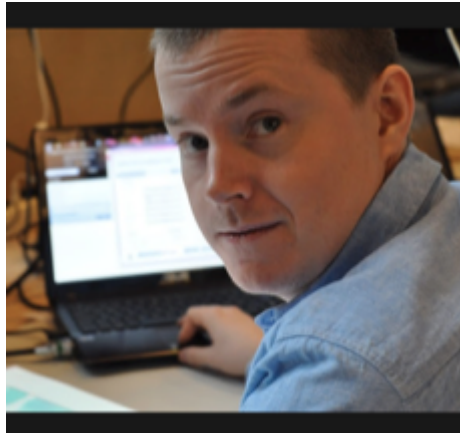


WebRTC and Mediated Presence

By Nicklas Nyström and Jimmy Nyström

Who are we?



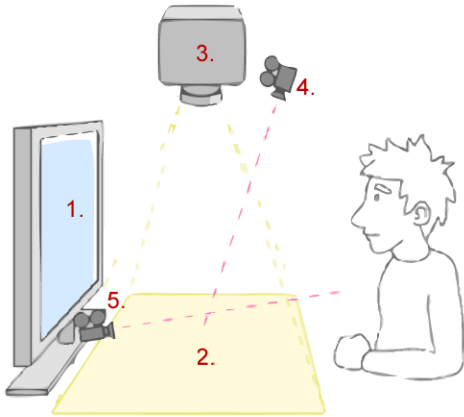
Jimmy Nyström and Nicklas Nyström,
brothers (Jimmy is the really old one) and
PhD students from the cold north

WebRTC

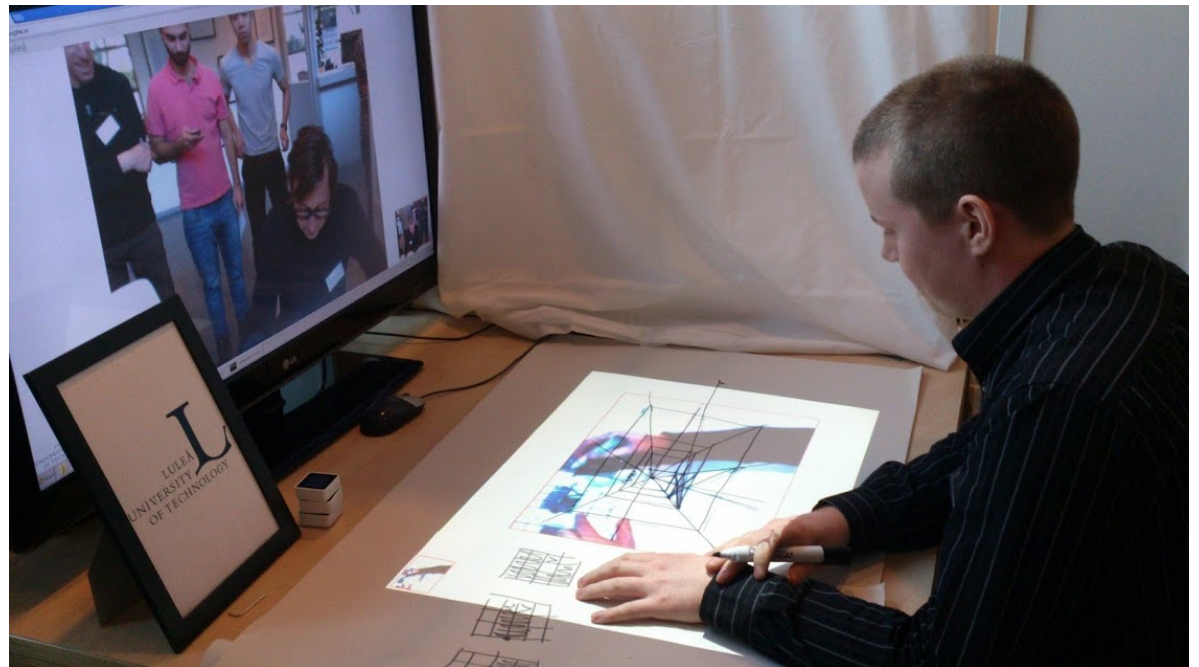
Real-time communication directly in the browser

- Audio, video and data
- Peer-to-peer communication
- No plugins needed

Mediated Sketching Table



You've probably seen this?





