

# WebRTC step by step



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# What is **mashme<sup>tv</sup>** ?

Social video-collaboration platform

Based in the cloud

Integrates many tools

Startup spin-off from UPM

## How big is **mashme<sup>tv</sup>** ?

800.000+ users in 72 countries

137.000+ meeting rooms

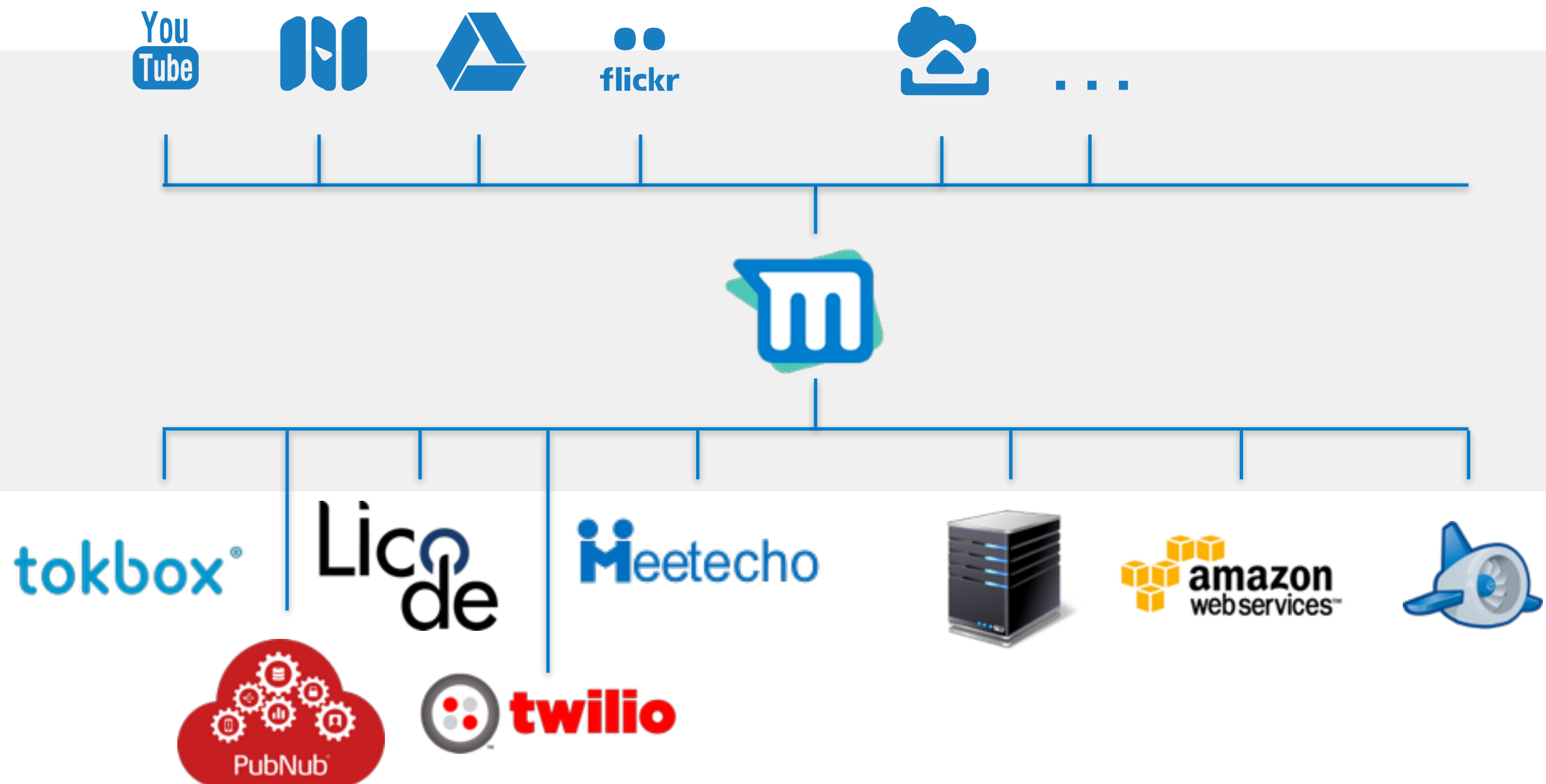
1.250.000 shared elements in 2014

# Take a look at **mashme<sup>tv</sup>**



DEMO TIME

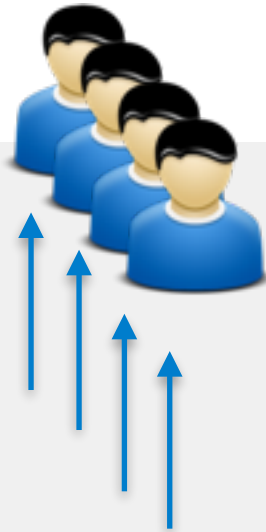
# The concept for **mashme<sup>tv</sup>**



# Synchronization



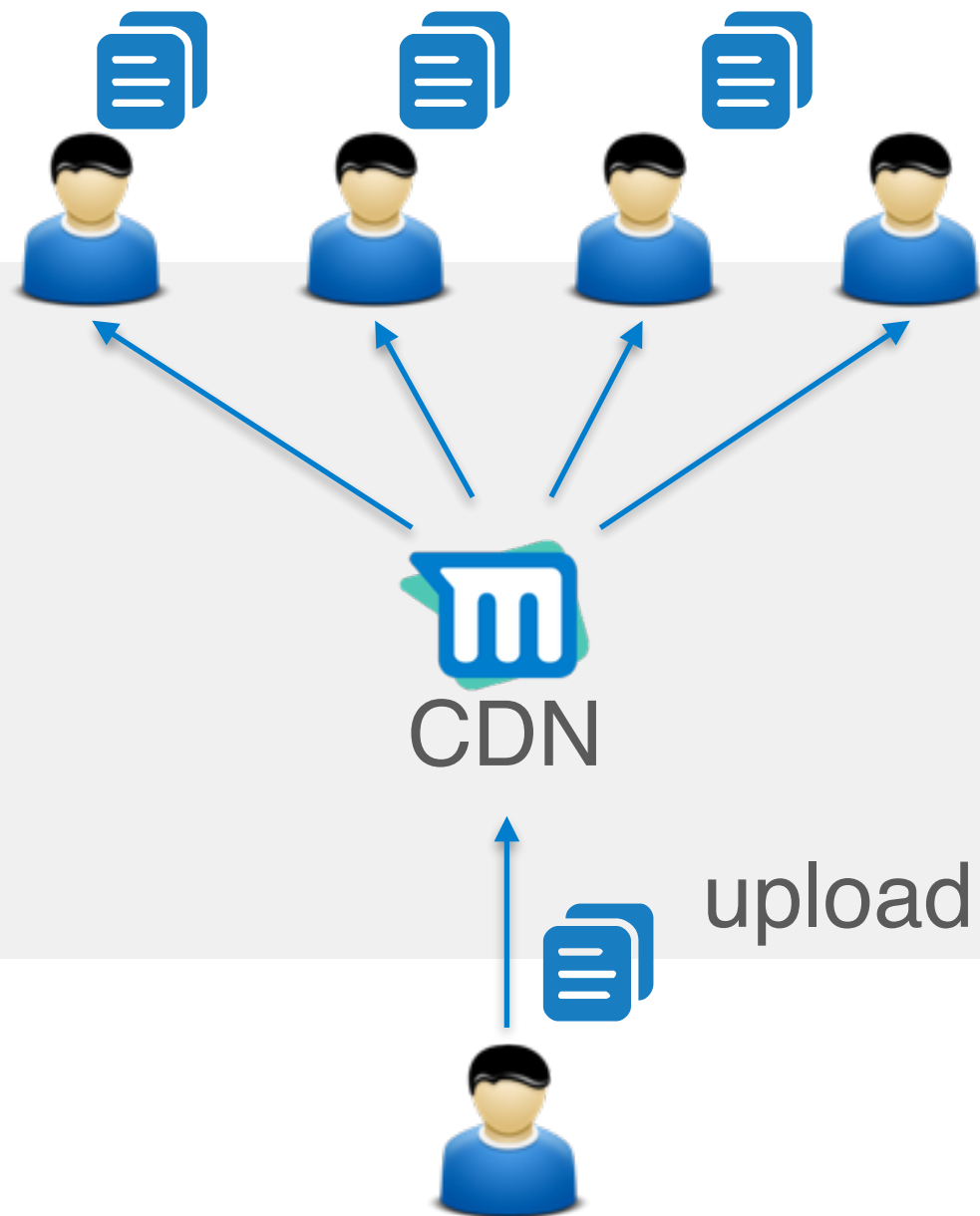
# Screen sharing VS **mashme**<sup>tv</sup>



