HTTPSSVC DNS RR

HTTPS service location & parameter specification via the DNS

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IETF 105 - July 2019
https://tools.ietf.org/html/draft-nygren-httpbis-httpssvc-03

Goals

- Solve a number of active problems holistically

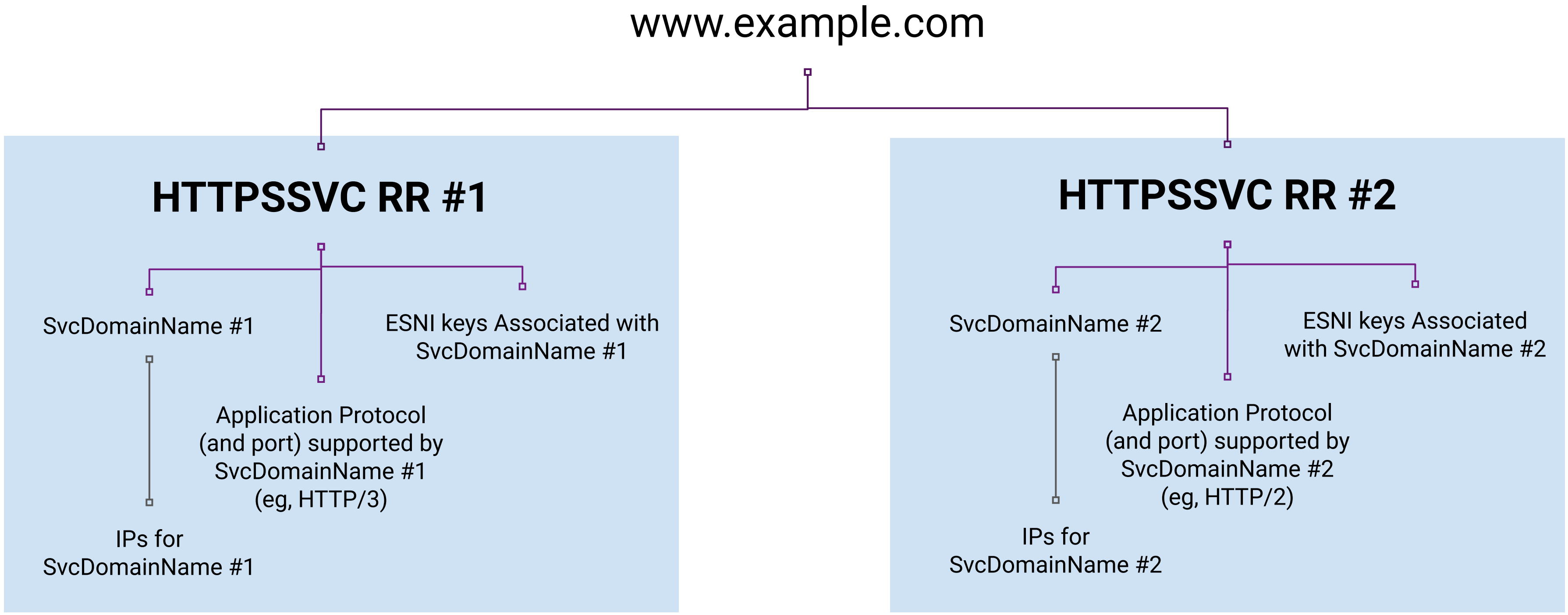
- Convey through DNS info needed to make connections to HTTPS URIs:
  - Encrypted SNI keys
  - Transport protocol (HTTP/3, HTTP/2, etc) and associated parameters
  - Indicate origin defaults to HTTPS
  - Service name (similar to SRV) — covers most “ANAME” use-cases
  - … extensible to future use-cases

Goals, cont...

- Single new record for browser to resolve in-parallel with AAAA/A
- Design for usability, extensibility, and to enable performance optimizations
- Compelling enough to convince clients (eg, browsers) to implement
- Opportunity to improve secure defaults

Associate service endpoints with parameters

Clients may end up on one or more service endpoints (i.e. sets of servers) which may have different capabilities and keys, such as on different CDNs. HTTPSSVC provides a way to tie these together.



www.example.com

HTTPSSVC RR #1

SvcDomainName #1

ESNI keys Associated with SvcDomainName #1

Application Protocol (and port) supported by SvcDomainName #1 (eg, HTTP/3)

