DNSSEC @ Mozilla

NANOG 51

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about:mozilla

Agenda

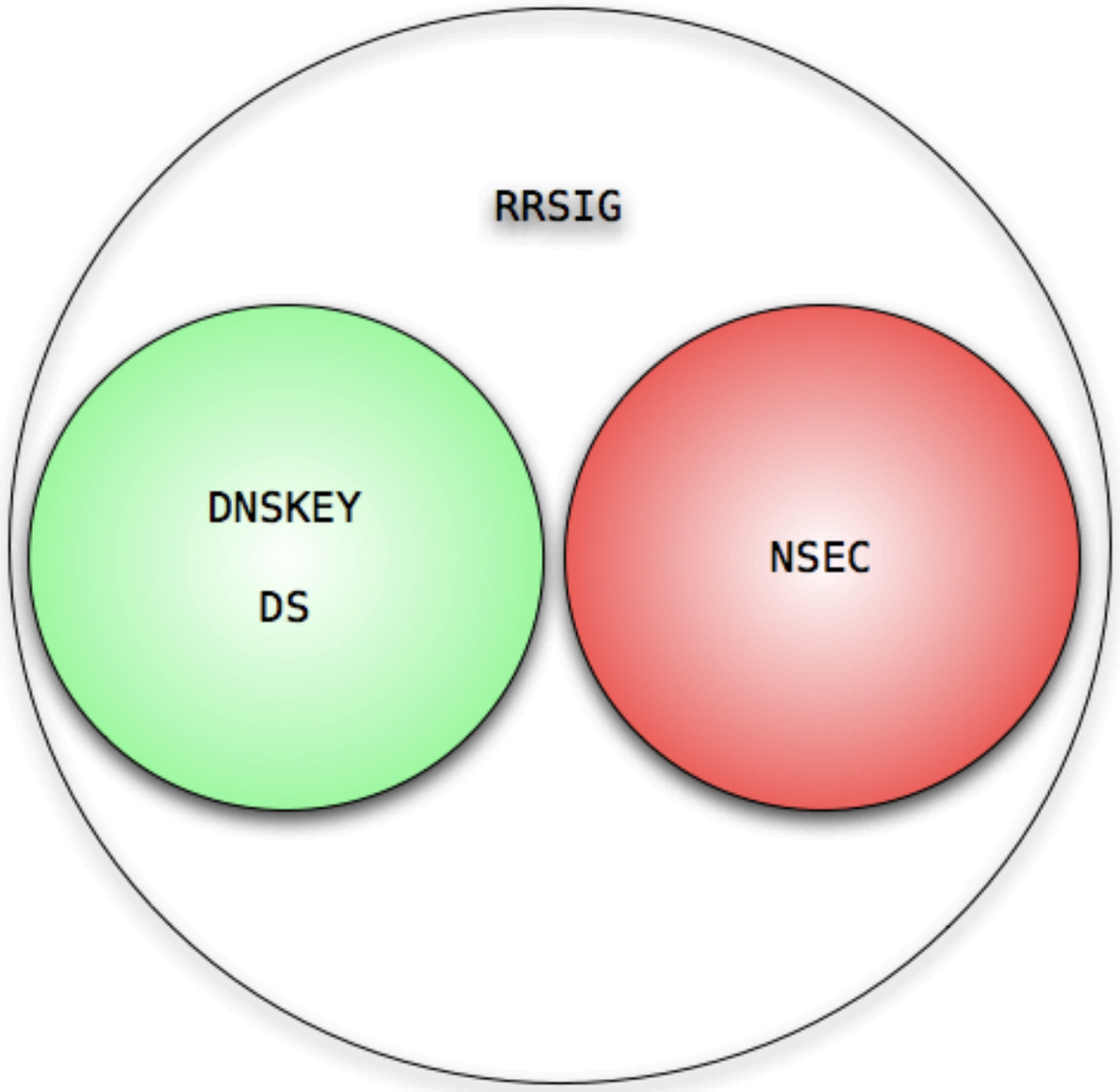
- The Basics
- Implementation
- What ~~we~~ I messed up

What and the Why

- DNS Security Extensions
  - Based on public key crypto
  - rfc 4033
  - http://en.wikipedia.org/wiki/DNSSEC
- DNS wasn't created for today's world
  - DNS cache poisoning
  - Phishing

What's new?

