



CERIAS

the center for education and research in information assurance and security

Exploiting Overlays for Practical and Profitable Traffic Attraction

Jeff Seibert and Cristina Nita-Rotaru

Department of Computer Science and CERIAS, Purdue University

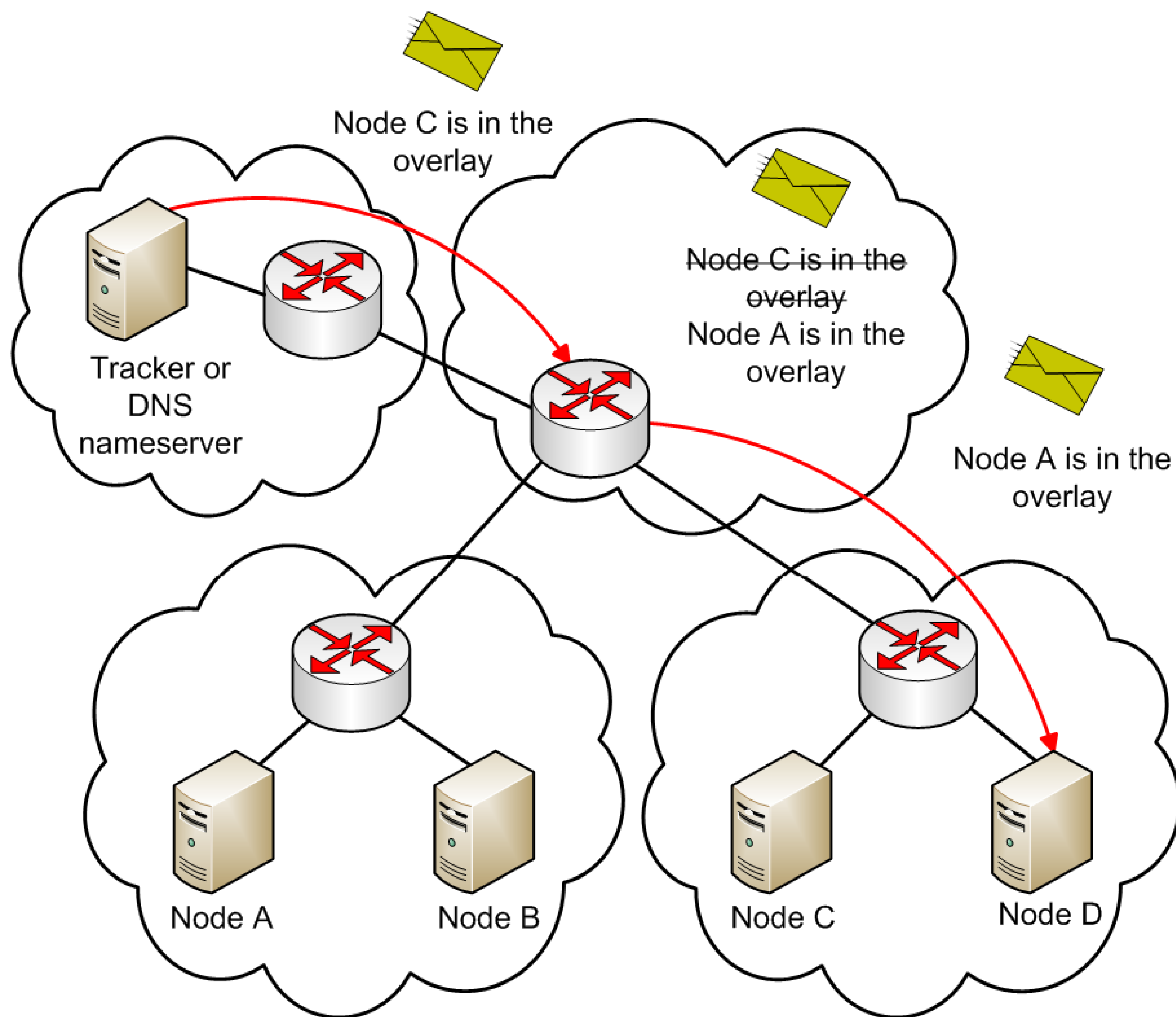
The Internet is heading towards efficiency!

- Content Distribution Networks (CDNs) are increasingly more prevalent
- Peer-to-Peer (P2P) systems are becoming "ISP Friendly"
- These efficient overlays reduce the amount of costly traffic that Internet Service Providers (ISPs) must send to other ISPs.



How does this efficiency happen?

- CDNs have servers all over the world on which they replicate content. The DNS infrastructure is used to direct users to the best available server.
- Recent research in P2P systems have proposed several different ways that nodes can find and choose peers that are in the same ISP or close by.



However, some ISPs actually gain from inefficiency!

- ISPs form provider-customer relationships, where the provider is paid by the customer to transport traffic.
- If a customer ISP can reduce outgoing traffic, this results in the provider losing revenue.
- As P2P and CDN traffic consist of a large percentage of traffic on the Internet today, we hypothesize that provider ISPs can profit much by causing **traffic attraction** attacks.

How can traffic attraction occur?

- ISPs manipulate the control plane of overlays so that data flows over their networks, along profitable paths.
- ISPs can rewrite DNS and BitTorrent tracker responses that travel along their networks, with nodes of their own choosing.
- ISPs can also simply deploy their own BitTorrent trackers or modify their DNS servers to influence nodes.

How profitable can traffic attraction be?

- We crawl a very popular BitTorrent tracker to find which clients were interested in which content.
- With BGP data, we are able to infer which ISPs will profit when two nodes send data to each other.
- Through simulations, we evaluate what happens when peers are selected randomly and also when an ISP controls the tracker.
- We find that most provider ISPs are able to at least double the amount of profitable traffic they carry. We also discover the trend that the smaller the ISP is, the more potential it has to increase traffic. Some ISPs can increase their profitable traffic more than 40 times.

BitTorrent Traffic Attraction Per ISP

