Hands-on Lab: Views in PostgreSQL

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

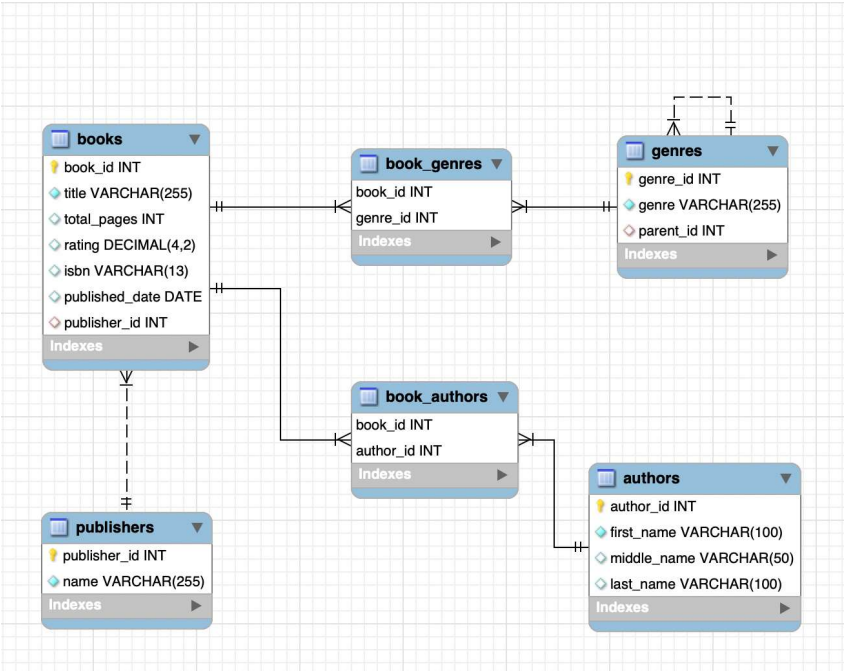
In this lab, you will use the PostgreSQL Database. PostgreSQL is a relational database management system (RDBMS) designed to store, manipulate, and retrieve data efficiently.

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

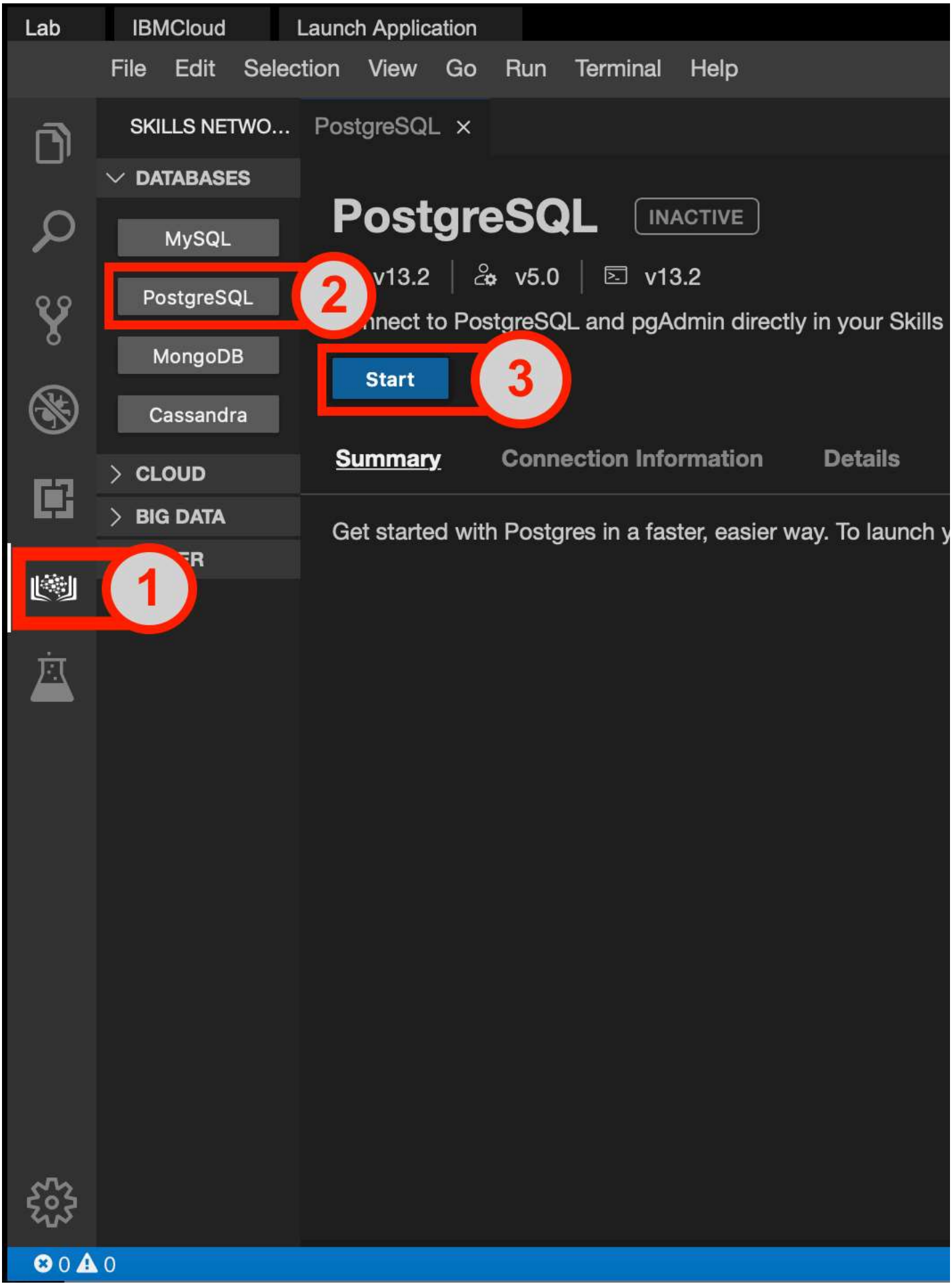
Lab structure

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.

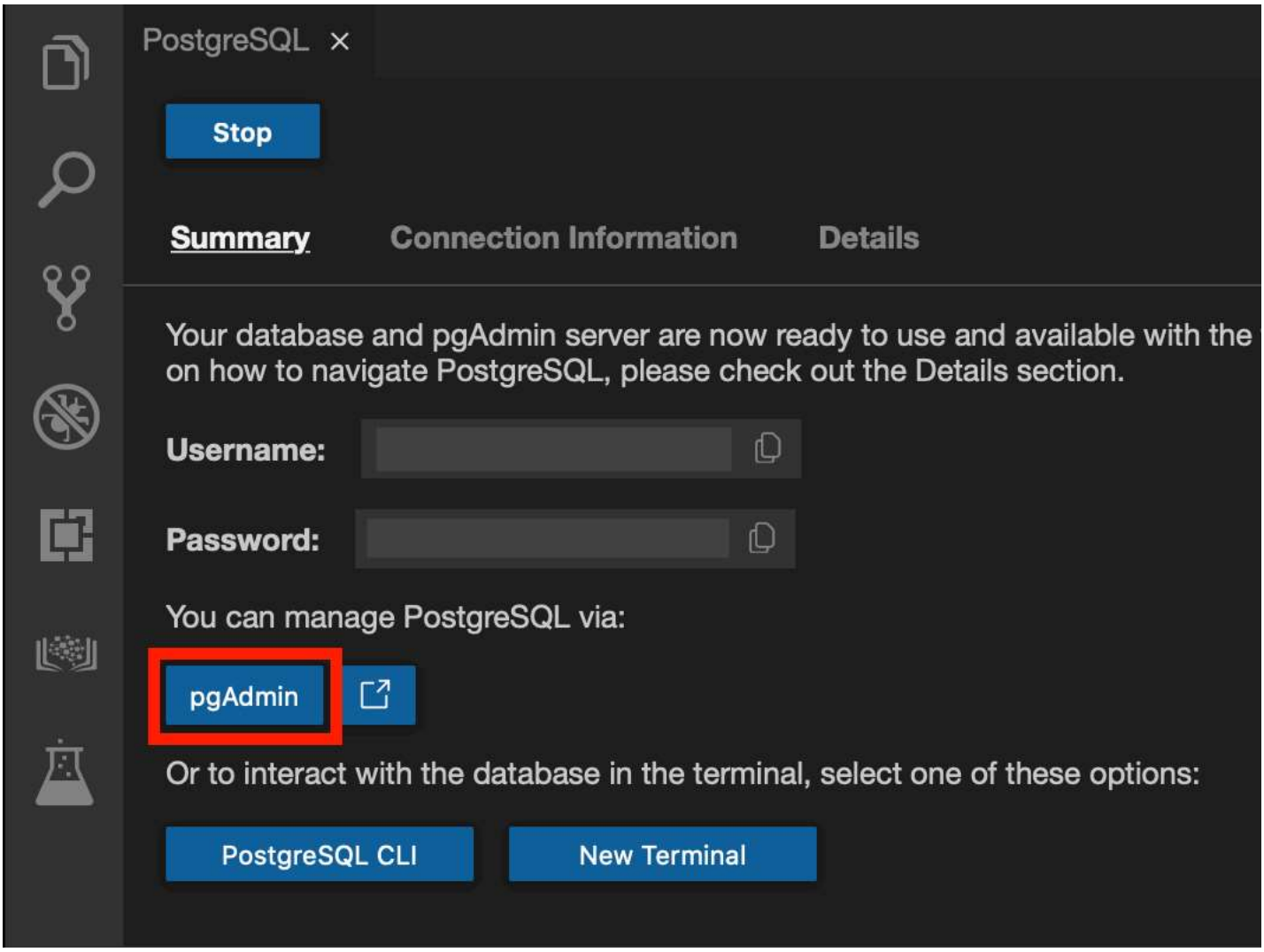
Task A: Restore a database schema and data

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:

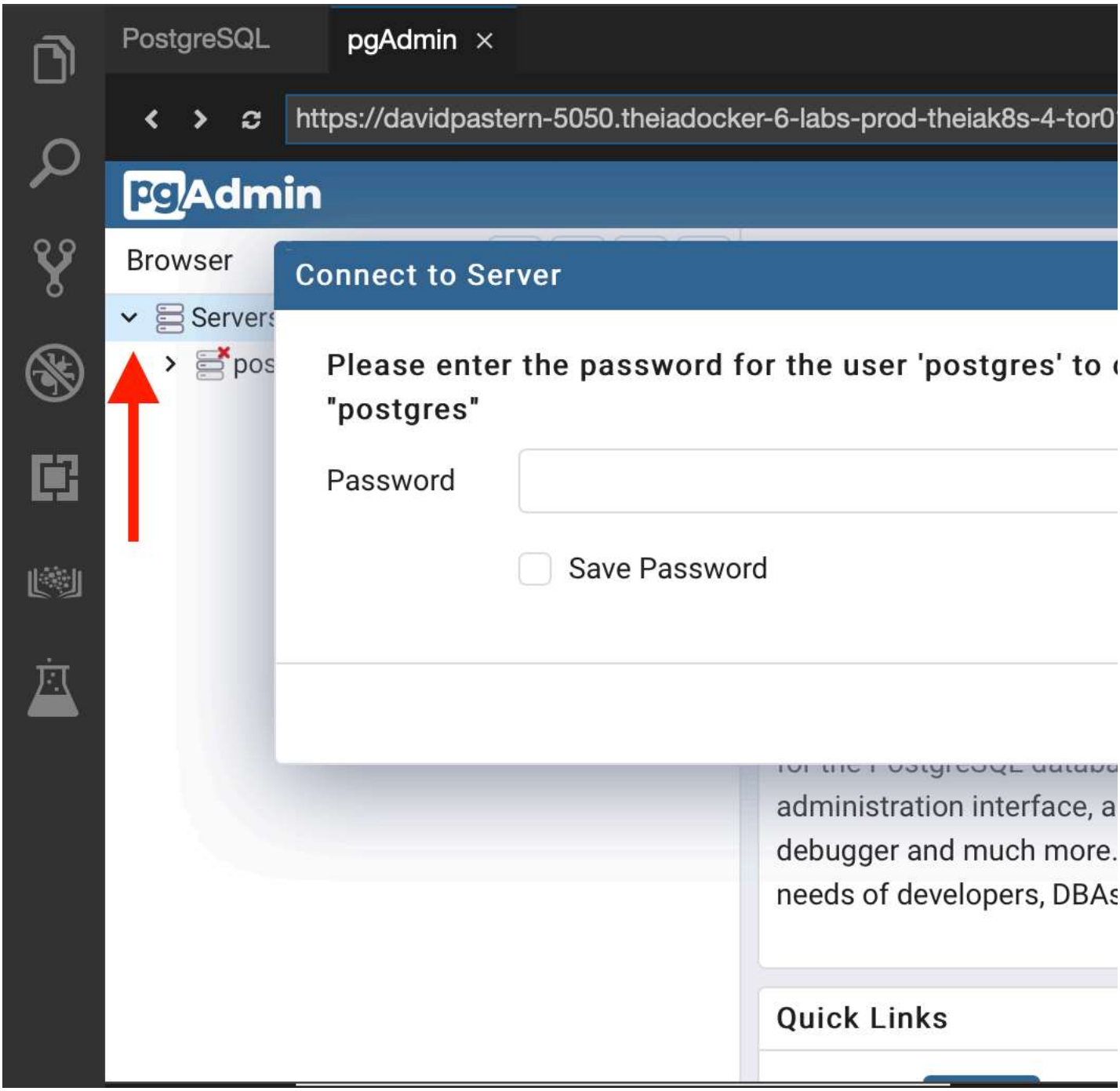
1. Download the following **eBooks** PostgreSQL dump file (containing the eBooks database schema and data) to your local computer.
    - eBooks_pgsql_dump.tar
2. Click the **Skills Network** extension on the left side of the window.
3. Select the **DATABASES** menu and click **PostgreSQL**.
4. Click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



