

An Efficient Approach For Avoiding Down Time of Production Data Base Server in Active/Passive Windows Failover Clustering Environment

A.Arockia Aswini, V.R.Manisankar, J.Jagadeesan

Abstract- Modern IT department facing immense challenge is to ensure the production Server availability at all times. To avoid downtime of Production Server, High availability Solution should be implemented like Microsoft Windows Failover Clustering. Microsoft Failover Windows Cluster provides the automatic failover to the standby node if a hardware (RAM, SMPS, CPU and etc...) failure or software failure (OS, SQL Server and etc...) occurs. Failover automatically occurs if the primary server fails. In this case, Active/passive two node windows Cluster is implemented along with SQL Server cluster. Windows Failover cluster will not failover for the customized application services which are node specific.

In three tier architecture (Web, App and DB), SQL Server Database instance installed in Cluster Environment as it has capable of failover to the passive node if primary node SQL instance or with Server level Software/Hardware failure occurs. Suppose, if any Application dependent Services which is installed in Primary Node which is required for providing interface between Web and Database Servers will not failover to the secondary node even though SQL Server and Cluster resources can does. Again, there will be a showstopper of entire business due to this application dependent services non-working. Intention of this paper is to provide the solution for how to failover such dependent application services to the passive node along with Cluster Services in order to avoid downtime.

I. INTRODUCTION

To ensure all time Availability of the Production Servers is the major challenges faced by the IT industry. Microsoft Windows Failover Cluster provides the High Availability Solution to the Production Servers. Windows Failover Cluster provides the automatic failover to the standby node if a hardware failure or software failure occurs. SQL Server Database installed in the windows Cluster for SQL instance High availability for Database production Server. Normally, failover clustering is helpful if an operating system failure occurs or if any a planned upgrade of the database system resources. Also, failover clustering increases server availability with no downtime. Active/passive two nodes failover cluster brings high Availability solution if incase of any disaster on primary node.

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Failover Cluster is responsible for bringing Server Cluster resources included SQL Server Services online during disaster on primary Node. This mechanism ensures the Server Availability without any interruption to the application users and access. In Few occasions, Production Database servers in Cluster environment will have application related customized dependent Services must be installed and run for providing communication interface between WEB and Database Servers. This case, During Cluster Failover these customized services will not be failover as they are node specific. Without running this dependent Application interface Services, failover cluster is not helpful to the entire High Availability of the Server. As these customized application services are required for application access. Even though the failover happens successfully due to some Hardware or software issues on primary node, there will be a showstopper of entire business unless and until these dependent services are up and running.

Intention of this paper is to provide the solution for how to failover such dependent application services to the passive node along with Cluster Services in order to avoid downtime.

In Our case, in order to access web application we need WebQA Application Services that is required to be installed and run on Database Server. This service will responsible for user authentication and communication between Web and Database Servers. Windows Cluster Windows Server failover cluster aims to provide high availability for services or applications that run within the failover cluster.

Server Clusters

A server cluster is a bunch of computer systems running Microsoft Windows 2003 or Windows Server 2008; working together as a single system. Each computer system forming a part of cluster is termed as a node in a cluster. The nodes in a cluster are in constant communication with each other through an exchange of periodic messages. These messages are called heartbeats. If one of the nodes in a cluster becomes unavailable due to any of the reasons for instance failure of a node or maintenance, another node in a cluster immediately takes over the responsibility of the failed node and starts providing all the services which the failed node would have provided. This process of automatically taking over the service from the failed node is termed as Failover.

Cluster Storage

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Every node in a cluster may be attached to one or more cluster storage devices. For most versions of Windows Server 2003 or 2008, the cluster storage which can be used is iSCSI, Serial Attached SCSI, parallel SCSI, and Fibre Channel.

Quorum Disk

Quorum Disk records the information's of windows clusters of both nodes. Failover will be initiated by cluster manager after looking the values in this disk.

Network configuration

The failover cluster also enlists at least two networks for communication, at least one public and one private. The private network should be configured for internal cluster communication only. The public network, however, is primarily for clients to connect to the applications that are running within the cluster. The cluster nodes communicate with one another over the private network by using *heartbeats* (periodic health detection signals that enable them to assess the status of other nodes in the cluster).