Videoconferencing

iDipityParis café

🍴 Cooking


Logged in as Jimmy ⚙️





You said: Hi guys
Sarah said: Hi Jimmy
Steve said: Welcome!
You said: I overheard you discussing veggie food recipes
You said: Have you seen this video? Great recipe!
Helen said: Wow, looks great!

Send



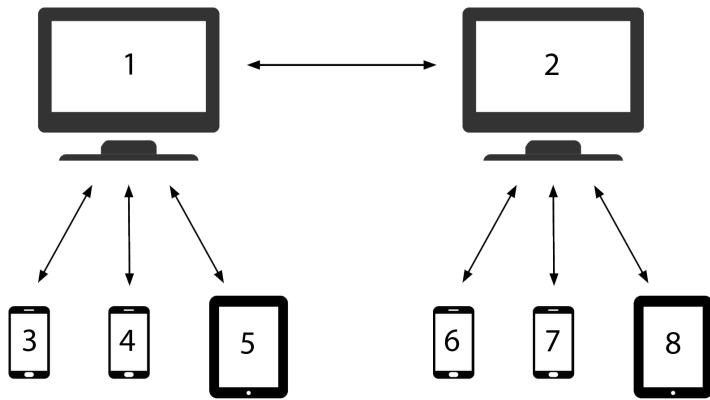
About

User guide

Contact us

Feedback / Bug report


Multi-Device Communication


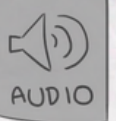






Demo




Shared Virtual Objects





Share 3D models


Material

Specular 

Red

Green


Blue

Diffuse 

Red

Green

Blue


Ambient 

Red

Green

Blue

Shininess



Light

Position

x

y

z


Misc.



BLOB!

