DANE and SMTP:
TLS Protection for SMTP Using DANE and DNSSEC

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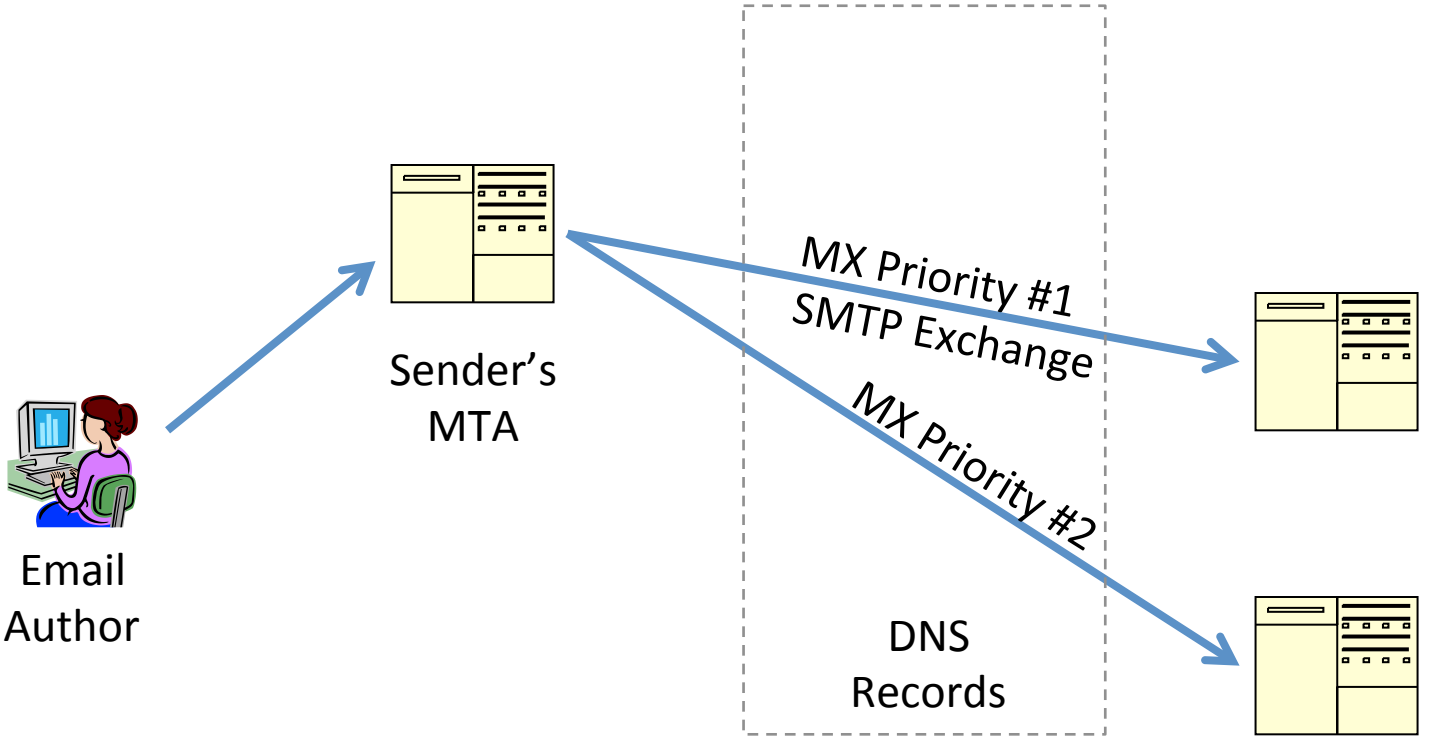
Sending E-Mail Today

