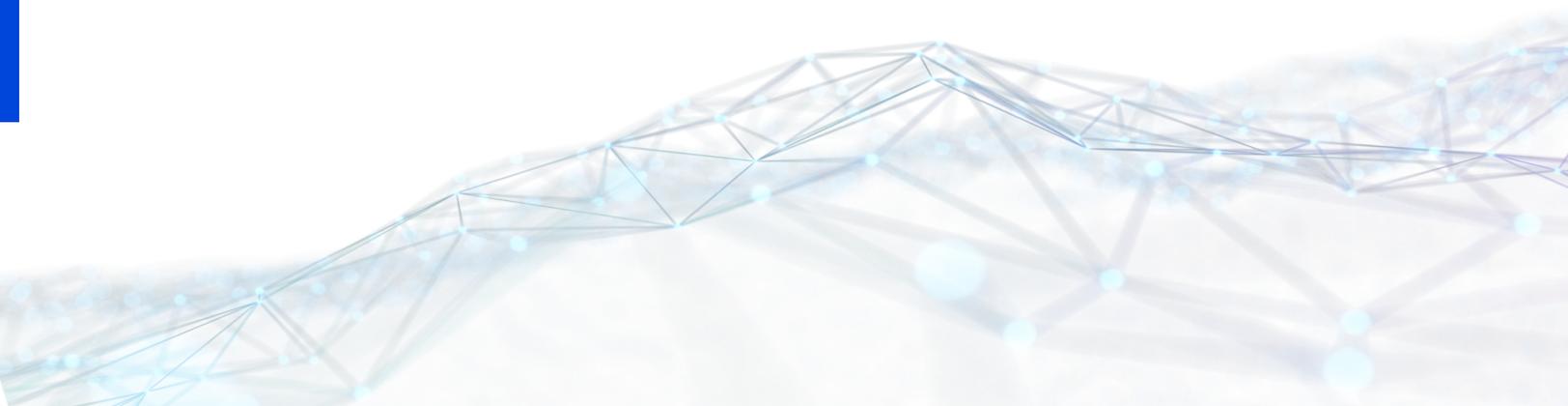




# TIBCO® BPM Enterprise

## Installation

Version 5.6.0 | November 2024



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# TIBCO BPM Enterprise Installation Profiles

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You can install TIBCO® BPM Enterprise in two configurations - one intended for development use, one for production.

## TIBCO BPM Enterprise Developer Server

TIBCO BPM Enterprise Developer Server is a simple configuration that can be used for rapid development and testing, comprising of:

- the TIBCO BPM Enterprise application
- a PostgreSQL database
- an ApacheDS LDAP server

These components are installed and built as separate Docker images, then composed into a multi-container, single-stack, single-machine, distributed application.



**Warning:** The Developer Server is intended only for rapid development and testing purposes. It is not intended for nor is it supported on the production environment.

## TIBCO BPM Enterprise on Kubernetes

TIBCO BPM Enterprise on Kubernetes is a production-level implementation, in which TIBCO BPM Enterprise is deployed as a container application into a Kubernetes cluster.

Production-level implementations of a database and an LDAP are also required. Data needed for TIBCO BPM Enterprise to communicate with these systems must be provided as injected configuration data, so it is available to the TIBCO BPM Enterprise application container.

Production-level capabilities such as scaling, high availability, and disaster recovery are provided by Kubernetes' inherent pod and container-level system management capabilities.

**i** **Note:** It is necessary to configure a database and an LDAP, to support scalability, high availability, and disaster recovery.

# Installing TIBCO BPM Enterprise Developer Server

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See the details provided in this section to install TIBCO BPM Enterprise on the developer server.

## System Requirements (Developer Server Profile)

**i Note:** All supported versions listed are minimum, and include any subsequent service packs or updates for those versions.

### Platform

TIBCO BPM Enterprise Developer Server must be installed on a platform running one of the following operating systems.

Operating System (64-bit)	Supported Versions (with any subsequent service packs or updates for these versions)
Microsoft Windows	10 and 11 64-bit on x86-64
Linux	Ubuntu Server 22.x, 24.x 64-bit on x86-64

### Container Platform

One of the following Docker products is required to provide container support for TIBCO BPM Enterprise.

Product	Supported Versions
Docker Enterprise Edition	<p>TIBCO BPM Enterprise has been validated on the latest version of Docker and Docker Compose (24.x).</p> <p><b>Note:</b> BPME only supports Linux-based containers. If using Windows platform, ensure that the docker kernel is switched to Linux containers mode.</p>
Docker Engine	
Docker Community Edition	
Docker Compose	

**Note:** Docker Compose is essential for container support.

The default Docker-compose directory where you can use the docker-compose commands is

```
CONFIG_
HOME/tibco/cfgmgmt/bpm/samples/bpm-
compose
```

## TIBCO Software

This software is required to develop the BPM applications that can be deployed to and run on TIBCO BPM Enterprise.

