Methods for Detection and Mitigation of BGP Route Leaks

ietf-idr-route-leak-detection-mitigation-02

(Route leak definition: draft-ietf-grow-route-leak-problem-definition)

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Changes Since Last Presented

- Re-synced with the latest definition draft

https://tools.ietf.org/html/draft-ietf-grow-route-leak-problem-definition-04

- Simpler, clearer description of the route leak detection algorithm
- Section 5.1: discussion of upgrade and downgrade attack possibilities
  - in the absence of BGPsec security protection for the RLP attribute
- Sections 5.1 through 5.4 offer updated design discussions and insights – based on WG comments, feedback

Route Leak Avoidance

- The proposal has built-in route-leak avoidance as well
- Will be explicitly described in the next revision
- Algorithm for route-leak avoidance :
  - When incoming update has RLP field set to ‘01’ by any AS in the received AS path, then receiver SHOULD NOT propagate to a provider or peer

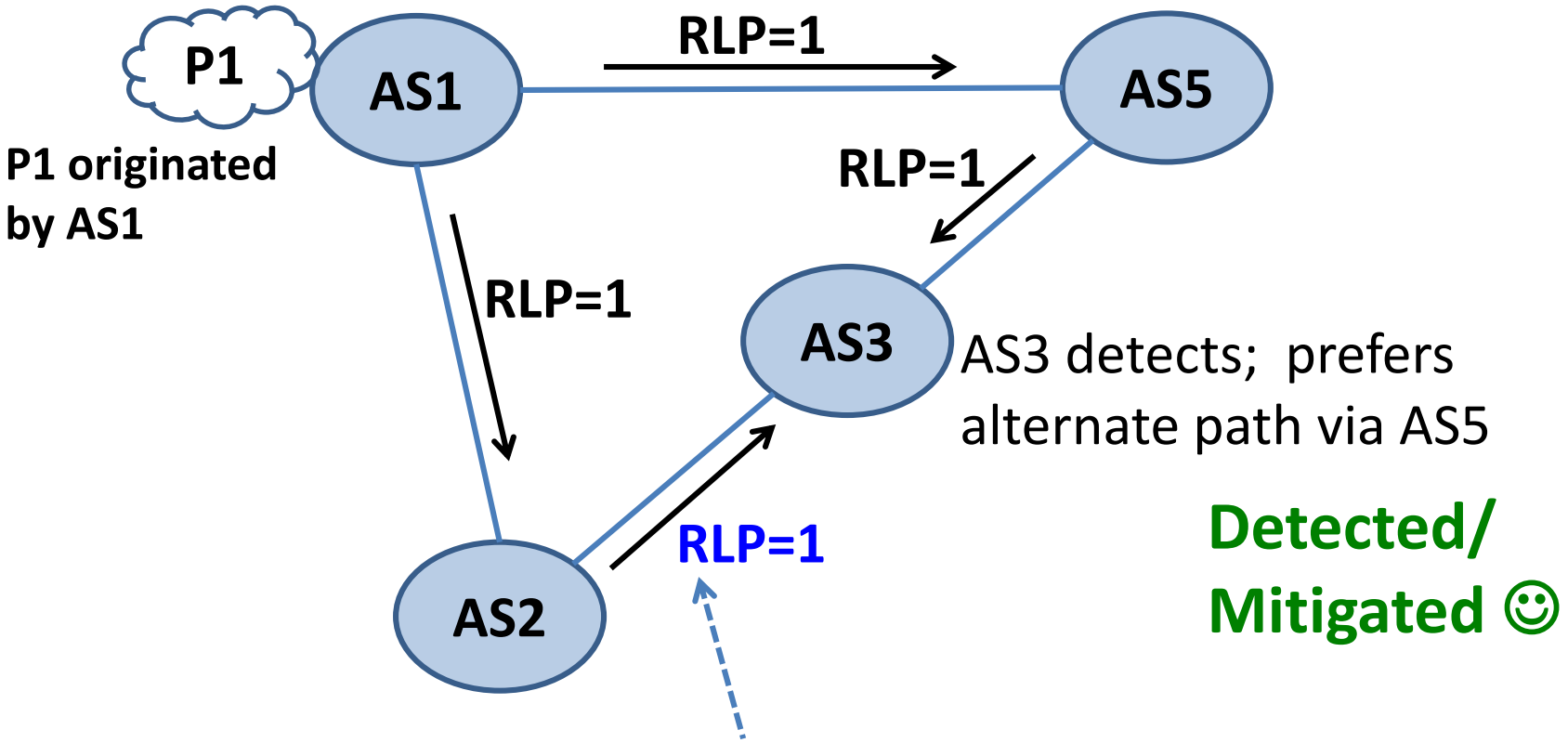
Note: For route-leak prevention marking, “SHOULD NOT propagate to a provider or peer” is better normative text than “CAN propagate only to customers”.
Operator may choose to select and forward a marked update for reachability if there is no alternate route.

