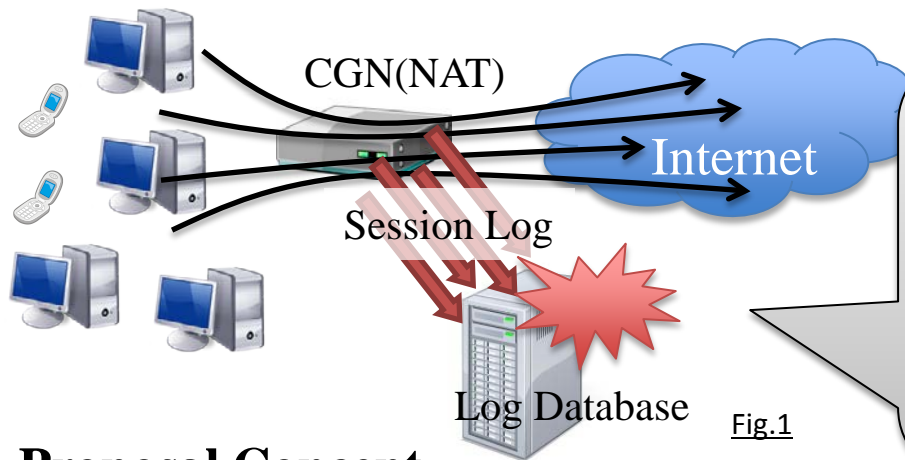


# A Novel Management Method of Carrier Grade NAT for Large Scale IPv4/IPv6 Networks

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## Problem

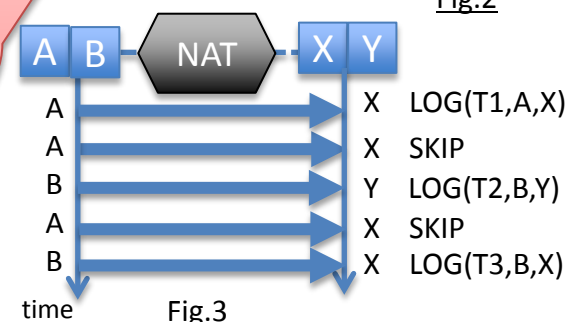
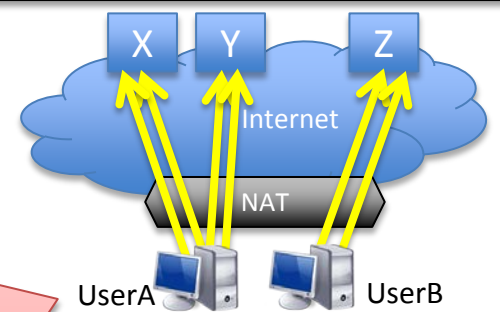
**The session log volume can be too large.**

- IPv4 address depletion forces ISPs and enterprises to deploy NAT in their networks.
- Network providers have to maintain the traceability for abuse of their users for several months.
- Potentially, the log volume will be 1PB/1M users/month.

## Proposal Concept

**This study assumes per-user bias of Internet usage, i.e. which destinations a user connects to, and when a user is active are seemed to be biased per-user.**

- In a simple case, when UserA connects to only site X and Y, and UserB connects to Z several times, per-session logging is not needed. (Fig.2)
- When clients share the same destination, by making use of timestamp of each session, logging of successive accesses from a user to a site can be compressed. (Fig.3)



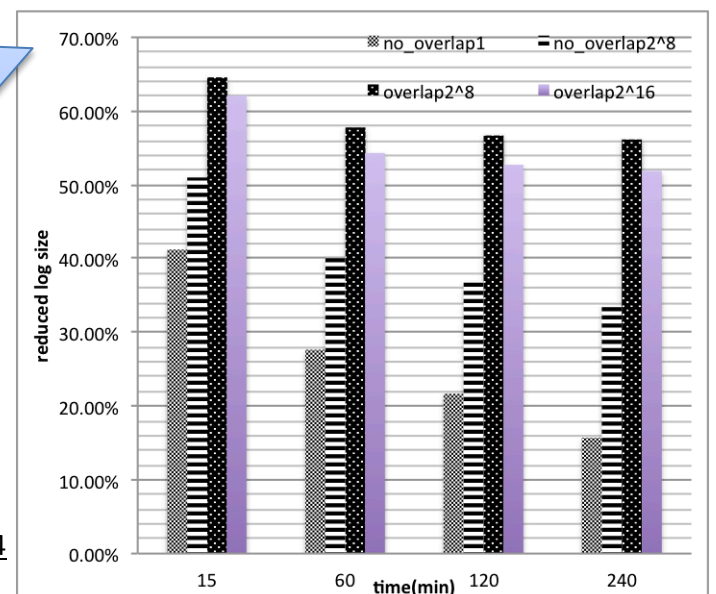
## Evaluation and Considerations

**The best reduction ratio is 48.2%. The reduction ratio depends on the length of time period and on the number of users that share an IP address.**

- This proposal is evaluated using actual TCP traffic data captured at trans-pacific line by WIDE project.

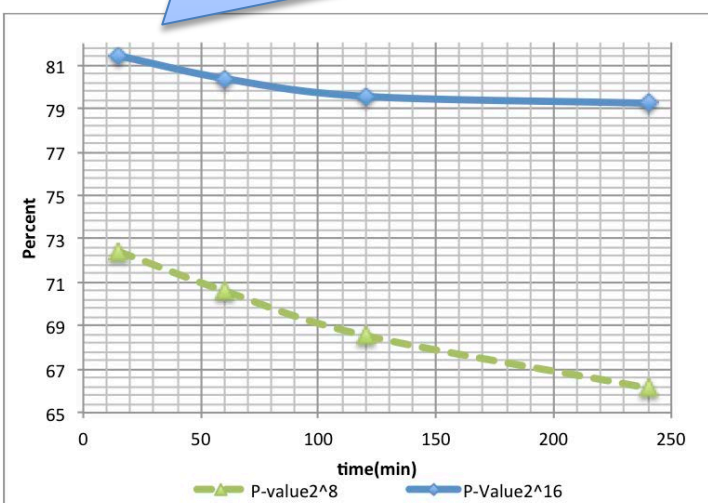
**The theoretical maximum reduction ratio by this mechanism is explored. If we take time period long enough, the ratio will converge around 79%.**

- When time period is long enough, access to new hosts can be ignored. Fig.5 explores the ratio of successive access of a user to a dst. host, which will be equal to reduction ratio.



## Conclusion

**This study proposes a mechanism for NAT log reduction, evaluates it using actual traffic data, and explored the theoretical maximum reduction ratio. More comprehensive evaluation is needed to verify the hypothesis of maximum ratio.**



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