

**Test Lab Guide: Demonstrate DHCP Failover in Windows Server "8" Beta**

Microsoft Corporation

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**Abstract**

This paper contains an introduction to Windows Server "8" Beta DHCP Failover, and step-by-step instructions for extending the Windows Server "8" Beta Base Configuration test lab to demonstrate DHCP Failover setup.

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# Introduction

Dynamic Host Configuration Protocol (DHCP) failover in Windows Server "8" Beta provides the ability for administrators to deploy a highly resilient DHCP service to support a large enterprise. The main goals of the feature are the following.

* Provide DHCP service availability at all times on the enterprise network
* If a DHCP server is no longer reachable, the DHCP client is able to extend the lease on its current IP address by contacting another DHCP server on the enterprise network

The DHCP server failover feature provides the ability to have two DHCP servers serve IP addresses and option configuration to the same subnet or scope, providing for continuous availability of DHCP service to clients. The two DHCP servers replicate lease information between them, allowing one server to assume responsibility for servicing of clients for the entire subnet when the other server is unavailable. It is also possible to configure failover in a load-balancing configuration with client requests distributed between the two servers in a failover relationship.

DHCP failover in Windows Server "8" Beta provides support for a maximum of two DHCP servers, and the failover relationship is limited to IPv4 scopes and subnets. Network nodes using Internet Protocol version 6 (IPv6) typically determine their own IPv6 address using stateless IP auto configuration. In this mode, the DHCP server delivers only the DHCP option configuration, and the server does not maintain any lease state information. A high availability deployment for stateless DHCPv6 is possible by simply setting up two servers with identical option configuration. Even in a stateful DHCPv6 deployment, the scopes do not run under high address utilization, which makes split scope a viable solution for high availability.

## In this guide

This guide provides step-by-step instructions for setting up a test lab based on the Windows Server "8" Beta Base Configuration and deploying DHCP failover using two server computers and one client computer. The resulting DHCP test lab demonstrates failover functionality.

Important

The following instructions are for configuring a DHCP failover test lab using the minimum number of computers. Individual computers are needed to separate the services provided on the network and to clearly show the desired functionality. This configuration is neither designed to reflect best practices nor does it reflect a desired or recommended configuration for a production network. The configuration, including IP addresses and all other configuration parameters, is designed only to work on a separate test lab network.

Attempting to adapt this DHCP test lab configuration to a pilot or production deployment can result in configuration or functionality issues.

## Test lab overview

In this test lab, DHCP failover is deployed with:

* One computer running Windows Server "8" Beta named DC1 that is configured as an intranet domain controller, Domain Name System (DNS) server, and Dynamic Host Configuration Protocol (DHCP) server.
* One intranet member server running Windows Server "8" Beta named APP1 that is configured as a general application server and Dynamic Host Configuration Protocol (DHCP) server.
* One member client computer running Windows 8 Consumer Preview named CLIENT1 that is configured as a DHCP client.

The DHCP test lab consists of one subnet that simulates an intranet named Corpnet (10.0.0.0/24).

Computers connect using a hub or switch. See the following figure.



Figure DHCP Test Lab Configuration

The test lab instructions demonstrate the configuration of DHCP failover using the Configure Failover wizard. Steps to view and modify the failover configuration are presented, and failover operation is verified using a test DHCP client.

## Hardware and software requirements

The following are required components of the test lab:

* The product disc or files for Windows Server "8" Beta.
* The product disc or files for Windows 8 Consumer Preview.
* Computers that meet the minimum hardware requirements for Windows Server "8" Beta.

# Steps for Configuring the DHCP Failover Test Lab

There are four steps to follow when setting up a DHCP failover test lab based on the Test Lab Guide Base Configuration.

1. Set up the Base Configuration test lab.

The DHCP failover test lab requires the [Test Lab Guide: Windows Server "8" Beta Base Configuration](http://go.microsoft.com/fwlink/p/?LinkId=236358) Corpnet subnet as its starting point.

