



Postgres Enterprise Manager

Release 7.12

Agent User Guide

Dec 17, 2019

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PEM is composed of three primary components: PEM server, PEM agent, and PEM web interface. The PEM agent is responsible for performing tasks on each managed machine and collecting statistics for the database server and operating system.

This document provides information that is required to work with PEM agents. The guide will acquaint you with the basic registering, configuration, and management of agents. The guide is broken up into the following core sections:

- **Postgres Enterprise Manager - Overview** - This section provides an overview of PEM architecture and also provides information about hardware and software prerequisites for installing a PEM agent.
- **Registering a PEM Agent** - This section provides information about registration of a PEM agent.
- **Managing a PEM agent** - This section provides information about configuring and managing a PEM agent.
- **Troubleshooting for PEM agent** - This section provides information about troubleshooting for PEM agents.
- **Uninstalling a PEM agent** - This section provides information about uninstalling a PEM agent.

This document uses *Postgres* to mean either the PostgreSQL or EDB Postgres Advanced Server database.

Postgres Enterprise Manager - Overview

1.1 PEM Architecture

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, 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.
- **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).

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`.

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

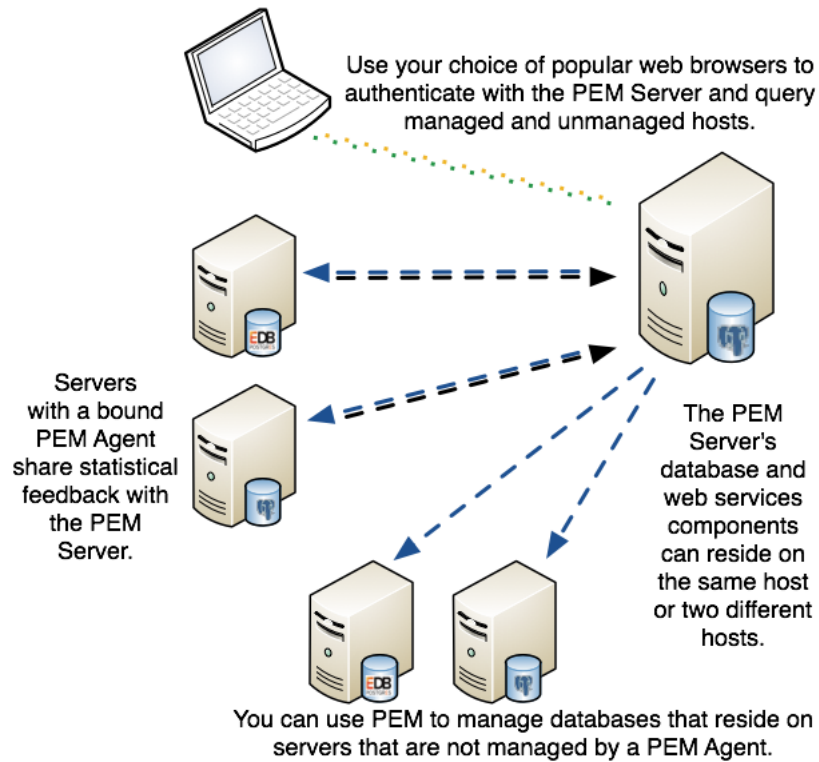


Fig. 1: A typical PEM installation.

1.2 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>

1.3 Hardware Prerequisites

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.

CHAPTER 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>

2.1 Installing an 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.



Fig. 1: *The PEM Agent installer welcome window*

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

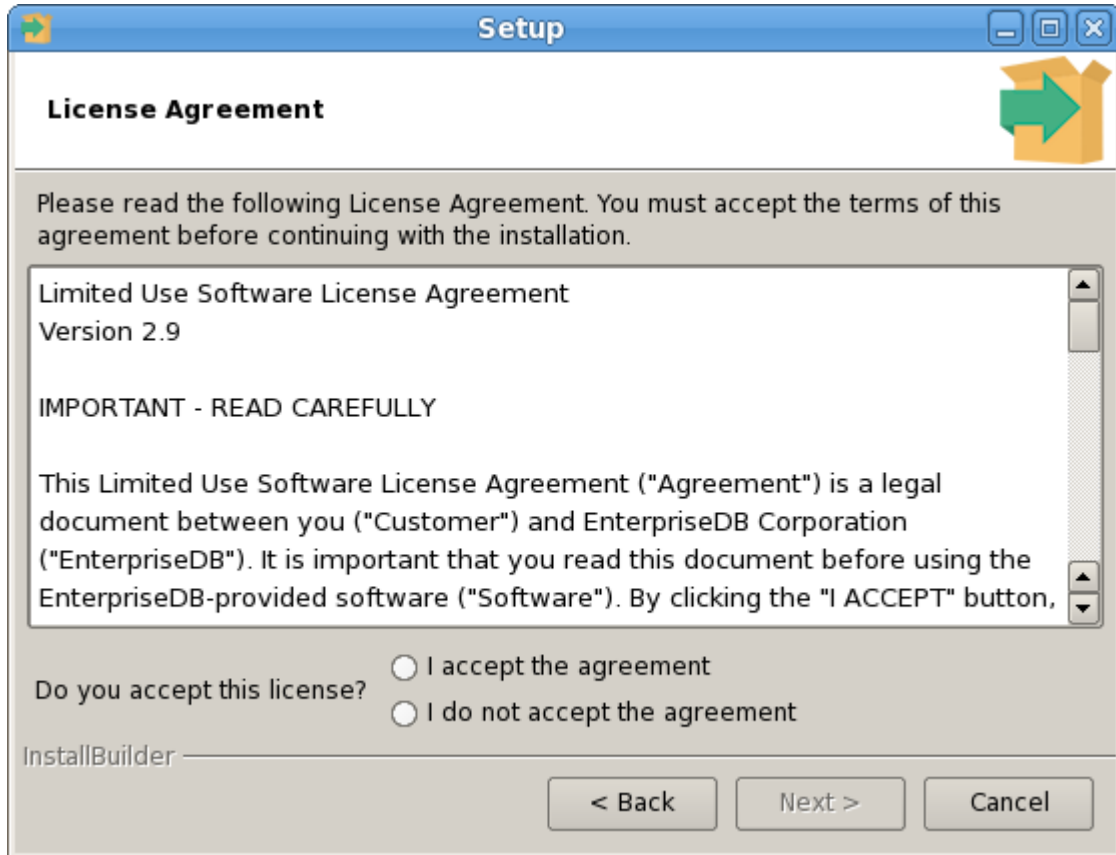


Fig. 2: *The PEM license agreement*

Carefully review the license agreement before highlighting the appropriate radio button and accepting the agreement; click `Next` to continue to the `Installation Directory` dialog.

