IBM Predictive Maintenance and Quality
Version 1.0

Installation Guide

Note
Before using this information and the product it supports, read the information in "Notices" on page 59.

Product Information

This document applies to IBM Predictive Maintenance and Quality 1.0 and may also apply to subsequent releases.

Licensed Materials - Property of IBM

© Copyright IBM Corporation 2013.
US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

Introduction v

Chapter 1. IBM Predictive Maintenance and Quality 1
Solution architecture 2

Chapter 2. Installation planning and preparation 5
Supported operating systems and hardware requirements 5
Ensuring that the required operating system packages are installed 6
Verifying that the Legacy UNIX compatibility package is installed 7
Installing prerequisite operating system packages on the BI node computer 8
Installation of Perl on the MDM node computer 8
Installing IBM Data Server Driver on the ESB node computer 9
Disabling SELinux on all target computers 9
Computer firewall settings required for the installation 9
Configuring your firewall settings for the **Deployment Wizard** 10
Configuring your firewall settings for the Data node installation and configuration 10
Disabling your computer's firewall during the installation 11
Mounting the USB hard disk drive 11
Verifying that your servers prerequisites are met 11

Chapter 3. Installation of the server components 13
Installation process 13
Starting the installer for the server components 14
Setting port numbers for the **Deployment Wizard** to use 14
Installing or selecting a database instance 15
Specifying the target computers to install the server components 15
Configuring parameters for the server components installation 16
Starting the installation 22
Configure the server components and test the installation 22
Testing the database installation and configuration 22
Configuring WebSphere Application Server for IBM Cognos BI 23
Saving your IBM Cognos Configuration settings and starting the services 24
Setting the password for the **mqm** user on the ESB node computer 24
Testing the installation of the server components 25
Computer firewall settings to run the server components 25
Configuring your firewall settings for all nodes 25
Configuring your firewall settings for the Analytics node computer 26
Configuring your firewall settings for the BI node computer 27
Configuring your firewall settings for the ESB node computer 28
Configuring your firewall settings for the MDM node computer 28
Configuring your firewall settings for the Data node computer 29

Chapter 4. Installation of the server artifacts 31
Starting the installer for the server artifacts 31
Setting port numbers for the **Deployment Wizard** to use 31
Specifying the target computers on which you will install the server artifacts 32
Configuring parameters for the server artifacts installation 33
Starting the installation of the server artifacts 36
Complete the configuration of the server components 36
Verifying the configuration of IBM SPSS Collaboration and Deployment Services 36
Configuring the MDM node 37

Chapter 5. Installation of the client components 39
Client components 39

© Copyright IBM Corp. 2013

Starting the installer for the client components 40
Installing IBM SPSS Collaboration and Deployment Services Deployment Manager 40
Adding a content server connection for IBM SPSS Collaboration and Deployment Services 41
Adding users and groups to IBM SPSS Collaboration and Deployment Services 41
Importing the Predictive Maintenance and Quality resource definitions into IBM SPSS Collaboration and Deployment Services 43
Adding credential definitions to IBM SPSS Collaboration and Deployment Services 43
Adding server definitions to IBM SPSS Collaboration and Deployment Services 44
Creating scoring configurations 44

Chapter 6. Uninstallation of the IBM Predictive Maintenance and Quality components 47
Uninstalling components from the Predictive Analytics node computer 47
Uninstalling components from the BI node computer 47
Uninstalling components from the ESB node computer 48
Uninstalling components from the MDM node computer 48
Uninstalling components from the Data node computer 49

Appendix A. Samples 51
Loading the sample data 51
Removing sample data 51

Appendix B. Products installed with IBM Predictive Maintenance and Quality 53

Appendix C. Troubleshooting 55
Log in as **root** rather than **su** or **sudo** 55
Browser not supported for the Launchpad 55
Installer does not launch 55
Test Connections validation errors 55
Viewing log files. 56
Temporary file locations 56
Ensuring connectivity between the Analytics node and the Data node computers 56
Modeler Server type not displaying in resource definitions 56
Unable to import the company archive in MDM 56
Error installing IBM Cognos BI in IBM Predictive Maintenance and Quality 57
Administration tool and product portal reference 57

Notices 59

Introduction

IBM® Predictive Maintenance and Quality uses data from multiple sources to give you the information that you need to make informed operational, maintenance, repair, or component replacement decisions.

IBM Predictive Maintenance and Quality provides you with operational intelligence data, which enables you to:

- Understand, monitor, predict, and control product and process variability
- Perform in-depth root cause failure analysis
- Identify incorrect operating practices
- Enhance equipment and process diagnostics capabilities

It also provides you with asset performance management capabilities that enable you to:

- Have forward visibility into equipment and process performance
- Increase asset uptime
- Identify safety issues
- Identify improper maintenance procedures
- Optimize maintenance intervals and procedures.

Audience

This document is intended to help users install Predictive Maintenance and Quality.

Finding information

To find IBM Predictive Maintenance and Quality product documentation on the web, go to the IBM Predictive Maintenance and Quality information center (http://pic.dhe.ibm.com/infocenter/pmq/v1r0m0/index.jsp).

Accessibility features

Accessibility features help users who have a physical disability, such as restricted mobility or limited vision, to use information technology products. Some of the components included in the IBM Predictive Maintenance and Quality solution have accessibility features.

IBM Predictive Maintenance and Quality HTML documentation has accessibility features. PDF documents are supplemental and, as such, include no added accessibility features.

Forward-looking statements

This documentation describes the current functionality of the product. References to items that are not currently available may be included. No implication of any future availability should be inferred. Any such references are not a commitment, promise, or legal obligation to deliver any material, code, or functionality. The development, release, and timing of features or functionality remain at the sole discretion of IBM.

© Copyright IBM Corp. 2013

Chapter 1. IBM Predictive Maintenance and Quality

With IBM Predictive Maintenance and Quality, you can monitor, analyze, and report on information that is gathered from devices. In addition, recommendations for actions can be generated by IBM Predictive Maintenance and Quality.

IBM Predictive Maintenance and Quality is an integrated solution that you can use to perform the following tasks:

- Predict the failure of an instrumented asset so that you can prevent costly unexpected downtime.
- Quickly mine maintenance logs to determine the most effective repair procedures and maintenance cycles.
- Identify the root cause of asset failure faster so that you can take corrective actions.

Instrumented assets generate data such as device ID, timestamp, temperature, and status code. This data can be collected and used in models that predict when an asset is likely to fail.

Examples of instrumented assets are manufacturing equipment, mining equipment, drilling equipment, farming equipment, security equipment, cars, trucks, trains, helicopters, engines, cranes, oil platforms, and wind turbines.

For example, an oil refinery is a system that combines thousands of interlocking pieces. It is critical that such a system is able to work safely and efficiently. You can use IBM Predictive Maintenance and Quality to monitor and track the lifecycle of each piece of the refinery, such as each pipe, pump, compressor, valve, furnace, turbine, tank, heat exchange unit, and boiler. Reports give you the information to ensure that you have the right parts available and can schedule repairs during downtimes.

Predictive maintenance

In predictive maintenance, you look for patterns in the usage and environmental information for equipment that correlate with failures that take place. This information is used to create predictive models to score incoming new data. You can predict the likelihood of failure. Scores are generated from this information that give you an indication of the health of the piece of equipment. In addition, key performance indicators (KPIs) are collected, which are used for reporting. KPIs help you to identify assets that do not conform to normal patterns of behavior. You can define rules to generate recommendations when a piece of equipment is identified as having a high probability of failure. Recommendations can be fed into other systems so that people are alerted to them automatically.

Predictive quality in manufacturing

Past operations data, environmental data, and historical defect data can be used to identify the causes of elevated defect rates. This information is used in predictive models, so that when incoming data is fed into the models, you can predict the likely defect rates. The predicted values are then used for analysis and reporting and to drive recommendations such as modification to inspection patterns, or recalibration of machinery. Scoring can be done on a near real-time basis.

© Copyright IBM Corp. 2013

Solution architecture

The IBM Predictive Maintenance and Quality solution is divided into nodes, where each node provides a specific function for the solution. Each node must be installed on a separate computer or on a separate virtual machine image from other nodes.

For a complete list of products included with Predictive Maintenance and Quality, see Appendix B, "Products installed with IBM Predictive Maintenance and Quality," on page 53.

The following diagram shows the nodes.

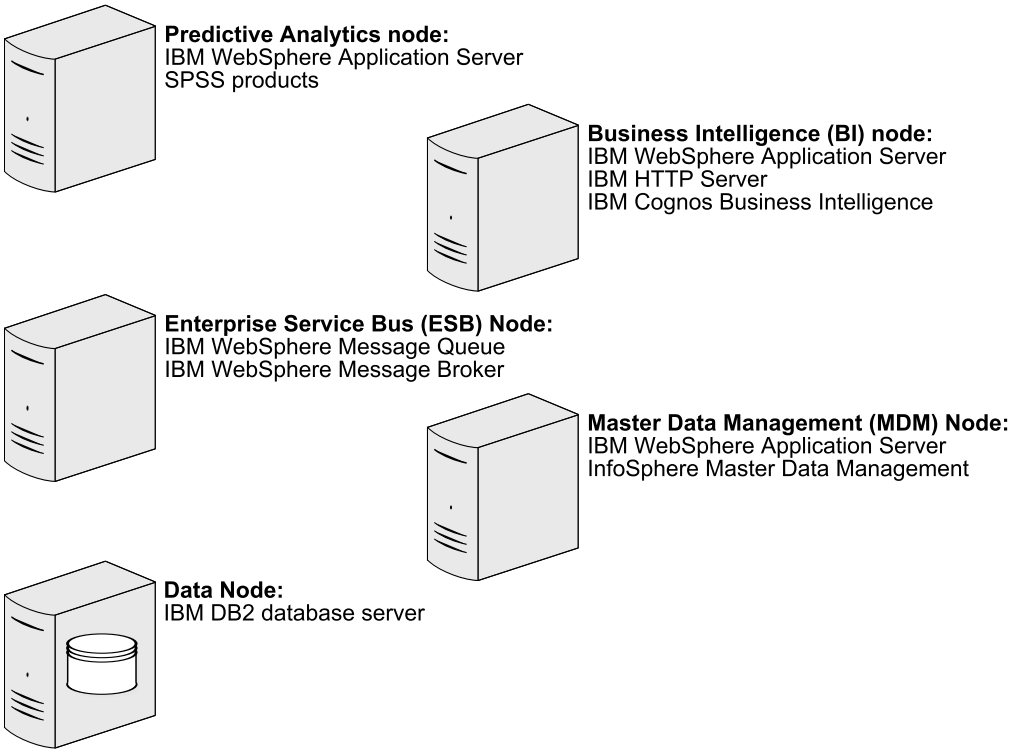

Figure 1. Predictive Maintenance and Quality nodes

Predictive Analytics node

The Analytics node in provides predictive scores and offers recommendations.

This node has the following software installed:

- IBM WebSphere® Network Deployment
- IBM SPSS® Collaboration and Deployment Services
- IBM SPSS Modeler Server
- IBM SPSS Data Access Pack
- IBM SPSS Text Analytics Server
- IBM SPSS Modeler Collaboration and Deployment Services Adapter
- IBM SPSS Decision Management
- IBM SPSS Statistics Server
- IBM SPSS Statistics Collaboration and Deployment Services Adapter

- IBM DB2® Client

Business Intelligence (BI) node

The BI node provides dashboards and reports.

This node has the following software installed:

- IBM WebSphere Network Deployment
- IBM HTTP Server
- IBM Cognos® Business Intelligence
- IBM DB2 Client

Enterprise Service Bus (ESB) node

The ESB node server processes events, updates the content for IBM Cognos Business Intelligence, and triggers predictive scoring and decision management. It also loads master data into the solution.

This node has the following software installed:

- IBM WebSphere Message Queue
- IBM WebSphere Message Broker
- IBM WebSphere Message Broker Explorer
- IBM WebSphere Message Broker ODBC Database Extender

Master Data Management (MDM) node

The MDM node manages the master data for the solution. The master data includes the set of devices that supply events to the solution and their locations. It also includes metadata that is used to determine how events are processed by the solution.

This node has the following software installed:

- IBM WebSphere Network Deployment
- IBM InfoSphere® Master Data Management Collaboration Edition
- IBM DB2 Client

Data node

The Data node provides the database server that contains the databases that are used by other products in the solution. The database acts as an event store and holds calculated key performance indicators (KPIs) and profiles. It also contains supporting master data for the solution.

This node has the following software installed:

- IBM DB2 Enterprise Server Edition

Chapter 2. Installation planning and preparation

Before you install IBM Predictive Maintenance and Quality, ensure that the computers that you use meet the minimum requirements for operating systems, prerequisite software, processing, and disk space.

You must also install additional prerequisite software on some computers, including the Business Intelligence (BI) node, the Master Data Management (MDM) node, and the Enterprise Service Bus (ESB) node computers.

Important: The computers or virtual machines that you use for Predictive Maintenance and Quality nodes must not have any of the included software already installed.

