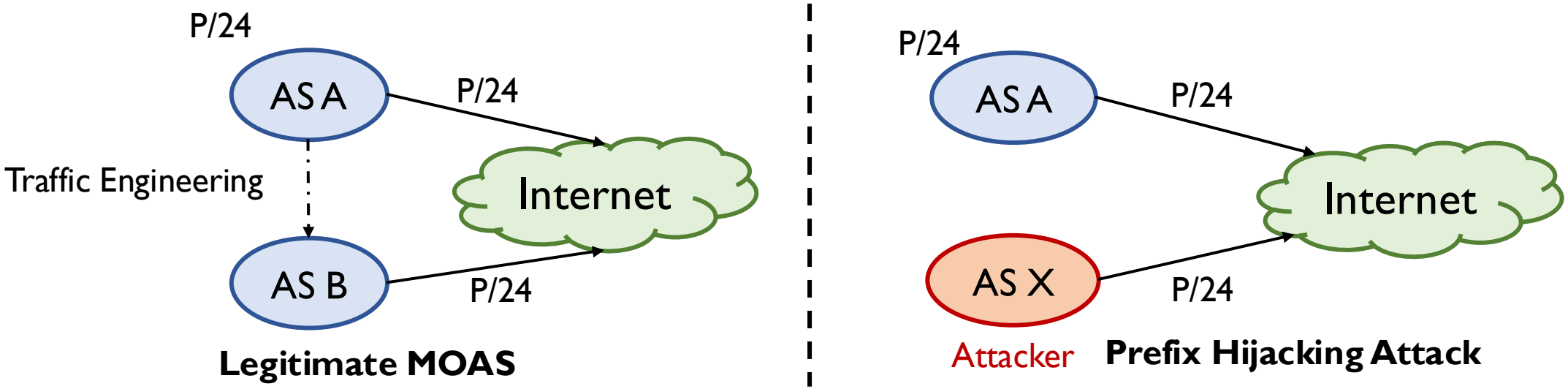
BGP Signed Origin Delegation Attestation (SODA)

Shenglin(Forrest) Jiang
Zhongguancun Laboratory

draft-jiang-idr-bgp-soda

Introduction

- **RFC1930 RECOMMEND**: One prefix, one origin AS
- **Today's Internet**: Legitimate MOAS is common in the era of AI
  - CDN, DDoS mitigation, traffic engineering, IXPs
- **Challenge:** Is it hijack, misconfiguration, or legitimate?



For detailed analysis see our problem statement draft: https://datatracker.ietf.org/doc/draft-jiang-sidrops-psvro/

Measurement

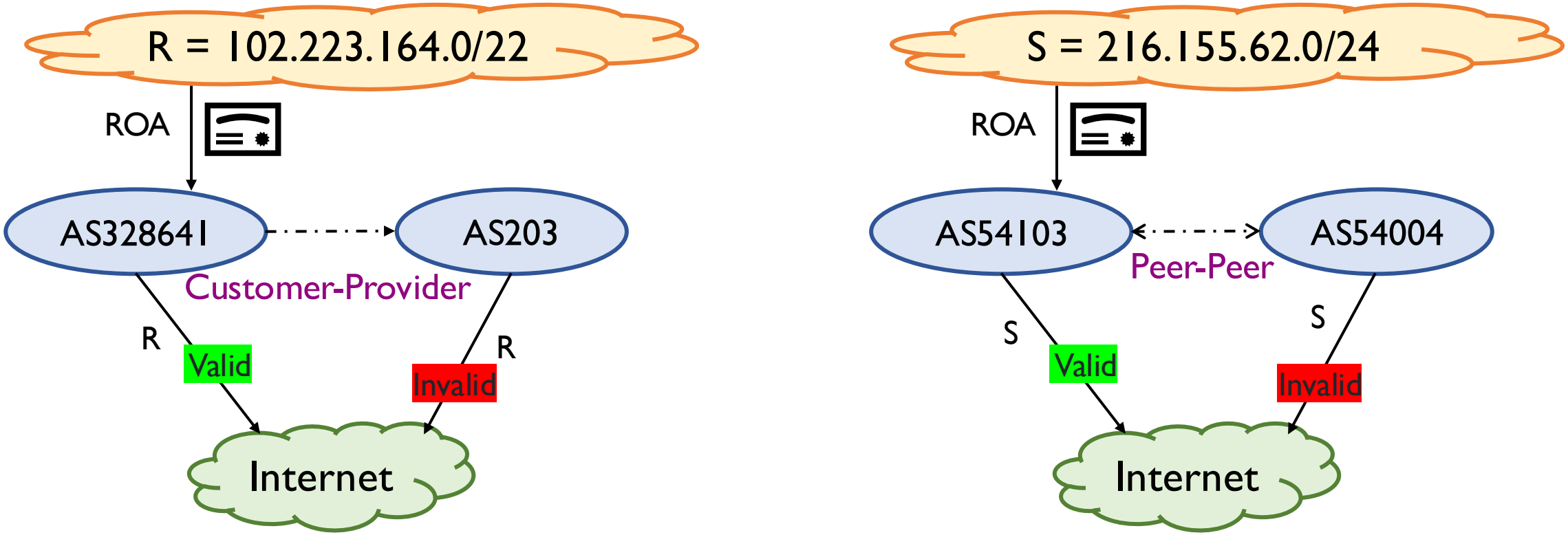
- Existing ROV systems may not adequately distinguish legitimate MOAS from malicious attacks, potentially misclassifying legitimate traffic
  - Over 700 conflicts per day were classified as invalid, which is higher than the results from current monitoring systems
  - Most cases are "false positives", not actual routing hijacks

