



# Improvements of an XMPP API for the use in distributed pair programming

Diploma Thesis

by

Henning Staib

Tutor: Karl Beecher and Stephan Salinger



# Overview

- What is Smack?
- How is Smack used in Saros?
- Problems with Smack
- Smack Community
- Reactivating the Smack Community
- Work Units (Smack)
- Work Units (Saros)
- Timetable

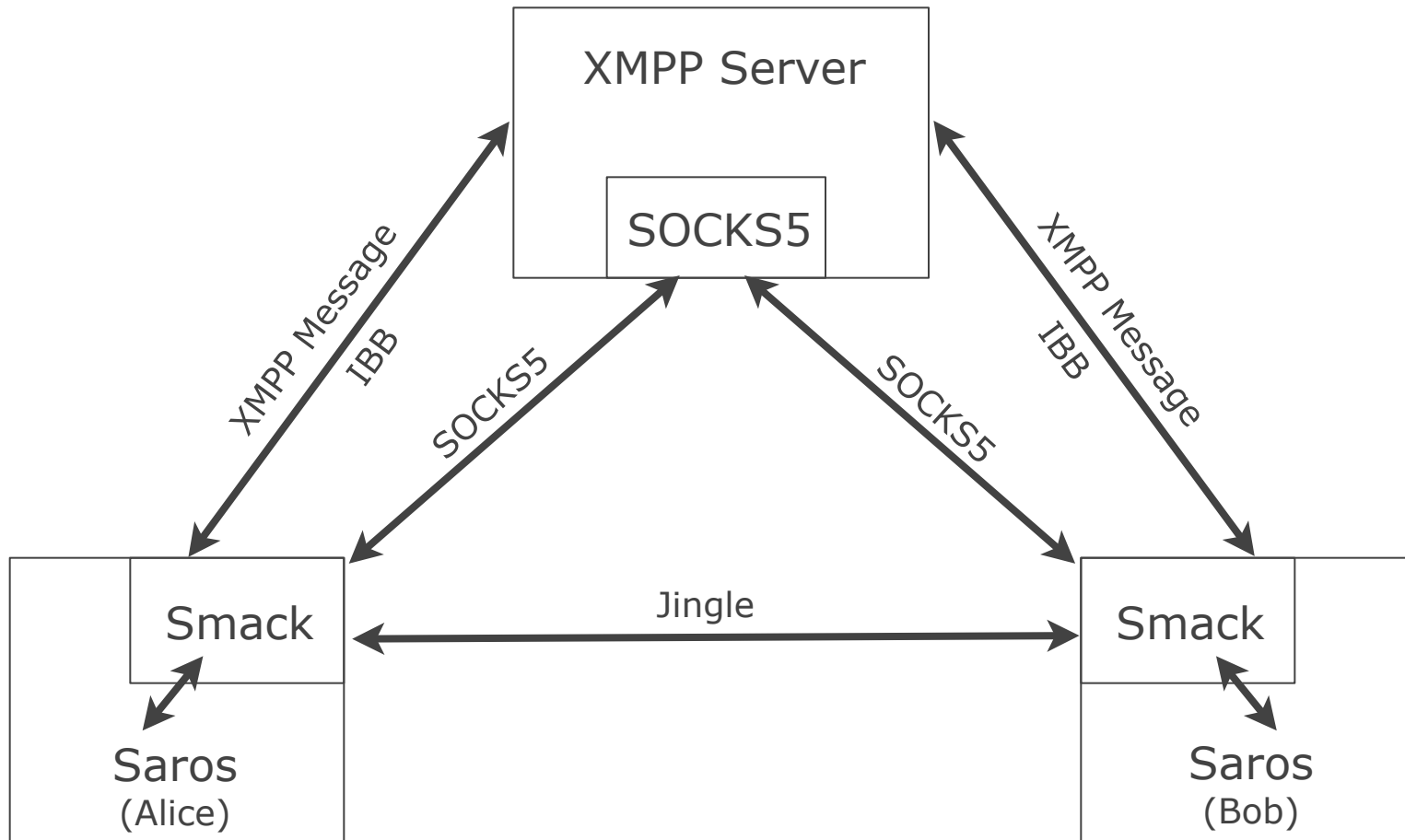
# What is Smack?

