



Postgres Enterprise Manager

Release 7.13

PEM BART Management Guide

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This guide will acquaint you with the dialogs that are built into the Postgres Enterprise Manager™ (PEM) web interface that make it easier for you to monitor and manage BART.

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

CHAPTER 1

Managing a BART Server

Postgres Enterprise Manager (PEM) is designed to assist database administrators, system architects, and performance analysts when administering, monitoring, and tuning PostgreSQL and Advanced Server database servers.

The EDB Backup and Recovery Tool (BART) is an administrative utility providing simplified backup and recovery management for multiple local or remote EDB Postgres Advanced Server and PostgreSQL database servers. For more information about BART, please visit the EnterpriseDB website at:

<https://www.enterprisedb.com/enterprise-postgres/edb-postgres-backup-and-recovery-tool>

From PEM version 7.10 onwards, you can manage a BART server through PEM console. PEM provides a user-friendly interface that allows you to manage your BART server and perform all the BART operations from PEM console.

1.1 Prerequisites

- Before adding a BART server to the PEM console, you must manually install and configure BART on the BART host. For more information about installing and configuring BART, please see the *BART Installation Guide* available at:

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

- Before associating a database server with a BART server, you must install SSH on the database server and the BART server.
- Before restoring a BART backup, you must install BART, PEM agent, and SSH on the target server. SSH must also be installed on the BART server that you plan to use for restore.
- To take a backup of the standby database servers, you must ensure that the latest *pg_basebackup* utility is installed on the database server that you want to manage through BART.

1.2 Configuring a BART Server

You can use the `Create-BART` server dialog to register an existing BART server with the PEM server. To access the dialog, right-click on the `BART Servers` node and select `Create-BART Server`.

Create - BART server

General Misc

Agent name

Server name

Host

IP address of the BART host

User

Username for the BART host

Installation path

Path to BART installation directory

Backup path

Path where all the backups will be stored

pg_basebackup path

Path to pg_basebackup binary, eg: /usr/edb/as11/bin/pg_basebackup

Xlog/WAL method?

Retention policy

Log file

Path to the BART log file

Fig. 1: The `Create-BART` server dialog - General tab

Use the fields on the `General` tab to describe the general properties of the BART Server:

- Use the `Agent Name` field to select the agent that you want to configure as a BART server. Only those PEM agents that are supported for BART are listed in the drop-down list.
- Use the `Server Name` field to specify a user-friendly name for the server. The name specified will identify the server in the Browser tree.
- Use the `Host` field to specify the IP address of the host or agent where BART is installed.
- Use the `User` field to specify the user name that will be used for performing all the BART operations. You can either use the `enterprisedb` (for Advanced Server) or `postgres` (for PostgreSQL) database user account or you can create a new BART user account. This user must be an operating system user who owns the BART backup catalog directory.
- Use the `Installation path` field to specify the directory path where BART is installed on the host or BART server.
- Use the `Backup path` field to specify the file system parent directory where all BART backups and archived WAL files will be stored.
- Use the `pg_basebackup_path` field to specify the path to the `pg_basebackup` utility.
- Use the `Xlog/WAL method` field to specify how the transaction log should be collected during the execution of `pg_basebackup`. The default option is `fetch`; it specifies that the transaction log files will be collected after the backup has completed. Set the `Xlog` method to `stream` to stream the transaction log in parallel with the full base backup creation. If streaming is used, the `max_wal_senders` configuration parameter in the `postgresql.conf` file for affected database servers must account for an additional session for the streaming of the transaction log (the setting must be a minimum of 2).

For more information about Xlog method, see:

<https://www.postgresql.org/docs/current/app-pgbasebackup.html>

- Use the `Retention policy` field to specify the retention policy for the backup. This determines when an active backup should be marked as obsolete, and hence, be a candidate for deletion. You can specify the retention policy in terms of number of backup or in terms of duration (days, weeks, or months).
- Use the `Log file` field to specify the path to BART log file. This is an optional field.

