UNIVERSITÄT PADERBORN
Die Universität der Informationsgesellschaft

Master Thesis

Public testing of a peer-to-peer based social network application

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Overview

- Motivation
- Goals
- LibreSocial Architecture
- Changes
- Evaluation
- Conclusion

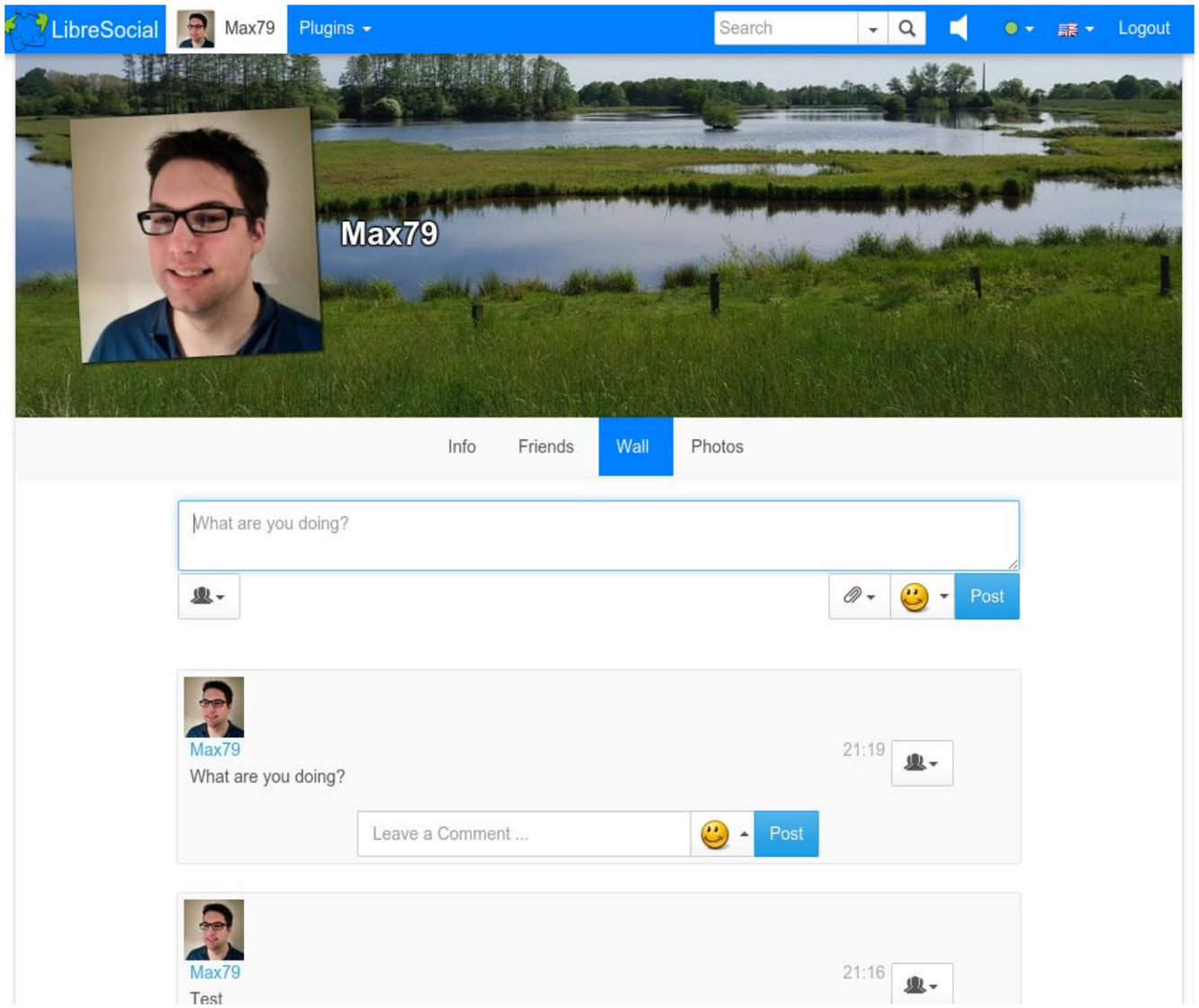
Motivation

- Most important features are implemented
- Synthetic tests covered in a previous master thesis
- Now it is interesting to see how it performs when end users

Goals

- Find out whether the application is stable enough
- Test it with a larger base of different computers and network connections
- Do real users have problems with the handling
- Identify problems in terms of publishing the software (licensing etc.)

