EDB Postgres Enterprise Manager®
Agent User Guide
Version 7.8

June 05, 2019

EDB Postgres Enterprise Manager Installation Guide
by EnterpriseDB® Corporation
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Table of Contents

1 Postgres Enterprise Manager - Overview 4
1.1 Supported Platforms 6
1.2 Hardware Pre-Requisites 7
2 Installing a PEM Agent 8
2.1 Installing a PEM Agent on a Windows Host 9
2.2 Invoking a Graphical Installer from the Command Line 18
2.2.1 Invoking a Graphical Installer in Text Mode 18
2.2.2 Invoking a Graphical Installer in Unattended Mode 20
2.3 Installing a PEM Agent on RHEL or CentOS Host 21
2.4 Installing a PEM Agent on a SLES Host 23
2.5 Installing a PEM Agent on a Debian or Ubuntu Host 24
3 Registering a PEM Agent 25
3.1 Using a non-root User Account to Register a PEM Agent 27
4 PEM Agent Management 29
4.1 PEM Agent Privileges 29
4.1.1 Functionality Not Available to a non-root User 29
4.1.2 Functionality Not Available to a User who is not a Database Superuser 30
4.2 PEM Agent Configuration 31
4.3 PEM Agent Properties 34
5 PEM Agent Troubleshooting 37
5.1 Restoring a Deleted PEM agent 37
5.2 Reconfiguring the PEM Server 38
5.3 Using a Command Line to Delete PEM Agents with a Down or Unknown Status 39
6 Uninstalling a PEM Agent 40

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1 Postgres Enterprise Manager - Overview

Postgres Enterprise Manager (PEM) consists of components that provide the management and analytical features of PEM:

- PEM Server: The PEM server is used as the data repository for monitoring data and as a server to which both agents and clients connect. The PEM server consists of an instance of PostgreSQL and an associated database for storage of monitoring data, and a server that provides web services.

- PEM web interface: The PEM web interface allows you to manage and monitor Postgres servers and utilize PEM extended functionality. The web interface software is installed with the PEM server installer, and is accessed via your choice of web browser.

- PEM Agent: The PEM agent is responsible for executing tasks and reporting statistics from the agent host and monitored Postgres instances to the PEM server. A single PEM agent can monitor multiple installed instances of Postgres that reside on one or many hosts.

  The PEM Agent installer creates two executables: the PEM worker (`pemworker.exe`) and the PEM agent (`pemagent.exe`). Each PEM worker has a corresponding PEM agent that you can use to start or stop the PEM worker. The PEM agent will also restart the PEM worker should it terminate unexpectedly.

  The PEM worker log file contains information related to PEM worker activity (probe activities, heartbeat responses, etc.), and is stored in `/var/log/pem/worker.log`.

- SQL Profiler plugin: This plugin to the Postgres server is used to generate the monitoring data used by the SQL Profiler tool. Installation of the SQL Profiler plugin is optional, but the plugin must be installed into each instance of Postgres you wish to profile. The SQL Profiler may be used with any supported version of an EnterpriseDB distribution of a PostgreSQL server or an Advanced Server (not just those managed through the PEM server).

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The architectural diagram below (Figure 1.1) illustrates the relationship between the various servers and workstations involved in a typical PEM installation.

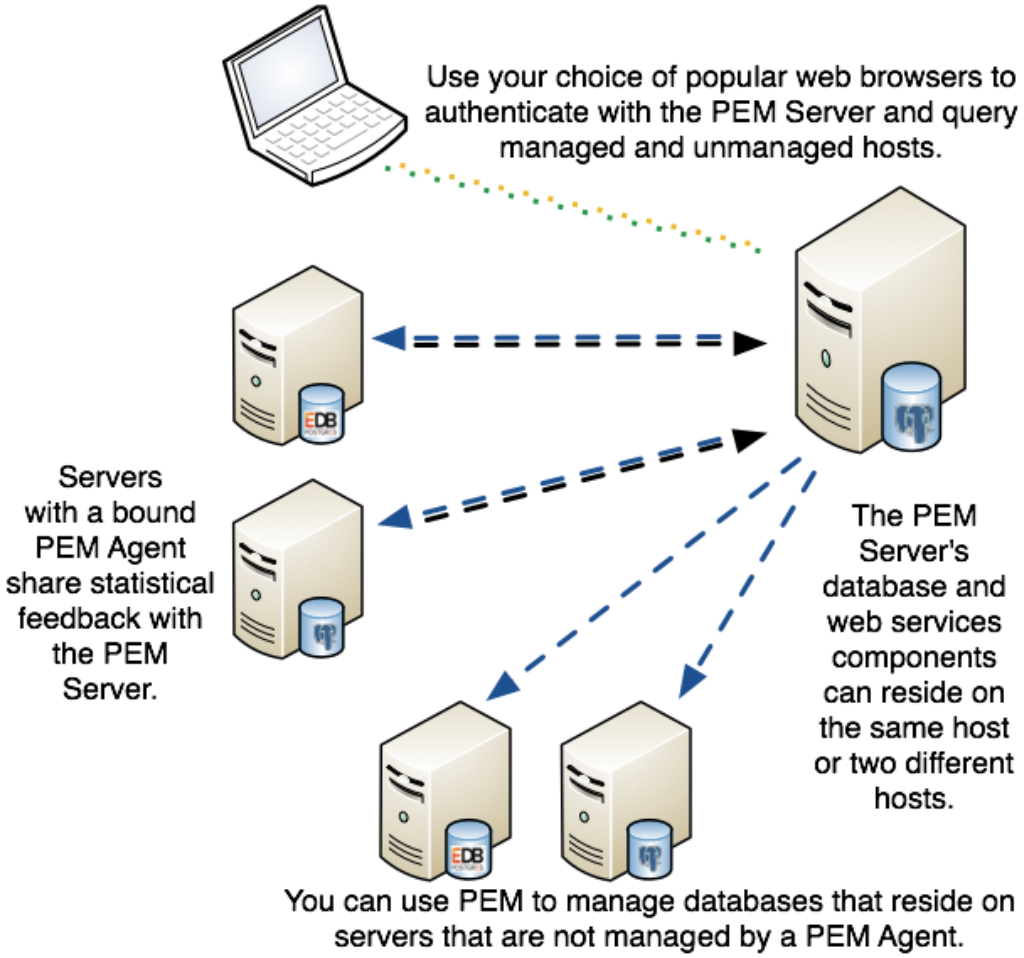

Figure 1.1 - A typical PEM installation.

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1.1 Supported Platforms

The PEM agent is supported on any Linux or Windows platform on which Advanced Server or PostgreSQL version 9.4 or higher is supported.

For information about platforms supported by Advanced Server or PostgreSQL, see:

https://www.enterprisedb.com/services-support/edb-supported-products-and-platforms

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1.2 Hardware Pre-Requisites

For optimum speed when monitoring servers and rendering dashboards, we recommend installing PEM on a system with at least:

- 4 CPU cores
- 8 GB of RAM
- 100 GB of Storage

Additional disk space is required for data storage. Please note that resource usage will vary based on which probes are defined and enabled, and the activity level on the monitored databases. Monitoring server resources (as you use PEM) will let you know when you need to expand your initial system configuration.

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2 Installing a PEM Agent

You can use a graphical installer to install the Postgres™ Enterprise Manager agent on a Windows host. This graphical installer can also be invoked from command line.

To install the Postgres™ Enterprise Manager agent on a Linux host, you must use an RPM package.

Installers are available from the EnterpriseDB website at:

http://www.enterprisedb.com/download-postgres-enterprise-manager

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2.1 Installing a PEM Agent on a Windows Host

On a Windows system, you can invoke the installer by right-clicking on the downloaded installer's icon, and selecting `Run as Administrator`. The PEM Agent Setup Wizard opens, welcoming you.

Figure 2.1 - The PEM Agent Installer's Welcome dialog.

Click `Next` to continue to the `License Agreement`.

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Figure 2.2 - The PEM License Agreement.

Carefully review the license agreement (see Figure 2.2) before highlighting the appropriate radio button and accepting the agreement; click `Next` to continues to the `Installation Directory` dialog.