- Open Source Extensible Messaging and Presence Protocol (XMPP) Client API for Java
- developed by Jive Software
  - other projects:
    - Openfire (XMPP Server)
    - Spark (XMPP GUI Client)
    - SparkWeb (XMPP Web Client)
- implements the XMPP Core Stack and many XMPP Extension Protocols (XEP) as defined by the XMPP Standards Foundation (XSF)
  - file transfers
  - SOCKS5 bytestreams
  - In-Band bytestreams (IBB)
  - Jingle (peer-to-peer media sessions)
  - In-Band registration
- latest official release of Smack 3.1.0 beta 1 in October 2008

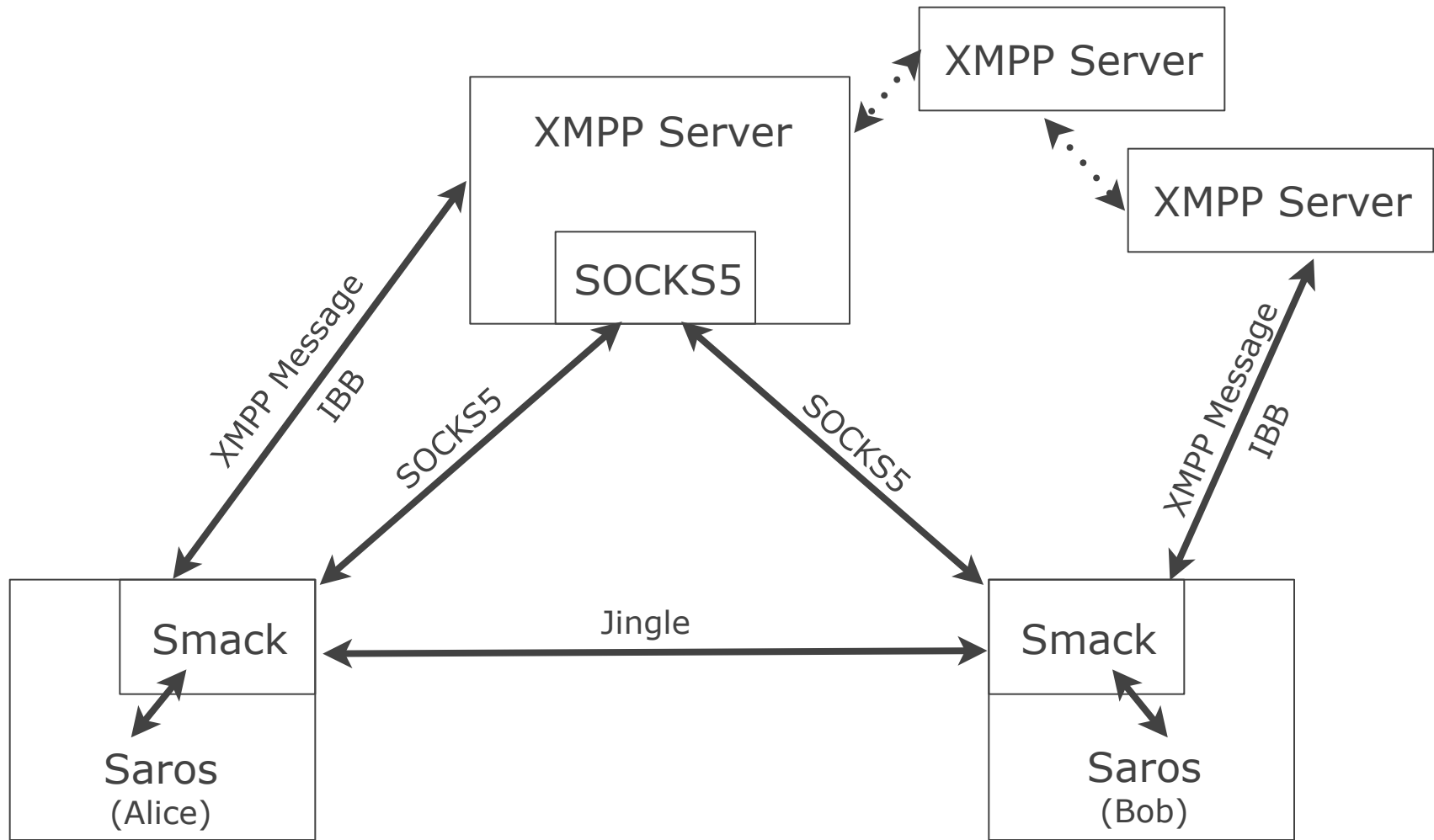
## How is Smack used in Saros?

