

Hands-on Lab: Views in PostgreSQL



Skills
Network

Estimated time needed: 15 minutes

In this lab, you will learn how to create, execute, and materialize views in the PostgreSQL database service using the pgAdmin graphical user interface (GUI) tool. Materialized views behave differently compared to regular views. The result set is materialized or saved for future use in the materialized views. You can not insert, update, or delete rows like in regular views. Materialized views store the results of a database query as a separate table-like object so that someone can access the results later without having to re-run the query. As a result, materialized views can improve database performance compared to regular views.

Software used in this lab

In this lab, you will use the [PostgreSQL Database](#). PostgreSQL is a relational database management system (RDBMS) designed to store, manipulate, and retrieve data efficiently.

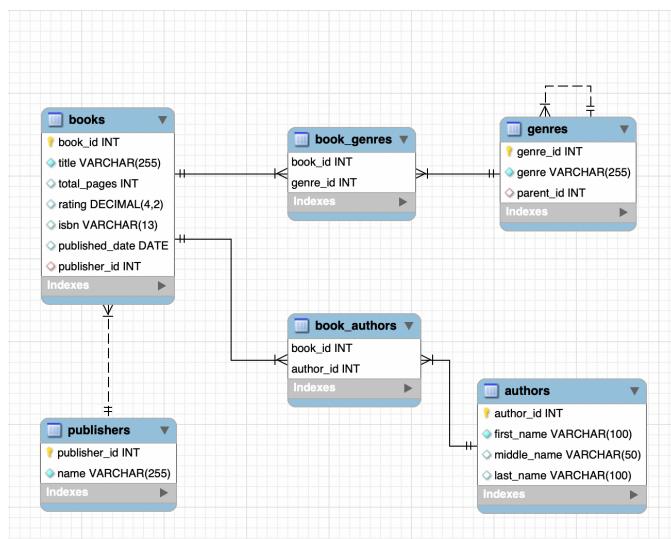


To complete this lab, you will utilize the PostgreSQL relational database service available as part of IBM Skills Network Labs (SN Labs) Cloud IDE. SN Labs is a virtual lab environment used in this course.

Database used in this lab

You will use the eBooks database in the lab.

The following ERD diagram shows the schema of the complete eBooks database used in this lab:



Objectives

After completing this lab, you will be able to use pgAdmin with PostgreSQL to:

- Restore a database schema and data
- Create and execute a view
- Create and execute a materialized view

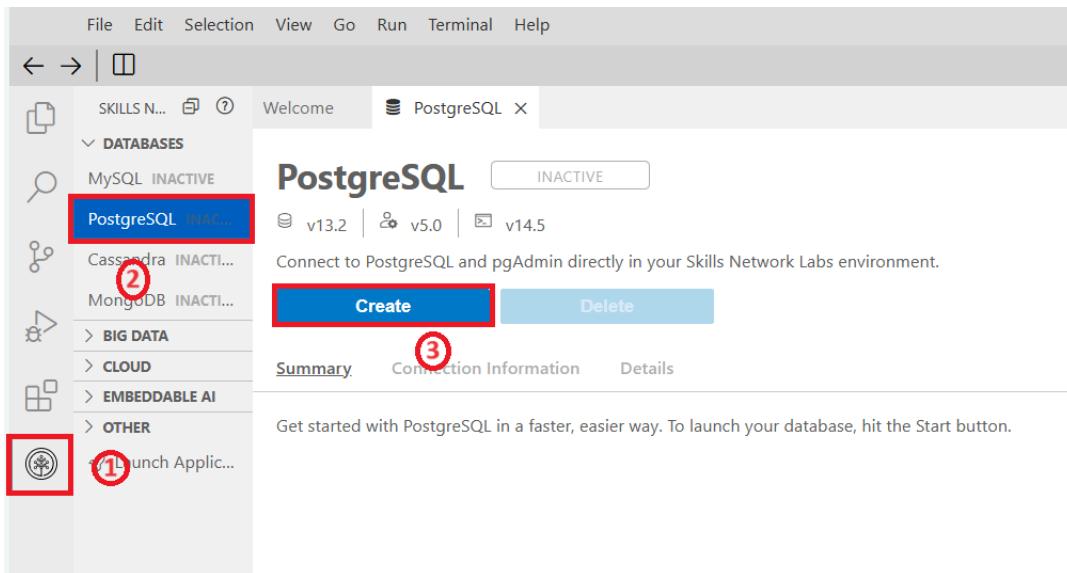
Lab structure

In this exercise, you will go through three tasks to learn how to create and execute views and materialized views in the PostgreSQL database service using the pgAdmin graphical user interface (GUI) tool.

