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

**Lab 21**

**IPv6: EUI-64**  
Co-Authored by Ryan Gresham

**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.

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Part II: Convert the first octet to binary.

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

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

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

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

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

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

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Part II: Convert the first octet to binary.

\_\_\_\_\_\_\_\_\_\_\_:A6:50:FF:FE:E5:21:75

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

\_\_\_\_\_\_\_\_\_\_\_: A6:50:FF:FE:E5:21:75

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

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

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

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Part II: Convert the first octet to binary.

\_\_\_\_\_\_\_\_\_\_\_:1D:63:FF:FE:93:A7:8D

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

\_\_\_\_\_\_\_\_\_\_\_: 1D:63:FF:FE:93:A7:8D

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

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

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

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Part II: Convert the first octet to binary.

\_\_\_\_\_\_\_\_\_\_\_: DC:BA:FF:FE:7A:DB:4A

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

\_\_\_\_\_\_\_\_\_\_\_: DC:BA:FF:FE:7A:DB:4A

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

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

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

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

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