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Signaling Prefix Origin Validation Results from a Route-Server to Peers
draft-ietf-sidrops-route-server-rpki-light-00

Abstract

This document defines the usage of the BGP Prefix Origin Validation State Extended Community [I-D.ietf-sidr-origin-validation-signaling] to signal prefix origin validation results from a route-server to its peers. Upon reception of prefix origin validation results peers can use this information in their local routing decision process.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in [RFC2119] only when they appear in all upper case. They may also appear in lower or mixed case as English words, without normative meaning.

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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This Internet-Draft will expire on July 17, 2017.

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1. Introduction

RPKI-based prefix origin validation [RFC6480] can be a significant operational burden for BGP peers to implement and adopt. In order to boost acceptance and usage of prefix origin validation and ultimately increase the security of the Internet routing system, IXPs may provide RPKI-based prefix origin validation at the route-server [I-D.ietf-idr-ix-bgp-route-server]. The result of this prefix origin validation is signaled to peers by using the BGP Prefix Origin

Validation State Extended Community as introduced in [I-D.ietf-sidr-origin-validation-signaling].

Peers receiving the prefix origin validation result from the route-server(s) can use this information in their local routing decision

process for acceptance, rejection, preference, or other traffic engineering purposes of a particular route.

2. Signaling Prefix Origin Validation Results from a Route-Server to Peers

The BGP Prefix Origin Validation State Extended Community (as defined in [I-D.ietf-sidr-origin-validation-signaling]) is utilized for signaling prefix origin validation result from a route-server to peers.

[I-D.ietf-sidr-origin-validation-signaling] proposes an encoding of the prefix origin validation result [RFC6811] as follows:

Value	Meaning
0	Valid
1	Not found
2	Invalid

Table 1

This encoding is re-used. Route-servers providing RPKI-based prefix origin validation set the validation state according to the prefix origin validation result (see [RFC6811]).

3. Operational Recommendations

3.1. Local Routing Decision Process

A peer receiving prefix origin validation results from the route server MAY use the information in its own local routing decision process. The local routing decision process SHOULD apply to the rules as described in section 5 [RFC6811].

A peer receiving a prefix origin validation result from the route server MAY redistribute this information within its own AS.

3.2. Route-Server Receiving the BGP Prefix Origin Validation State Extended Community

An IXP route-server receiving routes from its peers containing the BGP Prefix Origin Validation State Extended Community MUST remove the extended community before the route is re-distributed to its peers. This is required regardless of whether the route-server is executing prefix origin validation or not.

Failure to do so would allow opportunistic peers to advertise routes tagged with arbitrary prefix origin validation results via a route-server, influencing maliciously the decision process of other route-server peers.

3.3. Information about Validity of a BGP Prefix Origin Not Available at a Route-Server

In case information about the validity of a BGP prefix origin is not available at the route-server (e.g., error in the ROA cache, CPU overload) the route-server MUST NOT add the BGP Prefix Origin Validation State Extended Community to the route.

3.4. Error Handling at Peers

A route sent by a route-server SHOULD only contain none or one BGP Prefix Origin Validation State Extended Community.

A peer receiving a route from a route-server containing more than one BGP Prefix Origin Validation State Extended Community SHOULD only consider the largest value (as described in Table 1) in the validation result field and disregard the other values. Values larger than two in the validation result field MUST be disregarded.

4. IANA Considerations

None.

5. Security Considerations

A route-server could be misused to spread malicious prefix origin validation results. However, peers have to trust the route-server anyway as it collects and redistributes BGP routing information to other peers.

To countermeasure DDoS attacks, it is widespread to provide blackholing services at IXPs (see RFC 7999 [RFC7999]). Peers are using blackholing to drop traffic, typically by announcing smaller subnets, which are unter attack. Assuming, for practical reasons, peers will not reflect these announcements in their ROAs. In such situations, the RPKI validation status for a prefixes, providing a ROA, would be "Invalid". Given that other peers evaluating the RPKI status, this leads to a degradation of prefixes being blackholed. It's recommended that peers validating the RPKI status use a adopted classification for such prefixes.

The introduction of a mechanisms described in this document does not pose a new class of attack vectors to the relationship between route-servers and peers.

6. References

6.1. 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, <http://www.rfc-editor.org/info/rfc2119>.

[RFC4360] Sangli, S., Tappan, D., and Y. Rekhter, "BGP Extended Communities Attribute", RFC 4360, DOI 10.17487/RFC4360, February 2006, <http://www.rfc-editor.org/info/rfc4360>.

[RFC6811] Mohapatra, P., Scudder, J., Ward, D., Bush, R., and R. Austein, "BGP Prefix Origin Validation", RFC 6811, DOI 10.17487/RFC6811, January 2013, <http://www.rfc-editor.org/info/rfc6811>.

[RFC7999] King, T., Dietzel, C., Snijders, J., Doering, G., and G. Hankins, "BLACKHOLE Community", RFC 7999, DOI 10.17487/RFC7999, October 2016, <http://www.rfc-editor.org/info/rfc7999>.

6.2. Informative References

[I-D.ietf-idr-ix-bgp-route-server]
Jasinska, E., Hilliard, N., Raszuk, R., and N. Bakker, "Internet Exchange BGP Route Server", draft-ietf-idr-ix-bgp-route-server-12 (work in progress), June 2016.

[I-D.ietf-sidr-origin-validation-signaling]
Mohapatra, P., Patel, K., Scudder, J., Ward, D., and R. Bush, "BGP Prefix Origin Validation State Extended Community", draft-ietf-sidr-origin-validation-signaling-07 (work in progress), November 2015.

[RFC6480] Lepinski, M. and S. Kent, "An Infrastructure to Support Secure Internet Routing", RFC 6480, DOI 10.17487/RFC6480, February 2012, <http://www.rfc-editor.org/info/rfc6480>.

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