Software	Supported Versions
TIBCO Business Studio™ - BPM Edition	5.6.0

## Web Browsers

A web browser is required to access the TIBCO BPM Enterprise clients (Work Manager, Case Manager, Administrator, Organization Browser, App Dev, API Explorer, and Calendar).

Browser	Supported Versions
Google Chrome	TIBCO BPM Enterprise has been validated on the latest versions of these browsers. For more information on the supported versions, see the readme.

Browser	Supported Versions
Mozilla Firefox	
Microsoft Edge	

## Download TIBCO BPM Enterprise Software

Download the TIBCO BPM Enterprise software distribution set from [TIBCO eDelivery](#) to the machine on which you are going to install it.

### Procedure

1. Sign in to [TIBCO eDelivery](#).
2. Download the TIBCO BPM Enterprise software package for your platform.
3. Extract the TIBCO BPM Enterprise archive file to a temporary, empty directory on the machine on which you want to run the TIBCO BPM Enterprise installer.

## Install TIBCO BPM Enterprise Developer Server

### Procedure

1. Navigate to the temporary directory containing the previously downloaded and extracted TIBCO BPM Enterprise archive file.
2. Run the `TIBCOUniversalInstaller` executable.
3. Click **Next** on the **Welcome** screen.
4. Accept the license agreement and click **Next**.
5. Select **Create a New TIBCO\_HOME** to create a new installation environment. In the **Directory** field, specify or browse to the directory into which you want to install TIBCO BPM Enterprise, then click **Next**.

**i Note:**

- The directory cannot be the same as the directory of an existing installation environment.
- The directory should be empty.
- The directory path cannot contain the following special characters:  
# \$ % & \* < > ? ` |

6. On the **Installation Profile Selection** screen, select **BPM Developer Server**, then click **Next**.
7. Accept the default directory in the **TIBCO Configuration Directory** screen (referred to as *CONFIG\_HOME*), or type a directory name, or click **Browse** to select a directory, then click **Next**.

Ensure that the selected directory is not the configuration directory for another TIBCO installation environment.

8. On the **Pre-Install Summary** screen, verify the details, then click **Next**.

The installer completes the following tasks:

- processes and copies the required TIBCO BPM Enterprise files to *TIBCO\_HOME*
  - configures the TIBCO BPM Enterprise software, copying the required files to *CONFIG\_HOME*
  - builds Docker images of the PostgreSQL, ApacheDS LDAP server, and TIBCO BPM Enterprise application, and
  - starts the TIBCO BPM Enterprise Developer Server (using `docker-compose up`), which exposes the PostgreSQL, ApacheDS LDAP server, and TIBCO BPM Enterprise application as services.
9. When the installation is complete, click **Finish** to close the installer.
  10. Verify that you can log into TIBCO BPM Enterprise, as the `tibco-admin` user (with password `secret`), on the following URL:

```
http://localhost/apps/login/index.html
```

- i Note:**
- Do not shutdown Docker Compose, to avoid data loss, because the database is part of the Docker Compose.

# Installing TIBCO BPM Enterprise on Kubernetes

---

See the details provided in this section to install TIBCO BPM Enterprise on Kubernetes.

## System Requirements (Kubernetes Profile)

Make sure that you have all of the following system requirements in place before attempting to install TIBCO BPM Enterprise.

**i Note:** All supported versions listed are minimum, and include any subsequent service packs or updates for those versions.

### Platform

TIBCO BPM Enterprise must be installed on a platform that runs one of the following operating system variants.

Operating System (64-bit)	Supported Versions (with any subsequent service packs or updates for these versions)
Linux	Red Hat Enterprise Linux Server 7.x, 8.x, 9.x 64-bit on x86-64
	Ubuntu 22.x, 24.x 64-bit on x86-64

### Container Platform

One of the following is required to provide container support for TIBCO BPM Enterprise.

Container Runtime	Supported Versions
Docker Enterprise Edition	TIBCO BPM Enterprise has been validated on the latest version of Docker.
Containerd	TIBCO BPM Enterprise has been validated on Kubernetes Version 1.30, 1.28, 1.29 (1.7.21).
CRI-O	TIBCO BPM Enterprise has been validated on Kubernetes Version 1.30.

## Container Orchestration

### PaaS

Product	Supported Versions
Kubernetes	1.29, 1.30
OpenShift	4.17
Any <a href="#">CNCF Certified Kubernetes</a> platform	For the supported Kubernetes version.

### Cloud PaaS

Product	Supported Versions
Azure Kubernetes Service (AKS)	TIBCO BPM Enterprise has been validated on the latest versions of Kubernetes supported by AKS.
AWS Elastic Kubernetes Service (EKS)	TIBCO BPM Enterprise has been validated on the latest versions of Kubernetes supported by EKS.

