PostgreSQL WAL File Naming and LSN Interpretation

WAL File Structure

WAL File Name: Contains 24 hexadecimal characters.

> ***Format:***
> ***TTTTTTTTXXXXXXXX000000YY***

- TTTTTTTT: Timeline ID (8 hexadecimal characters)
- XXXXXXXX: WAL sequence number (8 hexadecimal characters)
- 000000YY: Offset within the WAL file (8 hexadecimal characters)

LSN (Log Sequence Number)

> ***Query to Get Current LSN:***
>
> ***SELECT pg_current_wal_lsn(), pg_current_wal_insert_lsn();***

Example Output:
pg_current_wal_lsn | pg_current_wal_insert_lsn

76/7D000000 | 76/7D000028

- 76/7D000028:
  - 76: Timeline ID.
  - 7D: WAL segment number.
  - 000028: Position inside the WAL segment (in hexadecimal).

Understanding WAL Naming

Combining LSN to WAL File Name:

> ***LSN Structure: Mid Part + Last Part***
>
> ***For '76/7D000028', the corresponding WAL file name is derived using:***
>
> ***SELECT pg_walfile_name('76/7D000028');***

Example Output:
000000010000007600000007D

- 00000001: Timeline (1 in hexadecimal).
- 00000076: Sequence number higher part.
- 0000007D: Sequence number lower part.

Key Points

Hexadecimal Representation:
Each character in the WAL file name represents 4 bits.

- Timeline (8 hex characters) = 32 bits
- Mid Part (8 hex characters) = 32 bits
- Last Part (8 hex characters) = 32 bits

Position in WAL:
76/7D000028: 28 indicates the byte position within WAL file 7D.