- every Saros Client is connected to a XMPP Server
- Contact Management (Contacts, Presence changes)
- Activities are transmitted via DataTransferManager (more than 16kib) and XMPP Messages (less than 16kib and fallback)
- Invitation process uses DataTransferManager to exchange project information and files
- DataTransferManager
  - P2P Streams via TCP (preferred) or UDP (XEP-0166 Jingle)
  - fallback FileTransfer (XEP-0052)
    - SOCKS5 ByteStream (XEP-0065)
    - In-Band Bytestreams (XEP-0047)

# How is Smack used in Saros?



# How is Smack used in Saros?



# Problems with Smack

- problems when connecting to the XMPP Server
  - SASL Plain Authentication does not work
  - no support for authentication with proxy
  - Listeners can only be added after login (so messages stored on the server get lost if the client receives them before the listener can be registered)
- problems with FileTransfer
  - SOCKS5 sometimes does not work
  - SOCKS5 is neither configurable nor can it be switched off
  - OutgoingFileTransfer#getProgress does not work
  - early cancellation of connection attempt if try timed out
- problems with Jingle
  - JingleFileTransferManager starts very slow (up to 20 seconds)
  - Jingle determines „bad“ IPs
  - little support for connection-oriented protocols
  - outdated version of JStun

# Problems with Smack

- general problems
  - fault tolerance
    - some exceptions cause a disconnect (invalid XML, well formatted but otherwise erroneous XML)
    - exceptions while disconnecting from server
  - error messages
    - all exceptions are wrapped in XMPPException so it is hard and in some cases impossible to get the real cause of the exception for further error handling
  - API is not standard compliant anymore (specification changed)
  - code inconsistencies
    - some settings are configurable via xml config file
    - some settings can be changed programmatically
    - some settings are constants
    - some settings are only in code
- almost no active development from Jive Software since a year

