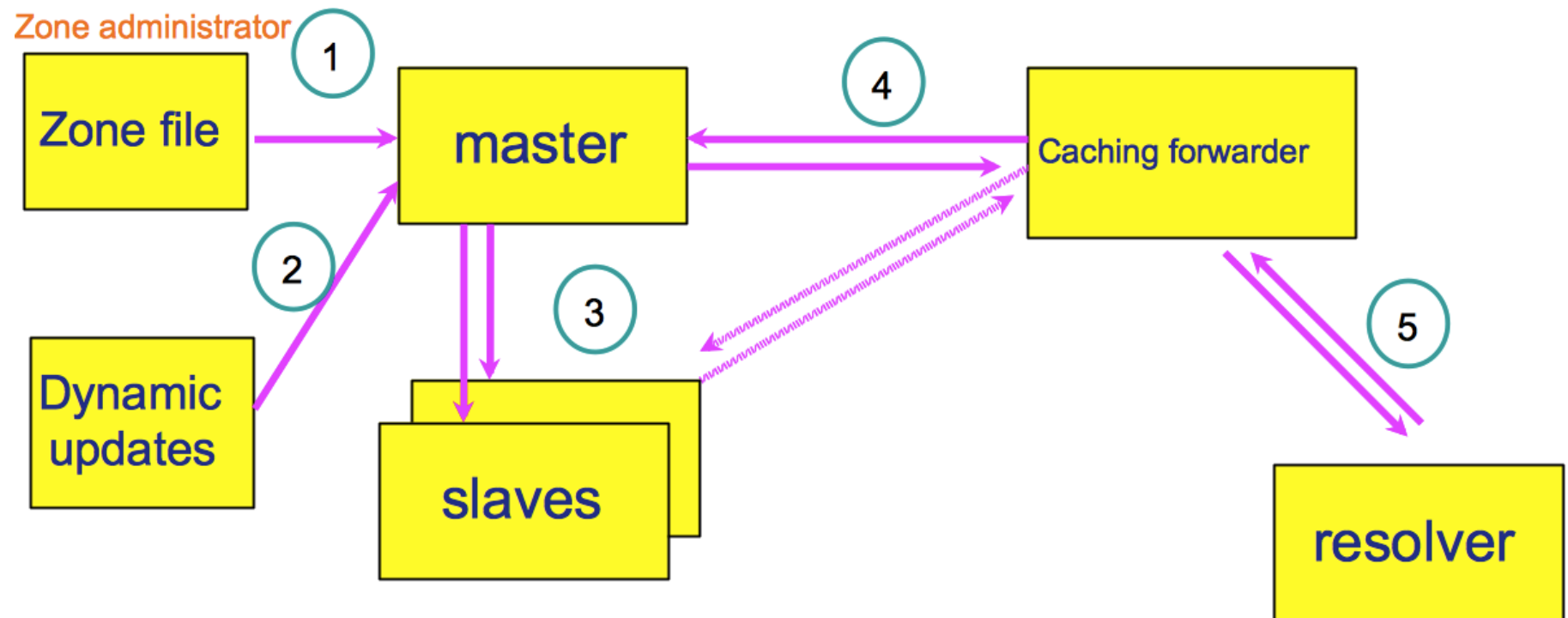


Advanced DNS Operations & Security

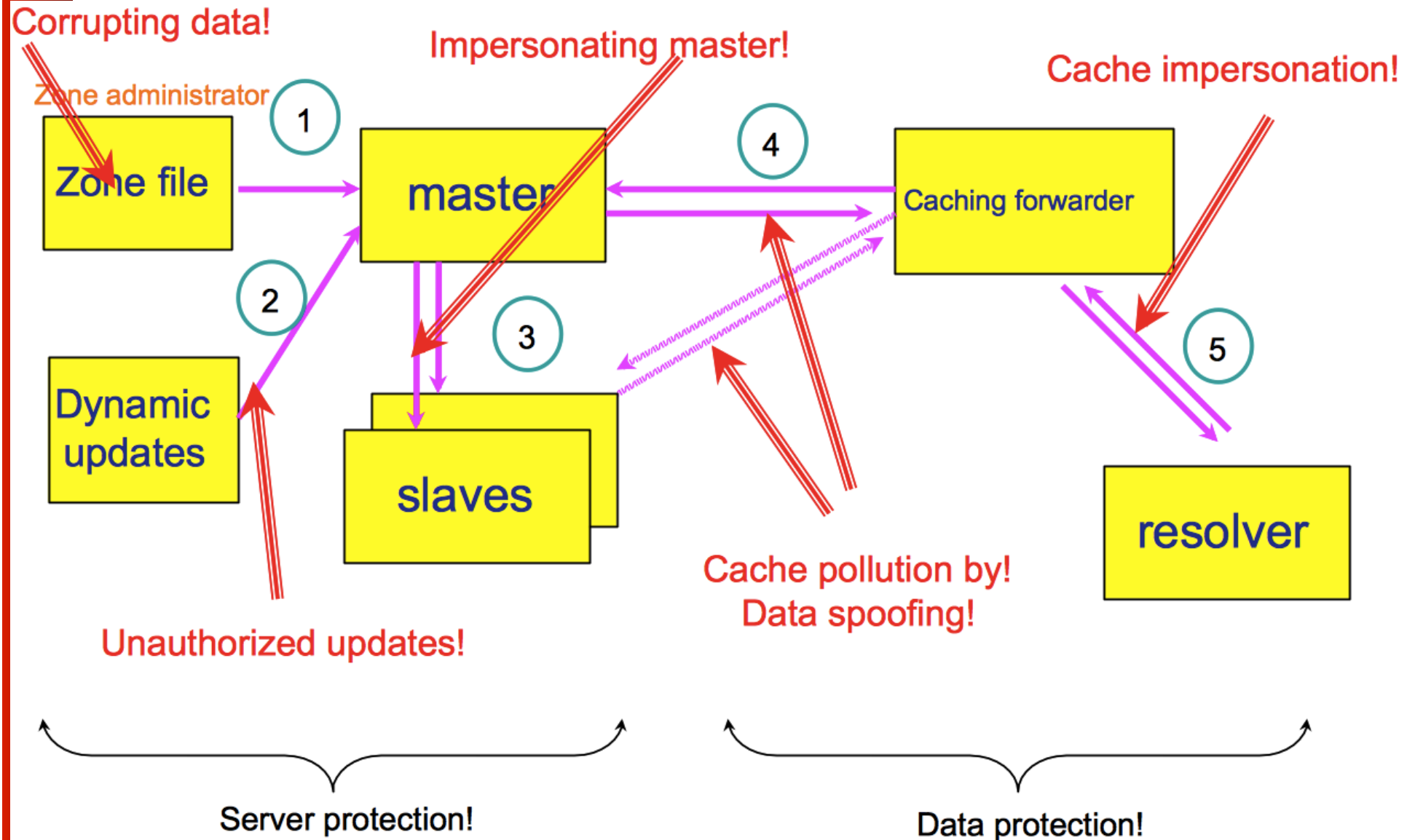
