



EDB

EDB*Plus User's Guide

Release 39

EDB*Plus

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CHAPTER 1

Introduction

This guide describes how to connect to an Advanced Server database using EDB*Plus. EDB*Plus provides a command line user interface to EDB Postgres Advanced Server that accepts SQL commands that allow you to:

- Query certain database objects
- Execute stored procedures
- Format output from SQL commands
- Execute batch scripts
- Execute OS commands
- Record output

For detailed information about the features supported by Advanced Server, consult the complete library of Advanced Server guides available at:

<https://www.enterprisedb.com/edb-docs>

CHAPTER 2

EDB*Plus

EDB*Plus is a utility program that provides a command line user interface to EDB Postgres Advanced Server. EDB*Plus accepts SQL commands, SPL anonymous blocks, and EDB*Plus commands.

EDB*Plus commands are compatible with Oracle SQL*Plus commands and provide various capabilities including:

- Querying certain database objects
- Executing stored procedures
- Formatting output from SQL commands
- Executing batch scripts
- Executing OS commands
- Recording output

You can use an RPM installer or a graphical installer to add EDB*Plus to your Advanced Server installation.

3.1 Installation Pre-Requisites

Before installing EDB*Plus, you must first install Java (version 1.8 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:

- On RHEL or CentOS 7:

```
# yum -y install java
```

- On RHEL or CentOS 8:

```
# dnf -y install java
```

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

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

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

<https://www.enterprisedb.com/user/login>

After receiving your repository credentials:

1. Create the repository configuration file.
2. Modify the file, providing your user name and password.

3. Install EDB*Plus.

For detailed information about creating and using EDB repositories to install Advanced Server or its supporting components, see the *EDB Postgres Advanced Server Installation Guide* available at:

<https://www.enterprisedb.com/edb-docs>

3.2 Installing EDB*Plus on a CentOS Host

You can use an RPM package to install EDB*Plus on a CentOS host.

- To install the repository configuration file, assume superuser privileges, and invoke one of the following platform-specific commands:

On CentOS 7:

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

On CentOS 8:

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

- Replace the `USERNAME:PASSWORD` variable in the following command with the username and password of a registered EDB user:

```
sed -i "s@<username>:<password>@USERNAME:PASSWORD@" /etc/yum.repos.d/edb.repo
```

- Before installing EDB*Plus, you must install the `epel-release` package:

On CentOS 7:

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

On CentOS 8:

```
dnf -y install https://dl.fedoraproject.org/pub/epel/epel-release-latest-8.noarch.rpm
```

- For CentOS 8, enable the PowerTools repository to satisfy package dependencies:

```
dnf config-manager --set-enabled PowerTools
```

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 EDB 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 the following command to install EDB*Plus:

- On CentOS 7:

```
yum -y install edb-asxx-edbplus
```

- On CentOS 8:

```
dnf -y install edb-asxx-edbplus
```

Where, `xx` is the Advanced Server version.

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

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

3.3 Installing EDB*Plus on a RHEL Host

You can use an RPM package to install EDB*Plus on a RHEL host.

- To install the repository configuration file, assume superuser privileges, and invoke one of the following platform-specific commands:

On RHEL 7:

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

On RHEL 8:

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

- Replace the `USERNAME : PASSWORD` variable in the following command with the username and password of a registered EDB user:

```
sed -i "s@<username>:<password>@USERNAME:PASSWORD@" /etc/yum.repos.d/
edb.repo
```

- Before installing EDB*Plus, you must install the `epel-release` package:

On RHEL 7:

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

On RHEL 8:

```
dnf -y install https://dl.fedoraproject.org/pub/epel/epel-release-
latest-8.noarch.rpm
```

- Enable the repository:

On RHEL7, enable the `optional`, `extras`, and `HA` repositories to satisfy package dependencies:

```
subscription-manager repos --enable "rhel-*-optional-rpms" --enable
"rhel-*-extras-rpms" --enable "rhel-ha-for-rhel-*-server-rpms"
```

On RHEL 8, enable the `codeready-builder-for-rhel-8-*-rpms` repository to satisfy package dependencies:

```
ARCH=$( /bin/arch )

subscription-manager repos --enable "codeready-builder-for-rhel-8-$
{ARCH}-rpms"
```

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 EDB 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 the following command to install EDB*Plus:

- On RHEL 7:

```
yum -y install edb-asxx-edbplus
```

- On RHEL 8:

```
dnf -y install edb-asxx-edbplus
```

Where, `xx` is the Advanced Server version.

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

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

3.4 Installing EDB*Plus on a CentOS/RHEL 7 ppc64le Host

You can use an RPM package to install EDB*Plus on a CentOS or RHEL 7 ppc64le host.

- To install the IBM Advance Toolchain repository:

On CentOS or RHEL 7 ppc64le:

```
rpm --import https://public.dhe.ibm.com/software/server/POWER/Linux/
toolchain/at/redhat/RHEL7/gpg-pubkey-6976a827-5164221b
```

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

- After creating the `advance-toolchain.repo` file, use your choice of editor to set the value of the `enabled` parameter to 1, and replace the `username` and `password` placeholders in the `baseurl` specification with the registered EDB username and password.

```
[advance-toolchain]
name=Advance Toolchain IBM FTP
baseurl=https://public.dhe.ibm.com/software/server/POWER/Linux/
toolchain/at/redhat/RHEL7
failovermethod=priority
enabled=1
gpgcheck=1
gpgkey=ftp://public.dhe.ibm.com/software/server/POWER/Linux/
toolchain/at/redhat/RHELX/gpg-pubkey-6976a827-5164221b
```

- To install the `Enterprisedb` repository configuration file, assume superuser privileges and invoke the following command:

On CentOS or RHEL 7 ppc64le:

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

- Replace the `USERNAME:PASSWORD` in the following command with the username and password of a registered EDB user:

```
sed -i "s@<username>:<password>@USERNAME:PASSWORD@" /etc/yum.repos.d/
edb.repo
```

- Before installing EDB*Plus, you must install the `epel-release` package:

On CentOS or RHEL 7 ppc64le:

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

- Enable the repository:

On RHEL7, enable the `optional`, `extras`, and `HA` repositories to satisfy package dependencies:

```
subscription-manager repos --enable "rhel-*-optional-rpms" --enable  
"rhel-*-extras-rpms" --enable "rhel-ha-for-rhel-*-server-rpms"
```

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 EDB 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 the following command to install EDB*Plus:

```
yum -y install edb-asxx-edbplus
```

Where, `xx` is the Advanced Server version.

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

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

3.5 Installing EDB*Plus on a Debian or Ubuntu Host

To install EDB*Plus on a Debian or Ubuntu host, you must have credentials that allow access to the EDB repository. To request credentials for the repository, visit:

<https://www.enterprisedb.com/repository-access-request>

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

- Assume superuser privileges:

```
sudo su -
```

- Configure the EDB repository:

On Debian 9, Ubuntu 18, and Ubuntu 20:

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

On Debian 10:

- a. Set up the EDB repository:

```
sh -c 'echo "deb [arch=amd64] https://apt.enterprisedb.com/
$(lsb_release -cs)-edb/ $(lsb_release -cs) main" > /etc/apt/
sources.list.d/edb-$(lsb_release -cs).list'
```

- b. Substitute your EDB credentials for the username and password placeholders in the following command:

```
sh -c 'echo "machine apt.enterprisedb.com login <USERNAME>
password <PASSWORD>" > /etc/apt/auth.conf.d/edb.conf'
```

- Add support to your system for secure APT repositories:

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

- Add the EBD signing key:

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

- Update the repository metadata:

```
apt-get update
```

- Install Debian package:

```
apt-get -y install edb-asxx-edbplus
```

Where, xx is the Advanced Server version.

3.6 Configuring an RPM Installation

After performing an RPM installation of EDB*Plus, you must set the values of environment variables that allow EDB*Plus to locate your Java installation. Use the following commands to set variable values:

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

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:

You must confirm that an `identd` server is installed and running. You can use the `yum` package manager to install an `identd` server by invoking the command:

- On RHEL or CentOS 7:

```
yum -y install xinetd authd
```

- On RHEL or CentOS 8:

```
dnf -y install xinetd authd
```

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

```
service auth
{
    disable = yes
    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 the server arguments, please erase `-E`.

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

```
systemctl enable xinetd
systemctl start xinetd
```

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

```
# map_name      system_username  postgres_username
  edbas         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` column is `enterprisedb`.

