DNS Hijacking

Inappropriate domain name management causes DNS Hijacking

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Kazunori Fujiwara, JPRS
<fujiwara@jprs.co.jp>

What is ‘inappropriate domain name management’?

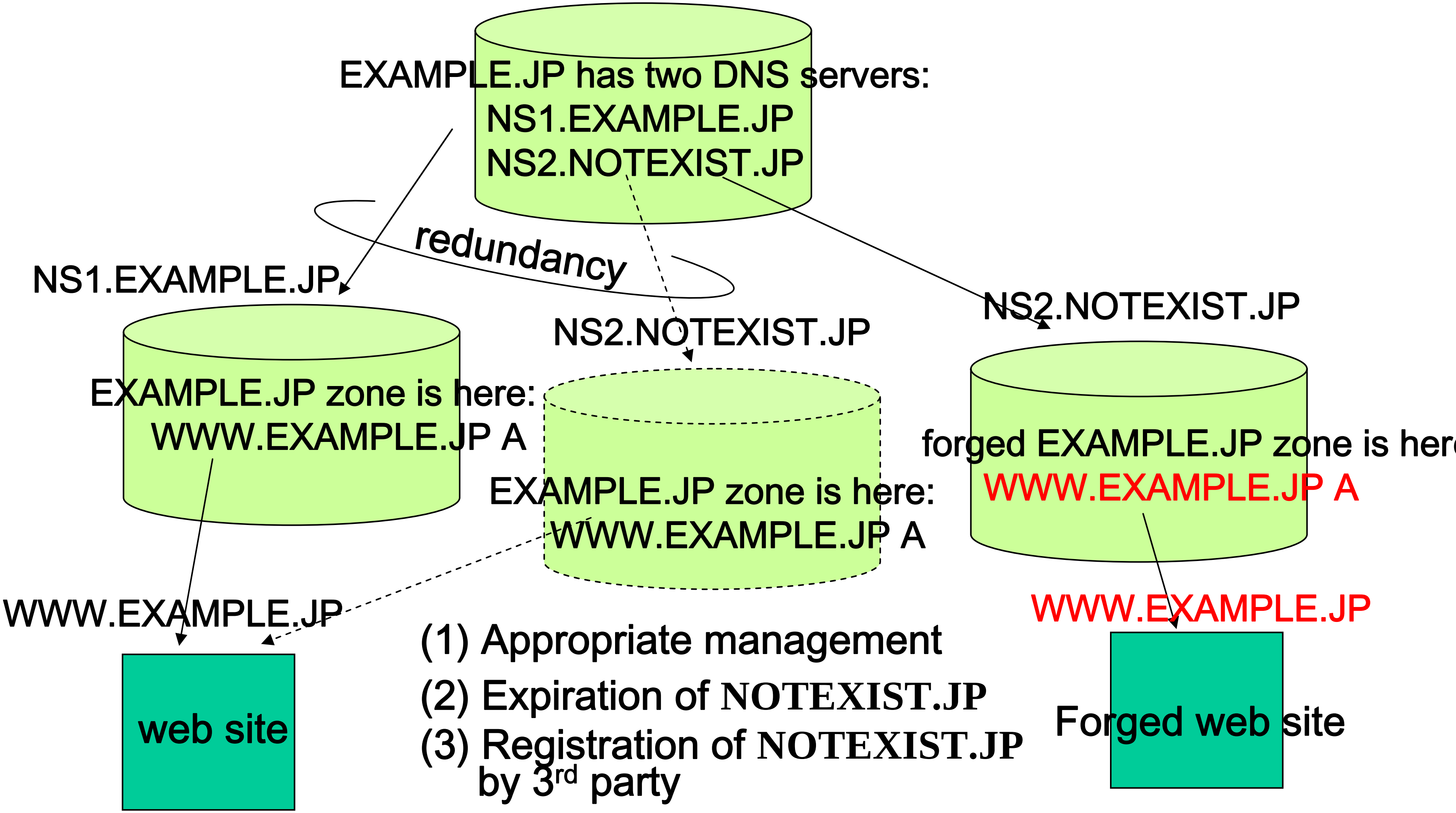
- Registrants have to manage
  - DNS servers that provide zone information (Child)
    - Contains DNS servers’ information
  - DNS servers’ information that is registered to registry (Parent)
- Child and Parent should be synchronized
  - If not, it causes lame delegation
  - If not, it is in one of inappropriate states
- Typical inappropriate states
  - Registering incorrect name (typo)
  - Leaving expired (non-existing) domain name in Parent
  - Leaving non-working DNS server as Child

- These states may cause DNS hijacking.