DNS Security - TSIG



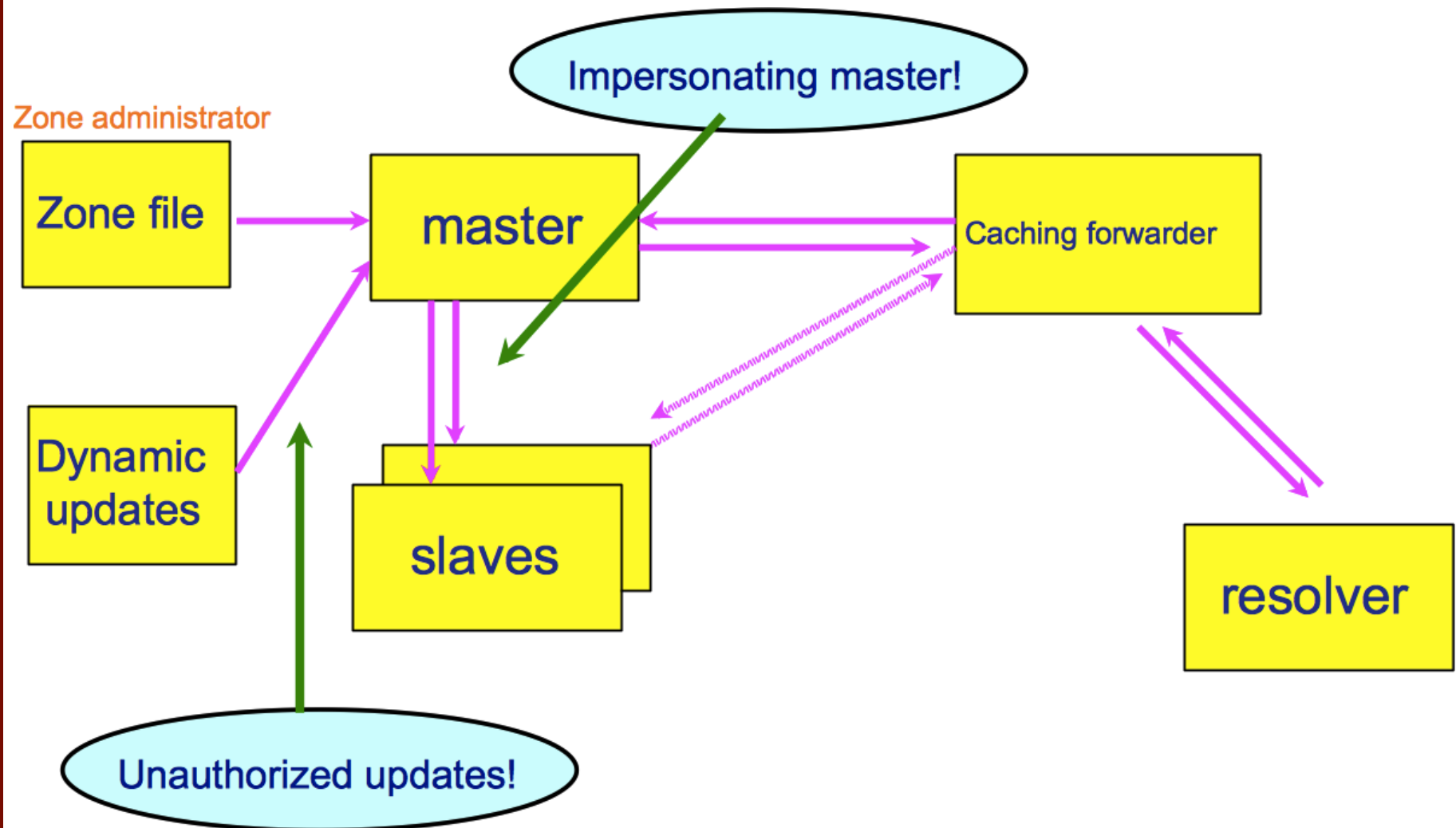
DNS: Data Flow