frustrating experiences are delivered here

your bad upload connection goes here

## Screen sharing VS **mashme<sup>tv</sup>**

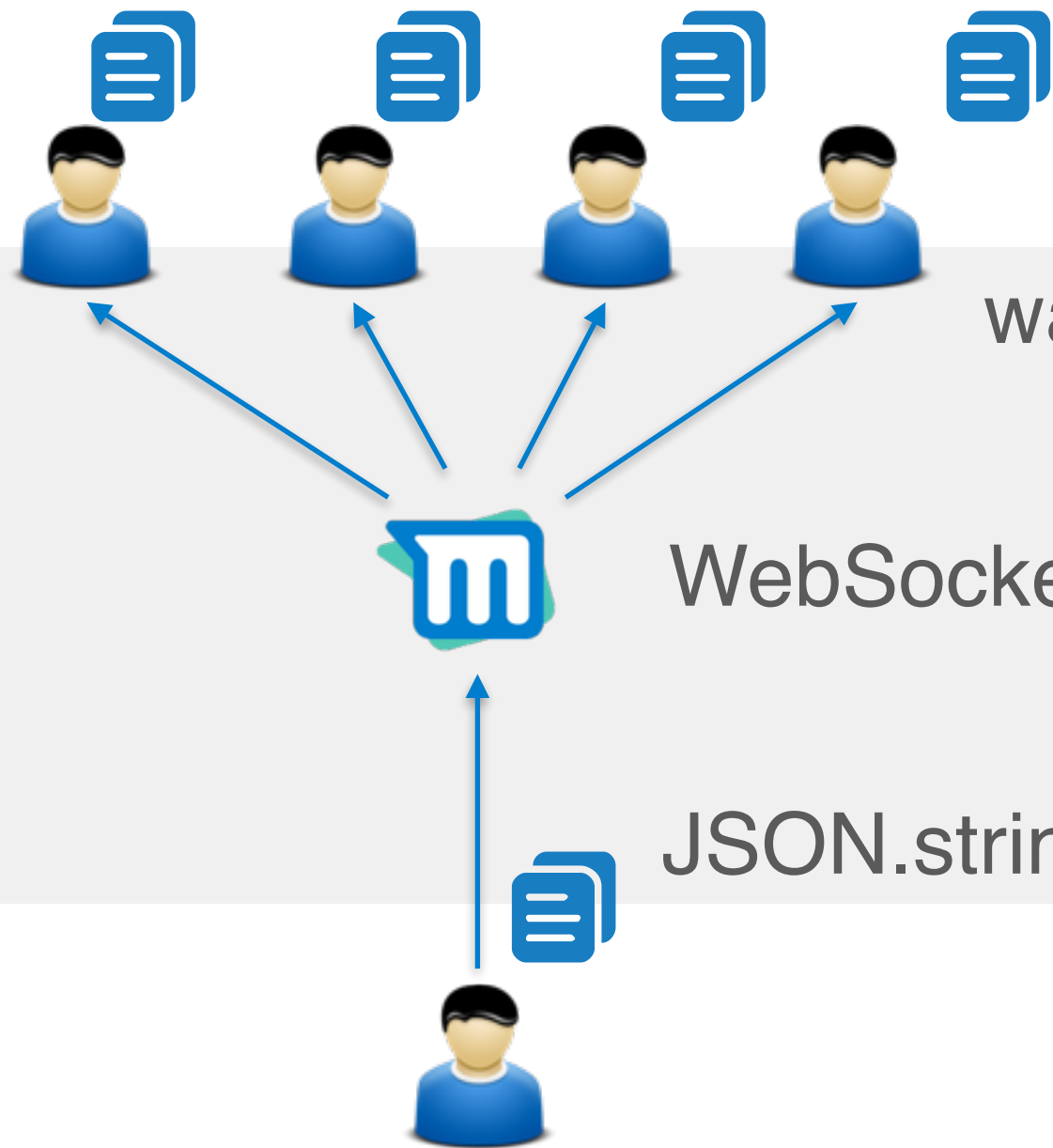


everyone downloads the same content

upload the document to our CDN



## Sync in mashme<sup>tv</sup>

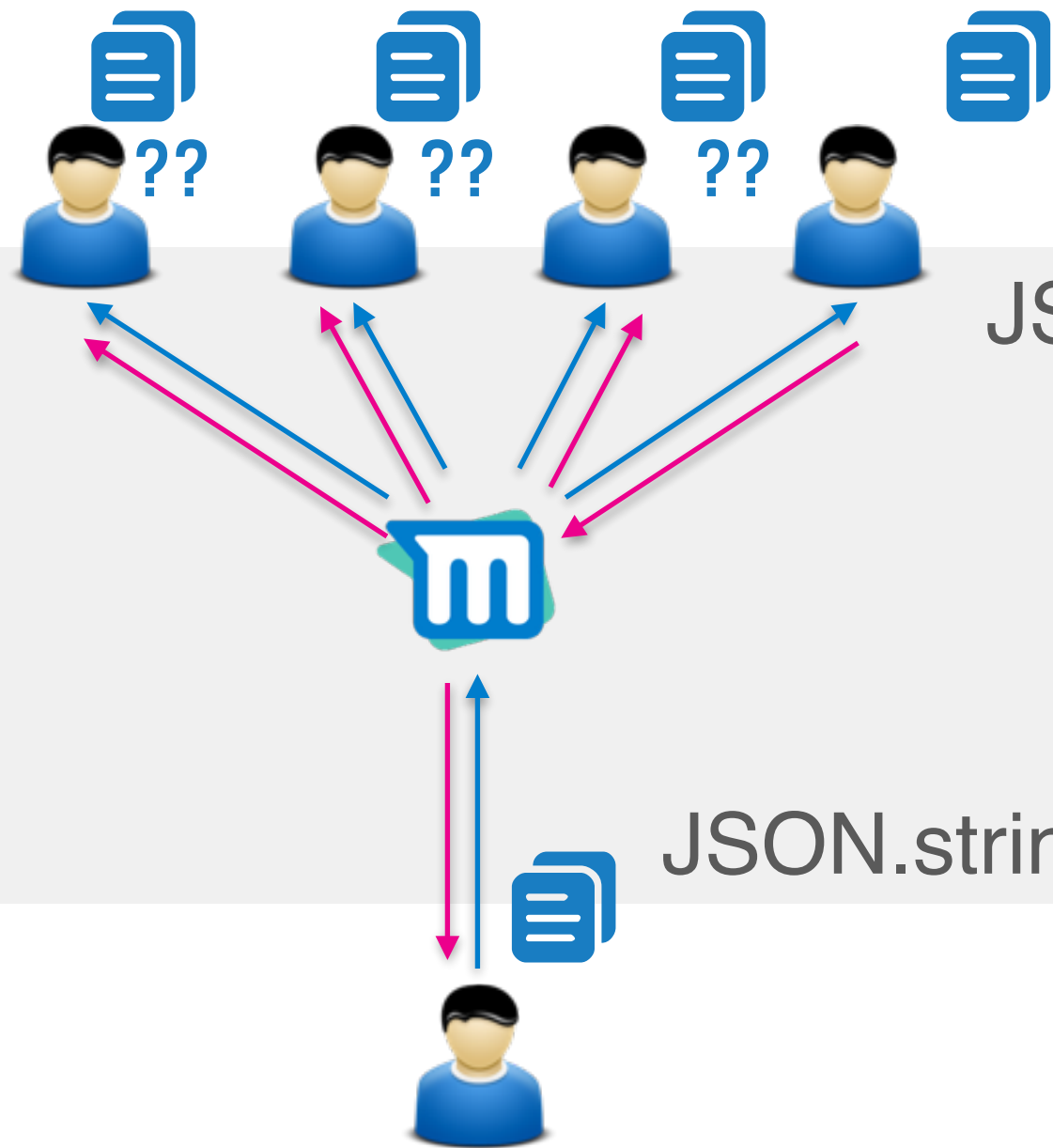


