

# AAE Control Room 10 LTS

## Failover Cluster Configuration Guide

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# 1 INTRODUCTION

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This document provides introduction to Microsoft failover cluster technology, configuration overview and configuration guide to:

- Automation Anywhere Web Socket Server Service
- Subversion Server
- Microsoft SQL Server

## 2 ACRONYMS AND TERMINOLOGY

---

MSFC	Microsoft Failover Cluster
LB	Load Balancer
SCSI	Small Computer System Interface
iSCSI	Internet Small Computer System Interface
DO	Domain Object
AD	Active Directory
DC	Domain Controller
CSV	Cluster Shared Volume
HA	High Availability
DAS	Direct Attached Storage
SAN	Storage Area Network
Failover	A procedure by which a system automatically transfers control to a duplicate system when it detects a fault or failure.
Failback	A process of restoring operations to a primary machine or facility after they have been shifted to a secondary machine or facility during failover. During a site-wide failover, I/O (input/output) and its processes are shifted from a primary location to a temporary disaster recovery (DR) location.
Node	Physical Host who is participating in Failover process.
Primary (Active) Node	Host (Node) which has access to all service and storage and actively serving.

Secondary (Passive/Slave) Node	A Duplicate or replicate node of primary which is ideal to serve after failover.
Clustered Service	Generic Windows Service who is participating in failover/failback procedure.
Cluster Group (Role)	Group of clustered services which failovers together and dependent on each other.

### 3 OVERVIEW

Automation Anywhere's product is designed from scratch to be single-tenant, isolated, and self-contained within our customer's environment and therefore mitigates the risk of "cross-contamination" from an unlikely event of a security breach in another customer's network. In another words, we are an on premise product.

Due to the nature of the on premise approach, Automation Anywhere leverages our customers' existing Disaster Recovery (DR) and High Availability (HA) infrastructure. Therefore, we do not have our own customized solution for DR or HA. This approach allows us to configure the environment so that it easily integrates with existing DR or HA infrastructure, avoiding the need for our customers to change their existing process / solution. However, we do have recommendations:

1. What is High Availability (HA)?

High Availability is a designed system that ensures continued content/database availability and maintains business service continuity. The purpose of HA is to protect business processes from any single points of failure.

Threats to service availability include hardware and network failure, storage corruption, and unacceptable Mean Time To Recovery (MTTR) responses. Any interruption to routine processes potentially disrupts business operations.

Protection options include many choices – cluster failovers, virtualization, mirroring, caching, etc. Businesses must have HA integrated into their systems.

The HA policies must include a specified SLA (Service Level Agreement).

Depending on the importance of the business processes, SLA can range from 90% to 99.999%.

2. What is Disaster Recovery (DR)?

A disaster is defined as a catastrophic interruption of business processes. A disaster might be a local event – for example, power failure to the company's data servers. Of greater consequence would be regional disasters – for example, weather (flooding, tornados, etc.) that take down communication services over a large area.

The Disaster Recovery process requires a much more robust system response process. The company's DR policies must include recovery situations from the common foreseeable events to the uncommon but possible catastrophes.



## 4 LOAD BALANCING

---

### 4.1 OVERVIEW

Since “productivity” is essential part of our product, optimal system performance is extremely important to us. Hence, our system is designed to be flexible to handle large number of requests. Our web-tier is designed such that it can scale horizontally. In another words, there can be multiple web servers handling requests (load) simultaneously. Our approach is to balance the load among several web servers so that the load could be balanced across multiple physical boxes.

### 4.2 LOAD BALANCING ARCHITECTURE

The Server Control Room (CR) is a web-based application responsible for Management and Control of all Bot Development and Operations. The Control Room executes on MS Internet Information Services (IIS) 8 or later in Windows Server 2012 R2. The IIS hosts the application layer including licenses, Version Control System (VCS), and other function calls.

**Network load balancing** is achieved by running multiple instances of the CR, each in its own IIS web server and a load balancer in front of it handling web requests. The Load Balancer can either be an external appliance (such as an F5 load balancer) or you can use the built-in Microsoft Network Load Balancer (NLB) available on Server 2012. With NLB, the IIS Servers in the cluster also acts as the Load Balancer.

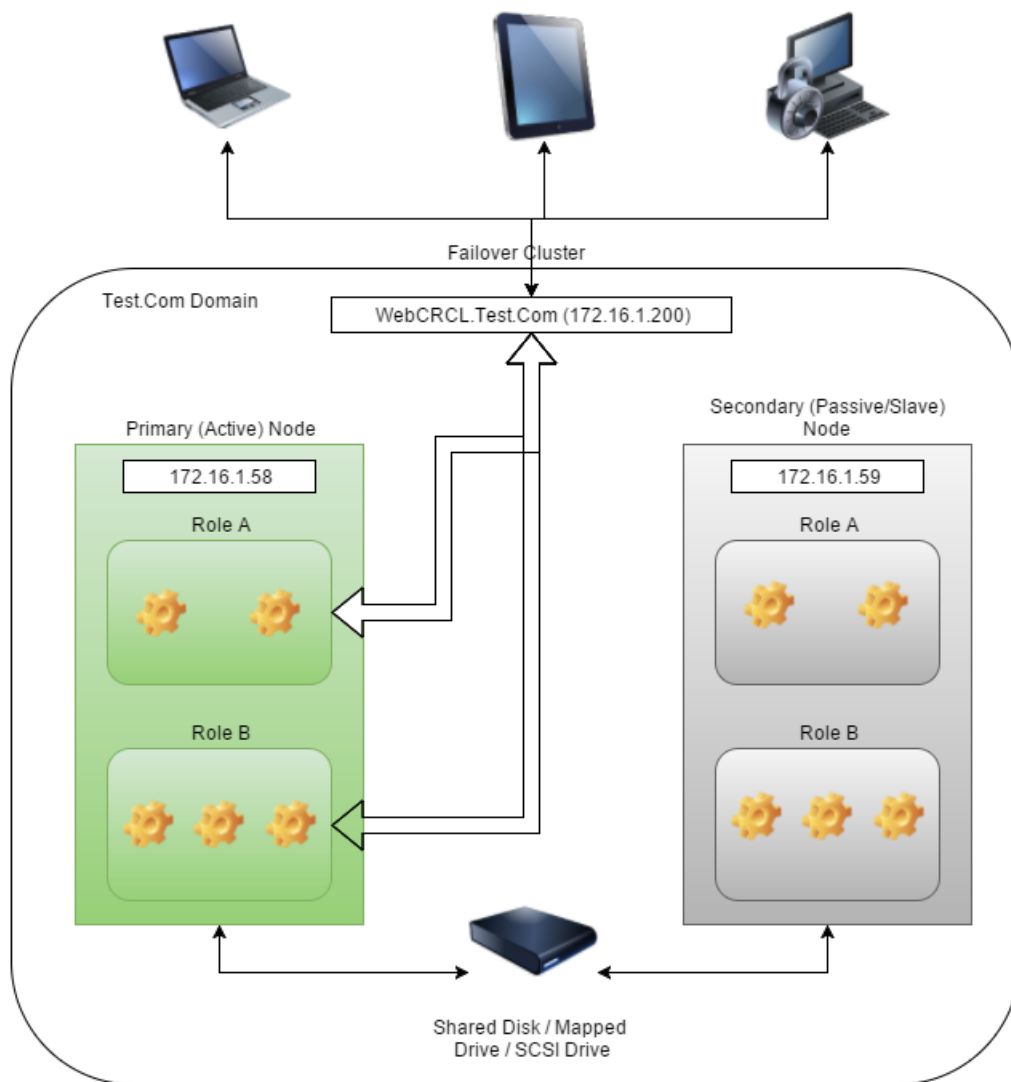
The IIS instances access a separate physical box containing shared services (that may be customer-specific), Web Socket Services, a shared MSSQL database, and the CR license manager.

### 4.3 MICROSOFT WINDOWS CLUSTERING

By using a failover cluster, you can ensure that users have nearly constant access to important server-based resources. A failover cluster is a set of independent computers that work together to increase the availability of services and applications. The clustered servers (called nodes) are connected by physical cables and by software. If one of the nodes fails, another node begins to provide service through a process known as failover.

Failover cluster provides single point of access to end users so that when cluster resources fail over to secondary node, end user doesn't require to change any configuration from his end. This single point of contact is a Virtual IP that represents Name of the cluster. This IP is not associate with any physical machine but just represents an entry in the Domain name list which is used by Domain Controller and Failover Clustering services together to divert traffic to Physical Failover cluster ACTIVE node. Following is the High Level component diagram of the same.

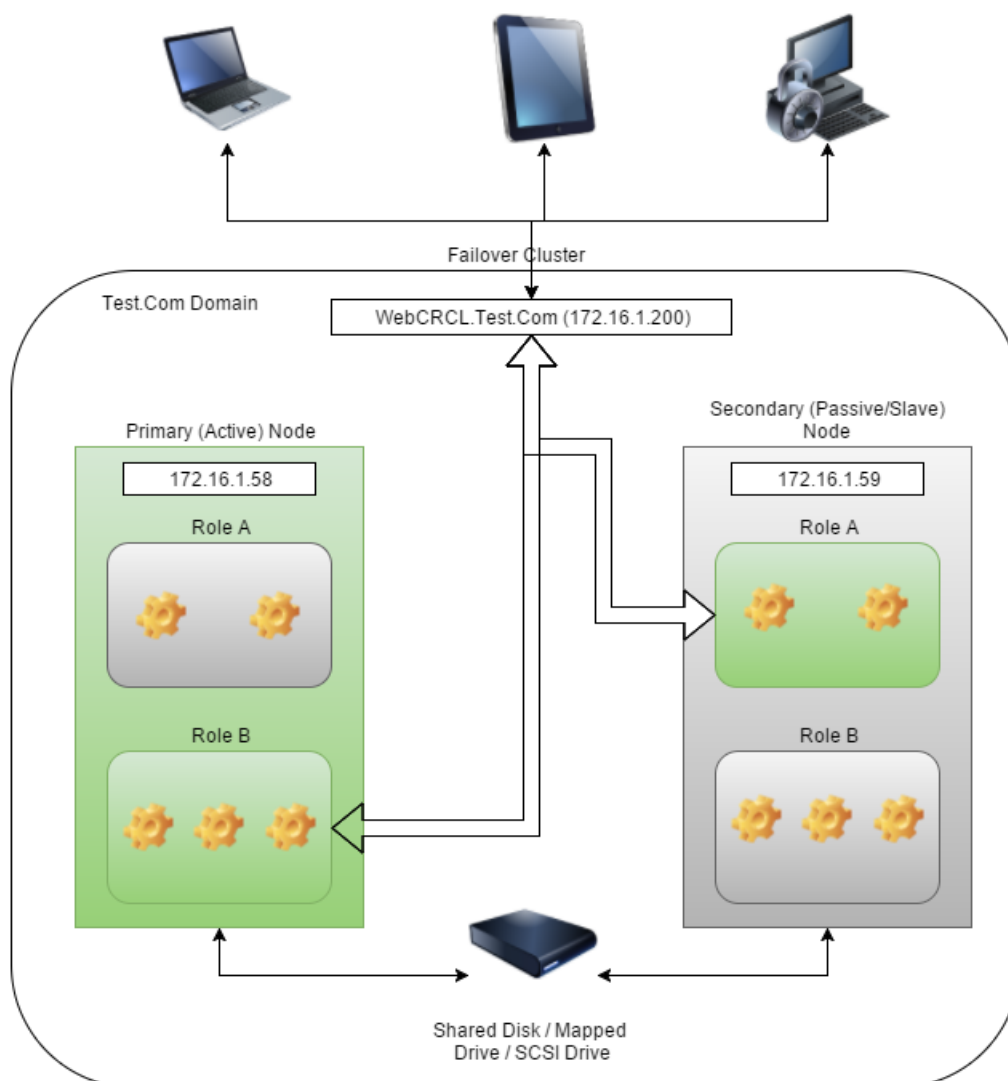




**Figure 4.1**

Figure 3-1 represents the two node failover cluster. Complete environment is setup in Test.Com domain.

- **WebCRCL** is the name of the cluster which is associated with Virtual IP (I.e. 172.16.1.200).
- Two roles (Groups) have been created which contains set of services. Role to Service(s) relationship can be One to One or One to Many i.e. one Role can have one service or many services.
- Figure 3-1 represents normal scenario where all the services in both the roles are working fine. Traffic is being diverted to Node 1 in normal way.



**Figure 4.2**

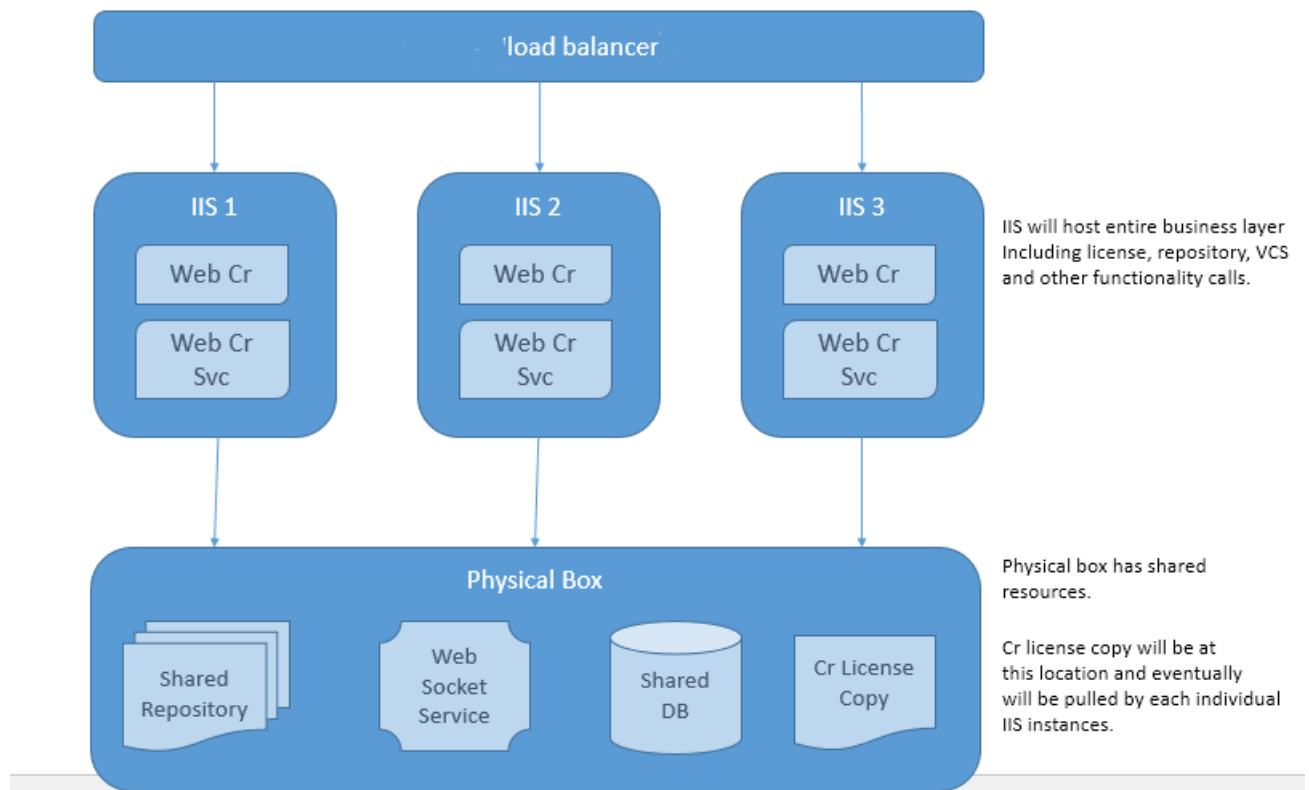
- Figure 3-2 represents failover scenario. One of the service in Role A (let's say Service 1) faces some issue serving the request and crashes. It stops the service (Windows Service state changes from Running to Stopped). As soon as goes to Stopped state, failover happens and all the service in Role A goes offline and comes online in Secondary Node. The requests to that particular service(s) will now be diverted to Node 2.
- In both the scenario end user don't need to take any action and after **an X\* minute downtime** the service will be available to serve again from Node 2.

