



Mconf and WebRTC

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Agenda

- ❏ Background
- ❏ A bit of history
- ❏ Mconf and WebRTC
- ❏ Mconf Academic Network
- ❏ Final remarks



Porto Alegre
Brasil

Background

- ❑ PRAV research group at Federal University of Rio Grande do Sul
 - ❑ Computer Networks and Multimedia
- ❑ Many years of experience developing real-time applications
 - ❑ Videoconference applied to telemedicine and education



GT-Mconf

- ❑ Started in October 2010
- ❑ Innovation program by the Brazilian NREN (RNP)
- ❑ Proposed by prof. Valter Roesler
- ❑ Aimed to build a videoconferencing system easy to use and accessible by computers and mobile devices

Working Groups Program

- ❑ Call for proposal once a year
- ❑ A few projects selected every year

- ❑ 1st year: prototype
- ❑ 2nd year: pilot
- ❑ 3rd year: service

GT-Mconf

- ❑ Research on various applications (video/web conferencing + management), mostly open source

- ❑ Isabel Videoconference

- ❑ Global Plaza

- ❑ Virtual Conference Centre (VCC)

- ❑ OpenMeetings

- ❑ MediaMosa

- ❑ Kaltura

- ❑ DimDim

- ❑ VMukti

- ❑ EVO

- ❑ Opencast Matterhorn

- ❑ Opencast Steeple

- ❑ Access Grid

- ❑ CineGrid

- ❑ Janet

- ❑ BigBlueButton

GT-Mconf

- ❑ Back in 2010
 - ❑ HTML5 specification was incomplete
 - ❑ No WebRTC

GT-Mconf

- ❑ Research on various applications (video/web conferencing + management), mostly open source

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- ❑ **Global Plaza**

- ❑ Virtual Conference Centre (VCC)

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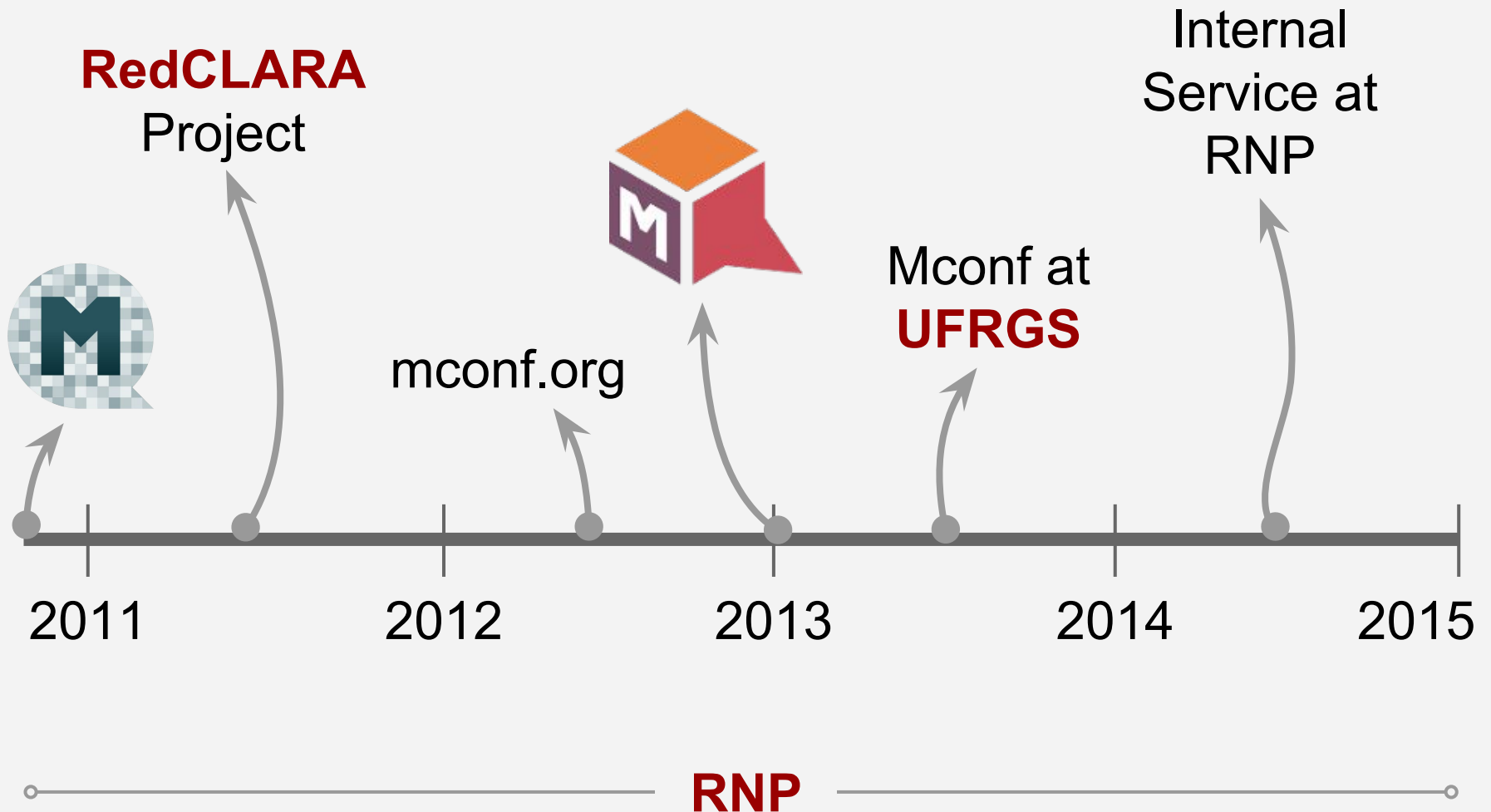
- ❑ Access Grid

