Deployment of IRR in JP and Routing Security

for improvement the reliability of routing

NTT Communications 'OCN' / JPNIC IRR-Plan Chair

Tomoya Yoshida <yoshida@ocn.ad.jp>

Inter-AS

- Exchanging by BGP
- The route generated in somewhere in the worlds is transmitted all over the world
- The Internet is always continuing changing
  - What flow will come from somewhere in advance, it does not understand in many cases

Hijack Route

- Malice
  - SPAM Send
  - Site/Network Hijack
- Miss Configuration : sometimes bug
  - Redistribute
  - type miss

Hijack Route vs. Right Route

- Injection place of hijack route
  - Customer
    - ー＞checking of use address and prefix filtering
  - Peer
    - ー＞often found
  - Upstream
    - ー＞often found

Hijack Route vs. Right Route

- Prefix length of hijack route
  - Same
    - ―＞Form of connection, as-path etc
  - Shorter
    - ―＞Although influence can be disregarded, it is unpleasant
  - Longer
    - ―＞Inhales

Hijack Route vs. Right Route

- AS path length of hijack route
  - Same
    - ー＞Depend on form of connection
  - Shorter
    - ー＞Depend on form of connection but almost lose
  - Longer
    - ー＞Cannot be said that it is OK absolutely

Hijack Route vs. Right Route

- origin AS of hijack route
  - Same
    - ―＞May be hard to detect
  - Different
    - ―＞May not be hard to detect

Hijack Route vs. Right Route

- MED value of hijack route
  - SAME
    - ー＞Depend on form of connection
  - Shorter
    - ー＞When the AS Path is also same, it will lose
  - Bigger
    - ー＞May not to be safe absolutely