Existing Cluster Environment

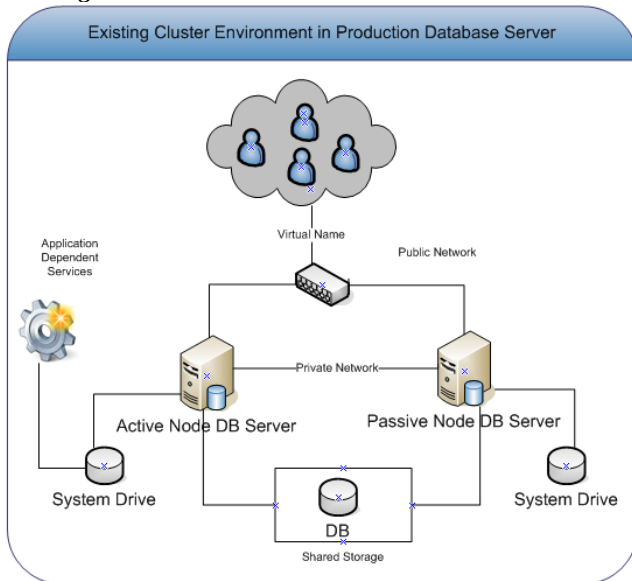


Fig 1.1 Existing Cluster Environment of Production Database Server

Architecture Explained

As per the architecture Fig1.1 above, Production Database Server was clustered (Windows 2003) and database files were available in the shared Storage (SAN). Application Dependent Service was installed in Database production Server in the primary node (Active node). Application Dependent Service which is required for providing interface between Web and DB server. Hence, this App dependent service plays the vital role for accessing the application by users. This service is available in the primary node Local system Drive(C :) and related service available in the windows Services (services.msc). In this case, if incase of any issues with primary node (Active Node) windows cluster will failover to the secondary node (passive Node) along with SQL instance. Now, this application (Refer Fig

1.2) dependent service cannot be failover as it is node specific and again overall system will not be accessible by users and lead to showstopper of entire business.

SQL Server services, all other Physical disks (shared storage) and other resources of windows cluster will be failover to the passive node except this application dependent Services.

Need to include this application dependent service into failover Cluster resources. So that during Failover this resource will be automatically failover and start work from another node Active as well.

During Failover

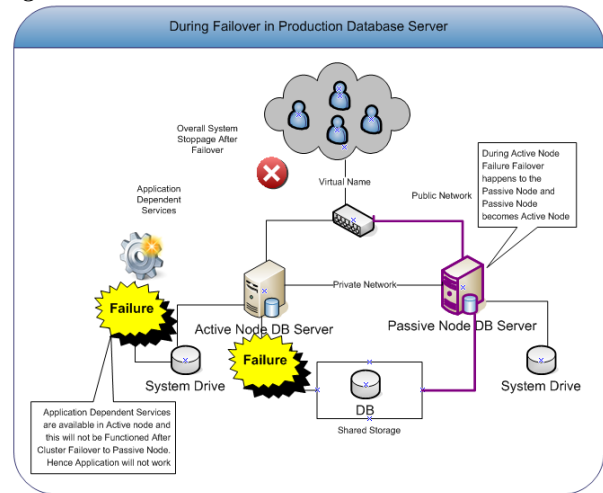


Fig 1.2 Application Dependent Service fails during Cluster Failover of Production Database Server

Solution

To overcome aforesaid problem, need to install particular application dependent service MSI into shared storage where cluster will have access and SQL databases were located. Installation should be done from the both Cluster Nodes (Active and Passive) and need to add this particular service as a generic service to the Cluster Admin resources. Make this newly installed service as dependent services to the Cluster administrator. Step by step procedure explained below on how to include application dependent service into the Failover Cluster.

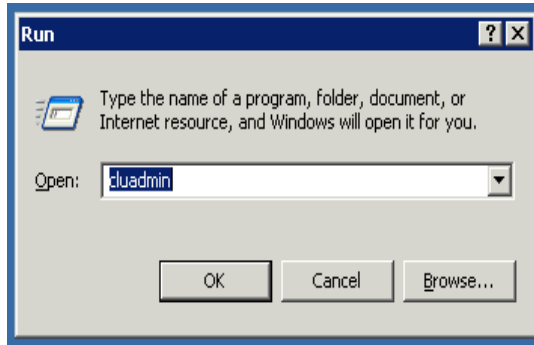
Approach to include Application Dependent Services into Failover Cluster

Steps to setup Application Dependent Services in cluster environment

1. Logon to Production Server cluster node1 which need to setup Application Dependent Service. Logon with administrative privileges login account.
2. Install WebQA Application MSI in shared disk (SAN/NAS) location. Hence both cluster nodes can be accessing the same Drive. After installation it will create the respective service on Windows Services.
3. Failover the cluster services to another Node(Passive Node).
4. Logon to Production Server cluster node2 with administrative privileges.
5. Install WebQA MSI in shared disk (SAN/NAS) same drive location where node 1 installed.

After this activity, all appropriate entries would be recorded in registry. This entry values will help to failover Application dependent services during Cluster failover.

