Considerations for IPv6 addressing plan

SOFTBANK TELECOM Corp.
Shingo Kudo

Agenda

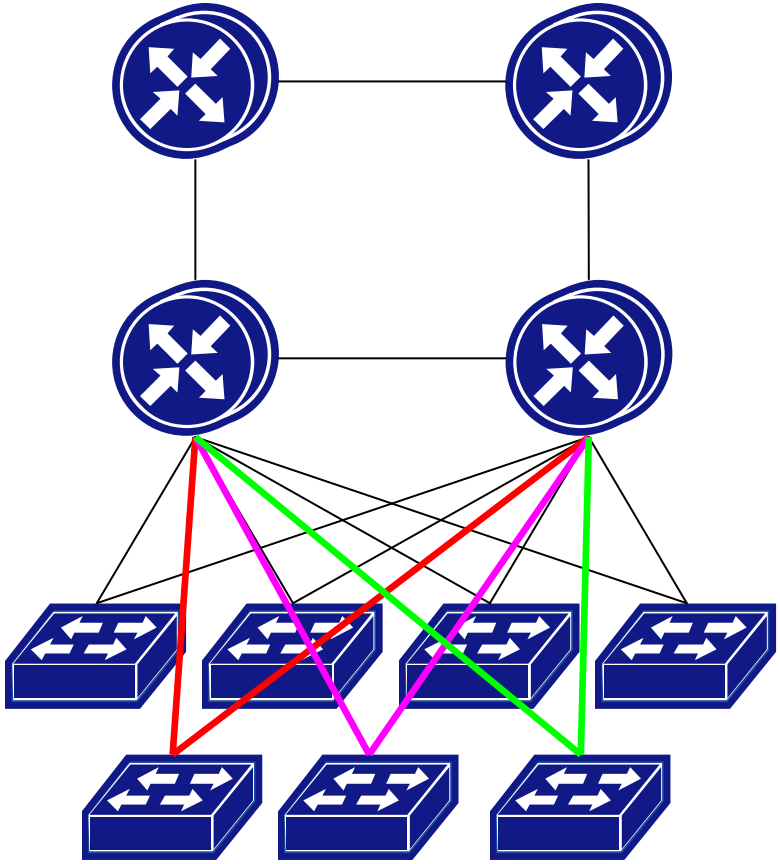
- Configuration Infrastructure ACL (iACL)
- Reverse DNS setting
- Addressing and reverse DNS in Softbank IPv6 deployment

What is iACL and its motivation

- The iACL is ACL denying packets from outside to infrastructure devices
  - Ex. deny any xxx.xxx.xxx.xxx/26(infrastracture address) at border routers
- To hide ISP devices and topologies from outsite by not responding to Ping / Traceroute
- To prevent high CPU utilization caused by packets to devices directly

In IPv4…

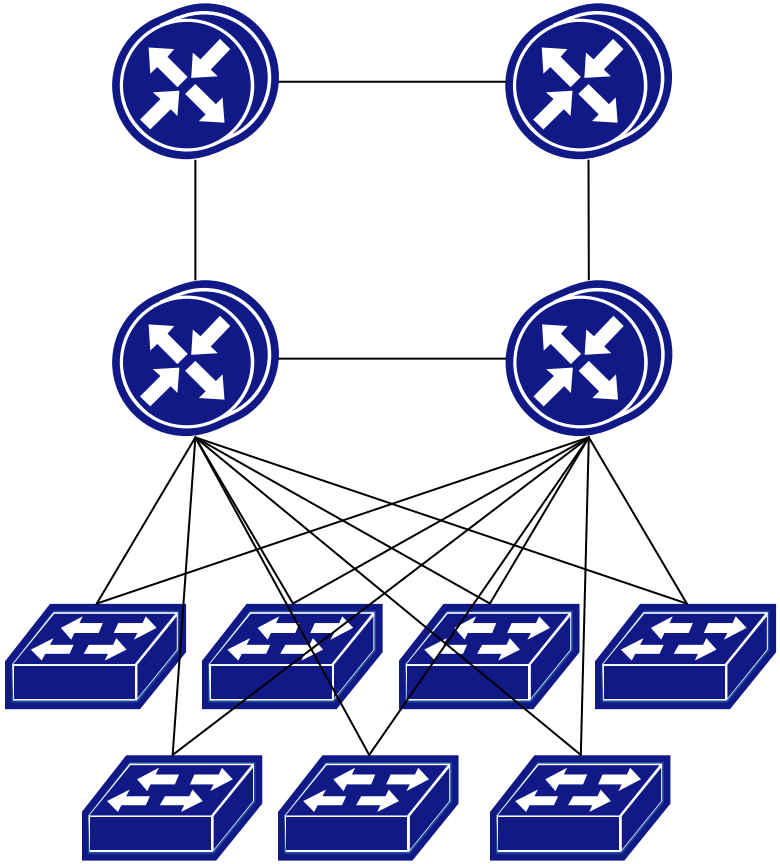
- Simple example.



