableSpace.
- Static Model Data tables and indexes can be allocated to Static Model data Tables and Static Model Data Indexes TableSpaces respectively. The Monitor database tables that will be associated with the first TableSpace are:
  - ORG_UNIT
  - ORGANIZATION
  - ROLE_DATA
  - USER_DATA
  - PROCESS
  - PROCESS_MODEL
  - ACTIVITY

The indexes of the tables above will be assigned to the second TableSpace

- Runtime Data tables and indexes can be allocated to Runtime Data Tables and Runtime Data Indexes TableSpaces respectively. The Monitor database tables that will be associated with the first TableSpace are:
  * PROCESS_INST
  * ACTIVITY_INST
  * WORK_ITEM
  * VARIABLES
  * NOTIFY

  The indexes of the tables above will be assigned to the second TableSpace.
- Events Data tables and indexes can be allocated to Events Data Tables and Events Data Indexes TableSpaces respectively. The Monitor database tables that will be associated with the first TableSpace are:
  * EVENTS
  * DELAYED_EVENTS
  * MBEVENTS
  * CXFLOWEVENTRECORDS

  The indexes of the tables above will be assigned to the second TableSpace.
- Process Data tables and indexes can be allocated to Process Data Tables and Process Data Indexes TableSpaces respectively. The Monitor database table that will be associated with the first TableSpace is:
  * PROCESS_DATA

  The index of the table above will be assigned to the second TableSpace.
- Security tables and indexes can be allocated to Security Tables and Security Indexes TableSpaces respectively. The Monitor database tables that will be associated with the first TableSpace are:
  * SECGROUP
  * SECGRPMEMBER
  * SECACTION
  * SECSECOBJTYPE
  * SECACL
  * SECACE
  * SECPERMISSION
  * SECSECSESSION
  * SECUSER

* SECSECMANAG
* SECPRINCIPAL
* SECSECTYPE
* SECANDORCONSTR
* SECAND
* SECOR

The indexes of the tables above will be assigned to the second TableSpace.

- Different Large Objects (LOBs) tables can be assigned to several LOB TableSpaces as in the following:
  * Static Model Lob table can be allocated to Static Model Lob TableSpace. The Monitor database table that will be associated with this TableSpace is:
    - PROCESS_MODEL
  * Process Data Lob table can be allocated to Process Data Lob TableSpace. The Monitor database table that will be associated with this TableSpace is:
    - PROCESS_DATA
  * Configuration Data Lob table can be allocated to Configuration Data Lob TableSpace. The Monitor database table that will be associated with this TableSpace is:
    - CONFIG_DATA
  * Notify Extra Data Lob table can be allocated to Notify Extra Data Lob TableSpace. The Monitor database table that will be associated with this TableSpace is:
    - NOTIFY
  * Event Data Lob table can be allocated to Event Data Lob TableSpace. The Monitor database table that will be associated with this TableSpace is:
    - EVENTS
  * Delayed Event Data Lob table can be allocated to Delayed Event Data Lob TableSpace. The Monitor database table that will be associated with this TableSpace is:
    - DELAYED_EVENTS
  * WBI Message Broker Lob table can be allocated to WBI Message Broker Lob TableSpace. The Monitor database table that will be associated with this TableSpace is:
    - MBEVENTS

3.3.2 In the MQ Workflow Database (FMCDB):

- MQ Workflow Connector Queue (EventQueue) tables and indexes can be allocated to EventQueue Tables and EventQueue Indexes TableSpaces respectively. The database tables that will be associated with the first TableSpace are:
  * HS_AUDIT_TRAIL
  * HS_CONT_DETAIL
  * HS_PROC_DATA
  * HS_SCHEMA

  The indexes of the tables above will be assigned to the second TableSpace.
- MQ Workflow Data Lobs can be allocated to MQWF Data Lobs TableSpace. The database table that will be associated with this TableSpace is:
  * HS_CONT_DETAIL

3.4 Using the National Language Support (NLS)

To serve as many users as possible, WBI Monitor v4.2.4 provides Globalization features in order to support using multiple languages other than English.

The supported code pages are:

1252 - English	1255 - Hebrew
1252 - French	1256 - Arabic
1252 - German	932 - Japanese
1252 - Italian	936 - Chinese (Traditional)
1252 - Portuguese	950 - Simplified Chinese
1252 - Spanish	949 - Korean

Note: Switching GUI and text direction to Right-to-Left is not supported in this release.

The support for multiple languages rather than the English language requires that the WBI Monitor database must be created with UTF-8 code page.

If you have created the monitor database with a different code page (for example IBM-1252), whether as a new database for the recent version of WBI Monitor or for any previous version of WBI Monitor, and you need to allow using multiple languages then you must export all tables of the WBI Monitor schema (defaults to WFM unless changed) and import these tables into a newly created database with UTF-8 code page before the database migration. Please consult your Database Administrator for information about converting the code page of an existing database.

Chapter 4: WBI Monitor Installation

This chapter provides a step-by-step procedure that guides you through Installing IBM WebSphere Business Integration (WBI) Monitor with all its components and deploying the Monitor Server on Windows, AIX and Solaris platforms. The chapter also contains the procedures of un-deploying the Monitor Server and how to completely uninstall WBI Monitor. At this stage, it is assumed that all the prerequisite software has been installed, and the Monitor and Event Queue databases have been created and configured successfully.

The following conventions are used for all the instructions throughout this document:

- **<WebSphere>** : The WebSphere home directory. e.g. C:\WebSphere
- **<MQ>** : The MQ Workflow home directory. (For example: *C:\WebSphere\AppServer* on Windows platform, */usr/WebSphere/AppServer* on AIX platform, or */opt/WebSphere/AppServer* in Solaris platform).
- **<DB2>** : The DB2 home directory. (For example: *C:\SQLLIB*)
- **<Oracle>** : The Oracle home directory on the Oracle Server machine (if Oracle is not running on the same machine on which the IBM WebSphere Application Server is installed). For example: C:\oracle\ora81 (Local) or \\oracle_machine\oracle\ora81 (Network)
- **<Monitor>** : The Monitor installation directory. (For example: *C:\WBIMonitor*)
- **<WebServerName>** : The name of the machine that hosts the Web server for which the WebSphere is configured. (For example: The machine name on which the IBM HTTP Server or Microsoft IIS 4.0 or IIS 5.0 is installed)
- **<ServerName>** : The name of the server on which the Monitor will be installed.
- <**WebPath**> : The monitor web application web path (For example: */monitor*).

Important Notes:

- On AIX and Solaris platforms, use forward slash / instead of back-slash \ when writing paths.
- The names and paths of folders and files are case sensitive.
- The names and paths of folders and files that you will specify during the installation should not contain any spaces. (For example, the Monitor installation directory, the WebSphere home directory, and/or the DB2 home directory)

- Make sure that the user account you are using have all needed permissions. For example, using a user account who has no permissions on WebSphere or the Database will fail to install and deploy the monitor.
- On AIX 5.1 platform, the environment variable named **LIBPATH** must be appended with the following paths: **<MQ>**/*lib* and **<MQ>**/*lib*/*mqserver*. To do this, type the following command in the console window from which you will start the WebSphere and then press Enter:

  *export LIBPATH=$LIBPATH:***<MQ>**/*lib:***<MQ>**/*lib*/*mqserver*

- The Monitor will not work if the server properties *client.encoding.override* or *default.client.encoding* are set to any encoding other than UTF-8.

  If you are using WebSphere Application Server 4.0.5, the property **client.encoding.override=UTF-8** should be added explicitly in the server JVM's settings. This must be done manually after you finish the deployment if you performed the deployment automatically using the WBI Monitor Installation Wizard as in the following steps:

  * Open Administrator's console
  * Select the Monitor Server from the Application servers
  * Select the **JVM Settings** tab
  * In the **System Properties** list, click **Add**
  * Type **client.encoding.override** as the property name.
  * Type **UTF-8** as the value.
  * Click apply and restart the server

- Make sure to increase the parameter named Statement Cache Size of the connection pool for all Data Sources that are created after successful deployment. The default value for WebSphere Application Server 4.x is 100 which is suitable for single threaded event processor. You should increase it to enhance the system performance if you plan to configure multiple event processors. The default value for WebSphere Application Server 5.x is 10 which must be increased to 100 if you plan to use single threaded event processor or to more than 100 if you plan to configure multiple event processors.

4.1 IBM WBI Monitor Installation Wizard

The WBI Monitor is installed using the **WBI Monitor Installation Wizard.** This wizard allows you to do the following:

- Perform only the manual installation of the WBI Monitor components by extracting the necessary folders and files that are required for the installation and deployment.
- Install the WBI Monitor components and perform the automatic deployment for these components as follows:
  * Perform the automatic deployment of the Monitor Server on IBM WebSphere Application Server 4.0.2 or IBM WebSphere Application Server 5.0 or IBM WebSphere Deployment Manager 5.0 on Windows, AIX and Solaris platforms.
  * Install the WBI Monitor Portlets on a specific WebSphere Portal Server.
  * Install the LDAP Bridge

The following sections in this chapter describe how to use the WBI Monitor installation wizard to install these components automatically.

For a description of the manual deployment of Monitor Server on WebSphere 4.0.2, please refer to *Appendix A* of this guide: *Manual Deployment of WBI Monitor on WebSphere 4.0.2*. For a description of the manual deployment of Monitor Server on WebSphere 5.0, please refer to *Appendix B* of this guide: *Manual Deployment of WBI Monitor on WebSphere 5.0.*

For a description of the manual installation of WBI Monitor Portlets on a WebSphere Portal Server, please refer to the section entitled *Installing WBI Monitor Portlets* in *chapter 4 WebSphere Portal Support* of the *WBI Monitor User Guide*

For a description of how to Control the Logging Service in IBM WBI Monitor, please refer to *Appendix D* of this guide: *Controlling the Logging Service in IBM WBI Monitor v4.2.4*

4.1.1 Starting the WBI Monitor Installation Wizard

The WBI Monitor Installation Wizard starts by running the jar file named ***WBIMonitor424.jar*** from the product CD or from the location where you have extracted the contents of the zip file that you downloaded from the Internet.

Before starting the WBI Monitor Installation Wizard, you have to make sure that an environment variable named WAS_HOME is defined and contains the actual path of the IBM WebSphere Application Server installation directory. If this variable is not defined, then you must define it by doing the following:

• **On Windows platform:**

1. Open a command line window.
2. Type the following:

   WAS_HOME = **<WebSphere>**

   Set WAS_HOME
3. Run the WBIMonitor424.jar from this command line window.

• **On AIX or Solaris platforms:**

1. Open a Terminal Console using root.
2. Type the following in the command line:

   WAS_HOME= **<WebSphere>**

   export WAS_HOME
3. Run the *WBIMonitor424.jar* from this terminal console.

If you are using IBM DB2 as the database server on AIX and Solaris platforms only, make sure that you run the Installation wizard with a user who is in the DB2 Administrators group. You should also run at least once the **<DB2>**/*db2profile* file from the same terminal console from which you will start the wizard. In order to run the db2profile command:

1. Open a terminal console.
2. Change the directory to **<DB2>**.
3. Type the following in the command line and then press **Enter**:
   ../db2profile
4. Run the *WBIMonitor424.jar* file from the same terminal console.

You have to make sure also that the IBM JDK 1.3.0 is installed on your machine. Alternatively, you can use the IBM JDK that is shipped with IBM WebSphere Application Server.

To start the WBI Monitor Installation Wizard, run the WBIMonitor424.jar file by doing the following:

• **On Windows platform**:

1. Start a command prompt window.
2. Type the following in the command prompt and then press Enter:

   java.exe -jar G:\WBIMonitor424.jar

Where G: is your CD drive name. Replace this name with the actual name of your CD drive or with the location where the *WBIMonitor424.jar* file exists.

If the java.exe is not included in the Path environment variable path then type the full path of java.exe (e.g. C:\WebSphere\AppServer\java\bin\java.exe).

• On AIX and Solaris platforms:

1. Start a terminal console as root.
2. Type the following in the command prompt and then press Enter:

java -jar /tmp/WBIMonitor424.jar

Where /tmp is the location where the WBIMonitor424.jar file exists.

If the java is not included in the PATH environment variable, then type the full path of java (e.g. "*/usr/WebSphere/AppServer/java/bin/java*" in AIX platform or *"/opt/WebSphere/AppServer/java/bin/java"* in Solaris platform)

In the following sections of this chapter, you will be guided through the detailed steps of using the WBI Monitor Installation Wizard to install the WBI Monitor components.

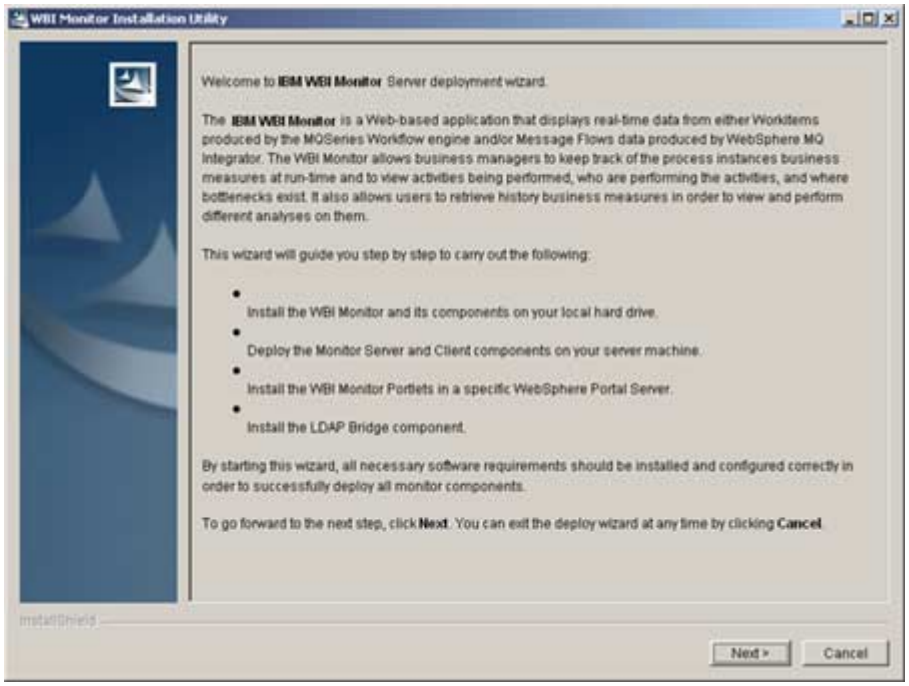
4.2 WBI Monitor Server Installation and Deployment

The Monitor Server component can be deployed automatically on WebSphere Application Server using the WBI Monitor Installation Wizard by selecting the Automatic Deployment as the deployment type.

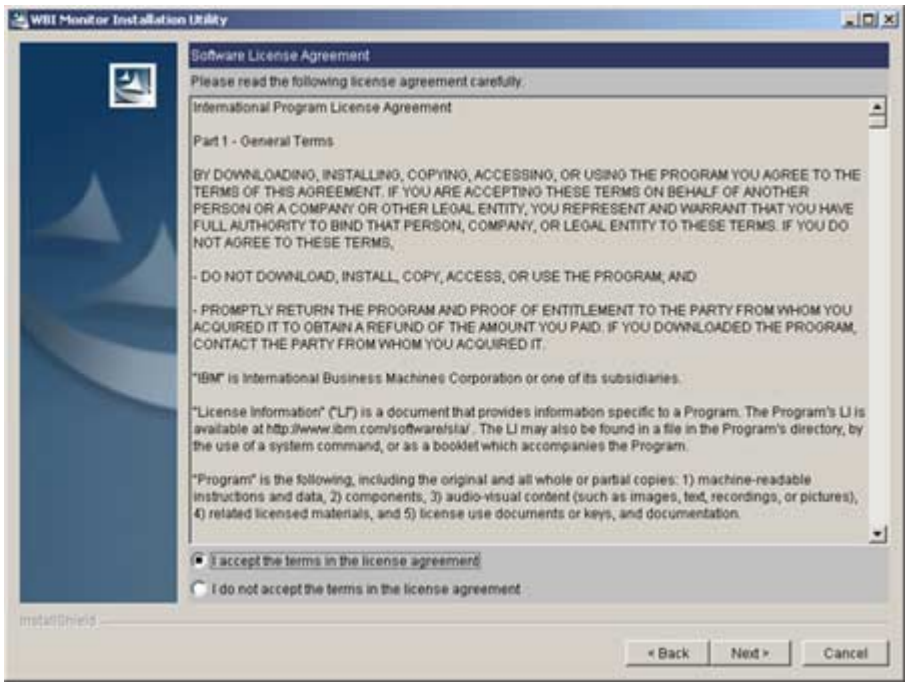
The wizard will lead you through a set of steps to gather the required information for the Monitor Server deployment, and then the wizard will deploy the Monitor Server automatically.

The following are the wizard steps for installing and deploying Monitor Server:

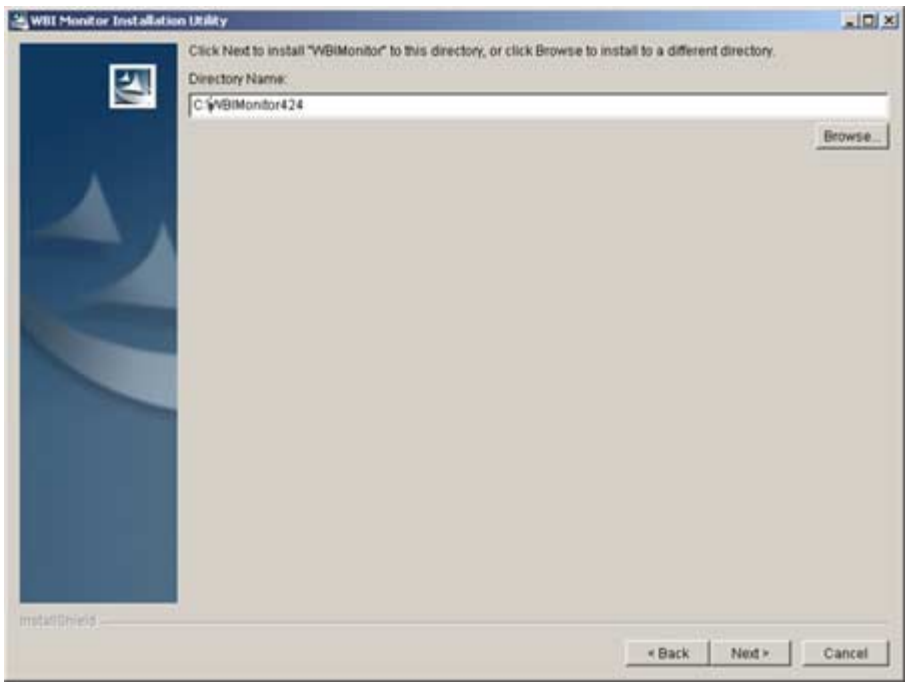
1. The WBI Monitor Installation Wizard starts on the **Welcome** screen. For all wizard steps, to go forward to the next step, click **Next**. To go back to the previous step click **Back**. You can exit the wizard at any time by clicking **Cancel**.



2. The next screen is the License Agreement. Read the License Agreement carefully and select the **I accept the terms in the License Agreement** radio button to accept the agreement, then Click Next to continue. If you select the **I do not accept the terms in the License Agreement** then you will exit this installation wizard.

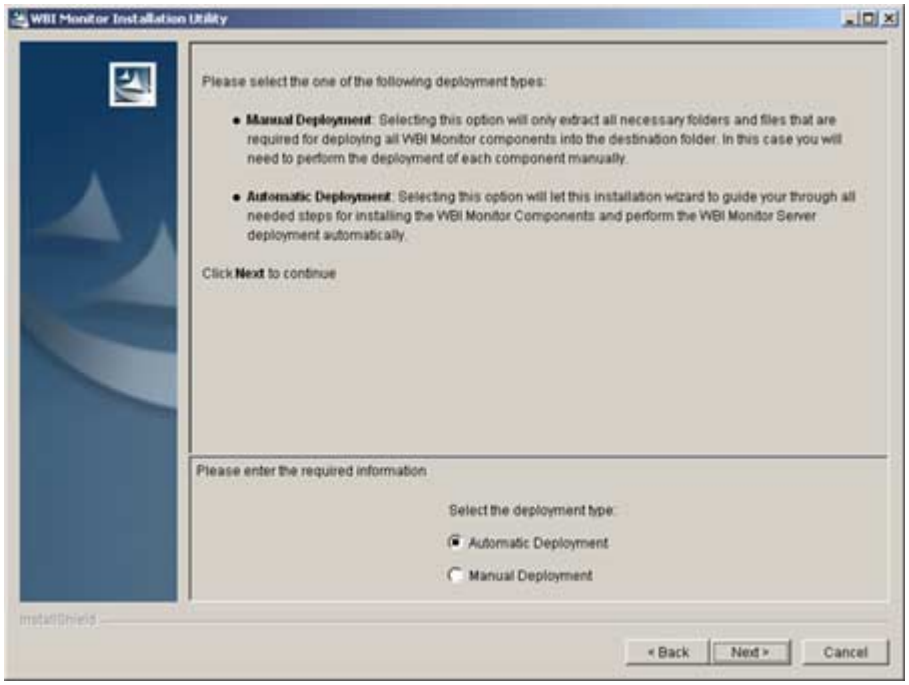


3. In the next screen you should enter the Monitor installation directory (**<Monitor>**) where the necessary folders and files will be extracted. This directory also will be the WBI Monitor Working Directory. You can accept the default path or change this path to a new folder. Then, you can click **Next** to continue.



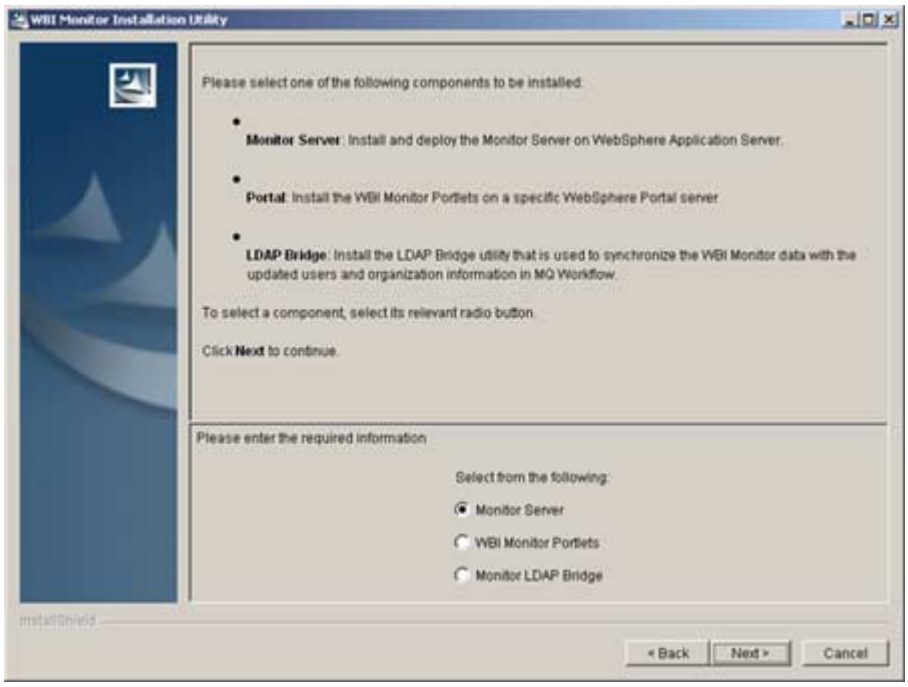
4. The next screen is the **Deployment Type** where you can select one of the following deployment types:

- **Manual Deployment**: Selecting this option will only extract all necessary folders and files that are required for deploying all WBI Monitor components into the destination folder. In this case you will need to perform the deployment of each component manually.
- **Automatic Deployment**: Selecting this option will let this installation wizard perform all needed steps for installing the WBI Monitor Components and perform the WBI Monitor Server deployment automatically.

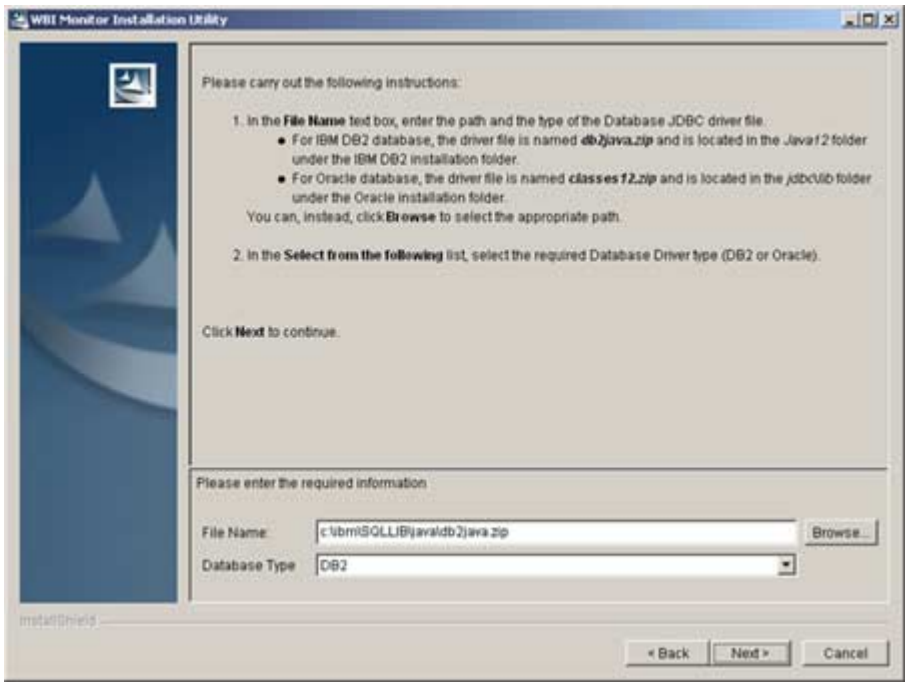


Select the **Automatic Deployment** option and then click **Next** to continue.

5. The next screen of the WBI Monitor Installation Wizard appears if you select the **Automatic Deployment** option as the deployment type. In this screen, you should select one or more of the WBI Monitor components to be installed. Select the **Monitor Server** option to install and deploy the WBI Monitor Server component and then click Next to continue.



6. In the next wizard screen you will be asked to enter the path and the type of the Database JDBC driver file. For IBM DB2 database, this driver file is named ***db2java.zip*** and is located in the **<DB2>***Java12* folder. For Oracle database, this driver file is named ***classes12.zip*** and is located in the **<Oracle>***jdbc**lib* folder. Enter the required path or click Browse to select the path. Then select the driver type from **DB Driver Type** combo box. If the entered path is not correct, then you will be informed by a message, and the wizard will not continue until you enter the correct path. Then, you can click **Next** to continue.



7. In the next screen you will be asked to enter the following information for the Monitor database:

   - In the **Name/URL** field, enter the Monitor database name (or the database URL).

     * If you are using Oracle database server, then type the following for the Monitor database URL: *jdbc:oracle:thin:@***<Oracle_Server_Name>***:***<Oracle_Server_Port_Number>***:WFMDB*

     * Where **<Oracle_Server_Name>** is the name or the IP address of the Oracle Database Server machine, and **<Oracle_Server_Port_Number>** is the Oracle Server Port Number (the default port is 1521)

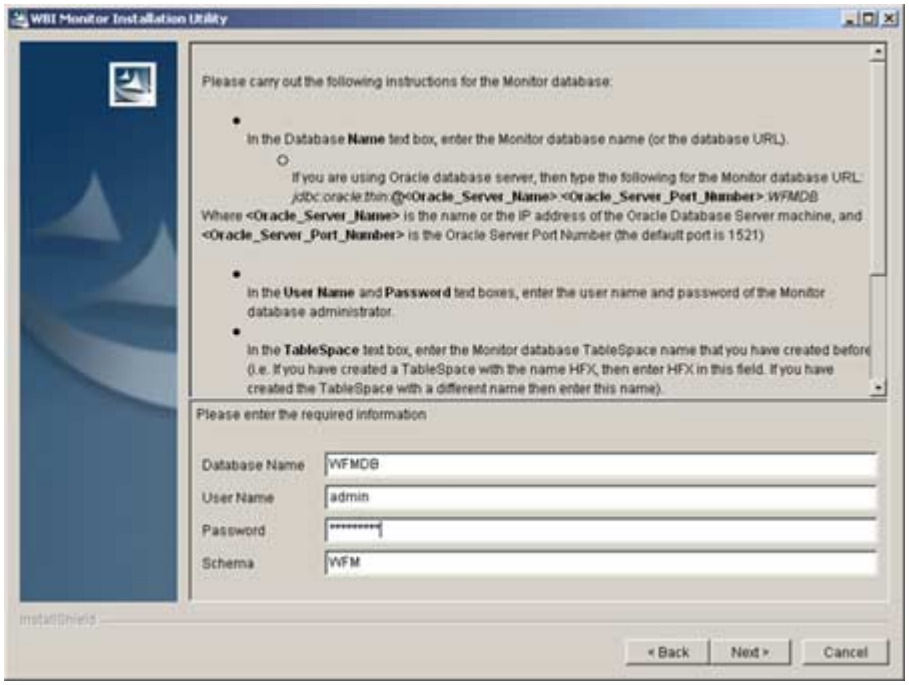
   - In the **User Name** and **Password** fields, enter the user name and password of the Monitor database administrator.

   - In the **Schema** field, enter the Monitor database schema (The default value is WFM).

     * In Oracle Database, the Monitor database schema must be the same as the Database Administrator's User Name

   The wizard will check the connection with the database using the entered database name (or URL), user name and password. If one or more of the entered parameters are not correct, then you will be

informed by a message, and the wizard will not continue until you enter the correct parameters. Then click **Next** to continue.



The wizard will also check this database to verify if it is a newly created database or a database of an earlier version of the WBI Monitor that requires to be upgraded to the recent version's modifications. If the specified database belongs to the previous version of WBI Monitor, then a message will appear to tell you that the specified database belongs to a previous version of WBI Monitor, and it needs to be upgraded using the Database Migration Utility before starting this Installation Wizard. Then the wizard will be terminated.

Please refer to the section entitled *WBI Monitor Database Migration* in *Chapter 6: Upgrading your Existing Version of WBI Monitor to the Recent Version* in this guide for detailed information about the Database upgrade.

8. After you enter the Monitor database information and if the , you should specify the names of the required TableSpaces for each group of tables and indexes in the Monitor database as follows:

   - In the **Default TableSpace** field, type the name of the TableSpace that you want to set as the default TableSpace. This TableSpace will be used as the TableSpace of any tables or indexes group for which you have not specified a TableSpace.

If you leave this field empty, then the database default TableSpace will be considered and used as the default TableSpace.

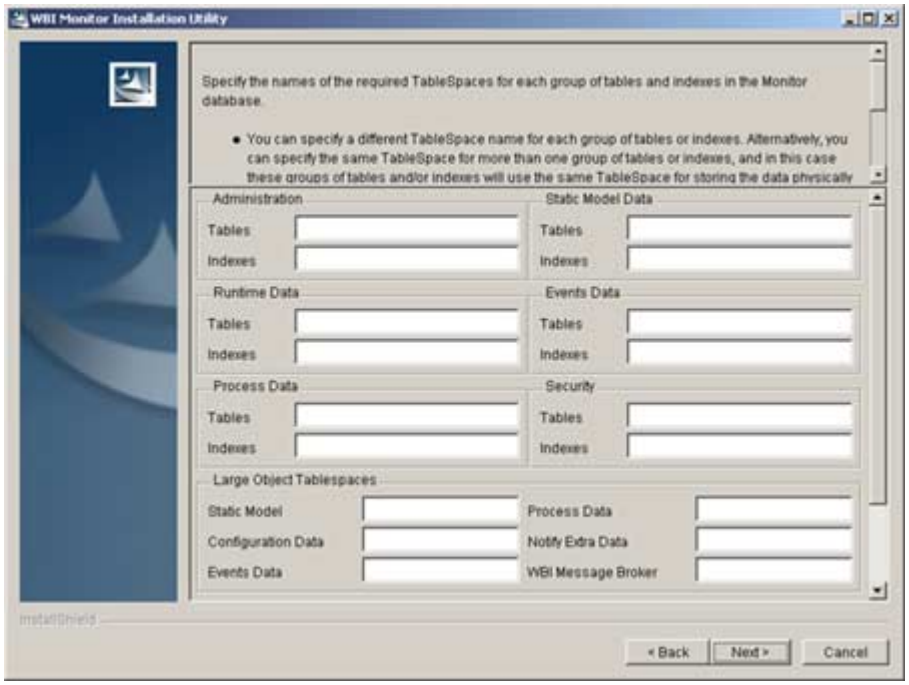
- In the **Administration** section, type a TableSpace name for each of the following:
    * Administration Tables.
    * Administration Indexes.
- In the **Static Model Data** section, type a TableSpace name for each of the following:
    * Static Model Data Tables.
    * Static Model Data Indexes.
- In the **Runtime Data** section, type a TableSpace name for each of the following:
    * Runtime Data Tables.
    * Runtime Data Indexes.
- In the **Events Data** section, type a TableSpace name for each of the following: (These TableSpaces are used for the Event Queue (MQ Workflow) database):
    * Events Data Tables.
    * Events Data Indexes.
- In the **Process Data** section, type a TableSpace name for each of the following:
    * Process Data Tables.
    * Process Data Indexes.
- In the **Security** section, type a TableSpace name for each of the following:
    * Security Tables.
    * Security Indexes.
- In the **Large Objects TableSpaces** section, type a TableSpace name for each of the following:
    * Static Model Lob.
    * Process Data Lob.
    * Configuration Data Lob.
    * Notify Extra Data Lob.
    * Event Data Lob.
    * WBI Message Broker Lob.

You can specify a different TableSpace name for each group of tables or indexes. Alternatively, you can specify the same TableSpace for more than one group of tables or indexes. In the later case these groups of tables and/or indexes will use the same TableSpace for storing the data physically on the hard drive.

If you leave a blank field without specifying a TableSpace name, then the default TableSpace will be used for the corresponding group of tables or indexes.

The specified TableSpace should have been previously created in the Database server. Otherwise, the deployment will not be performed properly and you will not be able to create the database tables.

Click **Next** to continue.

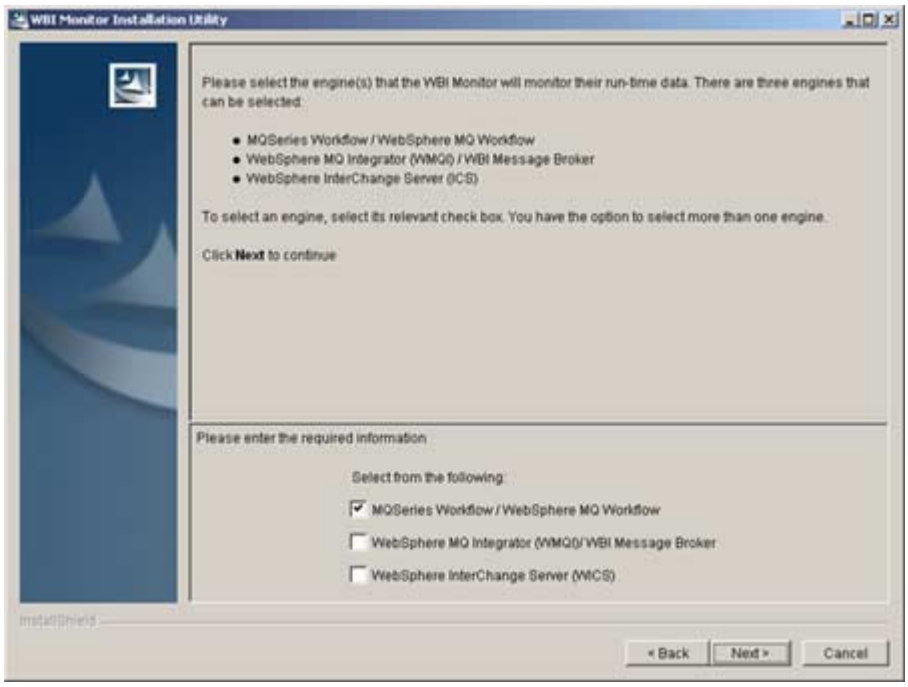


9. In the next screen you will be asked to select the workflow engine(s) that the WBI Monitor will monitor their run-time data. There are two workflow engines that can be selected:

   - MQSeries Workflow / WebSphere MQ Workflow

   - WebSphere MQ Integrator (WMQI) / WBI Message Broker

   - **WebSphere InterChange Server (WICS)**



You can select one of these options or you can select a combination of them. According to your selection, the wizard steps will vary to let you enter the required information for the selected option as will be described in the following sections.

If the specified WBI Monitor database belongs to a previous version of WBI Monitor, then the MQSeries Workflow / WebSphere MQ Workflow option will be selected by default and its check box will be disabled so that you cannot de-select it.

4.2.1 MQ Workflow is Selected

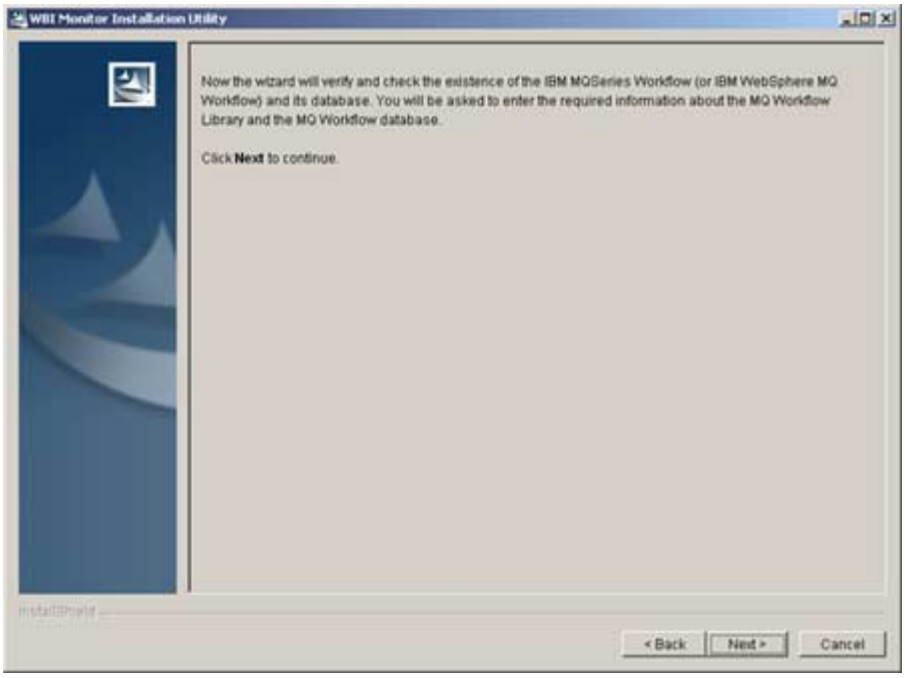
If you select the MQ Workflow option, whether you select it alone or with another option (WMQI and/or WICS), you must enter the following information:

- The MQ Workflow Configuration parameters.
- The MQ Workflow Database (the Event Queue Database) parameters.

In this case the WBI Monitor will be forced to authenticate the logged users to WBI Monitor Client through the MQ Workflow. That means any user who will login to WBI Monitor Client must be an MQSeries Workflow registered user, and only MQSeries Workflow users have the privilege to log in to WBI Monitor Client.

The following are the wizard screens that appear when you select the MQSeries Workflow / WebSphere MQ Workflow option:

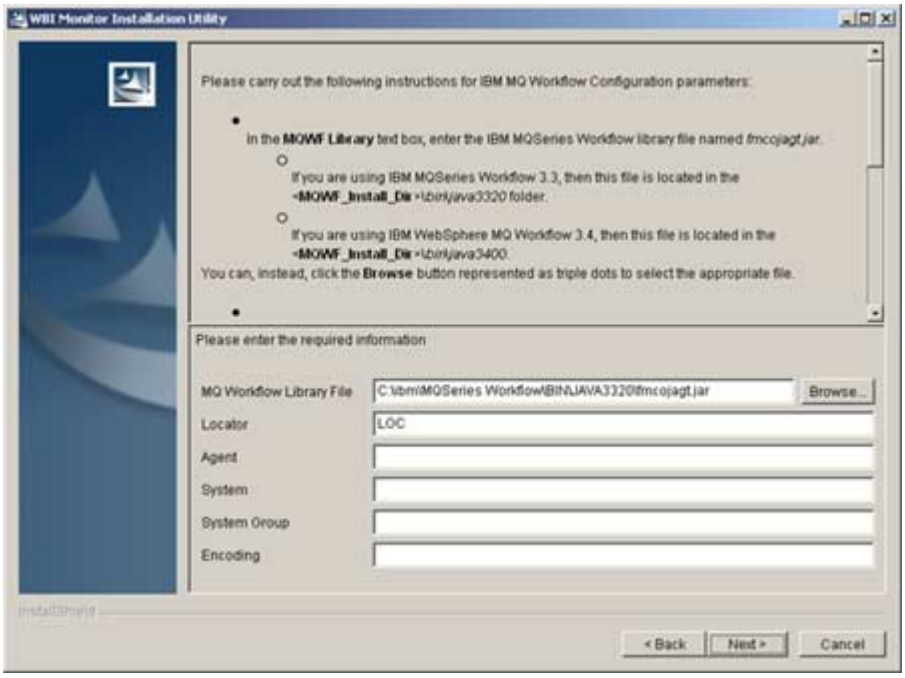
1. In the next screen you will be informed that the wizard will check for the existence of the IBM MQ Workflow and its database. Click **Next** to continue.



