

The Internet's ORG Domains: a study in self-organizing diversity

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Since they were first conceptualized by Peggy Karp and David Mills¹, the Internet's principal host naming systems have grown and evolved primarily through self-organization. This includes its structure, as well as administrative and technical schema for binding a name to computer connected to the Internet that is currently manifested as the Domain Name System (DNS).

Since the inception of these schema, their success - indeed arguably the success of the Internet itself - derives from the ability of users to self-select their own names on a mutually exclusive basis. This stands in stark contrast to most other naming systems in the formal communications world where some users are handed some random number or name based on a rigid assignment process. The latter are prominently represented by telephone number or telecommunication directory service conventions - E.164, and F.500.²

Where users have had self-selected names, such as with Internet host and domain names, or as with email or instant messenger or game monikers at the application level, the deployment and growth of the services have typically been far faster, much less expensive to administer, more extensive, and generally more successful than those without self-selection.

The beginnings of the ORG domains

Perhaps the most interesting and eclectic parts of the Internet namespace are the ORG domains. The ORG domain was one of first nine domains instantiated on 1 Jan 1985 by the SRI NIC at Menlo Park as part of the implementation of the Domain Name System. The other domains instituted on that date included ARPA, COM, EDU, GOV, MIL, NET, NORDU.NET, and the root.

Because the ORG domain was largely regarded as a defacto USA domain, as country domains were added over the ensuing years to eventually encompass 242 nations and territories, many of those country domains created their own ORG subdomains. Available information suggests this practice now exists in at least 75 countries. As discussed further below, some of these subdomains have been extensively populated. Collectively, they constitute a user affinity ORG community of considerable diversity.

¹ Peggy Karp while at the Mitre Corp in 1971 proposed and then subsequently developed the Internet's host naming system. See P.M. Karp, *Standardization of Host Mnemonics*, RFC226, 20 Sep 1971. David Mills while at Comsat Corp in 1981 proposed the organization of host names based on domains. See D. L. Mills, *Internet Name Domains*, RFC799, 1 Sep 1981.

² International Telecommunication Union - Telecommunication Standardization Sector Recommendation E.164, *The international public telecommunication numbering plan (05/97)*, F.500, *International public directory services (08/92)*.

The origins of diversity

Because Internet name systems had a fundamentally different origin and paradigm (maintenance of autonomous, distributed systems of self-selected names) than those emerging from structured telecommunication standards environments, they always reflected a pragmatic fuzziness. Nowhere was this more exemplified than in the ORG domains.

In October 1984 when the initial top level domain names were designated for what was then the "ARPA-Internet and the DARPA research community," the domains were described as follows:

Temporary

ARPA = The current ARPA-Internet hosts.

Categories

GOV = Government, any government related domains...

EDU = Education, any education related domains...

COM = Commercial, any commercial related domains...

MIL = Military, any military related domains...

ORG = Organization, any other domains...

Countries

The English two letter code (alpha-2) identifying a country according to the ISO Standard for "Codes for the Representation of Names of Countries"³

At the outset, as ORG domains were registered by the Menlo Park SRI NIC, the domains reflected a substantial diversity. The first 53 ORG domains registered are listed in Table 1 – an extract from the NIC database transferred from SRI to GSI in 1991. They included everything from major commercial DOD contractors and Federal government institutes, to hospitals and professional associations, to Internet service providers and product development groups, to individuals and casual discussion lists.

When the SRI NIC published its formal guidelines for registrations in 1987, this emerging diversity was captured in the following categorization:

"ORG" exists as a parent to subdomains that do not clearly fall within the other top-level domains. This may include technical-support groups, professional societies, or similar organizations.⁴

Several years later in 1994, this continuing diversity was expressed as:

ORG - This domain is intended as the miscellaneous TLD for organizations that didn't fit anywhere else. Some non-government organizations may fit here.⁵

³ J. Postel, J. Reynolds, *Domain Requirements*, RFC920, Oct 1984

⁴ M. Stahl, *Domain Administrators Guide*, RFC1032, Nov 1987

⁵ J. Postel, *Domain Name System Structure and Delegation*, RFC1591, Mar 1994.

