

idr
Internet-Draft
Updates: [4271](#) (if approved)
Intended status: Standards Track
Expires: November 23, 2012

W. Kumari
Google
R. Bush
Internet Initiative Japan
H. Schiller
Verizon
K. Patel
Cisco Systems
May 22, 2012

**Codification of AS 0 processing.
draft-ietf-idr-as0-05**

Abstract

This document updates [RFC 4271](#) and proscribes the use of AS 0 in BGP OPEN and AS_PATH / AS4_PATH BGP attribute.

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 <http://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 November 23, 2012.

Copyright Notice

Copyright (c) 2012 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 (<http://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 Simplified BSD License text as described in [Section 4.e](#) of

the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1.	Introduction	3
1.1.	Requirements notation	3
2.	Behavior	3
3.	IANA Considerations	4
4.	Security Considerations	4
5.	Acknowledgements	4
6.	References	4
6.1.	Normative References	4
6.2.	Informative References	5
Appendix A.	Changes / Author Notes.	5
	Authors' Addresses	6

1. Introduction

Autonomous System 0 is listed in the IANA Autonomous System Number Registry as "Reserved - May be use to identify non-routed networks" ([\[IANA.AS Numbers\]](#)).

[RFC6491] specifies that AS number zero in a ROA is used to mark an NLRI which is to be marked as Invalid.

No clear statement that AS 0 was proscribed could be found in any BGP specification. This document corrects this omission, most importantly in the case of the AS_PATH. This represents an update to the error handling procedures given in [\[RFC4271\]](#).

As at least two implementations discard routes containing AS 0, and to allow approaches such as the above, this document codifies this behavior.

1.1. Requirements notation

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 [\[RFC2119\]](#).

2. Behavior

A BGP speaker MUST NOT originate or propagate a route with an AS number of zero in the AS_PATH, AS4_PATH, AGGREGATOR or AS4_AGGREGATOR attributes.

An UPDATE message that contains the AS number of zero in the AS_PATH or AGGREGATOR attribute MUST be considered as malformed, and be handled by the procedures specified in [\[I-D.ietf-idr-error-handling\]](#).

An UPDATE message that contains the AS number of zero in the AS4_PATH or AS4_AGGREGATOR attribute MUST be considered as malformed, and be handled by the procedures specified in [\[I-D.ietf-idr-rfc4893bis\]](#).

If a BGP speaker receives zero as the peer AS in an OPEN message, it MUST abort the connection and send a NOTIFICATION with Error Code "OPEN Message Error" and subcode "Bad Peer AS" (see [\[RFC4271\]](#) [Section 6.2](#)). A router MUST NOT initiate a connection claiming to be AS number zero.

Authors of future protocol extensions that carry the Autonomous System number are encouraged keep in mind that AS number zero is reserved and to provide clear direction on how to handle AS number

zero.

3. IANA Considerations

The IANA is requested to update the Reference for number 0 in the "Autonomous System (AS) Numbers" registry to reference this document.

4. Security Considerations

By allowing a RPKI resource holder to issue a ROA saying that AS 0 is the only valid origin for a route, we allow them to state that a particular address resource is not in use. By ensuring that all implementations that see AS 0 in a route ignore that route, we prevent a malicious party from announcing routes containing AS 0 in an attempt to hijack those resources.

In addition, by standardizing the behavior upon reception of an AS_PATH (or AS4_PATH) containing AS 0, this document makes the behavior better defined, and security gotchas often lurk in the undefined spaces.

5. Acknowledgements

The authors wish to thank Enke Chen, Brian Dickson, Bruno Decraene, Robert Raszuk, Jakob Heitz, Danny McPherson, Chris Morrow, iLya, John Scudder, Jeff Tantsura, Daniel Ginsburg and Susan Hares. Apologies to those we may have missed, it was not intentional.