Then, 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=edbas
```

- If you are using an IPv6 local connection, modify the file entry to read:

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

You must restart the Advanced Server service before invoking EDB*Plus. For detailed information about controlling the Advanced Server service, see the *EDB Postgres Advanced Server Installation Guide*, available at:

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

3.7 Using the Graphical Installer

Graphical installers for EDB*Plus are available via StackBuilder Plus; you can access StackBuilder Plus through your Windows or Linux start menu. After opening StackBuilder Plus and selecting the installation for which you wish to install EDB*Plus, expand the component selection screen tree control to select and download the EDB*Plus installer.

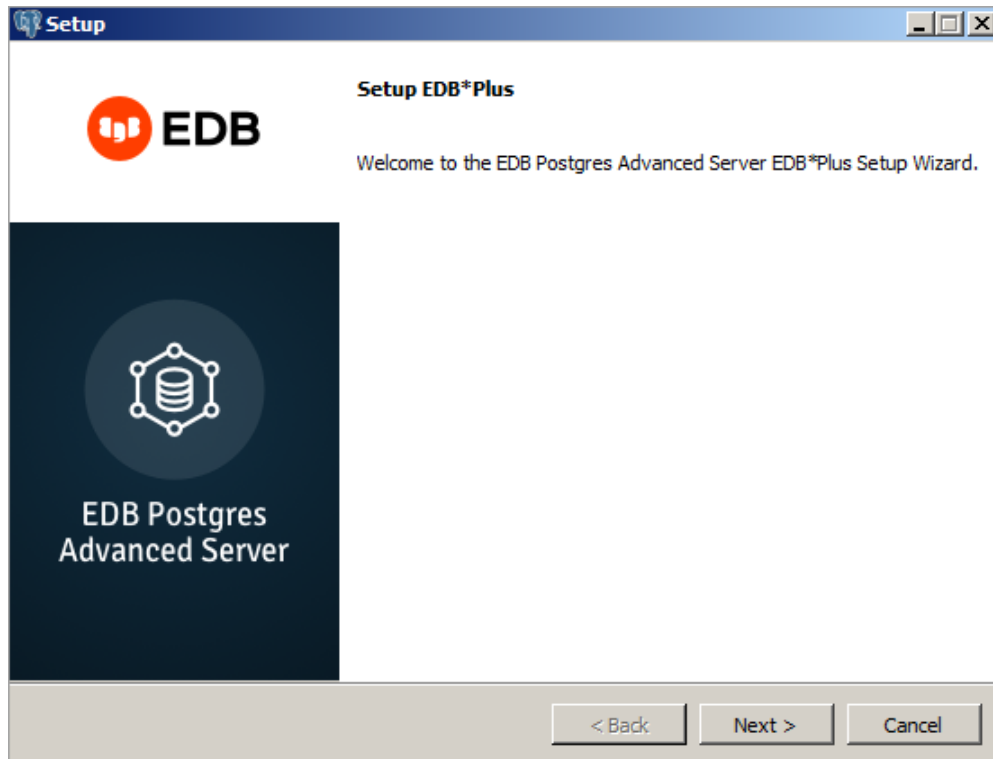


Fig. 1: *The EDB*Plus Welcome window*

The EDB*Plus installer welcomes you to the setup wizard, as shown in the figure below.

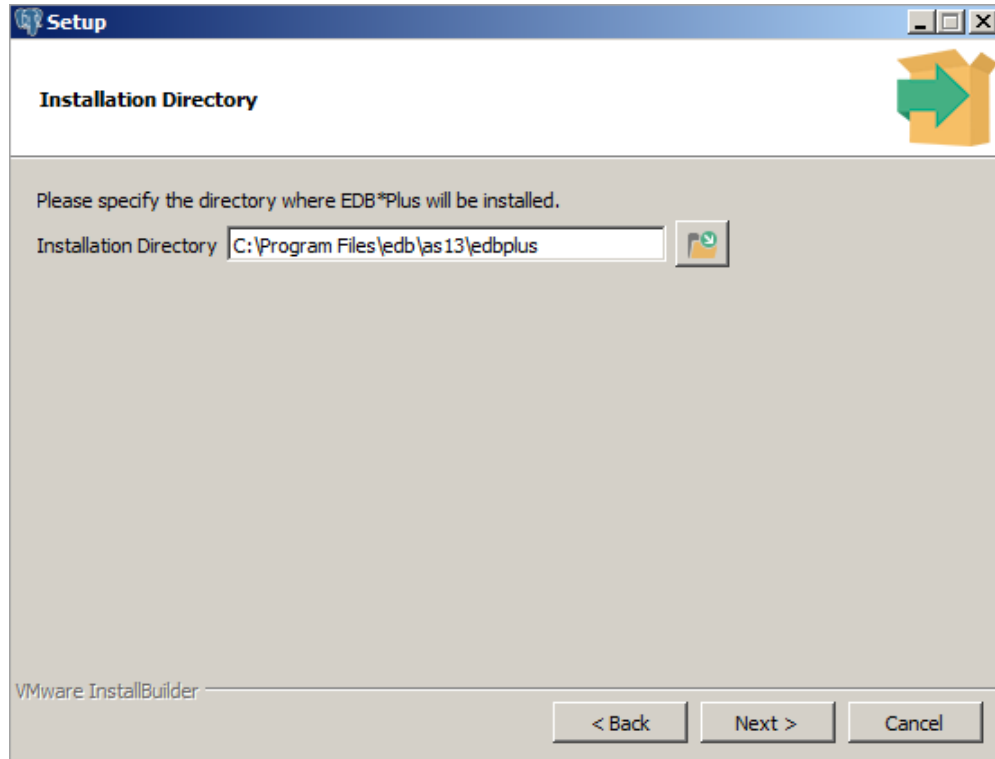


Fig. 2: *The Installation Directory window*

Use the Installation Directory field to specify the directory in which you wish to install the EDB*Plus software. Then, click Next to continue.

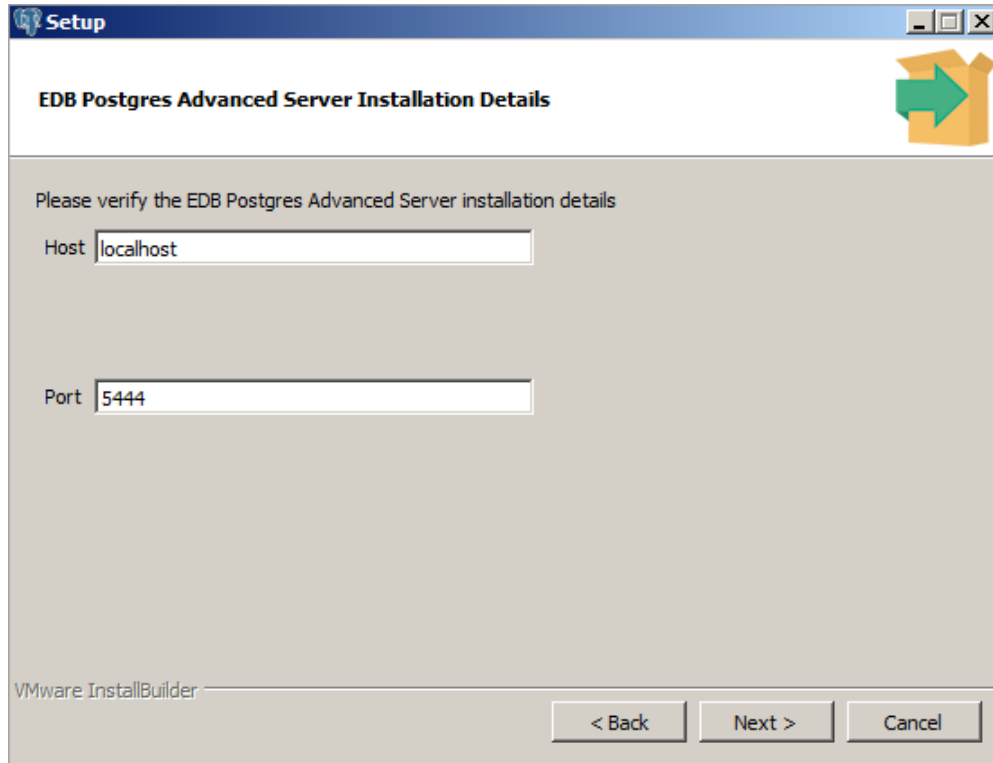


Fig. 3: *The Advanced Server Installation Details window*

Use fields on the EDB Postgres Advanced Server Installation Details window to identify the location of the Advanced Server host:

- Use the `Host` field to identify the system on which Advanced Server resides.
- Use the `Port` field to identify the listener port that Advanced Server monitors for client connections.

Then, click `Next` to continue.

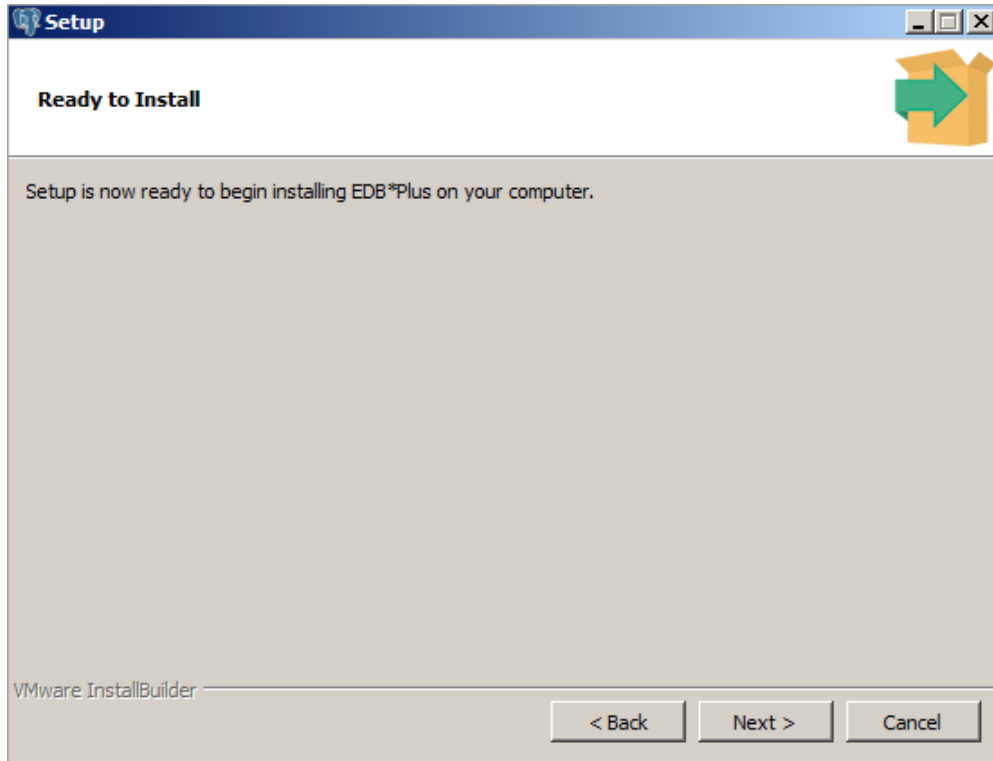


Fig. 4: *The Ready to Install window*

The Ready to Install window notifies you when the installer has all of the information needed to install EDB*Plus on your system. Click Next to install EDB*Plus.

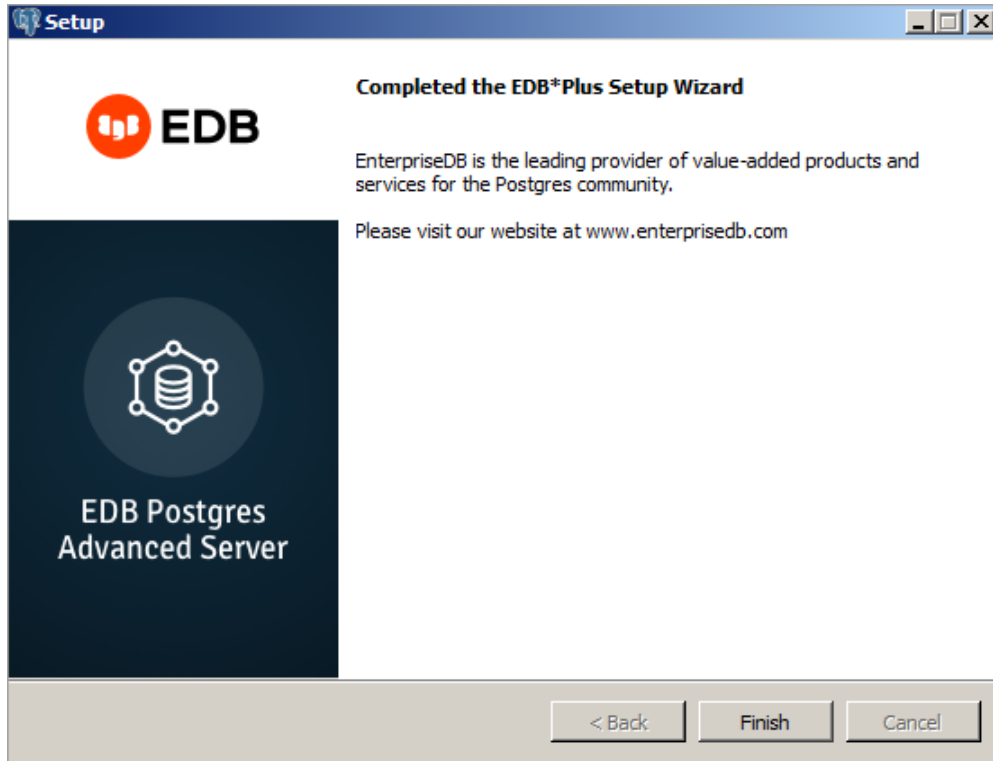


Fig. 5: *The installation is complete*

The installer notifies you when the setup wizard has completed the EDB*Plus installation. Click `Finish` to exit the installer.

Using EDB*Plus

To open an EDB*Plus command line, navigate through the Applications or Start menu to the Advanced Server menu, to the Run SQL Command Line menu, and select the EDB*Plus option. You can also invoke EDB*Plus from the operating system command line with the following command:

```
edbplus [ -S[SILENT ] ] [ <login> | /NOLOG ] [ @<scriptfile>[.<ext> ] ]
```

SILENT

If specified, the EDB*Plus sign-on banner is suppressed along with all prompts.

login

Login information for connecting to the database server and database. login takes the following form; there must be no white space within the login information.

```
<username>[/<password>][@{<connectstring> | <variable> } ]
```

Where:

username is a database username with which to connect to the database.

password is the password associated with the specified username. If a password is not provided, but a password is required for authentication, a password file is used if available. If there is no password file or no entry in the password file with the matching connection parameters, then EDB*Plus will prompt for the password.

connectstring is the database connection string with the following format:

```
<host>[:<port>][/<dbname>][?ssl={true | false}]
```

Where:

host is the hostname or IP address on which the database server resides. If neither @connectstring nor @variable nor /NOLOG is specified, the default host is assumed to be localhost. port is the port number receiving connections on the database server. If not specified, the default is 5444. dbname is the name of the database to connect to. If not specified the default is edb. If Internet Protocol version 6 (IPv6) is used for the connection instead of IPv4, then the IP address must be enclosed within square brackets (that is, [ipv6_address]). The following is an example using an IPv6 connection:

```
edbplus.sh enterprisedb/password@[fe80::20c:29ff:fe7c:78b2]:5444/edb
```

The pg_hba.conf file for the database server must contain an appropriate entry for the IPv6 connection. The following example shows an entry that allows all addresses:

#	TYPE	DATABASE	USER	ADDRESS	METHOD
host		all	all	::0/0	md5

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

<https://www.postgresql.org/docs/current/static/auth-pg-hba-conf.html>

If an SSL connection is desired, then include the ?ssl=true parameter in the connection string. In such a case, the connection string must minimally include host:port, with or without /dbname. If the ssl parameter is not specified, the default is false. See *Using a Secure Sockets Layer (SSL) Connection* for instructions on setting up an SSL connection.

variable is a variable defined in the login.sql file that contains a database connection string. The login.sql file can be found in the edbplus subdirectory of the Advanced Server home directory.

/NOLOG

Specify /NOLOG to start EDB*Plus without establishing a database connection. SQL commands and EDB*Plus commands that require a database connection cannot be used in this mode. The CONNECT command can be subsequently given to connect to a database after starting EDB*Plus with the /NOLOG option.

scriptfile[.ext]

scriptfile is the name of a file residing in the current working directory, containing SQL and/or EDB*Plus commands that will be automatically executed after startup of EDB*Plus. ext is the filename extension. If the filename extension is sql, then the .sql extension may be omitted when specifying scriptfile. When creating a script file, always name the file with an extension, otherwise it will not be accessible by EDB*Plus. (EDB*Plus will always assume a .sql extension on filenames that are specified with no extension.)

The following example shows user enterprisedb with password password, connecting to database edb running on a database server on the localhost at port 5444.