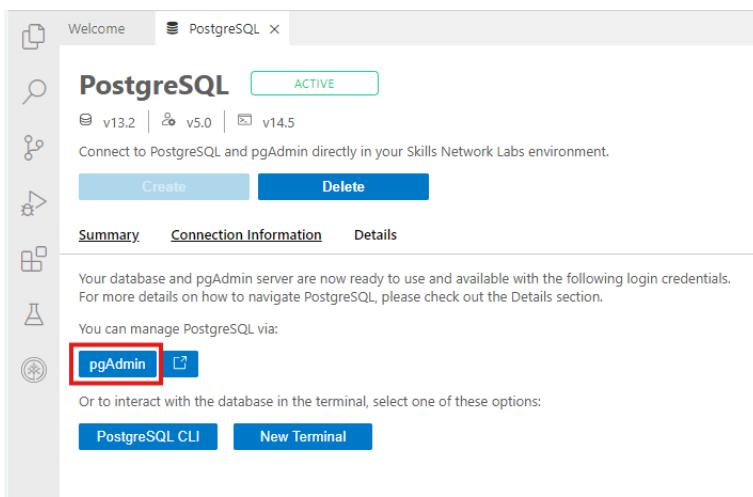
Task A: Restore a database schema and data

To get started with this lab, you will first download the relevant eBooks database dump file, then launch PostgreSQL and pgAdmin using the Cloud IDE. You can do this by following these steps:

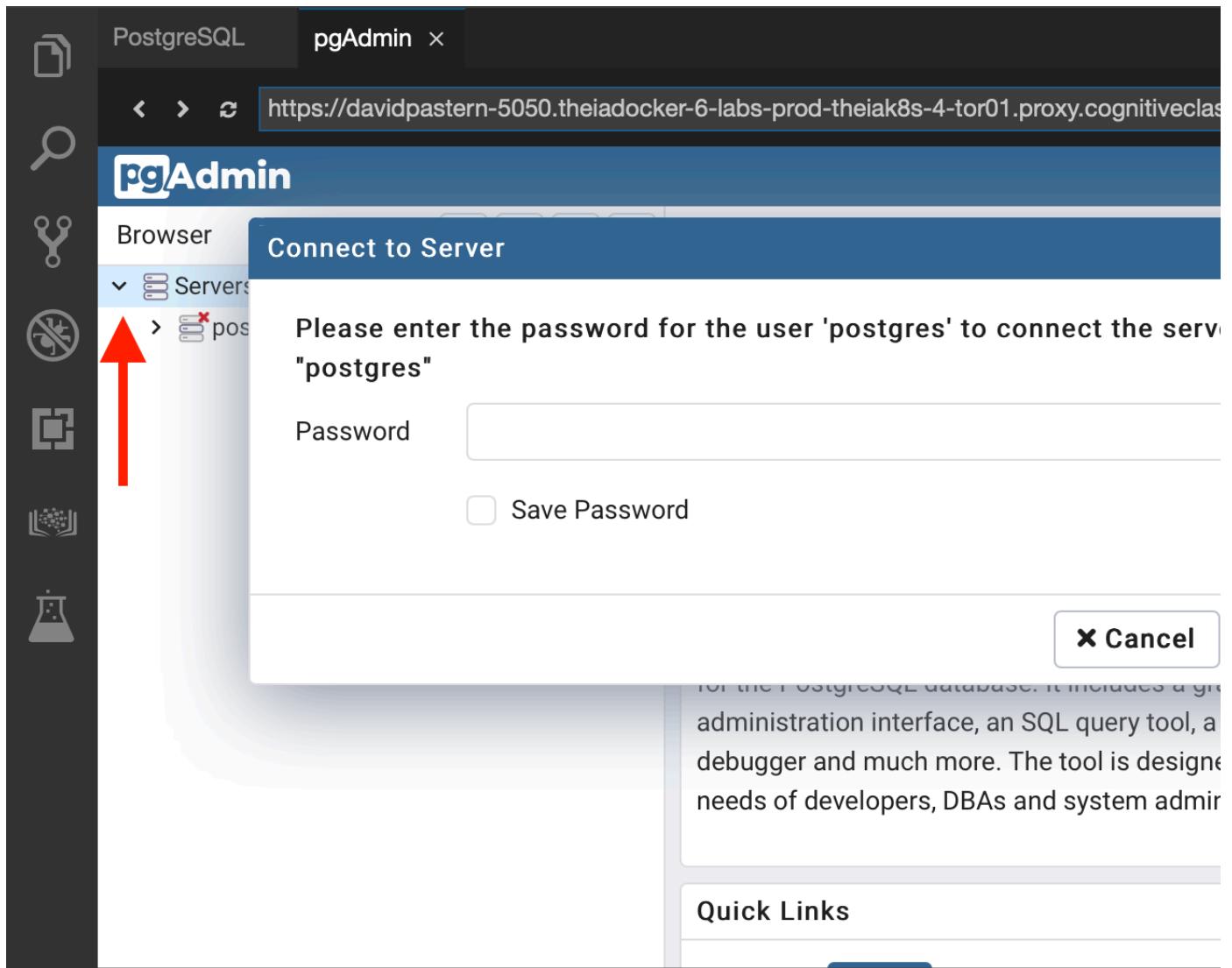
1. Download the following eBooks PostgreSQL dump file (containing the eBooks database schema and data) to your local computer.
 - [eBooks_pgsql_dump.tar](#)
2. Click the Skills Network extension button on the left side of the window.
3. Open the DATABASES menu and click PostgreSQL.
4. Click Create. PostgreSQL may take a few moments to start.