## Database

The TIBCO BPM Enterprise database must be hosted on the following database servers:

Database	Supported Versions
PostgreSQL	13.x, 14.x, 15.x, and 16.x
Microsoft SQL Server	2019 (mssql-jdbc-9.2.1.jre8.jar) 2022 (mssql-jdbc-12.2.0.jre11.jar)
Oracle	19c (ojdbc8.jar) , 23c (ojdbc11.jar,ojdbc8.jar)
DB2	11.5.x
Azure SQL Database	V12

## LDAP Directory Server

TIBCO BPM Enterprise user information must be hosted on one of the following LDAP directory servers:

LDAP Server	Supported Versions
ActiveDirectory	Verified on Windows Server 2016
OpenLDAP	Verified on version 2.4.50
ApacheDS	Verified on versions 1.5.5, 1.5.6, 2.0
Azure AD	Verified against latest Azure AD version available at the time of test

## TIBCO Software

This software is required to develop BPM applications that can be deployed to and run on, TIBCO BPM Enterprise.

Software	Supported Versions
TIBCO Business Studio™ - BPM Edition	5.6.0

## Web Browsers

A web browser is required to access the TIBCO BPM Enterprise clients (Work Manager, Administrator, Organization Browser, Case Manager, Calendar, App Dev, and API Explorer).

Browser	Supported Versions
Google Chrome	TIBCO BPM Enterprise has been validated on the latest versions of these browsers. For information on the supported version, refer to the readme.
Mozilla Firefox	
Microsoft Edge	

## Download TIBCO BPM Enterprise Software

Download the TIBCO BPM Enterprise software distribution set from [TIBCO eDelivery](#) to the machine on which you are going to install it.

### Procedure

1. Sign in to [TIBCO eDelivery](#).
2. Download the TIBCO BPM Enterprise software package for your platform.
3. Extract the TIBCO BPM Enterprise archive file to a temporary, empty directory on the machine on which you want to run the TIBCO BPM Enterprise installer.

## Install TIBCO BPM Enterprise for Kubernetes

Use the TIBCO Universal Installer to install the product and build a Docker image of the TIBCO BPM Enterprise application.

### Before you begin

Docker must be installed and running.

## Procedure

1. Navigate to the temporary directory containing the previously downloaded and extracted TIBCO BPM Enterprise archive file.
2. Run the `TIBCOUniversalInstaller` executable.
3. Click **Next** on the **Welcome** screen.
4. Accept the license agreement and click **Next**.
5. Select **Create a New TIBCO\_HOME** to create a new installation environment. In the **Directory** field, specify or browse for the directory in which you want to install TIBCO BPM Enterprise. Click **Next**.

 **Note:**

- The directory cannot be the same as the directory of an existing installation environment.
- The directory should be empty.
- The directory path cannot contain the following special characters:  
# \$ % & \* < > ? ` |

6. On the **Installation Profile Selection** screen, select **BPM for Kubernetes**, then click **Next**.
7. Accept the default directory for the **TIBCO Configuration Directory** screen referred to as `CONFIG_HOME`), or type a directory name, or click **Browse** to select a directory, then click **Next**.

 **Note:** Ensure that the selected directory is not the configuration directory for another TIBCO installation environment.

8. On the **Database Type** screen, click the required database type. If you want to select a database type other than PostgreSQL, click **Browse** to navigate to the location of the appropriate JDBC driver.

For more details about the supported drivers for each database type, see [JDBC\\_DRIVERCLASS](#).

9. Click **Next**.

10. On the **Pre-Install Summary** screen, verify the details, then click **Next**.

The installer completes the following tasks:

- processes and copies the required TIBCO BPM Enterprise files to *TIBCO\_HOME*,
- configures the TIBCO BPM Enterprise software, copying the required files to *CONFIG\_HOME*, and
- builds the Docker image of the TIBCO BPM Enterprise application, which you can then add to Kubernetes.

11. When the installation is complete, click **Finish** to close the installer.

## Creating the TIBCO BPM Enterprise Database

A TIBCO BPM Enterprise database is required to hold data, both about the system itself, and data that is used by TIBCO BPM Enterprise applications. TIBCO BPM Enterprise supports SQL Server, PostgreSQL and Oracle Database. See:

- [Creating Database Using Microsoft SQL Server](#)
- [Creating Database Using PostgreSQL](#)
- [Creating Database Using Oracle](#)
- [Creating Database Using IBM DB2](#)
- [Creating the TIBCO BPM Enterprise Schema](#)

**i Note:** These procedures briefly describe what you need to do on the database server, but do not describe in detail how to perform each task. If necessary, you must work with your database administrator to perform these tasks.

**i Note:** The database activity can be configured to use PostgreSQL database or the TIBCO BPM Enterprise database. For example, if TIBCO BPM Enterprise database is Oracle, the database activity can be configured to use Oracle or PostgreSQL at the run time.