- ❑ CineGrid

- ❑ Janet

- ❑ **BigBlueButton**

Timeline



Key aspects of Mconf

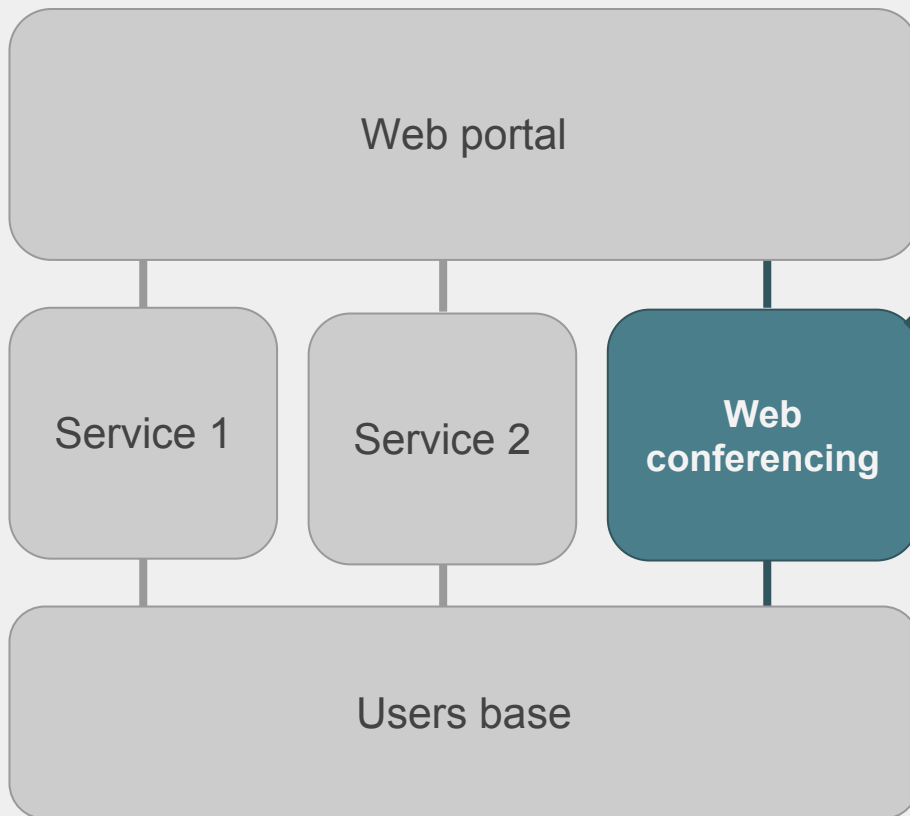
Integration

Customization

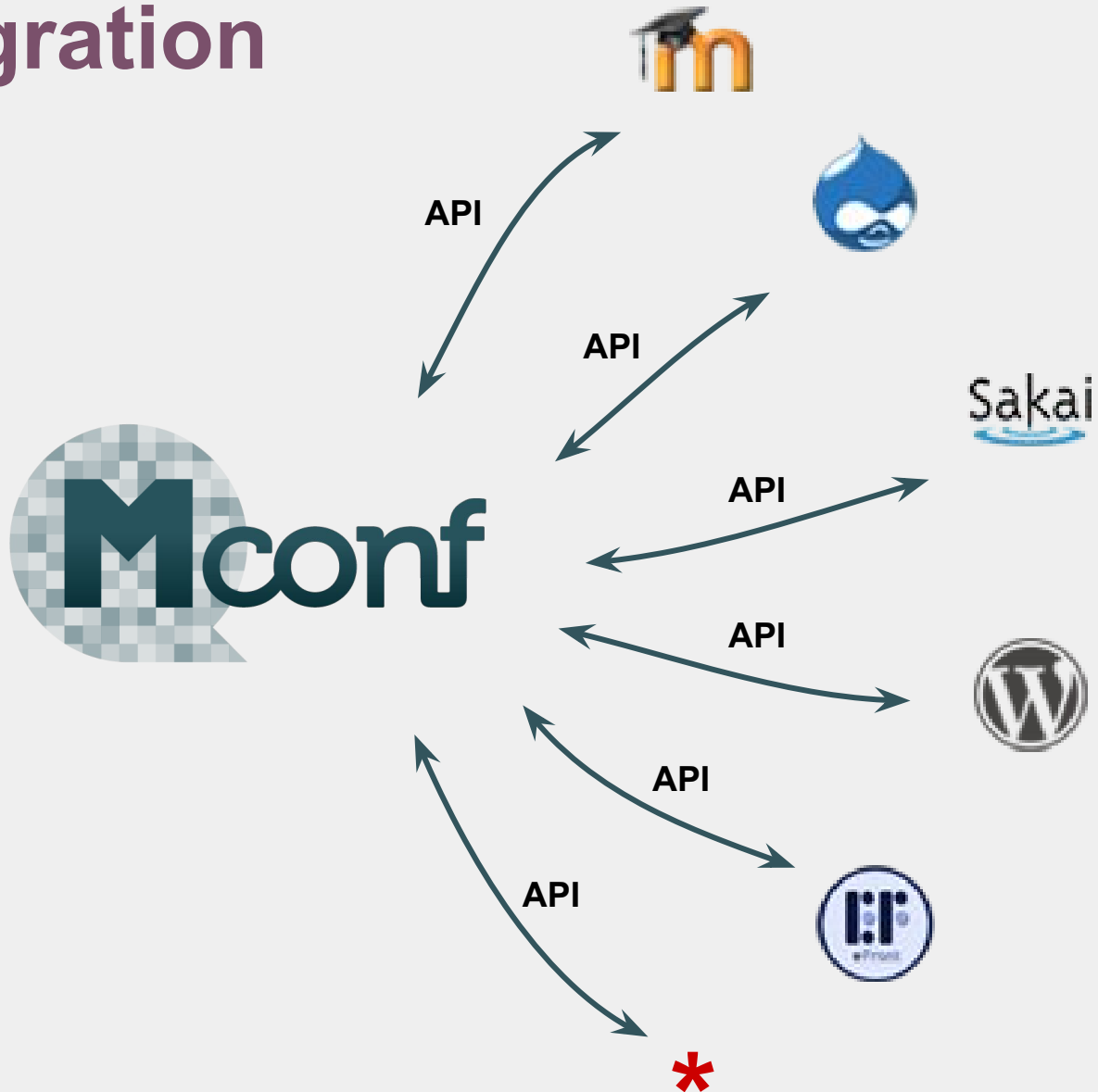
Open Source

Integration

Organization structure



Integration

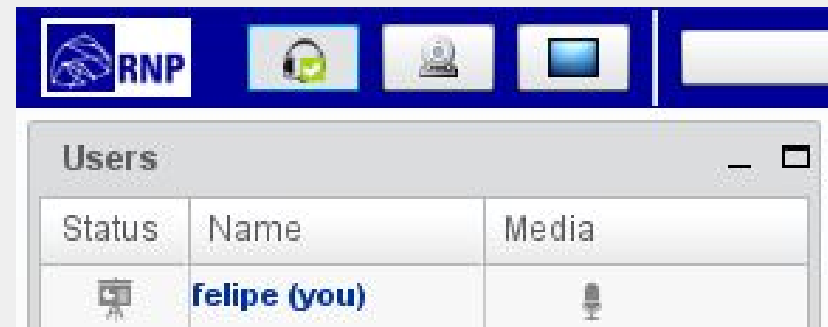


Customization





Usuários

Papel	Nome	Mídia
	Alexandre (você)	



Users

Status	Name	Media
	felipe (you)	




Mconf tecnologia

Usuários

Papel	Nome	Mídia
	Lucas (você)	

Customization

Instituição A *Mconf* Olá, Leonardo Crauss Daronco




 **Página inicial**


Instituição B Página inicial Caixa de entrada **0** Comunidades Eventos






Leonardo Crauss Daronco
daronco@mconf.com

 Perfil  Conta  Atividades recentes

 My Home Inbox **0** Spaces Manage



Leonardo Daronco
daronco@mconf.com

 Profile  Account  Activity list

Open source



- ✓ Collaborative development
- ✓ More developers
- ✓ More users
- ✓ More organizations working towards the same system



- ✓ More solid and stable product
- ✓ More reliability and longer life time
- ✓ Less dependency on a single service provider

Mconf is not BigBlueButton!

Mconf-Live is based on BigBlueButton

Many contributions from Mconf back to the BigBlueButton core

Collaborative development

- * weekly meetings, shared roadmap
- * developer summits

Main contributions to BigBlueButton

- ❑ Window for videos (video dock)
- ❑ Videos in the recordings
- ❑ Ability to share multiple cameras
- ❑ Extensions to the API
- ❑ Mobile client with Adobe Air (bbb-air-client)
- ❑ Hooks for external applications on events
- ❑ Layout module
- ❑ ...

Only on Mconf-Live

- ❑ Shared notes
- ❑ Ability to download the presentation and chat
- ❑ WebRTC reconnection
- ❑ Brandable logo
- ❑ Distributed recordings
- ❑ Emojis
- ❑ Guest access
- ❑ Fullscreen
- ❑ ...