5. Open the pgAdmin graphical user interface (GUI) by selecting **pgAdmin** in the Cloud IDE interface.

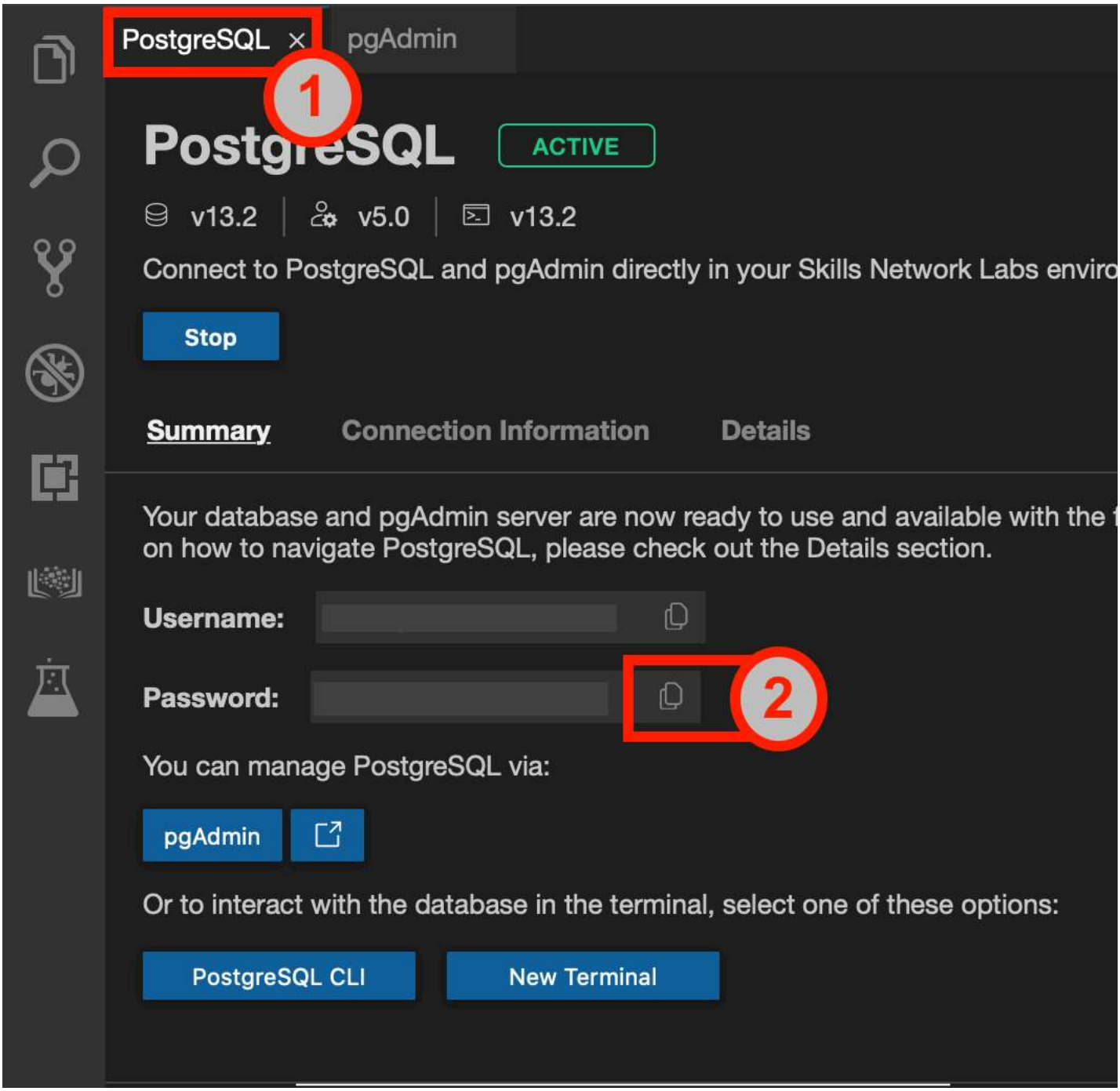


6. Once the pgAdmin GUI opens, click **Servers** on the left side of the page. You will be prompted to enter a password.

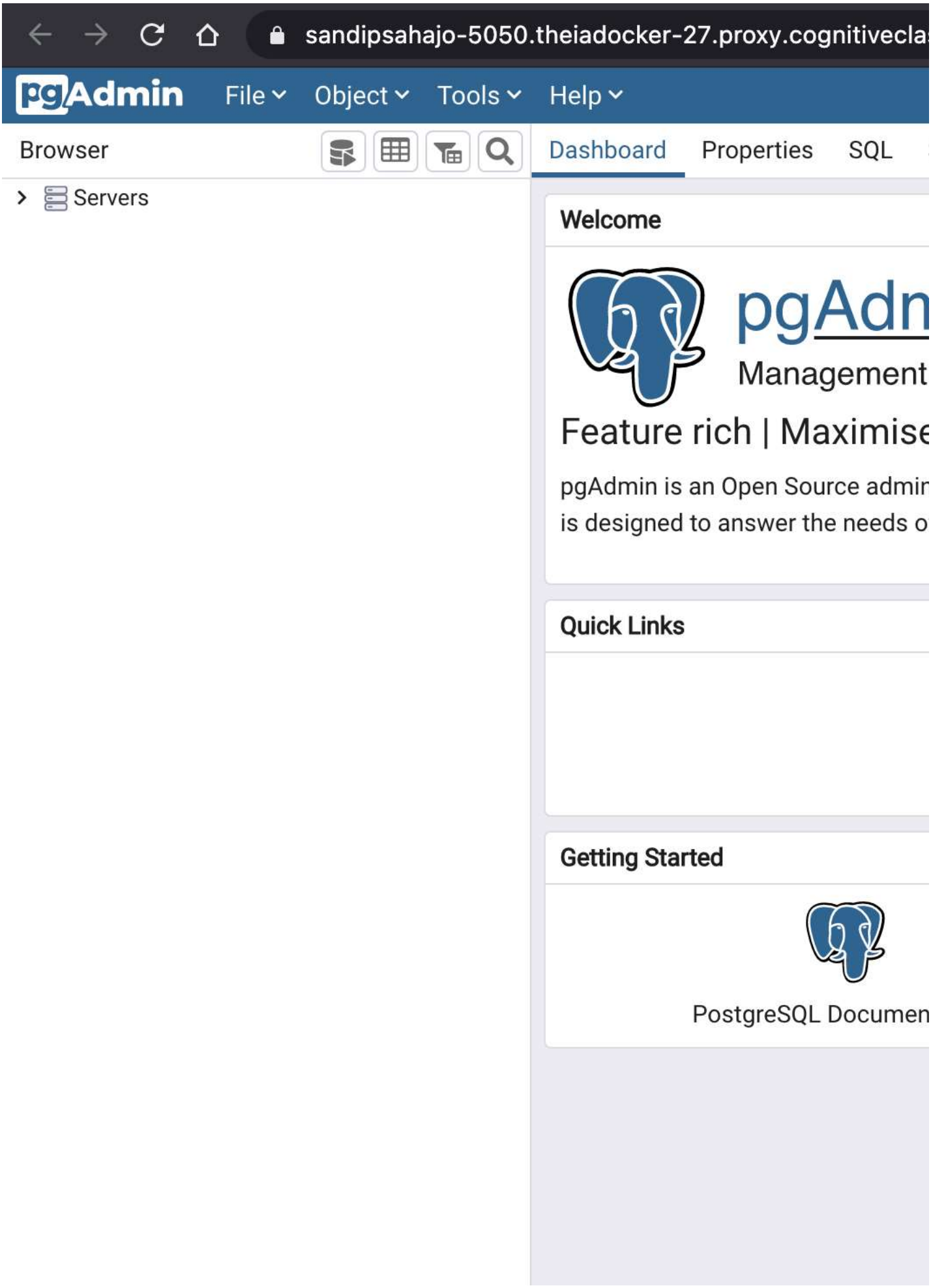


7. To retrieve your password, click **PostgreSQL** near the top of the interface.

8. Click **Copy** to 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.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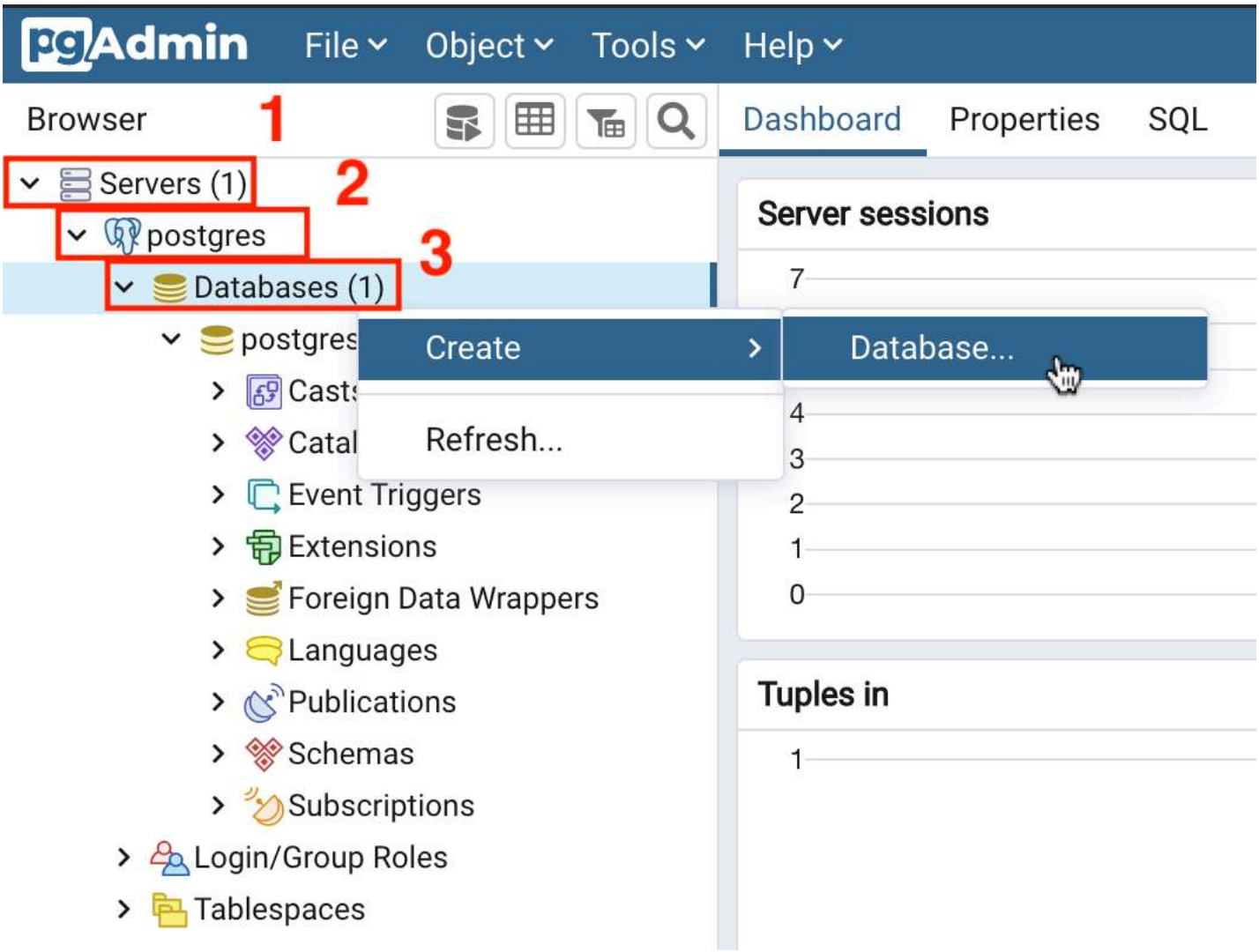
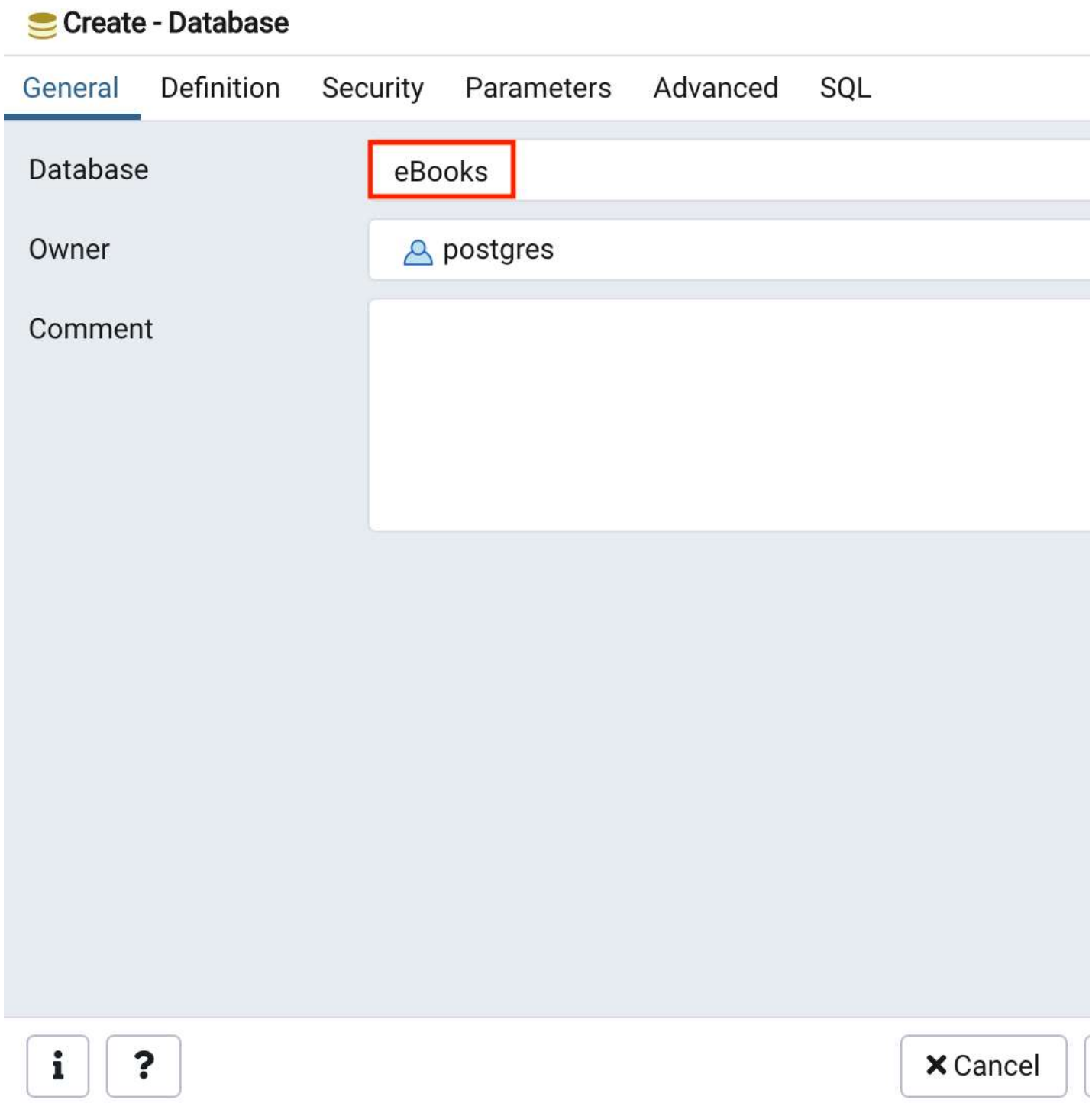
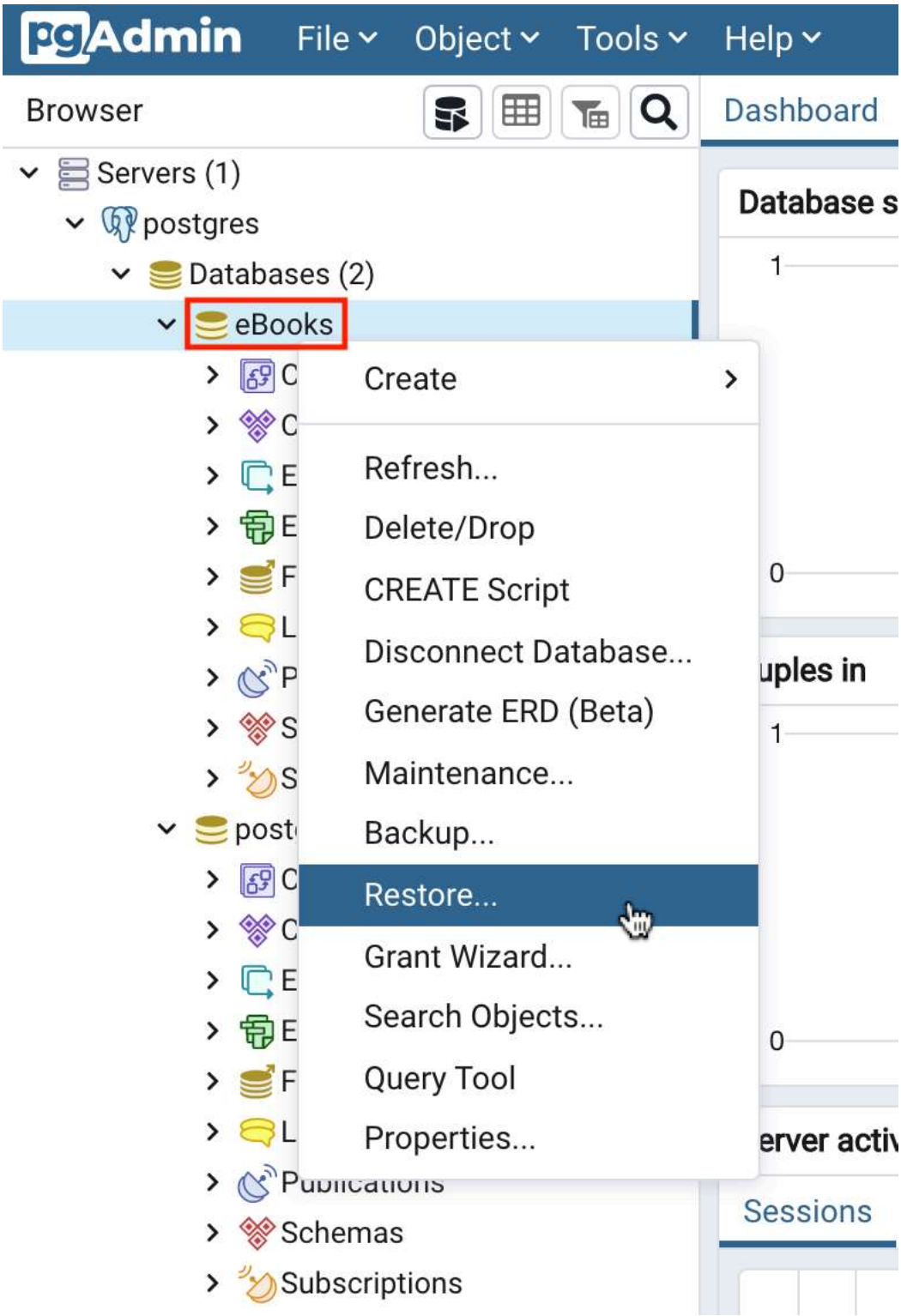
11. In the tree view, expand **Servers** > **postgres** > **Databases**. Enter your PostgreSQL service session password if prompted during the process. Right-click on **Databases** and go to **Create > Database**. Type **eBooks** as the database name and click **Save**.



