Storage Engines

MySQL supports multiple storage engines, with InnoDB and MyISAM being the most commonly used.

MyISAM

1. **Table-Level Locking:**
   - **Description:**
     - MyISAM uses table-level locking, which means that the entire table is locked for the duration of a read or write operation.
   - **Types of Locks:**
     - **Read Lock (Shared Lock):**
       - Multiple read operations can occur simultaneously.
       - Write operations are blocked until all read locks are released.
     - **Write Lock (Exclusive Lock):**
       - Only one write operation can occur at a time.
       - All other read and write operations are blocked until the write lock is released.
   - **Implications:**
     - **Advantages:**
       - Simpler to implement and manage.
       - Can be faster for read-heavy workloads with fewer write operations.
     - **Disadvantages:**
       - Poor concurrency for write-heavy workloads.
       - Write operations can block reads, leading to potential bottlenecks.

InnoDB

1. **Row-Level Locking:**
   - **Description:**
     - InnoDB uses row-level locking, which means that only the specific rows involved in a transaction are locked.
   - **Types of Locks:**
     - **Shared Lock (S Lock):**
       - Allows multiple transactions to read the same rows simultaneously.
       - Prevents other transactions from writing to the locked rows.

    - **Exclusive Lock (X Lock):**
        - Prevents other transactions from reading or writing to the locked rows.
    - **Intent Locks:**
        - **Intent Shared Lock (IS Lock):**
            - Indicates that a transaction intends to read rows in a table.
            - Compatible with other IS locks and S locks, but not with IX or X locks.
        - **Intent Exclusive Lock (IX Lock):**
            - Indicates that a transaction intends to write rows in a table.
            - Compatible with other IX locks, but not with S or X locks.
- **Implications:**
    - **Advantages:**
        - Higher concurrency as only specific rows are locked.
        - Better performance for mixed read/write workloads.
        - Supports transactions and ACID compliance.
    - **Disadvantages:**
        - More complex locking mechanism.
        - Slightly higher overhead compared to table-level locking.

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