

Definition and problem statement for consistency in inter-domain routing and forwarding

draft-cheng-sidrops-consistency-forwarding-00

Presenter: Shengnan Yue (China Mobile)

Co-author: Weiqiang Cheng (China Mobile)

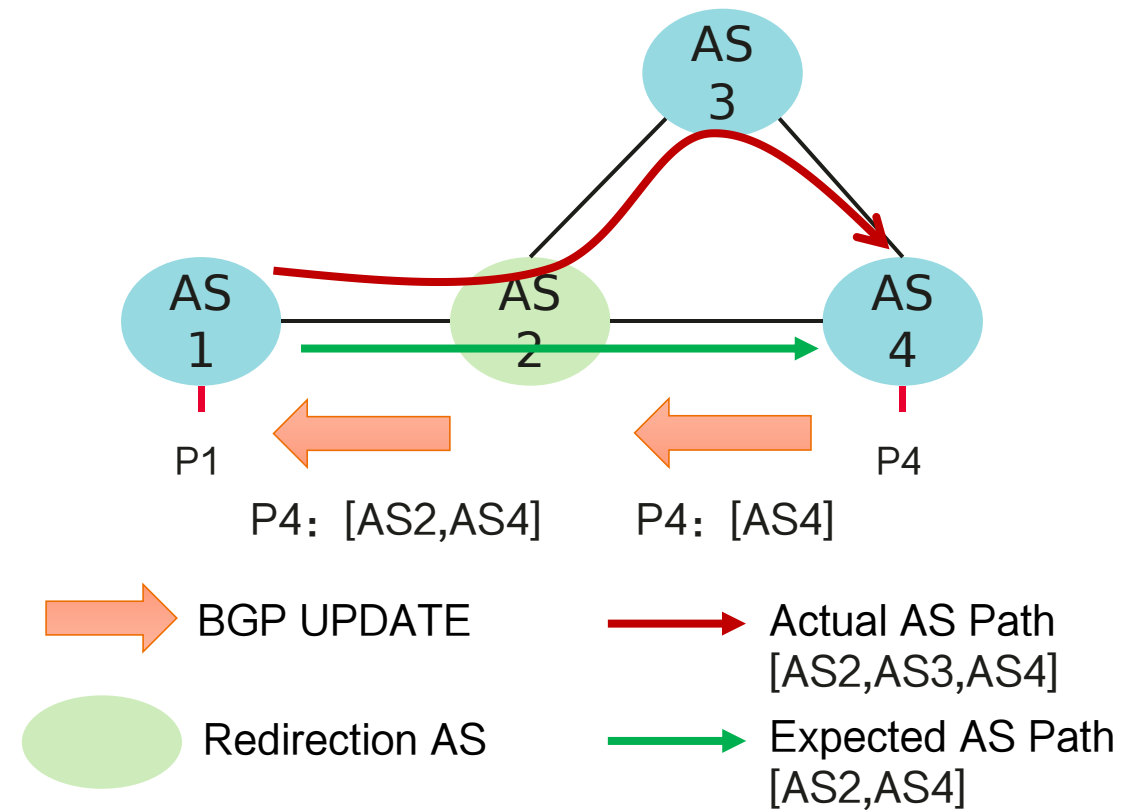
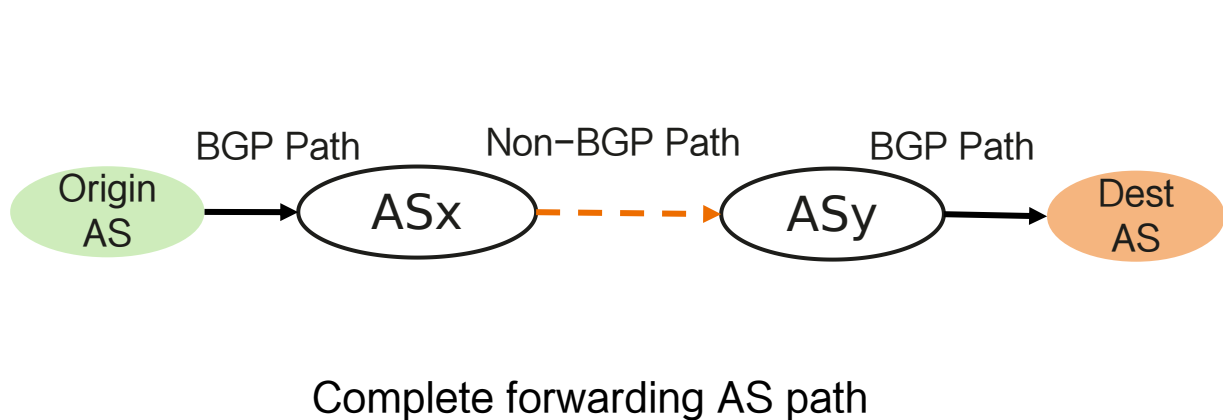
Mingxing Liu(Huawei)

