IETF-80 Prague, Czech

Secure Extension of BGP by Decoupling Path Propagation and Adoption

draft-zhang-idr-decoupling-01
draft-zhang-idr-decoupling-02

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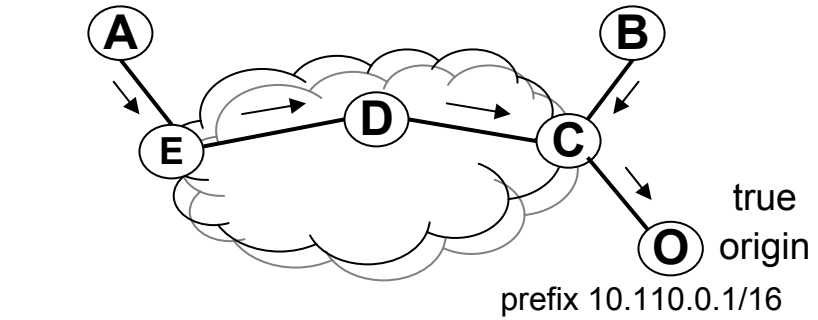
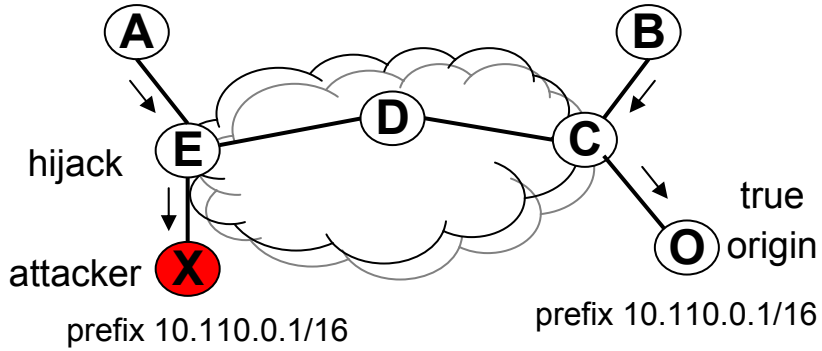
False Routing Announcements

- Interrupt the Internet service
- Source
  - Malicious attack
  - Mis-configuration
- Attacker can do
  - Black holing
  - Interception



True origin announces prefix 10.110.0.1/16

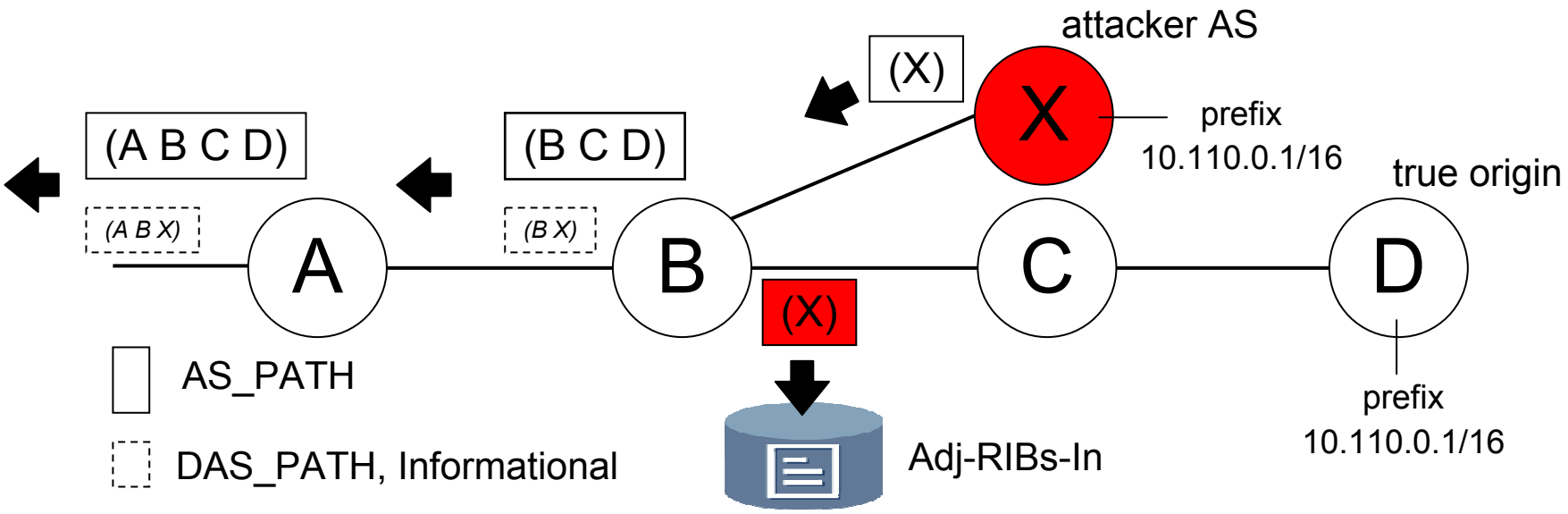


False origin announces prefix 10.110.0.1/16 and hijacks A's route

Solutions

- Prevention
  - based on RPKI (used by SIDR), act before attacks
  - however, not widely deployed
- Detection
  - monitoring & reaction, act after attacks
- Mitigation
  - filtering on routers' own knowledge, act during attacks