*\* X minutes downtime depends on the configuration administrator selects. These are the number of restart attempts he configures before failing over while configuring Role, number of failover allowed in particular hours and fallback configuration.*

Refer the section on [Configuring Distributed Components...](#) for details of configuration administrator can perform on Cluster Role to configure restart attempts and fallback.

## 5 WEB CONTROL DISTRIBUTED ARCHITECTURE

### 5.1 TWO TIER ARCHITECTURE WITH LOAD BALANCER



**Figure 5.1**

## 5.2 TWO TIER ARCHITECTURE WITH LOAD BALANCER AND HIGH AVAILABILITY WITH FAILOVER CLUSTER

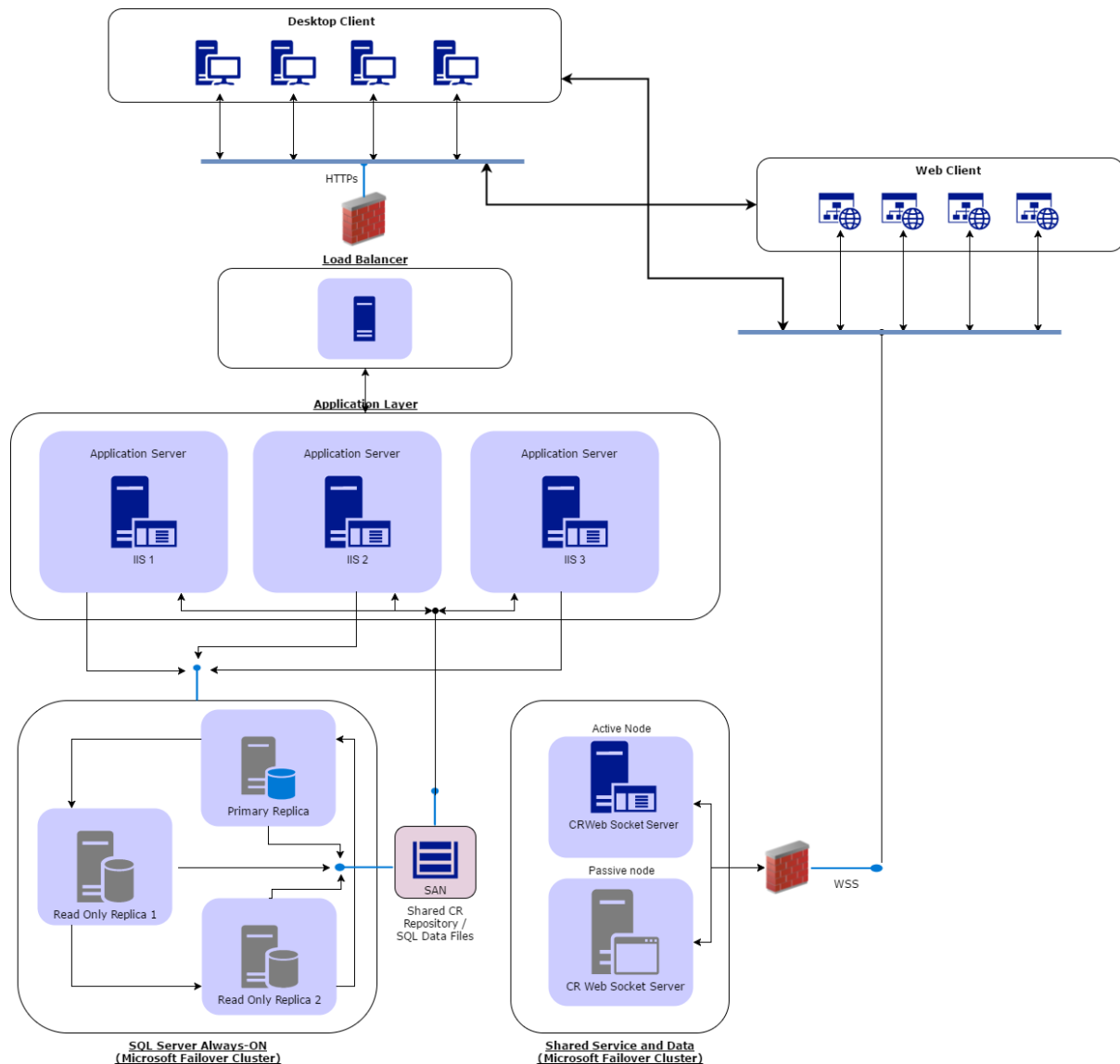


Figure 5.2



## 6 UNDERSTANDING REQUIREMENT OF SAN

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It is highly recommended to utilize the SAN for storing the shared data. SAN provides good scalability, performance and data isolation over NAS. Web Control Room has following components required a shared location,

- Repository
- Microsoft SQL Server 2012 and higher
- Subversion Repository

Apart from above benefits, SAN also provides, high uptime, workload isolation, long distance connectivity, centralized management, and disaster recovery.

## 7 EVALUATING THE BENEFITS OF CLUSTERING

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A cluster is two or more computers working together to provide higher availability, reliability, and scalability than can be obtained by using a single system. When failure occurs in a cluster, resources are redirected and the workload is redistributed. Microsoft cluster technologies guard against three specific types of failure:

- Application and service failures, which affect application software and essential services.
- System and hardware failures, which affect hardware components such as CPUs, drives, memory, network adapters, and power supplies.
- Site failures in multisite organizations, which can be caused by natural disasters, power outages, or connectivity outages.

If one server in a cluster stops working, a process called failover automatically shifts the workload of the failed server to another server in the cluster. Failover ensures continuous availability of applications and data.

This ability to handle failure allows clusters to meet two requirements that are typical in most data centre environments:

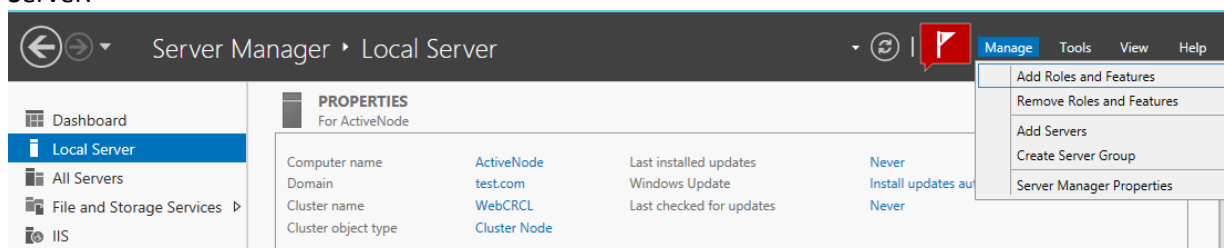
1. **High availability.** The ability to provide end users with access to a service for a high percentage of time while reducing unscheduled outages.
2. **High reliability.** The ability to reduce the frequency of system failure.

## 8 HOW TO CONFIGURE FAILOVER CLUSTER

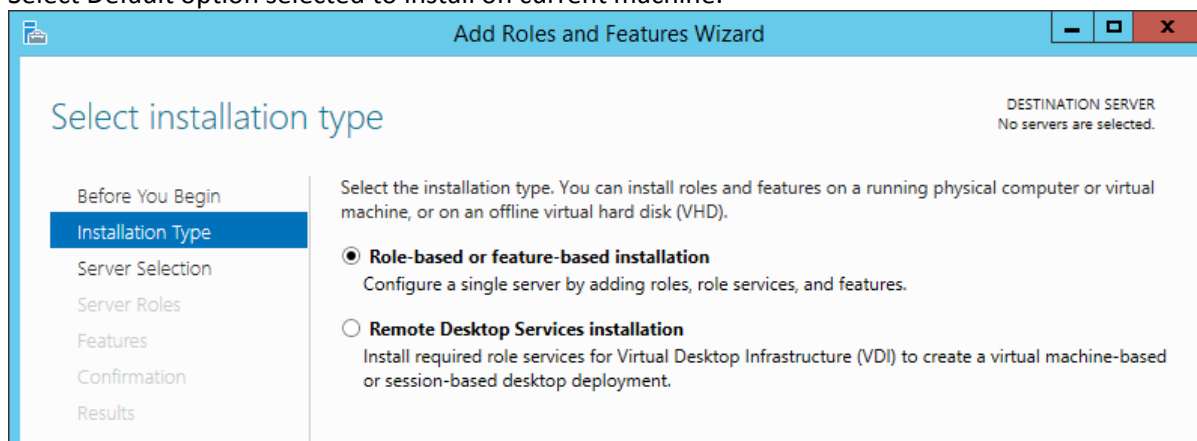
**Pre-requisite:** Make sure both the nodes have latest windows update installed and no restart pending.

**Note:** User is required to have rights to create DO (Domain Object) in the AD (Active Directory). Please make sure to use suitable user permission or consult your Domain Administrator to provide particular access rights to create Failover Cluster object.

1. Open Server Manager Console and navigate to “Add Roles and Features” in Manage from Local Server.



2. Select Default option selected to install on current machine.



3. Keep “Select a server from the server pool” selected. If you have multiple server in cluster group selected already, you will see multiple options in the below window.

**Note:** The Server pool name is an example. It will be different and based on Machine name configured for particular node. (The image shown below mentions the Conteso-N1. Conteso.local which is taken as an example. The actual name will be different based on the name of the

computer given by administrator).

The screenshot shows the 'Add Roles and Features Wizard' window. The title bar says 'Add Roles and Features Wizard'. The main heading is 'Select destination server'. On the left, there is a navigation pane with the following items: 'Before You Begin', 'Installation Type', 'Server Selection' (highlighted), 'Server Roles', 'Features', 'Confirmation', and 'Results'. The main content area has the text 'Select a server or a virtual hard disk on which to install roles and features.' Below this, there are two radio buttons: 'Select a server from the server pool' (selected) and 'Select a virtual hard disk'. Below the radio buttons is a 'Server Pool' section with a 'Filter:' text box. Below the filter is a table with the following data:

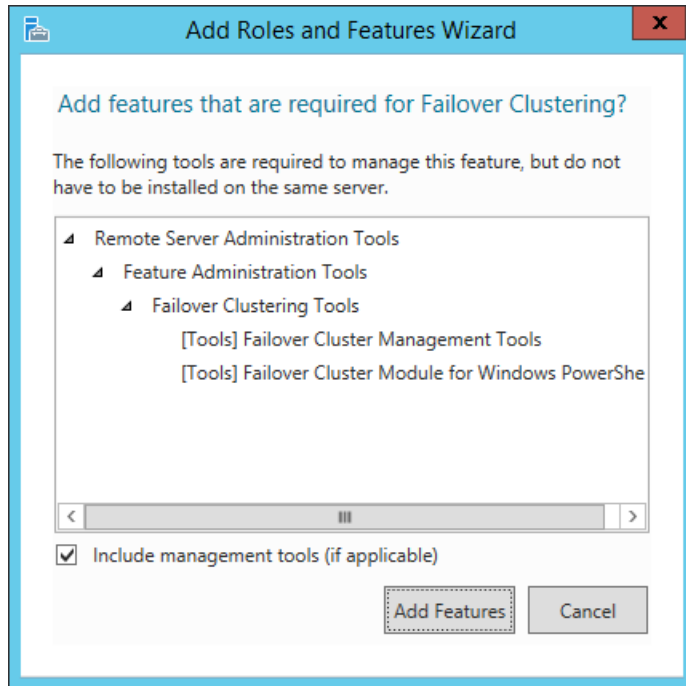
Name	IP Address	Operating System
PassiveNode.test.com	169.254.1.77,1...	Microsoft Windows Server 2012 R2 Datacenter
ActiveNode.test.com	169.254.2.119,...	Microsoft Windows Server 2012 R2 Datacenter

Below the table, it says '2 Computer(s) found'. Below that, it says 'This page shows servers that are running Windows Server 2012, and that have been added by using the Add Servers command in Server Manager. Offline servers and newly-added servers from which data collection is still incomplete are not shown.' At the bottom, there are four buttons: '< Previous', 'Next >', 'Install', and 'Cancel'.

