# Quick start

<https://www.postgresql.org/docs/manuals/>

## Install Postgresql

There are two way to install postgresql on Centos. Yum or binary packages. After 11 version, Postgresql doesn’t support the binary packages on Centos. If we want to install postgresql via binary packages, we need to build the package via source code.

The following is the install link: <https://www.postgresql.org/download/linux/redhat/>

We can get the binary package via this link: <https://www.enterprisedb.com/download-postgresql-binaries>.

The following is the step to install postgresql via binary package.

### Get the binary package

<https://get.enterprisedb.com/postgresql/postgresql-10.10-1-linux-x64-binaries.tar.gz>

### unzip the package

[root@centos7 ~]# tar zxf postgresql-10.9-1-linux-x64-binaries.tar.gz

[root@centos7 ~]# cd pgsql/

[root@centos7 pgsql]# ls

bin doc include lib pgAdmin 4 share stackbuilder

[root@centos7 pgsql]#

### Create a postgresql user

Postgresql can’t use root to start, so we need to use a normal user to start the postgresql process. We can create a new user for postgresql or just use a normal user.

### Install postgresql to a folder

|  |
| --- |
| [root@centos7 pgsql]# cd ..  [root@centos7 ~]# mv pgsql/ /opt/  [root@centos7 ~]# chown postgres:postgres /opt/pgsql/ -R |

### Init postgresql

|  |
| --- |
| [root@centos7 ~]# chown postgres:postgres /opt/pgsql/ -R  [root@centos7 ~]# su postgres  bash-4.2$ cd /opt/pgsql/bin/  bash-4.2$ ./initdb -D ../data  The files belonging to this database system will be owned by user "postgres".  This user must also own the server process.  The database cluster will be initialized with locale "en\_US.UTF-8".  The default database encoding has accordingly been set to "UTF8".  The default text search configuration will be set to "english".  Data page checksums are disabled.  creating directory ../data ... ok  creating subdirectories ... ok  selecting default max\_connections ... 100  selecting default shared\_buffers ... 128MB  selecting default timezone ... PRC  selecting dynamic shared memory implementation ... posix  creating configuration files ... ok  running bootstrap script ... ok  performing post-bootstrap initialization ... ok  syncing data to disk ... ok  WARNING: enabling "trust" authentication for local connections  You can change this by editing pg\_hba.conf or using the option -A, or  --auth-local and --auth-host, the next time you run initdb.  Success. You can now start the database server using:  ./pg\_ctl -D ../data -l logfile start  **bash-4.2$ ls -lt ../data/**  total 48  drwx------. 4 postgres postgres 68 Aug 14 02:48 pg\_logical  drwx------. 5 postgres postgres 41 Aug 14 02:48 base  drwx------. 2 postgres postgres 4096 Aug 14 02:48 global  drwx------. 2 postgres postgres 18 Aug 14 02:48 pg\_notify  drwx------. 2 postgres postgres 18 Aug 14 02:48 pg\_subtrans  drwx------. 3 postgres postgres 60 Aug 14 02:48 pg\_wal  drwx------. 2 postgres postgres 18 Aug 14 02:48 pg\_xact  -rw-------. 1 postgres postgres 4513 Aug 14 02:48 pg\_hba.conf  -rw-------. 1 postgres postgres 1636 Aug 14 02:48 pg\_ident.conf  -rw-------. 1 postgres postgres 88 Aug 14 02:48 postgresql.auto.conf  -rw-------. 1 postgres postgres 22855 Aug 14 02:48 postgresql.conf  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_commit\_ts  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_dynshmem  drwx------. 4 postgres postgres 36 Aug 14 02:48 pg\_multixact  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_replslot  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_serial  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_snapshots  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_stat  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_stat\_tmp  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_tblspc  drwx------. 2 postgres postgres 6 Aug 14 02:48 pg\_twophase  -rw-------. 1 postgres postgres 3 Aug 14 02:48 PG\_VERSION |

### Start postgresql

|  |
| --- |
| bash-4.2$ ./pg\_ctl -D ../data -l logfile start  bash-4.2$ ps -ef|grep postgres  root 5419 3082 0 02:48 pts/1 00:00:00 su postgres  postgres 5420 5419 0 02:48 pts/1 00:00:00 bash  postgres 6269 1 0 03:22 pts/1 00:00:00 /opt/pgsql/bin/postgres -D ../data  postgres 6271 6269 0 03:22 ? 00:00:00 postgres: checkpointer process  postgres 6272 6269 0 03:22 ? 00:00:00 postgres: writer process  postgres 6273 6269 0 03:22 ? 00:00:00 postgres: wal writer process  postgres 6274 6269 0 03:22 ? 00:00:00 postgres: autovacuum launcher process  postgres 6275 6269 0 03:22 ? 00:00:00 postgres: stats collector process  postgres 6276 6269 0 03:22 ? 00:00:00 postgres: bgworker: logical replication launcher |

### Create a start script

|  |
| --- |
| bash-4.2$ vi start.sh  bash-4.2$ chmod 755 start.sh  bash-4.2$ cat start.sh  #!/bin/sh  ./pg\_ctl -D ../data -l logfile start |

### Connect to postgresql via psql

|  |
| --- |
| **bash-4.2$ psql -h localhost**  psql (11.4, server 10.9)  Type "help" for help.  **postgres=# help**  You are using psql, the command-line interface to PostgreSQL.  Type: \copyright for distribution terms  \h for help with SQL commands  \? for help with psql commands  \g or terminate with semicolon to execute query  \q to quit |

