



# Cisco Mobile Networks Tunnel Templates for Multicast

The Cisco Mobile Networks--Tunnel Templates for Multicast feature allows the configuration of multicast on statically created tunnels to be applied to dynamic tunnels brought up on the home agent and mobile router. A tunnel template is defined and applied to the tunnels between the home agent and mobile router. The mobile router can now roam and the tunnel template enables multicast sessions to be carried to the mobile networks.

## Feature Specifications for Cisco Mobile Networks-Tunnel Templates for Multicast

Feature History	
Release	Modification
12.2(15)T	This feature was introduced.
Supported Platforms	
For platforms supported in Cisco IOS Release 12.2(15)T, consult Cisco Feature Navigator.	

- [Finding Feature Information](#), on page 1
- [Prerequisites for Cisco Mobile Networks Tunnel Templates for Multicast](#), on page 2
- [Restrictions for Cisco Mobile Networks Tunnel Templates for Multicast](#), on page 2
- [How to Configure Tunnel Templates for Multicast](#), on page 2
- [Configuration Examples for Tunnel Templates for Multicast](#), on page 7
- [Additional References](#), on page 8
- [Command Reference](#), on page 9
- [Glossary](#), on page 9

## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and 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.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to <https://cfng.cisco.com/>. An account on Cisco.com is not required.

## Prerequisites for Cisco Mobile Networks Tunnel Templates for Multicast

Reverse tunneling must be enabled from the mobile router to the home agent.

## Restrictions for Cisco Mobile Networks Tunnel Templates for Multicast

Tunnels cannot be removed if they are being used as templates.

## How to Configure Tunnel Templates for Multicast

### Applying the Tunnel Template on the Home Agent

This task describes how to apply the tunnel template to the tunnels brought up at the home agent.

#### SUMMARY STEPS

1. `enable`
2. `configure terminal`
3. `ip multicast-routing`
4. `interface tunnel interface-number`
5. `ip pim sparse-mode`
6. `exit`
7. `router mobile`
8. `exit`
9. `ip mobile mobile-networks`
10. `template tunnel interface-number`
11. `end`
12. `show ip mobile tunnel`

#### DETAILED STEPS

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

	Command or Action	Purpose
Step 2	<b>configure terminal</b> <b>Example:</b>  Router# configure terminal	Enters global configuration mode.
Step 3	<b>ip multicast-routing</b> <b>Example:</b>  Router(config)# ip multicast-routing	Enables IP multicast routing.
Step 4	<b>interface tunnel interface-number</b> <b>Example:</b>  Router(config)# interface tunnel 100	Designates a tunnel interface and enters interface configuration mode. <ul style="list-style-type: none"> <li>• This is the tunnel template that will be applied to the mobile networks.</li> </ul>
Step 5	<b>ip pim sparse-mode</b> <b>Example:</b>  Router(config-if)# ip pim sparse-mode	Enables Protocol Independent Multicast (PIM) on the tunnel interface in sparse mode.
Step 6	<b>exit</b> <b>Example:</b>  Router(config-if)# exit	Returns to global configuration mode.
Step 7	<b>router mobile</b> <b>Example:</b>  Router(config)# router mobile	Enables Mobile IP on the router.
Step 8	<b>exit</b> <b>Example:</b>  Router(config-router)# <b>exit</b>	Returns to global configuration mode.
Step 9	<b>ip mobile mobile-networks</b> <b>Example:</b>  Router(config)# ip mobile mobile-networks	Configures mobile networks for the mobile host and enters mobile networks configuration mode.
Step 10	<b>template tunnel interface-number</b> <b>Example:</b>  Router(mobile-networks)# template tunnel 100	Designates the tunnel template to apply during registration. <ul style="list-style-type: none"> <li>• The <i>interface-number</i> argument is set to the tunnel template defined in Step 4.</li> </ul>

	Command or Action	Purpose
<b>Step 11</b>	<b>end</b> <b>Example:</b> Router (mobile-networks) # <b>end</b>	Exits to privileged EXEC mode.
<b>Step 12</b>	<b>show ip mobile tunnel</b> <b>Example:</b> Router# <b>show ip mobile tunnel</b>	Displays active tunnels. <ul style="list-style-type: none"> <li>• Use this command to verify the configuration.</li> </ul>

