Experience with 8 bit label in JP Zone

1st August 2004

IEPG Meeting

Yoshiro YONEYA <yone@jprs.co.jp>

Japan Registry Service

Overview

- Introduction
- Specification
- Result of Survey
- Observed effects

Introduction

Brief history of Japanese JP Domain name (JDN)

2000/11 Started DNS testbed by RACE

2001/02 Started registration of JDN

2001/05 Started DNS resolution service by
　　　　　　　　RACE for registered JDN

2003/03 Standardization of IDN

2003/07 Started DNS resolution service by Punycode

2003/09 Finished DNS resolution service by RACE

2004/02 Started Japanese JP-Navi service

2004/07 Around 42,000 JDNs

Current situation of JDN

- Registrants want to use JDN actively
- However, if registrants advertise JDN, it will cause an unfavorable situation because JDN/IDN-aware Web browsers are not deployed widely yet
  - Windows Internet Explorer, which has more than 90% market share, is not JDN/IDN-aware yet
  - Registrants have difficulty in supporting users who met an access error
- The state is "difficult case" even if registrants want to use
  - Chicken and Egg problem

JPRS is doing

- ## Utilize JDN much more
  - – Perform JDN promotion actively
- ## Deploy JDN/IDN-aware environment
  - – Introduction of technologies and counter measures through media and so on
  - – Influence to vendors such as browser, OS, PC manufacturers and mobile phone carriers

Objectives of Japanese JP-navi

- By using DNS
  - Inform users to use JDN/IDN-aware Web browsers
  - Decrease 8bit label DNS queries
- Because JDN/IDN-aware Web browsers are not deployed widely yet
  - Users happen to see unexpected error, but they can not understand the reason
  - JDN registrants want to utilize their JDN, but it is hard to get understanding of users that JDN/IDN-aware application is required
  - Without deployment of JDN/IDN-aware environment, it continues 8bit label DNS queries
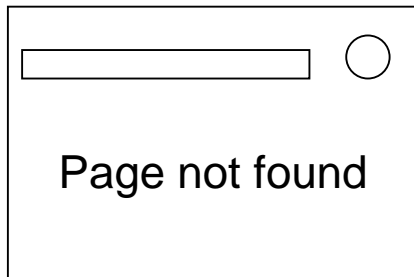
Before and after

Before Japanese JP-navi

Users type JDN to JDN/IDN-
unaware Web browser
"http://   .jp/"
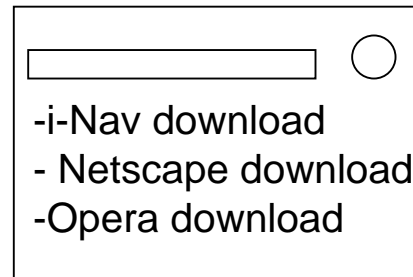
Browser cause an error

Page not found

After Japanese JP-navi

Users type JDN to JDN/IDN-
unaware Web browser
"http://   .jp/"

Browser browses a web site
which inform users JDN/IDN-
aware environments

-i-Nav download
- Netscape download
-Opera download

Before starting Japanese JP-navi

- Explained specification and result of our survey to Japanese Internet community
  - Highlighting that this is a temporary service
- Opened 3 weeks public comment period simultanously
  - From 19 Jan 2004 to 6 Feb 2004
- Started on 18 Feb 2004

Specification

Overview

- Only when JDN registrant wishes, adds UTF-8 encoded JDN onto JP zone
  - Japanese JP-navi is opt-in
  - Requires existence of NS
  - Adds A and MX RRs
- When users type JDN through JDN/IDN-unaware Web browser, a certain Web page is shown
  - To navigate i-Nav™ plug-in download page
  - To introduce JDN/IDN-aware browsers such as Opera and Netscape Navigator

Example of the Page

RRs added onto JP

- A and MX RRs for UTF-8 encoded JDN and with www

  xn--wgv71a119e.jp. NS   ns. xn--wgv71a119e.jp.

       .jp.   A   10.10.10.10

                        MX 10   not-exist.jp.

  www.   .jp.   A   10.10.10.10

                        MX 10   not-exist.jp.

  - AAAA is not provided

- Basically, 4 RRs are added per domain
  - In maximum, 12 RRs are added if the JDN includes alphabet
    - To support compatible characters of alphabets
      ASCII   "JPRS   .jp"
      Full-width (Upper)   "   .jp"
      Half-width (lower)   "   .jp"
  - If JDN includes digit and/or hyphen, 8 RRs are added
    ASCII   "123-   .jp"
    Full-width   "   .jp"

Treatment of SMTP

- **Due to A RR addition, SMTP connection is expected**
  - To avoid receiving E-Mail, add MX RR which does not exist to make immediate error
- **There are MTAs that try to connect A if connect to MX failed (RFC2821 violation)**
  - No SMTP service provided
    - Not to record any connection
  - RFC2821 incompliant MTAs will retry for a several days
- **SMTP connection may be rare (our assumption)**
  - MTA will cause error during address format checking

Result of Survey

UTF-8 8bit label treatment in DNS

- 8bit is permitted as a protocol, but there are very few operational experiences
  - Cite from RFC1035, 3.1 Name space definitions

    Although **labels can contain any 8 bit values** in octets that make up a label…

- Target of survey on UTF-8 8bit label treatment on DNS servers
  - Authoritative server
    - BIND, which is used as authoritative server of JP DNS
  - Cache server
    - BIND, dnscache and Windows DNS service, which is widely used in Japan

Items of the 8bit label survey

- Can contain A and MX RRs
- Can zone transfer
- Can hold a lot of 8bit label
- Can hold a long label (up to 63 octets)
- No influence to 7bit queries
- 8bit label and its masked 7bit label are distinguished completely
  - Both authoritative and cache server

Results of the 8bit label survey

- No problem was found for authoritative servers used in JP DNS
  - Also no problem was found for NSD, tinydns and other versions of BIND
- No problem was found for BIND (as a cache) available from ISC's ftp site
  - Works fine even on BIND Version 4.8.3
  - Excluded non release (Alpha, beta and RC) versions of BIND 9 series to decrease target (for time constraints)
- No problem was found for dnscache (djbdns)
- No problem was found for Windows DNS service if 8bit label is UTF-8
  - Another encodings were not responded
- No problem was found for SOHO routers (NAT boxes) as far as availed

Example: Current test environment

TIPS: Using UTF-8 on DNS

- In dig, '¥' followed 3digits decimal can represent arbitrary code
  - Example for lookup A RR of "   .jp" in UTF-8
  - dig '¥230¥151¥165¥230¥156¥172¥232¥170¥158.jp' a
  - Using UTF-8 directly is also available if your command line accepts it
- BIND's zone file notation is the same

Observed effects

Case study: Campaign of a famous beverage maker

- A Japanese famous beverage maker used a JDN for a product's campaign
  - http://　　.jp/　in addition to http://namacha.jp/
- Campaign period
  - Jun 15 09:00 to Jul 31 21:00 (JST)
- Medias to have been used to advertise JDN
  - Posters inside store
  - Posters on vending machine
  - Advertisement in magazines

Access count of Japanese JP-navi

Total Access

JDN Link

Opera DL

Netscape DL

i-Nav DL

2/19 3/4 3/18 4/1 4/15 4/29 5/13 5/27 6/10 6/24 7/8