IPv6:
Basics & Perspectives

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Agenda

- What is it?
- Why do we need it?
- A note on notation
- You're soaking in it
- Ideal simple implementation
- Unfamiliar Friends
- Things which change
- Problems
- Consequences of being late to the party
- Starting points

What is IPv6

- A new protocol
- It is not an enhanced or better IPv4
  - Implemented with "Dual stack" approach
  - 128 bit addresses using a new notation
- Autoconfiguration is part of the protocol
- There is no equivalent of RFC-1918

Why do we need IPv6

- Running out of IPv4 address space
- Future address space intensive applications
  - Smart dust
  - Automotive subsystems
- For the foreseeable future we will be running both IPv6 and IPv4
  - Transition is a myth – there are still DECnet boxes out there
  - People with IPv4 are happy enough and see no reason to change
- Some devices will never be IPv6 capable

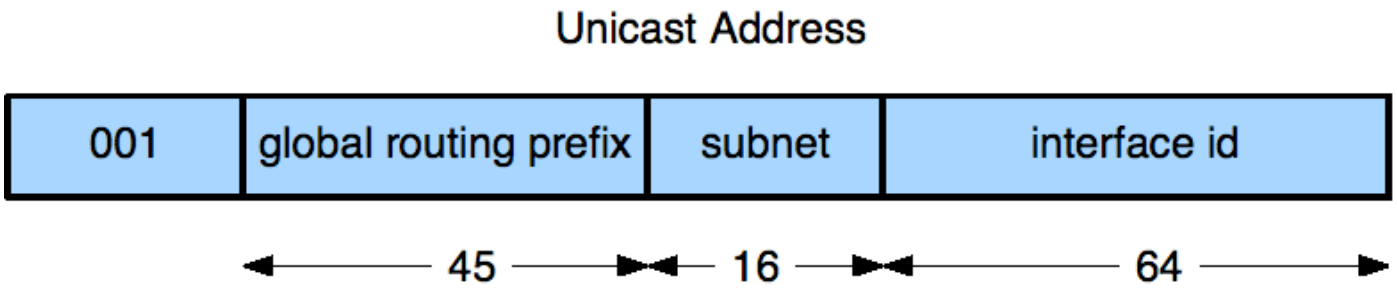
You're soaking in it

- Like the old Palmolive Dishwashing Liquid Ad IPv6 is already in use
  - Macs / Airports (since extreme)
  - Available on XP on by default in Vista
  - iPhone's do IPv6 (silently)

A Note on Notation

- Groups of 4 hex digits separated by colons
- Anything not mentioned is a zero
  - 2a01:348:6:39f::2
  - 2a01:348:245::/48
  - 2a01:348:245:0:203:baff:fe24:102
- URLs
  - http://[2a01:348:1fa::2]/
- Link local
  - fe80::/64

Ideal Simple Implementation



- Each site should receive a /48
- Each network at a site should be /64
- Implement "site topology" in 16 bit subnet
- The standard /48 makes networks portable
- The interface id is a mac address unless explicitly set

Unfamiliar Friends

- Old friends have changed
- Default address family is IPv4
  - Solaris
    - ping -Ainet6 *hostname*
    - traceroute -Ainet6 *hostname*
  - Linux / BSD
    - ping6 *hostname*
    - traceroute6 *hostname*
- 3rd party tools
  - Sometimes use "-6"

Things which change

- Scripts & Logging
  - Address format different
  - Options change
- Hosts
  - Configure dual stack
  - Ordinary DHCP delivers enough with IPv6 autoconf
- Routers
  - Only recently have domestic affordable ADSL routers with IPv6 become available

Things which change

- Firewalls
  - Even if your firewall handles IPv4 and IPv6 using a common rule set you must consider the absence of NAT

Problems

- Auto conf woes
  - What if your system forgets which address it used
    - Devices with multiple MAC addresses
    - Random selection of MAC address
- DHCPv6
  - Competes with automatic configuration and route discovery
  - Not implemented on MacOSX out of the box – and haven't missed it yet
  - Probably desirable for MS Win sites

Problems

- Diagnosis
  - 2 stacks same protocols
  - IPv4 DNS carries IPv6 information
  - 1 stack broken doesn't break everything
  - Lookup rules: lookup AAAA if present and able try it before timing out to IPv4
- Teach users to turn IPv6 off and on
- Foreign sites
  - Misconfigured IPv6 at their end
  - May want separate names for IPv6 and IPv4 sites

Being late to the party

- Not so bad if
  - WWW Content provider – for most of the foreseeable future IPv4 sites will be visible by IPv6 only hosts via proxies and service provider NAT
- Bad if
  - Sysadmin – you do NOT want to do a transition over a weekend
  - Have distributed NAT unfriendly services like VOIP phones on commodity tails
  - Can not get IPv4 addresses

Being late to the party

- Most service providers are in **NO hurry**
  - Customers aren't demanding it
  - Plenty of scope in transition technologies
  - Significant expense in supporting IPv6
    - training
    - new equipment
    - bleeding edge - things will go wrong new class of "the Internet is slow" problems
- Proactive measures
  - Build your test lab **now**
  - Buy equipment that works with IPv6

Starting points

- Free Tunnel Brokers

SixXS		www.sixxs.net
Hurricane Electric		ipv6.he.net

- Local suppliers
  - Internode
    - Native on ADSL
    - SAGE-AU sponsor
  - IPv6Now

No endorsement of any product / service implied

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