



**EDB**

**BART Installation and Upgrade Guide**

*Release 2.6.1*

**BART Installation and Upgrade Guide**

Jan 11, 2021

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# Contents

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<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	Requirements Overview . . . . .	1
1.1.1	Supported Platforms and Database Versions . . . . .	1
1.1.2	Software Requirements . . . . .	1
1.1.3	Limitation . . . . .	2
<b>2</b>	<b>Installing BART</b>	<b>3</b>
2.1	Installing BART on a CentOS Host . . . . .	3
2.2	Installing BART on a RHEL Host . . . . .	7
2.3	Installing BART on a RHEL/CentOS 7 PPCLE Host . . . . .	10
2.4	Installing BART on a Debian or Ubuntu Host . . . . .	12
2.5	Installing BART on an SLES 12 Host . . . . .	13
<b>3</b>	<b>Configuring BART</b>	<b>14</b>
3.1	Establishing the BART User Account . . . . .	14
3.2	Configuring BART and Database Server . . . . .	15
3.2.1	Configuring the BART Host . . . . .	17
3.2.2	Configuring the Database Server . . . . .	25
<b>4</b>	<b>Upgrading BART</b>	<b>42</b>
4.1	Upgrading from Older Versions of BART (except 2.0) . . . . .	43
4.2	Upgrading from BART 2.0 . . . . .	44
<b>5</b>	<b>Uninstalling BART</b>	<b>45</b>
5.1	Uninstalling BART on a RHEL/CentOS Host . . . . .	45
5.2	Uninstalling BART on an SLES 12 Host . . . . .	46
5.3	Uninstalling BART on a Debian/Ubuntu Host . . . . .	46
<b>6</b>	<b>Conclusion</b>	<b>47</b>



This guide provides information about how to install and configure the EDB Backup and Recovery Tool (BART) 2.6.1.

## 1.1 Requirements Overview

### 1.1.1 Supported Platforms and Database Versions

- To view a complete list of supported platforms, visit the [EDB website](#).
- BART supports the following database versions:
  - Advanced Server versions 9.6, 10, 11, 12, and 13.
  - PostgreSQL versions 9.6, 10, 11, 12, and 13.

### 1.1.2 Software Requirements

The following components are required for BART installation.

- BART Host Components - Use EDB packages to add BART host components; see *Installing BART* for information about how to install these components.
- Additional Components - In addition to the BART host components, the following components are required:

- The *Secure Shell (SSH) server daemon and Secure Copy (SCP) client programs* must be enabled and activated on the BART host as well as on the remote database server hosts on which BART will be managing backup and recovery.
- BART uses the `pg_basebackup` utility program when taking full backups.

### 1.1.3 Limitation

BART supports taking only a full backup of standby servers; it does not support taking incremental or parallel backups of standby servers.

## CHAPTER 2

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### Installing BART

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This section will walk you through performing a fresh installation of BART on a host. Installation instructions are organized into the following platform/installer specific sections:

- *Installing BART on a CentOS or RHEL Host*
- *Installing BART on a Debian or Ubuntu Host*
- *Installing BART on an SLES 12 Host*

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**Note:** If you are using the pdf version of this document, using cut/paste to copy command may result in extra spaces or carriage returns in the pasted command. If a command fails, check the command carefully for additional characters.

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## 2.1 Installing BART on a CentOS Host

The following section demonstrates installing BART on a CentOS host using an RPM package. This section assumes that the user has some knowledge of installation and system administration procedures, and has administrative privileges on the host.

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

On CentOS 6 and 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
```

2. Replace the `USERNAME:PASSWORD` in the following command with the username and password of a registered EnterpriseDB user:

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

To request credentials for the repository, visit the [EDB website](#).

3. Before installing BART, execute the following command to install the Extra Packages for Enterprise Linux (EPEL) release package:

On CentOS 6:

```
yum -y install https://dl.fedoraproject.org/pub/epel/epel-release-  
↳latest-6.noarch.rpm
```

```
sed -i "s@^#baseurl=@baseurl=@;s@^mirrorlist=@#mirrorlist=@@" /etc/  
↳yum.repos.d/epel.repo
```

On CentOS 6, you need to install SCL repository:

```
yum -y install centos-release-scl
```

On CentOS 7:

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

On CentOS 8:

```
dnf -y install epel-release
```

4. For CentOS 8, enable the PowerTools repository to satisfy EPEL package dependencies:

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

5. For CentOS 8, disable the built-in PostgreSQL module:

```
dnf -qy module disable postgresql
```

6. Optionally, install the `pg_basebackup` utility program using the server client package. If you do not already have the `pg_basebackup` program installed on the BART host, you can install a limited number of files that include the `pg_basebackup` program by invoking the following command:

On CentOS 6 and 7:

```
yum install edb-as<xx>-server-client
```

On CentOS 8:

```
dnf install edb-as<xx>-server-client
```

In the above command, replace `<xx>` with the required Advanced Server version. The `pg_basebackup` version must be the same or more recent than the database server to be backed up. For example, `pg_basebackup` version 10 can be used to back up database server version 10, but cannot be used to back up database server version 11.

7. Use the following command to install BART:

On CentOS 6 and 7:

```
yum -y install edb-bart
```

On CentOS 8:

```
dnf -y install edb-bart
```

Repeat the installation process described in this section to install BART on each remote host on which an incremental backup is to be restored.

To verify the BART installation, navigate to the `/usr/edb/bart/bin` directory and execute the following command:

```
bart --version
```

The `bart --version` command should return the current BART version. If the `bart --version` command returns an error stating the `PATH` is not available after switching from the root user to another BART user account, adjust the setting of the `PATH` environment variable to include the directory location of the BART `bin` subdirectory in the `~/.bashrc` or `~/.bash_profile` files of the following user accounts:

- The BART user account on the BART host. See [Configuring BART](#) for details.
- The remote user account on the remote host to which incremental backups are to be restored. For details, see the *EDB Backup and Recovery User Guide* available at the [EDB website](#).

Upon successful installation, BART is installed in the `BART_HOME` directory:



`/usr/edb/bart`

The installation includes the following files:

File Name	Location	Description
<code>bart</code>	<code>&lt;BART_HOME&gt;/bin</code>	BART command line, executable program
<code>bart-scanner</code>	<code>&lt;BART_HOME&gt;/bin</code>	BART WAL scanner program
<code>bart.cfg.sample</code>	<code>&lt;BART_HOME&gt;/etc</code>	Sample BART configuration file
<code>xlogreader_ident.so</code>	<code>&lt;BART_HOME&gt;/lib</code>	Libraries supporting WAL versions
<code>bart_license.txt</code>	<code>&lt;BART_HOME&gt;</code>	License agreement

After BART is installed successfully, you need to *configure the installation*.

## 2.2 Installing BART on a RHEL Host

The following section demonstrates installing BART on a RHEL host using an RPM package. This section assumes that the user has some knowledge of installation and system administration procedures, and has administrative privileges on the host.

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

On RHEL 6 and 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
```

2. Replace the `USERNAME:PASSWORD` in the following command with the username and password of a registered EnterpriseDB user:

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

To request credentials for the repository, visit the [EDB website](#).

