Abstract

This document provides an implementation report for RPKI Router protocol as defined in [I-D.ietf-sidr-rpki-rtr]. The editor did not verify the accuracy of the information provided by respondents or by any alternative means. The respondents are experts with the implementations they reported on, and their responses are considered authoritative for the implementations for which their responses represent.

Requirements Language

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].

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 5, 2012.

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1. Introduction

In order to formally validate the origin ASs of BGP announcements, routers need a simple but reliable mechanism to receive RPKI [I-D.ietf-sidr-rpki-rtr] prefix origin data from a trusted cache. The RPKI Router protocol defined in [I-D.ietf-sidr-rpki-rtr] provides a mechanism to deliver validated prefix origin data to routers.

This document provides an implementation report for the RPKI Router protocol as defined in [I-D.ietf-sidr-rpki-rtr].

The editor did not verify the accuracy of the information provided by respondents or by any alternative means. The respondents are experts with the implementations they reported on, and their responses are considered authoritative for the implementations for which their responses represent.

2. Implementation Forms

Contact and implementation information for person filling out this form:

Name: Keyur Patel, Email: keyupate@cisco.com, Vendor: Cisco Systems, Inc. Release: IOS

Name: Forhad Ahmed, Email: foarhad@cisco.com, Vendor: Cisco Systems, Inc. Release: IOS-XR

Name: Hannes Gredler, Email: hannes@juniper.net, Vendor: Juniper Networks, Inc., Release: JUNOS

Name: Rob Austein, Email: sra@hactrn.net, Vendor: rpki.net project, Release: N/A

Name: Tim Bruijnzeels, Email: tim@ripe.net, Vendor: RIPE NCC Release: RIPE NCC validator-app 2.0.0 https://certification.ripe.net/content/public-repo/releases/net/ripe/rpki-validator/rpki-validator-app/2.0.0/rpki-validator-app-2.0.0-bin.zip

3. Protocol PDUs

Does the implementation support receive side functionality Sec.5.1. of [I-D.ietf-sidr-rpki-rtr] Serial Notify PDU?

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support send side functionality for Sec.5.1. of [I-D.ietf-sidr-rpki-rtr] Serial Notify PDU?
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support receive side functionality for Sec.5.2. of [I-D.ietf-sidr-rpki-rtr] Serial Query PDU?
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support send side functionality for Sec.5.2. of [I-D.ietf-sidr-rpki-rtr] Serial Query PDU?
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support receive side functionality for
Sec.5.3. of [I-D.ietf-sidr-rpki-rtr] Reset Query PDU?

Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support send side functionality for Sec.5.3. of [I-D.ietf-sidr-rpki-rtr] Reset Query PDU?

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support receive side functionality for Sec.5.4. of [I-D.ietf-sidr-rpki-rtr] Cache Response PDU?

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support send side functionality for Sec.5.4. of [I-D.ietf-sidr-rpki-rtr] Cache Response PDU?

Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support receive side functionality for Sec.5.5. of [I-D.ietf-sidr-rpki-rtr] IPv4 Prefix PDU?

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support send side functionality for Sec.5.5. of [I-D.ietf-sidr-rpki-rtr] IPv4 Prefix PDU?

Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support receive side functionality for Sec.5.6. of [I-D.ietf-sidr-rpki-rtr] IPv6 Prefix PDU?

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support send side functionality for Sec.5.6. of [I-D.ietf-sidr-rpki-rtr] IPv6 Prefix PDU?

Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support receive side functionality for Sec.5.7. of [I-D.ietf-sidr-rpki-rtr] End Of Data PDU?
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support send side functionality for Sec.5.7. of [I-D.ietf-sidr-rpki-rtr] End Of Data PDU?
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support receive side functionality for Sec.5.8. of [I-D.ietf-sidr-rpki-rtr] Cache Reset PDU?
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: UNIT TEST

Does the implementation support send side functionality for Sec.5.8. of [I-D.ietf-sidr-rpki-rtr] Cache Reset PDU?
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support send side functionality for Sec.5.9. of [I-D.ietf-sidr-rpki-rtr] Error Report PDU?

Cisco IOS: YES
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Does the implementation support receive side functionality for Sec.5.9. of [I-D.ietf-sidr-rpki-rtr] Error Report PDU?

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO, Error PDU gets silently ignored
rpki.net: YES
RIPE: YES

4. Protocol Sequence

Does RPKI Router protocol implementation follow the four protocol sequences as outlined in Section 6 of [I-D.ietf-sidr-rpki-rtr]?

