



## **IP Addressing: DNS Configuration Guide, Cisco IOS XE Release 2**

### **Americas Headquarters**

Cisco Systems, Inc.  
170 West Tasman Drive  
San Jose, CA 95134-1706  
USA  
<http://www.cisco.com>  
Tel: 408 526-4000  
800 553-NETS (6387)  
Fax: 408 527-0883

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# Configuring DNS

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The Domain Name System (DNS) is a distributed database in which you can map host names to IP addresses through the DNS protocol from a DNS server. Each unique IP address can have an associated host name. The Cisco IOS XE software maintains a cache of host name-to-address mappings for use by the **connect**, **telnet**, and **ping EXEC** commands, and related Telnet support operations. This cache speeds the process of converting names to addresses.

- [Finding Feature Information, page 1](#)
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## Finding Feature Information

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## Prerequisites for Configuring DNS

To use DNS, you must have a DNS name server on your network.

## Information About DNS

- [DNS Overview, page 1](#)

## DNS Overview

If your network devices require connectivity with devices in networks for which you do not control name assignment, you can assign device names that uniquely identify your devices within the entire internetwork.

The global naming scheme of the Internet, the DNS, accomplishes this task. This service is enabled by default. The following sections summarize DNS concepts and function:

### Host Names for Network Devices

Each unique IP address can have an associated host name. DNS uses a hierarchical scheme for establishing host names for network nodes. This allows local control of the segments of the network through a client-server scheme. The DNS system can locate a network device by translating the host name of the device into its associated IP address.

### Domains Names for Groups of Networks

IP defines a naming scheme that allows a device to be identified by its location in the IP. This is a hierarchical naming scheme that provides for *domains*. On the Internet, a domain is a portion of the naming hierarchy tree that refers to general groupings of networks based on organization type or geography. Domain names are pieced together with periods (.) as the delimiting characters. For example, Cisco is a commercial organization that the IP identifies by a *com* domain name, so its domain name is *cisco.com*. A specific device in this domain, the File Transfer Protocol (FTP) system, for example, is identified as *ftp.cisco.com*.

### Name Servers

To keep track of domain names, IP has defined the concept of a *name server*. Name servers are programs that have complete information about their namespace portion of the domain tree and may also contain pointers to other name servers that can be used to lead to information from any other part of the domain tree. Name servers know the parts of the domain tree for which they have complete information. A name server may also store information about other parts of the domain tree. To map domain names to IP addresses, you must first identify the host names, then specify a name server, and enable the DNS service.

### Cache

To speed the process of converting names to addresses, the name server maintains a database, called a *cache*, of host name-to-address mappings for use by the **connect**, **telnet**, and **ping** EXEC commands, and related Telnet support operations. The cache stores the results from previous responses. Upon receiving a client-issued DNS query, it will check this local storage to see if the answer is available locally.

### Name Resolvers

Name resolvers are programs that extract information from name servers in response to client requests. Resolvers must be able to access at least one name server. The resolver either uses that name server's information to answer a query directly or pursues the query using referrals to other names servers. A resolver will typically be a system routine that is directly accessible to user programs. Therefore, no protocol is necessary between the resolver and the user program.

### Zones

The domain namespace is divided into areas called zones that are points of delegation in the DNS tree. A zone contains all domains from a certain point downward, except those for which other zones are authoritative.

### Authoritative Name Servers

A name server is said to be an authority for the parts of the domain tree for which it has complete information. A zone usually has an authoritative name server, often more than one. An authoritative name server has been configured with host table information or has acquired host table information through a zone

transfer (the action that occurs when a secondary DNS server starts up and updates itself from the primary server).

### DNS Operation

Within an organization, you can have many name servers, but Internet clients can query only those that the root name servers know. The other name servers answer internal queries only.