Why is per Prefix Marking Important

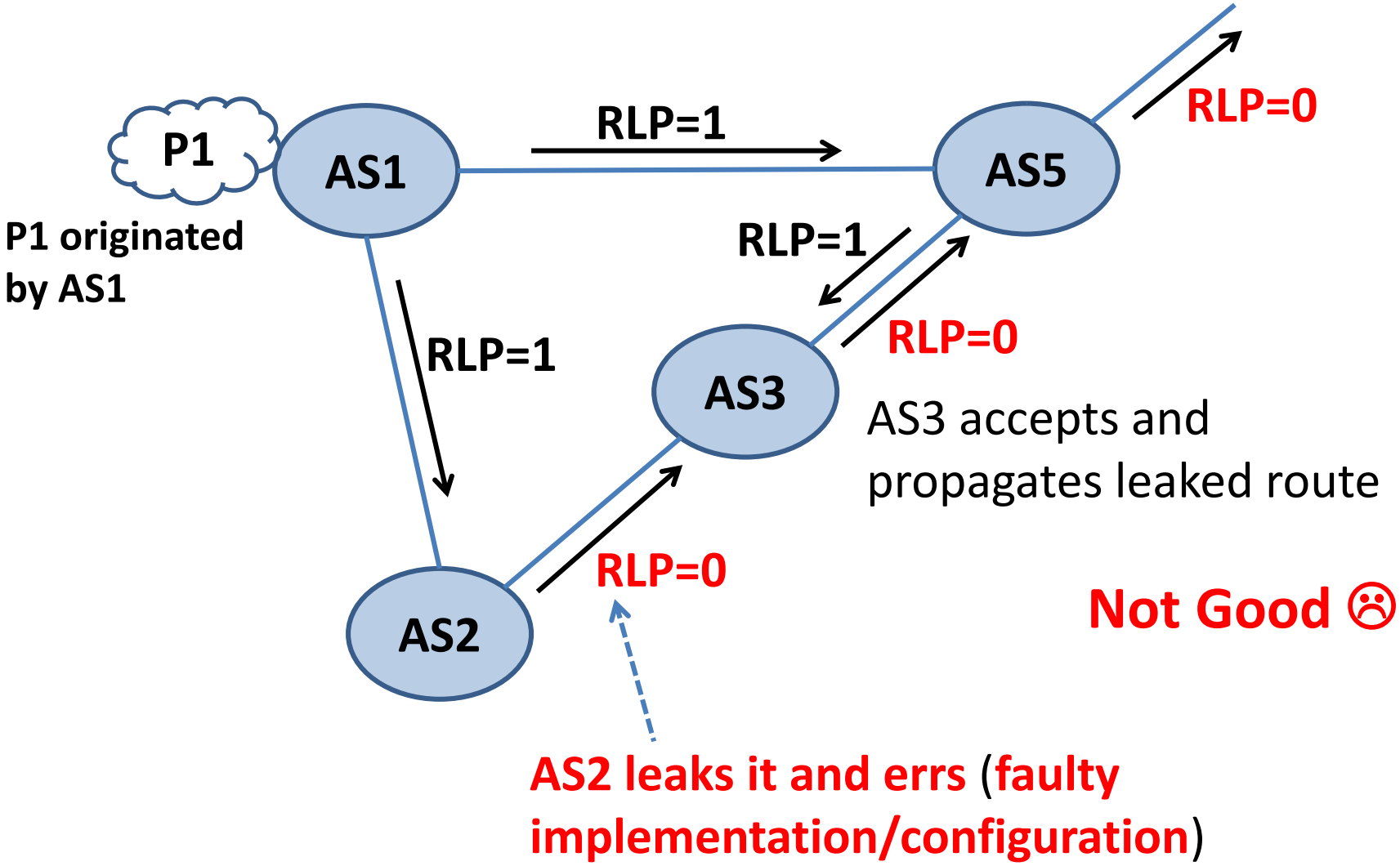
- Routes for prefixes with different business models are often sent over the same peering link
- Hence, sender-receiver relation does not always conform to P2C, C2P, P2P categories (estimate: about 35% of BGP peering links (see [Anwar])
- But ISP has knowledge of its policy and hence knows the type of peering relationship on a per prefix basis
- If major ISPs mark routes for RLP, that would result in substantial success for RLP-based avoidance/detection/mitigation