watching slide 3 in 200ms or less

WebSockets and/or WebRTC Data Channel

`JSON.stringify(go to slide 3);`

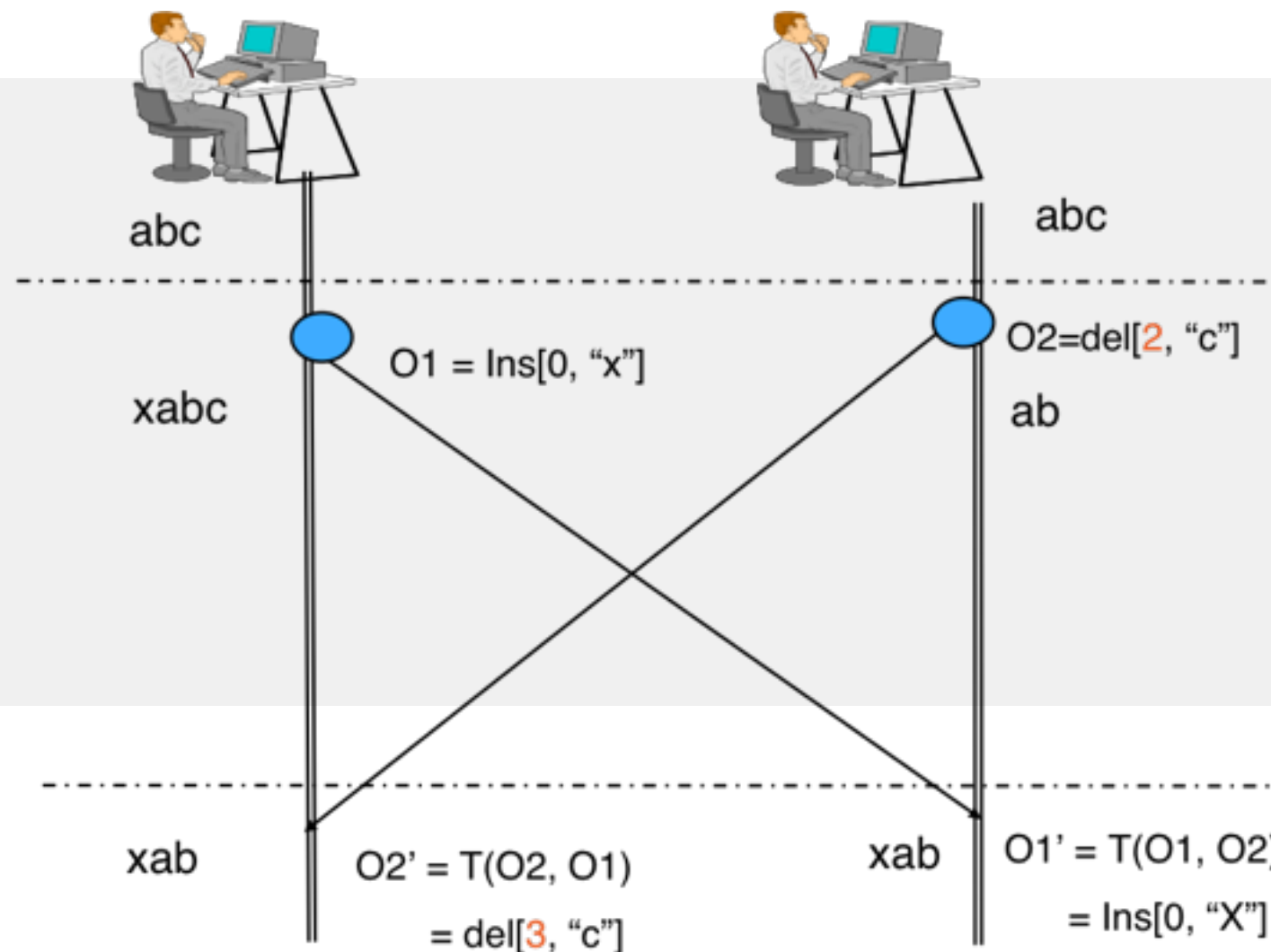
# Collaboration == Collisions



`JSON.stringify(go to slide 4);`

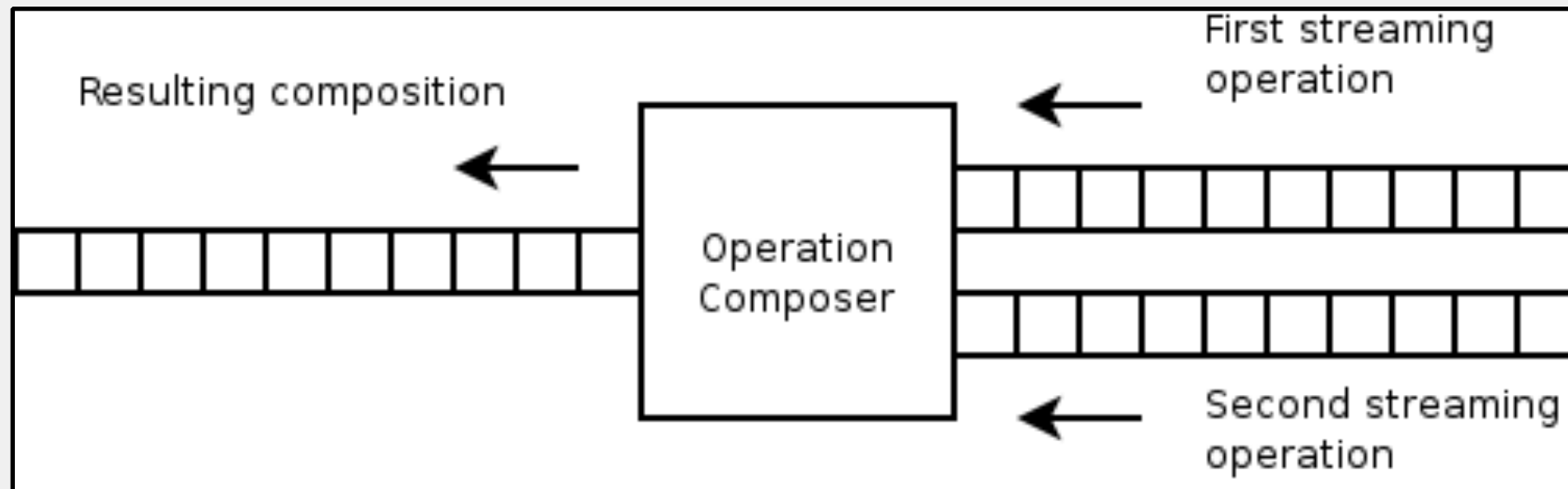
