YANG Data Model for IPv4 ARP & IPv6 Address Resolution

draft-ietf-rtgwg-arp-yang-model-04
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draft-zhang-rtgwg-ipv6-address-resolution-yang-00
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Recap - What does the IPv4 ARP model cover

- Existing *ietf-ip.yang* [RFC8344] covers **basic** dynamic and static ARP entries on an interface.

- This draft covers the **extra bits** of ARP implementations that many vendors support, but *ietf-ip* doesn’t cover, e.g.
  - Proxy ARP, Grat. ARP configuration, etc.
  - ARP statistics

- **Changes since -03 (IETF 106)**
  - Editorial improvements to YANG module, security sections
  - New co-authors

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### YANG Module: `ietf-arp`

```yang
module: ietf-arp
  +--rw arp
    +--rw dynamic-learning?  boolean
  +--augment /if:interfaces/if:interface/ip:ipv4:
    +--rw expiry-time?        uint32
    +--rw dynamic-learning?   boolean
    +--rw proxy-arp
      |  +--rw mode?   enumeration
    +--rw gratuitous-arp
      |  +--rw enable?     boolean
      |  +--rw interval?   uint32
    +--ro statistics
      +--ro in-requests-pkts?  yang:counter32
      +--ro in-replies-pkts?   yang:counter32
      +--ro in-gratuitous-pkts? yang:counter32
      +--ro out-requests-pkts? yang:counter32
      +--ro out-replies-pkts?  yang:counter32
      +--ro out-gratuitous-pkts? yang:counter32
    +--augment /if:interfaces/if:interface/ip:ipv4/ip:neighbor:
      +--ro remaining-expiry-time?  uint32
```
Gaps in the IPv6 Missing Part

- *draft-ietf-rtgwg-arp-yang-model* can **NOT** provide support for IPv6 address resolution

- **Protocols**: IPv6 Neighbor Discovery (ND) published in RFC 4861 & Duplicate Address Detection (DAD) published in RFC 4862

- **Existing YANG definitions**
  - **RFC8344**: *ietf-ip.yang* covers basic **dynamic and static IPv6 Neighbor Cache** entries and **DAD** on an interface
    - *leaf forwarding* defines IsRouter flag, *list neighbor* defines Neighbor Cache
    - *leaf dup-addr-detect-transmits* defines the number of consecutive NSs of DAD
  - **RFC8349**: *ietf-ipv6-routerAdvertisements.yang* only covers **Router Advertisement** [RFC 4861]
Design of IPv6 ND YANG model

This document defines YANG data model "ietf-nd" to configure and manage IPv6 Neighbor Discovery (ND), which covers:

- IPv6 Address Resolution
- Proxy Neighbor Advertisement
- Neighbor Unreachability Detection (NUD)
- DAD
- ND Statistics
YANG Module "ietf-nd"

- ND configuration
  - global configuration
  - per interface ND configuration: augments "ipv6" of ietf-ip.yang

- Related Features
  - Neighbor Cache entry
  - dynamic IPv6 address resolution
  - NUD
  - DAD
  - proxy Neighbor Advertisement
  - ND Statistics
Next steps

- Comments are welcome
- Request WG adoption of draft-zhang-rtgwg-ipv6-address-resolution-yang
Thanks!
RFC8344: A YANG Data Model for IP Management

module: ietf-ip
  augment /if:interfaces/if:interface:
    +-rw ipv6!
      +-rw enabled?            boolean
      +-rw forwarding?         boolean
      ...
    +-rw neighbor* [ip]
      |   +-rw ip               inet:ipv6-address-no-zone
      |   +-rw link-layer-address yang:phys-address
      |   +-ro origin?          neighbor-origin
      |   +-ro is-router?       empty
      |   +-ro state?           enumeration
    +-rw dup-addr-detect-transmits? uint32
    +-rw autoconf
    ...

RFC8349: A YANG Data Model for Routing Management

module: ietf-ipv6-unicast-routing
  augment /if:interfaces/if:interface/ip:ipv6:
    +-rw ipv6-router-advertisements
      +-rw send-advertisements?  boolean
      +-rw max-rtr-adv-interval? uint16
      +-rw min-rtr-adv-interval? uint16
      +-rw managed-flag?         boolean
      +-rw other-config-flag?    boolean
      +-rw link-mtu?             uint32
      +-rw reachable-time?       uint32
      +-rw retrans-timer?        uint32
      +-rw cur-hop-limit?        uint8
      +-rw default-lifetime?     uint16
      +-rw prefix-list
      ...

RFC8344: A YANG Data Model for IP Management

RFC8349: A YANG Data Model for Routing Management