Create - BART server

General **Misc**

Scanner log file
Path to the Xlog/WAL scanner log file

WAL compression?
Compress the archived Xlog/WAL files in gzip format (The gzip must be in the BART user account's PATH)

Copy Xlog/WAL during restore?
Copy the archived Xlog/WAL files from the BART backup catalog to the restore_path/archived_wals directory prior to the database server archive recovery

Thread count
Number of threads used to copy blocks

Batch size
Number of blocks of memory used for copying the modified blocks, the default value is 49412

Scan interval
Number of seconds before forcing a scan of the Xlog/WAL files, default value 0 means no brute-force scanning will be started

MBM scan timeout
Number of seconds to wait for MBM file before timing out, applicable only for incremental backup

Buttons: **Cancel** **Reset** **Save**

Fig. 2: The Create-BART server dialog - Misc tab

Use the fields on the Misc tab to describe the backup-related properties of the BART Server:

- Use the `Scanner log file` field to specify the path to the Xlog/WAL scanner log file. This is an optional field; BART does not create a WAL scanner log file if you do not specify the path.
- Use the `WAL compression?` switch to specify if you want to compress the archived Xlog/WAL files in Gzip format. To enable WAL compression, the gzip compression program must be present in the BART user account's PATH. The WAL compression setting must not be enabled for those database servers where you need to take incremental backups.
- Use the `Copy WALs during restore?` field to specify how the archived WAL files are collected when

invoking the RESTORE operation. Set to enabled to copy the archived WAL files from the BART backup catalog to the `restore_path/archived_wals` directory prior to the database server archive recovery. Set to disabled to retrieve the archived WAL files directly from the BART backup catalog during the database server archive recovery. Enabling this option helps you save time during the restore operation.

- Use the `Thread count` field to specify the number of worker threads for copying blocks or data files from the database server to the BART backup catalog. Specify a `thread count` of 1 if you want to take the backup using the `pg_basebackup` utility.
- Use the `Batch size` field to specify the number of blocks of memory used for copying modified blocks. This is applicable only for incremental backups.
- Use the `scan interval` field to specify the number of seconds after which the WAL scanner should scan the new WAL files.
- Use the `MBM scan timeout` field to specify the number of seconds to wait for MBM files before timing out. This is applicable only for incremental backups.

1.3 Associating the BART Server with a Database Server

After configuring the BART server, you need to associate it with the database server whose backup you want to manage with BART. You can do one of the following:

- Use the PEM console to modify the properties of an existing monitored database server to map it to the newly configured BART server.
- Use the PEM console to create a new monitored database server, and map it to the newly configured BART server.

To map the BART server to a new PEM database server, right-click the `PEM Server Directory` node and select `Create > Server`. Enter the details on all the generic tabs and then enter the BART-specific details on the BART tab.

Create - Server

General

Connection

SSL

SSH Tunnel

Advanced

PEM Agent

BART

General

Misc

For BART configuration, you need to install a PEM agent on the database server if Remote Monitoring is disabled for the agent. BART supports database server version 9.5 and above

BART server

Select from the list

Server name

Database server name that uniquely identifies an entry for database server in the server section of the configuration file

Description

Backup name

Template for backup name (may include %year, %month, %day, %hour, %minute, and %second)

Host address

IP address of the database server to be configured for backup

Port

5444

User

Password

Cluster owner

Operating system user that owns the database cluster

Archive command

Parameters for archive command (%p, %h, %a, %f)

Allow incremental backup?

No

Warning: Allowing incremental backup will use passwordless SSH authentication

Fig. 3: The Create Server dialog (BART - General tab)

Use the fields on the `General` tab to describe the general properties of the BART Server that will map to the PEM server:

- Use the `BART server` field to select the BART server name. All the BART servers configured in the PEM console will be listed in this drop down list.
- Use the `Server name` field to specify a name for the database server that you want to backup using the BART server. This name gets stored in the BART configuration file.
- Use the `Description` field to specify the description of the database server.
- Use the `Backup name` field to specify a template for user-defined names to be assigned to the backups of the database server. If you do not specify a backup name template, then the backup can only be referenced in BART

sub-commands by the BART assigned, integer backup identifier.