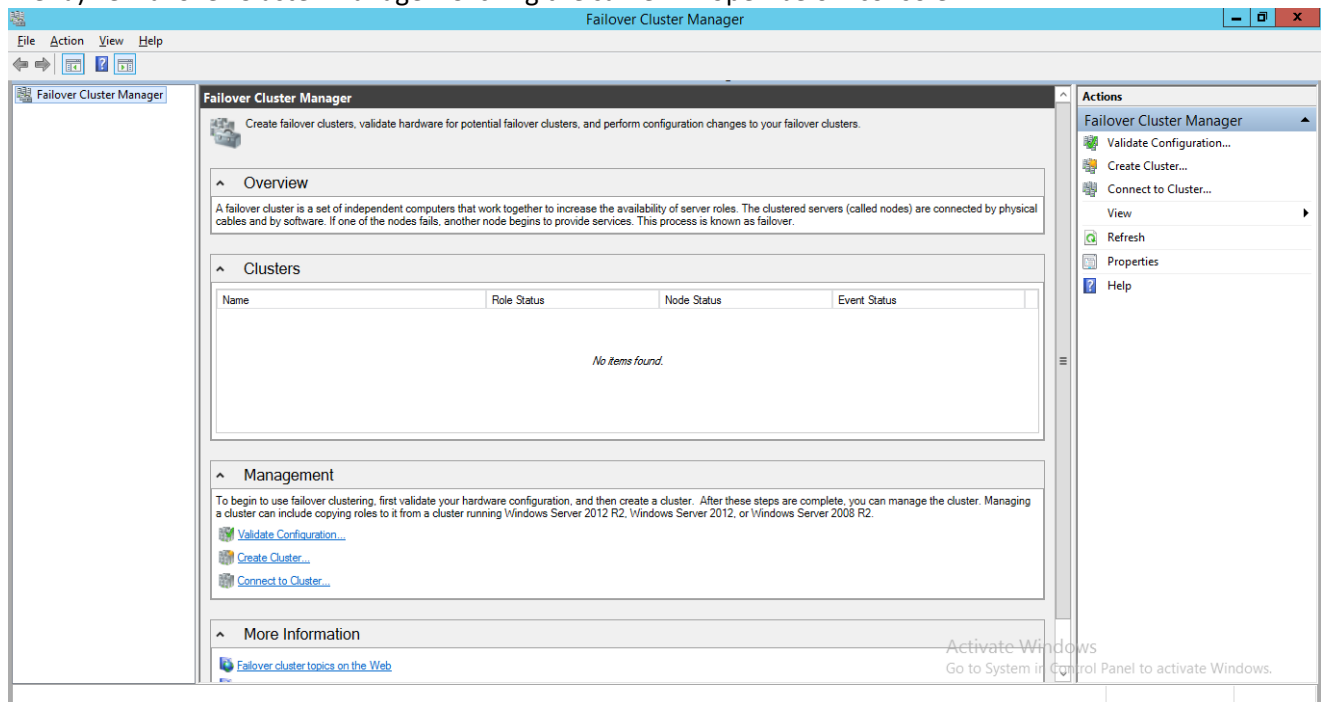
4. Click "Next" and select "Failover Clustering" option.

The screenshot shows the 'Add Roles and Features Wizard' window. The title bar says 'Add Roles and Features Wizard'. The main heading is 'Select features'. On the left, there is a navigation pane with the following items: 'Before You Begin', 'Installation Type', 'Server Selection', 'Server Roles', 'Features' (highlighted), 'Confirmation', and 'Results'. The main content area has the text 'Select one or more features to install on the selected server.' Below this, there is a 'Features' list with checkboxes. The 'Failover Clustering (Installed)' checkbox is checked. To the right of the list is a 'Description' box with the following text: 'Failover Clustering allows multiple servers to work together to provide high availability of server roles. Failover Clustering is often used for File Services, virtual machines, database applications, and mail applications.' At the bottom, there are four buttons: '< Previous', 'Next >', 'Install', and 'Cancel'.

- Click on “Add Features”.



- Click on “Install” and let installation finish. If it asks to restart, please do so.
- Once installation completed, user will be able to see option in the Tools (or search from start menu) i.e. Failover Cluster Manager. Clicking the same will open below console.



- Perform the same steps for Node 2.

## 9 CREATING CLUSTER

**Note:** Please make sure to login as domain admin account to perform below steps.

1. Open Failover Cluster Manager Console and click on “Create Cluster” link. Type the name/IP of the hosts whom you want to participate in clustering. Click on Add button to add them.

The screenshot shows the 'Create Cluster Wizard' window with the 'Select Servers' step selected in the left-hand navigation pane. The main area contains instructions to add server names. A text box labeled 'Enter server name:' is empty. Below it, a list box labeled 'Selected servers:' contains 'ActiveNode.test.com' and 'PassiveNode.test.com'. To the right of the list box are 'Add' and 'Remove' buttons. Above the list box is a 'Browse...' button. At the bottom of the window are '< Previous', 'Next >', and 'Cancel' buttons.

**Create Cluster Wizard**

**Select Servers**

Before You Begin  
Select Servers  
Validation Warning  
Access Point for Administering the Cluster  
Confirmation  
Creating New Cluster  
Summary

Add the names of all the servers that you want to have in the cluster. You must add at least one server.

Enter server name:

Selected servers: ActiveNode.test.com  
PassiveNode.test.com

Browse...  
Add  
Remove

< Previous   Next >   Cancel

2. Click “Next” and provide a valid cluster name. Please make sure there don’t exist any physical machine or domain object with the same name in the domain. Select the IP address from the available range.

The screenshot shows the 'Create Cluster Wizard' window with the 'Access Point for Administering the Cluster' step selected in the left-hand navigation pane. The main area contains instructions to type the name for administering the cluster. A text box labeled 'Cluster Name:' contains 'WebCRCL'. Below it is a warning message about NetBIOS name limits. A table with two columns, 'Networks' and 'Address', shows a selected network '172.16.0.0/21' with the corresponding IP address '172 . 16 . 0 . 20'. At the bottom of the window are '< Previous', 'Next >', and 'Cancel' buttons.

**Create Cluster Wizard**

**Access Point for Administering the Cluster**

Before You Begin  
Select Servers  
Access Point for Administering the Cluster  
Confirmation  
Creating New Cluster  
Summary

Type the name you want to use when administering the cluster.

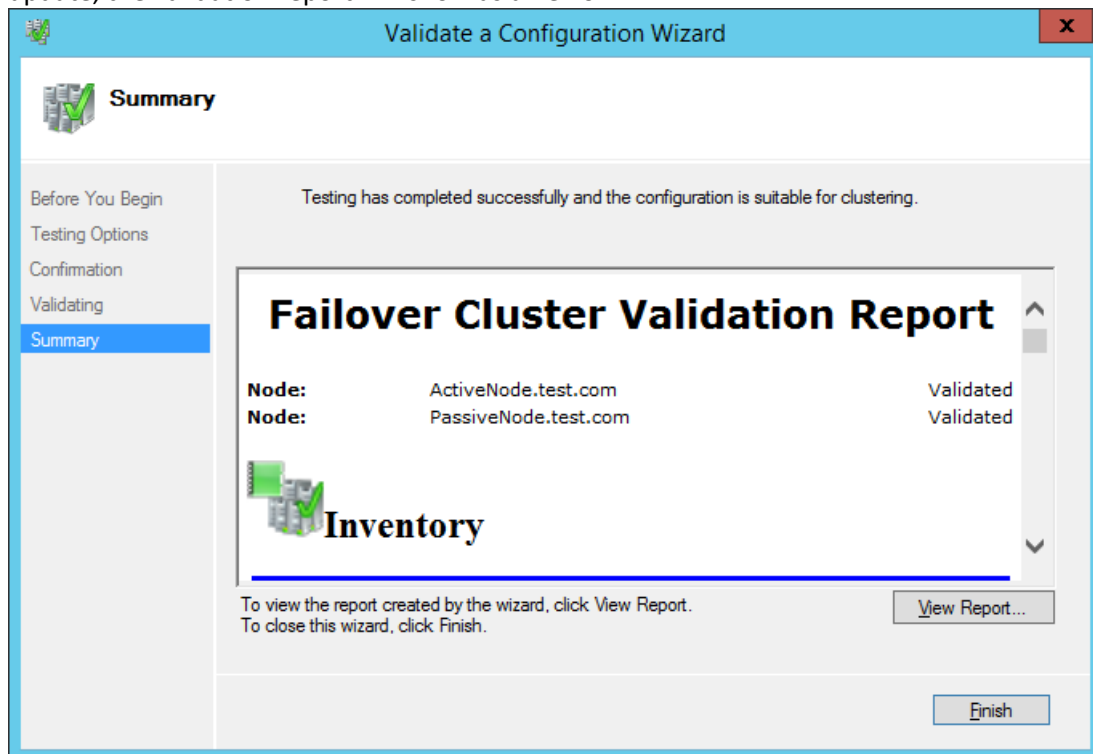
Cluster Name: WebCRCL

The NetBIOS name is limited to 15 characters. One or more IPv4 addresses could not be configured automatically. For each network to be used, make sure the network is selected, and then type an address.

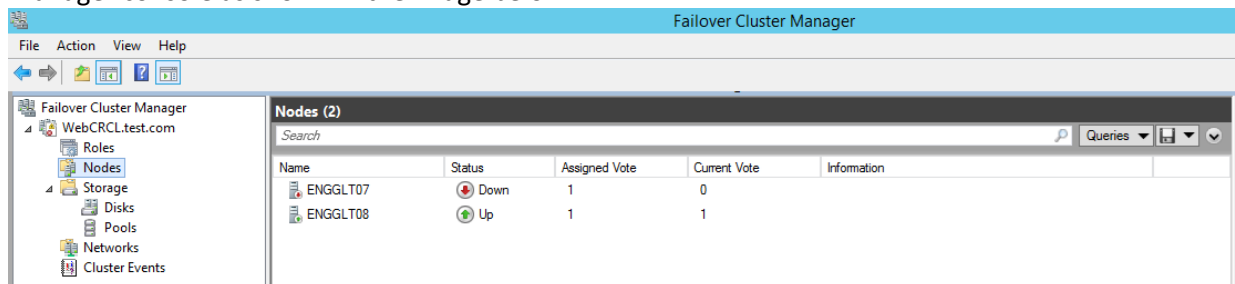
	Networks	Address
<input checked="" type="checkbox"/>	172.16.0.0/21	172 . 16 . 0 . 20

< Previous   Next >   Cancel

- Click “Next” and validate the configuration. If cluster hosts are missing any configuration or update, the validation report will show as an error.



- Click “Finish” and it will navigate to “Create Cluster” Dialog. Click “Next” and it will create cluster with provided configuration.
- Once created, cluster configuration and other details will be available in the Failover Cluster Manager console as shown in the image below.



## 10 CREATING A SQL SERVER 2012 ALWAYS ON AVAILABILITY GROUP

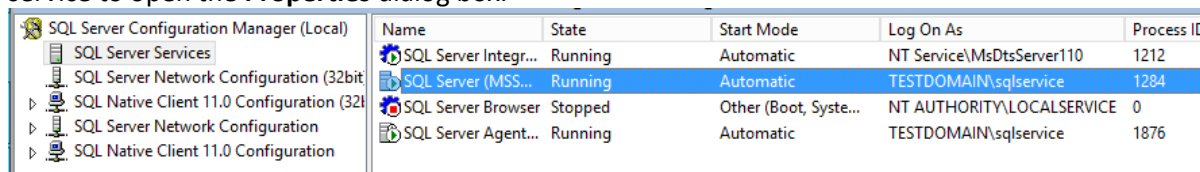
### 10.1 PREREQUISITES

- **Windows Server Failover Cluster (WSFC).** AlwaysOn Availability Groups rely on the Windows Server Failover Cluster for failure detection and management of the Availability Group replicas.
- [Download SQL Server 2012 Enterprise Edition](#). AlwaysOn Availability Group is an Enterprise Edition feature.
- **Same SQL Server collation for all replicas.** It is recommended not running databases with different collation requirements in the same SQL Server instance due to potential issues caused by applications using temporary tables.  
This is one of the reasons for keeping the database collation the same for a single instance (SharePoint 2013 also requires a specific collation for the content databases.) If you want to configure AlwaysOn Availability Groups for your databases, they should all be running the same collation on all of the SQL Server instances acting as replicas.
- **Two SQL Server Instances acting as replicas.** SQL Server instances that will be used as a standby for high availability and/or disaster recovery are called **replicas**. Two nodes to act as Active-Node and Passive-node with SQL Instance installed.

### 10.2 ENABLE SQL SERVER 2012 ALWAYS ON AVAILABILITY GROUPS FEATURE

Once the Windows Server Failover Cluster has been created, we can now proceed with enabling the AlwaysOn Availability Groups feature in SQL Server 2012. This needs to be done on all of the SQL Server instances that you will configure as replicas in your Availability Group. To enable the SQL Server 2012 AlwaysOn Availability Groups feature:

1. Open **SQL Server Configuration Manager**. Double-click the **SQLServer (MSSQLSERVER)** service to open the **Properties** dialog box.



Name	State	Start Mode	Log On As	Process ID
SQL Server Integr...	Running	Automatic	NT Service\MsDtsServer110	1212
SQL Server (MSS...	Running	Automatic	TESTDOMAIN\sqlservice	1284
SQL Server Browser	Stopped	Other (Boot, Syste...	NT AUTHORITY\LOCALSERVICE	0
SQL Server Agent...	Running	Automatic	TESTDOMAIN\sqlservice	1876

2. In the **Properties** dialog box, select the **AlwaysOn High Availability** tab. Check the **Enable AlwaysOn Availability Groups** check box. This will prompt you to restart the SQL Server service. Click **OK**.
3. Restart the SQL Server service.