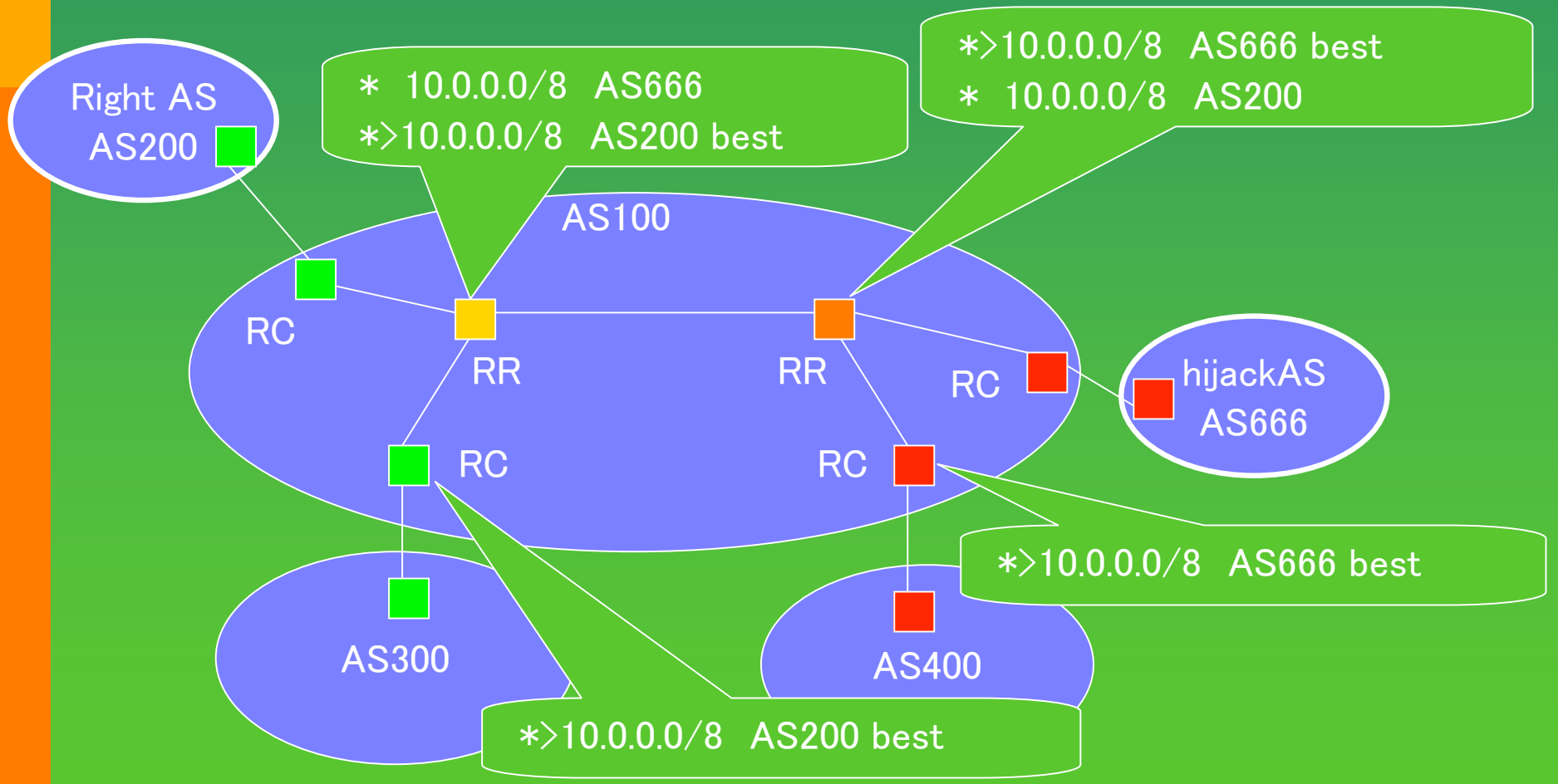
Hijack Route vs. Right Route

- bgp community strings of hijack route
  - Same
    ー＞Depend on the filtering of bgp community
  - Different
    ー＞Depend on the filtering of bgp community

Pollution condition of router

- Hijack Route only
  - Completely polluted
- Hijack Route（best） + Right Route
  - Regrettably polluted
- Hijack Route + Right Route(best)
  - Safe but dangerous
- Right Route only
  - Beautiful body

As For pollution condition, even the inside of AS is different



It dose now …

- The wrong route is detected promptly
  - What is the right route?
  - How to detect?
- Maintain the information or IR and IRR suitably
  - Insist the right route

The Scope of which can detect by only IRR

Can detect

Different origin AS
Different prefix length

Depend on object

AS Path
bgp community
MED

Difficult

Same origin AS
Same prefix length
The location of origin etc...

Reliable Information

- Scattered IRR
  - IRR as a registration place
  - The justification of data is not checked in many cases
- Reliable information?
  - Assignment/Allocation information
    - IP Address, AS number
  - IR knows