2. Configure APP1.

APP1 is already a member server computer that is configured with IIS and also acts as a file server. For the DHCP failover test lab, APP1 must be configured as a DHCP server.

3. Configure DC1.

DC1 is already configured as a domain controller, DNS and DHCP server for the Corpnet subnet. For the DHCP failover test lab, DC1 must be configured in a failover relationship with APP1.

4. Demonstrate DHCP failover using CLIENT1.

CLIENT1 is a client computer running Windows 8 Consumer Preview. For the DHCP failover test lab, CLIENT1 will be used to test and demonstrate failover operation.

This guide provides steps for configuring the computers of the Base Configuration test lab, configuring DHCP server failover, and demonstrating DHCP client operation. The following sections provide details about how to perform these tasks.

## Step 1: Set up the Base Configuration Test Lab

Set up the Base Configuration test lab for the Corpnet subnet using the procedures in the “Steps for Configuring the Corpnet Subnet” section of the [Test Lab Guide: Windows Server "8" Beta Base Configuration](http://go.microsoft.com/fwlink/p/?LinkId=236358). Connect **DC1**, **APP1**, and **CLIENT1** to the Corpnet subnet.

## Step 2: Configure APP1

APP1 configuration for the DHCP failover test lab consists of the following procedure:

 Install the DHCP Server role

The following section explains this procedure in detail.

### Install the DHCP Server role on APP1

Configure APP1 as a second DHCP server in the Corpnet subnet. Install the DHCP server role, but do not create a scope. The scope settings will be deployed as part of failover configuration in Step 3.

To install the DHCP Server role on APP1

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| 1. In the **Dashboard** console of Server Manager, under **Configure this local server**, click **Add roles and features**.
2. Click **Next** three times to get to the server role selection screen.
3. In the **Select server roles** dialog, select **DHCP Server**, click **Add Features** when prompted, and then click **Next**.
4. In the **Select features** dialog, click **Next**.
5. Click **Next** on the DHCP Server screen, and then click **Install**.
6. Allow the installation to complete, and then in the Results window, click the link for **Complete DHCP configuration**.
7. In the DHCP Post-Install configuration wizard, click **Next**, and then click **Commit**.
8. On the Summary page, click **Close**.
9. In the Add Roles and Features Wizard, click **Close**.
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| Description: Description: Description: http://upload.wikimedia.org/wikipedia/en/7/7f/Windows_PowerShell_icon.png **Windows PowerShell equivalent commands**  |
| The following Windows PowerShell cmdlet or cmdlets perform the same function as the preceding procedure. Enter each cmdlet on a single line, even though they may appear word-wrapped across several lines here because of formatting constraints. **Install-WindowsFeature DHCP -IncludeManagementTools** |

## Step 3: Configure DC1

DC1 is already configured as a domain controller, DNS and DHCP server for the Corpnet subnet. For the DHCP failover test lab, DC1 must be configured in a failover relationship with APP1. DC1 configuration for the DHCP failover test lab consists of the following procedures:

* Change the DHCP lease time for the Corpnet scope
* Configure DC1 in a failover partnership with APP1
* View and modify the failover configuration

The following sections explain these procedures in detail.

### Modify the lease time for the Corpnet DHCP scope

DC1 is already a DHCP server for the Corpnet subnet with a scope defined for 10.0.0.0/24. In this step you will modify the scope lease duration to two minutes. This very short lease duration will simplify the DHCP failover demonstration.

