Use of SRV records in conjuction 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 todays 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.

   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

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.

```
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

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   Domain names - concepts and facilities. P.V. Mockapetris.
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[RFC1035]
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[RFC2782]
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   brandsen, P. Vixie, L. Esibov. February 2000. RFC 2782.

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