ASPA: IETF109

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ASPA Object Profile

- ~~There MUST be single object for each (AS, AFI)!~~
- There SHOULD be single object for each (AS, AFI) per registry!
- All ASPA objects for an (AS, AFI) SHOULD be the same!

ASPA Pair Verification

- Retrieve all cryptographically valid ASPAs in a selected AFI with a customer value of AS1. The union of SPAS forms the set of "Candidate Providers."
- If the set of Candidate Providers is empty, then the procedure exits with an outcome of "Unknown."
- If AS2 is included in the Candidate Providers, then the procedure exits with an outcome of "Valid."
- Otherwise, the procedure exits with an outcome of "Invalid."

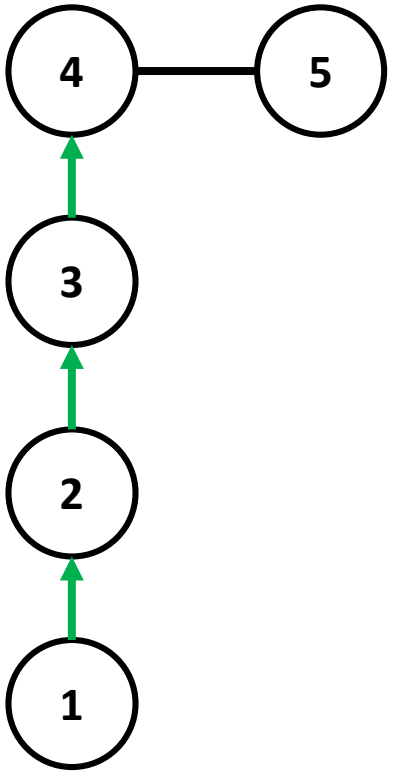
ASPA Verification Procedure

- ~~Beautiful ASCII drawings;~~
- Python code for verification procedures;
- Improved wording (special thanks to Jay Borkenhagen);

Terms

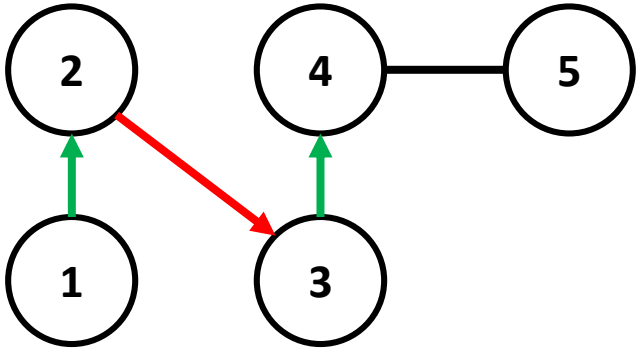
- Line goes up – route is announced from customer to provider;
- Line goes down – route is announced from provider to customer;
- Line goes straight – route is announced from peer to peer;
- The arrow shows the order of the ASPA check, not the route advertisement!