Table 1. ORG Domains Registered, 1985-1989

MITRE	10-Jul-85	The MITRE Corporation
SRC	25-Mar-86	Semiconductor Research Corporation
ITERUS	8-May-86	SAIC-ITER San Diego Co-Center
SUPER	10-Jul-86	IDA/Center For Computing Sciences
M2C	11-Dec-86	Massachusetts Microelectronics Center
AERO	7-Jan-87	The Aerospace Corporation
MCNC	15-Jan-87	MCNC
RAND	2-Apr-87	The RAND Corporation
MN	4-Apr-87	MN.ORG Domain Park
RTI	1-May-87	Research Triangle Institute
USENIX	14-Jul-87	Usenix Association
SOFTWARE	3-Sep-87	Software Productivity Consortium
FIDONET	25-Feb-88	FidoNet Public Relations
AMPR	27-Apr-88	Amateur Radio Digital Communications
OSF	4-Aug-88	Open Software Foundation
IDA	11-Aug-88	Institute for Defense Analyses
CACTUS	9-Sep-88	The Austin Unix Users Group
NM	9-Sep-88	New Mexico Technet
MI	16-Sep-88	Michigan Unix Users Group
CCF	22-Sep-88	Cleveland Clinic Foundation
ERIM	21-Oct-88	Environmental Research Institute of Michigan
SKI	11-Nov-88	Smith-Kettlewell Eye Res. Inst
ITI	30-Nov-88	Industrial Technology Institute
UCM	2-Dec-88	Matchmaker Electronic Pen-Pal Network
JAX	11-Jan-89	Jackson Laboratory
NCOAST	13-Jan-89	North Coast Computer Resources
NCSC	13-Jan-89	North Carolina Supercomputing Center
NJECN	2-Feb-89	New Jersey Educational Computer Network
AAAI	9-Feb-89	American Association for Artificial Intelligence
IE	24-Feb-89	The MITRE Corporation
OACIS	29-Mar-89	Oregon Advanced Computing Institute
STJUDE	29-Mar-89	St.Jude Hospital
MBARI	11-Apr-89	Monterey Bay Aquarium Research Institute
HOUNIX	25-Apr-89	Houston UNIX Users Group
UI	22-May-89	Unix International
CASTLE	24-May-89	Castle Public Access Unix
HDL	1-Jun-89	Harvest DataLink
CARL	7-Jun-89	Carl Corporation
MSRI	27-Jun-89	Mathematical Sciences Research Institute
AGI	15-Jul-89	The Agouron Institute
SF-BAY	17-Jul-89	San Francisco Bay Public-Access Unix
MEF	31-Jul-89	Ziebmfef Public Access Unix
OCLC	11-Aug-89	Online Computer Library Center, Inc.
EI	23-Aug-89	Engineering Information, Inc.
CAS	5-Sep-89	Chemical Abstracts Services
BATTELLE	11-Sep-89	Battelle Memorial Institute
SUB	12-Sep-89	SUB-NET
AIP	21-Sep-89	American Institute of Physics
SDPA	28-Sep-89	SDPA Center for Regional Studies
NUGATT	1-Nov-89	NUGATT
CANAL	6-Nov-89	Mark H. Weber
LONESTAR	8-Nov-89	Texas Lunch Bunch
IEEE	1-Dec-89	Institute of Electrical and Electronic Engineers, Inc.

