



# DHCP Relay Server ID Override and Link Selection Option 82 Suboptions

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The DHCP Relay Server ID Override and Link Selection Option 82 Suboptions feature enables the relay agent to be part of all DHCP message exchanges by supporting the use of two suboptions of the relay agent information option (option 82). This design allows DHCPv4 to operate in networks where direct communication between the client and server is not possible or desired. When used together, these two suboptions enable the deployment of an architecture where it is desirable to have all DHCP traffic flow through the relay agent, allowing for greater control of DHCP communications.

This feature also introduces the capability to manually configure the interface for the relay agent to use as the source IP address for messages relayed to the DHCP server. This configuration allows the network administrator to specify a stable, hardware-independent IP address (such as a loopback interface).

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the Feature Information Table at the end of this document.



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**Americas Headquarters:**  
Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134-1706 USA

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## Restrictions for DHCP Relay Server ID Override and Link Selection Option 82 Suboptions

If this feature and the DHCP Relay MPLS VPN Support feature are both configured, DHCP Relay MPLS VPN Support takes precedence.

## Information About DHCP Relay Server ID Override and Link Selection Option 82 Suboptions

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### Server ID Override Suboption

The server identifier (ID) override suboption allows the DHCP relay agent to specify a new value for the server ID option, which is inserted by the DHCP server in the reply packet. This suboption allows the DHCP relay agent to act as the actual DHCP server such that the renew requests will come to the relay agent rather than the DHCP server directly. The server ID override suboption contains the incoming interface IP address, which is the IP address on the relay agent that is accessible from the client. Using this information, the DHCP client sends all renew and release request packets to the relay agent. The relay agent adds all of the appropriate suboptions and then forwards the renew and release request packets to the original DHCP server.

### Link Selection Suboption

The link selection suboption provides a mechanism to separate the subnet/link on which the DHCP client resides from the gateway address (giaddr), which can be used to communicate with the relay agent by the DHCP server. The relay agent will set the suboption to the correct subscriber subnet and the DHCP server will use that value to assign an IP address rather than the giaddr value. The relay agent will set the giaddr to its own IP address so that DHCP messages are routable over the network.

## DHCP Relay Server ID Override and Link Selection Option 82 Suboptions Feature Design

The current DHCP IPv4 deployment model assumes a single routing domain between the DHCP client and DHCP server. In some network designs, the DHCP server can not directly communicate with DHCP clients. Customers may choose this design to make critical infrastructure servers inaccessible and to protect the DHCP server from client attacks.

Relay agents are used to forward requests and replies between clients and servers when they are not on the same physical subnet. In all cases, the DHCP relay agent must be able to communicate directly with both

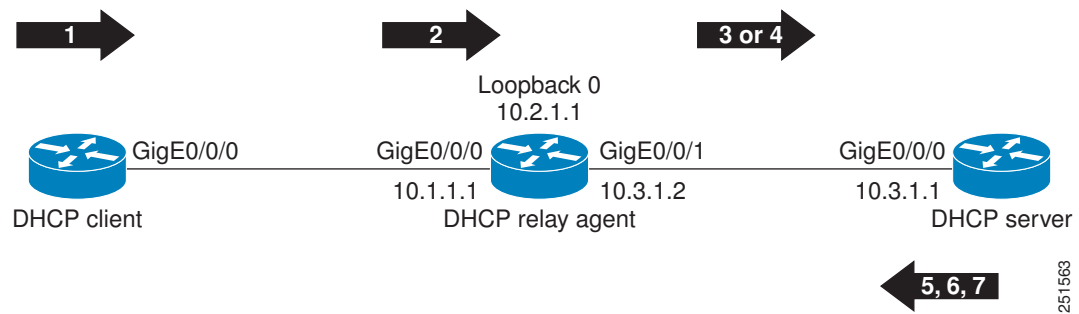
the DHCP server and DHCP client. By using the relay agent information option (option 82), the DHCP relay agent can include additional information about itself when forwarding client-originated DHCP packets to a DHCP server.

The DHCP Relay Server ID Override and Link Selection Option 82 Suboptions feature enables the relay agent to be part of all DHCP message exchanges by supporting the use of two suboptions of option 82: server ID override and link selection suboptions. This design results in all DHCP messages flowing through the relay agent, allowing for greater control of DHCP communications.

Communication from the DHCP server through the relay agent can also be an issue. If the server needs to reach the client, it must do so through the relay agent. The IP address of the relay agent might not be ideal. For example, if the network is renumbered or if the interface at the relay agent is down for some reason, the server may not be able to reach the client. This feature introduces the capability to manually configure the interface for the relay agent to use as the source IP address for messages relayed to the DHCP server. This configuration allows the network administrator to specify a stable, hardware-independent IP address (such as a loopback interface).

