.eu Insights

EURid-UNESCO World report on Internationalised Domain Names deployment 2012

November 2012

With the support of
Communication and Information Sector

United Nations
Educational, Scientific and
Cultural Organization

EURid
www.eurid.eu

.eu Insights

The EURid Insights series aims to analyse specific aspects of the domain name environment. The reports are based on surveys, studies and research conducted by EURid in cooperation with industry experts and sector leaders.

EURid-UNESCO World report on Internationalised Domain Names deployment 2012

The World report on Internationalised Domain Names deployment updates the EURid-UNESCO Internationalised Domain Names State of Play report 2011. This year, the data set includes 88 TLDs, compared with 55 in 2011. The report also looks at deployment experiences of IDN ccTLDs in selected regions and explores opportunities and challenges for IDN deployment going forward.

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Foreword by Vinton G. Cerf

This report provides an extraordinary and interesting examination of the uptake of Internationalised Domain Names (IDNs) in selected regions and countries in which Internet services are available.

For historical reasons, the Domain Name System (DNS) and its predecessor (the so-called "host.txt" table) adopted naming conventions using simple Latin characters drawn from the letters A-Z, digits 0-9 and the hyphen ("-"). The host-host protocols developed for the original ARPANET project were the product of research and experimentation led in very large part by English language speaking graduate students working in American universities and research laboratories. The project was focused on demonstrating the feasibility of building a homogeneous, wide area packet switching network connecting a heterogeneous collection of time-shared computers. This project led to the Internetting project that was initially carried out by researchers in the United States of America and the United Kingdom, joined later with groups in Norway, Germany and Italy, along with a few visiting researchers from Japan and France. The primary focus of the Internetting project was to demonstrate the feasibility of interconnecting different classes of packet switched networks that, themselves, interconnected a wide and heterogeneous collection of timeshared computers.

The heterogeneity of interest was not in language or script but in the underlying networks and computers that were to be interconnected. Moreover, the Internet inherited applications and protocols from the ARPANET and these were largely developed by English language speakers (not all of them necessarily native speakers). The documentation of the projects was uniformly prepared in English. It should be no surprise, then, that the naming conventions of the Internet rested for many years on simple ASCII-encoded strings. The simplicity of this design and the choice to treat upper and lower case characters as equivalent for matching purposes, avoided for many years the important question of support for scripts other than Latin characters. As the Internet has spread across the globe, the absence of support for non-Latin scripts became a notable deficiency.

For technical reasons, support for non-Latin scripts was treated as a design and deployment problem whose solution was intended to minimise change to the domain name resolution infrastructure. This was debated in the Internet Engineering Task Force more than once, but the general conclusion was always that requiring a change to every resolver and domain name server, rather than changes on the client side only, would inhibit deployment and utility. This led to the development of so-called "punycode" that would map Unicode characters representing characters from many of the world's scripts into ASCII characters (and the reverse). This choice also had the salient feature of making unambiguous the question of matching domain names since the punycoded

representations were unique and canonical in form. This design is not without its problems but that is where we are at present.

On the face of it, there should be considerable interest in the use of IDNs drawn from a single script. For specific language speakers, writings in the character set commonly used to render strings in that language would be more likely to be understandable or memorable than strings written in other scripts or in mixtures of scripts. Early introduction of IDNs only at the second level of the Domain Name System produced hybrid strings whose second and lower level domain labels might be expressed in a particular script but whose top-level domain would still have to be rendered in ASCII. Not surprisingly, this form of naming was not too popular.

With the effort to develop methods for representing domain names entirely in non-Latin scripts, there came the possibility that a Russian language speaker, for example, might register or respond to a domain name expressed entirely in Cyrillic characters. The same could be said for Chinese, Korean, Urdu, Arabic, Hebrew, Greek and other language speakers whose written form would draw from Unicoded representations of characters from their native language scripts.

The expectation was that speakers of languages not expressible in Latin characters would be drawn to register entire and fully-qualified domain names, including top-level domains, in scripts of their choice. This report provides substantial insight into the assumptions and dynamics of actual IDN registration and use.

The adoption and use of IDNs has been varied and, notably, the recent call from ICANN for proposed new top-level domains did not produce a very big percentage of non-Latin character set proposals. I speculate that there are a number of reasons for this. Some are characterised in the report as stemming from systemic features such as lack of local registrars, lack of Internet Exchange Point infrastructure, etc. It seems likely that anyone registering a domain name intended to be understood by particular language speakers would be drawn to use registrars prepared to interact with the registrant in the language associated with the script. Lack of local-language speaking registrars might inhibit registrations.

There is another possible explanation. The utility of a domain name is partly dependent on the size of the user base that can understand and/or remember it. This suggests that IDNs should be more popular for character sets that are in widespread use. This is also true in relative terms. While the population of Korea is smaller, in absolute terms, than China, one would expect domain names written in the Korean script to be more popular in Korea than in China. Among domain name speculators, the resale value of a domain name may be partly correlated with the accessibility of the domain name to the global Internet population. The report helps to quantify some of the parameters that affect the uptake of IDNs in various contexts. It also properly outlines some of the problems associated with the present design and use of IDNs, including non-uniformity of treatment by browsers.

In the long run, while IDNs have definite appeal, it seems likely that their use will tend to cluster around users that have facility with the script involved and producers of content that is usefully and conveniently identified with uniform script domain names. One of the dynamics that may mitigate against rapid uptake of IDNs in domain names is the indexing of content, regardless of scripts used. If objects, web pages included, can be discovered through search using Unicode strings and approximate matching algorithms (versus the absolute match needed for resolving domain names), it may matter less in which script the associated domain name is written. These can, in theory, be captured as URLs and invoked by clicking, remembered as bookmarks or entries in directories for convenient recall. It remains to be seen how significant the memorability of a particular domain name happens to be. Even in our use of email, we tend to rely on directory methods, group names, and automatic completion of prefix strings to refer to our correspondents. The same may be said for document or other class of content identifiers.

These reports are very valuable for their quantitative insight into the use of IDNs and may also provide guidance towards the evolution of alternative ways in which naming may prove useful in the Internet context.

Vinton G. Cerf

Executive summary

Internationalised Domain Names (IDNs) are an essential building block towards creating a truly multilingual Internet. The Domain Name System (DNS) has historically only supported a limited character set (the ASCII characters a-z, 0-9 and the hyphen). Since 1996, the technical community has been developing the standards necessary to create domain names in all scripts, for all languages.

In 2000, IDNs were introduced to the market under .com and .net (i.e. as second level domains). Over the next decade, some country code top-level domains (ccTLDs), for example, .jp and .cn, followed. However, until recently IDNs could only be registered at the second level, because the DNS only supported ASCII endings (TLDs). As a result of pressure from the country code community, ICANN introduced a fast track process to create IDN ccTLDs in 2007-2008. By 2010 the first IDN ccTLDs were launched, making entirely multilingual domains available. To date, 31 IDN ccTLDs have been approved by ICANN, of which 19 have been launched including .한국 (Republic of Korea), .قطر (Qatar), .فلسطين (Palestine), .الجزائر (Algeria), .香港 (Hong Kong), .سورية (Syrian Arab Republic), .қаз (Kazakhstan), .срб (Serbia), .新加坡 and .சிங்கப்பூர் (Singapore). .中国 (China) should be available from October 2012.

In support of WSIS action line C8 (Cultural diversity and identity, linguistic diversity and local content) and implementation of the UNESCO Recommendation concerning the Promotion and Use of Multilingualism and Universal Access to Cyberspace, EURid the .eu ccTLD registry in cooperation with UNESCO presents the World Report on IDNs Deployment. This follows on from the EURid-UNESCO 2011 study, Internationalised Domain Names State of Play, which found that there was a significant correlation between IDNs and local language[1].

The World Report presents quantitative data on the deployment of IDNs to date. With a data set comprising 90% of domain name registrations across all top-level domains[2], the report makes comparisons with the previous year, analysing data provided by 79 TLD registries across Europe, Asia, Africa, and Oceania, and country case studies on IDN deployment in the Russian Federation, Qatar, Saudi Arabia, Egypt, and the Republic of Korea.

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[1] *Source: EURid-UNESCO Internationalised Domain Names State of Play 2011.*

[2] *Data set comprises 203 million domain name registrations although the data set is not complete for every parameter. According to Verisign Domain Name Industry Brief, March 2012, there were more than 225 million domain name registrations across all top-level domains as at December 2011.*

The World Report identifies obstacles to be overcome before universality for IDNs can be achieved. In general, registering and using IDNs remains an inconsistent, unsatisfactory experience for many Internet users, as a result of:

- Limited support for IDNs by Internet Service Providers (ISPs) and domain name registrars
- Inconsistent user experience because of Internet browsers
- Lack of email functionality for IDNs. Publication of relevant technical standards occurred in 2012; implementation remains a challenge
- Lack of support for IDNs in popular applications and websites in the creation of user accounts, e.g. Facebook.

Until these challenges are overcome, IDN popularity will lag behind that of ASCII domain names. In addition, there may be softer, cultural factors inhibiting IDN growth, which are more difficult to measure. English (and ASCII) remains the lingua franca of the DNS, and of the majority of domain name registrars. As a result, even those who might be expected to opt for IDNs have chosen ASCII instead. This is seen in some of the new generic top-level domain (gTLD) applications, which are reviewed in the report.

Uptake of IDNs in some regions (for example, the Russian Federation and the Republic of Korea) is higher than in others. The EURid-UNESCO World Report explores this disparity and concludes that factors such as language, culture and infrastructure on the one hand, and ccTLD factors on the other, combine to impact IDN uptake in a region (see figure 1). These factors are:

- **Country indicators:**
  - Linguistic and cultural homogeneity
  - Local Internet Exchange Points (IXP)
  - Broadband penetration
  - Local language content
  - Size of population (market).

- **ccTLD (local domain name) indicators:**
  - Low prices
  - Liberal registration policies
  - Brand of the ccTLD
  - Strong network of local registrars.

The Russian Federation, the Republic of Korea and China all have strong **country indicators**. In contrast, despite strong Internet infrastructure, Qatar's linguistically heterogeneous society results in English being used for many transactions. Saudi Arabia has no Internet Exchange Points (IXPs) and few if any local language popular applications.

The Republic of Korea and the Russian Federation both score highly for **ccTLD indicators**, with strong local registrar bases, liberal registration policies, low prices and a long-

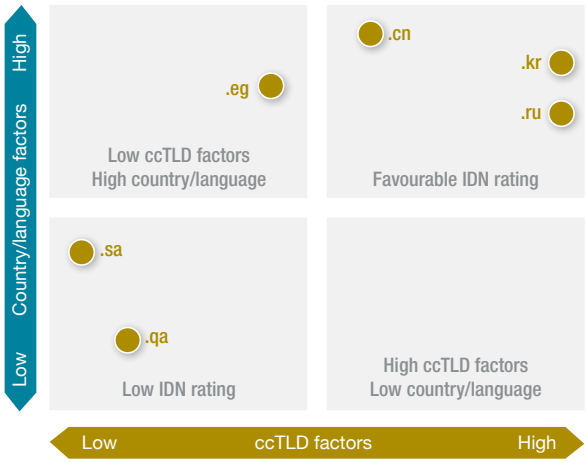
established ccTLD registry. In contrast, the Saudi Arabia ccTLD has no registrars and high retail prices. Qatar, despite liberal registration policies, has recently re-established its ccTLD (brand) and 80% of its registrars are not locally based. Egypt has a strong network of local registrars, but high prices limit uptake of the ccTLD.

Another factor which merits further exploration is the attractiveness of a ccTLD to domain name speculators. News reports[3] allege that speculative registrations contributed to the high volumes at the launch of .pф and this view is supported by data on the usage of the domain. In contrast, some ccTLDs do not seem to be attractive to speculators. More research is needed to understand the reasons for this, to determine whether there is any correlation between low price and presence of local registrars in determining the attractiveness of a ccTLD to speculators.

The issue of IDNs has received more attention within the international community in recent years. EURid and UNESCO recognise that greater awareness is needed about IDNs and understanding of the importance of the Internet for generating economic growth and social development.

Therefore, UNESCO views IDNs as a benchmark indicating the presence of local content in a country or region, or that a country takes appropriate measures to promote local content.

Figure 1 – IDN-readiness matrix



[3] *For example, http://www.1prime.biz/news/_Russian_antitrust_starts_proceedings_against_six_domain_registrars/0/%7BCB060DF6-53E9-4962-9C60-330262E50EB6%7D.uif, and http://domainincite.com/6708-court-throws-out-russian-gaming-scandal-claims, both accessed 21 August 2012.*

Glossary of terms

- **ASCII**
  The American Standard Code for Information Interchange, representing text in computers, communications equipment and other devices. In the context of the Domain Name System ASCII means the letters “a-z” inclusive, the numerals “0-9” inclusive and the hyphen “-”. Until the year 2000, no other characters were allowed in domain names, and in 2009, the first IDN ccTLDs were introduced.
- **ccTLD**
  Country code top-level domain, which represents a country or territory found in the ISO 3166 list, for example .eu (European Union), .de (Germany), .uk (United Kingdom) or .fr (France).
- **CENTR**
  The European country code top-level domain organisation, a not-for-profit organisation which supports the interests of ccTLD managers, www.centr.org.
- **EURid**
  The European Registry of Internet Domain Names, EURid, manages the .eu top-level domain under contract to the European Commission. The .eu TLD was launched for general registration in 2006 and has over 3.6 million domain names.
- **gTLD**
  Generic top-level domain, which does not represent a particular country or territory. Examples include .com, .net, .org, .info and .biz.
- **Hybrid IDN, hybrid domain**
  An Internationalised Domain Name in which the constituent elements are in different scripts. Examples of hybrid IDNs are shown in figure 3.
- **ICANN**
  The Internet Corporation for Assigned Names and Numbers. A non-profit company responsible for management of the domain name root operation (the IANA), policy coordination for generic top-level domains (gTLDs), and for Internet numbering. In 2012, ICANN launched a process to create an unlimited number of new gTLDs, over 1 900 applications were received. ICANN’s policy development is guided by a number of support organisations and advisory committees representing various stakeholder groups including governments, the domain name industry, business, ccTLD registries and civil society, www.icann.org.
- **IDN**
  Internationalised Domain Name. A domain name written in non-Latin scripts such as Chinese, Arabic, Hangul or Cyrillic. For an explanation of IDNs, see Part 1 of the World Report, page 17.

- **IDN ccTLD**
  A country code top-level domain written in non-Latin scripts. Examples include .한국 (the Republic of Korea), .قطر (Qatar), .中国 (China) and .рф (the Russian Federation).
- **IDN ccTLD Fast Track**
  A process developed within ICANN to implement IDN ccTLDs. The first IDN ccTLDs were approved by ICANN in 2009. The IDN ccTLD Fast Track process continues, and to date 31 IDN ccTLDs have been approved by ICANN, of which 19 have launched for public registrations. The remainder are preparing to launch.
- **IETF**
  Internet Engineering Task Force. Develops Internet standards. Its members are volunteers from the international technical community, and it is open to any interested individual. IETF standards are published as Requests for Comment (RFC), www.ietf.org.
- **ISOC**
  The Internet Society. Formed in 1992, it promotes the open development, evolution and use of the Internet for all, www.isoc.org.
- **ISP**
  Internet Service Provider. An organisation that provides access to the Internet, and a variety of related services including web hosting, or email services.
- **IXP**
  Internet Exchange Point. Internet Service Providers (ISPs) can exchange Internet traffic between their networks, thereby reducing costs and increasing speed in resolving Internet queries (e.g. web pages).
- **Landrush**
  When a new TLD is first launched, there is a period of time when trademark holders and others who have rights in particular names or brands have the opportunity to pre-register domain names (sunrise period). Following the sunrise period, the registry opens for general registrations - this is called the landrush.
- **OECD**
  Organisation for Economic Co-operation and Development, www.oecd.org.
- **Punycode**
  The syntax by which a string of Unicode characters is transliterated uniquely and reversibly into the ASCII character set used by the Domain Name System. Punycode is the underlying technology which makes IDNs possible. See Part 1 for further explanation.
- **Register**
  The domain name database managed by a registry.

- **Registrant**
  A domain name registrant is the person or organisation in whose name or on whose behalf a domain name is registered. For example, UNESCO is the registrant of the domain name unesco.org.
- **Registrar**
  A domain name registrar. An organisation that is allowed to register domain names in one or more TLDs on behalf of its customers. To register gTLDs, registrars must be accredited by ICANN. Most ccTLDs operate their own systems of registrar accreditation. Examples of well-known registrars are Go Daddy Inc., Tucows and 101Domains.com.
- **Registry**
  A domain name registry is a top-level domain provider. For example EURid is the registry for .eu as is Verisign for .com.
- **Second level domain**
  Domain names have a hierarchical structure, starting (in left-to-right scripts) to the right of the dot, with the top-level domain. Most domain names are registered at the second level, e.g. under .eu or .com. For the domain name example.com, “example” is the second level domain. Some domains, e.g. .uk and .jp, only register domain names at the third level, e.g. under .co.uk or .co.jp.
- **TLD**
  Top-level domain. The domain name system is hierarchical and is organised into various top-level domains (TLDs), e.g. .com, .eu or .pф under which domain names can be registered.
- **UNESCO**
  United Nations Educational, Scientific and Cultural Organisation, whose mission is building peace in the minds of men and women. UNESCO is organised into four sectors, including the Communication and Information Sector whose mission is building inclusive knowledge societies through information and communication, www.unesco.org.
- **Unicode**
  A technical standard used for consistent encoding of text from ASCII into other scripts.
- **WSIS**
  The World Summit on the Information Society a UN process which took place between 2003 and 2005 and resulted in the Geneva Declaration of Principles and the Tunis Agenda. A number of UN organisations, including UNESCO, have been tasked with fulfilling action lines resulting from the WSIS.

