Troubleshoot Common BGP Issues

Contents

Introduction

This document describes how to troubleshoot common issues with Border Gateway Protocol (BGP).

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 in this document was created from the devices in a specific lab environment. All of the devices used in this document started with a cleared (default) configuration. If your network is live, ensure that you understand the potential impact of any command.

Background Information
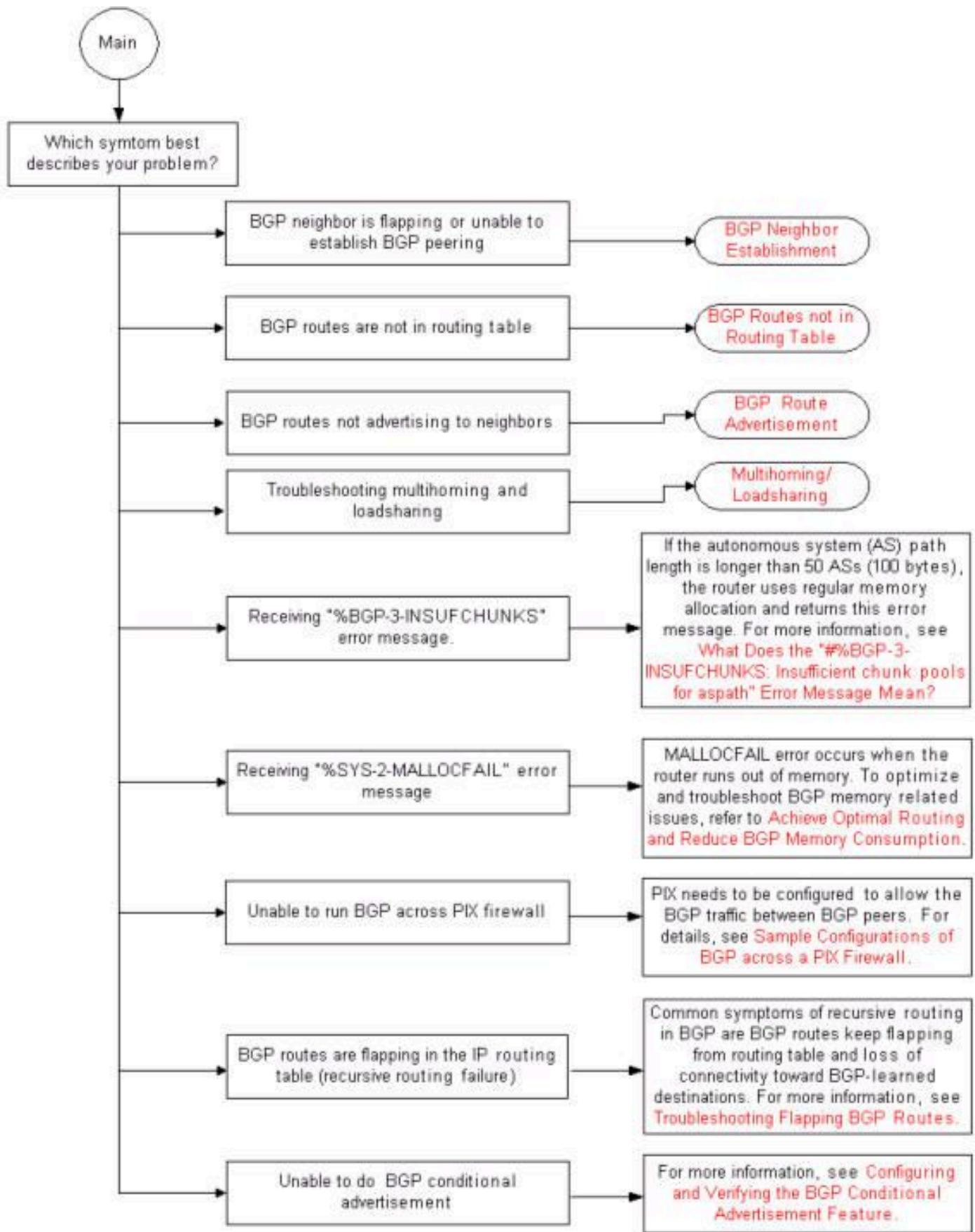
This document provides flowcharts for several options to troubleshoot BGP issues.

