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Analytical Study of Domain Name System, its disputes and legal issues

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Abstract: This research paper presents detail study and analysis of the domain names, domain name system, domain name disputes, and its dispute resolution procedures in brief. In this research paper, the analysis of worldwide various domain name registrars, domain name root servers, domain name registries are presented by collecting data from Internet Corporation for Assigned Names and Numbers corporation's website, and continent-wise statistical report is prepared. The technical control and administration of domain name system as a whole is identified. Various disputes and legal issues related to domain names are also studied. The preliminary results of this work is that, more than seventy five percent of domain name system is operated, administered and managed under the control of United States. And India's participation in domain name system is not even noticeable. The DNS disputes and issues are identified. And to control the domain name disputes, its disputes resolution procedures, domain name registration procedures needs to be made more stringent with a global involvement. By using simple probe tool method to measure the response time of the root servers from various locations around the world, results that regions in Oceania, Africa, South America and part of Asia are under-served by the current root servers. [01] In such scenario, applying First Come and First Serve policy [02] for domain name registration is unfair and not reliable for registrants from under served regions.

Keywords: Domain name system (DNS), Registrars, Registries, Root servers, Internet corporation for assigned names and numbers (ICANN), Internet's Assigned Number Authority(IANA), World Intellectual Property Organization (WIPO)

1. Introduction

Domain names are names used to identify websites on the Internet. They are unique addresses of computers connected to the Internet. But the computers understands language of numbers, Technically, a typical Internet address appears as "120.11.23.55". These all-numeric form addresses are known as the IP addresses, as with IP addresses, domain names are also delimited with periods (dots), a typical domain name appears as www.google.com.

The dominant purpose of the domain name is simply to provide an easy method for remembrance of another's electronic address. Domain name is a unique name used to identify, among other things, a specific web site. Domain names are nothing but proxies for the IP address, there is no logical correspondence between the IP address and the domain name. Since it is not possible to remember each and every numerical value of an IP address, the system of domain names evolved which is known as Domain name system (DNS). The DNS is used "to translate human friendly domain names in to its corresponding computer friendly IP address and vice-versa." The DNS has an involvement of central authority, registry system, registrars, root servers system; they are responsible for overall operation of DNS. It is a perfect co-ordination system it is a distributed database of information that computers use to match domain names to IP addresses.

Any computers communicating on Internet, do not 'talk' in terms of domain names, but interpret a domain name into corresponding IP addresses. All servers on the Internet interpret the same domain names in same way. It is essential for this reason that domain names are unique and therefore, similar domain names cannot be offered to two separate entities. The unique feature of domain names is that the said domain

names are registered on ‘first come, first serve’ basis. This feature of domain names has given rise to domain name disputes like Cyber-squatting.

Cyber-squatting is a form of speculation where a domain name is registered with the intention of selling off the same. It is a practice by means of which a person or legal entity books up the trade mark, business name or service mark of another as his own domain name for the purpose of holding on to it and thereafter selling the same domain name to other person for valuable premium and consideration. For instance, the domain name www.microsoft.org’ was available and was registered by Amit Mehrotra much before Microsoft Corporation could think of it. This led to numerous ticklish legal issues. Microsoft Corporation, despite of possessing the trademark Microsoft, could not get the domain name ‘www.microsoft.org’ because of the ‘first come, first serve’ criteria of domain name registration. The first reported Indian case is that of Yahoo! Inc. Versus Akash Arora. The plaintiff, who is the registered owner of the domain name ‘yahoo.com’, succeeded in obtaining an interim order restraining the defendant and his agents from dealing in service or goods on the Internet or otherwise under the domain name ‘yahooindia.com’ or any other trademark / domain name which is deceptively similar to the plaintiff's trademark, ‘Yahoo!’

There are conflicts between domain names and Trademark to put it simply, as the domain names are indeed different from trademarks. While it is possible that the same trademark may be registered by different persons in different categories and different lines of businesses, but in case of domain name it may be possible to register only one domain name corresponding to such trademark. This aspect of domain names has also led to legal problems. There are many other sensitive legal issues related to domain names which are concurrent claims for same domain name, passing-off of domain names, domain name verses trademark etc.