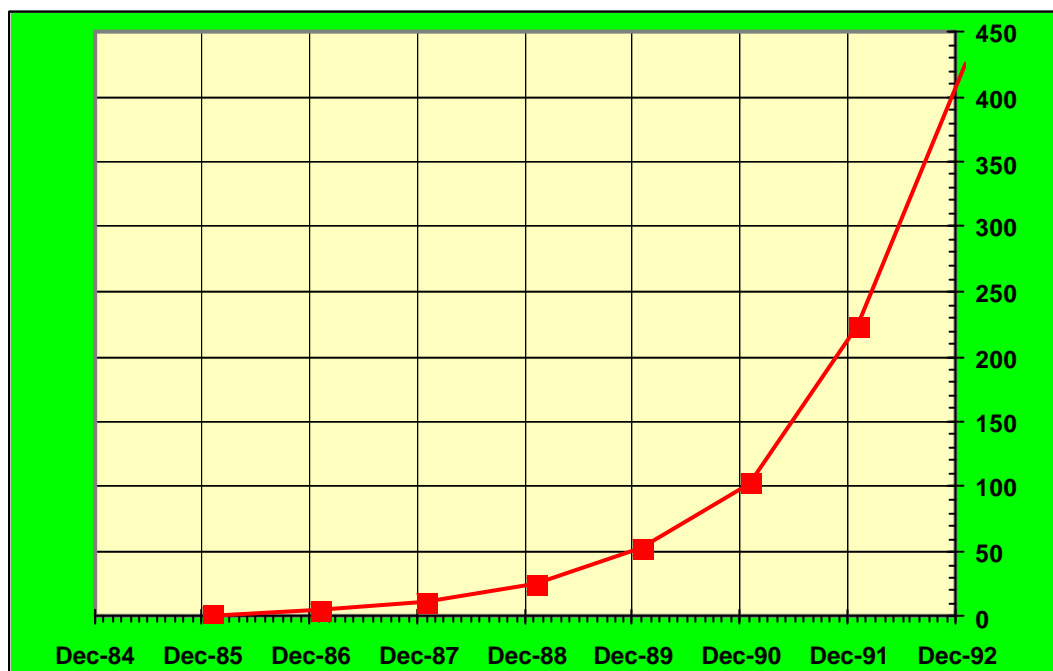
Popular Internet reference works helped propagate the ORG diversity orientation. Doug Comer's domain name table indicates ORG has the "meaning" of "organizations other than those above."⁶ Paul Mockapetris in the Lynch-Rose **Internet System Handbook** indicates the ORG domain has the "contents" of "other organizations."⁷

The first major country code domain added in 1985 – UK – emulated the self-selecting namespace schema with an ORG.UK domain, as did Israel in the same year with ORG.IL. In 1986, many of the successive new country NICs (with the exception of France who chose ASSO.FR) established similar ORG subdomain approaches. These included Australia (ORG.AU), Japan (ORG.JP), Sweden (ORG.SE), and Korea (OR.KR).

Growth and development of the ORG domain

The early use of ORG domains – like DNS generally – was not significant, but did display an exponential growth trend. See Figure 1, below

Figure 1. ORG registered domains 1985 - 1992



This pattern of growth of the ORG domains generally proceeded at a relatively slow pace until the early-90s when the growth became even more exponential..

⁶ Douglas E. Comer, **Internetworking with TCP/IP**, Prentice Hall, 2nd Edition, 1991, Fig. 20.8 at 316.

⁷ Paul V. Mockapetris, Chap. 11 in Daniel C. Lynch and Marshall T. Rose, editors, **Internet System Handbook**, Addison-Wesley Publishing Company, Inc, 1993, Table 11.1 at 485.

Figure 2. ORG domain growth 1992 - 2002 (log scale)

