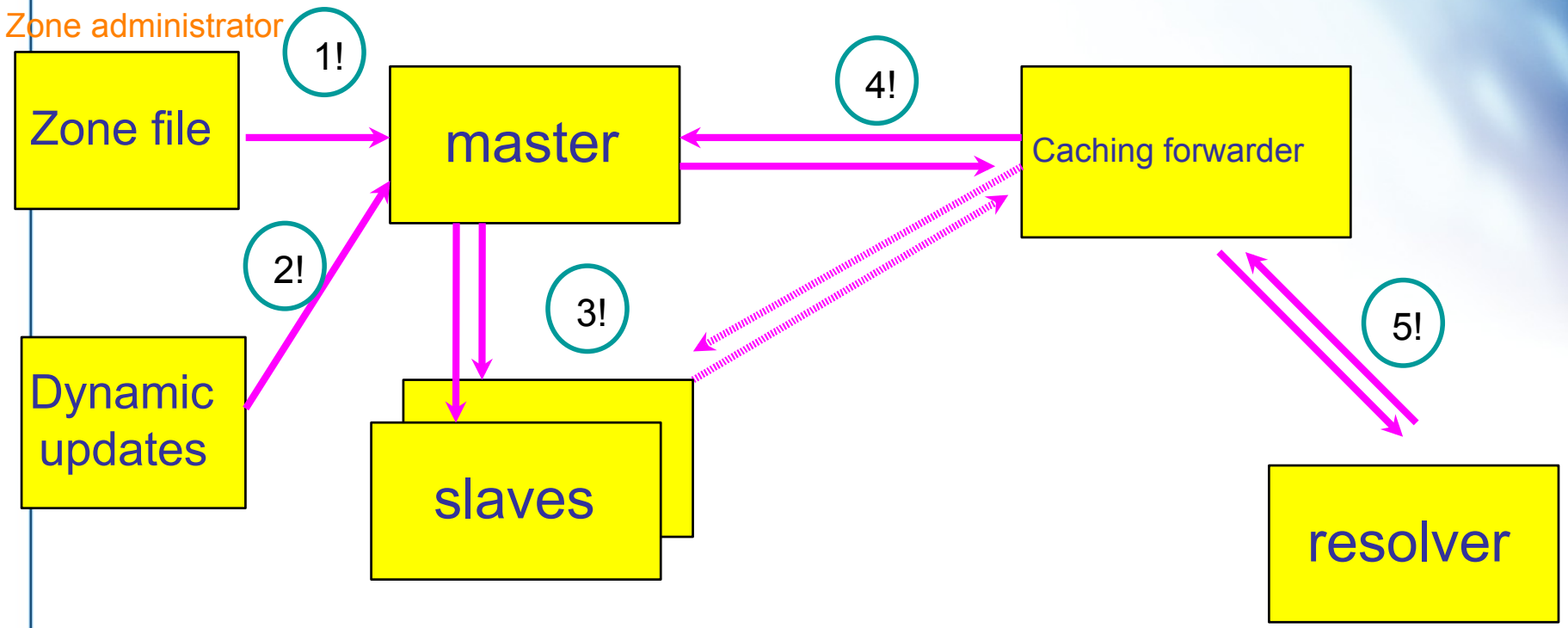
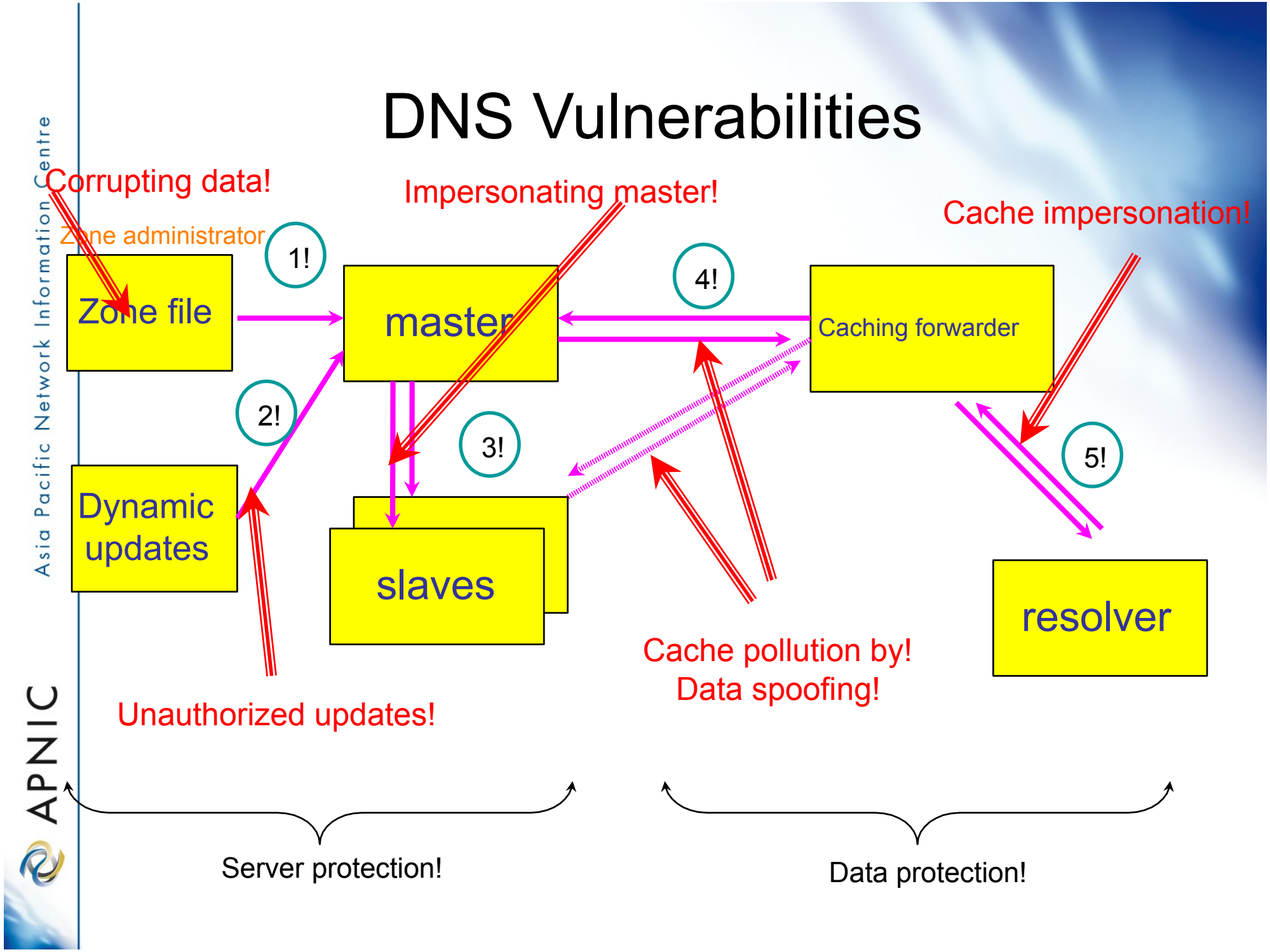
DNS / DNSSEC Workshop

