Abstract

This document specifies the HIP BONE instance specification for RELOAD. It provides the details needed to build a RELOAD-based
overlay that uses HIP.

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1. Introduction

The HIP BONE (Host Identify Protocol-Based Overlay Networking Environment) specification [I-D.ietf-hip-bone] provides a high-level framework for building HIP-based [RFC5201] overlays. The HIP BONE framework leaves the specification of the details on how to combine a particular peer protocol with HIP to build an overlay up to documents referred to as HIP BONE instance specifications. A HIP BONE instance specification needs to define, minimally:

- the peer protocol to be used
- how to transform the peer IDs used by the peer protocol into the ORCHIDs (Overlay Routable Cryptographic Hash Identifiers) [RFC4843] that will be used in HIP
- which peer protocol primitives trigger HIP messages

This document addresses all the previous items and provides additional details needed to build RELOAD-based HIP BONEs.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

3. Peer Protocol

The peer protocol to be used is RELOAD, which is specified in [I-D.ietf-p2psip-base]. When used with RELOAD, HIP takes the role of the RELOAD's Forwarding and Link Management Layer (described in Section 5.5. of [I-D.ietf-p2psip-base]). The RELOAD HIP BONE instance provides to the applications the RELOAD Messaging API.

4. Peer ID to ORCHID Transformation

RELOAD uses 128 bit peer IDs called Node-IDs. Since HIP uses 128 bit ORCHIDs, peer's ORCHID can be used as such as the RELOAD Node-ID.

5. Mapping between Protocol Primitives and HIP Messages

The Attach procedure in RELOAD establishes a connection between two peers. This procedure is performed using the AttachReq and AttachAns messages. When HIP is used, the Attach procedure is performed by using a HIP base exchange. That is, peers send HIP I1 messages
instead of RELOAD AttachReq messages.

The RELOAD AttachLite procedure is used for the same purpose as the Attach procedure in scenarios with no NATs. When HIP is used, the AttachLite procedure is also performed by using a HIP base exchange. That is, peers send HIP I1 messages instead of RELOAD AttachLiteReq messages.

All other RELOAD messages are sent as such between the peers using the paths set up by HIP.

6. Routing HIP Messages via the Overlay

If a host has no valid locator for the receiver of a new HIP packet, and the receiver is part of a RELOAD HIP BONE overlay the host is participating in, the host can send the HIP packet to the receiver using the overlay routing.

When sending a HIP packet via the overlay, the host MUST add an empty ROUTE_VIA parameter [I-D.ietf-camarillo-hip-via] to the packet with the SYMMETRIC flag set and with an OVERLAY_ID parameter (see Section 7) containing the identifier of the right overlay network. Host consults the RELOAD Topology Plugin for the next hop and sends the HIP packet to that host.

An intermediate host receiving a HIP packet with the OVERLAY_ID parameter checks if it is participating in that overlay, and drops packets sent to unknown overlays. If the host is not the final destination of the packet (i.e., the HIP header's receiver's HIT does not match to any of its HITs), it checks if the packet contains a ROUTE_DST parameter. Such packets are forwarded to the next hop as specified in [I-D.ietf-camarillo-hip-via]. Otherwise, the host finds the next hop from the RELOAD Topology Plugin and forwards the packet there. The host MUST add the HIT it uses on the HIP association with the next hop host to the end of the ROUTE_VIA parameter, if present.

When the final destination host receives the HIP packet, the host processes it as specified in [RFC5201]. If the HIP packet generates a response, the response is routed back on the same path using ROUTE_DST parameter as specified in [I-D.ietf-camarillo-hip-via].
7. Packet Formats

```
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type | Length |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Identifier |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

<table>
<thead>
<tr>
<th>Type</th>
<th>[ TBD by IANA: 980 ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>4</td>
</tr>
<tr>
<td>Identifier</td>
<td>32 bit identifier for the overlay</td>
</tr>
</tbody>
</table>

Figure 1: Format of the OVERLAY_ID parameter

Figure 1 shows the format of a new HIP parameter used for identifying the right overlay if a host participates in multiple overlay networks. For RELOAD HIP BONE overlay networks, the identifier is calculated as defined in Section 5.3.2 of [I-D.ietf-p2psip-base].

8. NAT Traversal

RELOAD relies on the Forwarding and Link Management Layer providing NAT traversal capabilities. Thus, the RELOAD HIP BONE instance implementation MUST implement [I-D.ietf-hip-nat-traversal] or some other reliable NAT traversal mechanism.

HIP relay servers are not generally needed with this HIP BONE instance since the overlay network can be used for relaying the Base Exchange and further HIP signaling can be done directly between the peers.

9. Security Considerations

TBD.

10. IANA Considerations

This section is to be interpreted according to [RFC5226].

This document updates the IANA Registry for HIP Parameter Types [RFC5201] by assigning new HIP Parameter Type value for the new HIP Parameter OVERLAY_ID (defined in Section 7).
11. Normative References


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