

Network Working Group
Internet-Draft
Intended status: Informational
Expires: 5 April 2026

T. Bruijnzeels
T. de Kock
RIPE NCC
O. Borchert
NIST
D. Ma
ZDNS
2 October 2025

Human Readable Validate ROA Payload Notation
draft-ietf-sidrops-vrp-notation-04

Abstract

This document defines a human readable notation for Validated ROA Payloads (VRP, RFC 6811) based on ABNF (RFC 5234) for use with RPKI tooling and documentation.

Status of This Memo

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

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <https://datatracker.ietf.org/drafts/current/>.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

This Internet-Draft will expire on 5 April 2026.

Copyright Notice

Copyright (c) 2025 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<https://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Revised BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Revised BSD License.

Table of Contents

1. Requirements notation	2
2. Introduction	2
3. VRP Notation Definition	3
3.1. roa-prefix	3
3.2. origin-asn	4
4. Example Notations	4
5. IANA Considerations	4
6. Security Considerations	4
7. Acknowledgements	4
8. Normative References	4
Authors' Addresses	5

1. Requirements notation

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. Introduction

This informational document defines a human readable notation for Validated ROA Payloads (VRPs) [RFC6811].

We provide this notation because it can help to create consistency between RPKI Relying Party software output, making it easier for operators to compare results. It can also be used by RPKI Certificate Authorities (CA) command line interfaces and/or configuration. E.g. allowing a CA to provide a listing of intended VRPs which can be easily compared to RP output. Our final goal is that this will be helpful for documentation.

The chosen notation style can be read from left to right to mean that the holder of the prefix (and optional max length) on the left authorises announcements by the ASN on the right.

That said, this document is informational. Implementations can choose to use their own notation styles instead of, or in addition to this.

3. VRP Notation Definition

This specification uses ABNF syntax specified in [RFC5234].

```

notation      = vrp-prefix separator origin-asn
vrp-prefix    = v4-vrp-prefix / v6-vrp-prefix

v4-vrp-prefix = v4-cidr ["-" v4-max-length]
v4-cidr       = v4-address "/" v4-pfx-length
v4-address    = v4-byte "." v4-byte "." v4-byte "." v4-byte
v4-byte       = %d0-255
v4-pfx-length = %d0-32
v4-max-length = %d0-32

v6-vrp-prefix = v6-cidr ["-" v6-max-length]
v6-cidr       = v6-address "/" v6-pfx-length
v6-address    = (v6-un / v6-no-0 / v6-l-0 / v6-m-0 / v6-t-0)
v6-un         = "::"
v6-no-0       = v6-bytes 7*7(":" v6-bytes)
v6-l-0        = ":" 1*7(":" v6-bytes)
v6-m-0        = 1*6(v6-bytes ":" ) ":" 1*6(":" v6-bytes)
v6-t-0        = 1*7(v6-bytes ":" ) ":"
v6-bytes      = %x0-FFFF
v6-pfx-length = %d0-128
v6-max-length = %d0-128

separator     = " => "

origin-asn    = "AS" uint32
uint32        = %d0-4294967295

```

3.1. roa-prefix

This field denotes a single Validated ROA Prefix (VRP) as defined in section 2 of [RFC6811]. VRPs consist of either an IPv4 or an IPv6 prefix using CIDR prefix notation, optionally followed by a max-length value.

Unfortunately we could not find pre-existing formal ABNF syntax specifications for IPv4 and IPv6 CIDR prefix notation. The fairly basic specifications defined above cover the notation of valid CIDR prefixes, but it should be noted that they also allow for the notation of invalid IPv6 addresses, and allow for prefix length values that are not applicable to the base IP address. Rather than

trying to define these rules in detail here we refer to section 3.1 of [RFC4632] for guidelines on IPv4 CIDR notation and section 2.3 of [RFC4291] for IPv6.

If the max-length is specified then its value needs to be the same as or longer than the length of the prefix within the bounds applicable to the address family of the prefix. If it is omitted then the effective max-length for the VRP will be the same as the VPR prefix length.

3.2. origin-asn

This field consists of the string "AS" followed by a decimal value of a 32-bit Autonomous System Number using the asplain presentation as specified in [RFC5396]. Decimal values MUST represent a 32 bit value, and therefore MUST be part of the range 0-4294967295.

4. Example Notations

```
192.0.2.0/24 => AS65000
192.0.2.0/24-24 => AS65000
192.0.2.0/24-32 => AS65000
192.0.2.0/32 => AS65000

2001:db8::/32 => AS65000
2001:db8::/32-32 => AS65000
2001:db8::/32-128 => AS65000
2001:db8::/128 => AS65000
```

5. IANA Considerations

This document has no IANA actions.

6. Security Considerations

TBD

7. Acknowledgements

Thanks to Nan Geng for the editorial feedback. Thanks to Randy Bush for suggesting to allow only one possible notation for AS numbers.

8. 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>>.

- [RFC4291] Hinden, R. and S. Deering, "IP Version 6 Addressing Architecture", RFC 4291, DOI 10.17487/RFC4291, February 2006, <<https://www.rfc-editor.org/info/rfc4291>>.
- [RFC4632] Fuller, V. and T. Li, "Classless Inter-domain Routing (CIDR): The Internet Address Assignment and Aggregation Plan", BCP 122, RFC 4632, DOI 10.17487/RFC4632, August 2006, <<https://www.rfc-editor.org/info/rfc4632>>.
- [RFC5234] Crocker, D., Ed. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", STD 68, RFC 5234, DOI 10.17487/RFC5234, January 2008, <<https://www.rfc-editor.org/info/rfc5234>>.
- [RFC5396] Huston, G. and G. Michaelson, "Textual Representation of Autonomous System (AS) Numbers", RFC 5396, DOI 10.17487/RFC5396, December 2008, <<https://www.rfc-editor.org/info/rfc5396>>.
- [RFC6811] Mohapatra, P., Scudder, J., Ward, D., Bush, R., and R. Austein, "BGP Prefix Origin Validation", RFC 6811, DOI 10.17487/RFC6811, January 2013, <<https://www.rfc-editor.org/info/rfc6811>>.
- [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>>.

Authors' Addresses

Tim Bruijnzeels
RIPE NCC
Email: tbruijnzeels@ripe.net

Ties de Kock
RIPE NCC
Email: tdekock@ripe.net

Oliver Borchert
NIST
Email: oliver.borchert@nist.gov

Di Ma
ZDNS
Email: madi@zdns.cn