

IT341 Introduction to System Administration

Project V – Implementing DNS

A domain name server (DNS)...

- translates a human-readable address – such as **itvm21-1a.it.cs.umb.edu**
- into an IP address – such as **158.121.106.128**

DNS is better than the (flat) NIS as a database of domain names because it is hierarchical and distributed over the Internet. Also, it delegates a sub-domain's addresses to that sub-domain. For example, the DNS server for *cs.umb.edu* maintains the IP address for *it20.cs.umb.edu*. We will want to establish a DNS server for the sub-domain *it.cs.umb.edu*

In fact, we will want to provide three different IP addresses:

- a **public** address for those outside *cs.umb.edu*
- a **cslan** address for those on *cs.umb.edu*
- and a **private** address to those inside the network.

Initially, we thought we would set up three DNS servers, two on it20 serving the outside (outside of it20) and one on (say) it21 serving the inside. But this doesn't work because the DNS server should be on the same server as the dhcp server, that is it20.

So then we considered installing and configuring two dns server processes on it20: one to listen to the outside and one to listen to the inside. This might have been possible but it was way more complicated than we thought any solution should be.

Dai Phan found a much simpler solution: a three-in-one dns server, which makes use of the bind9 concept of views. We have one dns server running on it20, which presents three views: one to the inside local lan, one to the csan, and one to the outside world.

Much is done on the Server, it20:

1. Install bind9 on the server.

```
sudo apt-get update
sudo apt-get install bind9
```

2. We define a new /etc/bind/named.conf.local We use an **acl** (access control list) clause to name the set of internal hosts *internals*. When we subsequently refer to *internals*, we are referring to the hosts, **127.0.0.0/24** and **10.0.0.0/24**. We do a similar thing for the csan (cs.umb.edu). We then go on to define the three views: *internal*, *cslan*, and *external*.

```
/etc/bind/named.conf.local
//
// Do any local configuration here
//

acl internals {
```

```

        127.0.0.0/24;
        10.0.0.0/24;
};

acl cslan {
    192.168.0.0/16;
};

view "internal" {
    match-clients { internals; };
    recursion yes;
    zone "it.cs.umb.edu" {
        type master;
        file "/etc/bind/internal/db.it";
    };
    forwarders { 192.168.105.51; };
    include "/etc/bind/named.conf.default-zones";
};

view "cslan" {
    match-clients { cslan; };
    recursion no;
    zone "it.cs.umb.edu" {
        type master;
        file "/etc/bind/cslan/db.it";
    };
};

view "external" {
    match-clients { any; };
    recursion no;
    zone "it.cs.umb.edu" {
        type master;
        file "/etc/bind/external/db.it";
    };
};

// Consider adding the 1918 zones here, if they are not used in
// your organization
//include "/etc/bind/zones.rfc1918";

```

Notice that the views specify the clients to which they present themselves. The `internal` view presents itself only to the `internals` – those inside the `it.cs.umb.edu` lan. The `cslan` view presents itself to the `cs.umb.edu` lan. The `external` view presents itself to any other hosts, i.e. outside the `cs.umb.edu` lan.

More technically, the views may be seen as *conditionals*, and the `match-clients` are the conditions. So an incoming **dns** request is handled by going through the views one at a time, matching the originating client with the `match-clients` clauses until a match is found.

Notice that the options are contained within in the view clauses and so apply only to each view; so for example, `dns` requests originating internally permit recursive searches but

requests originating externally do not. Likewise, the three views all specify zone files for it20, but in different subdirectories: **internal**, **cslan** and **external**.