The figure below shows the processing that occurs on the DHCP relay agent and DHCP server when this feature is configured.

**Figure 1** DHCP Relay Agent and DHCP Server Processing of Option 82 Suboptions



- 1 The DHCP client generates a DHCP request and broadcasts it on the network.
- 2 The DHCP relay agent intercepts the broadcast DHCP request packet and inserts a server ID override suboption and link selection suboption to its relay agent information option in the DHCP packet. The server ID override and link selection suboptions contain the incoming interface IP address, which is the IP address on the relay agent that is accessible from the client (10.1.1.1 in this case).
- 3 The relay agent sets the giaddr to the IP address of an interface that is reachable by the DHCP server (typically the server-facing interface that will be used to transmit the message, 10.3.1.2 in this case).
- 4 If the source interface is explicitly configured on a loopback interface (**ip dhcp-relay source-interface** command), the relay agent will use that address as the source IP address (*giaddr*) for messages relayed to the DHCP server (10.2.1.1 in this case).

The following processing occurs on the DHCP server after receiving the forwarded packets from the relay agent:

- 1 The DHCP server uses the link selection suboption to locate the correct address pools for the DHCP client.
- 2 The DHCP server sets the server ID option to the value specified by the server ID override suboption of the DHCP packet.
- 3 The DHCP server sends the reply message to the IP address specified in the giaddr.

The DHCP client will see the relay agent address as the server ID and use that address when unicasting RENEW messages.

# How to Configure Support for the DHCP Relay Server ID Override and Link Selection Suboptions

- [Configuring the DHCP Relay Agent to Insert the DHCP Server ID Override and Link Selection Suboptions into Option 82, page 4](#)

## Configuring the DHCP Relay Agent to Insert the DHCP Server ID Override and Link Selection Suboptions into Option 82

To configure this feature, perform the steps below:



### Note

If this feature and the DHCP Relay MPLS VPN Support feature are both configured, the DHCP Relay MPLS VPN Support feature takes precedence.

### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `ip dhcp-relay information option server-override`
4. `ip dhcp-relay source-interface type number`
5. `interface type number`
6. `ip dhcp relay information option server-id-override`
7. `ip dhcp relay source-interface type number`

### DETAILED STEPS

	Command or Action	Purpose
Step 1	<p><code>enable</code></p> <p><b>Example:</b></p> <pre>Router&gt; enable</pre>	<p>Enables privileged EXEC mode.</p> <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<p><code>configure terminal</code></p> <p><b>Example:</b></p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>

Command or Action	Purpose
<p><b>Step 3</b> <code>ip dhcp-relay information option server-override</code></p> <p><b>Example:</b></p> <pre>Router(config)# ip dhcp-relay information option server-override</pre>	<p>Enables the system to globally insert the server ID override and link selection suboptions into the DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.</p> <ul style="list-style-type: none"> <li>If the <code>ip dhcp relay information option server-id-override</code> interface configuration command is configured on an interface, it overrides the global configuration on that interface only.</li> </ul>
<p><b>Step 4</b> <code>ip dhcp-relay source-interface type number</code></p> <p><b>Example:</b></p> <pre>Router(config)# ip dhcp-relay source- interface loopback 0</pre>	<p>(Optional) Globally configures the source interface for the relay agent to use as the source IP address for relayed messages.</p> <ul style="list-style-type: none"> <li>This command allows the network administrator to specify a stable, hardware-independent IP address (such as a loopback interface).</li> <li>If the <code>ip dhcp relay source-interface</code> interface configuration command is configured on an interface, it overrides the global configuration on that interface only.</li> </ul>
<p><b>Step 5</b> <code>interface type number</code></p> <p><b>Example:</b></p> <pre>Router(config)# interface GigabitEthernet0/0/0</pre>	<p>(Optional) Configures an interface and enters interface configuration mode.</p>
<p><b>Step 6</b> <code>ip dhcp relay information option server-id-override</code></p> <p><b>Example:</b></p> <pre>Router(config-if)# ip dhcp relay information option server-id-override</pre>	<p>(Optional) Enables the system to insert the server ID override and link selection suboptions on a specific interface into the DHCP relay agent information option in forwarded BOOTREQUEST messages to a DHCP server.</p>
<p><b>Step 7</b> <code>ip dhcp relay source-interface type number</code></p> <p><b>Example:</b></p> <pre>Router(config-if)# ip dhcp relay source- interface loopback 2</pre>	<p>(Optional) Configures the source interface for the relay agent to use as the source IP address for relayed messages.</p>