To modify the scope lease duration on DC1

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| 1. From the Start screen, click **DHCP**.
2. In the DHCP console tree, expand **dc1.corp.contoso.com**, expand **IPv4**, and select **Scope [10.0.0.0] Corpnet**.
3. Right-click **Scope [10.0.0.0] Corpnet**, and click **Properties**.
4. Change **Lease duration for DHCP clients** to **0 Days, 0 Hours, and 2 Minutes**. Click **OK**.
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| Description: Description: Description: http://upload.wikimedia.org/wikipedia/en/7/7f/Windows_PowerShell_icon.png **Windows PowerShell equivalent commands** |
| The following Windows PowerShell cmdlet or cmdlets perform the same function as the preceding procedure. Enter each cmdlet on a single line, even though they may appear word-wrapped across several lines here because of formatting constraints. **Set-DhcpServerv4Scope -ScopeId 10.0.0.0 -LeaseDuration 00:02:00** |

### Configure DC1 in a failover partnership with APP1

Next, configure a failover relationship between DC1 and APP1 using the Configure Failover wizard.

To configure a failover relationship with APP1

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| 1. In the DHCP console tree, right-click **Scope [10.0.0.0] Corpnet**, and click **Configure Failover**.
2. In the Configure Failover wizard, click **Next**.
3. In **Partner Server**, type **app1.corp.contoso.com**, and then click **Next**.
4. Next to **Relationship Name**, type **DC1-APP1**.
5. Next to **Maximum Client Lead Time**, enter **0 hours** and **1 minutes**. This very short MCLT will simplify the DHCP failover demonstration.
6. By default, the **Load Balance** mode is selected with equal load balancing percentages. You can choose to modify these values if desired.
7. Type a shared secret for this failover relationship next to **Shared Secret**.
8. Click **Next**, and then click **Finish**.
9. Verify that the failover relationship is successfully configured, and then click **Close** in the progress dialog.
10. On APP1, open the DHCP console and view the available scopes under **IPv4**. Confirm that the scope from DC1 is duplicated on APP1.
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| Description: Description: Description: http://upload.wikimedia.org/wikipedia/en/7/7f/Windows_PowerShell_icon.png **Windows PowerShell equivalent commands** |
| The following Windows PowerShell cmdlet or cmdlets perform the same function as the preceding procedure. Enter each cmdlet on a single line, even though they may appear word-wrapped across several lines here because of formatting constraints. **Add-DhcpServerv4Failover -PartnerServer app1.corp.contoso.com -Name DC1-APP1 -ScopeId 10.0.0.0 -MaxClientLeadTime 00:01:00 -SharedSecret secret -Force** |

### View and modify the failover configuration

After a failover relationship has been configured, status can be viewed by accessing the **Failover** tab of the **scope Properties** dialog. Settings can be viewed and modified by accessing the **Failover** tab of the **IPv4 Properties** dialog.

To view and modify failover configuration

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| 1. On DC1 or APP1, from the DHCP management console, right-click **Scope [10.0.0.0] Corpnet**. Note that a new menu item is now available called **Deconfigure Failover**. This menu item indicates that failover is configured for this scope.
2. Right-click **Scope [10.0.0.0] Corpnet**, click **Properties**, and then click the **Failover** tab. Note that **State of this Server** and **State of Partner Server** are both **Normal**. Click **OK**.
3. Right-click **IPv4**, click **Properties**, and then click the **Failover** tab. You can select any of the failover relationships listed and click **Edit** or **Delete**.
4. Click **Edit** to view or modify the failover relationship you just created.
5. Click **OK** to close the **View/Edit Failover Relationship** dialog box, and then click **OK** to close **IPv4 Properties**.
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| Description: Description: Description: http://upload.wikimedia.org/wikipedia/en/7/7f/Windows_PowerShell_icon.png **Windows PowerShell equivalent commands** |
| The following Windows PowerShell cmdlet or cmdlets perform the same function as the preceding procedure. Enter each cmdlet on a single line, even though they may appear word-wrapped across several lines here because of formatting constraints. **Get-DhcpServerv4Failover -ScopeId 10.0.0.0** **Get-DhcpServerv4Failover -Name DC1-APP1** |

## Step 4: Demonstrate DHCP failover using CLIENT1

Use the following procedures to demonstrate DHCP failover operation:

* Determine which server has provided a lease to CLIENT1
* Stop the DHCP service on one DHCP server
* Verify that CLIENT1 has automatically obtained a new lease from the second server

The following sections explain these procedures in detail.

