

PostgreSQL

```
username: bishaltwr  
password: MjMzNjMtYmlzaGFs
```

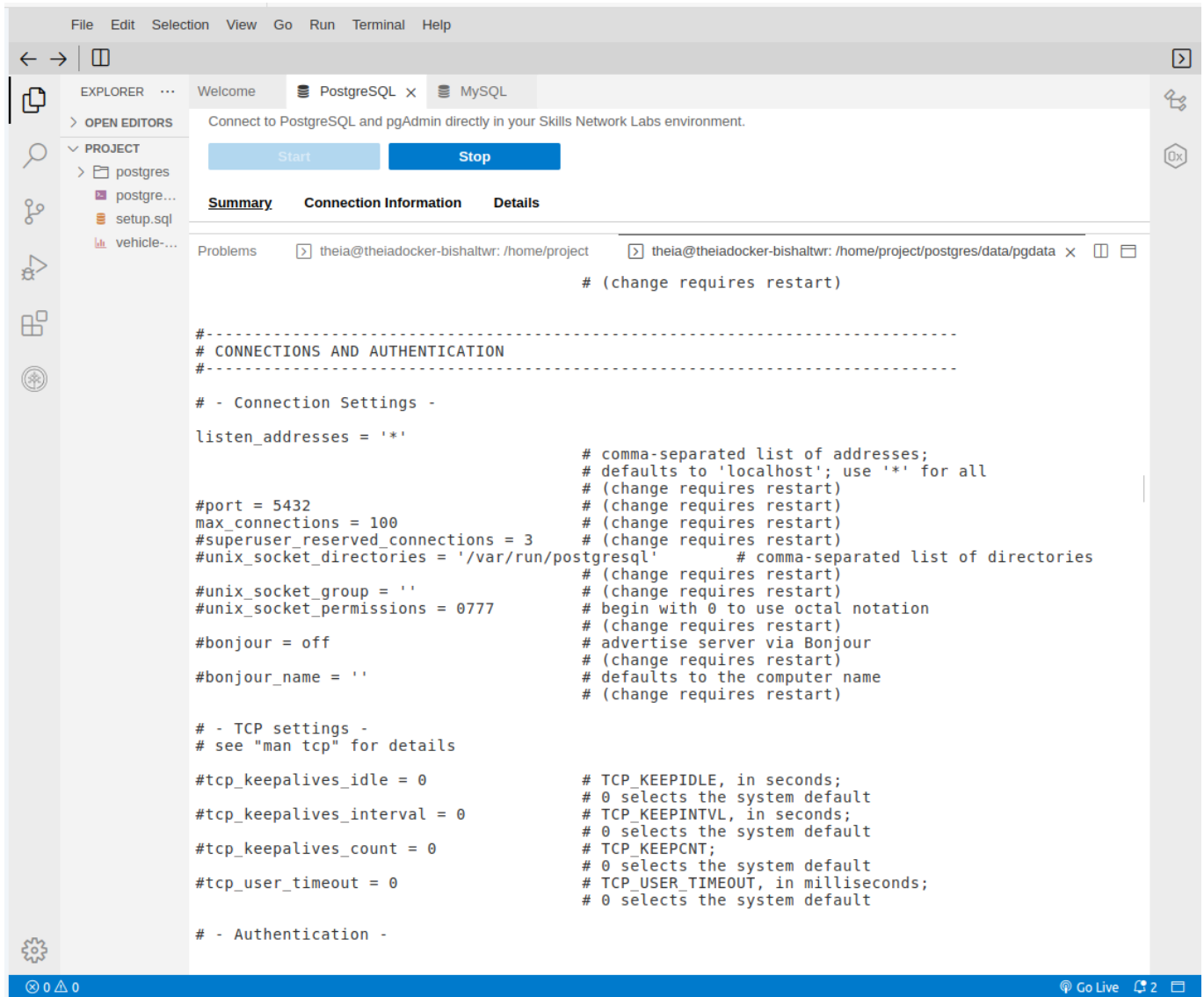
- Downloading setup file and running:

```
wget https://cf-courses-data.s3.us.cloud-object-  
storage.appdomain.cloud/IBM-DB0231EN-  
SkillsNetwork/labs/Final%20Assignment/postgres-setup.sh  
  
chmod +x ./postgres-setup.sh  
  
./postgres-setup.sh
```

Task 1.1: Find the settings in PostgreSQL

- What is the maximum number of connections allowed for the postgresSQL for this server?
 - Answer: 100
- postgresql.conf file

