

The US Domain

Status of this Memo

This memo provides information for the Internet community. It does not specify an Internet standard. Distribution of this memo is unlimited.

Table of Contents

1.	Introduction	2
1.1	The Internet Domain Name System.....	2
1.2	Top Level Domains.....	3
1.3	The US Domain	4
2.	Naming Structure	4
2.1	State Codes	5
2.2	City Codes or Locality Names.....	5
2.3	Examples of Names.....	5
3.	Registration	8
3.1	Requirements	8
3.2	Direct Entries	9
3.2.1	UUCP Hosts	9
3.2.2	Non-IP Hosts	10
3.3	Delegated Subdomains	12
3.3.1	Schools	12
3.3.2	State Agencies	14
3.3.3	Federal Agencies	14
3.3.4	Delegation Requirement.....	14
3.3.5	Delegation Procedures	15
3.3.6	Subdomain Contacts.....	18
4.	Database Information.....	19
4.1	Name Servers	19
4.2	Zone files	20
4.3	Resource Records	21
4.3.1	A Records	22
4.3.2	CNAME Records	22
4.3.3	MX Records	22
4.3.4	HINFO Records	23
4.3.5	PTR Records	23
4.4	Wildcards	23
5.	References	24
6.	Security Considerations	25
7.	Author's Address	25
	Appendix-I: US Domain Names BNF.....	26
	Appendix-II: US Domain Questionnaire for Host Entry.....	28

1. INTRODUCTION

1.1 The Internet Domain Name System

The Domain Name System (DNS) provides for the translation between host names and addresses. Within the Internet, this means translating from a name such as "venera.isi.edu", to an IP address such as "128.9.0.32". The DNS is a set of protocols and databases. The protocols define the syntax and semantics for a query language to ask questions about information located by DNS-style names. The databases are distributed and replicated. There is no dependence on a single central server, and each part of the database is provided in at least two servers.

The assignment of the 32-bit IP addresses is a separate activity. IP addresses are assigned by the Network Information Center (Hostmaster@NIC.DDN.MIL).

In addition to translating names to addresses for hosts that are on the Internet, the DNS provides for registering DNS-style names for other hosts reachable (via electronic mail) through gateways or mail relays. The records for such name registration point to an Internet host (one with an IP address) that acts as a mail forwarder for the registered host. For example, the host "bah.rochester.ny.us" is registered in the DNS with a pointer to the mail relay "relay1.uu.net". This type of pointer is called an MX record.

This gives electronic mail users a uniform mail addressing syntax and avoids making users aware of the underlying network boundaries.

The reason for the development of the domain system was growth in the Internet. The host name to address mappings were maintained by the Network Information Center (NIC) in a single file, called HOSTS.TXT, which was FTPed by all the hosts on the Internet. The network population was changing in character. The timeshared hosts that made up the original ARPANET were being replaced with local networks of workstations. Local organizations were administering their own names and addresses, but had to wait for the NIC to make changes in HOSTS.TXT to make the changes visible to the Internet at large. Organizations also wanted some local structure on the name space. The applications on the Internet were getting more sophisticated and creating a need for general purpose name service. The idea of a hierarchical name space, with the hierarchy roughly corresponding to organizational structure, and names using "." as the character to mark the boundary between hierarchy levels. A design using a distributed database and generalized resources was implemented.

The domain system provides standard formats for resource data,

standard methods for querying the database, and standard methods for name servers to refresh local data from other name servers.

1.2 Top-Level Domains

The top-level domains in the DNS are EDU, COM, GOV, MIL, ORG, INT, and NET, and all the 2-letter country codes from the list of countries in ISO-3166.

Even though the intention was that any educational institution anywhere in the world could be registered under the EDU domain, in practice it has turned out with few exceptions only those in the United States have registered under EDU, similiary with COM (for commercial). In other countries, everything is registered under the 2-letter country code, often with some subdivision. For example, in Korea (KR) the second level names are AC for academic community, CO for commercial, GO for government, and RE for research. However each country may go it's own way about organizing its domain, and many have.

There are no plans of putting all of the organizational domains .EDU .GOV .COM etc., under .US.

However, there are some states registered in the .GOV domain (11 by 2 letter code), and 3 by full names)

ca.gov	la.gov	ohio.gov	va.gov
co.gov	md.gov	or.gov	wa.gov
hawaii.gov	nc.gov	sc.gov	
ia.gov	ny.gov	texas.gov	

Other names sometimes appear as top-level domain names. Some people have made up names in the DNS style without coordinating or registering with the DNS management. Some names that typically appear are ".BITNET", ".UUCP", and two-letter codes for continents, such as ".NA" for North America (this conflicts with the official Internet code for Namibia).

For example, the DNS style name "KA7EEJ.CO.USA.NA" is used in the amateur radio network. These addresses are never supposed to show up on the Internet but they do occasionally. The amateur radio network people created their own naming scheme, and it interferes sometimes with Internet addresses.

1.3 The US Domain

The US Domain is an official top-level domain in the DNS of the Internet community. It is registered with the Network Information Center. The domain administrators are Jon Postel and Ann Westine Cooper at the Information Sciences Institute of the University of Southern California (USC-ISI).

US is the ISO-3166 2-letter country code for the United States and thus the US Domain is established as a top-level domain and registered with the NIC the same way other country domains are.

Because organizations in the United States have registered primarily in the EDU and COM domains, little use was initially made of the US domain.

In the past, the computers registered in the US Domain were primarily owned by small companies or individuals with computers at home. However, the US Domain has grown and currently registers hosts in federal government agencies, state government agencies, K12 schools, community colleges, private schools, libraries, county agencies, and city utilities, to name a few.

