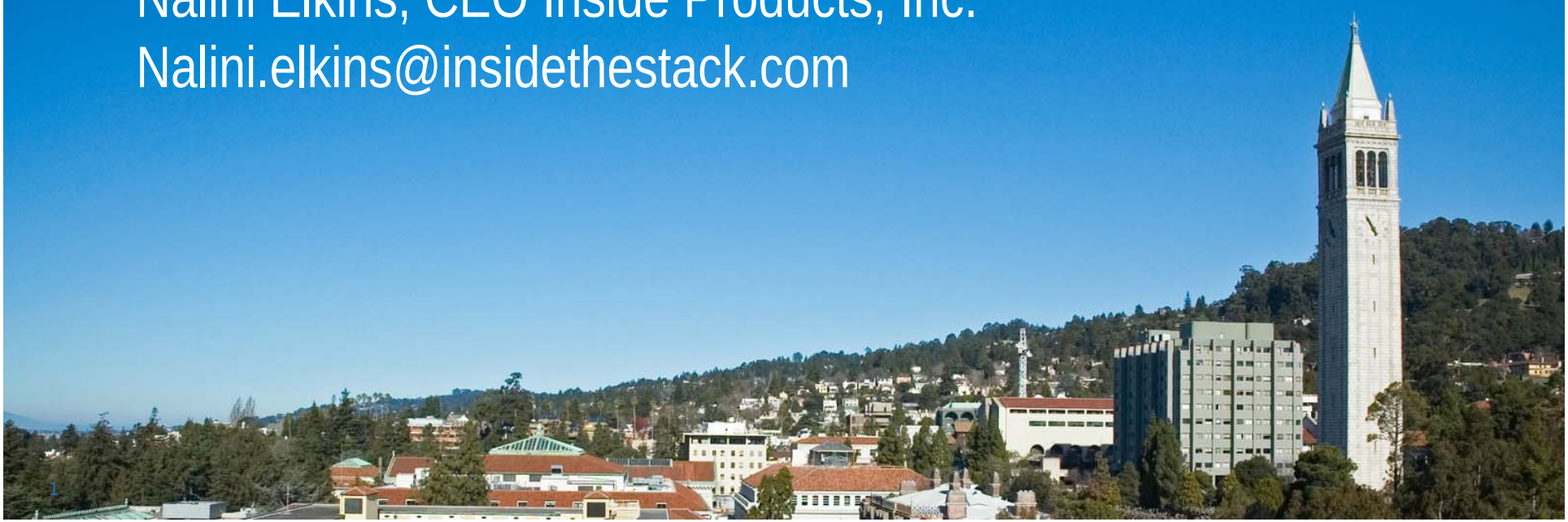
SHARKFEST '13

Wireshark Developer and User Conference

Intro to IPv6 Addressing

Nalini Elkins, CEO Inside Products, Inc.
Nalini.elkins@insidethestack.com

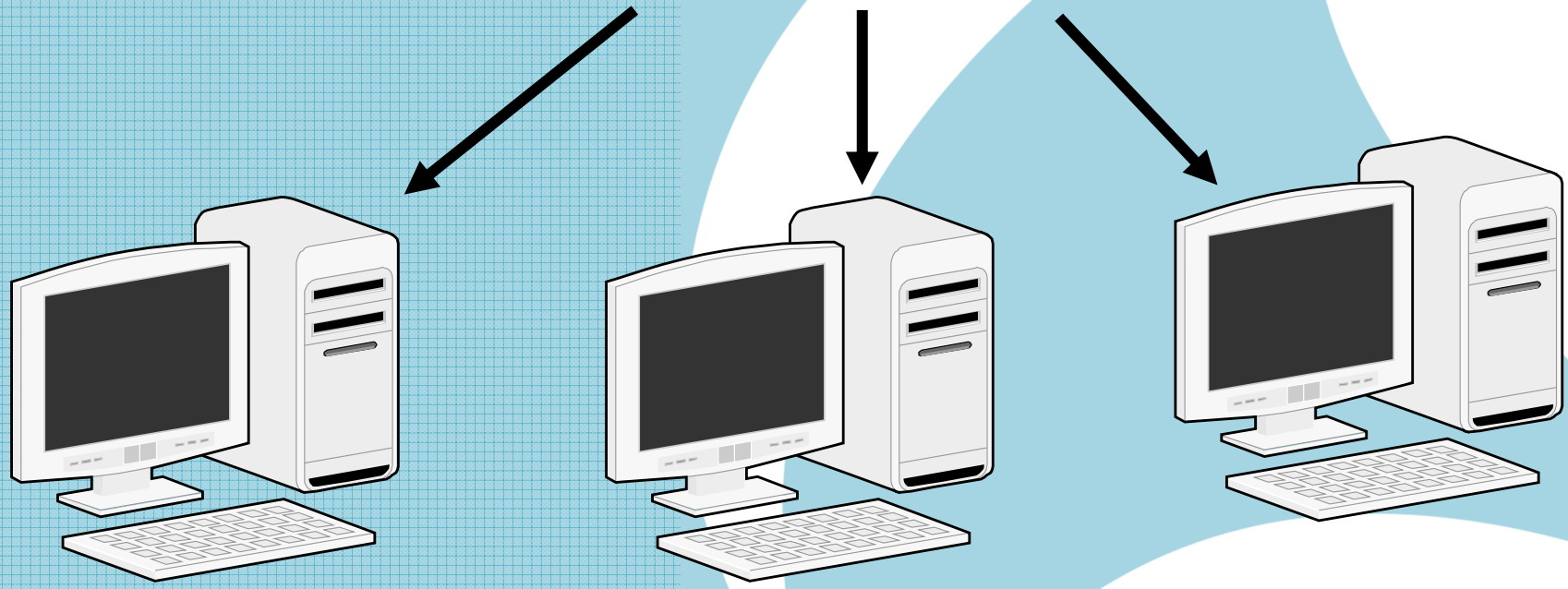


Agenda

- Prefixes
- Zero-compression
- Extension headers
- IPv4 / IPv6 differences
- Addressing models and types : site local, link local, global unicast
- IPv6 Address States / Basic IPv6 Trace Reading (Stateless and Statefull autoconfiguration)
- Privacy addressing
- Reading IPv6 traces

Network Addresses

Each one needs one!



Let's Look at Some Addresses

What is this?

1600 Pennsylvania Ave
NW Washington, DC 20500

Sample IPv4 Addresses

192.168.1.1

10.12.15.201

201.23.5.104

Sample IPv6 Addresses

3FFE:52AB:2:ABC:123:56:DE:1

2001::2:ABC:123

FE80:1234::1

FF01::2

::