```
C:\Program Files\edb\as13\edbplus>edbplus enterprisedb/password
Connected to EnterpriseDB 13.0.1 (localhost:5444/edb) AS enterprisedb

EDB*Plus: Release 13 (Build 39.0.0)
```

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```
Copyright (c) 2008-2020, EnterpriseDB Corporation. All rights reserved.
```

```
SQL>
```

The following example shows user `enterprisedb` with password, `password`, connecting to database `edb` running on a database server on the `localhost` at port `5445`.

```
C:\Program Files\edb\as13\edbplus>edbplus enterprisedb/
password@localhost:5445/edb
Connected to EnterpriseDB 13.0.1 (localhost:5445/edb) AS enterprisedb

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Copyright (c) 2008-2020, EnterpriseDB Corporation. All rights reserved.

SQL>
```

Using variable `hr_5445` in the `login.sql` file, the following illustrates how it is used to connect to database `hr` on `localhost` at port `5445`.

```
C:\Program Files\edb\as13\edbplus>edbplus enterprisedb/password@hr_5445
Connected to EnterpriseDB 13.0.1 (localhost:5445/hr) AS enterprisedb

EDB*Plus: Release 13 (Build 39.0.0)
Copyright (c) 2008-2020, EnterpriseDB Corporation. All rights reserved.

SQL>
```

The following is the content of the `login.sql` file used in the previous example.

```
define edb="localhost:5445/edb"
define hr_5445="localhost:5445/hr"
```

The following example executes a script file, `dept_query.sql` after connecting to database `edb` on server `localhost` at port `5444`.

```
C:\Program Files\edb\as13\edbplus>edbplus enterprisedb/password @dept_query
Connected to EnterpriseDB 13.0.1 (localhost:5444/edb) AS enterprisedb

SQL> SELECT * FROM dept;

DEPTNO DNAME          LOC
-----
10      ACCOUNTING      NEW YORK
20      RESEARCH        DALLAS
30      SALES           CHICAGO
40      OPERATIONS      BOSTON

SQL> EXIT
Disconnected from EnterpriseDB Database.
```

The following is the content of file `dept_query.sql` used in the previous example.


```
SET PAGESIZE 9999
SET ECHO ON
SELECT * FROM dept;
EXIT
```

Using a Secure Sockets Layer (SSL) Connection

An EDB*Plus connection to the Advanced Server database can be accomplished using secure sockets layer (SSL) connectivity.

Using SSL requires various prerequisite configuration steps performed on the database server involved with the SSL connection as well as creation of the Java truststore and keystore on the host that will run EDB*Plus.

The Java *truststore* is the file containing the Certificate Authority (CA) certificates with which the Java client (EDB*Plus) uses to verify the authenticity of the server to which it is initiating an SSL connection.

The Java *keystore* is the file containing private and public keys and their corresponding certificates. The keystore is required for client authentication to the server, which is used for the EDB*Plus connection.

The following is material to which you can refer to for guidance in setting up the SSL connections:

- For information on setting up SSL connectivity to the Advanced Server database, see the section about secure TCP connections with SSL in Chapter 18 “Server Setup and Operation” in the PostgreSQL Core Documentation located at:

<https://www.postgresql.org/docs/current/ssl-tcp.html>

- For information on JDBC client connectivity using SSL, see the section on configuring the client in Chapter 4 “Using SSL” in The PostgreSQL JDBC Interface located at:

<https://jdbc.postgresql.org/documentation/head/ssl-client.html>

The following sections provide information for the configuration steps of using SSL.

- Configuring SSL on Advanced Server
- Configuring SSL for the EDB*Plus client
- Requesting SSL connection to the Advanced Server database

5.1 Configuring SSL on Advanced Server

This section provides an example of configuring SSL on a database server to demonstrate the use of SSL with EDB*Plus. A self-signed certificate is used for this purpose.

Step 1: Create the certificate signing request (CSR).

In the following example the generated certificate signing request file is `server.csr`. The private key is generated as file `server.key`.

```
$ openssl req -new -nodes -text -out server.csr \
> -keyout server.key -subj "/CN=enterprisedb"
Generating a 2048 bit RSA private key
.....+++
.....+++
writing new private key to 'server.key'
-----
```

Note: When creating the certificate, the value specified for the common name field (designated as `CN=enterprisedb` in this example) must be the database user name that is specified when connecting to EDB*Plus.

In addition, user name maps can be used as defined in the `pg_ident.conf` file to permit more flexibility for the common name and database user name. Steps 8 and 9 describe the use of user name maps.

Step 2: Generate the self-signed certificate.

The following generates a self-signed certificate to file `server.crt` using the certificate signing request file, `server.csr`, and the private key, `server.key`, as input.

```
$ openssl x509 -req -days 365 -in server.csr -signkey server.key \
> -out server.crt
Signature ok
subject=/CN=enterprisedb
Getting Private key
```

Step 3: Make a copy of the server certificate (`server.crt`) to be used as the root Certificate Authority (CA) file (`root.crt`).

```
$ cp server.crt root.crt
```

Step 4: Delete the now redundant certificate signing request (`server.csr`).

```
$ rm -f server.csr
```

Step 5: Move or copy the certificate and private key files to the Advanced Server data directory (for example, `/opt/edb/as10/data`).

```
$ mv root.crt /opt/edb/as10/data
$ mv server.crt /opt/edb/as10/data
$ mv server.key /opt/edb/as10/data
```

Step 6: Set the file ownership and permissions on the certificate files and private key file.

Set the ownership to the operating system account that owns the data sub-directory of the database server. Set the permissions so that no other groups or accounts other than the owner can access these files.

```
$ chown enterprisedb root.crt server.crt server.key
$ chgrp enterprisedb root.crt server.crt server.key
$ chmod 600 root.crt server.crt server.key
$ ls -l
total 152
    .
    .
    .
-rw----- 1 enterprisedb enterprisedb 985 Aug 22 11:00 root.crt
-rw----- 1 enterprisedb enterprisedb 985 Aug 22 10:59 server.crt
-rw----- 1 enterprisedb enterprisedb 1704 Aug 22 10:58 server.key
```

Step 7: In the `postgresql.conf` file, make the following modifications.

```
ssl = on
ssl_cert_file = 'server.crt'
ssl_key_file = 'server.key'
ssl_ca_file = 'root.crt'
```

Step 8: Modify the `pg_hba.conf` file to enable SSL usage on the desired database to which EDB*Plus is to make the SSL connection.

In the `pg_hba.conf` file, the `hostssl` type indicates the entry is used to validate SSL connection attempts from the client (EDB*Plus).

The authentication method is set to `cert` with the option `clientcert=1` in order to require an SSL certificate from the client against which authentication is performed using the common name of the certificate (`enterprisedb` in this example).

The `map=sslusers` option specifies that a mapping named `sslusers` defined in the `pg_ident.conf` file is to be used for authentication. This mapping allows a connection to the database if the common name from the certificate and the database user name attempting the connection match the `SYSTEM-USERNAME/PG-USERNAME` pair listed in the `pg_ident.conf` file.

The following is an example of the settings in the `pg_hba.conf` file if the database (`edb`) must use SSL connections.

```
# TYPE  DATABASE        USER            ADDRESS                 METHOD
# "local" is for Unix domain socket connections only
local   all             all                                     md5
# IPv4 local connections:
hostssl edb             all 192.168.2.0/24 cert clientcert=1 map=sslusers
```

Step 9: The following shows the user name maps in the `pg_ident.conf` file related to the `pg_hba.conf` file by the `map=sslusers` option. These user name maps permit you to specify database user names `edbuser`, `postgres`, or `enterprisedb` when connecting with EDB*Plus.

```
# MAPNAME      SYSTEM-USERNAME  PG-USERNAME
sslusers      enterprisedb     edbuser
sslusers      enterprisedb     postgres
sslusers      enterprisedb     enterprisedb
```

Step 10: Restart the database server after you have made the changes to the configuration files.

5.2 Configuring SSL for the EDB*Plus Client

After you have configured SSL on the database server, the following steps provide an example of generating certificate and keystore files for EDB*Plus (the JDBC client).

Step 1: Using files `server.crt` and `server.key` located under the database server data sub-directory, create copies of these files and move them to the host where EDB*Plus is to be running.

Store these files in the desired directory to contain the trusted certificate and keystore files to be generated in the following steps. The suggested location is to create a `.postgresql` sub-directory under the home user account that will invoke EDB*Plus. Thus, these files will be under the `~/ .postgresql` directory of the user account that will run EDB*Plus.

