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W. Kumari
Google, Inc.
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**Deprecation of BGP AS_SET, AS_CONFED_SET.
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Abstract

This document deprecates the use of the AS_SET and AS_CONFED_SET types of the AS_PATH in BGPv4. This is done to simplify the design and implementation of the BGP protocol and to make the semantics of the originator of a route more clear. This will also simplify the design, implementation and deployment of bonding work in the Secure Inter-Domain Routing Working Group.

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1. Introduction

The AS_SET path segment type of the AS_PATH attribute ([\[RFC4271\]](#), [Section 4.3](#)) is created by a router that is performing route aggregation and contains an unordered set of ASs that the update has traversed. The AS_CONFED_SET path segment type ([\[RFC5065\]](#)) of the AS_PATH attribute is created by a router that is performing route aggregation and contains an unordered set of Member AS Numbers in the local confederation that the update has traversed (AS_CONFED_SETs are very similar to AS_SETs, but are used within a confederation).

By performing aggregation, a router is, in essence, combining multiple routes into a new route. This type of aggregation blurs the semantics of what it means to originate a route. These can cause operational issues that include reachability problems and traffic engineering issues.

From analysis of past Internet routing data it is apparent that aggregation that involves AS_SETs is very seldom used in practice on the public network and, when it is, often contains reserved AS numbers ([\[RFC1930\]](#)) and / or only a single AS in the AS_SET. The reduction in table size provided by the aggregation is outweighed by additional complexity in the BGP protocol and confusion regarding what exactly is meant by originating a route.

2. 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 [\[RFC2119\]](#).

3. Deployment and modification of behavior

Operators are strongly advised to not generate any new announcements containing AS_SETs or AS_CONFED_SETs and to withdraw any existing routes containing them as soon as possible. As with any change, the operator should understand the full implications of the change.

It is worth noting that new technologies (such as those that take advantage of the "X.509 Extensions for IP Addresses and AS Identifiers" ([\[RFC3779\]](#)) may not support routes with AS_SETs / AS_CONFED_SETs in them, and MAY treat as infeasible routes containing them. Future BGP implementations may also do the same.

It is expected that, even before the deployment of these technologies, operators may begin filtering routers that contain

AS_SETs or AS_CONFED_SETs.

4. IANA Considerations

This document contains no IANA considerations.

5. Security Considerations

By removing support for the AS_SET path segment type of the AS_PATH attribute future BGP implementations can be simplified. This will also simplify the design and implementation of the RPKI and systems that will rely on it. By removing corner cases we remove complexity and code that is not exercised very often, which decreases the attack surface.

6. Acknowledgements

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Apologies to those who I may have missed, it was not intentional.

7. Normative References

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Author's Address

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

Phone: +1 571 748 4373
Email: warren@kumari.net