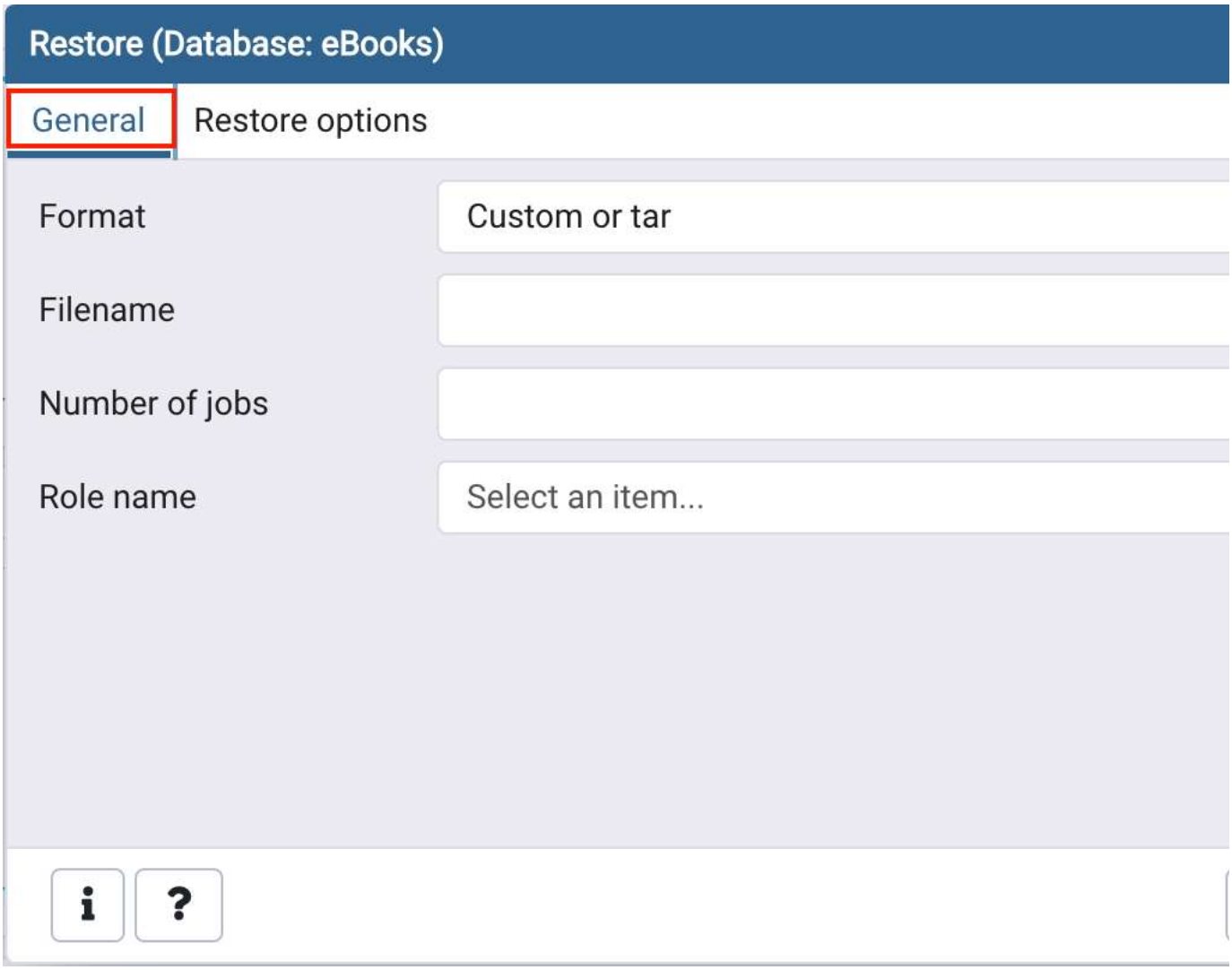


12. In the tree-view, expand **eBooks**. Right-click **eBooks** and select **Restore**.

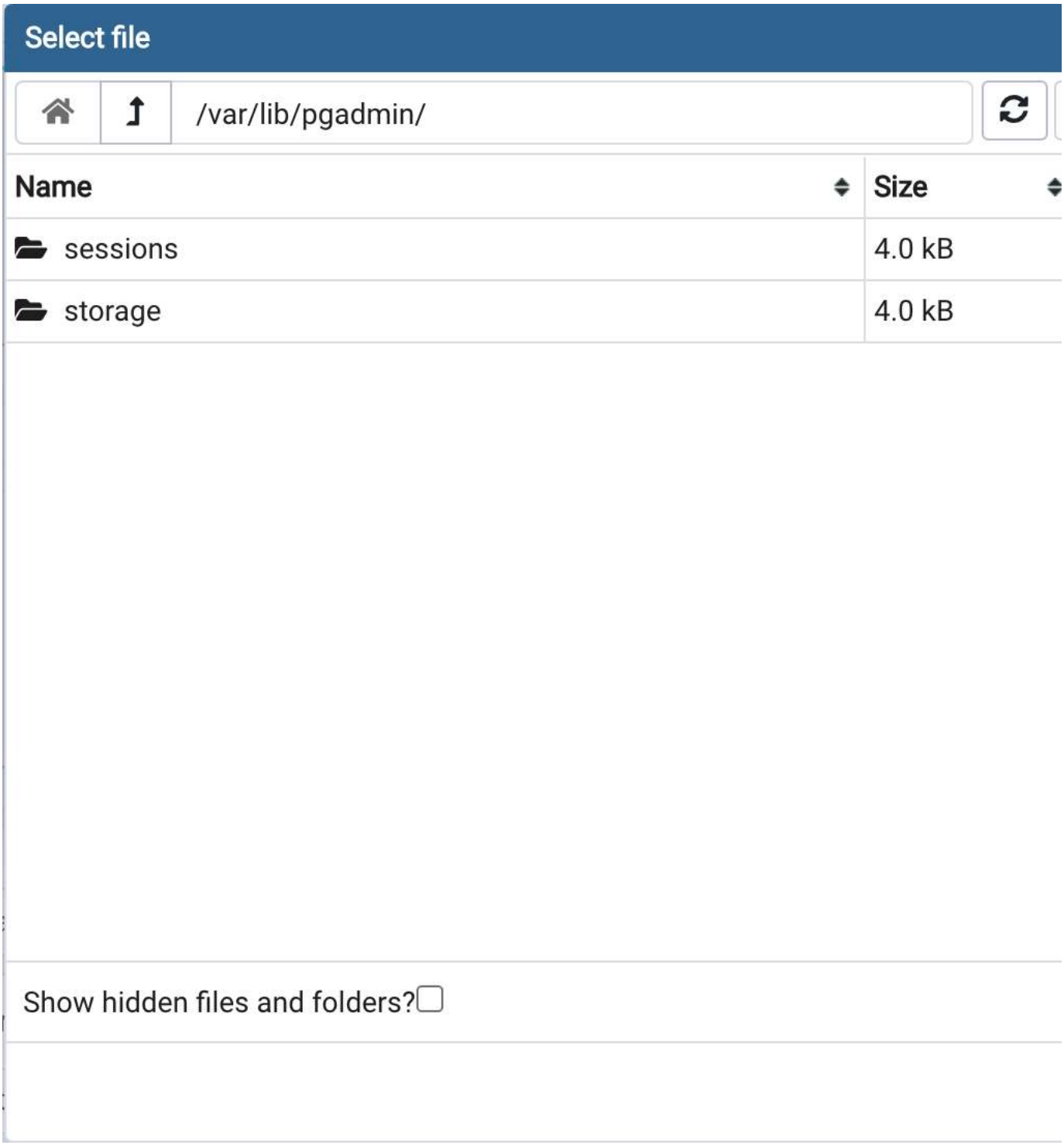


13. Follow the instructions below to restore and proceed to Task B:

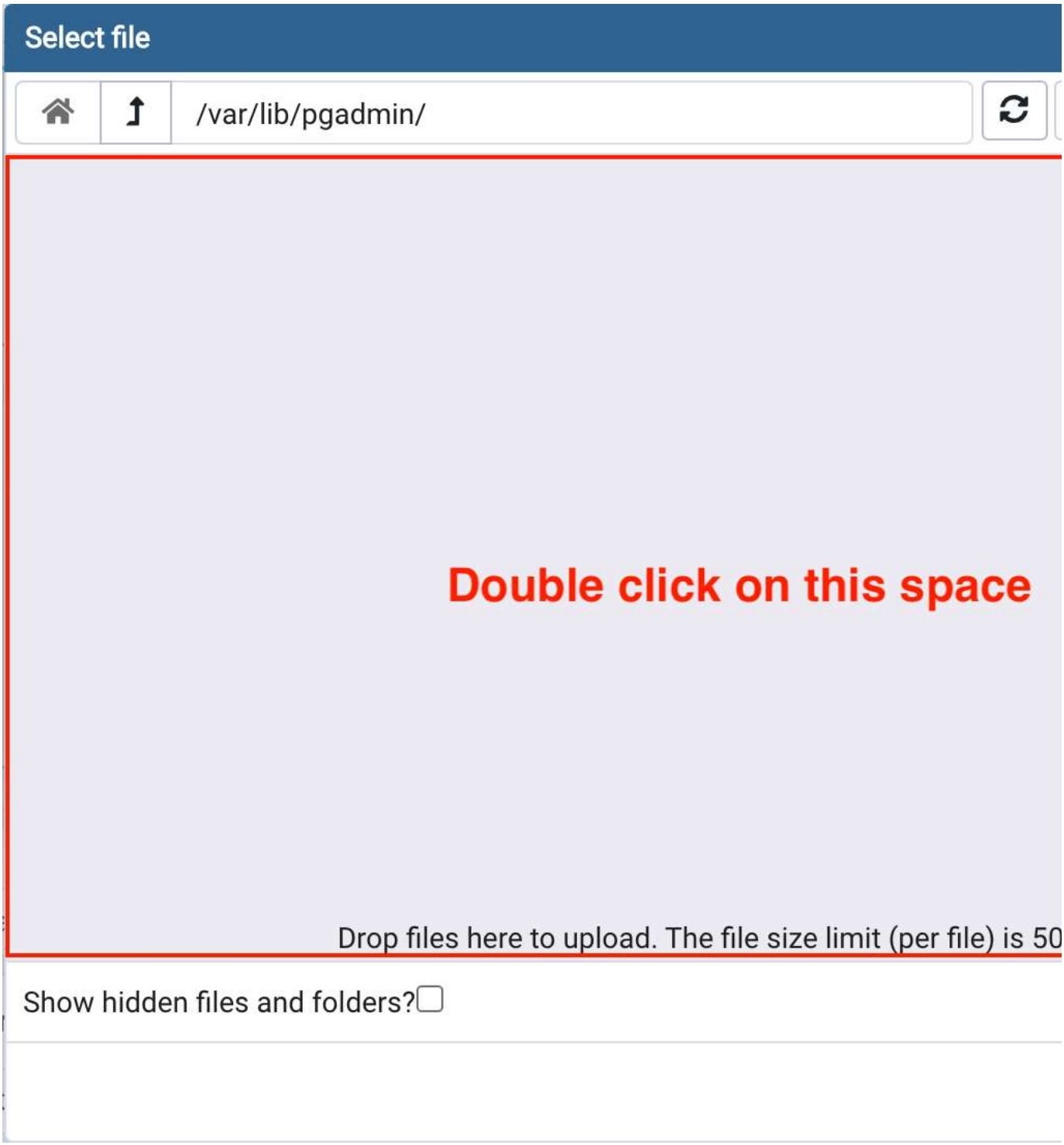
    - On the **General** tab, click **Select file** by the **Filename** box.



- Click **Upload File**.