For this example, assume file `edb.crt` is a copy of `server.crt` and `edb.key` is a copy of `server.key`.

Step 2: Create an additional copy of `edb.crt`.

```
$ cp edb.crt edb_root.crt
$ ls -l
total 12
-rw-r--r-- 1 user user  985  Aug 22 14:17  edb.crt
-rw-r--r-- 1 user user 1704  Aug 22 14:18  edb.key
-rw-r--r-- 1 user user  985  Aug 22 14:19  edb_root.crt
```

Step 3: Create a Distinguished Encoding Rules (DER) format of file `edb_root.crt`. The generated DER format of this file is `edb_root.crt.der`. The DER format of the file is required for the `keytool` program used in Step 4.

```
$ openssl x509 -in edb_root.crt -out edb_root.crt.der -outform der
$ ls -l
total 16
-rw-r--r-- 1 user user  985  Aug 22 14:17  edb.crt
-rw-r--r-- 1 user user 1704  Aug 22 14:18  edb.key
-rw-r--r-- 1 user user  985  Aug 22 14:19  edb_root.crt
-rw-rw-r-- 1 user user  686  Aug 22 14:21  edb_root.crt.der
```

Step 4: Use the `keytool` program to create a keystore file (`postgresql.keystore`) using `edb_root.crt.der` as the input. This process adds the certificate of the Postgres database server to the keystore file.

Note: The file name `postgresql.keystore` is recommended so that it can be accessed in its default directory location `~/.postgresql/postgresql.keystore`, which is under the home directory of the user account invoking EDB*Plus. Also note that the file name suffix can be `.jks` instead of `.keystore` (thus, file name `postgresql.jks`). However, in the remainder of these examples, file name `postgresql.keystore` is used.

For Windows only: The path is `%APPDATA%\postgresql\postgresql.keystore`

The `keytool` program can be found under the `bin` subdirectory of the Java Runtime Environment installation.

You will be prompted for a new password. **Save this password as it must be specified with the `PGSSLCERTPASS` environment variable.**

```
$ /usr/java/jdk1.8.0_131/jre/bin/keytool -keystore postgresql.keystore \
> -alias postgresqlstore -import -file edb_root.crt.der
Enter keystore password:
Re-enter new password:
Owner: CN=enterprisedb
Issuer: CN=enterprisedb
Serial number: c60f40256b0e8d53
Valid from: Tue Aug 22 10:59:25 EDT 2017 until: Wed Aug 22 10:59:25 EDT 2018
Certificate fingerprints:
    MD5: 85:0B:E9:A7:6E:4F:7C:B0:9B:D6:3A:44:55:E2:E9:8E
    SHA1: DD:A6:71:24:0B:6C:F8:BC:7A:4C:89:9B:DC:22:6A:6C:B0:F5:3F:7C
    SHA256:
DC:02:64:E2:B0:E9:6F:1C:FC:4F:AE:E6:18:85:0B:79:57:43:C3:C5:AE:43:0D:37
:49:53:6D:11:69:06:46:48
    Signature algorithm name: SHA1withRSA
    Version: 1
Trust this certificate? [no]: yes
Certificate was added to keystore
```

Step 5: Create a PKCS #12 format of the keystore file (`postgresql.p12`) using files `edb.crt` and `edb.key` as input.

Note: The file name `postgresql.p12` is recommended so that it can be accessed in its default directory location `~/.postgresql/postgresql.p12`, which is under the home directory of the user account invoking EDB*Plus.

For Windows only: The path is `%APPDATA%\postgresql\postgresql.p12`

You will be prompted for a new password. **Save this password as it must be specified with the `PGSSLKEYPASS` environment variable.**

```
$ openssl pkcs12 -export -in edb.crt -inkey edb.key -out postgresql.p12
Enter Export Password:
Verifying - Enter Export Password:
$ ls -l
```

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```
total 24
-rw-rw-r-- 1 user user 985 Aug 24 12:18 edb.crt
-rw-rw-r-- 1 user user 1704 Aug 24 12:18 edb.key
-rw-rw-r-- 1 user user 985 Aug 24 12:20 edb_root.crt
-rw-rw-r-- 1 user user 686 Aug 24 12:20 edb_root.crt.der
-rw-rw-r-- 1 user user 758 Aug 24 12:26 postgresql.keystore
-rw-rw-r-- 1 user user 2285 Aug 24 12:28 postgresql.p12
```

Step 6: If the `postgresql.keystore` and `postgresql.p12` files are not already in the `~/ .postgresql` directory, move or copy them to that location.

For Windows only: The directory is `%APPDATA%\ .postgresql`

Step 7: If the default location `~/ .postgresql` is not used, then the full path (including the file name) to the `postgresql.keystore` file must be set with the `PGSSLCERT` environment variable, and the full path (including the file name) to file `postgresql.p12` must be set with the `PGSSLKEY` environment variable before invoking EDB*Plus.

In addition, if the generated file from Step 4 was not named `postgresql.keystore` or `postgresql.jks` then, use the `PGSSLCERT` environment variable to designate the file name and its location. Similarly, if the generated file from Step 5 was not named `postgresql.p12` then, use the `PGSSLKEY` environment variable to designate the file name and its location.

5.3 Requesting an SSL Connection between EDB*Plus and the Advanced Server Database

Be sure the following topics have been addressed in order to perform an SSL connection:

- The trusted certificate and keystore files have been generated for both the database server and the client host to be invoking EDB*Plus.
- The `postgresql.conf` file for the database server contains the updated configuration parameters.
- The `pg_hba.conf` file for the database server contains the required entry for permitting the SSL connection.
- For the client host, either the client's certificate and keystore files have been placed in the user account's `~/ .postgresql` directory or the environment variables `PGSSLCERT` and `PGSSLKEY` are set before invoking EDB*Plus.
- The `PGSSLCERTPASS` environment variable is set with a password.
- The `PGSSLKEYPASS` environment variable is set with a password

When invoking EDB*Plus, include the `?ssl=true` parameter in the database connection string as shown for the `connectstring` option in *Using EDB*Plus*.

The following is an example where EDB*Plus is invoked from a host that is remote to the database server.

The `postgresql.conf` file of the database server contains the following modified parameters:

```
ssl = on
ssl_cert_file = 'server.crt'
ssl_key_file = 'server.key'
ssl_ca_file = 'root.crt'
```

The `pg_hba.conf` file of the database server contains the following entry for connecting from EDB*Plus on the remote host:

```
# TYPE      DATABASE          USER            ADDRESS                 METHOD
# "local" is for Unix domain socket connections only
local      all                all                                md5
# IPv4 local connections:
hostssl    edb                all              192.168.2.24/32      cert clientcert=1
```

On the remote host where EDB*Plus is to be invoked, the Linux user account named `user` contains the certificate and keystore files in its `~/.postgresql` directory:

```
[user@localhost ~]$ whoami
user
[user@localhost ~]$ cd .postgresql
[user@localhost .postgresql]$ pwd
/home/user/.postgresql
[user@localhost .postgresql]$ ls -l
total 8
-rw-rw-r-- 1 user user 758 Aug 24 12:37 postgresql.keystore
-rw-rw-r-- 1 user user 2285 Aug 24 12:37 postgresql.p12
```

Logged into Linux with the account named `user`, EDB*Plus is successfully invoked with the `ssl=true` parameter:

```
$ export PGSSLCERTPASS=keypass
$ export PGSSLKEYPASS=exppass
$ cd /opt/edb/as10/edbplus
$ ./edbplus.sh enterprisedb/password@192.168.2.22:5444/edb?ssl=true
Connected to EnterpriseDB 10.0.1 (192.168.2.22:5444/edb)
AS enterprisedb

EDB*Plus: Release 10 (Build 36.0.0)
Copyright (c) 2008-2020, EnterpriseDB Corporation. All rights reserved.

SQL>
```

Alternatively, without placing the certificate and keystore files in `~/.postgresql`, but in a different directory, EDB*Plus can be invoked in the following manner:

```
$ export PGSSLCERT=/home/user/ssl/postgresql.keystore
$ export PGSSLKEY=/home/user/ssl/postgresql.p12
$ export PGSSLCERTPASS=keypass
$ export PGSSLKEYPASS=exppass
$ cd /opt/edb/as10/edbplus
```

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```
$ ./edbplus.sh enterprisedb/password@192.168.2.22:5444/edb?ssl=true
Connected to EnterpriseDB 10.0.1 (192.168.2.22:5444/edb)
AS enterprisedb

EDB*Plus: Release 10 (Build 36.0.0)
Copyright (c) 2008-2020, EnterpriseDB Corporation. All rights reserved.

SQL>
```

Note that in both cases the database user name used to log into EDB*Plus is `enterprisedb` as this is the user specified for the common name field when creating the certificate in Step 1 of *Configuring SSL on Advanced Server*.

