

White Paper



**The Post-.COM Internet:
A Five-Step Process for Top
Level Domain Additions**

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Executive Summary

The Post-COM Internet: A Five-Step Process for Top Level Domain Additions

Milton L. Mueller & Lee W. McKnight

This white paper describes a procedure the Internet Corporation for Assigned Names and Numbers (ICANN) can use to add 40 top-level domains to the Internet domain name system on an annual basis. The proposed process is predictable in timing and procedure, rule-driven, and economically efficient.

1. A two-week period for applicants to register their desired TLD strings. Thirty of the forty would be available to commercial applicants. Ten of the forty would be reserved for noncommercial and developing country applicants.
2. A 3-month period in which auctions would be held for the commercial applications (if there are more applicants than slots) and random selection processes used for the 10 noncommercial slots.
3. A 2-month period in which the winning names would be announced, and possibly, challenged on intellectual property or confusion grounds. We propose ICANN's uniform dispute resolution procedure be adapted to resolve future TLD disputes.
4. A short period for the winning TLD applicants to sign lightweight, standard-template ICANN registry contracts, similar to current registrar accreditation.
5. A 2-week period in which the new names are added to the root zone file.

A flow chart of the process is included at the end of the executive summary.

Adopting such a process is past due. While ICANN has had reason to focus on establishing its own structure, after 4 years of existence it has yet to define a method for managing TLD additions to the root. The root of the DNS is an important international resource. There is now and likely always will be demand for TLD additions.

The paper recognizes that it will take time to design and implement the procedures, and targets 2005 as the year for the first full implementation.

- For 2003, we advocate going ahead with a round of TLD additions as advocated by ICANN's CEO using the old, ad hoc discretionary method.
- In 2004, we advocate a special round of TLD additions using streamlined procedures to consider the 30+ left over applicants from the 2000 round of proposed additions.
- In 2005, the new procedures would go into effect.

The white paper identifies several sources of demand for new TLDs. One source of demand is developing countries that are not yet ready to apply but will be eventually as their Internet economies grow. As additional examples, the paper examines the case for 3 proposed TLDs: a <.mobi> domain for the mobile telecommunications services industry, a <.health> domain proposed by the World Health Organization, and a <.dns> domain with the capacity to solve many of the current naming problems associated with DNS by creating permanent and stable object identifiers.

The paper suggests that ICANN's role is not to second-guess the marketplace by choosing which of these TLDs are "good ideas" or most likely to succeed, but simply to coordinate TLD assignments. Consumers and suppliers interacting in the marketplace should determine which ones succeed.

The paper anticipates and attempts to answer many of the arguments that might be advanced against the proposed procedure:

- Trademarks and defensive registrations: we show that expansion of the name space would not impose undue burdens on trademark holders, because the value of domain names and the incentives for name speculation and cybersquatting would be undermined by expanding the name space through additional TLDs.
- Auctions: we answer various questions about how the auctions, which are intended to fairly allocate a resource and not enrich ICANN, and random selection procedures might work.
- Taxonomic name space: we argue that a demand-driven name space is more flexible and more attuned to what users want than a rigid classification scheme imposed from the top down.
- Separating names from registries: we put forward a number of reasons why the provision of registry service would not be helped and may be harmed by detaching responsibility for specific names from specific registry operators.

The paper analyzes the technical constraints on TLD additions and shows that the DNS protocol imposes only two significant limitations: the number of additions should be set at a low enough level to retain the hierarchical structure of the name space, and the rate of change in the root zone should not exceed the capacity of the root zone manager to accurately and reliably update and distribute the root zone file. In response to these constraints, we propose capping TLD additions at 40 per year. The specific number is admittedly arbitrary; in fact, any number between 30 and 80 would be acceptable according to many experts. However, for procedural simplicity and economic reasons we argue that it makes sense to fix the number at a known level. We also argue that root server load is not a serious factor limiting TLD additions.

Call for Applications

Auctions and Lotteries

IPR Challenge

Contracting

Entry into Root Zone

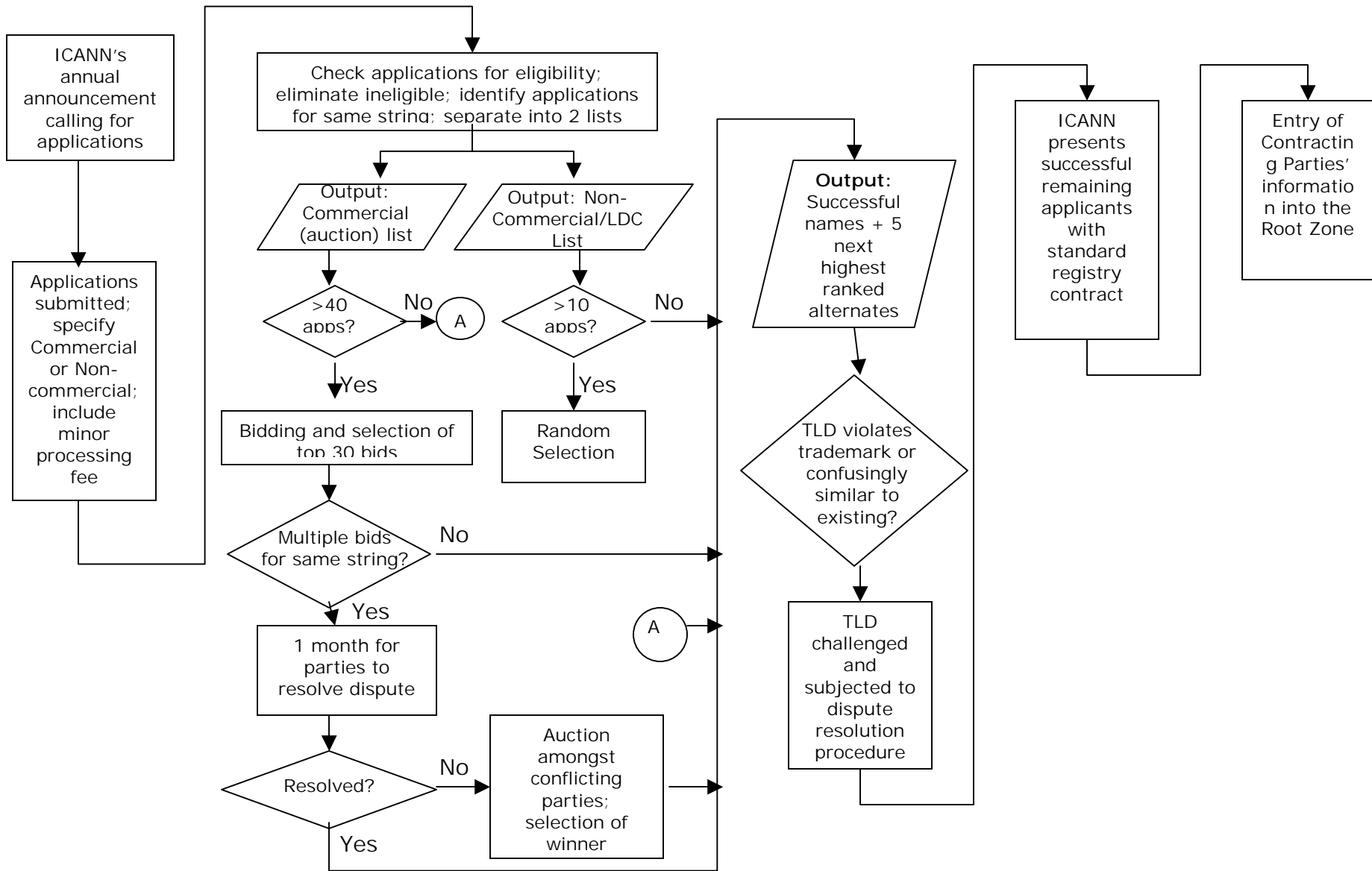
2 weeks

3 months

2 months

1 week

2 weeks



Critics charge that it is the De Beers of the Internet: an organization that, like the diamond cartel, has created an artificial scarcity to protect a few established players.

Simson Garfinkle, *Technology Review*, March 2003

1. Managing the Domain Name System (DNS) Name Space: Time for a new policy

ICANN – the Internet Corporation for Assigned Names and Numbers - was created to manage the root of the Internet’s global domain name system (DNS). As the quotation above suggests, ICANN suffers from an image problem in spite of the arcane nature of its tasks and functions. One of the most important aspects of that function is to make policy decisions about how top-level domain names (TLDs) are added. Before a top-level domain name registry such as .com or .info can function, it must be entered into the root of the DNS. ICANN is the gatekeeper of the commonly accepted DNS root. It has the authority to decide what names are added to it, what pace they can be added at, what criteria will be used to determine who gets the available name assignments, and who gets to operate the registries. Policy conflict over adding new TLDs is one of the issues that led to the creation of ICANN in the first place.¹

ICANN’s decisions about TLDs have an *economic* as well as a technical dimension. By controlling the addition of top-level domains, ICANN controls the supply of a valued resource (domain names) as well as the degree of differentiation in the market (which names exist). Adding TLDs also determines how much competition there is in the market for domain name registration services. Adding TLDs expands the supply of names and name registration services available to the public, while restricting the number of TLDs limits competitive entry into the market and limits consumer choices. The basic points are these:

- ICANN needs to define routine, sensible procedures to add TLDs.
- Those procedures should work regardless of whether the market is booming or in decline.
- Users and suppliers interacting in the market, not ICANN, should decide whether specific TLDs are valuable or not.

¹ “The new corporation ultimately should have the authority to manage and perform a specific set of functions related to coordination of the domain name system, including the authority necessary to: ...3) oversee policy for determining the circumstances under which new TLDs are added to the root system.” U.S. Department of Commerce, NTIA, “Management of Names and Addresses,” Statement of Policy (The White Paper), Docket Number: 980212036-8146-02, June 5, 1998. See also Mueller, [Ruling the Root](#), (MIT Press, 2002) Chapter 6.

- ICANN's procedures for adding TLDs should be demand-driven, light handed, and focused on coordinating the technical parameters of DNS rather than regulation and restriction of the market.

Significant attention has been given to the debates over ICANN's governance structure and its attempts to change that structure. This paper is *not* about those debates. It is a long-overdue look at the single most important area of substantive policy under ICANN's jurisdiction, namely the addition of new TLDs. This paper identifies a policy vacuum around TLD additions that has been allowed to exist for too long. It proposes a new policy approach that would make room for innovation and improve the fairness, efficiency, and competitiveness of DNS management. The authors believe that these policies should be adopted regardless of how ICANN makes its decisions, or what methods it uses to select its Board and develop its policies.

Does anybody care about new TLDs anymore? For a few years in the late 1990s, top-level domains were assumed to be licenses to print money. Domain names at any level were assumed to have enormous power to attract Internet traffic. Those expectations have been deflated by the Internet bust of the new Millennium, and by greater sophistication among users. It is noteworthy, however, that the overall market for domain names declined by only about 10 percent in late 2001 and the first half of 2002, and then resumed its global growth. Certainly, the domain name land rush and hysteria of the Internet boom period are things of the past. Does this mean that the issue of new TLDs is moot, and that there is no pressing need to address the issue? No. That perspective is as superficial and wrong as the overblown expectations of the boom years. It is like saying that the slowdown in 3G wireless development means that we don't need to worry about how the radio spectrum is managed anymore.