### 10.3 CREATE AND CONFIGURE SQL SERVER 2012 ALWAYS ON AVAILABILITY GROUPS

First, Add Login Role “SQL service user” or “NT AUTHORITY\SYSTEM” to each SQL Node / Instance. For example, you can write a query as shown:

```
USE [master]
```

```
GO
```

```
CREATE LOGIN [nt authority\system] FROM WINDOWS WITH DEFAULT_DATABASE=[master]
```

GO

Grant the “SQL service user” or “NT AUTHORITY\SYSTEM” account the following server-level permissions:

1. Alter Any Availability Group
2. Connect SQL
3. View server state

For example, you can write a query as shown:

```
“GRANT ALTER ANY AVAILABILITY GROUP TO [NT AUTHORITY\SYSTEM]
```

```
GO
```

```
GRANT CONNECT SQL TO [NT AUTHORITY\SYSTEM]
```

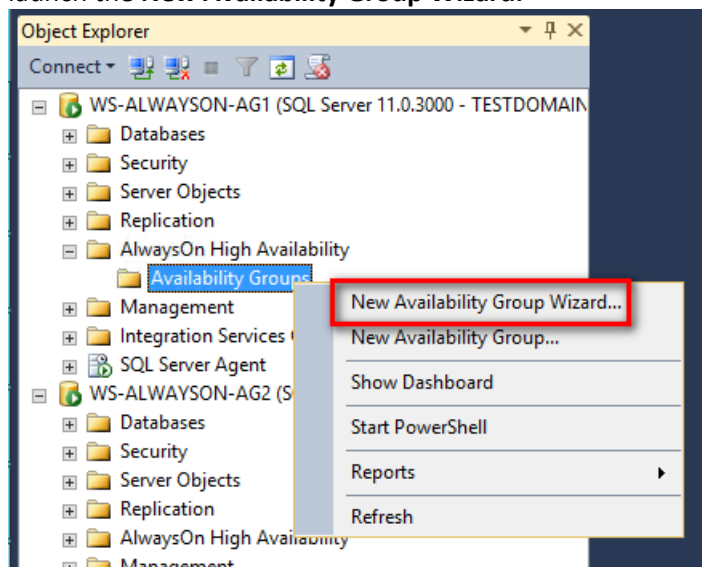
```
GO
```

```
GRANT VIEW SERVER STATE TO [NT AUTHORITY\SYSTEM]
```

```
GO”
```

To create and configure a SQL Server 2012 AlwaysOn Availability Group,

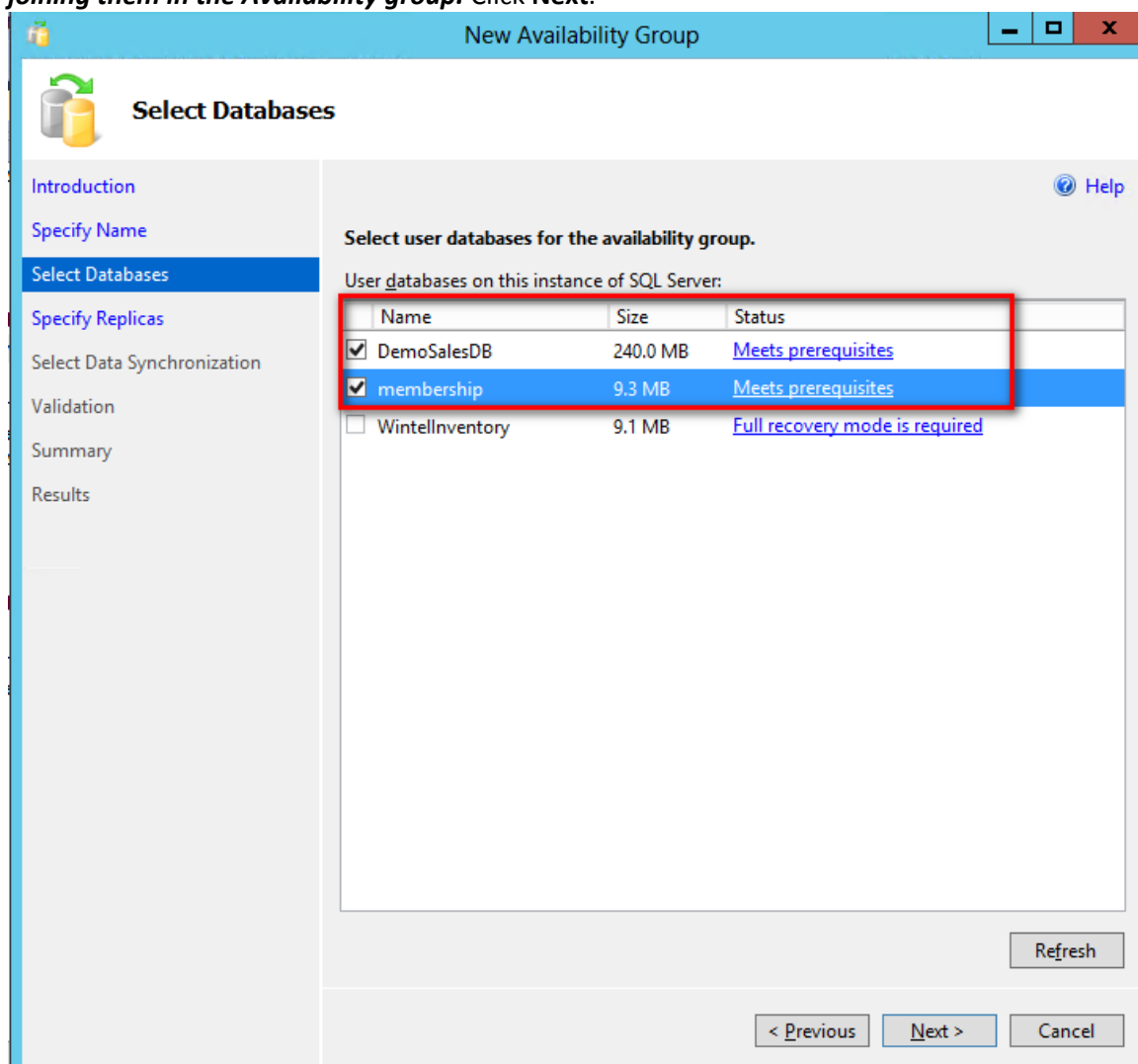
1. Open **SQL Server Management Studio**. Connect to the SQL Server instance.
2. Back up Database before creating New availability group.
3. In **Object Explorer**, expand the **AlwaysOn High Availability** folder. Right-click on the **Availability Groups** folder and select the **New Availability Group Wizard...** option. This will launch the **New Availability Group Wizard**.



4. In the **Introduction** page, click **Next**.
5. In the **Specify Availability Group Name** page, enter the name of the Availability Group in the **Availability group name:** field. Click **Next**.
6. In the **Select Databases** page, select the checkbox beside the database that you want to include in your Availability Group. ***The databases have to be in Full recovery model prior to***



**joining them in the Availability group. Click Next.**



**Select Databases**

Select user databases for the availability group.

User databases on this instance of SQL Server:

Name	Size	Status
<input checked="" type="checkbox"/> DemoSalesDB	240.0 MB	<a href="#">Meets prerequisites</a>
<input checked="" type="checkbox"/> membership	9.3 MB	<a href="#">Meets prerequisites</a>
<input type="checkbox"/> WintellInventory	9.1 MB	<a href="#">Full recovery mode is required</a>

Refresh

< Previous Next > Cancel

7. In the **Specify Replicas** page, under the Replicas tab, click the **Add Replicas** button and connect to the other SQL Server instances that you joined as nodes in your Windows Server Failover Cluster. Configure the following options:
  - Automatic Failover (Up to 2) : **Checked**
  - Synchronous Commit (Up to 3) : **Checked**
  - Readable Secondary: **No**
3. In the **Endpoints** tab, verify that the port number value is **5022**.
4. In the **Listener** tab, select the **Create an availability group listener** option. Enter the following details.
  - Listener DNS name: **Name that you will use in your application connection string**
  - Port: **1433**

**Note:** This Client Access point to be used while connecting to DB during Application Layer Installation

5. Click the **Add...** button to provide an IP address. In the **Add IP Address** dialog box, enter your preferred virtual IP address in the **IPv4 Address** field. Click **OK**. Click **Next**.
6. In the **Select Initial Data Synchronization** page, select the **Full** option. Provide a shared folder that is accessible the replicas and that the SQL Server service account used by both replicas has **Write** permissions to. This is just a temporary file share to store the database backups that will be used to initialize the databases in an Availability group. If you are dealing with large databases, it is recommended that you manually initialize the databases prior to configuring them as your network bandwidth may not be able to accommodate the size of the database backups. Click **Next**.

The screenshot shows the 'New Availability Group' wizard window. The title bar says 'New Availability Group'. The main heading is 'Select Initial Data Synchronization'. On the left is a navigation pane with links: Introduction, Specify Name, Select Databases, Specify Replicas, Select Data Synchronization (highlighted), Validation, Summary, and Results. The main area has the heading 'Select your data synchronization preference.' with three radio button options: **Full** (selected), **Join only**, and **Skip initial data synchronization**. Below the 'Full' option, it says 'Specify a shared network location accessible by all replicas:' followed by a text box containing '\\FSW-CLUSTER\\SQL' (highlighted with a red rectangle) and a 'Browse...' button. At the bottom are buttons for '< Previous', 'Next >', and 'Cancel'. A 'Help' icon is in the top right.

7. In the **Validation** page, verify that all validation checks return successful results. Click **Next**.
8. In the **Summary** page, verify all configuration settings and click **Finish**. This will create and configure the AlwaysOn Availability Group and join the databases.
9. In the **Results** page, verify that all tasks have been completed successfully.

## 11 INSTALLING WEB CONTROL ROOM DISTRIBUTED COMPONENTS

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Following are the main distributable components of Web Control Room which is required to be clustered in order to achieve High Availability.

- Automation Anywhere Web Socket Server Service
- Subversion Service
- Microsoft SQL Server 2012 and higher

A service to be highly available, it need to share the data that it offers to clients. During installation, administrator needs to identify the required components that is required to be deployed on shared directory (mapped drive). Following are the list of files and directory that is needed to be installed/deployed at mapped drive for distributed component of Web Control Room.

- Web Socket Service: None (in memory data)
- Subversion Service: Repository Directory
- Microsoft SQL Server 2012 and higher: Data Dictionary

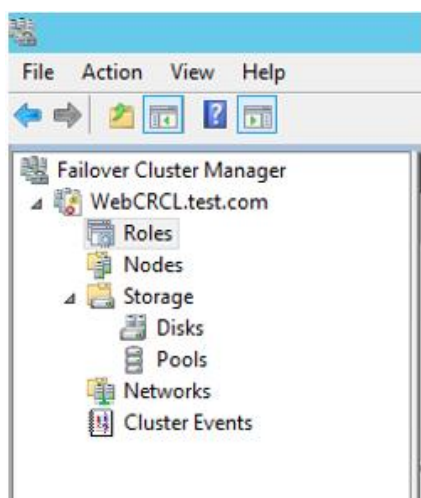
All installer of above distributed components provide provision to select directory location during installation. Please make sure to select mapped drive while selecting Data Directory or Repository Directory.

## 12 CONFIGURING DISTRIBUTED COMPONENTS AS CLUSTERED SERVICES

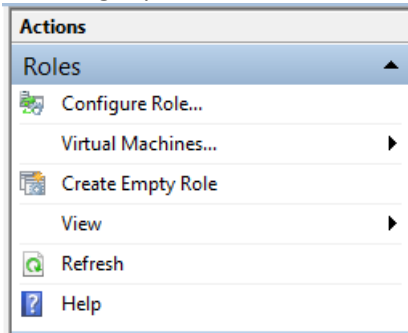
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To configure the distribute components as clustered component, identify the dependency of component and service first. Group all those components while configuration. E.g. CollabNet provide two services upon installation of Subversion Server, CollabNet Subversion Apache and CollabNet Subversion svnserve services respectively. For repository to work over HTTP protocol, Apache service in dependent on Svnserve service. Hence it is required to group them under same role.

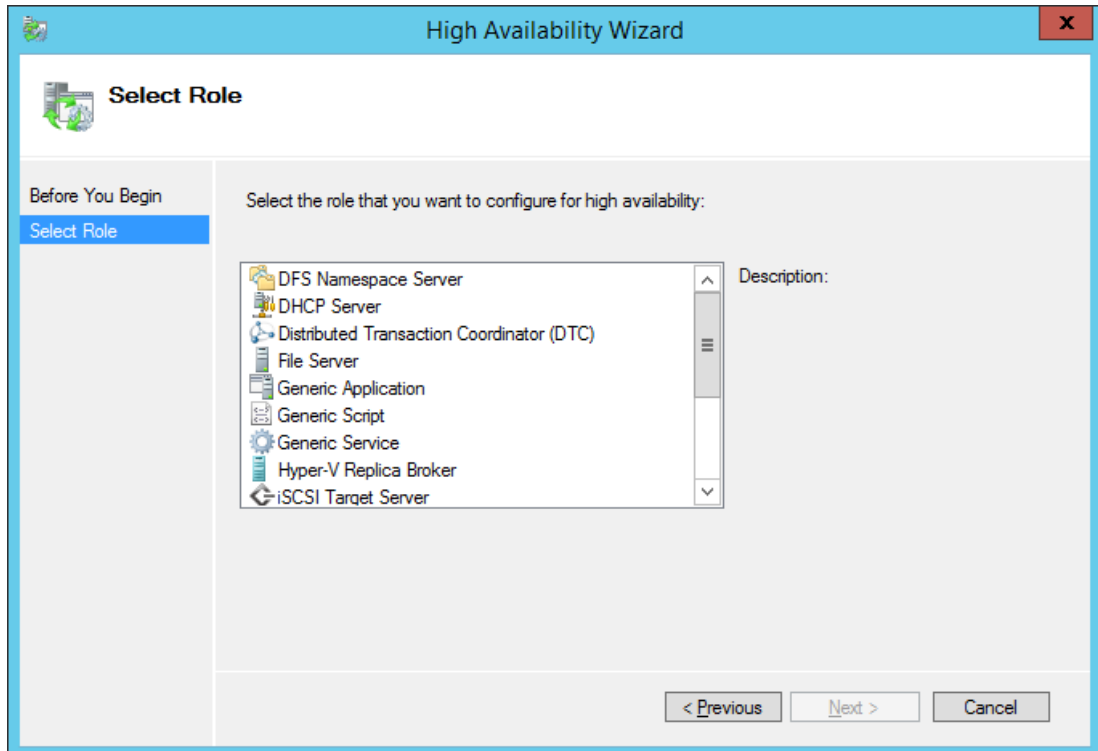
1. Open Failover cluster manager console.
2. Navigate to cluster node and click "Roles"



