Massive emailing

With Linux, Postfix and Ruby on Rails

Iván Belmonte <http://ibelmonte.com>

The problem

Your internet app is offering user registration with newsletter subscription and alerts

Almost 90% of your registered users use free email accounts from Hotmail, Gmail or Yahoo.

Why your email messages can be marked as Spam:

* The context
* The content type
* The amount of users getting the same message
* Other antispam tests: SMTP headers, DNS stuff, networking...

The problem

The systems detect you as a spammer
=> marks you as SPAMMER

Users get your emails in INBOX, but move them to junk folder
=> they report you are a SPAMMER
=> system marks you as SPAMMER

Things you can do in a non technical way

- Refine your contents and target
- Personalize your emails, don't send the same to everyone
- Send each user that info affecting him, or that you think he will be interested in

The technical solution

Most important concept: **REPUTATION**

Focus on:

* **Sysadmining:** DNS, MTA (postfix)
* **Programming:** rails plugin *ar_mailer*
* **Networking:** routing (netfilter)

The technical solution

The concept behind **IP REPUTATION**

It's like a credit score. One provider knows what type of email can expect from you (IP), based on the history of email received from you along the time.

↓↓ emails = neutral reputation

↑↑ emails ↓↓ spam = ↑↑ reputation

Domain REPUTATION also affects

↑↑ spam links to your domain = ↓↓ domain reputation

The technical solution

Most important provider **LIMITS**

Amount of emails ⟹ i.e: Hotmail ~15.000 eml/day

It differs on each provider, and may vary depending on the spam hits

Trap hits ⟹ *Mailbox unavailable* bounces

Complaint rates ⟹ Amount of users tagging your emails as SPAM or Junk

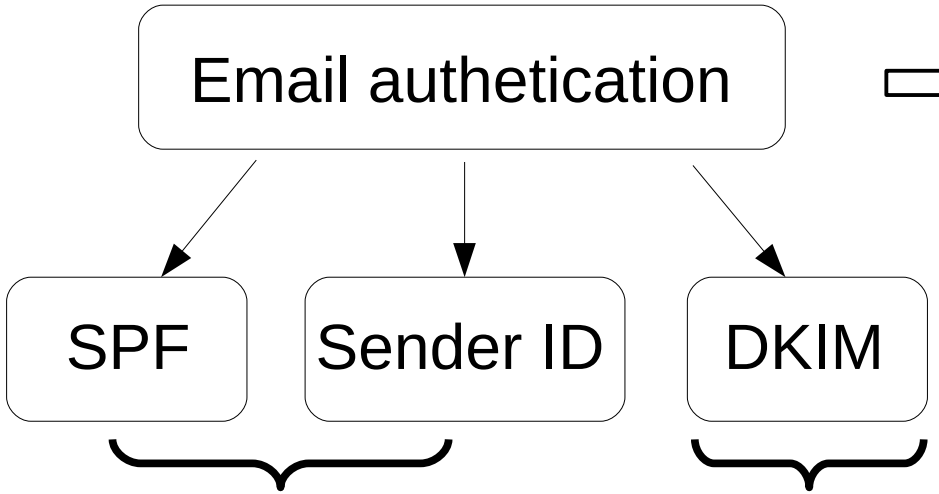
Trap hits + complaint rate ⟹
- \- 1% acceptable
- \+ 1% suspicious
- \+ 10% spammer

The technical solution

↓↓ emails = neutral rep ⟹ hard limits

Spam! = bad rep ⟹ ***SPAM***

↑↑ emails ↓↓ spam = ↑↑ rep ⟹ relaxed limits



⟹ Helps good scoring on AS tests

WHO can send email using your domain name

Identifies the server which the email is coming from

The keys

- Set up **SPF** on your DNS servers
- Set up **Sender ID** (Microsoft crappy clone of SPF)
- Set up **DKIM** (DomainKeys) to sign your messages
- Send your emails on an **even flow** (periodically)
- Don't try unavailable targets: build a **blacklist**
- Don't annoy users: build a **greylist**
- **Balance** the amount of emails between multiple IP's

The keys:

SPF
(Sender Policy Framework)

The keys: SPF

SPF is a DNS technique: a record saying WHO can send emails using your domain name.

```
ivanhq.net.       TXT  "v=spf1 ip4:213.27.212.191 ip4:213.27.212.208 \
                          a mx ptr include:aspmx.googlemail.com ~all"
```

v=spf1	⇨	SPF version 1
ip4:aa.bb.cc.dd	⇨	Ipv4 IP's allowed to send email using this domain
a mx ptr	⇨	DNS resource records where these IP's can appear
include:aspmx.googlemail.com	⇨	Also inherit SPF from aspmx.googlemail.com's DNS zone
~all	⇨	The rest of the IP's on the internet are prohibited

The keys: Sender ID

Sender ID is strongly based in SPF, but it's algorythm for authentication differs from the original.