Mingqing Huang(Huawei)

Shengnan Yue (China Mobile)

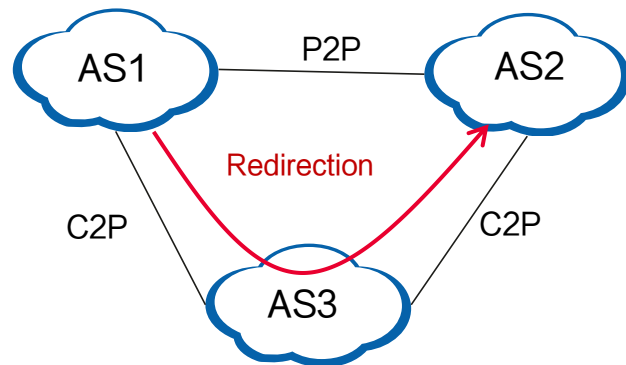
Consistency in inter-domain routing and forwarding

- Consistency means that inter-AS traffic is forwarded along the AS_PATH in the reverse direction.
 - AS_PATH attribute of BGP UPDATE records the AS number that it has passed through.
 - Theoretically, inter-domain forwarding behavior depends on inter-domain routing.
- However, the actual forwarding AS path is usually different with the AS_PATH in BGP UPDATE
 - The origin AS, maybe any AS, does not see the actual forwarding AS path from the BGP announcement.

