Setting up your IP Phone using DHCP and DNS

In dynamically setting up a VOIP phone, you could use DHCP, but many DHCP servers do not allow you to set the SIP Proxy address. You could manually set it, or find a DHCP server that sets it, or use other means.

A commonly used technique is to use a DNS SRV record. Using this approach, you get the IP Address, Subnet Mask, Gateway Address, and DNS address from your DHCP server, and then get the SIP Proxy from the DNS. Setting up the aliases, i.e., the 3 or 4 digit phone numbers you use to dial might still take some doing.

This note describes how to setup your DNS to supply SIP Proxy addresses to your VOIP Phones.

Using DNS SRV Records

A Domain Name Server (DNS) SRV record helps connecting to a SIP user in a similar way that an MX record helps email delivery. When you send email to "john@example.com", the MX record for *example.com* might tell the mail transfer agent to deliver email to a completely different machine, such as "zaphod.foobar.com". Similarly, when you want to make a SIP phone call to john@example.com, the SRV record might tell your computer that it should connect to "galaxy.starsystem.tw" to do so.

Why use DNS SRV records for SIP?
Dialling by domain names lets a SIP user have a single public "SIP address" which can be redirected at will to their current location. SRV records maintain stability and also opens up the possibility to use your own domain, regardless of the domain of the SIP service you are using.

DNS SRV resource records indicates how to find services for various protocols.

From RFC 2782:

This document describes a DNS RR which specifies the location of the server(s) for a specific protocol and domain.

Currently, one must either know the exact address of a server to contact it, or broadcast a question.

The SRV RR allows administrators to use several servers for a single domain, to move services from host to host with little fuss, and to designate some hosts as primary servers for a service and others as backups.

Clients ask for a specific service/protocol for a specific domain (the word domain is used here in the strict RFC 1034 sense), and get back the names of any available servers.

For a SIP proxy in a domain, this means that

- You can set SRV records of a domain to point to a SIP proxy in another domain. Like e-mail, where a mail server handles mail to many domains, a SIP proxy can handle users in many domains. The key is to set the DNS SRV records in the user domain (like voip-info.org) zone file to point to a SIP Proxy somewhere else (like sip.iptel.org). With a configuration like this, calls to user@voip-info.org will be automatically routed to the SIP proxy sip.iptel.org.
- In a DNS zone, you can specify multiple SIP proxies. If the proxy with the highest priority is not reachable, the SIP ua or proxy that tries to reach a user within the domain tries the next proxy defined in the zone with a SRV record.

Example Describing the Use of SRV Records

In order to use SRV records, you will need the following information:

a. The IETF Service Type (You can view a more or less complete listing of those here, original RFC #2782 here) in the format _servicetype._layer4.
b. The priority of your systems.
c. The load, or 'weight' those systems can handle. (optional)
d. The port number your service will be running on.
e. The hostname of the system your service will run on.

All of this information gets entered into your zone file in the above order, like so:

```
a  (TTL) SRV  b (c) d e.
```

For example, you would do a sip server, running on host.tld like so:

```
_sip._udp        SRV 0 5060 host.tld.
```

As I described above, _sip._udp is the IETF Service Type for SIP protocol running on UDP. SRV is the DNS record type, 0 is the priority of this entry, we don't have a load entry here, and 5060 is the port number that SIP runs on. host.tld is our hostname.

You could do a similar setup for iax, like so:

```
_iax._udp        SRV 0 4569 host.tld.
```

You will of course need to make sure that host.tld has a related A record or CNAME record to go with it, like so:

```
host.tld        A        xxx.xxx.xxx.xxx
```

An example from the Cisco site

```
;;;; NAPTR records for sip services
   ;          order pref flags service      regexp  replacement
      IN NAPTR 50   50   "s"   "SIPS+D2T"     ""
_sips._tcp.cisco.com.
      IN NAPTR 90   50   "s"   "SIP+D2T"      ""   _sip._tcp.cisco.com.
      IN NAPTR 100  50   "s"   "SIP+D2U"      ""   _sip._udp.cisco.com.

;;;; SRV records for each sip service
  ;;                          Priority Weight Port Target
  _sips._tcp.cisco.com SRV      10       1       5061 farm1.cisco.com.
                       SRV      20       1       5061 farm2.cisco.com.
  _sip._tcp.cisco.com  SRV      10       1       5060 farm1.cisco.com.
                       SRV      20       1       5060 farm2.cisco.com.
  _sip._udp.cisco.com  SRV      10       1       5060 farm1.cisco.com.
                       SRV      20       1       5060 farm2.cisco.com.

;;;; A records for the contacts mentioned in SRV records
    farm1           IN  A          10.4.175.126  ;; proxy1
                    IN  A          10.4.175.127  ;; proxy2
    farm2           IN  A          10.4.175.128  ;; proxy3
                    IN  A          10.4.175.129  ;; proxy4

;;;; A records for the well known names of the hosts
    proxy1          IN  A          10.4.175.126
    proxy2          IN  A          10.4.175.127
    proxy3          IN  A          10.4.175.128
    proxy4          IN  A          10.4.175.129
```

DNS Servers Supporting SRV Records

- BIND 9
- djbdns (through patching for SRV or generic SRV records)
- MyDNS: http://mydns.bboy.net/: A free DNS server for UNIX (serving records from SQL - currently MySQL/PostgreSQL)
- Microsoft DNS http://www.microsoft.com/technet/prodtechnol/office/livecomm/library/deployse/lcsdse_8.mspx The process for adding SRV records to Microsoft DNS is documented in their LCS 2005 Deployment guide.