

# Results from project ~~DNS~~ EDER

IETF 112  
1-5 November 2021  
Online

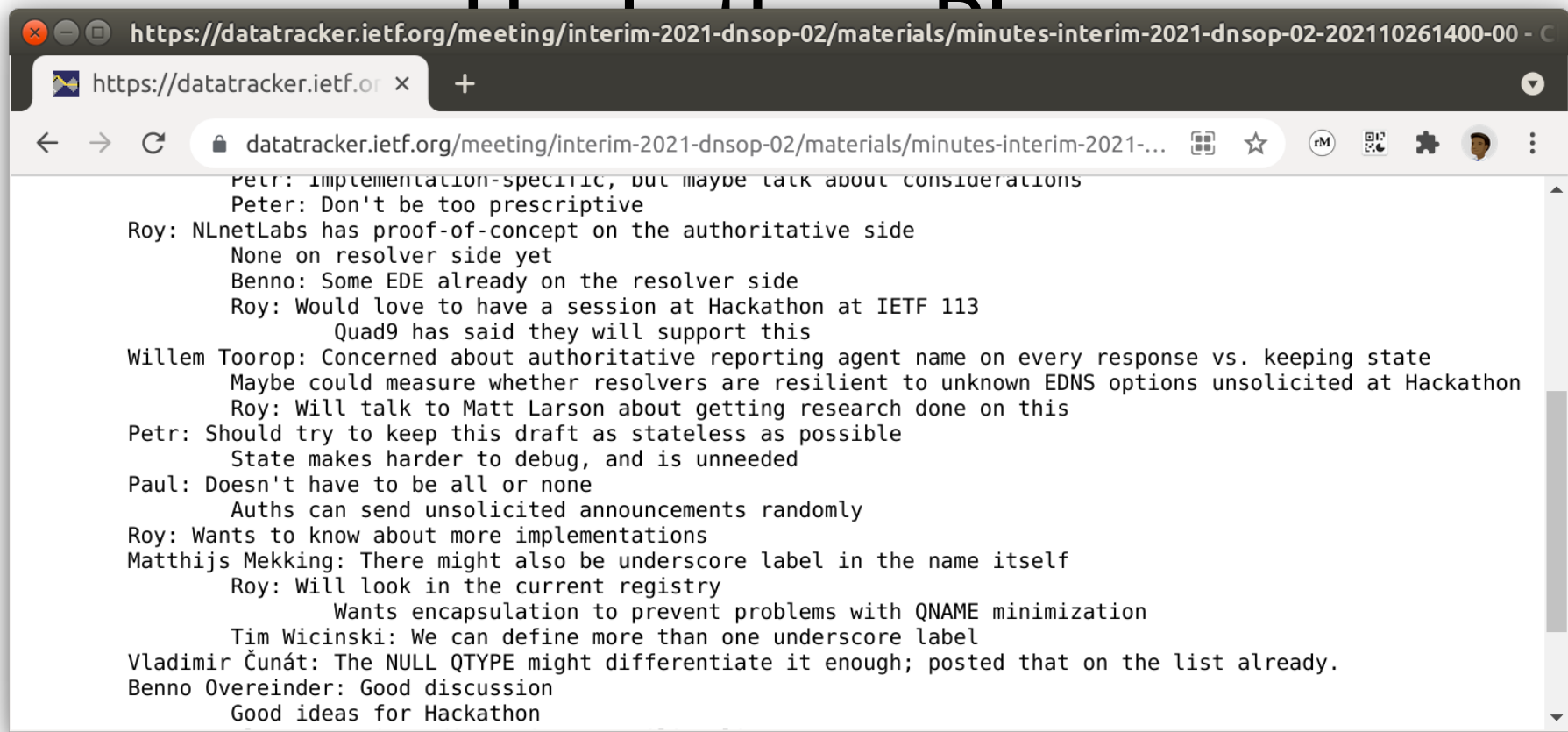


# Hackathon Plan

- DNS Error Reporting
  - [draft-ietf-dnsop-dns-error-reporting](#)
  - Builds upon Extended DNS Errors [RFC8914], but reporting to authoritative instead of querier

# Hackathon Plan

- DNS Error Reporting
  - [draft-ietf-dnsop-dns-error-reporting](#)
  - Builds upon Extended DNS Errors [RFC8914], but reporting to authoritative instead of querier ... Hence EDER (**E**xtended **D**NS **E**rror **R**eporting)
  - Discussed during the DNSOP interim meeting on the 26<sup>th</sup> October