LibreSocial

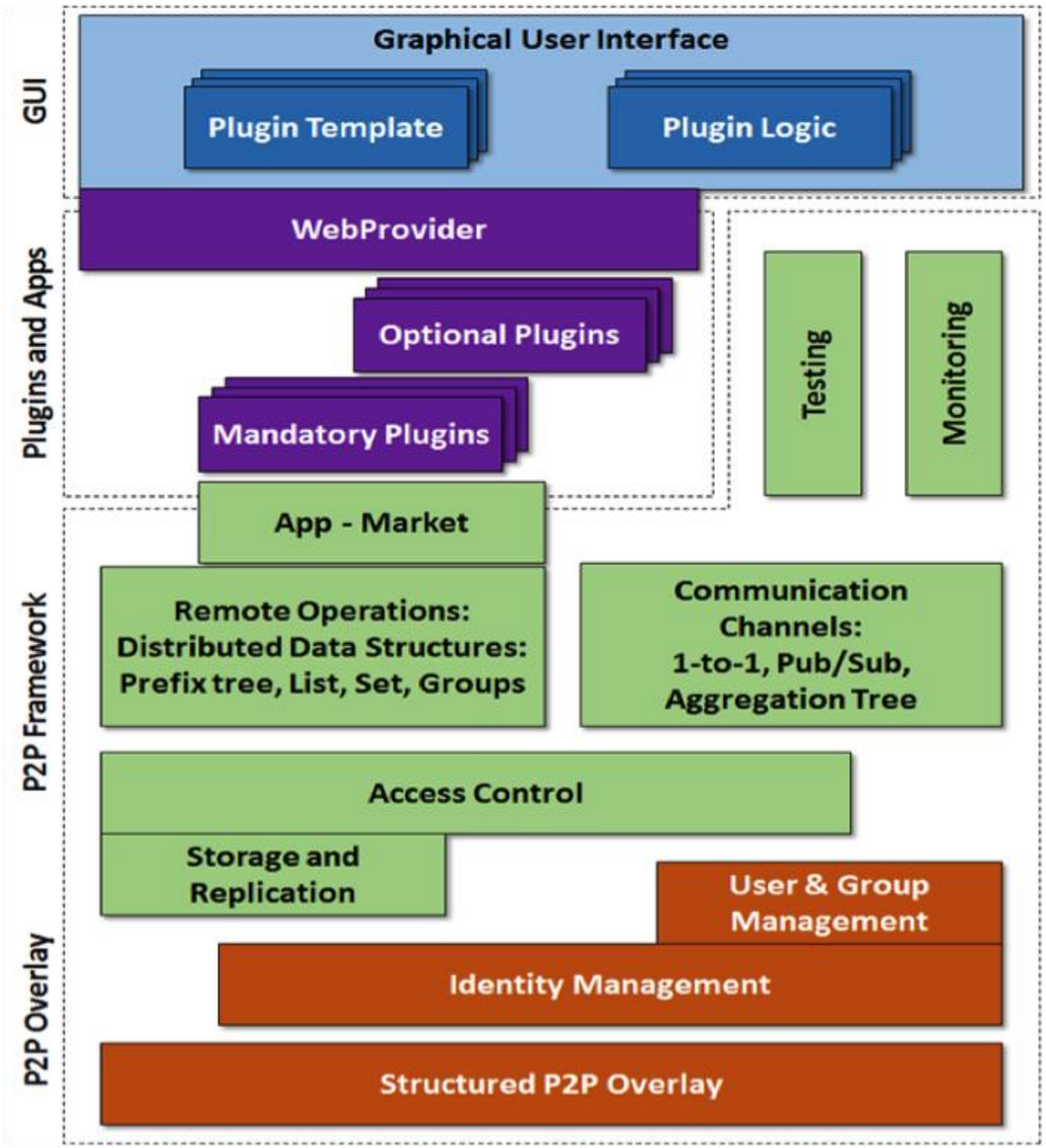


- Social Network based on P2P Network
- Users share resources
- Data distributed across the network

LifeSocial - LibreSocial

- Due to legal reasons LifeSocial had to be renamed
  - Survey to find out the most popular alternative out of a number of suggestions
  - Also a new logo was introduced
- New website inform and attract users and as a download repository for the application during the tests and later

LibreSocial Architecture



- Layered architecture
- Based on OSGI
- Eclipse RCP Dependencies mostly removed
- Functionalities implemented as plugins
- HTML5 GUI

Image from PG2013/2014 Final Document, pg. 37

Adaptions

- Until now only used internally
- Some modifications needed to make it usable for average users
- Find an easy way for the users to send bug reports
- Show-stopper bugs

Monitoring

- Part of the framework that allows to observe the development of several values over time
  - E.g. Message Count, Data Rate, User actions
- Efficiently gathers the information from the nodes in the network by using an overlay tree network on top of the p2p-network

Improvements for Monitoring

- Monitoring consumed more and more cpu and memory
  - statistics were written to plain text files
  - Many new metrics introduced in previous thesis
  - File was completely loaded to memory and rewritten completely for each new set of monitoring data (every 5 seconds)



- Solution: New SQLite statistics output
  - Very fast and time needed for writing data nearly constant
  - More precise as data is written more often
  - But
    - Has to be converted afterwards for further processing
    - Monitoring Files are larger