3. The zone file for the internal view (/etc/bind/internal/db.it) serves up private IP addresses:

```
; BIND data file for (internal) view of zone it.cs.umb.edu.
;
; This file will be modified from the original by Al Bird in Jan 2016
; It is structured to reflect the new IT lab Configuration
;
;
$TTL      86400
@         IN      SOA  it.cs.umb.edu. hostmaster.cs.umb.edu. (
          2016021401 ; Serial Al Bird Sun 14 Feb 2016 17:14:01 EST
          604800    ; Refresh
          86400     ; Retry
          2419200   ; Expire
          86400 )   ; Negative Cache TTL
;
@         IN      NS   it20.it.cs.umb.edu.
;
; Private addresses given out by the inward-facing view.
;
mailhost  IN      CNAME it20.it.cs.umb.edu.
smtp      IN      CNAME it20.it.cs.umb.edu.
;
it20      IN      A    10.0.0.1
;
; Inside The PC hosts themselves
;
it21      IN      A    10.0.0.240
it22      IN      A    10.0.0.241
it23      IN      A    10.0.0.242
it24      IN      A    10.0.0.243
it25      IN      A    10.0.0.244
it26      IN      A    10.0.0.245
it27      IN      A    10.0.0.246
it28      IN      A    10.0.0.247
;
; Extra Machines for testing purposes
;
it30      IN      A    10.0.0.248
it31      IN      A    10.0.0.249
;
; Inside vm's for s16.
;

itvm21-1a IN      A    10.0.0.128
itvm22-1a IN      A    10.0.0.129
itvm23-1a IN      A    10.0.0.130
itvm24-1a IN      A    10.0.0.131
itvm25-1a IN      A    10.0.0.132
itvm26-1a IN      A    10.0.0.133
itvm27-1a IN      A    10.0.0.134
```

itvm28-1a	IN	A	10.0.0.135
;			
itvm21-1b	IN	A	10.0.0.136
itvm22-1b	IN	A	10.0.0.137
itvm23-1b	IN	A	10.0.0.138
itvm24-1b	IN	A	10.0.0.139
itvm25-1b	IN	A	10.0.0.140
itvm26-1b	IN	A	10.0.0.141
itvm27-1b	IN	A	10.0.0.142
itvm28-1b	IN	A	10.0.0.143
itvm21-2a	IN	A	10.0.0.144
itvm22-2a	IN	A	10.0.0.145
itvm23-2a	IN	A	10.0.0.146
itvm24-2a	IN	A	10.0.0.147
itvm25-2a	IN	A	10.0.0.148
itvm26-2a	IN	A	10.0.0.149
itvm27-2a	IN	A	10.0.0.150
itvm28-2a	IN	A	10.0.0.151
;			
itvm21-2b	IN	A	10.0.0.152
itvm22-2b	IN	A	10.0.0.153
itvm23-2b	IN	A	10.0.0.154
itvm24-2b	IN	A	10.0.0.155
itvm25-2b	IN	A	10.0.0.156
itvm26-2b	IN	A	10.0.0.157
itvm27-2b	IN	A	10.0.0.158
itvm28-2b	IN	A	10.0.0.159
itvm21-3a	IN	A	10.0.0.160
itvm22-3a	IN	A	10.0.0.161
itvm23-3a	IN	A	10.0.0.162
itvm24-3a	IN	A	10.0.0.163
itvm25-3a	IN	A	10.0.0.164
itvm26-3a	IN	A	10.0.0.165
itvm27-3a	IN	A	10.0.0.166
itvm28-3a	IN	A	10.0.0.167
;			
itvm21-3b	IN	A	10.0.0.168
itvm22-3b	IN	A	10.0.0.169
itvm23-3b	IN	A	10.0.0.170
itvm24-3b	IN	A	10.0.0.171
itvm25-3b	IN	A	10.0.0.172
itvm26-3b	IN	A	10.0.0.173
itvm27-3b	IN	A	10.0.0.174
itvm28-3b	IN	A	10.0.0.175
itvm21-4a	IN	A	10.0.0.176
itvm22-4a	IN	A	10.0.0.177
itvm23-4a	IN	A	10.0.0.178
itvm24-4a	IN	A	10.0.0.179
itvm25-4a	IN	A	10.0.0.180
itvm26-4a	IN	A	10.0.0.181
itvm27-4a	IN	A	10.0.0.183
itvm28-4a	IN	A	10.0.0.183
;			
itvm21-4b	IN	A	10.0.0.184