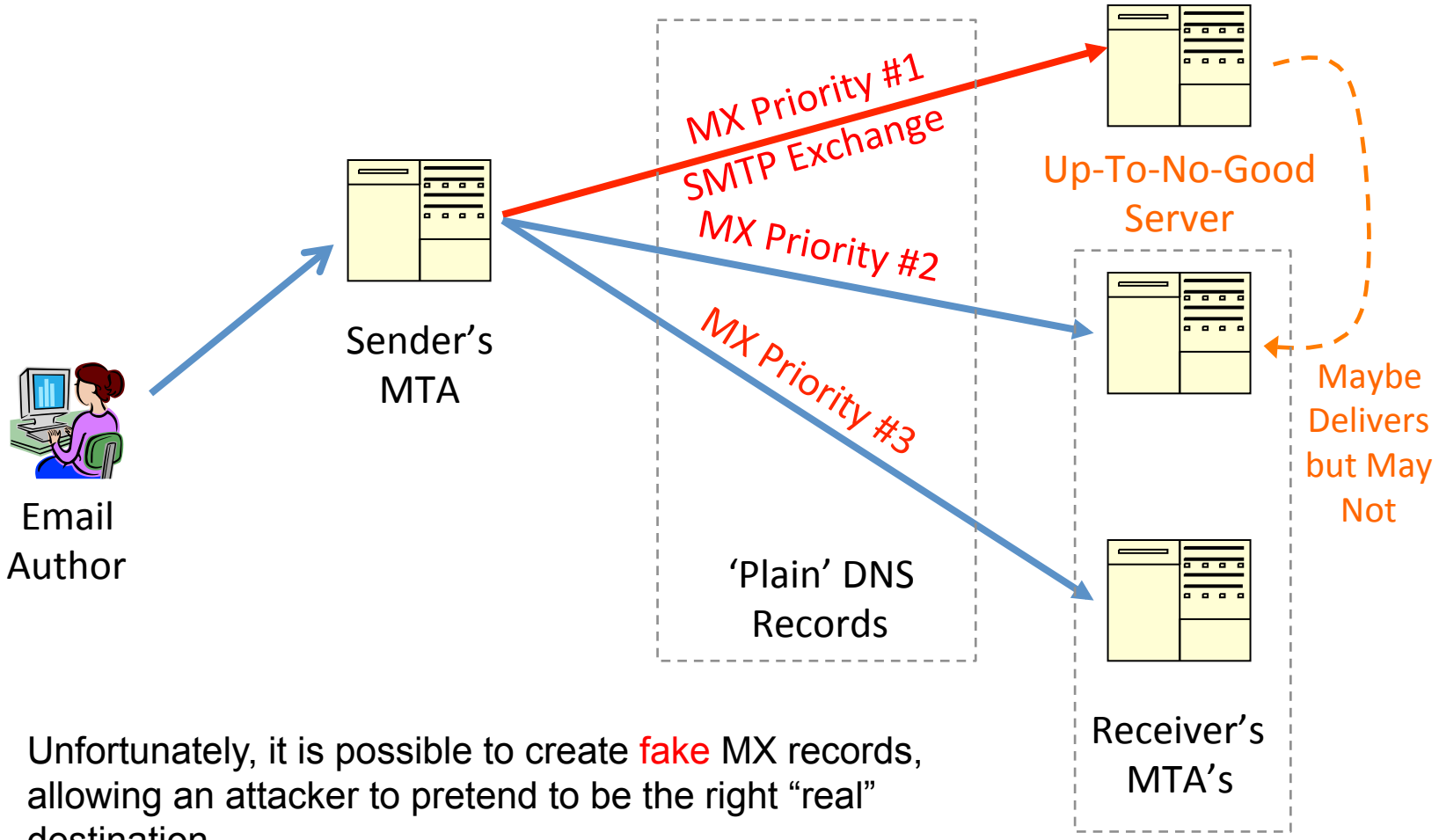


1. Sender transmits outgoing email to their mail server, i.e., Mail Transfer Agent (MTA)

2. The sender's MTA uses the