- Use the `Host address` field to specify the IP address of the database server that you want to configure for backup.
- Use the `Port` field to specify the port to be used for the database that you want to backup.
- Use the `User` field to specify the user of the database that you want to backup using BART through PEM console. If you want to enable incremental backups for this database server, then the user must be a superuser.
- Use the `Password` field to specify the password for the user of the database that you want to backup.
- Use the `Cluster Owner` field to specify the Linux operating system user account that owns the database cluster. This is typically `enterprisedb` for Advanced Server database clusters installed in the Oracle databases compatible mode, or `postgres` for PostgreSQL database clusters and for Advanced Server database clusters installed in the PostgreSQL databases compatible mode.
- Use the `Archive command` field to specify the desired format of the archive command string to be used in the `bart.cfg` file. Inputs provided for the Archive command will overwrite the database server's `Postgresql.conf` file. Once the server gets added, the database server will be restarted or database configurations will be reloaded.
- Use the `Allow incremental backup?` switch to specify if incremental backup should be enabled for this database server.
- Use the `Setup passwordless SSH?` switch to specify if you want to create SSH certificates to allow passwordless logins between the Database Server and the BART server. Ensure to bind a PEM agent before setting up the passwordless SSH authentication. Passwordless SSH will not work for a database server being remotely monitored by a PEM agent.

Create - Server

General

Connection

SSL

SSH Tunnel

Advanced

PEM Agent

BART

General

Misc

Override default configuration?

No

Override the database server configurations with the selected BART server configurations

Xlog method

Fetch

Method of collecting the transaction logs (fetch/stream)

Retention policy

1

Backups

Retention policy for the backup

Wal compression

Disabled

Compress the archived Xlog/WAL files in gzip format (The gzip must be in the BART user account's PATH)

Copy WALs during restore

Disabled

Copy the archived Xlog/WAL files from the BART backup catalog to the restore_path/archived_wals directory prior to the database server archive recovery

Thread count

1

Number of threads used to copy blocks

Batch size

49142

Number of blocks of memory used for copying the modified blocks, the default value is 49412

Scan interval

1

Number of seconds before forcing a scan of the Xlog/WAL files, default value 0 means no brute-force scanning will be started

MBM Scan timeout

20

Number of seconds to wait for MBM file before timing out, applicable only for incremental backup

?

Cancel

Reset

Save

Fig. 4: The Create - Server dialog (BART - Misc tab)

Use the fields on the `Misc` tab to describe the miscellaneous properties of the BART Server:

- Use the `Override default configuration?` Switch to specify if you want to override the BART server configurations with the specific database server configurations.
- Use the `Xlog method` to specify how the transaction log should be collected during the execution of `pg_basebackup`.
- Use the `Retention policy` field to specify the retention policy for the backup. This determines when an active backup should be marked as obsolete, and hence, be a candidate for deletion. You can specify the retention policy in terms of number of backup or in terms of duration (days, weeks, or months).
- Use the `WAL compression` switch to specify if you want to compress the archived Xlog/WAL files in Gzip format. To enable WAL compression, the gzip compression program must be present in the BART user account's

PATH. The `wal_compression` setting must not be enabled for those database servers where you need to take incremental backups.

- Use the `Copy WALs during restore` field to specify how the archived WAL files are collected when invoking the RESTORE operation. Set to enabled to copy the archived WAL files from the BART backup catalog to the `<restore_path>/archived_wals` directory prior to the database server archive recovery. Set to disabled to retrieve the archived WAL files directly from the BART backup catalog during the database server archive recovery.
- Use the `Thread count` field to specify the number of threads to copy the blocks. You must set `thread count` to 1 if you want to take a backup with the `pg_basebackup` utility.
- Use the `Batch size` field to specify the number of blocks of memory used for copying modified blocks, applicable only for incremental backups.
- Use the `Scan interval` field to specify the number of seconds after which the WAL scanner should scan the new WAL files.
- Use the `MBM scan timeout` field to specify the number of seconds to wait for MBM files before timing out, applicable only for incremental backups.

1.4 Viewing the BART Server Details on a PEM Dashboard

Once the BART server is associated with the database server, you can see the entire backup and restore related details for that particular BART server on the PEM Dashboard. You can also perform operations such as restoration or deletion of a backup that is listed on the dashboard.

