IPv6 Auto-configuration

Stateless and Stateful

Auto-configuration

- Hosts should be plug & play
- Use ICMPv6 messages (Neighbor Discovery)
- When booting, the host asks for network parameters:
  - IPv6 prefix(es)
  - default router address(es)
  - hop limit
  - (link local) MTU

Auto-configuration (continued)

- Only routers have to be manually configured
  - but work on prefix delegation is in progress
    (http://www.ietf.org/rfc/rfc3633.txt)
- Hosts can get automatically an IPv6 address
  - BUT it is not automatically registered in the DNS
- NEED for DNS Dynamic Update
  (RFC 2136 PS and RFC 3007 PS) for IPv6

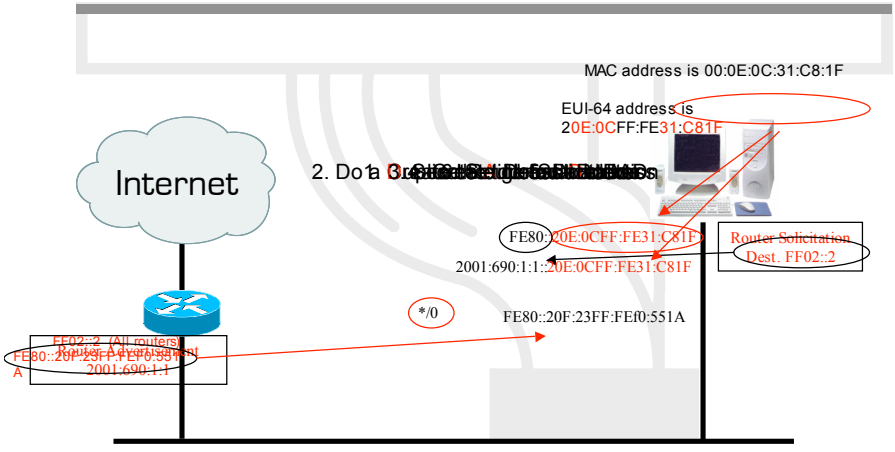
Stateless auto-configuration

- IPv6 Stateless Address Auto-configuration
  - RFC 2462
  - Does not apply to routers
- Hosts are listening for the Router Advertisements (RA) messages that routers periodically transmit !!!
- RA messages coming from the router(s) on the link identify the subnet
- Allows a host to create a global IPv6 from:
  - Its interface identifier = EUI-64(MAC @)
  - Router Advertisements
- Global Address = concat (RA, EUI64)

Stateless auto-configuration

- Default gateway is the router that sends RAs
- If RA doesn't carry any prefix, the host doesn't configure (automatically) any global IPv6 address
- It's impossible to automatically send DNS server addresses
- IPv6 addresses depends on networks adapters

Auto-configuration example



Stateful auto-configuration (DHCPv6)

- Dynamic Host Configuration Protocol for IPv6
  - RFC 3315 and RFC ???
- DHCPv6 works in a client-server model
  - Server
    - Responds to requests from clients
    - Optionally provides the client with:
      - IPv6 addresses
      - Other configuration parameters (DNS servers...)
    - Has the multicast address:
      - All_DHCP_Relay_Agents_and_Servers (FF02::1:2)
    - Memorizes client's state

Stateful auto-configuration (DHCPv6)

  - Client
    - initiates requests on a link to obtain configuration parameters
    - use its link local address to connect the server
    - Send requests to FF02::1:2 multicast address
  - Relay agent
    - node that acts as an intermediary to deliver DHCP messages between clients and servers
    - is on the same link as the client

Stateful auto-configuration (DHCPv6)

- The two types of configuration can complement each other
- Example:
  - we can obtain DNS server address from DHCPv6

In dual-stack we can obtain DNS server addresses from **DHCPv4**

- DHCPv6 Server/client Implementations
  - Dibbler
  - Project DHCPv6
  - ...

Auto-configuration example