

# Why Do BGP Neighbors Toggle Between Idle, Connect, and Active States?

Document ID: 13752

Author: Syed Faraz Shamim

---

## Introduction

### Prerequisites

- Requirements
- Components Used
- Network Diagram
- Conventions

### The Neighbor Statement Is Incorrect

Solution

### No Routes to the Neighbor Address Exist or the Default Route Is Used to Reach the Peer

Solution

### The `update-source` Command Is Missing Under BGP

Solution

### Related Information

---

## Introduction

When you establish a Border Gateway Protocol (BGP) session, BGP goes through several state changes before reaching the established state. Several things might prevent a BGP neighborship from correctly being established. This document discusses some of these possible reasons for this issue:

- The neighbor statement is incorrect.
- No routes to the neighbor address exist , or the default route (0.0.0.0/0) is being used to reach the peer.
- The **update-source** command is missing under BGP.
- A typing error resulted in the wrong IP address in the neighbor statement or the wrong autonomous system number. You need to check your configurations.
- Unicast is broken due to one of the following reasons:
  - ◆ Wrong virtual circuit (VC) mapping in an Asynchronous Transfer Mode (ATM) or Frame Relay environment in a highly redundant network.
  - ◆ Access list is blocking the unicast or TCP packet.
  - ◆ Network Address Translation (NAT) is running on the router and is translating the unicast packet.
  - ◆ Layer 2 is down.
- The lack of the **ebgp-multihop** command is a common mistake that keep peers from coming up. This issue is discussed in the second example.

## Prerequisites

### Requirements

There are no specific requirements for this document.

## Components Used

This document is not restricted to specific software and hardware versions.

The information presented in this document was created from devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If you are working in a live network, ensure that you understand the potential impact of any command before using it.

## Network Diagram

Use this network diagram as an example for the first three causes:



## Conventions

For more information on document conventions, refer to Cisco Technical Tips Conventions.

## The Neighbor Statement Is Incorrect

The `show ip bgp summary` command on Router R1-AGS shows the session is active.

```
R1-AGS(9)# show ip bgp summary
BGP table version is 1, main routing table version 1

Neighbor        V    AS MsgRcvd MsgSent   TblVer   InQ  OutQ Up/Down   State/PfxRcd
10.10.10.2      4    400     0       0         0     0    0 never      Active
```

Here are the configurations:

R1-AGS	R6-2500
<pre>interface Loopback0  ip address 2.2.2.2 255.255.255.255 ! interface Serial1  ip address 10.10.10.1 255.255.255.0 ! router bgp 400  neighbor 10.10.10.2 remote-as 400  neighbor 10.10.10.2 update-source Loopback0 ! ip route 1.1.1.1 255.255.255.255 10.10.10.2</pre>	<pre>interface Loopback0  ip address 1.1.1.1 255.255.255.255 ! interface Serial0  ip address 10.10.10.2 255.255.255.0 !</pre>

The `debug ip bgp` and `debug ip tcp transactions` commands show the TCP connection failing.

Debugs on Router R1-AGS:

```
router bgp 400
 neighbor 10.10.10.1 update-source Loopback0
!
ip route 2.2.2.2 255.255.255.255 10.10.10.1
```

```

BGP: 10.10.10.2 open active, local address 2.2.2.2
TCB00135978 created
TCB00135978 setting property 0 16ABEA
TCB00135978 bound to 2.2.2.2.11039
TCP: sending SYN, seq 3797113156, ack 0
TCP0: Connection to 10.10.10.2:179, advertising MSS 1460
TCP0: state was CLOSED -> SYNSENT [11039 -> 10.10.10.2(179)]
TCP0: state was SYNSENT -> CLOSED [11039 -> 10.10.10.2(179)]
TCP0: bad seg from 10.10.10.2 -- closing connection: seq 0 ack 3797113157 rcvnext 0 rcvwnd
TCP0: connection closed - remote sent RST
TCB00135978 destroyed
BGP: 10.10.10.2 open failed: Connection refused by remote host
TCP: sending RST, seq 0, ack 1965664223
TCP: sent RST to 1.1.1.1:11016 from 10.10.10.1:179

```

### Debugs on Router R6-2500:

```

TCP: sending RST, seq 0, ack 3797113157
TCP: sent RST to 2.2.2.2:11039 from 10.10.10.2:179
BGP: 10.10.10.1 open active, local address 1.1.1.1
TCB001E030C created
TCB001E030C setting property TCP_WINDOW_SIZE (0) 194F7A
TCB001E030C setting property TCP_TOS (11) 194F79
TCB001E030C bound to 1.1.1.1.11016
TCP: sending SYN, seq 1965664222, ack 0
TCP0: Connection to 10.10.10.1:179, advertising MSS 1460
TCP0: state was CLOSED -> SYNSENT [11016 -> 10.10.10.1(179)]
TCP0: state was SYNSENT -> CLOSED [11016 -> 10.10.10.1(179)]
TCP0: bad seg from 10.10.10.1 -- closing connection: seq 0 ack 1965664223 rcvnext 0 rcvwnd
TCP0: connection closed - remote sent RST
TCB 0x1E030C destroyed
BGP: 10.10.10.1 open failed: Connection refused by remote host

```

## Solution

To remedy this situation, either correct the loopback address in the neighbor statement, or remove the **update-source** command from the configuration.