Introduction

In collaboration with UNESCO, EURid, the .eu registry, presents the 2012 World report on Internationalised Domain Names (IDNs) deployment. It updates last year's study, Internationalised Domain Names State of Play, which was published in June 2011 and presented at the 2011 United Nations Internet Governance Forum in Nairobi, Kenya[4].

This year, the data set for this study is expanded from 53 to 88 TLDs, and includes 90% of all domain names registered as at December 2011, albeit that the data set is not complete for every parameter. The World Report includes case studies on the ccTLDs for the European Union, Russian Federation, Qatar, Saudi Arabia, Egypt and the Republic of Korea. Where an existing registry has launched an IDN ccTLD (for example, .sa and السعودية.) these are considered as two separate entities for the purpose of the report.

Part 1 of the World Report on IDN deployment sets out a background to IDNs and a timeline. It considers progress in supporting IDNs in email and browsers. It then reviews the IDN applications in ICANN's programmes to create new TLDs. A comparison of growth rates of IDN registrations versus general registrations is made within European registries and usage rates are compared amongst .eu and .pф IDNs and benchmarked with other TLDs. Case studies follow, on the European Union (.eu) ccTLD, and country case studies on the Russian Federation, Qatar, Saudi Arabia, Egypt and the Republic of Korea.

Building on the case studies, Part 2 analyses the disparity of performance with regard to IDN registration rates between countries and regions, and a matrix of IDN readiness is presented. The study ends with conclusions on IDN uptake and a possible way forward.

[4] *http://www.intgovforum.org/cms/component/chronocontact/?chronoformname=Workshops2011View&wspid=69.*

PART 01

Deployment of IDNs

1 What are Internationalised Domain Names, and why are they important?

Domain names, the Internet's addressing system, work because they are interoperable and resolve uniquely. This means that any user connected to the Internet, anywhere in the world, can get to the same destination by typing in a domain name (as part of a web or email address). The plan to internationalise the character sets supported within the DNS is almost as old as the Internet itself. However, technical constraints and the over-riding priority of interoperability resulted in a restricted character set within the Domain Name System: ASCII[5] a to z, 0 to 9 and the hyphen[6].

Figure 2 – Internationalised Domain Names explained

Technical standards to internationalise domain names were developed from the mid-1990s. The solution retains the DNS's restricted character set and transliterates every other character into it. Each series of non-ASCII characters is transliterated into a string of ASCII characters prefixed with xn--, called Punycode. Punycode domain names are meaningless to humans, but meaningful to machines that resolve domain names –

[5] *For an explanation of ASCII, see http://en.wikipedia.org/wiki/ASCII, accessed 21 August 2012.*
[6] *See Internationalization of Domain Names; A history of technology development, Klensin, J and Fältström, P.*

name servers. Thus, humans see the meaningful, transliterated characters when they navigate the Internet, whilst the underlying technical resolution of domain names remains unchanged.

Implementation of IDNs began in 2000 at the second level (under .com and .net) and 2001 (.jp). In the ten years that followed, several ccTLDs deployed IDNs, primarily supporting local language character sets. Some experimented with other strategies for internationalising domain names, but the IDN technology proved the most successful. Following pressure from the ccTLD community, ICANN introduced a fast track process to create IDN ccTLDs in 2007-2008. From 2010, IDNs became available at the top level having completed the specific process set by ICANN (for example, السعودية. for Saudi Arabia, .рф for the Russian Federation)[7].

IDNs are technically complex to implement. Many challenges remain, including (at a technical level) how to handle variant characters[8] which are prevalent in Arabic and Chinese scripts. Another challenge is the user experience, e.g. consistent representation in browsers and emails.

Despite the technical challenges, IDNs are viewed by many as a catalyst and a necessary first step to achieving a multilingual Internet. According to UNESCO, in 2008 only 12 languages accounted for 98% of Internet web pages; English, with 72% of web pages, was the dominant language online[9]. Recent reports indicate that other languages are growing rapidly online. For example, by 2010, only 20% of Wikipedia articles were in English[10]. Supporters of IDNs believe that enabling users to navigate the Internet in their native language is bound to enhance the linguistic diversity of the online population, and that IDNs are strongly linked to local content.

While this study focuses on the web, it should be noted that other applications also require internationalisation, e.g. email, file transfer protocol, etc.

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[7] *See http://www.icann.org/en/topics/idn/idn-activities-seoul-28oct09-en.pdf.*

[8] *IDN variants have been a focus for working groups within ICANN recently. See http://www.icann.org/en/news/public-comment/idn-variant-tld-revised-program-plan-04may12-en.htm, accessed 16 May 2012.*

[9] *See address of Janis Karklins, Assistant Director General, Communications and Information Sector, UNESCO, at the Opening Ceremony of the IGF Vilnius 2010.*

[10] *See "The relationship between local content, Internet development and access prices", Internet Society, OECD and UNESCO, 2011.*

2 IDN timeline

For more than a decade, hybrid IDNs have been available at the second level with ASCII top-level domains (for example, παράδειγμα.eu in figure 2). This situation was only satisfactory for Latin-based scripts used by many European languages, where the IDN element would commonly reflect accents or other diacritical marks on Latin characters. For speakers of languages not based on Latin scripts (for example, Chinese or Arabic), the hybrid IDN/ASCII domains were unsatisfactory. Right-to-left scripts, such as Arabic and Hebrew, created bi-directional domain names when combined with left-to-right TLD extensions, requiring users to have a familiarity with both their own language and Latin scripts in order to navigate the Internet. As explained in the .eu Insights report International Domain Names State of Play 2011, bi-directional domain names not only require Internet users to change script when typing in a single web address, but also potentially confuse the strict hierarchy of the DNS. Industry experts describe bi-directional domains as "barely usable"[11].

Figure 3 – Examples of hybrid and bi-directional IDNs (Japanese, Arabic and Hebrew)

[11] *Lipsicas, B. and Shikmoni, D., "Internationalized Domain Names: the long and winding road", CENTR Domain Wire, Issue 1, 2007.*

Internet governance discussions from 2006 onwards highlighted the lack of IDNs in the domain root zone (which would enable full IDNs including at the top level) as a key building block towards the goal of a multilingual Internet[12]. From 2005, there was increasing pressure on ICANN, the global coordinator of Internet domain names, to implement IDNs in the root zone.

In the meantime, some countries created their own work-arounds. For example, China and the Republic of Korea developed keyword searches at the domain name servers for .cn and .kr. For those searching for domains within the country, the keyword system resolves the domain without the user having to type the Latin-script domain ending (TLD). In China and Egypt, browser add-ons were developed to translate a domain into another name that would be looked up on national servers, to enable Internet users to enter local character strings into browsers. However, this solution relied on users downloading a plug-in, which was not compatible with every browser. These efforts indicate the importance that policy makers and technologists have placed on internationalising domain names, and that IDNs emerged as the superior technology amongst a number of alternatives.

In 2009, the ICANN Board approved a fast track process for IDN ccTLDs, describing the programme as a "top priority"[13]. By April 2011, 17 IDN ccTLDs had been launched. Since then, there has been a steady expansion of the number of IDN.IDN registries launched, including .한국 (Republic of Korea), .قطر (Qatar), .فلسطين (Palestine), .الجزائر (Algeria), .香港 (Hong Kong), .سورية (Syrian Arab Republic), .қаз (Kazakhstan), .срб (Serbia), .新加坡 and .சிங்கப்பூர் (Singapore).

As at April 2012, 31 IDN ccTLDs (for 21 countries and territories) have been added to the Internet root zone[14], of which 19 have been launched. This represents an increase of four since the same time last year. A further eight are approaching the end of the approval process.

Last year's Internationalised Domain Names State of Play report observed that non-Latin scripts fare less well with hybrid domains. Since 2011, some registries in non-Latin script environments (for example, Palestine and Hong Kong) now offer IDN-only or ASCII-only registrations, thus eliminating the "barely usable" hybrid and bi-directional IDN/ASCII domains (see figure 3).

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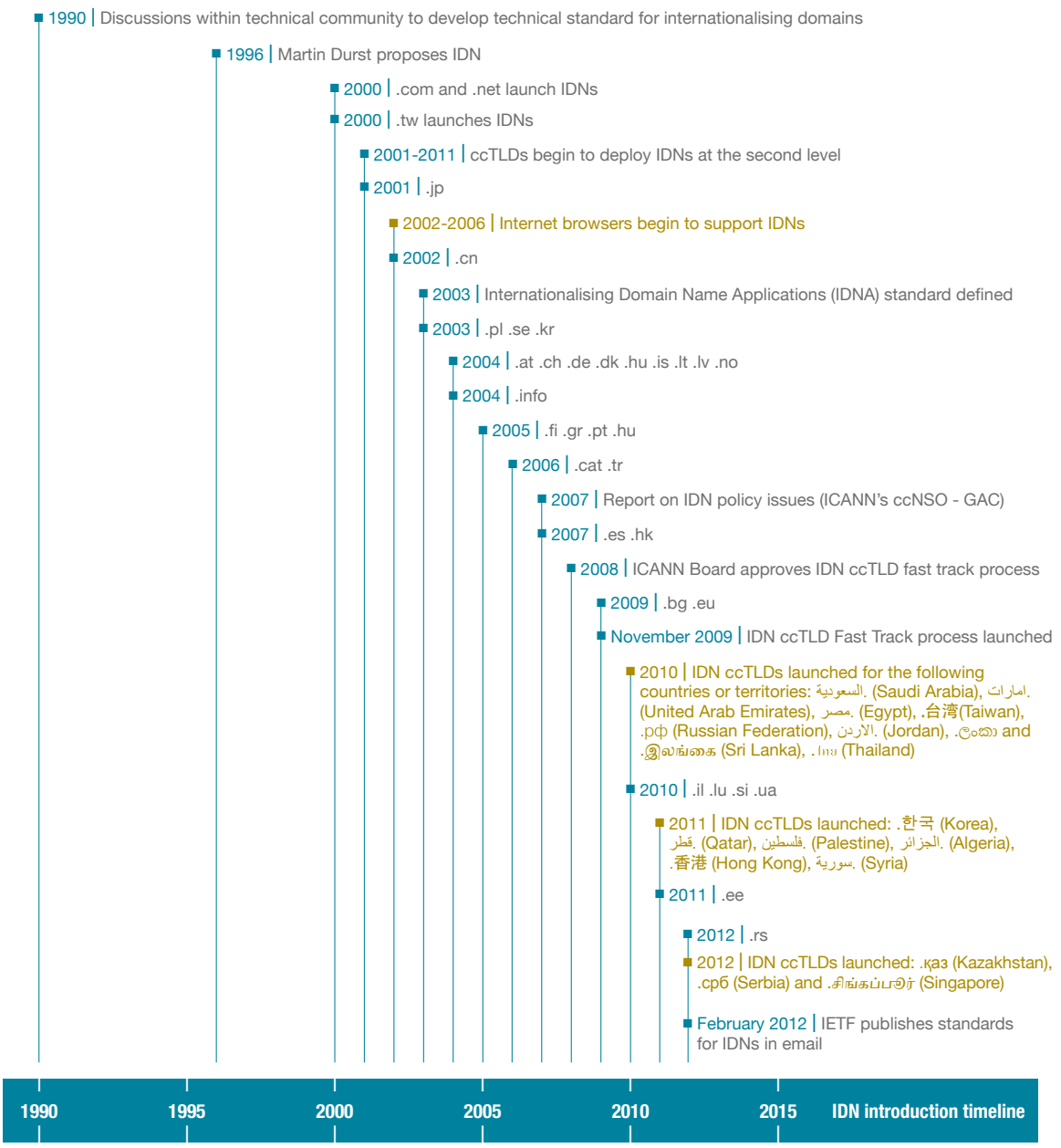
[12] *See Internet Governance Forum 2006, Diversity main session, http://www.intgovforum.org/cms/IGF-SummingUp-011106.txt, accessed 23 May 2012.*

[13] *See http://www.icann.org/topics/idn/idn-activities-seoul-28oct09-en.pdf.*

[14] *http://www.icann.org/en/resources/idn/fast-track/string-evaluation-completion, accessed 23 April 2012, and https://charts.icann.org/public/index-idn.html, accessed 17 June 2012.*

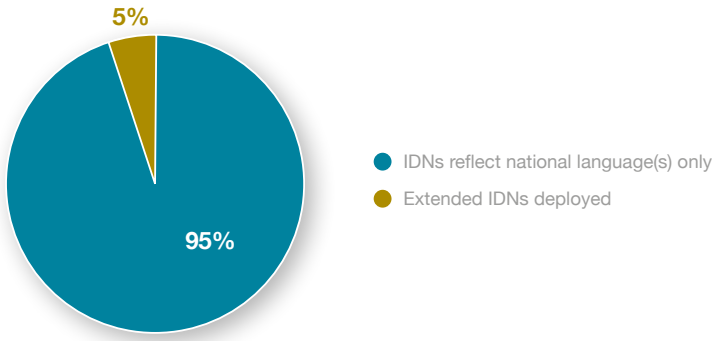
Figure 4 – IDN introduction timeline



3 Link with local language

Our hypothesis is that, for local languages using non-Latin scripts, there should be a nexus between IDN registrations and local content. 95% of ccTLDs which deploy IDNs only support local or regional languages, emphasising the strong link between IDN scripts offered and local languages.

Figure 5 – Link with locality – IDN deployment and local language, 2011



4 The IDN user experience: email and web browsers

4.1 Email functionality

Despite IDNs being available for over a decade, IDNs have not worked in email. 82% of those who responded to EURid's 2011 CENTR[15] survey identified email support for IDNs as the key challenge to uptake of IDNs.

[15] *CENTR is the European country code top-level domain organisation, a not-for-profit organisation that supports the interests of ccTLD managers. As part of its services, CENTR conducts surveys of its membership at the request of individual ccTLD registries. See www.centr.org.*

The lack of IDN email functionality has a knock-on effect on usability of a domain name. For example, most e-commerce sites and social networks require users to create an account with an email address. Facebook, for example, with 900 million users (April 2012), does not support IDN email addresses in user accounts[16], despite its extensive support for multilingualism on its content pages.

In 2012 the Internet Engineering Task Force (IETF) published standards for IDNs in email[17]. With the standards now developed, the next challenge will be deployment of support for IDN in email clients, such as Microsoft Outlook, Gmail and Thunderbird.

4.2 IDNs in web browsers

Since 2000, browsers have gradually moved to support IDN. After initial criticism of its original IDN implementation as a result of look-alike domains in different scripts[18], Mozilla (Firefox) developed a "white list" of over 50 IDN TLDs[19]. Firefox will only support a TLD if the registry has a policy for handling homoglyphs (characters that look the same but are different, for example, Latin "p" and Cyrillic "p"). While Mozilla explains that its approach "helps to keep confusingly similar domains from being displayed when rendered for the user", some TLD registries regard the white list approach as a barrier to greater uptake of IDNs[20]. This illustrates the delicate policy balance between full support for IDNs on the one hand and avoiding potential fraud deriving from user confusion on the other.

Safari and Opera also operate white lists. Safari always shows Punycode (xn--) for "look-alike characters in a URL [which] could be used to masquerade a website"[21]. Cyrillic scripts present particular challenges with this approach, as there are a large number of homoglyphs between Cyrillic and Latin scripts.

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[16] *See Report of workshop 69, IGF 2011, at http://www.intgovforum.org/cms/component/chronocontact/?chronoformname=Workshops2011View&wspid=69 'Ram Mohan defined the fundamental issue as uniformity of user experience. "The internationalized domain name merely gets you off the ground, but the uniformity of user experience is really where it's lacking. And you look at email, browsers, and search engines. Yesterday there was a panel where we heard that if you type in an IDN URL in Facebook or Twitter, it does not automatically convert it into a web link because - they don't recognize an IDN domain name as a URL, right? So that kind of acceptance has to happen at the application level."' Researchers' tests indicate that Facebook does not yet support IDNs in user accounts.*

[17] *6530 Overview and Framework for Internationalized Email. J. Klensin, Y. Ko., February 2012. (Format: TXT=64371 bytes) (Obsoletes RFC4952, RFC5504, RFC5825) (Status: PROPOSED STANDARD), 6531 SMTP Extension for Internationalized Email. J. Yao, W. Mao February 2012. (Format: TXT=40977 bytes) (Obsoletes RFC5336) (Status: PROPOSED STANDARD); 6532 Internationalized Email Headers. A. Yang, S. Steele, N. Freed. February 2012. (Format: TXT=22725 bytes) (Obsoletes RFC5335) (Updates RFC2045) (Status: PROPOSED STANDARD); 6533 Internationalized Delivery Status and Disposition Notifications. T. Hansen, Ed., C. Newman, A. Melnikov. February 2012. (Format: TXT=37990 bytes) (Obsoletes RFC5337) (Updates RFC3461, RFC3464, RFC3798, RFC6522) (Status: PROPOSED STANDARD. These proposed standards cover the internationalisation of domain names as part of email addresses and also internationalisation to the left of the @ sign. Although these elements are technically separate, the IETF decided in 2005 that it should proceed with a solution which encompassed the entire email address, thus supporting true internationalisation of email.*

[18] *For example, see "The State of Homograph Attacks", Johanson, E., 2005, http://www.shmoo.com/idn/homograph_old.txt, accessed 2 July 2012, which used the example of paypal.com in Cyrilliic scripts.*

[19] *http://www.mozilla.org/projects/security/tld-idn-policy-list.html, accessed 25 April 2012.*

[20] *Source: EURid IDN Survey 2012, CENTR members.*

[21] *http://support.apple.com/kb/HT3733 , accessed 25 April 2012.*

Chrome has a different approach. It displays IDNs only in languages that the individual user claims to understand, derived from the user language settings in the browser. "For example, http://россия.net will be displayed in IDN form if you claim to speak Russian or another language written in Cyrillic, and as Punycode otherwise. Likewise, http://私の団体も.jp/ will be shown in IDN form only if you claim to speak Japanese in Google Chrome's options."[22]

Chrome will always display Punycode (i.e. xn--, see figure 2) for components that mix scripts.