### Stop postgresql

|  |
| --- |
| **bash-4.2$ ps -ef|grep post**  root 1512 1 0 00:35 ? 00:00:00 /usr/libexec/postfix/master -w  postfix 1514 1512 0 00:35 ? 00:00:00 qmgr -l -t unix -u  postfix 4684 1512 0 02:15 ? 00:00:00 pickup -l -t unix -u  root 5419 3082 0 02:48 pts/1 00:00:00 su postgres  postgres 5420 5419 0 02:48 pts/1 00:00:00 bash  postgres **6269** 1 0 03:22 pts/1 00:00:00 /opt/pgsql/bin/postgres -D ../data  postgres 6271 6269 0 03:22 ? 00:00:00 postgres: checkpointer process  postgres 6272 6269 0 03:22 ? 00:00:00 postgres: writer process  postgres 6273 6269 0 03:22 ? 00:00:00 postgres: wal writer process  postgres 6274 6269 0 03:22 ? 00:00:00 postgres: autovacuum launcher process  postgres 6275 6269 0 03:22 ? 00:00:00 postgres: stats collector process  postgres 6276 6269 0 03:22 ? 00:00:00 postgres: bgworker: logical replication launcher  postgres 6596 5420 0 03:36 pts/1 00:00:00 ps -ef  postgres 6597 5420 0 03:36 pts/1 00:00:00 grep post  **bash-4.2$ kill 6269**  **bash-4.2$ ps -ef|grep post**  root 1512 1 0 00:35 ? 00:00:00 /usr/libexec/postfix/master -w  postfix 1514 1512 0 00:35 ? 00:00:00 qmgr -l -t unix -u  postfix 4684 1512 0 02:15 ? 00:00:00 pickup -l -t unix -u  root 5419 3082 0 02:48 pts/1 00:00:00 su postgres  postgres 5420 5419 0 02:48 pts/1 00:00:00 bash  postgres 6600 5420 0 03:36 pts/1 00:00:00 ps -ef  postgres 6601 5420 0 03:36 pts/1 00:00:00 grep post |

## How to connect to Postgresql

By default, Postgresql just allows use localhost to connect to Postgresql service via port 5432. If we need to update the configuration files.

|  |
| --- |
| bash-4.2$ psql -h 192.168.1.105  psql: could not connect to server: Connection refused  Is the server running on host "192.168.1.105" and accepting  TCP/IP connections on port 5432? |

We need to config the following configuration files.

### ../data/postgresql.conf

|  |
| --- |
| listen\_addresses = '\*' |
| By default, postgresql just listen localhost:5432, we need to change the listen\_addresses to \*. |

The default listen:

|  |
| --- |
| bash-4.2$ netstat -plnt|grep 5432  (Not all processes could be identified, non-owned process info  will not be shown, you would have to be root to see it all.)  tcp 0 0 127.0.0.1:5432 0.0.0.0:\* LISTEN 6269/postgres  tcp6 0 0 ::1:5432 :::\* LISTEN 6269/postgres |

After changing the listen\_addresses and restart Postgresql

|  |
| --- |
| bash-4.2$ netstat -plnt |grep 5432  (Not all processes could be identified, non-owned process info  will not be shown, you would have to be root to see it all.)  tcp 0 0 0.0.0.0:5432 0.0.0.0:\* LISTEN 6646/postgres  tcp6 0 0 :::5432 :::\* LISTEN 6646/postgres  bash-4.2$ |

Try to connect to postgresql

|  |
| --- |
| bash-4.2$ psql -h 192.168.1.105  psql: FATAL: no pg\_hba.conf entry for host "192.168.1.105", user "postgres", database "postgres", SSL off |

### ../data/pg\_hba.conf

The detail of the configuration file is pgsql\doc\postgresql\html\auth-pg-hba-conf.html

Add the following line.

|  |
| --- |
| host all all 0.0.0.0/0 trust |

Restart postgresql and connect again:

|  |
| --- |
| bash-4.2$ ps -ef|grep post  root 1512 1 0 00:35 ? 00:00:00 /usr/libexec/postfix/master -w  postfix 1514 1512 0 00:35 ? 00:00:00 qmgr -l -t unix -u  postfix 4684 1512 0 02:15 ? 00:00:00 pickup -l -t unix -u  root 5419 3082 0 02:48 pts/1 00:00:00 su postgres  postgres 5420 5419 0 02:48 pts/1 00:00:00 bash  postgres 6646 1 0 03:39 pts/1 00:00:00 /opt/pgsql/bin/postgres -D ../data  postgres 6648 6646 0 03:39 ? 00:00:00 postgres: checkpointer process  postgres 6649 6646 0 03:39 ? 00:00:00 postgres: writer process  postgres 6650 6646 0 03:39 ? 00:00:00 postgres: wal writer process  postgres 6651 6646 0 03:39 ? 00:00:00 postgres: autovacuum launcher process  postgres 6652 6646 0 03:39 ? 00:00:00 postgres: stats collector process  postgres 6653 6646 0 03:39 ? 00:00:00 postgres: bgworker: logical replication launcher  postgres 6710 5420 0 03:43 pts/1 00:00:00 ps -ef  postgres 6711 5420 0 03:43 pts/1 00:00:00 grep post  bash-4.2$ kill 6646  bash-4.2$ ./start.sh  waiting for server to start.... done  server started  bash-4.2$ psql -h 192.168.1.105  psql (11.4, server 10.9)  Type "help" for help.  postgres=# |

## Create a User

We need to create a database and set a user to connect to postgresql and read/write the database.

|  |
| --- |
| postgres=# create database test;  CREATE DATABASE  postgres=# CREATE ROLE test;  CREATE ROLE  postgres=# ALTER ROLE test LOGIN ;  ALTER ROLE  postgres=# ALTER ROLE test with password '123456';  ALTER ROLE  postgres=# GRANT ALL on DATABASE test to test;  GRANT  postgres=# |

Connect to test database using test user:

|  |
| --- |
| bash-4.2$ psql -h 192.168.1.105 -U test -W  Password:  psql (11.4, server 10.9)  Type "help" for help.  test=> |