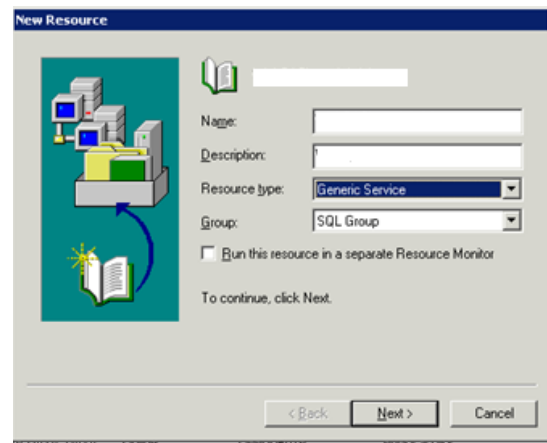
6. Fail back to cluster node 1.
7. Logon to cluster node 1
8. Navigate windows services (Services.msc), Stop the Application Dependent services (WebQA) and make it on manual mode. Also change the Logon account for the service into the same domain account which Cluster is running.
9. Open cluster Admin in the Production Server Node1.



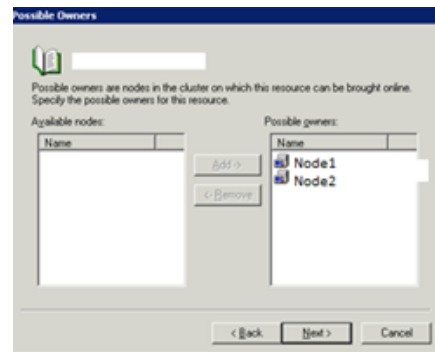
10. Create new resource in SQL group (All drives has mapped in SQL Group). SQL Group is a group where will have all the SQL Services and Shared disk in the Cluster. All the Resources under SQL Group should be online.



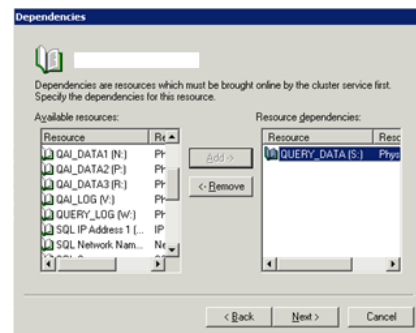
11. Type the Dependent Services information and select resource type as Generic Service. This is to ensure particular services will not dependent on SQL Services and sustain this services as generic for Cluster.



12. Add the cluster nodes (Active Node, Passive Node) which this services should be failover. These selected Nodes are possible owners of this particular service during failover.

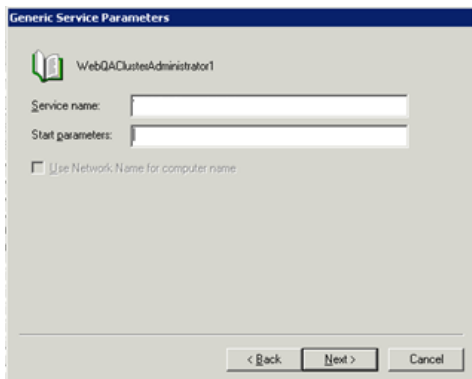


13. Add the Shared drive Name where Application dependent service has been installed.

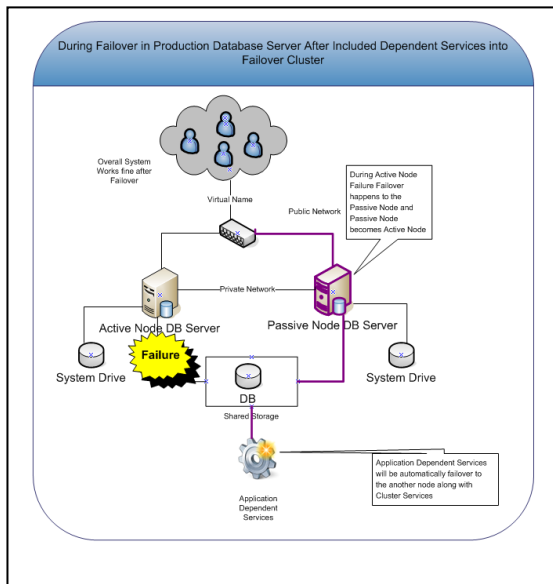


14. Type the service name (Start parameters are not required for this service) of the application dependent service as located in Windows Services.

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15. Enable the created generic services online under cluster Administrator



16. After Cluster Failover or Failback, this application Dependent Service will be automatically up and run along with SQL cluster resources without any interruption.

After included Application Dependent Service into Failover Cluster

II. CONCLUSION

Based on this solution, we can achieve the server high availability inclusion of all the customized application dependent services. Server High availability is inclusion of software, hardware and other depended services which required for entire application usage would be bring into online automatically during crisis situation on primary server. Using this approach, we can customize the application dependent services into failover cluster which helpful during crisis situation. Not only Service, we can able to include executable files which is relevant to the application or database servers. Windows Cluster will not have the direct solution for such dependent services or executable. Using the recommended procedures to include them depends on need.

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