Microsoft's Internet Explorer has supported IDNs since version 7. It will generate Punycode where the domain name is outside the user's chosen language set, or where the domain name contains characters that are not part of any language or the domain name contains mixed scripts.[23]

Discussions with technical managers of ccTLDs[24] operating in Cyrillic script environments indicate an acceptance that the goal of avoiding user confusion is genuine. They remarked that a "white-list" approach requires browser operators to know each registry's IDN policy, and that such approaches may not scale with the upcoming expansion of the domain name space (see Section 5). Another suggestion[25] was that browsers could implement a special indicator, similar to a padlock, for IDN domains which could appear similar to ASCII domains (and therefore cause confusion), for example, caxap (entirely ASCII) and caxap (entirely Cyrillic), to alert users to potential confusion while maintaining IDN display, rather than defaulting to Punycode.

In practical terms, IDNs do resolve in browsers, but those which are not white-listed (for example, Cyrillic and Greek) will appear as a meaningless jumble of letters and numbers to the user after resolution.

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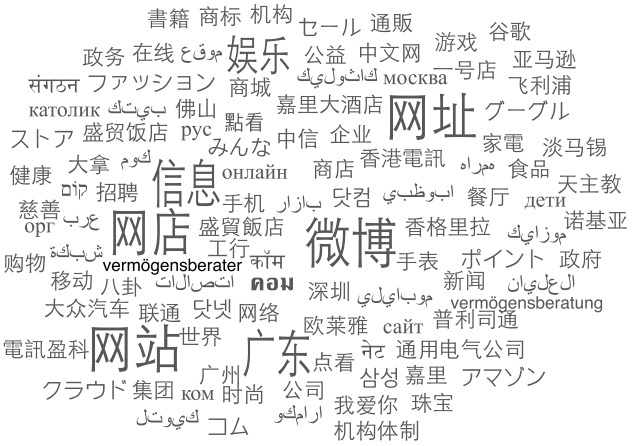
[22] *http://www.chromium.org/developers/design-documents/idn-in-google-chrome, accessed 25 April 2012.*
[23] *msdn.microsoft.com/en-us/library/dd565654(v=vs.85).aspx.*
[24] *Daniel Kalchev, Technical Director .bg; Dmitry Belyavsky, ccTLD.ru.*
[25] *Daniel Kalchev, .bg (Bulgaria) ccTLD Manager, 25 April 2012.*

5 New IDN gTLDs?

After a long period of consultations with interested stakeholders and discussions at multiple levels, in January 2012, ICANN opened a process to create an unlimited number of new generic top-level domains (gTLDs). Applications could be made in any script, and had the potential to further enhance the multilingualism of the Domain Name System.

Figure 6 – IDN gTLD applications to ICANN, 2012



The applications received by ICANN were published on 13 June 2012. A total of 1 930 new gTLDs were applied for. Despite an extensive outreach programme by ICANN targeting communities and cultures whose languages are not usually represented in ASCII, only 6% of the applications are for IDNs. There are 73 Chinese script (of which 7 are contested)[26], 15 Arabic script, 10 Japanese, 8 Cyrillic, 3 Hangul, 3 Hindi, 1 Hebrew, and 1 Thai[27]. 46% of the IDN applications are from applicants "in country/region", including applications for trademarks, geographic terms and community gTLDs. 54% are from applicants "out of region" for example, US or EU organisations[28]. For example, there are 12 applications for .com equivalents in different scripts.

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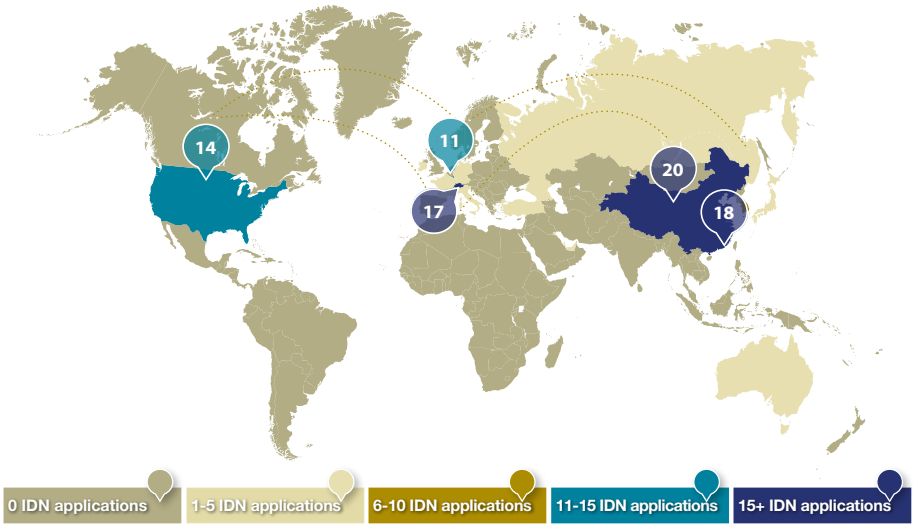
[26] *I.e. have more than one application for identical domains. To avoid user confusion and technical difficulties, no two domain names or top-level domains can be identical.*

[27] *There are two applications for Latin script strings with diacritics. These are not included in this analysis.*

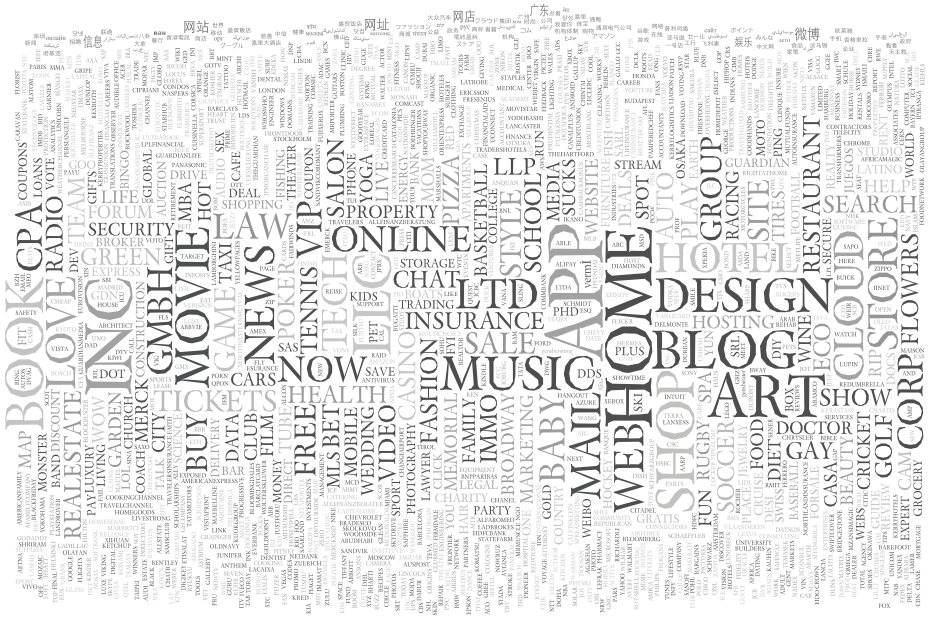
[28] *Some applications show as from Europe, but are in fact oversees offices of US corporations, for example, 65% of the applications from Switzerland are Verisign, Inc., the .com registry; 100% of the applications from Luxembourg are from Amazon, Inc.*

Figure 7 – Geographical location of IDN gTLD applicants[29]



[29] *Source: Dot-Nxt Inc., June 2012.*

Figure 8 – gTLD applications (all), 2012



Source: ICANN

The new gTLD process offered the potential to diversify the languages and scripts represented in the DNS. Instead, a review of the 1 930 applications indicates that applications for IDNs are so heavily outnumbered by applications for ASCII strings that they risk being lost in the mix (figure 8). The process may further cement the supremacy of English language and Latin script as the lingua franca of Internet addressing. For example, .abudhabi, .dubai, .kyoto, .osaka and .tokyo are all applied for as ASCII strings rather than as IDNs.

6 Adoption of IDNs – update

6.1 Deployment at the second level

In 2011, EURid in cooperation with UNESCO published its first report on IDNs[30] with a data sample of 163.7 million domain names as at December 2010. This year, the number has increased to 203 million, or 90% of domain name registrations across all top-level domains. The increase in the data sample size reflects both an expansion in the number of TLDs included in the sample and the general growth in domain names in the past 12 months.

Figure 9 – Deployment of IDNs by registry

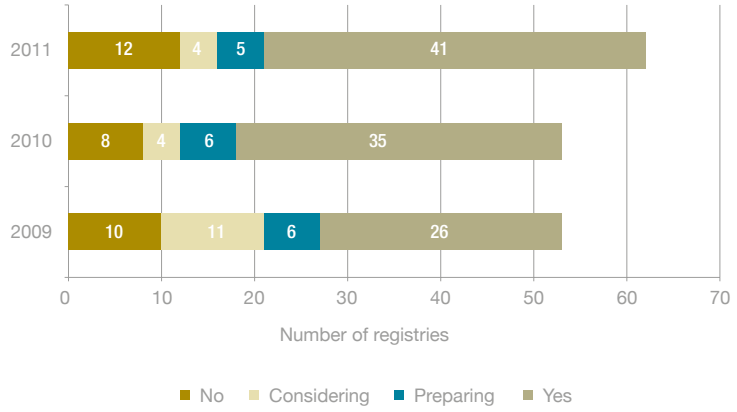
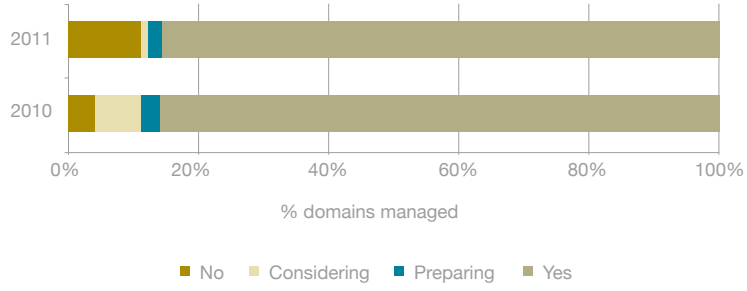


Figure 10 – Deployment of IDNs by domains managed



[30] *Internationalised Domain Names State of Play, see www.eurid.eu/insights.*

The number of IDNs in the sample studied was 3.9 million as at December 2011[31].

Last year in the EURid-UNESCO report Internationalised Domain Names State of Play 2011, it was reported that (amongst the registries surveyed) there was a movement towards deployment of IDNs[32]. This year, the sample of registries has expanded, and there are now 41 registries (66%) in the sample which have deployed IDNs (see figure 9). Two registries which reported that they were considering deployment in 2011, in 2012 report that they are no longer considering IDNs.

When viewed by number of domain names under management in the sample (figure 10), there is an increase in the number included under "No". As well as reflecting the larger data sample year on year, two large registries which were "considering" IDNs in earlier surveys, this year confirmed their decision not to pursue IDN deployment. The percentage of domains under management offering IDN registration ("Yes") remains unchanged, mainly because of the size of the .com/.net registry (64% the total domains under management in the sample).

6.2 Growth rate of IDNs compared with ASCII domain names

In last year's report, it was observed that in European ccTLDs, IDN registrations tended to grow at a higher rate than the general register. Conversely, IDNs under the Japanese ccTLD fared less well than ASCII registrations (IDNs were experiencing negative growth).

This year, individual registries' IDN growth rates (where available) are compared with that of the whole register (in other words, ASCII domains) in 52 TLDs. Figure 11 shows this comparison, with the TLDs anonymised. While growth rates for the entire register cluster around the 13% average, the IDN growth rates average at 15%, reflecting the higher distribution around the mean. The IDN numbers tend to be a small percentage of the total register, so low actual growth (in numbers) can result in high percentage growth. For example, in .is (Iceland - not shown in the figure due to scaling), IDN registrations grew from 500 to over 2 100 in the year to December 2011, a 300% increase. A TLD launch can also skew percentage growth figures. For example, following the relaunch of the Ukrainian TLD, ASCII domains grew from 2 410 in December 2010 to 623 807 in December 2011, a growth rate of over 25 000% (not shown in figure 11 due to scaling).

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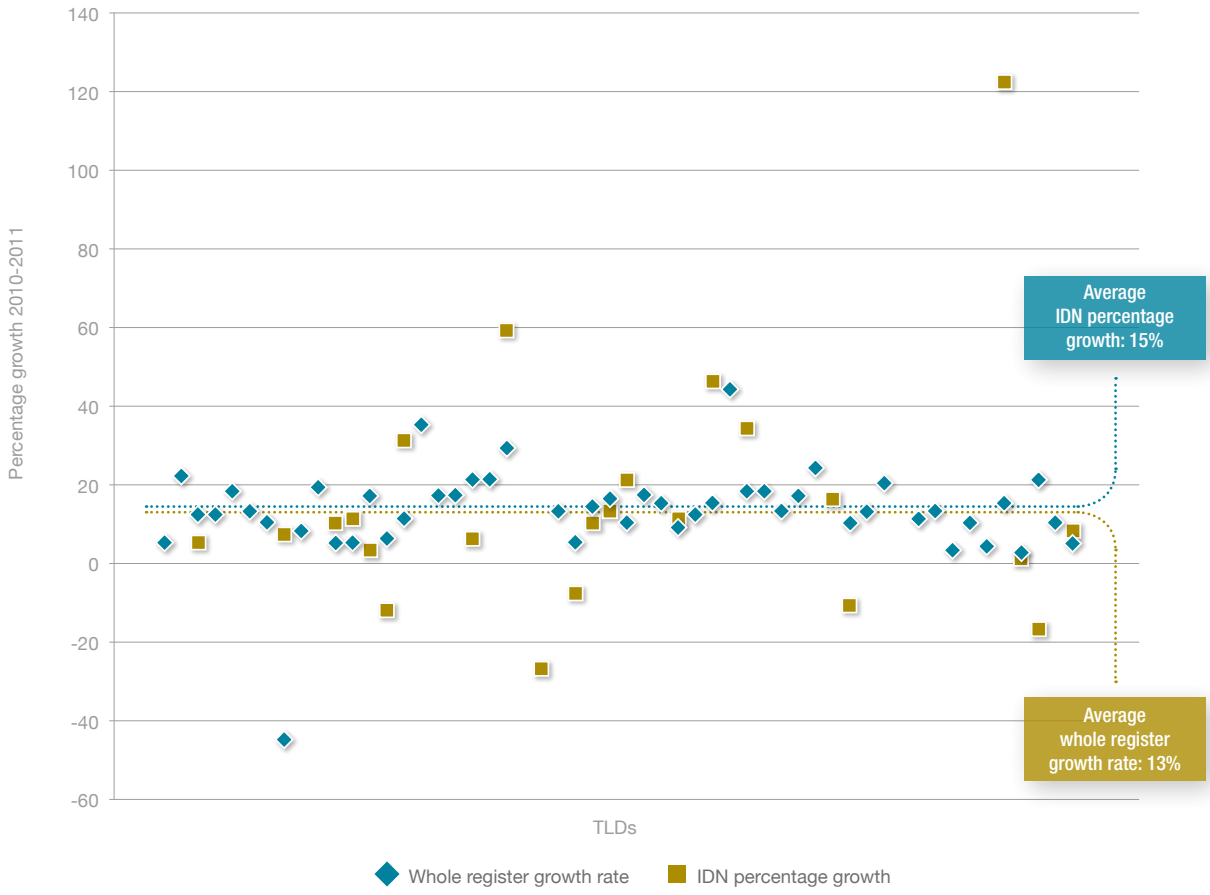
[31] *Many registries do not report their IDN registrations separately, and therefore this number is incomplete. The source of the data is EURid's CENTR survey 2012, 1:1 contact with TLD registries and publicly available sources (for example, registry websites). See Appendix 1.*

[32] *Internationalised Domain Names State of Play, p10, "The number supporting IDNs grew from 23 to 29 between 2009 and 2010. In the same period, seven registries changed their IDN status from "considering deployment" to "implemented IDNs". http://www.eurid.eu/files/Insights.pdf.*

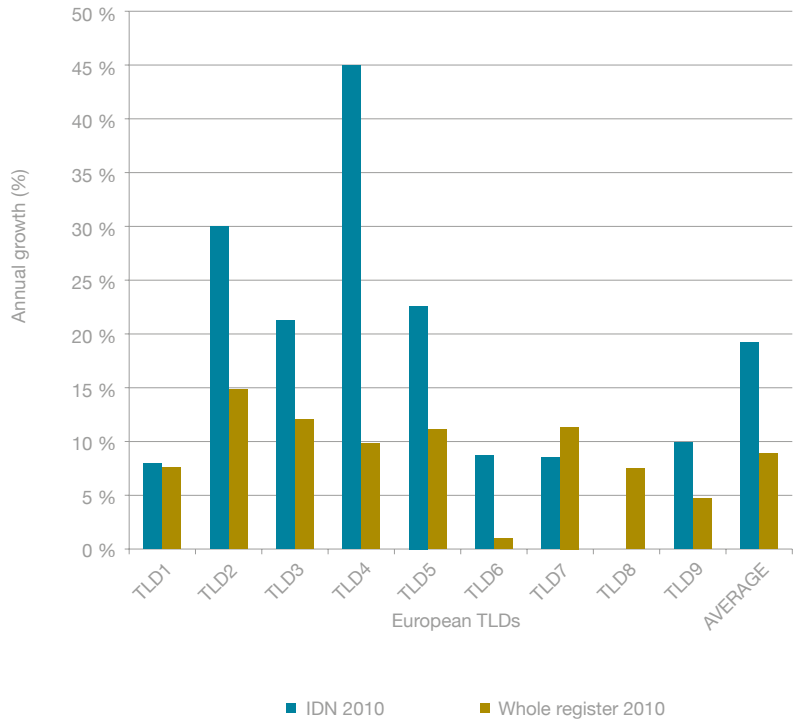
Figure 11 – Comparison of IDN and whole register growth rates 2010-2011



In last year's report[33], it was noted that IDN growth rates amongst a small sample of seven TLDs was higher than general growth. As at December 2011, the same TLDs were considered, along with two others. The comparison shows that among nine European ccTLDs (using Latin script IDNs, e.g. diacritics) in 2010, the average growth of IDNs was 11% greater than the average growth of the whole register (figure 12). In contrast, the same sample a year later does not provide such a clear picture. For the year 2011, average growth rates between the IDNs and the whole register are closer than in 2010 (IDNs are 2% higher than whole register in 2011, see figure 13). The standard deviation of IDN

[33] *Internationalised Domain Names State of Play 2011, www.eurid.eu/insights.*

Figure 12 – European TLDs
Comparison of IDN growth rate vs. whole register 2010



growth for 2011 is higher (9) than the general register (5), and shows less volatility compared with 2010 (13 compared with 4). The actual number of IDN registrations remains small in comparison with the size of the overall register in all cases.