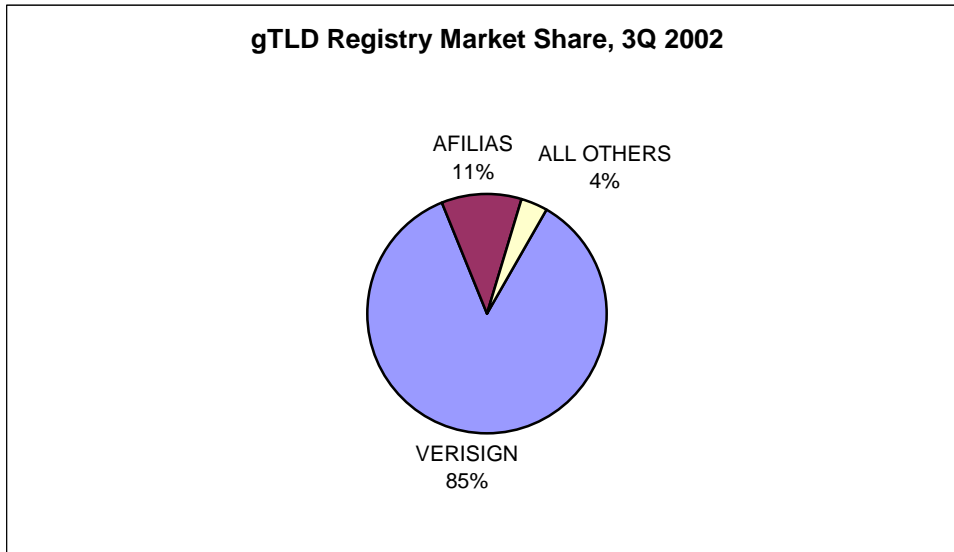
The domain name space is still a valuable resource and we still need to manage it properly. The market for domain name related services is a significant and growing part of the Internet, representing about US\$ 3 billion in annual revenues. There are now and will continue to be legitimate requests for the addition of new TLDs, which we discuss in the next section. At least a dozen companies who applied to ICANN for the right to operate a TLD registry but were turned down are still willing and able to operate a registry. New names (e.g., .blog or .enum) that identify new communities or services have come into being. Last, but by no means least, we must not forget that at the registry level, the market for generic TLD registration services is still highly concentrated, with one operator (VeriSign) controlling over 85 percent of the market.² That level of market concentration could easily be remedied with new entry and new, meaningful TLDs.

For the Internet, and for the U.S. National Telecommunications and Information Administration at this time of unprecedented need for international cooperation, the perception of unfairness in global resource allocation that ICANN suffers from can be as damaging as the reality. U.S. administrations have done an unprecedented good deed for

² As of the 3rd Quarter of 2002, there were a total of 30.5 million domain names registered in the generic top-level domains (.com, .net, .org, .info, .biz, .name, .cc, .tv, .ws). VeriSign owns and operates .com (21.4 million registrations), .net (3.62 million registrations), .tv (475,000 registrations) and .cc (581,000 registrations).

decades in funding and nurturing the Internet, and permitting the technology to diffuse to the world. It is also unsurprising that, at this time of reflection on its mission and procedures, ICANN needs some positive suggestions to realize its true potential, and to prevent it from being subject to the usual ‘regulatory capture’ which many institutions

have suffered from in the past. We offer the following suggestions and look forward to debating these ideas in the weeks and months to come.



1.1 The continuing need for new competition

One of ICANN’s most widely acknowledged successes was the creation of retail-level competition for the registration of .com, .net, and .org domain names. This was done by imposing a vertical separation between the wholesale “registry” functions, and retail “registrar” functions. In the major generic TLDs regulated by ICANN, these “retail” functions of registrars must be separated from the “wholesale” registry functions of maintaining the zone files.³

In the registrar market, ICANN has implemented a simple accreditation process that allows any business meeting certain qualifications to enter the market and compete. This approach has worked beautifully at making the retail market competitive. It has driven down prices and improved service. In contrast to the registrar market, ICANN has failed to create sufficient competition in the registry market. There is no reason why the registry market could not be as competitive as the registrar market. In this paper, we propose a basic accreditation scheme for registries and a basic limit on the number of new TLDs added per year that would make the registry market open and competitive as well.

³ In essence, registries operate public databases that exclusively assign second-level names under TLDs and provide, in real time, the name resolution data needed to use the names for communication over the Internet. Registrars, on the other hand, directly interact with customers to perform the functions of accepting customer orders for specific names, maintaining customer accounts, billing customers, accepting changes from customers, notifying them of expiration, and so on.

It is important to understand the importance of competition at the registry level. Registries are the critical infrastructure of the domain name system. Registrars are just intermediary services built on top of that infrastructure. Ultimately, effective competition in domain services requires open entry and robust competition at both the registry and registrar segments of the market. If there is insufficient competition in the registry market, the whole domain name services industry is not sufficiently competitive.

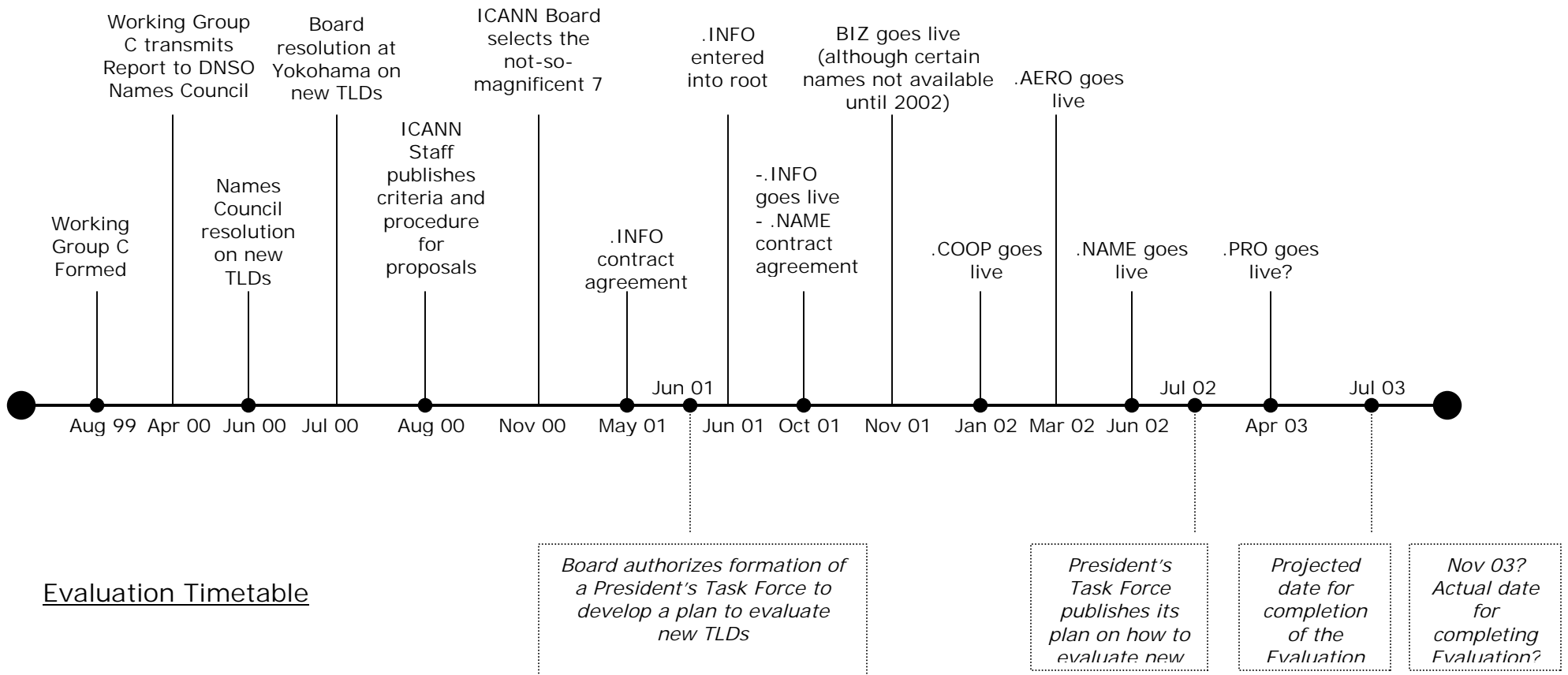
Why has ICANN been unable to successfully produce competition at the registry level? We believe the answer is simple and is entrenched in current ICANN processes (or the lack thereof): ICANN has not defined a routine method for adding top level domain names and for authorizing new registries to operate them. The authors believe that these factors negatively effect competition, undermine ICANN's quest for global legitimacy, and further are a disservice to the U.S. federal government which receives more than its share of the blame for ICANN's continuing growing pains.

At present, ICANN has defined no uniform criteria for evaluating applications. It has fixed no regular timetable for accepting and deciding upon applications. No one knows when ICANN will add new TLDs. No one knows upon what basis it might choose to do so or refuse to do so. This policy vacuum has made the addition of new domains a painfully slow, unpredictable, and entirely discretionary process. The effect has been to substantially raise the costs of entry into the domain name registry market, and to make insider politics rather than economic value the chief determinant of who gets to participate. The delays and costs of this non-policy have taken a terrible toll on the domain name industry. They have prolonged the dominance of a few well-entrenched players for years and led to the destruction of several innovative businesses that attempted to compete as domain name registries.⁴

Luckily for consumers and businesses, this state of affairs is unnecessary and can be remedied with a few simple reforms of ICANN processes. ICANN's restrictive approach to DNS regulation has no basis in the technical requirements of managing the system. The Domain Name System is a highly flexible protocol that could support many new names and a great deal of diversity and competition among TLD registries. Adding TLDs to the domain name system is a simple process technically and, within reasonable constraints, poses no technical risks to the operation of DNS or the Internet. It is not difficult to define operational requirements for a TLD registry that will avoid significant negative technical externalities from adding a TLD. Indeed, revenues generated by new registry fees could be used to finance major improvements in ICANN's administration and in the root zone servers.

⁴ Name.space, an innovative registry that supported nearly 500 generic top-level domain names, and Image Online Design, which attempted to develop a <.web> TLD have been held in abeyance for nearly 6 years now. RegistryPro, although a winner of the <.pro> domain in the year 2000 TLD additions, has been hampered by heavy registry contract obligations. Neustar's financial viability was harmed by the overinvestment that is typical of limited markets allocated through beauty contests, where applicants have a strong incentive to promise more than they can deliver.

Timetable for introduction of new TLDs



NOTE: although July 2003 was the projected date for completion of the Evaluation, this assumed that an RFP for the evaluation would be drafted by staff and approved by the board, an evaluator selected, and the evaluation launched by *September 2002*. As of Feb. 2003, no RFP had been issued. Thus, the process is at least 5 months behind schedule and the completion date would have to be pushed back to November 2003 at the *earliest*. Based on the foregoing analysis, it is apparent that, left to its own devices, it will take ICANN **four and a half years** to complete all aspects of the first round of TLD additions. At the end of that process, it still will not have developed a routine method of adding TLDs; it will only have an assessment or evaluation of the first seven additions – a number and process it considers “experimental.”

1.2 Overview of the Proposal for Reform:

Top Level Domain Additions in a Mature ICANN

This paper advances a proposal for a new approach to top-level domain additions.

- It calls upon ICANN to add applicant-proposed names to the root annually. TLD names should be proposed by applicants who perceive a commercial, technical, or social need for them.
- The paper proposes to cap the number of TLDs added per year at 40, a number that is technically and operationally safe.
- Ten (10) of the TLDs would be reserved for noncommercial, sponsored domains and Lesser Developed Countries (LDCs), the remaining 30 would be open for commercial applicants
- Applicants would know in advance the technical and operational criteria they would have to meet to qualify; TLD addition and registry operation would become as basic and routine as registrar accreditation.
- Applicants would have to pay fees that would cover the administrative and maintenance costs of IANA and the root server operators.
- If there were too many applicants for the available slots they would have to engage in auctions (the 30 commercial TLDs) or random selection procedures (the 10 noncommercial and LDC slots).
- ICANN's review of and approval of TLD applications would not be based on the applicants' business model, policies, nationality, language, or type of services offered.
- Instead, the review would be based entirely on coordinating the name space and preserving the technical stability of the DNS.

The proposal is outlined in more detail in Section 4 below. A flow chart describing the process is available in section 4 as well.

2. Who Needs New TLDs?

A critical feature of our reform proposal is that it is intended to make TLD additions responsive to market forces, including consumer demand. In this section we discuss the sources of demand for new Top Level Domains.

The call for name space expansion does not derive from a “shortage” of domain names as such. The current DNS name space, using existing TLDs and the restricted-ASCII set, is virtually infinite.⁵ But this is like saying that the world’s automotive needs could all be met by one model of car. TLD additions can be ignored only if one ignores user preferences, human factors issues, competition, and important legal and economic issues about who controls and customizes a domain registry. The debate over new top-level domains is really a debate about the degree to which DNS administration should respond to human factors, user demand and competition policy concerns. It’s also a debate over the degree to which the DNS administrator should second-guess or downplay the importance of naming to various industries.

As we show below, namespace expansion would give users choices of identifiers that conform more closely to their preferences. Adding new TLDs would also provide an opportunity for new companies to enter the industry and try out new service concepts. It is important to emphasize the following point: *It does not really matter whether a new, open policy toward TLD additions results in one hundred successful new names and registries within three years, or only one or two successful new names and registries.* The point is that the market would be able to respond to consumer demand and supplier innovation. The resulting market structure would better be able to discover and respond to what people want and need.

