

PostgreSQL WAL File Naming and LSN Interpretation

WAL File name contains 24 character
(each character is a hexadecimal number means each character is represented using 4 bits)

WAL File Naming

Timeline	Sequence number higher part	6 leading zeros	Sequence number lower part
TTTTTTTT	XXXXXXXX	000000	YY
00000000	10000000	76	00000007D

[postgres] # `select pg_current_wal_lsn(), pg_current_wal_insert_lsn();`
`pg_current_wal_lsn | pg_current_wal_insert_lsn`

76/7D000000 | 76/7D000028 28 is the position in 7D WAL file
(1 row)

LSN is made of mid part + last part

WAL File name contains 24 hexadecimal character

db time line	mid part	last part
00000001	00000076	0000007D
8 hexadecimal character	8 hexadecimal character	8 hexadecimal character = (8+8+8) = 24

In hexadecimal each character is represented using 4 bits.

8*4 bits	8*4 bits	8*4 bits
32 bits	32 bit	32 bit

you can guess the name of the WAL file based on the above output, it is best to use the `pg_walfile_name` function.

[postgres] # `select pg_walfile_name('76/7D000028');`
`pg_walfile_name`

00000001000000760000007D

WAL File Structure

WAL File Name: Contains 24 hexadecimal characters.

Format:

TTTTTTTTXXXXXXXXX000000YY

- 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:

00000001000000760000007D

- 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.