# sqlc SQL to type-safe Go

**START HERE**

**`sqlc init`**
Create sqlc.yaml

**`sqlc diff`**
Is output stale?

**`sqlc generate`**
SQL to Go code

**`sqlc verify`**
Check against cloud tag

**`sqlc compile`**
Check SQL only

**`-- name: <Name> :one`**
Declare a query

**`sqlc vet`**
Lint queries

**`sqlc.arg(<name>)`**
Name a parameter

**schema.sql** tables or migrations → **`sqlc generate`** → **query.sql** named queries → **`parsed and typed`** → **Go package** models, methods → **`you call`** → **Your app** typed results

## CONCEPTS

You write schema and queries in plain SQL; sqlc generates type-safe Go code, so the SQL is the source of truth.

Commit the generated code and run sqlc diff in CI to catch forgotten regeneration.

## COMMANDS

**`sqlc init`**
Create an empty sqlc.yaml (v2 format)

**`sqlc generate`**
Generate code from schema and queries

**`sqlc compile`**
Check SQL for syntax and type errors

*Parses and type-checks only; writes no files.*

**`sqlc vet`**
Run lint rules over the queries

**`sqlc diff`**
Show how output differs from files on disk

**`sqlc -f <file> generate`**
Use another config file

**`sqlc init --v1`**
Create a version 1 config instead

**`sqlc parse`**
Print the SQL AST as JSON

**`sqlc createdb`**
Create an ephemeral database

**`sqlc verify --against <tag>`**
Compare to a tagged push

**`sqlc push -t <tag>`**
Upload project to sqlc cloud

**`sqlc push --dry-run`**
Dump the push request only

**`sqlc --no-remote generate`**
Disable remote execution

**`sqlc version`**
Print installed version

## QUERY ANNOTATIONS

**`-- name: <Name> :one`**
Return a single row

**`-- name: <Name> :many`**
Return a slice of rows

**`-- name: <Name> :exec`**
Run it, return only an error

**`-- name: <Name> :execrows`**
Return affected row count

**`-- name: <Name> :execresult`**
Return the driver's sql.Result

**`-- name: <Name> :execlastid`**
Return the generated ID

**`-- name: <Name> :batchexec`**
Batch executions (pgx, Go only)

**`-- name: <Name> :batchone`**
Batch of single-row queries

**`-- name: <Name> :batchmany`**
Batch of multi-row queries

**`-- name: <Name> :copyfrom`**
Bulk insert, driver specific

## PARAMETERS AND MACROS

**`sqlc.arg(<name>)`**
Name a parameter in the Go method

**`sqlc.narg(<name>)`**
Name a parameter and make it nullable

*Useful for optional filters: WHERE x = coalesce(sqlc.narg(x), x).*

**`sqlc.slice("<name>")`**
Slice in IN (...) for MySQL/SQLite

*Expanded at runtime, so not usable with prepared statements.*

**`sqlc.embed(<table>)`**
Return the table's model struct as a field

### Placeholders per engine

| Engine | Placeholder |
|---|---|
| `postgresql` | $1, $2 |
| `mysql` | ? |
| `sqlite` | ? |

## SQLC.YAML

**`version: "2"`**
Config format version

**`engine: postgresql`**
postgresql, mysql or sqlite

**`schema: "<path>"`**
Schema file, dir or migrations

**`queries: "<path>"`**
Query file or directory

**`gen.go.package: <name>`**
Go package name of the output

**`gen.go.out: <dir>`**
Output directory

**`sql_package: pgx/v5`**
Pick driver (default database/sql)

**`emit_json_tags: true`**
Add json tags to structs

**`emit_interface: true`**
Generate a Querier interface

**`emit_empty_slices: true`**
Return [] instead of nil for :many

**`emit_pointers_for_null_types`**
Use *T for nullable columns

**`overrides:`**
Map db types or columns to Go types

**`rules: [<name>]`**
Enable vet rules for this package

**`database.uri: ${DB_URL}`**
Live database for vet; env vars expand

**`database.managed: true`**
Use a managed database (needs cloud)

**`analyzer.database: false`**
Skip database-backed analysis

**`strict_function_checks: true`**
Error on unknown functions

**`codegen: / plugins:`**
Plugin based output (process, wasm)

## VET RULES

**`sqlc/db-prepare`**
Built-in: prepare every query on the DB

*Needs database.uri; the DB must already have the current schema.*

**`-- @sqlc-vet-disable <rule>`**
Skip a rule for one query

### CEL variables in a rule

| Variable | Holds |
|---|---|
| `query.sql` | SQL text |
| `query.name` | Query name |
| `query.cmd` | one, many, exec... |
| `query.params` | Parameter list |
| `config.engine` | Configured engine |

## RECIPES

### Minimal sqlc.yaml

```
version: "2"
sql:
  - engine: "postgresql"
    schema: "schema.sql"
    queries: "query.sql"
    gen:
      go:
        package: "db"
        out: "db"
```

### CRUD queries

```
-- name: GetAuthor :one
SELECT * FROM authors WHERE id
= $1;

-- name: ListAuthors :many
SELECT * FROM authors ORDER BY
name;

-- name: DeleteAuthor :exec
DELETE FROM authors WHERE id =
$1;
```

### Custom vet rule

```
rules:
  - name: no-delete
    message: "don't use delete"
    rule:
query.sql.contains("DELETE")
# then add - no-delete under
sql[].rules
```

### CI freshness check

```
sqlc compile
sqlc vet
sqlc diff   # non-zero if
generated code is stale
```