

2016 Failover cluster using Azure blob as a cluster quorum

Server cluster

Microsoft Cluster Server. Microsoft Cluster Server (MSCS) is a computer program that allows server computers to work together as a computer cluster, to provide failover and increased availability of applications, or parallel calculating power in case of high-performance computing (HPC) clusters (as in supercomputing).

Active passive failover

With one node acting as the passive 'failover' node. Active/Passive is just a configuration of an N+1 cluster where N is the number of instances running and N+1 is the number of nodes in the cluster, under normal circumstances there will be a node in the cluster acting as a passive node waiting for a failover to occur.

Quorum Understanding

Quorum is designed to prevent split-brain scenarios which can happen when there is a partition in the network and subsets of nodes cannot communicate with each other. This can cause both subsets of nodes to try to own the workload and write to the same disk which can lead to numerous problems. However, this is prevented with Failover Clustering's concept of quorum which forces only one of these groups of nodes to continue running, so only one of these groups will stay online.

Quorum determines the number of failures that the cluster can sustain while still remaining online. Quorum is designed to handle the scenario when there is a problem with communication between subsets of cluster nodes, so that multiple servers don't try to simultaneously host a resource group and write to the same disk at the same time. By having this concept of quorum, the cluster will force the cluster service to stop in one of the subsets of nodes to ensure that there is only one true owner of a particular resource group. Once nodes which have been stopped can once again communicate with the main group of nodes, they will automatically rejoin the cluster and start their cluster service.

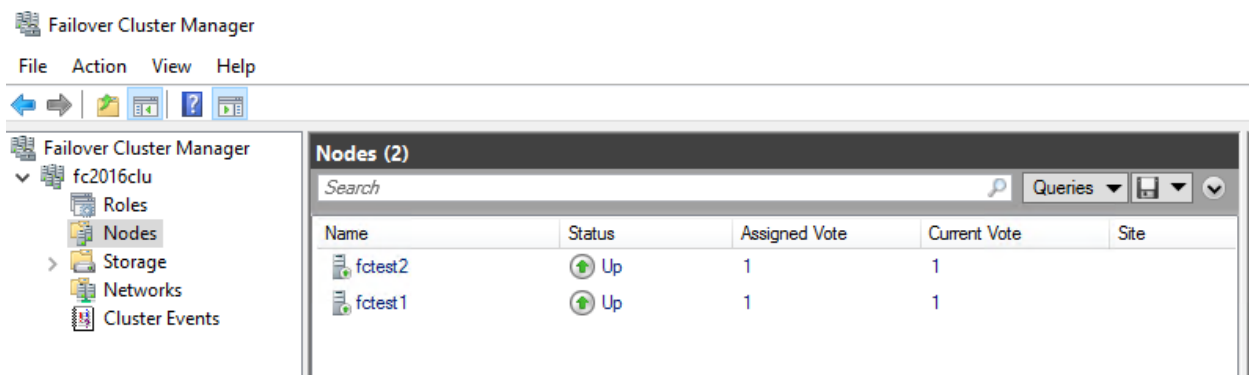
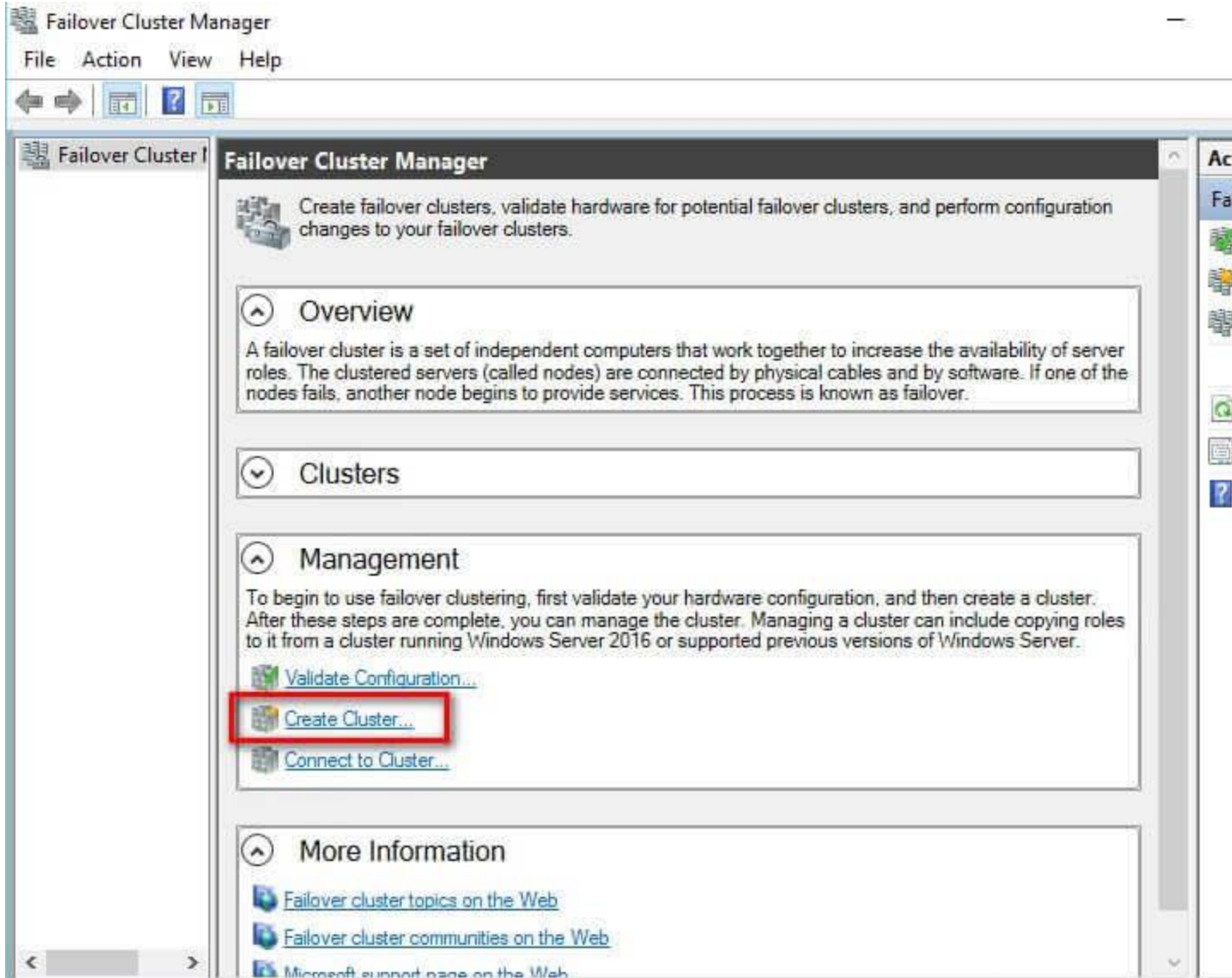
In Windows Server 2016, there are two components of the system that have their own quorum mechanisms:

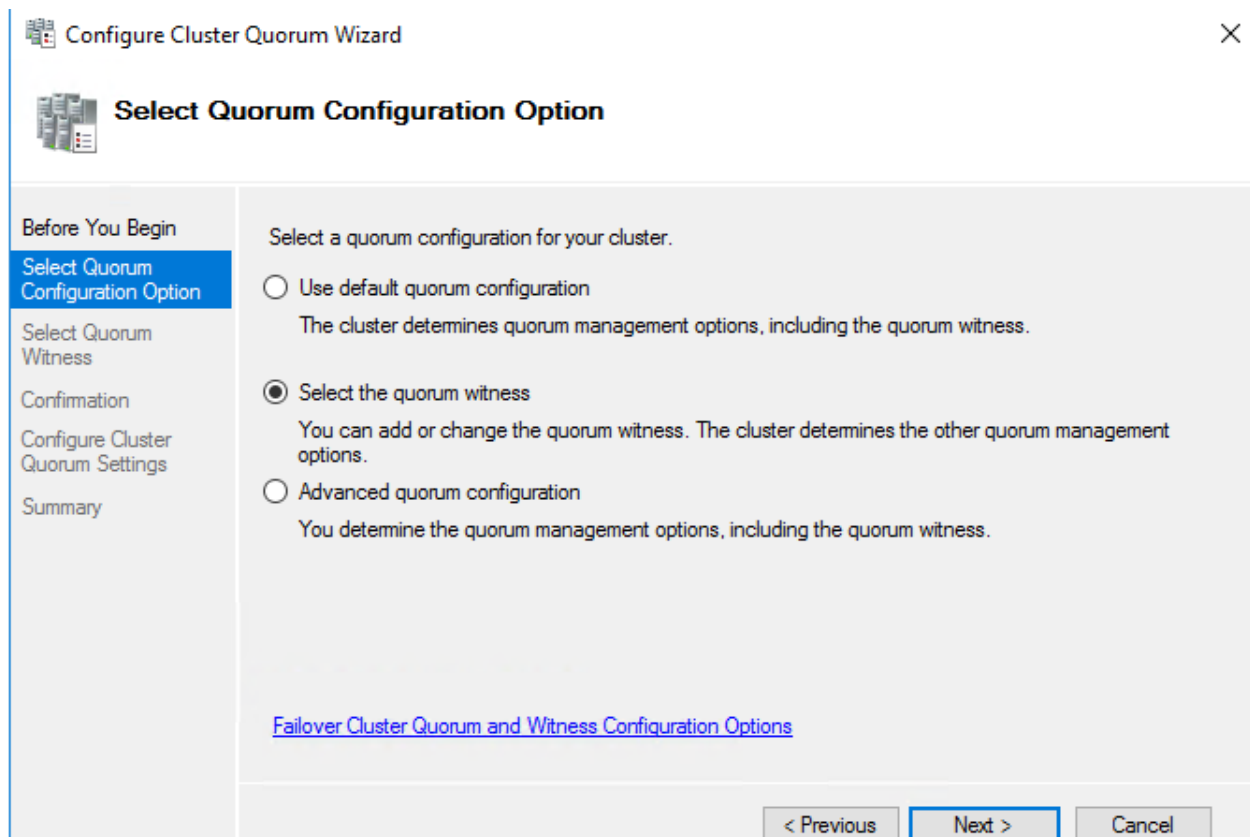
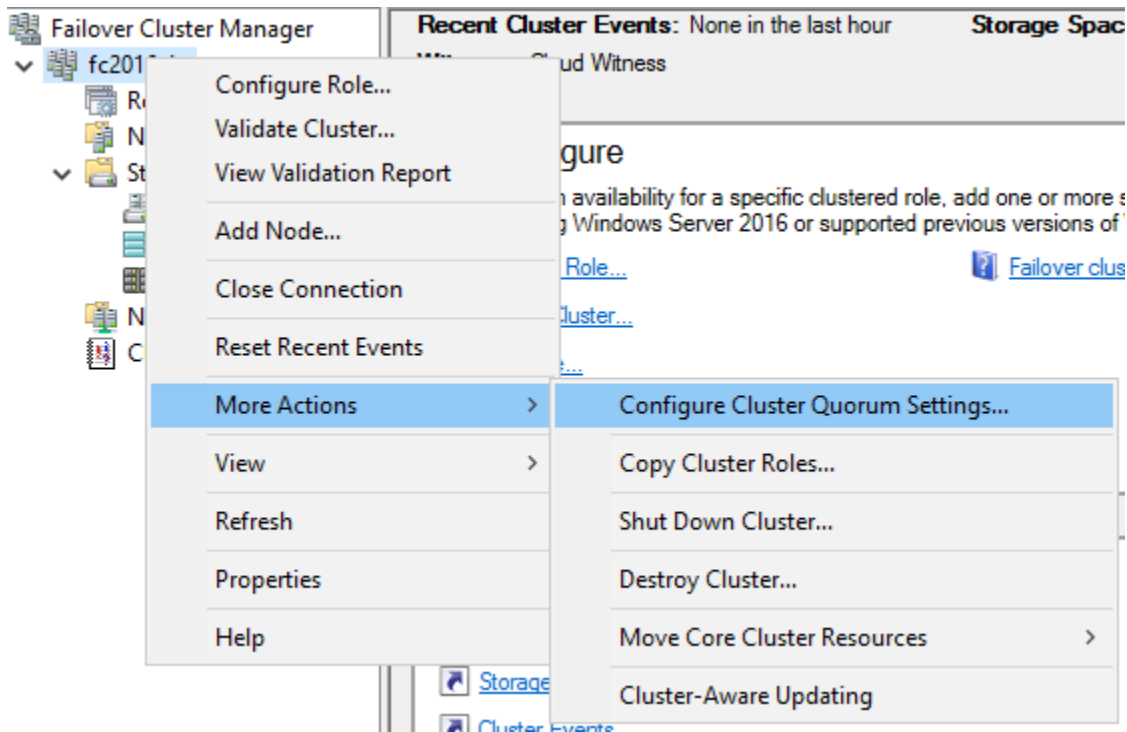
- Cluster Quorum: This operates at the cluster level (i.e. you can lose nodes and have the cluster stay up)
- Pool Quorum: This operates on the pool level when Storage Spaces Direct is enabled (i.e. you can lose nodes and drives and have the pool stay up). Storage pools were designed to be used in both clustered and non-clustered scenarios, which is why they have a different quorum mechanism.