## Creating Database Using Microsoft SQL Server

To create and configure a Microsoft SQL Server instance, perform the following procedure:

### Procedure

1. Create an SQL Server instance that is used to hold the BPM database.
2. Configure the SQL Server instance to use mixed (Windows and SQL Server) authentication.
3. Enable the TCP/IP network protocol for the SQL Server instance. For example,
  - a. In SQL Server Configuration Manager, expand **SQL Server Network Configuration**.
  - b. Click **Protocols for *instance\_name*** where *instance\_name* is the name of the SQL Server instance.
  - c. Right-click **TCP/IP** and click **Enable**.
  - d. Restart the SQL Server instance.
4. Run the script as the database administrator to create the database instance, login, and *bpmuser* (user). TIBCO BPM Enterprise uses this role whenever it connects to the BPM database.

```
CONFIG_HOME/tibco/cfgmgmt/bpm/database/mssql/createuser.sql
```

**i** **Note:** The BPME database tables are generated automatically using the BPME utility.

**i** **Note:** If you are using Microsoft SQL Server 2022, it may be necessary to add the following code to the end of the injected JDBC URL to establish a connection:  
;encrypt=true;trustServerCertificate=true;

# Creating Database Using PostgreSQL

## Before you begin

The PostgreSQL server must be running.

## Procedure

1. Using a suitable SQL client application, connect to the PostgreSQL server.
2. Create a new database with a suitable name. For example:

```
$ createdb bpmdb
```

3. Run the script as the database administrator to create the *bpmuser* role (user). TIBCO BPM Enterprise uses this role whenever it connects to the BPM database.

```
CONFIG_HOME/tibco/cfgmgmt/bpm/database/postgres/createuser.sql
```



**Note:** The BPME database tables are generated automatically using the BPME utility.

# Creating Database Using Oracle

Create an Oracle database instance (including a pluggable database for TIBCO BPM Enterprise), configure it, and start it.

## Procedure

1. Create an Oracle database instance that is used to hold the TIBCO BPM Enterprise database.

Create a pluggable database (PDB) in your container database (CDB) for TIBCO BPM Enterprise to use. This is because TIBCO BPM Enterprise users have exclusive rights to perform actions. If you install TIBCO BPM Enterprise on the CDB, BPM users have exclusive rights to perform actions on the CDB.

**Note:** The TIBCO BPM Enterprise database for each BPM system must use separate Oracle database users/schemas. Use of separate tablespaces is also recommended.

2. Set the OPEN\_CURSORS initialization parameter to a value of 400 or greater.
3. Configure the character sets for the Oracle database instance as follows: NLS\_CHARACTERSET must be AL32UTF8 and NLS\_NCHAR\_CHARACTERSET must be AL16UTF16.
4. Start the Oracle database instance.

After the startup of the CDB, the PDBs do not open automatically. You must make sure that the PDB on which BPM is running is opened after startup. For more information, refer to the documentation supplied with Oracle.

5. As the database administrator, run the following script to create the *bpmuser* role (user). TIBCO BPM Enterprise uses this role whenever it connects to the BPM database.

```
CONFIG_HOME/tibco/cfgmgmt/bpm/database/oracle/createuser.sql
```

**Note:** The BPME database tables are generated automatically using the BPME utility.

## Creating Database Using IBM DB2

The following procedure describes the steps to create an IBM DB2 database instance for TIBCO BPM Enterprise, to configure, and to start the database.

### Procedure

1. Create an operating system user account for the BPM system to use to connect to the BPM database - for example, *bpmuser*. (Alternatively, you can identify an existing operating system account to use.)
2. Start the database.
3. Create a new, empty database that can be used to store the BPM Enterprise database

tables.

4. Set the database page size to 16384 and other required options by using the following commands:

```
db2 create database bpm pagesize 16384
db2 connect to bpm user db2inst1 using db2inst1
db2 create tablespace systoolspace in ibmcatgroup managed by
automatic storage extentsize 4
db2 create user temporary tablespace systoolstmpspace in
ibmcatgroup managed by automatic storage extentsize 4
db2 disconnect all
```

5. As the database administrator, run the following script to create the *bpmuser* role (user). TIBCO BPM Enterprise uses this role whenever it connects to the BPM database.

```
CONFIG_HOME/tibco/cfgmgmt/bpm/database/db2/createuser.sql
```

**i Note:** The BPME database tables are generated automatically using the BPME utility.

## Creating the TIBCO BPM Enterprise Schema

To create a database schema, run the `-setupDatabase` option with the following `execute` argument:

```
docker run -it --rm tibco/bpm/utility:5.6.0 utility -setupDatabase
execute
```

**i Note:** Ensure that the database credentials of the user you created in the previous section are provided to the tool using the `-dbConfig` option. Also, the URL must reflect the type and location of the database you are using.

