

What is PostgreSQL?

PostgreSQL is a powerful, open source object-relational database system. It has more than 15 years of active development and a proven architecture that has earned it a strong reputation for reliability, data integrity, and correctness. It runs on all major operating systems, including Linux and Windows. It includes most SQL:2008 data types. It also supports storage of binary large objects, including pictures, sounds, or video. It has native programming interfaces and exceptional documentation.



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About PostgreSQL

An enterprise class database, PostgreSQL boasts sophisticated features such as Multi-Version Concurrency Control (MVCC), point in time recovery, tablespaces, asynchronous replication, nested transactions (savepoints), online/hot backups, a sophisticated query planner/optimizer, and write ahead logging for fault tolerance. It supports international character sets, multibyte character encodings, Unicode, and it is locale-aware for sorting, case-sensitivity, and formatting. It is highly scalable both in the sheer quantity of data it can manage and in the number of concurrent users it can accommodate. There are active PostgreSQL systems in production environments that manage in excess of 4 terabytes of data.

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Abstract

Welcome to the *PostgreSQL 9.0 Official Documentation*! After many years of development, PostgreSQL has become feature-complete in many areas. This release shows a targeted approach to adding features (e.g., authentication, monitoring, space reuse), and adds capabilities defined in the later SQL standards.

Part VI.

Reference

The entries in this Reference are meant to provide in reasonable length an authoritative, complete, and formal summary about their respective subjects. More information about the use of PostgreSQL, in narrative, tutorial, or example form, can be found in other parts of this book. See the cross-references listed on each reference page.

The reference entries are also available as traditional "man" pages.

I. SQL Commands

This part contains reference information for the SQL commands supported by PostgreSQL. By "SQL" the language in general is meant; information about the standards conformance and compatibility of each command can be found on the respective reference page.

ABORT

Name

ABORT -- abort the current transaction

Synopsis

```
ABORT [ WORK | TRANSACTION ]
```

Description

ABORT rolls back the current transaction and causes all the updates made by the transaction to be discarded. This command is identical in behavior to the standard SQL command ROLLBACK, and is present only for historical reasons.

Parameters

```
WORK  
TRANSACTION
```

Optional key words. They have no effect.

Notes

Use COMMIT to successfully terminate a transaction.

Issuing ABORT when not inside a transaction does no harm, but it will provoke a warning message.

Examples

To abort all changes:

```
ABORT;
```

Compatibility

This command is a PostgreSQL extension present for historical reasons. `ROLLBACK` is the equivalent standard SQL command.

See Also

`BEGIN`, `COMMIT`, `ROLLBACK`

ALTER AGGREGATE

Name

`ALTER AGGREGATE` -- change the definition of an aggregate function

Synopsis

```
ALTER AGGREGATE name ( type [ , ... ] ) RENAME TO new_name
ALTER AGGREGATE name ( type [ , ... ] ) OWNER TO new_owner
ALTER AGGREGATE name ( type [ , ... ] ) SET SCHEMA new_schema
```

Description

`ALTER AGGREGATE` changes the definition of an aggregate function.

You must own the aggregate function to use `ALTER AGGREGATE`. To change the schema of an aggregate function, you must also have `CREATE` privilege on the new schema. To alter the owner, you must also be a direct or indirect member of the new owning role, and that role must have `CREATE` privilege on the aggregate function's schema. (These restrictions enforce that altering the owner doesn't do anything you couldn't do by dropping and recreating the aggregate function. However, a superuser can alter ownership of any aggregate function anyway.)

Parameters

name

The name (optionally schema-qualified) of an existing aggregate function.

type

An input data type on which the aggregate function operates. To reference a zero-argument aggregate function, write `*` in place of the list of input data types.

new_name

The new name of the aggregate function.

new_owner

The new owner of the aggregate function.

new_schema

The new schema for the aggregate function.

Examples

To rename the aggregate function `myavg` for type `integer` to `my_average` :

```
ALTER AGGREGATE myavg(integer) RENAME TO my_average;
```

To change the owner of the aggregate function `myavg` for type `integer` to `joe`:

```
ALTER AGGREGATE myavg(integer) OWNER TO joe;
```

To move the aggregate function `myavg` for type `integer` into schema `myschema`:

```
ALTER AGGREGATE myavg(integer) SET SCHEMA myschema;
```

Compatibility

There is no `ALTER AGGREGATE` statement in the SQL standard.