2.1 The demand for new top-level domain names

One can identify at least six distinct sources of demand for new top-level domains.

1. **A choice of more desirable names.** Given a choice between a meaningless domain name and a meaningful, catchy one, most users prefer the latter. Users may want more choices regarding the identity they project online. They may want the domain name they use, either as an email addresses or web site URL, to make a particular kind of statement. Thus, while the current top-level names provide only a handful of generic strings such as *.com*, *.net*, *.org*, or *.info*, end users might prefer additional options, such as *.shop*, *.zone*, *.free*, *.blog*, *.sucks*, etc. Bear in mind that to someone who reads Chinese characters and not English, *business.com* is as meaningless as *ghfhjj-u0-99wwofrz.com*. The demand for

⁵ If users didn’t care about who managed their domain, or about price and service competition, there would be no need for additional TLDs. If users were willing to register meaningless identifiers such as *ghfhjj-u0-99wwvery.net*, or if they were satisfied with names that went into deeper and deeper levels of the naming hierarchy, such as *nuts.to.this.name.syr.edu*, the DNS could easily accommodate all conceivable future registrations without any change.

incorporating new scripts into the DNS is derived from the same economic and human factors as the demand for new top-level domains. It is clear that real demand for a wider choice of names exists. The first two new TLDs created by ICANN, *.biz* and *.info*, generated approximately a million paid registrations each in a year of operation. It took Network Solutions more than five years to register a million *.com* names. Even the new TLD names offered by alternative root system operator New.net have received tens of thousands of registrations, despite the severe handicap of being invisible to many users of the Internet.

2. **A more persistent and portable name.** Users who have an email address under their Internet Service Provider's name (e.g., user@aol.com) may want to expand their service options by obtaining their own domain (e.g., me@myname.tld). Controlling your own domain has several desirable consequences. The email address is likely to be more memorable and to match more closely the preferences of the user. A user-owned email address is also likely to be more persistent than one associated with an ISP or a third-party provider's email service. If an ISP goes out of business, raises its prices or offers poor service, users would be forced to change providers. If their domain name or email address is derived from their ISP, it will have to be changed when they switch providers.⁶ Registering a domain name gives the user a form of address portability. A user's email address can remain constant when using different ISPs. This lowers consumers' switching costs and makes the ISP market more competitive, just as number portability does in the voice telephony market.
3. **Shorter names.** Given a choice between a longer and/or deeply hierarchical domain name and a shorter, flatter one, users will probably prefer the shorter one. Users may want to move up the DNS hierarchy; i.e., they may want a second-level domain instead of a third-level domain, or a top-level domain instead of a second-level domain. Moving up the hierarchy shortens the name, making it more easily usable.
4. **More control over the name.** Moving up the hierarchy also increases the consumer's legal, economic and technical control over the administration of the name. In a hierarchical name space, an identifier is dependent upon the registrants above them in the hierarchy. Organizations higher-up in the contractual chain must operate the name servers pointing to lower levels in the hierarchy. The "higher-ups" have the leverage to impose policies regarding use, prices, name selection etc. on people lower down in the hierarchy. To escape these constraints, end users may want to move up the hierarchy. As an analogy, many companies heavily dependent on networks may choose to "in-source" their network operation

⁶ Hundreds of thousands of Internet users were reminded of the need for this when AT&T Broadband was forced to stop using the domain name <mediaone.net> as part of a legal settlement. Around 630,000 end users had to suffer the inconvenience of changing their email addresses and web page URLs as a result. Indeed, ownership and other domain name changes at AT&T Broadband forced some users to go through 3 different email address changes in 60 days. Users incur sunk costs in the form of paid-for business cards and advertising expenses, as well as additional costs related to the confusion and missed communications engendered by the change.

and management functions and avoid dependence on telecommunication service vendors. Likewise, some companies may prefer to in-source their DNS by operating a TLD, thereby minimizing reliance on external registry firms. A corporation to whom online identity is essential, such as AOL or Amazon.com, may decide that it wants to “in-source” its DNS management functions completely and eliminate its dependence on VeriSign.

5. **Verifying identity.** Some groups of organizations may want to establish a controlled name space, analogous to <.edu> for US universities, to promote authenticity of online identity. Control of a top-level domain gives one the authority to impose authentication or conduct rules on those within the name space.
6. **Competition.** Market competition may induce companies to enter markets to compete for registration business already served inadequately by other businesses. For example, the <.name> TLD is targeted at personalized domain names, but their business model and policy restrictions are unattractive to many registrants, and they have not won the support of registrars. As a consequence, the number of registrations in the <.name> TLD is fairly low, and the important market for individual registrations is being poorly served. An alternative TLD for personal names would add competition and choice to the market. Many policy advocates within ICANN’s process speak of “cloned” name spaces as if it is self-evident that duplicating the constituency served by one registry/name is necessarily a bad thing. But competition is all about overlapping services that give consumers choices. No one believes that Burger King should not be allowed to exist because McDonald’s already serves the market for fast-food burgers.

In sum, adding top-level domains will have a major impact on a) the variety and usability of identifiers, b) competition, c) the ability of firms to control their digital identity services, and d) technical innovation.

3. Technical constraints

Technical risks are often cited as one reason for extreme caution in the addition of new top-level domains. However, these concerns are founded largely on ignorance of the technical workings of the domain name system. Regular additions of a fixed, modest number of top-level domains to the root each year pose no technical risks to the Internet.

As a distributed open system, the Internet has many sources of instability. Some of the problems are intentional, such as the antics of script kiddies, criminal break-ins, spam, and organized denial of service attacks. Others are unintentional, stemming from poorly configured routers, congestion, poorly designed or badly implemented DNS software, inter-software incompatibilities, hardware breakdowns, and so on. All act to negatively affect the response times and connectivity of ordinary users. Given the broad range of problems that can and do afflict the Internet's daily operation, changes in the number of top level domain names is, we will show, a vanishingly small part of the total picture. Of all the problems faced by the Internet at this point in time of terrorism and organized denial of service attacks, TLD additions are not what we need to worry about. Having additional TLDs may even decrease the impact of various intentional or unintentional problems because new registries may bring a new set of service sites and nodes to cope with problem situations.

It is noteworthy that respected technical experts have never voiced doubts about the ability of Internet technology to handle the addition of a finite number of new TLDs. Jon Postel, one of the original designers of the DNS protocol and for many years the manager of the root, proposed adding 50 new top level domains annually over a three to six year period in 1996.⁷ Paul Vixie, one of the developers of the dominant BIND software used by DNS name servers, went on record in an ICANN Working Group saying that "A million names under [the root] isn't fundamentally harder to write code or operate computers for than are a million names under COM."⁸ Paul Mockapetris, author of the basic RFCs defining the DNS protocol, wrote "I'd feel safe adding a bunch of new TLDs, 10s or maybe 100s."⁹

Doubts about the technical risks of TLD additions have been voiced primarily for political and economic reasons. Some incumbent registries or registrars are concerned

⁷ Draft-postel 1996. The proposal is archived here: <http://www.ripe.net/ripe/mail-archives/dns-wg/1996/msg00055.html>. While this plan was rejected, its failure was not due to technical concerns about expansion of the root zone.

⁸ Vixie's message was sent to the ICANN DNSO Working Group on new Top-level domains, (Working Group C), 15 December 1999. <http://www.dns0.org/wgroups/wg-c/Arc01/msg00203.html>

⁹ Paul Mockapetris to Jon Weinberg, and reposted to Working Group C, Dec 15, 1999. In response to this White Paper draft Mockapetris added, "while you quote me as saying adding 10s or 100s was safe, you should understand that the quote was in the context of recommending a conservative course, and not to dispute the million delegation remarks of Vixie, merely to start slow toward the million (assuming that turned out to be a useful place to go)."

about facing additional competition.¹⁰ Some trademark holders would like to prevent the creation of new spaces where name speculation or cyber-squatting might occur. In both cases, however, the objections are based on economic policy preferences, not technical risk.

Whatever the merits of placing regulatory or economic restraints on TLD additions, we must clearly distinguish between restraints based on technical factors and those based on economic protectionism or regulatory control. If willing buyers and willing suppliers of new services are being deprived of the right to enter a market, sound public policy dictates that we correctly identify and openly debate the real reasons why.

In this section, we show that there is no ambiguity whatsoever about the technical capability of the DNS to support TLD additions at the rate we propose. To make this case we need to back up and describe some basic technical features of the DNS.

3.1 The Root Zone File

The domain name system is a distributed database. It allows users anywhere on the Internet to submit a query (a domain name) and receive the right information in return: the IP address of the queried domain, or other records. The DNS as a total system responds to billions of queries every hour.

The DNS name space is organized hierarchically. The root only contains information about the very top level of the hierarchy. Information about the lower levels is held by a network of local, national, or global name servers. Most of the real work of DNS is done by *these* name servers, not by the centralized root. There are more than half a million name servers around the world, and they are operated by individuals, small organizations, large enterprises, ISPs, and the major domain name registries and registrars. Information about how to resolve domain names is cached (stored) locally, so that most users' queries can be answered locally and never go to the root.

The DNS root is just a set of 13 name servers at the top of the naming hierarchy. It contains the authoritative list of top level domains, and associates each TLD name with second-level name servers that hold authoritative information about second-level names under each TLD. The root's authoritative list of TLDs is called the *root zone file*.

The root zone file is a simple ASCII text file. At the beginning of 2003, it contained records for 258 TLDs. 243 of them are country codes drawn from the ISO-3166-1 list. Fifteen of them are so-called "generic" or global names such as .info or .com. For each TLD, there is an average of ten (10) records in the root zone file. As noted above, these records provide the information needed to direct queries to the proper name servers of second-level domain registries. Thus, there are a total of only 2573 records in the root zone. The whole file consumes only 100 kilobytes of storage. It is much smaller

¹⁰ Roland LaPlante, Chief Marketing Officer of Afilias, was quoted in a news report as cautioning against introducing any significant new TLDs in the near future. The reason? "[W]e must allow adequate time... [so] that their introduction does not negatively crowd or disrupt the current registration marketplace by offsetting the existing supply versus demand structure." See ICANN Blog, <http://icann.blog.us/2002/10/23.html>

than a one page letter written in MS Word software. Ten copies of the root zone could be stored on a 3½ inch floppy disk.

The U.S. Commerce Department holds ultimate policy authority over the content of the root zone file. The U.S. Commerce Department has delegated to ICANN the responsibility for handling requests for changes to the root zone and working out the policies that govern how and why those changes are made. Thus, any changes to the root zone must first be approved by ICANN and then go to the U.S. Department of Commerce for final approval.

Once changes are made, they must be distributed across all 13 of the Internet's root servers. Operationally, VeriSign Global Registry Services administers the primary root server (the so-called "A" root), which is the most current and authoritative version of the root zone file. All authorized updates and changes to the root zone file start at the A root and are distributed to the other 12 servers at least twice daily.

3.2 Technical constraints on new TLDs

There are three possible ways in which TLD additions might impact technical stability:

- The need for a finite limit on the number of TLDs
- Root zone file flux
- Root server load

By "need for a finite limit" we mean that the DNS is a hierarchical name space, a tree structure the design of which presumes there are fewer names at the top of the tree and more names as one goes down into the branches. If TLDs were added in a way that allowed or encouraged *all* names to be registered at the root, then the hierarchical structure of the name space would be defeated. That would undermine the robust, distributed nature of the Internet and make it far too dependent on a single point of failure (the root).

By "root zone file flux," we refer to the rate at which the content of the root zone file changes. If the root zone file must be changed frequently, the updates distributed too often and there are large numbers of changes, there is a greater risk that errors will be made.

By "root server load," we refer to the rate at which the root servers are queried by computers connected to the Internet. If the query load exceeds the capacity of the root server system, then the performance of the DNS system as a whole would be impaired.

Below, we show that first two issues can be easily addressed by simply fixing the number of TLD additions at a safe pace and number. We also show that TLD addition at the recommended pace (40 per year) is unlikely to have any discernable effect on root server load.

3.2.1 Finite Limit

It is a simple matter to address the first potential problem. One need only specify a finite limit to the number of TLDs that can be added over time. There is no precise way

to define what this limit should be, so the choice of a specific number is necessarily somewhat arbitrary. But if the purpose is to retain the hierarchical nature of the name space, it is clear that with tens of millions of second-level domain names one could add hundreds of TLDs annually and still retain a hierarchical structure. In this white paper, we have proposed making it possible to add 40 new TLDs annually. (Note well that we are talking about accommodating a *maximum* of 40 applications – if there were fewer than 40 qualifying applications in a year there would be fewer than 40 additions.) This is a quite conservative number. It would take more than six years of additions at the limit for the number of TLDs to double.