Critical installation and configuration issues

To review a list of critical installation and configuration issues for IBM Predictive Maintenance and Quality version 1.0 as of the date of release, see the document titled Critical installation and configuration issues for IBM Predictive Maintenance and Quality version 1.0 (http://www.ibm.com/support/docview.wss?uid=swg21637185).

Supported operating systems and hardware requirements

Review the minimum hardware and operating system requirements before you install IBM Predictive Maintenance and Quality. The requirements apply for all computers or virtual machines that you use for the installation.

Server computers

The IBM Predictive Maintenance and Quality server components must be installed on computers that are running the 64-bit Red Hat Enterprise Linux Server Edition version 6.3 (x86_64) operating system.

You must have the **Legacy UNIX compatibility** package installed. The package is selected when the operating system is set up. The components of this package must be installed on each computer or virtual machine image on which you install a Predictive Maintenance and Quality node.

Hardware requirements

At a minimum, each computer or virtual machine that is hosting a Predictive Maintenance and Quality server component, or node, must have the following hardware requirements:

- 4 processors
- 8 GB of RAM
- 500 GB of hard disk space

Each node must be installed on a separate computer or on a separate virtual machine image.

User requirements

© Copyright IBM Corp. 2013

You must have **root** access to all of the computers on which you install a Predictive Maintenance and Quality node. Each computer on which you install a node must have remote **root** log in enabled.

You must log in to the computer where you run the installer as **root**.

Client computers

The Predictive Maintenance and Quality client components must be installed on computers that are running Microsoft Windows 7 64-bit operating systems.

Ensuring that the required operating system packages are installed

Specific operating system packages must be installed on each computer or virtual machine where you install an IBM Predictive Maintenance and Quality node.

Ensure that the following packages are installed:

- libXext-1.1-3.el6.i686.rpm
- libXft-2.1.13-4.1.el6.i686.rpm
- libXi-1.3-3.el6.i686.rpm
- libXp-1.0.0-15.1.el6.i686.rpm
- libXpm-3.5.8-2.el6.i686.rpm
- libXrender-0.9.5-1.el6.i686.rpm
- libXtst-1.0.99.2-3.el6.i686.rpm
- compat-libstdc++-33-3.2.3-69.el6.i686.rpm
- compat-libstdc++-296-2.96-144.el6.i686.rpm
- expat-2.0.1-11.el6_2.i686.rpm
- fontconfig-2.8.0-3.el6.i686.rpm
- freetype-2.3.11-6.el6_2.9.i686.rpm
- libstdc++-4.4.6-4.el6.i686.rpm
- libX11-1.3-2.el6.i686.rpm
- libXau-1.0.5-1.el6.i686.rpm
- libxcb-1.5-1.el6.i686.rpm
- libICE-1.0.6-1.el6.i686.rpm
- libuuid-2.17.2-12.7.el6.i686.rpm
- libSM-1.1.0-7.1.el6.i686.rpm
- libXt-1.0.7-1.el6.i686.rpm
- libXmu-1.0.5-1.el6.i686.rpm
- libjpeg-6b-46.el6.i686.rpm
- libpng-1.2.49-1.el6_2.i686.rpm
- zlib-1.2.3-27.el6.i686.rpm
- glibc-2.12-1.80.el6.i686.rpm
- openmotif-2.3.3-4.el6.i686.rpm

Procedure

1. Log in as **root**.
2. Type the following command to verify that an operating system package is installed:

`rpm -qi full_package_name`

For example, to verify that `libXext-1.1-3.el6.i686` is installed, type `rpm -qi libXext-1.1-3.el6.i686`.

3. Install any package that is not already installed.

   You must download any missing package, and then install the downloaded package by typing the following command:

   `rpm -ihv full_package_name.rpm`

   For example, to install `libXext-1.1-3.el6.i686`, type `rpm -ihv libXext-1.1-3.el6.i686.rpm`.

4. Repeat these steps on each computer on which you install a Predictive Maintenance and Quality node.

Verifying that the Legacy UNIX compatibility package is installed

Legacy UNIX compatibility must be installed on each computer or virtual machine where you install an IBM Predictive Maintenance and Quality node.

You must verify that the following packages are installed:

- `authd-1.4.3-30.el6.x86_64.rpm`
- `cups-lpd-1.4.2-48.el6.x86_64.rpm`
- `dump-0.4-0.6.b42.el6.x86_64.rpm`
- `finger-0.17-39.el6.x86_64.rpm`
- `finger-server-0.17-39.el6.x86_64.rpm`
- `krb5-appl-servers-1.0.1-7.el6_2.1.x86_64.rpm`
- `ksh-20100621-16.el6.x86_64.rpm`
- `mksh-39-7.el6.x86_64.rpm`
- `ncompress-4.2.4-54.el6_2.1.x86_64.rpm`
- `rsh-0.17-60.el6.x86_64.rpm`
- `rsh-server-0.17-60.el6.x86_64.rpm`
- `rusers-0.17-61.el6.x86_64.rpm`
- `rusers-server-0.17-61.el6.x86_64.rpm`
- `rwho-0.17-34.el6.x86_64.rpm`
- `talk-0.17-34.el6.x86_64.rpm`
- `talk-server-0.17-34.el6.x86_64.rpm`
- `tcp_wrappers-7.6-57.el6.x86_64.rpm`
- `telnet-0.17-47.el6.x86_64.rpm`
- `telnet-server-0.17-47.el6.x86_64.rpm`
- `tftp-0.49-7.el6.x86_64.rpm`
- `xinetd-2.3.14-34.el6.x86_64.rpm`

Procedure

1. Log in as **root**.
2. Type the following command to verify that an operating system package is installed:

   `rpm -qi full_package_name`

   For example, to verify that `authd-1.4.3-30.el6.x86_64` is installed, type `rpm -qi authd-1.4.3-30.el6.x86_64`.

3. Install any package that is not already installed.

   You must download any missing package, and then install the downloaded package by typing the following command:

   `rpm -ihv full_package_name.rpm`

   For example, to install `authd-1.4.3-30.el6.x86_64`, type `rpm -ihv authd-1.4.3-30.el6.x86_64.rpm`.
4. Repeat these steps on each computer on which you install a Predictive Maintenance and Quality node.

Installing prerequisite operating system packages on the BI node computer

Specific operating system packages must be installed on the Business Intelligence (BI) node computer or virtual machine before you install IBM Predictive Maintenance and Quality.

The following packages must be installed:

- `libselinux-2.0.94-5.3.el6.i686.rpm`
- `cracklib-2.8.16-4.el6.i686.rpm`
- `db4-4.7.25-17.el6.i686.rpm`
- `audit-libs-2.2-2.el6.i686.rpm`
- `pam-1.1.1-13.el6.i686.rpm`

Procedure

1. Log in to the BI node computer as **root**.
2. Type the following command to verify that an operating system package is installed:

   `rpm -qi full_package_name`

   For example, to verify that `libselinux-2.0.94-5.3.el6.i686` is installed, type `rpm -qi libselinux-2.0.94-5.3.el6.i686`.
3. Install any package that is not already installed.

   You must download any missing package, and then install the downloaded package by typing the following command:

   `rpm -ihv full_package_name.rpm`

   For example, to install `libselinux-2.0.94-5.3.el6.i686`, type `rpm -ihv libselinux-2.0.94-5.3.el6.i686.rpm`.

   Important: To install `pam-1.1.1-13.el6.i686.rpm`, use the following command: `rpm --force -ivh pam-1.1.1-13.el6.i686.rpm`.

Installation of Perl on the MDM node computer

You must install a version of Perl on the Master Data Management (MDM) node computer for IBM Predictive Maintenance and Quality.

In the **Deployment Wizard**, you are prompted for a location on the MDM node computer where you installed Perl.

For more information about installing Perl for IBM InfoSphere Master Data Management, see the MDM documentation(pic.dhe.ibm.com/infocenter/mdm/v10r1/index.jsp?topic=%2Fcom.ibm.pim.ins.doc%2Fpim_tsk_installingperl.html).

Note: For IBM Predictive Maintenance and Quality, the minimum version of Perl is 5.10.

Installing IBM Data Server Driver on the ESB node computer

Before you can deploy IBM Predictive Maintenance and Quality, you must install the IBM Data Server Driver for ODBC and CLI on the Enterprise Service Bus (ESB) node computer.

Procedure

1. Go to the IBM driver and client download page (www.ibm.com/support/docview.wss?uid=swg21385217).
2. Click the link for **IBM Data Server Driver for ODBC and CLI (CLI Driver)**.
3. If prompted, log in with your IBM account.
4. Select **IBM Data Server Driver for ODBC and CLI (Linux AMD64 and Intel EM64T)**.
5. Click **Continue**, and download the driver.
6. Go to the directory where you downloaded the driver.
7. Type the following command to extract the files:

   ```
   tar -zxf ibm_data_server_driver_for_odbc_cli_linuxx64_v10.1.tar.gz
   ```

   The files are extracted to the `odbc_cli/clidriver` directory.
8. Copy the `odbc_cli` directory to the `var` directory to match the default location in the server installer. For example, ensure the path is `/var/odbc_cli`.

Disabling SELinux on all target computers

You must disable the Security-Enhanced Linux (SELinux) feature on all computers where you install an IBM Predictive Maintenance and Quality node.

Procedure

1. Log in as **root**.
2. Go to the `/etc/sysconfig` directory.
3. Type `sestatus` to verify that the SELinux feature is disabled.
4. If the SELinux feature is not disabled, open the `selinux` file for editing.
5. Change the `SELINUX` value to `disabled`.

   For example, the file should include:

   ```
   SELINUX=disabled
   ```
6. Save and close the file.
7. Restart the computer for the changes to take effect.
8. Repeat these steps on each computer on which you install a Predictive Maintenance and Quality node.

Computer firewall settings required for the installation

The **Deployment Wizard** requires bidirectional communication with each IBM Predictive Maintenance and Quality node when you install a server component or server artifact component, and your firewall can interfere with this communication. To unsure this communication, you must configure your firewall settings for the installation.

Configuring your firewall settings for the Deployment Wizard

On each computer on which you will install an IBM Predictive Maintenance and Quality node, you must open two ports to allow the bidirectional communication that is required by the **Deployment Wizard**. After you open the ports in your firewall, you can then enter these port values in the **Deployment Wizard**.

Procedure

1. Log in as **root**.
2. Back up your existing firewall settings by typing the following command:

   ```
   /etc/init.d/iptables save
   ```

3. Add rules for the two ports that are required by the **Deployment Wizard** with the following command:

   ```
   iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport 35000 -j ACCEPT
   iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport 30000 -j ACCEPT
   ```

   Where port **35000** and **30000** are available port numbers on your computers. You do not have to use these port numbers, but you must use available port numbers.

   If you do not use ports **35000** and **30000**, ensure that you change only the port number values in the commands.

   Tip: Using the same port numbers for each target computer is recommended.
4. Type the following command to save your firewall settings:

   ```
   /etc/init.d/iptables save
   ```

5. Type the following command to restart your firewall.

   ```
   /etc/init.d/iptables restart
   ```

6. Verify that your changes have been applied with the following command:

   ```
   iptables -L
   ```

   The added port should appear in the list.
7. Repeat these steps on each computer on which you install a Predictive Maintenance and Quality node, and on the computer from where you run the installation if it is not one of the node computers.

Configuring your firewall settings for the Data node installation and configuration

Before you can install and configure the IBM Predictive Maintenance and Quality Data node, you must ensure that the database server port number is open on the Data node computer.

Procedure

1. Log in to the Data node computer as **root**.
2. Back up your existing firewall settings by typing the following command:

   ```
   /etc/init.d/iptables save
   ```

3. Add rules for the port with the following command:

   ```
   iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport port_number -j ACCEPT
   ```

   For example, to open **50000**, type the following command

   ```
   iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport 50000 -j ACCEPT
   ```

   Note: If you are using a port number other than 50000 for your database server, ensure you open the appropriate port number.

4. Type the following command to save your firewall settings:
   `/etc/init.d/iptables save`
5. Type the following command to restart your firewall.
   `/etc/init.d/iptables restart`
6. Verify that your changes have been applied with the following command:
   `iptables -L`
   The added ports should appear in the list.

Disabling your computer's firewall during the installation

If you choose to temporarily disable your computer's firewall during the installation of IBM Predictive Maintenance and Quality, ensure that you enable the firewall on each node after the installation is complete.

Important: If you disable your computer's firewall during the installation, you must still ensure that the required ports are opened on each node computer when you restart your firewall.

Procedure

1. Log in as the **root** user.
2. Go to the `/etc/init.d` directory.
3. Type the following command:
   `iptables stop`
4. Repeat these steps on each computer on which you install a node and on the server from which you are running the installation.

What to do next

After the installation is complete, on each node, go to the `/etc/init.d` directory, and type `iptables start` to restart your firewall.

Mounting the USB hard disk drive

The installation files for IBM Predictive Maintenance and Quality are provided on a universal serial bus (USB) hard disk drive. You can run the installation from the USB or you can copy the files to your computer before you start the installation. Before you do either, you must mount the USB hard disk drive.

For more information about mounting USB hard disk drives, see the Red Hat Customer Portal (https://access.redhat.com/home).