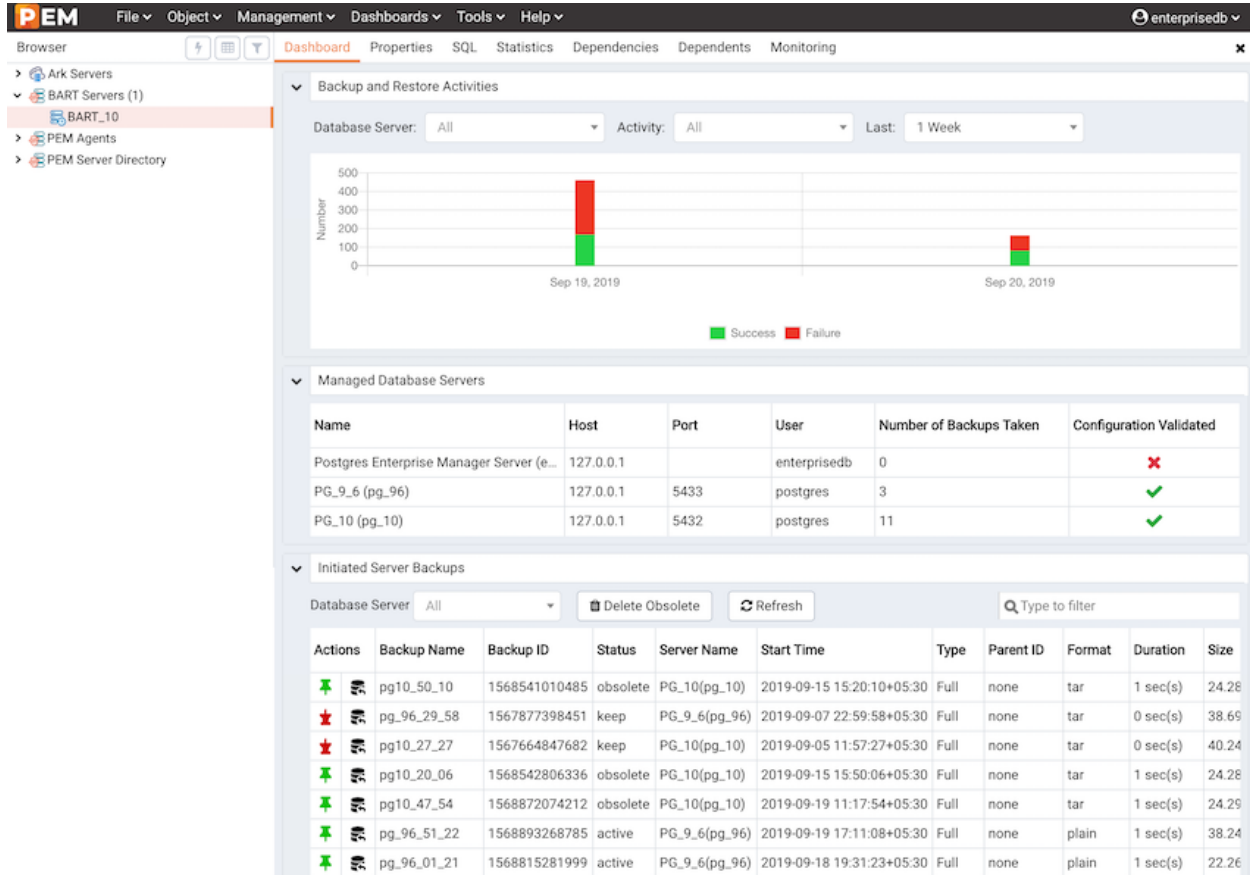


Fig. 5: The BART Backup Dashboard

When you select a monitored BART server, details of all the associated database servers along with their backups and restore activities are displayed as a chart on the Dashboard in the Backup and Restore Activities panel. You can filter the list of backups on any criteria that you specify in the filter boxes (the database server, activity, or duration).

The Managed Database servers panel displays a list of all the database servers managed by that particular BART server along with their high-level details.

The Initiated Server Backups panel displays a list of all the backups of the database servers managed by that particular BART server. You can filter the list to display the details of a particular database server. You can also filter the list on any criteria that you specify in the filter box. Typically, this filter works with any kind of string value (excluding date, time, and size) listed under the columns. For example, you can type `tar` to filter the list and display only those backups that are in tar format.

Backup details displayed include the Backup Name, Backup ID, Status, Server Name, Start Time, Type, Parent ID, Format, Duration, and Size. The Status column shows the status of the backups which can be one of the following: In Progress, Active, Keep, or Obsolete.

