

Recommendation for Prefix Binding in the Softwire DS-Lite Context

draft-vinapamula-softwire-dslite-prefix-binding

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S. Vinapamula (sureshk@juniper.net)

M. Boucadair (mohamed.boucadair@orange.com)

Problem

- ISPs want to limit the usage of AFTR resources on per-subscriber basis for fair usage of resources
 - Examples of policies: Preserve external IPv4 address assigned in the AFTR, Port Quota, PCP mappings, etc.
 - These policies are used for dimensioning purposes and also to ensure that AFTR resources are not exhausted
 - Relying on the B4 address is not sufficient nor reliable (multiple softwires can be established, B4 address may change, etc.)
- When the B4 IPv6 address changes, associated mappings created in the AFTR are no more valid
 - Stale mappings hanging around in the system, consume not only system resources, but also reduce the available quota of resources per subscriber
 - Disruption in traffic for existing connections.
 - Maintaining these stale mapping may result in creation of new set of mappings
- When services are hosted behind B4 element, these services has to advertise about their change, when ever there is a change of the B4 address
 - Means to discover the change of B4 address are required
 - Needed to trigger updates to a rendez-vous server

Introducing Subscriber-Mask

- Subscriber-Mask is an AFTR system-wide configuration parameter
- Subscriber-Mask is an integer that indicates the length of significant bits to be applied on the source IPv6 address (internal side) to identify a prefix also subscriber
 - Generic per-subscriber policies are applied based on the Prefix
 - Does not require to configure every subscriber prefix
- Subscriber-Mask must be configurable
 - Default value is 56

Recommendations (1)

- A policy SHOULD be enforced at the AFTR to limit the amount of active softwires per subscriber
 - The default value is 1
- Resource contexts created at the AFTR level SHOULD be based on the Prefix derived through Subscriber-Mask and B4 address, and not based on the full B4 address
 - Administrators SHOULD configure per-subscriber limits of resource usage, instead of per-tunnel limits
 - These resources include, number of flows, maximum authorized mappings including PCP, NAT pool resources, etc.

Recommendations (2)

- If a new IPv6 address is assigned to B4, the AFTR SHOULD migrate existing state to be bound to the new B4's IP address
 - This ensures the traffic destined to the previous IPv6 address will be redirected to the new IPv6 address
 - The destination address for the encapsulated return traffic SHOULD be the last seen address from the CPE (i.e., matching the same Prefix)
- *Justifications*
 - *Avoid stale mappings*
 - *Ensure sessions continuity*

Recommendation (3)

- In the event of change of the CPE WAN IPv6 prefix, unsolicited PCP ANNOUNCE messages SHOULD be sent by the B4 element to internal hosts to update their mappings
 - *This is valid for PCP-enabled CPEs*
 - *Justifications:*
 - *Allows internal PCP clients to update their mappings with the new B4 IPv6 address*
 - *Trigger updates to rendez-vous server (e.g., dyndns)*

Recommendation (4)

- When a new prefix is assigned to the CPE, stale mappings may exist in the AFTR. To avoid such issues, stable IPv6 prefix assignments are **RECOMMENDED**
 - *Justification: Stable prefix assignment allows to avoid consuming both implicit and explicit resources*

Recommendations (5)

- In case for any reason an IPv6 prefix has to be reassigned, it is RECOMMENDED to reassign a prefix only when all the resources in use associated with that prefix are cleared from the AFTR
 - *Justification: Avoid to redirect traffic of the old owner of the prefix to the new owner of that prefix*

Recommendations (6)

- Anti-spoofing filters have to be installed to protect AFTR from receiving spoofed packets, by rogue subscribers, sourced with B4 addresses derived from a prefix that are not assigned to them.
 - *Justification: Protecting AFTR from DoS, for genuine subscribers.*

Changes since Last IETF

- Change Prefix-Mask to Subscriber-Mask because this was confusing
- Define the concept of Subscriber-Mask
- Add an example on how Subscriber-Mask can be used
- Recommendation 6
- And other edits

Next Step

- This short document provides a set of recommendations aiming to:
 - Enhance the serviceability of DS-Lite
 - Ease AFTR resources management
 - Enforce generic per-subscriber policies without requiring explicit configuration of every CPE IPv6 prefix to the AFTR, nor any additional interfaces (e.g., RADIUS)
- This is a missing piece work
- Request adoption