# Impact of Prefix Hijacking on Payments of Providers

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## Introduction

Whereas prefix hijacking is usually examined from security perspectives, this work looks at it from a novel economic angle. Our study stems from an observation that a transit AS (Autonomous System) has a financial interest in attracting extra traffic to the links with its customers. We simulate a real hijacking incident in the Internet in a real Internet-scale AS-level topology with synthetic traffic data. Then, we measure traffic on all inter-AS links and compute the payments of providers. The analysis of our results from technical, business and legal viewpoints suggests that hijacking-based traffic attraction is a viable strategy that can create a fertile ground for tussles between providers. In particular, giant top-tier providers appear to have the strongest financial incentives to hijack popular prefixes and then deliver the intercepted traffic to proper destinations.

## Methods

❑ A real incident of prefix hijacking in the Internet using a real AS-level topology

- YouTube prefix hijacked by Pakistan Telecom on 24th of February 2008 [1]
- AS-relationship data set recorded on 21st of February 2008, by the Cooperative Association for Internet Data Analysis (CAIDA) [2]
- Internet-scale simulations in C-BGP [3]

❑ Synthetic demand for YouTube-bound traffic

- Uniform YouTube addressed video uploads from 27084 ASes

❑ Inter-AS link pricing and provider payments

- Price $p_t$ for a transit link [4]: $p_t = m_t * V^{0.75}$

  $V$ is the traffic volume in Kbps
  $m_t = 0.0675$ is such that 1 Mbps is priced at \$12

- Price $p_e$ for a peering link [5]: $p_e = m_e * V^{0.4}$

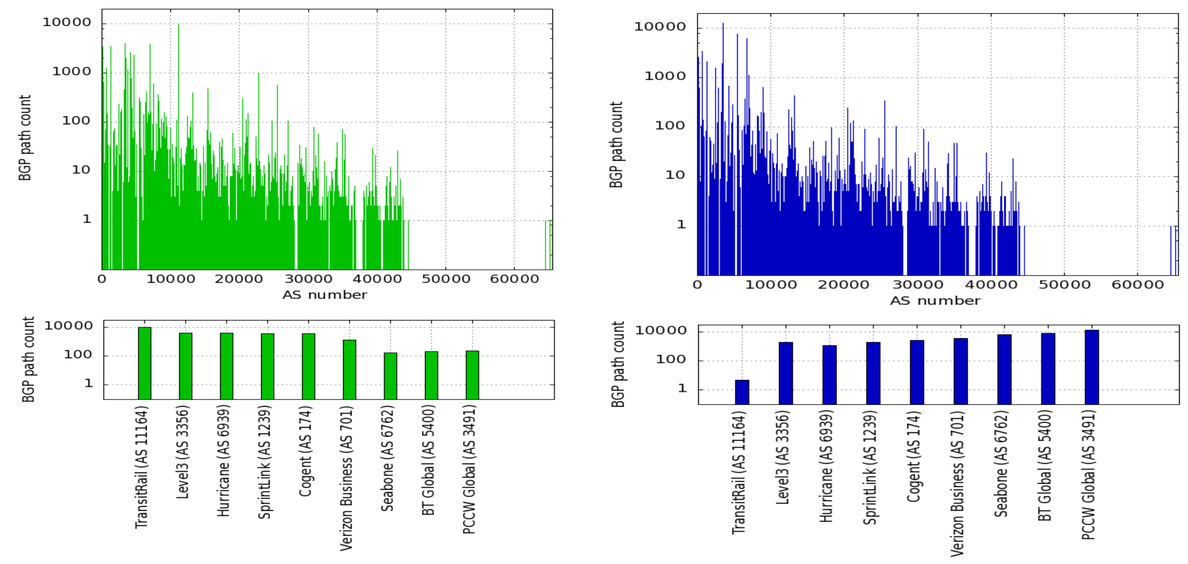
  $V$ is the traffic volume in Kbps
  $m_e = 0.0631$ is such that 1 Mbps is priced at \$1