Verifying that your servers prerequisites are met

Scripts are provided to help you ensure that the computers on which you install an IBM Predictive Maintenance and Quality node meet the minimum requirements.

The following scripts are provided:

CheckPkg.sh
: Verifies that the required `rpm` packages are installed on the computer. The `rpm` names are listed in the `packages.lst` file.

CheckDB2.sh
: Verifies the version, installation location, instance name, and status of an existing IBM DB2 server.

CheckPaf.sh
Verifies the operating system, disk space, memory, and number of processors for computer.

checkport.sh
Verifies that a port is open on the computer firewall. For example, on the Data node computer, type `./checkport.sh 50000` to ensure that port 50000 is open on that computer.

CheckRemotePort.sh
Verifies that a port is open on a remote computer's firewall. For example, to verify that the database server port number is open on the Data node computer, type `./CheckRemotePort.sh` *`data_node_name`* `50000` to ensure that port 50000 is open on that computer. *data_node_name* can be the fully qualified domain name or IP address of the Data node computer.

CheckUser.sh
Verifies that the current user is **`root`**.

CheckWAS.sh
Tests if WebSphere Application Server is installed on a node computer. If installed, the version, build level and date, and installation location are displayed.

Procedure

1. In a terminal window, go to the USB hard disk drive that you mounted or to the directory where you copied the installation files.
2. In a terminal window, go to the USB hard disk drive that you mounted or to the directory where you copied the installation files.
3. Go to the `Prerequisite Checker` directory.
4. Copy the scripts to each computer on which you want to verify that the prerequisites are met.
5. Run the scripts as required.

Chapter 3. Installation of the server components

The installation program installs the required software on each computer that you identify as an IBM Predictive Maintenance and Quality node. The installation program can be run from one of the computers that will be a node, or it can be run from another computer.

Installation process

With the IBM Predictive Maintenance and Quality installation program, you can select the individual computers on which each solution node is to be installed and enter configuration information for each software component.

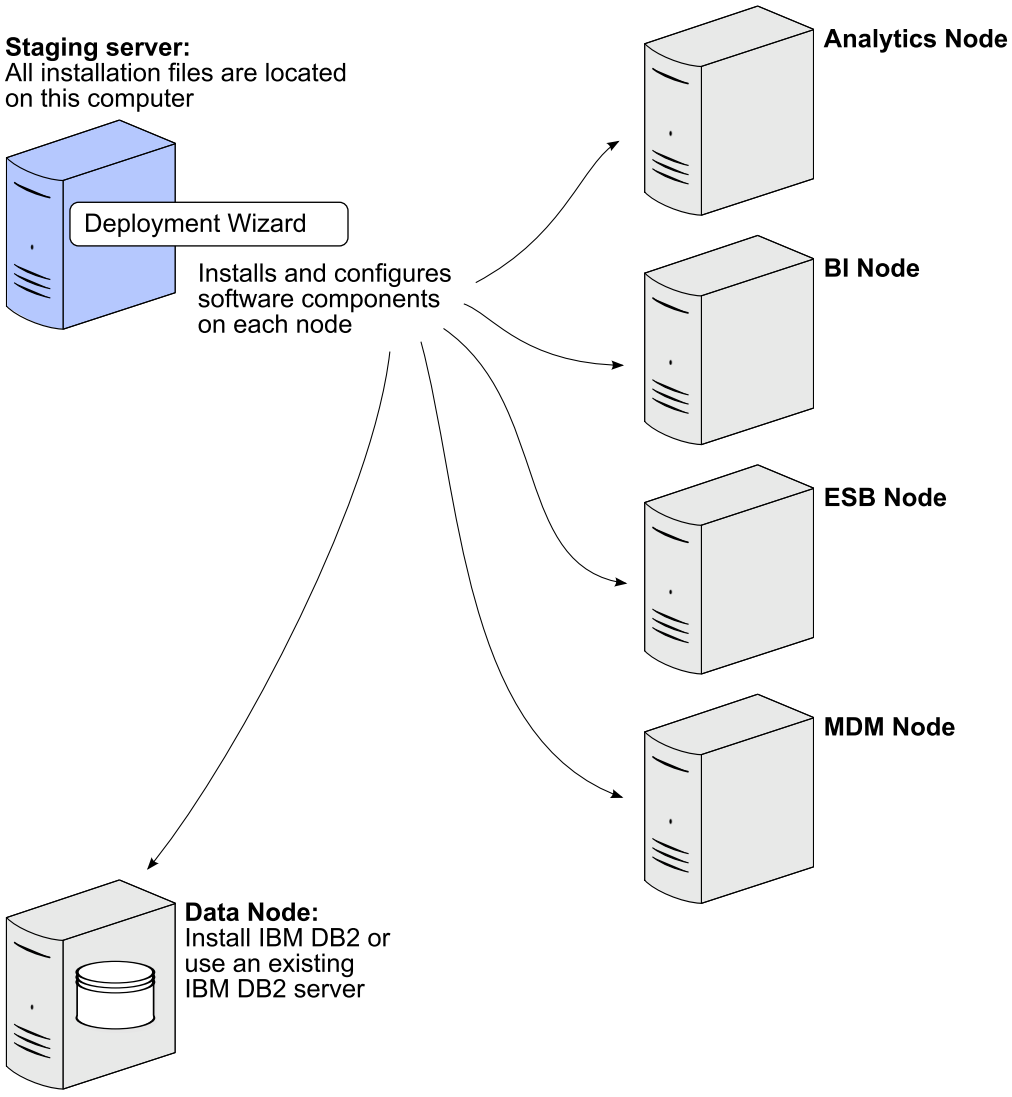

Figure 2. Predictive Maintenance and Quality installation process

In the diagram, the staging server represents the computer from which you run the installation. In your installation, the staging server can also be used as a node

© Copyright IBM Corp. 2013

computer. The staging server must also be using the same operating system as the other computers on which you install a node. It must also have the same prerequisites.

Starting the installer for the server components

Use the Launchpad to start the IBM Predictive Maintenance and Quality server installer.

Before you begin

Ensure that you are logged in as **root**.

You must have a Firefox, version 10 or earlier, or SeaMonkey, version 2.9 or earlier, web browser installed and set as your default web browser on the computer from where you run the installation.

Procedure

1. In a terminal window, go to the USB hard disk drive that you mounted or to the directory where you copied the installation files.
2. Go to the `ServerInstaller/disk1` directory.
3. Type the following command to change the permissions for the installation files:

   ```
   chmod -R 755 *
   ```
4. Enter the following command:

   ```
   ./launchpad.sh
   ```
5. Review the information in the Launchpad panels.
6. To start the **Deployment Wizard**, click **Install Server** > **Predictive Maintenance and Quality Server Installer**.

Setting port numbers for the Deployment Wizard to use

If you opened ports for the installation of IBM Predictive Maintenance and Quality components, you must set those port numbers in the **Deployment Wizard**.

Procedure

1. In the **Deployment Wizard**, click **Edit** > **Preferences**.

   The **Deployment Preferences** window appears.
2. Enter `30000` in the **Data Port Number** box.

   Important: Ensure that you enter the port number that you opened if you selected a port other than 30000.
3. Enter `35000` in the **Communication Port Number** box.

   Important: Ensure that you enter the port number that you opened if you selected a port other than 35000.
4. If you are using the computer on which you are running the installation as a node, do the following steps:
   a. Click **Target Computer Settings**.
   b. Select **localhost** in the **Target Computer** field.
   c. Enter the communication port number that you set in the **Communication Port** field. For example, enter `35000`.

Note: The **RMI Registry Port** is unavailable if you are using localhost as a node.

Installing or selecting a database instance

IBM Predictive Maintenance and Quality requires a database instance. You can install IBM DB2 from the **Deployment Wizard** or use an existing IBM DB2 instance.

If you are using an existing IBM DB2 instance, it must be IBM DB2 Enterprise Server Edition 9.7 with IBM DB2 9.7 Fix Pack 7.

Procedure

1. Select one of the following options:
   - **Install IBM DB2 Enterprise Server Edition**
   - **Use existing IBM DB2 Enterprise Server Edition**

     If you select this option, IBM DB2 Enterprise Server Edition must already be installed and running on the Data node computer.
2. Click **Next**.

Specifying the target computers to install the server components

You must specify a different target computer for each IBM Predictive Maintenance and Quality node. A node can be installed on a computer or virtual machine, but each node must be installed on a separate computer or virtual machine.

Before you begin

You must have **root** access on each computer on which you install a node.

You might have to change a setting in a configuration file on your target computer to allow the **Deployment Wizard** to access the computer as **root**. Use the following steps if you receive a message that says the connection to the target computer was refused:

1. On the target computer, go to the `/etc/ssh` directory and open `sshd_config` for editing.
2. Change the `PermitRootLogin` property to `yes`.
3. Save the file. You may have to restart the server for the change to take effect.

Procedure

1. On the **Specify Target Computers** pages of the **Deployment Wizard**, enter the name or IP address of the computer on which you install a node in the **Target Computer** box.

   The **Deployment Wizard** prompts you for each node computer.

   If you are installing a node on the computer where you are running the **Deployment Wizard**, you can enter `localhost`.
2. Click **Add**.
   a. When you enter a computer other than `localhost`, in the **Target Computer Credentials** box, enter the **User ID** and **Password** for the **root** user.

      Important: Ensure that you enter the credentials for the **root** user on the target computer.

b. Click **Test Login**.
c. Click **Add**.

   The computer that you entered appears in the **Selected target computers** box.

3. Do the following steps if you opened ports for the installation.
   a. Click **Edit** > **Preferences**.
   b. Click **Target Computer Settings**.
   c. Select the computer name or IP address in the **Target Computer** field.
   d. Enter the communication port number that you set in the **Communication Port** field. For example, enter `35000`.
   e. Enter the Data Port Number that you set in the **RMI Registry Port** field. For example, enter `30000`.

      Note: If you are using localhost as a node in the installation, the **RMI Registry Port** is unavailable.
4. In the **Selected target computers** box, select the target computer, and click **Test Connections**.

   Important: Test Connections tests the connection, tests the credentials, and locates or enables a deployment agent on the target computer. You must have an active deployment agent on each target computer.

   If you receive an error message after you click **Test Connections**, you might have to change some settings on your computers.
   - Edit your iptable settings or temporarily disable your firewall. For more information, see "Computer firewall settings required for the installation" on page 9.
   - Compare and correct your domain name system (DNS) settings for each computer. For example, type `sudo system-config-network`. Select **DNS configuration**, and ensure that your host name domain and DNS search path settings are correct.
   - Ensure that the `/etc/host` file has the correct entries.
5. Click **Next**.
6. Repeat the steps for each computer on which you install a node.

Configuring parameters for the server components installation

The **Deployment Wizard** displays some default values for each component of IBM Predictive Maintenance and Quality. You can accept the default values or change them to suit your environment.

If you are prompted for users, the **Deployment Wizard** creates the users on the appropriate target node computer, if they do not exist. For example, IBM DB2 requires a DB2 administrator user, an instance owner user, and a fenced user. Each of these users is created on the Data node computer.

Procedure

Use the following tables to verify or enter values in each field on each panel of the **Deployment Wizard**:

- Clicking **Browse** browses the target computer's file system. It does not browse the local computer from where you are running the **Deployment Wizard**.

- For some values, such as passwords, default values are not provided. Ensure that you enter all values on each panel of the **Deployment Wizard**.
- On the **Configure IBM DB2 Enterprise Edition** page, enter a name for each database that is to be created by the **Deployment Wizard**.

  Important: Ensure you use a separate database for each product.

  Important: You cannot use the same user for the IBM DB2 administrative user and the instance owner. They must be different users.

Table 1. IBM DB2 configuration parameters for a new database server installation

Field	Default or example value	Description
DB2 Server Installation Directory	`/opt/ibm/db2/V9.7`	The location where IBM DB2 is to be installed on the Data node computer.
DB2 Database Port Number	`50000`	The port number that is used by IBM DB2.
DB2 Server Administrative User Name	`dasusr1`	The user ID that runs the administration server.
DB2 Server Administrative Password	There is no default value for this field.	The password for the user ID that runs the administration server.
DB2 Server Administrative Home Directory	`/home/dasusr1`	The home directory for the user ID that runs the administration server. This directory is on the Data node computer's file system.
DB2 Instance Owner User Name	`db2inst1`	The user ID that controls the DB2 processes and owns the directories that are used by the database instance.
DB2 Instance Owner Password	There is no default value for this field.	The password for the DB2 instance owner user.
DB2 Instance Owner Home Directory	`/home/db2inst1`	The home directory for the DB2 instance owner user. This directory is on the Data node computer's file system.
DB2 Fenced User Name	`db2fenc1`	The user ID that can run user-defined functions and store procedures.
DB2 Fenced Password	There is no default value for this field.	The password for the DB2 instance owner user.
DB2 Fenced User Home Directory	`/home/db2fenc1`	The home directory for the DB2 instance owner user. This directory is on the Data node computer's file system.

Table 2. IBM DB2 configuration parameters for an existing database server

Field	Default or example value	Description
DB2 Installation Location	`/opt/ibm/db2/V9.7`	The location where IBM DB2 is installed on the Data node computer.

