Windows Clustering Part 1

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PASS

SQL saturday

About Me
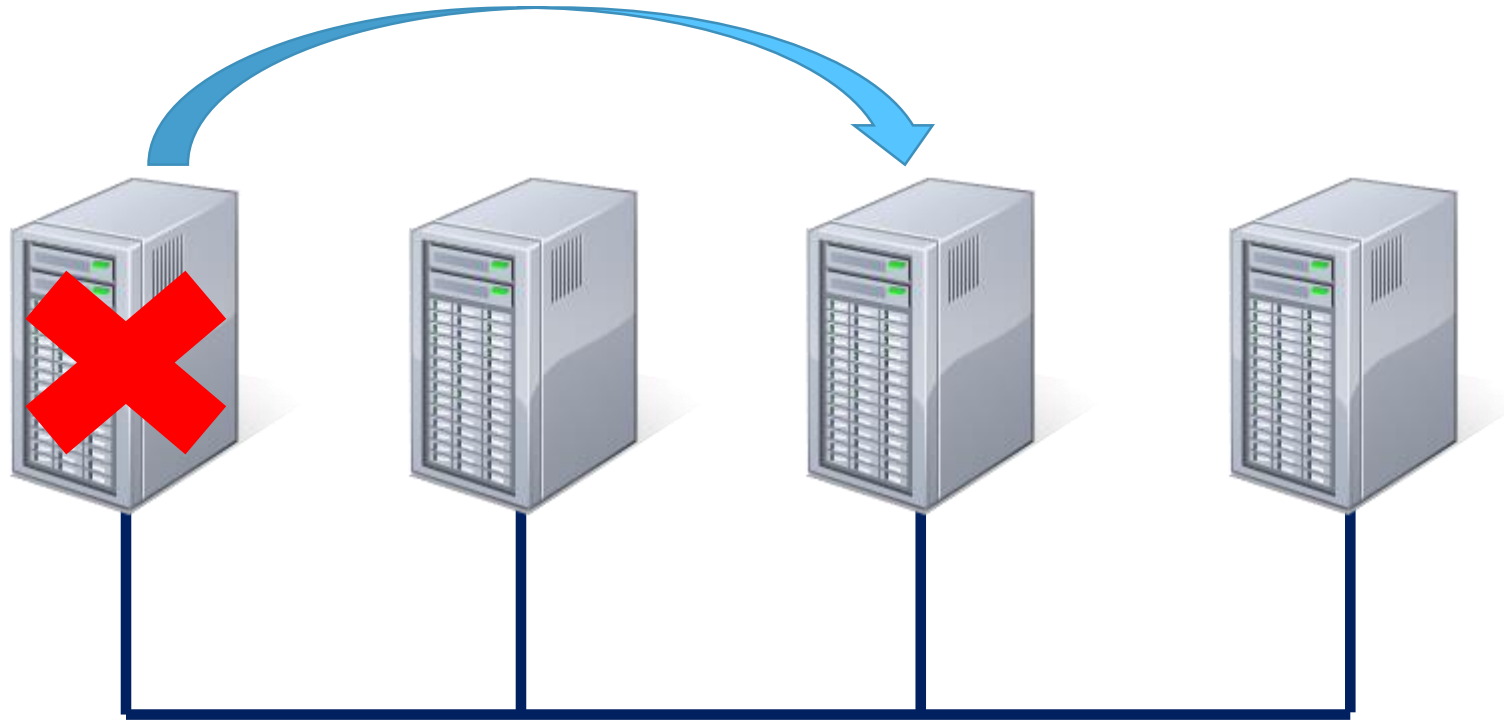
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Objectives

- Hardware

- Software

- Networking

Introduction

What is Clustering?

What is High Availability?

What is Disaster Recovery?

How do we know which one we need?

Other Options

- Backups
- Failover Clustering
- Availability Groups
- Mirroring
- Log Shipping
- Replication

What can and cannot be clustered?

- Database Engine
- Analysis Services

- SSRS
- SSIS
- SQL Browser

Terminology

CNO - Cluster Name Object

VCO - Virtual Cluster Object

AG – Availability Group

FCI – Failover Cluster Instance

CSV – Cluster Shared Volume

WSFC – Windows Server Failover Cluster

FSW – File Share Witness

Disk Witness

Node

Resource

Resource Group

Heartbeat

Quorum

Preparation

Hardware Preparation

- HCL – Hardware Compatibility List no longer required

- Identical hardware HIGHLY suggested, but not required

- Cluster Validation is REQUIRED

Choose an Operating System

Version	Standard	Enterprise	Datacenter
Server 2008/R2	0	16	16
Server 2012/R2	64	N/A	64

What's New in Windows Server 2012 – Part 1

- Management of cluster nodes with Server Manager and Cluster Manager
  - Add/Remove Roles and Features for multiple nodes
  - Search and Custom Views

- Management of Clustered Roles
  - Priority Startup
  - Node Draining

- Cluster Shared Volumes
  - BitLocker Full Drive Encryption Supported
  - Can be made visible to only some nodes instead of all
  - Volume repair without taking the CSV offline

What's New in Windows Server 2012 – Part 2

- Cluster Aware Updating

- Active Directory Enhancements
    - Specify OU when creating VCOs
    - Group Managed Service Accounts still not supported

- Clustered Task Scheduler

- Dynamic Quorum

What's New in Windows Server 2012 R2

- Active Directory Detached Cluster
  - Nodes still required to be AD joined
  - Authentication against CNO uses NTLM

- Dynamic Witness Disk
  - Even number of nodes it gets a vote. Odd number and it does not.
  - Witness goes offline it's vote is removed

- Forced Quorum – No more split brain

- 50% Node Split

Choose a SQL Server Version

Version	Standard	Enterprise	Datacenter
SQL 2008	2	OS Max	N/A
SQL 2008 R2	2	OS Max	OS Max
SQL 2012	2	OS Max	N/A
SQL 2014	2	OS Max	N/A

Choose a SQL Server Version

- SQL Server 2012

  - Multi-site Clustering

  - TempDB on Local Storage

  - Flexible Failover Policy

  - Availability Groups

Choose a SQL Server Version

- SQL Server 2014

  - Add Azure Replica Wizard

  - Secondary Replicas increased from 4 to 8

  - Secondary Replicas remain readable when disconnected from primary

  - FCIs can use CSVs as Cluster Shared Disks

Installation

Prerequisites

- Roles and Features must be added
  - Application Server Role – If MSDTC needed
    - Distributed Transactions Option
  - Failover Clustering Feature
  - Multipath I/O – If needed

- All nodes must be in the same domain

- Domain account that is an administrator on all nodes

- Install account must have rights to create computer objects (CNO)
  - Must be left disabled if pre-staging

Private Network

- Dedicated NIC Cards
- Can use a crossover cable if only 2 nodes
- Each node should hit separate switches
- Must be on a subnet different from the public network
  - 10.x.x.x (class A)
  - 172.16.0.0 to 172.31.255.255 (class B)
  - 192.168.x.x (class C)

Public Network

- Dedicated NIC Cards

- Each node should hit separate switches

- Must be on a subnet different from the private network

Storage Network

- iSCSI

- Be Prepared to Configure HBAs

IP Requirements

- Cluster Network Name

- Each node x2 (public and private)

- Each instance of SQL Server

- MSDTC if needed

- Storage NICs if needed

DNS

- Cluster itself

- Each node public (private not required)

- Each instance of SQL Server

- MSDTC if needed

Demo

Summary

- Hardware

- Software

- Networking

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