3.2.1 Root zone flux

Adding TLDs has linear effects on the size of the root zone file; it neither increases nor decreases the number of records required by each TLD. Thus, if the maximum of 40 TLDs were added each year, it would take a decade for the zone file to double in size to 218 kilobytes. By contemporary standards, this is still a very small file. The processing power required to search it to match queries would not increase appreciably.

Senior figures within the IETF, such as Paul Vixie and Karl Auerbach, have pointed out that the root servers use the same technology as the name servers for the top-level domains. In that respect, the root zone file is no different from any other DNS zone file. There are millions of functioning registrations in the *.com*, *.net*, *.org*, *.de*, and *.uk* zone files, and changes, deletions and additions occur on a minute-by-minute basis. Those zones work reliably. Hence, from a purely operational standpoint one might reasonably conclude that there could be millions of top-level domains.

There is one important difference about the root zone, however: errors or corrupted files at the root level could have more damaging consequences for Internet users than mistakes that occur lower in the hierarchy. An erroneous root zone file could result in the inaccessibility of entire TLDs, containing thousands or even millions of user identities, until the problem was fixed. The effects of a corrupted TLD zone file, on the other hand, would be limited to second-level names and hence the bad effects would be more localized (although here, too, a major second-level domain name such as <aol.com> could affect millions of users). Thus, there is a valid technical concern about limiting the *rate at which the root zone changes* in order to minimize the risk of propagating errors in the root zone. (In this regard, the size of the <.com> zone has been a problem; in the past Network Solutions has experienced sporadic trouble updating and distributing it properly, although for the most part it works remarkably reliably given the rate at which it changes.)

Some Internet technologists believe that root zone changes could and should be automated. More conservative engineers, on the other hand, believe that the root zone must continue to be altered by hand and subject to human inspection before being released and propagated to the root servers. Even the adherents of this most conservative view, however, believe that 20 – 90 additions and changes in the root zone file made in batch mode at a specific periodic rate, such as annually or every six months, are safe. Thus, with regard to the rate at which the root zone can change there are no serious

technical objections to the addition of 40 or so new TLDs being added annually to the root zone. Indeed, that number comes in at the middle of the safe spectrum.

There is no doubt about the ability of the root servers to handle this level of addition:

- *It has already been proposed by experts.* As noted earlier, the original root administrator and one of the designers of the DNS, the late Dr. Jon Postel, proposed adding 50 new TLDs a year for three years in a row back in 1996. More recently, Paul Hoffman, chair of an IETF working group on a DNS-related standard, publicly proposed adding 25 every six months.¹¹
- *We have already done it.* During the early and mid-1990s, as country code TLDs were being delegated, the root zone was expanding by 10-20 TLDs or more per year for nearly a decade. From 1994 to 1996, 40 or more TLDs were added each year. At that time the root zone file was managed by the equivalent of one full-time person. Moreover, the technology has become more powerful. Thus, there is no factual basis for viewing the proposed rate of addition as a technical risk.

3.2.2 Root server load

The only other technical concern raised by the addition of new TLDs is how TLD additions affect the query load on the root servers. Root server load is a topic on which a great deal of measurement and research has taken place in the last three years. In particular, a number of studies carried out by the Cooperative Association for Internet Data Analysis (CAIDA)¹² from 2000 to the present have examined the number and type of queries received by the root servers, as well as the response times of the root servers.¹³ These studies make it clear that, relative to other dominating factors, the number of top-level domains in the root zone file could have only a miniscule effect on the overall load of the servers.

Currently, the most active root servers receive around 3000 queries per second, totaling 250-300 million per day for each server. The query load has increased steadily as the Internet has grown. Most of the growth occurred when no TLDs were added, from 1996 to 2001, making it clear that usage, not the number of TLDs as such, is the key factor. Hardware and software upgrades have enabled the servers to keep up.

Although the number of IP addresses assigned to root name servers is limited to thirteen, the number of computers that can be linked to each address is not restricted. Thus, root name servers can be implemented on several machines. In the Fall of 2002, the ability of root servers to expand their capacity was dramatically improved by application of the “BGP anycast” technique, which has allowed mirror copies of the F root server to

¹¹ Paul Hoffman, “Reforming the Administration of the DNS Root,” April 25, 2002. <http://www.proper.com/ICANN-notes/dns-root-admin-reform.html>

¹² See <http://www.caida.org/outreach/papers/>.

¹³ Of particular interest is D. Wessels, “Toward Lowering the Load on DNS Root Nameservers.” Presentation before the North American Network Operators Group (NANOG), October 2002. See also N. Brownlee, kc claffy, Evi Nemeth, “DNS Root/gTLD Performance Measurements,” 2001.

be established in Spain and the Asia-Pacific region. Measurements conducted by Rob Thomas's "DNS Data" web site show a dramatic improvement in the response times of the F root server since these changes were made.¹⁴ The M root server in Japan is also taking steps to expand its capacity in the same way. These new configurations make it unlikely that the query load will exceed computing capacity of the root name servers any time soon.

Studies of the composition of the queries that go to the root servers make it even clearer that root server load is not a constraint on the number of TLDs, provided that additions are kept to a reasonable, regular pace. The CAIDA studies indicated that almost 98% of all the queries that go to the root are "bogus" requests caused by software implementation problems or other software factors. For example, one of the most serious causes of root server load is the absence of negative caching in the DNS software of a major vendor. Without negative caching, a request for a nonexistent domain can be repeated indefinitely, and some poorly designed programs will aggressively retransmit thousands of these bad requests. According to the CAIDA research, these kinds of problems account for 70 percent of current root server load. Other implementation problems account for another 28 percent of root server load. Normal, legitimate queries constituted only two percent of the root server load. Thus, even if doubling the number of TLDs over a decade-long period actually doubled the number of legitimate root server queries, it would add only two percent to the total load. Adding TLDs would not affect the software configuration and implementation problems that create most of the load.

Because the DNS relies so heavily on caching at lower levels of the name server hierarchy, there is no simple, linear relationship between adding TLDs and increasing root server load. The consensus position within IETF seems to be merely that the number of TLDs should be finite rather than infinite, so that the hierarchical character of name resolution and assignment is maintained. As IETF Chair Fred Baker put it,

If we can add one TLD (and we obviously can), we can add 1000 TLDs to the [root zone] table. How that relates to [root-server] lookups for those TLDs is indeterminate from the fact that they are there. ...The fact that we added seven TLDs does not mean that we have even *changed* the root server load, much less multiplied it by something. How much additional load we would get is a *business* question: how many new computers, with people using them (and what would they be doing, and what sites would they therefore be accessing), will be added to the Internet because this TLD is in operation?¹⁵

ICANN's initial addition of 7 new TLDs and the re-vitalization of the dormant <.us> TLD have led to no discernable change in root load or root server behavior. In sum, TLD additions have minor impact on what is a more fundamental question, which is how the DNS is able to scale with the growth of the Internet, and how the open Internet developers community can respond to software externalities in the Internet "commons." Poorly implemented and/or badly designed software has the greatest impact on root

¹⁴ Rob's DNS page, www.cymru.com/DNS/

¹⁵ Email to author, October 11, 2002

server load. The general growth of the Internet, and new DNS applications such as ENUM, may have an impact. The effect of TLD additions is minimal.

4. A Rational Name Space Management Regime

In this section we propose a TLD addition process that is economically efficient, pro-competitive, and good for the long-term sustainability of ICANN and the root server operators. We begin by defining five criteria that a TLD addition process must meet. In the process, we show that ICANN's current process (or lack of a defined process) does not meet any of those criteria. We then define a policy and a process that do.

4.1 Criteria for a TLD Add Process

4.1.1 Predictable in timing & procedure

The first and in some way most basic criteria is that the process should be fixed and regular. TLD additions are not an "experiment" or a step into the unknown. They are a routine part of DNS management. Growth or change in zone files at any level of the DNS was always contemplated as a normal activity during the design of the protocol. Thus, businesses or organizations interested in offering DNS services requiring a TLD must have a known procedure for applying for one. The procedure must follow a publicly defined and reasonable schedule that ICANN adheres to. Put in the simplest terms, applicants for TLDs should know what they have to do and when they have to do it. They should be assured of either a "yes" or a "no" within a defined and reasonable time frame.

A fixed addition schedule has a number of excellent efficiency and fairness properties. For example, it prevents incumbent registries from exerting political pressure to prevent competitive entry. And it discourages exploitation of scarcity in the name space by suppliers or name speculators, making it clear that new TLDs will continue to be added and hence any business model based on exploitation of artificial scarcity will not succeed in the long term.

Finally, open entry is a prerequisite for growth and innovation. To understand this argument, imagine how the U.S. telecommunications industry would function if the U.S. Federal Communications Commission, which controls the allocation and assignment of radio frequencies, had no defined rules or procedures for requesting and assigning radio frequencies. What if the only way forward for service providers and users who needed frequency bands would be to continually lobby the FCC's Commissioners and staff persons? Their lobbying efforts would not only have to convince the FCC to award them the specific frequencies they needed; they would also have to convince them that the FCC should even consider awarding *any* new frequency assignments at all. Obviously such a process, or rather absence of process, would act as a huge barrier to entry in the relevant industries, and would smother innovation and growth in radio-related areas.

ICANN's current TLD addition process is not fixed, nor is it regular. No one knows when or why TLDs will be added. If we examine its initial process (see box, next page) we see that it has treated the initial set of additions as an "experiment" that began in 1999 and must be studied until 2005. Then in late 2002 ICANN's CEO suddenly

declared that he thought adding three new sponsored TLDs would be a good idea. This out-of-the-blue announcement did not emerge from any stable, defined process but may have emerged from insider lobbying by constituencies and applicants. While we support adding TLDs, the proposal perpetuates the harmful idea that TLD additions are to be performed sporadically on an ad hoc basis rather than being regularized and routine.

4.1.2 Responsive to market demand

Addition of TLDs is not fundamentally a technical issue (once it takes place within the defined constraints); it is a matter of permitting supply to respond to demand. Whatever process is adopted should allow companies to respond to real or perceived needs in the marketplace. Since marketplace needs and demands change over time, the best way to assure responsiveness to demand is to make entry open to any qualifying applicant and allow market forces to determine which ideas are good and succeed, and which are not and fail. The root zone file manager should not impose artificial limits on entry or attempt to protect incumbents. New TLD names should be defined by applicants who have done the market research and are willing to invest the money and sweat equity required to get through the process. They should not be defined by central planners who think they know what names the world needs.

By way of contrast, ICANN's current process is not responsive to demand. Indeed, ICANN's CEO has openly questioned whether TLD additions should pay attention to demand.¹⁶

4.1.3 Fairness (Rule-driven rather than discretionary)

The process for awarding TLDs should be governed by rules and specific criteria that are applied on a nondiscriminatory basis to all applicants. The process should not be driven by insider politics and the discretion of the ICANN Board. Insofar as possible, all relevant criteria for an award should be objective. Where human judgment is called for (e.g., trademark conflicts or issues of confusing similarity or deception) the process for resolving such disputes should be well-known (e.g., referral to an arbitration panel or alternative dispute resolution service with known rules and precedents).

ICANN's TLD addition process to date has been completely discretionary. A variety of law and policy analysts have documented the striking parallels between ICANN's authorization of new TLDs and the Federal Communications Commission's licensing of broadcast stations.¹⁷ Broadcast licensing has been based on "comparative hearings," in which applicants put before the Commission a host of promises about how they would "serve the public interest" and the Commissioners tried to discern from these promises which applicants have the most merit. The process earned the nickname "beauty contests" because choices were based more on the taste and discretion of the Commissioners than on any defined and objective criteria. By creating such wide latitude

¹⁶ Lynn, in the news article cited in note 11 above, noted that "some people" don't think it is a good idea to respond to demand, and asked "Do we just respond to market demand... or do we structure the namespace according to some taxonomy, or in some third way?"

¹⁷ Harold Feld, email to author; Jonathan Weinberg (2002), Mueller (2002) chapter 10.

for discretion, the broadcast licensing process heightened the importance of insider politics in the selection process. Lyndon Johnson's exploitation of the Commission's discretionary power over broadcast station channel allocation is an example of the kinds of abuses one can expect from an assignment system based on discretion.¹⁸

But one need not rely on criticism of ICANN to support this point. ICANN's own Board chairman, Vint Cerf, compared ICANN's TLD selection process to the reviews of business plans conducted by a venture capital firm, and urged that ICANN find a way to "extract" itself from such nontechnical issues.¹⁹

4.1.4 Efficient

A TLD addition process should be economically efficient. This means two things.