Table 2. IBM DB2 configuration parameters for an existing database server (continued)

Field	Default or example value	Description
DB2 Instance Name	`db2inst1`	The name of the instance in which your databases will be created.
DB2 Instance Password	There is no default value for this field.	The password for the DB2 instance owner user.
DB2 Port Number	`50000`	The port number that is used by IBM DB2.

Table 3. IBM DB2 configuration parameters: Database names.
Important: The database names cannot exceed 8 characters.

Field	Default or example value	Description
SPSS Database Name	`SPSSDB`	The SPSS database that is used by the components that are installed on the Predictive Analytics node computer.
Cognos Database Name	`COG102CS`	The IBM Cognos content store database.
MDM Database Name	`MDMDB`	The Master Data Management (MDM) node database.

Table 4. IBM DB2 client parameters.
Note: The values entered are applied to all nodes where the IBM DB2 client is installed.

Field	Default or example value	Description
DB2 Client Installation Directory	`/opt/ibm/db2/V9.7`	The location where the IBM DB2 client is to be installed. This directory is on the MDM node, Business Intelligence (BI) node, and Analytics node computer's file system.
DB2 Client Instance User Name	`db2inst1`	The user ID for the DB2 client.
DB2 Client Instance Password	There is no default value for this field.	The password for the DB2 client instance owner user.
DB2 Client Instance Home Directory	`/home/db2inst1`	The home directory for the DB2 client instance owner user on each node.

Table 5. WebSphere installation parameters

Field	Default or example value	Description
WebSphere Installation Directory	`/opt/IBM/WebSphere/AppServer`	The location where the WebSphere Application Server is to be installed. The location is the same for each node where WebSphere is installed.

Table 6. HTTP Server installation parameters

Field	Default or example value	Description
HTTP Server Installation Directory	`/opt/IBM/HTTPServer`	The location where IBM HTTP Server is to be installed. This directory is on the BI node computer's file system.
HTTP Port Number	`80`	The port number that is used by HTTP Server.

Table 7. IBM Cognos BI installation parameters

Field	Default or example value	Description
Cognos BI Installation Location	`/opt/ibm/cognos/c10_64`	The location where IBM Cognos BI is to be installed. This directory is on the BI node computer's file system.

Table 8. WebSphere profile for IBM Cognos BI parameters.
Note: The settings in this table are applied to the WebSphere installation on the BI node.

Field	Default or example value	Description
WebSphere Profile Location	`/opt/IBM/WebSphere/AppServer/profiles`	The location where the WebSphere profile is to be created. This directory is on the BI node computer's file system.
WebSphere Profile Name	`COGNOSProfile`	The name of the WebSphere profile that is used for IBM Cognos BI.
WebSphere Host Name	This value is automatically entered.	The name or IP address of the BI node computer.
WebSphere Profile template location	`/opt/IBM/WebSphere/AppServer/profileTemplates/default`	The location where the WebSphere profile templates are located.

Table 9. IBM Cognos BI Server parameters

Field	Default or example value	Description
Database Host Name	This value is automatically entered.	The name or IP address of the Data node computer.
WebSphere Host Name	This value is automatically entered.	The name or IP address of the BI node.
Cognos Dispatcher Application Server Port	`9080`	The HTTP transport port number for the WebSphere Application Server where IBM Cognos is running.
Database Server Host Name	This value is automatically entered.	The name or IP address of the Data node.

Table 10. WebSphere Message Broker installation parameters

Field	Default or example value	Description
WebSphere Message Broker Installation Location	`/opt/ibm/mqsi/8.0.0.1`	The location where WebSphere Message Broker is to be installed. This directory is on the Enterprise Service Bus (ESB) node computer's file system.
WMB ODBC Database Extender Install Location	`/opt/ibm/IE02/2.0.0`	The location where WebSphere Message Broker ODBC Database Extender is to be installed. This directory is on the Enterprise Service Bus (ESB) node computer's file system.
WebSphere Message Broker Explorer Installation Directory	`/opt/IBM/MBExplorer`	The location where WebSphere Message Broker Explorer is to be installed. This directory is on the Enterprise Service Bus (ESB) node computer's file system.

Table 11. WebSphere Message Broker and Queue installation parameters

Field	Default or example value	Description
ESB Deployment Location	`/var/PMQ`	The location where Predictive Maintenance and Quality files can be placed.
Location of the IBM Data Server Driver for ODBC and CLI	`/var/odbc_cli`	The location where you downloaded the IDM Data Server Driver. This directory is on the ESB node computer's file system.
Broker Name	`pmqbroker`	The broker to be created.
Queue Manager Name	`pmqmanager`	The Queue Manager name to be created.
Execution Group	`pmqgroup`	The name of a group of message flows that are assigned to a broker
Specify Database Node IP Address	This value is automatically entered.	The name of IP address of the Data node computer.

Table 12. WebSphere Message Broker installation parameters

Field	Default or example value	Description
MDM Collaboration Server Installation Directory	`/opt/IBM/MDMPIM`	The location where Master Data Management Collaboration Server is to be installed. This directory is on the MDM node computer's file system.

Table 13. InfoSphere Master Data Management parameters

Field	Default or example value	Description
WebSphere Profile Location	`/opt/IBM/WebSphere/AppServer/profiles`	The location where the WebSphere profile is to be created. This directory is on the MDM node computer's file system.
WebSphere Profile Name	`MDMProfile`	The name of the WebSphere profile that is used for InfoSphere Master Data Management.
WebSphere Host Name	This value is automatically entered.	The name or IP address of the MDM node computer.
Default WebSphere Template Path	`/opt/IBM/WebSphere/AppServer/profileTemplates/default`	The location where the WebSphere profile templates are located.
MDM DB2 Host Name	This value is automatically entered.	The name or IP address of the Data node computer.
Perl Installation Directory	`/opt/ActivePerl-5.16`	The location where you installed Active Perl. This location on the MDM node computer.

Table 14. IBM SPSS Collaboration and Deployment Server parameters

Field	Default or example value	Description
SPSS Collaboration and Deployment Services Installation Directory	`/opt/IBM/SPSS/Deployment/5.0/Server`	The location where IBM SPSS Collaboration and Deployment Services is to be installed. This location is on the Analytics node computer's file system.
WebSphere Profile Location	`/opt/IBM/WebSphere/AppServer/profiles`	The location where the WebSphere profile is to be created. This directory is on the Analytics node computer's file system.
WebSphere Profile Default Template Location	`/opt/IBM/WebSphere/AppServer/profileTemplates/default`	The location where the WebSphere profile templates are located. This directory is on the Analytics node computer's file system.
WebSphere Profile Name	`SPSSProfile`	The name of the WebSphere profile that is used for the SPSS products.
WebSphere Host Name	This value is automatically entered.	The name or IP address of the Analytics node computer.
SPSS DB2 Database Host Name	This value is automatically entered.	The name or IP address of the Data node computer.
Modeler Server Installation Directory	`usr/IBM/SPSS/ModelerServer/15.0`	The directory where the IBM SPSS Modeler Server is to be installed. This directory is on the Analytics node computer.

Table 14. IBM SPSS Collaboration and Deployment Server parameters (continued)

Field	Default or example value	Description
SPSS Collaboration and Deployment Services Enterprise Viewer Installation Directory	`/opt/IBM/SPSS/Deployment/5.0/EnterpriseViewDriver`	The directory where the IBM SPSS Collaboration and Deployment Services Enterprise View Driver is to be installed. This directory is on the Analytics node computer.
SPSS Collaboration and Deployment Services Python Installation Directory	`/opt/IBM/SPSS/Deployment/5.0/PythonEssentials`	The directory where the IBM SPSS Collaboration and Deployment Services Python Scripting Essentials is to be installed. This directory is on the Analytics node computer.
SPSS Data Access Pack Installation Directory	`/root/SDAP61`	The directory where the IBM SPSS Data Access Pack is to be installed. This directory is on the Analytics node computer.
SPSS Statistics Installation Directory	`/opt/IBM/SPSS/StatisticsServer21`	The directory where the IBM SPSS Statistics Server is to be installed. This directory is on the Analytics node computer.

Starting the installation

After you enter all of the required fields in the **Deployment Wizard**, you can start the installation and configuration of the IBM Predictive Maintenance and Quality components.

Procedure

On the **Summary Panel** of the **Deployment Wizard**, click **Deploy all**.

Note: If you choose to deploy the tasks individually, you must click **Deploy task** for each task in the order that the tasks appear on the **Summary** panel.

Configure the server components and test the installation

After the installation of the IBM Predictive Maintenance and Quality server components is complete, you must perform some additional configuration tasks and then test the installation.

Testing the database installation and configuration

You can test the database installation and configuration by logging in to the Data node computer and listing the databases on the server. You can also list the databases available on each node computer where the IBM DB2 client was installed.

Procedure

1. Log on to the Data node computer.
   a. Open a terminal window, and change to the database instance owner user. For example, `su - db2inst1`.

b. Enter the following command to list the databases on the computer:

   `db2 list database directory`

   The following databases are listed:

   - `COG102DB`
   - `MDMDB`
   - `SPSSDB`

2. Log on to the Business Intelligence (BI) node computer.
   a. Open a terminal window, and change to the database client user. For example, `su - db2inst1`.
   b. Enter the following command to list the databases on the computer:

      `db2 list database directory`

      `COG102DB` is listed.
3. Log on to the Predictive Analytics node computer.
   a. Open a terminal window, and change to the database client user. For example, `su - db2inst1`.
   b. Enter the following command to list the databases on the computer:

      `db2 list database directory`

      `SPSSDB` is listed.
4. Log on to the Master Data Management (MDM) node computer.
   a. Open a terminal window, and change to the database client user. For example, `su - db2inst1`.
   b. Enter the following command to list the databases on the computer:

      `db2 list database directory`

      `MDMDB` is listed.

Configuring WebSphere Application Server for IBM Cognos BI

To complete the installation of the IBM Predictive Maintenance and Quality server components, you must configure properties in IBM WebSphere Application Server for IBM Cognos Business Intelligence.

Procedure

1. Open a web browser.
2. In the address bar, type the address for the WebSphere Admin Console that was installed on the BI node computer.

   The Admin console address is: `http://`*`bi_node_name`*`:9060/ibm/console`. Where *`bi_node_name`* is the name or IP address for the BI node computer.
3. Expand **Servers** > **Server Types** > **WebSphere application servers**, and click **server1**.
4. Under **Server Infrastructure**, expand **Java and Process Management**, and click **Process Definition**.
5. Under **Additional Properties**, click **Java Virtual Machine**.
6. In the **Initial Heap Size** box, enter **512**.
7. In the **Maximum Heap Size** box, enter **1024**.
8. Click **Apply**, and then click **Save**.
9. Under **Additional Properties**, click **Environment Variables**.
10. Click **New**.
11. In the **Name** box, enter `LD_LIBRARY_PATH`.

12. In the **Value** box, enter the path the IBM Cognos BI `bin64` directory. For example, enter `/opt/ibm/cognos/c10_64/bin64/`.

    Important: If you changed the default value in the **Cognos BI Installation Location** field in the **Deployment Wizard**, ensure you use the path you entered.
13. Click **Apply**, and then click **Save**.

Saving your IBM Cognos Configuration settings and starting the services

You must save the configuration settings in IBM Cognos Configuration before you can start the IBM Cognos application in WebSphere Application Server.

Procedure

1. Log in to the BI node computer as **root**.
2. Go to the `/opt/ibm/cognos/c10_64/bin64` directory.
3. Type the following command:

   ```
   ./cogconfig.sh
   ```

   IBM Cognos Configuration starts.
4. Click **File** > **Save**.
5. Close IBM Cognos Configuration.

   Important: If you are prompted to start the Cognos Content Database service, click **No**.
6. Log in to the BI node computer as **root** using a terminal emulator, such as PuTTY.

   Note: Using a terminal emulator like PuTTY ensures that the proper profile is loaded.
7. Go to the WebSphere Application Server Profile Location. For example, go to the `/opt/IBM/WebSphere/AppServer/profiles/COGNOSProfile/bin` directory if you used the default path in the **Deployment Wizard**.
8. Type `./stopServer.sh server1` to stop WebSphere Application Server.
9. Type `./startServer.sh server1` to start WebSphere Application Server.

Results

WebSphere Application Server is configured for IBM Cognos BI.

It may take several minutes for all of the IBM Cognos services to start for the first time.

Setting the password for the `mqm` user on the ESB node computer

You must set the password for the **mqm** user on the Enterprise Service Bus (ESB) node computer.

Procedure

1. Log in to the ESB node computer as **root**.
2. Type the following command:

   ```
   passwd mqm
   ```

3. Enter `mqm` and the new password.

   You do not have to use `mqm`. It is only a suggestion. If you do use `mqm`, you will see a message saying that your password is too weak. But, you can ignore the message.

Testing the installation of the server components

You can test the installation of the IBM Predictive Maintenance and Quality server components by accessing some of the component portals.

For example, you can open the IBM Cognos BI portal on the BI node. If the portal opens, IBM Cognos BI is installed and running. You can also access the SPSS configuration tool on the Analytics node computer.