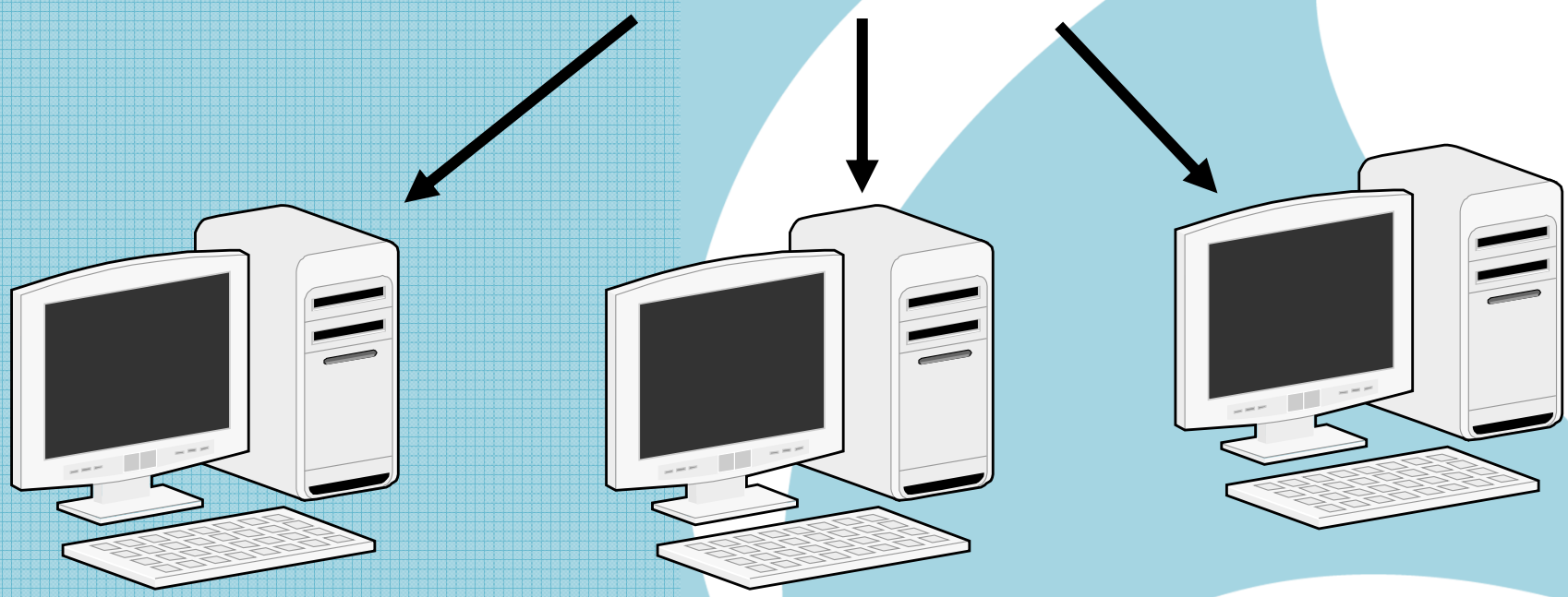
Barriers to Implementation

New address format

arek Pevajfae93897 A%$
NW WA$o3ihqio3hr, BBB 20500

TCP/IP Network

Addresses



192.168.1.100
2001:5c0:8fff:3::100

192.168.1.101
2001:5c0:8fff:3::101

192.168.1.102
2001:5c0:8fff:3::102

Private vs. Public Addresses

Public: 1600 Pennsylvania Ave NW, Washington, DC 20500

Private: P.O. Box 27624 Washington, D.C. 20500

What is this?

192.168.1.1

It is ...

192.168.1.1

- IPv4
- Private

What is this?

FE80:1234::1

It is …

FE80:1234::1

- IPv6
- Private

What is this?

201.23.5.104

It is ...

201.23.5.104

- IPv4
- Public

What is this?

2001::2:ABC:123

It is …

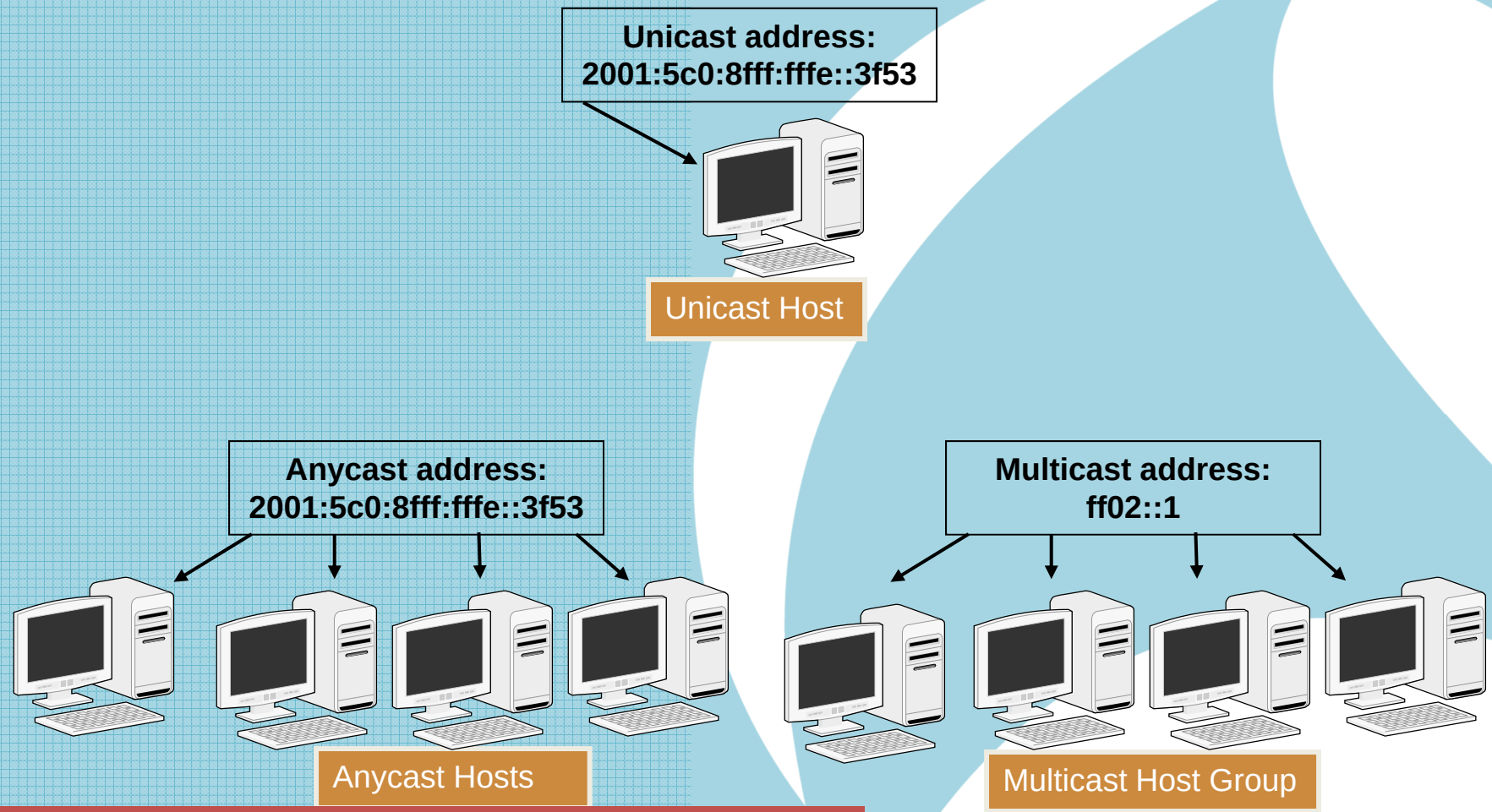
2001::2:ABC:123

- IPv6
- Public

Addressing Concepts

- Decimal notation (IPv4)
  - 1.2.3.4
- Hexadecimal notation (IPv6)
  - 00 - FF
- Binary
  - 1 byte = 8 bits

IPv6 Address Types



Anycast addresses appear the same as unicast addresses

IPv6 Address Representation

- IPv4 Address : 32 bits – IPv6 address : 128 bits
- IPv6 address : 8 sections of 4 hex digits (16 bits)
  - 1111:2222:3333:4444:5555:6666:7777:8888
- Zero-compression
  - 1111:2222:0:0:5555:6666:7777:8888
  - 1111:2222::5555:6666:7777:8888
- Prefix length
  - 1111:2222::5555:6666:7777:8888 /64
- Prefix alone
  - 1111:2222:: /64

Important IPv6 Prefix Notations

/8	11111111xxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx	00xx:: FFxx::
/16	1111111111111111.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx	0000:: FFFF::
/32	1111111111111111.1111111111111111. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx	0000:0000:: FFFF:FFFF::
/48	1111111111111111.1111111111111111. 1111111111111111.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx	0000:0000:0000:: FFFF:FFFF:FFFF::
/56	1111111111111111.1111111111111111. 1111111111111111.11111111xxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx	0000:0000:0000:00xx:: FFFF:FFFF:FFFF:FFxx::
/64	1111111111111111.1111111111111111. 1111111111111111.1111111111111111. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx. xxxxxxxxxxxxxxxx.xxxxxxxxxxxxxxxx	0000:0000:0000:0000:: FFFF:FFFF:FFFF:FFFF::

IPv6 Routes on Windows

Publish	Type	Met	Prefix	Idx	Gateway/Interface Name
Yes	Manual	9000	::/0	23	2620:9b::1900:1
No	Manual	256	::1/128	1	Loopback Pseudo 1
No	Manual	8	2001::/32	12	Teredo Tunneling
No	Manual	256	2620:9b::/96	23	Hamachi
No	Manual	256	2620:9b::1991:e216/128	23	Hamachi
No	Manual	256	fe80::/64	23	Hamachi
No	Manual	256	fe80::/64	12	Teredo Tunneling
No	Manual	256	ff00::/8	1	Loopback Pseudo
No	Manual	256	ff00::/8	12	Teredo Tunneling
No	Manual	256	ff00::/8	23	Hamachi

Zero Compression

- IPv6 addresses are zero compressed.
- Double colon can appear only once.
- Zero compression on special addresses.

