# Stateless IPv4 over IPv6 report draft-janog-softwire-report-01

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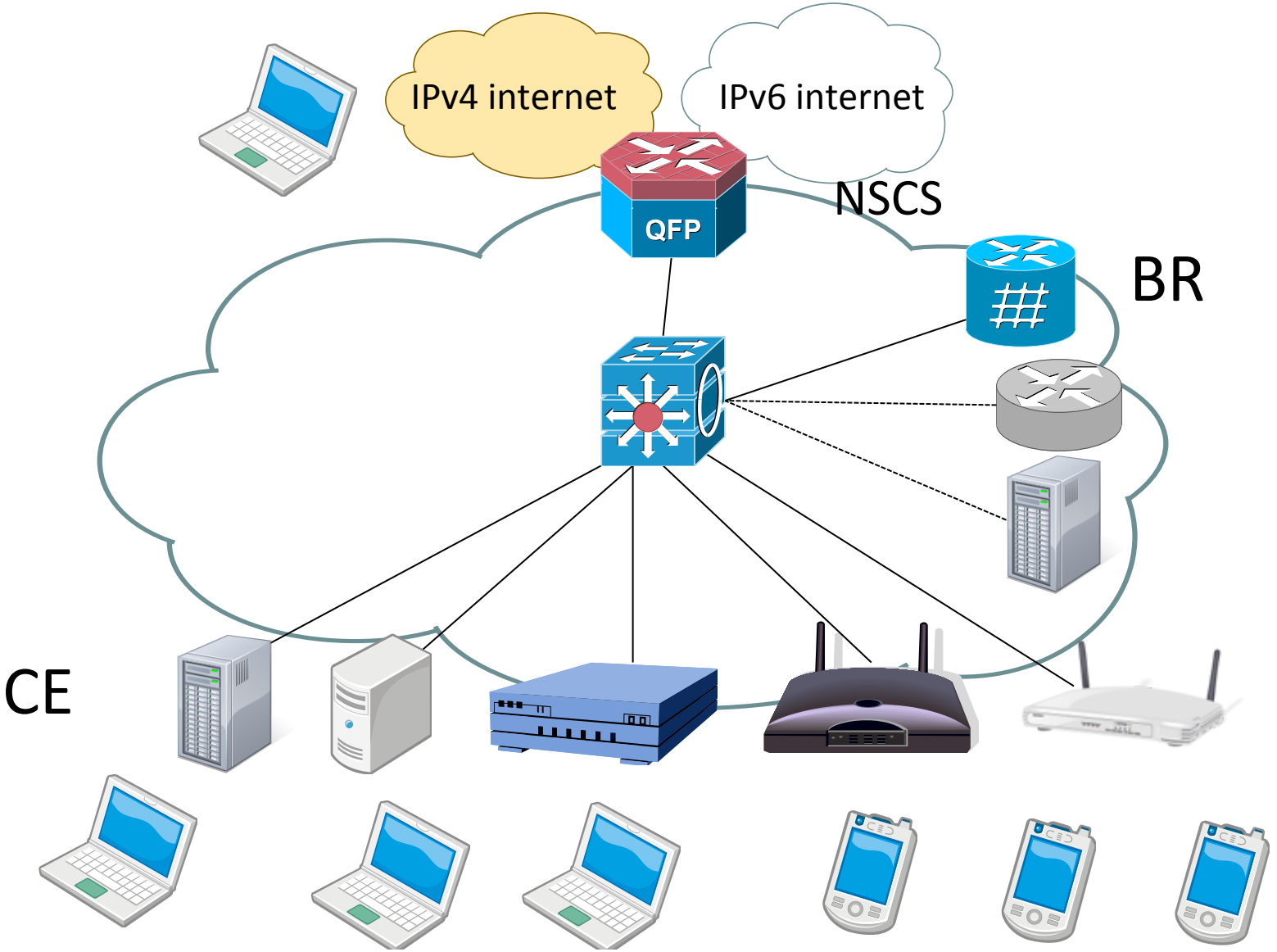
# What is JANOG?

- JApan Network Operator's Group
- 2 Major Activities
  - Mailing list janog@janog.gr.jp +6200 subscribers
  - 2 Meetings per year
  - Working Group focus special technology
- JANOG established Working group to focus the stateles IPv4 over IPv6.
- WG had held MAP-E interop events at Nagaoka.
- 7 vendors and 9 implementations attended to the interop events

# The documents

- Implementation Report
- IPv4 functionality over IPv6
  - ICMP,FTP,IPSec VPN,SSL VPN,PPTP,L2TP
  - Instant Messaging and VoIP [RFC6586]
  - STUN, NAT-Analyzer
- BR redundancy
- Interoperability