`JSON.stringify(go to slide 3);`

# Operational Transformations





# Google Wave Operational Transformations



# Managing operations in mashme<sup>tv</sup>



youtube\_play  
youtube\_stop  
youtube\_jump  
...



map\_zoom  
map\_pan  
...

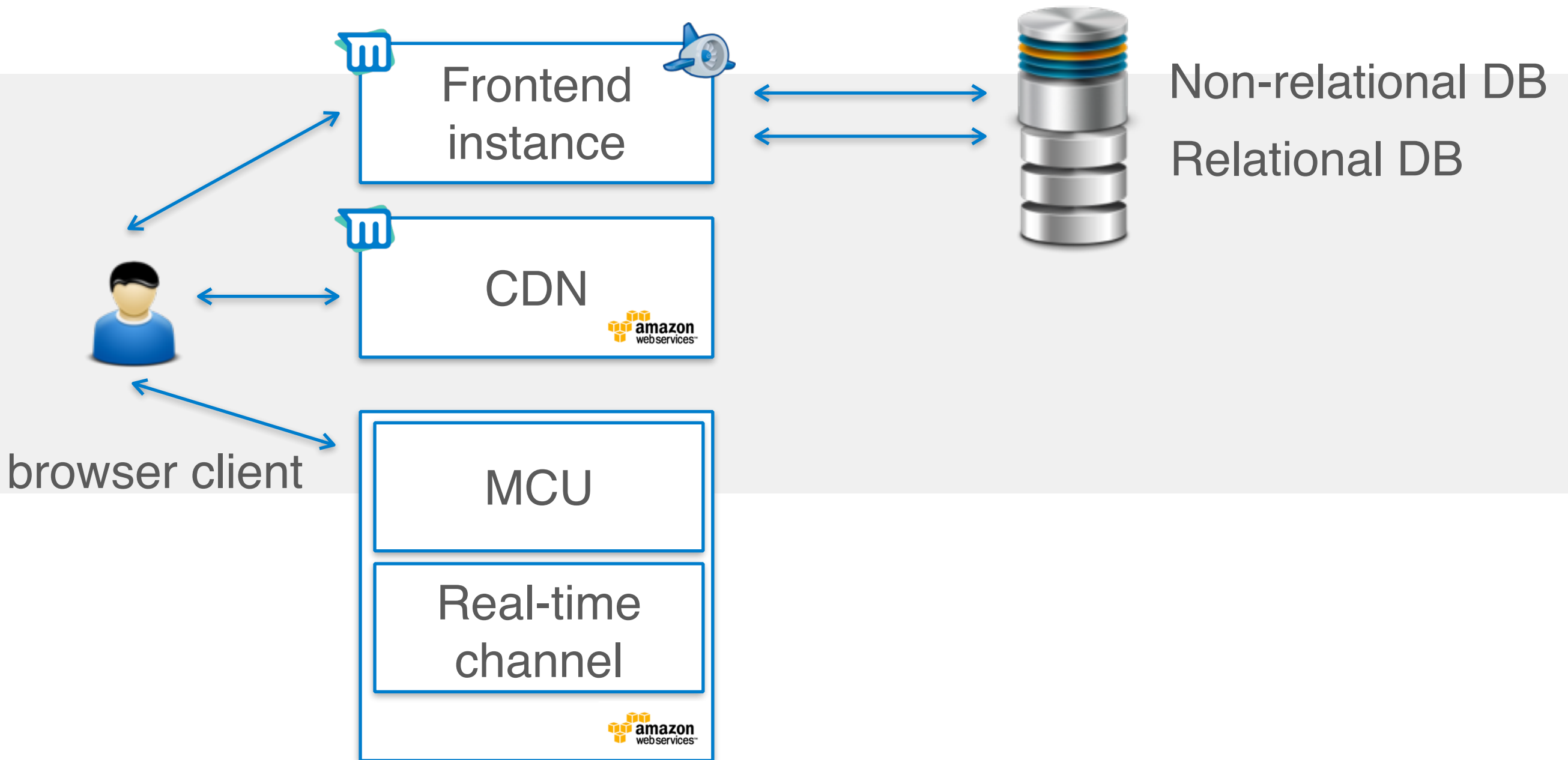
...