IPs for SvcDomainName #1

HTTPSSVC RR #2

SvcDomainName #2

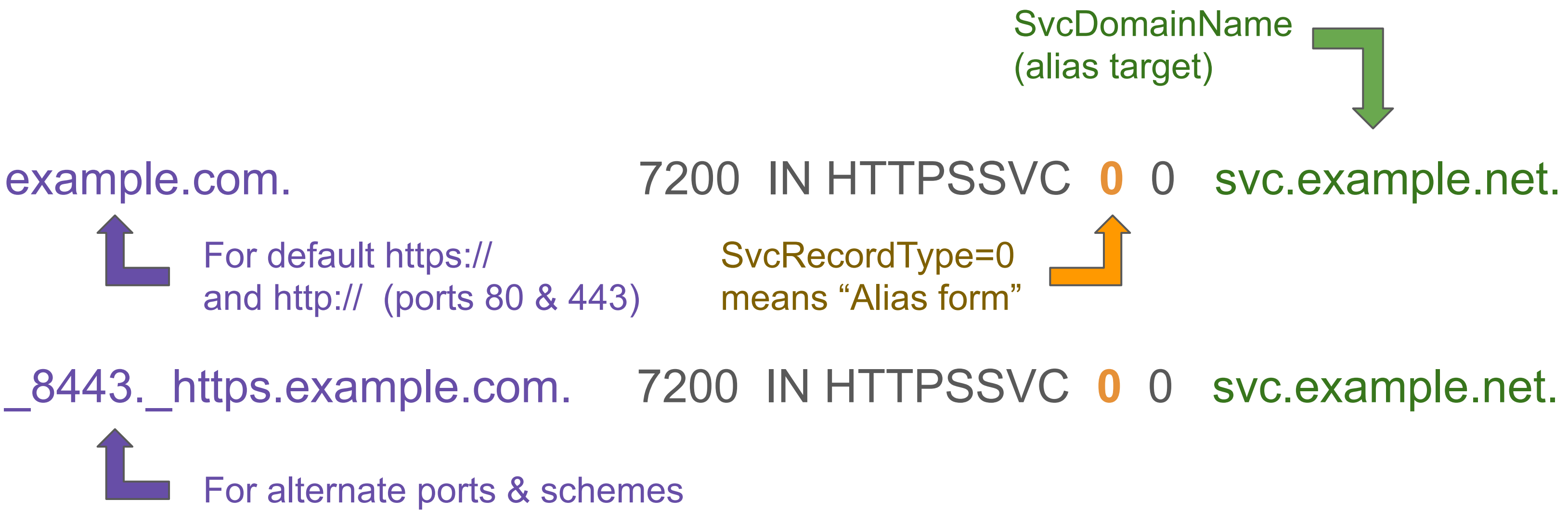
ESNI keys Associated with SvcDomainName #2

Application Protocol (and port) supported by SvcDomainName #2 (eg, HTTP/2)

IPs for SvcDomainName #2

Alias form (SvcRecordType=0)

- Covers many “SRV” and “ANAME” use-cases



SvcDomainName
(alias target)

example.com. 7200 IN HTTPSSVC 0 0 svc.example.net.

For default https://
and http:// (ports 80 & 443)

SvcRecordType=0
means “Alias form”

_8443._https.example.com. 7200 IN HTTPSSVC 0 0 svc.example.net.

For alternate ports & schemes

Alternative services form (SvcRecordType=1)

- Covers ESNI use case and other protocol improvements

SvcRecordType=1
means “Alt-Svc form”

Lower SvcFieldPriority
means preferred

```
svc.example.net.  7200  IN HTTPSSVC 1 2 svc3.example.net. "h3=\":8003\"; \
                                                          esnikeys=\"...\""
```

SvcFieldValue encodes protocol, port, ESNI keys,
and other params in HTTP Alt-Svc (rfc7838) format

```
svc.example.net.  7200  IN HTTPSSVC 1 3 svc2.example.net. "h2=\":8002\"; \
                                                          esnikeys=\"...\""
```

“Please use QUIC to UDP svc3.example.net:8003 with these ESNI keys, or use HTTP/2 to TCP svc2.example.net:8002 with these other ESNI keys.”

Comparison between HTTPSSVC & ANAME

(for the “zone apex CNAME” issue)

HTTPSSVC

Pros:

- Doesn’t require any changes to DNS servers

Cons:

- Only respected by compliant clients
- HTTPS-specific

ANAME

Pros:

- Doesn’t require any changes to clients

Cons:

- Requires complex changes to participating authoritative servers, especially when DNSSEC or ECS is also in use

Neither may fully replace the need or use-cases for the other.

Next steps...

Forums:

- httpbis : on Thursday   (best home for adoption?)
- dnsop : on Tuesday   (feedback on DNS RR & coverage of ANAME use-case)
- tls : on Thursday   (alternative to ESNI RR for HTTPS use-case)

Current workspace prior to adoption:

https://github.com/MikeBishop/dns-alt-svc

BIND9 private type implementation already available! (Thanks Mark Andrews!)

Feedback on mailing list(s) and to authors most welcome!

FAQs

- Why HTTP(S)-specific?
    - Different protocols have different bootstrap requirements
    - Builds on Alt-Svc which is a capability already in HTTP
    - HTTP(S) is most common reason given for needing ANAME
    - This proposal is not “browser” specific and should be able to work with API & mobile clients
- Why include ESNI?
    - Specific use-case TLS WG is looking to solve
    - Better for HTTPS use-case than an “ESNI” specific record
    - Easy to split esnikeys=”...” alt-svc parameter to its own draft
- Why address HSTS case?
    - Unique opportunity to improve secure defaults, especially for “bare names”