Procedure

1. Open a web browser.
2. In the address bar, type the address for the IBM Cognos Content Manager status page.

   The address is `http://`*`bi_node_name`*`:9080/p2pd/servlet`, where *`bi_node_name`* is the name or IP address for the BI node computer.

   The Content Manager status says **Running**.
3. In the address bar, type the address for the IBM Cognos BI portal.

   The address is `http://`*`bi_node_name`*`/ibmcognos/`, where *`bi_node_name`* is the name or IP address for the BI node computer.

   Note: Ensure that you add the trailing / to the URL.

   IBM Cognos Connection appears.
4. In the address bar, type the address for the SPSS administration console.

   The address is `http://`*`analytics_node_name`*`:9080/config`, where *`analytics_node_name`* is the name or IP address for the Analytics node computer.

   The SPSS administration console appears.

Computer firewall settings to run the server components

Each IBM Predictive Maintenance and Quality node computer requires certain ports to be opened for the server components to operate in a multi-computer solution, and you must configure your firewall settings for each specific node.

Configuring your firewall settings for all nodes

On each computer on which you install an IBM Predictive Maintenance and Quality node, you must open specific ports.

The following ports must be open:

- **vnc-server**
- **x11**
- **5901**
- **5902**
- **5903**
- **6001**
- **6002**

- **6003**
- **22**

Procedure

1. Log in as **root**.
2. Back up your existing firewall settings by typing the following command:
   `/etc/init.d/iptables save`
3. Add rules for the ports with the following command:
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport port_number -j ACCEPT`

   For example, to open **vnc-server**, type the following command
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport vnc-server -j ACCEPT`
4. Type the following command to save your firewall settings:
   `/etc/init.d/iptables save`
5. Type the following command to restart your firewall.
   `/etc/init.d/iptables restart`
6. Verify that your changes have been applied with the following command:
   `iptables -L`
   The added port should appear in the list.
7. Repeat these steps on each computer on which you install a Predictive Maintenance and Quality node.

Configuring your firewall settings for the Analytics node computer

You must ensure that certain ports are open on the Predictive Analytics node computer for IBM Predictive Maintenance and Quality.

The following ports must be open:

- **45088**
- **58313**
- **28052**
- **tungsten-https**
- **glrpc**
- **corbaloc**
- **59356**
- **9043**
- **9060**

Procedure

1. Log in to the Analytics node computer as **root**.
2. Back up your existing firewall settings by typing the following command:
   `/etc/init.d/iptables save`
3. Add rules for the ports with the following command:
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport port_number -j ACCEPT`

   For example, to open **45088**, type the following command
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport 45088 -j ACCEPT`
4. Repeat the previous step for each of the required port values.

5. Type the following command to save your firewall settings:
   `/etc/init.d/iptables save`
6. Type the following command to restart your firewall.
   `/etc/init.d/iptables restart`
7. Verify that your changes have been applied with the following command:
   `iptables -L`
   The added ports should appear in the list.

Configuring your firewall settings for the BI node computer

You must ensure that certain ports are open on the Business Intelligence (BI) node computer for IBM Predictive Maintenance and Quality.

The following ports must be open:

- **9362**
- **vrace**
- **9663**
- **corbaloc**
- **9043**
- **glrpc**
- **http**
- **tungsten-https**
- **9060**
- **6001**
- **6002**
- **6003**
- **5901**
- **5902**
- **5903**

Procedure

1. Log in to the BI node computer as **root**.
2. Back up your existing firewall settings by typing the following command:
   `/etc/init.d/iptables save`
3. Add rules for the ports with the following command:
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport port_number -j ACCEPT`

   For example, to open **9362**, type the following command
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport 9362 -j ACCEPT`
4. Repeat the previous step for each of the required port values.
5. Type the following command to save your firewall settings:
   `/etc/init.d/iptables save`
6. Type the following command to restart your firewall.
   `/etc/init.d/iptables restart`
7. Verify that your changes have been applied with the following command:
   `iptables -L`
   The added ports should appear in the list.

Configuring your firewall settings for the ESB node computer

You must ensure that certain ports are open on the Enterprise Service Bus (ESB) node computer for IBM Predictive Maintenance and Quality.

The following ports must be open:

- **boks**
- **boks_clntd**
- **boks_servm**
- **boks_servc**
- **ibm-mqseries**

Procedure

1. Log in to the ESB node computer as **root**.
2. Back up your existing firewall settings by typing the following command:
   `/etc/init.d/iptables save`
3. Add rules for the ports with the following command:
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport port_number -j ACCEPT`

   For example, to open **boks**, type the following command
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport boks -j ACCEPT`
4. Repeat the previous step for each of the required port values.
5. Type the following command to save your firewall settings:
   `/etc/init.d/iptables save`
6. Type the following command to restart your firewall.
   `/etc/init.d/iptables restart`
7. Verify that your changes have been applied with the following command:
   `iptables -L`
   The added ports should appear in the list.

Configuring your firewall settings for the MDM node computer

You must ensure that certain ports are open on the Master Data Management (MDM) node computer for IBM Predictive Maintenance and Quality.

The following ports must be open:

- **9060**
- **tungsten-https**
- **50498**
- **9634**
- **9633**
- **57537**
- **49888**
- **53343**
- **41950**
- **60573**
- **43420**
- **40187**
- **netsteward**

- **corbaloc**
- **glrpc**
- **44152**
- **43830**
- **39188**
- **9043**
- **7507**
- **49298**
- **8881**
- **cddbp-alt**
- **40752**
- **50512**
- **35086**
- **bacula-dir**
- **jetdirect**
- **55052**
- **32970**
- **commplex-link**
- **37253**
- **9060**

Procedure

1. Log in to the MDM node computer as **root**.
2. Back up your existing firewall settings by typing the following command:
   `/etc/init.d/iptables save`
3. Add rules for the ports with the following command:
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport port_number -j ACCEPT`

   For example, to open **9060**, type the following command
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport 9060 -j ACCEPT`
4. Repeat the previous step for each of the required port values.
5. Type the following command to save your firewall settings:
   `/etc/init.d/iptables save`
6. Type the following command to restart your firewall.
   `/etc/init.d/iptables restart`
7. Verify that your changes have been applied with the following command:
   `iptables -L`
   The added ports should appear in the list.

Configuring your firewall settings for the Data node computer

You must ensure that certain ports are open on the Data node computer for IBM Predictive Maintenance and Quality.

The following ports must be open:

- **ibm-db2**
- **db2c_db2inst1**

Procedure

1. Log in to the Data node computer as **root**.
2. Back up your existing firewall settings by typing the following command:
   `/etc/init.d/iptables save`
3. Add rules for the ports with the following command:
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport port_number -j ACCEPT`

   For example, to open **ibm-db2**, type the following command
   `iptables -I INPUT -m state --state NEW -m tcp -p tcp --dport ibm-db2 -j ACCEPT`
4. Type the following command to save your firewall settings:
   `/etc/init.d/iptables save`
5. Type the following command to restart your firewall.
   `/etc/init.d/iptables restart`
6. Verify that your changes have been applied with the following command:
   `iptables -L`
   The added ports should appear in the list.

Chapter 4. Installation of the server artifacts

The server artifacts include report content and workflows for IBM Predictive Maintenance and Quality. The installation program will install artifacts on each node computer.

Starting the installer for the server artifacts

Use the Launchpad to start the IBM Predictive Maintenance and Quality server artifacts installer.

Before you begin

Ensure that you are logged in as **root**.

You must have a Firefox, version 10 or earlier, or SeaMonkey, version 2.9 or earlier, web browser installed and set as your default web browser on the computer from where you run the installation.

Procedure

1. In a terminal window, go to the USB hard disk drive that you mounted or to the directory where you copied the installation files.
2. Go to the `ServerArtifacts/disk1` directory.
3. Type the following command to change the permissions for the installation files:

   ```
   chmod -R 755 *
   ```
4. Enter the following command:

   ```
   ./launchpad.sh
   ```
5. Review the information in the Launchpad panels.
6. Click **Install Server Artifacts** > **Predictive Maintenance and Quality Server Artifacts Accelerator** to start the **Deployment Wizard** to install the server artifacts.
7. Follow the prompts to install the server artifacts.
8. On the **Select Tasks** page, select all nodes.

Setting port numbers for the Deployment Wizard to use

If you opened ports for the installation of IBM Predictive Maintenance and Quality components, you must set those port numbers in the **Deployment Wizard**.

Procedure

1. In the **Deployment Wizard**, click **Edit** > **Preferences**.

   The **Deployment Preferences** window appears.
2. Enter `30000` in the **Data Port Number** box.

   Important: Ensure that you enter the port number that you opened if you selected a port other than 30000.
3. Enter `35000` in the **Communication Port Number** box.

© Copyright IBM Corp. 2013

Important: Ensure that you enter the port number that you opened if you selected a port other than 35000.

4. If you are using the computer on which you are running the installation as a node, do the following steps:
   a. Click **Target Computer Settings**.
   b. Select **localhost** in the **Target Computer** field.
   c. Enter the communication port number that you set in the **Communication Port** field. For example, enter `35000`.

      Note: The **RMI Registry Port** is unavailable if you are using localhost as a node.

Specifying the target computers on which you will install the server artifacts

You must specify a each computer on which you installed an IBM Predictive Maintenance and Quality node. Ensure that you identify the correct computer for each node.

Before you begin

You must have **`root`** access on each computer on which you install a node.

You might have to change a setting in a configuration file on your target computer to allow the **Deployment Wizard** to access the computer as **`root`**. Use the following steps if you receive a message that says the connection to the target computer was refused:

1. On the target computer, go to the `/etc/ssh` directory and open `sshd_config` for editing.
2. Change the `PermitRootLogin` property to `yes`.
3. Save the file. You may have to restart the server for the change to take effect.

Procedure

1. On the **Specify Target Computers** pages of the **Deployment Wizard**, enter the name or IP address of the computer on which you installed the node you are prompted for in the **Target Computer** box.

   The **Deployment Wizard** prompts you for each node computer.

   If you installed a node on the computer where you are running the **Deployment Wizard**, enter `localhost`.
2. Click **Add**.
   a. When you enter a computer other than `localhost`, in the **Target Computer Credentials** box, enter the **User ID** and **Password** for the **`root`** user.

      Important: Ensure that you enter the credentials for the **`root`** user on the target computer.
   b. Click **Test Login**.
   c. Click **Add**.

      The computer that you entered appears in the **Selected target computers** box.
3. Do the following steps if you opened ports for the installation.
   a. Click **Edit** > **Preferences**.

b. Click **Target Computer Settings**.
c. Select the computer name or IP address in the **Target Computer** field.
d. Enter the communication port number that you set in the **Communication Port** field. For example, enter `35000`.
e. Enter the Data Port Number that you set in the **RMI Registry Port** field. For example, enter `30000`.

   Note: If you are using localhost as a node in the installation, the **RMI Registry Port** is unavailable.

4. In the **Selected target computers** box, select the target computer, and click **Test Connections**.

   Important: Test Connections tests the connection, tests the credentials, and locates or enables a deployment agent on the target computer. You must have an active deployment agent on each target computer.

   If you receive an error message after you click **Test Connections**, you might have to change some settings on your computers.

   - Edit your iptable settings or temporarily disable your firewall. For more information, see "Computer firewall settings required for the installation" on page 9.
   - Compare and correct your domain name system (DNS) settings for each computer. For example, type `sudo system-config-network`. Select **DNS configuration**, and ensure that your host name domain and DNS search path settings are correct.
   - Ensure that the `/etc/host` file has the correct entries.
5. Click **Next**.
6. Repeat the steps for each node computer.

Configuring parameters for the server artifacts installation

The **Deployment Wizard** displays some default values for each component. You can accept the default values or change them to suit your environment.

Procedure

Use the following table to verify or enter values in each field on each panel of the **Deployment Wizard**.

Table 15. Data node parameters

Field	Default or example value	Description
Data Node Deployment Location	`/opt/IBM/PMQ/Data`	The location where the server artifacts are to be installed on the Data node computer.
DB2 Instance Owner User Name	`db2inst1`	The user ID that controls the DB2 processes and owns the directories that are used by the database instance.

Table 15. Data node parameters (continued)

Field	Default or example value	Description
DB2 Instance Owner Password	There is no default value for this field.	The password for the DB2 instance owner user. **Note:** Ensure that you use the same password as you provided during the server installation.

Table 16. Enterprise Service Bus (ESB) node parameters

Field	Default or example value	Description
Enterprise Service Bus Node Deployment Location	`/var/PMQ`	The location where the server artifacts are to be installed on the ESB node computer.
Installation Location of Message Broker	`/opt/ibm/mqsi/8.0.0.1`	The location where WebSphere Message Broker is installed. This directory is on the ESB node computer's file system.
Websphere Message Queue Location	`/opt/mqm`	The location where WebSphere Message Queue is installed. This directory is on the ESB node computer's file system.
Broker Name	`pmqbroker`	The broker name that you created.
Queue Manager Name	`pmqmanager`	The Queue Manager name that you created.
Execution Group	`pmqgroup`	The name of a group of message flows that are assigned to a broker that you created.
PMQIntegration SPSS WebService URL	`http://`*`analytics_node_name`*`:`*`port`*`/scoring/services/Scoring.HttpV1`	Where *`analytics_node_name`* is the name or IP address of the Predictive Analytics node computer, and *`port`* is the HTTP port for the WebSphere instance, for example 9080.
PMQMaximoIntegration SPSS WebService URL	`http://`*`analytics_node_name`*`:`*`port`*`/meaweb/services/EXTSYS1_MXWOInterface`	Where *`analytics_node_name`* is the name or IP address of the Analytics node computer, and *`port`* is the HTTP port for the WebSphere instance, for example 9080.