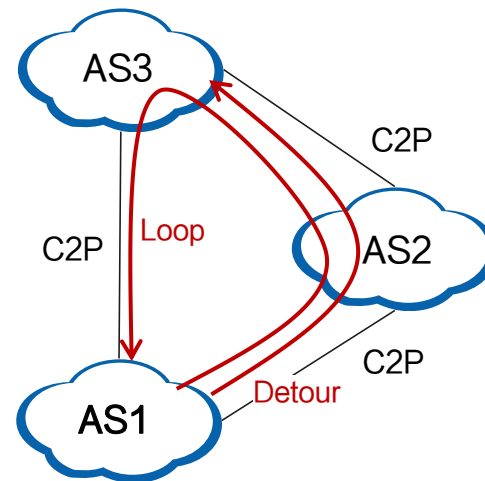


The risk of the inconsistency

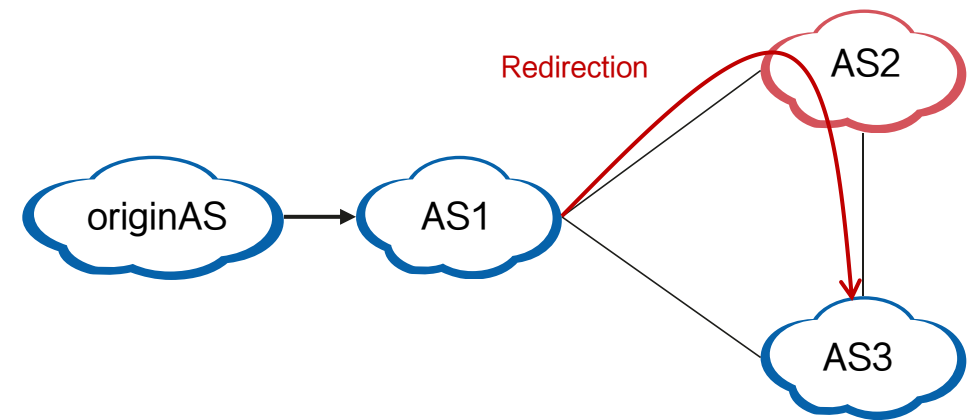
- Traffic blackhole
- Loop/Detour
- Malicious AS
- Non-optimal route



Traffic blackhole



Loop/Detour

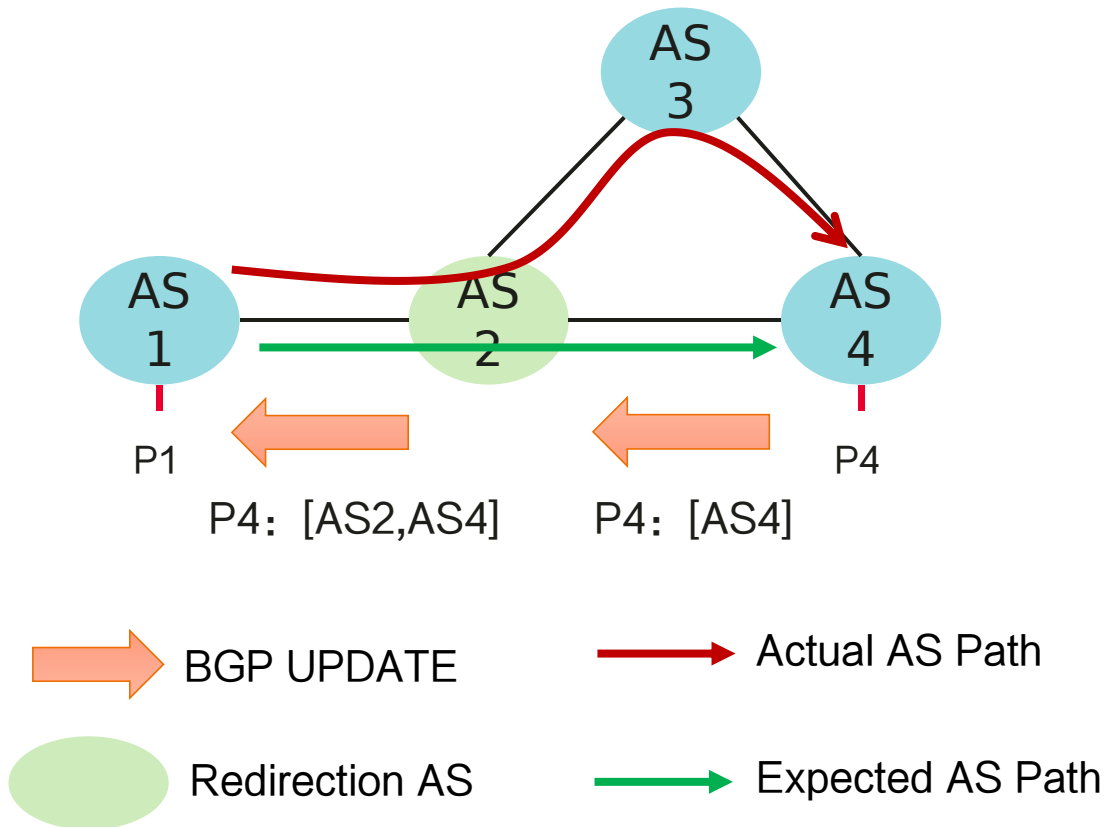


Malicious AS

What results in the inconsistency?