## Basic command

### \h

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| --- |
| **postgres=# \h**  Available help:  ABORT CREATE USER  ALTER AGGREGATE CREATE USER MAPPING  ALTER COLLATION CREATE VIEW  ALTER CONVERSION DEALLOCATE  ALTER DATABASE DECLARE  ALTER DEFAULT PRIVILEGES DELETE  ALTER DOMAIN DISCARD  ALTER EVENT TRIGGER DO  ALTER EXTENSION DROP ACCESS METHOD  ALTER FOREIGN DATA WRAPPER DROP AGGREGATE  ALTER FOREIGN TABLE DROP CAST  ALTER FUNCTION DROP COLLATION  ALTER GROUP DROP CONVERSION  ALTER INDEX DROP DATABASE  ALTER LANGUAGE DROP DOMAIN  ALTER LARGE OBJECT DROP EVENT TRIGGER  ALTER MATERIALIZED VIEW DROP EXTENSION  ALTER OPERATOR DROP FOREIGN DATA WRAPPER  ALTER OPERATOR CLASS DROP FOREIGN TABLE  ALTER OPERATOR FAMILY DROP FUNCTION  ALTER POLICY DROP GROUP  ALTER PROCEDURE DROP INDEX  ALTER PUBLICATION DROP LANGUAGE  ALTER ROLE DROP MATERIALIZED VIEW  ALTER ROUTINE DROP OPERATOR  ALTER RULE DROP OPERATOR CLASS  ALTER SCHEMA DROP OPERATOR FAMILY  ALTER SEQUENCE DROP OWNED  ALTER SERVER DROP POLICY  ALTER STATISTICS DROP PROCEDURE  ALTER SUBSCRIPTION DROP PUBLICATION  ALTER SYSTEM DROP ROLE  ALTER TABLE DROP ROUTINE  ALTER TABLESPACE DROP RULE  ALTER TEXT SEARCH CONFIGURATION DROP SCHEMA  ALTER TEXT SEARCH DICTIONARY DROP SEQUENCE  ALTER TEXT SEARCH PARSER DROP SERVER  ALTER TEXT SEARCH TEMPLATE DROP STATISTICS  ALTER TRIGGER DROP SUBSCRIPTION  ALTER TYPE DROP TABLE  ALTER USER DROP TABLESPACE  ALTER USER MAPPING DROP TEXT SEARCH CONFIGURATION  ALTER VIEW DROP TEXT SEARCH DICTIONARY  ANALYZE DROP TEXT SEARCH PARSER  BEGIN DROP TEXT SEARCH TEMPLATE  CALL DROP TRANSFORM  CHECKPOINT DROP TRIGGER  CLOSE DROP TYPE  CLUSTER DROP USER  COMMENT DROP USER MAPPING  COMMIT DROP VIEW  COMMIT PREPARED END  COPY EXECUTE  CREATE ACCESS METHOD EXPLAIN  CREATE AGGREGATE FETCH  CREATE CAST GRANT  CREATE COLLATION IMPORT FOREIGN SCHEMA  CREATE CONVERSION INSERT  CREATE DATABASE LISTEN  CREATE DOMAIN LOAD  CREATE EVENT TRIGGER LOCK  CREATE EXTENSION MOVE  CREATE FOREIGN DATA WRAPPER NOTIFY  CREATE FOREIGN TABLE PREPARE  CREATE FUNCTION PREPARE TRANSACTION  CREATE GROUP REASSIGN OWNED  CREATE INDEX REFRESH MATERIALIZED VIEW  CREATE LANGUAGE REINDEX  CREATE MATERIALIZED VIEW RELEASE SAVEPOINT  CREATE OPERATOR RESET  CREATE OPERATOR CLASS REVOKE  CREATE OPERATOR FAMILY ROLLBACK  CREATE POLICY ROLLBACK PREPARED  CREATE PROCEDURE ROLLBACK TO SAVEPOINT  CREATE PUBLICATION SAVEPOINT  CREATE ROLE SECURITY LABEL  CREATE RULE SELECT  CREATE SCHEMA SELECT INTO  CREATE SEQUENCE SET  CREATE SERVER SET CONSTRAINTS  CREATE STATISTICS SET ROLE  CREATE SUBSCRIPTION SET SESSION AUTHORIZATION  CREATE TABLE SET TRANSACTION  CREATE TABLE AS SHOW  CREATE TABLESPACE START TRANSACTION  CREATE TEXT SEARCH CONFIGURATION TABLE  CREATE TEXT SEARCH DICTIONARY TRUNCATE  CREATE TEXT SEARCH PARSER UNLISTEN  CREATE TEXT SEARCH TEMPLATE UPDATE  CREATE TRANSFORM VACUUM  CREATE TRIGGER VALUES  CREATE TYPE WITH |

