DBMS Data Backup

Failure with loss of Non-Volatile storage

What would happen if the non-volatile storage like RAM abruptly crashes? All transaction, which are being executed are kept in main memory. All active logs, disk buffers and related data is stored in non-volatile storage.

When storage like RAM fails, it takes away all the logs and active copy of database. It makes recovery almost impossible as everything to help recover is also lost. Following techniques may be adopted in case of loss of non-volatile storage.

- A mechanism like checkpoint can be adopted which makes the entire content of database be saved periodically.

- State of active database in non-volatile memory can be dumped onto stable storage periodically, which may also contain logs and active transactions and buffer blocks.

- <dump> can be marked on log file whenever the database contents are dumped from non-volatile memory to a stable one.

Recovery:

- When the system recovers from failure, it can restore the latest dump.

- It can maintain redo-list and undo-list as in checkpoints.

- It can recover the system by consulting undo-redo lists to restore the state of all transaction up to last checkpoint.

Database backup & recovery from catastrophic failure

So far we have not discovered any other planet in our solar system, which may have life on it, and our own earth is not that safe. In case of catastrophic failure like alien attack, the database administrator may still be forced to recover the database.

Remote backup, described next, is one of the solutions to save life. Alternatively, whole database backups can be taken on magnetic tapes and stored at a safer

place. This backup can later be restored on a freshly installed database and bring it to the state at least at the point of backup.

Grown up databases are too large to be frequently backed-up. Instead, we are aware of techniques where we can restore a database by just looking at logs. So backup of logs at frequent rate is more feasible than the entire database. Database can be backed-up once a week and logs, being very small can be backed-up every day or as frequent as every hour.

Remote Backup

Remote backup provides a sense of security and safety in case the primary location where the database is located gets destroyed. Remote backup can be offline or real-time and online. In case it is offline it is maintained manually.
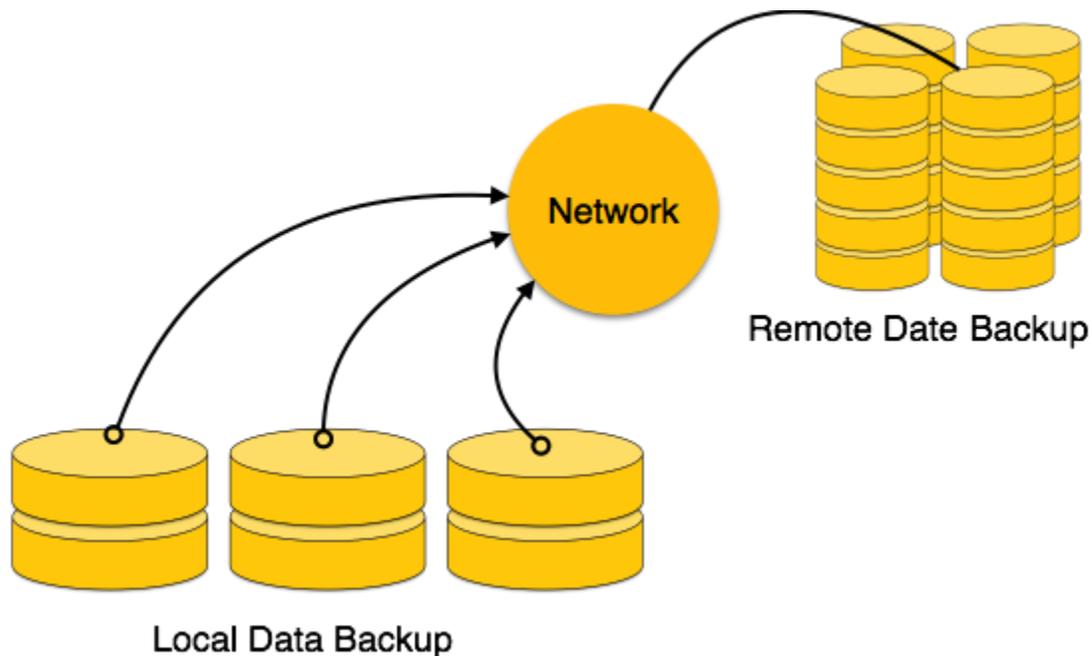
[*Image: Remote Data Backup*]

Online backup systems are more real-time and lifesavers for database administrators and investors. An online backup system is a mechanism where every bit of real-time data is backed-up simultaneously at two distant place. One of them is directly connected to system and other one is kept at remote place as backup.

As soon as the primary database storage fails, the backup system sense the failure and switch the user system to the remote storage. Sometimes this is so instant the users even can't realize a failure.

Source:

http://www.tutorialspoint.com/dbms/dbms_data_backup.htm