DNS Vulnerabilities



TSIG protected vulnerabilities



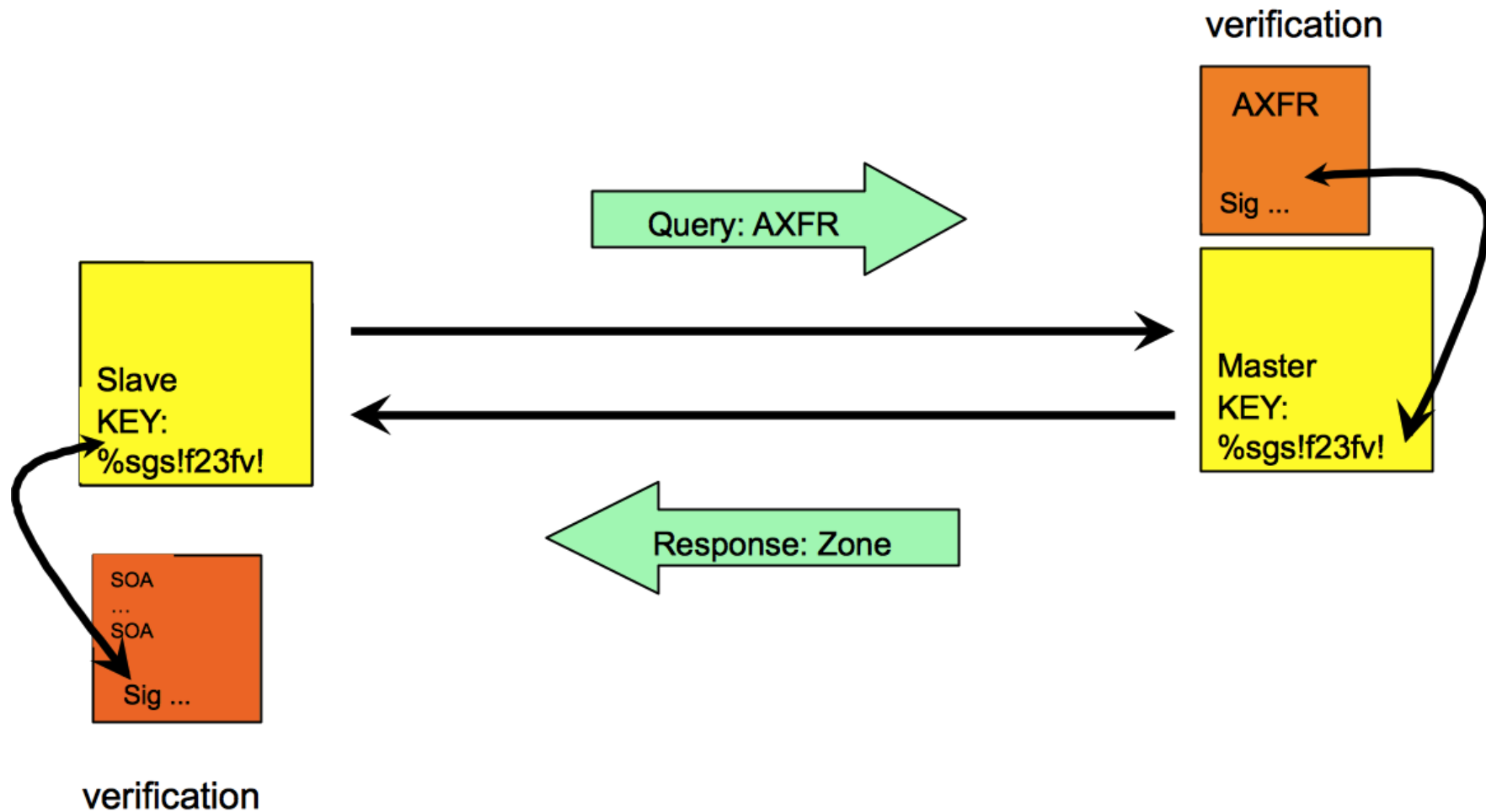
What is TSIG ?