receiver's DNS "MX" records to find a destination MTA address.

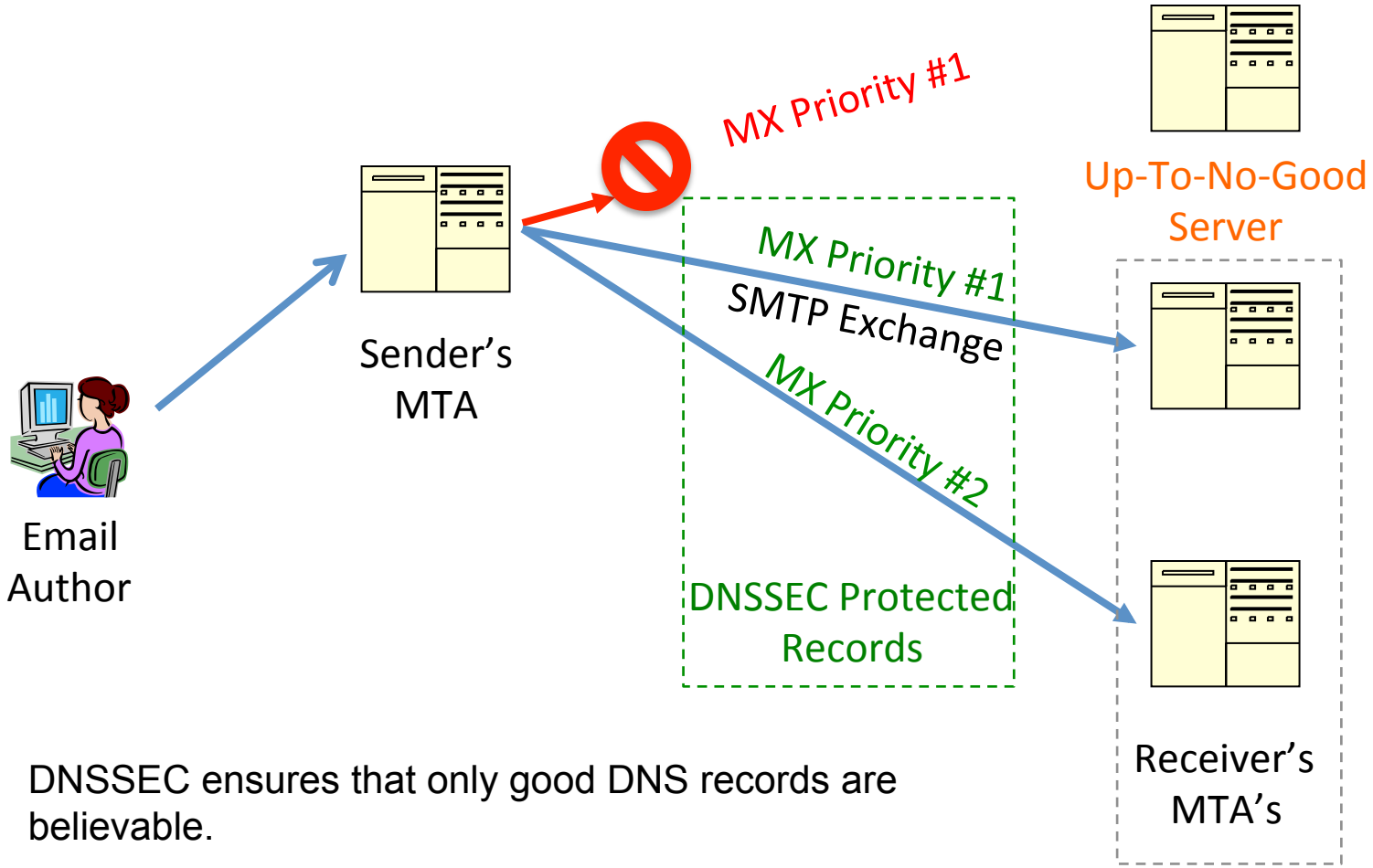
3. The sender's MTA sends email to the receiver's MTA address.