- 4 new RRs - rfc 4034
  - DNSKEY
  - DS
  - NSEC/NSEC3
  - RRSIG



What's new?

- Keys - Public and Private
  - Key Signing Key - KSK
  - Zone Signing Key - ZSK
  - Algorithms
  - Rollovers
  - Operational Practices - rfc 4641

Relationships

Debugging DNSSEC problems for mozilla.org

.	✓ Found 3 DNSKEY records for . ✓ DS=19036/SHA1 verifies DNSKEY=19036/SEP ✓ Found 1 RRSIGs over DNSKEY RRset ✓ RRSIG=19036 and DNSKEY=19036/SEP verifies the DNSKEY RRset ✓ . refers to org for mozilla.org ✓ Found 2 DS records for org in the referral ✓ Found 1 RRSIGs over DS RRset ✓ RRSIG=21639 and DNSKEY=21639 verifies the DS RRset
org	✓ Found 4 DNSKEY records for org ✓ DS=21366/SHA256 verifies DNSKEY=21366/SEP ✓ Found 2 RRSIGs over DNSKEY RRset ✓ RRSIG=1743 and DNSKEY=1743 verifies the DNSKEY RRset ✓ org refers to mozilla.org for mozilla.org ✓ Found 1 DS records for mozilla.org in the referral ✓ Found 1 RRSIGs over DS RRset ✓ RRSIG=1743 and DNSKEY=1743 verifies the DS RRset
mozilla.org	✓ Found 3 DNSKEY records for mozilla.org ✓ DS=51618/SHA1 verifies DNSKEY=51618/SEP ✓ Found 2 RRSIGs over DNSKEY RRset ✓ RRSIG=51618 and DNSKEY=51618/SEP verifies the DNSKEY RRset ✓ mozilla.org A RR has value 63.245.209.11 ✓ Found 1 RRSIGs over A RRset ✓ RRSIG=62897 and DNSKEY=62897 verifies the A RRset

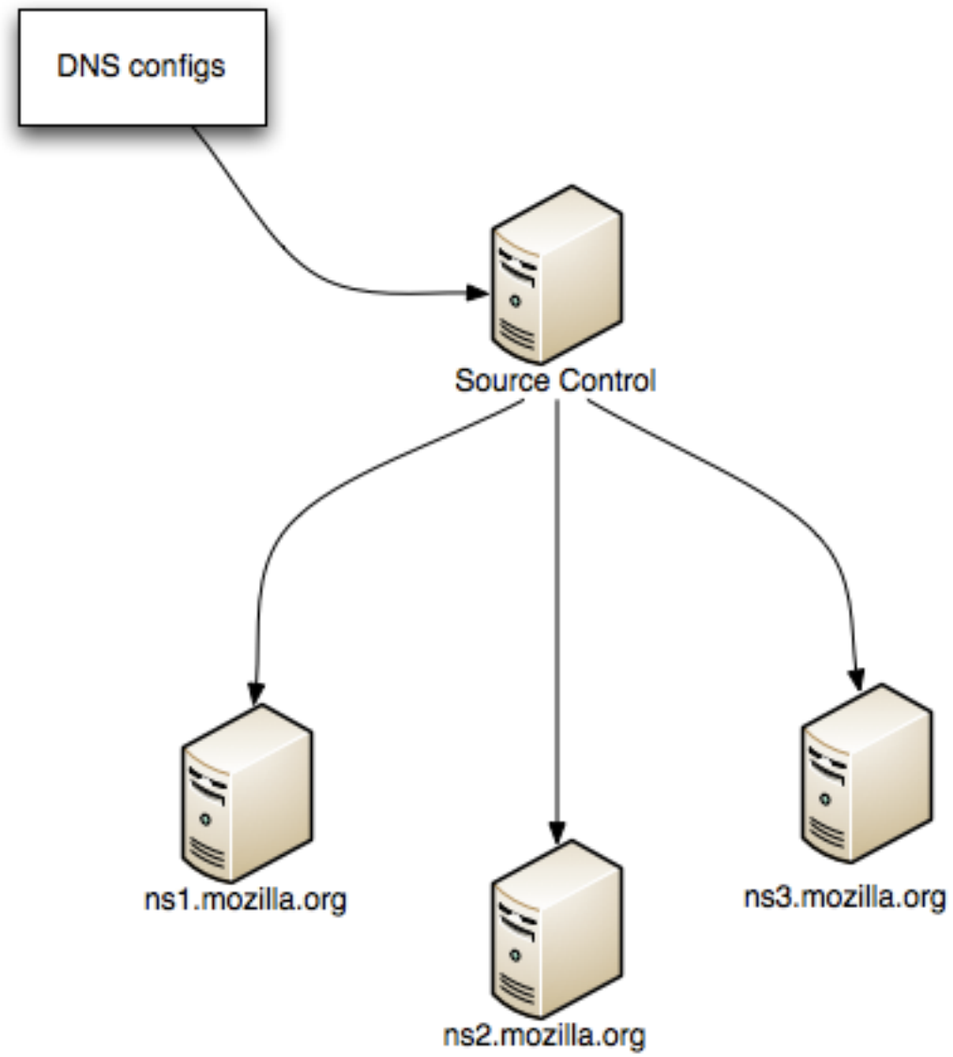
Move your mouse over any ⊗ or ⚠ symbols for remediation hints.

