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Implementation of Hybrid, Eager and Lazy Replication Protocols in managing online & offline Transfer operations for Agricultural Bank of Sudan

إنشاء نظام هجين من خوارزميات النسخ المتسرعة و المتراخية لإدارة عمليات التحاويل المصرفية للبنك الزراعي السوداني في وضع التشغيل الآني و غير الآني

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By

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Abstract

Transferring money is one of the most important services provided by Agricultural Bank of Sudan(ABS).This is because ABS has a bout 100 branches speared throughout Sudan. Unfortunately, when the central server is down or there is a network failure, the transfer system will be idle in all branches and the work is continued manually until the central server is up again.

In this thesis, we present a hybrid approach that combines the beneficial features characteristic to both eager and lazy replication protocols to manage ABS Transfer System in both online and offline modes. This thesis also discusses issues arising from operating an application in offline mode, such as transitions between online and offline operation, and proposes solutions that enable both online and offline operation for Oracle applications. In addition, this thesis provides a framework for the development of offline-capable applications.

The purpose of this thesis is to make ABS Transfer System capable of running in both online and offline modes so as to be always active in spite of network failure .when there is a network failure or the central server is down the system switches to off-line mode automatically.

مستخلص البحث

تعتبر خدمة التحاويل النقدية و احدة من أهم الخدمات المصرفية التي يقدمها البنك الزراعي السوداني وذلك لإنتشار فروع البنك في جميع أنحاء السودان حيث يبلغ عدد فروعه حوالي 100 فرع. تتمثل المشكلة في نظام التحاويل بالفروع في تعطل النظام عن العمل عند حدوث مشاكل في الاتصال مع المخدم الرئيسي حيث يتم مواصلة العمل بصورة يدوية و من ثم إنزالها في النظام عند توفر المخدم الرئيسي .

في هذا البحث نقوم بتقديم طريقة جديدة لإدارة نظام التحاويل في وضع التشغيل الآني ووضع التشغيل غير الآني وذلك بالاستفادة من خصائص خوارزميات النسخ المتسرع Eager والمتراخي Lazy وجمعهما في نظام واحد. كما يقوم البحث بمناقشة المشاكل التي تنتج من تشغيل التطبيقات في وضع التشغيل غير الآني كعملية التحويل من وضع التشغيل الآني إلي وضع التشغيل غير الآني ووضع الحلول التي تمكن هذه التطبيقات من العمل في هذه الأوضاع المختلفة وبخاصة تطبيقات أوراكل . كما نقوم في هذا البحث بتقديم قالب وشكل عام لتطوير التطبيقات في وضع التشغيل غير الآني .

الغرض من هذا البحث جعل نظام التحاويل للبنك الزراعي السوداني أن يعمل في وضع التشغيل غير الآني حتى لا يتعطل النظام عن العمل حيث يتحول النظام بصورة آلية للعمل في وضع التشغيل غير الآني عند عدم توفر الاتصال مع المخدم الرئيسي .

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List of Acronyms

ABS	Agricultural Bank of Sudan
QoS	Quality of the Service
1SR	One-copy serializability
ROWA	Read-One Write-All
ROWAA	Read One, Write All Available
2PC	2 Phase Commit
SQL	Structured Query Language
SI	Snapshot Isolation
JDBC	Java Database Connectivity
RAIDb	Redundant Array of Inexpensive Databases
RAIDs	Redundant Array of Inexpensive Disks
FIFO	First In First Out
RPC	Remote Procedure Call
DDL	Data Definition Language
DML	Data Manipulation Language
LAN	Local Area Network
2PL	two-phase locking

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