6.3 The impact of landrush renewals

Whether at the top or second level, a successful IDN launch will translate into a net reduction in register size at the first renewal point. This is observed in the .pф registry, which saw a net reduction of 200 000 domains in January 2012, despite healthy growth throughout 2011. The same phenomenon is seen at the second level, where the .eu and .si registries saw a drop in IDN registrations in the year to December 2011, reflecting the impact of IDN landrush renewals.

Figure 13 – European TLDs
Comparison of IDN growth rate vs. whole register, 2011

6.4 Developments in individual ccTLDs

The Republic of Korea IDN TLD, .한국, which launched for open registrations in October 2011, had over 210 000 registrations by December 2011. During the same time period, the number of Hangul registrations under the ASCII .kr dropped by over 17%, suggesting that users may have dropped hybrid mixed-script IDN.kr domains in favour of fully-Hangul domain names.

Israel's IDN registration growth was 59% (compared with its non-IDN growth rate of 29% for the same period). Having launched IDNs at the end of 2010, more than 31 000 had been registered by December 2011. The Hebrew IDN registrations are at the third level (see figure 3). Despite the popularity of the IDN launch, the ccTLD registry reports that so far there is little evidence of use of the Hebrew IDNs in advertising. The hybrid domains, which combine left-to-right endings with right-to-left labels, still present usability and semantic challenges.

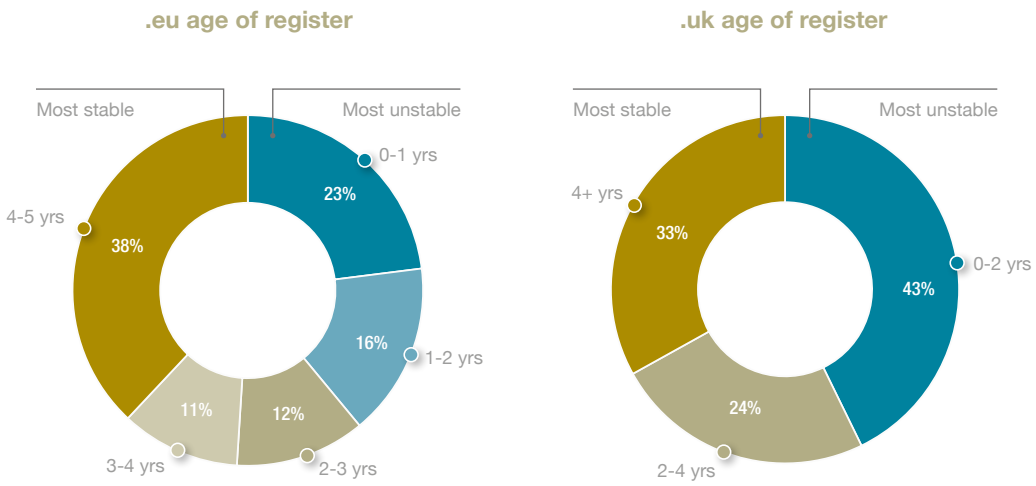
The Israeli registry has applied to ICANN for the allocation of a Hebrew ccTLD[34].

[34] *http://www.isoc.org.il/domains/idn_eng/, accessed 23 May 2012.*

7 Usage of IDNs compared with ASCII domains

Within the industry, there is a perceived link between usage of a domain name and likelihood of renewal[35]. If a domain name has been renewed once, it is more likely to be renewed again[36]. In this way, registries become more stable as their proportion of "aged" domains increases (see figure 14). Therefore, analysing the usage of IDNs gives a good indication of (1) long term viability of IDNs as a business proposition and (2) may highlight differences between usage of IDNs and ASCII domain names.

Figure 14 – Comparison of .eu and .uk age of register



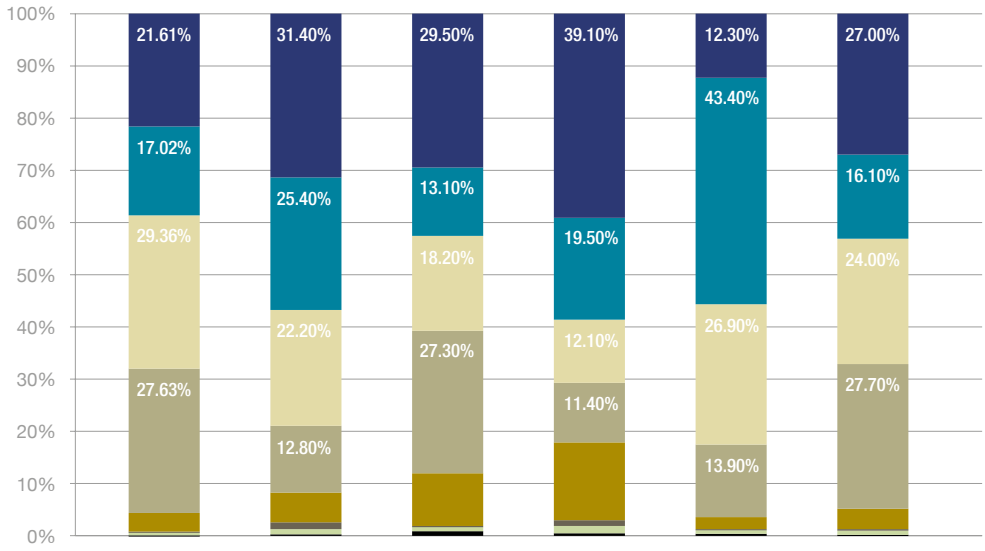
Sources: EURid and Nominet 2011

[35] *See Nominet The Domain Business: "Usage of a domain has a clear link to likelihood of renewal", http://db.nominet.org.uk/node/nominet-commentary-5/.*

[36] *For example, see Public Interest Registry Dashboard July-December 2011, p6. Renewal rates grow by age of domain name from 61% (1 year) to over 85% (3 years). Source: http://pir.org/pdf/dashboard_2H_2011.pdf, accessed 28 May 2012. Similar trends are seen in .eu.*

In 2012, EURid reviewed the usage of its IDN registrations. It found that over 70% of .eu IDNs are in use, compared with 77% in the .eu general register (see figure 15). While 17% of .eu IDNs resolve to a holding page, and 27% to pay-per-click, over 21% are used for business and 3% for community sites. The high levels of IDN usage in .eu augur well for the long-term sustainability and user acceptance of IDNs.

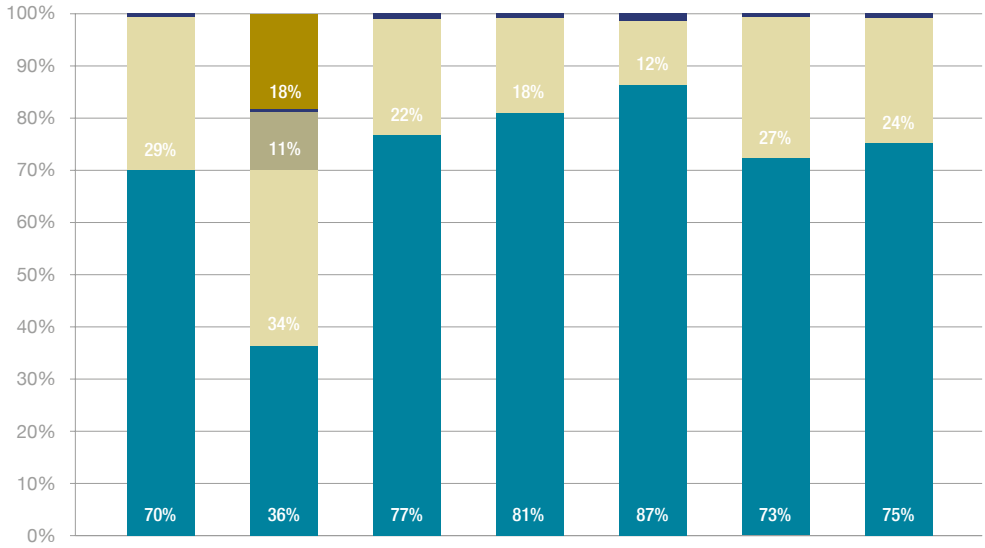
Figure 15 – .eu IDN usage compared with a range of TLDs



CATEGORY	.eu IDN	.eu	.com	ccTLD1	.mobi	.biz
Business	21.61%	31.40%	29.50%	39.10%	12.30%	27.00%
Holding page	17.02%	25.40%	13.10%	19.50%	43.40%	16.10%
Error	29.36%	22.20%	18.20%	12.10%	26.90%	24.00%
Pay-per-click	27.63%	12.80%	27.30%	11.40%	13.90%	27.70%
Community	3.57%	5.70%	10.10%	14.90%	2.30%	3.90%
Institutional	0.10%	1.30%	0.20%	1.10%	0.20%	0.30%
Password protected	0.62%	1.00%	0.80%	1.40%	0.70%	0.80%
Pornography	0.10%	0.30%	0.90%	0.50%	0.40%	0.20%

In comparison to the general .eu usage, the proportion of pay-per-click is higher in IDNs, and business use lower. Figure 15 compares .eu IDN usage figures with those of .eu, .com, a ccTLD[37], .mobi and .biz[38]. The other domains are selected because of their popularity (.com/ccTLD), and in the case of .mobi and .biz, as comparatively new TLDs, to benchmark with .pф and .eu's IDN registrations. The first comparison excludes .pф, as its usage figures[39] are reported under more general categories (for example, "web-site", rather than business, community, etc).

Figure 16 – IDN usage comparison, including .pф



CATEGORY	.eu IDN	.pф	.eu	.com	ccTLD1	.mobi	.biz
Not specified		18%					
Others	1%	1%	1%	1%	1%	1%	1%
Redirect		11%					
Error	29%	34%	22%	18%	12%	27%	24%
Website	70%	36%	77%	81%	87%	73%	75%

[37] *EURid has agreed not to reveal the identity of the ccTLD, hence it is referred to in figure 16 as "ccTLD1".*
[38] *Source: "Website usage trends among top-level domains", EURid in collaboration with Leuven Statistics Research Centre, 2011.*
[39] *Source: statdom.ru, accessed 16 May 2012.*

Figure 15 indicates that business usage of .eu IDNs is greater than in .mobi, and is within 10% of .biz and .com. It is significantly lower than "ccTLD1", supporting the findings of a EURid .eu Insights report[40] that ccTLDs have high business usage.

Usage of the Russian domains is categorised differently. Interpolating the above figures into the Russian schema[41] (figure 16), it appears that while error rates are broadly comparable across all the domains, website usage is lower in .рф. News reports indicate that some Russian registrars made speculative registrations at the time of landrush in November 2010, and then sought to auction cherished domains at high prices. The relatively lower usage figures in .рф are consistent with a higher than average level of domain name speculation. However, further research is needed to understand the precise reasons, and the data interpolation may also introduce inaccuracies. For example, the .рф domain has over 18% "Not specified". If added to the website figures, its general usage figures conform more closely to the comparators.

8 .eu IDNs

Having launched IDNs in a landrush in December 2009, by December 2010 there were 69 000 .eu IDN registrations. Analysis showed a strong link between local language and geographic location of registrant. For example, 46% of .eu registrations were from Germany and the two most popular IDN characters were ü (in 13 341 domains) and ä (in 12 655 domains), both of which are frequently found in German words. Moreover, for 75% of Greek .eu IDNs, the registrant was located in Greece; and Bulgaria's share of Cyrillic script .eu IDNs was more than double that of the next most popular, Germany.

The .eu IDN landrush, starting 10 December 2009, proved popular. More than 47 000 .eu IDNs were registered on the first day. Even after the landrush peak, growth in the first year of .eu IDNs was 23% to 1 December 2010 (figure 17).

Just as the .рф register shrunk after its first renewal of its landrush peak, .eu also experienced a net loss of more than 12 000 IDNs between 1 December 2010 and 1 January 2011. Even discounting the landrush effect, growth of .eu IDNs in the second year is notably lower than the previous 12 months (3% compared with 23%), and is also lower than new registration growth in the general register for the same period (5.5%[42]).

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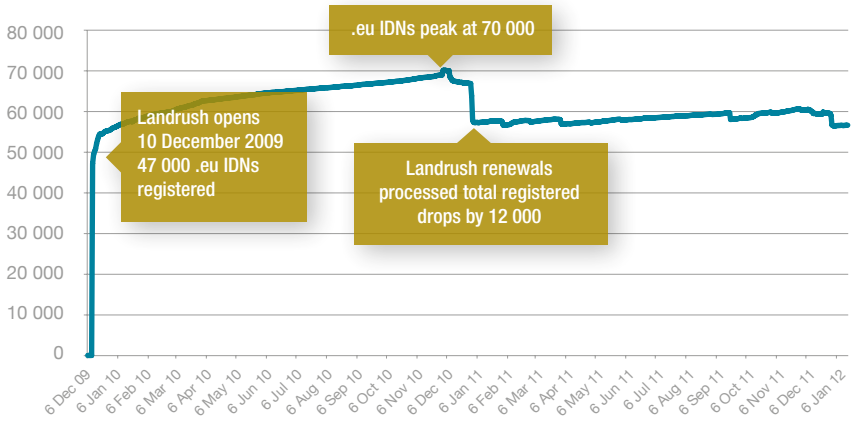
[40] *"Website usage trends among top-level domains", 2011, http://www.eurid.eu/files/Insights_Cat3.pdf.*

[41] *"Website" includes business, community, holding page, pay-per-click, institutional and pornography. "Error" and "Not delegated" are categorised as "error". "Not specified" includes password protected.*

[42] *Source, EURid Quarterly Report, Q4 2011, http://www.eurid.eu/files/Q4_2011.pdf, accessed 23 May 2012.*

Figure 17 – .eu IDNs, 2009-2011



We can speculate as to the reasons why the rate of .eu IDN growth may have dropped in the past year:

- End-user awareness of IDNs remains low, according to anecdotal evidence from registries. Generally, the Internet's addressing system remains dominated by ASCII and Latin script languages, and it is inferred that end users do not yet expect to find, use or register non-Latin script domain names.
- For those that are aware of IDNs, the user experience of IDNs in browsers, applications and email remains variable and this may impact on user decisions to renew or register after the initial landrush period.
- There is a strong correlation between domain name growth and economic growth[43]. During 2011, the Eurozone crisis is likely to have affected general growth of .eu domains. Greece, for example, saw its share of IDNs as a percentage of the .eu domains by country decline from 9.7% in 2010 to 7.6% in 2011. Against this hypothesis, in the same period, Greece's general .eu registrations remained steady at 1% of the register and grew by 10.5%[44].
- There is a correlation between local infrastructure and local content. Greece and Bulgaria, two of the EU Member States with the greatest affinity between local language and IDNs, are significantly below the EU average in many Digital

[43] *See http://db.nominet.org.uk/node/macro-economic-influence/ - correlation between FTSE 100 and .uk register growth 1996-2011, accessed 26 April 2012. Also, prices of domains in the secondary market correlate closely with NASDAQ, Lindenthal, T., "Valuable Words: Pricing Internet Domain Names", March 28 2012, http://www.idnx.com/working_paper_IDNX.pdf, Section 6 figure 6, p18.*

[44] *Source, EURid Quarterly Report, December 2010 and December 2011.*

Agenda Targets[45], for example, households with Internet access, fixed and mobile broadband penetration.

- New IDN registrations may have been boosted at the launch in 2009 by registrar price promotions and short-term marketing campaigns[46], which had a positive but short-term impact on growth.

Overall the .eu IDN registrations shrunk by 13% between December 2010 and December 2011.

