

Dynamic versus Static Entries

In an arp cache table, you will typically find two types of entries - *dynamic* and *static*. A dynamic entry is an IP to MAC address pair that your computer has learned of itself during recent communication with that device. A static entry on the other hand is one that was manually entered (or by the operating system) into the cache. Static entries will remain in the cache indefinitely unless explicitly removed. Dynamic entries will stay in cache unless they have not been used recently and the ARP cache timeout has expired.

WINDOWS

METHOD-1

1. arp /d - Delete the Entire Arp Cache

The **/d** switch when used without specifying an IP address will delete the entire arp cache. On newer Windows operating system, this command requires elevated permission. Unless you are troubleshooting a network issue that requires it, deleting the entire arp cache is not typical. For most computers, deleting the entire cache has no adverse effect. Your computer will simply re-perform the arp look-ups find the MAC addresses when the need arises.

To delete the entire arp cache, type the following in the command window then press Enter:

```
C:\WINDOWS\system32>arp /d
```

If you display the cache once the delete command is issued, you will see the entire cache is empty (or near empty), as illustrated in screenshot below. Depending on how soon you are viewing your arp cache after performing the delete command, you may already see your cache being re-populated as your computer continues re-learns them as it communicates with devices on your network.

```
C:\WINDOWS\system32>arp -a

Interface: 10.52.0.6 --- 0xf
    Internet Address      Physical Address      Type
    10.52.0.1             00-ff-62-59-e0-40     dynamic
    224.0.0.22            01-00-5e-00-00-16     static
    239.255.255.250       01-00-5e-7f-ff-fa     static

Interface: 192.168.1.67 --- 0x1a
    Internet Address      Physical Address      Type
    192.168.1.254         a0-9d-86-e2-ee-80     dynamic
    224.0.0.22            01-00-5e-00-00-16     static

Interface: 192.168.56.1 --- 0x1d
    Internet Address      Physical Address      Type
    224.0.0.22            01-00-5e-00-00-16     static
```

2. arp /s - Manually Add an Entry to Arp Cache

The /s switch when used to manually add an entry to the arp cache. To add the IP address 192.168.1.68 to the physical address of 08-25-25-a7-e2-92, type the following in the command window then press Enter:

```
C:\WINDOWS\system32>arp /s 192.168.1.68 08-25-25-a7-e2-92
```

On newer Windows operating system, this command requires elevated permission.

If you display the cache once the add command is issued, you will see the cache now shows the entry you added, as illustrated in the screenshot below. Additionally, because it is manually added, this entry is flagged as a static entry.

```
C:\WINDOWS\system32>arp -a

Interface: 10.52.0.6 --- 0xf
    Internet Address      Physical Address      Type
    10.52.0.1             00-ff-62-59-e0-40     dynamic
    192.168.1.68          08-25-25-a7-e2-92     static
    224.0.0.22            01-00-5e-00-00-16     static
    239.255.255.250       01-00-5e-7f-ff-fa     static

Interface: 192.168.1.67 --- 0x1a
    Internet Address      Physical Address      Type
    192.168.1.254         a0-9d-86-e2-ee-80     dynamic
    224.0.0.22            01-00-5e-00-00-16     static

Interface: 192.168.56.1 --- 0x1d
    Internet Address      Physical Address      Type
    224.0.0.22            01-00-5e-00-00-16     static
```

3. arp /d Inetaddr - Delete an Arp Entry

The `/d Inetaddr` switch is used to delete an entry from the arp cache, where *Inetaddr* is the IP address.. On newer Windows operating system, this command requires elevated permission. Although entries in the arp cache will automatically be removed if your computer has not communicated with it recently, being able to manually delete an entry is helpful particularly when you know an entry is incorrect or when performing network troubleshooting.

For example, to delete the entry with IP address of 192.168.1.68 from our above example screenshot, type the following in the command window then press Enter:

```
C:\WINDOWS\system32>arp /d 192.168.1.68
```

If you display the cache once the delete command is issued, you will see the entry is no longer listed, as illustrated in the screenshot below.

```
C:\WINDOWS\system32>arp -a

Interface: 10.52.0.6 --- 0xf
Internet Address      Physical Address      Type
10.52.0.1             00-ff-62-59-e0-40     dynamic
10.52.255.255         ff-ff-ff-ff-ff-ff     static
224.0.0.22            01-00-5e-00-00-16     static
224.0.0.252           01-00-5e-00-00-fc     static
239.255.255.250       01-00-5e-7f-ff-fa     static

Interface: 192.168.1.67 --- 0x1a
Internet Address      Physical Address      Type
192.168.1.254         a0-9d-86-e2-ee-80     dynamic
192.168.1.255         ff-ff-ff-ff-ff-ff     static
224.0.0.22            01-00-5e-00-00-16     static

Interface: 192.168.56.1 --- 0x1d
Internet Address      Physical Address      Type
192.168.56.255        ff-ff-ff-ff-ff-ff     static
224.0.0.22            01-00-5e-00-00-16     static
```

