DNS/DNSSEC Workshop

TSIG

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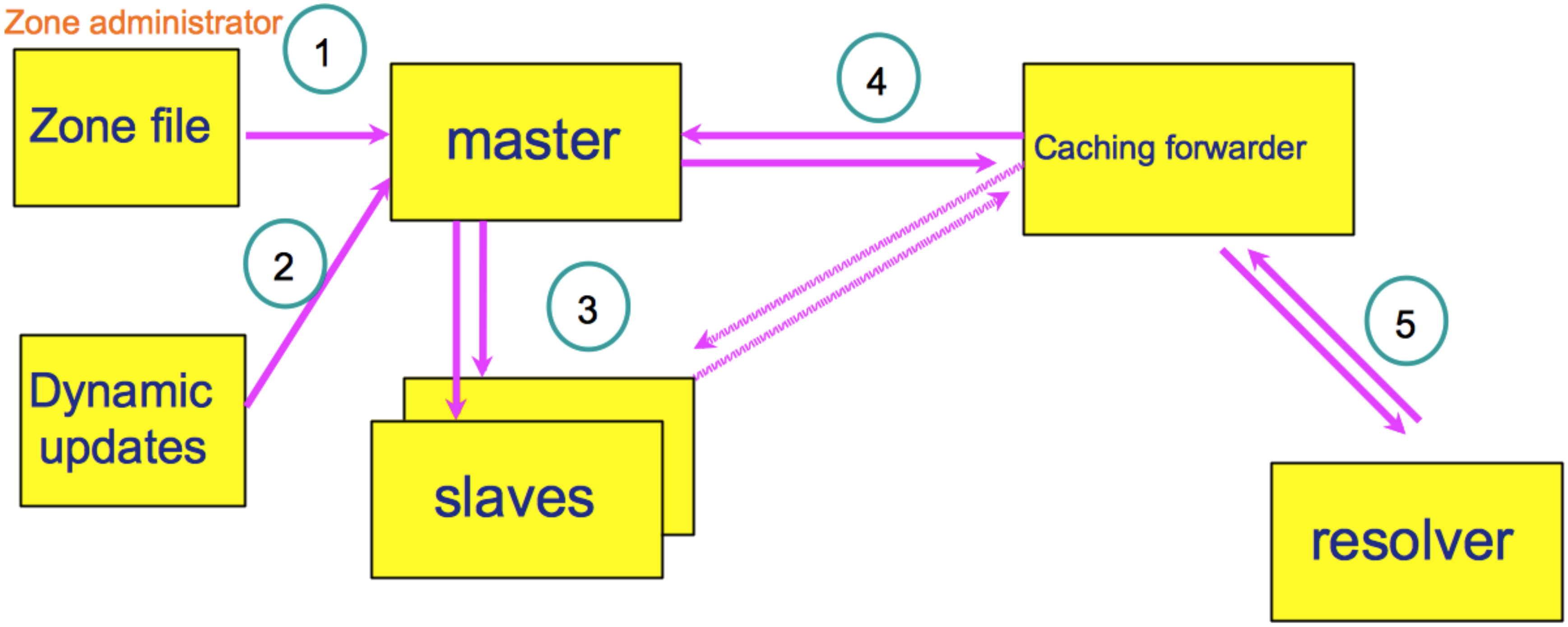
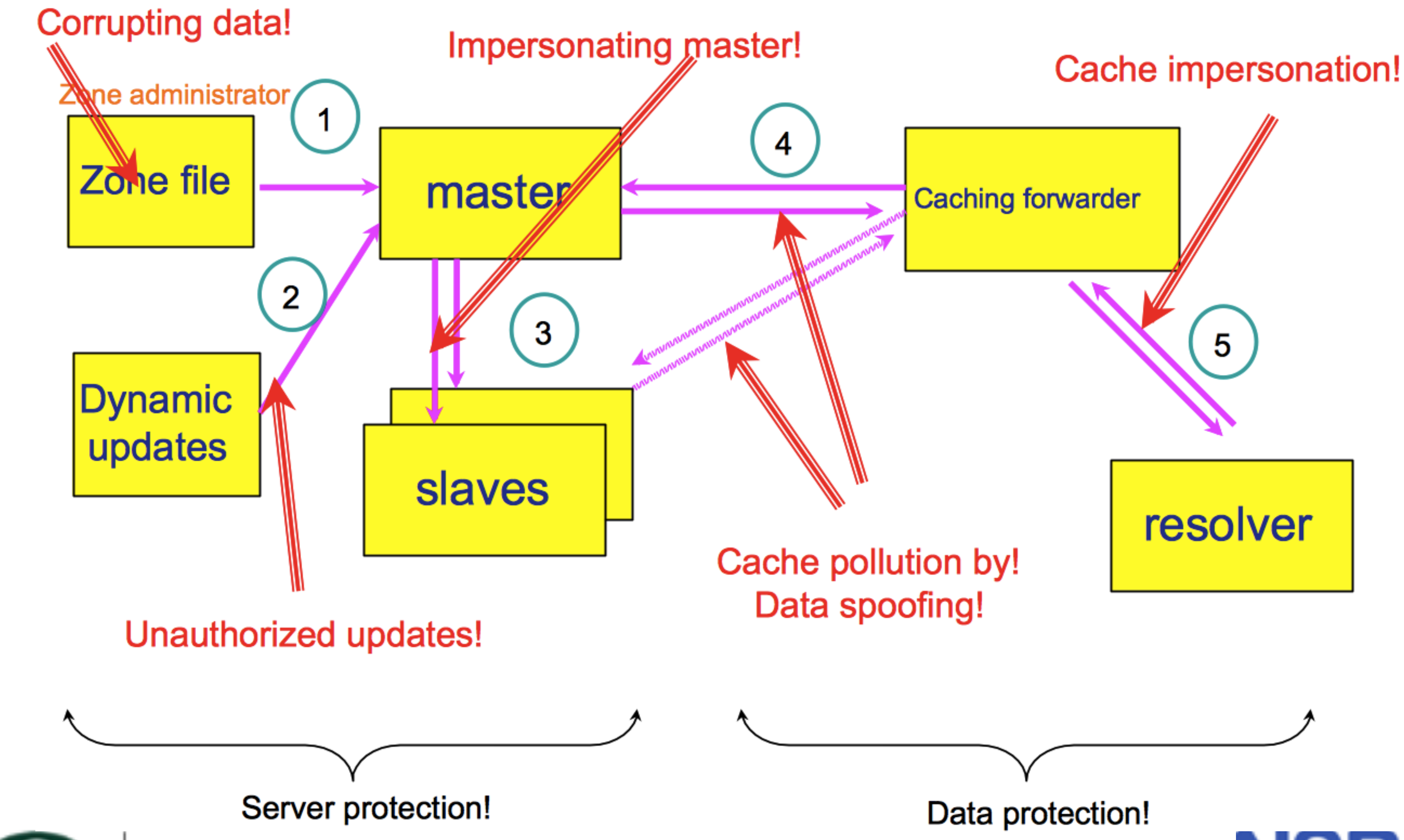
NSRC
Network Startup Resource Center

