

Annex 1

The Core values:

The core values have been developed to provide guidance for any further steps to implement the reform. Most of them are not surprising, since they are more or less explicitly mentioned in the MoU¹ with the USG, but since the debate on the reform started with the mission and went then further down the road towards the detail of the bylaws, this kind of intermediate level of detail was felt to be important.

The core values are also used as a checkpoint for all further decisions on structure, on committees, or on policy decisions. During the process of adopting the core values the main debate was on the question of how explicit issues like internationalization, policy development, involvement of governments should be mentioned in this context. In the end the core values reflect quite well the issues presented in the “reasons for reform” as discussed in a chapter:

(<http://www.icann.org/general/bylaws.htm>)

- “1. Preserving and enhancing the operational stability, reliability, security, and global interoperability of the Internet.
2. Respecting the creativity, innovation, and flow of information made possible by the Internet by limiting ICANN's activities to those matters within ICANN's mission requiring or significantly benefiting from global coordination.
3. To the extent feasible and appropriate, delegating coordination functions to or recognizing the policy role of other responsible entities that reflect the interests of affected parties.
4. Seeking and supporting broad, informed participation reflecting the functional, geographic, and cultural diversity of the Internet at all levels of policy development and decision-making.
5. Where feasible and appropriate, depending on market mechanisms to promote and sustain a competitive environment.
6. Introducing and promoting competition in the registration of domain names where practicable and beneficial in the public interest.

¹ Memorandum of Understanding

7. Employing open and transparent policy development mechanisms that (i) promote well-informed decisions based on expert advice, and (ii) ensure that those entities most affected can assist in the policy development process.
8. Making decisions by applying documented policies neutrally and objectively, with integrity and fairness.
9. Acting with a speed that is responsive to the needs of the Internet while, as part of the decision-making process, obtaining informed input from those entities most affected.
10. Remaining accountable to the Internet community through mechanisms that enhance ICANN's effectiveness.
11. While remaining rooted in the private sector, recognizing that governments and public authorities are responsible for public policy and duly taking into account governments' or public authorities' recommendations.”

The bylaws further state:

“These core values are deliberately expressed in very general terms, so that they may provide useful and relevant guidance in the broadest possible range of circumstances. Because they are not narrowly prescriptive, the specific way in which they apply, individually and collectively, to each new situation will necessarily depend on many factors that cannot be fully anticipated or enumerated; and because they are statements of principle rather than practice, situations will inevitably arise in which perfect fidelity to all eleven core values simultaneously is not possible. Any ICANN body making a recommendation or decision shall exercise its judgment to determine which core values are most relevant and how they apply to the specific circumstances of the case at hand, and to determine, if necessary, an appropriate and defensible balance among competing values.”

The implementation of the core values will be taken a step further into the various elements of corporate governance, such as:

- Role and responsibilities of directors
- Code of conduct for meetings

and a variety of other points which need clarification to enhance the efficiency of the Board is developed in the Board Governance Committee whose charter is given at <http://www.icann.org/committees/board-governance/charter.htm>.

Internet protocol "IP" addresses

Three different mechanisms ensure navigation on the Internet:

- Addresses (the so-called IP addresses)
- Protocols: Protocols are procedures and formats that are used to enable computer-to-computer communication.
 - Computers share common knowledge of identifiers to make clear which protocols are being used. For example, Internet Protocol version 4 is in use today; IPv6 is coming.
- Domain names system (DNS)

The basis for Internet exchanges relies on Internet addresses: these are used by protocols to rout data from origin to destination.

One should bear in mind that the basic telecommunications technology used on the Internet is packet-switching, running on any communications substrate. Basically, each time a machine has to send a stream of data to another machine, the corresponding data are chopped into elementary data packets. These packets are individually routed from the origin to destination by the protocol in use (TCP/IP).

TCP/IP

Unlike the X.25 telecommunications standard, highly popularised in Western Europe in the 70's, the technology used on the Internet gives no priority to the different exchanges.² In other words, there is no resource reserved for data exchange between two given machines. One characteristic is that there is no such thing as a "busy line" on the Internet. Conversely there may be uneven delays to transmit data. Also, the individual data packets are routed through various telecommunications backbones and arteries according to instantaneous available bandwidth at each routing node.

² As explained by Vint Cerf at MCI WorldCom in July 1999,

- Circuit (telephony) is like reserving bicycle lanes from LA to NY!
- Packet (Internet) is like sharing of the highway among high speed cars.

TCP/IP, the basic telecommunications protocol (which historically succeeded to NCP, Network Control Protocol) is built to ensure the proper transmission and acquisition of data.

The "IP" part of the TCP/IP protocol will perform the mission of routing the packets from origin to destination using the available channels. They will probably be transmitted via different itineraries. As a result, these packets may be received by the destination machine in a different sequence than the originating one.

It is the mission of the "TCP" part of TCP/IP to make sure that:

All packets have been received by the destination machine

The packets have been re-sequenced and re-assembled in order to build the original stream of data, be it a piece of text, a picture, an audio clip or a video clip. If applicable, TCP asks for re-transmission after a time-out.

Typically, an IPV4 Internet packet looks like shown on Figure 1:

"from" address	"to" address	Version number	CONTENTS
166.45.18.99	204.146.165.100	"4"	"hello"

Figure 1: A typical IPv4 Internet packet

IPV4

IPV4, the protocol version that is currently used, was created in 1983. IPV6, the successor, is being deployed currently, as explained below.

IPV4 gives a provision of 2^{32} addresses on the Internet.

Figure 2 is a screen capture of the dialogue window used in "Windows" to assign the different TCP/IP parameters.

Each of the four zones has an addressing capacity of 256 addresses (i.e. 2^8), which makes 2^{32} for the total capacity of addresses available under IPV4.

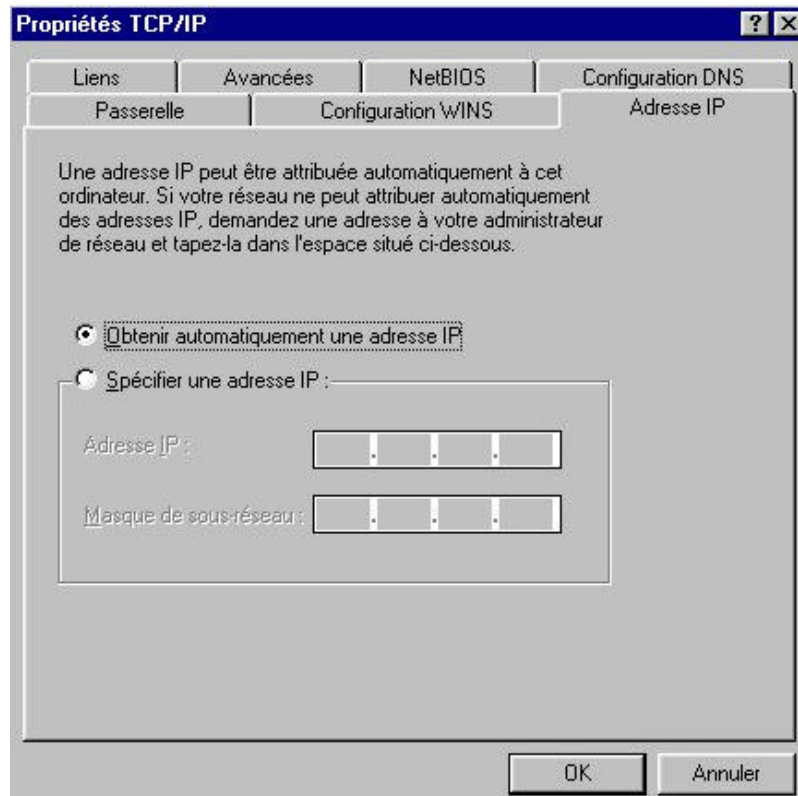


Figure 2: Address pattern under IPv4

As shown on Figure 1, there are two different ways to assign an IP address:

- Dynamic allocation of an address when a net-citizen (residential or business) gets connected to the Internet. In this case, the "allocating authority", owner of a pool of addresses, allocates a temporary address to the subscriber for the duration of the session. The ISPs fulfill this functionality for their subscribers. Companies allocate addresses for their employees in the same way. At the end of the session, the addresses can be re-assigned to any other user.
- Permanent allocation of an address for all permanently connected machines on the Internet (e.g. mail servers, data servers, search engines, portals, etc.). In this case, the four zones on Figure 1 are permanently filled with an address from 0 to 2^{32} .

The same addresses may be duplicated, i.e. used on private networks by different organizations at the same time: in this case, the machines identified on private networks (mostly business networks) cannot access the Internet. This explains the mask ("Masque de sous-réseau" on Figure 2). Actually, the use of the "mask" has changed:

If "0000-0000-0000-0000" is considered the generic pattern for an IPV4 address, it really consists of two contiguous parts:

- Left part is the network address
- Right part is the machine address within the network.

In this context, a given address like the AFNIC's would be written 192.134.7.0/24³. The "/24" is the prefix length, which in this case is 24 bits, leaving 8 bits for addressing machines individually (maximum number of machines of the subnetwork is 2⁸, i.e. 256 machines).

NAT (Network Address Translation):

Network Address Translators (NATs) are often used when the network's internal IP addresses cannot be used outside the network either for privacy reasons or because they are invalid for use outside the network.

A NAT is used for peer-to-peer communication, in order to allow application such as Netmeeting. A NAT sits in between the public Internet and the network it serves, and works by rewriting IP addresses and port numbers in IP headers on the fly so the packets all appear to be coming from (or going to) the single public IP address of the NAT device instead of the actual source or destination. NAT is now commonly used in small home-office routers and in software used by consumers to connect several personal computers to a single cable modem. It is even used by some Internet Service Providers (NAT is not the only possible solution; proxy servers are also commonly used, but require more configuration, and sometimes require custom client software.) (*"Eventually, we'll all switch to IPv6, which will have 128-bit addresses, and will solve the problem once and for all, but that's probably not going to be commonplace for many years."*)⁴

³ Pronounce "slash 24"

⁴ Dan Kegel, Caltech <http://www.alumni.caltech.edu/~dank/peer-nat.html>

Difficulties with NATs:

Some applications send IP addresses or port numbers hidden inside their datapackets, where NAT cannot properly rewrite them - so these applications do not work when one tries to use them on computers behind NATs.

For security reasons, some NATs only allow incoming traffic from an outside address if an outgoing packet has already been sent to that outside address. This means that two people behind different NATs cannot open up connections to each other in the usual way - ever!

As will be discussed below, the introduction of IPV6 can be seen as an alternative to NATs.

There is another vocabulary used for IP addresses, using the word "class":

-----	-----	-----	-----
-----	"A" class: defined by an 8-bit block: provision of 2^{24} addresses		
-----	-----	"B" Class: 2^{16} addresses	
-----	-----	-----	"C" Class: 2^8 addr.

Figure 3: Address block definition

For example, the address of the AFNIC is written 192.134.7.0/24; therefore, it owns a "C" class of contiguous addresses. A set of contiguous addresses is also called a subnet.

We will discuss later on the relationship between addresses and routing procedures over the Internet.

The unicast/multicast/anycast notion:

- In the unicast mode, IP allows a source node to transmit IP datagrams to a single destination node. The destination node is identified by a unicast address.
- In the multicast mode, IP allows a source node to transmit IP datagrams to a group of destination nodes. The destination nodes are identified by a multicast group, and a multicast address is used to identify the multicast group: a given packet is routed to a set of designated destination machines: this mode is particularly interesting in applications like video distribution: unicast allows to send the data only once on the network lending itself to

significant savings in bandwidth. Multicast (unlike unicast) requires a special programming of the routers to accommodate final distribution over the destination machines. Therefore, multicast is not broadly deployed.

- IP cast allows a source node to transmit IP datagrams to a single destination node, out of a group of destination nodes. IP datagrams will reach the closest destination node in the set of destination nodes, based on the routing measure of distance. The source node does not need to choose the closest destination node, as the routing system will figure it out (in other words, the source node has no control over the selection). The set of destination nodes is identified by an anycast address. Although there are multiple examples of anycast in IPv4, anycast is meant to be implemented under IPv6 (RFC2373).

The AS concept:

AS means "autonomous system": it is a subset of traffic routers which are controlled by a single entity, e.g. a public network operator or a private enterprise for internal usage. Each AS has a number (16 bit) assigned by a RIR upon a simple request. This is only an administrative record.

Throughout the Internet, the routers use BGP (Border Gateway Protocol, RFC 1771). This protocol provides an intelligent dynamic route based on most specific prefix and shortest Autonomous System (AS) path. These routes are loaded in RAM in the routers, and are updated regularly. A given router knows the most frequently used routes, and uses them as a default choice. A "default free" operator would know 120,000 different routes under IPv4 address scheme.⁵ Transitioning from IPv4 to IPv6 (see below) is going to trigger a complete update of these tables throughout the Internet.

While traffic routers exchange data between themselves using BGP, another protocol is used as an Interior Gateway Protocol to distribute routing information within a single Autonomous System: this is Open Shortest Path First (OSPF, RFC 2328).

At this time, the decision to move to IPv6 was made, and the ICANN has encouraged the TLDs to deploy this new addressing mode.