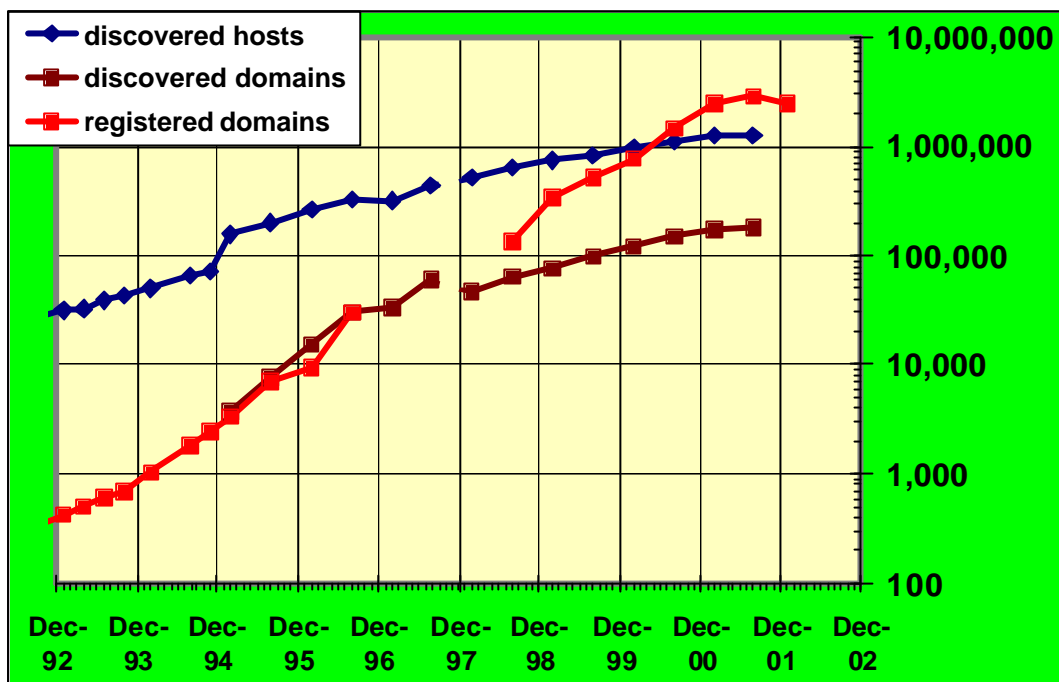


Figure 2 depicts three key ORG development metrics on a log scale. These include the number of registered domains,⁸ as well as those domains and their associated hosts discovered in actual use by Mark Lottor's Network Wizards – who has expertly undertaken these measurements on a regular basis for nearly two decades.⁹

Until the 1997 timeframe, the number of domains in actual use rather closely paralleled the registered domains. However, as registrations increased significantly to obtain the rights to a name, and as increasingly large numbers of domains became homed on a single host, the domains-in-use value appears to have a slower growth rate than those registered.