**i Note:** If you do not run the `-setupDatabase` option with the `execute` argument, the required SQL script file is sent to STDOUT. You can redirect STDOUT to a file in the normal way to run the script yourself.

Alternatively, to create a database schema running the utility as a Kubernetes job, use the following code:

```
cat <<EOF | kubectl apply -f -
apiVersion: batch/v1
kind: Job
metadata:
  name: utility
  namespace: bpme
spec:
  template:
    spec:
      hostPID: true
      containers:
      - name: utility
        image: tibco/bpm/utility:5.6.0
        command: ["utility","-dbConfig","url=jdbc:db2://bpm-
db2:50000/bpm:driverType=4;fullyMaterializeLobData=true;fullyMaterialize
Input
Streams=true;progressiveStreaming=2;progressiveLocators=2;useJDBC4C
olumnNameAndLabelSemantics=2;"]
        restartPolicy: Never
EOF
```

**i Note:** Update the above **-dbConfig** options depending on the database that is used.

**i Note:** As a Kubernetes and OpenShift user, you can use this to create a database schema running utility.

For more details regarding utility and its commands, see Appendix: Utility Commands of the *TIBCO® BPM Enterprise Administration Guide*.

## Configure the LDAP Directory Server

Configure the LDAP directory server so that TIBCO BPM Enterprise can access the LDAP directories that hold the details of users who may need to be able to log in to TIBCO BPM Enterprise client applications.

## Before you begin

The LDAP directory server must be running.

Option	Arguments	Description
-setupAdminUser	ldapAlias=<Alias> ldapDn=<LDAP DN> displayName=<Display Name>	Configures the tibco-admin user to a custom LDAP and / or display name

Enclose argument values with spaces in single quotes, for example, `ldapDn='UID=admin, OU=system'`.

For example, to set the display name for the TIBCO Admin User to Administrator, run:

```
docker run -it --rm tibco/bpm/utility:5.6.0 utility -setupAdminUser
ldapAlias=System displayName=Administrator.
```

For more details regarding utility and its commands, see *Appendix: Utility Commands* of the *TIBCO BPM Enterprise Administration Guide*.

## Create a Kubernetes Deployment

Create a Kubernetes Deployment (a `.yaml` configuration file), which describes how to deploy the Docker image of the TIBCO BPM Enterprise application to the Kubernetes cluster. A sample deployment file is included in the TIBCO BPM Enterprise installation.

The following table describes the parameters in the deployment file.

Parameter	Description
<code>name:</code>	The name to be used to identify the TIBCO BPM Enterprise container.
<code>image:</code>	The name of the Docker image of the TIBCO BPM Enterprise application.  ( <b>Default:</b> <code>tibco/bpm/runtime:5.6.0</code> )
<code>livenessProbe:</code>	Kubernetes <code>livenessProbe</code> is used to ensure that the container is

Parameter	Description
	<p>healthy and responsive. This must be defined using an <code>HttpGetAction</code>, with:</p> <ul style="list-style-type: none"> <li>• path defined as <code>/bpm/adapter/v1/liveness</code>.</li> <li>• port defined with the same value as <code>containerPort</code>.</li> </ul>
<code>readinessProbe:</code>	<p>Kubernetes <code>readinessProbe</code> is used to determine the container's readiness to accept work. This must be defined using an <code>HttpGetAction</code>, with:</p> <ul style="list-style-type: none"> <li>• path defined as <code>/bpm/adapter/v1/readiness</code>.</li> <li>• port defined with the same value as <code>containerPort</code>.</li> </ul>
<code>ports:</code>	<p>Port numbers to be exposed:</p> <ul style="list-style-type: none"> <li>• <code>containerPort</code>: Number of the port to expose on the pod's IP address. (Default: 8181)</li> <li>• <code>hostPort</code>: Number of the port to expose on the host. (Default: 8181)</li> </ul>
<code>env:</code>	<p>This section must contain the following environment variables, which are used to inject configuration data required by TIBCO BPM Enterprise into the pod:</p> <ul style="list-style-type: none"> <li>• <b>JDBC_DRIVERCLASS</b> - The <code>JDBC_DRIVERCLASS</code> is optional, and defaults to PostgreSQL. The default <code>JDBC_DRIVERCLASS</code> is <code>org.postgresql.Driver</code>. However, it can be set to Oracle or Microsoft SQL Server driver name based on the target database to connect. If the database is Oracle, set the <code>JDBC_DRIVERCLASS</code> to <code>oracle.jdbc.OracleDriver</code>. If the database is Microsoft SQL Server, set the <code>JDBC_DRIVERCLASS</code> to <code>com.microsoft.sqlserver.jdbc.SQLServerDriver</code>. If the database is IBM DB2, set the <code>JDBC_DRIVERCLASS</code> to <code>com.ibm.db2.jcc.DB2Driver</code></li> <li>• <b>JDBC_URL</b> - The JDBC connection string to connect to the TIBCO BPM Enterprise database.</li> </ul>