### \?

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| --- |
| postgres=# \?  General  \copyright show PostgreSQL usage and distribution terms  \crosstabview [COLUMNS] execute query and display results in crosstab  \errverbose show most recent error message at maximum verbosity  \g [FILE] or ; execute query (and send results to file or |pipe)  \gdesc describe result of query, without executing it  \gexec execute query, then execute each value in its result  \gset [PREFIX] execute query and store results in psql variables  \gx [FILE] as \g, but forces expanded output mode  \q quit psql  \watch [SEC] execute query every SEC seconds  Help  \? [commands] show help on backslash commands  \? options show help on psql command-line options  \? variables show help on special variables  \h [NAME] help on syntax of SQL commands, \* for all commands  Query Buffer  \e [FILE] [LINE] edit the query buffer (or file) with external editor  \ef [FUNCNAME [LINE]] edit function definition with external editor  \ev [VIEWNAME [LINE]] edit view definition with external editor  \p show the contents of the query buffer  \r reset (clear) the query buffer  \s [FILE] display history or save it to file  \w FILE write query buffer to file  Input/Output  \copy ... perform SQL COPY with data stream to the client host  \echo [STRING] write string to standard output  \i FILE execute commands from file  \ir FILE as \i, but relative to location of current script  \o [FILE] send all query results to file or |pipe  \qecho [STRING] write string to query output stream (see \o)  Conditional  \if EXPR begin conditional block  \elif EXPR alternative within current conditional block  \else final alternative within current conditional block  \endif end conditional block  Informational  (options: S = show system objects, + = additional detail)  \d[S+] list tables, views, and sequences  \d[S+] NAME describe table, view, sequence, or index  \da[S] [PATTERN] list aggregates  \dA[+] [PATTERN] list access methods  \db[+] [PATTERN] list tablespaces  \dc[S+] [PATTERN] list conversions  \dC[+] [PATTERN] list casts  \dd[S] [PATTERN] show object descriptions not displayed elsewhere  \dD[S+] [PATTERN] list domains  \ddp [PATTERN] list default privileges  \dE[S+] [PATTERN] list foreign tables  \det[+] [PATTERN] list foreign tables  \des[+] [PATTERN] list foreign servers  \deu[+] [PATTERN] list user mappings  \dew[+] [PATTERN] list foreign-data wrappers  \df[anptw][S+] [PATRN] list [only agg/normal/procedures/trigger/window] functions  \dF[+] [PATTERN] list text search configurations  \dFd[+] [PATTERN] list text search dictionaries  \dFp[+] [PATTERN] list text search parsers  \dFt[+] [PATTERN] list text search templates  \dg[S+] [PATTERN] list roles  \di[S+] [PATTERN] list indexes  \dl list large objects, same as \lo\_list  \dL[S+] [PATTERN] list procedural languages  \dm[S+] [PATTERN] list materialized views  \dn[S+] [PATTERN] list schemas  \do[S] [PATTERN] list operators  \dO[S+] [PATTERN] list collations  \dp [PATTERN] list table, view, and sequence access privileges  \drds [PATRN1 [PATRN2]] list per-database role settings  \dRp[+] [PATTERN] list replication publications  \dRs[+] [PATTERN] list replication subscriptions  \ds[S+] [PATTERN] list sequences  \dt[S+] [PATTERN] list tables  \dT[S+] [PATTERN] list data types  \du[S+] [PATTERN] list roles  \dv[S+] [PATTERN] list views  \dx[+] [PATTERN] list extensions  \dy [PATTERN] list event triggers  \l[+] [PATTERN] list databases  \sf[+] FUNCNAME show a function's definition  \sv[+] VIEWNAME show a view's definition  \z [PATTERN] same as \dp  Formatting  \a toggle between unaligned and aligned output mode  \C [STRING] set table title, or unset if none  \f [STRING] show or set field separator for unaligned query output  \H toggle HTML output mode (currently off)  \pset [NAME [VALUE]] set table output option  (NAME := {border|columns|expanded|fieldsep|fieldsep\_zero|  footer|format|linestyle|null|numericlocale|pager|  pager\_min\_lines|recordsep|recordsep\_zero|tableattr|title|  tuples\_only|unicode\_border\_linestyle|  unicode\_column\_linestyle|unicode\_header\_linestyle})  \t [on|off] show only rows (currently off)  \T [STRING] set HTML <table> tag attributes, or unset if none  \x [on|off|auto] toggle expanded output (currently off)  Connection  \c[onnect] {[DBNAME|- USER|- HOST|- PORT|-] | conninfo}  connect to new database (currently "postgres")  \conninfo display information about current connection  \encoding [ENCODING] show or set client encoding  \password [USERNAME] securely change the password for a user  Operating System  \cd [DIR] change the current working directory  \setenv NAME [VALUE] set or unset environment variable  \timing [on|off] toggle timing of commands (currently off)  \! [COMMAND] execute command in shell or start interactive shell  Variables  \prompt [TEXT] NAME prompt user to set internal variable  \set [NAME [VALUE]] set internal variable, or list all if no parameters  \unset NAME unset (delete) internal variable  Large Objects  \lo\_export LOBOID FILE  \lo\_import FILE [COMMENT]  \lo\_list  \lo\_unlink LOBOID large object operations |

### Show all

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| --- |
| test=> show ALL;  name | setting | description  -------------------------------------+--------------------+-------------------------------------------------------------------------------------------------------------------------------  allow\_system\_table\_mods | off | Allows modifications of the structure of system tables.  application\_name | psql | Sets the application name to be reported in statistics and logs.  archive\_command | (disabled) | Sets the shell command that will be called to archive a WAL file.  archive\_mode | off | Allows archiving of WAL files using archive\_command.  archive\_timeout | 0 | Forces a switch to the next WAL file if a new file has not been started within N seconds.  array\_nulls | on | Enable input of NULL elements in arrays.  authentication\_timeout | 1min | Sets the maximum allowed time to complete client authentication.  autovacuum | on | Starts the autovacuum subprocess.  autovacuum\_analyze\_scale\_factor | 0.1 | Number of tuple inserts, updates, or deletes prior to analyze as a fraction of reltuples.  autovacuum\_analyze\_threshold | 50 | Minimum number of tuple inserts, updates, or deletes prior to analyze.  autovacuum\_freeze\_max\_age | 200000000 | Age at which to autovacuum a table to prevent transaction ID wraparound.  autovacuum\_max\_workers | 3 | Sets the maximum number of simultaneously running autovacuum worker processes.  autovacuum\_multixact\_freeze\_max\_age | 400000000 | Multixact age at which to autovacuum a table to prevent multixact wraparound.  autovacuum\_naptime | 1min | Time to sleep between autovacuum runs.  autovacuum\_vacuum\_cost\_delay | 20ms | Vacuum cost delay in milliseconds, for autovacuum.  autovacuum\_vacuum\_cost\_limit | -1 | Vacuum cost amount available before napping, for autovacuum.  autovacuum\_vacuum\_scale\_factor | 0.2 | Number of tuple updates or deletes prior to vacuum as a fraction of reltuples.  autovacuum\_vacuum\_threshold | 50 | Minimum number of tuple updates or deletes prior to vacuum.  autovacuum\_work\_mem | -1 | Sets the maximum memory to be used by each autovacuum worker process.  backend\_flush\_after | 0 | Number of pages after which previously performed writes are flushed to disk.  backslash\_quote | safe\_encoding | Sets whether "\'" is allowed in string literals.  bgwriter\_delay | 200ms | Background writer sleep time between rounds.  bgwriter\_flush\_after | 512kB | Number of pages after which previously performed writes are flushed to disk.  bgwriter\_lru\_maxpages | 100 | Background writer maximum number of LRU pages to flush per round.  bgwriter\_lru\_multiplier | 2 | Multiple of the average buffer usage to free per round.  block\_size | 8192 | Shows the size of a disk block.  bonjour | off | Enables advertising the server via Bonjour.  bonjour\_name | | Sets the Bonjour service name.  bytea\_output | hex | Sets the output format for bytea.  check\_function\_bodies | on | Check function bodies during CREATE FUNCTION.  checkpoint\_completion\_target | 0.5 | Time spent flushing dirty buffers during checkpoint, as fraction of checkpoint interval.  checkpoint\_flush\_after | 256kB | Number of pages after which previously performed writes are flushed to disk.  checkpoint\_timeout | 5min | Sets the maximum time between automatic WAL checkpoints.  checkpoint\_warning | 30s | Enables warnings if checkpoint segments are filled more frequently than this.  client\_encoding | UTF8 | Sets the client's character set encoding.  client\_min\_messages | notice | Sets the message levels that are sent to the client.  cluster\_name | | Sets the name of the cluster, which is included in the process title.  commit\_delay | 0 | Sets the delay in microseconds between transaction commit and flushing WAL to disk.  commit\_siblings | 5 | Sets the minimum concurrent open transactions before performing commit\_delay.  constraint\_exclusion | partition | Enables the planner to use constraints to optimize queries.  cpu\_index\_tuple\_cost | 0.005 | Sets the planner's estimate of the cost of processing each index entry during an index scan.  cpu\_operator\_cost | 0.0025 | Sets the planner's estimate of the cost of processing each operator or function call.  cpu\_tuple\_cost | 0.01 | Sets the planner's estimate of the cost of processing each tuple (row).  cursor\_tuple\_fraction | 0.1 | Sets the planner's estimate of the fraction of a cursor's rows that will be retrieved.  data\_checksums | off | Shows whether data checksums are turned on for this cluster.  data\_sync\_retry | off | Whether to continue running after a failure to sync data files.  DateStyle | ISO, MDY | Sets the display format for date and time values.  db\_user\_namespace | off | Enables per-database user names.  deadlock\_timeout | 1s | Sets the time to wait on a lock before checking for deadlock.  debug\_assertions | off | Shows whether the running server has assertion checks enabled.  debug\_pretty\_print | on | Indents parse and plan tree displays.  debug\_print\_parse | off | Logs each query's parse tree.  debug\_print\_plan | off | Logs each query's execution plan.  debug\_print\_rewritten | off | Logs each query's rewritten parse tree.  default\_statistics\_target | 100 | Sets the default statistics target.  default\_tablespace | | Sets the default tablespace to create tables and indexes in.  default\_text\_search\_config | pg\_catalog.english | Sets default text search configuration.  default\_transaction\_deferrable | off | Sets the default deferrable status of new transactions.  default\_transaction\_isolation | read committed | Sets the transaction isolation level of each new transaction.  default\_transaction\_read\_only | off | Sets the default read-only status of new transactions.  default\_with\_oids | off | Create new tables with OIDs by default.  dynamic\_shared\_memory\_type | posix | Selects the dynamic shared memory implementation used.  effective\_cache\_size | 4GB | Sets the planner's assumption about the total size of the data caches.  effective\_io\_concurrency | 1 | Number of simultaneous requests that can be handled efficiently by the disk subsystem.  enable\_bitmapscan | on | Enables the planner's use of bitmap-scan plans.  enable\_gathermerge | on | Enables the planner's use of gather merge plans.  enable\_hashagg | on | Enables the planner's use of hashed aggregation plans.  enable\_hashjoin | on | Enables the planner's use of hash join plans.  enable\_indexonlyscan | on | Enables the planner's use of index-only-scan plans.  enable\_indexscan | on | Enables the planner's use of index-scan plans.  enable\_material | on | Enables the planner's use of materialization.  enable\_mergejoin | on | Enables the planner's use of merge join plans.  enable\_nestloop | on | Enables the planner's use of nested-loop join plans.  enable\_seqscan | on | Enables the planner's use of sequential-scan plans.  enable\_sort | on | Enables the planner's use of explicit sort steps.  enable\_tidscan | on | Enables the planner's use of TID scan plans.  escape\_string\_warning | on | Warn about backslash escapes in ordinary string literals.  event\_source | PostgreSQL | Sets the application name used to identify PostgreSQL messages in the event log.  exit\_on\_error | off | Terminate session on any error.  extra\_float\_digits | 0 | Sets the number of digits displayed for floating-point values.  force\_parallel\_mode | off | Forces use of parallel query facilities.  