3. Before installing BART, execute the following command to install the Extra Packages for Enterprise Linux (EPEL) release package:

On RHEL 6:

```
yum -y install https://dl.fedoraproject.org/pub/epel/epel-release-  
↳latest-6.noarch.rpm
```

```
sed -i "s@^#baseurl=@baseurl=@;s@^mirrorlist=@#mirrorlist=@" /etc/  
↳yum.repos.d/epel.repo
```

On RHEL 6, you need to install SCL repository:

```
yum -y install centos-release-scl
```

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
```

#### 4. Enable the repository:

On RHEL 7, enable the `optional`, `extras`, and `HA` repositories to satisfy EPEL 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 EPEL packages dependency:

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

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

#### 5. For RHEL 8, disable the built-in PostgreSQL module:

```
dnf -qy module disable postgresql
```

#### 6. Optionally, install the `pg_basebackup` utility program using the server client package. If you do not already have the `pg_basebackup` program installed on the BART host, you can install a limited number of files that include the `pg_basebackup` program by invoking the following command:

On RHEL 6 and 7:

```
yum install edb-as<xx>-server-client
```

On RHEL 8:

```
dnf install edb-as<xx>-server-client
```

In the above command, replace `<xx>` with the required Advanced Server version. The `pg_basebackup` version must be the same or more recent than the database server to be backed up. For example, `pg_basebackup` version 10 can be used to back up database server version 10, but cannot be used to back up database server version 11.

#### 7. Use the following command to install the BART:

On RHEL 6 and 7:

```
yum -y install edb-bart
```

On RHEL 8:

```
dnf -y install edb-bart
```

Repeat the installation process described in this section to install BART on each remote host on which an incremental backup is to be restored.

To verify the BART installation, navigate to the `/usr/edb/bart/bin` directory and execute the following command:

```
bart --version
```

The `bart --version` command should return the current BART version. If the `bart --version` command returns an error stating the PATH is not available after switching from the root user to another BART user account, adjust the setting of the PATH environment variable to include the directory location of the BART bin subdirectory in the `~/ .bashrc` or `~/ .bash_profile` files of the following user accounts:

- The BART user account on the BART host. See *Configuring BART* for details.
- The remote user account on the remote host to which incremental backups are to be restored. For details, see the *EDB Backup and Recovery User Guide* available at the [EDB website](#).

Upon successful installation, BART is installed in the BART\_HOME directory:

```
/usr/edb/bart
```

The installation includes the following files:

File Name	Location	Description
<code>bart</code>	<code>&lt;BART_HOME&gt;/bin</code>	BART command line, executable program
<code>bart-scanner</code>	<code>&lt;BART_HOME&gt;/bin</code>	BART WAL scanner program
<code>bart.cfg.sample</code>	<code>&lt;BART_HOME&gt;/etc</code>	Sample BART configuration file
<code>xlogreader_ident.so</code>	<code>&lt;BART_HOME&gt;/lib</code>	Libraries supporting WAL versions
<code>bart_license.txt</code>	<code>&lt;BART_HOME&gt;</code>	License agreement

After BART is installed successfully, you need to *configure the installation*.

## 2.3 Installing BART on a RHEL/CentOS 7 PPCLE Host

The following section demonstrates installing BART on a RHEL host using an RPM package. This section assumes that the user has some knowledge of installation and system administration procedures, and has administrative privileges on the host.

1. Install Advance Toolchain:

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

cat > /etc/yum.repos.d/advance-toolchain.repo <<EOF

# Beginning of the configuration file
[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
# End of the configuration file
```

2. To install the repository configuration, assume superuser privileges and invoke the following command:

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

3. Replace the `USERNAME:PASSWORD` in the following command with the username and password of a registered EnterpriseDB user:

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

To request credentials for the repository, visit the [EDB website](#).

4. Before installing BART, execute the following command to install the Extra Packages for Enterprise Linux (EPEL) release package:

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

5. On RHEL 7, enable the `optional`, `extras`, and `HA` repositories to satisfy EPEL package dependencies:

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

6. Invoke the following command to install BART:

```
yum -y install edb-bart
```

## 2.4 Installing BART on a Debian or Ubuntu Host

Perform the following steps to install a Debian package using the EnterpriseDB apt repository.

To request credentials for the repository, visit the [EDB website](#).

1. Assume the superuser privileges.

```
sudo su -
```

2. To configure the EnterpriseDB 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 EnterpriseDB 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 EnterpriseDB 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'
```

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

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

4. Add the EDB signing key; When invoking the command, replace the username and password with the credentials provided by EnterpriseDB.

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

5. Update the repository metadata.

```
apt-get update
```

6. Install the Debian package.

```
apt-get install edb-bart
```

## 2.5 Installing BART on an SLES 12 Host

This section provides instructions for installing BART on an SLES 12 SP4 host using the zypper package manager. BART is supported on SLES SP4 and SP5 versions.

1. Assume superuser privileges.

```
sudo su -
```

2. Use the following command to add the EDB repository to your SLES host:

```
zypper addrepo https://zypp.enterprisedb.com/suse/edb-sles.repo
```

3. Invoke the following command to refresh the metadata:

```
zypper refresh
```

4. Install SUSEConnect to register the host with SUSE to allow access to SUSE repositories:

```
zypper install SUSEConnect
```

5. Register the host with SUSE to allow access to SUSE repositories and replace 'REGISTRATION\_CODE' and 'EMAIL' with your SUSE registration information:

```
SUSEConnect -r 'REGISTRATION_CODE' -e 'EMAIL'
```

```
SUSEConnect -p PackageHub/12.4/x86_64
```

```
SUSEConnect -p sle-sdk/12.4/x86_64
```

6. Install the following repository for PEM dependencies:

```
zypper addrepo https://download.opensuse.org/repositories/Apache:/  
↳Modules/SLE_12_SP4/Apache:Modules.repo
```

7. Refresh the metadata:

```
zypper refresh
```

8. Then, use the zypper utility to install BART:

```
zypper -n install edb-bart
```



---

### Configuring BART

---

To configure BART, you must establish the BART user account, *configure the BART host*, and *configure the database server* that will be backed up.

### 3.1 Establishing the BART User Account

The BART user account is an operating system user that will run the BART command line program. The BART user account must:

- own the BART backup catalog.
- be able to run the `bart` program and the `bart-scanner` program.
- be able to establish a SSH/SCP connection to and from each database server managed by BART.

You can optionally use the `enterprisedb` database user as the BART user account for an Advanced Server database and `postgres` database user as the BART user account for a PostgreSQL server. If you do not wish to use an existing database user as the BART user account, you must create an operating system user to assume the role.

`replp .. index`: configuration parameter reference

## 3.2 Configuring BART and Database Server

As stated earlier, to configure BART, you must *configure the BART host* as well as the *database server*. The following table acts as a configuration parameter reference listing the mandatory and optional parameters with default values for [SERVER] as well as [BART] sections.

- Parameters set in the [BART] section are applicable to all BART managed database servers.
- Parameters set in the `Server` section are applicable only to the specific server; the `Server` parameter setting overrides the [BART] section setting.

For information about configuring BART host parameters, see the *BART Host Parameter Reference* and for information about configuring the database server parameters, see the *Database Server Parameter Reference*.

<b>Parameter</b>	<b>Type</b>	<b>Default</b>	<b>[SERVER]</b>	<b>[BART]</b>
[BART]	Mandatory	N/A	N/A	Yes
<bart_host>	Mandatory	N/A	N/A	Yes
<backup_path>	Mandatory	N/A	N/A	Yes
<pg_basebackup_path>	Mandatory	N/A	N/A	Yes
retention_policy	Optional	<max_number>BACKUPS	Yes	Yes
wal_compression	Optional	Disabled	Yes	Yes
copy_wals_during_restore	Optional	Disabled	Yes	Yes
xlog_method	Optional	fetch	Yes	Yes
logfile	Optional	/tmp/bart.log	N/A	Yes
scanner_logfile	Optional	/tmp/bart_scanner. log	N/A	Yes
<bart_socket_directory>	Optional	/tmp	N/A	Yes
<bart_socket_name>	Optional	<MD5 checksum>	N/A	Yes
<thread_count>	Optional	1	Yes	Yes
<batch_size>	Optional	49152	Yes	Yes
<scan_interval>	Optional	0	Yes	Yes
<mbm_scan_timeout>	Optional	20 seconds	Yes	Yes
<workers>	Optional	1	Yes	Yes
[Server Name]	Mandatory	N/A	Yes	N/A
<backup_name>	Optional	N/A	Yes	N/A
host	Mandatory	N/A	Yes	N/A
port	Mandatory	5444 for EPAS; 5432 for Postgres	Yes	N/A
user	Mandatory	N/A	Yes	N/A
<archive_path>	Optional	BART backup catalog	Yes	N/A
<archive_command>	Optional	N/A	Yes	N/A
<cluster_owner>	Mandatory	enterprisedb for EPAS postgres for PostgreSQL	Yes	N/A
<remote_host>	Optional	N/A	Yes	N/A
<tablespace_path>	Optional	N/A	Yes	N/A
allow_incremental_backup	Optional	Disabled	Yes	N/A
description	Optional	N/A	Yes	N/A

### 3.2.1 Configuring the BART Host

To configure the BART host, perform the following steps on the BART host as a root user:

**Step 1.** Navigate to the `usr/edb/bart/etc` directory and make a copy of the `bart.cfg.sample` file to create the `bart.cfg` file that will contain the parameter settings.

**Step 2.** Confirm that the Postgres `pg_basebackup` utility program is installed on the BART host. The `pg_basebackup` utility resides in the `bin` directory under your Postgres installation.

**Step 3.** Ensure the `LD_LIBRARY_PATH` environment variable includes the location of the `libpq` library. If your `libpq` library does not reside in the default location (`POSTGRES_INSTALL_HOME/lib`), you must add the library path to the `LD_LIBRARY_PATH` environment variable in the BART user account's profile (`bash_profile`) located in `/home/<bart user account>`:

```
# .bash_profile
# Get the aliases and functions
if [ -f ~/.bashrc ]; then
. ~/.bashrc
fi
# User specific environment and startup programs
export LD_LIBRARY_PATH=/usr/edb/as11/lib:$LD_LIBRARY_PATH
```

**Step 4.** Create the BART backup catalog and ensure the BART user account holds privileges on the BART backup catalog. In the following example, the BART configuration file specifies `/opt/backup` as the parent directory for the BART backup catalog in the `<backup_path>` parameter:

```
[BART]

bart_host = bartuser@192.168.2.22
backup_path = /opt/backup
pg_basebackup_path = /usr/edb/as11/bin/pg_basebackup
logfile = /tmp/bart.log
scanner_logfile = /tmp/bart_scanner.log
```

In the following example, `bartuser` is the BART user account. The example creates and sets the ownership and permissions on the BART backup catalog:

```
su root
mkdir /opt/backup
chown bartuser /opt/backup
chgrp bartuser /opt/backup
chmod 700 /opt/backup
```

If the subdirectory does not exist, BART creates a subdirectory for each database server listed in the configuration file when you invoke the `bart` command line program.

**Step 5.** Use your choice of editor to open the BART configuration file (located in the `usr/edb/bart/etc` directory) and edit the configuration as required. You must add the mandatory parameters to the `[BART]` section. Default values may be used for optional parameters.

The following table describes the `[BART]` host parameters.

<b>Parameters/Placeholder</b>	<b>Type</b>	<b>Description</b>
<code>[BART}</code>	Mandatory	Identifies the global section of the configuration file. It must be named BART.
<code>bart_host</code>	Mandatory	Specify the bart user name and the IP address of the bart host on which the BART utility resides. You must specify it in the form of <code>&lt;bart_user&gt;@&lt;bart_host_address&gt;</code> .
<code>backup_path</code>	Mandatory	Specify the path to the file system parent directory where all BART backups are stored.
<code>pg_basebackup_path</code>	Mandatory	Specify the path to the <code>pg_basebackup</code> program that you installed on the BART host. For information about <code>pg_basebackup</code> version-specific restrictions, see the EDB Backup and Recovery User Guide available at the <a href="#">EDB website</a> .
<code>wal_compression</code>	Optional	<p>Set this parameter to <code>enabled</code> to compress the archived WAL files in <code>gzip</code> format in the BART backup catalog when the <code>MANAGE</code> subcommand is invoked. By default it is set to <code>disabled</code>.</p> <p>The <code>gzip</code> compression program must be in the BART user account's <code>PATH</code> and the WAL compression setting must not be enabled for those database servers where you need to take incremental backups.</p>

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Table 1 – continued from previous page

Parameters/Placeholder	Type	Description
copy_wals_during_restore	Optional	<p>Set this parameter to <code>enabled</code> to copy the archived WAL files from the BART backup catalog to the <code>restore_path/archived_wals</code> directory prior to the database server archive recovery. Enabling this option helps you save time during the restore operation.</p> <p>Set this parameter to <code>disabled</code> (default) to retrieve the archived WAL files directly from the BART backup catalog during the database server archive recovery.</p> <p>During the restore operation, recovery settings will be saved in the <code>postgresql.auto.conf</code> file. The <code>restore_command</code> in the <code>postgresql.auto.conf</code> file will be determined by the value specified in the <code>copy_wals_during_restore</code> parameter.</p> <p>If the <code>RESTORE</code> subcommand is invoked with the <code>-c</code> option, the archived WAL files are copied from the BART backup catalog to the <code>restore_path/archived_wals</code> directory, thus overriding any setting of the <code>copy_wals_during_restore</code> parameter. If the <code>RESTORE</code> subcommand is invoked without the <code>-c</code> option, the value specified by the <code>copy_wals_during_restore</code> parameter is used.</p>

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Table 1 – continued from previous page

<b>Parameters/Placeholder</b>	<b>Type</b>	<b>Description</b>
xlog_method	Optional	<p>Specify how the transaction log is collected during the execution of <code>pg_basebackup</code> through the <code>BACKUP</code> subcommand.</p> <p>Set <code>xlog_method</code> to <code>fetch</code> (default) to collect the transaction log files after the backup is completed.</p> <p>Set to <code>stream</code> to stream the transaction log in parallel with the full backup creation.</p>
retention_policy	Optional	<p>Set this parameter to determine when an active backup should be marked as <code>obsolete</code> when the <code>MANAGE</code> subcommand is used.</p> <p>You can specify the retention policy either in terms of number of backups or duration (days, weeks, or months). <code>&lt;max_number&gt; BACKUPS</code> (default), <code>&lt;max_number&gt; DAYS</code>, <code>&lt;max_number&gt; WEEKS</code>, or <code>&lt;max_number&gt; MONTHS</code> where <code>&lt;max_number&gt;</code> is a positive integer.</p> <p>For information about managing backups using a retention policy, see the EDB Backup and Recovery User Guide available at the <a href="#">EDB website</a>.</p>

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Table 1 – continued from previous page

<b>Parameters/Placeholder</b>	<b>Type</b>	<b>Description</b>
logfile	Optional	<p>Use this parameter to specify the path to the BART log file. The default log file location is <code>/tmp/bart.log</code>.</p> <p>The log file will be created the first time you invoke the <code>bart</code> command line program using the sample configuration file value. To change the default setting, you must delete the <code>bart.log</code> file from the <code>/tmp</code> directory and create a new log file in another directory so that a new log file will be created and owned by the new BART user account.</p> <p>If no path to a log file is specified, BART does not create a log file.</p>
scanner_logfile	Optional	<p>Use this parameter to specify the path to the XLOG/WAL scanner log file. The default location is <code>/tmp/bart_scanner.log</code>.</p> <p>The scanner log file will be created the first time you invoke the <code>bart_scanner</code> program using the sample configuration file value. To change the default setting, you must delete the <code>bart_scanner.log</code> file from the <code>/tmp</code> directory and create a new log file in another directory so that a new log file will be created and owned by the new BART user account.</p> <p>If no path to a log file is specified, BART does not create a WAL scanner log file.</p>
<bart_socket_directory>	Optional	<p>Specify the socket directory path where all BART sockets will be stored. The default directory is <code>/tmp</code>. While specifying the <code>bart_socket_directory</code> path, you must ensure that the directory exists and the BART user has the required access permissions to the directory.</p>

continues on next page



Table 1 – continued from previous page

<b>Parameters/Placeholder</b>	<b>Type</b>	<b>Description</b>
<bart_socket_name>	Optional	Specify a user-friendly BART socket file name. Using this option overrides the default BART socket name generated using MD5 checksum. You must shut down the bart-scanner before setting this option. You can view the <bart_socket_name> in the sockPath field after starting the bart-scanner in the debug mode. This option helps in preventing the use of MD5 during the bart-scanner startup, thus making BART more compliant in FIPS mode.
<thread_count>	Optional	Specify the number of worker threads for copying blocks (for incremental backups) or data files (for full backup) from the database server to the archive_path when the BACKUP subcommand is invoked. The default value is 1.  The same set of worker threads are used for the compression operation when taking full backups in order to provide parallel, compressed backups when the BACKUP subcommand is specified with the -z or -c options. The compression operation does not apply to incremental backups. See <i>thread count</i> for more information.
<batch_size>	Optional	Specify the number of blocks of memory used for copying modified blocks from the database server to the archive_path when the BACKUP subcommand is invoked for incremental backups.  The default value is 49152 blocks; each block is 8192 bytes. The maximum permitted value is 131072 blocks and the minimum permitted value is 1 block. Reduce the <batch_size> setting if the server runs out of memory while executing the pg_read_binary_file().

continues on next page

Table 1 – continued from previous page

<b>Parameters/Placeholder</b>	<b>Type</b>	<b>Description</b>
<scan_interval>	Optional	<p>Specify the number of seconds after which the WAL scanner should initiate force scanning of the new WAL files. The default value is 0, which means no brute-force scanning will be started.</p> <p>After upgrading to the latest version of BART, users who have set this parameter to a non-default value may see increased CPU consumption on the part of bart-scanner. If this is an issue, consider increasing the configured value of <code>scan_interval</code> parameter, or removing the setting if it is not required.</p>
<mbm_scan_timeout>	Optional	<p>Specify the number of seconds to wait for MBM files before timing out; this parameter is applicable only for incremental backup. You must set the <code>scan_interval</code> to a value significantly less than the MBM scan timeout.</p> <p>The default value is 20 seconds. The <code>mbm_scan_timeout</code> parameter value must be greater than 0. If the value is 0 or negative, then an error will be displayed during an incremental backup.</p>
<workers>	Optional	<p>Specify the number of parallel worker processes required to stream the modified blocks of an incremental backup to the restore host. The default value is 1.</p>

### Thread Count

If the `BACKUP` subcommand is invoked with the `--thread-count` option, then the number of worker threads specified by this option overrides any setting of the `thread_count` parameter in the BART configuration file. If the `BACKUP` subcommand is invoked without the `--thread-count` option, then the following determines the number of worker threads used:

- The setting of the `thread_count` parameter in the server section of the BART configuration file overrides the setting of `thread_count` in the global section for that particular database server.

- If omitted in the server section, the setting of `thread_count` in the global section is used.
- If the `thread_count` parameter is not specified in either section, the default is 1.
- When taking a full backup, if the `thread_count` in effect is only 1, then the `pg_basebackup` utility is used to take the full backup unless the `--no-pg_basebackup` option is specified with the `BACKUP` subcommand.

`<thread_count>` will not be effective if the backup is taken on a standby server.

If parallel backup is run with `N` number of worker threads, then it will initiate `N + 1` concurrent connections with the server.

**Step 6** Invoke the `CHECK-CONFIG` subcommand, omitting the `-s` option to check the parameter settings in the BART configuration file. It should return the current BART version.

```
bart CHECK-CONFIG
```

The `CHECK-CONFIG` subcommand displays an error message if the required configuration is not properly set. You need to check the logfile to fix this.

## 3.2.2 Configuring the Database Server

To configure the database server, you must:

1. Authorize SSH/SCP access without a password prompt.
2. *Create and configure a replication database user.*
3. *Adding the database server to the configuration file (server section).*
4. *Enable WAL archiving of the server.*
5. *Verify the server configuration settings.*

The following section will walk you through the configuration process.

---

**Note:** You must authorize SSH/SCP access and set up a replication database user before restarting the database server with WAL archiving enabled.

---

### Authorizing SSH/SCP Access

BART uses the Secure Shell (`ssh`) and Secure Copy (`scp`) Linux utility programs to copy the backup and WAL files from the BART managed database servers to the BART host as well as to restore backups.

- The client/server `ssh` and `scp` commands must not prompt for a password when establishing a connection with the target server (the server to which a passwordless connection is being made).
- A passwordless connection uses *authorized public keys* (public key of a client user account) to authenticate with the target server.
- You must add the public key of each client user account to the target user account's authorized public keys list on the target server.

For BART usage, there are two scenarios that require a passwordless SSH/SCP connection:

- When connecting from each BART managed database server (SSH/SCP client) to the BART host (target SSH/SCP server) to support WAL archiving as implemented by the `archive_command` parameter.
  - In this case, the database server user account should generate the public key file (`id_rsa.pub`) with the `ssh-keygen -t rsa` command on the database server host.
  - The public key file name should be appended to the `~/.ssh/authorized_keys` file on the BART host. The `authorized_keys` file is in the BART user account's home directory.
- When connecting from the BART host (SSH/SCP client) to each BART managed database server (target SSH/SCP server) for taking incremental backups and for supporting restoration

of the full backup, the archived WAL files, and the modified blocks, which occurs when the BART `RESTORE` subcommand is given.

- In this case, the BART user account should generate the public key file (`id_rsa.pub`) with the `ssh-keygen -t rsa` command on the BART host.
- The public key file name should be appended to the `~/.ssh/authorized_keys` file on the database server host. The `authorized_keys` file is in the home directory of the user account that owns the directory where the database backup is to be restored.
- If backups are to be taken from a given database server host, but restored to a different database server host, the passwordless SSH/SCP connections must be configured from the BART host to the database server host from which the backup is to be taken as well as from the BART host to the database server host to which the backup is to be restored.

See the EDB Backup and Recovery Reference Guide available at the [EDB website](#) to view examples of creating a passwordless connection.

### Enabling Public Key Authentication

The following example enables SSH/SCP access on a CentOS 6.x host; similar (platform-specific) steps will apply to other platforms/versions.

1. In the SSH server daemon configuration file (`sshd_config`) located in the `/etc/ssh`, set the `PubkeyAuthentication` parameter to `yes`.
2. Reload the configuration file:

```
service sshd reload
```

If you get any SSH or SCP errors, examine the `/var/log/secure` log file.

### Creating a Passwordless Connection

The following general instructions will walk you through generating a client's public key file, creating the target server's authorized public keys file, and creating a passwordless connection.

**Step 1.** On the client system, log in as the user account that will be initiating the SSH or SCP connection.

**Step 2.** Navigate to the user account's home directory and check for an existing `.ssh` subdirectory. If the `.ssh` directory does not exist, create one and assign the required privileges to the user.

**Step 3.** Generate the public key file with the following command. Accept all prompted defaults and do not specify a passphrase when prompted for one.

```
ssh-keygen -t rsa
```

The public key file named `id_rsa.pub` is created in the `.ssh` subdirectory.

**Step 4.** While logged into the client where you just generated the public key file, use SCP to make a temporary copy of it on the target server:

```
scp ~/.ssh/id_rsa.pub <target_user>@<host_address>:tmp.pub
```

**Step 5.** Navigate into the target user account's home directory and check for an existing `.ssh` subdirectory. If it does not exist, create one and assign the required privileges to the user.

**Step 6.** Append the temporary, client's public key file, `tmp.pub`, to the `authorized_keys` file. If an `authorized_keys` file does not exist, create a new file, but do not completely replace any existing `authorized_keys` file.

```
cat tmp.pub >> ~/.ssh/authorized_keys
```

Make sure the `authorized_keys` file is only accessible by the file owner and not by groups or other users. If the `authorized_keys` file does not have the required permission setting or it was newly created, change the file permissions as follows:

```
chmod 600 ~/.ssh/authorized_keys
```

**Step 7.** Delete the temporary public key file:

```
rm tmp.pub
```

Now, when logged into the client system as `user` there should be no prompt for a password when commands such as the following is given:

```
ssh target_user@host_address
```

### Setting up a Replication Database User

For each database server that is to be managed by BART, a database user must be chosen to serve as the *replication database user*. The replication database user sets the `archive_command` configuration parameter when the `INIT` subcommand is invoked and creates backups when the `BACKUP` subcommand is invoked. The replication database user must be a superuser.

When executed with the `PSQL` client, the following PostgreSQL command creates a superuser to be the replication database user:

```
CREATE ROLE repuser WITH LOGIN SUPERUSER PASSWORD
'password';
```

The `pg_hba.conf` file must minimally permit the replication database user to have access to the database.

In the following example, the `pg_hba.conf` file permits the `repuser` (replication database user) to have access to the `template1` database. The IP address from which `repuser` has access to `template1` database is the location of the BART host:

**For `pg_basebackup` only:** If `pg_basebackup` is to be used for taking any backups (such as for standby servers), the replication database user must also be included in the `pg_hba.conf` file as a replication database connection as shown by the last entry in the following example.

```
# TYPE DATABASE USER ADDRESS METHOD
# "local" is for Unix domain socket connections only
local all all md5
# IPv4 local connections:
host template1 repuser 192.168.2.22/32 md5
host all enterprisedb 127.0.0.1/32 md5
# IPv6 local connections:
host all all ::1/128 md5
# Allow replication connections from localhost, by a user with the
# replication privilege.
host replication repuser 192.168.2.22/32 md5
```

The replication database user must be specified for the `user` parameter in the BART configuration file for the database server as shown in the following example:

```
[ACCTG]
host = 192.168.2.24
port = 5444
user = repuser
cluster_owner = enterprisedb
remote_host = enterprisedb@192.168.2.24
description = "Accounting"
```

There must be no password prompt when connecting to the database server with the replication

database user. There are several ways to permit this; one recommended method is to use a `.pgpass` file located in the BART user account's home directory.

For example, if `bartuser` is the BART user account, then the `.pgpass` file located in the `/home/bartuser` directory must contain the following entry:

```
192.168.2.24:5444::repuser:password
```

When `bartuser` invokes a BART backup, the password for the replication database user, `repuser`, is obtained from the `.pgpass` file of `bartuser` to connect to the database server running at `192.168.2.24` on port `5444`.

The `.pgpass` file must contain an entry for each BART managed database server and its corresponding replication database user and password.



### Adding a Database Server to the BART Configuration File

To manage the backup and recovery of a database server, you must add entries to the [SERVER] section of the BART configuration file, which is located in <BART\_HOME>/etc directory.

#### *Database Server Parameter Reference*

Set the following parameters in the [SERVER] section of the BART configuration file. The parameter setting in the [SERVER] section overrides the setting in the global [BART] section for that particular database server. If omitted, the default value will be used.

For each cluster serviced by BART, the following parameters are mandatory:

```
[HR]