The backups are marked as `Obsolete` after the backup retention period has passed or number of retained backups that you have specified as retention policy of the BART server is met. If you want to make an exception so that a particular backup does not get marked as `Obsolete` even after the expiry of the duration of retention policy, then you need to mark that particular backup as `Keep`. Similarly, if you mark a particular backup as `NoKeep`, the backup is re-evaluated to determine if its status should be changed back to obsolete based upon the current retention policy.

A pin in the first column under *Actions* indicates that a backup can be marked as *Keep* by clicking the pin; while an inverted pin indicates that the backup can be marked as *NoKeep*. The second column under *Actions* displays the *Restore* icon; you can perform the *Restore* operation by clicking on the icon.

You can delete all the `Obsolete` backups by clicking the `Delete Obsolete` button. You can also refresh the list of backups by clicking the `Refresh` button.

1.5 Scheduling BART Backups

To schedule a backup using BART, select **Schedule Backup** under **Tools** menu. You can see a list of scheduled backups with details such as **Logs**, **Last result**, **Database server**, **Last backup name**, **Started on**, **Type**, **Parent**, **Format**, **Verify checksum?**, and **Use pg_basebackup?**. Click the **Add** icon (+) to add a schedule for the backup. Enter the details in the schedule definition dialog:

The screenshot shows the 'Schedule Backups - BART1' dialog box with the 'General' tab selected. The dialog has a table at the top with columns: Logs, Last Result, Database server, Last backup name, Started on, Type, Parent, Format, Verify checksum?, and Use pg_basebackup?. Below the table, there are three tabs: General, Schedule, and Notifications. The 'General' tab is active, showing various configuration options for the backup. The 'Database server' field is set to 'Postgres Enterprise Manager Server (BART_S3)'. The 'Backup name' field is empty, with a note below it stating 'This overrides the value of backup_name parameter in the server section of BART configuration file.' The 'Type' field is set to 'Full'. The 'Parent' field is empty, with a note below it stating 'Select Latest full to take the backup on top of the last full backup. Select Latest to take the backup on top of the last backup, regardless of it being a full backup or incremental backup.' The 'Format' field is set to 'Tar'. The 'Gzip compression?' field is set to 'No'. The 'Compression level' field is set to '6', with a note below it stating 'Gzip compression level for the tar file output, applicable only if you select the output format as tar.' The 'Use pg_basebackup?' field is set to 'No', with a note below it stating 'Use pg_basebackup for standby database servers.' The 'Thread count' field is set to '6', with a note below it stating 'Number of threads used to copy blocks, applicable only if pg_basebackup is not used for backup.' The 'Verify checksum?' field is set to 'No', with a note below it stating 'Verify the md5 checksum after full backup.'

Fig. 6: The Schedule Backup dialog - General options

Use the fields on the **General** tab to describe the general properties of the backup:

- Use the **Database Server** field to specify the target database server that you want to back up.
- Use the **Backup name** to specify a user-defined name for the backup.
- Use the **Backup type** switch to specify the backup type I. e. full backup or incremental backup.
- Use the **Parent backup** field to select the ID of the parent backup for incremental backup. This parent backup can either be a full or an incremental backup.
- Use the **Format** switch to specify the output format of the backup i.e plain text or tar. For incremental backup, you need to select plain text only.
- Use the **Gzip compression** switch to specify if gzip compression should be enabled for the backup. This option is applicable only for the tar format.
- Use the **Compression level** field to specify the gzip compression level on the tar file output.
- Use the **Thread count** field to specify the number of threads that will copy the blocks.
- Use the **MBM scan timeout** field to specify the number of seconds to wait for required MBM files before timing out.
- Use the **Verify checksum** field to specify if you want the application to verify the checksum of the backup.

- Use the `pg_basebackup` field to specify if the `pg_basebackup` utility should be used for the backup. Typically, `pg_basebackup` utility is used only for backing up the standby servers since it cannot be used for incremental backups.

