

PostgreSQL 16 Administration

Backup and Replication

New features in DBA3-13 → DBA3-16 materials

The DBA3-16 course update includes some changes and additions covering new features in PostgreSQL 14–16.

They are presented in the table below and organized by topic. Corresponding links to the documentation and other reference resources are also provided.

Topic	Feature description	Version	Documentation	Reference resources
Backup				
01. Logical Backup	The COPY command now supports the HEADER parameter for text format (Rémi Lapeyre)	15	COPY	PostgreSQL 15: part 5 or CommitFest 2022-03.
	pg_dump now supports LZ4 and Zstandard compression (Georgios Kokolatos, Justin Pryzby).	16	pg_dump	PostgreSQL 16: part 5 or Commitfest 2023-03
02. Base Backup	pg_basebackup now supports the --target parameter, which specifies the location of the base backup (Robert Haas).	15	pg_basebackup	PostgreSQL 15: part 5 or CommitFest 2022-03.
	Allow pg_basebackup's option --compress option to control the compression location (server or client), compression method, and compression options (Michael Paquier, Robert Haas).	15	pg_basebackup	PostgreSQL 15: part 5 or CommitFest 2022-03.

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03. Write-Ahead Log Archive	Allow the guc-restore-command setting to be changed during a server reload (Sergei Kornilov).	14	restore_command	PostgreSQL 14: part 4 or "January breakthrough" (CommitFest 2021-01) (in Russian)
	pg_receivewal now supports the LZ4 compression method (Georgios Kokolatos).	15	pg_receivewal	PostgreSQL 15: Part 3 or Commitfest 2021-11
	Allow archiving via loadable modules (Nathan Bossart). Previously, archiving was only possible using shell commands. The new server variable archive_library specifies the library of functions to be called for archiving.	15	archive_library	PostgreSQL 15: part 5 or CommitFest 2022-03.
	Add function pg_get_wal_replay_pause_state() to show the current recovery pause state (Dilip Kumar). It provides more detailed information than the pg_is_wal_replay_paused() function, which has also been kept.	14	Recovery Control Functions	PostgreSQL 14: part 5 or "Spring freeze" CommitFest 2021-03 (in Russian)
Replication				
04. Physical Replication	Add server parameter guc-log-recovery-conflict-waits to report long recovery conflict wait times (Bertrand Drouvot, Masahiko Sawada).	14	log_recovery_conflict_waits	PostgreSQL 14: part 4 or "January breakthrough" (CommitFest 2021-01) (in Russian)
	Pause recovery on a hot standby server if the primary changes its parameters in a way that prevents replay on the standby (Peter Eisentraut). Previously the standby would shut down immediately.	14	Hot Standby	PostgreSQL 14: part 4 or "January breakthrough" (CommitFest 2021-01) (in Russian)

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05. Switchover to Replica	Add --config-file switch to pg_rewind, simplifying use of the program when server configuration files are located outside the data directory (Gunnar Bluth).	15	pg_rewind	PostgreSQL 15: part 5 or CommitFest 2022-03.
	Remove server variable promote_trigger_file (Simon Riggs). It was needed to promote a standby server to primary, which can now be done using pg_ctl promote or pg_promote().	16	pg_ctl promote pg_promote()	PostgreSQL 16: part 3 or CommitFest 2022-11
06. Logical Replication	Allow logical replication to stream long in-progress transactions to subscribers (Dilip Kumar, Amit Kapila, Ajin Cherian, Tomas Vondra, Nikhil Sontakke, Stas Kelvich). Previously transactions that exceeded guc-logical-decoding-work-mem were written to disk until the transaction completed.	14	logical_decoding_work_mem	PostgreSQL 14: Part 2, or "Overshadowed by the Thirteenth" (Commitfest 2020-09)
	Add system view pg_stat_replication_slots, reflecting replication slot activity (Masahiko Sawada, Amit Kapila, Vignesh C). The pg_stat_reset_replication_slot() function resets the statistics for a slot.	14	pg_stat_replication_slots pg_stat_reset_replication_slot()	PostgreSQL 15: Part 1, or Commitfest 2021-07
	Add support for publishing all tables in a schema (Vignesh C, Hou Zhijie, Amit Kapila).	15	CREATE PUBLICATION	PostgreSQL 15: Part 3 or Commitfest 2021-11
	Allow publication content to be filtered using a WHERE clause (Hou Zhijie, Euler Taveira, Peter Smith, Ajin Cherian, Tomas Vondra, Amit Kapila). Rows not satisfying the WHERE clause are not published.	15	CREATE PUBLICATION	PostgreSQL 15: part 5 or CommitFest 2022-03.
	Allow publication content to be restricted to specific columns (Tomas Vondra, Álvaro Herrera, Rahila Syed).	15	CREATE PUBLICATION	PostgreSQL 15: part 5 or CommitFest 2022-03.

