



## Upgrading to Pentaho Business Analytics 4.8



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# Contents

Introduction.....	5
New Features in 4.8.....	6
Introducing Pentaho Mobile.....	6
Introducing Instaview.....	6
New Features in Big Data.....	6
New Features in Pentaho Data Integration.....	7
New Features in Analyzer, Dashboards, and Interactive Reporting.....	8
New Features in Information Assets.....	9
Best Practices for Production Upgrades.....	10
Prerequisites.....	11
Backing Up.....	12
Stopping the Solution Database Service on Windows.....	12
Renaming Your Old Pentaho Installation.....	13
How to Check Your Java Version.....	14
Upgrading the BA Server.....	15
Manual WAR Deployment.....	15
Manual Deployment Upgrade Checklist.....	15
Obtaining the Pentaho BA Server Build Materials.....	17
Changes to the Solution Database.....	17
The Solution Database: Upgrading the Quartz Schema.....	17
Removing the Xalan JAR for JBoss Deployments.....	17
Copying the Oracle Quartz JAR Pre-Build.....	18
Installing the Analysis Enterprise Edition Plugin.....	18
Building New WAR Files.....	19
Rebuilding the Solutions Directory.....	21
Adding Linux and OS X Support for Printing Analyzer Geo Maps.....	21
Adding Windows Support for Printing Analyzer Geo Maps.....	22
Installing Pentaho User Console Plugins.....	22
Archive-Based Deployment.....	23
Archive Deployment Upgrade Checklist.....	23
Obtaining the Installation Materials.....	24
Deploying the BA Server.....	25
Business Analytics Graphical Installer Deployment.....	32
Graphical Installer Deployment Upgrade Checklist.....	32
Obtaining the Installation Materials.....	33
Deploying the BA Server.....	34
Migrating Your Solutions.....	42
Merging Your BA Server Configuration Files.....	43
Updating pentahoObjects.spring.xml.....	43
Updating applicationContext-spring-security.xml.....	44
Updating web.xml.....	44
Upgrading Your Single-Sign On Configuration.....	45
CAS Property Reference.....	45
Upgrading the Pentaho Enterprise Console.....	47
Moving JDBC Drivers.....	48
Testing Your New BA Server.....	49
Upgrading the Pentaho Client Tools.....	50
Post-Upgrade Configuration.....	51
Cleanup.....	52
Compatibility Matrix: Supported Components.....	53
JDBC Drivers.....	57
Troubleshooting.....	76

File Names and Paths.....	76
Examining Log Files.....	76
JDBC Driver Problems.....	76
Unable to Use the Database Init Scripts for PostgreSQL.....	76
context.xml Changes Do Not Take Effect After Re-deploying a WAR.....	76
Tomcat Logs Report Memory Leaks.....	76
User Console Themes Render Improperly After Upgrade.....	77

# Introduction

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This guide provides procedures and advice for system administrators who are upgrading from the Pentaho BA Suite Enterprise Edition 4.5.0-GA to Pentaho Business Analytics version 4.8.0-GA. This encompasses the BA Server (formerly "BI Server"), DI Server and any Pentaho client tools that you may have purchased licenses for. **This guide is not intended for upgrades to or from any other Business Analytics or BA Suite version, including release candidates (RC) and betas.**

If you only need to update the Pentaho Data Integration server and client tools, you may find it easier to follow the *Pentaho Data Integration 4.3 to 4.4 Upgrade Guide* instead of trying to follow only the PDI sections of this larger Business Analytics document.

You must upgrade to the latest BA and DI Server versions using either archive packages or the manual WAR build and deployment process (BA Server only). Once the new version is installed, migrate your solutions and server configuration settings from the old instance to the new one. Upgrading the Pentaho client tools is a much simpler operation that will take less time and effort. If you have a large number of client tool deployments, however, you may want to find a way to automate part or all of the client tool upgrade process.



**Warning:** Do not skip ahead! Optional procedures are clearly defined. If you omit any required part of the upgrade process, you **will** be left with a non-functioning configuration and will very likely have to restore your previous configuration and start over from the beginning.

## New Features in 4.8

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There are many new features available in Pentaho Business Analytics 4.8. We highlight some of these features so you can easily see the difference between the new version of Pentaho Business Analytics and the previous version. Review the content on highlighted features of 4.8 to decide if updating to the newest version of Pentaho Business Analytics can benefit your situation.

### Introducing Pentaho Mobile

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Pentaho is pleased to introduce Pentaho Mobile.

**Pentaho Mobile enables you to access business analytics content while on-the-go, using the Apple iPad.**

Pentaho Mobile allows you to

- Browse your repository
- View your reports and drill deeper into your data
- Deep dive your data using ad-hoc OLAP analytics
- Mark reports as favorites for easy access
- Set default start-up reports

and many other features that allow for quicker and easier access to the data you need.

### Introducing Instaview

---

Pentaho is excited to present Pentaho Instaview.

**Pentaho Instaview is the fast way to start using PDI to analyze and visualize data.** Instaview uses templates to manage the complexities of data access and preparation. Business analysts, data scientists, and database administrators can focus only on selecting and filtering the data they want to explore.

Once the data has been selected, Instaview automatically generates transform and metadata models, executes them, and launches Pentaho Analyzer. This allows you to explore your data in the PDI desktop user interface.

With Instaview, you no longer have to set up a staging database, understand ETL transforms, learn about metadata models, or publish to a server before visualizing data. As data requirements become more advanced, you have the ability to create your own templates and use the full power of PDI.

### New Features in Big Data

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There are several features in Pentaho Business Analytics 4.8 that benefit you if you work with big data technologies. Some features highlighted are the new Hadoop shim and job steps using **Sqoop**, **Oozie**, and **Avro**. Pentaho also now supports Cloudera's Distribution Including Apache Hadoop (CDH) version 4 and improvements to the **Cassandra Input** transformation step and the **MongoDB Input** step.

#### Hadoop Shim

- **The new Hadoop Shim is an insulation layer between Pentaho Big Data technologies and the underlying accessed Hadoop distribution.**
  - The Hadoop Shim allows easy configuring for specific Hadoop distributions and versions.
  - The Hadoop Shim is used by all Pentaho applications that access Hadoop data, including PDI, BA Server and DI Server.
  - Users accessing data do not have to manually remove files and libraries and hand copy new ones.
  - To change to a different Hadoop version, you only need to change a single setting in a config file.
  - The libraries for the most popular Hadoop distributions and versions are included.

## Sqoop

- **A new job step allows PDI to orchestrate importing and exporting data between the Hadoop Distributed File System (HDFS) and relational databases using Apache Sqoop.**
  - Sqoop implements MapReduce to perform the bulk movement of data, which provides fast parallel operation as well as fault tolerance.

## Oozie

- **A new job step allows PDI to orchestrate Oozie workflows within PDI jobs.**
  - Oozie is a workflow/coordination system that manages Apache Hadoop jobs and is integrated with the rest of the Hadoop stack.
  - PDI's ability to integrate with countless off-Hadoop technologies and Oozie's use of Hadoop's speed and scalability make for a powerful combination.

## Avro

- **A new transformation step for reading and decomposing the rich data structures stored using the Apache Avro serialization format and turning them into a data stream.**
  - The data can now be transformed using the many PDI transformation steps and then can later be used for reporting, analysis or storage in another system.

## CDH4

- **Pentaho Big Data now supports Cloudera's Distribution Including Apache Hadoop (CDH) version 4.**

## Performance Enhancements and Improvements

- **Pentaho has made changes to the Cassandra Input transformation step and the MongoDB Input step. These increase performance for the user.**

## New Features in Pentaho Data Integration

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There are many new features in Pentaho Data Integration (PDI) 4.4 that can make your business analysis even more powerful. Some features highlighted are the new PDI Operations Mart, and new steps such as the **Concat** step, **SAS Input** step, and **EDI to XML** step.

### PDI Operations Mart

- **The new PDI Operations Mart enables administrators to collect and query PDI log data into one centralized data mart for easy reporting and analysis.**
  - The operations mart has predefined samples for Pentaho Analyzer, Interactive Reporting, and Dashboards. Individualized reports can be self-crafted.
 

Sample inquiries include

    - How many jobs/transformations have been successful vs. failed in a given period?
    - How many jobs/transformations are currently running?
    - What are the longest running jobs or transformations in a given period?
    - What is the highest failure rate of job/transformations in a given period?
    - How many rows have been processed in a particular time period? This allows you to see a trend of rows/time in time series for selected transformations.
  - The operations mart provides setup procedures for MySQL, Oracle, and PostgreSQL databases.
  - Install instructions for the PDI Operations Mart are available in the Pentaho InfoCenter.

### New Concat Fields Step

- **The Concat Fields step is used to concatenate multiple fields into one target field.**

- The fields can be separated by a separator and the enclosure logic is completely compatible with the **Text File Output** step.
- This step is very useful for concatenation of fields as key/value pairs for the Hadoop **MapReduce Output** step.

### New SAS Input Step

- **The new SAS Input step reads files in sas7bdat format created by SAS software.**
  - This new step allows PDI developers to import files in sas7bdat format.

### New EDI to XML Step

- **The EDI to XML step converts EDI message text, which conforms to the ISO 9735 standard, to generic XML.**
  - The XML text is more accessible and allows for selective data extraction using XPath and the **Get Data From XML** step.

## New Features in Analyzer, Dashboards, and Interactive Reporting

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Improvements in Pentaho Analyzer, Dashboards, and Interactive Reporting can help you perform powerful business analysis. Some features highlighted are enhancements in visualization and speed, as well as the presentation and analysis of data.

### Pentaho Analyzer

- **A Column-Line Combo chart visualization**
  - Business analysts can include the new Column-Line Combo visualization in their Analyzer reports, which makes it easier for them to make strategic business decisions.
- **Client-side chart rendering that improves the performance of interactivity**
  - The new client-side chart rendering makes visualization interactivity faster by limiting server-client latency.
- **An increased number of maximum plot points configurable per chart type**
  - Each chart type now has a unique limit on the maximum number of plot points. Reasonable defaults are set, but these limits can be increased to support a larger volume of data display.
- **The ability to show missing rows of data**
  - Some reports and visualizations benefit from the display of missing data rows that were previously hidden by default. This setting can be changed by the user on a report-by-report basis.
- **Support for drill-through when filters are applied**
  - An improvement to Analyzer's MDX generation makes it possible to support drill-through to underlying records even when filters are applied. Previous reports that used a workaround for drill-through support may now benefit from simplification.
- **A consolidated toolbar that increases the available report area**
  - Users have an enhanced canvas to work with.

Enhancements in reporting include

### Pentaho Interactive Reporting

- **Enhanced report filtering, including the ability to create grouped constraints**
  - Report authors can now create more advanced filter conditions including grouped constraints, for example a filter definition such as "(Territory = EMEA AND Sales > 1,000) OR (Territory = APAC AND Sales > 500)"

Enhancements in dashboard designs include

### Pentaho Dashboard Designer

- **Ability to print a screenshot of dashboards created using Pentaho Dashboard Designer or print individual dashboard panels within a dashboard.**



- Dashboard users can now print a screenshot of a dashboard or an individual dashboard panel. Dashboard printing applies to dashboards created with Pentaho Dashboard Designer and the printing capability must be enabled by an administrator.

## New Features in Information Assets

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We have made improvements that enable you to easily find the content you are looking for. We have added a guide that enables developers to more easily customize PDI, as well as a two guides written for new Pentaho Business Analytics offerings.

### New Pentaho Data Integration Software Development Kit

- **The new *Extending and Embedding Pentaho Data Integration* guide enables developers to utilize PDI beyond the out-of-the box experience.**
  - The new guide explains the mechanics of extending PDI plugins. It also explains embedding PDI functionality directly into Java applications. We provide sample code for all plugin types and embedding scenarios.

### Reorganization of the Pentaho InfoCenter

- **The Pentaho InfoCenter has been organized into user sections.**
  - It is easier to find the information that you need in the reorganized Pentaho InfoCenter. Guides are organized by user category, so you can click on your category and instantly navigate to the guide that you need.

## Best Practices for Production Upgrades

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In order to minimize downtime for your users and ensure the integrity of your solution data, it's best to perform the upgrade on a test server that has an exact copy of your production BA Server. Once you've verified the upgrade process on your test machine, you can perform the same procedure on your production server with confidence.

You can work with your test server at any time without having to worry about disturbing your users, but you may want to schedule the production upgrade for a weekend, evening, or other period of planned downtime so that no users are interrupted in the process.

Some users may need additional training or documentation for Interactive Reporting, Pentaho Data Integration, and Analyzer. The latest Pentaho documentation can always be found in the Pentaho InfoCenter at <http://infocenter.pentaho.com>. In addition, Pentaho now provides most of its Enterprise Edition documentation in PDF format with every BA Server archive package and the graphical installer. To access the PDFs, log into the Pentaho User Console and go to the **Help** menu. Most of the Pentaho client tools also ship with up-to-date PDF documentation.

To arrange for Web-based or classroom training sessions, contact your Pentaho sales representative.

## Prerequisites

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To complete the upgrade, you need the following:

- A currently running Pentaho BA Server Enterprise Edition version 4.5-GA. **Other BA Server versions are not covered or supported in this guide.**
- A test server or virtual machine that contains a software environment identical to your production server.
- The knowledge and permissions to access and make changes to your production server.
- Administrator permissions in your existing Pentaho Enterprise Console.
- Sufficient time to complete each phase of the upgrade. The exact amount of time depends on the complexity of your security infrastructure, the size of your solution repository database, and the speed of your server hardware.
- See the *Compatibility Matrix: Supported Components* to ensure that you have the correct versions of hardware, drivers, and software.

## Backing Up

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**Warning:** You must quit all Pentaho programs and stop all Pentaho-related services (including the BA Server, DI Server, Pentaho Enterprise Console, and the solution database) before creating backups. After this point, do not start any of these programs or services until directed to do so.

Before you proceed with a production upgrade, you should back up every part of the BA Server that will change. The easiest way to back up a directory is to create a compressed archive of it. Generally on a Windows system you would use the Zip or RAR formats through programs like 7-zip or WinRAR. On Linux, BSD, and Solaris, you would use GNU Tar or bsdtar. No matter which program you use, you should end up with either one single file that encompasses the entire `/pentaho/` directory (for graphical installer and archive deployments), or the `/pentaho/` directory plus the **pentaho.war** file from your application server (for manual deployments).

### Stopping the Solution Database Service on Windows

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If you installed the BA Server on Windows through the graphical installation utility, the solution database will be running as a Windows service. To stop this service, go to the **Service Manager** in the Windows Control Panel, then stop the **Pentaho Solution Repository** service.

## Renaming Your Old Pentaho Installation

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Before you proceed, ensure that your BA Server, DI Server, and Pentaho Enterprise Console servers are stopped.

Rename your old `/pentaho/server/` directory to **`/pentaho/server_old/`** or some other appropriate name. Alternatively, you can move this directory to a different location.

```
mv /home/pentaho/pentaho/server/ /home/pentaho/pentaho/server_old/
```



**Note:** None of the software installed to this directory works while it is renamed. If you need to abort the upgrade and start any servers in the server directory, you must rename it back to **`server`**.

## How to Check Your Java Version

---

Pentaho Business Analytics requires a Java Runtime Environment (JRE) or Java Development Kit (JDK). Follow this procedure to see which version of Java is installed on your system and configured to be the default Java executable. There may be multiple JREs or JDKs on your system, but only one can be set as the global default. If a particular JRE or JDK is not specified by an application on startup, the default is used. Pentaho establishes a specific system variable named **PENTAHO\_JAVA\_HOME** to declare which Java instance it will use.

1. Open a terminal or command prompt window.
2. Type this command in: **java -version** and press **Enter**.

Along with the Java version, the bit-ness, 32-bit or 64-bit, and patch level also shows in the output. For example ...

```
java version "1.6.0_21"  
Java(TM) SE Runtime Environment (build 1.6.0_21-b06)  
Java HotSpot(TM) 64-Bit Server VM (build 17.0-b16, mixed mode)
```

# Upgrading the BA Server


There are three upgrade paths for the BA Server, depending on how you installed the previous Pentaho release:

- 1. Manual deployment:** If you built a Pentaho WAR and deployed it to your own application server, you will follow the same process to upgrade it. After the WAR is deployed, you'll merge your old pentaho-solutions directory with the new one, then upgrade the Pentaho Enterprise Console. Client tools are upgraded separately by using archive packages. The instructions for this path begin here: [Manual WAR Deployment](#) on page 15.
- 2. Archive deployment:** If you deployed Business Analytics from individual archive packages, you'll download 4.8.0-GA packages, unpack them, and merge your old pentaho-solutions directory with the new one. The instructions for this path begin here: [Archive-Based Deployment](#) on page 23.
- 3. Graphical installer deployment:** If you previously used the graphical installation utility to install a Business Analytics environment, the easiest upgrade path is to use a BA Server archive package to replace Enterprise Console and the BA Server, then merge your old pentaho-solutions directory with the new one. The instructions for this path begin here: [Business Analytics Graphical Installer Deployment](#) on page 32.

Refer to the sections below that refer to your chosen upgrade path.

## Manual WAR Deployment

If you previously used the manual deployment process to build a BA Server WAR, you should use the same process to upgrade to 4.8.0-GA.

 **Note:** If you aren't making any custom changes to the WAR, and you aren't running any other applications on your application server, it may be easier to use the archive-based deployment method instead. The BA Server archive package includes a preconfigured Tomcat 6.0 server with the pentaho.war already deployed.

## Manual Deployment Upgrade Checklist

The Upgrade Checklist is a concise list of instructions intended to show a high-level overview of the upgrade process. It also serves as a method of verifying that each task is performed in the correct order. You may find it useful to print the checklist out and physically mark each step in the Done column as you complete it. **The checklist is not the complete instruction set;** consult the verbose instructions throughout this guide for more details on each step.

Step	Procedure	Done
Step 1	Download the upgrade materials from the Pentaho Customer Support Portal.	
Step 2	Stop your application server, the Pentaho Enterprise Console server, and your solution database.	
Step 3	Back up your <code>/pentaho/</code> directory and the Pentaho Web application (pentaho.war or the uncompressed WAR directory in your application server's deploy or webapps directory).	
Step 4	Rename the <code>/pentaho/server/</code> directory to <code>/pentaho/server_old/</code> .	
Step 5	Unpack the biserver-manual-ee package to a temporary location.	
Step 6	Upgrade the Oracle schema for the existing solution database	
Step 7	Remove the BA Server's Xalan JAR from the build materials.	
Step 8	If you are using an Oracle solution repository, copy the <b>quartz-oracle-x.x.x.jar</b> file to the appropriate directory to be included in the WAR build.	
Step 9	If you have made any changes to <b>web.xml</b> , merge your customizations with the <code>/biserver-manual-ee/build-resources/pentaho-webapp/WEB-INF/web.xml</code> file, then copy that merged file to the <code>/biserver-manual-ee/build-resources/WEB-INF/</code> directory.	
Step 10	Copy your old <b>context.xml</b> file (for Tomcat deployments), or your <b>pentahoHibernate-ds.xml</b> and <b>quartz-ds.xml</b> files (for JBoss deployments) to the <code>/biserver-manual-ee/build-resources/custom-pentaho-webapp/META-INF/</code> directory.	