A global study of domain name disputes would show that they could be broadly classified under the following heads: 1. Infringement- This refers to a dispute where the original registrant intentionally trades off the resemblance between domain name and another famous trademark. Thereafter, the registrant tries to encash on the reputation of trademark holder by running a business similar to that of trademark holder. In such cases, the use of the mark (domain name) would be illegal under the existing trademark law, regardless of whether the infringement occurred as an Internet domain name or in any other context. The standard factors, which determine infringement under the traditional trademarks, law like: i. the strength of the trademark, ii. The deceptive similarity between the plaintiff's and the defendant's mark, iii. The likelihood of confusion in the minds of the public, etc., would apply in cases of infringement of domain names also. 2.Concurrent claims- In this category of domain name dispute, there is more than one legitimate user of the domain name. Apparently, there is no intention to trade off a trademarked name and little or no potential for confusion between the products of the conflicting claimants. Both parties have a particular trademark of their own or a valid reason to use a particular domain name. For example, both Moonlight Computers and Moonlight Dry Cleaners would be interested in registering the domain name ‘moonlight.com’

The organization responsible for overall coordination and management of the DNS is the ‘Internet assigned number authority’ (IANA). In the United States today, the major part of the assignment of Domain Name is done by registry called as ‘Network Solutions Inc [Hereinafter to be referred as NSI]. The world over the assignment and registration of domain names are carried out by registries called as ‘Network Information Center’ (NIC). However the most significant development in the world of Internet has been the establishment of non-profit organisation called as ‘Internet Corporation for Assigned Names and Numbers’ (ICANN). It is a global organization created in OCTOBER 1998 by a broad coalition of Internet’s business, technical, academic and user communities. ICANN is assuming responsibility for a set of technical function previously performed under the U.S Government contracted by IANA and other groups. ICANN today is responsible for managing and coordinating the DNS to ensure ‘Universal Resolvability’. To categorically state, the core ambit of ICANN’s function is to develop and manage Internet policy and logistics related to (i) Internet Protocol (ii) IP address and (iii) Domain Names.

The assignment of Domain Names is carried out by the administrator, of a desired Top Level Domain (TLD) who is authorized by ICANN, called as registrars. Application can be made electronically by means of online forms for the registration of domain name available with the respective TLD administrators. Only domain names which had previously not been assigned are open for assignment and every applicant must

ensure that the domain name he or she seeks to register does not infringe any others trademark. There is an international treaty organization "World Intellectual property organizations" (WIPO), with more than 185 nation states as its members, undertook a series of consultations concerning the management of domain name system. Finally, in April 1999, WIPO issued its final report including its recommendations to ICANN (Internet Corporation for assigned names and numbers). Most of the WIPO recommendations were approved by the ICANN and have been incorporated in the current Uniform Domain Name Dispute Resolution Policy (UDRP), which has come into effect from 1st January 2000. The UDRP fight against cyber-squatting. Under the said Policy, a summary procedure is adopted to adjudicate the complaint of any complainant relating to any domain name on payment of processing fees. This policy is in operation. Under the said Policy, Indian companies have won back their legitimate domain names like 'www.tata.org' and 'www.philipsindia.com' of TATA and Philips India respectively have won back their legitimate domain names under the said policy. Disputes can be prevented through technical innovations as per one of statement made by International bureau in seminar organized by WIPO.[01] [02]

2. Theoretical Work

2.1. Methodology Used

In this research work a study of domain names, domain name system and domain name disputes in detail and the dispute resolution procedures in brief. During this study, the analysis of worldwide various domain name registrars, domain name root servers are done by collecting data from Internet using InterNIC's, ICAAN and IANA's sites and continent-wise statistical report is prepared. Various disputes and legal issues on domain names are studied. The case law is studied, reviewed and analyzed from domain names using WIPO's site.

