Development of a Social Extension for Real-Time Communication in CAD Software

Markus Müller, 2.11.2015 (Bachelor's Thesis, final presentation)

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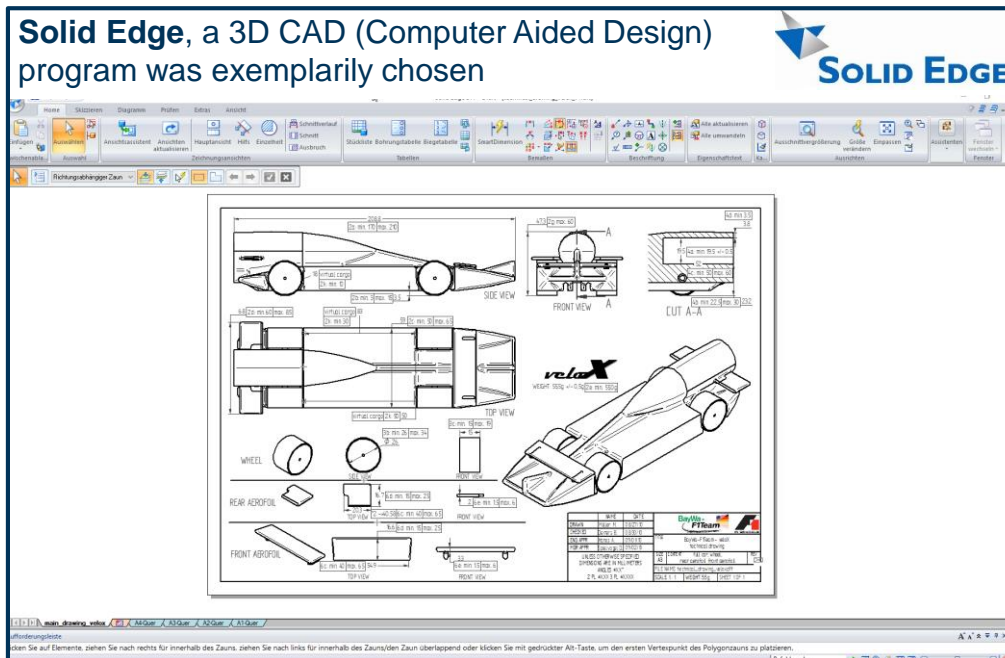Technische Universität München, Germany

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Structure

1. **Motivation**

2. **Review of Existing Instant Messaging Applications**

3. **Qualitative Interviews**

4. **Implementation of *EmbeddedChat***

5. **Live Demo**

6. **User Evaluation**

7. **Conclusion & Future Work**

How can Social Software be integrated into existing Vertical Software?

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In Cooperation with Siemens

"Vertical Social Software" Project

Solid Edge, a 3D CAD (Computer Aided Design) program was exemplarily chosen

SOLID EDGE

in this thesis: **Integration of Instant Messaging**
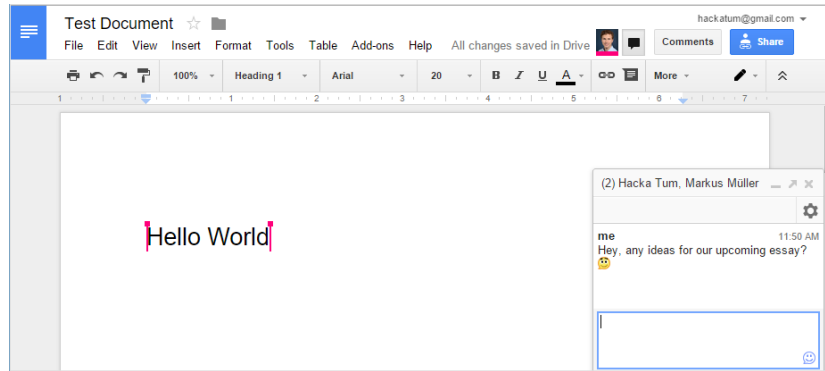
Research Questions

- How do CAD designers communicate in their daily work?
- How can an instant messaging client make use of a CAD programs' context?
- Do CAD designers find instant messaging an useful addition to their job?