- This figure has 8 devices and 14 p2p link.
- 8 loopback address(/32) and 14 link address(/30).
- = 8+4x14 = 64 = /26
- iACL is
  - deny any xxx.xxx.xxx.xxx/26
- When network will be expanded, iACL should be changed again
  - deny any xxx.xxx.xxx.xxx/26
  - deny any yyy.yyy.yyy.yyy/26
- Over and over…

In IPv6…

- If we choose /64 for link address



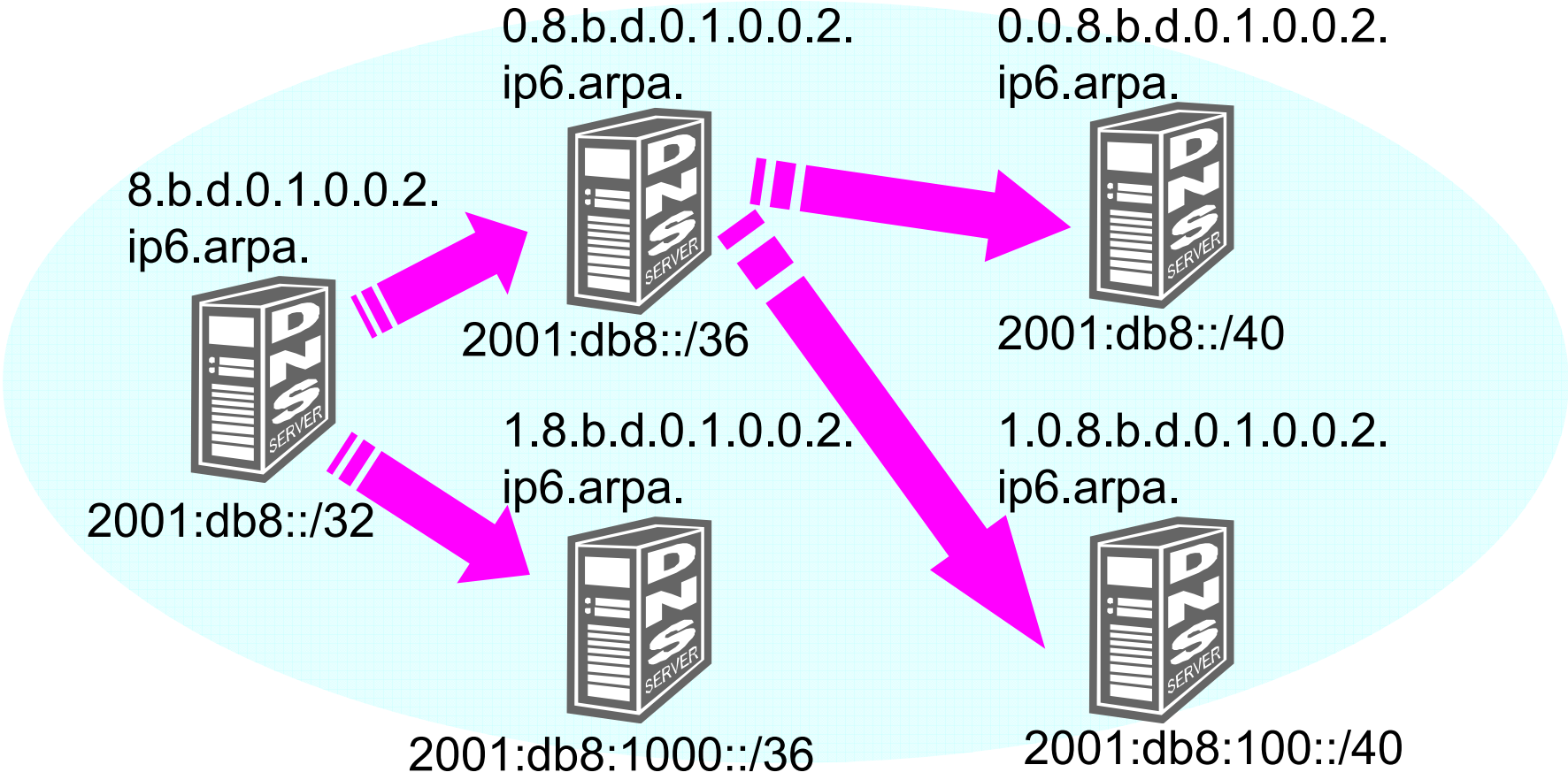
- 8 loopback address(/128) and 14 link address(/64)
- = 8+(2^64)*14 ≒ /60
- iACL is…
  - deny any xxx:xxx::/60
- Is /60 enough even for future expansion in your network?
- If it's not enough, you should add another line and line to iACL again !!