2. In the next screen you will be asked to enter the following IBM MQ Workflow Configuration parameters in each corresponding field:

   - **BM MQSeries Workflow Library**: The MQSeries Workflow library file named fmcojagt.jar and located in the <**MQ**>*bin**java3320* folder if you are using IBM MQSeries Workflow 3.3.2 or located in the <**MQ**>*bin**java3400* if you are using IBM WebSphere MQ Workflow 3.4. (You can click the Browse button represented as triple dots to select this file).
   - **Locator**: The MQSeries Workflow Locator Policy that is used to locate the MQSeries Workflow Java Agent. This property can have one of the following values: LOC, RMI, OSA, IOR, COS, or JNDI. The default is LOC (Local Locator Policy)
   - **Agent**: The MQSeries Workflow Agent's Name
   - **System**: The MQSeries Workflow System's Name.
   - **System Group**: The MQSeries Workflow System Group's Name.
   - **Encoding**: The MQSeries Workflow server machine encoding. (This property must be set if the MQ Workflow server machine encoding is different from the Monitor Server machine encoding).

Enter the required values for each corresponding field and click **Next** to continue.



Important Note: In MQ Workflow, a default configuration must be defined even if the entered System Group and System belong to a different configuration.

3. In the next screen you will be asked to enter the following information for the IBM MQ Workflow database (The Event Queue Database):
   - In the **Name/URL** field, enter the MQ Workflow database name or the database URL.
     * If you are using Oracle database server, then type the following for the MQ Workflow database URL:
       *jdbc:oracle:thin:@***<Oracle_Server_Name>***:***<Oracle_Server_Port_Number>***:FMCDB***
       where **<Oracle_Server_Name>** is the name or the IP address of the Oracle Database Server machine, and **<Oracle_Server_Port_Number>** is the Oracle Server Port Number (the default port is 1521)
   - In the **Administrator** and **Password** fields, enter the user name and password of the MQSeries Workflow database administrator.
   - In the **Schema** field, enter the MQSeries Workflow database schema (The default value is FMC).
     * In Oracle Database, the Event Queue database schema must be the same as the Database Administrator's User Name.

- In the MQ Workflow Connector Queue section, type the TableSpaces names for each of the following:
    * Tables
    * Indexes
    * Large Objects (LOBs)

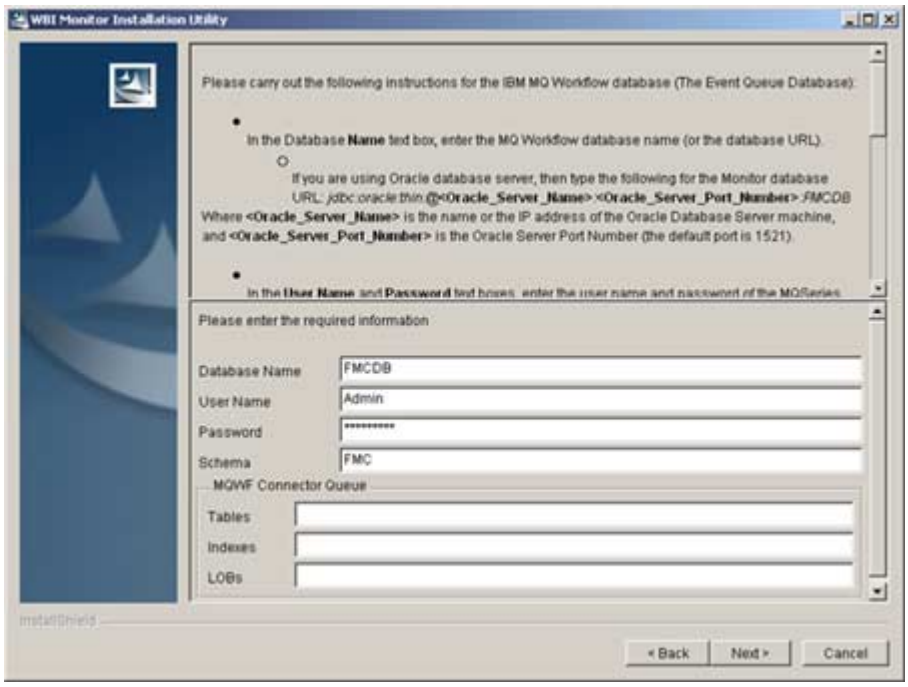
  You can specify a different TableSpace name for each of these three fields. Alternatively, you can specify the same TableSpace for more than one field. In the later case these groups of tables and/or indexes will use the same TableSpace for storing the data physically on the hard drive.

  If you leave a blank field without specifying a TableSpace name, then the default TableSpace will be used for the corresponding group of tables or indexes.

  The specified TableSpace should have been previously created in the Database server. Otherwise, the deployment will not be performed properly and you will not be able to create the database tables.

The wizard will check the connection with the database using the entered database name (or URL), user name and password. If one or more of the entered parameters are not correct, then you will be informed by a message, and the wizard will not continue until you enter the correct parameters.

Click **Next** to continue.



4.2.2 MQ Workflow is not Selected

If you select WebSphere MQ Integrator (WMQI) / WBI Message Broker and/or WebSphere InterChange Server (ICS) as the workflow engine, without selecting the MQSeries Workflow / WebSphere MQ Workflow, then you will be asked to enter the information about the authentication and security type that you will use to authenticate the logged users to the WBI Monitor Client, as long as you will not use the MQ Workflow authentication.

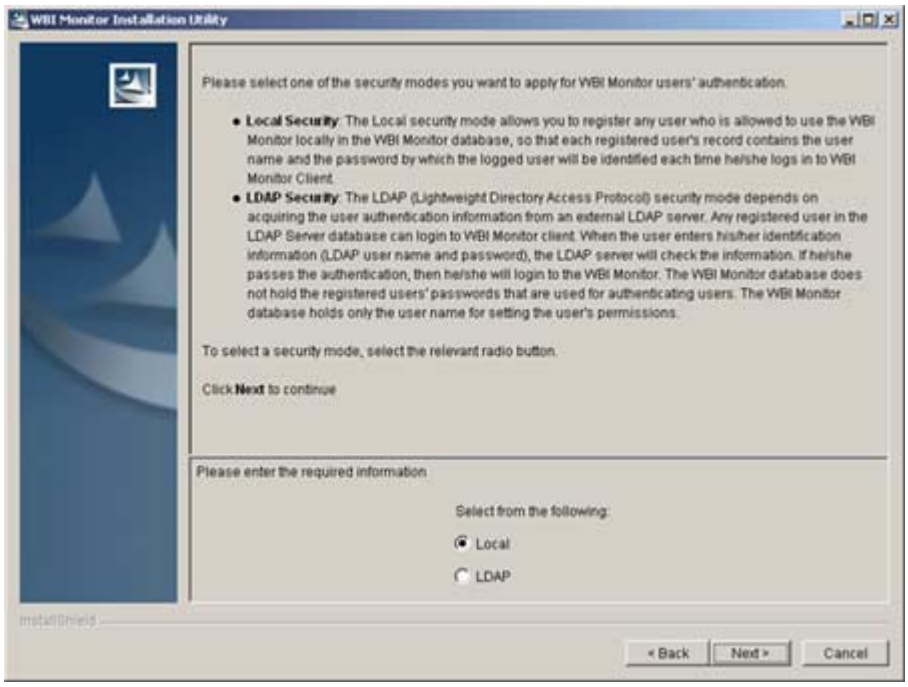
The following are the wizard screens that appear when you select WebSphere MQ Integrator (WMQI) / WBI Message Broker and/or WebSphere InterChange Server (ICS) as the workflow engine:

1. In the next screen, select the security mode you want to apply. You have the option to select one of the following security modes:

   - **Local Security**: The Local security mode allows you to register any user who is allowed to use the WBI Monitor locally in the WBI Monitor database, so that each registered user's record contains the user name and the password by which the logged user will be identified each time he/she logs in to WBI Monitor Client.

   - **LDAP Security**: The LDAP (Lightweight Directory Access Protocol) security mode depends on acquiring the user authentication information from an external LDAP server. The LDAP Server is a stand-alone, external server that holds a database of all employees who have an identification record in the LDAP Server database. For the LDAP Authentication method, any registered user in the LDAP Server database can login to WBI Monitor client. When the user enters his/her identification information (LDAP user name and password), the LDAP server will check the information. If he / she passes the authentication, then he will login to the WBI Monitor. The WBI Monitor database does not hold the registered users' passwords that are used for authenticating users. The WBI Monitor database holds only the user name for setting the user's permissions.

Select the appropriate security mode and then click **Next** to continue.



2. The next screen appears only if you select the LDAP Security mode to let you enter the required LDAP configuration parameters as follows:
   - In the **LDAP URL** field: Type the LDAP Server URL and port number (for example *ldap://ldapsrvr:389/*)

On AIX and Solaris platforms, type the LDAP server IP address instead of the server name

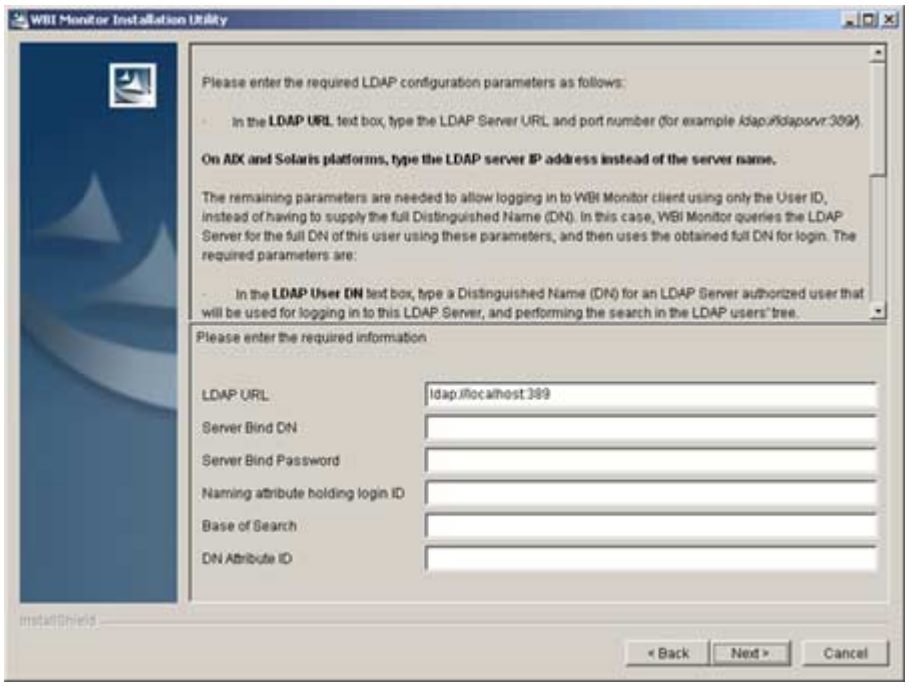
The remaining parameters are needed to allow logging in to WBI Monitor client using only the User ID, instead of having to supply the full Distinguished Name (DN). In this case, WBI Monitor queries the LDAP Server for the full DN of this user using these parameters, and then uses the obtained full DN for login.

The required parameters are:

- In the **Server Bind DN** field: Type a Distinguished Name (DN) for an LDAP Server authorized user that will be used for logging in to this LDAP Server, and performing the search in the LDAP users' tree.
- In the **Server Bind Password** field: Type the password of the defined User DN.

The Server Bind DN and Server Bind Password fields are optional. If you leave these fields empty without specifying a user then the user *anonymous* will be used. In this case this user should have at least read/search access rights on the LDAP directory.

- In the **Naming Attribute Holding Login ID** field: Type the name of the prefix that precedes the user ID in the LDAP Server database (i.e. CN, UID,...etc). The value of this parameter varies between the different types of LDAP Servers.
- In the **Base of Search** field: Type the starting point in the LDAP tree from which the query will start searching for the full DN of the given user ID.
- In the **DN Attribute ID** field: Type the name of the Distinguished Name attribute ID (for example *distinguishedName*, *entrydn* ...etc. This value is case sensitive).



- Click **Next** to continue.

4.2.3 Continuing the Wizard Steps

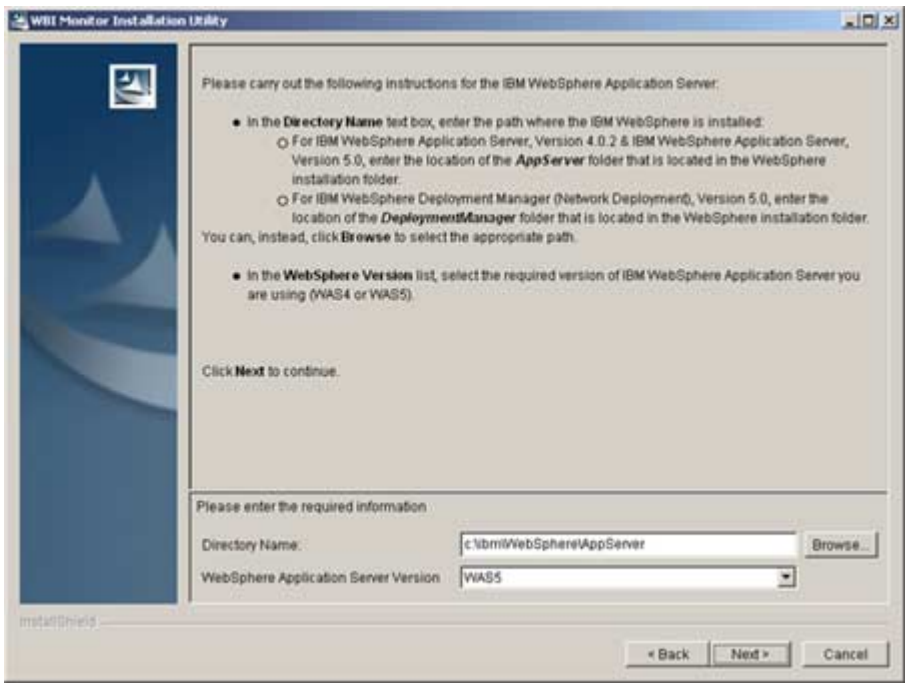
Now after entering the required information according to the selected engine, the wizard steps will continue to complete installing the Monitor Server component.

1. In the next screen, you will be asked to enter the Installed version of IBM WebSphere Application Server and its installation path.
   - Select the version of IBM WebSphere Application Server you are using from the WebSphere Version drop down list (WebSphere 4 or WebSphere5).
   - Enter the location where the IBM WebSphere is installed:
     * For IBM WebSphere Application Server, Version 4.0.2 & IBM WebSphere Application Server, Version 5.0, enter the location of

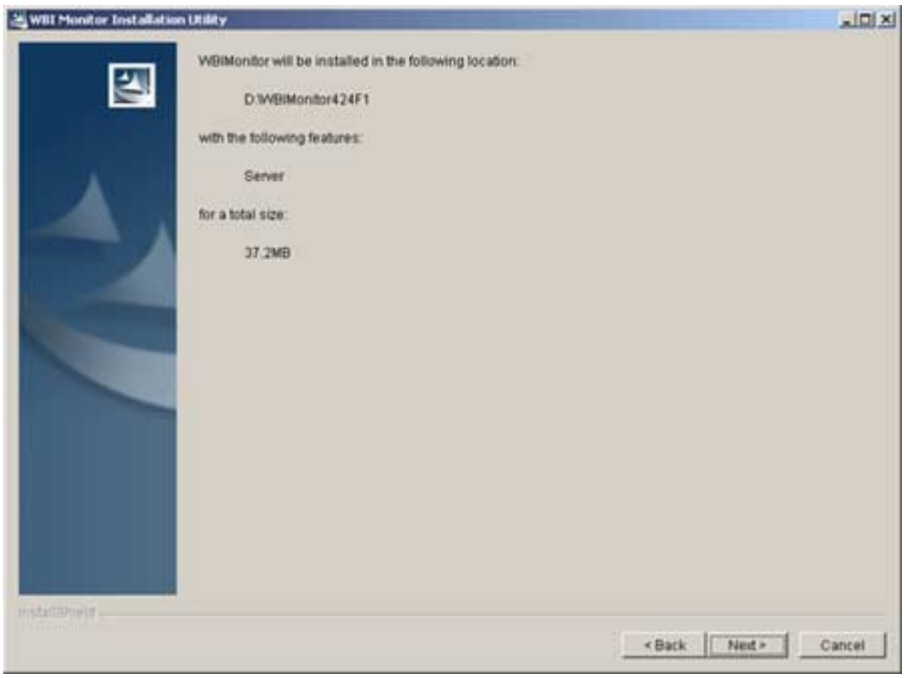
the ***AppServer*** folder that is located in the WebSphere installation folder.

* For IBM WebSphere Deployment Manager (Network Deployment), Version 5.0, enter the location of the ***DeploymentManager*** folder that is located in the WebSphere installation folder.

Enter the required path or click **Browse** to select the path. If the entered path is not correct, then you will be informed by a message, and the wizard will not continue until you enter the correct path. Then, you can click **Next** to continue.



2. In the next screen, you will be informed with the Monitor Server installation summary. The wizard now is ready to start extracting the necessary folders and files needed for installing the WBI Monitor Server Component and then update the Monitor Enterprise Archive file (*monitor.ear*) with the new parameters that you have specified in the wizard steps. Click Next to continue.



3. After extracting the necessary folders and files needed for WBI Monitor Server deployment, the wizard now is ready to do the following:

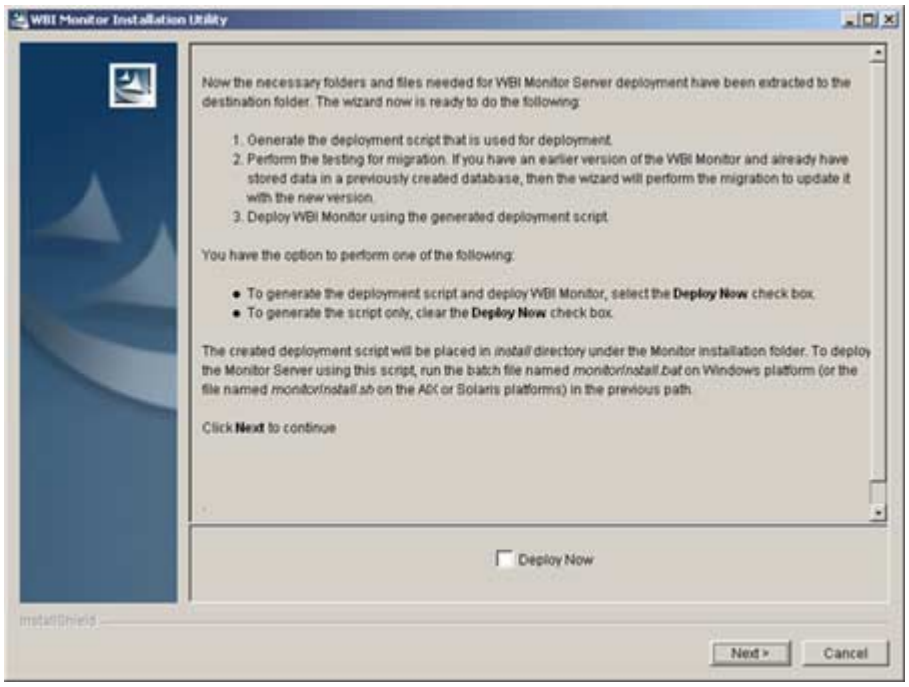
   - Generate the deployment script that is used for deployment.

   - Deploy WBI Monitor using the generated deployment script.

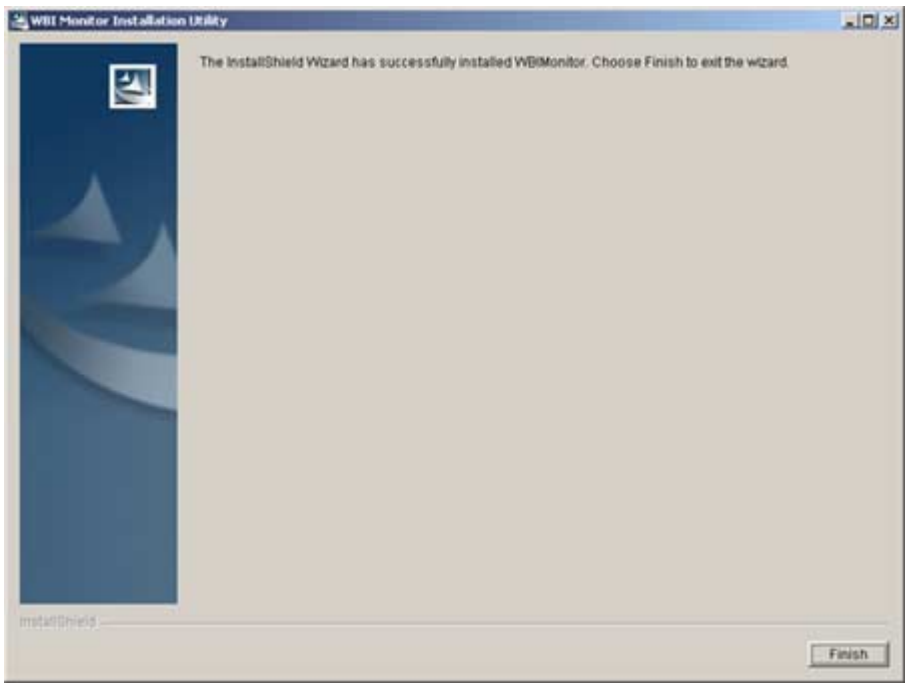
You have the option to do either of the following:

- To generate the deployment script and deploy WBI Monitor, select the **Deploy** check box.
- To generate the script only, clear the **Deploy** check box.

The created deployment script will be placed in **<Monitor>***install* directory. To deploy the Monitor by using this script, run the batch file named *monitorInstall.bat* in Windows platform (or the file named *monitorInstall.sh* in the AIX or Solaris platforms) in the previous path. Now click **Next** to continue.



4. Now the WBI Monitor Server installation has finished. You will need to start the deployed Application Server from the WebSphere Administrator's Console, in order to run WBI Monitor. Click **Finish** to exit this installation wizard.



4.2.4 Start the New Application Server

4.2.4.1 For IBM WebSphere Application Server 4.0.2

1. Start the WebSphere Administrator's Console.
2. In the WebSphere Administrative Domain tree, right-click Nodes > **<ServerName>** > Application Servers > MonitorServer and select Start from the shortcut menu that appears.
3. Wait until the confirmation message appears, and then click OK.

4.2.4.2 For IBM WebSphere Application Server 5.0

You must restart the Default Server (server1) after you deployed the WBI Monitor new Application Server. To do this:

1. On Windows platform, run a command prompt window. On AIX or Solaris platforms start a terminal console window.
2. Change the directory to **<WebSphere>**\bin
3. Type the following command line:

   stopServer server1

For AIX and Solaris platforms, type *stopServer.sh server1.* This command is case sensitive.

4. Wait until the Application Server is stopped and the confirmation message appears, and then type the following command line:

   startServer server1

For AIX and Solaris platforms, type *startServer.sh server1.* This command is case sensitive.

5. Wait until the Application Server is started and the confirmation message appears.

4.2.4.3 For IBM WebSphere Deployment Manager (Network Deployment) 5.0

Start the installed WBI Monitor Enterprise Application.

From the WebSphere Administrative Console, do the following:

1. From the left hand tree, select **Applications > Enterprise Applications**. The **Enterprise Applications** page appears.
2. Select the **IBM_WBI_Monitor** application by selecting the check box next to its name.
3. Click **Start**

4.2.5 Finalize the Monitor Server Deployment

4.2.5.1 Initialize the Monitor Database

1. Run a Web browser (such as MS Internet Explorer)
2. Type the following URL:
   http://<WebServerName><WebPath>/admin
   (eg. http://monitorsrvr/monitor/admin)
   The Login Page appears
3. Enter the User ID and Password of a valid user. (Please refer to the WBI Monitor *Administration Guide* for detailed information about the WBI Monitor authentication and security options). The Administration Utility Web page opens.
4. Create the Monitor Database tables. Please refer to the WBI Monitor *Administration Guide* for the detailed instructions of creating Monitor database tables.
5. Close the browser.

4.2.5.2 Importing Organization XML Files

You have to import the required organization XML files to the WBI Monitor database in order to complete the deployment instructions.

Please refer to the WBI Monitor *Administration Guide* for the detailed instructions of importing organization XML files.

4.2.6 WBI Monitor Server Un-Deployment

This section is used to completely un-deploy the Monitor Server from WebSphere. To do this:

4.2.6.1 For IBM WebSphere Application Server 4.0.2

1. Stop the running **MonitorServer** application server.
2. Run the batch file named *monitorunInstall.bat* in Windows platform or the file named *monitorUnInstall.sh* in AIX or Solaris platforms. These files are located in **<Monitor>**\install. This will uninstall WBI Monitor automatically.
3. Delete the file *monitor_deployed.ear* from **<WebSphere>***AppServer**InstallableApps*\
4. Delete the directory named ***MonitorServer*** which is located in **<WebSphere>**/temp/**<WAS_NODE_NAME>**/

4.2.6.2 For IBM WebSphere Application Server 5.0 and IBM WebSphere Deployment Manager 5.0

1. Run the batch file named *monitorunInstall.bat* in Windows platform or the file named *monitorUnInstall.sh* in AIX or Solaris platforms. These files are located in **<Monitor>**\install. This will uninstall WBI Monitor automatically.

For IBM WebSphere Application Server 5.0, the log files are shared between the different applications so that it will not be deleted.

2. Delete the directory named ***MonitorServer*** which is located in **<WebSphere>**/temp/**<WAS_NODE_NAME>**/

This directory does not exist if you have deployed the WBI Monitor Application Server on the default (base) Application Server named server1

3. Restart the WebSphere Application Server

4.3 Installing the WBI Monitor Portlets Component

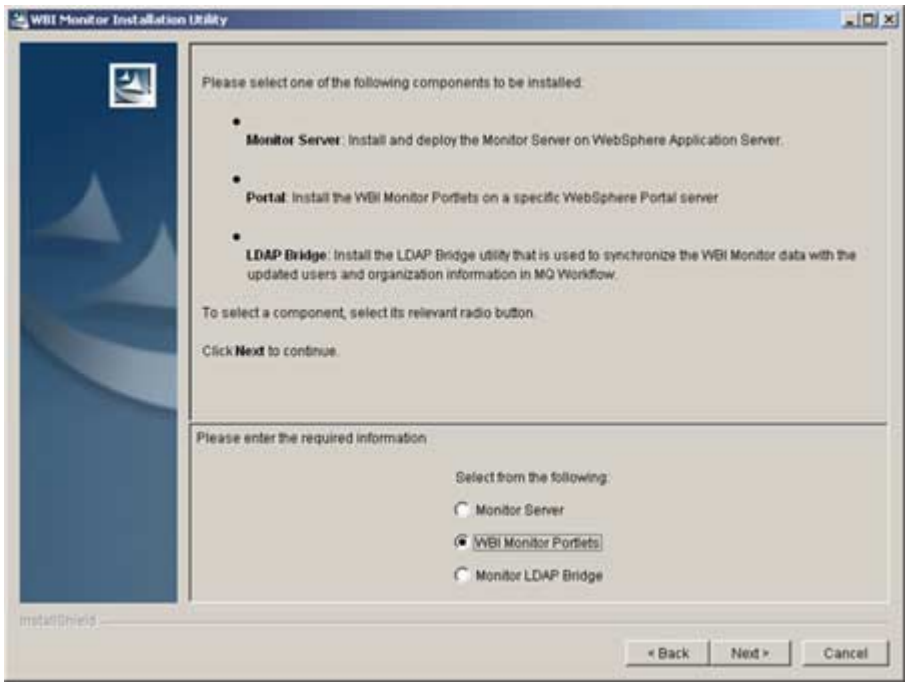
The WBI Monitor Portlets component can be installed automatically using the WBI Monitor Installation Wizard. This will install the four WBI Monitor Portlets (Workflow Dashboard Portlet, Business Dashboard Portlet, Process Diagram Portlet, and Notification Portlet) automatically into a specific WebSphere Portal Server.

You will be guided through a set of steps to gather the required information for installing this component, and then the wizard will install the Monitor portlets automatically. Please refer to Chapter 4: IBM WebSphere Portal Support of the WBI Monitor User Guide for detailed information about the support for WebSphere Portal in WBI Monitor and how to install the WBI Monitor Portlets manually.

Important Note: The Monitor Server installation and deployment must be performed before installing the WBI Monitor Portlets component.

The following are the WBI Monitor Installation Wizard steps for installing the Portal component:

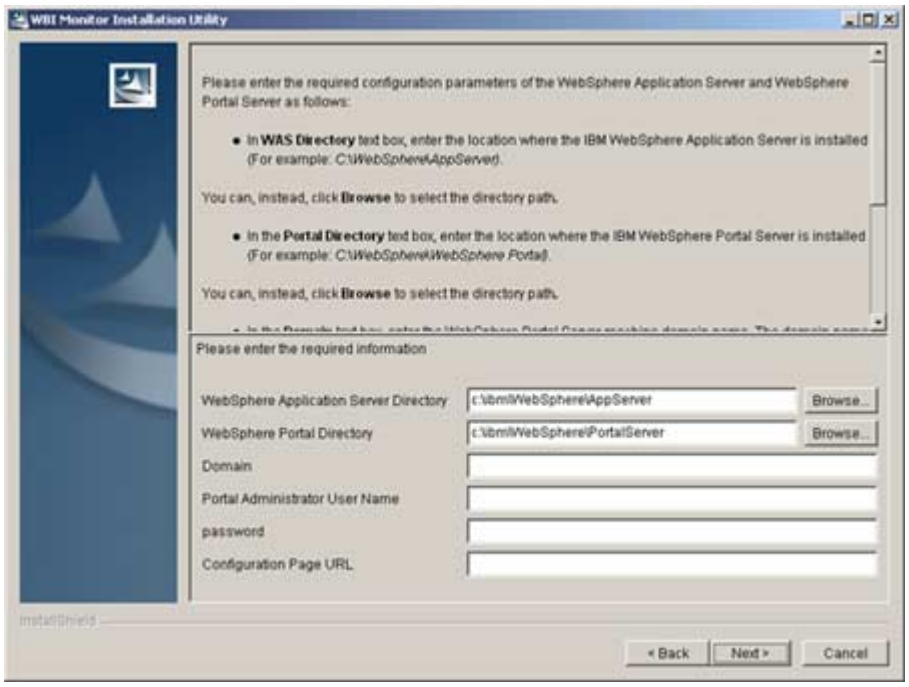
1. The WBI Monitor Installation Wizard starts on the **Welcome** screen. Click **Next** to continue.
2. In the License Agreement step, accept the License Agreement and click **Next** to continue.
3. Enter the Monitor installation directory where the necessary folders and files will be extracted. Then, click **Next** to continue.
4. In the **Deployment Type** step, select **Automatic Deployment** and click **Next** to continue.
5. In the **Installed Component** step select the **WBI Monitor Portlets** option and click **Next** to continue.



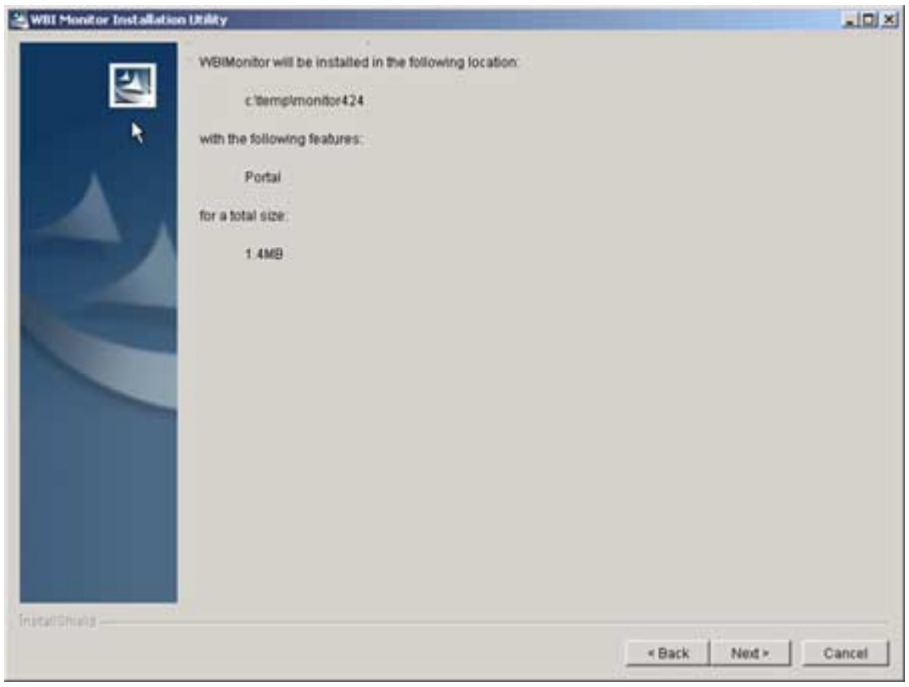
6. In the next wizard screen that appears after the **Installed Component** screen, you will be asked to enter the required configuration parameters of the WebSphere Application Server and WebSphere Portal Server as the following:

   - In **WAS Directory** field, enter the location where the IBM WebSphere Application Server is installed (For example: *C:\WebSphere\AppServer).* You can click Browse to select the directory location.
   - In the **Portal Directory**, enter the location where the IBM WebSphere Portal Server is installed (For example: *C:\WebSphere\WebSphere Portal).* You can click Browse to select the directory location.
   - In the **Domain** field, enter the DNS Domain name on which the WebSphere Portal server is installed. (for example: egy.ibm.com)
   - In the **Portal Administrator User Name** and **Password** fields, enter the user name and password of one of the WebSphere Portal Server administrators that will be used to login to the Portal Server and perform the installation.
   - In the **Configuration Page URL** field, enter the URL that is used to access the portal configuration servlet. This URL consists of the portal host name, the base URL for the portal, as specified during installation (for example /wps), and the servlet extension (/config).

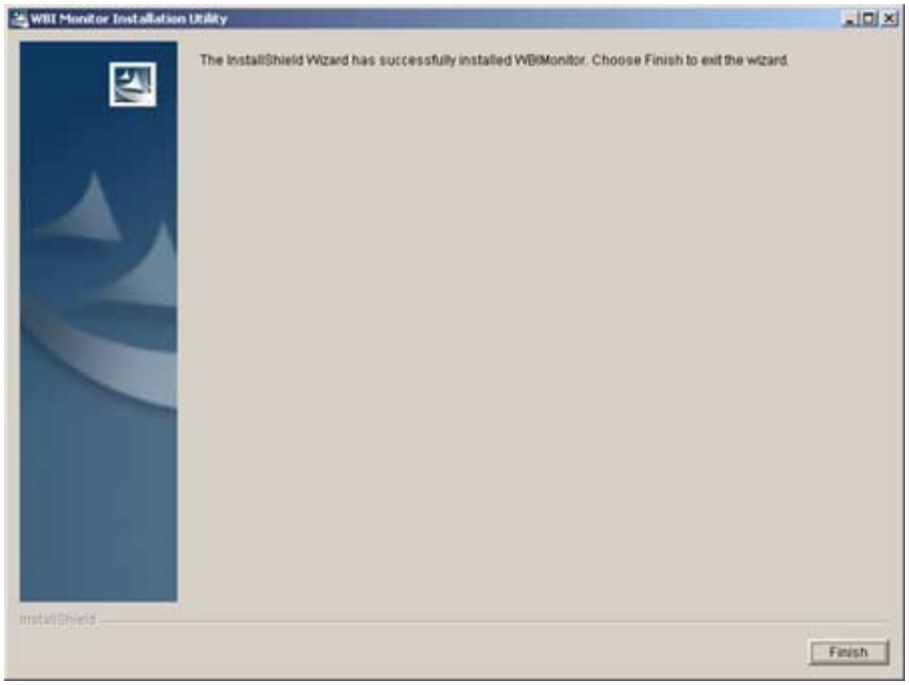
Click **Next** to continue



7. In the next screen, you will be informed with the Portal installation summary. The wizard now is ready to start installing the WBI Monitor portlets on the specified WebSphere Portal Server.
   Click Next to continue.



8. Now the WBI Monitor Portlets installation has finished. Click **Finish** to exit this installation wizard.



4.4 Installing the Monitor LDAP Bridge Component

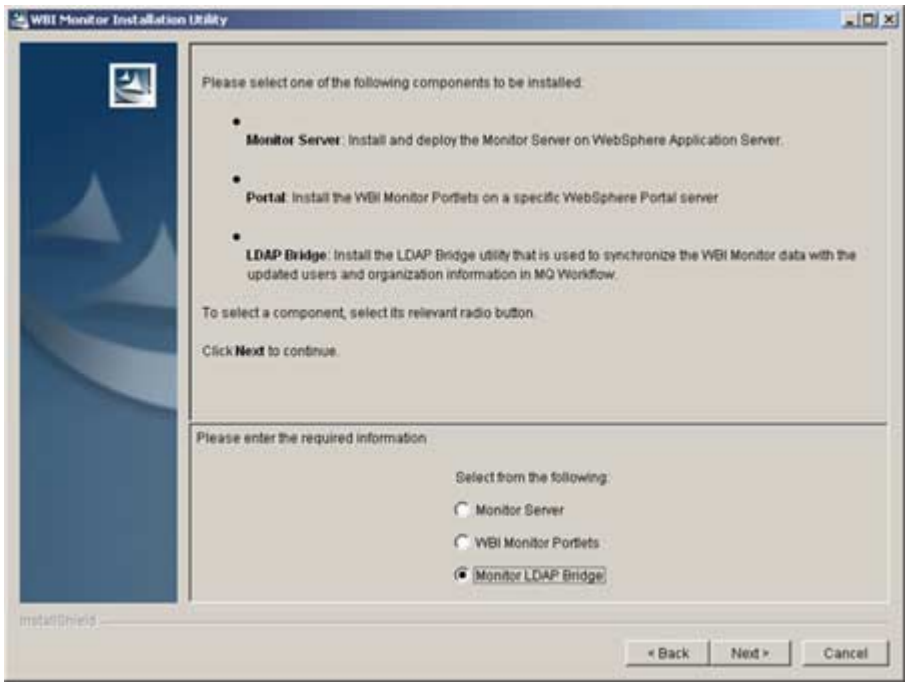
The Monitor LDAP Bridge component is necessary to be installed if you are using IBM WebSphere MQ Workflow 3.4 that depends on an LDAP server for acquiring the users' information. In this case any changes in the users' information/definition that occurs in the LDAP server and are reflected in the MQ Workflow should be also reflected in WBI Monitor in order to update the processes and organization information in WBI Monitor with the changed information in MQ Workflow.

Installing the Monitor LDAP Bridge component will extract only a folder named *ldapbridge* in the specified destination directory. This folder contains a single .jar file named *ldapbridge.jar*. By running this jar file the users information in WBI Monitor will be updated with all changes that occurred in the LDAP Server from which the MQ Workflow obtains the users information.

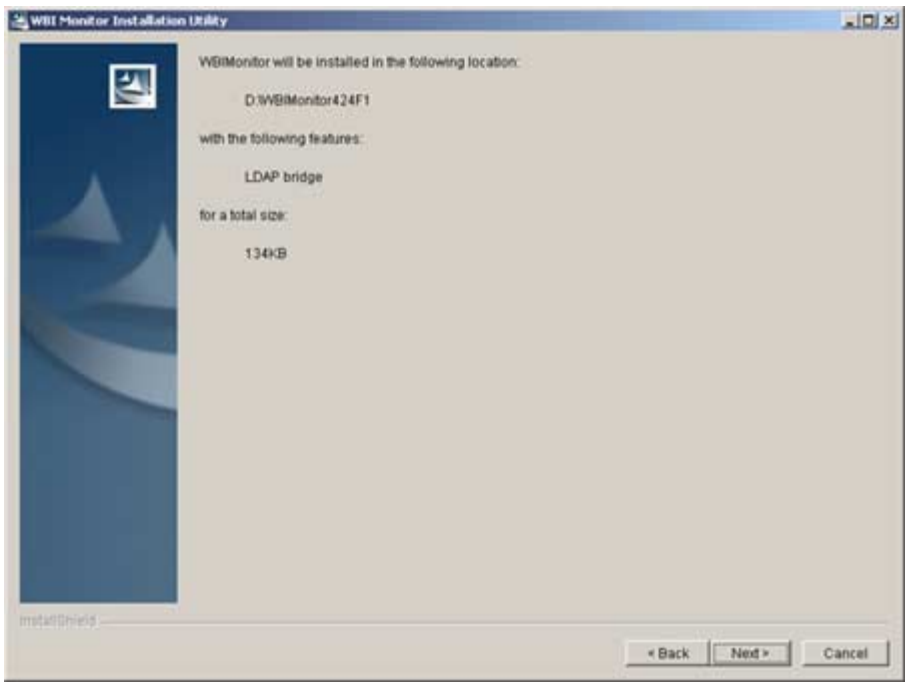
Important Note: The Monitor Server installation and deployment must be performed before installing the Monitor LDAP Bridge component.

The following are the WBI Monitor Installation Wizard steps for installing the Portal component:

1. The WBI Monitor Installation Wizard starts on the **Welcome** screen. Click **Next** to continue.
2. In the License Agreement step, accept the License Agreement and click **Next** to continue.
3. Enter the Monitor installation directory where the necessary folders and files will be extracted. Then, click **Next** to continue.
4. In the **Deployment Type** step, select **Automatic Deployment** and click **Next** to continue.
5. In the **Installed Component** step select the **Monitor LDAP Bridge** option and click Next to continue.



6. Once you select to install the LDAP Bridge component from the Installed Components step and clicked **Next**, you will be informed with the Monitor LDAP Bridge installation summary. The wizard now is ready to start installing the *Monitor LDAP Bridge* folder on the specified destination directory.



Click **Next** to start the installation.

7. Now the Monitor LDAP Bridge installation has finished. Click **Finish** to exit this installation wizard.

4.4.1 Running the Monitor LDAP Bridge

After you have installed the Monitor LDAP Bridge component, you will need to run the installed jar file periodically in order to update the WBI Monitor database with the changes that occurred in the LDAP Server on which the MQ Workflow acquires the users' information.