~20-50%	>83.1%	>73.4%
of networks enforce ROV growth has stalled	of RPKI-Invalid prefixes are legitimate routes	of alerts are false positives hijack-detection

"Demystifying RPKI-Invalid Prefixes: Hidden Causes and Security Risks," NDSS Symposium. Accessed: May 08, 2026.

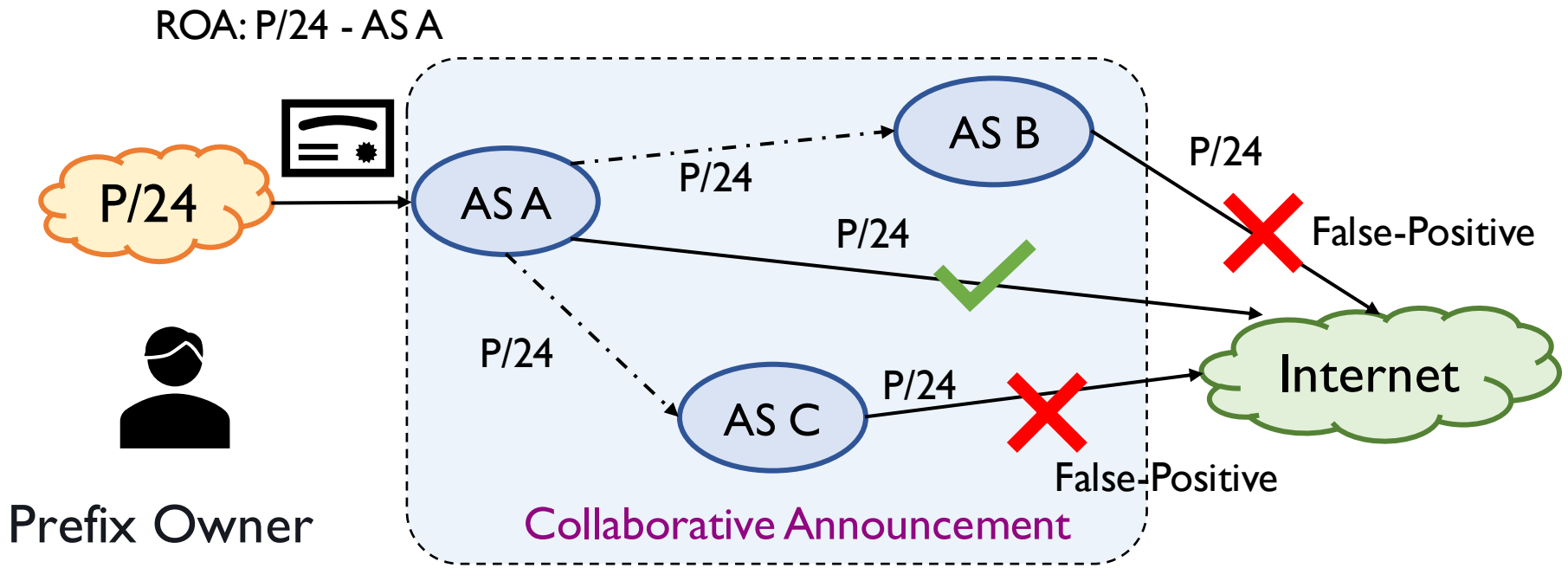
Case Study

- Two ASes in a commercial partnership announced the same prefix. But only one AS is authorized by ROA



