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

Shishio Tsuchiya shtsuchi@cisco.com

Shuichi Ohkubo ohkubo@sakura.ad.jp

Yuya Kawakami kawakami@mfeed.ad.jp

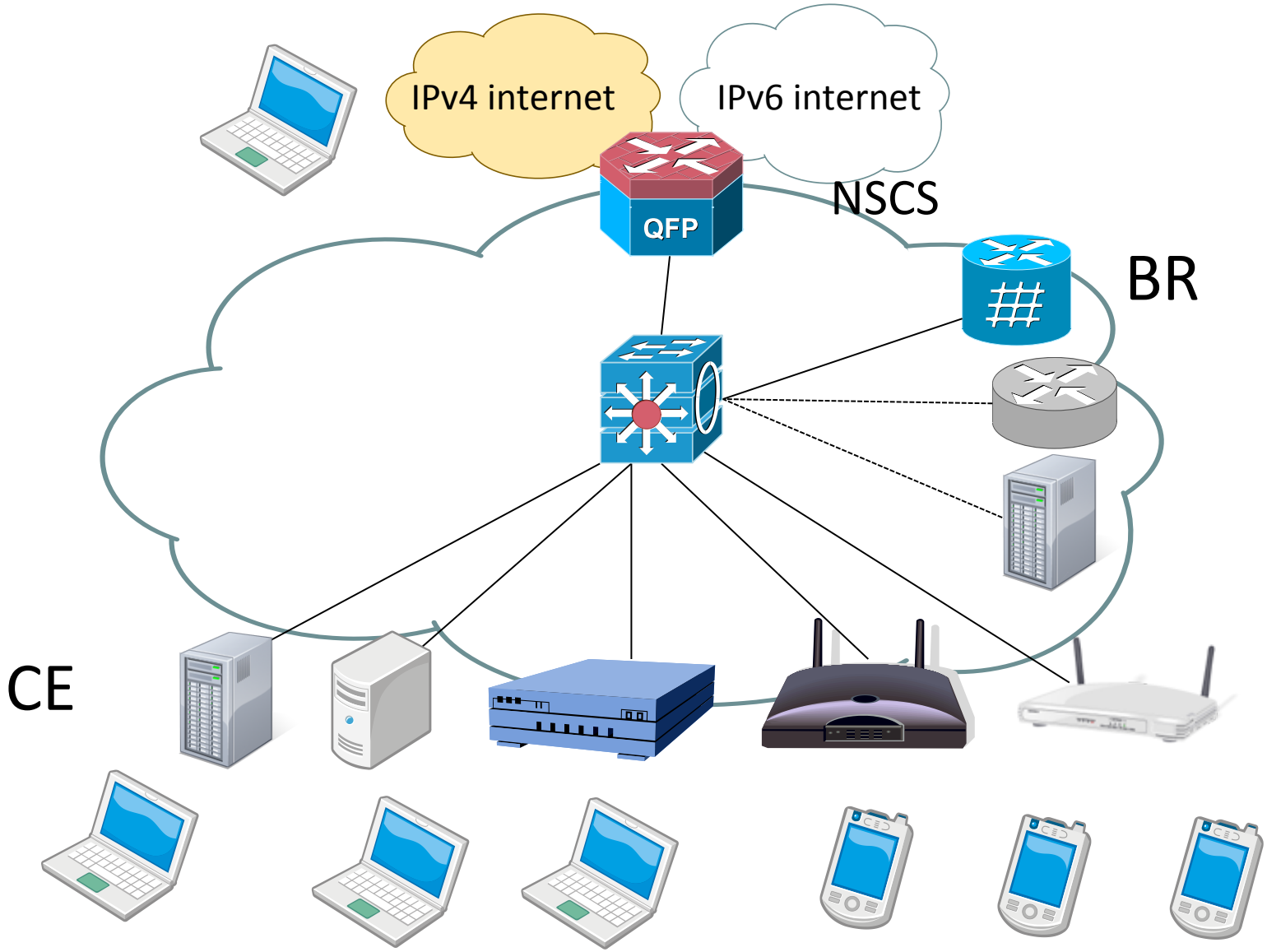
What is JANOG?