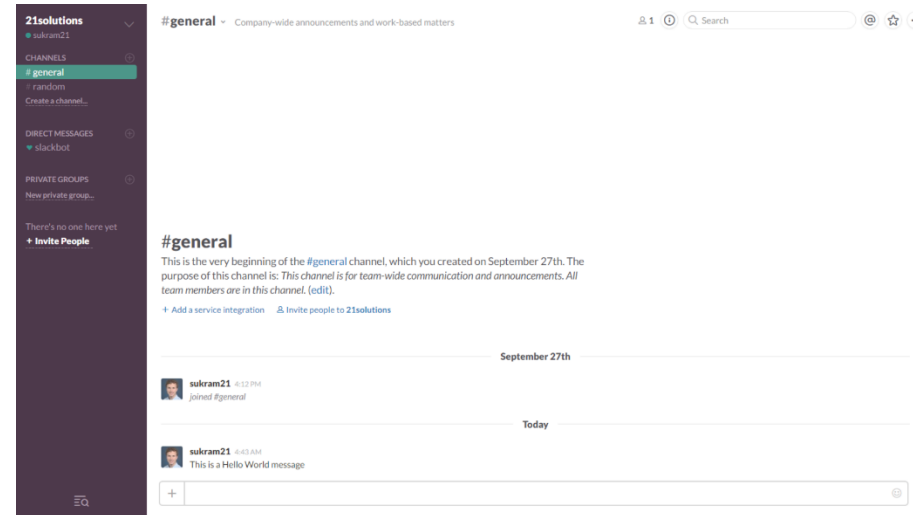# What are related Instant Messengers?

Integrated Group Chat

Google Drive

- Integrated into document view of Google Drive
- Group Chat with online collaborators
- History of past revisions available

slack

- Team and business chat
- Instant messaging and group chat built arround channels
- Media sending
- Integration with many external tools (events from external tools are published to slack)
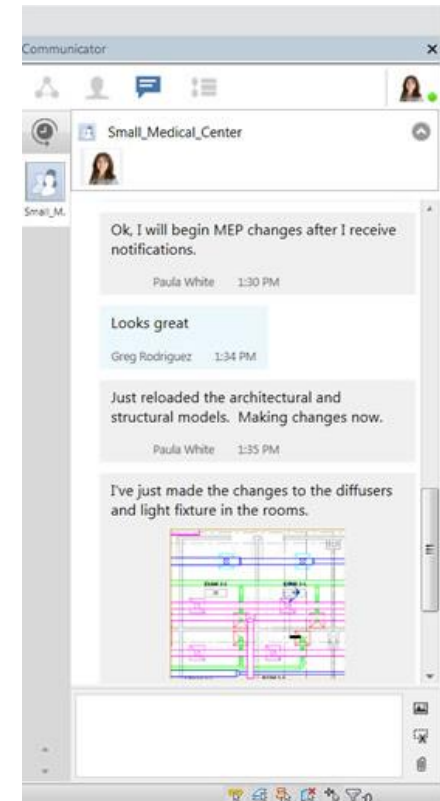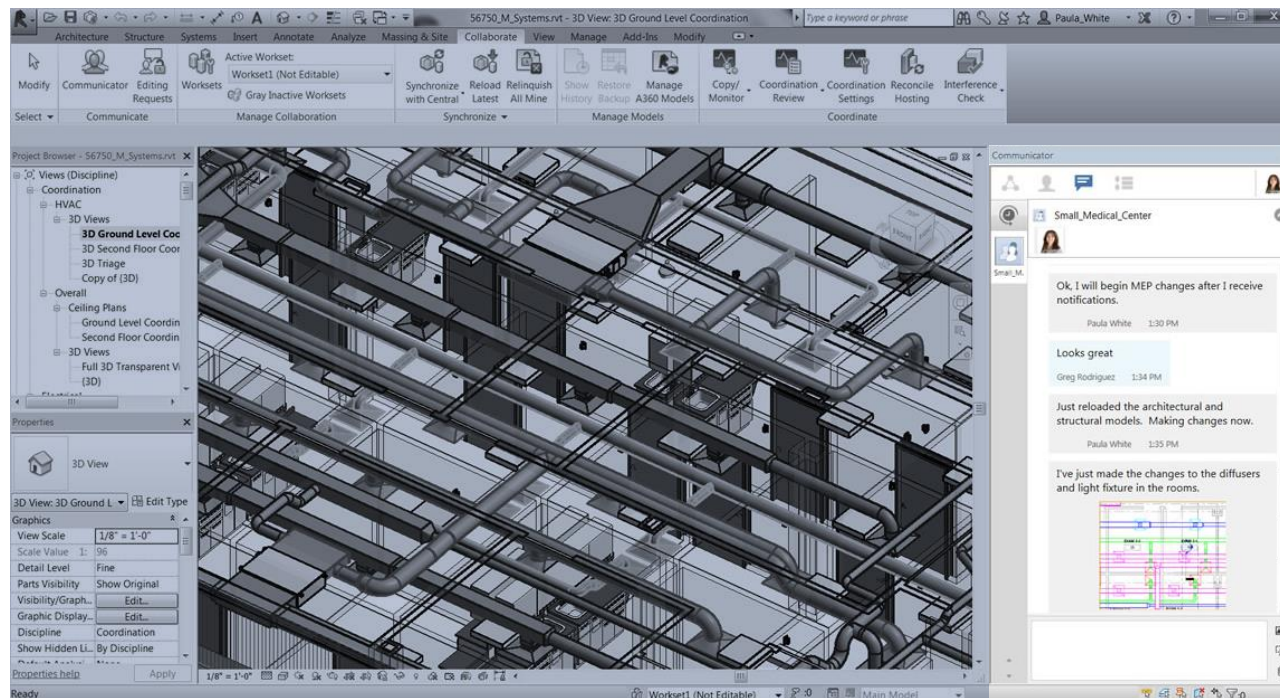- Powerful search with file content indexing