Table 17. Business Intelligence (BI) node parameters

Field	Default or example value	Description
Business Intelligence Deployment Location	`/opt/IBM/PMQ/BI`	The location where the server artifacts are to be installed on the BI node computer.

Table 17. Business Intelligence (BI) node parameters (continued)

Field	Default or example value	Description
Cognos Install Location	`/opt/ibm/cognos/c10_64`	The location where IBM Cognos BI is installed. This directory is on the BI node computer's file system.
WebSphere Install Location	`/opt/IBM/WebSphere/AppServer`	The location where WebSphere is installed. This directory is on the BI node computer's file system.
DB2 Instance Home Directory	`/home/db2inst1`	The home directory of the database instance owner.
Cognos BI Dispatcher URI	`http://`*`bi_node_name`*`:9080/p2pd/servlet/dispatch`	The URL to the IBM Cognos BI dispatcher, where *`bi_node_name`* is the name or IP address of the BI node computer.
DB2 Database Instance User Name	`db2inst1`	The user ID for the IBM Cognos content store database.
DB2 Database Instance Password	There is no default value for this field.	The password for the database instance owner user.
DB2 Database Port Number	`50000`	The port number for the IBM DB2 database server.
DB2 Database Hostname	There is no default value for this field.	The name or IP address of the Data node computer.

Table 18. Analytics node parameters

Field	Default or example value	Description
Analytics Deployment Location	`/opt/IBM/PMQ/Analytics`	The location where the server artifacts are to be installed on the Analytics node computer.
Modeler Server Install Location	`/usr/IBM/SPSS/ModelerServer/15.0`	The location where the Modeler Server is installed.
Collaboration and Deployment Services Install Location	`/opt/IBM/SPSS/Deployment/5.0/Server`	The location where IBM SPSS Collaboration and Deployment Services is installed. This location is on the Analytics node computer.

Table 19. Master Data Management (MDM) node parameters

Field	Default or example value	Description
Master Data Deployment Location	`/opt/IBM/PMQ/MDM`	The location where the server artifacts are to be installed on the MDM node computer.

Starting the installation of the server artifacts

After you enter all of the required fields in the **Deployment Wizard**, you can start the installation of the server artifacts.

Procedure

On the **Summary Panel** of the **Deployment Wizard**, click **Deploy all**.

Note: If you choose to deploy the tasks individually, you must click **Deploy task** for each task in the order that the tasks appear on the **Summary** panel.

Complete the configuration of the server components

After you have installed the IBM Predictive Maintenance and Quality server artifacts, you can complete the configuration of the server components.

Verifying the configuration of IBM SPSS Collaboration and Deployment Services

To complete the configuration of IBM SPSS Collaboration and Deployment Services Server, you must verify the **URL Prefix** value for your environment.

Procedure

1. Open a web browser.
2. In the address bar, type the address for the Collaboration and Deployment administration console.

   The address is `http://analytics_node_name:9080/config`, where *analytics_node_name* is the name or IP address for the Predictive Analytics node computer.
3. Enter the **Login name** and **Password** for the administrator user, and click **Login**.

   The default **Login name** is `admin`, and the default **Password** is `admin`.
4. On the **Configuration** panel, under **Setup**, click **URL Prefix**.
5. In the **URL Prefix** box, verify that the address is `http://analytics_node_name:9080`, where *analytics_node_name* is the name or IP address of the Analytics node computer.
6. If the value is correct, you do not have to complete the remaining steps in this task.
7. If the value is not correct, enter the name or IP address of the Analytics node computer, and click **Set**.
8. Open the WebSphere Administrative Console in your web browser.

   The address is `http://analytics_node_name:9060/ibm/console`, where *analytics_node_name* is the name or IP address for the Analytics node computer. 9060 is the default port number for the WebSphere Administrative Console.
9. Click **Log in**.

   You do not need to enter a value in the **User ID** box.
10. Under **Applications** > **Application Types** > **WebSphere Enterprise Applications**, select **IBM_SPSS_Collaboration_and_Deployment_Services_5.0**, and click **Stop**.

11. Select **IBM_SPSS_Collaboration_and_Deployment_Services_5.0**, and click **Start** to restart the application and apply the changes.

Configuring the MDM node

To configure the Master Data Management (MDM) node, you must log in to the MDM administration console and import content files.

The content files are installed onto the MDM node computer by the Server Artifact installer. You must copy the content files from the MDM node to a computer where you have Microsoft Internet Explorer installed.

Procedure

1. Copy the MDM node contents to your Microsoft Windows-based computer with an FTP client or by using a shared directory.

   The contents files are installed to `/opt/ibm/PMQ` by default on the MDM node computer. The contents file is named `IBMPMQ.zip`.
2. In Microsoft Internet Explorer, go to the MDM administration console.

   The address is `http://`*`mdm_node_name`*`:7507/utils/enterLogin.jsp`, where *`mdm_node_name`* is the name or IP address of the MDM node computer.
3. In **User name**, enter `Admin`.

   Note: These values are case-sensitive.
4. In the **Password** box, enter `trinitron`.
5. In the **Company** box, enter `IBMPMQ`.
6. Click **Login**.
7. Click **System Administrator** > **Import Environment**.
8. In the **Import Company Environment** box, browse to and select the `IBMPMQ.zip` file that you copied.
9. Click **Import**.
10. Log out, and log back in to the MDM administration console to ensure that the import was completed.

Chapter 5. Installation of the client components

There are several client components that are included with IBM Predictive Maintenance and Quality. You can install the components as you require.

Important: The client components must be installed on computers running the Microsoft Windows 7 64-bit operating system.

Important: Install the client components only after you successfully install the server components.

Client components

The following client components for IBM Predictive Maintenance and Quality are available to be installed.

Database connectivity

IBM DB2 Connect™ must be installed to enable connectivity to the analytics database.

Predictive modeling and decision management

Install the following components so that you can modify or create predictive models and so that you can perform decision management tasks:

- IBM SPSS Collaboration and Deployment Services Deployment Manager
- IBM SPSS Modeler Client
- IBM SPSS Statistics Client
- IBM SPSS Text Analytics Client

Optionally, install the following components:

- IBM SPSS Collaboration and Deployment Services Documentation
- IBM SPSS Decision Management Documentation
- IBM SPSS Modeler Client Documentation
- IBM SPSS Statistics Desktop

Business intelligence

Install IBM Cognos Framework Manager so that you can modify the reporting model metadata.

Optionally, install the following components:

- IBM Cognos Business Intelligence Samples
- IBM Cognos Dynamic Query Analyzer
- IBM Cognos for Microsoft Office
- IBM Cognos Lifecycle Manager
- IBM Cognos Mobile
- IBM Cognos Real-time Monitoring
- IBM Cognos Software Development Kit

© Copyright IBM Corp. 2013

- IBM Cognos Supplementary Languages Documentation

Enterprise service bus

Install the following components:

- WebSphere Message Broker Toolkit
- WebSphere MQ for Windows

Use the WebSphere Message Broker Toolkit to create, manage, deploy, and delete message flows and associated resources in a development environment.

Starting the installer for the client components

The IBM Predictive Maintenance and Quality client installers are provided on the same USB hard disk drive as the server and content installers.

Important: The **Deployment Wizard** copies the installers to your computer. You must run each installer individually after they are copied to your computer.

Procedure

1. Insert the Predictive Maintenance and Quality USB hard disk drive into the USB port of your Microsoft Windows 7-based computer.
2. Go to the `Client/disk1` directory.
3. Double-click `launchpad64.exe`.
4. Review the information in the Launchpad panels.
5. Click **Install Client** > **Predictive Maintenance and Quality Client Accelerator** to start the **Deployment Wizard**.
6. On the **Select Tasks** panel, select the groups of clients you want to install, and click **Next** to select the client components that you want to install.

   Important: The required client components include the following:
   - WebSphere Message Broker Toolkit
   - WebSphere MQ for Windows
   - IBM SPSS Collaboration and Deployment Services Deployment Manager
   - IBM SPSS Modeler Client
   - IBM SPSS Statistics Desktop
   - IBM SPSS Statistics Client
   - IBM SPSS Text Analytics Client
   - IBM Cognos Framework Manager
7. Enter a location for each client component installer to be copied to. The default is `C:\IBM\PMQ\Client Installer`.
8. On the **Summary Panel**, click **Deploy all**.
9. After the client installers are copied to your computer, you must install each client individually by using its installer.

Installing IBM SPSS Collaboration and Deployment Services Deployment Manager

You must install IBM SPSS Collaboration and Deployment Services Deployment Manager to complete the configuration of IBM Predictive Maintenance and Quality.

Install IBM SPSS Collaboration and Deployment Services Deployment Manager on a computer running the Microsoft Windows 7 operating system.

Procedure

1. Go to the *install_location*\Client Installer\Analytics\IBM SPSS Collaboration and Deployment Services Deployment Manager directory.

   By default, the *install_location* is C:\IBM\PMQ\.
2. Extract the installer files from the zip file.
3. Double-click install.exe to start the IBM SPSS Collaboration and Deployment Services Deployment Manager installation.
4. Follow the steps in the wizard to install the client component.

   For more information about the installation of Deployment Manager, see the IBM SPSS documentation (pic.dhe.ibm.com/infocenter/spsscads/v5r0m0/index.jsp).

Adding a content server connection for IBM SPSS Collaboration and Deployment Services

You must add a connection to your IBM SPSS Collaboration and Deployment Services repository in the IBM SPSS Collaboration and Deployment Services Deployment Manager client.

After you add the connection, the server folder displays in the **Content Explorer**, and you can log in to the server.

Procedure

1. On your Microsoft Windows computer, start IBM SPSS Collaboration and Deployment Services Deployment Manager. For example, click **Start** > **Deployment Manager**.
2. Click **File** > **New** > **Content Server Connection**.
3. In the **Connection Name** box, enter a name for your Collaboration and Deployment Services repository.
4. In the **Host** box, enter the name or IP address of the Predictive Analytics node computer.
5. In the **Port** box, enter 9080.

   9080 is the port number used by the WebSphere Application Server instance.
6. Click **Finish**.
7. Click the connection name that you created.
8. In the **User ID** box, enter admin.
9. In the **Password** box, enter admin.
10. Click **OK**.

Adding users and groups to IBM SPSS Collaboration and Deployment Services

You use IBM SPSS Collaboration and Deployment Services Deployment Manager to manage users and groups. You must add an administrator user for IBM Predictive Maintenance and Quality.

Procedure

1. In Deployment Manager, click **Tools** > **Server Administration**.
2. Click **Click here to define a new administrative server connection**.

3. In the **Name** box, enter a name for your server, and click **Next**.
4. In the **Host** box, enter the name or IP address of Predictive Analytics node computer.
5. In the **Port** box, enter the port number of for the WebSphere instance. The default value is `9080`.
6. Click **Finish**.
7. Double-click the connection name that you created.
8. In the **User ID** box, enter `admin`.
9. In the **Password** box, enter `admin`.
10. Click **OK**.
11. Expand **Users and Groups**, and double-click **Local User Repository**.
12. Select **Show all available users/groups**.
13. Click **New Group**.
    a. Enter `administrator`.
    b. Select **Show all available users**.
    c. Under **Available users**, move the **admin** user to **Groups contains users**.
    d. Click **OK**.
14. Click **New Group**.
    a. Enter `DM Administrator`.
    b. Select **Show all available users**.
    c. Under **Available users**, move the **admin** user to **Groups contains users**.
    d. Click **OK**.
15. Click **New Group**.
    a. Enter `DM Users`.
    b. Select **Show all available users**.
    c. Under **Available users**, move the **admin** user to **Groups contains users**.
    d. Click **OK**.
16. Double-click **Roles**.
17. Click **New Role**.
    a. In the **Role Name** box, enter `DM Administrator`.
    b. Click **Select All** to add all actions for this user role.
    c. Click **OK**.
    d. Select the **DM Administrator** role, and click **Edit Users and Groups**.
    e. Click **Show all available users/groups**.
    f. Under **Available users**, move the **DM Administrator** group to **Users/Groups Assigned to Role**.
    g. Click **OK**.
18. Click **New Role**.
    a. In the **Role Name** box, enter `DM User`.
    b. Click **Select All** to add all actions for this user role.
    c. Click **OK**.
    d. Select the **DM User** role, and click **Edit Users and Groups**.
    e. Click **Show all available users/groups**.
    f. Under **Available users**, move the **DM Users** group to **Users/Groups Assigned to Role**.
    g. Click **OK**.