Problem #1: Fake MX Records



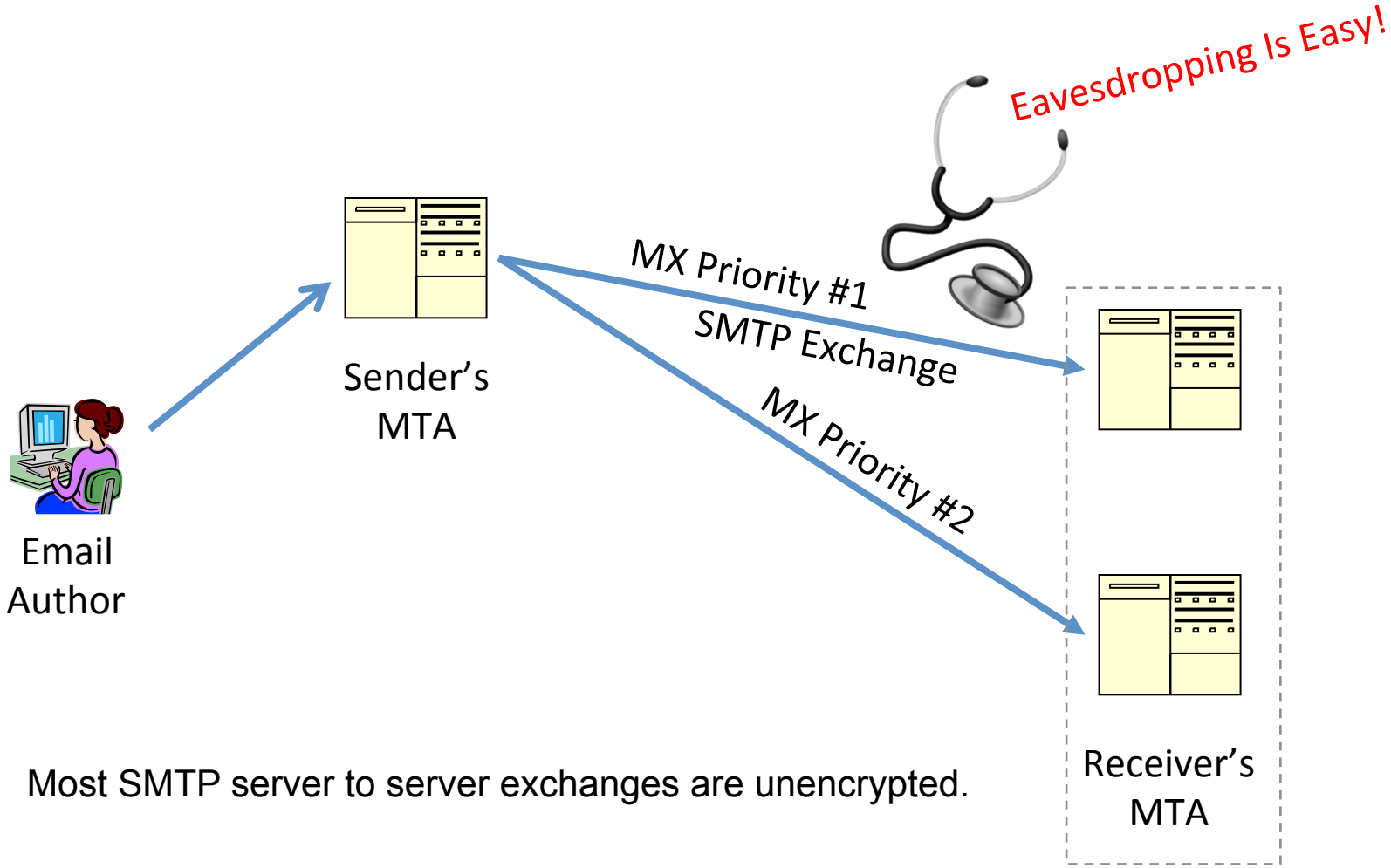
Unfortunately, it is possible to create fake MX records, allowing an attacker to pretend to be the right "real" destination.