No need to set up anything special, SPF will produce validation pass as well.

You can notify Microsoft your SPF record using a form located in:

http://www.microsoft.com/senderid

The keys:

DKIM
(DomainKeys Identified Mail)

The keys: DKIM

DKIM is an evolution of DomainKeys

Signs your messages with a unique SSL key for your domain

Quick setup for Postfix

► Install the milter and generate a key

```
aptitude install dkim-filter
mkdir /etc/dkim
cd /etc/dkim
dkim-genkey
```

► Edit *`/etc/dkim-filter.conf`*

```
Domain yourdomain.com
KeyFile /etc/dkim/default.private
Selector Default
```

The keys: DKIM

- Enable the milter local socket *`/etc/default/dkim-filter`*

```
SOCKET="local:/var/run/dkim-filter/dkim-filter.sock"
```

- Tell Postfix about the milter *`/etc/postfix/main.cf`*

```
milter_default_action = accept
milter_protocol = 2
smtpd_milters = local:/var/run/dkim-filter/dkim-filter.sock
non_smtpd_milters = local:/var/run/dkim-filter/dkim-filter.sock
```

- Restart postfix and dkim-filter

```
/etc/init.d/dkim-filter restart
/etc/init.d/postfix restart
```

The keys: DKIM

- Setup a TXT record on your DNS zone with the contents of */etc/dkim/default.txt*

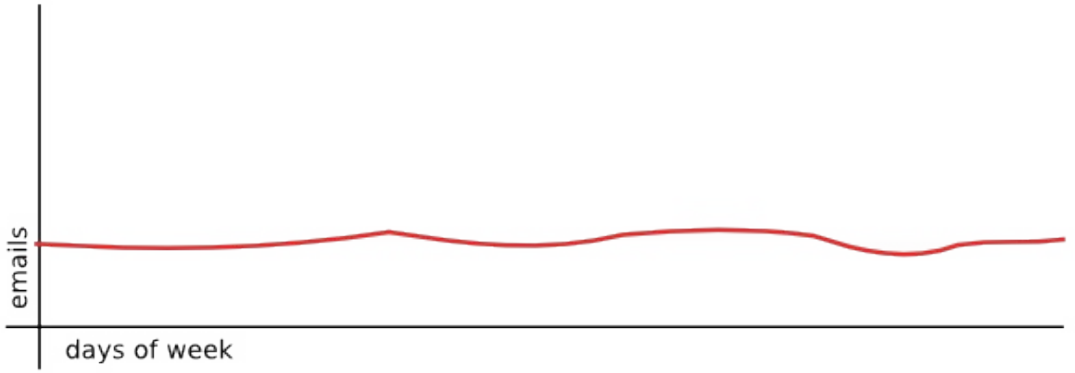
```
default._domainkey IN TXT "v=DKIM1; g=*; k=rsa; p=MIGfMA0GC\
SqGSIb3DQEBAQUAA4GNADCBiQKBgQDKMSawPqz66qFjWQqPv1IftH5\
Xki5tGBqOMKtdv6v1oRQauHmCIrMmXXtNajsxdcifQKKKQPD4s4k5tMVha\
BfiUH8i69nIbfUsOaso0fhVU7/YLlbe5dyQscFgbFwgPU2mMMcXuQgDipwx\
cedGjQYYM0u+JXbDw0BthXELDIkfQwIDAQAB"
```

The keys:

Sending flow
(ar_mailer rails plugin)

The keys: sending flow

Don't send your email all at once: send it on an even flow during all the period.



The keys: ar_mailer

ar_mailer stores your emails in a DB, and lets you send them in batches.

- Install ar_mailer plugin (gem is not Rails 2.2 comp)

```
script/plugin install git://github.com/adzap/ar_mailer.git
```

- Generate a model for the emails

```
script/generate model email
```

- Setup a simple validation for the emails

```
class Email < ActiveRecord::Base
  validates_presence_of :from, :to, :mail
end
```

The keys: ar_mailer

- Change application ActionMailer's delivery method
  environment.rb

```
ActionMailer::Base.delivery_method = :activerecord
```

- If you don't have one, create a mailer class

```
class Newsletter < ActionMailer::ARMailer
end
```

- If you already had one, simply replace

```
# class Alerts < ActionMailer::Base

class Alerts < ActionMailer::ARMailer
[...]
end
```

The keys: ar_mailer

Plugin comes with a script called *ar_sendmail* used for managing the queue of messages stored in DB.

