

DATABASE MANAGEMENT ISSUES IN MOBILE COMPUTING

Lesson 07

Data Recovery Issues

NUMBER OF REASONS WARRANTING DATABASE RECOVERY

- Media failure
- System failure
- Transaction abortion
- Data destruction due to intentional external attack or due to unintentional (due to careless handling) user carelessness

NUMBER OF REASONS WARRANTING DATABASE RECOVERY

- Data may also be destroyed due to destruction of the physical media hoarding the data
- Logical program errors and a transaction may not materialize
- Finally, there may be loss of main memory due to system errors (hardware or software)

NON-RECOVERABLE DATA

- In case of media failure, intentional attack on the database and transactions logging data, or physical media destruction
- However, data recovery possible in other cases

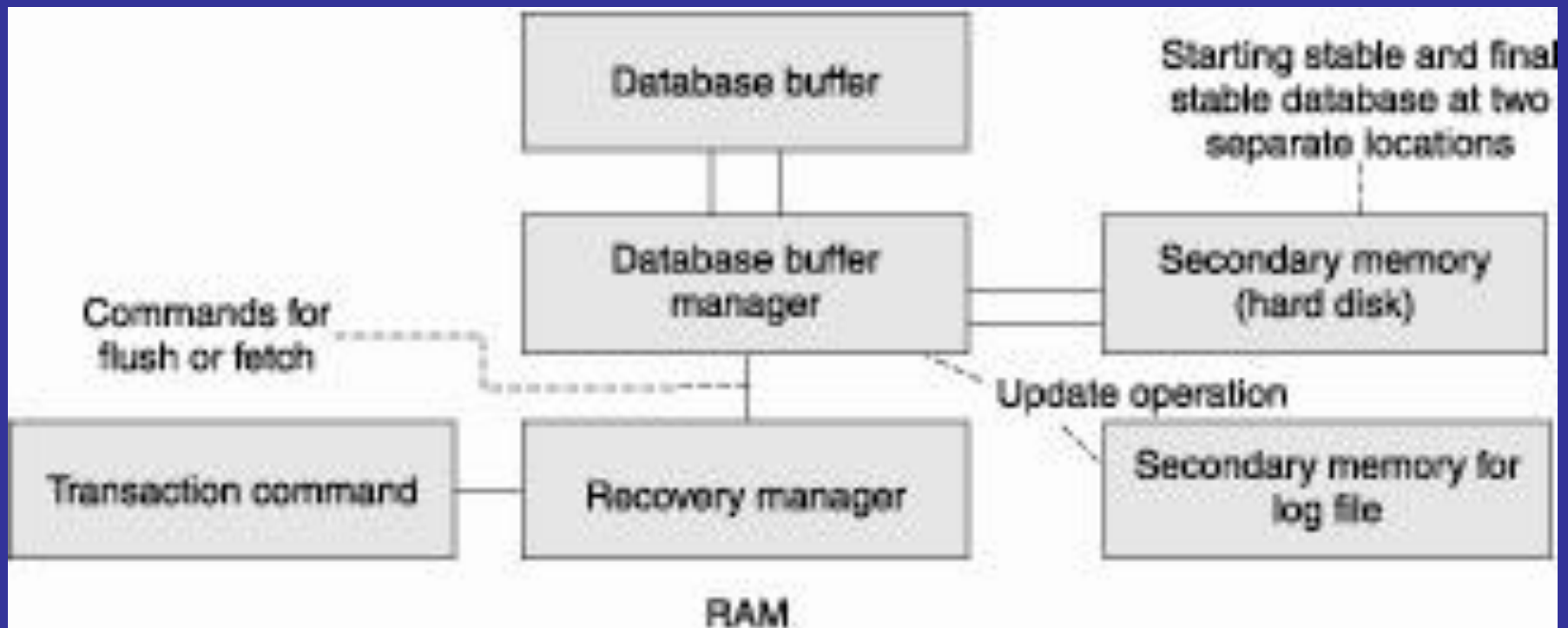
EXAMPLE

- Assume that transactions started at time t_0 and system crash or failure occurs at $t_0 + T$.
- Assuming that transactions T_0 to T_{n-1} are required to be completed in sequence $T_0, T_1, T_2, \dots, T_{n-1}$, the following cases are possible

EXAMPLE

- Case 1: Last transactions incomplete
- Case 2: Initial and Last transactions incomplete

RECOVERY MANAGEMENT ARCHITECTURE



RECOVERY MANAGER

- Recovers or aborts a transaction using the logged entries

RECOVERY MANAGER LOG FILE

- Each instruction for a transaction for update (insertion, deletion, replacement, and addition) logged.
- Database read instructions are not logged
- Log files stored at a different storage medium
- Log entries flushed out after the final stable state database is stored

LOGGED ENTRY FIELDS

- Transaction type (begin, commit, or rollback transaction)
- Transaction ID
- Operation-type
- Object on which the operation performed
- Pre-operation and post-operation values of the object

CHECK POINT BASED RECOVERY

- Uses the checkpoints for operations on the data during a set of transactions
- Recovery always made by back-scanning the logged records
- A checkpoint-based data recovery procedure defines the stage, up to which the back-scanning of logged operations in the secondary storage is to be done

RECOVERY MODELS

- Full recovery model
- Bulk logged recovery model
- Simple recovery model

SUMMARY

- Data recovery Model
- Recovery manager
- Check Points
- Logged Fields help in recovery

End of Lesson 07
Data Recovery Issues