



IPv6 Network Services

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Overview

- Introduction
- Popular Network Services
 - WWW
 - Email
 - Remote Access
 - Domain Name Services
 - Address Assignment & Configuration



Overview

- Summary
- Q&A



Introduction

- Assumption is that you have started to or plan to migrate to IPv6
- Analogy - IPv6 networks provide the plumbing, network services produces and facilitates the flow of certain types of information
- Majority of user initiated Internet traffic would more than likely fall into one of the following categories
 - WWW
 - DNS
 - Email



Introduction

- Successful migration to or deployment of IPv6 for traditional applications will require that network servers and clients alike support
 - Dual-stack communications (IPv4 and IPv6), minimally
 - Pure IPv6 support, ideally
- Imagine not being able to
 - Get or send email
 - Surf the Internet
 - Send and receive Instant Messages



Introduction

- New applications that will be born as a result of IPv6
 - Video
 - Voice
 - Peer-to-Peer applications
 - Others?



WWW





WWW

- Several web server offer support for IPv6
 - Apache 2.0.44+
 - IIS 6.0+
- Popular web browsers offer some degree of IPv6 support
 - IE 6.0+
 - Firefox 1.0.2
 - Mozilla 1.7+
 - Opera 7+
 - Lynx 2.8.5+



WWW

- With or Without DNS
 - IPv6 WWW with DNS
 - <http://www.ipv6forum.org>
 - IPv6 WWW without DNS
 - `http://[2001:630:d0:131:230:48ff:fe51:564d]`



Email





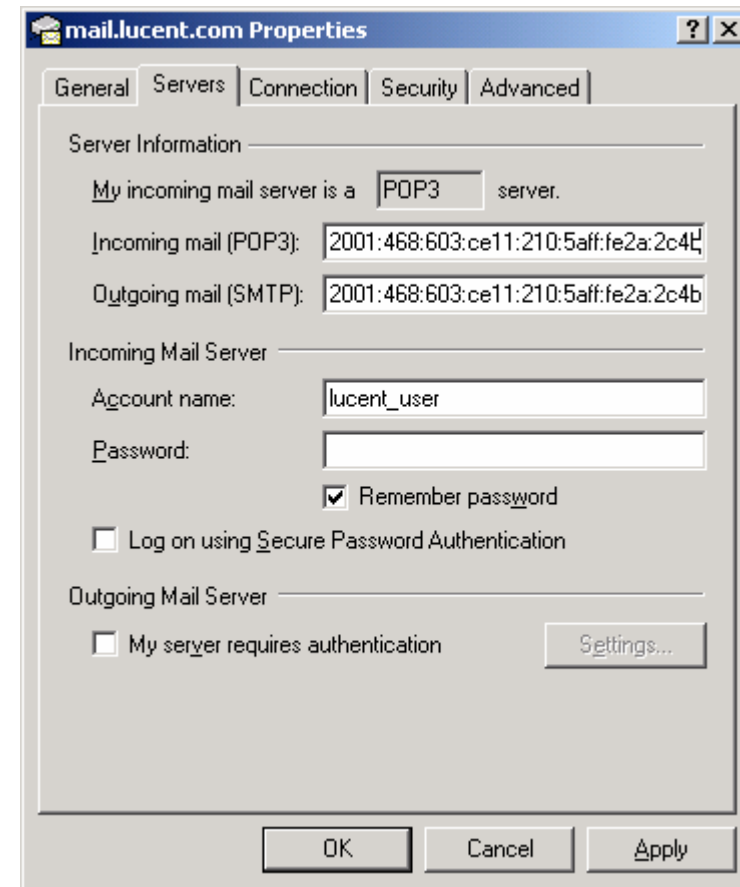
Email

- Mail servers that support IPv6
 - sendmail
 - courier
- Mail clients
 - Mutt 1.4.1+
 - Fetchmail 6.2.2+
 - Mozilla 1.4+
 - Ximian Evolution 1.4.5+



Email

- Imagine having to configure mail clients using IPv6 addresses ☹️
- Confusing configuration and limited email client support need to be considered