Schedule Backups - BART1

Logs	Last Result	Database server	Last backup name	Started on	Type	Parent	Format	Verify checksum?	Use pg_basebackup?
		Postgres Enterprise Manager Server (B...			Full		Tar	No	No

General **Schedule** Notifications

General Repeat

Enabled? ☒ Yes

Start: 2019-09-20 03:35:48 -04:00

End: YYYY-MM-DD HH:mm:ss Z

Fig. 7: The Schedule Backup dialog - (Schedule : General)

Provide information on the `Schedule` tab to describe the scheduling details:

- Use the `Enabled?` switch to indicate if the schedule should be enabled (`Yes`) or disabled (`No`).
- Use the calendar selector in the `Start` field to specify the starting date and time for the schedule.
- Use the calendar selector in the `End` field to specify the ending date and time for the schedule.

Schedule Backups - BART1

Logs	Last Result	Database server	Last backup name	Started on	Type	Parent	Format	Verify checksum?	Use pg_basebackup?
		Postgres Enterprise Manager Server (B...			Full		Tar	No	No

General **Schedule** Notifications

General Repeat

Schedules are specified using a **cron-style** format.
 For each selected time or date element, the schedule will execute.
 e.g. To execute at 5 minutes past every hour, simply select '05' in the Minutes list box.
 Values from more than one field may be specified in order to further control the schedule.
 e.g. To execute at 12:05 and 14:05 every Monday and Thursday, you would click minute 05, hours 12 and 14, and weekdays Monday and Thursday.
 For additional flexibility, the Month Days check list includes an extra Last Day option. This matches the last day of the month, whether it happens to be the 28th, 29th, 30th or 31st.

Days

Week days: Select the weekdays...

Month days: Select the month days...

Months: Select the months...

Times

Hours: Select the hours...

Minutes: Select the minutes...

Fig. 8: The Schedule Backup dialog - (Schedule : Repeat)

Use the fields on the `Repeat` tab to specify the details about the schedule in a cron-style format. The schedule will execute on each date or time element selected on the `Repeat` tab. Click within a field to open a list of valid values for that field; click on a specific value to add that value to the list of selected values for the field. To clear the values from a field, click the `X` located at the right-side of the field.

Use the fields within the `Days` box to specify the days on which the schedule will execute:

- Use the `Week Days` field to select the days on which the schedule will execute.
- Use the `Month Days` field to select the numeric days on which the schedule will execute. Specify the `Last Day` to indicate that the schedule should be performed on the last day of the month, regardless of the date.
- Use the `Months` field to select the months in which the schedule will execute.

Use the fields within the `Times` box to specify the times at which the schedule will execute:

- Use the `Hours` field to select the hour at which the schedule will execute.
- Use the `Minutes` field to select the minute at which the schedule will execute.

Schedule Backups - BART1

Logs	Last Result	Database server	Last backup name	Started on	Type	Parent	Format	Verify checksum?	Use pg_basebackup?
		Postgres Enterprise Manager Server (B...			Full		Tar	No	No

General Schedule Notifications

Send the notifications: **DEFAULT**

Determines when to send a notification for the job/scheduled backup:

ON FAILURE :
Send a notification on the failure/interruption of the job/scheduled backup.

ALWAYS :
Send a notification on the completion of the job/scheduled backup regardless of the result.

NEVER :
Do not send a notification for the job/scheduled backup.

DEFAULT :
Use the agent/system level job notification configuration to determine whether, and when to send the notification.

Email group:

Select the email-group to get the job/scheduled backup notification on completion.

Fig. 9: *The Schedule Backup dialog - (Schedule : Notifications)*

Use the fields on the `Notifications` tab to specify the email notification settings for a scheduled backup:

- Use the `Send the notifications` field to specify when you want the email notifications to be sent.
- Use the `Email group` field to specify the email group that should receive the email notification.

1.6 Restoring BART Backups

You can restore the backups that you have earlier created using BART server on a target remote host. When you select a particular BART server, all the associated backups are listed in the Dashboard under `Initiated Server Backups`.

To restore a backup, click the `Restore` icon next to the backup that you want to restore.