Arrangement of opinion here

The Route may be hijacked

↓

The technique of checking the justification of the route is required

↓

Reliable information is required

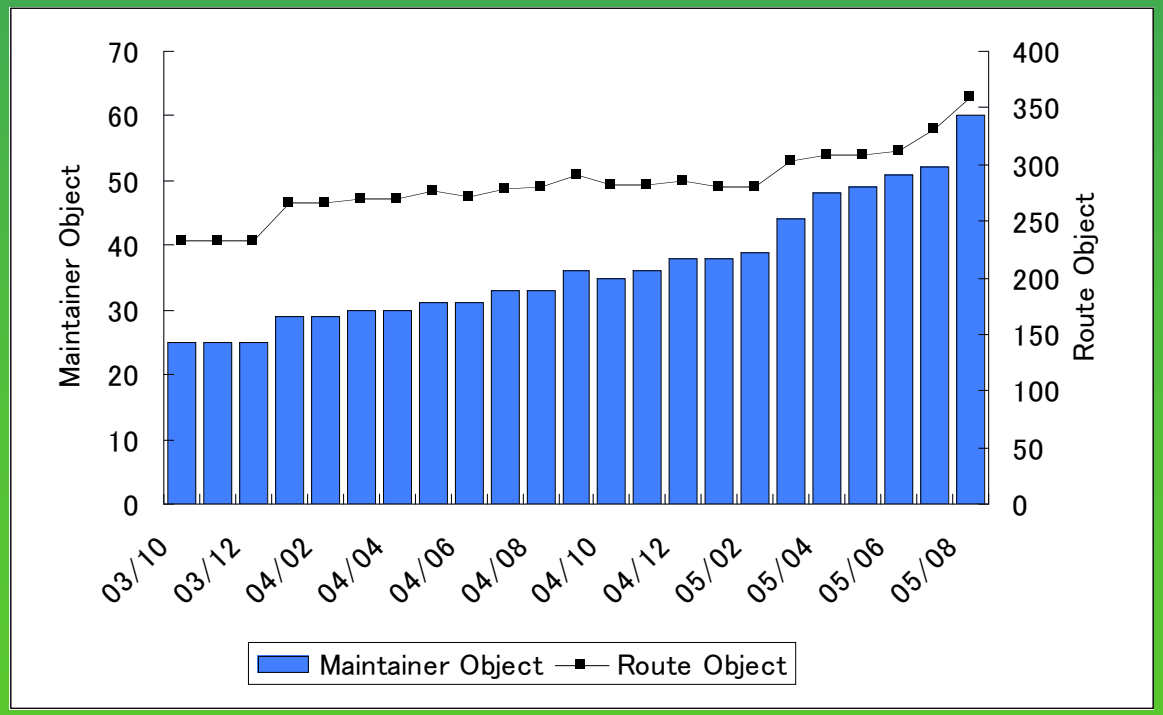
↓

IR do the IRR

Experimental IRR service by JPNIC

- Free Service for JP community
- Mirroring : APNIC, RIPE NCC, RADB
- # of objects

(2005/08/01)
Mntner : 60
Route :359
Aut-num :36
As-set :34



How to make a reliable information? Why we choose to operate IRR?

- It is necessity to cooperate with the database of an IP address, in order to keep the information on IRR healthy
  - The right validation is not made in IRR which ISP does
  - In Japan, more reliable information offer of IRR can expect enough by JPNIC operate IRR
- By practical use of IRR, danger, such as mistake operation, is reduced and it can contribute to keep the Internet safe