If you have the output of a **show ip bgp**, **show ip bgp neighbors**, **show ip bgp summary**, or **show tech-support** command from your Cisco device, you can use Cisco CLI Analyzer to display potential issues and

fixes. To use Cisco CLI Analyzer, you must be a registered Cisco user.
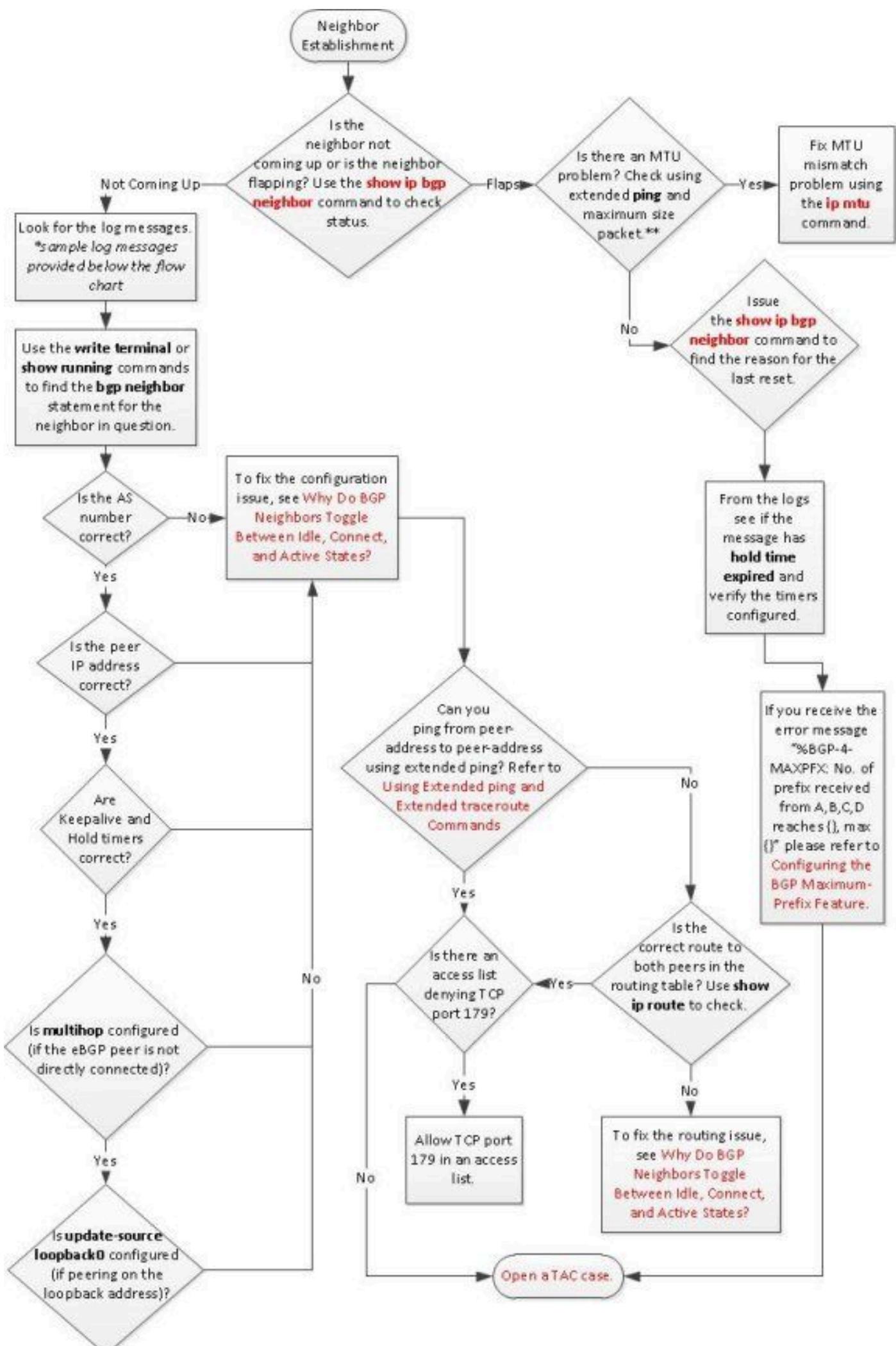
✎ **Note**: Only registered Cisco users can access internal tools and information.