Parameter	Description
	<ul style="list-style-type: none"><li>• <b>LDAP_NAME_ALIAS</b> - Identifies the LDAP directory.</li><li>• <b>LDAP_NAME_URL</b> - Used to connect to the LDAP directory.</li><li>• <b>JDBC_SSL_CONFIG</b> - This is the SSL configuration for the JDBC connection.</li><li>• <b>LDAP_&lt;GROUP_NAME&gt;_SSLCERT</b> - This is used to configure LDAP SSL.</li></ul> <p>Use of the following environment variable is optional, but recommended:</p> <ul style="list-style-type: none"><li>• <b>ADMIN_CRYPTO_KEY</b> - Defines the key used to encrypt and decrypt sensitive data held in the BPM database definition of shared resources (HTTP Clients, Keystore Providers, SSL Client Providers, SMTP Connections, SAML Connections, and OpenID Connections).</li></ul> <div style="border: 1px solid #ccc; padding: 5px; background-color: #f9f9f9;"><p><b>Note:</b> If ADMIN_CRYPTO_KEY is not specified, this data is stored in the BPM database in unencrypted format.</p></div> <p>For more information, see <a href="#">Configure Environment Variables</a>.</p>

## Configure Environment Variables

You can set the variable `INSTALLATION_TYPE` to `Production`. This enables you to only deploy artifacts that have been locked for production in TIBCO Business Studio - BPM Edition.

If you do not configure this variable, it is by default set to `Development`. In this case, you can deploy any type of project.

If set to `Production`, the variable `INSTALLATION_TYPE` is configured as follows:

### For Docker:

```
environment:  
- INSTALLATION_TYPE= Production
```

### For Kubernetes:

```
- name: INSTALLATION_TYPE  
  value: Production
```

For more general information about Docker deployment, see [Deployment](#).

## Configure Environment Variables

The following shows environment variables that are required to get TIBCO BPM Enterprise up and running.

These environment variables are included in the deployment sample that is provided in the TIBCO BPM Enterprise installer.

The following shows the minimum requirements.

### Database Connections

The following JDBC environment variables are provided in the deployment samples that are included with the TIBCO BPM Enterprise installer. These are the minimum requirements for connection to the database.

It is a good practice to store the database and LDAP username and password as Kubernetes secrets. This can be added to the deployment configuration as follows:

```
envFrom:  
  - secretRef:  
      name: bpm.database.secrets  
  - secretRef:  
      name: bpm.ldap.secrets
```

The `bpm.database.secrets` should have the following names:

- JDBC\_USERNAME
- JDBC\_PASSWORD

The `bpm.ldap.secrets` should have the following names:

- LDAP\_SYSTEM\_PRINCIPAL
- LDAP\_SYSTEM\_CREDENTIALS

- LDAP\_NAME\_CREDENTIALS

Parameter	Description
JDBC_URL	The JDBC connection string that TIBCO BPM Enterprise uses to connect to the TIBCO BPM Enterprise database.

## LDAP Directory Connections

The LDAP environment variables are made up of three parts, each separated by an underscore (\_). For example, LDAP\_SYSTEM\_PRINCIPAL.

- The first part, LDAP denotes the type of environment variable (for LDAP connection)
- The second part, SYSTEM denotes the group the environment variable belongs to. LDAP connections require a number of configurable parameters to work, such as ALIAS, PRINCIPAL, CREDENTIALS, and URL. We must know which ones belong together. The group name (for example, SYSTEM) can be anything you like as long as it is the same for each of the environment variable types.
- The third part is the type of environment variable. These can be (but are not limited to) ALIAS, URL, PRINCIPAL, and CREDENTIALS. The value of ALIAS is how the connection shows up in the UI and the rest determines the actual connection details.

The following LDAP environment variables are provided in the deployment samples that are included with the TIBCO BPM Enterprise installer. These are the minimum requirements for connection to the database.

Parameter	Description
LDAP_NAME_ALIAS	The name used to identify this LDAP directory. (This name is displayed as the <b>Alias</b> for an LDAP source when creating or editing an LDAP Container in the Organization Browser.)
LDAP_NAME_URL	The URL that TIBCO BPM Enterprise uses to connect to this LDAP directory, in the format: <div style="background-color: #e6f2ff; padding: 10px; margin: 10px 0;"> <pre>ldap://hostname:port/DN</pre> </div> where:

Parameter	Description
	<ul style="list-style-type: none"> <li>• <i>hostname</i> is the DNS name or IP address of the machine hosting the LDAP server.</li> <li>• <i>port</i> is the port number used by the LDAP server.</li> <li>• <i>DN</i> is the Distinguished Name to use as the search base for this LDAP directory.</li> </ul>

where *NAME* is the name of the LDAP connection.

