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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 simpify the
   design, implementation and deployment of onging work in the Secure
   Inter-Domain Routing Working Group.

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 2, 2011.

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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. Terminology

   Deprecate: To advise against the use of a feature or function.
        Typically done before the removal of the feature or function
        from a product.

4. Deployment and modification of behavior

   Operators who are currently announcing routes containing AS_SETs or
   AS_CONFED_SETs are advised to investigate why they are doing so and
   withdraw these announcements (and possibly reannounce the network
   without the aggregation). 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.

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

5. IANA Considerations

This document contains no IANA considerations.

6. 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.

7. Acknowledgements

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

8. Normative References

[RFC1930] Hawkinson, J. and T. Bates, "Guidelines for creation,
           selection, and registration of an Autonomous System (AS)",
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[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
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[RFC3779] Lynn, C., Kent, S., and K. Seo, "X.509 Extensions for IP

                Addresses and AS Identifiers", RFC 3779, June 2004.

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

   [RFC5065] Traina, P., McPherson, D., and J. Scudder, "Autonomous
              System Confederations for BGP", RFC 5065, August 2007.

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