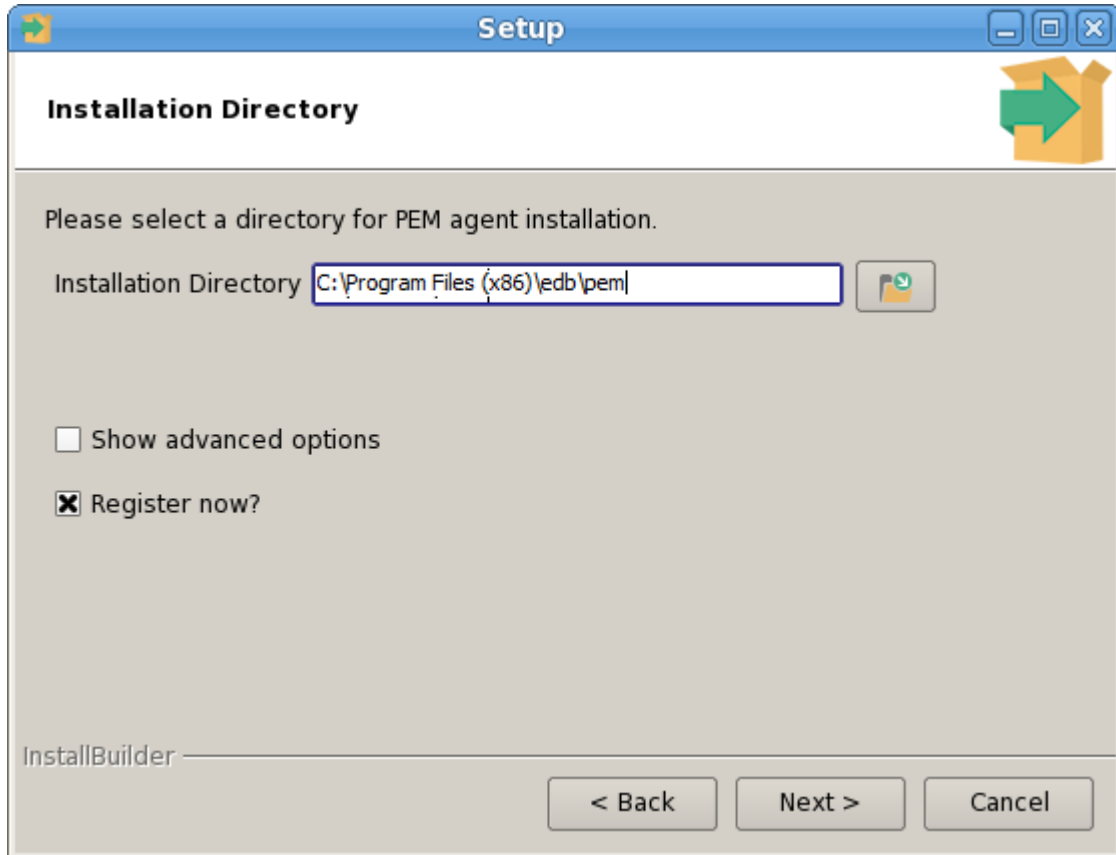
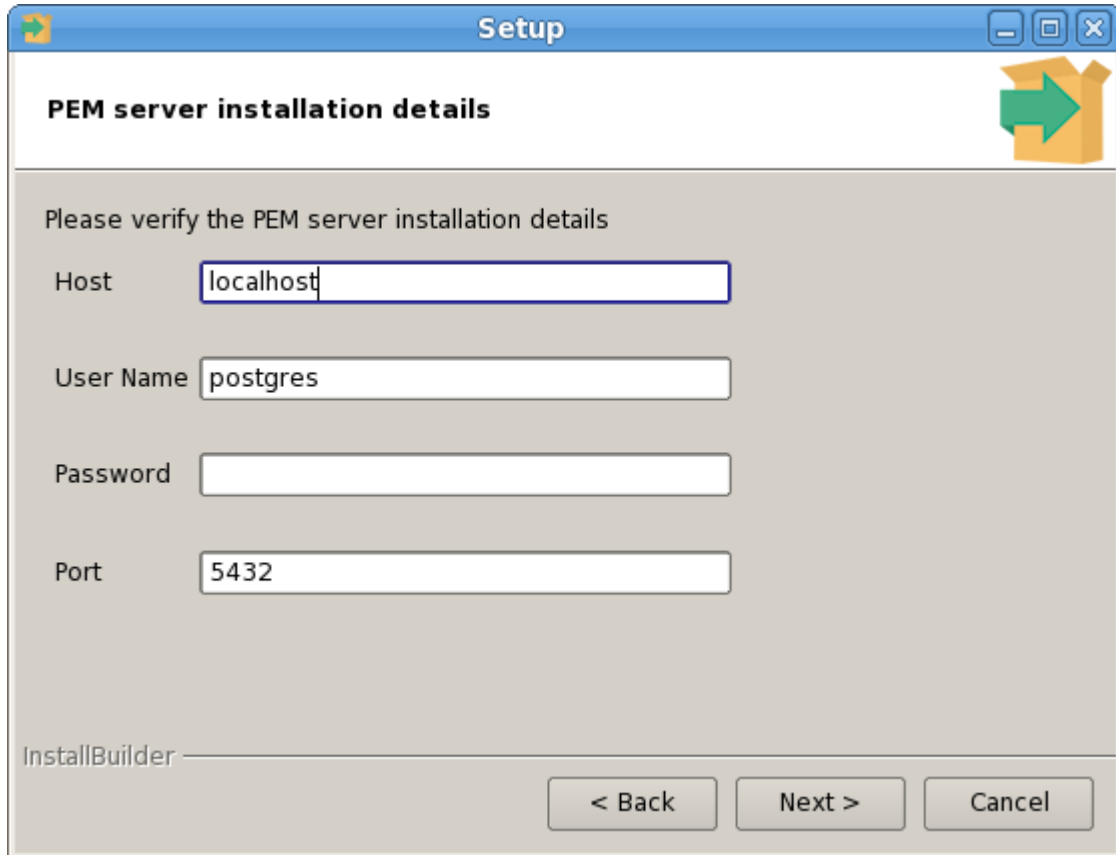


Fig. 3: *Specify an Installation Directory*

By default, the PEM agent is installed in the `/home/opt/PEM` directory. You can accept the default installation directory, or modify the contents of the Installation Directory field, 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. 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.