Problems

- Instabilities when applications run for some days
  - Data (Files, Photos) cannot be retrieved anymore or at least it takes very long
  - Message Lost Errors occur when this happens
- Rather complex to debug
- Combination of multiple problems

Problems

- Data objects were stored as compressed XML files
  - Very big files in contrast to actual payload
  - Takes a very long time to process

- Nodes were unable to handle the messages in time and queues filled up → Messages dropped

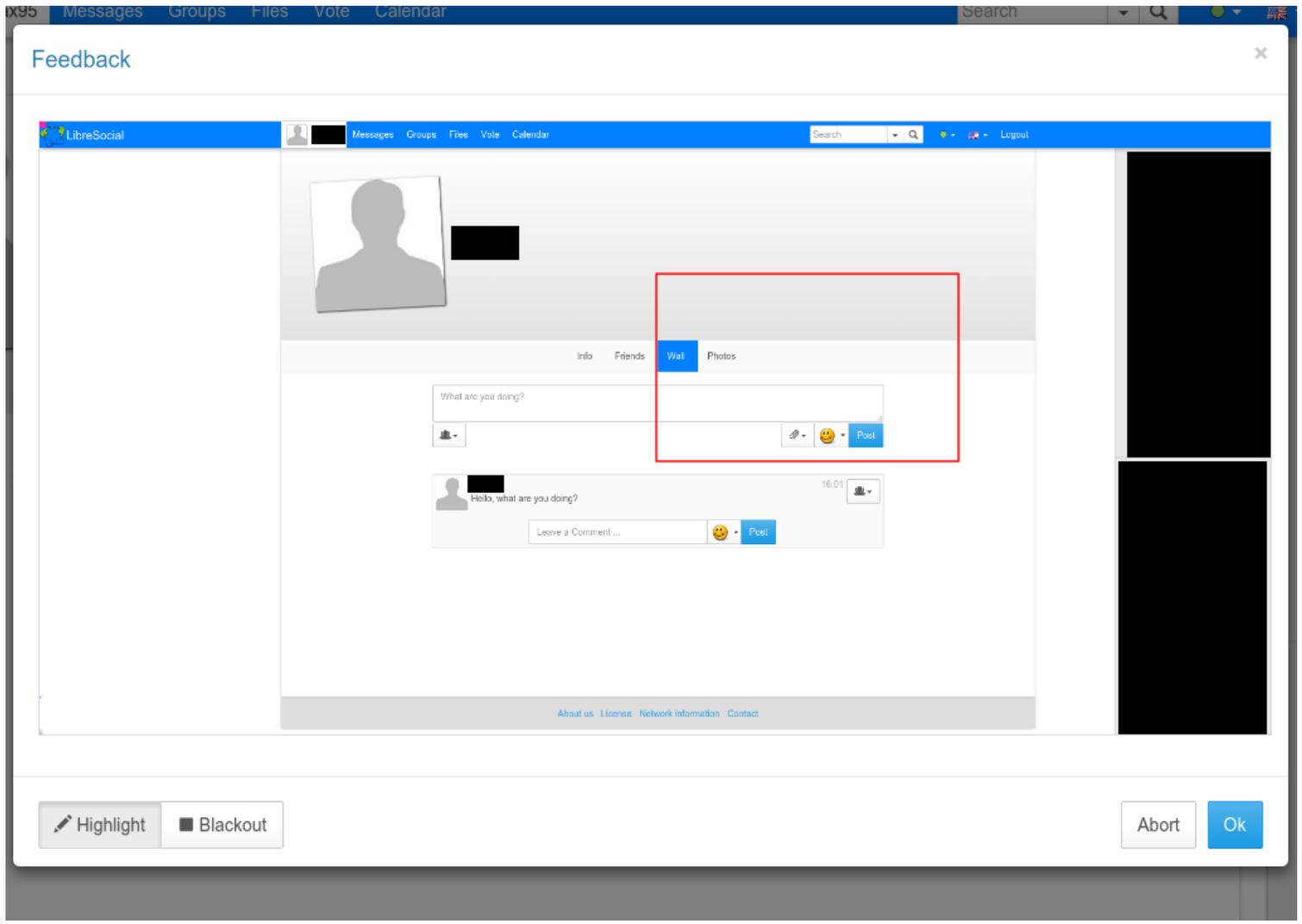
- Kryo Serialization Library instead of XML reduced time needed to store a typical file chunk (500 KByte) from >500ms to 2ms