Autodesk A360 offers instant messaging integration

- Revit: CAD program for planning and designing of buildings
- Connected with Autodesk Cloud Project-Platform A360
- *A360 Communicator* integrated as a sidebar

- Offers Instant Messaging & Group Chat with whole project group
- Media & Screenshot sending possible
- Context Information available (view on which model project partners are currently working; view model revisions)

How are Solid Edge Users currently solving problems? Open Interviews

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Participants

- 6 Solid Edge professionals from 3 companies
- 6 students from "F1 in Schools"

Results

Solid Edge users use the internet to find solutions, but very passively	Communication with (familiar) team members is preferred, support later
No instant messenger use by professionals	F1 in Schools users try to use tools they use for private matters and fail
No direct denial of a chat, but no clear need and euphoria	

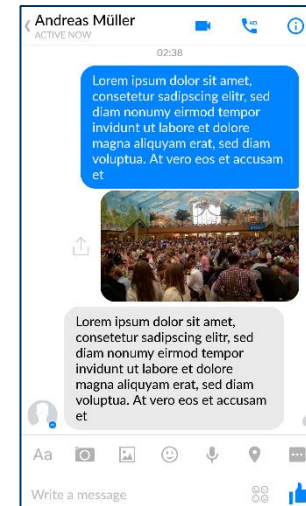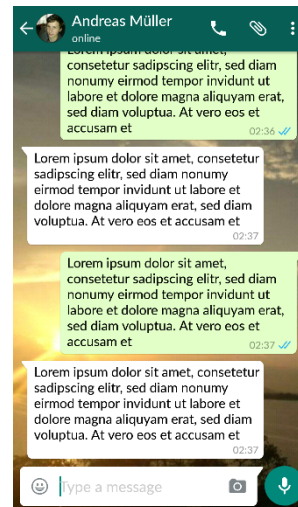# **EmbeddedChat** as a Generic Instant Messenger