⁵ Under IPv6, this number is currently 300. This low figure shows the very weak penetration of IPv6 at this time.

Moving from IPV4 to IPV6 is clearly a necessity. Although it remains unsure whether it is the right time to move:

- As mentioned above, there are huge numbers of IPv4 addresses not currently used. A powerful international organization in charge of addresses management might have the legitimacy and the power to go after the blue chip corporations who retain these resources and deprive the Internet community.
- The economy is currently at its lowest, and the costs of the move will impact many players, as sketched hereunder.

The decision to move may be understood as an "encouragement towards the culture of waste", since the immediate need for more IP addresses could be fulfilled by re-assigning non-used existing addresses.

Under IPV6, the potential number of addresses over the Internet gets to 2^{128} . It's a huge number, somewhat astronomical.⁶ It is highly probable that this number was chosen to make sure that there will never be any more shortage.

The impact of transitioning to IPV6 is going to be very significant:

- upgrading all the routers (see below)
- upgrading the table of addresses on all machines
- Change applications: browsers, mail servers, file transfer protocols, etc.

On the other hand, IPV6 is going to bring substantial advantages:

- No need for NATs anymore for peer-to-peer real-time communication.
- Possibility to implement anycast:

Anycast was discussed above in conjunction with unicast and multicast.

⁶ About the number 2^{128} , we all remember the old parabol of the miller who was granted an award from his sultan. He begged to be rewarded with grains of corn: one grain (i.e. 2^0) on the first box of the checkerboard, two (2^1) on the second, 4 (2^2) on the third, 8 (2^3) on the fourth, etc., until the 64th box. The result is close to 2^{128} , which is probably the naïve translation of the infinite: truly, the quantity of corn is huge and almost impossible to express: a huge number of naval convoys of all the available cargo ships loaded with that corn.

Anycasting is designed to let one host initiate the efficient updating of router tables for a group of hosts. IPv6 can determine which gateway host is closest and sends the packets to that host as though it were a unicast communication. In turn, that host can anycast to another host in the group until all routing tables are updated.

Anycast is used to set up identical copies of existing servers (same IP address and exactly the same data). It works like radio transmitters (you will talk or listen to the nearest one), Standard Internet routing will bring the queries to the nearest server, it will mitigate the impact of denial of service attacks.

- IPsec: the IP security protocol that uses cryptography to provide security services on tunnels that travel over untrusted networks.
- Mobile IP: this mechanism aims at allowing to move in mobile networks and could be a great business opportunity for the corresponding European industry (e.g. Nokia, Siemens, Alcatel).

The IMS ('IP Multimedia Subsystem') vision integrates mobile voice communications and Internet capabilities, bringing the power and wealth of Internet services to mobile users. IMS enables peer-to-peer real-time services - such as voice, video - over a packet-switched domain, allowing the creation and deployment of IP-based multimedia services in mobile networks as they evolve from GPRS to UMTS and beyond. Another key attraction of IMS is scalable common service control - its ability to manage parallel services for the user, opening the mobile network to third party application service providers and introducing an open, business model in place of the traditional telephony model of specialised service providers.

- The technological change from 32-bit CPUs to 64-bit platforms could also be seen as an industrial opportunity for the European industry.

Techno-economic impact of the IPV4 → IPV6 move on the routers:

There are two main protocols to program routers to transmit data: OSPF and BGP.

- OSPF (RFC 1131 and 1245) stands for Open Shortest Path First. OSPF is an Internal gateway protocol; it is designed to be used internally to a single Autonomous System.
- BGP(RFC 1771) stands for Border Gateway Protocol. BGP selects an intelligent route based on most specific prefix and shortest Autonomous System (AS) path. BGP version 4 is the current **de facto** exterior routing

protocol in the Internet. BGP learns multiple paths via internal and external BGP speakers; it picks the best path and installs in the IP forwarding table.

The routers market is a very big market, and yet difficult to evaluate. Among the main manufacturers, there are:

- CISCO, the only manufacturer marketing the whole range of routers (i.e. 2,000; 4,000; 7,000; 14,000 (probably 85% of the total market)
- Juniper, which only markets high performance routers (telecom operators routers)
- Riverstone, Bay Send, Baywan
- Sixwind, Foundry, Nokia, etc. who market small routers (for 5-10 PCs).

As it appears, very few European manufacturers are on this market which is just about to boom thanks to IPV6: the whole software of these machines needs to be updated, and as it is most frequent in this case, it is necessary to upgrade the whole configuration of the routers, this encompassing the RAM modules, in order to support bulkier versions of software. As it turns out, manufacturers (e.g. CISCO) insist upon delivering these modules of RAM themselves, as a condition of the guarantee and maintenance contract.

In order to support IPv6, the entire Internet community will face considerable costs to upgrade the routers: companies, telecom operators, ISPs, etc. leading to an enhanced market volume e.g for routers⁷

Further it should be understood that we are seeing the end of the CPUs using 32-bit architectures⁸. This is already true for PCs. The Pentium 4 is most probably the last chipset marketed by Intel using a 32-bit architecture.

As for servers, routers and other machines needing very powerful CPUs, 64-bit processors are under way. From this point of view, it is highly probable that router

⁷ It would be a worthwhile effort to evaluate the market, conduct a study of feasibility for a European presence on this market: one of the ideas is to use UNIX platforms and public pieces of software such as BSD (Berkley System Distribution), already used by Nokia.

⁸ Let us bear in mind that the CPU architecture has evolved tremendously since the initial 4-bit chipset first marketed by Intel. Today, pocket calculators and washing machines use 8-bit architectures, telephones use 16-bit, PCs use 32-bit and servers already use 64-bit. Routers use specific chipset in the ASIC extension boards.

manufacturers may be using the IPv4 ? IPv6 transition to introduce machines based on the new CPUs.

Imbalance in address distribution:

Figure 4 shows the situation of address distribution and its imbalance.

Developing continents in terms of Internet (e.g. Asia, Latin America, and above all Africa) do not get a proper share of the available resource worldwide.

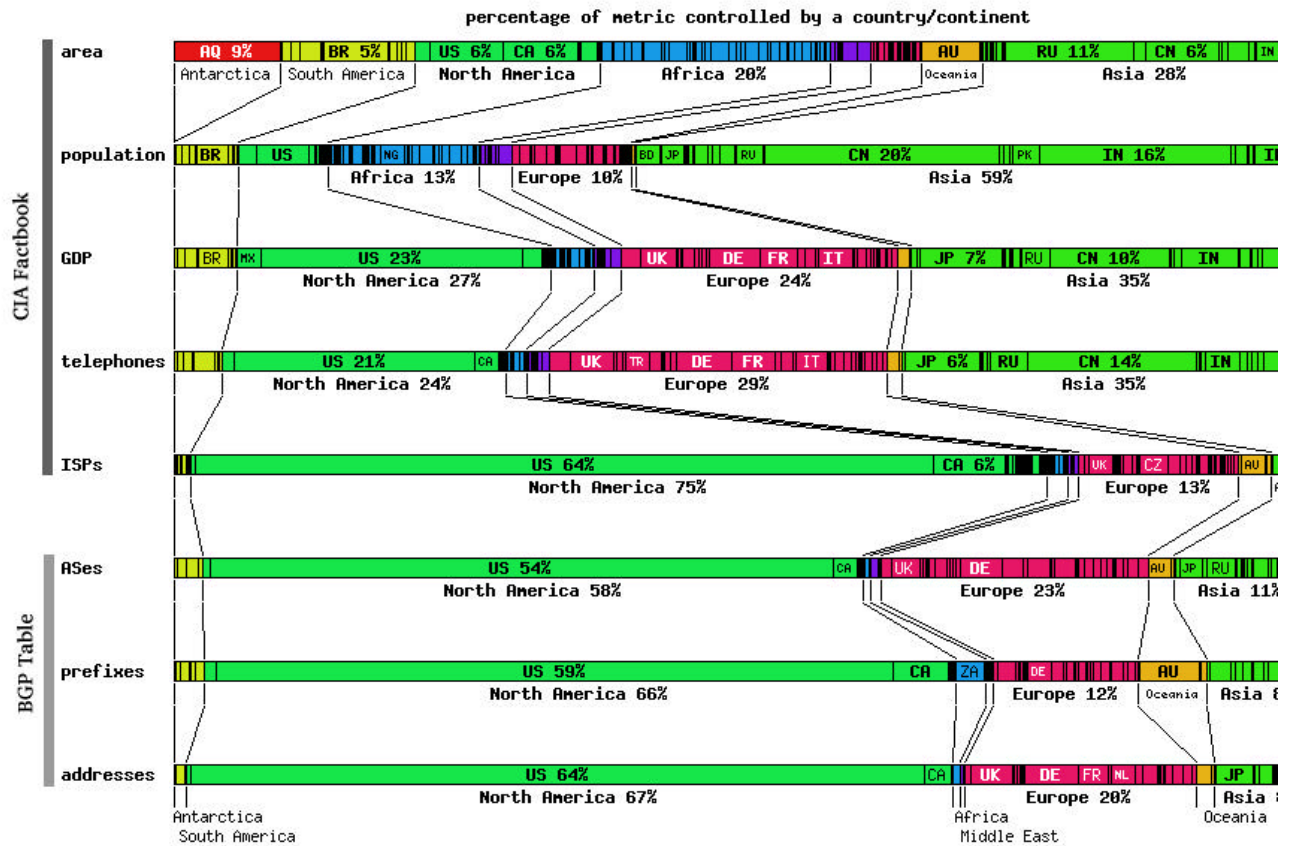


Figure 4 Imbalance in address distribution (IPV4)

IPV6 could assist in solving this problem.

Domain names

As stated above, two machines can only correspond on the Internet if they know each other's address. Therefore, the key issue is to know in advance the partner's IP address.

This is the whole purpose of domain names. Truthfully, IP addresses (whether they be V4 or V6) are almost impossible to remember. Domain names were created to

help remember host names. For example, afnic.fr, is a lot easier to remember than 139.100.x.x.

As discussed later, domain names are resolved into genuine IP addresses thanks to the DNS (Domain names server) application.

What's a domain name ?

It is "a unique designator on the Internet made up of symbols separated by dots", such as

"This.is.a.sample.domain.name.com"

The individual words or characters between the dots are called **labels**. The label on the far right represents the **top level domain**, like com, org, uk and so on. The penultimate label on the right represents the second level of domain, or "**second level domain**."

Other terms are children and parents.

Certain rules are to be followed in creating domain names:

- There can be no more than 127 labels.
- No label can be longer than 63 characters.
- Labels are made up of letters, numbers and hyphens, and may not start with hyphens.
- Labels are case insensitive.⁹
- A domain name must be defined in its closest ancestral zone (The one with the most labels).

Domain names are organized in "TLD"s (Top Level Domains) and other categories.

There is a real "birth certificate" for TLDs, called RFC 920. Here is what it says:

"The Purpose of Domains:

Domains are administrative entities. The purpose and expected use of domains is to divide the name management required of a central administration and assign it to sub-administrations. There are no geographical, topological, or technological

⁹ This will change with the introduction of IDN: see below

constraints on a domain. The hosts in a domain need not have common hardware or software, nor even common protocols. Most of the requirements and limitations on domains are designed to ensure responsible administration.”

RFC 1591 describes the general characteristics of 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.¹⁰

Under each TLD a hierarchy of names may be created. 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 the individual organizations' responsibility.

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 others, organization names are listed directly under the country code. The organization for the US country domain is described in RFC 1480.”

Domain Requirements

This topic has been defined in (RFC 920 October 1984).

General Purpose Domains

While the initial domain name "ARPA" arises from the history of the development of this system and environment, in the future most of the top level names will be very general categories like "government", "education", or "commercial". The purpose is to provide an organization name that is free of undesirable semantics.

¹⁰ It's somewhat funny to see how things can evolve with the time, since there is pressure to create more and more generic TLDs these days.

After a short period of initial experimentation, all current ARPA-Internet hosts will select some domain other than ARPA for their future use. The use of ARPA as a top level domain will eventually cease.¹¹Initial Set of Top Level Domains:

¹¹ As we now know, it did not cease: E-NUM is part of the arpanet TLD, i.e. controlled by DOD!

The initial top level domain names are:¹²

- Temporary
 - ARPA = The current ARPA-Internet hosts.
- Categories
 - GOV = Government, any government related domains meeting the second level requirements.
 - EDU = Education, any education related domains meeting the second level requirements.
 - COM = Commercial, any commercial related domains meeting the second level requirements.
 - MIL = Military, any military related domains meeting the second level requirements.
 - ORG = Organization, any other domains meeting the second level requirements.
- Countries

The English two letter code (alpha-2) identifying a country according to the ISO Standard for "Codes for the Representation of Names of Countries"¹³.

Multiorganizations

A multiorganization may be a top level domain if it is large, and is composed of other organizations; particularly if the multiorganization can not be easily classified into one of the categories and is international in scope.

The UC Domain (fictitious example to illustrate the second level domain concept):

¹² This RFC introduces the gTLDs (here referred as "categories") and the ccTLDs (here referred as "countries"). Furthermore, the list of countries codes is defined as "ISO, "Codes for the Representation of Names of Countries", ISO-3166, International Standards Organization, May 1981. As can be seen, second level domains are also introduced in RFC 920.

