Delegated Credentials to Host Encrypted DNS Forwarders on CPEs

draft-reddy-add-delegated-credentials-01

IETF 117, July 2023

Tiru Reddy (Nokia)

M. Boucadair (Orange)

Dan Wing (Citrix)

Shashank Jain (McAfee)

The Problem

- Goal: Deploy encrypted DNS on local managed CPEs
  - Improve privacy: local network, query aggregation
  - Improve security: malware filtering, MUD [RFC8520]
  - Improve performance: Local DNS caching
- However,
  - Encrypted DNS requires CA-signed certificates
  - Difficult to obtain CA-signed certificates for CPEs
  - Managed CPEs ease user burden, but creates scale burden

DDR and DNR

- DDR's scope is restricted to public IP addresses
  - Prefix re-numbering induces issues
    - DNS service delayed until new certificate acquired
  - ACME IP Identifier Validation Extension (RFC 8738) not supported
- DNR requires proving possession of an FQDN
  - Unique FQDNs are viable (*cpe-1234.example.net*)
  - ACME approach: CPE hosts Internet-facing HTTP or DNS server
    - Struggle with CGN (mobile networks)
  - An Alternative approach: CPE obtains certificate signature from Internet-facing server

Issuing CPE certificates from CA

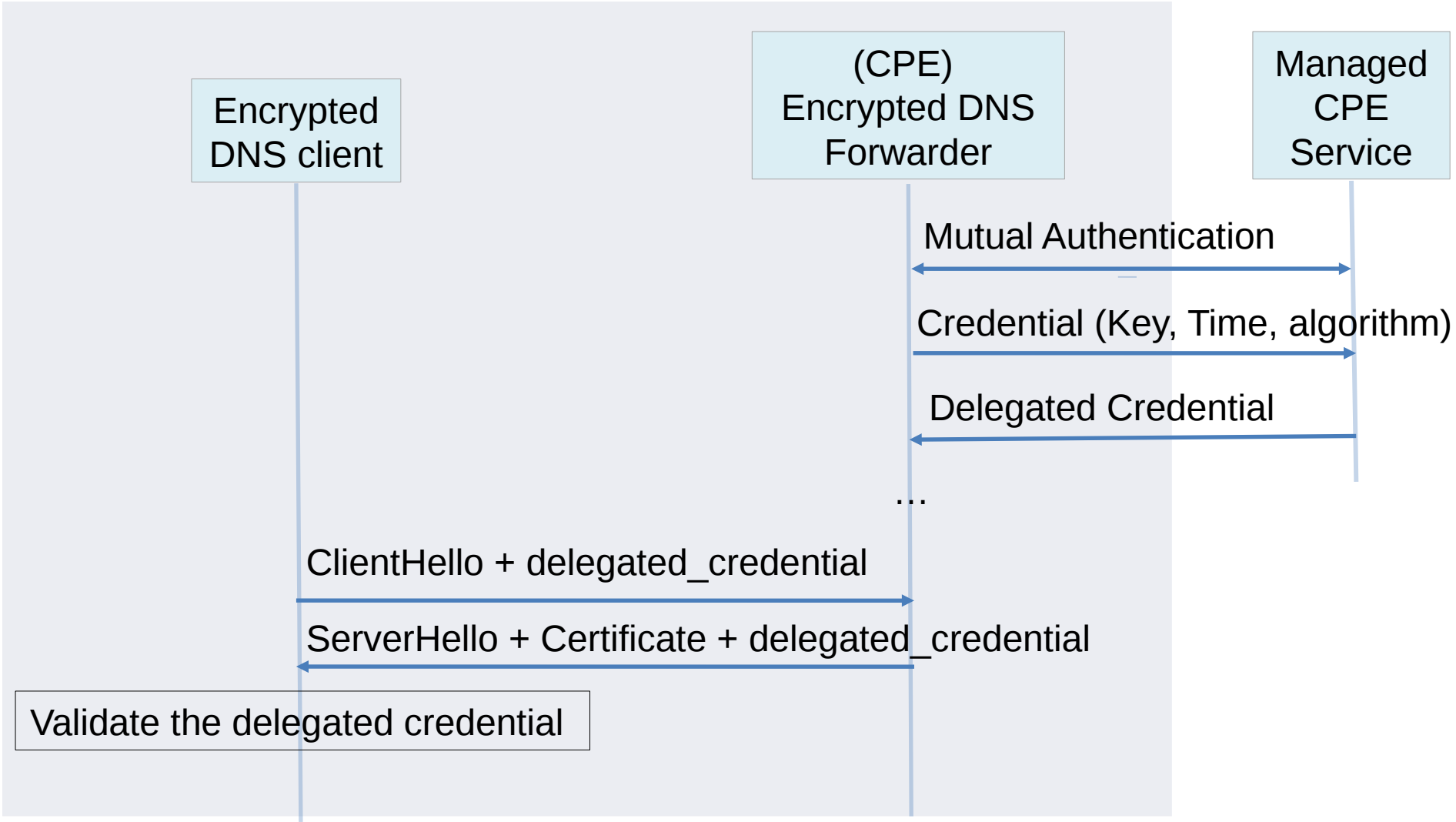
- Could trigger DoS mitigation (throttling) by CA
- Ongoing traffic to renew short-lived certificates (STAR, RFC8739)
- CPE are often unavailable (unplugged)

Solution: Avoid High Traffic to CAs

- Send traffic to Managed CPE service (rather than CA)
- Use *subcerts* [RFC9345] or *name constraints* [RFC8280]

subcerts	**name constraints**
• Con: TLS client & server need subcert support • Pro: Some client support (Firefox)	• Standardized 2008 • Con: Little/none CA support

Sequence Diagram



draft-reddy-add-delegated-credentials-01

- Comments and suggestions are welcome

Modern Managed CPE

- Upgraded without end-user intervention
- Already support encrypted DNS (e.g., PowerDNS DNSdist)

https://blog.open-xchange.com/dnsdist-as-a-router-ready-solution