To run the Monitor LDAP Bridge:

- **On Windows platform:**

1. Start a command prompt window.
2. Type the following in the command prompt and then press Enter:

   java.exe -jar **<Monitor>** \ldapbridge*ldapbridge.jar -f* **<FDLFile>** *-u* **<MonitorAdminUserName>** *-p* **<MonitorAdminPassword>** *-s http://***<WebServerName><WebPath>**

If the java.exe is not your environment variable path then type the full path of java.exe (e.g. C:\WebSphere\AppServer\java\bin\ java.exe)

- **On AIX and Solaris platforms:**

1. Start a terminal console using root.

2. Type the following in the command prompt and then press Enter:

   java -jar **<Monitor>** \ldapbridge*ldapbridge.jar -f* **<FDLFile>** *-u* **<MonitorAdminUserName>** *-p* **<MonitorAdminPassword>** *-s http://***<WebServerName><WebPath>**

If the java.exe is not your environment variable path then type the full path of java.exe (e.g. "/*usr*/*WebSphere*/*AppServer*/*java*/*bin*/*java*" in AIX platform or *"/opt/WebSphere/AppServer/java/bin/java"* in Solaris platform

Where:

- **<FDLFile>**: The full path and name of the FDL file that has been produced by running the MQ Workflow LDAP Bridge. This file contains the updated information for the organization units and their users that have been changed in the LDAP Server and have been updated in the MQ Workflow.
- **<MonitorAdminUserName>**: A valid user name for a WBI Monitor administrator.
- **<MonitorAdminPassword>**: the password of the specified administrator's user name.
- *http://***<WebServerName><WebPath>**: The web address that is used to access the WBI Monitor Client. (for example: *http://MonitorServer/monitor)*.

4.5 WBI Monitor Clustering Support for WebSphere Deployment Manager

As one of the major features of the IBM WebSphere Application Server v5.0.x, WBI Monitor supports clustering deployment using the WebSphere 5.0.x Application Server and Deployment Manager.

A Cluster is a set of application servers that are managed together for the purpose of failover handling and participate in workload management. The servers that are members of a cluster can be on different host machines, as opposed to the servers that are part of the same node and must be located on the same host machine.

Servers that belong to a cluster are members of that cluster set and must all have identical application components deployed on them. Please refer to the WebSphere Application Server and Deployment Manager v5.0.x documentation for details about creating and configuring clusters.

In order to install and deploy the WBI Monitor in a cluster, there are two possible cases:

- If you already have an existing cluster that is configured and its members have running web applications, then you must install and deploy the WBI Monitor on each member in that cluster using the manual deployment steps (not the WBI Monitor Installation Wizard). Notice that each node must point to the same database(s).
- If you are building a new cluster or adding a new node to a cluster on which the WBI Monitor is installed and deployed, then you should install and deploy the WBI Monitor on each cluster member, either automatically using the WBI Monitor Installation Wizard or manually by performing the manual deployment steps. Notice that each node must point to the same database(s). This must be done before adding each machine to the cluster.

Please refer to *Appendix B* of this guide: *Manual Deployment of WBI Monitor on WebSphere 5.0* for a description of the manual deployment of Monitor Server on WebSphere 5.0

4.6 WBI Monitor Un-Installation

This section describes how to completely uninstall the WBI Monitor from your machine using the WBI Monitor Uninstallation Wizard in order to remove all folders and files that was installed by the WBI Monitor installation wizard. The WBI Monitor Uninstallation Wizard starts by running the jar file named ***uninstall.jar*** that is located in the **<Monitor>**_*uninst* folder.

Before starting the WBI Monitor Uninstallation Wizard, make sure that the IBM JDK 1.3.0 is installed on your machine. Alternatively, you can use the IBM JDK shipped with IBM WebSphere Application Server.

To start the WBI Monitor Uninstallation Wizard:

1. Run the ***uninstall.jar*** file by doing the following:

   - In Windows platform:

     * Start a command prompt window.
     * Type the following in the command prompt and then press Enter:

       java.exe -jar **<Monitor>**_*uninst**uninstall.jar*

If the java.exe is not your environment variable path then type the full path of java.exe (e.g. C:\WebSphere\AppServer\java\bin\java.exe)

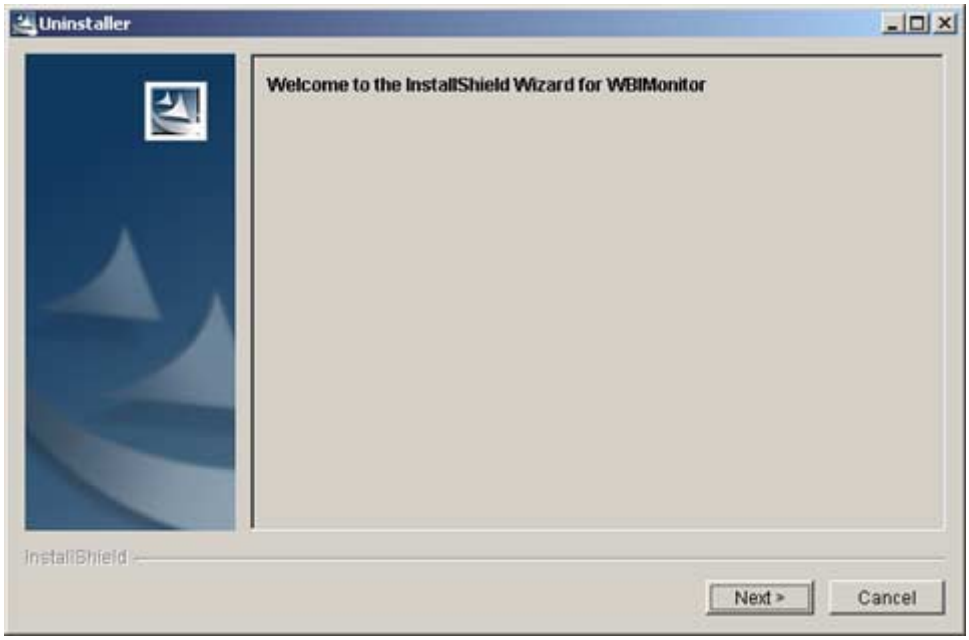
   - In AIX and Solaris platforms:

     * Start a terminal console using root.
     * Type the following in the command prompt and then press Enter:

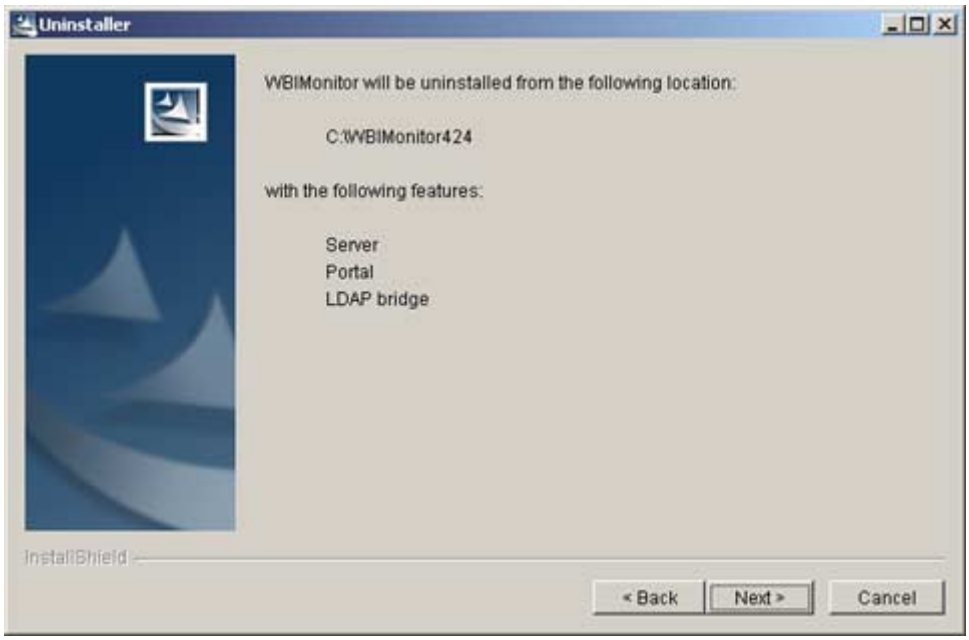
       java -jar **<Monitor>**/*_uninst*/*uninstall.jar*

If the java.exe is not your environment variable path then type the full path of java.exe (e.g. "/*usr*/*WebSphere*/*AppServer*/*java*/*bin*/*java*" in AIX platform or *"/opt/WebSphere/AppServer/java/bin/java"* in Solaris platform

2. Once you start the Uninstallation wizard, a **Welcome** dialog box appears. Click **Next** to continue through the wizard or click **Cancel** to exit the wizard.



3. The next screen contains the Home Directory on which the WBI Monitor was installed and the installed components. Click **Next** to start removing these installed components and remove the files and folders from your hard drive, **Back** to return to the previous step, or **Cancel** to exit the wizard.



4. After all files and folders are removed from your hard drive, the next screen will tell you that the Uninstallation Wizard has finished

uninstalling the WBI Monitor from your system. Click **Finish** to exit the wizard.

Appendix A: Manual Deployment of WBI Monitor on WebSphere 4.0.2

This appendix describes the manual steps of deploying WBI Monitor on IBM WebSphere 4.0.2. Before starting these steps, it is assumed that the Monitor Database (and Event Queue Database if you are using MQ Workflow as your engine) with the required Table Spaces are created and configured in your Database Server.

The following conventions are used for all the instructions throughout this document:

- **<WebSphere>** = The WebSphere home directory. e.g. C:\Websphere
- **<MQ>** = The MQ Workflow home directory. (e.g. *c:\fmcwinnt* on Windows platform, /*user*/*fmc* on AIX platform, or /*opt*/*fmc* on Solaris platform)
- **<DB2>** = The DB2 home directory. e.g. c:\sqllib
- **<Oracle>** = The Oracle home directory on the Oracle Server machine (if Oracle is not running on the same machine on which the IBM WebSphere Application Server is installed). e.g. C:\oracle\ora81 (Local) or \\oracle_machine\oracle\ora81 (Network)
- **<Monitor>** = The Monitor installation directory where the WBI Monitor has been installed. e.g. C:\WBIMonitor
- **<WebServerName>** = The name of the machine that hosts the Web server for which the WebSphere is configured. (Ex. The machine name on which the IBM HTTP Server or Microsoft IIS 4.0 or IIS 5.0 is installed)
- **<ServerName>** = The name of the server on which the Monitor will be installed.

On AIX and Solaris platforms, use forward slash / instead of back-slash \ when writing paths.

Important notes:

- The names and paths of folders and files are case sensitive.
- Make sure that the user you are using have all needed permissions. For example, using a user who has no permissions on WebSphere or the Database will fail to deploy the monitor.
- On AIX 5.1 platform, the environment variable named **LIBPATH** must be appended with the following pathes: **<MQ>**/*lib* and **<MQ>**/*lib*/*mqserver*. To do this, type The following command in the console

window from which you will start the WebSphere and then press Enter:
*export LIBPATH=$LIBPATH:***<MQ>***/lib:***<MQ>***/lib/mqserver*

- The Monitor will not work if the server properties *client.encoding.override* or *default.client.encoding* are set to any encoding other than UTF-8.

  If you are using WebSphere Application Server 4.0.5, the property **client.encoding.override=UTF-8** should be added explicitly in the server JVM's settings.

1 Monitor Server Deployment

1.1 Configure IBM WebSphere

In Windows NT or Windows 2000, make sure that the *IBM WS AdminServer* service is started and running.

The purpose of these steps is to create and configure a new Application Server in WebSphere. The Application Server resides inside the Monitor Server.

In order to perform this operation, start the WebSphere **Administrator's Console** and perform the following steps:

1.1.1 Create JDBC Provider and Data Sources

If a previous driver is already created and installed, then you can skip the following steps for creating and installing the database drivers for the data source.

You need to create the required Database Drivers and their Data Sources. The creation of the Database Drivers and their Data Sources should be performed as the following sequence:

1. If you are not using IBM MQ Workflow as your engine or If the Monitor database and the Event Queue database are located in the same physical database:
   - Create and install only one Pool Database Driver.
   - Create only one Pool Data Sources under the created Pool Database Driver points to the Monitor database.
2. If the Monitor database and the EventQueue database are located in two physical databases:
   - Create and install one Pool Database Driver.
   - Create two Pool Data Sources under the created Pool Database Driver (one Data Source points to the Monitor database and the other Data Source points to Event Queue database).
   - Create and install one XA Database Driver.
   - Create two XA Data Sources under the created XA Database Driver (one Data Source points to the Monitor database and the other Data Source points to Event Queue database).

The following table provides the required values for the each Database Driver and Data Source as you should enter through the creation steps:

For Monitor Pool JDBC Provider:

Property/Field Name	DB2	Oracle
Name	MonitorDB2PoolDriver	MonitorOraclePoolDriver
Database JDBC Driver File Name	db2java.zip	classes12.zip
Database JDBC Driver File path	<DB2>*java*\	<Oracle>*jdbc**lib*
Implementation Class	COM.ibm.db2.jdbc.DB2ConnectionPoolDataSource	oracle.jdbc.pool.OracleConnectionPoolDataSource

For Monitor Pool Data Source:

Property/Field Name	Value
Name	Monitor_Pool_DataSource
JNDI Name	MonitorPoolDataSource

For Event Queue Pool Data Source:

Property/Field Name	Value
Name	Event_Queue_Pool_DataSource
JNDI Name	EventQueuePoolDataSource

For Monitor XA JDBC Provider:

Property/Field Name	DB2	Oracle
Name	MonitorDB2XADriver	MonitorOracleXADriver
Database JDBC Driver File Name	db2java.zip	classes12.zip
Database JDBC Driver File path	<DB2>*java12*\	<Oracle>*jdbc**lib*
Implementation Class	COM.ibm.db2.jdbc.DB2XADataSource	oracle.jdbc.xa.client.OracleXADataSource

For Monitor XA Data Source:

Property/Field Name	Value
Name	Monitor_XA_DataSource
JNDI Name	MonitorXADataSource

F**or Event Queue XA Data Source:**

Property/Field Name	Value
Name	Event_Queue_XA_DataSource
JNDI Name	EventQueueXADataSource

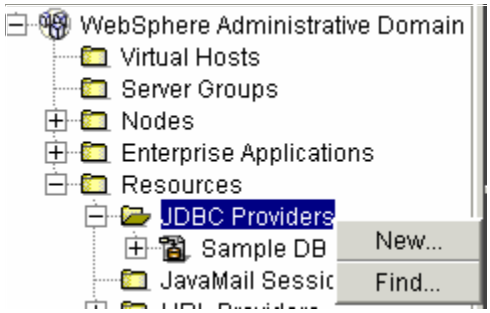
The following sections describe the required steps that you should follow to create and install a JDBC Provider and to create a Data Source under this driver:

Create and Install the JDBC Provider

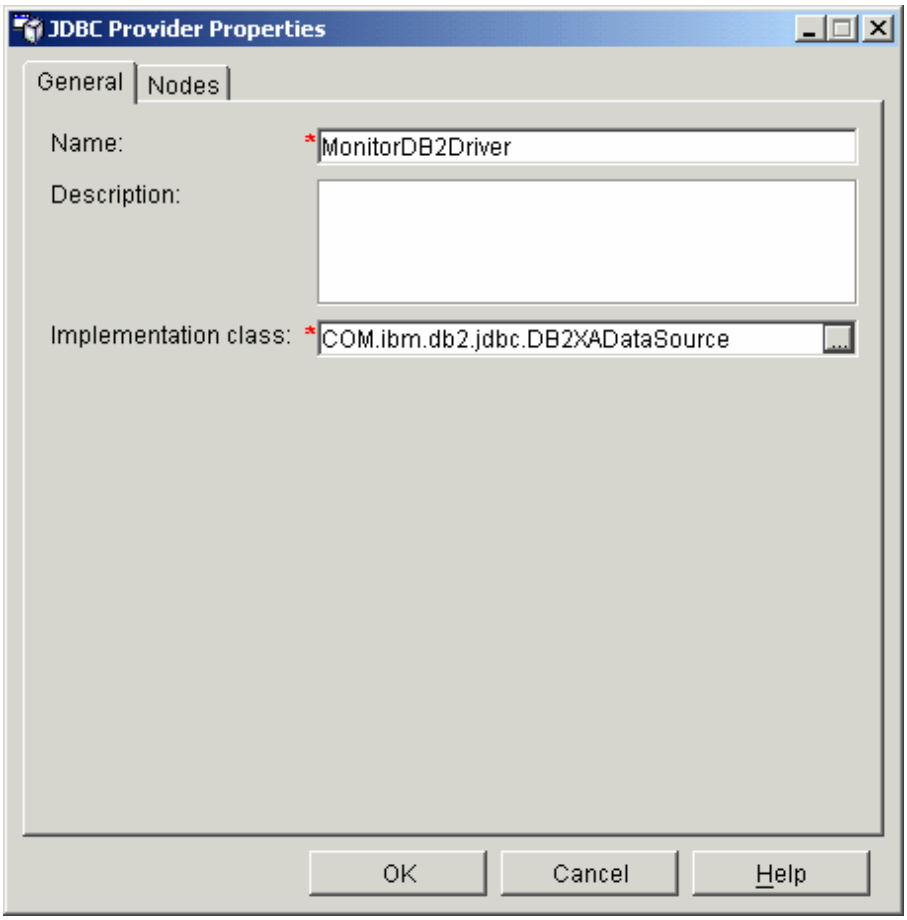
Creating a JDBC Provider:

To create a JDBC Provider:

1. Expand the WebSphere Administrative Domain tree, and select **Resources > JDBC Providers**
2. Right-click the **JDBC Providers** and select **New** from the shortcut menu that appears.

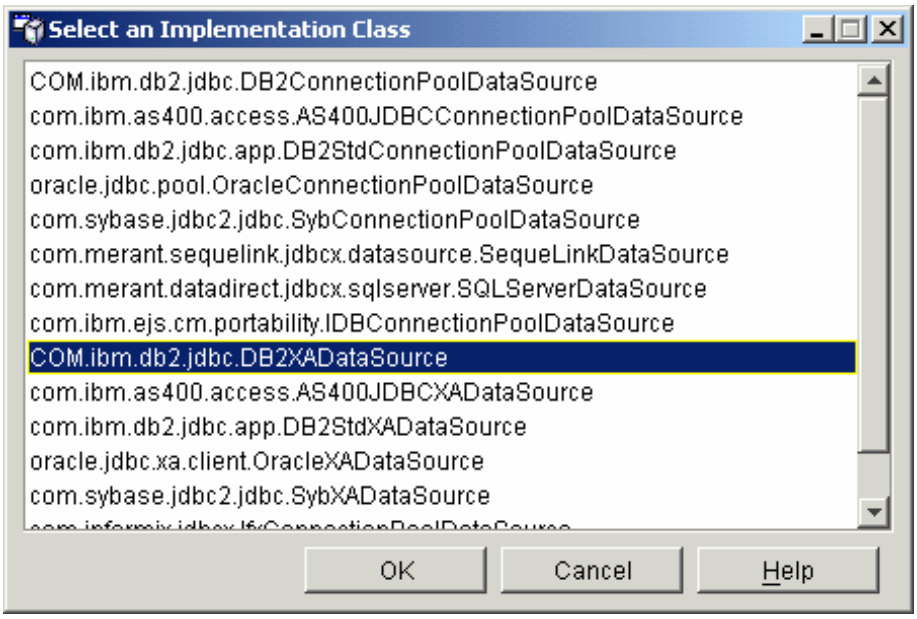


The **JDBC Provider Properties** dialog box appears



- Type database driver name in the **Name** box.

- Click the **Browse** button (represented by triple dots) next to the **Implementation Class** field. The **Select an Implementation Class** dialog box appears.

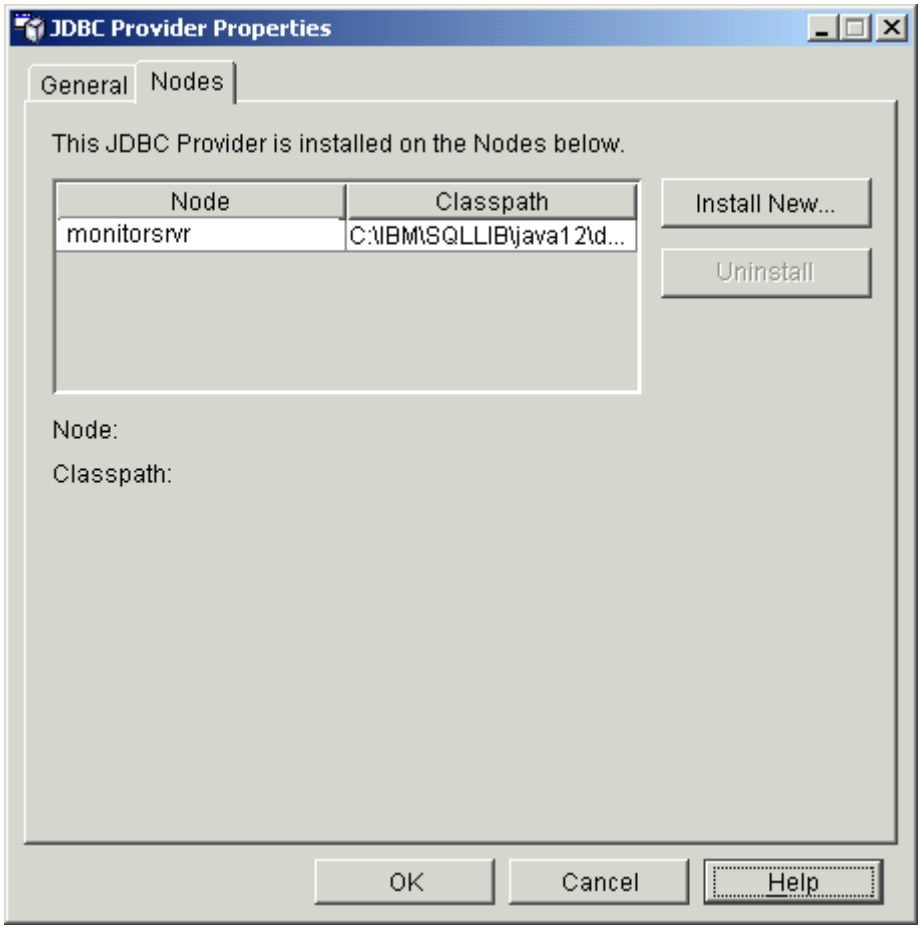


- From the **Implementation Classes** list, select the appropriate implementation class for the database driver according to the above table.
- Click **OK**. The dialog box will close and you will return to the **JDBC Provider Properties** dialog box where the selected class appears in the **Implementation Class** field.

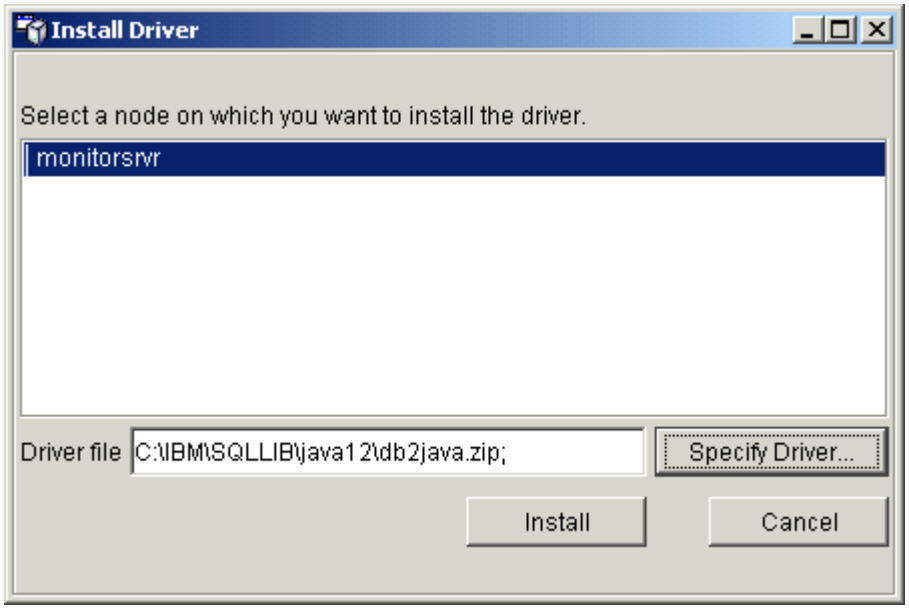
Installing the Created Database Driver

To install the created JDBC Driver:

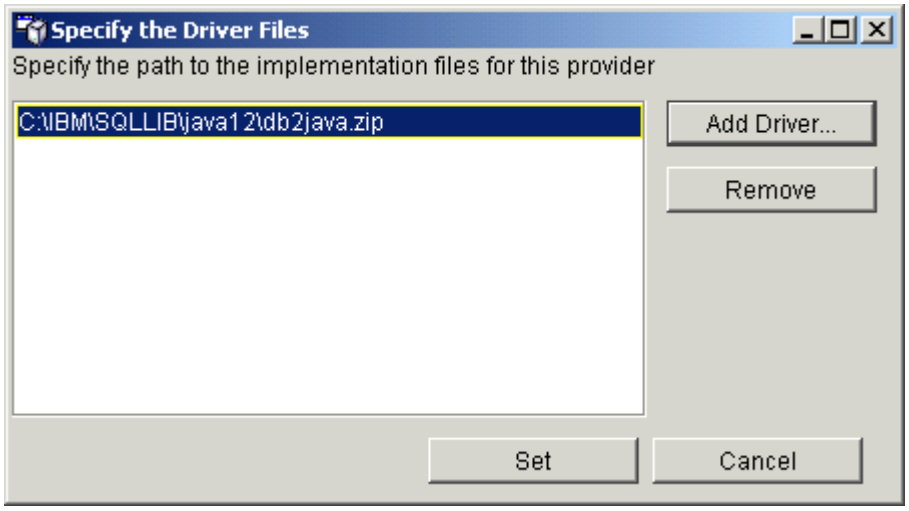
1. While you are in the **JDBC Provider Properties** dialog box, select the **Nodes** tab.



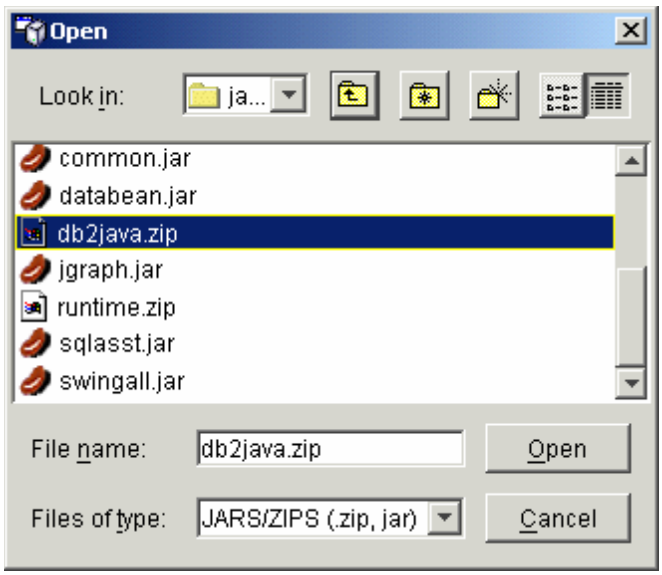
2. Click **Install New**, the **Install Driver** dialog box appears.



3. Select <**ServerName**> from the **Nodes** list, and click **Specify Driver** in order to select a driver to be installed for the node. The **Specify the Driver Files** dialog box appears.



4. Click **Add Driver**. The **Open** dialog box appears.

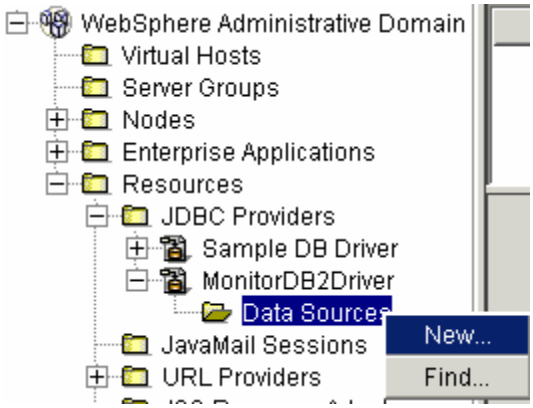


5. Select the appropriate JDBC driver file name and path according to your database server type, and click **Open**.
6. Select the added driver in the **Specify the Driver Files** dialog box and click **Set**.
7. Click **Install** in the **Install Driver** dialog box.
8. Click OK in the JDBC Provider Properties dialog box. The Database Driver will be installed.

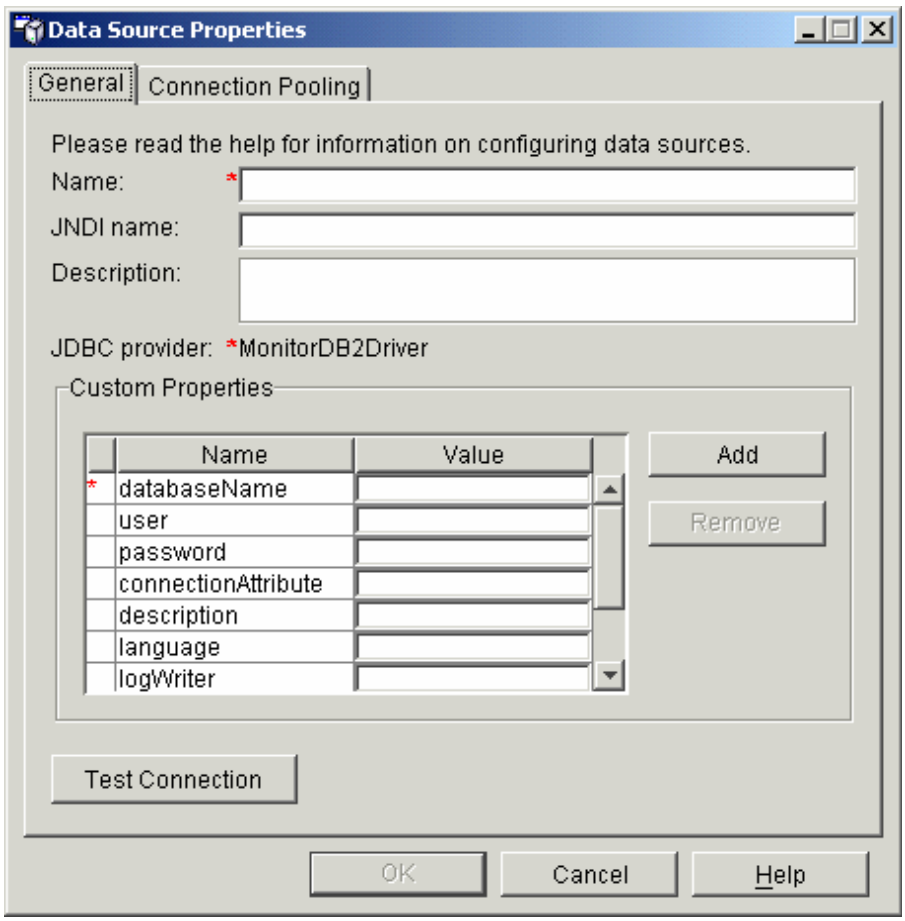
Creating a Data Source

To create a Data Source to point to a Database and a Communication Driver:

1. Expand the **WebSphere Administrative Domain** tree, and select **Resources > JDBC Providers**> **<DatabaseDriverName> Data Sources**
2. Right-click Data Sources and select **New** from the shortcut menu that appears.



- The **Data Source Properties** dialog box appears.

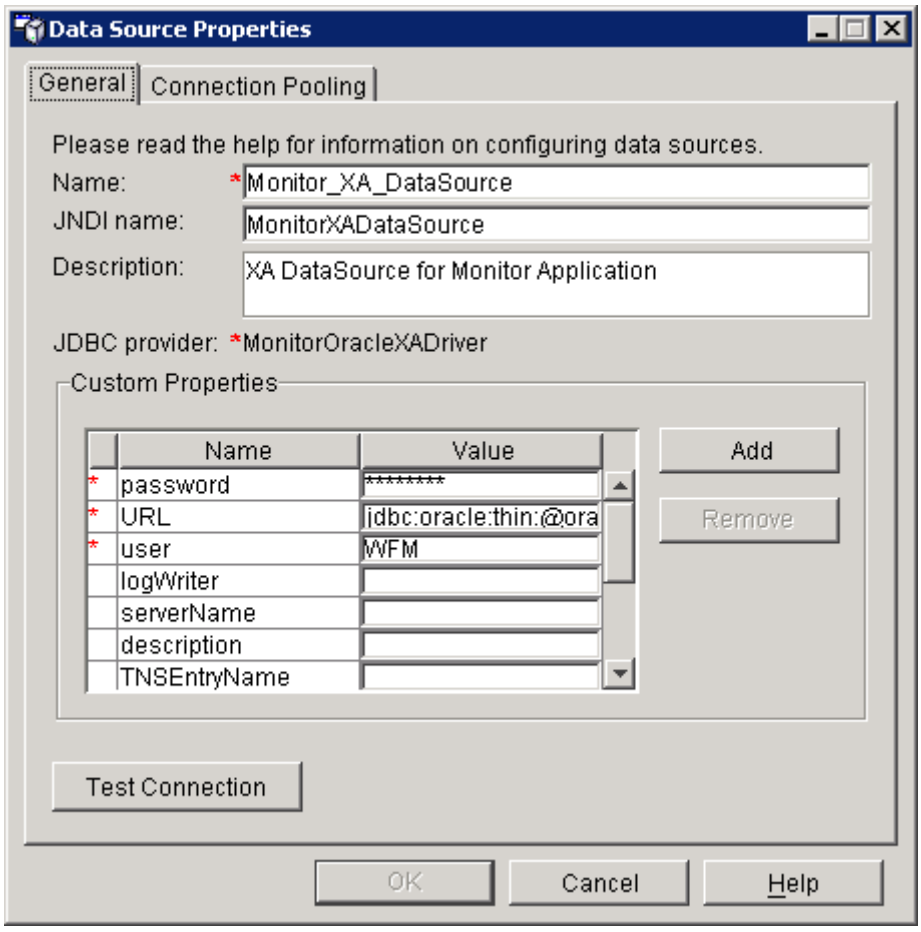


- Type the Data Source name in the **Name** box.
- Type the Data Source JNDI name in the **JNDI name** box.
- In the **Custom Properties** table:

- Type the name of the database to which the created Data Source points in the **Database Name** field. (For example WFMDB for Monitor database or FMCDB for MQ Workflow database. If you created the Monitor Database or the Event Queue Database with a different name, then you should type this name in the Database Name field.).

  * For Oracle database, the field name is **URL** and it should be filled with the database URL instead of the database name. (For example *jdbc:oracle:thin:*@**<Oracle_Server_Name>***:***<Oracle_Server_Port_Number>***:>:<DatabaseName>**

    Where **<Oracle_Server_Name>** is the name or the IP address of the Oracle Database Server machine, **<Oracle_Server_Port_Number>** is the Oracle Server Port Number (the default port is 1521) and **<DatabaseName>** is the database name (for example WFMDB for Monitor database or FMCDB for MQ Workflow database. If you created the Monitor Database or the Event Queue Database with a different name, then you should type this name in the Database Name field).



- Type the Database connection user's name and password in the **User** and **Password** fields.

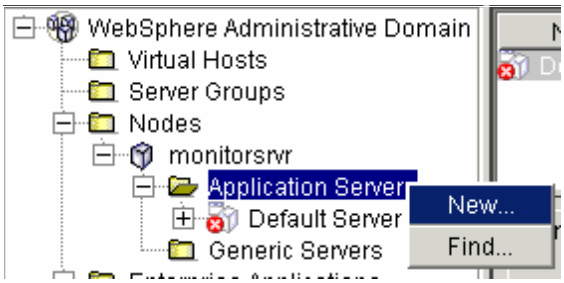
You can test the connection with the Database with the entered user name or password by clicking Test Connection. If the Database name, user name or password is not correct, then you will be notified by a message. Otherwise, another message will confirm that the connection is successful.

Click OK. The Data Source will be created.

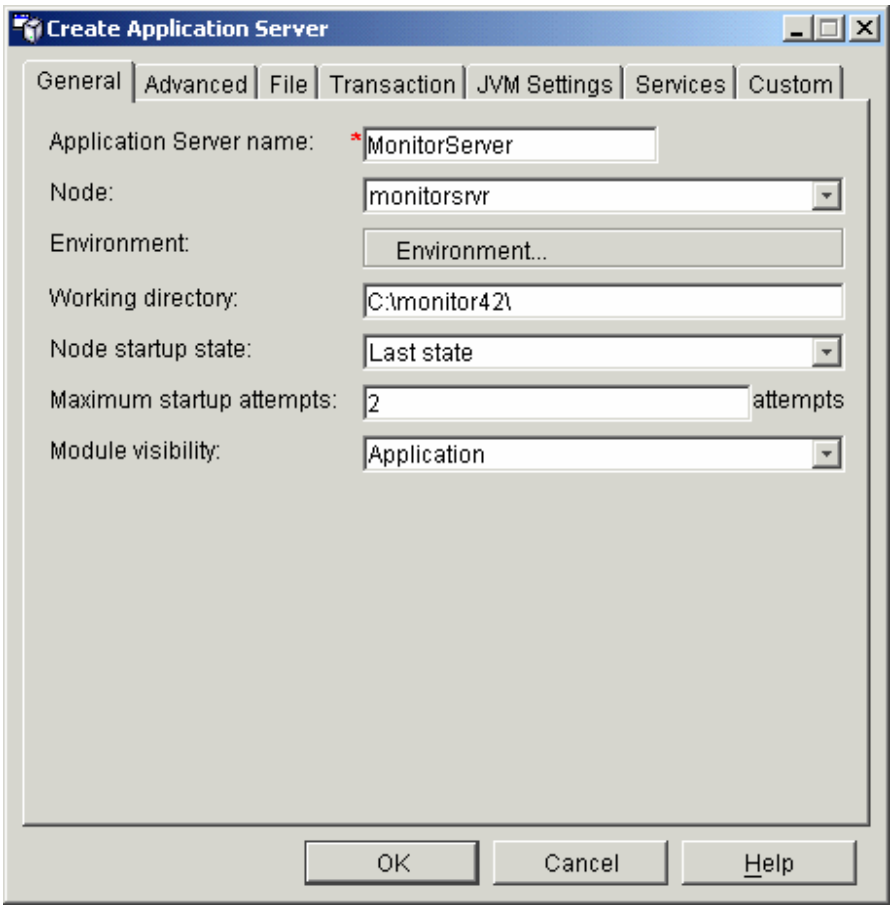
1.1.2 Create a new Application Server

Now your next step is to create a new Application Server for WBI Monitor.

1. In the **WebSphere Administrative Domain** tree, right-click **Nodes > <ServerName> > Application Servers** and select **New** from the shortcut menu that appears.

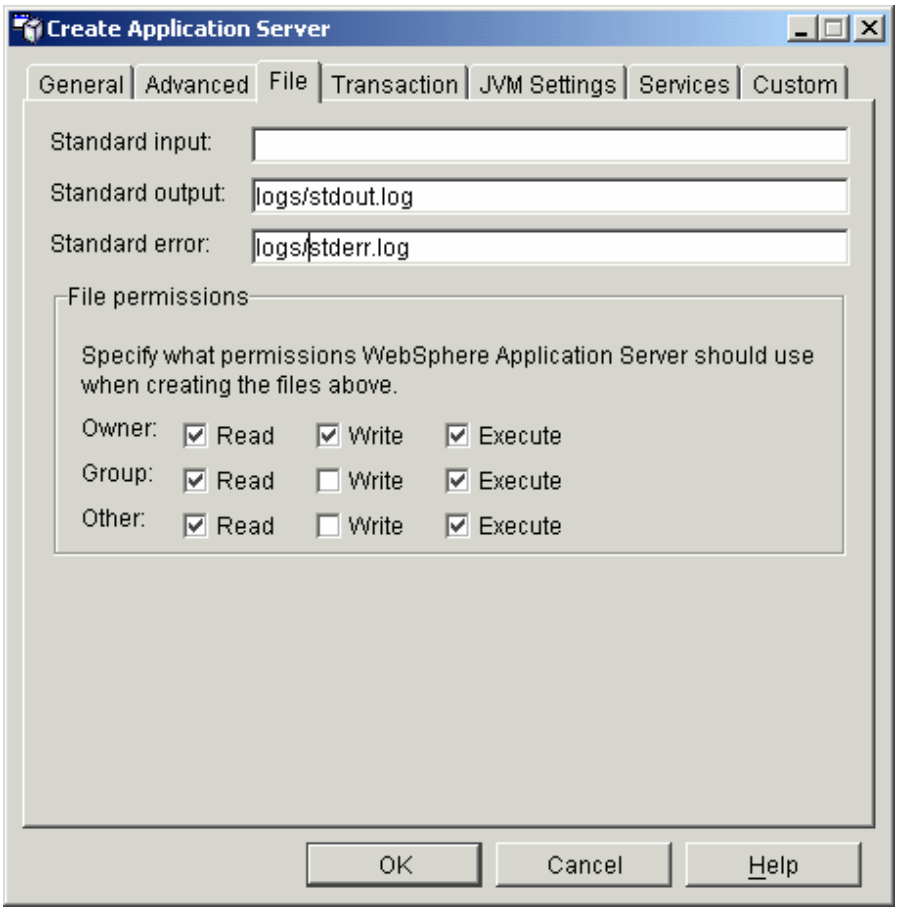


The **Create Application Server** dialog box appears.



