Internationalized Domain Names -
Getting them to work

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What is IDN?

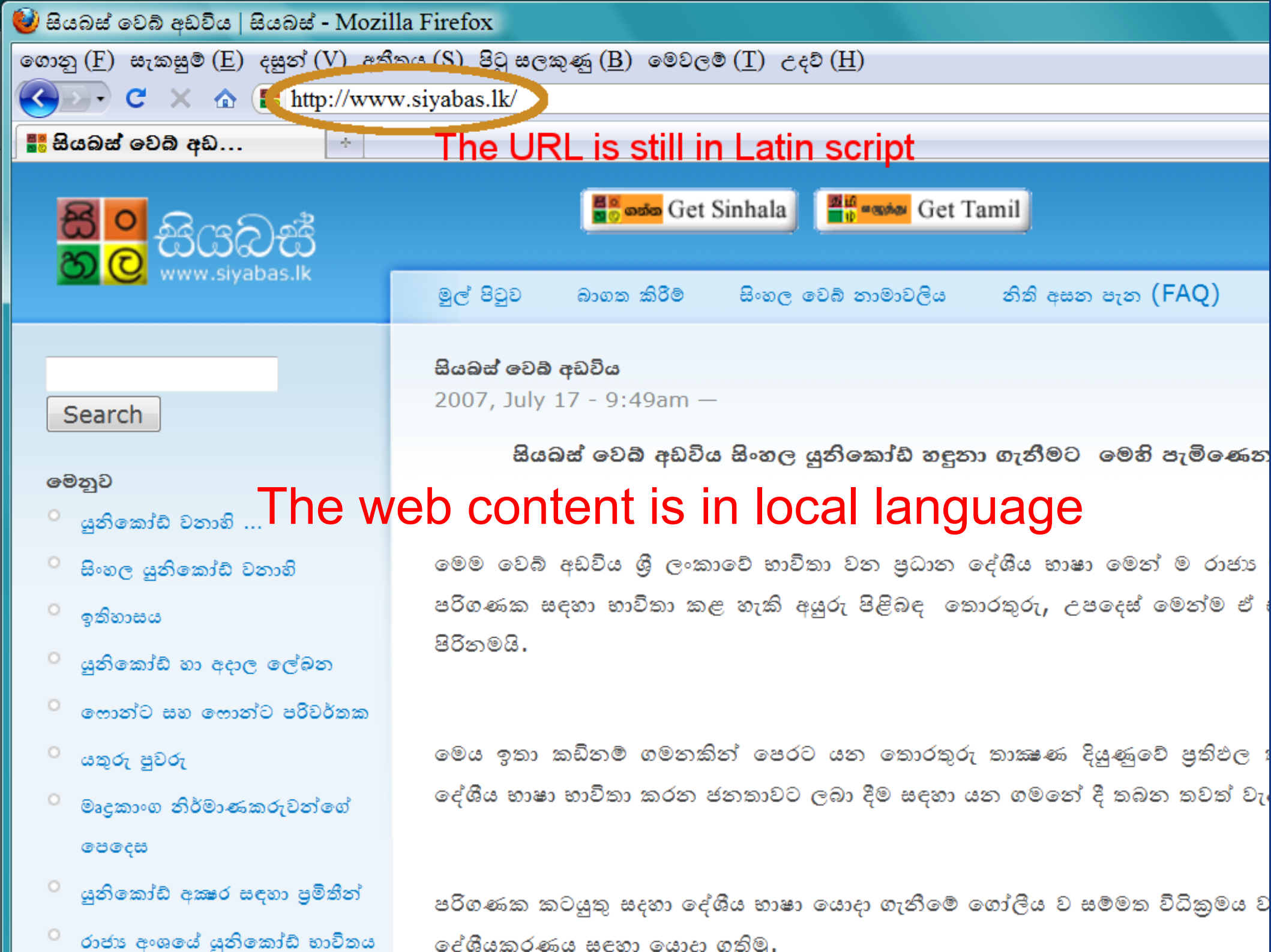
- Originally DNS names were restricted to the characters a-z (letters), 0-9 (digits) and '-' (hyphen) (LDH)
- Most languages use many other characters
  - accents and additional characters in Latin-based languages
  - non-Latin scripts
- IDN is a method of using domain names in other scripts
  - while maintaining compatibility with the ASCII DNS

IDN is…

- An abbreviation for “Internationalized Domain Name”
- A domain name where at least one character is outside the Letter-Digit-Hyphen set used in the original DNS
- Based on Unicode (ISO 10646) characters
- Major transition from 38 ASCII characters to thousands of Unicode characters

Why IDNs?

- Largest number of Internet users now in the Asia-Pacific
- Growing number of users not familiar with ASCII
  - or prefer to use their own script
- Using ASCII Domain names is significant linguistic barrier
- Native speakers of Arabic, Chinese, Japanese, Russian, Hindi, Tamil, Thai and others at considerable disadvantage
- Some names cannot be clearly expressed in Latin
- Need to provide a seamless experience
  - without toggling keyboards and typing unfamiliar characters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How IDN works

- Uses ASCII characters “on the wire” between clients and servers
  - no change to the original DNS protocol
  - used in thousands of servers
- URLs based on Unicode (ISO 10646) characters
  - possible to also use legacy character sets
- Applications (e.g. web browsers) convert the Unicode labels to ASCII
- Called Internationalizing Domain Names in Applications (IDNA)