Location: /home/project/postgres/data/pgdata/postgresql.conf



Exercise 1.2 User management

- Perform using CLI not GUI

Task 1.2: Create a User

```
psql --username=postgres --host=localh
```

```
postgres=# CREATE USER backup_operator;
CREATE ROLE
postgres=#
```

Task 1.3 - Create a Role

```
postgres=# CREATE ROLE backup;
CREATE ROLE
postgres=#
```


Task 1.4 - Grant privileges to role

```

tolldata=# GRANT CONNECT ON DATABASE tolldata TO backup;
GRANT
tolldata=# GRANT SELECT ON ALL TABLES IN SCHEMA toll TO backup;
GRANT

```

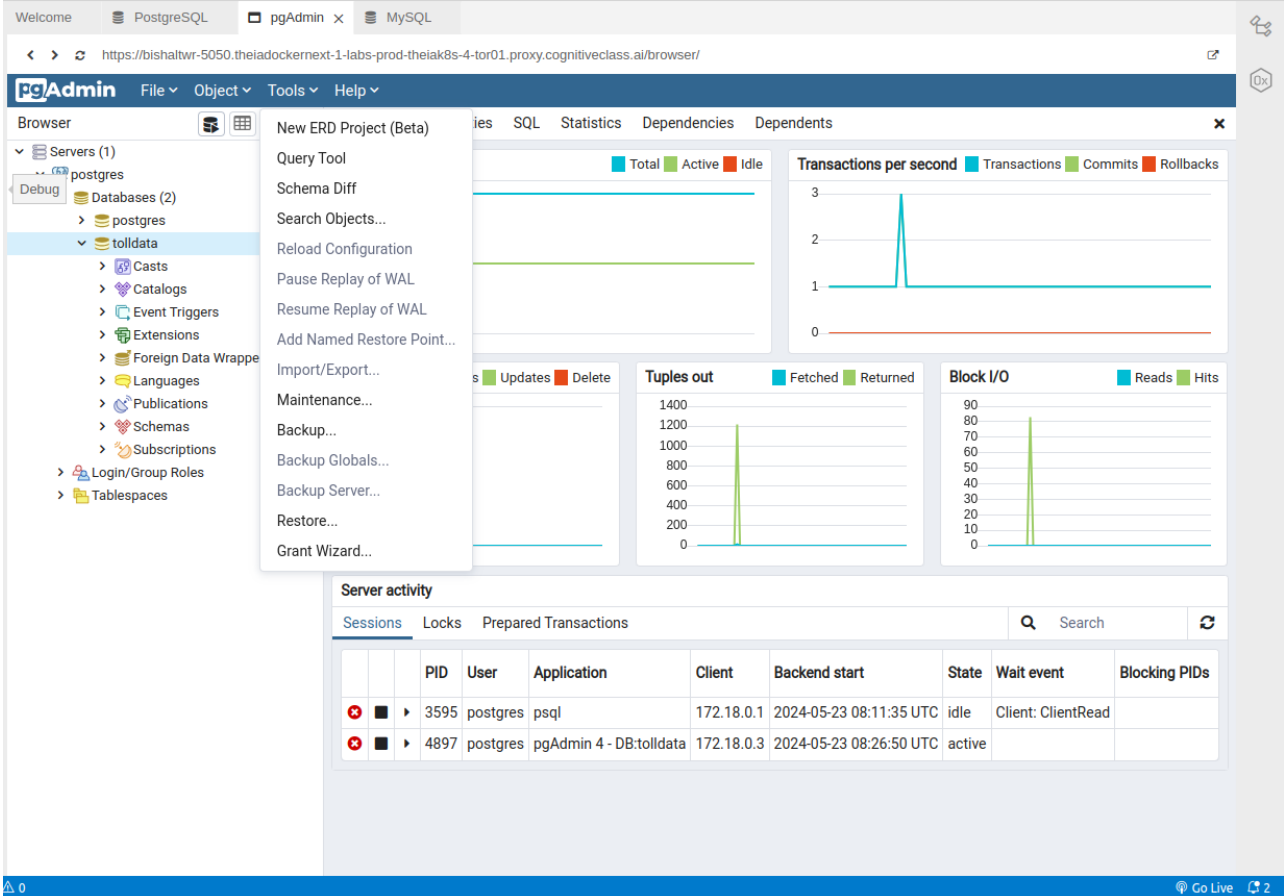
Task 1.5 - Grant role to an user

 grant_role_to_user

Exercise 1.3 - Backup

Task 1.6 - Backup a database on PostgreSQL server

- Backup tolldata using PGADMIN GUI



The screenshot displays the pgAdmin 4 web interface. The left sidebar shows the database hierarchy with 'tolldata' selected. The 'Tools' menu is open, listing various database management tasks. The main panel features several performance monitoring graphs and a 'Server activity' table.