DNS Security - TSIG

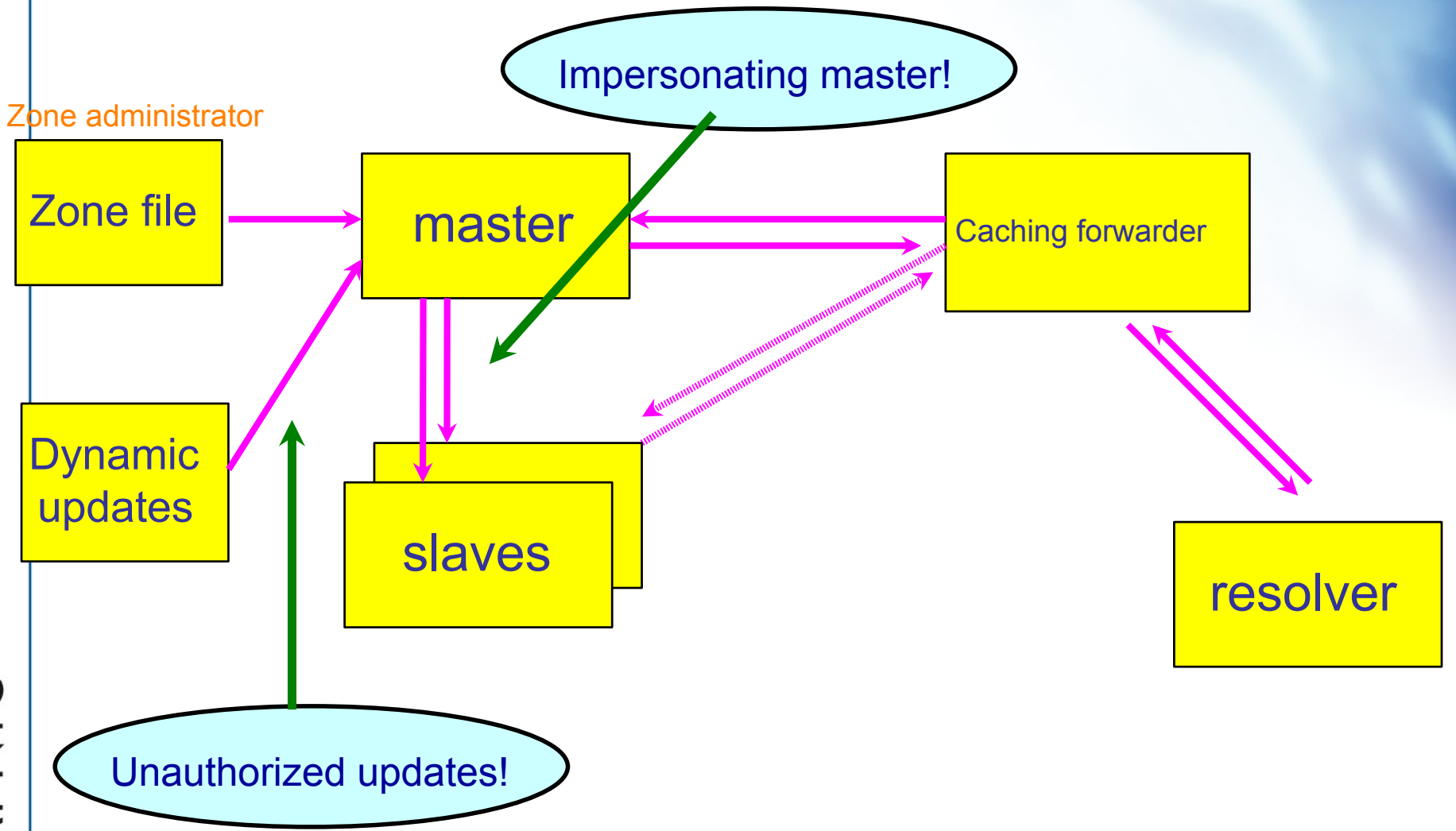
DNS: Data Flow



DNS Vulnerabilities