Figure 18 – Percentage growth, .eu IDNs, 2010-11

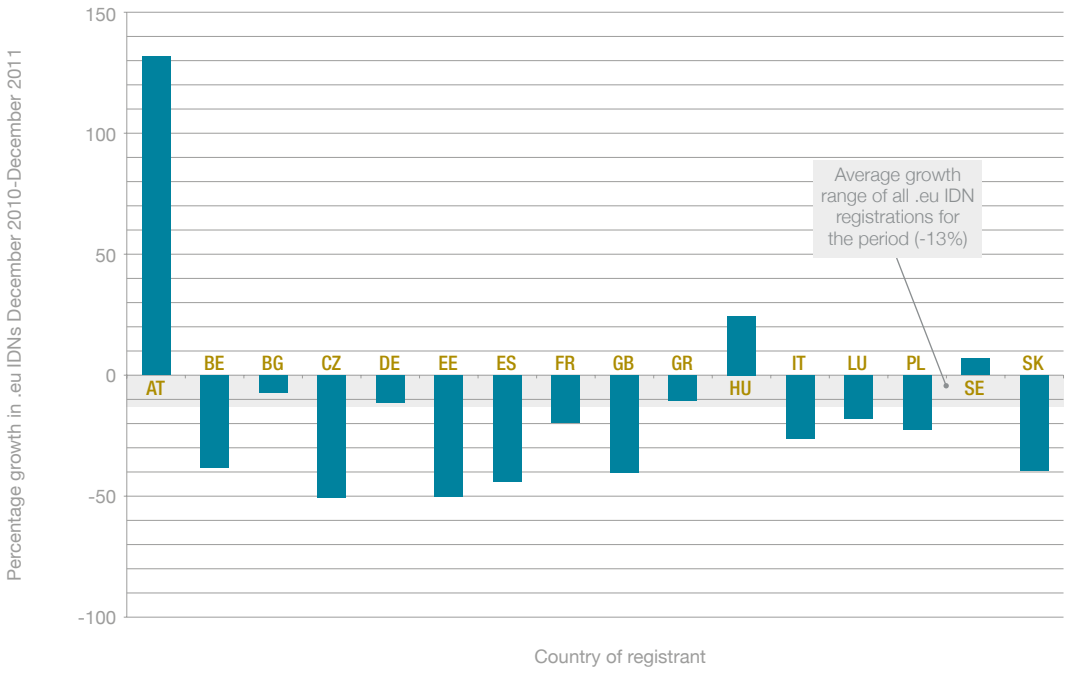


Figure 18 plots the growth of .eu IDNs by country of registrant[47]. While in real terms, the number of .eu IDNs in Germany, Greece and Bulgaria all dropped between 2010 and 2011, they were less affected than in countries with weaker links between local language and IDNs (for example, the Czech Republic and the United Kingdom). The number of .eu IDNs in Austria more than doubled in the same period; Hungary and Sweden also saw increases. These may reflect promotions by local registrars.

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[45] *Source: http://ec.europa.eu/information_society/digital-agenda/scoreboard/index_en.htm, accessed 9 July 2012.*

[46] *For example, United Domains AG (Germany) and Zone Media (Estonia) both organised marketing campaigns to coincide with the launch of .eu IDNs in December 2009.*

[47] *Source: EURid, January 2012. Countries with less than 500 .eu IDN domains are excluded from this comparison.*

The link with local language remains. Greece still has the highest percentage of IDNs as a proportion of total .eu registrations per country. Bulgaria still has more than twice the number of Cyrillic script .eu domain names than the next highest country.

9 Country case studies

This section provides case studies for the following countries: the Russian Federation, Qatar, Saudi Arabia, Egypt and the Republic of Korea. Unlike many of the European ccTLDs, which operate primarily in Latin script and use IDNs to represent special characters or diacritics, the countries selected for case studies are not well served by the mixed-script, hybrid IDNs. Some of the countries studied were active in advocating IDNs to be implemented at the top level, because of the poor end-user experience and other challenges associated with hybrid IDNs which mixed scripts or were bi-directional.

All the countries in the case studies are first movers in the deployment of IDN at the top level, from different scripts and geographic regions, and their languages are not well served by the ASCII DNS. Despite having these aspects in common, their experiences in deploying IDNs are diverse and the analysis section (Part 2) explores the reasons why this may be.

The case studies take as their starting point the strong correlation between local infrastructure and local content[48], and begin with a review of country and language factors such as size of population, linguistic diversity and general literacy levels. Internet penetration, broadband and number of Internet Exchange Points are also highlighted.

Next, each case study reviews factors relating to the ccTLD, such as number of registrars, registry policies, pricing and strength of the ccTLD brand. These elements are explored on the basis that the ccTLD registry forms part of the national Internet infrastructure. It can also be a catalyst for enabling the local Internet industry (combining infrastructure and content creation) – and the impact of having a local network of domain name registrars is highlighted as a particularly significant factor.

The country case studies form the basis for developing a matrix of IDN readiness in Section 10, based on country, Internet infrastructure and language factors on the one hand, and ccTLD registry factors on the other. The focus of Sections 9 and 10 is on fully-IDN domains, rather than hybrid domains.

[48] *ISOC, OECD, UNESCO "The relationship between local content, Internet development and access prices", 2011.*

9.1 The Russian Federation

The Russian Federation has a population of 142 million and ranks 11th globally in gross domestic product[49]. According to the ITU, there are 61 million Internet users in the Russian Federation (44.3% Internet penetration). Russian Federation literacy levels are high (98%); 85% of adults have completed secondary education[50] and, according to a 2005 study, more than half attained tertiary education (double the OECD average)[51]. Prices for broadband access vary according to region, averaging $27 a month in the regions around Moscow, and $69 a month in the Far East (for 1 megabit per second)[52]. There are 15 Internet Exchange Points (IXPs) in the Russian Federation, in geographically diverse locations[53]. This is the highest number per country in the European region[54].

Of a population of 141.9 million, 80% regard Russian as their native language. The remaining 20% of the population speak 180 languages[55]. Thus, despite official support for all languages spoken in Russia, Russian is the dominant language. Net migrant stock is low (8.4%), as are levels of outbound and inbound mobile students (0.5% and 0.6%, respectively). The Russian Federation produces 67 feature films each year and has over 1 200 cinemas; domestic recorded music makes up 70% of music retail sales; the level of imports of recorded media, visual arts and audio-visual media are low[56]. These factors indicate a high level of cultural and linguistic homogeneity.

The Russian Federation ccTLD operator, the Coordination Centre for TLD RU, is a not-for-profit company established in 2001. Following its foundation, the domain name registration system was substantially reorganised, and new accreditation processes introduced. It has 25 accredited registrars, all of which are based in the Russian Federation. In 2010, the Coordination Centre was delegated the Cyrillic IDN for the Russian Federation, .рф[57].

The Russian Federation ASCII domain has a strong brand, and has enjoyed healthy growth for several years (for example, 24% growth between December 2009 and December 2010[58]). According to Verisign, the growth of the Russian Federation's

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[49] *Source: World Bank, http://data.worldbank.org/country/russian-federation and http://databank.worldbank.org/databank/download/GDP.pdf (2010), accessed 16 May 2012.*

[50] *Source: UNESCO Regional Overview: Central and Eastern Europe and Central Asia, Education for All Global Monitoring Report 2011, p15 http://unesdoc.unesco.org/images/0019/001917/191765e.pdf.*

[51] *Source: UNESCO, EDUCATION TRENDS IN PERSPECTIVE ANALYSIS OF THE WORLD EDUCATION INDICATORS 2005 Edition, http://www.uis.unesco.org/TEMPLATE/pdf/wei/WEI2005.pdf, accessed 16 May 2012.*

[52] *Source: Global Voices, "Russia: Mapping Broadband Internet Prices", 14 March 2010. Prices quoted are as at November 2009. http://globalvoicesonline.org/2010/03/14/russia-mapping-broadband-internet-prices/, accessed 16 May 2012.*

[53] *Source: Euro-IX, https://www.euro-ix.net/europe, accessed 2 July 2012.*

[54] *Source: Euro-IX, 2010 report on European IXPs, https://www.euro-ix.net/documents/380-euro-ix-report-2010-pdf?download=yes, accessed 2 July 2012.*

[55] *Source: Net.Lang "Towards the multilingual cyberspace", Maaya Network, 2012, p290, http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/netlang_EN_pdfedition.pdf, accessed 19 September 2012.*

[56] *Source: UNESCO World Report on Cultural Diversity (2009).*

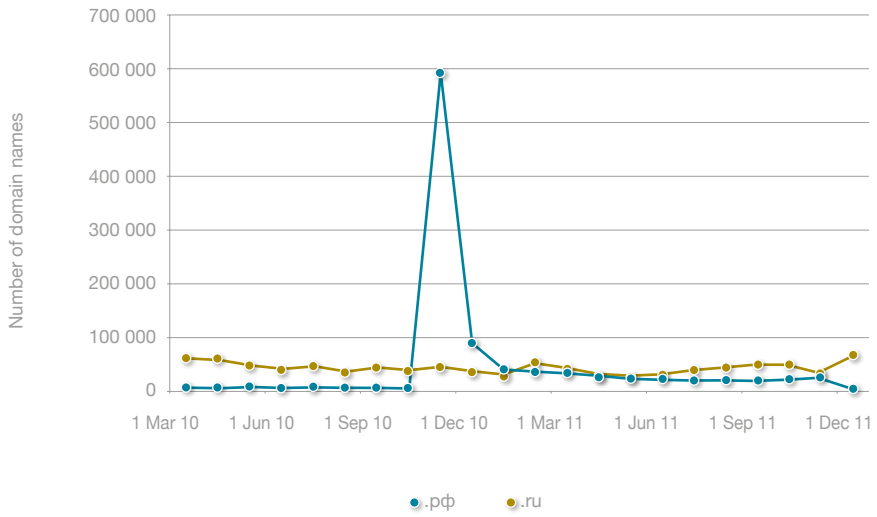
[57] *Source: http://cctld.ru/en/about/ Coordination Center for TLD RU website, accessed 24 May 2012.*

[58] *Source: statdom.ru.*

Internet industry accounted for .ru's strong growth in 2007-8[59]. In December 2011, the .ru domain had 3.6 million registrations and the .рф domain 937 211[60].

In terms of volumes, the Russian Federation IDN TLD, .рф, has been the most successful of IDN experiences to date. Russian Federation IDNs grew by 54% between December 2010 and December 2011. Monthly growth rates have been comparable with the longer-established .ru domain (ASCII only), albeit with a slightly downward trend.

Figure 19 – .рф and .ru monthly net growth compared, 2010-2011



By February 2012, .рф had lost 16% of its total register as the impact of landrush renewals was felt[61]. The .рф domain had 615 000 registrations during its first month of landrush (November 2010). When so large a proportion of the register falls due for renewal at once, the overall register size inevitably decreases. Even with a healthy renewal rate of 67%[62], this resulted in the deletion of 200 000 landrush domain names[63].

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[59] *The .ru domain grew by 61% in 2007. ".ru benefited from the continued growth of its Internet industry". Source Verisign Domain Name Industry Brief, March 2008, http://www.verisigninc.com/assets/domain-name-report-march08.pdf, accessed 24 March 2012.*

[60] *Source: statdom.ru.*

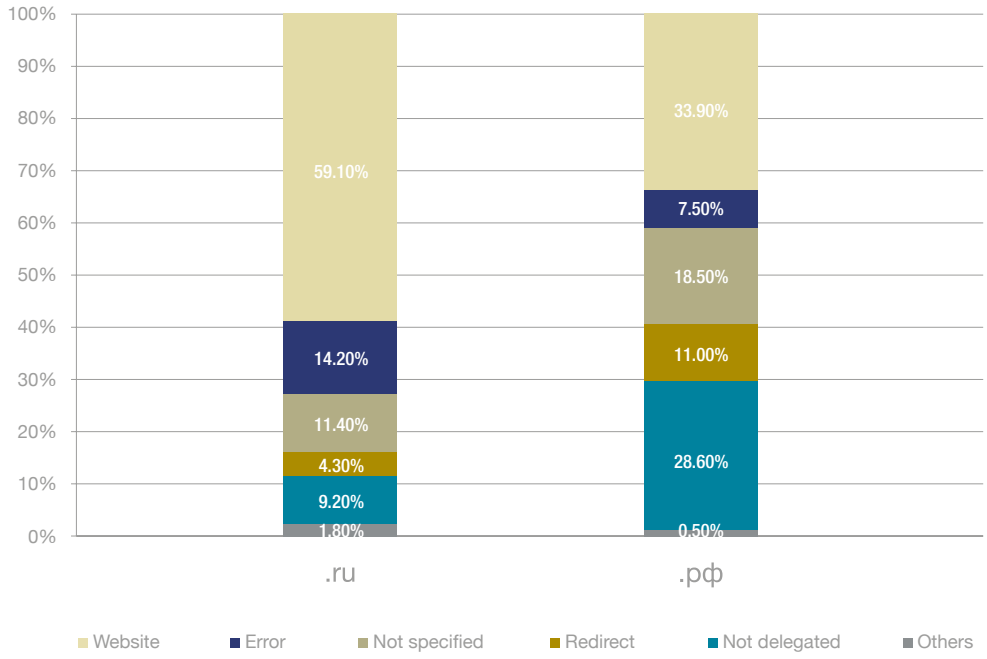
[61] *From 937 913 (December 2011) to 783 373 (February 2012).*

[62] *For example, .co estimated a 66-68% renewal of landrush domains, August 2011, http://www.thedomains.com/2011/08/16/co-says-they-are-getting-a-68-renewal-rate/, accessed 25 April 2012. The same article states that .org reports a 61% first year renewal rate. .uk's first renewal rate (at two years) is less than 60%. http://db.nominet.org.uk/node/the-uk-register-2/.*

[63] *http://statdom.ru/tld/%D1%80%D1%84/report/domainsrenewal/#10. The Statdom site shows that renewal rates for .рф were as low as 56% (Jan 2012), before recovering.*

In the past year, the Russian Federation registry has set up a detailed statistics site for the .ru and .рф domains, Statdom.ru[64]. According to Statdom, 72% of .рф domains are delegated (in use), compared with 91% in .ru. Statdom has also analysed the usage of .ru and .рф domains (see figure 20). The higher levels of non-delegation and redirects in .рф are partly to be expected in a newer domain and this is supported by EURid's research on general website usage[65]. The relatively high figures for pay-per-click and parked pages are also consistent with domain name speculation, and further research is required to clarify this point. Over time, we would expect to see the percentages of active websites increase as the domain gains user traction. The Statdom site does not categorise "website" further and it is assumed to include business sites, holding pages, community or personal, and pay-per-click.

Figure 20 – Comparison between website usage .ru and .рф, 2012



Source: Statdom.ru

[64] *http://statdom.ru/tld/%D1%80%D1%84/report/summary/, accessed 25 April 2012.*

[65] *EURid Insights: Website usage trends among top-level domains, 2012. http://www.eurid.eu/files/Insights_Cat3.pdf: "Older, more established TLDs have a higher percentage of business sites than the new TLDs".*

9.2 Qatar

Qatar has a population of 1.7 million and ranks 58th in gross domestic product[66]. Measured by GDP based on purchasing power parity per capita, Qatar was ranked top in the world in 2010, i.e. has the highest income per capita[67]. Qatar has a high level of Internet use (69% of the population[68]) and affordable Internet access. A national broadband network project will deliver very high speeds by 2015. Literacy levels are 95% amongst adults and over 97% amongst youth, compared with regional averages of 75% and 89% respectively[69]. A high level of the population is educated to university level. Therefore, Qatar does not face many of the basic challenges – affordable access, literacy, local infrastructure – identified by UNESCO, ISOC and OECD[70] as key enablers of local language content.

While Arabic is widely spoken in Qatar, the high proportion of foreign workers (1.3 million[71]), results in English being used in many business contexts. Some commentators fear that Arabic is "slowly dying out" in parts of the Arabian Peninsula[72]. While this may overstate the situation, there is no doubt that, unlike some countries in this study which have seen a large uptake of their national IDN (e.g. the Russian Federation and the Republic of Korea), Qatar does not have a single, dominant language[73]. For example, 78% per cent of the population is of migrant stock, its outbound and inbound mobile student rates are high (20.2% and 28%)[74].

Qatar has recently published a strategy to develop digital content and has started mechanisms to develop Arabic language content, for example, Qatar's Digital Content Incubation Centre[75].

In 2010, the Qatar ccTLD registry changed operator to the Supreme Council of Information and Communication Technology[76]. The previous incumbent had run .qa as a closed registry, with restricted registration policies. The new registry introduced a first-come, first-served policy, with no limit on the number of domains registered by a single entity[77]. Therefore, compared with other ccTLDs in this study, the Qatar registry remains in

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66 *Source: World Bank, http://data.worldbank.org/country/qatar and http://databank.worldbank.org/databank/download/GDP.pdf (2010), accessed 16 May 2012.*

67 *Source: Global Finance Magazine, "The World's Richest and Poorest Countries", http://www.gfmag.com/tools/global-database/economic-data/10299-the-worlds-richest-and-poorest-countries.html#axzz1v1EWKX63, accessed 16 May 2012.*

68 *Source: Google, with data from World Bank. http://www.google.co.uk/publicdata/explore?ds=d5bncppjof8f9_&met_y=it_net_user_p2&idim=country:QAT&dl=en&hl=en&q=number+of+internet+users+qatar, accessed 16 May 2012.*

69 *Source: UNESCO, Education (all levels) profile, Qatar http://stats.uis.unesco.org/unesco/TableViewer/document.aspx?ReportId=121&IF_Language=en&BR_Country=6340, accessed 16 May 2012.*

70 *ISOC, OECD, UNESCO "The relationship between local content, Internet development and access prices", 2011.*

71 *Source: "Qatar's foreign workers overwhelm labour market", Gulf News, http://gulfnews.com/news/gulf/qatar/qatar-s-foreign-workers-overwhelm-labour-market-1.917667, accessed 16 May 2012.*

72 *See "Is Arabic a dying language?", Global Post, Hundley, T., February 22 2010, http://www.globalpost.com/dispatch/middle-east/100216/arabic-endangered-language.*

73 *Source: Source Net.Lang "Towards the multilingual cyberspace", Maaya Network, 2012, p290. http://www.unesco.org/new/fileadmin/MULTIMEDIA/HQ/CI/CI/pdf/netlang_EN_pdfedition.pdf.*

74 *Source: UNESCO World Report on Cultural Diversity (2009).*

75 *Source: Connect Arab Summit 2012, Background Paper, Digital Content. http://www.itu.int/net/ITU-D/CDS/gq/generic/asp-reference/gq_file_download.aspx?FileID=711, accessed 22 June 2012.*

76 *Source: IANA, http://www.iana.org/reports/2010/qa-report-12oct2010.html.*

77 *Source: Qatar ccTLD registration policy, http://www.domains.qa/sites/default/files/Qatar%20Domains%20Registry-Domain%20Name%20Registration%20Policy_0.pdf, accessed 16 May 2012.*

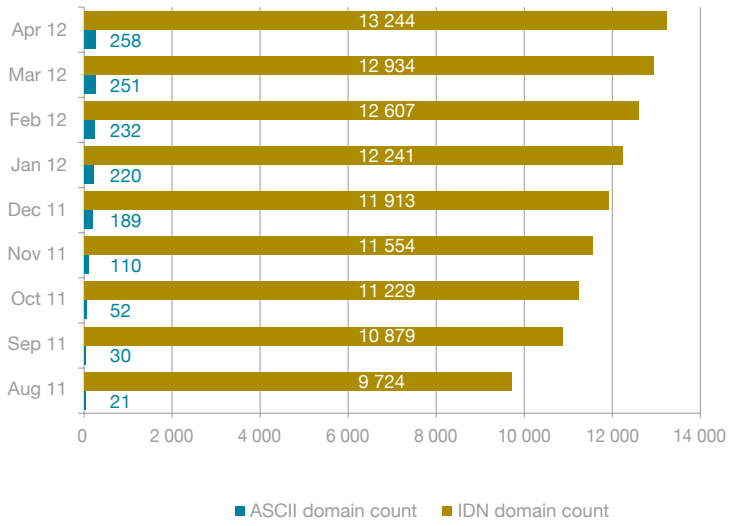
transition and is still to enjoy the fruits of reform. It has yet to build a strong brand, being newly re-established, nor has it built a local base of registrars despite having recently introduced a system of registrar accreditation.

