Database Memory Concepts

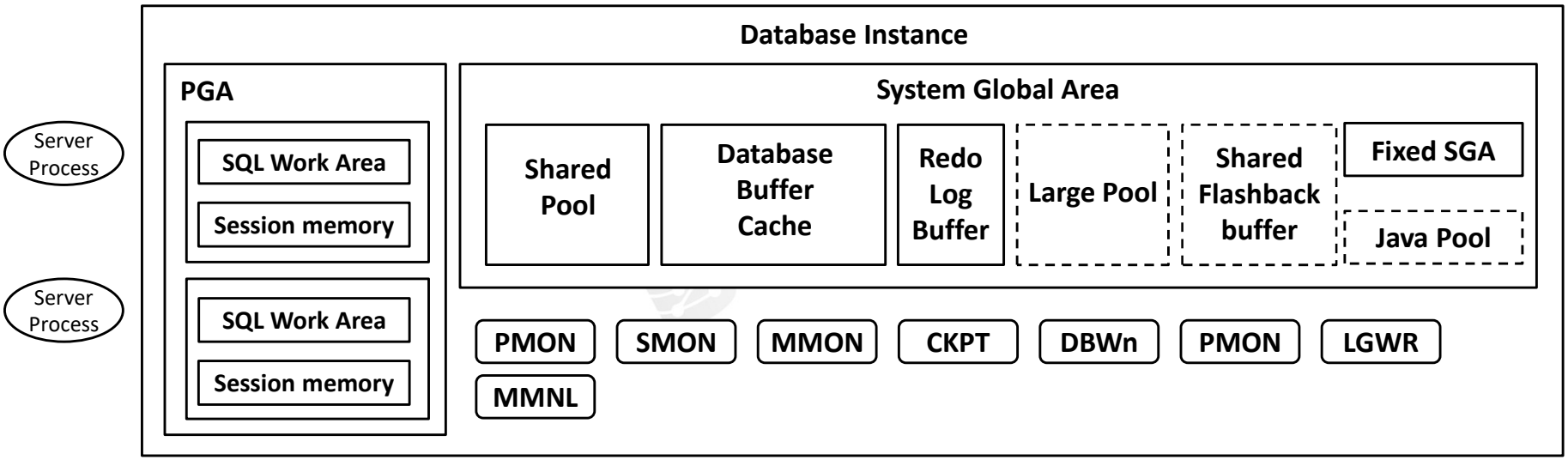
By Ahmed Baraka

Objectives

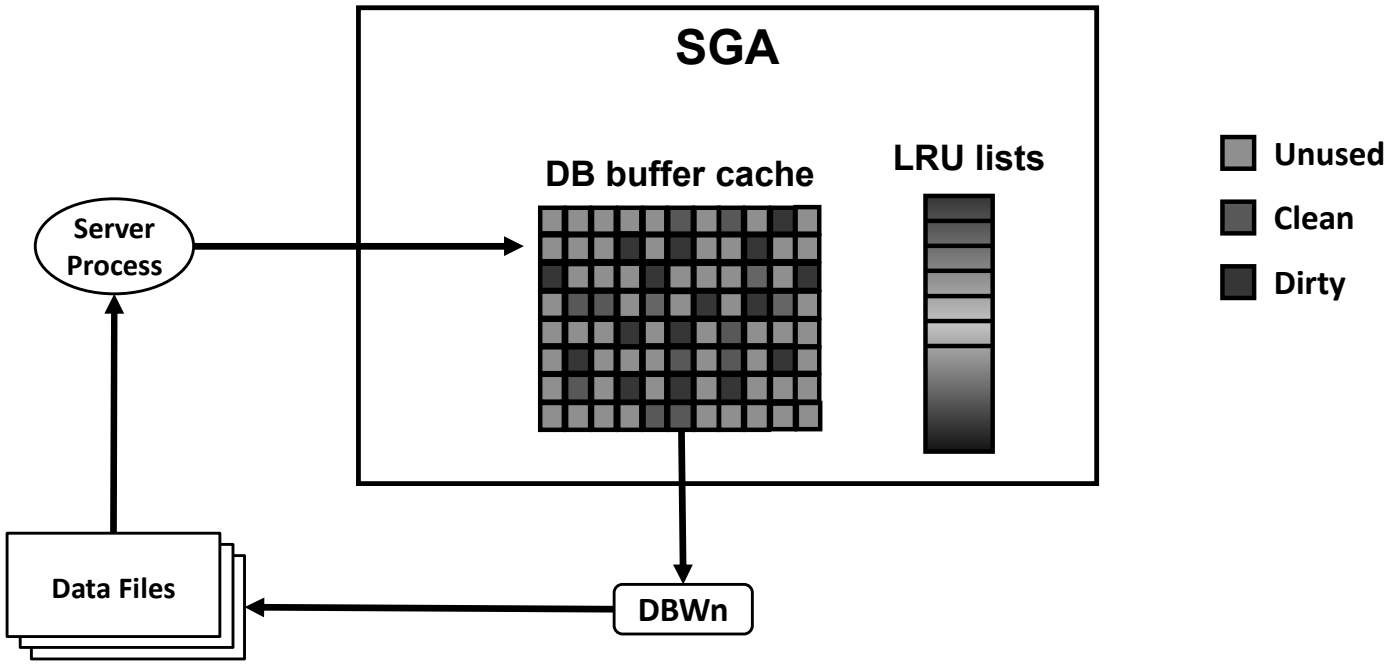
In this lecture, you will learn how to understand and describe the following:

- Database Buffer Cache
- Shared Pool
- Large Pool
- Redo Log Buffer
- The impact of the application types on the database memory areas

Reviewing Oracle Database Memory Structures



Database Buffer Cache



About Database Buffer Cache

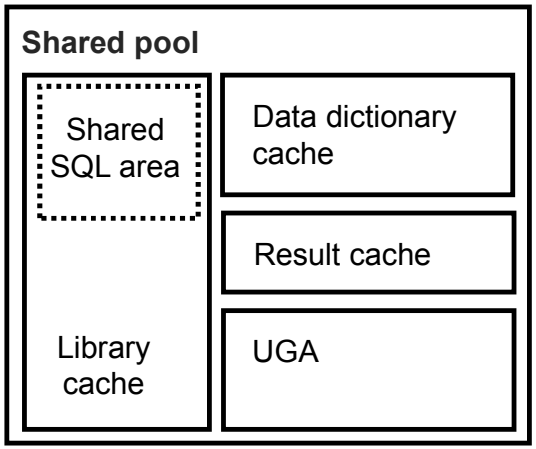
- Is a memory area that stores copies of data blocks read from data files
- All users can share the blocks in the buffer cache
- Purposes:
  - Optimize physical I/O
  - Keep frequently accessed blocks in the buffer cache and write infrequently accessed blocks to disk
- A buffer can be in any of the following mutually exclusive states:
  - **Unused**: the buffer not been used or accessed
  - **Clean**: this buffer was used earlier and now contains a read-consistent version of a block as of a point in time.
  - **Dirty**: the buffer contain modified data that has not yet been written to disk.

About Database Buffer Cache

- DBWn process writes **dirty** blocks from the buffer cache into datafiles
- The least recently used (LRU) list is used to know the most used blocks
  - The blocks in the top are the most frequently accessed blocks (hot)
  - The block in the bottom are the least frequently accessed blocks (cold)

About Shared Pool

- **Library cache**: command text, parsed code, and execution plan
- **Data dictionary cache**: definitions for tables, columns, and privileges
- **Result cache**: results from SQL queries and PL/SQL functions
- **User Global Area (UGA)**: session information (used when Oracle shared server is configured and when the large pool is not configured)