5. Next, open the pgAdmin Graphical User Interface by clicking **pgAdmin** in the Cloud IDE interface.



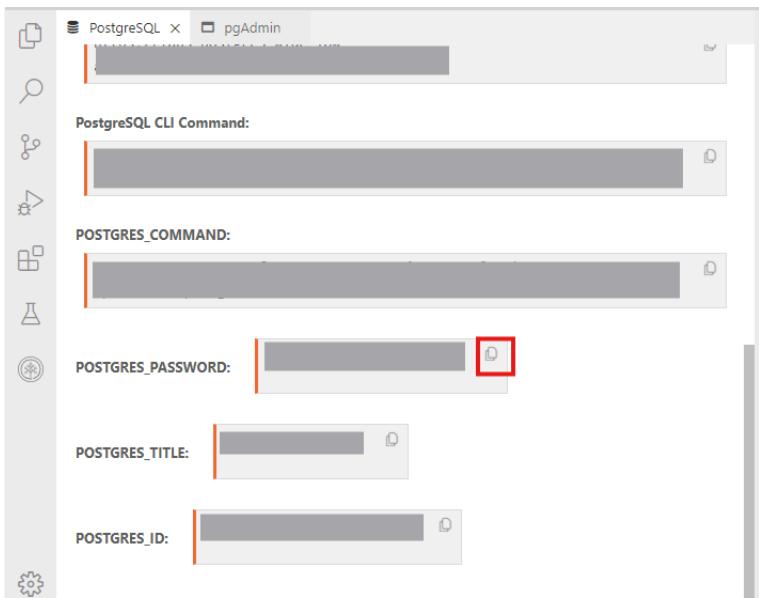
6. Once the pgAdmin GUI opens, click **Servers** tab on the left side of the page. You will be prompted to enter a password.



7. To retrieve your password, click PostgreSQL tab near the top of the interface and select Connection Information tab.

A screenshot of the PostgreSQL configuration page. The 'PostgreSQL' tab is selected and highlighted with a red box. Below it, the status is shown as 'ACTIVE'. There are three buttons: 'Create' (light blue), 'Delete' (dark blue), and 'Connection Information' (red box). Underneath, there are fields for 'POSTGRES_USERNAME' (disabled), 'POSTGRES_HOST' (disabled), 'POSTGRES_PORT' (disabled), and 'URL' (disabled). A gear icon is at the bottom left.

8. Scroll down and click the Copy icon on the left of your password to copy the session password onto your clipboard.



9. Navigate back to the **pgAdmin** tab and paste your password, then click **OK**.

10. You will then be able to access the pgAdmin GUI tool.

← → C ⌂ sandipsahajo-5050.theiadocker-27.proxy.cognitiveclass.ai/browser/

pgAdmin File ▾ Object ▾ Tools ▾ Help ▾

Browser     Dashboard Properties SQL Statistics Depen

>  Servers

Welcome

 pg**Admin**
Management Tools for Post
Feature rich | Maximises PostgreSQL
pgAdmin is an Open Source administration and management tool designed to answer the needs of developers, DBAs

Quick Links

 Add New

Getting Started

 PostgreSQL Documentation

Browser **1**

Servers (1) **2**

postgres **3**

Databases (1)

- postgres
 - Create
 - Cast...
 - Catalog...
 - Refresh...
 - Event Triggers
 - Extensions
 - Foreign Data Wrappers
 - Languages
 - Publications
 - Schemas
 - Subscriptions
 - Login/Group Roles
 - Tablespaces