¹³ This ISO standard is the set of ISO 3166 codes. Five different editions of the list were made, particularly after the political changes in countries (Re-unification of Germany in 1989, political changes in Yugoslavia, triggering the need for new country codes, etc.)

It might be that a large state wide university with, say, nine campuses and several laboratories may want to form a domain. Each campus or major off-campus laboratory might then be a subdomain, and within each subdomain, each department could be further distinguished. This university might be a second level domain in the education category.

One might see domain style names for hosts in this domain like these:

LOCUS.CS.LA.UC.EDU

CCN.OAC.LA.UC.EDU

ERNIE.CS.CAL.UC.EDU

A.S1.LLNL.UC.EDU

A.LAND.LANL.UC.EDU

NMM.LBL.CAL.UC.EDU

E-NUM:

E-NUM is a service using the DNS and based on a process "*Mapping Telephone Numbers Onto The Internet*".

ENUM is a technology that translate normal telephone numbers into a format that can be used to store and retrieve Internet addressing information, which can in turn be used to route communications over the Internet. As such, ENUM can help to bridge the gap

between the traditional telephone network and the Internet¹⁴. With ENUM and "Voice over Internet Protocol" ("VoIP") technology, an increasing amount of voice communications can be carried over the Internet instead of over the telephone network. Initially, ENUM is likely to be deployed by corporations and other large institutions that seek to reduce their use of traditional telephone services. This technology has the potential to allow large and small users to save money and increase control over, and flexibility in, their communications.

¹⁴ The concept of bridging this gap automatically brings up the issue of a "competition" between the organisations which have the responsibility to run the traditional telephone network on one hand, and the Internet on the other hand, respectively the ITU and the ICANN. Therefore, E-NUM carries a significant load of political reservation: who is going to control that bridge ?

But ENUM's potential benefits also bring risks in terms of privacy and other public policy concerns. The simplest implementation of ENUM envisions that individuals' personal contact information (such as telephone numbers and e-mail addresses) will be stored in special records located in the Domain Name System (or DNS) of the global Internet. Because the DNS is publicly available, the use of ENUM could significantly compromise the privacy of its users.

ENUM does offer important potential benefits, and if implemented correctly it can enhance rather than harm individual privacy. But any country seeking to implement ENUM should pay close attention to the important issues of public concern that it raises.

Annex 2

List of Figures

Part I

Figure 1: Addresses supporting organisation	8
Figure 2: DNSO organisation	11
Figure 3: Growth of ccTLDs per year	12
Figure 4: Mechanism of the IDNA process.....	16
Figure 5: The Domain Name System	21
Figure 6: DNS assignment on a PC	22
Figure 7: The root servers.....	24
Figure 8: IANA missions as stated in their home page	28
Figure 9: Structure of ICANN previous to reform (ICANN 1).....	32
Figure 10: Overview of constituency membership	38
Figure 11: ICANN's Board selection Procedure	41
Figure 12: Overview NOMCOM.....	42

Part II

Figure 1: ICANN accreditations of registrars in the CNO market	76
Figure 2: Number of active registrars in the CNO market.....	78
Figure 3: Market shares of the Top-10 registrars in CNO market	79

The opinions expressed in this study are those of the authors and do not necessarily reflect the views of the European Commission, nor does the Commission accept responsibility for the accuracy of the information contained therein.

Annex 3

Internet Protocol version 4 address space

(last updated 2003-02-12)

The allocation of Internet Protocol version 4 (IPv4) address space to various registries is listed here. Originally, all the IPv4 address spaces was managed directly by the IANA. Later parts of the address space were allocated to various other registries to manage for particular purposes or regional areas of the world. RFC 1466 [RFC1466] documents most of these allocations.

Address

Block	Date	Registry - Purpose	Notes or Reference
000/8	Sep 81	IANA - Reserved	
001/8	Sep 81	IANA - Reserved	
002/8	Sep 81	IANA - Reserved	
003/8	May 94	General Electric Company	
004/8	Dec 92	Bolt Beranek and Newman Inc.	
005/8	Jul 95	IANA - Reserved	
006/8	Feb 94	Army Information Systems Center	
007/8	Apr 95	IANA - Reserved	
008/8	Dec 92	Bolt Beranek and Newman Inc.	
009/8	Aug 92	IBM	
010/8	Jun 95	IANA - Private Use	See [RFC1918]
011/8	May 93	DoD Intel Information Systems	
012/8	Jun 95	AT&T Bell Laboratories	
013/8	Sep 91	Xerox Corporation	
014/8	Jun 91	IANA - Public Data Network	
015/8	Jul 94	Hewlett-Packard Company	
016/8	Nov 94	Digital Equipment Corporation	

017/8 Jul 92 Apple Computer Inc.
018/8 Jan 94 MIT
019/8 May 95 Ford Motor Company
020/8 Oct 94 Computer Sciences Corporation
021/8 Jul 91 DDN-RVN
022/8 May 93 Defense Information Systems Agency
023/8 Jul 95 IANA - Reserved
024/8 May 01 ARIN - Cable Block (Formerly IANA - Jul 95)
025/8 Jan 95 Royal Signals and Radar Establishment
026/8 May 95 Defense Information Systems Agency
027/8 Apr 95 IANA - Reserved
028/8 Jul 92 DSI-North
029/8 Jul 91 Defense Information Systems Agency
030/8 Jul 91 Defense Information Systems Agency
031/8 Apr 99 IANA - Reserved
032/8 Jun 94 Norsk Informasjonsteknologi
033/8 Jan 91 DLA Systems Automation Center
034/8 Mar 93 Halliburton Company
035/8 Apr 94 MERIT Computer Network
036/8 Jul 00 IANA - Reserved (Formerly Stanford University - Apr 93)
037/8 Apr 95 IANA - Reserved
038/8 Sep 94 Performance Systems International
039/8 Apr 95 IANA - Reserved
040/8 Jun 94 Eli Lilly and Company
041/8 May 95 IANA - Reserved
042/8 Jul 95 IANA - Reserved
043/8 Jan 91 Japan Inet

044/8 Jul 92 Amateur Radio Digital Communications

045/8 Jan 95 Interop Show Network

046/8 Dec 92 Bolt Beranek and Newman Inc.

047/8 Jan 91 Bell-Northern Research

048/8 May 95 Prudential Securities Inc.

049/8 May 94 Joint Technical Command (Returned to IANA Mar 98)

050/8 May 94 Joint Technical Command (Returned to IANA Mar 98)

051/8 Aug 94 Department of Social Security of UK

052/8 Dec 91 E.I. duPont de Nemours and Co., Inc.

053/8 Oct 93 Cap Debis CCS

054/8 Mar 92 Merck and Co., Inc.

055/8 Apr 95 Boeing Computer Services

056/8 Jun 94 U.S. Postal Service

057/8 May 95 SITA

058/8 Sep 81 IANA - Reserved

059/8 Sep 81 IANA - Reserved

060/8 Sep 81 IANA - Reserved

061/8 Apr 97 APNIC (whois.apnic.net)

062/8 Apr 97 RIPE NCC (whois.ripe.net)

063/8 Apr 97 ARIN (whois.arin.net)

064/8 Jul 99 ARIN (whois.arin.net)

065/8 Jul 00 ARIN (whois.arin.net)

066/8 Jul 00 ARIN (whois.arin.net)

067/8 May 01 ARIN (whois.arin.net)

068/8 Jun 01 ARIN (whois.arin.net)

069/8 Aug 02 ARIN (whois.arin.net)

070/8 Sep 81 IANA - Reserved

071/8	Sep 81	IANA - Reserved	
072/8	Sep 81	IANA - Reserved	
073/8	Sep 81	IANA - Reserved	
074/8	Sep 81	IANA - Reserved	
075/8	Sep 81	IANA - Reserved	
076/8	Sep 81	IANA - Reserved	
077/8	Sep 81	IANA - Reserved	
078/8	Sep 81	IANA - Reserved	
079/8	Sep 81	IANA - Reserved	
080/8	Apr 01	RIPE NCC	(whois.ripe.net)
081/8	Apr 01	RIPE NCC	(whois.ripe.net)
082/8	Nov 02	RIPE NCC	(whois.ripe.net)
083/8	Sep 81	IANA - Reserved	
084/8	Sep 81	IANA - Reserved	
085/8	Sep 81	IANA - Reserved	
086/8	Sep 81	IANA - Reserved	
087/8	Sep 81	IANA - Reserved	
088/8	Sep 81	IANA - Reserved	
089/8	Sep 81	IANA - Reserved	
090/8	Sep 81	IANA - Reserved	
091/8	Sep 81	IANA - Reserved	
092/8	Sep 81	IANA - Reserved	
093/8	Sep 81	IANA - Reserved	
094/8	Sep 81	IANA - Reserved	
095/8	Sep 81	IANA - Reserved	
096/8	Sep 81	IANA - Reserved	
097/8	Sep 81	IANA - Reserved	

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121/8 Sep 81 IANA - Reserved
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123/8 Sep 81 IANA - Reserved
124/8 Sep 81 IANA - Reserved

125/8	Sep 81	IANA - Reserved	
126/8	Sep 81	IANA - Reserved	
127/8	Sep 81	IANA - Reserved	See [RFC3330]
128/8	May 93	Various Registries	
129/8	May 93	Various Registries	
130/8	May 93	Various Registries	
131/8	May 93	Various Registries	
132/8	May 93	Various Registries	
133/8	May 93	Various Registries	
134/8	May 93	Various Registries	
135/8	May 93	Various Registries	
136/8	May 93	Various Registries	
137/8	May 93	Various Registries	
138/8	May 93	Various Registries	
139/8	May 93	Various Registries	
140/8	May 93	Various Registries	
141/8	May 93	Various Registries	
142/8	May 93	Various Registries	
143/8	May 93	Various Registries	
144/8	May 93	Various Registries	
145/8	May 93	Various Registries	
146/8	May 93	Various Registries	
147/8	May 93	Various Registries	
148/8	May 93	Various Registries	
149/8	May 93	Various Registries	
150/8	May 93	Various Registries	
151/8	May 93	Various Registries	

152/8 May 93 Various Registries
153/8 May 93 Various Registries
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174/8 May 93 Various Registries
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178/8 May 93 Various Registries

179/8	May 93	Various Registries	
180/8	May 93	Various Registries	
181/8	May 93	Various Registries	
182/8	May 93	Various Registries	
183/8	May 93	Various Registries	
184/8	May 93	Various Registries	
185/8	May 93	Various Registries	
186/8	May 93	Various Registries	
187/8	May 93	Various Registries	
188/8	May 93	Various Registries	
189/8	May 93	Various Registries	
190/8	May 93	Various Registries	
191/8	May 93	Various Registries	
192/8	May 93	Various Registries	
193/8	May 93	RIPE NCC	(whois.ripe.net)
194/8	May 93	RIPE NCC	(whois.ripe.net)
195/8	May 93	RIPE NCC	(whois.ripe.net)
196/8	May 93	Various Registries	
197/8	May 93	IANA - Reserved	
198/8	May 93	Various Registries	
199/8	May 93	ARIN	(whois.arin.net)
200/8	Nov 02	LACNIC	(whois.lacnic.net)
201/8	May 93	Reserved	(Central and South America)
202/8	May 93	APNIC	(whois.apnic.net)
203/8	May 93	APNIC	(whois.apnic.net)
204/8	Mar 94	ARIN	(whois.arin.net)
205/8	Mar 94	ARIN	(whois.arin.net)

206/8	Apr 95	ARIN	(whois.arin.net)
207/8	Nov 95	ARIN	(whois.arin.net)
208/8	Apr 96	ARIN	(whois.arin.net)
209/8	Jun 96	ARIN	(whois.arin.net)
210/8	Jun 96	APNIC	(whois.apnic.net)
211/8	Jun 96	APNIC	(whois.apnic.net)
212/8	Oct 97	RIPE NCC	(whois.ripe.net)
213/8	Mar 99	RIPE NCC	(whois.ripe.net)
214/8	Mar 98	US-DOD	
215/8	Mar 98	US-DOD	
216/8	Apr 98	ARIN	(whois.arin.net)
217/8	Jun 00	RIPE NCC	(whois.ripe.net)
218/8	Dec 00	APNIC	(whois.apnic.net)
219/8	Sep 01	APNIC	(whois.apnic.net)
220/8	Dec 01	APNIC	(whois.apnic.net)
221/8	Jul 02	APNIC	(whois.apnic.net)
222/8	Feb 03	APNIC	(whois.apnic.net)
223/8	Feb 03	APNIC	(whois.apnic.net)
224/8	Sep 81	IANA - Multicast	
225/8	Sep 81	IANA - Multicast	
226/8	Sep 81	IANA - Multicast	
227/8	Sep 81	IANA - Multicast	
228/8	Sep 81	IANA - Multicast	
229/8	Sep 81	IANA - Multicast	
230/8	Sep 81	IANA - Multicast	
231/8	Sep 81	IANA - Multicast	
232/8	Sep 81	IANA - Multicast	

233/8 Sep 81 IANA - Multicast
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255/8 Sep 81 IANA - Reserved

Reference

[RFC1466]

[RFC1918]

[RFC3330]

Annex 4

History of the Internet. ccTLDs in chronological order of top-level domain creation at the InterNIC.