Upstream Path: Example



(1, 2), (2,3), (3,4) are **Valid**

The path is **Valid**



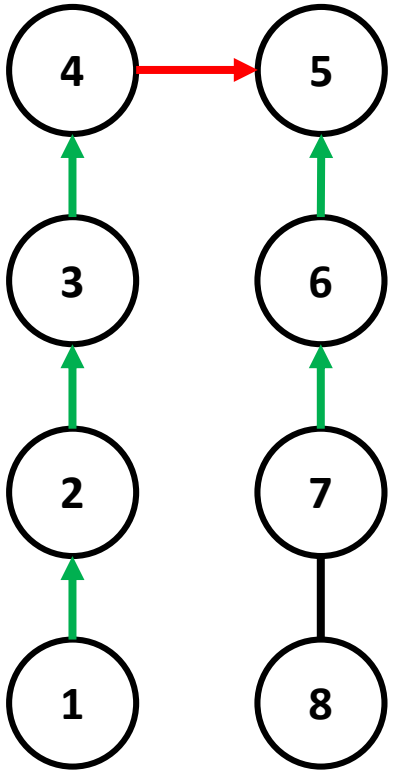
(1, 2) is Valid, (2, 3) is **Invalid**

The path is **Invalid**

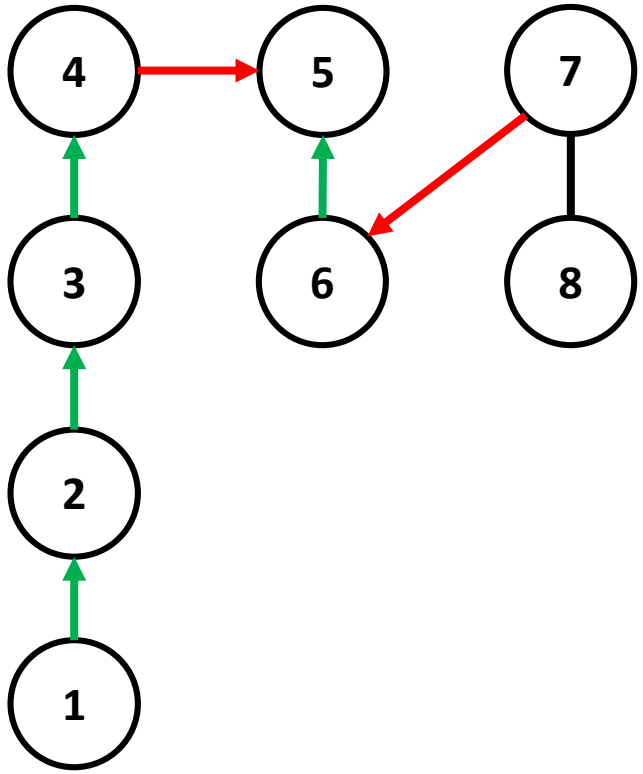
Upstream Path: Formal Procedure

1. If the AS_PATH has zero length, then procedure halts with the outcome "Invalid";
2. If the last segment in the AS_PATH has type AS_SEQUENCE and its value isn't equal to receiver's neighbor AS, then procedure halts with the outcome "Invalid";
3. If there exists I such that Seg(I-1).type and Seg(I).type equal to AS_SEQUENCE, Seg(I-1).value != Seg(I).value and customer-provider verification procedure with parameters (Seg(I-1).value, Seg(I).value, AFI) returns "Invalid" then the procedure also halts with the outcome "Invalid";
4. If the AS_PATH has at least one AS_SET segment, then procedure halts with the outcome "Unverifiable";
5. If there exists I such that Seg(I-1).type and Seg(I).type equal to AS_SEQUENCE, Seg(I-1).value != Seg(I).value and customer-provider verification procedure with parameters (Seg(I-1).value, Seg(I).value, AFI) returns "Unknown" then the procedure also halts with the outcome "Unknown";
6. Otherwise, the procedure halts with an outcome of "Valid".

Downstream Paths: Example



(1, 2), (2,3), (3,4) are **Valid**
(4,5) is **Invalid**, but it's **OK!**
(6,5), (7,6) are **Valid**
The path is **Valid**



(1, 2), (2,3), (3,4) are **Valid**
(4,5) is **Invalid**, but it's **OK!**
(6,5) is **Valid**, (7,6) is **Invalid**
The path is **Invalid**

Downstream Paths: Formal Procedure

1. If the AS_PATH has zero length, then procedure halts with the outcome "Invalid";
2. If a route is received from a provider and the last segment in the AS_PATH has type AS_SEQUENCE and its value isn't equal to receiver's neighbor AS, then the procedure halts with the outcome "Invalid";
3. Let's define I_MIN as the minimal index for which Seg(I-1).type and Seg(I).type equal to AS_SEQUENCE, its values aren't equal and the verification procedure for (Seg(I-1).value, Seg(I).value, AFI) returns "Invalid".
4. If I_MIN doesn't exist put the length of AS_PATH in I_MIN variable and jump to 5.
5. If there exists J > I_MIN such that both Seg(J-1).type, Seg(J).type equal to AS_SEQUENCE, Seg(J-1).value != Seg(J).value and the customer-provider verification procedure returns "Invalid" for (Seg(J).value, Seg(J-1).value, AFI), then the procedure halts with the outcome "Invalid";
6. If the AS_PATH has at least one AS_SET, segment then procedure halts with the outcome "Unverifiable";
7. If there exists J > I_MIN such that both Seg(J-1).type, Seg(J).type equal to AS_SEQUENCE, Seg(J-1).value != Seg(J).value and the customer-provider verification procedure returns "Unknown" for (Seg(J).value, Seg(J-1).value, AFI), then the procedure halts with the outcome "Unknown";
8. If there exists I_MIN > J such that both Seg(J-1).type, Seg(J).type equal to AS_SEQUENCE, Seg(J-1).value != Seg(J).value and the customer-provider verification procedure returns "Unknown" for (Seg(J-1).value, Seg(J).value, AFI), then the procedure halts with the outcome "Unknown";
9. Otherwise, the procedure halts with an outcome of "Valid".

Questions

- Is WG happy with ASPA algorithm?
- Is WG happy with its formal language?
- Does Python code improve readability?
- Is WG willing to start WGLC?