At the time of writing, retail prices for .qa domains range between $37 and $99 for a year's registration. This is high compared with .com ($14) or .eu ($11[78] and $7.90[79]), but lower than retail prices for other countries in the region. Generally, as the number of registrars expands in a TLD, price competition intensifies, resulting in a "race to the bottom".

The IDN ending for Qatar, .قطر, was launched at the same time as the relaunch of the .qa (ASCII) registry. The registration figures of the IDN and ASCII .qa ccTLD are set out in figure 21.

The Qatar registry supported the launch of the IDN ccTLD with aggressive marketing. A three-month sunrise period was followed by a landrush. Figure 22 shows that growth of the IDN ccTLD in 2012 has slowed to an average of 13 new registrations per month. Meanwhile, the healthy growth of the ASCII .qa domain over the same period suggests that users are not migrating away from ASCII to IDN domains.

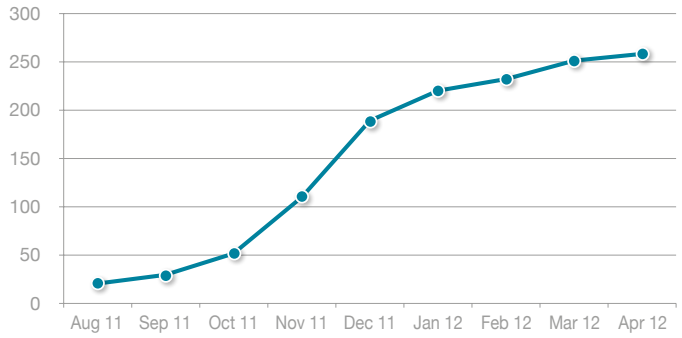
Figure 21 – Registration volumes, Qatar (ASCII and IDN).



[78] *Source: GoDaddy price promotion £7.19 for a year, accessed 23 May 2012, http://www.godaddy.com/domains/search.aspx?isc=gfnf4uka01&ci=8969.*

[79] *Source: 123 reg price promotion £4.99 per year for .eu, accessed 23 May 2012, http://www.123-reg.co.uk/domain-names/cheap-domain-names.shtml.*

Figure 22 – IDN domain count, Qatar



According to the Qatar registry's own research on user acceptability, one of the major drivers for registration was national pride in using the language rather than content. The registry is making ongoing improvements in response to user feedback. It has also highlighted some sites as "IDN champions", including a university and a blogging site, *ishmana*, which gives meanings of Qatari dialect words.

The Qatar registry identified the "content ecosystem" as a major challenge to IDN uptake. The registry did not perceive that registrars currently feel market pressure to introduce IDN-friendly interfaces for their customers, or equivalent tools to register domain names, create and publish local content in non-Latin scripts. This may be a consequence of having so high a proportion of international, rather than local, registrars. It contrasts with the experience in .eu and .рф, where local registrars support national and regional languages more readily. The Qatar registry has 12 accredited registrars, of which only two, Q-tel and W3Infotech, are locally based in Qatar. The other 83% of Qatar accredited registrars are also ICANN accredited and are based outside Qatar.

Therefore, in part because of its small domestic market, Qatar lacks an important element of local infrastructure, home-grown registrars, and this results in a lack of competition at the local level.

The impact is seen when seeking to register a قطر. domain through one of the 12 accredited registrars. Compared to the ease of registering a domain name, and publishing a website "on the fly" in the English language, or Latin script, few international registrars, with the exception of the registrar 101Domains[80], have a good interface for IDNs. If a user who speaks only Arabic wanted to register a Qatar IDN, he or she would only

[80] *101 Domains is an ICANN accredited registrar. See www.101domain.com/aboutus.htm.*

be able to use the websites of the two local registrars. One other registrar provides its website in a range of languages, including Japanese and Chinese. The remainder provide their website only in English, German, French or Spanish. This reflects the reality of the global registrar market, which is that the majority of the actors conduct business in only a handful of European languages, especially English. This trickles down to limit the choice of languages in which end users can transact.

Whereas the local registrars signal the availability of both .qa and the IDN on their home pages, the international registrars offer .qa amongst sometimes hundreds of domain endings, requiring the user to navigate to deep pages within the site to find the relevant offering. In one case, the registrar Safenames[81] only offers IDNs for registration in Punycode, with no indication to an Arabic speaker of what they will get.

The Qatar registry is actively seeking to expand its local registrar base as more Internet hosting and content service providers are approached, and continues to raise awareness of the domain. For example, through social networking and a mobile application which is currently in development.

9.3 Saudi Arabia

Saudi Arabia has a population of 27.4 million (2010) and is 26th in the GDP world rankings. It has 41% Internet penetration[82]. In 2006, it had 12.1% broadband penetration and 81% mobile penetration[83]. It has 605 secure Internet servers per million people. It has 89% net enrolment in primary education and an adult literacy rate of 86%.[84]

According to the World Values Survey (2008), 95% of Saudis describe themselves as "very proud" or "quite proud" of their nationality, and 49% relate primarily to their country (as opposed to locality)[85]. Arabic is the official language. The number of living languages in Saudi Arabia is low (20), and institutional support for the official language is high (100% of total yearly instructional hours devoted to language for school grades 1-6)[86]. Outbound and inbound mobile student rates are low (1.9% and 2.2%, respectively). 63% of recorded music sales and repertoire are domestic, but there is a reasonably high level of imports of cultural goods, for example, 32.4% books, 26.3% recorded media and 23.8% visual arts. Tourism flows, both outbound and inbound, are mainly to and from the Arabian peninsula[87].

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[81] *Safenames is an ICANN accredited registrar, see http://www.safenames.net/AboutUs/CompanyOverview.aspx.*
[82] *Source: World Bank databank for Saudi Arabia 2002-2010.*
[83] *Source: UNESCO World Report on Cultural Diversity, 2009, table 4.*
[84] *Source: World Bank databank for Saudi Arabia 2002-2010.*
[85] *Source: World Values Survey database, 2008, referenced in UNESCO World Report on Cultural Diversity 2009, table 6.*
[86] *Source: UNESCO World Report on Cultural Diversity, 2009, table 7.*
[87] *Source: UNESCO World Report on Cultural Diversity, 2009, tables 11, 15, 16, 17.*

There are no Internet Exchange Points (IXPs) in Saudi Arabia. Whereas some countries (for example, Egypt, China and Brazil) have home-grown versions of popular micro blogging, social network and search sites, Saudi Arabia does not[88].

The Saudi ccTLD domain (.sa) was operated from 1995-2006 by the King Abdullah City for Science and Technology. In late 2006, the task of operating the ccTLD was moved to SaudiNIC under the control of the Communication and Information Technology Commission (CITC). The number of .sa domains was 26 766 in December 2011, and the number of registrations in the Saudi IDN domain, السعودية., 1 790.

The Saudi registry has no registrars, but a number of commercial registrars do offer registration of Saudi domains. The registrars appear to make the registration on their own behalf and then transfer the domain to their customer[89]. The .sa domain registration rules have strict eligibility criteria, requiring the registrant to be based in Saudi Arabia, or have a registered trademark in Saudi Arabia. The IDN ccTLD, السعودية., may be registered by any natural or legal person, and it is not clear whether the same eligibility criteria apply as in the ASCII domain[90]. This may be one of the reasons why there are a variety of descriptions of the Saudi registration rules on registrar sites[91].

Although SaudiNIC does not charge registration fees, retail prices for Saudi domain names are high, ranging between $129.30 and $199 for a year's registration in a sample of five registrars. Reasons for the high prices may include the manual registration system arising from the eligibility criteria.

In last year's Internationalised Domain Names State of Play report, we noted that the Saudi IDN domain, السعودية., had grown to 7% of the size of .sa (the ASCII domain) within a few months of launch. After the initial burst of registrations in 2010, the monthly rate of registration under the IDN domain had dropped to an average of 27 new registrations per month in 2011 (see figures 23 and 24)[92].

Last year's Internationalised Domain Names State of Play report noted that generally the rate of growth in the Saudi domain was increasing year on year. The healthy percentage growth rate has continued, with both the ASCII and IDN Saudi domains growing at a rate of 24% in 2011, compared with 16.8% growth in 2008-9 and 23% in 2009-10[93].

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[88] *Source: Saudi ccTLD registry.*
[89] *For example, 101 Domains, EURODNS, bNamed.net.*
[90] *See Sections 2/2 and 2/3 of the Domain Regulations at http://nic.sa/view/regulation, accessed 24 May 2012.*
[91] *For example, see Rwgusa.net: registrants "must have a trade mark in Saudi Arabia matching the domain name or provide company incorporation documents of a company in Saudi Arabia. A letter on the official letterhead of your organisation addressed to SaudiNIC requesting the domain name registration is also required. Local administrative contact required." Registration time is estimated at 4-6 weeks.*
[92] *Source: SaudiNIC 2012.*
[93] *2008-2010 figures are for ASCII .sa domain. Source SaudiNIC.*

Figure 23 – Saudi IDN ccTLD since deployment

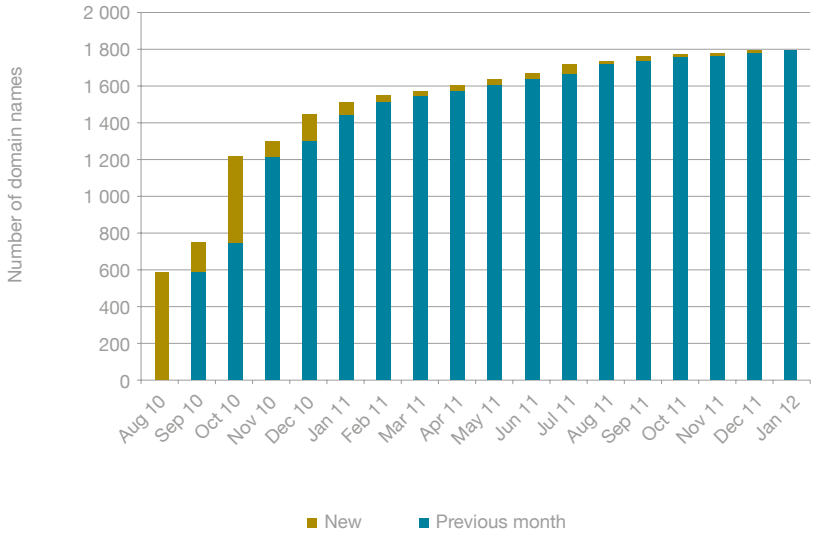
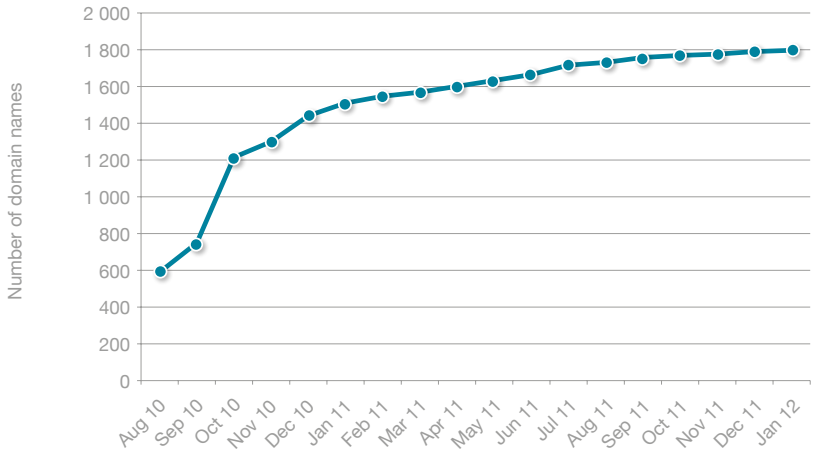


Figure 24 – Saudi IDN ccTLD since deployment (cumulative)



The Saudi ccTLD manager noted that despite healthy percentage growth, the actual number of IDNs is not high. He attributed a number of factors as the cause of this:

- Lack of end-user awareness of the Arabic IDN, due to lack of marketing
- Handling of Arabic IDNs in browsers remains problematic[94]
- SaudiNIC is unable to provide variants of the IDN ccTLD as these have not been delegated by ICANN
- Working with Punycode is not convenient, particularly for non-Arabic speaking system administrators and webmasters (because they do not understand Arabic and the Punycode does not help them know what the actual IDN is). Many expatriates are working as systems administrators and webmasters in Saudi Arabia.

9.4 Egypt

The principal source for this case study is the ISOC, OECD, UNESCO study on Local Infrastructure and Local Content, 2011.

With a population of 73 million, Egypt is the second most populous country in Africa, and is an economically middle-income country. Egypt is on track to reach the Millennium Development Goal of universal primary education by 2015, but illiteracy (especially amongst women) remains a challenge. Egypt's population is described as fairly homogenous and Arabic is spoken nationwide.

Egypt has the largest Internet market in Africa. According to the ITU, 24.2% of Egyptians are Internet users and over 1 million households have ADSL. Egypt has also been a pioneer of Internet Exchange Points (IXPs), which reduce the costs of access and latency. There is a "flourishing and dynamic" ISP market. Following the Internet switch-off during the Arab Spring of early 2011, Egypt is now strengthening redundancy and resilience of key infrastructure to prevent the same thing happening again. Internet access and mobile costs are relatively affordable.

There are several government-led initiatives to promote Arabic language Internet content, digitisation of national archives and digital literacy. Over 140 000 graduates have received basic Internet skills training. Egyptian Internet community members were among the leaders in applying pressure to find technological approaches to solve both the IDN and right-to-left challenges for presenting scripts in Internet browsers. When the Arabic language equivalent of Facebook was launched in Egypt in March 2009, it gained 3.6 million users within two years. Of the seven most popular Arabic Internet sites, three are from Egypt (Youm7, Myegy and Ahram)[95]. Over 40% of Egyptian newspapers and magazines have online versions, although less than 30% of those provide a

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[94] *See http://nic.net.sa/docs/Zoman-IDN-SDC-Amman-Oct-2010.pdf.*

[95] *Source: Connect Arab Summit 2012, Background Paper on Digital Content, http://www.itu.int/net/ITU-D/CDS/gq/generic/asp-reference/gq_file_download.aspx?FileID=711.*

readers' comment service. Over 30% of the total Arabic language blogs are Egyptian[96]. Egypt was one of the first countries to be delegated an IDN ccTLD, and was one of the first to launch. However, the events of 2011 have so far prevented the opening of the landrush for .مصر. Overall, the number of registrations in the Egyptian ASCII ccTLD, .eg, remain low (8 253). The price of registrations in the Egyptian ccTLD remains high ($83 per year at the second level under .eg although prices under sub-domains like .com.eg are substantially lower)[97].

9.5 Republic of Korea

The principal source for this case study is the ISOC, OECD, UNESCO study on Local Infrastructure and Local Content, 2011.

The Republic of Korea ranked 12 in world GDP in 2009 (its GDP having risen from just above that of Burkina Faso in 1960). It is a high-tech, middle labour cost market. The Republic of Korea is described as "one of the most homogenous countries in the world", both ethnically and linguistically. It scores 0.06 on the Linguistic Diversity index, one of the lowest scores in the world[98]. The country had a population made up almost entirely of Koreans[99], but is now supplementing its workforce with migrant labour, due to its rapidly aging population. Its outbound and inbound mobile student rates are 3.1% and 1.0%, respectively. The Republic of Korea produces 110 national feature films and has 1 800 cinemas; 56% of the recorded music repertoire is domestic; however, significant percentages of visual arts and audio-visual media are imported (28.4% and 28.8%). Outbound and inbound tourism are mainly from within the region[100].

The Republic of Korea is a world leader in fixed broadband infrastructure, ranking first on the number of fibre-to-the-home (FTTH) subscribers, on the number of households with broadband, and on download speeds. Even rural areas are connected to fixed broadband with 99.8% coverage by 2008. The Republic of Korea benefits from ten sub-marine fibre-optic cables in eight different regions.

