RFC Compliance Test Report
BGPPLUS-AS4 Results

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a project by the Network Device Education Foundation, Inc (www.NetDEF.org)

	Master 2017-01-16 --- Ubuntu 16.04	Master 2017-01-16 --- FreeBSD 10.3	Stable 2.0-rc1 --- FreeBSD 10.3	Stable 2.0-rc1 --- Ubuntu 16.04	Stable 2.0-rc2 --- Ubuntu 16.04	Stable 2.0-rc2 --- FreeBSD 10.3	Master 2017-02-24 --- Ubuntu 16.04	Master 2017-02-24 --- FreeBSD 10.3	Master 2017-03-07 --- FreeBSD 10.3	Master 2017-03-07 --- Ubuntu 16.04	Release 2.0 --- Ubuntu 16.04	Release 2.0 --- FreeBSD 10.3
Type	FRR	FRR	FRR	FRR	FRR	FRR	FRR	FRR	FRR	FRR	FRR	FRR
Commit ID	ab0c954	ab0c954	16e3267	16e3267	5753eb9	5753eb9	821cf0d	821cf0d	1a664f5	1a664f5	3e71b5d	3e71b5d
Commit Date	2017-01-16	2017-01-16	2017-01-19	2017-01-19	2017-02-23	2017-02-23	2017-02-24	2017-02-24	2017-03-07	2017-03-07	2017-04-02	2017-04-02
ANVL-BGPPLUS-AS4-1.1	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

ANVL-BGPPLUS-AS4-1.1 — **MUST**

Setup Verification

```
Setup Verification Tests
Bring up BGP4 Connection using 4-Octet AS capapbiility
```

ANVL-BGPPLUS-AS4-2.1	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

ANVL-BGPPLUS-AS4-2.1 — **MUST**

RFC4893 Section 3 Page 2 "Protocol Extensions"

```
Protocol Extensions
The Capability that is used by a BGP speaker to convey to its BGP
peer the 4-octet Autonomous System number capability, also carries
the 4-octet Autonomous System number of the speaker in the Capability
Value field of the Capability Optional Parameter.
```

ANVL-BGPPLUS-AS4-2.2	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

ANVL-BGPPLUS-AS4-2.2 — **MUST**

RFC4893 Section 3 Page 2 "Protocol Extensions"

```
Protocol Extensions
The Capability   Length field of the Capability is set to 4.
```

ANVL-BGPPLUS-AS4-2.3	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

ANVL-BGPPLUS-AS4-2.3 — **MUST**

RFC4893 Section 3 Page 2 "Protocol Extensions"

```
Protocol Extensions
NEW BGP speakers carry AS path information expressed in terms of
4-octet Autonomous Systems numbers by using the existing AS_PATH
attribute, except that each AS number in this attribute is encoded
not as a 2-octet, but as a 4-octet entity.
```

BGPPLUS-AS4 Results

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ANVL- BGPPLUS- AS4-2.4 **MUST**	pass	pass	pass	pass	pass	pass	FAIL	FAIL	pass	pass	pass	pass
RFC4893 Section 3 Page 2 "Protocol Extensions"												
Protocol Extensions The same applies to the AGGREGATOR attribute - NEW BGP speakers use the same attribute, except that the AS carried in this attribute is encoded as a 4-octet entity.												
ANVL- BGPPLUS- AS4-2.5 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
RFC4893 Section 3 Page 2 "Protocol Extensions" Note: Here we check for the flags only												
Protocol Extensions To preserve AS path information with 4-octet AS numbers across OLD BGP speakers, this document defines a new AS path attribute, called AS4_PATH.This is an optional transitive attribute that contains the AS path encoded with 4-octet AS numbers.												
ANVL- BGPPLUS- AS4-2.6 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
RFC4893 Section 3 Page 2 "Protocol Extensions" Note: Here we check for the value in the field												
Protocol Extensions To preserve AS path information with 4-octet AS numbers across OLD BGP speakers, this document defines a new AS path attribute, called AS4_PATH.This is an optional transitive attribute that contains the AS path encoded with 4-octet AS numbers.												
ANVL- BGPPLUS- AS4-2.7 **MUST**	pass	pass	pass	pass	pass	pass	FAIL	FAIL	pass	pass	pass	pass
RFC4893 Section 3 Page 3 "Protocol Extensions" Note: Here we check the attribute flags												
Protocol Extensions Similarly, this document defines a new aggregator attribute called AS4_AGGREGATOR, which is optional transitive.												

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ANVL-BGPPLUS-AS4-2.8 **MUST**	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL

ANVL-BGPPLUS-AS4-2.8 — RFC4893 Section 3 Page 3 "Protocol Extensions"
Note: Here we check the attribute value

```
Protocol Extensions
Similarly, this document defines a new aggregator attribute called
AS4_AGGREGATOR, which is optional transitive.
```

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ANVL-BGPPLUS-AS4-2.9 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

ANVL-BGPPLUS-AS4-2.9 — RFC4893 Section 3 Page 3 "Protocol Extensions"

```
Protocol Extensions
We denote this special AS number as AS_TRANS for ease of description
in the rest of this specification.  This AS number is also placed
in the "My Autonomous System" field of the OPEN message originated
by a NEW BGP speaker, if the speaker does not have a (globally unique)
2-octet AS number.
```

	...	...	...	...	...	...	...	...	...	...	...	...
ANVL-BGPPLUS-AS4-3.1 **SHOULD**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass

ANVL-BGPPLUS-AS4-3.1 — RFC4893 Section 4.1 Page 3 "Interaction Between NEW BGP Speakers"
Note: For AS4_PATH attribute

```
Interaction Between NEW BGP Speakers
The new attributes, AS4_PATH and AS4_AGGREGATOR SHOULD NOT be carried
in the UPDATE messages between NEW BGP peers.
```

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ANVL-BGPPLUS-AS4-3.2 **SHOULD**	pass	pass	pass	pass	pass	pass	FAIL	FAIL	pass	pass	pass	pass

ANVL-BGPPLUS-AS4-3.2 — RFC4893 Section 3 Page 3 "Protocol Extensions"
Note: For AS4_AGGREGATOR attribute

```
Interaction Between NEW BGP Speakers
The new attributes, AS4_PATH and AS4_AGGREGATOR SHOULD NOT be carried
in the UPDATE messages between NEW BGP peers.
```

BGPPLUS-AS4 Results

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ANVL-BGPPLUS-AS4-3.3 **SHOULD**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	NEGATIVE RFC4893, Sect. 4.1, Page 3, Interaction Between NEW BGP Speakers Note: This is for AS4_PATH attribute											
	Interaction Between NEW BGP Speakers A NEW BGP speaker that receives the AS4_PATH and AS4_AGGREGATOR path attributes in an UPDATE message from a NEW BGP speaker SHOULD discard these path attributes and continue processing the UPDATE message.											
ANVL-BGPPLUS-AS4-3.4 **SHOULD**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	NEGATIVE RFC4893, Sect. 4.1, Page 3, Interaction Between NEW BGP Speakers Note: This is for AS4_AGGREGATOR attribute											
	Interaction Between NEW BGP Speakers A NEW BGP speaker that receives the AS4_PATH and AS4_AGGREGATOR path attributes in an UPDATE message from a NEW BGP speaker SHOULD discard these path attributes and continue processing the UPDATE message.											
ANVL-BGPPLUS-AS4-4.1 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893 Section 4.2.2 Page 4 "Generating Updates"											
	Generating Updates (NEW-OLD BGP Speaker) When communicating with an OLD BGP speaker, a NEW speaker MUST send the AS path information in the AS_PATH attribute encoded with 2-octet AS numbers.											
ANVL-BGPPLUS-AS4-4.2 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893 Section 4.2.2 Page 4 "Generating Updates" Note: For AS4_PATH attribute											
	Generating Updates (NEW-OLD BGP Speaker) The NEW speaker MUST also send the AS path information in the AS4_PATH attribute (encoded with 4-octet AS numbers), except for the case where the entire AS path information is composed of 2-octet AS numbers only. In this case, the NEW speaker SHOULD NOT send the AS4_PATH attribute.											