from\_collapse\_limit | 8 | Sets the FROM-list size beyond which subqueries are not collapsed.  fsync | on | Forces synchronization of updates to disk.  full\_page\_writes | on | Writes full pages to WAL when first modified after a checkpoint.  geqo | on | Enables genetic query optimization.  geqo\_effort | 5 | GEQO: effort is used to set the default for other GEQO parameters.  geqo\_generations | 0 | GEQO: number of iterations of the algorithm.  geqo\_pool\_size | 0 | GEQO: number of individuals in the population.  geqo\_seed | 0 | GEQO: seed for random path selection.  geqo\_selection\_bias | 2 | GEQO: selective pressure within the population.  geqo\_threshold | 12 | Sets the threshold of FROM items beyond which GEQO is used.  gin\_fuzzy\_search\_limit | 0 | Sets the maximum allowed result for exact search by GIN.  gin\_pending\_list\_limit | 4MB | Sets the maximum size of the pending list for GIN index.  hot\_standby | on | Allows connections and queries during recovery.  hot\_standby\_feedback | off | Allows feedback from a hot standby to the primary that will avoid query conflicts.  huge\_pages | try | Use of huge pages on Linux.  idle\_in\_transaction\_session\_timeout | 0 | Sets the maximum allowed duration of any idling transaction.  ignore\_checksum\_failure | off | Continues processing after a checksum failure.  ignore\_system\_indexes | off | Disables reading from system indexes.  integer\_datetimes | on | Datetimes are integer based.  IntervalStyle | postgres | Sets the display format for interval values.  join\_collapse\_limit | 8 | Sets the FROM-list size beyond which JOIN constructs are not flattened.  krb\_caseins\_users | off | Sets whether Kerberos and GSSAPI user names should be treated as case-insensitive.  lc\_collate | en\_US.UTF-8 | Shows the collation order locale.  lc\_ctype | en\_US.UTF-8 | Shows the character classification and case conversion locale.  lc\_messages | en\_US.UTF-8 | Sets the language in which messages are displayed.  lc\_monetary | en\_US.UTF-8 | Sets the locale for formatting monetary amounts.  lc\_numeric | en\_US.UTF-8 | Sets the locale for formatting numbers.  lc\_time | en\_US.UTF-8 | Sets the locale for formatting date and time values.  listen\_addresses | \* | Sets the host name or IP address(es) to listen to.  lo\_compat\_privileges | off | Enables backward compatibility mode for privilege checks on large objects.  local\_preload\_libraries | | Lists unprivileged shared libraries to preload into each backend.  lock\_timeout | 0 | Sets the maximum allowed duration of any wait for a lock.  log\_autovacuum\_min\_duration | -1 | Sets the minimum execution time above which autovacuum actions will be logged.  log\_checkpoints | off | Logs each checkpoint.  log\_connections | off | Logs each successful connection.  log\_destination | stderr | Sets the destination for server log output.  log\_disconnections | off | Logs end of a session, including duration.  log\_duration | off | Logs the duration of each completed SQL statement.  log\_error\_verbosity | default | Sets the verbosity of logged messages.  log\_executor\_stats | off | Writes executor performance statistics to the server log.  log\_file\_mode | 0600 | Sets the file permissions for log files.  log\_hostname | off | Logs the host name in the connection logs.  log\_line\_prefix | %m [%p] | Controls information prefixed to each log line.  log\_lock\_waits | off | Logs long lock waits.  log\_min\_duration\_statement | -1 | Sets the minimum execution time above which statements will be logged.  log\_min\_error\_statement | error | Causes all statements generating error at or above this level to be logged.  log\_min\_messages | warning | Sets the message levels that are logged.  log\_parser\_stats | off | Writes parser performance statistics to the server log.  log\_planner\_stats | off | Writes planner performance statistics to the server log.  log\_replication\_commands | off | Logs each replication command.  log\_rotation\_age | 1d | Automatic log file rotation will occur after N minutes.  log\_rotation\_size | 10MB | Automatic log file rotation will occur after N kilobytes.  log\_statement | none | Sets the type of statements logged.  log\_statement\_stats | off | Writes cumulative performance statistics to the server log.  log\_temp\_files | -1 | Log the use of temporary files larger than this number of kilobytes.  log\_timezone | PRC | Sets the time zone to use in log messages.  log\_truncate\_on\_rotation | off | Truncate existing log files of same name during log rotation.  logging\_collector | off | Start a subprocess to capture stderr output and/or csvlogs into log files.  maintenance\_work\_mem | 64MB | Sets the maximum memory to be used for maintenance operations.  max\_connections | 100 | Sets the maximum number of concurrent connections.  max\_files\_per\_process | 1000 | Sets the maximum number of simultaneously open files for each server process.  max\_function\_args | 100 | Shows the maximum number of function arguments.  max\_identifier\_length | 63 | Shows the maximum identifier length.  max\_index\_keys | 32 | Shows the maximum number of index keys.  max\_locks\_per\_transaction | 64 | Sets the maximum number of locks per transaction.  max\_logical\_replication\_workers | 4 | Maximum number of logical replication worker processes.  max\_parallel\_workers | 8 | Sets the maximum number of parallel workers that can be active at one time.  max\_parallel\_workers\_per\_gather | 2 | Sets the maximum number of parallel processes per executor node.  max\_pred\_locks\_per\_page | 2 | Sets the maximum number of predicate-locked tuples per page.  max\_pred\_locks\_per\_relation | -2 | Sets the maximum number of predicate-locked pages and tuples per relation.  max\_pred\_locks\_per\_transaction | 64 | Sets the maximum number of predicate locks per transaction.  max\_prepared\_transactions | 0 | Sets the maximum number of simultaneously prepared transactions.  max\_replication\_slots | 10 | Sets the maximum number of simultaneously defined replication slots.  max\_stack\_depth | 2MB | Sets the maximum stack depth, in kilobytes.  max\_standby\_archive\_delay | 30s | Sets the maximum delay before canceling queries when a hot standby server is processing archived WAL data.  max\_standby\_streaming\_delay | 30s | Sets the maximum delay before canceling queries when a hot standby server is processing streamed WAL data.  max\_sync\_workers\_per\_subscription | 2 | Maximum number of table synchronization workers per subscription.  max\_wal\_senders | 10 | Sets the maximum number of simultaneously running WAL sender processes.  max\_wal\_size | 1GB | Sets the WAL size that triggers a checkpoint.  max\_worker\_processes | 8 | Maximum number of concurrent worker processes.  min\_parallel\_index\_scan\_size | 512kB | Sets the minimum amount of index data for a parallel scan.  min\_parallel\_table\_scan\_size | 8MB | Sets the minimum amount of table data for a parallel scan.  min\_wal\_size | 80MB | Sets the minimum size to shrink the WAL to.  old\_snapshot\_threshold | -1 | Time before a snapshot is too old to read pages changed after the snapshot was taken.  operator\_precedence\_warning | off | Emit a warning for constructs that changed meaning since PostgreSQL 9.4.  parallel\_setup\_cost | 1000 | Sets the planner's estimate of the cost of starting up worker processes for parallel query.  