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

Diploma Thesis

by

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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?

- XMPP Server
- SOCKS5
- XMPP Message
- IBB
- SOCKS5
- SOCKS5
- Jingle
- XMPP Message
- IBB
- SOCKS5
- SOCKS5
- Jingle

Saros
(Alice)

Smack

Saros
(Bob)
How is Smack used in Saros?

![Diagram showing the use of Smack in Saros](image)
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  - outdated version of JStun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
LOC and Commit History of Smack SVN Repository
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

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

**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