Zoom

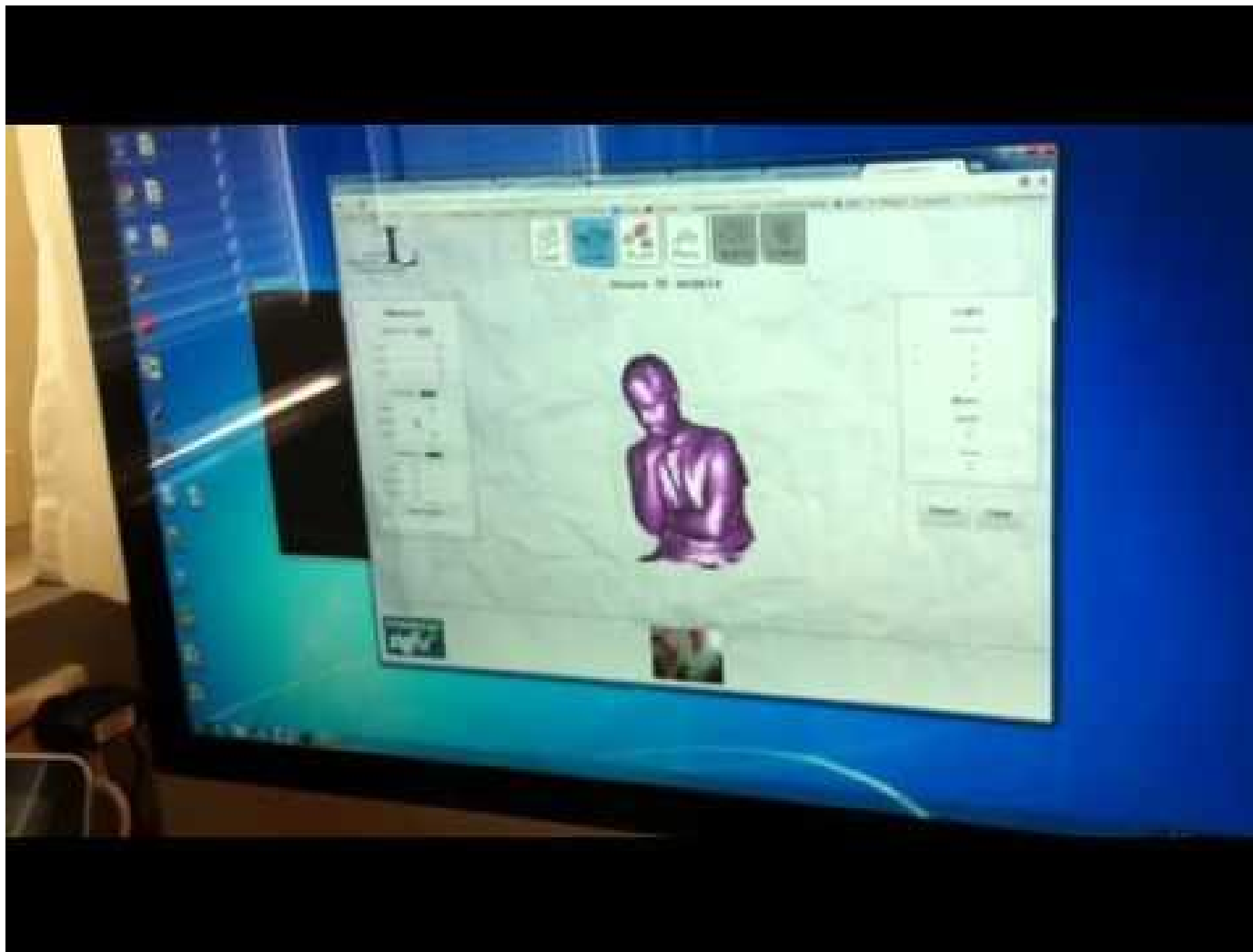
Share!

