SHRED: Spam Harassment Reduction via Economic Disincentives

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Joint work with Ed Blackmond, Eureka! Computing Solutions, Inc.

Quick background on Spam

- Email deemed as unwanted by receiver (often commercial/mostly unsolicited)

- Problem getting worse

- Number one source of complaint for major ISPs

- Some customers believe ISP is behind the spamming!

- Spammers getting smarter and filtering alone may not work

Our contribution

- We propose economic disincentives to spammers (only)
- Current cost for spamming is close to zero
- Economic disincentives have never been tried
- Our scheme is complementary to all the filtering schemes (reuse what works)

Requirements of anti-spam scheme

- Wanted email flows exactly as today (transparent to sender and receiver) without added monetary cost.

- Spammers can continue to participate but with added cost

- Should not have to give up on mailing lists, mail forwarding etc.

- Non-participant ISPs can continue to send/receive mail

- Since 100% of inter-domain email is over SMTP, no new protocol should be invented

- No additional impact on privacy of participants

Novel notions in our scheme

- Limited liability (not necessarily translated to cost) with one possible expression of liability as "stamp", which have associated expiry time.

- Credit Limit: number of stamps available to user at any given time. Varies between classes of users, set by ISP.

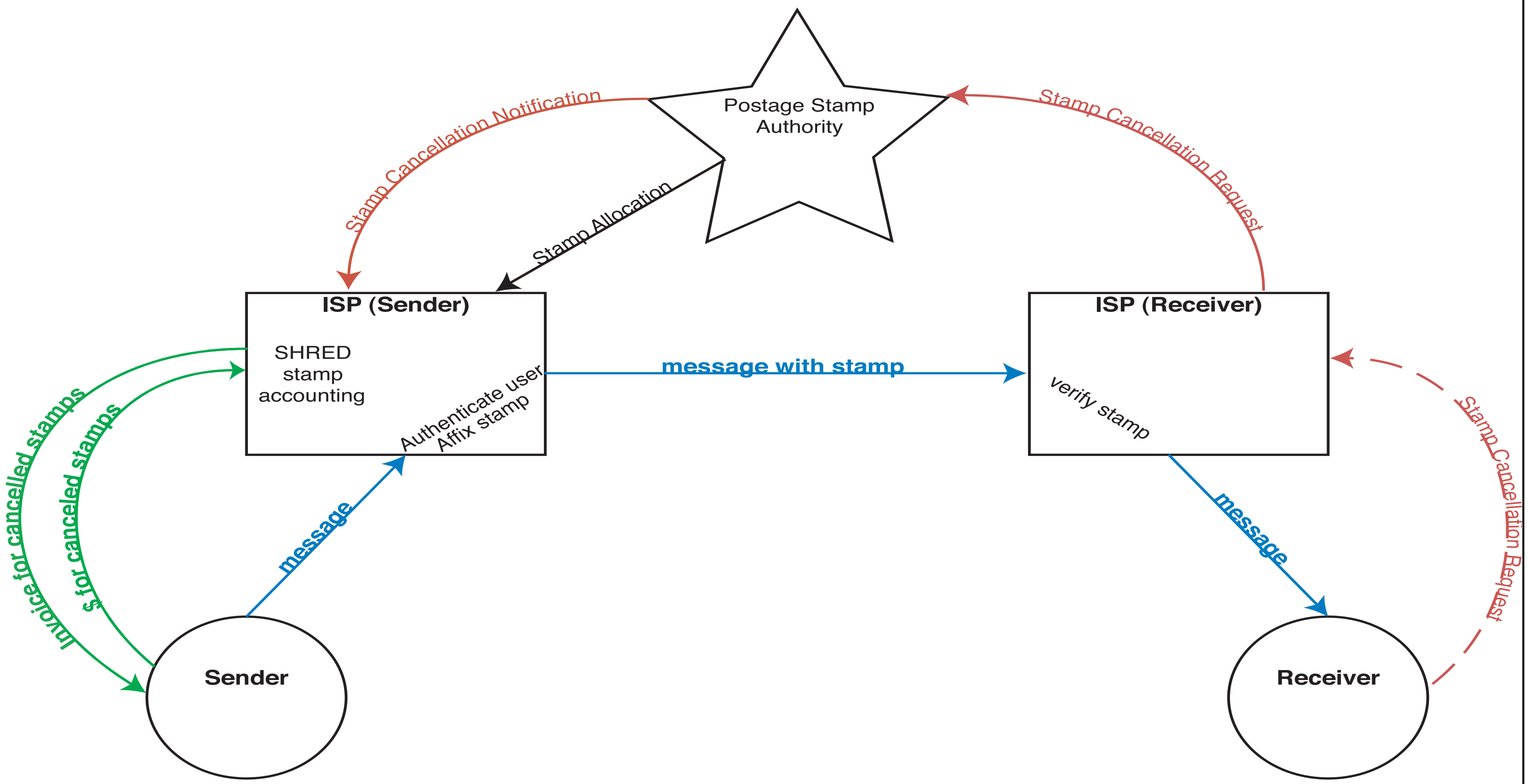
We seek to avoid:
Mandatory cost (monetary, computation, ...) added to *all* mail (wanted and unwanted).