See Also

`CREATE AGGREGATE`, `DROP AGGREGATE`

ALTER CONVERSION

Name

`ALTER CONVERSION` -- change the definition of a conversion

Synopsis

```
ALTER CONVERSION name RENAME TO new_name
```

```
ALTER CONVERSION name OWNER TO new_owner
```

Description

`ALTER CONVERSION` changes the definition of a conversion.

You must own the conversion to use `ALTER CONVERSION`. To alter the owner, you must also be a direct or indirect member of the new owning role, and that role must have `CREATE` privilege on the conversion's schema. (These restrictions enforce that altering the owner doesn't do anything you couldn't do by dropping and recreating the conversion. However, a superuser can alter ownership of any conversion anyway.)

Parameters

name

The name (optionally schema-qualified) of an existing conversion.

New_name

The new name of the conversion.

New_owner

The new owner of the conversion.

Examples

To rename the conversion `iso_8859_1_to_utf8` to `latin1_to_unicode`:

```
ALTER CONVERSION iso_8859_1_to_utf8 RENAME TO latin1_to_unicode;
```

To change the owner of the conversion `iso_8859_1_to_utf8` to `joe`:

```
ALTER CONVERSION iso_8859_1_to_utf8 OWNER TO joe;
```

Compatibility

There is no `ALTER CONVERSION` statement in the SQL standard.

See Also

CREATE CONVERSION, DROP CONVERSION

ALTER DATABASE

Name

ALTER DATABASE -- change a database

Synopsis

```
ALTER DATABASE name [ [ WITH ] option [ ... ] ]
```

where *option* can be:

```
CONNECTION LIMIT conlimit
```

```
ALTER DATABASE name RENAME TO new_name
```

```
ALTER DATABASE name OWNER TO new_owner
```

```
ALTER DATABASE name SET TABLESPACE new_tablespace
```

```
ALTER DATABASE name SET configuration_parameter { TO | = } { value | DEFAULT }
```

```
ALTER DATABASE name SET configuration_parameter FROM CURRENT
```

```
ALTER DATABASE name RESET configuration_parameter
```

```
ALTER DATABASE name RESET ALL
```

Description

`ALTER DATABASE` changes the attributes of a database.

The first form changes certain per-database settings. (See below for details.) Only the database owner or a superuser can change these settings.

The second form changes the name of the database. Only the database owner or a superuser can rename a database; non-superuser owners must also have the `CREATEDB` privilege. The current database cannot be renamed. (Connect to a different database if you need to do that.)

The third form changes the owner of the database. To alter the owner, you must own the database and also be a direct or indirect member of the new owning role, and you must have the `CREATEDB` privilege. (Note that superusers have all these privileges automatically.)

The fourth form changes the default tablespace of the database. Only the database owner or a superuser can do this; you must also have create privilege for the new tablespace. This command physically moves any tables or indexes in the database's old default tablespace to the new tablespace. Note that tables and indexes in non-default tablespaces are not affected.

The remaining forms change the session default for a run-time configuration variable for a PostgreSQL database. Whenever a new session is subsequently started in that database, the specified value becomes the session default value. The database-specific default overrides whatever setting is present in `postgresql.conf` or has been received from the `postgres` command line. Only the database owner or a superuser can change the session defaults for a database. Certain variables cannot be set this way, or can only be set by a superuser.

Parameters

name

The name of the database whose attributes are to be altered.

connlimit

How many concurrent connections can be made to this database. -1 means no limit.

new_name

The new name of the database.

new_owner

The new owner of the database.

new_tablespace

The new default tablespace of the database.

configuration_parameter
value

Set this database's session default for the specified configuration parameter to the given value. If *value* is `DEFAULT` or, equivalently, `RESET` is used, the database-specific setting is removed, so the system-wide default setting will be inherited in new sessions. Use `RESET ALL` to clear all database-specific settings. `SET FROM CURRENT` saves the session's current value of the parameter as the database-specific value.

See `SET` and *Chapter 18* (Vol.II) for more information about allowed parameter names and values.

Notes

It is also possible to tie a session default to a specific role rather than to a database; see `ALTER ROLE`. Role-specific settings override database-specific ones if there is a conflict.

Examples

To disable index scans by default in the database `test`:

```
ALTER DATABASE test SET enable_indexscan TO off;
```

Compatibility

The `ALTER DATABASE` statement is a PostgreSQL extension.