Mconf-Live

The screenshot displays the Mconf-Live interface. At the top, the user name 'Felipe Cecagno' is visible. The main content area shows a presentation slide titled '1 Integração' (Integration). The slide features a central 'Mconf' logo with several arrows labeled 'API' pointing to various external services: a graduation cap icon, a blue circular icon with a white face, 'Sakai', a WordPress logo, and a blue circular icon with 'CF' and '42' inside. A red asterisk is located at the bottom of the diagram. On the left side, there is a 'Usuários' (Users) panel with a table containing one entry: 'Felipe Cecagno (voz)'. Below this is a 'Notas compartilhadas' (Shared notes) section. On the right side, there is a 'Bate-papo' (Chat) window with a public message: 'Bem-vindo(a) a Felipe Cecagno!' and instructions for using the microphone. Below the chat is a 'Janela de vídeos' (Video window) showing a video feed of Felipe Cecagno wearing a headset and a red t-shirt. The bottom of the interface includes a navigation bar with a back button, a page indicator '18/47', a forward button, a zoom slider from 100% to 400%, and a full-screen button. The footer contains the copyright notice '© 2015 http://www.mconf.org', a language dropdown set to 'Portuguese (Brazilian)', and a layout dropdown set to 'Layout padrão'.

1 Integração

Mconf

API

API

API

API

API

API

Sakai

W

CF 42

*

Usuários

Papel	Nome	Mídia
	Felipe Cecagno (voz)	

Notas compartilhadas

Bate-papo

Público

Opções

Bem-vindo(a) a Felipe Cecagno!

Para compartilhar o seu microfone, clique no botão com um headset (à esquerda da barra superior). Use um headset para ter uma melhor experiência de áudio com menos ruídos.

Enviar

Janela de vídeos

Felipe Cecagno (você)

© 2015 http://www.mconf.org

Portuguese (Brazilian)

Layout padrão

BigBlueButton Foundation

Nonprofit organization responsible for the source code and the brand of BigBlueButton

Funding for developer summits

Mconf Tecnologia is a member of the BigBlueButton Foundation

Summit VIII: Ottawa, Ontario (Apr/16)



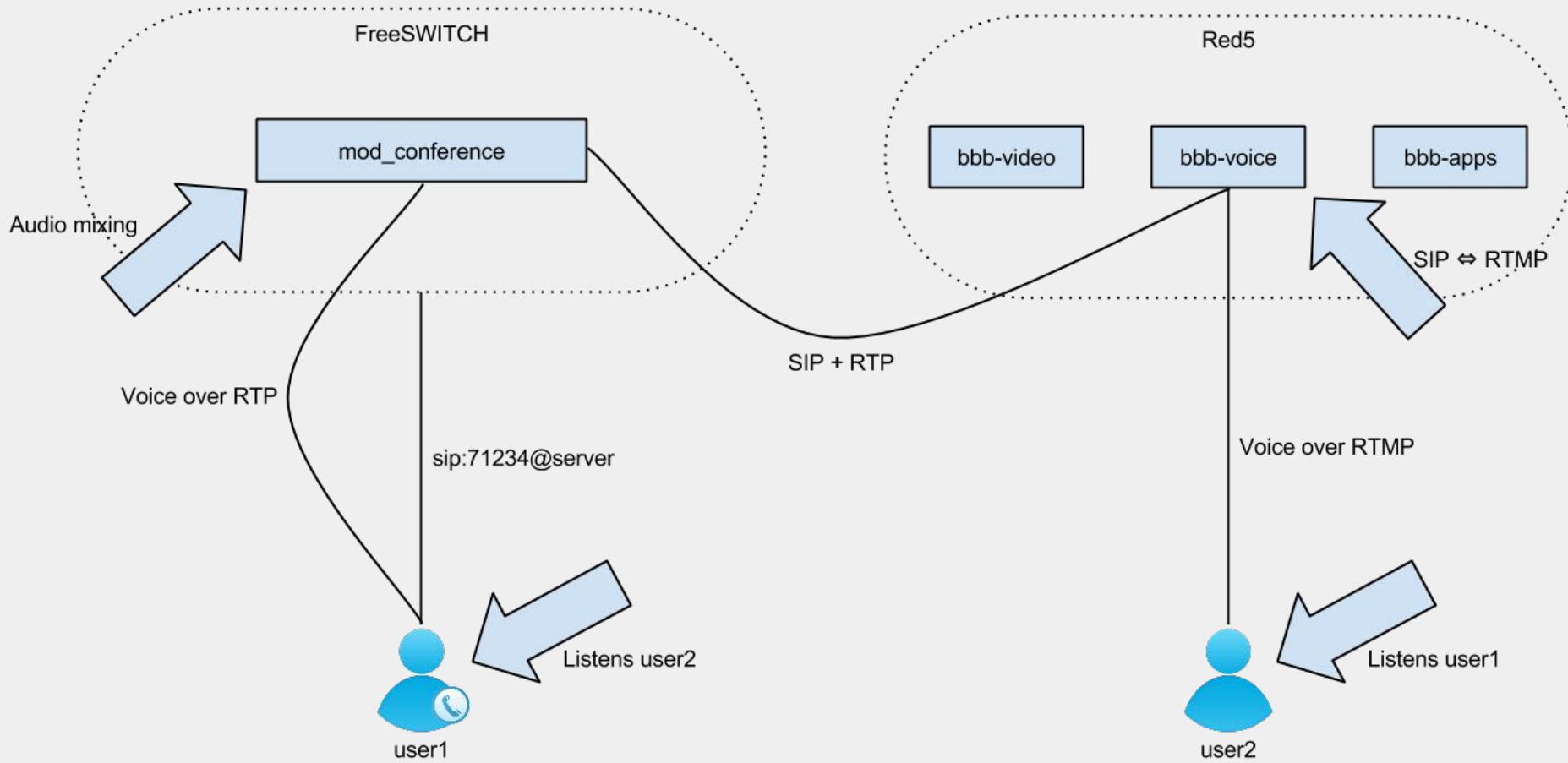
Mconf and WebRTC

Mconf-Live has a Flash-based client

WebRTC used for audio on Firefox and Chrome

Client-server architecture

Voice architecture



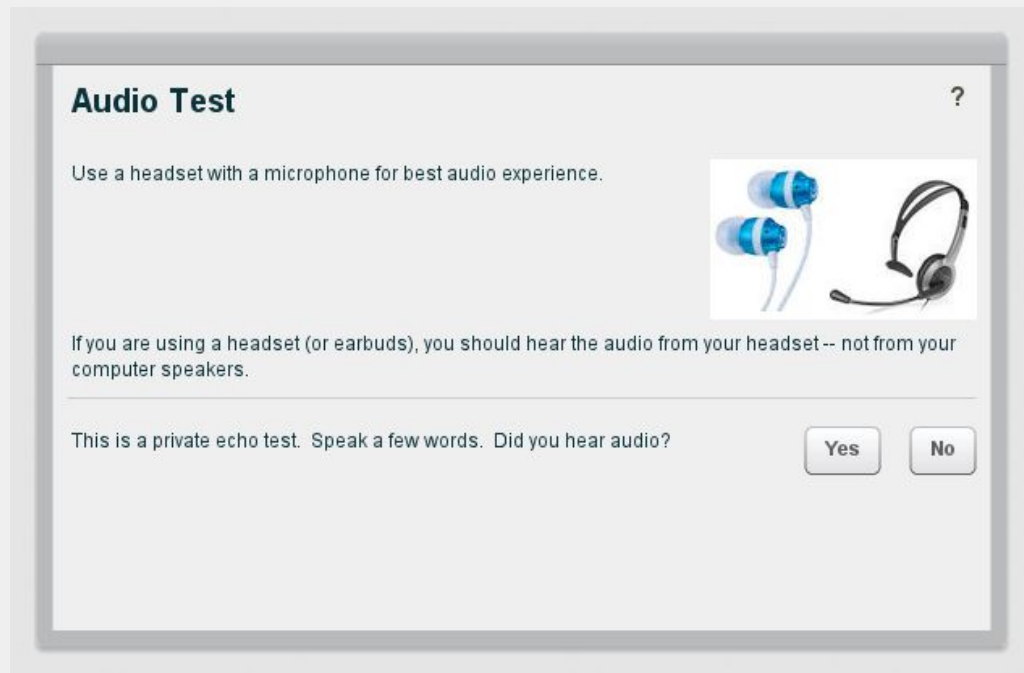
Voice architecture

sip.js connects to the (secure) websockets interface of FreeSWITCH, and communicates using SIP