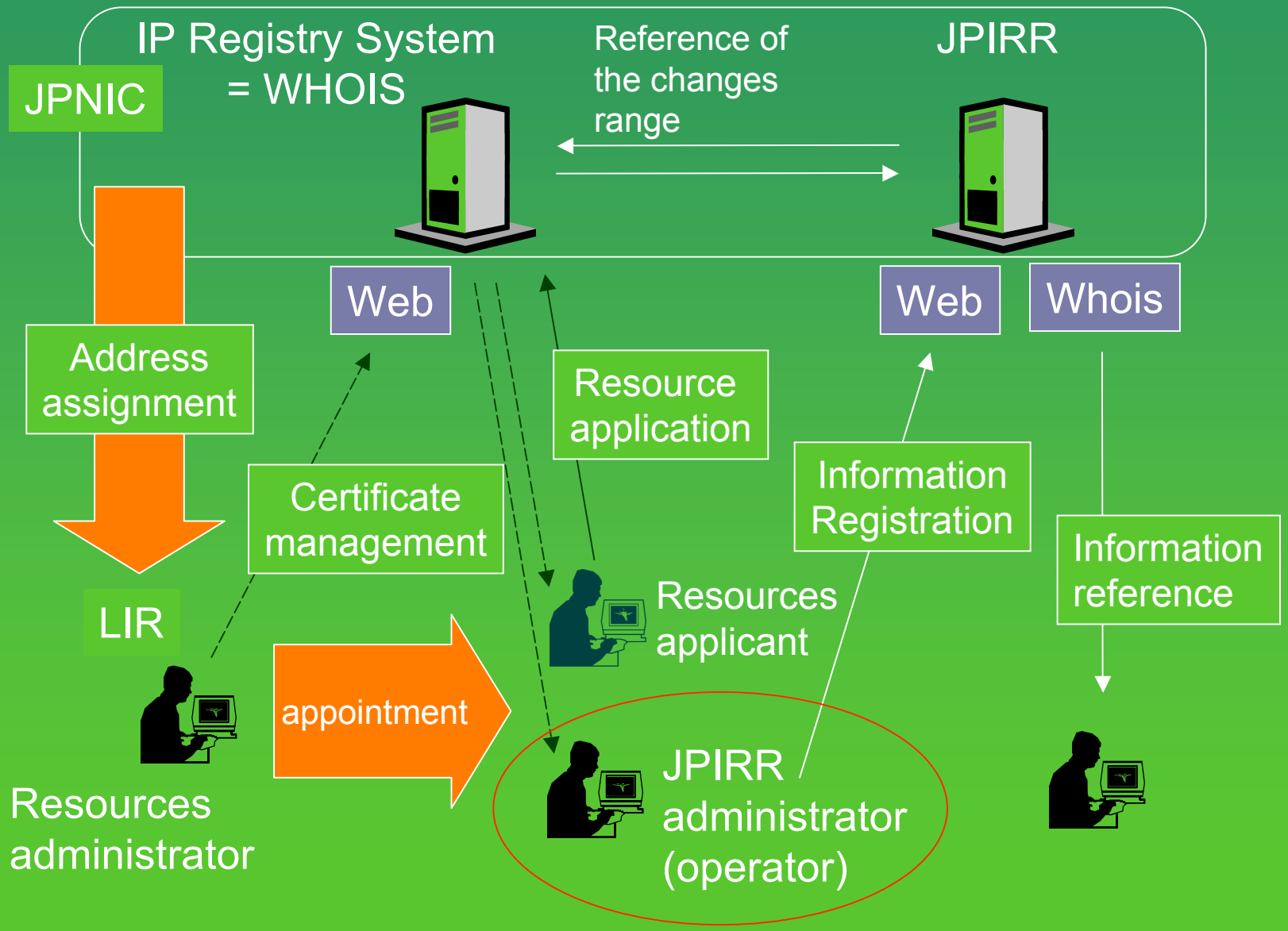
JPNIC operate IRR exactly

Future of JPIRR (part)