**> 100 events**

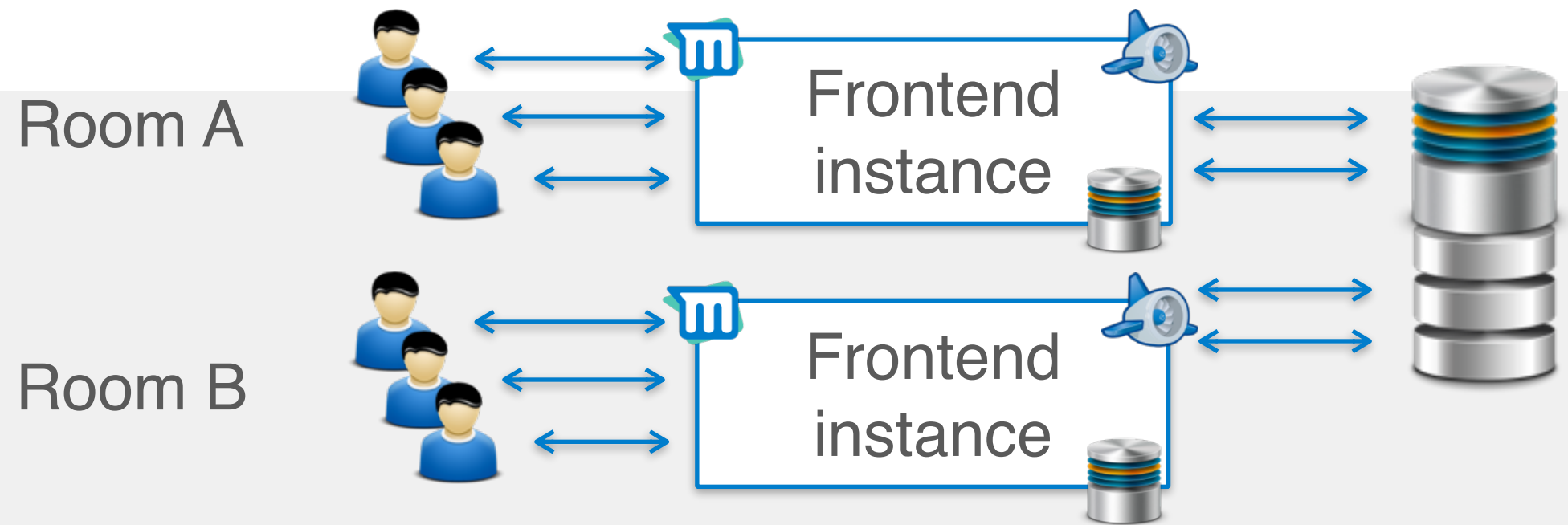
# Architecture



# Architecture for mashme<sup>tv</sup>



# Architecture for mashme<sup>tv</sup>



Relatively small instances to serve a few rooms  
Relatively small MCUs to serve a few rooms  
Memcache and/or REDIS to reduce DB pressure

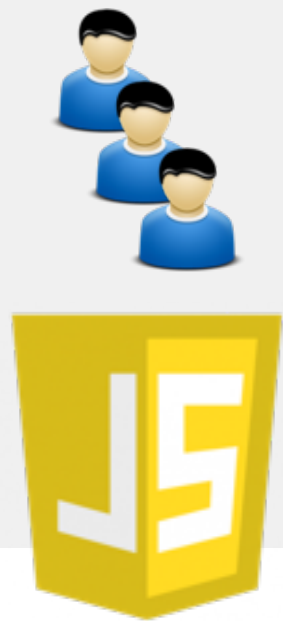


## Why small instances in **mashme<sup>tv</sup>**

- + Allow to cache many DB requests (for example room content, history, ...)
- + If a small instance or MCU fail casualties are minimal (a few rooms)
- + Fast recovery and traffic spikes adaptation
- + No need for complex configuration
- difficult to monitor
- difficult to adapt for very dynamic rooms

# How do we pay the bills at mashme<sup>tv</sup>

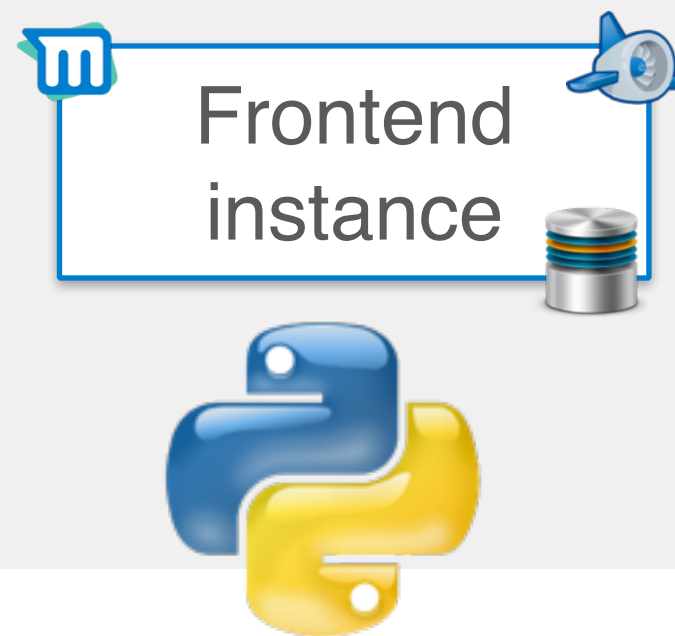
This is a very complex distributed ‘brain’



\$0

Javascript ( 95.000 lines of code)  
CSS3 (29.000 lines of code)  
HTML5 ( 47.000 lines of code)

This is a “silly” router



\$something

Python ( 5000 lines of code)

# How do we pay the bills at **mashme<sup>tv</sup>**



**\$MONEY**

- Most expensive infrastructure
- Knowing your traffic helps A LOT.

# WebRTC itself....



# Back to the past...

installation

proprietary

configuration

compatibility issues

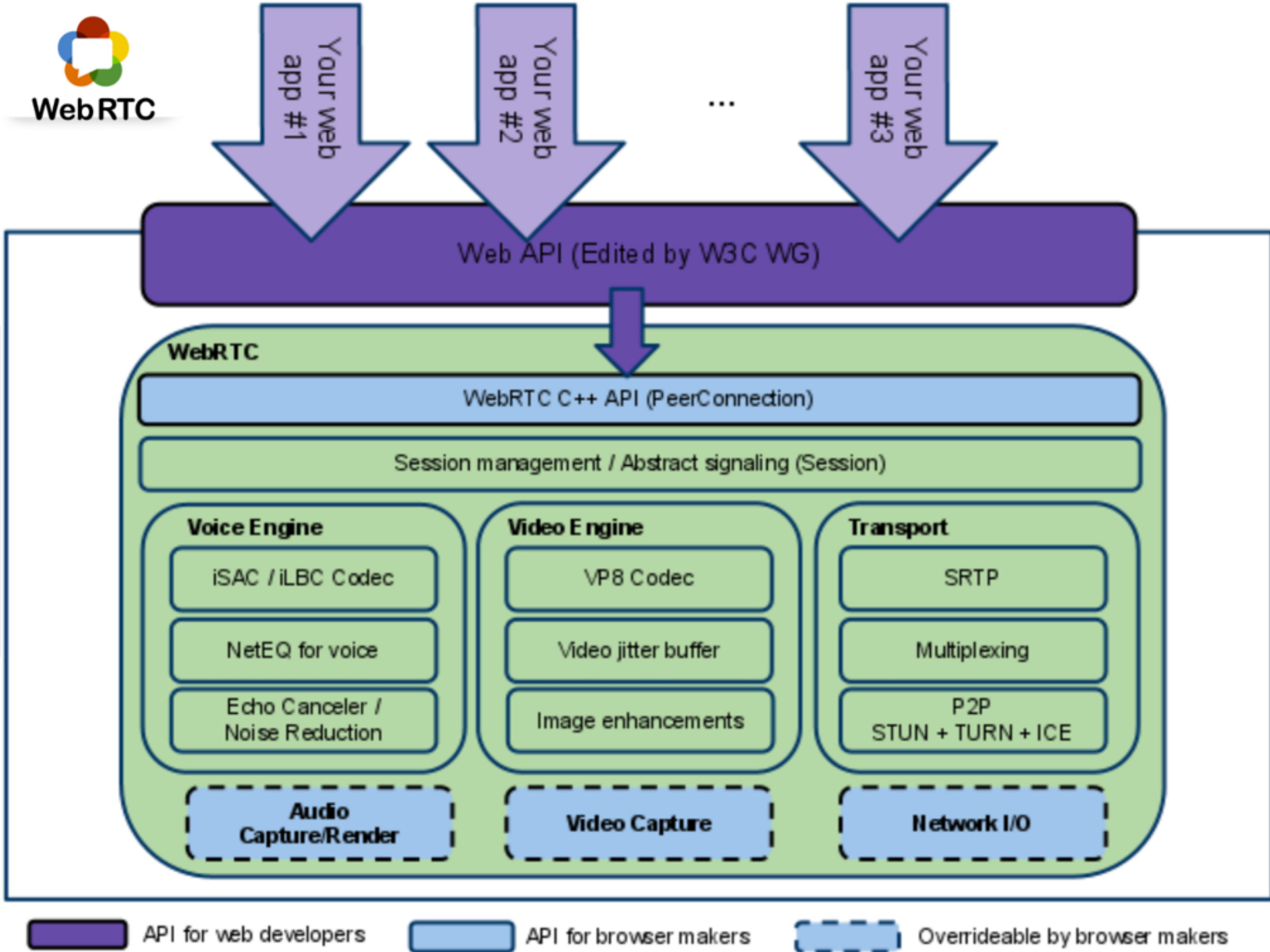


## the past simply doesn't work...

# What is WebRTC?

WebRTC is a **free**, open project that enables web browsers with **Real-Time Communications** (RTC) capabilities via **simple JavaScript APIs**. The WebRTC components have been optimized to best serve this purpose.