IPv6 addressing for infrastructure considering iACL

- IPv6 implementation is now on going.
  - If you are planning to use /64 for p2p link and /48 for customers, First allocated /32 may not be enough
- IETF 6man WG “draft-kohno-ipv6-prefixlen-p2p” should be considered
- If you will assign /127 for p2p link, /64 should be enough for infrastructure space even after considering future expansion
  - 9,223,372,036,854,775,808 /127 in /64

Reverse DNS

- IPv6 reverse DNS delegation is …



One of side effect of reverse DNS in IPv6

- For example, You are planning to assign 1st /36 for your infrastructure and the others for customer
  - 2001:db8:1000::/36~2001:db8:f000::/36 assigned service
- Delegate reverse DNS for 1st /36 to NOC team, for the other to service provisioning team
- Service provisioning team used all assigned space and want more address space from unused space in 1st /36
- But NOC team has **different policy for** reverse DNS
- Service provisioning team can’t set reverse DNS

Another side effect of revere DNS in IPv6

- In Japan, typical IPv4 reverse records for consumer-service are
  - ex.192.168.255.255 ⇔softbank192168255255.bbtec.net
- But some xSP doesn't set IPv6 reverse records, because the zone become very huge
  - Assigning /48 means 1,208,925,819,614,629,174,706,175 reverse records!! (It takes more than one minutes to read it)
- I think we don't need to set IPv6 reverse records for consumer-service. What do you think?

Softbank IPv6 deployment

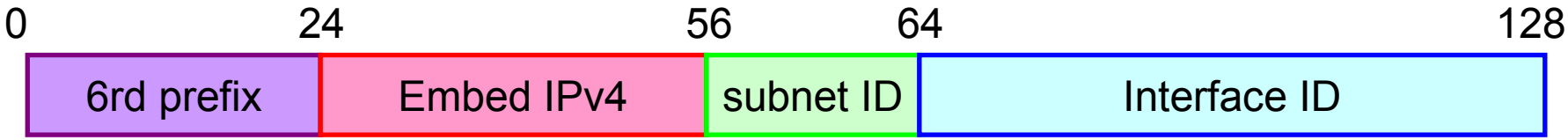
- Softbank set forth the plan…
  “IPv6 for Everybody!”

- Yahoo! Broadband started to provide both of IPv4/IPv6 from June 2010
  - We are using 6rd technology
    - 6rd border relay is deployed and operated by BBIX
  - Currently only FTTH user can use both IPv4/IPv6

- BTW, 6rd is most reasonable solution!!
  - RFC5969 (6rd protocol specification) is now proposed for standard

Addressing and reverse DNS in Softbank IPv6 deployment

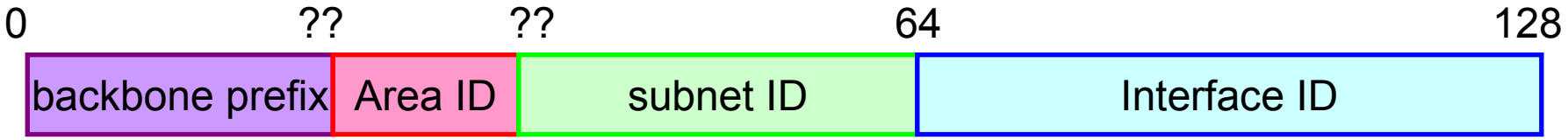
- We assigned /24 as a prefix for 6rd



- We don’t (can’t) set Reverse DNS for 6rd prefix
  - Because /24 reverse zone is very huge…
  - 20,282,409,603,651,670,423,947,251,286,015 addresses in /24

Addressing in Softbank IPv6 deployment

- Yahoo!BB backbone is divided to about 50 region
- Over 300 devices and 1,000 Link in biggest area
- We should consider IGP aggregation
- We used “Area ID”, and Embed “ID” in backbone IPv6 address range



Summary

- We should consider various factors in IPv6 addressing design
- One of example is addressing for infrastructure devices
  - Without considering future network expansion and minimizing address space for each link, iACL should be changed frequently.
- Reverse DNS delegation and IGP aggregation are another examples of such factors.

“Make a solid addressing plan to deploying!!”

Thank you!

Any Question/Comments?