805B:2D9D:DC28:0:0:FC57:0:0

↓

805B:2D9D:DC28::FC57:0:0

or

805B:2D9D:DC28:0:0:FC57::

FF00:4501:0:0:0:0:0:32

FF00:4501::32

0:0:0:0:0:0:0:1

::1

0:0:0:0:0:0:0:0

::

IPv4 / IPv6 Address Structure

	8 Bits	8 Bits	8 Bits	8 Bits
Network Prefix →	Octet1	Octet2	Octet3	Host

IPv4 Sample Address:204.12.34.5

	48 Bits	16 Bits	64 Bits
Network Prefix →	001……	Subnet ID	Interface ID

IPv6 Sample Address: 2001:5c0:8fff:fffe::1

	128 - n Bits	n Bits
Network Prefix →	FE80……	Interface ID

IPv6 Sample Address: FE80:1234::1

Addressing Changes

- No broadcast addressing
- Uses IPv6 multicast addressing
- IPv6 address planning is different from IPv4
- IPv4 and IPv6 subnet structure is different

IPv4 Broadcast Addresses

192.168.1.255
255.255.255.255

Importance of IPv6 Network Prefix

- First part of network prefix important!
- Example: 2001:5c0:8fff:0003::3f53
- Learn:
  - Can you go out on the internet with it,
  - What devices can you talk to,
  - Is it for special function.

FE80 = Link Local

FFxx = Multicast

2001 = Global Unicast

0000 = Special

Types of Unicast Addresses

48 Bits	16 Bits	64 Bits
001……	Subnet ID	Interface ID

Network Prefix

Global Unicast Address

2001:5c0:8fff:0003::3f53

Types of IPv6 unicast addresses:

- global unicast,
- link-local unicast, and
- site-local unicast.

IPv6 Global Unicast Address

- Global unicast address: 48-bit network prefix, 16-bit subnet ID, 64 bit interface ID
- Router interface: 64 bits
- Current global unicast address allocation: 2000::/3 (binary 001)

48 Bits	16 Bits	64 Bits
001……	Subnet ID	Interface ID

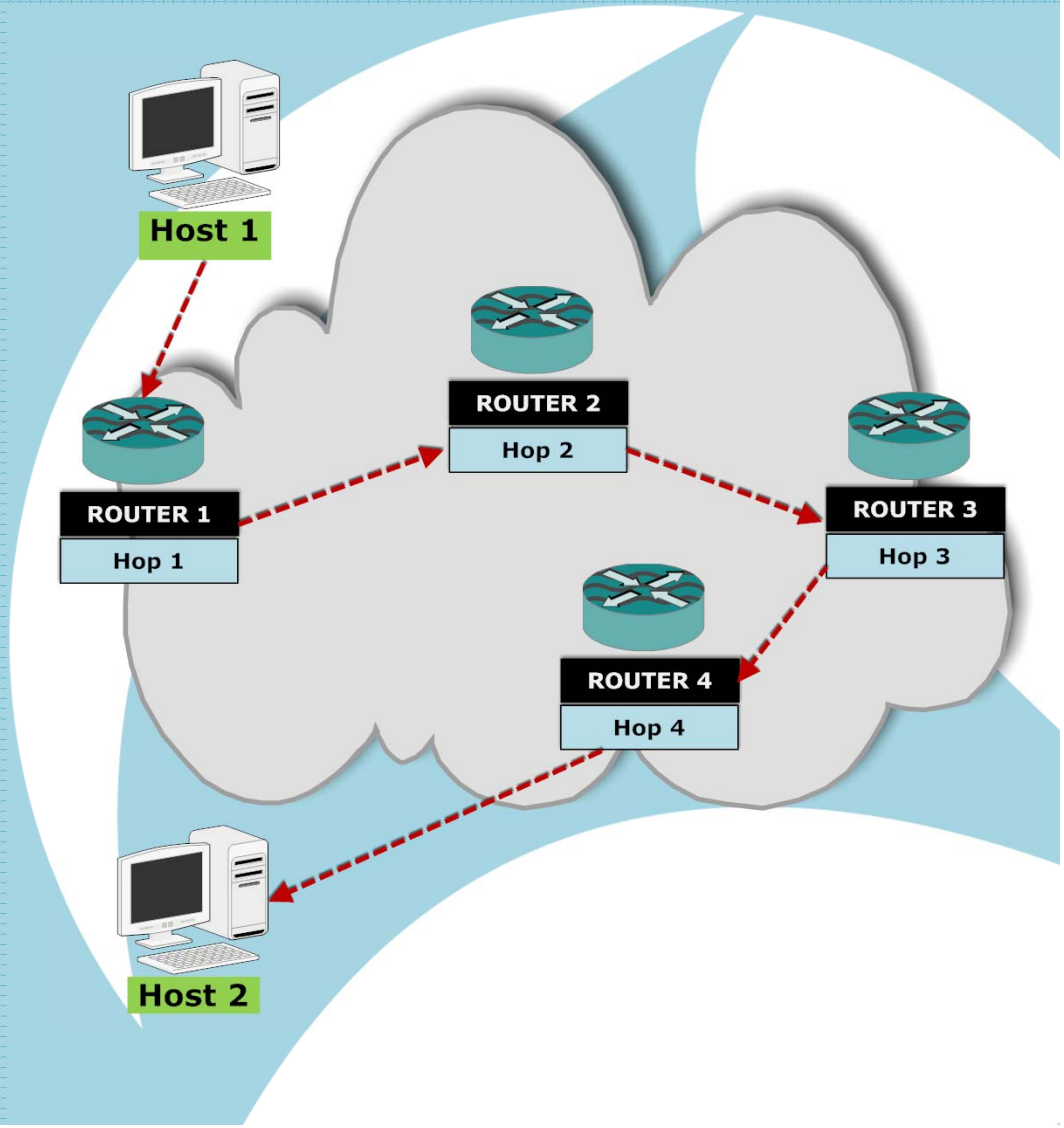
Network Prefix

Global Unicast Address

2001:5c0:8fff:0003::1

IPv6 Global Unicast Address

- IPv6 global unicast address= IPv4 global unicast address
- Plan network in hierarchy
- Limit routing table entries



Shortcut to cmd

```
C:\WINDOWS\system32>ipconfig

Windows IP Configuration


Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : 192.168.1.100
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        IP Address. . . . . . . . . . . . : fe80::211:d8ff:fe39:292b%4
        Default Gateway . . . . . . . . . : 192.168.1.1

Ethernet adapter Local Area Connection 2:

        Connection-specific DNS Suffix  . :
        Autoconfiguration IP Address. . . : 169.254.100.29
        Subnet Mask . . . . . . . . . . . : 255.255.0.0
        IP Address. . . . . . . . . . . . : 2001:5c0:8fff:fffe::3f53
        IP Address. . . . . . . . . . . . : fe80::2ff:8cff:fe10:3976%5
        Default Gateway . . . . . . . . . : 2001:5c0:8fff:fffe::3f52

Tunnel adapter Teredo Tunneling Pseudo-Interface:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : fe80::5445:5245:444f%6
        Default Gateway . . . . . . . . . :

Tunnel adapter Automatic Tunneling Pseudo-Interface:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : fe80::5efe:169.254.100.29%2
        Default Gateway . . . . . . . . . :

Tunnel adapter Automatic Tunneling Pseudo-Interface:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : fe80::5efe:192.168.1.100%2
        Default Gateway . . . . . . . . . :
```

Global Unicast Network Prefix

Network Prefix

48 Bits	16 Bits	64 Bits
001……	Subnet ID	Interface ID

Global Unicast Address

2001:5c0:8fff:0003::3f53

- Network Prefix: First part of an IPv6 address.
- Best practices: 48 bits

Global Unicast Subnet Prefix

- Subnet prefix: standard is 16 bits
- 65,535 subnets

Network Prefix →

48 Bits	16 Bits	64 Bits
001……	Subnet ID	Interface ID

Global Unicast Address

2001:5c0:8fff:fffe::1

Global Unicast Interface ID (IID)

- IID is for an interface
- IID must be unique
- IID: standard is 64 bits

48 Bits	16 Bits	64 Bits
001……	Subnet ID	Interface ID

Network Prefix

Global Unicast Address

2001:5c0:8fff:fffe::1

EUI-64 Format

- IID: based on the link-layer (MAC) address
- EUI-64 format : OUI field + FFFE + Serial Number