- **Transaction SIGNature**
- A mechanism for protecting communication between name servers and between stub resolvers and nameservers
- A keyed-hash is applied (like a digital signature), so the recipient of the message can verify that it hasn't been tampered with:
 - DNS question / answer
 - timestamp
- Based on a shared secret
 - Both the sender and recipient must be configured with it

What is TSIG ?

- RFC 2845 – TSIG
- Can also be used to authorize:
 - zone transfers
 - dynamic updates
 - authentication of caching forwarders
- Used in server configuration – not in the zone file

TSIG example:



TSIG steps

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

TSIG – Names & Secrets

- TSIG name
 - A name is given to the key. The name is what is transmitted in the message (so the receiver knows what key the sender has used, out of possibly many)
- TSIG secret value
 - A value determined during key generation
 - Usually seen encoded in BASE64

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 <key name>`

TSIG – Generating a Secret

- Example

```
dnssec-keygen -a HMAC-MD5 -b 128 -n host ns1-ns2.grp2.net
```

- This will generate a key similar to this:

```
Kns1-ns2.grp2.net.+157+15921
```

- Files

```
Kns1-ns2.grp2.net.+157+15921.key
```

```
Kns1-ns2.grp2.net.+157+15921.private
```

TSIG – Generating a Secret

- TSIG keys are never put in the zone files
- There can be some confusion as keys can look like Resource Records:

ns1-ns2.grp2.net. IN KEY 128 157 nEfRx9...bbPn7IyQtE=

TSIG – Configuring servers

- Configuring the key
 - in named.conf, same syntax as for the rndc statement:

- Using the key:

- in named.conf, add:

```
server x { key ....; };
```

... where 'x' is the IP address of the REMOTE server.

Configuration example – named.conf

Primary server 10.10.0.1

```
key ns1-ns2.grp2.net {  
    algorithm hmac-md5;  
    secret "APlaceToBe";  
};  
server 10.10.0.2 {  
    keys { ns1-ns2.grp2.net; };  
};  
zone "my.test.zone" {  
    type master;  
    file "db.myzone";  
    allow-transfer {  
        key ns1-ns2.grp2.net;  
    };  
};
```

Secondary server 10.10.0.2

```
key ns1-ns2.grp2.net {  
    algorithm hmac-md5;  
    secret "APlaceToBe";  
};  
server 10.10.0.1 {  
    keys { ns1-ns2.grp2.net; };  
};  
zone "my.test.zone" {  
    type slave;  
    file "db.myzone.slave";  
    masters { 10.10.0.1; };  
};
```

TSIG – Testing with dig

- You can use dig to check TSIG configuration

```
dig @<server> <zone> AXFR -k <TSIG keyfile>
```

or

```
dig @<server> <zone> AXFR -y "TSIG secret"
```

- Wrong key will return “Transfer failed”, and a message will be logged in the security category on the server being queried

TSIG – Time!

- TSIG is time sensitive (to avoid replays)
 - message protection expires in 5 minutes
 - make sure time is synchronized! (NTP)
 - for testing, set the time
 - in operations, use NTP!

Questions

?