- Payment P of an AS: $P = \Sigma_{t \in R} p_t - \Sigma_{t \in C} p_t - \Sigma_{e \in E} p_e$

  Set R contains the transit links where the AS is a provider
  Set C contains the transit links where the AS is a customer
  Set E contains the peering links of the AS

## Results

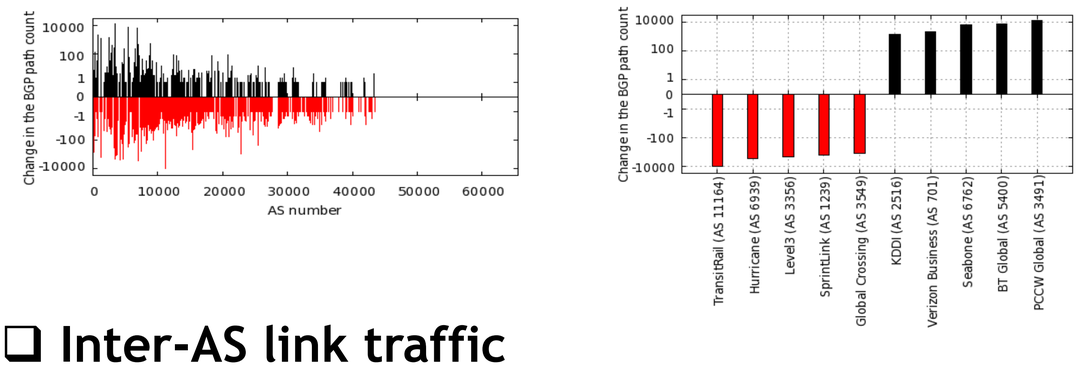
❑ BGP path counts of transit ASes



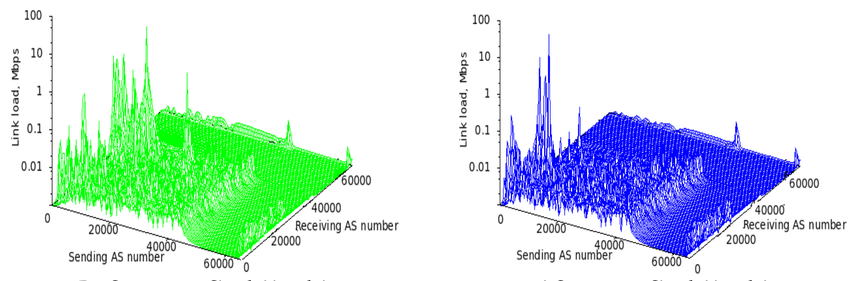

Before prefix hijacking — After prefix hijacking

Overall distributions are similar but some ASes are significantly affected

❑ Losers and winners of BGP paths



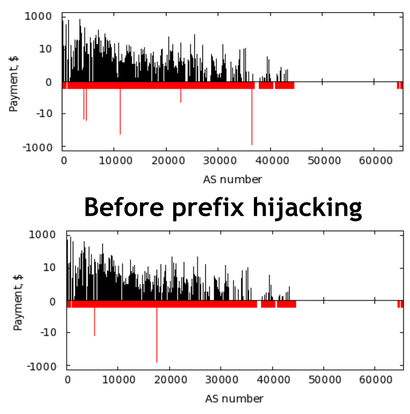

❑ Inter-AS link traffic




Before prefix hijacking — After prefix hijacking

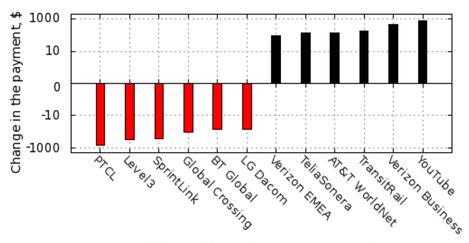
PTCL (AS 17557) successfully attracts YouTube (AS 36561) traffic

❑ Payments of providers




Before prefix hijacking

After prefix hijacking




Top-five losers and winners of payments

Top-tier provider-free ASes are biggest financial beneficiaries

## References

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