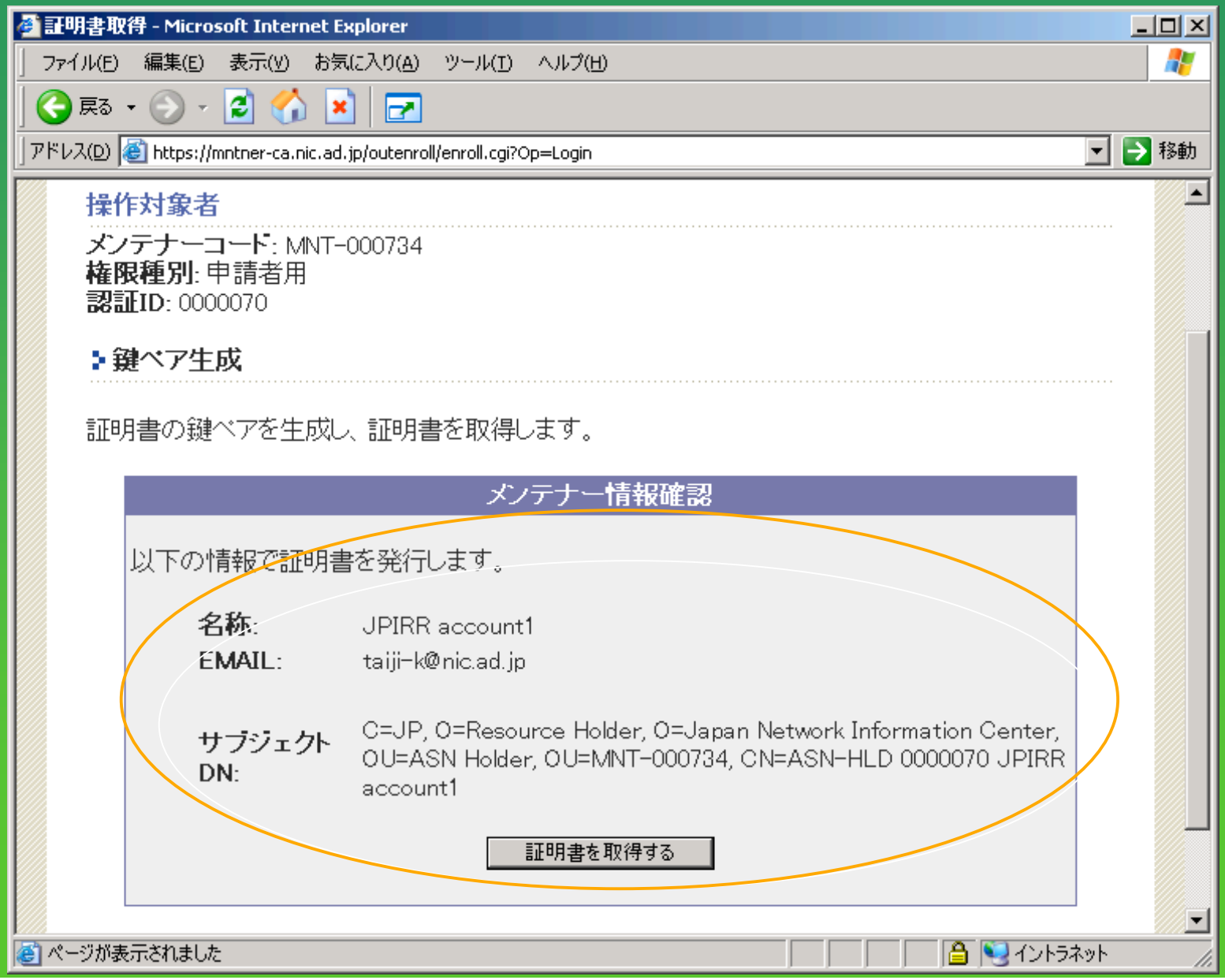
- Cooperate with the IP address database
  - The registration/change range is limited for every user
  - A certificate authority and an electronic certificate are utilized positively
- Checking the mirroring status
- Comparison with bgp route information
- searching your object