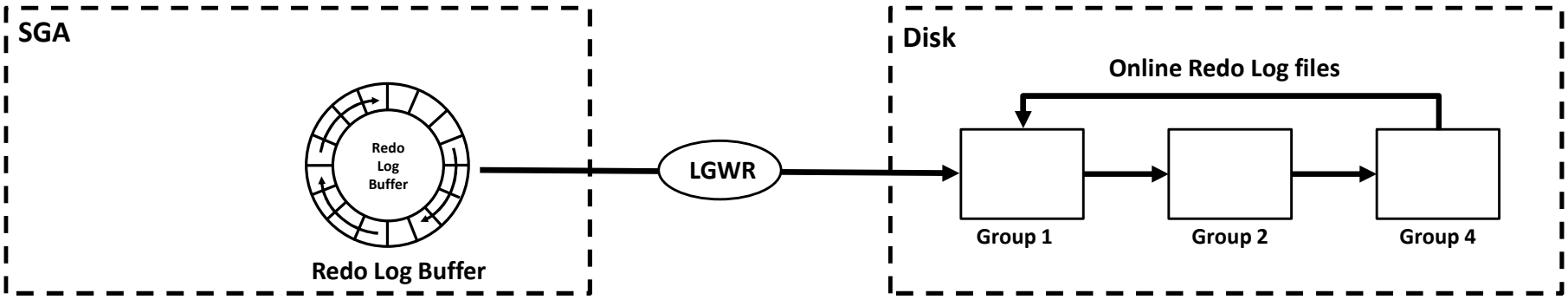


About Large Pool

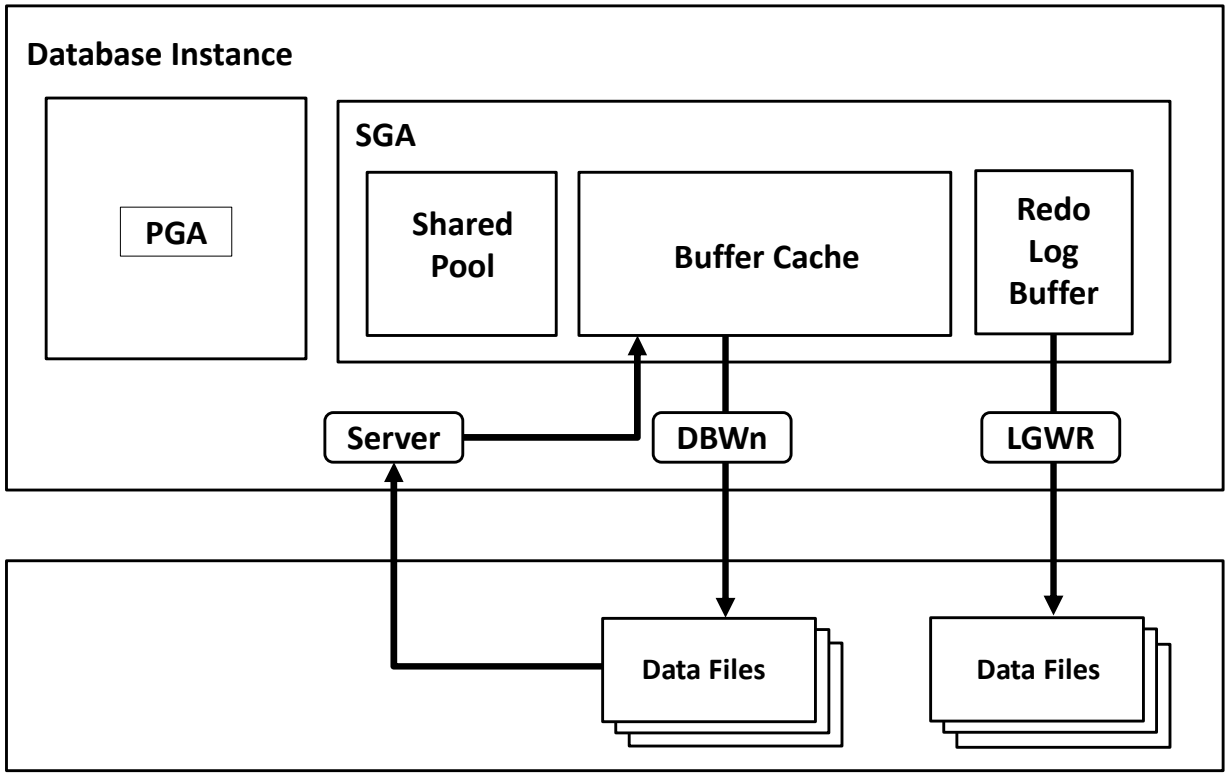
- Provides large memory allocations for:
  - Buffers for Recovery Manager (RMAN) I/O slaves
  - UGA for the shared server
  - Buffers for deferred inserts
- Reduces potential fragmentation of shared pool
- Recommended to configure

