Framework for Multi-domain IPv6-only Underlay Network and IPv4 as a Service

draft-ietf-v6ops-framework-md-ipv6only-underlay

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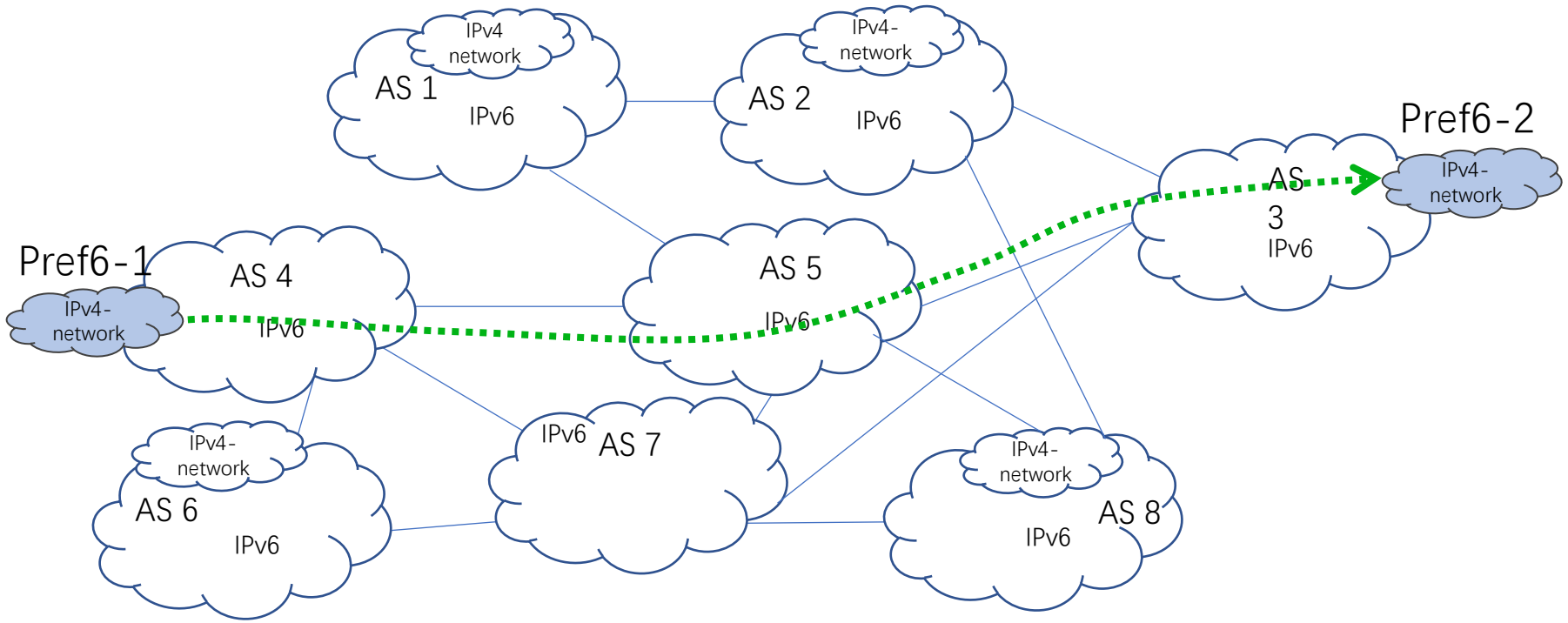
Overview

- This document illustrates a framework for building large scale IPv6-only network from the perspective of network operators.
- It proposes to efficiently support IPv4aaS based on stateless address mapping in multi-domain IPv6-only network.
- It is an informational document without any new protocol design. It was adopted in January 2023.

Framework at a glance



- Each PE is allocated at least one IPv6 mapping prefix (e.g., Pref-1, Pref-2).
- Address mapping rules are used to provide reachability of IPv4 addresses across IPv6-only networks.
- Both encapsulation and translation can used for IPv4aaS at the forwarding layer.

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Revisions made in version -08(1/2)

- The following scenario is added in section 3.
  - Scenario 4: IPv4 user to IPv6 server, i.e., IPv4-only user accesses IPv6 services hosted in data centers or other places.
- The illustration of ″user status″ is added in section 4.
  - ″User status″ refers to the address/port mapping relationship between different protocols formed during the conversion from IPv4 to IPv6,which is usually caused by a single IPv4 address being used by multiple IPv6 users.
- Section 6.4 is moved into section 6.1 so that readers know the overall procedure.
- It does not need coordination between different department or even different organizations. Mapping rule exchange between PEs in different ASes is solved through the extended MP-BGP protocol(draft-ietf-idr-mpbgp-extension-4map6).

