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Domain Name System Structure and Delegation

Status of this Memo

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

1. Introduction

This memo provides some information on the structure of the names in the Domain Name System (DNS), specifically the top-level domain names; and on the administration of domains. The Internet Assigned Numbers Authority (IANA) is the overall authority for the IP Addresses, the Domain Names, and many other parameters, used in the Internet. The day-to-day responsibility for the assignment of IP Addresses, Autonomous System Numbers, and most top and second level Domain Names are handled by the Internet Registry (IR) and regional registries.

2. The Top Level Structure of the Domain Names

In the Domain Name System (DNS) naming of computers there is a hierarchy of names. The root of system is unnamed. There are a set of what are called "top-level domain names" (TLDs). These are the generic TLDs (EDU, COM, NET, ORG, GOV, MIL, and INT), and the two letter country codes from ISO-3166. It is extremely unlikely that any other TLDs will be created.

Under each TLD may be created a hierarchy of names. Generally, under the generic TLDs the structure is very flat. That is, many organizations are registered directly under the TLD, and any further structure is up to the individual organizations.

In the country TLDs, there is a wide variation in the structure, in some countries the structure is very flat, in others there is substantial structural organization. In some country domains the second levels are generic categories (such as, AC, CO, GO, and RE), in others they are based on political geography, and in still others, organization names are listed directly under the country code. The organization for the US country domain is described in RFC 1480 [1].

Each of the generic TLDs was created for a general category of organizations. The country code domains (for example, FR, NL, KR, US) are each organized by an administrator for that country. These administrators may further delegate the management of portions of the naming tree. These administrators are performing a public service on behalf of the Internet community. Descriptions of the generic domains and the US country domain follow.

Of these generic domains, five are international in nature, and two are restricted to use by entities in the United States.

World Wide Generic Domains:

COM - This domain is intended for commercial entities, that is companies. This domain has grown very large and there is concern about the administrative load and system performance if the current growth pattern is continued. Consideration is being taken to subdivide the COM domain and only allow future commercial registrations in the subdomains.

EDU - This domain was originally intended for all educational institutions. Many Universities, colleges, schools, educational service organizations, and educational consortia have registered here. More recently a decision has been taken to limit further registrations to 4 year colleges and universities. Schools and 2-year colleges will be registered in the country domains (see US Domain, especially K12 and CC, below).

NET - This domain is intended to hold only the computers of network providers, that is the NIC and NOC computers, the administrative computers, and the network node computers. The customers of the network provider would have domain names of their own (not in the NET TLD).

ORG - This domain is intended as the miscellaneous TLD for organizations that didn't fit anywhere else. Some non-government organizations may fit here.

INT - This domain is for organizations established by international treaties, or international databases.

United States Only Generic Domains:

GOV - This domain was originally intended for any kind of government office or agency. More recently a decision was taken to register only agencies of the US Federal government in this domain. State and local agencies are registered in the country

domains (see US Domain, below).

MIL - This domain is used by the US military.

Example country code Domain:

US - As an example of a country domain, the US domain provides for the registration of all kinds of entities in the United States on the basis of political geography, that is, a hierarchy of <entity-name>.<locality>.<state-code>.US. For example, "IBM.Armonk.NY.US". In addition, branches of the US domain are provided within each state for schools (K12), community colleges (CC), technical schools (TEC), state government agencies (STATE), councils of governments (COG),libraries (LIB), museums (MUS), and several other generic types of entities (see RFC 1480 for details [1]).

To find a contact for a TLD use the "whois" program to access the database on the host rs.internic.net. Append "-dom" to the name of TLD you are interested in. For example:

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whois -h rs.internic.net us-dom
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or

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whois -h rs.internic.net edu-dom
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3. The Administration of Delegated Domains

The Internet Assigned Numbers Authority (IANA) is responsible for the overall coordination and management of the Domain Name System (DNS), and especially the delegation of portions of the name space called top-level domains. Most of these top-level domains are two-letter country codes taken from the ISO standard 3166.

A central Internet Registry (IR) has been selected and designated to handled the bulk of the day-to-day administration of the Domain Name System. Applications for new top-level domains (for example, country code domains) are handled by the IR with consultation with the IANA. The central IR is INTERNIC.NET. Second level domains in COM, EDU, ORG, NET, and GOV are registered by the Internet Registry at the InterNIC. The second level domains in the MIL are registered by the DDN registry at NIC.DDN.MIL. Second level names in INT are registered by the PVM at ISI.EDU.

While all requests for new top-level domains must be sent to the Internic (at hostmaster@internic.net), the regional registries are often enlisted to assist in the administration of the DNS, especially in solving problems with a country administration. Currently, the RIPE NCC is the regional registry for Europe and the APNIC is the

regional registry for the Asia-Pacific region, while the INTERNIC administers the North America region, and all the as yet undelegated regions.