Create - Database

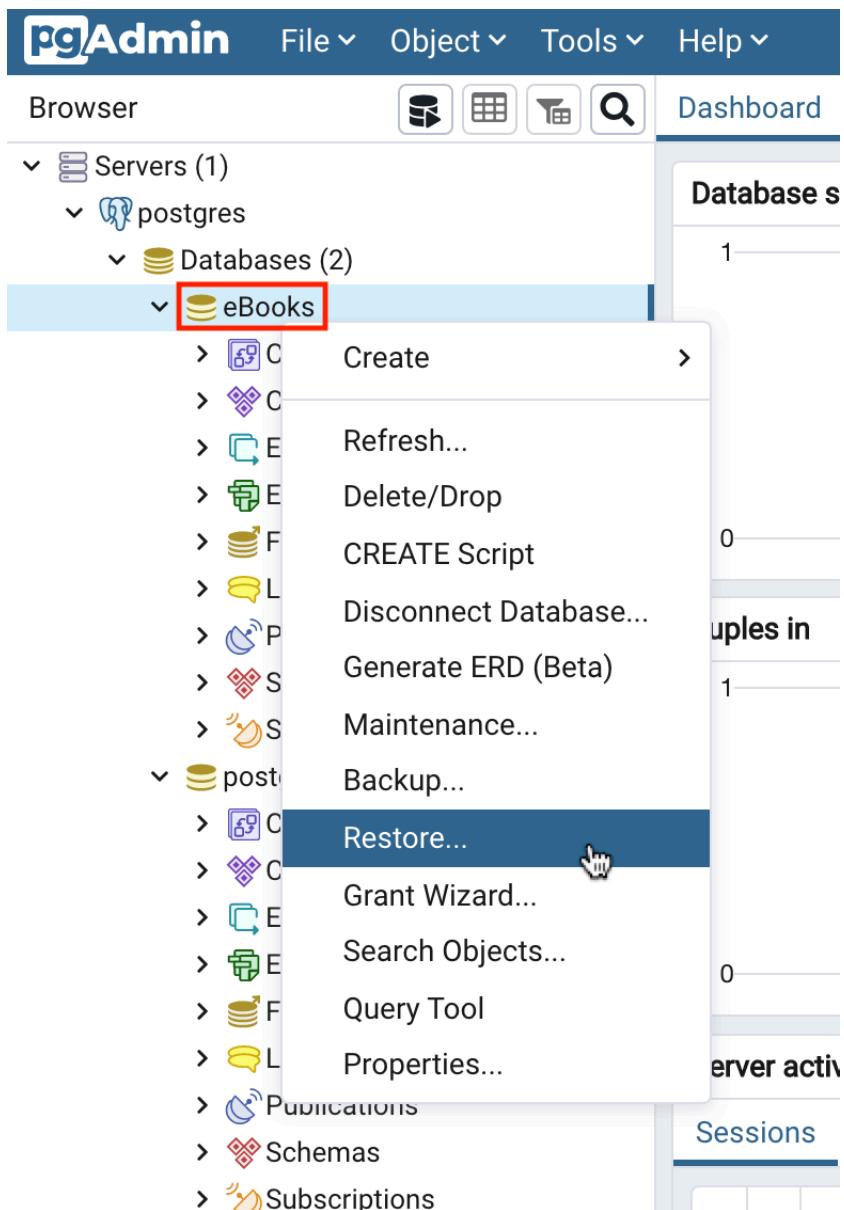
General Definition Security Parameters Advanced SQL

Database **eBooks**

Owner **postgres**

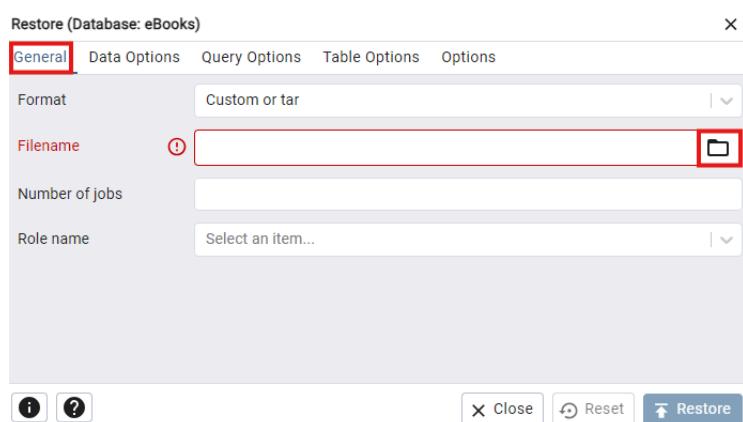
Comment

i **?** **Cancel** **Reset** **S**



13. Follow the instructions below to restore and proceed to Task B:

- On the General tab, click Select file by the Filename box.



