The role of domains and DNS in large scale abuse
Let's talk about SMTP
220 emmex.spamhaus.org. ESMTP Postfix (Linux)
HELO definitely.notaspammer.com
250 emmex.spamhaus.org
MAIL FROM: iam@definitely.notaspammer.com
250 Ok
RCPT TO: carel@spamhaus.org
250 Ok
DATA
354 End data with <CR><LF>.<CR><LF>
From: iam@definitely.notaspammer.com
To: carel@spamhaus.org
Subject: Fooled you!

Hey Carel,
Buy my stuff at http://definitely.notaspammer.com/offer
.
250 Ok: queued as C2CBD1A5487
QUIT
221 Bye
HELO definitely.notaspammer.com
MAIL FROM: iam@definitely.notaspammer.com
RCPT TO: carel@spamhaus.org
DATA
354 End data with <CR><LF>.<CR><LF>
From: iam@definitely.notaspammer.com
To: carel@spamhaus.org
Subject: Fooled you!

Hey Carel,
Buy my stuff at http://definitely.notaspammer.com/offer

. 250 Ok: queued as C2CBD1A5487
QUIT
221 Bye
HELO definitely.notaspammer.com
MAIL FROM: iam@definitely.notaspammer.com
RCPT TO: carel@spamhaus.org
DATA
From: iam@definitely.notaspammer.com
To: carel@spamhaus.org
Subject: Fooled you!

Hey Carel,
Buy my stuff at http://definitely.notaspammer.com/offer
.
250 Ok: queued as C2CBD1A5487
QUIT
221 Bye
Domains are excellent filtering hooks

Filtering on domains is well supported and can be deployed during various parts of the process.
Domain-based filtering is precise

By looking at domains we can also deal with bad mail originating from, or forwarded through, legit outbound mail servers.
Authentication catches most forgery

Widely deployed authentication checks make using not-your-own domains hard.
But it boils down to reputation

Reputation is generally attached to domains or FQDNs.

To truly play, you need your own domains. If you do bad things with them, you will need many.
Case 1

Snowshoe type mailer targeting the EU. Sending IP space spread all over, dedicated or VM. Mails fully authenticated.

Casino / dating / streaming
Hi firstname!

Gefeliciteerd! Jij bent een van de kanshebbers om gratis Netflix toegang te krijgen voor drie jaar!
Daily domain usage over April 2019 - Unique domains

Number of domains

Daily domain usage over 2019 - Unique domains
6894

Unique domains used in 2019 - at US $5 / domain
A sort of MPD

The number of domains combined with the associated mailing volumes allows the operators to blend in with legit traffic, essentially switching to a new identity whenever one stops working.
Case 1 domain profile

- CCTLDs heavily favored
- Always using registrar auth NS
- Very well partitioned
- Registrations lapse on expiry
- Domains are aged for a couple of weeks
Like good wine...
Case 2

Hailstorm type mailer targeting the US. Sending IP space spread all over, prefers a minimum of IPv4 /27, dedicated or VM. Mails fully authenticated.

High value leads (Mortgage, insurance, etc)
Hailstorm?
Volume vs. time
Volume vs. time
Daily domain usage over April 2019 - Unique domains

Number of domains

Some odd artifacts

wwwardashboard.com
wwwwrbrall.com
wwwaddfort.com
wwwtheatreticketsdirect.com
wwwjohncoxpaintings.com
wwwsovereignsociety.com
wwwpprbaseball.com
wwwsvarealtors.com
Some odd artifacts

astrowoldfest.com

infinitytraininganddevelopment.com

nothmyrtlebeachscvacationsrentals.com

instituteofpositiveeducation.com
3825

Unique domains used in 2019 - at ~ US $9 / domain
The benefit of minutes

Extremely short-lived identities make filtering and the correlation between campaigns difficult. While very noisy, as a mailing strategy it seems reasonably successful.
Case 2 domain profile

.com only

Exclusively second hand domains, 3 registrars

Original registration kept

Self-NS created moments before spam-run

Fire & Forget
Case 3

Botnet spammer using stolen domains. Domains are stolen by getting registrar control panel logins and changing the authoritative nameservers.

Dating, cryptocurrencies.
Somewhat fuzzy numbers, but...

ns1.firstdnshoster.com -> 3500+
ns1.fastdnslookup.com -> 7000+
ns1.seconddnshoster.com -> 1800+
Let's talk about authentication

SPF: Which IPs can send mail for $domain.

DKIM: Verify if mail really is from $domain.

DMARC: What to do if authentication fails.
SPF in DNS

"v=spf1 a:mail-out1.spamhaus.org a:mail-out2.spamhaus.org ~all"

"v=spf1 include:_netblocks.google.com ~all"

"v=spf1 ip4:194.109.24.0/24 ?all"
SPF for botnets - predicted

"v=spf1 ip4:0.0.0.0/0 ~all"

"v=spf1 ip4:0.0.0.0/1 ip4:128.0.0.0/1 ~all"
SPF for botnets - reality

Received: from x-hh1qvvk81.playdaterochester.com (138-204-199-73.iubtelecom.net.br.[138.204.199.73])
From: YacineFoucault@x-hh1qvvk81.playdaterochester.com
Subject: Message briskprosp
SPF for botnets - reality

x-hh1qvvk81.playdaterochester.com.
120 IN A 138.204.199.73

Received: from x-hh1qvvk81.playdaterochester.com
(138-204-199-73.iubtelecom.net.br[138.204.199.73])

x-hh1qvvk81.playdaterochester.com.
120 IN MX 10 mx1.x-hh1qvvk81.playdaterochester.com.
x-hh1qvvk81.playdaterochester.com.
120 IN MX 20 mx2.x-hh1qvvk81.playdaterochester.com.
SPF for botnets - reality

$ dig txt x-hh1qvvk81.playdaterochester.com
x-hh1qvvk81.playdaterochester.com.
120 IN TXT   "v=spf1 +ip4:138.204.199.73 -all"

$ dig txt x-hh1qvvk82.playdaterochester.com
x-hh1qvvk82.playdaterochester.com.
120 IN TXT   "v=spf1 +ip4:138.204.199.74 -all"

$ dig txt x-d34db33f.playdaterochester.com
x-d34db33f.playdaterochester.com.
120 IN TXT   "v=spf1 +ip4:107.140.146.15 -all"
But how?

$ dig version.bind txt chaos @31.148.219.110
;; Warning: Message parser reports malformed message packet.

; <<>> DiG 9.10.3-P4-Debian <<>> version.bind txt chaos @31.148.219.110
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 25032
;; flags: qr aa rd; QUERY: 1, ANSWER: 1, AUTHORITY: 0, ADDITIONAL: 0
;; WARNING: recursion requested but not available
;; ANSWER SECTION:
version.bind. 120 IN TXT "v=spf1 +all"
Case 3 domain profile

- Any TLD
- Domain control taken over from legitimate owner
- Control time varies wildly
- Custom DNS software to enable abuse
- Fire & Forget
This just in (Case 4)

10238  world
2843  us
2661  top
2461  date
1397  biz
875  live
618  nl
562  today
285  com
205  fun
Conclusions

Large domain portfolios are enabling a scale of abuse that would otherwise not be possible.

Registries and registrars have an increasingly important role to play.

Current market conditions favor miscreants.
Thank you!

For domain reputation discussions, things you found in DNS, and any abuse related talk:

carel@spamhaus.org