**Determine which server has provided a lease to CLIENT1**

Since DC1 and APP1 are configured to load balance DHCP requests, the CLIENT1 DHCP client may have received a lease from either server. First determine which server provided the lease, and then we will take that server offline.

To determine which server provided the lease to CLIENT1

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| 1. In the DHCP management console on **DC1**, expand **dc1.corp.contoso.com**, expand **IPv4**, expand **Scope [10.0.0.0] Corpnet**, and select **Address Leases**. Note the lease information for CLIENT1.
2. In the DHCP management console on **APP1**, expand **dc1.corp.contoso.com**, expand **IPv4**, expand **Scope [10.0.0.0] Corpnet**, and select **Address Leases**. Note that the same lease information is displayed for CLIENT1.
3. On **CLIENT1**, from the Start screen, type **command**, and then click **Command Prompt**.
4. From the command prompt, type **ipconfig /all** and hit **ENTER**.
5. In the ipconfig output, find the IP address listed next to **DHCP Server**. If 10.0.0.1 is listed, DC1 provided the address lease. If 10.0.0.3 is listed, APP1 provided the lease.
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### Stop the DHCP server service on one DHCP server

Next, stop the DHCP server service on the DHCP server you identified in the previous step. This will cause CLIENT1 to obtain a lease from the second server in the failover relationship.

To stop the DHCP server service and take one server offline

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| 1. On the DHCP server you identified above, launch the DHCP management console.
2. In DHCP console, right-click the server name , point to **All Tasks**, and then click **Stop**.
3. Confirm that the DHCP service is unavailable. The console will display the error message "**Cannot find the DHCP Server**".
4. Switch to the partner DHCP server and launch DHCP console.
5. Right-click **Scope [10.0.0.0] Corpnet**, click **Properties**, and then click the **Failover** tab. Note that **State of this Server** is now "**Lost contact with partner**", and **State of Partner Server** is "**Not Available**". Click **OK**.
 |

### Verify failover operation

CLIENT1 will obtain a new lease from the remaining DHCP server in the failover relationship.

To verify failover operation

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| 1. On **CLIENT1**, from the command prompt window, type **ipconfig /renew** and hit **ENTER**.
2. Type **ipconfig /all** and hit **ENTER**. Examine the address listed next to **DHCP Server**.

Note that CLIENT1 has now obtained a lease from the remaining DHCP server in the failover relationship.  |

# Snapshot the Configuration

This completes the DHCP failover test lab. To save this configuration so that you can quickly return to a working DHCP failover configuration from which you can test other DHCP modular test lab guides (TLGs), TLG extensions, or for your own experimentation and learning, do the following:

1. On all physical computers or virtual machines in the test lab, close all windows and then perform a graceful shutdown.
2. If your lab is based on virtual machines, save a snapshot of each virtual machine and name the snapshots **DHCP Failover TLG**. If your lab uses physical computers, create disk images to save the DHCP failover test lab configuration.

# Additional Resources

For more information about DHCP see the [Dynamic Host Configuration Protocol TechNet portal](http://technet.microsoft.com/en-us/network/bb643151.aspx).

For a list of all of the Windows Server “8” Beta TLGs, see [Windows Server “8” Beta Test Lab Guides](http://go.microsoft.com/fwlink/?LinkID=243062) in the TechNet Wiki.

For a list of additional Microsoft TLGs, see [Test Lab Guides](http://go.microsoft.com/fwlink/?LinkID=202817) in the TechNet Wiki.

To provide the authors of this guide with feedback or suggestions for improvement, send an email message to [tlgfb@microsoft.com](file:///C%3A%5CUsers%5Cjosephd%5CDocuments%5CSharePoint%20Drafts%5Ctlgfb%40microsoft.com).