2.2. Types of top-level domain Name(TLD)

They are as follows: 1.Generic TLD 2.Geographic or country code TLD. The current generic TLD's are as follows: i) .com for Commercial organization, ii) .int for International treaty organization, iii) .mil for defense in US. iv).edu for educational, v) .aero Intended for members of aviation only, vi) .org for miscellaneous and non-profit organisatons, vii) .biz Intended for bonafide businesses, viii) .net For network service providers, ix) .gov For government organizations, x) .coop Sponsored gTLD for cooperatives xi) .info open gTLD without restriction, xii) .musuem sponsored TLD for museums.Private parties are not permitted to register ".mil", ".int" and ".gov" TLDs. Generic domain names are issued by Network Solutions Inc., (NSI) as part of the InterNIC Generic domain names are unique to the entire world. To register a domain names with NSI, one needs to visit the InterNIC www website and fill in the forms and comply with the other stipulated formalities. Generally, NSI or ICAAN uses allocation policy of "first-come, first-served" (FCFS) for existing gTLDs. [3] And assigns domain names on a first come, first served basis. NSI will not exercise veto power over a requested name, so long as that name is not identical to one already assigned within the TLD.

Geographical TLDs end with a two-letter code, which is assigned to each country. It is also referred as country code TLD (ccTLD) and corresponds to a country, territory, or other geographic location. These TLDs with two letters have been established for over 240 countries and external territories. They are delegated to designated managers, who operate the ccTLDs according to local policies that are adapted to best meet the economic, cultural, linguistic, and legal circumstances of the country or territory involved. Following are some examples of the same:i) .in for India, ii) .uk for United kingdom, iii) .fr for France, iv) .us for USA, etc . Each country has an agency that handles registration of geographic domain names. These agencies are also known as NICs (Network Information Centres). Each country has its own registration policy and domain names ending with a geographic TLD are issued only to persons operating within the said country. The administration of a ccTLD is left to the specific country concerned. In addition to gTLDs and ccTLDs, there is one special TLD, and The .arpa domain name is used for technical infrastructure purposes. ICANN (Internet Corporation for assigned names and numbers) administers the .arpa TLD in cooperation with the Internet technical community under the guidance of the Internet

Architecture Board. Its name refers to the ARPAnet, the precursor of the modern Internet (in turn named for the United States Defense Advanced Research Projects Agency, ARPA). [12]

2.3. ICANN

ICANN is Internet Corporation for Assigned Names and Numbers act as the central authority. It is the nonprofit organisation that manages and coordinates the DNS and it is (ICANN).

2.4. Registries

Registries are organizations that operate top-level domains (TLDs), such as .ORG, .COM and .NET. These Registries are Person(s) or entity(ies) responsible for providing registry services, via contract with ICANN. The "Registry" is the authoritative, master database of all domain names registered in each Top Level Domain. The registry operator keeps the master database and also generates the "zone file" which allows computers to route Internet traffic to and from top-level domains anywhere in the world. There are currently five Regional Internet Registries (RIRs): AfriNIC (Africa), APNIC (Asia pacific NIC), ARIN (North America and sub-saharan Africa), LACNIC (Latin America and carribbean islands) and RIPE NCC. These non-profit organizations are responsible for distributing IP addresses on a regional level to Internet service providers and local registries. Internet users don't interact directly with the registry operator.

2.5. Registrar

Registrar is a person or entity that, via contract with ICANN, provides front-end domain name registration services to registrants, providing a public interface to the registry services. There are total eight hundred and ninety six ICANN approved registrars with the participation of only fifteen countries world-wide.

2.6. Root Server

Root servers are a machine that has the software and data needed to locate name servers that contain authoritative data for the TLDs (e.g., root servers know which name servers contain authoritative data for .COM, .NET, .FR, .UK, etc.). The root servers are, name servers and contain authoritative data for the very top of the DNS hierarchy. The root servers contain the IP addresses of all the TLD registries both the global registries such as .com, .org, etc. and the 244 country-specific registries such as .fr (France), .cn (China), etc. This is critical information. If the information is not 100% correct or if it is ambiguous, it might not be possible to locate a key registry on the Internet. In DNS parlance, the information must be unique and authentic. Technical specifications currently limit the number of root servers to thirteen. These machines are located around the globe, in the United States, the United Kingdom, Sweden and Japan.