In this example, the address is corrected.

R1-AGS	R6-2500
<pre> router bgp 400  neighbor 1.1.1.1 remote-as 400  neighbor 1.1.1.1 update-source Loopback0  ! ip route 1.1.1.1 255.255.255.255 10.10.10.2 </pre>	<pre> router bgp 400  neighbor 2.2.2.2 remote-as 400  neighbor 2.2.2.2 update-source Loopback0  ! </pre>

A look at the **show ip bgp summary** command shows Router R1-AGS is in the established state.

```

R1-AGS(9)# show ip bgp summary
BGP table version is 1, main routing table version 1

Neighbor      V    AS MsgRcvd MsgSent  TblVer  InQ  OutQ  Up/Down  State/PfxRcd
1.1.1.1       4    400      3       3        1    0    00:00:26      0

```

## No Routes to the Neighbor Address Exist or the Default Route Is Used to Reach the Peer

The **show ip bgp summary** command on Router R1-AGS shows the session is currently active.

```
R1-AGS(9)# show ip bgp summary
BGP table version is 1, main routing table version 1
```

```
Neighbor      V   AS MsgRcvd MsgSent  TblVer  InQ  OutQ Up/Down  State/PfxRcd
1.1.1.1       4   400     0     0       0    0    0 never    Active
```

Here are the configurations:

R1-AGS	R6-2500
<pre>interface Loopback0  ip address 2.2.2.2 255.255.255.255 ! interface Serial11  ip address 10.10.10.1 255.255.255.0 ! router bgp 300  neighbor 1.1.1.1 remote-as 400  neighbor 1.1.1.1 ebgp-multihop 2  neighbor 1.1.1.1 update-source Loopback0</pre>	<pre>interface Loopback0  ip address 1.1.1.1 255.255.255.255 ! interface Serial10  ip address 10.10.10.2 255.255.255.0 ! router bgp 400  neighbor 2.2.2.2 remote-as 300  neighbor 2.2.2.2 ebgp-multihop 2  neighbor 2.2.2.2 update-source Loopback0</pre>

Running **debug** commands shows there is no route to the neighbor.

Debugs on Router R1-AGS:

```
BGP: 1.1.1.1 open active, delay 9568ms
BGP: 1.1.1.1 multihop open delayed 19872ms (no route)
BGP: 1.1.1.1 multihop open delayed 12784ms (no route)
```

Debugs on Router R6-2500:

```
BGP: 2.2.2.2 open active, delay 6531ms
BGP: 2.2.2.2 multihop open delayed 14112ms (no route)
BGP: 2.2.2.2 multihop open delayed 15408ms (no route)
```

## Solution

The solution is to include a route to the next hop in the BGP neighbor statement. You can use a static or dynamic route depending on the situation. In an internal BGP (iBGP) environment where you have more control, you can propagate the route dynamically using a routing protocol. In an external BGP (eBGP) situation, it is recommended to configure a static route to reach the next hop.

Use the **neighbor ebgp-multihop** command only when the IP address you are peering to on your eBGP peer is not directly connected.

In this example, a static route was used.

R1-AGS	R6-2500
<pre>router bgp 300  neighbor 1.1.1.1 remote-as 400  neighbor 1.1.1.1 ebgp-multihop 2  neighbor 1.1.1.1 update-source Loopback0 ! ip route 1.1.1.1 255.255.255.255 10.10.10.2</pre>	<pre>router bgp 400  neighbor 2.2.2.2 remote-as 300  neighbor 2.2.2.2 ebgp-multihop 2  neighbor 2.2.2.2 update-source Loopback0</pre>

The **show ip bgp summary** command shows Router R1-AGS is in the established state.

```
R1-AGS(9)# show ip bgp summary
```

BGP table version is 1, main routing table version 1

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	400	3	3	1	0	0	00:00:26	0

**Note:** A default route is never going to be used to establish a BGP session (iBGP/eBGP), and you will see the same (no route) output in the debugs, although you will be able to ping the BGP neighbor. The solution is again to add a route to the BGP neighbor.