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ANVL-BGPPLUS-AS4-4.3	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893 Section 4.2.2 Page 4 "Generating Updates"											
MUST	Generating Updates (NEW-OLD BGP Speaker) In the AS_PATH attribute encoded with 2-octet AS numbers, non-mappable 4-octet AS numbers are represented by the well-known 2-octet AS number, AS_TRANS.											
ANVL-BGPPLUS-AS4-4.4	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893 Section 4.2.2 Page 4 "Generating Updates"											
MUST	Generating Updates (NEW-OLD BGP Speaker) Similarly, if the NEW speaker has to send the AGGREGATOR attribute, and if the aggregating Autonomous System"s AS number is truly 4-octets, then the speaker constructs the AS4_AGGREGATOR attributes by taking the attribute length and attribute value from the AGGREGATOR attribute and placing them into the attribute length and attribute value of the AS4_AGGREGATOR attribute, and sets the AS number field in the existing AGGREGATOR attribute to the reserved AS number, AS_TRANS.											
ANVL-BGPPLUS-AS4-4.5	pass	pass	pass	pass	pass	pass	FAIL	FAIL	pass	pass	pass	pass
	RFC4893 Section 4.2.2 Page 4 "Generating Updates"											
SHOULD	Generating Updates (NEW-OLD BGP Speaker) Note that if the AS number is 2-octets only, then the AS4_AGGREGATOR attribute SHOULD NOT be sent.											
ANVL-BGPPLUS-AS4-5.1	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
	RFC4893 Section 4.2.3 Page 4 "Processing Received Updates"											
MUST	Processing Received Updates (OLD-NEW BGP Speakers) If the AS4_PATH attribute is also received, both the attributes will be used to construct the exact AS path information, and therefore the information carried by both the attributes will be considered for AS path loop detection.											

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ANVL-BGPPLUS-AS4-5.2 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893, Section 4.2.3 Page 5 "Processing Received Updates" Note: This is for testing ignored AS4_PATH attribute											
	Processing Received Updates (OLD-NEW BGP Speakers) When both the attributes are received, if the AS number in the AGGREGATOR attribute is not AS_TRANS, then: - the AS4_AGGREGATOR attribute and the AS4_PATH attribute SHALL be ignored - the AS_PATH attribute SHALL be taken as the AS path information.											
ANVL-BGPPLUS-AS4-5.3 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893, Section 4.2.3 Page 5 "Processing Received Updates"											
	Processing Received Updates (OLD-NEW BGP Speakers) - the AGGREGATOR attribute SHALL be taken as the information about the aggregating node											
ANVL-BGPPLUS-AS4-5.4 **MUST**	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893 Section 4.2.3 Page 5 "Processing Received Updates"											
	Processing Received Updates (OLD-NEW BGP Speakers) Otherwise, - the AGGREGATOR attribute SHALL be ignored, - the AS4_AGGREGATOR attribute SHALL be taken as the information about the aggregating node											
ANVL-BGPPLUS-AS4-5.5 **MUST**	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL
	RFC4893 Section 4.2.3 Page 6 "Processing Received Updates"											
	Processing Received Updates (OLD-NEW BGP Speakers) If the number of AS numbers in the AS_PATH attribute is less than the number of AS numbers in the AS4_PATH attribute, then the AS4_PATH attribute SHALL be ignored, and the AS_PATH attribute SHALL be taken as the AS path information.											

BGPPLUS-AS4 Results

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ANVL- BGPPLUS- AS4-5.6	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	RFC4893 Section 4.2.3 Page 6 "Processing Received Updates"											
MUST	Processing Received Updates (OLD-NEW BGP Speakers) If the number of AS numbers in the AS_PATH attribute is larger than or equal to the number of AS numbers in the AS4_PATH attribute, then the AS path information SHALL be constructed by taking as many AS numbers and path segments as necessary from the leading part of the AS_PATH attribute, and then prepending them to the AS4_PATH attribute so that the AS path information has an identical number of AS numbers as the AS_PATH attribute.											
ANVL- BGPPLUS- AS4-6.1	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass	pass
	draft-ietf-idr-error-handling-01.txt Section 5.1 Page 6 " AGGREGATOR"											
MUST	Revised Update Message Error Handling According to New Draft The AGGREGATOR attribute SHALL be considered malformed if any of the following applies: Its length is not 6 (when the "4-octet AS number capability" is not advertised to, or not received from the peer [RFC4893]). Its length is not 8 (when the "4-octet AS number capability" is both advertised to, and received from the peer). An UPDATE message with a malformed AGGREGATOR attribute SHALL be handled using the approach of "attribute discard". NOTE:This test checks for second condition(Its length is not 8)											