- Message Lost Errors still occur after a few days of operation

Adaptions GUI

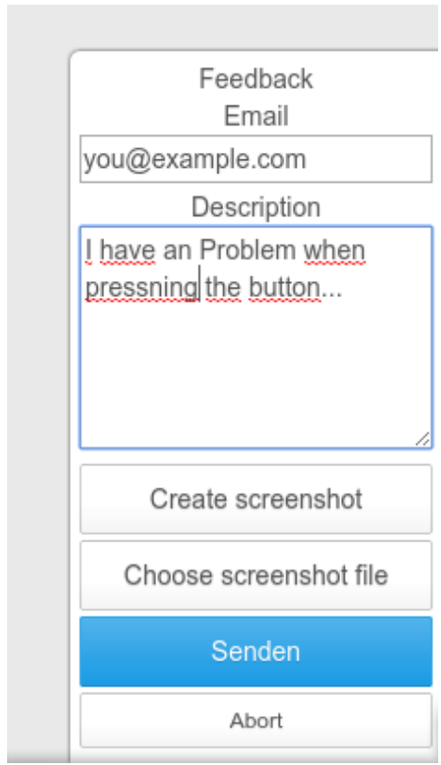
- Improved interactions between the users to make them use it as often as possible
  - Sharing of content to make the wall feed more interesting
  - Friend suggestions by using automated search
- Simplified Login process and Tutorial for Network setup
- Feedback Tool

Feedback Tool



Screenshot Editor with highlighting and blackening functionality

- Easy way to send bug reports to the developers
- Automatically takes screenshots



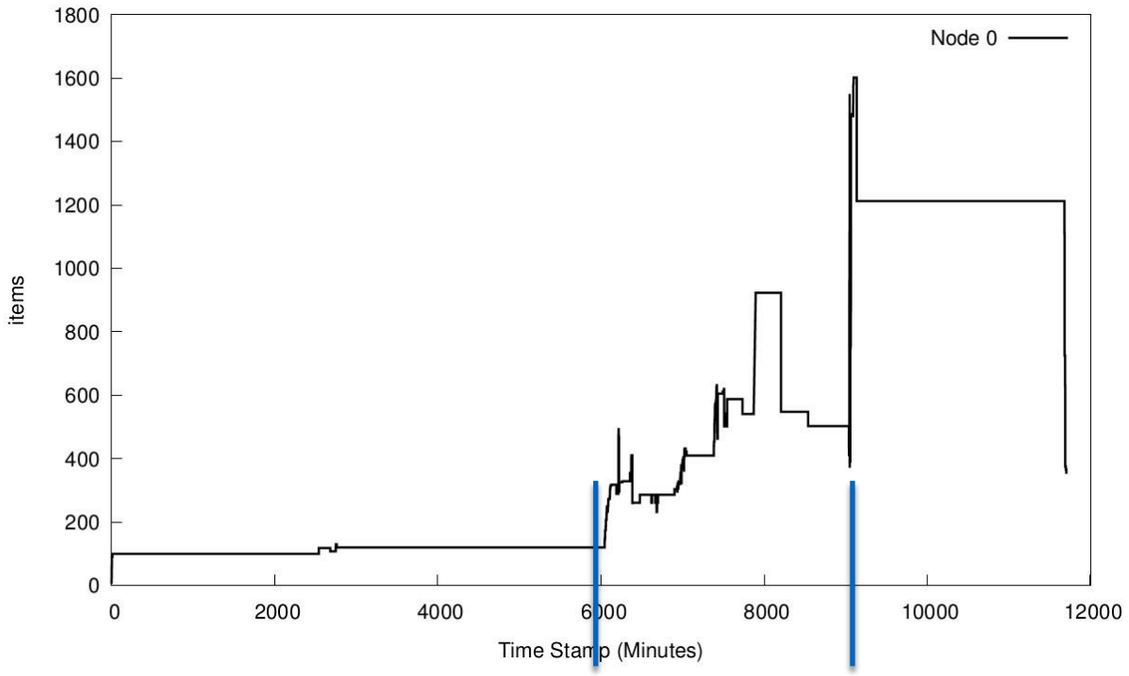
Feedback Panel

Tests

- 10 virtual Machines at the university as bootstrap nodes that are permanently available
- Multiple rounds of tests with more and more users
- Examination of monitoring data, feedback and mails, survey
- Traq as Bug/Feedback Management System