Server activity table:

	PID	User	Application	Client	Backend start	State	Wait event	Blocking PIDs
✖	3595	postgres	psql	172.18.0.1	2024-05-23 08:11:35 UTC	idle	Client: ClientRead	
✖	4897	postgres	pgAdmin 4 - DB:tolldata	172.18.0.3	2024-05-23 08:26:50 UTC	active		

The screenshot shows the pgAdmin 4 web interface. A 'Backup (Database: tolldata)' dialog is open, displaying the 'General' tab. The 'Filename' field is set to 'tolldatabackup', 'Format' is 'Tar', and 'Encoding' is 'Select an item...'. The 'Server activity' table in the background shows two sessions:

	PID	User	Application	Client	Backend start	State	Wait event	Blocking PIDs
✖	3595	postgres	psql	172.18.0.1	2024-05-23 08:11:35 UTC	idle	Client: ClientRead	
✖	4897	postgres	pgAdmin 4 - DB:tolldata	172.18.0.3	2024-05-23 08:26:50 UTC	active		

MySQL

Exercise 2.1 - Setup the lab environment

```
username: bishaltwr
password: MTA20TItYm1zaGFs
```

Task 2.1 - Restore MySQL server using a previous backup

SKILLS NETWORK TOOLBOX

> DATABASES

> BIG DATA

> CLOUD

> EMBEDDABLE AI

> OTHER

Launch Application

Welcome

MySQL x

Connect to MySQL and phpMyAdmin directly in your Skills Network Labs environment.

Start Stop

Summary

Connection Information

Details

Your database and phpMyAdmin server are now ready to use and available with the following login credentials. For more details on how to navigate MySQL, please check out the Details section.

Username: bishaltwr

theia@theiadocker-bishaltwr: /home/project

theia@theiadocker-bishaltwr: /home/project x

```
mysql> SHOW TABLES;
+-----+
| Tables_in_billing |
+-----+
| billdata          |
+-----+
1 row in set (0.00 sec)

mysql>
```

0 0 0

Go Live 1

Task 2.2 - Find the table data size

MySQL x

Connect to MySQL and phpMyAdmin directly in your Skills Network Labs environment.

Start Stop

Summary

Connection Information

Details

Your database and phpMyAdmin server are now ready to use and available with the following login credentials. For more details on how to navigate MySQL, please check out the Details section.

Username: bishaltwr

theia@theiadocker-bishaltwr: /home/project

theia@theiadocker-bishaltwr: /home/project x

```
mysql> SHOW TABLE STATUS WHERE Name = 'billdata';
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Name | Engine | Version | Row_format | Rows | Avg_row_length | Data_length | Max_data_length | Index_length | Data_free | Auto_increment | Create_time |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| billdata | InnoDB | 10 | Dynamic | 132130 | 51 | 6832128 | | 0 | 0 | 4194304 | NULL | 2024-05-23 08:40:07 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
1 row in set (0.01 sec)

mysql>
```

0 0 0

Go Live 1

Exercise 2.3 - Indexing

Task 2.3 - Baseline query performance

```
mysql> SELECT * FROM billdata WHERE billedamount>19999;
```

billid	customerid	billedamount	monthid
8509	285	20000	20096
68268	559	20000	20146
81622	643	20000	20157
84858	317	20000	20161
89353	871	20000	20163
102682	937	20000	20174
109574	386	20000	201810
121844	777	20000	201910

8 rows in set (0.07 sec)



```
mysql>
```

Task 2.4 - Create an index

```
mysql> CREATE INDEX idx_billedamount ON billdata (billedamount);
Query OK, 0 rows affected (0.63 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

Task 2.5 - Document the improvement in query performance

```
mysql> CREATE INDEX idx_billedamount ON billdata (billedamount);
Query OK, 0 rows affected (0.63 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
mysql> SELECT * FROM billdata WHERE billedamount>19999;
```

billid	customerid	billedamount	monthid
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89353	871	20000	20163
102682	937	20000	20174
109574	386	20000	201810
121844	777	20000	201910

8 rows in set (0.00 sec)

Exercise 2.4 - Storage Engines

Task 2.6 - Find supported storage engines