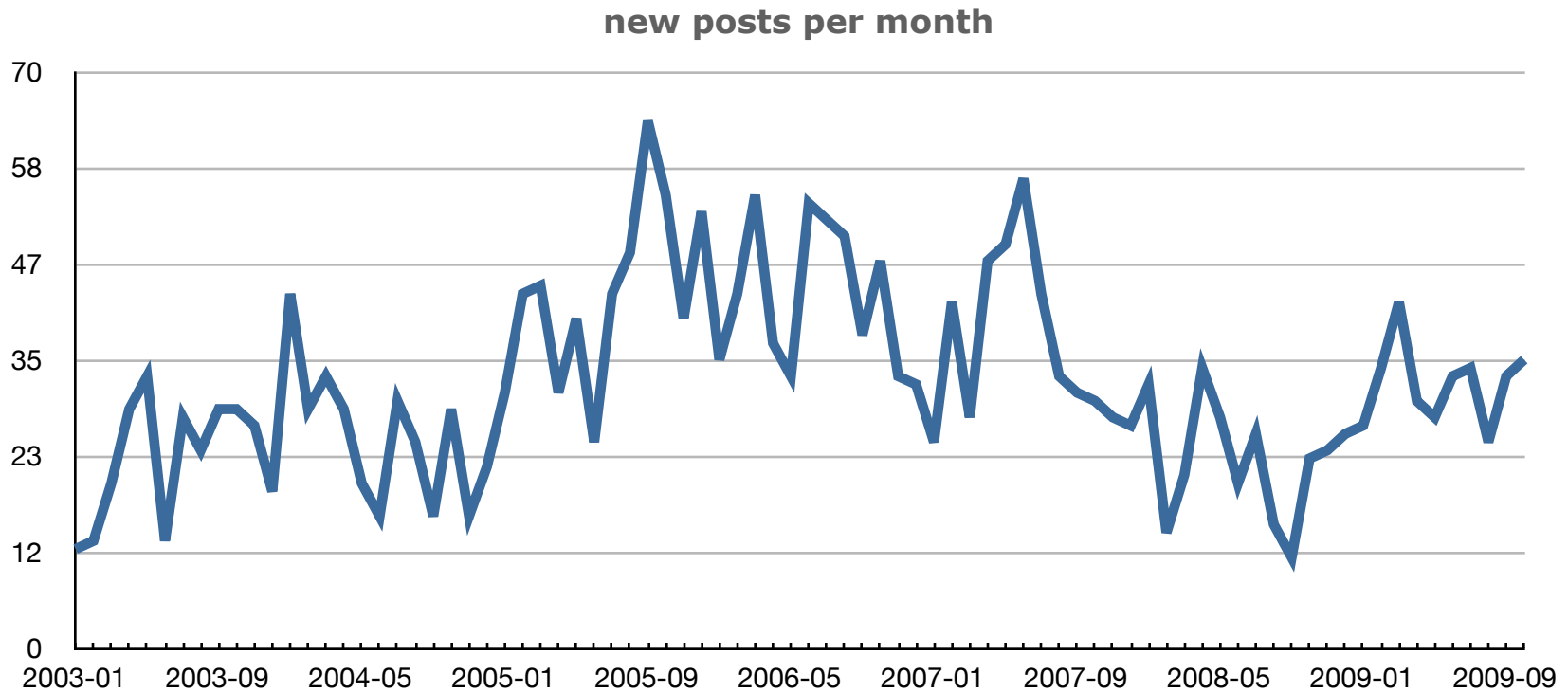




# Smack Community

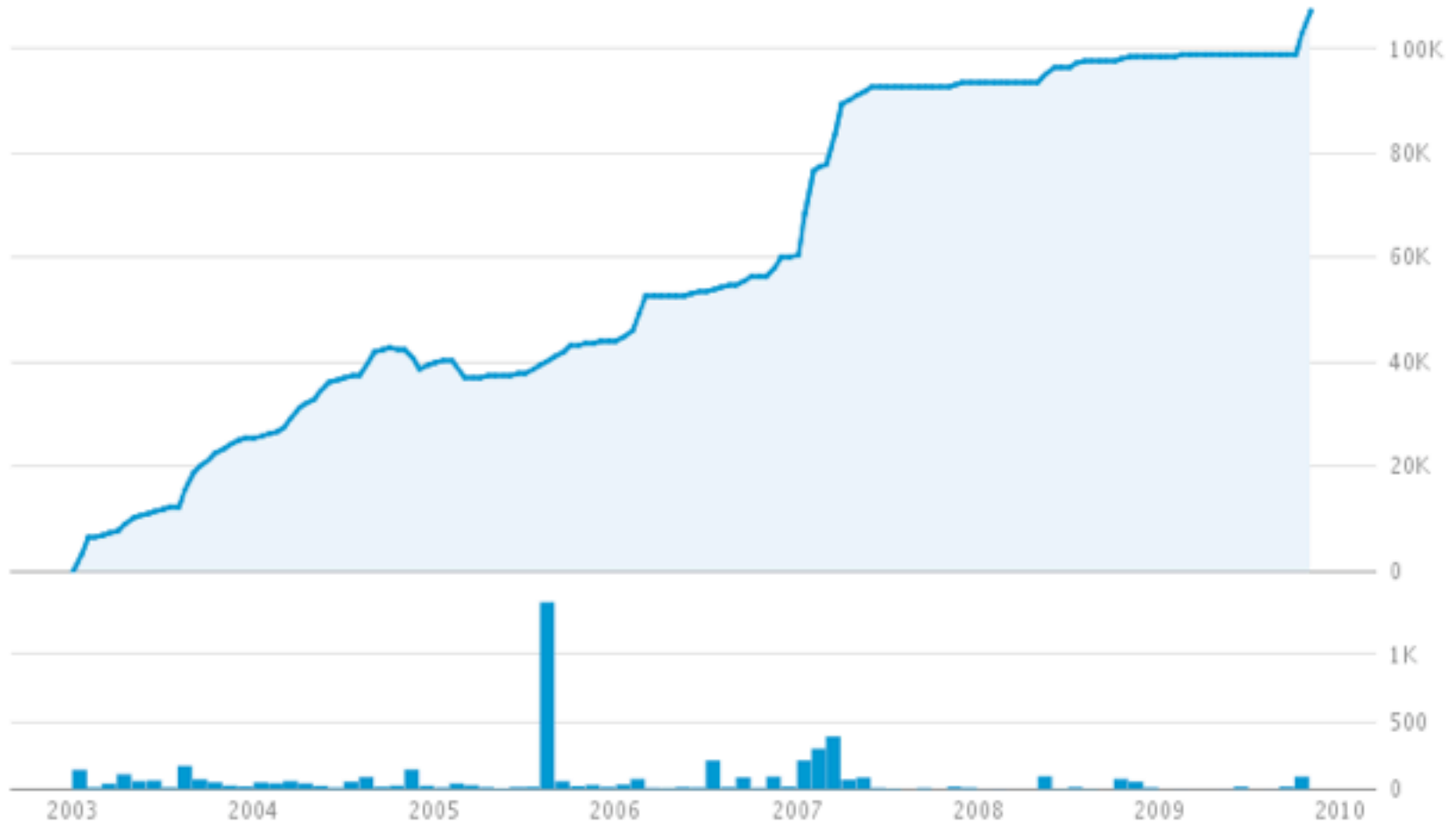
- currently 57 open bugs in the bug tracker
- 10 of these bugs have community patches attached or linked in the bug tracker
- some more patches in the message board
- message board with about 2600 posts since 2003
- none of the patches committed to source repository