Also notable are the host to domain ratios – which have substantially decreased as users elected to obtain their own domain name identifiers – and the diminishing rapid increase in ORG hosts – which is substantially attributable to the extensive deployment of firewalls.

⁸ See NSF InterNIC reports; Zooknic, <http://www.zooknic.com/Domains/counts.html>

⁹ See *Internet Domain Survey*, <http://www.isc.org/ds/>

Figure 3. ORG discovered domains growth, 1992 - 2001

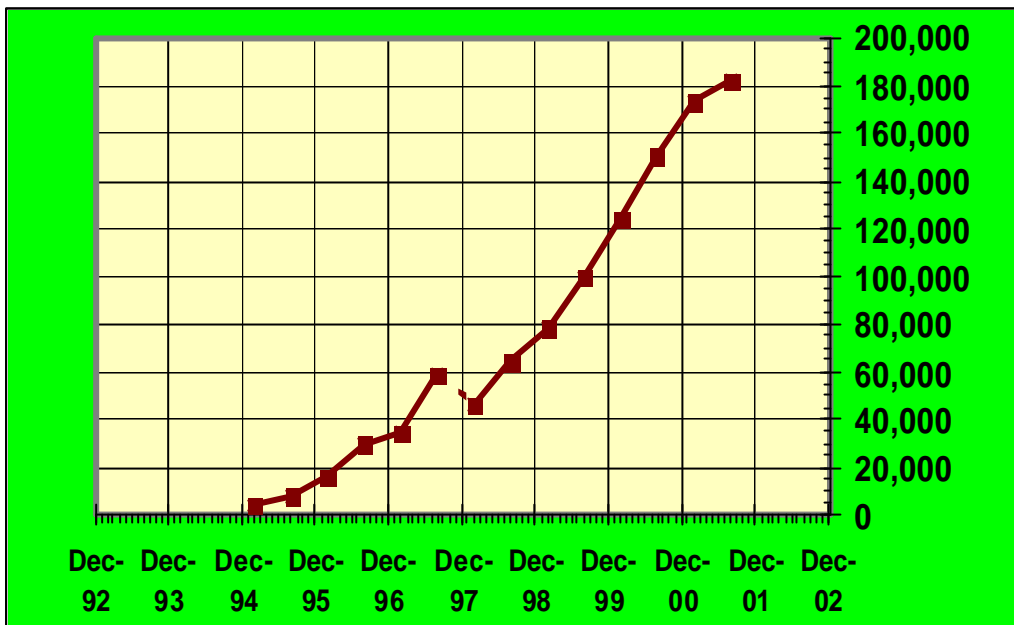
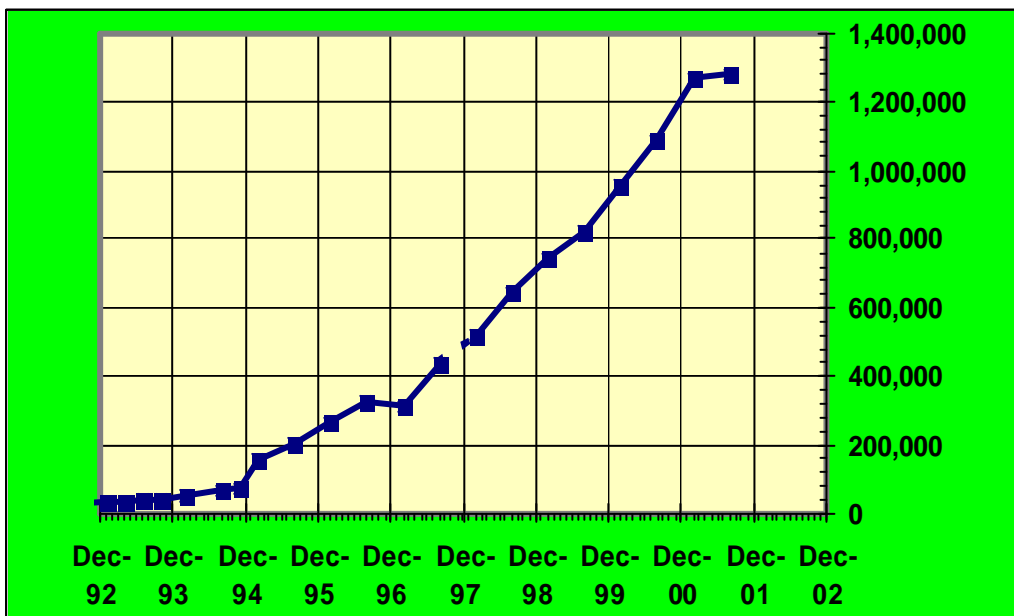