Fail over Cluster

A failover cluster is a group of servers that work together to maintain high availability of applications and services. If one of the servers, or nodes, fails, another node in the cluster can take over its workload without any downtime (this process is known as failover).

Installing the role from server manager.





Configure Cluster Quorum Wizard

Select Quorum Witness

Select a quorum witness option to add or change the quorum witness for your cluster configuration. As a best practice, configure a quorum witness to help achieve the highest availability of the cluster.

- Configure a disk witness
Adds a quorum vote of the disk witness
- Configure a file share witness
Adds a quorum vote of the file share witness
- Configure a cloud witness
Adds a quorum vote of the cloud witness
- Do not configure a quorum witness

[Failover Cluster Quorum and Witness Configuration Options](#)

< Previous **Next >** Cancel

Configure Cluster Quorum Wizard

Configure cloud witness

Please enter your Azure storage account credentials to configure the cloud witness. These credentials are not stored by the cluster. Instead, they are used to create a shared access signature that is stored in the cluster database.

Azure storage account name:

Azure storage account key:

Azure service endpoint:

Configure Cluster Quorum Wizard

Summary

You have successfully configured the quorum settings for the cluster.

Cluster Managed Voting	Enabled
Witness Type	Cloud Witness
Witness Resource	fc2016clu

To view the report created by the wizard, click View Report.

[View Report...](#)

Failover Cluster Manager

- fc2016clu
 - Roles
 - Nodes
 - Storage
 - Networks
 - Cluster Events

Recent Cluster Events: None in the last hour **Storage Spaces Direct (S2D):** Disabled

Witness: Cloud Witness

Configure

Configure high availability for a specific clustered role, add one or more servers (nodes), or copy roles from a cluster running Windows Server 2016 or supported previous versions of Windows Server.

- [Configure Role...](#)
- [Validate Cluster...](#)
- [Add Node...](#)
- [Copy Cluster Roles...](#)
- [Cluster-Aware Updating...](#)

[Failover cluster topics on the Web](#)

Navigate

- [Roles](#)
- [Nodes](#)
- [Storage](#)
- [Networks](#)
- [Cluster Events](#)

Cluster Core Resources

Name	Status	Information
Server Name		
Name: fc2016clu	Offline	
Cloud Witness		
Cloud Witness	Online	

Using powershell

Install Windows FC Feature

Install-WindowsFeature -Name Failover-Clustering -IncludeManagementTools

```
> Install-WindowsFeature -Name Failover-Clustering -IncludeManagementTools
Success Restart Needed Exit Code      Feature Result
-----
True     No                NoChangeNeeded {}
```

Validating Cluster Configuration

Test-Cluster -Node fctest1, fctest2

```
> Test-Cluster -Node fctest1, fctest2
Mode                LastWriteTime         Length Name
----                -
-a-----          3/8/2019   3:51 AM         651612 Validation Report 2019.03.08 At 03.50.41.htm
```

Creating the Windows Server Failover Cluster

New-Cluster -Name fc2016clu -Node fctest1, fctest2 -StaticAddress 10.0.0.6

Note: since i am trying on a workgroup systems, i am getting error due to AD

New-Cluster fc2016clu -Node fctest1, fctest2 -AdministrativeAccessPoint DNS

```
VIEW THE REPORT FILE BELOW:
WARNING: Report file location: C:\windows\cluster\Reports\
Name
----
fc2016clu
```

Get-ClusterResource

```
> Get-ClusterResource
Name                State OwnerGroup      ResourceType
----                -
Cluster IP Address Online Cluster Group IP Address
Cluster Name       Failed Cluster Group Network Name
```

Get-ClusterQuorum

```

> Get-ClusterNode
Name           ID      State
----           -
fctest1       2       Up
fctest2       1       Down

Get-ClusterQuorum
Cluster        QuorumResource
-----
fc2016c1u

```

Configuring Cloud Witness

In 2016 a feature called cloud witness can configure as quorum configuration in fail over cluster. This makes the possibility of multi-site stretched FC (span more than datacenters nodes).

Benefits

1. Leverages Microsoft Azure (no need for third separate datacenter).
2. Uses standard available Azure Blob Storage (no extra maintenance overhead of virtual machines hosted in public cloud).
3. Same Azure Storage Account can be used for multiple clusters (one blob file per cluster; cluster unique id used as blob file name).
4. Very low on-going \$cost to the Storage Account (very small data written per blob file, blob file updated only once when cluster nodes' state changes).
5. Built-in Cloud Witness resource type.