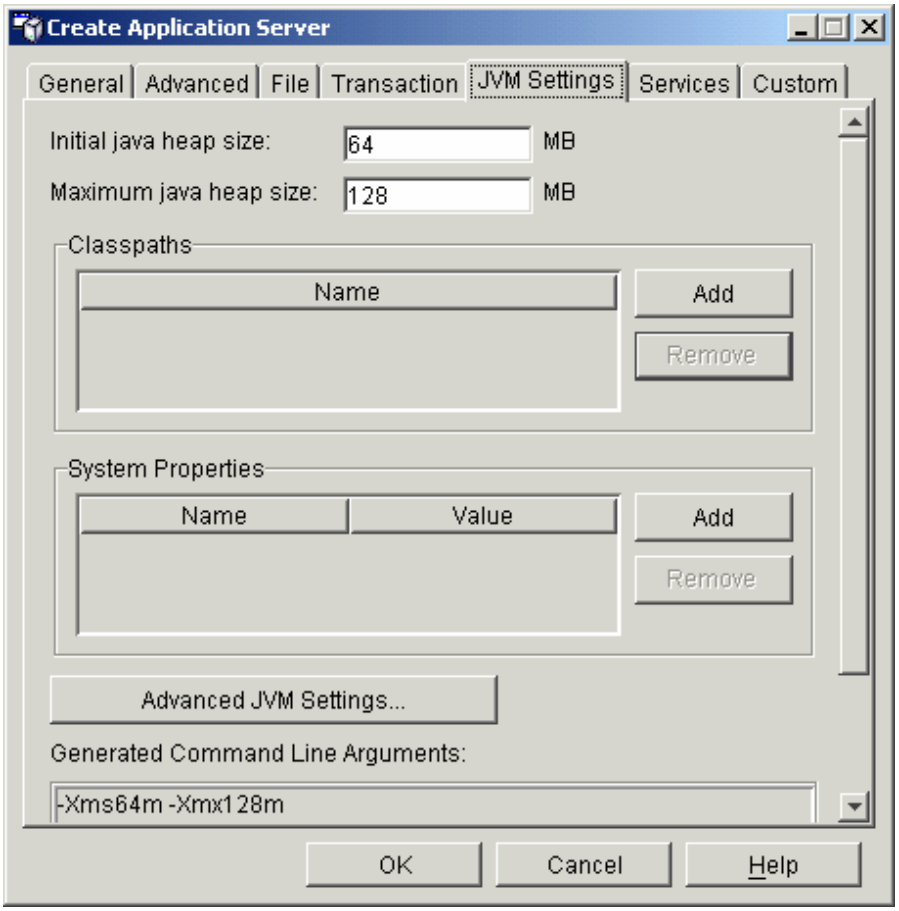
- In the **General** tab:
  * In the **Application Server Name** box, type ***MonitorServer***.
  * In the **Working Directory** box, type **<Monitor>**
  * In the **Module Visibility** combo box, select **Application**.
  * Leave the other fields as default

- In the **File** tab:



  * Leave the **Standard Input** box blank
  * In the **Standard Output** box, type ***logs/stdout.log***
  * In the **Standard Error** box, type ***logs/stderr.log***
  * Leave the check boxes in the **File Permissions** frame with their default settings.

- In the **JVM Settings** tab:



* In the **Initial Java Heap Size** box, type ***64***
* In the **Maximum Java Heap Size** box, type ***128***
* If you are using MQ Workflow as your engine then do the following in the Classpaths section:
  - Click **Add**. A new empty line appears in the **Classpaths** table under the **Name** column.
  - Type in the added line the full path and name of the MQ Workflow library file named *fmcojagt.jar* and located in the <**MQ**>*bin**java3320* folder if you are using IBM MQSeries Workflow 3.3.2 or located in the <**MQ**>*bin**java3400* if you are using IBM WebSphere MQ Workflow 3.4.
* If you are using WebSphere Application Server 4.0.5, then the property **client.encoding.override=UTF-8** should be added as in the following steps:
  - In the **System Properties** list, click **Add**
  - Type **client.encoding.override** in the **Name** field.
  - Type **UTF-8** in the **Value** field.

- Click **OK**. The new application server will be created.

1.1.3 Configure the WBI Monitor Initial Parameters

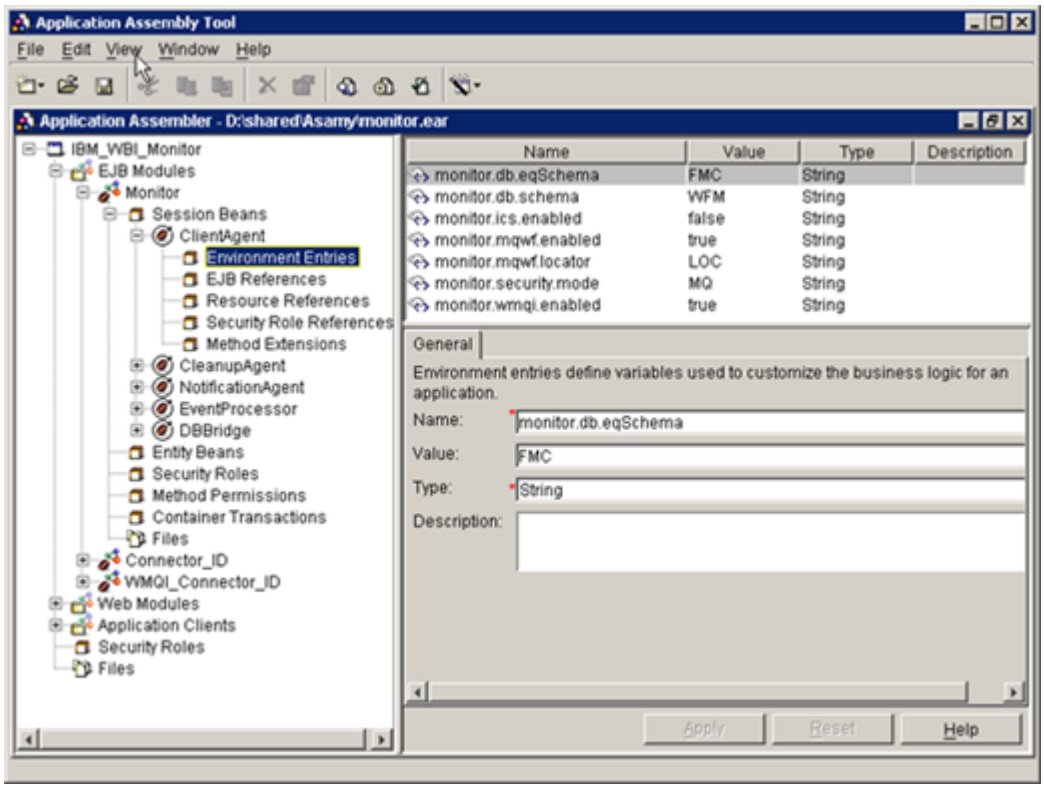
Now you should configure the WBI Monitor initial parameters. This is done through the WebSphere Application Assembly Tool.

To configure the WBI Monitor initial parameters:

1. From the WebSphere Administrator's Console, Select **Tools >Application Assembly Tools** from the menu.

   The **Application Assembly Tool** window opens.
2. Click **Cancel** to close the welcome screen.
3. Select **File> Open** from the menu. The **Open** dialog box appears.
4. Select the monitor.ear file located under the **<Monitor>***server**server*.
5. Expand the tree on the left.
6. Add the required environment entries (parameters) in the **Environment Entries** node under the session bean of the following modules:

   - For the **Monitor** EJB Module:
     * ClientAgent bean.
     * CleanupAgent bean.
     * NotificationAgent bean.
     * EventProcessor bean.
     * DBBridge bean.
   - For the **WMQI_Connector_ID** module
     * WMQIConnector bean.
   - For the **ICS_Connector_ID** module
     * ICSConnector bean.
   - For the **Connector_ID** module.
     * MQWFConnector bean.



The following table lists the required parameters that should be entered for each session bean.

Property Name / EJB Name:	ClientAgent	CleanupAgent	NotificationAgent	EventProcessor	MQWFConnector	WMQIConnector	ICSConnector	DBBridge
monitor.db.schema	✓	✓	✓	✓	✓	✓	✓	✓
monitor.db.eqSchema					✓			
monitor.db.tablespaces.adminData	✓							
monitor.db.tablespaces.adminIndexes	✓							
monitor.db.tablespaces.modelTables	✓							
monitor.db.tablespaces.modelIndexes	✓							
monitor.db.tablespaces.processInstTables	✓							
monitor.db.tablespaces.processInstIndexes	✓							
monitor.db.tablespaces.eventTables	✓							
monitor.db.tablespaces.eventIndexes	✓							
monitor.db.tablespaces.processDataTables	✓							

monitor.db.tablespaces.processDataIndexes	✓							
monitor.db.tablespaces.securityTables	✓							
monitor.db.tablespaces.securityIndexes	✓							
monitor.db.tablespaces.processModelLob	✓							
monitor.db.tablespaces.processDataLob	✓							
monitor.db.tablespaces.configValuesLob	✓							
monitor.db.tablespaces.notifyExtraDataLob	✓							
monitor.db.tablespaces.eventDataLob	✓							
monitor.db.tablespaces.delayedEventDataLob	✓							
monitor.db.tablespaces.mbDetailLob	✓							
monitor.db.tablespaces.eqTables					✓			
monitor.db.tablespaces.eqIndexes					✓			
monitor.db.tablespaces.conDetailDataLob					✓			
monitor.db.tablespaces.defaultTablespace	✓				✓			
monitor.wics.enabled	✓			✓				
monitor.wmqi.enabled	✓			✓				
monitor.mqwf.enabled	✓			✓				
monitor.security.mode	✓							
monitor.security.ldap.url	✓							
monitor.security.ldap.dn	✓							
monitor.security.ldap.password	✓							
monitor.security.ldap.naming.attr	✓							
monitor.security.ldap.root	✓							
monitor.security.ldap.dn.attr.id	✓							
monitor.mqwf.locator	✓		✓					
monitor.mqwf.agent	✓		✓					
monitor.mqwf.system	✓		✓					
monitor.mqwf.sysGroup	✓		✓					
monitor.mqwf.encoding				✓				

The following table provides the description of each parameter.

Parameter Name	Type	Value Description
monitor.db.schema	String	The Monitor Database Schema. The default value is *WFM*
monitor.db.eqSchema	String	The MQSeries Workflow Database (Event Queue Database) Schema. The default value is FMC

monitor.mqwf.enabled	String	Type *True* if you are using MQ Workflow as your engine or *False* otherwise.
monitor.wmqi.enabled	String	Type *True* if you are using WMQI as your engine or *False* otherwise.
monitor.wics.enabled	String	Type *True* if you are using WICS as your engine or *False* otherwise.
monitor.security.mode	String	The applied security mode: • Type *MQ* for MQ Workflow security mode if you are using MQ Workflow as your engine. • Type LDAP for LDAP security mode or Local for local security mode if you are only using WMQI as your engine.
monitor.security.ldap.url	String	The LDAP Server URL and port number (for example *ldap://ldapsrvr:389/*). This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.dn	String	A Distinguished Name (DN) for an LDAP Server authorized user that will be used for logging in to this LDAP Server, and performing the search in the LDAP users' tree. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.password	String	The password of the defined User DN. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.naming.attr	String	The name of the prefix that precedes the user ID in the LDAP Server database (i.e. CN, UID,...etc). The value of this parameter varies between the different types of LDAP Servers. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.root	String	The starting point in the LDAP tree from which the query will start searching for the full DN of the given user ID. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.dn.attr.id	String	The name of the Distinguished Name attribute ID (for example *distinguishedName*, *entrydn* ...etc. This value is case sensitive). This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.mqwf.locator	String	The MQSeries Workflow Locator Policy that is used to locate the MQSeries Workflow Java Agent. This property can have one of the following values: LOC, RMI, OSA, IOR, COS, or JNDI. The default value is LOC (Local Locator Policy)
monitor.mqwf.agent	String	The MQSeries Workflow Agent's Name
monitor.mqwf.system	String	The MQSeries Workflow System's Name
monitor.mqwf.sysGroup	String	The MQSeries Workflow System Group's Name
monitor.mqwf.encoding	String	The MQSeries Workflow Database encoding. (This property must be set if the MQ Workflow Database encoding is different from the Monitor Server machine encoding)

In addition to the above parameters, there are additional parameters that should be defined to hold the values of the Database TableSpaces names that you want to use for physically storing the Monitor and EventQueue database tables and indexes. You have the ability to use a number of TableSpaces that are up to 22 different TableSpaces; 19 of them are created in the Monitor Database and three of them are created in the EventQueue Database. The database tables and indexes are grouped and categorized so that each category can be assigned to a separate TableSpace. You can define different TableSpace name as the value for each system property. Alternatively, you can define the same TableSpace for more than one system properties. In the later case, this TableSpace will be used for the tables and indexes that are corresponding to these properties. You can also ignore defining any of these properties, and in this case the tables, which are supposed to be assigned to these TableSpaces, will be assigned to the default TableSpace that can be defined by the *monitor.db.tablespaces.defaultTablespace* property. If you did not define this property then the database user default TableSpace will be used as the default TableSpace.

Parameter Name	Type	Value Description
monitor.db.tablespaces.adminData	String	TableSpace name of the Monitor Database Administration tables.
monitor.db.tablespaces.adminIndexes	String	TableSpace name of the Monitor Database Administration indexes.
monitor.db.tablespaces.modelTables	String	TableSpace name of the Monitor Database Static model tables.
monitor.db.tablespaces.modelIndexes	String	TableSpace name of the Monitor Database Static model indexes.
monitor.db.tablespaces.processInstTables	String	First TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.processInstIndexes	String	First TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.eventTables	String	Second TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.eventIndexes	String	Second TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.processDataTables	String	Third TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.processDataIndexes	String	Third TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.securityTables	String	TableSpace name of the Monitor Database Security tables.
monitor.db.tablespaces.securityIndexes	String	TableSpace name of the Monitor Database Security indexes.

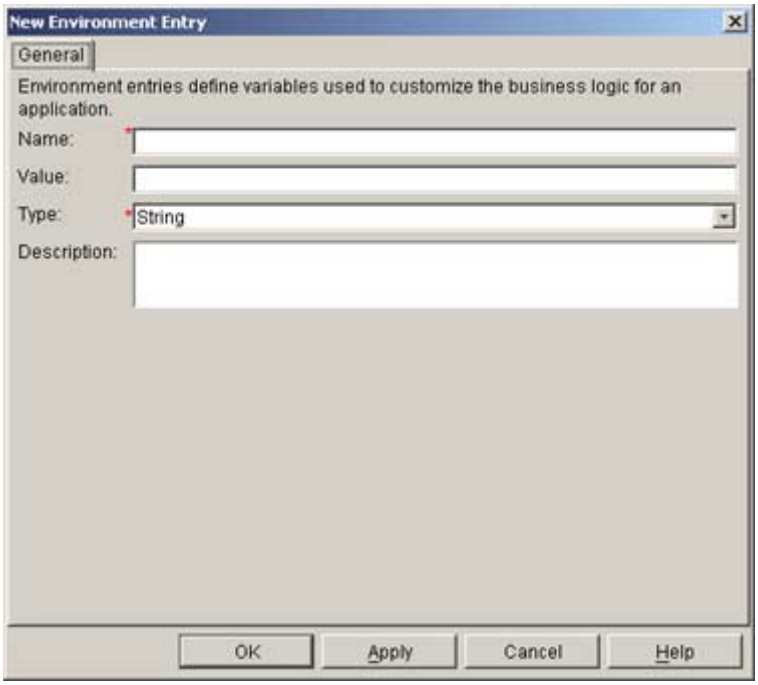
monitor.db.tablespaces.processModelLob	String	TableSpace name of the Monitor Database Process Model LOB.
monitor.db.tablespaces.processDataLob	String	TableSpace name of the Monitor Database Process Data LOB.
monitor.db.tablespaces.configValuesLob	String	TableSpace name of the Monitor Database Configuration Values LOB.
monitor.db.tablespaces.notifyExtraDataLob	String	TableSpace name of the Monitor Database Notify Extra Data LOB.
monitor.db.tablespaces.eventDataLob	String	TableSpace name of the Monitor Database Event Data LOB.
monitor.db.tablespaces.delayedEventDataLob	String	TableSpace name of the Monitor Database Delayed Event Data LOB.
monitor.db.tablespaces.mbDetailLob	String	TableSpace name of the Monitor Database WBI Message Broker LOB.
monitor.db.tablespaces.eqTables	String	TableSpace name of the MQSeries Workflow Database Event Queue tables .
monitor.db.tablespaces.eqIndexes	String	TableSpace name of the MQSeries Workflow Database Event Queue indexes.
monitor.db.tablespaces.conDetailDataLob	String	TableSpace name of the MQSeries Workflow Database Configuration Detail Data LOB
monitor.db.tablespaces.defaultTablespace	String	The name of the default TableSpace that is used for any tables or indexes category that has not been assigned to a specific TableSpace.

Important Note: In Oracle Database, the Event Queue database schema and the Monitor Database Schema must be the same as the Database Administrator's User Name.

Important Note: In MQ Workflow, a default configuration must be defined even if the entered System Group and System belong to a different configuration.

To add each one of these parameters, do the following:

- Right click inside the right-hand table, and select New from the shortcut menu that appears. The **New Environment Entry** dialog box appears.



- Type the parameter name in the **Name** field.
- Type the parameter value in the **Value** field.
- Select the parameter type from the **Type** drop down list.
- Click **OK**. The new parameter will be added to the table.

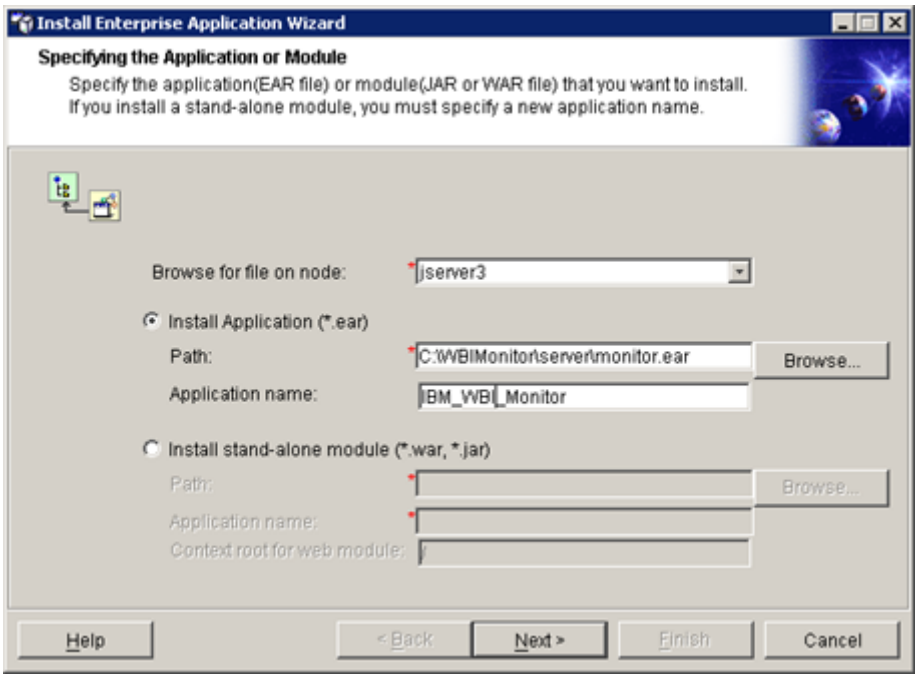
7. Select **File > Save** from the menu to save the *monitor.ear*.
8. Exit the **Application Assembly Tool**.

1.1.4 Install the WBI Monitor Enterprise Application

Now you will create and install an Enterprise Application for WBI Monitor.

1. From the **Console > Wizards** menu, select **Install Enterprise Application**. The **Install Enterprise Application Wizard** will start

2. In the **Specifying the Application or Module** screen:



- Select the <**ServerName**> node from the **Browse for file on node:** combo box if it is not displayed by default.
- Select the **Install Application (*.ear)** radio button.
- In the **Application name** box, type *IBM_WBI_Monitor*
- Click the **Browse** button to locate the monitor.ear file. The **Open** dialog box appears.
  * Select the monitor.ear file from the **<Monitor>***server**server*.
  * Click **Open**. The file will be selected and you will return to the **Specifying the Application or Module** screen
- Click **Next**.

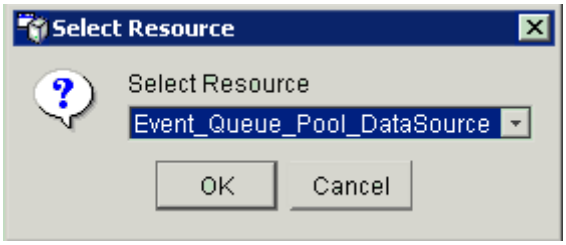
3. In the **Mapping Users to Roles** screen, click **Next**.
4. In the **Mapping EJB RunAs Roles to Users** screen, click **Next**.
5. In the **Binding Enterprise Beans to JNDI Names** screen, click **Next**.
6. In the **Mapping EJB References to Enterprise Beans** screen, click **Next**.
7. In the **Mapping Resource References to Resources** screen do the following:
   - If the Monitor database and the Event Queue database are located in the same physical database (one database), then all resource references should be mapped to the same physical data source named *Monitor_Pool_DataSource*.

- If the Monitor database and the Event Queue database are located in two physical databases, then map each resource reference to the appropriate resource according to the following table:

Resource Ref.	Module	Data Source Name	Data Source JNDI Name
jdbc/MonitorDataSource	MQWFConnector	Monitor_XA_DataSource	MonitorXADataSource
jdbc/EventQueueDataSource	MQWFConnector	Event_Queue_XA_DataSource	EventQueueXADataSource
jdbc/ PoolEventQueueDataSource	MQWFConnector	Event_Queue_Pool_DataSource	EventQueuePoolDataSource
jdbc/MonitorDataSource	CleanupAgent	Monitor_Pool_DataSource	MonitorPoolDataSource
jdbc/MonitorDataSource	ClientAgent	Monitor_Pool_DataSource	MonitorPoolDataSource
jdbc/MonitorDataSource	EventProcessor	Monitor_Pool_DataSource	MonitorPoolDataSource
jdbc/MonitorDataSource	NotificationAgent	Monitor_Pool_DataSource	MonitorPoolDataSource
jdbc/MonitorDataSource	WMQIConnector	Monitor_Pool_DataSource	MonitorPoolDataSource
jdbc/MonitorDataSource	ICSConnector	Monitor_Pool_DataSource	MonitorPoolDataSource

To perform the mapping:

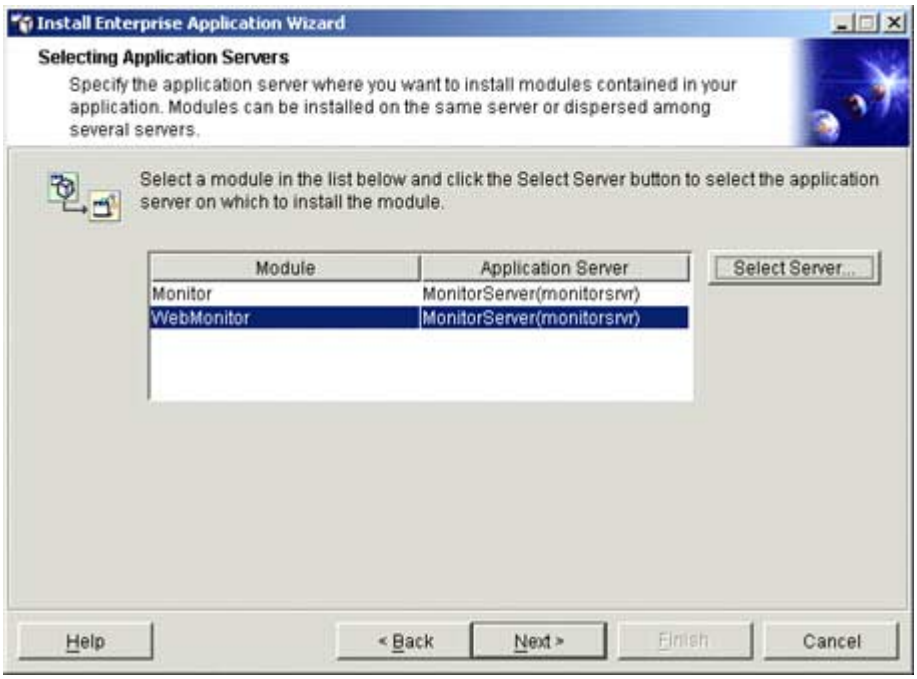
- Select the resource reference you want to map to a specific data source from the **Resource Reference** column.
- Click **Select Resource**. The Select Resource dialog box appears.



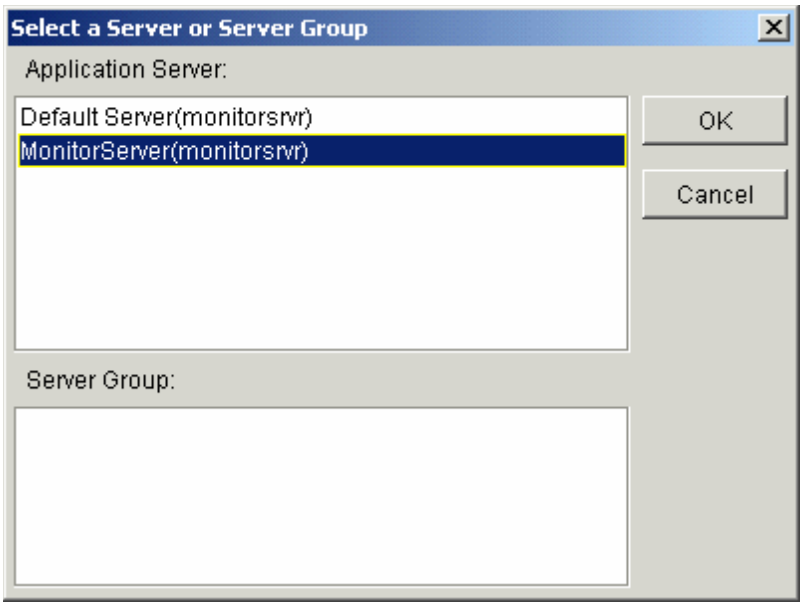
- Select the appropriate Data Source name from the **Select Resource** drop down list and click **OK.** The resource reference will be mapped to the selected resource and the JNDI Name of the selected data source will appear in the mapping table in the **JNDI Name** column.
- Click **Next** to continue.

8. In the **Specifying the Default DataSource for EJB Module** screen, click **Next**.
9. In the **Specifying DataSources for Individual CMP Beans** screen, click **Next**.
10. In the **Selecting Virtual Hosts for Web Modules** screen, click **Next**.

11. In the **Selecting Application Server** screen:



- Select **Monitor** from the **Module** column.
- Click **Select Server**. The **Select a Server or Server Group** dialog box appears.

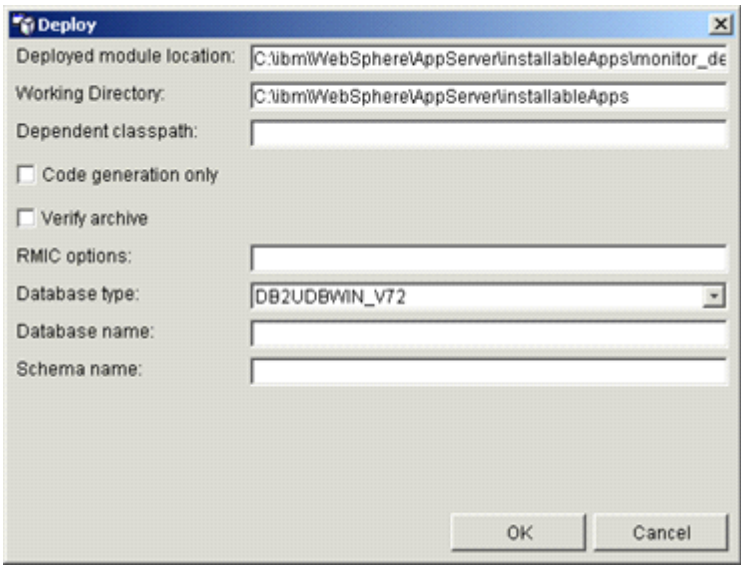


- Select MonitorServer**(<ServerName>)** from the **Application Server** list and click **OK**.
- Select **Web Monitor** from the **Module** column in the **Selecting Application Server** screen
- Click **Select Server**. The **Select a Server or Server Group** dialog box appears.

- Select MonitorServer**(<ServerName>)** from the **Application Server** list and click **OK**.
- Click **Next** in the **Selecting Application Server** screen.

12. In the **Completing Application Installation Wizard** screen, click **Finish.**

The **Deploy** dialog box appears.

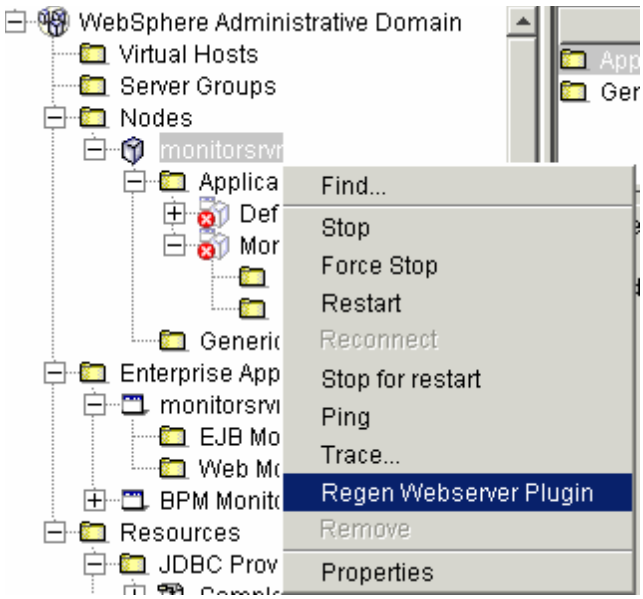


13. Accept the default values in the **Deploy** dialog box and click **OK**. The new Enterprise Application will be installed.
14. Wait until the confirmation message appears, and then click **OK**.

1.1.5 Regenerating Web Server Plug-in

Now you must regenerate the Web Server Plug-in to be adequate with the installed Enterprise Application. To regenerate the Web Server Plug-in:

1. In the **WebSphere Administrative Domain** tree, right-click **Nodes > <ServerName>** and select **Regen Webserver Plugin** from the shortcut menu that appears.



2. Wait until the confirmation message appears, and then click **OK**.

1.1.6 Restart the Web Server

Now you should restart the Web Server you have.

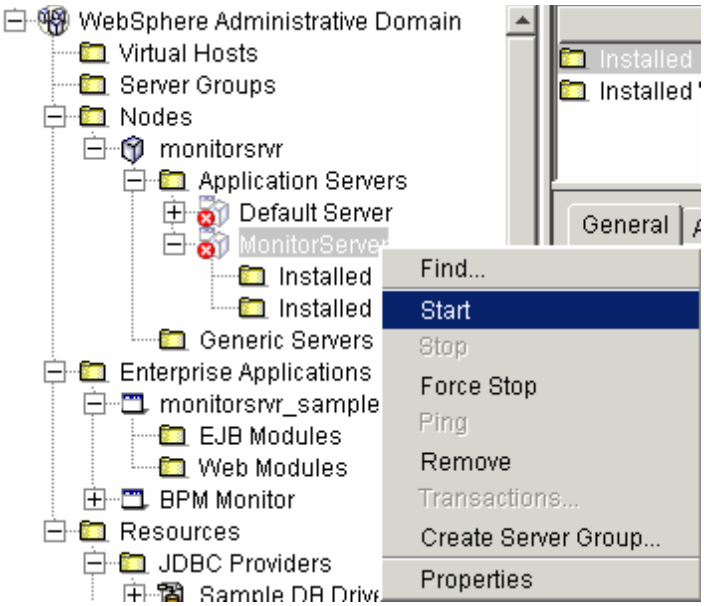
Example: If you installed IBM HTTP Server as the Web Server then do the following:

1. From the **Windows Taskbar**, select **Start > Programs > IBM HTTP Server > Stop IBM HTTP Server**.
2. Wait until the confirmation message that tells you that the IBM HTTP Server has been stopped.
3. From the **Windows Taskbar**, select **Start > Programs > IBM HTTP Server > Start IBM HTTP Server**.
4. Wait until the confirmation message that tells you that the IBM HTTP

1.1.7 Starting the Monitor Application Server

Now you must start the Monitor Application Server. To do this:

1. In the **WebSphere Administrative Domain** tree, right-click **Nodes > <ServerName> > Application Servers > > MonitorServer** and select **Start** from the shortcut menu that appears.

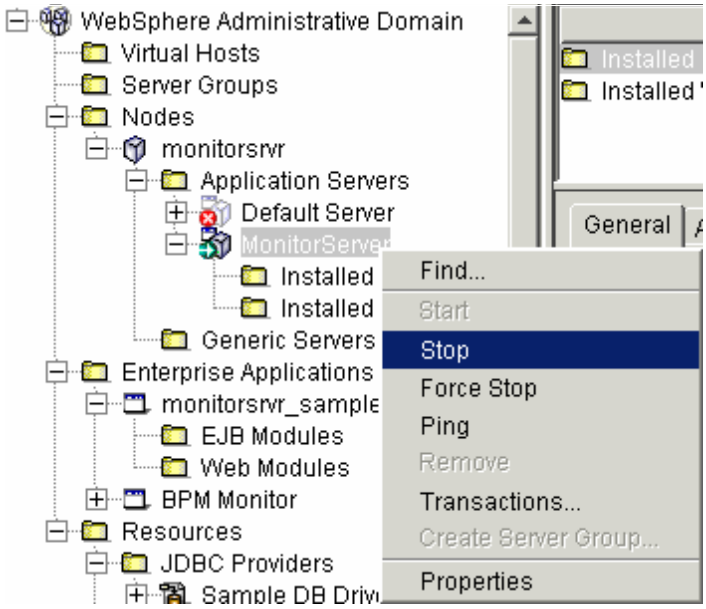


2. Wait until the confirmation message appears, and then click **OK**.

2 WBI Monitor Server Un-deployment

This section is used in a situation where you would like to completely un-deploy the Monitor Server. To completely un-deploy the Monitor perform the following steps:

1. Open the WebSphere Administrator's Console.
2. In the **WebSphere Administrative Domain** tree, right click **Nodes > <ServerName>> > Application Servers > MonitorServer** and select **Stop** from the shortcut menu that appears to stop the Monitor Application Server.



3. In the **WebSphere Administrative Domain** tree, right click the **Enterprise Applications > IBM_WBI_Monitor** and select **Remove** from the shortcut menu.
4. Right click the **Nodes > <ServerName>> > Application Servers > MonitorServer** and select **Remove** from the shortcut menu.
5. Remove all created Data Sources for the Monitor.
6. Remove the created Database Driver(s).
7. Delete the file *monitor_deployed.ear* from **<WebSphere>***AppServer**InstallableApps*\
8. Delete any reference for WBI Monitor from **<WebSphere>***AppServer**InstalledApps*\
9. Delete the directory named ***MonitorServer*** which is located in **<WebSphere>**/temp/**<WAS_NODE_NAME>**/
10. Delete all files in the **<Monitor>** folder.

Appendix B: Manual Deployment of WBI Monitor on WebSphere 5.0

This appendix describes the manual steps of deploying WBI Monitor on IBM WebSphere 5.0 Before starting these steps, it is assumed that the Monitor Database (and Event Queue Database if you are using MQ Workflow as your engine) with the required Table Spaces are created and configured in your Database Server. The following conventions are used for all the instructions throughout this document:

- **<WebSphere>** = The WebSphere home directory. e.g. C:\Websphere
- **<MQ>** = The MQ Workflow home directory. (e.g. *c:\fmcwinnt* on Windows platform, /*user*/*fmc* on AIX platform, or /*opt*/*fmc* on Solaris platform)
- **<DB2>** = The DB2 home directory. e.g. c:\sqllib
- **<Oracle>** = The Oracle home directory on the Oracle Server machine (if Oracle is not running on the same machine on which the IBM WebSphere Application Server is installed). e.g. C:\oracle\ora81 (Local) or \\oracle_machine\oracle\ora81 (Network)
- **<Monitor>** = The Monitor installation directory where the WBI Monitor has been installed. e.g. C:\WBIMonitor
- **<WebServerName>** = The name of the machine that hosts the Web server for which the WebSphere is configured. (Ex. The machine name on which the IBM HTTP Server or Microsoft IIS 4.0 or IIS 5.0 is installed)
- **<ServerName>** = The name of the server on which the Monitor will be installed.

Important Notes:

- On AIX and Solaris platforms, use forward slash / instead of back-slash \ when writing paths.
- The names and paths of folders and files are case sensitive.
- Make sure that the user you are using have all needed permissions. For example, using a user who has no permissions on WebSphere or the Database will fail to deploy the monitor.
- On AIX 5.1 platform, the environment variable named **LIBPATH** must be appended with the following pathes: **<MQ>**/*lib* and **<MQ>**/*lib*/*mqserver*. To do this, type The following command in the console window from which you will start the WebSphere and then press Enter:

  *export LIBPATH=$LIBPATH:***<MQ>**/*lib:***<MQ>**/*lib*/*mqserver*

- The Monitor will not work if the server properties *client.encoding.override* or *default.client.encoding* are set to any encoding other than UTF-8.

1 WBI Monitor Deployment

1.1 Configure IBM WebSphere

The manual deployment of WBI Monitor on WebSphere 5.0 is done through the IBM WebSphere Administrative Console for either WebSphere Application Server v5.0 or WebSphere Deployment Manager (Network Deployment) v5.0. The differences between the deployment steps on each of these WebSphere editions are:

- If you intend to deploy the WBI Monitor on WebSphere Deployment Manager (Network Deployment) v5.0 then you have to create a new Application Server (for example, named MonitorServer) on which the WBI Monitor Enterprise Application will be deployed. Also you have to select the node on which you will create the Application Sever and deploy the WBI Monitor Enterprise Application. This is done at the beginning of each section steps that requires the node selection.
- If you intend to deploy the WBI Monitor on WebSphere Application Server v5.0 then the WBI Monitor enterprise application should be deployed on the Default Server (server1). And in this case you don't need to create a new Application Server.

The following sections provide the detailed steps of the manual deployment of WBI Monitor on WebSphere.

1.1.1 Create JDBC Providers and Data Sources

If previous drivers are already created and installed, then you can skip the following steps for creating and installing the database drivers for the data source.

You need to create the required Database Drivers and their Data Sources. The creation of the Database Drivers and their Data Sources should be performed as the following sequence:

1. If you are not using IBM MQ Workflow as your engine or if the Monitor database and the Event Queue database are located in the same physical database:

   - Create and install only one Pool Database Driver.

   - Create only one Pool Data Sources under the created Pool Database Driver points to the Monitor database.

2. If the Monitor database and the Event Queue database are located in two physical databases:

   - Create and install one Pool Database Driver.

- Create two Pool Data Sources under the created Pool Database Driver (one Data Source points to the Monitor database and the other Data Source points to Event Queue database).
- Create and install one XA Database Driver.
- Create two XA Data Sources under the created XA Database Driver (one Data Source points to the Monitor database and the other Data Source points to Event Queue database).