Step	Procedure	Done
Step 11	If you have a Pentaho Analysis Enterprise Edition license, unpack the pentaho-analysis-ee archive to a temporary location, then copy the requisite JARs to the <code>/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/lib/</code> directory, and the requisite configuration files to the <code>/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/classes/</code> directory.	
Step 12	Build new Pentaho WAR packages with the BA Server 4.8.0 manual deployment materials.	
Step 13	Remove the old pentaho.war and pentaho-style.war files or directories from your application server's webapps or deploy directory.	
Step 14	Delete any old Pentaho-related temporary files or directories created by your application server.	
Step 15	Copy the new WARs to the <code>/server/webapps/</code> directory in Tomcat, or the <code>/server/default/deploy/</code> directory in JBoss.	
Step 16	Create a new <code>/pentaho/server/biserver-ee/</code> directory in the same location as the old one that you renamed earlier, and move the <code>/biserver-manual-ee/build/pentaho-solutions/</code> directory to it.	
Step 17	Unpack any Pentaho User Console plugins you may have licenses for (Analyzer, Dashboard Designer, Interactive Reporting, Mobile) to the <code>/pentaho/server/biserver-ee/pentaho-solutions/system/</code> directory.	
Step 18	Copy all of your solutions directories from the <code>/pentaho/server_old/biserver-ee/pentaho-solutions/</code> directory to the new one.	
Step 19	Copy the files documented in <a href="#">Merging Your BA Server Configuration Files</a> on page 43 to the new pentaho-solutions directory.	
Step 20	Edit the following files and merge in the changes as instructed: <code>pentahoObjects.spring.xml</code> , <code>applicationContext-spring-security.xml</code> , and <code>web.xml</code> .	
Step 21	Perform the documented steps for upgrading single-sign on if you previously used this as your authentication method.	
Step 22	If you're a PDI Enterprise Edition customer, continue on to the section that describes the DI Server upgrade process.	
Step 23	Unpack the new Pentaho Enterprise Console from the archive package to the <code>/pentaho/server/</code> directory.	
Step 24	Copy the following files from the old Pentaho Enterprise Console to the new one: <code>console.xml</code> , <code>console.properties</code> , <code>login.properties</code> , <code>login.conf</code> , <code>log4j.xml</code> ; and the entire <code>/resource/config/hsqldb/</code> directory.	
Step 25	If you have not already done so, move data source JDBC driver JARs from the old directories to the new ones. This includes the BA Server and Enterprise Console.	
Step 26	Start your solution database, Tomcat or JBoss service, and the Pentaho Enterprise Console and check for any obvious errors or failures in the console output or log file.	
Step 27	<b>Ensure that all of your content is accessible.</b> Log into the Pentaho User Console and verify that your product licenses work. Run a new report in Interactive Reporting to ensure that it is ready for production. Verify at least two existing analysis views or Analyzer reports for each data source. Verify that any previously created dashboards are functioning properly. Run all reports that have been published from Report Designer. Lastly, check all of your schedules to ensure that they are still properly configured and operational.	
Step 28	On workstations, unpack applicable client tools to the empty <code>/pentaho/design-tools/</code> directory.	



Step	Procedure	Done
Step 29	Verify that all client tools can access old content and publish to the BA Server. Verify that PDI can connect to the DI Server, if applicable.	
Step 30	Remove the <code>/pentaho/server_old/</code> directory on each upgraded machine, and any archive packages and temporary directories you used during the upgrade.	

## Obtaining the Pentaho BA Server Build Materials

Enterprise Edition customers can obtain the BA Server build package from the Pentaho Customer Support Portal by using their Pentaho account login credentials. If you are unfamiliar with these details, consult the Welcome Kit provided to you by Pentaho customer support as part of the Enterprise Edition enablement process.

The only strictly required package is `biserver-manual-ee-4.8.0-GA.zip`. It is platform-agnostic, so there is only one download for all operating systems, databases, and application servers. Download and unpack this file to a directory approved by your system administrator. The location does not matter to the BA Server, but it should be in a directory that is not over- or under-restricted by the operating system. This directory and the files in it are only used for building the BA Server. Once the software has been configured and built, it will be deployed directly to your application server as a WAR archive.

### Packages

The packages you will need for a Windows, Linux, Solaris and Mac OS servers are:

- **BA Server:** `biserver-manual-ee-4.8.0-GA.zip`
- **Dashboard Designer:** `pdd-plugin-ee-4.8.0-GA.zip` (if licensed)
- **Interactive Reporting:** `pir-plugin-ee-1.1.0-GA.zip` (if licensed)
- **Analyzer:** `paz-plugin-ee-4.8.0-GA.zip` (if licensed)
- **Pentaho Enterprise Console:** `pec-4.8.0-GA.zip`
- **Pentaho Mobile:** `pentaho-mobile-plugin-ee-4.8.0-GA.zip` (if licensed)

## Changes to the Solution Database

The default solution database engine for the 4.5.0-GA release of the Pentaho BA Server was MySQL. The default solution database engine for the 4.8.0-GA release of the Pentaho BA Server is PostgreSQL. If you are accustomed to using the default solution database or just wish to keep your existing solution database, Pentaho's recommendation for migrating from 4.5.0-GA to 4.8.0-GA is to configure your 4.8.0-GA BA Server to use your existing 4.5.0-GA solution database instance. There is no technical reason that you need to switch to the default PostgreSQL technology.

The proper configuration copies over as part of the exercise in the section [Merging Your BA Server Configuration Files](#). No additional instructions are necessary to make this change.

## The Solution Database: Upgrading the Quartz Schema

The Quartz scheduling engine has been upgraded in the Pentaho BA Server 4.8.0-GA. As part of the upgrade, several columns were changed or added to the Quartz tables. Follow the instructions below to upgrade the Quartz schema that is part of your existing solution database.

1. Navigate to `/pentaho/server/biserver-ee/data/<RDBMS>`, where `<RDBMS>` is the type of solution database RDBMS that your 4.5.0-GA installation is configured to use (`oracle10g`, `postgresql`, or `mysql5`).
2. Execute the `migrate_quartz_<rdbms>.sql` script using your preferred utility. For example, to upgrade the Quartz schema for a MySQL solution database, you would execute the following:

```
mysql -u root -p <migrate_quartz_mysql.sql
```

Your solution database Quartz schema is up-to-date.


## Removing the Xalan JAR for JBoss Deployments

JBoss 5.1 includes a Xalan JAR file that interferes with one included in the BA Server; they are different versions, so there is a class-cast exception whenever Xalan is called by BA Server content.

To fix this problem, remove the Xalan JAR from the BA Server build materials before building the WAR:

```
rm ./biserver-manual-ee/build-resources/pentaho-third-party/xalan-2.6.0.jar
```

This will force the BA Server to use the newer JBoss-supplied Xalan instance.

 **Note:** If you've already built a WAR and don't want to rebuild it, you can unpack the WAR and remove this JAR from the lib directory by hand.

## Copying the Oracle Quartz JAR Pre-Build


This section is only for administrators who are using an Oracle database for the Pentaho solution repository. You do not need to do this for Oracle data sources; only for Oracle solution repositories.

1. Create a `/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/lib/` directory.
2. Copy the `/biserver-manual-ee/build-resources/pentaho-third-party/quartz-oracle-1.7.2.jar` to the newly created `/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/lib/` directory.

The WAR build process includes the defined file. You are ready to proceed to the WAR build instructions.

## Installing the Analysis Enterprise Edition Plugin

Follow the instructions below to install the Pentaho Analysis Enterprise Edition package, which contains Analysis engine enhancements for large ROLAP deployments. This procedure does not cover Pentaho Analyzer installation.

 **Note:** If you are performing a manual WAR build and deployment, and you want to add the Pentaho Analysis Enterprise Edition JARs into the WAR pre-build, you can substitute `/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/` for `/WEB-INF/` references below.

1. If you have not already done so, retrieve the **pentaho-analysis-ee-4.8-GA** package from the Pentaho Customer Support Portal (login credentials were emailed to you with your Welcome Kit).
2. Unpack the archive to a temporary location.
3. If it is currently running, shut down the BA Server.
4. Copy only the following JARs from the `/pentaho-analysis-ee/lib/` directory to the `/tomcat/webapps/pentaho/WEB-INF/lib/` directory.
  - `infinispan-core-4.2.1.FINAL`
  - `jboss-transaction-api-1.0.1.GA`
  - `jcip-annotations-1.0`
  - `jgroups-2.12.0.CR5`
  - `marshalling-api-1.2.3.GA`
  - `memcached-0.0.1-PENTAHO`
  - `pentaho-analysis-ee-3.4.0-GA-obf`
  - `river-1.2.3.GA`
5. Copy all of the configuration files from `/pentaho-analysis-ee/config/` to the `/tomcat/webapps/pentaho/WEB-INF/classes/` directory.
6. Depending on the installation type; there would not be a **pentaho.war** (in archive based installations and executable based installations the **pentaho.war** is already deployed and the application will show as: `/tomcat/webapps/pentaho/`).
7. Remove the temporary **pentaho-analysis-ee** directory.

Pentaho Analysis Enterprise Edition is now installed with the default Infinispan configuration.

If you need to switch from Infinispan to Memcached, continue to the next section.

### Switching to Memcached

In order to complete this procedure, you must have your own pre-configured Memcached instance. You should have also installed the Analysis Enterprise Edition package to your BA Server or standalone Mondrian engine.

If you already use the Memcached cache framework in your organization and would like to hook it up to the Pentaho Analysis ROLAP engine, follow the directions below to switch from the default Infinispan cache framework configuration.



**Caution:** Pentaho and Mondrian developers recommend against using Memcached. You are almost certain to have better performance with Infinispan.

1. If the BA Server or standalone Mondrian engine are running, shut them down now.
2. If you performed a default install of the Pentaho Analysis Enterprise Edition package, then you should have all of the required JARs installed to the BA or Mondrian server. If you aren't sure, verify now that the following JARs are present in the `/WEB-INF/lib/` directory inside of your deployed `pentaho.war` or Mondrian engine:
  - `pentaho-analysis-ee`
  - `commons-lang`
  - `commons-io`
  - `commons-codec`
  - `pentaho-ee-dsc-core`
  - `memcached`
3. Edit the **pentaho-analysis-config.xml** in the `/WEB-INF/classes/` directory inside the deployed `pentaho.war` or Mondrian engine, and change the value of **SEGMENT\_CACHE\_IMPL** to match the class name referenced below:

```
<entry key="SEGMENT_CACHE_IMPL">com.pentaho.analysis.segmentcache.impl.memcached.MemcachedSegmentCache</entry>
```

4. Edit the **memcached-config.xml** in the `/WEB-INF/classes/` directory inside the deployed `pentaho.war` or Mondrian engine, and change the values of **SALT**, **SERVERS**, and **WEIGHT** to match your preference:

```
<entry key="SALT">YOUR SECRET SALT VALUE HERE</entry>
<entry key="SERVERS">192.168.0.1:1642,192.168.0.2:1642</entry>
<entry key="WEIGHTS">1,1</entry>
```

Your Pentaho Analysis Enterprise Edition instance is now configured to use Memcached for ROLAP segment caching.

### Memcached Configuration Options

These properties control Memcached settings, and are set in the **memcached-config.xml** file in the `/WEB-INF/classes/` directory inside of your deployed `pentaho.war` or Mondrian engine.



**Note:** This is not a comprehensive list of the potential Memcached settings; the options explained below are the ones most critical to Memcached configuration for Pentaho Analysis.

Property	Purpose
SERVERS	A comma-separated list of servers and port numbers representing the Memcached nodes usable by the plugin.
WEIGHTS	A comma-separated list of numbers representing the relative caching capacity of the servers defined in the SERVERS property. There must be exactly as many values of WEIGHTS as there are values of SERVERS. As an example, if the first server has a capacity of 128 megabytes, and the second has a capacity of 256 megabytes, the correct values for the WEIGHTS property should be "1,2", indicating that the first server has a relative size of half of the second one.
SALT	A secret key prefix to be used when saving and loading segment data from the Memcached nodes. This property must be the same for all Mondrian nodes that share their caches. If the SALT value is different from one node to the next, the nodes will not be able to share their cache data.

### Building New WAR Files

We advise you to keep your 4.5 WAR files in case you have to merge some of your content. However, you must build and deploy new Web Application Archive (WAR) files as part of the Pentaho 4.8 upgrade if you want to use your own application server.

## Building and Deploying a New JBoss WAR

Ensure that the application server and solution database are halted before continuing with the upgrade.

This process walks you through building a new `pentaho.war` and deploying it to your application server. You will have to adjust the paths in the examples to match your environment.

1. If you have made any customizations to your old **web.xml** file in the `/jboss/server/default/deploy/pentaho.war/WEB-INF/` directory, merge them into the new `web.xml` in `/biserver-manual-ee/build-resources/pentaho-webapp/WEB-INF/` and copy the merged file to `/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/`.
2. Open a terminal window and navigate to the `/biserver-manual-ee/` directory.
3. Run the following Ant command, changing the database to whichever one you're currently using for your solution repository: `ant -Darchive.target=war-pentaho-jboss-no-portal -Ddb=mysql5`

This builds an application server- and database-specific WAR. Possible database values are:

- `mysql5`
- `postgresql`
- `oracle10g`

4. Delete all of the old Pentaho WARs from the `/jboss/server/default/deploy/` directory. The relevant files are: `pentaho.war` and `pentaho-style.war`.
5. Copy the newly-built `pentaho.war` file from the `/biserver-manual-ee/build/pentaho-wars/jboss/portal/` directory to your existing `/jboss/server/default/deploy/` directory.
6. Copy the newly-built `pentaho-style.war` file from the `/biserver-manual-ee/build/pentaho-wars/` directory to your existing `/jboss/server/default/deploy/` directory.
7. Delete the `/jboss/server/default/tmp/` and `/jboss/server/default/work/` directories. These directories contain temporary files that, when missing, will force your application server to recompile all of your JSPs. This is a necessary step and will not cause any harm to JBoss.

Your instance of the Pentaho BA Server is updated to version 4.8, though there is much more to do before your upgrade is complete.

## Building and Deploying a New Tomcat WAR

Ensure that the application server and solution database are halted before continuing with the upgrade.

This process walks you through building and deploying a new BA Server WAR archive for Tomcat 6. You will have to adjust the paths in the examples to match your environment.

1. Copy your current **context.xml** file from your old Pentaho WAR directory to the **META-INF** subdirectory in `/biserver-manual-ee/build-resources/custom-pentaho-webapp/`.



**Note:** If you have made any changes to `context.xml`, you must delete the **pentaho.xml** file that Tomcat automatically generates based on the `context.xml` embedded in the Pentaho WAR. Tomcat will not overwrite this file on its own, so any `context.xml` changes will not be recognized until the old `pentaho.xml` is removed. Typically this file is located in `/tomcat/conf/Catalina/localhost/`. If this file is not present, then you probably didn't make any changes to `context.xml` and there is nothing to worry about.

```
cp /pentaho/server/biserver-ee/tomcat/webapps/pentaho/META-INF/context.xml /home/pgibbons/biserver-manual-ee/build-resources/custom-pentaho-webapp/META-INF/
```

2. If you have made any customizations to your old **web.xml** file in the `/tomcat/webapps/pentaho/WEB-INF/` directory, merge them into the new `web.xml` in `/biserver-manual-ee/build-resources/pentaho-webapp/WEB-INF/` and copy the merged file to `/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/`.
3. Delete the unpacked WAR directories in `/tomcat/webapps/`, which are: **pentaho** and **pentaho-style**.
4. Open a terminal window and navigate to the `/biserver-manual-ee/` directory.
5. Run the following Ant command, changing the database to whichever one you're currently using for your solution repository: `ant -Darchive.target=war-pentaho-tomcat -Ddb=mysql5`

This builds an application server- and database-specific WAR. Supported database values are:

- `mysql5`

- postgresql
  - oracle10g
6. Copy the newly-built `pentaho.war` from the `/biserver-manual-ee/build/pentaho-wars/tomcat/` directory to your existing `/tomcat/webapps/` directory.  
All of the WARs you deploy will automatically unpack when Tomcat starts, and create new directories to replace the ones you deleted previously.
  7. Copy the `pentaho-style.war` file from the `/biserver-manual-ee/build/pentaho-wars/` directory to your existing `/tomcat/webapps/` directory.

Your instance of the Pentaho BA Server is now updated to version 4.8.0, though there is much more to do before your upgrade is complete.

## Rebuilding the Solutions Directory

A new `pentaho-solutions` directory was created by the WAR build script that you just executed. Follow these directions to use the new `pentaho-solutions` directory. Modify the paths in the examples to match your scenario.

1. Create a new `/pentaho/server/biserver-ee/` directory in the exact location of the old one, which you earlier renamed to `/pentaho/server_old/biserver-ee/`.

```
mkdir -p /home/pentaho/pentaho/server/biserver-ee/
```


2. Copy the newly-built `pentaho-solutions` directory from `/biserver-manual-ee/build/` to the `/pentaho/server/` directory you just created.


```
cp -r /home/amenethil/downloads/biserver-manual-ee/build/pentaho-solutions/ /home/pentaho/pentaho/server/biserver-ee/
```

You now have a fresh solutions directory. You can now install the latest plugins, and migrate your settings and solutions to it according to the instructions later in this guide.

## Adding Linux and OS X Support for Printing Analyzer Geo Maps

There is an experimental function in Analyzer that enables you to print Geo Map visualizations. Follow the directions below to enable support on Linux and OS X. Windows configuration is covered in [Adding Windows Support for Printing Analyzer Geo Maps](#) on page 22.

 **Note:** Pentaho requires a specific version of **wkhtmltoimage** in order for this print function to work correctly. Even if you have `wkhtmltoimage` installed on your machine, install the Pentaho-supplied version as explained below. It will be explicitly called by Analyzer, and will not interfere with your existing `wkhtmltoimage` instance.

 **Note:** If you used the Business Analytics graphical installer, **skip all steps except the last two.**

1. Navigate to the **wkhtmltoimage** directory in your Pentaho installation. For archive installations, this is `/pentaho/biserver-ee/third-party-tools/wkhtmltoimage/`, and for manual deployments it is `/biserver-manual-ee/build-resources/third-party-tools/wkhtmltoimage/`.
2. For OS X, unpack the **wkhtmltoimage\_mac.tar.bz2** package; for 32-bit Linux, unpack the **wkhtmltoimage\_linux\_i386.tar.bz2** package; for 64-bit Linux, unpack the **wkhtmltoimage\_linux\_amd64.tar.bz2** package.
3. There is only one file in this archive: the executable **wkhtmltoimage**. If the executable has an extension, such as **i386** or **amd64**, rename the file to **wkhtmltoimage**.
4. Move the executable to: `/home/pentaho/pentaho/server/biserver-ee/wkhtmltoimage.` directory.
5. Edit the `/pentaho-solutions/system/pentaho.xml` file and set the value of **<html-to-image-tool>** to the full path to the **wkhtmltoimage** executable that you just unpacked.

```
<html-to-image-tool>/home/pentaho/pentaho/server/biserver-ee/third-party-tools/wkhtmltoimage/wkhtmltoimage</html-to-image-tool>
```

6. Save and close the file, then edit the `/pentaho-solutions/system/analyzer/settings.xml` file and uncomment the following line:


```
<!--open_layers>geomapexport</open_layers-->
```

7. Save and close the settings.xml file.

You have enabled the experimental print feature for Analyzer Geo Map visualizations.

## Adding Windows Support for Printing Analyzer Geo Maps

There is an experimental function in Analyzer that enables you to print Geo Map visualizations. Follow the below directions to enable support on Windows. Linux and OS X configuration are covered in [Adding Linux and OS X Support for Printing Analyzer Geo Maps](#) on page 21.

 **Note:** Pentaho requires a specific version of **wkhtmltoimage** in order for this print function to work correctly. Even if you have wkhtmltoimage installed on your machine, install the Pentaho-supplied version as explained below. It will be explicitly called by Analyzer, and will not interfere with your existing wkhtmltoimage instance.

 **Note:** If you used the Business Analytics graphical installer, **skip all steps except the last two.**

1. Navigate to the **wkhtmltoimage** directory in your Pentaho installation. For archive installations, this is `\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\`, and for manual deployments it is `\biserver-manual-ee\build-resources\third-party-tools\wkhtmltoimage\`.
2. Run the **wkhtmltoimage\_windows\_installer.exe** executable.
3. Accept the license agreement to continue.
4. Uncheck the **wkhtmltopdf** option, then click **Next**.
5. For the **Destination folder**, type in or navigate to the following path, creating the directories if they do not exist: `C:\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\`. Once you have navigated to the path, click **Install**.
6. When the installation is complete, click **Close**, then edit the `\pentaho-solutions\system\pentaho.xml` file and set the value of **<html-to-image-tool>** to the full path to the **wkhtmltoimage** executable that you specified in the installer, including the executable name of the package, which is **wkhtmltoimage**.

```
<html-to-image-tool>C:\pentaho\biserver-ee\third-party-tools\wkhtmltoimage
\wkhtmltoimage</html-to-image-tool>
```

7. Close that file, then edit the `\pentaho-solutions\system\analyzer\settings.xml` file and uncomment the following line:

```
<!--open_layers>geomapexport</open_layers-->
```

8. Save and close the settings.xml file.

You have enabled the experimental print feature for Analyzer Geo Map visualizations.