DNS: Data Flow



DNS Vulnerabilities



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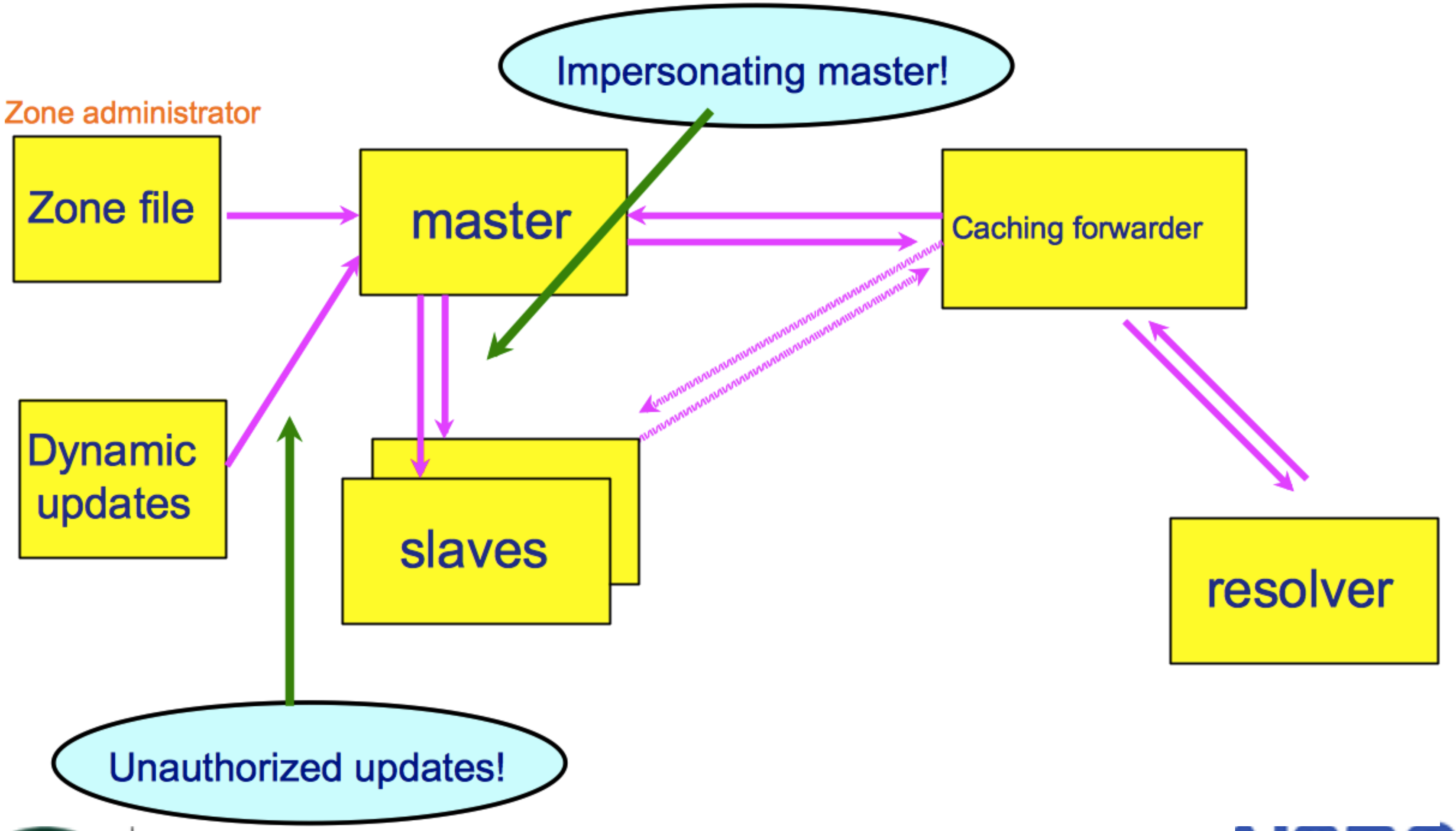
TSIG protected vulnerabilities