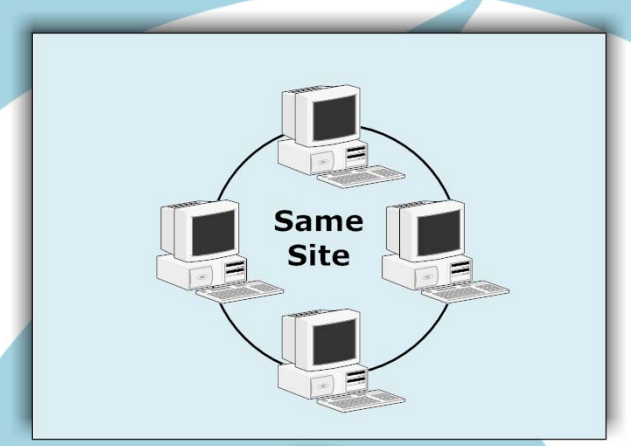
Example on Windows PC: result of IPConfig

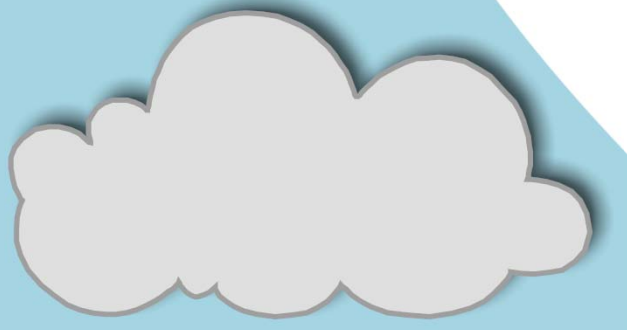
Ethernet adapter Local Area Connection:
Description : Realtek Family Fast Ethernet NIC
Physical Address : 00-11-D8-39-29-2B
Autoconfiguration Enabled . : Yes
IP Address : fe80::211:d8ff:fe39:292b%4

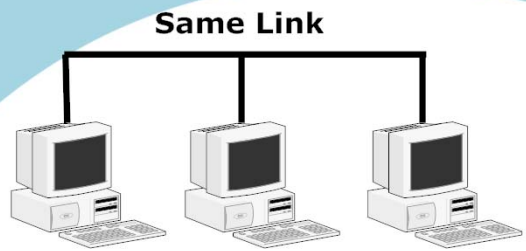
IPv6 Private Addresses

- Link-local or site-local
- Never routed outside a company or link
- Start with hex FE then 8 to F (1111 1110 1)
- Most common: FE80 (link-local)

FE8n – FEFn = Private Addresses







Link-Local Unicast Address

- IPv6 devices always have link-local address
- IPv6 devices use link-local to communicate with ‘on-link’ devices
- IPv6 routers must not forward link-local packets

10 Bits	54 Bits	64 Bits
1111111010	zeroes	Interface ID

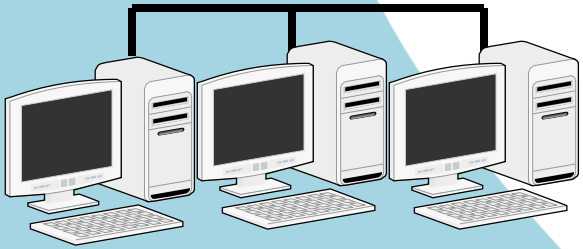
Sample Link-Local Address

Fe80:211:d8ff:fe39:292b

Link-Local Address Explained

- Why do you need link-local addresses?
- How do you get a link-local address?

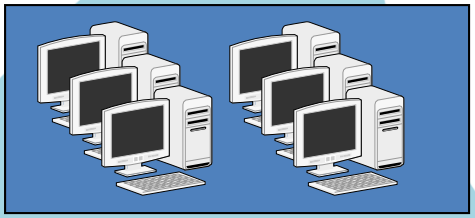
Who am I? IPv6 Stateless autoconfiguration



FE8n - FEBn = Link Local

Site-Local Unicast Addresses

- IPv4 site-local private addresses = 10.0.0.0/80.0/12 or 192.168.0.0/16
- Site-local address + NAT used for topology hiding
- IPv6 site-local unicast deprecated
- Impacts network architecture, security, Internet access
- Site scope multi-cast still available



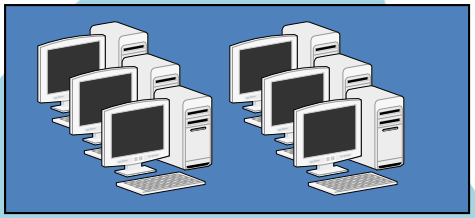
FECn - FEFn = Site Local

IPv6 Address Space Allocations

IPv6 Prefix	Allocation	Reference
0000::/8	Reserved by IETF	[RFC3513]
0100::/8	Reserved by IETF	[RFC3513]
0200::/7	Reserved by IETF	[RFC4048]
0400::/6	Reserved by IETF	[RFC3513]
0800::/5	Reserved by IETF	[RFC3513]
1000::/4	Reserved by IETF	[RFC3513]
2000::/3	Global Unicast	[RFC3513]
4000::/3	Reserved by IETF	[RFC3513]
6000::/3	Reserved by IETF	[RFC3513]
8000::/3	Reserved by IETF	[RFC3513]
A000::/3	Reserved by IETF	[RFC3513]
C000::/3	Reserved by IETF	[RFC3513]
E000::/4	Reserved by IETF	[RFC3513]
F000::/5	Reserved by IETF	[RFC3513]
F800::/6	Reserved by IETF	[RFC3513]
FC00::/7	Unique Local Unicast	[RFC4193]
FE00::/9	Reserved by IETF	[RFC3513]
FE80::/10	Link Local Unicast	[RFC3513]
FEC0::/10	Reserved by IETF	[RFC3879]
FF00::/8	Multicast	[RFC3513]

DeFacto Site-Local Unicast

- ULA (Unique Local Unicast) addresses
- Large address space!
- Conflicts?



FC00:: /7 = ULA

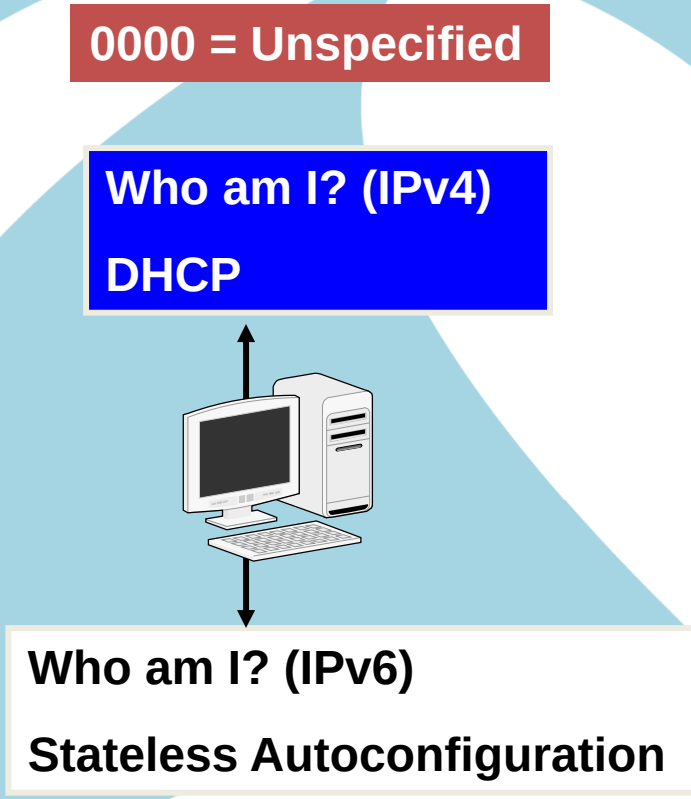
IPv6 Reserved Addresses

- Defined by the IETF
- Includes:
  - Unspecified,
  - Loopback and
  - IPv4 Embedded addresses
- See: http://www.iana.org/assignments/ipv6-address-space/ipv6-address-space.xml