Figure 3, above, shows the ORG domain-in-use growth on a linear scale – which more clearly depicts the growth, as well as a small discontinuity in 1996 arising from a shift in the measuring technique used.

Similarly, Figure 4, below, shows the ORG hosts-in-use growth on a linear scale.

Figure 4. ORG discovered hosts growth, 1992 - 2001



The growth in registered ORG domains on a linear scale is shown in Figure 5, below, with additional detail for 2001 shown in Figure 6. The growth has changed dramatically in 2001 as the last half of the year witnessed a decline in total registered ORG domains. The year 2002 began with about the same number of ORG domains as at the beginning of 2002 – likely from the expiration of those frivolously registered.

Figure 5. ORG registered domains growth, 1992 - 2002

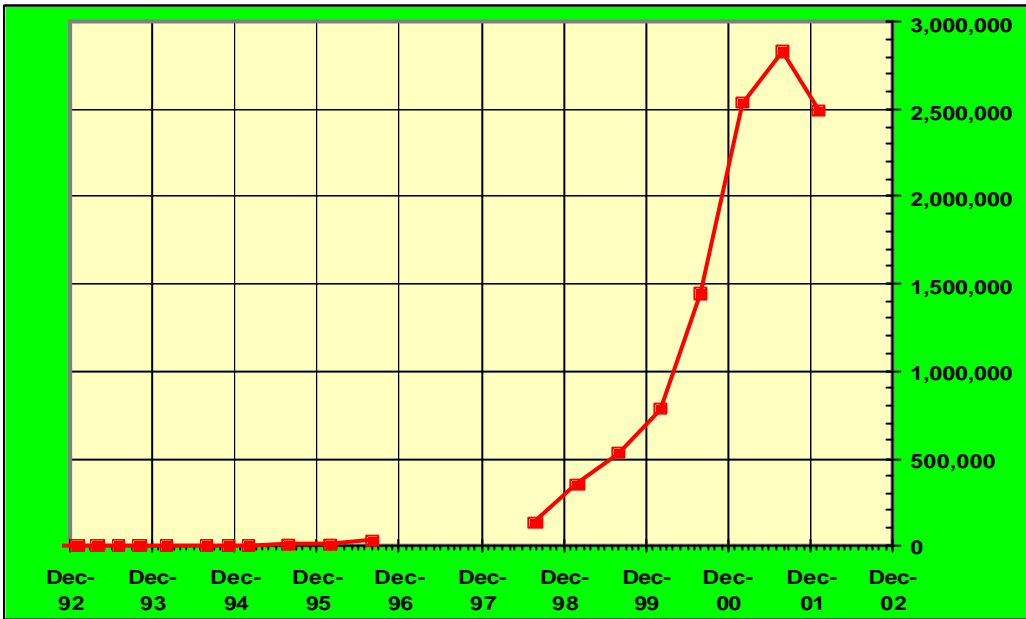
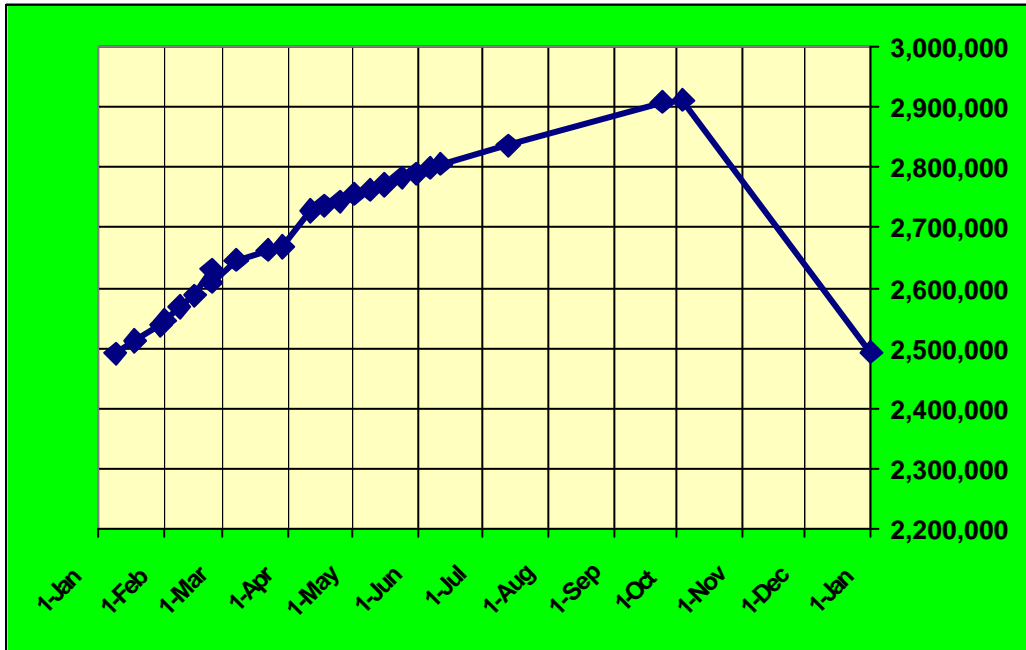


Figure 6. ORG registered domains growth, 2001-02



Current statistics concerning the country distribution of ORG domain residents are not available. However, the analysis of Lottor's data by John Quarterman of Matrix.Net in 1996 indicated that 87% of the ORG domain registrants were USA based, with the remain 13% distributed predominantly in Canada and the UK, combined with a small number of other countries. More current analysis by Matthew Zook indicates that by Jan 2001, for gTLDs as a group, 40% were registered to entities outside the USA.¹⁰

Growth and development of the country ORG domains

As the Internet grew and extensively expanded globally through the 90s, increasing numbers of countries established registration Network Information Centers (NICs) to create country DNS namespace. Some chose to structure the space with ORG (occasionally OR) subdomains, while others did not. Some chose relatively unfettered, self-selecting registration approaches, while others established extensive rules and requirements – frequently with associated high fees. The former generally were extensively used, while the latter experienced fairly moribund growth.

Table 2. Major country ORG domains

Domain	Country	Level 2	Level 3	Level3/2 ratio
uk	United Kingdom	69	67,125	973
au	Australia	69	44,251	641
hk	Hong Kong	18	10,515	584
nz	New Zealand	22	11,094	504
za	South Africa	30	13,445	448
tw	Taiwan	35	10,342	295
mx	Mexico	133	22,525	169

