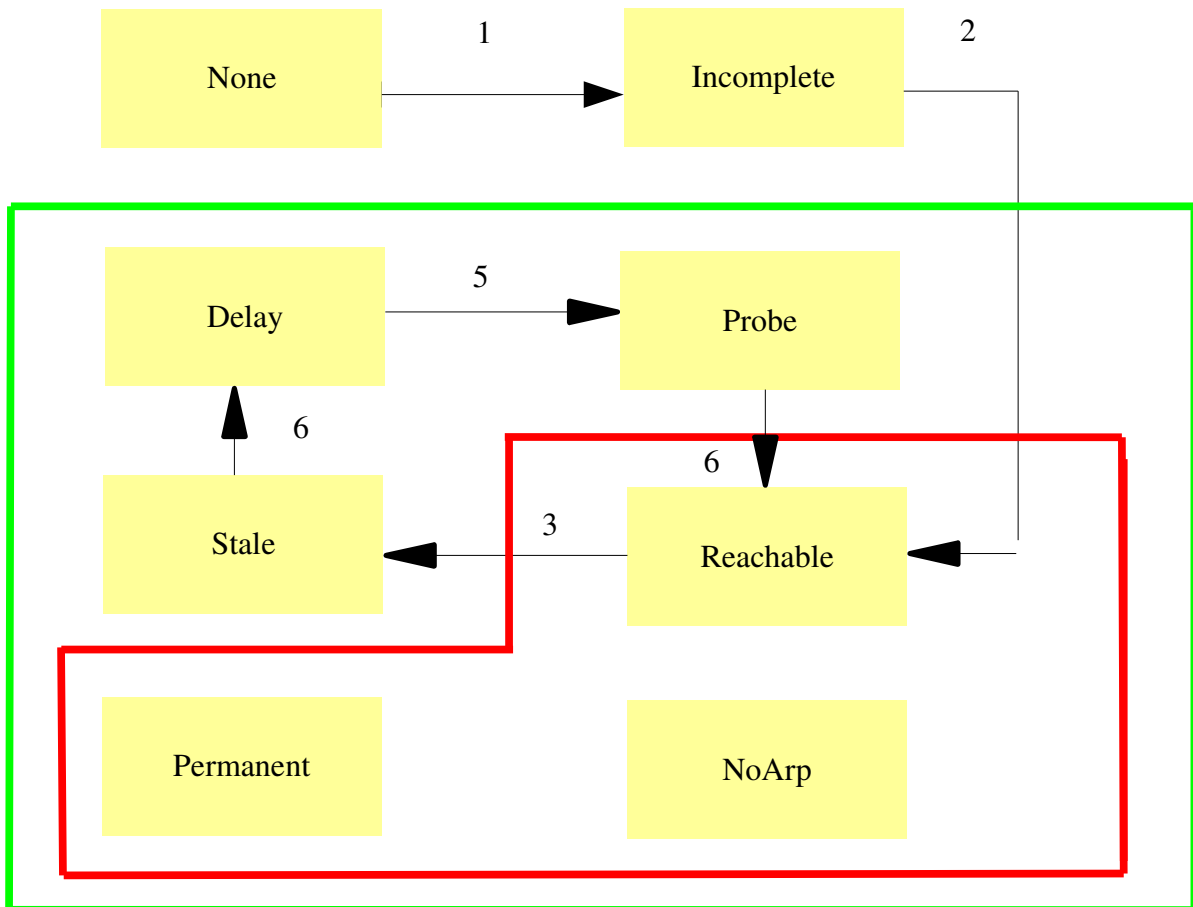


The ARP state machine

```
27 #define NUD_INCOMPLETE 0x01
28 #define NUD_REACHABLE 0x02
29 #define NUD_STALE 0x04
30 #define NUD_DELAY 0x08
31 #define NUD_PROBE 0x10
32 #define NUD_FAILED 0x20
33
34 /* Dummy states */
35 #define NUD_NOARP 0x40
36 #define NUD_PERMANENT 0x80
37 #define NUD_NONE 0x00
38
```

```
49 #define NUD_IN_TIMER (NUD_INCOMPLETE|NUD_DELAY|NUD_PROBE)
50 #define NUD_VALID (NUD_PERMANENT|NUD_NOARP|NUD_REACHABLE|
51 #define NUD_CONNECTED (NUD_PERMANENT|NUD_NOARP|NUD_REACHABLE)
```



- > **NUD_NONE** When a new route cache element is created, the *arp_bind_neighbour()* function is called. If a suitable ARP cache element cannot be found, *neigh_alloc()* creates a new one and sets its state to NUD_NONE.

- > **NUD_INCOMPLETE** When the first packet is sent that requires the new ARP cache element, *neigh_resolve_output()* will be called. This eventually leads to a call to *neigh_event_send*, which sends the ARP request and makes the transition to NUD_INCOMPLETE.

- > **NUD_REACHABLE** When an ARP response is received, the *struct neighbour* enters the NUD_REACHABLE state.

- > **NUD_STALE** When *neigh_periodic_timer()*, finds that the last time the entry was confirmed exceeded the *reachable* time parameter.

- > **NUD_DELAY** When *neigh_resolve_output()* is eventually called with a *struct neighbour* in the NUD_STALE state.

- > **NUD_PROBE** When the *neigh_timer_handler()* function associated with the *struct neighbour* is called in the NUD_DELAY state, a transition is made to NUD_PROBE and an ARP request is issued.

```

1    __neigh_event_send: 707
        n->state == NUD_NONE
3    neigh_periodic_timer: 598
    neigh_sync:537
        now-n->confirmed > n->parms->reachable
4    __neigh_event_send:740
        n->state == NUD_STALE
6    neigh_timer_handler: 650
    neigh_sync:543
        now-n->confirmed < n->parms->reachable
    arp_rcv:806
5    neigh_timer_handler: 657
        n->state == NUD_DELAY

```

Note: the textbook claims that receipt of a data packet refreshes the REACHABLE state. 20 extra credit quiz points to the first person who can demonstrate where/how this is done.