NAMING AND ADDRESSING FOR IPv6

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About Nominum

based in Redwood City, California

European office in Amsterdam - summer 2002

VC funded

~50 employees today

engineering led company:

- 60% developers or consultants

already a global company

- employees in EU, US, Singapore and Australia

Internet Software Consortium

US not for profit corporation

- solicits donations from industry and government

provides reference implementations of internet protocols

- Open Source
- unrestricted licensing, like BSD Unix

contracted Nominum to produce BIND9

- Nominum ended up "sponsoring" BIND9

Nominum Corporate Overview

DNS and DHCP technology experts

- we write the world's DNS and DHCP software
- driving IETF standards efforts
- provide the reference implementations of the protocols

committed to Open Source and open standards

value-added commercial offerings

DNS

Domain Name System

translates hostnames to IP addresses and vice versa

- eg www.example.com has IP address 10.11.12.13

actually a global distributed database

- also used for mail delivery, locating services, etc
- could become a simple PKI: Secure DNS (DNSSEC)
- vital for emerging technologies like ENUM

IPv6 will be almost impossible without DNS

DHCP

Dynamic Host Configuration Protocol

critical for "plug and play" networking

DHCP server enforces local network policy

- issues operational parameters to clients:
- IP address, local network mask, default route
- addresses of network servers:
  - DNS, file, print, NTP, web proxies, etc
- vendor-specific options

DNS Software - BIND

Berkeley Internet Name Domain

most important application on the internet

approx 80% of the world's name servers run BIND

all 13 internet root servers run BIND

- so do 99.9% the ccTLD and gTLD servers
- most ISPs with large DNS content use it too

if BIND fails, the internet stops

BIND9

the current major release of BIND DNS software

complete rewrite and architectural redesign:

- DNS for the 21st century
- threading
- huge DNS content
  - 2.5Gbytes for .com (and growing!)
- latest DNS developments:
  - IPv6 support, Secure DNS (DNSSEC)

Infrastructure Basics

DNS server

- for looking up names and addresses

DHCP server

- allocation of network operating parameters to devices

DHCP client

- eg desktop or mobile device: 3G phone, Palm Pilot, laptop

DNS resolver

- lookup software in a device to query a DNS server

Interaction between DNS and DHCP

DHCP server updates DNS content

- when clients enter and leave the network
- when clients renumber or relocate (roving users)

DHCP server tells clients how to configure their resolvers

- ie where the device should send its DNS queries

every non-trivial IP based network will have this interaction

DNS & IPv6 for New Networks - 1

run an IPv6 capable name server!

- BIND9 is the only open source alternative
- Nominum also has a proprietary (closed) solution

run a DHCPv6 server!

- none currently available
  - standards not yet finalised
  - nothing concrete to implement so far
- funding issue for ISC

DNS & IPv6 for New Networks - 2

IPv6 resolver

- send queries over IPv6
  - IPv6 Transport
- understand new (complex) DNS record types
- provided in BIND9.2

IPv6 client

- must have an IPv6 stack (obviously.....)

Why DHCPv6?

IPv6 autoconfiguration is not enough!

- unregulated network access
- configure higher-level network parameters for clients:
  - location of DNS, web, proxy servers
- authentication of clients
  - fine-grained operational parameters
- control of DNS content
  - trust the DHCP server, not the client!
- DHCPv6 server can "push" changes to clients

DNS & IPv6 Issues for the Internet

BIND9 needed for IPv6

- new resource record support

BIND9 not yet widely deployed

complex IPv6 migration strategy for the Internet

- awkward problems for the root servers
- transitioning name server infrastructure without breaking anything
- nobody is really sure how to do this yet

Why BIND9?

performance on multiprocessors

SecureDNS (DNSSEC)

Secure Dynamic Update

- fine-grained control of Dynamic Updates

IPv6 support

- DNS resource records
  - AAAA, A6, DNAME, binary labels
  - quad-A synthesis

QUESTIONS?