Importing the Predictive Maintenance and Quality resource definitions into IBM SPSS Collaboration and Deployment Services

Resource definitions include credential definitions, data source definitions, message domains, promotion policies, server definitions, and server cluster specifications. These resources are required for running jobs.

You must import these resource definitions into IBM SPSS Collaboration and Deployment Services Deployment Manager.

The resource files are installed onto the Predictive Analytics node computer by the Server Artifact installer. You must copy the content files from the Analytics node to the computer where you installed Deployment Manager.

Procedure

1. Copy the Analytics node contents to your Windows-based computer using either an FTP client or by using a shared directory.

   The contents files are installed to `/opt/ibm/PMQ` by default on the Analytics node computer.
2. On your Windows-based computer, in Deployment Manager, click **Content Explorer**.
3. Right-click **Content Repository**, and click **Import**.
4. Browse to and select the file named `PredictiveMaintenance.pes` in the directory where you copied the Analytics node contents.
5. Click **Open**.
6. Accept the default options in the **Import** window, and click **OK**.

Adding credential definitions to IBM SPSS Collaboration and Deployment Services

You must add user credential definitions in IBM SPSS Collaboration and Deployment Services Deployment Manager. You must add the credentials for your IBM SPSS admin user, the database instance owner, and the root user on the Predictive Analytics node computer.

Procedure

1. In Deployment Manager, click **Content Explorer**.
2. Expand **Resource Definitions** > **Credentials**.
3. Right-click **Credentials**, and click **New** > **Credentials Definition**.
   a. In the **Name** box, enter `admin`, and click **Next**.
   b. In the **User ID** box, enter `admin`.
   c. In the **Password** box, enter `admin`.
   d. In the **Security Provider** box, select **Local User Repository**.
   e. Click **Finish**.
4. Right-click **Credentials**, and click **New** > **Credentials Definition**.
   a. In the **Name** box, enter `db2inst1`, and click **Next**.
   b. In the **User ID** box, enter `db2inst1`.
   c. In the **Password** box, enter the password for your **`db2inst1`** user.
   d. Leave the **Security Provider** box blank.
   e. Click **Finish**.

5. Right-click **Credentials**, and click **New** > **Credentials Definition**.
   a. In the **Name** box, enter `modeler`, and click **Next**.
   b. In the **User ID** box, enter `root`.
   c. In the **Password** box, enter the password for the **root** user on the Analytics node computer.
   d. Leave the **Security Provider** box blank.
   e. Click **Finish**.

Adding server definitions to IBM SPSS Collaboration and Deployment Services

You must add server definitions in Deployment Manager.

If you are not using a computer that is running the Microsoft Windows 7 operating system, some entries, such as server types, may not display correctly.

Procedure

1. In Deployment Manager, click **Content Explorer**.
2. Expand **Resource Definitions**.
3. Right-click **Server**, and click **New** > **Server Definition**.
   a. In the **Name** box, enter `localhost`, and click **Next**.
   b. In the **Type** box, select **Content Repository Server**.
   c. Click **Next**.
   d. In the **Host** box, enter the name or IP address of Analytics node computer.
   e. In the **Port** box, enter `9080`.
   f. Click **Finish**.
4. Right-click **Server**, and click **New** > **Server Definition**.
   a. In the **Name** box, enter `modeler`, and click **Next**.
   b. In the **Type** box, select **Modeler Server**.
   c. Click **Next**.
   d. In the **Host** box, enter the name or IP address of Analytics node computer.
   e. In the **Port** box, leave the default value `28052`.
   f. In the **Default data path** box, enter the path to the data directory on Analytics node computer. For example, enter `/usr/IBM/SPSS/ModelerServer/15.0`
   g. Click **Finish**.

Creating scoring configurations

You must create scoring configurations for IBM Predictive Maintenance and Quality. You create these configurations in IBM SPSS Collaboration and Deployment Services Deployment Manager.

You must select the appropriate **Output data returned settings** for the steam you are configuring:

Table 20. Output data returned settings for each IBM Predictive Maintenance and Quality stream

Stream name	Scoring service name	Output data returned setting
`Health_Score_Model.str`	`RESOURCE_HEALTH_SCORE`	`HEALTH_SCORE`

Table 20. Output data returned settings for each IBM Predictive Maintenance and Quality stream (continued)

Stream name	Scoring service name	Output data returned setting
Life Time Analysis_Model1.str	**RESOURCE_LIFETIME_SCORE**	**RESOURCE_ID** **EXPECTED_DEVICE_LIFETIME**
Asset_Recommendation.str	**RESOURCE_RECOMMENDATION**	**HEALTH_RECOMMENDATION**

Procedure

1. In Deployment Manager, click **Content Explorer**.
2. Under **Content Repository** > **PredictiveMaintenance**, right-click the model for which you want to create the scoring. For example, right-click **Health_Score_Model.str**.
3. Click **Configure Scoring**.
4. In the **Configure Scoring Model** dialog box, click **Next**.
5. On the **Data provider settings** panel, click **Next**.
6. On the **Input data order** panel, click **Next**.
7. On the **Input data returned settings** panel, click **Next**.
8. On the **Output data returned settings** panel, select the appropriate score, and click **Next**. For example, for **Health_Score_Model.str**, select **HEALTH_SCORE**.
9. On the **Logging settings** panel, click **Next**.
10. On the **Advanced settings** panel, click **Finish**.
11. Repeat these steps for each stream you want to configure.

Chapter 6. Uninstallation of the IBM Predictive Maintenance and Quality components

Follow the uninstall instructions for each of the Predictive Maintenance and Quality components to uninstall the product.

Uninstalling components from the Predictive Analytics node computer

Follow the uninstall instructions for each component on the Analytics node computer.

Procedure

1. To uninstall the IBM DB2 client, see the IBM DB2 documentation (pic.dhe.ibm.com/infocenter/db2luw/v9r7).
2. To uninstall IBM SPSS Collaboration and Deployment Services, see the IBM SPSS documentation (pic.dhe.ibm.com/infocenter/wasinfo/v8r0).
   a. Go to the `/opt/ibm/InstallationManager/eclipse` directory, and run `IBMIM`.
   b. Click **Uninstall**, and follow the steps to uninstall the product.
3. To uninstall WebSphere Application Server, see the WebSphere documentation (pic.dhe.ibm.com/infocenter/wasinfo/v8r0).
   a. Go to the `/opt/ibm/InstallationManager/eclipse` directory, and run `IBMIM`.
   b. Click **Uninstall**, and follow the steps to uninstall the product.

   Note: If WebSphere Application Server processes are running and prevent you from uninstalling the product, you must stop the server process. Go to the `/opt/ibm/WebSphere/AppServer/profiles/`*`profile_name`*`/bin` directory, and type `./stopServer.sh server1`.
4. To uninstall IBM Installation Manager, see the IBM Installation Manager information center (pic.dhe.ibm.com/infocenter/install/v1r6).
   a. Go to the `/var/ibm/InstallationManager/uninstall` directory, and run `uninstall`.
   b. Follow the steps to uninstall Installation Manager.

Uninstalling components from the BI node computer

Follow the uninstall instructions for each component on the Business Intelligence (BI) node computer.

Procedure

1. To uninstall the IBM DB2 client, see the IBM DB2 documentation (pic.dhe.ibm.com/infocenter/db2luw/v9r7).
2. To uninstall IBM Cognos Business Intelligence, see the IBM Cognos BI documentation (pic.dhe.ibm.com/infocenter/cbi/v10r2m0).
   a. Go to the `/opt/ibm/cognos/c10_64/uninstall` directory.
   b. Type `./uninst -u`, and press Enter.
   c. Follow the steps to uninstall the product.
3. To uninstall IBM HTTP Server, see the IBM HTTP Server for WebSphere Application Server documentation (pic.dhe.ibm.com/infocenter/wasinfo/v8r0).

© Copyright IBM Corp. 2013

a. Go to the /opt/ibm/InstallationManager/eclipse directory, and run IBMIM.
b. Click **Uninstall**, and follow the steps to uninstall the product.

4. To uninstall WebSphere Application Server, see the WebSphere documentation (pic.dhe.ibm.com/infocenter/wasinfo/v8r0).
   a. Go to the /opt/ibm/InstallationManager/eclipse directory, and run IBMIM.
   b. Click **Uninstall**, and follow the steps to uninstall the product.

   Note: If WebSphere Application Server processes are running and prevent you from uninstalling the product, you must stop the server process. Go to the /opt/ibm/WebSphere/AppServer/profiles/*profile_name*/bin directory, and type ./stopServer.sh server1.
5. To uninstall IBM Installation Manager, see the IBM Installation Manager information center (pic.dhe.ibm.com/infocenter/install/v1r6).
   a. Go to the /var/ibm/InstallationManager/uninstall directory, and run uninstall.
   b. Follow the steps to uninstall Installation Manager.

Uninstalling components from the ESB node computer

Follow the uninstall instructions for each component on the Enterprise Service Bus (ESB) node computer.

Procedure

1. To uninstall WebSphere Message Broker, see the WebSphere Message Broker documentation (publib.boulder.ibm.com/infocenter/wmbhelp/v8r0m0).
2. To uninstall WebSphere Message Queue, see the WebSphere Message Queue documentation (publib.boulder.ibm.com/infocenter/wmqv6/v6r0).

Uninstalling components from the MDM node computer

Follow the uninstall instructions for each component on the Master Data Management (MDM) node computer.

Procedure

1. To uninstall the IBM DB2 client, see the IBM DB2 documentation (pic.dhe.ibm.com/infocenter/db2luw/v9r7).
2. To uninstall InfoSphere Master Data Management Server, see the IBM MDM documentation (pic.dhe.ibm.com/infocenter/mdm/v10r0m0).
   a. Go to the /opt/IBM/MDMPIM/_uninst directory.
   b. Type ./uninstall.bin, and press Enter.
   c. Follow the steps to uninstall the product.
3. To uninstall WebSphere Application Server, see the WebSphere documentation (pic.dhe.ibm.com/infocenter/wasinfo/v8r0).
   a. Go to the /opt/ibm/InstallationManager/eclipse directory, and run IBMIM.
   b. Click **Uninstall**, and follow the steps to uninstall the product.

   Note: If WebSphere Application Server processes are running and prevent you from uninstalling the product, you must stop the server process. Go to the /opt/ibm/WebSphere/AppServer/profiles/*profile_name*/bin directory, and type ./stopServer.sh server1.

4. To uninstall IBM Installation Manager, see the IBM Installation Manager information center (pic.dhe.ibm.com/infocenter/install/v1r6).
   a. Go to the `/var/ibm/InstallationManager/uninstall` directory, and run `uninstall`.
   b. Follow the steps to uninstall Installation Manager.

Uninstalling components from the Data node computer

Follow the uninstall instructions for each component on the Data node computer.

Procedure

To uninstall IBM DB2, see the IBM DB2 documentation (pic.dhe.ibm.com/infocenter/db2luw/v9r7).

Appendix A. Samples

Sample data is provided so that you can see the IBM Predictive Maintenance and Quality solution work end-to-end.

Loading the sample data

Sample data is installed as part of the IBM Predictive Maintenance and Quality server artifact installation. You can load the sample data to see an example of the Predictive Maintenance and Quality solution from end-to-end.

Procedure

1. Log in to the Enterprise Service Bus (ESB) node computer as the **mqm** user.
2. Go to the `/var/PMQ/MQSIFileInput/PMQSampleData/Sample_PMQ/MasterData-Set1` directory.
3. Copy the contents of that directory to the `/var/PMQ/MQSIFileInput/masterdatain` directory one file at a time.

   WebSphere Message Broker automatically loads the files from that directory. The files are automatically removed after they are loaded.

   Important: The files must be coped one at a time.
4. Go to the `/var/PMQ/MQSIFileInput/PMQSampleData/Sample_PMQ/MasterData-Set2` directory.
5. Copy the contents of that directory to the `/var/PMQ/MQSIFileInput/masterdatain` directory one file at a time.

   Important: `batch_batch_upsert_sample_pmq.csv` must be loaded last.
6. Go to the `/var/PMQ/MQSIFileInput/PMQSampleData/Sample_PMQ/EventData-Set3` directory.
7. Copy the contents of that directory to the `/var/PMQ/MQSIFileInput/eventdatain` directory one file at a time.

Removing sample data

Before you load live production data in IBM Predictive Maintenance and Quality, all sample data must be removed.

This procedure deletes all the contents of the event and master data tables. Its scope is not limited to the supplied sample data and so any additional content that is loaded is also deleted.

Before you begin

If test events were loaded from the sample master data, the test events must also be removed. For more information, see the *IBM Predictive Maintenance and Quality Solution Guide*.