itvm22-4b	IN	A	10.0.0.185
itvm23-4b	IN	A	10.0.0.186
itvm24-4b	IN	A	10.0.0.187
itvm25-4b	IN	A	10.0.0.188
itvm26-4b	IN	A	10.0.0.189
itvm27-4b	IN	A	10.0.0.190
itvm28-4b	IN	A	10.0.0.191
itvm21-5a	IN	A	10.0.0.192
itvm22-5a	IN	A	10.0.0.193
itvm23-5a	IN	A	10.0.0.194
itvm24-5a	IN	A	10.0.0.195
itvm25-5a	IN	A	10.0.0.196
itvm26-5a	IN	A	10.0.0.197
itvm27-5a	IN	A	10.0.0.198
itvm28-5a	IN	A	10.0.0.199
;			
itvm21-5b	IN	A	10.0.0.200
itvm22-5b	IN	A	10.0.0.201
itvm23-5b	IN	A	10.0.0.202
itvm24-5b	IN	A	10.0.0.203
itvm25-5b	IN	A	10.0.0.204
itvm26-5b	IN	A	10.0.0.205
itvm27-5b	IN	A	10.0.0.206
itvm28-5b	IN	A	10.0.0.207
itvm21-6a	IN	A	10.0.0.208
itvm22-6a	IN	A	10.0.0.209
itvm23-6a	IN	A	10.0.0.210
itvm24-6a	IN	A	10.0.0.211
itvm25-6a	IN	A	10.0.0.212
itvm26-6a	IN	A	10.0.0.213
itvm27-6a	IN	A	10.0.0.214
itvm28-6a	IN	A	10.0.0.215
;			
itvm21-6b	IN	A	10.0.0.216
itvm22-6b	IN	A	10.0.0.217
itvm23-6b	IN	A	10.0.0.218
itvm24-6b	IN	A	10.0.0.219
itvm25-6b	IN	A	10.0.0.220
itvm26-6b	IN	A	10.0.0.221
itvm27-6b	IN	A	10.0.0.222
itvm28-6b	IN	A	10.0.0.223
itvm21-7a	IN	A	10.0.0.224
itvm22-7a	IN	A	10.0.0.225
itvm23-7a	IN	A	10.0.0.226
itvm24-7a	IN	A	10.0.0.227
itvm25-7a	IN	A	10.0.0.228
itvm26-7a	IN	A	10.0.0.229
itvm27-7a	IN	A	10.0.0.230
itvm28-7a	IN	A	10.0.0.231
;			
itvm21-7b	IN	A	10.0.0.232
itvm22-7b	IN	A	10.0.0.233
itvm23-7b	IN	A	10.0.0.234
itvm24-7b	IN	A	10.0.0.235

```
itvm25-7b    IN          A    10.0.0.236
itvm26-7b    IN          A    10.0.0.237
itvm27-7b    IN          A    10.0.0.238
itvm28-7b    IN          A    10.0.0.239
```

4. The zone file for the **cslan** view (*/etc/bind/cslan/db.it*) serves up *cs.umb.edu* IP addresses:

```
; BIND data file for (cslan) view of zone it.cs.umb.edu.
;
; This file will be modified from the original by Al Bird in Jan 2016
; It is structured to reflect the new IT lab Configuration
;
;
$TTL      86400
@         IN      SOA  it.cs.umb.edu. hostmaster.cs.umb.edu. (
          2016012801 ; Serial Al Bird Wed Jan 28 17:14:01 EST 2016
          604800    ; Refresh
          86400     ; Retry
          2419200   ; Expire
          86400 )   ; Negative Cache TTL
;
@         IN      NS   it20.cs.umb.edu.
;
; Private addresses given out by the inward-facing view.
;
it20      IN      A    192.168.106.192
;
; Inside The PC Hosts themselves.
;
it21      IN      A    192.168.106.240
it22      IN      A    192.168.106.241
it23      IN      A    192.168.106.242
it24      IN      A    192.168.106.243
it25      IN      A    192.168.106.244
it26      IN      A    192.168.106.245
it27      IN      A    192.168.106.246
it28      IN      A    192.168.106.247
;
; Extra machines for testing purposes
;
it30      IN      A    192.168.106.248
it31      IN      A    192.168.106.249
;
; Inside vm's for s16.
;
itvm21-1a IN      A    192.168.106.128
itvm22-1a IN      A    192.168.106.129
itvm23-1a IN      A    192.168.106.130
itvm24-1a IN      A    192.168.106.131
itvm25-1a IN      A    192.168.106.132
```