A name server handles client-issued queries to the DNS server for locally defined hosts within a particular zone as follows:

- An authoritative name server responds to DNS user queries for a domain name that is under its zone of authority by using the permanent and cached entries in its own host table. If the query is for a domain name that is under its zone of authority but for which it does not have any configuration information, the authoritative name server simply replies that no such information exists..
- A name server that is not configured as the authoritative name server responds to DNS user queries by using information that it has cached from previously received query responses. If no router is configured as the authoritative name server for a zone, queries to the DNS server for locally defined hosts will receive nonauthoritative responses.

Name servers answer DNS queries (forward incoming DNS queries or resolve internally generated DNS queries) according to the forwarding and lookup parameters configured for the specific domain.

## How to Configure DNS

- [Mapping Host Names to IP Addresses, page 3](#)
- [Customizing DNS, page 5](#)
- [Disabling DNS Queries for ISO CLNS Addresses, page 6](#)
- [Verifying DNS, page 7](#)

## Mapping Host Names to IP Addresses

Perform this task to associate host names with IP addresses.

A name server is used to keep track of information associated with domain names. A name server can maintain a database of host name-to-address mappings. Each name can map to one or more IP addresses. In order to use this service to map domain names to IP addresses, you must specify a name server.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip host name [tcp-port-number] address1 [address2 ... address8]**
4. Do one of the following:
  - **ip domain name name**
  - 
  - **ip domain list name**
5. **ip name-server server-address1 [server-address2 ... server-address6]**
6. **ip domain lookup**

## DETAILED STEPS

Command or Action	Purpose
<p><b>Step 1</b> <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>
<p><b>Step 2</b> <code>configure terminal</code></p> <p><b>Example:</b></p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>
<p><b>Step 3</b> <code>ip host name [tcp-port-number] address1 [address2 ... address8]</code></p> <p><b>Example:</b></p> <pre>Router(config)# ip host cisco-rtp 192.168.0.148</pre>	<p>Defines a static host name-to-address mapping in the host name cache.</p> <ul style="list-style-type: none"> <li>• Typically, it is easier to refer to network devices by symbolic names rather than numerical addresses (services such as Telnet can use host names or addresses). Host names and IP addresses can be associated with one another through static or dynamic means.</li> <li>• Manually assigning host names to addresses is useful when dynamic mapping is not available.</li> </ul>
<p><b>Step 4</b> Do one of the following:</p> <ul style="list-style-type: none"> <li>• <b>ip domain name</b> <i>name</i></li> <li>•</li> <li>• <b>ip domain list</b> <i>name</i></li> </ul> <p><b>Example:</b></p> <pre>Router(config)# ip domain name cisco.com</pre> <p><b>Example:</b></p> <pre>Router(config)# ip domain list cisco1.com</pre>	<p>(Optional) Defines a default domain name that the Cisco IOS XE software will use to complete unqualified host names.</p> <p>or</p> <p>(Optional) Defines a list of default domain names to complete unqualified host names.</p> <ul style="list-style-type: none"> <li>• You can specify a default domain name that the Cisco IOS XE software will use to complete domain name requests. You can specify either a single domain name or a list of domain names. Any host name that does not contain a complete domain name will have the default domain name you specify appended to it before the name is looked up.</li> </ul> <p><b>Note</b> If there is no domain list, the domain name that you specified with the <b>ip domain name</b> global configuration command is used. If there is a domain list, the default domain name is not used. The <b>ip domain list</b> command is similar to the <b>ip domain name</b> command, except that with the <b>ip domain list</b> command you can define a list of domains, each to be tried in turn until the system finds a match.</p>



Command or Action	Purpose
<p><b>Step 5</b> <code>ip name-server server-address1 [server-address2 ... server-address6]</code></p> <p><b>Example:</b></p> <pre>Router(config)# ip name-server 172.16.1.111 172.16.1.2</pre>	<p>Specifies one or more hosts that supply name information.</p> <ul style="list-style-type: none"> <li>Specifies one or more hosts (up to six) that can function as a name server to supply name information for DNS.</li> </ul>
<p><b>Step 6</b> <code>ip domain lookup</code></p> <p><b>Example:</b></p> <pre>Router(config)# ip domain lookup</pre>	<p>(Optional) Enables DNS-based address translation.</p> <ul style="list-style-type: none"> <li>DNS is enabled by default. Use this command if DNS has been disabled.</li> </ul>

The name lookup system can be statically configured using the commands described in this task. Some other functions in Cisco IOS XE, such as DHCP can dynamically modify the state of the name lookup system. Use the **show hosts** command to display the cached host names and the DNS configuration.