The contact mailboxes for these regional registries are:

INTERNIC	hostmaster@internic.net
APNIC	hostmaster@apnic.net
RIPE NCC	ncc@ripe.net

The policy concerns involved when a new top-level domain is established are described in the following. Also mentioned are concerns raised when it is necessary to change the delegation of an established domain from one party to another.

A new top-level domain is usually created and its management delegated to a "designated manager" all at once.

Most of these same concerns are relevant when a sub-domain is delegated and in general the principles described here apply recursively to all delegations of the Internet DNS name space.

The major concern in selecting a designated manager for a domain is that it be able to carry out the necessary responsibilities, and have the ability to do a equitable, just, honest, and competent job.

1) The key requirement is that for each domain there be a designated manager for supervising that domain's name space. In the case of top-level domains that are country codes this means that there is a manager that supervises the domain names and operates the domain name system in that country.

   The manager must, of course, be on the Internet. There must be Internet Protocol (IP) connectivity to the nameservers and email connectivity to the management and staff of the manager.

   There must be an administrative contact and a technical contact for each domain. For top-level domains that are country codes at least the administrative contact must reside in the country involved.

2) These designated authorities are trustees for the delegated domain, and have a duty to serve the community.

   The designated manager is the trustee of the top-level domain for both the nation, in the case of a country code, and the global Internet community.

Concerns about "rights" and "ownership" of domains are inappropriate. It is appropriate to be concerned about "responsibilities" and "service" to the community.

3) The designated manager must be equitable to all groups in the domain that request domain names.

   This means that the same rules are applied to all requests, all requests must be processed in a non-discriminatory fashion, and academic and commercial (and other) users are treated on an equal basis. No bias shall be shown regarding requests that may come from customers of some other business related to the manager -- e.g., no preferential service for customers of a particular data network provider. There can be no requirement that a particular mail system (or other application), protocol, or product be used.

   There are no requirements on subdomains of top-level domains beyond the requirements on higher-level domains themselves. That is, the requirements in this memo are applied recursively. In particular, all subdomains shall be allowed to operate their own domain name servers, providing in them whatever information the subdomain manager sees fit (as long as it is true and correct).

4) Significantly interested parties in the domain should agree that the designated manager is the appropriate party.

   The IANA tries to have any contending parties reach agreement among themselves, and generally takes no action to change things unless all the contending parties agree; only in cases where the designated manager has substantially mis-behaved would the IANA step in.

   However, it is also appropriate for interested parties to have some voice in selecting the designated manager.

   There are two cases where the IANA and the central IR may establish a new top-level domain and delegate only a portion of it: (1) there are contending parties that cannot agree, or (2) the applying party may not be able to represent or serve the whole country. The later case sometimes arises when a party outside a country is trying to be helpful in getting networking started in a country -- this is sometimes called a "proxy" DNS service.

   The Internet DNS Names Review Board (IDNB), a committee established by the IANA, will act as a review panel for cases in which the parties can not reach agreement among themselves. The IDNB's decisions will be binding.

5) The designated manager must do a satisfactory job of operating the DNS service for the domain.

   That is, the actual management of the assigning of domain names, delegating subdomains and operating nameservers must be done with technical competence. This includes keeping the central IR (in the case of top-level domains) or other higher-level domain manager advised of the status of the domain, responding to requests in a timely manner, and operating the database with accuracy, robustness, and resilience.

   There must be a primary and a secondary nameserver that have IP connectivity to the Internet and can be easily checked for operational status and database accuracy by the IR and the IANA.

   In cases when there are persistent problems with the proper operation of a domain, the delegation may be revoked, and possibly delegated to another designated manager.

6) For any transfer of the designated manager trusteeship from one organization to another, the higher-level domain manager (the IANA in the case of top-level domains) must receive communications from both the old organization and the new organization that assure the IANA that the transfer in mutually agreed, and that the new organization understands its responsibilities.

   It is also very helpful for the IANA to receive communications from other parties that may be concerned or affected by the transfer.

4. Rights to Names

1) Names and Trademarks

   In case of a dispute between domain name registrants as to the rights to a particular name, the registration authority shall have no role or responsibility other than to provide the contact information to both parties.

   The registration of a domain name does not have any Trademark status. It is up to the requestor to be sure he is not violating anyone else's Trademark.

2) Country Codes

   The IANA is not in the business of deciding what is and what is not a country.

The selection of the ISO 3166 list as a basis for country code top-level domain names was made with the knowledge that ISO has a procedure for determining which entities should be and should not be on that list.

5. Security Considerations

Security issues are not discussed in this memo.

6. Acknowledgements

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