Want a second opinion? Test mozilla.org at dnsviz.net.

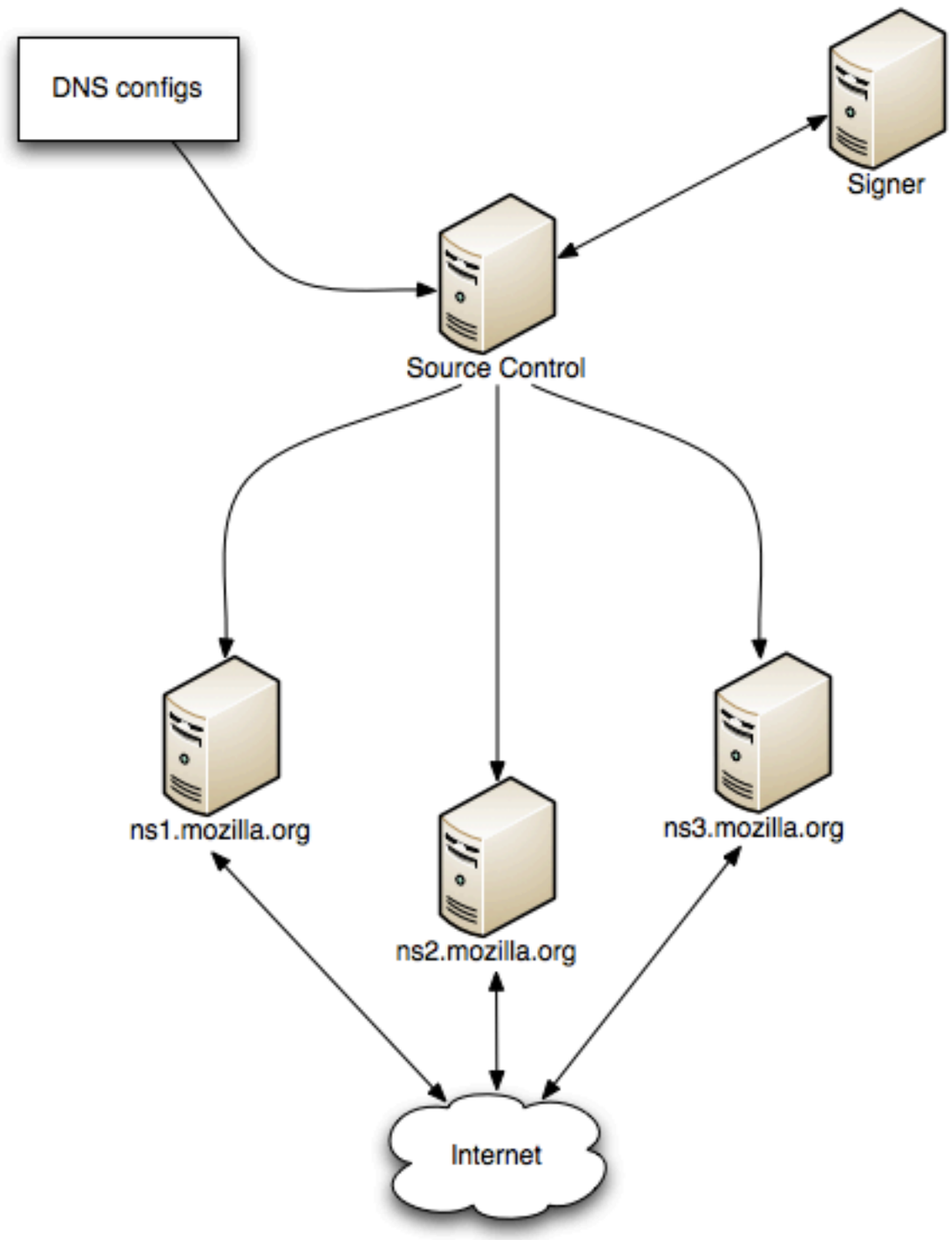
Before you leap...