- 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

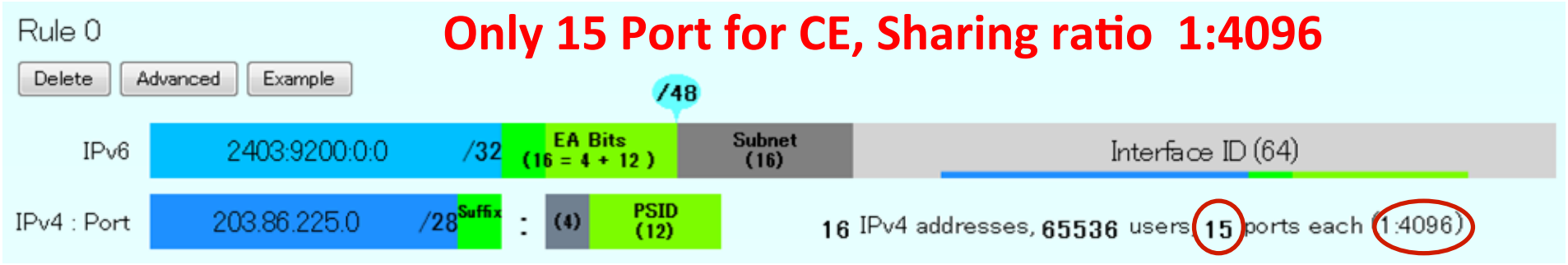
```
service cgn JANOG
 service-location preferred-active 0/0/CPU0
 service-type map-e Softwire
  cpe-domain ipv4 prefix 203.86.225.0/28
  cpe-domain ipv6 prefix 2403:9200::/32
  sharing-ratio 12
  aftr-endpoint-address 2403:9200:fff0::2
  contiguous-ports 0
```