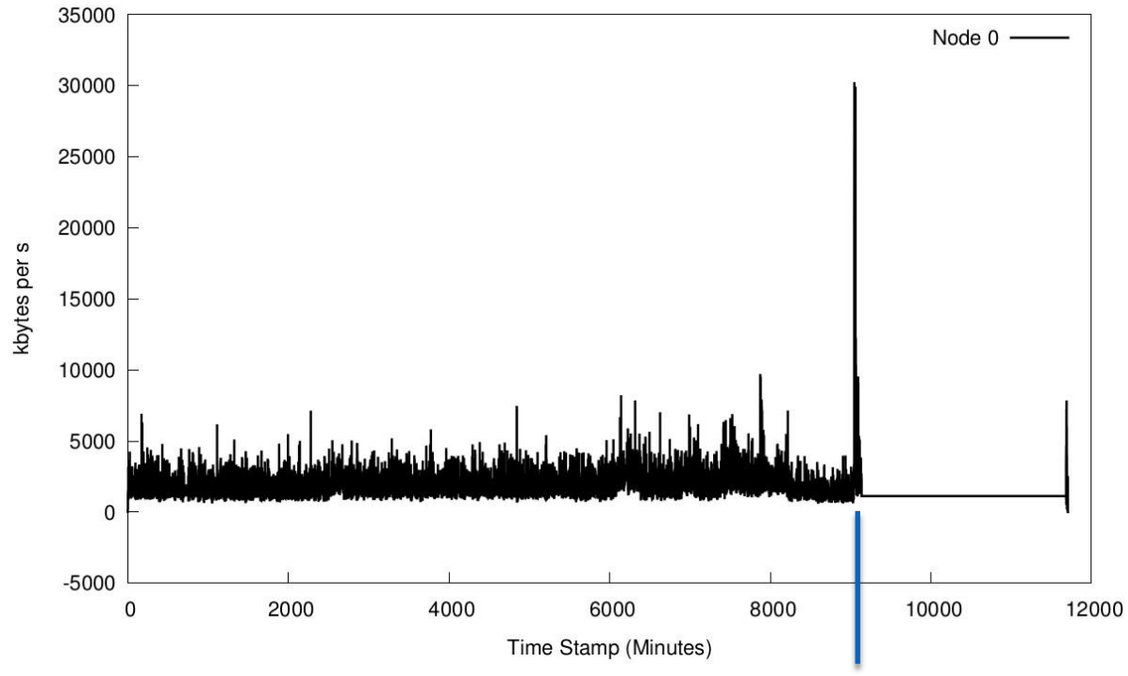
Monitoring I

Stored Items in Network



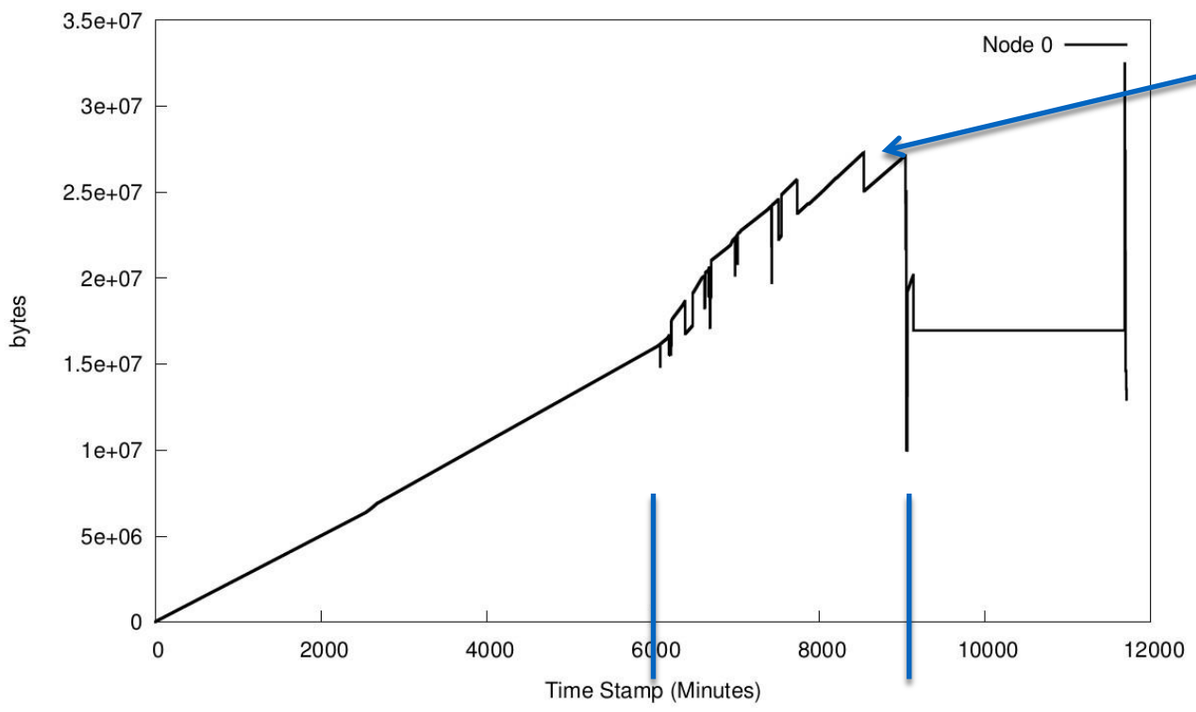
A B C

Data Rate



Monitoring II

