BCSE214 Assessment 2 Portfolio Appendix C part 1 Recovery

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1. When does a DBA perform forward recovery? What are the forward recovery steps? Explain in detail.

Roll-forward recovery used together with after-imaging and backup lets you recover from media failures. When a database disk fails a DBA can restore the most recent backup, then use roll-forward recovery to restore the database to the condition it was in before failure. The database engine uses data in the AI files to automatically reprocess all the transactions that have been executed since the last backup was made.

To use roll-forward recovery you must first:

* Perform regularly scheduled backups of the database
* Enable after-imaging immediately after you complete the backup
* Perform regularly scheduled backups of the AI files
* Store the AI files on different disks than those containing the database and BI files
* Archive the AI files to durable media as they become full

For example if you run a query like this

FOR EACH customer:

UPDATE customer.name customer.max-credit.

END.

You update customers 1 and 2, and while you are updating customer 3, the disk where the database file is stored is damaged. You cannot use the BI file to restore the transactions because the original database is no longer valid. However, because you enabled after-imaging, you can use roll-forward recovery to recover the database. If you do not enable after-imaging, you lose all the updates since the last database backup. Before updating the database, the database engine makes a copy of the current information and writes it to the BI file and the AI file. After updating customers 1 and 2, the database disk fails while updating customer 3. The AI files have a copy of all transactions completed since the last backup. Restore the last backup of the database and then roll forward the AI files to produce a restored database that contains all completed transactions.

To restore a database by using roll-forward recovery, you must already have a backup copy of the database, all the archived logs since the backup was created, and the active log files.

Roll-forward recovery steps

1. Make sure you have either Active logs or Online archived logs which are used during crash recovery to prevent a failure that might leave a database in an inconsistent state
2. Enabling log archival mode using the command SYSCS\_UTIL.SYSCS\_BACKUP\_DATABASE\_AND\_ENABLE\_LOG\_ARCHIVE\_MODE
3. Once the backup is complete you are ready to do the Roll-forward recovery
4. Perform roll-forward recovery by specifying the connection URL attribute rollForwardRecoveryFrom=path at boot time.
5. This brings the database to its most recent state by using full backup copy, archived logs, and active logs. All the log files should be in the database log path directory.

Example:

connect 'jdbc:derby:wombat;rollForwardRecoveryFrom=d:/backup/mydatabase';

select \* from t1;

(b) If a transaction is interrupted, what steps does the DBMS take to correct the database? Explain in Detail. Show example with Roll back and Save point in MySQL.

The DBMS should create a save point before the transaction is started and give it an identifier this creates a lock in the DB memory on the data that has been modified already so that if the next transaction is interrupted the modifications can be rollback to the save point using the rollback statement.

Example Pre rollback: save point created

Graphical user interface, text, application

Description automatically generated

Example Post rollback

Graphical user interface, application

Description automatically generated