Solution #1: DNSSEC

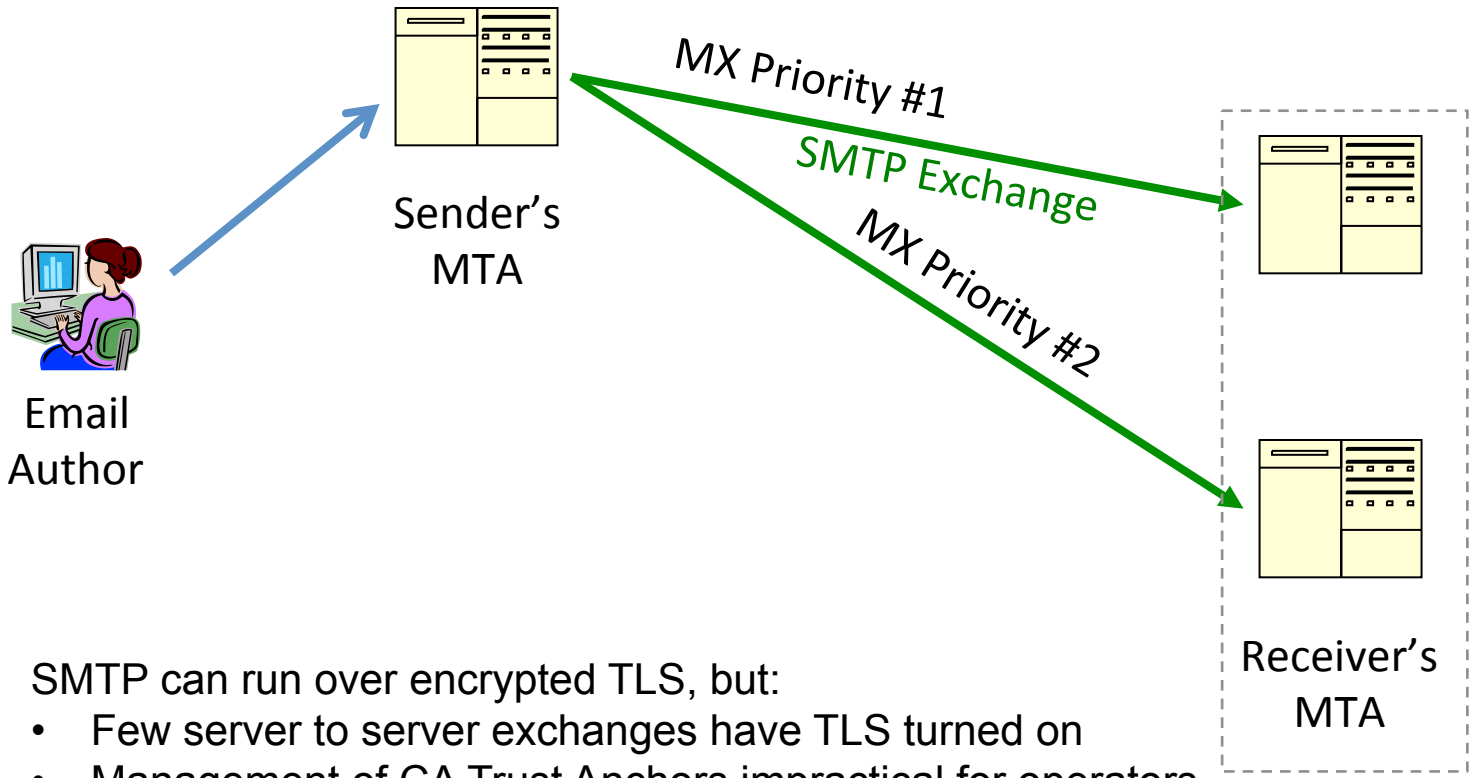


DNSSEC ensures that only good DNS records are believable.