TSIG Protected Vulnerabilities



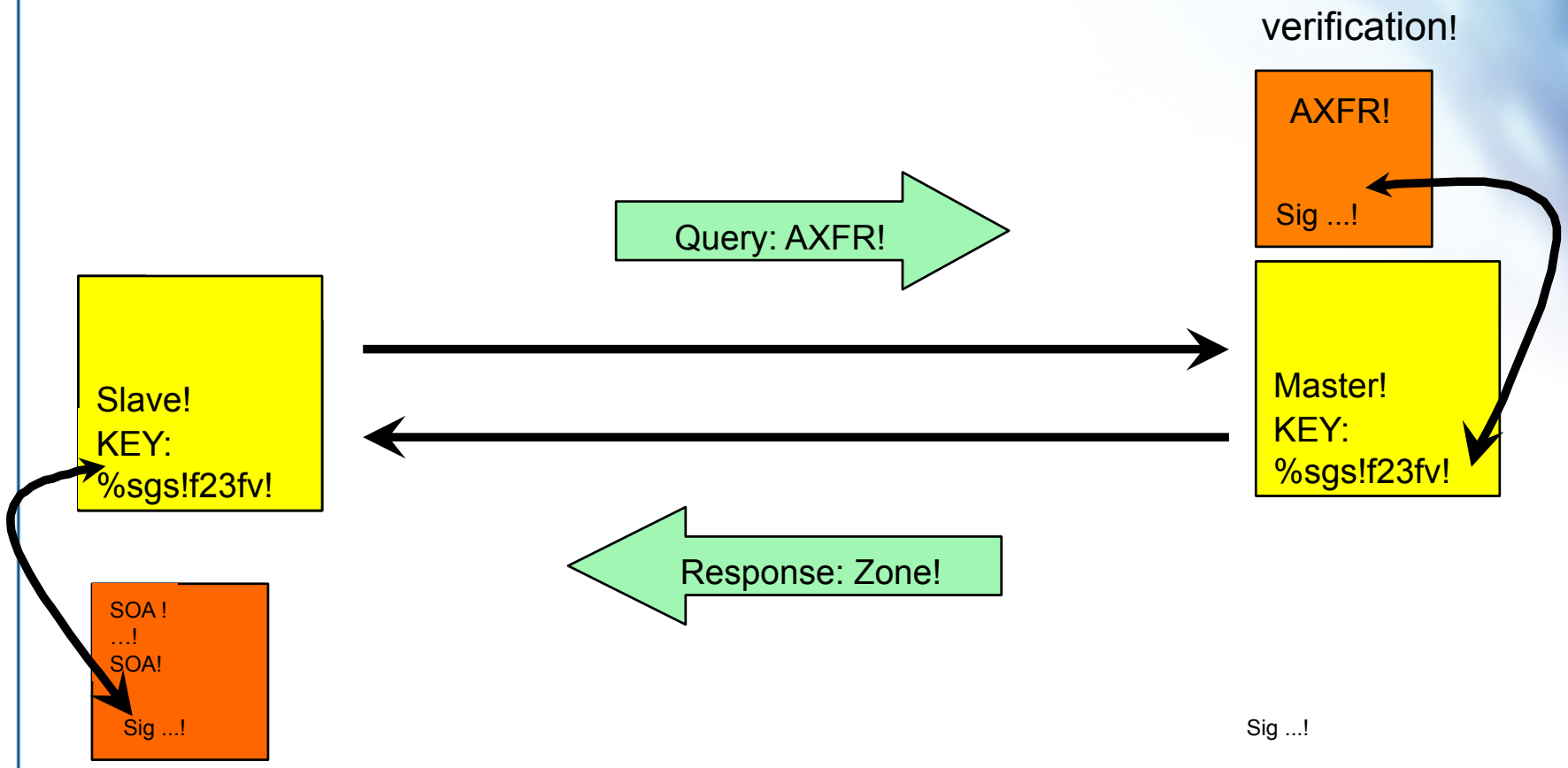
What is TSIG - Transaction Signature?