## The update-source Command Is Missing Under BGP

The `show ip bgp summary` command on Router R1-AGS shows the session is active.

```
R1-AGS(9)# show ip bgp summary
```

BGP table version is 1, main routing table version 1

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
1.1.1.1	4	400	0	0	0	0	0	never	Active

Here are the configurations:

R1-AGS	R6-2500
<pre>interface Loopback0  ip address 2.2.2.2 255.255.255.255 ! interface Serial11  ip address 10.10.10.1 255.255.255.0 ! router bgp 400  neighbor 1.1.1.1 remote-as 400 ! ip route 1.1.1.1 255.255.255.255 10.10.10.2</pre>	<pre>interface Loopback0  ip address 1.1.1.1 255.255.255.255 ! interface Serial0  ip address 10.10.10.2 255.255.255.0</pre>

Running `debug` commands shows the TCP connection fails

Debugs on Router R1-AGS:

```
TCP: sending RST, seq 0, ack 2248020754
TCP: sent RST to 10.10.10.2:11018 from 2.2.2.2:179
BGP: 1.1.1.1 open active, local address 10.10.10.1
TCB0016B06C created
TCB0016B06C setting property 0 16ADEA
TCB0016B06C bound to 10.10.10.1.11042
TCP: sending SYN, seq 4099938541, ack 0
TCP0: Connection to 1.1.1.1:179, advertising MSS 536
TCP0: state was CLOSED -> SYNSENT [11042 -> 1.1.1.1(179)]
TCP0: state was SYNSENT -> CLOSED [11042 -> 1.1.1.1(179)]
TCP0: bad seg from 1.1.1.1 -- closing connection: seq 0 ack 4099938542 rcvnxt 0 rcvwnd 0
TCP0: connection closed - remote sent RST
TCB0016B06C destroyed
BGP: 1.1.1.1 open failed: Connection refused by remote host
```

Debugs on Router R6-2500:

```
BGP: 2.2.2.2 open active, local address 10.10.10.2
TCB00194800 created
TCB00194800 setting property TCP_WINDOW_SIZE (0) E6572
TCB00194800 setting property TCP_TOS (11) E6571
TCB00194800 bound to 10.10.10.2.11018
```

```

TCP: sending SYN, seq 2248020753, ack 0
TCP0: Connection to 2.2.2.2:179, advertising MSS 556
TCP0: state was CLOSED -> SYNSENT [11018 -> 2.2.2.2(179)]
TCP0: state was SYNSENT -> CLOSED [11018 -> 2.2.2.2(179)]
TCP0: bad seg from 2.2.2.2 -- closing connection: seq 0 ack 2248020754 rcvnxt 0 rcvwnd 0
TCP0: connection closed - remote sent RST
TCB 0x194800 destroyed
BGP: 2.2.2.2 open failed: Connection refused by remote host
TCP: sending RST, seq 0, ack 4099938542
TCP: sent RST to 10.10.10.1:11042 from 1.1.1.1:179

```

## Solution

To solve this problem, either configure the **update-source** command on both routers, or remove the **update-source** command and change the neighbor statement on both routers. Below are examples of both solutions.

Here, the **update-source** command is configured on both routers.

R1-AGS	R6-2500
<pre> interface Loopback0  ip address 2.2.2.2 255.255.255.255 ! interface Serial1  ip address 10.10.10.1 255.255.255.0 ! router bgp 400  neighbor 1.1.1.1 remote-as 400  <b>neighbor 1.1.1.1 update-source Loopback0</b> ! ip route 1.1.1.1 255.255.255.255 10.10.10.2 </pre>	<pre> interface Loopback0  ip address 1.1.1.1 255.255.255.255 ! interface Serial0  ip address 10.10.10.2 255.255.255.0 </pre>

The **show ip bgp summary** command shows Router R1-AGS is in the established state.

```

R1-AGS(9)# show ip bgp summary
BGP table version is 1, main routing table version 1

Neighbor      V    AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down  State/PfxRcd
2.2.2.2       4    400     3      3         1    0    0 00:00:26      0

```

You only have to use the **update-source** command when someone is peering to your loopback address. This is true for an iBGP peer and an eBGP peer.

Here, the **update-source** command is removed and the neighbor statement is changed on both routers.

R1-AGS	R6-2500
<pre> interface Loopback0  ip address 2.2.2.2 255.255.255.255 ! interface Serial1  ip address 10.10.10.1 255.255.255.0 ! router bgp 400  <b>neighbor 10.10.10.2 remote-as 400</b> </pre>	<pre> interface Loopback0  ip address 1.1.1.1 255.255.255.255 ! interface Serial0  ip address 10.10.10.2 255.255.255.0 </pre>

The **show ip bgp summary** command shows Router R1-AGS is in the established state.

```

R1-AGS(9)# show ip bgp summary
BGP table version is 1, main routing table version 1

Neighbor      V    AS MsgRcvd MsgSent  TblVer  InQ OutQ Up/Down  State/PfxRcd
10.10.10.2    4    400     3      3         1    0    0 00:00:26      0

```

Neighbor	V	AS	MsgRcvd	MsgSent	TblVer	InQ	OutQ	Up/Down	State/PfxRcd
10.10.10.2	4	400	3	3	1	0	0	00:00:26	0

---

## Related Information

- [BGP Support Page](#)
  - [Technical Support – Cisco Systems](#)
- 

[Contacts & Feedback](#) | [Help](#) | [Site Map](#)

© 2008 – 2009 Cisco Systems, Inc. All rights reserved. [Terms & Conditions](#) | [Privacy Statement](#) | [Cookie Policy](#) | [Trademarks of Cisco Systems, Inc.](#)

---

Updated: Aug 10, 2005

Document ID: 13752

---