The administration of the US Domain was managed solely by the Domain Registrar in the past. However, due to the increase of hosts, administration of subdomains is being delegated to others.

Any computer in the United States may be registered in the US Domain.

2. NAMING STRUCTURE

The US Domain hierarchy is based on political geography. The namespace under .US is the state namespace, then the city namespace, then organization or computer name and so on.

For example:

SPK.WA.US
VANC.WA.US

There is of course no problem with running out of names.

The things that are named are individual computers.

If you register now in one city and then move, the database can be updated with a new name in your new city, and a pointer can be set up from your old name to your new name. This type of pointer is called a CNAME record.

The use of un-registered names is not effective and causes problems for other users. Inventing your own name and using it without registering is not a good idea.

2.1 State Codes

The state codes are the two letter US Postal abbreviations.

2.2 City Codes or Locality Names

Cities may be named (designated) by their full name (spelled out with hyphens replacing spaces (e.g., Los-Angeles or New-York)), or by a city code. The first choice is the full city name, the second choice is the city codes from Western Union's "City Mnemonics" list, and a third choice is a code for your city chosen by the applicant. However, it is very desirable that all users in the same city use the same designator for the city.

Abbreviated city names are a good idea, particularly when the city name is long, as there is much to type already. One of the problems is that the city codes in the Western Union City Mnemonics list are sometimes not very good abbreviations. Users sometimes tend to prefer abbreviations that are commonly used already from that region. Such as SF for San Francisco, MPK for Menlo Park.

Exceptions have been made in the abbreviations, even though this causes extra work to keep track of these abbreviations. One abbreviation for one city. Applicants are told what codes are currently in use, however, if a city code is not used yet, and they would prefer to use a different code that is more common among the natives, then the new code is allowed. However, once it's registered, then everyone else who registers in that city will have to use that code or spell out the full city name.

Some applicants have tried to get a copy of the Western Union City Mnemonics code list but it is no longer available from Western Union. However, we do have a copy but it is not online. If you are requesting an abbreviated city code please let us know and we will gladly look it up for you.

2.3 Examples of Names

For small entities like individuals or small businesses there is usually no problem with selecting locality based names.

For example: Zuckys.Santa-Monica.CA.US

For large entities like large corporations with multiple facilities in several cities or states this often seems like a unreasonable constraint (especially when compared with the alternative of registering directly in the .COM domain). However, a company does have a headquarters office in a particular locality and so could register with that name.

For example: IBM.Armonk.NY.US

EXAMPLES OF THE NAMING STRUCTURE IN THE US DOMAIN

PRIVATE (business or individual)

=====

Camp-Curry.Yosemite.CA.US	<====	a business
IBM.Armonk.NY.US	<====	a business
Dogwood.atl.GA.US	<====	a business
Geo-Petrellis.Culver-City.CA.US	<====	a restaurant
Zuckys-Santa-Monica.CA.US	<====	a restaurant
Joe-Josts.Long-Beach.CA.US	<====	a bar
Holodek.Santa-Cruz.CA.US	<====	a personal computer

FEDERAL

=====

Senate.FED.US	<====	US Senate
DOD.FED.US	<====	US Defense Dept.
DOT.FED.US	<====	US Transportation Dept.
USPS.FED.US	<====	US Postal Service
VA.FED.US	<====	US Veterans Administration
IRS.FED.US	<====	US Internal Revenue Service
Yosemite.NPS.Interior.FED.US	<====	a federal agency

STATE

=====

Senate.STATE.MN.US	<====	state Senate
House.STATE.MN.US	<====	state House of Reps
MDH.STATE.MN.US	<====	state Health Dept.
HUD.STATE.CA.US	<====	state House and Urban Dev. Dept.
DOT.STATE.MN.US	<====	state Transportation Dept.
Caltrans.STATE.CA.US	<====	state Transportation Dept.
DMV.STATE.CA.US	<====	state Motor Vehicles Dept.
Culver-City.DMV.STATE.CA.US	<====	a local office of DMV

CITY | COUNTY

=====

```
Police.CITY.Culver-City.CA.US      <==== a city department
Fire-Dept.CITY.Los-Angeles.CA.US   <==== a city department
Fire-Dept.COUNTY.Los-Angeles.CA.US <==== a county department
```

REGIONAL | DISTRICT | LIBRARY

=====

```
SCAQMD.DISTRICT.CA.US              <==== a regional district
Bunker-Hill-Improvement.DISTRICT.LA.CA.US <==== a local district
```

```
Huntington.LIB.LA.US               <==== a private library
Venice.LA-City.LIB.CA.US           <==== a city library
MDR.LA-County.LIB.CA.US            <==== a county library
```

K12 | CC | STATE UNIV | PRIVATE SCHOOLS

=====

```
Los-Angeles.UC.STATE.CA.US         <==== UCLA
Berkeley.UC.STATE.CA.US            <==== "CAL"
Irvine.UC.STATE.CA.US              <==== University of Calif. Irvine
Santa-Cruz.UC.STATE.CA.US          <==== University of Calif. Santa Cruz
Northridge.CSU.STATE.CA.US         <==== Calif. State. Univ. Northridge
Fullerton.CSU.STATE.CA.US          <==== Calif. State. Univ. Fullerton
Sonoma.CSU.STATE.CA.US             <==== Calif. State. Univ. Sonoma
```

```
SMCC.Santa-Monica.CC.CA.US         <==== a public community college
Trade-Tech.Los-Angeles.CC.CA.US    <==== a public community college
```

```
Hamilton.High.LA-Unified.K12.CA.US <==== a public K12 school
Sherman-Oaks.Elem.LA-Unified.K12.CA.US <==== a public K12 school
John-Muir.Middle.Santa-Monica.K12.CA.US <==== a public K12 school
```

```
St-Monica.High.Santa-Monica.CA.US  <==== a private high school
St-Monica.Elem.Santa-Monica.CA.US   <==== a private elem. school
Crossroads-School.Santa-Monica.CA.US <==== a private school
Mary-Ellens.Montessori-School.LA.CA.US <==== a private school
Leland-Stanford-Jr-Univ.Stanford.CA.US <==== a private school
Loyola-Marymount-Univ.Los-Angeles.CA.US <==== a private school
```

