# EDB Postgres Advanced Server

## Version 9.5



Built at 2021-01-28T13:51:15

# 1 Requirements Overview

The following sections detail the supported platforms and installation requirements for EDB Postgres Advanced Server 9.5.

## Supported Platforms

The Advanced Server 9.5 RPM packages are supported on the following platforms:

64 bit Linux:

- CentOS (x86_64) 6.x and 7.x
- Red Hat Enterprise Linux (x86_64) 6.x and 7.x
- Red Hat Enterprise Linux (IBM Power8 Little Endian or ppc64le) 7.x

The Advanced Server 9.5 interactive installer is supported on the following platforms:

64 bit Windows:

- Windows 2012 R2
- Windows Server 2008 R2 Server

64 bit Linux:

- CentOS 6.x and 7.x
- Debian 7.6
- OEL 6.x and 7.x
- Red Hat Enterprise Linux 6.x and 7.x
- SLES 11.x and 12.x
- Ubuntu 14.04

The Connectors (JDBC/.NET/ODBC/OCL) are supported on 32 bit and 64 bit Windows 7, Windows 8 and Windows 10 clients.

**Note**: The data directory of a production database should not be stored on an

NFS file system.

## Supported Locales

Advanced Server inherits support for many locales from PostgreSQL. While the installers have been used successfully in various locales, EnterpriseDB has explicitly tested and certified for the following locales:

en_US United States English

zh_HK Traditional Chinese with Hong Kong SCS

zh_TW Traditional Chinese for Taiwan

zh_CN Simplified Chinese

ja_JP Japanese

ko_KR Korean

For more information about the locales supported by PostgreSQL, please see:

https://www.postgresql.org/docs/9.5/static/locale.html

## RPM Installation Pre-Requisites

You can use an RPM package to install Advanced Server and its supporting components on a Linux host. Before installing the Advanced Server, you must:

### Install the EPEL Release Package

You can use yum to install the epel-release package:

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

Please note that you may need to enable the [extras] repository definition in the CentOS-Base.repo file (located in /etc/yum.repos.d).

If yum cannot access a repository that contains epel-release, you will get an error message:

No package epel available.

Error: Nothing to do

If you receive this error, you can download the EPEL rpm package, and install it manually. To manually install EPEL, download the rpm package, assume superuser privileges, navigate into the directory that contains the package, and install EPEL with the command:

yum install epel-release

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

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# 1.1 Using a Package Manager to Install Advanced Server

You can use the Yum (Yellowdog Updater, Modified) package manager to install Advanced Server or Advanced Server supporting components. Yum will attempt to satisfy package dependencies as it installs a package, but requires access to the Advanced Server repositories. If your system does not have access to a repository via the Internet, you can use RPM to install a package or create a local repository, but you may be required to manually satisfy package dependencies.

The ppas95 meta RPM installs Advanced Server, and its core supporting components. You can use the Advanced Server meta RPM for installation convenience, or pick and choose any sub-component that you need on a particular machine. Note that some sub-components require the installation of other Advanced Server component packages, while other packages may be

installed individually. For a complete list of the RPM installers available for Advanced Server and its supporting components, see Section 3.3.

The installation of the server package creates a database superuser named enterprisedb. The user is assigned a UID and a GID of 26. The user has no default password; use the passwd command to assign a password for the user. The default shell for the user is bash, and the user's home directory is /var/lib/ppas.

By default, Advanced Server logging is configured to write files to the pg_log subdirectory of the data directory, rotating the files each day and retaining one week of log entries. You can customize the logging behavior of the server by modifying the postgresql.conf file, located in /var/lib/ppas/9.5/data.

The RPM installers place Advanced Server components in the directories listed in the table below:

| PPAS Component | Path to Installation Directory |
|---|---|
| Executables | /usr/ppas-9.5/bin |
| Libraries | /usr/ppas-9.5/lib |
| Documentation | /usr/ppas-9.5/share/doc |
| Contrib | /usr/ppas-9.5/share/contrib |
| Data | /var/lib/ppas/9.5/data |
| Backup area | /var/lib/ppas/9.5/backups |
| Templates | /usr/ppas-9.5/share |
| Procedural Languages | /usr/ppas-9.5/lib |
| Development Headers | /usr/ppas-9.5/include |
| Shared data | /usr/ppas-9.5/share |
| Regression tests | /usr/ppas-9.5/lib/pgxs/src/test/regress |
| SGML Documentation | /usr/ppas-9.5/share/doc |

The file locations are Linux Standard Base (LSB) compliant.

## Installing an RPM Package

Before installing the Advanced Server or a supporting component via an RPM

package, you must request 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 Advanced Server and its supporting components.

**Creating a Repository Configuration File and Installing Advanced Server**

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.

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
```

After saving your changes to the configuration file, you can use yum install command to install Advanced Server. For example, to install the server and its core components, use the command:

```
yum install ppas95-server
```

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.

After installing Advanced Server, you must configure the installation; see Section 3.2, *Configuring an Advanced Server Installation*, for details.

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.

## Updating an RPM Installation

If you have an existing Advanced Server RPM installation, you can use yum to upgrade your repository configuration file and update to a more recent product version. To update the edb.repo file, assume superuser privileges and enter:

```
yum upgrade edb-repo
```

yum will update the edb.repo file to enable access to the current EDB repository, configured to connect with the credentials specified in your edb.repo file. Then, you can use yum to upgrade all packages whose names include the expression ppas:

```
yum upgrade ppas*
```

Please note that the yum upgrade command will only perform an update between minor releases; to update between major releases, you must use pg_upgrade. For more information about using pg_upgrade, see Section 8.

For more information about using yum commands and options, enter yum --help on your command line, or visit:

https://access.redhat.com/documentation/en-

US/Red_Hat_Enterprise_Linux/6/html/Deployment_Guide/ch-yum.html

## Installing Advanced Server on an Isolated Network

You can create a local yum repository to act as a host for the Advanced Server RPM packages if the server on which you wish to install Advanced Server (or supporting components) cannot directly access the EnterpriseDB repository. Please note that this is a high-level listing of the steps required; you will need to modify the process for your individual network.

To create and use a local repository, you must:

1. Use yum to install the yum-utils and createrepo packages:

```
yum install yum-utils yum install createrepo
```

2. Create a directory in which to store the repository:

```
mkdir /srv/repos
```

3. Copy the RPM installation packages to your local network repository. You can download the individual RPM files from:

   repos.enterprisedb.com

4. Sync the RPM packages and create the repository.

```
reposync -r ppas95 -p /srv/repos createrepo /srv/repos
```

5. Install your preferred webserver on the host that will act as your local repository, and ensure that the repository directory is accessible to the other servers on your network. For example, you might install lighttpd:

```
yum install lighttpd
```

6. If you are using lighttpd, you must provide a configuration file that identifies the location of the repository on your local network. For example, the configuration file might contain:

```
$HTTP["host"] == "yum.domain.com"{ server.document-root =
"/srv/repos" server.errorlog="/var/log/lighttpd/yum_error.log"
```

> accesslog.filename = "/var/log/lighttpd/yum_access.log"}
>
> For detailed information about installing, configuring and using lighttpd, visit the official project site at:

http://redmine.lighttpd.net/projects/1/wiki/Docs

7. On each isolated database server, configure yum to pull updates from the mirrored repository on your local network. For example, you might create a file called /etc/yum.repos.d/edb-repo with connection information that specifies:

> [ppas95] name=EnterpriseDB Advanced Server 9.5 baseurl=http://yum.domain.com/ppas95 enabled=1 gpgcheck=0

After specifying the location and connection information for your local repository, you can use yum commands to install Advanced Server and its supporting components on the isolated servers. For example:

> yum install ppas95

For more information about creating a local repository, visit:

http://yum.baseurl.org/

## Configuring a Package Installation

The packages that install the database server component also create a service configuration file and service startup scripts. The service configuration file is named ppas-9.5 and resides in /etc/sysconfig/ppas.

The file contains environment variables that specify default values that are used by the service startup script when initializing a database and configuring the service for use.

![image](./images/image3.png)

*Figure 3.5 — The Advanced Server service configuration file.*

The file contains the following environment variables:

- PGENGINE specifies the location of the engine and utility executable files.
- PGPORT specifies the listener port for the database server.
- PGDATA specifies the path to the data directory.
- PGLOG specifies the location of the log file to which the server writes startup information.
- Use the INITDBOPTS variable to specify any initdb option or options that you wish to apply to the new cluster.

You can modify the ppas-9.5 file before invoking the startup script to change the listener port, data directory location, startup log location or installation mode. Note that if you plan to create more than one instance on the same system, you may wish to copy the ppas-9.5 file (and the associated startup script that resides in /etc/init.d), and modify the file contents for each additional instance that resides on the same host.

Please note that the options specified in the service configuration file are only enforced if initdb is invoked via the service command; if you manually invoke initdb (at the command line), you must specify the other options (such as the data directory and installation mode) on the command line.

## Specifying initdb Options in the Service Configuration File

By default, the INITDBOPTS variable is commented out in the service configuration file; unless modified, when you run the service startup script, the new cluster will be created in a mode compatible with Oracle databases. Clusters created in this mode will contain a database named edb, and have a database superuser named enterprisedb.

To create a new cluster in PostgreSQL mode, remove the pound sign (#) in front of the INITDBOPTS variable, enabling the "--no-redwood-compat" option. Clusters created in PostgreSQL mode will contain a database named postgres, and have a database superuser named enterprisedb.

You may also specify multiple initdb options. For example, the following statement:

```
INITDBOPTS="--no-redwood-compat -U alice --locale=en_US.UTF-8"
```

Creates a database cluster (without compatibility features for Oracle) that contains a database named postgres that is owned by a user named alice; the cluster uses UTF-8 encoding.

For more information about creating a custom cluster with initdb, see Section 5.4.

## Creating a Database Cluster and Starting the Service

After specifying any options in the service configuration file, you must create the database cluster and start the service; these steps are platform specific.

### *On RHEL or CentOS 6.x*

To create a database cluster in the PGDATA directory that listens on the port specified by the PGPORT specified in the service configuration file described in Section 3.2, assume root privileges, navigate into the /usr/ppas-9.5/bin directory, and invoke the service script:

```
service ppas-9.5 initdb
```

You can also assign a locale to the cluster when invoking initdb. By default, initdb will use the value specified by the $LANG operating system variable, but if you append a preferred locale when invoking the script, the cluster will use the alternate value. For example, to create a database cluster that uses simplified Chinese, invoke the command:

```
service ppas-9.5 initdb zh_CH.UTF-8
```

After creating a database cluster, start the database server with the command:

```
service ppas-9.5 start
```

The command starts a postmaster listening on the port specified in the service configuration file; by default, an Advanced Server postmaster listens on port 5444.

For more information about using the service command, please see Section 5.2.

### *On RHEL or CentOS 7.x*

To invoke initdb on a RHEL or CentOS 7.x system, with the options specified in the service configuration file, assume the identity of the operating system

superuser:

```
su - root
```

Then, invoke initdb:

```
/usr/lib/systemd/system/ppas-9.5.sh initdb
```

After creating the cluster, use systemctl to start the service:

For more information about using initdb, see Section 5.4.

## Advanced Server RPM Installers

The tables that follow list the packages that are available from EnterpriseDB. Please note that you can also use the yum search command to access a list of the packages that are currently available from your configured repository. To use the yum search command, open a command line, assume root privileges, and enter:

```
yum search package
```

Where *package* is the search term that specifies the name (or partial name) of a package. The repository search will return a list of available packages that include the specified search term.

The following table lists the packages that are stored in the ppas95 repository:

| Package Name | Package Installs |
| --- | --- |
| | The ppas95 meta RPM installs Advanced Server, and its core supporting components. This package installs:<br><br>Database server<br><br>Client programs (edb-psql, pg_dump, pg_restore, and other client utilities)<br><br>Community contributed modules |

| Package Name | Community documentation<br>Package Installs |
| --- | --- |
| | ecpg/ecpgPlus |
| | EDB Plus |
| | Index Advisor |
| | Infinite Cache |
| | pgAgent |
| | pgsnmpd |
| ppas95 | PL Debugger |
| | PL/Java |
| | PL/Perl |
| | PL/Python |
| | PL/Tcl |
| | pgpool-extensions |
| | Slony Replication |
| | SQL Profiler |
| | SQL Protect |
| | sslutils |
| | Supporting library files |
| | Before installing this package, you must install EPEL; for detailed information about installing EPEL, see Section 2.3. |
| ppas95-server | This package contains an Advanced Server meta installer that installs the database server. |

| Package Name | Package Installs |
|---|---|
| ppas95-server-client | The ppas95-server-client package contains client programs and utilities that you can use to access and manage Advanced Server. |
| ppas95-server-contrib | The ppas95-contrib package installs contributed tools and utilities that are distributed with Advanced Server. Files for these modules are installed in:<br>Documentation: /usr/ppas-9.5/share/doc<br>Loadable modules: /usr/ppas-9.5/lib<br>Binaries: /usr/ppas-9.5/bin |
| ppas95-server-core | The ppas95-server-core package includes the programs needed to create the core functionality behind the Advanced Server database. |
| ppas95-server-devel | The ppas95-server-devel package contains the header files and libraries needed to compile C or C++ applications that directly interact with an Advanced Server server and the ecpg or ecpgPlus C preprocessor. |
| ppas95-server-docs | The ppas95-server-docs package installs the SGML source for the PostgreSQL documentation, as well as the documentation in HTML and PDF format. |
| ppas95-server-indexadvisor | This package installs Advanced Server's Index Advisor feature. The Index Advisor utility helps determine which columns you should index to improve performance in a given workload. |
| ppas95-server-libs | The ppas95-server-libs package provides the essential shared libraries for any ppas client program or interface. |
| ppas95-server-pldebugger | This package implements an API for debugging PL/pgSQL functions on Advanced Server. |
| ppas95-server-plperl | The ppas95-server-plperl package installs the PL/Perl procedural language for Advanced Server. Please note that the ppas95-server-plperl package is dependent on the platform-supplied version of Perl. |
| ppas95-server-plpython | The ppas95-server-plpython package installs the PL/Python procedural language for Advanced Server. Please note that the ppas95-server-plpython package is dependent on the platform-supplied version of Python. |

| Package Name | Package Installs |
|---|---|
| ppas95-server-pltcl | The ppas95-pltcl package installs the PL/Tcl procedural language for Advanced Server. Please note that the ppas95-server-pltcl package is dependent on the platform-supplied version of TCL. |
| ppas95-server-sqlprofiler | This package installs Advanced Server's SQL Profiler feature. SQL Profiler helps identify and optimize SQL code. |
| ppas95-server-sqlprotect | This package installs Advanced Server's SQL Protect feature. SQL Protect provides protection against SQL injection attacks. |
| ppas95-server-sslutils | This package installs functionality that provides SSL support for the PEM Client. |
| ppas95-edbplus | The ppas95-edbplus package contains the files required to install the EDB Plus command line client. EDB Plus commands are compatible with Oracle's SQL*Plus. |
| ppas95-icache | This package contains the files required to install the Infinite Cache service on a cache server node. Infinite Cache is a high-performance, distributed memory object caching system that distributes database load across multiple cache servers. |
| ppas95-pgagent | This package installs pgAgent; pgAgent is a job scheduler for Advanced Server. Before installing this package, you must install EPEL; for detailed information about installing EPEL, see Section 2.3. |
| ppas95-pgsnmpd | SNMP (Simple Network Management Protocol) is a protocol that allows you to supervise an apparatus connected to the network. |
| ppas95-pljava | This package installs PL/Java, providing access to Java stored procedures, triggers and functions via the JDBC interface. |
| ppas95-pgpool34-extensions | This package creates server extensions required by the server. |
| ppas95-postgis | This package installs PostGIS (geographic information systems) extensions for Advanced Server. Before installing this package, you must install EPEL; for detailed information about installing EPEL, see Section 2.3. |

| Package Name | Package Installs |
|---|---|
| ppas95-postgis-core | This package installs packages that support PostGIS functionality. Before installing this package, you must install EPEL; for detailed information about installing EPEL, see Section 2.3. |
| ppas95-postgis-docs | This package installs PostGIS community documentation. Before installing this package, you must install EPEL; for detailed information about installing EPEL, see Section 2.3. |
| ppas-postgis-jdbc | This package installs the JDBC driver for PostGIS and EDB Plus. |
| ppas95-postgis-utils | This package installs PostGIS utilities. Before installing this package, you must install EPEL; for detailed information about installing EPEL, see Section 2.3. |
| ppas95-replication | This package contains the meta installer for Slony-I replication and documentation. Slony-I facilitates master-standby replication, and is suited for large databases with a limited number of standbys. |
| ppas95-replication-core | This package contains the files required to install Slony-I replication. Slony-I facilitates master-standby replication, and is suited for large databases with a limited number of standby systems. |
| ppas95-replication-docs | This package contains the Slony-I project documentation (in pdf form). |
| ppas95-replication-tools | This package contains the Slony altperl tools and utilities that are useful when deploying Slony-I replication environments. Before installing this package, you must install EPEL; for detailed information about installing EPEL, see Section 2.3. |

The following table lists the packages for Advanced Server supporting components:

| Package Name | Package Installs |
|---|---|
| edb-bart | The edb-bart package installs the EnterpriseDB Backup and Recovery Tool. For more information, visit http://www.enterprisedb.com/edb-backup-and-recovery-tool. |

| Package Name | Package Installs |
|---|---|
| efm20 | The efm20 package installs EnterpriseDB Failover Manager. Failover Manager is a high-availability module that enables automatic failover. For more information, visit http://www.enterprisedb.com/products/edb-failover-manager. |
| pem-agent | The pem-agent package installs the Postgres Enterprise Manager (PEM) agent. PEM allows you to manage, monitor and tune single or multiple servers from a single console. For more information about PEM, visit http://www.enterprisedb.com/products/postgres-enterprise-manager. |
| ppas-jdbc | The ppas-jdbc package includes the .jar files needed for Java programs to access an Advanced Server database. |
| ppas-migrationtoolkit | The ppas-migrationtoolkit package installs Migration Toolkit; the Migration Toolkit utility facilitates migration to an Advanced Server database from Oracle, PostgreSQL, MySQL, Sybase and SQL Server. |
| ppas-oci | The ppas-oci package installs the EnterpriseDB Open Client library, allowing applications that use the Oracle Call Interface API to connect to an Advanced Server database. |
| ppas-oci-devel | This package installs the OCI include files; install this package if you are developing C/C++ applications that require these files. |
| ppas-odbc | This package installs the driver needed for applications to access an Advanced Server system via ODBC (Open Database Connectivity). |
| ppas-odbc-devel | This package installs the ODBC include files; install this package if you are developing C/C++ applications that require these files. |
| ppas-pgbouncer16 | This package contains pgBouncer (a lightweight connection pooler). This package requires the libevent package. |
| ppas-pgpool34 | This package contains the PgPool meta installer. PgPool provides connection pooling and load balancing for Advanced Server installations. |

| Package Name | Package Installs |
| --- | --- |
| ppas-xdb | This package contains the xDB meta installer; xDB provides asynchronous cross-database replication. For more information, visit http://www.enterprisedb.com/download-xdb-replication-server-mmr. |

Please Note: The available packages are subject to change.

## 1.2 Installing Advanced Server with the Interactive Installer

The Advanced Server installer is available from the EnterpriseDB website at:

http://www.enterprisedb.com/downloads/postgres-postgresql-downloads

After navigating to the Software Downloads page, choose the Advanced Server installation that corresponds to your platform. After selecting a download, you will be invited to register as an Advanced Server user. Enter your current EnterpriseDB login information, or complete an online registration form to start the download.

When the download completes, extract the files using your system-specific file extractor.

You can use the extracted installer in different installation modes to perform an Advanced Server installation:

- For information about using the extracted files to perform a graphical installation on Windows, See Section 4.3.1.
- For information about performing a graphical installation on Linux, see Section 4.3.2.
- For information about using the installer to perform a command line installation, see Section 4.4.1.
- For information about performing an unattended installation, see Section

4.4.2.
- For information about performing an installation with limited privileges, see Section 4.4.3.
- For information about the command line options you can use when invoking the installer, see Section 4.4.4.

During the installation process, the Advanced Server installer program copies a number of temporary files to the location specified by the TEMP or TMP environment variable (on Windows), or to the /tmp directory (on Linux). You can optionally specify an alternate location for the installer to place the temporary files by modifying or creating the TEMP environment variable.

If invoking the installer from the command line, you can set the value of the variable on the command line:

> On Windows, use the command:
>
> SET TEMP=*temp_file_location*
>
> On Linux, use the command:
>
> export TEMP=*temp_file_location*

Where *temp_file_location* specifies the alternate location for the temporary files.

Please Note: If you are invoking the installer to perform a system upgrade, the installer will preserve the configuration options specified during the previous installation.

## Graphical Installation Prerequisites

### *User Privileges*

Before invoking the installer on a Linux system, you must have superuser privileges to perform an Advanced Server installation. To perform an Advanced Server installation on a Windows system, you must have administrator privileges. If you are installing Advanced Server into a Windows system that is configured with User Account Control (UAC) enabled, you can assume sufficient privileges to invoke the graphical installer by right clicking on the name of the installer and selecting Run as administrator from the

context menu. When prompted, enter an administrator password to continue.

### *SELinux Permissions*

Before invoking the installer on a system that is running SELinux, you must set SELinux to permissive mode.

The following example works on Redhat Enterprise Linux, Fedora Core or CentOS distributions. Use comparable commands that are compatible with your Linux distribution to set SELinux to permissive mode during installation and return it to enforcing mode when installation is complete.

Before installing Advanced Server, set SELinux to permissive mode with the command:

```
# setenforce Permissive
```

When the installation is complete, return SELinux to enforcing mode with the command:

```
# setenforce Enforcing
```

### *Linux-specific Software Requirements*

You must install xterm, konsole, or gnome-terminal before executing any console-based program installed by the Advanced Server installer. Without a console program, you will not be able to access Advanced Server configuration files through menu selections.

Before invoking StackBuilder Plus on a Linux system, you must install the redhat-lsb package. To install the package, open a terminal window, assume superuser privileges, and enter:

```
# yum install redhat-lsb
```

For more information about using StackBuilder Plus, see Using Stackbuilder Plus.

### *Windows-specific Software Requirements*

Be sure to apply Windows operating system updates before invoking the Advanced Server installer. If (during the installation process) the installer encounters errors, exit the installation, and ensure that your version of

Windows is up-to-date before restarting the installer.

### *Migration Toolkit or EDB*Plus Installation Pre-requisites*

Before using the Advanced Server installer to install Migration Toolkit or EDB*Plus, you must first install Java (version 1.7 or later). On a Linux system, you can use the yum package manager to install Java. Open a terminal window, assume superuser privileges, and enter:

```
# yum install java-1.7.0
```

Follow the onscreen instructions to complete the installation.

If you are using Windows, Java installers and instructions are available online at:

http://www.java.com/en/download/manual.jsp

## Locales Requiring Product Keys

The Advanced Server 9.5 installer will request a product key before completing an installation into a host system using one of the locales listed in the table below. Product keys are available from your local Advanced Server distributor.

Note: The product key applies only to the Advanced Server installation program. The Advanced Server database program has no built-in limitations or expiration features that require a product key or any other activation technique.

| Locale | Locale Identifier |
|---|---|
| Traditional Chinese with Hong Kong SCS | zh_HK |
| Traditional Chinese for Taiwan | zh_TW |
| Simplified Chinese | zh_CN |
| Japanese | ja_JP |
| Korean | ko_KR |
| Argentina - Spanish | es_ar |
| Beliz - English | en_bz |

| Locale | Locale Identifier |
|---|---|
| Brazil - Portuguese | pt_br |
| Bolivia - Spanish | es_bo |
| Chile - Spanish | es_cl |
| Colombia - Spanish | es_co |
| Costa Rica - Spanish | es_cr |
| Dominican Republic - Spanish | es_do |
| Ecuador - Spanish | es_ec |
| Guatemala - Spanish | es_gt |
| Guyana - English | en_gy |
| Honduras - Spanish | es_hn |
| Mexico - Spanish | es_mx |
| Nicaragua - Spanish | es_ni |
| Panama - Spanish | es_pa |
| Peru - Spanish | es_pe |
| Puerto Rico - Spanish | es_pr |
| Paraguay - Spanish | es_py |
| El Salvador - Spanish | es_sv |
| Uruguay - Spanish | es_uy |
| Venezuela - Spanish | es_ve |

During an installation in one of the listed locales, the Product Key window (shown in Figure 4.1) will open, prompting you to provide a valid product key. Enter a product key, and press Next to continue with the installation.

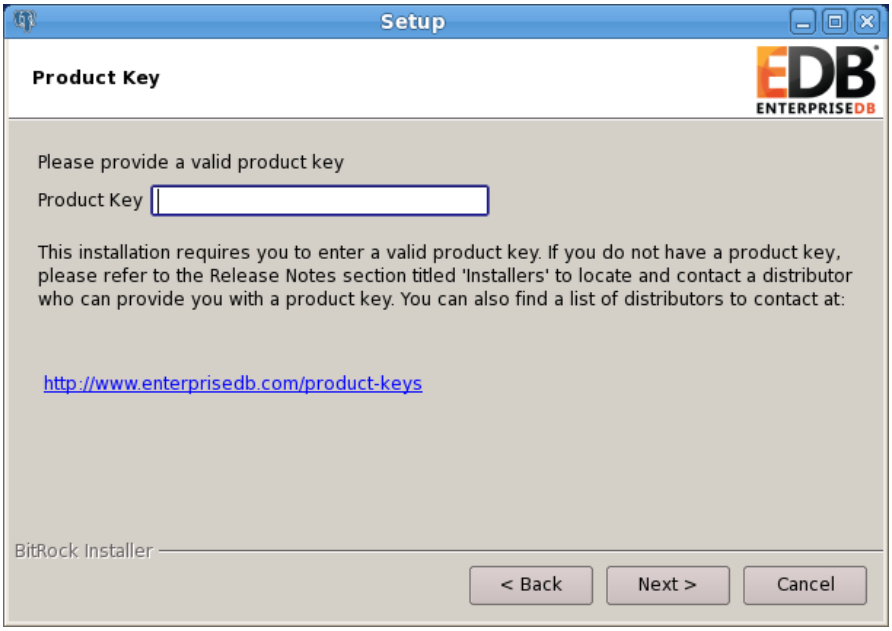



*Figure 4.1 — The Advanced Server Product Key Window*

## Performing a Graphical Installation

The graphical installation wizard provides a quick and easy way to install Advanced Server 9.5 on a Linux or Windows system. As the installation wizard's easy-to-follow dialogs lead you through the installation process, specify information about your system, your system usage, and the modules that will best complement your installation of Advanced Server. When you complete the dialogs, the installer performs an installation based on the selections made during the setup process.

When the Advanced Server installation finishes, you will be offered the option to invoke the StackBuilder Plus package manager. StackBuilder Plus provides an easy-to-use graphical interface that downloads and installs applications, drivers and utilities and their dependencies. See Using Stackbuilder Plus for more information about using StackBuilder Plus.

## Using the Graphical Installer with Windows

To perform an installation using the graphical installation wizard on a Windows system, you must have administrator privileges. To start the installation wizard, assume administrator privileges, and double-click the ppasmeta-9.5.*x.x*-windows executable file.

*To install Advanced Server on some versions of Windows, you may be required to right click on the installer file and select Run as Administrator from the context menu to invoke the installer with Administrator privileges.*

The wizard opens a Language Selection popup; select an installation language from the drop-down listbox and click OK to continue. If you do not have Java installed on your system, the installer will ask you to confirm that you wish to continue the installation without installing Java based components; click Yes to continue to the Setup window (shown in Figure 4.2):

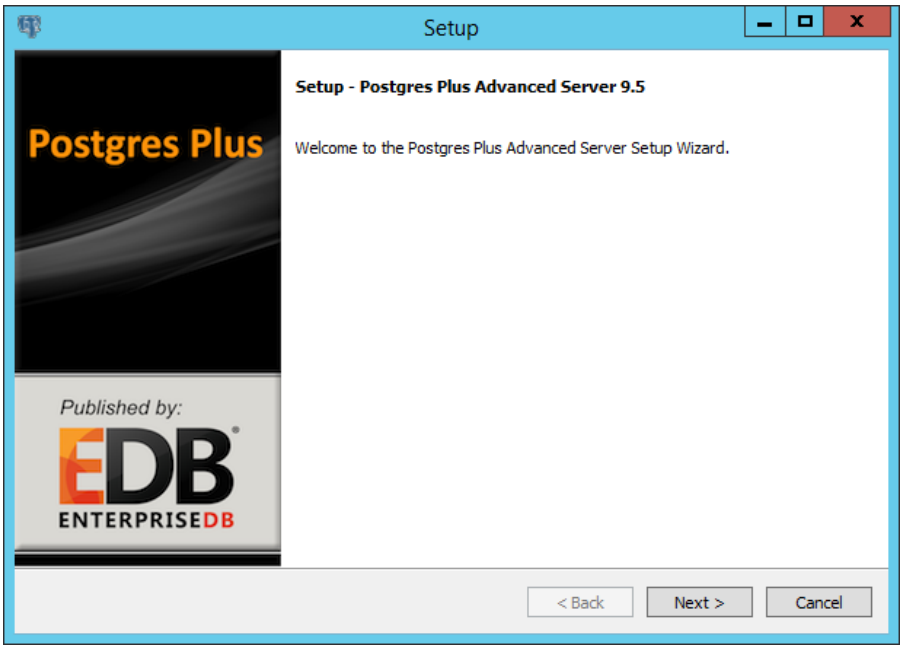



*Figure 4.2 — The Advanced Server installer Welcome window*

Click Next to continue. The EnterpriseDB License Agreement (Figure 4.3) opens.

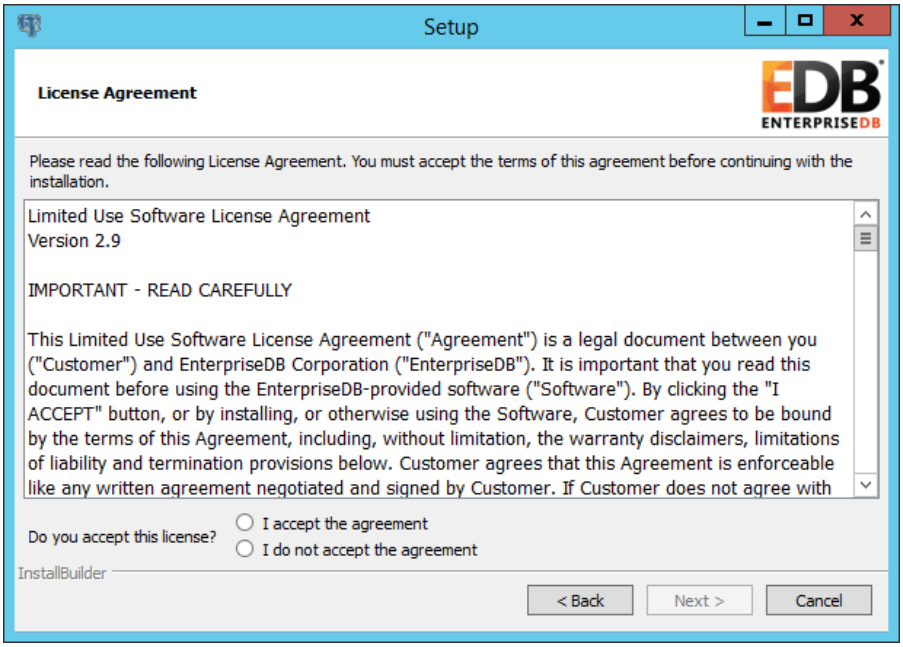



*Figure 4.3 — The EnterpriseDB License Agreement*

Carefully review the license agreement before highlighting the appropriate radio button; click Next to continue.

The User Authentication window opens, as shown in Figure 4.4.

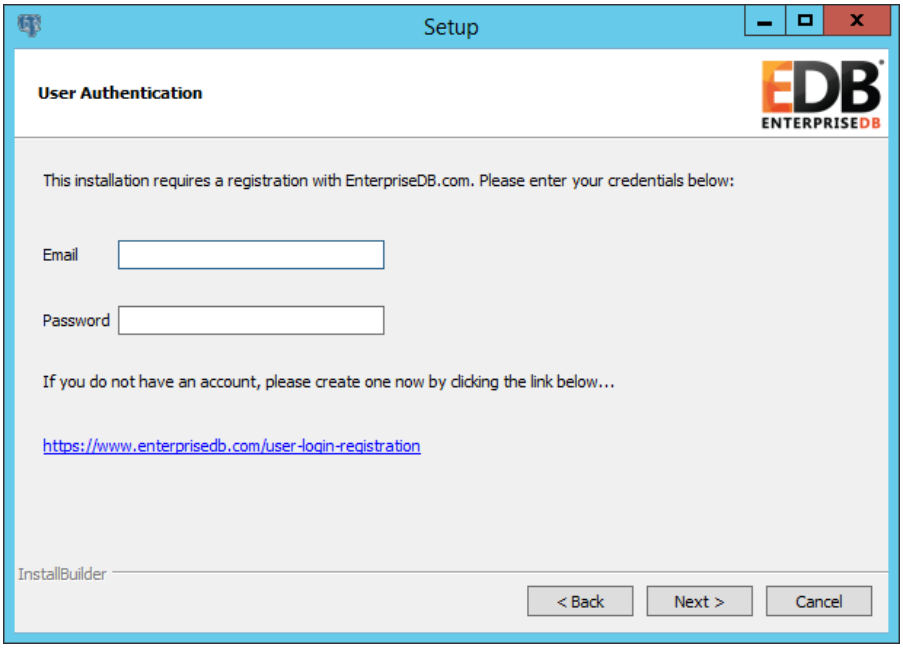



*Figure 4.4 — The User Authentication window.*

Before continuing, you must provide the email address and password associated with your EnterpriseDB user account. Registration is free; if you do not have an EnterpriseDB user account, click the link provided to open a web browser, and supply your user information.

Enter the email address of a registered account in the Email field, and the corresponding password in the Password field, and click Next to continue.

The Installation Directory window opens, as shown in Figure 4.5.

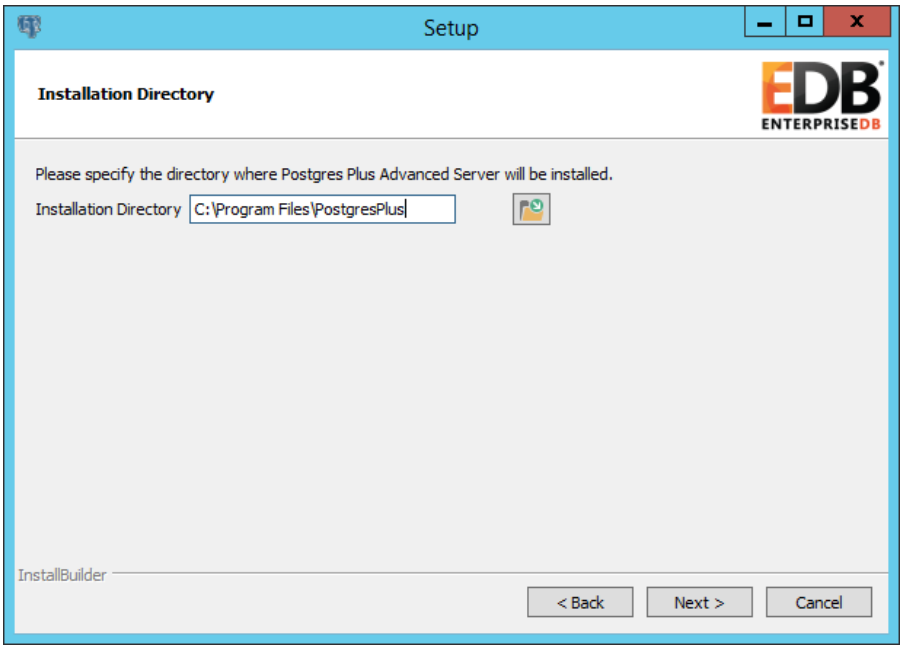



*Figure 4.5 — The Installation Directory window.*

By default, the Advanced Server installation directory is:

> C:\Program Files\PostgresPlus

You can accept the default installation location, and click Next to continue, or optionally click the File Browser button to open the Browse For Folder dialog (shown in Figure 4.6) to choose an alternate installation directory.

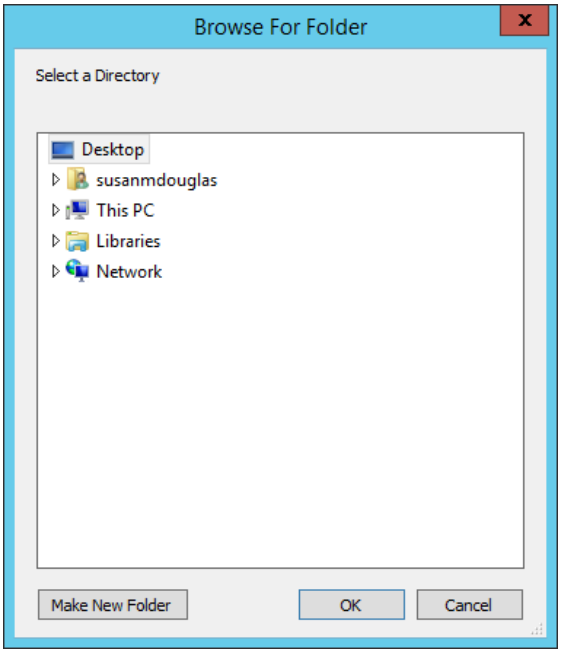



*Figure 4.6 — The Browse For Folder dialog*

Use the tree control displayed on the Browse For Folder dialog to navigate to an alternate installation directory, or create a new installation directory by selecting the Make New Folder button, and entering a name for the new folder.

After selecting an alternate installation directory, click OK to continue. When you return to the Installation Directory window, click Next to open the Select Components window.

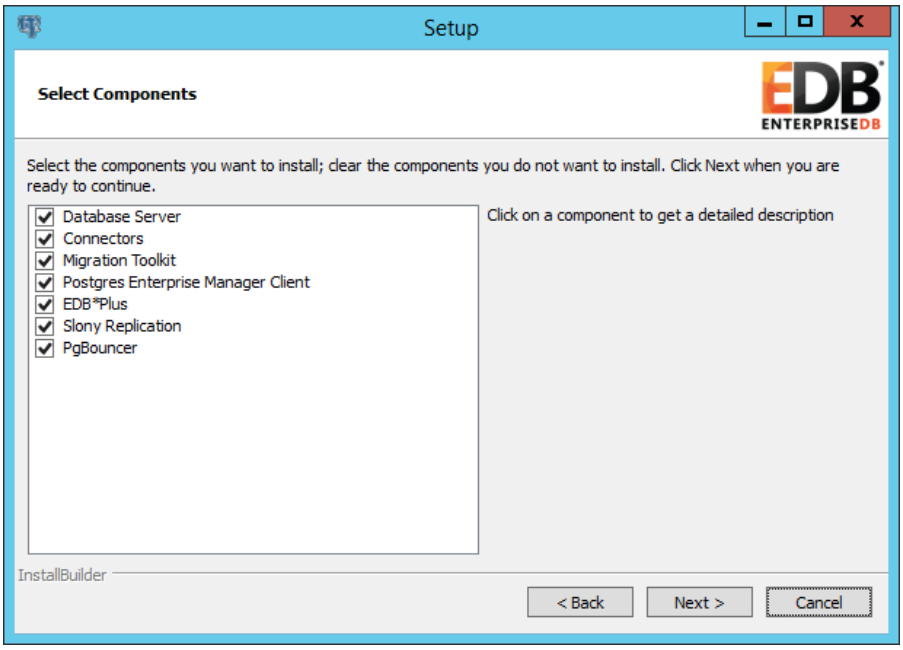



*Figure 4.7 — The Select Components window*

The Select Components window (shown in Figure 4.7) contains a list of the optional components that you can install with the Advanced Server installation wizard. Note that if you do not have Java installed on your system, those components that require Java are disabled and will not be installed. You can omit a module from the Advanced Server installation by de-selecting the box next to the components name.

The installation wizard can install the following components while installing Advanced Server 9.5:

### Database Server

> Select the Database Server option to install Advanced Server 9.5.

### Connectors

> Select the Connectors option to install the client connector API's for JDBC, .NET, OCI and ODBC. The client connectors facilitate application connectivity for Advanced Server.

### Migration Toolkit

> If you have Java installed on your system, you can use the Migration Toolkit option to install Migration Toolkit. Migration Toolkit is a command line migration utility that facilitates migration from MySQL, Oracle, Microsoft SQL Server and Sybase databases.
>
> See the *EDB Postgres (Postgres Plus) Migration Guide* for more information about Migration Toolkit, available from the EnterpriseDB website at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

### Postgres Enterprise Manager Client

> Select the Postgres Enterprise Manager Client option to install the PEM Client application. The PEM Client provides a powerful graphical interface for database management and monitoring.

### EDB*Plus

> If you have Java installed on your system, you can select the EDB*Plus

option to install EDB*Plus. EDB*Plus is the Advanced Server SQL command line interface that offers compatibility with Oracle's SQL Plus commands.

### Slony Replication

Check the box next to Slony Replication to specify that Slony-I should be included in the installation process. Slony-I facilitates master-standby replication suited for large databases with a limited number of standby systems.

### PgBouncer

PgBouncer is a lightweight connection pooling utility for Advanced Server. Connection pooling can dramatically reduce processing time and resources for systems maintaining client connections to one or more databases.

The StackBuilder Plus package manager is a graphical tool that can easily download and add any omitted modules (and the resulting dependencies) after the installation is complete. StackBuilder Plus is included in the Advanced Server installation. See Using Stackbuilder Plus for more information about StackBuilder Plus.

After adjusting the list of modules or accepting the default and installing all modules, click Next to open the Data Directory window (shown in Figure 4.8).

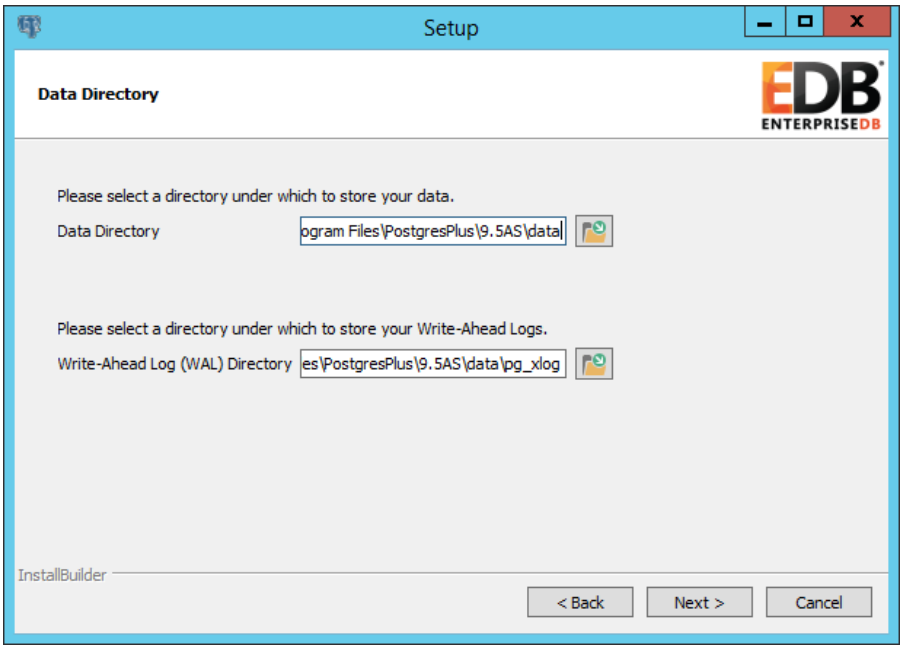



*Figure 4.8 — The Data Directory window.*

By default, the Advanced Server data files are saved to:

> C:\Program Files\PostgresPlus\9.5AS\data

You can accept the default location for the data files, or use the File Browser button to open the Browse For Folder dialog.

The default location of the Advanced Server Write-Ahead Log Directory is C:\Program Files\PostgresPlus\9.5AS\data\pg_xlog.

Advanced Server uses write-ahead logs to help ensure transaction safety and speed transaction processing; when you make a change to a table, the change is stored in shared memory and a record of the change is written to the write-ahead log. When you do a COMMIT, Advance Server writes contents of the write-ahead log to disk.

Accept the default file locations, or specify alternate locations with the file selector button; click Next to continue to the Configuration Mode window (shown in Figure 4.9).

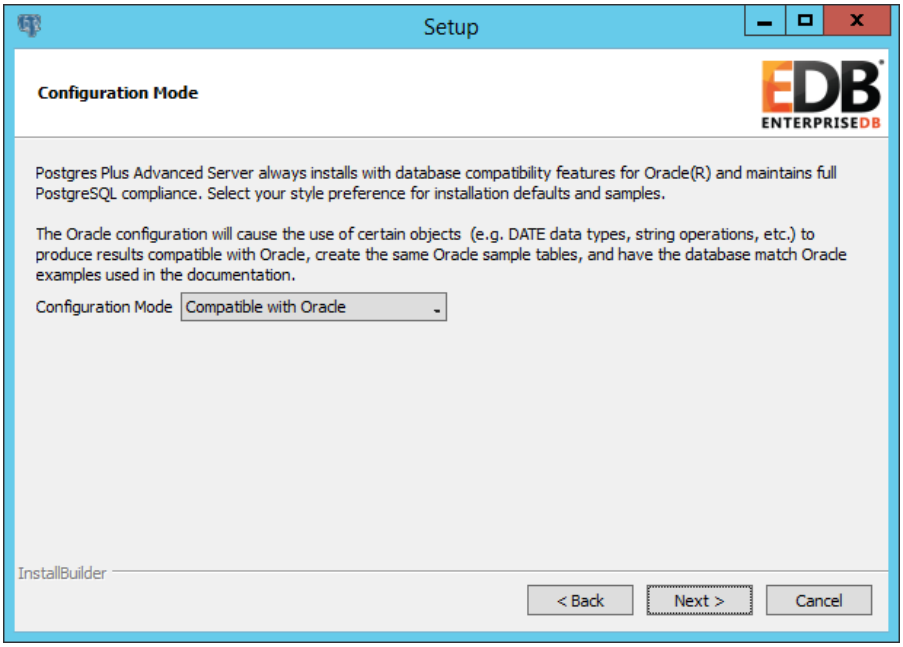



*Figure 4.9 — The Configuration Mode window.*

Use the drop-down listbox on the Configuration Mode window to choose a server dialect. The server dialect specifies the compatibility features supported by Advanced Server.

By default, Advance Server installs in Compatible with Oracle mode; you can choose between Compatible with Oracle and Compatible with PostgreSQL

installation modes.

### *Compatible with Oracle*

> If you select Compatible with Oracle on the Configuration Mode dialog, the installation will include the following features:
>
> - Data dictionary views compatible with Oracle databases.
> - Oracle data type conversions.
> - Date values displayed in a format compatible with Oracle syntax.
> - Support for Oracle-styled concatenation rules (if you concatenate a string value with a NULL value, the returned value is the value of the string).
> - Schemas (dbo and sys) compatible with Oracle databases added to the SEARCH_PATH.
> - Support for the following Oracle built-in packages:

| Package | Functionality Compatible with Oracle Databases |
|---|---|
| dbms_alert | Provides the ability to register for, send and receive alerts. |
| dbms_crypto | Provides a way to encrypt or decrypt RAW, BLOB or CLOB data. |
| dbms_job | Implements job-scheduling functionality. |
| dbms_lob | Provides the ability to manage large objects. |
| dbms_lock | Provides support for the DBMS_LOCK.SLEEP procedure. |
| dbms_mview | Provides a way to manage and refresh materialized views. |
| dbms_output | Provides the ability to display a message on the client. |
| dbms_pipe | Provides the ability to send a message from one session and read it in another session. |
| dbms_profiler | Collects and stores performance data about PL/pgSQL and SPL statements. |
| dbms_random | Provides a way to generate random numbers. |
| dbms_rls | Implements row level security. |
| dbms_scheduler | Provides a way to create and manage Oracle-style jobs. |
| dbms_session | A partial implementation that provides support for DBMS_SESSION.SET_ROLE. |

| Package | Functionality Compatible with Oracle Databases |
|---|---|
| dbms_sql | Implements use of Dynamic SQL |
| dbms_utility | Provides a collection of misc functions and procedures. |
| utl_encode | Provides a way to encode or decode data. |
| utl_file | Provides a way for a function, procedure or anonymous block to interact with files stored in the server's file system. |
| utl_http | Provides a way to use HTTP or HTTPS to retrieve information found at a URL. |
| utl_mail | Provides a simplified interface for sending email and attachments. |
| utl_raw | Provides a way to manipulate or retrieve the length of raw data types. |
| utl_smtp | Implements smtp email functions. |
| utl_url | Provides a way to escape illegal and reserved characters in a URL. |

> This is not a comprehensive list of the compatibility features for Oracle included when Advanced Server is installed in Compatible with Oracle mode; more information about Advanced Server is found in the *Database Compatibility for Oracle Developer's Guide*, available from the EnterpriseDB website at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

> If you choose to install in Compatible with Oracle mode, the Advanced Server superuser name is enterprisedb.

### *Compatible with PostgreSQL*

> When installed in Compatible with PostgreSQL mode, Advanced Server exhibits complete compatibility with PostgreSQL version 9.5.
>
> For more information about PostgreSQL functionality, visit the official PostgreSQL website at http://www.postgresql.org.
>
> If you choose to install in Compatible with PostgreSQL mode, the Advanced Server superuser name is postgres.

After specifying a configuration mode, click Next to continue to the Password window (shown in Figure 4.10).

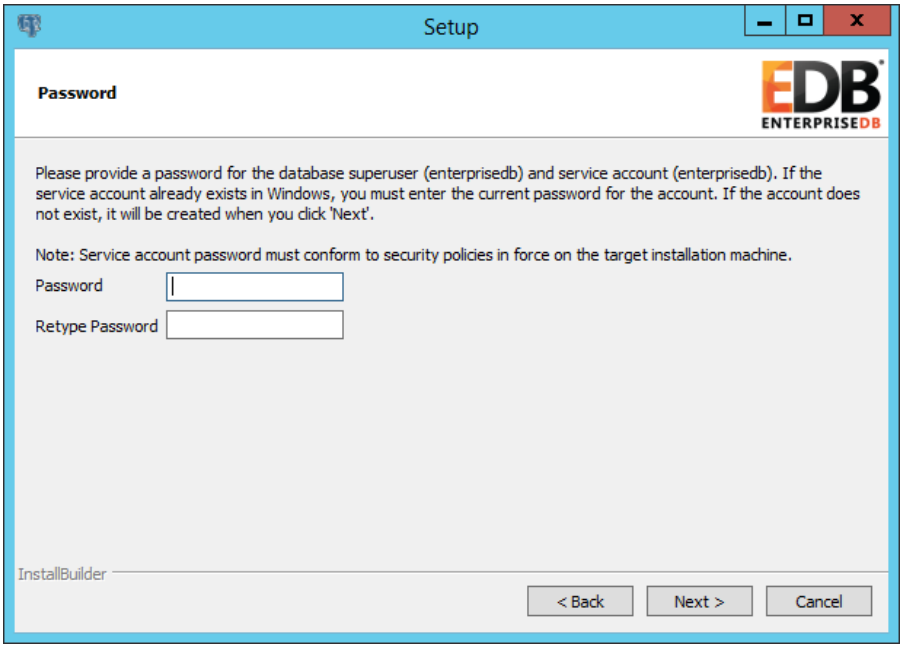



*Figure 4.10 — The Password window.*

Advanced Server uses the password specified on the Password window for the database superuser and pgAgent service. The specified password must conform to any security policies existing on the Advanced Server host.

After entering a password in the Password field, and confirming the password in the Retype Password field, click Next to continue.

The Additional Configuration window opens (shown in Figure 4.11).

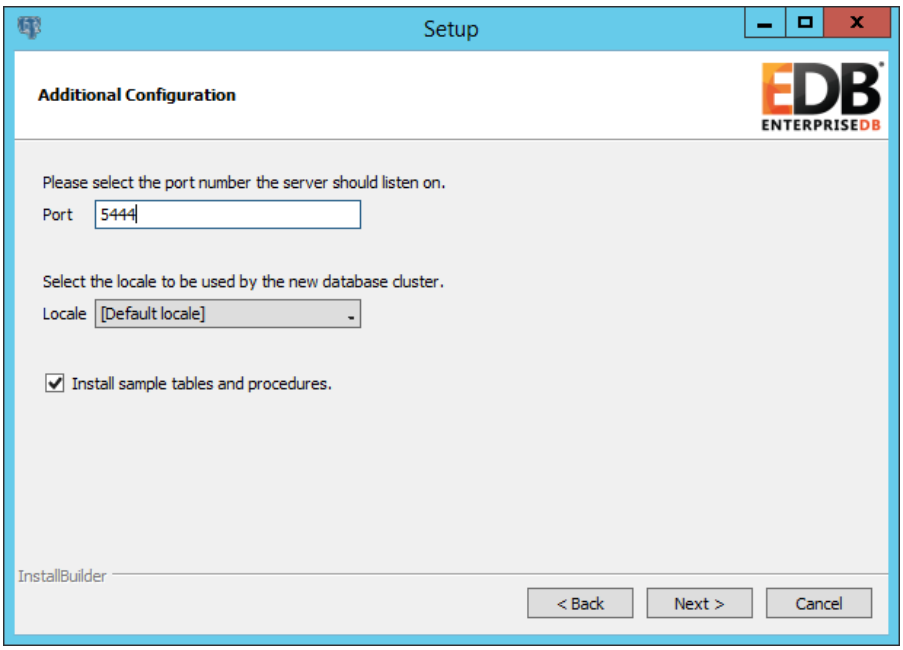


*Figure 4.11 — The Additional Configuration window.*

Use the fields on the Additional Configuration window to specify installation details:

- The Port field specifies the port number that Advanced Server should listen to for connection requests from client applications.
- If the Locale field is set to [Default Locale], Advanced Server uses the system locale as the working locale. Use the drop-down listbox next to Locale to specify an alternate locale for Advanced Server.
- Check the box next to Install sample tables and procedures to instruct the installation wizard to install the corresponding sample data for the server dialect specified on the Compatibility Mode window.

After verifying the information on the Additional Configuration window, click Next to open the Dynatune Dynamic Tuning: Server Utilization window (shown in Figure 4.12).

The graphical installation wizard facilitates performance tuning via the Dynatune Dynamic Tuning feature. Dynatune functionality allows Advanced Server to make optimal usage of the system resources available on the host machine on which it is installed.

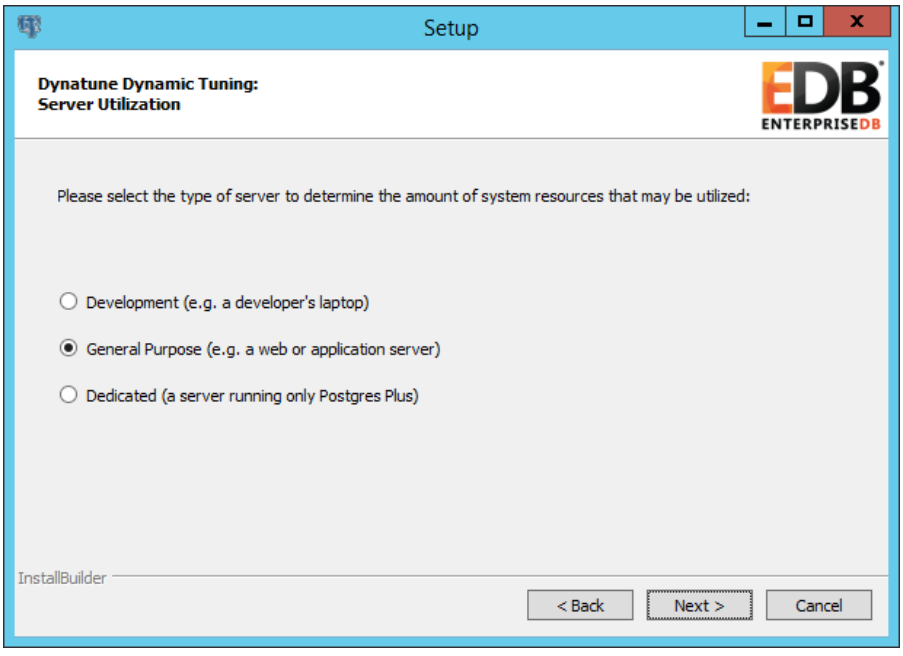



*Figure 4.12 — The Dynatune Dynamic Tuning: Server Utilization window.*

The edb_dynatune configuration parameter determines how Advanced Server allocates system resources. Use the radio buttons on the Server Utilization window to set the initial value of the edb_dynatune configuration parameter:

- Select Development to set the value of edb_dynatune to 33.

> A low value dedicates the least amount of the host machine's resources to the database server. This is a good choice for a development machine.
>
> - Select General Purpose to set the value of edb_dynatune to 66.

> A mid-range value dedicates a moderate amount of system resources to the database server. This would be a good setting for an application server with a fixed number of applications running on the same host as Advanced Server.
>
> - Select Dedicated to set the value of edb_dynatune to 100.

> A high value dedicates most of the system resources to the database server. This is a good choice for a host machine that is dedicated to running Advanced Server.

After the installation is complete, you can adjust the value of edb_dynatune by editing the postgresql.conf file. After editing the postgresql.conf file, you must restart the server for the changes to take effect.

Select the appropriate setting for your system, and click Next to continue to the Dynatune Dynamic Tuning: Workload Profile window (shown in Figure 4.13).

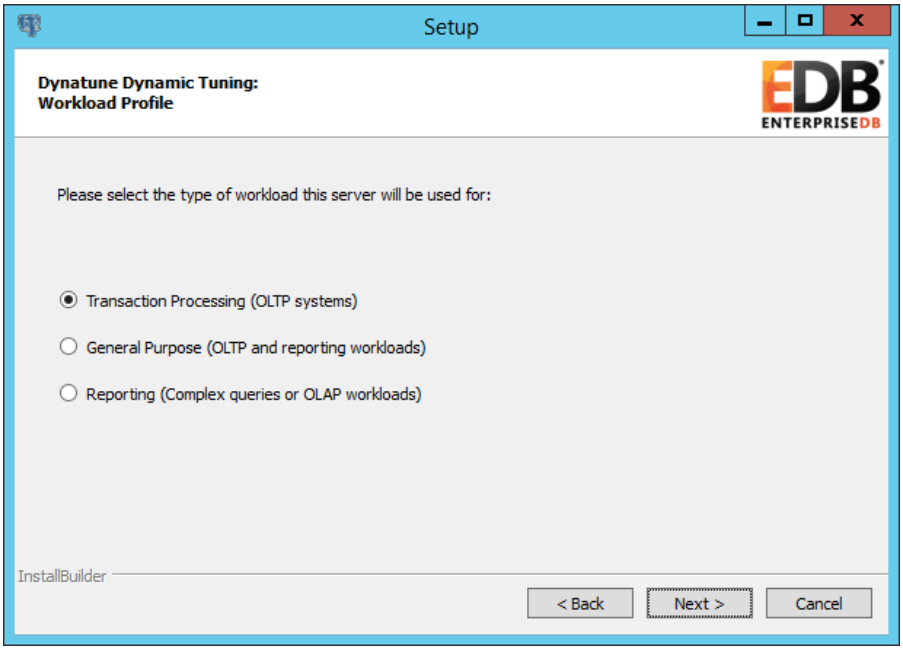



*Figure 4.13 — The Dynatune Dynamic Tuning: Workload Profile window.*

Use the radio buttons on the Workload Profile window to specify the initial value of the edb_dynatune_profile configuration parameter. The edb_dynatune_profile parameter controls performance-tuning aspects based on the type of work that the server performs.

- Select Transaction Processing (OLTP systems) to specify an edb_dynatune_profile value of oltp.

> Recommended when Advanced Server is processing heavy online transaction processing workloads.
>
> - Select General Purpose (OLTP and reporting workloads) to specify an edb_dynatune_profile value of mixed.

> Recommended for servers that provide a mix of transaction processing and data reporting.
>
> - Select Reporting (Complex queries or OLAP workloads) to specify an edb_dynatune_profile value of reporting.

> Recommended for database servers used for heavy data reporting.

After the installation is complete, you can adjust the value of edb_dynatune_profile by editing the postgresql.conf file. After editing the postgresql.conf file, you must restart the server for the changes to take effect.

For more information about edb_dynatune and other performance-related topics, see the *EDB Postgres (Postgres Plus) Enterprise Edition Guide* available from the EnterpriseDB website at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

Click Next to continue. The Advanced Configuration window (shown in Figure 4.14) opens.

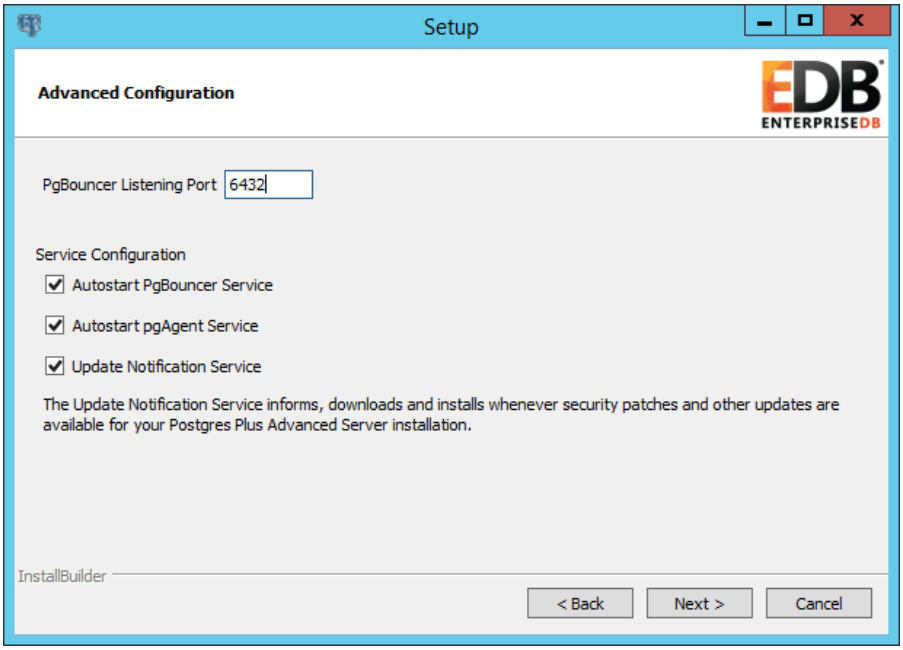



*Figure 4.14 — The Advanced Configuration window.*

PgBouncer is a lightweight connection pooling utility for Advanced Server. Connection pooling can dramatically reduce processing time and resources for systems maintaining client connections to one or more databases. By default, Advanced Server expects PgBouncer to listen on port 6432.

Please note that the pgbouncer program stores a list of users and passwords in clear-text form in the following file:

> C:\Program Files\PostgresPlus\pgbouncer\etc\userlist.txt

By default, the file is located in a directory that is accessible only to the cluster owner (by default, enterprisedb), but administrators should take note of the file and maintain permissions in a manner that secures the file from un-trusted users.

For more information about PgBouncer, visit the project site at:

https://wiki.postgresql.org/wiki/PgBouncer

pgAgent is a job scheduling agent for Postgres, capable of running multi-step batch/shell and SQL tasks on complex schedules. pgAgent also provides background support for the DBMS_JOB built-in package that is compatible with Oracle databases.

When enabled, the Update Notification Service notifies you of any new updates and security patches available for your installation of Advanced

Server.

By default, Advanced Server is configured to start the the pgBouncer, pgAgent and Update Notification services when the system boots; clear applicable Autostart checkboxes, or accept the defaults, and click Next to continue.

The Pre Installation Summary opens as shown in Figure 4.15.

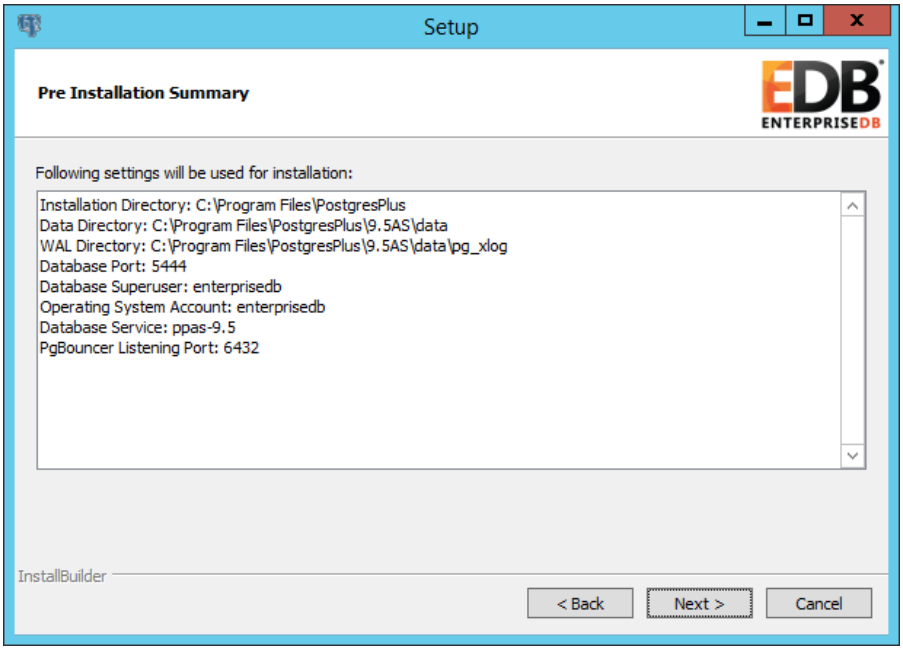



*Figure 4.15 — The Pre Installation Summary.*

The Pre Installation Summary provides an overview of the options specified during the Setup process. Review the options before clicking Next; use the Back button to navigate back through the dialogs to modify installation options.

The Ready to Install window confirms that the installer has the information it needs about your configuration preferences to install Advanced Server. Click Next to continue.

The installation wizard confirms the installation progress of Advanced Server via a series of progress bars (see Figure 4.16).

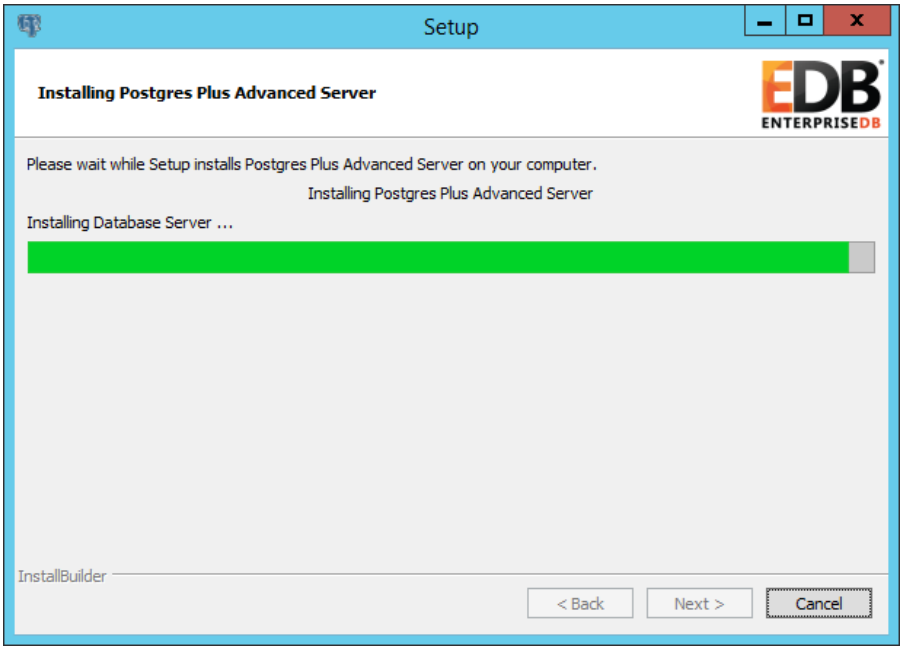



*Figure 4.16 — The Advanced Server installation, in progress.*

As each supporting module is unpacked and installed, the module's installation is confirmed with a popup dialog (see Figure 4.17).

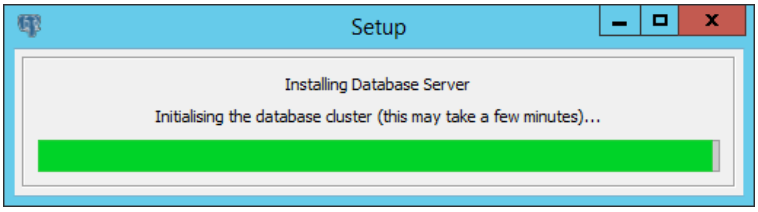



*Figure 4.17 — Popup dialogs confirm the installation of the supporting modules.*

Before the installation wizard completes the Advanced Server installation, it offers to Launch Stack Builder Plus at exit (see Figure 4.18).

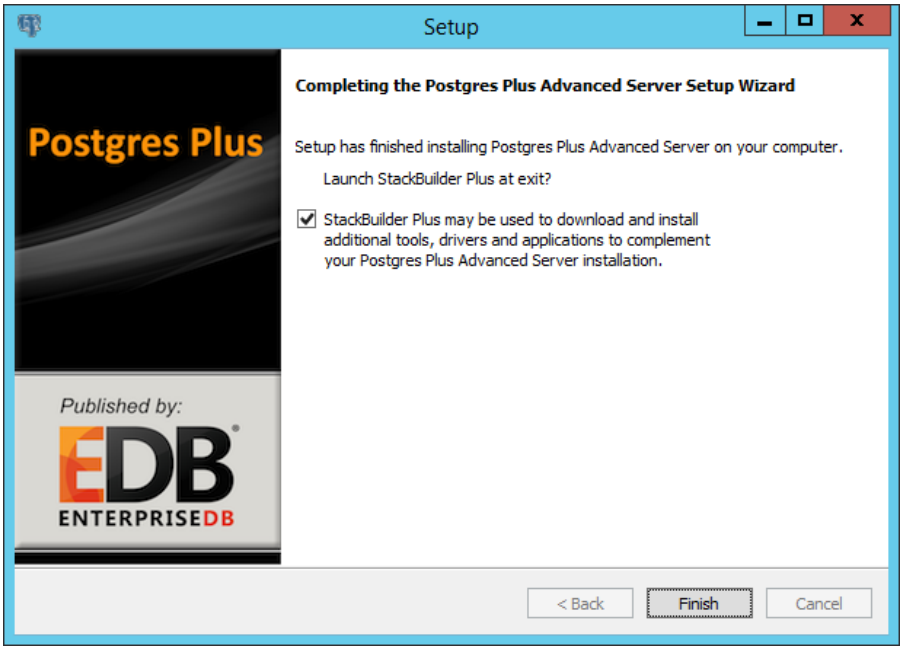



*Figure 4.18 — The installation wizard offers to Launch StackBuilder Plus at exit.*

You can optionally clear the StackBuilder Plus checkbox and click Finish to complete the Advanced Server installation or accept the default and proceed to StackBuilder Plus.

The StackBuilder Plus utility provides a graphical interface that downloads and installs applications and drivers that work with Advanced Server. You can invoke StackBuilder Plus at installation time or (after the installation completes) through the Advanced Server 9.5 menu. For more information about StackBuilder Plus, see Using Stackbuilder Plus.

## Using the Graphical Installer on a Linux System

To use the graphical installation wizard on a Linux system, you must have superuser privileges. To invoke the installation wizard, open a Terminal window, navigate to the directory that contains the unpacked Advanced Server binary file, and enter the command:

```
./ppasmeta-9.5.x.x-linux.run
```

The wizard opens a Language Selection popup; select an installation language from the drop-down listbox and click OK to continue. If you do not have Java installed on your system, the installer will ask you to confirm that you wish to continue the installation without installing Java based

components; click Yes to continue to the Setup window (shown in Figure 4.19).


*Figure 4.19 — The Postgres Plus Advanced Server installer Welcome window.*

Click Next to continue. The License Agreement window (shown in Figure 4.20) opens.

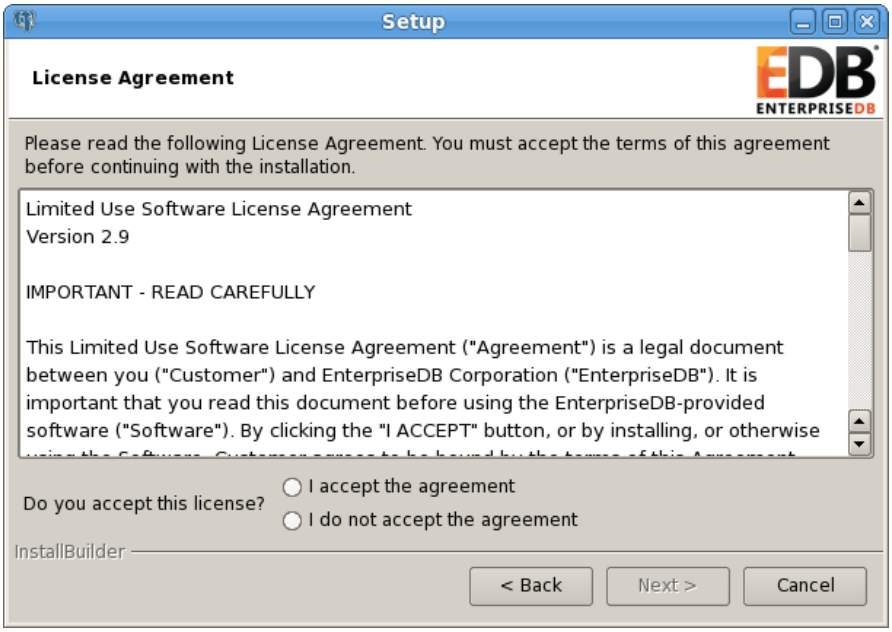



*Figure 4.20 — The EnterpriseDB License Agreement.*

Review the EnterpriseDB license agreement carefully before selecting the radio button next to I accept the agreement. Click Next to continue to the User Authentication window.

The User Authentication window opens, as shown in Figure 4.21:

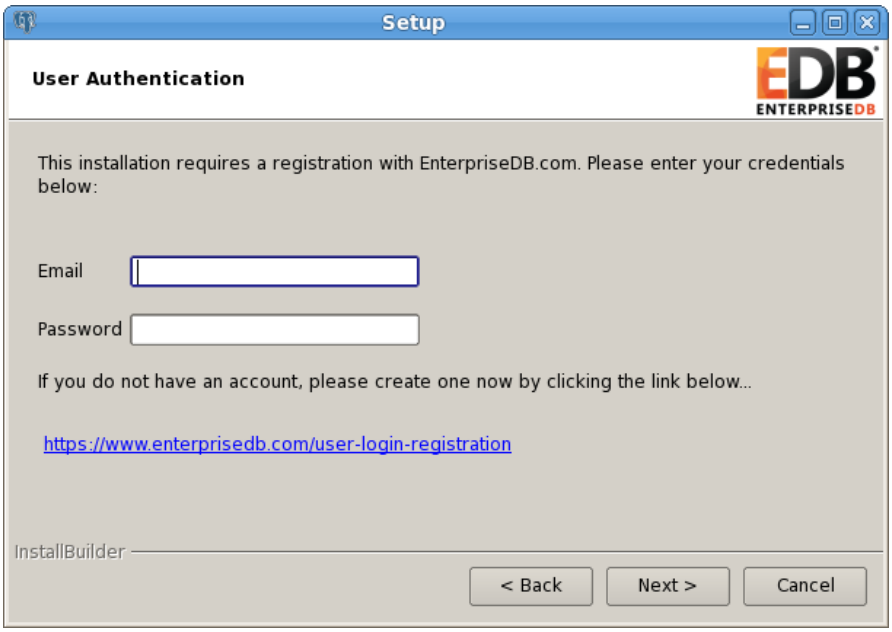



*Figure 4.21 — The User Authentication window.*

Before continuing, you must provide the email address and password associated with your EnterpriseDB user account. Registration is free; if you do not have an EnterpriseDB user account, click the link provided to open a web browser, and enter your user information.

Enter the email address of a registered account in the Email field, and the corresponding password in the Password field, and click Next to continue to the Installation Directory window (see Figure 4.22).

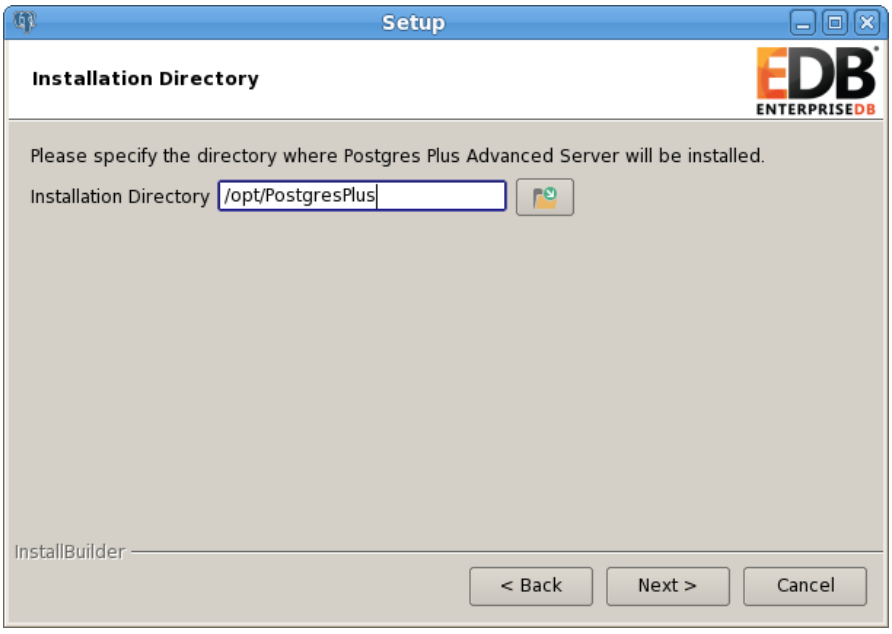



*Figure 4.22 — The Installation Directory window.*

By default, the Advanced Server installation directory is:

> /opt/PostgresPlus

You can accept the default installation location, and click Next to continue, or optionally click the File Browser button to open the Browse For Folder dialog (shown in Figure 4.23) to choose an alternate installation directory.

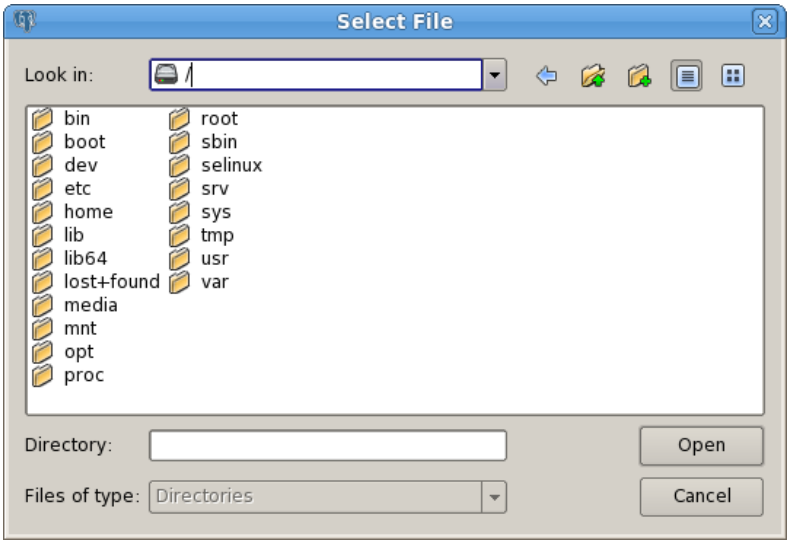



*Figure 4.23 — The file browser dialog.*

Use the file browser dialog to navigate to an alternate installation directory, or create a new installation directory by selecting the Add Folder icon, and entering a name for the new folder.

After selecting an alternate installation directory, click OK to continue. When you return to the Installation Directory window, click Next to open the Select Components window.

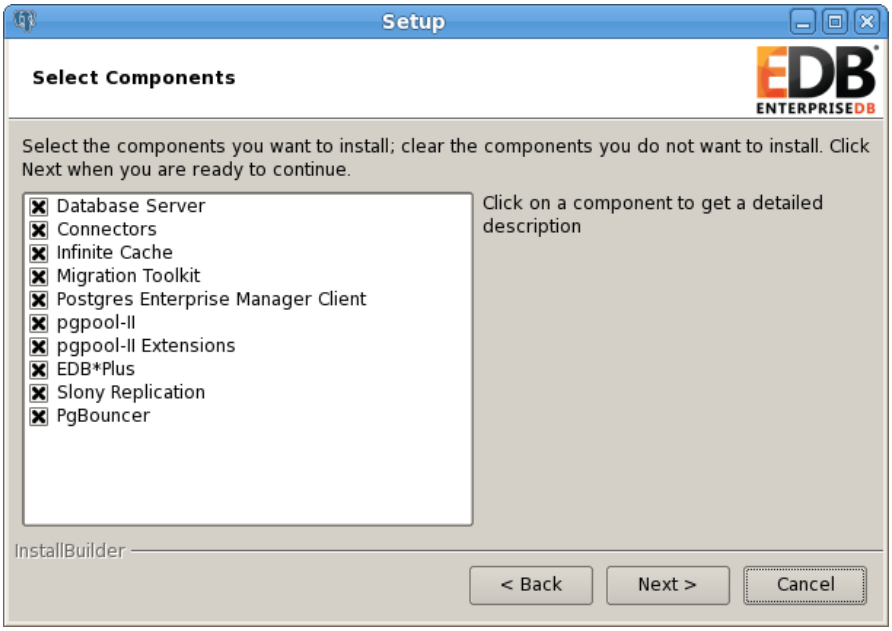



*Figure 4.24 — The Select Components window.*

The Select Components window (shown in Figure 4.24) contains a list of the utilities that you can install with the Advanced Server installation wizard. If your system does not include a Java installation, those components that are dependent on Java will be disabled. You can skip the installation of a module by clearing the checkmark next to the component name.

The installation wizard can install the following components while installing Advanced Server 9.5:

### Database Server

> Select the Database Server option to install Advanced Server 9.5.

### Connectors

> Select the Connectors option to install the client connector API's for JDBC, OCI and ODBC. The client connectors facilitate application connectivity for Advanced Server.

### Infinite Cache

> Select the Infinite Cache option to install the icache daemon.
>
> The installation wizard can optionally install the icache daemon on a remote icache server without including a complete installation of Advanced Server. To install only the icache daemon, deselect the other

components shown on the Select Components window before clicking Next.

For more information about using Infinite Cache and the icache daemon, see the *EDB Postgres (Postgres Plus) Enterprise Edition Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

### Migration Toolkit

If you have Java installed on your system, you can use the Migration Toolkit option to install Migration Toolkit. Migration Toolkit is a command line migration utility that facilitates migration from MySQL, Oracle, SQL Server and Sybase databases. See the *EDB Postgres Migration Toolkit Guide* for more information about Migration Toolkit, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

### Postgres Enterprise Manager Client

Select the Postgres Enterprise Manager Client option to install the PEM Client application. The PEM Client provides a powerful graphical interface for database management and monitoring.

### pgpool-II

Use the pgpool-II option to include pgpool-II in the Advanced Server installation. pgpool-II provides load balancing, connection pooling, high availability, and connection limits for Advanced Server databases.

### pgpool-II Extensions

If you are installing pgpool-II, check the box next to pgpool-II Extensions to include the server extensions required by the server to implement pgpool-II functionality.

### EDB*Plus

Select the EDB*Plus option to install EDB*Plus. EDB*Plus is the Advanced Server command line interface that offers compatibility with

> Oracle's SQL Plus commands.
>
> Please Note that the EDB*Plus installation option will only be enabled if your system contains Java.

### Slony Replication

> Check the box next to Slony Replication to specify that Slony-I should be included in the Advanced Server installation. Slony-I facilitates master-standby replication suited for large databases with a limited number of standby systems.

### PgBouncer

> PgBouncer is a lightweight connection pooling utility for Advanced Server. Connection pooling can dramatically reduce processing time and resources for systems maintaining client connections to one or more databases.

The StackBuilder Plus package manager is a graphical tool that can easily download and add any omitted modules (and the resulting dependencies) after the installation is complete. StackBuilder Plus is included in the Advanced Server installation. See Using Stackbuilder Plus for more information about StackBuilder Plus.

After editing the list of supporting components, click Next to open the Additional Directories window (shown in Figure 4.25).

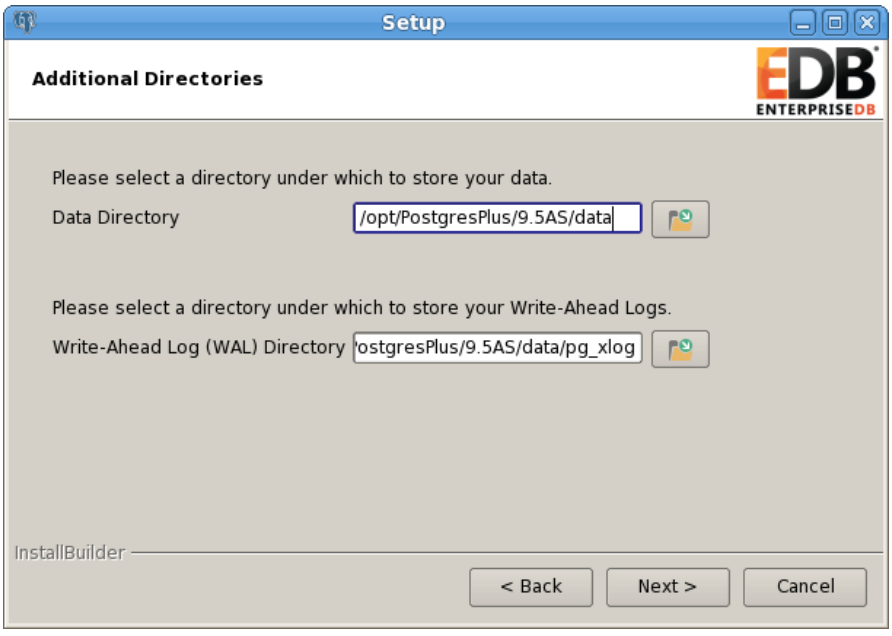


*Figure 4.25 — The Additional Directories window.*

Use the fields on the Additional Directories window to specify locations for the Advanced Server data directory and write-ahead log directory.

The default Data Directory is /opt/PostgresPlus/9.5AS/data. You can optionally use the file selector button to specify an alternate location.

The default location of the Advanced Server Write-Ahead Log Directory is /PostgresPlus/9.5AS/data/pg_xlog. Accept the default location, or specify an alternate location with the file selector button.

Advanced Server uses write-ahead logs to help ensure transaction safety and speed transaction processing; when you make a change to a table, the change is stored in shared memory and a record of the change is written to the write-ahead log. When you do a COMMIT, Advance Server writes contents of the write-ahead log to disk.

Click Next to continue to the Configuration Mode window (shown in Figure 4.26).

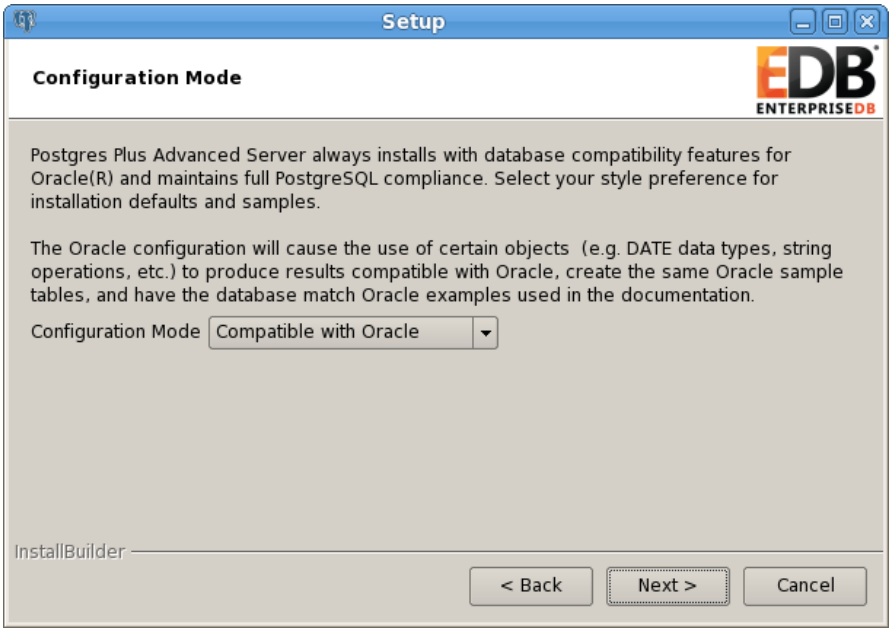



*Figure 4.26 — The Configuration Mode window.*

Use the drop-down listbox on the Configuration Mode window to choose a server dialect. The server dialect specifies the compatibility features supported by Advanced Server.

By default, Advance Server installs with database compatibility with Oracle;

you can choose between Compatible with Oracle and Compatible with PostgreSQL installation modes.

### *Compatible with Oracle Mode*

If you select Compatible with Oracle on the Configuration Mode dialog, the installation will include the following features:

- Dictionary views compatible with Oracle databases.
- Oracle data type conversions.
- Date values displayed in a format compatible with Oracle syntax.
- Oracle-styled concatenation rules (if you concatenate a string value with a NULL value, the returned value is the value of the string).
- Schemas (dbo and sys) compatible with Oracle databases added to the SEARCH_PATH.
- Support for the following Oracle built-in packages:

| Package | Functionality Compatible with Oracle Databases |
|---|---|
| dbms_alert | Provides the ability to register for, send and receive alerts. |
| dbms_crypto | Provides a way to encrypt or decrypt RAW, BLOB or CLOB data. |
| dbms_job | Implements job-scheduling functionality. |
| dbms_lob | Provides the ability to manage large objects. |
| dbms_lock | Provides support for the DBMS_LOCK.SLEEP procedure. |
| dbms_mview | Provides a way to manage and refresh materialized views. |
| dbms_output | Provides the ability to display a message on the client. |
| dbms_pipe | Provides the ability to send a message from one session and read it in another session. |
| dbms_profiler | Collects and stores performance data about PL/pgSQL and SPL statements. |
| dbms_random | Provides a way to generate random numbers. |
| dbms_rls | Implements row level security. |
| dbms_scheduler | Provides a way to create and manage Oracle-style jobs. |
| dbms_session | A partial implementation that provides support for DBMS_SESSION.SET_ROLE. |

| Package | Functionality Compatible with Oracle Databases |
|---|---|
| dbms_sql | Implements use of Dynamic SQL |
| dbms_utility | Provides a collection of misc functions and procedures. |
| utl_encode | Provides a way to encode or decode data. |
| utl_file | Provides a way for a function, procedure or anonymous block to interact with files stored in the server's file system. |
| utl_http | Provides a way to use HTTP or HTTPS to retrieve information found at a URL. |
| utl_mail | Provides a simplified interface for sending email and attachments. |
| utl_raw | Provides a way to manipulate or retrieve the length of raw data types. |
| utl_smtp | Implements smtp email functions. |
| utl_url | Provides a way to escape illegal and reserved characters in a URL. |

This is not a comprehensive list of the compatibility features for Oracle included when Advanced Server is installed in Compatible with Oracle mode. For more information, refer to the *Database Compatibility for Oracle Developer's Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

If you choose to install in Compatible with Oracle mode, the Advanced Server superuser name is enterprisedb.

### *Compatible with PostgreSQL Mode*

> When installed in Compatible with PostgreSQL mode, Advanced Server exhibits complete compatibility with Postgres version 9.5. For more information about PostgreSQL functionality, review the PostgreSQL core documentation at:

https://www.postgresql.org/docs/9.5/static/index.html

> If you choose to install in Compatible with PostgreSQL mode, the Advanced Server superuser name is postgres.

After specifying a configuration mode, click Next to continue to the Password window (shown in Figure 4.27).

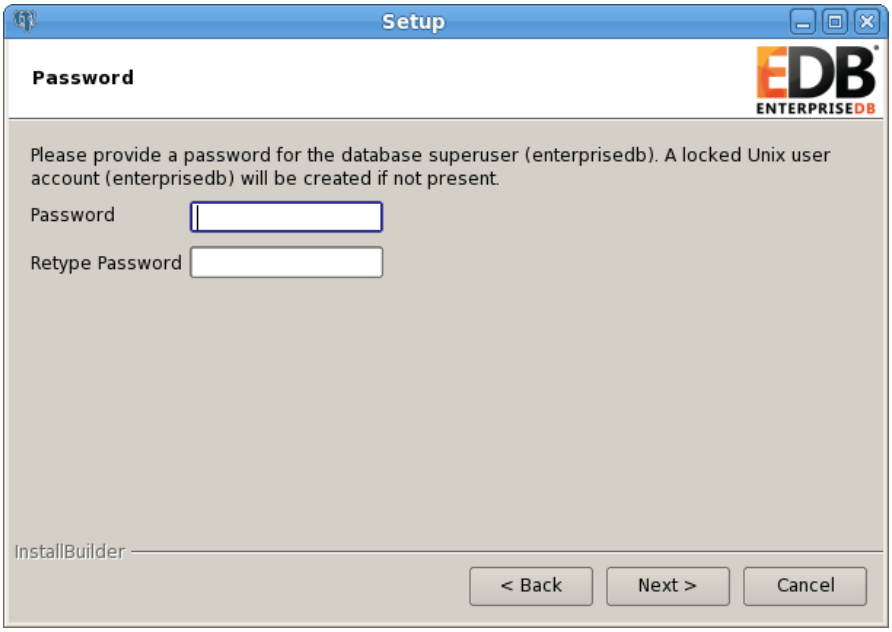



*Figure 4.27 — The Password window.*

Advanced Server uses the password specified on the Password window for the database superuser and pgAgent service. The specified password must conform to any security policies existing on the Advanced Server host.

After entering a password in the Password field, and confirming the password in the Retype Password field, click Next to continue.

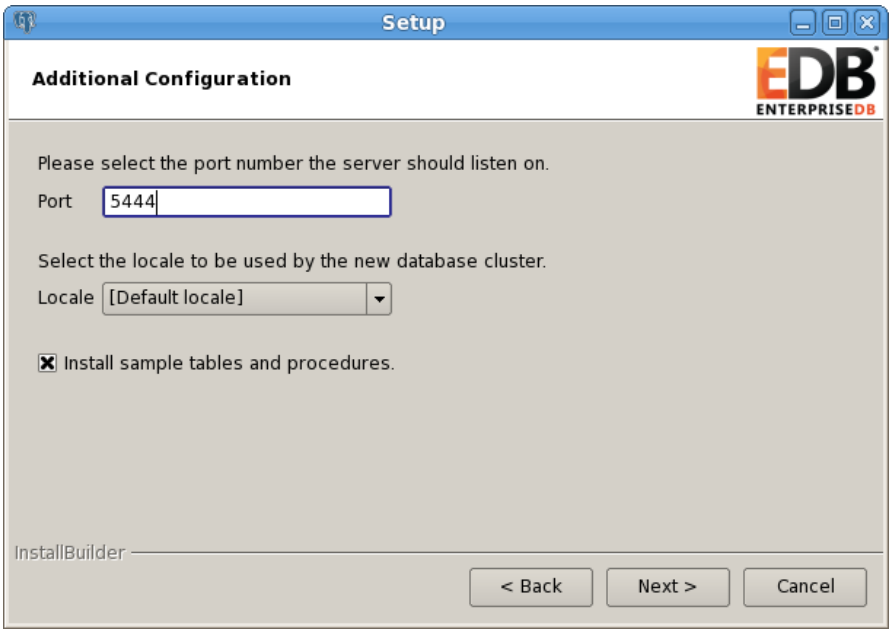



*Figure 4.28 — The Additional Configuration window.*

Use the fields on the Additional Configuration window (shown in Figure 4.28) to specify installation details:

- The Port field specifies the port number that Advanced Server should listen to for connection requests from client applications.
- If the Locale field is set to [Default Locale], Advanced Server uses the system locale as the working locale. Use the drop-down listbox next to Locale to specify an alternate locale for Advanced Server.
- Check the box next to Install sample tables and procedures to instruct the installation wizard to install the corresponding sample data for the server dialect specified on the Compatibility Mode window.

After verifying the information on the Additional Configuration window, click Next to open the Dynatune Dynamic Tuning: Server Utilization window (shown in Figure 4.29).

The installation wizard facilitates performance tuning via the Dynatune Dynamic Tuning feature. Dynatune functionality allows Advanced Server to make optimal usage of the system resources available on the host machine.

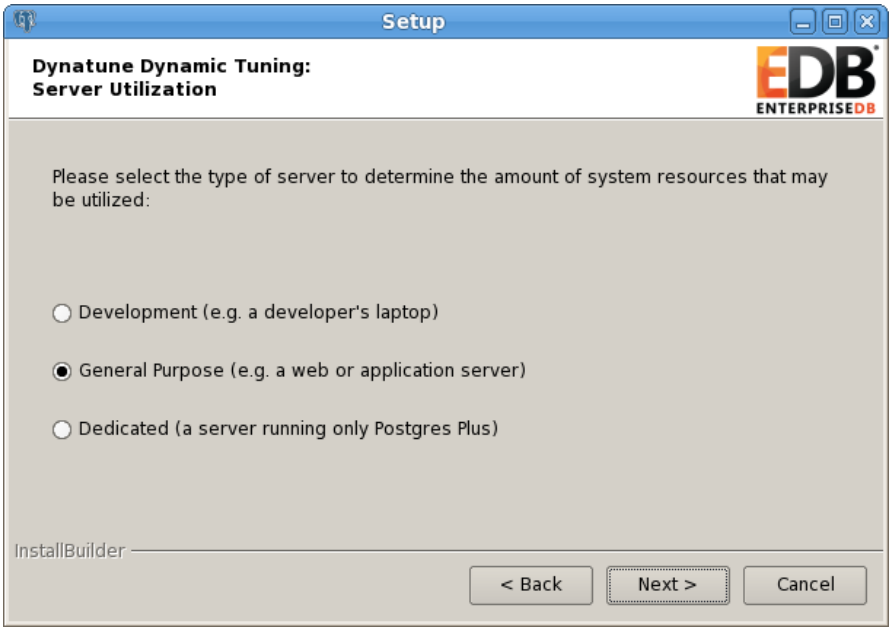



*Figure 4.29 — The Server Utilization window.*

The edb_dynatune configuration parameter determines how Advanced Server allocates system resources. The radio buttons on the Server Utilization window set the initial value of the edb_dynatune configuration parameter.

- Select Development to set the value of edb_dynatune to 33.

A low value dedicates the least amount of the host machine's resources to the database server. This is a good choice for a development machine.

- Select General Purpose to set the value of edb_dynatune to 66.

A mid-range value dedicates a moderate amount of system resources to the database server. This would be a good setting for an application server with a fixed number of applications running on the same host as Advanced Server.

- Select Dedicated to set the value of edb_dynatune to 100.

A high value dedicates most of the system resources to the database server. This is a good choice for a host machine that is dedicated to running Advanced Server.

After the installation is complete, you can adjust the value of edb_dynatune by editing the postgresql.conf file. After editing the postgresql.conf file, you must restart the server for the changes to take effect.

Select the appropriate setting for your system, and click Next to continue to the Dynatune Dynamic Tuning: Workload Profile window (shown in Figure 4.30).

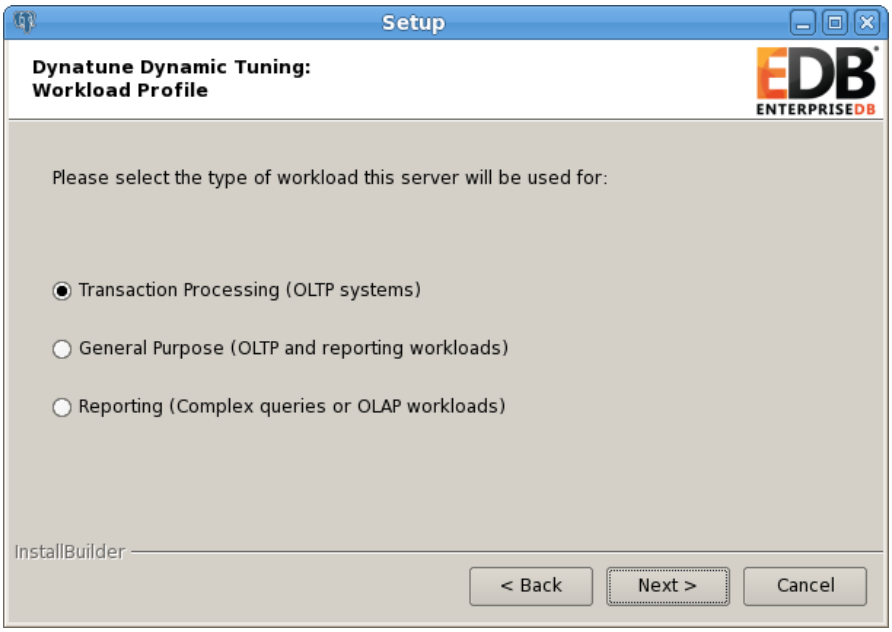



*Figure 4.30 — The Workload Profile window.*

Use the radio buttons on the Workload Profile window to specify the initial value of the edb_dynatune_profile configuration parameter. The

edb_dynatune_profile parameter controls performance-tuning aspects based on the type of work that the server performs.

- Select Transaction Processing (OLTP systems) to specify an edb_dynatune_profile value of oltp.

> Recommended when Advanced Server is processing heavy online transaction processing workloads.
>
> - Select General Purpose (OLTP and reporting workloads) to specify an edb_dynatune_profile value of mixed.

> Recommended for servers that provide a mix of transaction processing and data reporting.
>
> - Select Reporting (Complex queries or OLAP workloads) to specify an edb_dynatune_profile value of reporting.

> Recommended for database servers used for heavy data reporting.

After the installation is complete, you can adjust the value of edb_dynatune_profile by editing the postgresql.conf file. After editing the postgresql.conf file, you must restart the server for the changes to take effect.

For more information about edb_dynatune and other performance-related topics, see the *EDB Postgres (Postgres Plus) Enterprise Edition Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

After selecting the radio button that best describes the use of the system, click Next to continue. The Advanced Configuration window (shown in Figure 4.31) opens.

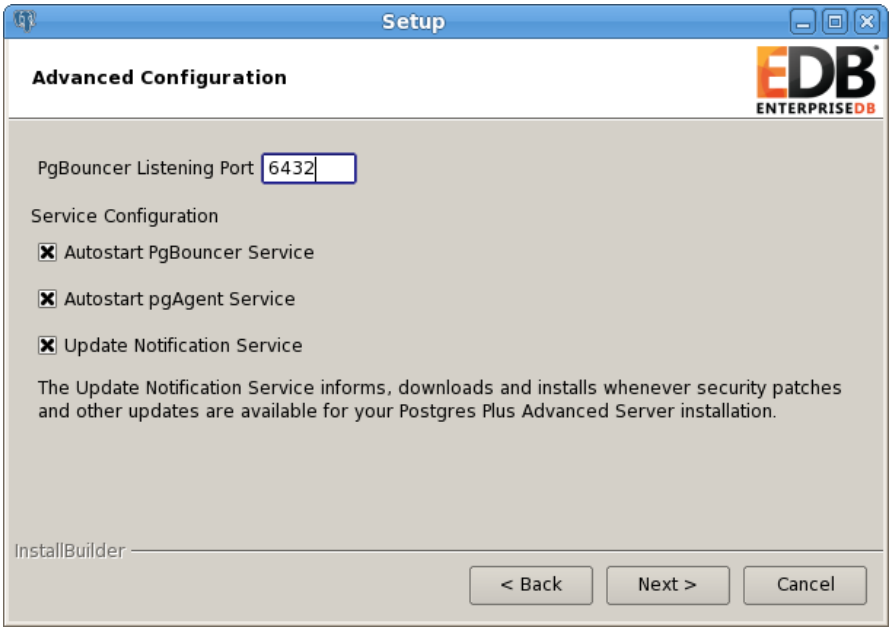



*Figure 4.31 — The Advanced Configuration window.*

PgBouncer is a lightweight connection pooling utility for Advanced Server. Connection pooling can dramatically reduce processing time and resources for systems maintaining client connections to one or more databases. By default, Advanced Server expects PgBouncer to listen on port 6432.

Please Note: The pgbouncer program stores a list of users and passwords in clear-text form in the following file:

> /opt/PostgresPlus/pgbouncer/etc/userlist.txt.

By default, the file is located in a directory that is accessible only to the cluster owner (by default, enterprisedb), but administrators should take note of the file and maintain permissions in a manner that secures the file from untrusted users.

For more information about PgBouncer, visit:

http://wiki.postgresql.org/wiki/PgBouncer

pgAgent is a job scheduling agent for Postgres, capable of running multi-step batch/shell and SQL tasks on complex schedules. pgAgent also provides background support for the DBMS_JOB built-in package compatible with Oracle databases.

When enabled, the Update Notification Service notifies you of any new updates and security patches available for your installation of Advanced

Server.

By default, Advanced Server is configured to start the pgBouncer, pgAgent and Update Notification services when the system boots; clear applicable Service Configuration checkboxes, or accept the defaults, and click Next to continue.

The Pre Installation Summary opens (shown in Figure 4.32).

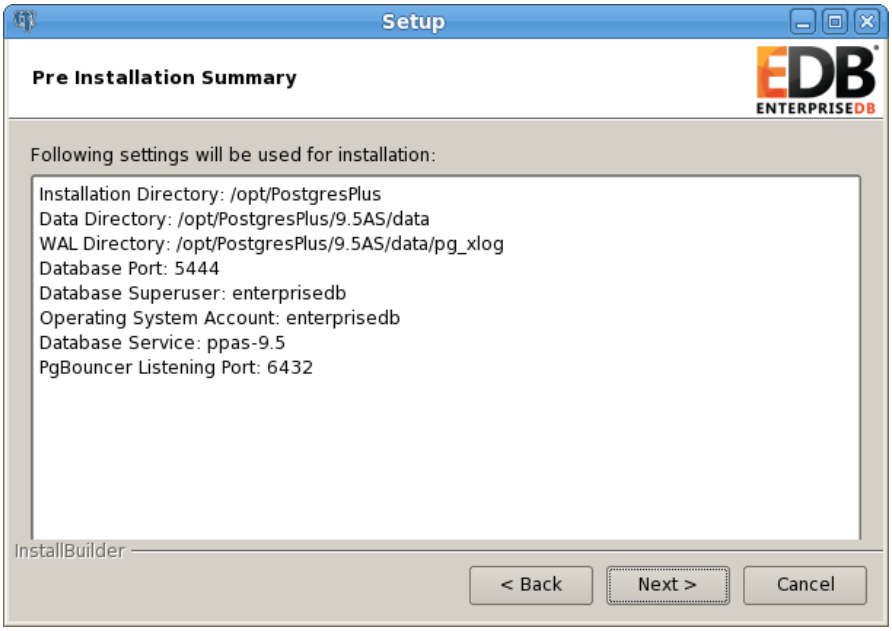



*Figure 4.32 — The Pre Installation Summary.*

The Pre Installation Summary provides an overview of the options specified during the Setup process. Review the options before clicking Next; use the Back button to navigate back through the dialogs to modify installation options.

The Ready to Install window (shown in Figure 4.33) confirms that the installer has the information it needs about your configuration preferences to install Advanced Server.

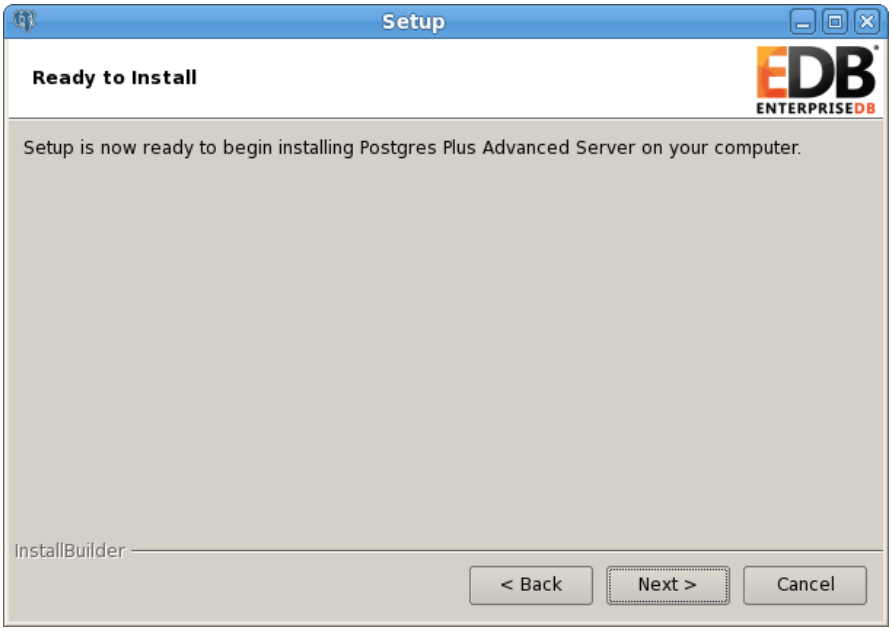



*Figure 4.33 — The Ready to Install window.*

Click Next to continue. The installation wizard confirms the installation progress of Advanced Server via a series of progress bars (shown in Figure 4.34).

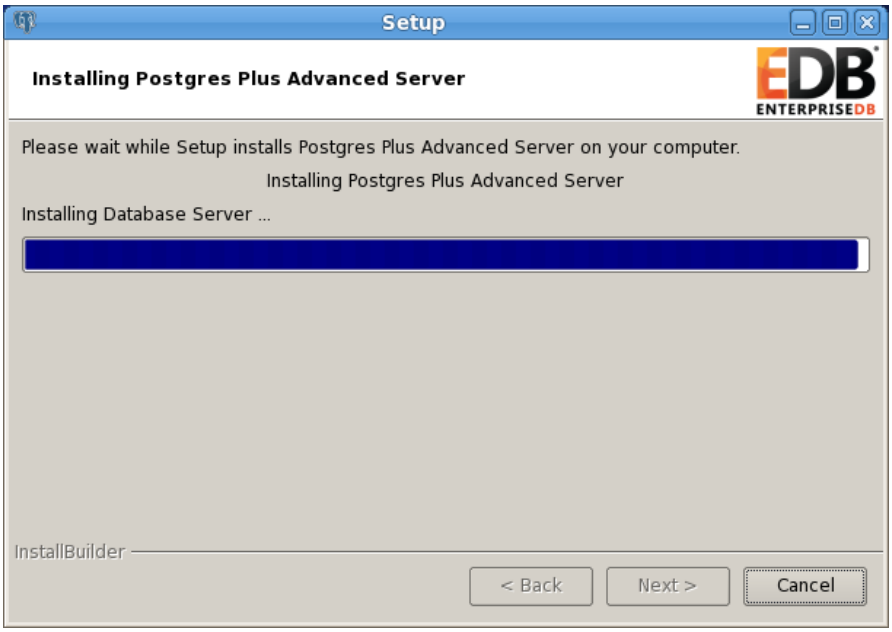



*Figure 4.34 — The installation wizard confirms the installation progress.*

Pop-up dialogs confirm the installation of the server and individual components (shown in Figure 4.35).

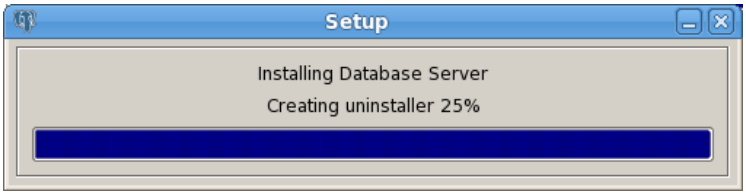



*Figure 4.35 — Popup dialogs confirm the installation progress.*

Before the installation wizard completes the Advanced Server installation, it offers to Launch Stack Builder Plus at exit (see Figure 4.36).

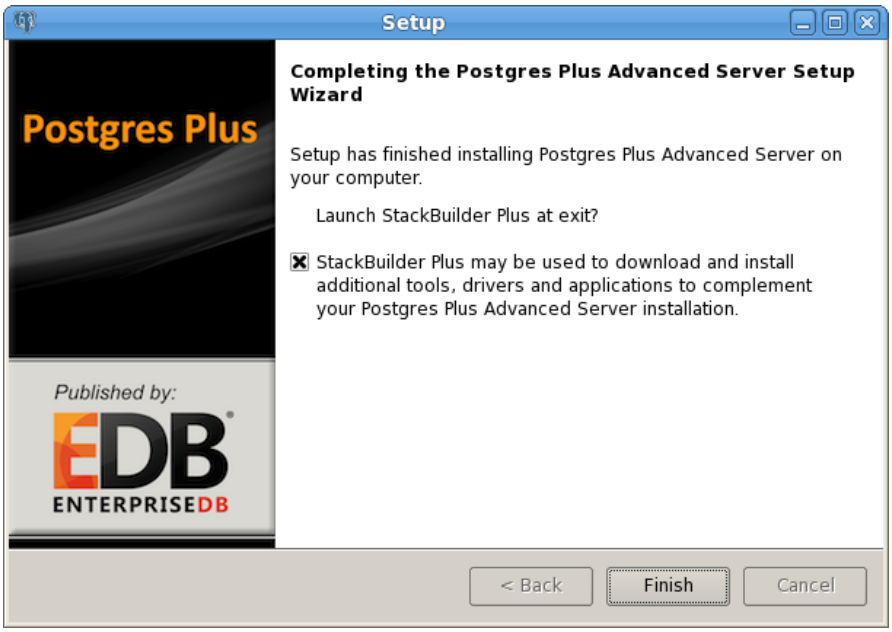



*Figure 4.36 — The installation wizard offers to Launch StackBuilder Plus at exit.*

You can optionally clear the StackBuilder Plus box and click Finish to complete the Advanced Server installation or accept the default and proceed to StackBuilder Plus.

StackBuilder Plus provides a graphical interface that downloads and installs applications and drivers that work with Advanced Server. For more information about StackBuilder Plus, see Using Stackbuilder Plus.

## Invoking the Installer from the Command Line

The command line options of the Advanced Server installer offer functionality in situations where a graphical installation may not work because of limited resources or privileges. You can:

- Include the --mode unattended option when invoking the installer to perform an installation without user input.
- Include the --mode text option when invoking the installer to perform an installation from the command line.
- Invoke the installer with the --extract-only option to perform a minimal installation when you don't hold the privileges required to perform a complete installation.

Not all command line options are suitable for all platforms. For a complete reference guide to the command line options, see Section 4.4.4, *Reference - Command Line Options*.

Please Note: If you are invoking the installer from the command line to perform a system upgrade, the installer will ignore command line options, and preserve the configuration of the previous installation.

## Performing a Text Mode Installation

To specify that the installer should run in text mode, include the -mode text command line option when invoking the installer. Text-mode installations are useful if you need to install on a remote server using ssh tunneling (and have access to a minimal amount of bandwidth), or if you do not have access to a graphical interface.

In text mode, the installer uses a series of command line questions to establish the configuration parameters. Text-mode installations are valid only on Linux systems.

You must assume superuser privileges before performing a text-mode installation. To perform a text-mode installation on a Linux system, navigate to the directory that contains the installation binary file and enter:

```
# ./ppasmeta-9.5.x.x-linux.run --mode text
```

At any point during the installation process, you can press Ctrl-C to abort the installation.

The installer starts, prompting you to select an installation language (see Figure 4.37).

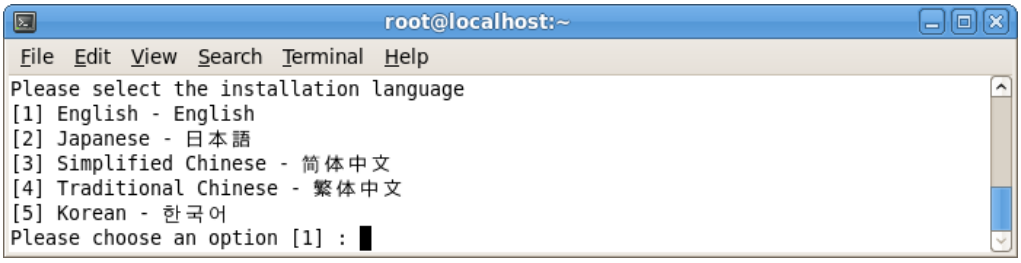



*Figure 4.37 — The text mode installer prompts you to select an installation language.*

The installation language is the language used by the installer during the installation process. The default value for English is displayed in square braces immediately to the left of the prompt ([1]); press Enter to accept the default value and continue, or change the value to specify an alternate installation language.

If the installer detects that you do not have Java installed on your system, it will alert you that it will not install Java-based components. Select Y or Enter to continue, or exit the installation and install Java before re-opening the installer.

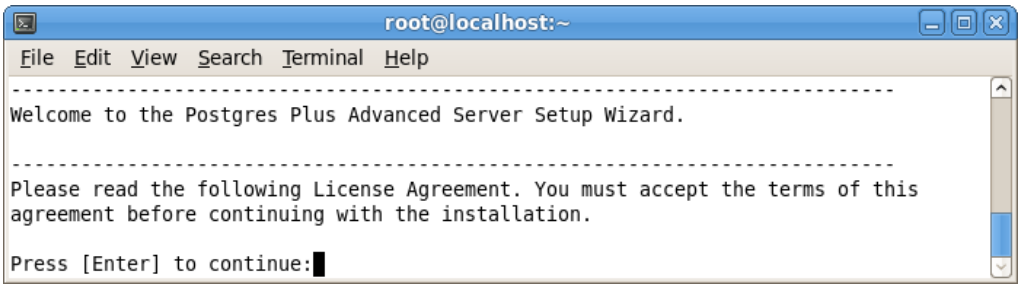



*Figure 4.38 — The text mode installer welcomes you to the Setup Wizard.*

The text mode installer welcomes you to the Setup Wizard (shown in Figure 4.38), and introduces the License agreement. Use the Enter key to page through the License agreement.

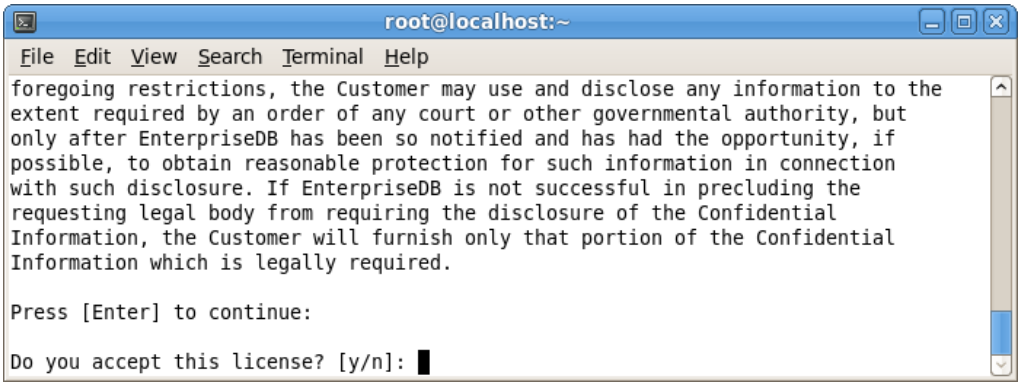


*Figure 4.39 — Accept the license agreement to continue.*

After reading the license agreement, enter y to accept the agreement and proceed with the installation (see Figure 4.39). Enter n if you do not accept the license agreement; this will abort the installation. Press Enter to proceed.

Next, Advanced Server will prompt you for the User Authentication information associated with your EnterpriseDB user account (see Figure 4.40). There is no charge to register for an EnterpriseDB user account; if you do not have a user account, visit http://www.enterprisedb.com/user-login-registration to register.

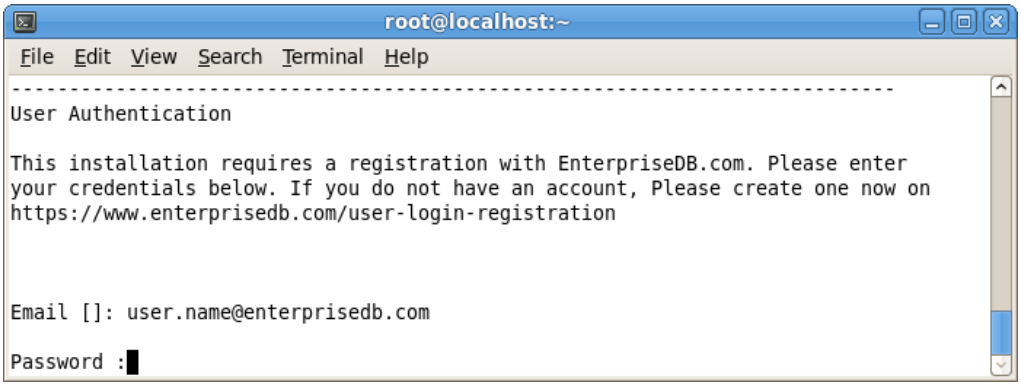



*Figure 4.40 — Enter User Authentication information when prompted.*

When prompted, enter the email address of a registered account, and then the corresponding password. Press Enter to continue to the next prompt (shown in Figure 4.41).

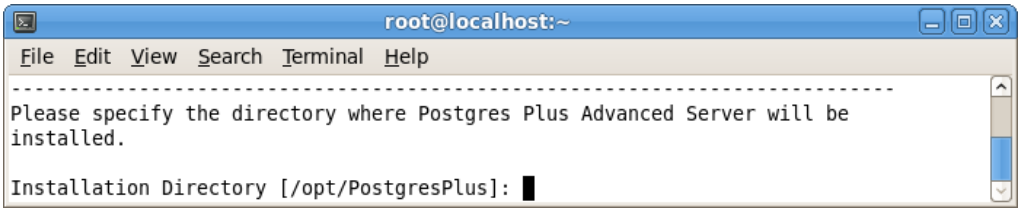



*Figure 4.41 — Specify an installation directory for Advanced Server.*

By default, Advanced Server is installed in /opt/PostgresPlus/9.5AS. Enter an alternate location, or press Enter to accept the default and continue to the component selection portion of the installation process (see Figure 4.42).

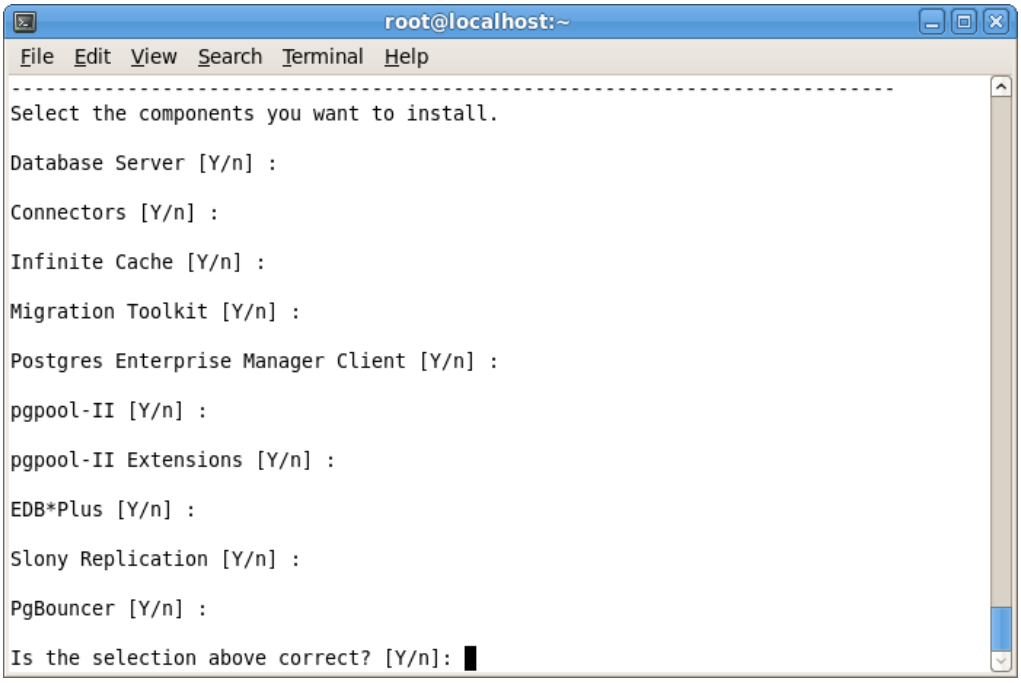



*Figure 4.42 — Select supporting components for installation.*

The installer prompts you individually for each component that is to be installed with Advanced Server; enter Y (or press Enter to accept the default value of yes) after each component that you wish to include with the installation. Enter n to omit a component from the installation.

The Advanced Server components are:

### Database Server

> Select the Database Server option to install Advanced Server 9.5.

### Connectors

> Select the Connectors option to install the client connector API's for JDBC, .NET, OCI and ODBC. The client connectors facilitate application connectivity for Advanced Server.

### Infinite Cache Daemon

> Select the Infinite Cache option to install the icache daemon.
>
> The installation wizard can optionally install the icache daemon on a remote icache server without including a complete installation of Advanced Server. To install only the icache daemon, deselect the other components shown on the Select Components window before clicking

> Next.
>
> For more information about using Infinite Cache and the icache daemon, see the *EDB Postgres (Postgres Plus) Migration Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

### Migration Toolkit

> Select the Migration Toolkit option to install Migration Toolkit. Migration Toolkit is a command line migration utility that facilitates migration from MySQL, Oracle, SQL Server and Sybase databases. See the *EDB Postgres Migration Toolkit Guide* for more information about Migration Toolkit, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

### Postgres Enterprise Manager Client

> Select the Postgres Enterprise Manager Client option to install the PEM Client application. The PEM Client provides a powerful graphical interface for database management and monitoring.

### pgpool-II

> pgpool-II provides load balancing, connection pooling, high availability, and connection limits for Advanced Server databases.

### pgpool-II Extensions

> If you are installing pgpool-II, include the pgpool-II Extensions to provide the extensions required by the server to implement pgpool-II functionality.

### EDB*Plus

> Select the EDB*Plus option to install EDB*Plus. EDB*Plus is the Advanced Server command line interface that offers compatibility with Oracle’s SQL Plus commands.

### Slony Replication

> Check the box next to Slony Replication to specify that Slony-I should be included in the Advanced Server installation. Slony-I facilitates master-standby replication suited for large databases with a limited number of standby systems.

### PgBouncer

> PgBouncer is a lightweight connection pooling utility for Advanced Server. Connection pooling can dramatically reduce processing time and resources for systems maintaining client connections to one or more databases.

After selecting components for installation, confirm that the list is correct by entering Y; enter n to iterate through the list of components a second time. Press Enter to continue.

Next, the installer prompts you to specify the location of the additional directories required by Advanced Server (see Figure 4.43).

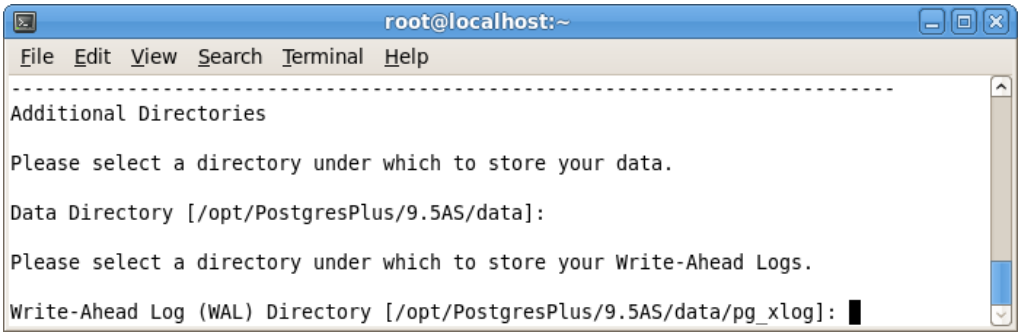



*Figure 4.43 — The installer prompts you for additional directory locations.*

The default data directory is /opt/PostgresPlus/9.5AS/data. You can specify an alternate location, or press Enter to accept the default and continue.

The default location of the Advanced Server Write-Ahead Log Directory is /opt/PostgresPlus/9.5AS/data/pg_xlog. Press Enter to accept the default location and continue, or specify an alternate location.

Advanced Server uses write-ahead logs to help ensure transaction safety and speed transaction processing; when you make a change to a table, the change is stored in shared memory and a record of the change is written to the write-ahead log. When you COMMIT a transaction, Advance Server writes contents of the write-ahead log to disk.

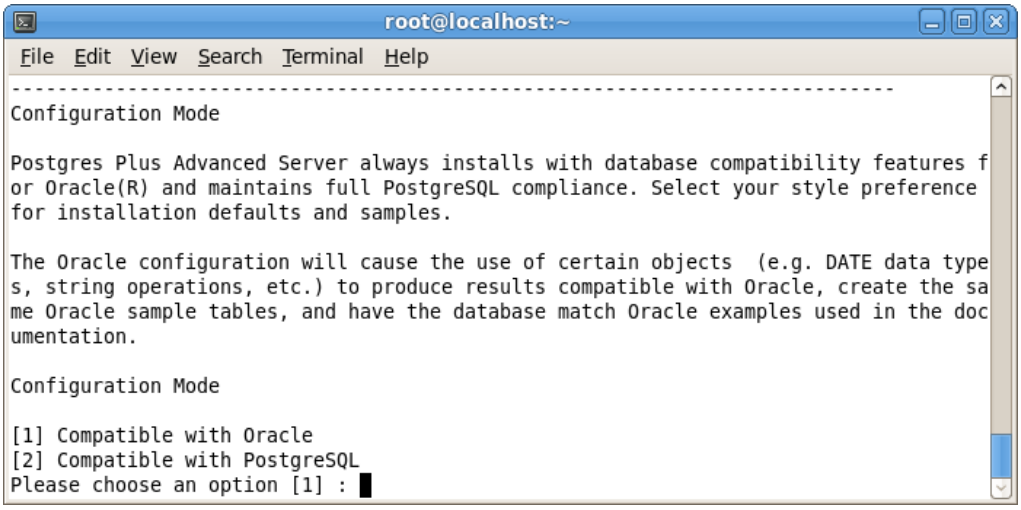



*Figure 4.44 — Specifying a Configuration Mode.*

The installer prompts you to select a Configuration Mode (see Figure 4.44). The configuration mode specifies the server dialect that Advanced Server will be compatible with; you can choose between Compatible with Oracle and Compatible with PostgreSQL installation modes.

### *Compatible with Oracle Mode*

> Installing Advanced Server in Compatible with Oracle mode provides the following functionality:
>
> - Data dictionary views and data type conversions compatible with Oracle databases.
> - Date values displayed in a format compatible with Oracle syntax.
> - Oracle-styled concatenation rules (if you concatenate a string value with a NULL value, the returned value is the value of the string).
> - Schemas (dbo and sys) compatible with Oracle databases added to the SEARCH_PATH.
> - Support for the following Oracle built-in packages:

| Package | Functionality Compatible with Oracle Databases |
|---|---|
| dbms_alert | Provides the ability to register for, send and receive alerts. |
| dbms_crypto | Provides a way to encrypt or decrypt RAW, BLOB or CLOB data. |
| dbms_job | Implements job-scheduling functionality. |
| dbms_lob | Provides the ability to manage large objects. |

| Package | Functionality Compatible with Oracle Databases |
|---|---|
| dbms_lock | Provides support for the DBMS_LOCK.SLEEP procedure. |
| dbms_mview | Provides a way to manage and refresh materialized views. |
| dbms_output | Provides the ability to display a message on the client. |
| dbms_pipe | Provides the ability to send a message from one session and read it in another session. |
| dbms_profiler | Collects and stores performance data about PL/pgSQL and SPL statements. |
| dbms_random | Provides a way to generate random numbers. |
| dbms_rls | Implements row level security. |
| dbms_scheduler | Provides a way to create and manage Oracle-style jobs. |
| dbms_session | A partial implementation that provides support for DBMS_SESSION.SET_ROLE. |
| dbms_sql | Implements use of Dynamic SQL |
| dbms_utility | Provides a collection of misc functions and procedures. |
| utl_encode | Provides a way to encode or decode data. |
| utl_file | Provides a way for a function, procedure or anonymous block to interact with files stored in the server's file system. |
| utl_http | Provides a way to use HTTP or HTTPS to retrieve information found at a URL. |
| utl_mail | Provides a simplified interface for sending email and attachments. |
| utl_raw | Provides a way to manipulate or retrieve the length of raw data types. |
| utl_smtp | Implements smtp email functions. |
| utl_url | Provides a way to escape illegal and reserved characters in a URL. |

> This is not a comprehensive list of the compatibility features for Oracle included when Advanced Server is installed in Compatible with Oracle mode; more information about Advanced Server is available in the *Database Compatibility for Oracle Developer's Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

> If you choose to install in Compatible with Oracle mode, the Advanced Server superuser name is enterprisedb.

### *Compatible with PostgreSQL Mode*

> When installed in Compatible with PostgreSQL mode, Advanced Server exhibits complete compatibility with Postgres version 9.5. For more information about Postgres functionality, see the PostgreSQL core documentation, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

> If you choose to install in Compatible with PostgreSQL mode, the Advanced Server superuser name is postgres.

Press Enter to accept the default configuration mode (Compatible with Oracle) and continue; enter 2 and press Enter to install in Compatible with PostgreSQL mode. The installer prompts you for a database superuser password (see Figure 4.45).

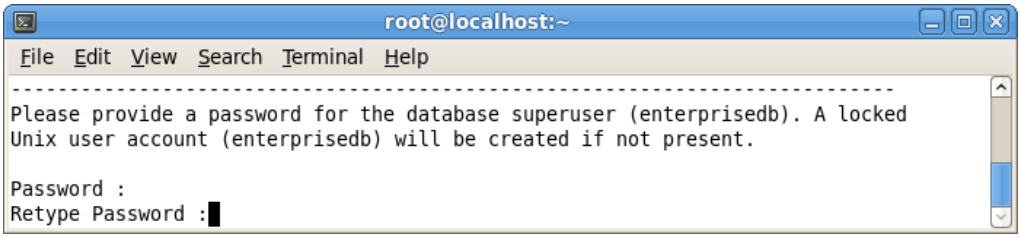



*Figure 4.45 — Enter password information for the service account.*

Advanced Server uses the password specified on the Password window for the database superuser and pgAgent service. The specified password must conform to any security policies existing on the Advanced Server host.

After entering a password in the Password field, confirm the password and press Enter to continue. The installer asks for Additional Configuration information (see Figure 4.46).

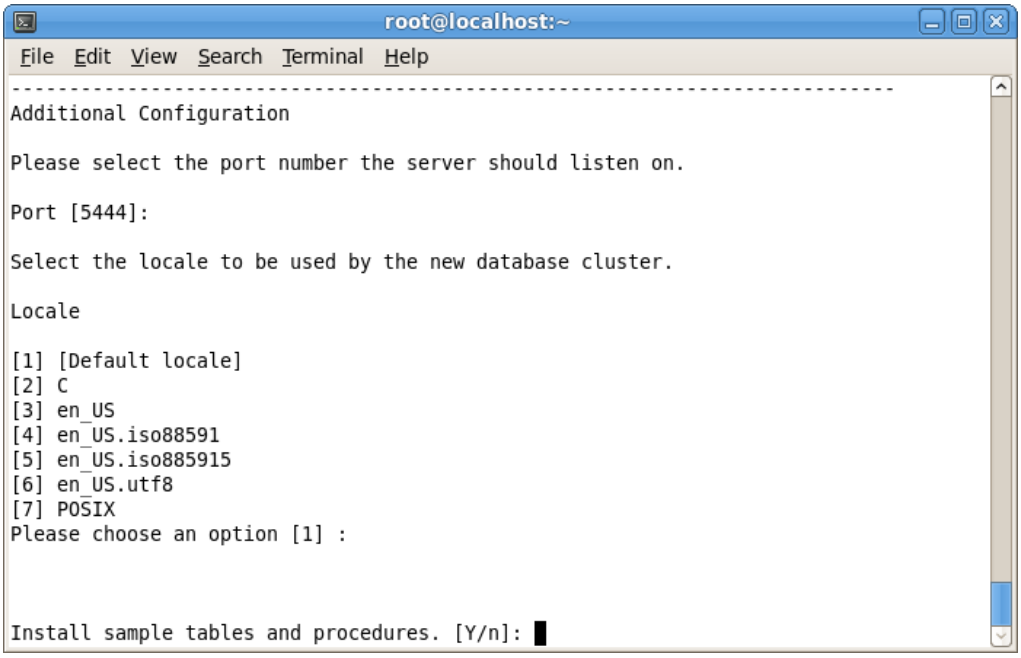



*Figure 4.46 — The installer prompts for Additional Configuration information.*

- When prompted, enter the Port that the Advanced Server service will monitor for connections. By default, Advanced Server chooses the first available port after port number 5444.
- Specify a Locale by entering a locale number from the list shown. Accept the Default locale value to instruct the installer to use the system locale as the server locale.
- When prompted, enter Y (or press Enter to accept the default value) to install the sample tables and procedures for the database dialect specified by the compatibility mode (Oracle or PostgreSQL).

- When the Update Notification Service prompt appears, enter Y to indicate that Advanced Server should notify you of any available updates and security patches for your installation of Advanced Server.

Dynatune functionality allows Advanced Server to make optimal usage of the system resources available on the host machine. To facilitate performance tuning through Dynatune, the installer prompts you for Server Utilization and Workload Profile information (see Figure 4.47).

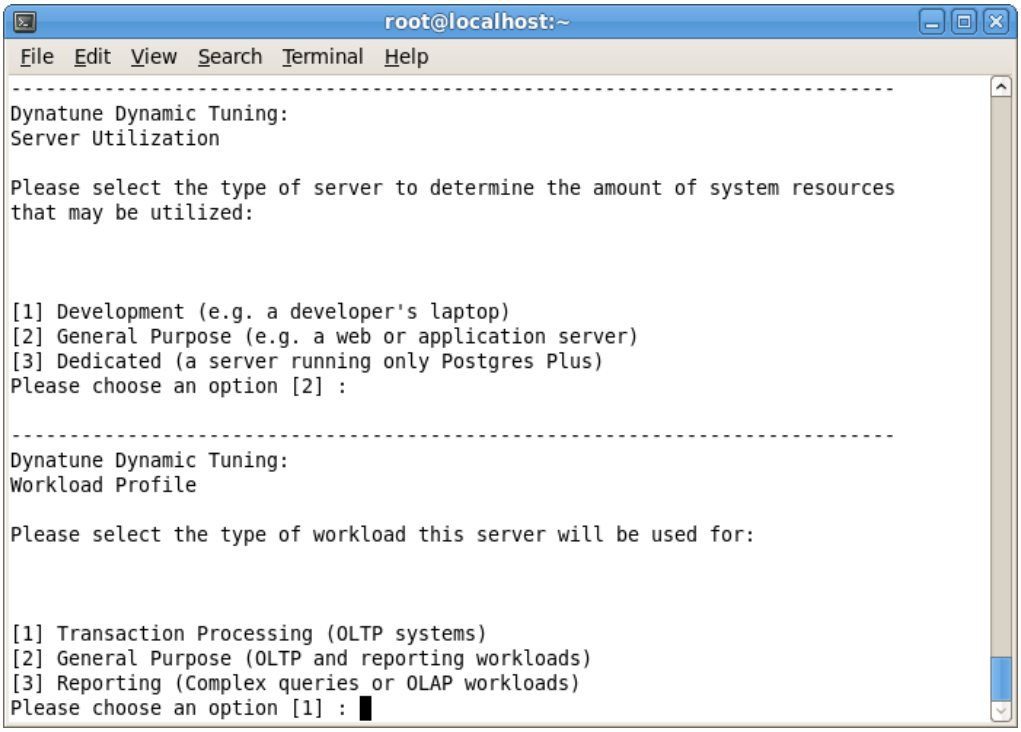



*Figure 4.47 — Specify Dynatune configuration information.*

The edb_dynatune configuration parameter determines how Advanced Server allocates system resources. Specify a usage type for the Advanced Server installation to establish the initial value of edb_dynatune.

- Specify Development to set the value of edb_dynatune to 33.

> A low value dedicates the least amount of the host machine's resources to the database server. This is a good choice for a development machine.
>
> - Specify General Purpose to set the value of edb_dynatune to 66.

> A mid-range value dedicates a moderate amount of system resources to the database server. This would be a good setting for an application server with a fixed number of applications running on the same host as Advanced Server.
>
> - Specify Dedicated to set the value of edb_dynatune to 100.

> A high value dedicates most of the system resources to the database server. This is a good choice for a host machine that is dedicated to running Advanced Server.

Enter a value of 1, 2 or 3, or simply accept the default value of 2 (to indicate that the server will be used for General Purpose processing) and press Enter

to continue.

Next, the Advanced Server installer prompts for a description of the system Workload Profile.

The installer uses the Workload Profile to establish the initial value of the edb_dynatune_profile configuration parameter. The edb_dynatune_profile parameter controls performance-tuning aspects based on the type of work that the server performs.

- Enter 1 to indicate Transaction Processing (OLTP systems) and set the value of edb_dynatune_profile to oltp.

> Recommended when Advanced Server is processing heavy online transaction processing workloads.
>
> - Enter 2 to indicate General Purpose (OLTP and reporting workloads) and set the value of edb_dynatune_profile to mixed.

> Recommended for servers that provide a mix of transaction processing and data reporting.
>
> - Enter 3 to indicate Reporting (Complex queries or OLAP workloads) and set the value of edb_dynatune_profile to reporting.

> Recommended for database servers used for heavy data reporting.

After choosing a Workload Profile, press Enter to continue.

After the installation is complete, you can adjust the values of edb_dynatune and edb_dynatune_profile by editing the postgresql.conf file and restarting the server.

For more information about edb_dynatune and other performance-related topics, see the *EDB Postgres (Postgres Plus) Migration Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

When the installer continues, it requests configuration information for the PgBouncer and pgAgent services (see Figure 4.48).

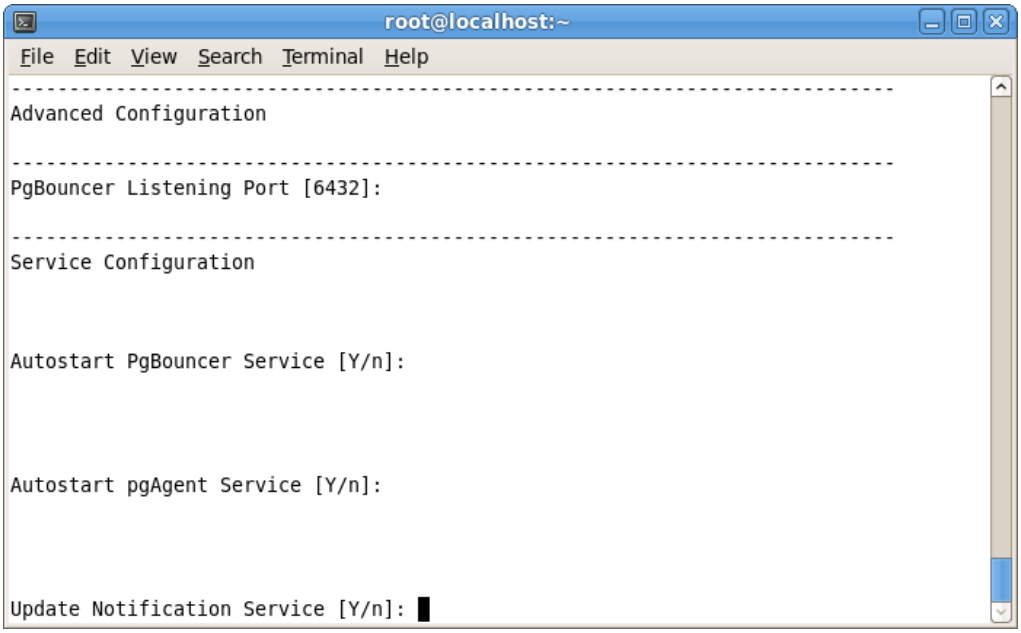



*Figure 4.48 — The installer requests configuration information about PgBouncer and pgAgent.*

PgBouncer is a lightweight connection pooling utility for Advanced Server. Connection pooling can dramatically reduce processing time and resources for systems maintaining client connections to one or more databases.

Please note that the pgBouncer program stores a list of users and passwords in clear-text form in the following file:

> /opt/PostgresPlus/pgbouncer/etc/userlist.txt.

By default, the file is located in a directory that is accessible only to the cluster owner (by default, enterprisedb), but administrators should take note of the file and maintain permissions in a manner that secures the file from untrusted users.

For more information about PgBouncer, visit the project site at:

http://pgbouncer.projects.postgresql.org/doc/usage.html

By default, Advanced Server expects PgBouncer to listen on port 6432; update the Listening Port field, or accept the default, and press Enter to continue.

pgAgent is a job scheduling agent for Postgres, capable of running multi-step batch/shell and SQL tasks on complex schedules. pgAgent also provides background support for the DBMS_JOB built-in package compatible with

Oracle databases.

If enabled, the Update Notification Service notifies you of any available updates and security patches for your installation of Advanced Server.

By default, the installer specifies that Advanced Server should start the services when the system boots; specify n to disable PgBouncer, pgAgent and the Update Notification Service, or accept the defaults, and press Enter to continue to the Pre Installation Summary (shown in Figure 4.49).

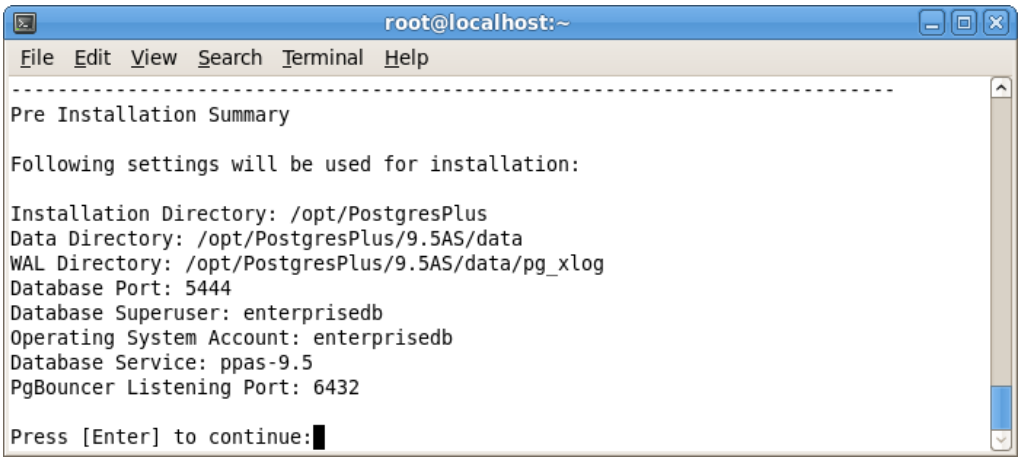



*Figure 4.49 — The Pre Installation Summary.*

The Pre Installation Summary lists the options specified during the installation setup process; review the listing and press Enter to continue; press Enter again to start the installation process. The installer extracts the Advanced Server files and proceeds with the installation (shown in Figure 4.50).

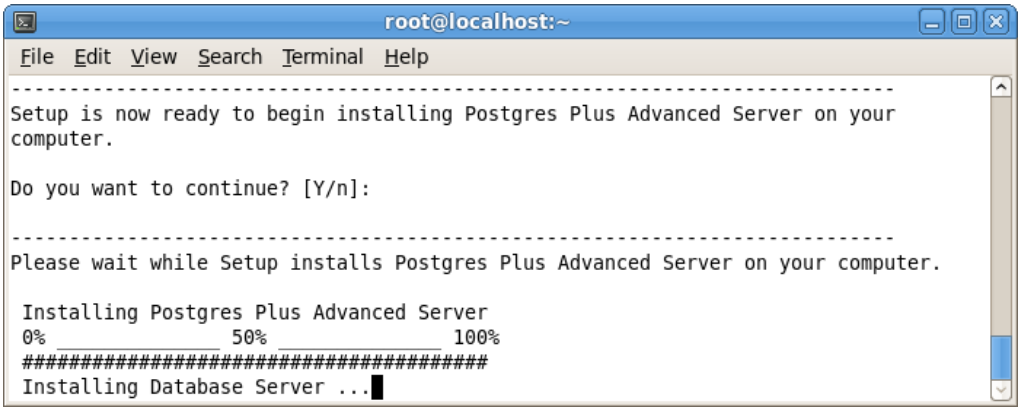



*Figure 4.50 — The Advanced Server installer performs the installation.*

The dialog lists each module as it is being installed, and informs you when the installation is complete (see Figure 4.51).

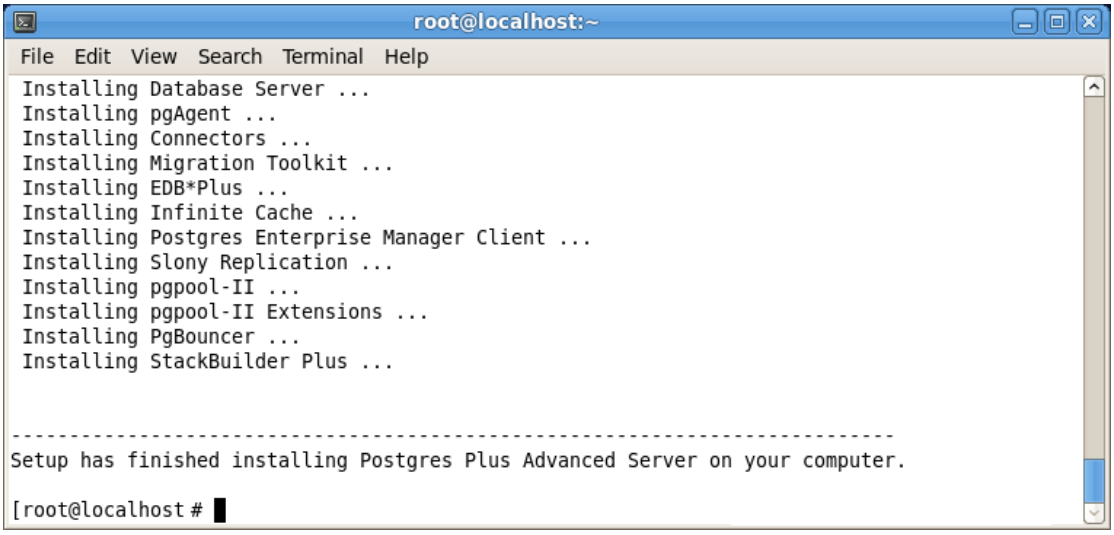



*Figure 4.51 — The text mode installation is complete.*

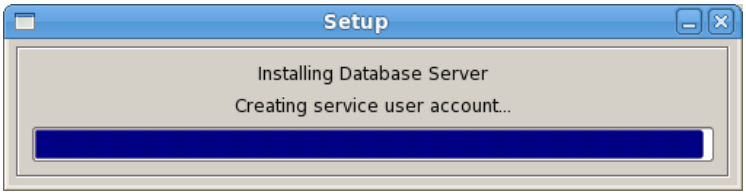
## Performing an Unattended Installation

To specify that the installer should run without user interaction, include the --mode unattended command line option. In unattended mode, the installer uses one of the following sources for configuration parameters:

- command line options (specified when invoking the installer)
- parameters specified in an option file
- Advanced Server installation defaults

Unattended installations are supported on both Windows and Linux systems.

You can embed the non-interactive Advanced Server installer within another application installer; during the installation process, a progress bar displays for the user (shown in Figure 4.52).




> *Figure 4.52 — Using --mode unattended displays a progress bar to the user.*

You must have superuser privileges to install Advanced Server using the --

mode unattended option on a Linux system. On a Windows system, administrative privileges are required. If you are using the --mode unattended option to install Advanced Server with another installer, the calling installer must be invoked with superuser or administrative privileges.

To start the installer in unattended mode, specify the -mode unattended option on the command line.

***On Linux***

To install in unattended mode on a Linux machine, navigate to the directory that contains the Advanced Server installer and enter:

./ppasmeta-9.5.*x*.*x*-linux.run --mode unattended --superpassword *database_superuser_password* --webusername *edb_user_name@email.com* --webpassword *edb_user_password*

The --superpassword option specifies a password for the database superuser. If you omit the option, the database superuser password defaults to enterprisedb. The default password can be easily guessed by a potential intruder; be sure to provide a stronger password with the --superpassword option.

You must include the --webusername and --webpassword options to specify the identity of a registered EnterpriseDB user. There is no charge to register for an EnterpriseDB user account; if you do not have an account, you can create one at:

http://www.enterprisedb.com/user-login-registration

You can control configuration parameters for Advanced Server by specifying options at the command line, or by including the parameters in a configuration file. Specify the parameters within the configuration file in option=value pairs (shown in Figure 4.53).

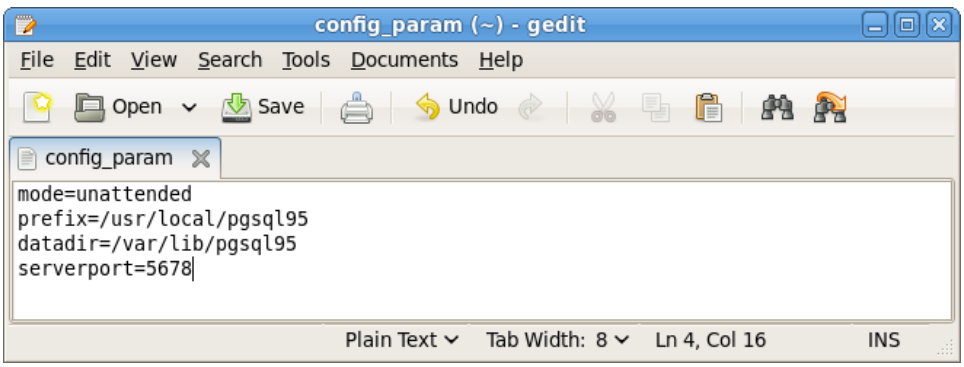


*Figure 4.53 — A sample configuration parameter file.*

When you invoke the installer, include the --optionfile parameter, and the complete path to the configuration parameter file:

# ./ppasmeta-9.5.*x*.*x*-linux.run --optionfile /$HOME/config_param

For more information about the command line options supported during an unattended installation, see Section 4.4.4, *Reference - Command Line Options*.

***On Windows***

To start the installer in unattended mode on a Windows system, navigate to the directory that contains the executable file, and enter:

ppasmeta-windows.exe --mode unattended --superpassword *database_superuser_password* --servicepassword *system_password* --webusername *edb_user_name@email.com* --webpassword *edb_user_password*

Include the --servicepassword option to specify an operating system password for the user installing Advanced Server. Omitting the option can lead to authentication problems on some Windows systems, and enforced password policies may not accept the default password (enterprisedb).

Use the --webusername and --webpassword options to specify the identity of a registered EnterpriseDB user; if you do not have an account, you can create one at:

http://www.enterprisedb.com/user-login-registration

## Performing an Installation with Limited Privileges

To perform an abbreviated installation of Advanced Server without access to root or administrative privileges, invoke the installer from the command line and include the --extract-only option. Invoking the installer with the --extract-only option extracts the binary files in an unaltered form, allowing you to experiment with a minimal installation of Advanced Server.

If you invoke the installer with the --extract-only option, you must manually

start and stop the server with pg_ctl. For more information about starting the Advanced Server service, see Section 5.2.3, *Using pg_ctl to Control Advanced Server*.

If you include the --extract-only option when you invoke the installer, the installer steps through a shortened form of the installation wizard. During the brief installation process, the installer generates an installation script that can be later used to complete a more complete installation. To invoke the installation script, you must have superuser privileges on Linux or administrative privileges on Windows.

The installation script:

- Initializes the database cluster if the cluster is empty.
- Configures the server to start at boot-time.
- Creates services for the supporting components (such as pgAgent and PgBouncer).
- Establishes initial values for Dynatune (dynamic tuning) variables.

The scripted Advanced Server installation does not include menu shortcuts or access to StackBuilder Plus, and no modifications are made to registry files. The Advanced Server Update Monitor will not detect components installed by the scripted installation, and will not issue alerts for available updates to those components.

To perform a limited installation and generate an installation script, download and unpack the Advanced Server installer. Navigate into the directory that contains the installer, and invoke the installer with the command:

> On Linux:
>
> ./ppasmeta-9.5.*x.x*-linux.run --extract-only yes
>
> On Windows:
>
> ppasmeta-9.5.*x.x*-windows.exe --extract-only yes

A dialog opens, prompting you to choose an installation language. Select a language for the installation from the drop-down listbox, and click OK to continue. The Setup Wizard opens (shown in Figure 4.54).


*Figure 4.54 — The Welcome window.*

Click Next to continue to the Advanced Server license agreement (shown in Figure 4.55).

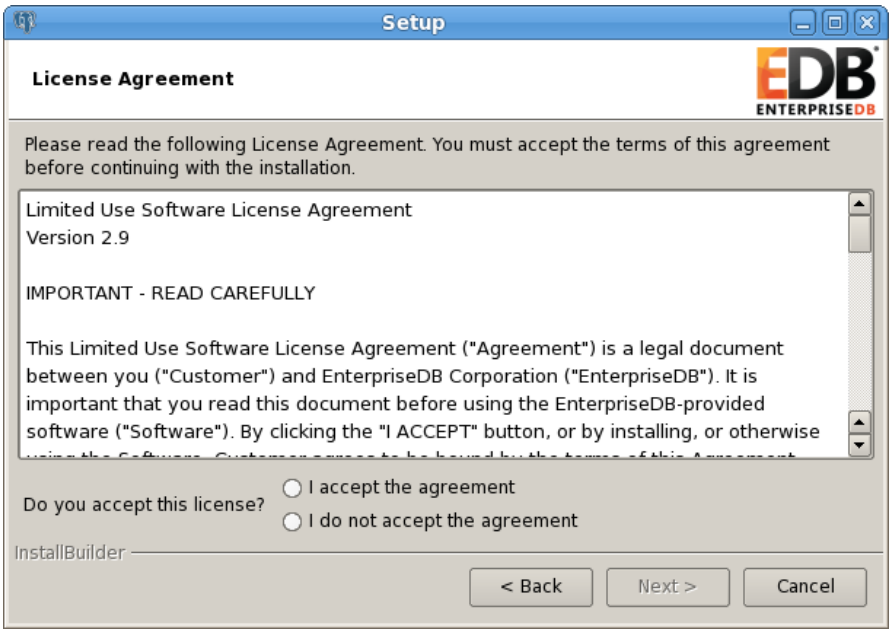



*Figure 4.55 — The Advanced Server license agreement.*

After reading the license agreement, select the appropriate radio button and click Next to continue to the User Authentication window (shown in Figure 4.56).

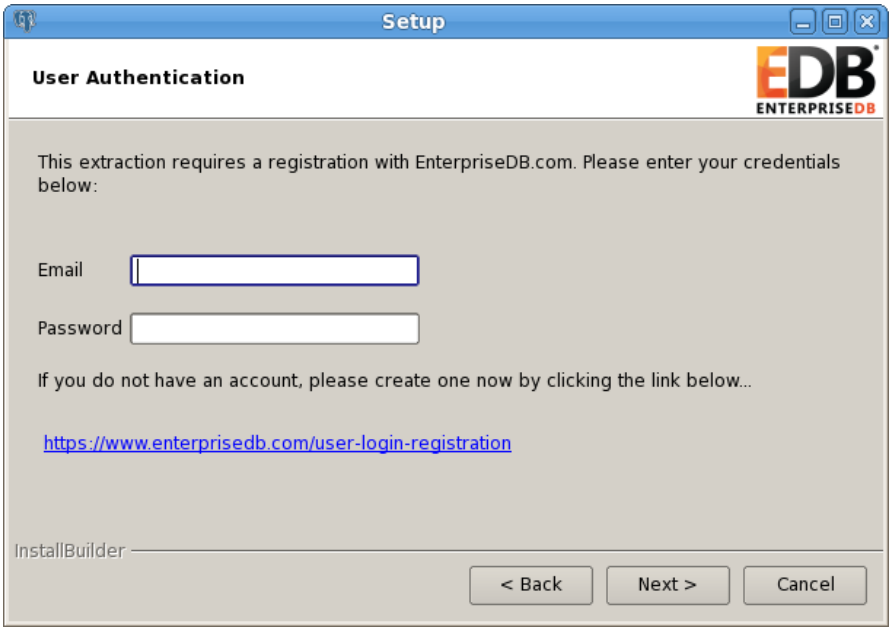



*Figure 4.56 — The Advanced Server User Authentication window.*

Before continuing, you must provide the email address and password associated with your EnterpriseDB user account. Registration is free; if you do not have a user account, click the link provided to open a web browser, and register your user information.

Enter the email address of a registered account in the Email field, and the corresponding password in the Password field, and click Next to continue.

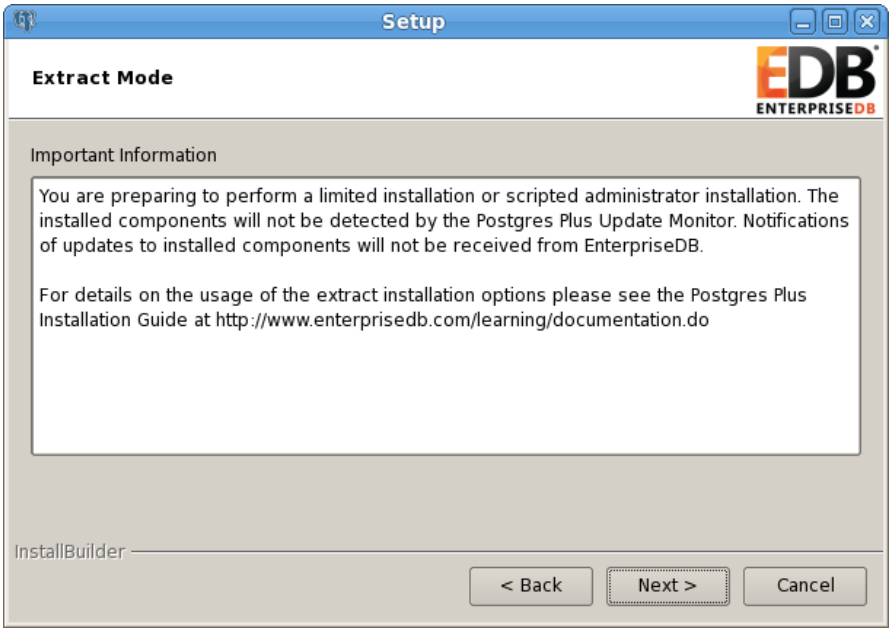



*Figure 4.57 — The Extract Mode confirmation window.*

The Extract Mode window (shown in Figure 4.57) serves as a reminder that this is a limited installation, and as such, Update Monitor will not be able to

notify you of available updates for the software included in this installation. Click Next to continue to the Installation Directory window (shown in Figure 4.58).

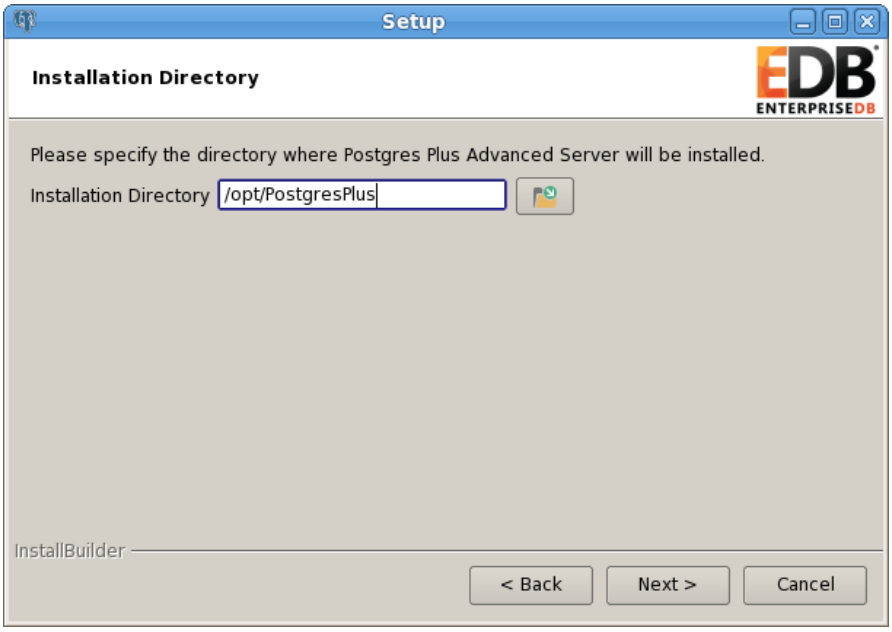



*Figure 4.58 — Specify an installation directory.*

> On Linux, the default Advanced Server installation directory is:
>
> /opt/PostgresPlus
>
> On Windows, the default Advanced Server installation directory is:
>
> C:\Program Files (x86)\PostgresPlus\9.5AS

You can accept the default installation location, and click Next to continue to the Ready to Install window (shown in Figure 4.59), or optionally click the File Browser button to choose an alternate installation directory.

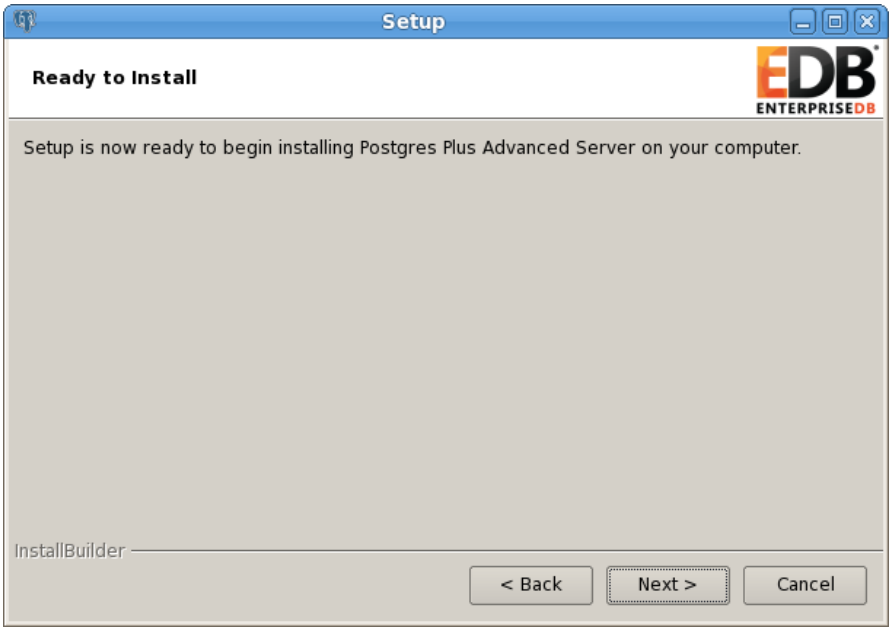



*Figure 4.59 — The installation wizard is ready to install Advanced Server.*

Click Next to proceed with the Advanced Server installation.

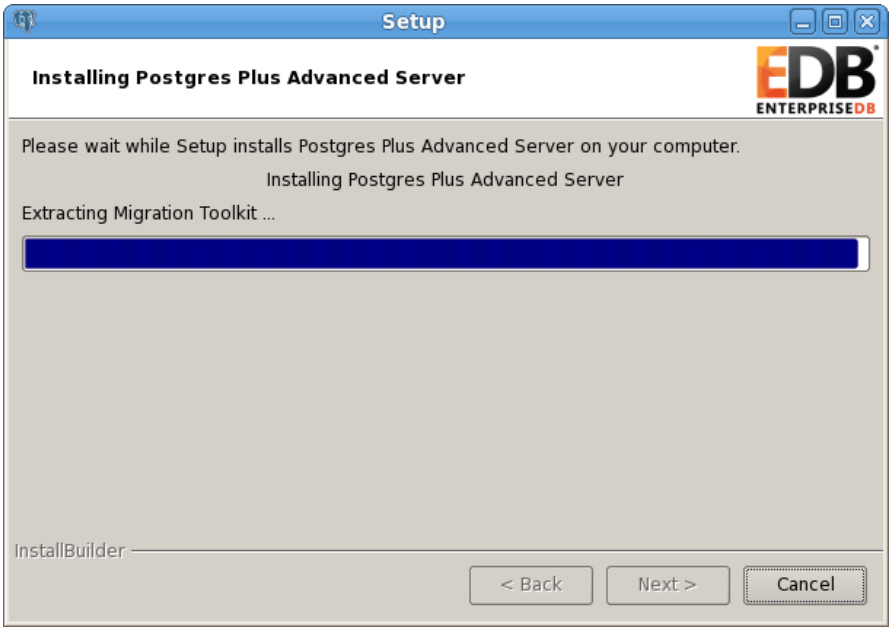



*Figure 4.60 — Progress bars mark installation progress.*

During the installation, progress bars and popups mark the installation progress (Figure 4.60).

A minimal installation of Advanced Server is complete (see Figure 4.61).

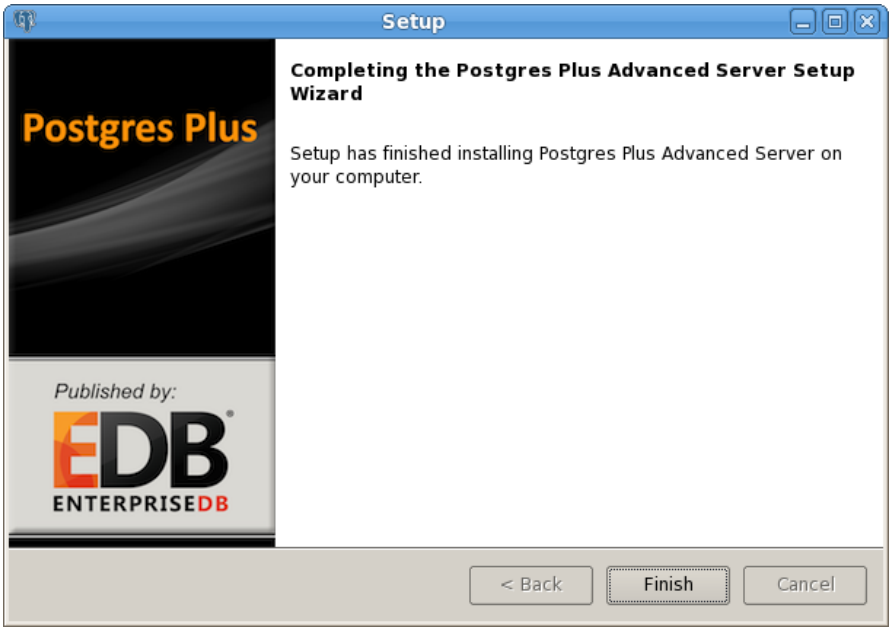



*Figure 4.61 — The Advanced Server installation is complete.*

After completing the minimal installation, you can perform a full installation by executing the installation script that is (by default) located in:

> On Linux:
>
> /opt/PostgresPlus/
>
> On Windows:
>
> C:\Program Files (x86)\PostgresPlus\

To execute the installation script, open a command line and navigate to the directory that contains the script. Assume superuser or administrative privileges, and execute the command:

> On Linux:
>
> ./runAsRoot.sh
>
> On Windows:
>
> cscript runAsAdmin.vbs

The installation script executes at the command line, prompting you for installation configuration information. The default configuration value is displayed in square braces after each prompt; update the default value or

press Enter to accept the default value and continue.

The following dialog is an example of a scripted installation on a Linux system. The actual installation dialog will vary by platform and reflect the options specified during the installation.

\========== INSTALLATION DIRECTORY \========== Please enter the installation directory: [ /opt/PostgresPlus ] :

> The installation directory is the directory where Advanced Server is installed.

\========== DATA DIRECTORY \========== NOTE: If data directory exists and postgresql.conf file exists in that directory, we will not initialize the cluster. Please enter the data directory path: [ /opt/PostgresPlus/9.5AS/data ] :

> The data directory is the directory where Advanced Server data is stored.

\========== WAL DIRECTORY \========== Please enter the Write-Ahead Log (WAL) directory path: [ /opt/PostgresPlus/9.5AS/data/pg_xlog ] :

> The WAL directory is where the write-ahead log will be written.

\========== DATABASE MODE \========== Please enter Database Mode [oracle]:

> Database mode specifies the database dialect with which the Advanced Server installation is compatible. The optional values are oracle or postgresql.
>
> ***Compatible with Oracle Mode***
>
> Specify oracle mode to include the following functionality:
>
> - Data dictionary views and data type conversions compatible with Oracle databases.
> - Date values displayed in a format compatible with Oracle syntax.
> - Oracle-styled concatenation rules (if you concatenate a string value with a NULL value, the returned value is the value of the string).
> - Schemas (dbo and sys) compatible with Oracle databases added to

the SEARCH_PATH.

- Support for the following Oracle built-in packages:

| Package | Functionality Compatible with Oracle Databases |
|---|---|
| dbms_alert | Provides the ability to register for, send and receive alerts. |
| dbms_crypto | Provides a way to encrypt or decrypt RAW, BLOB or CLOB data. |
| dbms_job | Implements job-scheduling functionality. |
| dbms_lob | Provides the ability to manage large objects. |
| dbms_lock | Provides support for the DBMS_LOCK.SLEEP procedure. |
| dbms_mview | Provides a way to manage and refresh materialized views. |
| dbms_output | Provides the ability to display a message on the client. |
| dbms_pipe | Provides the ability to send a message from one session and read it in another session. |
| dbms_profiler | Collects and stores performance data about PL/pgSQL and SPL statements. |
| dbms_random | Provides a way to generate random numbers. |
| dbms_rls | Implements row level security. |
| dbms_scheduler | Provides a way to create and manage Oracle-style jobs. |
| dbms_session | A partial implementation that provides support for DBMS_SESSION.SET_ROLE. |
| dbms_sql | Implements use of Dynamic SQL |
| dbms_utility | Provides a collection of misc functions and procedures. |
| utl_encode | Provides a way to encode or decode data. |
| utl_file | Provides a way for a function, procedure or anonymous block to interact with files stored in the server’s file system. |
| utl_http | Provides a way to use HTTP or HTTPS to retrieve information found at a URL. |
| utl_mail | Provides a simplified interface for sending email and attachments. |
| utl_raw | Provides a way to manipulate or retrieve the length of raw data types. |
| utl_smtp | Implements smtp email functions. |

| Package | Functionality Compatible with Oracle Databases |
| --- | --- |
| utl_url | Provides a way to escape illegal and reserved characters in a URL. |

> This is not a comprehensive list of the compatibility features for Oracle included when Advanced Server is installed in Compatible with Oracle mode; more information about Advanced Server is available in the *Database Compatibility for Oracle Developer's Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

> If you choose to install in Compatible with Oracle mode, the Advanced Server superuser name is enterprisedb.
>
> ***Compatible with PostgreSQL Mode***
>
> Specify Postgresql to install Advanced Server with complete compatibility with Postgres version 9.5.
>
> For more information about PostgreSQL functionality, see the PostgreSQL core documentation, available at:

https://www.postgresql.org/docs/9.5/static/index.html

> If you choose to install in Compatible with PostgreSQL mode, the Advanced Server superuser name is postgres.

\==== PORT \==== NOTE: We will not be able to examine, if port is currently used by other application. Please enter port: [5444]:

> Specify a port number for the Advanced Server listener to listen on.

\====== LOCALE \====== Please enter the locale: [DEFAULT]:

> Specify a locale for the Advanced Server installation. If you accept the DEFAULT value, the locale defaults to the locale of the host system.

\============= SAMPLE TABLES \============= Install sample tables and procedures? (Y/n) [Y]:

> Press Return, or enter Y to accept the default, and install the sample

> tables and procedures; enter an N and press Return to skip this step.

\========== DATABASE SUPERUSER PASSWORD \========== Please provide password for the super-user(enterprisedb):[]: Please re-type password for the super-user(enterprisedb):[]:

> Specify and confirm a password for the database superuser. By default, the database superuser is named enterprisedb. (On Windows, there is no password validation if you are logged in as an administrator but you may be prompted to supply a service account password.)

\========== SERVER UTILIZATION \========== Please enter the server utilization: [66]:

> Specify a value between 1 and 100.
>
> The server utilization value is used as an initial value for the edb_dynatune configuration parameter. edb_dynatune determines how Advanced Server allocates system resources.
>
> - A low value dedicates the least amount of the host machine's resources to the database server; a low value is a good choice for a development machine.
> - A mid-range value dedicates a moderate amount of system resources to the database server. A mid-range value is a good setting for an application server with a fixed number of applications running on the same host as Advanced Server.
> - A high value dedicates most of the system resources to the database server. A high value is a good choice for a host machine that is dedicated to running Advanced Server.

> After the installation is complete, you can adjust the value of edb_dynatune by editing the postgresql.conf file. After editing the postgresql.conf file, you must restart the server for the changes to take effect.

\========== WORKLOAD PROFILE \========== Please enter the workload profile: [oltp]:

> The workload profile value is used as an initial value for the edb_dynatune_profile configuration parameter. edb_dynatune_profile controls performance-tuning based on the type of work that the server

> performs.
>
> - Specify oltp if the server will be processing heavy online transaction workloads.
> - Specify mixed if the server will provide a mix of transaction processing and data reporting.
> - Specify reporting if the database server will be used for heavy data reporting.

> After the installation is complete, you can adjust the value of edb_dynatune_profile by editing the postgresql.conf file and restarting the server.

Before continuing with the installation, the installer displays the selected options and initializes the database cluster in preparation for the installation of individual components. When the installer has prepared the system for the installation, the installation begins. Before installing a component, the installer prompts you to select modules for installation. With each component, onscreen warnings may alert you to unresolved dependencies.

*Please note that paths and the components installed will vary by platform.*

Found Slony replication. Do you want to configure Slony? (Y/n) [Y]:

> Slony facilitates master-standby replication suited for large databases with a limited number of standby systems.
>
> NOTE: slony replication service is installed. Please configure it as per your requirement and start the service.

Found PgBouncer. Do you want to configure PgBouncer? (Y/n) [Y] :

> PgBouncer is a lightweight connection pooling utility for Advanced Server. Connection pooling can dramatically reduce processing time and resources for systems maintaining client connections to one or more databases.

\============== PGBOUNCER PORT \============== NOTE: We will not be able to examine, if port is currently used by other application. Please enter the port on which PgBouncer will listen: [6432]:

> Specify a listener port for the PgBouncer utility.

Starting PgBouncer service…

Found Infinite Cache. Do you want to configure Infinite Cache? (Y/n) [Y]:

> For more information about Infinite Cache and the icache daemon, see the *EDB Postgres (Postgres Plus) Migration Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

NOTE: Infinite Cache service is installed. Please configure it as per your requirement and start the service.

Found pgpool-II. Do you want to configure pgpool-II? (Y/n) [ Y ] :

NOTE: ppas-pgpool-3.4 service is installed. Please configure it as per your requirement and start the service.

> pgpool-II provides load balancing, connection pooling, high availability, and connection limits for Advanced Server databases.

Found EdbPlus. Do you want to configure EdbPlus? (Y/n) [Y]:

> EDB*Plus is the Advanced Server command line interface that offers compatibility with Oracle's SQL Plus commands. The installer will prompt you for the absolute path of java on your system; Java 1.7 or higher is required for EDB*Plus.

