Chair of Network Architectures and Services
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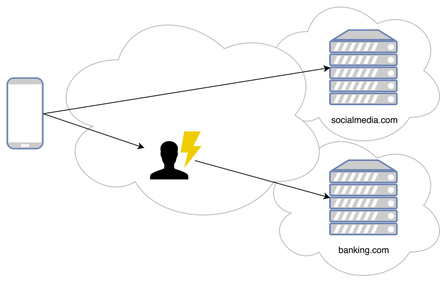
INTERCEPTLS

Detection and Characterization of TLS Interception in Access Networks

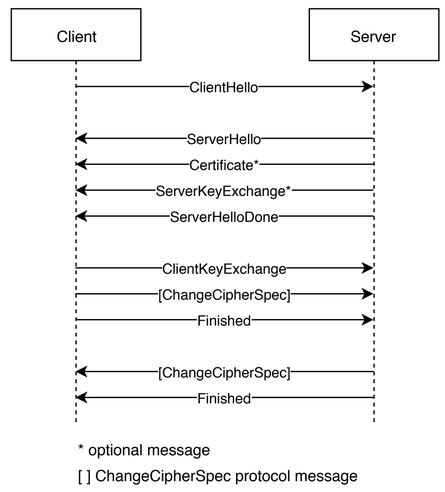
Motivation

- TLS connections are intercepted [1, 2, 3]
- These interceptions were detected using a single viewpoint approach (either client or server viewpoint)
- Single viewpoint approaches rely on heuristics or may not detect all interceptions
- Our goal is to detect interceptions and characterize middleboxes to obtain a more complete picture (client and server side view), e.g. detect selective interceptions



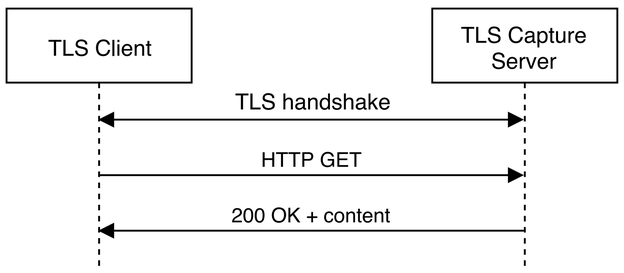
Background

- Transport Layer Security (TLS) is used to establish a secure connection between two parties
- Trust is established via Public Key Infrastructure (PKI)

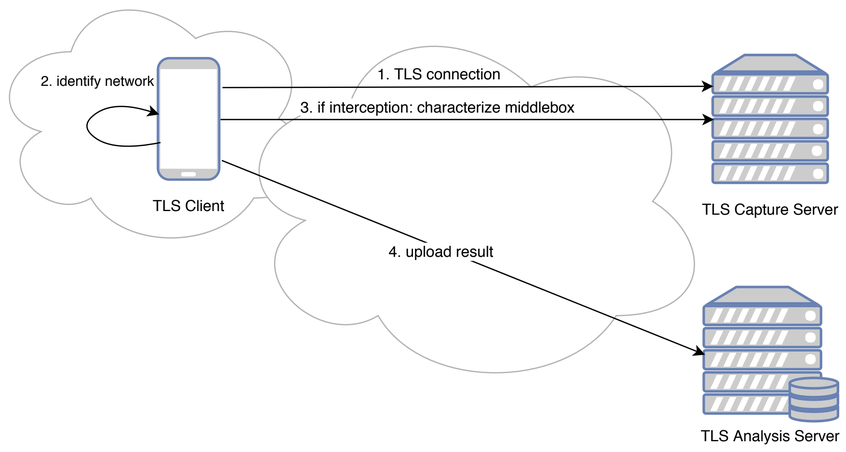


Design

- Obtain full picture of TLS interceptions (client and server view)
- Detect (selective) interceptions
- Characterize middlebox (supported TLS versions, mimicked TLS fingerprint, behaviour on non-existent server name identification or http host)
- Obtain network information (network type, public ip address, gateway, DNS, location)
- Crowd-sourced approach (Android app and desktop client)



Implementation



Clients are available for:

- Android (6.0+)
- CLI (tested on Ubuntu 17.10, macOS 10.13)

Results

In four months, 3485 measurements were collected. Four of these were intercepted using self-signed certificates. Further analysis is still required.

Future Work

- Support for TLS 1.3
- Deploy server in different environments
- Grow user base
- Add additional middlebox characteristics

Support us and download the Android app. More information about the project can be found on `https://interceptls.net.in.tum.de`

[1] X. De Carnavalet et al. Killed by proxy: Analyzing client-end tls interception software. *NDSS*, 2016.
[2] Z. Durumeric et al. The security impact of https interception. *NDSS*, 2017.
[3] R. Holz, T. Riedmaier, N. Kammenhuber, and G. Carle. X. 509 forensics: Detecting and localising the ssl/tls men-in-the-middle. In *European Symposium on Research in Computer Security*, pages 217–234. Springer, 2012.

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