See Also

`CREATE DATABASE`, `DROP DATABASE`, `SET`, `CREATE TABLESPACE`

ALTER DEFAULT PRIVILEGES

Name

`ALTER DEFAULT PRIVILEGES` -- define default access privileges

Synopsis

```
ALTER DEFAULT PRIVILEGES
  [ FOR { ROLE | USER } target_role [, ...] ]
  [ IN SCHEMA schema_name [, ...] ]
  abbreviated_grant_or_revoke
```

where `abbreviated_grant_or_revoke` is one of:

```
GRANT { { SELECT | INSERT | UPDATE | DELETE | TRUNCATE | REFERENCES | TRIGGER }
  [, ...] | ALL [ PRIVILEGES ] }
```

```

ON TABLES
TO { [ GROUP ] role_name | PUBLIC } [, ...] [ WITH GRANT OPTION ]

GRANT { { USAGE | SELECT | UPDATE }
[,...] | ALL [ PRIVILEGES ] }
ON SEQUENCES
TO { [ GROUP ] role_name | PUBLIC } [, ...] [ WITH GRANT OPTION ]

GRANT { EXECUTE | ALL [ PRIVILEGES ] }
ON FUNCTIONS
TO { [ GROUP ] role_name | PUBLIC } [, ...] [ WITH GRANT OPTION ]

REVOKE [ GRANT OPTION FOR ]
{ { SELECT | INSERT | UPDATE | DELETE | TRUNCATE | REFERENCES | TRIGGER }
[,...] | ALL [ PRIVILEGES ] }
ON TABLES
FROM { [ GROUP ] role_name | PUBLIC } [, ...]
[ CASCADE | RESTRICT ]

REVOKE [ GRANT OPTION FOR ]
{ { USAGE | SELECT | UPDATE }
[,...] | ALL [ PRIVILEGES ] }
ON SEQUENCES
FROM { [ GROUP ] role_name | PUBLIC } [, ...]
[ CASCADE | RESTRICT ]

REVOKE [ GRANT OPTION FOR ]
{ EXECUTE | ALL [ PRIVILEGES ] }
ON FUNCTIONS
FROM { [ GROUP ] role_name | PUBLIC } [, ...]
[ CASCADE | RESTRICT ]

```

Description

`ALTER DEFAULT PRIVILEGES` allows you to set the privileges that will be applied to objects created in the future. (It does not affect privileges assigned to already-existing objects.) Currently, only the privileges for tables (including views), sequences, and functions can be altered.

You can change default privileges only for objects that will be created by yourself or by roles that you are a member of. The privileges can be set globally (i.e., for all objects created in the current database), or just for objects created in specified schemas. Default privileges that are specified per-schema are added to whatever the global default privileges are for the particular object type.

As explained under `GRANT`, the default privileges for any object type normally grant all grantable permissions to the object owner, and may grant some privileges to `PUBLIC` as well. However, this behavior can be changed by altering the global default privileges with `ALTER DEFAULT PRIVILEGES`.

Parameters

target_role

The name of an existing role of which the current role is a member. If `FOR ROLE` is omitted, the current role is assumed.

schema_name

The name of an existing schema. Each *target_role* must have `CREATE` privileges for each specified schema. If `IN SCHEMA` is omitted, the global default privileges are altered.

role_name

The name of an existing role to grant or revoke privileges for. This parameter, and all the other parameters in *abbreviated_grant_or_revoke*, act as described under `GRANT` or `REVOKE`, except that one is setting permissions for a whole class of objects rather than specific named objects.

Notes

Use `psql's \ddp` command to obtain information about existing assignments of default privileges. The meaning of the privilege values is the same as explained for `\dp` under `GRANT`.

If you wish to drop a role for which the default privileges have been altered, it is necessary to reverse the changes in its default privileges or use `DROP OWNED BY` to get rid of the default privileges entry for the role.

Examples

Grant `SELECT` privilege to everyone for all tables (and views) you subsequently create in schema `myschema`, and allow role `webuser` to `INSERT` into them too:

```
ALTER DEFAULT PRIVILEGES IN SCHEMA myschema GRANT SELECT ON TABLES TO PUBLIC;
ALTER DEFAULT PRIVILEGES IN SCHEMA myschema GRANT INSERT ON TABLES TO webuser;
```

Undo the above, so that subsequently-created tables won't have any more permissions than normal:

```
ALTER DEFAULT PRIVILEGES IN SCHEMA myschema REVOKE SELECT ON TABLES FROM PUBLIC;
ALTER DEFAULT PRIVILEGES IN SCHEMA myschema REVOKE INSERT ON TABLES FROM webuser;
```

Remove the public `EXECUTE` permission that is normally granted on functions, for all functions subsequently created by role `admin`:

```
ALTER DEFAULT PRIVILEGES FOR ROLE admin REVOKE EXECUTE ON FUNCTIONS FROM PUBLIC;
```

Compatibility

There is no `ALTER DEFAULT PRIVILEGES` statement in the SQL standard.

