

Accessing SoC's PostgreSQL Server

You'll be using [PostgreSQL](https://www.postgresql.org/docs/current/index.html) (<https://www.postgresql.org/docs/current/index.html>), an open-source relational database management system, for your assignment and project. PostgreSQL is based on the [client-server architecture](https://www.postgresql.org/docs/current/tutorial-arch.html) (<https://www.postgresql.org/docs/current/tutorial-arch.html>). This document describes how you can connect to SoC's PostgreSQL server from the Linux server **stu.comp.nus.edu.sg** using the command line client application named [psql](https://www.postgresql.org/docs/current/app-psql.html) (<https://www.postgresql.org/docs/current/app-psql.html>).

1. Linux Server

To access the Linux server **stu.comp.nus.edu.sg**, you will need to have a SoC account. If you do not have a SOC account, visit <https://mysoc.nus.edu.sg/~newacct/> to apply for one. Once you have an account, please visit <https://mysoc.nus.edu.sg/~myacct/services.cgi> to activate your access to SoC's servers.

You can now access the server using the [ssh command](#)

(<https://www.howtogeek.com/311287/how-to-connect-to-an-ssh-server-from-windows-macos-or-linux/>) as follows where <username> is the userid of your SoC account:

```
ssh <username>@stu.comp.nus.edu.sg
```

To logout from the Linux server, use the exit command:

```
$ exit
```

In the above and subsequent examples, we use '\$' to denote the Linux server's command prompt.

2. SoC's PostgreSQL server

This section describes how to access SoC's PostgreSQL server from the Linux server **stu.comp.nus.edu.sg**.

First, login to the **stu** server:

```
ssh <username>@stu.comp.nus.edu.sg
```

To connect to the database server, you need the following information: the hostname or host address of the database server, the port number that the database server is listening for connections, the username and password of your PostgreSQL account, and the name of the database that you are accessing on the database server.

The hostname of the server is **postgres01-1**, the port number is **5432**, and the database name is **cs2102**.

Your PostgreSQL username is your **NUSNET userid**.

Before accessing the PostgreSQL server for the first time, you need to reset the password of your PostgreSQL account. To do this, visit <https://mysoc.nus.edu.sg/app/pgsql>. Your new password is a randomly generated string of characters.

Assuming that your PostgreSQL username is 'alice', you can now access the PostgreSQL server using the psql client application as follows:

```
$ psql -h postgres01-1 -p 5432 -d cs2102 -U alice
```

After entering your password, you should see something like the following:

```
psql (10.15 (Ubuntu 10.15-0ubuntu0.18.04.1), server 12.5 (Ubuntu 12.5-0ubuntu0.20.04.1))
WARNING: psql major version 10, server major version 12.
         Some psql features might not work.
SSL connection (protocol: TLSv1.3, cipher: TLS_AES_256_GCM_SHA384, bits: 256, compression: off)
Type "help" for help.

alice=>
```

There are two types of commands that you can input using psql: **SQL commands** (which terminate with a semicolon) that will be sent to the database server for execution, and **psql's meta-commands** (which always begin with a backslash) that will be executed by psql.

You can change your PostgreSQL password (from within psql) using the SQL's [alter user](#) (<https://www.postgresql.org/docs/current/sql-alteruser.html>) command as follows:

```
alice=> alter user alice with password 'wonderland';
```

The above example changes alice's password to 'wonderland'.

To exit the psql application, use the meta-command **\q**:

```
alice=> \q
```

2.1. PostgreSQL Environment Variables

To avoid having to type in the database server hostname, port number, database name, and your account username each time you use psql, you can configure these values using the appropriate [PostgreSQL's environment variables](#) (<https://www.postgresql.org/docs/current/libpq-envvars.html>).

First, login to the stu.comp.nus.edu.sg server. Next, append the following four lines to the file named **.bashrc** located in your home directory (i.e., `~/bashrc`).

```
export PGHOST=postgres01-1
export PGPORT=5432
export PGDATABASE=cs2102
export PGUSER=alice
```

In the above, you should replace 'alice' with your PostgreSQL username.