Identified Goal

- A **generic**, multi-purpose instant messenger (1 to 1 & group chat)
- Integration with Solid Edge as a **sidebar**
- **Image** and direct **screenshot sending**
- Via an **Event Timeline** users should see used commands of conversation participants
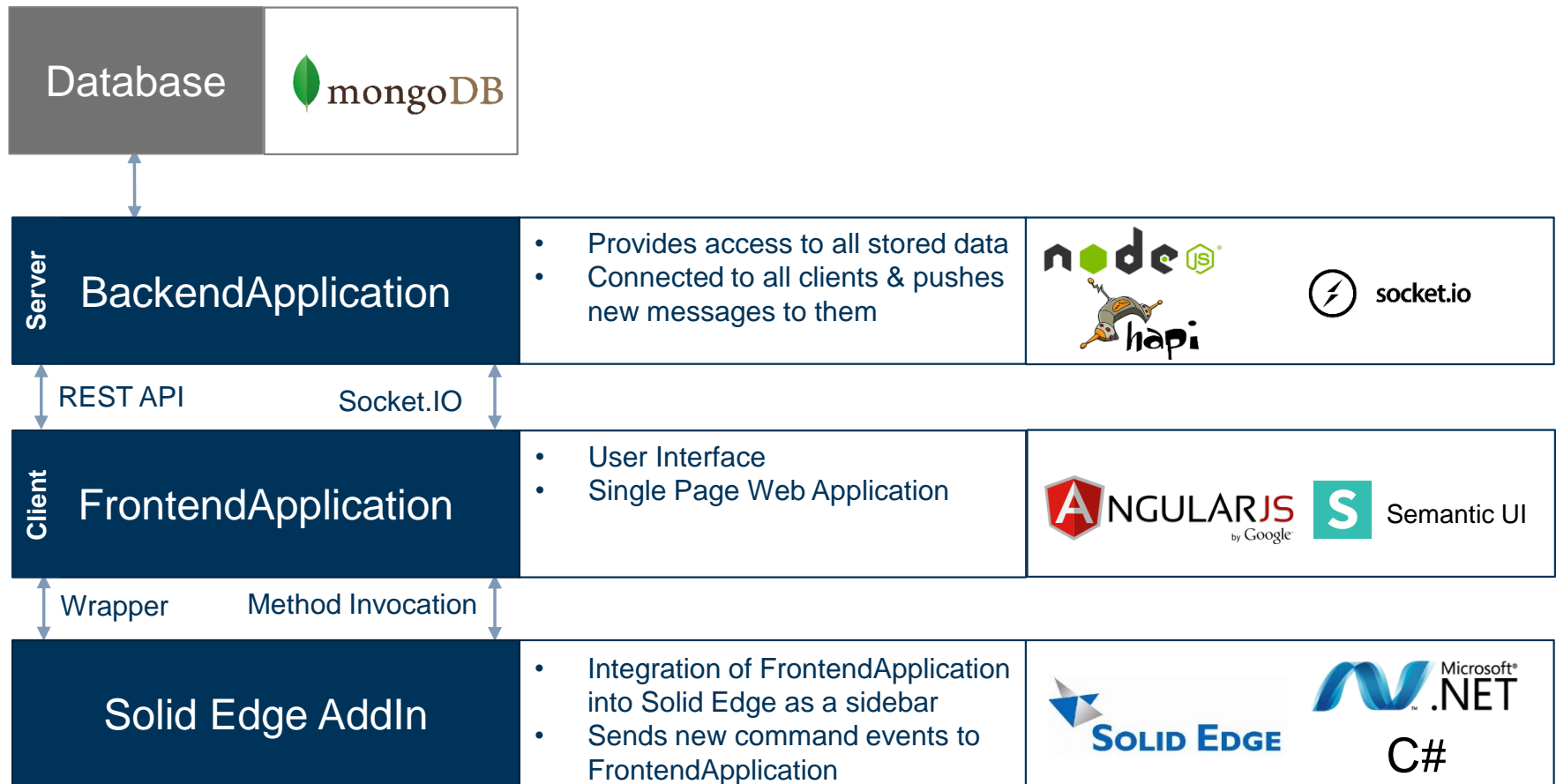
Implementation

Functionality to be implemented as a **web application** with HTML5 - integration in other programs possible, standalone clients possible

Mobile instant messengers WhatsApp and Facebook Messenger as **UI role models**

EmbeddedChat consists of three components

Database mongoDB

Server

BackendApplication
- Provides access to all stored data
- Connected to all clients & pushes new messages to them

node JS · hapi · socket.io

REST API   Socket.IO

Client

FrontendApplication
- User Interface
- Single Page Web Application

ANGULARJS by Google · S Semantic UI

Wrapper   Method Invocation

Solid Edge AddIn
- Integration of FrontendApplication into Solid Edge as a sidebar
- Sends new command events to FrontendApplication

SOLID EDGE · Microsoft .NET C#

Live Demo

Demonstration Video:
English: https://www.youtube.com/watch?v=b577ISWLBHI
German: https://www.youtube.com/watch?v=uAurMs6GLDo

Features
- Integration into Solid Edge as a side bar
- View online status of your contacts
- Screenshot sending
- View commands used by your chat partner
- Archive conversations with a title
- Notifications about new messages
- Group chat
- Image sending (e.g. TUM logo in the video)

Research Question

"*Do CAD designers find instant messaging a useful addition to their job?*"

Hypotheses

- **H1:** Solid Edge users often use chat messengers in their private life, but do not use any for work communication.
- **H2:** Solid Edge users find chatting with their (Solid-Edge-using) contacts within the program useful.
- **H3:** Solid Edge users see a need for chat functionality within Solid Edge at their workplace

General

- Two-Week Online Survey
- Localized in German and English
- *[EmbeddedChat Demo Video]* was shown
- Duration to participate ~15min

Who participated in the Online Survey?