### Examples

The following example displays the active Mobile IP tunnels and the template configuration for the tunnel on the home agent:

```
Router# show ip mobile tunnel
Mobile Tunnels:
Total mobile ip tunnels 2
Tunnel1:
  src 1.1.1.1, dest 20.20.0.1
  encaps IP/IP, mode reverse-allowed, tunnel-users 1
  IP MTU 1460 bytes
  Path MTU Discovery, mtu:0, ager:10 mins, expires:never
  outbound interface Tunnel0
  HA created, fast switching enabled, ICMP unreachable enabled
  27 packets input, 2919 bytes, 0 drops
  24 packets output, 2568 bytes
Running template configuration for this tunnel:
ip pim sparse-dense-mode
Tunnel0:
  src 1.1.1.1, dest 30.30.10.2
  encaps IP/IP, mode reverse-allowed, tunnel-users 1
  IP MTU 1480 bytes
  Path MTU Discovery, mtu:0, ager:10 mins, expires:never
  outbound interface Ethernet1/3
  HA created, fast switching enabled, ICMP unreachable enabled
  0 packets input, 0 bytes, 0 drops
  24 packets output, 3048 bytes
```

## Applying the Tunnel Template on the Mobile Router

This task describes how to apply the tunnel template to the tunnels brought up at the mobile router.

### SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip multicast-routing**
4. **interface tunnel** *interface-number*
5. **ip pim sparse-mode**

6. **exit**
7. **router mobile**
8. **exit**
9. **ip mobile router**
10. **template tunnel** *interface-number*
11. **end**
12. **show ip mobile tunnel**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <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>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> <pre>Router# configure terminal</pre>	Enters global configuration mode.
<b>Step 3</b>	<b>ip multicast-routing</b> <b>Example:</b> <pre>Router(config)# ip multicast-routing</pre>	Enables IP multicast routing.
<b>Step 4</b>	<b>interface tunnel</b> <i>interface-number</i> <b>Example:</b> <pre>Router(config)# interface tunnel 100</pre>	Designates a tunnel interface and enters interface configuration mode. <ul style="list-style-type: none"> <li>• This is the tunnel template that will be applied to the mobile networks.</li> </ul>
<b>Step 5</b>	<b>ip pim sparse-mode</b> <b>Example:</b> <pre>Router(config-if)# ip pim sparse-mode</pre>	Enables PIM on the tunnel interface in sparse mode.
<b>Step 6</b>	<b>exit</b> <b>Example:</b> <pre>Router(config-if)# exit</pre>	Returns to global configuration mode.
<b>Step 7</b>	<b>router mobile</b> <b>Example:</b> <pre>Router(config)# router mobile</pre>	Enables Mobile IP on the router.

	Command or Action	Purpose
Step 8	<b>exit</b> <b>Example:</b> <pre>Router(config-router)# exit</pre>	Returns to global configuration mode.
Step 9	<b>ip mobile router</b> <b>Example:</b> <pre>Router(config)# ip mobile router</pre>	Enables the mobile router and enters mobile router configuration mode.
Step 10	<b>template tunnel <i>interface-number</i></b> <b>Example:</b> <pre>Router(mobile-router)# template tunnel 100</pre>	Designates the tunnel template to apply during registration. <ul style="list-style-type: none"> <li>The <i>interface number</i> argument is set to the tunnel template defined in Step 4.</li> </ul>
Step 11	<b>end</b> <b>Example:</b> <pre>Router(mobile-router)# end</pre>	Exits to privileged EXEC mode.
Step 12	<b>show ip mobile tunnel</b> <b>Example:</b> <pre>Router# show ip mobile tunnel</pre>	Displays active tunnels. <ul style="list-style-type: none"> <li>Use this command to verify the configuration.</li> </ul>

### Examples

The following example displays the active Mobile IP tunnels and the template configuration for the tunnel on the mobile router:

```
Router# show ip mobile tunnel
Mobile Tunnels:
Total mobile ip tunnels 1
Tunnel0:
  src 20.20.0.1, dest 1.1.1.1
  encaps IP/IP, mode reverse-allowed, tunnel-users 1
  IP MTU 1480 bytes
  Path MTU Discovery, mtu:0, ager:10 mins, expires:never
  outbound interface Ethernet4/2
  MR created, fast switching enabled, ICMP unreachable enabled
  22 packets input, 2468 bytes, 0 drops
  27 packets output, 2892 bytes
Running template configuration for this tunnel:
ip pim sparse-mode
```

# Configuration Examples for Tunnel Templates for Multicast

## Tunnel Templates for Multicast Example

In the following example, a tunnel template is defined and configured to be brought up at the home agent and mobile router. The foreign agent does not require any additional configuration to support the Cisco Mobile Networks--Tunnel Templates for Multicast feature.