[www.webrtc.org](http://www.webrtc.org)



# Who does who in WebRTC?

You develop WebRTC apps

W3C does JS APIs for you

and C++ APIs for browser vendors

Browser vendors implement the standard





# What with IE and Safari?



Skype and lync  
ORTC



Facetime + H264



# Why should I care?

WebRTC allows videoconference without...

installation

configuration

premium codecs

Videoconference market

\$14 billions in 2016

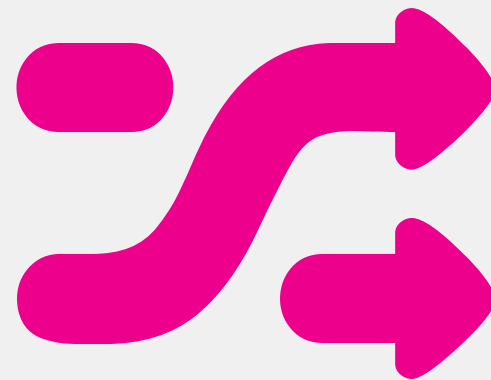
1 billion compatible devices in 2016

Become a more valuable web developer

# WebRTC JS APIs



getUserMedia



RTCPeerConnection



RTCDataChannel



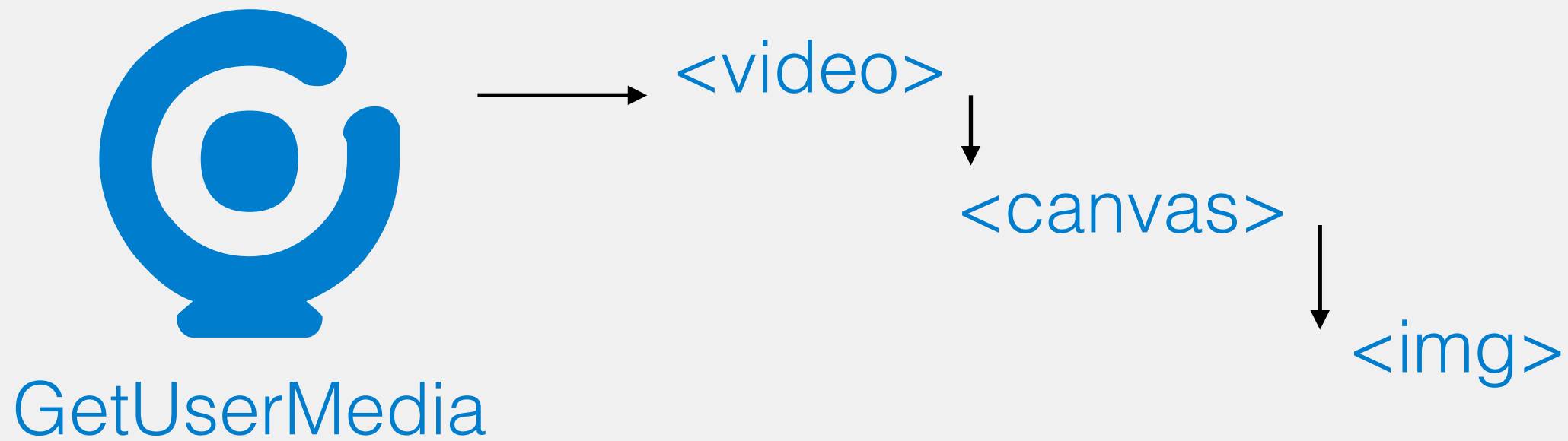
Grant access to devices

GetUserMedia is NOT WebRTC

We also need RCTPeerConnection

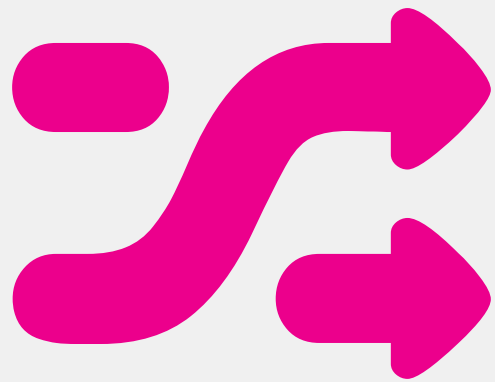
			
	Chrome	Firefox	Opera
