

# Hybrid Unicast/Multicast DNS-Based Service Discovery

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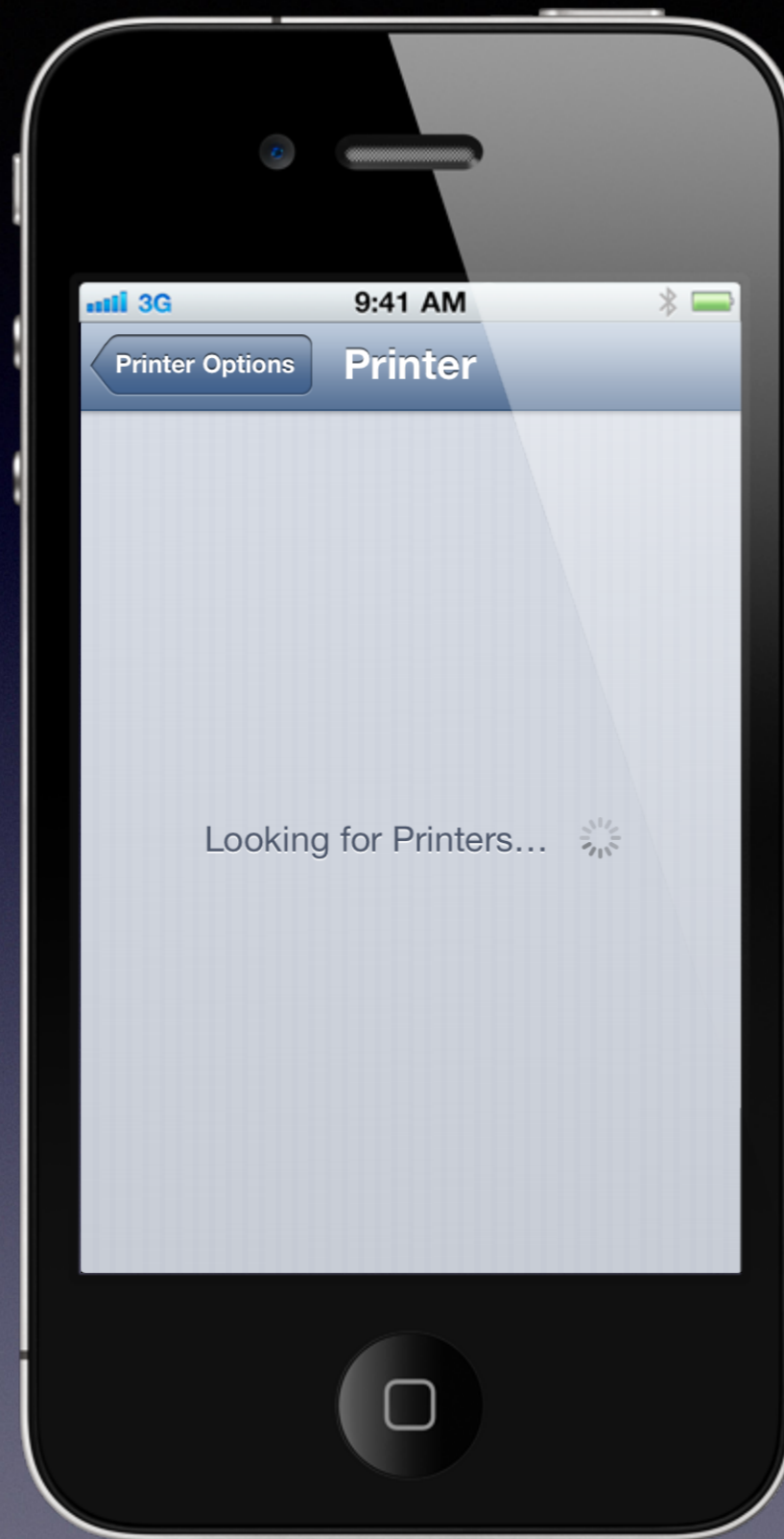
DNSSD WG, 90<sup>th</sup> IETF, Toronto, Canada, July 2014

