



TOWARDS A COMMON SPECIFICATION

IETF84 – Softwires WG

Intro

- Stateless or Lightweight does NOT mean NO configuration
- Examples:

“Stateful”	“Stateless”	“Lightweight”
Per CPE state created by user traffic	No dynamic state created by CPE traffic	No dynamic state created by CPE traffic
Configured address pools. Dynamic forwarding rules	Configured forwarding rules per domain. Variable domain size	Configured forwarding rules per CPE. Dynamic address pools
DS-Lite AFTR* Stateful NAT64	MAP Border Relay** 4rd-u BR****	Translated B4/LW4o6 ***

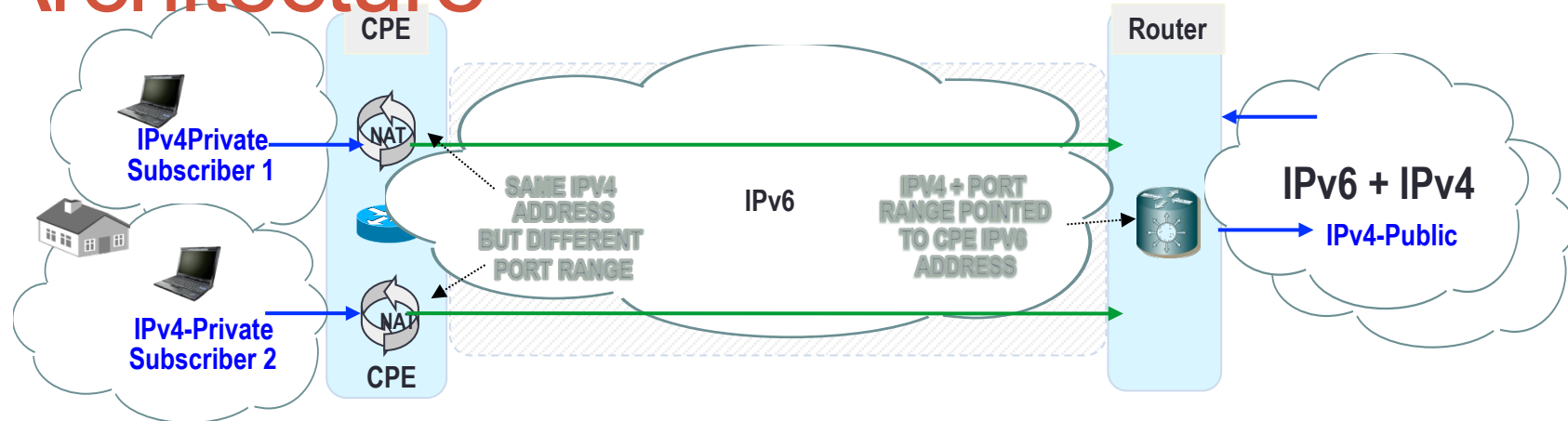
*RFC6333 and RFC6146

** <http://tools.ietf.org/html/draft-ietf-softwire-map>

***<http://tools.ietf.org/html/draft-cui-softwire-b4-translated-ds-lite>

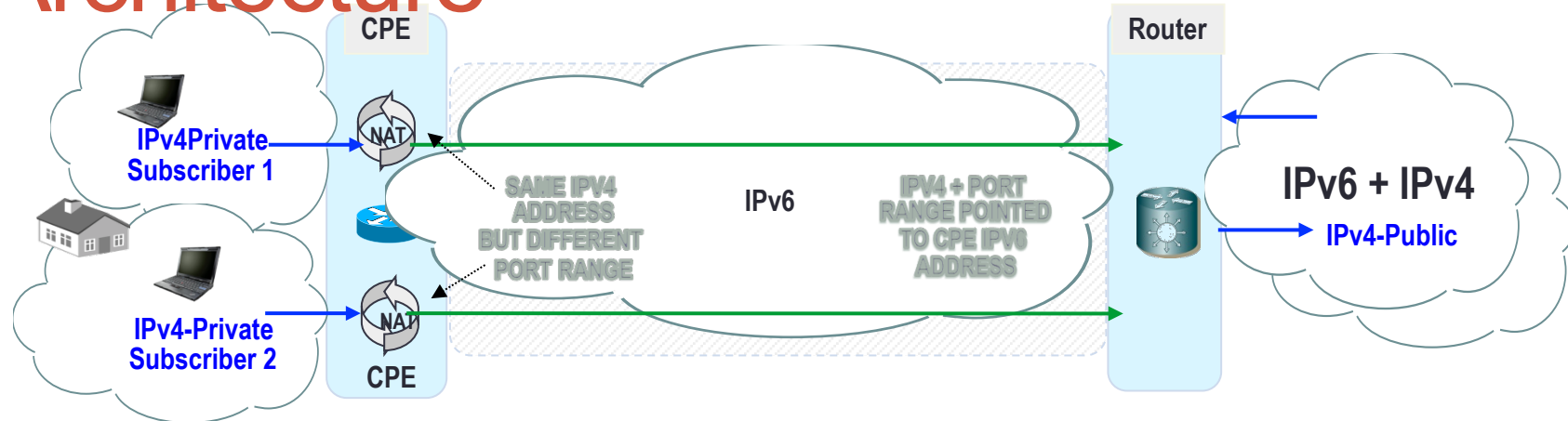
****<http://tools.ietf.org/html/draft-ietf-softwire-4rd>