2.7. Domain name system (DNS)

The DNS is a distributed database of information that computers use to match domain names to IP addresses. The data that makes up the Internet's DNS is propagated through a network of thousands of name servers, each responsible for pointing the users it supports in the right direction to get the information they need. It all starts with a component called a resolver that is a part of a user's browser application. Once a domain name is keyed into the browser, a request is forwarded to the local name server.[03]

2.8. DNS basic name resolution techniques

The Iterative and Recursive Resolution are Conventional name resolution transforms a DNS name into an IP address. At the highest level, this process can be considered to have two phases. In the first phase, we locate a DNS name server that has the information we need: the address that goes with a particular name. In the second phase, we send that server a request containing the name we want to resolve, and it sends back the address required.[03]

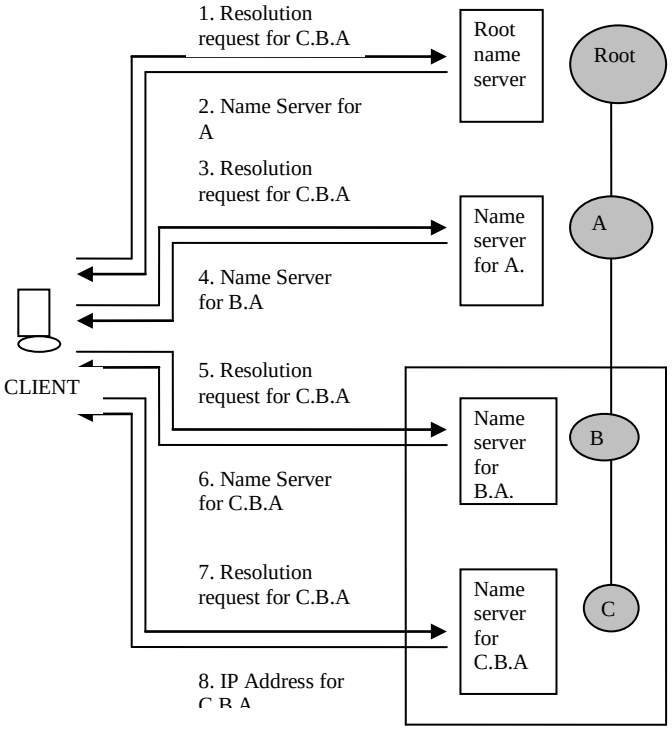


Figure1. Iterative DNS name resolution

Here In this paper only one method is covered, in iterative resolution, if a client sends a request to a name server that does not have the information the client needs, the server returns a pointer to a different name server and the client sends a new request to that server. In recursive resolution, if a client sends a request to a server that doesn't have the requested information, that server takes on the responsibility for sending requests to other servers to find the necessary records, then returns them to the client. A server doing this takes on the role of client for its requests to other servers. Both methods eventually lead to the right device, but they differ in how they assign responsibility for resolution when it requires multiple steps. The Iterative method is illustrated in Figure 1 given above. Thus, The DNS has an involvement of central authority, registry system, registrars, root servers system; they are responsible for overall operation of DNS.[03]

2.9. Domain Name Disputes and its categorization

In today's cyber world, where businesses are conducted on Internet media, domain names play very important role, domain names are used for promoting, advertising, conducting businesses and for many more. As the number of domain names starts growing the disputes related to it also started increasing rapidly. The domain name in the online world is just like trade name in the offline world which serves to identify the goods/services provided by the company. In domain name disputes, domain names are conflicting with trademarks and trade names this is due to fact first, global nature of domain names and country specific nature of trademark laws. Second, domain names have not yet received legal recognition as that of trademarks even though the domain names are very important element for conducting online businesses. Third, there is no connection and coordination between domain name registration and trademark registration procedure. And registration of Trademarks and trade names are carried out as per respective countries jurisdictions or their own trade mark laws. Although the nature of Domain Name Disputes varies, still they can categorically be grouped under the distinct heads:

2.9.1 Cybersquatting: In the disputes relating to Cybersquatting, cases of 'Illegitimate claims to Domain Names' form a core. Cyber squatting is a form of speculation where a domain name is registered with the intention of selling the same. The problem of cyber squatting is more acute than it seemingly is, in any given Internet domain name - consisting of the exact combination of numbers, letters and characters, can

be registered to one entity only. If someone attempts to register a domain name previously registered to someone else, he will be prevented from doing so because of the prior registration of that domain name by the first user. Cases- The leading case is Panavision .V. Toeppen; Toeppen registered the panavision.com and approached Panavision to sell it. Rather than pay, Panavision sued Toeppen and won an injunction on a trademark-dilution theory. The court found commercial use because Toeppen's business was to reserve trademarks as domain names and then sell to the trademark owners. Before this case, in Intermatic, Inc. V. Toeppen, ransom of domain name was also found to be commercial use.

