Asia Pacific Network Information Centre

APNIC

DNS / DNSSEC Workshop

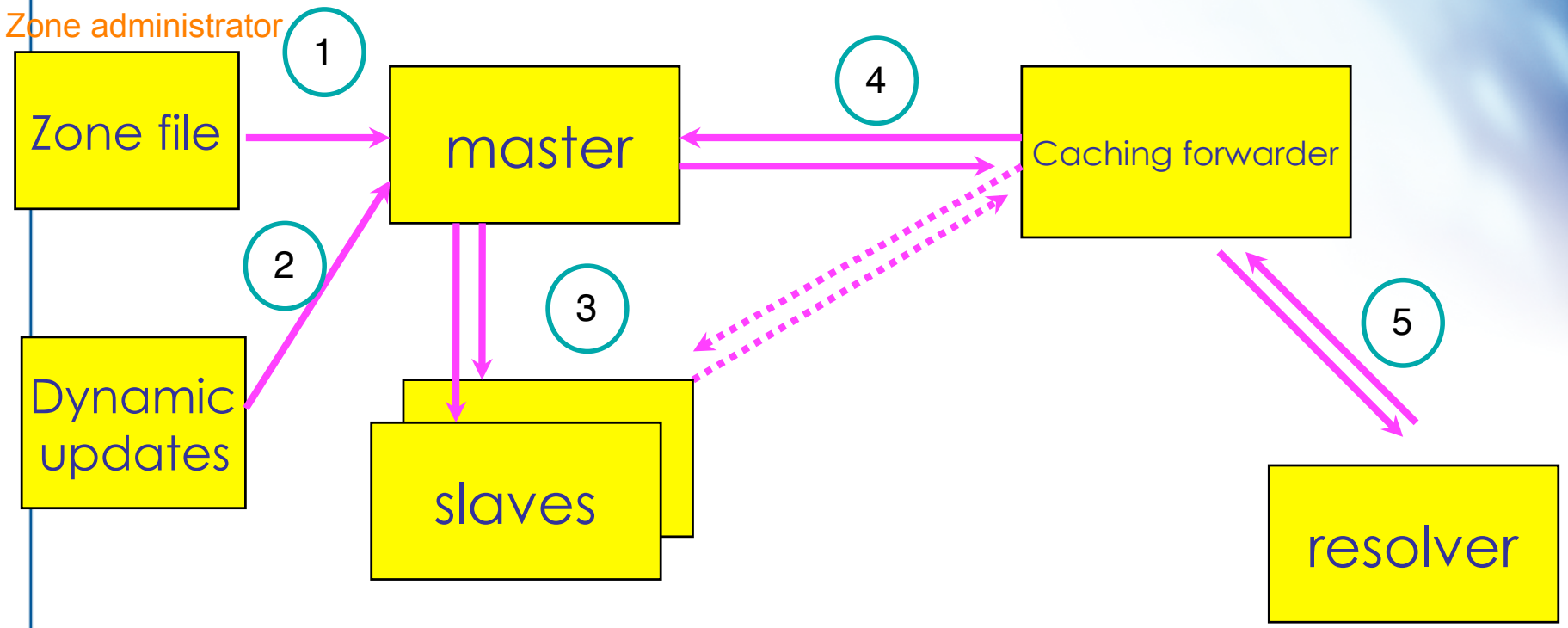
DNS Security - TSIG

Hong Kong
15-19 February 2011

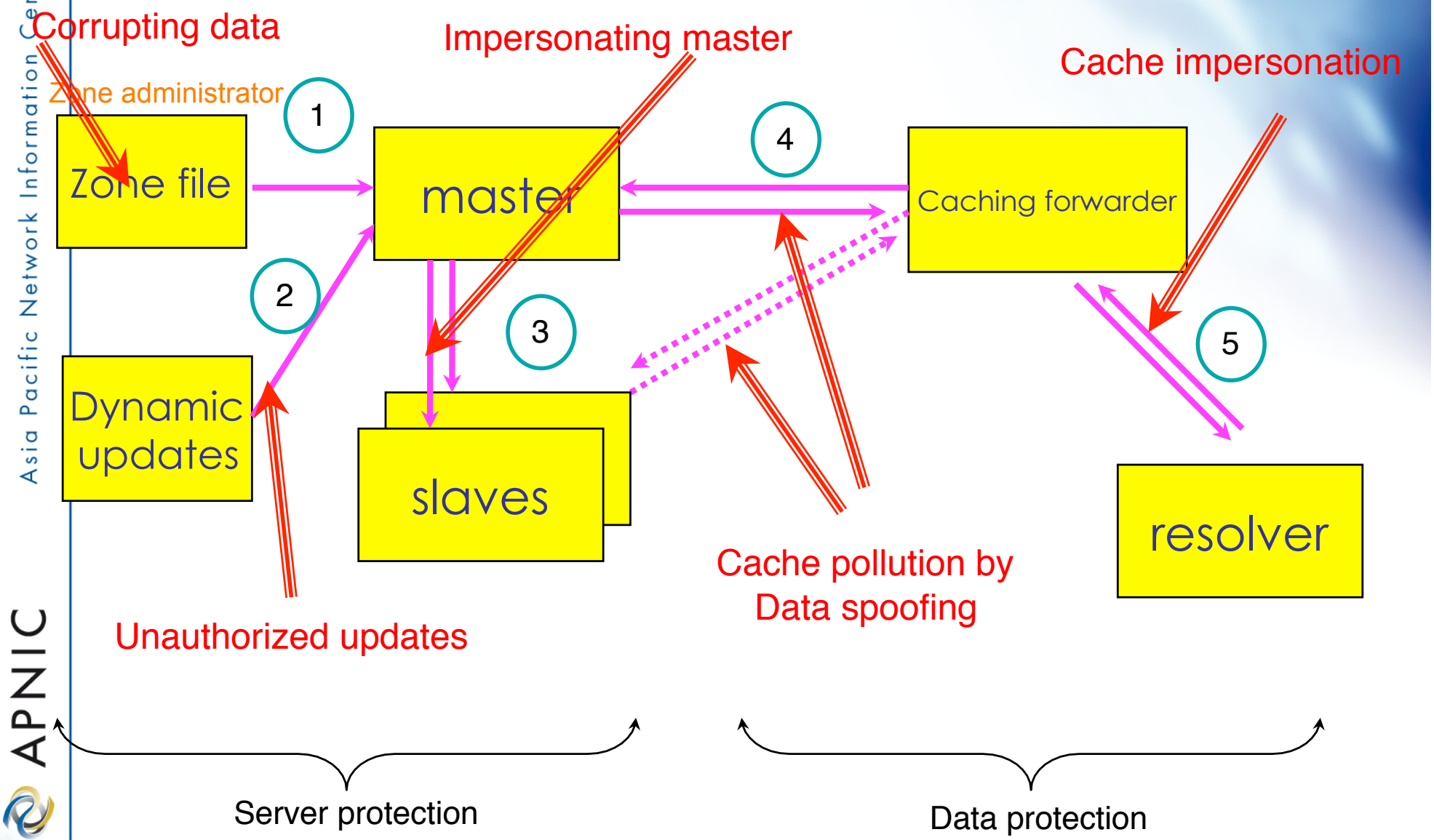