TURN and STUN configured server-wide

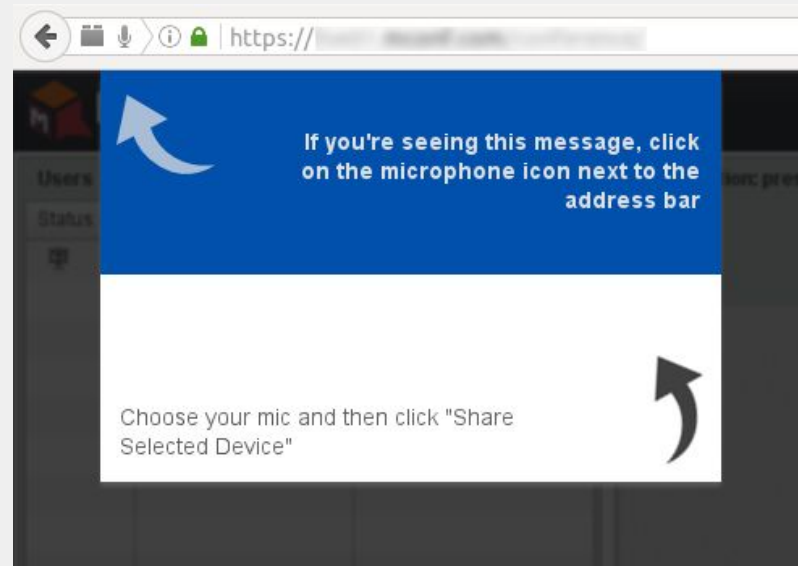
Voice architecture

Echo test and then transfer to the conference



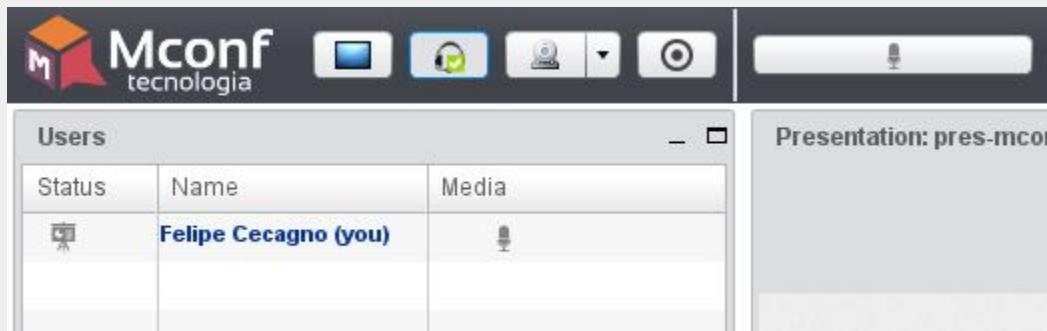
Voice architecture

Bridge between Flash and Javascript for coordination



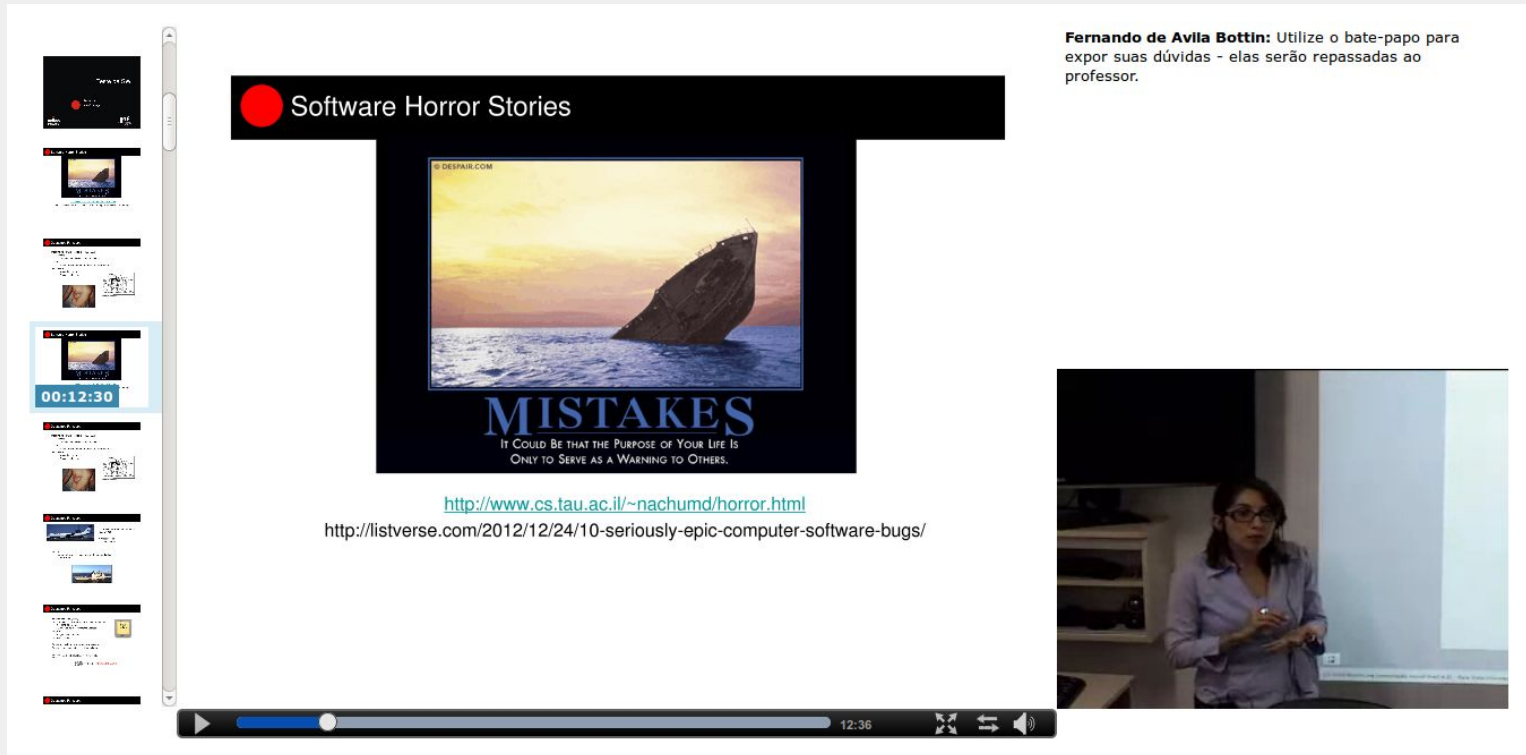
Voice architecture

After established the connection, signaling goes through FreeSWITCH Event Socket Library (mute, unmute, talking, ...)