First, it should discourage rent-seeking behavior and the opportunities for legal conflict by applicants and incumbents. "Rent-seeking" refers to efforts by market participants to gain market power by investing in protectionist policies or favorable subsidies.²⁰ ICANN's current process is tantamount to an engraved invitation to engage in rent-seeking. With new entry completely subject to the whims of ICANN's management and Board, applicants *and their opponents and competitors* have no choice but to invest heavily in politics. Open entry according to a defined procedure dramatically reduces such unproductive activity, by eliminating discretion of the Board and hard-wiring new entry into the system.

Second, the process should make sure that the administrative and opportunity costs of an application, and the costs of actually implementing TLD additions in the root server system, are borne by those who create the costs. TLD application fees should reflect as precisely as possible the actual costs of reviewing applications for conformity to defined, objective criteria. They should not be used as a means of financing ICANN's general budget. If adding 40 TLDs a year led to costs of hiring one full-time staff to manage and review changes in the root zone file, then 1/40 of that amount should be part of the fees assigned to each successful applicant. Likewise, if adding TLDs can be projected to affect the hardware and software costs of the root server operators by a defined amount, then 1/40 of that amount should be part of the fees assigned to each successful applicant, and the monies distributed to the root server operators.

4.1.5 Technically safe

Finally, the procedure for actually adding TLDs to the zone files, and the limits placed on the number of changes each year, should fall safely within the technical

¹⁸ KTBS-TV channel 7 went on the air on 28 November 1952, after a long freeze of TV station licensing. We now know that LBJ had worked behind the scenes throughout the Freeze to make sure that the Sixth Report & Order allocated but a single VHF channel to Austin, and that his family would get it - uncontested. <http://www.emmyonline.org/tvq/articles/32-23-10.asp>

¹⁹ Quoted in Brock Meeks, "ICANN and the seven dwarves" (MSNBC News, Nov. 22, 2000).

²⁰ A more technical definition is "the expenditure of social resources to capture wealth transfers." See J.M. Buchanan, R.D. Tollison, and G. Tullock, *Toward a Theory of a Rent-Seeking Society*, College Station: Texas Tech University Press, 1980.

capabilities of the root server system. As we have shown in Section 3, this means a finite limit, somewhere in the tens of TLDs each year, on TLD addition-related changes in the root zone.

4.2 A TLD Addition Process

Below, we propose a five-step process for TLD additions. Using this process, ICANN would add a maximum of 40 new TLDs each year. (There is nothing magic about this particular number; technical constraints indicate that it is safest to remain in the “tens” per year, but it could be 30 or 50. One does, however, need a specific number to implement the procedure.)

As a prologue to full implementation of this procedure, we advocate going ahead with the new round of TLD additions in year 2003, as proposed by ICANN’s CEO. We do not want to see implementation of our proposal used as an excuse for prolonging the freeze. Out of fairness to past applicants, we also favor a special round in 2004 that is confined to the unsuccessful applicants in the first round of TLD additions in year 2000. Those applicants paid \$50,000 and as ICANN itself admitted at the time, many of them were rejected not because there was anything wrong with them but because of artificial limits imposed on the number at that time.

Our process, which should be completely implemented by 2005, comprises the following steps:

4.2.1 Call for applications (2 weeks)

ICANN would announce a two-week period each year for applicants to register their desired TLD string in ICANN’s application registry, paying a modest administrative fee (most likely around a thousand US dollars). The applications may want to include a fitness disclosure and a statement of financial capability showing access to the financial resources needed to operate a registry, but a more open system would allow brokers and resellers to apply as well.

Commercial applicants could propose any number of TLD strings, but during the auction process (see step two below) they would only be able to win two. ICANN would allow new commercial names to be proposed by anyone: interested communities, incumbent registry operators, entrepreneurs, etc. Whether the business models proposed were “sponsored” or “unsponsored,” “restricted” or not, would be up to the applicants; it would not affect the selection procedure.

The procedure would incorporate a reservation of 10 TLDs for sponsored noncommercial TLDs and Lesser Developed Countries (LDCs). We would employ the United Nations definition of LDCs. These applications would be rationed via random selection rather than competitive bidding, necessitating some limit on the number of applications per entity. The winners would pay a fixed processing and maintenance fee high enough to discourage nonserious applications.

4.2.2 Auctions and Random Selections (3 months)

After the application registration period ends, ICANN would check for eligibility (eliminating ineligible applications), sort applicants into random-rationed and auction-rationed, and identify any applications for the same TLD string.

If eligible commercial applications for more than 30 TLD strings were received, a bidding process would be triggered. ICANN would have the right to set a reservation price at the level of its costs of processing and implementing TLD additions.

We envision a simultaneous multiple round auction in which applicants would bid to get one or two of their proposed strings into the top 30. We believe this can be implemented in a web-based, eBay-type interface. To repeat, while applicants can propose any number of TLD strings (paying a separate application fee for each one), they can only win a maximum of two in the auction. In each round of the auction, the 30 TLD strings attracting the highest bids would be listed. In the next round, applicants would then decide either to bid more to push their proposed TLD into the top 30, or drop out. When the bidding stops, the final result is known.

A number of auction procedures exist and economic research on the topic is well developed enough to support the design of auction procedures for specific purposes. Any actual implementation of this plan would of course need to pay careful attention to the details of the auction design. We do suggest that when the auction is finished, each of the top 30 applicants pay the same fee as the lowest winning bidder, rather than the amount of their bid.²¹

Proceeds of the auction would finance activities directly related to modifying and maintaining the root zone. A defined portion of the fees would be allocated to the root server operators. Of course, if less than 30 eligible commercial applications were received, no bidding process would be triggered. In that case, all qualifying applicants would simply pay ICANN's reservation price. This price, too, should include some payment to support root server operation.

If there were more than 10 applications for noncommercial names a random selection process would be held to select the 10 qualifying applicants. To prevent abuse or possible manipulation of the random selection process, we propose that TLDs emerging from this process cannot be sold or transferred.

If, after the initial round of bidding, multiple applications for the same TLD string remained, ICANN would give the contending parties a defined period of time (say, a month) to resolve the contention on their own. If that failed an ascending bid auction would be held for the right to operate the specific TLD string under contention. The winner of the ascending bid auction would pay either the first or the second price.

²¹ Except in cases of competitive bidding over the same string, in which case the winning bidder should pay the amount they bid.

4.2.3 IPR Challenge (2 months)

After settling the issue of which TLD strings should be added, the successful names, plus an additional 5 alternate names that were the next-highest ranked in the auction, would be published. At that point a period set aside for intellectual property challenges would go into effect. If a TLD was confusingly similar to an existing TLD or threatened to violate a trademark, it could be challenged and subjected to a dispute resolution procedure. With some adaptation, UDRP principles provide a good basis for resolving TLD disputes; e.g., confusing similarity to a trademark, trade name, or trade name acronym; lack of a right or legitimate interest in the name; evidence of bad faith (although notions of bad faith would not be able to incorporate evidence from the way the name was used because no use has taken place yet). Clearly, the global strength of the mark in question would be a new and very important consideration. Whereas a <.aol> top-level domain might be prohibited for anyone by AOL-Time Warner, there are many companies that use “National” as a trademark, and hence a <.national> top-level domain name might pass. The IPR challenge procedure applies only to challenges to the string itself – it does not involve challenges to the procedures or policies used by the registry to assign names.

TLD strings eliminated through the IPR challenge process would be refunded their auction payment (with the costs of the challenge proceeding deducted) but not their application processing fees. The next highest-ranking alternate name that made it through the IPR challenge process would then be eligible for the next step.

4.2.4 Contracting (1 week)

After the IPR challenge period expired and disputes were resolved ICANN would present the successful remaining applicants with standard registry contracts. We emphasize that the contracts should be standardized and uniform, not developed on a case-by-case basis for each registry. As standardized contracts they would be less intrusive and less regulatory than ICANN’s current registry contracts. The contracts would require adherence to a minimal set of ICANN-defined technical specifications and conformity to established ICANN policies. This would include standards for transferring a zone file that would allow DNS to be maintained if a registry failed. This might also include, for example, a commitment to bind registrants in unrestricted, unsponsored domains to use the UDRP. We do not, however, think it necessary for the contract to require registrar-registry split, nor do we think it necessary for the contract to cap the price of services in new TLDs. New TLD operators could not possibly be dominant market actors, and no one has to register in their domain. Ergo, no price cap is necessary.

4.2.5 Entry into the Root Zone (2 weeks)

The final step would be the entry of the contracting parties’ information into the root zone. Currently this would require the approval of the U.S. Department of Commerce; whether that would be necessary and appropriate in the long term is a policy issue outside the scope of this paper.

Note that while this procedure uses auctions and random selection to ration TLD additions when there are too many applications, the procedure does not presume that

rationing is necessary. If fewer than 30 commercial applications (or fewer than 10 LDC or noncommercial sponsored applications) were received, no competitive bidding (or random selection) would be required; applicants would be added merely by paying ICANN's application fee and its processing fee. The procedure would permit the addition of up to 40 TLDs annually for an indefinite period of time, so it is possible that the limits would not be reached some years.

5. Anticipating the Debate

In the previous section we defined a flexible, market-oriented approach to TLD additions. In this section we examine various arguments that might be made against the procedure.

5.1 *Defensive registrations and IPR*

The biggest objection to regular TLD additions is likely to come from major trademark holders. Many of them view new TLDs not as expansions of choice in the domain name market but as additional costs of business. They may believe that adding new name spaces under new TLDs imposes upon them the burden of registering their trademarks and brand names in new TLDs again and again, in order to protect them from name speculators and cybersquatters. The costs of these additional registrations to any individual company are perceived as small relative to the potential nuisance value of misappropriated or misused names, but the aggregate value of defensive registrations is probably around US\$ 10 – 15 million.²²

Some registrars and registries have deliberately played upon these fears, using promotional strategies designed to scare brand holders into registering the same domain names across all TLDs in order to prevent others from getting them. In the late 1990s, this led to the creation of a vicious cycle that fueled the bubble in the DNS market, as speculators and trademark owners entered into a race to register, preempt or recover millions of domain names.²³

While trademark holders' concerns are legitimate, shutting down expansion of the name space is not the solution. Moreover, it is a remedy that is out of proportion to the damage inflicted. It erases potentially hundreds of millions, possibly billions of dollars of added value in order to foreclose the possibility of a much smaller level of harm.

Name speculation and cybersquatting are business activities. As such, they hinge on two economic factors: 1) the willingness of someone else to buy the name, and 2) the ability of the name to deliver Web traffic (or some other kind of value) for the registrant. The first factor, of course, is completely dependent upon the second.

A routine TLD addition procedure attacks name speculation at its root. It makes the supply of domain names so abundant that the possession of any given character string is less important.²⁴ In a regime of domain name abundance, web sites and services will gain attention by developing reputations and offering users value – not by having a

²² Author's estimates based on registration statistics from <.com>, <.org>, and Edelman/Zittrain studies of the <.biz>, and "open ccTLD" domains.

²³ Milton Mueller, "Success by Default: A new profile of domain name trademark disputes under ICANN's UDRP," Syracuse: The Convergence Center, 2002. <http://dcc.syr.edu/reports.htm>

²⁴ It is noteworthy that in ICANN's first round of TLD additions, one of the most vocal critics of adding any new TLDs was an individual who had invested heavily in speculative registrations in the .MD top-level domain (the country code for Moldova).

scarcity value or special meaning. The domain name will be relegated to the status of a mnemonic identifier – which is all it was supposed to be all along.

The limited number of gTLDs was the initial cause of the cybersquatting problem. Perpetuating scarcity only perpetuates the economic forces that fuel the problem. An open market for TLD supply would do more to “normalize” the status of domain names than continued limits on entry. While it may cause trademark holders concern in the short term, it is really the only long-term solution to the problem.