The following shows an LDAP Directory Connection example. Every system must have a "system" alias from which the "tibco-admin" user can be sourced.

```
LDAP_SYSTEM_ALIAS:system
LDAP_SYSTEM_URL:ldap://bpm-apacheds:10389/ou=system
LDAP_SYSTEM_PRINCIPAL:uid=admin,ou=system
LDAP_SYSTEM_CREDENTIALS:secret
```

## ADMIN\_CRYPTO\_KEY - Shared Resource Encryption Key

ADMIN\_CRYPTO\_KEY defines the key used to encrypt and decrypt sensitive data held in the BPM database definition of shared resources (HTTP Clients, Keystore Providers, SSL Client Providers, SMTP Connections, SAML Connections, and OpenID Connections) used by TIBCO BPM Enterprise.

Use of ADMIN\_CRYPTO\_KEY is optional but recommended. When used, ADMIN\_CRYPTO\_KEY must be injected into the Kubernetes pod so that it is available to the TIBCO BPM Enterprise application container.

When ADMIN\_CRYPTO\_KEY is used, the following Shared Resource configuration parameters are stored in the BPM database in symmetrically encrypted form (AES 128-bit GCM mode). If ADMIN\_CRYPTO\_KEY is not used, these parameters are instead stored as clear (unencrypted) text.

Shared Resource	Parameters encrypted when using ADMIN_CRYPTO_KEY
HTTP Client	Realm, Username, and Password (for basic authentication)

Shared Resource	Parameters encrypted when using ADMIN_CRYPTO_KEY
Keystore Provider	Password (for Keystore)
SSL Client Provider	Key alias for identity, Key Alias Password (for Mutual Authentication)
SMTP Connection	Username, Password (Login credentials)
SAML Connection	KeyAlias to encrypt, Key alias to encrypt password, Key alias to sign, Key alias to sign password, Default key alias, Default key alias password (Advanced settings)
OpenID Connection	Client ID, Client secret

ADMIN\_CRYPTO\_KEY can be specified using either of the following methods:

- by defining the encryption key as a [Kubernetes secret](#), which is referenced from ADMIN\_CRYPTO\_KEY using the `valueFrom` parameter. See Example 1 below.
- by assigning a simple text string value to ADMIN\_CRYPTO\_KEY. See Example 2 below.

### Example 1 - Using ADMIN\_CRYPTO\_KEY with Secrets in a Deployment Configuration File

Use the following command to define a secret (`admin-crypto-key`) on the kube-apiserver. `admin-crypto-key` contains a single key (`secretkey`) with a value of `password123`.

```
$ kubectl create secret generic admin-crypto-key --from-literal=secretkey=password123
```

Use the following definition to inject the encryption key into the Kubernetes pod.

```
apiVersion: apps/v1
kind: Deployment
.
```

```

.
spec:
.
.
  env:
    - name: ADMIN_CRYPTO_KEY
      valueFrom:
        secretKeyRef:
          name: admin-crypto-key
          key: secretkey

```

**!** **Important:** The admin-crypto-key secret must exist on the kube-apiserver when the Deployment is applied. Otherwise, the container cannot be started.

### Example 2 - Using ADMIN\_CRYPTO\_KEY as a Plain Environment Variable in a Deployment Configuration File

```

apiVersion: apps/v1
kind: Deployment
.
.
spec:
.
.
  env:
    - name: ADMIN_CRYPTO_KEY
      value: TheSecretPasswordToUseForEncryption

```

## Upgrading TIBCO BPM Enterprise from 5.x to 5.6.0

To upgrade TIBCO BPM Enterprise to 5.6.0, perform the following steps:

1. Ensure that no TIBCO BPM Enterprise container or pod is running.
2. Upgrade the database using the utility command. For more information, see [Creating the TIBCO BPM Enterprise Database](#).
3. Provide the latest version of the docker image into the PaaS environment. For more

information, see [Create a Kubernetes Deployment](#).

4. Configure environment variables and deploy the latest setup. For more information, see [Configure Environment Variables](#).

## Additional System Requirements for a Distributed BPM System

A distributed TIBCO BPM Enterprise system has additional architectural requirements.

The requirements for a distributed BPM system are shown in the following table.

Requirement	Description
Load Balancer	Manages HTTPS requests from TIBCO BPM Enterprise clients across the nodes hosting BPM pods.

**i Note:** The load balancer, the database server, the LDAP server, and the SMTP server (if used) must each be available to each pod that is part of the BPM system.

For a high availability configuration, each of them must also be configured to provide high availability and fault tolerance.

### Load Balancer

The load balancer must be configured as follows:

- TIBCO BPM Enterprise HTTP port (**Default:** 8181) used for communication between TIBCO BPM Enterprise and external clients must be configured for load balancing across the relevant pods.
- Sticky connections should be used so that client session context is maintained. (If the server hosting this session dies, the client is logged out and you need to log in again.)