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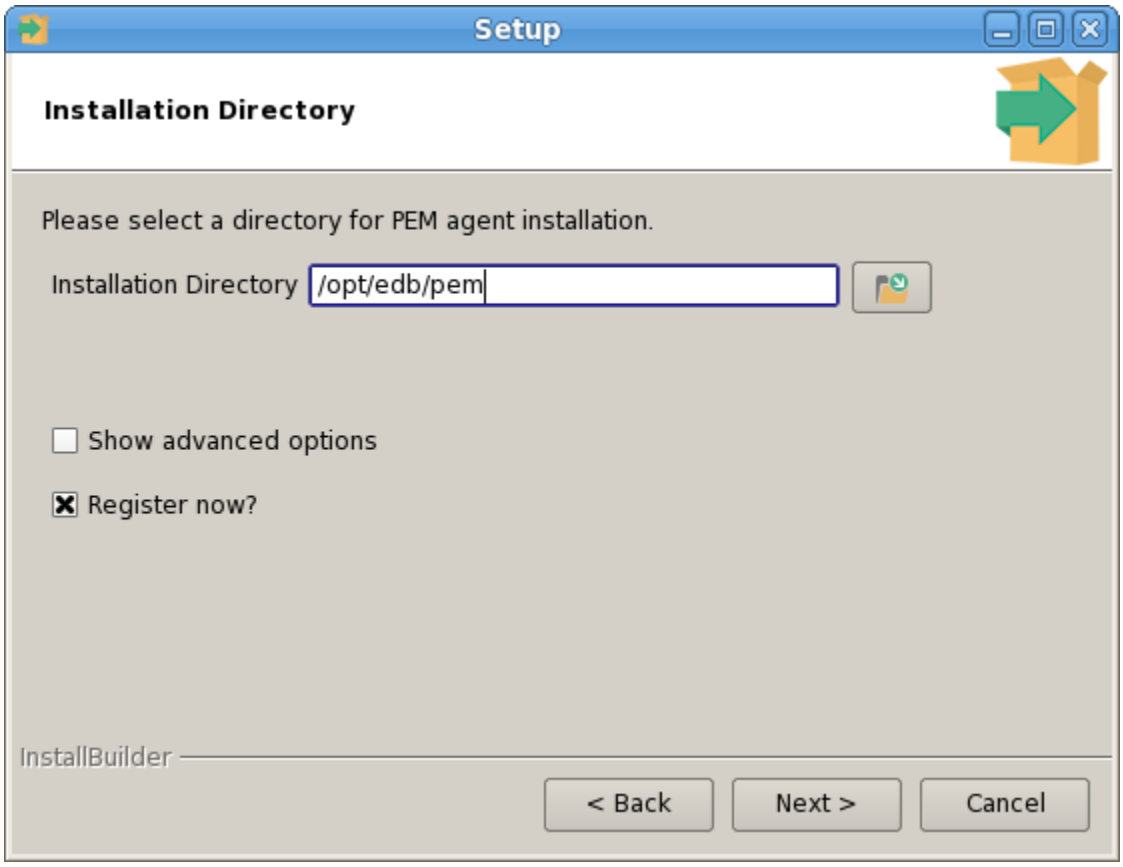

Figure 2.3 - Specify an Installation Directory

By default, the PEM agent is installed in `C:\Program Files\PEM` directory. You can accept the default installation directory, or modify the contents of the `Installation Directory` field (see Figure 2.3), specifying an alternate installation directory for the PEM agent.

By default, the PEM agent installer places a certificate in the Administrator's `%APPDATA%\pem` directory on Windows. Check the `Show advanced options` box to indicate that you would like the PEM agent installer to include a dialog that allows you to specify an alternate path for the certificate file.

Check the box next to `Register now?` to instruct the installer to register the newly installed PEM agent with the PEM server.

Click `Next` to continue to the `PEM Server Installation Details` dialog.

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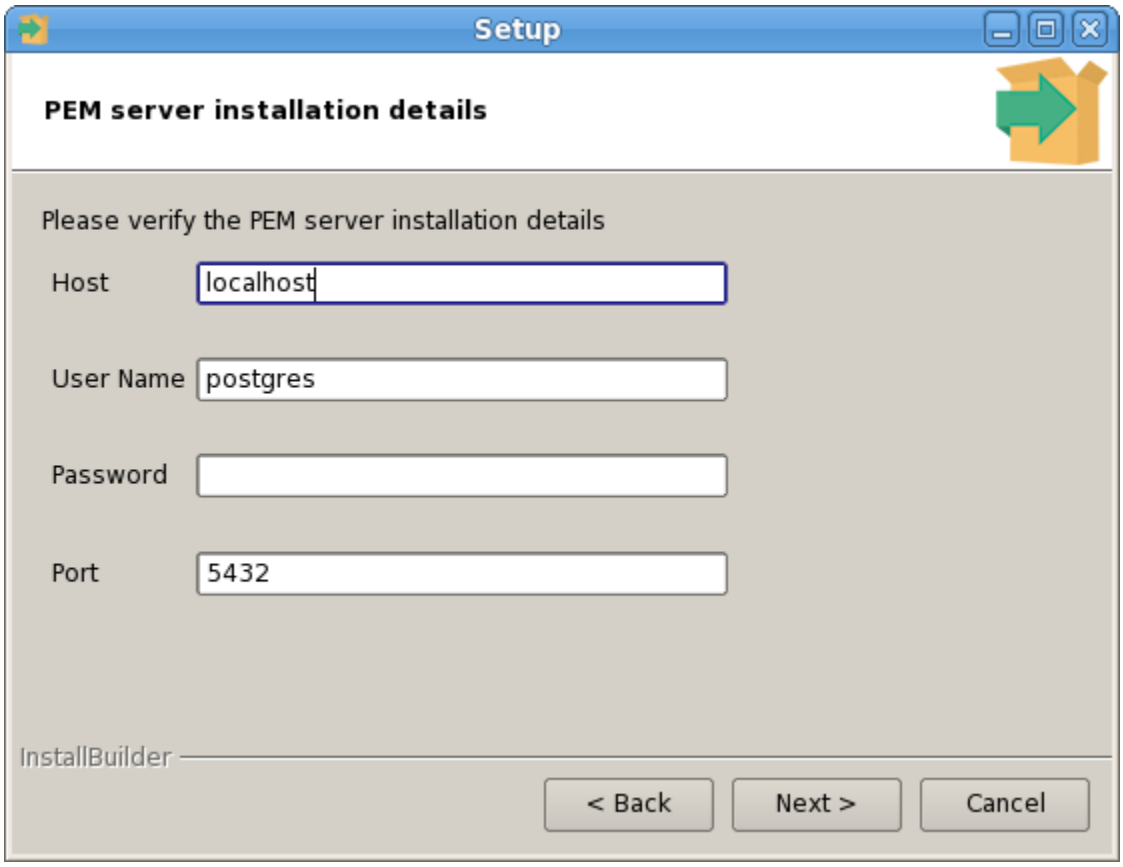

Figure 2.4 - Provide PEM server installation details

Enter the connection details for the PEM server on the `PEM server installation details` dialog (see Figure 2.4):

- Specify the name or IP address of the system on which the PEM database server resides in the `Host` field. Please note: If the PEM-HTTPD web server and PEM database are hosted on different systems, you must specify *the host of the PEM database*.
- Specify the name of the database superuser in the `User Name` field.
- Specify the password associated with the database superuser in the `Password` field.
- Specify the port that PostgreSQL is monitoring in the `Port` field.

Click `Next` to continue. The installer will attempt to connect to the server to verify that the details are correct.

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Please Note: The PEM server must allow connections from the PEM agent installer. If you encounter a connection error, confirm the connection properties specified on the `PEM Server Installation Details` dialog are correct, and confirm that the `pg_hba.conf` file (on the PEM server) will allow a connection to the server described in the error message.