[Anwar] "Investigating Interdomain Routing Policies in the Wild"
http://www.cs.usc.edu/assets/007/94928.pdf

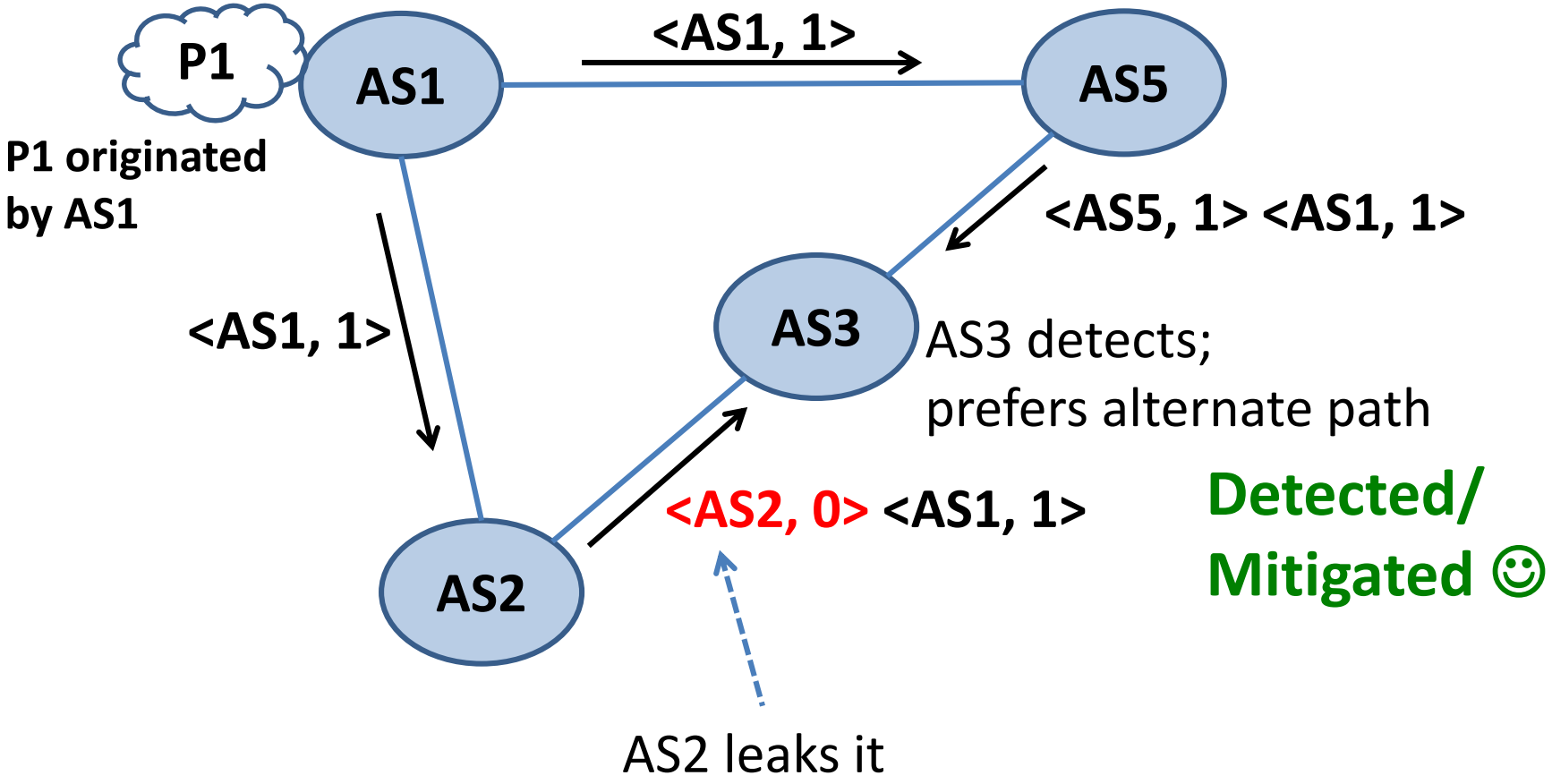
Route Leak Protection (RLP) Attribute: Per Update