When appropriate, subdomains are delegated and partitioned in various categories, such as:

K12.<state>.US	=	kindegarten thru 12th grade
CC.<state>.US	=	community colleges
LIB.<state>.US	=	libraries
STATE.<state>.US	=	state government agencies
<org-name>.FED.US	=	federal government agencies

The Appendix-I contains the current US Domain Names BNF, but in actuality, the names under these subdomains may vary according to the decision of the administrators of these subdomains.

Some users would like names associated with a greater metropolitan area or region like the "Bay Area" or "Tri-Cities". One problem with this is that these names are not necessarily unique within a state. The best thing to do in this case is to use the larger metropolitan city in your host name. Cities and in some cases counties are used.

3. REGISTRATION

3.1 Requirements

Anyone requesting to register a host in the US Domain is sent a copy of the US Domain policy and procedure, and must fill out a US Domain questionnaire.

The US Domain template, is similar to the NIC Domain template however, it is not the same. To request a copy of the US Domain questionnaire, send a message to the US Domain registrar (us-domain@isi.edu).

Note: If you are registering a name in a delegated zone (see Section 3.3.6). Please register with the contact for that zone.

The key people must have electronic mailboxes (that work). Please provide all the information indicated in the "Administrator" and "Technical Contact" slot. This person will be the point of contact for any administrative and policy questions about the domain.

The administrator is usually the person who manages the organization being registered. The technical contact can also be administrator, or the systems person, or someone who is familiar with the technical details of the Internet. The technical contact should have a valid working e-mail address. This is necessary in case something goes wrong.

It is important that your "Return-Path" and "From" field indicate an Internet style address. UUCP style addresses such as "host1!user" will not work. This is fine within the UUCP world, but not the Internet. If you want people on the Internet to be able to send mail to you, your return path needs to be an Internet style address: such as host1!user@internet.gateway.host or user@internet.gateway.host.

It is also possible to register through one of the Internet service providers that have established working relationships with the US domain administrator.

If everything checks out, turn around time for registering a host is usually a day or two. The nameservers are updated anywhere from 12 to 24 hours later.

There are two ways to be registered in the US Domain, directly, or by delegation.

3.2 Direct Entries

Direct entry in the database of the US Domain appeals most to individuals and small companies. Fill out the application and send it directly to the US Domain administrator. If you are in an area where the zone is delegated to someone else your request will be forwarded to the zone administrator for your registration.

3.2.1 UUCP Hosts

Many applicants have hosts in the UUCP world. Some are one hop away, some two and three hops away from their "Internet Forwarder", this is ok. What is important is getting an Internet host to be your forwarder. If you do not already have an Internet forwarder, there are several businesses that provide this service for a fee, such as UUNET.UU.NET (postmaster@uunet.uu.net), PSI (postmaster@UU2.PSI.COM) and CERFNET (help@cerf.net). Sometimes local colleges in your area are already on the Internet and may be willing to act as an Internet Forwarder. You would need to work this out with the systems administrator we cannot make these arrangements for you.

Although we work with UUCP service providers, the Internet US Domain registration is not affiliated with the registration of UUCP Map entries. The UUCP map entry does not provide us with sufficient information. If you do not have a copy of the US Domain questionnaire template, please send a message to: us-domain@isi.edu and request one. See Appendix-II.

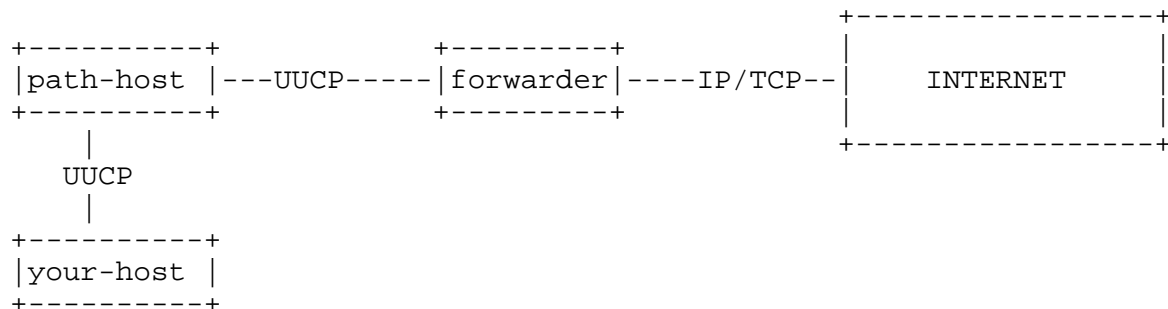

```
this:
    "your-host"  MX  10  "forwarder"
```

This must be entered by the US Domain administrator.

In the "forwarder" routing tables there must be information about "your-host" with a rule like: If I see mail for "your-host" I will send it via uucp by calling phone number "123-4567".