## Kubernetes Service

```

apiVersion: v1
kind: Service
metadata:
  name: bpm-service
  namespace: ${K8SNAMESPACE}
  annotations: {}
spec:
  type: NodePort
  selector:
    app: bpm
    tier: backend
  ports:
  - protocol: TCP
    port: 8181
    targetPort: 8181

```

## Kubernetes Ingress YAML Configuration

**i Note:** This configuration is applicable for AWS application load balancer.

The following configuration is for illustration purposes only.

```

apiVersion: networking.k8s.io/v1
kind: Ingress
metadata:
  name: "bpm-alb-ingress"
  namespace: ${K8SNAMESPACE}
  annotations:
    kubernetes.io/ingress.class: alb
    alb.ingress.kubernetes.io/scheme: internet-facing
    alb.ingress.kubernetes.io/certificate-arn: ${CERTIFICATE_ARN}
    # Sticky session duration is 7 days 604800 seconds
    alb.ingress.kubernetes.io/target-group-attributes:
      stickiness.enabled=true,stickiness.lb_cookie.duration_seconds=604800

    alb.ingress.kubernetes.io/listen-ports: '[{"HTTP": 80,"HTTPS":443}]'
    alb.ingress.kubernetes.io/actions.ssl-redirect: '{"Type":"redirect",
"RedirectConfig": { "Protocol": "HTTPS", "Port": "443",
"StatusCode": "HTTP_301"}}'
    alb.ingress.kubernetes.io/healthcheck-protocol: HTTP
    alb.ingress.kubernetes.io/target-type: ip

```

```
    alb.ingress.kubernetes.io/healthcheck-port: traffic-port
    alb.ingress.kubernetes.io/healthcheck-path: /bpm/adapter/v1/liveness
spec:
  rules:
  - host: ${DNS_ALIAS_FQ_DOMAIN_NAME}
    http:
      paths:
      - path: /*
        backend:
          serviceName: ssl-redirect
          servicePort: use-annotation
      - path: /*
        backend:
          serviceName: bpm-service
          servicePort: 8181
```

# Reference

---

You can install TIBCO BPM Enterprise in the console mode and silent mode.

## Installing in Console Mode

When you run the installer in console mode, the installer prompts for values on a console window and you can move through the installation by responding to the prompts. Console mode can be used to install the software in a non-Windows environment.

### Procedure

1. Open a console window and navigate to the temporary directory where you extracted the product archive file.
2. Run `TIBCOUniversalInstaller -console`. The installer launches a second console window.
3. Complete the installation by responding to the console window prompts. The console also provides an option to return to a previous selection periodically.
4. When the installation is completed, press **Enter** to exit the installer.

## Installing in Silent Mode

To install TIBCO BPM Enterprise using either default or custom settings that are saved in a response file, run TIBCO Universal Installer in silent mode.

In silent mode, the universal installer does not prompt for any inputs during installation. Instead, the installer uses the values specified in the `TIBCOUniversalInstaller-bpme_n.n.n.silent` file.

The `TIBCOUniversalInstaller-bpme_n.n.n.silent` file is packaged in the directory that contains the universal installer. Edit the file with information for your environment before launching the silent installation, as explained below.

## Procedure

1. Download the TIBCO BPM Enterprise package.
2. Extract the contents of the package to a temporary directory.
3. Using a console window, navigate to the temporary directory.
4. Make a backup copy of the `TIBCOUniversalInstaller-bpme_n.n.n.silent` file.
5. Using a text editor, open the `TIBCOUniversalInstaller-bpme_n.n.n.silent` file and specify the required entry keys. Refer to the comments in the file for a description of each entry key.



**Warning:** Ensure that all drive letters are specified in uppercase. Otherwise, the silent installation may fail.

6. Run the command:

```
TIBCOUniversalInstaller.exe -silent
```

## Result

When the installation completes, a message indicating the completion of the installation is displayed. For additional information, check the log file.

# TIBCO Documentation and Support Services

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For information about this product, you can read the documentation, contact TIBCO Support, and join TIBCO Community.

## How to Access TIBCO Documentation

Documentation for TIBCO products is available on the [Product Documentation website](#), mainly in HTML and PDF formats.

The [Product Documentation website](#) is updated frequently and is more current than any other documentation included with the product.

## Product-Specific Documentation

The documentation for this product is available on the [TIBCO® BPM Enterprise Product Documentation](#) page.

## How to Contact Support for TIBCO Products

You can contact the Support team in the following ways:

- To access the Support Knowledge Base and getting personalized content about products you are interested in, visit our [product Support website](#).
- To create a Support case, you must have a valid maintenance or support contract with a Cloud Software Group entity. You also need a username and password to log in to the [product Support website](#). If you do not have a username, you can request one by clicking **Register** on the website.

## How to Join TIBCO Community

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requests from within the [TIBCO Ideas Portal](#). For a free registration, go to [TIBCO Community](#).

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