RLP Attribute: Per Update



RLP Attribute: Per Hop

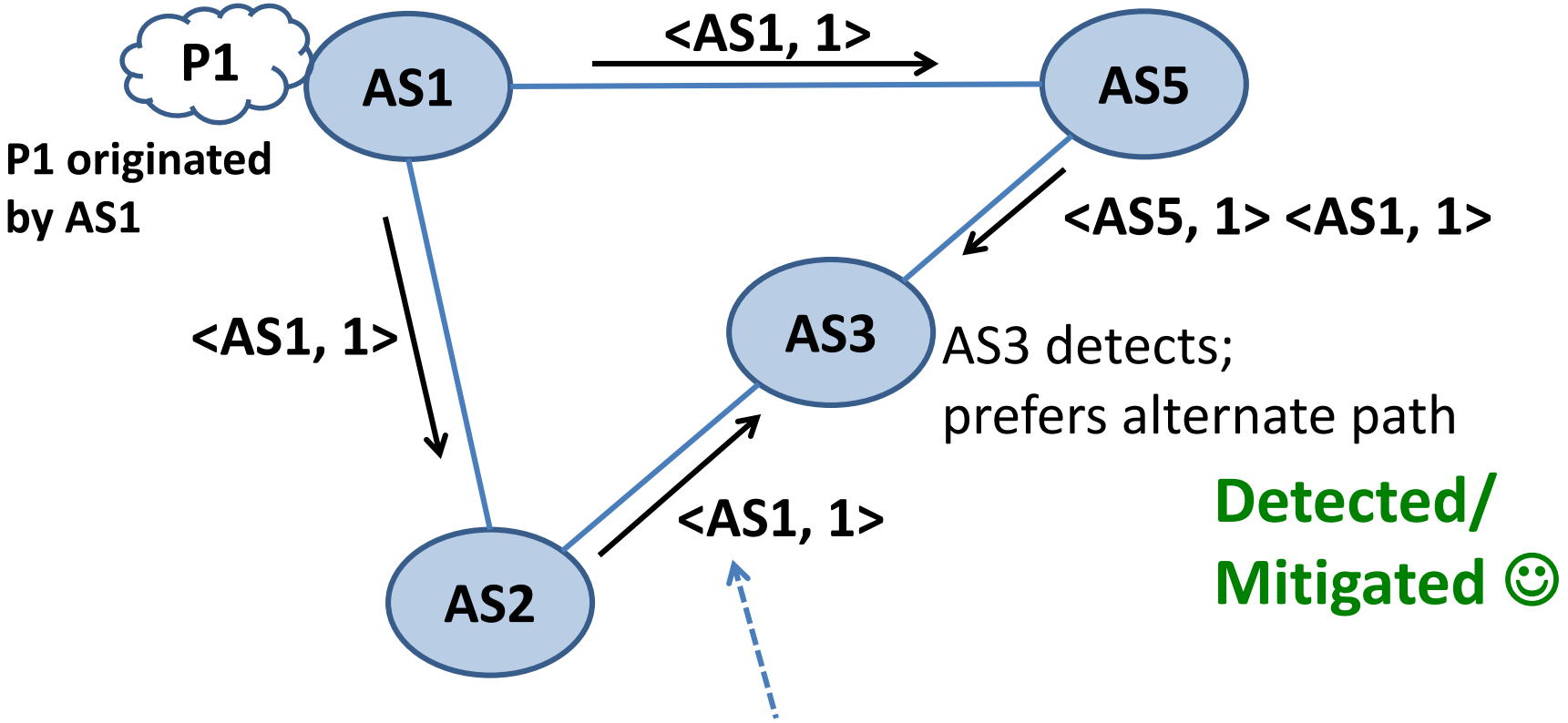


Optional transitive RLP attribute structure - examples:

<AS4, RLP4> <AS3, RLP3> <AS2, RLP2> <AS1, RLP1> -- when all ASes upgraded

<AS4, RLP4> <AS3, RLP3> <AS1, RLP1> -- when AS2 is not upgraded

RLP Attribute: Per Hop



Per Update vs. Per Hop -- Summary

- Partial deployment will exist for years … having a per-hop RLP flag allows operator to evaluate better, e.g., if they would prefer well marked provider path over a questionable customer path
- Per-hop RLP marking can be more easily secured in the future; E.g., by placing the marking bits in BGPsec Flags field which is per hop