Review: Peer-Assisted Content Distribution

Summary

The paper discusses the benefits and potential risks of peer-assisted CDNs using a Hybrid CDN called NetSession.Hybrid CDN's combine the architectures of infrastructure systems and peer-to-peer systems.NetSession was a system designed to combine the key benefits of peer-to-peer CDNs i.e scalability and infrastructure CDNs i.e reliability. NetSession uses HTTPS or HTTP protocol to download content from edge servers, and swarm protocol to download from peers. Unlike Bittorrent there is no tit-for-tat strategy that would affect slow uploaders and so users are free to not upload the content. Along with downloading the file, HTTPS connections with edge servers have other functionalities like ensuring content integrity, authorisation, configuration and reporting.The protocol is robust and handles situations where failures of different nodes can occur.

Using data collected from the logs for october 2012, the paper claims that though the users are not required to contribute resources, they generally leave the setting to the default value chosen by the content provider. Paper also claims that the performance is not reduced significantly when compared to infrastructure systems, and is more reliable than peer-to-peer network. Peer-assisted network helps achieve global coverage as it makes it possible to access content even if the closest infrastructure nodes are far away.Overall the design is attractive and can deliver a number of benefits which complement the key weakness such as user mobility, malicious peers.

Strengths

1. The main strength of the paper is the theory explained in the first part is backed by proper data analysis and charts which helps in understanding the key points easily.
2. Peer-assisted CDNs can offload a significant percentage of the traffic to peers without a significant loss in performance or reliability, thereby reducing the cost of maintaining the infrastructure resources.
3. Peer-assisted networks help improve global coverage.

Weaknesses

1. Related work could have been in the beginning, which helps in getting an approximate idea of the work described in the paper.
2. Malicious peers could cause trouble and so peer-assisted networks need additional protection against attacks from within the network.

What did you learn from the paper?

The idea of achieving the best of both the worlds i.e infrastructure systems and peer-to-peer systems is interesting and new to me. I learned that though users generally don't tend to upload when there is no incentive, using peer-assisted CDN the download speed is not much affected which is not intuitive but is interesting.

Avenues of future work

Further detailed analysis on the weaknesses of peer-assisted CDNs exploring possible attacks is an area that can be explored.

What would you do differently

1) As for the ordering of the sections I would place the related work section after the Introduction section.
2) NetSession avoids the risk of tilting traffic of ISPs, this was backed by data but no proper explanation was given as to how it avoids. I would try to explore this area.
3) If possible I would try to gather/generate data on different vulnerabilities and do some analysis of what could affect peer-assisted CDNs.

Comments

The paper is extremely interesting, starts with a motivation and describes the approach clearly using examples and figures when needed. Gives a detailed explanation of the whole architecture and identifies the key strengths and weaknesses of the architecture. It also uses data to support the benefits of the approach. Only feedback is that it would have been better if the weaknesses could be explained in detail similar to the strengths.