Information on ccTLD creation extracted from the InterNIC whois database on 11 May 1999. The missing information "Record created" for .FI (Finland) has been recovered.

References:

<http://www.ccwhois.org/ccwhois/cctld/ccTLDs-by-date.html>

No	YYMMDD	Country or territory (InterNIC handle)
1	850215	United States of America top-level domain (US-DOM)
2	850724	United Kingdom of Great Britain top-level domain (UK-DOM)
3	851024	Israel (State of) top-level domain (IL-DOM)
4	860305	Australia top-level domain (AU-DOM)
5	860425	Netherlands top-level domain (NL-DOM)
6	860805	Japan top-level domain (JP-DOM)
7	860902	France top-level domain (FR-DOM)
8	860904	Sweden (Kingdom of) top-level domain (SE-DOM)
9	860929	Korea (Republic of) top-level domain (KR-DOM)
10	861105	Germany (Federal Republic of) top-level domain (DE-DOM)
11	861204	Finland top-level domain (FI-DOM)
12	870119	New Zealand top-level domain (NZ-DOM)
13	870317	Norway (Kingdom of) top-level domain (NO-DOM)
14	870514	Canada top-level domain (CA-DOM)
15	870520	Switzerland (Swiss Confederation) top-level domain (CH-DOM)
16	870608	Malaysia top level domain (MY-DOM)

17	870714	Denmark (Kingdom of) top-level domain (DK-DOM)
18	870923	Argentina (Argentine Republic) top-level domain (AR-DOM)
19	871118	Iceland (Republic of) top-level domain (IS-DOM)
20	871223	Italy top-level domain (IT-DOM)
21	880101	Chile (Republic of) top-level domain (CL-DOM)
22	880120	Austria (Republic of) top-level domain (AT-DOM)
23	880127	Ireland top-level domain (IE-DOM)
24	880414	Spain top-level domain (ES-DOM)
25	880630	Portugal (Portuguese Republic) top-level domain (PT-DOM)
26	880805	Belgium (Kingdom of) top-level domain (BE-DOM)
27	880907	Thailand (Kingdom of) top-level domain (TH-DOM)
28	881019	Singapore (Republic of) top-level domain (SG-DOM)
29	890201	Mexico (United Mexican States) top-level domain (MX-DOM)
30	890219	Greece (Hellenic Republic) top-level domain (GR-DOM)
31	890418	Brazil (Federative Republic of) top-level domain (BR-DOM)
32	890508	India (Republic of) top-level domain (IN-DOM)
33	890615	Yugoslavia (Federal Republic of) top-level domain (YU2-DOM)
34	890731	Taiwan top-level domain (TW-DOM)
35	890827	Puerto Rico top-level domain (PR-DOM)
36	891013	Nicaragua (Republic of) top-level domain (NI-DOM)
37	900103	Hong Kong (Hisiangkang, Xianggang) top-level domain (HK-DOM)
38	900615	Sri Lanka (Democratic Socialist Republic of) top-level domain (LK-DOM)
39	900730	Poland (Republic of) top-level domain (PL-DOM)
40	900910	Costa Rica (Republic of) top-level domain (CR-DOM)
41	900910	Uruguay (Eastern Republic of) top-level domain (UY-DOM)
42	900914	Philippines (Republic of the) top-level domain (PH-DOM)

43	900917	Turkey (Republic of) top-level domain (TR-DOM)
44	901107	Hungary (Republic of) top-level domain (HU-DOM)
45	901107	South Africa (Republic of) top-level domain (ZA-DOM)
46	901128	China (People's Republic of) top-level domain (CN-DOM)
47	901130	Egypt (Arab Republic of) top-level domain (EG-DOM)
48	910201	Ecuador (Republic of) top-level domain (EC-DOM)
49	910226	Bolivia (Republic of) top-level domain (BO-DOM)
50	910307	Venezuela (Republic of) top-level domain (VE-DOM)
51	910508	Namibia (Republic of) top-level domain (NA-DOM)
52	910517	Tunisia top-level domain (TN-DOM)
53	910825	Dominican Republic top-level domain (DO-DOM)
54	910903	Antigua and Barbuda top-level domain (AG-DOM1)
55	910903	Barbados top-level domain (BB-DOM)
56	910903	Bahamas (Commonwealth of the) top-level domain (BS-DOM)
57	910903	Belize top-level domain (BZ-DOM)
58	910903	Dominica (Commonwealth of) top-level domain (DM-DOM1)
59	910903	Saint Kitts & Nevis top-level domain (KN-DOM)
60	910903	Saint Lucia top-level domain (LC-DOM)
61	910903	Suriname top-level domain (SR-DOM1)
62	910903	Trinidad & Tobago (Republic of) top-level domain (TT-DOM)
63	910903	Saint Vincent & the Grenadines top-level domain (VC-DOM)
64	910909	Paraguay (Republic of) top-level domain (PY-DOM)
65	910924	Jamaica top-level domain (JM-DOM)
66	910926	Papua New Guinea top-level domain (PG-DOM)
67	911106	Zimbabwe (Republic of) top-level domain (ZW-DOM)
68	911125	Peru (Republic of) top-level domain (PE-DOM)

69	911224	Colombia (Republic of) top-level domain (CO1-DOM)
70	920226	Antarctica top-level domain (AQ-DOM)
71	920401	Slovenia top-level domain (SI1-DOM)
72	920421	Albania (Republic of) top-level domain (AL-DOM)
73	920603	Cuba (Republic of) top-level domain (CU-DOM)
74	920603	Estonia (Republic of) top-level domain (EE-DOM)
75	920603	Fiji (Republic of) top-level domain (FJ-DOM)
76	920603	Grenada (Republic of) top-level domain (GD1-DOM)
77	920603	Lithuania (Republic of) top-level domain (LT-DOM)
78	920603	Pakistan (Islamic Republic of) top-level domain (PK-DOM)
79	920814	Guatemala (Republic of) top-level domain (GT-DOM)
80	920904	Mozambique (People's Republic of) top-level domain (MZ-DOM)
81	920917	Macau top-level domain (MO-DOM)
82	921026	Kuwait (State of) top-level domain (KW-DOM)
83	921201	United Arab Emirates top-level domain (AE1-DOM)
84	921201	Ukraine top-level domain (UA1-DOM)
85	921202	Georgia (Republic of) top-level domain (GE1-DOM)
86	921202	Malta (Republic of) top-level domain (MT1-DOM)
87	930113	Czech Republic top-level domain (CZ-DOM)
88	930113	Lesotho (Kingdom of) top-level domain (LS1-DOM)
89	930226	Liechtenstein (Principality of) top-level domain (LI-DOM)
90	930226	Romania top-level domain (RO-DOM)
91	930227	Croatia / Hrvatska (Republic of) top-level domain (HR-DOM)
92	930227	Indonesia top-level domain (ID1-DOM)
93	930319	Botswana (Republic of) top-level domain (BW-DOM)
94	930319	Senegal (Republic of) top-level domain (SN-DOM)

95	930329	Burkina Faso top-level domain (BF-DOM)
96	930329	Slovakia top-level domain (SK-DOM)
97	930331	Bermuda top-level domain (BM-DOM)
98	930416	Honduras (Republic of) top-level domain (HN-DOM)
99	930429	Kenya (Republic of) top-level domain (KE-DOM)
100	930429	Latvia (Republic of) top-level domain (LV-DOM)
101	930514	Faroe Islands top-level domain (FO-DOM)
102	930719	Swaziland (Kingdom of) top-level domain (SZ-DOM)
103	930825	Azerbaijan top-level domain (AZ-DOM)
104	930825	Lebanon (Lebanese Republic) top-level domain (LB-DOM)
105	930909	Netherlands Antilles top-level domain (AN2-DOM)
106	930923	Macedonia (The former Yugoslav Republic of) top-level domain (MK2-DOM)
107	930929	Mali (Republic of) top-level domain (ML2-DOM)
108	931013	New Caledonia (Nouvelle Calédonie) top-level domain (NC2-DOM)
109	931126	Morocco (Kingdom of) top-level domain (MA2-DOM)
110	940103	Algeria (People's Democratic Republic of) top-level domain (DZ-DOM)
111	940201	Bahrain (State of) top-level domain (BH-DOM)
112	940324	Moldova (Republic of) top-level domain (MD3-DOM)
113	940325	Zambia (Republic of) top-level domain (ZM-DOM)
114	940406	Iran (Islamic Republic of) top-level domain (IR2-DOM)
115	940407	Russia (Russian Federation) top-level domain (RU-DOM)
116	940408	Greenland top-level domain (GL2-DOM)
117	940414	Vietnam (Socialist Republic of) top-level domain (VN-DOM)
118	940415	Guam top-level domain (GU-DOM)
119	940419	Solomon Islands top-level domain (SB2-DOM)

120	940510	Belarus top-level domain (BY-DOM)
121	940517	Saudi Arabia (Kingdom of) top-level domain (SA3-DOM)
122	940525	Panama (Republic of) top-level domain (PA3-DOM)
123	940603	Brunei top-level domain (BN3-DOM)
124	940726	Cyprus (Republic of) top-level domain (CY-DOM)
125	940809	Guinea (Republic of) top-level domain (GN2-DOM)
126	940826	Armenia top-level domain (AM2-DOM)
127	940913	Guyana Top-level Domain top-level domain (GY-DOM)
128	940919	Kazakhstan Top-level Domain top-level domain (KZ-DOM)
129	941104	El Salvador top-level domain (SV2-DOM)
130	941123	Jordan (The Hashemite Kingdom of) top-level domain (JO2-DOM)
131	941212	Gabon (Republic of) top-level domain (GA3-DOM)
132	950103	Bulgaria top level domain (BG-DOM)
133	950119	Ghana top-level domain (GH2-DOM)
134	950120	Monaco (Principality of) top-level domain (MC6-DOM)
135	950125	Nepal top-level domain (NP3-DOM)
136	950127	Luxembourg (Grand Duchy of) top-level domain (LU1-DOM)
137	950214	Cote d'Ivoire (Republic of) top-level domain (CI3-DOM)
138	950216	Anguilla top-level domain (AI3-DOM)
139	950302	Mongolia top-level domain (MN3-DOM)
140	950308	Uganda (Republic of) top-level domain (UG-DOM)
141	950315	Nigeria top-level domain (NG2-DOM)
142	950410	Vanuatu top-level domain (VU-DOM)
143	950419	Micronesia (Federated States of) top-level domain (FM2-DOM)
144	950419	Kiribati top-level domain (KI2-DOM)
145	950429	Cameroon top-level domain (CM2-DOM)

146	950429	Uzbekistan top-level domain (UZ-DOM)
147	950503	Cayman Islands top-level domain (KY-DOM)
148	950712	Kyrgyzstan (Republic of) top-level domain (KG2-DOM)
149	950714	Tanzania (United Republic of) top-level domain (TZ2-DOM)
150	950714	Samoa top-level domain (WS3-DOM)
151	950725	Madagascar top-level domain (MG2-DOM)
152	950808	Cook Islands top-level domain (CK3-DOM)
153	950816	San Marino (Republic of) top-level domain (SM4-DOM)
154	950831	Virgin Islands (US) top-level domain (VI4-DOM)
155	950911	Vatican City State top-level domain (VA4-DOM)
156	951006	Mauritius top-level domain (MU3-DOM)
157	951015	Ethiopia (Democratic Federal Republic of) top-level domain (ET3-DOM)
158	951115	Angola (Republic of) top-level domain (AO4-DOM)
159	951205	Gibraltar top-level domain (GI3-DOM)
160	951218	Tonga top-level domain (TO5-DOM)
161	960109	Andorra top-level domain (AD7-DOM)
162	960118	Benin (Republic of) top-level domain (BJ3-DOM)
163	960220	Aruba top-level domain (AW4-DOM)
164	960220	Cambodia top-level domain (KH2-DOM)
165	960220	Syria (Syrian Arab Republic) top-level domain (SY2-DOM)
166	960318	Norfolk Island top-level domain (NF3-DOM)
167	960318	Tuvalu top-level domain (TV17-DOM)
168	960319	French Polynesia top-level domain (PF4-DOM)
169	960411	Oman (Sultanate of) top-level domain (OM6-DOM)
170	960424	Central African Republic top-level domain (CF4-DOM)
171	960424	Mauritania top level domain (MR3-DOM)