Case 2:

In this case your hosts talks to another host that ... that talks to an IP host. In other words, there are multiple hops between your host and the Internet.



"Forwarder" must be an IP host on the internet.

You must ask "forwarder" if they are willing to be the Internet Forwarder for "Your-Host". You must ask "path-host" to relay your mail.

In the US Domain of the DNS DataBase there must be an entry like this:

```
"your-host"  MX  10  "forwarder"
```

This must be entered by the US Domain Administrator.

In the "forwarder" routing tables there must be information about "your-host" with a rule like: If I see mail for "your-host" I will send it via UUCP to "path-host" by calling phone number "123-4567". and "path-host" must also know how to relay the mail to "your-host".

Note: It is assumed that "path-host" is already MXed to "forwarder". It is not appropriate to ask to MX "your-host" to "path-host" (this is sometimes called double MXing). The host on the right hand side of an MX entry must be a host on the Internet with an IP address (e.g., 128.9.2.32).

3.3 Delegated Subdomains

The administrator of the US Domain is responsible for the assignment of all the DNS names that end with ".US". Of course, one person or even one group can't handle all this in the long run so portions of the name space are delegated to others.

Delegation of cities, companies within cities, schools (K12), community colleges (CC), libraries (LIB), state government (STATE), and federal government agencies, departments, etc., is acceptable and practical.

For a delegated portion of the namespace, for example a city, no alterations can be made to that name, no abbreviations added, etc. unless applied for.

Sometimes there may be two people running name servers in the same city because different portions of the name space has been delegated to them. For example, someone may be delegated the <city>.<state>.US name space, and someone else from a state government agency may have the .STATE.<state>.US, portion. For example, Fred may run the name servers for Sacramento.CA.US and Joe may run the name servers for STATE.CA.US in Sacramento.

If a company would like to have wildcard records added, or run their own name servers in a city that we have delegated name space to, this is ok.

Delegation of the whole State namespace is not yet implemented. The delegated part of the name space is in the form of:

```
.STATE.<state>.US.  
.K12.<state>.US.  
.CC.<state>.US.  
.LIB.<state>.US.  
<org-name>.<city>.<state>.US.  
.CITY.<city-name>.<state>.US.  
<org-name>.FED.US.
```

3.3.1 Schools

As schools begin to join the Internet, there ought to be a consistent scheme for naming them. A "K12" name branch has been established in each state in the US Domain for this purpose.

Public schools are usually organized by districts which can be larger or smaller than a city or county.

It makes sense to name schools within districts. However districts often have the same name as a city or county so there has to be a way to distinguish a public school district name from some other type of locality name. The keyword "K12" is used for this.

In some districts, the same school name is used at different levels, for example, Washington Elementary School and Washington High School. We suggest that when necessary the keywords "Elementary", "Middle", and "High" be used to distinguish these schools. These keywords would only be used when they are needed, if the school's name is unique without such keywords don't use them.

Typical K12 school names currently used are like:

```
IVY.PRS.K12.NJ.US
DMHS.JCPS.K12.KY.US
OHS.EUNION.K12.CA.US
BOHS.BREA.K12.CA.US
```

These names could be long. Given the large number of schools, organizing by school district and state seems appropriate. When there are many things to name some of the names must be long.

In some cases there may be appropriate abbreviations that can be used. For example Hamilton High School in Los Angeles could be:

```
Hami.Hi.LA.K12.CA.US
```

Some School Examples:

Hamilton.High.LA-Unified.K12.CA.US	<== a public school
Sherman-Oaks.Elem.LA-Unified.K12.CA.US	<== a public school
John-Muir.Middle.Santa-Monica.K12.CA.US	<== a public school
Crossroads-School.Santa-Monica.CA.US	<== a private school
SMCC.CC.CA.US	<== a community college
Northridge.CSU.STATE.CA.US	<== a state university

If a school has a bunch of PCs, then each PC should have a name. Suppose they are named "alpha", "beta", ... then if they belong to a school named "Lincoln.High.Lakewood.K12.CA.US" their names would be:

```
alpha.Lincoln.High.Lakewood.K12.CA.US.
beta.Lincoln.High.Lakewood.K12.CA.US
```

...

3.2.2 State Agencies

US Domain namespace has been delegated to the state government agencies. For example, in the State of Minnesota, the subdomain is STATE.MN.US

This means that the person running the namservers for state.mn.us are responsible for naming agencies, of the state government. For example:

State Agencies:

Senate.STATE.MN.US	<== State Senate
MDH.STATE.MN.US	<== Dept. of Health
CALTRANS.STATE.CA.US	<== Dept. of Transportation
DMV.STATE.CA.US	<== Dept. of Motor Vehicles

3.3.3 Federal Agencies

A federal namespace has been delegated to the federal government agencies. For example the subdomain for the Federal Reserve Bank of Minneapolis is MNPL.FRB.FED.US. Other examples are listed below.

Federal Government Agencies:

Senate.FED.US	<====	US Senate
DOD.FED.US	<====	US Defense Dept.
USPS.FED.US	<====	US Postal Service
VA.FED.US	<====	US Veterans Administration
IRS.FED.US	<====	US Internal Revenue Service
Yosemite.NPS.Interior.FED.US	<====	A Federal agency

3.3.4 Delegation Requirements

When a subdomain is delegated, the following requirements must be met:

- 1) There must be a knowledgeable and competent technical contact, familiar with the Internet Domain Name System. This requirement is easily satisfied if the technical contact already runs some other nameservers.
- 2) Organizations requesting delegations must provide at least two independent (robust and reliable) DNS name servers in physically separate locations on the Internet.