```
mysql> SHOW ENGINES;
```

Engine	Support	Comment	Transactions	XA	Savepoints
FEDERATED	NO	Federated MySQL storage engine	NULL	NULL	NULL
MEMORY	YES	Hash based, stored in memory, useful for temporary tables	NO	NO	NO
InnoDB	DEFAULT	Supports transactions, row-level locking, and foreign keys	YES	YES	YES
PERFORMANCE_SCHEMA	YES	Performance Schema	NO	NO	NO
MyISAM	YES	MyISAM storage engine	NO	NO	NO
MRG_MYISAM	YES	Collection of identical MyISAM tables	NO	NO	NO
BLACKHOLE	YES	/dev/null storage engine (anything you write to it disappears)	NO	NO	NO
CSV	YES	CSV storage engine	NO	NO	NO
ARCHIVE	YES	Archive storage engine	NO	NO	NO

9 rows in set (0.00 sec)

Task 2.7 - Find the storage engine of a table

```
mysql> SHOW TABLE STATUS LIKE 'billdata';
```

Name	Engine	Version	Row_format	Rows	Avg_row_length	Data_length	Max_data_length	Index_length	Data_free	Auto_increment	Create_time
Update_time	Check_time	Collation	Checksum	Create_options	Comment						
billdata	InnoDB	10	Dynamic	132130	51	6832128		0	0	4194304	NULL 2024-05-23 08:56:46
2024-05-23 08:40:09	NULL	utf8mb4_0900_ai_ci	NULL								

1 row in set (0.00 sec)

Exercise 3.1 - Prepare the lab environment

- Download the file billing.csv

Task 3.1 - Restore the table billing

The screenshot shows the IBM Db2 on Cloud console interface. The top navigation bar includes 'Load Data', 'Load History', 'Tables', 'Views', 'Indexes', 'Aliases', 'MQTs', 'Sequences', and 'Application objects'. The 'Load Data' section is active, showing a 'Load details' card for a job named 'My computer billing.csv' targeting 'VGX43827.BILLING'. The job status is 'COMPLETE'. Below this, the 'Status' tab is selected, displaying a large blue circle icon and the message 'The data load job succeeded. You can now work with your data.' The statistics show 132,000 rows read, 132,000 rows loaded, and 0 rows rejected. The start time is 05/23/2024 7:34:10 PM and the end time is 05/23/2024 7:34:16 PM. On the right, the 'Errors' and 'Warnings' tabs are visible, both showing 'No errors'.

Exercise 3.3 - Create a view

Task 3.2 - Create a view named basicbilldetails with columns customerid, month, billedamount

IBM Db2 on Cloud

Load Data Load History Tables **Views** Indexes Aliases MQTs Sequences Application objects

Generate SQL

Back

*Untitled ... x +

Syntax assistant

Run all

```
1 CREATE VIEW basicbilldetails AS
2 SELECT customerid, month, billedamount
3 FROM billing;
```

History

Find by statement or status

Script	Date	Status	Runtime
Untitled - 1	May 23, 2024 7:42:21 PM	1	0.009 s
CREATE VIEW basicbilldetails AS SELECT customerid, month, billedamount FROM billing			0.009 s

Exercise 3.4 - Indexing

Task 3.3 - Baseline query performance

History Results

Result set 1 Details

Run time
0.031 s

Run by
vgx43827

Database
crn:v1:bluemix:public:dashdb-for-tr...

Full query body

```
SELECT * FROM billing
WHERE billedamount = 19929
```

Task 3.4 - Create an index

History Results

Run time
0.195 s

Run by
vgx43827

Database
crn:v1:bluemix:public:dashdb-for-tr...

Affected rows
0

Full query body

```
CREATE INDEX idx_billedamount ON billing (billedamount);
```

Task 3.5 - Document the improvement in query performance

The screenshot displays a database query interface. At the top, a SQL query is entered in a text area:

```
4  
5 SELECT * FROM billing  
6 WHERE billedamount = 19929;  
7
```

Below the query area, there are two tabs: "History" and "Results". The "Results" tab is active, showing the following details:

- Run time:** 0.069 s
- Run by:** vx43827
- Database:** cmv1.bluemix:public:dashdb-for-tr...

To the right of these details, there is a section labeled "Full query body" which contains the same SQL query as above. A copy icon is visible in the top right corner of this section.

On the left side of the interface, there is a vertical toolbar with icons for a list, a search, a document, and a question mark.