0000:: /8 = Reserved

IPv6 Unspecified Address

- Who am I?
- IPv6 *unspecified address*.
- Stateless Autoconfiguration
- Represented as ::



```
164 ADCD      PACKET   00000004 08:14:04.416323 Packet Trace
  From Interface     : ETH1                Device: LCS Ethernet      Full=342
   Tod Clock         : 2006/01/06 08:14:04.416317                    Intfx: 4
   Sequence #        : 0                   Flags: Pkt
  IpHeader: Version  : 4                   Header Length: 20
   Tos               : 00                  QOS: Routine Normal Service
   Packet Length     : 342                 ID Number: 0000
   Fragment          :                     Offset: 0
   TTL               : 128                 Protocol: UDP             CheckSum: 3998 FFFF
   Source            : 0.0.0.0
   Destination       : 255.255.255.255

  UDP
   Source Port       : 68    (bootpc)      Destination Port:  67    (bootps)
   Datagram Length   : 322                 CheckSum: 93B0 FFFF
   BOOTP Opcode      : REQUEST             HW Type: ETHERNET 10M  HW Length: 6
    HOP Count        : 0                   Trans ID: 1047706584   Seconds: 0
    Client IP        : 0.0.0.0             Your IP: 0.0.0.0
    Server IP        : 0.0.0.0             Gateway: 0.0.0.0
    Client HW Addr   : 0013D38D61FB00000000000000000000 Flags: 0
    Server Host Name:
    Boot FileName    :
    Vendor Info      : 638253633501033D07010013D38D61FB3204C0A801650C0C42617272792D636
    Vendor Info      : 6D7061715110000000426172727 92D636F6D7061712E3C084D53465420352E3
     DHCPMSG         : DhcpREQUEST
     CLIENTID        : 7 010013D38D61FB
     REQIPADDR       : 192.168.1.101
     HOSTNAME        : Barry-compaq
     DHCPDDNS        : 16 00000042617272792D636F6D7061712E
     CLASSID         : MSFT 5.0
     PARMLIST        : 11 options
```

IPv6 Stateless Autoconfiguration

File Edit View Go Capture Analyze Statistics Help

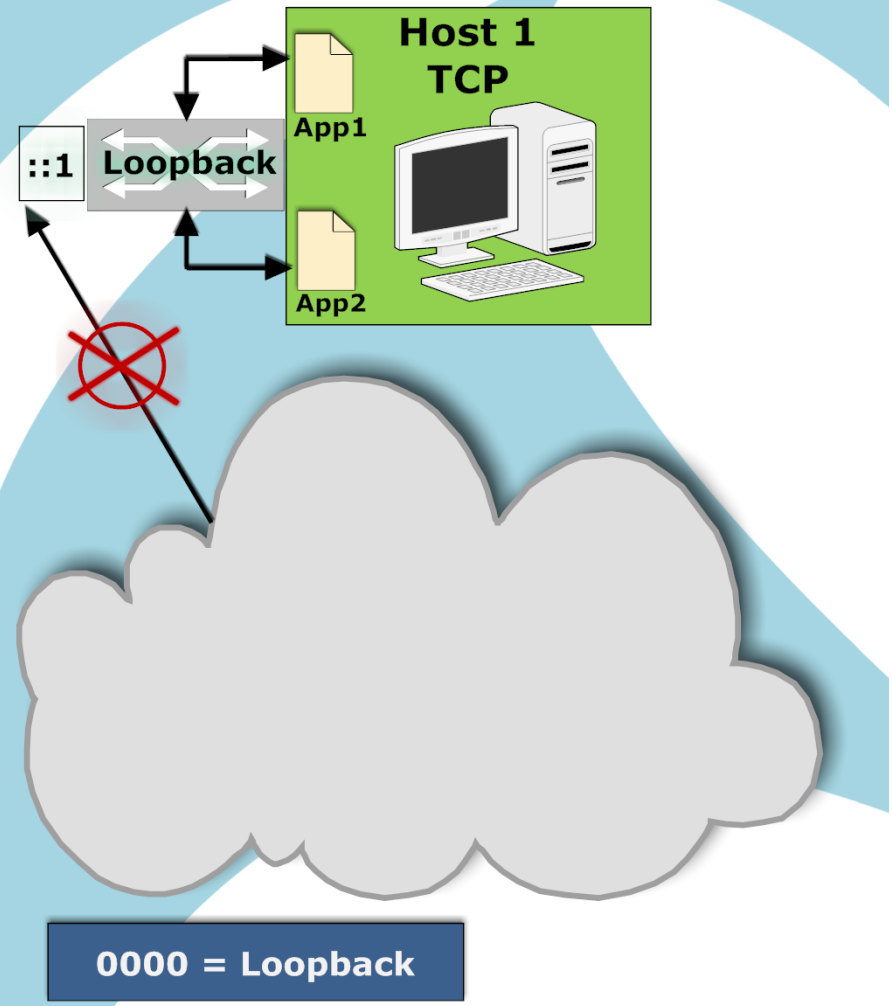
Filter: icmpv6 Expression... Clear Apply

No.	Time	Source	Destination	Protocol	Info
38	19.885381	fe80::213:d3ff:fe8	ff02::1:ff8d:61fb	ICMPv6	Multicast listener report
39	19.885395	fe80::213:d3ff:fe8	ff02::2	ICMPv6	Router solicitation
40	19.885416	::	ff02::1:ff8d:61fb	ICMPv6	Neighbor solicitation
43	21.885387	fe80::213:d3ff:fe8	ff02::1:ff8d:61fb	ICMPv6	Multicast listener report
46	23.885313	fe80::213:d3ff:fe8	ff02::2	ICMPv6	Router solicitation
52	27.885227	fe80::213:d3ff:fe8	ff02::2	ICMPv6	Router solicitation

```
⊞ Frame 40 (78 bytes on wire, 78 bytes captured)
⊟ Ethernet II, Src: 192.168.1.102 (00:13:d3:8d:61:fb), Dst: IPv6-Neighbor-Discovery_ff:8d:61:fb (33:33:ff:8d:61:fb)
    Destination: IPv6-Neighbor-Discovery_ff:8d:61:fb (33:33:ff:8d:61:fb)
    Source: 192.168.1.102 (00:13:d3:8d:61:fb)
    Type: IPv6 (0x86dd)
⊟ Internet Protocol Version 6
    Version: 6
    Traffic class: 0x00
    Flowlabel: 0x00000
    Payload length: 24
    Next header: ICMPv6 (0x3a)
    Hop limit: 255
    Source address: ::
    Destination address: ff02::1:ff8d:61fb
⊟ Internet Control Message Protocol v6
    Type: 135 (Neighbor solicitation)
    Code: 0
    Checksum: 0xe302 [correct]
    Target: fe80::213:d3ff:fe8d:61fb
```

Loopback Address

- IPv6 loopback address is 0:0:0:0:0:0:0:1 (::1)
- Acts like IPv4 loopback.
  - Can't be assigned to physical interface.
  - Used by local applications
  - Can't travel outside node
  - Can't be forwarded by router



IPv4 Addresses in IPv6

- From reserved space (0000::/8)
- IPv4 Mapped (Embedded) IPv6 Addresses.
- Last 32 bits = IPv4 address
- Shown in IPv4 notation
- May see on IBM mainframe applications