Clear





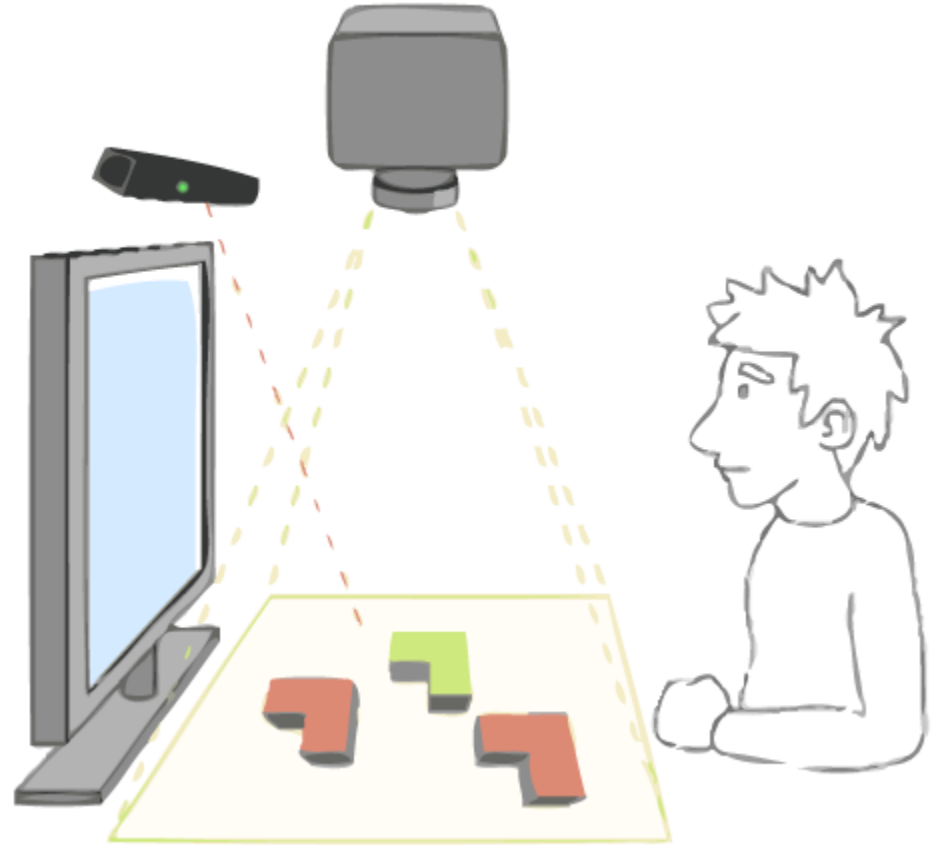
Shared Virtual Objects



Collaborative Game

Based on the
mediated sketching

Intuitive interaction
with virtual objects



Collaborative Game

The interface is set against a crumpled paper background. At the top left is the Luleå Tekniska Universitet logo. To its right is a row of six icons in hand-drawn boxes: 'CHAT' (two people), 'SHARE' (a globe), 'PLAY' (three blocks), 'PEEK' (a magnifying glass over a block), 'AUDIO' (a speaker), and 'VIDEO' (a camera). Below the logo, the text 'Time passed: 00:18' is shown, followed by 'Your turn' in red, and then 'You can move red and green blocks.' in black. Two buttons, 'End game' and 'Give up turn', are positioned to the left of the game board. The game board itself is a 5x5 grid on a green grassy surface, containing several colored blocks: a large green block at the bottom left, and various red and blue blocks arranged in the center and right. At the bottom of the interface, there is a 'POWERED BY zigfu' logo on the left and two small video windows showing the faces of the two players on the right.