- Ensure that you upload the files to this path: /var/lib/pgadmin/. To do this, you can either manually navigate to the path (or) copy /var/lib/pgadmin/, replace /home/ with it, and press Enter. You should then see some default files in that path, as shown below.

Select file

Name	Date Modified	Size
azurecredentialcache	Wed Sep 4 23:52:55 2024	
pgadmin4.db	Thu Sep 5 11:30:52 2024	164.0 kB
sessions	Thu Sep 5 11:13:23 2024	
storage	Wed Sep 4 23:52:55 2024	

4 items

File Format All Files

- Click on the three dots, then select **Upload**.

Select file

Name	Date Modified	Size	Actions
azurecredentialcache	Wed Sep 4 23:52:55 2024		Rename Delete Upload ✓ List View Grid View Show Hidden Files
pgadmin4.db	Thu Sep 5 11:42:48 2024	164.0 kB	
sessions	Thu Sep 5 11:13:23 2024		
storage	Wed Sep 4 23:52:55 2024		

4 items

File Format All Files

- Double-click on the drop files area and load the **eBooks_pgsql_dump.tar** you downloaded earlier on your local computer.

Select file

- When the upload is complete, close the drop files area by clicking **X**.

Select file

- Ensure **Format** is set to **All Files**, select the uploaded **eBooks_pgsql_dump.tar** file from the list, and then click **Select**.

Select file

File Format: All Files

Cancel Select

Name	Date Modified	Size
azurecredentialcache	Wed Sep 4 23:52:55 2024	
eBooks_pgsql_dump.tar	Thu Sep 5 11:54:03 2024	74.2 kB
pgadmin4.db	Thu Sep 5 11:43:06 2024	164.0 kB
sessions	Thu Sep 5 11:13:23 2024	
storage	Wed Sep 4 23:52:55 2024	

- In the General tab, ensure the filename path matches the one shown below. If you see a different path that includes "None," modify it accordingly.

Restore (Database: eBooks)

General Data Options Query Options Table Options Options

Format: Custom or tar

Filename: /var/lib/pgadmin/eBooks_pgsql_dump.tar

Number of jobs:

Role name: Select an item...

Close Reset Restore

- Now switch to the **Options** tab. Under **Disable**, toggle on the **Triggers** option, and then click **Restore**.

Restore (Database: eBooks)

General Data Options Query Options Table Options Options

Disable

Triggers

Miscellaneous / Behavior

Verbose messages

Use SET SESSION AUTHORIZATION

Exit on error

Exclude schema:

Close Reset Restore

Task B: Create and execute a view

- In the tree-view, expand **eBooks > Schemas > public**. Right-click **Views** and go to **Create > View**.

pgAdmin File Object Tools Help

Browser Dashboard Properties SQL Statistics Depen

Servers (1) postres Databases (2) eBooks Casts Catalogs Event Triggers Extensions Foreign Data Wrappers Languages Publications Schemas (1) public Collations Domains FTS Configurations FTS Dictionaries FTS Parsers FTS Templates Foreign Tables Functions Materialized Views Procedures Sequences Tables (6) Trigger Functions Types Views Subscriptions

Creates View... Refresh... Grant Wizard... Search Objects... Query Tool

1 2 3 4 5 6

The screenshot shows the pgAdmin interface with the 'Properties' tab selected. In the left sidebar, under 'eBooks', a 'Views' node is highlighted with a red box and labeled '4'. A context menu is open at the bottom right of the sidebar, with 'Create' highlighted and labeled '5'. The 'Create' option has a submenu with 'View...' highlighted and labeled '6'. The submenu also includes 'Refresh...', 'Grant Wizard...', 'Search Objects...', and 'Query Tool'.

2. On the General tab, type `publisher_and_rating_view` as the name of the view. Then, switch to the Code tab.

Create - View

X

General

Definition Code Security SQL

Name

publisher_and_rating_view

Owner

postgres

Schema

public

Comment



Cancel

Reset

Save

3. On the **Code** tab, copy and paste the following code. Then click **Save**.

```
SELECT books.title, books.rating, publishers.name  
FROM books INNER JOIN publishers ON books.publisher_id = publishers.publisher_id
```

Create - View

General Definition **Code** Security SQL

```
1 SELECT books.title, books.rating, publishers.name  
2 FROM books INNER JOIN publishers ON books.publisher_id = publishers.publisher_id  
3
```