Desktop	v23+	v22+	v18+
Mobile	v28+	v24+	v12+

# Get user media

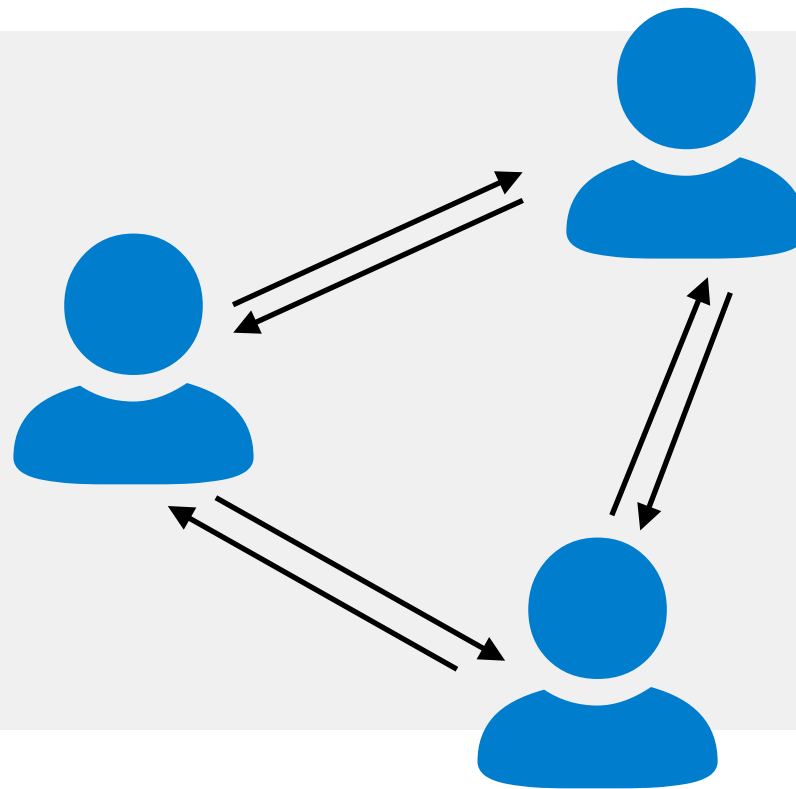




Demo time

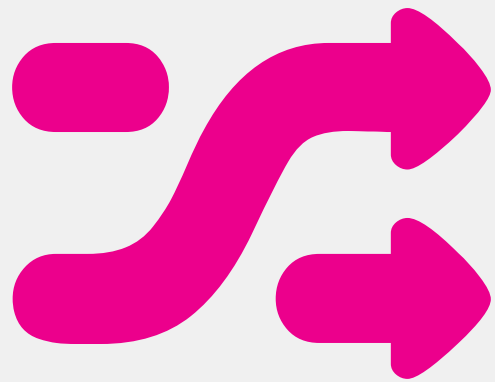


RTCPeerConnection

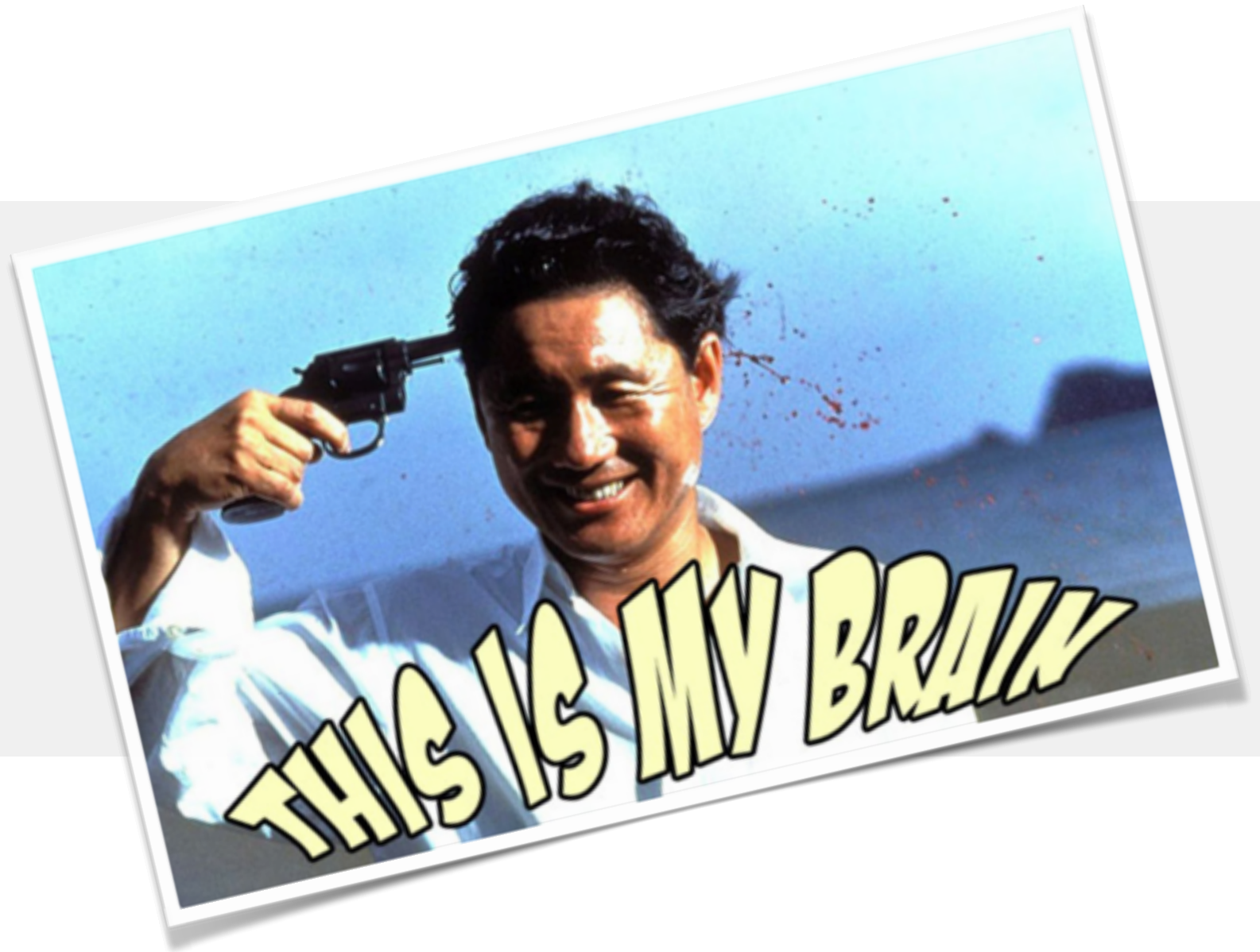


- **ICE**: Interactive Connectivity Establishment
- **STUN**: Session Traversal Utilities for NAT
- **TURN**: Traversal Using Relay around NAT
- **SDP**: Session Description Protocol
- **SCTP**: Stream Control Transport Protocol
- **SRTP**: Secure Real-time Transport Protocol
- **UDP** (User datagram protocol) vs **TCP** (Transmission Control Protocol)

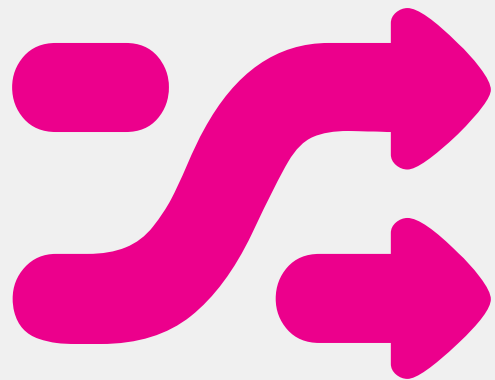




RTCPeerConnection



RTCPeerConnection help us with...



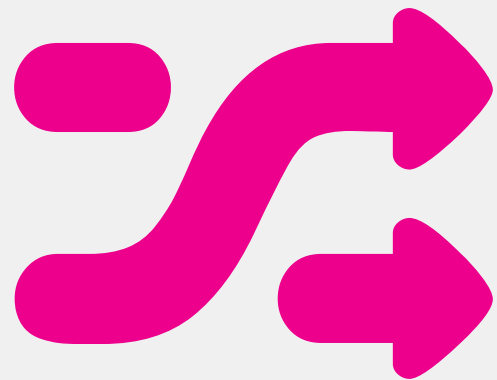
ICE workflow

STUN keep alive

MediaStream management

RTCPeerConnection won't help with...

