IPv6 for SMB's: Easy or Hard?

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Network Conversions

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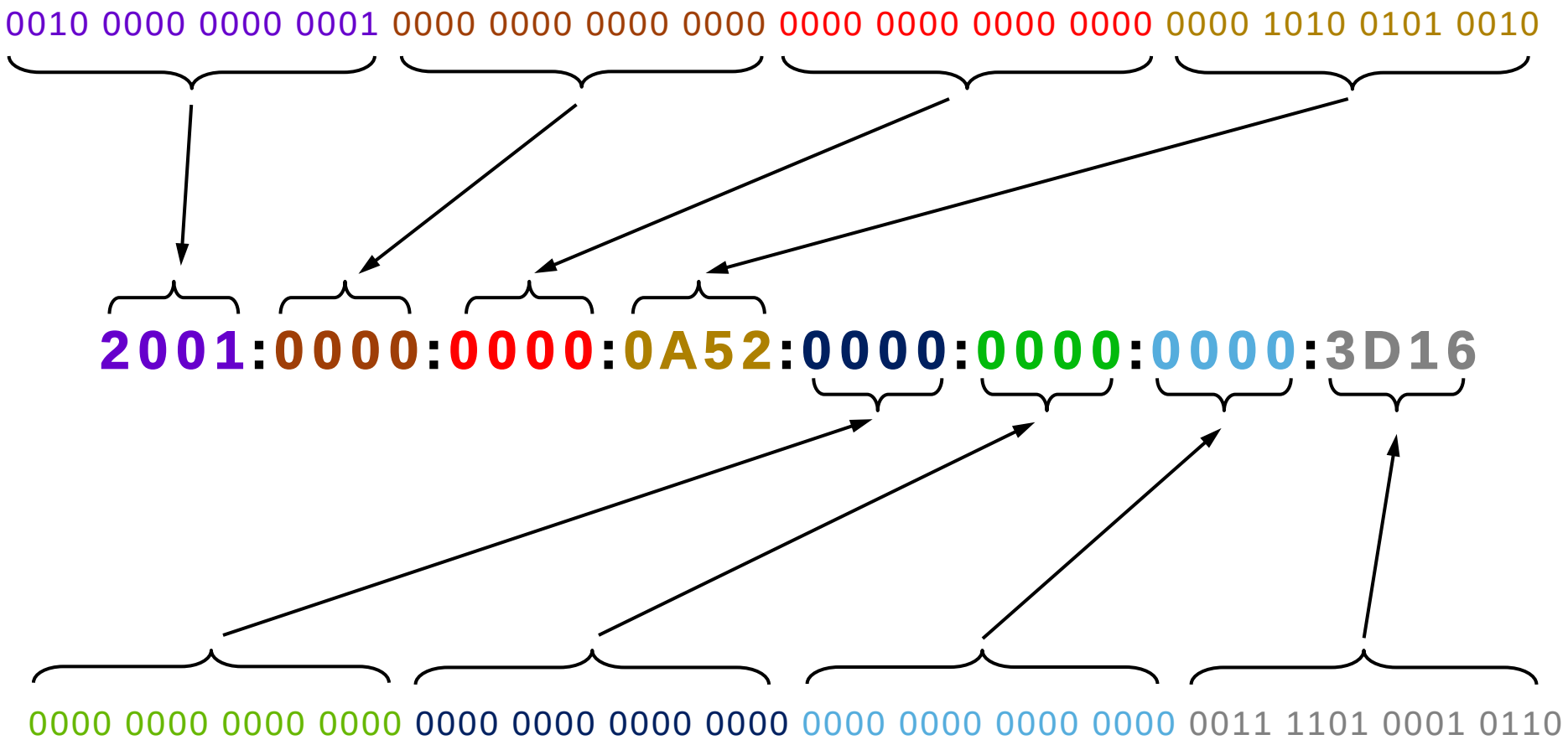
Agenda