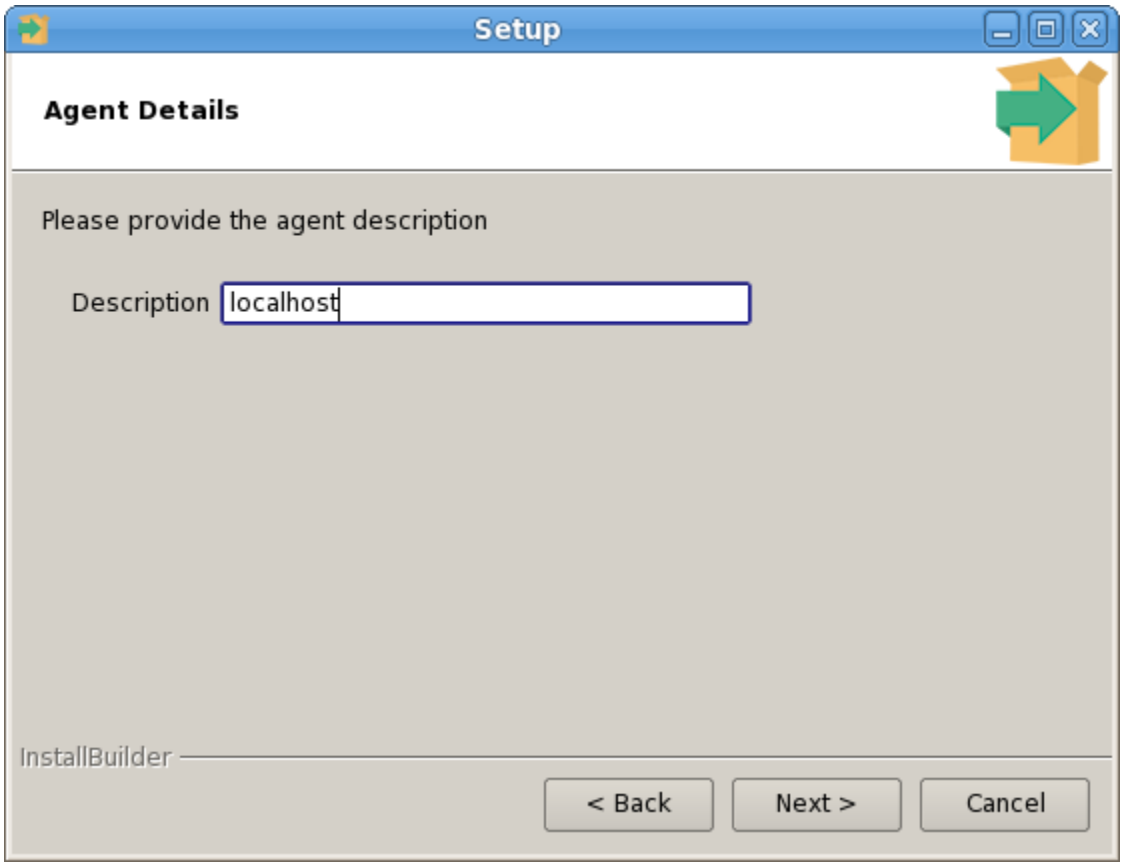

Figure 2.5 - Specify a descriptive name for the PEM agent

The tree control displayed in the `Browser` panel of the PEM web interface displays the value entered in the `Description` field (shown in Figure 2.5) to identify the PEM agent. Specify a descriptive name for the agent, such as the hostname of the machine the agent is installed on, or a name that reflects the host's functionality.

Provide a descriptive name, or accept the default provided by the PEM agent host, and click `Next` to continue.

If you checked the `Show advanced options` checkbox shown in Figure 3.24, the `Advanced options` dialog opens (shown in Figure 2.6).

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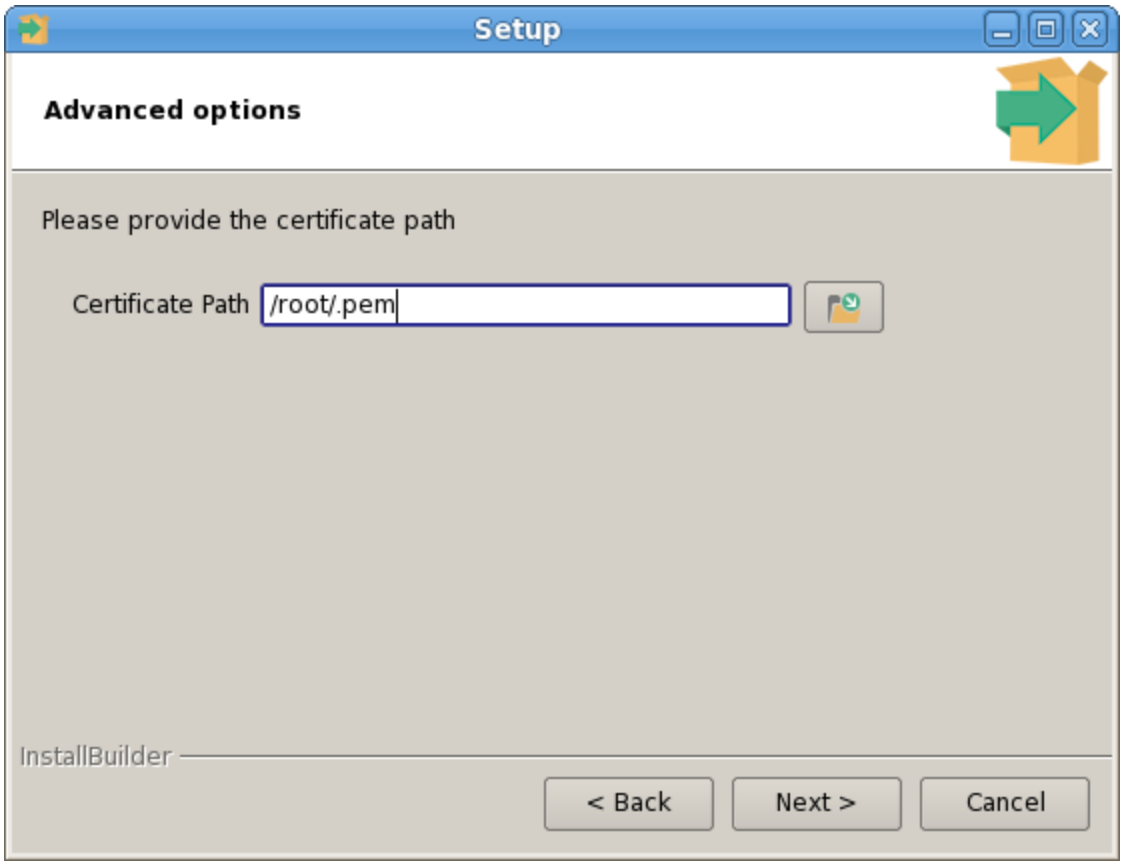

Figure 2.6 – Provide the certificate path

By default, the PEM agent installer places the certificate in the `/root/.pem` directory. Specify an alternate path for the certificate or accept the default and click `Next`.

The wizard is now ready to install the PEM agent; click `Back` to amend the installation directory, or `Next` to continue.

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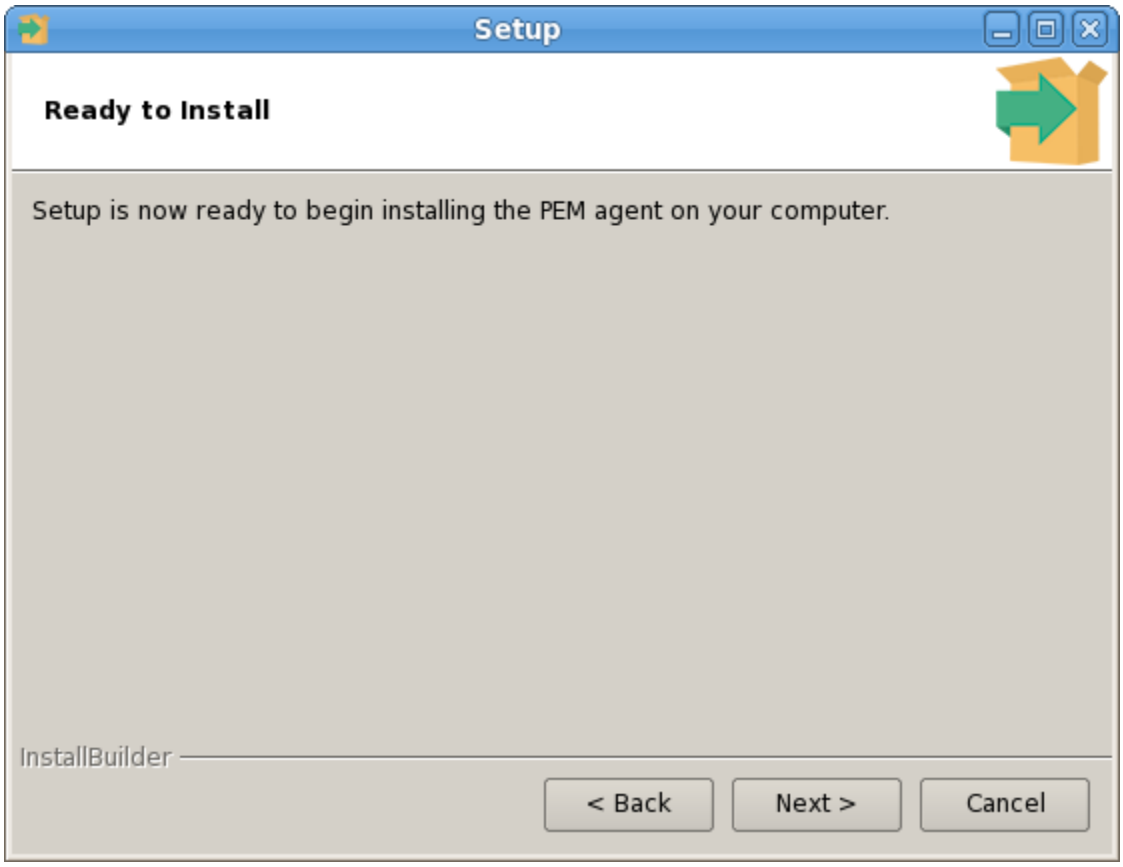