Setup

PEM server installation details

Please verify the PEM server installation details

Host

User Name

Password

Port

InstallBuilder

< Back Next > Cancel

Fig. 4: Provide PEM server installation details

Enter the connection details for the PEM server on the PEM server installation details dialog:

- 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.

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.

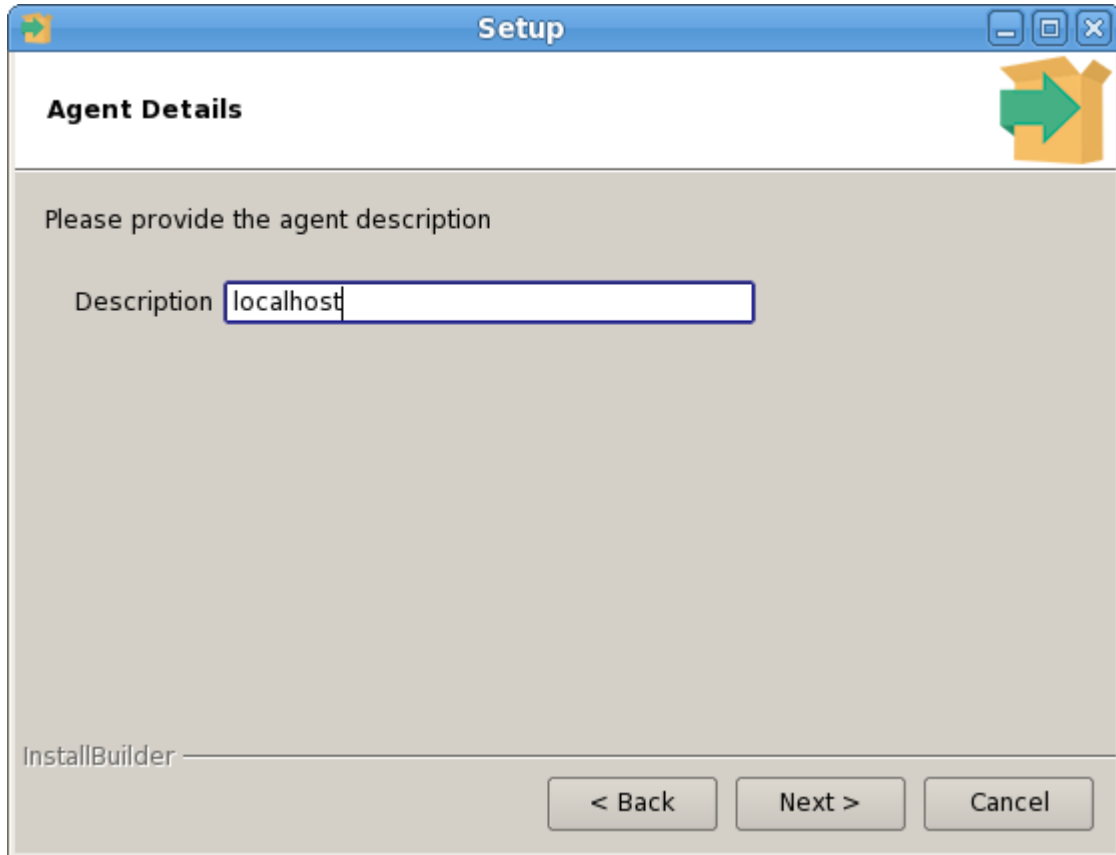


Fig. 5: *Specify a descriptive name for the PEM agent*

The tree control displayed in the Browser panel of the PEM web interface displays the value entered in the `Description` field 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, the `Advanced options` dialog opens:

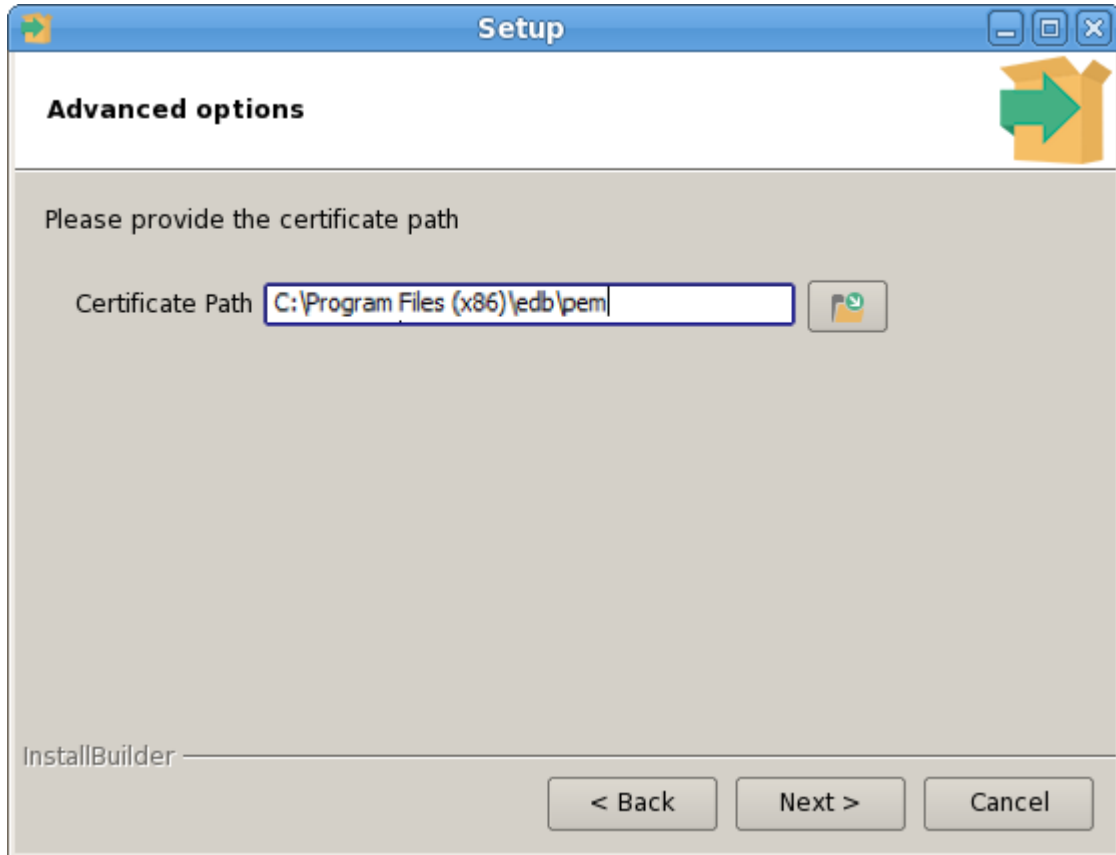


Fig. 6: *Provide the certificate path*

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.

