Major Features: Postgres 18

BRUCE MOMJIAN

EDB

PostgreSQL is an open-source, full-featured relational database. This presentation gives an overview of the Postgres 18 release.

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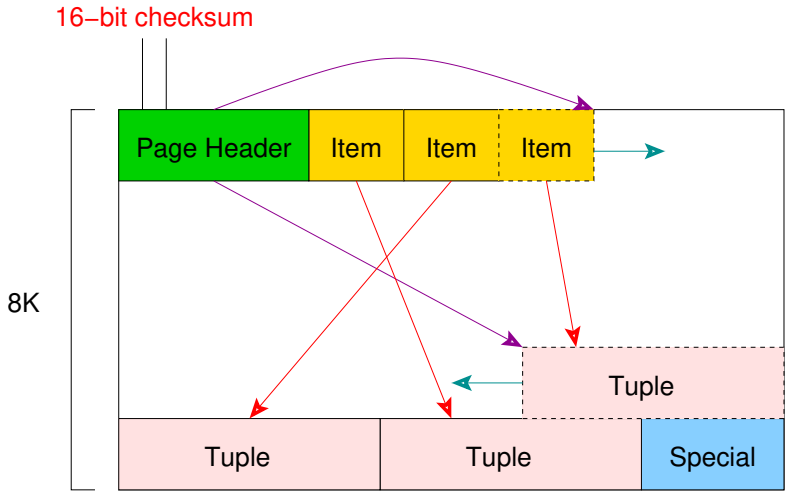
Postgres 18 Feature Outline

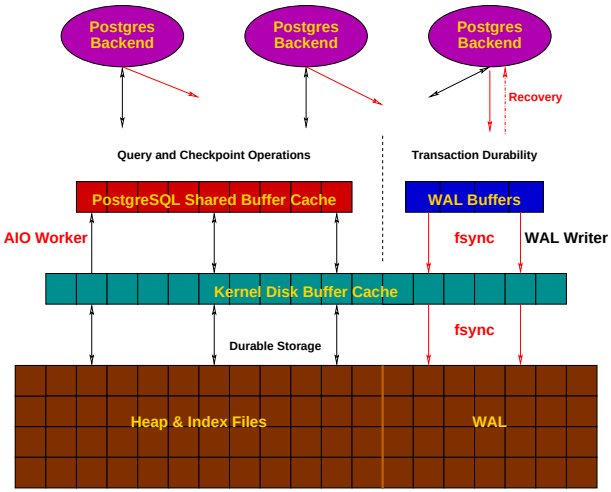
1. Checksums enabled by default
2. Asynchronous I/O workers
3. Skip scans
4. Other optimizer improvements
5. Pg_upgrade optimizer statistics preservation
6. COPY error limits
7. Foreign data wrapper SCRAM authentication

Full item list at https://momjian.us/pgsql_docs/release-18.html.

1. Checksums Enabled by Default



2. Asynchronous I/O Workers



https://pganalyze.com/blog/postgres-18-async-io

3. Skip Scans: Setup

```
CREATE TABLE skip_scan_test (
        a INTEGER,  -- values 1-5
        b INTEGER,  -- values 1-5
        c SERIAL    -- unique
);

INSERT INTO skip_scan_test (a, b)
    SELECT random(1, 5), random(1, 5)
    FROM generate_series(1, 100000);

CREATE INDEX i_skip_scan_test ON skip_scan_test (a, b, c);

ANALYZE;

\set EXPLAIN 'EXPLAIN (COSTS OFF)'
```

Unchanged

```
:EXPLAIN SELECT c
FROM skip_scan_test
WHERE a = 1;
                 QUERY PLAN
---------------------------------------------
 Bitmap Heap Scan on skip_scan_test
   Recheck Cond: (a = 1)
   ->  Bitmap Index Scan on i_skip_scan_test
         Index Cond: (a = 1)

:EXPLAIN SELECT c
FROM skip_scan_test
WHERE a > 5;
                        QUERY PLAN
-----------------------------------------------------------
 Index Only Scan using i_skip_scan_test on skip_scan_test
   Index Cond: (a > 5)
```