Information offer to smooth management of the Internet

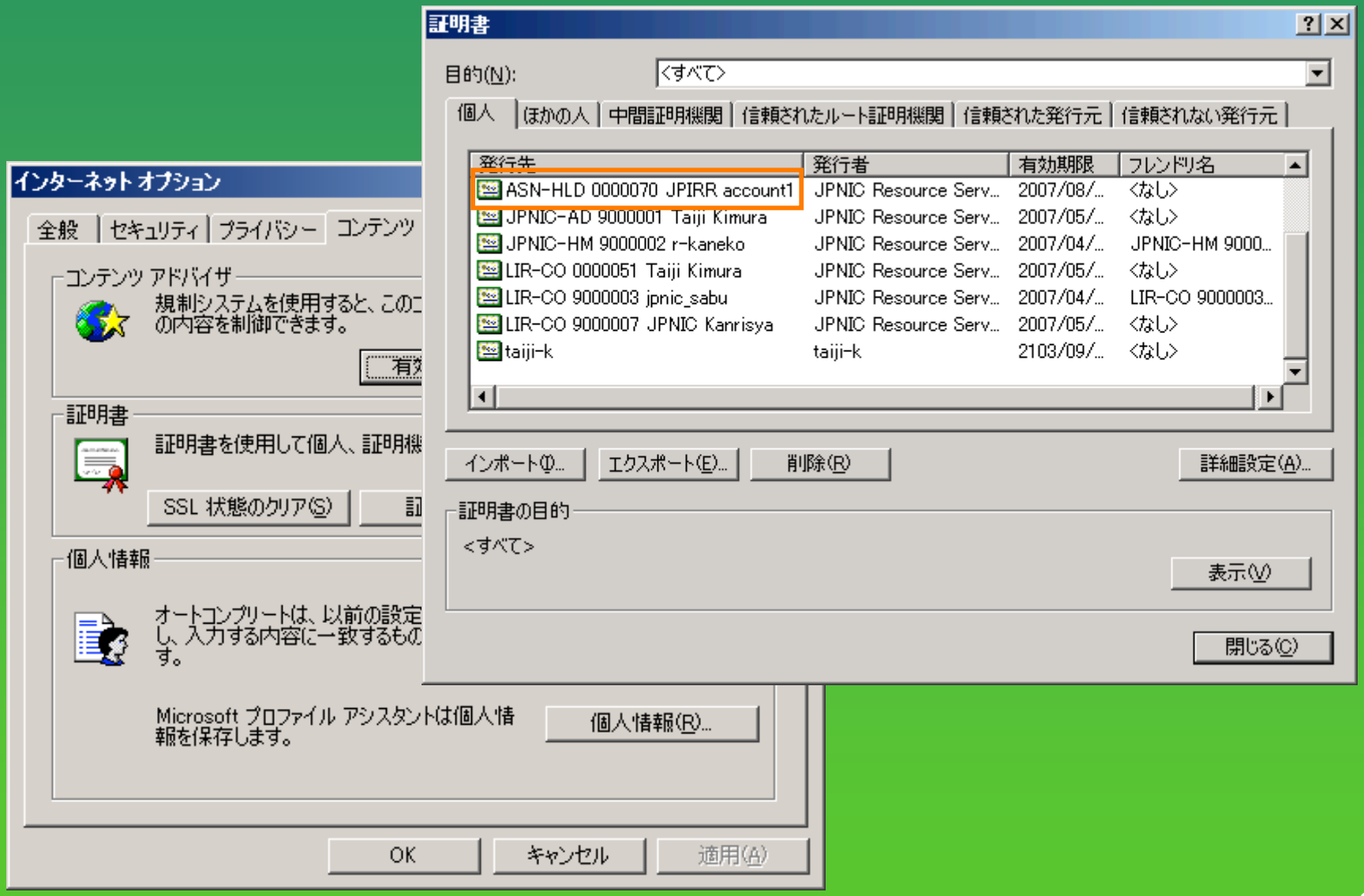
Attestation mechanism



Attestation acquisition example



It uses by WEB browser



JP route information = JPIRR

First of all, the right Japan routing database is made

of course, IPv6 also do from now

Routing Information database of BGP is made in JP

BGP Operation using IRR

- Domestic AS number and AS-PATH number are increasing, and updating work is serious
- Although Japan has performed operation of carrying out mutual exchange of the AS PATH, it does not suit and it has become the present time from ancient times
- If the filter is carried out firmly at each entrance of ISP, the route with strange as-path will not flow

Automation by IRR

- Using AS-Set object and Route objects

```
as-set:      AS-OCN
descr:       ASes advertised by OCN
members:  AS4713,
          AS290,  AS2504,  AS2526,  AS4249,  AS4688,
          AS4710,  AS4711,  AS4718,  AS7502,  AS7511,
          AS7521,  AS7522,  AS7524,  AS7529,  AS7668,
          AS7671,  AS7672,  AS7674,  AS7676,  AS7682,
          AS7684,  AS7686,  AS9351,  AS9353,  AS9363,
          AS9368,  AS9370,  AS9374,  AS9601,  AS9602,
          AS9605,  AS9612,  AS9614,  AS9617,  AS9618,
                :
```

```
route:     10.1.0.0/16
route:     10.2.0.0/16
....
```

AS-Path filter + Prefix Filter

```
_290$
_2504$
.... +
10.100.0.0/16
10.200.0.0/16
....
```

It is important that route object is managed exactly and reliable!