Problem #2: Unprotected SMTP



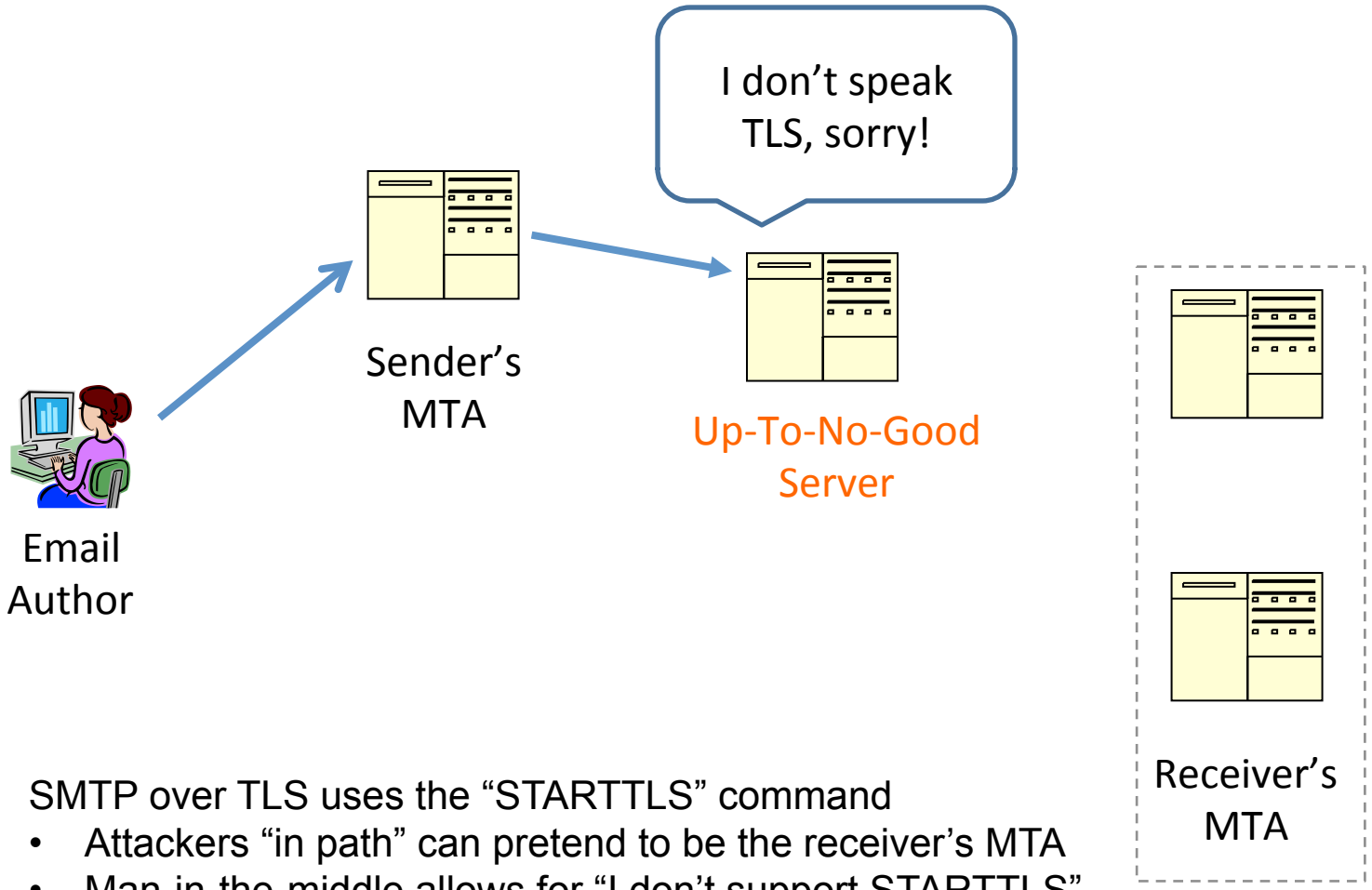
Solution #2: TLS-Protected SMTP



SMTP can run over encrypted TLS, but:

- Few server to server exchanges have TLS turned on
- Management of CA Trust Anchors impractical for operators
  - MTA servers don't normally distribute trust anchor lists
- DANE records are being defined to act as a DNS-based trust anchor