LULEÅ
TEKNISKA
UNIVERSITET

CHAT SHARE PLAY PEEK AUDIO VIDEO

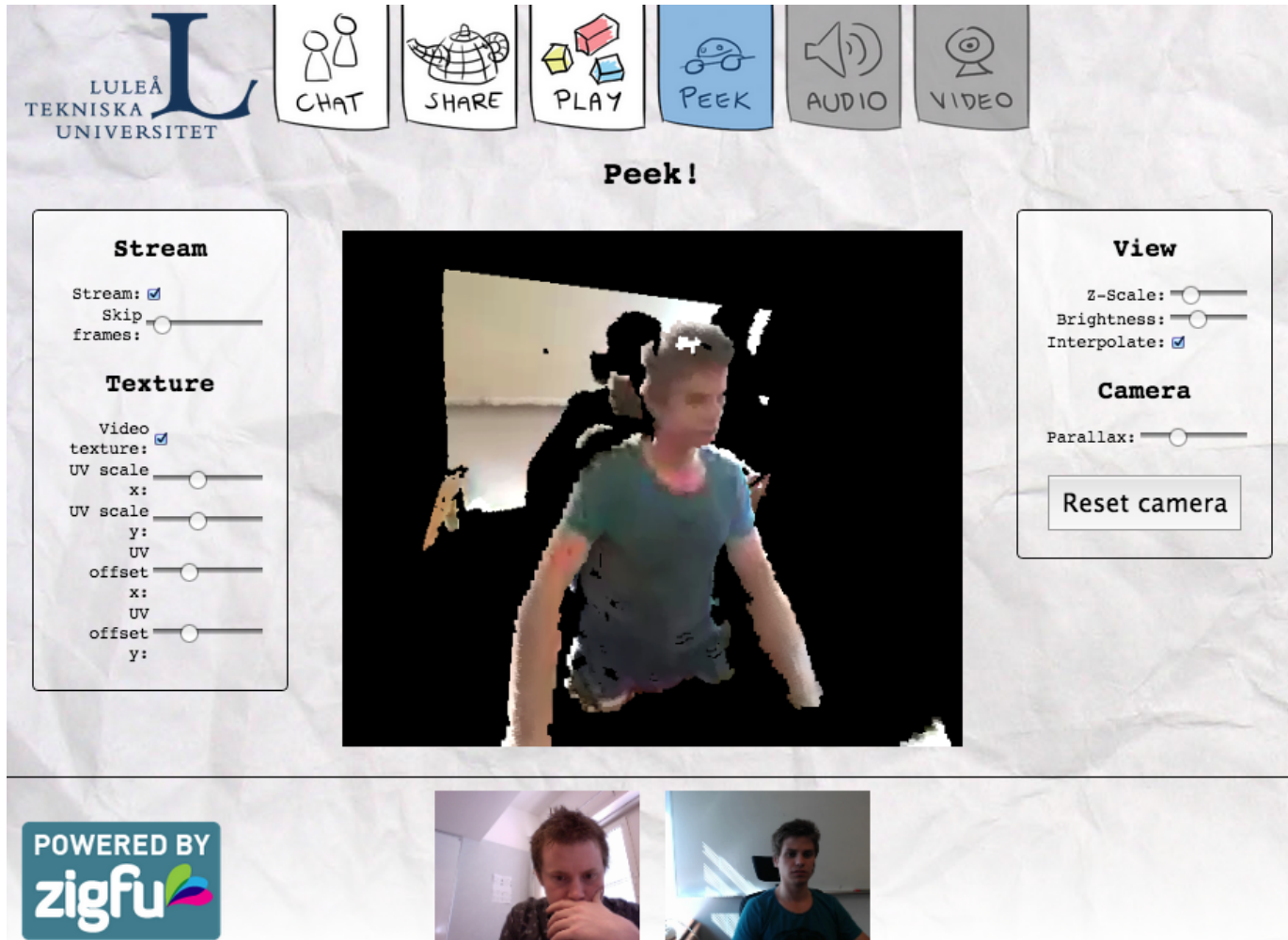
Time passed: 00:18
Your turn
You can move red
and green blocks.

End game

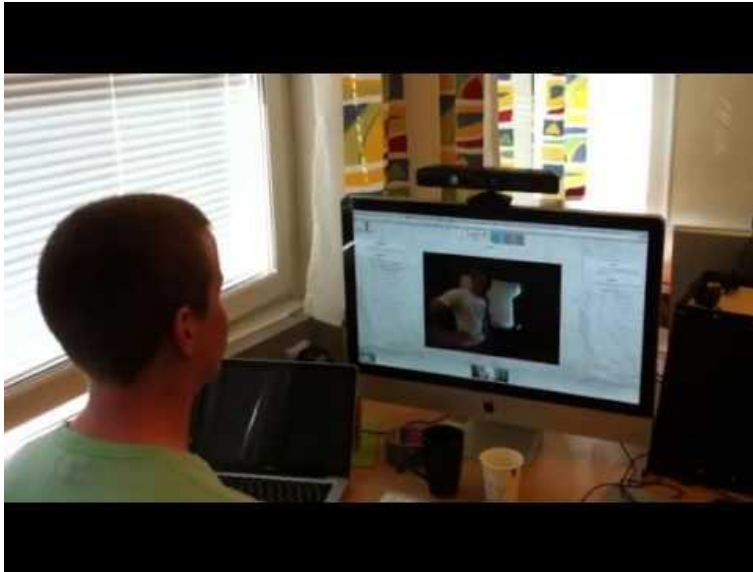
Give up turn

POWERED BY
zigfu

3D Video Chat



3D Video Chat



The World Wide Web



I've been living in a cave for thirty years, what's this web you're talking about?