Main Troubleshoot Flowchart

```
┌─────────┐
│  Main   │
└────┬────┘
     │
     ▼
┌──────────────────┐
│ Which symtom best │
│ describes your    │
│ problem?          │
└────┬─────────────┘
     │
     ├──────────▶ ┌────────────────────────────┐          ┌──────────────────┐
     │            │ BGP neighbor is flapping or │──────────▶│ BGP Neighbor     │
     │            │ unable to establish BGP     │          │ Establishment    │
     │            │ peering                     │          └──────────────────┘
     │            └────────────────────────────┘
     │
     ├──────────▶ ┌────────────────────────────┐          ┌──────────────────┐
     │            │ BGP routes are not in       │──────────▶│ BGP Routes not in │
     │            │ routing table               │          │ Routing Table    │
     │            └────────────────────────────┘          └──────────────────┘
     │
     ├──────────▶ ┌────────────────────────────┐          ┌──────────────────┐
     │            │ BGP routes not advertising  │──────────▶│ BGP  Route       │
     │            │ to neighbors                │          │ Advertisement    │
     │            └────────────────────────────┘          └──────────────────┘
     │
     ├──────────▶ ┌────────────────────────────┐          ┌──────────────────┐
     │            │ Troubleshooting multihoming │──────────▶│ Multihoming/     │
     │            │ and loadsharing             │          │ Loadsharing      │
     │            └────────────────────────────┘          └──────────────────┘
```