# What got done

- BPF Program that appends EDNS Option on outgoing responses
  - BPF = new **B**erkley **P**acket **F**ilter (way beyond tcpdump -f)
  - Run program **in** the Linux kernel
  - Name server agnostic
  - You don't have to anticipate it beforehand
  - <https://github.com/NLnetLabs/XDPeriments/tree/master/opt-extend>

## • BPF

root@eder: ~/XDPeriments/opt-extend

root@eder: ~/XDPeriments/opt-extend 84x26

To see these additional updates run: apt list --upgradable

Last login: Fri Nov 5 13:26:12 2021 from 2a10:3781:85e:0:9b94:3ad8:6479:28a

root@eder:~# git clone https://github.com/NLnetLabs/XDPeriments.git

Cloning into 'XDPeriments'...

remote: Enumerating objects: 314, done.

remote: Counting objects: 100% (314/314), done.

remote: Compressing objects: 100% (219/219), done.

remote: Total 314 (delta 185), reused 212 (delta 92), pack-reused 0

Receiving objects: 100% (314/314), 83.83 KiB | 5.99 MiB/s, done.

Resolving deltas: 100% (185/185), done.

root@eder:~# cd XDPeriments/

root@eder:~/XDPeriments# git submodule update --init

Submodule 'libbpf' (https://github.com/libbpf/libbpf) registered for path 'libbpf'

Cloning into '/root/XDPeriments/libbpf'...

Submodule path 'libbpf': checked out 'db9614b6bd69746809d506c2786f914b0f812c37'

root@eder:~/XDPeriments# cd opt-extend

root@eder:~/XDPeriments/opt-extend# make load

sudo /sbin/tc qdisc add dev eth0 clsact

/usr/bin/touch clsact

clang -target bpf -O3 -Wall -Werror -I../libbpf/src -D'DEFAULT\_IFACE="eth0"' -c -o t

c\_dns\_add\_option.o tc\_dns\_add\_option.c

sudo /sbin/tc filter del dev eth0 egress || true

sudo /sbin/tc filter add dev eth0 egress bpf da obj tc\_dns\_add\_option.o

root@eder:~/XDPeriments/opt-extend#

ses

f)

end

- **BPF** `root@eder:~/XDPeriments/opt-extend# make load`  
`sudo /sbin/teig add dev eth0 class`

```
root@eder: ~/XDPeriments/opt-extend
root@eder: ~/XDPeriments/opt-extend 84x12
Submodule 'libbpf' (https://github.com/libbpf/libbpf) registered for path 'libbpf'
Cloning into '/root/XDPeriments/libbpf'...
Submodule path 'libbpf': checked out 'db9614b6bd69746809d506c2786f914b0f812c37'
root@eder:~/XDPeriments# cd opt-extend/
root@eder:~/XDPeriments/opt-extend# make load
sudo /sbin/tc qdisc add dev eth0 clsact
/usr/bin/touch clsact
clang -target bpf -O3 -Wall -Werror -I../libbpf/src -D'DEFAULT_IFACE="eth0"' -c -o t
c_dns_add_option.o tc_dns_add_option.c
sudo /sbin/tc filter del dev eth0 egress || true
sudo /sbin/tc filter add dev eth0 egress bpf da obj tc_dns_add_option.o
root@eder:~/XDPeriments/opt-extend#
```

```
willem@makaak: ~ 108x15
willem@makaak:~$ dig @167.172.42.125 random.eder.nl netlabs.nl A +norec

; <<>> DiG 9.16.15-Ubuntu <<>> @167.172.42.125 random.eder.nl netlabs.nl A +norec
; (1 server found)
;; global options: +cmd
;; Got answer:
;; ->>HEADER<<- opcode: QUERY, status: NOERROR, id: 63926
;; flags: qr aa; QUERY: 1, ANSWER: 1, AUTHORITY: 1, ADDITIONAL: 3

;; OPT PSEUDOSECTION:
; EDNS: version: 0, flags:; udp: 1232
; OPT=65001: 06 72 65 70 6f 72 74 09 6e 6c 6e 65 74 6c 61 62 73 02 6e 6c 00 00 (".report.netlabs.nl..")
;; QUESTION SECTION:
;random.eder.netlabs.nl.      IN      A
```