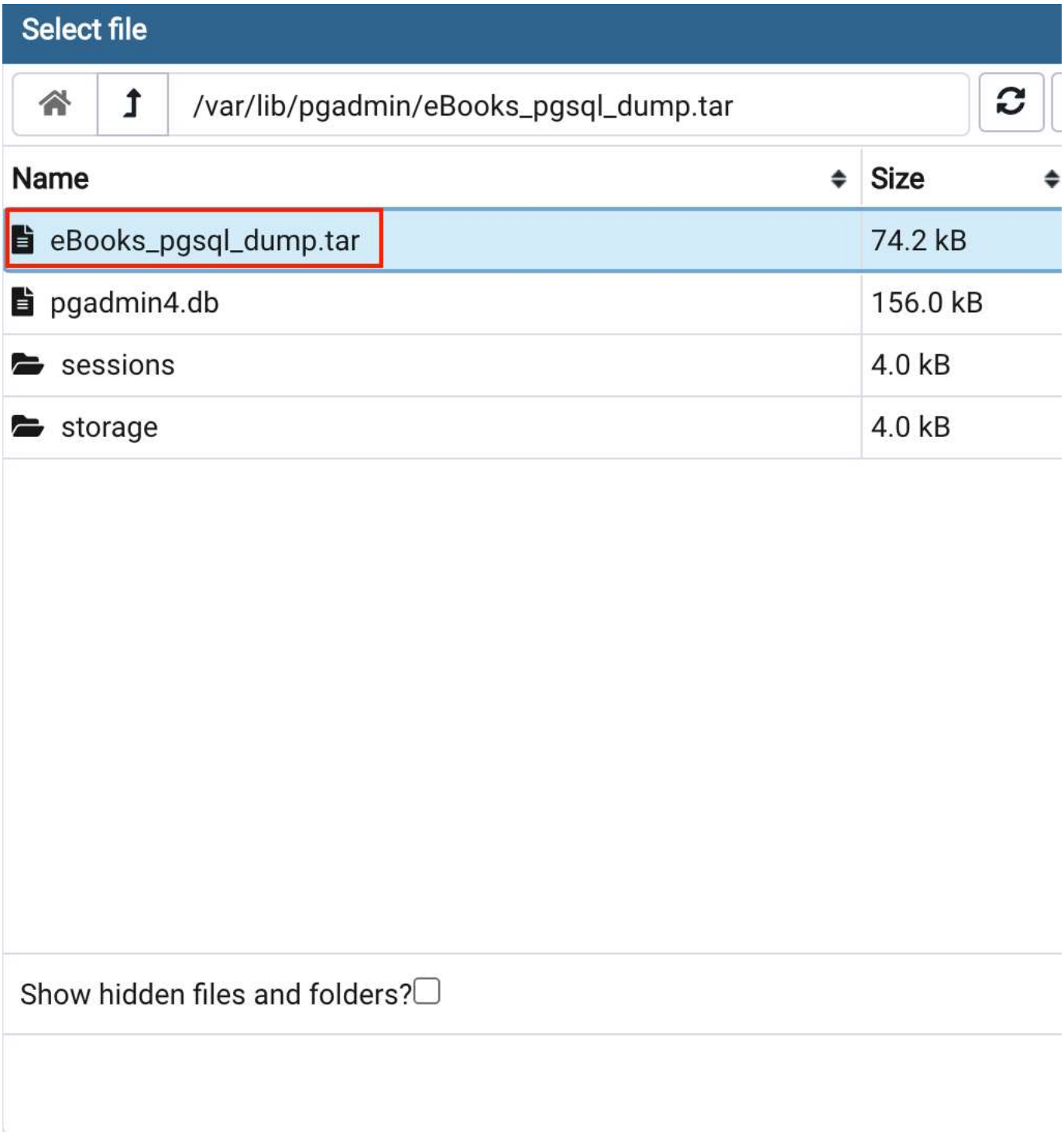


- Double-click on the drop files area and load the **eBooks_pgsql_dump.tar** you downloaded earlier on your local computer.

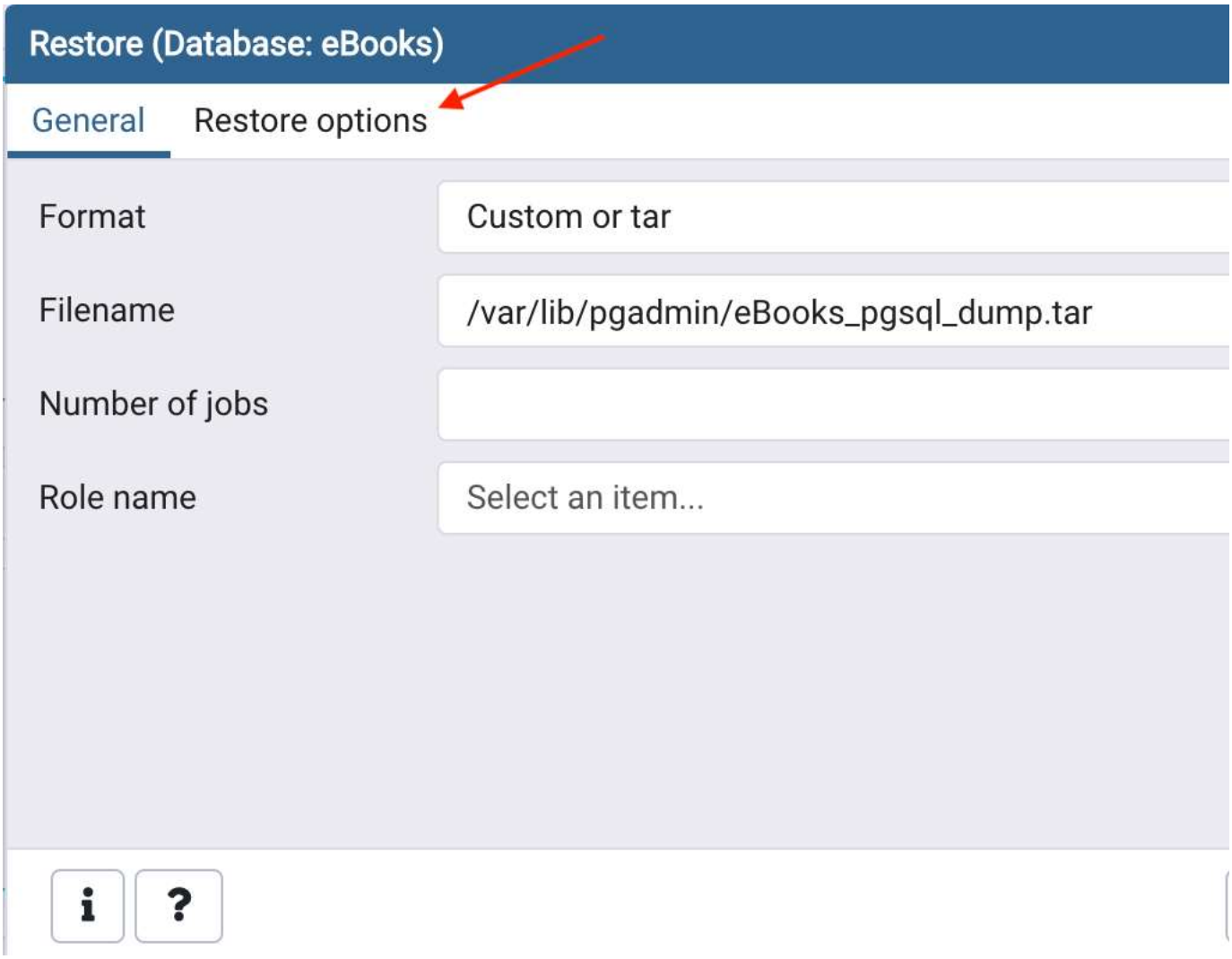


- When the upload is complete, close the drop files area by clicking **X**.

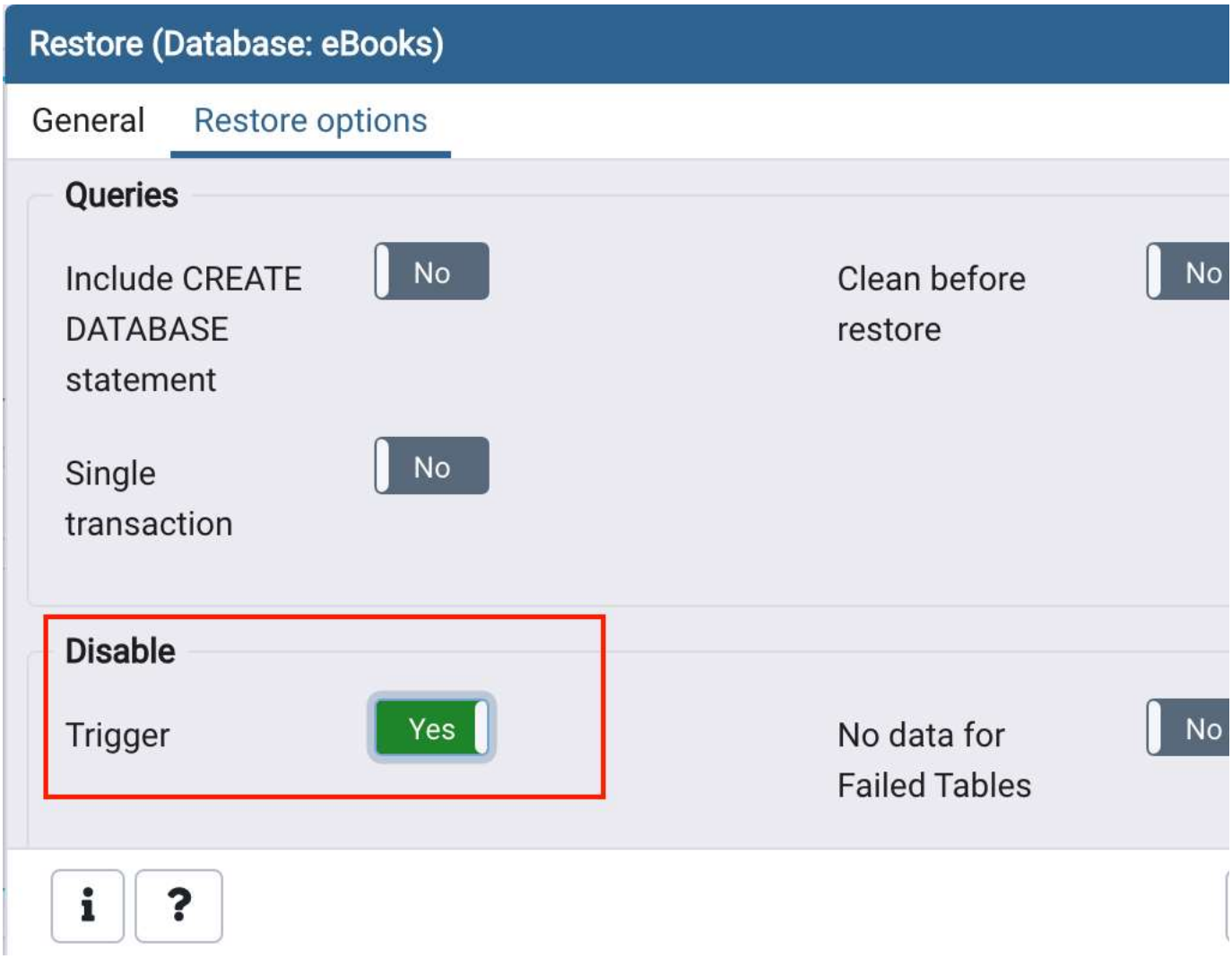
- Ensure **Format** is set to **All Files**, select the uploaded **eBooks_pgsql_dump.tar** file from the list, and then click **Select**.



- Now switch to the **Restore options** tab.



- Under **Disable**, set the **Trigger** option to **Yes**. Then click **Restore**.