The following tables provide the required values for the each Database Driver and Data Source as you should enter through the creation steps:

For Monitor Pool JDBC Provider

Property/Field Name	DB2	Oracle
Type	DB2 JDBC Provider	Oracle JDBC Thin Driver
Name	MonitorDB2PoolDrive	MonitorOraclePoolDrive
Database JDBC Driver File Name	db2java.zip	classes12.zip
Database JDBC Driver File path	<DB2>*java12*\	<Oracle>*jdbc**lib*

For Monitor Pool Data Source

Property/Field Name	Value
Name	Monitor_Pool_DataSource
JNDI Name	MonitorPoolDataSource

For Event Queue Pool Data Source

Property/Field Name	Value
Name	Event_Queue_Pool_DataSource
JNDI Name	EventQueuePoolDataSource

For Monitor XA JDBC Provider

Property/Field Name	DB2	Oracle
Type	DB2 JDBC Provider (XA)	Oracle JDBC Thin Driver (XA)
Name	MonitorDB2XADrive	MonitorOracleXADrive
Database JDBC Driver File Name	db2java.zip	classes12.zip
Database JDBC Driver File path	<DB2>*java12*\	<Oracle>*jdbc**lib*

For Monitor XA Data Source

Property/Field Name	Value
Name	Monitor_XA_DataSource
JNDI Name	MonitorXADataSource

For Event Queue XA Data Source

Property/Field Name	Value
Name	Event_Queue_XA_DataSource
JNDI Name	EventQueueXADataSource

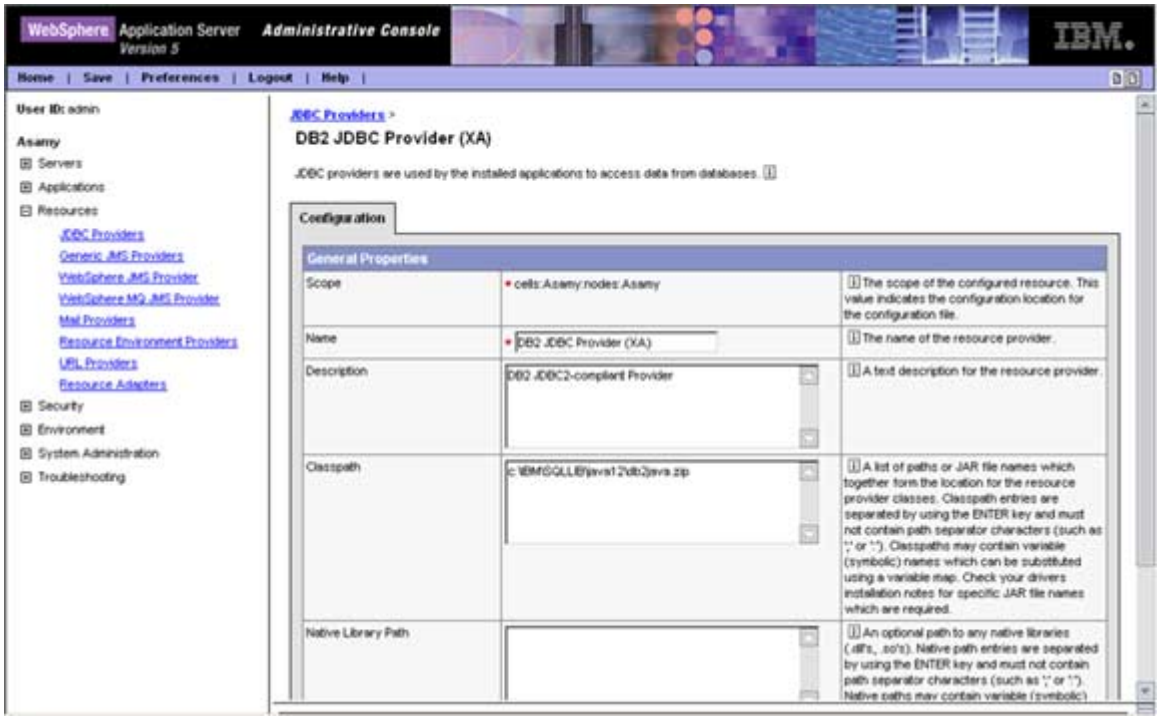
The following sections describe the required steps that you should follow to create and install a Database Driver and to create a Data Source under this driver:

Creating and Installing a JDBC Provider

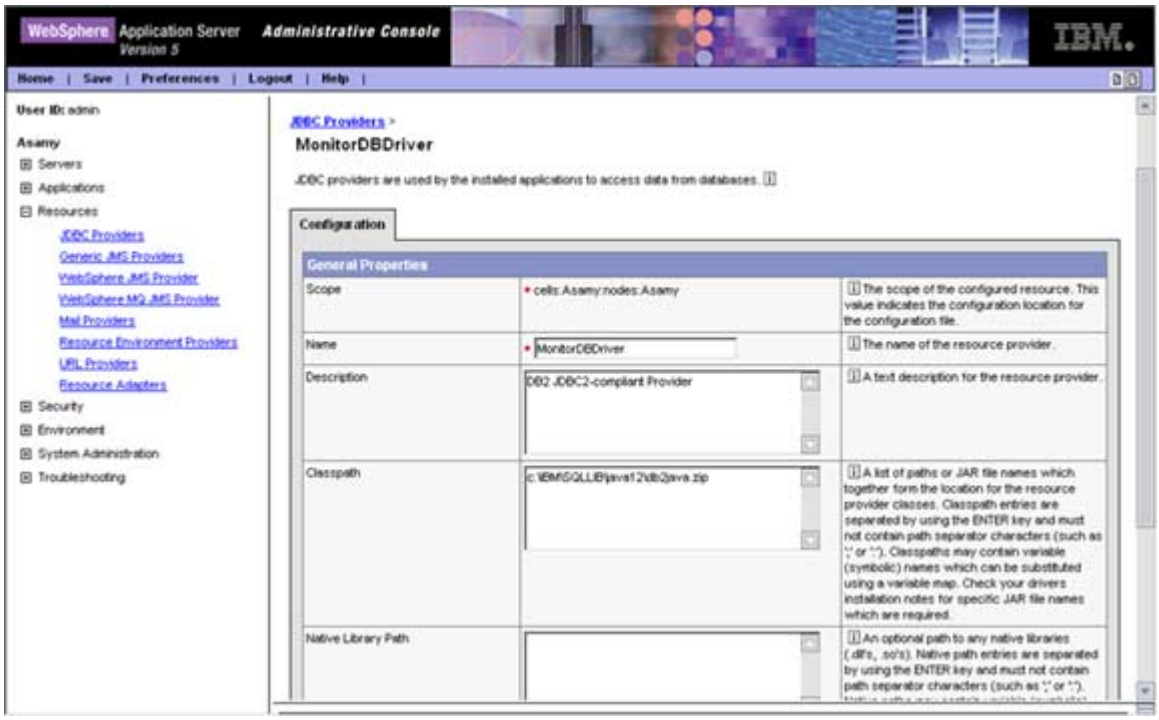
To create and install a JDBC Provider:

1. From the left hand tree, select **Resources > JDBC Providers**. The **JDBC Provider** page appears in the right side of the window.

2. Click **New**. The **JDBC Provider > New** page appears.



3. Select the JDBC Driver type from the **JDBC Providers** drop down list:
4. Click **Apply**, the configuration page of the selected JDBC Provider type appears.



5. Type JDBC Provider name in the **Name** box.

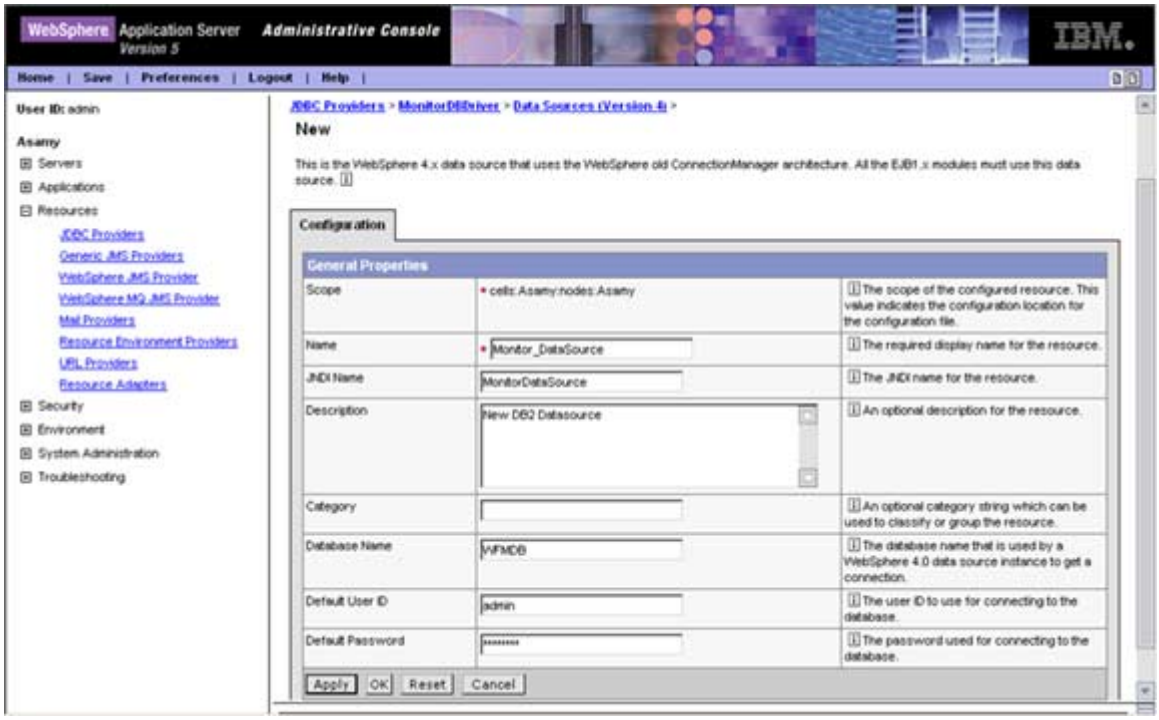
6. Type a description for the new JDBC Provider in the **Description** box (Optional)
7. In the **Classpath** box, change the contents of this field to contain the path and name of the JDBC Driver file according to your Database Server type.
8. Click **OK**.
9. Click **Save** in the top menu bar to save your changes. The **Save** page appears.
10. Click **Save**.

Creating the Data Source

To create a Data Source to point to a Database and a Communication Driver under the created JDBC Provider:

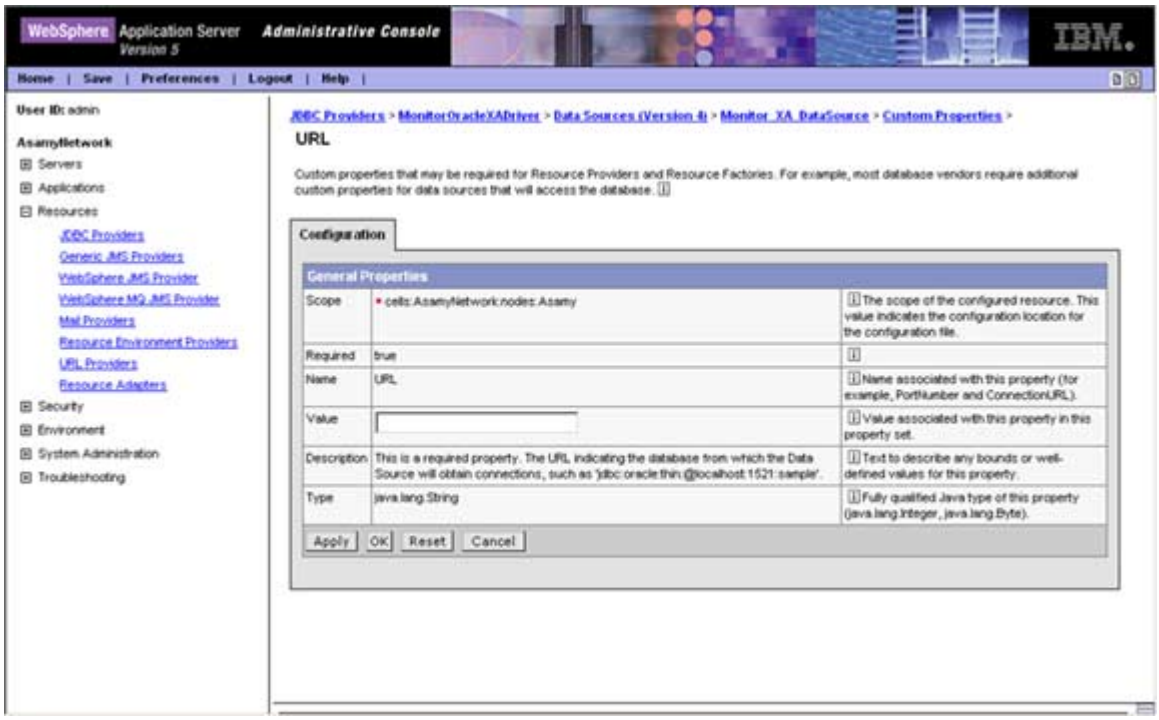
1. From the left hand tree, select **Resources > JDBC Providers.** The **JDBC Providers** page appears on the right.
2. From the **Existing JDBC Provider** list, click the Hyperlink of the JDBC Provider you have created. The configuration page of the JDBC Provider appears.
3. From the **Additional Properties** section, click the **Data Sources (Version 4)** hyperlink. The **Data Sources (Version 4)** page appears.

4. Click **New.** The Configuration page of the new Data Source appears.



5. Type Data Source name in the **Name** box.
6. Type Data Source JNDI name in the **JNDI name** box.
7. In the **Database Name** field:
   - For DB2 database: Type the name of the database to which the data source points (For example WFMDB for Monitor database or FMCDB for MQ Workflow database. If you created the Monitor Database or the Event Queue Database with a different name, then you should type this name in the Database Name field.).
   - For Oracle database: Leave this field empty
8. Type the Database Administrator's user name and password in the **Default User ID** and **Default Password** fields.
9. Click **Apply**.
10. For Oracle database only:
    - In the **Additional Properties** section that appears in the bottom of the page:
      * Click the **Custom Properties** hyperlink. The Custom Properties Page appears.

* In the **Custom Properties** page click the **URL** property hyperlink. The **URL Properties** page appears.



* In the **Value** field type: *jdbc:oracle:thin:*@**<Oracle_Server_Name>***:***<Oracle_Server_Port_Number>***:>***:***<DatabaseName>**

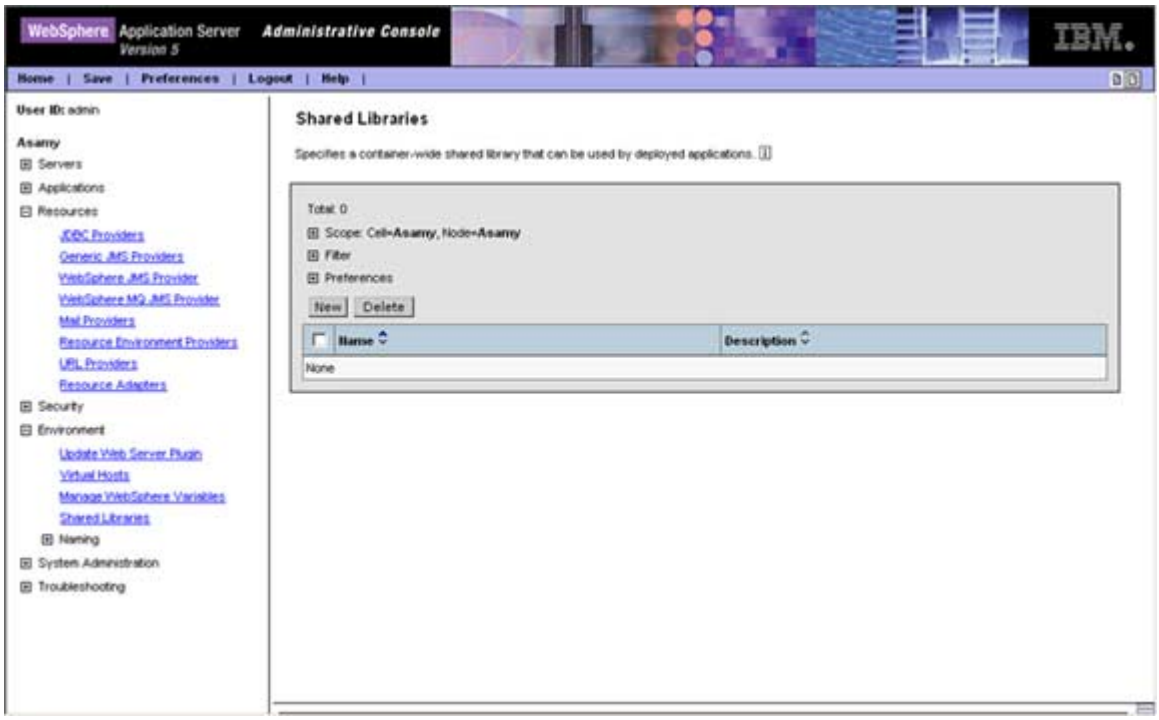
Where **<Oracle_Server_Name>** is the name or the IP address of the Oracle Database Server machine, **<Oracle_Server_Port_Number>** is the Oracle Server Port Number (the default port is 1521) and **<DatabaseName>** is the database name (for example WFMDB for Monitor database or FMCDB for MQ Workflow database. If you created the Monitor Database or the Event Queue Database with a different name, then you should type this name in the Database Name field.).

* Click **Apply**.

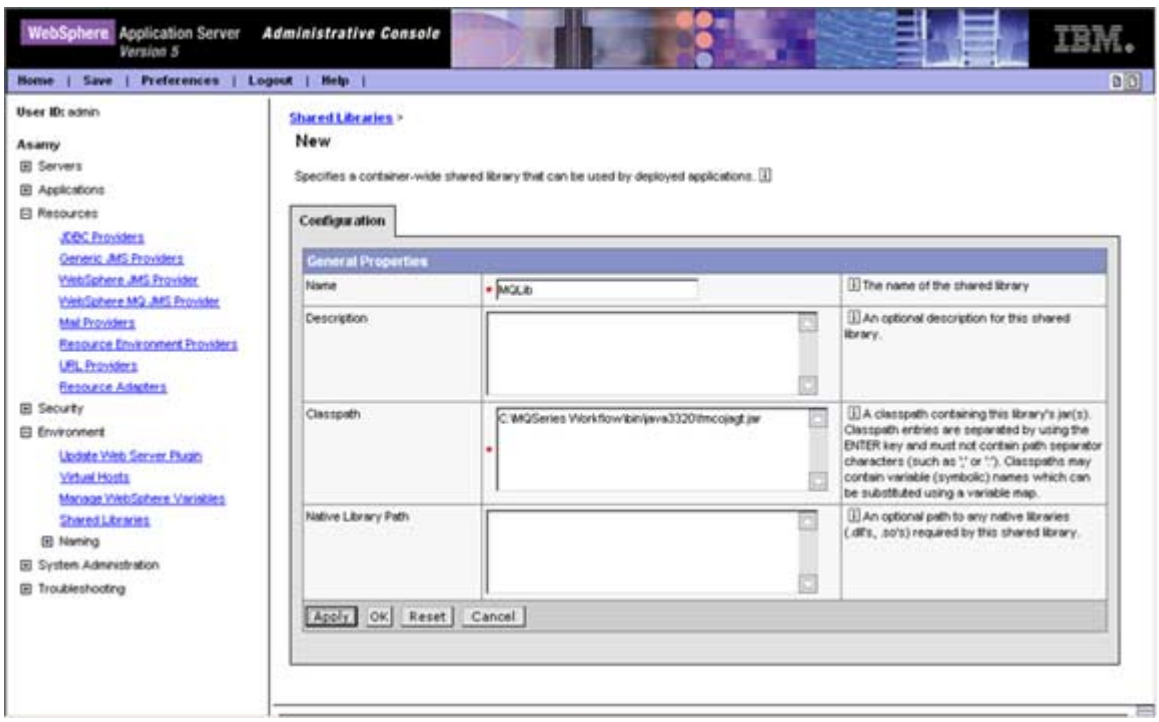
- Click **OK**
- Click **Save** in the top menu bar to save your changes. The **Save** page appears.
- Click **Save**.

1.1.2 Create a new Shared Library

1. In the left hand tree expand the **Environment** node
2. Select the **Shared Library** hyperlink. The Shared Libraries page appears.



3. Click **New**. The configuration page of the new Shared Library appears.



4. Type ***MQLib*** in the **Name** box.
5. Type a description for the new shared library in the **Description** box (Optional).

- In the **Classpath** box, enter the path of the file **fmcojagt.jar** file (the default location is under the **<MQ>**\bin\java3320 folder

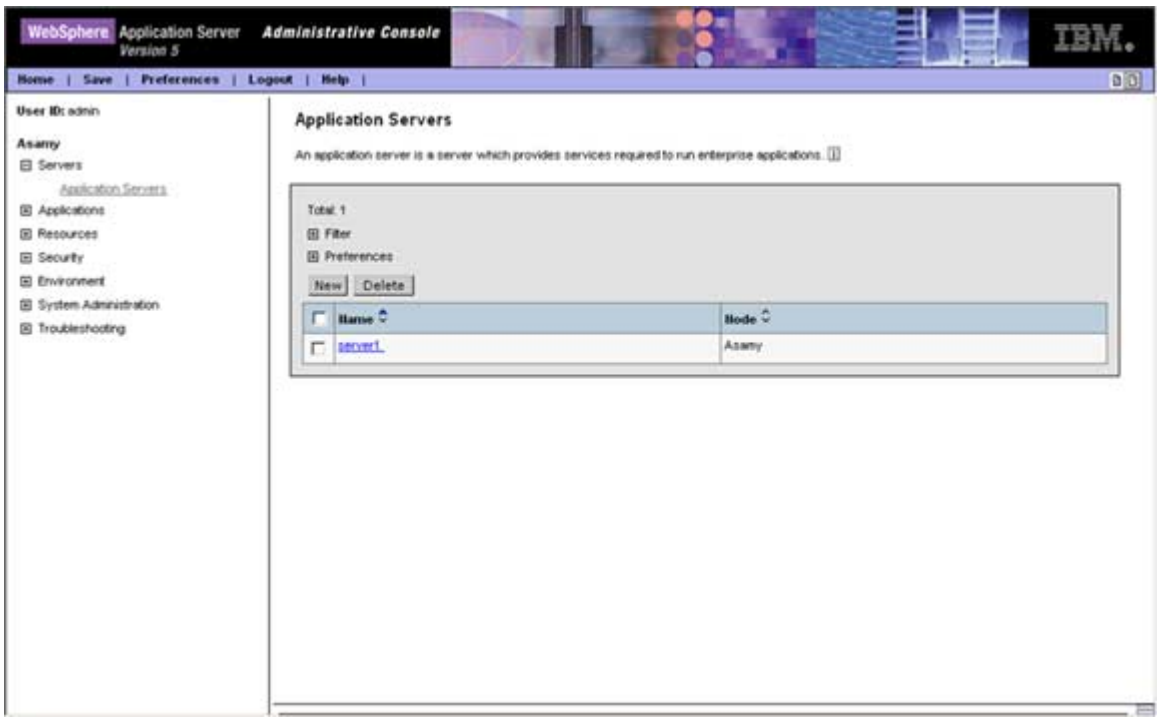
6. Click **OK**
7. Click **Save** in the top menu bar to save your changes. The **Save** page appears.
8. Click **Save**.

1.1.3 Create a new Application Server

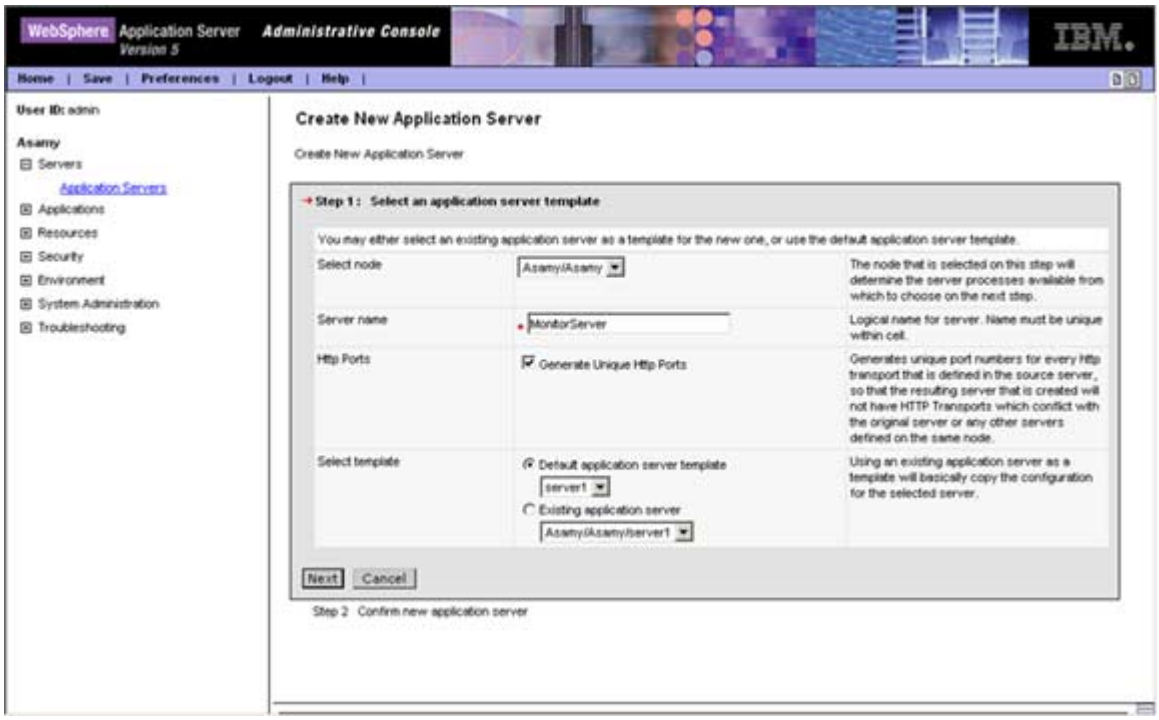
The following steps describe how to create a new Application Server named *MonitorServer*, on which you will deploy the WBI Monitor Enterprise Application in case of deploying on WebSphere Deployment Manager (Network Deployment) v5.0. Do not create this new Application Server if you are going to deploy the WBI Monitor Enterprise Application on the Default Server (server1) in case you are deploying on WebSphere Application Server 5.0.

To create a new Application Server for WBI Monitor:

1. From the Left hand tree, expand the **Servers** node.
2. Click the **Application Servers** hyperlink. The **Application Servers** page appears.



3. Click **New**. The **Create New Application Server** wizard appears.



4. Select the node on which the new Application Server will be created from the **Select Node** drop down list.
5. Type *MonitorServer* in the **Server name** field.
6. Leave the other fields with their default values.
7. Click **Next**. The **Confirmation Page** appears.
8. Click **Finish**. The new Application Server will be created and its name will be added to the **Application Servers** list in the **Application Servers** page.
9. Click **Save** in the top menu bar to save your changes. The **Save** page appears.
10. Click **Save**.

1.1.4 Configure the New Application Server

After creating the MonitorServer Application Server, you need to configure its parameters. If you intend to deploy the WBI Monitor Enterprise Application on the default Application Server (Default Server) named server1, then adjust this Application Server with the different settings.

To configure the Default Server (server1):

1. From the Left hand tree, expand the **Servers** node.
2. Click the **Application Servers** hyperlink. The **Application Servers** page appears.

3. Click the **server1** hyperlink in the **Application Servers** list. The **server1 Configuration Page** appears.
4. Click the **Process Definition** hyperlink. The **Process Definition** configuration page appears.
   - Click the **Java Virtual Machine** hyperlink. The **Java Virtual Machine** configuration page appears.
     * In the **Initial java heap size** box, type 64
     * In the **Maximum java heap size** box, type 128
     * Click **OK**.
5. Click **Save** in the top menu bar to save your changes. The **Save** page appears.
6. Click **Save**.

To configure the MonitorServer:

1. From the Left hand tree, expand the **Servers** node.
2. Click the **Application Servers** hyperlink. The **Application Servers** page appears.
3. Click the **MonitorServer** hyperlink in the **Application Servers** list. The **MonitorServer Application Server Configuration Page** appears.
4. Click the **Process Definition** hyperlink. The **Process Definition** configuration page appears.
   - In the **Working Directory** box, type **<Monitor>**
   - Leave the other fields with their default values.
   - Click **Apply**.
   - Click the **Java Virtual Machine** hyperlink. The **Java Virtual Machine** configuration page appears.
     * In the **Initial java heap size** box, type 64
     * In the **Maximum java heap size** box, type 128
     * Click **OK**.
   - Click the **MonitorServer** hyperlink in the top of the page to return to the **MonitorServer Configuration Page**.
   - Click the **Logging and Tracing** hyperlink. The **Logging and Tracing** configuration page appears.
   - Click the **JVM Logs** hyperlink. The **JVM Logs** Configuration Page appears.
     * In the **System.out** section change the value in the **File Name** field to contain the following: <**Monitor**>/***logs/ stdout.log***
     * In the **System.err** section change the value in the **File Name** field to contain the following: <**Monitor**>/***logs/ stderr.log***
     * Click **OK**.

5. Click **Save** in the top menu bar to save your changes. The **Save** page appears.
6. Click **Save**.

1.1.5 Configure the Virtual Host

Now you should configure the default_host virtual host in order to add the server HTTP port to its Host Aliases list.

These steps are done only if you have created a new Application Server in case of Network Deployment. If you will deploy the WBI Monitor Enterprise Application on the Default Server (server1) then do not perform these steps.

To configure the Virtual Host:

1. In the left hand tree, expand the **Servers** node.
2. Click the **Application Servers** hyperlink. The **Application Servers** page appears.
3. Click the **MonitorServer** hyperlink. The **MonitorServer** configuration page appears.
4. Click the **Web Container** hyperlink from the **Additional Properties** table. The **Web Container** page appears.
5. Click the **HTTP Transports** hyperlink from the **Additional Properties** table. The **HTTP Transports** page appears.
6. Click the ***** hyperlink in the **First** row of the **HTTP Transports** table.
7. Copy the value in the **Port** field.
8. In the left hand tree, expand the **Environment** node.
9. Click the **Virtual Hosts** hyperlink. The **Virtual Hosts** configuration page appears.
10. Click the **default_host** hyperlink in the hosts list. The **default_host** configuration page appears.
11. Click the **Host Aliases** hyperlink in the **Additional Properties** table. The **Host Aliases** page appears.
12. Click **New**. The Configuration page of the new Host Alias appears.
13. Type * in the **Host Name** field
14. Type the MonitorServer HTTP Port Number that you've copied in the **Port** field.
15. Click **OK**.
16. Click **Save** in the top menu bar to save your changes. The **Save** page appears.
17. Click **Save**.

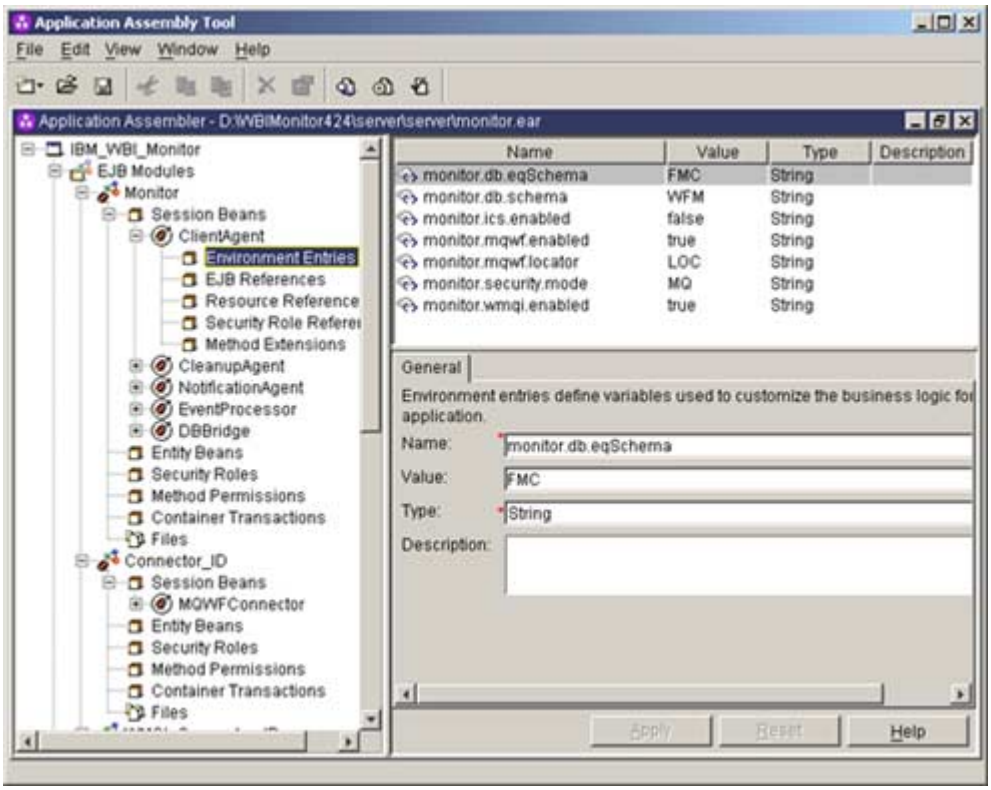
1.1.6 Configure the WBI Monitor Initial Parameters

Now you should configure the WBI Monitor initial parameters. This is done through the WebSphere Application Assembly Tool.

To configure the WBI Monitor initial parameters:

1. Start the **WebSphere Application Assembly Tool**.
2. Click **Cancel** to close the welcome screen.
3. Select **File> Open** from the menu. The Open dialog box appears.
4. Select the monitor.ear file located under **<Monitor>***server**server.*
5. Expand the tree on the left.
6. Add the required environment entries (parameters) in the **Environment Entries** node under the session bean of the following modules:

   - For the **Monitor** EJB Module:
     * ClientAgent bean.
     * CleanupAgent bean.
     * NotificationAgent bean.
     * EventProcessor bean.
     * DBBridge bean.
   - For the **WMQI_Connector_ID** module
     * WMQIConnector bean.
   - For the **ICS_Connector_ID** module
     * ICSConnector bean.
   - For the **Connector_ID** module.
     * MQWFConnector bean.



The following table lists the required parameters that should be entered for each session bean.

Property Name / EJB Name:	ClientAgent	CleanupAgent	NotificationAgent	EventProcessor	MQWFConnector	WMQIConnector	ICSConnector	DBBridge
monitor.db.schema	✓	✓	✓	✓	✓	✓	✓	✓
monitor.db.eqSchema					✓			
monitor.db.tablespaces.adminData	✓							
monitor.db.tablespaces.adminIndexes	✓							
monitor.db.tablespaces.modelTables	✓							
monitor.db.tablespaces.modelIndexes	✓							
monitor.db.tablespaces.processInstTables	✓							
monitor.db.tablespaces.processInstIndexes	✓							
monitor.db.tablespaces.eventTables	✓							
monitor.db.tablespaces.eventIndexes	✓							
monitor.db.tablespaces.processDataTables	✓							

monitor.db.tablespaces.processDataIndexes	✓							
monitor.db.tablespaces.securityTables	✓							
monitor.db.tablespaces.securityIndexes	✓							
monitor.db.tablespaces.processModelLob	✓							
monitor.db.tablespaces.processDataLob	✓							
monitor.db.tablespaces.configValuesLob	✓							
monitor.db.tablespaces.notifyExtraDataLob	✓							
monitor.db.tablespaces.eventDataLob	✓							
monitor.db.tablespaces.delayedEventDataLob	✓							
monitor.db.tablespaces.mbDetailLob	✓							
monitor.db.tablespaces.eqTables					✓			
monitor.db.tablespaces.eqIndexes					✓			
monitor.db.tablespaces.conDetailDataLob					✓			
monitor.db.tablespaces.defaultTablespace	✓				✓			
monitor.wmqi.enabled	✓			✓				
monitor.wics.enabled	✓			✓				
monitor.mqwf.enabled	✓			✓				
monitor.security.mode	✓							
monitor.security.ldap.url	✓							
monitor.security.ldap.dn	✓							
monitor.security.ldap.password	✓							
monitor.security.ldap.naming.attr	✓							
monitor.security.ldap.root	✓							
monitor.security.ldap.dn.attr.id	✓							
monitor.mqwf.locator	✓		✓					
monitor.mqwf.agent	✓		✓					
monitor.mqwf.system	✓		✓					
monitor.mqwf.sysGroup	✓		✓					
monitor.mqwf.encoding				✓				

The following table provides the description of each parameter.

Parameter Name	Type	Value Description
monitor.db.schema	String	The Monitor Database Schema. The default value is *WFM*
monitor.db.eqSchema	String	The MQSeries Workflow Database (Event Queue Database) Schema. The default value is FMC

monitor.mqwf.enabled	String	Type *True* if you are using MQ Workflow as your engine or *False* otherwise.
monitor.wmqi.enabled	String	Type *True* if you are using WMQI as your engine or *False* otherwise.
monitor.wics.enabled	String	Type *True* if you are using WICS as your engine or *False* otherwise.
monitor.security.mode	String	The applied security mode: • Type *MQ* for MQ Workflow security mode if you are using MQ Workflow as your engine. • Type LDAP for LDAP security mode or Local for local security mode if you are only using WMQI as your engine.
monitor.security.ldap.url	String	The LDAP Server URL and port number (for example *ldap://ldapsrvr:389/*). This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.dn	String	A Distinguished Name (DN) for an LDAP Server authorized user that will be used for logging in to this LDAP Server, and performing the search in the LDAP users' tree. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.password	String	The password of the defined User DN. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.naming.attr	String	The name of the prefix that precedes the user ID in the LDAP Server database (i.e. CN, UID,...etc). The value of this parameter varies between the different types of LDAP Servers. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.root	String	The starting point in the LDAP tree from which the query will start searching for the full DN of the given user ID. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.dn.attr.id	String	The name of the Distinguished Name attribute ID (for example *distinguishedName*, *entrydn* ...etc. This value is case sensitive). This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.mqwf.locator	String	The MQSeries Workflow Locator Policy that is used to locate the MQSeries Workflow Java Agent. This property can have one of the following values: LOC, RMI, OSA, IOR, COS, or JNDI. The default value is LOC (Local Locator Policy)
monitor.mqwf.agent	String	The MQSeries Workflow Agent's Name
monitor.mqwf.system	String	The MQSeries Workflow System's Name
monitor.mqwf.sysGroup	String	The MQSeries Workflow System Group's Name
monitor.mqwf.encoding	String	The MQSeries Workflow Database encoding. (This property must be set if the MQ Workflow Database encoding is different from the Monitor Server machine encoding)

In addition to the above parameters, there are additional parameters that should be defined to hold the values of the Database TableSpaces names that you want to use for physically storing the Monitor and EventQueue database tables and indexes. You have the ability to use a number of TableSpaces that are up to 22 different TableSpaces; 19 of them are created in the Monitor Database and three of them are created in the EventQueue Database. The database tables and indexes are grouped and categorized so that each category can be assigned to a separate TableSpace. You can define different TableSpace name as the value for each system property. Alternatively, you can define the same TableSpace for more than one system properties. In the later case, this TableSpace will be used for the tables and indexes that are corresponding to these properties. You can also ignore defining any of these properties, and in this case the tables, which are supposed to be assigned to these TableSpaces, will be assigned to the default TableSpace that can be defined by the *monitor.db.tablespaces.defaultTablespace* property. If you did not define this property then the database user default TableSpace will be used as the default TableSpace..

Parameter Name	Type	Value Description
monitor.db.tablespaces.adminData	String	TableSpace name of the Monitor Database Administration tables.
monitor.db.tablespaces.adminIndexes	String	TableSpace name of the Monitor Database Administration indexes.
monitor.db.tablespaces.modelTables	String	TableSpace name of the Monitor Database Static model tables.
monitor.db.tablespaces.modelIndexes	String	TableSpace name of the Monitor Database Static model indexes.
monitor.db.tablespaces.processInstTables	String	First TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.processInstIndexes	String	First TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.eventTables	String	Second TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.eventIndexes	String	Second TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.processDataTables	String	Third TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.processDataIndexes	String	Third TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.securityTables	String	TableSpace name of the Monitor Database Security tables.
monitor.db.tablespaces.securityIndexes	String	TableSpace name of the Monitor Database Security indexes.

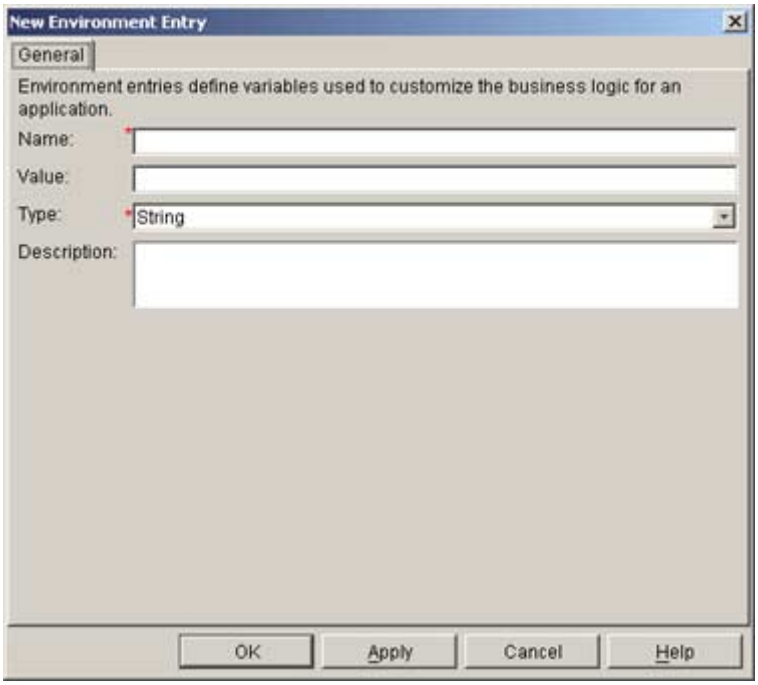
monitor.db.tablespaces.processModelLob	String	TableSpace name of the Monitor Database Process Model LOB.
monitor.db.tablespaces.processDataLob	String	TableSpace name of the Monitor Database Process Data LOB.
monitor.db.tablespaces.configValuesLob	String	TableSpace name of the Monitor Database Configuration Values LOB.
monitor.db.tablespaces.notifyExtraDataLob	String	TableSpace name of the Monitor Database Notify Extra Data LOB.
monitor.db.tablespaces.eventDataLob	String	TableSpace name of the Monitor Database Event Data LOB.
monitor.db.tablespaces.delayedEventDataLob	String	TableSpace name of the Monitor Database Delayed Event Data LOB.
monitor.db.tablespaces.mbDetailLob	String	TableSpace name of the Monitor Database WBI Message Broker LOB.
monitor.db.tablespaces.eqTables	String	TableSpace name of the MQSeries Workflow Database Event Queue tables .
monitor.db.tablespaces.eqIndexes	String	TableSpace name of the MQSeries Workflow Database Event Queue indexes.
monitor.db.tablespaces.conDetailDataLob	String	TableSpace name of the MQSeries Workflow Database Configuration Detail Data LOB
monitor.db.tablespaces.defaultTablespace	String	The name of the default TableSpace that is used for any tables or indexes category that has not been assigned to a specific TableSpace.

Important Note: In Oracle Database, the Event Queue database schema and the Monitor Database Schema must be the same as the Database Administrator's User Name.

Important Note: In MQ Workflow, a default configuration must be defined even if the entered System Group and System belong to a different configuration.

To add each one of these parameters, do the following:

- Right click inside the right-hand table, and select New from the shortcut menu that appears. The **New Environment Entry** dialog box appears.



- Type the parameter name in the **Name** field.
- Type the parameter value in the **Value** field.
- Select the parameter type from the **Type** drop down list.
- Click **OK**. The new parameter will be added to the table.

7. Select **File > Save** from the menu to save the *monitor.ear*.
8. Exit the **Application Assembly Tool**.

1.1.7 Install the WBI Monitor Enterprise Application

Now you will create and install an Enterprise Application for WBI Monitor.

1. From the left hand tree, expand the **Applications** node.
2. Click the **New Enterprise Application** hyperlink. The **Preparing for the application installation** wizard first page appears.
3. Click the **Browse** button to locate the *monitor.ear* file. The **Open** dialog box appears.
   - Select the *monitor.ear* file located in *server* folder.
   - Click **Open**. The file will be selected.
4. In the second step of the **Preparing for the application installation** wizard, select the **Generate Default Binding** check box
5. Click **Next**. The **Install New Application** wizard will start on its first step's page:

- In the **Directory to Install Application** field, enter the directory you want to be used for installing the WBI Monitor Enterprise Application. If you leave this field empty, then the default directory that the IBM WebSphere Application Server used for installing the applications will be used (i.e. C:\WebSphere\ApplicationServer\installedApps).
- Select the **Deploy EJBs** check box.
- Leave the other settings with the default values.
- Click **Next**.

