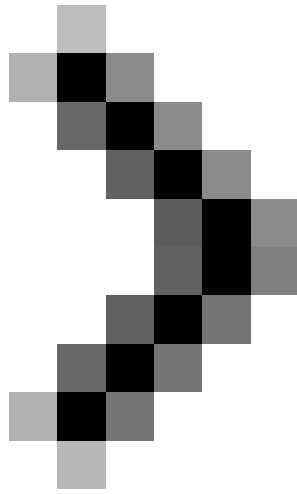


Troubleshoot connectivity problems in the network - Part 6

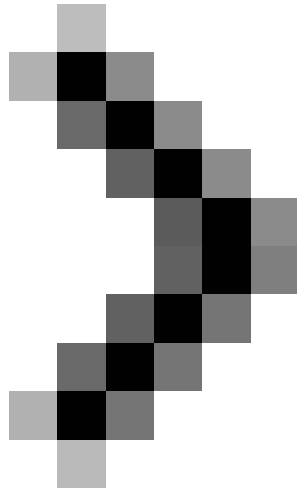
This part 6 will continue the series on troubleshooting network connectivity problems by introducing some issues in the Windows routing table.



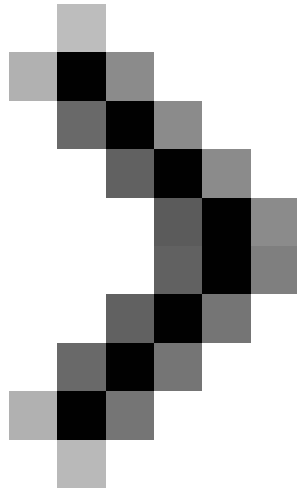
Troubleshoot network connectivity problems (Part 1)



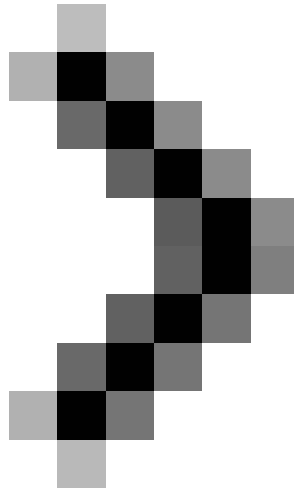
Troubleshoot network connectivity problems (Part 2)



Troubleshoot network connectivity problems (Part 3)



Troubleshooting network connectivity problems (Part 4)



Troubleshoot connectivity problems in the network (Part 5)

Brien M. Posey

Network Administration - *So far in this series, I have shown you how to diagnose some connection-related problems. In this section, we want to clarify to you some problems with Windows routing tables, some problems in the routing table that cause connection problems.*

Throughout this series, we mentioned a lot about routing. Preliminaryly, a router is a device that allows packets to be transferred from one network segment to another. A router is always connected to a minimum of network segments, but often it is connected to a lot. That means that a router needs to be able to indicate which network segment to forward the packet to to reach its destination. This is the problem inside the router's routing tables.

Routing tables allow routers to make decisions about forwarding packets, but what you might not realize is that there are many routing tables built into the Windows operating system. You can view these routing tables by opening a command window and entering that `ROUTE PRINT` command, as shown in Figure A.

```

Command Prompt

C:\>route print
=====
Interface List
  9 ...00 0f b5 fb 3c f7 ..... Realtek RTL8169/8110 Family PCI Gigabit Ethernet
  NIC (NDIS 6.0)
  7 ...00 16 17 39 f2 a6 ..... Realtek RTL8139/810x Family Fast Ethernet NIC
  1 ..... Software Loopback Interface 1
  14 ...00 00 00 00 00 00 e0 6104 Adapter
  8 ...00 00 00 00 00 00 e0 isatap.{48E95265-7094-473E-B3AF-BBCE7E5489D2}
  10 ...00 00 00 00 00 00 e0 isatap.{5709B809-6480-44FD-A5D5-9ABA651AA96B}
=====

IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          147.100.100.100  147.100.100.40   266
127.0.0.0                  255.0.0.0        On-link          127.0.0.1        306
127.0.0.1                  255.255.255.255  On-link          127.0.0.1        306
127.255.255.255           255.255.255.255  On-link          127.0.0.1        306
147.100.0.0                255.255.0.0      On-link          147.100.100.40   266
147.100.100.40            255.255.255.255  On-link          147.100.100.40   266
147.100.255.255           255.255.255.255  On-link          147.100.100.40   266
169.254.0.0                255.255.0.0      On-link          147.100.100.40   30
169.254.255.255           255.255.255.255  On-link          147.100.100.40   266
224.0.0.0                  240.0.0.0        On-link          127.0.0.1        306
224.0.0.0                  240.0.0.0        On-link          147.100.100.40   266
255.255.255.255           255.255.255.255  On-link          127.0.0.1        306
255.255.255.255           255.255.255.255  On-link          147.100.100.40   266
=====

Persistent Routes:
Network Address            Netmask          Gateway Address  Metric
0.0.0.0                    0.0.0.0          147.100.100.100  Default
0.0.0.0                    0.0.0.0          147.100.100.100  Default
=====

IPv6 Route Table
=====
Active Routes:
If Metric Network Destination      Gateway
14 1110 ::0 2002:c058:6301::c058:6301
1 306 ::1/128 On-link
14 1018 2002::16 On-link
14 266 2002:9364:6427::9364:6427/128
On-link
14 266 2002:9364:6428::9364:6428/128
On-link
9 266 fe80::/64 On-link
9 266 fe80::9da:d617:84df:a1f2/128
On-link
1 306 ff00::/8 On-link
9 266 ff00::/8 On-link
=====

Persistent Routes:
None

C:\>_

```

Figure A: Windows routing tables

At first glance, the screen capture above seems quite complicated, but one thing you need to keep in mind is that we captured the screen with Windows Vista. Windows Vista includes internal IPv6 routing information along with standard IPv4 information. If you want to use the Route Print command in other versions of Windows, the IPv6 information will not be present, then the information presented will be much simpler.

