Customer Edge Identification Algorithm

This application describes a mechanism for identifying the edge of a customer network using IPv6 Prefix Delegation.

As subscribers deploy more complicated home networks, there is a need to identify the boundary of the network. This boundary identification helps routers determine where to implement firewalls and NAT, where to terminate tunnels in an overlay network, when a back-up connection is available, etc.

Our application is an algorithm to determine the customer edge based on address assignment. Using standard provisioning mechanisms (RFC 6204), the router obtains both an address on its WAN interface (IA_NA) and a delegated prefix for its LAN interface(s) (IA_PD). The router compares the two addresses. If the first 48 bits of the IA_NA and IA_PD are different, the router identifies the prefix as an "external prefix" and itself as the Customer Edge Router (CER). If the first 48 bits are the same, the router identifies the prefix as an "internal prefix" and itself as an Internal Router (IR).

This mechanism can be used alone or in conjunction with other CER Identification mechanisms such as the DHCPv6 CER_ID option. Our invention has the advantage of working even in cases where home routers do not support the CER_ID option.

There are also other cases in which it is informative to understand and identify internal vs. external prefixes, which this invention allows.

Wwe recognized the need to determine the edge of a customer network e.g. for firewall placement, overlay tunnel termination, IPv4 NAT, etc. One contemplated option is to use a CER_ID option that could be distributed via DHCPv6. One limitation to that approach is that all routers need to support the option, or some internal routers downstream of the non-supporting router might identify themselves as the CER. While the behavior of a router that does not support this invention is indeterminate, all supporting routers in the home (including those behind the non-supporting router) will correctly identify themselves as either the CER or an IR.

There is no solution in existing routers. One idea we are pursuing is a DHCP-based CER_ID option. While it will correctly identify the customer edge, if there is a router in the network that does not propagate the option, downstream routers will incorrectly identify themselves as the CER. This current invention is likely to be implemented alone or along side the CER_ID option.