
# DNS Security Extension (DNSSEC)

# Why DNSSEC?

- DNS is not secure
  - Applications depend on DNS
  - Known vulnerabilities
- DNSSEC protects against data spoofing and corruption

# Outline

- Introduction
- DNSSEC mechanisms
  - to authenticate servers (TSIG / SIG0)
  - to establish authenticity and integrity of data
    - Quick overview
    - New RRs
    - Using public key cryptography to sign a single zone
    - Delegating signing authority ; building chains of trust
    - Key exchange and rollovers
- Conclusions

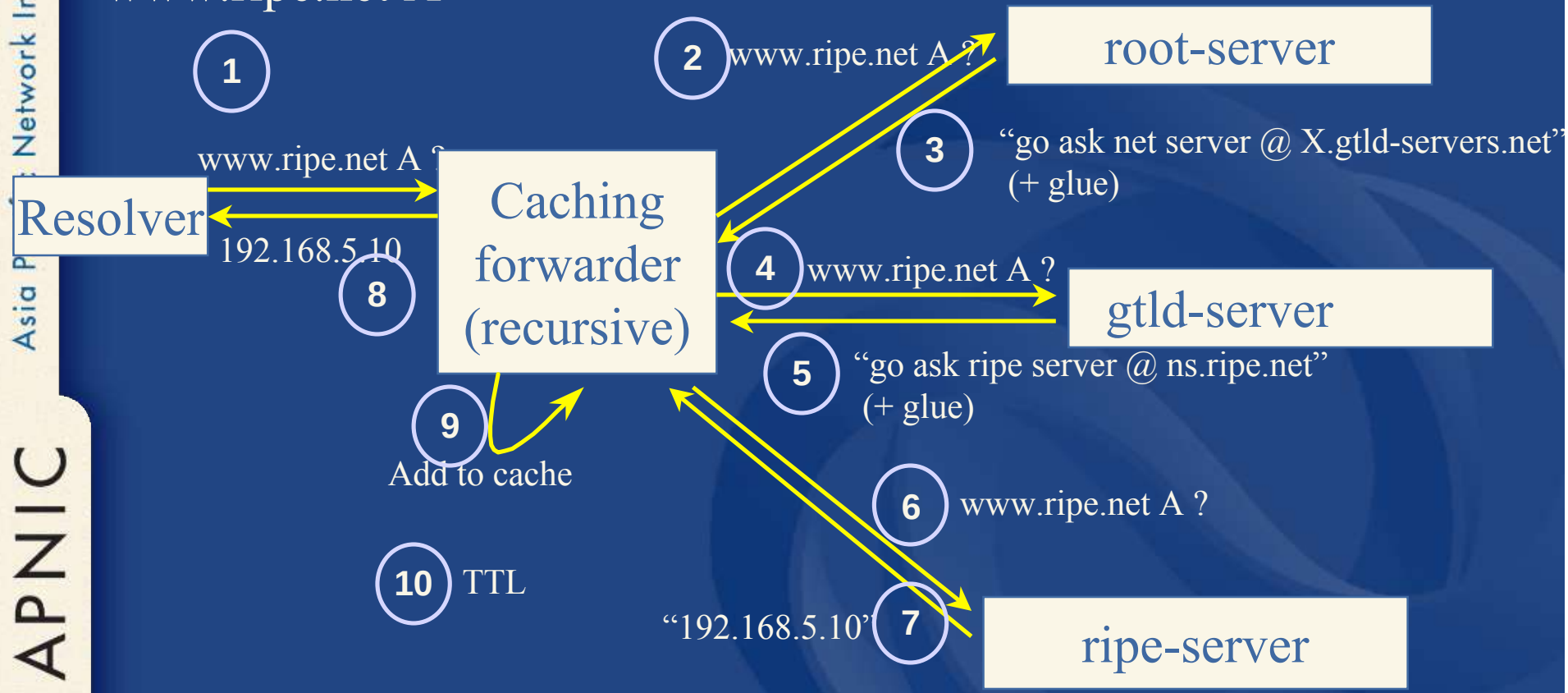
# DNS: Known Concepts

- Known DNS concepts:
  - Delegation, Referral, Zone, RRs, label, RDATA, authoritative server, caching forwarder, stub and full resolver, SOA parameters, etc
  - Don’t know? Do ask!