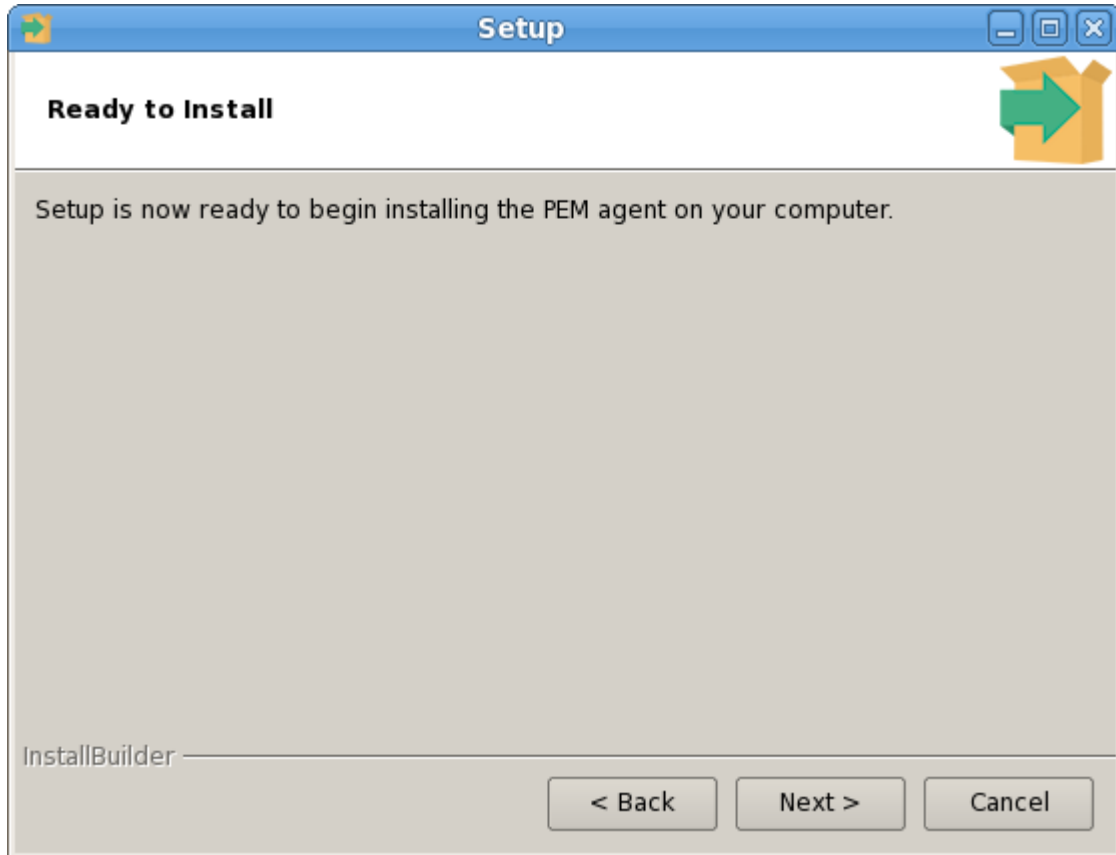


Fig. 7: The PEM Agent installation is ready to begin

Click `Next` on the `Ready to Install` dialog to instruct the installer to copy files to the system and register the agent on the PEM server.

