**IFT 266 Introduction to Network Information Communication Technology**

**Lab 28**

**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

1. Invert the seventh bit:

0100 00**1**1 :C3:19:FF:FE:BD:E2:4A

1. Apply IPv6 formatting:

43C3:19FF:FEBD:E24A

1. 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.

B3 in 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 (B1)\_:E6:45:FF:FE:4F:B1:73

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

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

1. 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.

A3 in 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 (A1)\_: A6:50:FF:FE:E5:21:75

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

A1:A6:50:FF:FE:E5:21:75

1. 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.

70 in binary 01110000\_:1D:63:FF:FE:93:A7:8D

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

01110010 (72)\_: 1D:63:FF:FE:93:A7:8D

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

72:1D:63:FF:FE:93:A7:8D

1. 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.

D3 in 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 (D1)\_: DC:BA:FF:FE:7A:DB:4A

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

D1:DC:BA:FF:FE:7A:DB:4A

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

FE80::D1DC:BAFF:FE7A:DB4A

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

The main security issue with EUI-64 is its potential to compromise privacy, as it allows for device tracking across various networks by incorporating the device's unique MAC address into the IPv6 address.

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

Options such as DHCPv6, Cryptographically Generated Addresses (CGA), and manual assignment improve privacy by masking or separating the device’s MAC address from its IPv6 address.