Task B: Create and execute a view

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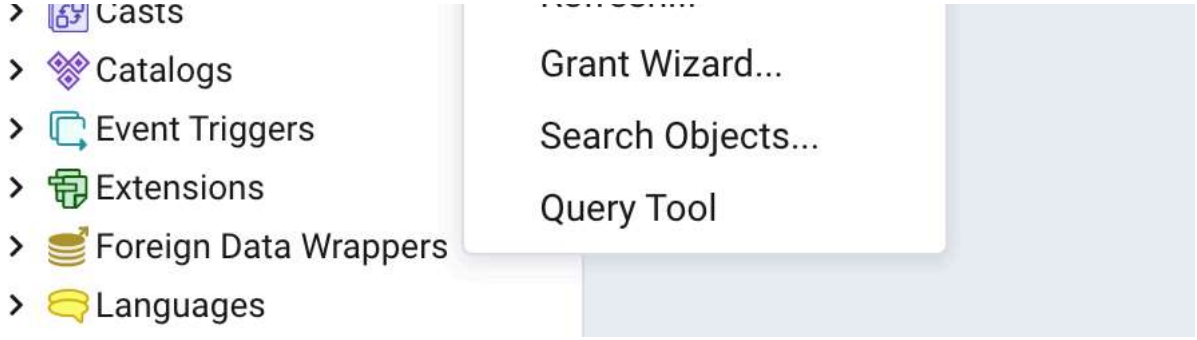
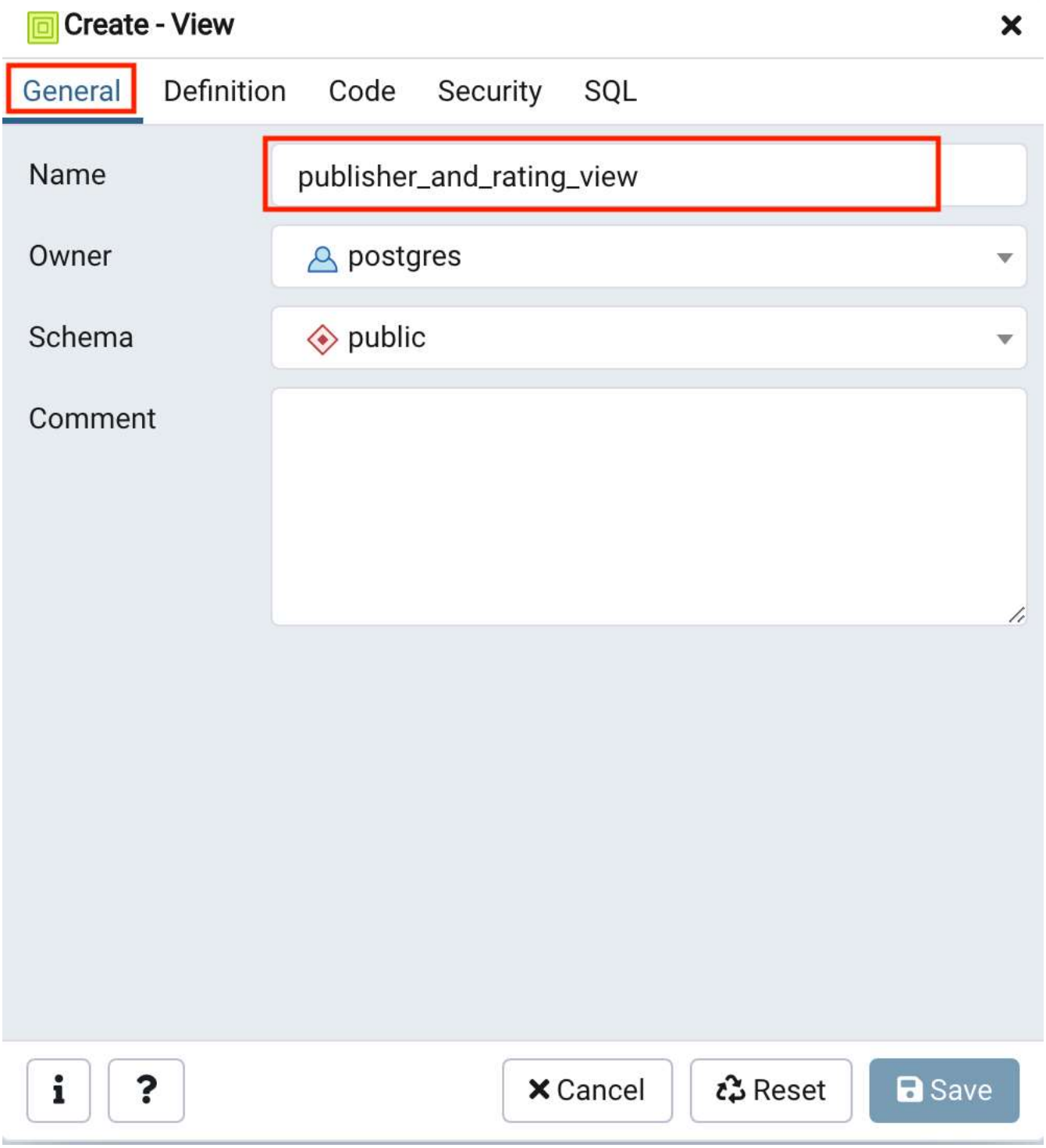


2. On the **General** tab, type **publisher_and_rating_view** as the name of the view. Then, switch to the **Code** tab.



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

```
1. 1
```

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

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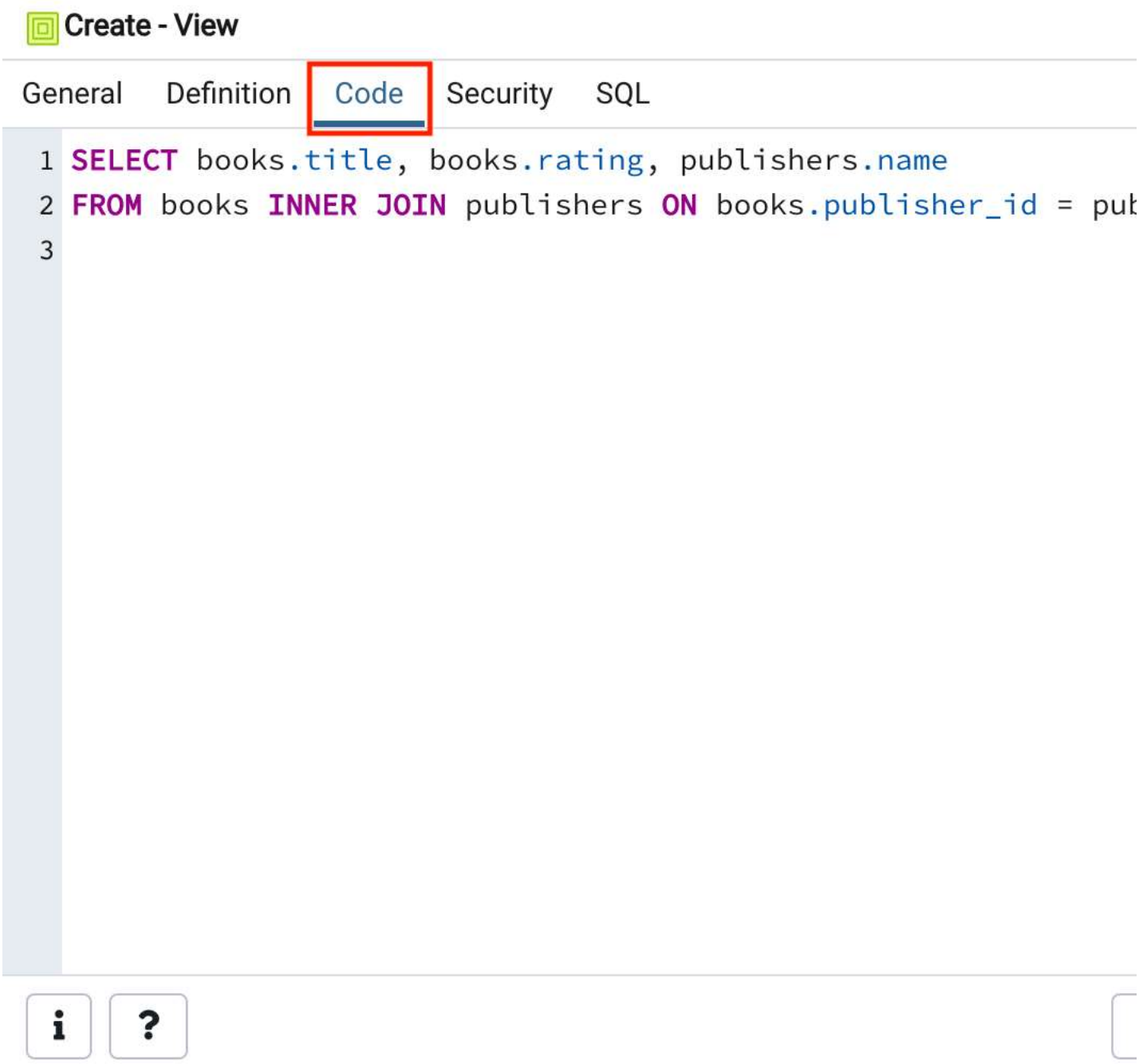
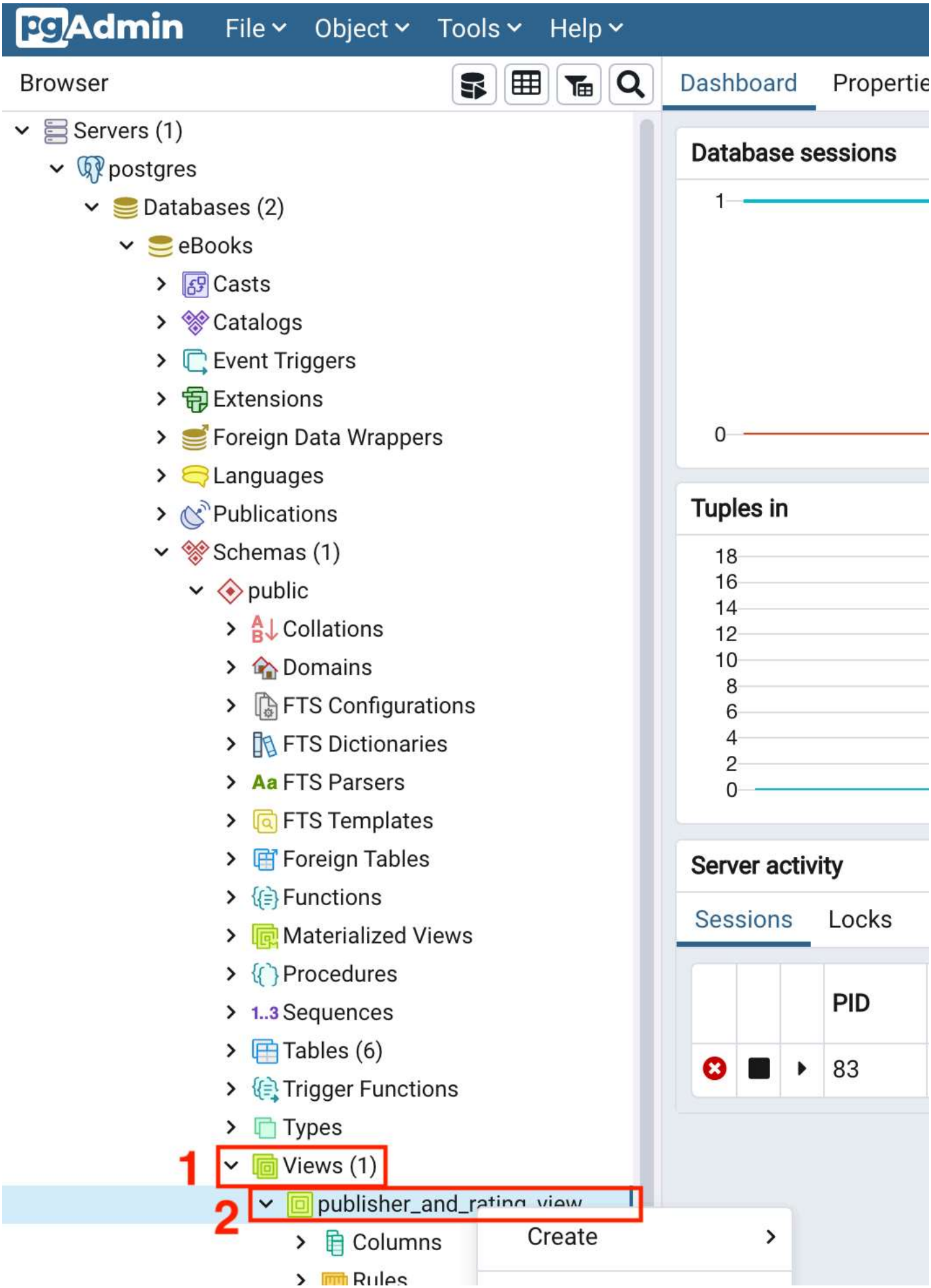


