

Use of SRV records in conjunction with HTTP and URIs.

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Abstract

The combined use of SRV records for HTTP along with URIs is not as straight forward as it would appear at first glance. This document looks at the issues involved and recommends solutions.

Introduction

Many of today's HTTP sites are virtual, that is they are hosted on a machine that is not known by the name the HTTP site is known by. This leads to the problem of how to rationally give these HTTP sites IP addresses. This has traditionally been done by using CNAMEs [[RFC1034](#)][RFC1035] or by using explicit IP address records where CNAMEs are illegal due to restrictions in the DNS.

Both of these solutions have undesired side effects. CNAMEs are not protocol specific. Using IP address records is a logistic nightmare for large servers with many virtual sites. This is becoming a bigger problem as companies move away from identifying their HTTP site with a ``www'' prefix and just use their delegated domain name, e.g. ``http://example.com/''.

Using SRV [[RFC2782](#)] records would seem to be a natural solution to this problem in that they are protocol specific and will work where CNAMEs are illegal in the DNS.

There are problems with doing this without thought however in that URIs [[RFC1738](#)] can specify a port and SRV records do specify a port. When this occurs which one do you honour?

In addition to this SRV records provide for load balancing. For most protocols this is straight forward as there will only be a single connection made. For HTTP however there are often many connections made in a session. Should each of these individual connections be load balanced or should the load balancing be on a per session basis?

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC 2119](#).

1. URIs without an explicit port specification

If the URI does not explicitly specify a port to connect to, i.e. the URI does not contain a ``:<port>'' part, there is no port conflict. In this case a client MUST follow the logic specified in [[RFC2782](#)], including the server selection mechanism provided by the priority and weight fields. If SRV records do not exist then the client MUST fall back to looking for IP address records.

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Once a server is selected it SHOULD be continued to be used for the rest of the session if possible after an initial connection is made. If a server has multiple addresses the client SHOULD continue to use the same address while possible taking into consideration ttl values on address records. If connections to this address fail it SHOULD try the other addresses for the server first before attempting other servers.

Examples:

Single SRV record:

```
URI:      http://example.com/
SRV RR:   _http._tcp.example.com. SRV  10 0 8080 host1.example.com.
A RRs:    example.com.                A    10.0.0.2
          host1.example.com.          A    10.0.1.1
```

Connect to: 10.0.1.1 port 8080

Multiple SRV records:

```
URI:      http://example.com/
SRV RRs:  _http._tcp.example.com. SRV  10 1 8080 host1.example.com.
          _http._tcp.example.com. SRV  10 3 8080 host2.example.com.
          _http._tcp.example.com. SRV  20 0 8080 host3.example.com.
A RRs:    example.com.                A    10.0.0.4
          host1.example.com.          A    10.0.1.2
          host2.example.com.          A    10.0.2.2
          host3.example.com.          AAAA 1080::8:800:200C:417A
```

Connect to: 10.0.1.2 port 8080 or 10.0.2.2 port 8080 if either is available (the probability of being selected should be 25% for 10.0.1.2 port 8080, and 75% for 10.0.2.2 port 8080); otherwise, try 1080::8:800:200C:417A port 8080.

2. URIs with a explicit port specification

If the URI does explicitly specify a port to connect to then there is a potential conflict in the port specification between the URI and the SRV records, and the SRV record is ignored. In this case the user agent MUST query for address records for the host name in the URI (instead of SRV records).

If the server has multiple addresses the client SHOULD continue to use the same address while possible taking into consideration ttl

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values on address records.

Examples:

Default port specified:

```
URI:      http://example.com:80/
SRV RR:   _http._tcp.example.com. SRV  10 1 8080 host2.example.com.
A RRs:    example.com.             A    10.0.0.1
          host2.example.com.       A    10.0.2.2
```

Connect to: 10.0.0.1 port 80

Non-default port specified:

```
URI:      http://example.com:8080/
SRV RR:   _http._tcp.example.com. SRV  10 1 80 host2.example.com.
CNAME RR: example.com.             CNAME host1.example.com.
A RRs:    host1.example.com.       A    10.0.0.1
          host2.example.com.       AAAA 1080::8:800:200C:417A
```

Connect to: 10.0.0.1 port 8080

3. Transitioning Considerations

When transitioning from using a non-SRV solution to using a SRV based solution old, non-SRV aware, clients will continue to look for address records. It may be necessary to use redirection at the HTTP layer to direct these clients to the new servers if the SRV records point to a different <address, port> tuple.

It will also be necessary to continue to provide the existing address / CNAME records until there is a significant percentage of SRV aware clients. Experience has shown that this should be within one to two years of the introduction of the first SRV aware client, for HTTP.

In cases where you are just trying to replace the A or CNAME record referring to a service providers machine with a SRV record the

following should suffice.

The service provider is hosting the service on machine.example.net and you are example.com.

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example.com. A <IP address of machine.example.net>
_http._tcp.example.com. SRV 0 0 80 machine.example.net.

Security Considerations

The authors believe the algorithm described in this document to not cause any new security problems. However care should be taken as SRV and non-SRV aware clients may be directed to different locations.

IANA Considerations

A well known label has to be allocated for the first label of the http SRV record. This document has used ``_http''.

References

[RFC1034]

Domain names - concepts and facilities. P.V. Mockapetris.
Nov-01-1987. STD 0013, [RFC 1034](#).

[RFC1035]

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[RFC1738]

Uniform Resource Locators (URL). T. Berners-Lee, L. Masinter, M. McCallum. December 1994. [RFC 1738](#).

[RFC2782]

A DNS RR for specifying the location of services (DNS SRV). A. Gulbrandsen, P. Vixie, L. Esibov. February 2000. [RFC 2782](#).

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