

LENS: Leveraging Social Networking and Trust to Prevent Spam Transmission

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Spam is Bad

- In 2010, 89% of the emails were spams (262 billion spam messages daily) [1].
- Projections show that spam will incur a cost of \$338 billion by 2013 [2].

Common State-of-the-Art Strategies

- Filter spam at the recipient's edge.
- Content-based filtering has turned spam problem into false +ve and -ve one.

LENS, a novel spam protection system, leverages the social network of the recipient.

- Mitigates spam beyond recipient's social circles, by accepting only legitimate emails.
- Filter at the SMTP time to prevent transmission at the sender's edge.

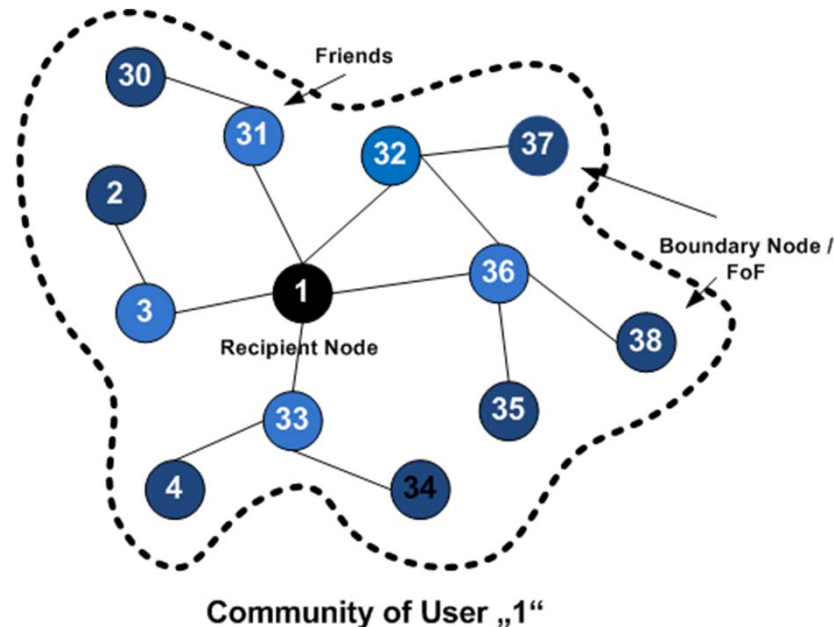
There exists two types of communication

1. Within recipient's community (social network).
2. Outside recipient's community (rest of the world).

Communication Within Community

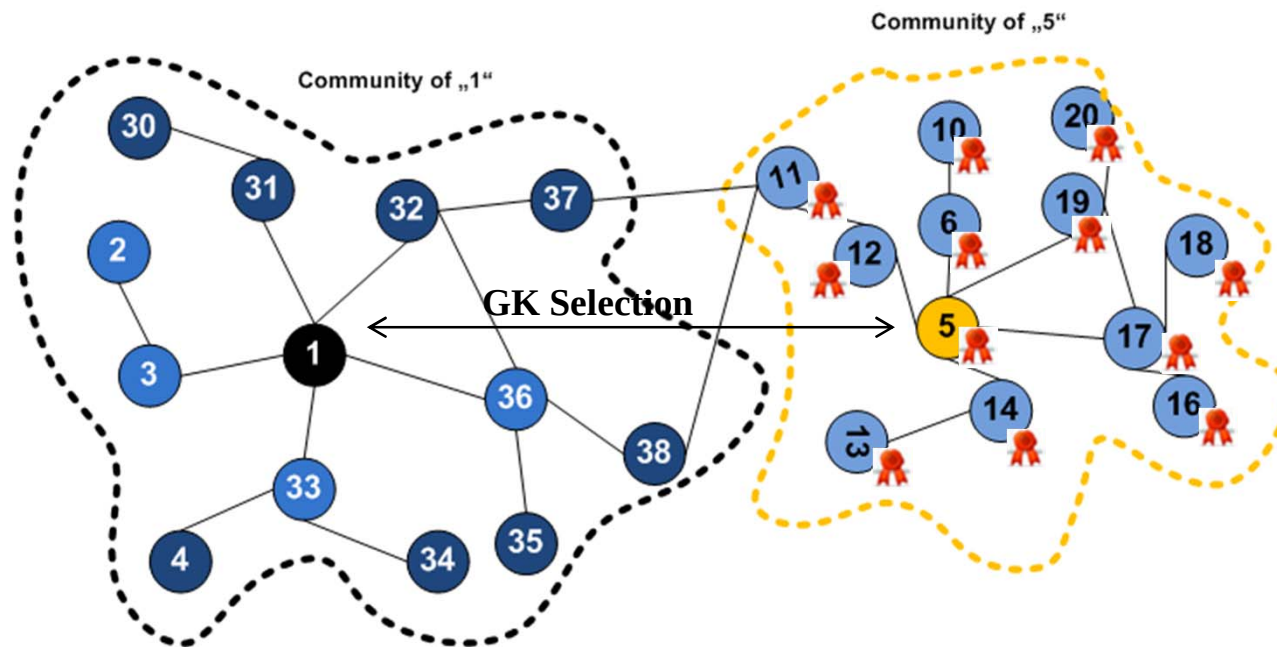


- Any email within the community is delivered directly to the recipient.
- Community consists of two social hops
 - Friends and
 - Friends of Friends (FoF), also called boundary nodes (BN)