# The interop event network topology



# BR Participant list

| Vendor | OS/Equipement |
|---|---|
| IP Infusion | Linux 2.6.18 |
| | NetBSD 4.0.1 |
| Furukawa Network Solution Corp. | FX5000 |
| ASAMAP | Vyatta |
| Internet Initiative Japan Inc. | SEIL/X1 |
| Cisco Systems | IOS-XR/ASR9000 |

- 5 vendors, 6 implementations

# CE Participant list

| Vendor | OS/Equipement |
|---|---|
| IP Infusion | Linux 2.6.18 |
| | NetBSD 4.0.1 |
| Furukawa Network Solution Corp. | F60W |
| ASAMAP | Vyatta |
| Internet Initiative Japan Inc. | SEIL/X1 |
| CERNET | OpenWRT |
| Yamaha Corporation | RTX1200 |

- 6 vendors, 7 implementations
- Total  7 vendors , 9 implementations

# Implementation Report *cont'd*

- Security mechanism
  - ask consistency checks between IPv4 and IPv6 src on BR/CE Section 13 of [I-D.ietf-softwire-map].
- Provisioning method
  - all of attendee only support manual configuration.
  - There is difference configuration type for "Length of EA bits"
- Reachability to BR address
  - 3BR can confirm reachability of BR address
  - 2BR can not confirm reachability of BR address but can confirm reachability of BR's interface address.

# Difference configuration type for "Length of EA bits"

```
Rule IPv6 prefix:          2403:9200::/32
Rule IPv4 prefix:          203.86.225.0/28
EA bits:                   16bit(48-32)
Port-Set ID:               12bit
PSID offset:               4
BR IPv6 address:           2403:9200:fff0:0::2
```

```
# set interfaces map map0 role br
# set interfaces map map0 br-address 2001:db8::1/64
# set interfaces map map0 default-forwarding-mode translation
# set interfaces map map0 default-forwarding-rule true
# set interfaces map map0 rule 1 ipv6-prefix 2001:db8:89ab::/48
# set interfaces map map0 rule 1 ipv4-prefix 192.0.2.0/24
# set interfaces map map0 rule 1 ea-length 16
```

useful for operation and trouble shooting

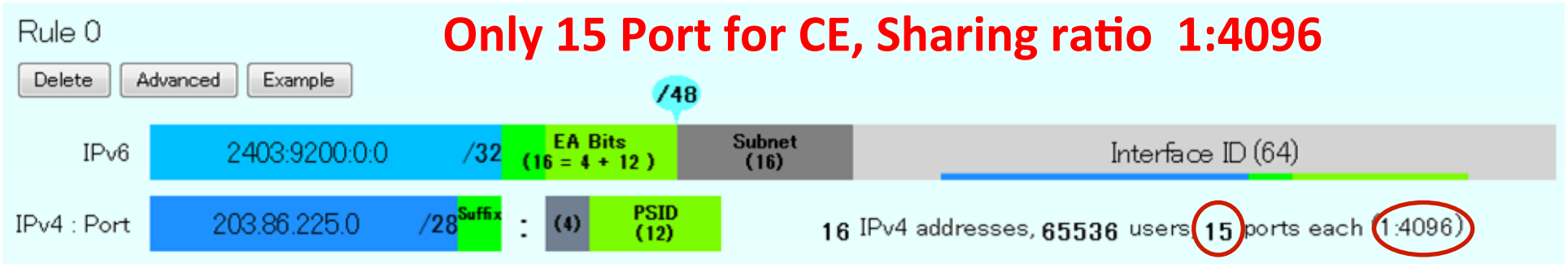
```
service cgn JANOG
 service-location preferred-active 0/0/CPU0
 service-type map-e Softwire
  cpe-domain ipv4 prefix 203.86.225.0/28
  cpe-domain ipv6 prefix 2403:9200::/32
  sharing-ratio 12
  aftr-endpoint-address 2403:9200:fff0::2
  contiguous-ports 0
```

**easy to understand design**

- Appendix 2 all of configuration

# Test Parameter
# MAP-E

| Parameter | Value |
|---|---|
| Rule IPv6 prefix | 2403:9200::/32 |
| Rule IPv4 prefix | 203.86.225.0/28 |
| End-user IPv6 prefix | 2403:9200:fff1::/48 - 2403:9200:fff7::/48 |
| EA bits | 16bit(48-32) |
| Port-Set ID | 12bit |
| PSID offset | 4 |
| BR IPv6 address | 2403:9200:fff0:0::2 |
| Topology | Mesh |

