Providing DNSSD Service on Infrastructure

draft-tlmk-infra-dnssd

Ted Lemon <elemon@apple.com>

Problem Statement

(finally we have an excuse)

mDNS over WiFi has several issues

- multicast consumes massive airtime per bit
- WiFi devices that do beacon skipping miss multicasts

Little hope of fixing this: WiFi is deeply entrenched

Use case: battery-operated device on WiFi wants to advertise/discover services

- How do we support this without mDNS?

Current related work

We’ve actually been talking about solving this for a long time

We have a real-world example solution on Thread:

- Full service DNS resolver on Thread mesh
- SRP service advertised on Thread mesh
- DNS Discovery Proxy provided to discovery clients on Thread mesh
- DNS Advertising Proxy provided to discovery clients on infrastructure

What would it take to replicate this on a bog-standard WiFi network?

Full DNSSD service
(sort of like full-service resolver)

Full DNSSD service on infrastructure would provide:

- Full-service resolver
- SRP registrar
- Advertising Proxy
- Discovery Proxy

So basically the same thing we already have on Thread

What's missing is a way to advertise/discover it

Two modes

(depends on whether we have infrastructure support or not)

One very expedient solution:

- existing Thread BR (or similar) provides full DNSSD service on infrastructure

Probably better, but harder to deliver:

- Infrastructure (CE router) provides full DNSSD service

Infrastructure is better because it’s less volatile

Ad hoc is expedient because it doesn’t require software on CE router

Advertising

Simple:

- advertise in Router Advertisement with a flag
- if the server is not the router, it's the DNS resolver in the RA RDNSS option

This can be done by Thread BRs as well as infrastructure routers

If the service is seen on a router with a nonzero lifetime, this is preferred

Advertising for non-router devices

If a device that's not a router wants to advertise service, RA won't work

Instead it can advertise using mDNS

This is not ideal, but initial mDNS discovery is cheaper than mDNS advertising

mDNS can include more information (see draft)

Routers can provide additional info via DNSSD (mDNS and/or DNS)

Requestor behavior

A requestor that wants to use this service discovers it in RAs

If not present in RAs, or more information needed, can do DNSSD query

Requestor prefers infrastructure service

If no service present, fall back to mDNS (or fail)

Maintenance

- requestor must renew prior to lease expiry
- requestor must track status by doing periodic unicast DNSSD query
- periodic query can be at a rate that is friendly to battery life
- if DNSSD query is negative, requestor chooses new server

Providing DNSSD Service on Infrastructure

draft-tlmk-infra-dnssd

Ted Lemon <elemon@apple.com>