

**NAME**

**arp** - Address Resolution Protocol

**SYNOPSIS**

**device ether**

**DESCRIPTION**

The Address Resolution Protocol (ARP) is used to dynamically map between Protocol Addresses (such as IP addresses) and Local Network Addresses (such as Ethernet addresses). This implementation maps IP addresses to Ethernet addresses. It is used by all the Ethernet interface drivers.

ARP caches Internet-Ethernet address mappings. When an interface requests a mapping for an address not in the cache, ARP queues the message which requires the mapping and broadcasts a message on the associated network requesting the address mapping. If a response is provided, the new mapping is cached and any pending message is transmitted. ARP will queue at most *net.link.ether.inet.maxhold* packets while waiting for a response to a mapping request; only the most recently “transmitted” packets are kept. If the target host does not respond after several requests, the host is considered to be down allowing an error to be returned to transmission attempts. Further demand for this mapping causes ARP request retransmissions, that are ratelimited to one packet per second. The error is EHOSTDOWN for a non-responding destination host, and EHOSTUNREACH for a non-responding router.

The ARP cache is stored in per-interface link-level table.

ARP entries may be added, deleted or changed with the arp(8) utility. Manually-added entries may be temporary or permanent, and may be "published", in which case the system will respond to ARP requests for that host as if it were the target of the request.

In the past, ARP was used to negotiate the use of a trailer encapsulation. This is no longer supported.

ARP watches passively for hosts impersonating the local host (i.e., a host which responds to an ARP mapping request for the local host's address).

Proxy ARP is a feature whereby the local host will respond to requests for addresses other than itself, with its own address. Normally, proxy ARP in FreeBSD is set up on a host-by-host basis using the arp(8) utility, by adding an entry for each host inside a given subnet for which proxying of ARP requests is desired. However, the "proxy all" feature causes the local host to act as a proxy for *all* hosts reachable through some other network interface, different from the one the request came in from. It may be enabled by setting the sysctl(8) MIB variable *net.link.ether.inet.proxyall* to 1.

**MIB Variables**

The ARP protocol implements a number of configurable variables in *net.link.ether.inet* branch of the *sysctl(3)* MIB.

<i>allow_multicast</i>	Install ARP entries with the multicast bit set in the hardware address. Installing such entries is an RFC 1812 violation, but some proprietary load balancing techniques require routers to do so. Turned off by default.
<i>garp_rexmit_count</i>	Retransmit gratuitous ARP (GARP) packets when an IPv4 address is added to an interface. A GARP is always transmitted when an IPv4 address is added to an interface. A non-zero value causes the GARP packet to be retransmitted the stated number of times. The interval between retransmissions is doubled each time, so the retransmission intervals are: {1, 2, 4, 8, 16, ...} (seconds). The default value of zero means only the initial GARP is sent; no additional GARP packets are retransmitted. The maximum value is sixteen.  The default behavior of a single GARP packet is usually sufficient. However, a single GARP might be dropped or lost in some circumstances. This is particularly harmful when a shared address is passed between cluster nodes. Neighbors on the network link might then work with a stale ARP cache and send packets destined for that address to the node that previously owned the address, which might not respond.
<i>log_arp_movements</i>	Log movements of IP addresses from one hardware address to another. See <i>DIAGNOSTICS</i> below. Turned on by default.
<i>log_arp_permanent_modify</i>	Log attempts by a remote host to modify a permanent ARP entry. See <i>DIAGNOSTICS</i> below. Turned on by default.
<i>log_arp_wrong_iface</i>	Log attempts to insert an ARP entry on an interface when the IP network to which the address belongs is connected to another interface. See <i>DIAGNOSTICS</i> below. Turned on by default.
<i>max_log_per_second</i>	Limit the number of remotely triggered logging events to a configured value per second. Default is 1 log message per second.
<i>max_age</i>	How long an ARP entry is held in the cache until it needs to be refreshed. Default is 1200 seconds.
<i>maxhold</i>	How many packets to hold in the per-entry output queue while the entry is

being resolved. Default is 16 packets.

<i>maxtries</i>	Number of retransmits before a host is considered down and an error is returned. Default is 5 tries.
<i>proxyall</i>	Enables ARP proxying. Turned off by default.
<i>wait</i>	Lifetime of an incomplete ARP entry. Default is 20 seconds.

## DIAGNOSTICS

**arp: %x:%x:%x:%x:%x:%x is using my IP address %d.%d.%d.%d on %s!** ARP has discovered another host on the local network which responds to mapping requests for its own Internet address with a different Ethernet address, generally indicating that two hosts are attempting to use the same Internet address.

**arp: link address is broadcast for IP address %d.%d.%d.%d!** ARP requested information for a host, and received an answer indicating that the host's ethernet address is the ethernet broadcast address. This indicates a misconfigured or broken device.

**arp: %d.%d.%d.%d moved from %x:%x:%x:%x:%x:%x to %x:%x:%x:%x:%x:%x on %s** ARP had a cached value for the ethernet address of the referenced host, but received a reply indicating that the host is at a new address. This can happen normally when host hardware addresses change, or when a mobile node arrives or leaves the local subnet. It can also indicate a problem with proxy ARP. This message can only be issued if the sysctl *net.link.ether.inet.log\_arp\_movements* is set to 1, which is the system's default behaviour.

**arpresolve: can't allocate linfo for %d.%d.%d.%d** The route for the referenced host points to a device upon which ARP is required, but ARP was unable to allocate a routing table entry in which to store the host's MAC address. This usually points to a misconfigured routing table. It can also occur if the kernel cannot allocate memory.

**arp: %d.%d.%d.%d is on if0 but got reply from %x:%x:%x:%x:%x:%x on if1** Physical connections exist to the same logical IP network on both if0 and if1. It can also occur if an entry already exists in the ARP cache for the IP address above, and the cable has been disconnected from if0, then reconnected to if1. This message can only be issued if the sysctl *net.link.ether.inet.log\_arp\_wrong\_iface* is set to 1, which is the system's default behaviour.

**arp: %x:%x:%x:%x:%x:%x attempts to modify permanent entry for %d.%d.%d.%d on %s** ARP has received an ARP reply that attempts to overwrite a permanent entry in the local ARP table. This error will only be logged if the sysctl *net.link.ether.inet.log\_arp\_permanent\_modify* is set to 1, which is the

system's default behaviour.

**arp: %x:%x:%x:%x:%x:%x is multicast** Kernel refused to install an entry with multicast hardware address. If you really want such addresses being installed, set the sysctl *net.link.ether.inet.allow\_multicast* to a positive value.

#### SEE ALSO

inet(4), route(4), arp(8), ifconfig(8), route(8), sysctl(8)

Plummer, D., "RFC826", *An Ethernet Address Resolution Protocol*.

Leffler, S.J. and Karels, M.J., "RFC893", *Trailer Encapsulations*.