The BGP best path selection modifications
Various validation systems, how they work and how they should work?

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Introduction

- Why are we discussing validation?

What is validation today?

- RPKI / ROA
- BGPSEC Path Validation
- IRR + toolkits
  - AS-SET
- LOAs from customers
- Trust networks – Peers / Friends
- "I trust that X network does some kind of prefix validation"

Filtering still not enabled

- We don’t follow BCP38
- We don’t have anti-spoof
- We barely have customer prefix filters
- We rarely discuss what validation should be
- Very few have working RPKI/ROA systems (valid/invalid/unknown)

- Validation is still clearly a big problem!

Good news for validation

- Introducing validation attributes on BGP prefixes!
- Vendors already starting to implement
- Validation will get better and happen via normal upgrade process
  - Hardware / Software / Router vendors
- First time in a very long time we are looking at the BGP path selection process

The future of validation

- Equally sized received prefixes will be judged on validation attributes prior to anything else for selection.
- Battling hijacking and errors becomes easier
- Participation protects your prefixes in a far broader reach than basic filtering.

Future of validation details

- Validation attributes look to be an array of 2
  - BGPSEC Path Validation v(v1)
  - RPKI/ROA Prefix to AS Origin validation v(v2)
- The more positive validation attributes, the higher in the path selection tree.
  - 2 is better than 1
  - 1 is better than 0

The bad news? Opportunity to fix?

- BGP path selection will still prefer longer prefixes over validation
  - Should we continue down this path?
  - Should we ignore longer prefixes when a shorter has validation?
  - Pro: No longer need to enable le 24 + le 48 as more specifics will no longer take the traffic
  - Con: You will need to implement *some* level of validation on all longer allocations and assignments in order for them to be seen on the global internet.
  - Potential Con: If we are successful, the validation method itself may become a target for miscreants
  - Pro: Well peered networks will keep bleeding traffic to a minimum

Can we make validation easier?

- Validation is hard, let's go shopping
- Implementation methods for RPKI / ROAs and / or path validation and BGPSEC are currently considered difficult to implement.
- Few networks want to depend on external calculation for valid/invalid/unknown

- **What if we create one more level of validation?**

Simple, perhaps crazy, idea…

- Annual link, like POC validation, which simply says – I am a known contact for "my" prefix(es)
- Expand the validation attribute array in BGP
  - v(v,v) changes to v(v,v,v)
  - 3 beats 2, 2 beats 1, 1 beats none.
- Carrot to keep some basic contact information accurate
- Hard for miscreants to get around, easy for operators to manage
- Where does this live?
  - Unknown.. RIRs? IRR? Some new DB?

Thanks

- Questions / Comments?
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