Restore Backup - bkp-1 (Postgres Enterprise Manager Server(AA))

General Advanced Notifications

Target agent name ⚠ Select from the list
Name of the agent where you want to restore the backup

Remote user
User account on the remote database server host where you want to restore the backup

Remote host address Enter/Select from the list
IP address of the remote host where you want to restore the backup

SSH port 22
SSH port to be used for restoring the backup

Restore path
Path where you want to restore the backup

Number of workers 1
Number of worker processes to run in parallel to stream the modified blocks of an incremental backup to the restore location

Tablespace paths

Tablespace Name (OID)	Path
-----------------------	------

? Cancel Restore

Fig. 10: The *Restore Backup* dialog - General

In the `Restore Backup` dialog, provide information in the fields on the `General` tab:

- Use the `Target agent` field name to specify the name of the agent where you want to restore the backup.
- Use the `Remote user` field to specify the use account on the remote database server host where you want to restore the backup.
- Use the `Remote host address` field to specify the IP address of the remote host where you want to restore the backup.
- Use the `SSH port` field to specify the SSH port to be used for restoring the backup.
- Use the `Restore path` field to specify the path where you want to restore the backup.
- Use the `Number of workers` field to specify processes to run in parallel to stream the modified blocks of an incremental backup to the restore location.
- Use the `Setup passwordless SSH?` switch to specify if you want to create SSH certificates to allow passwordless logins between the BART server and the target host for restore.

Fig. 11: *The Restore Backup dialog - Advanced*

On the Advanced tab, specify your preferences for advanced options for restoring the backup:

- Use the `Copy WALs to restore path?` switch to specify if you want to copy WALs to the restore path.
- Use the `Point in time recovery` switch to specify if you want point in time recovery.
- Use the `Timeline ID` field to specify the timeline ID to be used for replaying the archived WAL files for point-in-time recovery.
- Use the `Transaction ID (XID)` field to specify the transaction ID for point-in-time recovery.
- Use the `Timestamp` field to the timestamp to be used for restore.

Note: You can specify either `Transaction ID` or `Timestamp` for the point-in-time recovery.

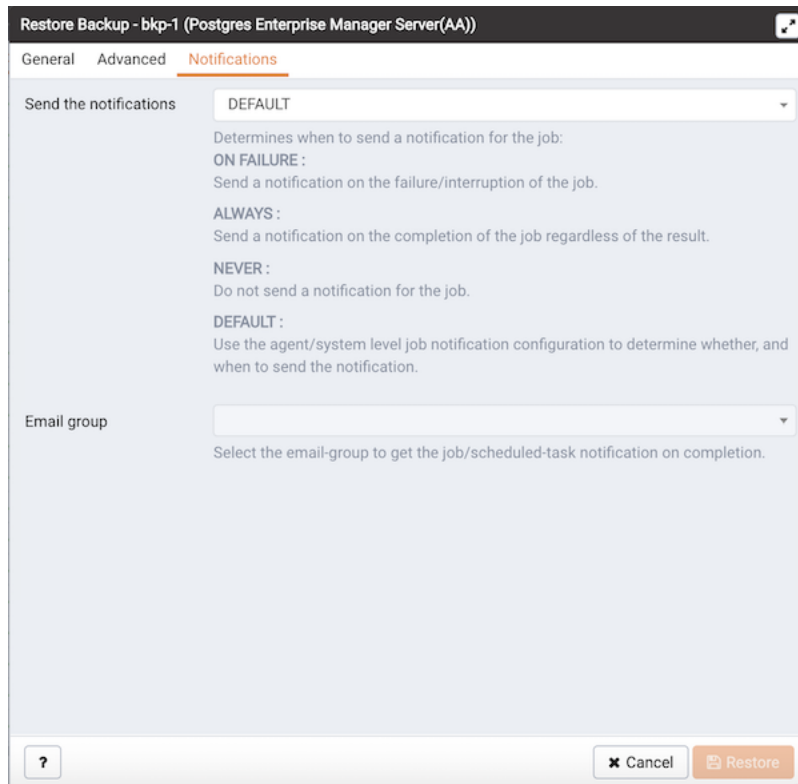


Fig. 12: *The Restore Backup dialog - Notifications*

Use the fields on the `Notifications` tab to specify the email notification settings for restoring the backup.

- Use the `Send the notifications` field to specify when you want the email notifications to be sent.
- Use the `Email group` field to specify the email group that should receive the email notification.

CHAPTER 2

Conclusion

EDB Postgres Enterprise Manager BART Management Features Guide

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

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