METHOD-2

In the following example, new arp entry is the IP address 192.168.1.66 and the MAC address e4-46-da-19-7e-9d. The network interface is “Local Area Connection”.

```
Windows PowerShell
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PS C:\WINDOWS\system32> netsh
netsh>interface
In future versions of Windows, Microsoft might remove the Netsh functionality
for TCP/IP.

Microsoft recommends that you transition to Windows PowerShell if you currently
use netsh to configure and manage TCP/IP.

Type Get-Command -Module NetTCPIP at the Windows PowerShell prompt to view
a list of commands to manage TCP/IP.

Visit https://go.microsoft.com/fwlink/?LinkId=217627 for additional information
about PowerShell commands for TCP/IP.
netsh interface>ipv4
netsh interface ipv4>add neighbors "Local Area Connection" "192.168.1.66" "e4-46-da-19-7e-9d" store=persistent

netsh interface ipv4>show neighbors

Interface 15: Local Area Connection

Internet Address      Physical Address      Type
-----
10.16.0.1             00-00-00-00-00-00    Unreachable
10.17.0.1             00-00-00-00-00-00    Unreachable
10.49.0.1             00-ff-62-59-e0-40    Reachable
10.49.255.255         ff-ff-ff-ff-ff-ff    Permanent
10.51.0.1             00-00-00-00-00-00    Unreachable
10.52.0.1             00-00-00-00-00-00    Unreachable
192.168.1.66          e4-46-da-19-7e-9d    Permanent
192.168.1.67          Unreachable          Unreachable
224.0.0.22            01-00-5e-00-00-16    Permanent
224.0.0.251           01-00-5e-00-00-fb    Permanent
224.0.0.252           01-00-5e-00-00-fc    Permanent
239.255.255.250       01-00-5e-7f-ff-fa    Permanent
255.255.255.255       ff-ff-ff-ff-ff-ff    Permanent
```

Ubuntu / Debian

1. ifconfig

```
[08/23/20]seed@VM:~$ ifconfig
enp0s3    Link encap:Ethernet  HWaddr 08:00:27:89:71:f7
          inet addr:192.168.1.5  Bcast:192.168.1.255  Mask:255.255.255.0
          inet6 addr: fe80::d0a7:4c3c:5ca6:c336/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:45 errors:0 dropped:0 overruns:0 frame:0
          TX packets:104 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:3230 (3.2 KB)  TX bytes:9719 (9.7 KB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:88 errors:0 dropped:0 overruns:0 frame:0
          TX packets:88 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:22834 (22.8 KB)  TX bytes:22834 (22.8 KB)
```

2. arp -a

```
[08/23/20]seed@VM:~$ arp -a
? (192.168.1.4) at 08:00:27:da:7a:64 [ether] on enp0s3
? (192.168.1.1) at 52:54:00:12:35:00 [ether] on enp0s3
? (192.168.1.254) at <incomplete> on enp0s3
[08/23/20]seed@VM:~$
```

3. To create a static entry for this gateway, a file must be created in `/etc/network/if-up.d/`. This must be created as root user.

```
[08/23/20]seed@VM:~$ sudo nano /etc/network/if-up.d/add-my-static-arp
```

```
Terminal
GNU nano 2.5.3 File: /etc/network/if-up.d/add-my-static-arp

#!/bin/sh
arp -i enp0s3 -s 192.168.1.4 08:00:27:da:7a:64

[ Read 3 lines ]
^G Get Help ^O Write Out ^W Where Is ^K Cut Text ^J Justify ^C Cur Pos
^X Exit ^R Read File ^\ Replace ^U Uncut Text ^T To Linter ^_ Go To Line
```

4. After that the executable bit has to be set for this file.

```
[08/23/20]seed@VM:~$ sudo chmod +x /etc/network/if-up.d/add-my-static-arp
[08/23/20]seed@VM:~$
```

5. Check for the arp cache.

```
[08/23/20]seed@VM:~$ arp -a
? (192.168.1.4) at 08:00:27:da:7a:64 [ether] PERM on enp0s3
? (192.168.1.1) at 52:54:00:12:35:00 [ether] on enp0s3
? (192.168.1.254) at <incomplete> on enp0s3
? (192.168.1.3) at 08:00:27:fb:af:ea [ether] on enp0s3
[08/23/20]seed@VM:~$
```

6. After reboot, arp cache. This keeps the entry permanent even after a reboot.

```
[08/23/20]seed@VM:~$ arp -a
? (192.168.1.1) at 52:54:00:12:35:00 [ether] on enp0s3
? (192.168.1.4) at 08:00:27:da:7a:64 [ether] PERM on enp0s3
? (192.168.1.254) at <incomplete> on enp0s3
```