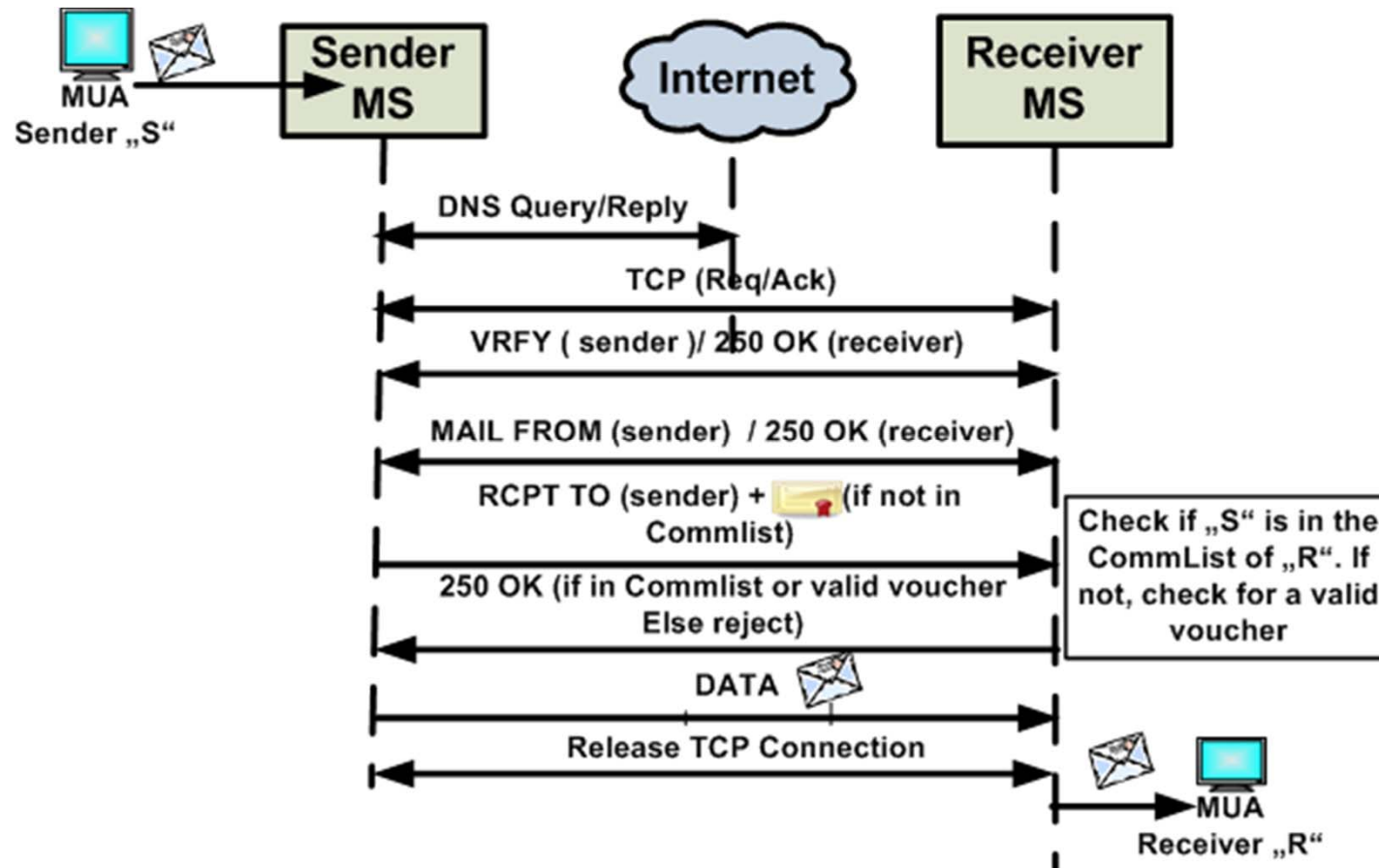


Communication Outside the Community

- Trusted/Legitimate users, called Gate Keepers (GKs) are selected at various hop counts away for the recipient.
- GK vouch for legitimate users outside the community of the recipient, by issuing unforgeable vouchers.
- GK can only vouch for his immediate community.



Email Processing with LENS



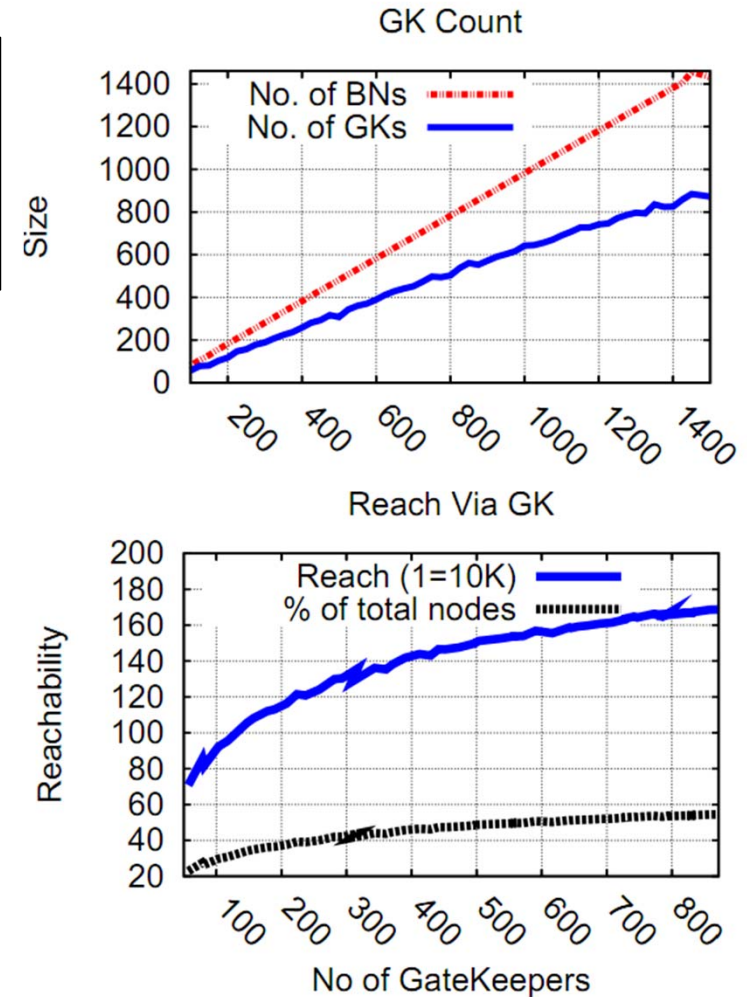
Experiment on Facebook Dataset



Interested in

- # of GKs for receiving messages
- Reachability of recipient via GK

- 3.1 M users, 23 M edges [3]
- Randomly select 4K users of community size 100-1500
- Number of GKs between 56-880
- Reachability between 710K - 1.7 million (23-55%)



Reliable email delivery from millions of potential users is possible using GKs in the order of hundred.

Thanks



References



- [1] <http://royal.pingdom.com/2011/01/19/email-spam-statistics/>
- [2] <http://www.redcondor.com/company/>
- [3] Christo Wilson, Bryce Boe, Alessandra Sala, Krishna P.N. Puttaswamy, and Ben Y. Zhao. User interactions in social networks and their implications. In Proc. of EuroSys, 2009.

LENS Architecture

