



案6

IPv6 on FLETS Hikari: a way forward?

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Disclaimers

- The following is to the best of our current knowledge
- These are our personal opinions only and do not necessarily reflect the opinions of Google
- We offer these opinions in the hope that they will help the industry transition to IPv6, because we believe that widespread deployment of high-quality IPv6 Internet access is key to the long-term health of the Internet
- Google is not a player in the Japanese ISP market
- Now, with that out of the way...

Background

- World IPv6 Launch
 - "Fallback" problem caused widespread AAAA filtering
 - Risk: Japan takes its own path as the rest of the world embraces IPv6
 - Only solution is wide deployment of IPv6 Internet access
- IPv6 support provided by FLETS光
 - NGN: 案2 (PPPoE+NAT66), 案4 (native IPoE+source routing)
 - B-FLETS: currently no options
- ISP uptake of IPv6 on FLETS 光 is very low (~0.1%)
 - Suggests options are unattractive
- Easiest path might be:
 - Start from NGN (there are technical options already)
 - Start from existing options and make as few changes as possible

Assumptions

- Based on our understanding:
- **IPv6 IPoE lower infrastructure cost**
 - No PPP concentrators
 - No L2TP terminators
 - No NAT66 in CPE
- **IPv6 IPoE has some technical advantages**
 - Faster (1Gbps vs 200Mbps for residential)
 - No tunneling
 - No NAT66
 - No multiprefix problem
 - Wide support in common OSes and routers, Japanese and international
- In the long term, lower infrastructure cost is good for everyone

Issues with current 案4

1. Competitive landscape
 - Only 3 VNEs can use it
 - All others have to outsource operation to VNEs
2. Complicates operational support
 - Operations outsourced to VNEs
 - Increases troubleshooting / support costs
3. Higher cost to ISPs
 - Not part of NGN basic service
 - ISP must Intra-prefecture traffic can only carried by NGN, not ISP
 - Only POIs are in Tokyo (東) and Osaka (西)
4. Complex application process
 - Currently being addressed