Signaling channel

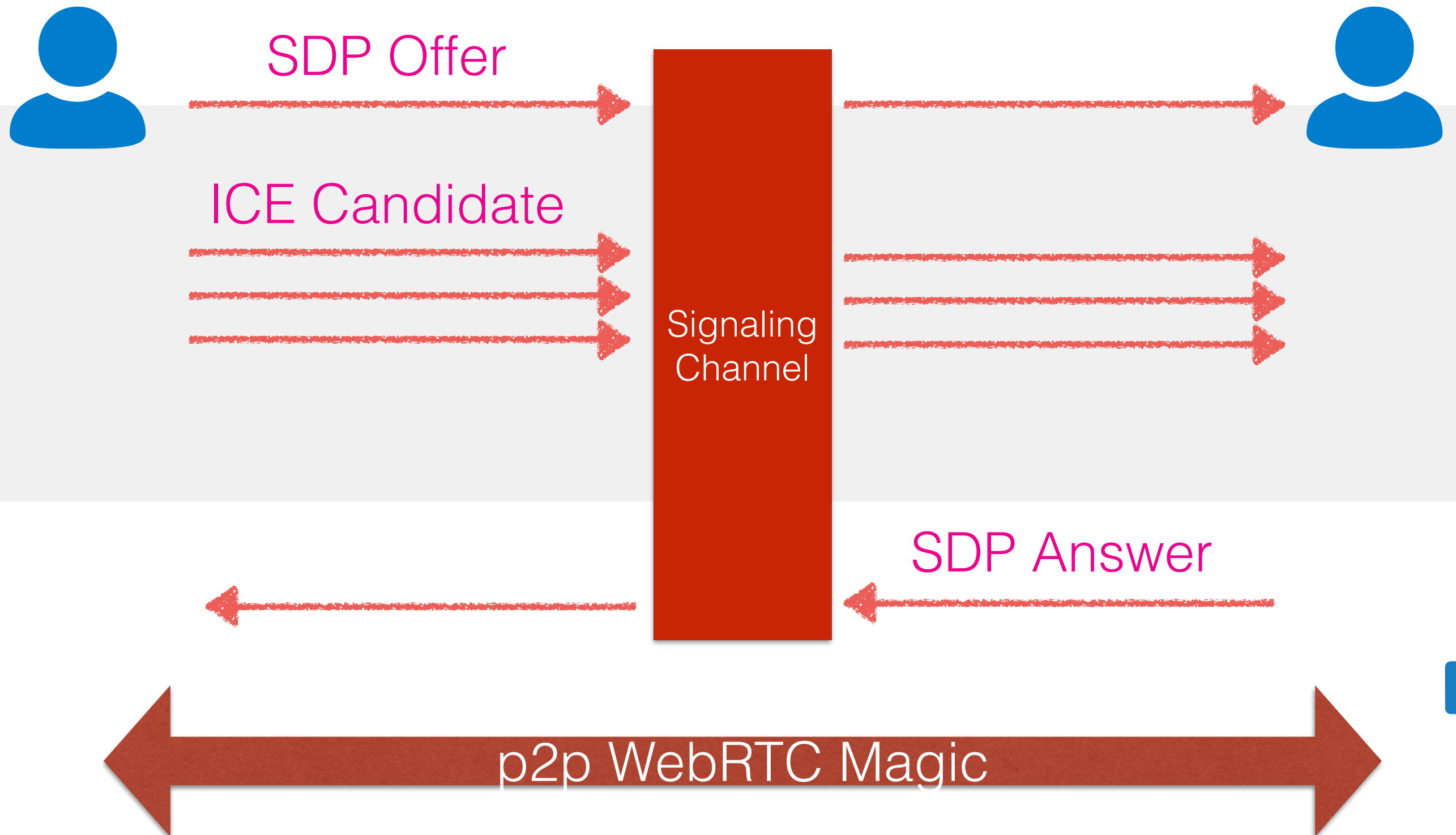


- SIP: Session initiation protocol
- JINGLE
- WebSockets
- Noticias en paloma mensajera

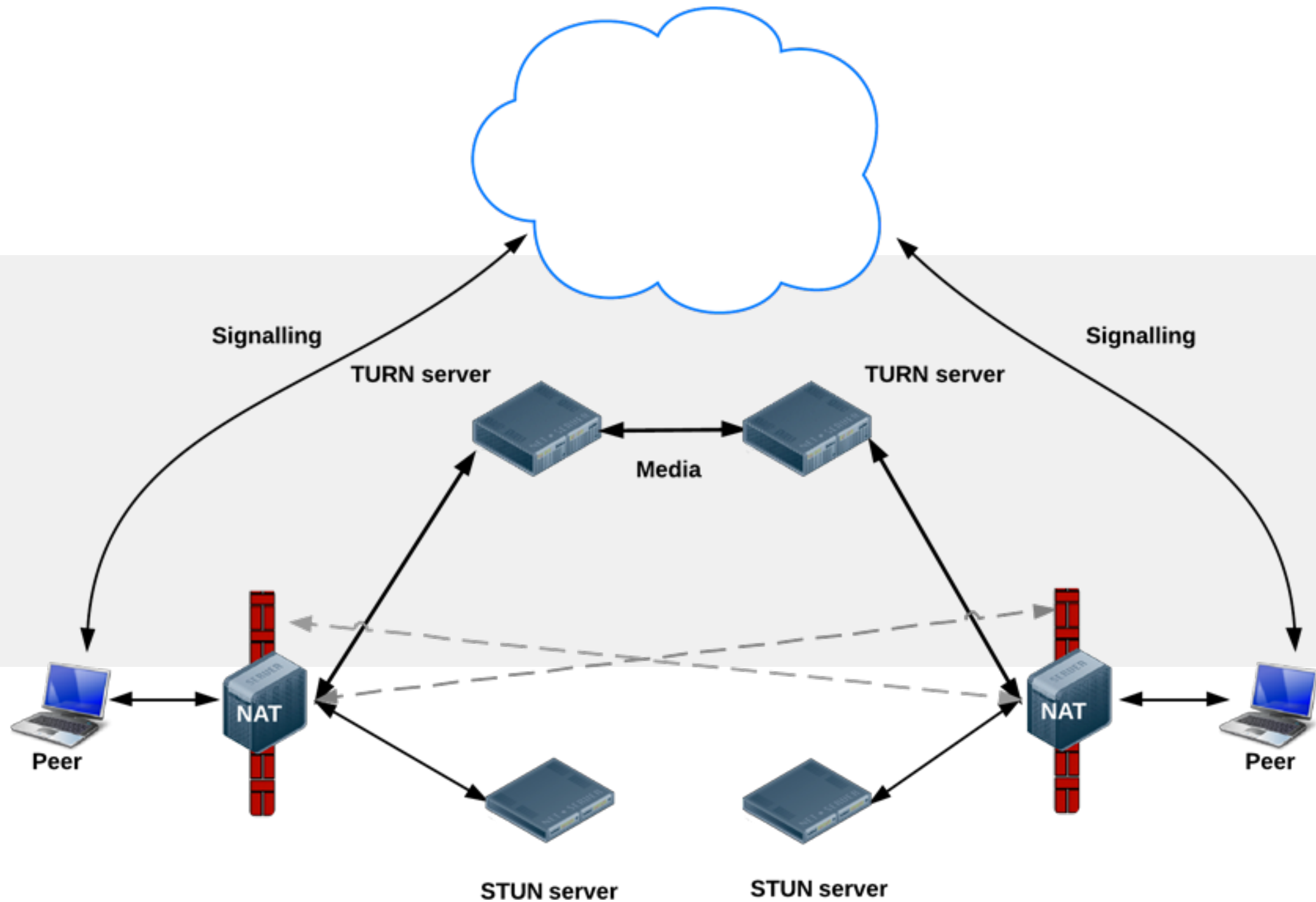
In my example...



# Signaling



# What if we don't see each other...?





Demo time



RTCDataChannel

P2P binary data

Videogames

P2P CDN

WebTorrent

Remote control

File exchange

# You should know....



**mashme**tv





# Questions?



# Thank you

-  [contact@mashme.tv](mailto:contact@mashme.tv)
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-  [@mashmetv](https://twitter.com/mashmetv)
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