- IPv6 address
- Network applications
- Network utilities
- Server operating systems
- Client operating systems
- Network peripherals
- Security concerns
- How to Connect with IPv6

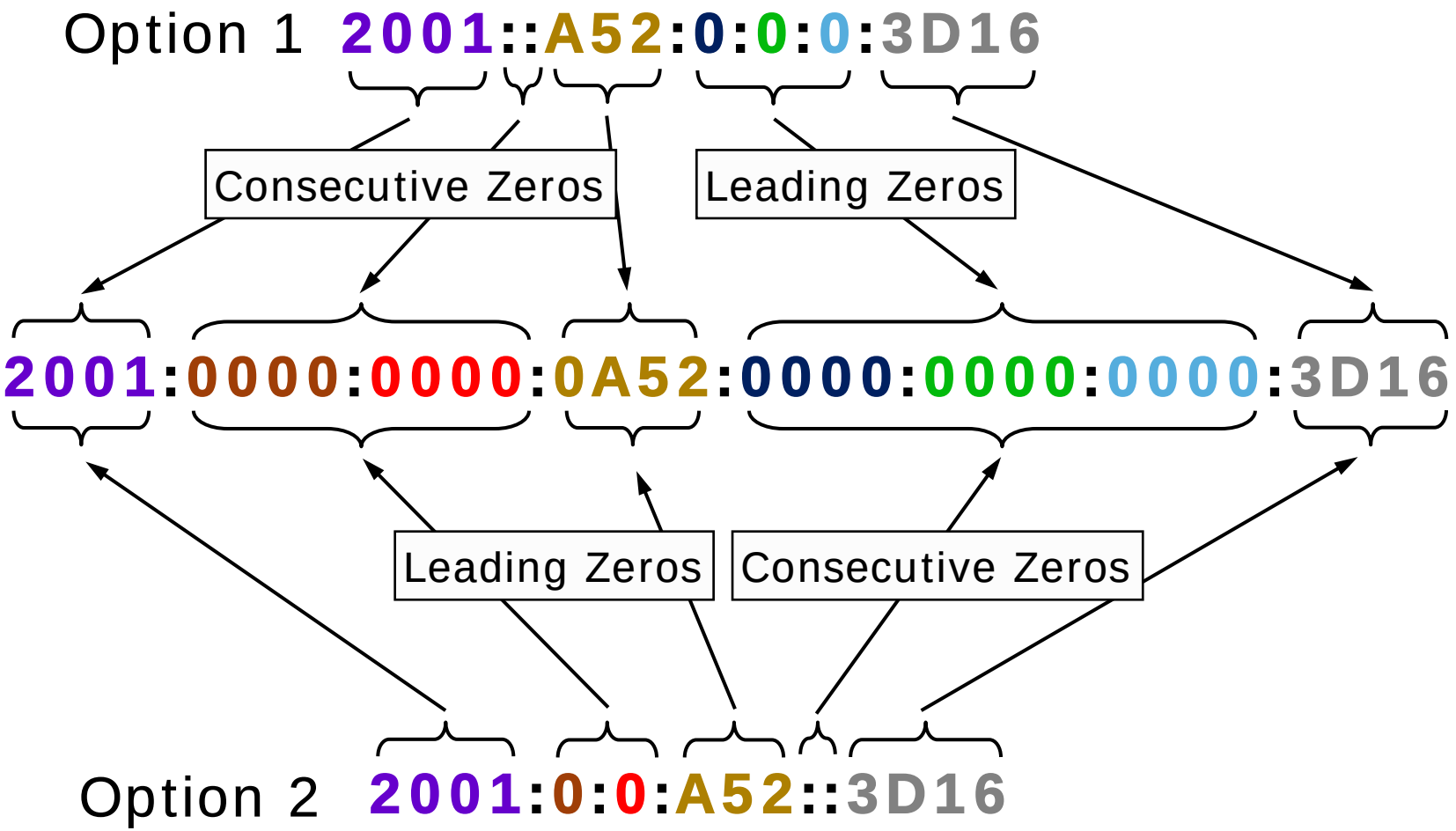
Do you remember -----

- What network protocols you were running in 1990 ?
  - IPX/SPX – Novell
  - AppleTalk – Apple
  - NetBIOS/NetBEUI – Sytek, IBM, Microsoft
  - DECnet – DEC
  - XNS – Xerox
  - Others ???
- What network protocols you were running in 2000 ?
  - IP (IPv4)
  - IPv6 maybe ??
- How many of you were involved in the conversion of one or more of these protocols to IP (IPv4)?