Figure 2.7 - The PEM Agent installation is ready to begin

Click `Next` on the `Ready to Install` dialog (shown in Figure 2.7) to instruct the installer to copy files to the system and register the agent on the PEM server.

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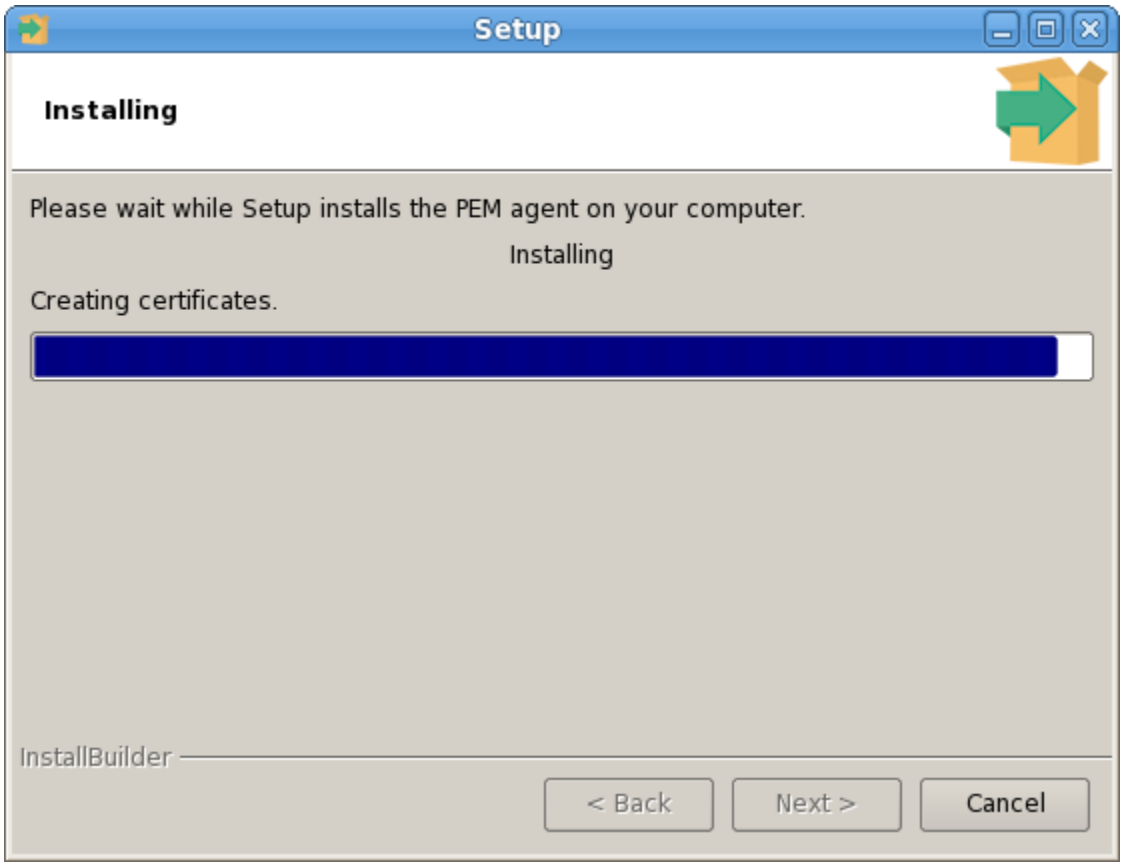

Figure 2.8 - Progress bars mark the installation's progress

The PEM agent installer displays progress bars (shown in Figure 2.8) to mark the PEM agent's installation progress.

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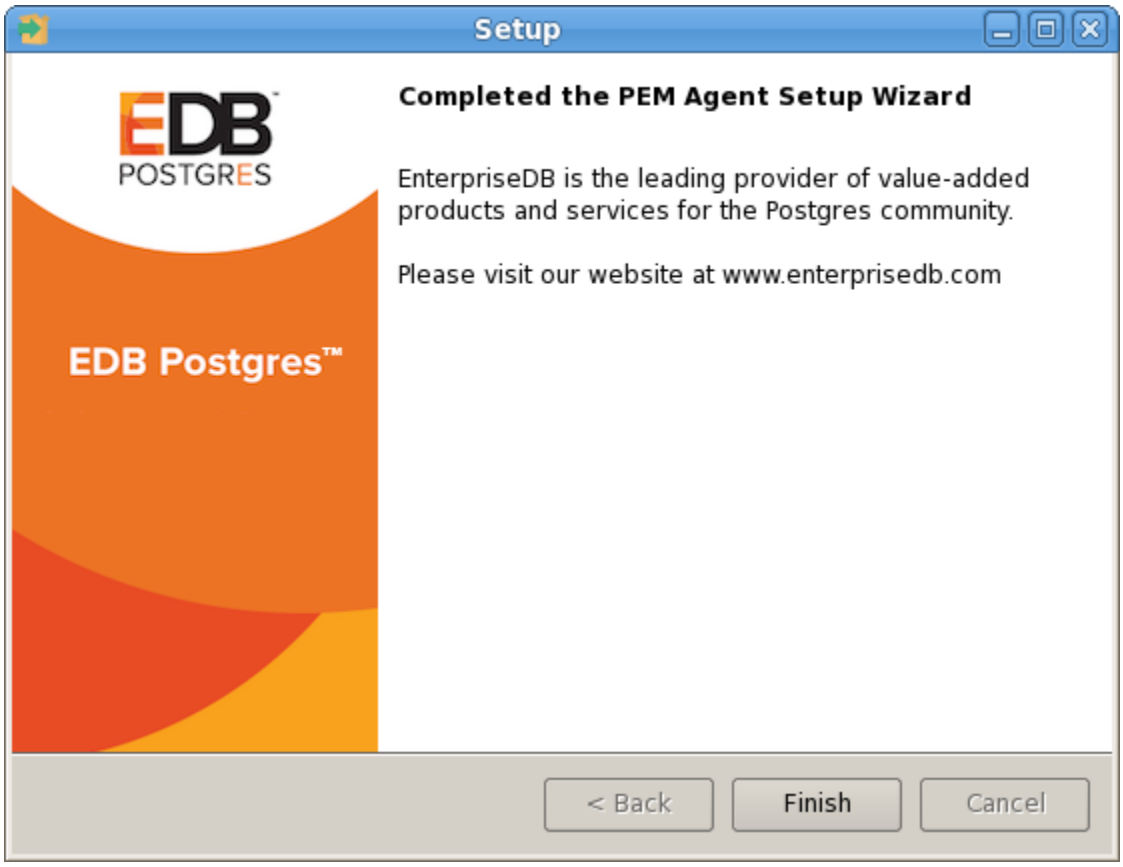

Figure 2.9 - The PEM Agent installation is complete

When the installation has completed (see Figure 2.9), the PEM agent will be running and reporting operating system and host data to the PEM server. To start monitoring Postgres instances on the host of the PEM agent, they must now be added to PEM's enterprise directory and bound to the agent.

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2.2 Invoking a Graphical Installer from the Command Line

The command line options of the PEM server and PEM agent installers offer functionality in situations where a graphical installation may not work because of limited resources or system configuration. You can:

- Include the `--mode unattended` option when invoking the installer to perform an installation without additional user input.