- 3) The subdomain must accept all applicants on an equal basis.
- 4) The subdomain must provide timely processing of requests. To do this it is helpful to have several individuals knowledgeable about the procedures so that the operations are not delayed due to one persons unavailability (for example by being on vacation).

3.3.5 Delegation Procedures

The procedure that is followed when a subdomain is delegated includes the following steps:

- 1) Evaluate the technical contact's experience with DNS. Make sure there is a need for the proposed delegation. Make sure the technical contact has the information about the US Domain and the suggested naming structure.
- 2) Note: In the past there was the concept of a "coordinator" for a group or a club or "Domain Park". They would arrange to coordinate the registration of all the computers used by members of the club and forward all the information for the group to the US Domain Administrator. Most coordinators have moved into the position of administrator of that now delegated subdomain.
- 3) Add the new technical contact to the "us-dom-adm" mailing list for distributing updates to the US Domain policies and procedures, or other pertinent information.
- 4) Delete any hosts from our zone file that belongs in the newly delegated subdomain and make sure they now have the hosts in their zone file.

- 5) Send them a copy of the zone file so their initial zone file is identical to ours. For example:

```
mil.wi.us.      86400      SOA spool.mu.edu. manager.spool.mu.edu. (
                                920904 ;serial
                                28800  ;refresh
                                14400  ;retry
                                3600000 ;expire
                                86400  ) ;minim

mil.wi.us.      86400      NS      spool.mu.edu.
spool.mu.edu.   50400      A       134.48.1.31
mil.wi.us.      86400      NS      sophie.mscs.mu.edu.

sophie.mscs.mu.edu. 50400      A       134.48.4.6
solaria.mil.wi.us.  86400      HINFO   Sun 3/60 SunOs
solaria.mil.wi.us.  86400      MX       10 spool.mu.edu.
nthomas.mil.wi.us.  86400      HINFO   386 Clone DOS
nthomas.mil.wi.us.  86400      MX       10 spool.mu.edu.
rwmke.mil.wi.us.    86400      HINFO   UNIX PC UNIX
rwmke.mil.wi.us.    86400      MX       10 spool.mu.edu.
milestn.mil.wi.us.  86400      HINFO   PC AT ENIX
milestn.mil.wi.us.  86400      MX       10 spool.mu.edu.
dawley.mil.wi.us.   86400      HINFO   386 Clone DOS
dawley.mil.wi.us.   86400      MX       10 spool.mu.edu.
...
-----
```


- 6) The US Domain zone file must have the following records, showing the name, address, e-mail, and phone number of the technical contact for the delegated subdomain and the name of the delegated name space and the names of the nameservers.

```

;
;
;Delegated zone: .mil.wi.us
;Contact: Steven Goodman
;          manager@spool.mu.edu
;          Marquette University
;          (414) 288-6734

mil.wi.us.      604800  NS      SPOOL.MU.EDU.
                604800  NS      SOPHIE.MSCS.MU.EDU.

; A glue record is not needed this time. Glue records are
; needed when the name of the server is a subdomain of the
; delegated domain.
;

```

- 7) Check to see that delegated subdomain name servers are up and running, and make sure the delegated hosts are installed in their zone file. Now delete any hosts from the US Domain zone file that belongs in the newly delegated subdomain.
- 8) Inform the technical contact of the newly delegated subdomain that wildcard records are allowed in the zone file under the organizational subdomain but no wildcard records are allowed under the "city" or "state" domain.

3.3.6 Subdomain Contacts

Approximately 680 individual hosts are registered, but we have delegated the following portions of the namespace. We do not know how many hosts are registered under each of these subdomains.

DELEGATED ZONE =====	CONTACT =====
TUCSON.AZ.US	leonard@arizona.edu
SF.CA.US	sf-hostmaster@apple.com
PREMENOS.SF.CA.US	jenkins@premenos.sf.ca.us
SCVL.CA.US	sinster@scintilla.capitola.ca.us
SANTA-CRUZ.CA.US	sinster@scintilla.capitola.ca.us
APTOS.CA.US	sinster@scintilla.capitola.ca.us
CAMPBELL.CA.US	sinster@scintilla.capitola.ca.us
CAPITOLA.CA.US	sinster@scintilla.capitola.ca.us
FELTON.CA.US	sinster@scintilla.capitola.ca.us
ZAYANTE.CA.US	sinster@scintilla.capitola.ca.us
BOULDER-CREEK.CA.US	sinster@scintilla.capitola.ca.us
DARWIN.PTVY.CA.US	brian@angband.stanford.edu
LOGAN-HS.UNIONCITY.CA.US	cjw@marmot.nersc.gov
BOULDER.CO.US	trent@XOR.COM
COLOSPGS.CO.US	trent@XOR.COM
DENVER.CO.US	trent@XOR.COM
DVR.CO.US	trent@XOR.COM
CHI.IL.US	matt@oddjjob.uchicago.edu
EUGENE.OR.US	meyer@oregon.uoregon.edu
SPRINGFIELD.OR.US	meyer@oregon.uoregon.edu
MULTNOMAH.LIB.OR.US	brianw@polaris.admin.ogi.edu
PGH.PA.US	ecd@CERT.ORG
SPK.WA.US	root@dogear.spk.wa.us
MIL.WI.US	manager@spool.mu.edu
ATL.GA.US	charvey@gatech.gatech.edu
Mt-PARK.GA.US	charvey@gatech.gatech.edu
CLARKSTON.GA.US	charvey@gatech.gatech.edu
STATE.MN.US	dfazio@mr.net
MNPL.FRB.FED.US	dfazio@mr.net
K12.CA.US	mdm@NIC.CSU.NET
CC.CA.US	mdm@NIC.CSU.NET
K12.MI.US	sandra.s.waite@um.cc.umich.edu
K12.TX.US	bmannings@is.rice.edu
K12.NJ.US	becker@nisc.jvnc.net
K12.MS.US	fwpm@msstate.edu
dmhs.jcps.K12.KY.US	lentner@sura.net
TIES.K12.MN.US	dfazio@mr.net

The following MD.US counties have been delegated to
(butler@brl.mil).