- Inter-domain traffic Redirection

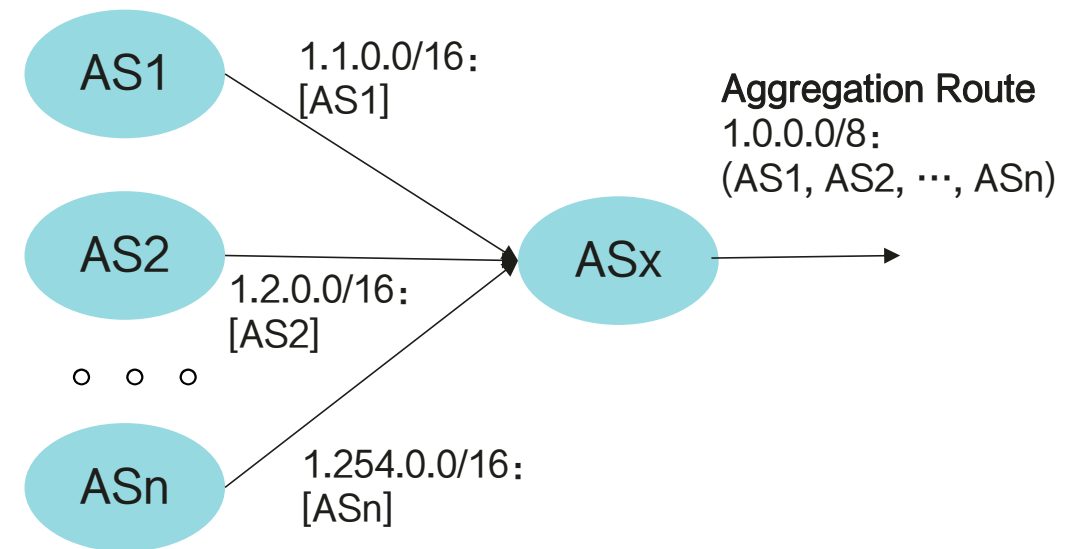
- > No control plane/routing protocol awareness



- Ambiguous routing specifications

- > Route aggregation

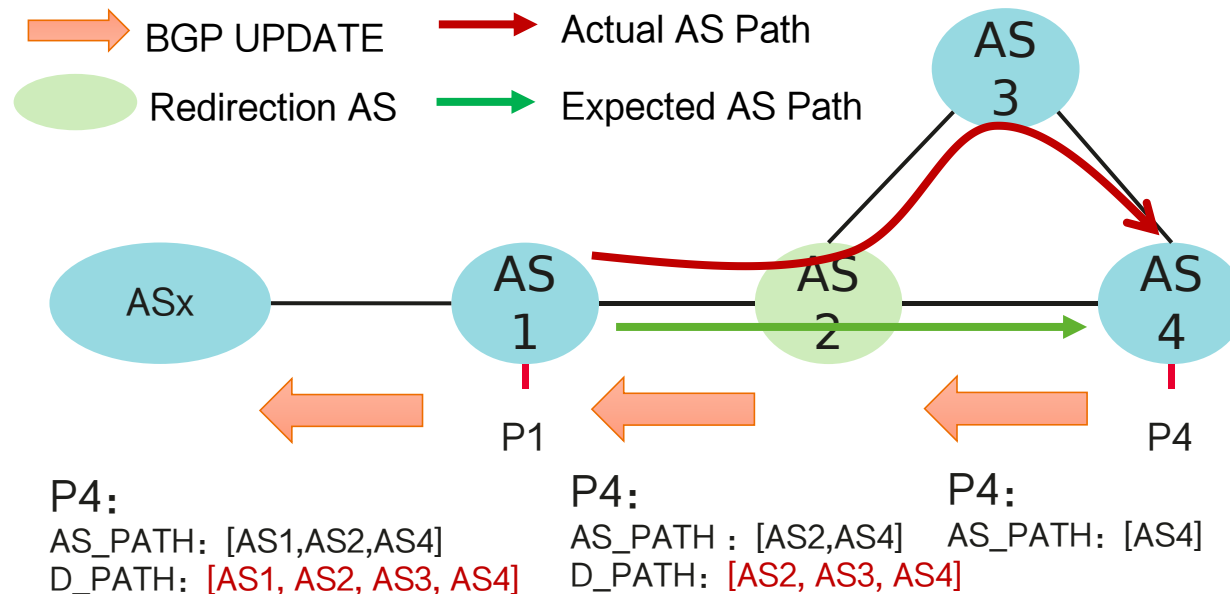
- The ordered AS_Sequence is converted to the unordered AS_SET