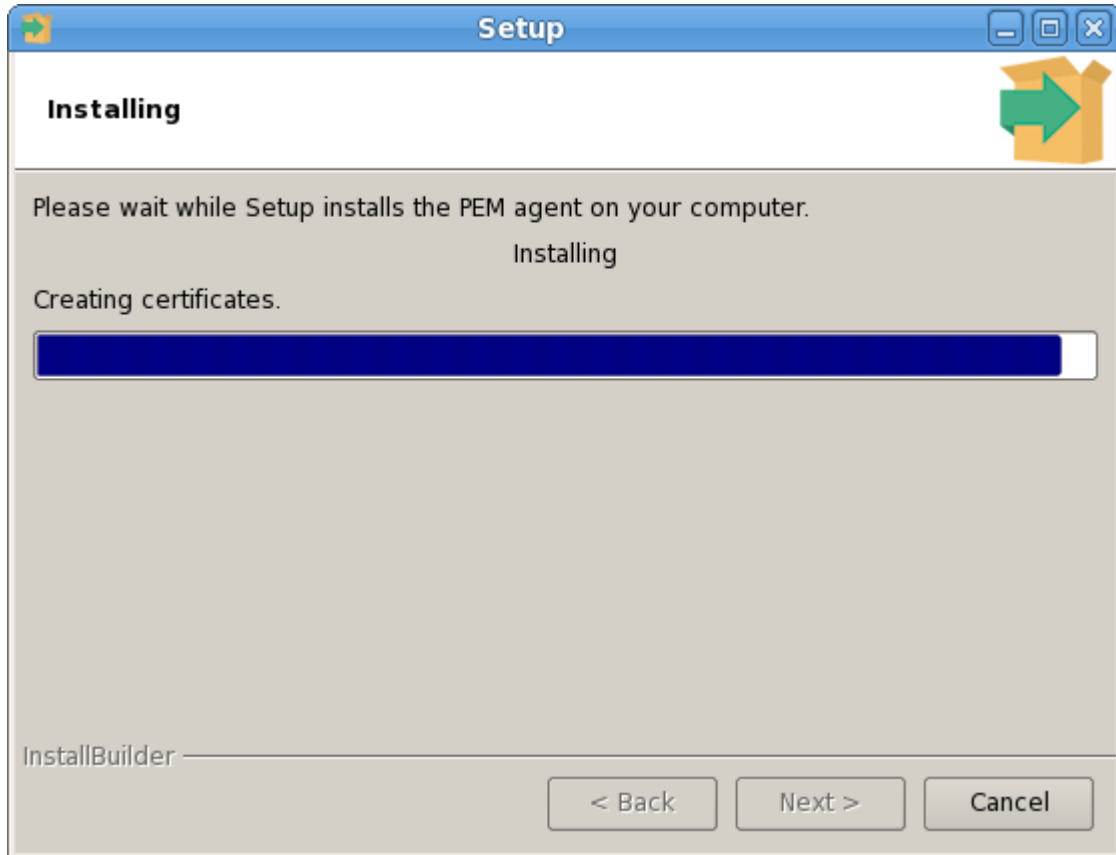


Fig. 8: *Progress bars mark the installation's progress*

The PEM agent installer displays progress bars to mark the PEM agent's installation progress.

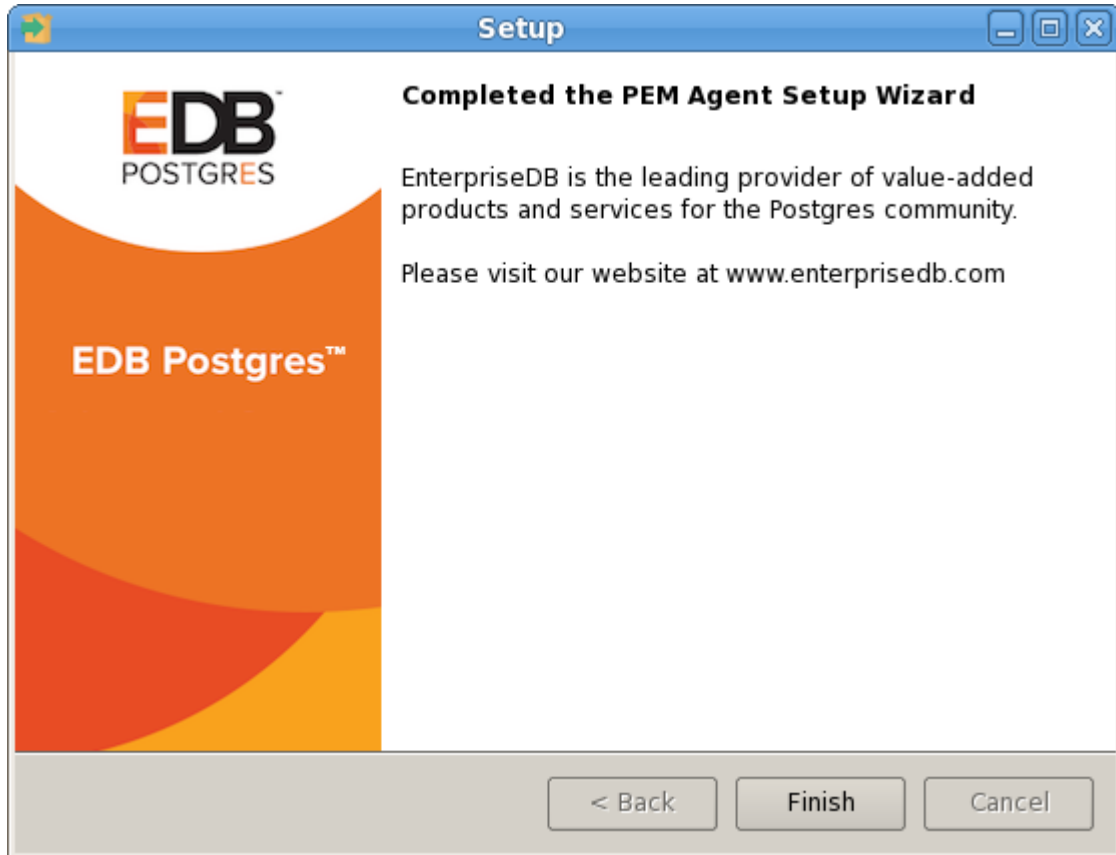


Fig. 9: *The PEM Agent installation is complete*

When the installation has completed, 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.

2.2 Invoking a Graphical Installer from the Command Line

The command line options of PEM agent graphical installer offers 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.

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]:
```

```
-----
```

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. 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]:
```

(continues on next page)

(continued from previous page)

```
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%
#####
```

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 agent 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: *xx* specifies the version of PEM agent. *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.

Note: When configuring a shell/batch script run by a Windows agent that has PEM 7.11 or later version installed, the `AllowBatchJobSteps` parameter must be set to `True` in the `agent.cfg` file. The pemagent will not execute any batch/shell script by default.

2.3 Installing an Agent on a RHEL or CentOS host

On a Linux 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 on a host, you must:

- Install the `epel-release` package on the host:

```
yum -y install https://dl.fedoraproject.org/pub/epel/epel-release-latest-7.noarch.rpm
```

Note: You may need to enable the `[extras]` repository definition in the `CentOS-Base.repo` file (located in `/etc/yum.repos.d`).

- You must also have credentials that allow access to the EnterpriseDB repository. For information about requesting credentials, visit:

<https://info.enterprisedb.com/rs/069-ALB-339/images/Repository%20Access%2004-09-2019.pdf>

After receiving your repository credentials you can:

1. Create the repository configuration file.
2. Modify the file, providing your user name and password.
3. Install `edb-pem-agent`.

Creating a Repository Configuration File

To create the repository configuration file, assume superuser privileges, and invoke the following command:

```
yum -y install https://yum.enterprisedb.com/edb-repo-rpms/edb-repo-latest.noarch.rpm
```

The repository configuration file is named `edb.repo`. The file resides in `/etc/yum.repos.d`.

Modifying the file, providing your user name and password

After creating the `edb.repo` file, use your choice of editor to ensure that the value of the `enabled` parameter is `1`, and replace the `username` and `password` placeholders in the `baseurl` specification with the name and password of a registered EnterpriseDB user.