How ‘domain name hijack’ can happen?

- Suppose DNS server’s domain name exists no more
  - EXAMPLE.JP has NS1.EXAMPLE.JP and NS2.NOTEXIST.JP as its name servers, but NOTEXIST.JP was expired and not existent any more
  - Anyone can register NOTEXIST.JP and setup NS2.NOTEXIST.JP as a DNS server of EXAMPLE.JP
  - Then he/she can forge zone information so that DNS responses from NS1.EXAMPLE.JP and from NS2.NOTEXIST.JP are different
- This situation easily happen
  - If domain name registration manager and DNS operation manager in registrant organization are different and their activities are not synchronized

How ‘domain name hijack’ can happen?



EXAMPLE.JP has two DNS servers:
NS1.EXAMPLE.JP
NS2.NOTEXIST.JP

redundancy

NS1.EXAMPLE.JP

EXAMPLE.JP zone is here:
WWW.EXAMPLE.JP A

NS2.NOTEXIST.JP

EXAMPLE.JP zone is here:
WWW.EXAMPLE.JP A

NS2.NOTEXIST.JP

forged EXAMPLE.JP zone is her
WWW.EXAMPLE.JP A

WWW.EXAMPLE.JP

web site

WWW.EXAMPLE.JP

Forged web site

(1) Appropriate management

(2) Expiration of NOTEXIST.JP

(3) Registration of NOTEXIST.JP by 3rd party

Case study : in Japan (1/2)

- One domain name had two DNS servers
  - A famous credit card company's domain name
  - One DNS server kept working but the other stopped its operation (April 2005)
- Stopped DNS server's domain name was expired. One month after, anyone could register expired domain name. (May 2005)
  - An attacker could register the domain name and run malicious authoritative DNS server.
  - In this situation, forging to DNS and phishing is very easy
- One person warned this situation to Japanese community
- Now, it has been fixed

Case study : in Japan (2/2)

- IPA (a governmental organization) announced a security advisory about this issue
- After that, JPRS, JPCERT, and Ministries announced their advisories
- Articles about this were published on various web sites
- National newspaper Asahi-Shimbun wrote it up.
  - http://www.asahi.com/english/Herald-asahi/TKY200510030127.html

Who is responsible?

- Registrant of the domain name is responsible for its management
  - Registrant should confirm and keep the configuration appropriate
  - TLD registries sets and modifies the zone data reflecting the instructions given by Registrants or Registrars
- On the other hand, registries/registrars can check and find inappropriately managed domain names
  - What roles should registries play?
    - Education
    - Check & individual notification

What TLD registry can do

- Promote Registrants' understanding about DNS
  - Through web pages of registries/registrars/ISPs/…
  - Through news from media
  - Through public lectures
- Check the status of domain names and warn the registrants/registrars about the inappropriateness
  - Only TLD registries can check all the domains
  - But it is difficult to check the appropriateness if registered DNS server name is not under the TLD
  - Therefore, cooperation between registries is required
- Disable DNS delegation if the domain name is exposed to significant danger
  - With or without any consent/notification to the registrar

What JPRS did

- Expressed public warning on its Web site
- Checking appropriateness of DNS setting under .JP
  - Not checked if DNS servers are not under .JP
- Sending warning mails to registrars (monthly)
- Sending warning to registrants (monthly)
  - E-mail
  - Postal mail
- Start implementing to disable inappropriate DNS delegation

Consideration and inquiries□

- What should we do as TLD registry ?
  - LAME delegation check and disabling delegation includes this
- Collaborative checking among TLDs is required
  - It is difficult to check the appropriateness if registered DNS server name is not under the TLD
- Do you cope with inappropriate domain name management ? If you will do, please let me know!
  - Do you face such domain name hijacking?
  - What kind of measures have you taken to address this issue?
  - Results

Questions/Comments?