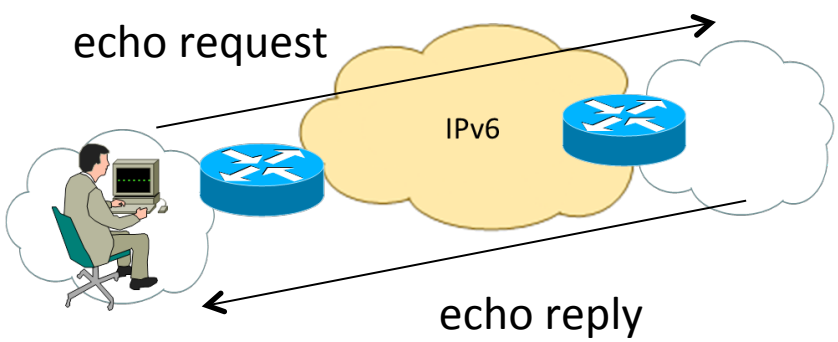


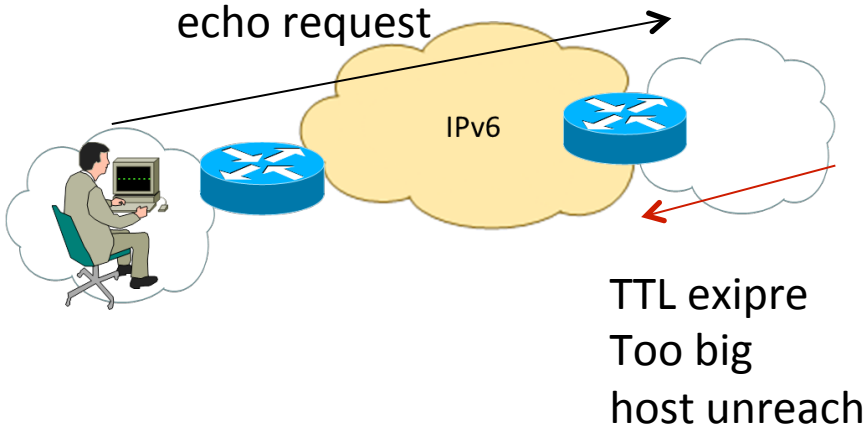
# Test Parameter
# MTU

| Parameter | IPv6 MTU | TCP MSS clamp | Tunnel IF IPv4 MTU |
|---|---|---|---|
| Value | 1500byte | Enable | 1460byte |