3. Go to Right panel and select “Configure Role”.

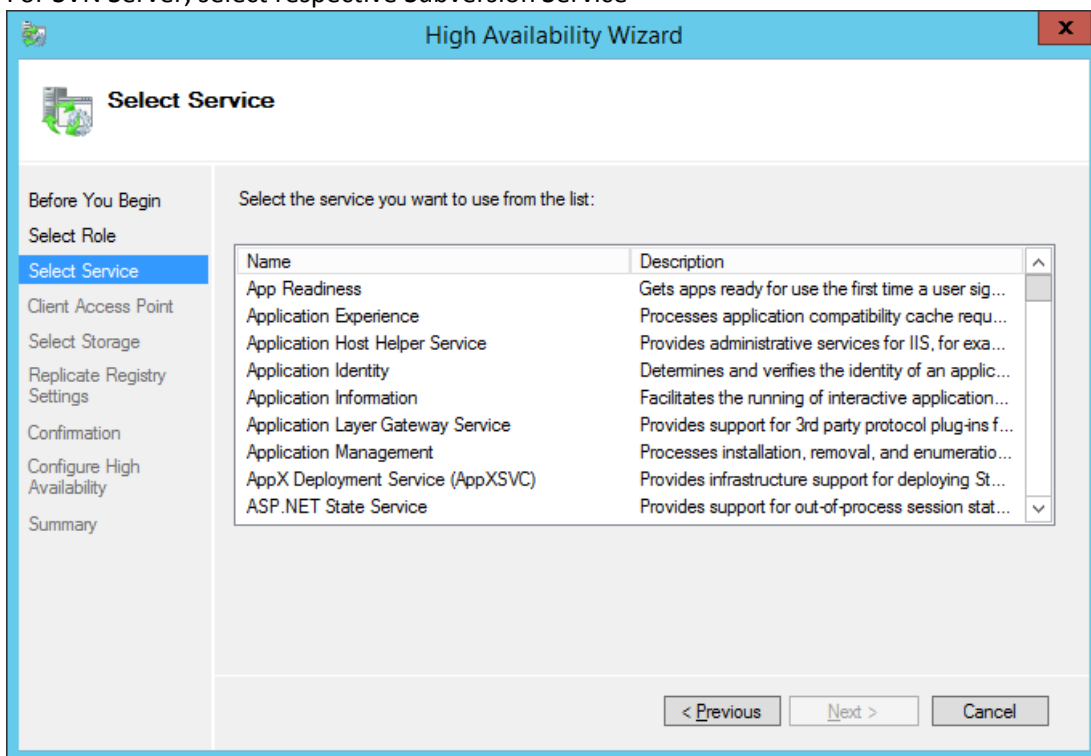


4. Select “Generic Service” and click on Next.

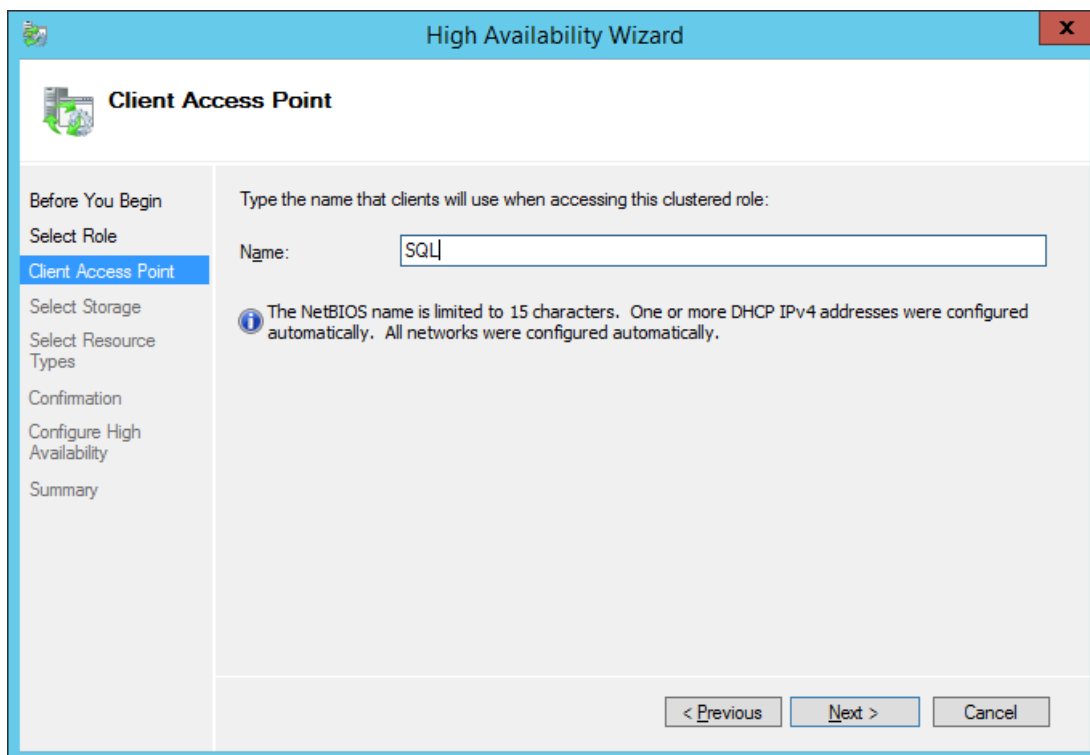


5. Select required generic service from the list.  
Select respective service from Generic Service wizard for which Cluster Role is being created. I.e.
  - For Web Socket Server, select Automation Anywhere web socket server service,

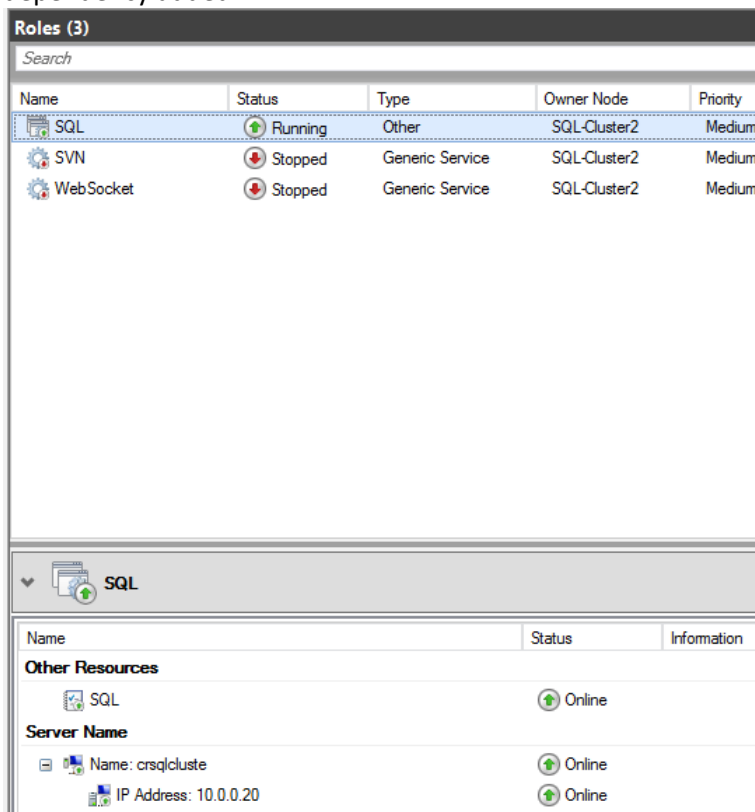
- For SVN Server, select respective Subversion Service



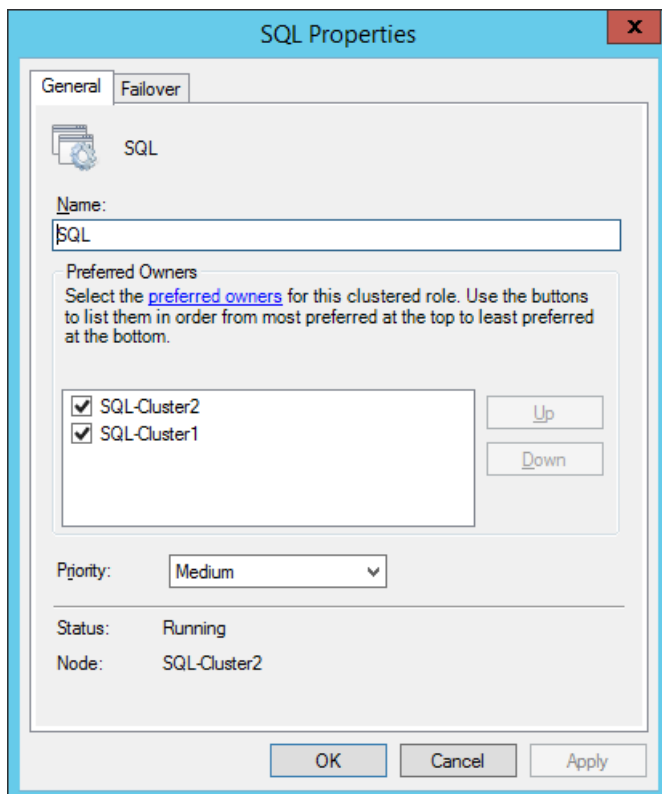
6. Select Client Access Point. This is an IP address/DNS Name access by client application and will be point of contact.

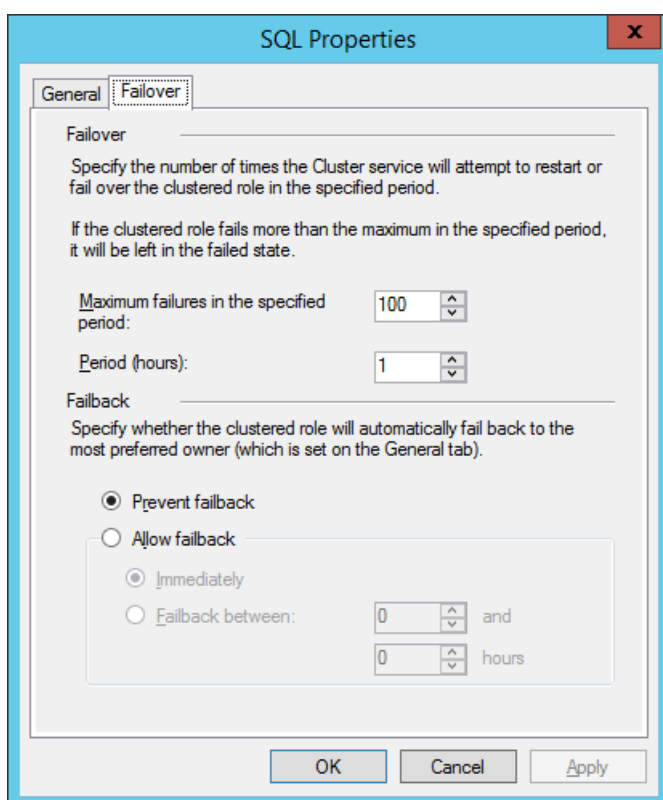


- Click on next and finish the wizard. It will create a Role with required resource and dependency added.



- Right click on Role and go to properties. Select owner and go to Failover tab in same window and provide appropriate values for failover and fallback conditions.





**SQL Properties**

**General** **Failover**

**Failover**  
Specify the number of times the Cluster service will attempt to restart or fail over the clustered role in the specified period.  
If the clustered role fails more than the maximum in the specified period, it will be left in the failed state.

Maximum failures in the specified period: 100

Period (hours): 1

**Failback**  
Specify whether the clustered role will automatically fail back to the most preferred owner (which is set on the General tab).

☒ Prevent failback

☐ Allow failback

☒ Immediately

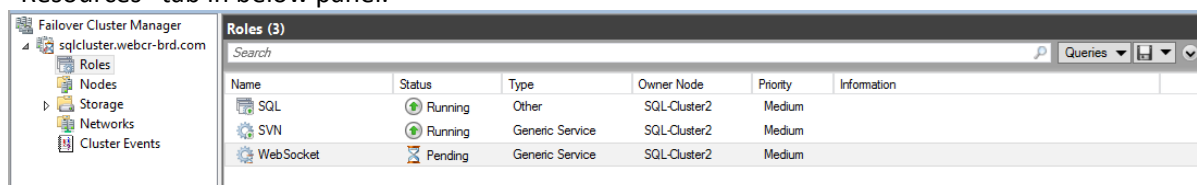
☐ Failback between: 0 and 0 hours

OK Cancel Apply

- Maximum failure in the specified period: This represents the number of time a Role can failover in particular time period.
- Period (hr): The time period mention in above property
- Failback: Whether to allow or prevent failback of role when server/services is available online back.

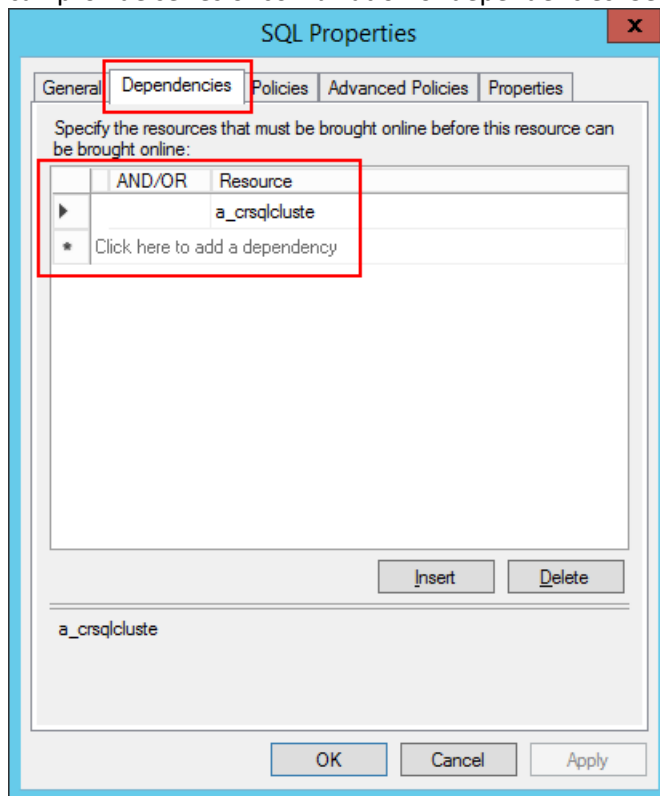
**Note:** Please make a note that default value is 1 failover within 6 hours. It is recommended to increase this value.

- Once the above configurations have been set, roles are technically available to serve. However, it is required to set dependency if any. To set the same select the Role and go to “Resources” tab in below panel.



Name	Status	Type	Owner Node	Priority	Information
SQL	Running	Other	SQL-Cluster2	Medium	
SVN	Running	Generic Service	SQL-Cluster2	Medium	
Web Socket	Pending	Generic Service	SQL-Cluster2	Medium	

10. Right click on particular resource and select Properties. Go to “Dependencies” tab. Here you can provide series of combination of dependencies. Select the resource from dropdown.



11. The Configuring Dependency is dependent of the Service being configured. E.g. Automation Anywhere Web Socket Server Service has no dependency over any other resource.



12. Go to Policies tab and select the Failover policies.

The screenshot shows the 'SQL Properties' dialog box with the 'Policies' tab selected. The 'Response to resource failure' section is highlighted with a red box. It contains the following options and settings:

- ☐ If resource fails, do not restart
- ☒ If resource fails, attempt restart on current node
  - Period for restarts (mm:ss): 15:00
  - Maximum restarts in the specified period: 1
  - Delay between restarts (ss.f): 0.5
- ☒ If restart is unsuccessful, fail over all resources in this Role
- ☒ If all the restart attempts fail, begin restarting again after the specified period (hh:mm): 01:00

Below these options is a link: [More about restart policies](#).