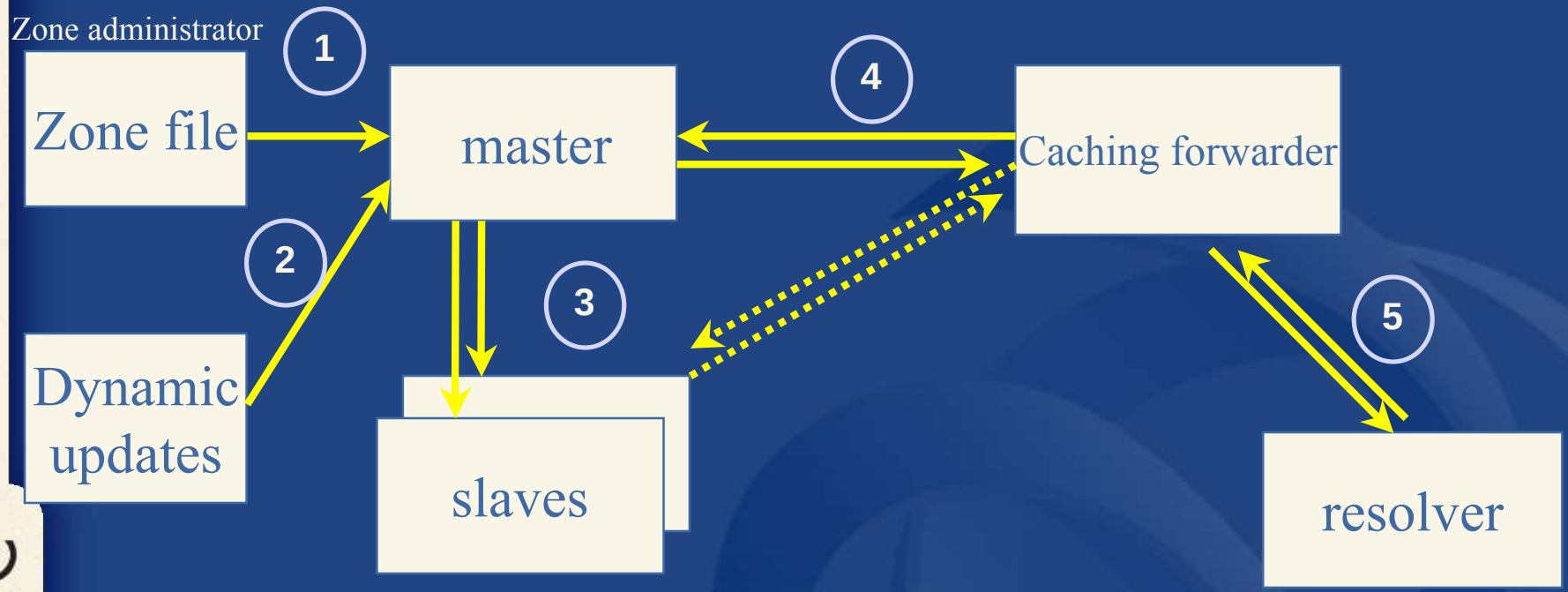
# Reminder: DNS Resolving

Question:

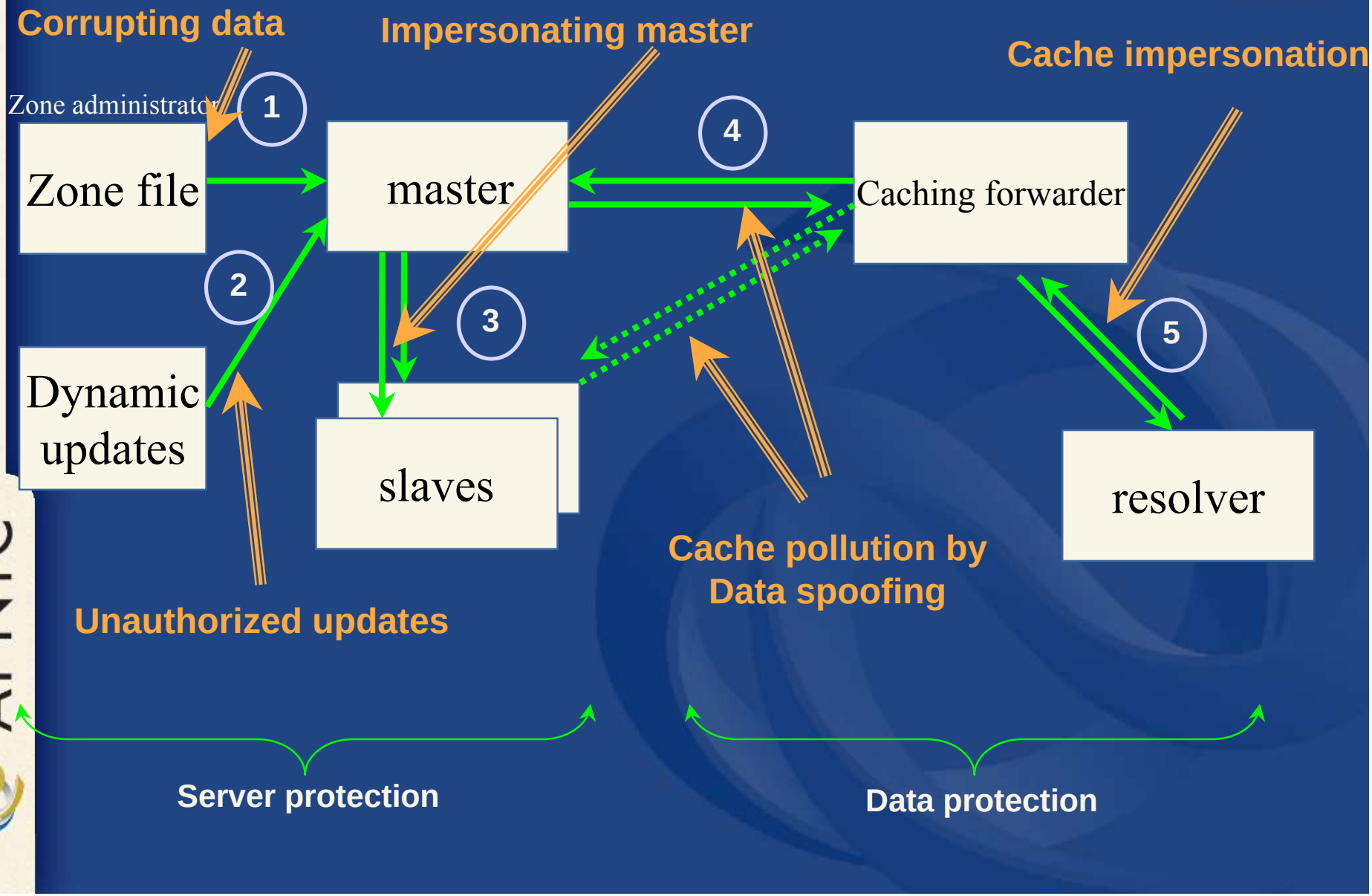
www.ripe.net A



# DNS: Data Flow



# DNS Vulnerabilities



# DNS Protocol Vulnerability

- DNS data can be spoofed and corrupted on its way between server and resolver or forwarder
- The DNS protocol does not allow you to check the validity of DNS data
  - Exploited by bugs in resolver implementation (predictable transaction ID)
  - Corrupted DNS data might end up in caches and stay there for a long time (TTL)
- How does a slave (secondary) knows it is talking to the proper master (primary)?