- Include the `--mode text` option when invoking the installer to perform an installation from the command line with an interactive installer.

Not all command line options are suitable for all platforms. For a complete reference guide to the command line options, include the `--help` option when you invoke the installer.

2.2.1 Invoking a Graphical Installer in Text Mode

You can invoke the PEM agent installer at the command line to perform an interactive installation if your system does not support a full graphical installation. Please note that the system on which you are installing the agent must have access to the PEM server.

You must have Administrative privileges to install the PEM server. You can invoke the PEM server installer with the following command:

```
pem-server-7.x.x-windows-x64.exe --mode text
```

Example

When you invoke the PEM agent installer, the installer welcomes you:

```
-------------------------------------------------------------
Welcome to the Postgres Enterprise Manager (PEM) Agent Setup Wizard.
-------------------------------------------------------------
```

Before installing the PEM server, you must review and accept the terms of the PEM license agreement:

```
Please read the following License Agreement. You must accept the
terms of this agreement before continuing with the installation.

Press [Enter] to continue:
Do you accept this license? [y/n]:
-------------------------------------------------------------
```

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Next, you will be prompted for an installation directory; you can use the default installation directory, or specify an alternate location.

By default, the PEM agent installer places a certificate in the Administrator's `%APPDATA%\pem` directory (on Windows). Enter a Y after `Show advanced options` to access menu options that allow you to specify an alternate path for the certificate file.

```
Installation Directory

Please select a directory for PEM agent installation.
Installation Directory [/opt/edb/pem]:
Show advanced options [y/N]:
-----------------------------------------------------------------
```

When prompted, provide information about the PEM server installation:

```
PEM server installation details

Please verify the PEM server installation details
Host [localhost]:
User Name [postgres]:
Password :
Port [5432]:
-----------------------------------------------------------------
```

You can provide a descriptive name for the agent, or press return to accept the default:

```
Agent Details

Please provide the agent description
Description [localhost]:
-----------------------------------------------------------------
```

The installer will prompt you before it proceeds with the installation; press Return to start the installation:

```
Setup is now ready to begin installing the PEM agent on your
computer.
Do you want to continue? [Y/n]:
-----------------------------------------------------------------

Please wait while Setup installs the PEM agent on your computer.



 Installing
 0% ______________ 50% ______________ 100%
 ########################################
```

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The installer will notify you when the installation is complete:

```
EnterpriseDB is the leading provider of value-added products and
services for the Postgres community.
Please visit our website at www.enterprisedb.com
```

2.2.2 Invoking a Graphical Installer in Unattended Mode

You can perform an unattended PEM server installation by providing installation preferences on the command line when invoking the installer. Please note that the system on which you are installing the PEM server must have internet access.

Before invoking the PEM agent installer in unattended mode, you must:

- install the PEM server; the `pg_hba.conf` file of the PEM server must allow connections from the host of the PEM agent.
- ensure that the monitored Postgres database has SSL enabled, and is accepting connections.

You must have Administrator privileges to install the PEM agent. Use the following command to invoke the PEM agent installer in unattended mode:

```
pem-agent-7.x.x-windows-x64.exe --mode unattended
--pghost pem_server_host_address --pgport pem_server_port
--pguser postgres --pgpassword pguser_password
--agent_description agent_name
```

Where:

pem_server_host_address specifies the IP address of the host of the PEM server.

pem_server_port specifies the port used by the backing PEM database; by default, the database uses port `5432`.

pguser_password specifies the password associated with the PEM database superuser.

agent_name specifies a descriptive name for the PEM agent.

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2.3 Installing a PEM Agent on RHEL or CentOS Host

On a RHEL or CentOS system, you can use the `yum` package manager to install a PEM agent. Please note that before using a package manager to install the PEM agent, the host must contain the following packages:

```
epel-release
wxBase
```

After providing the pre-requisite packages, you can install the PEM agent:

1. Download the `edb-repo` installation package from:

   http://yum.enterprisedb.com/

   The `edb-repo` package creates the repository configuration file (named `edb.repo`). The `edb.repo` file defines multiple repositories hosted at EnterpriseDB.com.

2. Assume superuser privileges and use the following command to install the `edb-repo` package, and create the repository configuration file:

   ```
   rpm -Uvh edb-repo-9.x-x.noarch.rpm
   ```

   Where *x* specifies the version of the file.

   Then, use your choice of editor to modify the configuration file, enabling the `enterprisedb-tools` and `enterprisedb-dependencies` repositories. The configuration file is named `edb.repo`; it resides in `/etc/yum.repos.d`.

   To enable a repository, change the value of the `enabled` parameter to 1 and replace the *`user_name`* and *`password`* placeholders in the `baseurl` specification with your repository credentials. Contact EnterpriseDB for repository credentials.

   For example:

   ```
   [enterprisedb-tools]
   name=EnterpriseDB Tools $releasever - $basearch
   baseurl=http://user_name:password@yum.enterprisedb.com/tools/r
   edhat/rhel-$releasever-$basearch
   enabled=1
   gpgcheck=1
   gpgkey=file:///etc/pki/rpm-gpg/ENTERPRISEDB-GPG-KEY

   [enterprisedb-dependencies]
   name=EnterpriseDB Dependencies $releasever - $basearch
   baseurl=http://user_name:password@yum.enterprisedb.com/depende
   ncies/redhat/rhel-$releasever-$basearch
   ```

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```
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/ENTERPRISEDB-GPG-KEY

[edbas96]
name=EnterpriseDB Advanced Server 9.6 $releasever - $basearch
baseurl=http://user_name:password@yum.enterprisedb.com/9.6/red
hat/rhel-$releasever-$basearch
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/ENTERPRISEDB-GPG-KEY
```

3. After modifying the content of the repository configuration file, you can use yum to install the PEM agent:

```
yum install edb-pem-agent
```

When the installation is complete, `yum` will display a list of the installed packages and dependencies (see Figure 2.10).

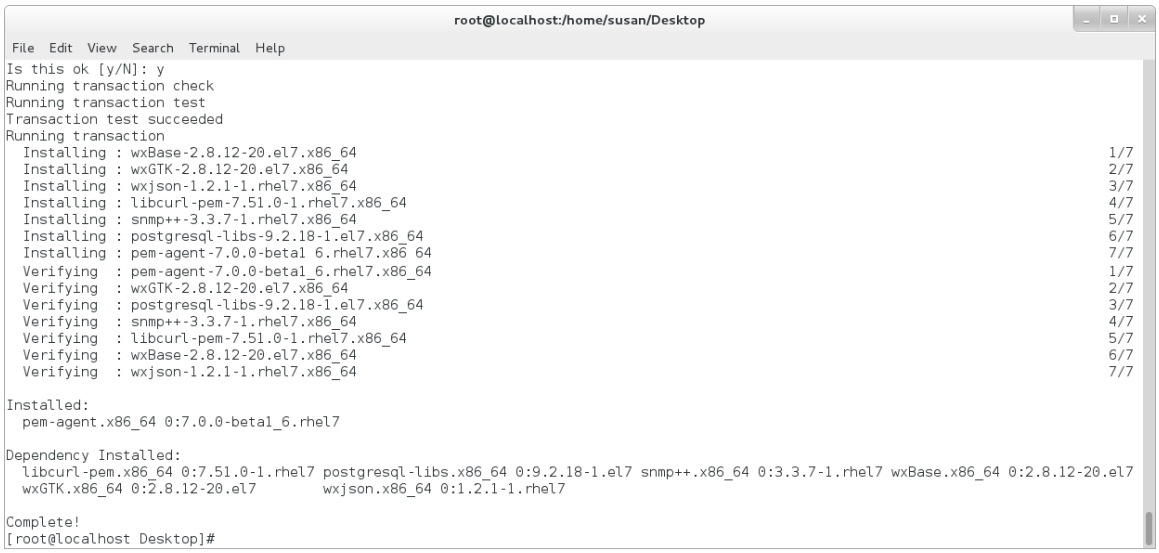

Figure 2.10 – Using an RPM package to install the PEM agent.

When you install an RPM package that is signed by a source that is not recognized by your system, yum may ask for your permission to import the key to your local server. If prompted, and you are satisfied that the packages come from a trustworthy source, enter a y, and press `Return` to continue.

During the installation, yum may encounter a dependency that it cannot resolve. If it does, it will provide a list of the required dependencies that you must manually resolve.

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2.4 Installing a PEM Agent on a SLES Host

For detailed information about installing Advanced Server and supporting components on a SLES host, please consult the EDB Postgres Advanced Server Installation Guide, available at:

https://www.enterprisedb.com/resources/product-documentation

SLES packages are available from:

https://zypp.enterprisedb.com

Before installing a PEM agent, you must install prerequisite packages. If you are using a SLES SP2 host, use the following commands:

```
SUSEConnect -p sle-module-legacy/12/x86_64
SUSEConnect -p sle-sdk/12/x86_64
zypper addrepo
https://download.opensuse.org/repositories/Apache:Modules/SLE_
12_SP2/Apache:Modules.repo
zypper addrepo
http://download.opensuse.org/repositories/Cloud:/OpenStack:/Ne
wton:/cisco-apic:/2.3.1/SLE_12_SP2/ pem_opensuse_boost
zypper refresh
zypper install edb-pem-agent
```

If you are using a SLES 12 SP3 host, use the following commands in the given sequence to install the agent:

```
SUSEConnect -p sle-module-legacy/12/x86_64
SUSEConnect -p sle-sdk/12/x86_64
zypper addrepo
https://download.opensuse.org/repositories/Apache:Modules/SLE_
12_SP3/Apache:Modules.repo
zypper addrepo
http://download.opensuse.org/repositories/Cloud:/OpenStack:/Ne
wton:/cisco-apic:/2.3.1/SLE_12_SP3/ pem_opensuse_boost
zypper refresh
zypper install edb-pem-agent
```

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2.5 Installing a PEM Agent on a Debian or Ubuntu Host

To install a PEM agent on a Debian or Ubuntu host, you must have credentials that allow access to the EnterpriseDB repository. To request credentials for the repository, visit the EnterpriseDB Advanced Downloads page at:

https://www.enterprisedb.com/advanced-downloads

The following steps will walk you through using the EnterpriseDB apt repository to install a Debian package. When using the commands, replace the username and password with the credentials provided by EnterpriseDB.

1. Go to https://apt.enterprisedb.com/ and log in as root:

```
sudo su -
```

2. Configure the EnterpriseDB repository:

```
sh -c 'echo "deb
https://username:password@apt.enterprisedb.com/$(lsb_release -
cs)-edb/ $(lsb_release -cs) main" > /etc/apt/sources.list.d/edb-
$(lsb_release -cs).list'
```

3. Add support to your system for secure APT repositories:

```
apt-get install apt-transport-https
```

4. Add the EBD signing key:

```
wget -q -O -https://username:password @apt.enterprisedb.com/edb-
deb.gpg.key | apt-key add -
```

5. Update the repository metadata:

```
apt-get update
```

6. Use the following command to install the Debian package:

- For PEM Server and agent: `apt-get install edb-pem-server`
- For PEM agent: `apt-get install edb-pem-agent`

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3 Registering a PEM Agent

Each PEM agent must be *registered* with the PEM server. The registration process provides the PEM server with the information it needs to communicate with the agent. The PEM agent graphical installer supports agent self-registration, but you can use the `pemworker` utility to register the agent if you skip PEM agent registration during a graphical installation or use an RPM package to install a PEM agent.

The RPM installer places the PEM agent in the `/usr/edb/pem/agent/bin` directory. To register an agent, include the `--register-agent` keywords along with registration details when invoking the `pemworker` utility:

```
pemworker --register-agent
```

Append command line options to the command string when invoking the `pemworker` utility. Each option should be followed by a corresponding value:

Option	Description
--pem-server	Specifies the IP address of the PEM server. This parameter is required.
--pem-user	Specifies the name of the PEM user. This parameter is required.
--pem-port	Specifies the port that PEM monitors for connections. The default value is 5432.
--cert-path	Specifies the complete path to the directory in which certificates will be created. If you do not provide a path, certificates will be created in: On Linux, ~/.pem On Windows, %APPDATA%/pem
--display-name	Specifies a user-friendly name that will be displayed in the PEM Browser tree control. The default is the system hostname.
--group	The name of the group in which the agent will be displayed.
--team	The name of the group role that may access the PEM Agent.
--owner	The name of the owner of the PEM Agent.
--force-registration	Include the force_registration clause to instruct the PEM server to register the agent with the arguments provided; this clause is usefule if you are overriding an existing agent configuration. The default value is Yes.
--enable-heartbeat-connection	Enable the enable-heartbeat-connection parameter to create a dedicated heartbeat connection between PEM Agent and server to update the active status. The default value is No.

Before any changes are made on the PEM database, the connecting agent is authenticated with the PEM database server. When invoking the `pemworker` utility, you must provide the password associated with the PEM server administrative user role (`postgres`). There are three ways to specify the administrative password; you can:

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- set the `PEM_MONITORED_SERVER_PASSWORD` environment variable.
- provide the password on the command line with the `PGPASSWORD` keyword.
- create an entry in the `.pgpass` file.

Failure to provide the password will result in a password authentication error; you will be prompted for any other required but omitted information. When the registration is complete, the server will confirm that the agent has been successfully registered.

Setting PEM Agent Configuration Parameters

The PEM agent RPM installer creates a sample configuration file named `agent.cfg.sample` in the `/usr/edb/pem/agent/etc` directory. When you register the PEM agent, the `pemworker` program creates the actual agent configuration file (named `agent.cfg`). You must modify the `agent.cfg` file, adding the following configuration parameter:

```
heartbeat_connection = true
```

You must also add the location of the `ca-bundle.crt` file (the certificate authority). By default, the installer creates a `ca-bundle.crt` file in the location specified in your `agent.cfg.sample` file. You can copy the default parameter value from the sample file, or, if you use a `ca-bundle.crt` file that is stored in a different location, specify that value in the `ca_file` parameter:

```
ca_file=/usr/libexec/libcurl-pem7/share/certs/ca-bundle.crt
```

Then, use a platform-specific command to start the PEM agent service; the service is named `pemagent`. For example, on a CentOS or RHEL 6.x system, you would use the command:

```
/etc/init.d/pemagent
```

On a CentOS or RHEL 7.x host, a use systemctl to start the service:

```
systemctl start pemagent
```

The service will confirm that it is starting the agent; when the agent is registered and started, it will be displayed on the `Global Overview` dashboard and in the `Object browser` tree control of the PEM web interface.

For information about using the `pemworker` utility to register a server, please see the *PEM Getting Started Guide*, available at:

https://www.enterprisedb.com/resources/product-documentation

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3.1 Using a non-root User Account to Register a PEM Agent

To register a PEM agent using a non-root user, you first need to install PEM agent as a `root` user. After installation, change to a non-root user (for example, `edb`) and perform the following steps:

1. Create `.pem` directory and logs directory as following and assign `700` permissions to it

   ```
   mkdir /home/<edb>/.pem

   mkdir /home/<edb>/.pem/logs

   chmod 700 /home/<edb>/.pem

   chmod 700 /home/<edb>/.pem/logs
   ```

2. Register the agent with PEM server using `pemworker` utility as following:

   ```
   ./pemworker --register-agent --pem-server <172.19.11.230> -
   -pem-user <postgres> --pem-port <5432> --display-name
   <non_root> --cert-path /home/<edb> --config-dir /home/<edb>
   ```

   The above command creates agent certificates & `agent.cfg` inside `/home/edb/.pem` directory. Assign `600` permission to these files using the command:

   ```
   chmod -R 600 /home/edb/.pem/agent*
   ```

3. Change the parameters of `agent.cfg` file as following.

   ```
   agent_ssl_key=/home/edb/.pem/agent<id>.key

   agent_ssl_crt=/home/edb/.pem/agent<id>.crt

   log_location=/home/edb/.pem/worker.log

   agent_log_location=/home/edb/.pem/agent.log
   ```

4. Update the value for path and user in the pemagent service file:

   - If you are using CentOS 6, update the `pemagent service` file to reflect the correct path of agent.cfg file and also change user `su` to `su edb`.

   - If you are using CentOS 7, Update the parameters as following:

     ```
     User=edb
     ```

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```
   ExecStart=/usr/edb/pem/agent/bin/pemagent -c
/home/edb/.pem/agent.cfg
```

5. Kill the agent process that was started earlier and then restart the agent service using the non-root user as below:-

   ```
   sudo /etc/init.d/pemagent start/stop/restart
   ```

6. Check the agent status on PEM dashboard.

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4 PEM Agent Management

The sections that follow provide information about the behavior and management of a PEM agent.