AL.MD.US.	Allegany
AA.MD.US.	Anne Arundel
BA.MD.US.	Baltimore
CAL.MD.US.	Calvert
CAR.MD.US.	Caroline
CE.MD.US.	Cecil
CH.MD.US.	Charles
DO.MD.US.	Dorchester
FR.MD.US.	Frederick
GA.MD.US.	Garrett
HA.MD.US.	Harford
HO.MD.US.	Howard
KE.MD.US.	Kent
MO.MD.US.	Montgomery
PG.MD.US.	Prince George's
QA.MD.US.	Queen Anne's
SM.MD.US.	St. Mary's
SO.MD.US.	Somerset
TA.MD.US.	Talbot
WA.MD.US.	Washington
WI.MD.US.	Wicomico
WO.MD.US.	Worcester

4. DATABASE INFORMATION

4.1. Name Servers

Name servers are the repositories of information that make up the domain database. The database is divided up into sections called zones, which are distributed among the name servers. While name servers can have several optional functions and sources of data, the essential task of a name server is to answer queries using data in its zones. The response to a query can always be generated using only local data, and either contains the answer to the question or a referral to other name servers "closer" to the desired information.

A given zone will be available from several name servers to insure its availability in spite of host or communication link failure. Every zone is required to be available on at least two servers, and many zones have more redundancy than that.

The US Domain is currently supported by six name servers.

```
venera.isi.edu
ns.isi.edu
ns.hercules.csl.sri.com
nnsf.nsf.net
ns.uu.net
adm.brl.mil
```

4.2 Zone Files

A "zone" is a registry of domains kept by a particular organization. A zone registry is "authoritative", that is, the master copy of the registry is kept by the zone organization, and this copy is, by definition, always up-to-date. Copies of this registry may be distributed to other places and kept in caches, but these caches are not authoritative, and may be out-of-date.

Every zone has at least one node, and hence domain name, for which it is authoritative, and all of the nodes in a particular zone are connected. Given the tree structure, every zone has a highest node which is closer to the root than any other node in the zone. The name of this node is often used to identify the zone. The data that describes a zone has four major parts:

- 1) Authoritative data for all nodes within the zone.
- 2) Data that defines the top node of the zone
(can be thought of as part of the authoritative data).
- 3) Data that describes delegated subzones, i.e., cuts
around the bottom of the zone,
- 4) Data that allows access to name servers for subzones
(sometimes called "glue" data).

The zone administrator has to maintain the zones at all the nameservers which are authoritative for the zone. When the changes are made they must be distributed to all of the name servers.

Copies of the zone files are not available unless you are on the Internet. To look at the zone files use the "dig" program of the DNS domain name system.

```
dig @nshost host-your-checking axfr
```

4.3 Resource Records

Records in the zone data files are called resource records (RRs). The standard Resource records (RR) are specified in STD 13, RFC 1034 and STD 13, RFC 1035 (3,4). An RR has a standard format as shown.

```
<name> [<ttd>] [<class>] <type> <data>
```

The first field is always the name of the domain record. The second field is an optional time to live field. This specifies how long this data will be stored in the data base. The third field is the address class; the class field specifies the protocol group most often this is the Internet class "IN". The fourth field states the type of the resource record. The fields after that are dependent on the Type of RR. The fifth field is the data field which is defined differently for each type and class of data. Here is a list of the current commonly used types.

SOA	Start of Authority
NS	Name Server
A	Internet Address
CNAME	Canonical Name (nickname pointer)
HINFO	Host Information
WKS	Well Known Services
MX	Mail Exchanger
PTR	Pointer

What do the fields mean?

foo.LA.CA.US.	604800	MX	10	Venera.ISI.EDU.
(1)	(2)	(3)	(4)	(5)

- 1) domain name
- 2) time to live information
- 3) mail exchanger record
- 4) preference value to determine (if more than one forwarder) which mailer to use first, lower number higher preference
- 5) the Internet forwarding host.

4.3.1 A Records

Internet (IP) Address. The data for an "A" record is an Internet address in a dotted decimal form. A sample "A" record might look like:

venera.isi.edu.	A	128.9.0.32
(name)	(A)	(address)

The name field is the machine name, and the address is the network address. There should be only one "A" record for each address of a host.

4.3.2 CNAME Records

Canonical Name resource record, CNAME, specifies an alias for a canonical name. This is essentially a pointer to the official name for the requested name. All other RRs appear under this official name. A machine named FERNWOOD.MPK.CA.US may want to have the nickname ANTERIOR.MPK.CA.US. In that case, the following RR would be used:

anterior.mpk.ca.us.	CNAME	fernwood.mpk.ca.us.
(alias nickname)		(canonical name)

Nicknames (the name associated with the RR is the nickname) may be added for awhile when a host changes its name, usually because it moves to another state. It helps to have this CNAME pointer so if any mail comes to the old address it will get forwarded to the new one. There cannot be any other RRs associated with a nickname of the same class.