parallel\_tuple\_cost | 0.1 | Sets the planner's estimate of the cost of passing each tuple (row) from worker to master backend.  password\_encryption | md5 | Encrypt passwords.  port | 5432 | Sets the TCP port the server listens on.  post\_auth\_delay | 0 | Waits N seconds on connection startup after authentication.  pre\_auth\_delay | 0 | Waits N seconds on connection startup before authentication.  quote\_all\_identifiers | off | When generating SQL fragments, quote all identifiers.  random\_page\_cost | 4 | Sets the planner's estimate of the cost of a nonsequentially fetched disk page.  replacement\_sort\_tuples | 150000 | Sets the maximum number of tuples to be sorted using replacement selection.  restart\_after\_crash | on | Reinitialize server after backend crash.  row\_security | on | Enable row security.  search\_path | "$user", public | Sets the schema search order for names that are not schema-qualified.  segment\_size | 1GB | Shows the number of pages per disk file.  seq\_page\_cost | 1 | Sets the planner's estimate of the cost of a sequentially fetched disk page.  server\_encoding | UTF8 | Sets the server (database) character set encoding.  server\_version | 10.9 | Shows the server version.  server\_version\_num | 100009 | Shows the server version as an integer.  session\_replication\_role | origin | Sets the session's behavior for triggers and rewrite rules.  shared\_buffers | 128MB | Sets the number of shared memory buffers used by the server.  ssl | off | Enables SSL connections.  ssl\_ca\_file | | Location of the SSL certificate authority file.  ssl\_cert\_file | server.crt | Location of the SSL server certificate file.  ssl\_crl\_file | | Location of the SSL certificate revocation list file.  ssl\_key\_file | server.key | Location of the SSL server private key file.  ssl\_prefer\_server\_ciphers | on | Give priority to server ciphersuite order.  standard\_conforming\_strings | on | Causes '...' strings to treat backslashes literally.  statement\_timeout | 0 | Sets the maximum allowed duration of any statement.  superuser\_reserved\_connections | 3 | Sets the number of connection slots reserved for superusers.  synchronize\_seqscans | on | Enable synchronized sequential scans.  synchronous\_commit | on | Sets the current transaction's synchronization level.  synchronous\_standby\_names | | Number of synchronous standbys and list of names of potential synchronous ones.  syslog\_facility | local0 | Sets the syslog "facility" to be used when syslog enabled.  syslog\_ident | postgres | Sets the program name used to identify PostgreSQL messages in syslog.  syslog\_sequence\_numbers | on | Add sequence number to syslog messages to avoid duplicate suppression.  syslog\_split\_messages | on | Split messages sent to syslog by lines and to fit into 1024 bytes.  tcp\_keepalives\_count | 9 | Maximum number of TCP keepalive retransmits.  tcp\_keepalives\_idle | 7200 | Time between issuing TCP keepalives.  tcp\_keepalives\_interval | 75 | Time between TCP keepalive retransmits.  temp\_buffers | 8MB | Sets the maximum number of temporary buffers used by each session.  temp\_file\_limit | -1 | Limits the total size of all temporary files used by each process.  temp\_tablespaces | | Sets the tablespace(s) to use for temporary tables and sort files.  TimeZone | PRC | Sets the time zone for displaying and interpreting time stamps.  timezone\_abbreviations | Default | Selects a file of time zone abbreviations.  trace\_notify | off | Generates debugging output for LISTEN and NOTIFY.  trace\_recovery\_messages | log | Enables logging of recovery-related debugging information.  trace\_sort | off | Emit information about resource usage in sorting.  track\_activities | on | Collects information about executing commands.  track\_activity\_query\_size | 1024 | Sets the size reserved for pg\_stat\_activity.query, in bytes.  track\_commit\_timestamp | off | Collects transaction commit time.  track\_counts | on | Collects statistics on database activity.  track\_functions | none | Collects function-level statistics on database activity.  track\_io\_timing | off | Collects timing statistics for database I/O activity.  transaction\_deferrable | off | Whether to defer a read-only serializable transaction until it can be executed with no possible serialization failures.  transaction\_isolation | read committed | Sets the current transaction's isolation level.  transaction\_read\_only | off | Sets the current transaction's read-only status.  transform\_null\_equals | off | Treats "expr=NULL" as "expr IS NULL".  unix\_socket\_group | | Sets the owning group of the Unix-domain socket.  unix\_socket\_permissions | 0777 | Sets the access permissions of the Unix-domain socket.  update\_process\_title | on | Updates the process title to show the active SQL command.  vacuum\_cost\_delay | 0 | Vacuum cost delay in milliseconds.  vacuum\_cost\_limit | 200 | Vacuum cost amount available before napping.  vacuum\_cost\_page\_dirty | 20 | Vacuum cost for a page dirtied by vacuum.  vacuum\_cost\_page\_hit | 1 | Vacuum cost for a page found in the buffer cache.  vacuum\_cost\_page\_miss | 10 | Vacuum cost for a page not found in the buffer cache.  vacuum\_defer\_cleanup\_age | 0 | Number of transactions by which VACUUM and HOT cleanup should be deferred, if any.  vacuum\_freeze\_min\_age | 50000000 | Minimum age at which VACUUM should freeze a table row.  vacuum\_freeze\_table\_age | 150000000 | Age at which VACUUM should scan whole table to freeze tuples.  vacuum\_multixact\_freeze\_min\_age | 5000000 | Minimum age at which VACUUM should freeze a MultiXactId in a table row.  vacuum\_multixact\_freeze\_table\_age | 150000000 | Multixact age at which VACUUM should scan whole table to freeze tuples.  wal\_block\_size | 8192 | Shows the block size in the write ahead log.  wal\_buffers | 4MB | Sets the number of disk-page buffers in shared memory for WAL.  wal\_compression | off | Compresses full-page writes written in WAL file.  wal\_consistency\_checking | | Sets the WAL resource managers for which WAL consistency checks are done.  wal\_keep\_segments | 0 | Sets the number of WAL files held for standby servers.  wal\_level | replica | Set the level of information written to the WAL.  wal\_log\_hints | off | Writes full pages to WAL when first modified after a checkpoint, even for a non-critical modifications.  wal\_receiver\_status\_interval | 10s | Sets the maximum interval between WAL receiver status reports to the primary.  wal\_receiver\_timeout | 1min | Sets the maximum wait time to receive data from the primary.  wal\_retrieve\_retry\_interval | 5s | Sets the time to wait before retrying to retrieve WAL after a failed attempt.  wal\_segment\_size | 16MB | Shows the number of pages per write ahead log segment.  wal\_sender\_timeout | 1min | Sets the maximum time to wait for WAL replication.  wal\_sync\_method | fdatasync | Selects the method used for forcing WAL updates to disk.  wal\_writer\_delay | 200ms | Time between WAL flushes performed in the WAL writer.  wal\_writer\_flush\_after | 1MB | Amount of WAL written out by WAL writer that triggers a flush.  work\_mem | 4MB | Sets the maximum memory to be used for query workspaces.  xmlbinary | base64 | Sets how binary values are to be encoded in XML.  xmloption | content | Sets whether XML data in implicit parsing and serialization operations is to be considered as documents or content fragments.  zero\_damaged\_pages | off | Continues processing past damaged page headers.  (254 rows) |