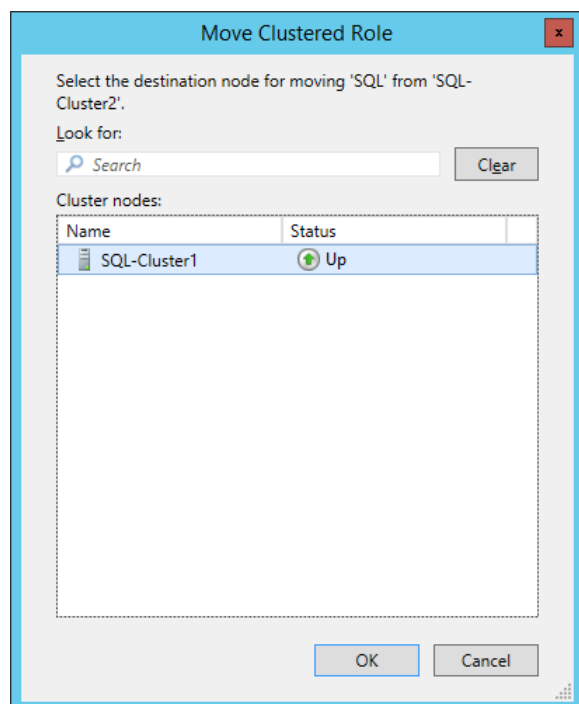
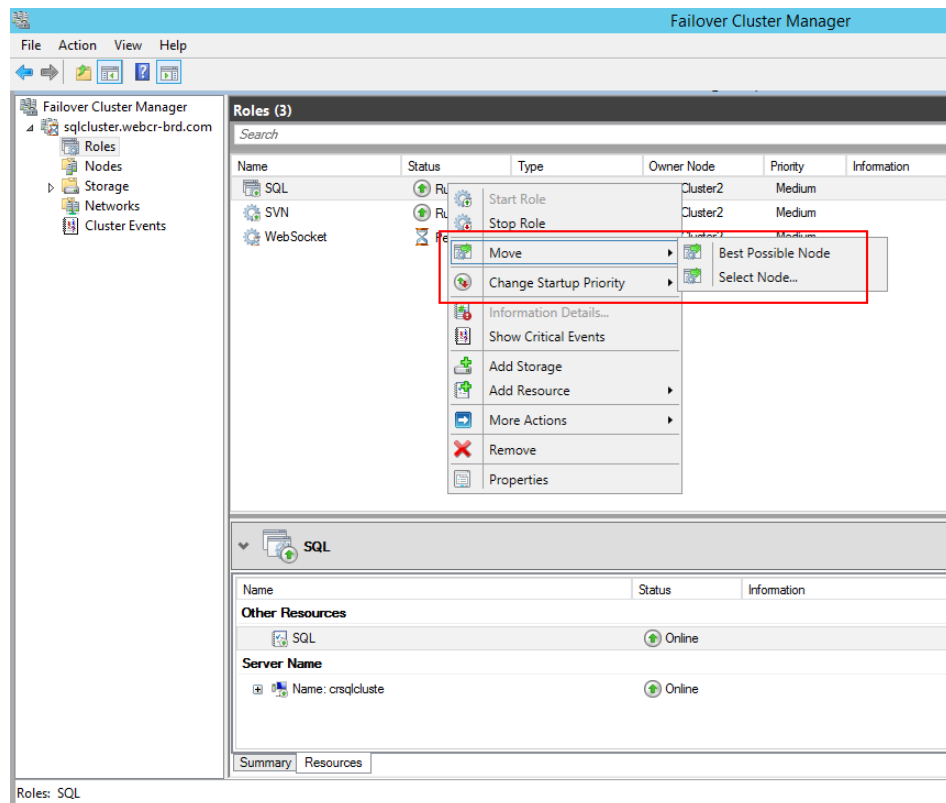
The 'Pending timeout' section is also visible, with a description: 'Specify the length of time the resource can take to change states between Online and Offline before the Cluster service puts the resource in the Failed state.' and a 'Pending timeout (mm:ss):' field set to 03:00.

At the bottom are 'OK', 'Cancel', and 'Apply' buttons.

13. Click "OK" and complete the procedure for all Roles and Resources you have created.

## 13 MANUAL FAILOVER TEST

Microsoft Failover Cluster Management console provides provision to test failover manually by right clicking on the role and moving it to other node. This will replicate the failover e.g. service executable crash, network failure and machine failure.



## 14 DISASTER RECOVERY

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Automation Anywhere defaults to the Windows platform for Disaster Recovery, we recommend that Automation Anywhere Tasks and reference files be deployed according to the existing organization's DR policies for file, and data transfers. Usually it's prior or in parallel to production deployment of automated tasks.

### 14.1 HARDWARE FAILURES

It is recommended that multiple web servers be setup in an active-active method to not only balancing load but also provides protection against local hardware failures. It is recommended that database server be setup in a Windows Clustering environment so that there are multiple database servers connected to a single storage array. Depending on the criticality of data, the storage array should be using RAID 5 at minimum. Usage of SAN for shared services and DB is recommended.

### 14.2 DATA CORRUPTION

Regular on-site full and daily backup of database server is highly recommended. More frequent differential backup strategy can also be used to reduce the data loss.

Besides the database, the AAE Control Room repository also requires backup of configuration and task files.

If network storage is used on the primary site, the same storage configuration should be used at the DR site. The in-built replication mechanism updates the DR repository from the main site.

If a solution for replication is needed, one option would be the optional Windows feature, Distributed File System (DFS). DFS configuration is described in [Appendix A](#).

### 14.3 ENVIRONMENTAL DISASTERS

To protect against a geographical or environmental disaster, we also recommend that a regular off-site backup be performed regularly where the backups are stored geographically apart.

**Note:** For any processes that had stopped during an event of production failure in between execution, the task level log file and other intermediate files would help to provide the last execution status of the process.

This step-by-step has been created to help you get started in creating a SQL Server 2012 AlwaysOn Availability Group

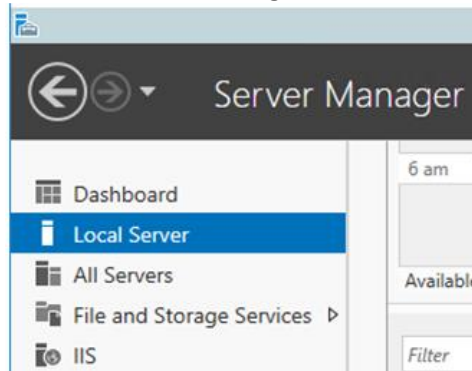
## 15 APPENDIX A – REPOSITORY REPLICATION

### 15.1 INSTALL DFS MANAGEMENT FEATURES

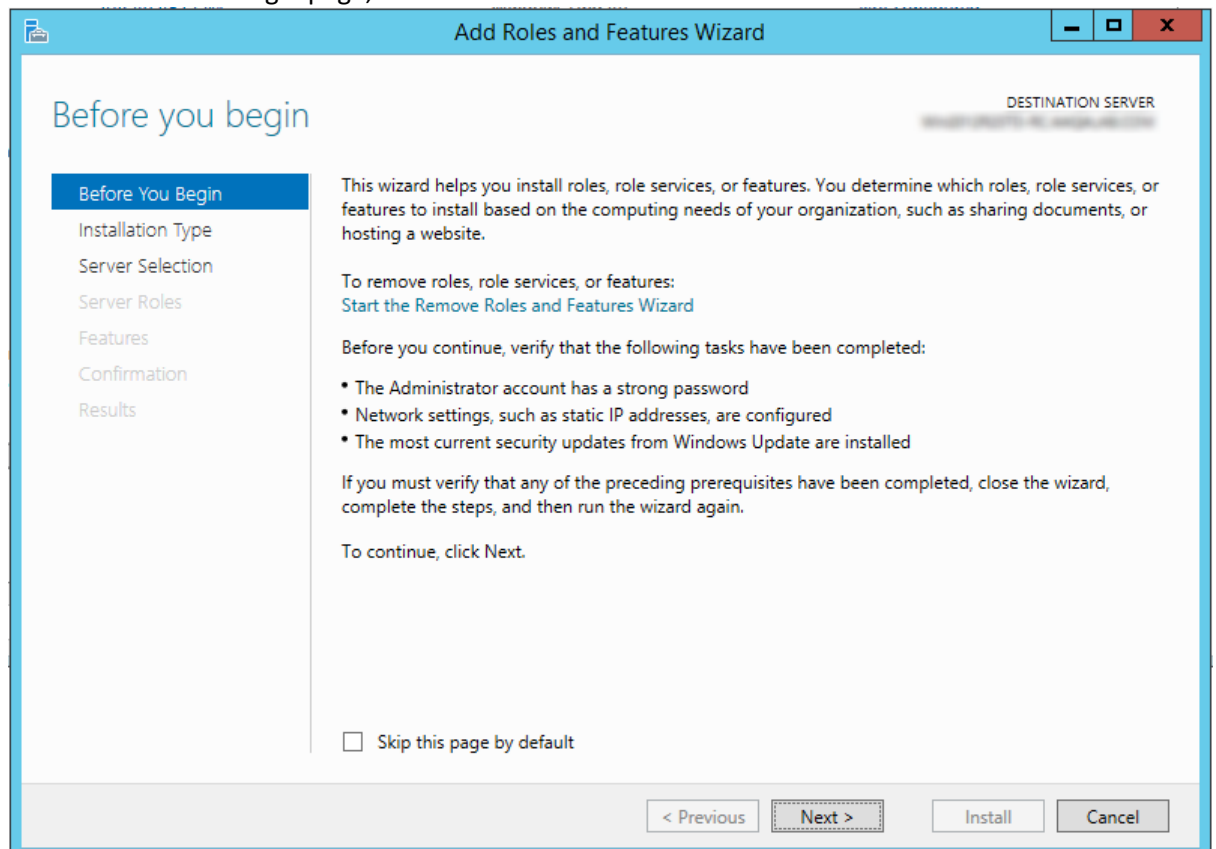
Follow these steps to setup and run DFS.

**NOTE:** This procedure is done on the Primary server and the Hot-standby server.

1. Start the Server Manager and select the Local Server tab.



2. On Manage, select Add Roles and Features. This starts the Add Roles and Features Wizard dialog.
3. On the Before You Begin page, click Next.



4. On the Select installation type page, select Role-based or feature-based installation radio button. Click Next.

**Add Roles and Features Wizard**

DESTINATION SERVER

### Select installation type

Select the installation type. You can install roles and features on a running physical computer or virtual machine, or on an offline virtual hard disk (VHD).

- ☒ **Role-based or feature-based installation**  
Configure a single server by adding roles, role services, and features.
- ☐ **Remote Desktop Services installation**  
Install required role services for Virtual Desktop Infrastructure (VDI) to create a virtual machine-based or session-based desktop deployment.

< Previous   **Next >**   Install   Cancel

5. On the Select destination server page, select the Select a server from the server pool radio button. Click Next.

**Add Roles and Features Wizard**

DESTINATION SERVER

### Select destination server

Select a server or a virtual hard disk on which to install roles and features.

- ☒ **Select a server from the server pool**
- ☐ **Select a virtual hard disk**

**Server Pool**

Filter:

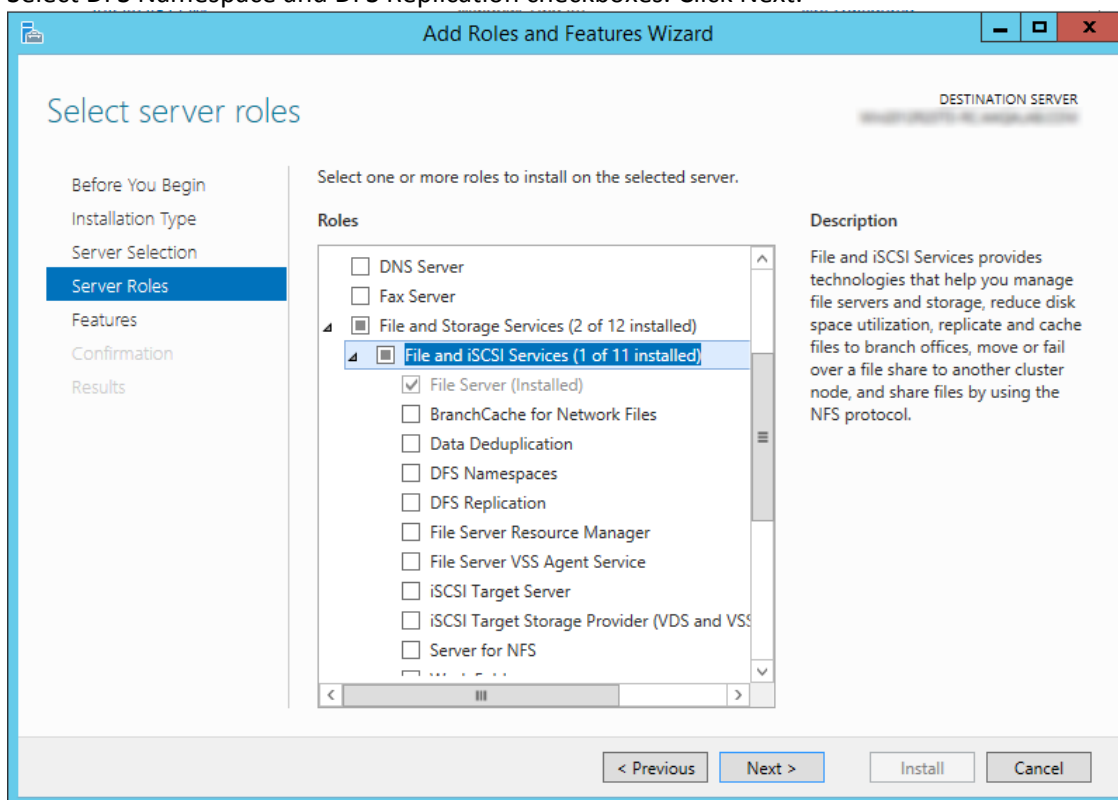
Name	IP Address	Operating System
Win2012R2STD-RC.AAQ...	192.168.2.78	Microsoft Windows Server 2012 R2 Standard