6. References

6.1. Normative References

[I-D.ietf-idr-error-handling]

Scudder, J., Chen, E., Mohapatra, P., and K. Patel,
"Revised Error Handling for BGP UPDATE Messages",
[draft-ietf-idr-error-handling-01](#) (work in progress),
December 2011.

[I-D.ietf-idr-rfc4893bis]

Vohra, Q. and E. Chen, "BGP Support for Four-octet AS
Number Space", [draft-ietf-idr-rfc4893bis-06](#) (work in
progress), April 2012.

[IANA.AS_Numbers]

IANA, "Autonomous System (AS) Numbers",
<<http://www.iana.org/assignments/as-numbers>>.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.

[RFC4271] Rekhter, Y., Li, T., and S. Hares, "A Border Gateway Protocol 4 (BGP-4)", [RFC 4271](#), January 2006.

6.2. Informative References

[RFC6491] Manderson, T., Vegoda, L., and S. Kent, "Resource Public Key Infrastructure (RPKI) Objects Issued by IANA", [RFC 6491](#), February 2012.

[Appendix A](#). Changes / Author Notes.

[RFC Editor: Please remove this section before publication]

Draft accepted as IDR Doc, notes reset. Please see notes for [draft-wkumari-idr-as0.xml](#) for prior comments.

Changes -00.

- o Added AS4_PATH -- Robert Raszuk.
- o Change "bgp listener" to "bgp speaker" -- Enke Chen
- o Consistent use of AS_PATH (v., AS-PATH and AS PATH) -- Danny McPherson
- o New text for Sec 2 P1 -- Enke / Keyur / Scudder,
<http://www.ietf.org/mail-archive/web/idr/current/msg05786.html>
- o I made a boo boo -- I had the file open in 2 editors, made changes in one and overwrote them by saving on the "other, then checked the broken one into SVN. Apologies to all whose comments I may have missed...

Changes -01

- o The WG thread
<http://www.ietf.org/mail-archive/web/idr/current/msg05685.html>
showed a very strong preference for separating the error definition and handling -- the chairs also showed a preference to Publish this and point to the error handling that Enke will write.
- o The originally suggested text ("An UPDATE message that contains the AS number of zero in the AS-PATH attribute MUST be...") only referenced the AS-PATH, readed AS4_PATH, *AGGREGATOR as suggested by Robert Raszak and Danny.

Changes -02

- o Fixed the reference for *AGGREGATOR. This required breaking it out into two sentences / clauses.
- o Added text on other places where an AS can show up (e.g: "4-Octet AS specific Extended Community" [5668]) -- thanks to Keyur.

Changes - 03

- o Removed text on other places where an AS can show up (e.g: "4-Octet AS specific Extended Community" [5668]).
- o Added *very* generic "Authors of future protocol extensions..." text

Changes -04

- o Looks like the draft needs an 'Updates: [RFC 4271](#)' header. Can you make the change? -- JGS.
- o "You have things a bit scrambled in these two paragraphs" -- JGS (whoops!).
- o Editorial: I suggest dropping the parentheses in... JGS.
- o Added "This document updates [rfc 4271](#)" to keep IDNITs happy...
- o Bumped refs: [draft-ietf-sidr-iana-objects](#) has been published as [RFC 6491](#), idr-error is now -01, 4893bis is now -06

Changes - 05

- o Added something to the intro saying what we update and why. This was in the abstract, but I didn't have it in the intro. Stupid.

Authors' Addresses

Warren Kumari
Google
1600 Amphitheatre Parkway
Mountain View, CA 94043
US

Email: warren@kumari.net

Randy Bush
Internet Initiative Japan
5147 Crystal Springs
Bainbridge Island, WA 98110
US

Email: randy@psg.com

Heather Schiller
Verizon
22001 Loudoun County Parkway
Ashburn 20147
US

Email: heather.schiller@verizon.com

Keyur Patel
Cisco Systems
170 W. Tasman Drive
San Jose, CA 95134
USA

Phone:
Fax:
Email: keyupate@cisco.com
URI:

