

MASARYK UNIVERSITY  
FACULTY OF INFORMATICS



# **Real-time Communication between Web Browsers**

MASTER THESIS

**Pavel Smolka**

Brno, 2013

## **Declaration**

Hereby I declare, that this paper is my original authorial work, which I have worked out by my own. All sources, references and literature used or excerpted during elaboration of this work are properly cited and listed in complete reference to the due source.

**Advisor:** doc. RNDr. Tomáš Pitner, Ph.D.

## Acknowledgement

Thanks to everyone... TODO

## **Abstract**

TODO

## **Keywords**

XMPP, real-time communication, RTC, Celebrio, web browser, TODO

## Contents

1	Introduction . . . . .	1
2	Extensible Messaging and Presence Protocol . . . . .	3
3	Other approaches to RTC . . . . .	4
4	XMPP client in Javascript . . . . .	5
4.1	Ember.js . . . . .	5
4.1.1	Section . . . . .	5
5	Talker . . . . .	6
6	Inter-process Communication Framework . . . . .	7
7	Conclusion . . . . .	8
7.1	Another part of the conclusion . . . . .	8
	Bibliography . . . . .	9
	Index . . . . .	10
A	Screenshots of the application . . . . .	11

# Introduction

However, the manner of Internet usage essentially changed during the first decade of 21st century. Using the Internet and using the web browser became almost synonyms. People use the web browser as the primary platform to do every single task on the Internet. Sometimes it's not even possible to use the other internet services without visiting certain web page in the web browser and performing the authentication there.<sup>1</sup> Considering the mentioned fact, web browsers became also the basic platform for the communication tools. Even though the purpose of the world wide web and HTTP protocol was completely different at first (displaying single documents connected via hypertext links), it appeared that there is the need of common rich applications running withing web browser - rich internet application. So popular social networks are built on top of the web browser platform and they are used by more than billion people over the world. [3] And the main reason why the social networks are so popular is the real-time stream of news and messages from the other people. By the beginning of the year 2013, I would say that static web is dead - users prefer interactivity.

As mentioned above, the web browser became one of the most popular platforms. Celebrio, simple software for the elderly simulating the operating system interface, is typical

1

example of rich internet application. [1] All the topics mentioned in the previous paragraph appeared to be very important in the system. When questioning the elderly people in the Czech Republic, it appeared that almost 90 % of the elderly computer users use the real-time communication applications. [2] Interaction with their loved ones is the most desired benefit they expect from the computer. Therefore, creating real-time application, text messenger supporting video calling, became not only programming challenge but also a business goal.

In the first chapter, there is .... TODO

The programming part of the thesis comprises the implementation of real-time text chat application, video calling application and simple "inter-process" communication tool for Celebrio.



## **Chapter 2**

### **Extensible Messaging and Presence Protocol**

At first, this chapter should describe the important parts of XMPP protocol (mostly just picking the appropriate references).

Later on, description of BOSH extension, including the advantages and limitations. Describe also the connection to HTTP protocol.

Jingle extension - multimedia. Does this deserve complete chapter???

Pub-sub extensions for inter-process communication.

## **Chapter 3**

### **Other approaches to RTC**

Describe other approaches to RTC in WB than XMPP. Tell why we didn't use them (or that we used - OpenTok).

Mention:

WebSockets

OpenTok

WebRTC (<http://www.webrtc.org/>)

Google hangouts API

## **Chapter 4**

### **XMPP client in Javascript**

Describe the tools that can be used to implement RTC in WB (and which were used to implement Celebrio Talker)

- Strophe (simple XMPP in Javascript)

- Strophe plugins

- Possible server-side implementations (JAXL, XMPPHP, ...)

#### **4.1 Ember.js**

##### **4.1.1 Section**

## **Chapter 5**

### **Talker**

Describe the Talker application in Celebrio.

Mention what we expected from the app (value proposition)

Then, application analysis, design and implementation.

Describe the architecture and used tools&frameworks: JS + Ember.js, OpenTok, WebSockets in new OpenTok

## **Chapter 6**

### **Inter-process Communication Framework**

Implement and describe framework for inter-process communication in Celebrio.

First, the lightweight one (which we already have), then implement the "heavy" one, if there's enough time.

## **Chapter 7**

### **Conclusion**

conclusion

#### **7.1 Another part of the conclusion**

Another part of the conclusion... just to have subchapter here

## Bibliography

- [1] Donko, P. and Kunc, P. and Novák, M. and Smolka, P. and Volmut, J.: *Celebrio System*, 2013 [retrieved 2/19/2013], from <<http://www.celebriosoftware.com/celebrio-system>>. 1
- [2] Smolka, P. and Novák, M.: *Elderly people and the computers*, 2/11/2013 [retrieved 2/19/2013], from <<http://infogr.am/Seniori-a-pocitace>>. 1
- [3] Olanoff, D.: *Facebook Announces Monthly Active Users Were At 1.01 Billion As Of September 30th*, TechCrunch, 10/23/2012 [retrieved 2/19/2013], from <http://techcrunch.com/2012/10/23/facebook-announces-monthly-active-users-were-at-1-01-billion> X <http://techcrunch.com/2012/10/23/facebook-announces-monthly-active-users-were-at-1-01-billion-as-of-september-30th/>. 1
- [4] Miniwatts Marketing Group: *Internet Users in the World - 2012 Q2*, Internet World Stats, 2/17/2013 [retrieved 2/19/2013], from <<http://www.internetworldstats.com/stats.htm>>. 1
- [5] Ward, J.: *What is a Rich Internet Application?*, 10/17/2007 [retrieved 2/19/2013], from <<http://www.jamesward.com/2007/10/17/what-is-a-rich-internet-application/>>.
- [6] Saint-Andre, P. and Smith, K. and Tronçon, R.: *XMPP: The Definitive Guide*, Sebastopol: O'Reilly, 2009, 978-0-596-52126-4, 320.

## **Index**



## **Appendix A**

### **Screenshots of the application**

Some screenshots from Celebrio Talker