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## Using DNS SRV RRs with URLs

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Abstract

DNS SRV RRs of a domain implicitly specify servers and port numbers corresponding to the domain.

By combining URLs and SRV RRs, no port numbers have to be specified explicitly in URLs, even if non-default port numbers are used, which makes URLs more concise for port based virtual and real hosting, where port based real hosting means that multiple servers sharing an IP address are distinguished by port numbers to give service for different URLs, which is the case for port forwarded servers behind

NAT and servers with realm specific IP.

## 1. Introduction

This memo specifies informative guidelines on how to use DNS SRV RRs [SRV] with URLs [URI].

Without explicitly specifying port numbers in URLs, SRV RR is useful to map a <reg-name> to IP addresses and port numbers of one or more servers, which can make URLs more concise for port based virtual and real hosting, where port based real hosting means that multiple servers sharing an IP address are distinguished by port numbers to give service for different URLs, which is the case for port forwarded servers behind NAT [NAT] and servers with realm specific IP [RSIP].

For SRV RRs usable for a URL, the URL must include <reg-name>, a domain name, that is, have the following syntax [URI]:

```
<scheme>://[<userinfo>@]<reg-name>[:<port0>]<path>[?<query>]
```

It is also required that <reg-name> corresponds to a DNS hostname: <hostname>.

The URL means a client and a <server> communicate over a protocol named <proto> using a single port number. In this memo, it is assumed that the client can deduce one or more <proto> from <scheme>.

<proto> and <scheme> may be defined globally in Assigned Numbers or locally at <hostname> [SRV].

## 2. SRV Look Up

First, SRV RRs of a DNS node, <\_><scheme>.<\_><proto>.<hostname>, is looked up.

If the node does not have any SRV RR, DNS derived address(es) of <hostname> is the address(es) of the server and <port0> (or default port of <scheme>) is the port number to be used.

Otherwise, if the node has at least one SRV RR [SRV]:

```
<_><scheme>.<_><proto>.<hostname> SRV <priority> <weight>  
                                <port1> <target>
```

<target> is the server to be used by the client. If there are multiple SRV RRs of the node, multiple <target>s are contacted in the order described by [SRV].



If there are multiple <proto> names corresponding to <scheme>, all the SRV RRs for all the <proto> names are looked up and they are mixed together and tried in the order described by [SRV] as if all the RRs are located in a single domain. Note that the ordering rule in [SRV] is preserved between SRV RRs with same <proto>, even after mixing.

If <port0> exists, <port0>+<port1> (with 16bit arithmetic) is the port number to be used. The reason of addition is that, if <port0> is explicitly specified, there is no reason to ignore it, but SRV RRs assumes all the <target> may not use a same port number, which will be the case with port forwarding with NAT and realm specific IP. So, <port0> is interpreted as an offset and added to <port1>.

If <port0> does not exist, <port1> is the port number to be used, unless <port1> is 0. If <port1> is 0, <scheme> default port number should be used.

If a server requests the client tell the URL used, reply should be the original URL:

```
<scheme>://[<userinfo>@]<reg-name>[:<port0>]<path>[?<query>]
```

not:

```
<scheme>://[<userinfo>@]<target>:<port1>[+<port0>]<path>[?<query>]
```

which enables name based virtual hosting by <reg-name> and improves security (see "Security Considerations" section).

### 3. Caching

As SRV RRs of `_<scheme>._<proto>.<hostname>` are looked up before address(es) of <hostname>, if `_<scheme>._<proto>.<hostname>` does not exist, extra DNS query is repeated every time <reg-name> appears in a URL.

Thus, DNS should support negative caching.

In addition, clients should remember non existence of the node `_<scheme>._<proto>.<hostname>` for a few minutes.

Managers of a <hostname>, which does not need SRV, may also set up an SRV RR as:

```
_<scheme>._<proto>.<hostname> SRV 0 1 0 <hostname>
```

in addition to address RRs for <hostname>, which act as a positive



cache with no effect (including an effect on port number, following zero replacing rules in the previous section).

#### **4. Security Considerations**

Be aware that DNS look up of SRV RR may not be very secure.

For example, SSL key of `https://<reg-name>` should be derived from not `<target>` but `<hostname>`.

#### **5. IANA Considerations**

This document has no actions for IANA.

#### Informative References

[SRV] A. Gulbrandsen, P. Vixie, L. Esibov, "A DNS RR for specifying the location of services (DNS SRV)", [RFC2782](#), February 2000.

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[RSIP] M. Borella, J. Lo, D. Grabelsky, G. Montenegro, "Realm Specific IP: Framework", [RFC3102](#), October 2001.

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