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Channels

- 6 Solid Edge focused online forums, one F1 in Schools focused forum
- Companies interviewed in the beginning
- Multiple Solid Edge Mailing lists
  - SE Field Support USA
  - SE Sales Partners in Germany
  - SE Europe Employees

Participants

- 91 Solid Edge users (62 German, 29 English)
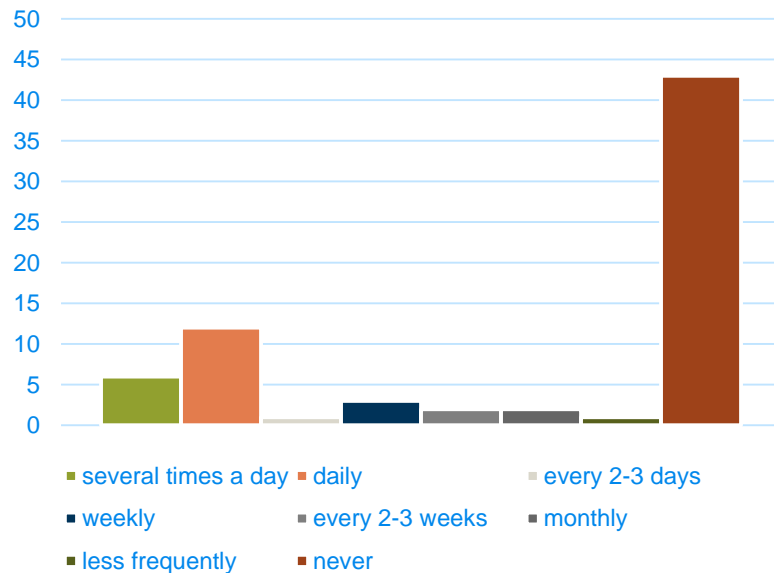- 73 Solid Edge professionals, 18 students
- 60 complete participations

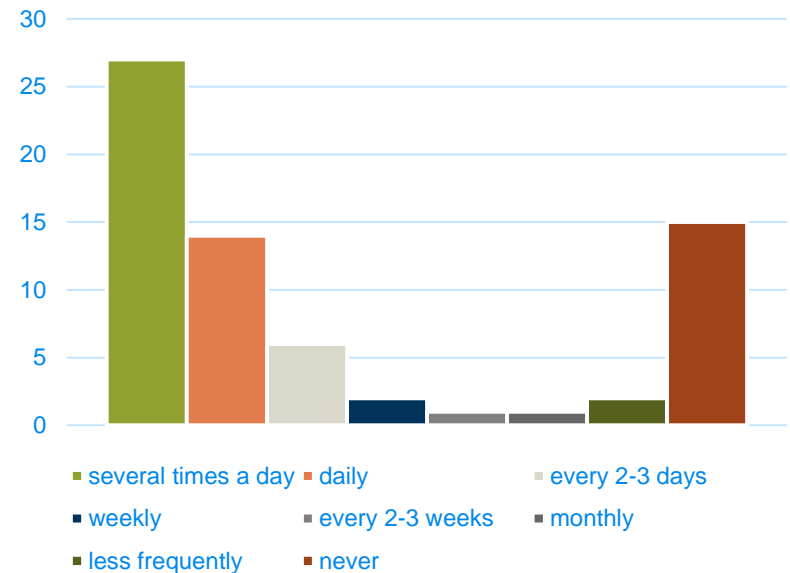# Do Solid Edge users use chat messengers for work communication?

Hypothesis 1

✓ *Solid Edge users often use chat messengers in their private life, but do not use any for work communication.*

Instant Messaging used at work

- several times a day
- daily
- every 2-3 days
- weekly
- every 2-3 weeks
- monthly
- less frequently
- never

Use of Chat Messengers in private life

- several times a day
- daily
- every 2-3 days
- weekly
- every 2-3 weeks
- monthly
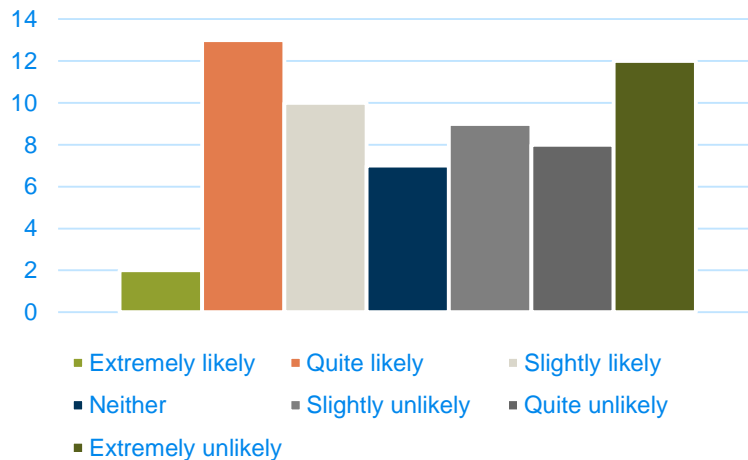- less frequently
- never