Unchanged

```
:EXPLAIN SELECT c
FROM skip_scan_test
WHERE a = 1 AND b = 2 AND c = 100;
                        QUERY PLAN
-----------------------------------------------------------
 Index Only Scan using i_skip_scan_test on skip_scan_test
   Index Cond: ((a = 1) AND (b = 2) AND (c = 100))

-- since PG 8.1, crude skip scan
:EXPLAIN SELECT c
FROM skip_scan_test
WHERE a = 1 AND c = 100;
                        QUERY PLAN
-----------------------------------------------------------
 Index Only Scan using i_skip_scan_test on skip_scan_test
   Index Cond: ((a = 1) AND (c = 100))
```

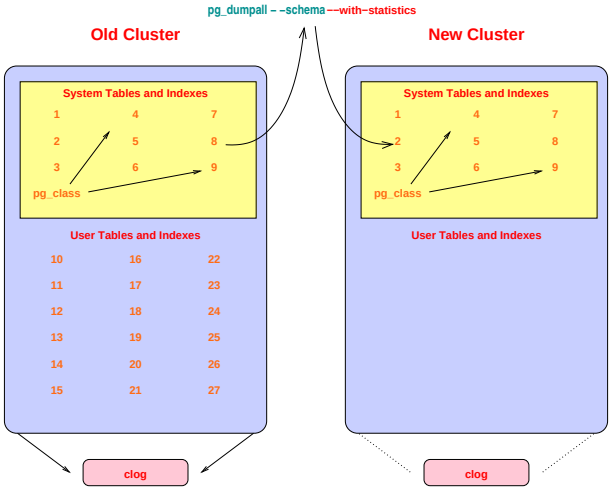
Now Index Scans, Previously Sequential Scans

```
:EXPLAIN SELECT c
FROM skip_scan_test
WHERE a > 1 AND c = 100;
                          QUERY PLAN
-------------------------------------------------------------
 Index Only Scan using i_skip_scan_test on skip_scan_test
   Index Cond: ((a > 1) AND (c = 100))

:EXPLAIN SELECT c
FROM skip_scan_test
WHERE c = 100;
                          QUERY PLAN
-------------------------------------------------------------
 Index Only Scan using i_skip_scan_test on skip_scan_test
   Index Cond: (c = 100)
```

4. Other Optimizer Improvements

- Automatically remove some unnecessary table self-joins
- Convert some IN (VALUES ...) to x = ANY ... for better optimizer statistics
- Allow transforming OR-clauses to arrays for faster index processing

5. Pg_upgrade Optimizer Statistics Preservation



Also available with *pg_dump*/*pg_dumpall*.

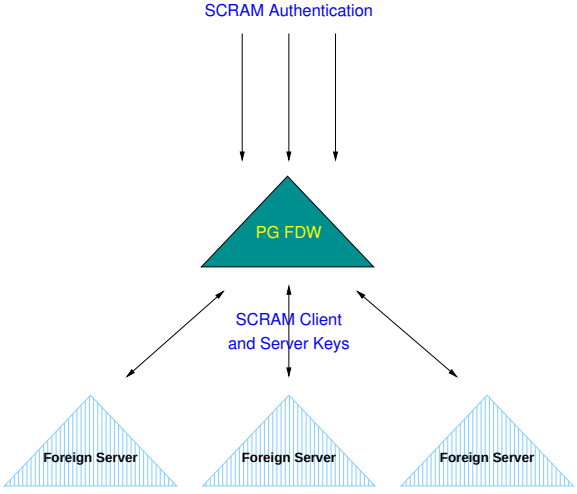
6. COPY Error Limits

```
CREATE TABLE copy_test (int_col INTEGER, date_col DATE, jsonb_col JSONB);

COPY copy_test (int_col) FROM STDIN WITH (ON_ERROR ignore, REJECT_LIMIT 1);
test> 1
test> 2
test> a
test> \.
NOTICE:  1 row was skipped due to data type incompatibility

SELECT * FROM copy_test;
 int_col | date_col | jsonb_col
---------+----------+-----------
       1 | (null)   | (null)
       2 | (null)   | (null)
```

COPY Error Limits

```
COPY copy_test (int_col) FROM STDIN WITH (ON_ERROR ignore, REJECT_LIMIT 1);
test> 3
test> b
test> c
test> \.
ERROR:  skipped more than REJECT_LIMIT (1) rows due to data type incompatibility
CONTEXT:  COPY copy_test, line 3, column int_col: "c"

SELECT * FROM copy_test;
 int_col | date_col | jsonb_col
---------+----------+-----------
       1 | (null)   | (null)
       2 | (null)   | (null)
```

7. Foreign Data Wrapper SCRAM Authentication



Conclusion

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