We seek to reuse many existing ideas: whitelists, blacklists, filters

Scheme

- Postage Stamp Authority (PSA) – neutral stamp managing entity, allocates stamp offline to ISPs via secure channel
- Participant ISPs include a 'stamp' SMTP header with outgoing mail
- Stamp, with expiry time, expresses sender's liability (modest amount)
- Senders have a (varying) limit on number of outstanding stamps
- Receivers can (optionally) allow only stamped messages
- Receiver, within stamp expiry period, can 'cancel' unwanted messages
- Users 'credit' limit automatically increased upon stamp expiry
- Cancellations add cost reduce sender's ability to send more messages (can reduce credit limit for longer period - until renegotiation)

SHRED Architecture

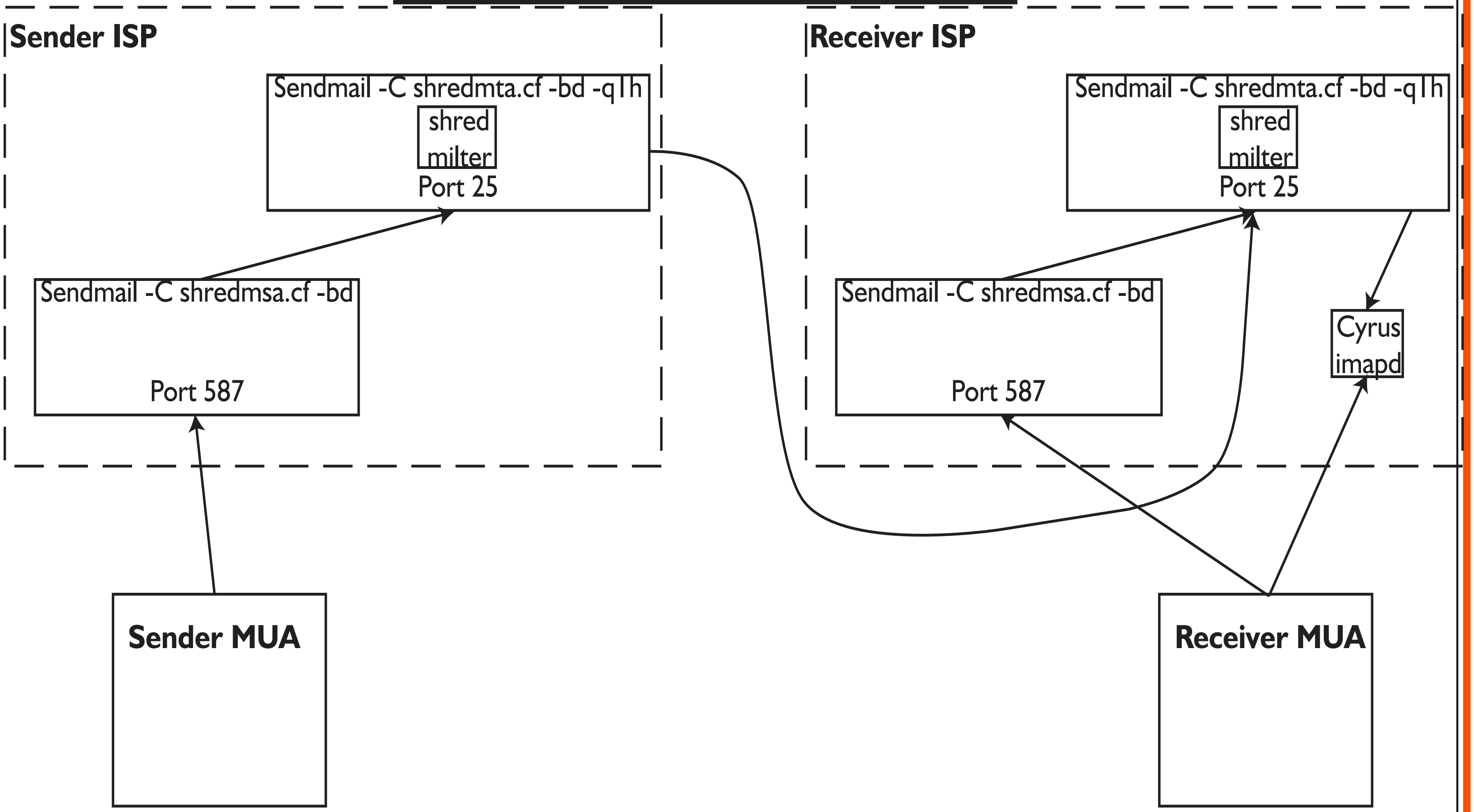


Internet E-Mail Delivery w/ SHRED

Benefits

- Meets transparency goals of senders/receivers
- Implementable on top of SMTP (prototype done, 1K LOC)
- Stamps are cryptographically strong and costly for rogues to break and once detected get added to black list
- Co-operates well with all filtering schemes; can also use filter to cancel stamps of spam messages automatically
- Provides economic disincentive to spammers since they may now have to pay for mail that may not even be read

SHRED Implementation



What does a stamp look like

- Version ID
- Julian seconds (current time)
- Internal counter
- Issuing PSA ID
- Sender ISP ID
- Signed by PSA issuing stamp

Status

- AT&T has intellectual property interests in this area
- Prototype implementation
- Detailed paper ready (beta review)
- Ongoing discussions with WorldNet and AOL (anyone else here interested?)
- Open for suggestions