6. For the Steps 2 to 4 in the wizard, click **Next** without changing any parameters.
7. In step 5 page (**Mapping Resource References to Resources)** do the following:
   - If the Monitor database and the Event Queue database are located in the same physical database (one database), then all resource references are mapped to the same physical data source named *Monitor_Pool_DataSource*.
   - If the Monitor database and the Event Queue database are located in two physical databases, then map each resource reference to the appropriate resource according to the following table:

EJB	Resource Ref.	Data Source Name	Data Source JNDI Name
ClientAgent	jdbc/MonitorDataSource	Monitor_Pool_DataSource	MonitorPoolDataSource
CleanupAgent	jdbc/MonitorDataSource	Monitor_Pool_DataSource	MonitorPoolDataSource
EventProcessor	jdbc/MonitorDataSource	Monitor_Pool_DataSource	MonitorPoolDataSource
NotificationAgent	jdbc/MonitorDataSource	Monitor_Pool_DataSource	MonitorPoolDataSource
MQWFConnector	jdbc/MonitorDataSource	Monitor_XA_DataSource	MonitorXADataSource
MQWFConnector	jdbc/EventQueueDataSource	Event_Queue_XA_DataSource	EventQueueXADataSource
MQWFConnector	jdbc/ PoolEventQueueDataSource	Event_Queue_Pool_DataSource	EventQueuePoolDataSource
WMQIConnector	jdbc/MonitorDataSource	Monitor_Pool_DataSource	MonitorPoolDataSource
ICSConnector	jdbc/MonitorDataSource	Monitor_Pool_DataSource	MonitorPoolDataSource

   To perform the mapping:
   - Select the Reference(s) you want to map to a specific resource (data source) by selecting the check box in its row in the table.
   - Select the appropriate resource (Data Source) from the **Specify existing Resource JNDI name** drop down list.
   - Click Apply. The selected resource will be mapped to all selected references, and its name will appear in the **JNDI Name** column's cells for these references.
8. For Step 6 in the wizard, click **Next** without changing any parameters.
9. In the Step 7 page (**Map modules to application servers)** do the following:

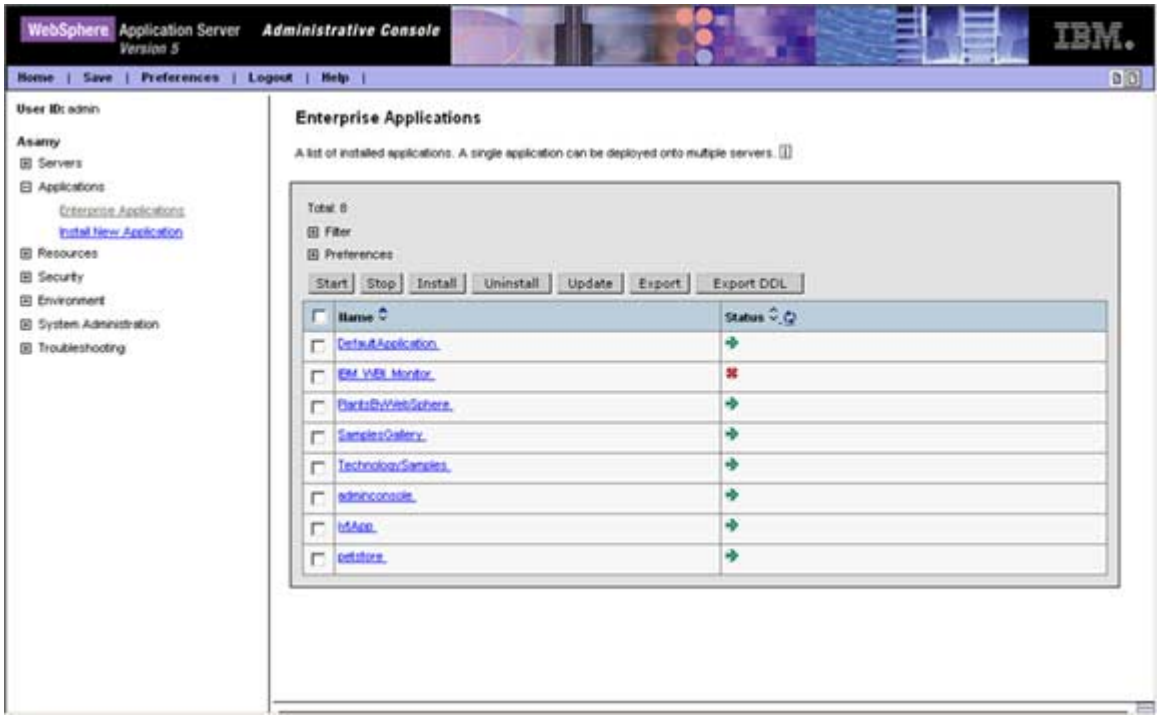
- Select the Application Server on which you want to deploy the WBI Monitor Enterprise Application from the Clusters and Servers list.
- Select the check box next to the **Module** column header to select all existing modules (Monitor, MonitorService, and MonitorClient).
- Click **Apply**.
- Click **Next**.

10. In the Steps 8, click next without changing any parameters.
11. In Step 9 (**Summary**) the settings you have chosen will be listed. Review these settings. To return to any previous step, click the step number hyperlink and or click **Finish** if all settings are correct.
12. Wait until the installation is finished and the confirmation page appears
13. Click **Save to Master Configuration** hyperlink to save your configuration. Then click **Save** in the confirmation message.

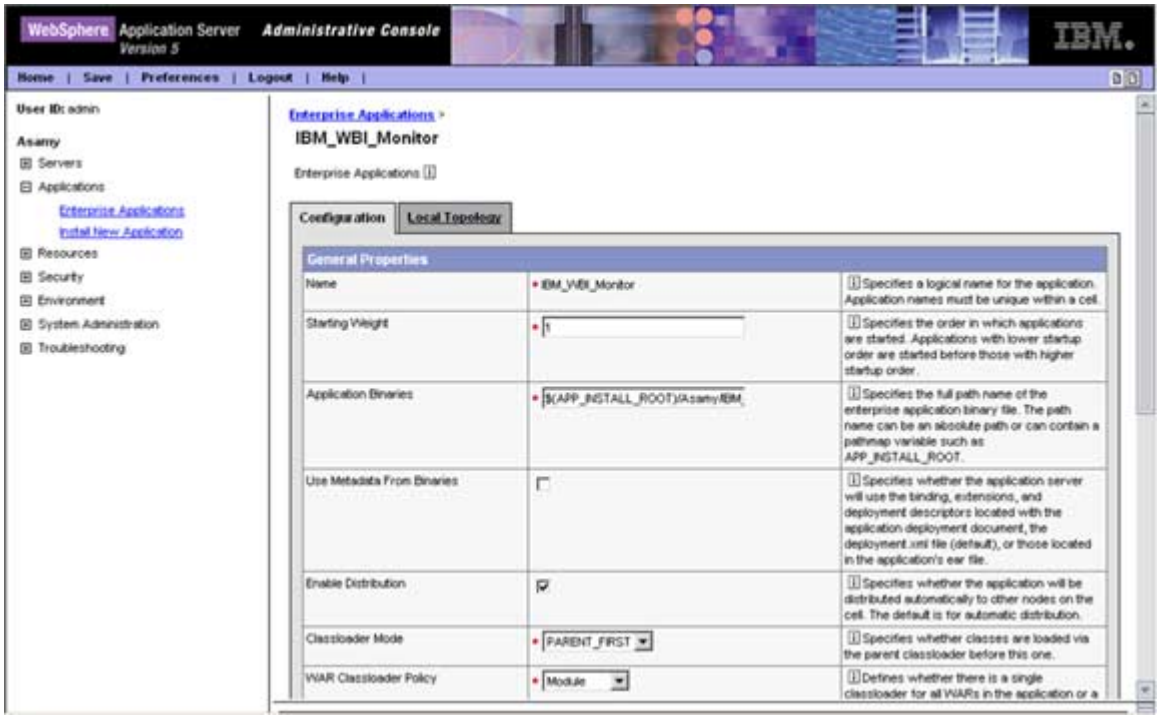
1.1.8 Assign the Created Shared Library to the Installed Enterprise Application

Now you should assign the MQLib shared library that you have created before to the WBI Monitor Enterprise Application that you have just installed. To do this:

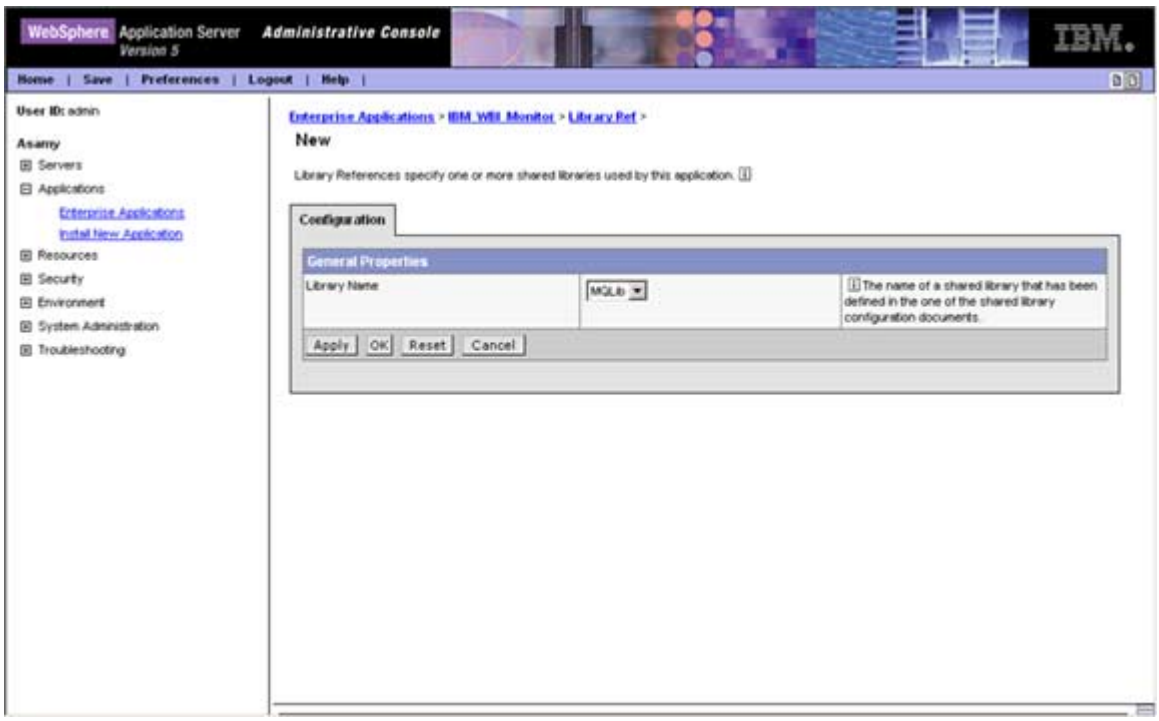
1. In the left hand tree, expand the Applications node.
2. Click the **Enterprise Applications** hyperlink. The **Enterprise Applications** page appears.



3. Click the **IBM_WBI_Monitor** hyperlink (or the name of the installed Enterprise Application of the WBI Monitor if you have changed the default name). The **IBM_WBI_Monitor Configuration Page** appears.



4. Click the **Libraries** hyperlink from the **Additional Properties** table. The **Library Ref page** appears.
5. Click **Add**. The **Configuration** page of the new Shared Library Reference appears.



6. Select the *MQLib* shared library from the **Library Name** drop down list.
7. Click **OK**.
8. Click **Save** in the top menu bar to save your changes. The **Save** page appears.
9. Click **Save**.

1.1.9 Regenerate Web Server Plug-in

Now you must regenerate the Web Server Plug-in to be adequate with the installed Enterprise Application. To regenerate the Web Server Plug-in:

1. In the left hand tree, expand the **Environment** node.
2. Click the **Update the Web Server Plugin** hyperlink. The Update web server plugin configuration page appears.

3. Click **OK**.

1.1.10 Restart the Web Server

Now you should restart the Web Server you have.

Example: If you installed IBM HTTP Server as the Web Server then do the following:

1. From the Windows Taskbar, select **Start > Programs > IBM HTTP Server 1.3.26 > Stop IBM HTTP Server.**
2. Wait until the confirmation message that tells you that the IBM HTTP Server has been stopped.

3. From the Windows Taskbar, select **Start > Programs > IBM HTTP Server > Start IBM HTTP Server**.
4. Wait until the confirmation message that tells you that the IBM HTTP Server has been started.

1.1.11 Start the Application Server and the Enterprise Application

For IBM WebSphere Application Server v5.0

You must restart the Default Server (server1) after you deployed the WBI Monitor new Application Server. To do this:

1. On Windows platform, run a command prompt window. On AIX or Solaris platforms start a terminal console window.
2. Change the directory to <WebSphere>\bin
3. Type the following command line:

   stopserver server1

This command is case sensitive.

4. Wait until the Application Server is stopped and the confirmation message appears, and then type the following command line:

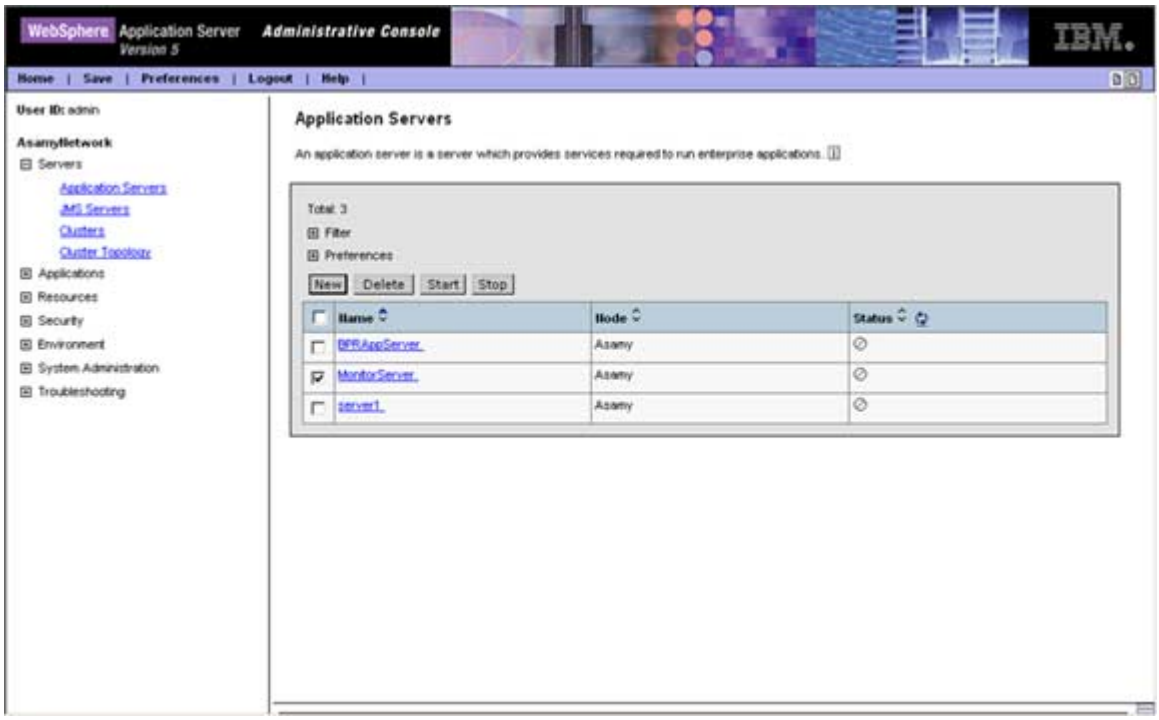
   startserver server1

5. Wait until the Application Server is started and the confirmation message appears.

For IBM WebSphere Deployment Manager (Network Deployment) v5.0

From the Administrative Console, do the following:

1. From the left hand tree, select **Servers > Application Servers**. The **Application Servers** page appears.



2. Select the *MonitorServer* Application Server by selecting the check box next to the Application Server's name.

If you have created the application server with a different name or you have deployed the Monitor Enterprise Application on a different Application Server then select it from the list.

3. Click **Start**.

2 WBI Monitor Server Un-deployment

This section is used to completely remove the WBI Monitor Application Server. To completely remove the WBI Monitor, perform the following steps:

1. Open the **WebSphere Administrative Console**.
2. Uninstall the WBI Monitor Enterprise Application (the default name is IBM_WBI_Monitor).
   - From the left hand tree, select Applications > Enterprise Applications.
   - Select the check box next to the IBM_WBI_Monitor Enterprise Application name.
   - Click **Stop**.
   - Select the IBM_WBI_Monitor Enterprise Application again.
   - Click **Uninstall**.
3. Delete the HTTP Port that you have added to the Host Aliases list.
4. Delete the MonitorServer Application Server.

If you have deployed the WBI Monitor Enterprise Application on the Default Server named server1, then do not perform the above two steps (3 and 4).

5. Delete the added MQLib shared library.
6. Delete the added JDBC Providers.
7. Save your changes.
8. Delete the file *monitor_deployed.ear* from **<WebSphere>***AppServer**InstallableApps*\
9. Delete any reference for WBI Monitor from **<WebSphere>***AppServer**InstalledApps*\
10. Delete the directory named ***MonitorServer*** which is located in **<WebSphere>**/temp/**<WAS_NODE_NAME>**/

This directory does not exist if you have deployed the WBI Monitor Application Server on the default (base) Application Server named server1

11. Restart the WebSphere Application Server.

Appendix C: IBM DB2 7.2 Database Server Configuration

This chapter provides detailed steps about configuring your database server by creating the Monitor database and configuring both the Monitor database and the Event Queue database (the IBM MQSeries Workflow or the IBM WebSphere MQ Workflow database) using IBM DB2 UDB 7.2 with fixpack 5 on Windows platform.

1 Creating the Monitor Database

To create the Monitor database

1. Open DB2 **Control Center**.
2. Create a new Database (No specific name is required, but IBM WBI Monitor recommends *WFMDB* as the Monitor database name).
   - Expand the tree in the left tree browser until you reach the **Databases** node.
   - Right-click the **Databases** node and select **Create > Database Using Wizard** from the shortcut menu to create the database. The **Create Database** dialog box opens.
   - Type *WFMDB* in the **Database Name** text box, and *WFMDB* in the **Alias** text box
   - Click **Finish**
3. Configure the Database Instance on which the database has been created by running the following commands from the command line, and then restart the DB2:
   - db2set DB2_RR_TO_RS=YES
   - db2set DB2_HASH_JOIN=Y
   - db2set DB2_EXTENDED_OPTIMIZATION=ON
4. Configure the created database by adjusting the following configuration settings:
   - Right-click the WFMDB and select **Configure** from the shortcut menu.
   - In the Configure Database dialog box, select the **Performance** tab.
   - Scroll the **Parameters** grid and change the values of the following parameters to these values:
     * Maximum Storage for Lock list: 50000

* Application Heap Size: 4096
* Application Control Heap Size: 4096

- Select the **Application** tab and change the value of the following parameters:
  * Maximum Lock per application: 50
  * Lock timeout: 60
- Select the **Logs** tab and change the value of the following parameter:
  * Minimum commit group: 3
- Click **OK**.

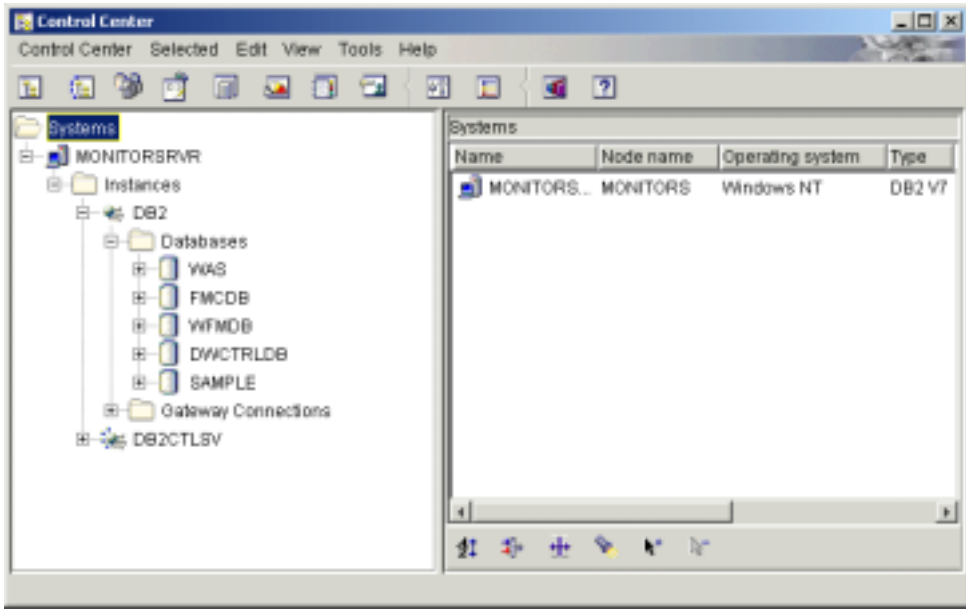
In order for the above parameters to take effect, you must bounce the DB2 instance for the instance parameters and restart WebSphere Application Server for the database parameters.

5. If one of the business processes in the organization file (.org) contains more than 55 business measures, you should calculate the page size by performing the following steps:
   - From the .org file, calculate the maximum number of business measures in any process of the model
   - Divide the calculated number by 55
   - Round the result number up to the nearest integral value. (e.g. if the result is 1.3 then the you should round it up to 2)
   - Multiply the last value by 4K.
   - Round the result up to the nearest value of 8K, 16K, 32K, etc. This will be the required page size. (E.g. if the result is 12K, then the required page size is 16K)

2 Creating the Buffer Pool

Create a Buffer Pool named **HFXBP** with the calculated page size:

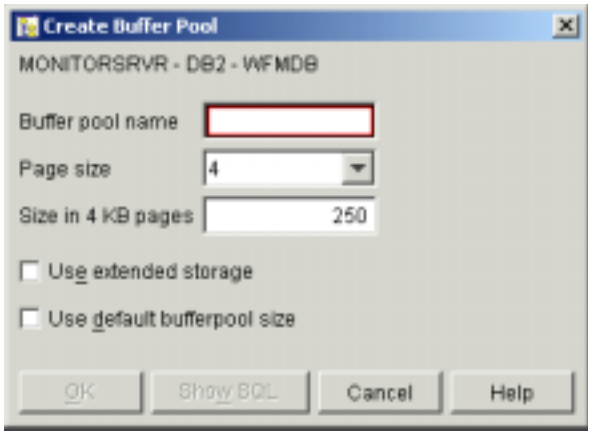
1. Open IBM DB2 Control Center



2. Expand **Databases > WFMDB**
3. Right click **Bufferpools** and select **Create** from the shortcut menu
4. In the **Create Buffer Pool** dialog box, do the following:

   - For the Buffer Pool field, type the name of the Buffer Pool (No specific name is required, but IBM WBI Monitor recommends **HFXBP** as the Buffer Pool name).

   - In the **Page Size** combo box select a number that equal to the calculated page size you calculated in the previous steps, then click **OK**.



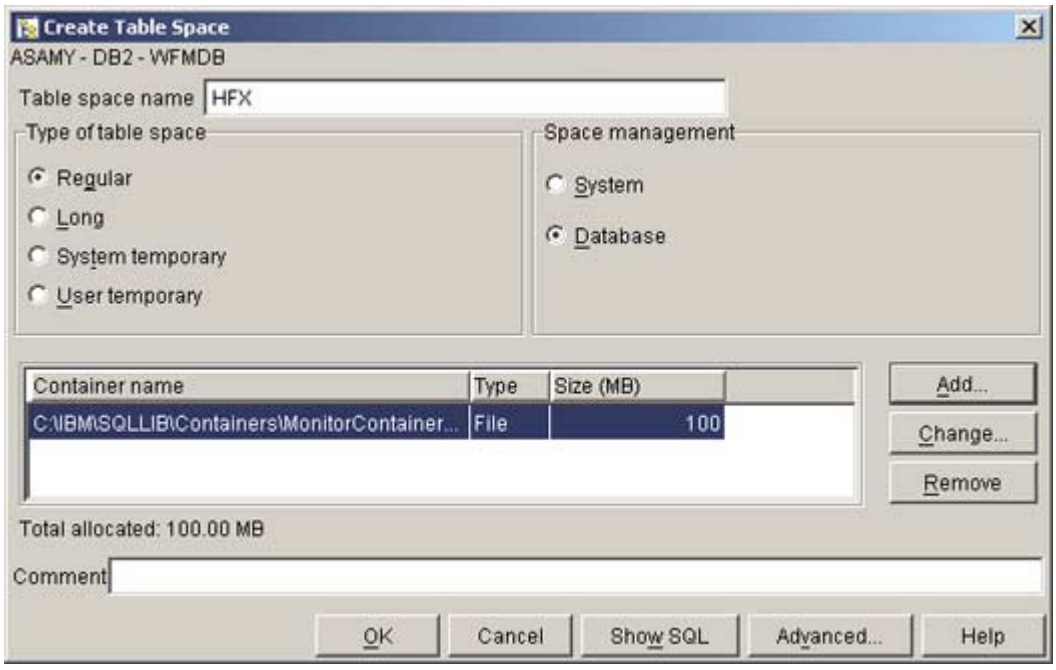
5. Bounce the DB2 Instance.

3 Creating the TableSpaces for EventQueue and Monitor Databases

1. In WFMDB database, create the required table spaces with the calculated page size.

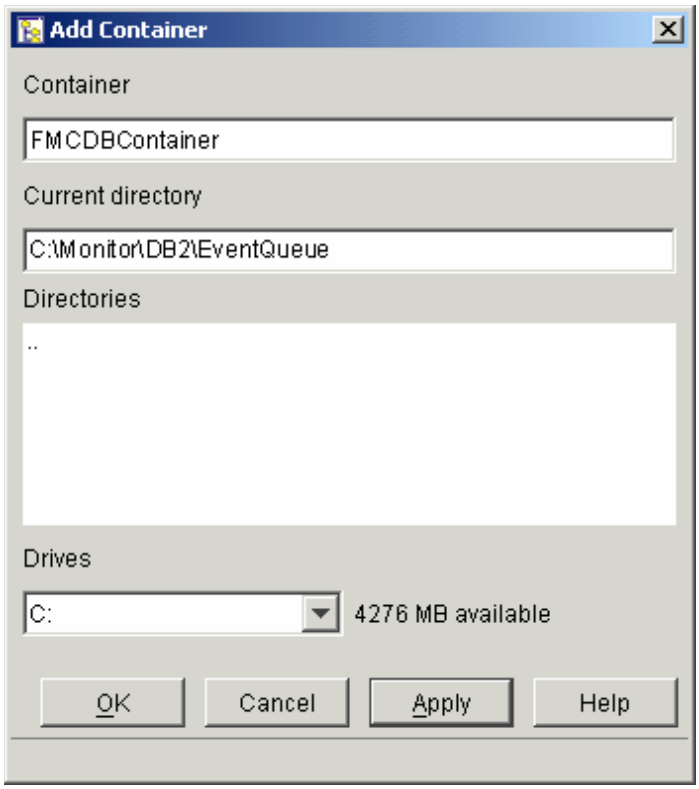
   The following steps describe how to create a sample table space named **HFX**:

   - Open the IBM DB2 Control Center again
   - Expand **Databases > WFMDB**
   - Right click **Table Spaces** and select **Create** from the shortcut menu, then select **Table Space** from the sub menu. (Don't select **Table Space Using Wizard**)
   - In the **Create Table Space** dialog box do the following
     * In the **Table Space Name** text box type *HFX*



     * In the **Space Management** section select the proper management method that you want to use (**System** or **Database**).
     * Click **Add.**
     * In the **Add Container** dialog box, do the following:
     * If you selected System as the TableSpace management method:

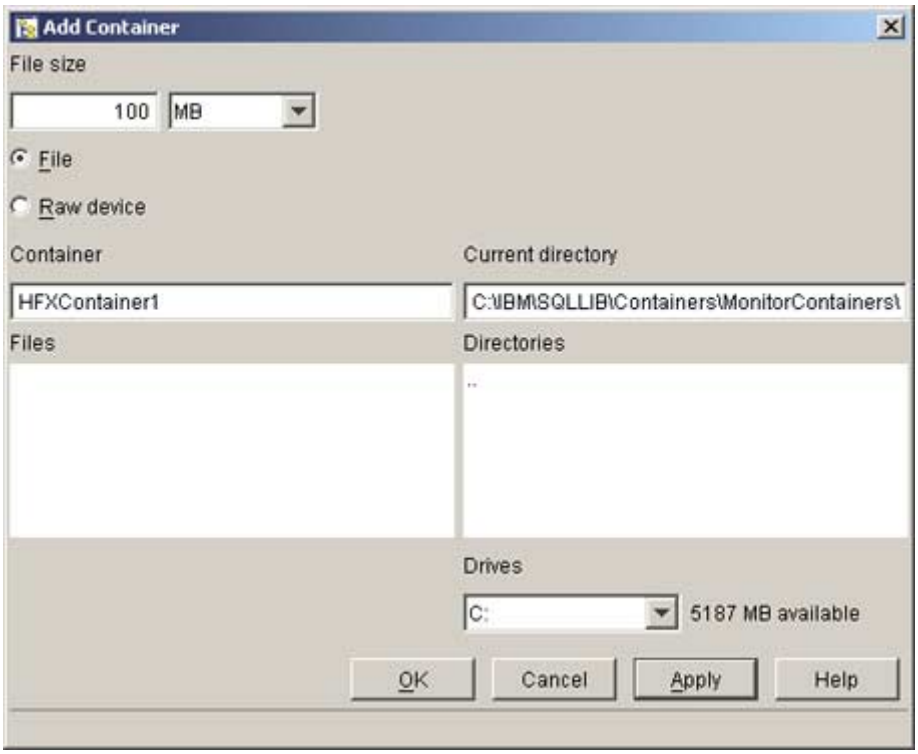
- In the **Add Container** dialog box:



- In the **Container Name** text box, type the container name
- In the **Current Directory** text box, type the container current directory or select the directory path, then click **OK**.

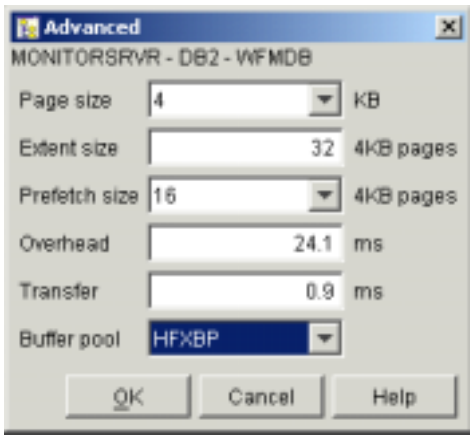
* If you selected **Database** as the TableSpace management method:

- In the **Add Container** dialog box



- In the **File size** text box, enter the container file size.
- In the **Container Name** text box, type the container name
- In the **Current Directory** text box, type the container current directory or select the directory path, then click **OK**.

* Click **Advanced**
* In the **Advanced** dialog box:



- In the **Page Size** combo box select a number that equal to the calculated page size you calculated before.
- In the **BufferPool** field, select **HFXBP**
- Click **OK**

* Click **OK** to create the Table Space and to close the **Create Table Space** dialog box

2. In the MQ Workflow database (e.g. FMCDB), create the required table spaces. Repeat the above steps in order to create each table space.

The value of the page size of the table space of the MQ Workflow database is not affected by the number of business measures in the organization file processes.

Make sure that IBM DB2 Server is configured for JDK 1.2 or higher.

Appendix D: Controlling the Logging Service in IBM WBI Monitor v4.2.4

IBM WebSphere Business Integration (WBI) Monitor provides you with the capability of logging all the messages that are transacted at run time in its various components. You can control the Logging service to log only specific types of messages, or to log all types of messages that are associated with one or more function areas (components) of the application.

The ability to control the logging service manifests significant importance as it limits the amount, and type, of the data that is saved to the WBI Monitor log file. This remarkably enables the user, and thus customer support team members, to trace source of a particular problem more easily by limiting the logging of messages to only those pertaining to the parts of the application in which problems take place. Hence, this eliminates the need for analyzing and scrolling down unneeded messages (e.g. Error, Warning…etc) that may exist in a conventional stretched log file.

The produced WBI Monitor log files are mainly **stderr.txt** and **stdout.txt**. In case of WAS 4.0, they could be found in the folder named **Logs** that resides in the directory on which you have deployed the WBI Monitor. In case of WAS 5.0, they could be found in the folder named **Logs** that resides in the root WebSphere directory.

The control of logging service is implemented through the definition of one or more categories and/or detail Level in the **Java Virtual Machine** tab in WAS 4.0.2, or WAS 5.0.

1 Message Logging/Tracing

The logging service is controlled through two system properties. These two properties are: (Detail) **Levels**, and **Categories**.

The first system property (**Levels**) enables the logging of messages based on defined (detail) Levels. Each level is an integer value that represents one or more types of messages to be logged. The second system property (**Categories**) enables logging all debug messages related to one or more function areas (categories) that you specify in a comma-separated parameter on WAS 4.0, or WAS 5.0.

1.1 Levels

You can setup the logging service to log messages or errors depending on the level you specify. The level of details to be saved to the log file is defined by specifying the appropriate integer value from the following table:

Level	Description
1	This level enables logging **Fatal Error** messages.
2	This level enables logging **Error** messages.
3	This level enables logging **Warning** messages.
4	This level enables logging **Debug** messages.

1.2 Categories

When you specify a category in the logging service, you enable the logging of all the debugging messages that are related to this category. In case of specifying multiple categories, at least one comma must separate between every two successive category names.

For example **ADMIN,IMPORT,,,SECURITY,,,"** is valid a value, and implies that you enables the logging of the debug messages for these three categories.

Any values that you type other than those listed in the following table will be ignored.

For categories to be active, you have to use detail Level 4.

The following table depicts the function areas (categories) whose debug messages can be logged in the WBI Monitor log file.

Category	Description
ALL	It means that all categories will be logged.
NONE	It means that no category will be logged.
IMPORT	It means logging messages concerning the import of model, and the export of actual values.
EVENT_PROCESSING	It means logging messages concerning the module handling MQ Workflow events and calling appropriate monitor engine functions.
EVENT_COLLECTOR	It means logging messages concerning module handling the retrieval of audit trails events and process data from MQ Workflow.
MONITOR_ENGINE	It means logging messages concerning module handling the event processor commands to store appropriate data in monitor database.
BUSSINESS_ENGINE	It means logging messages concerning the calculation of business measures at the appropriate locations, and firing notifications when necessary.
DATABASE	It means logging messages concerning database transactions such as inserting, updating, deleting, or querying data.
SECURITY	It means logging messages concerning adding, removing, and updating users, groups, and users' & groups' permissions/constraints, in addition to login and logout.
ADMIN_MANAGER	It means logging messages concerning suspending, resuming or terminating process instances. This also includes logging messages related to transferring work items, creating or dropping database, starting or stopping monitor services, and starting or stopping event queue.
CONFIGURATION	It means logging messages concerning adding, updating and deleting configurations and system configurations.
REPORT	It means logging messages concerning the handling of the different reports displayed in the Business Dashboard.
WFD	It means logging messages concerning the Workflow Dashboard.
REPOSITORY	It means logging messages concerning the retrieval of the model elements (org units, employees, processes…etc).

2 Controlling the Logging Service

You can control the logging service in WAS 4.0 or WAS 5.0 by following the steps below.

2.1 WAS 4.0

1. Access the Java Virtual Machine page.
   - Click **WebSphere Administrative Domain > Nodes > NodeName > Application Servers** > server name (whose JVM settings you want to configure [MonitorServer] in the console navigation tree).
   - Select the **JVM Settings** tab.
2. On the **Java Virtual Machine** tab, specify values for the JVM settings as needed. Specify command-line arguments to pass to the Java virtual machine code that starts the application server process in a name-value pairs:
   - Click **Add** to enter an entry in the **System Property** table.
   - Specify name/value pair property: for example type **monitor.debug.level** (or **monitor.debug.cateogory**) in the **Name** field, and type the value in the **Value** field.
   - Click **Apply** to view a page with your new settings.
3. Restart the application server.

2.2 WAS 5.0

1. Access the Java Virtual Machine page.
   - Click **Servers > Application Servers** in the console navigation tree.
   - On the **Application Server** page, click on the name of the server whose JVM settings you want to configure [server1].
   - On the settings page for the selected application server [server1], click **Process Definition**.
   - On the Process Definition page, click **Java Virtual Machine** in the **Additional Properties**.
2. On the **Java Virtual Machine** page, specify values for the JVM settings as needed.Click **Custom Properties** in **Additional Properties**:
   - Click **New** to display the settings page for your internal system configurations property.
   - Specify name/value pair property: type **monitor.debug.level** (or **monitor.debug.category**) in the **Name** field, and type the value in the **Value** field.
   - Click **Apply** to view a page with your new settings.

- Click **OK** to return to the **Custom Properties** page, where your new property appears in the list.
- Click **OK** to return to the **Java Virtual Machine** page.

3. Click **Save** on the console taskbar.
4. Restart the application server.

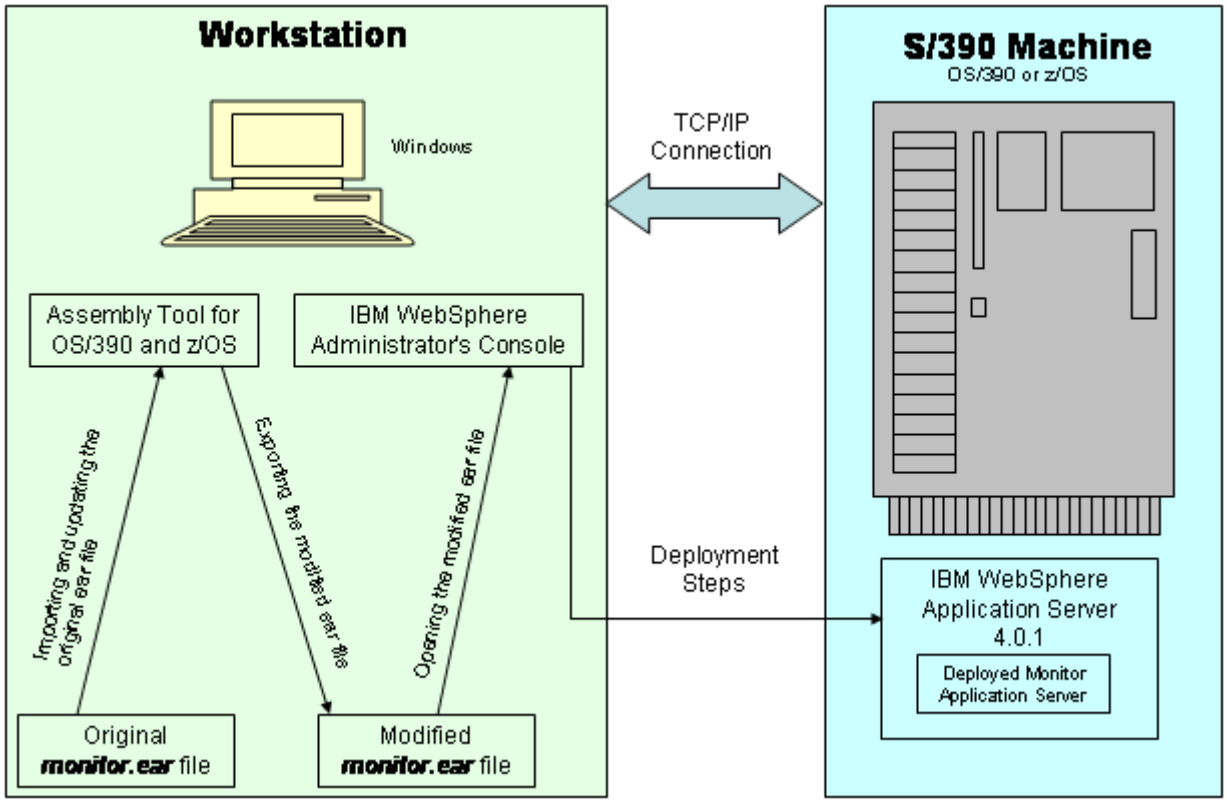
PART

III

IBM WBI Monitor Deployment on OS/390 and z/OS Platforms

Chapter 5: WBI Monitor Deployment on OS/390 and z/OS Platforms

This chapter contains detailed steps for deploying IBM WBI Monitor on IBM WebSphere Application Server 4.0.1 for OS/390 and z/OS Platforms. The following figure illustrates the deployment sequence and the required environment to perform the deployment.



The following conventions are used for all the instructions throughout this document:

- **<Monitor>** = The Monitor installation directory. e.g. C:\WBIMonitor
- **<WebServerName>** = The name of the machine that hosts the Web server for which the WebSphere is configured.
- **<ServerName>** = The name of the server on which the Monitor will be installed.
- <**MonitorWebPath**> = The monitor web application web path eg. /monitor.

- <**MonitorServiceWebPath**> = The monitor web application web path eg. / monitorservice.

Important note: The names and paths of folders and files are case sensitive.

Important note: **Make sure that the user you are using have all needed permissions. For example, using a user who has no permissions on WebSphere will fail to deploy the monitor.**

The Monitor will not work if the server properties *client.encoding.override* or *default.client.encoding* are set to any encoding other than UTF-8.

5.1 IBM WBI Monitor Deployment

5.1.1 Configure the Database Server

The first thing you have to do is to configure the Database Server. To do this:

1. Create the Monitor database (i.e. WFMDB)
2. Create the required TableSpaces in both the Monitor Database (WFMDB) and the EventQueue Database (FMCDB). WBI Monitor allows you to control the distribution of the Monitor and the EventQueue Database tables and indexes into a number of TableSpaces that are up to 22 TableSpaces; 19 of them are created in the Monitor Database and three of them are created in the EventQueue Database. The database tables and indices are grouped and categorized so that each category can be assigned to a separate TableSpace.