itvm26-1a	IN	A	192.168.106.133
itvm27-1a	IN	A	192.168.106.134
itvm28-1a	IN	A	192.168.106.135
;			
itvm21-1b	IN	A	192.168.106.136
itvm22-1b	IN	A	192.168.106.137
itvm23-1b	IN	A	192.168.106.138
itvm24-1b	IN	A	192.168.106.139
itvm25-1b	IN	A	192.168.106.140
itvm26-1b	IN	A	192.168.106.141
itvm27-1b	IN	A	192.168.106.142
itvm28-1b	IN	A	192.168.106.143
itvm21-2a	IN	A	192.168.106.144
itvm22-2a	IN	A	192.168.106.145
itvm23-2a	IN	A	192.168.106.146
itvm24-2a	IN	A	192.168.106.147
itvm25-2a	IN	A	192.168.106.148
itvm26-2a	IN	A	192.168.106.149
itvm27-2a	IN	A	192.168.106.150
itvm28-2a	IN	A	192.168.106.151
;			
itvm21-2b	IN	A	192.168.106.152
itvm22-2b	IN	A	192.168.106.153
itvm23-2b	IN	A	192.168.106.154
itvm24-2b	IN	A	192.168.106.155
itvm25-2b	IN	A	192.168.106.156
itvm26-2b	IN	A	192.168.106.157
itvm27-2b	IN	A	192.168.106.158
itvm28-2b	IN	A	192.168.106.159
itvm21-3a	IN	A	192.168.106.160
itvm22-3a	IN	A	192.168.106.161
itvm23-3a	IN	A	192.168.106.162
itvm24-3a	IN	A	192.168.106.163
itvm25-3a	IN	A	192.168.106.164
itvm26-3a	IN	A	192.168.106.165
itvm27-3a	IN	A	192.168.106.166
itvm28-3a	IN	A	192.168.106.167
;			
itvm21-3b	IN	A	192.168.106.168
itvm22-3b	IN	A	192.168.106.169
itvm23-3b	IN	A	192.168.106.170
itvm24-3b	IN	A	192.168.106.171
itvm25-3b	IN	A	192.168.106.172
itvm26-3b	IN	A	192.168.106.173
itvm27-3b	IN	A	192.168.106.174
itvm28-3b	IN	A	192.168.106.175