## Installing Pentaho User Console Plugins

In order to proceed with this task, you must have already purchased an Enterprise Edition license for the products you want to install. Skip this process if you do not have the requisite license.

The Pentaho User Console is built with a plugin architecture that enables you to expand its functionality with new client tools and functions. Follow the directions below to install any of the following plugins:

- Pentaho Analyzer
- Pentaho Dashboard Designer
- Pentaho Interactive Reporting
- Pentaho Mobile

 **Note:** The Pentaho Analysis Enterprise Edition plugin is separate from Analyzer, and requires a different installation process. That process is found in *Installing the Analysis Enterprise Edition Plugin*.

1. If you have not already done so, download the plugin packages from the Pentaho Customer Support Portal. The installation materials list are defined in *Obtaining the Installation Materials*.
2. Unpack the plugin packages to the `/pentaho/server/biserver-ee/pentaho-solutions/system/` directory.

This will create a subdirectory for each plugin that you unpack.

The plugins you downloaded are now installed, though you will still need to merge your solution files and register your licenses. Continue to [Migrating Your Solutions](#) on page 42.

## Archive-Based Deployment

To upgrade the BA Server via archive packages, you'll simply download new packages, unpack them, and merge your BA Server configuration and solutions by hand. Step-by-step instructions are below.

### Archive Deployment Upgrade Checklist

The Upgrade Checklist is a concise list of instructions intended to show a high-level overview of the upgrade process. It also serves as a method of verifying that each task is performed in the correct order. You may find it useful to print the checklist out and physically mark each step in the Done column as you complete it. **The checklist is not the complete instruction set**; consult the verbose instructions throughout this guide for more details on each step.

Step	Procedure	Done
Step 1	Download the upgrade materials from the Pentaho Customer Support Portal.	
Step 2	Stop all Pentaho programs and services, including the solution repository database.	
Step 3	Back up your <code>/pentaho/</code> directory and hibernate and quartz databases.	
Step 4	Rename the <code>/pentaho/server/</code> directory to <code>/pentaho/server_old/</code> , then create a new, empty <code>/pentaho/server/</code> directory.	
Step 5	Unpack the BA Server archive package to the empty <code>/pentaho/server/</code> directory.	
Step 6	Upgrade the Quartz schema in the existing solution database.	
Step 7	Copy any necessary JDBC drivers for your solution database and data sources to the <code>/pentaho/server/biserver-ee/tomcat/lib/</code> directory.	
Step 8	Copy over your old <code>web.xml</code> to the new <code>/tomcat/webapps/pentaho/WEB-INF/</code> directory.	
Step 9	Copy your old <code>context.xml</code> file from the <code>/server_old/biserver-ee/tomcat/webapps/pentaho/META-INF/</code> directory to the new one.	
Step 10	Copy over your old <code>server.xml</code> to the new <code>/tomcat/conf/</code> directory.	
Step 11	Unpack any Pentaho User Console plugins you may have licenses for (Analyzer, Dashboard Designer, Interactive Reporting) to the <code>/pentaho/server/biserver-ee/pentaho-solutions/system/</code> directory.	
Step 12	If you have a Pentaho Analysis Enterprise Edition license, unpack the <code>pentaho-analysis-ee</code> archive to a temporary location, then copy the requisite JARs to the <code>/pentaho/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/lib/</code> directory, and the requisite configuration files to the <code>/pentaho/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/classes/</code> directory.	
Step 13	Remove the Pentaho sample content.	
Step 14	Copy all of your solution directories from the <code>/pentaho/server_old/biserver-ee/pentaho-solutions/</code> directory to the new one.	
Step 15	Copy the files documented in <a href="#">Merging Your BA Server Configuration Files</a> on page 43 to the new <code>pentaho-solutions</code> directory.	
Step 16	Edit the following files and merge in the changes as instructed: <code>pentahoObjects.spring.xml</code> , <code>applicationContext-spring-security.xml</code> , and <code>web.xml</code> .	
Step 17	If you're a PDI Enterprise Edition customer, continue on to the section that describes the DI Server upgrade process.	
Step 18	Copy the following files from the old Pentaho Enterprise Console to the new one: <code>console.xml</code> , <code>console.properties</code> , <code>login.properties</code> , <code>login.conf</code> , <code>log4j.xml</code> ; and the entire <code>/resource/config/hsqldb/</code> directory.	

Step	Procedure	Done
Step 19	Update any Enterprise Edition license keys if necessary.	
Step 20	If you installed the Interactive Reporting plugin, use the license installer utility (or start the BA Server and Enterprise Console and use the license interface in Enterprise Console) to install the Pentaho Reporting Enterprise Edition license key.	
Step 21	Start the solution database, BA Server, and Pentaho Enterprise Console and check for any obvious errors or failures in the console output and log file.	
Step 22	<b>Check that all of your content is accessible.</b> Log into the Pentaho User Console and verify that your product licenses work. Run a new report in Interactive Reporting to ensure that it is ready for production. Verify at least two existing analysis views or Analyzer reports for each data source. Verify that any previously created dashboards are functioning properly. Run all reports that have been published from Report Designer. Lastly, check all of your schedules to ensure that they are still properly configured and operational.	
Step 23	On workstations, remove old client tool directories, then unpack applicable client tools to the empty <code>/pentaho/design-tools/</code> directory.	
Step 24	Verify that all client tools can access old content and publish to the BA Server. Verify that PDI can connect to the DI Server, if applicable.	
Step 25	Remove the <code>/pentaho/server_old/</code> directory on each upgraded machine, and any archive packages and temporary directories you used for the upgrade.	

## Obtaining the Installation Materials

As an Enterprise Edition customer, you can obtain the BA Server and client tool pre-configured packages from the Pentaho Customer Support Portal by using your Pentaho account login credentials. If you are unfamiliar with these details, consult the Welcome Kit provided to you by Pentaho customer support as part of enabling the Enterprise Edition of Pentaho Business Analytics.

The Pentaho Enterprise Console is included in the Pentaho Business Analytics package, so you do not need to download it separately.

The **Pentaho User Console plugins** items below refer to add-ons for the Pentaho User Console, such as Dashboard Designer, Interactive Reporting, Pentaho Mobile, and Pentaho Analyzer.

### Windows

The packages you will need for a Windows server are:

- **BA Server (includes the Pentaho Enterprise Console):** biserver-ee-4.8.0-GA.zip
- **Pentaho Analyzer plugin:** paz-plugin-ee-4.8.0-GA.zip
- **Pentaho Dashboard Designer plugin:** pdd-plugin-ee-4.8.0-GA.zip
- **Pentaho Interactive Reporting plugin:** pir-plugin-ee-1.1.0-GA.zip
- **Pentaho Mobile:** pentaho-mobile-package-name.zip

The packages you will need for your Windows workstations are:

- **Report Designer:** prd-ee-3.9.0-GA.zip
- **Metadata Editor:** pme-ee-4.8.0-GA.zip
- **Schema Workbench:** psw-ee-3.4.1.zip
- **Design Studio for 32-bit Windows:** pds-ee-win-32-4.0.0-GA.zip
- **Design Studio for 64-bit Windows:** pds-ee-win-64-4.0.0-GA.zip
- **Design Studio plugins for existing Eclipse installations:** org.pentaho.designstudio.editors.actionsequence\_4.0.0.GA.zip
- **Aggregation Designer:** /4.8.0-GA/client/windows/pad-ee-1.4.0-GA.zip
- **Data Integration:** pdi-ee-client-4.4.0-GA.zip



## Supported Operating Systems Other Than Windows

The packages you will need for a Unix and Linux-based servers are:


- **BA Server (includes the Pentaho Enterprise Console):** biserver-ee-4.8.0-GA.tar.gz
- **Pentaho Analyzer plugin:** paz-plugin-ee-4.8.0-GA.tar.gz
- **Pentaho Dashboard Designer plugin:** pdd-plugin-ee-4.8.0-GA.tar.gz
- **Pentaho Interactive Reporting plugin:** pir-plugin-ee-1.1.0-GA.tar.gz
- **Pentaho Mobile:** pentaho-mobile-package-name.tar.gz

The packages you will need for your Linux or Solaris workstations are:

- **Report Designer:** prd-ee-3.9.0-GA.tar.gz
- **Metadata Editor:** pme-ee-4.8.0-GA.tar.gz
- **Schema Workbench:** psw-ee-3.4.1.tar.gz
- **Design Studio for 32-bit Linux:** pds-ee-linux-32-4.0.0-GA.tar.gz
- **Design Studio for 64-bit Linux:** pds-ee-linux-64-4.0.0-GA.tar.gz
- **Design Studio plugins for existing Eclipse installations:** org.pentaho.designstudio.editors.actionsequence\_4.0.0.GA.zip
- **Aggregation Designer:** pad-ee-1.4.0-GA.tar.gz
- **Data Integration:** pdi-ee-client-4.4.0-GA.tar.gz

## Deploying the BA Server

Follow the directions below to install a new BA Server and the Pentaho Enterprise Console. The examples assume a Linux or Solaris environment; adjust the paths accordingly for Windows-based machines.

 **Note: Solaris users:** The default behavior of the tar utility in Solaris 10 is to truncate long file names when unpacking an archive created with GNU tar, as the Pentaho archives are. Therefore, you must use GNU tar instead of Solaris tar for this procedure. The path to GNU tar on Solaris 10 is typically `/usr/sfw/bin/gtar`. If you do not have `gtar` installed on your system, you will need to install it or some other GNU tar-compatible utility (such as `star`).

1. Re-create the `/pentaho/server/` directory that you renamed earlier.

```
mkdir -p /home/pentaho/pentaho/server/
```

2. Untar or unzip the **biserver-ee-4.8.0-GA** archive from wherever you downloaded it to the new location.

```
tar zxvf /home/amenethil/downloads/biserver-ee-4.8.0-GA.tar.gz -C /home/pentaho/pentaho/server/
```

This will create new **biserver-ee** and **enterprise-console** subdirectories.

The BA Server and Pentaho Enterprise Console are now extracted into the proper directories. Continue on to the next several sections to install drivers, change the hostname and port if necessary, and install any plugins that you have support entitlements for.

### Changes to the Solution Database

The default solution database engine for the 4.5.0-GA release of the Pentaho BA Server was MySQL. The default solution database engine for the 4.8.0-GA release of the Pentaho BA Server is PostgreSQL. If you are accustomed to using the default solution database or just wish to keep your existing solution database, Pentaho's recommendation for migrating from 4.5.0-GA to 4.8.0-GA is to configure your 4.8.0-GA BA Server to use your existing 4.5.0-GA solution database instance. There is no technical reason that you need to switch to the default PostgreSQL technology.

The proper configuration copies over as part of the exercise in the section Merging Your BA Server Configuration Files. No additional instructions are necessary to make this change.

### The Solution Database: Upgrading the Quartz Schema

The Quartz scheduling engine has been upgraded in the Pentaho BA Server 4.8.0-GA. As part of the upgrade, several columns were changed or added to the Quartz tables. Follow the instructions below to upgrade the Quartz schema that is part of your existing solution database.

1. Navigate to `/pentaho/server/biserver-ee/data/<RDBMS>`, where `<RDBMS>` is the type of solution database RDBMS that your 4.5.0-GA installation is configured to use (oracle10g, postgresql, or mysql5).

- Execute the `migrate_quartz_<rdbms>.sql` script using your preferred utility. For example, to upgrade the Quartz schema for a MySQL solution database, you would execute the following:

```
mysql -u root -p <migrate_quartz_mysql.sql
```

Your solution database Quartz schema is up-to-date.

### Copying Solution Database JDBC Drivers

In order for your BA Server to connect to the system databases (referred to as the solution database, or solution repository) in the RDBMS of your choice, you need to add the RDBMS's JDBC driver library to the BA Server's and Enterprise Console's `lib` directory. The instructions in this section are focused solely on solution database configuration and connectivity with the BA Server.

Follow the below process to enable the BA Server to connect to an Oracle, MySQL, or PostgreSQL solution database.

- Find or retrieve a JDBC driver JAR from your database vendor or third-party driver developer.

Due to licensing restrictions, Pentaho does not distribute the necessary JDBC driver JARs. You can retrieve a JDBC driver from your database vendor. To that end, you may find these links helpful:

- **Oracle:** <http://www.oracle.com/technetwork/topics/index.html>
- **MySQL:** <http://www.mysql.com/downloads/connector/j/>
- **PostgreSQL:** <http://jdbc.postgresql.org/download.html>

- For the BA Server, copy the appropriate JDBC driver JAR file to the `/tomcat/lib/` directory for Tomcat, or the `/jboss/server/default/lib/` directory for JBoss.
- For Enterprise Console, copy the driver JAR to the `/pentaho/server/enterprise-console/lib/` directory.

The BA Server and Enterprise Console have the necessary driver to communicate with your solution database.

### Copying context.xml, server.xml, and web.xml

The `context.xml`, `server.xml`, and `web.xml` files contain important configuration information that must be transferred to your new BA Server instance. Some of these files may need to be changed later in the upgrade process, but for right now, you must copy them to the new deployment.

- Copy your old **context.xml** from `/server_old/biserver-ee/tomcat/webapps/pentaho/META-INF/` to `/server/biserver-ee/tomcat/webapps/pentaho/META-INF/`.
- Copy your old **web.xml** from `/server_old/biserver-ee/tomcat/webapps/pentaho/WEB-INF/` to `/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/`.
- Copy your old **server.xml** from `/server_old/biserver-ee/tomcat/conf/` to `/server/biserver-ee/tomcat/conf/`.

Your core BA Server configuration files have been transferred to your new BA Server.

### Installing Pentaho User Console Plugins

In order to proceed with this task, you must have already purchased an Enterprise Edition license for the products you want to install. Skip this process if you do not have the requisite license.

The Pentaho User Console is built with a plugin architecture that enables you to expand its functionality with new client tools and functions. Follow the directions below to install any of the following plugins:

- Pentaho Analyzer
- Pentaho Dashboard Designer
- Pentaho Interactive Reporting
- Pentaho Mobile

 **Note:** The Pentaho Analysis Enterprise Edition plugin is separate from Analyzer, and requires a different installation process. That process is found in *Installing the Analysis Enterprise Edition Plugin*.


- If you have not already done so, download the plugin packages from the Pentaho Customer Support Portal. The installation materials list are defined in *Obtaining the Installation Matrials*.
- Unpack the plugin packages to the `/pentaho/server/biserver-ee/pentaho-solutions/system/` directory.

This will create a subdirectory for each plugin that you unpack.

The plugins you downloaded are now installed, though you will still need to merge your solution files and register your licenses. Continue to [Migrating Your Solutions](#) on page 42.

### Installing the Analysis Enterprise Edition Plugin

Follow the instructions below to install the Pentaho Analysis Enterprise Edition package, which contains Analysis engine enhancements for large ROLAP deployments. This procedure does not cover Pentaho Analyzer installation.

 **Note:** If you are performing a manual WAR build and deployment, and you want to add the Pentaho Analysis Enterprise Edition JARs into the WAR pre-build, you can substitute `/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/` for `/WEB-INF/` references below.

1. If you have not already done so, retrieve the **pentaho-analysis-ee-4.8-GA** package from the Pentaho Customer Support Portal (login credentials were emailed to you with your Welcome Kit).
2. Unpack the archive to a temporary location.
3. If it is currently running, shut down the BA Server.
4. Copy only the following JARs from the `/pentaho-analysis-ee/lib/` directory to the `/tomcat/webapps/pentaho/WEB-INF/lib/` directory.
  - infinispan-core- 4.2.1.FINAL
  - jboss-transaction-api-1.0.1.GA
  - jcip-annotations-1.0
  - jgroups-2.12.0.CR5
  - marshalling-api-1.2.3.GA
  - memcached-0.0.1-PENTAHO
  - pentaho-analysis-ee-3.4.0-GA-obf
  - river-1.2.3.GA
5. Copy all of the configuration files from `/pentaho-analysis-ee/config/` to the `/tomcat/webapps/pentaho/WEB-INF/classes/` directory.
6. Depending on the installation type; there would not be a **pentaho.war** (in archive based installations and executable based installations the **pentaho.war** is already deployed and the application will show as: `/tomcat/webapps/pentaho/`).
7. Remove the temporary **pentaho-analysis-ee** directory.


Pentaho Analysis Enterprise Edition is now installed with the default Infinispan configuration.

If you need to switch from Infinispan to Memcached, continue to the next section.

### Switching to Memcached

In order to complete this procedure, you must have your own pre-configured Memcached instance. You should have also installed the Analysis Enterprise Edition package to your BA Server or standalone Mondrian engine.

If you already use the Memcached cache framework in your organization and would like to hook it up to the Pentaho Analysis ROLAP engine, follow the directions below to switch from the default Infinispan cache framework configuration.

 **Caution:** Pentaho and Mondrian developers recommend against using Memcached. You are almost certain to have better performance with Infinispan.

1. If the BA Server or standalone Mondrian engine are running, shut them down now.
2. If you performed a default install of the Pentaho Analysis Enterprise Edition package, then you should have all of the required JARs installed to the BA or Mondrian server. If you aren't sure, verify now that the following JARs are present in the `/WEB-INF/lib/` directory inside of your deployed `pentaho.war` or Mondrian engine:
  - pentaho-analysis-ee
  - commons-lang
  - commons-io
  - commons-codec
  - pentaho-ee-dsc-core
  - memcached

3. Edit the **pentaho-analysis-config.xml** in the `/WEB-INF/classes/` directory inside the deployed pentaho.war or Mondrian engine, and change the value of **SEGMENT\_CACHE\_IMPL** to match the class name referenced below:


```
<entry key="SEGMENT_CACHE_IMPL">com.pentaho.analysis.segmentcache.impl.memcached.MemcachedSegmentCache</entry>
```

4. Edit the **memcached-config.xml** in the `/WEB-INF/classes/` directory inside the deployed pentaho.war or Mondrian engine, and change the values of **SALT**, **SERVERS**, and **WEIGHT** to match your preference:

```
<entry key="SALT">YOUR SECRET SALT VALUE HERE</entry>
<entry key="SERVERS">192.168.0.1:1642,192.168.0.2:1642</entry>
<entry key="WEIGHTS">1,1</entry>
```

Your Pentaho Analysis Enterprise Edition instance is now configured to use Memcached for ROLAP segment caching.  
*Memcached Configuration Options*


These properties control Memcached settings, and are set in the **memcached-config.xml** file in the `/WEB-INF/classes/` directory inside of your deployed pentaho.war or Mondrian engine.

 **Note:** This is not a comprehensive list of the potential Memcached settings; the options explained below are the ones most critical to Memcached configuration for Pentaho Analysis.

Property	Purpose
SERVERS	A comma-separated list of servers and port numbers representing the Memcached nodes usable by the plugin.
WEIGHTS	A comma-separated list of numbers representing the relative caching capacity of the servers defined in the SERVERS property. There must be exactly as many values of WEIGHTS as there are values of SERVERS. As an example, if the first server has a capacity of 128 megabytes, and the second has a capacity of 256 megabytes, the correct values for the WEIGHTS property should be "1,2", indicating that the first server has a relative size of half of the second one.
SALT	A secret key prefix to be used when saving and loading segment data from the Memcached nodes. This property must be the same for all Mondrian nodes that share their caches. If the SALT value is different from one node to the next, the nodes will not be able to share their cache data.