- You can see your queued mails

```
ruby /usr/bin/ar_sendmail --mailq --chdir /path/to/your/app/   \
--environment production
```

- I usually prefer a script for these things

```
#!/bin/bash
#
# super hacker script for looking the ar_mailer queue
# place it in    /usr/local/bin/ar_queue.sh   or something

RUBY="/usr/local/bin/ruby"
AR_SENDMAIL="/usr/bin/ar_sendmail"
PATH="/var/www/www.subastasde.com/current/"
ENVIRONMENT="production"

$RUBY $AR_SENDMAIL --mailq --chdir $PATH --environment $ENVIRONMENT
```

The keys: ar_mailer

- Run ar_sendmail in verbose mode to see if it works

```
ruby /usr/bin/ar_sendmail -ov
```

- Run ar_sendmail daemon mode if you like it...

```
ruby /usr/bin/ar_sendmail -d --batch-size 20 --delay 300

# 20 emails per batch
# 300s between batches
```

- ...or from the cron if you prefer

```
*/5 * * * *     /usr/local/bin/ruby /usr/bin/ar_sendmail -o --batch-size 20   \
                --chdir /path/to/your/app/ --environment production
```

The keys: ar_mailer

- If you need a mailer class to send messages inmediately you can set up ar_mailer individually

```
# environment.rb
ActionMailer::Base.delivery_method = :sendmail
```

```
# quick sending class

class QuickClass < ActionMailer::Base
end
```

```
# ar_mailer class

class QuickClass < ActionMailer::ARMailer
  self.delivery_method = :activerecord
end
```

The keys:

Manage *trap hits* and *complaint rates* (blacklist and greylist)

The keys: building lists

Show an **UNSUBSCRIBE** button on each email you send
Show also a **No more emails from you** button
The easier/quicker they are, the better for you

- Use a token based authentication (i.e. Atuhlogic plugin)
- When someone **unsubscribes**, you put him on the **greylist**
- When someone clicks **No more emails**, put him on the **blacklist**

greylist

You can't send newsletters

You may send alerts

You may send platform notices

blacklist

You send NOTHING

The keys: log parsing

- Build a log parser for blacklisting trap hits
- look for “user unknown”, “mailbox unavailable”, “mailbox is full”...

```
#!/bin/bash
#
# super hacker script for blacklisting unavailable mailboxes
# place it in    /usr/local/bin/blacklist_log_parser.sh   or something

STRING=”user unknown”
DBNAME=”my_app”
DBUSER=”h4cker”
DBPW=”god”

UNKNOWN_USERS=`grep -ir "$STRING" /var/log/mail.log | cut -f 2 \
 -d "=" | cut -f 1 -d ">" | cut -f 2 -d "<" | sort -u`

for USER in $UNKNOWN_USERS; do
        mysql -u$DBUSER -p$DBPW $DBNAME -e \
        “INSERT INTO blacklist VALUES('','$USER')”
done
```

The keys:

Sending limits
(netfilter routing)

The keys: routing

Limit your sending to not more than 50.000 eml/week per IP

Solution: send your eml from multiple IP's (2 or more)

- The hard way: multiple MTA instances, maintaining routing decision
- The easy way: route outgoing traffic with netfilter

```
#!/bin/bash
#
# super hacker script for balancing traffic on two IP's
# place it in    /etc/init.d/mxload   or something

MX1_IP="74.207.246.203"
MX2_IP="74.207.246.205"

/sbin/iptables -X
/sbin/iptables -F
/sbin/iptables -t nat -X
/sbin/iptables -t nat -F                                    (part 1)
```

The keys: routing

```
/sbin/iptables -t mangle -A POSTROUTING -o eth0 -p tcp --dport 25 \
-m state --state new -m statistic --mode nth --every 2 --packet 1 \
-j CONNMARK --set-mark 1

/sbin/iptables -t mangle -A POSTROUTING -o eth0 -p tcp --dport 25 \
-m state --state new -m statistic --mode nth --every 2 --packet 0 \
-j CONNMARK --set-mark 2

/sbin/iptables -t nat -A POSTROUTING -o eth0 -p tcp --dport 25 \
-m connmark --mark 1 -j SNAT --to $MX1_IP

/sbin/iptables -t nat -A POSTROUTING -o eth0 -p tcp --dport 25 \
-m connmark --mark 2 -j SNAT --to $MX2_IP
```

(part 2)

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