Database Administration

a. Transaction Management Plan:

Transaction Management Flowchart:

Start Transaction

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|--> Retrieve/Update Data

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| |--> Perform Calculations/Operations

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| |--> Validate Data

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| |--> Error Handling

| | |

| | |--> If Error, Rollback Transaction

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| |--> If No Error, Commit Transaction

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End Transaction

The transaction flow-chart for processing transactions at Walmart will include the following

steps:

Start Transaction: Start a new transaction.

Execute Database Operations: Perform the required database operations, such as inserting,

updating, or deleting records.

Commit Transaction: Save the changes permanently and make them visible to other

transactions.

Rollback Transaction: Undo the changes and restore the database to its previous state if an

error occurs.

End Transaction: Finish the transaction.

b. Database Security Policy:

Access Control:

Implement role-based access control (RBAC) to assign appropriate privileges to users based on

their roles and responsibilities. (Lutkevich,2022)

Restrict access to sensitive data and database management functions to authorized personnel

only.

Regularly review and update access control policies to ensure they align with the organization's

security requirements. (Lutkevich,2022)

User Authentication:

Implement a robust user authentication mechanism, such as username/password

authentication or two-factor authentication.

Enforce strong password policies and educate users about password security best practices.

Consider implementing additional authentication measures, such as biometric authentication

or single sign-on (SSO), for enhanced security.

System Availability:

Implement measures to ensure high availability and reliability of the database system.

Implement redundancy and failover mechanisms, such as clustering or replication, to minimize

downtime in case of hardware or software failures.

Regularly monitor the database system for performance issues, capacity planning, and

proactive maintenance to avoid system downtime.

Back-up and Recovery Model:

Back-up Frequency:

Perform regular backups of the database to protect against data loss. The frequency of backups

will depend on the criticality of the data and the recovery point objectives (RPO) defined by the

organization.(Lucy,2018)

Consider performing daily incremental backups and periodic full backups.

Back-up Levels:

Full Backups: Take periodic full backups weekly of the entire database to ensure a complete

copy of all data.

Incremental Backups: Take incremental backups daily that capture only the changes made since

the last backup. This helps reduce backup time and storage requirements.(Lucy,2018)

Recovery Model:

Implement a recovery model that supports point-in-time recovery, such as the Full Recovery

Model in Microsoft SQL Server or the Archive Log Mode in Oracle Database.

Regularly test the recovery process to ensure data recoverability and minimize the recovery

time objective (RTO).

Off-Site Storage:

Store backup files in an off-site location or utilize cloud storage to protect against physical

damage or loss of data in case of disasters or site failures.

Data Validation and Integrity Checks:

Regularly validate the integrity of backups by performing data consistency checks and

comparing backup data with the live database.

Documentation and Procedures:

Document the backup and recovery procedures in detail, including step-by-step instructions,

necessary tools, and contact information for support.

Train database administrators and other relevant personnel on backup and recovery

procedures.

By implementing a comprehensive database administration plan that includes

transaction management, database security policies, and a robust backup and recovery model,

Walmart can ensure the integrity, security, and availability of their database system.

*References*

*Backup and recovery* (2022) *Cohesity*. Available at: https://www.cohesity.com/glossary/backup-and-recovery (Accessed: 17 May 2023).

Lutkevich, B. (2022) *What is access control?*, *Security*. Available at: https://www.techtarget.com/searchsecurity/definition/access-control (Accessed: 17 May 2023).