

Advertising Proxy Status

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Latest Update

- Still talks in terms of a general-purpose DNSSD proxy
- Advertising proxy described in terms of mDNS registrar and DNS authoritative server
- I talked about separating this out into multiple documents in March, but haven't had time to do this yet.
- I still think this is the right thing to do

Operational Experience

- Deployed widely in Apple Thread Border Routers and OpenThread Border Routers
- Mostly just works
- Problems:
 - Name conflict behavior
 - Scalability
 - Multi-mDNS responder issues

Name Conflict Behavior

- When two or more advertising proxies are advertising the same zone, we see more conflicts than we would like (we would like zero)
- TSR doesn't always address these conflicts
- The reasons for the conflicts are often obscure
 - mDNS probes may include some but not all RRs on a name because of packet-fitting algorithm
 - This can produce conflicts where no conflict exists
 - Conflicts can exist for service instance name but not hostname, or vice versa
 - Renumbering can cause name conflicts

Packet Fitting conflicts

- Apple's mDNS implementation tries to fill mDNS packets to improve efficiency
- If you have several services registering at the same time, as can happen on startup, the effect of this can be that for either a service instance name or a hostname, some records are in one probe packet, while other records are in another
- This looks like a conflict according to RFC6762
- So even though there is no actual conflict, we get a conflict

Service Instance vs Hostname

- We can get conflicts where the service instance name is seen to be in conflict on one advertising proxy, but the hostname is seen to be in conflict on the other, resulting in the registration succeeding on neither
- In a late conflict situation, this results in the service not being advertised at all
- Additionally, Matter enforces name uniqueness during onboarding and requires that names not change, so even if this is detected and communicated to the SRP client, we still lose because the SRP client can't rename.

Renumbering

- In Stub network situations, because the stub routers aren't necessarily stable, renumbering can happen spontaneously on the stub network
- When this happens, the SRP registration is updated
- This is an additional source of name conflicts.
- Although TSR in principle handles this gracefully, we see in practice that we do get name conflicts as a result of this.

Thinking about Conflicts

- Types of conflicts:
 1. Conflict between stale data and fresh data (TSR)
 2. Conflict between two independent services
 3. Partial conflict: Service Name vs Host Name
 4. Conflicts between namespaces
- Only (2) is an actual conflict, although (4) is effectively a conflict for the advertising proxy

Proposed Solution

- Treat SRP zones and the mDNS zone as distinct namespaces.
- SRP registrations only conflict within an SRP zone
- SRP clients are never asked to rename other than because of an SRP conflict (that is, never for an mDNS conflict)
- This means that SRP and SRP replication just maintain an SRP dataset using SRP, and that dataset is published on a best-effort basis using mDNS
- Somehow resolve the conflict on the mDNS side
- Maybe some strategy in SRP replication to avoid predictable conflicts
- Maybe improve TSR

Scalability Issues

- mDNS scalability
 - how many names can a registrar handle?
 - how many registrars per name is too many?
- SRP scalability: how many SRP replication peers?

Multi mDNS Registrar problems

- Existing mDNS implementations don't seem to behave well when there are multiple publishers for the same name
- How well does RFC6762 handle multiple registrars for the same name?
- Do we need to update it?
- Can we have primary and backup mDNS registrars, with the backups operating less aggressively, and possibly not defending names?
- Should we just limit the number of registrars per name?

Remaining Work

- I think the way we talked about handling conflicts is wrong and needs to change
- In particular, the coupling between SRP and mDNS for the purpose of name conflict detection is clearly a bad idea. I've updated the document to remove this.
- I think the text is currently descriptive rather than prescriptive, and so perhaps not the best guide for implementors. I would like to update this to be more prescriptive (e.g., when a name appears in the zone, do this, when a name is removed from a zone, do this, etc.)