itvm21-4a	IN	A	192.168.106.176
itvm22-4a	IN	A	192.168.106.177
itvm23-4a	IN	A	192.168.106.178
itvm24-4a	IN	A	192.168.106.179
itvm25-4a	IN	A	192.168.106.180
itvm26-4a	IN	A	192.168.106.181
itvm27-4a	IN	A	192.168.106.183
itvm28-4a	IN	A	192.168.106.183
;			
itvm21-4b	IN	A	192.168.106.184
itvm22-4b	IN	A	192.168.106.185
itvm23-4b	IN	A	192.168.106.186
itvm24-4b	IN	A	192.168.106.187
itvm25-4b	IN	A	192.168.106.188
itvm26-4b	IN	A	192.168.106.189
itvm27-4b	IN	A	192.168.106.190
itvm28-4b	IN	A	192.168.106.191
itvm21-5a	IN	A	192.168.106.192
itvm22-5a	IN	A	192.168.106.193
itvm23-5a	IN	A	192.168.106.194
itvm24-5a	IN	A	192.168.106.195
itvm25-5a	IN	A	192.168.106.196
itvm26-5a	IN	A	192.168.106.197
itvm27-5a	IN	A	192.168.106.198
itvm28-5a	IN	A	192.168.106.199
;			
itvm21-5b	IN	A	192.168.106.200
itvm22-5b	IN	A	192.168.106.201
itvm23-5b	IN	A	192.168.106.202
itvm24-5b	IN	A	192.168.106.203
itvm25-5b	IN	A	192.168.106.204
itvm26-5b	IN	A	192.168.106.205
itvm27-5b	IN	A	192.168.106.206
itvm28-5b	IN	A	192.168.106.207
itvm21-6a	IN	A	192.168.106.208
itvm22-6a	IN	A	192.168.106.209
itvm23-6a	IN	A	192.168.106.210
itvm24-6a	IN	A	192.168.106.211
itvm25-6a	IN	A	192.168.106.212
itvm26-6a	IN	A	192.168.106.213
itvm27-6a	IN	A	192.168.106.214
itvm28-6a	IN	A	192.168.106.215
;			
itvm21-6b	IN	A	192.168.106.216
itvm22-6b	IN	A	192.168.106.217
itvm23-6b	IN	A	192.168.106.218
itvm24-6b	IN	A	192.168.106.219


```

itvm25-6b      IN          A      192.168.106.220
itvm26-6b      IN          A      192.168.106.221
itvm27-6b      IN          A      192.168.106.222
itvm28-6b      IN          A      192.168.106.223

itvm21-7a      IN          A      192.168.106.224
itvm22-7a      IN          A      192.168.106.225
itvm23-7a      IN          A      192.168.106.226
itvm24-7a      IN          A      192.168.106.227
itvm25-7a      IN          A      192.168.106.228
itvm26-7a      IN          A      192.168.106.229
itvm27-7a      IN          A      192.168.106.230
itvm28-7a      IN          A      192.168.106.231
;
itvm21-7b      IN          A      192.168.106.232
itvm22-7b      IN          A      192.168.106.233
itvm23-7b      IN          A      192.168.106.234
itvm24-7b      IN          A      192.168.106.235
itvm25-7b      IN          A      192.168.106.236
itvm26-7b      IN          A      192.168.106.237
itvm27-7b      IN          A      192.168.106.238
itvm28-7b      IN          A      192.168.106.239

```

5. The zone file for the external view, /etc/bind/external/db.it, serves up public IP addresses:

```

; BIND data file for (external) view of zone it.cs.umb.edu.
;
; This file will be modified from the original by Al Bird in Jan 2016
; It is structured to reflect the new IT lab Configuration
;
;
$TTL      86400
@         IN          SOA  it.cs.umb.edu. hostmaster.cs.umb.edu. (
                2016021801 ; Serial Al Bird Thu Feb 18 2016 17:14:01 EST
                604800    ; Refresh
                86400     ; Retry
                2419200   ; Expire
                86400    ) ; Negative Cache TTL
;
@         IN          NS   it20.cs.umb.edu.
;
; Private addresses given out by the inward-facing view.
;
;
it20      IN          A      158.121.106.192
;
; The Pc hosts themselves.
;

```

```
it21          IN          A    158.121.106.240
it22          IN          A    158.121.106.241
it23          IN          A    158.121.106.242
it24          IN          A    158.121.106.243
it25          IN          A    158.121.106.244
it26          IN          A    158.121.106.245
it27          IN          A    158.121.106.246
it28          IN          A    158.121.106.247
;
; Extra machines for testing purposes
;
it30          IN          A    158.121.106.248
it31          IN          A    158.121.106.249
;
; Inside vm's for s16.
;
itvm21-1a    IN          A    158.121.106.128
itvm22-1a    IN          A    158.121.106.129
itvm23-1a    IN          A    158.121.106.130
itvm24-1a    IN          A    158.121.106.131
itvm25-1a    IN          A    158.121.106.132
itvm26-1a    IN          A    158.121.106.133
itvm27-1a    IN          A    158.121.106.134
itvm28-1a    IN          A    158.121.106.135
;
itvm21-1b    IN          A    158.121.106.136
itvm22-1b    IN          A    158.121.106.137
itvm23-1b    IN          A    158.121.106.138
itvm24-1b    IN          A    158.121.106.139
itvm25-1b    IN          A    158.121.106.140
itvm26-1b    IN          A    158.121.106.141
itvm27-1b    IN          A    158.121.106.142
itvm28-1b    IN          A    158.121.106.143
;
itvm21-2a    IN          A    158.121.106.144
itvm22-2a    IN          A    158.121.106.145
itvm23-2a    IN          A    158.121.106.146
itvm24-2a    IN          A    158.121.106.147
itvm25-2a    IN          A    158.121.106.148
itvm26-2a    IN          A    158.121.106.149
itvm27-2a    IN          A    158.121.106.150
itvm28-2a    IN          A    158.121.106.151
;
itvm21-2b    IN          A    158.121.106.152
itvm22-2b    IN          A    158.121.106.153
itvm23-2b    IN          A    158.121.106.154
itvm24-2b    IN          A    158.121.106.155
itvm25-2b    IN          A    158.121.106.156
itvm26-2b    IN          A    158.121.106.157
```