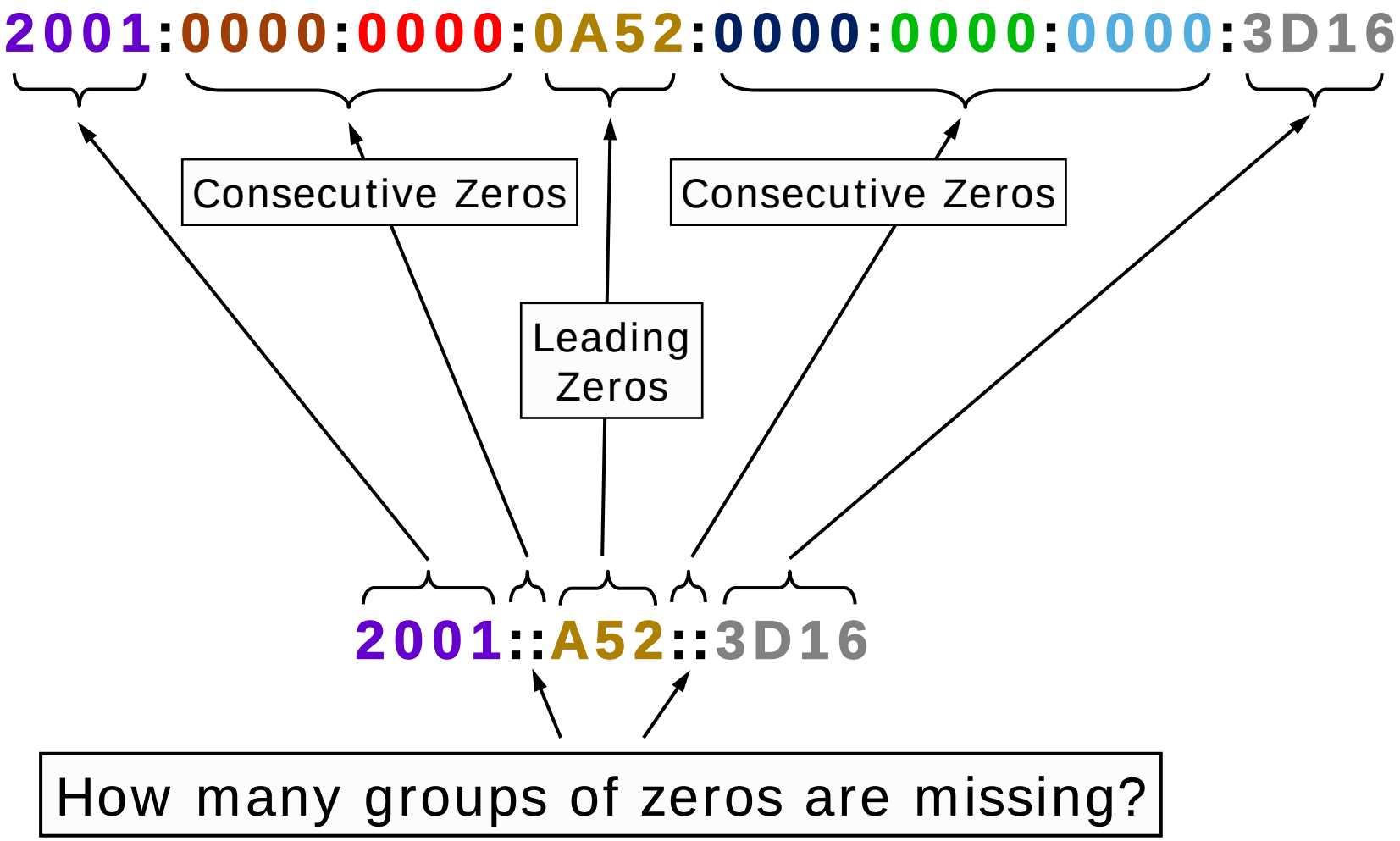
Hexadecimal notation



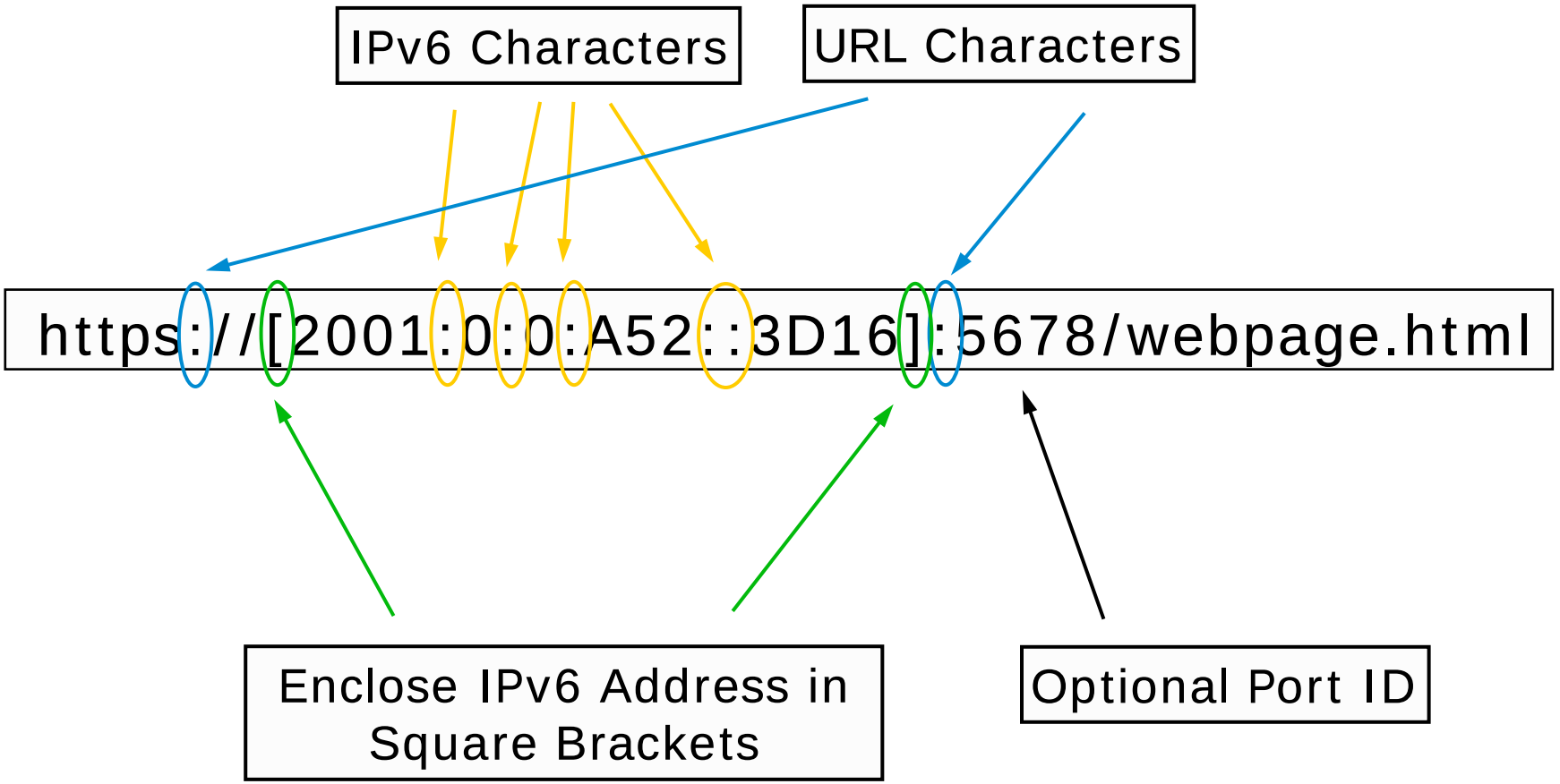
Shorthand notation



Incorrect shorthand notation



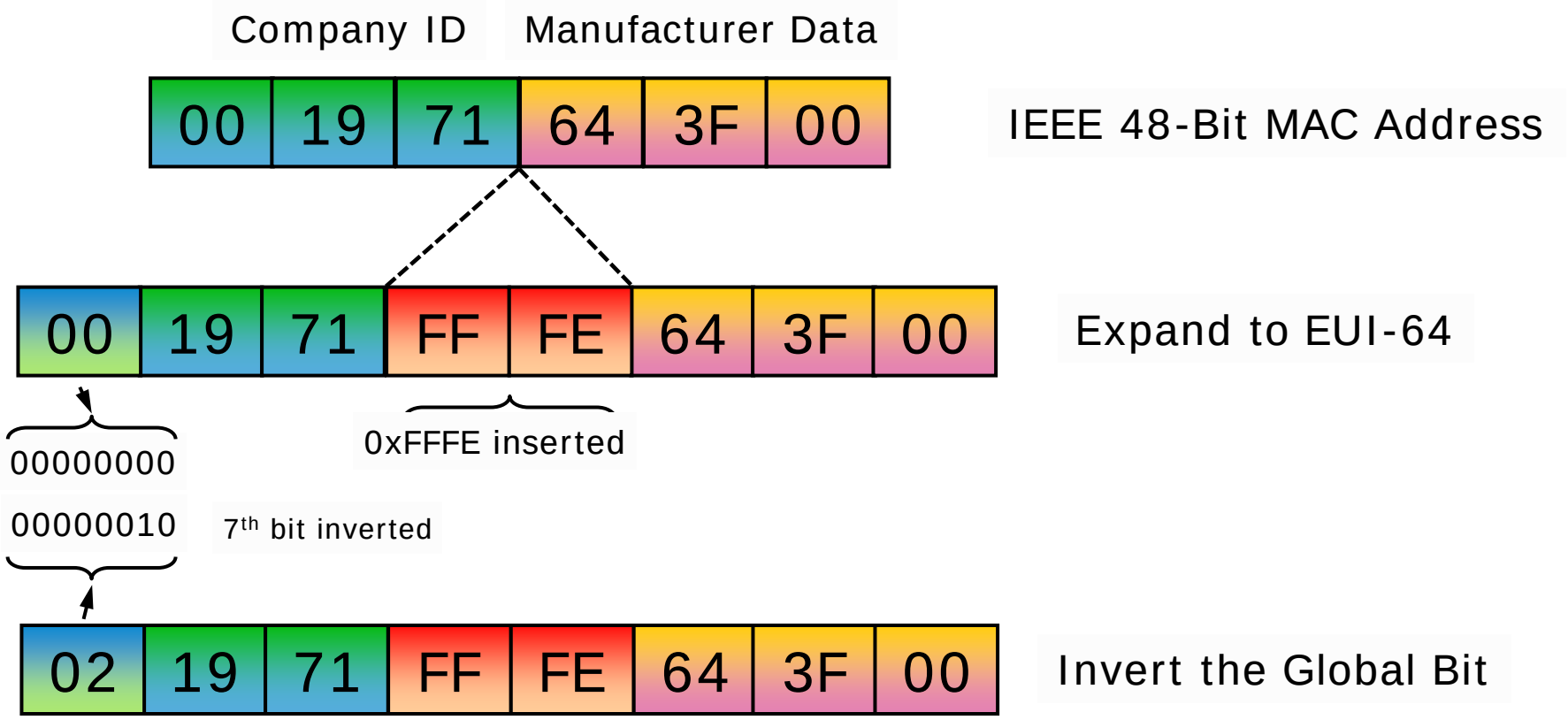
Mixed URL & IPv6 notation in URL



IPv6 addresses

- Assigning the interface ID:
  - Autoconfiguration
    - SLAAC (Stateless address autoconfiguration), generally a /64
      - Modified IEEE EUI-64 format (RFC 4291)
        - Derived from MAC address
      - Privacy format (RFC 4941)