There are two text editors that could use on the stu server: [nano](#)

(<https://www.howtogeek.com/howto/42980/the-beginners-guide-to-nano-the-linux-command-line-text-editor/>) and the mighty [vim](#) (<http://yannesposito.com/Scratch/en/blog/Learn-Vim-Progressively/>).

The above configurations will be effective in your subsequent logins to the stu server. You will be able to connect to the postgres01-1 server with simply psql:

```
$ psql
```

2.2. PostgreSQL Password File

To avoid having to type your PostgreSQL password, you can store the password in the [PostgreSQL password file](#) (<https://www.postgresql.org/docs/current/libpq-pgpass.html>) named **.pgpass**. The default location of this file is in your home directory (i.e., `~/.pgpass`).

Each line in this file is of the form **host:port:dbname:username:password**.

For a user with PostgreSQL username "alice" and password "wonderland", the contents of .pgpass would be

```
postgres01-1:5432:cs2102:alice:wonderland
```

Finally, to prevent other users from accessing this file, use the chmod command as follows:

```
$ chmod 600 ~/.pgpass
```

2.3. Accessing PostgreSQL server from outside of SoC

To access the PostgreSQL server from a machine that is outside of SoC's internal network, you will need to go through [SoC VPN](#) (<https://dochub.comp.nus.edu.sg/cf/guides/network/vpn>). Note that SoC VPN is different from NUS VPN. Connecting to NUS VPN only allows you access to the NUS internal network, but not the SoC internal network.

For example, if you've installed psql on your PC, you can connect to postgres01-1 from your PC (via SoC VPN) as follows:

```
psql -h postgres01-1.comp.nus.edu.sg -p 5432 -d cs2102 -U alice
```

2.4. Resetting Password for PostgreSQL Account

If you forget your PostgreSQL account password, you can reset it by visiting <https://mysoc.nus.edu.sg/app/psql>

3. Getting Help

If you require technical help with your SoC or PostgreSQL account, please email techsvc@comp.nus.edu.sg.

To learn more about psql, you can read its manual [online](https://www.postgresql.org/docs/current/app-psql.html) (<https://www.postgresql.org/docs/current/app-psql.html>) or on the stu server using the **man** command:

```
$ man psql
```

Appendix A: Ssh Clients

To login to the stu server from your PC, you need to have a [ssh client](https://en.wikipedia.org/wiki/Comparison_of_SSH_clients) (https://en.wikipedia.org/wiki/Comparison_of_SSH_clients) installed on your PC.

Linux and macOS users should already have a ssh client installed by default.

Windows 10 users could install the [Windows Subsystem for Linux \(WSL\)](https://docs.microsoft.com/en-us/windows/wsl/install-win10) (<https://docs.microsoft.com/en-us/windows/wsl/install-win10>) and use Linux. You could also use other ssh clients such as [PuTTY](https://www.howtogeek.com/311287/how-to-connect-to-an-ssh-server-from-windows-macos-or-linux/) (<https://www.howtogeek.com/311287/how-to-connect-to-an-ssh-server-from-windows-macos-or-linux/>) or use [Windows 10's new built-in command](https://www.howtogeek.com/336775/how-to-enable-and-use-windows-10s-built-in-ssh-commands/) (<https://www.howtogeek.com/336775/how-to-enable-and-use-windows-10s-built-in-ssh-commands/>).

Appendix B: Introduction to Linux

If you are new to the Linux environment, the following are some learning resources:

- [Getting Started with Linux](https://www.digitalocean.com/community/tutorial_series/getting-started-with-linux) (https://www.digitalocean.com/community/tutorial_series/getting-started-with-linux)
- [The Linux Command Line](http://linuxcommand.org/index.php) (<http://linuxcommand.org/index.php>)
- [UNIX Tutorial for Beginners](http://www.ee.surrey.ac.uk/Teaching/Unix/) (<http://www.ee.surrey.ac.uk/Teaching/Unix/>)
- [The Missing Semester of Your CS Education](https://missing.csail.mit.edu) (<https://missing.csail.mit.edu>)

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