

Bonjour's DNS-Based Service Discovery

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Three Legs of Bonjour Networking

- Addressing
- Naming
- Browsing

Addressing

- Self-Assigned Link-Local Addressing
 - Pick random address in 169.254/16
 - ARP to see if anyone else is using it
 - If someone else is using it, try again
 - Ongoing conflict checking
- RFC 3927
 - “Dynamic Configuration of IPv4 Link-Local Addresses”
- <http://www.ietf.org/rfc/rfc3927.txt>
- <http://www.zeroconf.org/>

IPv4 Link-Local Availability

- Self-Assigned IPv4 Link-Local Addressing first appeared in:
 - Mac OS 8.5, Summer 1998
 - Windows 98, Summer 1998
 - Mac OS X 10.0
 - ZCIP for Linux <http://zeroconf.sourceforge.net/>
- You may know it as Autonet, AutoIP, etc.
- IPv6 already has Link-Local Addressing
 - RFC 2462 “IPv6 Stateless Address Autoconfiguration”
 - <http://www.ietf.org/rfc/rfc2462.txt>

Naming

- Multicast DNS
 - Pick desired name in ".local." subdomain
 - Issue Query to see if anyone else is using it
 - If someone else already using it, pick another
 - Ongoing conflict checking
- draft-cheshire-dnsext-multicastdns-07.txt
- <http://www.multicastdns.org/>

Multicast DNS Availability

- Multicast DNS client
 - Mac OS 9.2
 - Mac OS X
 - iPhone & iPod touch
 - Linux
 - Bonjour for Windows
<http://www.apple.com/support/downloads/bonjourforwindows.html>
- Just type
 - "laserwriter.local." into your Web browser
 - "ssh mymac.local." into a terminal window

Browsing

- Raising the bar
- Should not need to know name in advance

DNS Service Discovery

- Devices already need:
 - IPv4 Link-Local Addressing
 - Multicast DNS
- Don't need more code
 - Multicast DNS gives us Service Discovery too
- draft-cheshire-dnsext-dns-sd-05.txt
- <http://www.dns-sd.org/>

Browsing Via DNS PTR

- DNS Query:

_ipp._tcp.local. PTR ?

Browsing Via DNS PTR

- DNS Response(s):

_ipp._tcp.local. PTR

Sales._ipp._tcp.local.

Marketing._ipp._tcp.local.

Engineering._ipp._tcp.local.

3rd Floor Copy Room._ipp._tcp.local.

Components of Service Name

- User-Visible Name
3rd Floor Copy Room._ipp._tcp.local.
- Service Type/Service Protocol Name
3rd Floor Copy Room._ipp._tcp.local.
- Domain
3rd Floor Copy Room._ipp._tcp.local.

Lookup Via DNS SRV

- DNS Queries:

Sales._ipp._tcp.local.	SRV	?
Sales._ipp._tcp.local.	TXT	?

Lookup Via DNS SRV

- DNS Responses:

Sales._ipp._tcp.local.	SRV	0 0 631	my-printer.local.
Sales._ipp._tcp.local.	TXT	pdl=application/postscript	
my-printer.local.	A	169.254.12.34	

DNS-SD Availability

- On OS X 10.2, iPhone, iPod touch:
 - System API
- Bonjour for Windows
<http://www.apple.com/support/downloads/bonjourforwindows.html>
- Other Platforms:
 - Use Apple's Darwin Open Source
 - Other Independent Implementations
 - Implement from spec: draft-cheshire-dnsext-dns-sd-05.txt
- <http://www.dns-sd.org/>