### Home Agent Configuration

```
!  
ip multicast-routing  
!  
interface Loopback0  
 ip address 1.1.1.1 255.255.255.255  
 ip pim sparse-mode  
!  
!  
! Tunnel template to be applied to mobile networks  
interface tunnel100  
 ip address 13.0.0.1 255.0.0.0  
 ip pim sparse-mode  
!  
!  
router mobile  
ip mobile mobile-networks 11.1.0.1  
 description jet  
 network 11.1.2.0 255.255.255.0  
 network 11.1.1.0 255.255.255.0  
! Select tunnel template to apply during registration  
 template tunnel100  
!  
ip mobile secure host 11.1.0.1 spi 101 key hex 12345678123456781234567812345678 algorithm  
md5 mode prefix-suffix  
!  
no ip mobile tunnel route-cache  
!
```

### Mobile Router Configuration

```
!  
ip multicast-routing  
!  
interface Loopback0  
 ip address 11.1.0.1 255.255.255.255  
 ip pim sparse-mode  
!  
!  
! Tunnel template to be applied to mobile networks  
interface tunnel 100  
 no ip address  
 ip pim sparse-mode  
!  
!  
interface Ethernet1/1  
 ip address 20.0.0.1 255.0.0.0
```

```

ip pim sparse-mode
ip mobile router-service roam
!
router mobile
ip pim rp-address 7.7.7.7
ip mobile secure home-agent 1.1.1.1 spi 102 key hex 23456781234567812345678123456781 algorithm
md5 mode prefix-suffix
ip mobile router
address 11.2.0.1 255.255.0.0
home-agent 1.1.1.1
! Select tunnel template to apply during registration
template tunnel 100
register extend expire 5 retry 2 interval 15
register lifetime 10000
reverse-tunnel
!

```

## Additional References

For additional information related to Cisco Mobile Networks--Tunnel Templates for Multicast, see the following sections:

### Related Documents

Related Topic	Document Title
Mobile IP configuration tasks	"Configuring Mobile IP" chapter in the <i>Cisco IOS IP Configuration Guide</i> , Release 12.2
Mobile IP commands: complete command syntax, command mode, defaults, usage guidelines, and examples	"Mobile IP Commands" chapter in the <i>Cisco IOS IP Command Reference, Volume 1 of 3: Addressing and Services</i> , Release 12.2
Multicast configuration tasks	"Configuring IP Multicast Routing" chapter in the <i>Cisco IOS IP Configuration Guide</i> , Release 12.2
Multicast commands: complete command syntax, command mode, defaults, usage guidelines, and examples	"IP Multicast Routing Commands" chapter in the <i>Cisco IOS IP Command Reference, Volume 3 of 3: Multicast</i> , Release 12.2
Mobile IP commands related to Cisco Mobile Networks	<i>Cisco Mobile Networks</i> feature document, Releases 12.2(4)T and 12.2(13)T.

### 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
None	To obtain lists of supported MIBs by platform and Cisco IOS release, and to download MIB modules, go to the Cisco MIB website on Cisco.com at the following URL:  <a href="http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml">http://www.cisco.com/public/sw-center/netmgmt/cmtk/mibs.shtml</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
Technical Assistance Center (TAC) home page, containing 30,000 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/public/support/tac/home.shtml">http://www.cisco.com/public/support/tac/home.shtml</a>

## Command Reference

The following commands are introduced or modified in the feature or features documented in this module. For information about these commands, see the *Cisco IOS IP Mobility Command Reference* at [http://www.cisco.com/en/US/docs/ios/ipmobility/command/reference/imo\\_book.html](http://www.cisco.com/en/US/docs/ios/ipmobility/command/reference/imo_book.html). For information about all Cisco IOS commands, go to the Command Lookup Tool at <http://tools.cisco.com/Support/CLILookup> or to the *Cisco IOS Master Commands List* .

- **show ip mobile tunnel**
- **template tunnel (mobile networks)**
- **template tunnel (mobile router)**

## Glossary

**home agent** --A router on a home network of the mobile node or that tunnels packets to the mobile node or mobile router while they are away from home. It keeps current location information for registered mobile nodes called a mobility binding .

**mobile network** --A network that moves with the mobile router. A mobile network is a collection of hosts and routes that are fixed with respect to each other but are mobile, as a unit, with respect to the rest of the Internet.

**mobile router** --A mobile node that is a router. It provides for the mobility of one or more entire networks moving together, perhaps on an airplane, a ship, a train, an automobile, a bicycle, or a kayak. The nodes connected to a network served by the mobile router may themselves be fixed nodes or mobile nodes or routers.



---

**Note** Refer to [Networking Terms and Acronyms](#) for terms not included in this glossary.

---