## Customizing DNS

Perform this task to customize your DNS configuration.

In a multiple server configuration without the DNS round-robin functionality, many programs will use the first host server/IP address for the whole time to live (TTL) of the cache while using the second and third host servers/IP addresses only in the event of host failure. This behavior presents a problem when a high volume of users all arrive at the first host during the TTL time. For example, the network access server (NAS) sends out a DNS query; the DNS servers reply with a list of the configured IP addresses to the NAS. The NAS then caches these IP addresses for a given time (for example, five minutes). All users that dial in during the five minute TTL time will land on one host, the first IP address in the list.

In a multiple server configuration with the DNS round-robin functionality, the DNS server returns the IP address of all hosts to rotate between the cache of host names. During the TTL of the cache, users are distributed among the hosts. This functionality distributes calls across the configured hosts and reduces the amount of DNS queries.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip domain timeout** *seconds*
4. **ip domain retry** *number*
5. **ip domain round-robin**

## DETAILED STEPS

Command or Action	Purpose
<p><b>Step 1</b> <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>
<p><b>Step 2</b> <code>configure terminal</code></p> <p><b>Example:</b></p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>
<p><b>Step 3</b> <code>ip domain timeout <i>seconds</i></code></p> <p><b>Example:</b></p> <pre>Router(config)# ip domain timeout 17</pre>	<p>(Optional) Specifies the amount of time to wait for a response to a DNS query.</p> <ul style="list-style-type: none"> <li>If the <b>ip domain timeout</b> command is not configured, the Cisco IOS XE software will wait 3 seconds for a response to a DNS query.</li> </ul>
<p><b>Step 4</b> <code>ip domain retry <i>number</i></code></p> <p><b>Example:</b></p> <pre>Router(config)# ip domain retry 10</pre>	<p>(Optional) Specifies the number of times to retry sending DNS queries.</p> <ul style="list-style-type: none"> <li>If the <b>ip domain retry</b> command is not configured, the Cisco IOS XE software will retry DNS queries twice.</li> </ul>
<p><b>Step 5</b> <code>ip domain round-robin</code></p> <p><b>Example:</b></p> <pre>Router(config)# ip domain round-robin</pre>	<p>(Optional) Enables round-robin functionality on DNS servers.</p>

## Disabling DNS Queries for ISO CLNS Addresses

Perform this task to disable DNS queries for ISO CLNS addresses.

If your router has both IP and ISO Connectionless Network Service (ISO CLNS) enabled and you want to use ISO CLNS network service access point (NSAP) addresses, you can use the DNS to query these addresses, as documented in RFC 1348. This feature is enabled by default.

### SUMMARY STEPS

- `enable`
- `configure terminal`
- `no ip domain lookup nsap`

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
Step 3	<b>no ip domain lookup nsap</b>  <b>Example:</b> Router(config)# no ip domain lookup nsap	Disables DNS queries for ISO CLNS addresses.

## Verifying DNS

Perform this task to verify your DNS configuration.

- enable
- ping *hosts*
- show hosts

## SUMMARY STEPS

- enable
- ping *hosts*
- show hosts

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>Enter your password if prompted.</li> </ul>

Command or Action	Purpose
<b>Step 2</b> <code>ping hosts</code>  <b>Example:</b>  Router# <code>ping cisco-rtp</code>	Diagnoses basic network connectivity. <ul style="list-style-type: none"> <li>After the DNS configuration is set, you can verify the DNS server by using a hostname to ping or telnet to a device.</li> </ul>
<b>Step 3</b> <code>show hosts</code>  <b>Example:</b>  Router# <code>show hosts</code>	Displays the default domain name, the style of name lookup service, a list of name server hosts, and the cached list of host names and addresses. <ul style="list-style-type: none"> <li>After a name is resolved using DNS, use the <b>show hosts</b> command to view the cached hostnames and the DNS configuration.</li> </ul>