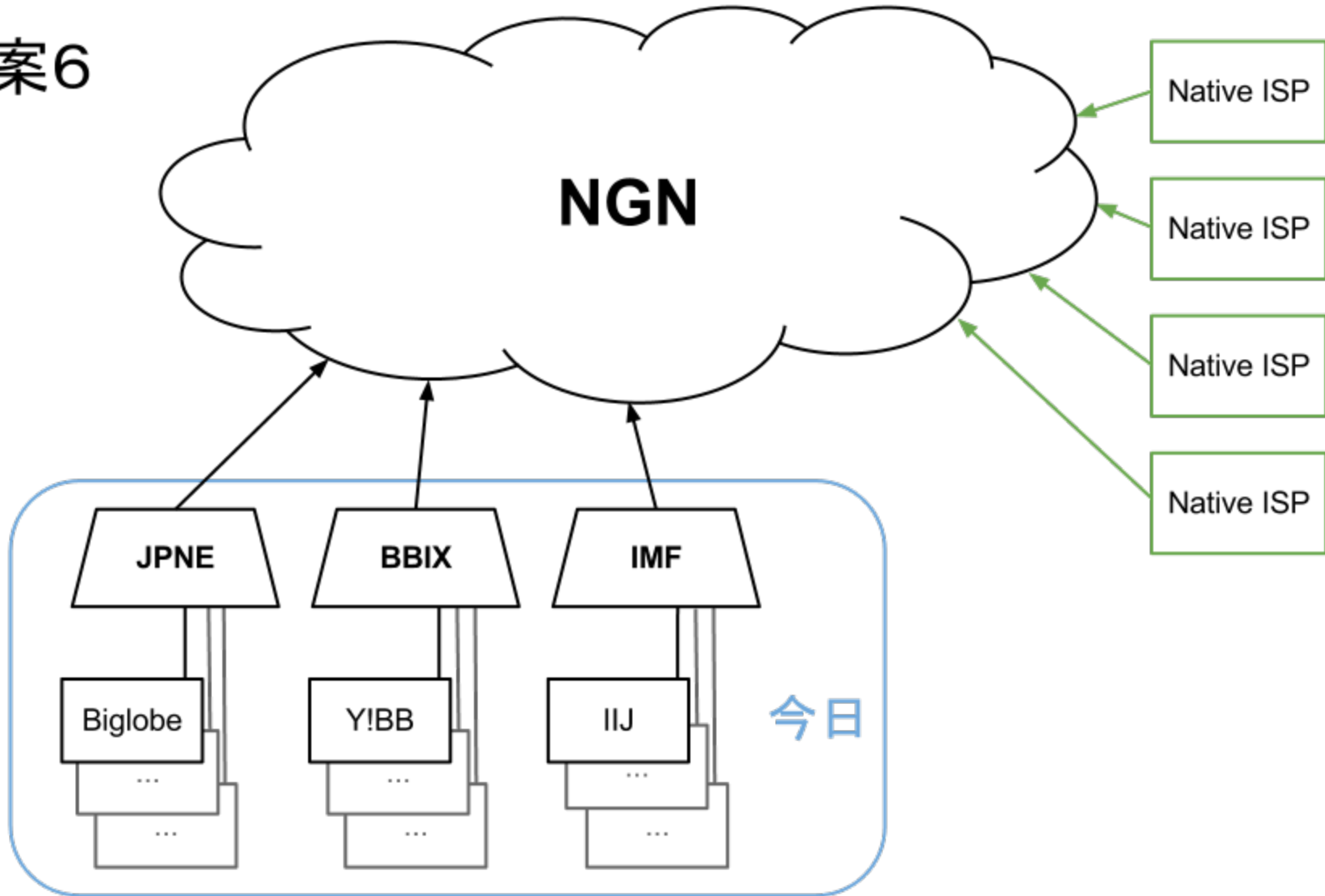
Increasing number of VNEs and POIs

- The number of IPoE players is expected to increase:
 - IPv6によるインターネットの利用高度化に関する研究会第18回:
 - 「VNE事業者数拡大の目途は立った」
 - 「数十程度になるのではと見込んでいる」
- Increasing the number of POIs under discussion:
 - IPv6によるインターネットの利用高度化に関する研究会第21回:
 - 「尚、相互接続点(POI) [...] VNE事業者様と協議」
- This would address some of the issues:
 - Addresses #1 (broadens competitive landscape)
 - Addresses #2 (ISPs can use 案4 directly instead of through a VNE)
 - Partly addresses #3
- Some issues would still remain

Cost issue not completely addressed

- 案4 not part of NGN basic service
 - Substantial increase in per-user cost over IPv4-only or 案2
- This could be an issue
 - Even though 案4 has lower cost, **cost to ISPs could be higher**
 - This could lead ISPs to prefer 案2
 - JAIPA already requested 案2 support in NTT home gateway
 - But long term, PPPoE provides slower speeds and could cost more
- How to make native IPoE more attractive to ISPs?

案6



$$2 + 4 = 6$$

- Benefits of Option 2

- Many ISPs
- Multiple POIs
- Part of NGN basic service
- Allows bigger than /64 via DHCPv6 prefix delegation



- Benefits of Option 4

- Save money, maintenance, and power by not tunneling
- 1 Gbps speeds
- Compatible with common OSEs



- Combined into Option 6

- Multiple native IPv6 ISPs
 - Some will resell to smaller, virtual ISPs who want roaming
- Multiple POIs
- DHCPv6 prefix delegation even if user does not have 光電話
- Lower **long-term** capital and operational costs

A way forward?

- It may be possible to achieve consensus on 案6
 - Requires discussion between NTT東西, ISPs, VNEs, MIC...
- If consensus, 案6 could be **included in basic NGN service**
 - Would resolve the cost issue
 - Would ensure low-cost, fast, high-quality, IPv6 access in long term
 - Would benefit users, ISPs, NTT, and the industry as a whole



Questions?