5.1.1 Why the Dominance of COM is part of the problem

The mutually reinforcing cycle of cybersquatting and defensive registration was a product of the historical dominance of the name space by the <.com> TLD. We may not realize it now, but in the early days of the web (late 1996 and early 1997) nearly *80 percent* of all domain name registrations in the world were concentrated in <.com>.²⁵ Moreover, there were only a million or so registered domain names. Thus, common, simple domain names under <.com> had great power at that time. Many people navigated the Web by guessing the domain name and typing it directly into their browser. What gave domain names their business value was their ability, or potential, to deliver large quantities of web traffic. Well-known trademarks and brand names under <.com> were especially vulnerable to squatting, because of users’ propensity to rely on guessed names. This propensity was reinforced strongly by the web browsers’ method of automatically placing the <.com> extension at the end of any name typed into the URL window.

Under these unique – and bygone – conditions short, generic or branded second-level domain names under the <.com> gTLD were scarce and valuable commodities. Name speculation was a predictable response. By occupying large numbers of generic words or other names in the <.com> space, speculators hoped to maximize their chances of profiting from the demand of someone who wanted that particular string, or of capturing web traffic of users who typed in common generic words as a way of searching the Web.

These conditions have already changed substantially. Evidence of major change is apparent from the following facts:

- There are far too many registered domain names under the major gTLDs (nearly 30 million) to rely on guessing anymore. Users now rely primarily on search engines and portals to navigate the web.
- The most popular browser software (Internet Explorer 6) no longer appends <.com> to words typed into the URL, but acts more like a search engine, returning a list of web sites that might correspond to the desired keywords regardless of what domain name they are under.
- Search engines have improved greatly. Typing a few keywords into Google is more likely to direct users to where they want to go than guessing a domain name. Indeed, contention about how Google ranks its

²⁵ InterNIC, Network Wizards

search results have replaced domain name registration as the great preoccupation of the Internet economy.²⁶

- Reflecting the lowered value of domain names, millions of speculative and defensive registrations were not renewed in 2002, deflating the <.com> TLD by about ten million registrations, and other legacy gTLDs by a comparable percentage.
- The same decline in speculative and squatter registrations apparent in <.com> was seen in the country code domains that were converted into open TLDs and marketed as competitors to the gTLDs, such as <.cc>, <.tv>, and <.ws>.²⁷
- ICANN's Uniform Domain Name Dispute Resolution Policy process has provided trademark owners a way to recover abusive registrations, diminishing the incentives to profit from it. Moreover, the number of trademark – domain name conflicts taken to plummeted as the speculative boom in domain names has receded.²⁸

5.1.2 Realism in Trademark Protection

The new conditions have led to a more realistic attitude among many Internet-savvy trademark lawyers. Lucy Nichols, the chief trademark attorney for one of the world's most significant brand names, Nokia, observes that:

“There are over 3000 registrations that contain "Nokia" in the open gTLDs. Those registrations fall into one of four categories ...1) ones that we own; 2) inactive ones; 3) non-Nokia sites that can be considered "fair use" ...including critical sites; and 4) truly objectionable sites that involve misleading, fraudulent or dilutive commercial use of the Nokia brand. I concentrate my resources on number four. It's a waste of time and effort to focus resources on 2) and unfair with respect to 3). For registrations in category 2, I'd rather someone else pay for the registration fees and renewal fees and keep the names inactive and off the market. I don't believe that the dilution argument should be expanded to cover domain names that are not being used.”²⁹

At bottom, defensive registrations are fueled by the increasingly unrealistic fear that unless a company controls every manifestation of its name in the domain name space, it will lose customers or traffic. But it is not easy to attract large amounts of traffic to a web site. Under current conditions, mere registration of a domain name, no matter

²⁶ “Google Battles ‘Optimizers,’” Wall St. Journal, Feb 26, 2003.

²⁷ “The large number of expiring registrations in .CC suggests a decrease in size of at least that ccTLD and perhaps open ccTLDs generally. One interpretation of this fact is that speculators, squatters, and warehouseers may be learning that the open ccTLD market is not as profitable as they had hoped or expected...” B. Edelman, “Registrations in Open ccTLDs.” <http://cyber.law.harvard.edu/people/edelman/open-cctlds/>

²⁸ Mueller, “Success by Default” (2002), note 22 above

²⁹ Lucy Nichols, speaking at “Trademarks in Cyberspace,” INTA Conference, New York, October 23, 2002

how appealing or generic the name, will no longer do it. Not when there are 22 million second-level names in .com alone, and 50 million domain names worldwide. Web sites must be advertised and promoted to attract attention. Today, the most serious problems associated with domain name use concern the re-registration of expired names by pornographers. Registering once-popular domain names can instantly deliver thousands of hits after making only a very small investment. The most important issues users face today have to do with protecting investments in names they are already using and have built up equity in – issues such as how domain names are renewed, deleted or transferred among registrars. Restricting the market for TLDs is a response to the problems of 1996, not the issues of 2003.

ICANN's policy toward TLD addition perpetuated artificial scarcity, and hence prolonged the problems associated with it. It chose to create only two new open, commercial TLDs (.info and .biz), thus creating a nice, fat target for speculators, cybersquatters and defensive registrations. Artificial scarcity necessitated "sunrise" procedures and other adjustments to the expected "land rush". Even so, the number of defensive registrations was much lower than expectations. Early fears were that a new TLD might attract as many as 1 or 2 million defensive registrations alone. In reality, neither TLD has managed to exceed 2 million registrations in total, and one study estimates the number of defensive registrations as about 20 percent of the total, or about 150,000.³⁰ At any rate, the environment created by this artificial limit on the number of new TLDs cannot be used to predict how the market or user behavior would respond to a regime of regularized open entry.

5.2 Are auctions the right assignment method?

Some criticism may focus upon auctions as an assignment method. We feel that auctions are the best way to determine who should get a TLD when not all demands can be satisfied. The bids reflect the real opportunity cost of picking one applicant over another. For applicants, it is a more determinate procedure than a beauty contest. They know that their chances of success increase with every increase in the monetary value of their bid. At every round of the auction process, they can see what they need to do to get their TLD in the accepted pool. In a comparative selection process by the Board, applicants have no idea how much additional investment in preparation or lobbying will increase their chances of success. It is a more impartial and objective method of selection, eliminating board discretion.

We recognize various potential problems with auctions. The proposed addition of 30 commercial TLDs per year is a somewhat arbitrary number. If the real demand for TLDs far exceeded that number, auction prices could be bid up to high levels, imposing higher costs on applicants. There are also questions about the ability of government agencies and major, regulated and possibly subsidized utilities to bid in the auction. However, our proposal that the winning bidders pay only the amount of the *lowest successful bid* would do a lot to ensure that the auction prices paid would remain at reasonable levels.

³⁰ Ben Edelman, "Survey of Usage of the .biz TLD," June 2002.
<http://cyber.law.harvard.edu/tlds/001/>

Because developing countries and noncommercial applicants may have a worthy proposal but be unable to outbid commercial applicants, we have proposed a reservation (10 noncommercial TLDs) and a random selection procedure for assigning those TLDs. Of course, not all noncommercial applicants have few resources; see the discussion of <.health> below.

Some may note that in the wireless arena, auctions have produced what appear to be inflated prices for spectrum assignments, creating financial burdens on prospective service providers. This is not a valid criticism of our procedure for assigning domain names. The 3G auctions were a once-off deal, an auction in which all the spectrum available for 3G development was offered at once in an artificially limited number of licenses. Failure to participate in this auction meant that service companies were blocked from the 3G market forever. Many economists criticized the structure of these auctions as encouraging monopolization of the market and inflating prices for spectrum.³¹ In our procedure, the name space would be expanded continuously at a defined rate (40 new TLDs per year). This would reduce the scarcity value of bids in any given auction, and would be very unlikely to produce the kind of inflated, speculative prices associated with the 3G auctions.

Below, we answer some of the typical questions that an auction procedure might raise.

Would auctions force new entrants to pay extraordinarily high prices for TLDs?

Unlikely. We don't yet know what the equilibrium auction price would be, or even whether competitive bidding will be necessary at all. But the expansion of the top level name space proposed here is substantial and occurs every year for an indefinite time period, so the level of scarcity should be minimal and hence the price should be reasonable.

It should also be noted that the auction method we advocate would not require bidders to pay their actual bid price. They would only have to pay the price set by the 30th-ranked bidder. For example, if the highest bidder in the auction bids \$100 million for a <.sex> TLD and the 30th-ranked bidder offers \$75,000 for a <.wine> TLD, all 30 successful applicants would pay \$75,000. However, if there were multiple bidders for .sex, an ascending bid auction would be held and the winner would have to pay the second-highest price, which could be substantial. In those cases, however, the high prices would be confined to the strings with the highest commercial value, and in those cases we think it appropriate that any winner pay the market price for it.

³¹ "The limitation of the number of national UMTS licenses to 4-6 has not been determined by spectrum scarcity, but rather by national policy decisions. Most countries could issue eight or ten licenses if they wished. And the World Radio Council (WRC) allocated even more spectrum in May 2000 for 3G assignment. This so called spectrum scarcity for 3G licenses is an artificial barrier to entry created national government policies." William Melody, "Assessing Highly Imperfect Mobile Markets," *Telecommunications Policy* 25,1 and 2 (March 2001). <http://www.tpeditor.com/editorials/2001/ed25-1+2.htm>

Recall that ICANN's initial set of TLD applications required a US\$ 50,000 fee. That led to only 44 applications at the height of the domain name boom. It is quite possible that had our auction procedures been used back then applicants would have paid less than \$50,000 each.

What if less than 30 applicants want TLDs in a given year – won't the application process and TLD additions impose costs on ICANN that will not be recovered due to the lack of an auction?

No. Processing applications is covered by a separate, cost-based fee, and ICANN will determine the actual cost of entering a TLD into the root zone and use it as the reservation price when no auction needs to be held.

Would this method push the .com problem to the top level, as every company in the world tried to get its name in the top level?

No. A maximum of 30 commercial TLDs can be added to the root every year. At that pace, it would take 100 years to add only 3000 company names. Also, firms that are interested will have to pay cost-recovering fees and, if there is a mad rush of applicants, outbid all other applicants to be successful. A TLD cannot possibly become a vanity tag under those conditions; companies that cannot generate substantial revenue or business value from the services derived from a TLD are not going to throw money away in an auction for a resource they don't need.

What happens to the TLD applications that were proposed but rejected in ICANN's first round in 2000? These applicants have already paid \$50,000 to apply. Isn't it unfair to make them go through the auction process?

We agree. Our proposal calls for these proposals to be given a guaranteed slot in a round of commercial TLD additions held in 2004.

Could the auction procedure be abused; for example companies with no intention of operating a registry could enter applications and bids simply to block or pre-empt a firm that really wants and needs a TLD?

Collusion and manipulation of auctions can be avoided with proper design. Also, the larger the number of bidders the more difficult and costly collusion becomes. Since an auction is held only when the number of applicants exceeds 30, collusion would be difficult.

Once there are a sufficient number of bidders, the flexibility of the multiple round auction makes manipulation very difficult. Any bidder can enter as many names as they like, and bid what is necessary to get it into the top 30 during any round. Playing a spoiler role would be extremely expensive and difficult under such circumstances.

One could also consider perverse blocking to be a feature of ICANN's *current* method. In "beauty contests," applicant proposals are public; the whole world can see what names an applicant wants to operate and the content of the business plan. They can then engage in lobbying and various forms of publicity, blacballing and hidden pressure to attack the idea. These kinds of tactics may cost them very little in relative terms.

Who gets the money from the auctions?

Ideally, ICANN and the root server operators should split the proceeds according to a formula that reflects the relative cost burdens imposed on them by adding TLDs. We acknowledge that if TLDs prove to be unexpectedly popular and very high auction prices result, this could produce an embarrassment of riches. We welcome suggestions as to other forms of distribution of the proceeds. We also acknowledge that many non-US organizations will be less than thrilled about paying large sums to a U.S. government contractor, but this is an implied criticism of the institutional arrangement, not of the auction procedure.

5.3 Do we need a “taxonomy” of sponsored, restricted domains?

One proposal is that new TLDs should be permitted but all new TLDs would be part of a fixed, mutually exclusive set of categories that users would be stuffed into.³² All new TLDs would be sponsored and restricted, and registries will be forced to authenticate registrants “to ensure that they are registering names that are germane to their businesses and not infringing on another's intellectual property.”³³

Forcing all new TLDs to carefully authenticate a correspondence between the identity of a registrant and the TLD name would make all domain name registration a slow and manual process. Costs would quadruple over what users pay now. With the exception of a few very small TLDs that are noncommercial and subsidized (e.g., .edu, .mil and .museum) efforts to restrict access to domains have proven to be more difficult than expected. Both .biz and .name, for example, contain thousands of registrations that do not conform to the policy restrictions associated with the domain.