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	Allow subscribers to stop the application of logical replication changes on error (Osumi Takamichi, Mark Dilger). This behavior is enabled on the subscriber side with the <code>disable_on_error</code> parameter and helps avoid an infinite loop when an error occurs while applying the change stream.	15	disable_on_error	PostgreSQL 15: part 5 or CommitFest 2022-03.
	Add ALTER SUBSCRIPTION ... SKIP, allowing transactions to be skipped on the subscriber side (Masahiko Sawada).	15	ALTER SUBSCRIPTION	PostgreSQL 15: part 5 or CommitFest 2022-03.
	Allow logical replication subscribers to process only changes that have no origin (Vignesh C, Amit Kapila). This can be used to avoid replication loops. This is controlled by the new CREATE SUBSCRIPTION ... ORIGIN option. ORIGIN.	16	Logical Replication	PostgreSQL 16: part 2 or CommitFest 2022-09
	Add a predefined <code>pg_create_subscription</code> role with the privilege to create subscriptions (Robert Haas).	16	pg_create_subscription	PostgreSQL 16: part 5 or Commitfest 2023-03
	Improve the performance of applying logical replication changes to tables that lack a primary key (Onder Kalaci, Amit Kapila). Specifically, REPLICA IDENTITY FULL can now use btree indexes rather than sequentially scanning the table to find matches.	16	Identifying rows to be updated or deleted in the WAL	PostgreSQL 16: part 5 or Commitfest 2023-03
	Allow logical replication initial table synchronization to copy rows in binary format (Melih Mutlu). This is only possible for subscriptions marked as binary.	16	Logical Replication	PostgreSQL 16: part 5 or Commitfest 2023-03
	Allow logical replication subscriptions to use binary transfer mode (Dave Cramer). This is faster than text mode, but slightly less robust.	14	Logical Replication	PostgreSQL 14: part 5 or "July Warm-Up" CommitFest 2021-03 (in Russian)

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	Allow parallel application of logical replication (Hou Zhijie, Wang Wei, Amit Kapila). The STREAMING parameter in CREATE SUBSCRIPTION can now be set to parallel, allowing large transactions to be transferred using parallel worker processes. The number of parallel worker processes is set using the new server variable <code>max_parallel_apply_workers_per_subscription</code>.	16	CREATE SUBSCRIPTION Number of parallel worker processes for a subscription	https://github.com/postgres/postgres/commit/216a7848 https://github.com/postgres/postgres/commit/d540a02a
07. Use Cases	Allow logical decoding on standbys (Bertrand Drouvot, Andres Freund, Amit Khandekar). Snapshot WAL records are required for logical slot creation but cannot be created on standbys. To avoid delays, the new function <code>pg_log_standby_snapshot()</code> allows creation of such records.	16	Logical Decoding pg_log_standby_snapshot()	PostgreSQL 16: part 5 or Commitfest 2023-03
Clustering Technologies				
08. Overview	Enhanced functionality for the libpq <code>target_session_attrs</code> parameter (Haribabu Kommi, Greg Nancarrow, Vignesh C, Tom Lane). It now supports new values: read-only, primary, standby, and prefer-standby.	14	target_session_attrs	PostgreSQL 14: part 5 or "Spring freeze" CommitFest 2021-03 (in Russian)