Recording

mod_conference records the raw audio, including WebRTC



The screenshot shows a video player interface. On the left is a vertical thumbnail strip with a play button and a timestamp of 00:12:30. The main video area displays a presentation slide titled "Software Horror Stories" with a red circle icon. The slide features a poster for "MISTAKES" showing a sinking ship at sunset, with the text "IT COULD BE THAT THE PURPOSE OF YOUR LIFE IS ONLY TO SERVE AS A WARNING TO OTHERS." Below the poster are two URLs: <http://www.cs.tau.ac.il/~nachumd/horror.html> and <http://listverse.com/2012/12/24/10-seriously-epic-computer-software-bugs/>. At the bottom of the video player is a progress bar and a timestamp of 12:36. To the right of the video player, there is a text block and a small video thumbnail.

Fernando de Avila Bottin: Utilize o bate-papo para expor suas dúvidas - elas serão repassadas ao professor.

WebRTC Stats

Different APIs on Chrome and Firefox

Different level of detail

Chrome offers much more information

WebRTC Stats

Using adapter.js (<https://github.com/webrtc/adapter>)



The image displays three sequential screenshots of a WebRTC interface, illustrating the status of a user's audio connection. Each screenshot shows a control bar with icons for video, audio, and a dropdown menu, followed by a 'Users' table and a status message.

Top Screenshot: The audio icon is green, indicating a good connection. The status message reads: "Your WebRTC audio connection is great".

Status	Name	Media
	User 495034 (you)	

Middle Screenshot: The audio icon is yellow, indicating a fine connection. The status message reads: "Your WebRTC audio connection is fine".

Status	Name	Media
	User 6679945 (you)	

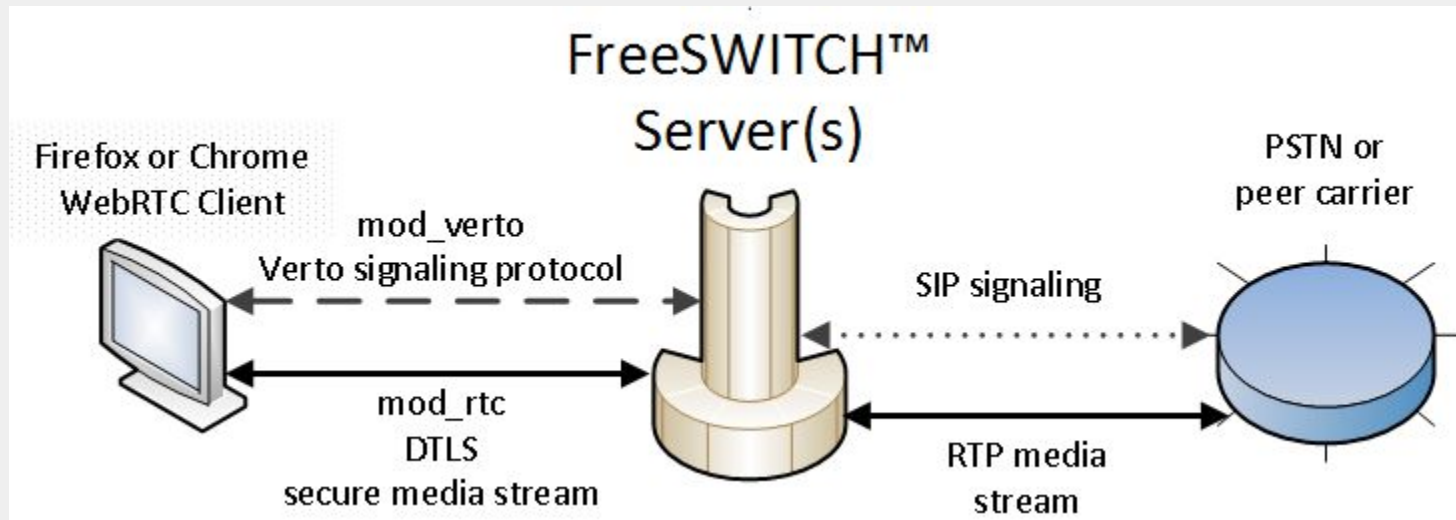
Bottom Screenshot: The audio icon is red, indicating a bad connection. The status message reads: "Your WebRTC audio connection is bad".

Status	Name	Media
	User 6679945 (you)	

WebRTC Desktop Sharing

Being developed by Blindside Networks

Fallback to Java Web Start desktop sharing



Challenges

HTTPS and getUserMedia on Chrome

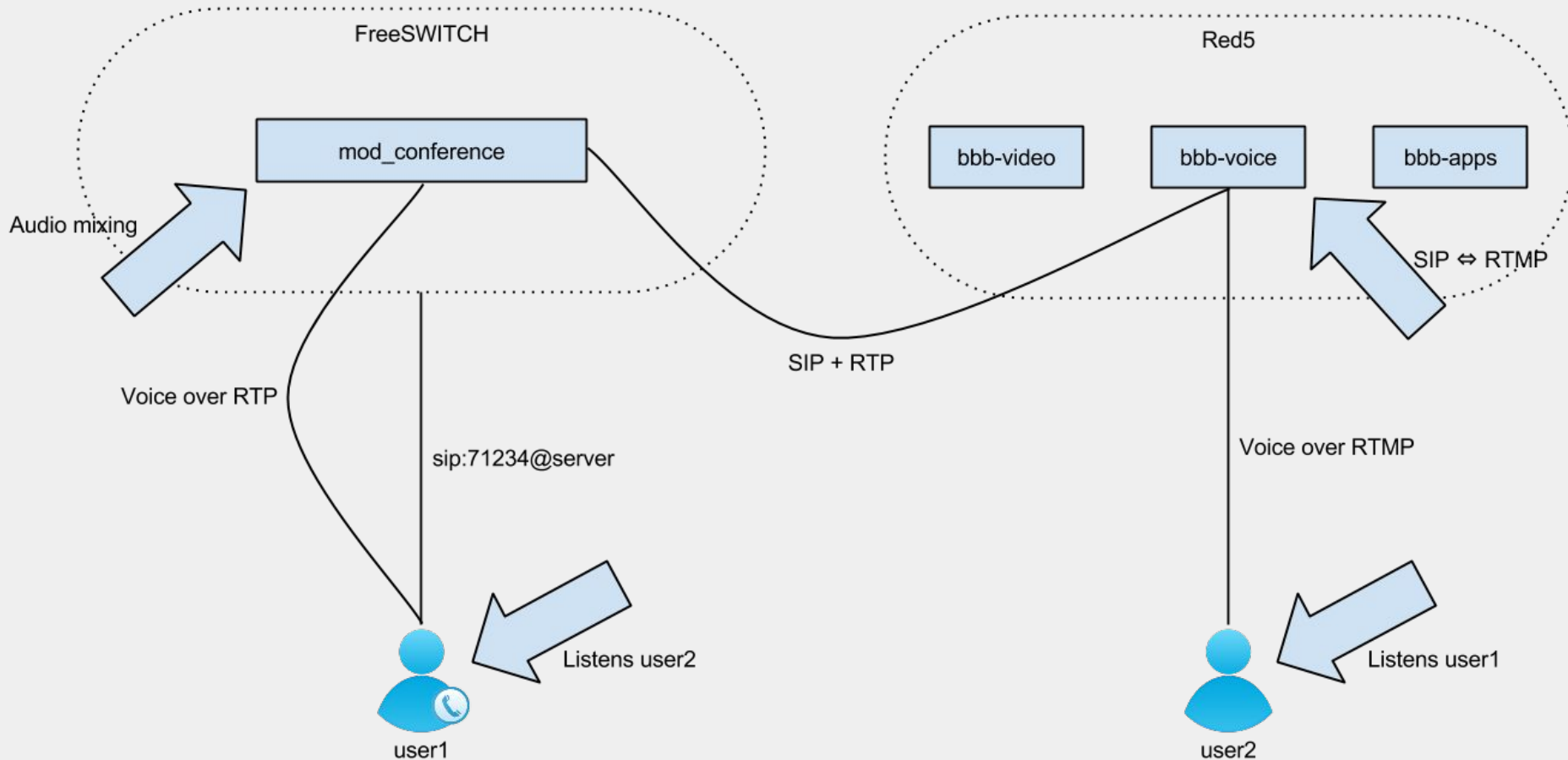
Let's encrypt! <https://letsencrypt.org/>