X Cancel



4. In the tree view, expand Views. Right-click **publisher_and_rating_view** and go to **View/Edit Data > All Rows**.

pgAdmin File Object Tools Help

Browser Dashboard Properties SQL Statistics

Servers (1) postres Databases (2) eBooks Casts Catalogs Event Triggers Extensions Foreign Data Wrappers Languages Publications Schemas (1) public Collations Domains FTS Configurations FTS Dictionaries FTS Parsers FTS Templates Foreign Tables Functions Materialized Views Procedures Sequences Tables (6) Trigger Functions Types Views (1) publisher_and_rating_view Columns Rules Triggers Subscriptions postres Casts Catalogs Event Triggers Extensions Foreign Data Wrappers Languages Publications

Database sessions

1 0

Tuples in

18
16
14
12
10
8
6
4
2
0

Server activity

Sessions Locks Prepared Transactions

	PID	User	A
X	83	postgres	p

Contextual menu for publisher_and_rating_view:

- Views (1)
- publisher_and_rating_view
- View/Edit Data
- All Rows

Submenu for View/Edit Data:

- Create
- Refresh...
- Delete/Drop
- Drop Cascade
- Scripts
- Search Objects...
- Query Tool
- Properties...
- First 100 Rows
- Last 100 Rows
- Filtered Rows...

[Query Editor](#) [Query History](#)

```
1  SELECT * FROM public.publisher_and_rating_view
2
```

[Data Output](#) [Explain](#) [Messages](#) [Notifications](#)

	title character varying (255)	rating numeric (4,2)	name character varying (255)
1	Lean Software Development: ...	4.17	Addison Wesley
2	Facing the Intelligence Explosi...	3.87	Machine Intelligence Researc...
3	Scala in Action	3.74	Manning
4	Patterns of Software: Tales fr...	3.84	Oxford University Press, USA
5	Anatomy Of LISP	4.43	McGraw-Hill
6	Computing machinery and int...	4.17	MSAC Philosophy Group
7	XML: Visual QuickStart Guide	3.66	Peachpit Press
8	SQL Cookbook	3.95	O'Reilly Media
9	The Apollo Guidance Comput...	4.29	Praxis Publications Inc
10	Minds and Computers: An Intr...	3.54	Edinburgh University Press
11	The Architecture of Symbolic ...	4.50	McGraw-Hill
12	Nmap Network Scanning: The...	4.32	Nmap Project
13	The It Handbook for Business:...	4.40	Createspace Independent Pub...
14	Accidental Empires	4.00	Harper
15	Introducing HTML5	3.97	New Riders Publishing

Task C: Create and execute a materialized view

1. In the tree view, expand **eBooks > Schemas > public**. Right-click **Materialized Views** and go to **Create > Materialized View**.

pgAdmin File Object Tools Help

Browser Dashboard Properties SQL Statist

Servers (1) postres Databases (2) eBooks (1) Casts Catalogs Event Triggers Extensions Foreign Data Wrappers Languages Publications Schemas (1) public Collations Domains FTS Configurations FTS Dictionaries FTS Parsers FTS Templates Foreign Tables Functions Materialized Views Procedures Sequences Tables (6) Trigger Functions Types Views (1) Subscriptions

1 2 3 4 5 6

Create Refresh... Grant Wizard... Search Objects... Query Tool

2. On the General tab, type `publisher_and_rating_materialized_view` as name of the view. Then switch to the **Code** tab.

Create - Materialized View

General Definition Code Parameter Security SQL

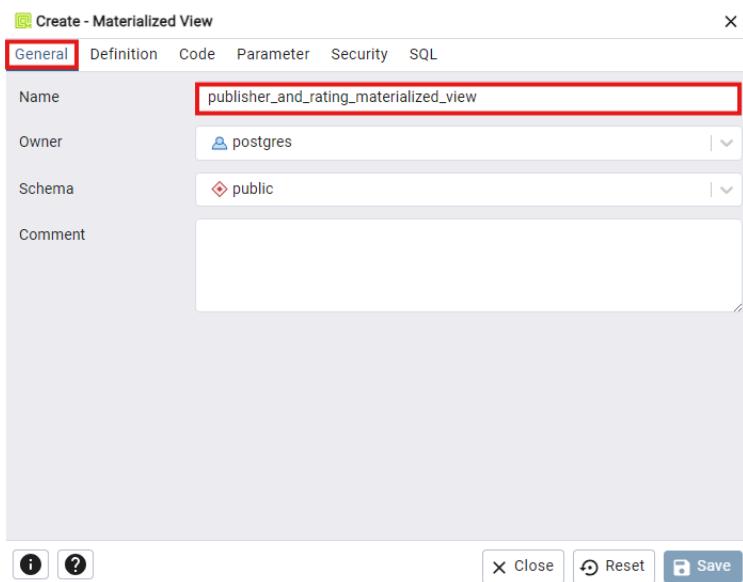
Name: publisher_and_rating_materialized_view