Procedure

1. Type the following command to connect to the **IBMPMQ** datastore:

   `db2 "connect to IBMPMQ user` *`user_name`* `using` *`password`*`"`

© Copyright IBM Corp. 2013

2. Run SampleDeletes.sql in the location: /opt/IBM/PMQ/Data by using the following command:
   ```
   db2 "-tvf /opt/IBM/PMQ/Data/SampleDeletes.sql"
   ```
3. Type the following command to commit the transaction:
   ```
   db2 "commit"
   ```
4. Type the following command to populate the master tables with NA rows:
   ```
   db2 "call SCHEMA.POP_NA( 'EN' , 'English' , 'PMQ' , 'PMQ' )"
   ```
   Ensure that the correct schema name is used, such as db2inst1
5. Type the following command to run the Calendar generation procedure:
   ```
   db2 "call SCHEMA.Calendar_pop"
   ```
6. Type the following command to disconnect from the database:
   ```
   db2 "connect reset"
   ```

Appendix B. Products installed with IBM Predictive Maintenance and Quality

The following products are installed with or available to be installed with Predictive Maintenance and Quality.

Server components

- IBM DB2 Enterprise Server Edition 9.7 for Linux on AMD64 and Intel EM64T systems (x64) English
- IBM DB2 9.7 Fix Pack 7 for Linux/x86-64 (64 bit), DB2 Server Fix Pack
- IBM DB2 Enterprise Server Edition 9.7 Client for Linux on AMD64 and Intel EM64T systems (x64) English
- IBM WebSphere Network Deployment 8.0 for Multiplatform, Multilingual
- IBM WebSphere Network Deployment 8.0 Fix Pack 5
- IBM WebSphere Network Deployment 8.0 Supplements Pack for Multiplatform Multilingual
- IBM Installation Manager 1.6 for Linux 64-bit Multilingual
- IBM Cognos Business Intelligence Server 10.2.0 Linux x86 Multilingual
- IBM WebSphere Message Broker V8.0.0.1 Linux x86-64 Multilingual
- IBM WebSphere Message Broker 8.0 Fix Pack 2
- IBM WebSphere Message Broker Explorer 8.0.0.2
- IBM WebSphere Message Broker ODBC Database Extender (IE02)
- IBM WebSphere Message Queue V7.5 for Linux on x86 64bit Multilingual
- IBM SPSS Collaboration and Deployment Services Server 5.0 Red Hat Enterprise Linux Multilingual
- IBM SPSS Collaboration and Deployment Services Deployment Manager 5.0 Fix pack 1
- IBM SPSS Collaboration and Deployment Services Enterprise View Driver 64-bit 5.0 Red Hat Enterprise Linux Multilingual
- IBM SPSS Collaboration and Deployment Services Web Installer for Deployment Manager 5.0 Multiplatform Multilingual
- IBM SPSS Collaboration and Deployment Services Enterprise Python Scripting 5.0 Red Hat Enterprise Linux Multilingual
- IBM SPSS Modeler Server 64-bit 15.0 Linux Multilingual
- IBM SPSS Modeler Server 64-bit 15.0 Fix Pack 1
- IBM SPSS Data Access Pack 6.1 sp3 Multiplatform English
- IBM SPSS Text Analytics Server 64-bit 15.0 Linux Multilingual
- IBM SPSS Modeler 15.0 Collaboration and Deployment Services Adapter 64-bit 5 Linux Multilingual
- IBM SPSS Modeler Collaboration and Deployment Services Adapter 15 Fix Pack 1
- IBM SPSS Decision Management 7.0 Linux Multilingual
- IBM SPSS Decision Management 7.0 Fix Pack 1
- IBM SPSS Decision Management Modeler Extension Libraries 7.0 Linux Multilingual

© Copyright IBM Corp. 2013

- IBM SPSS Decision Management Modeler Extension Libraries 7.0 Fix Pack 1
- IBM SPSS Decision Management Modeler Advantage 7.0 Linux Multilingual
- IBM SPSS Decision Management Modeler Advantage 7.0 Fix Pack 1
- IBM SPSS Decision Management Customer Applications 7.0 Linux Multilingual
- IBM SPSS Decision Management Customer Applications 7.0 Fix Pack 1
- IBM SPSS Decision Management for Claims 7.0 Linux Multilingual
- IBM SPSS Decision Management for Claims 7.0 Fix Pack 1
- IBM SPSS Statistics 21.0 Collaboration and Deployment Services Adapter 64-bit 5.0 Linux Multilingual
- IBM SPSS Statistics 21.0 Collaboration and Deployment Services Adapter 5.0 Fix Pack 1
- IBM SPSS Statistics - Essentials for Python 21.0 for Linux 64 Multilingual
- IBM SPSS Statistics Server 64-bit 21.0 Linux Multilingual
- IBM Infosphere Master Data Management Collaboration Server V10.1.0 Multiplatform Multilingual 10.1.0.0
- Quick Start Documentation - IBM Infosphere Master Data Management V10.1.0 Multiplatform Multilingual

Client and optional components

- IBM DB2 Connect Personal Edition 9.7 for Windows® on AMD64 and Intel® EM64T systems (x64) English
- IBM Cognos Framework Manager 10.2.0 Microsoft Windows Multilingual
- IBM Cognos Business Intelligence Samples 10.2.0 Multiplatform Multilingual
- IBM Cognos Supplementary Languages Documentation 10.2.0 Multiplatform Multilingual
- IBM Cognos Dynamic Query Analyzer 10.2.0 Multiplatform Multilingual
- IBM Cognos for Microsoft Office 10.1.1 for Business Intelligence 10.2.0 Microsoft Windows Multilingual
- IBM Cognos Lifecycle Manager 10.2.0 Microsoft Windows English
- IBM Cognos Mobile 10.2.0 Multiplatform Multilingual
- IBM Cognos Real-time Monitoring 10.2.0 Multiplatform Multilingual
- IBM Cognos Software Development Kit 10.2.0 Multiplatform English
- IBM SPSS Collaboration and Deployment Services Deployment Manager 64-bit 5.0 Microsoft Windows Multilingual
- IBM SPSS Collaboration and Deployment Services Documentation 5.0 Multilingual
- IBM SPSS Modeler Client 64-bit 15.0 Microsoft Windows Multilingual
- IBM SPSS Text Analytics Client 64-bit 15.0 Microsoft Windows Multilingual
- IBM SPSS Modeler Client Documentation 15.0 Multilingual
- IBM SPSS Decision Management Documentation 7.0
- IBM SPSS Statistics Client 64-bit 21.0 Microsoft Windows Multilingual
- IBM SPSS Statistics Client/Developer Installation Documentation 21.0 Multilingual
- IBM Message Broker Toolkit V8.0.0.1 Windows 1 Multilingual
- IBM Message Broker Toolkit Fix Pack 2
- IBM Installation Manager V1.6.0 for Windows Multilingual
- IBM WebSphere MQ V7.5 for Windows Multilingual

Appendix C. Troubleshooting

This section contains troubleshooting information for the IBM Predictive Maintenance and Quality installation.

Log in as `root` rather than `su` or `sudo`

To run the IBM Predictive Maintenance and Quality installation, you must log in to the computer from where you run the installation as **`root`**. Using **`su root`** or **`sudo`** to run the installer is not supported in this version.

Browser not supported for the Launchpad

You must have a Firefox, version 10 or earlier, or SeaMonkey, version 2.9 or earlier, web browser that is installed and set as your default web browser on the computer from where you run the IBM Predictive Maintenance and Quality installation. If you have another browser that is set as your default and want to keep your existing default browser, you can temporarily use a supported browser for the installation.

Procedure

1. On the computer from where you run the installation, download a supported web browser. For example, download Firefox version 10.
2. Uncompress the downloaded file if necessary.
3. In a terminal window, type the following command:

   `export BROWSER=/`*`path_to_supported_browser`*
4. Then, start the Launchpad by typing the following command:

   `./launchpad.sh`

   The Launchpad should appear in the supported browser.

Installer does not launch

If the IBM Predictive Maintenance and Quality installer does not launch, ensure that you have completed all of the prerequisite tasks and installed all of the required `rpm` packages.

Test Connections validation errors

If you click the **Test Connections** button in the IBM Predictive Maintenance and Quality installer and you receive an error, use the following tips to verify communication between the **Deployment Wizard** and the target computer.

- Ensure that you entered a valid host name or IP address.
- Ensure that you can ping the target computer from the computer where you are running the installation.
- Ensure that all of your computers have valid entries in the `/etc/hosts` file.
- Ensure that your firewall is disabled or that the ports required for the **Deployment Wizard** are open on all computers.

© Copyright IBM Corp. 2013

Viewing log files

Log files for the IBM Predictive Maintenance and Quality installation can be displayed in the **Deployment Wizard**.

Procedure

1. To view log files in the **Deployment Wizard**, select the message, and click **Detailed messages** or **Master log**.
2. If you clicked **Detailed messages**, select a message, and click **View Details**.

Temporary file locations

Temporary files are created during the IBM Predictive Maintenance and Quality installation. You can find the location for the temporary files from the **Deployment Wizard**.

Procedure

In the **Deployment Wizard**, click **Edit** > **Preferences**.
The path to the location for the temporary files is shown in the **Path** box.

Ensuring connectivity between the Analytics node and the Data node computers

In IBM Predictive Maintenance and Quality, if the task for configuring the IBM SPSS Collaboration and Deployment Services displays a database initialization error, you may have to run the `traceroute` command to ensure communication between the Predictive Analytics node and the Data node.

Procedure

1. On the Analytics node computer, enter the following command:

   `traceroute` *`data_node_name`*

   Where *`data_node_name`* is the name or IP address of the Data node computer.
2. Try the task again.

Modeler Server type not displaying in resource definitions

In IBM Predictive Maintenance and Quality, if the **Modeler Server** type does not display in resource definitions in IBM SPSS Collaboration and Deployment Services Deployment Manager, try closing Deployment Manager and opening it again.

Unable to import the company archive in MDM

If you cannot import the IBM Predictive Maintenance and Quality company archive in the Master Data Management (MDM) console, you can manually import the archive.

Procedure

1. Log in to the MDM node computer as **`root`**.
2. Copy the `IBMPMQ.zip` file from `/opt/IBM/PMQ/`*`MDM_version`* directory to the `/opt/IBM/PMQ` directory.
3. Enter the following command:

   ```
   $TOP/bin/importCompanyFromZip.sh --company_code=IBMPMQ --zipfile_path=/opt/IBM/PMQ/IBMPMQ.zip
   ```

Error installing IBM Cognos BI in IBM Predictive Maintenance and Quality

The IBM Cognos Business Intelligence installer requires a specific library file in order to run.

For information about the problem and the resolution, see the IBM support page (http://www.ibm.com/support/docview.wss?uid=swg21612290).

Administration tool and product portal reference

The administrative tools and portals for IBM Predictive Maintenance and Quality are located in several locations.

Access information for the tools and portals is provided in the following table.

Table 21. Administration tool and product portal reference

Administration tool or portal and description	**URL or location**
WebSphere Integrated Solutions Console The **WebSphere Integrated Solutions Console** is the administration tool for WebSphere. The **WebSphere Integrated Solutions Console** is running on each node computer where WebSphere is installed. Use the console to start and stop applications.	`http://server_node_name:9060/ibm/console` Where *server_node_name* is the name or IP address of a node computer where WebSphere is installed. Leave the **User ID** box blank.
IBM Cognos Configuration Use **IBM Cognos Configuration** to configure settings for IBM Cognos Business Intelligence.	`/opt/IBM/cognos/c10_64/bin64/cogconfig.sh` **IBM Cognos Configuration** is installed on the Business Intelligence (BI) node computer.
IBM Cognos Connection Use **IBM Cognos Connection** to access reports. **IBM Cognos Administration** Use **IBM Cognos Administration** to configure IBM Cognos BI, such as add data source connections and set security.	`http://bi_node_name/ibmcognos` Where *bi_node_name* is the name or IP address of BI node computer.

Table 21. Administration tool and product portal reference (continued)

Administration tool or portal and description	URL or location
IBM SPSS Collaboration and Deployment Services Deployment Manager Use **IBM SPSS Collaboration and Deployment Services Deployment Manager** to configure IBM SPSS server settings.	`http://`*`analytics_node_name`*`:9080/config` Where *`analytics_node_name`* is the name or IP address of Predictive Analytics node computer. The default user name is **`admin`**. The default password is **`admin`**.
IBM InfoSphere Master Data Management Collaboration Server	`http://`*`mdm_node_name`*`:7507` Where *`mdm_node_name`* is the name or IP address of Master Data Management (MDM) node computer. The default user name is **`Admin`**. This value is case sensitive. The default password is **`trinitron`**. This value is case sensitive. You must also enter a company name. The default company name is `IBMPMQ`.

Notices

This information was developed for products and services offered worldwide.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service. This document may describe products, services, or features that are not included in the Program or license entitlement that you have purchased.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd.
19-21, Nihonbashi-Hakozakicho, Chuo-ku
Tokyo 103-8510, Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

© Copyright IBM Corp. 2013

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Software Group
Attention: Licensing
3755 Riverside Dr
Ottawa, ON K1V 1B7
Canada

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

IBM, the IBM logo and ibm.com are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at " Copyright and trademark information " at www.ibm.com/legal/copytrade.shtml.

The following terms are trademarks or registered trademarks of other companies:

- Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.
- Intel, Intel logo, Intel Inside, Intel Inside logo, Intel Centrino, Intel Centrino logo, Celeron, Intel Xeon, Intel SpeedStep, Itanium, and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
- Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.
- UNIX is a registered trademark of The Open Group in the United States and other countries.
- Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.