

Data Engineering Day 16:

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Backup and restore Databases.

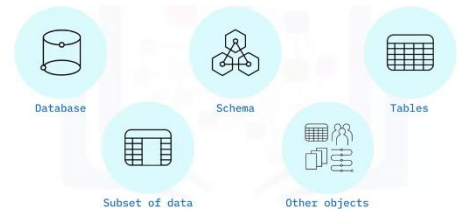
Introductions to backup and restore.

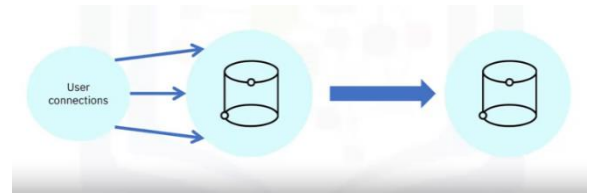


- Backup and restore refers to saving a copy of the data for the protections, recovering from the data loses, while moving the data to different system and many more. Basically, the core reason is to prevent data loss.

Logical backups	Physical Backups
Commands like DDL and DML are used for recreations of the databases such as creating tables and inserting a data in newly created databases.	The physical backups refer to copying of the files or data, logs, and configurations physically in a drive.
can reclaim wasted spaces.	Smaller and the quicker methods
Slowe and may impact the performances	Less granular
Granular, restore allows you to recover individual files or folders, significantly reducing the amount of time it takes to recover lost data.	Can only restore to similar RDBMS
Backup/restore, import/export, dump & load utilities	Common for specialized cloud and the storage systems.

- **What can we backup?**
 - Basically, we can backup Databases, schema, tables, etc. as shown in the figure below.



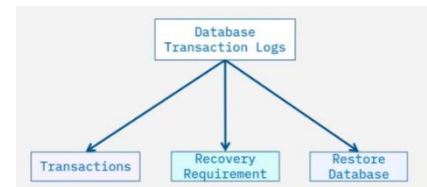
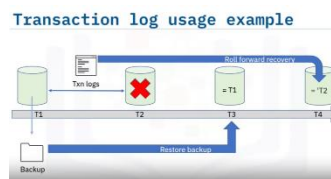


#Backup policies:

- Hot backup – taken while data is in use while it is active while the cold back refers while a database is not in used or are performed while databases aren't used for anything.
- Logical or physical backups
- Hot or cold
- Compressions and the encryptions
- Frequencies, Schedule and the automate.

#Using database transactions logs for recovery.

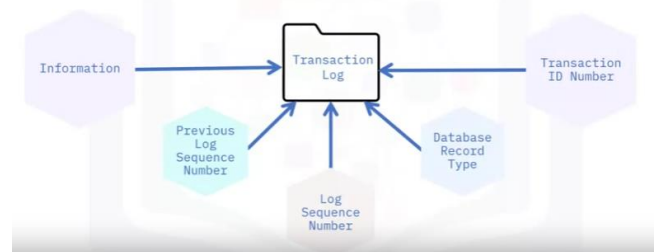
- Transition logs are the histories of transitions performed while backing up the data in databases as shown below.



- The following command is used for backing up the MySQL files in the system and the command is used after
`eia@theiadocker-u65011415: /home/project` `> theia@theiadocker-u65011415: /home/project` `x` `□` `□`
`theia@theiadocker-u65011415: /home/projects$ mysqldump --host=127.0.0.1 --port=3306 --user=root --password world countrylanguage > world_countrylanguage_mysql_backup.sql`

finished MySQL scripting in the terminals:

Basic anatomy of a database log



Introductions to security and user management.

- **Overview of Database Security:**

- Database security is the most features that every organization should consider in today's world because data is the source of income or data is the money.
- There are multiple ways in which security can be performed into the system to prevent the loss of data.

- **Server security:**

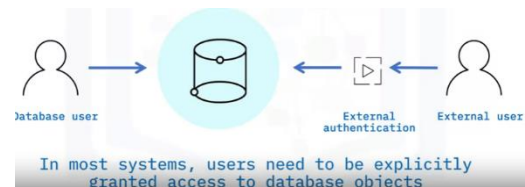
- Performing the security level at server will protect data from being hacked.
- On – premises servers (who is accessing), and managed cloud are important steps taken to achieve this stage of security.

- **Authentication:**

- Give the password or the pin for getting access.
- Also keep the record of those users who have access to the databases.

- **Authorizations:**

- Give access to only the right person for using the data.

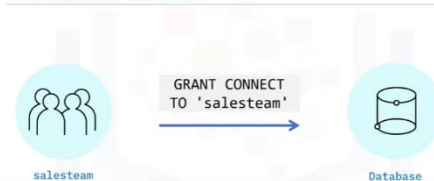


#Users, Groups, and Roles:

- **Database users:**

- Allowed to use a specific
- The figure below shows For group of people to get

Database access



object of a database.
giving the permissions.
access of the databases

Table access



- The figure on my right hand shows how access is granted for using the tables to a group of people of similar interest (maybe for data scientist or analysis)

Auditing the database activities:

- Looking after the databases performances, authentications, authorizations and many more functionalities of the database.
- Its importance is to identify the gap in security of the systems.
- Tracking the errors in the systems.

Encrypting the data:

- The encryption of data refers to the process of converting data into a secure format that cannot be easily understood by unauthorized people.
- Examples of encrypting data or transactions record, employee
- The figure on the right-hand side achieve the encryptions by using s where it required key to decode the data.

Algorithms and keys



Algorithms and keys



included payment cards details etc. shows one of the ways to specific algorithms

```
mysql> ALTER TABLE countrylanguage MODIFY COLUMN Percentage varbinary(255);
Query OK, 984 rows affected (0.08 sec)
Records: 984 Duplicates: 0 Warnings: 0

mysql> UPDATE countrylanguage SET Percentage = AES_ENCRYPT(Percentage, @key_str);
Query OK, 984 rows affected (0.05 sec)
Rows matched: 984 Changed: 984 Warnings: 0

mysql> SELECT * FROM countrylanguage LIMIT 5;
```

CountryCode	Language	IsOfficial	Percentage
ABW	Dutch	T	0x0364F84CB0644BDAF65F721B07F687E
ABW	English	F	0xA07247A81AAC65F8C288F52A4484B
ABW	Papiamentu	F	0x31AC1AC7C382903B8817A7DDA57A866D
ABW	Spanish	F	0xACDCBE084BF8C8CFD941DB006F16A3E9
AFG	Balochi	F	0xFDA727A26842CD027A491B6FA2481672

5 rows in set (0.00 sec)

- The

figure below shows the data before encryption in MySQL CLI.

- The figure below shows the data being encrypted.