**Not 1280 byte**

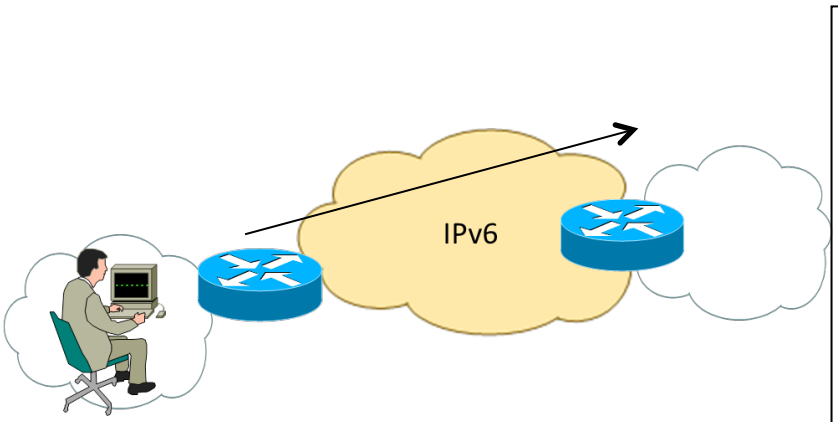
# IPv4 functionality over IPv6
# ICMP

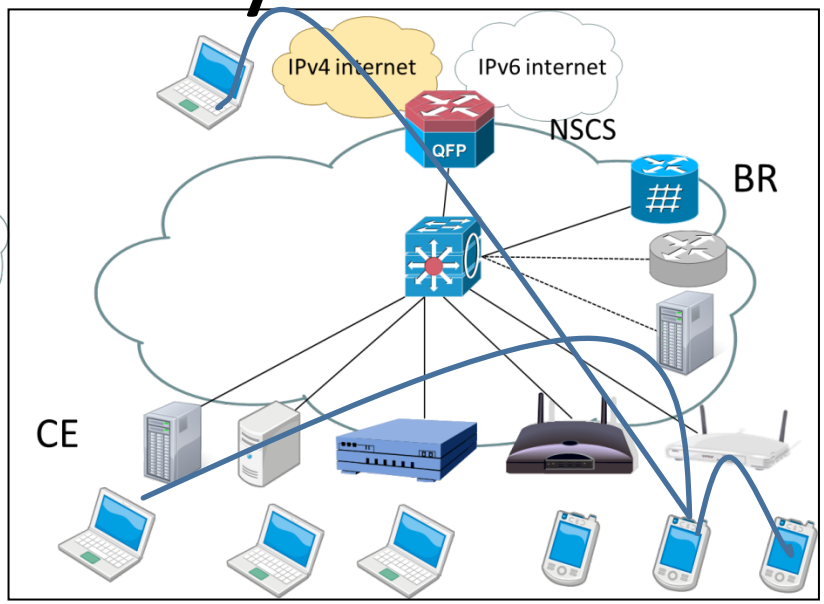



- With Identifier message for CE/BR
- Null Identifier message for BR

# IPv4 functionality over IPv6



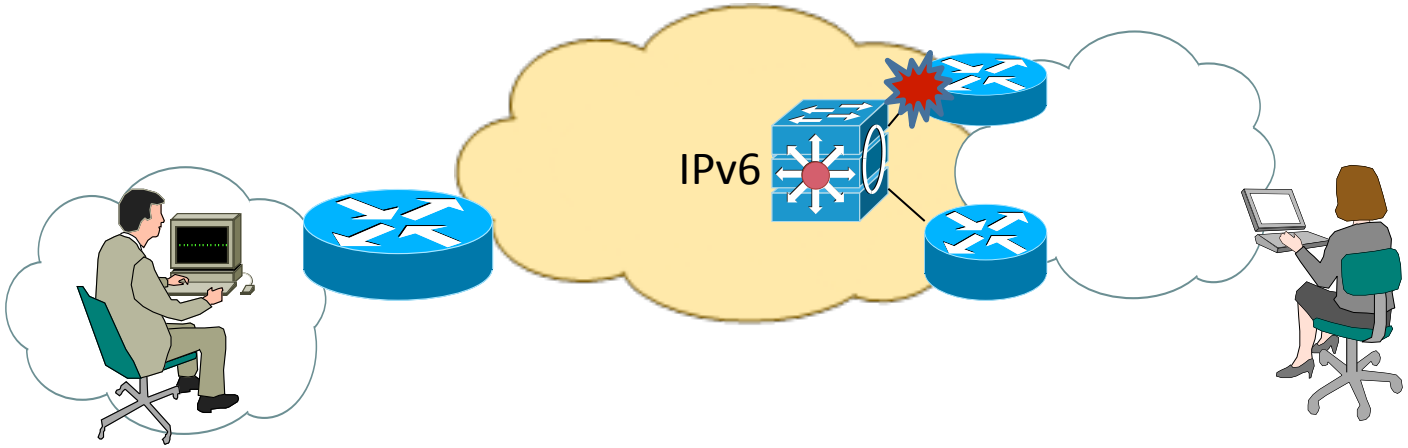




- VPN(IPSec VPN,SSL VPN,PPTP,L2TP),FTP(Port/PASV)
- Instant Messaging ,VoIP and Video
- NAT Verification tool
  - KONAMI [RFC4787] verification tool
  - NAT-Analyzer(TUM)

# Issue of IPv4 functionality

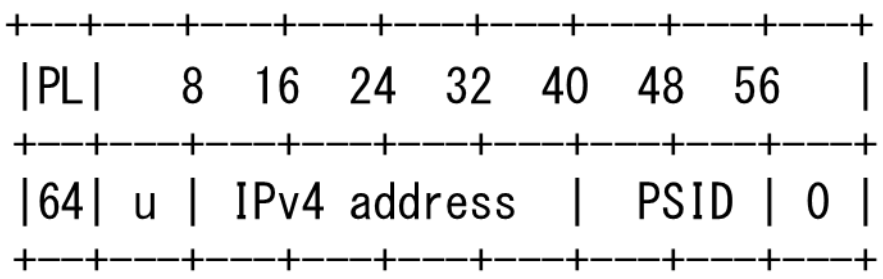
- Even DNS query occupy NAT table(only 15)
  - UDP/DNS timeout immediately
  - DNS transport proxy ,section-3 of [I-D.draft-dec-stateless-4v6]
- Implicit IPv6 MTU limitation(1280byte)
  - could not browse, could not video chat
  - should well-managed, section 10.1 of [I-D.ietf-softwire-map]
- All of vendor support NAT Traversal
- Most of modern message tools  are succeed
- NAT-verification tool and FTP(ACTV) result depends on implementation of NAT.

# BR redundancy




- Confirmed BR redundancy by routing convergence
- Skype session kept, could communicate after converged

# Interoperability
# The IPv6 Interface Identifier




**Wrong** :2403:9200:fff6:0:cb:56e1:fff:6000
Correct: 2403:9200:fff6:0:cb:56e1:f0f:f600

- mis-understanding “left-padding” and “right-padding”
- If it could add example to explain format in Section6, then it would be more understandable.

# Conclusion

- Many vendors already supported MAP-E.
- No critical interoperability issue between multivendor CE and CE,CE and BR,BR and BR.
- DNS transport proxy and MTU issue already discussed on IETF and draft.
- MAP-E is mature