As you can see in the figure, the routing information is divided into 3 main parts; section list interface, IPv4 route table section and routing IPv6 table. For the purpose of this article, we will not go into the discussion of the IPv6 route table because there are still very few organizations that use IPv6 today.

Transportation list

The interface list is designed to show you all the network interfaces that Windows currently knows about it. We have separated the Interface List output in Figure B.

```

=====
Interface List
 9 ...00 0f b5 fb 3c f7 ..... Realtek RTL8169/8110 Family PCI Gigabit Ethernet
NIC (NDIS 6.0)
 7 ...00 16 17 39 f2 a6 ..... Realtek RTL8139/810x Family Fast Ethernet NIC
 1 ..... Software Loopback Interface 1
14 ...00 00 00 00 00 00 00 e0 6T04 Adapter
 8 ...00 00 00 00 00 00 e0 isatap.{48B95265-7094-473E-B3AF-BBCE7E5489D2}
10 ...00 00 00 00 00 00 00 e0 isatap.{5709B809-6480-44FD-A5D5-9ABA651AA96B}
=====

```

Figure B: Interface List lists all the network adapters of the machine

If you look at the figure above, you will see the first two items in the list that correspond to the physical network adapters. The adapters listed above demonstrate a number of different issues:

- Windows recognizes that adapter
- The driver has been installed for the adapter.
- Windows is manipulating adapters as a path for IPv4 traffic

The third item shown in Figure B is the loopback adapter. This is not a physical network adapter but a physical mechanism that Windows uses for internal communication. The loopback adapter must be present for Windows to work properly. If the loopback adapter is lost, you should remove other network components and then reinstall them.

The fourth item in the list shown in Figure B above is 6T04 adapter. This is a logical mechanism that Windows uses to route IPv6 traffic and IPv6. This mechanism is only available in Windows Vista.

The remaining items in the above list indicate that IPv6 is tied to the machine's two physical network adapters.

Routing table

Although it is sometimes useful to be able to verify that Windows knows the existence of your network adapters, in the end, routing tables also make decisions to control traffic. You can see the IPv4 routing table in Figure C below.

```

=====
IPv4 Route Table
=====
Active Routes:
Network Destination        Netmask          Gateway          Interface        Metric
0.0.0.0                    0.0.0.0          147.100.100.100 147.100.100.40   266
127.0.0.0                  255.0.0.0          On-link          127.0.0.1        306
127.0.0.1                  255.255.255.255   On-link          127.0.0.1        306
127.255.255.255           255.255.255.255   On-link          127.0.0.1        306
147.100.0.0                255.255.0.0       On-link          147.100.100.40   266
147.100.100.40            255.255.255.255   On-link          147.100.100.40   266
147.100.255.255           255.255.255.255   On-link          147.100.100.40   266
169.254.0.0                255.255.0.0       On-link          147.100.100.40   30
169.254.255.255           255.255.255.255   On-link          147.100.100.40   266
224.0.0.0                  240.0.0.0          On-link          127.0.0.1        306
224.0.0.0                  240.0.0.0          On-link          147.100.100.40   266
255.255.255.255           255.255.255.255   On-link          127.0.0.1        306
255.255.255.255           255.255.255.255   On-link          147.100.100.40   266
=====
Persistent Routes:
Network Address            Netmask          Gateway Address  Metric
0.0.0.0                    0.0.0.0          147.100.100.100 Default
0.0.0.0                    0.0.0.0          147.100.100.100 Default
=====

```

Figure C: Routing table used by IPv4

The routing tables shown above are slightly more complicated because there are many network adapters here. Regardless of the number of machines configured, we will see entries that always exist in the routing table. The table below lists all of these items and what they are used for:

Destination network address

Describe

0.0.0.0

This is the default router used when no valid route is found.

127.0.0.0

This is the loopback address used for internal communication.

147.100.0.0

This is the internal subnet address.

147,100,100.40

This is the IP address assigned to the network interface card.

147.100.255.255

This is the broadcast address for the subnet

224.0.0.0

This is the Windows multicast address

255.255.255.255

This is the limited broadcast address of Windows.

As you can see, some of the addresses in the table above are specific. If you need help figuring out which address is assumed, use the `IPCONFIG / all` command to see how TCP / IP is configured for each of the network adapters. You can use that information to assist in discovering the addresses used within routing tables.

Another thing to note is that if the system is using multiple network adapters, you will have multiple entries for each specific network address. For example, if you look at the image above, you will see some entries with the address range 196.254.xx These entries correspond to the secondary network adapter of the machine we are testing.

Now that you know what to look for in routing tables, there is still a real question about what you will do if the information found in the routing tables is wrong or incomplete. In this case, you have two options. You can remove and reinstall network components or you can rebuild routing tables.

Conclusion

In the next part of this article series, I will show you some of the tools built with Windows to troubleshoot network connectivity issues.

You finished reading the article "**Troubleshoot connectivity problems in the network - Part 6**" edited by the [TipsMake](#) team. We hope this article has provided you with many useful tech tips and tricks. You can search for similar articles on tips and guides. Thank you for reading and for following us regularly.