Ten million people in the Republic of Korea have received Internet education. The Republic of Korea's population of 48 million is highly literate and has an early adoption culture.

The Republic of Korea has 126 local Internet Service Providers (ISPs) and four IXPs. It has a million ccTLD domain registrations under .kr and 210 000 under .한국 (to December 2011) since the landrush launch in September 2011[101].

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[96] *Source: IDSC, 2010.*

[97] *Source: http://www.egregistry.eg/price%20policy.html, accessed 13 September 2012, indicates that the fee for registration at the 2nd level under .eg: $83 annual fee; under .com.eg, .net.eg, org.eg: $16 annual fee; under edu.eg, sci.eg, gov.eg, mil.eg: $11 annual fee; and under info.eg, sports.eg, name.eg: $8 annual fee.*

[98] *Source: Ethologue, 2005.*

[99] *Source: ISOC, OECD, UNESCO study on Local Infrastructure and Local Content 2011.*

[100] *Source: UNESCO World Report on Cultural Diversity 2009.*

[101] *Source: http://isis.kisa.or.kr/eng/sub01/?pageId=010600#.*

In keeping with its cultural and linguistic homogeneity and its early adoption culture, the Republic of Korea has been an early developer of Internet content. “Another reason for the use of local content is related to the fact that the Korean population has historically remained inward looking”[102]. Korean language websites and services, for example, Naver (search engine), Daum and Nate, Cyworld (social networking), are among the top ten most visited sites in the Republic of Korea. More recently, Facebook, Twitter and Google have arrived in the Republic of Korea and are winning market share.

Local content is very rich, covering games in particular, but also user-created content, email, blogs, news, music and e-learning[103].

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[102] *Source: ISOC, OECD, UNESCO study on Local Infrastructure and Local Content 2011, para 366.*
[103] *Source: ISOC, OECD, UNESCO study on Local Infrastructure and Local Content 2011, footnote 204.*

PART 02

Analysis

10 What local factors contribute to IDN growth at the local level?

Why is it that IDNs are doing well in some countries and not others? While limitations in the functionality of IDNs continue to affect all users globally, it is clear that in some countries users have enthusiastically adopted IDNs, whereas others struggle for basic uptake.

This section explores the reasons behind the variable uptake of IDNs in different countries or regions. It starts with a reminder that, for all IDNs, basic functionality and user experiences are poor: handling and acceptance across browsers, in emails and in major websites remain inconsistent and support for IDNs amongst registrars is variable. Moreover, using IDNs can be problematic in some portable devices. While tablets that use Safari, Chrome or Internet Explorer as their browser may support IDNs, other applications on those devices often do not support internationalised characters. Thus, as people increasingly take advantage of the latest portable devices, paradoxically the IDN experience is diminished.

Until these basic steps are resolved, IDN registration and use will continue to underperform in relation to ASCII domains.

Having reviewed registry managers' opinions on IDN uptake, this section considers country/language factors that may encourage or inhibit IDN take up. The analysis is based on criteria developed in ISOC, OECD and UNESCO's study of the correlations between local infrastructure and local content.

Our research suggests that, in addition to country/language factors, the way that the ccTLD is operated, and in particular the presence or absence of local registrars, may also be linked to IDN uptake. Our hypothesis is that, if a high volume of IDN registrations is desired (whether or not this is the case depends on the individual objectives of the ccTLD registry), then a combination of low prices, liberal registration policies, a strong ccTLD brand and in particular a network of local registrars (who carry out much-needed marketing and awareness raising) are all contributing factors to growth[104].

[104] *Most domain name registries do not deal directly with registrants (end users) of domain names. Registrars act as intermediaries or even as contracting parties with registrants and usually provide complementary services such as web hosting or design, email forwarding, etc.*

10.1 General points about IDNs

10.1.1 Basic functionality still remains a challenge

As noted above, registering and using IDNs remains an inconsistent and sometimes unsatisfactory experience. Section 4 explores how browsers support IDNs and the progress towards introducing consistent handling of IDNs in emails. Despite steady technical progress, some of the world's most popular websites, such as Facebook, do not support IDNs in the creation of user accounts. Until these basic challenges are overcome, IDN popularity will lag behind that of ASCII domain names.

10.1.2 Registry managers' views on IDNs

The Internationalised Domain Names State of Play 2011 report[105] included a qualitative survey of registry managers' opinions on aspects of IDN implementation. It asked three questions about how the following results relate to the registry's expectations: uptake of IDNs, support for IDNs by registrars, and the extent of end-user awareness of IDNs. Each question was scored on a Likert scale from 0 (below expectations) to 5 (exceeds expectations).

The survey, which was limited to CENTR members and associate members[106], was repeated in 2012 and 26 registries responded, compared with 19 in 2011. The responses in 2012 came from a more geographically diverse group, with seven from Asia (two in 2011), 18 from Europe (17 in 2011), and one from Oceania (zero in 2011). The responses from Asia covered Arabic, Chinese, Japanese and Latin scripts. In contrast to the 2011 sample, the majority of which dealt with hybrid domains (IDN.ASCII), the 2012 group included five registries which were operating full IDN.IDN domains.

Overall, despite different participants, the results were consistent with the previous year.

Figure 25 – Average scores for IDN qualitative survey, 2011-12

Question	2011	2012	Comments
How does the uptake of IDN registrations relate to your expectations?	2.63	2.92	Improved since last year.
How well are IDNs supported by your registrars?	3.76	3.42	Reduced since last year.
How would you rate end-user awareness of IDNs?	2.56	2.50	Equivalent to last year.

[105] *http://link.eurid.eu/insights.*
[106] *For a list of CENTR members, see http://www.centr.org/members.*

Overall, there are few discernible differences in responses to the survey when viewed by UN region. As might be expected, the individual results do reflect the experiences of individual registries. So, whilst the Russian Federation ccTLD (operating the .рф IDN ccTLD) is enthusiastic across all dimensions, the Japanese are less so (especially comparing 2012 with 2011), as are the Iranians (both of which continue to operate in hybrid domains). In general, these qualitative answers vary greatly by registry. Since they ask subjective opinions, there is not necessarily an evidence base to support the impressions.

The TLD managers were also asked the question, "What change (either within the registry or the wider market) could improve uptake of IDNs?" The responses were free-text, with no suggestions made in the survey questions.

In 2011, there were ten responses; in 2012 there were 20 comments (from 17 registries). Whereas last year, comments highlighted the addition of email functionality and better support in browsers as the changes that would improve IDN uptake, in 2012 the answers were more varied, and registries tended to give more than one answer (see figure 26).

Figure 26 – What change (either within the registry or the wider market) could improve uptake of IDNs? Registry responses, 2012

Change advocated	Number	Percentage of answers
Email/client application	6	17%
Greater user awareness/change in habit of end users	8	23%
Wider support at registrar level	4	11%
Finding a solution for character variants	2	5%
Better support in browsers	6	17%
Relevant offerings, like bundling	1	3%
Easy management of DNS and web server, and translation between Unicode and Punycode	4	11%
Allow single character IDNs at the top level	1	3%
Browser support is no longer an issue for IDNs	1	3%
We do not expect mass market appeal for IDNs in our environment	1	3%
Our local language character set is similar to ASCII, therefore IDNs are not hard to operate	1	3%

10.2 Developing a matrix for IDN strength by country

Existing studies[107] show a correlation between local infrastructure and local content, but are "not able to positively determine the direction of causality due to data constraints and complex mutual dependencies"[108]. While it is usually assumed that IDNs could act as a catalyst for generating local content, it is also likely that IDNs – as local infrastructure – may themselves contribute to local content creation. In any event, assuming that IDNs are closely linked with local language, the following section of this report develops criteria to analyse the IDN readiness of a country or territory. While IDNs in themselves are not local content, our research indicates a strong correlation between adoption of IDNs and local language.

The criteria are developed around two organising themes: the first criteria relate to the country and language, and are drawn from existing criteria developed by ISOC, OECD and UNESCO[109]. The second relate to the TLD itself (strength of local registrar base, registration policies, price and brand of the TLD) and have been developed from our own research.

A matrix of TLD versus country/language factors is then scored based on information from the case studies to give an indication of IDN readiness. The matrix is primarily intended to reflect full IDN TLDs rather than hybrid domains.

10.3 Learning from criteria linking local language content and infrastructure

Research by ISOC, OECD and UNESCO[110] reveals a significant correlation between the development of network infrastructure and the growth of local content. Local content is defined as being in the users' language and relevant to the communities in which they live and work. The research contains country case studies which highlight factors present in environments where there is strong local content:

- Homogeneity in the local language and national population (for example, the Republic of Korea and Egypt), even a cultural insularity explains why the volume of local content is ahead of foreign content (see impact of the "Great firewall of China"[111])
- The presence of local Internet Exchange Points (for example, Kenya and Egypt)
- Broadband penetration drives lower costs of access and faster network performance (for example, the Republic of Korea)

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[107] *"The relationship between local content, Internet development and access prices", 2011. Connect Arab Summit 2012, a collaboration between the Internet Society, OECD and UNESCO, presented at the IGF Nairobi, 2011; Connect Arab Summit 2012, "Digital Arabic Content" Background paper, February 2012.*

[108] *"The relationship between local content, Internet development and access prices", 2011, a collaboration between the Internet Society, OECD and UNESCO, p5.*

[109] *"The relationship between local content, Internet development and access prices", 2011, a collaboration between the Internet Society, OECD and UNESCO.*

[110] *Ibid.*

[111] *Ibid p80, para 285.*

- For Internet content, successful local language adaptation of global content solutions such as social networks, micro blogging and online auctions (for example, Kenya, China and Brazil).

The differences seen in the case studies above suggest that similar factors may also have an impact on the rate of IDN uptake in a region. In addition, the size of the population, i.e. the local market, is taken into account.

10.4 Factors relating to the TLD

10.4.1 The vital role of local registrars

The ISOC, OECD and UNESCO study[112] notes the importance of a "flourishing, dynamic national ISP market (for example, Egypt and the Republic of Korea) in fostering local content". Many (but not all) ISPs may also be domain name registrars.

Because of their gateway function, ccTLDs have a key role to play in establishing a national ecosystem of registrars. If a ccTLD has low barriers to entry for registrars, this creates a virtuous circle of local businesses offering local language domains and developing relevant technical skills and experience at the local level. Relatively few local registrars have the scale to become ICANN accredited (in other words, to offer .com and other gTLD registrations), the majority operating only at the national level. For example, the largest European ccTLDs, .de, .uk, .nl and .eu, each have a solid, local registrar base. Even in smaller registries, the impact of the local ccTLD in fostering registrars at the national level is seen, e.g. the Slovenian registry has over 100 registrars, many of which are based locally and offer their services in Slovene[113]. The Slovenian ccTLD has a penetration of over 50 domain names per thousand of population[114]. Figure 27 compares the numbers of registrars in Qatar with those of the four largest European ccTLDs.

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[112] *Ibid.*
[113] *http://www.registry.si/registrars.html, accessed 15 May 2012.*
[114] *http://www.registry.si shows domain registrations of 102 422 and World Bank population figures of 2 million (2010), accessed 15 May 2012. http://data.worldbank.org/country/slovenia.*

Figure 27 – Analysis of ccTLD registrar bases

Domain/ TLD	Number of registrars[1]	Number of registrars based in country	Number of ICANN accredited registrars in country/ region[2]	Percentage of ICANN accredited registrars supporting ccTLD
.qa / .قطر	12	2	0	83%
.de	286[3]	232	23	9%
.uk	4 148		20	0.5%
.nl	1 739[4]	1 622	10	0.5%
.eu	853		124	15%

[1] *CENTR A Level Survey 2010.*
[2] *ICANN, http://www.icann.org/registrar-reports/accredited-list.html, accessed 12 July 2012.*
[3] *http://www.denic.de/denic/mitglieder/mitgliederliste-nach-laendern.html, accessed 12 July 2012.*
[4] *https://www.sidn.nl/en/about-nl/finding-a-registrar/registrars-by-country/, accessed 12 July 2012.*

The table does not give the complete picture, because a number of international registrars (which are also ICANN accredited) support the .de, .eu, .uk, and .nl domains. Even so, ICANN accredited registrars are in the minority of all the larger ccTLD registries. For example, of 286 Denic registrars, 232 are based within Germany.

In contrast, there are fewer, if any, local registrars in the Arabic script regions, such as Saudi Arabia, Jordan and Qatar. Registrars offering those ccTLDs tend to be national branches of large North American businesses, whose engineers are primarily English speaking. The Saudi and Qatari registry managers both independently highlighted the scarcity of local registrars as the main obstacle to growth of the IDN ccTLD. The Jordanian registry also highlighted lack of understanding of local DNS operators in dealing with Unicode (i.e. IDNs presented in human readable – Arabic – format), as the main reason for low figures of IDN registration under .الاردن..[115]

Indirectly, the lack of marketing which the Saudi and Qatari registry managers, and respondents to the 2012 EURid CENTR survey (figure 26), raised as a challenge, may be a consequence of the lack of local registrars. Few ccTLDs market directly to end users, leaving that to their registrars.

The presence or absence of local registrars is significant in terms of local content because, where ccTLDs (for example, .uk and .nl) have a large registrar base, there is a "long tail" of smaller businesses which support a local clientele. In .eu, the total number of registrars is over 850 but the top 100 registrars control 83% of the register, and the top 500 control 99%[116]. Therefore, over 350 .eu registrars control 1% of the register,

[115] *.jo / .الاردن (.al-ordun) Domain Name 2011 Annual Report, p23.*
[116] *EURid Quarterly Report, Q4 2011, p23, http://www.eurid.eu/files/Q4_2011.pdf, accessed 24 May 2012.*

averaging just over 100 domain names each. This indicates that domain registration is a minority part of their business. Logically, to stay in business, domain registration cannot be the primary income source for the long tail registrars. The primary business may be web design or hosting, and domains are an add-on for clients. These services support local content and a home-grown skills base, operating in the local language. Similar patterns are observed in other ccTLDs[117].

It is therefore suggested that a strong, local registrar base with the requisite skills (technical and local language) to support IDNs is an important factor in determining the rate of growth.

10.4.2 Registration policies

As ccTLDs are largely independent in their policy making, registration policies are set at the national level. Some (like .uk) adopt completely open, first-come first-served registration policies and have no eligibility criteria. Some have strict eligibility criteria. For example, the Saudi ccTLD requires residency and that the domain name matches any relevant trade mark registration. Others, for example .eu or .de, require evidence of residency, or limit the number of domain names per registrant (.no). In this way, ccTLDs adopt policies suited to their environment.

Over the past decade, the trend within Europe has been for closed registries to liberalise their registration policies, adopting first-come, first-served policies. France, Spain, Sweden and, most recently, Portugal have liberalised.

Experience shows that ccTLD registration policies (open or closed) have a direct relationship to registration volumes. So, if high growth and a large register are the ccTLD's objectives, liberal (first-come, first-served) registration policies coupled with low prices will help to achieve this. As many ccTLDs are not-for-profit and therefore set fees on a cost-recovery basis, liberalising registration policies also helps reduce costs, as manual checks for eligibility are no longer required, and automated registration is more straightforward.

Following liberalisation of their registration policies, both the Spanish and French ccTLDs experienced high levels of growth (.es grew from 120 000 to 520 000 in the year following liberalisation in 2005[118]). The impact of two liberalisations on the .fr domain are seen in figure 28.

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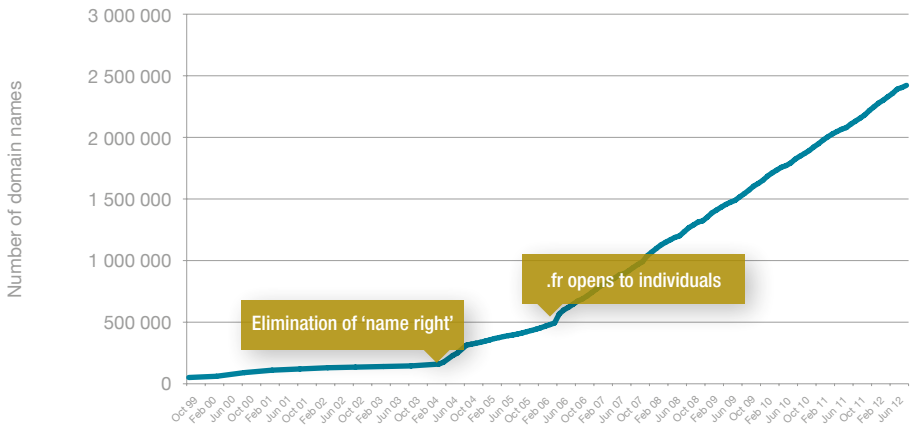
[117] *77% of the .uk register is controlled by the top 20 registrars. Nominet Domain Business, http://db.nominet.org.uk/node/the-top-20/, accessed 16 May 2012. Nominet Registrar satisfaction survey, September 2008, shows 23.1% have less than 50 domains, http://www.nominet.org.uk/digitalAssets/49301_RegistrarSatisfactionSurveySeptember2008.pdf, accessed 16 May 2012.*

[118] *CENTR.*

Figure 28 – Impact of liberalisation on French domain name registrations[119]

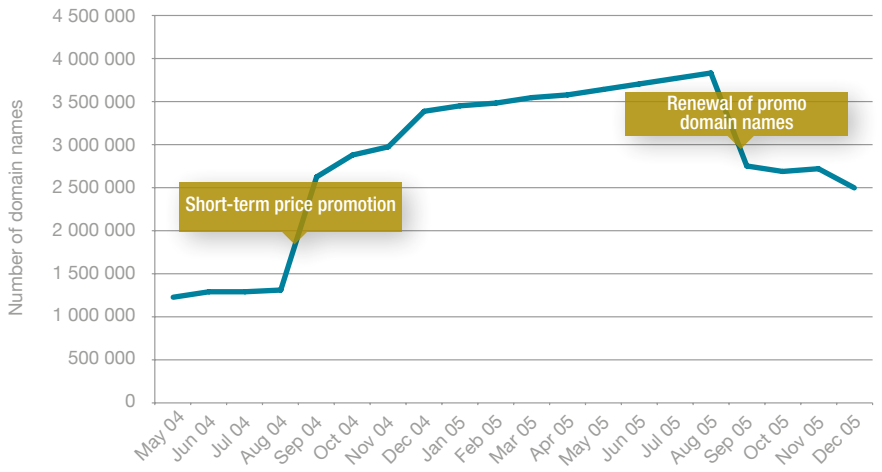


Conversely, in late 2009 the Chinese registry introduced strict eligibility and use criteria into .cn which had been first-come, first-served. Coupled with a price increase, the registration volumes fell from 13.7 million in December 2009 (for a time, the largest ccTLD in the world) to 3.3 million in just two years[120]. In the years prior to those policy changes, .cn had experienced high growth[121] as a result of liberal registration policies and aggressive price promotions[122].