4.3.3 MX Records

Mail Exchanger records, MX, are used to specify a machine that knows how to deliver mail to a machine that is not directly connected to the Internet. For example, venera.isi.edu is the mail gateway that knows how to deliver mail to foo.la.ca.us, but other machines on the network cannot deliver mail directly to foo.la.ca.us. These two machines may have a private connection or use a different transport medium (such as uucp). The preference value (10) is the order that a mailer should follow when there is more than one way to deliver mail to a single machine. The lower the number the higher the preference.

foo.LA.CA.US.	604800	MX	10	Venera.ISI.EDU.
foo.LA.CA.US.	604800	MX	20	relay1.uu.net.

4.3.4 HINFO Records

Host information resource records, HINFO is for host specific data. This lists the hardware and operating system that are running at the listed host. It should be noted that a space separates the hardware information and the operating system information. If you want to include a space in the machine name you must quote the name. Host information is not specific to any class, so ANY may be used for the address class. There should be one HINFO record for each host.

```
acb.la.ca.us.      HINFO      VAX-11/780      UNIX
                   (Hardware)   (Operating System)
```

The official HINFO types can be found in the latest Assigned Numbers RFC, the most recent edition being RFC 1340. The hardware type is called the Machine Name, and the software type is called the System Name.

The information users supply about this is often inconsistent or incomplete. Please follow the terms in the current "Assigned Numbers".

4.3.5 PTR Records

A Domain Name Pointer record, PTR, allows special names to point to some other location in the domain data base. These are typically used in setting up reverse pointers for the special IN-ADDR.ARPA domain. PTR names should be unique to the zone.

```
0.0.9.128.in-addr.arpa    PTR    isi-net.isi.edu.
      (special name)              (real name)
```

A PTR record is to be added to the IN-ADDR.ARPA domain for every A record registered in the US Domain. These PTR records need to be added by the administrator of the network where the host is connected. The US Domain administration does not administer the network and cannot make these entries in the DNS database.

4.4 Wildcards

The wildcard records are of the form "*.<anydomain>", where <anydomain> is any domain name. The wildcards potentially apply to descendants of <anydomain>, but not to <anydomain> itself.

For example, suppose a large company located in California with a large, non-IP/TCP, network wanted to create a mail gateway. If the company was called DWP.LA.CA.US, and the IP/TCP capable gateway machine (Internet forwarder) was called ELROY.JPL.NASA.GOV, the

following RRs might be entered into the .US zone.

dwp.la.ca.us	MX	10	ELROY.JPL.NASA.GOV
*.dwp.la.ca.us	MX	10	ELROY.JPL.NASA.GOV

The wildcard record *.DWP.LA.CA.US would cause an MX query for any domain name ending in DWP.LA.CA.US to return an MX RR pointing at ELROY.JPL.NASA.GOV. The entry without the "*" is needed so the host dwp can be found.

In the US Domain, wildcard records are allowed in our zone files under the organizational subdomain (and where noted otherwise) but no wildcard records are allowed under the "City" or "State" domain.

The authors strongly believe that it is in everyone's interest and good for the Internet to have each host explicitly registered (that is, we believe that wildcards should not be used), we also realize that not everyone agrees with this belief. Thus, we will allow wildcard records in the US Domain under groups or organizations. For example, *.DWP.LA.CA.US.

The reason we feel single entries are the best is by the mere fact that if anyone wanted to find one of the hosts in the domain name system it would be there, and problems can be detected more easily. When using wildcards records all the hosts under a subdomain are hidden.

5. REFERENCES

- [1] Stahl, M., "Domain Administrators Guide", RFC 1032, SRI International, November 1987.
- [2] Lottor, M., "Domain Administrators Operations Guide" RFC 1033, SRI International, November 1987.
- [3] Mockapetris, P., "Domain Names - Concepts and Facilities", STD 13, RFC 1034, ISI, November 1987.
- [4] Mockapetris, P., "Domain Names - Implementation and Specification", STD 13, RFC 1035, ISI, November 1987.
- [5] Dunlap, K., "Name Server Operations Guide for Bind, Release 4.3", UC Berkeley, SMM:11-3.
- [6] Partridge, C., "Mail Routing and the Domain Name System", STD 14, RFC 974, BBN, January 1986.

6. SECURITY CONSIDERATIONS

Security issues are not discussed in this memo.

7. AUTHORS' ADDRESSES

Ann Cooper
USC/Information Sciences Institute
4676 Admiralty Way
Marina del Rey, CA 90292

Phone: 1-310-822-1511
Email: cooper@isi.edu

Jon Postel
USC/Information Sciences Institute
4676 Admiralty Way
Marina del Rey, CA 90292

Phone: 1-310-822-1511
Email: postel@isi.edu

APPENDIX-I: US DOMAIN NAMES BNF
 =====

```

<us-domain-name> ::= <us-name><dot><us>

<us-name> ::= <state-name><dot><state-code> |
               <fed-name><dot><fed>

<state-code> ::= <the two-letter code of a state from the
                  zip code directory>

<state-name> ::= <local-name><dot><locality> |
                  <state-agency-name><dot><state> |
                  <regional-agency-name><dot><agency>

<fed-name> ::= <the dotted hierarchical name of a US
                federal government agency>

<locality> ::= <the full name of a city from the
                zip code directory> |
                <a short code name for a city> |
                <the full name of a county, township,
                or parish> |
                <other well known and commonly used
                locality name>

<local-name> ::= <entity-name> |
                  <city-name><dot><city> |
                  <county-name><dot><county> |
                  <local-agency-name><dot><agency>

<state-agency-name> ::= <the dotted hierarchical name of a state
                        government agency>

<regional-agency-name> ::= <the dotted hierarchical name of a special
                           agency or district not an element of the
                           state government and typically larger than
                           a single city or county, for example, the
                           Southern California Air Quality Management
                           District>

<entity-name> ::= <the dotted hierarchical name of an entity
                  within a city, for example: a company,
                  business, private school, club, organization,
                  or individual>

<city-name> ::= <the dotted hierarchical name of a city
                 government agency>