   This number is the maximum number of TableSpaces to which you can assign the database tables and indexes. This means you do not have to create all these TableSpaces, but you can create part of them. In this case, during the deployment steps, you can assign more than one group of tables or indices to the same TableSpace.

   Please refer to the section named *Database Tables and Indexes Allocation with Multiple TableSpaces* in *Chapter 3: Database Server Configuration* of this guide for details about the distribution of the Monitor and EventQueue database tables and indexes on multiple TableSpaces.
3. Adjust the Database authorizations for the User ID that will be used by the WBI Monitor to access the database. The following are the required actions on the database that should be used in order to set the needed permissions for the given User ID:

   - DDL actions

   * ALTER TABLE
   * CREATE TABLE & DROP TABLE
   * CREATE TRIGGER & DROP TRIGGER

   - DML actions

   * SELECT
   * INSERT
   * UPDATE
   * DELETE
   * SELECT FROM SYSIBM.SYSTRIGGERS
   * SELECT FROM SYSIBM.SYSDUMMY1
4. Create the Monitor and EventQueue Database Tables by running the DDL files named *monitorCreate.sql* and *eqCreate.sql* respectively. These files are located in the **<Monitor>**/*server*/*docs*/*ddl* folder.

Before running, these files have to be edited in order to update them with the actual Schema and TableSpace name that you have created in the database. To do this:

- Open each of these two files in any text editor.
- Replace the variables named $TABLESPACE$ and $SCHEMA$ with the actual name of the TableSpace and Schema in each creation statement of the tables and indexes.

  For example:

  The original statement is:

  ```
  CREATE TABLE "$SCHEMA$"."SCHEMA_HEADER"("VERSION"
  INTEGER NOT NULL) IN $TABLESPACE$$
  ```

  The modified statement should be

  ```
  CREATE TABLE "WFM"."SCHEMA_HEADER"("VERSION"
  INTEGER NOT NULL) IN AdminTablespace$
  ```

- Save and close the file.

Important Notes:

- **The delimiter used in these files is the Dollar Sign ($). You must set this delimiter in the command that you will use to run these files specifically, otherwise the default DB2 delimiter (;) will be used.**

- **For distributed installation and deployment (where the Database server is located on a z/OS or an OS/390 machine while the WebSphere Application Server is installed and used from a different Windows, AIX or Solaris machine), You must make sure that the Database Client is installed on the client machine where the WebSphere Application Server is installed,and is properly configured and connected to the Database Server that exists on the Mainframe. Consult your database Administrator for information about configuring the DB2 database client to connect to the remote database.**

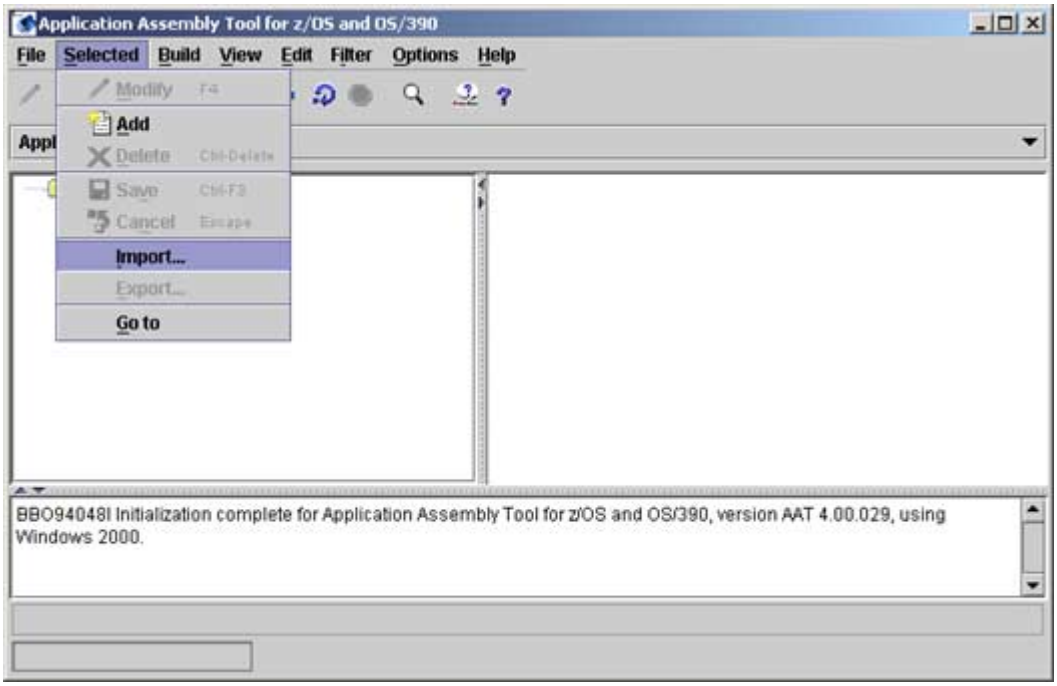
5.1.2 Modifying the Monitor Enterprise Archive File

Before starting the deployment of **IBM WBI Monitor** application server on WebSphere Application Server, you should first modify the original monitor.ear file that has been installed on your machine in **<Monitor>**/*server*/*server* using the manual deployment option in the WBI Monitor installation wizard. This is important in order to make this file compatible with OS/390 and z/OS operating systems.

The following sections and their steps describe how to use the **Assembly Tool for z/OS and OS/390** to modify the *monitor.ear* file:

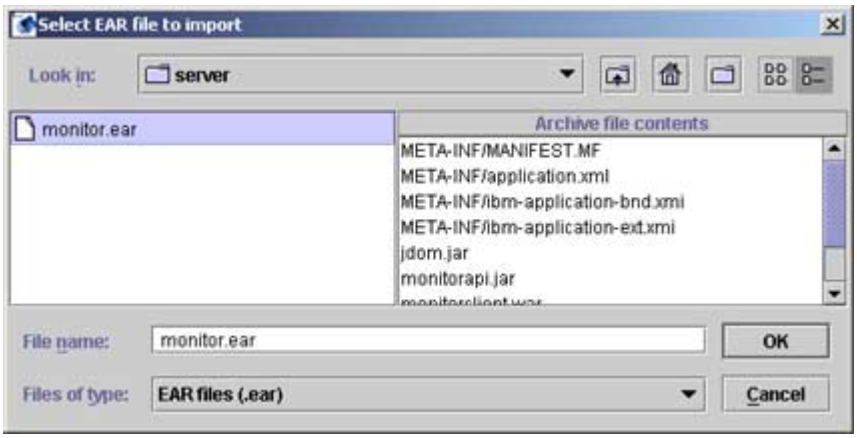
5.1.2.1 Importing the Monitor Enterprise Archive File

1. Open the **Assembly Tool for z/OS and OS/390**.
2. From the Assembly Tool menu bar, select **Selected > Import**.



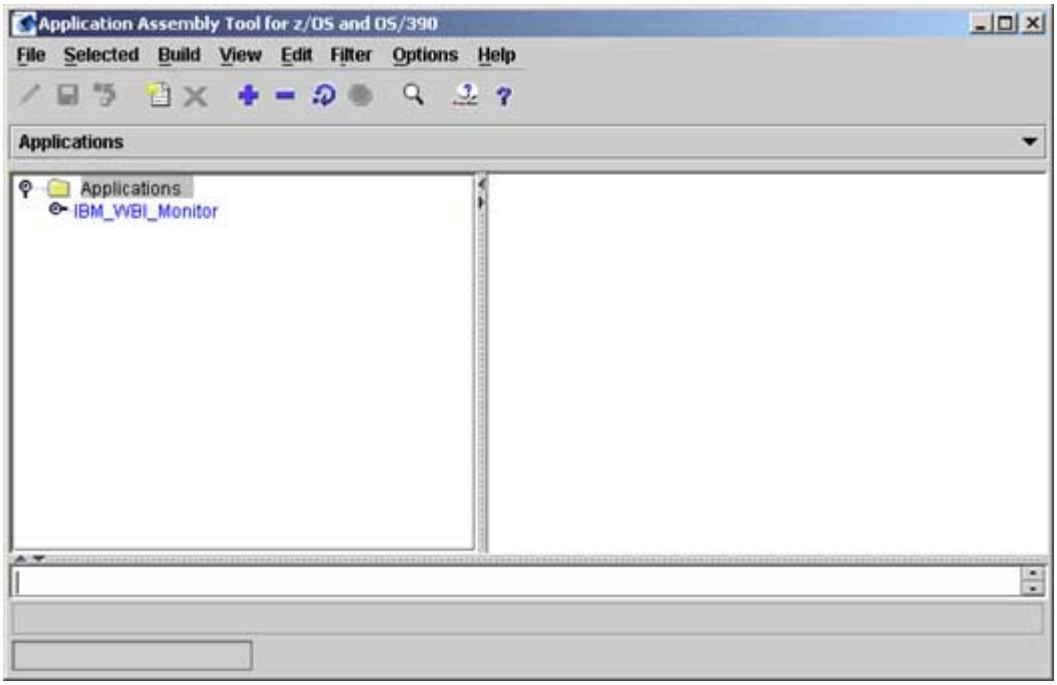
The **Import Application** dialog box appears.

3. Click **Choose**. The **Select EAR File to Import** dialog box appears.



4. Locate and select the monitor.ear file from the temporary folder in which you have placed a copy of it, click **OK**, and then click **OK** in the **Import Application** dialog box.

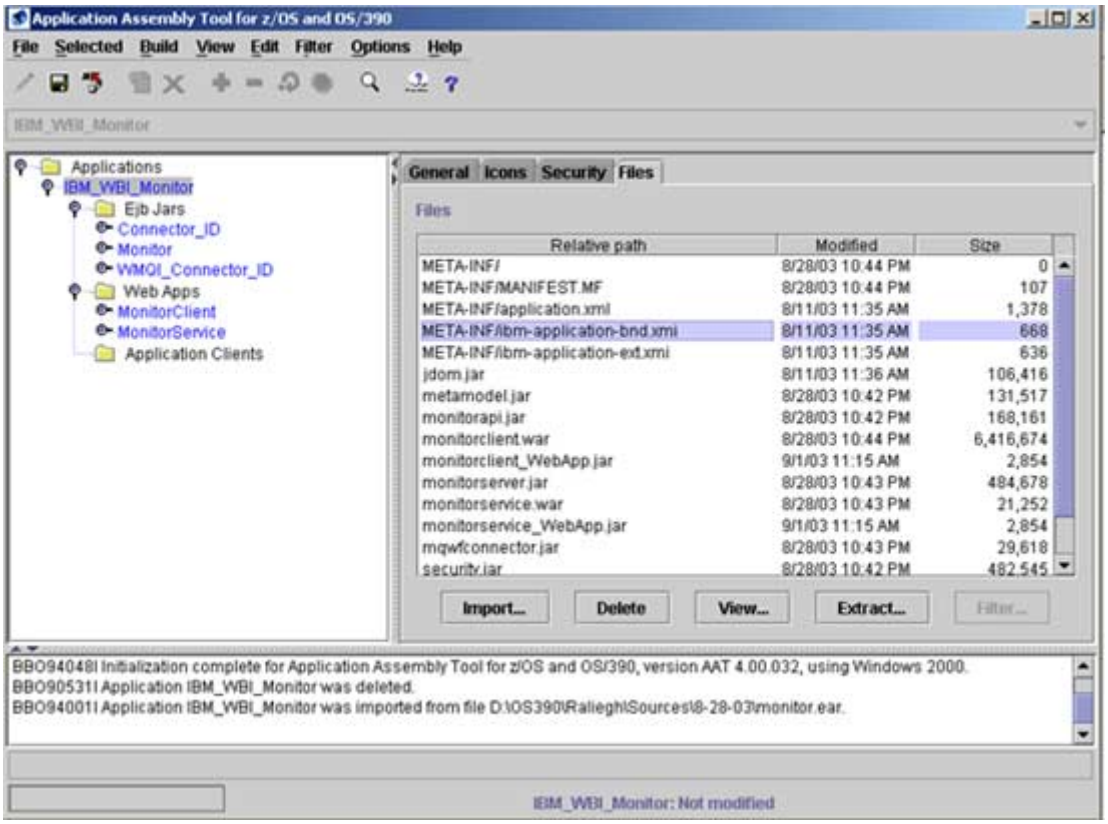
   The **IBM_WBI_Monitor** node will be created and displayed under the **Applications** tree.



5.1.2.2 Deleting the XMI Files

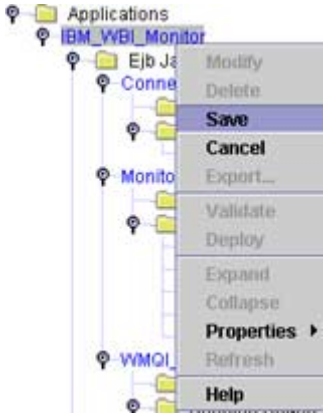
1. Right-click the **IBM_WBI_Monitor** node and select **Modify** from the shortcut menu that appears.

2. Select the **Files** tab on the right.



3. From the **Files** list, select each file that has *.**xmi*** extension (2 files), and then click **Delete** for each selected file.

4. Right-click the **IBM_WBI_Monitor** node and select **Save** from the shortcut menu.



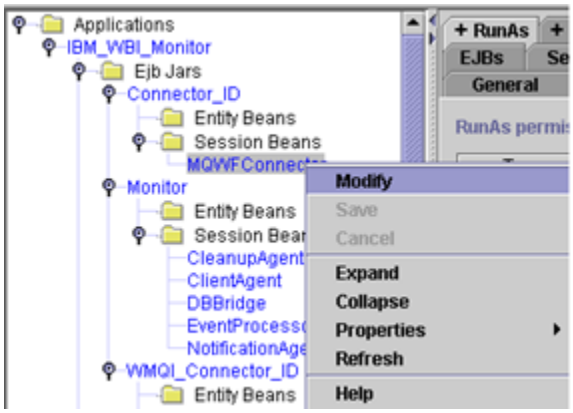
5. Repeat the above steps for the **Connector_ID, Monitor,** and **WMQI_Connector_ID** nodes under the **IBM_WBI Monitor>EJB Jars** node, and for the **MonitorClient** and **MonitorService** nodes under the **IBM_WBI Monitor>Web Apps** node to delete all files that have the extension ***.xmi*** from their files list.

5.1.2.3 Modifying the Session Beans

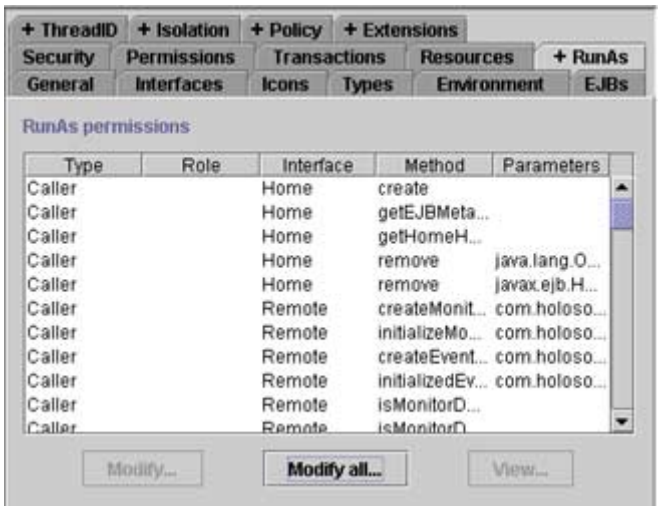
1. Expand the **Applications** tree
2. Do the following for each session bean of the following EJB modules under **IBM_WBI_Monitor \ Ejb Jars**:

   - For the **WMQI_Connector_ID** module
     * WMQIConnector bean.
   - For the **ICS_Connector_ID** module
     * ICSConnector bean.
   - For the **Monitor** EJB Module:
     * ClientAgent bean.
     * CleanupAgent bean.
     * NotificationAgent bean.
     * EventProcessor bean.
     * DBBridge bean.
   - For the **Connector_ID** module.
     * MQWFConnector bean

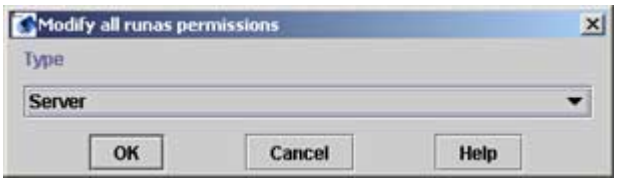
3. Right-click the **<SessionBeanName>** node in the tree and select **Modify** from the shortcut menu that appears.



4. Select the **+RunAs** tab on the right.
5. Click **Modify All**.

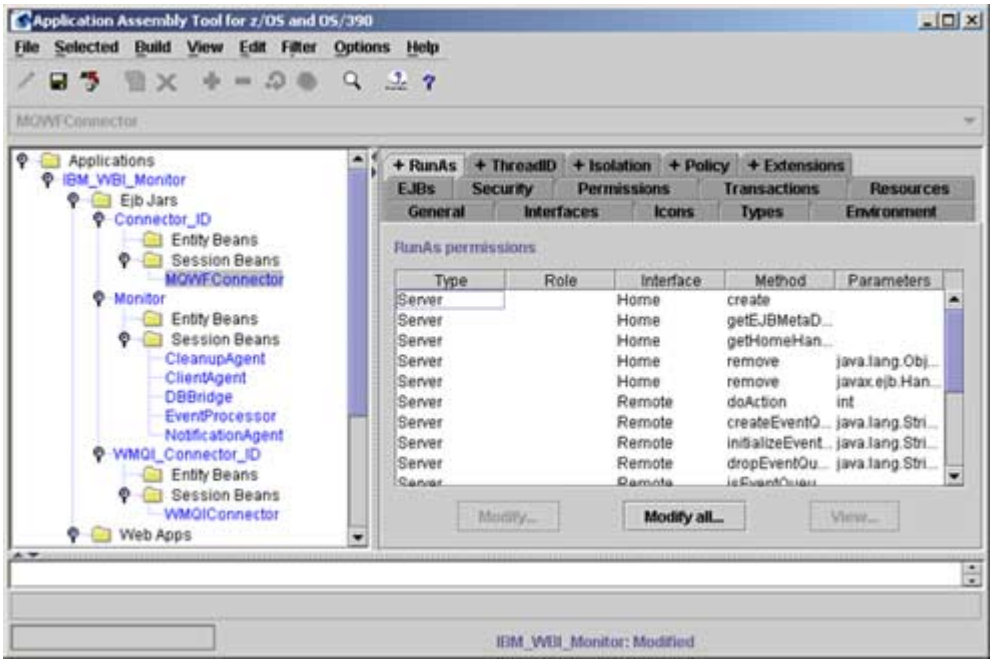


The **Modify all runas permissions** dialog box appears.

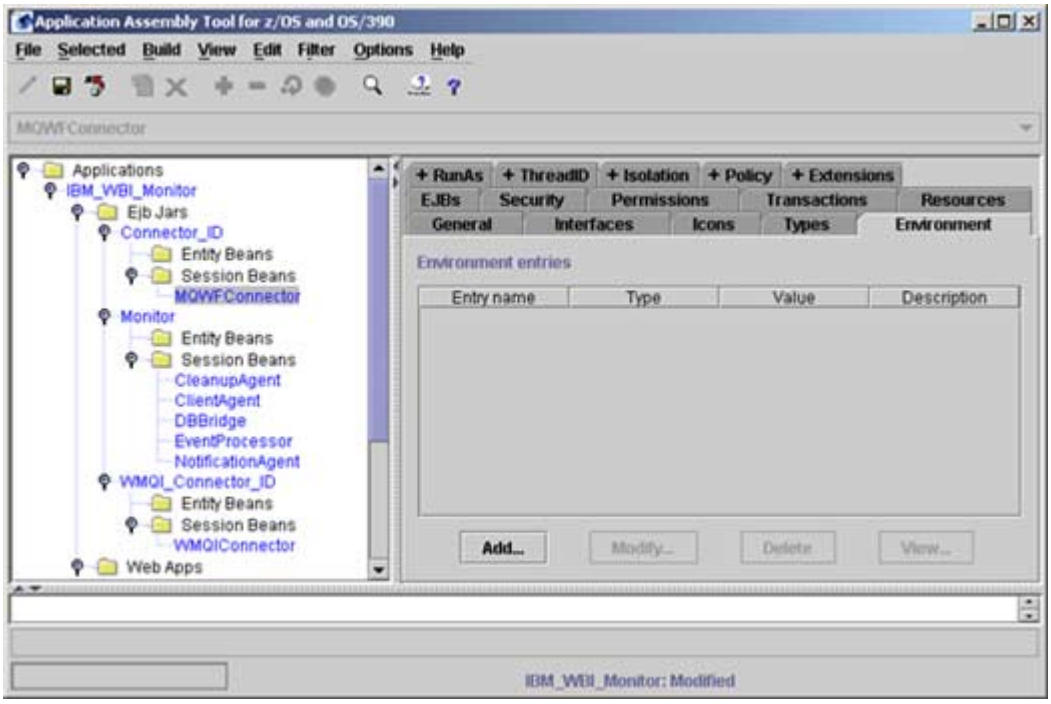


6. Select **Server** from the **Type** combo box.

7. Click **OK**. The **Type** column will display *Server* for all Runas Permissions.



8. Select the **Environment** tab.



9. In the **Environment** tab add the EJB environment parameters as the following table:

Property Name / EJB Name:	ClientAgent	CleanupAgent	NotificationAgent	EventProcessor	MQWFConnector	WMQIConnector	ICSConnector	DBBridge
monitor.db.schema	✓	✓	✓	✓	✓	✓	✓	✓
monitor.db.eqSchema					✓			
monitor.db.tablespaces.adminData	✓							
monitor.db.tablespaces.adminIndexes	✓							
monitor.db.tablespaces.modelTables	✓							
monitor.db.tablespaces.modelIndexes	✓							
monitor.db.tablespaces.processInstTables	✓							
monitor.db.tablespaces.processInstIndexes	✓							
monitor.db.tablespaces.eventTables	✓							
monitor.db.tablespaces.eventIndexes	✓							
monitor.db.tablespaces.processDataTables	✓							
monitor.db.tablespaces.processDataIndexes	✓							
monitor.db.tablespaces.securityTables	✓							
monitor.db.tablespaces.securityIndexes	✓							
monitor.db.tablespaces.processModelLob	✓							
monitor.db.tablespaces.processDataLob	✓							
monitor.db.tablespaces.configValuesLob	✓							
monitor.db.tablespaces.notifyExtraDataLob	✓							
monitor.db.tablespaces.eventDataLob	✓							
monitor.db.tablespaces.delayedEventDataLob	✓							
monitor.db.tablespaces.mbDetailLob	✓							
monitor.db.tablespaces.eqTables					✓			
monitor.db.tablespaces.eqIndexes					✓			
monitor.db.tablespaces.conDetailDataLob					✓			
monitor.db.tablespaces.defaultTablespace	✓				✓			
monitor.wmqi.enabled	✓			✓				
monitor.wics.enabled	✓			✓				
monitor.mqwf.enabled	✓			✓				
monitor.security.mode	✓							

monitor.security.ldap.url	✓							
monitor.security.ldap.dn	✓							
monitor.security.ldap.password	✓							
monitor.security.ldap.naming.attr	✓							
monitor.security.ldap.root	✓							
monitor.security.ldap.dn.attr.id	✓							
monitor.mqwf.locator	✓		✓					
monitor.mqwf.agent	✓		✓					
monitor.mqwf.system	✓		✓					
monitor.mqwf.sysGroup	✓		✓					
monitor.mqwf.encoding				✓				

The following table provides the description of each parameter.

Parameter Name	Type	Value Description
monitor.db.schema	java.lang.String	The Monitor Database Schema. The default value is *WFM.* This property must not has null value.
monitor.db.eqSchema	java.lang.String	The MQSeries Workflow Database (Event Queue Database) Schema. The default value is FMC. This property must not has null value.
monitor.mqwf.enabled	java.lang.String	Type *True* if you are using MQ Workflow as your engine or *False* otherwise.
monitor.wmqi.enabled	java.lang.String	Type *True* if you are using WMQI as your engine or *False* otherwise.
monitor.wics.enabled	java.lang.String	Type *True* if you are using WICS as your engine or *False* otherwise.
monitor.security.mode	java.lang.String	The applied security mode: • Type *MQ* for MQ Workflow security mode if you are using MQ Workflow as your engine. • Type LDAP for LDAP security mode or Local for local security mode if you are only using WMQI as your engine.
monitor.security.ldap.url	java.lang.String	The LDAP Server URL and port number (for example *ldap:///ldapsrvr:389/*). This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.dn	java.lang.String	A Distinguished Name (DN) for an LDAP Server authorized user that will be used for logging in to this LDAP Server, and performing the search in the LDAP users' tree. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.

monitor.security.ldap.password	java.lang.String	The password of the defined User DN. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.naming.attr	java.lang.String	The name of the prefix that precedes the user ID in the LDAP Server database (i.e. CN, UID,...etc). The value of this parameter varies between the different types of LDAP Servers. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.root	java.lang.String	The starting point in the LDAP tree from which the query will start searching for the full DN of the given user ID. This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.security.ldap.dn.attr.id	java.lang.String	The name of the Distinguished Name attribute ID (for example *distinguishedName*, *entrydn* ...etc. This value is case sensitive). This parameter is added only if you are only using WMQI as your engine with LDAP security mode.
monitor.mqwf.locator	String	The MQSeries Workflow Locator Policy that is used to locate the MQSeries Workflow Java Agent. This property can have one of the following values: LOC, RMI, OSA, IOR, COS, or JNDI. The default value is LOC (Local Locator Policy)
monitor.mqwf.agent	java.lang.String	The MQSeries Workflow Agent's Name
monitor.mqwf.system	java.lang.String	The MQSeries Workflow System's Name
monitor.mqwf.sysGroup	java.lang.String	The MQSeries Workflow System Group's Name
monitor.mqwf.encoding	java.lang.String	The MQSeries Workflow Database encoding. (This property must be set if the MQ Workflow Database encoding is different from the Monitor Server machine encoding)

In addition to the above parameters, there are additional parameters that should be defined to hold the values of the Database TableSpaces names that you want to use for physically storing the Monitor and EventQueue database tables and indexes. You have the ability to use a number of TableSpaces that are up to 22 different TableSpaces; 19 of them are created in the Monitor Database and three of them are created in the EventQueue Database. The database tables and indexes are grouped and categorized so that each category can be assigned to a separate TableSpace. You can define different TableSpace name as the value for each system property. Alternatively, you can define the same TableSpace for more than one system properties. In the later case, this TableSpace will be used for the tables and indexes that are corresponding to these properties. You can also ignore defining any of these properties, and in this case the tables, which are supposed to be assigned to these TableSpaces, will be assigned to the default TableSpace that can be defined by the *monitor.db.tablespaces.defaultTablespace* property. If you did not define

this property then the database user default TableSpace will be used as the default TableSpace.

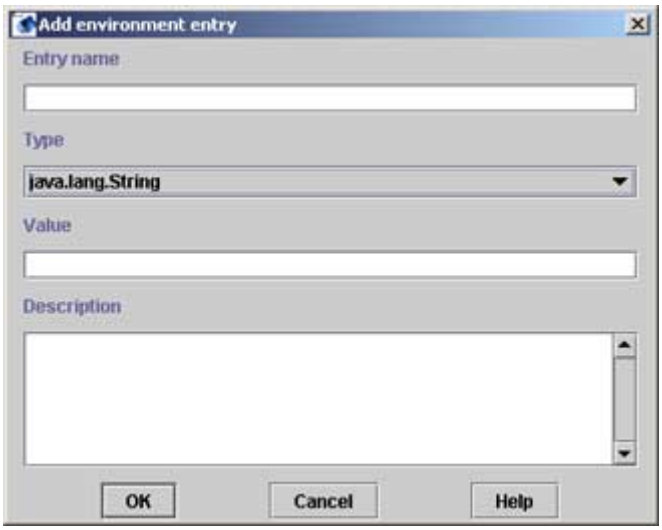
Parameter Name	Type	Value Description
monitor.db.tablespaces.adminData	String	TableSpace name of the Monitor Database Administration tables.
monitor.db.tablespaces.adminIndexes	String	TableSpace name of the Monitor Database Administration indexes.
monitor.db.tablespaces.modelTables	String	TableSpace name of the Monitor Database Static model tables.
monitor.db.tablespaces.modelIndexes	String	TableSpace name of the Monitor Database Static model indexes.
monitor.db.tablespaces.processInstTables	String	First TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.processInstIndexes	String	First TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.eventTables	String	Second TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.eventIndexes	String	Second TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.processDataTables	String	Third TableSpace name of the Monitor Database Dynamic tables.
monitor.db.tablespaces.processDataIndexes	String	Third TableSpace name of the Monitor Database Dynamic indexes.
monitor.db.tablespaces.securityTables	String	TableSpace name of the Monitor Database Security tables.
monitor.db.tablespaces.securityIndexes	String	TableSpace name of the Monitor Database Security indexes.
monitor.db.tablespaces.processModelLob	String	TableSpace name of the Monitor Database Process Model LOB.
monitor.db.tablespaces.processDataLob	String	TableSpace name of the Monitor Database Process Data LOB.
monitor.db.tablespaces.configValuesLob	String	TableSpace name of the Monitor Database Configuration Values LOB.
monitor.db.tablespaces.notifyExtraDataLob	String	TableSpace name of the Monitor Database Notify Extra Data LOB.
monitor.db.tablespaces.eventDataLob	String	TableSpace name of the Monitor Database Event Data LOB.
monitor.db.tablespaces.delayedEventDataLob	String	TableSpace name of the Monitor Database Delayed Event Data LOB.
monitor.db.tablespaces.mbDetailLob	String	TableSpace name of the Monitor Database WBI Message Broker LOB.
monitor.db.tablespaces.eqTables	String	TableSpace name of the MQSeries Workflow Database Event Queue tables .

monitor.db.tablespaces.eqIndexes	String	TableSpace name of the MQSeries Workflow Database Event Queue indexes.
monitor.db.tablespaces.conDetailDataLob	String	TableSpace name of the MQSeries Workflow Database Configuration Detail Data LOB
monitor.db.tablespaces.defaultTablespace	String	The name of the default TableSpace that is used for any tables or indexes category that has not been assigned to a specific TableSpace.

Important Note: In MQ Workflow, a default configuration must be defined even if the entered System Group and System belong to a different configuration.

To add each of these parameters do the following:

- Click **Add**. The Add environment entry dialog box appears.



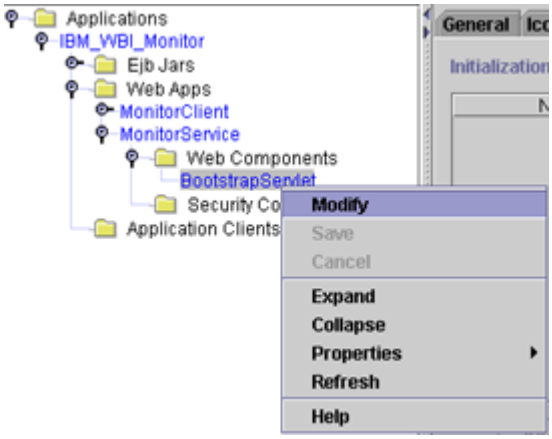
- Type the parameter name in the Entry Name box.
- Select the parameter type from the Type drop down list.
- Type the parameter value in the **Value** box.
- Click **OK**.

10. Right-click the **<SessionBeanName>** node and select **Save** from the shortcut menu.

5.1.2.4 Adjusting the BootstrapServlet Parameter

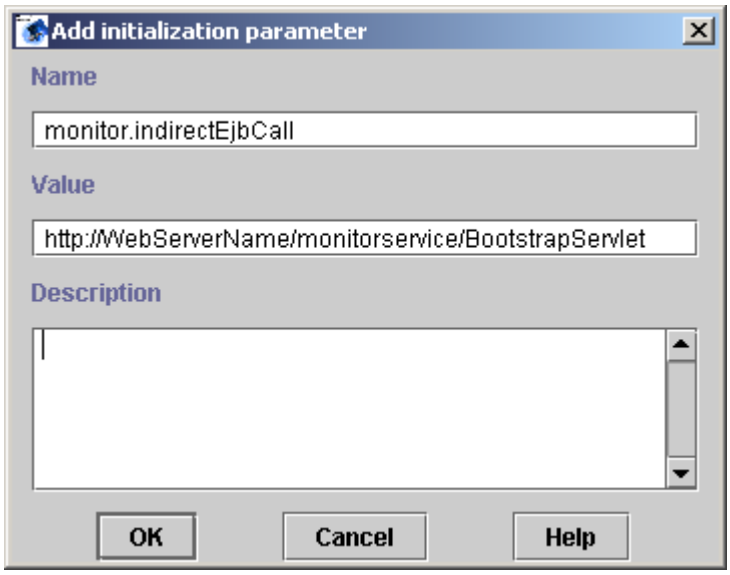
Add the **monitor.indirectEjbCall** parameter to the BootstrapServlet parameters list:

1. Expand the **Applications** tree and select **IBM_WBI_Monitor \ Web Apps \ MonitorService \ Web Components \ BootstrapServlet**
2. Right-click the **BootstrapServlet** node and select **Modify** from the shortcut menu that appears.

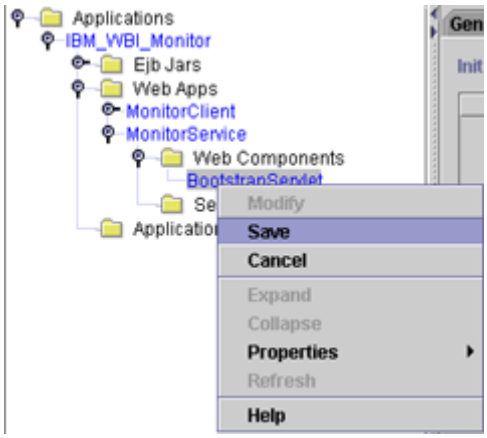


3. Select the **Parameters** tab on the right.

4. Click **Add**. The **Add initialization parameter** dialog box appears.

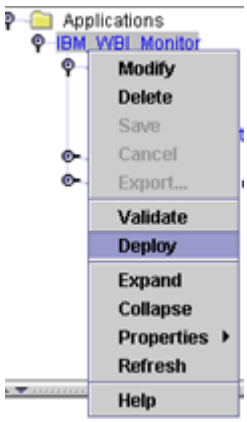


5. Type *monitor.indirectEjbCall* in the **Name** field.
6. Type *http://***<WebServerName><MonitorServiceWebPath>**/ *BootstrapServlet* in the **Value** field.
7. Click **OK**.
8. Right-click the **BoorstapServlet** node and select **Save** from the shortcut menu.

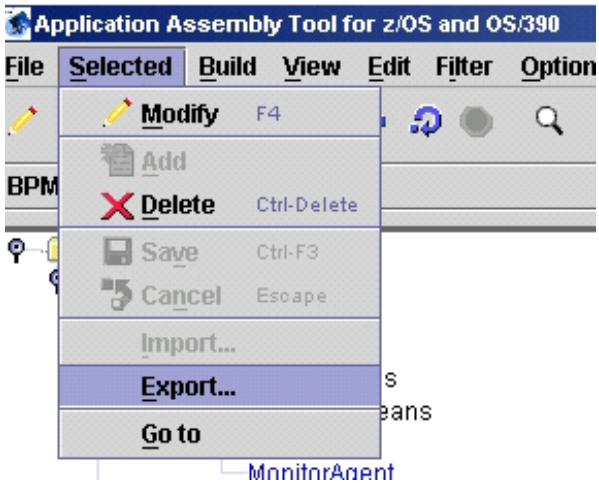


5.1.2.5 Deploying and Exporting the Modified Monitor Enterprise Archive (.ear) File

1. Right-click the **IBM_WBI_Monitor** node in the **Applications** tree and select **Deploy** from the shortcut menu that appears.



2. Wait for the confirmation message that notifies you that the *Application IBM_WBI_Monitor was deployed* appears in the **Status Bar**.
3. Select **Selected > Export** from the menu.



The **Export Application** dialog box appears.

4. Make sure that the **WebSphere for z/OS Version 4.0 compatible** check box is selected.

5. Enter the path and the name of the modified Monitor Enterprise Archive (.ear) file, and then click **OK**.

It is preferred to export the file with a new name (example: monitord.ear) so that to distinguish it from the original file. However, if you want to replace the original file, you can click Choose and select the path and the name of the original file to replace it.

The modified Monitor Enterprise Archive (.ear) file will be saved with the specified name in the selected path.

5.1.3 Deploying IBM WBI Monitor

After modifying the Monitor Enterprise Archive (.ear) file, you are now ready to start the IBM WBI Monitor deployment. The deployment steps are performed using the Administration Tool of IBM WebSphere Application Server for z/OS and OS/390, which is installed on a client machine that has Windows, AIX, or Solaris as its operating system and connected to the S390 Mainframe where the IBM WebSphere Application Server for z/OS and OS/390 is installed over a LAN/WAN TCP/IP connection.

The following sections describe in detail the deployment steps of the IBM WBI Monitor on IBM WebSphere Application Server for z/OS and OS/390.

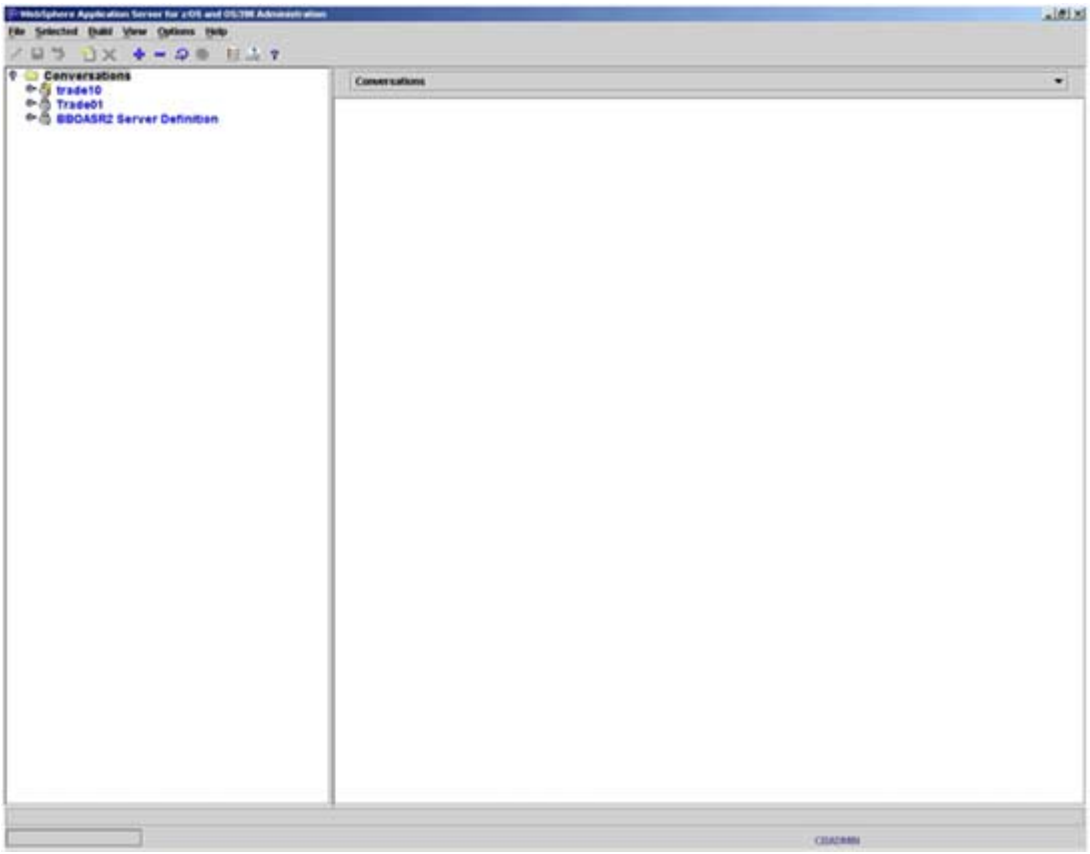
5.1.3.1 Adding a New Conversation for the Monitor Application Server

1. Start the Administration Tool of IBM WebSphere Application Server for z/OS and OS/390.

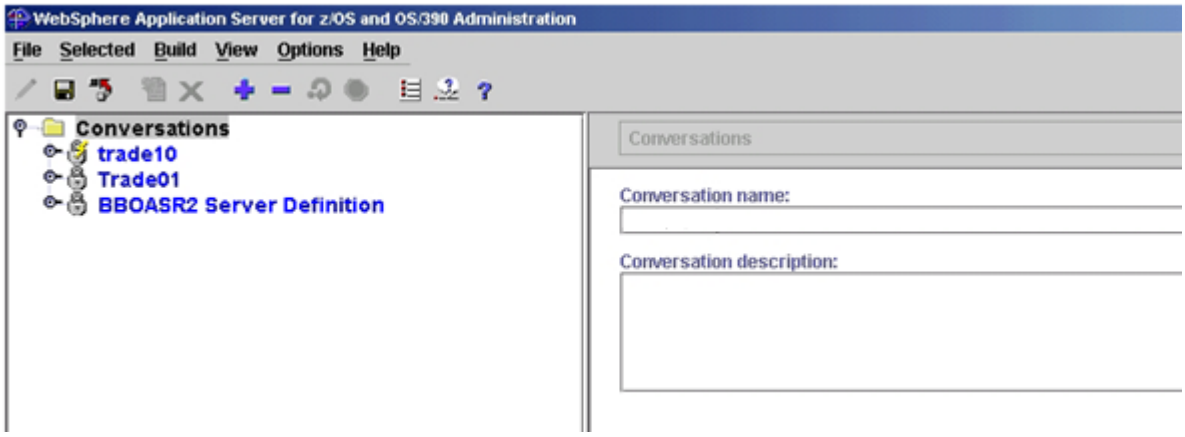
   The **Login** dialog box appears

2. Enter the name (or the IP address), port number, user Id, and password of the WebSphere Server for z/OS and OS/390 on which you will deploy the Monitor in the corresponding fields and then click **OK**.