Data Received

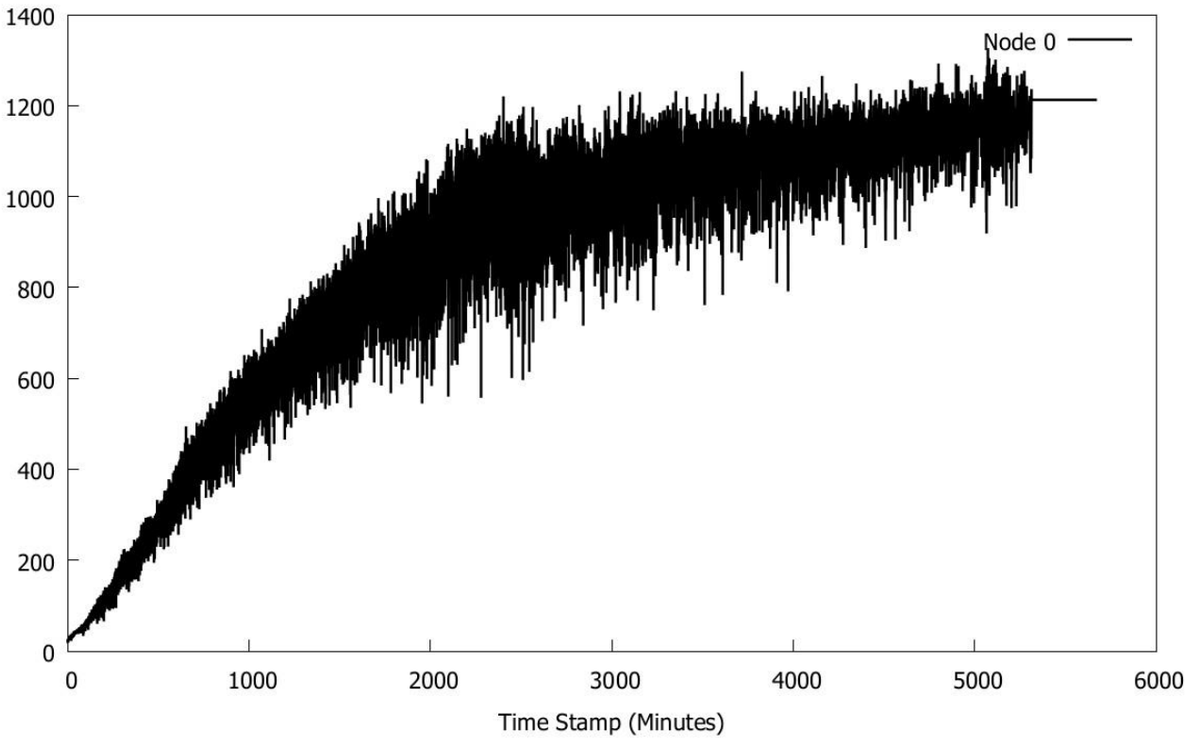


Anomaly

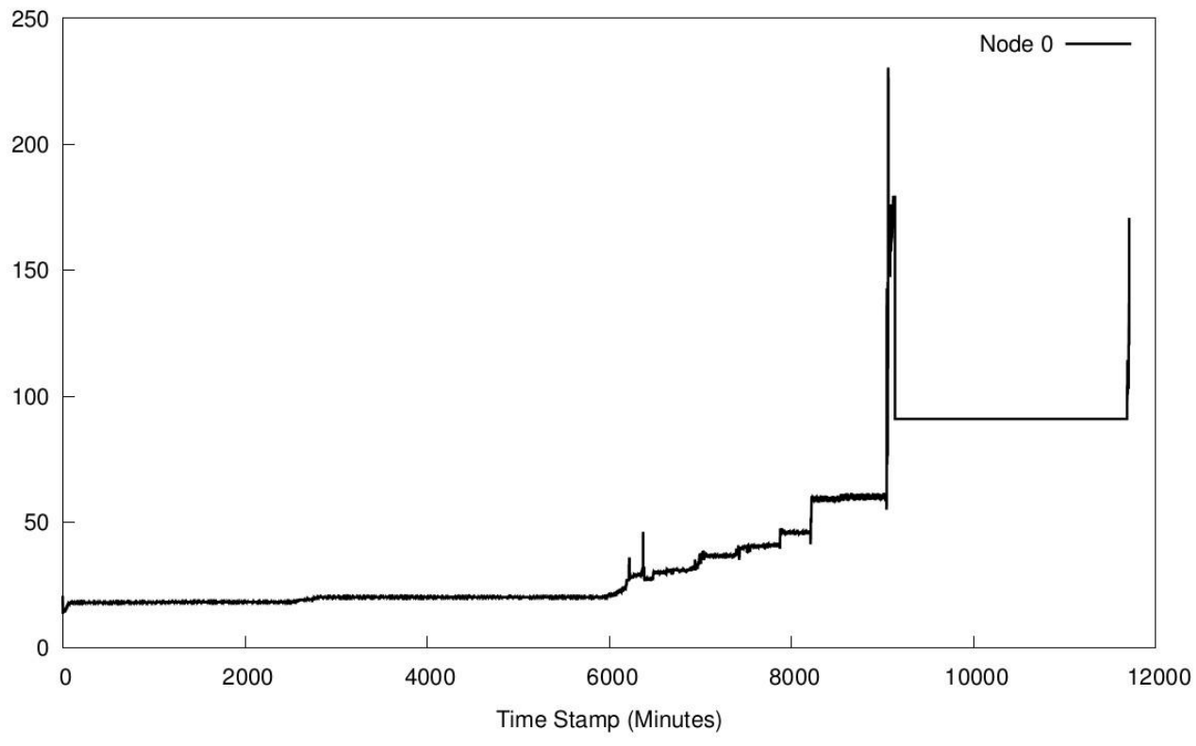
Graph should be monotonically increasing