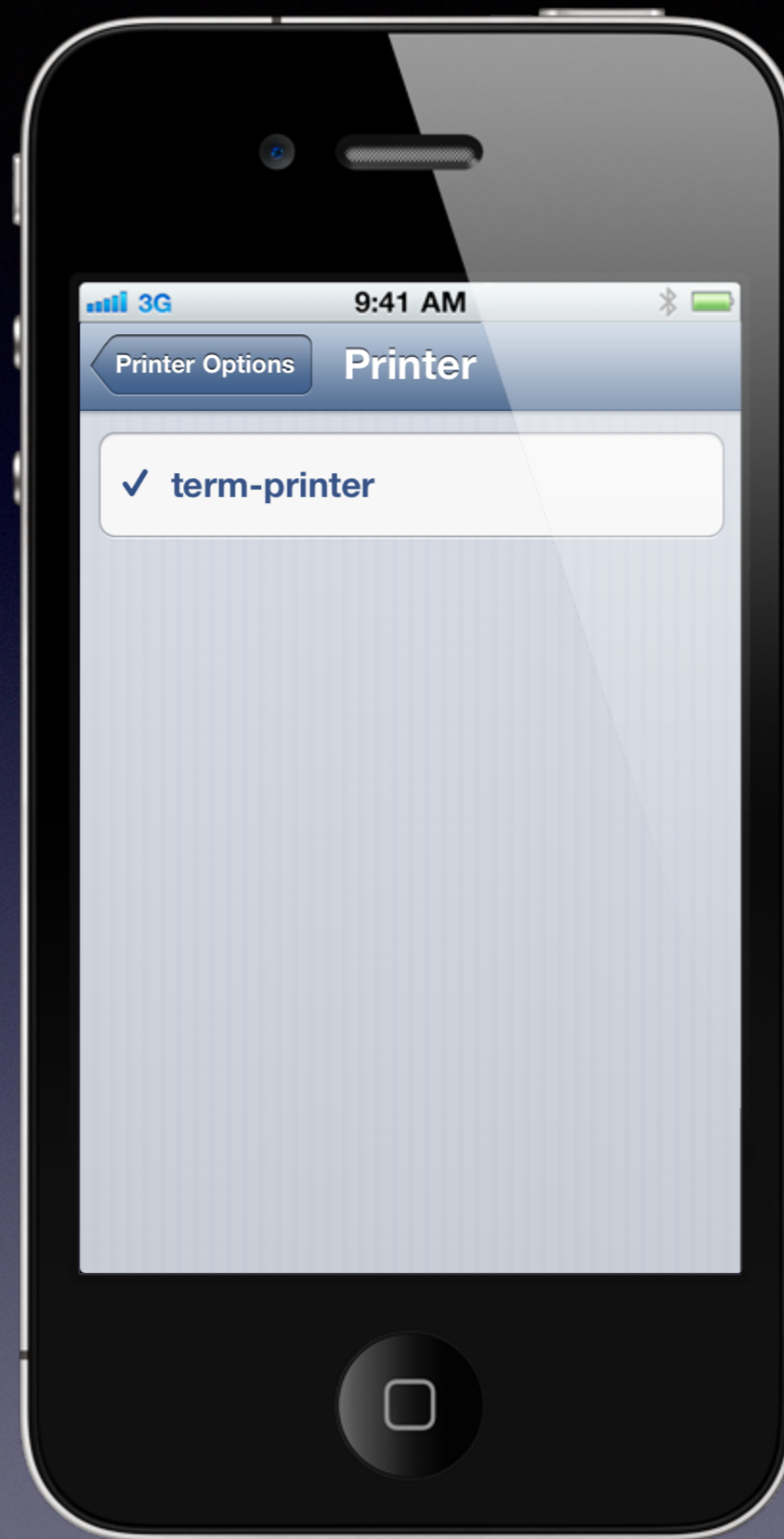
# Overview

- Multicast DNS widely used to advertise services
  - e.g., printers, wireless access points, cameras
- Unicast DNS widely used to perform queries
- Need to connect the two worlds
  - Can be done manually today
  - Would be better if automated









# Unicast Walkthrough

- DHCP
- Domain Enumeration
- Browse for Services
- Resolve chosen Service Instance
  - Connect
  - End-to-End Security & Access Control

# DHCP

```
% scutil
> list
...
subKey [74] = State:/Network/Service/21B5304C-C227-4932-BFCF-54B28F4CA1D2/DHCP
...

> show State:/Network/Service/21B5304C-C227-4932-BFCF-54B28F4CA1D2/DHCP
<dictionary> {
  Option_15 : <data> 0x6d656574696e672e696574662e6f7267
  ...
}

% echo 6d656574696e672e696574662e6f7267 0A | xxd -r -p
meeting.ietf.org
```



# Domain Enumeration

```
% dig lb._dns-sd._udp.meeting.ietf.org. ptr

;<<>> DiG 9.6-ESV-R4-P3 <<>> lb._dns-sd._udp.meeting.ietf.org. ptr
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 35624
;; flags: qr aa rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 2, ADDITIONAL: 4

;; QUESTION SECTION:
;lb._dns-sd._udp.meeting.ietf.org. IN PTR

;; ANSWER SECTION:
lb._dns-sd._udp.meeting.ietf.org. 3600 IN PTR meeting.ietf.org.

;; Query time: 8 msec
;; SERVER: 130.129.5.6#53(130.129.5.6)
;; WHEN: Wed Mar 13 10:16:40 2013
;; MSG SIZE rcvd: 188
```

# Domain Enumeration (2)

```
% dig @8.8.8.8 lb._dns-sd._udp.meeting.ietf.org. ptr

; <<>> DiG 9.6-ESV-R4-P3 <<>> @8.8.8.8 lb._dns-sd._udp.meeting.ietf.org. ptr
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 24571
;; flags: qr rd ra; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0

;; QUESTION SECTION:
;lb._dns-sd._udp.meeting.ietf.org. IN PTR

;; ANSWER SECTION:
lb._dns-sd._udp.meeting.ietf.org. 1532 IN PTR meeting.ietf.org.

;; Query time: 21 msec
;; SERVER: 8.8.8.8#53(8.8.8.8)
;; WHEN: Wed Mar 13 10:18:27 2013
;; MSG SIZE rcvd: 64
```

# Browse

```
% dig +short @8.8.8.8 _pdl-datastream._tcp.meeting.ietf.org. ptr  
term-printer._pdl-datastream._tcp.meeting.ietf.org.
```

# Resolve

```
% dig +short @8.8.8.8 term-printer._pdl-datastream._tcp.meeting.ietf.org. srv  
0 0 9100 term-printer.meeting.ietf.org.
```

```
% dig +short @8.8.8.8 term-printer.meeting.ietf.org. AAAA  
2001:67c:370:128:a65d:36ff:fe32:44ba
```

# Proxy Operation

- Receive unicast query
- Emit *corresponding* multicast query
- Receive multicast responses
- Return *corresponding* unicast responses
- <https://tools.ietf.org/html/draft-cheshire-dnssd-hybrid-01>

# Next Steps

- <https://tools.ietf.org/html/draft-cheshire-dnssd-hybrid-01>
- Three independent implementations so far
- Adopt current draft as starting point for Working Group document?
- Alternative proposals?