        - Derived from random number generator
  - Stateful
    - generally via DHCPv6
  - Cryptographically generated (RFC 3972)
    - Secure/unique interface ID
  - Manual configuration

Interface ID from MAC



Types of addresses

- Unicast
  - One-to-one communication
- Multicast
  - One-to-many communications
- Anycast
  - Combination use of both Unicast and Multicast
- Global
  - Internet routable
- Link-local scope
  - Automatically assigned per interface
- Loopback/Localhost
  - ::1/128

Network utilities

- Ping
- Trace route
- Telnet
- SSH
- TFTP
- FTP

- If using SLAAC link-local address, must specify as:

  <ipv6-addr>%<zone-id>

  - Ex., ping fe80::20c:29ff:fe04:643b%11 (Win7)
  - Ex., ping fe80::20c:29ff:fe04:643b%<vlan-id> (ProVision)

Server operating systems

- Microsoft Server
  - 2003
    - Limited server application support
      - no: AD, DHCPv6, RDP, Exchange, SQL, ftp,
  - 2008
    - Most (if not all) server applications

- Linux
  - Longest support, generally most server applications

Client operating systems

- Microsoft Windows
  - XP – w/SP2 - must install IPv6 protocol
    - CLI only configuration
  - Vista & 7 - native and enabled by default
    - GUI and CLI configuration
  - All use RFC3041 privacy addresses by default
- Apple Mac OS X
  - Mac OS X 10.4+ - native and enabled by default
    - GUI and CLI configuration
    - Uses EUI-64 address by default, no DHCPv6 support
- Linux
  - Generally natively enabled