Challenges

Listen only mode with WebRTC

Challenges

Listen only mode with WebRTC



Challenges

Video !!

Flash and HTML5

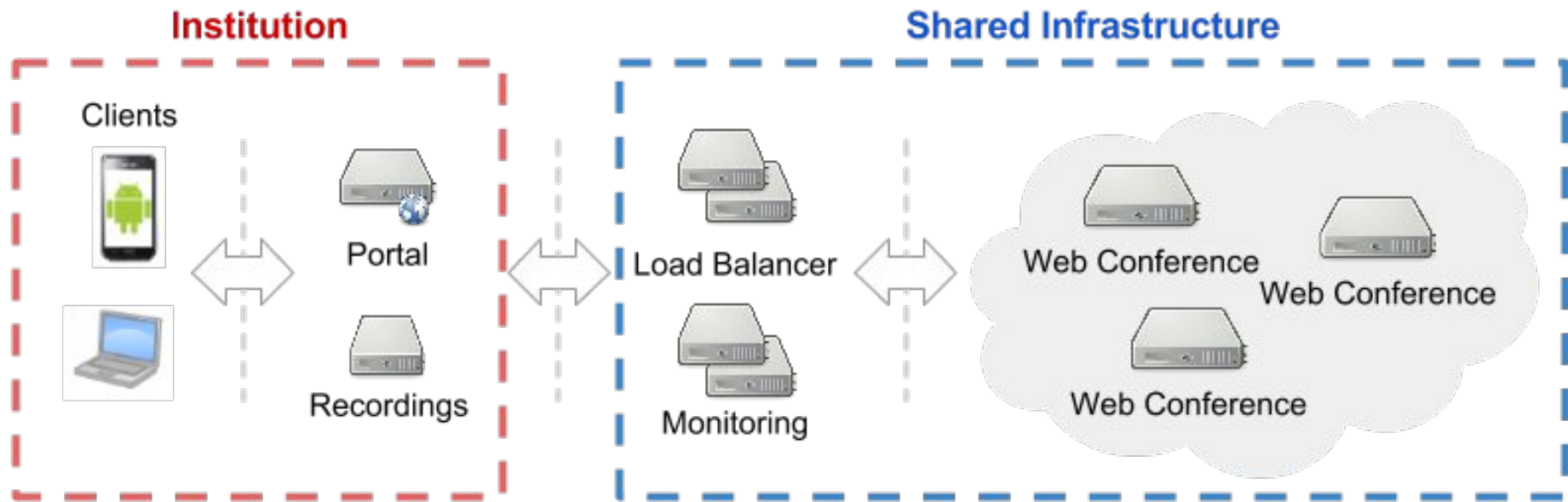
Bridge between FreeSWITCH and Red5

Mconf Academic Network

- ❑ Proposed in 2012 at Terena Conference
- ❑ Collaborative web conferencing network for academic institutions
- ❑ Shared pool of web conferencing servers

Mconf Academic Network

Simplified architecture:



Mconf Academic Network

- ❑ Main advantages:
 - ❑ High availability
 - ❑ Optimization of resources
 - ❑ Low setup and maintenance cost
 - ❑ Monitored environment
 - ❑ Detailed statistics and usage reports
 - ❑ Institutions manage their own users, their permissions and their data (including recordings)
 - ❑ Global collaborative open source development

Mconf Academic Network

- ❑ 14 partners in 8 countries
- ❑ 31 Mconf-Live servers
- ❑ 10 Recording servers