We do not oppose and may often favor the creation of new TLDs that are sponsored and restricted. But many users have no interest in or need for authenticated and restricted domains. That is why there are thousands of times more registrations in open domains than in restricted domains.

A top-down and entirely restricted approach to naming will not be responsive to actual user demand and user needs. It is impossible for ICANN or any central authority to predict what names or categories users will find useful and desirable. Tastes, conditions, and names of interest change over time. Names like <.blog> and <.enum>, utterly meaningless a few years ago, have entered our vocabulary and become important. Linguistic, economic, and political diversity militate against atop-down approach. A uniform categorization scheme will result in semantic conflicts; a category name in English might mean something completely different in German.

Advocates of a “taxonomic approach” believe that by grouping millions of domain names into defined categories, ICANN will make it easier for Internet users to “find things on the Internet.” This premise is incorrect. As discussed above, Internet users

³² “This taxonomised structure opens up a range of places where individuals, companies and organisations will find a place they want to be, and where users can easily find them. ... The ability to buy a name in a particular TLD will be restricted to those who can demonstrate they are bona fide members of the target group.

³³ BC position on new gTLDs December 2002 page 2.

do not search the Internet by scanning lists of domain names. Even if a clean, intuitive “taxonomy” of TLDs could be defined, each TLD would have at minimum thousands of entries in it. The largest ones (like .com, .net, .org, .de and co.uk) would have tens of millions of entries. No one seeks content by scanning a list of registered domain names and trying to guess what services or content is stored at them. Users have a variety of far more sophisticated tools at their disposal, such as search engines, portals, and referrals.

The primary function of domain names is not to help up find things we are looking for. Domain names are not a directory and have only minimal usefulness as a search token. Domain names are just memorable identifiers. Their purpose is to assist us in easy communication. That is why they have to be memorable, not systematic. Most people's memory works through association rather than categorizing.

ICANN’s basic mission is simply to coordinate unique parameters to permit stable and consistent operation of the root zone. It should not attempt to tell the public what names they “ought” to adopt or what categories they “ought” to fit into.

5.4 Should names be separated from registries?

Another potential criticism of our proposal is that registries should have no control over the TLD names that they operate. Instead, ICANN will define all TLD names and assign operation of the names to “qualified” registry operators.

The fundamental difference between this proposal and ours is that name additions are not demand-driven and regular, but are imposed on the market in a top-down fashion. In that respect, the proposal is similar to the “taxonomic” idea discussed above. But separating the name from the registry has important implications for the market structure and market process of the domain name registration industry.

First, competitive entry would be discouraged by the inability of a registry operator to have any control over the name they supplied. It is noteworthy that *all* new entry into the domain name registry market since ICANN’s inception has come from specific registry operators interested in supporting specific names that they believe would attract specific user communities. The separation concept reveals a very basic lack of understanding as to how markets operate and how innovation and competition occur in a market economy. Consider the following questions:

- Who is going to finance and build a domain name registry when they have no idea what name, if any, they are going to operate?
- How can prospective registries construct a business plan and raise capital if they do not know whether they will be awarded something on the scale of <.com> (tens of millions of registrations) or something on the scale of <.museum> (with only two thousand registrations)?
- How can prospective registries develop effective marketing and branding concepts if they have no interest in the name per se and no prior ties to the communities served by the TLD?
- Why should a community of Internet users that invests time and money in getting a name established have no control over which operator provides them with registry service?

- Separating the name from the registry would harm technical innovation. Registries are databases. The structure and operation of a database are very sensitive to the type of data one is dealing with and the unique needs of the users of the data.

Separating the name and the registry does not make it easier or more efficient to protect the investment of registrants when a registry goes out of business. The only protection that users can have against a failing registry is that its DNS records are stored somewhere and can be transferred to a new operator willing and able to serve them. Under a normal, market-oriented regime failing registries would sell their customer base and associated records to a surviving registry. In a competitive market many operators will be happy to purchase additional customer base. In a regime where ICANN controls assignment of names to registries ICANN will, at best, ask available operators which registry wants to take over the names, and if multiple operators are interested it will hold an auction for that right. This is not much different than the effect of a market, except for the interposition of an intermediary. At worst, ICANN will simply order a registry to take over and serve the names regardless of whether it wants to or it feels it has the capacity to do so – a method unlikely to produce good service. At any rate *either* response to failure does *not* require strict separation of the name from the registry. ICANN could have the authority to order existing registries to take over the names of failing registries regardless of how names are initially proposed and assigned.

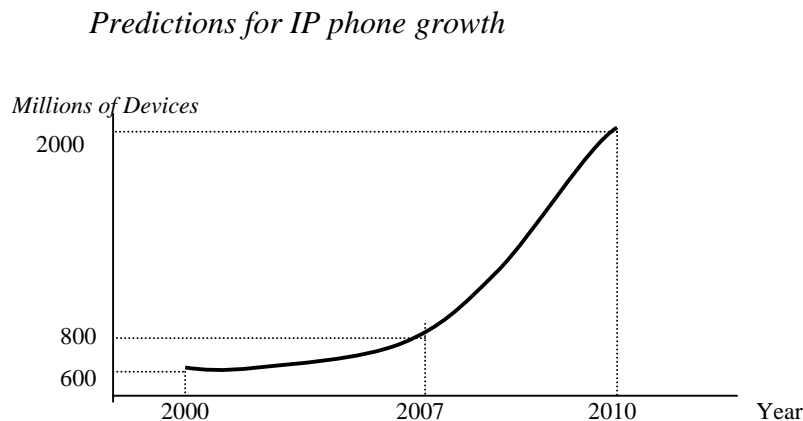
Finally, any TLD creation method that separates names from registries must determine *how* would names be initially assigned to registries. If names are assigned to registries based on *ad hoc* decisions of ICANN's Board or staff, then the assignment process is rife with opportunities for political haggling, discrimination, collusion and insider dealing (registries and registrars play a major role in selecting the Board). If names are assigned on the basis of competitive bidding, then the bids will reflect the value expected of specific names, and the results would be very close to our own proposal, which allows registries to propose their own names and bid for the right to operate them.

6. Case Studies of TLD Additions

This section provides three examples of proposals for new TLDs that have been delayed by ICANN. In two of the cases, we see a common pattern: ideas that have significant merit, and command support from important business or organizational actors, have been placed into suspended animation by ICANN's unnecessarily cautious and restrictive policies toward TLD creation and management. In both cases, ICANN has inadvertently slipped into the role of an authority passing judgment on the relative merits of business proposals, rather than serving as a technical coordinator facilitating market entry while maintaining stability.

6.1 Proposals for an m-TLD (.mobile or similar)

Mobile phone use has been on the increase and predictions are that by the year 2010 over 2 Billion IP enabled phones will be in use. Given the convenience of accessing information through a phone, there has been high interest in providing internet services through a broad range of Internet appliances including mobile devices.³⁴ While numerous phones and calling plans already offer internet access, slow download speeds have kept internet use to a bare minimum amongst cell phone users. But the advent of third generation digital phones (3G), along with technical breakthroughs in compression and data transmission technologies, are expected to bring about a drastic increase amongst the web enabled/internet ready phones.



Source: McKnight and Shuster, in McKnight, Lehr, Clark, *Internet Telephony*, 2001.

³⁴ For more on the convergence of voice telecommunications and Internet data services leading to new applications and markets, including for mobile media, see Lee W. McKnight, William Lehr, and David D. Clark, eds., *Internet Telephony*, MIT Press, 2001

The development of this mobile-internet market depends on several criteria coming together at the right time:

The availability of mobile-ready content: a sufficient amount of mobile-ready content needs to be available in order to induce mobile consumers to purchase this service. This content needs to be easy to access and to use.

The ability to provide mobile content at a sustainable price: the content needs to be priced in such a manner as to induce mobile consumers to purchase this service. At the same time, businesses need to be able to develop viable business models that will encourage them to enter this space as the market develops.

Convergence on standards: the necessary name allocation procedures as well as technical standards and protocols need to be developed by the industry in order to ensure proper operation and global adoption.

Many firms in the mobile industry believe that these factors can be pushed forward through the creation of a new TLD for mobile users (an mTLD).³⁵ They believe that without an mTLD, this market will develop more slowly and be fraught with problems due to lack of common standards for mobile access. In their view, ICANN's inaction regarding the allocation of new TLDs can greatly hinder the development of the whole mobile internet space.

6.1.1 Why an mTLD instead of a SLD?

The successful adoption of mobile internet content by consumers will depend on several important factors. Two key ones are:

- The ability of the mobile user to readily identify the content or user he/she is accessing as being "mobile ready":
- The ability to have easily identifiable, short, easy to remember naming system for mobile content and users

It is possible that a new top-level domain name (such as *.mobile) could help to fulfill these needs.

One might consider using lower level domains to provide mobile internet content. This would entail using second-level or third-level domains within an existing TLD (such as .com, .biz). For example, *mobile.businessname.com*, or *businessname.com/mobile*. The problem is that this would provide no marketplace-wide guarantee that the online content has been mobile enabled, because each individual business would use a different naming convention and take different approaches to the supply of information. For example, one business may delegate *businessname1.com/mobile* as the place where they want mobile consumers to access, while another business may delegate *onthego.businessname2.com* as the place where mobile content is stored. In contrast, a top-level domain with fixed naming conventions under the control of the industry will indicate clearly that the content has been

³⁵ Cite public UMTS documents

customized for mobile access. In short, an mTLD will act as a signaling mechanism for consumers.

Using second-level or third-level names under an existing TLD is also bound to create names that are longer and harder to remember than naming conventions based on a TLD. For mobile users, short and easy to use names are particularly important.

6.1.2 Industry-wide cooperation and an mTLD

An mTLD also has the potential to provide space for personal names of individual subscribers; e.g., *yourname.per.mobi*. This would provide an alternative to imperfectly-portable telephone numbers. In the U.S., mobile telephone numbers are still not portable across service providers. This constitutes a major switching cost that limits the effectiveness of competition. Even when mobile telephone numbers are portable, the geographic range of portability and interconnection may be dramatically limited by national regulations and regional standards conflicts. Internet-based communication, on the other hand, is global in scope, and naming conventions associated with finding mobile devices ought to be as well. The replacement of national, non-portable or semi-portable identifiers with global identifiers fully portable across service providers could have revolutionary effects on the industry.

Equally important, having an mTLD will enable industry-wide cooperation and standardization around a single effort. Organizations (businesses, consumer and public interest groups, regulators) can come together to develop naming conventions as well as data presentation, compression, transmission and access standards for mobile devices. Without a unifying entity (such as an mTLD), it is quite possible that the market for mobile content will develop in a highly fragmented manner, prompting slow adoption by consumers. Currently, those who wish to catalyze this industry-wide cooperation are frustrated by rigidity and ad hoc nature of ICANN processes.

All of their attention must be devoted to currying favor with ICANN's Board and management to build support for creating the TLD, rather than on building the value proposition of a mobile Internet. While the effect is not intentional, ICANN's artificial scarcity may actually discourage cooperation among relevant organizations, because the "prize" of a TLD is so rare and scarce that whoever gets one is granted enormous power relative to those who are not so lucky.

One of the most important reasons for an mTLD is having the authority to manage and operate the mobile name space. Not granting a new mTLD would force the constituents in the mobile internet space to implement their operations under the restrictions of existing TLD's and their owning/governing entities. Mobile internet businesses and users would be dependent on and subject to rules of operation and service level expectations that were made for users accessing the Internet through standard computer terminals. All indications show that the expectations of the mobile user would be vastly different from that of the static internet user. For example, mobile internet users might

- Require much faster lookup times

- Access the internet more times per day than normal internet users but stay online for shorter periods

The .com TLD already controls over 25 million assigned domains, and this would rise if large numbers of mobile internet users are to be served within that domain. Would the look up times expected by the mobile users be served by the already-over subscribed .com registry? What incentive would the .com (or other) registry have to change its current operational procedures and governance in order to meet the unique needs of mobile internet users? In the telecommunication services space this would be the equivalent of forcing enterprises to depend on the telephone companies to install, own and run their Local Area Networks, instead of provisioning their own – an act most businesses would reject.

A separate mTLD would enable the consumers and businesses in the mobile internet space to control their own destiny, instead of being dependent on non-affiliated third party service providers who have multiple constituencies with very different needs.

6.1.3 A fixed TLD addition procedure and the “virtuous cycle” of innovation

Realizing the promise of the mobile industry depends on sparking a so-called “virtuous cycle” involving positive feedback among disparate elements of the value chain. The availability of innovative products at a suitable price leads consumers to purchase these products, thus spurring businesses to innovate more, further fueling consumer demand. A virtuous cycle of this sort needs to be started in order for a new market to develop. In the case of mobile internet services, customers will use the mobile internet if it provides the type of information they want in the way they want it (i.e. fulfilling some of the criteria identified above, such as simple, easy to remember names, mobile ready content etc.), at a price that is affordable. Similarly, businesses will enter the mobile internet space to fulfill this demand if they see that consumers are interested, there is significant growth potential, and the potential for economic returns.

ICANN is not the only obstacle to such a cycle, but many participants in the mobile industry see it as a significant one. They would like to see ICANN help jump start this virtuous cycle of innovation, competition, and adoption by routinizing and making more predictable and certain its process for granting new TLDs. Once the mobile industry can gauge with confidence *if* and *when* a new mTLD will be authorized, businesses will start creating the necessary products and services that can serve consumers. Given the natural time lag between companies investing in research and development to the time that a product comes out in the market, the earlier ICANN sets expectations for a new mTLD introduction, the better the chances of introducing new mobile products into the market. With a clear signal from ICANN,

- Content providers, application developers and other businesses related to wireless services can start developing new technologies
- Industry and consumer groups can start developing vital naming and other standards (such as global identification schemes for mobile users)

- Operators can develop operational procedures, integrate mobile internet services into current billing systems (in an ideal situation, a mobile operator automatically signs up a user, and allocate a unique internet ID) each time he/she signs up for new mobile service. This automatically increases the number of users who utilize the mTLD space. More users will increase the # of mobile websites through the mTLD and thereby increase the overall market size of Mobile internet services)

In conclusion, there are potentially beneficial aspects of an mTLD. Of course, there are also many potential pitfalls. The industry may fail to coalesce around a single one for various reasons; users may not find the value proposition compelling; some radical new technology could displace the whole traditional mobile wireless industry. There can be no certainty that an mTLD will work. But that lack of certainty is in itself the point. Decisions about what works and what does not can only be made through trial and error in the *marketplace*. ICANN should not set itself up as a substitute for that process. For the marketplace to function properly, innovators and entrepreneurs have to be able to try things. In order for this to happen, ICANN should serve only as the coordinator of market entry, not as a roadblock that tries to predict or guarantee which high-technology businesses will succeed or fail or which business plans add value and which don't.

6.2 A TLD to end all TLDs? The .dns idea

A TLD proposal that points in a radically different direction was proposed by Bob Frankston, the co-developer of the first spreadsheet software (Visicalc) and formerly a developer with Lotus (1986 to 1990) and Microsoft (1993 to 1998). Frankston wants ICANN to create a new <.dns> TLD where completely meaningless but permanent and persistent domain names can be assigned to Internet resources. As Mr. Frankston put it, "We're selling numbers. Big numbers and we promise that we'll never sell the same number twice. More to the point, we are selling handles that can be used to maintain stable linkages across the Internet."

Meaningless, numerical domain names? Wasn't the purpose of domain names to make Internet identifiers easier to use through semantics? This seemingly bizarre idea makes more sense when the issues of identifier persistence and stable links are taken into account.

Consider what happens now when a web site named www.goodkiddies.com is used by a children's toy manufacturer. The toy manufacturer, known for fun, high quality goods for small children builds up a clientele over time. But then it goes out of business, or merges and consequently fails to renew the domain name. For months, maybe even a year or two, web sites all over the world that link to <goodkiddies.com> will have broken links. Worse, once the name expires the same name can be registered by anyone else who gets there first. This could include, say, a pornographic web site eager to ensnare the

attention of unsuspecting web users. The harvesting of expired domain names is now a well-organized business.³⁶

Or maybe the toy manufacturer simply forgets to renew its domain. Unless it has an ironclad trademark on the term “goodkiddies” its absent-mindedness is likely to result in the name being lost to someone else. The toy manufacturer’s business, and the expectations of many of its customers and business partners, may be disrupted.

Under the <.dns> concept, this chain of events would not happen. True, companies will still go out of business and their web sites will disappear. But the unique identifiers would go out of existence with them or, if maintained by archivists, continue to be associated with the same objects. According to Frankston, “A dotDNS name can be used like an ISBN number to identify a document independent of ownership. Of course, this means that we will also use up a lot of dotDNS keys and leave us with a few trillion bytes of stale pointers. Despite our tendency to worry about scarcity let me assure you that there is no shortage of integers or, for that matter, disk space.”

Frankston, like many other technical people,³⁷ believes that the presence of meaning in domain names is the underlying cause of all the legal, economic and even some technical problems associated with DNS. Meaning leads to conflicts over value and property, claim jumping, speculation and lawsuits. Because there can be only one <smith.com>, for example, all the world’s companies and people named “Smith” must compete for that special, premium name. Neither Smith nor Jones would fight over whether they are assigned 23388.5767.dns or 88865.483.dns, on the other hand.

Under the .dns TLD, the names themselves have little commercial value. They have a very low price and are intended to be available essentially forever. Since the names themselves are not special, the number of dots isn't important either. Thus, asserts Frankston, “we can readily structure dotDNS to put little load on the root servers and distribute the load to second or lower level servers. The number of dots is significant only in that they represent a degree of dependency on the servers between the handle's server and the root server. In order to provide stability we require that the principal dotDNS providers be able to assure permanence.”

The actual effort to be a dotDNS registrar is modest since the task is simply to maintain a pointer to the zone associated with the record. An actual implementation, however, will require some design in order to assure that only those authorized can make a change in name server records. One approach would be to associate an authorization key (a crypto key) that acts like sufficient proof of authority. Registrars can offer services such as holding the capabilities on behalf of their users. Of course such services would have a cost and the registrars would charge for it. dotDNS does not intend to be run as a charity service.

³⁶ “When Domains Go Unrenewed, the Opportunists Swoop In.” Washington Post. November 22, 2001.

³⁷ See Paul Vixie, “External Issues in DNS Scalability, “ November 11, 1995, a paper making a similar argument.

The dotDNS concept adduces the following examples of where the market for its approach might be rooted:

The P2P Community: Peer to peer connections need a way to maintain stable linkages for various purposes. Rather than arguing about various naming and handle schemes, dotDNS can provide a simple and bland basis for creating local namespaces. By binding to a dotDNS handle, linkages can be stable over the long term. The P2P effort can then focus on using the linkages rather than just maintaining them.

Schools Sites: Schools have found that it is not safe to put links on their web sites because such links don't just go bad, they are harvested and repurposed for marketing of products that can be very offensive to their users. Having a stable handle largely removes that risk. Of course the site provider itself can change but to the extent you trust the provider you can trust the link.

Archivists and Others: Archivists value linkages that don't unravel if one forgets to pay a bill or shirks responsibility by dying.

Site designers and providers: Instead of putting linkages among sites at the mercy of gTLD names, linkages can use stable dotDNS names. Sites already use long untypeable URLs so this is no different. Since dotDNS names are readily available there is the added flexibility of using base names instead of building in the assumption that the identifiers share a common DNS suffix. The approach is both flexible and stable. It is safe to embed dotDNS links into products be they software or hardware. These can range from help files to small devices inside walls.

6.3 The .health proposal

The World Health Organization has submitted an application to ICANN for the creation of a new TLD for health information.

The allocation of a separate hTLD has implications for users and providers of healthcare services. The benefits of a new hTLD could be numerous – two in particular are worth focusing on: consumer protection and the ability to set standards for healthcare information.

Consumer protection

Perhaps the main goal of setting up an hTLD is consumer protection. Today there are over ten thousand web sites dedicated to health. There are even more if medical and medical-related websites are counted. There is no way for the average consumer to navigate through this information in a logical manner. Due to the large amount of poor-quality information available online, finding specific, useful, information can often be difficult. In particular, finding unbiased information can be challenge. Worse than the navigation problems is the opportunity for user confusion to lead to fraud and abuse over the Internet. This is a most serious problem in lower income and developing countries, where the relatively unsophisticated audiences have been prime targets for various online scams on matters involving their health. A new hTLD can service as a guide to consumers – it can indicate quality, standardized, reliable health information.

Just as an mTLD could signal mobile ready content, the hTLD can serve as a brand that signals standardized, quality information. As in the case of an mTLD, it should be apparent that a second-level domain name will not provide the signaling function. Certainly, users who found their way to a web site using a second-level domain name could benefit from some of the same credibility functions, if the web site was operated by WHO or some other credible organization. But it is much more difficult for a single web site to establish itself in the minds of the global public than it is for many different web sites, all using and advertising the .health TLD, to do so.

Setting of standards for health-related content and ethics

The other key function of a hTLD is to provide point of focus for the various efforts of developing standards for web content. The WHO, as a well respected world organization, is in a particularly suitable position to lead this effort – it can act as a convening authority in the building of an international process about ethics for the web.

They are already industry groups, consumer groups, governments and coalition of concerned groups like the American Medical Association working on the issue of standards. There is danger of differing standards being developed by these various entities. But if ICANN acts without further delay and grants an hTLD, it might be able to help save immeasurable rework by allowing the WHO to bring these disparate efforts under one roof. The WHO, through the hTLD can harmonize the standards already being developed. These standards can then be validated through the member websites that will be in the hTLD.

Just like the mTLD, there is of course the possibility that the setting of standards doesn't progress smoothly even with an hTLD. Existing web sites could refuse to conform to these standards, and might prefer to present their data under the current domain names. But even in the this worse case scenario, an hTLD can at least function as an alternate site on the internet for quality healthcare information.

7.0 Conclusion

This white paper has argued that ICANN can best serve Internet users, developing countries, non-governmental organizations, as well as corporations by rapidly but carefully implementing technical procedures for routine management of the Domain Name System. Sustained innovation in the global Internet economy depends on the ‘creative destruction’ of existing practices, including for names.³⁸

Presuming general agreement with these statements, the most important remaining question is how exactly to do this.

We have demonstrated how ICANN’s procedures for adding TLDs can be demand-driven, light handed, and focused on coordinating the technical parameters of DNS. Further,

We have offered our thoughts on how users and suppliers interacting in a market can decide if specific Top Level Domains (TLDs) are valuable.

The proposed 5 step process for TLD additions takes six months, and can be implemented by 2005:

A two-year ramp-up process would begin in 2003 with consideration of the limited number of additions proposed by ICANN CEO Stuart Lynn.

In 2004, the ‘grandfathered’ remaining applicants from the 2000 round, numbering around 30, would be evaluated through the –in-the-process-of being-standardized procedures for TLD additions. This would serve both to meet those applicants needs by not requiring them to reapply after having paid hefty fees in 2000. Further, this special round would offer an opportunity to ICANN to debug the new procedures and ensure that they are sustainable by the global Internet community.

There are admittedly several open questions which are beyond the scope of this white paper. We invite and encourage to engage in debate on such questions as:

1. ***Can an equitable system for allocating 10 TLDs annually to developing countries and non-governmental organizations be designed?*** Would a random assignment system (in U.S. terms, a lottery) be fair to both developing countries and NGOs? Or would a ‘beauty contest’ administered by ICANN better serve to ensure that there is no cheating and more meritorious applications receive a TLD?
2. ***Where would the money go?*** E-Bay style auctions of 30 commercial TLDs annually might, or might not, generate significant revenues. We have suggested that in the first instance the funds should be used to support the operations of the root servers themselves, on which the entire Internet depends. Secondly, ICANN administrative costs for operating the now streamlined process must be covered. However, a system for use of

³⁸ See Lee W. McKnight, “Internet Business Models: Creative Destruction as Usual,” in Lee W. McKnight, Paul Vaaler, Raul Katz, eds., *Creative Destruction: Business Survival Strategies in the Global Internet Economy*, MIT Press, 2001, 2002, (Japanese translation Toyo Kezai 2003)

surplus funds generated by the associated application fees and auction prices should be implemented contemporaneously with the streamlined procedures themselves, or the process risks being perceived as illegitimate. We suggest that an ICANN Foundation be established to receive those funds for use by developing countries and non-governmental organizations. Activities to support increased Internet access worldwide as well as efforts to sustain the global Internet culture could be supported by the ICANN Foundation.

We welcome further debate on the post-.com Internet, and look forward to 2005!

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Further Reading

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