BGP Main Flowchart
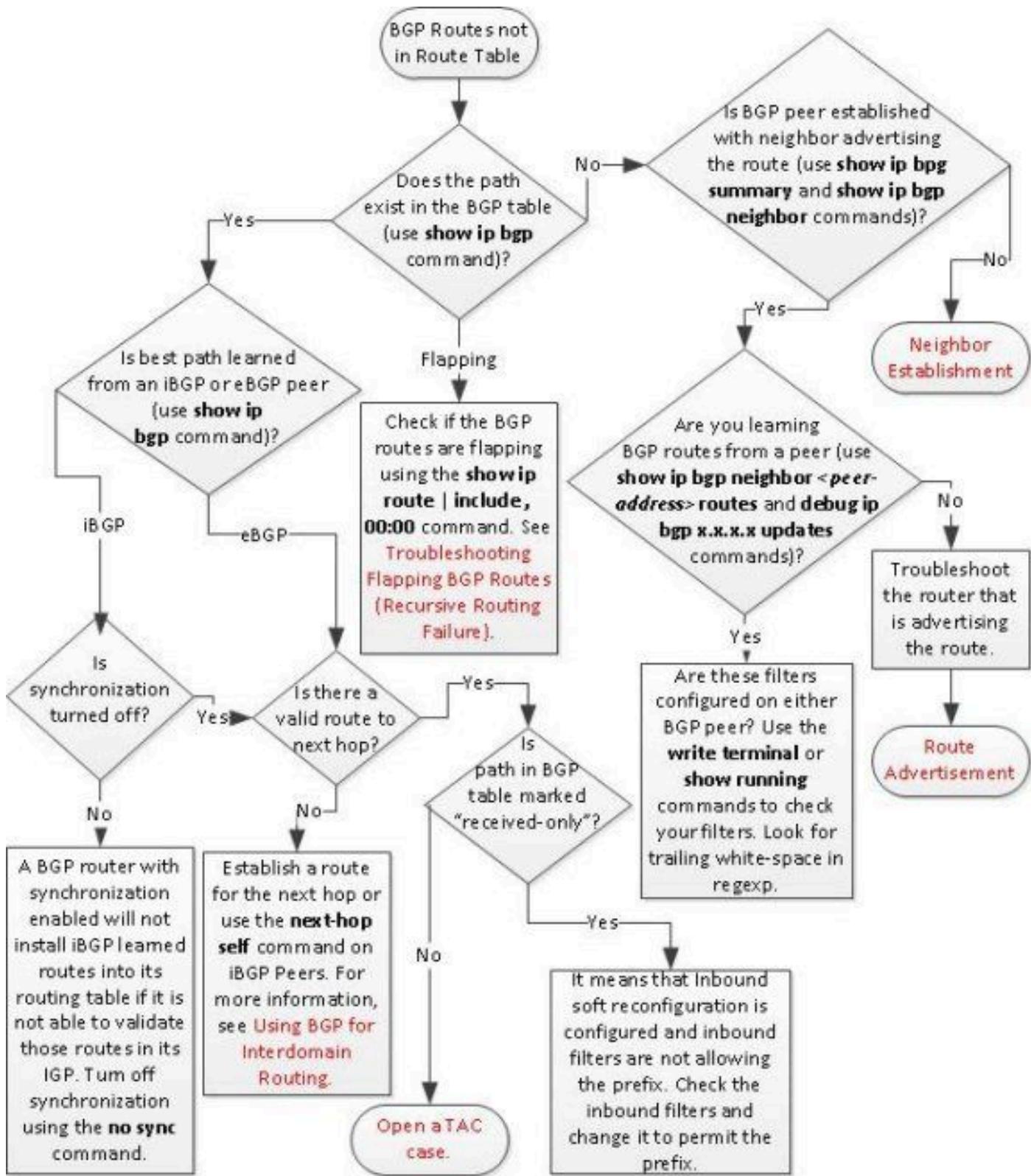
Troubleshoot BGP Neighbor Establishment

```
                                    Neighbor
                                  Establishment
                                        │
                                        ▼
                                   Is the
                                neighbor not
              Not Coming Up   coming up or is the neighbor          Is there an MTU              Fix MTU
          ◄──────────────────  flapping? Use the show ip bgp ──Flaps──►  problem? Check using ──Yes──►  mismatch
          │                     neighbor command to check          extended ping and            problem using
          ▼                           status.                      maximum size                 the ip mtu
   Look for the log messages.                                      packet. **                   command.
   *sample log messages                                                │
   provided below the flow                                             │
   chart                                                              No
          │                                                            │              Issue
          ▼                                                            ▼          the show ip bgp
   Use the write terminal or                                                     neighbor command to
   show running commands                                                         find the reason for the
   to find the bgp neighbor                                                           last reset.
   statement for the                                                                      │
   neighbor in question.                                                                  ▼
          │                  To fix the configuration                              From the logs
          ▼                  issue, see Why Do BGP                                see if the
   Is the AS         No      Neighbors Toggle                                     message has
   number      ────────────► Between Idle, Connect,                              hold time
   correct?                  and Active States?                                   expired and
          │                                                                       verify the timers
         Yes                                                                      configured.
          │                                                                            │
          ▼                                                                            ▼
   Is the peer                                                                  If you receive the
   IP address                                                                  error message
   correct?                              Can you                               "%BGP-4-
          │                          ping from peer-                           MAXPFX: No. of
         Yes                         address to peer-address                    prefix received
          │                          using extended ping? Refer to             from A,B,C,D
          ▼                          Using Extended ping and    ─────No─────►   reaches {}, max
   Are                               Extended traceroute                        {}" please refer to
   Keepalive and                     Commands                                   Configuring the
   Hold timers                              │                                   BGP Maximum-
   correct?                                Yes                                  Prefix Feature.
          │                                 │
         Yes                                ▼
          │                          Is there an              Is the
          ▼                          access list    ◄──Yes──  correct route to
   Is multihop configured            denying TCP              both peers in the
   (if the eBGP peer is not          port 179?               routing table? Use show
   directly connected)?                     │                ip route to check.
          │                                Yes                     │
         Yes                                │                     No
          │                                 ▼                      │
          ▼                          Allow TCP port              ▼
   Is update-source                  179 in an access       To fix the routing issue,
   loopback0 configured              list.                  see Why Do BGP
   (if peering on the                                       Neighbors Toggle
   loopback address)?                                       Between Idle, Connect,
                                                            and Active States?

                                     Open a TAC case.
```

✎ command. By default, BGP resets the neighborship if the link used in order to reach the neighbor goes down. Disable this feature under BGP Configuration in order to keep BGP stable and prevent the interface from flapping.