### Adding Linux and OS X Support for Printing Analyzer Geo Maps

There is an experimental function in Analyzer that enables you to print Geo Map visualizations. Follow the directions below to enable support on Linux and OS X. Windows configuration is covered in [Adding Windows Support for Printing Analyzer Geo Maps](#) on page 22.

 **Note:** Pentaho requires a specific version of **wkhtmltoimage** in order for this print function to work correctly. Even if you have wkhtmltoimage installed on your machine, install the Pentaho-supplied version as explained below. It will be explicitly called by Analyzer, and will not interfere with your existing wkhtmltoimage instance.

 **Note:** If you used the Business Analytics graphical installer, **skip all steps except the last two.**

1. Navigate to the **wkhtmltoimage** directory in your Pentaho installation. For archive installations, this is `/pentaho/biserver-ee/third-party-tools/wkhtmltoimage/`, and for manual deployments it is `/biserver-manual-ee/build-resources/third-party-tools/wkhtmltoimage/`.
2. For OS X, unpack the **wkhtmltoimage\_mac.tar.bz2** package; for 32-bit Linux, unpack the **wkhtmltoimage\_linux\_i386.tar.bz2** package; for 64-bit Linux, unpack the **wkhtmltoimage\_linux\_amd64.tar.bz2** package.
3. There is only one file in this archive: the executable **wkhtmltoimage**. If the executable has an extension, such as **i386** or **amd64**, rename the file to **wkhtmltoimage**.

4. Move the executable to: `/home/pentaho/pentaho/server/biserver-ee/wkhtmltoimage` directory.
5. Edit the `/pentaho-solutions/system/pentaho.xml` file and set the value of `<html-to-image-tool>` to the full path to the **wkhtmltoimage** executable that you just unpacked.

```
<html-to-image-tool>/home/pentaho/pentaho/server/biserver-ee/third-party-tools/wkhtmltoimage/wkhtmltoimage</html-to-image-tool>
```

6. Save and close the file, then edit the `/pentaho-solutions/system/analyzer/settings.xml` file and uncomment the following line:


```
<!--open_layers>geomapexport</open_layers-->
```

7. Save and close the settings.xml file.

You have enabled the experimental print feature for Analyzer Geo Map visualizations.

### Adding Windows Support for Printing Analyzer Geo Maps

There is an experimental function in Analyzer that enables you to print Geo Map visualizations. Follow the below directions to enable support on Windows. Linux and OS X configuration are covered in [Adding Linux and OS X Support for Printing Analyzer Geo Maps](#) on page 21.

 **Note:** Pentaho requires a specific version of **wkhtmltoimage** in order for this print function to work correctly. Even if you have wkhtmltoimage installed on your machine, install the Pentaho-supplied version as explained below. It will be explicitly called by Analyzer, and will not interfere with your existing wkhtmltoimage instance.

 **Note:** If you used the Business Analytics graphical installer, **skip all steps except the last two.**

1. Navigate to the **wkhtmltoimage** directory in your Pentaho installation. For archive installations, this is `\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\`, and for manual deployments it is `\biserver-manual-ee\build-resources\third-party-tools\wkhtmltoimage\`.
2. Run the **wkhtmltoimage\_windows\_installer.exe** executable.
3. Accept the license agreement to continue.
4. Uncheck the **wkhtmltopdf** option, then click **Next**.
5. For the **Destination folder**, type in or navigate to the following path, creating the directories if they do not exist: `C:\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\`. Once you have navigated to the path, click **Install**.
6. When the installation is complete, click **Close**, then edit the `\pentaho-solutions\system\pentaho.xml` file and set the value of `<html-to-image-tool>` to the full path to the **wkhtmltoimage** executable that you specified in the installer, including the executable name of the package, which is **wkhtmltoimage**.

```
<html-to-image-tool>C:\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\wkhtmltoimage</html-to-image-tool>
```

7. Close that file, then edit the `\pentaho-solutions\system\analyzer\settings.xml` file and uncomment the following line:

```
<!--open_layers>geomapexport</open_layers-->
```

8. Save and close the settings.xml file.

You have enabled the experimental print feature for Analyzer Geo Map visualizations.

### Removing Pentaho Sample Data and Solutions

By default, Pentaho provides a sample data source and a solution directory filled with example content. These samples are provided for evaluation and testing. Once you are ready to move from an evaluation or testing scenario to development or production, you can remove the sample content. Follow the instructions below to completely remove the Pentaho sample data and solutions.

1. Stop the BA Server.
2. If they exist, delete the `/pentaho/server/biserver-ee/pentaho-solutions/steel-wheels/` and `/pentaho/server/biserver-ee/pentaho-solutions/bi-developers/` directories.

These directories contain sample content for CDF and BA Server plugins. They are not present in typical manual deployment scenarios.

**3.** Edit the `/pentaho/WEB-INF/web.xml` file inside of the deployed `pentaho.war`.

As laid down by the Pentaho graphical installer and archive packages, this path should be `/pentaho/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/web.xml`. If you performed a manual WAR build and deployment, then you must adjust the path to fit your configuration.

**4.** Remove the sample servlets by commenting them out or removing them from the file:

```
<!-- [BEGIN SAMPLE SERVLETS] -->
<servlet>
  <servlet-name>UpdateSampleEmails</servlet-name>
  <jsp-file>/jsp/UpdateSampleEmails.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>Widgets</servlet-name>
  <jsp-file>/jsp/Widgets.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>SampleDashboard</servlet-name>
  <jsp-file>/jsp/SampleDashboard.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>ChartSamplesDashboard</servlet-name>
  <jsp-file>/jsp/ChartSamplesDashboard.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>SampleDrill</servlet-name>
  <jsp-file>/jsp/SampleDrill.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>SWDashboard</servlet-name>
  <jsp-file>/jsp/SWDashboard.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>Map</servlet-name>
  <jsp-file>/jsp/Map.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>SampleFlashDashboard</servlet-name>
  <jsp-file>/jsp/SampleFlashDashboard.jsp</jsp-file>
</servlet>
<!-- [END SAMPLE SERVLETS] -->
```

**5.** Remove the sample servlet mappings in the same fashion:

```
<!-- [BEGIN SAMPLE SERVLET MAPPINGS] -->
<servlet-mapping>
  <servlet-name>UpdateSampleEmails</servlet-name>
  <url-pattern>/UpdateSampleEmails</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>Widgets</servlet-name>
  <url-pattern>/Widgets</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SampleDashboard</servlet-name>
  <url-pattern>/SampleDashboard</url-pattern>
</servlet-mapping>
```

```

<servlet-mapping>
  <servlet-name>ChartSamplesDashboard</servlet-name>
  <url-pattern>/ChartSamplesDashboard</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SampleDrill</servlet-name>
  <url-pattern>/SampleDrill</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SWDDashboard</servlet-name>
  <url-pattern>/SWDDashboard</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>Map</servlet-name>
  <url-pattern>/Map</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SampleFlashDashboard</servlet-name>
  <url-pattern>/SampleFlashDashboard</url-pattern>
</servlet-mapping>
<!-- [END SAMPLE SERVLET MAPPINGS] -->

```

#### 6. Remove the **SampleDataStartupListener**:

```

<listener>
  <listener-class>org.pentaho.platform.web.http.context.HsqldbStartupListener</
listener-class>
</listener>

```

#### 7. Remove the **hsqldb-databases** section:

```

<!-- [BEGIN HSQLDB DATABASES] -->
  <context-param>
    <param-name>hsqldb-databases</param-name>
    <param-value>sampledata@../../data/hsqldb/sampledata</param-value>
  </context-param>
<!-- [END HSQLDB DATABASES] -->

```

#### 8. Remove the **SystemStatusFilter** filter:



**Note:** This is not part of the Pentaho samples; it provides error status messages that are only useful for development and testing purposes, and should be removed from a production system.

```

<filter>
  <filter-name>SystemStatusFilter</filter-name>
  <filter-class>com.pentaho.ui.servlet.SystemStatusFilter</filter-class>
  <init-param>
    <param-name>initFailurePage</param-name>
    <param-value>InitFailure</param-value>
    <description>This page is displayed if the PentahoSystem fails to properly
initialize.</description>
  </init-param>
</filter>

```

#### 9. Remove the filter mapping for the **SystemStatusFilter**:

```

<filter-mapping>
  <filter-name>SystemStatusFilter</filter-name>
  <url-pattern>/*</url-pattern>
</filter-mapping>

```

#### 10. Save and close the web.xml file.

#### 11. Delete the `/pentaho/server/biserver-ee/data/` directory.

This directory contains a sample database, control scripts for that database and the environment settings it needs to run, and SQL scripts to initialize a new Pentaho solution repository.

Your BA Server instance is now cleaned of samples and development/testing pieces, and is streamlined for production.

Continue to [Migrating Your Solutions](#) to finish the upgrade process.

## Business Analytics Graphical Installer Deployment

If you used the graphical installation utility previously, it's easiest to use archive packages to replace certain parts of Business Analytics that have changed. **There is no simple way to upgrade by using the latest Business Analytics installation utility**, and presently Pentaho does not have the ability to automatically upgrade an existing installation. Therefore you will have to merge your old settings and solutions by hand. All of the necessary instructions for this process are below.



**Note:** If you are concerned about the complexity of this upgrade process and do not feel that you can complete it on your own, you can hire a consultant to perform it for you. Contact Pentaho Services through your sales or support representative to learn more.

### Graphical Installer Deployment Upgrade Checklist

The Upgrade Checklist is a concise list of instructions intended to show a high-level overview of the upgrade process. It also serves as a method of verifying that each task is performed in the correct order. You may find it useful to print the checklist out and physically mark each step in the Done column as you complete it. **The checklist is not the complete instruction set**; consult the verbose instructions throughout this guide for more details on each step.

Step	Procedure	Done
Step 1	Download the upgrade materials from the Customer Support Portal.	
Step 2	Stop all Pentaho programs and services, including the solution repository database.	
Step 3	Back up your <code>/pentaho/server/</code> directory and hibernate and quartz databases.	
Step 4	Rename the <code>/pentaho/server/</code> directory to <code>/pentaho/server_old/</code> , and create a new empty <code>/pentaho/server/</code> directory to replace it.	
Step 5	Unpack the BA Server archive package to the empty <code>/pentaho/server/</code> directory.	
Step 6	Upgrade the Quartz schema in the existing solution database.	
Step 7	Copy any necessary JDBC drivers for your solution database and data sources to the <code>/pentaho/server/biserver-ee/tomcat/lib/</code> directory.	
Step 8	Copy your old <code>web.xml</code> and <code>context.xml</code> from the old Pentaho WAR to the new one.	
Step 9	Copy over your old <code>server.xml</code> to the new <code>/tomcat/conf/</code> directory.	
Step 10	Unpack any Pentaho User Console plugins you have licenses for (Analyzer, Dashboard Designer, Interactive Reporting) to the <code>/pentaho/server/biserver-ee/pentaho-solutions/system/</code> directory.	
Step 11	If you have a Pentaho Analysis Enterprise Edition license, unpack the <code>pentaho-analysis-ee</code> archive to a temporary location, then copy the requisite JARs to the <code>/pentaho/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/lib/</code> directory, and the requisite configuration files to the <code>/pentaho/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/classes/</code> directory.	
Step 12	Copy over the <b>scripts</b> directories from the old <code>enterprise-console</code> and <code>tomcat</code> directories to the new ones.	
Step 13	For 64-bit Windows systems, copy the Tomcat executables from the old BA Server instance to the new one.	
Step 14	For Windows deployments, copy over the Start Menu icons from the old BA Server instance to the new one.	
Step 15	Remove the Pentaho sample content.	



Step	Procedure	Done
Step 16	Copy all of your solution directories from the <code>/pentaho/server_old/biserver-ee/pentaho-solutions/</code> directory to the new one.	
Step 17	Copy the files documented in <a href="#">Merging Your BA Server Configuration Files</a> on page 43 to the new <code>pentaho-solutions</code> directory.	
Step 18	Edit the following files and merge in the changes as instructed: <code>pentahoObjects.spring.xml</code> , <code>applicationContext-spring-security.xml</code> , and <code>web.xml</code> .	
Step 19	If you're a PDI Enterprise Edition customer, continue on to the section that describes the DI Server upgrade process.	
Step 20	Copy the following files from the old Pentaho Enterprise Console to the new one: <code>console.xml</code> , <code>console.properties</code> , <code>login.properties</code> , <code>login.conf</code> , <code>log4j.xml</code> ; and the entire <code>/resource/config/hsqldb/</code> directory.	
Step 21	If you have not already done so, move data source JDBC driver JARs from the old directories to the new ones. This includes the BA Server and Enterprise Console.	
Step 22	Update any Enterprise Edition licenses if necessary.	
Step 23	Start the solution database, BA Server, and Pentaho Enterprise Console and check for any obvious errors or failures in the console output and log file.	
Step 24	<b>Check that all of your content is accessible.</b> Log into the Pentaho User Console and verify that your product licenses work. Run a new report in Interactive Reporting to ensure that it is ready for production. Verify at least two existing analysis views or Analyzer reports for each data source. Verify that any previously created dashboards are functioning properly. Run all reports that have been published from Report Designer. Lastly, check all of your schedules to ensure that they are still properly configured and operational.	
Step 25	On workstations, remove old client tool directories, then unpack applicable client tools to the empty <code>/pentaho/design-tools/</code> directory.	
Step 26	Verify that all client tools can access old content and publish to the BA Server. Verify that PDI can connect to the DI Server, if applicable.	
Step 27	Remove the <code>/pentaho/server_old/</code> directory, and any archive packages and temporary directories you used for the upgrade.	

## Obtaining the Installation Materials

As an Enterprise Edition customer, you can obtain the BA Server and client tool pre-configured packages from the Pentaho Customer Support Portal by using your Pentaho account login credentials. If you are unfamiliar with these details, consult the Welcome Kit provided to you by Pentaho customer support as part of enabling the Enterprise Edition of Pentaho Business Analytics.

The Pentaho Enterprise Console is included in the Pentaho Business Analytics package, so you do not need to download it separately.

The **Pentaho User Console plugins** items below refer to add-ons for the Pentaho User Console, such as Dashboard Designer, Interactive Reporting, Pentaho Mobile, and Pentaho Analyzer.

### Windows

The packages you will need for a Windows server are:

- **BA Server (includes the Pentaho Enterprise Console):** `biserver-ee-4.8.0-GA.zip`
- **Pentaho Analyzer plugin:** `paz-plugin-ee-4.8.0-GA.zip`
- **Pentaho Dashboard Designer plugin:** `pdd-plugin-ee-4.8.0-GA.zip`
- **Pentaho Interactive Reporting plugin:** `pir-plugin-ee-1.1.0-GA.zip`
- **Pentaho Mobile:** `pentaho-mobile-package-name.zip`

The packages you will need for your Windows workstations are:

- **Report Designer:** prd-ee-3.9.0-GA.zip
- **Metadata Editor:** pme-ee-4.8.0-GA.zip
- **Schema Workbench:** psw-ee-3.4.1.zip
- **Design Studio for 32-bit Windows:** pds-ee-win-32-4.0.0-GA.zip
- **Design Studio for 64-bit Windows:** pds-ee-win-64-4.0.0-GA.zip
- **Design Studio plugins for existing Eclipse installations:**  
org.pentaho.designstudio.editors.actionsequence\_4.0.0.GA.zip
- **Aggregation Designer:** /4.8.0-GA/client/windows/pad-ee-1.4.0-GA.zip
- **Data Integration:** pdi-ee-client-4.4.0-GA.zip

### Supported Operating Systems Other Than Windows

The packages you will need for a Unix and Linux-based servers are:

- **BA Server (includes the Pentaho Enterprise Console):** biserver-ee-4.8.0-GA.tar.gz
- **Pentaho Analyzer plugin:** paz-plugin-ee-4.8.0-GA.tar.gz
- **Pentaho Dashboard Designer plugin:** pdd-plugin-ee-4.8.0-GA.tar.gz
- **Pentaho Interactive Reporting plugin:** pir-plugin-ee-1.1.0-GA.tar.gz
- **Pentaho Mobile:** pentaho-mobile-package-name.tar.gz

The packages you will need for your Linux or Solaris workstations are:

- **Report Designer:** prd-ee-3.9.0-GA.tar.gz
- **Metadata Editor:** pme-ee-4.8.0-GA.tar.gz
- **Schema Workbench:** psw-ee-3.4.1.tar.gz
- **Design Studio for 32-bit Linux:** pds-ee-linux-32-4.0.0-GA.tar.gz
- **Design Studio for 64-bit Linux:** pds-ee-linux-64-4.0.0-GA.tar.gz
- **Design Studio plugins for existing Eclipse installations:**  
org.pentaho.designstudio.editors.actionsequence\_4.0.0.GA.zip
- **Aggregation Designer:** pad-ee-1.4.0-GA.tar.gz
- **Data Integration:** pdi-ee-client-4.4.0-GA.tar.gz

## Deploying the BA Server

Follow the directions below to install a new BA Server and the Pentaho Enterprise Console onto your server. The examples assume a Linux environment; adjust the paths accordingly for Windows-based machines.

1. Create a new server directory to replace the one you renamed earlier.

```
mkdir /home/pentaho/pentaho/server/
```

2. Untar or unzip the **biserver-ee-4.8.0-GA** archive from wherever you downloaded it to the new server directory.

```
tar zxvf /home/amenethil/downloads/biserver-ee-4.8.0-GA.tar.gz -C /home/pentaho/pentaho/server/
```

This will create new **biserver-ee** and **enterprise-console** subdirectories.

The BA Server and Pentaho Enterprise Console are now extracted into the proper directories. Continue on to the next several sections to install drivers, change the hostname and port if necessary, and install any plugins that you have support entitlements for.

### Copying context.xml, server.xml, and web.xml

The context.xml, server.xml, and web.xml files contain important configuration information that must be transferred to your new BA Server instance. Some of these files may need to be changed later in the upgrade process, but for right now, you must copy them to the new deployment.

1. Copy your old **context.xml** from `/server_old/biserver-ee/tomcat/webapps/pentaho/META-INF/` to `/server/biserver-ee/tomcat/webapps/pentaho/META-INF/`.
2. Copy your old **web.xml** from `/server_old/biserver-ee/tomcat/webapps/pentaho/WEB-INF/` to `/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/`.

3. Copy your old **server.xml** from `/server_old/biserver-ee/tomcat/conf/` to `/server/biserver-ee/tomcat/conf/`.

Your core BA Server configuration files have been transferred to your new BA Server.

### Changes to the Solution Database

The default solution database engine for the 4.5.0-GA release of the Pentaho BA Server was MySQL. The default solution database engine for the 4.8.0-GA release of the Pentaho BA Server is PostgreSQL. If you are accustomed to using the default solution database or just wish to keep your existing solution database, Pentaho's recommendation for migrating from 4.5.0-GA to 4.8.0-GA is to configure your 4.8.0-GA BA Server to use your existing 4.5.0-GA solution database instance. There is no technical reason that you need to switch to the default PostgreSQL technology.

The proper configuration copies over as part of the exercise in the section [Merging Your BA Server Configuration Files](#). No additional instructions are necessary to make this change.

### The Solution Database: Upgrading the Quartz Schema

The Quartz scheduling engine has been upgraded in the Pentaho BA Server 4.8.0-GA. As part of the upgrade, several columns were changed or added to the Quartz tables. Follow the instructions below to upgrade the Quartz schema that is part of your existing solution database.

1. Navigate to `/pentaho/server/biserver-ee/data/<RDBMS>`, where `<RDBMS>` is the type of solution database RDBMS that your 4.5.0-GA installation is configured to use (oracle10g, postgresql, or mysql5).
2. Execute the `migrate_quartz_<rdbms>.sql` script using your preferred utility. For example, to upgrade the Quartz schema for a MySQL solution database, you would execute the following:

```
mysql -u root -p <migrate_quartz_mysql.sql
```

Your solution database Quartz schema is up-to-date.

### Installing Pentaho User Console Plugins

In order to proceed with this task, you must have already purchased an Enterprise Edition license for the products you want to install. Skip this process if you do not have the requisite license.