host = 192.168.2.24
port = 5432
user = postgres
cluster_owner = postgres
```

**Note:** The port parameter setting is required only if the database server listens on a port other than the default (for example if Postgres listens on a port other than 5432).

The following table describes the database server parameters.

Parameters/Placeholder	Type	Description
[ServerName]	Mandatory	Specify the server name that you want to backup using BART. It is not case-sensitive when referenced with BART subcommand options.  A lowercase conversion of this name is used to create a subdirectory in the BART backup catalog for storing the backups and WAL files for this database server (for eg., epas12).

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Table 2 – continued from previous page

Parameters/Placeholder	Type	Description
<backup_name>	Optional	Specify a <i>template</i> for user-defined, friendly names that will be assigned to the backups of the database server. The maximum permitted length of backup name is 49 characters. The <backup_name> parameter can be overridden by the --backup-name option of the BACKUP subcommand. If this parameter is omitted from the BART configuration file, and the --backup-name option with a user-defined name is not specified with the BACKUP subcommand, then the backup can only be referenced in BART subcommands by the BART assigned, integer backup identifier.
host	Mandatory	Specify the IP address of the database server to be configured for backup.
port	Mandatory	Specify the port number identifying the database server instance (that is, the relevant database cluster) to be backed up. The default port number for EPAS is 5444 and for Postgres it is 5432. The port parameter setting is only required if the database server listens on a port other than the default value.
User	Mandatory	Specify the replication database user name used by BART to establish the connection to the database server for full backups. See <i>Setting up a Replication Database User</i> for more information.

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Table 2 – continued from previous page

Parameters/Placeholder	Type	Description
<archive_path>	Optional	<p>Specify the path where archived WAL files will be stored.</p> <p>The default location is the BART backup catalog (&lt;backup_path&gt;/&lt;server_name&gt;/archived_wals).</p>
<archive_command>	Optional	<p>When the INIT subcommand is used, the content and variables specified in the BART &lt;archive_command&gt; result in the archive command string to be generated into the Postgres archive_command parameter in the postgresql.auto.conf file.</p> <p>To configure the BART &lt;archive_command&gt; parameter, enclose the command string within single quotes (').</p> <p>If you do not specify the &lt;archive_command&gt; parameter in the configuration file, the default setting is taken as 'scp %p %h:%a/%f'. See <i>Archive Command Auto Configuration</i> for information about variables.</p> <p>The BART &lt;archive_command&gt; parameter in the BART configuration file, and the Postgres &lt;archive_command&gt; parameter in the postgresql.conf file (or the postgresql.auto.conf file) refer to two different parameters that are to be set in different manner.</p>

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Table 2 – continued from previous page

Parameters/Placeholder	Type	Description
<cluster_owner>	Mandatory	Specify the Linux operating system user account that owns the database cluster. This is typically <code>enterprisedb</code> for Advanced Server database clusters installed in the Oracle compatible mode, or <code>postgres</code> for Advanced Server database clusters installed in the PostgreSQL compatible mode and PostgreSQL database clusters.
<remote_host>	Optional	Specify the IP address of the remote server to which a backup is to be restored. Specify this parameter in the form of <code>&lt;remote_user&gt;@&lt;remote_host_address&gt;</code> . <code>&lt;remote_user&gt;</code> is the user account on the target database server host that accepts a passwordless SSH/SCP login connection and owns the directory where the backup is to be restored. <code>&lt;remote_host_address&gt;</code> is the IP address of the remote host. For restoring a backup to a remote host or for restoring any backup where <code>&lt;remote_user&gt;</code> and the BART user account are not the same users, either this parameter must be set or it may be specified with the <code>-r</code> option with the BART RESTORE subcommand.
<tablespace_path>	Optional	Specify path to which tablespaces are to be restored in the format <code>OID = &lt;tablespace_path&gt;</code> ; If the backup is to be restored to a remote host specified by the <code>&lt;remote_host&gt;</code> parameter, then the tablespace paths must exist on the remote host.

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Table 2 – continued from previous page

Parameters/Placeholder	Type	Description
allow_incremental_backup	Optional	<p>Set this parameter to <code>enabled</code> to enable use of the WAL scanner and permit taking incremental backups when the <code>BACKUP</code> subcommand is invoked with the <code>--parent</code> option.</p> <p>Set it to <code>disabled</code> (default) to disallow incremental backups and thus permit only full backups.</p> <p>For information about using the <code>BACKUP</code> subcommand and running the WAL scanner, please see the EDB Backup and Recovery User Guide available at the <a href="#">EDB website</a>.</p>
Description	Optional	Specify the description that will be used to identify the database server.

For information regarding the following parameters, see *configuring the BART host*.

- `retention_policy`
- `xlog_method`
- `wal_compression`
- `copy_wals_during_restore`.
- `thread_count`.
- `batch_size`.
- `scan_interval`.
- `mbm_scan_timeout`.
- `workers`

### Backup Name Template

- The template is an alphanumeric string that may include the following variables that will be replaced with the timestamp values when the backup is taken:
  - `%year` to be replaced by 4-digit year
  - `%month` to be replaced by 2-digit month
  - `%day` to be replaced by 2-digit day
  - `%hour` to be replaced by 2-digit hour

- %minute to be replaced by 2-digit minute
- %second to be replaced by 2-digit second
- To include a percent sign (%) as a character in the backup name, specify %% in the template.
- Do not enclose the template string in quotes even if you want the template to include space characters, otherwise the enclosing quotes are stored as part of the backup name. However, when referenced with the -i option by BART subcommands use of space characters in the backup name requires enclosing the backup name in quotes.

The following example shows the configuration settings of three database servers:

```
[ACCTG]

host = 127.0.0.1
port = 5444
user = enterprisedb
cluster_owner = enterprisedb
backup_name = acctg_%year-%month-%dayT%hour:%minute:%second
archive_command = 'cp %p %a/%f'
allow_incremental_backups = enabled
retention_policy = 8 BACKUPS
description = "Accounting"

[MKTG]

host = 192.168.2.24
port = 5444
user = repuser
cluster_owner = enterprisedb
remote_host = enterprisedb@192.168.2.24
allow_incremental_backups = enabled
description = "Marketing"

[HR]

host = 127.0.0.1
port = 5432
user = postgres
cluster_owner = postgres
retention_policy = 4 DAYS
description = "Human Resources"
```

### Enabling WAL Archiving

WAL archiving must be enabled for the database server for which BART is to perform backup and recovery management.

- The WAL Archiving Configuration section describes the manual WAL archiving configuration process.
- The Archive Command Auto Configuration section describes an automated WAL archiving process.

#### *WAL Archiving Configuration*

Set the following configuration parameters in the `postgresql.conf` file to enable WAL archiving

- Set `wal_level` to `replica` or higher.
- Set `archive_mode` to `on`.
- Set the PostgreSQL `archive_command` parameter to copy the WAL files to the `archive_path`. The `archive_command` configuration parameter mentioned here is located in the `postgresql.conf` file; the PostgreSQL `archive_command` parameter is used in a different manner than the BART *archive\_command*.
- Set `max_wal_senders` to a value high enough to leave at least one session available for the backup. If the `xlog_method=stream` parameter setting is to be used by this database server, the `max_wal_senders` setting must account for an additional session for the transaction log streaming (the setting must be a minimum of 2). See *Configuring the BART host* for information about the `xlog_method` parameter.

For detailed information about WAL archiving, see the [PostgreSQL Core Documentation](#).

The `ARCHIVE PATH` field displayed by the `BART SHOW-SERVERS` subcommand displays the full directory path where the WAL files should be copied as specified in the `archive_command` configuration parameter in the `postgresql.conf` file:

```
-bash-4.1$ bart SHOW-SERVERS -s acctg
SERVER NAME : acctg
HOST NAME   : 192.168.2.24
USER NAME   : repuser
PORT       : 5444
REMOTE HOST :
RETENTION POLICY : none
DISK UTILIZATION : 0.00 bytes
NUMBER OF ARCHIVES : 0
ARCHIVE PATH  : /opt/backup/acctg/archived_wals
ARCHIVE COMMAND : (disabled)
XLOG METHOD   : fetch
WAL COMPRESSION : disabled
```

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```
TABLESPACE PATH(s) :
INCREMENTAL BACKUP : DISABLED
DESCRIPTION : "Accounting"
```

The parameter settings in the following example will copy the WAL files to a directory named `/opt/backup/acctg/archived_wals` on the BART host located at `192.168.2.22` as the `bartuser` user account. Using the `bartuser` account ensures that the operation will have sufficient permissions to copy to the BART backup catalog owned by `bartuser`.

```
archive_mode = on                # allows archiving to be done
                                  # (change requires restart)
archive_command = 'scp %p bartuser@192.168.2.22:/opt/backup/acctg/
↳archived_wals/%f'
                                  # command to use to archive a
↳logfile segment
                                  # placeholders: %p = path of
↳file to archive
                                  # %f = file name only
...
max_wal_senders = 1              # max number of walsender
↳processes
                                  # (change requires restart)
```

The database server must be restarted in order to initiate WAL archiving, but do not do so until you have verified that the full path of the BART backup catalog has been created by a prior BART subcommand or the archive operation will fail.

