ICANN’s open, participative, bottom-up approach is critical because a stable and secure network requires global solutions that can match local languages, characters, and cultural conventions. The more that technical and linguistic experts, policy-makers, application developers, end users and other stakeholders can work together, the sooner we are likely to achieve our goal of a fully internationalised Internet. ICANN looks forward to continuing to facilitate open forums for all interested parties as the world moves toward this goal.

Additional information concerning the IDN Program can be found at http://icann.org/topics/idn/

For more information on how to participate in IDN activities, please contact: idn@icann.org

Internationalised Domain Name Glossary

Historically, domain names on the Internet were restricted to using ASCII characters (i.e. a-z, 0-9 and ‘-’). However, with the increasing use of the Internet in all regions and by diverse linguistic groups of the world, the need for multilingual domain names has become more intense. Various acronyms are used widely in communications around internationalising the domain name space. Explanations for these are provided below aimed at making this topic simpler to understand.

**ASCII** (American Standard Code for Information Interchange) ASCII is a common numerical code for computers and other devices that work with text. Computers can only understand numbers, so an ASCII code is the numerical representation of a character such as ‘a’ or ‘θ’. When mentioned in relation to ASCII TLDs or ASCII domain names, this refers to the fact that before internationalisation only the letters a-z, digits 0-9, and the hyphen ‘-’, were allowed in domain names.

**DNS** (Domain Name System) The DNS makes using the Internet easier by allowing a familiar string of letters (the “domain name”) to be used instead of the arcane IP address. So, instead of typing 207.151.159.3, you can type www.internic.net.

**IDN** (Internationalised Domain Names in Application) IDNA is a mechanism to handle non-ASCII characters in domain names in a standard fashion. It is allowing Internet application to use domain names with non-ASCII characters by converting them to ASCII labels that the DNS will understand. The standards are developed by the IETF: http://www.ietf.org.

**Punycode** This is the sequence of ASCII characters all IDNs will be encoded into in order for the Domain Name System (DNS) to understand and manage the names. The intention is that domain name registrants and users will never see this decoded form of a domain name. The sole purpose is for the DNS to be able to resolve for example an address containing local characters. The DNS is only capable of handling ASCII characters. For example, the punycode version of [“τεταξίσεις.το”] (this is the Greek, in Dvorak script, version of “example.test”) is: xn--p1b6ci4b4b3a.xn--11b5bs3a9aj6g.

The prefix for the punycode version of the domain names is always “xn--”. Hence this prefix is often reserved at the registry level to avoid confusion in registration of IDNs.

**LDH** (Letter, Digit, Hyphen) A subset of the ASCII characters that only contains letters a-z, digits 0-9 and the hyphen ‘-’. And the term “LDH code points” usually refers to this subset. Originally, domain name labels were restricted to this subset of characters.

**UTF-8** This is the Unicode encoding format used for representation of the registration of IDNs. There are several Unicode encoding formats of which UTF-8 is one.

The Internet Corporation for Assigned Names and Numbers

**ICANN** is a non-profit organisation responsible for coordinating the Internet’s systems of unique identifiers, including the systems of domain names and numeric addresses that are used to reach computers on the Internet. ICANN exists to ensure the stable and secure operation of these unique identifier systems, which are vital to the Internet’s operation. In addition, ICANN continues policy development related to local technical functions through itseffective bottom-up consensus model. Further information in ICANN is available at http://icann.org.

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As geographic participation in the Internet expands, there has been a dramatic increase in its use by diverse linguistic groups. Content reflecting this linguistic diversity has long been available online, but there is substantial demand to continue the development of multilingual access to the Internet, that is, multilingual characters on both sides of the ‘dot’. Aspects related to multilingual or Internationalised Domain Names (IDNs) have gathered worldwide attention because they relate to a core resource, the Domain Name System (DNS). The needs for timely deployment of IDNs to meet global demand and to preserve interoperability and global addressability have emphasised the necessity of global communication, coordination, and participation on this issue.

HISTORY OF MULTILINGUALISM AND THE DOMAIN NAME SYSTEM

Internationalisation measures, including IDNs, might be the largest change in Internet operation since TCP/ IP (Transmission Control Protocol/Internet Protocol) was introduced. Furthermore, IDN deployment might be more significant and complex than the original DNS introduction. To fully understand the difficulties related to internationalisation of the domain name space, it is important and useful to give a brief review the history of IDN technology development.