Monitoring III

Average Memory Usage of the Java VM (Before / After)



Measurement of old Version by
Weifeng Peng / Dheeraj Balabhadruni

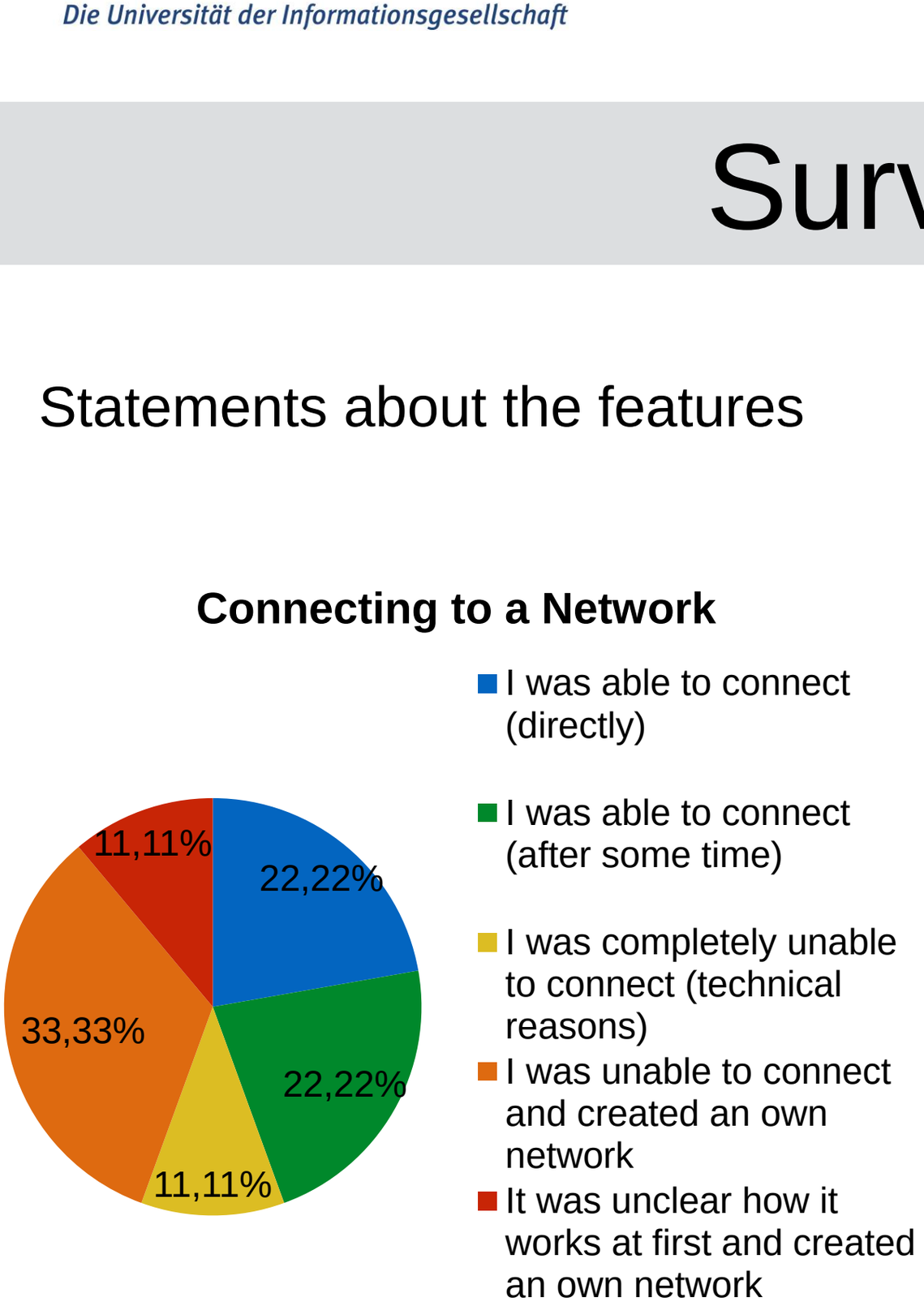


Improved Version

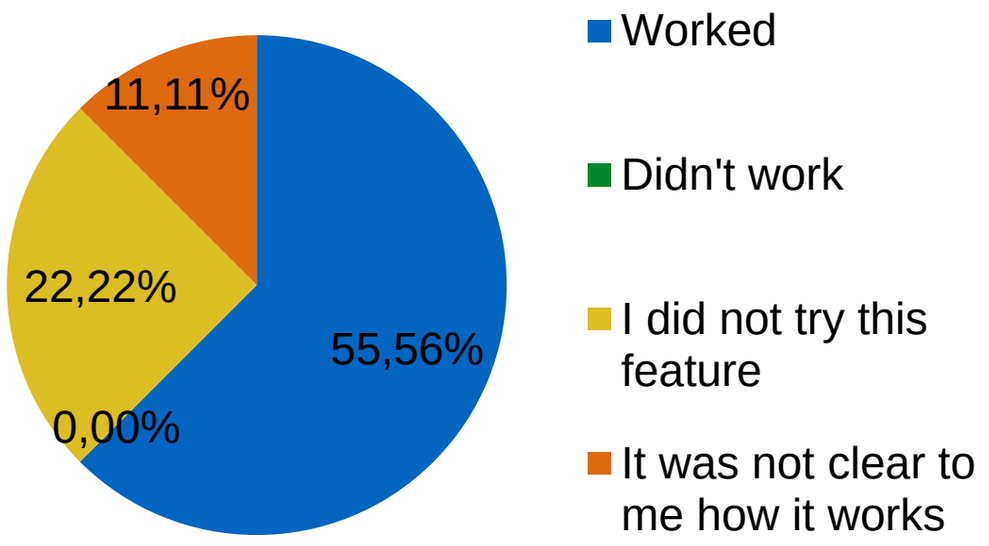
Survey I

Statements about the features

Connecting to a Network

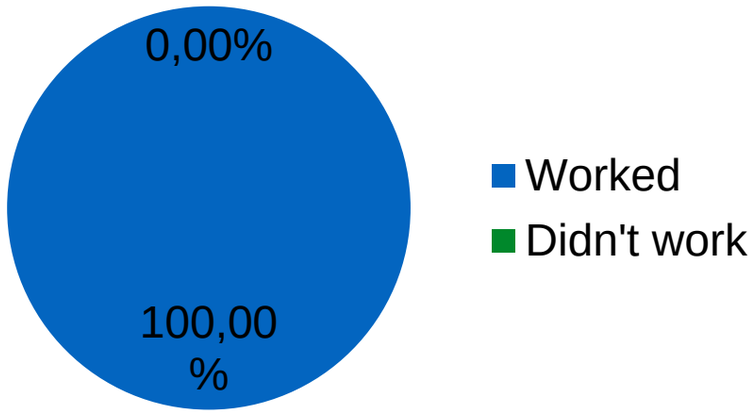


Messaging Feature

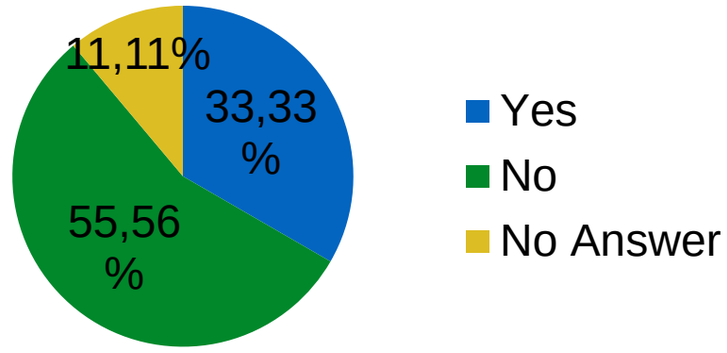


Survey II

Photogallery Feature



Interested in Raspberry PI Version



Survey III

Feature Requests

A current network status information. I never knew if the problem was on my site or the network‘s.

Adding Friends or users to network event. / Shared Calendar (2x)

A browser displaying open networks which a free to join (2x)

File synchronisation across friend‘s PCs

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Institute of Computer Science
Research Group - Theory of Distributed Systems

Bug Reports

Selection of reported Bugs

(about 60 Tickets in Database)

- ✓ Wrong network device preselected
- ✓ Tooltips for Buttons missing
- ✓ Popup Windows cannot be moved
- ✓ Attacks (De-anonymization, CSRF-Wall Posts)
- Exceptions on Logout
- Time of Wall Posts is incorrect

Outcome

- Quite usable when the network was just created
- Problems arise after some time
- Discrepancies in monitoring
- Problems have to be fixed before more users can be invited

Conclusion

- Achievements:
  - infrastructure for user tests (Build scripts, website, Feedback Tool)
  - Improved Monitoring
  - Memory footprint significantly reduced
  - User reports

- Future work:
  - Still some critical bugs present that prevent trouble-free usage
  - Additional functionality based on the use case
  - Several Bugs that were reported during the tests

Thanks for your attention!

Questions?