The Pentaho User Console is built with a plugin architecture that enables you to expand its functionality with new client tools and functions. Follow the directions below to install any of the following plugins:

- Pentaho Analyzer
- Pentaho Dashboard Designer
- Pentaho Interactive Reporting
- Pentaho Mobile

 **Note:** The Pentaho Analysis Enterprise Edition plugin is separate from Analyzer, and requires a different installation process. That process is found in *Installing the Analysis Enterprise Edition Plugin*.


1. If you have not already done so, download the plugin packages from the Pentaho Customer Support Portal. The installation materials list are defined in *Obtaining the Installation Matrials*.
2. Unpack the plugin packages to the `/pentaho/server/biserver-ee/pentaho-solutions/system/` directory.

This will create a subdirectory for each plugin that you unpack.

The plugins you downloaded are now installed, though you will still need to merge your solution files and register your licenses. Continue to [Migrating Your Solutions](#) on page 42.

### Installing the Analysis Enterprise Edition Plugin

Follow the instructions below to install the Pentaho Analysis Enterprise Edition package, which contains Analysis engine enhancements for large ROLAP deployments. This procedure does not cover Pentaho Analyzer installation.

 **Note:** If you are performing a manual WAR build and deployment, and you want to add the Pentaho Analysis Enterprise Edition JARs into the WAR pre-build, you can substitute `/biserver-manual-ee/build-resources/custom-pentaho-webapp/WEB-INF/` for `/WEB-INF/` references below.

1. If you have not already done so, retrieve the **pentaho-analysis-ee-4.8-GA** package from the Pentaho Customer Support Portal (login credentials were emailed to you with your Welcome Kit).

2. Unpack the archive to a temporary location.
3. If it is currently running, shut down the BA Server.
4. Copy only the following JARs from the `/pentaho-analysis-ee/lib/` directory to the `/tomcat/webapps/pentaho/WEB-INF/lib/` directory.
  - `infinispan-core-4.2.1.FINAL`
  - `jboss-transaction-api-1.0.1.GA`
  - `jcip-annotations-1.0`
  - `jgroups-2.12.0.CR5`
  - `marshalling-api-1.2.3.GA`
  - `memcached-0.0.1-PENTAHO`
  - `pentaho-analysis-ee-3.4.0-GA-obf`
  - `river-1.2.3.GA`
5. Copy all of the configuration files from `/pentaho-analysis-ee/config/` to the `/tomcat/webapps/pentaho/WEB-INF/classes/` directory.
6. Depending on the installation type; there would not be a **pentaho.war** (in archive based installations and executable based installations the **pentaho.war** is already deployed and the application will show as: `/tomcat/webapps/pentaho/`).
7. Remove the temporary **pentaho-analysis-ee** directory.

Pentaho Analysis Enterprise Edition is now installed with the default Infinispan configuration.

If you need to switch from Infinispan to Memcached, continue to the next section.

### Switching to Memcached

In order to complete this procedure, you must have your own pre-configured Memcached instance. You should have also installed the Analysis Enterprise Edition package to your BA Server or standalone Mondrian engine.

If you already use the Memcached cache framework in your organization and would like to hook it up to the Pentaho Analysis ROLAP engine, follow the directions below to switch from the default Infinispan cache framework configuration.



**Caution:** Pentaho and Mondrian developers recommend against using Memcached. You are almost certain to have better performance with Infinispan.

1. If the BA Server or standalone Mondrian engine are running, shut them down now.
2. If you performed a default install of the Pentaho Analysis Enterprise Edition package, then you should have all of the required JARs installed to the BA or Mondrian server. If you aren't sure, verify now that the following JARs are present in the `/WEB-INF/lib/` directory inside of your deployed `pentaho.war` or Mondrian engine:
  - `pentaho-analysis-ee`
  - `commons-lang`
  - `commons-io`
  - `commons-codec`
  - `pentaho-ee-dsc-core`
  - `memcached`
3. Edit the **pentaho-analysis-config.xml** in the `/WEB-INF/classes/` directory inside the deployed `pentaho.war` or Mondrian engine, and change the value of **SEGMENT\_CACHE\_IMPL** to match the class name referenced below:

```
<entry key="SEGMENT_CACHE_IMPL">com.pentaho.analysis.segmentcache.impl.memcached.MemcachedSegmentCache</entry>
```


4. Edit the **memcached-config.xml** in the `/WEB-INF/classes/` directory inside the deployed `pentaho.war` or Mondrian engine, and change the values of **SALT**, **SERVERS**, and **WEIGHT** to match your preference:

```
<entry key="SALT">YOUR SECRET SALT VALUE HERE</entry>
<entry key="SERVERS">192.168.0.1:1642,192.168.0.2:1642</entry>
<entry key="WEIGHTS">1,1</entry>
```

Your Pentaho Analysis Enterprise Edition instance is now configured to use Memcached for ROLAP segment caching.

## Memcached Configuration Options


These properties control Memcached settings, and are set in the **memcached-config.xml** file in the `/WEB-INF/classes/` directory inside of your deployed pentaho.war or Mondrian engine.

 **Note:** This is not a comprehensive list of the potential Memcached settings; the options explained below are the ones most critical to Memcached configuration for Pentaho Analysis.

Property	Purpose
SERVERS	A comma-separated list of servers and port numbers representing the Memcached nodes usable by the plugin.
WEIGHTS	A comma-separated list of numbers representing the relative caching capacity of the servers defined in the SERVERS property. There must be exactly as many values of WEIGHTS as there are values of SERVERS. As an example, if the first server has a capacity of 128 megabytes, and the second has a capacity of 256 megabytes, the correct values for the WEIGHTS property should be "1,2", indicating that the first server has a relative size of half of the second one.
SALT	A secret key prefix to be used when saving and loading segment data from the Memcached nodes. This property must be the same for all Mondrian nodes that share their caches. If the SALT value is different from one node to the next, the nodes will not be able to share their cache data.

## Adding Linux and OS X Support for Printing Analyzer Geo Maps

There is an experimental function in Analyzer that enables you to print Geo Map visualizations. Follow the directions below to enable support on Linux and OS X. Windows configuration is covered in [Adding Windows Support for Printing Analyzer Geo Maps](#) on page 22.

 **Note:** Pentaho requires a specific version of **wkhtmltoimage** in order for this print function to work correctly. Even if you have wkhtmltoimage installed on your machine, install the Pentaho-supplied version as explained below. It will be explicitly called by Analyzer, and will not interfere with your existing wkhtmltoimage instance.

 **Note:** If you used the Business Analytics graphical installer, **skip all steps except the last two.**

1. Navigate to the **wkhtmltoimage** directory in your Pentaho installation. For archive installations, this is `/pentaho/biserver-ee/third-party-tools/wkhtmltoimage/`, and for manual deployments it is `/biserver-manual-ee/build-resources/third-party-tools/wkhtmltoimage/`.
2. For OS X, unpack the **wkhtmltoimage\_mac.tar.bz2** package; for 32-bit Linux, unpack the **wkhtmltoimage\_linux\_i386.tar.bz2** package; for 64-bit Linux, unpack the **wkhtmltoimage\_linux\_amd64.tar.bz2** package.
3. There is only one file in this archive: the executable **wkhtmltoimage**. If the executable has an extension, such as **i386** or **amd64**, rename the file to **wkhtmltoimage**.
4. Move the executable to: `/home/pentaho/pentaho/server/biserver-ee/wkhtmltoimage` directory.
5. Edit the `/pentaho-solutions/system/pentaho.xml` file and set the value of **<html-to-image-tool>** to the full path to the **wkhtmltoimage** executable that you just unpacked.

```
<html-to-image-tool>/home/pentaho/pentaho/server/biserver-ee/third-party-tools/wkhtmltoimage/wkhtmltoimage</html-to-image-tool>
```

6. Save and close the file, then edit the `/pentaho-solutions/system/analyzer/settings.xml` file and uncomment the following line:


```
<!--open_layers>geomapexport</open_layers-->
```


7. Save and close the settings.xml file.

You have enabled the experimental print feature for Analyzer Geo Map visualizations.

## Adding Windows Support for Printing Analyzer Geo Maps

There is an experimental function in Analyzer that enables you to print Geo Map visualizations. Follow the below directions to enable support on Windows. Linux and OS X configuration are covered in [Adding Linux and OS X Support for Printing Analyzer Geo Maps](#) on page 21.

 **Note:** Pentaho requires a specific version of **wkhtmltoimage** in order for this print function to work correctly. Even if you have wkhtmltoimage installed on your machine, install the Pentaho-supplied version as explained below. It will be explicitly called by Analyzer, and will not interfere with your existing wkhtmltoimage instance.

 **Note:** If you used the Business Analytics graphical installer, **skip all steps except the last two.**

1. Navigate to the **wkhtmltoimage** directory in your Pentaho installation. For archive installations, this is `\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\`, and for manual deployments it is `\biserver-manual-ee\build-resources\third-party-tools\wkhtmltoimage\`.
2. Run the **wkhtmltoimage\_windows\_installer.exe** executable.
3. Accept the license agreement to continue.
4. Uncheck the **wkhtmltopdf** option, then click **Next**.
5. For the **Destination folder**, type in or navigate to the following path, creating the directories if they do not exist: `C:\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\`. Once you have navigated to the path, click **Install**.
6. When the installation is complete, click **Close**, then edit the `\pentaho-solutions\system\pentaho.xml` file and set the value of **<html-to-image-tool>** to the full path to the **wkhtmltoimage** executable that you specified in the installer, including the executable name of the package, which is **wkhtmltoimage**.

```
<html-to-image-tool>C:\pentaho\biserver-ee\third-party-tools\wkhtmltoimage\wkhtmltoimage</html-to-image-tool>
```

7. Close that file, then edit the `\pentaho-solutions\system\analyzer\settings.xml` file and uncomment the following line:

```
<!--open_layers>geomapexport</open_layers-->
```

8. Save and close the settings.xml file.

You have enabled the experimental print feature for Analyzer Geo Map visualizations.


## Copying Startup Scripts

The Business Analytics installer includes a series of scripts that start and stop Pentaho services. These are different between Linux and Windows, but the directories have the same names. These scripts are not included in the archive packages, so you must copy them over from various directories in your old Pentaho instance.

1. Copy your old `/server_old/biserver-ee/tomcat/scripts/` directory to the new tomcat directory.
2. Copy your old `/server_old/enterprise-console/scripts/` directory to the new enterprise-console directory.

All of the necessary BA Server startup scripts have been copied. However, if you installed the DI Server, its scripts will be copied later as part of the DI Server upgrade procedure.

## Copying Windows 64-bit Tomcat Executables

 **Note:** If you are using a 32-bit version of the BA Server, you do not need to follow this procedure.

If you are upgrading a 64-bit Windows BA Server that was deployed via the graphical installation utility, you must copy the old Tomcat executable files and a batch script. The archive distribution is 32-bit only for Windows deployments; however, the version of Tomcat the Pentaho ships has not changed between BA Server 3.10 and 4.8. Therefore, you can simply copy these three files from `\pentaho\server_old\biserver-ee\tomcat\bin\` to the new bin directory:

1. tomcat6.exe
2. tomcat6w.exe

### 3. service.bat

If you do not copy these files, the resulting BA Server instance runs on a 32-bit application server.

### Copying Windows Start Menu Icons



**Note:** This procedure applies only to Windows users.

Copy all of the **.ico** files from `\pentaho\server_old\biserver-ee\` to the new `biserver-ee` directory. These are the icon graphics for the Windows Start menu.

### Removing Pentaho Sample Data and Solutions

By default, Pentaho provides a sample data source and a solution directory filled with example content. These samples are provided for evaluation and testing. Once you are ready to move from an evaluation or testing scenario to development or production, you can remove the sample content. Follow the instructions below to completely remove the Pentaho sample data and solutions.

1. Stop the BA Server.
2. If they exist, delete the `/pentaho/server/biserver-ee/pentaho-solutions/steel-wheels/` and `/pentaho/server/biserver-ee/pentaho-solutions/bi-developers/` directories.  
These directories contain sample content for CDF and BA Server plugins. They are not present in typical manual deployment scenarios.
3. Edit the `/pentaho/WEB-INF/web.xml` file inside of the deployed `pentaho.war`.  
As laid down by the Pentaho graphical installer and archive packages, this path should be `/pentaho/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/web.xml`. If you performed a manual WAR build and deployment, then you must adjust the path to fit your configuration.
4. Remove the sample servlets by commenting them out or removing them from the file:

```
<!-- [BEGIN SAMPLE SERVLETS] -->
<servlet>
  <servlet-name>UpdateSampleEmails</servlet-name>
  <jsp-file>/jsp/UpdateSampleEmails.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>Widgets</servlet-name>
  <jsp-file>/jsp/Widgets.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>SampleDashboard</servlet-name>
  <jsp-file>/jsp/SampleDashboard.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>ChartSamplesDashboard</servlet-name>
  <jsp-file>/jsp/ChartSamplesDashboard.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>SampleDrill</servlet-name>
  <jsp-file>/jsp/SampleDrill.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>SWDashboard</servlet-name>
  <jsp-file>/jsp/SWDashboard.jsp</jsp-file>
</servlet>

<servlet>
  <servlet-name>Map</servlet-name>
  <jsp-file>/jsp/Map.jsp</jsp-file>
</servlet>
```

```

<servlet>
  <servlet-name>SampleFlashDashboard</servlet-name>
  <jsp-file>/jsp/SampleFlashDashboard.jsp</jsp-file>
</servlet>
<!-- [END SAMPLE SERVLETS] -->

```

5. Remove the sample servlet mappings in the same fashion:

```

<!-- [BEGIN SAMPLE SERVLET MAPPINGS] -->
<servlet-mapping>
  <servlet-name>UpdateSampleEmails</servlet-name>
  <url-pattern>/UpdateSampleEmails</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>Widgets</servlet-name>
  <url-pattern>/Widgets</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SampleDashboard</servlet-name>
  <url-pattern>/SampleDashboard</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>ChartSamplesDashboard</servlet-name>
  <url-pattern>/ChartSamplesDashboard</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SampleDrill</servlet-name>
  <url-pattern>/SampleDrill</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SWDashboard</servlet-name>
  <url-pattern>/SWDashboard</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>Map</servlet-name>
  <url-pattern>/Map</url-pattern>
</servlet-mapping>

<servlet-mapping>
  <servlet-name>SampleFlashDashboard</servlet-name>
  <url-pattern>/SampleFlashDashboard</url-pattern>
</servlet-mapping>
<!-- [END SAMPLE SERVLET MAPPINGS] -->

```

6. Remove the **SampleDataStartupListener**:

```

<listener>
  <listener-class>org.pentaho.platform.web.http.context.HsqldbStartupListener</
listener-class>
</listener>

```

7. Remove the **hsqldb-databases** section:

```

<!-- [BEGIN HSQLDB DATABASES] -->
  <context-param>
    <param-name>hsqldb-databases</param-name>
    <param-value>sampledata@../../data/hsqldb/sampledata</param-value>
  </context-param>
<!-- [END HSQLDB DATABASES] -->

```

8. Remove the **SystemStatusFilter** filter:





**Note:** This is not part of the Pentaho samples; it provides error status messages that are only useful for development and testing purposes, and should be removed from a production system.

```
<filter>
  <filter-name>SystemStatusFilter</filter-name>
  <filter-class>com.pentaho.ui.servlet.SystemStatusFilter</filter-class>
  <init-param>
    <param-name>initFailurePage</param-name>
    <param-value>InitFailure</param-value>
    <description>This page is displayed if the PentahoSystem fails to properly
initialize.</description>
  </init-param>
</filter>
```

**9. Remove the filter mapping for the `SystemStatusFilter`:**

```
<filter-mapping>
  <filter-name>SystemStatusFilter</filter-name>
  <url-pattern>/*</url-pattern>
</filter-mapping>
```

**10. Save and close the web.xml file.**

**11. Delete the `/pentaho/server/biserver-ee/data/` directory.**

This directory contains a sample database, control scripts for that database and the environment settings it needs to run, and SQL scripts to initialize a new Pentaho solution repository.

Your BA Server instance is now cleaned of samples and development/testing pieces, and is streamlined for production.

Continue to [Migrating Your Solutions](#) to finish the upgrade process.

## Migrating Your Solutions

---

BA Server content is stored in the `/pentaho/server_old/biserver-ee/pentaho-solutions/` directory. However, this is also where the BA Server's configuration files are stored, as well as Pentaho-supplied sample content. You must move your BI content from your old solutions directory to the new one. Copying the settings and other configuration information will happen in the next section.



**Note:** You must use the archive flag or option when you copy if you want a minimal impact on your solution database. If you copy without the archive option, all of the dates on your solution files and directories will reset to today's date, which will force the solution repository to refresh.

When you copy your solution directories, which are stored in `/pentaho/server_old/biserver-ee/pentaho-solutions/`, this should include all reports, data sources, metadata definitions, dashboards, charts, and action sequences you've created and published. **Do not copy** any other directories at this time.



**Danger:** Be sure that you transfer **all** of the solution directories that you've created. Some people may only have one solution directory, and some may have many directories to segregate content for different departments or data sources. If you fail to copy over a solution directory, the content it contains will not be carried over to your new Pentaho instance.

After you have copied your solutions to your new solutions directory, proceed to the next section to learn how to migrate your settings.

## Merging Your BA Server Configuration Files

---

The following configuration files have changed between version 4.5.0 and 4.8.0:

- pentahoObjects.spring.xml
- applicationContext-spring-security.xml
- web.xml

Instructions for merging changes into all of the above-listed files are in the next subsection. Before you get to that point, however, there are a few customized configuration files that you must copy over from your old pentaho-solutions directory to the new one. These files cover security, solution repository, and audit log configuration. While they have not changed in version 4.8.0, they are customized according to your BA Server settings.

Copy the following **files** -- **but not any subdirectories** -- from your old BA Server `/pentaho-solutions/` directory to the new one:

- `/admin/audit/*`
- `/system/*`
- `/system/olap/datasources.xml`
- `/system/mondrian/mondrian.properties`
- `/system/analyzer/analyzer.properties`
- `/system/google/googlesettings.xml` (if you are using your own Google Maps API key)

Copy the following **directories** and all of the files and subdirectories therein from your old BA Server `/pentaho-solutions/` directory to the new one:

- `/system/content/`
- `/system/dialects/`
- `/system/hibernate/`
- `/system/quartz/`
- `/system/metadata/`

These directories contain Pentaho samples. If they exist in your current BA Server installation, you should keep the new versions. If they do not exist in the old installation, you can safely delete them from the new pentaho-solutions directory:

- `/bi-developers/`
- `/steel-wheels/`

After you've copied all of these files to the proper locations in your new pentaho-solutions directory, continue on to the next subsection to learn how to merge the other files.

### Updating pentahoObjects.spring.xml

---

Follow the instructions below to bring your old pentahoObjects.spring.xml file up to date for the BA Server 4.8.0.

1. Open your recently copied `/pentaho-solutions/system/pentahoObjects.spring.xml` file with a text editor.
2. Find the `</beans>` tag at the end of the file, and add the following line directly above it:

```
<!--
Used by Dashboard Printing to authenticate the printing process for a given user.
-->
<bean id="PreAuthenticatedSessionHolder"
class="org.pentaho.platfrom.web.http.PreAuthenticatedSessionHolder">
  <!-- TTL in seconds -->
  <constructor-arg value="600"/>
  <!-- eviction schedule in seconds -->
  <constructor-arg value="60"/>
</bean>
```

3. Save the file and close the text editor.

Your `pentahoObjects.spring.xml` file is current for the 4.8.0 installation.

## Updating applicationContext-spring-security.xml

Follow the instructions below to bring your old applicationContext-spring-security.xml file up to date for the BA Server 4.8.0.