172	960424	Niger top-level domain (NE5-DOM)
173	960514	Lao People's Democratic Republic top-level domain (LA7-DOM)
174	960522	Djibouti top-level domain (DJ2-DOM)
175	960612	Qatar top-level domain (QA3-DOM)
176	960725	French Guiana top-level domain (GF3-DOM)
177	960807	Guernsey (Channel Islands, Bailiwick of) top-level domain (GG3-DOM)
178	960808	Jersey (Channel Islands, Bailiwick of) top-level domain (JE2-DOM)
179	960814	Bosnia-Herzegovina top-level domain (BA6-DOM)
180	960816	Marshall Islands (Republic of the) top-level domain (MH3-DOM)
181	960819	Yemen top-level domain (YE2-DOM)
182	960905	Togo (Republic of) top-level domain (TG5-DOM)
183	960911	Isle of Man top-level domain (IM6-DOM)
184	960924	Eritrea top-level domain (ER4-DOM)
185	960925	Maldives (Republic of) top-level domain (MV4-DOM)
186	960926	Zaire (Republic of) top-level domain (ZR2-DOM)
187	961021	Burundi (Republic of) top-level domain (BI4-DOM)
188	961021	Cape Verde top-level domain (CV8-DOM)
189	961021	Guadaloupe top-level domain (GP4-DOM)
190	961021	Rwanda (Republic of) top-level domain (RW6-DOM)
191	961022	Northern Mariana Islands top-level domain (MP7-DOM)
192	970103	Malawi top-level domain (MW5-DOM)
193	970114	Congo (Republic of) top-level domain (CG6-DOM)
194	970127	Turks and Caicos Islands top-level domain (TC13-DOM)
195	970204	Guinea-Bissau top-level domain (GW8-DOM)
196	970204	Myanmar top-level domain (MM12-DOM)
197	970220	Virgin Islands (British) top-level domain (VG4-DOM)

198	970306	Haiti top-level domain (HT6-DOM)
199	970306	Montserrat top-level domain (MS13-DOM)
200	970306	Sudan top-level domain (SD18-DOM)
201	970326	Falkland Islands top-level domain (FK3-DOM)
202	970328	Gambia top-level domain (GM6-DOM)
203	970328	Martinique top-level domain (MQ5-DOM)
204	970407	French Reunion Island top-level domain (RE12-DOM)
205	970409	Liberia top-level domain (LR6-DOM)
206	970423	Libya top-level domain (LY4-DOM)
207	970424	Christmas Island top-level domain (CX11-DOM)
208	970509	Iraq top-level domain (IQ11-DOM)
209	970509	Seychelles top-level domain (SC24-DOM)
210	970509	Sierra Leone top-level domain (SL7-DOM)
211	970509	East Timor top-level domain (TP5-DOM)
212	970530	Turkmenistan top-level domain (TM9-DOM)
213	970612	American Samoa top-level domain (AS17-DOM)
214	970612	Palau top-level domain (PW8-DOM)
215	970620	Niue top-level domain (NU9-DOM)
216	970710	Equatorial Guinea top-level domain (GQ5-DOM)
217	970710	Pitcairn Island top-level domain (PN5-DOM)
218	970716	Bhutan top-level domain (BT8-DOM)
219	970724	Heard and McDonald Islands top-level domain (HM9-DOM)
220	970731	South Georgia and the South Sandwich Islands top-level domain (GS13-DOM)
221	970820	Congo (The Democratic Republic of the) top-level domain (CD27-DOM)
222	970820	Saint-Pierre and Miquelon top-level domain (PM11-DOM)

223	970821	Bouvet Island top-level domain (BV4-DOM)
224	970821	Svalbard and Jan Mayen Islands top-level domain (SJ5-DOM)
225	970826	French Southern Territories top-level domain (TF13-DOM)
226	970828	Somalia top-level domain (SO10-DOM)
227	970916	British Indian Ocean Territory top-level domain (IO5-DOM)
228	970923	St. Helena top-level domain (SH9-DOM)
229	971013	Cocos (Keeling) Islands top-level domain (CC24-DOM)
230	971016	Afghanistan top-level domain (AF12-DOM)
231	971103	Chad Republic top-level domain (TD9-DOM)
232	971107	Sao Tome and Principe top-level domain (ST20-DOM)
233	971107	Tokelau Islands top-level domain (TK11-DOM)
234	971114	Wallis and Futuna Islands top-level domain (WF7-DOM)
235	971117	Mayotte top-level domain (YT6-DOM)
236	971204	US Minor Outlying Islands top-level domain (UM8-DOM)
237	971211	Tajikistan top-level domain (TJ19-DOM)
238	971219	Ascension Island top-level domain (AC24-DOM)
239	980330	Nauru Island top-level domain (NR8-DOM)
240	980608	Comoros top-level domain (KM15-DOM)
241	990520	Bangladesh top-level domain (BD22-DOM)
242	000322	Palestinian Territory top-level domain

ISO3166-1 country codes are related to countries and territories, the status of country or territory may change over time

The RIPE NCC is trying to keep track of changes of country codes in ISO 3166/MA tables, at <ftp://ftp.ripe.net/iso3166-countrycodes.txt> .

Annex 5



Register of Members

Organisation

TLD(s)

Representative

AFNIC

France (.fr & 4 others)

Olivier Guillard

ARNES

Slovenia (.si)

Marko Bonac

CARNet

Croatia (.hr)

Sonja Priscan

CHIP

Hungary (.hu)

Balazs Martos

CIRA

Canada (.ca)

Maureen Cubberley

CZ.NIC

Czech Republic (.cz)

Petr Kral

DENIC

Germany (.de)

Sabine Dolderer

Digital Systems

Bulgaria (.bg)

Dragomir Slavov

DK Hostmaster

Denmark (.dk)

Per Kølle

DNS Belgium

Belgium (.be)

Marc Van Wesemael

FCCN

Portugal (.pt)

Pedro Veiga

FICORA

Finland (.fi)

Merja Saari

GR-Hostmaster

Greece (.gr)

Vaggelis Segredakis

IEDR

Ireland (.ie)

Michael Fagan

IPM

Iran (.ir)

Siavash Shahshahani

Island Networks

Guernsey (.gg)

Nigel Roberts

ISOC.AM

Armenia (.am)

Igor Mkrtumyan

ISOC-IL

Israel (.il)

Doron Shikmoni

IT-NIC

Italy (.it)

Stefano Trumpy

LITNET NOC

Lithuania (.lt)

Daiva Tamulioniene

MoldData

Moldova (.md)

Pavel Chirev

NASK

Poland (.pl)

Maciej Kozlowski

NIC Malta

Malta (.mt)

Victor Nezval

NIC.AC

Ascension Island (.ac)

Paul Kane

NIC.AT

Austria (.at)

Richard Wein

Nominet UK

United Kingdom (.uk)

William Black

NORID

Norway (.no, .bv & .sj)

Alf Hansen

Palestinian Registry

Palestine (.ps)

Ghassan Qadah

RED.ES

Spain (.es)

Alberto Rodriguez Raposo

RESTENA DNS-LU

Luxembourg (.lu)

Gilles Massen

RNC

Romania (.ro)

Eugenie Staicut

RosNIIROS

Russia (.ru)

Alexei Platonov

SIDN

Netherlands (.nl)

Bart Boswinkel

IIS

Sweden (.se)

Anders Janson

STA

Andorra (.ad)

Joan Marc Lauga i Courtil

SWITCH

Switzerland (.ch & .li)

Marcel Schneider

UCY-DNS

Cyprus (.cy)

Agathoclis Stylianou

ASSOCIATE MEMBERS

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.info

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JPRS

Japan (.jp)

Hiro Hotta

NeuStar

.us

Jennie-Marie Idler

VeriSign

.com, .org & .net

Bart McKay

OBSERVERS

European Commission

N/A

Christopher Wilkinson

ICANN ccTLD Liaison

N/A

Herbert Vitzthum

RIPE Chair

N/A

Rob Blokzijl

Annex 6

IANA Report on Redelegation of .pn

IANA Report

Subject: Request of the Pitcairn Island Council for Redelegation of .pn Top-Level Domain

Date: February 11, 2000

The Internet Assigned Numbers Authority (the IANA), as part of the administrative functions associated with management of the domain-name system root, is responsible for receiving requests for delegation and redelegation of top-level domains, investigating the circumstances pertinent to those requests, and reporting on the requests. In September 1997, the IANA received a request for redelegation of the .pn (Pitcairn Island) top-level domain. This report gives the findings and conclusions of the IANA on its investigation of that request.

Factual and Procedural Background

On July 10, 1997, the IANA approved a request for initial delegation of the top-level domain .pn. At that time and today, that two-letter code was and is set forth on the ISO 3166-1 maintained by the ISO 3166 Maintenance Agency (ISO 3166/MA) <<http://www.din.de/gremien/nas/nabd/iso3166ma/index.html>> as the approved Alpha-2 code for Pitcairn Island.

Pitcairn Island is an overseas territory of the United Kingdom. (The territory is formally known as Pitcairn, Henderson, Ducie, and Oeno Islands, due to the inclusion of some outlying islets.) The territory, located in the South Pacific at 25° 04' S, 130° 06' W, has a total population consisting of approximately 50 descendants of the Bounty mutineers and their Tahitian wives. Local government of Pitcairn Island consists of an Island Council elected mostly by the inhabitants of the island (with a few appointed members) and an elected Island Magistrate and Chairman of the Island Council. The UK Government appoints a Governor of the territory and a Commissioner responsible for liaison between the Governor and the Island Council.

Pitcairn Island's telephone service consists of a local party-line telephone system. International telephone service is limited to Inmarsat service within a daily window. The local system is not presently capable of transmitting e-mail. The island has no

airstrip. The economy consists of subsistence farming, fishing, and handicrafts made for sale to passing ships.

The original delegation of the .pn top-level domain was made in the name of Tom Christian as administrative contact and Nigel Roberts as technical contact. The listed organization was Pitcairn Names (Orichalk Ltd). Mr Christian (the great-great-grandson of Fletcher Christian) is resident on Pitcairn. Mr Roberts is a private computer consultant with an address in the Channel Islands and is associated with Orichalk Ltd. The .pn top-level domain has been used predominantly for registration of domain names to entities not affiliated with the territory, in exchange for a fee collected by Orichalk.

Shortly after the initial delegation was made, on September 8, 1997 Leon Salt, Commissioner for Pitcairn Island, wrote to the IANA stating that:

The Government of Pitcairn Island has concluded, after due process of examination and consultation, that the persons who have assumed the management of the PN top-level domain, currently registered at IANA, do not adequately serve the interests of [sic] the country and community of Pitcairn Island.

The letter requested revocation of the delegation to Messrs Christian and Roberts and a redelegation to the Office of the Governor of Pitcairn Island, with nameservice to be provided by a consultant in New Zealand.

On October 16, 1997, the IANA requested that Commissioner Salt contact Mr Roberts to discuss and seek to resolve the situation by agreement.

On October 24, 1997, the Pitcairn Island Council met on the island and requested the Commissioner, Leon Salt, who was then visiting, to seek transfer of the .pn top-level domain to the Pitcairn Island Administration (located in New Zealand). In a letter dated November 3, 1997, the Chairman of the Island Council and Chief Island Magistrate, Jay Warren, conveyed the sentiments of the Council to Commissioner Salt:

At our meeting held on the 24th of October 1997, the island council has requested me to convey to you that we would like the Pitcairn Island administration to obtain the domain name "pn" for exclusive use in reference to Pitcairn Island. The Island Council feels it is important to ensure the name "Pitcairn Island" and its abbreviated form "pn" should serve the interest of Pitcairn Island and the islanders rather than the interest of any individual or organisation not connected with the island.

Commissioner Salt forwarded this letter to the IANA and requested a redelegation of the .pn domain naming the Commissioner as administrative contact.

In an e-mail to the IANA dated November 18, 1997, Commissioner Salt stated that the original delegates were not providing any service for the community and noted plans, under the requested redelegation, to provide Internet access to the Island by implementing a functioning e-mail system.

By e-mail to the IANA, Mr Roberts expressed his objection, and conveyed Mr Christian's objection, to the redelegation. There ensued, at Mr Roberts' behest, a series of discussions in the UK Government, and Mr Roberts reported to the IANA in a November 23, 1997 e-mail that "the very highest level in London" was considering whether to recommend a course contrary to the request of the Pitcairn Island Council. A meeting was held on January 23, 1998 among Mr Roberts and various UK Government officials, but the UK Government continued to support the Pitcairn Island Council's request and no resolution was achieved.

On July 21, 1998, Baroness Simons, the UK Government Minister with responsibility for UK Overseas Territories, including Pitcairn Island, wrote to the IANA requesting redelegation consistent with the wishes of the Pitcairn Island Council. On July 28, 1998, Commissioner Salt reiterated the Pitcairn Island Administration's request for redelegation. On August 3, 1998, Mr Roberts sent the IANA another e-mail objecting to redelegation as requested by the Pitcairn Island Council. On August 14, 1998, Dr Postel (then Director of the IANA) wrote to Baroness Simons expressing concern that Mr Roberts had not cooperated with the transfer that had been requested and suggesting that she contact Mr Roberts to seek to achieve a cooperative resolution.

On September 8, 1998, Baroness Simons wrote to the IANA expressing regret over Mr Roberts' lack of cooperation and stating that the original delegation violated the guidelines of RFC 1591 in that the administrative contact (Mr Christian) did not have a direct link to the Internet. She also noted that the Island Council should have been consulted when the delegation was made.

On September 22, 1998, the IANA advised Mr Roberts of its belief that the redelegation would be appropriate. On September 23, 1998, Mr Roberts replied again, once again objecting. After receipt of this letter, the redelegation was delayed. No activity occurred at the IANA on this matter for some time, due to Dr. Postel's death on October 16, 1998, and the transition of responsibility for performing the

IANA function from the University of Southern California to the Internet Corporation for Assigned Names and Numbers.