# Smack Community





## LOC and Commit History of Smack SVN Repository



# Smack Community

possible reasons why Jive Software does not apply the patches

- patches do not come with test
  - Smack has about 230 unit tests
  - writing the patch is only half of the work
- Smack is used in Spark
- parts of the code of Smack is included in Openfire
- a patch must work in all this projects
- Smack should be a small library that also works on mobile devices
  - patches with dependencies to other big libraries are problematic
- Jive Software is more focused on Openfire and Spark

## Reactivating the Smack Community

- gain access to a branch of Jive Softwares Smack SVN repository
  - by creating new well tested patches
  - direct contact with Jive Software people
- improve existing patches
- create documentation of the Smack architecture for easier access to smack development
- define code rules and testing rules
- message board for smack developers (not for developers using the Smack API)
- active participation in the Smack community

What if all attempts to cooperate with Jive Software fail?

- fork project (on github or sourceforge)
- convince developers of the smack community to work on the fork



# Work Units (Smack)

## Work Unit 1

- FileTransfer
  - Bugfixing
    - SOCKS5 sometimes does not work
    - OutgoingFileTransfer#getProgress does not work
  - make SOCKS5 FileTransfer configurable (switch on/off, port, etc...)
  - Timeout problems
- related bugs: SMACK-263, SMACK-239, SMACK-169, SMACK-137



# Work Units (Smack)

## Work Unit 2

- Jingle
  - JingleFiletransferManager starts slowly
  - finding „bad“ IP addresses
  - improve support for connection oriented protocols
  - check why UDP is so slow
  - update JSTUN
- related bugs: SMACK-283, SMACK-267, SMACK-248, SMACK-139



# Work Units (Smack)

## Work Unit 3

- PacketListeners
  - exceptions in PacketListener cause a connection loss
  - RosterListener can't be registered before login to XMPP Server
    - causes messages to get lost
- related bugs: SMACK-156

## Work Unit 4

- Connection to XMPP Server
  - SASL Plain Authentication does not work
  - no authentication with proxy
  - exceptions are thrown if server disconnects
- related bugs: SMACK-243, SMACK-157





## Work Units (Saros)

- improve exception handling with more meaningful XMPPExceptions
- Saros ReconnectionManager
- settings dialog for Smack network settings
- integrate Smack API changes
- improve network layer

# Timetable

Month	Activities	Extra Activities Fork
November	work unit 1 (create first patch) contact Jive Software	
December	work unit 2 decide if fork or not write Smack developer documentation	create new repository for Smack
January	work unit 3 work unit 4	build Homepage message board advertising
February	work unit 6?	
March	work unit 7?	
April	write down thesis	

## ongoing activities:

- participation in Smack community
- Saros development (reviews, tests, work units for Saros)
- write down thesis



# Summary

## Scientific Questions:

- „How can an open source project controlled by a company be reactivated?“
- („How can an open source project successfully be forked?“)
- „How can the quality of contributions of an open source community be increased?“

## Implementation Tasks:

- Smack
  - XMPP
  - FileTransfer
  - Jingle
  - Architecture (Interfaces)
- Saros
  - Test
  - Patch reviews
  - Network Layer



# Questions?



# Thanks