If flapping occurs due to high CPU, refer to [Troubleshooting High CPU Utilization on Cisco Routers](#).
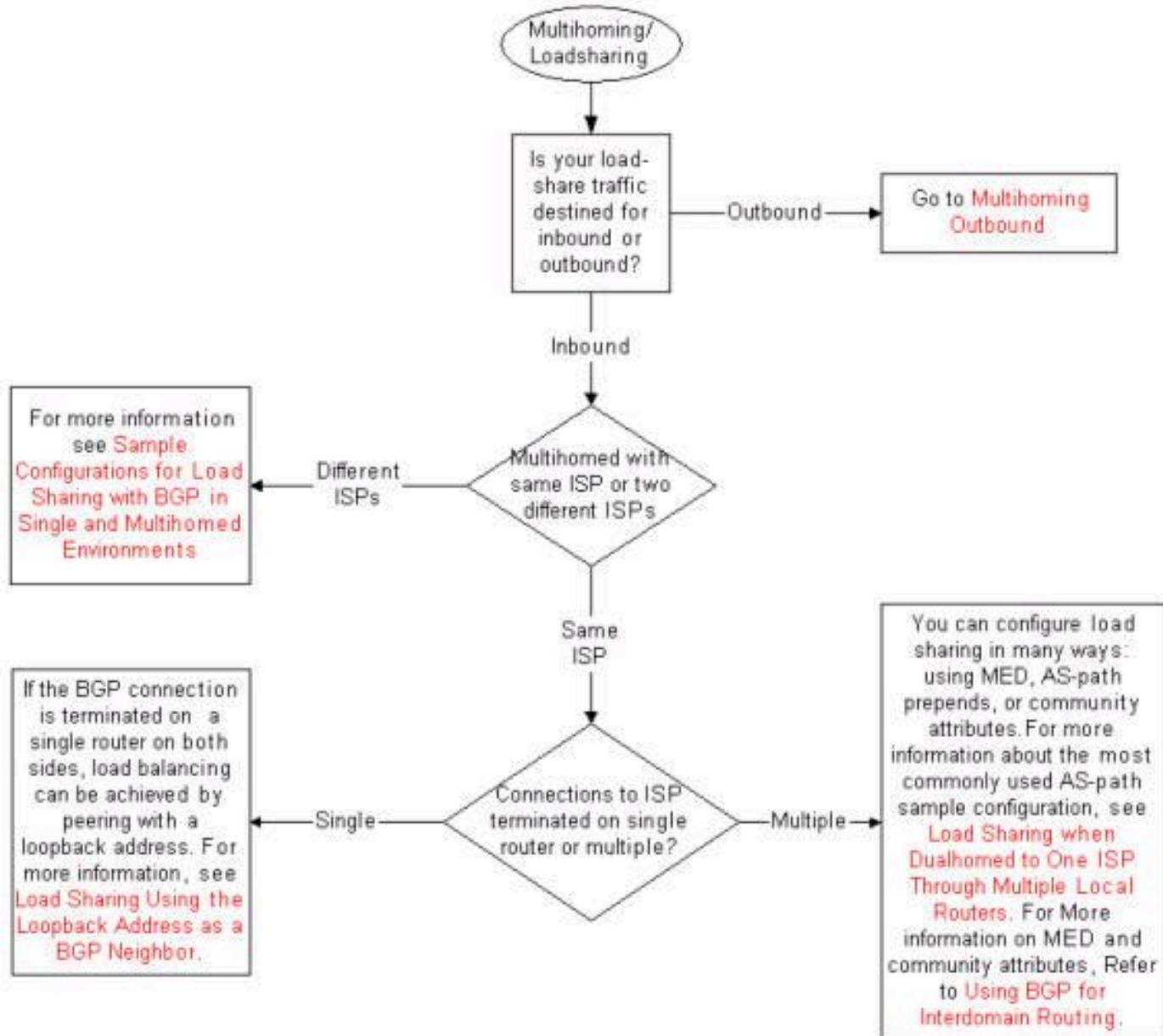
## Troubleshoot Routes Missing from the Routing Table