- A system of linked **HTML** documents...
- ...made interactive through **JavaScript**...
- ...with **CSS** describing their look and formatting.

New web technologies

- HTML5, Open Web Platform
- WebRTC

Enabling powerful browser applications
without the need to install additional software

HTML5

<video>

Makes adding video to your page as easy as adding an image...

<audio>

... and the same goes for sound

<canvas>

A rectangle in your page where you can use JavaScript to draw anything

WebRTC

- Accessing local audio and video
- Communicating audio and video
- Communicating arbitrary data

Accessing Local Media

MediaStream

- Audio
- Video

Our Demo

<http://webcamtoy.com/>

<http://seriouslyjs.org/>

getUserMedia

```
var constraints = {video: true};  
var localVideo = document.getElementById("localVideo");  
  
function gotStream(stream){  
    localVideo.src = URL.createObjectURL(stream);  
}  
  
navigator.webkitGetUserMedia(constraints, gotStream);
```

Communicating Video and Audio

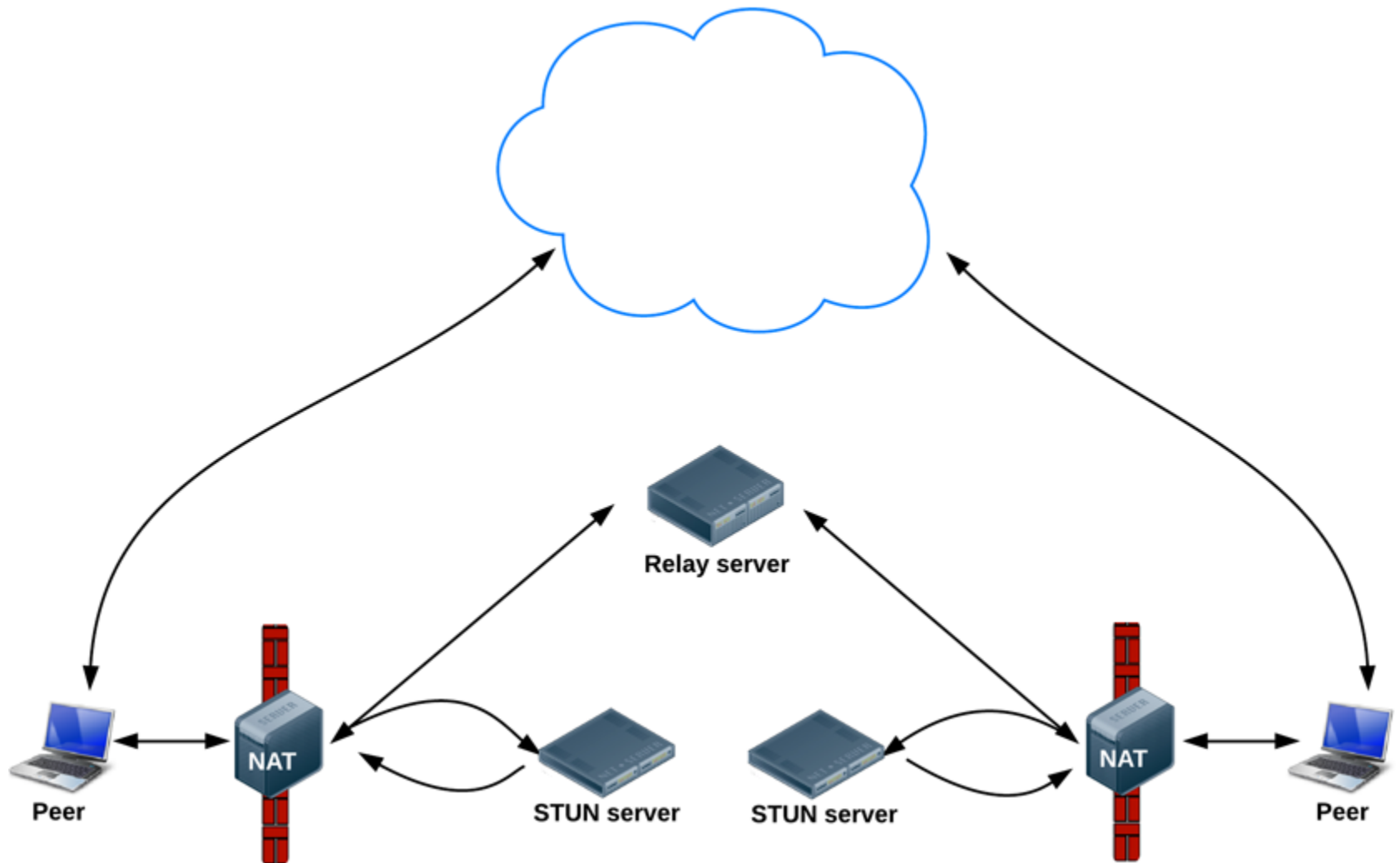
RTCPeerConnection

- Sending the local MediaStream
- Receiving remote MediaStreams

Communicating Video and Audio

- **Session control messages:** to initialize or close the communication
- **ICE Candidate:** tells you who you are to the outside world (your computer's IP address and port)
- **Session description:** tells you what codecs and resolutions can be handled by your browser and the browser it wants to communicate with

Communicating Video and Audio



Communicating Video and Audio

RTCPeerConnection

Our Demo

<http://simpl.info/rtppeerconnection/>

A good tutorial:

<https://bitbucket.org/web rtc/codelab>

Communicating Arbitrary Data

RTCDataChannels

- Similar to WebSockets
- Low latency
- Unreliable or reliable transfer

<http://simpl.info/rtdchannel/>

<https://www.sharefest.me/>

Frameworks