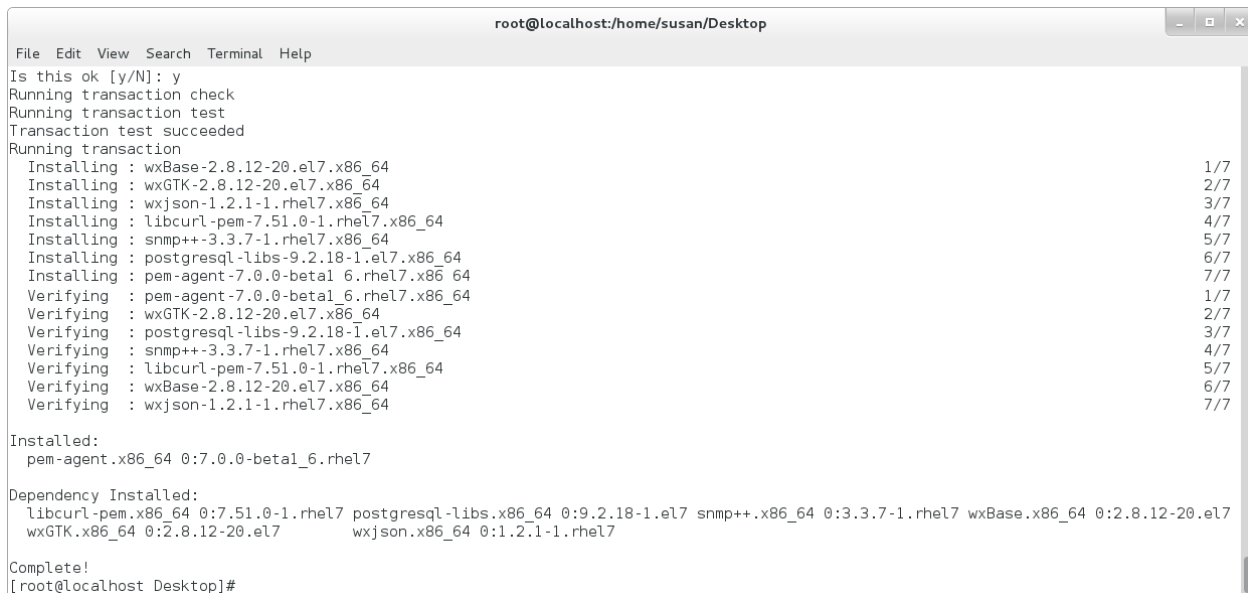
```
[edb]
name=EnterpriseDB RPMs $releasever - $basearch
baseurl=https://<username>:<password>@yum.enterprisedb.com/edb/redhat/rhel-
↪$releasever-$basearch
enabled=1
gpgcheck=1
gpgkey=file:///etc/pki/rpm-gpg/ENTERPRISEDB-GPG-KEY
```

Installing PEM Agent

After saving your changes to the configuration file, you can use the `yum install` command to install `edb-pem-agent`. For example, the following command installs `edb-pem-agent`:

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

When the installation is complete, yum will display a list of the installed packages and dependencies.



```

root@localhost:/home/susan/Desktop
File Edit View Search Terminal Help
Is this ok [y/N]: y
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : wxBase-2.8.12-20.el7.x86_64                1/7
  Installing : wxGTK-2.8.12-20.el7.x86_64                2/7
  Installing : wxjson-1.2.1-1.rhel7.x86_64               3/7
  Installing : libcurl-pem-7.51.0-1.rhel7.x86_64         4/7
  Installing : snmp++-3.3.7-1.rhel7.x86_64              5/7
  Installing : postgresql-libs-9.2.18-1.el7.x86_64       6/7
  Installing : pem-agent-7.0.0-beta1_6.rhel7.x86_64      7/7
  Verifying  : pem-agent-7.0.0-beta1_6.rhel7.x86_64     1/7
  Verifying  : wxGTK-2.8.12-20.el7.x86_64              2/7
  Verifying  : postgresql-libs-9.2.18-1.el7.x86_64     3/7
  Verifying  : snmp++-3.3.7-1.rhel7.x86_64            4/7
  Verifying  : libcurl-pem-7.51.0-1.rhel7.x86_64       5/7
  Verifying  : wxBase-2.8.12-20.el7.x86_64            6/7
  Verifying  : wxjson-1.2.1-1.rhel7.x86_64            7/7

Installed:
  pem-agent.x86_64 0:7.0.0-beta1_6.rhel7

Dependency Installed:
  libcurl-pem.x86_64 0:7.51.0-1.rhel7 postgresql-libs.x86_64 0:9.2.18-1.el7 snmp++.x86_64 0:3.3.7-1.rhel7 wxBase.x86_64 0:2.8.12-20.el7
  wxGTK.x86_64 0:2.8.12-20.el7 wxjson.x86_64 0:1.2.1-1.rhel7

Complete!
[root@localhost Desktop]#

```

Fig. 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 `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.

2.4 Installing an 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.

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_
↪version_service_pack>/Apache:Modules.repo

zypper addrepo http://download.opensuse.org/repositories/Cloud:/OpenStack:/
↪Newton:/cisco-apic:/2.3.1/<SLE_version_service_pack>/ pem_opensuse_boost

zypper refresh

zypper install edb-pem-agent
```

Where *SLE_version_service_pack* is the version and service pack of the SLES that you are using, such as SLE_12_SP2 or SLE_12_SP3.

2.5 Installing an Agent on a Debian or Ubuntu Host

To install 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, contact [EnterpriseDB](#) .

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 agent:

```
apt-get install edb-pem-agent
```

Registering an 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 for Windows supports self-registration for the agent. You must use the `pemworker` utility to register the agent if the agent is on a Linux host.

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 |
|---|---|
| <code>-pem-server</code> | Specifies the IP address of the PEM backend database server. This parameter is required. |
| <code>-pem-port</code> | Specifies the port of the PEM backend database server. The default value is 5432. |
| <code>-pem-user</code> | Specifies the name of the Database user (having superuser privileges) of the PEM backend database server. This parameter is required. |
| <code>-pem-agent-user</code> | Specifies the agent user to connect the PEM server backend database server. |
| <code>-cert-path</code> | 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, <code>~/.pem</code> On Windows, <code>%APPDATA%/pem</code> |
| <code>-config-dir</code> | Specifies the directory path where configuration file can be found. The default is the <code><pemworker path>/../etc</code> . |
| <code>-display-name</code> | Specifies a user-friendly name for the agent that will be displayed in the PEM Browser tree control. The default is the system hostname. |
| <code>-force-registration</code> | Include the <code>force_registration</code> clause to instruct the PEM server to register the agent with the arguments provided; this clause is useful if you are overriding an existing agent configuration. The default value is Yes. |
| <code>-group</code> | The name of the group in which the agent will be displayed. |
| <code>-team</code> | The name of the database role, on the PEM backend database server, that should have access to the monitored database server. |
| <code>-owner</code> | The name of the database user, on the PEM backend database server, who will own the agent. |
| <code>-allow_server_restart</code> | Enable the <code>allow-server_restart</code> parameter to allow PEM to restart the monitored server. The default value is True. |
| <code>-allow-batch-probes</code> | Enable the <code>allow-batch-probes</code> parameter to allow PEM to run batch probes on this agent. The default value is False. |
| <code>-batch-script-user</code> | Specifies the operating system user that should be used for executing the batch/shell scripts. The default value is none; the scripts will not be executed if you leave this parameter blank or the specified user does not exist. |
| <code>-enable-heartbeat-connection</code> | Enable the <code>enable-heartbeat-connection</code> parameter to create a dedicated heartbeat connection between PEM Agent and server to update the active status. The default value is False. |
| <code>-enable-smtp</code> | Enable the <code>enable-smtp</code> parameter to allow the PEM agent to send the email on behalf of the PEM server. The default value is False. |
| <code>-enable-snmp</code> | Enable the <code>enable-snmp</code> parameter to allow the PEM agent to send the SNMP traps on behalf of the PEM server. The default value is False. |
| <code>-o</code> | Specify if you want to override the configuration file options. |

If you want to use any PEM feature for which database server restart is required by the pemagent such as Audit Manager, Log Manager, or Tuning Wizard, then you must set the value for `allow_server_restart` as `true` in the `agent.cfg` file.

Note: When configuring a shell/batch script run by a PEM agent that has PEM 7.11 or later version

installed, the user for the `batch_script_user` parameter must be specified. It is strongly recommended that a non-root user is used to run the scripts. Using the root user may result in compromising the data security and operating system security. However, if you want to restore the pemagent to its original settings using root user to run the scripts, then the `batch_script_user` parameter value must be set to `root`.

You can use the `PEM_SERVER_PASSWORD` environment variable to set the password of the PEM Admin User. If the `PEM_SERVER_PASSWORD` is not set, the server will use the `PGPASSWORD` or `pgpass` file when connecting to the PEM Database Server.

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.

3.1 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, 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>

3.2 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, assume the identity of a non-root user (for example `edb`) and perform the following steps:

1. Create the `.pem` directory and `logs` directory as following and assign read, write, and execute permissions to the file:

```
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 the `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 and an agent configuration file (`agent.cfg`) in the `/home/edb/.pem` directory. Assign read and write permissions to these files using the command:

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

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

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

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

6. Check the agent status on PEM dashboard.

Managing a PEM Agent

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

4.1 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.

If you limit the operating system privileges of the PEM agent, some of the PEM probes will not return information, and the following functionality 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, Streaming Replication, Log Analysis Expert 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 (root access required) | Linux/ Windows | Columns such as swap usage, CPU usage, IO read, IO write will be displayed as 0 in the session activity dashboard. |

Note: The above-mentioned list is not comprehensive, but should provide an overview of the type of functionality that will be limited.

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.

4.2 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 Linux systems, PEM configuration options are stored in the `agent.cfg` file, located in `/opt/edb/pem/agent/etc`. The `agent.cfg` file contains the following entries:

| Parameter Name | Description | Default Value |
|---------------------------------|---|---|
| <code>pem_host</code> | The IP address or hostname of the PEM server. | 127.0.0.1. |
| <code>pem_port</code> | The database server port to which the agent connects to communicate with the PEM server. | Port 5432. |
| <code>pem_agent</code> | A unique identifier assigned to the PEM agent. | The first agent is '1', the second agent is '2', and so on. |
| <code>agent_ssl_key</code> | The complete path to the PEM agent's key file. | <code>/root/.pem/agent.key</code> |
| <code>agent_ssl_cert</code> | The complete path to the PEM agent's certificate file. | <code>/root/.pem/agent.crt</code> |
| <code>agent_flag_dir</code> | 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. |
| <code>log_level</code> | Log level specifies the type of event that will be written to the PEM log files. | warning |
| <code>log_location</code> | Specifies the location of the PEM worker log file. | 127.0.0.1. |
| <code>agent_log_location</code> | Specifies the location of the PEM agent log file. | <code>/var/log/pem/agent.log</code> |
| <code>long_wait</code> | 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. | 30 seconds |

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| Parameter Name | Description | Default Value |
|--------------------------|--|---|
| short_wait | 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). | 10 seconds |
| alert_threads | 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; 0 for all other agents. |
| enable_smtp | When set to true, the SMTP email feature is enabled. | true for PEM server host; false for all others. |
| enable_snmp | When set to true, the SNMP trap feature is enabled. | true for PEM server host; false for all others. |
| enable_nagios | When set to true, Nagios alerting is enabled. | true for PEM server host; false for all others. |
| connect_timeout | The max time in seconds (a decimal integer string) that the agent will wait for a connection. | Not set by default; set to 0 to indicate the agent should wait indefinitely. |
| allow_server_restart | 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. | False |
| allow_package_management | If set to TRUE, the Update Monitor and Package Management features are enabled. | false |
| max_connections | The maximum number of probe connections used by the connection throttler. | 0 (an unlimited number) |
| connection_lifetime | Use ConnectionLifetime (or connection_lifetime) to specify the minimum number of seconds an open 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. | By default, set to 0 (a connection is dropped when the connection is idle after the agent's processing loop). |
| allow_batch_probes | If set to TRUE, the user will be able to create batch probes using the custom probes feature. | false |

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| Parameter Name | Description | Default Value |
|-----------------------------|---|---|
| heartbeat_connection | When set to TRUE, a dedicated connection is used for sending the heartbeats. | false |
| allow_streaming_replication | If set to TRUE, the user will be able to configure and setup streaming replication. | false |
| batch_script_dir | Provide the path where script file (for alerting) will be stored. | /tmp |
| connection_custom_setup | Use to provide SQL code that will be invoked when a new connection with a monitored server is made. | Not set by default. |
| ca_file | Provide the path where the CA certificate resides. | /opt/PEM/agent/share/certs/ca-bundle.crt. |
| batch_script_user | Provide the name of the user that should be used for executing the batch/shell scripts. | None |

