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B. Liang
Tsinghua University
Y. Xiang
Yunshan Networks

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Provenance Identifier TCP Option
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Abstract

This document describes a TCP option that carries a Provenance Identifier (ProvID) to enable correlation of TCP connections when transport-layer identifiers change along the path.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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1. Introduction

Transport connections in operator-managed network domains often traverse elements such as NATs, and service proxies. These devices commonly rewrite transport-layer identifiers or terminate and originate new TCP connections. As a result, what is logically a single communication between two workloads frequently appears as a series of distinct TCP connections.

These transformations break provenance continuity. Observations of TCP traffic at different points in the domain cannot reliably be associated with the same logical flow, and operators cannot determine which workload instance originally initiated a connection once rewriting has occurred.

This document defines an experimental TCP option that carries a small Provenance Identifier (ProvID). A ProvID is a compact value generated at connection initiation using workload-scoped attributes, such as host IP with process ID. The ProvID enables provenance correlation across rewriting boundaries within the domain.

The ProvID option is intended for operator-managed environments such as cloud platforms, enterprise networks, and data centers.

1.1. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

2. Option Format

The Provenance Identifier (ProvID) option uses a fixed-length experimental TCP option format. The option is identified by the experimental option kind and is distinguished by a fixed option length.

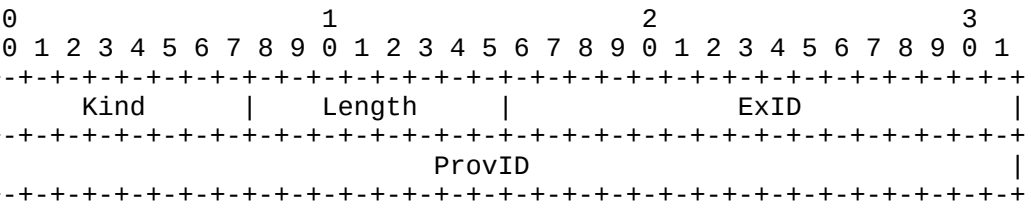

Figure 1: ProvID TCP Option Format

Kind
: The TCP option kind. The value of this field is 253.

Length
: The total length of the TCP option in bytes. For the ProvID option defined in this document, the value of this field is 12.

ExID
: The Experiment Identifier (ExID). This 2-byte field identifies the ProvID experiment when used with experimental TCP option kinds. The value of this field is 0xDEE9.

ProvID
: The Provenance Identifier. This field is 8 bytes in length and carries a provenance identifier defined by the sender.

3. IANA Considerations

This document’s IANA considerations are to be determined and will be provided in a subsequent revision of this draft. [TODO]

4. Security Considerations

This document’s security considerations are to be determined and will be provided in a subsequent revision of this draft. [TODO]

5. References

5.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

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[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

[RFC9293] Eddy, W., Ed., "Transmission Control Protocol (TCP)", STD 7, RFC 9293, DOI 10.17487/RFC9293, August 2022, <https://www.rfc-editor.org/info/rfc9293>.

5.2. Informative References

[draft-ietf-tcpm-ack-rate-request-10] Gomez, C. and J. Crowcroft, "ACK Rate Request", December 2025, <https://datatracker.ietf.org/doc/html/draft-ietf-tcpm-ack-rate-request-10>.

Appendix A. Appendix 1

TODO

Authors' Addresses

Bowen Liang
Tsinghua University
Email: liangbw25@mails.tsinghua.edu.cn

Yang Xiang
Yunshan Networks
Email: xiangyang@yunshan.net