Note: Create an Azure Storage Account to use as a Cloud Witness

1. Sign in to the Azure Portal.
2. On the Hub menu, select New -> Data + Storage -> Storage account.
3. In the Create a storage account page, do the following:
 - a. Enter a name for your storage account.

Storage account names must be between 3 and 24 characters in length and may contain numbers and lowercase letters only. The storage account name must also be unique within Azure.

- b. For Account kind, select General purpose.

You can't use a Blob storage account for a Cloud Witness.

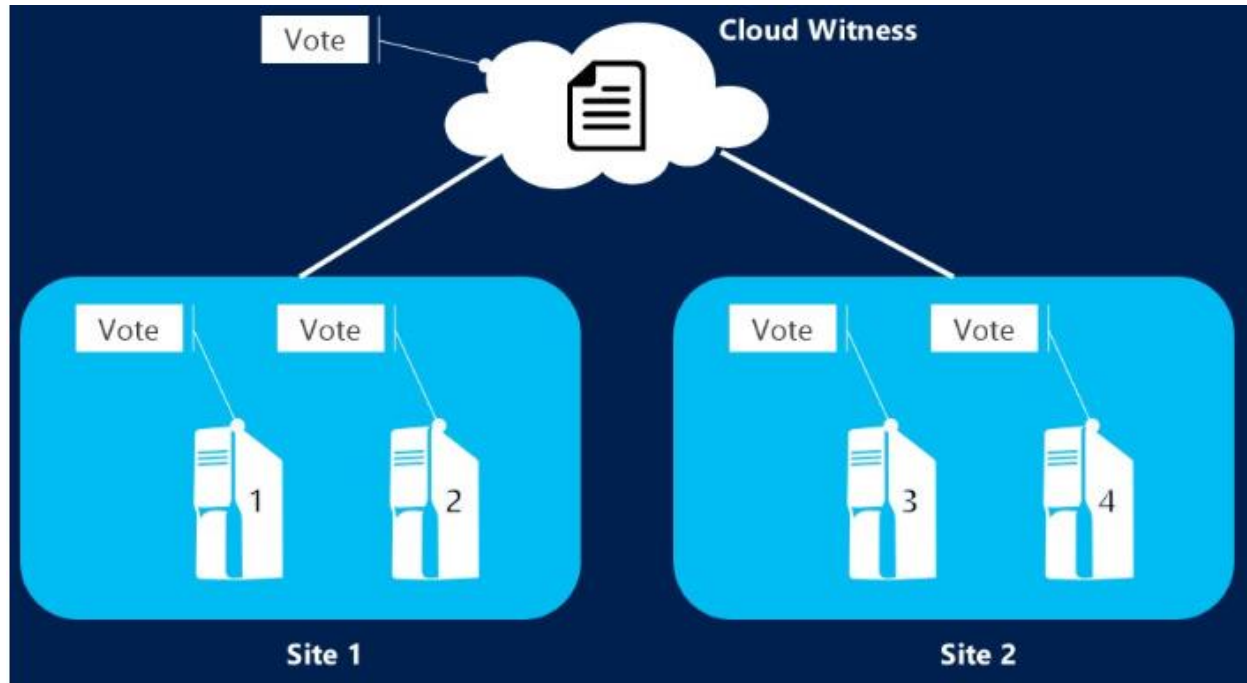
- c. For Performance, select Standard.

You can't use Azure Premium Storage for a Cloud Witness.

- d. For Replication, select Locally-redundant storage (LRS) .

Failover Clustering uses the blob file as the arbitration point, which requires some consistency guarantees when reading the data. Therefore you must select Locally-redundant storage for Replication type.

View and copy storage access keys for your Azure Storage Account



```
Set-ClusterQuorum -CloudWitness -AccountName <StorageAccountName> -AccessKey  
<StorageAccountAccessKey>
```

In case of using different endpoint

```
Set-ClusterQuorum -CloudWitness -AccountName <StorageAccountName> -AccessKey  
<StorageAccountAccessKey> -Endpoint <servername>
```

Reference

<https://docs.microsoft.com/en-us/windows-server/failover-clustering/failover-clustering-overview>

<https://docs.microsoft.com/en-us/windows-server/failover-clustering/deploy-cloud-witness>

<https://docs.microsoft.com/en-us/windows-server/storage/storage-spaces/storage-spaces-direct-overview>

<https://docs.microsoft.com/en-us/windows-server/storage/storage-spaces/understand-quorum>

<https://docs.microsoft.com/en-us/windows-server/storage/storage-spaces/deploy-storage-spaces-direct>