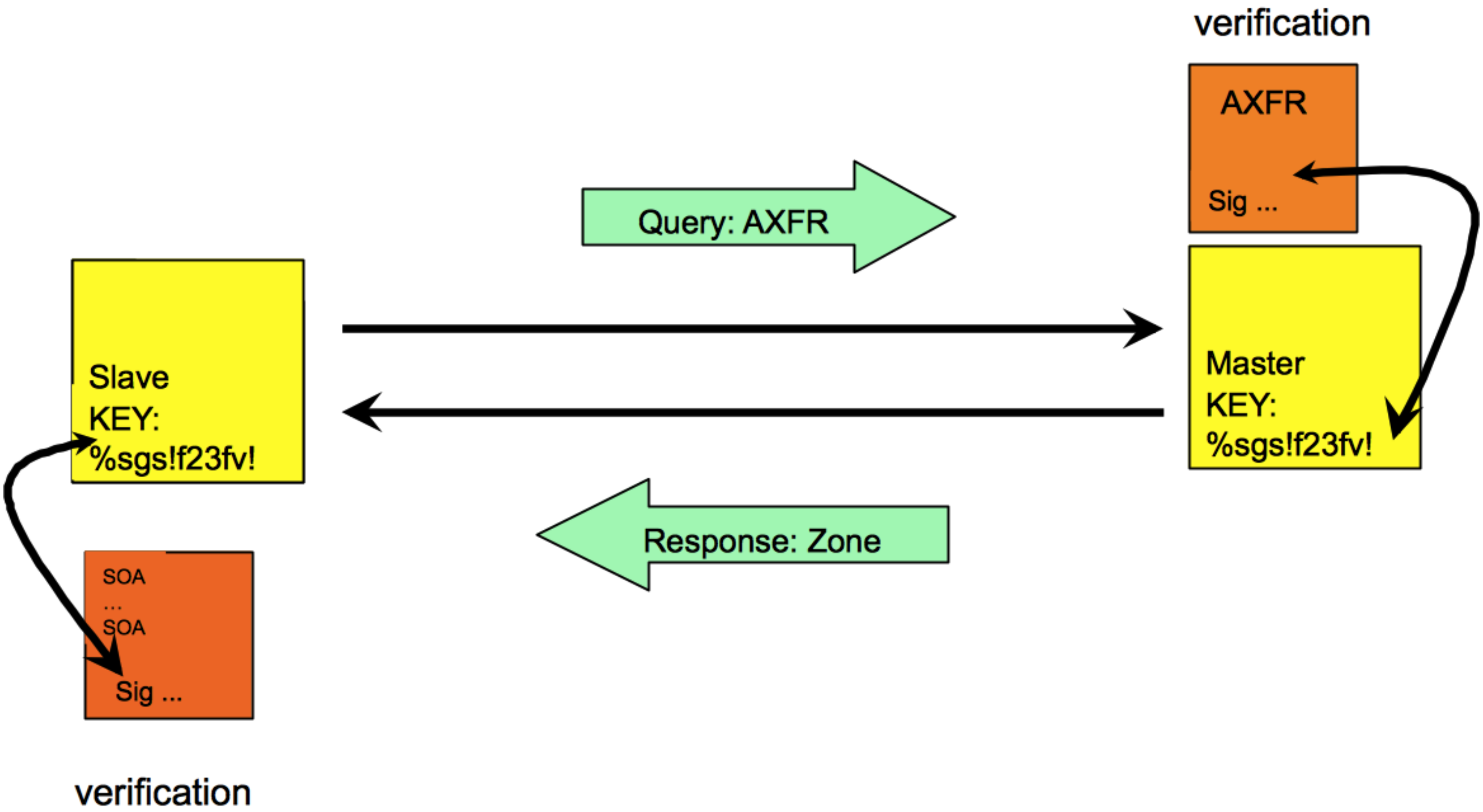
What is TSIG?

- **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
  - ACLs
  - In some contexts, names of keys (more on this later)

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

- Generate secret
- Communicate secret
- Configure servers
- 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

- Results in 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 was a KEY Resource Record that was replaced by DNSKEY (for DNSSEC)
  - Could cause some confusion as TSIG keys can look like those KEY RRs:

ns1-ns2.grp2.net. IN KEY 128 157 nEfRx9…bbPn7lyQtE=

TSIG – Generating a Secret

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

```
key ”ns1-ns2.grp2.net" {
   algorithm hmac-md5;
   secret "3etWczaeGesi0cEpeef7PhiKCkgC2sw==";
};
```

- Using the key:
  - in named.conf, add:

```
server a.b.c.d { key “ns1-ns2.grp2.net”; };
```

- … where ‘a.b.c.d’ is the IPv4 address of the REMOTE server
  - can use IPv6 address here as an alternative

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?

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