Start the WAL scanner by executing the following command:

```
./bart-scanner
```

### *Archive Command Auto Configuration*

To enable WAL archiving:

- In the `postgresql.conf` file, set the `wal_level` to `replica` or higher, `archive_mode` to `on`, and `max_wal_senders` to a value high enough to leave at least one session available for the backup. If the `xlog_method=stream` parameter setting is to be used by this database server as determined in the BART configuration file, the `max_wal_senders` setting must account for an additional session for the transaction log streaming (that is, the setting must be a minimum of 2). See *Configuring the BART host* for information on the `xlog_method` parameter.
- Configure the Postgres `archive_command` parameter automatically with the `INIT` subcommand and restart the database server when you are ready to initiate WAL archiving. The `INIT` subcommand invokes the Postgres `ALTER SYSTEM` command to set



the Postgres `archive_command` configuration parameter in the `postgresql.auto.conf` file located in the managed database server's `POSTGRES_INSTALL_HOME` data directory. For additional information about the `INIT` subcommand, see the EDB Backup and Recovery User Guide available at the [EDB website](#).

The archive command string that the `INIT` subcommand generates into the `postgresql.auto.conf` file is determined by the parameter setting of the BART `archive_command` parameter in the server section of the BART configuration file. If the BART `archive_command` parameter is not set in the server section for a given database server, the command string that is configured uses the following default format:

```
'scp %p %h:%a/%f'
```

The following table describes these variables:

Variable	Description
<code>%p</code>	The path of the file to archive used by the Postgres archiving process.
<code>%h</code>	Will be replaced by the <code>&lt;bart_user&gt;@&lt;bart_host_address&gt;</code> as specified in the <code>&lt;bart_host&gt;</code> parameter setting.
<code>%a</code>	Will be replaced by the BART <code>archived_wals</code> directory as specified in the <i>archive path</i> parameter setting. If the <code>&lt;archive_path&gt;</code> is not specified, then the default directory is <code>&lt;backup_path&gt;/&lt;server_name&gt;/archived_wals</code> . <code>&lt;server_name&gt;</code> is the lowercase conversion of the database server name.
<code>%f</code>	The archived file name used by the Postgres archiving process.

The placeholders `%h` and `%a` are replaced by the `INIT` subcommand when creating the archive command string. The placeholders `%p` and `%f` are not replaced by the `INIT` subcommand, but are kept as given to be used by the Postgres archiving process.

For example, to use the default archive command format, the BART configuration file contains the following settings where the BART `archive_command` parameter is omitted from the server section for `ACCTG`:

```
[BART]

bart_host= bartuser@192.168.2.22
backup_path = /opt/backup
pg_basebackup_path = /usr/edb/as11/bin/pg_basebackup
logfile = /tmp/bart.log
scanner_logfile = /tmp/bart_scanner.log

[ACCTG]
```

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```
host = 127.0.0.1
port = 5444
user = repuser
cluster_owner = enterprisedb
description = "Accounting"
```

The INIT subcommand is invoked by BART user account `bartuser` as follows:

```
[bartuser@localhost ~]$ bart INIT -s acctg -o
INFO: setting archive_command for server 'acctg'
WARNING: archive_command is set. server restart is required
```

If the BART backup catalog directory is not already complete, it will be completed.

The resulting archive command string in the `postgresql.auto.conf` file located in the managed database server's `POSTGRES_INSTALL_HOME/data` directory appears as follows:

```
# Do not edit this file manually!
# It will be overwritten by ALTER SYSTEM command.
archive_command = 'scp %p
bartuser@192.168.2.22:/opt/backup/acctg/archived_wals/%f'
```

Run the INIT subcommand with the `-o` option to override any existing `archive_command` setting in the `postgresql.conf` or the `postgresql.auto.conf` file. In addition, the `-o` option must be used to generate the command string if the `archive_mode` is set to `off` even if there are no existing settings of the `archive_command` in the `postgresql.conf` or `postgresql.auto.conf` files.

In this example, the following BART configuration file is used with an explicit setting of the BART `archive_command` parameter:

```
[BART]

bart_host= enterprisedb@192.168.2.22
backup_path = /opt/backup
pg_basebackup_path = /usr/edb/as11/bin/pg_basebackup
logfile = /tmp/bart.log
scanner_logfile = /tmp/bart_scanner.log

[ACCTG]

host = 127.0.0.1
port = 5444
user = repuser
cluster_owner = enterprisedb
```

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```
archive_command = 'cp %p %a/%f'  
description = "Accounting"
```

The INIT subcommand is invoked by BART user account `enterprisedb` as follows:

```
-bash-4.1$ bart INIT -s acctg -o  
INFO: setting archive_command for server 'acctg'  
WARNING: archive_command is set. server restart is required
```

The resulting Postgres `archive_command` parameter in the `postgresql.auto.conf` file appears as follows:

```
# Do not edit this file manually!  
# It will be overwritten by ALTER SYSTEM command.  
archive_command = 'cp %p /opt/backup/acctg/archived_wals/%f'
```

When the database server has been restarted, the `ARCHIVE COMMAND` field of the `SHOW-SERVERS` subcommand displays the active Postgres archive command as shown by the following example:

```
-bash-4.1$ bart SHOW-SERVERS -s acctg  
SERVER NAME : acctg  
HOST NAME : 127.0.0.1  
USER NAME : repuser  
PORT : 5444  
REMOTE HOST :  
RETENTION POLICY : none  
DISK UTILIZATION : 48.00 MB  
NUMBER OF ARCHIVES : 0  
ARCHIVE PATH : /opt/backup/acctg/archived_wals  
ARCHIVE SCOMMAND : `cp %p /opt/backup/acctg/archived_wals/%f`  
XLOG METHOD : fetch  
WAL COMPRESSION : disabled  
TABLESPACE PATH(s) :  
INCREMENTAL BACKUP : DISABLED  
DESCRIPTION : "Accounting"
```

## Verifying Configuration Settings

To verify the parameter settings of the database server specified, execute the `CHECK-CONFIG` subcommand with the `-s` option:

```
bart CHECK-CONFIG [ -s server_name ]
```

The `CHECK-CONFIG` subcommand confirms the following:

- The `cluster_owner` parameter is set to the user account owning the database cluster directory.
- A passwordless SSH/SCP connection is set between the BART user and the user account specified by the `cluster_owner` parameter.
- The BART user parameter specifies a database superuser.
- The BART user has access to the backup directory catalog.
- The `pg_hba.conf` file contains a replication entry for the database superuser specified by the BART user parameter.
- The `archive_mode` parameter in the `postgresql.conf` file is enabled.
- The `archive_command` parameter in the `postgresql.auto.conf` or the `postgresql.conf` file is set.
- The `allow_incremental_backups` parameter in the BART configuration file is enabled for database servers for which incremental backups are to be taken.
- Archiving of WAL files to the `archive_path` is in process.
- The WAL scanner program is running.