Wide-Area DNS Service Discovery

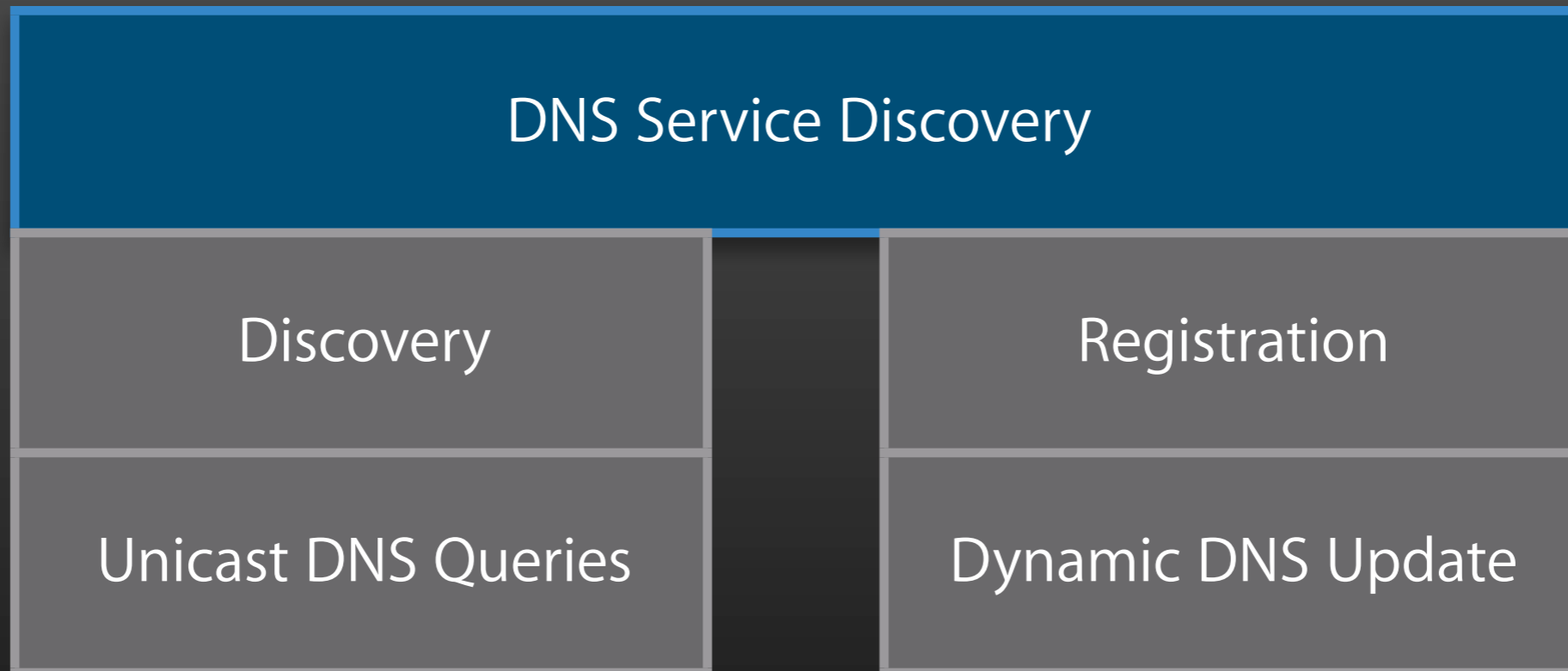
- Replace “local” with any existing DNS domain

Architecture (Local LAN)

DNS Service Discovery

Multicast DNS

Architecture (Wide Area)



Architecture

DNS Service Discovery

Discovery

Unicast Queries

Long Lived
Queries

Registration

Dynamic DNS Update

NAT-T

TSIG

RR Lease

Open Source License

Apache 2.0

Things that just work

*Covers Apple's
Bonjour APIs*



Zero Configuration Networking

The Definitive Guide

O'REILLY®

Stuart Cheshire & Daniel H. Steinberg

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The Definitive Guide

For More Information

Web Sites

Zero Configuration Networking

<http://www.zeroconf.org/>

Multicast DNS

<http://www.multicastdns.org/>

DNS Service Discovery

<http://www.dns-sd.org/>