80 Bits	16 Bits	32 Bits
zeroes	FFFF	IPv4 Address

IPv4 Mapped IPv6 Address

::ffff:192.168.0.1

IPv4 Compatible IPv6 Address

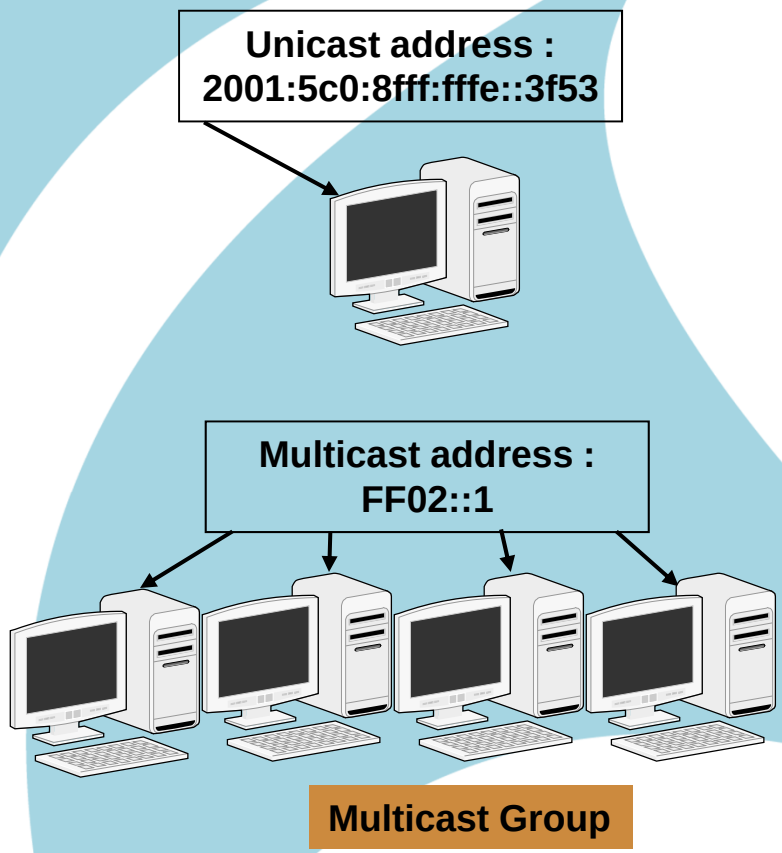
::192.168.0.1

Shortcut to cmd

```
C:\WINDOWS\system32>ipconfig

Windows IP Configuration


Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : 192.168.1.100
        Subnet Mask . . . . . . . . . . . : 255.255.255.0
        IP Address. . . . . . . . . . . . : fe80::211:d8ff:fe39:292b%4
        Default Gateway . . . . . . . . . : 192.168.1.1

Ethernet adapter Local Area Connection 2:

        Connection-specific DNS Suffix  . :
        Autoconfiguration IP Address. . . : 169.254.100.29
        Subnet Mask . . . . . . . . . . . : 255.255.0.0
        IP Address. . . . . . . . . . . . : 2001:5c0:8fff:fffe::3f53
        IP Address. . . . . . . . . . . . : fe80::2ff:8cff:fe10:3976%5
        Default Gateway . . . . . . . . . : 2001:5c0:8fff:fffe::3f52

Tunnel adapter Teredo Tunneling Pseudo-Interface:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : fe80::5445:5245:444f%6
        Default Gateway . . . . . . . . . :

Tunnel adapter Automatic Tunneling Pseudo-Interface:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : fe80::5efe:169.254.100.29%2
        Default Gateway . . . . . . . . . :

Tunnel adapter Automatic Tunneling Pseudo-Interface:

        Connection-specific DNS Suffix  . :
        IP Address. . . . . . . . . . . . : fe80::5efe:192.168.1.100%2
        Default Gateway . . . . . . . . . :
```

IPv6 Multicast

- In IPv6, multicasting used widely
- Multicast is like a newsletter subscription.
- Devices belong to a multicast group
- IPv4 multicast uses Class D range: (224.xx.xx.xx – 239.xx.xx.xx)



Common IPv6 Multicast Groups

- IPv6 multicast addresses start with FF.
- See some common groups below.
- Multicast addresses are registered with the Internet Assigned Numbers Authority (IANA).
- For more, see: http://www.iana.org/assignments/ipv6-multicast-addresses/ipv6-multicast-addresses.xml

IPv6 multicast address	Description
FF02::1	The all-nodes address
FF02::2	The all-routers address
FF02::5	The all-Open Shortest Path First (OSPF) routers address
FF02::6	The all-OSPF designated routers address

IPv6 Multicast Scope

- Last 4 bits is scope. (Ex. FF01, FF02, etc).

- FF01:: means on same interface
- FF02:: means on same link
- FF05:: means in the same site
- FF0E:: means in the Internet (all reachable!)

(From RFC4291)

Address Summary

- IPv6 is more than a bigger address!
- Many changes to protocol.

2001:5c0:8fff:fffe::1

2001:00:11:22:33:44

ff02::1

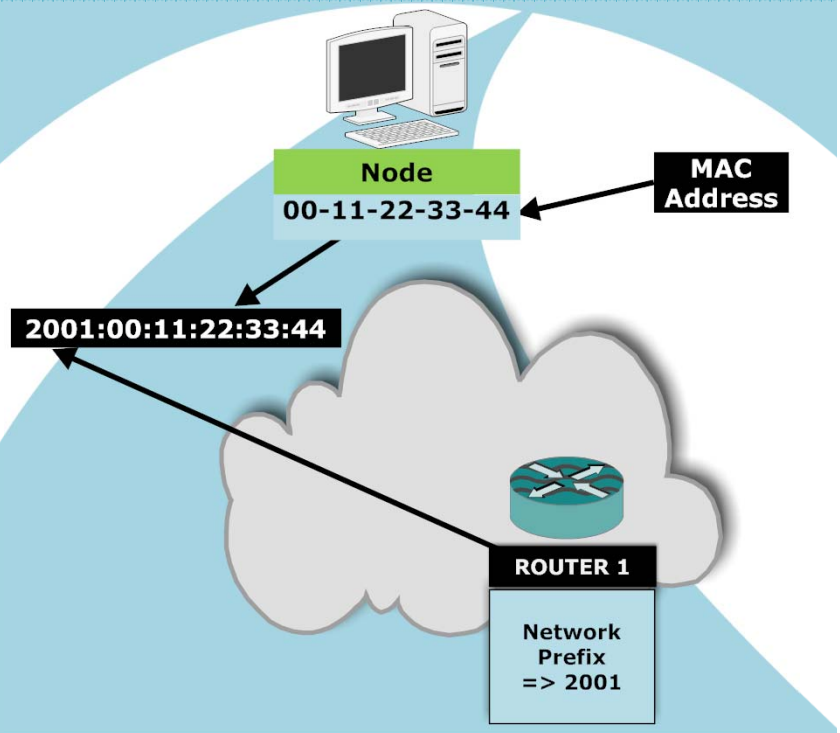
fe80:211:d8ff:fe39:292b

fe80:53fe:192:168:1:100

fe80:53fe:169.254.1.100

Stateless Autoconfiguration

- Stateless autoconfiguration (SLAAC)
- Link-local and global unicast address
- How?
- Use MAC address of adapter
- Talk with connected IPv6 router
- Join multicast groups

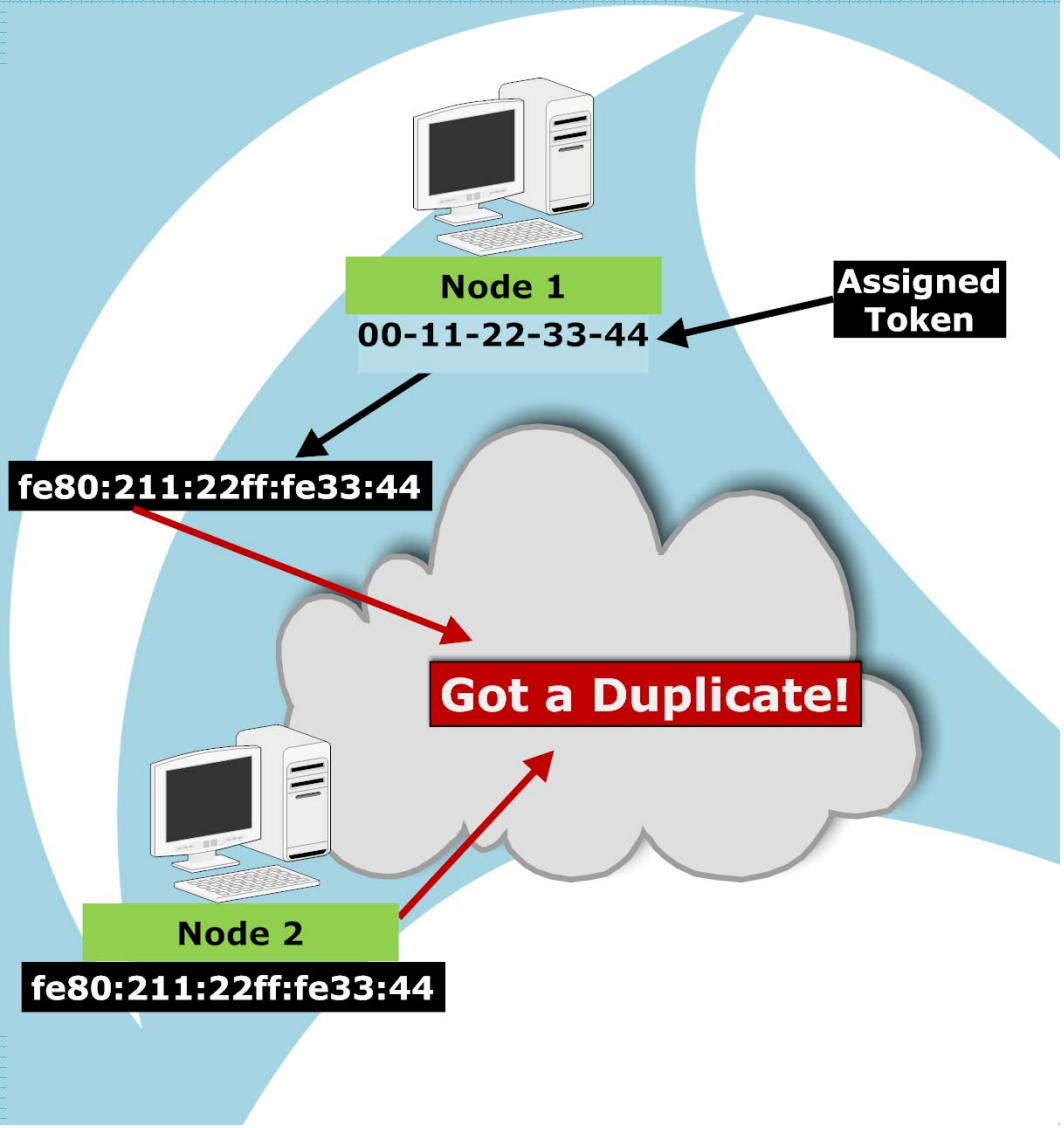


Example on Windows PC: result of IPConfig

Ethernet adapter Local Area Connection:
Description : Realtek Family Fast Ethernet NIC
Physical Address : 00-11-D8-39-29-2B
Autoconfiguration Enabled . : Yes
IP Address : fe80::211:d8ff:fe39:292b%4