Owner: postgres

Schema: public

Comment:

Info Help Close Reset Save



3. On the **code** tab, copy and paste the following code. Then click **Save**.

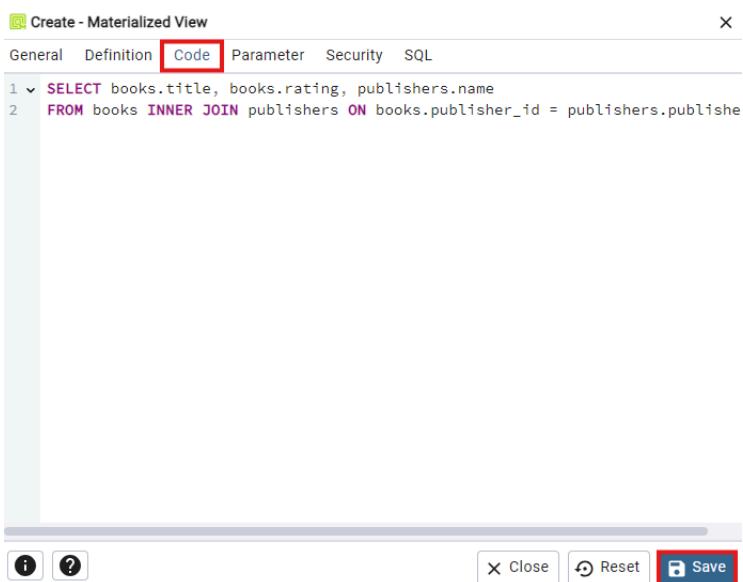
```
SELECT books.title, books.rating, publishers.name  
FROM books INNER JOIN publishers ON books.publisher_id = publishers.publisher_id
```

Create - Materialized View

General Definition **Code** Parameter Security SQL

```
1 ✓ SELECT books.title, books.rating, publishers.name  
2   FROM books INNER JOIN publishers ON books.publisher_id = publishers.publisher_id
```

Info Help Close Reset Save



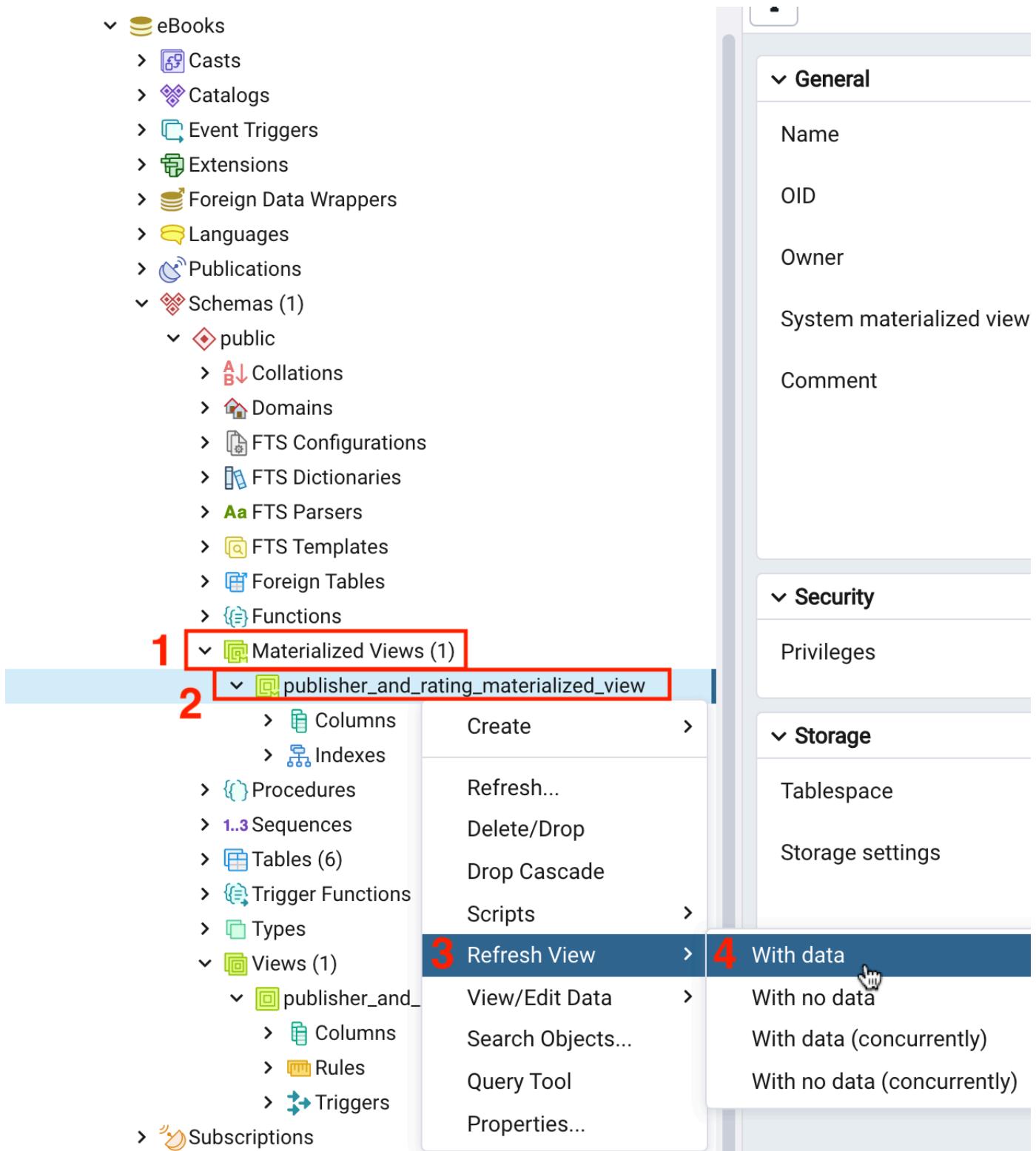
4. In the tree-view, expand **Materialized Views**. Right-click **publisher_and_rating_materialized_view** and go to **Refresh View > With data**.