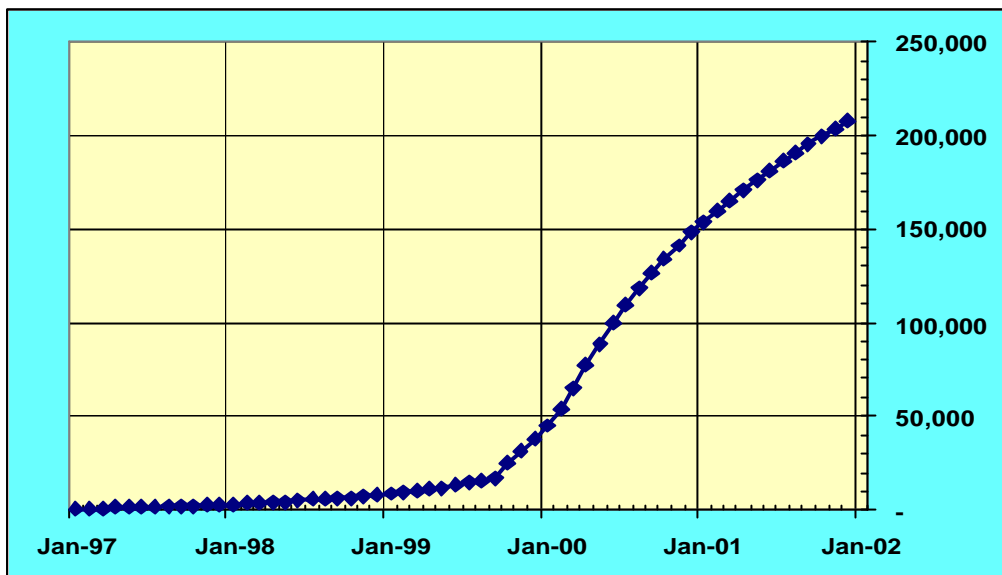
Table 2, above, depicts the major country ORG domains derived from Lottor's latest discovered domain statistics. It shows those countries that for those countries with a significant number (>10,000) of level 3 domains, those with high level3/2 ratios. What this reveals are those counties that have an exclusive sub-domain name structure with substantial ORG registrations under their country domains. All these are of the style ORG.[ccTLD]. Among these, it is only the United Kingdom and Australia that have well-populated ORG sub-domains.

The most successful country in attracting a large ORG user base is the UK – by virtue of its liberalized policies. Although the usage guidelines currently suggest ORG.UK should "correspond" to a "non-commercial organisation,"¹¹ there are no checks of any kind, and enormously diverse entities have registered names. The practice has been so successful that today there are 208,000 registered ORG.UK domains – almost equaling the number of CO.UK domains. The growth over the past five years is depicted in Figure 7, below. The data is publicly available on the Nominet website.

¹⁰ See <http://www.zooknic.com/Domains/index.html>

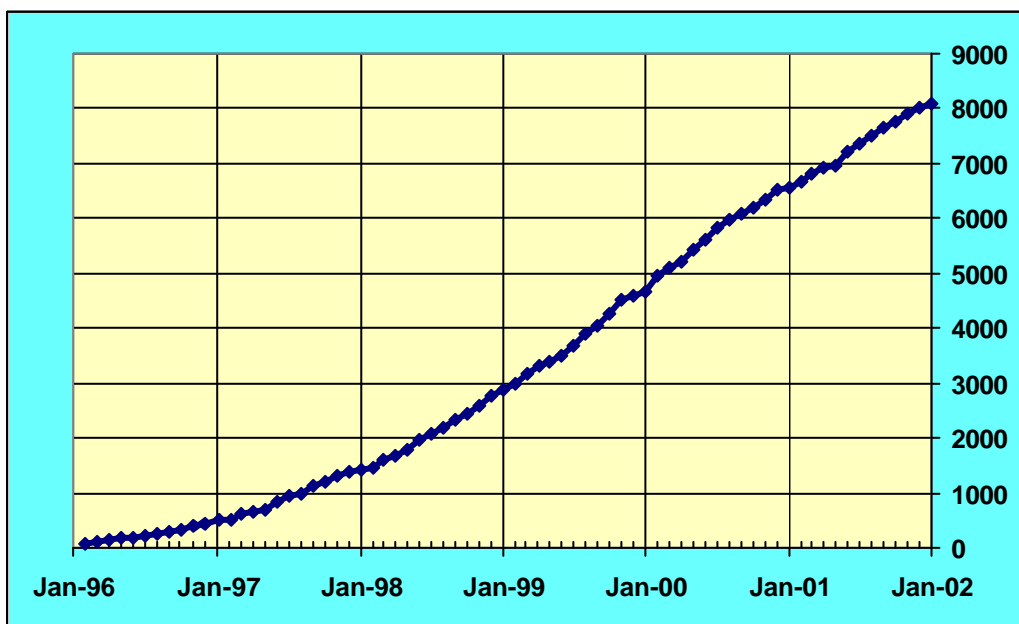
¹¹ See Nominet.uk, *Registering a Domain Name*, <http://www.nominet.org.uk/guide/reg1.html>