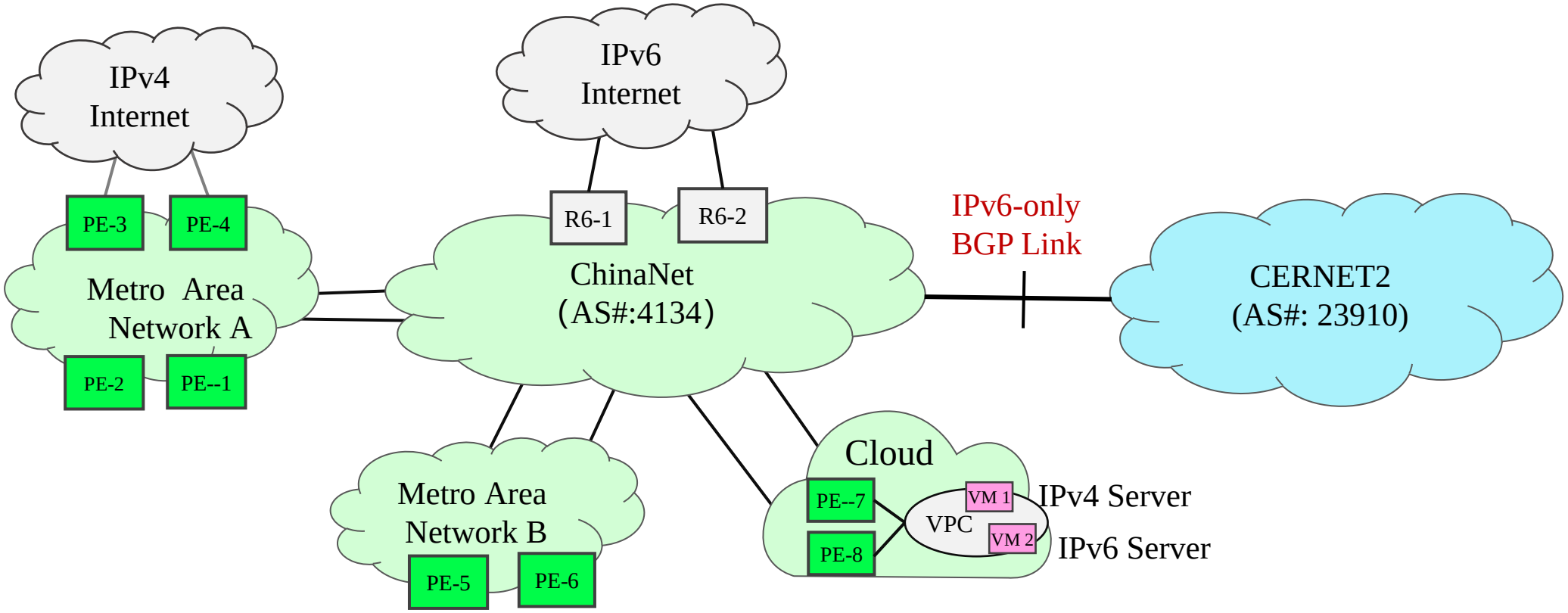
Revisions made in version -04(2/2)

- The section of 'IPv6 Mapping Prefix Allocation' has been changed by adding additional illustration for NSP(Network Specific Prefix).

Cons: Not found yet.	Cons: If the operator does not have a specific address prefix planning and policy configuration, in the case of operator-interworking, the same IPv4 address block will receive NSP prefixes from different operators, forming different IPv6 mapping routes. This may lead to an increase scale of the routing table in the IPv6 network, including FIB and RIB.

- Several editorial changes have been made.

Multi-domain IPv6-only Field Trial in Production Network



- It is compatible with existing techniques, such as 464XLAT.
- It can be extended to networks which consist of multiple ASes and are operated by different operators.

Acknowledgement for your comments

- Comments were received from Xipeng Xiao, Brian E. Carpenter, Jeffrey Haas, Bob Harold, Dhruv Dhody, Xipeng Xiao, Eduard Metz, Giuseppe Fioccola, Qin Wu, Shuping Peng, Zhenbin Li, Ron Bonica, Cheng Li, Vasilenko Eduard, Jingrong Xie, Aijun Wang, Dhruv Dhody，Nick Buraglio，Linda Dunbar，Guoliang Han，Weiqiang Cheng，Tianran Zhou，Huaimo Chen，etc.

Next Steps

- We think the document is stable and apply for LC in v6ops WG.
- Any new comments and suggestions are highly welcome.

Thank you !
Q&A