in conjunction with

APRICOT 2011

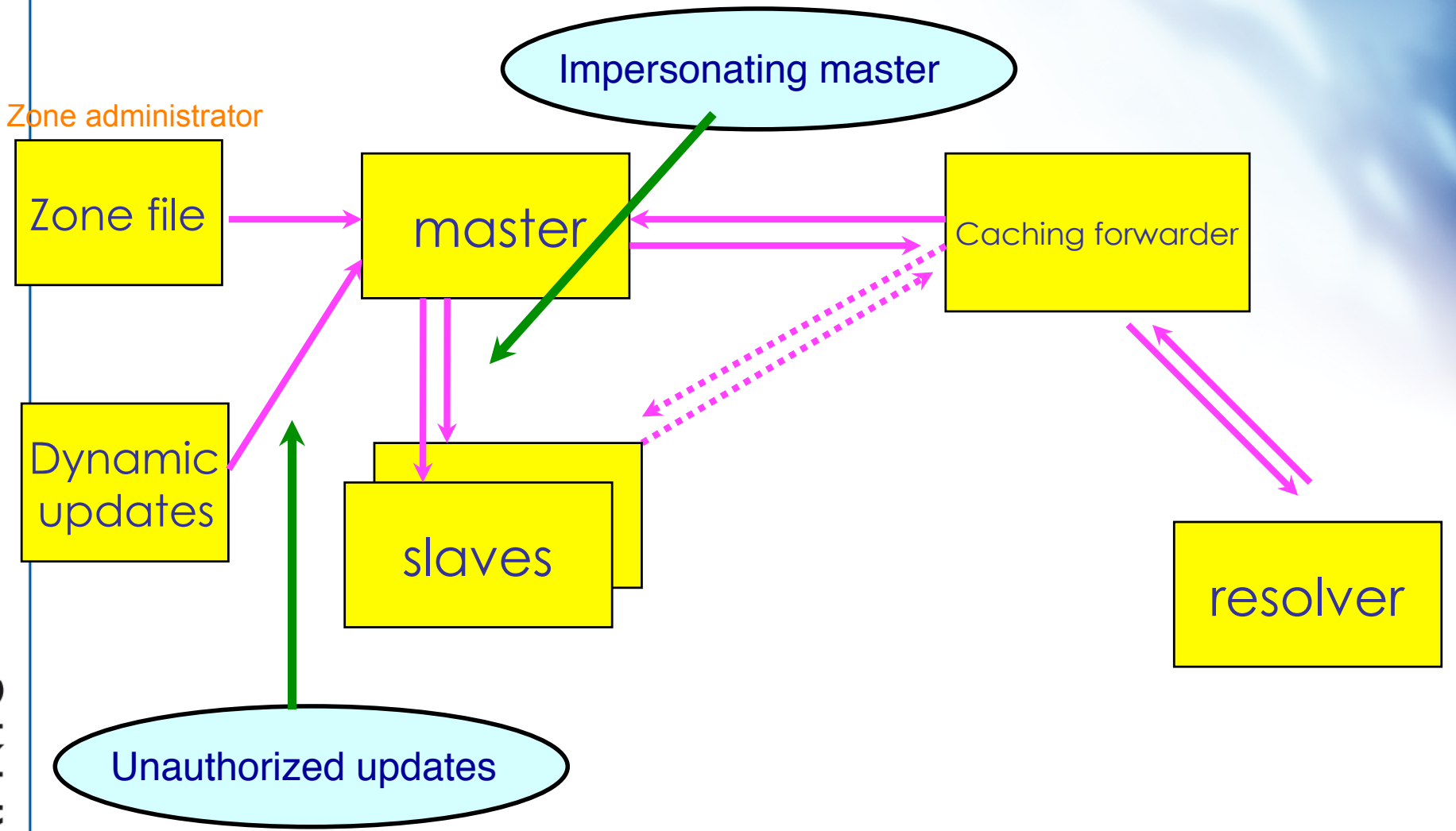
DNS: Data Flow



DNS Vulnerabilities



TSIG Protected Vulnerabilities



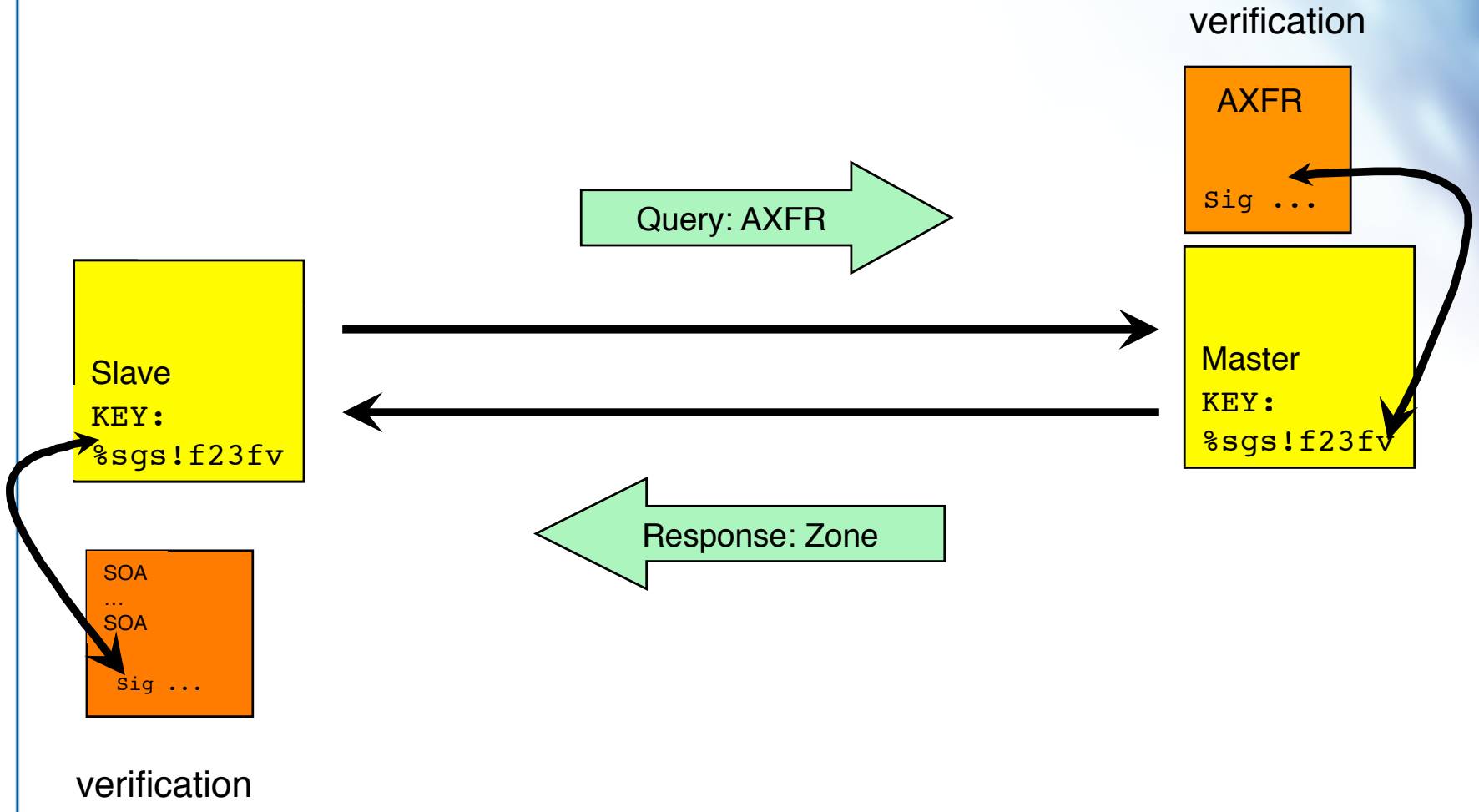
What is TSIG - Transaction Signature?

- 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

➢ `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
➢ Kns1-ns2.pcx.net.+157+15921.key
➢ 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?