Mconf Academic Network

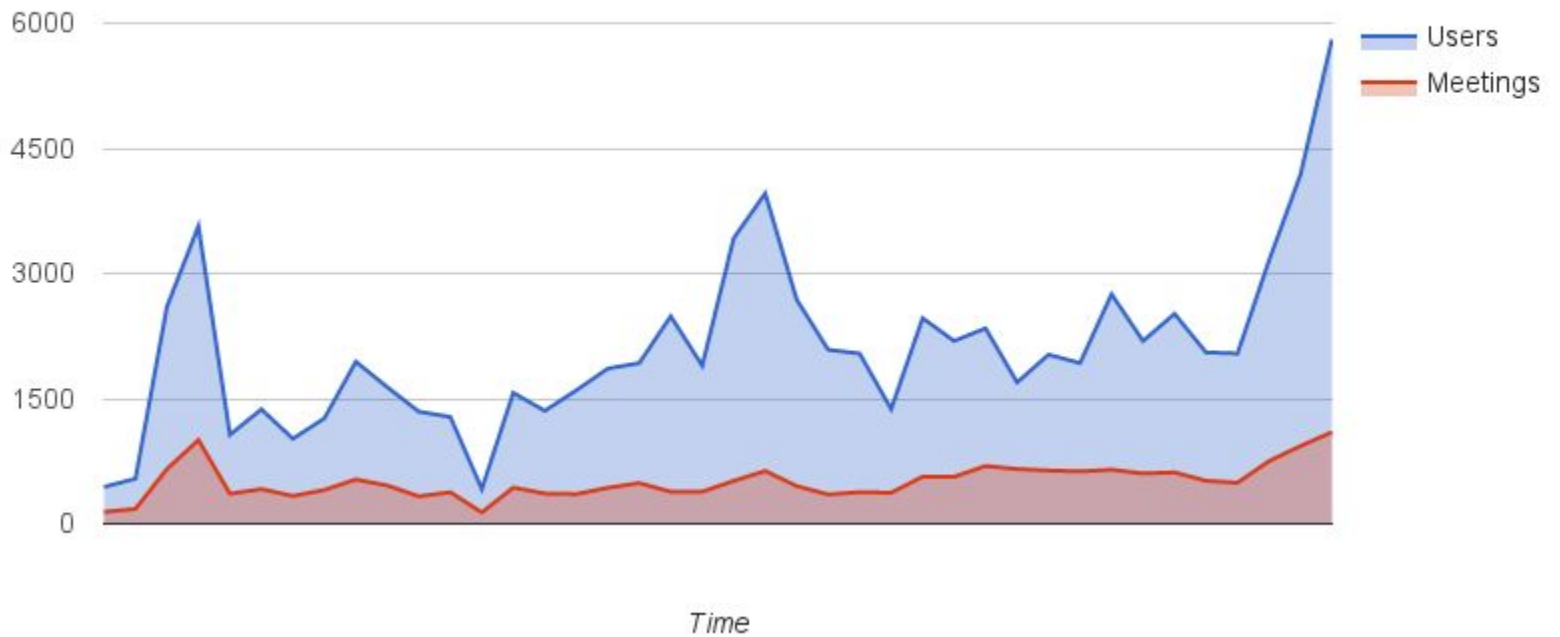


Mconf Academic Network

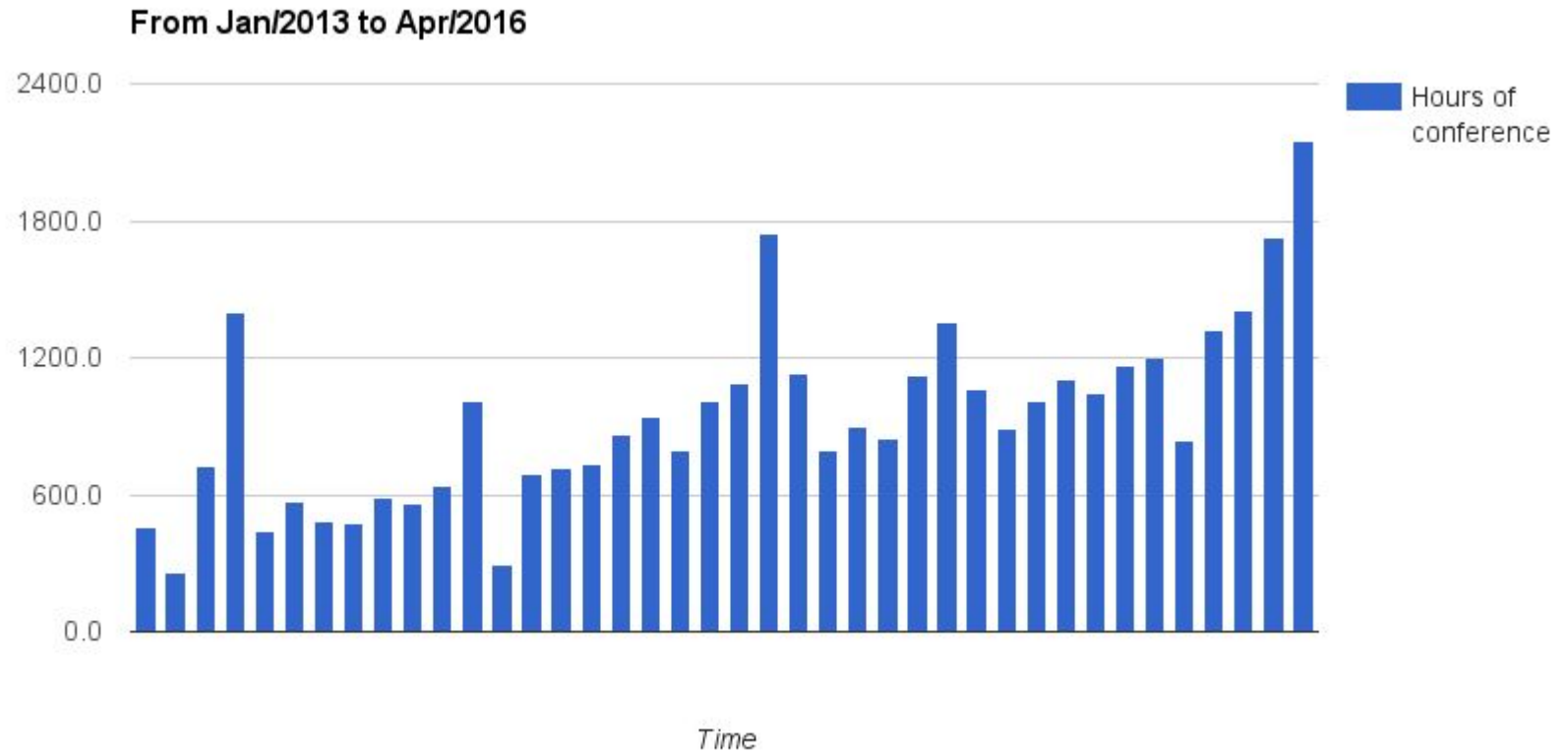
- ❑ Currently managed by Mconf Tecnologia
- ❑ Ongoing discussions on creating a nonprofit organization

Mconf Academic Network

From Jan/2013 to Apr/2016



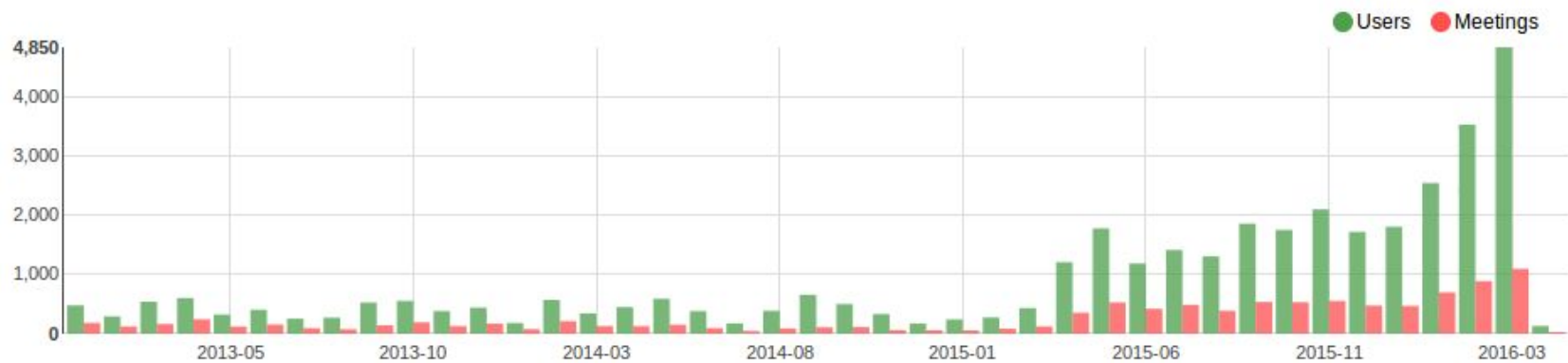
Mconf Academic Network



Mconf Academic Network

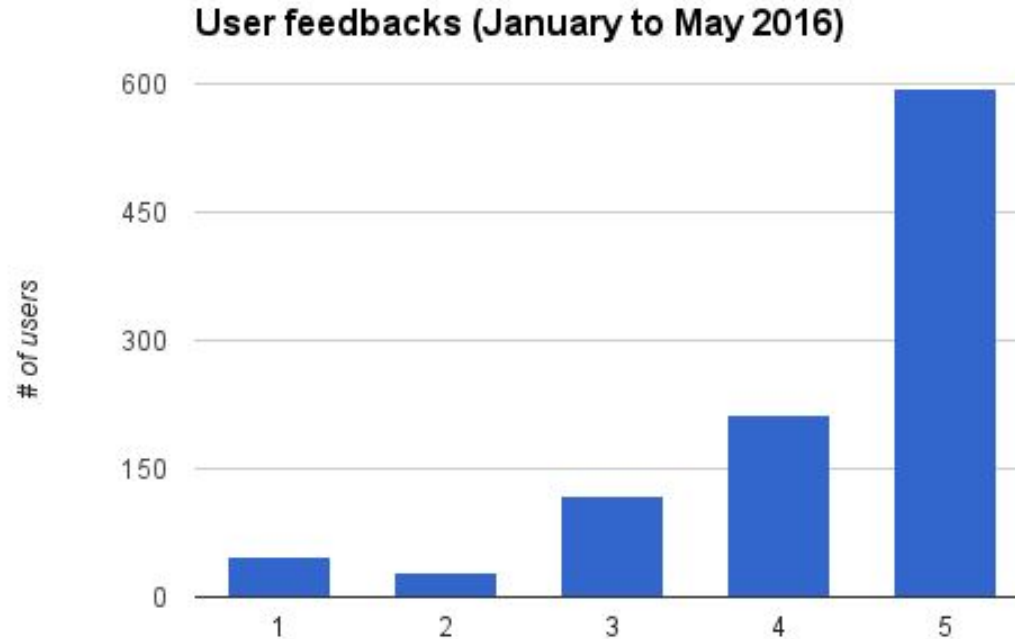
Usage report from 2013-01-01 to 2016-05-03