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

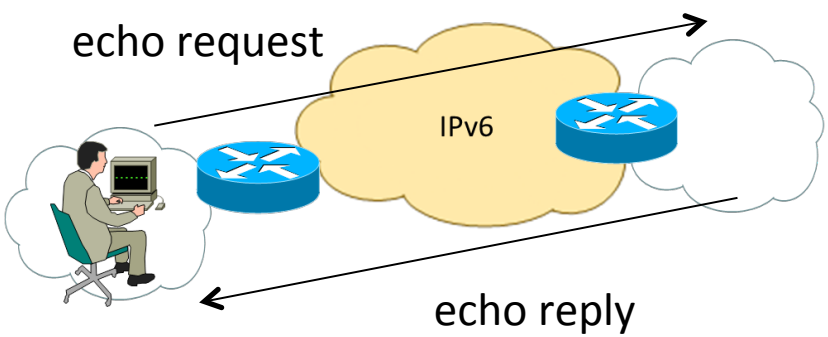


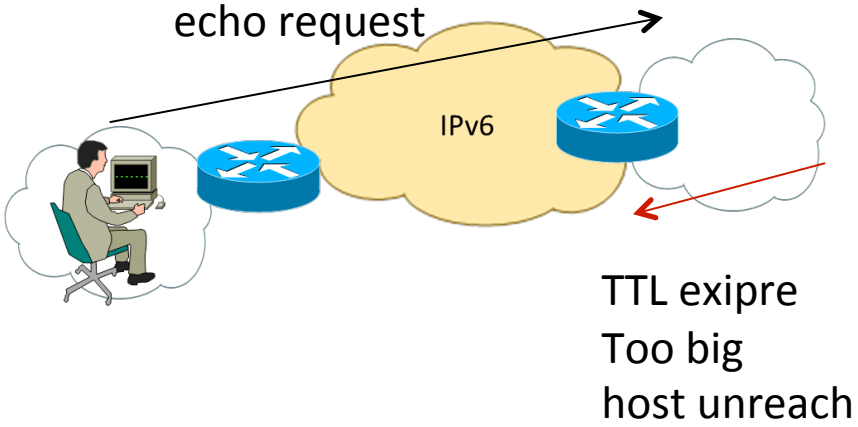
Test Parameter
MTU

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

Not 1280 byte

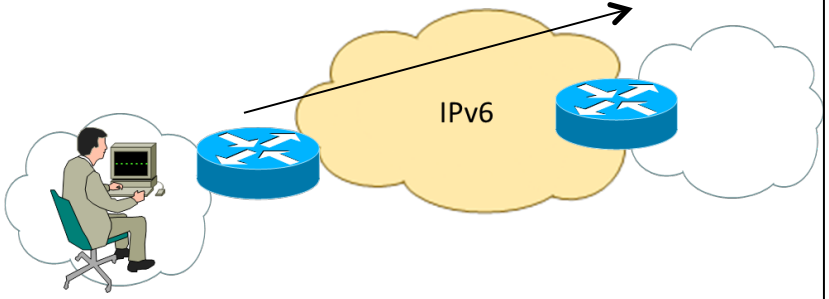
IPv4 functionality over IPv6
ICMP

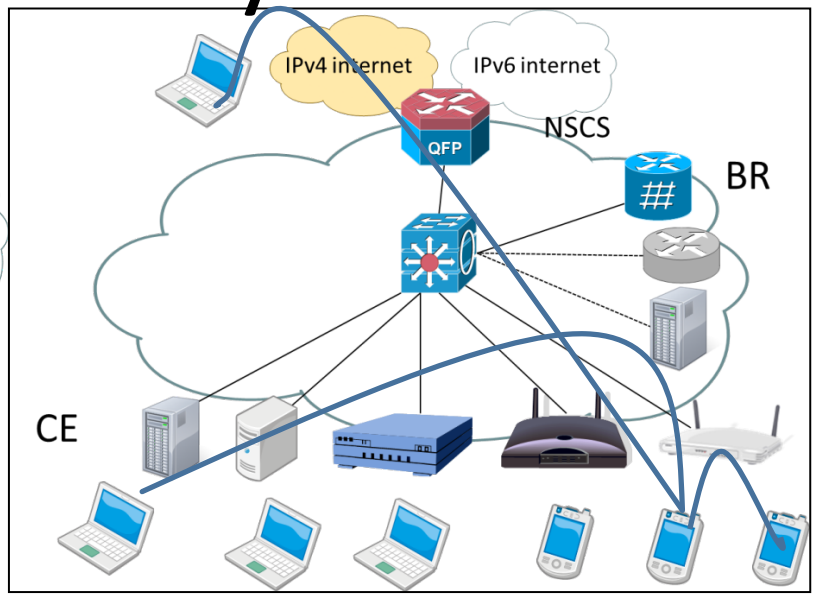




- With Identifier message for CE/BR
- Null Identifier message for BR

IPv4 functionality over IPv6



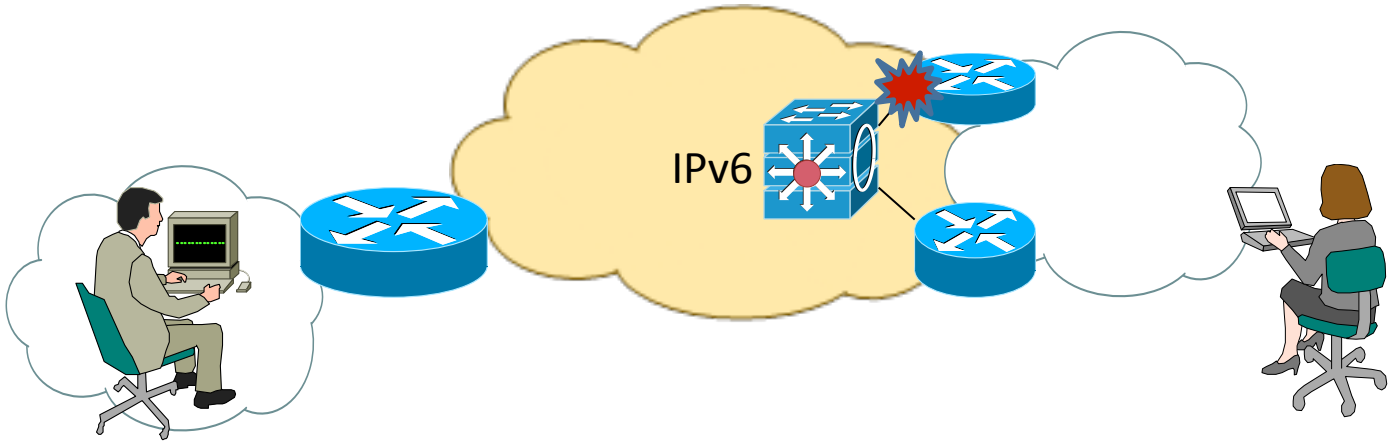


- VPN(IPSec VPN,SSL VPN,PPTP,L2TP),FTP(Port/PASV)
- Instant Messaging ,VoIP and Video
- NAT Verification tool
  - KONAMI [RFC4787] verification tool
  - NAT-Analyzer(TUM)

Issue of IPv4 functionality

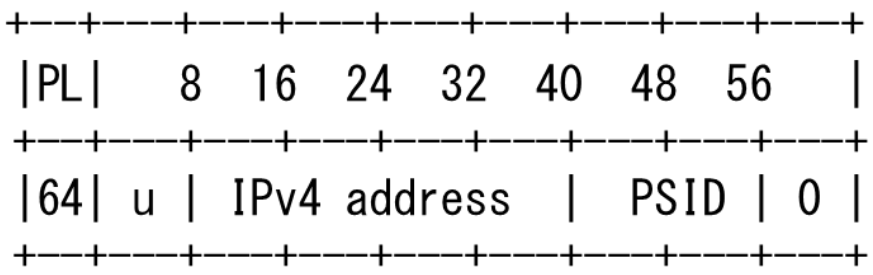
- Even DNS query occupy NAT table(only 15)
  - UDP/DNS timeout immediately
  - DNS transport proxy ,section-3 of [I-D.draft-dec-stateless-4v6]
- Implicit IPv6 MTU limitation(1280byte)
  - could not browse, could not video chat
  - should well-managed, section 10.1 of [I-D.ietf-softwire-map]
- All of 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