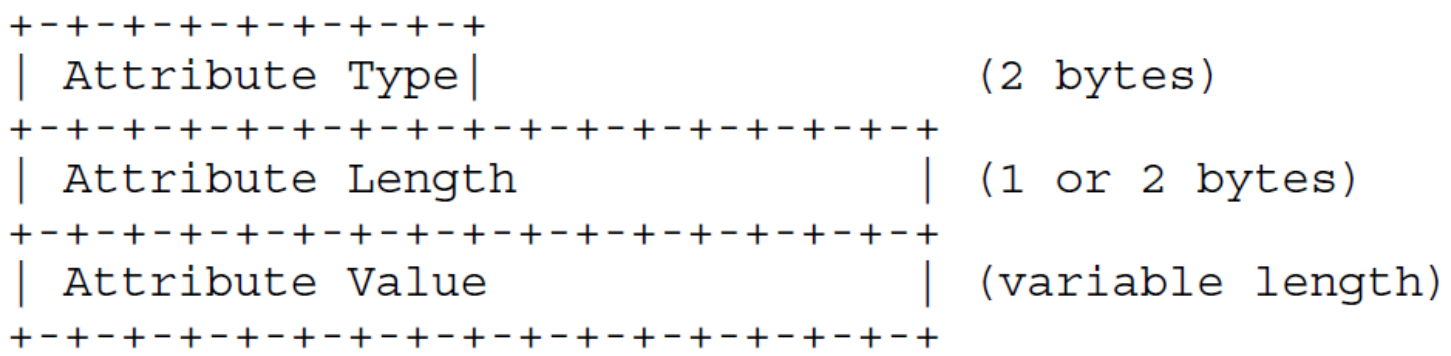
DBGP-A New Mitigation Scheme



DBGP: Decoupling path propagation and adoption in BGP

- (B X) is suspected and propagated in DAS_PATH attribute.
  - A *DAS_PATH will only used for informational purpose rather than real data delivery!*
- If (B X) is actually legitimate, the propagation in fact enable parallel validation.
  - When B propagate it to A as legitimate path later, A MAY have already finished the validation (e.g., checked by operators) in advance and can accept it directly without suspicion.

Optional & Transit DAS_PATH



Value	Segment	Type
1	DAS_SET	unordered set of ASs a route in the UPDATE message has traversed
2	DAS_SEQUENCE	ordered set of ASs a route in the UPDATE message has traversed

- Similar with AS_PATH attribute

Comments

- Cooperate with prevention schemes
- Operational complexity
- Add multiple DAS_PATHs option
- Detection facilitation
- Maintain separate trust-info history database

1. Cooperate with Prevention

- If we have SIDR solutions deployed on BGP routers, there are no false routing announcements at all.
  - ISP has no strong incentive to deploy RPKI
  - We need a multiple-line defense against attack
    - prevention, detection, mitigation

- Not chartered by SIDR
  - Work together with IDR
  - For the ultimate goal: to Secure IDR
  - Things can change, re-charter to include?

2. Operational Complexity

- The additional complexity of the BGP implementations in the regular production routers is something that is really unwanted from operators.
  - An optional attribute, ignored when received
  - Complexity similar to the “add-paths” solution
    - draft-ietf-idr-add-paths-04.txt

3. Separate History Database

- Mitigation solutions need additional memory for a separate historical database. For example, PGBGP routers store trusted origins in their databases.
  - By default, DBGP only uses Adj-RIBs-In
    - Save memory & maintenance effort

4. Detection Facilitation

- What do the detection systems do when they receive DAS_PATHs.
  - DBGP doesn't block the view of monitors of detection systems (the traditional mitigation does).
  - Detection systems had already been deployed. They can examine DAS_PATHs and send notifications to the victim AS (e.g., send email).

5. Multiple DAS_PATHs Export

- How about including multiple DAS_PATHs in one UPDATE message?
  - Multiple DAS_PATHs export is enabled now.

- Different from add-path WG draft
  - All the paths in “add-path” are available
  - All the paths in DAS_PATHs are unavailable

Thanks!