Architecture



1. CPE is provisioned with IPv4 address and port range for NAT44 operation
 2. IPv4 traffic is transported across regular IPv6. (either as IPinIP or translated).
 3. Router knows (not learns) the CPE IPv6 address and corresponding IPv4 + Port range
- Question: Guess which draft describes the above?
 - 1: Lightweight 4 over 6
 - 2: MAP

Architecture



1. CPE is *provisioned* with IPv4 address and port range for NAT44 operation
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 3. Router knows (not learns) the CPE IPv6 address and corresponding IPv4 + Port range
- Question: Guess which draft describes the above?

Answer: A+P – Both solutions derive from rfc6346

So what are the main usability differences?

	MAP	4rd-u	L46
IPv6 CPE Address	Provisioned:	Provisioned:	Provisioned:
IPv4 address on CPE	Provisioned: Variable combination of IPv6 prefix and MAP DHCP option	Provisioned: Variable combination of IPv6 prefix and 4rd DHCP option	Provisioned: DHCPv4 over IPv6, PCP
CPE Port range	Derived from provisioned PSID	Derived from provisioned PSID	Explicitly Provisioned
Concentrator “configuration” state	Order of domains. 1 domain can be all CPEs or 1 CPE	Order of domains. 1 domain can be all CPEs or 1 CPE	Per CPE and port range
CPE compatibility with DS-Lite AFTR	Yes – MAP-E mode	No	Yes
CPE compatibility with core NAT64	Yes – MAP-T mode	No	No
Mesh Mode	Yes (optional)	Yes (optional)	No
IPv4-IPv6 communication	Yes (MAP-T mode)	TBD	No

So what are the main usability differences?

	MAP	4rd-u	L46
IPv6 CPE Address	Provisioned:	Provisioned:	Provisioned:
IPv4 address on CPE	Provisioned: Variable combination of IPv6 prefix and DHCPv6 MAP option	Provisioned: Variable combination of IPv6 prefix and DHCPv6 4rd-u option	Provisioned: DHCPv4 sub option over IPv6, PCP
CPE Port range	Derived from provisioned PSID	Derived from provisioned PSID	Explicitly Provisioned
Concentrator "configuration" state	Order of domains. 1 domain can be all CPEs or 1 CPE	Order of domains. 1 domain can be all CPEs or 1 CPE	O(CPEs x port ranges)
CPE compatibility with DS-Lite AFTR	Yes – MAP-E mode	No	Yes
CPE compatibility with core NAT64/PLAT	Yes – MAP-E mode	No	No
Mesh Mode	Yes (optional)	Yes (optional)	No
IPv4-IPv6 communication	Yes (MAP-E mode)	TBD	No

IP Addresses and ports need to be provisioned on the CPE

Algorithmically derived

Port flexibility

Optimizable amount of configuration state

Per CPE configuration state

Re-usable with DS-Lite or NAT64

No reuse

Re-usable with DS-Lite AFTR

Optimizable Forwarding

Optimizable Forwarding

Non optimizable forwarding

Dependency on CPE IPv6 addressing

	MAP/4rd-u	TB4/LW46
CPE IPv6 Prefix	Operator assigned	Operator Assigned
CPE IPv6 IID	Computed by CPE from MAP/4rd-u settings/well known	Locally Configured
CPE IPv4	Provisioned (MAP Option + IPv6, or only one of these, or other)	Provisioned (using DHCPv4)
CPE Port Range	Algorithmic Code-point	Explicit

- IPv6 <-> IPv4 / PSID relationship is for optimization of concentrator configuration state.
 - Its actual use is a deployment choice
- Explicit port ranges give deployment flexibility
 - Their actual use is a deployment choice

Proposal for converging specs

Avoid multiple CPE side specs for essentially the same solution

- All specs have a common use-case sweet spot, and then allow move to other use-cases.
- 1. Allow same CPE to be used and maximally compatible
 - Use IPv6 data plane with no new semantics
 - Provision NAT44...
- 2. Move towards common provisioning
 - All solutions require explicit CPE configuration
 - Define all DHCPv6 and DHCPv4, PCP methods or pick one?
- 3. Allow setting of explicit port-ranges or PSID
 - Explicit port range disables algorithmic mode
- The above allows LW46 and MAP to continue with no major changes, except having a common provisioning/dhcp draft(s)

Summary

- The solutions are based on the same principles: A+P
 - Major is in possibility to have optimization of configuration and forwarding
- Technically convergence of the solutions appears possible covering:
 - Address independence and mapping
 - Allowing for optimization cases (config state, mesh mode)
 - Compatibility/usability
 - Common provisioning method(s) – but how many do we need??
- Some usage scenarios appear better suited to be covered by core “stateful” solutions (DS-Lite, NAT64)
 - Eg Arbitrary port ranges
 - Dynamic port allocations