## Configuration Examples for DNS

- [IP Domains Example, page 8](#)
- [Dynamic Lookup Example, page 8](#)
- [Customizing DNS Example, page 8](#)

### IP Domains Example

The following example establishes a domain list with several alternate domain names:

```
ip domain list csi.com
ip domain list telecomprog.edu
ip domain list merit.edu
```

### Dynamic Lookup Example

The following example configures the host name-to-address mapping process. IP DNS-based translation is specified, the addresses of the name servers are specified, and the default domain name is given.

```
! IP DNS-based host name-to-address translation is enabled
ip domain lookup
! Specifies hosts 192.168.1.111 and 192.168.1.2 as name servers
ip name-server 192.168.1.111 192.168.1.2
! Defines cisco.com as the default domain name the router uses to complete
! Set the name for unqualified host names
ip domain name cisco.com
```

### Customizing DNS Example

The following example allows a Telnet to company.example.com to connect to each of the three IP addresses specified in the following order: the first time the hostname is referenced, it would connect to 10.0.0.1; the second time the hostname is referenced, it would connect to 10.1.0.1; and the third time the

hostname is referenced, it would connect to 10.2.0.1. In each case, the other two addresses would also be tried if the first one failed; this is the normal operation of the Telnet command.

```
Router(config)# ip host company.example.com 10.0.0.1 10.1.0.1 10.2.0.1
Router(config)# ip domain round-robin
```

## Additional References

The following sections provide references related to DNS.

### Related Documents

Related Topic	Document Title
DNS commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	<i>Cisco IOS IP Addressing Services Command Reference</i>

### Standards

Standards	Title
No new or modified standards are supported by this functionality.	--

### MIBs

MIBs	MIBs Link
No new or modified 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 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

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

## 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/public/support/tac/home.shtml">http://www.cisco.com/public/support/tac/home.shtml</a></p>

## Feature Information for DNS

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.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1**      *Feature Information for DNS*

Feature Name	Releases	Feature Configuration Information
DNS	Cisco IOS XE Release 2.1	The Domain Name System (DNS) is a distributed database in which you can map host names to IP addresses through the DNS protocol from a DNS server. Each unique IP address can have an associated host name. The Cisco IOS XE software maintains a cache of host name-to-address mappings. This cache speeds the process of converting names to addresses.

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## VRF-Aware DNS

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The VRF-Aware DNS feature enables the configuration of a Virtual Private Network (VPN) routing and forwarding instance (VRF) table so that the domain name system (DNS) can forward queries to name servers using the VRF table rather than the named DNS server in the global IP address space. This feature allows DNS requests to be resolved within the appropriate Multiprotocol Label Switching (MPLS) VPN.

- [Finding Feature Information, page 13](#)
- [Information About VRF-Aware DNS, page 13](#)
- [How to Configure VRF-Aware DNS, page 14](#)
- [Configuration Examples for VRF-Aware DNS, page 19](#)
- [Additional References, page 20](#)
- [Feature Information for VRF-Aware DNS, page 21](#)

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## Information About VRF-Aware DNS

- [Domain Name System, page 13](#)
- [VRF Mapping and VRF-Aware DNS, page 14](#)

## Domain Name System

Domain Name System (DNS) is a standard that defines a domain naming procedure used in TCP/IP. A domain is a hierarchical separation of the network into groups and subgroups with domain names identifying the structure. The named groups consist of named objects, usually devices like IP hosts, and the subgroups are domains. DNS has three basic functions:

- **Name space:** This function is a hierarchical space organized from a single root into domains. Each domain can contain device names or more specific information. A special syntax defines valid names and identifies the domain names.