1. Open your recently copied /pentaho-solutions/system/applicationContext-spring-security.xml file with a text editor.
2. Find this line: `PATTERN_TYPE_APACHE_ANT` and add the following line directly below it, making certain the string is all on one line with no linebreaks.

```
/content/dashboards/print=securityContextHolderAwareRequestFilter,httpSessionContextIntegrationFilter,preAuthenticatedSecurityFilter,httpSessionReusedDetectionFilter,logoutFilter,authenticationProcessingFilter,basicProcessingFilter,requestParameterProcessingFilter,anonymousProcessingFilter,pentahoSecurityStartupFilter,exceptionTranslationFilter,filterInvocationInterceptor
```

3. Find this line: `CONVERT_URL_TO_LOWERCASE_BEFORE_COMPARISON` and add the following line directly below it:  
`\A/. *require-js-cfg.js\Z=Anonymous,Authenticated`
4. Find the following lines and move them just below `\A/webcontext.js.*\Z=Anonymous,Authenticated`:

```
\A/content/common-ui/resources/web/cache/cache-service.*
\Z=Anonymous,Authenticated
    \A/cacheexpiration-service.*\Z=Anonymous,Authenticated
```

5. Find the line `\A/content/common-ui/resources/web/dojo/djconfig.js.*\Z=Anonymous,Authenticated` and add the following line just below it:  
`\A/content/pentaho-mobile/resources/. *\Z=Anonymous,Authenticated`
6. Find the closing `</beans>` node. Add the following XML just above this node.

```
<!--
  This filter is used to join together two separate remote clients under one
  session/authentication. A logged-in user can have a key generated which can
  be passed to another system. That separate system can then make requests of
  the server passing in the generated key, which will automatically assign it
  the original IPentahoSession and Authentication. In essence the original
  user would then be logged into both machines.

  NOTE: This is used solely to support printing of Dashboards which are done by a
  separate process.
  Use of this filter outside of its original intention is discouraged as we will
  remove this as
  soon as a better printing solution is found.
-->


  bean id="preAuthenticatedSecurityFilter"
  class="org.pentaho.platform.web.http.security.PreAuthenticatedFilter">
  <constructor-arg ref="PreAuthenticatedSessionHolder"/>
  </bean>
```

7. Save and close the file.

Your applicationContext-spring-security.xml file is current for the 4.8 installation.

## Updating web.xml

Follow the instructions below to bring your old **web.xml** file up to date for the BA Server 4.8.0.

-  **Note:** You may have already completed this task if you performed a manual deployment upgrade and merged your old web.xml with the new one before the build.

1. Inside of your deployed **pentaho.war** file, open the `/WEB-INF/web.xml` file with a text editor.  
With an archive or graphical deployment, the path is: `/pentaho/server/biserver-ee/tomcat/webapps/pentaho/WEB-INF/`.
2. Search for this string: `RequireJSServlet`. If you find this string then remove the following. If you do not find it, then it has already been removed, and you don't need to make any changes.

```
<servlet>
  <servlet-name>RequireJSServlet</servlet-name>
  <servlet-class>org.pentaho.platform.web.servlet.RequireJSServlet</servlet-
class>
</servlet>
```

3. Save the file and close the text editor.

Your web.xml file is up-to-date.

## Upgrading Your Single-Sign On Configuration

This only applies to people who have modified the BA Server to work with a Central Authentication Service.

Follow the directions below to enable single sign-on in your newly upgraded BA Server.

1. Unpack your deployed Pentaho WAR file in place.  
Tomcat will typically do this automatically when you start it. JBoss will not typically unpack the WAR on its own, but if you unpack it by hand, the directory must have a `.war` extension.
2. Open a terminal or command prompt window and navigate to the `/biserver-manual-ee/build-resources/pentaho-ssso/` directory.
3. Edit the **sso-replacements.properties** file and change the default options to match your CAS configuration.  
Refer to the CAS properties reference below if you have any trouble figuring out what each property does. If you have the `sso-replacements.properties` file that you used to enable CAS support in BA Server 4.1, you can reuse it for this process, but you must ensure that the **cas.ticket.validator.url** property is updated according to the property reference below.
4. Use Ant to run the **sso-replacements** script with the **sso-pentaho** switch, as in the following example:

```
ant -f sso-replacements.xml sso-pentaho
```

Your upgraded SSO files are now in place.

## CAS Property Reference

### CAS Properties

These properties mostly refer to CAS services:

Property	Description	Example
<code>cas.authn.provider</code>	<b>Required.</b> Security back-end that CAS should use. Valid values are <code>memory</code> , <code>jdbc</code> , or <code>ldap</code>	<code>ldap</code>
<code>cas.login.url</code>	<b>Required.</b> CAS login URL.	<code>\${cas.base.url}/login</code>
<code>cas.ticket.validator.url</code>	<b>Required.</b> CAS ticket validator URL.	<code>\${cas.base.url}</code>
<code>cas.logout.url</code>	<b>Required.</b> CAS logout URL. A <code>service.logout.url</code> will be appended to this URL.	<code>\${cas.base.url}/logout?url=</code>
<code>cas.base.url</code>	URL under which all CAS services reside.	<code>https://localhost:8443/cas</code>

## Pentaho Properties

These are service URLs that serve as callbacks from the CAS server into the BI Platform:

Property	Description	Example
pentaho.service.url	<b>Required.</b> Processes CAS callback.	<code>\${_pentaho.service.base.url}/j_spring_cas_security_check</code>
pentaho.service.logout.url	<b>Required.</b> URL to go to after CAS logout.	<code>\${_pentaho.service.base.url}/Home</code>
pentaho.service.solutions.system.dir	Path to pentaho-solutions/system.	<code>/usr/local/pentaho/server/biserver-ee/pentaho-solutions/system/</code>
pentaho.service.lib.dir	Path to webapp lib directory.	<code>/usr/local/tomcat/common/lib/</code>
pentaho.service.web.xml	Path (including filename) of webapp's web.xml.	<code>/usr/local/tomcat/conf/web.xml</code>
pentaho.service.apctx.cas.xml	Path (including filename) of new applicationContext-spring-security-cas.xml.	<code>/usr/local/pentaho/server/biserver-ee/pentaho-solutions/system/applicationContext-spring-security-cas.xml</code>
pentaho.service.jsp.dir	Path to directory containing webapp's JSPs.	<code>/usr/local/tomcat/webapps/pentaho/jsp/</code>
pentaho.service.spring.beans.xml	Path (including filename) of pentaho-spring-beans.xml.	<code>/usr/local/pentaho/server/biserver-ee/pentaho-solutions/system/pentaho-spring-beans.xml</code>
pentaho.service.base.url	Service base URL.	<code>http://localhost:8080/pentaho</code>
pentaho.service.pentaho.war.dir	Webapp exploded WAR directory.	<code>/usr/local/tomcat/webapps/pentaho/</code>
pentaho.service.webinf.dir	Path to webapp's WEB-INF directory.	<code>/usr/local/tomcat/webapps/pentaho/WEB-INF/</code>

# Upgrading the Pentaho Enterprise Console

---

You must upgrade the Pentaho Enterprise console so that the new BA Server can work. To upgrade, follow the below process.

1. If you used the manual deployment process, you must now unpack the `pec-4.8.0-GA` zip or tar.gz file to the `/pentaho/server/` directory.

This creates a new **enterprise-console** directory with default settings.



**Note:** If you took the archive-based or graphical installer upgrade paths, you do not need to retrieve a new Enterprise Console package; it was included in the BA Server archive package. This step is only for people who have performed a manual WAR deployment.

2. Copy the following files from your old `/enterprise-console/resource/config/` directory into the new one:

- `console.xml`
- `console.properties`
- `login.properties`
- `login.conf`
- `log4j.xml`

```
cp /home/pentaho/pentaho/server_old/enterprise-console/resource/config/console.* /
home/pentaho/pentaho/server/enterprise-console/resource/config/ && cp /home/pentaho/
pentaho/server_old/enterprise-console/resource/config/log* /home/pentaho/pentaho/
server/enterprise-console/resource/config/
```

3. Copy your old `/enterprise-console/resource/config/hsqldb/` directory to the new Enterprise Console instance, overwriting the files that are there.

This directory contains PDI-specific settings.

```
cp -r /home/pentaho/pentaho/server_old/enterprise-console/resource/config/hsqldb/ /
home/pentaho/pentaho/server/enterprise-console/resource/config/
```

The Pentaho Enterprise Console has been upgraded to version 4.8.0.

## Moving JDBC Drivers

---



**Note:** JDBC driver versions prior to 4 may have issues with Java 6. Read your database vendor's compatibility notes carefully before moving or downloading driver JARs.



**Note:** Microsoft SQL Server customers frequently use an alternative, non-vendor-supported driver called JTDS. Ensure that you are downloading the expected driver before installing it.

In order for your existing data source connections to work, you must copy over your old JDBC driver JARs for all of your data sources. The relevant driver directories are below:



**Note:** Ensure that there are no other versions of the same vendor's JDBC driver installed in these directories before copying driver JARs. If there are other versions of the same driver, you may have to remove them to avoid confusion and potential class loading problems. This is of particular concern when you are installing a driver JAR for a data source that is the same database type as your Pentaho solution repository. If you have any doubts as to how to proceed, contact your Pentaho support representative for guidance.

- **BA Server:** /pentaho/server/biserver-ee/tomcat/lib/
- **Enterprise Console:** /pentaho/server/enterprise-console/jdbc/
- **Data Integration Server:** /pentaho/server/data-integration-server/tomcat/webapps/pentaho-di/WEB-INF/lib/
- **Data Integration client:** /pentaho/design-tools/data-integration/libext/JDBC/
- **Report Designer:** /pentaho/design-tools/report-designer/lib/jdbc/
- **Schema Workbench:** /pentaho/design-tools/schema-workbench/drivers/
- **Aggregation Designer:** /pentaho/design-tools/agg-designer/drivers/
- **Metadata Editor:** /pentaho/design-tools/metadata-editor/libext/JDBC/



## Testing Your New BA Server

---

Your server is now ready to test. From an end-user workstation, start a Web browser and navigate to **http://example.com:8080/pentaho**, changing **example.com** to your BA Server's hostname, domain name, or IP address. A login screen appears.

Click the **Login** button, log in normally with an existing user account, and verify that you can run all of your old BI content. Also verify that your schedules are still in place and functional. Specifically, Pentaho recommends that you verify the following actions if they apply to your Enterprise Edition scenario:

1. Open a report that requires no user prompts.
2. Open a report that requires user prompting (a parameterized report).
3. If you are a Pentaho Reporting Enterprise Edition customer, create a report using Interactive Reporting.
4. If you are a Pentaho Analysis Enterprise Edition customer, create a new Analyzer report.
5. If you are a Pentaho Reporting Enterprise Edition customer, create a new report through Interactive Reporting.
6. Open a dashboard if you have a Dashboard Designer support entitlement.
7. Create a new chart using Chart Designer if you have a Dashboard Designer support entitlement.
8. Publish a report from Report Designer.
9. Publish an analysis schema from Spoon.
10. After all other tests have been performed, check your server status in the Pentaho Enterprise Console.
11. Check your application server log for any errors.

## Upgrading the Pentaho Client Tools

---

Upgrading the Pentaho client tools on each user's workstation is considerably easier than upgrading the BA Server. You can either download and run the Business Analytics installer, or download and unpack individual client tool archive packages. If you choose the installer option, simply rename or remove the old client tools, then run the installer, uncheck the default options, select the client tools you want to install, and proceed through the rest of the installation. If you choose the archive package option, simply remove or rename the old client tool's directory, then unpack the new archive to the original location.

The only Pentaho client tools that store user settings are Report Designer and Pentaho Data Integration (Spoon). When upgrading these programs, the new instance will detect the custom settings from the old instance and use them automatically. These settings for Report Designer are stored in the **/.pentaho** directory, and the settings for Pentaho Data Integration (Spoon) are stored in the **/.kettle** directory, both in each user's home or user directory. No settings or content files are stored in the `/pentaho/design-tools/report-designer/` or `/pentaho/design-tools/data-integration/` directories (or the subdirectories for any other client tools). This means that you can safely remove the old Report Designer and Data Integration instances without harming the custom user settings.

## Post-Upgrade Configuration

---

Once your upgrade is complete, the only configuration you have to do is in regards to any new software you have installed. If you installed any new BA Server plugins that you did not have before, such as:

- Dashboard Designer
- Analyzer or Pentaho Analysis Enterprise Edition
- Interactive Reporting
- Mobile

Or any new PDI plugins, then you must install the appropriate license keys in the same manner that you previously installed Pentaho Business Analytics licenses.



**Note:** You do not need to reinstall any extant valid license keys.

# Cleanup

---

Now that your new BA Server version 4.8 is built, deployed, and tested, you can clean up some old or temporary files. Typically this would include:

- The temporary **biserver-manual-ee** or **biserver-ee** (from the archive package) directory
- Your **server\_old** directory
- Archive packages for client tools, servers, and plugins
- 4.1 backup artifacts, though you may want to keep these for a while, in case you need to roll back

# Compatibility Matrix: Supported Components

Pentaho aims to accommodate our clients' diverse computing environments. This list provides details about the environment components and versions we support. If you have questions about your particular computing environment, please contact Pentaho support.

## Client

Pentaho client software is hardware-independent and runs on client-class computers that comply with these specifications for minimum hardware and required operation systems.

Pentaho Software
Pentaho Aggregation Designer
Pentaho Data Integration
Pentaho Design Studio
Pentaho Metadata Editor
Pentaho Report Designer
Pentaho Schema Workbench

Hardware—32 or 64 bit	Operating System—32 or 64 bit
<p><b>Processors:</b></p> <ul style="list-style-type: none"> <li>• Apple Macintosh Dual-Core</li> <li>• Intel EM64T or AMD64 Dual-Core</li> </ul> <p><b>RAM:</b> 2 GB RAM</p> <p><b>Disk Space:</b> 2 GB free after installation</p>	<ul style="list-style-type: none"> <li>• Apple Macintosh OS 10.7 &amp; 10.8</li> <li>• Microsoft Windows 7</li> <li>• Ubuntu Server 10.X and 12.X</li> </ul>

## Server

Pentaho server software is hardware-independent and runs on server-class computers that comply with these specifications for minimum hardware and required operation systems.

Pentaho Software
Pentaho Business Analysis Server
Pentaho Data Integration Server
Pentaho Enterprise Console

Hardware—64 bit	Operating System—64 bit
<ul style="list-style-type: none"> <li>• Apple Macintosh Pro Quad-Core or Macintosh Mini Quad-Core</li> <li>• Intel EM64T or AMD64 Dual-Core</li> </ul> <p><b>RAM:</b> 8 GB with 4 GB dedicated to Pentaho servers, 1 GB to Pentaho Enterprise Console</p> <p><b>Disk Space:</b> 20 GB free after installation</p>	<ul style="list-style-type: none"> <li>• Apple Macintosh OS X Server 10.6 &amp; 10.7</li> <li>• CentOS Linux 5 &amp; 6</li> <li>• Microsoft Windows 2008 Server R1 &amp; R2</li> <li>• Red Hat Enterprise Linux 5 &amp; 6</li> <li>• Solaris 10</li> <li>• Ubuntu Server 10.X &amp; 12.X</li> </ul>

## Embedded Software

When embedding Pentaho software into other applications, the computing environment should comply with these specifications for minimum hardware and required operation systems.

Pentaho Software
Embedded Pentaho Reporting
Embedded Pentaho Analysis
Embedded Pentaho Data Integration

Hardware—32 or 64 bit	Operating System—32 or 64 bit
<p><b>Processors:</b></p> <ul style="list-style-type: none"> <li>• Apple Macintosh Pro Quad-Core or Macintosh Mini Quad-Core</li> <li>• Intel EM64T or AMD64 Dual-Core</li> </ul> <p><b>RAM:</b> 8 GB with 4 GB dedicated to Pentaho servers</p> <p><b>Disk Space:</b> 20 GB free after installation</p>	<ul style="list-style-type: none"> <li>• Apple Macintosh OS X Server 10.6 &amp; 10.7</li> <li>• CentOS Linux 5 &amp; 6</li> <li>• Microsoft Windows 2008 Server R1 &amp; R2</li> <li>• Microsoft Windows 7</li> <li>• Red Hat Enterprise Linux 5 &amp; 6</li> <li>• Solaris 10</li> <li>• Ubuntu Server 10.X &amp; 12.X</li> </ul>

### Application Servers

Servers to which you deploy Pentaho software must run one of these application servers.

Pentaho Software	Application Server
Pentaho Business Analysis Server	<ul style="list-style-type: none"> <li>• Jboss 5.1.x</li> <li>• Tomcat 6.0.x</li> </ul>
Pentaho Data Integration Server	Tomcat 6.0.x

### Solution Database Repositories

Pentaho software stores processing artifacts in these solution database repositories.

Pentaho Software	Database Repository
Pentaho Business Analysis Server	<ul style="list-style-type: none"> <li>• MySQL 5.x</li> <li>• Oracle 10g/11i</li> <li>• PostgreSQL 8.x &amp; 9.1.x*</li> </ul>
Pentaho Data Integration Server	Integrated Pentaho-specific, H2 1.2.131

\*Default installed solution database

### Data Sources

Pentaho software connects to these relational and non-relational data sources.

Pentaho Software	Data Source
Pentaho Reporting	<ul style="list-style-type: none"> <li>• JDBC 3**</li> <li>• ODBC</li> <li>• OLAP4J</li> <li>• XML</li> <li>• Pentaho Analysis</li> <li>• Pentaho Data Integration</li> <li>• Pentaho Metadata</li> </ul>
Pentaho Business Analysis Server, Action Sequences	<ul style="list-style-type: none"> <li>• Relational (JDBC)</li> <li>• Hibernate</li> <li>• Javascript</li> </ul>

Pentaho Software	Data Source
	<ul style="list-style-type: none"> <li>• Metadata (MQL)</li> <li>• Mondrian (MDX)</li> <li>• XML (XQuery)</li> <li>• Security User/Role List Provider</li> <li>• Data Integration Steps (PDI)</li> <li>• Other Action Sequences</li> <li>• Web Services</li> <li>• XMLA</li> </ul>
Pentaho Data Integration	<ul style="list-style-type: none"> <li>• JDBC 3**</li> <li>• OLAP4J</li> <li>• Salesforce</li> <li>• XML</li> <li>• CSV</li> <li>• Microsoft Excel</li> <li>• Pentaho Analysis</li> <li>• Apache Hadoop 0.20.2 &amp; 0.20.203.0***</li> <li>• Cloudera CDH3u4***</li> <li>• CDH4***</li> <li>• MapR 1.1.3 &amp; 1.2.0</li> <li>• Cassandra distributions               <ul style="list-style-type: none"> <li>• Apache 1.1.2</li> <li>• DataStax 1.1.2</li> </ul> </li> <li>• MongoDB 2.0.4</li> </ul>

\*\*Use a JDBC 3.x compliant driver that is compatible with SQL-92 standards when communicating with relational data sources. For your convenience, we provide a list of drivers used to get data from relational JDBC databases.

\*\*\*From one of these distributions: HBase 0.90.5 and Hive 0.7.1

### SQL Dialect-Specific

Pentaho software generates dialect-specific SQL when communicating with these data sources.