Number of users and meetings in the selected period (Monthly sampling)



Number of meetings	10792
Number of users	46961
Average meeting duration	127.18 minutes
Maximum number of simultaneous meetings	81
Average number of users	4.3515
Maximum number of simultaneous users	250
Number of recordings	1595
Average recording duration	88.214 minutes

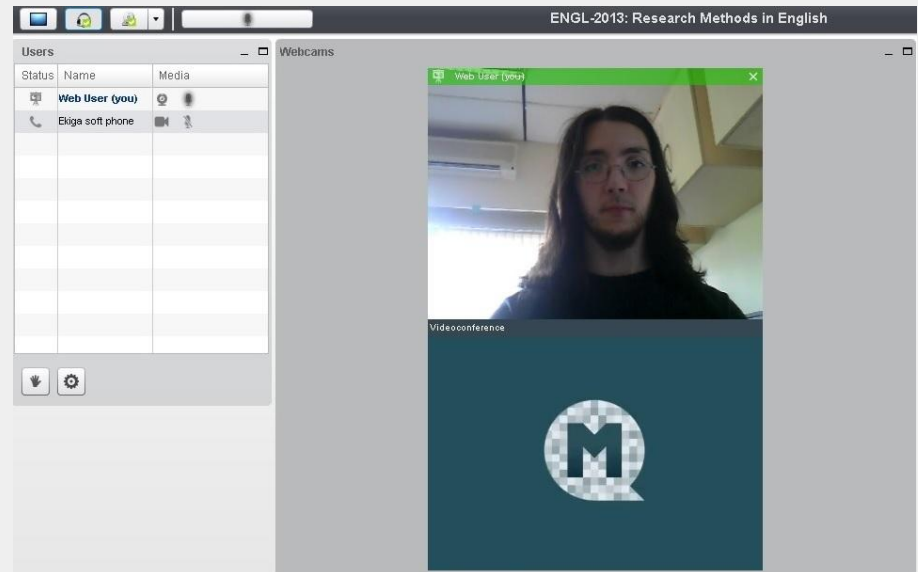
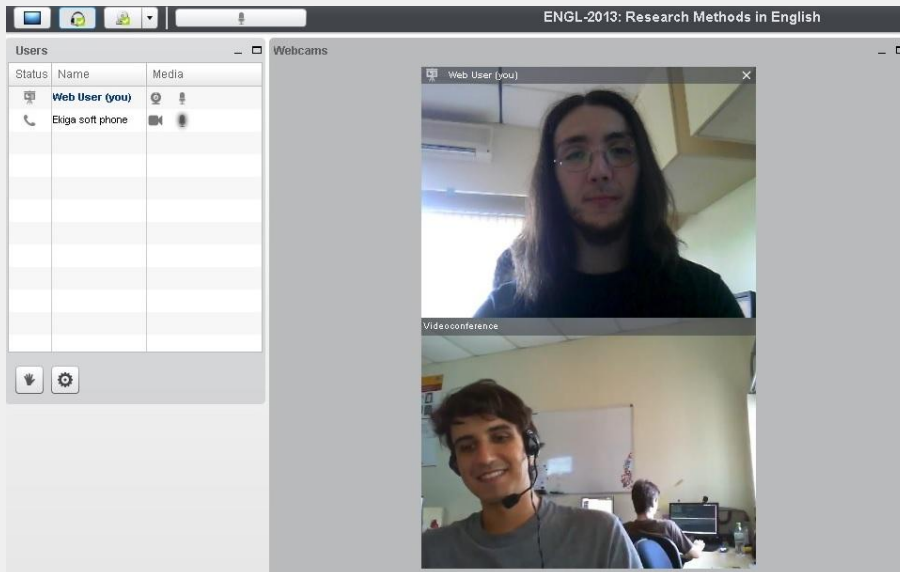
User feedback



- Most common problems:
 - Environment (microphone and camera setup)
 - Network connection

Roadmap

- ❏ Interoperability with videoconference systems, such as Cisco and Polycom, through SIP



Roadmap

Outbound calls

Dial a SIP endpoint

sip:

1	2	3
4	5	6
7	8	9
*	0	#

Dial

Close

Roadmap

HTML5 client (unified UI)

The screenshot displays a unified HTML5 client interface for a presentation. The interface is divided into three main sections:

- Participants Panel (Left):** Shows a list of participants under the heading "Participants". Below this, there are "MESSAGES" and "PARTICIPANTS (8)". The participants listed are Ernest (Presenter), Luke (You), Sonia, Ruben, Everlyn, Vivan, Lucille, and Fred. Each participant has a status icon (e.g., microphone, video) next to their name.
- Public Chat (Middle-Left):** A chat window titled "< Public Chat" showing messages from Sonia, Ruben, and Everlyn. Sonia's message is: "Maecenas faucibus mollis interdum. Nulla vitae elit libero, a pharetra." Ruben's message is: "Ornare Vehicula Sollicitudin Mattis". Everlyn's message is: "Etiam porta sem malesuada magna mollis euismod. Donec ullamcorper nulla non metus auctor fringilla."
- Presentation Area (Right):** Displays a slide titled "IMD 1004 Design Process" with a timer at "01:10". The slide content includes a large image of a red Range Rover driving on a snowy road. To the right of the image, the text reads: "FASTERHARDER SIMPLER". Below this, there are three bullet points: "FASTER: A small river named Duden flows by their place and supplies it with the necessary regellalia.", "HARDER: When she reached the first hills of the Italic Mountains, she had a last view back on the skyline.", and "SIMPLER: Rule signs our it green under meat first image, beginning lesser land. Evening own." The slide navigation controls at the bottom of the presentation area include arrows, "Slide 13", and a refresh icon.

At the bottom of the interface, there is a navigation bar with icons for "Actions" (a plus sign), "Mute", "Cam off", and "Raise". A small video thumbnail of a man is visible in the bottom right corner.

Roadmap

- ❑ High performance desktop sharing
- ❑ Improvements on the mobile integration

BigBlueButton Summit VIII

- ❏ Project update

<https://youtu.be/D6V05LazLhE>

- ❏ UI update

<https://youtu.be/AZgZV1bN0sU>

- ❏ HTML5 client update

<https://youtu.be/46Es4c24QSg>

Development team

- ~15 developers at our research group and company



Services by Mconf Tecnologia

Hosting (webconferencing as a service)

Tier 2 support

Customization and deployment

Software development

Final remarks

Many opportunities for collaboration:

- ❑ Testing and reporting issues
- ❑ Creating documentation
- ❑ Developing
- ❑ Funding improvements
- ❑ Joining the BigBlueButton Foundation
 - ❑ Developer Summit in Europe? 😊



Thank you!

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