The necessity for international cooperation

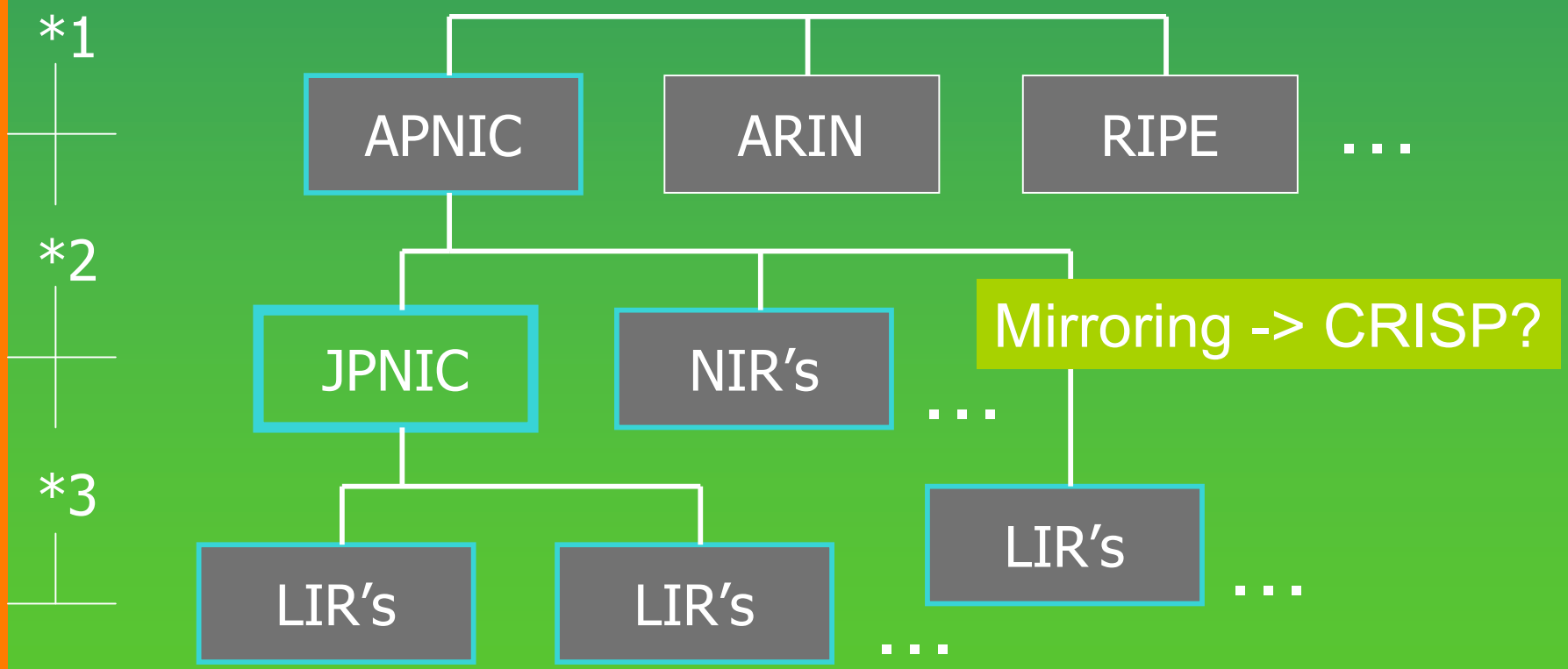
- It is not the problem solved even if only JPNIC does
- Operation based on the hierarchy of the Registry structure
  - Each registry manages exactly the route/AS information under management of own country or himself
  - It is also applicable to CRISP

CRISP: Cross Registry Information Service Protocol

IR hierarchy model : goal

Certificate authority, Internet Resource Management, IRR database management

*1 : Inter-RIR Mirror
*2 : Inter-IR Mirror
*3 : Member Mirror



Conclusion / Suggestion

- Reliable Information is made
- High flexibility BGP operation is realized by using internet routing information database
- We want to cooperate in the Asian area not only in Japan but in other countries and other regions