Cloud Computing Exercise #11

Creating Multiple Database Tables in RDS

A. Preparation

1. Sign in to your AWS account as the non-root admin user.

B. Create an EC2 and an RDS instance

1. Similar to the previous exercise, launch a new Amazon Linux AMI, connect to your instance using SSH and install psql (the PostgreSQL client) on it. Create a security group for your RDS instance that allows inbound TCP traffic on port 5432 from the EC2 instance’s security group. Then, launch a new RDS instance with PostgreSQl 10.17 as the database engine using the RDS security group you just created and configure it to create an initial database named “empdb”. For both the EC2 and RDS instances, use the free tier configuration settings. Once your database server is available, connect to the “empdb” database on it using the “psql” command from your EC2 instance.

C. Create a tables in the database

1. Use SQL commands to create the following tables that could be a part of a company’s HR database:
   * Table: Categories (describes different employee categories)

|  |  |  |
| --- | --- | --- |
| **id**  [int]  (primary key) | **description**  [text] | **is\_fulltime**  [boolean]  (no NULLs) |
| 1 | Manager | true |
| 2 | Regular Employee | true |
| 3 | System Administrator | true |
| 4 | Contractor | false |

In this table, the id column is the primary key, and it should have the serial auto-increment type. The is\_fulltime column should be mandatory (no NULLs).

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* Table: Employees (contains the list of employees and their attributes)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **id**  [int]  (primary key) | **user\_name**  [text]  (no NULLs) | **first\_name**  [text]  (no NULLs) | **last\_name**  [text]  (no NULLs) | **category\_id**  [int]  (foreign key) | **employment\_expires**  [date] |
| 1 | ggeek | Gabriel | Geek | 2 | NULL |
| 2 | ssmart | Sonia | Smart | 3 | NULL |
| 3 | ssuckup | Steve | Suckup | 2 | NULL |
| 4 | ffunny | Frank | Funny | 4 | January 31, 2022 |
| 5 | eemperor | Ewan | Emperor | 1 | NULL |
| 6 | nnice | Nancy | Nice | 2 | NULL |

In this table, the id field is the primary key and it should have the serial auto-increment type. The category\_id column is a foreign key and should refer to the id column of the Categories table. The employment\_expires column should accept NULLs as this column is only meaningful for contractors (everyone else is a full-time employee without preset termination date).

First, create the tables based on the information in the tables’ headers (schemas). Then, insert the content of the tables into the database tables row by row. First, fill the Categories table with data and only then insert data into the Employees table. Check the tables’ content by listing all columns and all rows in the tables. Then, write and execute the following queries using the select SQL command:

* List the first name and the user name for all employees whose last name starts with the letter ‘S”, sorted by their first names (in ascending order).
* List the first and last names of all employees who work full time (the value of the corresponding is\_fulltime column is true). This will need an inner join between the two tables.
* List the first names, last names, user names and category descriptions for all employees. This will also need and inner join.

Then, modify the Employees table by changing Sonia Smart’s user name to “sonias”. Run the previous two queries again, and verify that Sonia now has a new user name. Finally, assume that Steve Suckup has been fired and delete his record (the whole row) from the Employees table e.g. based on his user name or a combination of his first and last name.

1. Delete the both tables (Employees first, and then Categories), and quit psql. Exit the SSH session with your EC2 instance.

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D. Clean up after yourself

1. Go to the EC2 dashboard and terminate your EC2 instance.
2. Go back to the list of RDS instances (Services/RDS/Databases) and delete your RDS instance by selecting it and then selecting “Delete” on the “Actions” drop-down menu. Uncheck the “Create final snapshot?” option as we do not need that for this lab.
3. Log out of AWS.