- A mechanism for protecting a message from a primary to secondary and vice versa
- A keyed-hash is applied (like a digital signature) so recipient can verify message
  - DNS question or answer
  - & the timestamp
- Based on a shared secret - both sender and receiver are configured with it

What is TSIG - Transaction Signature?

- TSIG (RFC 2845)
  - authorizing dynamic updates & zone transfers
  - authentication of caching forwarders
- Used in server configuration, not in zone file

TSIG example



TSIG steps

1. Generate secret
2. Communicate secret
3. Configure servers
4. Test

TSIG - Names and Secrets

- TSIG name
  - A name is given to the key, the name is what is transmitted in the message (so receiver knows what key the sender used)
- TSIG secret value
  - A value determined during key generation
  - Usually seen in Base64 encoding

TSIG – Generating a Secret

- dnssec-keygen
  - Simple tool to generate keys
  - Used here to generate TSIG keys

ü dnssec-keygen -a <algorithm> -b <bits> -n host <name of the key>!

TSIG – Generating a Secret

- Example!

> dnssec-keygen –a HMAC-MD5 –b 128 –n HOST ns1-ns2.pcx.net

This will generate the key

> Kns1-ns2.pcx.net.+157+15921

>ls

ü Kns1-ns2.pcx.net.+157+15921.key

ü Kns1-ns2.pcx.net.+157+15921.private

TSIG – Generating a Secret

- TSIG should never be put in zone files!!!
  - might be confusing because it looks like RR:

ns1-ns2.pcx.net. IN KEY 128 3 157 nEfRX9…bbPn7lyQtE=!

TSIG – Configuring Servers

- Configuring the key
  - in named.conf file, same syntax as for rndc
  - key { algorithm ...; secret ...;}
- Making use of the key
  - in named.conf file
  - server x { key ...; }!
  - where 'x' is an IP number of the other server

Configuration Example – named.conf

Primary server 10.33.40.46

```
key ns1-ns2.pcx. net {!
        !algorithm hmac-md5;!
        !secret "APlaceToBe";!
};!
server 10.33.50.35 {!
        !keys {ns1-ns2.pcx.net;};!
};!
zone "my.zone.test." {!
        !type master;!
        !file “db.myzone”;!
        !allow-transfer {!
        !key ns1-ns2..pcx.net ;};!
};!
```

Secondary server 10.33.50.35

```
key ns1-ns2.pcx.net {!
        !algorithm hmac-md5;!
        !secret "APlaceToBe";!
};!
server 10.33.40.46 {!
  keys {ns1-ns2.pcx.net;};!
};!
zone "my.zone.test." {!
        !type slave;!
        !file “myzone.backup”;!
        !masters {10.33.40.46;};!
};!
```

You can save this in a file and refer to it in the named.conf using ‘include’ statement:

include “/var/named/master/tsig-key-ns1-ns2”;

TSIG Testing : dig

- You can use dig to check TSIG configuration
  - dig @<server> <zone> AXFR -k <TSIG keyfile>!

$ dig @127.0.0.1 example.net AXFR \!
-k Kns1-ns2.pcx.net.+157+15921.key!

- Wrong key will give “Transfer failed” and on the server the security-category will log this.

TSIG Testing - TIME!

- TSIG is time sensitive - to stop replays
  - Message protection expires in 5 minutes
  - Make sure time is synchronized
  - For testing, set the time
  - In operations, (secure) NTP is needed

Questions?