Found EdbMtk. Do you want to configure EdbMtk? (Y/n) [ Y ] :

> EDB Postgres Migration Toolkit is a command line migration utility that facilitates migration from MySQL, Oracle, SQL Server and Sybase databases. The installer will prompt you for the absolute path of java on your system; Java 1.7 or higher is required for Migration Toolkit.

Found Postgres Enterprise Manager Client. Do you want to configure Postgres Enterprise Manager Client? (Y/n)[Y]:

> Select the Postgres Enterprise Manager Client option to install the PEM Client application. The PEM Client provides a powerful graphical interface for database management and monitoring.

Options saved in '/opt/PostgresPlus/9.5AS/.rar_options_*xxxxx*' file.

After continued processing, the Advanced Server installation is complete.

## Reference - Command Line Options

You can optionally include the following parameters for an Advanced Server installation on the command line, or in a configuration file when invoking the Advanced Server installer.

--autostart_pgagent { yes | no }

> Use the --autostart_pgagent parameter to specify whether the installer should start the pgAgent service at boot-time. The default is yes.

--autostart_pgbouncer { yes | no }

> Use the --autostart_pgbouncer parameter to specify whether the installer should start the PgBouncer service. The default is yes.

--create_samples { yes | no }

> Use the --create_samples option to specify whether the installer should create the sample tables and procedures for the database dialect specified with the --databasemode parameter. The default is yes.

--databasemode { oracle | postgresql }

> Use the --databasemode parameter to specify a database dialect. The default is oracle.

--datadir *data_directory*

> Use the --datadir parameter to specify a location for the cluster's data directory. *data_directory* is the name of the directory; include the complete path to the desired directory.

--debuglevel { 0 | 1 | 2 | 3 | 4 }

> Use the --debuglevel parameter to set the level of detail written to the *debug_log* file (see --debugtrace). Higher values produce more detail (producing a longer trace file). The default is 2.

--debugtrace *debug_log*

Use the --debugtrace parameter to troubleshoot installation problems. *debug_log* is the name of the file that contains installation troubleshooting details.

--disable-components *component_list*

Use the --disable-components parameter to specify a list of Advanced Server components to exclude from the installation. By default, *component_list* contains'' (the empty string). *component_list* is a comma-separated list containing one or more of the following components:

dbserver

EDB Postgres Advanced Server 9.5.

connectors

The Advanced Server client connector API’s for JDBC, .NET, OCI and ODBC.

infinitecache

Linux only. InfiniteCache allows you to increase the amount of data maintained as in-memory cache by distributing the cache across multiple commodity hardware farms.

edbmtk

Migration Toolkit is a command line migration utility that facilitates migration from MySQL, Oracle, SQL Server and Sybase databases.

pem_client

Linux and Windows only. The Postgres Enterprise Manager Client provides a powerful graphical interface for database management and monitoring.

edbplus

EDB*Plus is the Advanced Server command line interface that offers compatibility with Oracle’s SQL Plus commands.

pgpool

Linux only. pgpool-II provides load balancing, connection pooling, high availability, and connection limits for Advanced Server databases.

pgpool-extensions

Include the pgpool-extensions option to install server extensions required by the server when running pgpool-II.

replication

Slony-I facilitates master-standby replication suited for large databases with a limited number of standby systems.

pgbouncer

PgBouncer is a lightweight connection pooler for Advanced Server that can dramatically reduce the processing time and resources required to maintain a large number of client connections to one or more databases.

--enable_acledit { 1 | 0 }

The --enable_acledit 1 option instructs the installer to grant permission to the user specified by the --serviceaccount option to access the Advanced Server binaries and data directory. By default, this option is disabled if --enable_acledit 0 is specified or if the --enable_acledit option is completely omitted. **Note:** Specification of this option is valid only when installing on Windows. This option cannot be specified when installing on Linux.

--enable-components *component_list*

Use the --enable-components parameter to specify a list of Advanced Server components to include in the installation. By default, all components are included in a standard Advanced Server. *component_list* is a comma-separated list containing one or more of the following components:

dbserver

EDB Postgres Advanced Server 9.5.

connectors

The Advanced Server client connector API’s for JDBC, .NET, OCI and ODBC.

infinitecache

Linux only. InfiniteCache allows you to increase the amount of data maintained as in-memory cache by distributing the cache across multiple commodity hardware farms.

edbmtk

Migration Toolkit is a command line migration utility that facilitates migration from MySQL, Oracle, SQL Server and Sybase databases.

pem_client

Linux and Windows only. The Postgres Enterprise Manager Client provides a powerful graphical interface for database management and monitoring.

edbplus

EDB*Plus is the Advanced Server command line interface that offers compatibility with Oracle’s SQL Plus commands.

pgpool

Linux only. PgPool provides connection pooling, load balancing, and connection limitations functionality for Advanced Server databases.

pgpool-extensions

Include the pgpool-extensions option to install server extensions required by the server when running pgpool-II.

replication

Slony-I facilitates master-standby replication suited for large databases with a limited number of standby systems.

pgbouncer

> PgBouncer is a lightweight connection pooler for Advanced Server that can dramatically reduce the processing time and resources required to maintain a large number of client connections to one or more databases.

--extract-only { yes | no }

> Include the --extract-only parameter to indicate that the installer should extract the Advanced Server binaries without performing a complete installation. Superuser privileges are not required for the --extract-only option. The default value is no.

--help

> Include the --help parameter to view a list of the optional parameters.

--installer-language { en | ja | zh_CN | zh_TW | ko }

> Use the --installer-language parameter to specify an installation language for Advanced Server. The default is en.
>
> en specifies English.
>
> ja specifies Japanese
>
> zh_CN specifies Chinese Simplified.
>
> zh_TW specifies Traditional Chinese.
>
> ko specifies Korean.

--install_runtimes { yes | no }

> Windows only. Include --install_runtimes to specify whether the installer should install the Microsoft Visual C++ runtime libraries. Default is yes.

--locale *locale*

> Specifies the locale for the Advanced Server cluster. By default, the installer will use to the locale detected by initdb.

--mode {qt | gtk | xwindow | text | unattended}

> Use the --mode parameter to specify an installation mode. The following

> modes are supported:
>
> qt - Specify qt to tell the installer to use the Qt graphical toolkit
>
> gtk - Specify gtk to tell the installer to use the GTK graphical toolkit.
>
> xwindow - Specify xwindow to tell the installer to use the X Window graphical toolkit.
>
> text - Specify text to perform a text mode installation in a console window. This is a Linux-only option.
>
> unattended - Specify unattended to specify that the installer should perform an installation that requires no user input during the installation process.

--optionfile *config_file*

> Use the --optionfile parameter to specify the name of a file that contains the installation configuration parameters. *config_file* must specify the complete path to the configuration parameter file.

--pgbouncerport

> Use the --pgbouncerport parameter to specify a listener port for the PgBouncer service. The default value is 6432.

*--*prefix *installation_dir*

> Use the --prefix parameter to specify an installation directory for Advanced Server. The default installation directory on a Linux system is:
>
> /opt/PostgresPlus/9.5AS
>
> The default installation directory on a Windows system is:
>
> C:\Program Files\PostgresPlus

--productkey *product_key*

> Use the --productkey parameter to specify a value for the product key.
>
> The --productkey parameter is only required when the specified system

> locale is Japanese, Chinese or Korean.

*--*serverport *port_number*

> Use the --serverport parameter to specify a listener port number for Advanced Server.
>
> If you are installing Advanced Server in unattended mode, and do not specify a value using the --serverport parameter, the installer will use port 5444, or the first available port after port 5444 as the default listener port.

--server_utilization {33 | 66 | 100}

> Use the --server_utilization parameter to specify a value for the edb_dynatune configuration parameter. The edb_dynatune configuration parameter determines how Advanced Server allocates system resources.
>
> - A value of 33 is appropriate for a system used for development. A low value dedicates the least amount of the host machine’s resources to the database server.
> - A value of 66 is appropriate for an application server with a fixed number of applications. A mid-range value dedicates a moderate amount of system resources to the database server.

> The default value is 66.
>
> - A value of 100 is appropriate for a host machine that is dedicated to running Advanced Server. A high value dedicates most of the system resources to the database server.

> When the installation is complete, you can adjust the value of edb_dynatune by editing the postgresql.conf file. After editing the postgresql.conf file, you must restart the server for the changes to take effect.

--serviceaccount *user_account_name*

> Use the --serviceaccount parameter to specify the name of the user account that owns the server process.
>
> - If --databasemode is set to oracle (the default), the default value of --serviceaccount is enterprisedb.
> - If -databasemode is set to postgresql, the default value of

--serviceaccount is set to postgres.

Please note that for security reasons, the --serviceaccount parameter must specify the name of an account that does not hold administrator privileges.

If you specify both the --serviceaccount option and the --enable_acledit 1 option when invoking the installer, the database service and pgAgent will use the same service account, thereby having the required permissions to access the Advanced Server binaries and data directory. **Note:** Specification of the --enable_acledit option is permitted only when installing on Windows. The --enable_acledit option cannot be specified when installing on Linux.

Please note that if you do not include the --serviceaccount option when invoking the installer, the NetworkService account will own the database service, and the pgAgent service will be owned by either enterprisedb or postgres (depending on the installation mode).

--servicename *service_name*

Use the --servicename parameter to specify the name of the Advanced Server service. The default is ppas-9.5.

--servicepassword *user_password*

Windows only. Use --servicepassword to specify the OS system password. If unspecified, the value of --servicepassword defaults to the value of --superpassword.

*--*superaccount *super_user_name*

Use the --superaccount parameter to specify the user name of the database superuser.

- If --databasemode is set to oracle (the default), the default value of --superaccount is enterprisedb.
- If -databasemode is set to postgresql, the default value of --superaccount is set to postgres.

--superpassword *superuser_password*

Use --superpassword to specify the database superuser password. If you

> are installing in non-interactive mode, --superpassword defaults to enterprisedb.

--unattendedmodeui { none | minimal | minimalWithDialogs }

> Use the --unattendedmodeui parameter to specify the installer's behavior during an unattended installation.
>
> Include --unattendedmodeui none to specify that the installer should not display progress bars during the Advanced Server installation.
>
> Include --unattendedmodeui minimal to specify that the installer should display progress bars during the installation process. This is the default behavior.
>
> Include --unattendedmodeui minimalWithDialogs to specify that the installer should display progress bars and report any errors encountered during the installation process (in additional dialogs).

--version

> Include the --version parameter to retrieve version information about the installer:
>
> Postgres Plus Advanced Server 9.5 --- Built on 2015-01-09 18:41:19 IB: 7.2.1-201106070924

--webusername {*registered_username*}

> You must specify the name of a registered user and password when performing an installation of EDB Postgres Advanced Server 9.5. Use the --webusername parameter to specify the name of the registered EnterpriseDB user that is performing the installation.
>
> *registered_username* must be an email address.
>
> If you do not have a registered user name, visit the EnterpriseDB website at:

http://www.enterprisedb.com/user-login-registration

--webpassword {*associated_password*}

> Use the --webpassword parameter to specify the password associated with the registered EnterpriseDB user that is performing the installation.

--workload_profile {oltp | mixed | reporting}

> Use the --workload_profile parameter to specify an initial value for the edb_dynatune_profile configuration parameter. edb_dynatune_profile controls aspects of performance-tuning based on the type of work that the server performs.
>
> - Specify oltp if the Advanced Server installation will be used to process heavy online transaction processing workloads.
>
> The default value is oltp.
>
> - Specify mixed if Advanced Server will provide a mix of transaction processing and data reporting.
> - Specify reporting if Advanced Server will be used for heavy data reporting.
>
> After the installation is complete, you can adjust the value of edb_dynatune_profile by editing the postgresql.conf file. After editing the postgresql.conf file, you must restart the server for the changes to take effect.
>
> For more information about edb_dynatune and other performance-related topics, see the *EDB Postgres (Postgres Plus) Migration Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

--xlogdir *directory_name*

> Linux only. Use the --xlogdir parameter to specify a location for the write-ahead log. The default value is datadir/pg_xlog.

## Using StackBuilder Plus

The StackBuilder Plus utility provides a graphical interface that simplifies the

process of downloading and installing modules that complement your Advanced Server installation. When you install a module with StackBuilder Plus, StackBuilder Plus automatically resolves any software dependencies.

Please note: If your installation resides on a Linux system, you must install the redhat-lsb package before invoking StackBuilder Plus. For more information, see Section 4.1.

You can invoke StackBuilder Plus at any time after the installation has completed by selecting the StackBuilder Plus menu option from the Postgres Plus Add-ons menu (Linux) or from the Apps menu (Windows). Enter your system password (if prompted), and the StackBuilder Plus welcome window opens (shown in Figure 4.62).

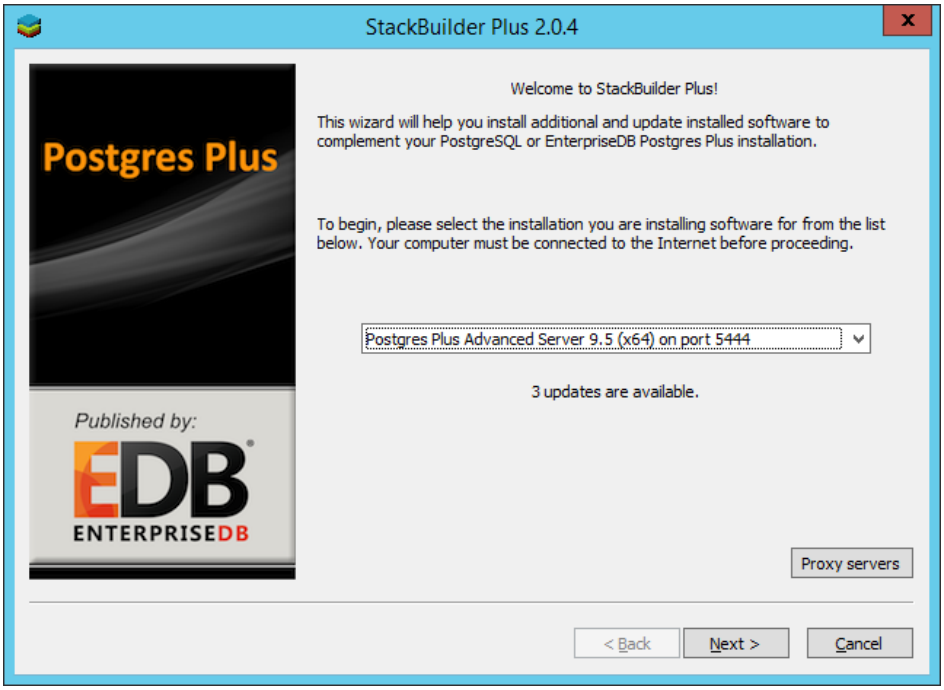



*Figure 4.62 — The StackBuilder Plus welcome window.*

Use the drop-down listbox on the welcome window to select your Advanced Server installation.

StackBuilder Plus requires Internet access; if your installation of Advanced Server resides behind a firewall (with restricted Internet access), StackBuilder Plus can download program installers through a proxy server. The module provider determines if the module can be accessed through an HTTP proxy or an FTP proxy; currently, all updates are transferred via an HTTP proxy and the FTP proxy information is not used.

If the selected Advanced Server installation has restricted Internet access,

use the Proxy Servers button on the Welcome window to open the Proxy servers dialog (shown in Figure 4.63).

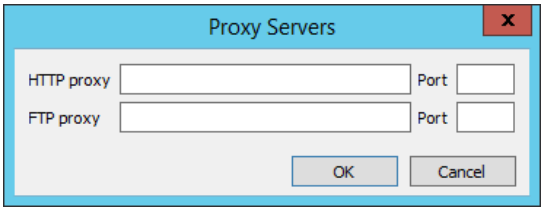



*Figure 4.63 — The Proxy servers dialog.*

Enter the IP address and port number of the proxy server in the HTTP proxy or FTP proxy fields on the Proxy servers dialog. Currently, all StackBuilder Plus modules are distributed via HTTP proxy (FTP proxy information is ignored). Click OK to continue.

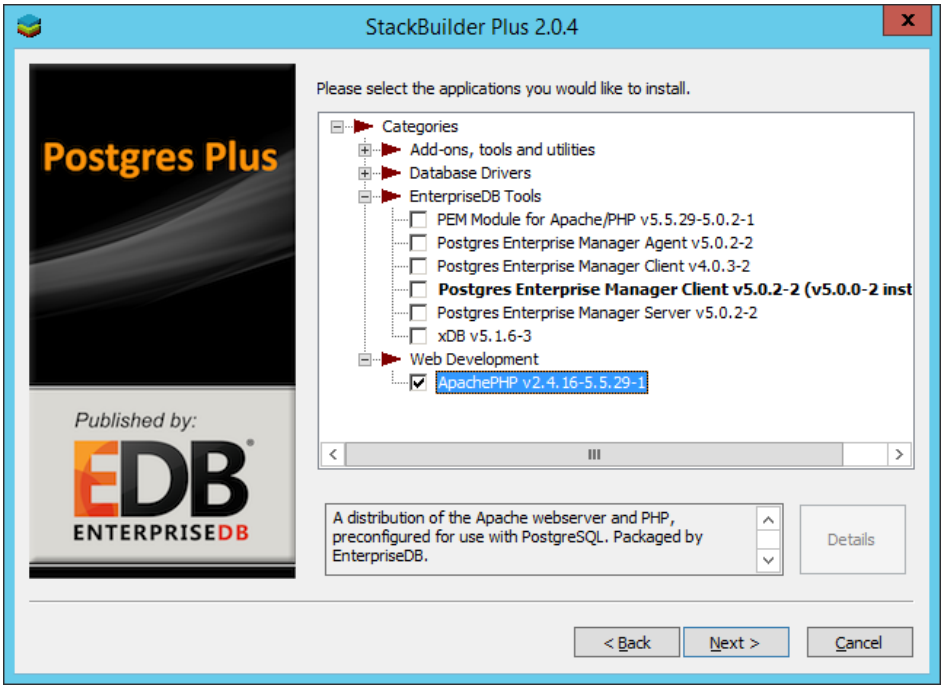



*Figure 4.64 — The StackBuilder Plus module selection window.*

The tree control on the StackBuilder Plus module selection window (shown in Figure 4.64) displays a node for each module category.

- If the module is installed, you will see the word (installed) to the right of the module name.
- If a module name is in **bold** type, the installer has detected a mismatch between the available version and the installed version.
- Boxes next to the modules that are already installed, but eligible for update are automatically checked.

To add new modules to the selected Advanced Server installation, check the box to the left of the module name and click Next. A window opens, requesting your EnterpriseDB registration information (as shown in Figure 4.65).

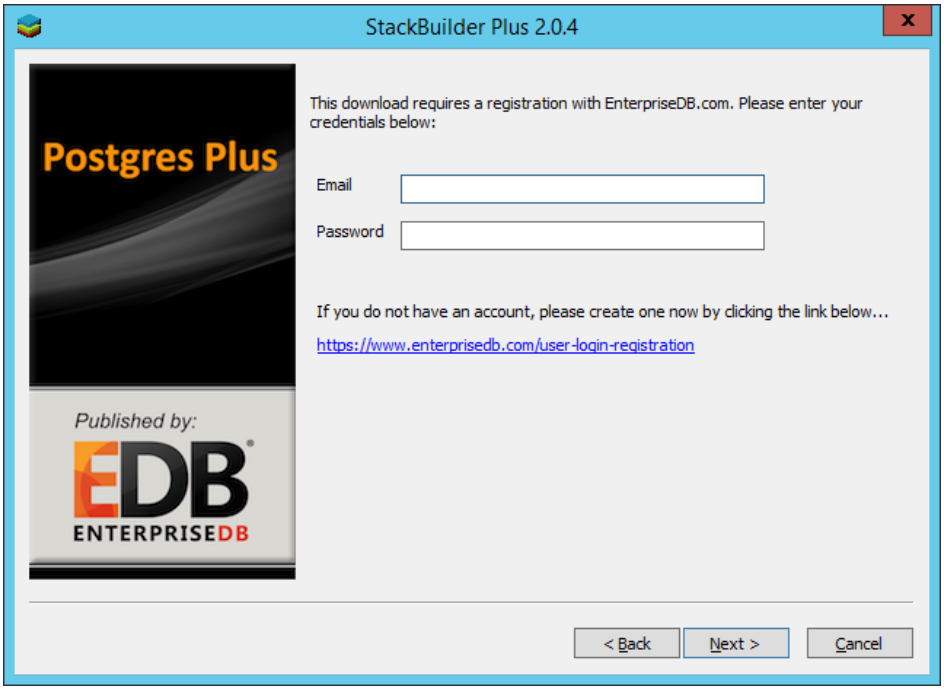



*Figure 4.65 — The User Authentication window.*

Before downloading and installing modules and updates with StackBuilder Plus, you must enter the user information associated with your EnterpriseDB account. If you do not have an EnterpriseDB user account, click the link provided to open a web browser, and enter your user information.

Enter the email address of a registered account in the Email field, and the corresponding password in the Password field, and click Next to continue. The next dialog confirms the packages selected (Figure 4.66).

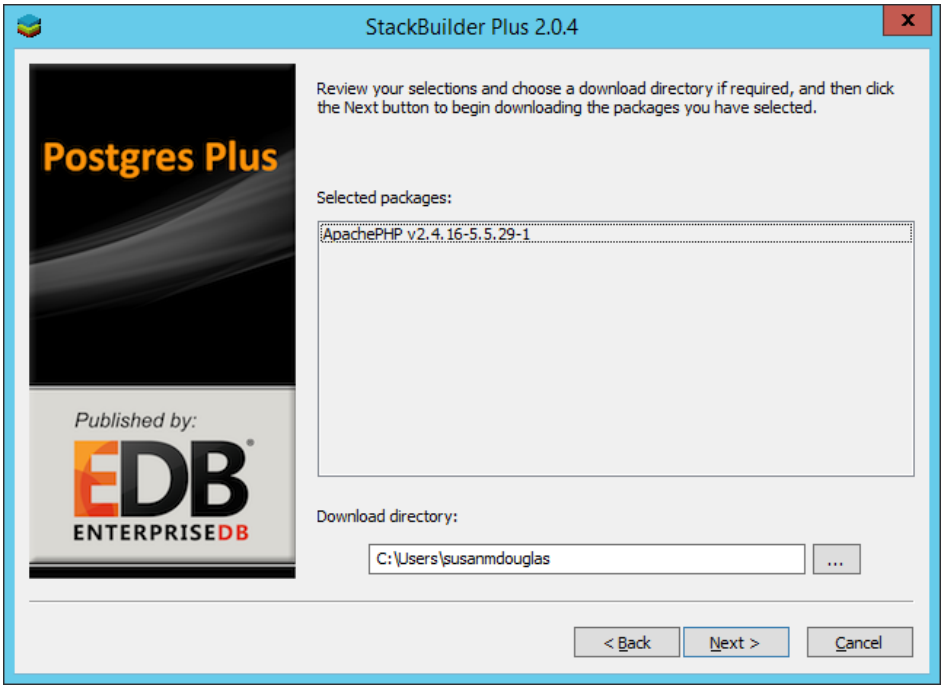



*Figure 4.66 — A summary window displays a list of selected packages.*

By default, the selected package installers are downloaded to:

On Windows:

> %TEMP%

On Linux:

> /tmp

You can change the directory; use the button to the right of the Download directory field to open a file selector, and choose an alternate location to store the downloaded installers. Click Next to connect to the server and download the required installation files. (see Figure 4.67).

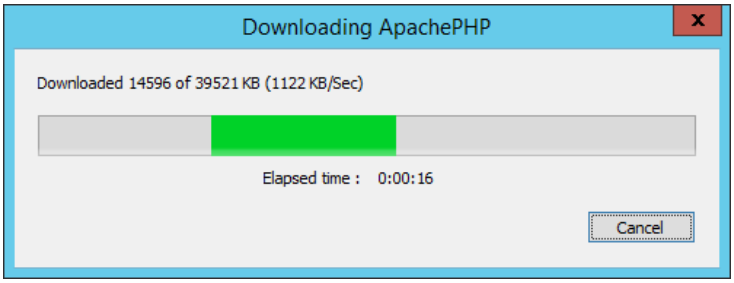



*Figure 4.67 — StackBuilder Plus is downloading installation files for the specified packages.*

When the download is complete, a window opens to confirm that the installation files have been downloaded and are ready for installation (see Figure 4.68).

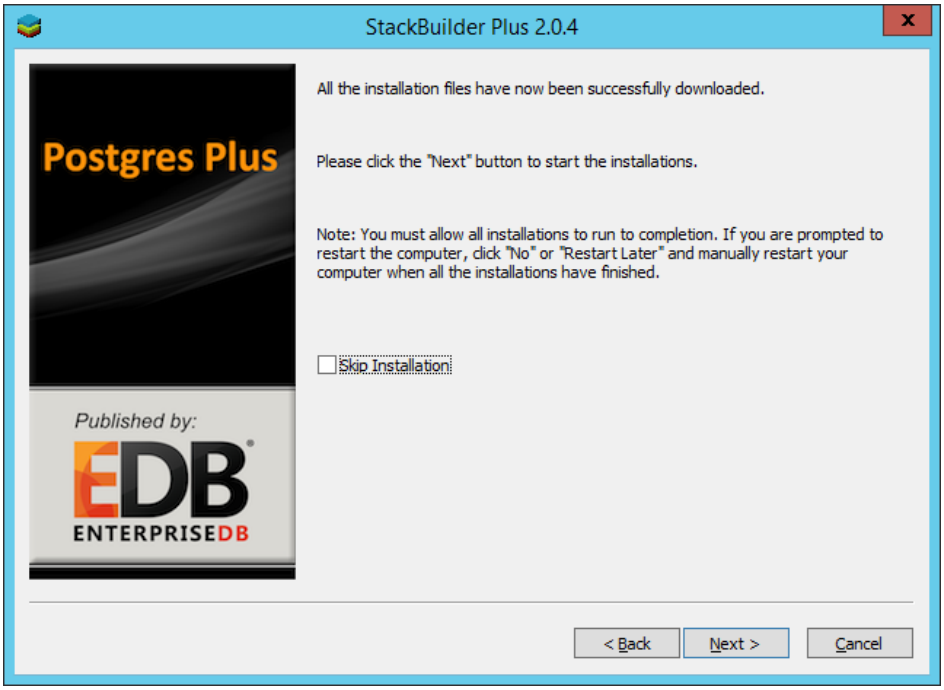



*Figure 4.68 — Confirmation that the download process is complete.*

You can check the box next to Skip Installation, and select Next to exit StackBuilder Plus without installing the downloaded files, or leave the box unchecked and click Next to start the installation process.

Each downloaded installer has different requirements. As the installers execute, they may prompt you to confirm acceptance of license agreements, to enter passwords, and enter configuration information.

During the installation process, you may be prompted by one (or more) of the installers to restart your system. Select No or Restart Later until all installations are completed. When the last installation has completed, re-boot the system to apply all of the updates.

You may occasionally encounter packages that don’t install successfully. If a package fails to install, StackBuilder Plus will alert you to the installation error with a popup dialog, and write a message to the log file at:

> On Windows: %TEMP%
>
> On Linux: /root

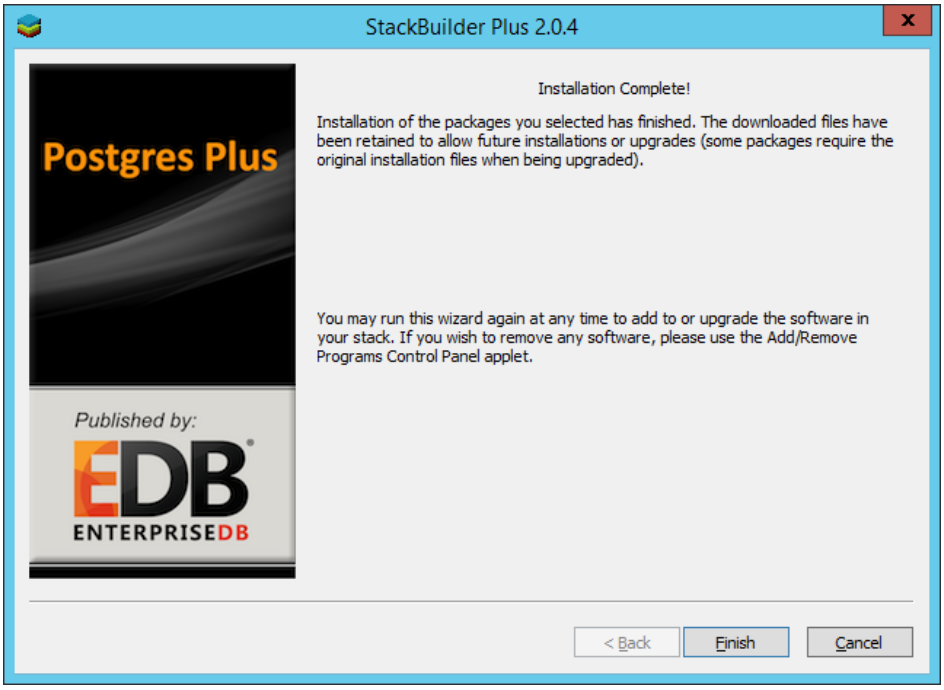



*Figure 4.69 — StackBuilder Plus confirms the completed installation.*

When the installation is complete, StackBuilder Plus will alert you to the success or failure of the installations of the requested packages (see Figure 4.69). If you were prompted by an installer to restart your computer, re-boot now.

The following table lists some of the modules supported by StackBuilder Plus. Please note that the list is subject to change and varies by platform.

| Category and Module Name | Description |
|---|---|
| Add-ons, tools and utilities | |
| EDB*Plus | An SQL*Plus-compatible command-line interface for Advanced Server. |
| EnterpriseDB Migration Toolkit | Migration Toolkit is a command line tool that facilitates migration from Oracle databases into Advanced Server |
| InfiniteCache | InfiniteCache (for Linux only) allows you to utilize memory on other computers connected to your network to increase the amount of memory in the shared buffer cache. |

| Category and Module Name | Description |
|---|---|
| PgBouncer | Connection pooler for Postgres Server, packaged by EnterpriseDB. |
| StackBuilder Plus | An advanced application stack builder. |
| pgAgent | pgAgent is a job scheduling agent for Postgres, capable of running multi-step batch/shell and SQL tasks on complex schedules |
| pgpool-II | pgpool-II provides load balancing, connection pooling, high availability, and connection limits for Advanced Server databases. |
| Database Drivers | |
| EnterpriseDB Connectors | A collection of drivers. Includes .NET, ODBC, JDBC and libpq drivers for Advanced Server |
| Database Server | |
| Advanced Server | The EDB Postgres Advanced Server database server. |
| EnterpriseDB Solution Pack | |
| Postgres Enterprise Manager Agent | The Postgres Enterprise Manager Agent is responsible for executing tasks and reporting statistics from the host and monitored Postgres instances to the PEM Server. |
| Postgres Enterprise Manager Client | The Postgres Enterprise Manager Client is a graphical client application that allows you to manager your Postgres server and access monitoring data on the PEM Server. |
| Postgres Enterprise Manager Server | The Postgres Enterprise Manager Server is used as the data repository for monitoring data and as a server to which the agents and client connect. |

| Category and Module Name | Description |
|---|---|
| xDB Replication Server | xDB Replication Server is an asynchronous, master-to-standby replication system enabling replication of tables from an Oracle, SQL Server or Postgres Plus Standard Server database to an Advanced Server database. |
| Replication Solutions | |
| Slony Replication | Slony-I is a master to multiple standbys replication system that supports cascading and failover. Packaged by EnterpriseDB. |
| Spatial Extensions | |
| PostGIS | PostGIS enables Advanced Server to store spatial data for geographic information systems (GIS). |
| Web Development | |
| ApachePHP | A distribution of the Apache webserver and PHP, preconfigured for use with Advanced Server. Packaged by EnterpriseDB. |

## Using the Update Monitor

The Update Monitor utility polls the Enterprise DB website and alerts you to security updates and enhancements as they become available for Advanced Server 9.5. Update Monitor is automatically installed and invoked with Advanced Server.

When Update Monitor is actively monitoring, the Postgres elephant icon is displayed in the system tray (see Figure 4.71).

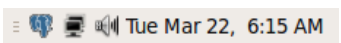



*Figure 4.71 — The Update Monitor icon.*

If you have installed more than one version of Advanced Server, Update Monitor watches for updates and alerts for all installed versions. When Update Monitor finds an update or alert, it displays an alert symbol to let you know

that an update or alert is available for one of the Advanced Server installations (see Figure 4.72).

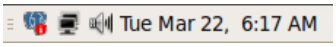



*Figure 4.72- The Update Monitor icon displays an alert.*

Right click on the symbol to open the context menu (shown in Figure 4.73).

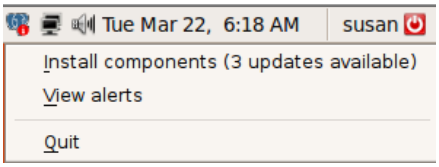



*Figure 4.73 — The Update Monitor context menu.*

If updates are available for your Advanced Server installation, the update count is displayed after the Install components menu item. Click Install components to start the installation process.

A system dialog opens, prompting you to enter your password (Figure 4.74).

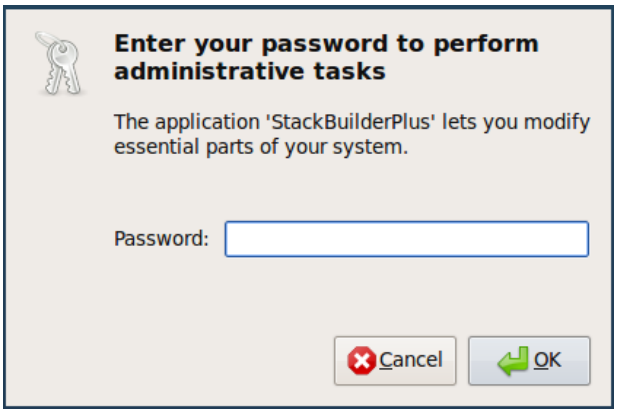



*Figure 4.74 — Enter a superuser password.*

Enter a superuser password, and click OK to continue. StackBuilder Plus opens (shown in Figure 4.75).


*Figure 4.75 — The StackBuilder Plus welcome window.*

The StackBuilder Plus wizard walks you through installing the latest versions of the Advanced Server component software; see Using Stackbuilder Plus for more information about the update process.

When the update is complete and there are no new updates available, the Update Monitor icon returns to a non-alerted state.

Update Monitor also monitors the EnterpriseDB website for alerts. If an alert is available for your Advanced Server installation, the Update Monitor icon displays an alert symbol. Right-click on the icon to access the context menu, where the alert count is displayed after the View alerts menu item. Choose the View alerts option to display the Postgres Plus Alerts window (see Figure 4.76).

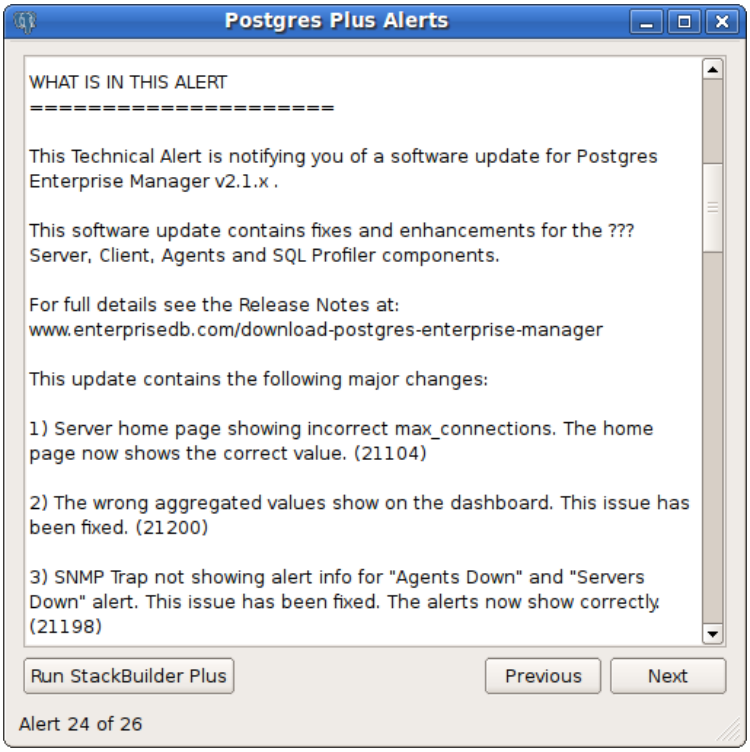



*Figure 4.76 — An EnterpriseDB alert.*

- The Postgres Plus Alerts window displays helpful hyperlinks that can direct you to more information relevant to the alert.
- Use the Run StackBuilder Plus button to open StackBuilder Plus from the alert to run applicable updates to your current Advanced Server installation.

## Installation Troubleshooting

### *Difficulty Displaying Java-based Applications*

If you encounter difficulty displaying Java-based applications (controls or text not being displayed correctly, or blank windows), upgrading to the latest libxcb-xlib libraries should correct the problem on most Linux distributions.

Please visit the following link for other possible work-arounds:

http://bugs.sun.com/bugdatabase/view_bug.do?bug_id=6532373

### *--mode unattended Authentication Errors*

Authentication errors from component modules during unattended installations

may indicate that the specified values of --servicepassword or --superpassword may be incorrect.

### *Errors During an Advanced Server Installation on Windows*

If you encounter an error during the installation process on a Windows system, exit the installation, and ensure that your version of Windows is up-to-date. After applying any outstanding operating system updates, re-invoke the Advanced Server installer.

### *Applications Fail to Launch During an Advanced Server Installation on Linux*

If applications fail to launch (such as StackBuilder Plus or your web browser) during the installation process on a Linux system, verify that the xdg-open program is on your system. If xdg-open is missing, install the xdg-utils package.

If you are using the GNOME desktop, load the root profile before running the Advanced Server installation script. To load the root profile, issue the command, su - root instead of su root before installing Advanced Server.

### *Configuration File Editors Close Spontaneously*

If you are using a Linux system with the gnome console, a bug in the gnome shell may cause configuration file editors accessed via the Expert Configuration menu (under the Postgres Plus Advanced Server Application menu) to close spontaneously. To correct this error, open a terminal window and enter:

dconf write /org/gnome/settings-daemon/plugins/cursor/active false

Please note that each time you reboot your system, you must invoke the command, resetting the value.

### *The Installation Fails to Complete Due to Existing data Directory Contents*

If an installation fails to complete due to existing content in the data directory, the server will write an error message to the server logs:

A data directory is neither empty, or a recognisable data directory.

If you encounter a similar message, you should confirm that the data directory is empty; the presence of files (including the system-generated lost+found folder) will prevent the installation from completing. Either remove the files from the data directory, or specify a different location for the data directory before re-invoking the installer to complete the installation.

# 1.3 Managing an Advanced Server Installation

Unless otherwise noted, the commands and paths noted in the following section assume that you have performed an installation with the interactive installer.

## Starting and Stopping Advanced Server and Supporting Components

A service is a program that runs in the background and requires no user interaction (in fact, a service provides no user interface); a service can be configured to start at boot time, or manually on demand. Services are best controlled using the platform-specific operating system service control utility. Many of the Advanced Server supporting components are services.

The following table lists the names of the services that control Advanced Server and services that control many of the Advanced Server supporting components:

| Component Name | Linux Service Name (installed by interactive installer) | Linux Service Name (installed by RPM) | Windows Service Name |
|---|---|---|---|

| Component Name | Linux Service Name (installed by interactive installer) | Linux Service Name (installed by RPM) | Windows Service Name |
|---|---|---|---|
| Advanced Server | ppas-9.5 | ppas-9.5 | ppas-9.5 |
| Infinite Cache | ppas-infinitecache | ppas95-icache | N/A |
| pgAgent | ppas-agent-9.5 | ppas95-pgagent | Postgres Plus Advanced Server 9.5 Scheduling Agent |
| PgBouncer | pgbouncer16 | ppas-pgbouncer16 | pgbouncer16 |
| PgPool | ppas-pgpool34 or ppas-pgpool-3.4 | ppas-pgpool34 | N/A |
| Slony | ppas-replication-9.5 | ppas95-replication | ppas-replication-9.5 |

Advanced Server's database server, and the services of Advanced Server's supporting components can be controlled at the command line or through operating system-specific graphical interfaces.

## Controlling a Service on Linux

The commands that control the Advanced Server service on a Linux platform are version specific.

## Controlling a Service on CentOS or RHEL 7.x

Advanced Server 9.5 is the first release that is supported on a Linux version that implements the systemd service manager. If your installation of Advanced

Server resides on version 7.x of RHEL and CentOS, you must use the systemctl command to control the Advanced Server service and supporting components.

The systemctl command must be in your search path and must be invoked with superuser privileges. To use the command, open a command line, and enter:

> systemctl *action service_name*

Where:

*service_name*

> *service_name* specifies the name of the service.

*action*

> *action* specifies the action taken by the service command. Specify:
>
> - start to start the service.
> - stop to stop the service.
> - restart to stop and then start the service.
> - status to discover the current status of the service.

## Controlling a Service on CentOS or RHEL 6.x

On version 6.x of RHEL or CentOS Linux, you can control a service at the command line with the service command. The service command can be used to manage an Advanced Server cluster, as well as the services of component software installed with Advanced Server.

The Linux service controller mechanism allows you to start and stop the server gracefully. Using the service command to change the status of a service allows the service controller to keep track of the server status (the pg_ctl command does not alert the service controller to changes in the status of a server).

The command must be in your search path and must be invoked with superuser privileges. Open a command line, and issue the command:

> service *service_name action*

The Linux service command invokes a script (with the same name as the service) that resides in /etc/init.d. If your Linux distribution does not support the service command, you can call the script directly by entering:

> /etc/init.d/*service_name action*

Where:

*service_name*

> *service_name* specifies the name of the service.

*action*

> *action* specifies the action taken by the service command. Specify:
>
> - start to start the service.
> - stop to stop the service.
> - condstop to stop the service without displaying a notice if the server is already stopped.
> - restart to stop and then start the service.
> - condrestart to restart the service without displaying a notice if the server is already stopped.
> - try-restart to restart the service without displaying a notice if the server is already stopped.
> - status to discover the current status of the service.

## Using pg_ctl to Control Advanced Server

You can use the pg_ctl utility to control an Advanced Server service from the command line on any platform. pg_ctl allows you to start, stop, or restart the Advanced Server database server, reload the configuration parameters, or display the status of a running server. You can invoke the utility with the command:

> pg_ctl -D *data_directory action*

*data_directory*

> *data_directory* is the location of the data controlled by the Advanced Server cluster.

*action*

> *action* specifies the action taken by the pg_ctl utility. Specify:
>
> - start to start the service.
> - stop to stop the service.
> - restart to stop and then start the service.
> - reload sends the server a SIGHUP signal, reloading configuration parameters
> - status to discover the current status of the service.

For more information about using the pg_ctl utility, or the command line options available, please see the official PostgreSQL core documentation, available at:

https://www.postgresql.org/docs/9.5/static/app-pg-ctl.html

### *Choosing Between pg_ctl and the service Command*

You can use the pg_ctl utility to manage the status of an Advanced Server cluster, but it is important to note that pg_ctl does not alert the operating system service controller to changes in the status of a server, so it is beneficial to use the service command whenever possible.

Note that when you invoke the installer with the --extract-only option, the installer does not create a service, it merely unpacks the server. If you have installed Advanced Server by invoking the installer with the --extract-only option, and not completed the installation with the installation script (runAsRoot.sh or runAsAdmin.sh) you must use the pg_ctl command to control the server.

## Using the edbstart and edbstop Utilities

Note: edbstart and edbstop functionality is supported only on Linux hosts that are running Advanced Server installations performed with the Interactive installer. RPM installations do not support edbstart and edbstop.

While the autostart scripts created during an Advanced Server installation

control a single database cluster, the edbstart and edbstop utilities can control multiple database clusters on the same host, with a single configuration file.

The edbstart and edbstop utilities use a file named edbtab (described below) to determine which instances of Advanced Server should start when the operating system boots, and stop when the host is shut down.

Before using the edbstart or edbstop utilities, you should disable the Advanced Server autostart scripts. The commands that disable the scripts are platform specific; open a command line, assume superuser privileges and enter the command:

On Fedora/Redhat:

```
chkconfig --level 2345 ppas-9.5 off
```

On Debian/Ubuntu:

```
update-rc.d ppas-9.5 disable
```

After disabling the Advanced Server service, use an editor to create a file named edbtab in the /etc directory, or copy the sample file located in:

```
/opt/PostgresPlus/9.5AS/scripts/server/autostart/edbtab
```

Edit the edbtab file, (shown in Figure 5.1) specifying a list of the Advanced Server clusters that the edbstart and edbstop programs will control, and an indicator that designates if the cluster should be automatically started and stopped.



*Figure 5.1 — The sample edbtab file.*

The edbtab file entry should take the form:

> *edb_home directory*:*edb_data_directory*:[Y|N]

*edb_home_directory*

> *edb_home_directory* specifies the home directory of the Advanced Server installation that the edbstart/edbstop utilities will control.

*edb_data_directory*

> *edb_data_directory* specifies the data directory of the database cluster that the edbstart/edbstop utilities will control. *edb_data_directory* is the same as the value of $PGDATA for a specified cluster.

[Y|N]

> Y specifies that edbstart and edbstop should control the service; N specifies that the user will control the service manually.

Include a separate entry in the edbtab file for each Advanced Server cluster that you wish to control with edbstart and edbstop.

After editing the edbtab file, copy the edb_autostart script to /etc/init.d. By default, the edb_autostart script is located in:

> /opt/PostgresPlus/9.5AS/scripts/server/autostart

Copy the edbstart and edbstop scripts to $EDBHOME. Make the scripts executable with the following command:

> chmod +x edbstart chmod +x edbstop chmod+x edbstart edbstop /etc/init.d/edb_autostart

Enable the edb_autostart service with the commands:

> chkconfig --level 2345 edb_autostart on chkconfig --add edb_autostart

For the service to take effect, you must restart your system.

### *Manually Controlling the Server with edbstart and edbstop*

You can use edbstart and edbstop at the command line to manually control all of the clusters specified in the edbtab file, or to control an individual cluster. Call edbstart without an argument to start all of the clusters listed within the edbtab file; invoke edbstop without an argument to stop all of the clusters listed in the edbtab file. You can control an individual cluster by specifying the cluster's data directory as an argument. The following command starts a cluster:

> edbstart /opt/PostgresPlus/9.5AS/data

While the following command stops a cluster:

```
edbstop /opt/PostgresPlus/9.5AS/data
```

## Configuring Component Services to AutoStart at System Reboot

After installing, configuring and starting the Slony, pgpool-II or Infinite Cache services on a Linux system, you must manually configure your system to autostart the service when your system reboots.

To configure a service to autostart on a Linux system, open a command line, assume superuser privileges, and enter the following command.

> On a Redhat-compatible Linux system:
>
> /sbin/chkconfig *service_name* on
>
> On a Debian-compatible Linux system, use the command:
>
> /usr/sbin/update-rc.d *service_name* enable
>
> Where *service_name* specifies the name of the service.

Please note: If you are using a Windows system, the Slony service will be configured to autostart by default. On Windows, you can use the Service Properties dialog to control the service startup type. For more information about controlling a service on Windows, see Section 5.3.

## Controlling a Service on Windows

The Windows operating system includes a graphical service controller that offers point-and-click control of Advanced Server and the services associated with Advanced Server components. The service controller simplifies changing the status of a server and configuring server start up behavior.

The Services utility can be accessed through the Windows Control Panel, or by navigating through the Start menu to Run; when the Run dialog opens, enter services.msc and click OK. When the Services window opens, use the

scroll bar to move through the listed services to highlight ppas-9.5 (see Figure 5.2).

*Figure 5.2 — The Advanced Server service in the Windows Services window.*

The Services window shows that the Advanced Server service (ppas-9.5) is currently Running, and has a Startup Type of Automatic.

- Use the Stop the service option to stop the instance of Advanced Server. Please note that any user (or client application) connected to the Advanced Server instance will be abruptly disconnected if you stop the service.

- Use the Start the service option to start the Advanced Server service.

- Use the Pause the service option to tell Advanced Server to reload the server configuration parameters. The Pause the service option is an effective way to reset the server parameters without disrupting user sessions for many of the configuration parameters. See Section 6, *Configuring Advanced Server* for more information about the parameters that can be updated with a server reload.

  Please Note: A limitation in Windows causes Advanced Server to generate an error message after performing a parameter reload. To confirm that the reload command has successfully updated the parameters, query the pg_settings table to verify that the change has taken effect.

- Use the Restart the service option to stop and then start the Advanced Server. Please note that any user sessions will be terminated when you stop the service. This option is useful to reset server parameters that only take effect on server start.

## Controlling Server Startup Behavior on Windows

You can use the Windows Services utility to control the startup behavior of the server. To alter the startup properties of a server, navigate through the Control Panel to the Services utility, or navigate through the Start menu to Run; when the Run dialog opens, enter services.msc and click OK.

Right click on the name of the service you wish to change and select

Properties from the context menu to open the Properties dialog.

Use the drop-down listbox in the Startup type field (shown in Figure 5.3) to specify how the Advanced Server service will behave when the host starts.

*Figure 5.3 — Specifying Advanced Server's startup behavior.*

- Specify Automatic (Delayed Start) to instruct the service controller to start after boot.

- Specify Automatic to instruct the service controller to start and stop the server whenever the system starts or stops.
- Specify Manual to instruct the service controller that the server must be started manually.

- Specify Disabled to instruct the service controller to disable the service; after disabling the service, you must stop the service or restart the server to make the change take effect. Once disabled, the server's status cannot be changed until Startup type is reset to Automatic (Delayed Start), Automatic or Manual.

## Using initdb to Create a Cluster

The PostgreSQL initdb command creates a database cluster. If you are using the graphical installer to install Advanced Server, the installer will invoke initdb to create a cluster for you. If you are using an RPM package to install Advanced Server, you must manually configure the service and invoke initdb to create your cluster; for more information, see Section 3.2.

When invoking initdb, you can:

- Specify environment options on the command line.
- Use the service command on RHEL or CentOS 6.x, and the service configuration file to configure the environment.
- Use the systemd service manager on RHEL or CentOS 7.x and the service configuration file to configure the environment.

For example, to invoke initdb on a RHEL or CentOS 7.x system, using the options specified in the service configuration file, assume the identity of the

operating system superuser:

```
su - root
```

Then, invoke initdb:

```
/usr/lib/systemd/system/ppas-9.5.sh initdb
```

For more information about specifying options in the service configuration file, see Section 3.2.

Advanced Server includes the following initdb options that allow you to customize your clusters.

--no-redwood-compat

Include the --no-redwood-compat keywords to instruct the server to create the cluster in PostgreSQL mode. When the cluster is created in PostgreSQL mode, the name of the database superuser will be postgres, the name of the default database will be postgres, and Advanced Server's features compatible with Oracle databases will not be available to the cluster.

--redwood-like

Include the --redwood-like keywords to instruct the server to use an escape character (an empty string ('')) following the LIKE (or PostgreSQL-compatible ILIKE) operator in a SQL statement that is compatible with Oracle syntax.

--icu-short-form

Include the --icu-short-form keywords to create a cluster that uses a default ICU (International Components for Unicode) collation for all databases in the cluster. For more information about Unicode collations, please refer to the *EDB Postgres (Postgres Plus) Migration Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

For more information about using initdb, see the PostgreSQL Core Documentation, available at:

https://www.postgresql.org/docs/9.5/static/app-initdb.htmlYou can also view online help for initdb by assuming superuser privileges and entering:

```
/path_to_initdb_installation_directory/initdb -help
```

Where *path_to_initdb_installation_directory* specifies the location of the initdb binary file.

## 1.4 Configuring Advanced Server

If you have performed an installation with a package manager, you can use your choice of editor to access and modify the configuration files. By default, when installed with a package manager, the configuration files are located in:

```
/var/lib/ppas/9.5/data
```

Unless otherwise noted, the commands and paths noted in the following section assume that you have performed an installation with the interactive installer.

You can easily update configuration parameters that Advanced Server uses to decide the behavior of its component software by modifying the following configuration files:

- The postgresql.conf file determines the initial values of Advanced Server configuration parameters.
- The pg_hba.conf file controls network authentication and authorization.
- The pg_ident.conf file maps operating system identities (user names) to Advanced Server identities (roles) when using ident-based authentication.

On a Windows system, the configuration files can be accessed from the Apps menu. To update these configuration files in Linux, navigate through the Postgres Plus Advanced Server 9.5 menu to the Expert Configuration menu and choose the menu selection that specifies the configuration file that you would like to edit (see Figure 6.1).



*Figure 6.1 — Edit the configuration files through the Expert Configuration menu selection.*

If superuser or administrative privileges are required to edit the file, a dialog opens prompting you for your password.

## Modifying the postgresql.conf File

Configuration parameters in the postgresql.conf file specify server behavior with regards to auditing, authentication, encryption, and other behaviors. The postgresql.conf file resides in the data directory under your Advanced Server installation; you can use your editor of choice to open the postgresql.conf file directly, or navigate through the Postgres Plus Advanced Server menu to the Expert Configuration menu, and select the Edit postgresql.conf menu selection.

If prompted, enter your password to access the configuration file (shown in Figure 6.2).



*Figure 6.2 — The postgresql.conf file.*

Parameters that are preceded by a pound sign (#) are set to their default value (as shown in the parameter setting). To change a parameter value, remove the pound sign and enter a new value. After setting or changing a parameter, you must either *reload* or *restart* the server for the new parameter value to take effect.

Within the postgresql.conf file, some parameters contain comments that indicate change requires restart. To view a list of the parameters that require a server restart, execute the following query at the EDB-PSQL command line (see Figure 6.3):

```
SELECT name FROM pg_settings WHERE context = 'postmaster';
```

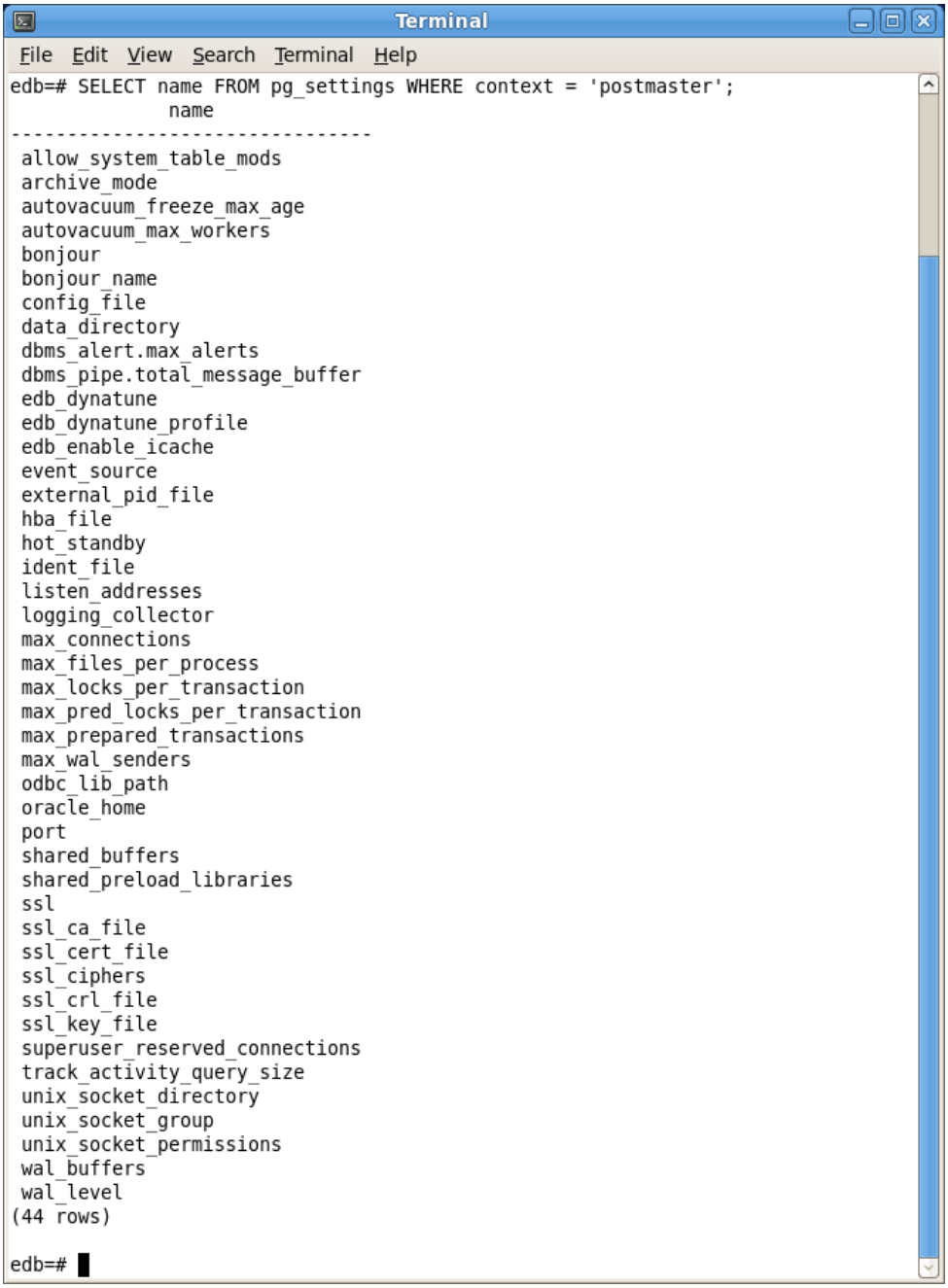



*Figure 6.3 — Configuration parameters that require a server restart.*

If you are changing a parameter that requires a server restart, see Section 5.1, *Starting and Stopping Advanced Server* for information about restarting Advanced Server.

You can reload the system configuration parameter values by navigating through the Postgres Plus Advanced Server 9.5 menu to the Expert Configuration menu, and choosing the Reload Configuration menu selection. Reloading the configuration parameters does not require Advanced Server users to log out of their current Advanced Server sessions.

## Modifying the pg_hba.conf File

Entries in the pg_hba.conf file specify the authentication method or methods that the server will use when authenticating connecting clients. Before connecting to the server, you may be required to modify the authentication properties specified in the pg_hba.conf file.

When you invoke the initdb utility to create a cluster, initdb creates a pg_hba.conf file for that cluster that specifies the type of authentication required from connecting clients.

The default authentication configuration specified in the pg_hba.conf file is:

# TYPE DATABASE USER ADDRESS METHOD

# "local" is for Unix domain socket connections only

local all all peer

# IPv4 local connections:

host all all 127.0.0.1/32 ident

# IPv6 local connections:

host all all ::1/128 ident

The pg_hba.conf file specifies that connections are allowed using peer and ident authentication:

- peer authentication allows local connections from the client's operating system user name to the database.
- ident authentication allows TCP/IP connections from the client's operating system user name (as listed in on an ident server).

To modify the pg_hba.conf file, open the file with your choice of editor. After modifying the authentication settings in the pg_hba.conf file, use the services utility (Windows), or use the following command to restart the server and apply the changes:

> service ppas-9.5 restart (Linux)

Appropriate authetication methods provide protection and security. Please consult the PostgreSQL documentation for details about authentication options:

https://www.postgresql.org/docs/9.5/static/auth-methods.html

For more information about modifying the pg_hba.conf file, see the PostgreSQL core documentation at:

https://www.postgresql.org/docs/9.5/static/auth-pg-hba-conf.html

## Setting Advanced Server Environment Variables

The graphical installers provide a script that simplifies the task of setting environment variables, allowing a user to more easily invoke client applications at the command line. The script sets the environment variables for your current shell session; when your shell session ends, the environment variables are destroyed. You may wish to invoke pgplus_env or pg_env from your system-wide shell startup script, so that environment variables are automatically defined for each shell session.

The pgplus_env script is created during the Advanced Server installation process and reflects the choices made during installation. To invoke the script, open a command line and enter:

On Linux:

```
source /opt/PostgresPlus/9.5AS/pgplus_env.sh
```

On Windows:

```
C:\Progra~1\PostgresPlus\9.5AS\pgplus_env.bat
```

As the pgplus_env.sh script executes (on Linux), it sets the following environment variables:

```
export PATH=/opt/PostgresPlus/9.5AS/bin:$PATH

export EDBHOME=/opt/PostgresPlus/9.5AS

export PGDATA=/opt/PostgresPlus/9.5AS/data
```

```
export PGDATABASE=edb

export PGPORT=5444

export PGLOCALEDIR=/opt/PostgresPlus/9.5AS/share/locale
```

As the pgplus_env.bat script executes (on Windows), it sets the following environment variables:

```
PATH="C:\Program Files\PostgresPlus\9.5AS\bin";%PATH%

EDBHOME=C:\Program Files\PostgresPlus\9.5AS

PGDATA=C:\Program Files\PostgresPlus\9.5AS\data

PGDATABASE=edb

PGUSER=enterprisedb

PGPORT=5444

PGLOCALEDIR=C:\Program Files\PostgresPlus\9.5AS\share\locale
```

If you have used an installer created by EnterpriseDB to install PostgreSQL, the pg_env script performs the same function. To invoke the pg_env script, open a command line, and enter:

On Linux:

```
source /opt/PostgreSQL/9.5/pg_env.sh
```

On Windows:

```
C:\Progra~1\PostgreSQL\9.5\pg_env.bat
```

As the pg_env.sh script executes (on Linux), it sets the following environment variables:

```
PATH=/home/opt/PostgreSQL/9.5/bin:$PATH

PGDATA=/home/opt/PostgreSQL/9.5/data

PGDATABASE=postgres
```

```
PGUSER=postgres

PGPORT=5432

PGLOCALEDIR=/home/opt/PostgreSQL/9.5/share/locale

MANPATH=$MANPATH:/home/opt/PostgreSQL/9.5/share/man
```

As the pg_env.bat script executes (on Windows), it sets the following environment variables:

```
PATH="C:\Program Files\PostgreSQL\9.5\bin";%PATH%

PGDATA=C:\Program Files\PostgreSQL\9.5\data

PGDATABASE=postgres

PGUSER=postgres

PGPORT=5432

PGLOCALEDIR=C:\Program Files\PostgreSQL\9.5\share\locale
```

## Connecting to Advanced Server

psql is a command line client application that allows you to query the server, and review the query results. Please note that additional configuration steps are required before connecting to an Oracle or MySQL database.

### Connecting to the Database with the psql Client

To open the psql client, the client must be in your search path. The executable resides in the bin directory, under your Advanced Server installation.

Use the following command and command options to start the psql client:

```
psql -d edb -U enterprisedb
```



*Figure 6.4 — Connecting to the server.*

Where:

> -d specifies the database to which psql will connect.
>
> -U specifies the identity of the database user that will be used for the session.

If you have performed an installation with the interactive installer, you can easily access the psql client through the Applications or Start menu. Navigate through the Postgres Plus Advanced Server 9.5 menu to the Run SQL Command Line menu, and select EDB-PSQL. When the Terminal window opens, provide connection information for your session.

For more information about using the command line client, please refer to the PostgreSQL core documentation at:

https://www.postgresql.org/docs/9.5/static/app-psql.html

## Connecting to an Oracle or MySQL Database

### *Oracle Client Connectivity*

Before connecting Advanced Server to an Oracle database, you must download and install the Oracle JDBC driver (ojdbc14.jar) from the Oracle website. You can find a link to the free JDBC driver at:

http://www.enterprisedb.com/downloads/third-party-jdbc-drivers

Download the ojdbc14.jar file and place it in the JAVA_HOME\jre\lib\ext directory.

### *MySQL Client Connectivity*

Before connecting Advanced Server to a MySQL database, you must download and install the MySQL JDBC driver (mysql-connector-java-5.0.8-bin.jar) from the MySQL website. You can find a link to the free JDBC driver at:

http://www.enterprisedb.com/downloads/third-party-jdbc-drivers

Download the mysql-connector-java-5.0.8-bin.jar file and place it in the

JAVA_HOME\jre\lib\ext directory.

# 1.5 Advanced Server Supporting Components

After installing Advanced Server, you must configure and manually start the services of some supporting components. The following sections list the Advanced Server components that require post-installation configuration, and information about their services.

Please note that you must install a Java environment before invoking EDB*Plus or Migration Toolkit or before using PL/Java or the JDBC connector.

## EDB*Plus - Configuring an RPM Installation

If you have performed an RPM installation of EDB*Plus, you must perform the following steps before invoking EDB*Plus.

### *Setting the Session Environment Variables*

Before invoking EDB*Plus on a Linux system, you must set the values of environment variables. Use the following commands to set variable values:

```
export JAVA_HOME=\<path_to_java> export PATH=\
<path_to_java>/bin:$PATH
```

### *Configuring EDB*Plus Authentication*

By default, the pg_hba.conf file for the RPM installer enforces IDENT authentication. Before invoking EDB*Plus, you must either modify the pg_hba.conf file, changing the authentication method to a form other than IDENT (and restarting the server), or perform the following steps to ensure that an IDENT server is accessible:

1. Confirm that an identd server is installed and running. For example, you can use the yum package manager to install an identd server by invoking the command:

```
yum install xinetd authd
```

The command should create a file named /etc/xinetd.d/auth that contains:

```
service auth { disable = no socket_type = stream wait = no user = ident
cps = 4096 10 instances = UNLIMITED server = /usr/sbin/in.authd
server_args = -t60 --xerror --os }
```

Note: if the file includes a -E argument at the end of server_args, please erase the -E.

Then, to start the identd server, invoke the commands:

```
systemctl enable xinetd

systemctl start xinetd
```

2. Open the pg_ident.conf file and create a user mapping:

```
# map_name system_username postgres_username

ppas enterprisedb enterprisedb
```

Where:

The name specified in the map_name column is a user-defined name that will identify the mapping in the pg_hba.conf file.

The name specified in the system_username column is enterprisedb.

The name specified in the postgres_username is enterprisedb.

3. Open the pg_hba.conf file and modify the IDENT entries.

If you are using an IPv4 local connection, modify the file entry to read:

```
host all all 127.0.0.0/0 ident map=ppas
```

If you are using an IPv6 local connection:

```
host all all ::1/128 ident map=ppas
```

4. Restart the Advanced Server service before invoking EDB*Plus.

## Infinite Cache

Unless otherwise noted, the commands and paths noted in the following section assume that you have performed an installation with the interactive installer.

Please note: Infinite Cache has been deprecated and may be removed in a future release. Please contact your EnterpriseDB Account Manager or sales@enterprisedb.com for more information.

InfiniteCache allows Linux systems to utilize memory on other computers connected to their network to increase the amount of memory in the shared buffer cache. For more information about Infinite Cache functionality, please refer to the *EDB Postgres (Postgres Plus) Migration Guide*, available from the EnterpriseDB website at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

After installing Advanced Server, you must provide configuration information for Infinite Cache, and start the service. You must:

1. Specify Infinite Cache server settings in the Infinite Cache configuration file.

2. Modify the Advanced Server postgresql.conf file, enabling Infinite Cache, and specifying connection and compression settings.

3. Start the Infinite Cache service.

The Infinite Cache configuration file is named ppas-infinitecache, and contains two parameters and their associated values:

| Parameter | Description | Default Value |
|---|---|---|

| Parameter | Description | Default Value |
|---|---|---|
| PORT | The PORT variable specifies the port on which Infinite Cache listens for connections from the server. | 11211 |
| CACHESIZE | The CACHESIZE variable specifies the default cache size (in mega-bytes) | 500 |

By default, the file is located in the /opt/PostgresPlus/infinitecache/etc directory. To modify a parameter value, open the ppas-infinitecache file with your editor of choice, and edit the parameter values.

To enable Infinite Cache, you must modify the postgresql.conf file, setting the values of the configuration parameters that control the behavior of Infinite Cache. To modify a parameter, open the postgresql.conf file (located in the data directory, under your Advanced Server installation), and locate the section of the configuration file shown below:

# - Infinite Cache #edb_enable_icache = off #edb_icache_servers = '' #'host1:port1,host2,ip3:port3,ip4' #edb_icache_compression_level = 6

Within the postgresql.conf file, lines that begin with a pound sign (#) are treated as a comment; to edit a given parameter, remove the pound sign and specify a value for the parameter. When you've updated and saved the configuration file, restart the database server for the changes to take effect.

| Parameter | Description |
|---|---|

| Parameter | Description |
| --- | --- |
| edb_enable_icache | Use the edb_enable_icache parameter to enable or disable Infinite Cache. When edb_enable_icache is set to on, Infinite Cache is enabled; if the parameter is set to off, Infinite Cache is disabled.<br><br>If you enable Infinite Cache, you must use the edb-icache_servers parameter to specify a list of cache servers.<br><br>The default value is off. |
| edb_icache_servers | Use the edb_icache_servers parameter to specify a list of one or more servers with active edb-icache daemons. Specify a string value that takes the form of a comma-separated list of hostname:port pairs. You may specify a maximum of 128 cache nodes. |
| edb_icache_compression_level | edb_icache_compression_level controls the compression level that is applied to each page before storing it in the distributed cache. The parameter must be greater than or equal to 0 or less than or equal to 9.<br><br>A compression level of 0 disables compression, while a compression level of 9 invokes the maximum amount of compression. By default, this parameter is set to 6. |

The following example shows a typical collection of Infinite Cache settings:

edb_enable_icache = on

edb_icache_servers = 'localhost,192.168.2.1:11200,192.168.2.2'

```
edb_icache_compression_level = 6
```

After specifying configuration options, you must start the Infinite Cache service. Before starting the service, ensure that the edb-icache daemons are running on each server specified in edb_icache_servers parameter.

The Infinite Cache service script is named ppas-infinitecache. The service script resides in the /etc/init.d directory. For detailed information about stopping or starting a service on your platform, please see Section 5.

## Language Pack

Language Pack installers contain supported languages that may be used with the Advanced Server and PostgreSQL database installers. The Language Pack installer allows you to create languages for PL/Perl, PL/Tcl, and PL/Python without installing supporting software from third party vendors.

The Language Pack installer includes:

- Tcl with TK, version 8.5
- Perl, version 5.20
- Python, version 3.3

You can use StackBuilder Plus to invoke the Language Pack installer. For information about using StackBuilder Plus, see Using Stackbuilder Plus.

The Perl package contains the cpan package manager, and Python contains pip and easy_install package managers. There is no package manager for Tcl/TK.

### *Configuring Language Pack on Linux*

On Linux, the installer places the languages in:

```
/opt/EnterpriseDB/LanguagePack/9.5/
```

If you install Language Pack before Advanced Server, the Advanced Server installer will detect the Language Pack installation, and set the paths in the plLanguages.config file for you.

If you are invoking the Advanced Server installer using the --extract-only

option, or if you install Language Pack after installing Advanced Server, you must manually configure the installation. The Language Pack configuration file is named:

```
/opt/PostgresPlus/9.5AS/etc/sysconfig/plLanguages.config
```

If you are installing Language Pack on a system that already hosts an Advanced Server installation, use your editor of choice to modify the plLanguages.config file, and modify the entries to include the locations of each language:

```
EDB_PERL_VERSION=5.20

EDB_PYTHON_VERSION=3.3

EDB_TCL_VERSION=8.5

EDB_PERL_PATH=/opt/EnterpriseDB/LanguagePack/9.5/Perl-5.20

EDB_PYTHON_PATH=/opt/EnterpriseDB/LanguagePack/9.5/Python-3.3

EDB_TCL_PATH=/opt/EnterpriseDB/LanguagePack/9.5/Tcl-8.5
```

After modifying the plLanguages.config file, restart the server for the changes to take effect. See Section 5 for detailed information about restarting the server.

### *Configuring Language Pack on Windows*

On Windows, the Language Pack installer places the languages in:

```
C:\EnterpriseDB\PostgreSQL\LanguagePack\9.5\x64
```

After installing Language Pack, you must set the following variables:

```
set PYTHONHOME=C:\EnterpriseDB\PostgreSQL\LanguagePack\9.5\x64\Python-3.3
```

Use the following commands to add Python, Perl and Tcl to your search path:

```
set PATH=C:\EnterpriseDB\PostgreSQL\LanguagePack\9.5\x64\Python-3.3\bin:C:\EnterpriseDB\PostgreSQL\LanguagePack\9.5\x64\Perl-
```

5.20\bin:C:\EnterpriseDB\PostgreSQL\LanguagePack\9.5\x64\Tcl-8.5\bin:%PATH%

After performing the system-specific steps required to configure Language Pack on Windows, restart the Advanced Server database server; see Section 5 for detailed information about restarting the server.

### *Configuring Language Pack on OSX*

If you are installing Language Pack on a PostgreSQL host on OSX, the Language Pack installer places the languages in:

```
/Library/PostgreSQL/LanguagePack/9.5
```

After installing Language Pack, you must set the following variables:

```
export PERLHOME=/Library/PostgreSQL/LanguagePack/9.5/Perl-5.20
export PYTHONHOME=/Library/PostgreSQL/LanguagePack/9.5/Python-3.3 export TCLHOME=/Library/PostgreSQL/LanguagePack/9.5/Tcl-8.5
```

Use the following commands to add Python, Perl and Tcl to your search path:

```
export PATH=$PYTHONHOME/bin:$PERLHOME/bin:$TCLHOME/bin:$PATH
export DYLD_LIBRARY_PATH=$PYTHONHOME/lib:$DYLD_LIBRARY_PATH
export DYLD_LIBRARY_PATH=$PERLHOME/lib/CORE:$DYLD_LIBRARY_PATH
export DYLD_LIBRARY_PATH=$TCLHOME/lib:$DYLD_LIBRARY_PATH
```

After performing the system-specific steps required to configure Language Pack on OSX, restart the Advanced Server database server; for information about restarting the server, consult the documentation available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

### *Known Language Pack Restrictions:*

(1) The current set of installers can only be installed in a fixed location. The packages are not relocatable.

(2) There is no package manager for Tcl.

(3) The installer will only extract in the stated installation path.

### *Known Bugs:*

1. On Windows, the pythonw.exe, pyw.exe and other binaries may produce an error, reporting fault module in a MSVCR120.dll.

## Migration Toolkit - Configuring an RPM Installation

Please note that you must install a Java environment before invoking EDB*Plus or Migration Toolkit or before using PL/Java or the JDBC connector.

If you have performed an RPM installation of Migration Toolkit, you must perform the following steps before invoking Migration Toolkit.

### *Using Migration Toolkit with IDENT Authentication*

By default, the pg_hba.conf file for the RPM installer enforces IDENT authentication for remote clients. Before invoking Migration Toolkit, you must either modify the pg_hba.conf file, changing the authentication method to a form other than IDENT (and restarting the server), or perform the following steps to ensure that an IDENT server is accessible:

1. Confirm that an identd server is installed and running. For example, you can use the yum package manager to install an identd server by invoking the command:

```
yum install xinetd authd
```

The command should create a file named /etc/xinetd.d/auth that contains:

```
service auth { disable = no socket_type = stream wait = no user = ident
cps = 4096 10 instances = UNLIMITED server = /usr/sbin/in.authd
server_args = -t60 --xerror --os }
```

Note: if the file includes a -E argument at the end of server_args, please erase the -E.

Then, to start the identd server, invoke the commands:

```
systemctl enable xinetd

systemctl start xinetd
```

2. Open the pg_ident.conf file and create a user mapping:

```
# map_name system_username postgres_username

ppas enterprisedb enterprisedb
```

Where:

> The name specified in the map_name column is a user-defined name that will identify the mapping in the pg_hba.conf file.
>
> The name specified in the system_username column is enterprisedb.
>
> The name specified in the postgres_username is enterprisedb.

3. Open the pg_hba.conf file and modify the IDENT entries.

If you are using an IPv4 local connection, modify the file entry to read:

```
host all all 127.0.0.0/0 ident map=ppas
```

If you are using an IPv6 local connection:

```
host all all ::1/128 ident map=ppas
```

4. Restart the Advanced Server service before invoking Migration Toolkit.

For more information about using Migration Toolkit, see the *EDB Postgres Migration Toolkit Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

## pgAgent

Unless otherwise noted, the commands and paths in the following section assume that you have performed an installation with the interactive installer.

pgAgent is a job scheduling agent for Advanced Server. When you schedule a pgAgent job, the scheduling agent records the job definition in a scheduling table. The pgAgent service (running in the background) monitors the scheduling table and executes jobs at their scheduled time.

The Advanced Server installer creates the scheduling tables required by the pgAgent service under schema pgagent. If you are installing Advanced Server in Compatible with Oracle mode (the default), the scheduling tables are created in the edb database; if you are installing in PostgreSQL mode, the tables are created in the postgres database.

You can use the Postgres Enterprise Manager Client (available from EnterpriseDB) to conveniently schedule and manage pgAgent jobs. The PEM Client also offers online documentation for pgAgent.

To use the DBMS_JOB package compatible with Oracle databases from a database other than the edb database, you must install the pgAgent schema into each additional database in which you wish to schedule jobs. To install the pgAgent schema, you must:

1. Connect to the target database.

2. Invoke the pgagent.sql script.

When installed with the RPM package, the pgagent.sql script is located in /usr/share/ppas95-pgagent-3.4.1. When installed with the interactive installer, the script is located in /opt/PostgresPlus/9.5AS/share/extension.

The pgAgent script will install the scheduling tables in the target database.

### *Installing the pgAgent Service on Linux*

If you installed Advanced Server using the interactive installer, pgAgent is installed as well. The pgagent program is installed under the bin subdirectory of the Advanced Server installation directory along with the required startup scripts, subdirectories for logging, etc.

Similarly, if you installed Advanced Server using the ppas95 RPM package or the ppas95-pgagent RPM package, pgAgent is installed. The pgagent program is installed under the bin subdirectory of the Advanced Server

installation directory along with the required startup scripts, subdirectories for logging, etc.

As already stated, when the interactive installer is used, the pgagent schema and its scheduling tables are created in either the edb database or the postgres database.

When the RPM package is used, the pgagent schema and its scheduling tables are not automatically created. The scheduling tables must be created by connecting to the desired database and executing the pgagent.sql script as previously described.

When the interactive installer is used, a script named servicemanager.sh along with other supporting files is installed under the installer/pgAgent subdirectory of the Advanced Server location for providing an alternative method for managing pgAgent.

The servicemanager.sh script can be used to install pgAgent, uninstall pgAgent, start the pgAgent service, stop the pgAgent service, or disable the automatic startup of pgAgent.

**Note:** The servicemanager.sh script is only provided when the interactive installer is used, and the same functionality provided by this script can be accomplished using the methods described in Chapter 5.

The following section describes the usage of this script.

### *Using Script servicemanager.sh on Linux*

You must have superuser privileges to manage the pgAgent service using the servicemanager.sh script.

When invoking the servicemanager.sh script, the current working directory from where the script is invoked must be /opt/PostgresPlus/9.5AS/installer/pgAgent.

If for whatever reason, you need to reinstall pgAgent using the servicemanager.sh script, you must create the pgpass file in the following directory:

```
/opt/PostgresPlus/9.5AS/installer/pgAgent/
```

The file should contain a set of connection properties that reflect the

properties specified during the Advanced Server installation process. The format of an entry in the pgpass file is as follows:

> *hostname:port:database:username:password*

Where:

> *hostname* specifies name of the Advanced Server host.
>
> *port* specifies the port on which the Advanced Server host is listening.
>
> *database* specifies the name of the database.
>
> *username* specifies the name of an Advanced Server user.
>
> *password* specifies the password of the database in which the scheduling table resides.

For example:

> localhost:5444:*:enterprisedb:edb

After creating the pgpass file, execute the following commands as the root user to install the pgAgent service and create the startup file. The script configures the pgAgent executor to run in the background at system startup.

cd /opt/PostgresPlus/9.5AS/installer/pgAgent

./servicemanager.sh *component_name user_name install_dir service_name action_type version data_dir pg_host pg_port pg_user pg_database*

This command takes the following arguments:

> *component_name* - Specify pgAgent.
>
> *user_name* - Specify the Linux operating system account that runs Advanced Server. For example, this is enterprisedb if installed with the mode compatible with Oracle databases. This is postgres if installed with the mode compatible with PostgreSQL databases.
>
> *install_dir* - Specify the Advanced Server installation directory.
>
> *service_name* - Specify ppas-agent-9.5.

*action_type* - Specify install to install pgAgent, uninstall to uninstall pgAgent, start to start up the pgAgent service, stop to stop the pgAgent service, or disable_autostart to prevent automatic startup of the pgAgent service.

*version* - Specify 9.5.

*data_dir* - Specify the Advanced Server data directory (for example, /opt/PostgresPlus/9.5AS/data).

*pg_host* - Specify the name or IP address of the target database server's host.

*pg_port* - Specify the port number of the target database server.

*pg_user* - Specify the name of the database user listed in the pgpass file (for example, enterprisedb).

*pg_database* - Specify the name of the target database.

The following is an example of an installation:

```
[root@localhost ~]# cd /opt/PostgresPlus/9.5AS/installer/pgAgent

[root@localhost pgAgent]# ./servicemanager.sh pgAgent enterprisedb \

> /opt/PostgresPlus/9.5AS ppas-agent-9.5 \

> install 9.5 /opt/PostgresPlus/9.5AS/data \

> 127.0.0.1 5444 enterprisedb edb

./servicemanager.sh ran to completion
```

After installing the service, you should remove the password from the pgpass file so that the password is not available to other users.

The following example starts the pgAgent service:

```
[root@localhost pgAgent]# ./servicemanager.sh pgAgent enterprisedb \

> /opt/PostgresPlus/9.5AS ppas-agent-9.5 \
```

```
> start 9.5 /opt/PostgresPlus/9.5AS/data \

> 127.0.0.1 5444 enterprisedb edb

Starting ppas-agent-9.5 [ OK ]

INFO: [PID: 11135]

INFO: [CMD: /opt/PostgresPlus/9.5AS/bin/pgagent -l 1 -s /var/log/ppas-agent-9.5/ppas-agent-9.5.log hostaddr=127.0.0.1 port=5444 dbname=edb user=enterprisedb]

MSG: [ppas-agent-9.5 started]

INFO: [Please see service script file /var/log/ppas-agent-9.5/ppas-agent-9.5_script.log for details]

./servicemanager.sh ran to completion
```

The following example stops the pgAgent service:

```
[root@localhost pgAgent]# ./servicemanager.sh pgAgent enterprisedb \

> /opt/PostgresPlus/9.5AS ppas-agent-9.5 \

> stop 9.5 /opt/PostgresPlus/9.5AS/data \

> 127.0.0.1 5444 enterprisedb edb

INFO: [PID: 11135]

INFO: [CMD: /opt/PostgresPlus/9.5AS/bin/pgagent -l 1 -s /var/log/ppas-agent-9.5/ppas-agent-9.5.log hostaddr=127.0.0.1 port=5444 dbname=edb user=enterprisedb]

Stopping ppas-agent-9.5 [ OK ]

MSG: [ppas-agent-9.5 stopped]

INFO: [Please see service script file /var/log/ppas-agent-9.5/ppas-agent-9.5_script.log for details]

./servicemanager.sh ran to completion
```

### *Installing the pgAgent Service on Windows*

pgAgent also provides an alternate command line argument that allows you to install or remove the pgAgent service on a Windows system. Use the following command to install the pgAgent service:

> pgagent INSTALL ser*vice_name* [*options*] *connection_string*

Where:

> *service_name* specifies the name of the pgAgent service.
>
> *options*

| Option | Description |
|---|---|
| -u | specifies a user or DOMAIN\user |
| -p | specifies a password associated with that user |
| -d | specifies a display name for the user |
| -t | specifies a poll time interval (in seconds). The default value is 10. |
| -r | specifies a retry period after connection abort (in seconds) Specify a value greater than or equal to 10; the default is 30. |
| -l | specifies a logging verbosity. Specify a 0 to log ERROR messages, 1 to log WARNING messages, or 2 to log DEBUG messages. The default is 0. |

*connection_string* specifies connection information for an Advanced Server host.

For example, the following command creates a pgAgent service on a Windows platform:

%EDB_HOME%\bin\pgagent INSTALL jobscheduler -u enterprisedb -p 1safepassword hostaddr=127.0.0.1 dbname=edb user=enterprisedb

The example is:

- Running on the localhost.
- Connecting to a database called edb.
- Connecting as user enterprisedb.
- Using the password 1safepassword.

You can optionally include the REMOVE keyword to remove a pgAgent service:

```
pgAgent REMOVE \<serviceName>
```

### *Controlling the pgAgent Service*

After installing the pgAgent service on either Linux or Windows, you must start the service. Please Note: if you stop or restart the Advanced Server service, the dependent pgAgent service is also stopped; you must manually restart the pgAgent service.

For detailed information about controlling the pgAgent service, see Section 5.

## PgBouncer

Unless otherwise noted, the commands and paths noted in the following section assume that you have performed an installation with the interactive installer.

PgBouncer is a lightweight connection pooler for Advanced Server. During an Advanced Server installation, the Advanced Configuration window will offer you the opportunity to specify a PgBouncer Listening Port, and allow you to specify a PgBouncer autostart preference. By default, PgBouncer is configured to monitor port 6432, and to start automatically when the operating system starts.

### *Configuring PgBouncer*

When the PgBouncer service is running, any Postgres Client connecting to the PgBouncer listener port specified in the configuration file will use connection pooling. PgBouncer connection and configuration information is stored in the pgbouncer.ini file, located under in the share directory, under your Advanced Server installation.

The PgBouncer configuration file is divided into two sections: [databases] and [pgbouncer].

The [databases] section of the configuration file contains a list of databases and the associated connection information; in an Advanced Server installation, the configuration file contains an entry for the installation of

Advanced Server that installed PgBouncer:

```
edb = host=127.0.0.1 port=5444
```

You can specify additional database connection information in the configuration file in the form of *keyword=value* pairs. You can include the following parameters:

| Parameter | Description |
|---|---|
| name | The name of the database to which the client application will connect. |
| host | The IP address of the host. |
| port | The port on which the host is listening. |
| dbname | The (optional) database name. |
| user | A username (if different than the information specified by the connecting client ). |
| password | A password (if different than the information specified by the connecting client). |

The following example demonstrates the syntax allowed in the [databases] section of the configuration file:

```
[databases]

edb = host=127.0.0.1 port=5444

acctg = host=192.168.10.101 port=5432 user=lola password=1safe_pwd!
```

Include the dbname parameter to map the connection name to an alternate database name. For example:

```
hr = host=127.0.0.1 port=5444 dbname=humanresources
```

Please note that the connection information will vary according to the platform, client software and identity you are connecting with. PgBouncer uses the information provided in the connection string to connect to the database server. Specifying a user in the pgbouncer.ini file overrides user details supplied by the client. If the client provides user information, that information is used to connect to PgBouncer, which in turn uses the information specified in the PgBouncer configuration file to connect to the server. The details of the

user specified in the configuration file must be defined in the database cluster.

Note: If you do not specify user details in pgbouncer.ini, the username and password will be authenticated by the database server and PgBouncer. As such, the username and password should be included in the userlist.txt file and the database cluster.

The [pgbouncer] section of the configuration file contains configuration details specific to PgBouncer:

| Parameter | Description |
|---|---|
| admin_users | A comma-delimited list of users that are allowed to access the Admin Console (for management and monitoring purposes). By default, PgBouncer is installed with an admin_user named enterprisedb. |
| auth_file | The path to the authentication file that contains username and passwords of clients that may connect to PgBouncer. The authentication file (userlist.txt) is located in /opt/PostgresPlus/pgbouncer/etc, and contains username/password pairs that specify the identities that clients may use to access PgBouncer. Within the authentication file, the username and password must be specified within double-quotes, as shown below:<br><br>`"user_name" "password"`<br><br>To make changes to the identities that can access PgBouncer, you can edit the existing authentication file, or specify an alternate authentication file with the auth_file parameter. |
| auth_type | The authentication method used by PgBouncer. May be: md5, crypt, plain, trust or any. The default value is md5. |
| listen_addr | The IP address on which PgBouncer listens for client connections. If omitted, only Unix socket connections are allowed; the client must also reside on the same host as PgBouncer and may not specify a host IP address when connecting to PgBouncer. |

| Parameter | Description |
|---|---|
| listen_port | The port that PgBouncer monitors for client connections. By default, PgBouncer listens on port 6432. |
| logfile | The path to the PgBouncer log file. |
| pidfile | The path to the process ID file. |
| pool_mode | The value of pool_mode specifies when the server connection can be made available to the connection pool. May be: session, transaction or statement. The default value is session. |

The following example demonstrates the syntax allowed in the [pgbouncer] section of the configuration file:

```
[pgbouncer]

logfile = /var/log/pgbouncer-1.6/pgbouncer.log

pidfile = /var/run/pgbouncer-1.6/pgbouncer-1.6.pid

listen_addr = *

listen_port = 6432

auth_type = md5

auth_file = /opt/PostgresPlus/PgBouncer-1.6/etc/userlist.txt

admin_users = enterprisedb

pool_mode = session
```

After editing the PgBouncer configuration file to reflect your environment, you must restart the PgBouncer service for the changes to take effect. For detailed information about controlling the PgBouncer service, see Section 5.

### *Using the PgBouncer Admin Console*

The Admin Console allows you to retrieve statistical information about PgBouncer activity, and to control the PgBouncer process. You can use the psql client to access the PgBouncer Admin Console by connecting to the pgbouncer database. The following example connects to the pgbouncer

database with the psql client on a Linux system. PgBouncer is listening on port 6432, with a user name of enterprisedb:

```
# ./psql -p 6432 -U enterprisedb pgbouncer
```

Please note that the required connection information will vary according to the connecting client, platform and authentication information required by the server.

After connecting to the pgbouncer database, you can use the SHOW CLIENTS command to retrieve client-related information:

```
# SHOW CLIENTS;
```

The SHOW CLIENTS command returns:

```
--[ RECORD 1]-+---------- type | C user | postgres database | pgbouncer state | active addr | unix port | 6432 local_addr | unix local_port | 6432 connect_time | 2010-05-25 05:26:20 request_time | 2010-05-25 05:39:46 ptr | 0x8655d20 link |
```

You can use other variations of the SHOW command to retrieve information about PgBouncer:

```
SHOW STATS SHOW SERVERS SHOW POOLS SHOW LISTS SHOW USERS SHOW DATABASES SHOW FDS SHOW CONFIG
```

You can use the following commands to control the PgBouncer process:

PAUSE

> Use the PAUSE command to disconnect all servers after waiting for current queries to complete.

SUSPEND

> Use the SUSPEND command to flush the socket buffers and suspend the PgBouncer process.

RESUME

> Use the RESUME command to resume work after a PAUSE or SUSPEND command.

SHUTDOWN

> Use the SHUTDOWN command to stop the PgBouncer process and exit.

RELOAD

> Use the RELOAD command to reload the PgBouncer configuration files.

For more information about using PgBouncer, visit:

http://pgbouncer.projects.pgfoundry.org/doc/usage.html

## pgpool-II

Unless otherwise noted, the commands and paths noted in the following section assume that you have performed an installation with the interactive installer.

The pgpool-II utility package acts as a middleman between client applications and Server database servers. pgpool-II functionality is transparent to client applications; client applications connect to pgpool-II instead of directly to Advanced Server, and pgpool-II manages the connection. EnterpriseDB supports the following pgpool-II features:

- Load balancing
- Connection pooling
- High availability
- Connection limits

pgpool-II runs as a service on Linux systems, and is not supported on Windows systems. pgpool-II functionality is controlled via configuration parameter settings made in the configuration files. If you have used the graphical installer, the configuration files are located in:

> /opt/PostgresPlus/pgpool-II-3.4/etc/pgpool.conf /opt/PostgresPlus/pgpool-II-3.4/etc/pool_hba.conf /opt/PostgresPlus/pgpool-II-3.4/etc/pcp.conf

If you have used an RPM package to install pgpool-II, the configuration files are located in:

> /etc/ppas-pgpool34/pgpool.conf

> /etc/ppas-pgpool34/pool_hba.conf
>
> /etc/ppas-pgpool34/pcp.conf

After modifying the parameter settings that implement pgpool-II functionality for your installation, you must restart the pgpool service. For detailed information about controlling the pgpool service, see Section 5.

Please note that the configuration options for pgpool-II are extensive; the options listed below should be considered a starting point only. For more information about configuring and using pgpool-II, please consult the project website at:

http://www.pgpool.net/mediawiki/index.php/Main_Page

### *pgpool-II Host Setup*

When pgpool-II starts, it records its process ID in a file whose name is determined by the pid_file_name configuration parameter. The initial value of the pid_file_name parameter in the sample file is:

> pid_file_name = '/var/run/pgpool/pgpool.pid'

Please note that the contents of the /var/run directory (including the pgpool directory) may be removed by the operating system during a reboot. The /var/run/pgpool directory should NOT be used as the location for the pgpool.pid file.

Modify the pid_file_name parameter to specify a safer directory location. For example:

> pid_file_name = '/var/run/ppas-pgpool34/ppas-pgpool34.pid'

The /var/run directory will persist after a system reboot, and if removed by the operating system, the pgpool.pid file will be recreated by pgpool-II upon startup.

### *Configuring Connection Pooling*

pgpool-II provides a set of child processes that maintain cached connections to one or more database servers. When a client connects, pgpool-II attempts to reuse a connection from its pool, thus avoiding the overhead of opening and closing client connections.

A connection in the pool can be reused only if the target database and the connection user match a prior connection that is currently in the pool. Connection pooling configuration options (such as the number of child processes, and the maximum number of cached connections per child) are specified in the pgpool.conf file.

To configure connection pooling with one database server:

1. Configure the pg_hba.conf file on the pgpool host to permit connections between the clients and the server.

2. Copy the pgpool.conf.sample file to pgpool.conf, and modify the file, setting the connection_cache parameter to on, and specifying connection properties for your database server.

> For example:
>
> connection_cache = on
>
> backend_hostname0 = 'localhost'
>
> backend_port0 = 5444
>
> backend_weight0 = 1
>
> backend_data_directory0 = '/opt/PostgresPlus/9.5AS/data'
>
> Note that in the pgpool.conf file, connection parameters have an appended digit that specifies a cluster node identifier. Database node 0 specifies values for the master node.

3. Optionally, configure pgpool-II client authentication.

4. Optionally, configure the PCP administrative interface.

5. Start pgpool-II and begin using your application.

### *Configuring Streaming Replication and pgpool-II Load Balancing*

EnterpriseDB supports replication scenarios that use pgpool-II load balancing with PostgreSQL streaming replication or Slony replication. The supported replication methods ensure that database updates made by client applications are applied to multiple backend servers. For detailed information about the

benefits of each replication method and detailed configuration instructions, please review project documentation for each utility.

When load balancing is enabled, pgpool-II distributes some types of SELECT statements to backend servers, allowing multiple database servers and hosts to share the processing load of SELECT statements issued by client applications.

When configuring pgpool-II load balancing, it is crucial that the initial database environments in all backend servers are identical:

- Tables must have the same name, definition, and row content.
- Schemas must exist in each backend application database.
- Roles and privileges must be comparably configured on each backend server to ensure that the result set of SQL statements are identical on all servers.

If you use password authentication, the same password must be assigned to an associated user name on each database server. The same user name/password pair is used to connect pgpool-II to each backend connection.

Within a replication scenario, each backend is uniquely identified by the host name (or IP address) and port number on which the database server instance is listening for connections. You must ensure that the pool_hba.conf and pg_hba.conf files allow a connection between that server and the host on which pgpool-II will be running.

The following example demonstrates how to implement pgpool-II load balancing with two servers (the master and replica nodes) in a Streaming Replication scenario. Configuring pgpool-II load balancing for a Slony replication scenario is similar; please consult the Slony documentation for information about configuring Slony replication.

### Step 1 - Configuring the Master Node of the Replication Scenario

Open an SSH session with the master node of the replication scenario, and modify the pg_hba.conf file (located in the /opt/PostgresPlus/9.5AS/data directory), adding connection information for the replication user (in the example that follows, edbrepuser resides on a standby node with an IP address of 107.178.217.178):

```
host replication edbrepuser 107.178.217.178/32 md5
```

The connection information should specify the address of the standby node of the replication scenario, and your preferred authentication method.

Modify the postgresql.conf file (located in /opt/PostgresPlus/9.5AS/data), adding the following replication parameter and values to the end of the file:

```
wal_level = hot_standby max_wal_senders = 3 checkpoint_segments = 8
wal_keep_segments = 8
```

Save the configuration file, and issue the following command in the OS Terminal window to restart the server:

```
/etc/init.d/ppas-9.5 restart
```

Use the sudo su - command to assume the identity of the enterprisedb database superuser:

```
sudo su - enterprisedb
```

Then, start a psql session, connecting to the edb database:

```
psql -d edb
```

At the psql command line, create a user with the replication attribute:

```
CREATE ROLE edbrepuser WITH REPLICATION LOGIN PASSWORD
'password';
```

**Step 2 - Configuring the Standby Node of the Replication Scenario**

Open an SSH session with the Standby server, and assume the identity of the database superuser (enterprisedb):

```
sudo su - enterprisedb
```

With your choice of editor, create a .pgpass file in the home directory of the enterprisedb user. The .pgpass file holds the password of the replication user in plain-text form; if you are using a .pgpass file, you should ensure that only trusted users have access to the .pgpass file:

Add an entry that specifies connection information for the replication user:

```
*:5444:*:edbrepuser:password
```

The server will enforce restrictive permissions on the .pgpass file; use the following command to set the file permissions:

```
chmod 600 .pgpass
```

Relinquish the identity of the database superuser:

```
exit
```

Then, assume superuser privileges:

```
sudo su -
```

Use your platform-specific command to stop the database server before replacing the data directory on the Standby node with the data directory of the Master node. For information about controlling the service, see Section 5.

Then, delete the data directory on the Standby node:

```
rm -rf /opt/PostgresPlus/9.5AS/data
```

After deleting the existing data directory, use the pg_basebackup utility to copy the data directory of the Master node to the Standby:

```
pg_basebackup --pgdata=/opt/PostgresPlus/9.5AS/data --format=p --label=standby --host=146.148.46.44 --username=edbrepuser --password --xlog-method=stream
```

The call to pg_basebackup specifies the IP address of the Master node and the name of the replication user created on the Master node.

For more information about the options available with the pg_basebackup utility, see the PostgreSQL core documentation at:

https://www.postgresql.org/docs/9.5/static/app-pgbasebackup.html

When prompted by pg_basebackup, provide the password associated with the replication user.

After copying the data directory, change ownership of the directory to the database superuser (enterprisedb):

```
chown -R enterprisedb /opt/PostgresPlus/9.5AS/data
```

Navigate into the data directory:

```
cd /opt/PostgresPlus/9.5AS/data
```

With your choice of editor, create a file named recovery.conf( in the /opt/PostgresPlus/9.5AS/data directory) that includes:

```
standby_mode = on trigger_file = /tmp/trigger_file primary_conninfo = 'host=146.148.46.44 port=5444 user=edbrepuser password=password'
```

Please note: the primary_conninfo parameter specifies connection information for the replication user on the master node of the replication scenario (in our example, edbrepuser resides on 146.148.46.44).

Change ownership of the recovery.conf file to enterprisedb:

```
chown enterprisedb:enterprisedb recovery.conf
```

Modify the postgresql.conf file (located in /opt/PostgresPlus/9.5AS/data), specifying the following values at the end of the file:

```
wal_level = hot_standby hot_standby = on
```

The data file has been copied from the Master node, and will contain the replication parameters specified previously.

Then, restart the server:

```
/etc/init.d/ppas-9.5 start
```

At this point, the Master node will be replicating data to the Standby node.

**Step 3 - Configuring pgpool-II Load Balancing**

Use your choice of editor to modify the pgpool.conf file. Within the pgpool.conf file, modify the parameter settings to specify that load balancing is enabled:

```
load_balance_mode = true
```

Then, specify the connections settings for the master database node in the parameter set that ends with a 0. For example:

```
backend_hostname0 = '146.148.46.44'
```

```
backend_port0 = 5444

backend_weight0 = 1

backend_data_directory0 = '/opt/PostgresPlus/9.5AS/data'
```

Then, specify the connections settings for each node to which queries will be distributed. Increment the number that follows the parameter name for each node, and provide connection details:

```
backend_hostname1 = '107.178.217.178'

backend_port1 = 5444

backend_weight1 = 1

backend_data_directory1 = '/opt/PostgresPlus/9.5AS/data'
```

Use the backend_weight parameter to specify how queries will be distributed amongst the nodes. Specify a value of 1 to indicate that you wish (qualified) queries to be equally distributed across the nodes of the replication scenario.

**Step 4 - Restart pgpool-II and begin using your application**

> For detailed information about starting the pgpool-II service, see Section 5.

### *Commonly Used pgpool-II Parameters*

The following table lists pgpool.conf parameters that are used when implementing connection pooling:

| Parameter Name | Description |
|---|---|
| pool_conn_dbname | Database name to which pgpool-II will connect. By default, pgpool-II will connect with postgres. |
| listen_addresses | Host name or IP address used by pgpool-II to listen for connections. Default is localhost. Change to '*' for all addresses. |
| port | Port for pgpool-II connections. Default is 9999. |
| pcp_port | Port for PCP connections. Default is 9898. |

| Parameter Name | Description |
|---|---|
| backend_hostname0 | Host name or IP address for backend 0. You can specify '' if the backend and pgpool-II are running on the same host. |
| backend_port0 | Port number for backend 0. |
| backend_weight0 | Weight for backend 0 (only in load balancing mode). Specify 1 for each backend if you want the load equally balanced, or decimal values (.9, .1, etc.) to weight the load towards certain backends. |
| backend_data_directory0 | Data directory for backend 0. |
| enable_pool_hba | Set to on to use pool_hba.conf for client authentication. |
| num_init_children | Number of pools. Default is 32. |
| max_pool | Number of connections per pool. Default is 4. |
| connection_cache | Set to on to enable connection pooling. |

The following table lists pgpool.conf parameters that are used when implementing replication and load balancing:

| Parameter Name | Description |
|---|---|
| Allow_sql_comments | If on, ignore SQL comments; modifications to this parameter require a reload of the pgpool.conf file. |
| load_balance_mode | Set to on to activate load balancing mode. If load_balance_mode is on and replicate_select is off, SELECT statements are sent to one backend. The proportion of SELECT statements each backend receives is determined by parameter backend_weight\<N>. |
| ignore_leading_white_space | Ignore leading white spaces of each query. Certain APIs such as DBI/DBD::Pg for Perl add white space that the user cannot control. Default is on. |

### *pgpool-II Client Authentication Configuration*

When pgpool-II is enabled, client applications connect to pgpool-II, which acts as a middleman for a Postgres server. A connecting client application is first authenticated with the pgpool-II server, and then authenticated with the Postgres server.

pgpool-II authentication properties are determined by parameter settings in the pool_hba.conf configuration file. The pool_hba.conf file is similar in format and function to the Postgres pg_hba.conf configuration file. Please consult the pgpool-II documentation for detailed information about pool_hba.conf entries.

To enable pgpool-II authentication:

1. Copy file pool_hba.conf.sample to pool_hba.conf.

2. Modify the pool_hba.conf file, specifying authentication information for servers or users that you wish to allow to connect. Entries follow the same format used in the pg_hba.conf file.

3. Modify the pgpool.conf file, setting the enable_pool_hba parameter to on.

4. Restart pgpool-II to reload the pgpool-II configuration files.

Note: user names and passwords specified in the pool_hba.conf file will be used for authentication with the database server; you must also specify those user names and passwords in the database server's pg_hba.conf file.

### *Connecting a Client to pgpool-II*

Client applications should connect directly to the pgpool-II listener port on the pgpool-II host. For example, to connect to the edb database (while using pgpool-II functionality), enter:

```
psql -d edb -U enterprisedb -h localhost -p 9999
```

When invoked at the psql prompt, the following SHOW command keywords will display pgpool-II information:

| Command | Information Provided |
|---|---|
| SHOW pool_status | Displays pgpool-II configuration parameters and their name, value, and description. |

| Command | Information Provided |
|---|---|
| SHOW pool_nodes | Displays a list of all configured nodes. |
| SHOW pool_processes | Displays a list of all pgpool-II processes waiting for connections or dealing with a connection. |
| SHOW pool_pools | Displays a list of pools. |
| SHOW pool_version | Displays the pgpool-II release number. |

### *PCP Configuration*

PCP is an administrative interface for pgpool-II that allows you to retrieve information about database nodes, pgpool-II child processes, etc. You should issue PCP commands from the Linux command line.

Before using PCP commands, you must modify the pcp.conf file, providing user names and passwords that you supply whenever you issue a PCP command. The user names in the pcp.conf file are completely independent of the database server user names and passwords.

Use the following steps to enable PCP:

1. Copy the pcp.conf.sample file to pcp.conf.

2. Add an entry to the pcp.conf file of the following form:

> *username:md5_password*
>
> where:
>
> *username* is a PCP user name.
>
> *md5_password* is the PCP password in md5 format
>
> You can use the pg_md5 program to generate the encrypted password from the clear-text form as shown below:
>
> $ pg_md5 mypassword
>
> 34819d7beeabb9260a5c854bc85b3e44

> For example, the entry in the pcp.conf file for a PCP user named pcpuser with the password of mypassword is:
>
> # USERID:MD5PASSWD
> pcpuser:34819d7beeabb9260a5c854bc85b3e44

3. Restart the pgpool service. For information about restarting the pgpool service, see Section 5.

4. When issuing a PCP command, specify the PCP user name and the unencrypted form of the password:

> $ pcp_node_info 5 localhost 9898 pcpuser mypassword 0 localhost 5432 1 1.000000

After configuring PCP, you can use PCP commands to control pgpool-II and retrieve information. Specify the following arguments when calling PCP commands:

| Argument | Description |
|---|---|
| timeout | Timeout value in seconds. PCP will disconnect if pgpool-II does not respond within the specified number of seconds. |
| host | The name of the pgpool-II host. |
| port | The PCP port number; the default value is 9898. |
| username | The PCP user name (as specified in pcp.conf.) |
| password | The password associated with the user name (as specified in pcp.conf). |

PCP recognizes the following commands:

| PCP Command | Description |
|---|---|
| pcp_node_*count timeout host port username password* | Total number of nodes defined in pgpool.conf |

| PCP Command | Description |
| --- | --- |
| pcp_node_info *timeout host port username password nodeid* | Displays information on the node given by \<nodeid> |
| pcp_proc_count *timeout host port username password* | Displays the pgpool-II child process IDs |
| pcp_proc_info *timeout host port username password processid* | Displays information on the pgpool-II child process given by \<processid> |
| pcp_detach_node [-g] *timeout host port username password nodeid* | Detaches the node specified by \<nodeid> from pgpool-II. If -g is given, wait until all clients are disconnected (unless client_idle_limit_in_recovery is -1 or recovery_timeout is expired). |
| pcp_attach_node *timeout host port username password nodeid* | Attaches the node specified by \<nodeid> to pgpool-II. |

## pgsnmpd

pgsnmpd is an SNMP agent that can return hierarchical information about the current state of Advanced Server on a Linux system. pgsnmpd is distributed with and installed by the Advanced Server installer as part of the Database Server component. The pgsnmpd agent can operate as a stand-alone SNMP agent, as a pass-through sub-agent, or as an AgentX sub-agent.

After installing Advanced Server, you will need to update the LD_LIBRARY_PATH variable. Use the command:

$export LD_LIBRARY_PATH=/opt/PostgresPlus/9.xAS/lib:$LD_LIBRARY_PATH

Where *x* specifies the server version.

This command does not persistently alter the value of LD_LIBRARY_PATH; consult the documentation for your distribution of Linux for information about persistently setting the value of LD_LIBRARY_PATH.

The examples that follow demonstrate the simplest usage of pgsnmpd, implementing read only access. pgsnmpd is based on the net-snmp library; for more information about net-snmp, please visit:

http://net-snmp.sourceforge.net

### *Configuring pgsnmpd*

The pgsnmpd configuration file is named snmpd.conf. For information about the directives that you can specify in the configuration file, please review the snmpd.conf man page (man snmpd.conf).

You can create the configuration file by hand, or you can use the snmpconf perl script to create the configuration file. The perl script is distributed with net-snmp package. net-snmp is an open-source package available from:

http://www.net-snmp.org

To use the snmpconf configuration file wizard, download and install net-snmp. When the installation completes, open a command line and enter:

```
snmpconf
```

When the configuration file wizard opens, it may prompt you to read in an existing configuration file. Enter none to generate a new configuration file (not based on a previously existing configuration file).

snmpconf is a menu-driven wizard. Select menu item 1: snmpd.conf to start the configuration wizard. As you select each top-level menu option displayed by snmpconf, the wizard walks through a series of questions, prompting you for information required to build the configuration file. When you have provided information in each of the category relevant to your system, enter Finished to generate a configuration file named snmpd.conf. Copy the file to:

```
/opt/PostgresPlus/9.xAS/share
```

Where *x* specifies the server version.

### *Setting the Listener address*

By default, pgsnmpd listens on port 161. If the listener port is already being used by another service, you may receive the following error:

> Error opening specified endpoint "udp:161".

You can specify an alternate listener port by adding the following line to your snmpd.conf file:

> agentaddress *$host_address*:2000

The example instructs pgsnmpd to listen on UDP port 2000, where *$host_address* is the IP address of the server (e.g. 127.0.0.1).

### *Invoking pgsnmpd*

Ensure that an instance of Advanced Server is up and running (pgsnmpd will connect to this server). Open a command line and assume super-user privileges, before invoking pgsnmpd with a command that takes the following form:

*path_to_PPAS*/bin/pgsnmpd -b -c *path_to_PPAS*/share/snmpd.conf -C "user=enterprisedb dbname=edb password=safe_password port=5444"

Where *path_to_PPAS* specifies the Advanced Server installation directory.

Include the -b option to specify that pgsnmpd should run in the background.

Include the -c option, specifying the path and name of the pgsnmpd configuration file.

Include connection information for your installation of Advanced Server (in the form of a libpq connection string) after the -C option.

### *Viewing pgsnmpd Help*

Include the --help option when invoking the pgsnmpd utility to view other pgsnmpd command line options:

pgsnmpd --help

Version PGSQL-SNMP-Ver1.0

usage: pgsnmpd [-s] [-b] [-c FILE ] [-x address ] [-g] [-C "Connect String"]

-s : run as AgentX sub-agent of an existing snmpd process

-b : run in the background

-c : configuration file name

-g : use syslog

-C : libpq connection string

-x : address:port of a network interface

-V : display version strings

### *Requesting information from pgsnmpd*

You can use net-snmp commands to query the pgsnmpd service. For example:

snmpgetnext -v 2c -c public localhost .1.3.6.1.4.1.5432.1.4.2.1.1.0

In the above example:

-v 2c option instructs the snmpgetnext client to send the request in SNMP version 2c format.

-c public specifies the community name.

localhost indicates the host machine running the pgsnmpd server.

.1.3.6.1.4.1.5432.1.4.2.1.1.0 is the identity of the requested object. To see a list of all databases, increment the last digit by one (e.g. .1.1, .1.2, .1.3 etc.).

The encodings required to query any given object are defined in the MIB (Management Information Base). An SNMP client can monitor a variety of servers; the server type determines the information exposed by a given server. Each SNMP server describes the exposed data in the form of a MIB (Management information base). By default, pgsnmpd searches for MIB's in the following locations:

> /usr/share/snmp/mibs
>
> $HOME/.snmp/mibs

## PL/Java

The PL/Java package allows you to create and execute Java stored procedures, triggers and functions via the JDBC interface. Unless otherwise noted, the commands and paths noted in the following section assume that you have performed an installation with the interactive installer.

Before installing PL/Java for use with a standard Java virtual machine (JVM) on a Linux system, you must first confirm that a Java runtime environment (version 1.5 or later) is installed on your system. Installation of a Java development kit also provides a Java runtime environment.

## Installing PL/Java on Linux

The following steps outline the process of installing PL/Java on a Linux system:

1. Edit the postgresql.conf file and add (or modify) the following settings:

   > pljava.classpath='*path_to_PPAS*/lib/pljava.jar'
   >
   > Where *path_to_PPAS* specifies the location of the Advanced Server installation.

2. Restart the database server.

3. If your Java installation is not located in the system default location, you must ensure that Advanced Server can locate the JRE shared libraries. To instruct the server where to find the Java libraries, modify the Advanced Server service startup script or the user profile, setting the path to the Java library.

   > Please note: If you include the command that sets the path in the service startup script, any user that invokes the startup script will set the path when the service restarts. If you include the command that sets the path in a user profile, the path will only be set for the session that belongs to the user that connects using that profile.
   >
   > You can use your editor of choice to open the Advanced Server service script. The script is named:

ppas-9.x

Open the script file, and add the following line to the beginning of the script:

{ export LD_LIBRARY_PATH= \<\
<*path_to_libjvm.so*>>:$LD_LIBRARY_PATH }

Where *path_to_libjvm.so* specifies the location of the libjvm.so file. After saving the file, restart the server; for information about controlling the service, see Section 5.

4. You can install PL/Java using either the installation script or the PL/Java Deployer application. Deployer is a Java client program that deploys PL/Java in the database.

The easiest method is to use the installation script. To run the installation script, login to the database in which you want to install PL/Java and use the following command to run the script:

edb-psql=# \i *path_to_PPAS/*share/pljava_install.sql

Where *path_to_PPAS* specifies the location of the Advanced Server installation.

Alternatively, you can use the PL/Java Deployer application. When invoking the Deployer application, you must specify a classpath that includes the deploy.jar file (by default, located in the lib subdirectory under your Advanced Server installation) and the edb-jdbc1*x*.jar file (by default, located in the /opt/PostgresPlus/connectors/jdbc directory).

The deploy.jar file contains the code for the deployer command; the edb-jdbc1*x*.jar file includes the EnterpriseDB JDBC driver. Use the following command to invoke the Deployer application:

java -cp *your_classpath* org.postgresql.pljava.deploy.Deployer [*options*]

Where *your_classpath* specifies the search path to the compiled classes.

You can include the following *options* when invoking the Deployer application:

-install

Installs the Java language and the sqlj procedures. The deployer will fail if the language is already installed.

-reinstall

Reinstalls the Java language and the sqlj procedures. This will effectively drop all jar files that have been loaded.

-remove

Drops the Java language and the sqlj procedures and loaded jar files.

-user *user_name*

*user_name* specifies the name of the user that is connecting to the database. Default is the current user.

-password *password*

*password* specifies the password of the user that is connecting to the database. Default is no password.

-database *database*

*database* specifies the name of the database to which to connect. The default value is edb.

-host *host_name*

*host_name* specifies the name of the host. The default value is localhost.

-port *port_number*

*port_number* specifies the Advanced Server port number. The default value is 5444.

The following example uses the Deployer application to install PL/Java:

```
java -cp /opt/PostgresPlus/connectors/connectors/jdbc/edb-
jdbc16.jar:/opt/PostgresPlus/connectors/lib/deploy.jar
org.postgresql.pljava.deploy.Deployer -install -user enterprisedb -
password password -database edb -host localhost -port 5444
```

> Because of the complexity of this command line, we recommend storing the command line in a shell script or a .bat script.

5. Open the psql client and connect to the database in which PL/Java is installed. You can invoke the following command to display two rows indicating that Java and "Java Untrusted" have been installed in the database:

```
select * from pg_language where lanname like 'java%';
```

## Installing PL/Java on Windows

The following steps outline the process of installing PL/Java on a Windows system:

1. Edit the postgresql.conf file and add (or modify) the following settings:

   pljava.classpath='*path_to_PPAS*/lib/pljava.jar'

   Where *path_to_PPAS* specifies the location of the Advanced Server installation.

2. Restart the database server.

3. Modify the PATH setting used by the edb-postmaster backend (if it runs as a service, you will normally change the System Environment setting) so that it contains the following two entries:

   %JRE_HOME%\bin;%*JRE_HOME*%\bin\client

   Where JRE_HOME specifies the installation directory of your Java runtime environment. If you have a Java development kit, substitute the location of $JDK_HOME/jre for JRE_HOME.

4. You can use either the installation script or the PL/Java Deployer application to install PL/Java. Deployer is a Java client program that deploys PL/Java in the database.

   The easiest method is to use the installation script. To run the installation script, login to the database in which you want to install PL/Java and use the following command to run the script:

edb-psql=# \i *path_to_PPAS*/share/pljava_install.sql

Where *path_to_PPAS* specifies the location of the Advanced Server installation.

Alternatively, you can use the PL/Java Deployer application. When invoking the Deployer application, you must specify a classpath that includes the deploy.jar file (by default, located in the lib subdirectory under your Advanced Server installation) and the edb-jdbc1*x*.jar file (located in the connectors/jdbc subdirectory under your Advanced Server installation).

The deploy.jar file contains the code for the deployer command; the edb-jdbc1*x*.jar file includes the EnterpriseDB JDBC driver. Use the following command to invoke the Deployer application:

java -cp *your_classpath* org.postgresql.pljava.deploy.Deployer [*options*]

Where *your_classpath* specifies the search path to the compiled classes.

You can include the following *options* when invoking the Deployer application:

-install

Installs the Java language and the sqlj procedures. The deployer will fail if the language is already installed.

-reinstall

Reinstalls the Java language and the sqlj procedures. This will effectively drop all jar files that have been loaded.

-remove

Drops the Java language and the sqlj procedures and loaded jar files.

-user *user_name*

*user_name* specifies the name of the user that is connecting to the database. Default is the current user.

-password *password*

*password* specifies the password of the user that is connecting to the database. Default is no password.

-database *database*

*database* specifies the name of the database to which to connect. The default value is edb.

-host *host_name*

*host_name* specifies the name of the host. The default value is localhost.

-port *port_number*

*port_number* specifies the Advanced Server port number. The default value is 5444.

The following example uses the Deployer application to install PL/Java:

```
java -cp "/opt/PostgresPlus/connectors\\connectors\\jdbc\\edb-jdbc16.jar;/opt/PostgresPlus/connectors\\lib\\deploy.jar" org.postgresql.pljava.deploy.Deployer -install -user enterprisedb -password password -database edb -host localhost -port 5444
```

Because of the complexity of this command line, we recommend storing the command line in a shell script or a .bat script.

5. Open the psql client and connect to the database in which PL/Java is installed. You can invoke the following command to display two rows indicating that Java and "Java Untrusted" have been installed in the database:

```
select * from pg_language where lanname like 'java%';
```

## Using PL/Java

To create a PL/Java program, you must first create a Java class that contains at least one static method, and then you must compile that class into a .class or .jar file. Next, you declare the Java function within SQL using the CREATE FUNCTION command. The CREATE FUNCTION command gives a SQL name to the function and associates the compiled class (and method name)

with that function name.

For example, the following CREATE FUNCTION statement creates a function names getsysprop:

```
CREATE FUNCTION getsysprop(VARCHAR) RETURNS VARCHAR AS 'java.lang.System.getProperty' LANGUAGE java; SELECT getsysprop('user.home');
```

When invoked, getsysprop will execute the getProperty (static) method defined within the java.lang.System class.

### *Creating and Installing a PL/Java Program*

The example that follows demonstrates the procedures used to create and install a simple HelloWorld program:

1. Save the following code sample to a file named HelloWorld.java

```
package com.mycompany.helloworld; public class HelloWorld { public static String helloWorld() { return "Hello World"; } }
```

2. Compile the file:

```
$ javac HelloWorld.java
```

and save it in a folder hierarchy as:

```
com/mycompany/helloworld/HelloWorld.class
```

3. Create an archive file (a JAR file) named helloworld.jar :

```
$ jar cf helloworld.jar \ com/mycompany/helloworld/HelloWorld.class
```

4. Open the psql client, and install the jar file with the following command:

```
edb=# SELECT sqlj.install_jar('file:///\<file_path>/helloworld.jar', 'helloworld', true);
```

To confirm that the jar file has been loaded correctly, perform a SELECT statement on the sqlj.jar_entry and sqlj.jar_repository tables.

5. Set the classpath as:

```
edb=# SELECT sqlj.set_classpath('public', 'helloworld');
```

The sqlj.classpath_entry table will now include an entry for the helloworld class file.

6. Create a function that uses Java to call the static function declared in the JAR file:

```
CREATE OR REPLACE FUNCTION helloworld() RETURNS "varchar"
AS 'com.mycompany.helloworld.HelloWorld.helloWorld' LANGUAGE
'java' VOLATILE;
```

7. Execute the function:

```
edb=# SELECT * FROM helloworld();

You should see the output:

helloworld ---------- Hello World (1 row)
```

The official PL/Java distribution is distributed with examples and documentation. For more information about using PL/Java, please see the project page at:

https://github.com/tada/pljava/wiki

## PL/Perl

The PL/Perl procedural language allows Advanced Server users to use Perl functions in Advanced Server applications. Before using PL/Perl, you must use the Language Pack installer (available via StackBuilder Plus) to install Perl. For information about using StackBuilder Plus, see Using Stackbuilder Plus. After downloading and installing the Language Pack, perform the OS specific Language Pack configuration steps outlined in Language Pack.

You must install PL/Perl in each database (or in a template database) before creating a PL/Perl function. Use the CREATE LANGUAGE command at the EDB-PSQL command line to install PL/Perl. Open the EDB-PSQL client, establish a connection to the database in which you wish to install PL/Perl, and enter the command:

```
CREATE LANGUAGE plperl;
```

Advanced Server confirms that the language is loaded with the response:

```
CREATE LANGUAGE
```

You can now use the features of the PL/Perl language from within Advanced Server. The following PL/Perl example creates a function named perl_max that returns the larger of two integer values:

CREATE OR REPLACE FUNCTION perl_max (integer, integer) RETURNS integer AS $$ if ($_[0] > $_[1]) { return $_[0]; } return $_[1]; $$ LANGUAGE plperl;

Pass two values when calling the function:

SELECT perl_max(1, 2);

Advanced Server returns:

perl_max --------- 2 (1 row)

For more information about using the Perl procedural language with Advanced Server, consult the official Postgres documentation, available at:

https://www.postgresql.org/docs/9.5/static/plperl.html

## PL/Python

The PL/Python procedural language allows Advanced Server users to create (and execute) functions written in Python within Advanced Server applications. The version of PL/Python used by Advanced Server is untrusted (plpython3u); it offers no restrictions on users to prevent potential security risks.

Please note: Advanced Server version 9.5 includes a major change in the Python installation for Linux systems. In previous releases, plpython was statically linked with ActiveState's python library. The EnterpriseDB Language Pack installer dynamically links with our shared object for python. In ActiveState Linux installers for Python, there was no dynamic library. As a result of these changes, plpython will no longer work with ActiveState installers.

You can use StackBuilder Plus to invoke the Language Pack installer. For information about using StackBuilder Plus, see Using Stackbuilder Plus. After downloading and installing the Language Pack, perform the OS specific configuration steps outlined in Section Language Pack.

Install PL/Python in each database (or in a template database) before creating a PL/Python function. You can use the CREATE LANGUAGE command at the EDB-PSQL command line to install PL/Python. Use EDB-PSQL to connect to the database in which you wish to install PL/Python, and enter the command:

> CREATE LANGUAGE plpython3u;
>
> Advanced Server confirms that the language is loaded with the response:
>
> CREATE LANGUAGE

After installing PL/Python in your database, you can use the features of the PL/Python language from within Advanced Server.

Please Note: The indentation shown in the following example must be included as you enter the sample function in EDB-PSQL. The following PL/Python example creates a function named pymax that returns the larger of two integer values:

CREATE OR REPLACE FUNCTION pymax (a integer, b integer) RETURNS integer AS $$ if a > b: return a return b $$ LANGUAGE plpython3u;

When calling the pymax function, pass two values as shown below:

SELECT pymax(12, 3);

Advanced Server returns:

pymax ------- 12 (1 row)

For more information about using the Python procedural language with Advanced Server, consult the official PostgreSQL documentation, available at:

https://www.postgresql.org/docs/9.5/static/plpython.html

# PL/Tcl

The PL/Tcl procedural language allows Advanced Server users to use Tcl/Tk functions in Advanced Server applications. Before using PL/Tcl with Advanced Server you must install TCL. You can use StackBuilder Plus to invoke the Language Pack installer (for information about using StackBuilder Plus, see Using Stackbuilder Plus). After downloading and installing the Language Pack, perform the operating system specific configuration steps outlined in Language Pack.

PL/Tcl is distributed with EDB Postgres Advanced Server. You must install PL/Tcl in each database (or in a template database) before creating a PL/Tcl function. Use the CREATE LANGUAGE command at the EDB-PSQL command line to install PL/Tcl. Use the psql client to connect to the database in which you wish to install PL/Tcl, and enter the command:

```
CREATE LANGUAGE pltcl;
```

After creating the pltcl language, you can use the features of the PL/Tcl language from within Advanced Server. The following PL/Tcl example creates a function named tcl_max that returns the larger of two integer values:

CREATE OR REPLACE FUNCTION tcl_max(integer, integer) RETURNS integer AS $$ if {[argisnull 1]} { if {[argisnull 2]} { return_null } return $2 } if {[argisnull 2]} { return $1 } if {$1 > $2} {return $1} return $2 $$ LANGUAGE pltcl;

Pass two values when calling the function:

SELECT tcl_max(1, 2);

Advanced Server returns:

tcl_max -------- 2 (1 row)

For more information about using the Tcl procedural language with Advanced Server, consult the official Postgres documentation, available at:

https://www.postgresql.org/docs/9.5/static/pltcl.html

# PostGIS

PostGIS is a PostgreSQL extension that allows you to store Geographic Information Systems (GIS) objects in an Advanced Server database. PostGIS includes functions for analyzing and processing GIS objects, and support for GiST-based R-Tree spatial indexes.

### *Installing PostGIS with a Package Manager*

You can use EnterpriseDB packages to add PostGIS to your Advanced Server installation.

**Note:** Before using a package to install PostGIS, you must install the EPEL repository. For information about installing the EPEL repository, see Section 2.3.

Then, invoke the PostGIS meta installer package with the command:

```
yum install ppas95-postgis
```

The ppas95-postgis package installs the following supporting Advanced Server packages:

```
ppas95-postgis-2.1.5

ppas95-postgis-utils

ppas95-postgis-docs

ppas95-postgis-core
```

Additional support for PostGIS is also provided by the following packages:

| Package | Provides |
|---|---|
| cfitsio | Library for manipulating FITS data files |
| gdal | GIS file format library |
| geos | A C++ port of the Java Topology Suite |
| hdf5 | General purpose library and file format for scientific data |
| libdap | The C++ DAP2 library |

| Package | Provides |
|---|---|
| libgeotiff | GeoTIFF format library |
| librx | POSIX regexp functions |
| netcdf | Libraries for the Unidata network Common Data Form |
| ogdi | Open Geographic Datastore Interface |
| proj | Cartographic projection software (PROJ.4) |

If you are installing PostGIS with a package manager, please note that you must manually create the template_postgis database and any PostGIS extensions required. For complete information about managing your PostGIS installation, please visit the official project website at:

http://postgis.net/documentation/

### *Using StackBuilder Plus to Install PostGIS*

If you have used the graphical installation wizard to install Advanced Server, you can use StackBuilder Plus to add PostGIS to your installation.

Navigate through the Start (or Applications) menu to the Postgres Plus Add-ons menu, and select StackBuilder Plus. Select your Advanced Server installation from the drop down listbox on the Welcome window and click Next to continue to the application selection page. Expand the Spatial Extensions node, and check the box next to PostGIS v2.1.x.x to download and install your selected version of PostGIS (see Figure 7.1).

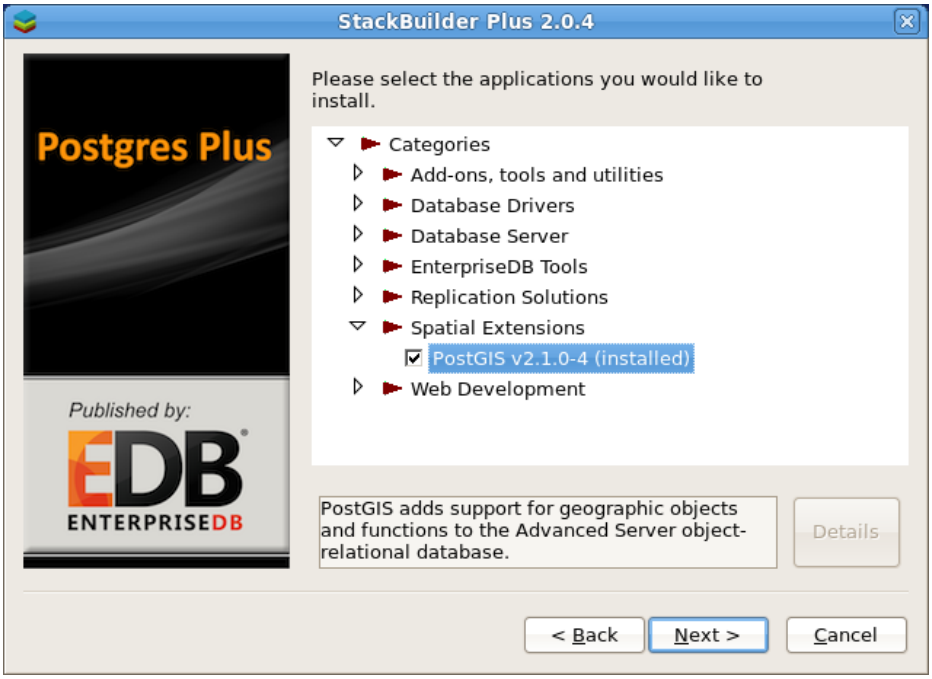



*Figure 7.1 — Open the Spatial Extensions node to locate PostGIS.*

Click Next to continue; the StackBuilder Plus wizard will walk you through the installation process. During the installation, StackBuilder Plus will install PostGIS and create the template_postgis database, as well as the PostGIS functions.

## Upgrading to PostGIS 2.0

If you are upgrading an existing Advanced Server installation (version 9.1 or prior) that contains PostGIS to a later version of Advanced Server, you must perform a manual upgrade. The pg_upgrade tool does not support upgrades of spatially enabled databases (a database that contains PostGIS database objects (functions, types, operators, tables, etc.).

To upgrade a database using PostGIS 1.x to PostGIS 2.x, use the pg_dump and pg_restore commands to perform a dump and restore of the PostGIS database. Please note: the host must contain an installation of Perl to perform this upgrade.

For complete information about PostGIS and performing an upgrade, see the PostGIS documentation at:

http://postgis.refractions.net/documentation/manual-2.0

The following summarizes the basic steps required to perform an upgrade to Advanced Server 9.5 when your current version of Advanced Server has PostGIS 1.x installed along with PostGIS databases:

- In your current Advanced Server cluster, use pg_dump to create a custom-format backup of each PostGIS 1.x database.
- Drop the PostGIS databases that were backed up, drop database template template_postgis, and uninstall PostGIS.
- Install Advanced Server 9.5, but do not install PostGIS at this time.
- Perform the upgrade to Advanced Server 9.5 using pg_upgrade as described in Section 8.3, *Upgrading to Advanced Server 9.5*. This upgrades all non-PostGIS databases to Advanced Server 9.5.
- Start up Advanced Server 9.5 and use StackBuilder Plus to install PostGIS 2.0.
- For each backup file created from a PostGIS 1.x database, create a new, empty PostGIS 2.0 database and restore each backup file into a new PostGIS database using Perl script postgis_restore.pl.

The following example illustrates an upgrade from Advanced Server 9.1 to Advanced Server 9.5 when PostGIS 1.5 is installed in Advanced Server 9.1, and a PostGIS database named roadmaps exists in the Advanced Server 9.1 cluster.

The roadmaps PostGIS database was created in Advanced Server 9.1 using the following command given in EDB-PSQL:

```
CREATE DATABASE roadmaps TEMPLATE=template_postgis;
```

In the roadmaps database, table roads was created and loaded with some rows:

```
CREATE TABLE roads (id INTEGER, name VARCHAR2(128));

SELECT AddGeometryColumn('roads', 'geom', -1, 'GEOMETRY', 2);

INSERT INTO roads (id, geom, name) VALUES (1,
GeomFromText('LINESTRING(0 10,0 0)', -1), 'Beacon Road'); INSERT
INTO roads (id, geom, name) VALUES (2,
GeomFromText('LINESTRING(0 0,0 10)', -1), 'Violet Road'); INSERT
INTO roads (id, geom, name) VALUES (3,
GeomFromText('LINESTRING(0 0,10 0)', -1), 'Skelton Street'); INSERT
INTO roads (id, geom, name) VALUES (4,
GeomFromText('LINESTRING(0 0,10 10)', -1), 'Fifth Avenue'); INSERT
```

```
INTO roads (id, geom, name) VALUES (5,
GeomFromText('LINESTRING(10 0,0 0)', -1), 'Lipton Street');

CREATE INDEX roads_index ON roads USING GIST(geom);
```

For purposes of this example, roadmaps is assumed to be the only PostGIS database in the cluster.

### Step 1 - Back up PostGIS databases

Following the directions for performing a hard upgrade, run pg_dump to create a backup file for the roadmaps database using the following command:

```
export PATH=$PATH:/opt/PostgresPlus/9.1AS/bin

pg_dump -U enterprisedb -Fc -b -v -f "/tmp/roadmaps.backup" roadmaps
```

Please Note: The backup file must be in custom-format as specified by the -Fc option. This is required by the Perl script you will later use to load the new PostGIS 2.0 database.

### Step 2 - Drop the PostGIS database template

While connected to database template1 as a superuser, drop the database template template_postgis as shown by the following:

```
template1=# UPDATE pg_database SET datistemplate = false WHERE
datname = 'template_postgis'; UPDATE 1 template1=# DROP
DATABASE template_postgis; DROP DATABASE
```

### Step 3 - Drop PostGIS databases

Before dropping a PostGIS database, be sure you have a backup (see Step 1). Then, drop the roadmaps database:

```
template1=# DROP DATABASE roadmaps; DROP DATABASE
```

### Step 4 - Uninstall PostGIS

To uninstall PostGIS, assume superuser privileges and invoke the following script (located in the Advanced Server home directory):

```
uninstall-postgis
```

### Step 5 - Perform the upgrade to Advanced Server 9.5 using pg_upgrade

Perform steps 1 through 7 described in Section 8.3 to upgrade to Advanced Server 9.5.

Please Note: At this time, skip step 8 of Section 8.3 - Do not restore the authentication settings in the pg_hba.conf file; the server must use trust authentication when loading the new PostGIS 2.0 databases from the backup files.

### Step 6 - Start Advanced Server 9.5 and use StackBuilder Plus to download and install PostGIS 2.0

For information about using StackBuilder Plus, see Using Stackbuilder Plus.

### Step 7 - Create a new PostGIS database

Create the PostGIS database with the template template_postgis as shown by the following:

```
createdb -U enterprisedb -T template_postgis -p 5445 roadmaps
```

### Step 8 - Add legacy PostGIS objects if necessary

If your applications require legacy PostGIS functions, these can be added using the legacy.sql script:

```
edb-psql -d roadmaps -U enterprisedb -p 5445 -f
"/opt/PostgresPlus/9.5AS/share/contrib/postgis-2.0/legacy.sql"
```

These legacy functions can later be removed with the uninstall_legacy.sql script.

### Step 9 - Restore the PostGIS database from the backup file

Run the Perl script postgis_restore.pl and pipe the output to EDB-PSQL to load the database from the backup file. This script contains functionality to skip objects known to PostGIS (since updated versions of these objects have been created in the new database you are loading) as well as convert certain old PostGIS constructs into new ones.

Be sure trust authentication mode is set in pg_hba.conf before running this script.