### Create table

|  |
| --- |
| postgres=# create table test (id int not null, name varchar(100) not null);  CREATE TABLE  postgres=# \d test  Table "public.test"  Column | Type | Collation | Nullable | Default  --------+------------------------+-----------+----------+---------  id | integer | | not null |  name | character varying(100) | | not null | |

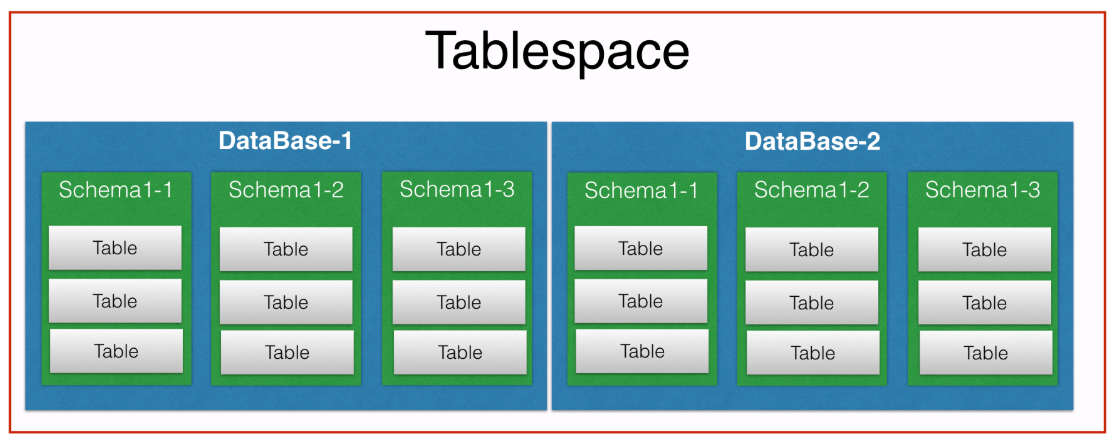
## Client site tools

### Psql

### Dbeaver

<https://dbeaver.io/>

# PostgreSQL tablespace database schema



<https://blog.csdn.net/zhu4674548/article/details/78080631>

# compare with Oracle

功能比较

<http://vschart.com/compare/oracle-database/vs/postgresql>

兼容性

<https://yq.aliyun.com/articles/230>

oracle到postgres 的迁移经验

<http://www.360doc.com/content/15/0318/14/9075092_456174956.shtml>

oracle mysql postgresql

<https://blog.csdn.net/qbyhqp/article/details/85319391>

# 存储过程函数

## 存储过程

有多种存储过程的语言，下面是标准的存储过程语言：

D:\files\opensource\postgresql\package\postgresql-10.9-1-linux-x64-binaries\pgsql\doc\postgresql\html\plpgsql.html

## 基本函数

D:\files\opensource\postgresql\package\postgresql-10.9-1-linux-x64-binaries\pgsql\doc\postgresql\html\functions.html

## 自定义函数

## 视图

# 开发

## Srping boot的例子

## 数据库连接池

<https://github.com/brettwooldridge/HikariCP>

# 系统管理

## 高可用

pgsql\doc\postgresql\html\runtime-config-replication.html

<https://www.jianshu.com/p/77f07af6ca4b>

不同的解决方案：

D:\files\opensource\postgresql\package\postgresql-10.9-1-linux-x64-binaries\pgsql\doc\postgresql\html\different-replication-solutions.html

## 性能调优