Start or Restart Sequence

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS:YES
rpki.net: YES
RIPE: YES

Typical Exchange
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS:YES
rpki.net: YES
RIPE: NO, we always respond as described in 6.3

Generation of Incremental Updates Sequence
Cisco IOS: No
Cisco IOS-XR: No
Juniper JUNOS: NO
rpki.net: YES
RIPE: NO

Receipt of Incremental Updates Sequence
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS:YES
rpki.net: YES
RIPE: NO

Generation of Cache has No data Sequence
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

5. Protocol Transport

Does RPKI Router protocol implementation support different protocol transport mechanism outlined in Section 7 of [I-D.ietf-sidr-rpki-rtr]?

SSH Transport
Cisco IOS: NO
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: NO

TLS Transport
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: NO
RIPE: NO

TCP Transport
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: YES
TCP-MD5 Transport
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: NO
RIPE: NO

TCP-AO Transport
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: NO
RIPE: NO

6. Error Codes

Does RPKI Router protocol implementation support different protocol error codes outlined in Section 10 of [I-D.ietf-sidr-rpki-rtr]? 

Receiving Error Code 1
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES

Sending Error Code 1
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES
Receiving Error Code 2
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: N/A
Sending Error Code 2
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES
Receiving Error Code 3
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: N/A
Sending Error Code 3
Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: NO
rpki.net: NO
RIPE: YES
Receiving Error Code 4
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES
Sending Error Code 4
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: NO
RIPE: YES
Receiving Error Code 5
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: NO
rpki.net: YES
RIPE: YES
Sending Error Code 5
Cisco IOS: YES
Cisco IOS-XR: YES
Juniper:

rpki.net: NO

RIPE: YES

Receiving Error Code 6

Cisco IOS: NO

Cisco IOS-XR: NO

Juniper JUNOS: NO

rpki.net: YES

RIPE: YES, but... fatal, so connection is dropped, but cache does not conclude it’s inconsistent

Sending Error Code 6

Cisco IOS: YES

Cisco IOS-XR: YES

Juniper JUNOS: NO

rpki.net: NO

RIPE: N/A

Receiving Error Code 7

Cisco IOS: NO

Cisco IOS-XR: No

Juniper JUNOS: NO

rpki.net: YES

RIPE: YES, but... fatal, so connection is dropped, but cache does not conclude it’s inconsistent

Sending Error Code 7

Cisco IOS: YES
7. Incremental Updates Support

RPKI Router protocol does support Incremental Updates defined in section 4 of [I-D.ietf-sidr-rpki-rtr].

Cisco IOS: NO
Cisco IOS-XR: NO
Juniper JUNOS: YES, (Receive side support)
rpki.net: YES
RIPE: NO

8. Session ID Support

Session ID is used to indicate that the cache server may have restarted and that the incremental restart may not be possible.

Does RPKI Router protocol implementation support Session ID procedures outlined in Section 5.10 of [I-D.ietf-sidr-rpki-rtr]?

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: NO, using random, but will FIX

9. Incremental Session Startup Support

RPKI Router protocol does support Incremental session startups with Serial Number and Session ID defined in the protocol. Does RPKI
Router protocol implementation support Incremental Session Startup Support as defined in section 5.10 of [I-D.ietf-sidr-rpki-rtr].

Cisco IOS: YES
Cisco IOS-XR: YES
Juniper JUNOS: YES
rpki.net: YES
RIPE: NO

10. Interoperable Implementations

List other implementations that you have tested interoperability of RPKI Router Implementation.

11. Cisco Implementation

Cisco: The Cisco IOS and IOS-XR implementation should be interoperable with other vendor RPKI Router Protocol implementations. In particular we have tested our interoperability with rpki.net’s RPKI Router implementation.

12. Juniper Implementation

Juniper: The Juniper Networks, Inc. JUNOS implementation should be interoperable with other vendor RPKI Router Protocol implementations. In particular we have tested our interoperability with rpki.net’s and RIPEs RPKI Router Cache implementation.

13. rpki.net Implementation

rpki.net: The rpki.net implementation should operate with other rpki-rtr implementations. In particular, we have tested our interoperability with Cisco IOS, Cisco IOS-XR, and Juniper.

14. RIPE NCC Implementation

RIPE NCC: The RIPE NCC validator has been tested by us with other rpki-rtr implementations. In particular we have tested with RTRLib and CISCO IOS. We received positive feedback from close contacts
15. IANA Considerations

This document makes no request of IANA.

Note to RFC Editor: this section may be removed on publication as an RFC.

16. Security considerations

No new security issues are introduced to the RPKI Router protocol defined in [I-D.ietf-sidr-rpki-rtr].

17. Acknowledgements

TBD....

18. Normative References


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