Network peripherals

- Printers
- VoIP phones
- Network cameras
- Embedded systems

** More manufacturers are supporting IPv6 in their devices

*** and IPv6 ready or supported does not mean the same thing to everybody!!!

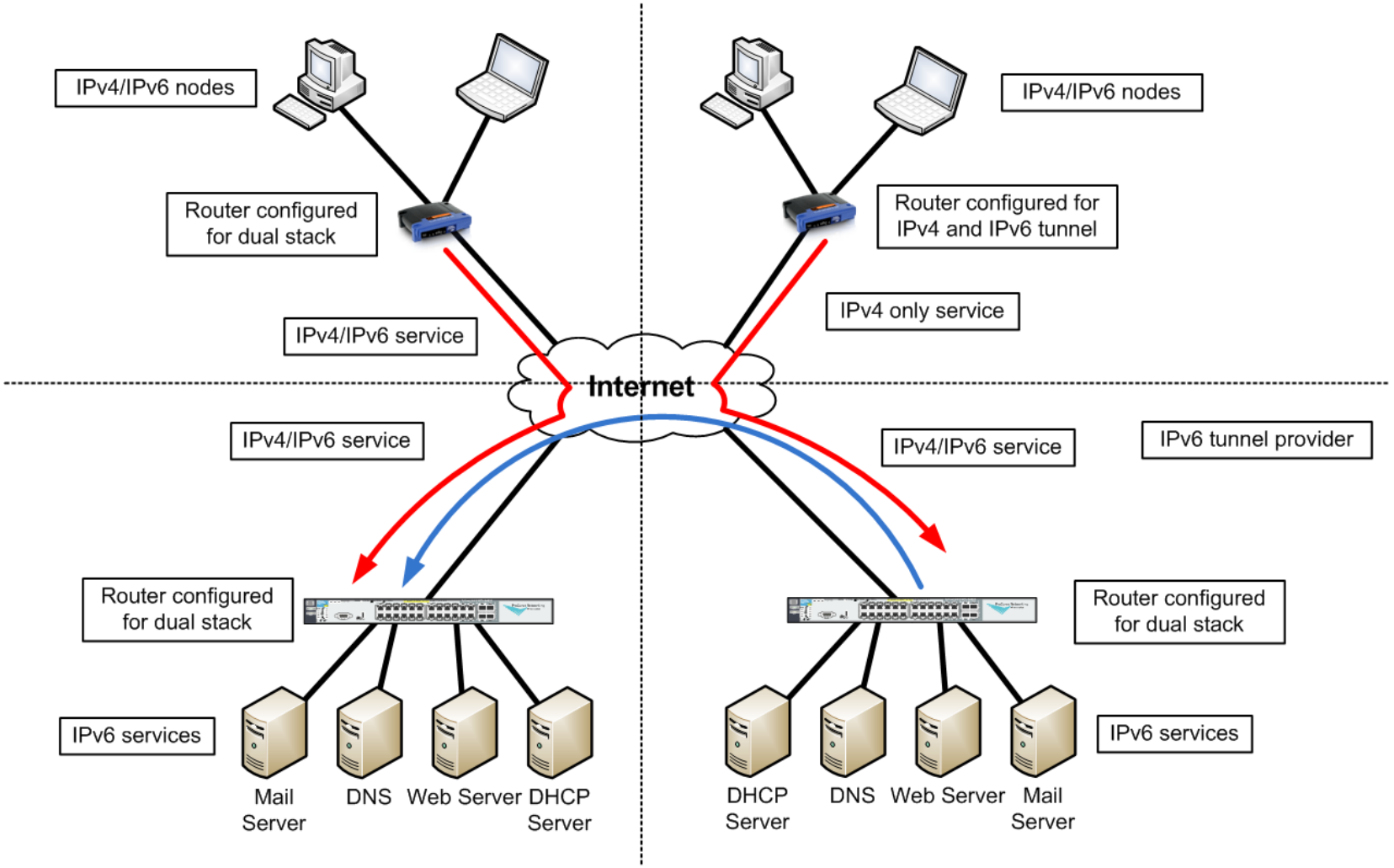
Security concerns

- If EUI-64 based address, can determine manufacturer of interface, which may lead to what type of device it is, and where in the network in may be located.
- Since IPv6 is enabled by default in many operating systems and devices, simple scan of network will provide tons of info
- Many “tools” already available for exploitation of devices/systems

How to Connect with IPv6

- Native
  - Many Internet Service Providers have started trials and beta's, 2012 should see increased IPv6 access
- Tunnel
  - free services available:
    - hurricane electric (he.net)
    - Gogo6/freenet6 (gogo6.com)
    - SixXS (sixxs.com)

IPv6 Tunnel


IPv4/IPv6 nodes
Router configured for dual stack
IPv4/IPv6 service
IPv4/IPv6 nodes
Router configured for IPv4 and IPv6 tunnel
IPv4 only service
Internet
IPv4/IPv6 service
IPv4/IPv6 service
IPv6 tunnel provider
Router configured for dual stack
Router configured for dual stack
IPv6 services
Mail Server
DNS
Web Server
DHCP Server
DHCP Server
DNS
Web Server
Mail Server
IPv6 services

World IPv6 Day System

- Local services
  - Web
  - mail
- External services
  - DNS
- IPv6 Connection
  - Tunnel – he.net

Thank You for Attending!

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