- Name registration: This function is used to enter names into the DNS database. Policies are outlined to resolve conflicts and other issues.
- Name resolution: This function is a distributed client and server name resolution standard. The name servers are software applications that run on a server and contain the resource records (RRs) that describe the names and addresses of those entities in the DNS name space. A name resolver is the interface between the client and the server. The name resolver requests information from the server about a name. A cache can be used by the name resolver to store learned names and addresses.

A DNS server can be a dedicated device or a software process running on a device. The server stores and manages data about domains and responds to requests for name conflict resolutions. In a large DNS implementation, there can be a distributed database over many devices. A server can be a dedicated cache.

## VRF Mapping and VRF-Aware DNS

To keep track of domain names, IP has defined the concept of a name server, whose job is to hold a cache (or database) of names appended to IP addresses. The cached information is important because the requesting DNS will not need to query for that information again, which is why DNS works well. If a server had to query each time for the same address because it had not saved any data, the queried servers would be flooded and would crash.

A gateway for multiple enterprise customers can be secured by mapping the remote users to a VRF domain. Mapping means obtaining the IP address of the VRF domain for the remote users. By using VRF domain mapping, a remote user can be authenticated by a VRF domain-specific AAA server so that the remote-access traffic can be forwarded within the VRF domain to the servers on the corporate network.

To support traffic for multiple VRF domains, the DNS and the servers used to resolve conflicts must be VRF aware. VRF aware means that a DNS subsystem will query the VRF name cache first, then the VRF domain, and store the returned RRs in a specific VRF name cache. Users are able to configure separate DNS name servers per VRF.

VRF-aware DNS forwards queries to name servers using the VRF table. Because the same IP address can be associated with different DNS servers in different VRF domains, a separate list of name caches for each VRF is maintained. The DNS looks up the specific VRF name cache first, if a table has been specified, before sending a query to the VRF name server. All IP addresses obtained from a VRF-specific name cache are routed using the VRF table.

## How to Configure VRF-Aware DNS

- [Defining a VRF Table and Assigning a Name Server to Enable VRF-Aware DNS, page 14](#)
- [Mapping VRF-Specific Hostnames to IP Addresses, page 16](#)
- [Configuring a Static Entry in a VRF-Specific Name Cache, page 17](#)
- [Verifying the Name Cache Entries in the VRF Table, page 18](#)

## Defining a VRF Table and Assigning a Name Server to Enable VRF-Aware DNS

Perform this task to define a VRF table and assign a name server.

A VRF-specific name cache is dynamically created if one does not exist whenever a VRF-specific name server is configured by using the **ip name-server vrf** command option or a permanent name entry is

configured by using the **ip host vrf** command option. The VRF name cache is removed whenever all name server and permanent entries in the VRF are disabled.

It is possible that multiple name servers are configured with the same VRF name. The system will send queries to those servers in turn until any of them responds, starting with the server that sent a response the last time.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip vrf *vrf-name***
4. **rd *route-distinguisher***
5. **exit**
6. **ip name-server [*vrf vrf-name*] *server-address1* [*server-address2*...*server-address6*]**
7. **ip domain lookup**

### DETAILED STEPS

Command or Action	Purpose
<b>Step 1 enable</b>  <b>Example:</b> Router> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2 configure terminal</b>  <b>Example:</b> Router# configure terminal	Enters global configuration mode.
<b>Step 3 ip vrf <i>vrf-name</i></b>  <b>Example:</b> Router(config)# ip vrf vpn1	Defines a VRF table and enters VRF configuration mode. <ul style="list-style-type: none"> <li>• The <i>vrf-name</i> argument can be up to 32 characters.</li> </ul>
<b>Step 4 rd <i>route-distinguisher</i></b>  <b>Example:</b> Router(config-vrf)# rd 100:21	Creates routing and forwarding tables for a VRF.