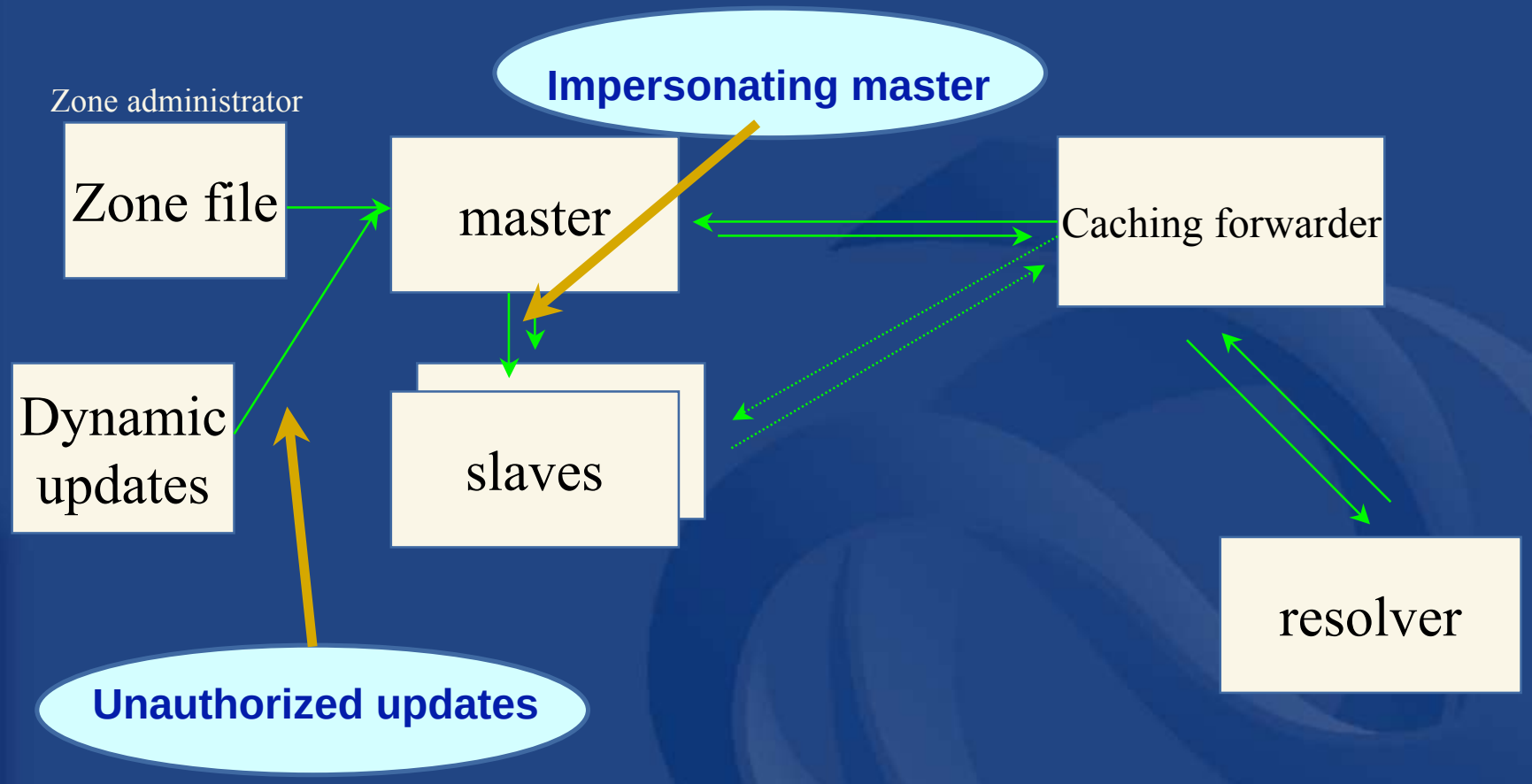
# Motivation for DNSSEC

- DNSSEC protects against data spoofing and corruption
- DNSSEC (TSIG) provides mechanisms to authenticate servers
- DNSSEC (KEY/SIG/NXT) provides mechanisms to establish authenticity and integrity of data
- A secure DNS will be used as a public key infrastructure (PKI)
  - However it is **NOT** a PKI

