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Study of High Availability Solutions of SQL Server

ABSTRACT

Now a day setting up powerful and strong production system our main goal is minimizing downtime and service interruptions. In present time we can realize the importance of high availability to improve operational performance and to reduce the impact of downtime when a disaster happens. So, AlwaysOn is a great feature of SQL Server from 2012 version. This paper covers high availability features or solutions such as Failover Clustering, Database Mirroring, Log Shipping

Keywords: *high availability, failover clustering, database mirroring, log shipping*

INTRODUCTION

High availability refers to systems which are continuously operate without failure for a long time. These types of systems are most durable. Availability experts emphasize that, for any system to be highly available, the parts of a system should be well-designed and thoroughly tested before they are used. Such systems typically have redundant hardware and software that makes the system available despite failures. One of the most important hardware-based technique is called Redundant Array of Independent Disks (RAID) in which data spread over multiple disks and any of the disk fails data will be recover from another disk. RAID having several levels like RAID-0, RAID-1, RAID-5 etch

RAID uses techniques like striping (RAID-0), mirroring (RAID-1) and striping with parity (RAID-5). This paper covers high availability solutions like failover clustering, Log shipping and database mirroring etc.

High Availability Solutions

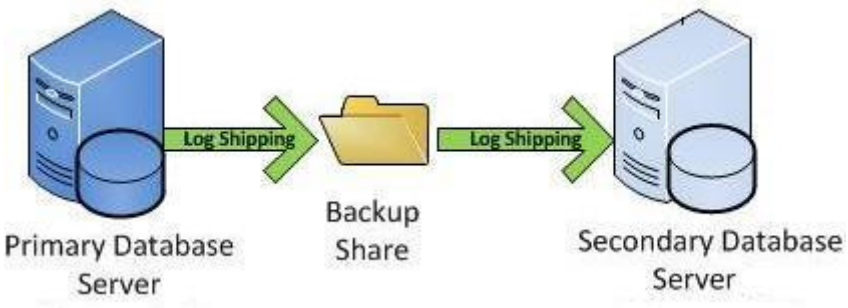
There are few mechanisms to apply high availability solutions and disaster recovery like log shipping and database mirroring etc.

Log Shipping

SQL Server log shipping is the process of taking backup of database and transaction log files on a production server, and then restoring or copying them onto a standby server. The key feature of log shipping is that it will automatically backup transaction logs. So, after the process result there are two copies of the data on to separate instance.

A log shipping session involves the following steps:

- Backing up the transaction log file on the primary SQL Server instance
- Copying or restoring the transaction log backup file on the secondary SQL Server instances



Log shipping consists of two servers:

The primary server in a log shipping configuration has the primary database you want to back up and restore on another server.

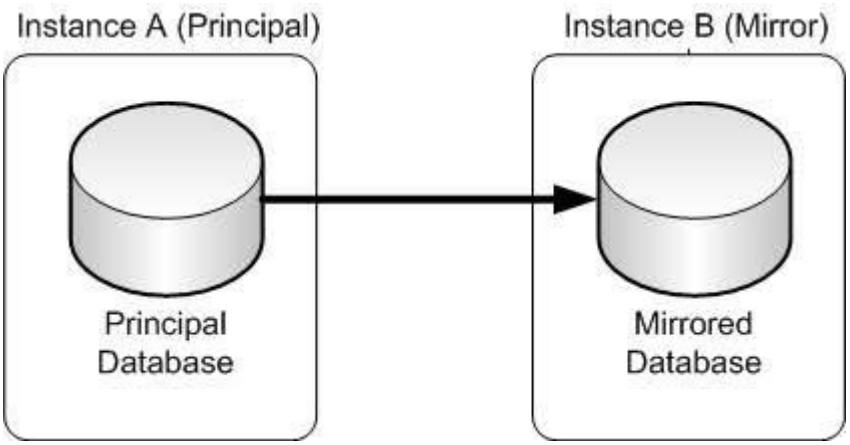
The secondary server hosts the database that maintains a copy of your

Database Mirroring

Database mirroring is a new high-availability feature in SQL Server. It's similar to log shipping is achieved by the use of a stand-by server. In database mirroring a copy of the live transaction log is kept on the stand by server which provides consistency to your database. In this manner, the standby is kept up-to-date with the primary. In this one SQL Server instance acts as a primary instance called the principal, while the other is a mirrored instance called the mirror. If the principal server fails, the mirror server automatically becomes the new principal server and recovers the principal database.

Database mirroring can be implemented in two various modes: synchronous mode and asynchronous mode.

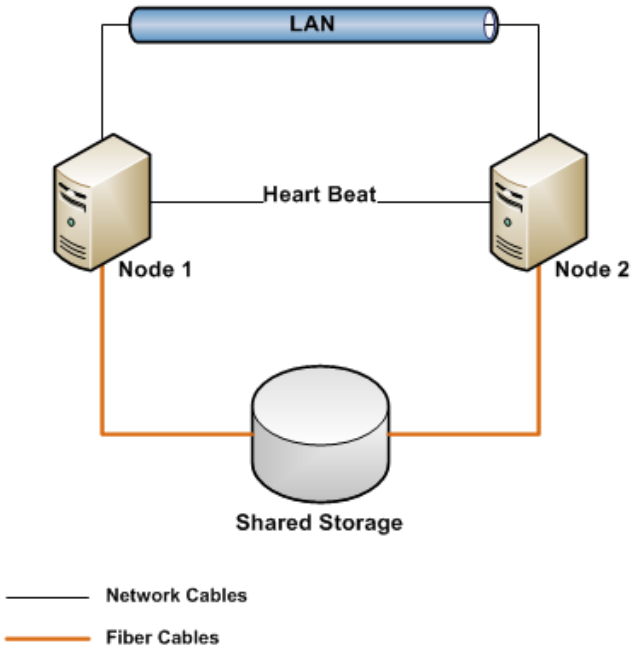
The first one called also high-safety mode assumes that transactions are committed on the primary server once the mirror server receives and commits them. In the second mode clients who apply transactions to the primary server do not wait for confirmation from the mirror server. Clients receive acknowledgement only from the primary server as soon as it sends transaction log records to the mirror server. Database mirroring is a reliable and high availability solution. It maximize database availability.



Fail Over Clustering

A failover cluster is a group of independent computers that work together to provide continuous availability and in the event of an application, hardware or operating system failure. The clustered servers (called nodes) are connected by physical cables and by software. If one of the servers, or nodes, fails, another node in the cluster can take over its workload without any downtime. The main concept behind failover clustering it to eliminate a single point of failure by including multiple network connections and shared data storage.

Example: A two-node clustering running a single instance of SQL Server, if primary hardware fails, SQL Server automatically fails over to the second node. Normally, this happens in under 20 seconds.



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