4. In the tree view, expand **Views**. Right-click **publisher_and_rating_view** and go to **View/Edit Data > All Rows**.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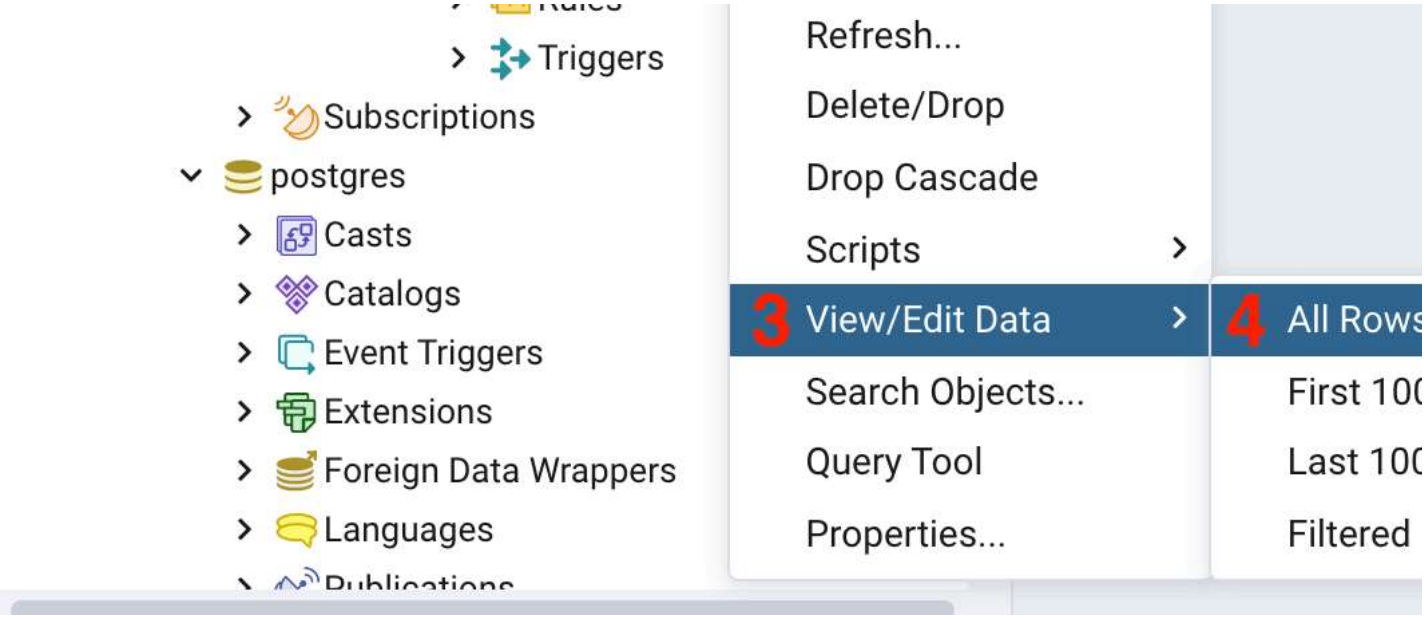


5. You will access the view you created. This action allows you to access and view the tables in your database.

public.publisher_and_rating_view/eBooks/postgres@postgres

Query Editor | Query History

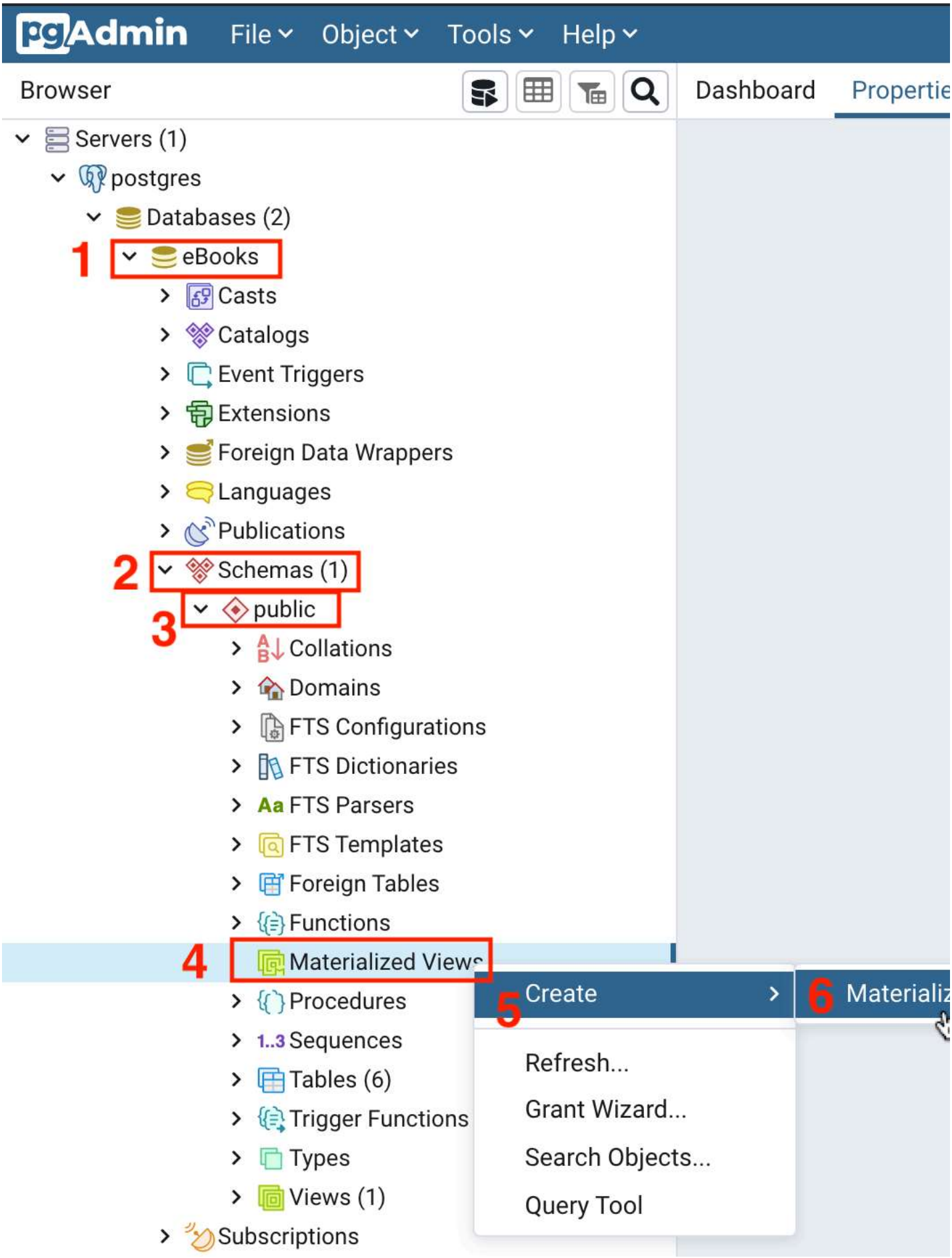
```
1  SELECT * FROM public.publisher_and_rating_view
2
```

Data Output | Explain | Messages | Notifications

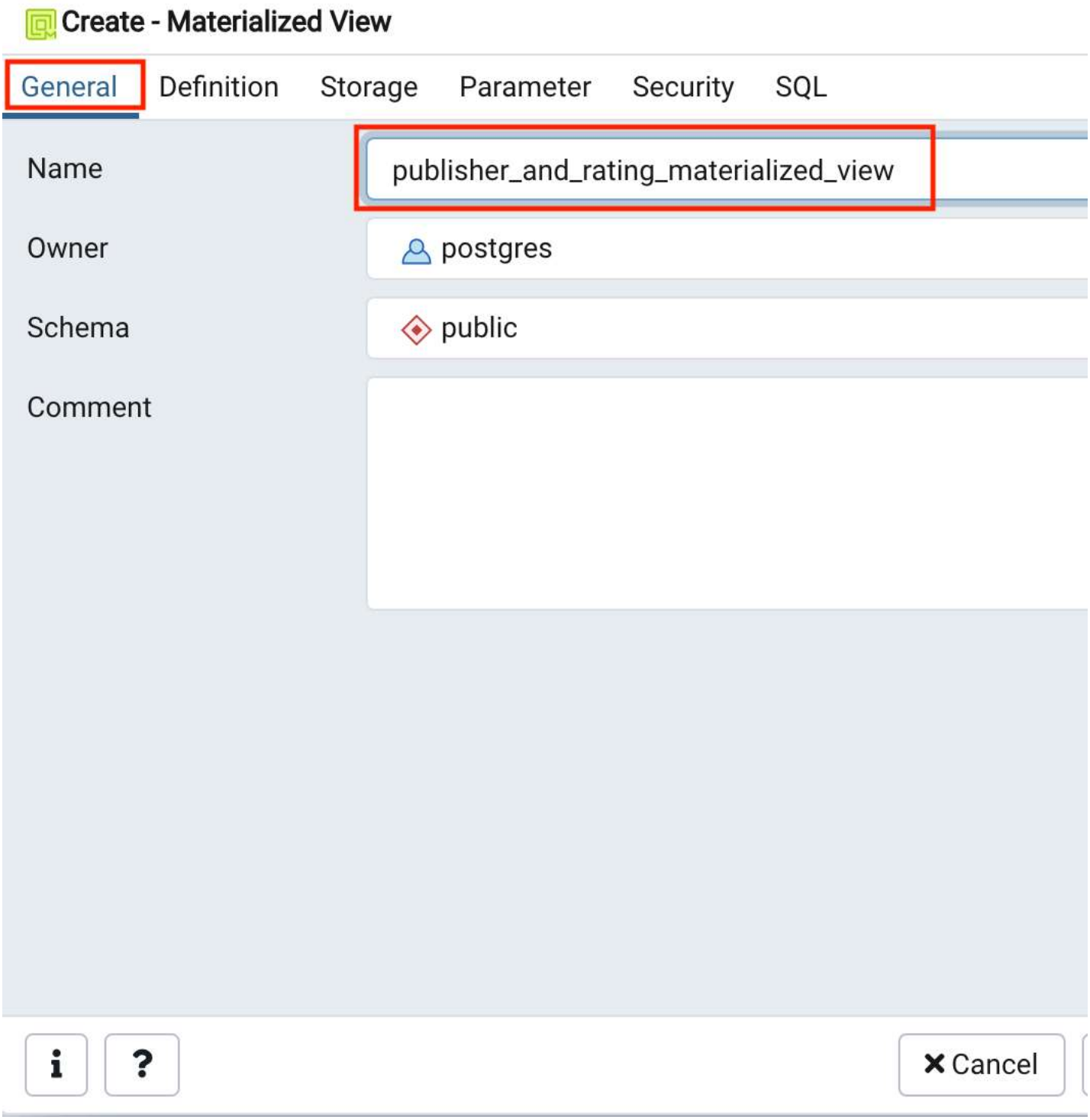
	title character varying (255)	rating numeric (4,2)	name character varying (255)
1	Lean Software Development: ...	4.17	Addison Wesley
2	Facing the Intelligence Explosi...	3.87	Machine Intelligence Researc...
3	Scala in Action	3.74	Manning
4	Patterns of Software: Tales fr...	3.84	Oxford University Press, 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**.