Other database user names can be used if the `pg_hba.conf` file with the `map` option and the `pg_ident.conf` file are used as described in Steps 8 and 9 of *Configuring SSL on Advanced Server*.

Command Summary

The following sections contains a summary of EDB*Plus commands.

6.1 ACCEPT

The `ACCEPT` command displays a prompt and waits for the user's keyboard input. The value input by the user is placed in the specified variable.

```
ACC[EPT ] variable
```

The following example creates a new variable named `my_name`, accepts a value of John Smith, then displays the value using the `DEFINE` command.

```
SQL> ACCEPT my_name
Enter value for my_name: John Smith
SQL> DEFINE my_name
DEFINE MY_NAME = "John Smith"
```

6.2 APPEND

`APPEND` is a line editor command that appends the given text to the end of the current line in the SQL buffer.

```
A[PPEND ] text
```

In the following example, a `SELECT` command is built-in the SQL buffer using the `APPEND` command. Note that two spaces are placed between the `APPEND` command and the `WHERE` clause in order to separate `dept` and `WHERE` by one space in the SQL buffer.

```
SQL> APPEND SELECT * FROM dept
SQL> LIST
  1 SELECT * FROM dept
SQL> APPEND WHERE deptno = 10
SQL> LIST
  1 SELECT * FROM dept WHERE deptno = 10
```

6.3 CHANGE

CHANGE is a line editor command performs a search-and-replace on the current line in the SQL buffer.

```
C[HANGE ] /from/[to/ ]
```

If `to/` is specified, the first occurrence of text `from` in the current line is changed to text `to`. If `to/` is omitted, the first occurrence of text `from` in the current line is deleted.

The following sequence of commands makes line 3 the current line, then changes the department number in the WHERE clause from 20 to 30.

```
SQL> LIST
  1 SELECT empno, ename, job, sal, comm
  2 FROM emp
  3 WHERE deptno = 20
  4* ORDER BY empno
SQL> 3
  3* WHERE deptno = 20
SQL> CHANGE /20/30/
  3* WHERE deptno = 30
SQL> LIST
  1 SELECT empno, ename, job, sal, comm
  2 FROM emp
  3 WHERE deptno = 30
  4* ORDER BY empno
```

6.4 CLEAR

The CLEAR command removes the contents of the SQL buffer, deletes all column definitions set with the COLUMN command, or clears the screen.

```
CL[EAR ] [ BUFF[ER ] | SQL | COL[UMNS ] | SCR[EEN ] ]
```

BUFFER | SQL

Clears the SQL buffer.

COLUMNS

Removes column definitions.

SCREEN

Clears the screen. This is the default if no options are specified.

6.5 COLUMN

The `COLUMN` command controls output formatting. The formatting attributes set by using the `COLUMN` command remain in effect only for the duration of the current session.

```
COL[UMN ]
[ column
  { CLE[AR ] |
    { FOR[MAT ] spec |
      HEA[DING ] text |
      { OFF | ON }
    } [...]
  }
]
```

If the `COLUMN` command is specified with no subsequent options, formatting options for current columns in effect for the session are displayed.

If the `COLUMN` command is followed by a column name, then the column name may be followed by one of the following:

1. No other options
2. CLEAR
3. Any combination of `FORMAT`, `HEADING`, and one of `OFF` or `ON`

`column`

Name of a column in a table to which subsequent column formatting options are to apply. If no other options follow `column`, then the current column formatting options if any, of `column` are displayed.

CLEAR

The `CLEAR` option reverts all formatting options back to their defaults for `column`. If the `CLEAR` option is specified, it must be the only option specified.

`spec`

Format specification to be applied to `column`. For character columns, `spec` takes the following format:

`n`

`n` is a positive integer that specifies the column width in characters within which to display the data. Data in excess of `n` will wrap around with the specified column width.

For numeric columns, `spec` is comprised of the following elements.

Element	Description
\$	Display a leading dollar sign.
,	Display a comma in the indicated position.
.	Marks the location of the decimal point.
0	Display leading zeros.
9	Number of significant digits to display.

If loss of significant digits occurs due to overflow of the format, then all #'s are displayed.

text

Text to be used for the column heading of `column`.

OFF | ON

If OFF is specified, formatting options are reverted back to their defaults, but are still available within the session. If ON is specified, the formatting options specified by previous COLUMN commands for `column` within the session are re-activated.

The following example shows the effect of changing the display width of the `job` column.

```
SQL> SET PAGESIZE 9999
SQL> COLUMN job FORMAT A5
SQL> COLUMN job
COLUMN JOB ON
FORMAT A5
wrapped
SQL> SELECT empno, ename, job FROM emp;
```

```
EMPNO ENAME      JOB
-----
 7369 SMITH        CLERK
 7499 ALLEN        SALES
                        MAN

 7521 WARD        SALES
                        MAN

 7566 JONES        MANAG
                        ER

 7654 MARTIN       SALES
                        MAN

 7698 BLAKE        MANAG
                        ER

 7782 CLARK        MANAG
                        ER

 7788 SCOTT        ANALY
                        ST
```

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7839	KING	PRESI DENT
7844	TURNER	SALES MAN
7876	ADAMS	CLERK
7900	JAMES	CLERK
7902	FORD	ANALY ST
7934	MILLER	CLERK

14 rows retrieved.

The following example applies a format to the sal column.

```
SQL> COLUMN sal FORMAT $99,999.00
SQL> COLUMN
COLUMN JOB ON
FORMAT A5
wrapped

COLUMN SAL ON
FORMAT $99,999.00
wrapped
SQL> SELECT empno, ename, job, sal FROM emp;
```

EMPNO	ENAME	JOB	SAL
7369	SMITH	CLERK	\$800.00
7499	ALLEN	SALES MAN	\$1,600.00
7521	WARD	SALES MAN	\$1,250.00
7566	JONES	MANAG ER	\$2,975.00
7654	MARTIN	SALES MAN	\$1,250.00
7698	BLAKE	MANAG ER	\$2,850.00
7782	CLARK	MANAG ER	\$2,450.00
7788	SCOTT	ANALY ST	\$3,000.00

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7839	KING	PRESI DENT	\$5,000.00
7844	TURNER	SALES MAN	\$1,500.00
7876	ADAMS	CLERK	\$1,100.00
7900	JAMES	CLERK	\$950.00
7902	FORD	ANALY ST	\$3,000.00
7934	MILLER	CLERK	\$1,300.00

14 rows retrieved.

6.6 CONNECT

Change the database connection to a different user and/or connect to a different database. There must be no white space between any of the parameters following the CONNECT command.

```
CON[NECT] <username>[/<password>][@{<connectstring> | <variable> } ]
```

Where:

`username` is a database username with which to connect to the database.

`password` is the password associated with the specified `username`. If a password is not provided, but a password is required for authentication, a search is made for a password file, first in the home directory of the Linux operating system account invoking EDB*Plus (or in the `%APPDATA%\postgresql\` directory for Windows) and then at the location specified by the `PGPASSFILE` environment variable. The password file is `.pgpass` on Linux hosts and `pgpass.conf` on Windows hosts. The following is an example on a Windows host:

```
C:\Users\Administrator\AppData\Roaming\postgresql\pgpass.conf
```

If a password file cannot be located, or it does not have an entry matching the EDB*Plus connection parameters, then EDB*Plus will prompt for the password. For more information about password files, see the PostgreSQL core documentation at:

<https://www.postgresql.org/docs/current/static/libpq-pgpass.html>

Note: When a password is not required, EDB*Plus does not prompt for a password such as when the `trust` authentication method is specified in the `pg_hba.conf` file. For more information about the `pg_hba.conf` file and authentication methods, see the PostgreSQL core documentation at <https://www.postgresql.org/docs/current/static/auth-pg-hba-conf.html>

`connectstring` is the database connection string. See *Using EDB*Plus* for further information on the database connection string.

`variable` is a variable defined in the `login.sql` file that contains a database connection string. The `login.sql` file can be found in the `edbplus` subdirectory of the Advanced Server home directory.