1 Computer(s) found

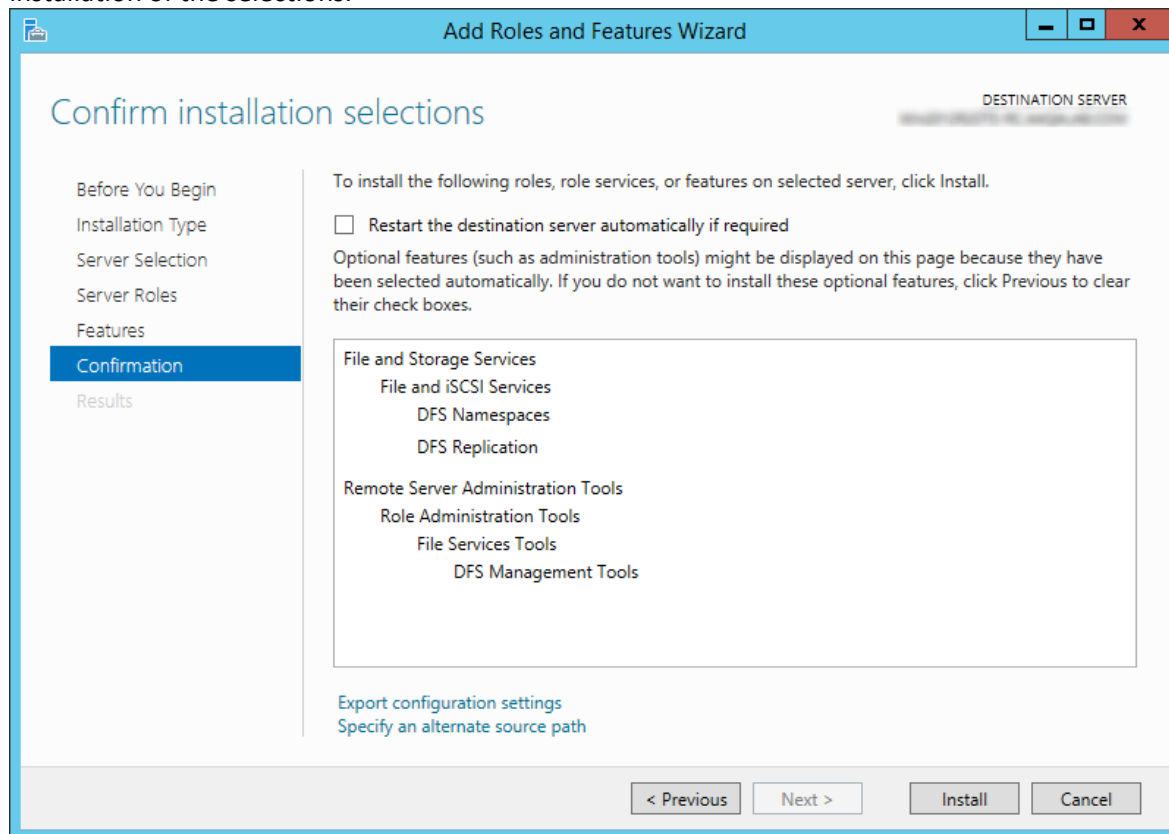
This page shows servers that are running Windows Server 2012, and that have been added by using the Add Servers command in Server Manager. Offline servers and newly-added servers from which data collection is still incomplete are not shown.

< Previous   **Next >**   Install   Cancel

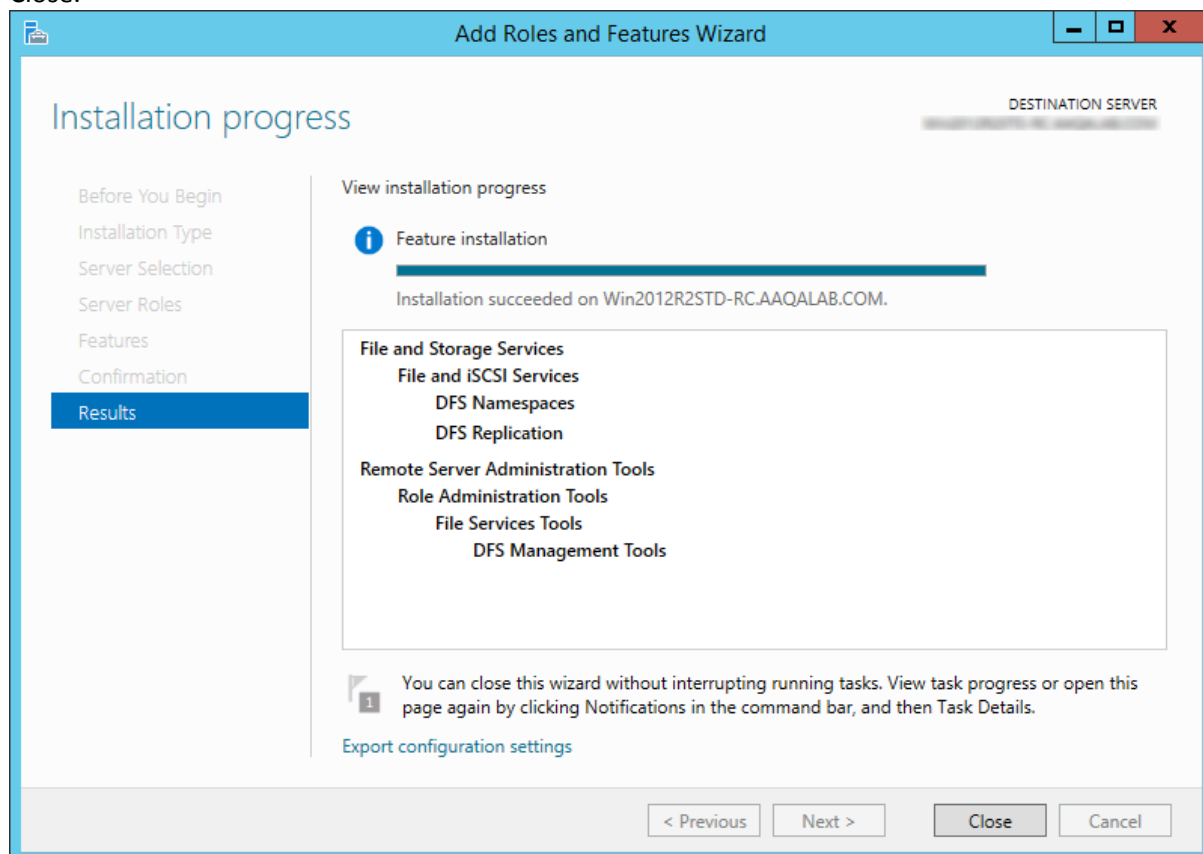
6. On the Select server roles page, Roles section, expand the File and Storage Services > File and iSCSI Services tree.
  - a. Select DFS Namespaces and DFS Replication checkboxes. Click Next.



7. On the Confirm Installation Selections page, click Install button. This initiates the installation of the selections.



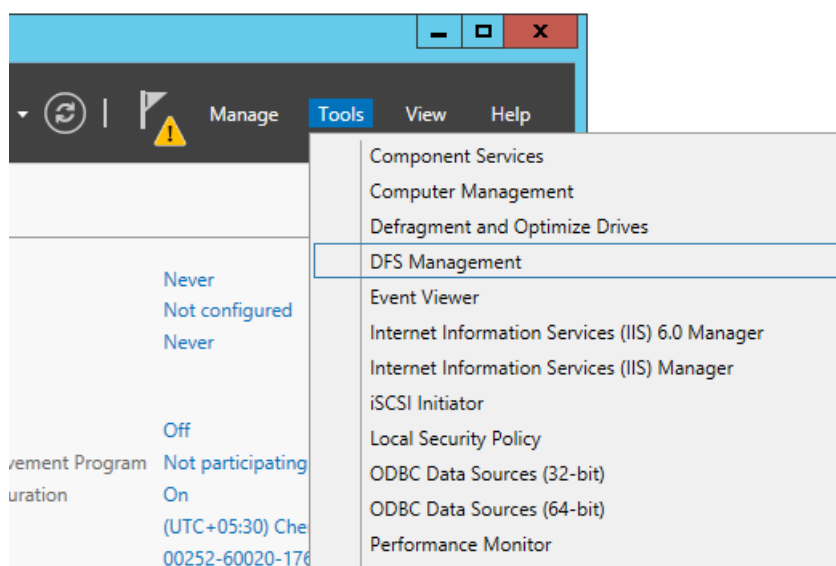
- On the Installation Progress page, wait for the installation to complete. When done, click Close.



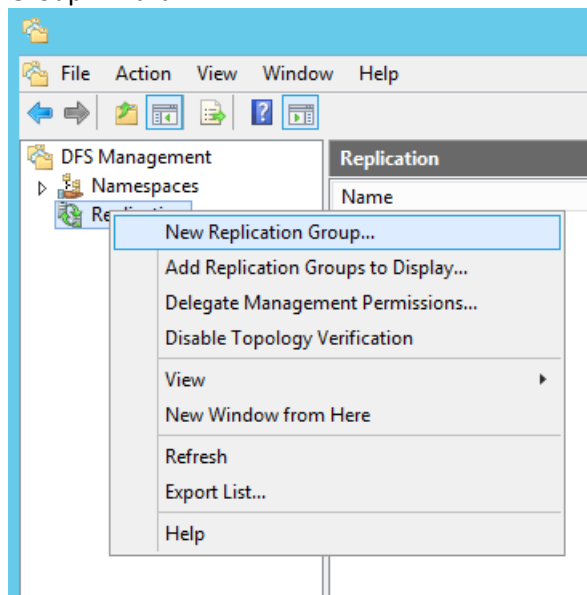
**Note:** This procedure is done on the Primary server and the Hot-standby server. This completes the installation of DFS Management.

## 15.2 DFS MANAGEMENT

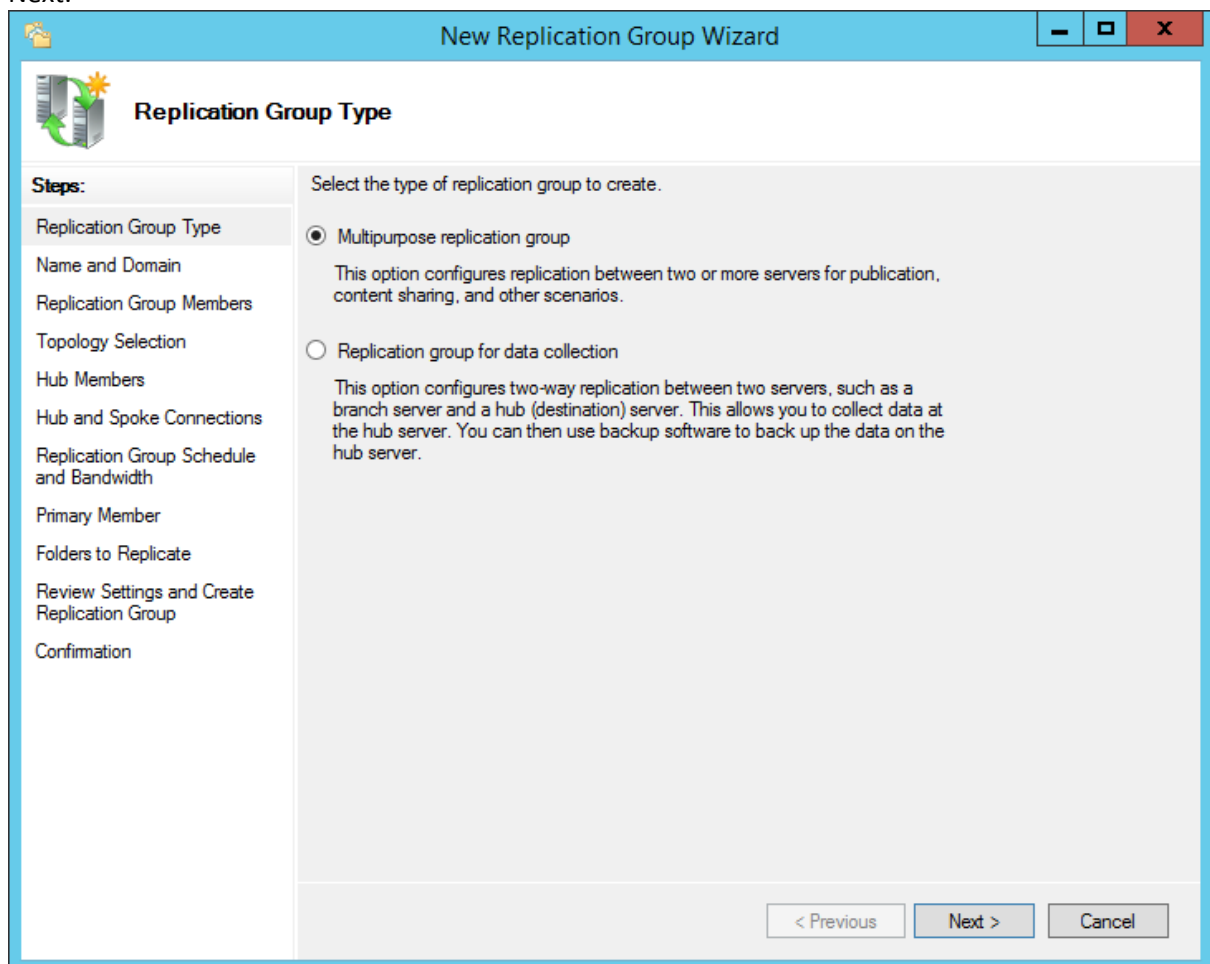
- On the Tools drop-down menu (right side), select DFS Management. This displays the New Replication Group Wizard.



2. Right-click on Replication and select New Replication Group. This displays the New Replication Group Wizard.



3. On the Replication Group Type page, select Multipurpose replication group radio button. Click Next.





4. On Name and Domain page:
  - a. Enter Name of replication group.
  - b. Enter Domain (or click Browse to locate).
  - c. Click Next.

The screenshot shows the 'New Replication Group Wizard' window, specifically the 'Name and Domain' step. The left sidebar lists the steps: Replication Group Type, Name and Domain (selected), Replication Group Members, Topology Selection, Hub Members, Hub and Spoke Connections, Replication Group Schedule and Bandwidth, Primary Member, Folders to Replicate, Review Settings and Create Replication Group, and Confirmation. The main area contains the following fields and instructions:

- Steps:** Replication Group Type, Name and Domain, Replication Group Members, Topology Selection, Hub Members, Hub and Spoke Connections, Replication Group Schedule and Bandwidth, Primary Member, Folders to Replicate, Review Settings and Create Replication Group, Confirmation.
- Instructions:** Type a name and domain for the replication group. The name of the replication group must be unique in the domain that hosts the replication group.
- Name of replication group:** A text box containing 'AARepositoryReplication'.
- Optional description of replication group:** A text box with a vertical scrollbar.
- Domain:** A text box containing '...COM' and a 'Browse...' button.
- Navigation buttons:** '< Previous', 'Next >', and 'Cancel'.