```

<county-name> ::= <the dotted hierarchical name of a county,
township, or parish government agency>

<local-agency-name> ::= <the dotted hierarchical name of a special
agency or district not an element of a
city or county government and typically
equal or smaller than a single city or
county, for example, the Bunker Hill
Improvement District>

<city> ::= "CITY"

<county> ::= "COUNTY" | "TOWNSHIP" | "PARISH"

<dot> ::= "."

<fed> ::= "FED"

<agency> ::= "AGENCY" | "DISTRICT" | "K12" | "CC" | "LIB"

<state> ::= "STATE" | "COMMONWEALTH"

<us> ::= "US"

Note: "K12" may be used for public school districts, only.
and "CC" may be used only for public community colleges,
and "LIB" can only be used by libraries.

APPENDIX-II: US DOMAIN QUESTIONNAIRE FOR HOST ENTRY

To register a host in the US domain, the following information must be sent to the US Domain Registrar (Us-Domain@ISI.EDU). Questions may be sent by electronic mail to the above address, or by phone to Ann Cooper (310-822-1511).

- (1) The name of the top-level domain to join.

For example: US

- (2) The name of the administrative head of the organization, including title, mailing address, phone number, organization, and network mailbox. This is the contact point for administrative and policy questions about the domain. In the case of a research project, this should be the principal investigator.

For example:

Administrator

Organization	The NetWorthy Corporation
Name	Penelope Q. Sassafrass
Title	President
Mail Address	The NetWorthy Corporation 4676 Andrews Way, Suite 100 Santa Clara, CA 94302-1212
Phone Number	(415) 123-4567
Net Mailbox	Sassafrass@ECHO.TNC.COM

- (3) The name of the technical contact for the entry, including title, mailing address, phone number, organization, and network mailbox. This is the contact point for problems concerning the domain or zone, as well as for updating information about the domain or zone.

For example:

Technical Contact

Organization	The NetWorthy Corporation
Name	Ansel A. Aardvark
Title	Executive Director
Mail Address	The NetWorthy Corporation 4676 Andrews Way, Suite 100 Santa Clara, CA. 94302-1212
Phone Number	(415) 123-6789
Net Mailbox	Aardvark@ECHO.TNC.COM

- (4) The name of the host. This is the name that will be used in tables and lists associating the domain with the domain server addresses. [While, from a technical standpoint, domain names can be quite long (programmers beware), shorter names are easier for people to cope with.]

For example: NetWorthy.Santa-Clara.CA.US

Or: Alpha.NetWorthy.Santa-Clara.CA.US
Beta.NetWorthy.Santa-Clara.CA.US

- (5) If this machine is not directly on the internet, how does it communicate with the Internet. Through UUCP, CREN, etc? Which forwarding host?

For example: The host "Networthy.Santa-Clara.CA.US" uses UUCP to connect to "RELAY.ISI.EDU" which is an Internet host.

The administrator of RELAY.ISI.EDU must agree to be the forwarding host for Networthy.Santa-Clara.CA.US, and the forwarding host must know a delivery method and route to it. No double MXing.

If you are requesting an indirect connection, that is, a Mail Exchanger (MX) record, what is the name and mailbox of the administrator of the forwarding host.

For example: John Smith
js@RELAY.ISI.EDU

- (6) Please describe your organization briefly.

For example: The NetWorthy Corporation is a consulting organization of people working with UNIX and the C language in an electronic networking environment. It sponsors two technical conferences annually and distributes a bimonthly newsletter.

- (7) What Domain Name System (DNS) Resource Records (RR) and values are to be entered.

- a. A Internet Address (internet hosts only)
- b. HINFO Host Information, Machine System
- c. WKS Well Known Services, Protocols, Ports (internet hosts only)
- d. MX Mail Exchanger (required for UUCP, and CREN hosts)

An example of RRs for an internet host.

```
NetWorthy.Santa-Clara.CA.US  IN  A      128.9.3.123
                              IN  HINFO  SUN-3/110C UNIX
                              IN  MX     10  ISI.EDU
                              IN  WKS    128.9.3.123. UDP (echo
                                                                tftp)
                              IN  WKS    128.9.3.133. TCP (telnet
                                                                ftp
                                                                tftp
                                                                finger)
```

An example of RRs for a non-internet host.

```
Beta.NetWorthy.Santa-Clara.CA.US  MX      10  RELAY.ISI.EDU
                                   HINFO  SUN-3/110C UNIX
```

- (8) Where is the IN-ADDR pointer record to be entered. (For internet hosts only.) It is your responsibility to see that this is done. Contact the administrator of the IP network your host is on. The US Domain administration does not administer the network and cannot make these entries in the DNS database.

For example:

123.3.9.128.IN-ADDR.ARPA. PTR NetWorthy.Santa-Clara.CA.US

Who is the contact for the zone of the IN-ADDR.ARPA data, where this record will be entered?

- (9) What Time to Live (TTL)? TTL is the time (in seconds) that a resolver will use the data it got from the domain server before it asks it again for the data. A typical TTL is One Week 604800. (NOTE: TTL is not applicable to non-Internet hosts.)

For example:

One Week 604800