draft-ietf-grow-as-path-prepending-02

IETF109

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Background / Motivation

Background
- Doug presented AS Path Prepending at Nanog 79.
- Participants asked if there was any BCP in IETF or other SDO.
- Answer was no.

Problem
- Excessive AS Path Prepending has caused routing issues on the internet.

Objective
- This document provides guidance, to the internet community, with how best to utilize AS Path Prepending in order to avoid negatively affecting the internet. And to offer alternatives.

Anonymized
- Anonymized using documentation prefixes [RFC5737] and ASs [RFC5398]

Use Cases

There are various reasons that AS Path Prepending is in use today including:

o Preferring one ISP over another ISP on the same ASBR or across different ASBRs

o Preferring one ASBR over another ASBR in the same site

o Utilize one path exclusively and another path solely as a backup

o Signal to indicate that one path may have a different amount of capacity than another where the lower capacity link still takes traffic

o An ISP doesn't accept traffic engineering using BGP communities. Prepending is the only option.

Problem Examples

1. An attacker, wanting to intercept or manipulate traffic to a prefix, enlists a datacenter to allow announcements of the same prefix with a fabricated short AS path. This malicious route would be preferred due to the shortened AS path.

2. During a routing leak, Country A leaked routes are preferred because Country B prefixes are being announced with an excessively prepended AS path. Any illegitimate route would be preferred over the legitimate route.

3. Long AS Paths cause an increase in memory usage by BGP speakers. The memory usage is not a concern in the control plane BGP implementations, but more so when AS Paths are included in Netflow messages.

Alternatives to AS Path Prepend

o Use predefined communities that are mapped to a particular
    behavior when propagated.

o Announce more specific routes on the preferred path.

o When AS Paths are of equivalent length, users could advertise
   paths, with IGP or EGP origin, over the preferred path while the
   other ASBRs (which would otherwise need to prepend N times)
   advertises with an INCOMPLETE origin code.

Best Practices

o Network operators should ensure prepending is absolutely
   necessary as many networks have excessive prepending

o There is no need to prepend more than 5 ASs. A diagram shows
   that 90% of AS path lengths are 5 ASNs or fewer in length.

 o Don't prepend ASNs that you don't own.

 o Prepending-to-all is a self-inflicted and needless risk that
    serves little purpose. Those excessively prepending their routes
    should consider this risk and adjust their routing configuration.

  o Operators should consider limiting the maximum AS-path
     length being accepted through aggressive filter policies.

Thanks for all the comments!