itvm27-2b	IN	A	158.121.106.158
itvm28-2b	IN	A	158.121.106.159
itvm21-3a	IN	A	158.121.106.160
itvm22-3a	IN	A	158.121.106.161
itvm23-3a	IN	A	158.121.106.162
itvm24-3a	IN	A	158.121.106.163
itvm25-3a	IN	A	158.121.106.164
itvm26-3a	IN	A	158.121.106.165
itvm27-3a	IN	A	158.121.106.166
itvm28-3a	IN	A	158.121.106.167
;			
itvm21-3b	IN	A	158.121.106.168
itvm22-3b	IN	A	158.121.106.169
itvm23-3b	IN	A	158.121.106.170
itvm24-3b	IN	A	158.121.106.171
itvm25-3b	IN	A	158.121.106.172
itvm26-3b	IN	A	158.121.106.173
itvm27-3b	IN	A	158.121.106.174
itvm28-3b	IN	A	158.121.106.175
itvm21-4a	IN	A	158.121.106.176
itvm22-4a	IN	A	158.121.106.177
itvm23-4a	IN	A	158.121.106.178
itvm24-4a	IN	A	158.121.106.179
itvm25-4a	IN	A	158.121.106.180
itvm26-4a	IN	A	158.121.106.181
itvm27-4a	IN	A	158.121.106.183
itvm28-4a	IN	A	158.121.106.183
;			
itvm21-4b	IN	A	158.121.106.184
itvm22-4b	IN	A	158.121.106.185
itvm23-4b	IN	A	158.121.106.186
itvm24-4b	IN	A	158.121.106.187
itvm25-4b	IN	A	158.121.106.188
itvm26-4b	IN	A	158.121.106.189
itvm27-4b	IN	A	158.121.106.190
itvm28-4b	IN	A	158.121.106.191
itvm21-5a	IN	A	158.121.106.192
itvm22-5a	IN	A	158.121.106.193
itvm23-5a	IN	A	158.121.106.194
itvm24-5a	IN	A	158.121.106.195
itvm25-5a	IN	A	158.121.106.196
itvm26-5a	IN	A	158.121.106.197
itvm27-5a	IN	A	158.121.106.198
itvm28-5a	IN	A	158.121.106.199
;			
itvm21-5b	IN	A	158.121.106.200

```

itvm22-5b      IN      A      158.121.106.201
itvm23-5b      IN      A      158.121.106.202
itvm24-5b      IN      A      158.121.106.203
itvm25-5b      IN      A      158.121.106.204
itvm26-5b      IN      A      158.121.106.205
itvm27-5b      IN      A      158.121.106.206
itvm28-5b      IN      A      158.121.106.207

itvm21-6a      IN      A      158.121.106.208
itvm22-6a      IN      A      158.121.106.209
itvm23-6a      IN      A      158.121.106.210
itvm24-6a      IN      A      158.121.106.211
itvm25-6a      IN      A      158.121.106.212
itvm26-6a      IN      A      158.121.106.213
itvm27-6a      IN      A      158.121.106.214
itvm28-6a      IN      A      158.121.106.215
;
itvm21-6b      IN      A      158.121.106.216
itvm22-6b      IN      A      158.121.106.217
itvm23-6b      IN      A      158.121.106.218
itvm24-6b      IN      A      158.121.106.219
itvm25-6b      IN      A      158.121.106.220
itvm26-6b      IN      A      158.121.106.221
itvm27-6b      IN      A      158.121.106.222
itvm28-6b      IN      A      158.121.106.223

itvm21-7a      IN      A      158.121.106.224
itvm22-7a      IN      A      158.121.106.225
itvm23-7a      IN      A      158.121.106.226
itvm24-7a      IN      A      158.121.106.227
itvm25-7a      IN      A      158.121.106.228
itvm26-7a      IN      A      158.121.106.229
itvm27-7a      IN      A      158.121.106.230
itvm28-7a      IN      A      158.121.106.231
;
itvm21-7b      IN      A      158.121.106.232
itvm22-7b      IN      A      158.121.106.233
itvm23-7b      IN      A      158.121.106.234
itvm24-7b      IN      A      158.121.106.235
itvm25-7b      IN      A      158.121.106.236
itvm26-7b      IN      A      158.121.106.237
itvm27-7b      IN      A      158.121.106.238
itvm28-7b      IN      A      158.121.106.239