- Check if your TLD has been signed
  - Else you're an Island of Trust
- Check with your registrar about DNSSEC
  - You might have to poke a bit
  - http://bit.ly/dnssecorg
- Make sure your software works
  - bind, unbound, opendnssec

Setup - Before



Setup - After


DNS configs
Signer
Source Control
ns1.mozilla.org
ns2.mozilla.org
ns3.mozilla.org
Internet

Commands

Generate keys

```
dnssec-keygen -K /mozilla.org/ -3 -n ZONE -f KSK mozilla.org
dnssec-keygen -K /mozilla.org/ -3 -n ZONE mozilla.org
```

Modify times (if needed)

```
dnssec-settime -A +6mo <keyid>
```

Sign your zones

```
dnssec-signzone -S -K /mozilla.org/ -o mozilla.org -a -t -u -3 salt -H 1 mozilla.org
```

Changes to bind - named.conf

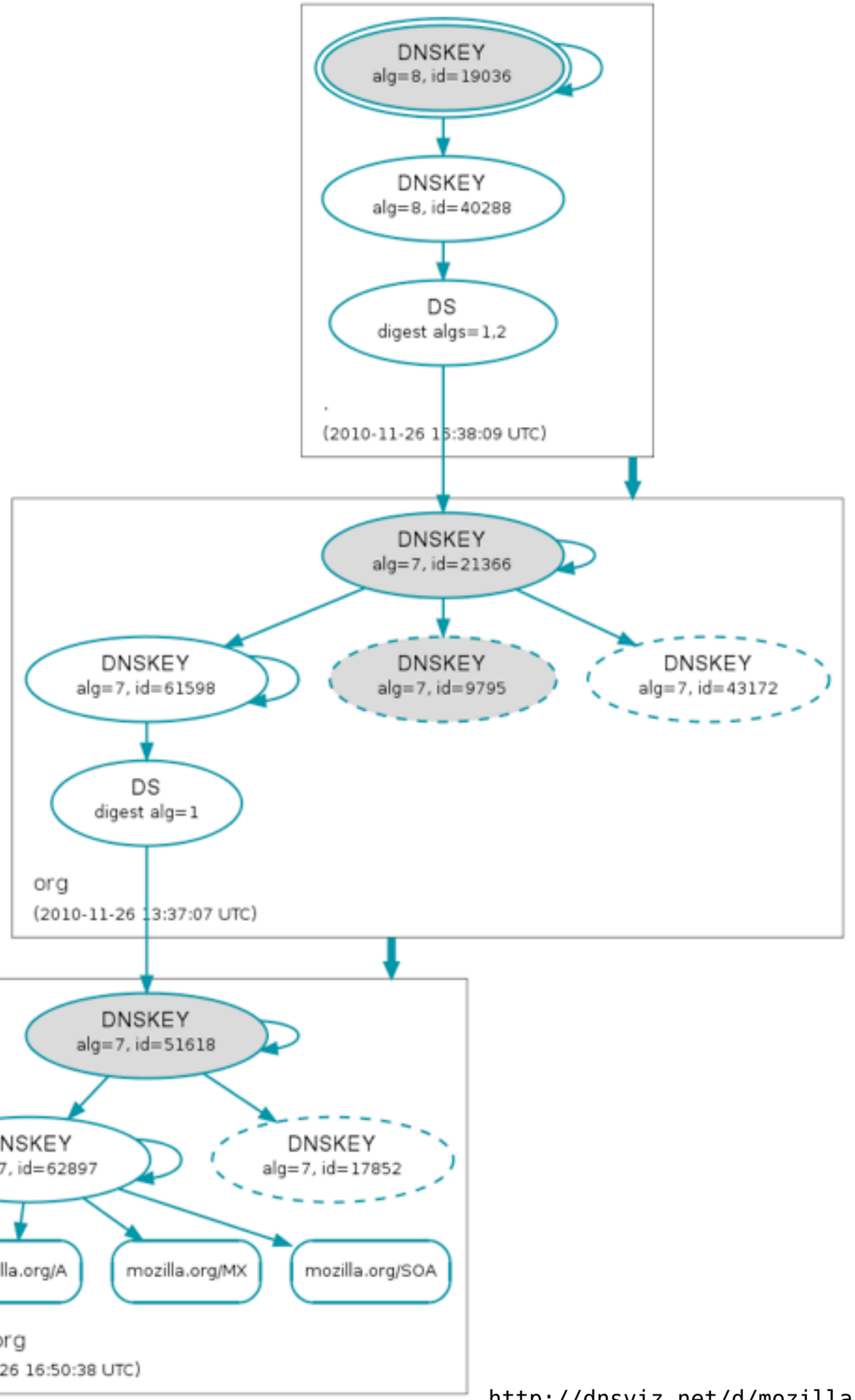
```
dnssec-enable yes;
dnssec-validation yes;

zone "mozilla.org" IN {
                type master;
                file "mozilla.org.signed";
}
```

Steps

- Upgrade `bind` across the board
- Kick off signer
- DNS servers pick up changes and restart
- Profit!!oneone!!

Verify!


DNSKEY
alg=8, id=19036
DNSKEY
alg=8, id=40288
DS
digest algs=1,2
.
(2010-11-26 15:38:09 UTC)
DNSKEY
alg=7, id=21366
DNSKEY
alg=7, id=61598
DNSKEY
alg=7, id=9795
DNSKEY
alg=7, id=43172
DS
digest alg=1
org
(2010-11-26 13:37:07 UTC)
DNSKEY
alg=7, id=51618
DNSKEY
alg=7, id=62897
DNSKEY
alg=7, id=17852
mozilla.org/A
mozilla.org/MX
mozilla.org/SOA
mozilla.org
(2010-11-26 16:50:38 UTC)

Things to be aware of

- Keys are everything, protect them
- Make sure you have a backup plan
- Eventually, you run the risk of your entire domain being unreachable
- Sign (zones), publish (zones) then push (DS)
- Network equipment might need changes