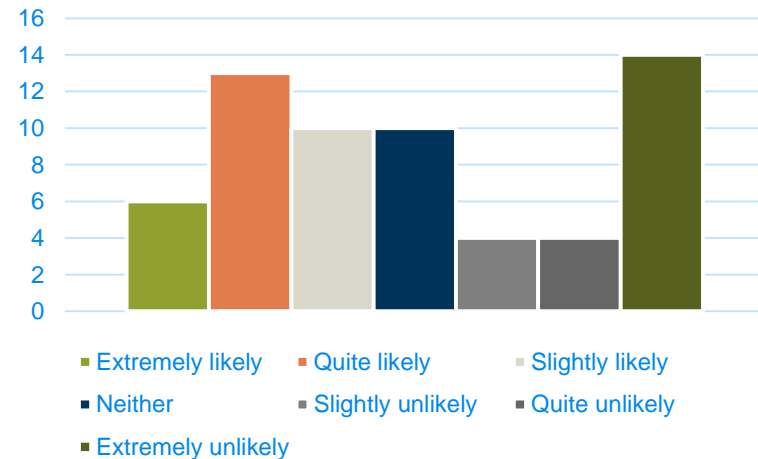# Do Solid Edge users find chatting within the program useful?

Hypothesis 2

✗ *Solid Edge users find chatting with their (Solid-Edge-using) contacts within the program useful.*

Using EmbeddedChat in my job would enable me to accomplish tasks more quickly.

- ■ Extremely likely
- ■ Quite likely
- ■ Slightly likely
- ■ Neither
- ■ Slightly unlikely
- ■ Quite unlikely
- ■ Extremely unlikely

I would find EmbeddedChat useful in my job.

- ■ Extremely likely
- ■ Quite likely
- ■ Slightly likely
- ■ Neither
- ■ Slightly unlikely
- ■ Quite unlikely
- ■ Extremely unlikely

Some opinions

"Sorry but the idea of using "Embedded Chat" is just another distraction from people doing their jobs."

"Working in the EMEA GTAC* Solid Edge Support it would help quite a lot."

"A second communication channel would be created […] only employees from the CAD sector could access it!" (from German)
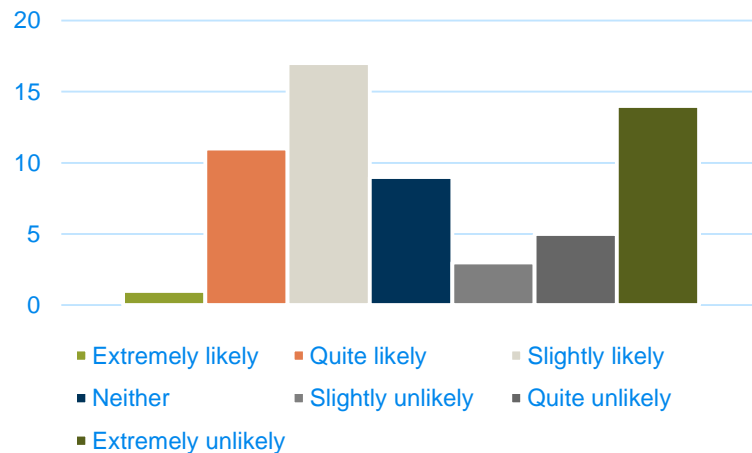
*GTAC: Global Technical Access Center

Do Solid Edge users see a need for integrated chat functionality?
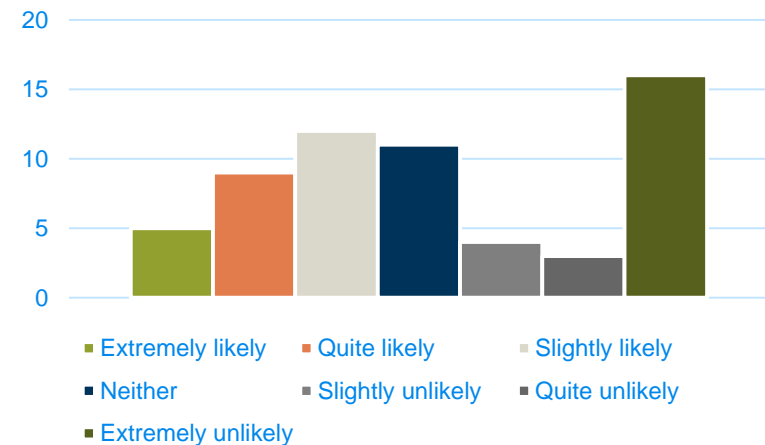
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Hypothesis 3

✗ *Solid Edge users see a need for chat functionality within Solid Edge at their workplace*

I would appreciate an introduction of EmbeddedChat.

