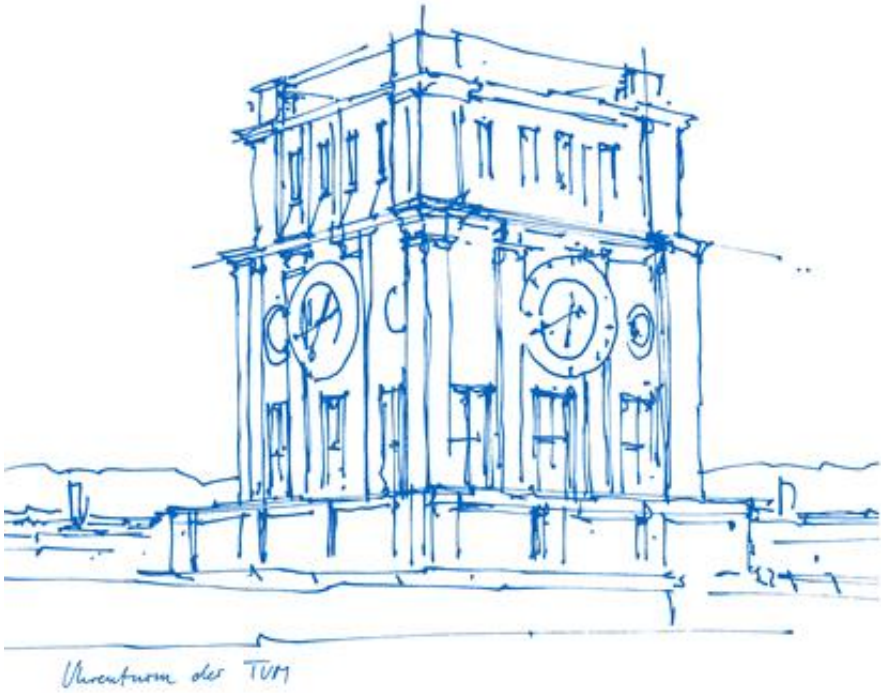
Assignment 2: Secure Cloud Sync

Design a protocol

Specify the protocol

Implement the protocol



Scenario and Specification

- Support of file operations
  - Actions: add and remove file(s) from multiple end points
    - User adds a file > synchronize to the server (uploaded) and to all other end points (downloaded)
    - User removes a file > synchronize to the server (remove) and to all other end points (remove)
  - Differential synchronization
    - Only synchronize the changes of the file content
- Security (attacks: Man-in-the-Middle, masquerading, impersonation, denial of service)
  - Scenario: one user has multiple end points (e.g., laptop, PC, smartphone)
  - User authentication between client and server
  - Encryption of entire network communication
  - Multi-way handshake to counter denial of service attacks
    - SYN cookies: https://en.wikipedia.org/wiki/SYN_cookies
    - Puzzles: https://en.wikipedia.org/wiki/Client_Puzzle_Protocol
  - Performance improvement after establishing a connection
    - Fast reconnect, e.g. zero-round-trip
- Forced congestion control (optional if already implemented)
  - Set packet rate (command line parameter)

Interface

Client:

scsync [-h <hostname|ip-addr>] [-p <port>] [-f <directory-path>] [-u <user>] [-pass<password>]

Server:

scsync [-s] [-p <port>] [-cc <packets>]

-s	Server mode: accept incoming connections from any host
-p	Specify the port number (use a default if not given)
-f	Upload all files in that directory to the server
-h	Remote host
-u	user
-pass	password
-cc	packets per second

Regulations

- Document (and motivate!) your design decisions
  - There are many possible approaches
- Write up a short specification for your protocol
  - Include sufficient detail so that one can understand and implement it
  - Litmus test
    - Design together in your group
    - One or two of our group members writes a part of the specification
    - The other(s) try to understand it, be critical!
- Do a draft version of your protocol specification
  - Amount: paper (max. 2 pages) and key functionality for discussion: 3 – 4 slides
  - Send to us by 11th June 2018, 23:59:59
  - Group discussions on 12th June 2018
- Update and complete your specification based upon feedback
  - Hand in the written specification by 24th June 2018, 23:59:59
  - Implement your specification by 24th June 2018, 23:59:59