The Administration Tool's main window opens.



3. Right click the **Conversations** node in the left hand tree and select **Add** from the shortcut menu that appears. The right area will display the properties of the new conversation to let you enter the values of the required properties.



4. Enter **<MonitorConversation>** in the **Conversation name** field.
5. If you want to add a description for this new conversation, then enter the description text in the **Conversation description** text box.
6. Click the **Save** button in the toolbar to save the new conversation.

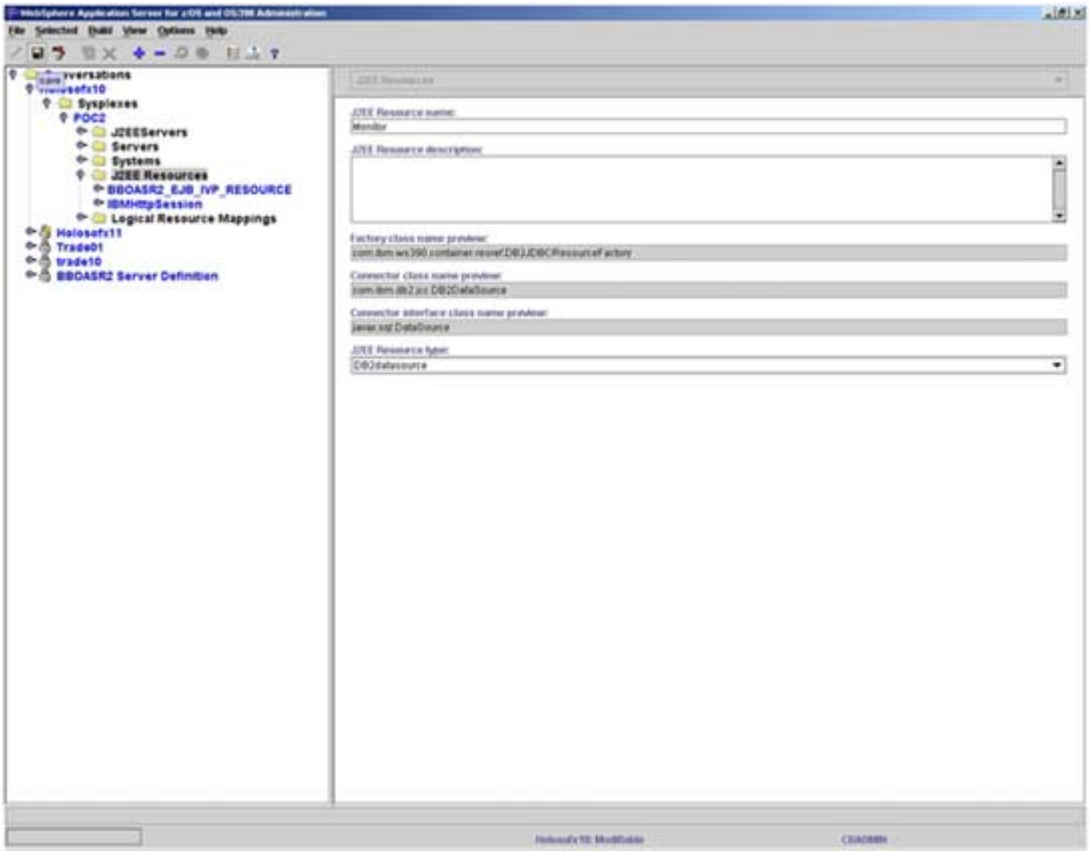
5.1.3.2 Creating the Monitor J2EE Resource

If a previous J2EE Resource has been created before and already points to the same DB2 location where the Monitor and EventQueue databases exist, then you can use it instead of creating a new J2EE Resource. In this case you don't need to perform the steps in this section.

Important Note: Make sure that the J2EE Resource (either the new J2EE Resource that you will create or the one that has been created before and you will use) must have JDBC Connection Pooling enabled.

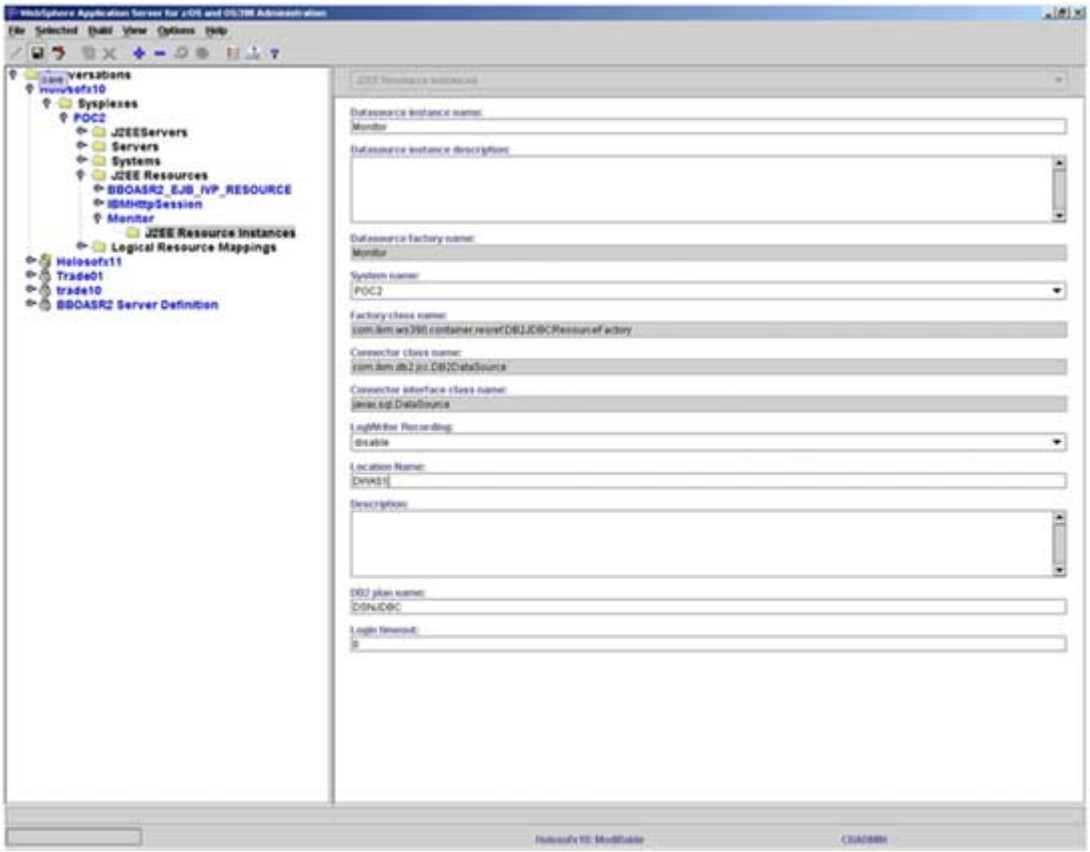
To create a new J2EE Resource:

1. Expand the **Conversations** tree and select **Conversation > <MonitorConversation> > Sysplexes > <SysplexName> > J2EEResources.**
2. Right click **J2EE Resources** and select **Add** from the shortcut menu that appears. The properties of the new J2EE Resource appear on the right.



3. Type ***Monitor*** in the **J2EE Resource name** field.

4. Select **DB2Datasource** from the **J2EE Resource type** combo box.
5. Click the **Save** button in the toolbar.
6. Expand the Conversations tree and select **Conversation > <MonitorConversation> > Sysplexes > <SysplexName> > J2EEResources > Monitor > J2EE Resource Instances**.
7. Right click the **J2EE Resource Instances** and select **Add** from the shortcut menu that appears. The properties of the new J2EE Resource Instance appear on the right.

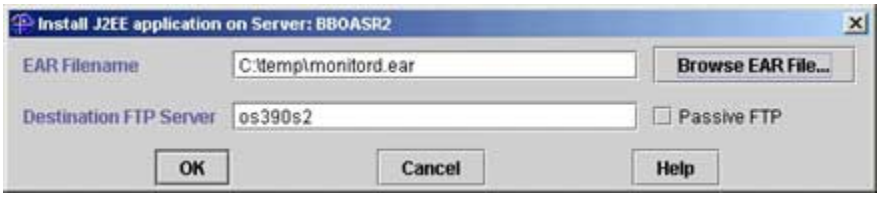


8. Type ***Monitor*** in the **Datasource instance name** field.
9. Type the DB2 Location name (the DB2 Subsystem name) on which the Event Queue and the Monitor databases exist in the **Location Name** field.
10. Click the **Save** button in the toolbar.

5.1.3.3 Installing the New Monitor J2EE Application

1. Expand the Conversations tree and select **Conversation > <MonitorConversation> > Sysplexes > <SysplexName> > J2EEServers > <MonitorJ2EEServerName>**.
2. Right click the **<MonitorJ2EEServerName>** and select **Install J2EE application** from the shortcut menu that appears.

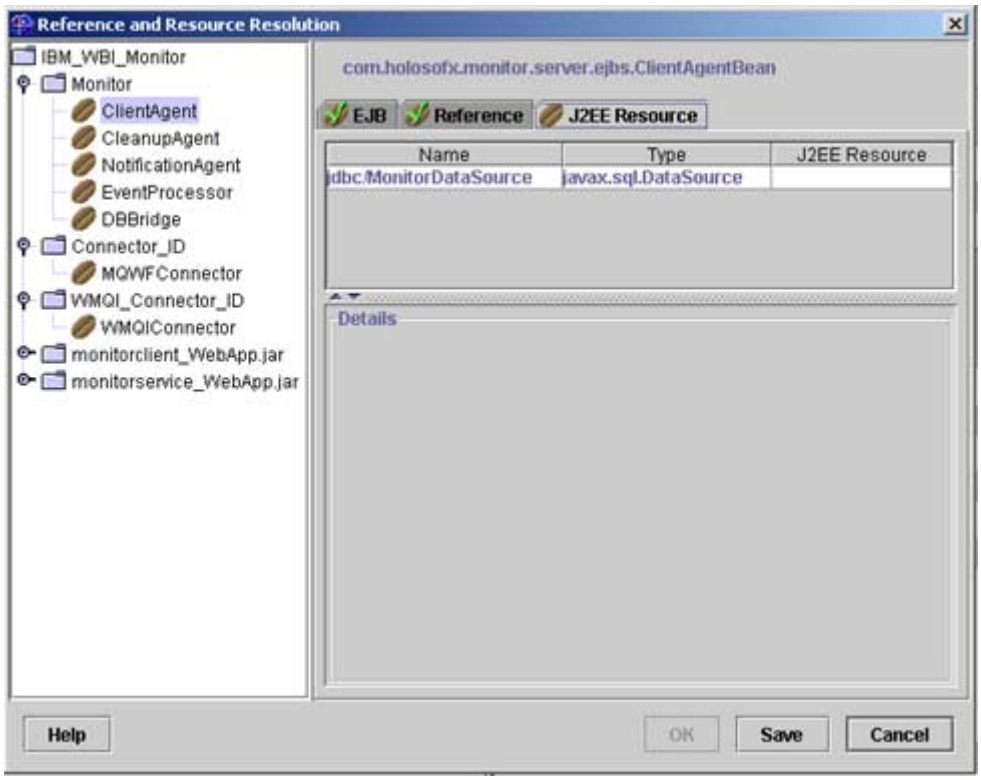
The **Install J2EE application on Server: <J2EEServerName>** dialog box appears.



3. Enter the path and the name of the Monitor Enterprise Archive (.ear) file that you have modified with the required parameters in the **EAR Filename** field.

   - You can click **Browse EAR File** to select the ear file name and path.

4. Keep the **Destination FTP Server** field and the **Passive FTP** check box with there default settings.
5. Click **OK**. A message appears to tell you that the application contains references to non existent resources.
6. Click **OK**. The **Reference and Resource Resolution** dialog box appears.

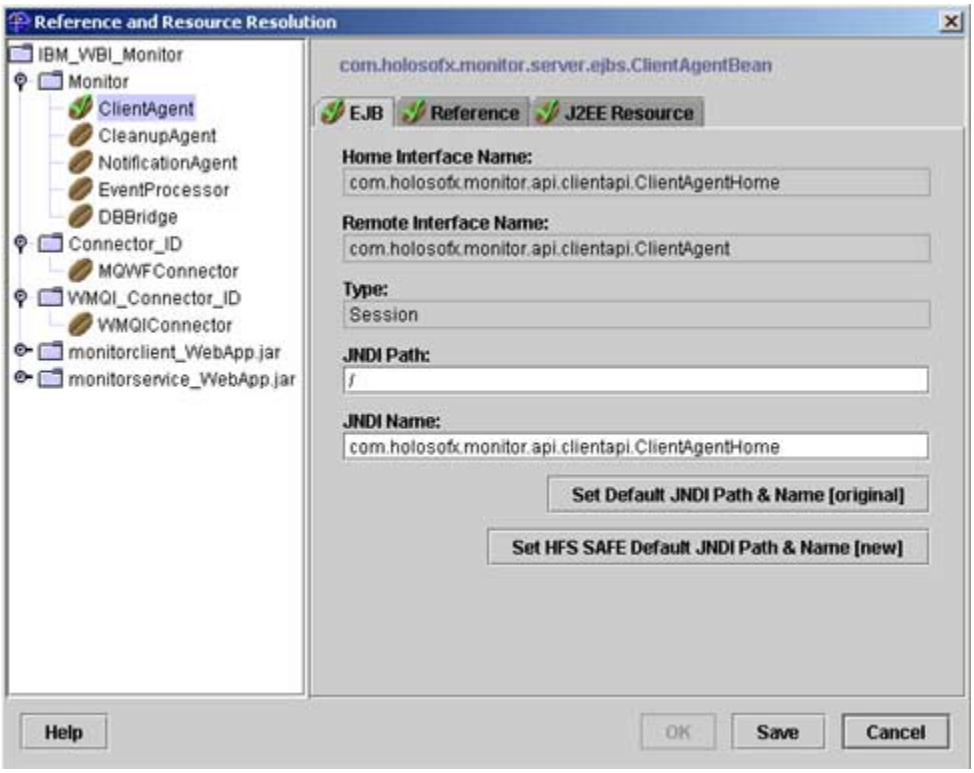


7. Expand the **IBM_WBI_Monitor** tree and select **Monitor > ClientAgent**. And do the following:

   - Select the J2EE Resource tab and do the following:

* Click the row cell of the **J2EE Resource** column that contain *jdbc/MonitorDataSource* in the **Name** cell, and select **Monitor** J2EE Resource from the drop down list.

- Select the **EJB** tab and do the following:



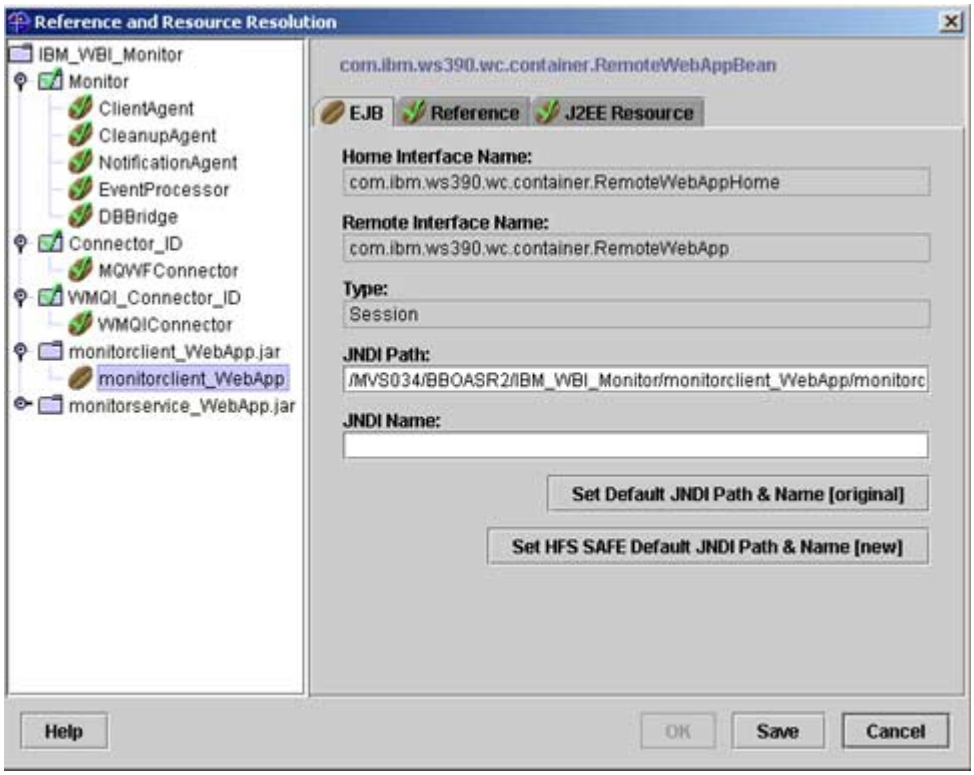
* Click **Set Default JNDI Path & Name** to restore the default JNDI path and name.

8. Repeat the previous step for the **CleanupAgent**, **NotificationAgent**, **EventProcessor**, and **DBBridge** nodes under the **Monitor** node. Also repeat the steps for the **WMQIConnector** node under the **WMQI_Connector_ID** node, for the **ICSConnector** node under the **ICS_Connector_ID** node and for the **MQWFConnector** node under the **Connector_ID** node.

   - For the **MQWFConnector** node select the **Monitor** J2EE Resource from the drop down list for all existing rows in the table (three rows).

9. Select **IBM_WBI_Monitor > monitorclient_WebApp.jar > monitorclient_WebApp** from the tree and do the following:

   - Select the **EJB** tab and do the following:



* Click **Set Default JNDI Path & Name** to restore the default JNDI path and name.

10. Repeat the previous step for the **IBM_WBI_Monitor > monitorservice_WebApp.jar > monitorservice_WebApp**

11. Click **OK** and wait until the new J2EE application is installed and deployed.

5.1.3.4 Adding the MQ Workflow Classpath and Library Path

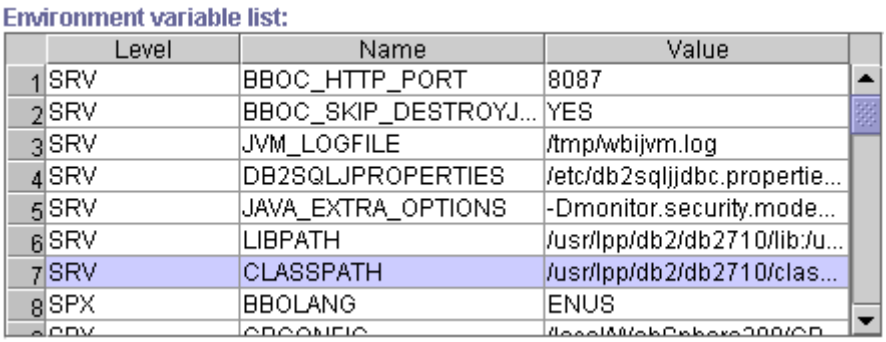
The last step you need to do before committing and activating the Monitor conversation is to add the MQ Workflow Classpath and Library path in order to be able to communicate with MQ Workflow. To do this:

1. Expand the Conversations tree and select **Conversation > <MonitorConversation> > Sysplexes > <SysplexName> > J2EEServers > <MonitorJ2EEServerName>**.

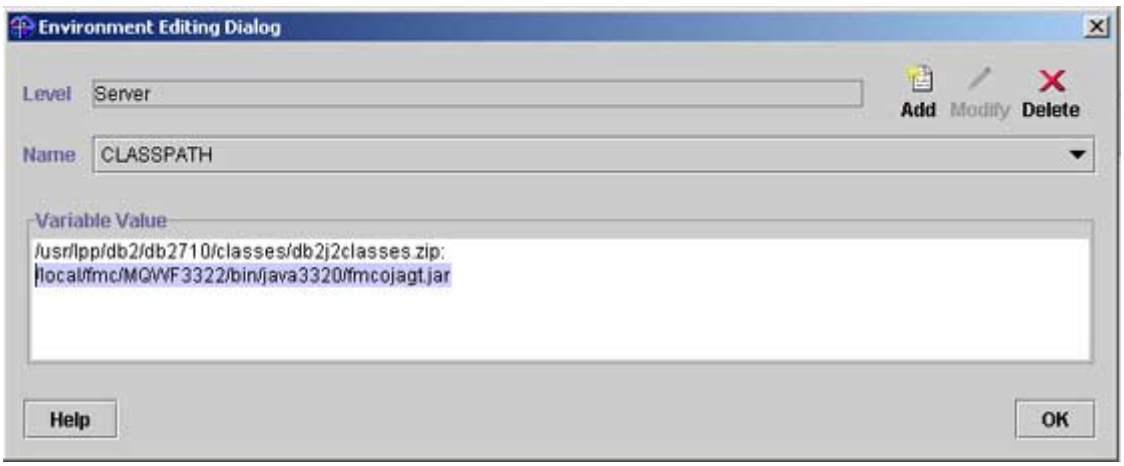
2. Right click the **<MonitorJ2EEServerName>** and select **Modify** from the shortcut menu that appears.

   The properties of the new J2EE Server appear on the right.

3. Scroll the **Properties** page until you find the **Environment Variable List**.



4. Double click the **CLASSPATH** environment variable. The **Environment Editing Dialog** appears.



5. In the **Variable Value** text box do the following:

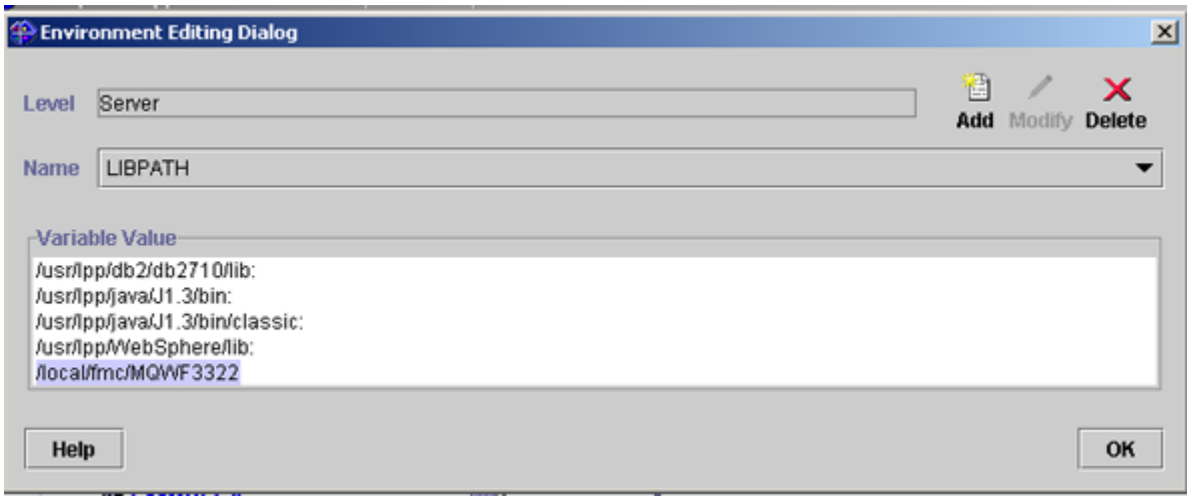
   - Type a semicolon at the end of the last line if it is not ended with a one and then press Enter to add a new line.

   - In the new line, type the path and name of the MQ Workflow Library file named fmcojagt.jar which is located in **<MQ>/**bin/java3320 if you have IBM MQSeries Workflow v3.3.2 or in **<MQ>**/bin/java3400 if you have IBM WebSphere MQ Workflow v3.4.

The added line should not end with semicolon if it is the last line in the box. Otherwise, you should type a semicolon at the end of this added line.

   - Click **OK**.

6. In the Environment Variable List, double click the **LIBPATH** environment variable. The **Environment Editing Dialog** appears.



7. In the **Variable Value** text box do the following:

   - Type a semicolon at the end of the last line if it is not ended with a one and then press Enter to add a new line.

   - In the new line, type the MQ Workflow installation path.

The added line should not end with semicolon if it is the last line in the box. Otherwise, you should type a semicolon at the end of this added line.

   - Click **OK**. Then click the **Save** button in the toolbar.

5.1.3.5 Committing and Activating the New Conversation

Now you can start committing and activating the Monitor conversation you have created. In order to do this:

1. Right click **<MonitorConversation>** in the **Conversations** tree and select **Commit** from the shortcut menu.
2. Click **OK** on the confirmation message.
3. Wait until the **Commit** task is finished.
4. Right click **<MonitorConversation>** in the **Conversations** tree and select **Complete** from the shortcut menu. A sub menu appears
5. Select **All tasks** from the sub menu.
6. Click **OK** on the confirmation message.
7. Wait until the **Complete** task is finished.
8. Right click **<MonitorConversation>** in the **Conversations** tree and select **Activate** from the shortcut menu. A sub menu appears
9. Click **OK** on the confirmation message.

10. Wait until the **Activate** task is finished. The Status bar will display a confirmation message that the conversation was activated.

5.1.3.6 Starting the WebServer and the Monitor Application

Now the IBM WBI Monitor Application Server deployment procedure has finished. You should now do these two steps in order to finalize and complete the deployment:

1. Start the Web Server that IBM WebSphere use (e.g. IBM HTTP Server).

If the Web Server was started then stop and restart it again.

2. Start the newly deployed Monitor Application Server.

5.1.4 Finalize the Monitor Server Deployment

5.1.4.1 Initialize the Monitor Database

1. Run a Web browser (such as MS Internet Explorer)
2. Type the following URL:

   http://<WebServerName><WebPath>/admin

   (eg. http://monitorsrvr/monitor/admin)

   The Login Page appears
3. Enter the User ID and Password of a valid user. (Please refer to the WBI Monitor *Administration Guide* for detailed information about the WBI Monitor authentication and security options). The Administration Utility Web page opens.
4. Initialize the Monitor Database tables by clicking the Create Database button that exists in the Monitor Database Setup page. The initialized tables must have been created previously using the DDL files named monitorCreate.sql and eqCreate.sql that are located in the <Monitor>/server/docs/ddl folder. Please refer to the section entitled Configure the Database Server above in this chapter for details about configuring the database server and creating the database tables.
5. Close the browser.

5.1.4.2 Importing Organization XML Files

You have to import the required organization XML files to the WBI Monitor database in order to complete the deployment instructions.

Please refer to the WBI Monitor *Administration Guide* for the detailed instructions of importing organization XML files.

5.2 WBI Monitor Server Removal

This section is used to completely un-deploy the Monitor Server. To completely un-deploy the Monitor perform the following steps:

1. Start the Administration Tool of IBM WebSphere Application Server for z/OS and OS/390.

   The **Login** dialog box appears

2. Enter the name (or the IP address), port number, user Id, and password of the WebSphere Server for z/OS and OS/390 on which you will deploy the Monitor in the corresponding fields and then click **OK**.

   The Administration Tool's main window opens.

3. Right click the **Conversations** node in the left hand tree and select **Add** from the shortcut menu that appears.

   The right area will display the properties of the new conversation to let you enter the values of the required properties.

4. Enter **<MonitorConversation>** in the **Conversation name** field.

5. If you want to add a description for this new conversation, then enter the description text in the **Conversation description** text box.

6. Click the **Save** button in the toolbar to save the new conversation.

7. Expand the **Conversations** tree and select ***Conversation* > <MonitorConversation> > Sysplexes > <SysplexName> > J2EEServers > <MonitorJ2EEServerName> > J2EEApplications > IBM_WBI_Monitor.**

8. Click the **Delete** button in the Toolbar (identified by a red X), or select **Selected > Delete** from the menu, or right click **IBM_WBI_Monitor** and select **Delete** from the shortcut menu that appears. A confirmation message appears.

9. Accept the confirmation message. a red cross will appear next to IBM_WBI_Monitor in the tree.

10. Right click **<MonitorConversation>** in the **Conversations** tree and select **Commit** from the shortcut menu.

11. Click **OK** on the confirmation message.

12. Wait until the **Commit** task is finished.

13. Right click **<MonitorConversation>** in the **Conversations** tree and select **Complete** from the shortcut menu. A sub menu appears

14. Select **All tasks** from the sub menu.

15. Click **OK** on the confirmation message.

16. Wait until the **Complete** task is finished.

17. Right click **<MonitorConversation>** in the **Conversations** tree and select **Activate** from the shortcut menu. A sub menu appears

18. Click **OK** on the confirmation message.
19. Wait until the **Activate** task is finished. The Status bar will display a confirmation message that the conversation was activated.

PART

IV

Upgrading your Existing Version of WBI Monitor to the Recent Version

Chapter 6: Upgrading your Existing Version of WBI Monitor to the Recent Version

This chapter contains the required information about upgrading your existing version of WBI Monitor (WBI Monitor v4.2.4 Fix Pack1, or WBI Monitor v4.2.4 Fix Pack1 HotFix) to the recent version (WBI Monitor v4.2.4 Fix Pack2). This includes replacing the deployed version of WBI Monitor application on WebSphere Application Server with the new version, as well as upgrading the existing Monitor database that already contains data stored in its tables to adhere to the latest modification in the recent version of WBI Monitor database, and migrate the stored data to the upgraded database.

The WBI Monitor upgrade must be performed in the following sequence:

1. Un-deploy the existing version of WBI Monitor Server completely from the WebSphere Application Server. On Windows, AIX and Solaris platform, you can perform the un-deployment either automatically or manually. On z/OS and OS/390 platforms you can only perform the un-deployment manually.

Refer to the section entitled WBI Monitor Server Un-Deployment in Part 2 - Chapter 2: WBI Monitor Installation of this guide for the detailed steps of automatic un-deployment of WBI Monitor Server. Refer also to the section with the same title in Appendix A: and Appendix B in Part 2 of this guide for the detailed steps of the manual un-deployment of WBI Monitor Server. Refer to the section entitled IBM WBI Monitor Deployment on OS/390 and z/OS Platforms in Part 3 of this guide for the un-deployment steps.

2. Backup your existing Monitor database.
3. Perform the Database Migration and Upgrade after completely un-deploying the existing deployed version of the Monitor Server. to do this run the appropriate SQL file that exists in the *migration\SQL* folder as the following:

   - For IBM DB2 database on Windows, AIX, and Solaris platforms run the file named *DB2.sql*.
   - For IBM DB2 database on OS/390 and z/OS platforms run the file named *DB2OS390.sql*

- For Oracle database on Windows, AIX, and Solaris platforms run the file named *ORACLE.sql*.

Before running these files, you should edit them in order to change the variable named $SCHEMA$ with the actual name of the tables schema in each occurrence in the files.

4. Install the new version of WBI Monitor and Deploy the WBI Monitor Server that belongs to the new version of WBI Monitor after completing the upgrade and migration of the database.

Refer to the section entitled WBI Monitor Server Installation and deployment in Part 2 - Chapter 2: WBI Monitor Installation of this guide for the detailed steps of automatic deployment of WBI Monitor Server. Refer also to Appendix A and Appendix B in Part 2 of this guide for the detailed steps of the manual deployment of WBI Monitor Server. Please refer to the section entitled IBM WBI Monitor Deployment on OS/390 and z/OS Platforms in Part 3 of this guide for the deployment steps.

Glossary

A

Activity
One of the steps that make up a process model. This can be a program activity, process activity, or block activity. It is also one of the building blocks that constitute a process model

Activity Instance Manager
The module that handles all functions related to the Activity instances data

Administration Sessions
The sessions Enterprise Java Beans (EJBs) are used to administrate the Monitor server. They handle cleanup of the Monitor database, security, and the import of the .org modeling data from IBM WebSphere Business Integration (WBI) Workbench™.

Administration Utility
A Web-based client that allows users to start the Event Queue triggers and create the Monitor and Event Queue database tables.

API, Application Programming Interface.
An interface provided by the MQ Series Workflow manager that enables programs to request services from the MQ Series Workflow manager. The services are provided synchronously.

Application Server
A server-side program that runs on a distributed network computer. It provides the business logic for an application program. The application server is usually considered as part of a three-tier application, consisting of a graphical user interface, an application (business logic) server, and a database.

Arrival Time
The timestamp at which a Job has been created.

Auto Cleanup
A Functionality in the Cleanup Utility that allows the application to automatically perform the process instances and history data cleanup on a periodical basis

B

Buildtime
An MQ Series Workflow component with a graphical user interface for creating and maintaining workflow models, administering resources, and the system network definitions.

Business Measures
Measures that allow users to evaluate the performance of the business process while running. There are two types of measures: those predefined by WBI Workbench such as cost and duration and User-defined ones.

C

Client Sessions
The sessions Enterprise Java Beans (EJBs) handle the communication with Monitor and Business Monitor client.

Completion Time
The timestamp at which a Job has been completed.

Container Data
The input /output data of an activity or process.

D

Data Connectors
Connections drawn between tasks in the process diagram. They determine the flow of data from an originating Task Object or Process Object to a target Task Object or Process Object respectively.

Data Container

Storage for the input and output data of an activity or process. See *input container* and *output containe*r.

Data Structure
A named entity that consists of a set of data structure members. Input and output containers are defined by reference to a data structure and adopt the layout of the referenced data structure type.

DB2
It is an IBM's universal database management system used by MQ Workflow and WBI Monitor to store process models and process-relevant data.

Decisions
An internal or external environmental condition (e.g., an event, a specification, or a standard) that affects a Business Process. A Decision is the question that is asked to determine the exact set of activities during the execution of a Process. For example, a question might be "What type of order?" or "How will the order be shipped?" A Decision is represented by a Decision Object in an Activity Decision Flow Diagram. There are two types of Decision Objects: Binary and Multiple.

Delay Status
The status of the current process that is based on its number of jobs, which are delayed as opposed to the number of jobs, executed on time.

E

Elapsed Duration
The Elapsed Duration of the Process Instance or Activity Instance.

Entreprise Java Beans (EJBs)
Enterprise Java Beans (EJB) is an architecture for setting up program components written in Java that run on the server side of a computer network that uses the client/server model.

Event
A message that comes from MQ Workflow to indicate a change in the Workflow entities, and their states. Examples of event types are 'Process Started', 'Activity instance ready', 'Work item created', 'Process completed'.

Event Collector Triggers
They are the triggers that get installed on the MQ Workflow database to collect the events of the container data and store them in the Monitor Event Queue tables to be processed later by the Monitor Engine.

Event Queue
The event queue is implemented as three database tables in DB2 that hold the event records to be picked up later by the Monitor Service for event processing.

Event Queue Manager
A program that handles the Event Queue filled in by triggers; reads the event and process data, processes events, and deletes them from the database.

F

FDL File: MQ Series Workflow Definition Language.
The language used to exchange MQ Series Workflow information between MQ Series Workflow system groups. It is used by the Import and Export function of MQ Series Workflow and contains the workflow definitions for staff, programs, data structures, and topology. This allows non-MQ Series Workflow components to interact with MQ Series Workflow. See also *export* and *impor*t

H

Head Unit
The Organization Unit to which another Organization Unit reports.

History Data
The high-level information calculated based on the Instances data, which represent business measures associated with a process

I

IBM MQSeries Workflow

A Workflow application developed by IBM that allows users to automate, manage and control their business processes.

Import
An MQ Series Workflow utility that accepts information in the MQ Series Workflow definition language (FDL) format and places it in an MQ Series Workflow database.

J

Java Database Connectivity (JDBC)
The mechanism by which Java code interfaces with a Database.

Job ID
The Workflow name of a Job or Process Instance.

M

Monitor Client
A Java client used on the enterprise network that allows business analysts to monitor the business processes at run time.

Monitor Data Model
A layer that grants access to the database data through Java Database Connectivity (JDBC) of the Monitor Server. All Monitor Database SQL statements are encapsulated in this layer.

Monitor Databases Tables
Tables that store two types of information. The first type is the information captured from the process model, such as the Process Activity Flow Diagram, that will be displayed during run time, the data associated with tasks such as User ID, Task or Activity name, Estimated Duration, etc, and Business Measures associated with the process model. The second type of information is that which is processed or deduced from the run time data captured from the Workflow database.

Monitor Engine
A module that handles the events coming from MQ Workflow. It picks up the events, processes them, and stores the result in the Database for later retrieval by the clients. Processed events are deleted after processing.

Monitor Event Queue Tables
Tables that store the events together with the container data triggers that are installed on the MQ Workflow database.

Monitor Import Utility
A Java client that allows users to open the Organization Folders containing the processes they want to monitor as well as the Business measures they have defined in WBI Workbench. They can select these measures, and import them to the Monitor Server.

Monitor Server
The server that handles all the back-end operations of the four User Clients. These clients control the cleanup of the Monitor database, security, and the import of the .org modeling data. The Monitor server also handles the communication with user clients, the events coming from MQ Workflow and the data access encapsulation of the SQL statements.

Monitor User Clients
The four Monitor User Clients that allow users to take all the necessary steps to monitor the business processes they have developed models for, and their associated Business Measures.

Monitoring API
A client layer that handles all the client/server communication and hides the details of the monitor server from the user clients.

N

Notification Duration
The maximum duration allowed for a process instance before a notification is issued. This duration is decided upon the data obtained from the Process model that has been created using the WBI Workbench and imported to the Monitor Server along with the Organization file. The value of the Notification Duration is entered by the Modeler in WBI Workbench, in the Notification tab of the Task Object dialog box.

O

Organization
An administrative unit of an enterprise. Organization is one of the criteria that can be used to dynamically assign activities to people. See *child organization* and *parent organizatio*n.

Organization Files
Files created by WBI Workbench They contain all process and repository data the user has entered.

Organization Folders
Folders created by WBI Workbench that enclose all process files, Organization files, and other related files.

Organization Unit
The subdivisions in an Organization. Organization Unit can represent departments, divisions, or sections.

Organization Unit Browser
A list that displays all imported Organization Units into the Monitor Database to manipulate it with the Cleanup utility

Organization Unit Manager
The name of the Manager of the selected Organization Unit that is entered by the user in the Organization Unit dialog box in WBI Workbench.

Overloaded
The status of the user performing the Work Items. The user is considered overloaded when there are more than four work items in his/her own work list. Overloaded status is indicated in a color code.

P

Phi
An Activity Decision Flow Diagram object outputted from one activity and/or inputted to the next one. This object represents the data or product that is manipulated or produced during the performance of a process. The term “Phi” is derived from the Greek letter phi (F) because it is made up of the letter I (for input) superimposed over an O (for output).

Process
A set of activities in an organization that are linked together

Process Browser
A list that displays all imported Processes into the Monitor Database to manipulate it with the Cleanup utility

Process Instance
An instance of a process that is currently executed.

Process Instances data
The crude data associated with each process instance created and stored in the WBI Monitor database.

Process Version
A version of a Process model that contains some changes from the original Process Model. The Process may have one (the original version) or more versions, and each version has a certain date at which this version became valid from.

Process Diagram
A graphical representation of a process that shows the properties of a process model.

Process Elements
The objects within an Activity Decision Flow Diagram, these being Tasks, Process Objects, Decisions, Decision Choices, Phis, External Entity/Process, Go To Objects, Stops, and Connectors.

Process History Manager
The module that handles all functions related to the Process history data.

Process Instance Manager
The module that handles all functions related to the Process instances data

Process Instance or Job
An instance of a process that is currently executed.

Process Management
The MQ Workflow Run time tasks associated with process instances. These consist of creating, starting, suspending, resuming, terminating, restarting, and deleting process instances.

Process Model.
A set of processes represented in a process model. The processes are represented in graphical form in the process diagram. The process model contains the definitions for staff, programs, and data structures

associated with the activities of the process. After having translated the process model into a process template, the process template can be executed over and over again. *Workflow model* and *process definition* are synonyms.

Process Status
The status of a process instance.

Q

Queue Controls
Controls that provide the Event Queue database with the Control Commands: Start and Stop.

Queue Status
The Event Queue status that could be either Started or Stopped.

R

Repository Manager
The module that handles the import of the .org and grants access to all the build-time entities defined in the WBI Workbench.

Role
A responsibility that is defined for staff members. Role is one of the criteria that can be used to dynamically assign activities to people.

Running Status
The status of a Process Instance based on the number of jobs of a process currently running as opposed to the number of jobs that are ready to run.

S

Security Manager
The module that handles authentication and authorizations of the logged-in users.

Setup Manager
The module that handles the creation and removal of the Monitor tables and triggers.

Starting Time
The timestamp at which a job has been started.

Sub-Process
A subordinate process impeded in another one.

T

Task
An activity in a Business Process that is manipulated by a specified Resource. Visually, Tasks represent the lowest level of work you can portray in a Process.

Translate
The action that converts a process model into a Runtime process template.

Tray
A graphical container represented by a yellow container that shows the Work Items waiting to be processed.

U

User
The employee who belongs to one of the Organization Units in an organization.

User ID
An alphanumeric string that uniquely identifies an MQ Series Workflow user.

W

WBI Monitor
WBI Monitor is a Java-based application developed to allow users monitor and manage their business processes that run on IBM MQ Workflow.

WBI Monitor database

A database contains the process instances data and the historical data

WBI Workbench
WBI Workbench is a Windows-based application developed to allow users model, analyze, and manage their business processes.

Web Client
An HTML client that allows users to monitor the business processes at run-time.

WebSphere
A set of IBM Java-based tools that allow customers to create and manage sophisticated business Web sites. The central WebSphere tool is the WebSphere Application Server (WAS), an application server that a customer can use to connect Web site users with Java applications or servlet.

Work Item
Representation of work to be done in the context of an activity in a process instance.

Work Item Manager
The module that handles all functions related to the Work items data.

Work Item Set Of A User
All work items assigned to a user

Work list
A list of work items assigned to a user and retrieved from a workflow management system

Workflow
The sequence of activities performed in accordance with the business processes of an enterprise.

Workflow Model
Synonym for *process mode*l

Working Duration
The Working Duration of the Process Instance or Activity Instance

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