"This looks hard and I'm lazy!"

Frameworks can make our lives easier:

- [Licode](#)
- [SimpleWebRTC](#)
- [EasyRTC](#)

First task

Programmers:

1. Download the material from the course web
2. Run the server. In a terminal:
 - a. `cd PATH/TO/FOLDER`
 - b. `node channel_server.js`
3. Test at <http://localhost:8080/task1.html>

Everyone else:

Warm-up exercise!

Second task

Programmers:

1. Try out WebRTC video chat: <http://localhost:8080/task2.html>
2. See if you can connect two computers
 - a. Use ifconfig (Mac) or ipconfig (Windows) to find the IP address of your computer

The rest:

Brainstorm ideas for a WebRTC application that might be useful in your project

Third task

Programmers:

1. Go to <http://localhost:8080/task3.html>
2. Play with the filters!
3. Try and replace the image with webcam video
4. Apply CSS filters to your video chat from task 2

Non-programmers:

Pick the best idea you've come up with and begin sketching on a mockup version

Fourth task

Programmers:

1. More advanced filters: <http://seriouslyjs.org/>
2. Take a look at <http://localhost:8080/Seriously.js/>
3. Try and use Seriously.js filters instead of CSS in your video chat
 - a. `webrtc-workshop/client/Seriously.js/seriously.full.min.js`
4. Can you use the Chroma Key filter to replace the background in your video chat?
 - a. tip 1: use the 'chroma' effect on the video, then 'blend' with an image
 - b. tip 2: <http://localhost:8080/task4.html> show how to apply effects to video

The rest:

Force the programmers to implement your mockup! :)

Links

W3C

- WebRTC Working Group
<http://www.w3.org/2011/04/webrtc/>
- Specifications
<http://dev.w3.org/2011/webrtc/editor/getusermedia.html> <http://dev.w3.org/2011/webrtc/editor/webrtc.html>

IETF

- RTCWeb Working group
<http://tools.ietf.org/wg/rtcweb/>

Thanks to Ericsson and Adam Bergkvist for inspiration and code!