BGP Routes not in Route Table

- **Does the path exist in the BGP table (use show ip bgp command)?**
  - Yes → **Is best path learned from an iBGP or eBGP peer (use show ip bgp command)?**
    - iBGP → **Is synchronization turned off?**
      - No → A BGP router with synchronization enabled will not install iBGP learned routes into its routing table if it is not able to validate those routes in its IGP. Turn off synchronization using the **no sync** command.
      - Yes → **Is there a valid route to next hop?**
        - No → Establish a route for the next hop or use the **next-hop self** command on iBGP Peers. For more information, see Using BGP for Interdomain Routing.
        - Yes → **Is path in BGP table marked "received-only"?**
          - No → Open a TAC case.
          - Yes → It means that Inbound soft reconfiguration is configured and inbound filters are not allowing the prefix. Check the inbound filters and change it to permit the prefix.
    - eBGP → **Is there a valid route to next hop?**
  - Flapping → Check if the BGP routes are flapping using the **show ip route | include, 00:00** command. See Troubleshooting Flapping BGP Routes (Recursive Routing Failure).
  - No → **Is BGP peer established with neighbor advertising the route (use show ip bpg summary and show ip bgp neighbor commands)?**
    - No → Neighbor Establishment
    - Yes → **Are you learning BGP routes from a peer (use show ip bgp neighbor <peer-address> routes and debug ip bgp x.x.x.x updates commands)?**
      - No → Troubleshoot the router that is advertising the route. → Route Advertisement
      - Yes → Are these filters configured on either BGP peer? Use the **write terminal** or **show running** commands to check your filters. Look for trailing white-space in regexp.

✎ **Note**: If the BGP routes are not in the routing table, verify if the network statement under the BGP configuration is correct.