Pentaho Software	Data Source
Pentaho Analysis	<ul style="list-style-type: none"> <li>• Access</li> <li>• DB2</li> <li>• Derby</li> <li>• Firebird</li> <li>• Greenplum</li> <li>• Hive</li> <li>• Hsqldb</li> <li>• Infobright</li> <li>• Informix</li> <li>• Ingres</li> <li>• Interbase</li> <li>• LucidDb</li> <li>• MicrosoftSqlServer</li> <li>• MySql</li> <li>• Neoview</li> <li>• Netezza</li> <li>• Oracle</li> <li>• PostgreSQL</li> </ul>

Pentaho Software	Data Source
	<ul style="list-style-type: none"> <li>• SqlStream</li> <li>• Sybase</li> <li>• Teradata</li> <li>• Vectorwise</li> <li>• Vertica</li> <li>• Other SQL-92 compliant****</li> </ul>
<b>Pentaho Metadata</b>	<ul style="list-style-type: none"> <li>• DB2</li> <li>• Firebird</li> <li>• H2</li> <li>• Hypersonic</li> <li>• Ingres</li> <li>• MS Access</li> <li>• ASSQL</li> <li>• MSSQLNative</li> <li>• MySQL</li> <li>• Netezza</li> <li>• Oracle</li> <li>• PostgresSQL</li> <li>• Sybase</li> <li>• Other SQL-92 compliant****</li> </ul>
<b>Pentaho Data Integration</b>	<ul style="list-style-type: none"> <li>• Apache Derby</li> <li>• AS/400</li> <li>• InfiniDB</li> <li>• Exasol 4</li> <li>• Firebird SQL</li> <li>• Greenplum</li> <li>• H2</li> <li>• Hypersonic</li> <li>• IBM DB2</li> <li>• Infobright</li> <li>• Informix</li> <li>• Ingres</li> <li>• Ingres VectorWise</li> <li>• LucidDB</li> <li>• MaxDB (SAP DB)</li> <li>• MonetDB</li> <li>• MySQL</li> <li>• MS SQL Server</li> <li>• Neoview</li> <li>• Netezza</li> <li>• Oracle</li> <li>• Oracle RDB</li> <li>• PostgresSQL</li> <li>• SQLite</li> <li>• Teradata</li> <li>• UniVerse database</li> <li>• Vertica</li> <li>• Other SQL-92 compliant****</li> </ul>

\*\*\*\*If your data source is not in this list and is compatible with SQL-92, Pentaho software uses a generic SQL dialect.



## Security

Pentaho software integrates with these third-party security authentication systems.

Pentaho Software	Authentication System
Pentaho Business Analysis Server Pentaho Enterprise Console	<ul style="list-style-type: none"> <li>Active Directory</li> <li>CAS</li> <li>Integrated Microsoft Windows Authentication</li> <li>LDAP</li> <li>RDBMS</li> </ul>
Pentaho Data Integration Server	<ul style="list-style-type: none"> <li>Active Directory</li> <li>LDAP</li> <li>RDBMS</li> </ul>

## Java Virtual Machine

All Pentaho software, except the Pentaho Mobile App, requires the Sun/Oracle version 1.6 (6.0) distribution of the Java Runtime Environment (JRE) or Java Development Kit (JDK).

## Web Browsers

Pentaho supports these major versions of Web browsers that are publicly available six weeks prior to when Pentaho begins to finalize a release. We also support the preceding major version.

Pentaho Software	Web Browser
Pentaho User Console Pentaho Enterprise Console Pentaho Report Designer*****	<ul style="list-style-type: none"> <li>Apple Safari 5.x</li> <li>Google Chrome 19</li> <li>Microsoft Internet Explorer 8 &amp; 9</li> <li>Mozilla Firefox 13 &amp; 14</li> </ul>

\*\*\*\*\*Requires a web browser to preview the exported HTML reports.

## Mobile Apps

Pentaho mobile apps run on the Apple iPad 2 and 3 using iOS 5.x and 6.

## JDBC Drivers

### JDBC Drivers

This reference is a continuous work in progress. If you are viewing it in the Pentaho InfoCenter and see something that is not correct, know of a driver that is not listed here, or have a tip you want to share, please let us know by using the comments fields found in the bottom right corner.

Database	Vendor	URL
<a href="#">Apache Derby</a>	IBM	<a href="http://db.apache.org/derby/derby_downloads.html">http://db.apache.org/derby/derby_downloads.html</a>
<a href="#">Cache'</a>	InterSystems	<a href="http://www.cachemonitor.de/intersystems-documentation/cache-jdbc-driver">http://www.cachemonitor.de/intersystems-documentation/cache-jdbc-driver</a>
<a href="#">CUBRID</a>	CUBRID	<a href="http://www.cubrid.org/?mid=downloadsitem=jdbc_driver">http://www.cubrid.org/?mid=downloadsitem=jdbc_driver</a>
<a href="#">Daffodil DB</a>	Daffodil Software	<a href="http://sourceforge.net/projects/daffodildb/">http://sourceforge.net/projects/daffodildb/</a>

Database	Vendor	URL
<a href="#">DB2 AS/400</a>	IBM	<a href="http://www-03.ibm.com/systems/i/software/toolbox/">http://www-03.ibm.com/systems/i/software/toolbox/</a>
<a href="#">DB2 Universal Database</a>	IBM	<a href="http://www-306.ibm.com/software/data/db2/java">http://www-306.ibm.com/software/data/db2/java</a>
<a href="#">Firebird</a>	Firebird Foundation	<a href="http://www.firebirdsql.org/en/jdbc-driver/">http://www.firebirdsql.org/en/jdbc-driver/</a>
<a href="#">FrontBase</a>	FrontBase	<a href="http://www.frontbase.com/cgi-bin/WebObjects/FBWebSite">http://www.frontbase.com/cgi-bin/WebObjects/FBWebSite</a>
<a href="#">Greenplum</a>	EMC2	<a href="http://jdbc.postgresql.org/download.html">http://jdbc.postgresql.org/download.html</a>
<a href="#">H2 Database</a>	H2	<a href="http://www.h2database.com">http://www.h2database.com</a>
<a href="#">Hive</a>	Apache	<a href="http://hive.apache.org/">http://hive.apache.org/</a>
<a href="#">HSQLDB</a>	HyperSQL	<a href="http://sourceforge.net/projects/hsqldb/">http://sourceforge.net/projects/hsqldb/</a>
<a href="#">Informix</a>	IBM	<a href="http://www-01.ibm.com/software/">http://www-01.ibm.com/software/</a>
<a href="#">Ingres</a>	Action	<a href="http://esd.action.com/product/drivers/JDBC/java">http://esd.action.com/product/drivers/JDBC/java</a>
<a href="#">InterBase</a>	Embarcadero	<a href="http://edn.embarcadero.com">http://edn.embarcadero.com</a>
<a href="#">jTDS Free MS Sybase</a>	jTDS	<a href="http://jtds.sourceforge.net/">http://jtds.sourceforge.net/</a>
<a href="#">LucidDB</a>	DynamoDB	<a href="http://www.dynamobi.com/c/downloads/stable/">http://www.dynamobi.com/c/downloads/stable/</a>
<a href="#">MaxDB</a>	SAP	<a href="http://maxdb.sap.com">http://maxdb.sap.com</a>
<a href="#">Mckoi</a>	Mckoi SQL Database	<a href="http://www.mckoi.com/originalmckoisql/index.html">http://www.mckoi.com/originalmckoisql/index.html</a>
<a href="#">Mimer</a>	Mimer Information Technology	<a href="http://www.mimer.com">http://www.mimer.com</a>
<a href="#">MonetDB</a>	MonetDB	<a href="http://www.monetdb.org/">http://www.monetdb.org/</a>
<a href="#">MySQL</a>	Oracle	<a href="http://dev.mysql.com/downloads/connector/j/">http://dev.mysql.com/downloads/connector/j/</a>
<a href="#">Neoview</a>	HP	<a href="https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=NEO10">https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=NEO10</a>
<a href="#">Netezza</a>	IBM	<a href="http://www.netezza.com">http://www.netezza.com</a>
<a href="#">OpenBase SQL</a>	OpenBase International	<a href="http://www.openbase.com/index.php/products/downloads">http://www.openbase.com/index.php/products/downloads</a>
<a href="#">Oracle</a>	Oracle	<a href="http://www.oracle.com/technetwork/database/features/jdbc/index.html">http://www.oracle.com/technetwork/database/features/jdbc/index.html</a>
<a href="#">Pervasive</a>	Pervasive	<a href="http://www.pervasivedb.com/download/Pages/PDBDownloads.aspx">http://www.pervasivedb.com/download/Pages/PDBDownloads.aspx</a>
<a href="#">PostgreSQL</a>	PostgreSQL Global Development Group	<a href="http://jdbc.postgresql.org/">http://jdbc.postgresql.org/</a>
<a href="#">SAP DB</a>	SAP DB	<a href="http://www.sapdb.org/sap_db_jdbc.htm">http://www.sapdb.org/sap_db_jdbc.htm</a>
<a href="#">SQLite</a>	Xerial	<a href="http://www.xerial.org/trac/Xerial/wiki/SQLiteJDBC">http://www.xerial.org/trac/Xerial/wiki/SQLiteJDBC</a>

Database	Vendor	URL
<a href="#">SQL Server</a>	Microsoft	<a href="http://msdn.microsoft.com/en-us/sqlserver/aa937724.aspx">http://msdn.microsoft.com/en-us/sqlserver/aa937724.aspx</a>
<a href="#">Sybase ASE</a>	SAP	<a href="http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect">http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect</a>
<a href="#">Sybase SQL Anywhere</a>	SAP	<a href="http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect">http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect</a>
<a href="#">SmallSQL</a>	SmallSQL	<a href="http://www.smallsql.de/download.html">http://www.smallsql.de/download.html</a>
<a href="#">Teradata</a>	Teradata	<a href="http://downloads.teradata.com/download/connectivity/jdbc-driver">http://downloads.teradata.com/download/connectivity/jdbc-driver</a>
<a href="#">Vertica</a>	HP	<a href="http://www.vertica.com">http://www.vertica.com</a>

### Apache Derby

Vendor Name	Details	
Recommended Native Driver		
IBM	<b>Company URL</b> <a href="http://www.ibm.com">http://www.ibm.com</a>	
	<b>Driver URL</b> <a href="http://db.apache.org/derby/derby_downloads.html">http://db.apache.org/derby/derby_downloads.html</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:derby://<server>[:<port>]/<databaseName>[:<URL attribute>=<value>] Embedded—jdbc:derby:<databaseName>[:create=true]	<b>Default Port</b> 1527
	<b>JDBC Class</b> org.apache.derby.jdbc.ClientDriver org.apache.derby.jdbc.EmbeddedDriver	<b>JDBC JAR File Name</b> derby.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	
	<b>Comments</b> Open source database	

### Caché

Vendor Name	Details
Recommended Native Driver	
InterSystems	<b>Company URL</b> <a href="http://www.cachemonitor.de">http://www.cachemonitor.de</a>
	<b>Driver URL</b> <a href="http://www.cachemonitor.de/intersystems-documentation/cache-jdbc-driver">http://www.cachemonitor.de/intersystems-documentation/cache-jdbc-driver</a>

Vendor Name	Details	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:Cache:// <server>[:<port>]/<namespace>	<b>Default Port</b> 1972
	<b>JDBC Class</b> com.intersys.jdbc.CacheDriver	<b>JDBC JAR File Name</b> cachedb.jar

**CUBRID**

Vendor Name	Details	
Recommended Native Driver		
CUBRID	<b>Company URL</b> <a href="http://www.cubrid.org">http://www.cubrid.org</a>	
	<b>Driver URL</b> <a href="http://www.cubrid.org/?mid=downloads&amp;item=jdbc_driver">http://www.cubrid.org/?mid=downloads&amp;item=jdbc_driver</a>	
	<b>JDBC URL Syntax by Type</b> Server— jdbc:cubrid:<server>:<port>:<databaseName>:<username>:<password> : [?<URL attribute>=<value>[&<URL attribute>=<value>] ... ]	<b>Default Port</b> 33000
	<b>JDBC Class</b> cubrid.jdbc.driver.CUBRIDDriver	<b>JDBC JAR File Name</b> N/A
	<b>Comments</b> Open source database highly optimized for Web applications.	

**Daffodil DB**

Vendor Name	Details	
Recommended Native Driver		
Daffodil Software	<b>Company URL</b> <a href="http://db.daffodilsw.com">http://db.daffodilsw.com</a>	
	<b>Driver URL</b> <a href="http://sourceforge.net/projects/daffodildb/">http://sourceforge.net/projects/daffodildb/</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:daffodilDB:// <server>[:<port>]/<databaseName>  Embedded— jdbc:daffodilDB_embedded:<databaseName>	<b>Default Port</b> 3456 N/A
	<b>JDBC Class</b> in.co.daffodil.db.rmi.RmiDaffodilDBDriver	<b>JDBC JAR File Name</b> DaffodilDB_client.jar DaffodilDB_Embedded.jar,

Vendor Name	Details	
	in.co.daffodil.db.jdbc.DaffodilDBDriver	DaffodilDB_Common.jar
	<b>Comments</b> Open source database	

**DB2 AS/400**

Vendor Name	Details	
Recommended Native Driver		
IBM	<b>Company URL</b> <a href="http://www.ibm.com">http://www.ibm.com</a>	
	<b>Driver URL</b> <a href="http://www-03.ibm.com/systems/i/software/toolbox/">http://www-03.ibm.com/systems/i/software/toolbox/</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:as400:// <server>naming=sql;errors=full	<b>Default Port</b> N/A
	<b>JDBC Class</b> com.ibm.as400.access.AS400JDBCDriver	<b>JDBC JAR File Name</b> as400.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	

**DB2 Universal Database**

Vendor Name	Details	
Recommended Native Driver		
IBM	<b>Company URL</b> <a href="http://www.ibm.com">http://www.ibm.com</a>	
	<b>Driver URL</b> <a href="http://www-306.ibm.com/software/data/db2/java">http://www-306.ibm.com/software/data/db2/java</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:db2://<server>[:<port>]/ <databaseName>[:<URL attribute>=<value>]	<b>Default Port</b> 50000
	<b>JDBC Class</b> com.frontbase.jdbc.FBJDriver	<b>JDBC JAR File Name</b> frontbasejdbc.jar

**Firebird**

Vendor Name	Details	
Recommended Native Driver		
Firebird Foundation	<b>Company URL</b>	

Vendor Name	Details	
	<a href="http://www.firebirdsql.org">http://www.firebirdsql.org</a>	
	<b>Driver URL</b> <a href="http://www.firebirdsql.org/en/jdbc-driver/">http://www.firebirdsql.org/en/jdbc-driver/</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:firebirdsql:<server>[/ <port>]:/<database-file> (JDBC Type 4, official format) Server—jdbc:firebirdsql:// <server>[:<port>]/<database-file> (JDBC Type 4, compatibility format) Server—jdbc:firebirdsql:native// <server>[/<port>]:/<database-file> (JDBC Type 2, compatibility format) Server—jdbc:firebirdsql:native:// <server>[:<port>]/<database-file> (JDBC Type 2, compatibility format. Requires libraries) Embedded— jdbc:firebirdsql:embedded:./<local- database-file> (JDBC Type 2, compatibility format. Requires libraries)	<b>Default Port</b> 3050 3050 3050 3050 N/A
	<b>JDBC Class</b> org.firebirdsql.jdbc.FBDriver	<b>JDBC JAR File Name</b> jaybird-full-xxx.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	

**FrontBase**

Vendor Name	Details	
Recommended Native Driver		
FrontBase	<b>Company URL</b> <a href="http://www.frontbase.com">http://www.frontbase.com</a>	
	<b>Driver URL</b> <a href="http://www.frontbase.com/cgi-bin/WebObjects/FBWebSite">http://www.frontbase.com/cgi-bin/WebObjects/FBWebSite</a>	
	<b>JDBC URL Syntax by Type</b> Server— jdbc:FrontBase://<host>[:<port>]/ <databaseName>	<b>Default Port</b> N/A
	<b>JDBC Class</b>	<b>JDBC JAR File Name</b>

Vendor Name	Details	
	com.frontbase.jdbc.FBJDriver	frontbasejdbc.jar

## Greenplum

Vendor Name	Details	
Recommended Native Driver		
Greenplum	<b>Company URL</b> <a href="http://www.greenplum.com">http://www.greenplum.com</a>	
	<b>Driver URL</b> <a href="http://jdbc.postgresql.org/download.html">http://jdbc.postgresql.org/download.html</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:postgresql:// <server>[:<port>]/<databaseName>	<b>Default Port</b> 5342
	<b>JDBC Class</b> org.postgresql.Driver	<b>JDBC JAR File Name</b> postgresql-8.x-xxx.jdbc4.jar
	<b>Comments</b> Greenplum uses the Postgresql JDBC driver	

## H2 Database

Vendor Name	Details	
Recommended Native Driver		
H2	<b>Company URL</b> <a href="http://www.h2database.com">http://www.h2database.com</a>	
	<b>Driver URL</b> <a href="http://www.h2database.com">http://www.h2database.com</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:h2:tcp://server[:port]/file-path Embedded—jdbc:h2:file-name	<b>Default Port</b> 9092 N/A
	<b>JDBC Class</b> jdbc:h2:tcp://server[:port]/file-path org.h2.Driver	<b>JDBC JAR File Name</b> h2-x.x.xxx.jar
	<b>Shipped with Pentaho Products</b> <ul style="list-style-type: none"> <li>• Pentaho Business Analysis Server</li> <li>• Pentaho Data Integration</li> <li>• Pentaho Metadata-Editor</li> </ul> Pentaho Report-Designer	
	<b>Comments</b>	

Vendor Name	Details
	Open source Java SQL database

## Hive

Vendor Name	Details	
Recommended Native Driver		
Apache	<b>Company URL</b> <a href="http://hive.apache.org/">http://hive.apache.org/</a>	
	<b>Driver URL</b> N/A	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:hive://<server>[:<port>]/ default	<b>Default Port</b> 10000
	<b>JDBC Class</b> org.apache.hadoop.hive.jdbc.HiveDriver	<b>JDBC JAR File Name</b> hive-jdbc-x.x.x-pentaho-y.y.y.jar Example: hive-jdbc-0.7.0-pentaho-1.0.1.jar*
	<b>Shipped with Pentaho Products</b> <ul style="list-style-type: none"> <li>• Pentaho Business Analysis Server</li> <li>• Pentaho Data Integration</li> <li>• Pentaho Metadata-Editor</li> </ul> Pentaho Report-Designer	
	<b>Comments</b> Data warehouse infrastructure that provides data summarization and ad hoc querying  *x.x.x is the Hive version, y.y.y is the Pentaho version. Pentaho has enhanced the standard Hive JDBC driver	

## HSQldb

Vendor Name	Details
Recommended Native Driver	
HyperSQL	<b>Company URL</b> <a href="http://www.hsqldb.org">http://www.hsqldb.org</a>
	<b>Driver URL</b> <a href="http://sourceforge.net/projects/hsqldb/">http://sourceforge.net/projects/hsqldb/</a>
	<b>JDBC URL Syntax by Type</b> Server—jdbc:hsqldb:hsq:// <server>[:<port>]/<databaseName>  Embedded Memory— jdbc:hsqldb:mem:<databaseName>



Vendor Name	Details	
	Embedded File — jdbc:hsqldb:file:<database-file>	
	<b>JDBC Class</b> org.hsqldb.jdbcDriver	<b>JDBC JAR File Name</b> hsqldb.jar
	<b>Shipped with Pentaho Products</b> <ul style="list-style-type: none"> <li>• Pentaho Enterprise-Console</li> <li>• Pentaho Business Analysis Server</li> <li>• Pentaho Aggregation-Designer</li> <li>• Pentaho Data Integration</li> <li>• Pentaho Metadata-Editor</li> <li>• Pentaho Report-Designer</li> </ul>	

**Informix**

Vendor Name	Details	
Recommended Native Driver		
IBM	<b>Company URL</b> <a href="http://www.ibm.com">http://www.ibm.com</a>	
	<b>Driver URL</b> =	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:informix-sqli://<server>[:<port>]/<databaseName>:informixserver=<dbservername>	<b>Default Port</b> 1533
	<b>JDBC Class</b> com.informix.jdbc.IfxDriver	<b>JDBC JAR File Name</b> ifxjdbc.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	

**Ingres**

Vendor Name	Details	
Recommended Native Driver		
Actian	<b>Company URL</b> <a href="http://www.actian.com/">http://www.actian.com/</a>	
	<b>Driver URL</b> <a href="http://esd.actian.com/product/drivers/JDBC/java">http://esd.actian.com/product/drivers/JDBC/java</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:ingres://<server>[:<port>]/<databaseName>	<b>Default Port</b> 21071
	<b>JDBC Class</b>	<b>JDBC JAR File Name</b>