On September 2, 1999, Commissioner Salt forwarded to the IANA a petition signed by Pitcairn residents requesting the redelegation:

We, the undersigned, being residents of Pitcairn Island, do hereby request and require that the management of our nation's Internet Top-Level Domain (.pn.) be reassigned forthwith to the Pitcairn Island Administration in Auckland, New Zealand, in accordance with the Island Council's instructions of 24th October 1997 and the letter from the Government of Pitcairn Island to IANA of September 1997.

In his accompanying e-mail, Commissioner Salt noted that the petition had been "signed by the entire resident adult population of Pitcairn Island (excluding other nationals), with the exception of two members of the community. Those two are Tom Christian, who is the present designated administrative contact, and his wife."

On September 3, 1999, Mr Roberts sent the IANA a message, once again objecting to the redelegation that had been requested by the Pitcairn Island Council and by the petition of the Pitcairn residents.

By a letter dated October 27, 1999, Tom Christian, the administrative contact for the .pn top-level domain, announced his support for the redelegation:

Following discussions with the resident community, Island Council, Information Technology advisers, and Government of the island, I now wish to change the delegation of the management of the tld as detailed below.

At this time, our island does not have the telecommunications infrastructure required for affordable Internet access for island residents. I am satisfied, however, that under the new tld management, we will have the best opportunity for the introduction of such infrastructure, bringing the benefits of the Internet to the whole community here.

* * *

Please make the change to the new management with immediate effect.

Mr Christian accompanied his letter with a modification template requesting redelegation as sought by the Island Council and the petition.

On December 1, 1999, Mr Roberts sent the IANA an e-mail that mentioned a possible compromise based on restructuring of the .pn domain. Mr Roberts also agreed to voluntarily suspend accepting registrations for the .pn domain.

On December 17, 1999, the IANA sent Mr Roberts an e-mail notifying him that the IANA was investigating the request for redelegation of the .pn top-level domain and summarizing the principal correspondence the IANA had received on the matter. Mr Roberts was invited to submit any additional comments he might have on the matter by December 31, 1999. The IANA's e-mail also suggested that Mr Roberts convey his compromise proposal directly to Commissioner Salt.

On December 27, 1999, Mr Roberts requested additional time to respond to the December 17 e-mail. On December 30, 1999, the IANA extended its invitation for responses until January 10, 2000, and indicated that no further delays should be expected. On January 4, 2000, Ron Collins, who is also affiliated with Orichalk, indicated that Mr Roberts would no longer be involved with the .pn top-level domain at Orichalk. Mr Collins also requested an additional extension of time (until January 31, 2000) to respond to the December 17 IANA e-mail. No substantive response has been received since then; instead, on January 31, 2000 Mr Collins requested yet another extension, for thirty more days.

On January 19, 2000, the Head of the Overseas Territories Department of the UK Foreign and Commonwealth Office wrote the IANA to advise that he had received a compromise proposal from Mr Collins, but that, after fully considering the proposal in good faith and with the interests of the Internet community in mind, the Pitcairn Island Administration (PIA) did not find the proposal acceptable. He also noted that "[t]he PIA and the UK Government are also agreed that the Pitcairn community, as the appropriate party, should be allowed to determine the management and administration of .pn."

Evaluation

This report is being provided under the contract for performance of the IANA function between the United States Government and the Internet Corporation for Assigned Names and Numbers. Under that contract, the IANA function that ICANN is responsible for performing includes:

- Administrative functions associated with root management. This function involves facilitation and coordination of the root zone of the domain name system. It includes . . . receiving delegation and redelegation requests, investigating the circumstances pertinent to those requests, and reporting on the requests. This function, however, does not include authorizing modifications, additions, or deletions to the root zone file

or associated information that constitute delegation or redelegation of top-level domains. The [IANA contract does] not alter root system responsibilities defined in Amendment 11 of the Cooperative Agreement.

An important component of Internet stability is adherence to past practices in delegation and redelegation matters. Those practices are summarized in "Internet Domain Name System Structure and Delegation" (ICP-1), which was issued in May 1999 to reflect "the current policies being followed by the Internet Assigned Numbers Authority (IANA) in administering delegations of Top Level Domain Names of the Internet Domain Names System (DNS)." ICP-1 represents an update of the portions of RFC 1591 (which was issued in March 1994) dealing with ccTLDs, to reflect evolution of the policies followed by the IANA through May 1999. Although there is ongoing consideration within the ICANN process of proposals for changes in policies concerning ccTLDs, no significant policies have yet been adopted that are at variance with ICP-1.

A fundamental principle reflected in ICP-1 is that ccTLDs are intended to be operated for the benefit of the Internet community in the nation or other territory with which the country-code is associated. As Dr Postel wrote in RFC 1591 (and as repeated in ICP-1):

The designated manager is the trustee of the TLD for both the nation, in the case of ccTLDs, and the global Internet community. Concerns about "rights" and "ownership" of domains are inappropriate. It is appropriate, however, to be concerned about "responsibilities" and "service" to the community.

Thus, in matters of delegation and redelegation of a ccTLD, the IANA seeks input from persons concerned or affected by the transfer, particularly those within the nation or territory which the ccTLD has been established to benefit. As Dr Postel observed in ccTLD News Memo #1 and as reiterated in ICP-1, the views of the government of the affected nation or territory are taken very seriously in this regard. Governmental views are particularly pertinent when the government is fulfilling its role of promoting management of the ccTLD in the public interest.

ccTLDs have been established to facilitate and promote the dispersion of the Internet globally. They allow the designated manager to adapt operations of the ccTLD to best meet the economic, cultural, and linguistic circumstances of the nation or territory involved.

In the case of a remote or developing nation or territory that has not yet attained affordable Internet access, such as Pitcairn Island, "proxy" DNS service outside of the nation or territory may be appropriate "as a temporary form of assistance to the creation of Internet connectivity in new areas." (ICP-1, section (a))

A key theme in the IANA's evaluation of redelegation matters is that the contending parties should seek to achieve a consensual solution to any disputes. As noted in ICP-1:

On a few occasions, the parties involved in proposed delegations or transfers have not been able to reach an agreement and the IANA has been required to resolve the matter. This is usually a long drawn out process, leaving at least one party unhappy, so it is far better when the parties can reach an agreement among themselves. [ICP-1, section (e)]

In this matter, for over two years the contending parties have discussed possible resolutions, but no consensual solution has been achieved. It is apparent that this is one of those circumstances in which non-consensual resolution is necessary.

Section (f) of ICP-1 discusses how redelegation requests are to be handled:

(f) Revocation of TLD Delegation. In cases where there is misconduct, or violation of the policies set forth in this document and RFC 1591, or persistent, recurring problems with the proper operation of a domain, the IANA reserves the right to revoke and to redelegate a Top Level Domain to another manager.

Several factors appear to make the present case particularly appropriate for redelegation:

1. All residents of Pitcairn Island, other than the administrative contact and his wife, have signed a petition requesting redelegation.
2. The administrative contact, Tom Christian, has separately endorsed and requested the redelegation.
3. The Pitcairn Island Council, which is the duly constituted local government, has formally requested the redelegation on behalf of the residents of the island.
4. The UK Government, which administers the territory's affairs, has given its support to the request of the Pitcairn residents and their local government.

5. The existing delegation, which has been in place for over two years, has not resulted in the introduction of reliable Internet connectivity on Pitcairn or in any other benefit to the relevant community.

6. The proposed new contacts (technical and administrative) have the technical qualifications to operate the ccTLD, have recognised their duty to operate the ccTLD for the benefit of the relevant community, and have put forward plans that would advance both the development of the Internet on Pitcairn and the interests of the Pitcairn community. These plans include (a) implementation of reliable e-mail connectivity on the island; (b) establishment of an official website at a .pn address to provide information to prospective tourists, and (c) creation of a .gov.pn subdomain to support the activities of the Pitcairn Island Administration. The operation of the .pn domain by nonresident commercial interests in this case appears to have thwarted these plans and is interfering with introduction of the Internet to the Pitcairn Island community.

Conclusion

It is the IANA's conclusion that the .pn top-level domain should be redelegated as requested by the Pitcairn Island Council and the petition of Pitcairn residents.

Comments concerning the layout, construction and functionality of this site should be sent to webmaster@icann.org.

Page Updated 11-February-00

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Annex 7

CENTR view on IANA

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Introduction

In its Response to the February 2002 proposal for ICANN Reform the Council of European National Top Level Domain Registries (CENTR) underlined the technical dependence of all ccTLD Managers on the supply of IANA / ccTLD database services. These services are currently supplied to ccTLD Managers by the IANA function, within ICANN's Marina del Rey operation.

The ccTLD Managers' further dependence upon the stable and secure operation of the global Root Name Servers has sometimes commanded greater attention than the equally critical maintenance of a database of ccTLD Managers and associated information. Such information includes addresses, telephone, email and other technical information, such as name server information for the ccTLD zone and registry web site addresses. The database schema, containing the records for each ccTLD Manager, to a large extent predates the establishment of ICANN. The database is generally referred to as 'the IANA database'.

To assist in the smooth, secure and stable management of the IANA database (including the goal of ensuring implementation of changes to the database 'in a timely manner') CENTR established a working group to formulate procedures that have proven to be successful, for possible implementation globally. The working group addressed issues such as changes to contact information, changes to name server information, and the more complex issues raised by a change in ccTLD Manager.

The working group's conclusions have now been reviewed and approved by CENTR's General Assembly and are set out in the recommendations in this paper.

Future Delivery of IANA ccTLD Services

The IANA function as it is carried out today by ICANN, under contract with the United States Government, deals with three issues:

Domain name services

IP address services

Protocol number assignment services

For ccTLD Managers, the essential and relevant service is the maintenance of the IANA database.

This database contains the administrative and technical information about each ccTLD. Part of this information is publicly available in the whois of the database, which can be viewed at www.iana.org/cctld/cctld-whois.htm and is made available through the port 43 Whois service at .

Ref: www.ccwhois.org/ccwhois/iana/20020819.IANA-DB-scoop-remarks.html

CENTR makes no recommendation at present, in this paper about the organisation best placed to deliver the IANA ccTLD Services.

Compilation of the IANA Database

The IANA ccTLD database currently contains several sets of data:

information about the ccTLD Manager's identity (most often this is an organisation or other legal person, though occasionally it is a natural person);

host names and addresses for the ccTLD's name server;

postal, telephonic and electronic addresses of the ccTLD Manager;

information regarding natural persons who are listed as administrative and technical contact persons for the ccTLD.

As the IANA ccTLD services are currently operated, all parties named in the IANA database have to give their consent to all changes, including routine technical changes, such as changes to name servers.

Recommendation 1 IANA Database Schema

CENTR believe that the opportunity should be taken, in future contracts between the US Government and the provider of the IANA ccTLD services, to define a more suitable database schema to contain the records of each participating ccTLD. It is suggested that, as a minimum, the database records.

the legal entity which is the manager of the ccTLD;

correct and up-to-date electronic, telephone and postal contact details for this manager;

contact details for the appropriate individuals who deal with administrative, technical and other matters for the ccTLD Manager;

a mechanism by which requests from the ccTLD Manager are validated by the database manager (and vice-versa) to avoid “spoofing”;

the list of authoritative name servers for the ccTLD;

The home page URL of the registry responsible for the ccTLD.

at the ccTLD Manager’s option, the address(es) where authoritative WHOIS information relating to a specific registered domain name may be obtained.

The legal entity, recorded by the provider of the IANA ccTLD services as the manager of the ccTLD should, in future be the source of all the information that is entered in the IANA database. The provider of IANA ccTLD services will need to satisfy itself that information it receives is authentic information supplied by the ccTLD Manager.

Recommendation 2 Identifying the ccTLD Manager through the Registration under the IANA Database Schema

CENTR believe that that one organisation only should be identified unambiguously in the IANA database, as the manager of each ccTLD.

The primary record in the IANA Database should be the full name of the legal entity which is registered as the ccTLD Manager. A new IANA Database schema should adopt a primary ‘Manager’ field, or sub-optimally a ‘Registrant’ field. The ccTLD Manager, is ‘the organisation in charge’ of the ccTLD Registry and it should clearly have overall responsibility for the ccTLD.

The ultimate authority for an organisation to manage a ccTLD Registry must continue to derive from the Local Internet Community, which comprises significantly interested parties in the country or territory which the two letter code refers to, including users, the Internet industry, government and other stakeholders. Such authority is not given by the organisation that supplies the ccTLD services, by the mere registration of the ccTLD Manager in the IANA database.

Recommendation 3 The ccTLD Manager should be a Legal Entity

Whilst recognising that historically a few ccTLD Managers have been 'natural persons' rather than 'legal persons', CENTR recommends that a ccTLD Manager (acting as Trustee for the local Internet community corresponding to the ccTLD Registry and for the global Internet community) should be a legal entity. If followed, this recommendation has the obvious merit, that problems created by the death of an individual who manages the ccTLD, without provision for his or her successor, are avoided.

In many cases the organisation that manages the ccTLD Registry will be established as a company or corporation. Of course there exist other legal entities that are recognised with legal personality under relevant local law, including foundations, and not for profit associations.

The legal entity that is chosen by the local Internet community to organise and manage the ccTLD Registry may be established in the country or territory that corresponds with the ISO 3166 two letter country code. This is not an absolute requirement.