✎ **Note**: In the **debug ip bgp x.x.x.x updates** command, **x.x.x.x** is the neighbor to which the route must be advertised.
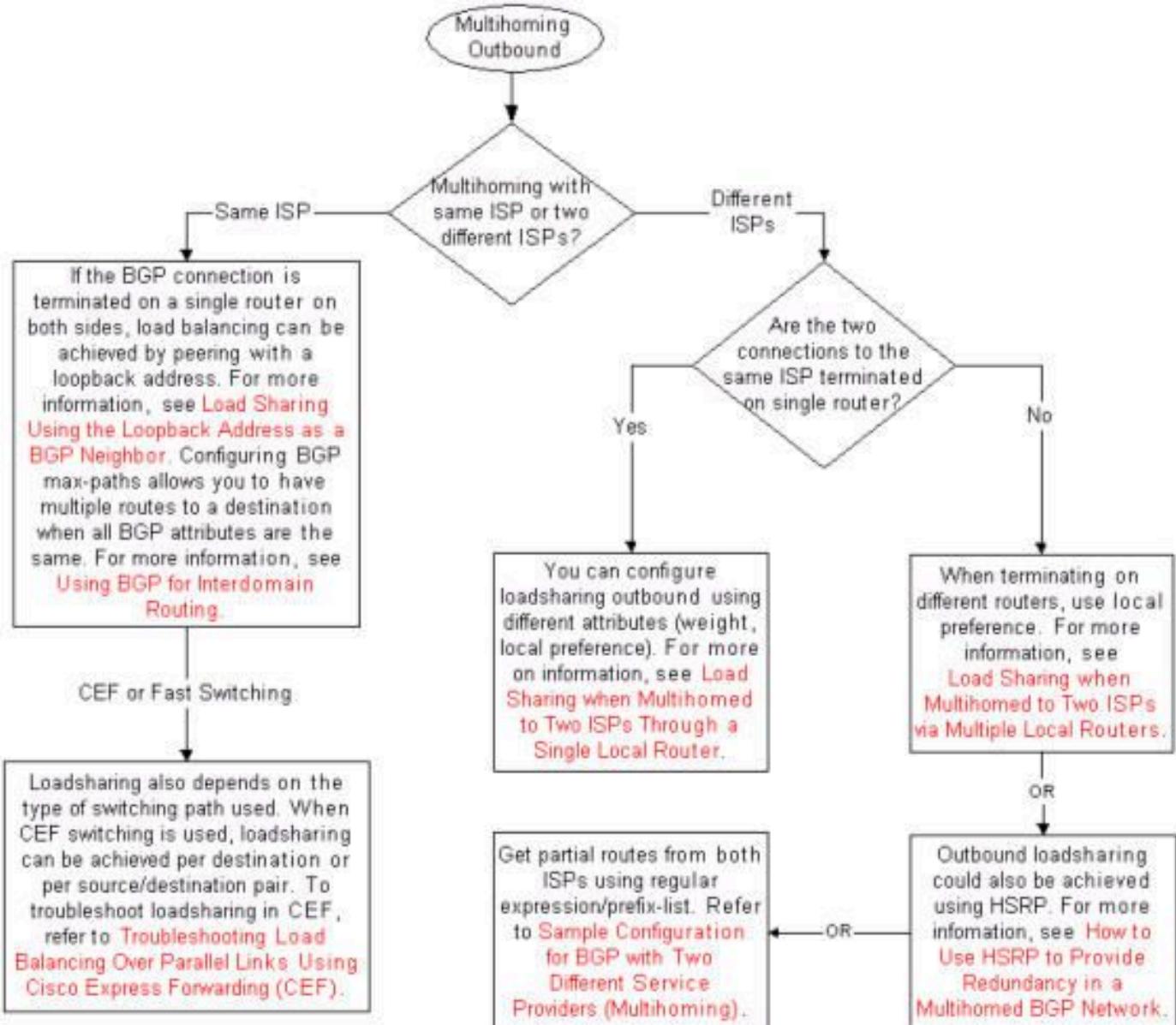

Troubleshoot Multihoming Inbound

Troubleshoot BGP Route Advertisement

Troubleshoot Multihoming Outbound

The flowchart titled "Multihoming Outbound" contains the following content:

Multihoming Outbound → **Multihoming with same ISP or two different ISPs?**

Same ISP:

If the BGP connection is terminated on a single router on both sides, load balancing can be achieved by peering with a loopback address. For more information, see Load Sharing Using the Loopback Address as a BGP Neighbor. Configuring BGP max-paths allows you to have multiple routes to a destination when all BGP attributes are the same. For more information, see Using BGP for Interdomain Routing.

CEF or Fast Switching:

Loadsharing also depends on the type of switching path used. When CEF switching is used, loadsharing can be achieved per destination or per source/destination pair. To troubleshoot loadsharing in CEF, refer to Troubleshooting Load Balancing Over Parallel Links Using Cisco Express Forwarding (CEF).

Different ISPs: → **Are the two connections to the same ISP terminated on single router?**

Yes:

You can configure loadsharing outbound using different attributes (weight, local preference). For more on information, see Load Sharing when Multihomed to Two ISPs Through a Single Local Router.

Get partial routes from both ISPs using regular expression/prefix-list. Refer to Sample Configuration for BGP with Two Different Service Providers (Multihoming).

No:

When terminating on different routers, use local preference. For more information, see Load Sharing when Multihomed to Two ISPs via Multiple Local Routers.

OR

Outbound loadsharing could also be achieved using HSRP. For more infomation, see How to Use HSRP to Provide Redundancy in a Multihomed BGP Network.

Related Information

- BGP & IP Routing Support
- Cisco IOS Primary Command List, All Releases
- Technical Support & Downloads - Cisco Systems