5. On Replication Group Members page, use Add to include replication member nodes. When done, click Next.

The screenshot shows the 'New Replication Group Wizard' window, specifically the 'Replication Group Members' step. The left sidebar lists the steps: Replication Group Type, Name and Domain, Replication Group Members (selected), Topology Selection, Hub Members, Hub and Spoke Connections, Replication Group Schedule and Bandwidth, Primary Member, Folders to Replicate, Review Settings and Create Replication Group, and Confirmation. The main area contains the following fields and instructions:

- Steps:** Replication Group Type, Name and Domain, Replication Group Members (selected), Topology Selection, Hub Members, Hub and Spoke Connections, Replication Group Schedule and Bandwidth, Primary Member, Folders to Replicate, Review Settings and Create Replication Group, Confirmation.
- Instructions:** Click Add and then select two or more servers that will become members of the replication group.
- Members:** A table with two columns: 'Server' and 'Domain'.
- Table Data:**

Server	Domain
ACTIVENODE	...COM
PASSIVENODE	...COM
- Buttons:** 'Add...' and 'Remove' buttons below the table.
- Navigation buttons:** '< Previous', 'Next >', and 'Cancel'.

6. On Topology Selection page, select the appropriate topology. Click Next.

The screenshot shows the 'New Replication Group Wizard' window, specifically the 'Topology Selection' step. The left sidebar lists the steps: Replication Group Type, Name and Domain, Replication Group Members, Topology Selection (highlighted), Replication Group Schedule and Bandwidth, Primary Member, Folders to Replicate, Review Settings and Create Replication Group, and Confirmation. The main area has the title 'Topology Selection' and a sub-header 'Select a topology of connections among members of the replication group.' There are three radio button options: 'Hub and spoke' (with a diagram of a central node connected to three peripheral nodes), 'Full mesh' (selected, with a diagram of four nodes all connected to each other), and 'No topology' (with a diagram of four isolated nodes). Each option has a descriptive paragraph. At the bottom right are buttons for '< Previous', 'Next >', and 'Cancel'.

7. On Replication Group Schedule and Bandwidth page:
- Select Replicate continuously using the specified bandwidth radio button.
  - On Bandwidth drop-down, select Full.
  - Click Next.

The screenshot shows the 'New Replication Group Wizard' window, specifically the 'Replication Group Schedule and Bandwidth' step. The left sidebar lists the steps: Replication Group Type, Name and Domain, Replication Group Members, Topology Selection, Replication Group Schedule and Bandwidth (highlighted), Primary Member, Folders to Replicate, Review Settings and Create Replication Group, and Confirmation. The main area has the title 'Replication Group Schedule and Bandwidth' and a sub-header 'Select the replication schedule and bandwidth to be used by default for all new connections in the replication group.' There are two radio button options: 'Replicate continuously using the specified bandwidth' (selected) and 'Replicate during the specified days and times'. The first option has a description and a 'Bandwidth:' label with a dropdown menu showing 'Full'. The second option has a description and an 'Edit Schedule...' button. At the bottom right are buttons for '< Previous', 'Next >', and 'Cancel'.

8. On Primary Member page, on Primary member drop-down, select item. Click Next.

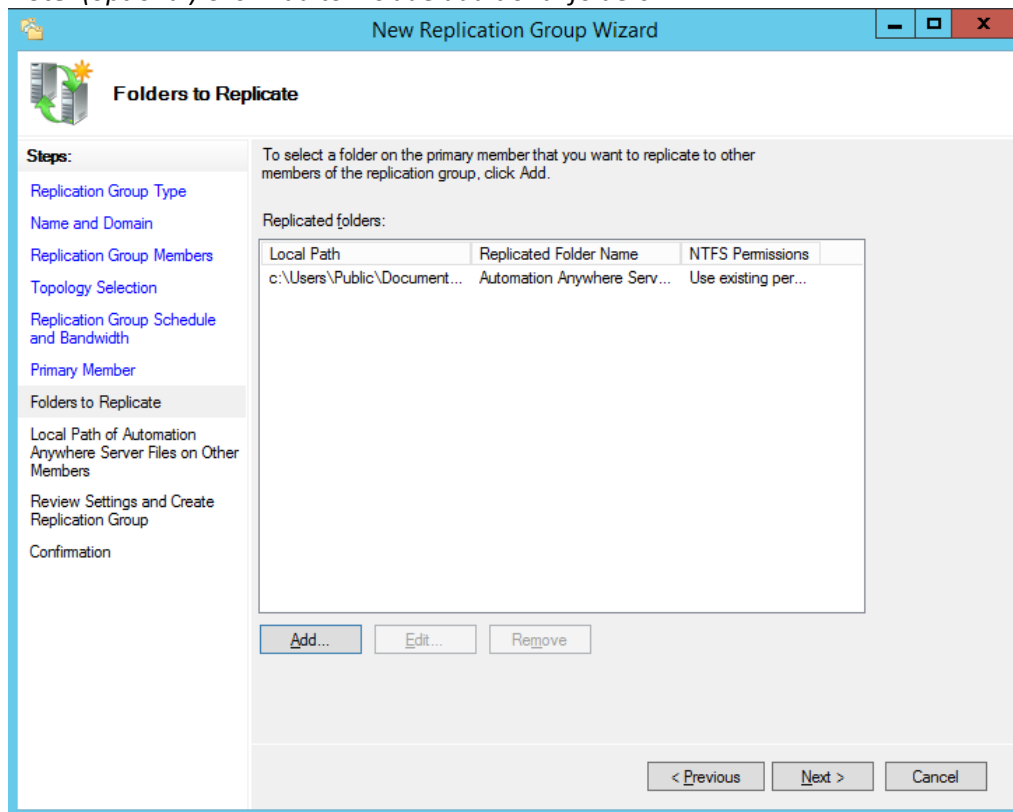
The screenshot shows the 'New Replication Group Wizard' dialog box, specifically the 'Primary Member' step. The title bar reads 'New Replication Group Wizard'. On the left, a 'Steps' pane lists: 'Replication Group Type', 'Name and Domain', 'Replication Group Members', 'Topology Selection', 'Replication Group Schedule and Bandwidth', 'Primary Member' (highlighted), 'Folders to Replicate', 'Review Settings and Create Replication Group', and 'Confirmation'. The main area has the heading 'Primary Member' with a server icon. It contains the instruction: 'Select the server that contains the content you want to replicate to other members. This server is known as the primary member.' Below this is a 'Primary member:' label and a dropdown menu showing 'ACTIVENODE'. An information icon and text state: 'If the folders to be replicated already exist on multiple servers, the folders and files on the primary member will be authoritative during initial replication.' At the bottom right are buttons for '< Previous', 'Next >', and 'Cancel'.

9. On the Add Folder to Replicate dialog:
- Enter Local path of folder to replicate (or click Browse and locate folder).
  - Accept Use name based on path default.
  - Click OK.

The screenshot shows the 'Add Folder to Replicate' dialog box. The title bar reads 'Add Folder to Replicate'. It has a 'Member:' label and a text box containing 'ACTIVENODE'. Below is a 'Local path of folder to replicate:' label, a text box with 'C:\Users\Public\Documents\Automation Anywhere', and a 'Browse...' button. An example path 'Example: C:\Documents' is shown. The next section says: 'Select or type a name to represent this folder on all members of the replication group. This name is known as the replicated folder name.' There are two radio buttons: 'Use name based on path:' (selected) and 'Use custom name:'. The selected option has a text box containing 'Automation Anywhere Server Files'. The unselected option has an empty text box. An example 'Example: Documents' is shown. At the bottom are buttons for 'Permissions >>', 'OK', and 'Cancel'.

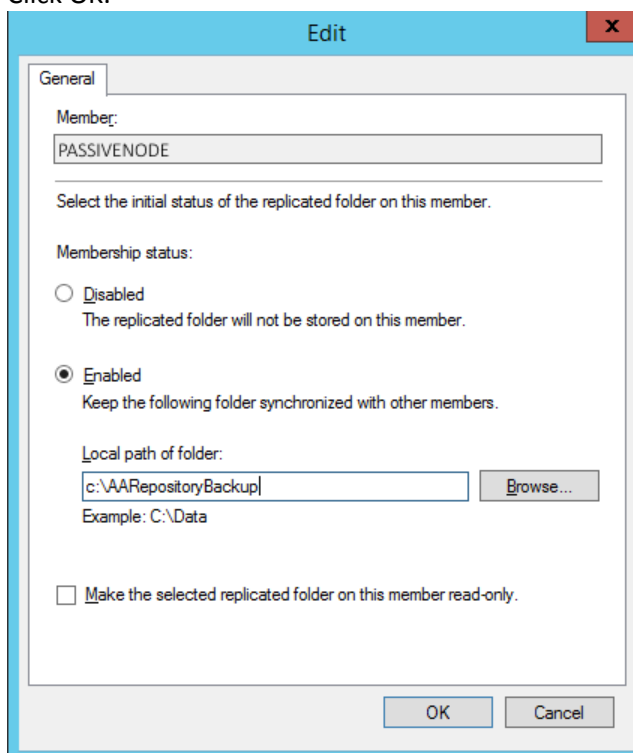
10. On the Folders to Replicate page, review the list. Click Next.

**Note:** (optional) Click Add to include additional folders.



11. On the Edit dialog:

- Accept Enabled default.
- Enter Local path of folder (or click Browse and locate folder).
- Click OK.



12. On Local Path of Automation Anywhere Server Files on Other Machines page, review path. Click Next.

**New Replication Group Wizard**

**Local Path of Automation Anywhere Server Files on Other Members**

**Steps:**

- Replication Group Type
- Name and Domain
- Replication Group Members
- Topology Selection
- Replication Group Schedule and Bandwidth
- Primary Member
- Folders to Replicate
- Local Path of Automation Anywhere Server Files on Other Members**
- Review Settings and Create Replication Group
- Confirmation

To specify the local path of the replicated folder or whether the folder is read-only, select the appropriate member and then click Edit

Primary member: WIN2012R2STDHR  
Primary member local path: c:\Users\Public\Documents\Automation .

Member details:

Member	Local Path	Membership Stat...
PASSIVENODE	C:\AARepositoryBac...	Enabled

Edit...

< Previous   Next >   Cancel

13. On Review Settings and Create Replication Group page, confirm the configuration details are accurate. Click Create.

**New Replication Group Wizard**

**Review Settings and Create Replication Group**

**Steps:**

- Replication Group Type
- Name and Domain
- Replication Group Members
- Topology Selection
- Replication Group Schedule and Bandwidth
- Primary Member
- Folders to Replicate
- Local Path of Automation Anywhere Server Files on Other Members
- Review Settings and Create Replication Group**
- Confirmation

You selected the following settings for the new replication group. If the settings are correct, click Create to create the new replication group. To change a setting, click Previous, or select the appropriate page in the orientation pane.

Replication group settings:

Replication Group Name: AAREpositoryReplication

Replication Group Description:

Domain of Replication Group: .COM

Replication Group Members (2):  
ACTIVENODE  
PASSIVENODE

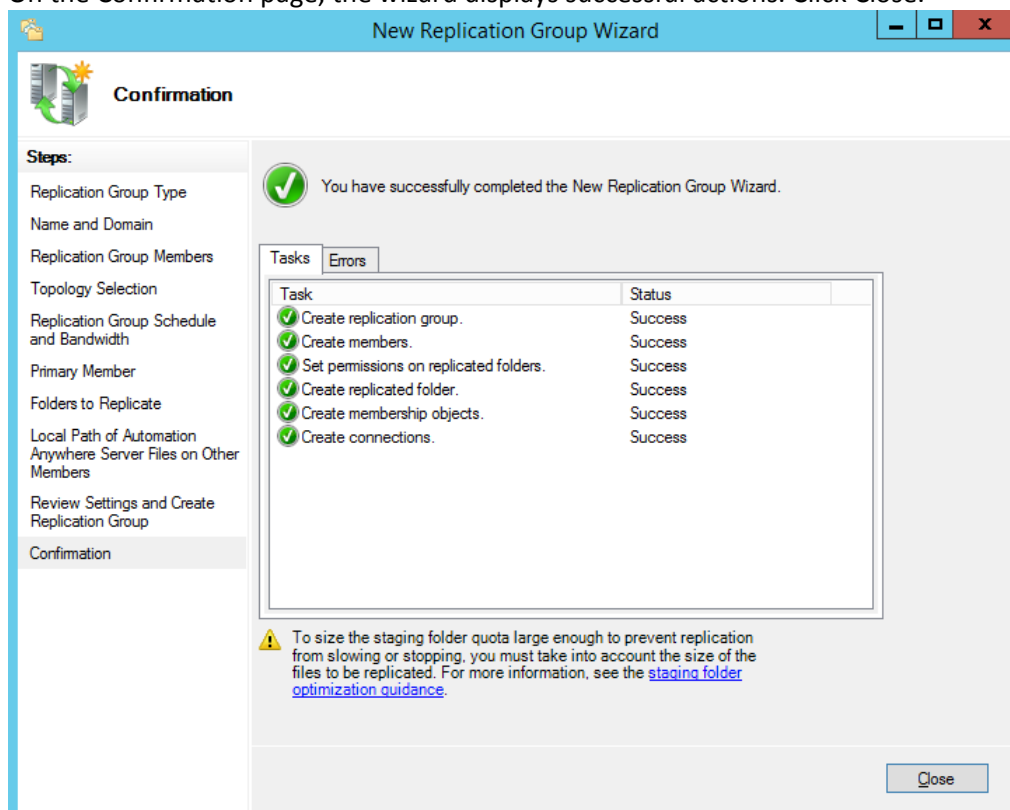
Topology type:  
Full mesh

List of connections (2):  
PASSIVENODE -> ACTIVENODE  
ACTIVENODE -> PASSIVENODE

Default Connection Schedule:  
Replicate continuously with Full bandwidth

< Previous   Create   Cancel

14. On the Confirmation page, the wizard displays successful actions. Click Close.



15. On the DFS Management window, Memberships tab, the created group is available.