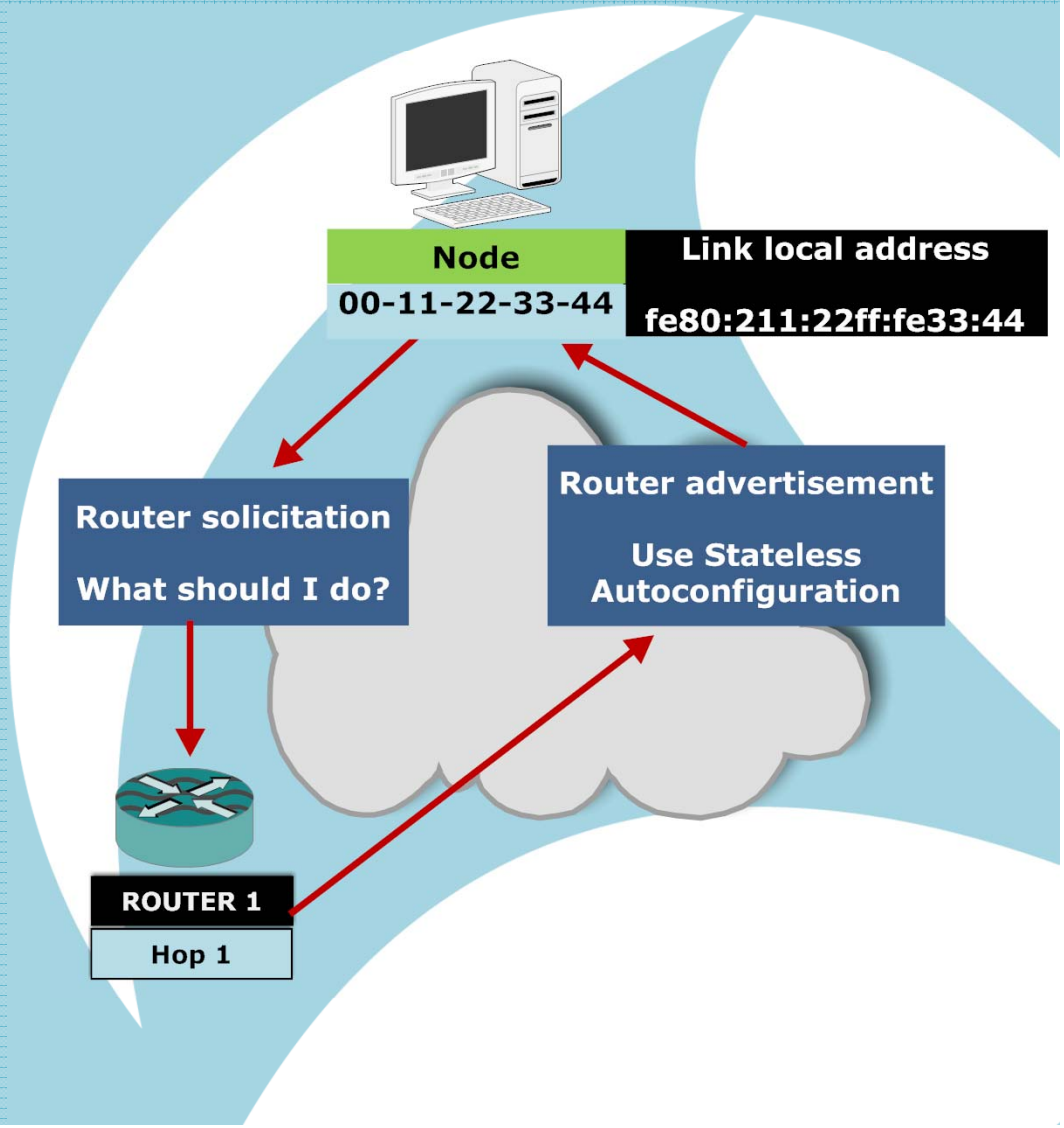
Link-Local Address Generate

- Link-Local Address
  - TCP/IP stack
  - FE80….
- Link-Local Address Uniqueness
  - Duplicate Address Detection (DAD)
  - ICMPv6 *Neighbor Solicitation* message
  - ICMPv6 *Neighbor Advertisement*



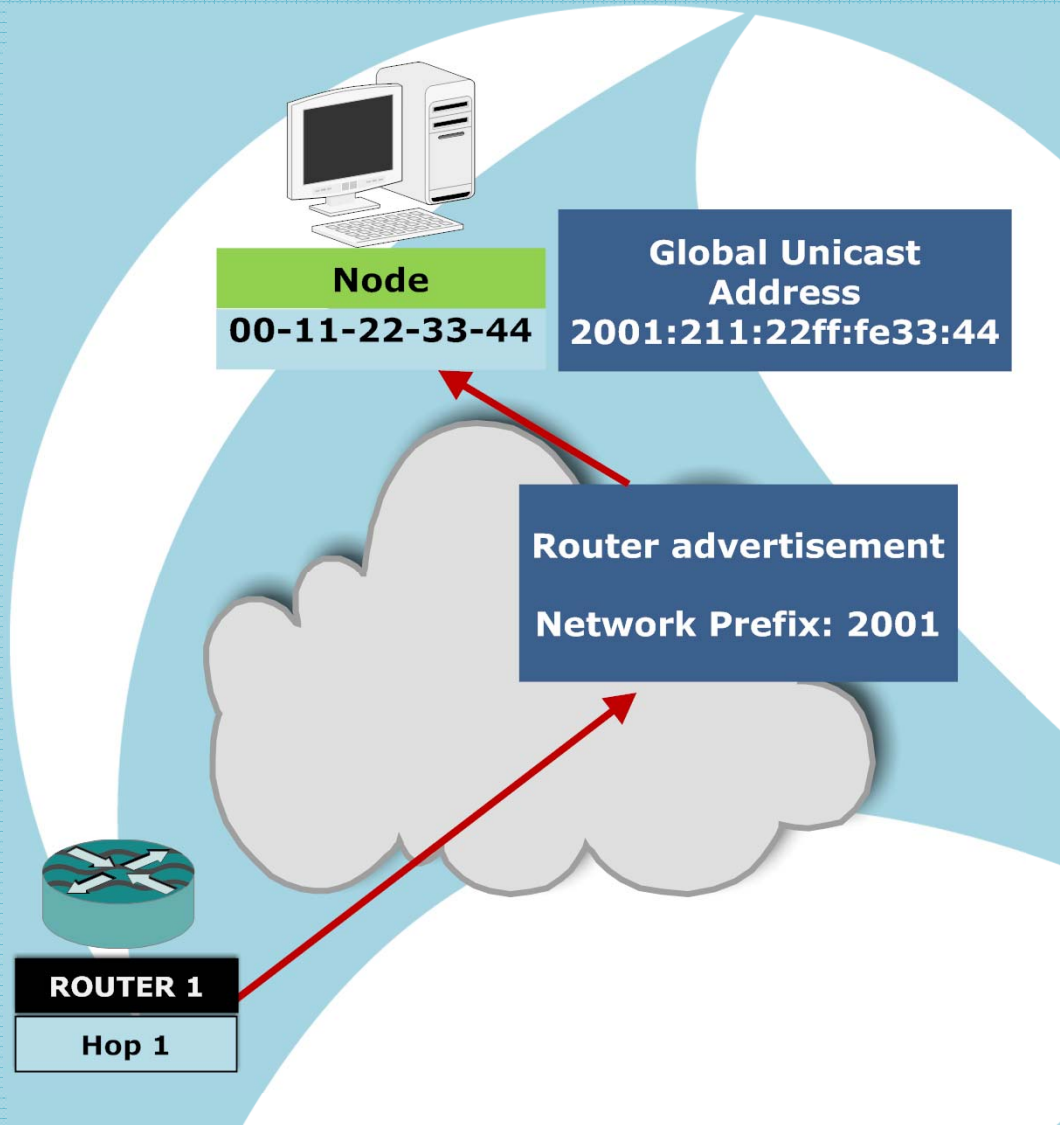
Generate Global Unicast Address

- Global unicast
  - Communicate over internet
  - Other side of local router
- Have IPv6 router?
- ICMPv6 *Router Advertisement / Router Solicitation* messages