In the UK One in a Million case, the cyber squatters registered a lot of domain names incorporating famous UK trademarks and trade names. They then attempted to resell them, posting details of availability on a website. Eventually, they were sued under the Trademarks Act. The court found for the plaintiffs because the cyber squatters' activity amounted to a threat of passing off because it was a deliberate practice with a clear intent to deceive people as to the origin of the domain. This activity in itself constituted appropriation of the plaintiff's goodwill. In another UK case Harrods Ltd. V. UK Network Service Ltd., the respondent registered the 'harrods.com' and attemped to secure payment from Harrods. The court ordered the respondent to give up 'harrods.com' and to refrain from infringing or passing off its service as those of Harrods. More and more similar cases were reported. It seems clear that cybersquating is recognized to be a kind of trademark infringment. However, it cannot be concluded from the traditional trademark theory. [02],[10] and [11].

2.9.2 Disputes based on legitimate claims: The disputes based on legitimate claims pose a great problem for the adjudicators. These kind of disputes involve parties having a legitimate claim to a Domain Name and since there can be only one registration for a particular Domain Name there lies a matter for adjudication. As the trademark laws are territorial in nature many parties use the same name as a trademark without causing infringement. But the area of Domain Names is universal in nature thus giving voice to the issue of territoriality. The possibility of such conflict arises from the lack of connection between the system for registering trademarks and the system for registering domain names.

The trademarks registration system is administered by a governmental authority on a territorial basis, while the domain names registration system is usually administered by a non-governmental organization without any functional limitation. Further, trademarks generally are issued for one or only a few categories of goods or services at a time, unless the trademark is famous or well-known, while domain names are registered on a first-come, first-served basis and offer a unique, global presence on the Internet. Trademark registrations generally require use to remain effective, while domain names can be reserved for future use.

It is identified that there are two types of legitimate competing claims dispute. Both the parties have a trademark claim in the domain name, only one party have a trademark claim. While the other has only a legitimate claim to the domain name. Since the DNS is not an outcome to the trademark system it is not incumbent for a legitimate Domain Name holder to have a trademark claim. An illustration of a legitimate claim dispute can be seen in Infospace.com. Inc .Vs. Infospace Technology Co. Ltd, wherein both the parties had asserted a legitimate claim over a domain name. In this case, The Complainant is Infospace.com Inc., a corporation organized and existing under the laws of the State of Delaware and having its principal place of business in Redmond, Washington, USA ("the Complainant"). And the Respondent is Infospace Technology Co. Ltd., a company registered under the laws of Jiangsu Province and having its principal place of business in Nanjing, China ("the Respondent"). While the Domain Name is similar to the Complainant's trademarks, the Complainant has failed to prove that the Respondent had no right or legitimate interest in the Domain Name and has failed to prove that the Domain Name was registered and is being used in bad faith. Accordingly the remedy requested by the Complainant is denied and the Respondent is not required to transfer the Domain Name to the Complainant. The Panel judged giving the benefit to the Respondent stated that the obligation is on the complainant to show that the Respondent lacked a right or legitimate interest in the domain name. As legitimate claim disputes are the most challenging types of disputes for the adjudicators and since there is lacunae in the law to decide disputes of legitimate claims the best approach to adjudicate such matters based purely on facts and circumstances that surround the dispute. [02],[10] and [11].

2.9.3 Legal Issues related to domain names: Following is the list of legal issues on domain names i. Protecting trade names from being registered as domain names. ii. Protecting Geographical name from being registered as Domain names. iii. Protecting Names of celebrities from registering as domain names. Here only one legal issue on domain names are discussed below:

Protecting Names of celebrities from registering as domain names- Shortly after every Chinese athlete won an Olympic gold medal, his or her name was registered as domain name by someone else. The names of celebrities were registered as domain names all over the world. Should they be protected? As we know, Julia Roberts and Madonna have been successful in getting back the domain names which are identical to their names, while Sting lost his case because the panel held that "there was evidence that the Respondent had made bona fide use of the name Sting prior to obtaining the domain name registration and there was no indication that he was seeking to trade on the good will of the well-known singer." In Germany, the Civil Code seeks to protect one's personality by enabling everybody to be recognized by his or her own name. If someone claims protection based on the Civil Code, the use of the domain name by the Cybersquatter does not necessarily have to be a commercial one. [02],[10] and [11].

