

# Secure Time Synchronization Protocol



Technische Universität München



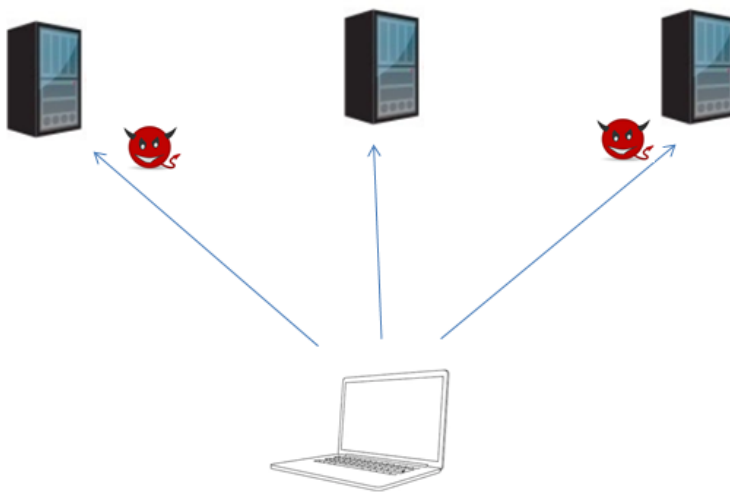
Fakultät für Informatik

Lehrstuhl für Echtzeitsysteme und Robotik

## Description

The Network Time Protocol (NTP) is used by many devices to synchronize their time with precise clocks of remote servers. In the simplest NTP protocol, a client device sends a packet to a server which responds with another packet. The response contains the time stamp of the request at the server side, as well as the time the response was sent. This allows the client to estimate the network delay and its clock offset. However, most NTP servers do not authenticate themselves to clients, so a network attacker can intercept packets and set the timestamps arbitrarily. Also, the attacker may delay the packets from authenticated servers. This emerges the need for secure network time protocol.

The focus of this thesis is the security of the network time protocol. During this thesis, we are going to attack NTP packets and develop one or several strategies for securing NTP using novel models.



## Tasks

- Literature review on the topic of securing network time protocol.
- Getting familiarized with one of time synchronization testbeds.
- Development and implementation of one or several protection strategies
- Evaluation of the performance by comparing the result to the unattacked NTP on available testbed.

### Supervisor:

Prof. Dr.-Ing. Matthias Althoff

### Advisor:

Amr Alanwar, M.Sc.

### Research project:

interACT

### Type:

MA

### Research area:

Secure Time Synchronization,  
NTP

### Programming language:

MATLAB/C++

### Required skills:

Programming in C++/MATLAB

### Language:

English

### Date of submission:

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**For more information please contact us:**

Phone:

E-Mail: [alanwar@tum.de](mailto:alanwar@tum.de)

Internet:

<https://amralanwar.webs.com/>