About Redo Log Buffer

- Contains redo entries that have the information to redo changes made by operations such as DML and DDL
- Content transferred by log writer process (LGWR):
  - When a user process commits a transaction
  - Every 3 seconds or when the redo log buffer is one-third full
  - Before a DBWn process writes modified buffers to disk



Memory Structures and Application Types



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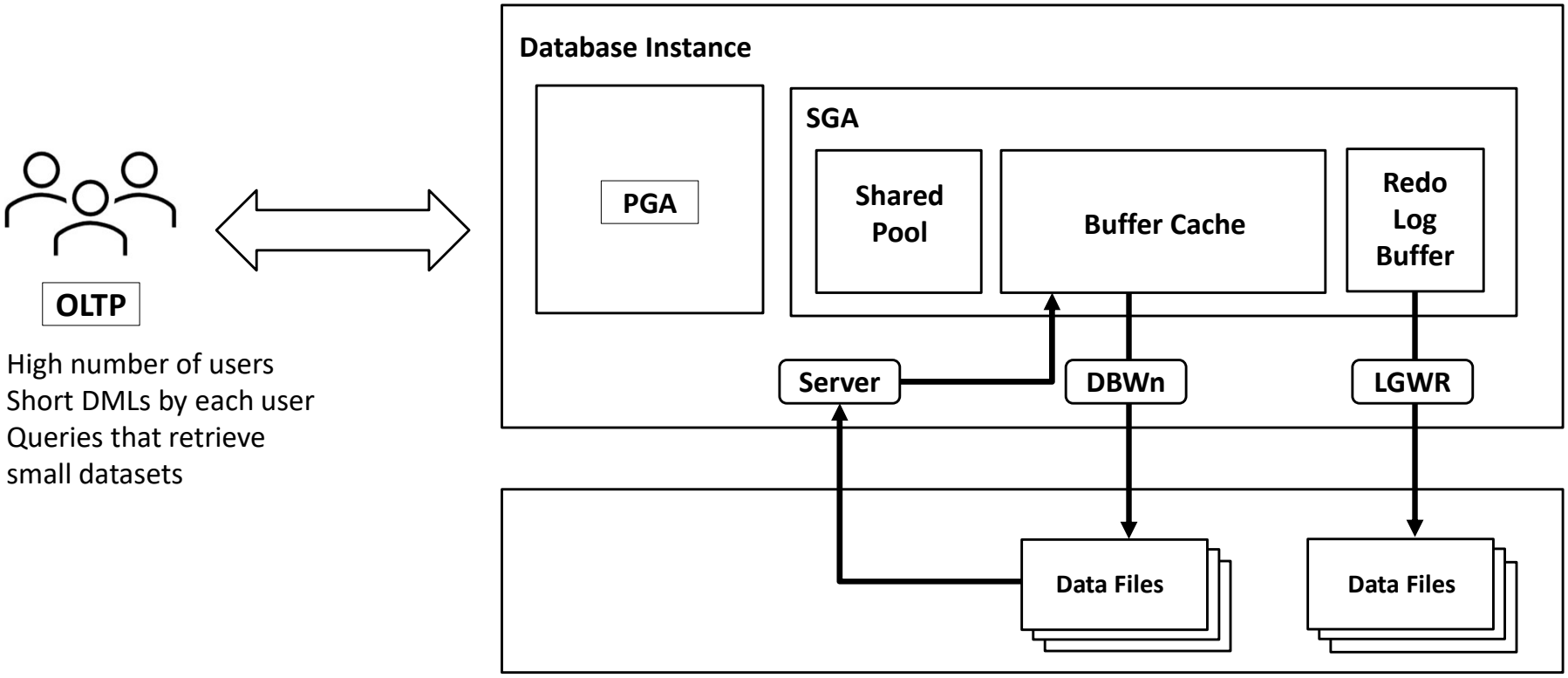
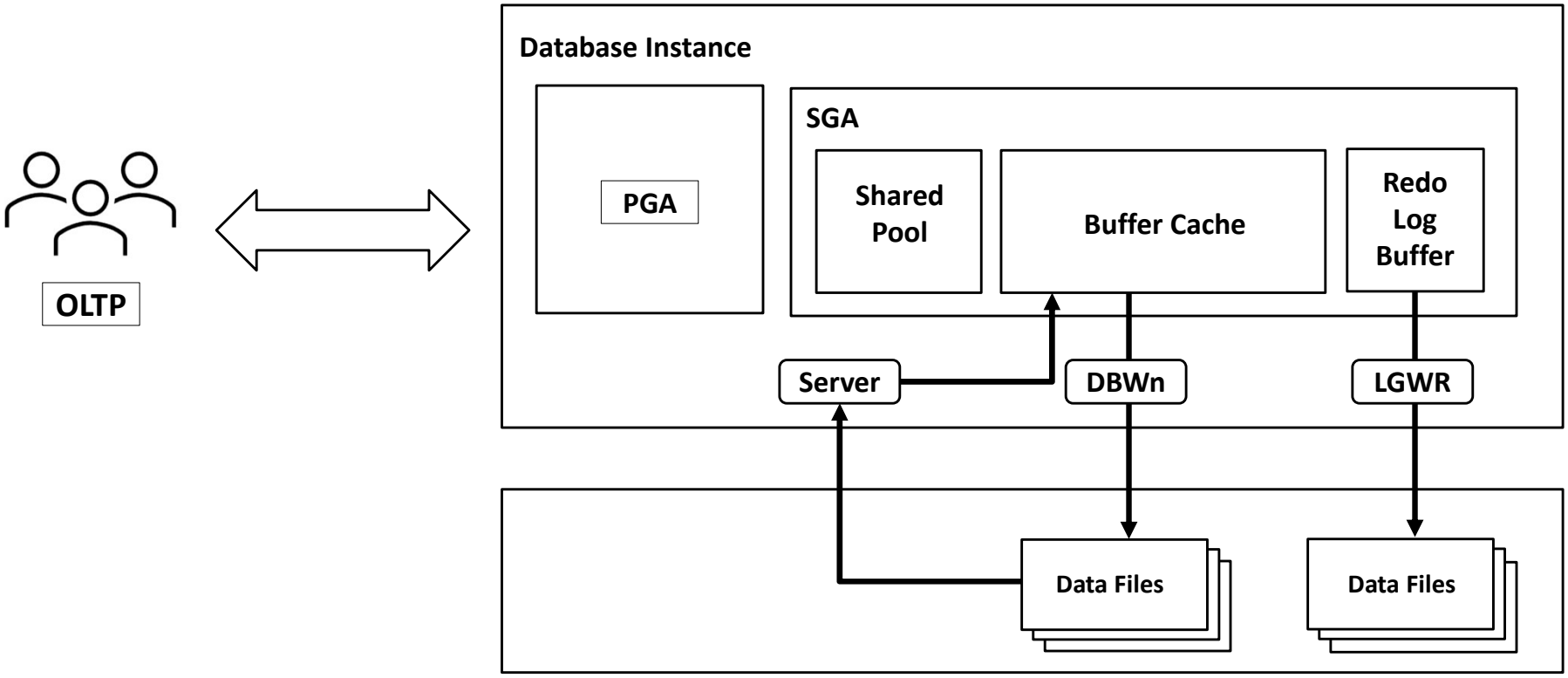