## Configuration Examples for DHCP Relay Server ID Override and Link Selection Option 82 Suboptions

- [DHCP Relay Server ID Override and Link Selection Option 82 Suboptions Example, page 6](#)

## DHCP Relay Server ID Override and Link Selection Option 82 Suboptions Example

In the following example, the IP address of the loopback interface is used as the source IP address for relayed messages. The client initiates IP address negotiation from GigabitEthernet interface 0/0/0. The DHCP relay agent is configured globally to insert the server ID override suboption and link selection suboption into the relay agent information option of the DHCP packet. The relay agent uses the server ID override suboption to force the DHCP server to use that value as the server ID in the DHCP message. The DHCP server uses the link selection suboption to determine from which subnet to assign an IP address.

### DHCP Client

```
interface GigabitEthernet0/0/0
 ip address dhcp
```

### DHCP Relay Agent

```
ip dhcp-relay information option server-override
ip dhcp-relay source-interface loopback0
!
interface Loopback0
 ip address 10.2.1.1 255.255.255.0
!
interface GigabitEthernet0/0/0
 ip address 10.1.1.1 255.255.255.0
 ip helper-address 10.3.1.1
!
interface GigabitEthernet1/0/0
 ip address 10.3.1.2 255.255.255.0
```

### DHCP Server

```
ip dhcp excluded-address 10.3.0.1
ip dhcp pool pool1
 network 10.1.1.0 255.255.255.0
 lease 0 0 1
!
interface GigabitEthernet0/0/0
 ip address 10.3.1.1 255.255.255.0
```

## Additional References

The following sections provide references related to the DHCP Relay Server ID Override and Link Selection Option 82 Suboptions feature.

### Related Documents

Related Topic	Document Title
DHCP conceptual information	“DHCP Overview” module
DHCP server configuration tasks, examples, and conceptual information	“Configuring the Cisco IOS XE DHCP Server” module

Related Topic	Document Title
DHCP relay agent configuration tasks, examples, and conceptual information	“Configuring the Cisco IOS XE DHCP Relay Agent” module
DHCP commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	<i>Cisco IOS IP Addressing Services Command Reference</i>

### Standards

Standard	Title
No new or modified standards are supported by this feature, and support for existing standards has not been modified by this feature.	--

### MIBs

MIB	MIBs Link
No new MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco IOS XE software releases, and feature sets, use Cisco MIB Locator found at the following URL: <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

### RFCs

RFC	Title
RFC 3527	<a href="#">Link Selection Suboption</a>
RFC 5107	<a href="#">DHCP Server Identifier Override Suboption</a>

### Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p><a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a></p>

## Feature Information for DHCP Relay Server ID Override and Link Selection Option 82 Suboptions

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

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**Table 1** *Feature Information for DHCP Relay Server ID Override and Link Selection Option 82 Suboptions*

Feature Name	Releases	Feature Configuration Information
DHCP Relay Server ID Override and Link Selection Option 82 Suboptions	Cisco IOS XE Release 2.1	<p>This feature enables the relay agent to be part of all DHCP message exchanges by supporting the use of two suboptions of the relay agent information option (option 82). This design allows DHCPv4 to operate in networks where direct communication between the client and server is not possible or desired. When used together, these two suboptions enable the deployment of an architecture where it is desirable to have all DHCP traffic flow through the relay agent, allowing for greater control of DHCP communications.</p> <ul style="list-style-type: none"> <li>The following commands were introduced by this feature: <b>ip dhcp-relay information option server-override</b>, <b>ip dhcp relay information option server-id-override</b>, <b>ip dhcp-relay source-interface</b>, and <b>ip dhcp relay source-interface</b>.</li> </ul>

## Glossary

**client** --A host trying to configure its interface (obtain an IP address) using DHCP or BOOTP protocols.

**DHCP** --Dynamic Host Configuration Protocol.

**DHCP options and suboptions** --Configuration parameters and other control information are carried in tagged data items that are stored in the options field of the DHCP message. Options provide a method of appending additional information. Vendors that want to provide additional information to their client not designed into the protocol can use options.

**giaddr** --gateway address field of the DHCP packet. The giaddr provides the DHCP server with information about the IP address subnet in which the client resides. The giaddr also provides the DHCP server with an IP address where the DHCP response messages can be sent.

**relay agent** --A router that forwards DHCP and BOOTP messages between a server and a client on different subnets.

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