

# Referensi Cepat PostgreSQL

Tabel, query, join, index, JSON, dan role

## Menghubungkan

### Command Line

```
psql -U postgres
psql -h localhost -p 5432 -U user -d mydb
psql "postgresql://user:pass@host:5432/mydb"
```

### Meta-Command psql

```
\l          Daftar database
\c dbname   Hubungkan ke database
\dt         Daftar tabel
\d tablename Tampilkan struktur tabel
\dn         Daftar schema
\du         Daftar role
\q         Keluar dari psql
\i file.sql Jalankan file SQL
```

## Tabel & Schema

### Buat Tabel

```
CREATE TABLE users (
  id SERIAL PRIMARY KEY,
  name VARCHAR(100) NOT NULL,
  email TEXT UNIQUE,
  created_at TIMESTAMPTZ DEFAULT NOW()
);
```

### Operasi Schema

```
CREATE SCHEMA app;
CREATE TABLE app.users (id SERIAL PRIMARY KEY);
SET search_path TO app, public;
DROP SCHEMA app CASCADE;
```

### Alter Table

```
ALTER TABLE users ADD COLUMN age INT;
ALTER TABLE users ALTER COLUMN name TYPE TEXT;
ALTER TABLE users DROP COLUMN age;
ALTER TABLE users RENAME TO customers;
```

## Tipe Data

### Numerik

<b>INTEGER / INT</b>	Integer 4-byte
<b>BIGINT</b>	Integer 8-byte
<b>SERIAL</b>	Integer auto-increment
<b>NUMERIC(p,s)</b>	Numerik eksak (mis. NUMERIC(10,2))
<b>REAL / DOUBLE PRECISION</b>	Floating-point (4 / 8 byte)
<b>BOOLEAN</b>	true / false / null

### String & Biner

<b>TEXT</b>	Teks panjang tak terbatas
<b>VARCHAR(n)</b>	Teks variabel hingga n karakter
<b>CHAR(n)</b>	Teks panjang tetap
<b>BYTEA</b>	Data biner
<b>UUID</b>	ID unik universal 128-bit

### Tanggal, JSON & Array

<b>DATE</b>	Tanggal kalender
<b>TIMESTAMPTZ</b>	Timestamp dengan zona waktu
<b>INTERVAL</b>	Rentang waktu (mis. '2 days')
<b>JSONB</b>	JSON biner (dapat diindeks)
<b>INT[] / TEXT[]</b>	Tipe array

## Query

### Insert

```
INSERT INTO users (name, email)
VALUES ('Alice', 'alice@example.com')
RETURNING id;
```

```
INSERT INTO users (name, email) VALUES
('Bob', 'bob@ex.com'),
('Carol', 'carol@ex.com');
```

### Select

```
SELECT * FROM users WHERE id = 1;
SELECT name, email FROM users
ORDER BY name LIMIT 10 OFFSET 20;
```

### Update

```
UPDATE users SET email = 'new@ex.com'
WHERE id = 1 RETURNING *;
```

### Upsert

```
INSERT INTO users (email, name)
VALUES ('a@ex.com', 'Alice')
ON CONFLICT (email) DO UPDATE
SET name = EXCLUDED.name;
```

### Delete

```
DELETE FROM users WHERE id = 1 RETURNING *;
TRUNCATE TABLE users RESTART IDENTITY;
```

## Join & Subquery

### Tipe Join

<b>INNER JOIN</b>	Baris yang cocok di kedua tabel
<b>LEFT JOIN</b>	Semua baris kiri + yang cocok di kanan
<b>RIGHT JOIN</b>	Semua baris kanan + yang cocok di kiri
<b>FULL OUTER JOIN</b>	Semua baris dari kedua tabel
<b>CROSS JOIN</b>	Produk kartesian
<b>LATERAL JOIN</b>	Subquery yang mereferensikan baris luar

### CTE (Common Table Expression)

```
WITH active AS (
  SELECT * FROM users WHERE active = true
)
SELECT a.name, o.total
FROM active a
JOIN orders o ON a.id = o.user_id;
```