After configuring the BART host and the database server(s), you can start using BART. For information about using BART, see the EDB Backup and Recovery User Guide available at the [EDB website](#).

---

## Upgrading BART

---

This section outlines the process of upgrading BART from an existing version to the latest version.

- *Upgrading from BART 2.0* describes the upgrade process from BART 2.0 to the latest version.
- *Upgrading from Older Versions of BART (except 2.0)* describes the upgrade process from previous BART versions (except 2.0) to the latest version.

### **Upgrade Restrictions**

The following restrictions apply with regard to previous BART versions.

- You can take incremental backups using the latest version only when the parent backup (full or incremental backup) has also been taken with the latest version.
- Using the latest version, you can restore incremental backups that are taken only with the latest version of BART. However, using the latest version you can restore full backups that were taken with older versions.

## 4.1 Upgrading from Older Versions of BART (except 2.0)

Perform the following steps to upgrade from older versions of BART (except 2.0) to the latest version:

**Step 1:** Assume the identity of the BART user account and invoke the following command to stop the BART WAL scanner program (`bart-scanner`):

```
bart-scanner STOP
```

**Step 2:** As the `root` user, upgrade to the latest BART version with the `yum upgrade` command.

- To upgrade the BART RPM package directly from the *EDB Yum Repository* website, specify only the package name:

On CentOS 6 and 7:

```
yum upgrade edb-bart
```

You can also use a downloaded RPM package file to upgrade. To use a downloaded BART RPM package file to upgrade, use the `yum` command, specifying the complete RPM package file name:

```
yum upgrade edb-bart-2.6.1 rhel7.x86_64.rpm
```

**Step 3:** Repeat the process described in this section to upgrade to the latest BART version on each remote hosts where an incremental backup will be restored.

For additional information about restoration of incremental backups on remote hosts, see the EDB Backup and Recovery User Guide available at the [EDB website](#).

**Step 4:** If the `bart --version` command returns an error stating the `PATH` is not available after switching from `root` user to another BART user account, adjust the setting of the `PATH` environment variable to include the location of the BART 2.6.1 executable (the `bin` subdirectory) in the `~/.bashrc` or `~/.bash_profile` files of the following user accounts:

- The BART user account on the BART host.
- The remote user account on the remote host to which incremental backups are to be restored. For details, see the EDB Backup and Recovery User Guide available at the [EDB website](#).

The `PATH` setting should be the same as set for BART 2.6.1 since all versions use `/usr/edb/bart/bin`.

---

**Note:** After upgrading to the latest BART version, you must take a new full backup of your system before performing an incremental backup.

---

## 4.2 Upgrading from BART 2.0

Perform the following steps to upgrade BART 2.0 to the latest version of BART:

**Step 1:** Install the latest version of BART. For information about how to install, see [installing BART](#).

**Step 2:** Save a copy of your BART 2.0 configuration file. The default location of the BART 2.0 configuration file is `/usr/edb/bart2.0/etc/bart.cfg`.

**Step 3:** Invoke the following command to remove BART 2.0:

On CentOS 6 and 7:

```
yum remove edb-bart20
```

**Step 4:** Place the BART 2.0 configuration file (`bart.cfg`) that you saved in Step 2 in the newly created `/usr/edb/bart/etc` directory. You can use many of the same configuration parameters for BART 2.6.1, but note that you must use a new directory for the BART backup catalog. A new set of full backups and incremental backups taken using BART 2.6.1 must be stored in a new BART backup catalog.

To specify an alternative configuration file name or location, use the `-c` option with BART subcommands. For more information about the `-c` option, see the EDB Backup and Recovery User Guide available at the [EDB website](#).

---

**Note:** The `bart.cfg` configuration file is only required on the BART 2.6.1 host from which you will invoke BART subcommands. BART does not require the `bart.cfg` file on hosts on which an incremental backup will be restored.

---

**Step 5:** Adjust the setting of the `PATH` environment variable to include the location of the BART 2.6.1 executable (the `bin` subdirectory) in the `~/.bashrc` or `~/.bash_profile` files for the following user accounts:

- The BART user account on the BART host.
- The user account on the remote host to which incremental backups will be restored. For details, see the EDB Backup and Recovery User Guide available at the [EDB website](#).

**Step 6:** Perform the BART 2.6.1 installation and BART 2.0 removal process on each remote host on which an incremental backup was restored using BART 2.0.

---

**Note:** After upgrading to the latest BART version, you must take a new full backup of your system before performing an incremental backup.

---

---

## Uninstalling BART

---

This section walks you through uninstalling BART.

### 5.1 Uninstalling BART on a RHEL/CentOS Host

To uninstall BART on a RHEL/CentOS host, assume the identity of the `root` user and invoke the following command:

On RHEL/CentOS 6 and 7:

```
yum remove edb-bart
```

On RHEL/CentOS 8:

```
dnf remove edb-bart
```

Uninstalling BART does not delete the backup files and archived WAL files that reside in the BART backup catalog. To permanently delete the backup files and archived WAL files in the BART backup catalog (`/opt/backup`), use one of the following commands:

- `rm -rf /opt/backup`
- `BART DELETE` subcommand

For information about the `BART DELETE` subcommand, see the *EDB Backup and Recovery User Guide* available at the [EDB website](#).



## 5.2 Uninstalling BART on an SLES 12 Host

To uninstall BART on an SLES 12 host, assume the identity of the `root` user and invoke the following command:

```
zypper remove edb-bart
```

## 5.3 Uninstalling BART on a Debian/Ubuntu Host

To uninstall BART on a Debian or Ubuntu host, invoke the following command:

```
apt-get remove edb-bart
```

# CHAPTER 6

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## Conclusion

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EDB Backup and Recovery Installation and Upgrade Guide

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## A

Archive\_Command\_auto\_configuration, 37

## B

BART host components, 1

## C

Conclusion, 47

Configuring BART, 14

Configuring the BART Host, 17

Configuring the Database Server, 25

## E

EDB Postgres Backup and Recovery Installation Guide, 1

Establishing the BART User Account, 14

## I

Installing BART, 3

Installing BART on a CentOS Host, 3

Installing BART on a Debian or Ubuntu Host, 12

Installing BART on a RHEL Host, 7

Installing BART on a RHEL/CentOS 7 PPCLE Host, 10

Installing BART on an SLES 12 Host, 13

Introduction, 1

## L

Limitation, 2

## P

Prerequisites, 1

## R

Requirements Overview, 1

## S

Software Requirements, 1

Supported Platforms and Database Versions, 1

## U

Uninstalling BART, 45

Uninstalling BART on a Debian/Ubuntu Host, 46

Uninstalling BART on a RHEL/CentOS Host, 45

Uninstalling BART on an SLES 12 Host, 46

Upgrading BART, 42

Upgrading from BART 2.0, 44

Upgrading from Older Versions of BART (*except 2.0*), 43