Punicode

- A case folding and normalization process
- Unicode strings converted to ASCII Compatible Encoding (ACE) (and back) using Punicode algorithm
- Domain labels starting with “xn--” represent ACE encoded “internationalized” label
- One-to-one correspondence between (normalised) Unicode label and ACE (Punicode)

Examples of Punicode conversion

Unicode string	ACE string
ascii.com	ascii.com
日本語.jp	xn--wgv71a119e.jp
தமிழ்.in	xn--rlcus7b3d.in
bücher.de	xn--bcher-kva.de
සිංහලidn.lk	xn--idn-u4k9u8ai4i.lk

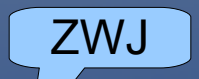
Issues in representing Indic languages with IDNA 2003

- A major issue is the handling of the zero-width joiner (ZWJ) and zero-width non-joiner (ZWNJ) characters
- These characters are used by most Indic scripts
- In some cases their use is optional (i.e. may change the appearance - but not the meaning - of a word)
  - In other cases they are required
- Omitting them will give an incorrect spelling or change the meaning

IDNA2003 Issues (cont.)

- IDNA2003 silently deletes ZWJ, ZWNJ and other control characters
- Results in some labels not displaying correctly

  e.g. ශ්‍රී → ශ්‍රී

  0DC1 0DCA 200D 0DBB 0DD3 → 0DC1 0DCA 0DBB 0DD3
- More than one Unicode label may map to the same Punycode label

Phishing issues

- Inter-script similarity
  - Certain letters in one script are similar (basically identical) to other letters in another script
  - e.g. Latin a, Cyrillic a
- Intra-script similarity
  - letter and numeral (or symbol) may look same

    e.g. Tamil அ (a) and Tamil அ (8)
  - two letters may look similar

    e.g. Sinhala ඩ and ධ

Browser issues

- Current browsers handle Unicode and automatically convert to Punicode
- May display punicode in URL bar instead of Unicode
  - anti-phishing feature
  - can be disabled via registry entry
- Some sites (e.g. Google) delete ZWJ/ZWNJ in search results
  - not an IDN issue, but annoying

Entering domain names

- Indic text is complex
- Some letters may need multiple keystrokes to enter
  - e.g. කෝ is entered using 4 keystrokes

IDN Process in Sri Lanka

- Sri Lanka formed an IDN task force
  - ICT Agency of Sri Lanka
  - Telecom Regulatory Commission
  - Official Languages Dept., Ministry of S & T, LK Domain Registry, ISPs, Universities, etc.
- First task – local lang. versions for .lk
- Identified potential strings
- Conducted Public Consultation

IDN Process (cont.)

- Obtained letters of support
- Submitted strings to ICANN
- Currently in evaluation process

IDN ccTLD Issues

- Labels for .lk in Sinhala and Tamil
  - short, meaningful ?, acceptable
- How many letters in a label?
  - what is a letter?
- Decided to use the full country name
- .ලංකා (.lanka) – Sinhala (4 keystrokes)
- .இலங்கை (.ilangei) – Tamil (6 keystrokes)

Selecting IDNs domains for organizations

- Names should be meaningful, easy to remember and easy to type
- Sinhala / Tamil names tend to be longer (in keystrokes) than English ones
- Abbreviations are less common in Sinhala/Tamil
  - some org. names sound strange when abbreviated
  - e.g. ICT Agency icta.lk => තොතාසනි.ලංකා
- Translate or Transliterate?

Selecting IDN strings for service names (e.g. www)

- www is a strange string
  - meaningless
  - difficult to pronounce
- How do we represent it in our language?
  - don't translate www
  - pick a string which clearly says “website”
- How about mail, rss, chat, proxy, etc.?

IDNA 2008

- Uses a different paradigm from IDNA 2003
- Most alphanumeric Unicode characters (except a few specified ones) are valid
- Applications (browsers) handle string mapping
- Registries handle registration restrictions
- Most differences between IDNA 2003 and IDNA 2008 are minor, except
  - IDNA 2008 allows ZWJ/ZWNJ in certain contexts
  - a few characters have different behaviour

IDNA 2008

- More information in tomorrow's tutorial

IDN Registration Policies

Registries (not only TLDs) need policies and procedures for:

- Handling of Indic numerals
- Unused and archaic letters
- Similar sounding letters
- Mixed-script labels
- Inter-label script mixing

LK Domain Registry Policies

- No registration of Indic numerals
- Registration limited to contemporary letters
  - should be able to register all company names, trademarks, ...
- No decision on similar-sounding letters
  - bundling?
- Allow registration of similar-looking letters
  - e.g. ඛ, ඛ ජ, ඡ etc.
- ZWJ only in specific contexts
  - more restrictive than IDNA 2008

LK Registry Policies (cont.)

- Allow Latin+Sinhala and Latin+Tamil mixed script labels
  - but no Sinhala+Tamil for now
- No inter-label script mixing
- Only register valid Unicode strings

LK Policies - Phishing

- No room for inter-script phishing
  - only allow Latin+Indic
  - no Latin letters similar to Indic
- Intra-script phishing possible
  - we don't register numerals or symbols
  - but some letters similar to others
  - e.g. (ඛ, ඛ; ච, ච; ඒ, ඒ)
  - users should be educated
  - bundling/reservation may be done

Domain Selection Guidelines

- No guidelines at present
- Sinhala/Tamil acronyms not common
- Recommend to select most significant word or words as domain name

Discussion