Command or Action	Purpose
<b>Step 5</b> <code>exit</code>  <b>Example:</b>  <pre>Router(config-vrf)# exit</pre>	Exits VRF configuration mode.
<b>Step 6</b> <code>ip name-server [vrf vrf-name] server-address1 [server-address2...server-address6]</code>  <b>Example:</b>  <pre>Router(config)# ip name-server vrf vpn1 172.16.1.111 172.16.1.2</pre>	Assigns the address of one or more name servers to a VRF table to use for name and address resolution. <ul style="list-style-type: none"> <li>The <code>vrf</code> keyword is optional but must be specified if the name server is used with VRF. The <code>vrf-name</code> argument assigns a name to the VRF.</li> </ul>
<b>Step 7</b> <code>ip domain lookup</code>  <b>Example:</b>  <pre>Router(config)# ip domain lookup</pre>	(Optional) Enables DNS-based address translation. <ul style="list-style-type: none"> <li>DNS is enabled by default. You only need to use this command if DNS has been disabled.</li> </ul>

## Mapping VRF-Specific Hostnames to IP Addresses

Perform this task to map VRF-specific hostnames to IP addresses.

### SUMMARY STEPS

- enable
- configure terminal
- Do one of the following:
  - `ip domain name [vrf vrf-name] name`
  - 
  - `ip domain list [vrf vrf-name] name`

### DETAILED STEPS

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

Command or Action	Purpose
<p><b>Step 2</b> <code>configure terminal</code></p> <p><b>Example:</b></p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>
<p><b>Step 3</b> Do one of the following:</p> <ul style="list-style-type: none"> <li>• <code>ip domain name [vrf vrf-name] name</code></li> <li>• <code>ip domain list [vrf vrf-name] name</code></li> </ul> <p><b>Example:</b></p> <pre>Router(config)# ip domain name vrf vpnl cisco.com</pre> <p><b>Example:</b></p> <pre>Router(config)# ip domain list vrf vpnl cisco.com</pre>	<p>Defines a default domain name that the Cisco IOS XE software will use to complete unqualified hostnames.</p> <p>or</p> <p>Defines a list of default domain names to complete unqualified hostnames.</p> <ul style="list-style-type: none"> <li>• You can specify a default domain name that the Cisco IOS XE software will use to complete domain name requests. You can specify either a single domain name or a list of domain names. Any hostname that does not contain a complete domain name will have the default domain name you specify appended to it before the name is looked up.</li> <li>• The <code>vrf</code> keyword and <code>vrf-name</code> argument specify a default VRF domain name.</li> <li>• The <code>ip domain list</code> command can be entered multiple times to specify more than one domain name to append when doing a DNS query. The system will append each in turn until it finds a match.</li> </ul>

## Configuring a Static Entry in a VRF-Specific Name Cache

Perform this task to configure a static entry in a VRF-specific name cache.

A VRF-specific name cache is dynamically created if one does not exist whenever a name server is configured for the VRF by using the `ip name-server vrf` command option or a permanent name entry is configured by using the `ip host vrf` command option. The VRF name cache is removed whenever all name server and permanent entries in the VRF are disabled.

### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `ip host [vrf vrf-name] name [tcp-port] address1 [address2...address8]`

## DETAILED STEPS

Command or Action	Purpose
<p><b>Step 1</b> <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>
<p><b>Step 2</b> <code>configure terminal</code></p> <p><b>Example:</b></p> <pre>Router# configure terminal</pre>	<p>Enters global configuration mode.</p>
<p><b>Step 3</b> <code>ip host [vrf vrf-name] name [tcp-port] address1 [address2...address8]</code></p> <p><b>Example:</b></p> <p><b>Example:</b></p> <pre>Router(config)# ip host vrf vpn3 company1.com 172.16.2.1</pre>	<p>Defines a static hostname-to-address mapping in the host cache.</p> <ul style="list-style-type: none"> <li>If the <b>vrf</b> keyword and <i>vrf-name</i> arguments are specified, then a permanent entry is created only in the VRF-specific name cache.</li> </ul>

## Verifying the Name Cache Entries in the VRF Table

Perform this task to verify the name cache entries in the VRF table.