```

6. We must modify /etc/nsswitch.conf to first use dns for host lookup:

```

# /etc/nsswitch.conf
#
# Example configuration of GNU Name Service Switch functionality.

```

```
# If you have the `glibc-doc-reference' and `info' packages
# installed, try: info libc "Name Service Switch"
# for information about this file.
```

```
passwd: compat
group: compat
shadow: compat
```

hosts: dns files

```
networks: files
```

```
protocols: db files
services: db files
ethers: db files
rpc: db files
```

```
netgroup: nis
```

7. That's it, so far as DNS is concerned. Of course, we need to restart bind9:

```
/etc/init.d/bind9 restart
```

8. Of course, we want to make sure that resolve.conf on the various boxes has the proper values. On it20, we want /etc/resolv.conf to be:

```
nameserver 127.0.0.1
nameserver 158.121.104.2
```

We do this by asking rickm to put the following in the dhcpd.conf for cs.umb.edu:

```
host it20.cs.umb.edu {
    hardware ethernet 00:26:b9:79:64:58;
    fixed-address it20.cs.umb.edu;
    option domain-name-servers 127.0.0.1, 158.121.104.2;
}
```

When it20 renews its dhcp lease, our dhcp client will go to this to get the **domain-name-servers** and put them in its resolve.conf. Because strangeland goes to itself for name resolution in the first instance, we direct it to 127.0.0.1.

Other clients will also want to go to it20 for dns service, and so because it20 runs their dhcp service, its dhcpd.conf includes the following:

```
subnet 10.0.0.0 netmask 255.255.255.0 {
    range 10.0.0.15 10.0.0.159;
    option domain-name-servers 10.0.0.1,158.121.104.2;
    option routers 10.0.0.1;
    default-lease-time 600;
    max-lease-time 7200;
}
```

The clients' dhcp client processes will use the information there to put the following into their own /etc/resolv.conf:

```
nameserver 10.0.0.1
nameserver 158.121.104.2
```

directing resolvers to go to it20 at ip address 10.0.0.1 for dns service. Since the clients get their information from the dhcp server on it20, it20's /etc/dhcp3/dhcpd.conf entry for subnet 10.0.0.0 must be modified:

```
subnet 10.0.0.0 netmask 255.255.255.0 {
    range                10.0.0.2 10.0.0.10;
    # option domain-name-servers 158.121.104.2,158.121.253.41;
    option domain-name-servers 10.0.0.1,158.121.104.2;
    option routers       10.0.0.1;
    default-lease-time   600;
    max-lease-time       7200;
}
```

On the Clients (You must do this):

9. We must modify /etc/nsswitch.conf to first use dns for host lookup:

```
# /etc/nsswitch.conf
#
# Example configuration of GNU Name Service Switch functionality.
# If you have the `glibc-doc-reference' and `info' packages
# installed, try: info libc "Name Service Switch"
# for information about this file.

passwd: compat nis
group: compat nis
shadow: compat nis

hosts: dns files
networks: files

protocols: db files
services: db files
ethers: db files
rpc: db files

netgroup: nis
```

10. We can test this from both inside and outside the it20 network using such invocations as:

```
dig @it20.cs.umb.edu it22.it.cs.umb.edu
dig @it20.cs.umb.edu google.com
```

You should test many other addresses of course!