SQLskills Immersion Event

IECAG: Clustering and Availability Groups

Module 4: Implementation Case Studies

Jonathan Kehayias
Jonathan@SQLskills.com

Overview

- Mixing FCIs with AGs for HA and DR
- Forcing service in a real disaster
- Workload issues with readable secondaries
- Unexpected Downtimes

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Mixing FCIs with AGs for HA and DR

- Financial institution with zero tolerance for transactional latency
- Primary datacenter in a hurricane prone area
- Secondary datacenter 150 miles further inland
- System must support local HA in each datacenter with DR to remote datacenter
  - Failover testing must be done in production monthly by running the entire workload in the other datacenter on alternating months

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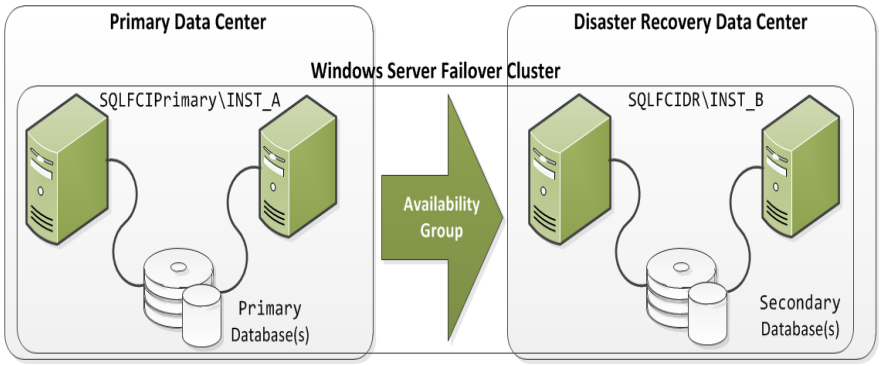
SQL FCI for HA and AG for DR



Source: "AlwaysOn Architecture Guide: Building a High Availability and Disaster Recovery Solution by Using Failover Cluster Instances and Availability Groups (Joe Sack, Sanjay Mishra), http://bit.ly/Rjql54

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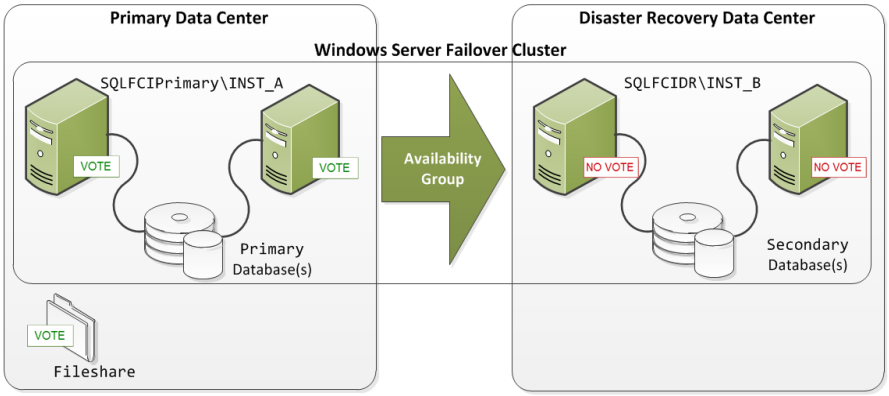
SQL FCI + AG Vote Assignments



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Forcing Service in a Real Disaster

- **Windows Server 2012 and SQL Server 2012**
- **2 node AG in client data centers in Nebraska and Arizona**
  - File share witness configured in primary data center for third vote
- **Primary data center power outage with failure of backup power systems**
  - Requires forced quorum for WSFC in secondary data center
  - Requires forcing failover of the AG to bring resources online in secondary data center
  - True DR scenarios had never been tested or simulated by the client

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Forcing Service in a Real Disaster

- **Client had created two additional two-node Availability Groups between the data centers**
  - Six total SQL Servers
- **Change configuration to a six-node WSFC with three Availability Groups**
  - Three nodes in primary data center vote to quorum
  - Three nodes in secondary data center have no votes to quorum
  - Simplified manual failover reconfiguration of quorum during maintenance windows

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Workload Issues with Readable Secondaries

- **Client upgrading to SQL Server 2012 from SQL Server 2008R2**
- **Failover Clustered Instance for writable workload serving as publisher for transactional replication**
- **Four transactional replication subscriber servers for read-only workloads behind BigIP F5 load balancer to support website activity**
- **New server hardware with SSD storage for upgrade to AGs with readable secondaries to simplify environment**
  - Required creating new indexes for read-only workload in primary server database
  - AG secondary databases offline in 2012 during AG failover (fixed in 2014)
- **Client ended up going back to Transactional Replication and eliminating AGs**

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Unexpected Downtimes

- **Availability Group health checks using sp_server_diagnostics timeout**
  - Memory Dumps
  - Tempdb full
  - Excessive I/O latency
- **A failure of sp_server_diagnostics to return results within 30 second interval is an unhealthy status and triggers a failover**
  - FCI might not failover for same conditions
  - Standalone instance would remain viable and online with degraded performance potentially but no downtime
- **You have to consider how technologies can introduce downtime**

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Review

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- **Forcing service in a real disaster**
- **Workload issues with readable secondaries**
- **Unexpected Downtimes**

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