Remote Access



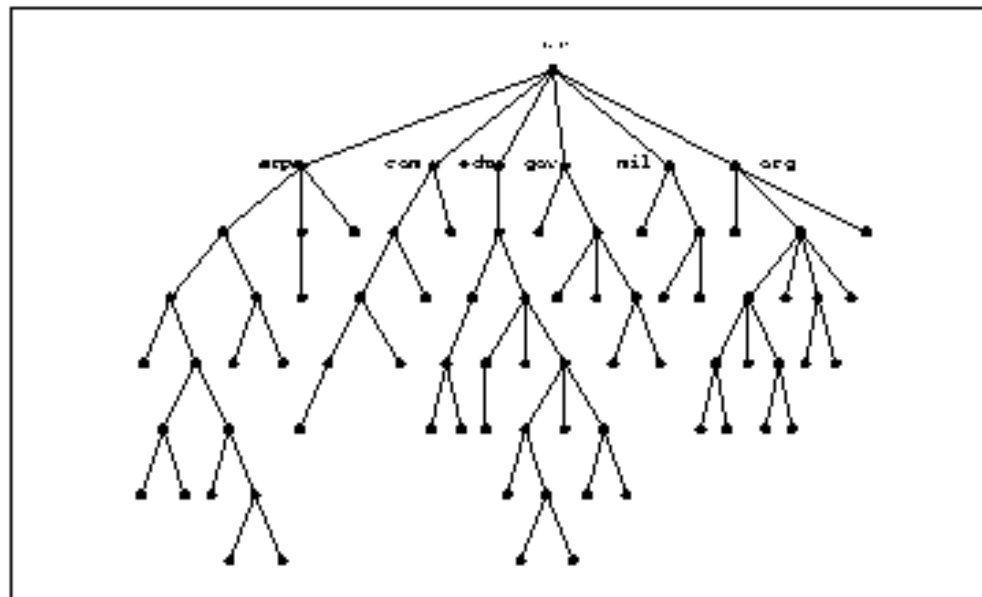


Remote Access

- OpenSSH_3.5p1 +
 - SSH (Secure Shell)
 - ssh -6 2001:468:603:ce11::80
 - ssh -6 2001:0468:0603:ce11:0210:5aff:fe2a:2c4b
 - ssh -6 lucent-dns.unh.moonv6.com
 - SFTP (Secure File Transfer)
 - sftp root@lucent-dns.unh.moonv6.com



Domain Name Services





Domain Name Services

- DNS simplifies the identification of network based resources for IPv6 and IPv4
 - By name versus By IP Address
 - Fundamental principle
- Practically a must for IPv6
- For some a must for IPv4 also
 - How many IPv4 address do you remember?
 - If any, how many of these could you commit to memory?
 - 2001:0468:0603:ce11:0210:5aff:fe2a:2c4b



Domain Name Services

- Basic DNS server setup and configuration, including resources records, is only part of the challenge
 - Additional more complex challenges are ahead
 - Future topic - Advanced DNS?
- How do nodes obtain knowledge of the DNS servers
 - Today (IPv4)
 - DHCP, static configuration
 - Tomorrow (IPv6)
 - DHCPv6,static, router advertisement, something new?



Domain Name Services

- Example /etc/resolv.conf

```
nameserver 2001:468:603:ce11::80
```

```
nameserver 2001:468:603:ce11:210:5aff:fe2a:2c4b
```

```
search unh.moonv6.com
```

```
domain unh.moonv6.com
```

- Example /etc/hosts

```
2001:468:603:c001:a00:20ff:fee7:8927 lucent-dns.unh.moonv6.com.
```

```
2001:468:603:ce11:210:5aff:fe2a:2c4b lucent-dns.lucent.moonv6.com.
```

```
2001:630:d0:131:230:48ff:fe51:564d www.ipv6forum.com.
```



Address Assignment & Configuration





Address Assignment & Configuration

- Router Advertisements Daemon
 - Available with Fedora Core 2+
 - Server based versus router based
 - Easy way to advertise routes for simple or test networks
 - Advertising prefixes facilitates autoconfiguration of IPv6 enabled nodes
 - Autoconfiguration results in the generation of a 128 bit IPv6 address
 - Still have to manually configure other system attributes today including DNS server address, DNS domain, NTP server, etc.



Address Assignment & Configuration

- DHCPv6
 - **Stateful** analogous to what we know today in IPv4, allocated IPv6 address and other attributes (DHCP options) dynamically
 - **Stateless** offer nodes the other attributes (DHCP options) dynamically
 - Both can be provided from a single, centralized server
 - Requires DHCPv6 client to facilitate end-user node updates



Address Assignment & Configuration

- Centralized Dynamic DNS updates
 - Better control over the sources of RFC2136 updates
 - Only DHCPv6 servers versus directly from EVERY node
- Promotes peer-to-peer
 - Peers can locate one another by name versus IP
(2001:0468:0603:ce11:0210:5aff:fe2a:2c4b)
- One size may not fit all
 - More alternatives are available
 - DHCPv6 may not be right for everyone, but will be for some



Other Considerations

- Network Time Protocol (NTP)
- File Transfer (FTP)
- Network Management & Monitoring
 - SNMP
- Others



Summary

- The most popular Internet applications today will more than likely continue to popular tomorrow
- Many of these applications today provide IPv6 support, many still do not.
- If IPv6 is in your future you must begin to identify critical applications that will require IPv6
- DNS and node configuration will almost always be a factor



Q & A

Thank you!

Please send questions, comments, and suggestions
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