How to keep consistency of inter-domain routing and forwarding

•1、 Obtaining deviation AS paths

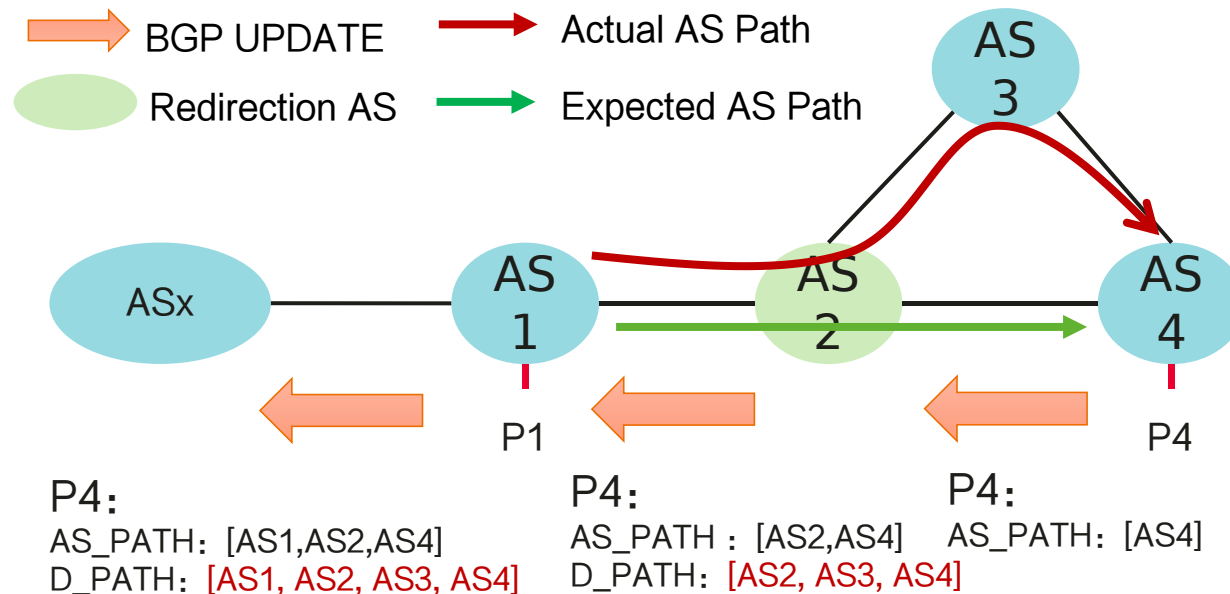
- > Acquire the next-hop AS and the destination prefix of the redirection rule.
- > Look up the AS_PATH in Adj_RIBs_In from the next-hop AS according to the destination prefix.



How to keep consistency of inter-domain routing and forwarding

•2、 Advertising the deviation path

- >The AS that generates the deviation AS path is obliged to check and advertise it to other ASes.
- >The deviation AS path and attributes of the specific flow should be included in BGP UPDATE



Use Cases

- Internet Visualization
- Inter-domain source address validation
- Troubleshooting
- Intent-based routing

Next Steps

- Any questions or comments are welcomed
- Will refine the solutions in the future