There is a correlation between liberal registration policies and high registration volumes.

[119] *Afnic Activity Report, 2007, p17, http://www.afnic.fr/medias/documents/afnic-activity-report-2007.pdf.*
[120] *EURid and CENTR surveys, 2010, 2011 and 2012.*
[121] *399% annual growth as at January 2008.*
[122] *Verisign: Domain Industry Brief, March 2008, p3, http://www.verisigninc.com/assets/domain-name-report-march08.pdf, accessed 24 May 2012.*

Figure 29 – .info, the impact of price promotions on registration volumes, 2004-5



10.4.3 Price

For many users, the price of a domain name does not particularly affect their decision to purchase. However, there is evidence that low prices and high registration volumes are highly correlated. The reasons for this are not clearly understood, but it may be a result of speculation or of price competition between competing domain endings. As noted, .cn's extraordinary growth through 2008-9 was fuelled in part by price promotions.

In the gTLD space, where short-term price promotions are more frequent, .info offers a graphic example of the short-term impact of dropping prices (see figure 29). Experience of near "give away" promotions in the industry is that a lower proportion of domain names are renewed. However, there is a clear correlation between low price and high growth, at least in the short term.

Conversely, high prices tend to inhibit growth and some ccTLDs deliberately adopt different policies, for example preferring to have a high nexus between the ccTLD and the country, to prevent cybersquatting, speculation or abusive registrations within their domain.

Price is therefore an important factor in enabling high volume domain name registrations. For IDNs to compete with other available domain endings, for example, .com and ASCII TLDs, low prices are essential.

10.4.4 Strength of the ccTLD registry and the brand locally

While some ccTLDs have been operating since the early days of the Internet, and predate the establishment of ICANN in 1998, others have been more recently established. Until the mid-late 1990s, when commercial use of the Internet was limited outside the US, the Domain Name System was organised fairly informally, including the appointment of ccTLD managers. While many of those informally appointed ccTLDs were successful, others have required a change of management.

In a 2010 .eu Insights report, EURid attributed "brand strength" as one of three factors driving the success of TLDs. For new TLDs, or those emerging with new management after a period of stagnation (such as .qa, and .jo/ الاردن.[123]), it is necessary for the managers to work hard to build the brand of the TLD. The 2010 study viewed customer service (i.e. relationships with registrars) as a key instrument of brand building, as registrars help to raise user awareness of the TLD through their own marketing efforts[124].

10.5 IDN-readiness matrix

This section scores each of the ccTLDs featured in case studies according to the country factors and ccTLD factors discussed above. These scores are then combined to produce an IDN-readiness matrix.

Each criterion is scored on a Likert scale between either 0-5 or 0-2 depending on the level of variability in each criterion. A score of 0 indicates that the criterion is not present, or is low. A high numerical score indicates that the criterion is highly present.

The scoring is indicative only, it does not make a value judgment on the relevant countries or territories.

Inevitably, reducing concepts as broad as "linguistic and cultural homogeneity" to a score of 0-5 is both reductive and subjective. The score is informed by measures contained in UNESCO's World Report on Cultural Diversity, i.e. net migration (outbound and inbound), languages, telecommunications access, education and literacy, international flows of mobile students at the tertiary level, broadcast content, movies, recorded music sales and repertoire, and international flows of selected cultural goods and services, and where country data is present, highlights from the World Values Survey. Data has been supplemented through other sources, such as World Bank country data and country case studies from the ISOC, OECD, UNESCO report on local infrastructure and local content.

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[123] *The Jordanian ccTLD was reorganised in 2011. See "The Rebirth of .jo" presentation at ICANN Costa Rica meeting, 2012, http://bit.ly/KzYhJA, accessed 28 May 2012.*

[124] *"How top-level domain customer service and brand influence customer buying behaviour", http://www.eurid.eu/files/eu_insights_1.pdf.*

Figure 30 – Language and country factors

	Russian Federation	China	Republic of Korea	Saudi Arabia	Egypt	Qatar
1. Cultural and linguistic homogeneity (0-5)	4	5	5	4	4	1
2. IXPs present (0-2)[1]	2	1	2	0	2	0
3. Broadband penetration (0-2)	2	2[2]	2	1	2	2
4. Local language applications (0-2)	...	2	2	1	1	...
5. Size of national market (population) (0-5)	3	5	2	2	3	1

[1] *https://prefix.pch.net/applications/ixpdir/, accessed 21 June 2012.*
[2] *29th Statistical Report on Internet Development in China 2012: 500 million Internet users; 356 million mobile Internet users, of which 69% are Internet enabled; 392 million home broadband subscriptions.*

The scores for IXPs are informed by the ISOC, OECD, UNESCO report on local infrastructure and local content, and other sources e.g. EuroISPA and datamap.com. IXPs tend to increase speed and reduce connection costs in a country or region.

On the analysis of country/language factors, the Russian Federation, China, the Republic of Korea and Egypt all score highly.

Comparing those countries which have launched IDN TLDs with their existing ASCII TLD may indicate the relative impact of language/country factors. The ASCII TLD figures are included as a control for the “ccTLD factors”. In each case, the same organisation runs both the ASCII and IDN ccTLD. Therefore, it is reasonable to assume that the same ccTLD factors will apply to both the ASCII and IDN domains, for example, presence of local registrars, price, registration policies and brand. The ASCII domains also provide an indication of the scale of registrations to expect for IDNs. At the higher end, the Russian Federation has over 3.5 million ASCII domains (under .ru) and nearly 1 million IDNs (under .рф), whilst Jordan has 4 000 ASCII domains (under .jo) and 100 IDNs (under .الاردن).

Figure 31 – IDNs in proportion to ASCII domains by country, December 2011

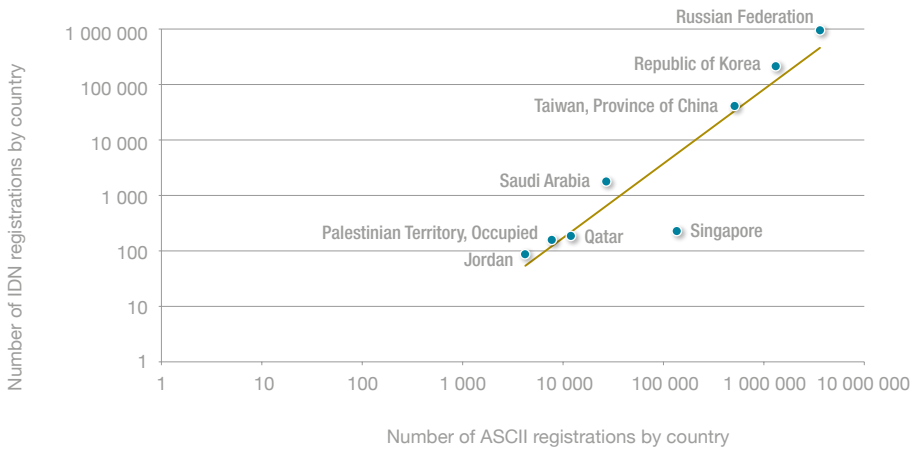


Figure 31 shows the comparison, using a double logarithmic scale to account for the high range of numbers (88-3.6 million). As the data sample is small, no firm conclusions are drawn. There is also a potential bias, as countries which perceive a strong language or cultural need for non-Latin scripts have tended to be early adopters of IDN TLDs. It is anticipated that in future the clarity of the current trend line may decrease, as the range of countries which launch IDNs in future becomes more heterogeneous.

Nevertheless, despite the differences in scale, this limited comparison (figure 31) does show a clear trend, indicated by the best fit line. The position of the outliers tends to support the hypothesis that countries with higher country and language indicators (the Russian Federation, the Republic of Korea and Saudi Arabia) would have a higher proportion of IDNs compared with ASCII registrations. Conversely, the more linguistically diverse Singapore[125] has a lower proportion of IDNs to ASCII registrations. We hope to revisit this comparison in future years, as more IDN TLDs are launched.

[125] *According to the 2010 Census of population, Statistical Release 1, Demographic Characteristics, Education, Language and Religion (Singapore Department of Statistics), 70.5% of the population of Singapore is literate in two or more languages. Of languages most frequently spoken athome: 32% English, 36% Mandarin, 14% Chinese dialects, 12% Malay, 3% Tamil and 2% others. English has become more prevalent in the last 10 years, p6, http://www.singstat.gov.sg/pubn/popn/c2010sr1/cop2010sr1.pdf, accessed 19 September 2012.*

Figure 32 – ccTLD factors

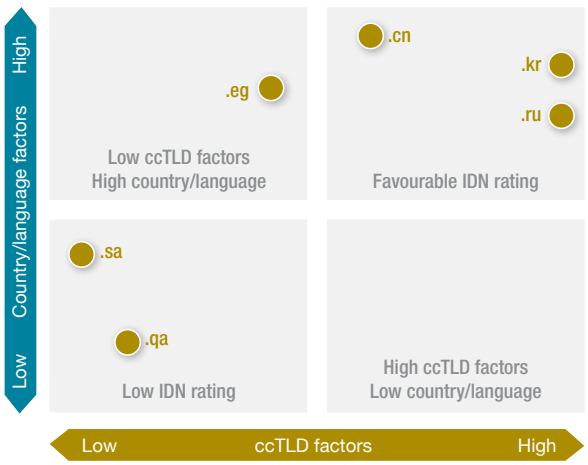
	Russian Federation	China	Republic of Korea	Saudi Arabia	Egypt	Qatar
1. Local registrar base (0-2)	2	2	2	0	2	0
2. Registration policies (0-2)	2	0	2	0	1	2
3. Low price (0-2)	2	1	2	0	0	0
4. Established TLD registry/brand (0-2)	2	2	2	1	1	0

Turning to ccTLD factors, the Republic of Korea and the Russian Federation both score maximum marks, with strong local registrar bases, liberal registration policies, low prices, and a long-established ccTLD registry. Saudi Arabia lacks local registrars and has high retail prices. Qatar, despite its liberal registration policies and proactive recruitment of registrars, has a recently re-established ccTLD and few local registrars. Due to its reorganisation of both policy and pricing, the Chinese ccTLD scores lower than it would have done three years ago.

It is emphasised that the above analysis makes no value judgment on the countries or territories, registries or any aspect of their operation. There are many valid reasons why some registries choose to have eligibility criteria and, as non-profit entities, the manual process for checking eligibility will tend to raise costs and therefore end-user prices. These factors are solely considered as a means of explaining the disparities observed in IDN registration volumes.

This translates to the following matrix:

Figure 33 – IDN-readiness matrix



11 Conclusions

The following conclusions are based on the report as a whole, whose data sample represents 90% of the world's registered domains, albeit that the data set is not complete in every case. Nevertheless, the sample is statistically significant and supports the following statements.

In order to promote the advance of multilingualism on the Internet, the role of IDNs within the complex ecosystem necessary to foster online multilingualism needs to be more fully appreciated. This would not only facilitate and increase access to linguistically and culturally diverse content, but also provide new socio and economic development opportunities.

For this to happen, it implies the following:

- The technical community, taking into consideration decisions made at policy level and local capacities, should work to implement the available Internet standards to hasten the adoption of email functionality for IDNs and adopt inclusive, transparent processes to facilitate the introduction of IDNs at the top level.
- Policy makers, including governments and other relevant stakeholders, must pay attention to developing strategies to promote the deployment and raise awareness of IDNs in their country or region as a priority, as an essential component of digital literacy.
- TLD registries, which play a vital role in fostering an enabling environment for IDN deployment, should review their policies on registrars, pricing and registration eligibility in the light of their likely impact on IDN deployment.

The potential of a multilingual Internet with thriving local content is a high priority for many countries and IDNs can strengthen its potential as a catalyst for local language content. IDNs should be seen as important prerequisite and can serve as a benchmark for the creation of an enabling environment and infrastructure.

Appendix 1

Data sources

The data presented in this report has been drawn from the following sources:

- CENTR A-Level survey January 2010, completed by 49 TLD registries
- EURid-commissioned surveys of CENTR members 2011 and 2012.
  The total number of registries surveyed was:
  - 2011 - 50 registries (CENTR survey plus .com and .net obtained directly from Verisign)
  - 2012 - 52 registries (as above with addition of .me and .sa)
- Additional data gathered through one-to-one contact with registries (for example, .qa, .sa, .jp, .hk, .kr, .com/.net)
- Analysis of publicly available data, including registration statistics published by .pф, .tw, .hk, .ir, .dk, .no, .kr, .ps, .rs, .se, .jo, .ma, .sg
- Secondary sources referenced in footnotes.

Data has been anonymised where not otherwise publicly available.

Appendix 2

Delegated IDN ccTLDs as at 23 April 2012

ccTLD reference	Primary string	String in English	Script	Year of launch
DZ	xn--lgbbat1ad8j الجزائر	Algeria / Al Jazair	Arabic	Not yet launched
CN	xn--fiqs8S 中国	China	Simplified Chinese	Not yet launched
	xn--fiqz9S 中國		Traditional Chinese	
EG	xn--wgbh1c مصر	Egypt	Arabic	2010
HK	xn--j6w193g 香港	Hong Kong	Han (simplified, traditional)	2011
IN	xn--h2brj9c भारत	Bharat / India	Devanagari (Hindi)	Not yet launched
	xn--mgbbh1a71e بهارت		Arabic	
	xn--fpcrj9c3d భారత్		Telugu	
	xn--gecrj9c ભારત		Gujarati	
	xn--s9brj9c ਭਾਰਤ		Gurmukhi (Punjabi)	
	xn--45brj9c ভারত		Bengali	
	xn--xkc2dl3a5ee0h இந்தியா		Tamil	
JO	xn--mgbayh7gpa الاردن	Al-Ordon	Arabic	2010
KZ	xn--80ao21a қаз	Kaz	Cyrillic	2012
KR	xn--3e0b707e 한국	Republic of Korea	Hangul	2011
MA	xn--mgbc0a9azcg المغرب	Morocco / al-Maghrib	Arabic	Not yet launched

ccTLD reference	Primary string	String in English	Script	Year of launch
PS	xn--ygbi2ammx فلسطين	Palestine	Arabic	2011
QA	xn--wgbl6a قطر	Qatar	Arabic	2011
RU	xn--p1ai рф	rf	Cyrillic	2010
SA	xn--mgberp4a5d4ar السعودية	Al Saudiah	Arabic	2010
RS	xn--90a3ac срб рб	srb	Cyrillic	2012
SG	xn--yfro4i67o 新加坡 xn--clchc0ea0b2g2a9gcd சிங்கப்பூர்	Singapore	Han Tamil	2012
LK	xn--fzc2c9e2c ලංකා xn--xkc2al3hye2a இலங்கை	Lanka Ilangai	Sinhala Tamil	2010
SY	xn--ogbpf8fl سورية	Syrian Arab Republic	Arabic	2011
TW	xn--kpry57d 台湾 xn--kprw13d 台湾	Taiwan, Province of China	Simplified Chinese Traditional Chinese	2010
TH	xn--o3cw4h ไทย	Thai	Thai	2010
TN	xn--pgbs0dh تونس	Tunis	Arabic	Not yet launched
AE	.xn--mgbaam7a8h امارات	Emarat	Arabic	2010

Appendix 3

IDN ccTLDs “Pending delegation” as at 23 April 2012

“Pending delegation” means that an application is in the final stages of the approval process. However, at this stage, there is no guarantee that the applied for string will be approved.

ccTLD reference	Primary string	String in English	Script
OM	xn--mgb9awbf عمان	Oman	Arabic
PK	xn--mgbai9azgqp6j پاکستان	Pakistan	Arabic
UA	xn--j1amh укр	ukr	Cyrillic
YE	xn--mgb2ddes اليمن	AlYemen	Arabic

Acknowledgements

Main author, Emily Taylor, with close collaboration of Giovanni Seppia and Marc Van Wesemael of EURid, and Jānis Kārkliņš and Irmgarda Kasinskaite of UNESCO. The authors thank all those from the domain name industry and technical community who have generously contributed information and comments to this report, including Abdulaziz Al-Zoman, Mohamed El-Bashir, Benny Lipsicas, Hiro Hotta, Minjung Park, Jian Zhang, Baher Esmat, Daniel Kalchev, Svetlana Lienko, Maggie Liang, Alireza Saleh, Siavash Shahshahani, Jonathan Shea, Will Shorter, Marcel Schneider, Marianne Larsen and Lise Fuhr, Juhani Juselius, Katrina Sataki, Annebeth Lange and other CENTR members, Oxford Information Labs Ltd (database design), Mark McFadden and Patrik Fältström.

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