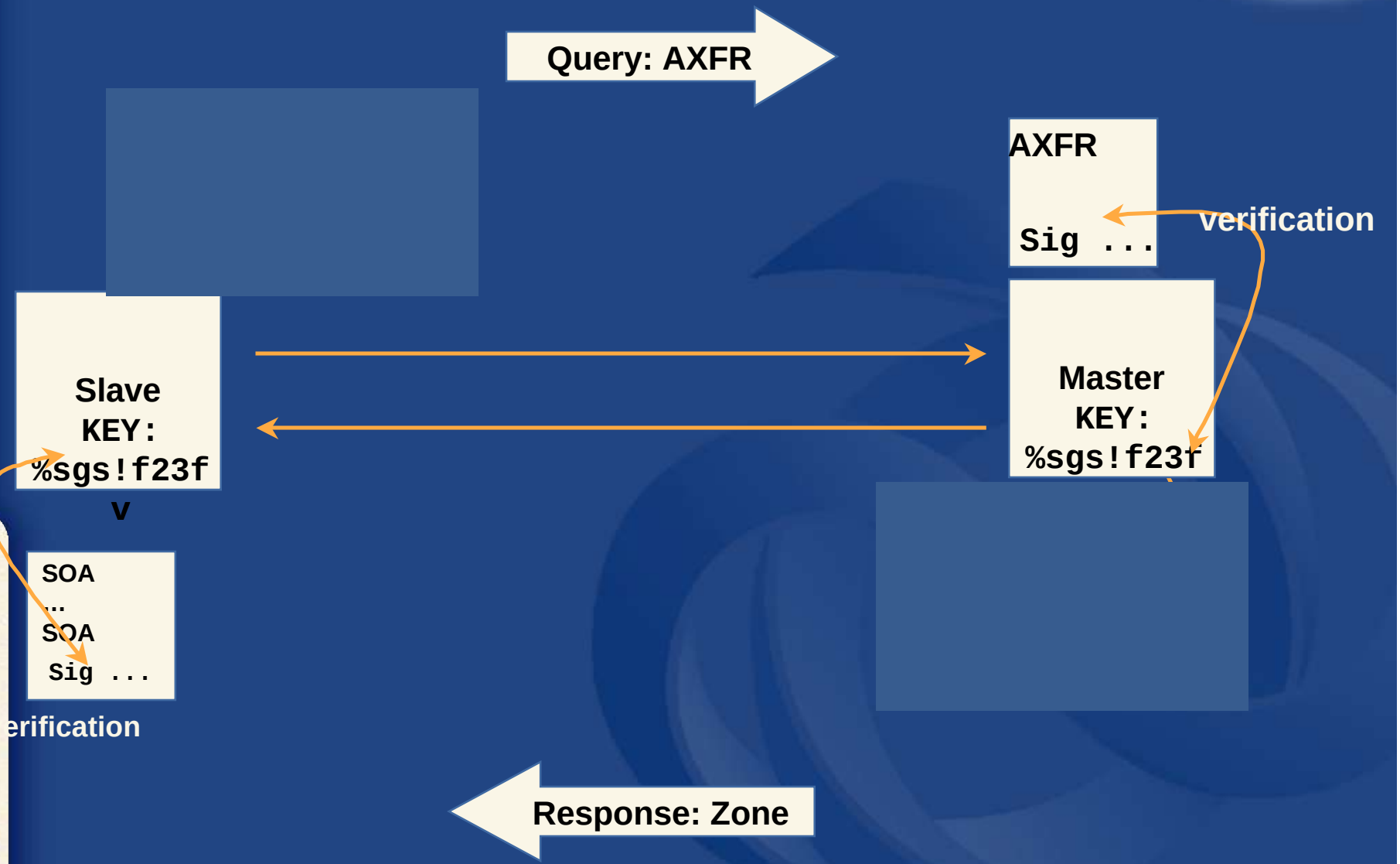
# DNSSEC Mechanisms to Authenticate Servers

- TSIG
- SIG0

# TSIG Protected Vulnerabilities



# TSIG example



# Authenticating Servers Using SIG0

- Alternatively its possible to use SIG0
  - Not widely used yet
  - Works well in dynamic update environment

- Public key algorithm
  - Authentication against a public key published in the DNS

# Questions?