Consideration of internationalising domain names goes back to the developmental stages of the Internet in the 1970s. During this time period, there were discussions around the usability of languages and scripts. However, the technology that is available and deployed in the Domain Name System today that allows practically any character in the registration of a domain name was not developed at that time. Therefore, a decision was made to limit characters available for registration of domain names to ASCII (characters of letters a-z, digits 0-9, and the hyphen “-”).

In 2003, the topic was raised again among technical bodies, and the Internet Engineering Task Force (IETF) released the Standards (RFCs 3490, 3491, and 3492) that also referred to as IDNA (IDNs in Application). These standards provide technical guidelines for successful deployment of IDNs, that is, a mechanism to handle non-ASCII characters in domain names in a standard fashion. It works by converting names with non-ASCII characters to ASCII labels that the Domain Name System will understand.

Subsequently, a group of Top Level Domain (TLD) registries and ICANN released version 1.0 of the “IDN Guidelines”. These guidelines (current version 2.1 is available at http://icann.org/topics/idn/implementation-guidelines.htm) were created for generic TLD (gTLD) registries to follow when implementing IDNs at the second level only (e.g., 실례.com).

Work is underway by the IDN TLD registry working group to amend these Guidelines further in the context of a Best Current Practice framework to ensure that the guideline directions will be used deeper into the DNS hierarchy and in particular as a set of principles for the implementation of internationalised top level labels.

For more detailed history of the technical development see: http://www.iana.org/putout/pip/focal/国际化/index.html

ICANN’s IDN PROGRAM

ICANN’s highest priority is to maintain a secure, stable, and single interoperable Internet. The Internet is based on a shared namespace and is originating in a single root, that ensures all users have a platform on which they can communicate with each other unambiguously. For example, this means that no matter where in the world you are accessing a website, the website address used will take you to the same place every time.

Presently, ICANN is leading an IDN program comprised of several initiatives involving a significant cross-section of the global Internet community to provide a secure method for implementation of internationalised top level domains in the root zone. The program purpose is to enable users to register and use domain names based on their local script. This includes users of languages based on right-to-left based scripts (such as Arabic) and users of languages based on non-alphabetic scripts (such as Mandarin Chinese). As a result end-users will, among other capabilities, be able to more easily identify localised content online by use of fully localised identifiers. One such example may be: http://실례.테스트 (“example.test” in Hangul script (Korean)).

Most of the programmatic objectives (described in detail below) are related to:
- DNS security and stability aspects of IDN implementation including technical and operational tests of root zone deployment of IDNs, and
- Engaging the global Internet community in the development of the policy that will guide the deployment, allocation and secure management of IDNs.

IDN TECHNICAL AND OPERATIONAL TEST ACTIVITIES

The technical testing program is intended to demonstrate that the insertion of IDN strings into the root has no appreciable negative impact on existing DNS resolutions. From a technical standpoint it can be difficult to prove a negative. However, the test plan that has been published combines laboratory, operational and live root zone testing, which provides reasonable certainty that insertion of IDN labels in the DNS will result in no deleterious effects. The testing program, reviewed by several independent entities, includes the necessary process, procedures and emergency mechanisms to ensure that the tests will be conducted in a safe manner. For example, the operational plan will include emergency procedures for removal of IDN labels from the root should unexpected events occur. The specific test designs are underway and will be made publicly available for anyone wishing to replicate the test.

This testing program is being managed by the ICANN President’s Advisory Committee for IDNs which was formed in late 2005 to provide advice to the ICANN Board and community, especially with regard to the technical stable implementation of IDN TLDs. This 25-member global committee meets monthly and is jointly chaired by three (former and current) members of the ICANN Board of Directors: Hualin Qian from China; Mounamet Diop from Senegal; and Paul Twomey, ICANN President and CEO, from Australia. (See, http://icann.org/committees/idnapc/)

IDN POLICY ISSUES AND DEVELOPMENT

ICANN’s policy development bodies are populated by a globally diverse membership that represents all country code TLD managers, governments, and key Internet constituency groups that wish to participate in the ICANN bottom-up model. The Generic Names and Support Organisation (GNSO), the Country Code Names Supporting Organisation (ccNSO) and the Government Advisory Committee (GAC) are jointly discussing IDN policy issues and potential policy statements. The GNSO (comprised of Internet constituency groups) has developed a draft terms of reference to guide the IDN policy development discussions and has also developed a plan of working collaboratively with the GAC (governments) and the ccNSO (ccTLD managers). Information on GNSO activities and their work is available at http://gns.icann.org; on the ccNSO at http://ccso.icann.org, and on the GAC at http://gac.icann.org.