4.1 PEM Agent Privileges

By default, the PEM agent is installed with `root` privileges for the operating system host and superuser privileges for the database server. These privileges allow the PEM agent to invoke unrestricted probes on the monitored host and database server about system usage, retrieving and returning the information to the PEM server.

Please note that PEM functionality diminishes as the privileges of the PEM agent decrease. For complete functionality, the PEM agent should run as `root`. If the PEM agent is run under the database server's service account, PEM probes will not have complete access to the statistical information used to generate reports, and functionality will be limited to the capabilities of that account. If the PEM agent is run under another lesser-privileged account, functionality will be limited even further.

Please note that if you limit the operating system privileges of the PEM agent, some of the PEM probes will not return information, and the functionality may be affected.

4.1.1 Functionality Not Available to a non-root User

If the PEM agent is run as a non-root user, it will limit the operating system privileges of the PEM and some of the PEM probes will not return information. The following functionality of PEM may be affected:

Probe or Action	Operating System	PEM Functionality Affected
Data And Logfile Analysis	Linux/Windows	The Postgres Expert will be unable to access complete information.
Session Information	Linux	The per-process statistics will be incomplete.
PG HBA	Linux/Windows	The Postgres Expert will be unable to access complete information.
Service restart functionality	Linux/Windows	The Audit Log Manager, Server Log Manager, Log Analysis Expert, streaming replication, and PEM may be unable to apply requested modifications.
Package Deployment	Linux/Windows	PEM will be unable to run downloaded installation modules.
Batch Task	Windows	PEM will be unable to run scheduled batch jobs in Windows.
Collect data from server where root access is required	Linux/Windows	Columns such as swap usage, CPU usage, IO read, IO write will be displayed as 0 in the session activity dashboard.

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4.1.2 Functionality Not Available to a User who is not a Database Superuser

If you restrict the database privileges of the PEM agent, the following PEM functionality may be affected:

Probe	Operating System	PEM Functionality Affected
Audit Log Collection	Linux/Windows	PEM will receive empty data from the PEM database.
Server Log Collection	Linux/Windows	PEM will be unable to collect server log information.
Database Statistics	Linux/Windows	The Database/Server Analysis dashboards will contain incomplete information.
Session Waits/System Waits	Linux/Windows	The Session/System Waits dashboards will contain incomplete information.
Locks Information	Linux/Windows	The Database/Server Analysis dashboards will contain incomplete information.
Streaming Replication	Linux/Windows	The Streaming Replication dashboard will not display information.
Slony Replication	Linux/Windows	Slony-related charts on the Database Analysis dashboard will not display information.
Tablespace Size	Linux/Windows	The Server Analysis dashboard will not display complete information.
xDB Replication	Linux/Windows	PEM will be unable to send xDB alerts and traps.

If the probe is querying the operating system with insufficient privileges, the probe may return a `permission denied` error.

If the probe is querying the database with insufficient privileges, the probe may return a `permission denied` error or display the returned data in a PEM chart or graph as an empty value.

When a probe fails, an entry will be written to the log file that contains the name of the probe, the reason the probe failed, and a hint that will help you resolve the problem.

You can view probe-related errors that occurred on the server in the Probe Log Dashboard, or review error messages in the PEM worker log files. On Linux, the default location of the log file is:

```
/var/log/pem/worker.log
```

On Windows, log information is available on the `Event Viewer`.

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4.2 PEM Agent Configuration

A number of user-configurable parameters and registry entries control the behavior of the PEM agent. You may be required to modify the PEM agent's parameter settings to enable some PEM functionality, such as the Streaming Replication wizard. After modifying values in the PEM agent configuration file, you must restart the PEM agent to apply any changes.

With the exception of the `PEM_MAXCONN` parameter, we strongly recommend against modifying any of the configuration parameters or registry entries listed below without first consulting EnterpriseDB support experts *unless* the modifications are required to enable PEM functionality.

- On 64 bit Windows systems, PEM registry entries are located in `HKEY_LOCAL_MACHINE\Software\Wow6432Node\EnterpriseDB\PEM\agent`

- On Linux systems, PEM configuration options are stored in the `agent.cfg` file, located in `/opt/edb/pem/agent/etc`

Parameter Name	Description	Value
`PEM_HOST (on Windows)` or `pem_host (on Linux)`	The IP address or hostname of the PEM server.	By default, set to 127.0.0.1.
`PEM_PORT (on Windows)` or `pem_port (on Linux)`	The database server port to which the agent connects to communicate with the PEM server.	By default, the PEM server monitors port 5432.
`AgentID (on Windows)` or `agent_id (on Linux)`	A unique identifier assigned to the PEM agent.	The first agent is assigned an identifier of '1', the second agent's identifier is '2', and so on.
`AgentKeyPath (on Windows)` or `agent_ssl_key (on Linux)`	The complete path to the PEM agent's key file.	By default, on Windows, C:\Users\<user_name>\AppData\Roaming\pem\agent.key By default on Linux, /root/.pem/agent.key
`AgentCrtPath (on Windows)` or `agent_ssl_crt (on Linux)`	The complete path to the PEM agent's certificate file.	By default, on Windows, C:\Users\<user_name>\AppData\Roaming\pem\agent.crt By default on Linux, /root/.pem/agent.crt
`AgentFlagDir (on Windows)` or `agent_flag_dir (on Linux)`	Used for HA support. Specifies the directory path checked for requests to take over monitoring another server. Requests are made in the form of a file in the specified flag directory.	Not set by default. This option allows you to override the hard-coded default.
`LogLevel (on Windows)` or `log_level (on Linux)`	Log level specifies the type of event that will be written to the PEM log files.	Log level may be set to: error, debug1, debug2, or warning. By default, log level is set to warning.

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log_location (on Linux)	Specifies the location of the PEM worker log file.	/var/log/pem/worker.log
agent_log_location (on Linux)	Specifies the location of the PEM agent log file.	/var/log/pem/agent.log
LongWait (on Windows) or long_wait (on Linux)	The maximum length of time (in seconds) that the PEM agent will wait before attempting to connect to the PEM server if an initial connection attempt fails.	By default, 30 seconds.
ShortWait (on Windows) or short_wait (on Linux)	The minimum length of time (in seconds) that the PEM agent will wait before checking which probes are next in the queue (waiting to run).	By default, 10 seconds.
AlertThreads (on Windows) or alert_threads (on Linux)	The number of alert threads to be spawned by the agent.	Set to 1 for the agent that resides on the host of the PEM server; should be set to 0 for all other agents.
EnableSMTP (on Windows) or enable_smtp(on Linux)	When set to true, the SMTP email feature is enabled.	By default, set to true for the agent that resides on the host of the PEM server; false for all other agents.
EnableSNMP (on Windows) or enable_snmp (on Linux)	When set to true, the SNMP trap feature is enabled.	By default, set to true for the agent that resides on the host of the PEM server; false for all other agents.
enable_nagios (on Linux only)	When set to true, Nagios alerting is enabled.	By default, set to true for the agent that resides on the host of the PEM server; false for all other agents.
ConnectTimeout (on Windows) or connect_timeout (on Linux)	The maximum length of time (in seconds, written as a decimal integer string) that the agent will wait for a connection.	Not set by default. If set to 0, the agent waits indefinitely.
AllowServerRestart (on Windows) or allow_server_restart (on Linux)	If set to TRUE, the agent can restart the database server that it monitors. Some PEM features may be enabled/disabled, depending on the value of this parameter.	By default, set to TRUE.
AllowPackageManagement (on Windows) or allow_package_management (on Linux)	If set to TRUE, the Update Monitor and Package Management features are enabled.	By default, set to FALSE.
MaxConnections (on Windows) or max_connections (on Linux)	The maximum number of probe connections used by the connection throttler.	By default, set to 0 (an unlimited number of connections).
ConnectionLifetime (on Windows) or connection_lifetime (on Linux)	Use ConnectionLifetime (or connection_lifetime) to specify the minimum number of seconds an open	By default, set to 0 (a connection is dropped when the connection is idle after the agent's processing loop completes a cycle in which the