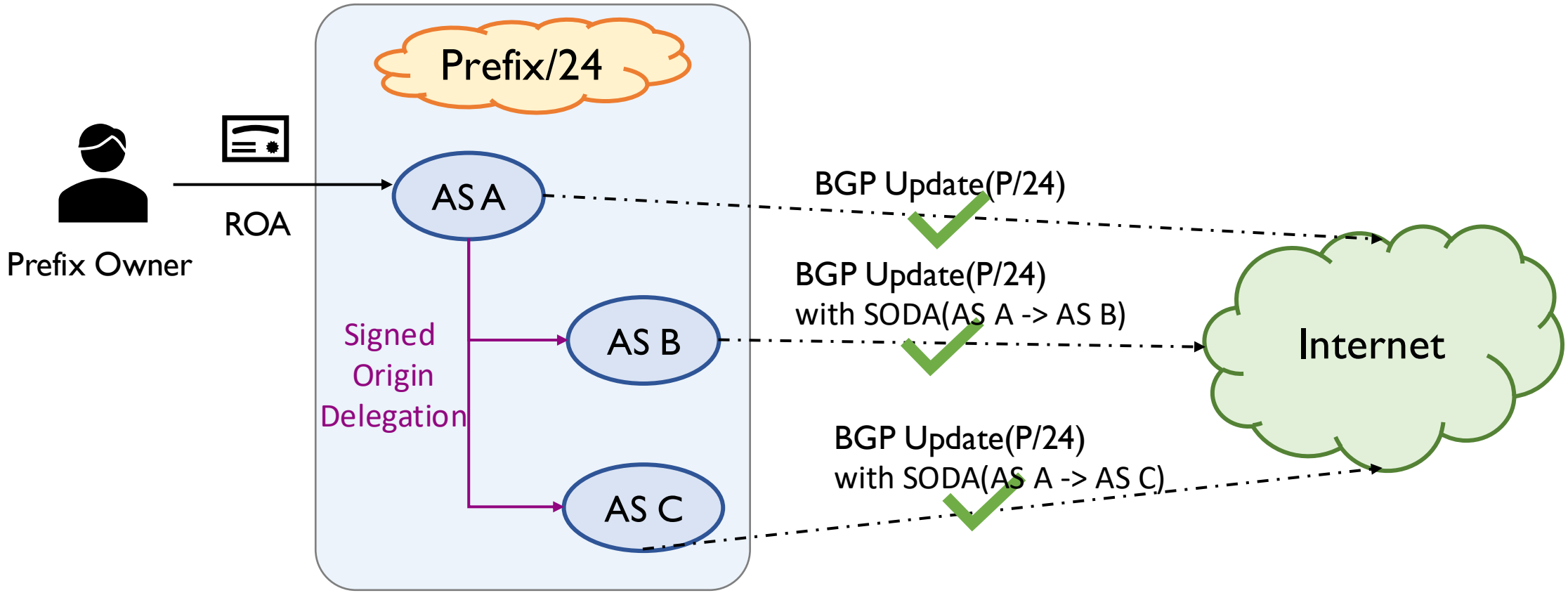
Problem Analysis

- A ROA is a cryptographically signed object that states which AS is authorized to originate IP prefix
- In some scenarios, the authorized AS needs to collaborate with other ASes to achieve business considerations



BGP Signed Origin Delegation Attestation (SODA)

- Signed Origin Delegation Attestation (SODA): *A BGP Path Attribute to Distinguish Legitimate MOAS from Route Hijacking*



How BGP SODA to work?

1 Delegator Signs

- Delegator holds RPKI EE certificate and BGPsec router certificate
- Signs SODA token using BGPsec key
- Delivers signed token to delegate via out-of-band

2 Delegatee Carries

- Attaches SODA attribute to BGP UPDATE messages
- One token per prefix per delegation period
- Signed once, carried many times

3 Receiver Verifies

- Standard ROV: ROA must exist
- Check and verify SODA : query RPKI and confirm delegator-asn holds prefix in EE certificate

Conclusion

- **>83.1%** of RPKI-Invalid prefixes are legitimate delegated MOAS. RPKI cannot distinguish them from hijacks

- We proposed a ”BGP Signed Origin Delegation Attestation (SODA)“, a BGP path attribute allows multiple ASes to announce an IP prefix, supporting business partnerships, traffic engineering, and DDoS mitigation

- The BGP SODA delivers cryptographic delegation proof within the BGP UPDATE, reusing existing BGPsec PKI without new infrastructure, remaining fully backward compatible, and adding minimal overhead

See additional details: *https://datatracker.ietf.org/doc/draft-jiang-idr-bgp-soda/*

Thank You!
Questions & Feedback

Comments are welcomed

Please email feedback or collaboration to

jiangshl@zgclab.edu.cn

or

draft-jiang-idr-bgp-soda@ietf.org