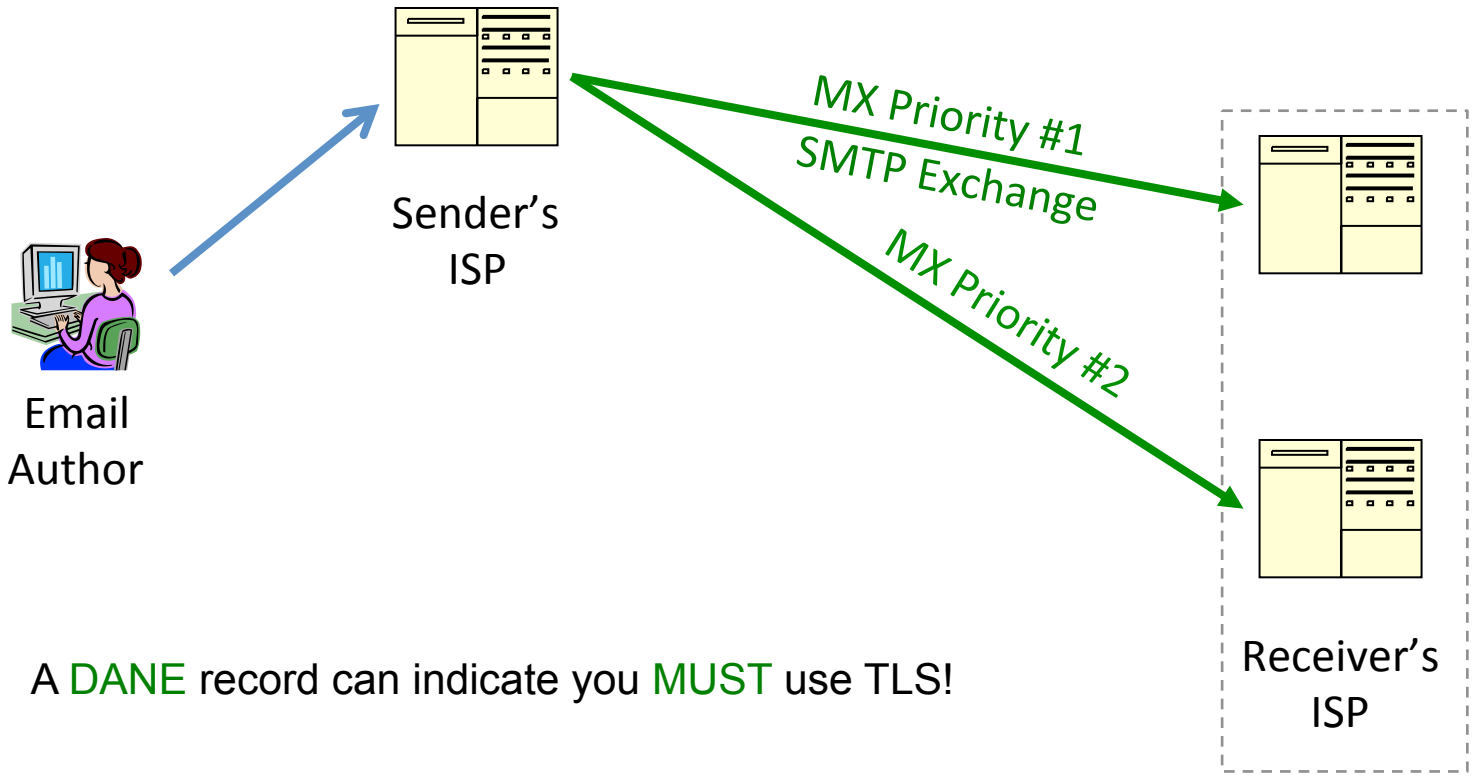
Problem #3: SMTP Man-in-the-Middle



SMTP over TLS uses the "STARTTLS" command

- Attackers "in path" can pretend to be the receiver's MTA
- Man-in-the-middle allows for "I don't support STARTTLS"
- Current default policy must be to deliver unencrypted if TLS is unavailable

Solution #3: SMTP over TLS with DANE



A DANE record can indicate you MUST use TLS!

SMTP Over TLS with DNSSEC & DANE

- Protects against MX record forgeries
- Protects against eavesdropping
- Protects against STARTTLS Man-in-the-Middle
- Provides secured X.509 trust-anchors for TLS