- ■ Extremely likely
- ■ Quite likely
- ■ Slightly likely
- ■ Neither
- ■ Slightly unlikely
- ■ Quite unlikely
- ■ Extremely unlikely

It would be easy to persuade my contacts to use EmbeddedChat.

- ■ Extremely likely
- ■ Quite likely
- ■ Slightly likely
- ■ Neither
- ■ Slightly unlikely
- ■ Quite unlikely
- ■ Extremely unlikely

Conclusion & Future Work

Summary

- Research Questions could largely be answered
- Two user evaluations (open evaluation in the beginning, online survey in the end)
- Working prototype now exists
- Company contacts were established

Limitations

- More specific research questions and use cases should have been defined
- Online Survey: Cross-program compatibility should have been emphasized
- No real-world testing

Future Work

- Real-world test with a reference company
- Introduction of EmbeddedChat into other programs + standalone client
- Screen Sharing & VoIP functionality; more advanced security

Thank you! Any more questions?

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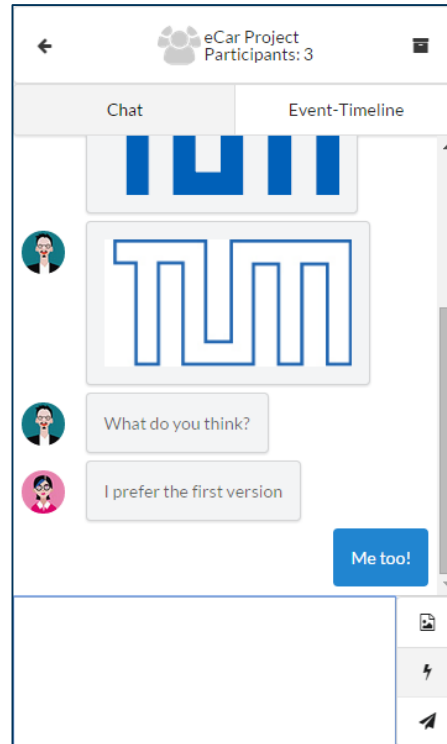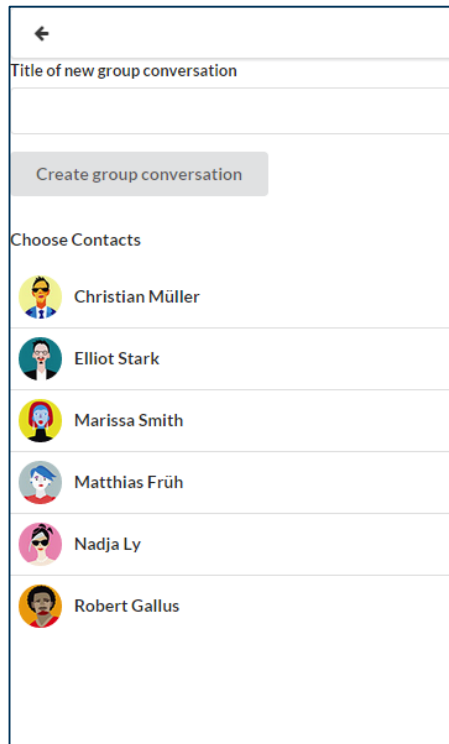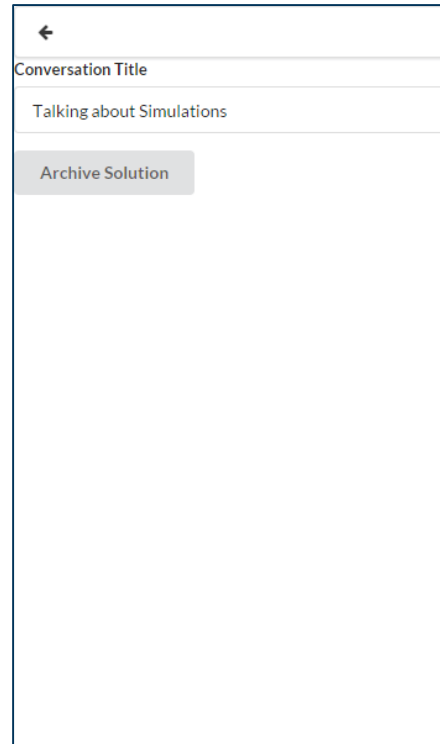wwwmatthes.in.tum.de