```
$ export PATH=$PATH:/opt/PostgresPlus/9.5AS/bin

$

$ perl /opt/PostgresPlus/9.5AS/share/contrib/postgis-2.0/postgis_restore.pl
"/tmp/roadmaps.backup" | edb-psql -U enterprisedb -p 5445 roadmaps 2>
/tmp/roadmaps_loaderr.txt

Converting /tmp/roadmaps.backup to ASCII on stdout...

Reading list of functions to ignore...

Writing manifest of things to read from dump file...

Writing ASCII to stdout...

WARNING: SRID -1 converted to 0 (official UNKNOWN)

ALTER TABLE

ALTER TABLE

SELECT 3911

DELETE 3911

SET

SET

SET

.

.

.
```

### Step 10 - Verify the PostGIS database has been properly restored

The following query verifies the content of the roads table in the roadmaps database:

```
$ edb-psql -d roadmaps -U enterprisedb -p 5445

edb-psql (9.5.0.0)

Type "help" for help.

roadmaps=# SELECT id, ST_AsText(geom) AS geom, name FROM roads
ORDER BY id;

id | geom | name

----+----------------------+---------------

1 | LINESTRING(0 10,0 0) | Beacon Road

2 | LINESTRING(0 0,0 10) | Violet Road

3 | LINESTRING(0 0,10 0) | Skelton Street

4 | LINESTRING(0 0,10 10) | Fifth Avenue

5 | LINESTRING(10 0,0 0) | Lipton Street

(5 rows)
```

**Step 11 - Repeat for each PostGIS database backup**

Repeat steps 7 through 10 for each PostGIS database backup file created in Step 1.

**Step 12 - Restore the authentication settings in the pg_hba.conf file**

Update the contents of the pg_hba.conf file to reflect your preferred authentication settings.

## Slony

Unless otherwise noted, the commands and paths noted in the following section assume that you have performed an installation with the interactive installer.

Slony is a master-standby replication environment that is well-suited for large databases with a limited number of standby systems. Slony replication:

- Shares data in one direction only: from a master node to a standby node.
- Is cascading; a standby node may pass data to another standby node.
- Does not allow modification of data on standby nodes.

For more information about Slony replication features, visit the Slony website at:

http://slony.info/

By default, the Advanced Server installation wizard installs Slony and the Slony configuration files, but does not start the Slony service. After configuring the replication environment, you must manually start the service.

- On Linux, the Slony connection configuration file is named ppas-replication-9.5.ini, and resides in the /etc directory, under the Advanced Server installation. Use the configuration file to specify connection information for the master and standby nodes.
- On Windows, the configuration files are named master.conf.sample and slave.conf.sample, and reside in the \share directory, under the Advanced Server installation; prior to configuring Slony, you must rename the configuration files to master.conf and slave.conf.

For information about configuring a Slony replication environment, please refer to the official project documentation, available at:

http://slony.info/documentation/

### *Starting the Slony Service*

After specifying configuration options, you must start the Slony service on each node of the replication environment. For detailed information about controlling the service, see Section 5.

## SQL Profiler

SQL Profiler helps locate and optimize poorly running SQL code. Before using SQL Profiler, you must:

1. Modify the postgresql.conf parameter file for the instance to include the SQL Profiler library in the shared_preload_libraries configuration parameter.

> For Linux installations, the parameter value should include:
>
> $libdir/sql-profiler
>
> On Windows, the parameter value should include:
>
> $libdir/sql-profiler.dll

2. Create the functions used by SQL Profiler. The SQL Profiler installation program places a SQL script (named sql-profiler.sql) in the share/contrib subdirectory of the main PostgreSQL installation directory on Linux systems. On Windows systems, this script is located in the share subdirectory.

> Using the PEM Client Query Tool or the psql command line interface, run the sql-profiler.sql script in the database specified as the Maintenance Database on the server you wish to profile. If you are using Advanced Server, the default maintenance database is named edb. If you are using a PostgreSQL instance, the default maintenance database is named postgres.
>
> To use the PEM Query Tool to run the script, highlight the name of the maintenance database in the PEM Client tree control, and navigate through the Tools menu, selecting Query tool. When the Query Tool opens, use the Open option on the Files menu to open a web browser and navigate to the sql-profiler.sql script. When the script opens in the SQL Editor panel of the Query Tool, select the Execute option from the Query menu to invoke the script and configure SQL Profiler.
>
> You can also use the psql command line to invoke the configuration script. The following command uses the psql command line to invoke the sql-profiler.sql script on a Linux system:
>
> $ /opt/PostgresPlus/9.5AS/bin/psql -U *user_name database_name* \< /opt/PostgresPlus/9.5AS/share/contrib/sql-profiler.sql

3. Stop and re-start the server for the changes to take effect.

After configuring SQL Profiler, it is ready to use with all databases that reside

on the server.

To open SQL Profiler on the PEM Client, highlight the name of a database you wish to profile in the tree control, and select SQL Profiler from the Management menu. The SQL Profiler wizard (shown in Figure 7.2) opens.


*Figure 7.2 — The SQL Profiler wizard.*

The SQL Profiler wizard will walk you through the process of defining a new trace, or opening an existing trace. For more information about using SQL Profiler, consult the Postgres Enterprise Manager online help text (accessed through the PEM Client Help menu), or the *EDB Postgres (Postgres Plus) Migration Guide*, available at:

http://www.enterprisedb.com/products-services-training/products/documentation/enterpriseedition

### *Troubleshooting*

If (after performing an upgrade to a newer version of SQL Profiler) you encounter an error that contains the following text:

An error has occurred: ERROR: function return row and query-specified return row do not match. DETAIL: Returned row contains 11 attributes, but the query expects 10.

To correct this error, you must replace the existing query set with a new query set. First, uninstall SQL Profiler by invoking the uninstall-sql-profiler.sql script, and then reinstall SQL Profiler by invoking the sql-profiler.sql script.

# sslutils

sslutils is a Postgres extension that provides SSL certicate generation functions to Advanced Server, for use by the Postgres Enterprise Manager server. sslutils is installed by the Advanced Server RPM server meta installer and the Advanced Server graphical installer.

## *sslutils Functions*

The sslutils package provides the functions described below.

### openssl_rsa_generate_key

The openssl_rsa_generate_key function generates an RSA private key. The function signature is:

> openssl_rsa_generate_key(integer) RETURNS text

When invoking the function, pass the number of bits as an integer value; the function returns the generated key.

### openssl_rsa_key_to_csr

The openssl_rsa_key_to_csr function generates a certificate signing request (CSR). The signature is:

> openssl_rsa_key_to_csr (text, text, text, text, text, text, text) RETURNS text

The text arguments expected by the rsa_key_to_csr function are:

> Argument 1: The name of the RSA key file.
>
> Argument 2: The common name (e.g. agentN) of the agent that will use the signing request.
>
> Argument 3: The name of the country in which the server resides.
>
> Argument 4: The name of the state in which the server resides.
>
> Argument 5: The location (city) within the state in which the server resides.

> Argument 6: The name of the organization unit requesting the certificate.
>
> Argument 7: The email address of the user requesting the certificate.

The function generates and returns the certificate signing request.

### openssl_csr_to_crt

The openssl_csr_to_crt function generates a self-signed certificate or a certificate authority certificate. The signature is:

> openssl_csr_to_crt(text, text, text) RETURNS text

The text arguments expected by the rsa_key_to_csr function are:

> Argument 1: The name of the certificate signing request.
>
> Argument 2: The path to the certificate authority certificate, or NULL if generating a certificate authority certificate.
>
> Argument 3: The path to the certificate authority's private key or (if parameter 2 is NULL) the path to a private key.

The function returns the self-signed certificate or certificate authority certificate.

### openssl_rsa_generate_crl

The openssl_rsa_generate_crl function generates a default certificate revocation list. The signature is:

> openssl_rsa_generate_crl(text, text) RETURNS text

The text arguments expected by the openssl_rsa_generate_crl function are:

> Argument 1: The path to the certificate authority certificate.
>
> Argument 2: The path to the certificate authority private key.

The function returns the certificate revocation list.

# 1.6 Upgrading an Installation With pg_upgrade

While minor upgrades between versions are fairly simple, and require only the installation of new executables, past major version upgrades have been both expensive and time consuming. pg_upgrade facilitates migration between any version of Advanced Server (version 9.0 or later), and any subsequent release of Advanced Server that is supported on the same platform.

Without pg_upgrade, to migrate from an earlier version of Advanced Server to Advanced Server 9.5, you must export all of your data using pg_dump, install the new release, run initdb to create a new cluster, and then import your old data. If you have a significant amount of data, that can take a considerable amount of time and planning. You may also have to use additional storage to temporarily accommodate both the original data and the exported data.

*pg_upgrade can reduce both the amount of time required and the disk space required for many major-version upgrades.*

The pg_upgrade utility performs an in-place transfer of existing data between Advanced Server and any subsequent version.

Several factors determine if an in-place upgrade is practical:

- The on-disk representation of user-defined tables must not change between the original version and the upgraded version.
- The on-disk representation of data types must not change between the original version and the upgraded version.
- To upgrade between major versions of Advanced Server with pg_upgrade, both versions must share a common binary representation for each data type. Therefore, you cannot use pg_upgrade to migrate from a 32-bit to a 64-bit Linux platform.

Before performing a version upgrade, pg_upgrade will verify that the two clusters (the old cluster and the new cluster) are compatible.

If the upgrade involves a change in the on-disk representation of database objects or data, or involves a change in the binary representation of data types, pg_upgrade will be unable to perform the upgrade; to upgrade, you will have to pg_dump the old data and then import that data into the new cluster.

The pg_upgrade executable is distributed with Advanced Server 9.5, and is installed as part of the Database Server component; no additional installation or configuration steps are required.

## Performing an Upgrade - Overview

To upgrade an earlier version of Advanced Server to the current version, you must:

- Install the current version of Advanced Server. The new installation must contain the same supporting server components as the old installation.
- Empty the target database or create a new target cluster with initdb.
- Place the pg_hba.conf file for both databases in trust authentication mode (to avoid authentication conflicts.
- Shut down the old and new Advanced Server services.
- Invoke the pg_upgrade utility.

When pg_upgrade starts, it performs a compatibility check to ensure that all required executables are present and contain the expected version numbers. The verification process also checks the old and new $PGDATA directories to ensure that the expected files and subdirectories are in place. If the verification process succeeds, pg_upgrade starts the old postmaster and runs pg_dumpall --schema-only to capture the metadata contained in the old cluster. The script produced by pg_dumpall is used in a later step to recreate all user-defined objects in the new cluster.

Note that the script produced by pg_dumpall recreates only user-defined objects and not system-defined objects. The new cluster will *already* contain the system-defined objects created by the latest version of Advanced Server.

After extracting the metadata from the old cluster, pg_upgrade performs the bookkeeping tasks required to sync the new cluster with the existing data.

pg_upgrade runs the pg_dumpall script against the new cluster to create (empty) database objects of the same shape and type as those found in the old cluster. Then, pg_upgrade links or copies each table and index from the old cluster to the new cluster.

## Linking versus Copying

When invoking pg_upgrade, you can use a command-line option to specify whether pg_upgrade should *copy* or *link* each table and index in the old cluster to the new cluster.

Linking is much faster because pg_upgrade simply creates a second name (a hard link) for each file in the cluster; linking also requires no extra workspace because pg_upgrade does not make a copy of the original data. When linking the old cluster and the new cluster, the old and new clusters share the data; note that after starting the new cluster, your data can no longer be used with the previous version of Advanced Server.

If you choose to copy data from the old cluster to the new cluster, pg_upgrade will still reduce the amount of time required to perform an upgrade compared to the traditional dump/restore procedure. pg_upgrade uses a file-at-a-time mechanism to copy data files from the old cluster to the new cluster (versus the row-by-row mechanism used by dump/restore). When you use pg_upgrade, you avoid building indexes in the new cluster; each index is simply copied from the old cluster to the new cluster. Finally, using a dump/restore procedure to upgrade requires a great deal of workspace to hold the intermediate text-based dump of all of your data, while pg_upgrade requires very little extra workspace.

Data that is stored in user-defined tablespaces is not copied to the new cluster; it stays in the same location in the file system, but is copied into a subdirectory whose name reflects the version number of the new cluster. To manually relocate files that are stored in a tablespace after upgrading, move the files to the new location and update the symbolic links (located in the pg_tblspc directory under your cluster's data directory) to point to the files.

## Invoking pg_upgrade

When invoking pg_upgrade, you must specify the location of the old and new cluster's PGDATA and executable (/bin) directories, as well as the name of the Advanced Server superuser, and the ports on which the installations are listening. A typical call to invoke pg_upgrade to migrate from Advanced Server 9.4 to Advanced Server 9.5 takes the form:

> pg_upgrade --old-datadir *path_to_9.4_data_directory* --new-datadir *path_to_9.5_data_directory* --user *superuser_name* --old-bindir *path_to_9.4_bin_directory* --new-bindir *path_to_9.5_bin_directory* --old-port *9.4_port* --new-port *9.5_port*

Where:

--old-datadir *path_to_9.4_data_directory*

> Use the --old-datadir option to specify the complete path to the data directory within the Advanced Server 9.4 installation.

--new-datadir *path_to_9.5_data_directory*

> Use the --new-datadir option to specify the complete path to the data directory within the Advanced Server 9.5 installation.

--username *superuser_name*

> Include the --username option to specify the name of the Advanced Server superuser. The superuser name should be the same in both versions of Advanced Server. By default, when Advanced Server is installed in Oracle mode, the superuser is named enterprisedb. If installed in PostgreSQL mode, the superuser is named postgres.
>
> If the Advanced Server superuser name is not the same in both clusters, the clusters will not pass the pg_upgrade consistency check.

--old-bindir *path_to_9.4_bin_directory*

> Use the --old-bindir option to specify the complete path to the bin directory in the Advanced Server 9.4 installation.

--new-bindir *path_to_9.5_bin_directory*

> Use the --new-bindir option to specify the complete path to the bin directory in the Advanced Server 9.5 installation.

--old-port *9.4_port*

> Include the --old-port option to specify the port on which Advanced Server 9.4 listens for connections.

--new-port *9.5_port*

> Include the --new-port option to specify the port on which Advanced Server 9.5 listens for connections.

## Command Line Options - Reference

> pg_upgrade accepts the following command line options; each option is available in a long form or a short form:

-b *path_to_old_bin_directory*

--old-bindir *path_to_old_bin_directory*

> Use the -b or --old-bindir keyword to specify the location of the old cluster's executable directory.

-B *path_to_new_bin_directory*

--new-bindir *path_to_new_bin_directory*

> Use the -B or --new-bindir keyword to specify the location of the new cluster's executable directory.

-c

--check

> Include the -c or --check keyword to specify that pg_upgrade should perform a consistency check on the old and new cluster without performing a version upgrade.

-d *path_to_old_data_directory*

--old-datadir *path_to_old_data_directory*

> Use the -d or --old-datadir keyword to specify the location of the old cluster's data directory.

-D *path_to_new_data_directory*

--new-datadir *path_to_new_data_directory*

> Use the -D or --new-datadir keyword to specify the location of the new allows you to create and execute.
>
> Please note: Data that is stored in user-defined tablespaces is not copied

> to the new cluster; it stays in the same location in the file system, but is copied into a subdirectory whose name reflects the version number of the new cluster. To manually relocate files that are stored in a tablespace after upgrading, you must move the files to the new location and update the symbolic links (located in the pg_tblspc directory under your cluster's data directory) to point to the files.

-j

--jobs

> Include the -j or --jobs keyword to specify the number of simultaneous processes or threads to use during the upgrade.

-k

--link

Include the -k or --link keyword to create a hard link from the new cluster to the old cluster. See Section 8.1.1, *Linking versus Copying* for more information about using a symbolic link.

-o *options*

--old-options *options*

> Use the -o or --old-options keyword to specify options that will be passed to the old postgres command. Enclose options in single or double quotes to ensure that they are passed as a group.

-O *options*

--new-options *options*

> Use the -O or --new-options keyword to specify options to be passed to the new postgres command. Enclose options in single or double quotes to ensure that they are passed as a group.

-p *old_port_number*

--old-port *old_port_number*

> Include the -p or --old-port keyword to specify the port number of the

> Advanced Server installation that you are upgrading.

-P *new_port_number*

--new-port *new_port_number*

> Include the -P or --new-port keyword to specify the port number of the new Advanced Server installation.
>
> Please note: If the original Advanced Server installation is using port number 5444 when you invoke the Advanced Server 9.5 installer, the installer will recommend using listener port 5445 for the new installation of Advanced Server.

-r

--retain

> During the upgrade process, pg_upgrade creates four append-only log files; when the upgrade is completed, pg_upgrade deletes these files. Include the -r or --retain option to specify that the server should retain the pg_upgrade log files.

-U *user_name*

--username *user_name*

> Include the -U or --username keyword to specify the name of the Advanced Server database superuser. The same superuser must exist in both clusters.

-v

--verbose

> Include the -v or --verbose keyword to enable verbose output during the upgrade process.

-V

--version

> Use the -V or --version keyword to display version information for

> pg_upgrade.

-?

-h

--help

> Use -?, -h or --help options to display pg_upgrade help information.

## Upgrading to Advanced Server 9.5

You can use pg_upgrade to upgrade from an existing installation of Advanced Server into the cluster built by the Advanced Server 9.5 installer or into an alternate cluster created using the initdb command. In this section, we will provide the details of upgrading into the cluster provided by the installer.

The basic steps to perform an upgrade into an empty cluster created with the initdb command are the same as the steps to upgrade into the cluster created by the Advanced Server 9.5 installer, but you can omit Step 2 (*Empty the edb database*), and substitute the location of the alternate cluster when specifying a target cluster for the upgrade.

If a problem occurs during the upgrade process, you can revert to the previous version. See Section 8.5, *Reverting to the Old Cluster* for detailed information about this process.

You must be an operating system superuser or Windows Administrator to perform an Advanced Server upgrade.

Step 1 - Install the New Server

Install Advanced Server 9.5, specifying the same non-server components that were installed during the previous Advanced Server installation. Please note that the new cluster and the old cluster must reside in different directories.

Step 2 - Empty the target database

The target cluster must not contain any data; you can create an empty cluster using the initdb command, or you can empty a database that was created during the installation of Advanced Server 9.5. If you have installed Advanced

Server in PostgreSQL mode, the installer creates a single database named postgres; if you have installed Advanced Server in Oracle mode, it creates a database named postgres and a database named edb.

The easiest way to empty the target database is to drop the database and then create a new database. Before invoking the DROP DATABASE command, you must disconnect any users or services that are currently using the database.

By default, the Advanced Server installation process installs and starts the following services:

- pgbouncer - The PgBouncer service
- ppas-agent-9.5 - The PgAgent service

Before dropping the target database, halt any services that are included in your installation.

On Windows, navigate through the Control Panel to the Services manager; highlight each service in the Services list, and select Stop.

On Linux, open a terminal window, assume superuser privileges, and navigate to the /etc/init.d directory. Manually stop each service; for example, invoke the command:

> ./ppas-agent-9.5 stop
>
> To stop the pgAgent service.

After stopping any services that are currently connected to Advanced Server, you can use the EDB-PSQL command line client to drop and re-create the database.

To open the EDB-PSQL command line, navigate through the Start menu and select Run SQL Command Line; select EDB-PSQL to open the command line client. When the client opens, connect to the template1 database as the database superuser. If prompted, provide authentication information; then, use the following command to drop the database:

> DROP DATABASE *database_name*;

Where *database_name* is the name of the database.

Then, create an empty database based on the contents of the template1 database:

```
CREATE DATABASE database_name;
```

Step 3 - Set both servers in trust mode

During the upgrade process, pg_upgrade will connect to the old and new servers several times; to make the connection process easier, you should edit the pg_hba.conf file, setting the authentication mode to trust. To modify the pg_hba.conf file, navigate through the Start menu to each Postgres Plus Advanced Server menu, and open the Expert Configuration menu; select the Edit pg_hba.conf menu option to open the pg_hba.conf file.

You should allow trust authentication for the previous Advanced Server installation, and Advanced Server 9.5 servers. Edit the pg_hba.conf file for both installations of Advanced Server as shown in Figure 8.1.

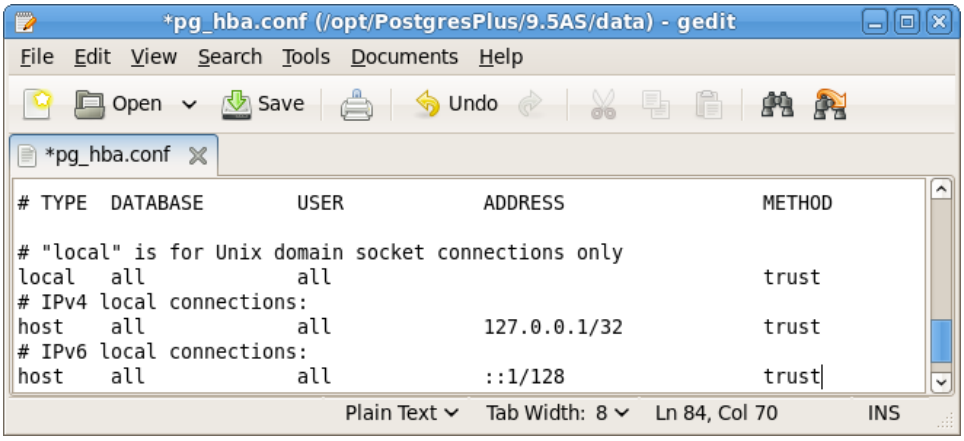



*Figure 8.1 — Configuring Advanced Server to use trust authentication.*

After editing each file, save the file and exit the editor.

If the system is required to maintain md5 authentication mode during the upgrade process, you can specify user passwords for the database superuser in a password file (pgpass.conf on Windows, .pgpass on Linux). For more information about configuring a password file, see the PostgreSQL Core Documentation, available through:

https://www.postgresql.org/docs/9.5/static/libpq-pgpass.html

Step 4 - Stop All Component Services and Servers

Before invoking pg_upgrade, you must stop any services that belong to the original Advanced Server installation, Advanced Server 9.5 or the supporting components. This ensures that a service will not attempt to access either cluster during the upgrade process.

The services that are most likely to be running in your installation are:

| Service: | On Linux: | On Windows |
|---|---|---|
| Postgres Plus Advanced Server 9.0 | ppas-9.0 | ppas-9.0 |
| Postgres Plus Advanced Server 9.1 | ppas-9.1 | ppas-9.1 |
| Postgres Plus Advanced Server 9.2 | ppas-9.2 | ppas-9.2 |
| Postgres Plus Advanced Server 9.3 | ppas-9.3 | ppas-9.3 |
| Postgres Plus Advanced Server 9.4 | ppas-9.4 | ppas-9.4 |
| Postgres Plus Advanced Server 9.5 | ppas-9.5 | ppas-9.5 |
| Advanced Server 9.0 Scheduling Agent | ppasAgent-90 | Postgres Plus Advanced Server 90 Scheduling Agent |
| Advanced Server 9.1 Scheduling Agent | ppasAgent-91 | Postgres Plus Advanced Server 91 Scheduling Agent |
| Advanced Server 9.2 Scheduling Agent | ppas-agent-9.2 | Postgres Plus Advanced Server 9.2 Scheduling Agent |
| Advanced Server 9.3 Scheduling Agent | ppas-agent-9.3 | Postgres Plus Advanced Server 9.3 Scheduling Agent |

| Service: | On Linux: | On Windows |
|---|---|---|
| Advanced Server 9.4 Scheduling Agent | ppas-agent-9.4 | Postgres Plus Advanced Server 9.4 Scheduling Agent |
| Advanced Server 9.5 Scheduling Agent | ppas-agent-9.5 | Postgres Plus Advanced Server 9.5 Scheduling Agent |
| Infinite Cache 9.2 | ppas-infinitecache-9.2 | N/A |
| Infinite Cache 9.3 | ppas-infinitecache-9.3 | N/A |
| Infinite Cache | ppas-infinitecache | N/A |
| PgBouncer 9.0 | pgbouncer-90 | pgbouncer-90 |
| PgBouncer 9.1 | pgbouncer-91 | pgbouncer-91 |
| PgBouncer 9.2 | pgbouncer-9.2 | pgbouncer-9.2 |
| PgBouncer 9.3 | pgbouncer-9.3 | pgbouncer-9.3 |
| PgBouncer | Pgbouncer | pgbouncer |
| PgBouncer 1.6 | ppas-pgbouncer-1.6 or ppas-pgbouncer16 | ppas-pgbouncer-1.6 |
| PgPool 9.2 | ppas-pgpool-9.2 | N/A |
| PgPool 9.3 | ppas-pgpool-9.3 | N/A |
| PgPool | ppas-pgpool | N/A |
| PgPool 3.4 | ppas-pgpool-3.4 or ppas-pgpool34 | N/A |
| Slony 9.2 | ppas-replication-9.2 | ppas-replication-9.2 |
| Slony 9.3 | ppas-replication-9.3 | ppas-replication-9.3 |
| Slony 9.4 | ppas-replication-9.4 | ppas-replication-9.4 |
| Slony 9.5 | ppas-replication-9.5 | ppas-replication-9.5 |
| xDB Publication Server 9.0 | edb-xdbpubserver-90 | Publication Service 90 |
| xDB Publication Server 9.1 | edb-xdbpubserver-91 | Publication Service 91 |
| xDB Subscription Server | edb-xdbsubserver-90 | Subscription Service 90 |
| xDB Subscription Server | edb-xdbsubserver-91 | Subscription Service 91 |

To stop a service on Windows:

Navigate through the Control Panel to the Services manager; highlight each running Advanced Server service displayed in the list, and select Stop.

To stop a service on Linux:

Open a terminal window, assume superuser privileges, and navigate to the /etc/init.d directory. Manually stop each Advanced Server service at the command line; for example, to stop Advanced Server 9.5 invoke the command:

```
./ppas-9.5 stop
```

Step 5 - Assume the identity of the cluster owner

Assume the identity of the Advanced Server cluster owner, and add the directory in which the pg_upgrade executable resides to the search path.

If you are using Windows, open a terminal window, assume the identity of the Advanced Server cluster owner and set the path to the pg_upgrade executable:

```
RUNAS /USER:enterprisedb "CMD.EXE" SET
PATH=%PATH%;C:\Program Files\PostgresPlus\9.5AS\bin
```

If you are using Linux, assume the identity of the Advanced Server cluster owner:

```
su - enterprisedb
```

Enter the Advanced Server cluster owner password if prompted. Then, set the path to include the location of the pg_upgrade executable:

```
export PATH=$PATH:/opt/PostgresPlus/9.5AS/bin
```

During the upgrade process, pg_upgrade writes a file to the current working directory of the enterprisedb user; you must invoke pg_upgrade from a directory where the enterprisedb super user has write privileges. After performing the above commands, navigate to a directory in which the enterprisedb user has sufficient privileges to write a file.

On Windows:

```
cd %TEMP%
```

On Linux:

```
cd /tmp
```

Step 6 - Perform a consistency check

Before attempting an upgrade, perform a consistency check to assure that the old and new clusters are compatible and properly configured. Include the --check option to instruct pg_upgrade to perform the consistency check.

The following example demonstrates invoking pg_upgrade to perform a consistency check on Linux:

```
pg_upgrade -d /opt/PostgresPlus/9.4AS/data -D
/opt/PostgresPlus/9.5AS/data -U enterprisedb -b
/opt/PostgresPlus/9.4AS/bin -B /opt/PostgresPlus/9.5AS/bin -p 5444 -P
5445 --check
```

If you are using Windows, you must quote any directory names that contain a space:

```
pg_upgrade.exe -d "C:\Program Files\PostgresPlus\9.4AS\data" -D
"C:\Program Files\PostgresPlus\9.5AS\data" -U enterprisedb -b
"C:\Program Files\PostgresPlus\9.4AS\bin" -B "C:\Program
Files\PostgresPlus\9.5AS\bin" -p 5444 -P 5445 --check
```

During the consistency checking process, pg_upgrade will log any discrepancies that it finds to a file located in the directory from which pg_upgrade was invoked. When the consistency check completes, review the file to identify any missing components or upgrade conflicts. You must resolve any conflicts before invoking pg_upgrade to perform a version upgrade.

If pg_upgrade alerts you to a missing component, you can use StackBuilder Plus to add the component that contains the component. Before using StackBuilder Plus, you must restart the Advanced Server 9.5 service. After restarting the service, open StackBuilder Plus by navigating through the Start menu to the Postgres Plus Advanced Server 9.5 menu, and selecting StackBuilder Plus. Follow the onscreen advice of the StackBuilder Plus wizard to download and install the missing components.

For more information about using StackBuilder Plus, please see Using Stackbuilder Plus.

When pg_upgrade has confirmed that the clusters are compatible, you can perform a version upgrade.

Step 7 - Run pg_upgrade

After confirming that the clusters are compatible, you can invoke pg_upgrade to upgrade the old cluster to the new version of Advanced Server.

On Linux:

```
pg_upgrade -d /opt/PostgresPlus/9.4AS/data -D
/opt/PostgresPlus/9.5AS/data -U enterprisedb -b
/opt/PostgresPlus/9.4AS/bin -B /opt/PostgresPlus/9.5AS/bin -p 5444 -P
5445
```

On Windows:

```
pg_upgrade.exe -d "C:\Program Files\PostgresPlus\9.4AS\data" -D
"C:\Program Files\PostgresPlus\9.5AS\data" -U enterprisedb -b
"C:\Program Files\PostgresPlus\9.4AS\bin" -B "C:\Program
Files\PostgresPlus\9.5AS\bin" -p 5444 -P 5445
```

pg_upgrade will display the progress of the upgrade onscreen:

```
$ pg_upgrade -d /opt/PostgresPlus/9.4AS/data -D
/opt/PostgresPlus/9.5AS/data -U enterprisedb -b /opt/PostgresPlus/9.4AS/bin
-B /opt/PostgresPlus/9.5AS/bin -p 5444 -P 5445

Performing Consistency Checks

-----------------------------

Checking current, bin, and data directories ok

Checking cluster versions ok

Checking database user is a superuser ok

Checking for prepared transactions ok

Checking for reg* system OID user data types ok

Checking for contrib/isn with bigint-passing mismatch ok
```

```
Creating catalog dump ok

Checking for presence of required libraries ok

Checking database user is a superuser ok

Checking for prepared transactions ok

If pg_upgrade fails after this point, you must re-initdb the

new cluster before continuing.

Performing Upgrade

----------------

Analyzing all rows in the new cluster ok

Freezing all rows on the new cluster ok

Deleting files from new pg_clog ok

Copying old pg_clog to new server ok

Setting next transaction ID for new cluster ok

Resetting WAL archives ok

Setting frozenxid counters in new cluster ok

Creating databases in the new cluster ok

Adding support functions to new cluster ok

Restoring database schema to new cluster ok

Removing support functions from new cluster ok

Copying user relation files

ok

Setting next OID for new cluster ok
```

Creating script to analyze new cluster ok

Creating script to delete old cluster ok

Upgrade Complete

---

Optimizer statistics are not transferred by pg_upgrade so,

once you start the new server, consider running:

analyze_new_cluster.sh

Running this script will delete the old cluster's data files:

delete_old_cluster.sh

While pg_upgrade runs, it may generate SQL scripts that handle special circumstances that it has encountered during your upgrade. For example, if the old cluster contains large objects, you may need to invoke a script that defines the default permissions for the objects in the new cluster. When performing the pre-upgrade consistency check pg_upgrade will alert you to any script that you may be required to run manually.

You must invoke the scripts after pg_upgrade completes. To invoke the scripts, connect to the new cluster as a database superuser with the EDB-PSQL command line client, and invoke each script using the \i option:

> \i *complete_path_to_script/script.sql*

It is generally unsafe to access tables referenced in rebuild scripts until the rebuild scripts have completed; accessing the tables could yield incorrect results or poor performance. Tables not referenced in rebuild scripts can be accessed immediately.

**Please Note**: If pg_upgrade fails to complete the upgrade process, the old cluster will be unchanged, except that $PGDATA/global/pg_control is renamed to pg_control.old and each tablespace is renamed to *tablespace*.old. To revert to the pre-invocation state:

Delete any tablespace directories created by the new cluster.

Rename $PGDATA/global/pg_control, removing the .old suffix.

Rename the old cluster tablespace directory names, removing the .old suffix.

Remove any database objects (from the new cluster) that may have been moved before the upgrade failed.

After performing these steps, resolve any upgrade conflicts encountered before attempting the upgrade again.

When the upgrade is complete, pg_upgrade may also recommend vacuuming the new cluster, and will provide a script that allows you to delete the old cluster.

*Before removing the old cluster, ensure that the cluster has been upgraded as expected, and that you have preserved a backup of the cluster in case you need to revert to a previous version.*

Step 8 - Restore the authentication settings in the pg_hba.conf file

If you modified the pg_hba.conf file to permit trust authentication, update the contents of the pg_hba.conf file to reflect your preferred authentication settings.

**Step 9 - Move and identify user-defined tablespaces (*Optional*)**

If you have data stored in a user-defined tablespace, you must manually relocate tablespace files after upgrading; move the files to the new location and update the symbolic links (located in the pg_tblspc directory under your cluster's data directory) to point to the files.

## pg_upgrade Troubleshooting

The troubleshooting tips in this section address problems you may encounter when using pg_upgrade.

## Upgrade Error - There seems to be a postmaster servicing the cluster

If pg_upgrade reports that a postmaster is servicing the cluster, please stop all Advanced Server services and try the upgrade again. See Step 4 in Section 8.3, *Upgrading to Advanced Server 9.5* for detailed information about stopping a service.

## Upgrade Error - fe_sendauth: no password supplied

If pg_upgrade reports an authentication error that references a missing password, please modify the pg_hba.conf files in the old and new cluster to enable trust authentication, or configure the system to use a pgpass.conf file. See Step 3 in Section 8.3, *Upgrading to Advanced Server 9.5* for detailed information about editing the pg_hba.conf file.

## Upgrade Error - New cluster is not empty; exiting

If pg_upgrade reports that the new cluster is not empty, please empty the new cluster. For details about providing an empty target cluster, see Step 2 in Section 8.3, *Upgrading to Advanced Server 9.5*. **Please note:** the target cluster may not contain any user-defined databases.

## Upgrade Error - Failed to load library

If the original Advanced Server cluster included libraries that are not included in the Advanced Server 9.5 cluster, pg_upgrade will alert you to the missing component during the consistency check by writing an entry to the loadable_libraries.txt file in the directory from which you invoked pg_upgrade.

In the example shown, the old cluster contains PostGIS, while the new installation does not. Generally, for missing libraries that are not part of a major component upgrade, perform the following steps:

1. Restart the Advanced Server service.

   Use StackBuilder Plus to download and install the missing module as described in Using Stackbuilder Plus.

2. Stop the Advanced Server service.

3. Resume the upgrade process: invoke pg_upgrade to perform consistency checking.

4. When you have resolved any remaining problems noted in the consistency checks, invoke pg_upgrade to perform the data migration from the old cluster to the new cluster.

Please Note: Advanced Server (version 9.2 and later) is compatible with PostGIS 2.0. For detailed instructions about upgrading to PostGIS 2.0, see Section 7.13.1.

## Reverting to the Old Cluster

The method used to revert to a previous cluster varies with the options specified when invoking pg_upgrade:

- If you specified the --check option when invoking pg_upgrade, an upgrade has not been performed, and no modifications have been made to the old cluster; you can re-use the old cluster at any time.
- If you included the --link option when invoking pg_upgrade, the data files are shared between the old and new cluster after the upgrade completes. If you have started the server that is servicing the new cluster, the new server has written to those shared files and it is unsafe to use the old cluster.
- If you ran pg_upgrade without the --link specification or have not started the new server, the old cluster is unchanged, except that the .old suffix has been appended to the $PGDATA/global/pg_control and tablespace directories.

> To reuse the old cluster, delete the tablespace directories created by the new cluster and remove the .old suffix from $PGDATA/global/pg_control and the old cluster tablespace directory names and restart the server that services the old cluster...

# 1.7 Un-Installing Advanced Server

You can use either the rpm or yum command to remove RPM packages. Note that removing a package does not damage the Advanced Server data directory.

The Advanced Server interactive installer creates uninstallers that you can use to remove Advanced Server or any of its individual components. If you uninstall an Advanced Server component, the remainder of the Advanced Server installation will remain intact.

Note that after uninstalling Advanced Server, the cluster data files remain intact and the service user persists. You may manually remove the cluster data and service user from the system.

## Uninstalling a Package with rpm

Include the -e option on the rpm command to remove installed packages; the command syntax is:

```
rpm -e package_name [package_name…]
```

Where *package_name* is the name of the package that you would like to remove. The package name is the name of the .rpm file used when installing the package, with the version number and file extension (.rpm) removed; for example, the command:

```
rpm -e ppas95
```

Removes the package installed with the command:

```
rpm -i ppas95-9.5.x.x.rhel6.rpm
```

To instruct rpm to remove multiple packages, provide a list of packages you wish to remove when invoking the command.

## Uninstalling a Package with yum

You can use the yum remove command to remove an RPM package. To remove a package, open a terminal window, assume superuser privileges, and enter the command:

> yum remove *package_name*

Where *package_name* is the name of the package that you would like to remove. The package name is the name of the .rpm file used when installing the package, with the file extension (.rpm) removed; for example, the command:

> yum remove ppas95

Removes the package installed with the command:

> yum install ppas95-9.5.*x*.*x*.rhel6.rpm

Note: yum and RPM will not remove a package that is required by another package. If you attempt to remove a package that satisfies a package dependency, yum or RPM will provide a warning.

## Un-Installing Advanced Server at the Command Line

The following table lists the names and locations of the Advanced Server binary uninstallers:

| PPAS Component | Uninstaller Name | Uninstaller Location |
|---|---|---|
| The Database Server | uninstall-db_server | /opt/PostgresPlus/9.5AS |
| Advanced Server and all supporting modules | uninstall-ppas_9_5_complete | /opt/PostgresPlus |
| Client Connectors | uninstall-connectors | /opt/PostgresPlus/connectors |
| EDB*Plus | uninstall-edbplus | /opt/PostgresPlus/9.5AS/edbplus |
| Infinite Cache | uninstall-infinitecache | /opt/PostgresPlus/infinitecache |

| PPAS Component | Uninstaller Name | Uninstaller Location |
|---|---|---|
| Migration Toolkit | uninstall-edbmtk | /opt/PostgresPlus/edbmtk |
| PEM Client | uninstall-pemclient | /opt/PostgresPlus/9.5AS/client-v*x* |
| pgAgent | uninstall-edbpgagent | /opt/PostgresPlus/9.5AS |
| PgBouncer | uninstall-pgbouncer | /opt/PostgresPlus/pgbouncer-1.6 |
| PgPool | uninstall-pgpool | /opt/PostgresPlus/pgpool-II-3.4 |
| PgPool Extension | uninstall-pgpool_extension | /opt/PostgresPlus/9.5AS |
| Slony Replication | uninstall-replication | /opt/PostgresPlus/9.5AS |
| StackBuilder Plus | uninstall-stackbuilderplus | /opt/PostgresPlus/stackbuilderplus |

To uninstall Advanced Server and all of the supporting modules, navigate to the Advanced Server directory and enter:

> On Linux, assume superuser privileges and enter:
>
> ./uninstall-ppas_9_4_complete
>
> On Windows assume Administrator privileges and enter:
>
> uninstall-ppas_9_4_complete.exe

A dialog opens, asking you to confirm your decision to uninstall Advanced Server (see Figure 9.1)

![image](./images/image85.png)

*Figure 9.1 — A dialog confirms that you wish to uninstall Advanced Server.*

Click Yes to confirm that you wish to uninstall Advanced Server. As the uninstallation progresses, a dialog displays a progress indicator for each uninstalled module. When the un-installer completes, a popup confirms that the data directory and service account have not been removed (see Figure 9.2).

![image](./images/image86.png)

*Figure 9.2 — A dialog confirms that the data directory and service user have*

*not been removed.*

When the uninstallation is complete, an Info dialog opens to confirm that Advanced Server (and/or its components) has been removed (see Figure 9.3).

*Figure 9.3 — The uninstallation is complete.*

## Un-installing Advanced Server on a Windows System

You can use the graphical interface provided by Windows to uninstall Advanced Server 9.5. Navigate through the Windows Control Panel to open the Windows Programs and Features dialog (shown in Figure 9.4).

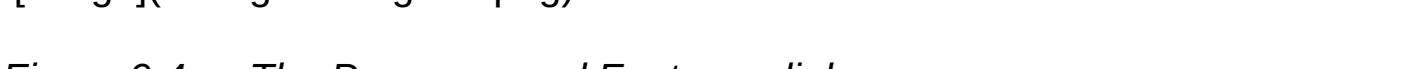


*Figure 9.4 — The Programs and Features dialog.*

Right click on Postgres Plus Advanced Server 9.5 or the component you wish to uninstall, and select Uninstall/Change from the context menu.

Select Postgres Plus Advanced Server 9.5 (Complete) to uninstall Advanced Server and the supporting Advanced Server components. If you are removing both the server and its supporting modules, a popup (shown in Figure 9.5) will prompt you to confirm that you wish to remove Advanced Server and its supporting components.

*Figure 9.5 — A dialog asks you to confirm that you wish to remove the server and its components.*

Select Postgres Plus Advanced Server 9.5 to uninstall only the Advanced Server database server. A system restart may be required to complete the removal of some Advanced Server components; if prompted, click OK to continue.

Please note that uninstalling Advanced Server will leave the data directory and database service user intact; you will be prompted for a confirmation (as shown in Figure 9.6).

*Figure 9.6 — A popup confirms that the data directory and service user account have not been removed from the host system.*

Popup dialogs signal the removal of each Advanced Server component. When the uninstallation process is complete, an Info dialog opens to confirm (shown in Figure 9.7)

*Figure 9.7 — An Info dialog confirms the uninstallation.*

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# 1.8 Introduction

*Notice: The names for EDB's products have changed. The product formerly referred to as Postgres Plus Advanced Server is now referred to as EDB Postgres Advanced Server. Until a new version of this documentation is published, wherever you see Postgres Plus Advanced Server you may substitute it with EDB Postgres Advanced Server. Name changes in software and software outputs will be phased in over time.*

The EDB Postgres Advanced Server Installation Guide is a comprehensive guide to installing EDB Postgres Advanced Server (Advanced Server). In this guide you will find detailed information about:

- Software prerequisites for Advanced Server 9.5
- Using a package manager to install and update Advanced Server and its supporting components or utilities
- Installation options available through the interactive installation wizard on both Linux and Windows
- Managing an Advanced Server installation
- Configuring an Advanced Server installation
- Configuring Advanced Server supporting components
- Using pg_upgrade to upgrade from an earlier version of Advanced Server to Advanced Server 9.5
- Uninstalling Advanced Server and its components

## Typographical Conventions Used in this Guide

Certain typographical conventions are used in this manual to clarify the meaning and usage of various commands, statements, programs, examples, etc. This section provides a summary of these conventions.

In the following descriptions a *term* refers to any word or group of words that are language keywords, user-supplied values, literals, etc. A term's exact meaning depends upon the context in which it is used.

- *Italic font* introduces a new term, typically, in the sentence that defines it for the first time.
- Fixed-width (mono-spaced) font is used for terms that must be given literally such as SQL commands, specific table and column names used in the examples, programming language keywords, etc. For example, SELECT * FROM emp;
- *Italic fixed-width font* is used for terms for which the user must substitute values in actual usage. For example, DELETE FROM *table_name*;

- A vertical pipe | denotes a choice between the terms on either side of the pipe. A vertical pipe is used to separate two or more alternative terms within square brackets (optional choices) or braces (one mandatory choice).

- Square brackets [ ] denote that one or none of the enclosed term(s) may be substituted. For example, [ a | b ], means choose one of “a” or “b” or neither of the two.

- Braces {} denote that exactly one of the enclosed alternatives must be specified. For example, { a | b }, means exactly one of “a” or “b” must be specified.

- Ellipses ... denote that the proceeding term may be repeated. For example, [ a | b ] ... means that you may have the sequence, “b a a b a”.