See AlsoGRANT, REVOKE

ALTER DOMAIN**Name**

ALTER DOMAIN -- change the definition of a domain

Synopsis

```
ALTER DOMAIN name
    { SET DEFAULT expression | DROP DEFAULT }
ALTER DOMAIN name
    { SET | DROP } NOT NULL
ALTER DOMAIN name
    ADD domain_constraint
ALTER DOMAIN name
    DROP CONSTRAINT constraint_name [ RESTRICT | CASCADE ]
ALTER DOMAIN name
    OWNER TO new_owner
ALTER DOMAIN name
    SET SCHEMA new_schema
```

Description

ALTER DOMAIN changes the definition of an existing domain. There are several sub-forms:

SET/DROP DEFAULT

These forms set or remove the default value for a domain. Note that defaults only apply to subsequent INSERT commands; they do not affect rows already in a table using the domain.

SET/DROP NOT NULL

These forms change whether a domain is marked to allow NULL values or to reject NULL values. You can only SET NOT NULL when the columns using the domain contain no null values.

ADD *domain_constraint*

This form adds a new constraint to a domain using the same syntax as CREATE DOMAIN. This will only succeed if all columns using the domain satisfy the new constraint.

DROP CONSTRAINT

This form drops constraints on a domain.

OWNER

This form changes the owner of the domain to the specified user.

SET SCHEMA

This form changes the schema of the domain. Any constraints associated with the domain are moved into the new schema as well.

You must own the domain to use `ALTER DOMAIN`. To change the schema of a domain, you must also have `CREATE` privilege on the new schema. To alter the owner, you must also be a direct or indirect member of the new owning role, and that role must have `CREATE` privilege on the domain's schema. (These restrictions enforce that altering the owner doesn't do anything you couldn't do by dropping and recreating the domain. However, a superuser can alter ownership of any domain anyway.)

Parameters

name

The name (possibly schema-qualified) of an existing domain to alter.

domain_constraint

New domain constraint for the domain.

constraint_name

Name of an existing constraint to drop.

CASCADE

Automatically drop objects that depend on the constraint.

RESTRICT

Refuse to drop the constraint if there are any dependent objects. This is the default behavior.

new_owner

The user name of the new owner of the domain.

new_schema

The new schema for the domain.

Notes

Currently, `ALTER DOMAIN ADD CONSTRAINT` and `ALTER DOMAIN SET NOT NULL` will fail if the named domain or any derived domain is used within a composite-type column of any table in the database. They should eventually be improved to be able to verify the new constraint for such nested columns.

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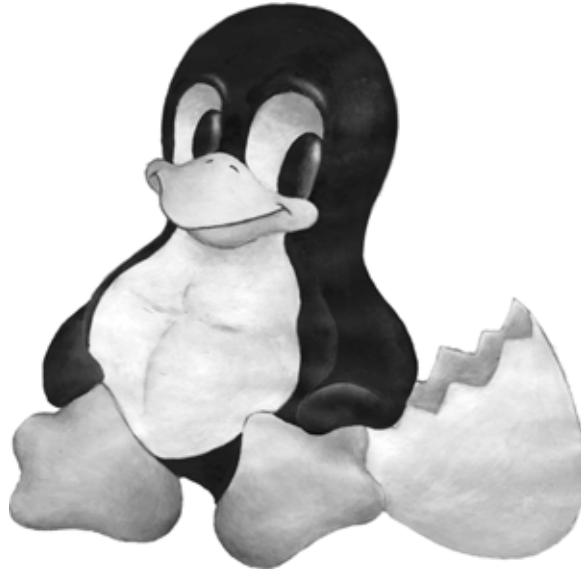
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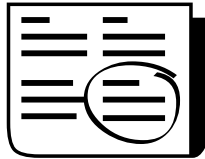


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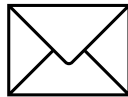


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