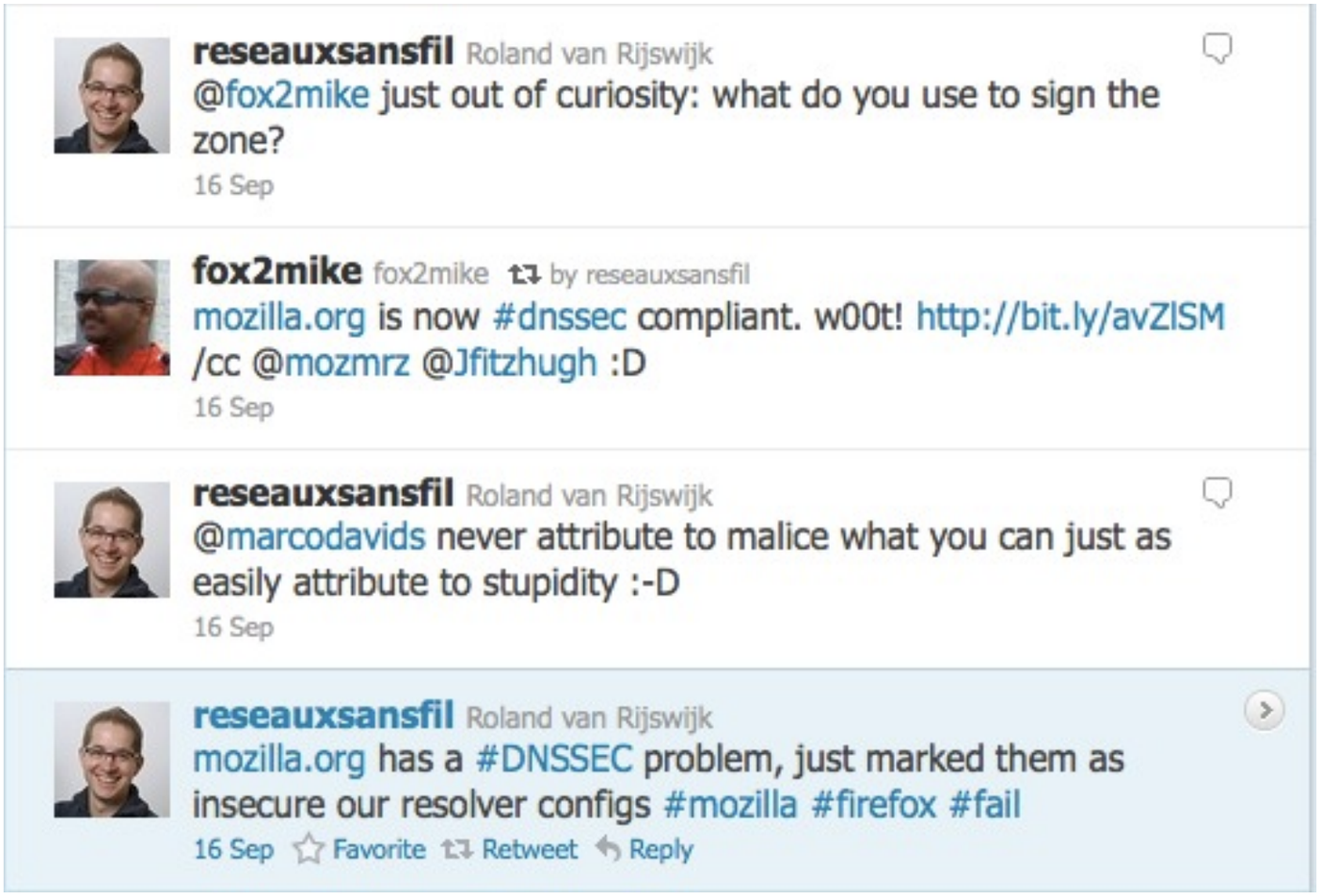
```
policy-map global policy
 class inspection_default
  inspect dns maximum-length 4096
```

boo-boo(s)

- DS was live, no signed zones aka “Security Lameness”
- Log levels

boo-boo(s)

- Of course, everyone on twitter notices and #fails you.



boo-boo(s)


npua Gilles Massen
@fox2mike Out of curiosity: did you get the steps wrong? (1. sign the zone, 2. publish DS record) (and congrats for having it up!)
16 Sep
npua Gilles Massen
@amelsec With mozilla.org blowing its DNSKEY, the day for DNSSEC could be better...
16 Sep
npua Gilles Massen
mozilla.org unreachable: should be signed (says .org) but isn't. Not good. #dnssec #fail
16 Sep Favorite Retweet Reply

Moving forward...

Thanks!

http://people.mozilla.org/~shyam/presentations/nanog-51-2011-final.pdf