Reliable client-server connections

Making Telnet secure

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Introduction

- Authentication of both clients and servers
- Decentralised
- Based on TLS
- Proof of concept

Introduction

How can current techniques be used to validate
the identity of both client and server, using a TLS connection,
in a decentralised way?

Motivation

- Increase usage of certificate by clients and servers
- Eliminate the need for certificate authorities
  - Diginotar debacle
  - Foreign governments
  - Centralized
- Techniques are available
- Currently no implementations exist

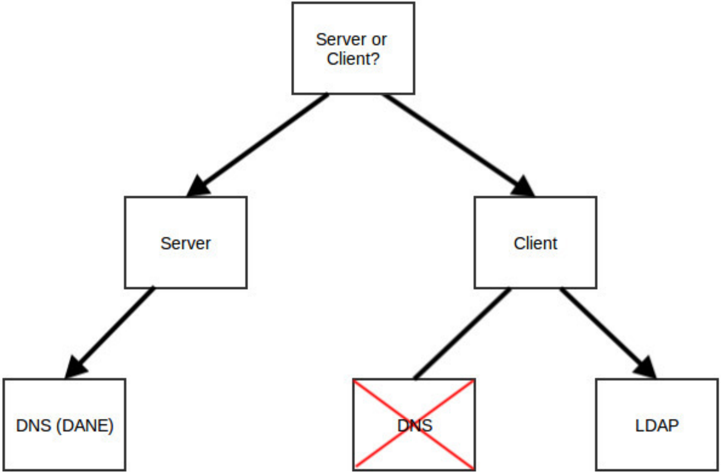
Design considerations

- PGP or X.509 (CA's)
- Validating certificates
- Daemon or Library
- Programming language

PGP or X.509

- X.509
  - Widely adapted
  - Validation of certificate is done by CA
- PGP
  - Certificates are managed by users
  - Decentralized design (web-of-trust)

Validating certificates



Daemon or Library

- Library
  - Existing GnuTLS library
- Daemon
  - Forwarding mechanism
  - Caching
  - Access to private keys
  - Multiple programming languages

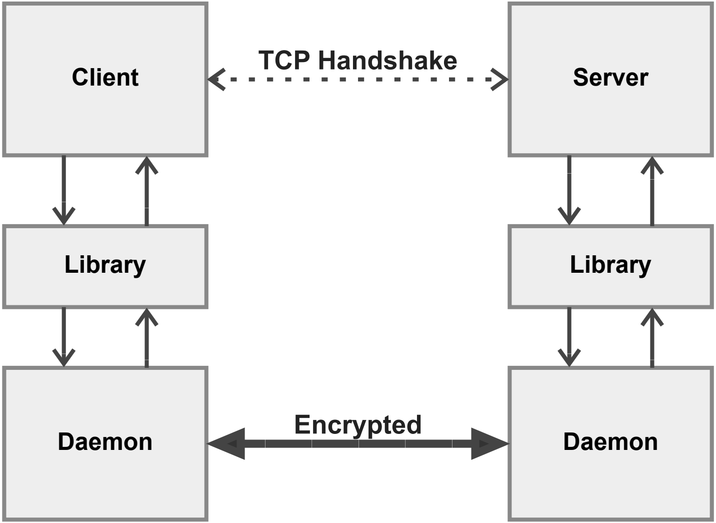
Programming Language

- Performance
- Future extension

Implementation

- Daemon
- Python
- PyGnuTLS Library
- Pass file descriptor of existing connection

Implementation

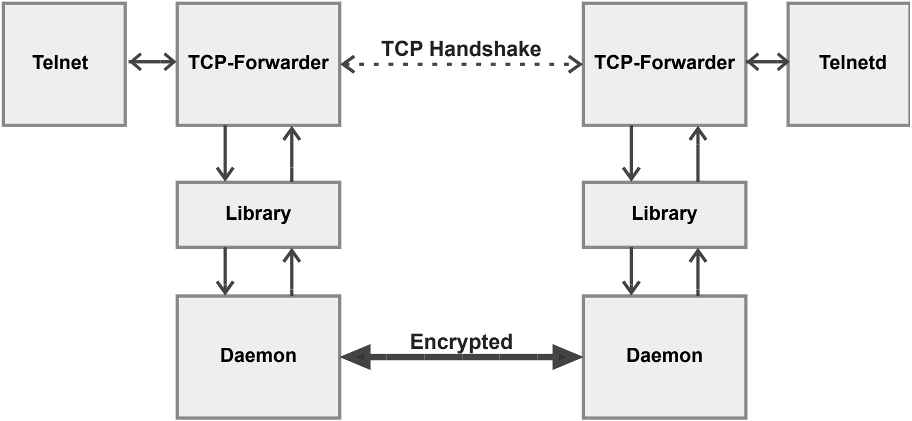


Implementation

- Based on certificate UID
    - LDAP
    - DANE
- Flags to *disable* certain checks
- DNSSEC
- Reponds with:
    - OK + id
    - ERR + code + message

Implementation

- Forwarding mechanism
- Telnet application as an example
- Possible with every other application



Conclusion

How can current techniques be used to validate the identity of both client and server using a TLS connection in a decentralised way?

- By creating a daemon it is possible!
- Easily implemented using single call to library
- It does work with an existing application (Telnet)
- `https://github.com/OS3/rp2_68`

Future work

- (D)TLS for UDP and SCTP
- (Soft)HSM
- Caching
- Certificate Pinning
- Libraries in other languages

Questions

Are there any questions?

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