On 64 bit Windows systems, PEM registry entries are located in:

HKEY_LOCAL_MACHINE\Software\Wow6432Node\EnterpriseDB\PEM\agent

The registry contains the following entries:

| Parameter Name | Description | Default Value |
|----------------|---|---|
| PEM_HOST | The IP address or hostname of the PEM server. | 127.0.0.1. |
| PEM_PORT | The database server port to which the agent connects to communicate with the PEM server. | Port 5432. |
| AgentID | A unique identifier assigned to the PEM agent. | The first agent is '1', the second agent is '2', and so on. |
| AgentKeyPath | The complete path to the PEM agent's key file. | %APPDATA%\Roaming\pem\agent.key. |
| AgentCrtPath | The complete path to the PEM agent's certificate file. | %APPDATA%\Roaming\pem\agent.crt |
| AgentFlagDir | 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. |
| LogLevel | Log level specifies the type of event that will be written to the PEM log files. | warning |

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| | | |
|------------------------|--|---|
| LongWait | 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. | 30 seconds |
| shortWait | 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). | 10 seconds |
| AlertThreads | 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; 0 for all other agents. |
| EnableSMTP | When set to true, the SMTP email feature is enabled. | true for PEM server host; false for all others. |
| EnableSNMP | When set to true, the SNMP trap feature is enabled. | true for PEM server host; false for all others. |
| ConnectTimeout | The max time in seconds (a decimal integer string) that the agent will wait for a connection. | Not set by default; if set to 0, the agent will wait indefinitely. |
| AllowServerRestart | 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. | true |
| AllowPackageManagement | If set to TRUE, the Update Monitor and Package Management features are enabled. | false |
| MaxConnections | The maximum number of probe connections used by the connection throttler. | 0 (an unlimited number) |
| ConnectionLifetime | Use ConnectionLifetime (or connection_lifetime) to specify the minimum number of seconds an open 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. | By default, set to 0 (a connection is dropped when the connection is idle after the agent's processing loop). |
| AllowBatchProbes | If set to TRUE, the user will be able to create batch probes using the custom probes feature. | false |

Continued on next page

Table 2 – continued from previous page

| | | |
|---------------------------|---|---|
| HeartbeatConnection | When set to TRUE, a dedicated connection is used for sending the heartbeats. | false |
| AllowStreamingReplication | If set to TRUE, the user will be able to configure and setup streaming replication. | false |
| BatchScriptDir | Provide the path where script file (for alerting) will be stored. | /tmp |
| ConnectionCustomSetup | Use to provide SQL code that will be invoked when a new connection with a monitored server is made. | Not set by default. |
| ca_file | Provide the path where the CA certificate resides. | /opt/PEM/agent/share/certs/ca-bundle.crt. |
| AllowBatchJobSteps | If set to true, the batch/shell scripts will be executed using Administrator user account. | None |

4.3 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.

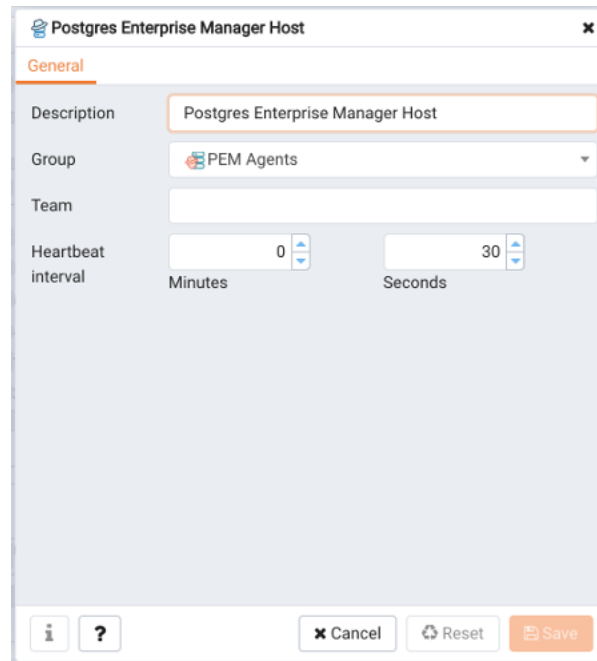


Fig. 1: *The PEM Agent Properties dialog*

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.
- 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.

5.1 Restoring a Deleted PEM Agent

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

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 of the `id` and `active` fields:

```
pem=# SELECT * FROM pem.agent;
```

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

```
pem=# UPDATE pem.agent SET active=true WHERE id=<x>;
```

Where, `x` is the identifier that was displayed in the 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; after the successful modification, the servers will be displayed as running properly.

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 '
```


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

Using the PEM web interface to delete PEM agents with `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.

1. Use the following query to delete the agents that are `Down` for more than *N* number of hours:

```
UPDATE pem.agent SET active=false 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> ));
```

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

```
UPDATE pem.agent SET active=false WHERE id IN
(SELECT id FROM pem.agent WHERE id NOT IN
(SELECT agent_id FROM pem.agent_heartbeat));
```

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 | PEM agent | Uninstaller name |
|--------------------|------------------|--------------------|
| uninstall-pemagent | Default location | /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.

EDB Postgres Enterprise Manager Agent User Guide

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- EDB designs, establishes coding best practices, reviews, and verifies input validation for the logon UI for EDB Postgres Enterprise Manager where present. EDB follows the same approach for additional input components, however the nature of the product may require that it accepts freeform SQL, WMI or other strings to be entered and submitted by trusted users for which limited validation is possible. In such cases it is not possible to prevent users from entering incorrect or otherwise dangerous inputs.
- EDB reserves the right to add features to products that accept freeform SQL, WMI or other potentially dangerous inputs from authenticated, trusted users in the future, but will ensure all such features are designed and tested to ensure they provide the minimum possible risk, and where possible, require superuser or equivalent privileges.
- EDB does not warrant that we can or will anticipate all potential threats and therefore our process cannot fully guarantee that all potential vulnerabilities have been addressed or considered.

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