### SUMMARY STEPS

- `enable`
- `show hosts [vrf vrf-name] {all|hostname} [summary]`
- `clear host [vrf vrf-name] {all|hostname}`

## DETAILED STEPS

Command or Action	Purpose
<p><b>Step 1</b> <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>

Command or Action	Purpose
<p><b>Step 2</b> <code>show hosts [vrf vrf-name] {all hostname} [summary]</code></p> <p><b>Example:</b></p> <pre>Router# show hosts vrf vpn2</pre>	<ul style="list-style-type: none"> <li>Displays the default domain name, the style of name lookup service, a list of name server hosts, the cached list of hostnames and addresses, and the cached list of hostnames and addresses specific to a particular Virtual Private Network (VPN).</li> <li>The <b>vrf</b> keyword and <i>vrf-name</i> argument only display the entries if a VRF name has been configured.</li> <li>If you enter the <b>show hosts</b> command without specifying any VRF, only the entries in the global name cache will display.</li> </ul>
<p><b>Step 3</b> <code>clear host [vrf vrf-name] {all hostname}</code></p> <p><b>Example:</b></p> <pre>Router# clear host vrf vpn2</pre>	<p>(Optional) Deletes entries from the hostname-to-address global address cache or VRF name cache.</p>

## Configuration Examples for VRF-Aware DNS

- [VRF-Specific Name Server Configuration Example, page 19](#)
- [VRF-Specific Domain Name List Configuration Example, page 19](#)
- [VRF-Specific Domain Name Configuration Example, page 20](#)
- [VRF-Specific IP Host Configuration Example, page 20](#)

### VRF-Specific Name Server Configuration Example

The following example shows how to specify a VPN named `vpn1` with the IP addresses of `172.16.1.111` and `172.16.1.2` as the name servers:

```
ip name-server vrf vpn1 172.16.1.111 172.16.1.2
```

### VRF-Specific Domain Name List Configuration Example

The following example shows how to add several domain names to a list in `vpn1` and `vpn2`. The domain name is only used for name queries in the specified VRF.

```
ip domain list vrf vpn1 company.com
ip domain list vrf vpn2 school.edu
```

If there is no domain list, the domain name that you specified with the **ip domain name** global configuration command is used. If there is a domain list, the default domain name is not used. The **ip domain list** command is similar to the **ip domain name** command, except that with the **ip domain list** command you can define a list of domains, each to be tried in turn until a match is found.

## VRF-Specific Domain Name Configuration Example

The following example shows how to define cisco.com as the default domain name for a VPN named vpn1. The domain name is only used for name queries in the specified VRF.

```
ip domain name vrf vpn1 cisco.com
```

Any IP hostname that does not contain a domain name (that is, any name without a dot) will have the dot and cisco.com appended to it before being looked up.

## VRF-Specific IP Host Configuration Example

The following example shows how to define two static hostname-to-address mappings in the host cache for vpn2 and vpn3:

```
ip host vrf vpn2 host2 10.168.7.18
ip host vrf vpn3 host3 10.12.0.2
```

## Additional References

The following sections provide references related to the VRF-Aware DNS feature.

### Related Documents

Related Topic	Document Title
DNS configuration tasks	"Configuring DNS" module
IP addressing services commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples	<i>Cisco IOS IP Addressing Services Command Reference</i>

### Standards

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

### MIBs

MIBs	MIBs Link
No new or modified 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 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**

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

**Technical Assistance**

Description	Link
The Cisco Technical Support website contains thousands of pages of searchable technical content, including links to products, technologies, solutions, technical tips, and tools. Registered Cisco.com users can log in from this page to access even more content.	<a href="http://www.cisco.com/techsupport">http://www.cisco.com/techsupport</a>

## Feature Information for VRF-Aware DNS

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.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 2** Feature Information for DNS

Feature Name	Releases	Feature Configuration Information
VRF-Aware DNS	Cisco IOS XE Release 2.1	The VRF-Aware DNS feature enables the configuration of a Virtual Private Network (VPN) routing and forwarding instance (VRF) table so that the domain name system (DNS) can forward queries to name servers using the VRF table rather than the named DNS server in the global IP address space. This feature allows DNS requests to be resolved within the appropriate Multiprotocol Label Switching (MPLS) VPN.

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