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



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

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

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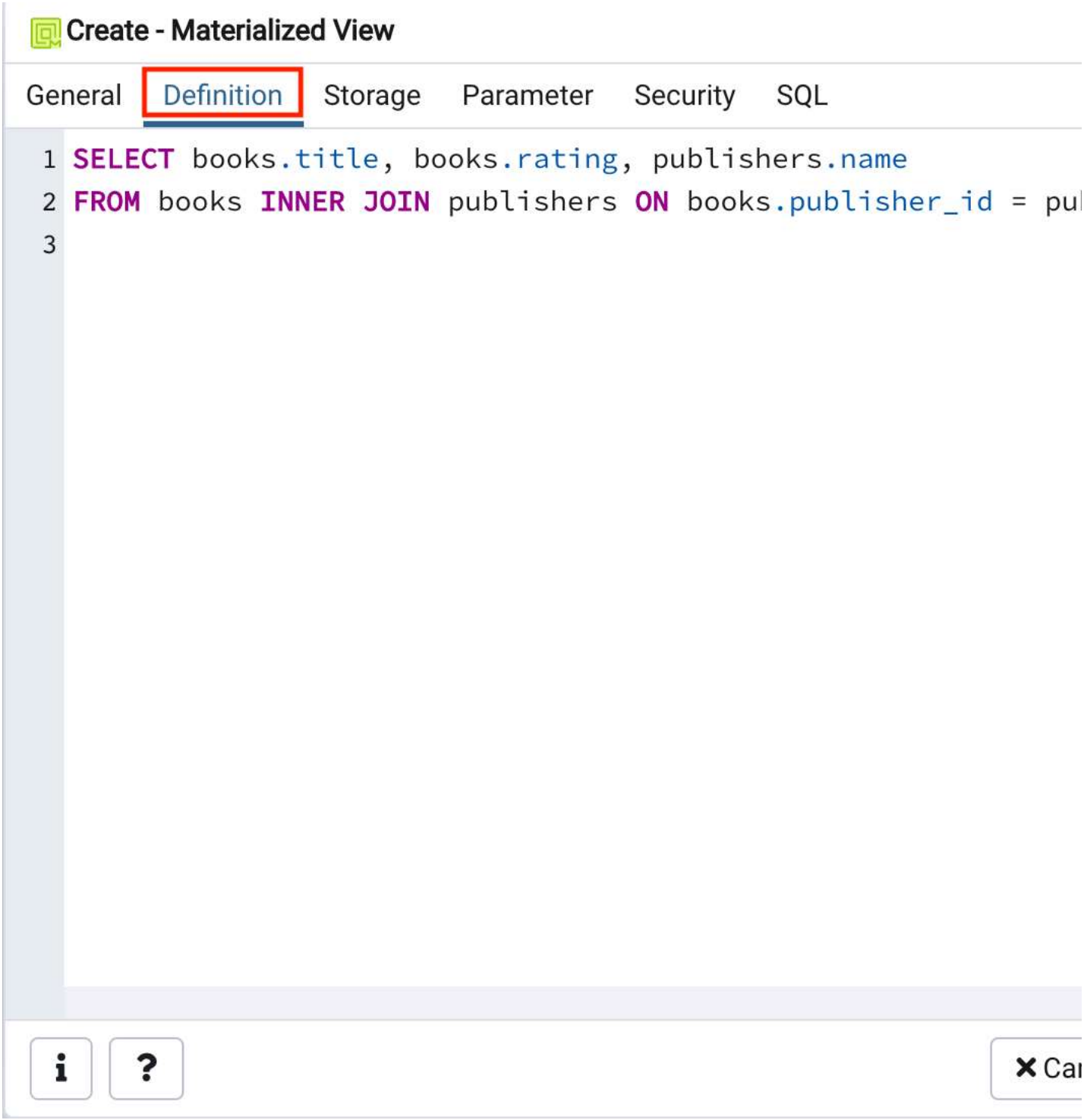
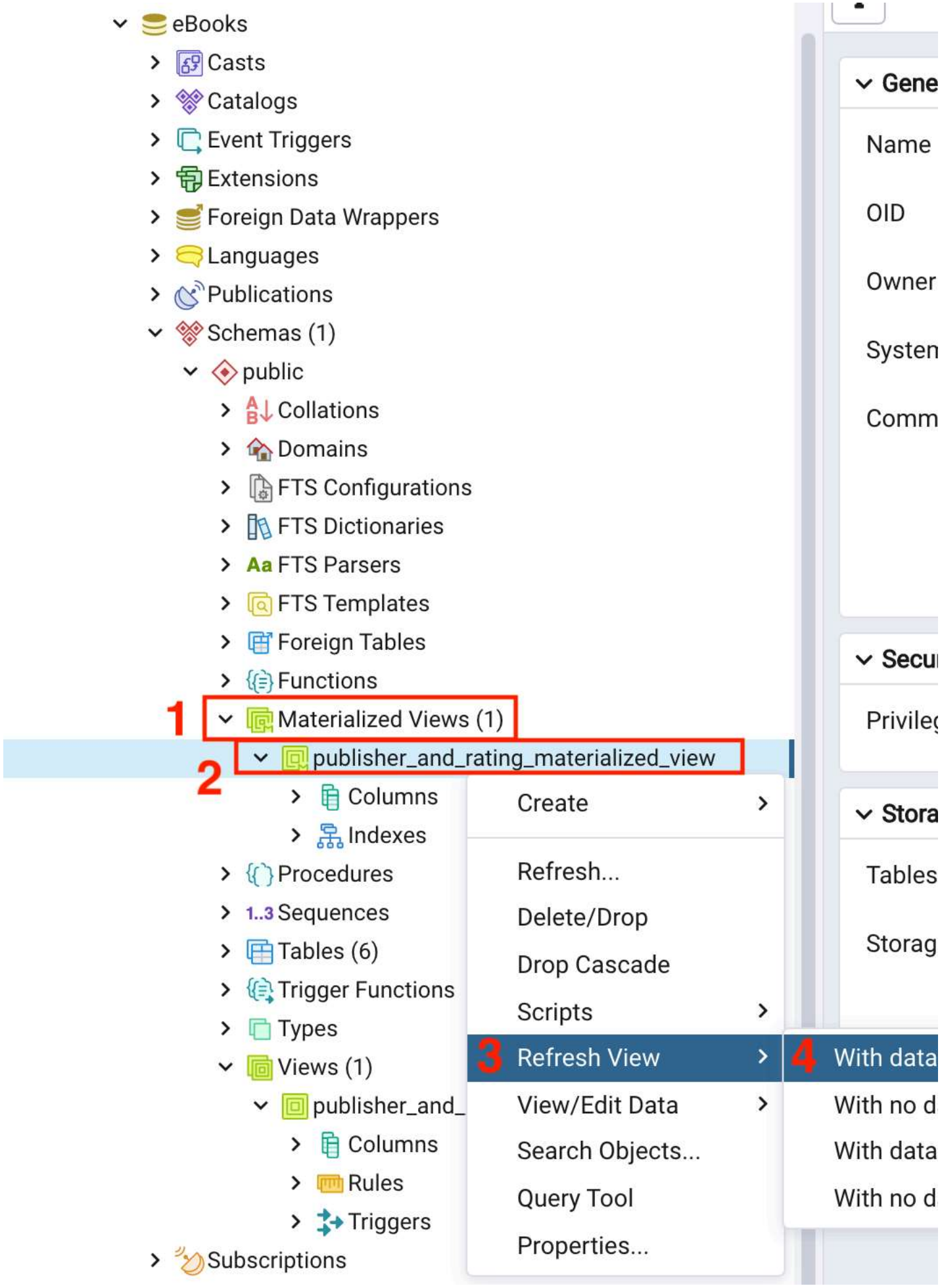


4. In the tree-view, expand **Materialized Views**. Right-click **publisher_and_rating_materialized_view** and go to **Refresh View > With data**.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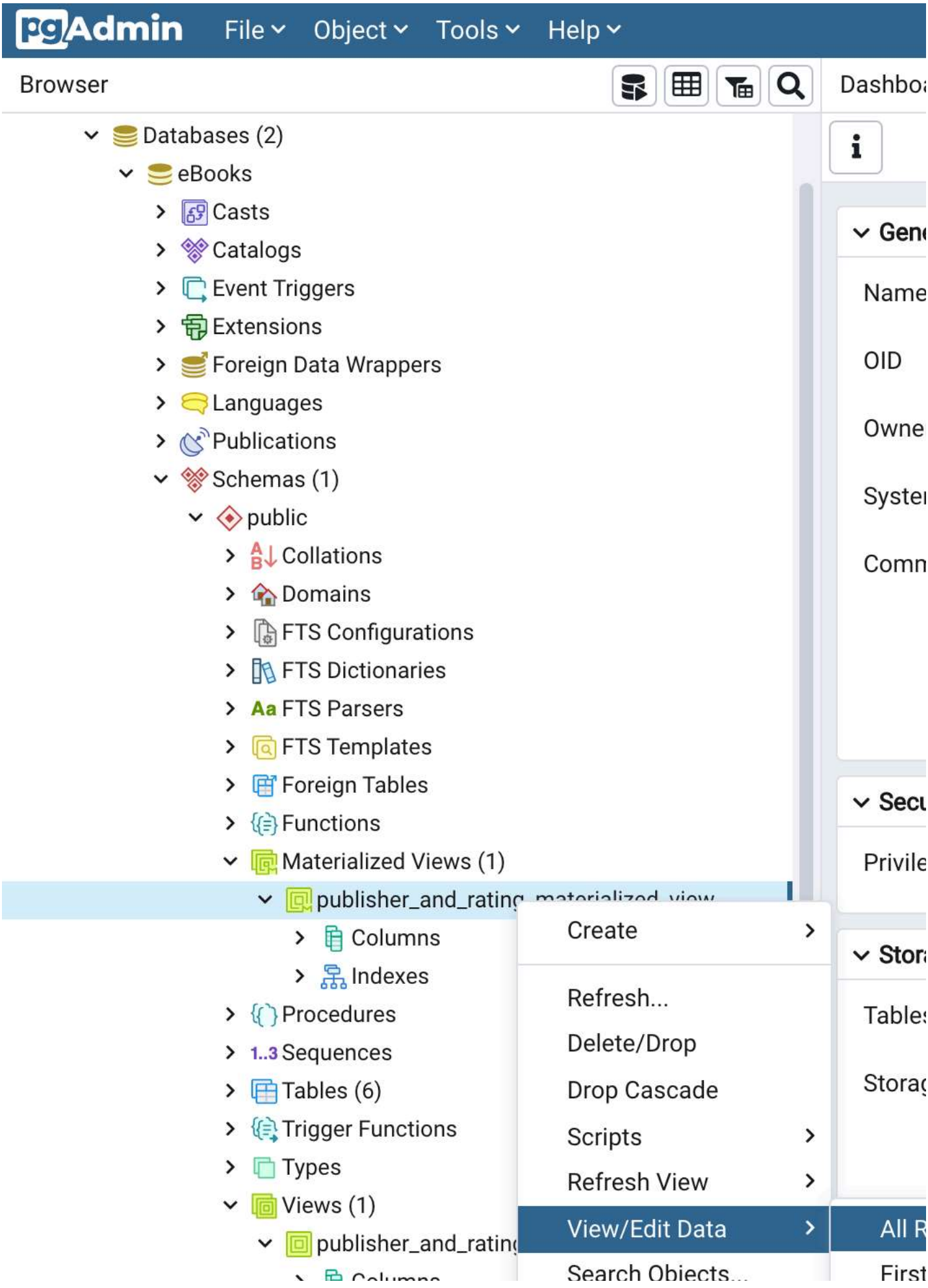
5. Right-click **publisher_and_rating_materialized_view** again and go to **View/Edit Data > All Rows**.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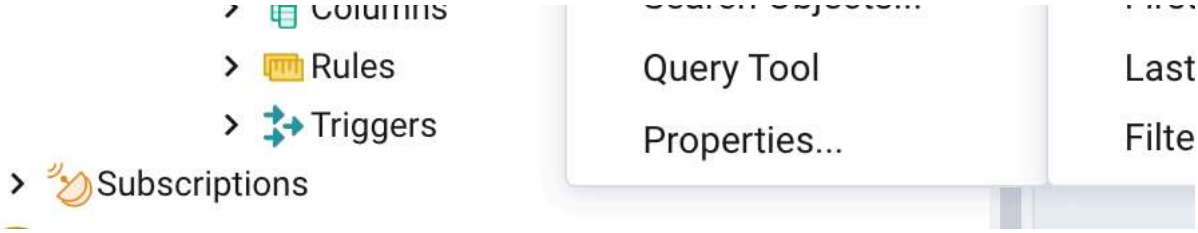

6. You will access the materialized view you created.

public.publisher_and_rating_materialized_view/eBooks/postgres@postgres

Query Editor | Query History

```
1  SELECT * FROM public.publisher_and_rating_materialized_vie
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
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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.

Author: Sandip Saha Joy

Other Contributors: David Pasternak