3. Data collection and analysis of Continent-wise Registrars, Root servers and Registries

In this data analysis the data about, worldwide ICANN accredited domain name registrars, location of root name servers and location of gTLD registries is collected from Internet source and tabulated. Then this data collected is scrutinized and arranged in country-wise then continent-wise fashion, and again tabulated. Based on which graphical report is generated about global distribution of domain name registrars, root name servers, registries using MS-Excel.

Table 1 Root Name servers

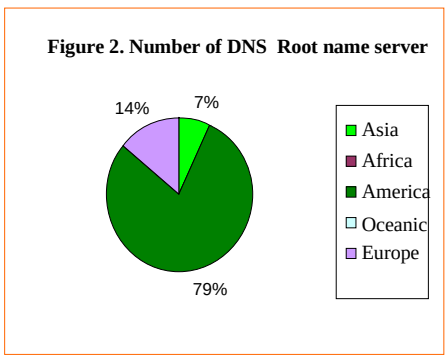
Continents	Number of DNS Root-name server
Asia	1
Africa	0
America	11
Oceanic	0
Europe	1
Total	13

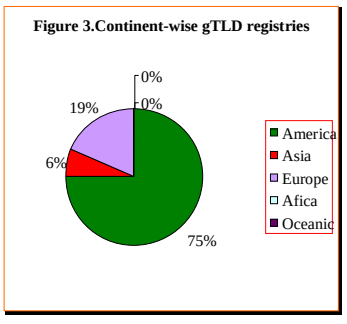
Table 2. Registry Operators.

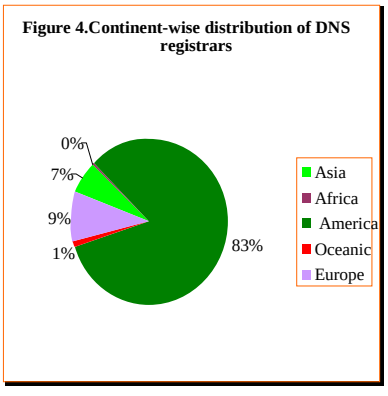
Continents	Number of gTLD Registry operator
America	12
Asia	1
Europe	3
Afica	0
Oceanic	0
Total	16

Table3. Registrar's

Continents	Number of registrars
Asia	60
Africa	2
America	736
Oceanic	13
Europe	85
Total	896







4. Conclusion

It is found that, there are total eight hundred and ninety six ICANN accredited registrars and out of which seven hundred and thirty six are in US itself. So maximum of revenue (eighty three percent of total)

out of domain name registration goes to US. There are sixteen gTLD registry operator, new as well old including sponsored and unsponsored, out of which twelve (seventy five percent) are based in U.S. So maximum of domain name registry service providers belongs to U.S. Hence, maximum of earning is obtained by US again. There is zero percent contribution by Africa, Oceanic continental countries. There are thirteen root name server out which of eleven are located in United states itself. Even if Internet is not owned by anybody, but seventy nine percent of distributed root name server operation is managed by U.S again.

Even though it is known, Internet is not owned by anybody, but indirectly it is administered, managed and controlled by United States of America. The response time of the root servers from various locations around the world is not same, which results that regions in Oceania, Africa, South America and part of Asia are under-served by the current root servers. In such scenario, applying First Come and First Serve policy for domain name registration is unfair and not reliable for registrants from under served regions. There is a need to find out better domain name registration policy based on efficiency and effectiveness of domain name system's technical infrastructure.

5. Future Scope

This research work encourages the author to propose a technical solution as E-DN disputes preventive system in which link between trademark registration of various countries and domain name registration needs to be established. This technology based world-wide solution will be certain, uniform, consistent, applicable to all without discrimination. This may prove as one of the standards capable of preventing domain name disputes as well as expandable to solve other issues too.

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