Vendor Name	Details	
	com.ingres.jdbc.IngresDriver	ijjdbc.jar
	<b>Comments</b> Open source relational database management system	

**InterBase**

Vendor Name	Details	
Recommended Native Driver		
Embarcadero	<b>Company URL</b> <a href="http://edn.embarcadero.com">http://edn.embarcadero.com</a>	
	<b>Driver URL</b> N/A	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:interbase://<server>/<full_db_path>	<b>Default Port</b> N/A
	<b>JDBC Class</b> interbase.interclient.Driver	<b>JDBC JAR File Name</b> interclient.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	

**JTDS Free MS SQL Sybase**

Vendor Name	Details	
Recommended Native Driver		
jTDS	<b>Company URL</b> <a href="http://jtds.sourceforge.net/">http://jtds.sourceforge.net/</a>	
	<b>Driver URL</b> N/A	
	<b>JDBC URL Syntax by Type</b> SQL Server— jdbc:jtds:<server_type>//<server>[:<port>][/<database>][;<property>=<value>[:...]] Sybase—jdbc:jtds:<server_type>://<server>[:<port>][/<database>]	<b>Default Port</b> 1433 7100
	<b>JDBC Class</b> interbase.interclient.Driver	<b>JDBC JAR File Name</b> jtds-x.x.x.jar
	<b>Shipped with Pentaho Products</b> <ul style="list-style-type: none"> <li>• Pentaho Enterprise-Console</li> <li>• Pentaho Business Analysis Server</li> </ul>	

Vendor Name	Details
	<ul style="list-style-type: none"> <li>• Pentaho Aggregation-Designer</li> <li>• Pentaho Data Integration</li> <li>• Pentaho Metadata-Editor</li> <li>• Pentaho Report-Designer</li> </ul>

**LucidDB**

Vendor Name	Details	
Recommended Native Driver		
DynamoDB	<b>Company URL</b> <a href="http://www.dynamobi.com">http://www.dynamobi.com</a>	
	<b>Driver URL</b> <a href="http://www.dynamobi.com/c/downloads/stable/">http://www.dynamobi.com/c/downloads/stable/</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:luiddb:http:// <server>[:<port>]	<b>Default Port</b> 8034
	<b>JDBC Class</b> org.luiddb.jdbc.LucidDbClientDriver	<b>JDBC JAR File Name</b> LucidDbClient-x.x.x.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	
	<b>Comments</b> Open source BI solution for Big Data	

**MaxDB**

Vendor Name	Details	
Recommended Native Driver		
SAP	<b>Company URL</b> <a href="http://www.sap.com">http://www.sap.com</a>	
	<b>Driver URL</b> <a href="http://maxdb.sap.com">http://maxdb.sap.com</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:sapdb:// <server>[:<port>]/<databaseName>	<b>Default Port</b> 7210
	<b>JDBC Class</b> com.sap.dbtech.jdbc.DriverSapDB	<b>JDBC JAR File Name</b> sapdbc.jar
	<b>Comments</b> Database management system developed and supported by SAP AG	

**Mckoi SQL Database**

Vendor Name		Details	
Recommended Native Driver			
Mckoi	<b>Company URL</b> <a href="http://www.mckoi.com">http://www.mckoi.com</a>		
	<b>Driver URL</b> <a href="http://www.mckoi.com/originalmckoisql/index.html">http://www.mckoi.com/originalmckoisql/index.html</a>		
	<b>JDBC URL Syntax by Type</b> Server—jdbc:mckoi:// <server>[:<port>][/<schema>]/		<b>Default Port</b> 9157
	<b>JDBC Class</b> com.mckoi.JDBCdriver		<b>JDBC JAR File Name</b> mckoidb.jar
	<b>Comments</b> Open source SQL database written in Java		

**Mimer**

Vendor Name		Details	
Recommended Native Driver			
Mimer Information Technology	<b>Company URL</b> <a href="http://www.mimer.com">http://www.mimer.com</a>		
	<b>Driver URL</b> N/A		
	<b>JDBC URL Syntax by Type</b> Server—jdbc:mimer:<protocol>:// <server>[:<port>]/<database>		<b>Default Port</b> 1360
	<b>JDBC Class</b> com.mimer.jdbc.Driver		<b>JDBC JAR File Name</b> mimer.jar

**MonetDB**

Vendor Name		Details	
Recommended Native Driver			
MonetDB	<b>Company URL</b> <a href="http://www.monetdb.org">http://www.monetdb.org</a>		
	<b>Driver URL</b> N/A		
	<b>JDBC URL Syntax by Type</b>		<b>Default Port</b> 50000

Vendor Name	Details	
	Server—jdbc:monetdb:// <server>[:<port>]/<database>	
	<b>JDBC Class</b> nl.cwi.monetdb.jdbc.MonetDriver	<b>JDBC JAR File Name</b> monetdb-jdbc-x.x.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	
	<b>Comments</b> An open source database system	

**MY SQL**

Vendor Name	Details	
Recommended Native Driver		
Oracle	<b>Company URL</b> <a href="http://www.mysql.com">http://www.mysql.com</a>	
	<b>Driver URL</b> <a href="http://dev.mysql.com/downloads/connector/j/">http://dev.mysql.com/downloads/connector/j/</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:mysql:// <hostname>[,<failoverhost>] [:<port>] /<dbname>[?<URL attribute>=<value>[&<URL attribute>=<value>] ... ]	<b>Default Port</b> 3306
	<b>JDBC Class</b> com.mysql.jdbc.Driver (official class name) org.gjt.mm.mysql.Driver (older class name)	<b>JDBC JAR File Name</b> mysql-connector-java-5.x.xx-bin.jar
	<b>Shipped with Pentaho Product</b> <ul style="list-style-type: none"> <li>• Pentaho Enterprise-Console</li> <li>• Pentaho Business Analysis Server</li> <li>• Pentaho Aggregation-Designer</li> <li>• Pentaho Metadata-Editor</li> <li>• Pentaho Report-Designer</li> </ul>	

**Neoview**

Vendor Name	Details
Recommended Native Driver	
HP	<b>Company URL</b> <a href="http://www.hp.com">http://www.hp.com</a>

Vendor Name	Details	
	<b>Driver URL</b> <a href="https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=NEO10">https://h20392.www2.hp.com/portal/swdepot/displayProductInfo.do?productNumber=NEO10</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:hpt4jdbc:// <system>[:<port>][[:]<URL attribute>= <value>[:<URL attribute>=<value> ...]	<b>Default Port</b> 18650
	<b>JDBC Class</b> com.hp.t4jdbc.HPT4Driver	<b>JDBC JAR File Name</b> N/A

**Netezza**

Vendor Name	Details	
Recommended Native Driver		
IBM	<b>Company URL</b> <a href="http://www.netezza.com">http://www.netezza.com</a>	
	<b>Driver URL</b> N/A	
	<b>JDBC URL Syntax by Type</b> jdbc:netezza://<server>[:<port>]/ <database>	<b>Default Port</b> 5480
	<b>JDBC Class</b> org.netezza.Driver	<b>JDBC JAR File Name</b> N/A

**OpenBase SQL**

Vendor Name	Details	
Recommended Native Driver		
OpenBase International	<b>Company URL</b> <a href="http://www.openbase.com">http://www.openbase.com</a>	
	<b>Driver URL</b> <a href="http://www.openbase.com/index.php/products/downloads">http://www.openbase.com/index.php/products/downloads</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:openbase://<server>/ <databaseName>	<b>Default Port</b> N/A
	<b>JDBC Class</b> com.openbase.jdbc.ObDriver	<b>JDBC JAR File Name</b> OpenBaseJDBC.jar

**Oracle**

Vendor Name		Details		
Recommended Native Driver				
Oracle	<b>Company URL</b> <a href="http://www.oracle.com">http://www.oracle.com</a>			
	<b>Driver URL</b> <a href="http://www.oracle.com/technetwork/database/features/jdbc/index.html">http://www.oracle.com/technetwork/database/features/jdbc/index.html</a>			
	<b>JDBC URL Syntax by Type</b> Thin Server— jdbc:oracle:thin:@<server>[:<port>]:<sid> OCI Server —jdbc:oracle:oci:@<server>[:<port>]:<sid>		<b>Default Port</b> 1521	
	<b>JDBC Class</b> oracle.jdbc.driver.OracleDriver oracle.jdbc.OracleDriver		<b>JDBC JAR File Name</b> ojdbcx.jar, ora18n.jar	
	<b>Comments</b> The OCI server requires OCI libraries			

**Pervasive**

Vendor Name		Details		
Recommended Native Driver				
Pervasive	<b>Company URL</b> <a href="http://www.pervasivedb.com/Pages/default.aspx">http://www.pervasivedb.com/Pages/default.aspx</a>			
	<b>Driver URL</b> <a href="http://www.pervasivedb.com/download/Pages/PDBDownloads.aspx">http://www.pervasivedb.com/download/Pages/PDBDownloads.aspx</a>			
	<b>JDBC URL Syntax by Type</b> Server—jdbc:pervasive:// <server>[:<port>]/<datasource>		<b>Default Port</b> 1583	
	<b>JDBC Class</b> com.pervasive.jdbc.v2.Driver		<b>JDBC JAR File Name</b> N/A	
	<b>Shipped with Pentaho Products</b> <ul style="list-style-type: none"> <li>• Pentaho Data Integration</li> <li>• Pentaho Report-Designer</li> </ul>			
<b>Comments</b> The data source is the ODBC DSN				

**PostgreSQL**

Vendor Name		Details	
Recommended Native Driver			
PostgreSQL Global Development Group	<b>Company URL</b> <a href="http://www.postgresql.org/">http://www.postgresql.org/</a>		
	<b>Driver URL</b> <a href="http://jdbc.postgresql.org/">http://jdbc.postgresql.org/</a>		
	<b>JDBC URL Syntax by Type</b> Server—jdbc:postgresql:// <server>[:<port>]/<databaseName>	<b>Default Port</b> 5342	
	<b>JDBC Class</b> org.postgresql.Driver	<b>JDBC JAR File Name</b> postgresql-8.x-xxx.jdbc4.jar	
	<b>Shipped with Pentaho Products</b> <ul style="list-style-type: none"> <li>• Pentaho Data Integration</li> <li>• Pentaho Report-Designer</li> </ul>		

**SAP DB**

Vendor Name		Details	
Recommended Native Driver			
SAP DB	<b>Company URL</b> N/A		
	<b>Driver URL</b> <a href="http://www.sapdb.org/sap_db_jdbc.htm">http://www.sapdb.org/sap_db_jdbc.htm</a>		
	<b>JDBC URL Syntax by Type</b> Server—jdbc:sapdb://<server>/ <database_name>	<b>Default Port</b> N/A	
	<b>JDBC Class</b> com.sap.dbtech.jdbc.DriverSapDB	<b>JDBC JAR File Name</b> sapdbc-x.x.x.jar	
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration		
	<b>Comments</b> FREE Enterprise Open Source Database		

**SQLite**

Vendor Name		Details	
Recommended Native Driver			
Xerial	<b>Company URL</b>		



Vendor Name	Details	
	N/A	
	<b>Driver URL</b> <a href="http://www.xerial.org/trac/Xerial/wiki/SQLiteJDBC">http://www.xerial.org/trac/Xerial/wiki/SQLiteJDBC</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:sqlite:<filename.db>	<b>Default Port</b> N/A
	<b>JDBC Class</b> org.sqlite.JDBC	<b>JDBC JAR File Name</b> sqlite-jdbc-x.x.x.jar
	<b>Shipped with Pentaho Products</b> Pentaho Data Integration	

**SQL Server**

Vendor Name	Details	
Recommended Native Driver		
Microsoft	<b>Company URL</b> <a href="http://www.microsoft.com">http://www.microsoft.com</a>	
	<b>Driver URL</b> <a href="http://msdn.microsoft.com/en-us/sqlserver/aa937724.aspx">http://msdn.microsoft.com/en-us/sqlserver/aa937724.aspx</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:sqlserver:// <server>[:<port>];DatabaseName=<databaseName>	<b>Default Port</b> 1433
	<b>JDBC Class</b> com.microsoft.sqlserver.jdbc.SQLServerDriver	<b>JDBC JAR File Name</b> sqljdbc4.jar
	<b>Comments</b> The open source jtds driver also works with MSSQL	

**Sybase ASE**

Vendor Name	Details	
Recommended Native Driver		
SAP	<b>Company URL</b> <a href="http://www.sybase.com">http://www.sybase.com</a>	
	<b>Driver URL</b> <a href="http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect">http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect</a>	
	<b>JDBC URL Syntax by Type</b> Server— jdbc:sybase:Tds:<server>[:<port>]/ <databaseName>	<b>Default Port</b> 5000

Vendor Name	Details	
	<b>JDBC Class</b> com.sybase.jdbc4.jdbc.SybDriver	<b>JDBC JAR File Name</b> N/A
	<b>Comments</b> The open source jTDS driver works with Sybase as well	

### Sybase SQL Anywhere

Vendor Name	Details	
Recommended Native Driver		
SAP	<b>Company URL</b> <a href="http://www.sybase.com">http://www.sybase.com</a>	
	<b>Driver URL</b> <a href="http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect">http://www.sybase.com/products/allproductsa-z/softwaredeveloperkit/jconnect</a>	
	<b>JDBC URL Syntax by Type</b> Server— jdbc:sybase:Tds:<server>[:<port>]/ <databaseName>	<b>Default Port</b> 2638
	<b>JDBC Class</b> com.sybase.jdbc4.jdbc.SybDriver	<b>JDBC JAR File Name</b> N/A
	<b>Comments</b> This open source jTDS driver works with Sybase as well	

### SmallSQL

Vendor Name	Details	
Recommended Native Driver		
SmallSQL	<b>Company URL</b> <a href="http://www.smallsql.de/">http://www.smallsql.de/</a>	
	<b>Driver URL</b> <a href="http://www.smallsql.de/download.html">http://www.smallsql.de/download.html</a>	
	<b>JDBC URL Syntax by Type</b> Embedded— jdbc:smallsql:databaseName[?URL attribute=value[URLattribute=value] ...]	<b>Default Port</b> N/A
	<b>JDBC Class</b> smallsql.database.SSDriver	<b>JDBC JAR File Name</b> smallsql.jar
	<b>Comments</b>	

Vendor Name	Details
	Java desktop SQL database engine

**Teradata**

Vendor Name	Details	
Recommended Native Driver		
Teradata	<b>Company URL</b> <a href="http://www.teradata.com">http://www.teradata.com</a>	
	<b>Driver URL</b> <a href="http://downloads.teradata.com/download/connectivity/jdbc-driver">http://downloads.teradata.com/download/connectivity/jdbc-driver</a>	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:teradata://<dbshost>/<URL attribute>[;<URL attribute>]...]	<b>Default Port</b> N/A
	<b>JDBC Class</b> com.teradata.jdbc.TeraDriver	<b>JDBC JAR File Name</b> terajdbc4.jar

**Vertica**

Vendor Name	Details	
Recommended Native Driver		
HP	<b>Company URL</b> <a href="http://www.vertica.com">http://www.vertica.com</a>	
	<b>Driver URL</b> TBD	
	<b>JDBC URL Syntax by Type</b> Server—jdbc:vertica://<server>[:<port>]/<databaseName>	<b>Default Port</b> 5433
	<b>JDBC Class</b> com.vertica.Driver	<b>JDBC JAR File Name</b> N/A

## Troubleshooting

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This section contains known problems and solutions relating to the procedures covered in this guide.

### File Names and Paths

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**Note:** This is the most common installation problem.

Many of the configuration files and paths in this guide are similar, and it is easy to confuse them, which could result in modifying the wrong files or copying to the wrong locations. Double-check your file names and paths and ensure that you've copied all of the right files to all of the correct directories.

Trailing slashes are important; both their inclusion and their absence, depending on the file and parameter or element you are modifying. Follow the examples in this guide exactly unless otherwise directed.

### Examining Log Files

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If the BA Server fails to start or work properly, the log file you should consult is **pentaho.log** in the `/pentaho/server/biserver-ee/tomcat/bin/` directory. The contents of this file will assist you in tracking down the problem.

### JDBC Driver Problems

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First, ensure that the correct JDBC driver JARs are installed to the correct locations, then check to make sure that there aren't conflicting driver versions. See the *Pentaho Business Analytics Administrator's Guide* for explanations of how to create JDBC Database connections and driver locations for all parts of Pentaho Business Analytics. Check with your database or driver vendor if you suspect you have having JDBC driver compatibility issues.

### Unable to Use the Database Init Scripts for PostgreSQL

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The **pg\_hba.conf** file contains host-based authentication information. If you can't run the SQL scripts that generate the Hibernate and Quartz databases, it's probably because the default user accounts for each database don't have the right permissions. To change this, edit the file to ensure that connections from local users created by the Pentaho sql scripts (**hibuser** and **pentaho\_user**) will be able to connect. The default on Debian-based systems is for local connections you use **ident** authentication, which means that database users must have local user accounts. In other words, to continue using **ident**, you would have to create local **hibuser** and **pentaho\_user** accounts. It's easier to just change the authentication method to something less restrictive, if your IT manager permits you to do so.

### context.xml Changes Do Not Take Effect After Re-deploying a WAR

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Re-deployment of a WAR or EAR with a custom **context.xml** may cause the original context.xml that you deployed with the original WAR or EAR to become permanently cached. Tomcat in particular will generate a WAR-specific context configuration file, and keep it in place even after the WAR is deleted. The location and naming convention for this file are: **\$CATALINA\_HOME/conf/Catalina/<host>/<war name>.xml**. Typically this will be something like: **/tomcat/conf/Catalina/localhost/pentaho.xml**. If this file exists, you will have to delete it prior to re-deploying pentaho.war if you have made any changes to context.xml.

### Tomcat Logs Report Memory Leaks

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When shutting down Tomcat, you may see some SEVERE-level warnings in the log file similar to these:

```
Dec 17, 2010 10:18:19 AM org.apache.catalina.loader.WebappClassLoader
clearReferencesJdbc
SEVERE: The web application [/pentaho] registered the JDBC driver
[mondrian.olap4j.MondrianOlap4jDriver] but failed to unregister it when the web
```

```
application was stopped. To prevent a memory leak, the JDBC Driver has been forcibly
unregistered.
Dec 17, 2010 10:18:19 AM org.apache.catalina.loader.WebappClassLoader
clearReferencesThreads
SEVERE: The web application [/pentaho] appears to have started a thread named [HSQLDB
Timer @49cf9f] but has failed to stop it. This is very likely to create a memory
leak.
Dec 17, 2010 10:18:19 AM org.apache.catalina.loader.WebappClassLoader
clearReferencesThreads
SEVERE: The web application [/pentaho] appears to have started a thread named [MySQL
Statement Cancellation Timer] but has failed to stop it. This is very likely to
create a memory leak.
Dec 17, 2010 10:18:19 AM org.apache.catalina.loader.WebappClassLoader
clearThreadLocalMap
SEVERE: The web application [/pentaho] created a ThreadLocal
with key of type [java.lang.InheritableThreadLocal] (value
[java.lang.InheritableThreadLocal@a1320e]) and a value of type
[org.pentaho.platform.engine.security.session.TrustedSystemStartupSession] (value
[org.pentaho.platform.engine.security.session.TrustedSystemStartupSession@111089b])
but failed to remove it when the web application was stopped. This is very likely to
create a memory leak.
```

These warnings are nothing to be concerned about when shutting down the Tomcat server, since they report problems with processes that are immanently being killed. However, they can have significance if you are only restarting or redeploying the Pentaho BA Server or DI Server Web applications. To avoid any memory leak problems in redeployment, you should restart Tomcat instead of redeploying or restarting the Web application with a live server.

## User Console Themes Render Improperly After Upgrade

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If you are seeing strange rendering problems in the Pentaho User Console shortly after performing a BA Server upgrade, the problem may be related to old JavaScript files being held in the browser cache. To fix this problem, clear your Web browser's cache, then reload the Pentaho User Console.