Recommendation 4 Clarification of the Authority of the Administrative and Technical Contacts in the IANA Database

The practical result of recommendations 2 and 3 is that the Administrative and Technical Contacts recorded in the IANA database will be recognised in the future as the appropriate individuals who deal with administrative, technical and other matters on behalf of the the ccTLD Manager, yet subservient to the ccTLD Manager. Whether or not these contact people are employees of the ccTLD Manager, they act in accordance with the authority given to them by the ccTLD Manager and not by the local Internet community in the country or territory concerned.

The clarification of roles will assist resolve the current uncertainty of the IANA staff as to who is in charge in each ccTLD Registry, in ccTLD Registries where duties are divided between three different parties; the administrative and technical contacts and the organisation that in future will be identified in the IANA database as the ccTLD Manager.

Recommendation 5 Process for Changes to Entries in the IANA Database

CENTR recognises that all changes proposed by the administrative or technical contact on behalf of a ccTLD Manager, should be notified to the other contact by the staff that manage the ccTLD IANA services. This naturally includes the replacement of a technical or administrative contact.

Missing from the current practices of the IANA and managed by ICANN are a documented set of procedures to be followed by a ccTLD Manager when requiring a change to its database entry and a statement on the web of the service level that the CCTLD Manager is entitled to receive, in terms of timely action on proposed changes.

Changes requests to the IANA should be prioritised:

(1) Quick changes: (within 7 working days, if not sooner)

name server changes - check with ccTLD Manager or Registrant and Technical Contact;

URL changes - check with ccTLD Manager or Registrant and Administrative or Technical contact;

(2) Medium Changes – (within 30 days)

replacement of the Administrative Contact - check with the ccTLD Manager or Administrative Contact and the ccTLD Manager – the ccTLD Manager's position is binding;

Replacement of the Technical Contact - check with the ccTLD Manager and the Technical Contact – the ccTLD Manager's position is binding;

Update to any address information - check with the ccTLD Manager and either the Administrative or Technical contact;

as soon as all parties have made representations.

The organisation providing the IANA ccTLD services should only implement changes to the IANA database (e.g. change of the address of a technical contact person or a change in telephone number) following proper authentication. Once authentication is established in a timely manner, the change will be made directly.

CENTR recommend that in the case of a change of ccTLD Registry Manager needs to follow a separate, and yet to be determined process. It is not the function of IANA or ICANN to facilitate that role – see Recommendation 7.

Attached to this paper as an Appendix are model forms for ccTLD Managers requesting changes to the following records:

IP Numbers of the ccTLD Managers' name servers

The ccTLD Manager's URL on the Web.

Address changes for contacting the Administrative and Technical Contacts for the ccTLD Manager.

Recommendation 6 Authentication of Communications to the IANA

CENTR recommend that the operating procedures of the IANA should include specific guidance, modified from time to time as necessary, concerning the process by which the IANA authenticates messages

sent by the administrative and technical contacts for a ccTLD Manager and the ccTLD Manager itself.

The procedures must be published on the web and may include some or all of the following methods of communication:

Signed letter received through the post or by fax

PGP signed email

Key Exchange

Password Exchange

5. As 1 and 2 above but including telephone confirmation

CENTR recommend that each ccTLD Manager should notify the IANA of its preferred method of authentication.

Recommendation 7 Change of ccTLD Manager (Redelegation)

In the case of proposed changes of ccTLD Manager, CENTR recognise that a complex set of issues arise which are only now coming to the attention of the global Internet community, for consideration and detailed review. Governments and ccTLD Managers have started the process of identifying the issues and are looking to work together to design solutions that ensure the stability of the Internet.

CENTR believe that the term 'redelegation' causes more confusion than is necessary and that it should not in the future be used in the context of changes of ccTLD Manager recorded in the IANA Database.

To address the general issue of ccTLD manager changes and specifically the manner in which a contentious change is managed in the future, CENTR recommends that the ccTLD Managers and the Governmental Advisory Committee continue their work on the principles and procedures for change of ccTLD Manager.

Where a change of ccTLD manager is not contentious, the current ccTLD Manager and the new ccTLD Manager should jointly notify IANA of the intended change in the management of the ccTLD, and in such cases IANA should implement the requested change. Thus for the time being, no change to the name or legal entity of the ccTLD Manager should be made without the explicit written consent of the current manager and the replacement manager.

For further information see: [ccTLD requirements for the international coordination of the DNS](#)

Recommendation 8 Independent Audit

The IANA ccTLD function needs to be carried out by a body, which must have the complete trust of all parties concerned.

This body must not deal with any policy actions, because all policy questions, including the issue of change of ccTLD Registry Manager, need to be dealt with separately, perhaps on a local basis under local law.

The organisation supplying the cc IANA services must in the future institute and maintain a formal change control system in order to track and log changes to the IANA database, and the records that result must be easily accessible to ccTLD Managers and other interested parties, on the web.

The organisation and management of the organisation supplying IANA ccTLD services must incorporate some form of independent quality auditing and a complete audit-trail of all operations of the auditor, must be maintained.

A Note on Funding the IANA ccTLD Services

The funding issue of the body who carries out the IANA function is not controversial as this function is not expensive.

CENTR Members have indicated a strong commitment to stable funding of the IANA ccTLD function. However CENTR Members will not accept cross-subsidy of matters unrelated to the IANA ccTLD function through such contributions.

Conclusion

If the IANA function is carried out in an independent manner , modified to take account of the recommendations contained in this paper which ensure stability, the internal structure of the organisation responsible for undertaking the IANA contract remains of limited relevance to ccTLD managers.

It is anticipated that Best Practice for the management of ccTLDs will continue to be developed, (in consultation with the broader internet community and Governments), by the ccTLD community.

CENTR is determined to work in a positive and co-operative way with all relevant stakeholders to improve the quality of IANA ccTLD Services delivered and to continue to facilitate communication of the needs of ccTLD Managers globally.

APPENDIX

Based on the templates used since 1995 CENTR submits draft templates to facilitate the efficient management of the IANA function:

Change IP Numbers:

Authorization

- 0a. (N)ew (M)odify (D)elele.....:
- 0b. Auth Scheme.....:
- 0c. ccTLD Domain Name.....:

Host

- 1a. Host Name.....:
- 1b. IP Address.....:

Host

- 2a Host Name.....:
- 2b IP Address.....:

Contact

- 3a. (I)ndividual (R)ole.....:
- 3b Name.....:
- 3c Organization Name.....:
- 3d. Street Address.....:
- 3e City.....:
- 3f State.....:
- 3g Postal Code.....:
- 3h. Country Code.....:
- 3i. Phone Number.....:
- 3j. Fax Number.....:
- 3k. E-Mailbox.....:

URL Changes

Authorization

- 0a. (N)ew (M)odify (D)elele.....:
- 0b. Auth Scheme.....:
- 0c. ccTLD Domain Name.....:

URL Change

- 1a. WHOIS (optional) Port 80 .:
- 1b. WHOIS (optional) Port 43.....:
- 1c. Home Page URL.....:

Contact

- 2a. (I)ndividual (R)ole.....:
- 2b. Name.....:
- 2c. Organization Name.....:
- 2d Street Address.....:
- 2e City.....:
- 2f State.....:
- 2g Postal Code.....:
- 2h. Country Code.....:
- 2i Phone Number.....:
- 2j Fax Number.....:
- 2k. E-Mailbox.....:

Address Changes:

Not to be used to change the ccTLD Manager recorded in the IANA Database

ccTLD Address Changes

- 1. Purpose/Description.....:
- 2. Top-Level Domain Name.....:

Organization Using Domain Name

- 3a Street Address.....:
- 3b. City.....:
- 3c. State.....:
- 3d. Postal Code.....:
- 3e. Country Code (2 letter).....:
- 3f. Phone Number.....:
- 3g. Fax Number.....:
- 3h. Email Address.....:

Administrative Contact/Agent

- 4a (I)ndividual or (R)ole?.....:

- 4b. Name.....:
- 4c Organization Name.....:
- 4d. Street Address.....:
- 4f. City.....:
- 4f. State.....:
- 4g Postal Code.....:
- 4h Country Code (2 letter).....:
- 4i Phone Number.....:
- 4j. Fax Number.....:
- 4k. Email Address.....:

Technical Contact

- 5a (I)ndividual or (R)ole?.....:
- 5b. Name.....:
- 5c. Organization Name.....:
- 5d. Street Address.....:
- 5e. City.....:
- 5f. State.....:
- 5g Postal Code.....:
- 5h. Country Code (2 letter).....:
- 5i. Phone Number.....:
- 5j. Fax Number.....:
- 5k. Email Address.....:

Annex 8

ICANN/DNSO, comment of Director Amadeu Abril y Abril
DNSO Mailling lists archives

[council]

<<< Chronological Index >>> <<< Thread Index >>>

[council] On Board elections:some unsolicited advice

To: council@dnso.org

Subject: [council] On Board elections:some unsolicited advice

From: Amadeu Abril i Abril <Amadeu@nominalia.com>

Date: Thu, 20 Feb 2003 13:17:34 +0100

Sender: owner-council@dnso.org

User-Agent: Mozilla/5.0 (Macintosh; U; PPC Mac OS X; en-US; rv:1.3a)
Gecko/20021212

Dear GNSO Council Members,

I'm writing to you in relation to the upcoming ICANN Board elections

(ie, the selection by the Council of seats 13 & 14 of the "New Board").

In this regard I have a (probably irrelevant) communication and a some
(blatantly unsolicited) advise.

I've been asked by a Council member if I would "seek reelection" (as, it was said,
knowing this would help planning the electoral process). The answer is quite simple:
No, I will not be running for a new Board term.

But it took me some time to explain the reasons for this choice, and , also my advice
for the Council on how I think that these elections should be run

Here it is. I grouped the arguments, and summarized my advice at the end of the mail.

WHY I AM NOT RUNNING

Because I want the New Board to be a better Board than the old one. I do have a high personal opinion about most if not all the current and past Directors. But, like it or not, probably the clearest truth about ICANN is that the Board does not work as it should. There are many reasons for that, and none amounts to any “conspiracy” whatsoever, but this is the reality: the Board discusses too little, too often it’s done too late, most of the times on topics that have nothing to do with DNS or any other “core topic”, and relate instead to “structure” and “process”; at the end of the day, we approve whatever comes from the staff (where all of the “intellectual processes” take place, as we all know).

I do insist; there are a lot of reasons for this, and it is not the scope of today’s mail. But one, clearly, is inertia. No matter the qualities of the individuals of any organization, the said organisation is “more” than the mere sum of those individualities. Certain dynamics are created, and changing relates more to a drastic change of the membership (and especially, leadership) than changing its rules and procedures.

We have spent a lot of energy in this Reform. If we simply keep going with the same people at the same places, very few things will change. In Amsterdam, I publicly advised all ICANN “electoral bodies” to take seriously the reform and deeply renew the very composition of the Board. It would be therefore completely incoherent that I seek reelection by the GNSO at this time. Especially when we know from experience how huge the advantage of the “incumbents” is (The first elections were, errr, a model of what they should not be, but the three of us have been subsequently reelected, and not only because we were the best candidates ;-)

Let me insist on one point: I am not trying to say that the current

Directors are “bad”. Or that the current DNSO-selected Directors do not deserve being reappointed. I’m not even saying that about myself ;-) What I am pointing out is that besides the individual qualities of each one “renewing the Board composition” so as to let it have a fresh start, a fresh look at the situation. We have this unique change, coupled with a new CEO. and “gestures”, “symbols” are often more effective than Bylaw changes. Let’s not miss this chance.

WHAT I WOULD LIKE SEEING FROM THE COUNCIL

There are other considerations besides the clear need to reinvigorate the Board (and many other areas; but this is the “plat du jour”...). I really encourage the Council to take the election of the new Directors with a different approach.

The Council has been more deeply renewed than the Board. Only Ken and Tony Harris sit here from the very beginning. Add Philip and you have all of those who were here at the time of the first Board elections. But all of you know how those, and subsequent, elections, developed. Let’s agree that we could do better;-) Perhaps not in terms of selecting the names you sent to the Board (OK, at least tow out of the three ;-). But the DNSO cannot simply be very proud of those electoral processes...

There are some especific things that I would humbly request the Council to take into account for the upcoming elections:

- * The need to renew the Board as a goal in itself (already explained)
- * The need to provide more DNS focus to the Board. Let me explain this one.

ICANN is a strange place, where we seem to play the “musical chairs” game. Most people look like “sitting” in the place that would suit better someone else.... Think about the GAC, that for a long time had lots of members who had absolutely nothing to do with any Governmental body. Even the Chair, until very recently, was not a Government official. Similarly the DNSO has elected three directors which are not closely related with DNS issues as their day jobs. Once again, don’t think about the

individuals. Individually taken, you probably made the best choices. But the overall package, submerged in the whole Board is, how would I say it, not intensive enough in DNS issues.