Start Screen
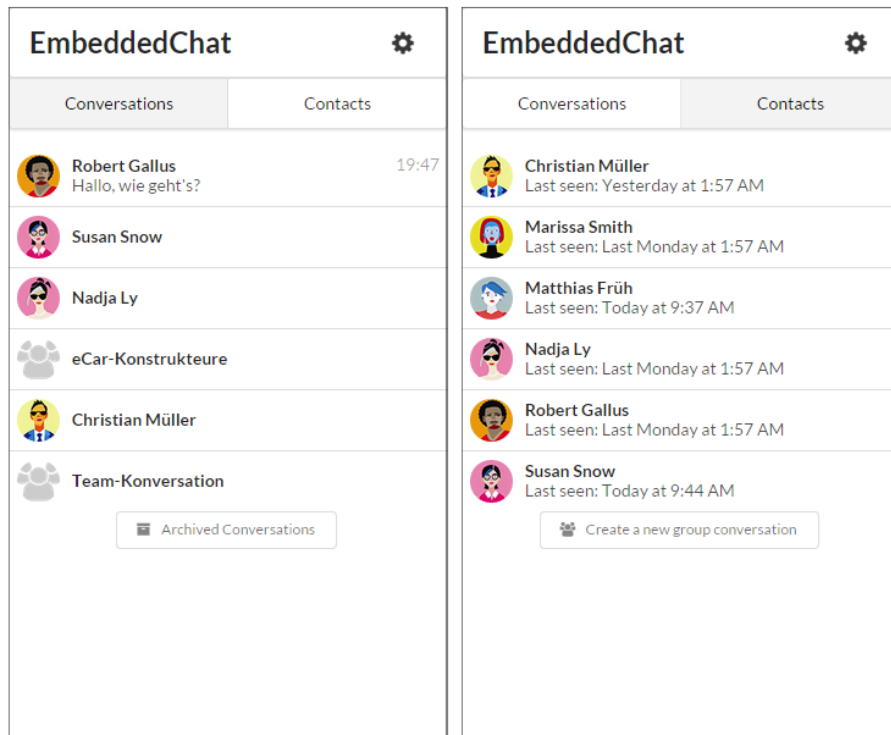
1to1 Chat
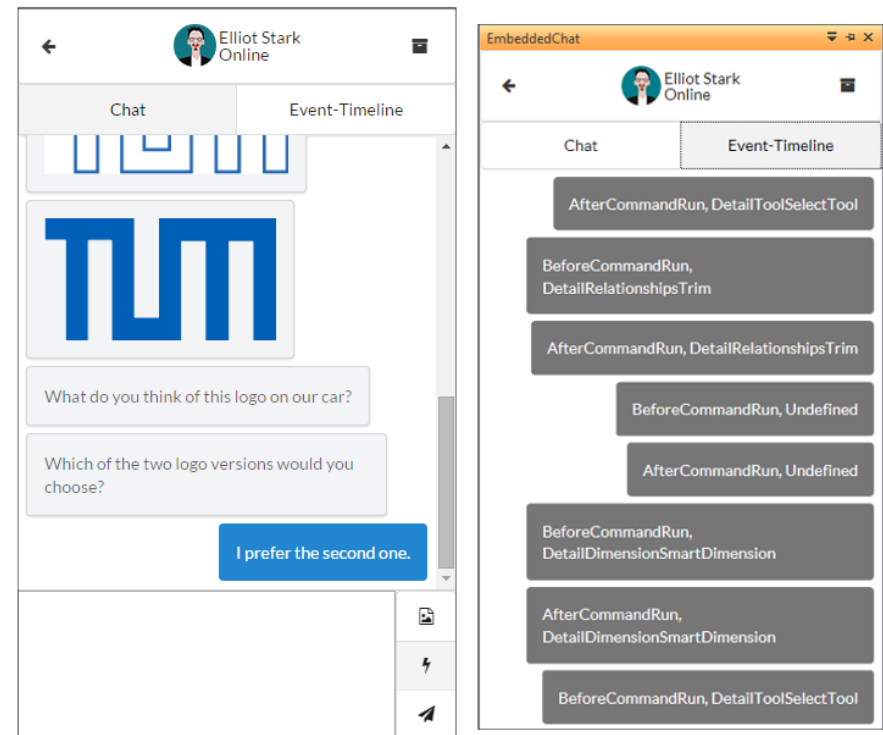
Group Conversation

Archive Conversation

User Profile