In the following example, the database connection is changed to database `edb` on the localhost at port 5445 with username `smith`.

```
SQL> CONNECT smith/mypassword@localhost:5445/edb
Disconnected from EnterpriseDB Database.
Connected to EnterpriseDB 13.0.1 (localhost:5445/edb) AS smith
```

From within the session shown above, the connection is changed to username `enterprisedb`. Also note that the host defaults to the localhost, the port defaults to 5444 (which is not the same as the port previously used), and the database defaults to `edb`.

```
SQL> CONNECT enterprisedb/password
Disconnected from EnterpriseDB Database.
Connected to EnterpriseDB 13.0.1 (localhost:5444/edb) AS enterprisedb
```

6.7 DEFINE

The `DEFINE` command creates or replaces the value of a *user variable* (also called a *substitution variable*).

```
DEF[INE ] [ variable [ = text ] ]
```

If the `DEFINE` command is given without any parameters, all current variables and their values are displayed.

If `DEFINE variable` is given, only `variable` is displayed with its value.

`DEFINE variable = text` assigns `text` to `variable`. `text` may be optionally enclosed within single or double quotation marks. Quotation marks must be used if `text` contains space characters.

The following example defines two variables, `dept` and `name`.

```
SQL> DEFINE dept = 20
SQL> DEFINE name = 'John Smith'
SQL> DEFINE
DEFINE EDB = "localhost:5445/edb"
DEFINE DEPT = "20"
DEFINE NAME = "John Smith"
```

Note: The variable `EDB` is read from the `login.sql` file located in the `edbplus` subdirectory of the Advanced Server home directory.

6.8 DEL

DEL is a line editor command that deletes one or more lines from the SQL buffer.

```
DEL [ n | n m | n * | n L[AST ] | * | * n | * L[AST ] |
    L[AST ] ]
```

The parameters specify which lines are to be deleted from the SQL buffer. Two parameters specify the start and end of a range of lines to be deleted. If the DEL command is given with no parameters, the current line is deleted.

n

n is an integer representing the nth line

n m

n and m are integers where m is greater than n representing the nth through the mth lines

*

Current line

LAST

Last line

In the following example, the fifth and sixth lines containing columns sal and comm, respectively, are deleted from the SELECT command in the SQL buffer.

```
SQL> LIST
 1 SELECT
 2   empno
 3   ,ename
 4   ,job
 5   ,sal
 6   ,comm
 7   ,deptno
 8* FROM emp
SQL> DEL 5 6
SQL> LIST
 1 SELECT
 2   empno
 3   ,ename
 4   ,job
 5   ,deptno
 6* FROM emp
```

6.9 DESCRIBE

The `DESCRIBE` command displays:

- A list of columns, column data types, and column lengths for a table or view
- A list of parameters for a procedure or function
- A list of procedures and functions and their respective parameters for a package.

The `DESCRIBE` command will also display the structure of the database object referred to by a synonym. The syntax is:

```
DESC[RIBE] [ schema.]object
```

`schema`

Name of the schema containing the object to be described.

`object`

Name of the table, view, procedure, function, or package to be displayed, or the synonym of an object.

6.10 DISCONNECT

The `DISCONNECT` command closes the current database connection, but does not terminate EDB*Plus.

```
DISC[ONNECT ]
```

6.11 EDIT

The `EDIT` command invokes an external editor to edit the contents of an operating system file or the SQL buffer.

```
ED[IT ] [ filename[.ext ] ]
```

`filename[.ext]`

`filename` is the name of the file to open with an external editor. `ext` is the filename extension. If the filename extension is `sql`, then the `.sql` extension may be omitted when specifying `filename`. `EDIT` always assumes a `.sql` extension on filenames that are specified with no extension. If the filename parameter is omitted from the `EDIT` command, the contents of the SQL buffer are brought into the editor.

6.12 EXECUTE

The EXECUTE command executes an SPL procedure from EDB*Plus.

```
EXEC[UTE ] spl_procedure [ ([ parameters ]) ]
```

spl_procedure

The name of the SPL procedure to be executed.

parameters

Comma-delimited list of parameters. If there are no parameters, then a pair of empty parentheses may optionally be specified.

6.13 EXIT

The EXIT command terminates the EDB*Plus session and returns control to the operating system. QUIT is a synonym for EXIT. Specifying no parameters is equivalent to EXIT SUCCESS COMMIT.

```
{ EXIT | QUIT }
[ SUCCESS | FAILURE | WARNING | value | variable ]
[ COMMIT | ROLLBACK ]SUCCESS | FAILURE |WARNING]
```

Returns an operating system dependent return code indicating successful operation, failure, or warning for SUCCESS, FAILURE, and WARNING, respectively. The default is SUCCESS.

value

An integer value that is returned as the return code.

variable

A variable created with the DEFINE command whose value is returned as the return code.

COMMIT | ROLLBACK

If COMMIT is specified, uncommitted updates are committed upon exit. If ROLLBACK is specified, uncommitted updates are rolled back upon exit. The default is COMMIT.

6.14 GET

The GET command loads the contents of the given file to the SQL buffer.

```
GET filename[.ext ] [ LIS[T ] | NOL[IST ] ]
```

filename[.ext]

filename is the name of the file to load into the SQL buffer. ext is the filename extension. If the filename extension is sql, then the .sql extension may be omitted when specifying

filename. GET always assumes a .sql extension on filenames that are specified with no extension.

LIST | NOLIST

If LIST is specified, the content of the SQL buffer is displayed after the file is loaded. If NOLIST is specified, no listing is displayed. The default is LIST.

6.15 HELP

The HELP command obtains an index of topics or help on a specific topic. The question mark (?) is synonymous with specifying HELP.

```
{ HELP | ? } { INDEX | topic }
```

INDEX

Displays an index of available topics.

topic

The name of a specific topic – e.g., an EDB*Plus command, for which help is desired.

6.16 HOST

The HOST command executes an operating system command from EDB*Plus.

```
HO[ST ] [os_command]
```

os_command

The operating system command to be executed. If you do not provide an operating system command, EDB*Plus pauses execution and opens a new shell prompt. When the shell exits, EDB*Plus resumes execution.

6.17 INPUT

The INPUT line editor command adds a line of text to the SQL buffer after the current line.

```
I[INPUT ] text
```

The following sequence of INPUT commands constructs a SELECT command.

```
SQL> INPUT SELECT empno, ename, job, sal, comm
SQL> INPUT FROM emp
SQL> INPUT WHERE deptno = 20
SQL> INPUT ORDER BY empno
SQL> LIST
```

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```

1 SELECT empno, ename, job, sal, comm
2 FROM emp
3 WHERE deptno = 20
4* ORDER BY empno

```

6.18 LIST

LIST is a line editor command that displays the contents of the SQL buffer.

```
L[IST] [ n | n m | n * | n L[AST] | * | * n | * L[AST] | L[AST] ]
```

The buffer does not include a history of the EDB*Plus commands.

n

n represents the buffer line number.

n m

n m displays a list of lines between n and m.

n *

n * displays a list of lines that range between line n and the current line.

n L[AST]

n L[AST] displays a list of lines that range from line n through the last line in the buffer.

*

* displays the current line.

* n

* n displays a list of lines that range from the current line through line n.

* L[AST]

* L[AST] displays a list of lines that range from the current line through the last line.

L[AST]

L[AST] displays the last line.

6.19 PASSWORD

Use the `PASSWORD` command to change your database password.

```
PASSW[ORD] [user_name]
```

You must have sufficient privileges to use the `PASSWORD` command to change another user's password. The following example demonstrates using the `PASSWORD` command to change the password for a user named `acctg`:

```
SQL> PASSWORD acctg
Changing password for acctg
  New password:
  New password again:
Password successfully changed.
```

6.20 PAUSE

The `PAUSE` command displays a message, and waits for the user to press `ENTER`.

```
PAU[SE] [optional_text]
```

`optional_text` specifies the text that will be displayed to the user. If the `optional_text` is omitted, Advanced Server will display two blank lines. If you double quote the `optional_text` string, the quotes will be included in the output.

6.21 PROMPT

The `PROMPT` command displays a message to the user before continuing.

```
PRO[MPT] [message_text]
```

`message_text` specifies the text displayed to the user. Double quote the string to include quotes in the output.

6.22 QUIT

The `QUIT` command terminates the session and returns control to the operating system. `QUIT` is a synonym for `EXIT`.

```
QUIT

[SUCCESS | FAILURE | WARNING | value | sub_variable]

[COMMIT | ROLLBACK]
```

The default value is `QUIT SUCCESS COMMIT`.

6.23 REMARK

Use `REMARK` to include comments in a script.

```
REM[ARK] [optional_text]
```

You may also use the following convention to include a comment:

```
/*
 * This is an example of a three line comment.
 */
```

6.24 SAVE

Use the `SAVE` command to write the SQL Buffer to an operating system file.