Global Unicast Assigned

- Global unicast address
  - Network prefix
  - Device identifier (IID)
- SLAAC advantages:
  - Easy to manage
  - No server required
  - Mobile / sensors
- Server addresses
- Security concerns



IID Security Concerns

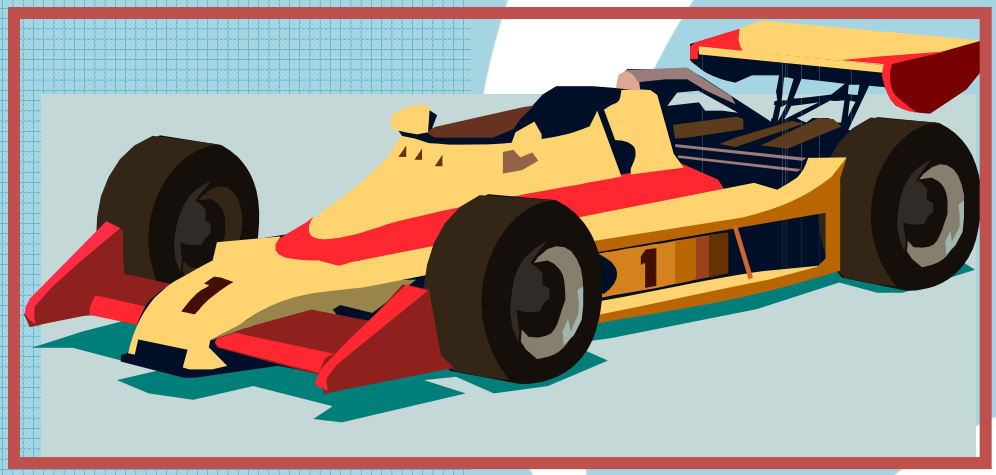
- Interface ID (IID): based on the link-layer (MAC) address
- EUI-64 format: OUI field + FFFE + Serial Number

Example on Windows PC: result of IPConfig

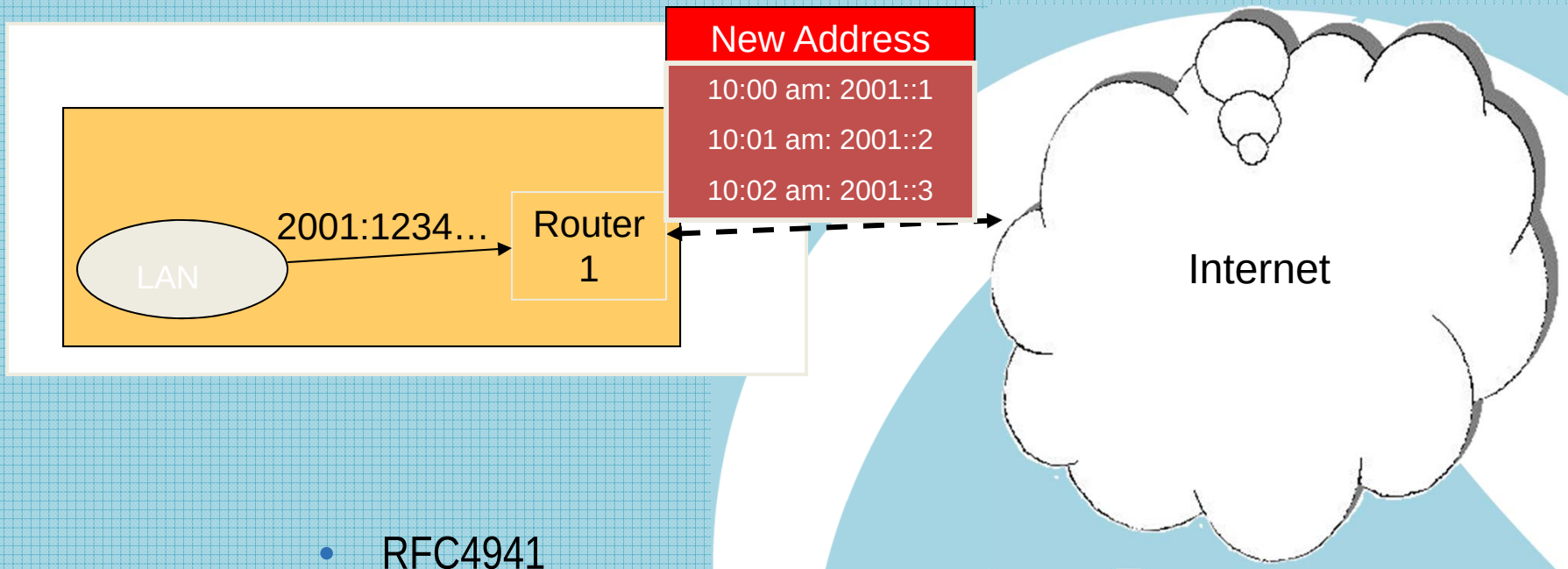
Ethernet adapter Local Area Connection:
Description : Realtek Family Fast Ethernet NIC
Physical Address : 00-11-D8-39-29-2B
Autoconfiguration Enabled . : Yes
IP Address : fe80::211:d8ff:fe39:292b%4

Other Uses For SLAAC

- Vehicle Identification Number-Based IPv6 Interface Identifier (VIID)
- draft-imadali-its-vinipv6-viid-00.txt



IPv6 Privacy Addresses



- RFC4941
- Anonymous addressing
- Change address frequently
- How to diagnose problems?
- Implementation differences

IPv4 and IPv6 Headers

IPv4 Main Header (20 Bytes)

Version	HdrLen	Type of Service	Total Length	
Identification			Flags	Fragment Offset
TimeToLive		Protocol	Checksum	
Source IP Address (4 bytes)				
Destination IP Address (4 bytes)				

IPv6 Main Header (40 Bytes)

Version	Traffic Class	Flow Label	
Payload Length		Next Header	Hop Limit
Source Address (16 bytes)			
Destination Address (16 bytes)			

- What is the same?
- What is different?

Common IPv6 Extension Headers

Next Header (Hex)	Next Header (Decimal)	Header Name	Description
0	0	Hop-by-Hop Options	For all devices on the path
2B	43	Routing	0 – Source Routing (deprecated) 2 – Mobile IPv6
2C	44	Fragment	Only when packet is fragmented
32	50	Encapsulated Security Payload (ESP)	IPSec encrypted data
33	51	Authentication Header (AH)	IPSec authentication
3C	60	Destination Options	http://www.iana.org/assignments/ipv6-parameters/ipv6-parameters.xml (Mobile IP, etc)

No.	Time	Source	Destination	Pro
1693	46.130640	::	ff02::2	IC

```
⊞ Frame 1693 (86 bytes on wire, 86 bytes captured)
⊟ Ethernet II, Src: 192.168.1.1 (00:14:bf:ba:45:f9), Dst: I
    Destination: IPv6-Neighbor-Discovery_00:00:00:02 (33:33
    Source: 192.168.1.1 (00:14:bf:ba:45:f9)
    Type: IPv6 (0x86dd)
⊟ Internet Protocol Version 6
    Version: 6
    Traffic class: 0x00
    Flowlabel: 0x00000
    Payload length: 32
    Next header: IPv6 hop-by-hop option (0x00)
    Hop limit: 1
    Source address: ::
    Destination address: ff02::2
⊟ Hop-by-hop Option Header
    Next header: ICMPv6 (0x3a)
    Length: 0 (8 bytes)
    Router alert: MLD (4 bytes)
    PadN: 2 bytes
⊟ Internet Control Message Protocol v6
    Type: 131 (Multicast listener report)
    Code: 0
    Checksum: 0x7ea3 [correct]
    Maximum response delay: 0
    Multicast Address: ff02::2
```

Other IPv6 Sessions

- Monday: 4:45 - IPv6 Address Planning
- Tuesday: 1:45 - IPv6 Security
- Tuesday : 4:45 - IPv6 Trace Analysis Using Wireshark