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Endpoint Identifier Destination Option

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Abstract

This document describes a Destination Option that is used to convey topologically independent endpoint identification information between source and destination endpoints in either IPv4 or IPv6 packets. The general format of Destination Options are described in [5]. The Nimrod Routing System [1] will make use of this option to convey Nimrod EIDs.

1 Introduction

Nimrod is a scalable internetwork routing architecture [1,2,3]. The Nimrod architecture is designed to accommodate an internetwork of arbitrary size, with heterogeneous service requirements and restrictions, and to admit incremental deployment throughout an internetwork. The key to Nimrod's scalability is its ability to represent and manipulate routing-related information at multiple

levels of abstraction.

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To do this efficiently, Nimrod separates the identification of communicating entities (endpoints, or "hosts") from any topological location information. Endpoint Identifiers (EIDs) are used to specify and uniquely identify endpoints connected to the network. Information about the topological location of an endpoint in an internetwork is given by a locator. An endpoint's locator may change as the network topology changes. Ongoing communication is not disrupted when a locator changes since the communicating endpoints are identified by their EIDs and not their locators.

The mapping from an endpoint name to an EID and set of locators will be stored in the existing DNS system as two additional RRs [4] under the Domain Name of the endpoint. This document describes how the Source and Destination EIDs are communicated in IP packets using the Destination Options Extension Header.

A Nimrod EID is a short binary identifier for an endpoint of a communication (e.g., a host) and has no structure or significance to the routing system other than global uniqueness. An endpoint can retain the same EID forever, no matter where in the network it is located.

2 Definition of the Endpoint Identifier Option

The Endpoint Identifier Option is contained in the Destinations Options Extension Header (type 60) of an IPv4 or IPv6 packet. An endpoint identifier may be of variable length and is not restricted to the format used by Nimrod. This document specifies the encoding for 8-octet Nimrod EIDs, which results in an option containing twenty (20) octets. The alignment requirement for the encoding specified herein is 8n. Subsequent versions of this document may specify encodings for endpoint identifiers of other lengths or formats.

Implementations are expected to verify that the Opt Data Len field contains 18 and that the Src and Dst Len fields contain 8 when using the following encoding.

```

+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| Option Type | Opt Data Len |   Src Len   |   Dst Len   |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| 0 0 1 0 0   |                                     |
+---+                                     +---+
|                                     |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
| 0 0 1 0 0   |                                     |
+---+                                     +---+
                                     Destination EID

```

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Option Type	<p>8-bit selector. The value <TBD> is used for the 5 least-significant bits of the Endpoint Identifier Option.</p> <p>The two most significant bits of the Option Type may vary from instance to instance. The value 00 should not be used. An endpoint may use other values as it deems appropriate to indicate whether or not an ICMP error message should be returned. See [5].</p> <p>Since endpoint identifiers do not change en-route, the third most significant bit should be zero.</p>
Opt Data Len	8-bit unsigned integer. The length, in octets, of the endpoint identification data in the Source and Destination EID fields.
Src Len	8-bit unsigned integer. The length, in octets, of the endpoint identifier in the Source EID field.
Dst Len	8-bit unsigned integer. The length, in octets, of the endpoint identifier in the Destination EID field.
Source EID	The endpoint identifier of the source. Nimrod EIDs begin with the five bits 00100. Other formats may be defined in subsequent versions of this document.
Destination EID	The endpoint identifier of the destination. Nimrod EIDs begin with the five bits 00100. Other formats may be defined in subsequent versions of this document.

3 Option Processing

The endpoint identifiers specified in the Endpoint Identifier Option are used to perform demultiplexing of IP packets at the transport layer. The Source EID field replaces the Source IP Address, and the Destination EID replaces the Destination IP Address, when identifying transport layer associations. They are also used in any pseudo headers [5,6,7] that are included in transport layer checksums.

The Endpoint Identifier Option need not appear in every packet.

When the communicating peers retain state information, as is the case for connection oriented transports such as TCP [7], or the

packets are part of an IPv6 Flow [5], the endpoint identifiers should be retained as part of the communication state, and thus their presence in subsequent packets is optional. Note that the option should not be omitted until the sending endpoint has received notification from its communication peer(s) indicating that they have received the identification information. For example, the ACK of a TCP SYN is sufficient notification in the case of TCP [7]. The endpoint identifiers are included in any pseudo header even when they are not present in a given packet.

4 Security Considerations

In order to detect spoofing, packets that contain the Endpoint Identifier Option should be protected by an authentication and integrity mechanism.

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6 References

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