Figure 7. ORG.UK registered domain growth, 1997 - 2001



The Australian ORG.AU domain - by contrast to ORG.UK – maintains an administrative process that does subject applications to some review. It's growth is depicted in Figure 8, below. Data is courtesy of administrator Robert Elz.

Figure 8. ORG.AU registered domain growth, 1996 - 2001



The benefits of market-driven diversity

It is sometimes said that the ORG domains are those for "non-profit" organizations. However, except for a few highly controlled national administrative regimes, this is patently not the case. By design, the ORG domain itself has always been, and remains, a specified catchall domain for any and all kinds of organizations, and the largest country ORG domain, ORG.UK appears to exhibit a similar broad distribution.

An enormous number of commercial, government, and educational organizations have a significant compelling need to create "organizations" ancillary to their activities. These may be permanent or adhoc study groups, developer groups, or product and brand-related groups. The ORG domain even includes large numbers individuals who establish countless virtual groups based on a family name for heritage and ancestral purposes that are facilitated my major research organizations like the Mormon Church.

In some countries, there are registration restrictions attempted such as incorporation. However, there are all kinds of groups that never get incorporated. Indeed, the vast majority do not. Prominent examples even in the Internet community include the IETF, IAB, IANA, etc. In practice, imposing restrictions creates significant delays and costs with many ambiguous registrants that serve so apparent useful purpose.

Because the ORG domain (as opposed most ccTLD ORG domains) initially and for the past sixteen years been under administered by USA entities that have imposed no restrictions by design, it has exhibited a dynamicism and produced invaluable benefits for a highly diverse user class, and even the economy at large. The last has arisen from the ability of entrepreneurs to immediately create affinity and marketing groups for new products – whether it is a new software platform or motion picture film.

Perhaps the most overlooked value proposition for the ORG domain as a catchall category by the original DNS namespace designers – it allowed entrepreneurs of all kinds to immediately create adhoc Internet-facilitated organizations.

Conversely, imposing restrictions is difficult, procedurally complex, costly, time consuming, and incurs legal liabilities. Because terms like "organization" or "non-profit" are so highly ambiguous and variable among different jurisdictions, it is not apparent what substantive purpose would have been served to have constrained use of the ORG domains. To have done so would have significantly throttled the development and growth of the Internet, and certainly been antithetical to it's self-organizing properties.

Name and addressing systems have a history that goes back to the beginnings of human record keeping and written communications. Different attitudes and cultures have been evident. There are those who favor well structure and administered namespaces. Others favor more self-organized, chaos-like namespaces that are essentially market driven.

In relatively current computer networking and communications history in the 1980's and early 1990's, huge international and domestic efforts were undertaken under the auspices of the International Telecommunication Union (ITU) and International

Organization for Standardization (ISO) denominated by their mandated global standards as X.500 and F.500. X.500 defined the namespace, while F.500 mandated a global administrative schema. The entire *de jure* formal international standards communities spent years developing what they believed was the perfect multimedia/communications namespace structure and administrative schema.

One of the leaders of this effort was asked about the rather extraordinary length and complexity of the identifiers and the difficulty showing them on business cards, and whether this wouldn't impede its use. His reply was that this didn't matter, and that people would do as they were told by their governments. This same standards community scorned and derided the Internet developments for their lack of structure and administration – whose early innovators had a history for creating wild names on a whim that sometimes make personal statements. Even at the national level, this was reflected in the choice the domain UK over the formally mandated GB.

These same tensions and differences play differently in diverse places in the world - with different reactions and results. They divergences are also represented in the Internet community. It seems less a matter of "right and wrong" than accommodating user needs and meeting national/local expectations...and keeping a certain good humour about it all.