### Subquery

```
SELECT name FROM users
WHERE id IN (
  SELECT user_id FROM orders
  WHERE total > 100
);
```

## Index

### Buat & Hapus

```
CREATE INDEX idx_name ON users(name);
CREATE UNIQUE INDEX idx_email ON users(email);
CREATE INDEX idx_gin ON posts USING GIN(tags);
DROP INDEX idx_name;
```

## Tipe Index

<b>B-tree</b>	Default, cocok untuk =, <, >, BETWEEN
<b>Hash</b>	Hanya perbandingan kesamaan
<b>GIN</b>	Generalized inverted — array, JSONB, full-text
<b>GiST</b>	Generalized search — geometri, range
<b>BRIN</b>	Block range — tabel besar yang terurut

### Analisis Query

```
EXPLAIN ANALYZE
SELECT * FROM users WHERE name = 'Alice';
```

## Fungsi & Prosedur

### Fungsi SQL

```
CREATE FUNCTION active_count()
RETURNS INTEGER AS $$
  SELECT COUNT(*)::INT FROM users
  WHERE active = true;
$$ LANGUAGE sql;
SELECT active_count();
```

### Fungsi PL/pgSQL

```
CREATE FUNCTION greet(name TEXT)
RETURNS TEXT AS $$
BEGIN
  RETURN 'Hello, ' || name;
END;
$$ LANGUAGE plpgsql;
```

### Fungsi Bawaan Berguna

<b>NOW() / CURRENT_TIMESTAMP</b>	Timestamp saat ini dengan TZ
<b>AGE(ts1, ts2)</b>	Interval antara dua timestamp
<b>COALESCE(a, b)</b>	Nilai non-null pertama
<b>NULLIF(a, b)</b>	NULL jika a = b
<b>GENERATE_SERIES(1, 10)</b>	Hasilkan baris nilai berurutan
<b>STRING_AGG(col, ',')</b>	Gabungkan nilai dengan separator

## Role & Izin

### Manajemen Role

```
CREATE ROLE app LOGIN PASSWORD 'secret';
ALTER ROLE app SET search_path TO myapp;
DROP ROLE app;
```

### Grant

```
GRANT ALL ON DATABASE mydb TO app;
GRANT SELECT, INSERT ON users TO reader;
GRANT USAGE ON SCHEMA public TO app;
REVOKE INSERT ON users FROM reader;
```

### Row-Level Security

```
ALTER TABLE users ENABLE ROW LEVEL SECURITY;
CREATE POLICY user_own ON users
FOR ALL USING (id = current_setting('app.uid')::INT);
```

## Dukungan JSON

### Operator JSONB

<b>-&gt; 'key'</b>	Ambil nilai JSON berdasarkan key (sebagai JSON)
<b>-&gt;&gt; 'key'</b>	Ambil nilai JSON berdasarkan key (sebagai teks)
<b>#&gt; '{a,b}'</b>	Ambil nilai bersarang berdasarkan path
<b>@&gt;</b>	Mengandung (kiri mencakup kanan)
<b>?</b>	Key ada
<b>  </b>	Gabungkan nilai JSONB

# Referensi Cepat PostgreSQL

## Query JSONB

```
SELECT data->>'name' FROM profiles
WHERE data @> '{"active": true}';
```

```
SELECT * FROM profiles
WHERE data ? 'email';
```

## Fungsi JSONB

```
SELECT jsonb_each(data) FROM profiles;
SELECT jsonb_array_elements('[1,2,3]');
SELECT jsonb_set(data, '{name}', 'Alice')
FROM profiles WHERE id = 1;
```

## Pola Umum

### Transaksi

```
BEGIN;
UPDATE accounts SET balance = balance - 100
WHERE id = 1;
UPDATE accounts SET balance = balance + 100
WHERE id = 2;
COMMIT; -- atau ROLLBACK;
```

### Window Function

```
SELECT name, salary,
       RANK() OVER (ORDER BY salary DESC),
       AVG(salary) OVER (PARTITION BY dept)
FROM employees;
```

### Salin Data

```
COPY users TO '/tmp/users.csv'
WITH (FORMAT csv, HEADER);
COPY users FROM '/tmp/users.csv'
WITH (FORMAT csv, HEADER);
```

### Backup pg\_dump

```
pg_dump -U postgres mydb > backup.sql
pg_dump -Fc mydb > backup.dump
pg_restore -d mydb backup.dump
```