- High number of users
- Short DMLs by each user
- Queries that retrieve small datasets

Memory Structures and Application Types



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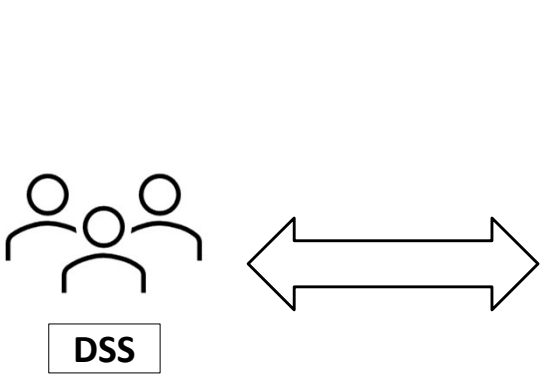
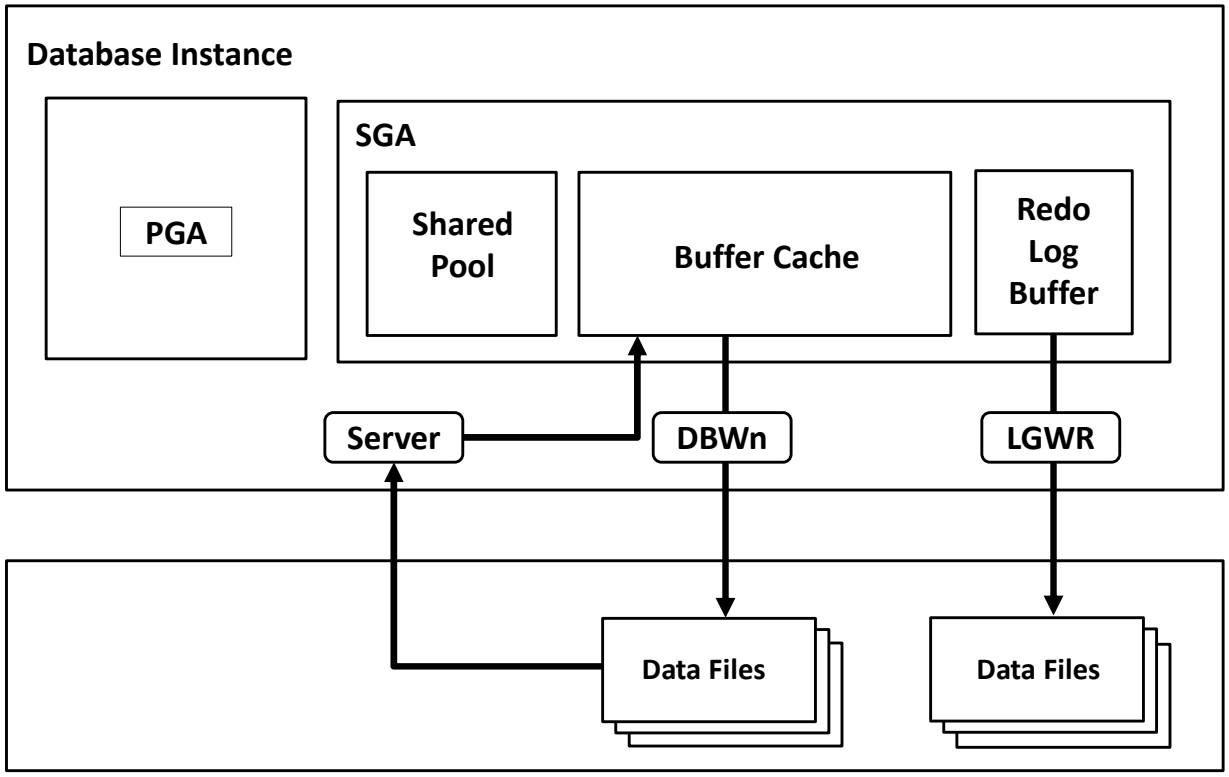