1 **Materialized Views (1)**

2 **publisher_and_rating_materialized_view**

3 Refresh View

4 With data 



5. Right-click **publisher_and_rating_materialized_view** again and go to **View/Edit Data > All Rows**.

- ▼ Databases (2)
 - ▼ eBooks
 - > Casts
 - > Catalogs
 - > Event Triggers
 - > Extensions
 - > Foreign Data Wrappers
 - > Languages
 - > Publications
 - ▼ Schemas (1)
 - ▼ public
 - > Collations
 - > Domains
 - > FTS Configurations
 - > FTS Dictionaries
 - > FTS Parsers
 - > FTS Templates
 - > Foreign Tables
 - > Functions
 - ▼ Materialized Views (1)
 - ▼ publisher_and_rating_materialized_view
 - > Columns
 - > Indexes
 - > Procedures
 - > Sequences
 - > Tables (6)
 - > Trigger Functions
 - > Types
 - ▼ Views (1)
 - ▼ publisher_and_rating_view
 - > Columns
 - > Rules
 - > Triggers

- Create >
- Refresh...
- Delete/Drop
- Drop Cascade
- Scripts >
- Refresh View >
- View/Edit Data > All Rows
- Search Objects...
- Query Tool
- Properties...

General

Name

OID

Owner

System materialized view

Comment

Security

Privileges

Storage

Tablespace

Storage settings

6. You will access the materialized view you created.

[Query Editor](#) [Query History](#)

```
1  SELECT * FROM public.publisher_and_rating_materialized_view
2
```

[Data Output](#) [Explain](#) [Messages](#) [Notifications](#)

	title character varying (255)	rating numeric (4,2)	name character varying (255)
1	Lean Software Development: ...	4.17	Addison Wesley
2	Facing the Intelligence Explosi...	3.87	Machine Intelligence Researc...
3	Scala in Action	3.74	Manning
4	Patterns of Software: Tales fr...	3.84	Oxford University Press, USA
5	Anatomy Of LISP	4.43	McGraw-Hill
6	Computing machinery and int...	4.17	MSAC Philosophy Group
7	XML: Visual QuickStart Guide	3.66	Peachpit Press
8	SQL Cookbook	3.95	O'Reilly Media
9	The Apollo Guidance Comput...	4.29	Praxis Publications Inc
10	Minds and Computers: An Intr...	3.54	Edinburgh University Press
11	The Architecture of Symbolic ...	4.50	McGraw-Hill
12	Nmap Network Scanning: The...	4.32	Nmap Project
13	The It Handbook for Business:...	4.40	Createspace Independent Pub...
14	Accidental Empires	4.00	Harper
15	Introducing HTML5	3.97	New Riders Publishing

At first glance, it does not look too different from the regular view you created earlier in this lab. From the user perspective, it is essentially the same: you see the results of a query displayed in a table-like format. The difference is that this materialized view is cached in the database so someone can reaccess the data in the future without re-running the database query.

Conclusion

Congratulations! You have completed this lab and learned how to restore a database schema and data, create and execute a view, and create and execute a materialized view.

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