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	but idle connection is retained. This parameter is ignored if the value specified in MaxConnections is reached and a new connection (to a different database) is required to satisfy a waiting request.	connection has not been used).
AllowBatchProbes (on Windows) or allow_batch_probes (on Linux)	If set to TRUE, the user will be able to create batch probes using the custom probes feature.	By default, set to FALSE.
HeartbeatConnection (on Windows) or heartbeat_connection (on Linux)	When set to TRUE, a dedicated connection is used for sending the heartbeats.	By default, set to FALSE.
AllowStreamingReplication (on Windows) or allow_streaming_replication (on Linux)	If set to TRUE, the user will be able to configure and setup streaming replication.	By default, set to FALSE.
BatchScriptDir (on Windows) or batch_script_dir (on Linux)	Provide the path where script file (for alerting) will be stored.	On Windows, C:\Users*user_name*\AppData\Local\Temp On Linux, set to /tmp.
ConnectionCustomSetup (on Windows) or connection_custom_setup (on Linux)	Use this parameter to provide SQL code that will be invoked each time a new connection with the monitored server is established.	By default, no value is provided.
ca_file (Linux only)	Provide the path where the CA certificate resides.	By default, /opt/PEM/agent/share/certs/ca-bundle.crt

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4.3 PEM Agent Properties

The PEM Agent properties dialog provides information about the PEM agent from which the dialog was opened; to open the dialog, right-click on an agent name in the PEM client tree control, and select `Properties` from the context menu.

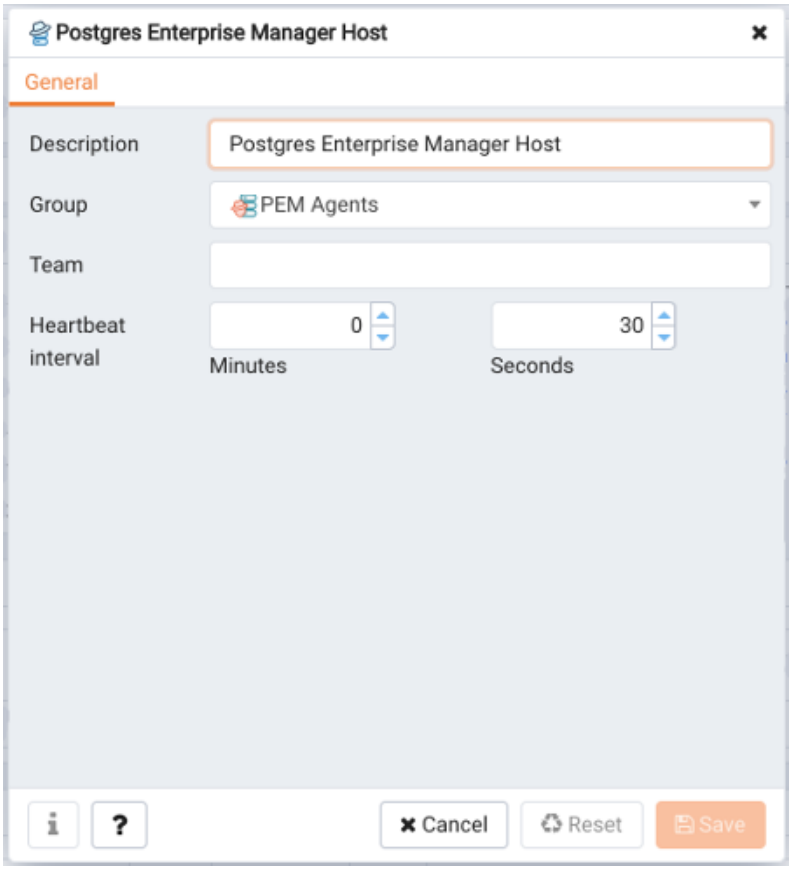

Figure 4.1 - The PEM Agent Properties dialog.

Use fields on the PEM Agent properties dialog to review or modify information about the PEM agent:

- The `Description` field displays a modifiable description of the PEM agent. This description is displayed in the tree control of the PEM client.
- You can use groups to organize your servers and agents in the PEM client tree control. Use the `Group` drop-down listbox to select the group in which the agent will be displayed.

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- Use the `Team` field to specify the name of the group role that should be able to access servers monitored by the agent; the servers monitored by this agent will be displayed in the PEM client tree control to connected team members. Please note that this is a convenience feature. The `Team` field does not provide true isolation, and should not be used for security purposes.

- The `Heartbeat interval` fields display the length of time that will elapse between reports from the PEM agent to the PEM server. Use the selectors next to the `Minutes` or `Seconds` fields to modify the interval.

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5 PEM Agent Troubleshooting

5.1 Restoring a Deleted PEM agent

If an agent has been deleted from `pem.agent` table then you cannot restore it. You need to re-register the agent using PEM worker utility.

If an agent has been deleted from PEM Web client but still has an entry in the `pem.agent` table with value of `active = f`, then you can restore the agent using the following steps:

1. Use the following command to check the values for “ID" and “active" fields:

   ```
   pem=# select * from pem.agent;
   ```

2. Update the status for agent to true in pem.agent table:

   ```
   pem=# update pem.agent set active=true where id=<x>;
   ```

   Where, *x* is the id that was displayed in output of the query used in step 1.

3. Refresh the PEM web client.

The deleted agent will be restored again. However, the servers that were bound to that particular agent might appear to be down. To resolve this issue, you need to modify the PEM agent properties of the server to add the bound agent again and after the successful modification, the servers will be displayed as running properly.

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5.2 Reconfiguring the PEM Server

In certain situations, you may need to uninstall the PEM server, install it again, and reconfigure the PEM server. Use the following commands in the given sequence:

1. Use the following command to remove the PEM server configuration and uninstall:

   ```
   usr/edb/pem/bin/configure-pem-server.sh –un
   ```

2. Use the following command to remove the PEM packages:

   ```
   yum erase edb-pem-server
   ```

3. Use the following command to drop the `pem` database:

   ```
   DROP DATABASE pem
   ```

4. Move the certificates from `/root/.pem/` to another location:

   ```
   mv /root/.pem/* <new_location>
   ```

5. Move the `agent.cfg` file from `/usr/edb/pem/agent/etc/agent.cfg` to another location:

   ```
   mv /usr/edb/pem/agent/etc/agent.cfg <new_location>
   ```

6. Then, use the following command to configure the PEM server again:

   ```
   /usr/edb/pem/bin/configure-pem-server.sh
   ```

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5.3 Using a Command Line to Delete PEM Agents with a Down or Unknown Status

Using the PEM web interface to delete PEM agents with a `Down` or `Unknown` status may be difficult if the number of such agents is large. In such situations, you might want to use the command line interface to delete Down or Unknown agents.

You can use the following query to delete the agents that are `Down` for more than `<N>` number of hours:

```
DELETE FROM pem.agent WHERE id IN
(SELECT a.id FROM pem.agent a JOIN pem.agent_heartbeat b ON
(b.agent_id=a.id) WHERE a.id IN
(SELECT agent_id FROM pem.agent_heartbeat WHERE
(EXTRACT(HOUR FROM now())- EXTRACT (HOUR FROM last_heartbeat)) >
<N> ));
```

Where `<N>` specifies the number of hours.

Use the following query to delete the agents with an `Unknown` status:

```
DELETE FROM pem.agent WHERE id IN (SELECT id FROM pem.agent WHERE
id NOT IN (SELECT agent_id FROM pem.agent_heartbeat));
```

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6 Uninstalling a PEM Agent

Use the uninstaller provided in the PEM installation directory to remove PEM agent from a system. By default, the PEM agent uninstaller is located:

Component	Uninstaller name	Default location
PEM agent	`uninstall-pemagent`	`/opt/edb/PEM/agent`

To remove an agent, assume superuser privileges, open a terminal window, and navigate into the directory in which the uninstaller resides; invoke the installer as follows:

```
./uninstall-agent_name
```

Where *agent_name* is the name of the agent that you wish to remove.

If the PEM installation resides on a Windows host, you can use the Windows `Uninstall a Program` applet to remove PEM components. To open the `Uninstall a Program` applet, navigate through the `Programs` submenu on the Windows `Control Panel`, selecting `Programs and Features`. When the `Uninstall a Program` window opens, highlight the name of the PEM component that you wish to remove, and click the `Uninstall/Change` button. A Windows popup will open, prompting you to confirm that you wish to remove the component; click `Yes` to remove the component.

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