Culturally-appropriate Local Environments and a Global Internet **Supplemental Information and Readings** John C Klensin, Geneva, 9 May 2006 *(preliminary version[1])*	Internet Society™

The presentation "Culturally-appropriate Local Environments and a Global Internet" provides an overview of a number of related issues. The papers and presentations identified below provide tutorials and more detailed discussion of some of those topics. They are not listed in any particular order.

Internet Navigation

A discussion of issues in navigation on the Internet, strengths and drawbacks of various approaches, and possibilities for the future.   While the presentation in this book does not focus primarily on multilingual issues (and some of what it does say is becoming somewhat dated), most of the analysis in it would apply to any language or cultural context.

> National Research Council, *Signposts in Cyberspace: The Domain Name System and Internet Navigation*, Washington, DC: National Academy Press, 2005.   ISBN 0309-09640-5 (Book) 0309-54979-5 (PDF). Chapters 6 through 8 are particularly relevant.
> http://www7.nationalacademies.org/cstb/pub_dns.html .

Domain Name System Tutorials

An understanding of how the Domain Name System (DNS) actually functions is useful as a foundation before trying to expand or alter its use and functions.

> Karrenberg, Daniel, "ISOC Member Briefing #16: The Internet Domain Name System", February 2004, "ISOC Member Briefing #19: DNS Root Name Servers Explained For Non-Experts", January 2005 (preliminary), and "ISOC Member Briefing #20: DNS Root Name Servers Frequently Asked Questions", January 2005 (preliminary). Available from http://www.isoc.org/briefings/
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> A different view, more consciously oriented to understanding by policy-makers , appears in the first few chapters of *Signposts in Cyberspace*, cited above.

DNS Appropriateness for New Purposes and How to Extend It

The obvious appeal of using the DNS for a variety of new functions is because it is implemented, fairly well understood, and widely deployed.   The obvious questions

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[1] This document is a work in progress and reflects the views of the author and not necessarily those of the Internet Society. Updated versions will be available from the Internet Society public policy page at http://www.isoc.org/pubpolpillar/

are how far the DNS technology can be stretched in various directions and what the implications of overstretching it might be.

> Klensin, John, "Role of the Domain Name System (DNS)", RFC 3467, February 2003. While this document is now somewhat old, most of its comments are still relevant. The document, which reflects the author's views and that of colleagues who reviewed and contributed to it, is available at ftp://ftp.rfc-editor.org/in-notes/rfc3467.txt An ISOC Member Briefing that updates and summarizes some of it is expected to appear later in 2006; watch for it at http://www.isoc.org/briefings/

> *Signposts in Cyberspace*, cited above, also contains some discussion on this subject from a different perspective.

> The Internet Architecture Board has been working on a new document, titled "Design Choices when Expanding DNS" that discusses ways of extending the DNS for various purposes.   The current working version can be located from http://www.iab.org/documents/drafts/index.html

Domain Name Synonyms, Short Names, Aliases, and Local Alternatives

Since the DNS was created, and even in the Internet's earlier "host table" system, arrangements have been developed to provide shorter names, names that are more convenient locally, and, more recently, names in local or more culturally-appropriate languages. These efforts and alternatives have been reviewed in a recent paper (still preliminary):

> Laing, S. and J. Klensin, "Names and Naming for the DNS", 5 May 2005, http://www.isoc.org/internet/issues/naming/namesandnaming-prelim.pdf

There has also been extensive work on so-called "keyword systems" which provide users with names that are more user-friendly than URLs. Many of these systems have been specifically designed for use within one or more local language environments. Since most of them resolve names to URLs and then use conventional DNS lookups, they can be considered to be layered on top of the DNS as discussed in the symposium presentation.

Unfortunately, most of the published materials that discuss the use of keywords have been written to promote particular systems and their virtues, rather than providing a good and balanced overview of what is possible with the technology and what limitations it imposes. There is a brief discussion of those issues in section 7.1 of *Signposts in Cyberspace*, cited above.

Content and Content Identification

Transmission of content in other than the traditional ASCII (ISO 646, ITU IA5) requires use of the widely-deployed MIME extension and specification of a "charset". The MIME framework is used, not only for email, but for the web and many other applications including some real-time data streaming. While Unicode in UTF-8 is generally preferred for international communications, many other character codings systems are in use historically, or might be used in the future when Unicode support is

not yet available or is otherwise considered problematic. The MIME-based use of character sets and, where needed, language identification is supported by a registration system. That system, rather than establishing rules about how things are used and what they mean, is simply intended to avoid the use of the same term by multiple parties to mean different things. Such conflicting uses of terms would cause severe interoperability problems as well as creating opportunities for threats to security and integrity of systems and messages. The registration mechanisms could have been distributed, e.g., using the notion of separate "registration arcs" that was developed as part of ITU Recommendation X.400, but principles of simplicity and efficiency of operation argued strongly against that choice (and continue to do so).

The basic MIME structure is specified in

> Freed, N and N. Borenstein, "Multipurpose Internet Mail Extensions (MIME) Part One: Format of Internet Message Bodies", RFC 2045 and "Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types", RFC 2046, November 1996. Available from ftp://ftp.rfc-editor.org/in-notes/rfc2045.txt and ftp://ftp.rfc-editor.org/in-notes/rfc2045.txt

The registration procedure for character sets and registry are

> Freed, N. and J. Postel, "IANA Charset Registration Procedures", RFC 2978, October 2000. ftp://ftp.rfc-editor.org/in-notes/rfc2978.txt. The registry itself is located at http://www.iana.org/assignments/character-sets

Internationalized Top-Level Domain Names

When Internationalized Domain Names are used below the top level, the registrant (subject to registry rules) has fairly complete control over names to be used. At the top level, any name that is actually installed into the DNS is visible to everyone, creating new issues, not only about what names can be used (i.e., accessibility from various scripts and languages) but also about what names or combinations of them may be offensive or problematic to others. For top-level domains, such issues can be resolved internationally, which may be impossible in practice. That situation, among many others, creates an argument for local alias arrangements at the top level (see the Domain Name Synonyms topic above).

The local alias approach is discussed for the specific case of TLDs in

> Klensin, John, "ISOC Member Briefing #18: Internationalizing Top-Level Domain Names: Another Look", http://www.isoc.org/briefings/ or, in somewhat more technical detail, in Klensin, J., "National and Local Characters for DNS Top Level Domain (TLD) Names", RFC 4185, October 2005. ftp://ftp.rfc-editor.org/in-notes/rfc4185.txt

> Additional discussion of the various issues can be found on ICANN's IDN page (http://www.icann.org/topics/idn/) , especially in the papers submitted prior to the Vancouver meeting in November 2005 (http://www.icann.org/announcements/announcement-17nov05.htm), however, this author believes that some of those papers do not reflect the realities of the DNS protocol and its operation.