Probably my only real frustration with ICANN is that there has been no way to get the Board's real attention to DNS issues. Just remember the way new TLDs were selected.. (the way, I insist, not necessarily the outcome). Remember the public discussions about IDN, deletions, grace periods, WLS, new registry agreements, transfers, Whols or any other topic in this area? Yes, they ranged from non-existing to scarily poor... There is within the Board too little real knowledge of the technical, business, and "social" implications of DNS issues. Worst even more than shat should be enough) there is very little interest. Take as you want, but the objective fact is that the record of the Board with these issues is not encouraging at all. And if ICANN exists is precisely to deal with these very issues (IP addresses, or ccTLDs are also important topics, indeed, but the reality is that they relation to ICANN competences is very different than with gTLDs).

Therefore I request you to seriously consider how the sum of the

Directors you elect can be read in this regard, what sort of "sign" do you want to send to the whole ICANN with your appointees. Frankly, if it is not the GNSO who brings a "plus" regarding DNS and especially gTLDs knowledge and, above all, INTEREST, what do you expect form the other selecting bodies?

* The need to be very careful wth both possible conflict of interests and personal ambition. Well, you know what I mean. Some of the past results can be explained by the fear that some candidates had a very loose sense of conflict of interest. If my general advise is that you gain DNS focus in the upcoming elections, then you will need to scrutinize closer than ever the personal attitudes f those individuals, their individual sense of independence and service. More than ever.

* The need to think at the Council level what sort of "message", what sort of Directors you want to send (beyond voting on the individual names). In the past, the real discussions have taken place at the Constituencies level. The Council, as such, has

just been the place for the vote. I urge you to think, as a college, not in substitution but in addition to the Constituencies, about what do you want form these elections, and, among other things, the points I am making in this post.

MAIN PROBLEM: NOW IS NOT THE TIME TO RUN THE ELECTIONS

If I am not mistaken you intend to run the elections in the old-fashioned way (with the famous “convention style” mechanism and all the rest!) starting just now. Sure, this is waht the Transition requires but.... let’s have a closer look.

Let’s imagine you run the elections. We have two new Directors, elected... for a very short time? Well, one for about one year, the other for a couple of years. Good.

But who is electing those Directors? In fact the “old” Council, with the old membership, and only paritally updated rules. Let me explain.

Before the end of “this” year each constituency has to renew/reaffirm the Council reps. Within months form now, therefore. This has to be done regardless of the fact that finally some constituencies see their reps reduce to two, as provided by the Bylaws, or that, for any reason, they keep three (but with decreased voting rights regarding registries and registrars). More importantly, the NomCom has to appoint three Council members (with voting rigths) and different other parties will elect non-voting liaisons. Then, we will have the “new” GNSO Council inist steady mode.

While the Council in its current form has the right to carry such elections, I submit that it would strongly increase the legitimacy of the GNSO and the Board if this is done by the “new” Council.

This is a process of re-legitimizing ICANN instances and, if you understand what i mean, it is better to reform the build the house from the basement, not from the roof: first we elect the NomCom, it sends its reps to the Council, and helps populating the ALAC that has also to appont a liaison... Then we re-legitimate the GNSO constituencies reps within the Council. This Council chooses the GNSO-selected Directors.

Frankly, it would be more elegant.

Let me clarify what i mean. Let's take a likely scenario. You run your elections and, say, you re-appoint Alex for a two-years term. And you appoint someone "new" for the one-year term. One year? No way. Let's be honest: past experiences clearly show that getting elected may depend on a miracle, but being reelected is even trivial. In our complex "political environment" the incumbent carries a HUGE advantage. So, most probably you would be selecting your share of the Board for the next coming four years, at least.

Shouldn't this be lest to the consideration of GNSO's "steady" Council? Wouldn't it be a sign of the "new attitude" that is as more important than the new Bylaws?

A related point: the way past elections were run, the realities of DNSO internal "politics" wre such that only a certain type of people, those with "political skills" but also having a really thick skin could really stand. Once again, the DNSO was lucky with the outcome (and i will not pretend to include any "modesty clause" here). But the way this has been carried out has prevented some "good" candidates from running. Shouldn't you give some thoughts, within the new Council, to different approaches to these elections, so as to widen the spectrum of suitable candidates?

Dont misunderstand me: the current Council has the right and the legitimation to carry the elections now and with the mechanism you want (provided that you sort out the point that you don't need a majority of 10 votes, as it is stated in the standing proposal, but rather 13, as six of the Council reps will have two votes

each). But in my modest views, and trying to learn from our history, I submit that you would provide a better service to ICANN if you would proceed from bottom to top and not the reverse, in appointing new officers/Directors, instead of tying the hands of future shapes of the Council that we don't know today how similar or different from the current one will be.

For sure, the GNSO cannot afford that once the NomCom elects its 8 directors and the Transition Board collapses (as the ASO has already re-appointed two of the current directors for the new terms and then there would be the required 10 "new" Directors) the Board remains with no GNSO-elected reps at all during some weeks/months. A stupid sign, yes.

But you can easily deal with that. Legally speaking, you cannot limit the terms of any Director to a different term than those established in the Bylaws. But you can easily get a commitment from, say, any two of the current Directors to keep on the Board (formally reelected by the GNSO Council) for some months until, say, the Annual Board meeting the year, at which time all the processes above should be long completed. Or any time prior to that meeting, say, as soon as NomCom and the Constituencies do their job regarding the Council and the Council itself feels fit to run the elections). A simple resignation from both Directors at such time would allow the process to run as it should. And you would get that commitment easily.

Indeed, you could elect somebody else to do that. But it would probably be less elegant to expect such behavior (be there for just a few months) from a new face....

Indeed, nothing would prevent that there, with the new Council and, hopefully, new procedures (if not necessarily new rules) say, Alex or Jonathan or anyone else declared that they would seek reelection. In any case, it is formally clear that I would not.

But it is above all a question of the old ICANN playing nice with the new one. It is a question of not trying to preclude the choices of the forms and institutions that will run ICANN from within very little.

MY ADVICE

In summary, my advice is that:

* The Council spends some time figuring out not just how many votes a successful candidate needs, but what sort of candidates, what sort of “message” is the GNSO as such sending to the new Board. The process is carried at Council level, not only at the constituency level (with the Council “just” voting).

* You keep three main goals in mind, besides the usual ones of honesty, energy, dedication etc....

- Renewing the Board, not only re-legitimizing it as a goal in itself
- Increased DNS-specific (technical and “market-wise”) skills added

to the Board

- Commitment to have the Board really working, and not just approving staff proposals

* You choose to build the house from the basement, not from the roof. This means that the Council won't run the “real” new elections (ie, you don't appoint those who will seat in the Board for the next years until the “New Council” has been “relegitimated”, emanating:

- The NomCom-appointed Council members are already in
- The Constituencies have elected/reaffirmed their Council reps
- The Council has figured out how the “new” voting mechanism (ie,

balanced voting among “contractual providers”/“users” works

* In the meanwhile, and in order to prevent the New Board leaving the GNSO without appointed Directors you do whatever is simpler from your perspective from these two options:

- You ask any two out of the three current Directors to stay with the clear understanding and commitment from both that it is only until the Annual Meeting 2004, or any such prior time as the conditions above (specially, the re-composition/re-affirmation of the Council) takes place.

- You appoint one/two new Directors, with the same conditions as above (if you find somebody willing to do so who commits not to re-run in the subsequent election, and is still "useful" for a six-month period time or so).

Thanks for your attention, and good luck whatever way you go!

Amadeu

Follow-Ups:

RE: [council] On Board elections:some unsolicited advice

From: "Jonathan Cohen" <jcohen@shapirocohen.com>

[<<< Chronological Index >>>](#) [<<< Thread Index >>>](#)

Annex 9

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Annex 10

Terms of Reference

Content of the Study

The Internet and its governance, especially ICANN itself, are undergoing radical and fast changes. As a consequence, the following list of topics will be amended according to upcoming requirements.

Part I: ICANN, statute, mission, functioning and decision making process

The objective of this part of the study will be to describe the “as is” situation of ICANN and its direct environment. This includes the topics mentioned in the title as well as membership structure or sometimes called “constituency” or stakeholder structure. Both, the official structure of ICANN current organisation as well as the stakeholders, i.e. the groups, individuals, industries, national authorities etc. which are directly and indirectly influenced by ICANN work will be described and analysed according to their impact to the current process and the results. The debate on reform of ICANN has started and the study will take the status of the current debate into account.

It is seen as key to describe and analyse

- Not only the official, published positions
- but also the perception, the view of the stakeholders on the processes, decision taking etc.
- and the perceived weaknesses
- and proposed ways of improvements

since this provides a basis for the synthesis.

Part II: The role of ICANN from a technical, economic, legal and international perspective

The main topics to be addressed in this section of the study are as follows:

II. 1. Economic and technical aspects

II.1.1. Internet infrastructure : (see CAIDA at the <http://mappa.mundi.net>)

Topology of the network.

- Technical as it is, few people try to understand and assess the connections between different backbones, access points where the ISPs are linked (e.g. LJNX the London exchange point), routers and root servers. A brief presentation of the system of backbones, and its relationship with the domain name system will be presented. A quick description of some of the attempts to map the Internet will be presented.

The economics of the network.

- Special attention will be focused on the economics of the backbone market, on the reasons for the existence of “peering” contracts and on the risk of monopolization of that market. The aim will be to understand the consequences for the future structure of the Internet and of its governance.

II.1.2. International dimension of Internet deployment:

- Growth of the users (both individual and professional)
- Broad evaluation of the relative importance of the different Internet communities around the world, (by registrations of domain names , by the traffic generated)
- Non-ASCII domain names and the consequences on the DNS. Who should be in charge?
- What is the economic impact?
- Emerging identity of large communities (e.g. EU)

II.1.3. IP norms and standards:

- Governance of IETF and IAB
- Connections with major IT players
- Implementation of Ipv6. How is this to impact the industries world-wide?
- Possible consequences, for example new platforms such as ENUM: who

should be in charge? How to exercise a power such as one-over-one to guarantee against deviances?

II.1.4. DNS Markets: (see <http://www.zooknic.com/>)

- TLDs and the financial case : new registrations and annual renewals
- Non-ASCII domain names, a new step?.
- New generic TLDs.
- Who should be in charge of regulating this worldwide market?
- New registrars and fair competition
- Evaluating the wealth

II.1.5. Future DNS:

- Names systems above DNS
- What is the game? Who can be the winners and the losers?
- Role of companies in a dominant position?
- What are the hidden cards?
- Search engines and directories, i.e. all reference tools

II.2. Legal and international aspects :

The objectives are three-fold:

- analyse the contractual relationship between ICANN and the US Agencies on the one hand, and ICANN and key stakeholders on the other hand,
- examine ICANN public policy functions, including the standardization function,
- assess ICANN practises in light of principles of existing international codes, (i.e. WIPO, ITU, etc.) and EC policies (Information society, Competition, Internal market).

II.2.1 ICANN relationships

- Analyse ICANN relationship with US Agencies (US DoC)
- Analyse the relationships between ICANN and the registries, between the registries and the registrars, including ICANN accreditation guidelines for registrars and between ICANN and other constituencies.
- Analyse ICANN funding structure
- Assess implementation of ICANN registration policy, including IPR protection (UDRP) and data protection.
- Analyse the relationship between ICANN and the country code TLDs, particularly with regard to the views of the Member (and potential Member) States.

II.2.2. Assessment of ICANN practices in light of international codes and EC policies

II.2.2.1 International Codes and Fora:

- **WIPO**

Assessment of WIPO contribution to ICANN resolution of domain names disputes, including WIPO proposals on outstanding issues (misleading registration of identifiers other than trademarks). Draw conclusions as far as ICANN competencies are concerned.

- **Protection of Domain names and TRIPS**

Analyse and assess the impact of TRIPS on domain names and on the enforcement of Intellectual Property Issues particularly with regard to trademarks and jurisdictional issues in the light of existing ICANN policies.

- **ITU**

Assessment of ICANN current standardization function in light of international practice, including ITU-experience in comparable areas.

- **Others (GATS, OECD, Global Business Dialogue, etc.)**

To the extent that the services provided by ICANN are currently not subjected to GATS disciplines, what would be the various negotiating options to do so?

11.2.2.2 EC policies:

- **Information society**

Analyse contribution to inter-operability of networks. Analyse respective competences of EC and Member States in respect of Internet governance.

- **Competition policy**

Consistency of the relationships between various players with EC competition policy: analysis of the market structure of the distinct relevant markets; access to these markets; competitive conditions on each one of these markets; effect on intra-community trade.

- **ETSI**

Assessment of ICANN current standardization function in light of European practice, including ETSI-experience in comparable areas.

- **Internal Market/Consumer protection, etc.**

Part III: Synthesis

The objective of this part of the study will draw conclusions from the findings of part I and II. The conclusions will be summarized in a set of recommendations. The addressee for these recommendations will primarily be the European Commission but may also be other entities taking part in the public private partnership of Internet Governance.

The recommendations will promote the following core values:

- The increase in wealth and the generation of value in Europe
- Fair competition
- Achieving the individual rights to free access to the Internet and the freedom of speech

The recommendations will cover a wide range of aspects:

- a very general and broad interpretation of governance and the philosophy of separation of powers (policy setting versus technical coordination)
- an analysis of European requirements

- how the European Internet community requirements can best be met
- how the European Internet community should best be involved in Internet governance
- additional research to support the above mentioned aspects