IFT 266 Introduction to Network Information Communication Technology

Lab 21

IPv6: EUI-64

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Objective

EUI-64 (Extended Unique Identifier) is a method we can use to automatically configure IPv6 host addresses.

It uses the device's MAC address to create a unique 64-bit interface ID that we can append to the network portion of an IPv6 address.

As a device's MAC address is unique, this ensures that every IPv6 address created is unique.

This method applies the following rules to convert MAC addresses to unique IPv6 addresses.

Rules:
1. Insert 'FFFE' in the middle of the MAC address.
2. Invert the seventh bit (0 to 1, 1 to 0).
3. Apply IPv6 formatting.
4. Append to network ID.

Example: Use the following network ID and MAC address to walk through the steps of converting a MAC address to an IPv6 address using the EUI-64 method.

Network Address: 2000:E27B:CAFE::/64 **MAC Address:** 41:C3:19:BD:E2:4A

1. Insert 'FFFE' in the middle of the MAC address:
   41:C3:19: **FF:FE** :BD:E2:4A

2. Invert the seventh bit:
   0100 0011 :C3:19:FF:FE:BD:E2:4A

3. Apply IPv6 formatting:
   43C3:19FF:FEBD:E24A

4. Append to network ID:
   2000:E27B:CAFE:43C3:19FF:FEBD:E24A

Convert the following MAC addresses to IPv6 interface ID's using EUI-64 formatting.

1. B3:E6:45:4F:B1:73

   Part I: Split the MAC address in half and add 'FFFE' in the middle.

   B3:E6:45:FF:FE:4F:B1:73

   Part II: Convert the first octet to binary.

   10110011 :E6:45:FF:FE:4F:B1:73

   Part III: Switch the seventh bit (from 0 to 1, or from 1 to 0).

   10110001 :E6:45:FF:FE:4F:B1:73

   Part IV: Convert binary back to hexadecimal and set the address in IPv6 notation.

   B1E6:45FF:FE4F:B173

2. A3:A6:50:E5:21:75

   Part I: Split the MAC address in half and add 'FFFE' in the middle.

   A3:A6:50:FF:FE:E5:21:75

   Part II: Convert the first octet to binary.

   10100011 :A6:50:FF:FE:E5:21:75

   Part III: Switch the seventh bit (from 0 to 1, or from 1 to 0).

   10100001 : A6:50:FF:FE:E5:21:75

   Part IV: Convert binary back to hexadecimal and set the address in IPv6 notation.

   A1A6:50FF:FEE5:2175

3. 70:1D:63:93:A7:8D

   Part I: Split the MAC address in half and add 'FFFE' in the middle.

   70:1D:63:FF:FE:93:A7:8D

   Part II: Convert the first octet to binary.

   11100000 :1D:63:FF:FE:93:A7:8D

   Part III: Switch the seventh bit (from 0 to 1, or from 1 to 0).

   11100010 : 1D:63:FF:FE:93:A7:8D

   Part IV: Convert binary back to hexadecimal and set the address in IPv6 notation.

   71ID:63FF:FE93:A78D

4. D3:DC:BA:7A:DB:4A

   Part I: Split the MAC address in half and add 'FFFE' in the middle.

   D3:DC:BA:FF:FE:7A:DB:4A

   Part II: Convert the first octet to binary.

   11010011 : DC:BA:FF:FE:7A:DB:4A

   Part III: Switch the seventh bit (from 0 to 1, or from 1 to 0).

   11010001 : DC:BA:FF:FE:7A:DB:4A

   Part IV: Convert binary back to hexadecimal and set the address in IPv6 notation.

   D1DC:BAFF:FE7A:DB4A

   Part V: Add the **link-local** prefix to the interface ID.

   FE80:D1DC:BAFF:FE7A:DB4A

5. What is the main security concern over using EUI-64 formatting?

   privacy if a system is traced.

6. What other options should be considered when assigning IPv6 addresses?

   IPV6 privacy extension