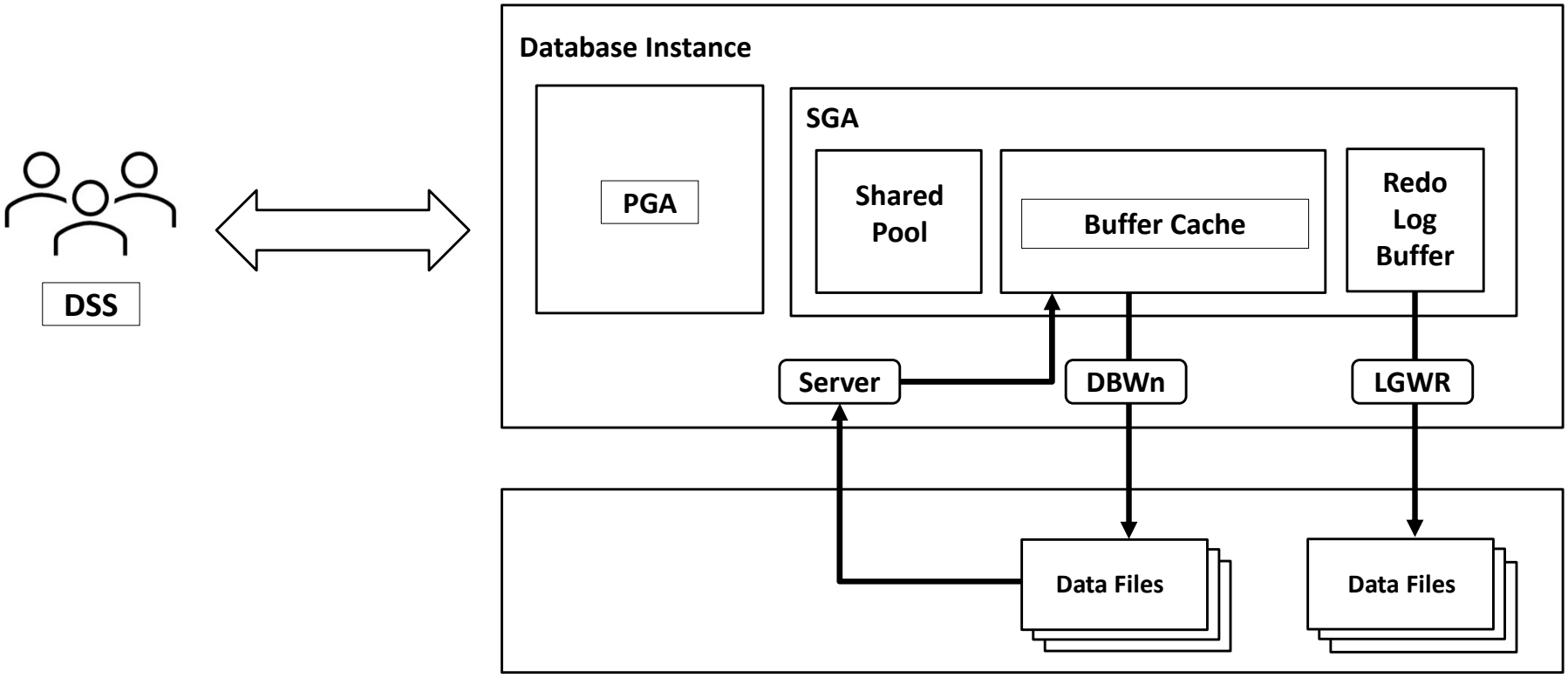


- Fewer number of users
- Queries that retrieve large datasets
- Fewer DMLs by each user
- Possible scheduled batch processing



Memory Structures and Application Types



Summary

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