- f)

```
root@eder: ~/XDPeriments/opt-extend 84x26
```

```
struct bpf_elf_map eder_map SEC("maps") = {
    .type      = BPF_MAP_TYPE_PROG_ARRAY,
    .id        = 1,
    .size_key   = sizeof(uint32_t),
    .size_value = sizeof(uint32_t),
    .pinning    = PIN_GLOBAL_NS,
    .max_elem   = 2,
```

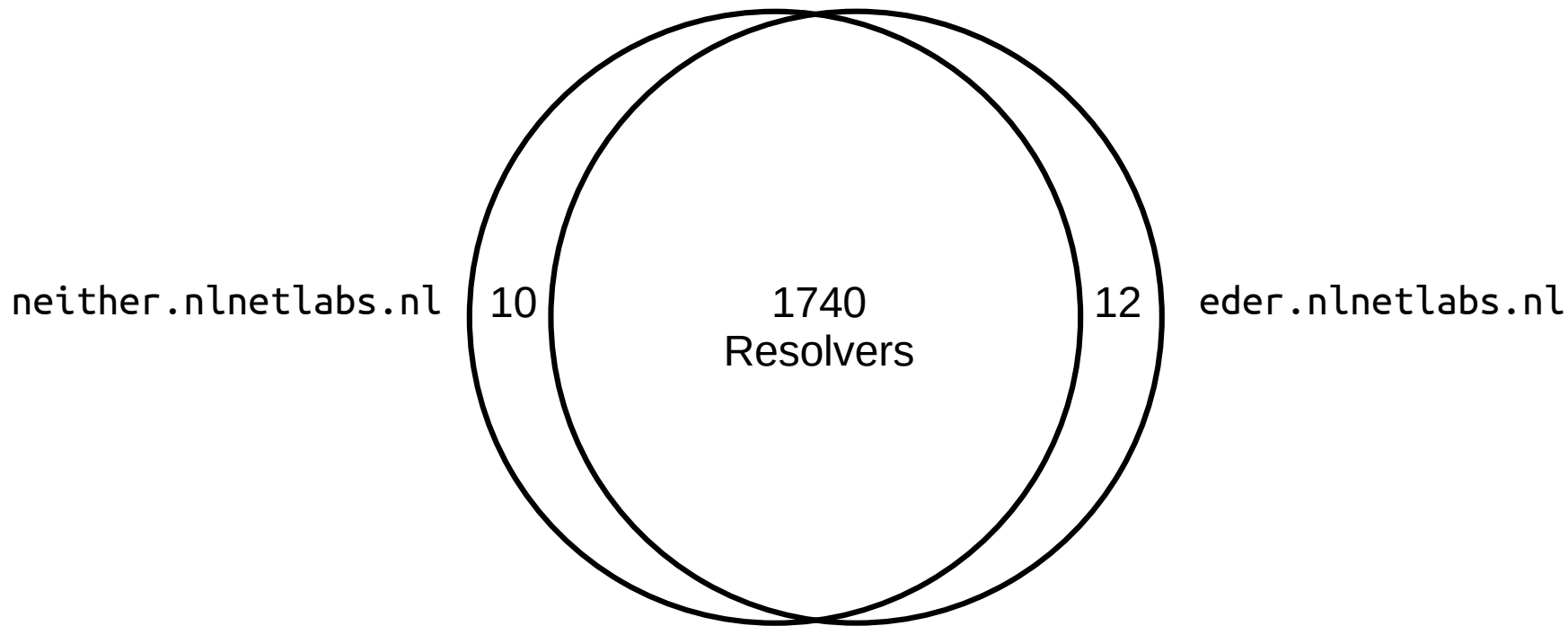
4%



# What got done

- RIPE Atlas measurements:
  - 1) Baseline measurement with `neither.nl`netlabs.nl  
<https://atlas.ripe.net/measurements/33172615/>
  - 2) Measurement with unsolicited option with `eder.nl`netlabs.nl  
<https://atlas.ripe.net/measurements/33173068/>
- One-off measurement targeting 1000 (the same) probes
- 962 probes participated
- Python program to process results: Link TODO

# What we learned



# Wrap Up

Team members:



Tom Carpay

&



Willem Toorop