```
SAV[E] file_name
[CRE[ATE] | REP[LACE] | APP[END]]
```

`file_name`

`file_name` specifies the name of the file (including the path) where the buffer contents are written. If you do not provide a file extension, `.sql` is appended to the end of the file name.

`CREATE`

Include the `CREATE` keyword to create a new file. A new file is created *only* if a file with the specified name does not already exist. This is the default.

`REPLACE`

Include the `REPLACE` keyword to specify that Advanced Server should overwrite an existing file.

`APPEND`

Include the `APPEND` keyword to specify that Advanced Server should append the contents of the SQL buffer to the end of the specified file.

The following example saves the contents of the SQL buffer to a file named `example.sql`, located in the `temp` directory:

```
SQL> SAVE C:\example.sql CREATE
File "example.sql" written.
```

6.25 SET

Use the `SET` command to specify a value for a session level variable that controls EDB*Plus behavior. The following forms of the `SET` command are valid:

SET AUTOCOMMIT

Use the `SET AUTOCOMMIT` command to specify commit behavior for Advanced Server transactions.

```
SET AUTO[COMMIT]
{ON | OFF | IMMEDIATE | statement_count}
```

Please note that EDB*Plus always automatically commits DDL statements.

ON

Specify ON to turn AUTOCOMMIT behavior on.

OFF

Specify OFF to turn AUTOCOMMIT behavior off.

IMMEDIATE

IMMEDIATE has the same effect as ON.

statement_count

Include a value for `statement_count` to instruct EDB*Plus to issue a commit after the specified count of successful SQL statements.

SET COLUMN SEPARATOR

Use the `SET COLUMN SEPARATOR` command to specify the text that Advanced Server displays between columns.

```
SET COLSEP column_separator
```

The default value of `column_separator` is a single space.

SET ECHO

Use the `SET ECHO` command to specify if SQL and EDB*Plus script statements should be displayed on-screen as they are executed.

```
SET ECHO {ON | OFF}
```

The default value is OFF.

SET FEEDBACK

The `SET FEEDBACK` command controls the display of interactive information after a SQL statement executes.

```
SET FEED[BACK] {ON | OFF | row_threshold}
```


row_threshold

Specify an integer value for row_threshold. Setting row_threshold to 0 is same as setting FEEDBACK to OFF. Setting row_threshold equal 1 effectively sets FEEDBACK to ON.

SET FLUSH

Use the SET FLUSH command to control display buffering.

```
SET FLU[SH] {ON | OFF}
```

Set FLUSH to OFF to enable display buffering. If you enable buffering, messages bound for the screen may not appear until the script completes. Please note that setting FLUSH to OFF will offer better performance.

Set FLUSH to ON to disable display buffering. If you disable buffering, messages bound for the screen appear immediately.

SET HEADING

Use the SET HEADING variable to specify if Advanced Server should display column headings for SELECT statements.

```
SET HEA[DING] {ON | OFF}
```

SET HEAD SEPARATOR

The SET HEADSEP command sets the new heading separator character used by the COLUMN HEADING command. The default is '| '.

```
SET HEADS[EP]
```

SET LINESIZE

Use the SET LINESIZE command to specify the width of a line in characters.

```
SET LIN[ESIZE] width_of_line
```

width_of_line

The default value of width_of_line is 132.

SET NEWPAGE

Use the SET NEWPAGE command to specify how many blank lines are printed after a page break.

```
SET NEWP[AGE] lines_per_page
```

lines_per_page

The default value of lines_per_page is 1.

SET NULL

Use the SET NULL command to specify a string that is displayed to the user when a NULL column value is displayed in the output buffer.

```
SET NULL null_string
```

SET PAGESIZE

Use the SET PAGESIZE command to specify the number of printed lines that fit on a page.

```
SET PAGES[IZE] line_count
```

Use the line_count parameter to specify the number of lines per page.

SET SQLCASE

The SET SQLCASE command specifies if SQL statements transmitted to the server should be converted to upper or lower case.

```
SET SQLC[ASE] {MIX[ED] | UP[PER] | LO[WER]}
```

UPPER

Specify UPPER to convert the command text to uppercase.

LOWER

Specify LOWER to convert the command text to lowercase.

MIXED

Specify MIXED to leave the case of SQL commands unchanged. The default is MIXED.

SET PAUSE

The SET PAUSE command is most useful when included in a script; the command displays a prompt and waits for the user to press Return.

```
SET PAU[SE] {ON | OFF}
```

If SET PAUSE is ON, the message Hit ENTER to continue... will be displayed before each command is executed.

SET SPACE

Use the SET SPACE command to specify the number of spaces to display between columns:

```
SET SPACE number_of_spaces
```

SET SQLPROMPT

Use SET SQLPROMPT to set a value for a user-interactive prompt:

```
SET SQLP[ROMPT] "prompt"
```

By default, SQLPROMPT is set to "SQL> "

SET TERMOUT

Use the SET TERMOUT command to specify if command output should be displayed onscreen.

```
SET TERM[OUT] {ON | OFF}
```

SET TIMING

The `SET TIMING` command specifies if Advanced Server should display the execution time for each SQL statement after it is executed.

```
SET TIMI[NG] {ON | OFF}
```

SET TRIMSPPOOL

Use the `SET TRIMSPPOOL` command to remove trailing spaces from each line in the output file specified by the `SPOOL` command.

```
SET TRIMS[POOL] {ON | OFF}
```

The default value is `OFF`.

SET VERIFY

Specifies if both the old and new values of a SQL statement are displayed when a substitution variable is encountered.

```
SET VER[IFY] { ON | OFF }
```

6.26 SHOW

Use the `SHOW` command to display current parameter values.

```
SHO[W] {ALL | parameter_name}
```

Display the current parameter settings by including the `ALL` keyword:

```
SQL> SHOW ALL
autocommit          OFF
colsep              " "
define              "&"
echo                OFF
FEEDBACK ON for 6 row(s).
flush              ON
heading            ON
headsep            "| "
linesize          78
newpage            1
null              " "
pagesize           14
pause              OFF
serveroutput       OFF
spool              OFF
sqlcase            MIXED
```

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```

sqlprompt      "SQL> "
sqlterminator  ";"
suffix         ".sql"
termout        ON
timing          OFF
verify         ON
USER is        "enterprisedb"
HOST is        "localhost"
PORT is        "5444"
DATABASE is    "edb"
VERSION is     "13.0.0"

```

Or display a specific parameter setting by including the `parameter_name` in the `SHOW` command:

```

SQL> SHOW VERSION
VERSION is "13.0.0"

```

6.27 SPOOL

The `SPOOL` command sends output from the display to a file.

```

SP[OOL] output_file | OFF

```

Use the `output_file` parameter to specify a path name for the output file.

6.28 START

Use the `START` command to run an EDB*Plus script file; `START` is an alias for `@` command.

```

STA[RT] script_file

```

Specify the name of a script file in the `script_file` parameter.

6.29 UNDEFINE

The `UNDEFINE` command erases a user variable created by the `DEFINE` command.

```

UNDEF[INE] variable_name [ variable_name... ]

```

Use the `variable_name` parameter to specify the name of a variable or variables.

6.30 WHENEVER SQLERROR

The `WHENEVER SQLERROR` command provides error handling for SQL errors or PL/SQL block errors. The syntax is:

```
WHENEVER SQLERROR
  { CONTINUE [COMMIT | ROLLBACK | NONE]
  | EXIT [SUCCESS | FAILURE | WARNING | n | sub_variable]
  [COMMIT | ROLLBACK] }
```

If Advanced Server encounters an error during the execution of a SQL command or PL/SQL block, EDB*Plus performs the action specified in the `WHENEVER SQLERROR` command:

Include the `CONTINUE` clause to instruct EDB*Plus to perform the specified action before continuing.

Include the `COMMIT` clause to instruct EDB*Plus to `COMMIT` the current transaction before exiting or continuing.

Include the `ROLLBACK` clause to instruct EDB*Plus to `ROLLBACK` the current transaction before exiting or continuing.

Include the `NONE` clause to instruct EDB*Plus to continue without committing or rolling back the transaction.

Include the `EXIT` clause to instruct EDB*Plus to perform the specified action and exit if it encounters an error.

Use the following options to specify a status code that EDB*Plus will return before exiting:

```
[SUCCESS | FAILURE | WARNING | n | sub_variable]
```

Please note that EDB*Plus supports substitution variables, but does not support bind variables.

EDB*Plus User's Guide

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