

# **WebRTC extravaganza - Standard browser-to-browser instant communication**

**Web Technologies for Applications**

Jun 2023



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WebRTC Paris Meetup | DevFest Perros-Guirec

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# WebRTC - a W3C Standard

2021 - WebRTC becomes a standard  
(per W3C and IETF (Internet Engineering Task Force))



# W3C - a Community-led Standardization Organization

- Any individual can participate to working groups
- Anyone can be a W3C member (membership fees apply :))
  - Browser Editors
  - End-users Solution providers
- Any member can propose for a new standard
- A standard will succeed only if it is elaborated collectively
- The working group leaders are making sure the consensus is going forward and reached before publication of a news standard.

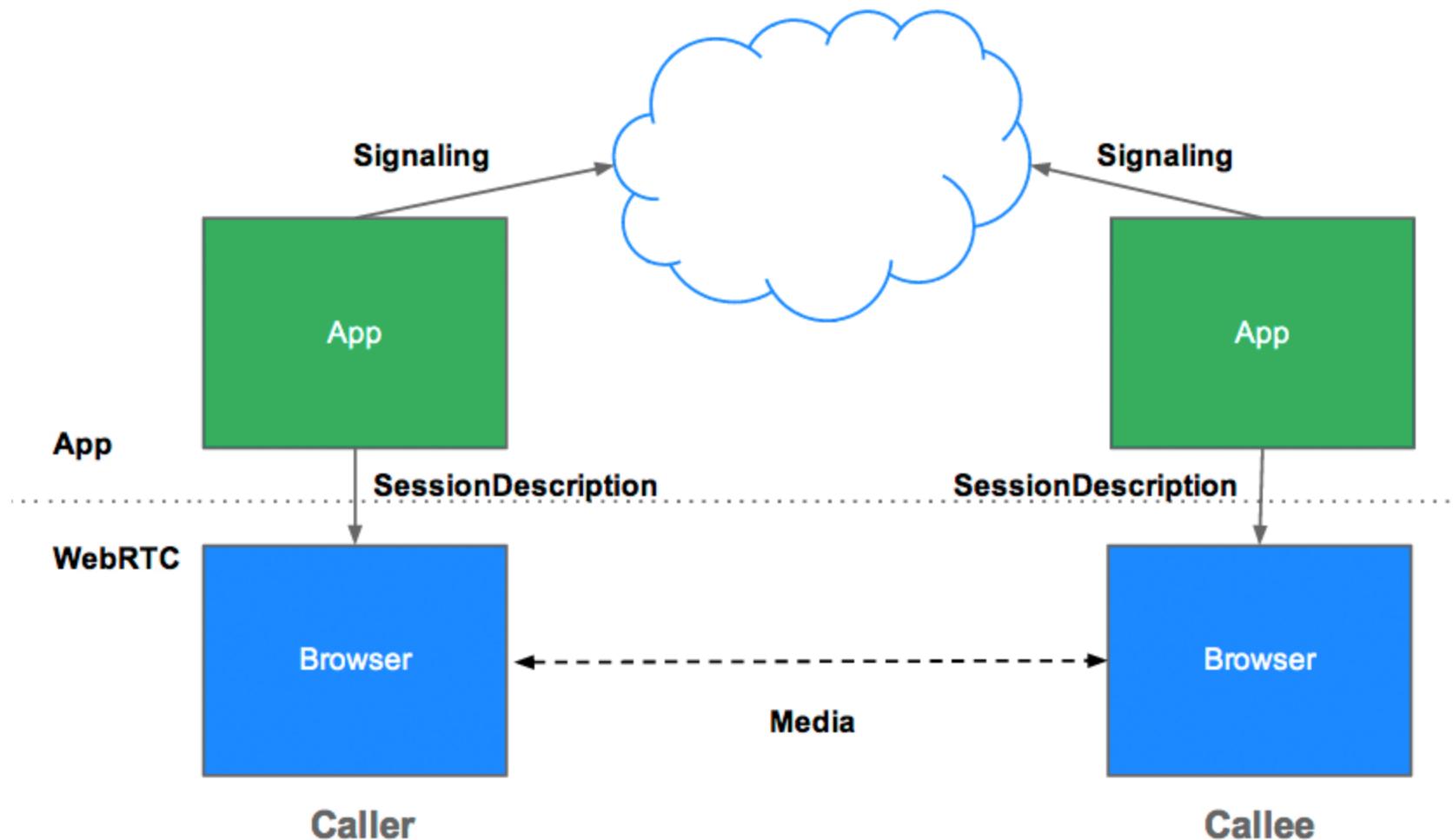
**Yes but what is WebRTC?**



# Yes but what is WebRTC?

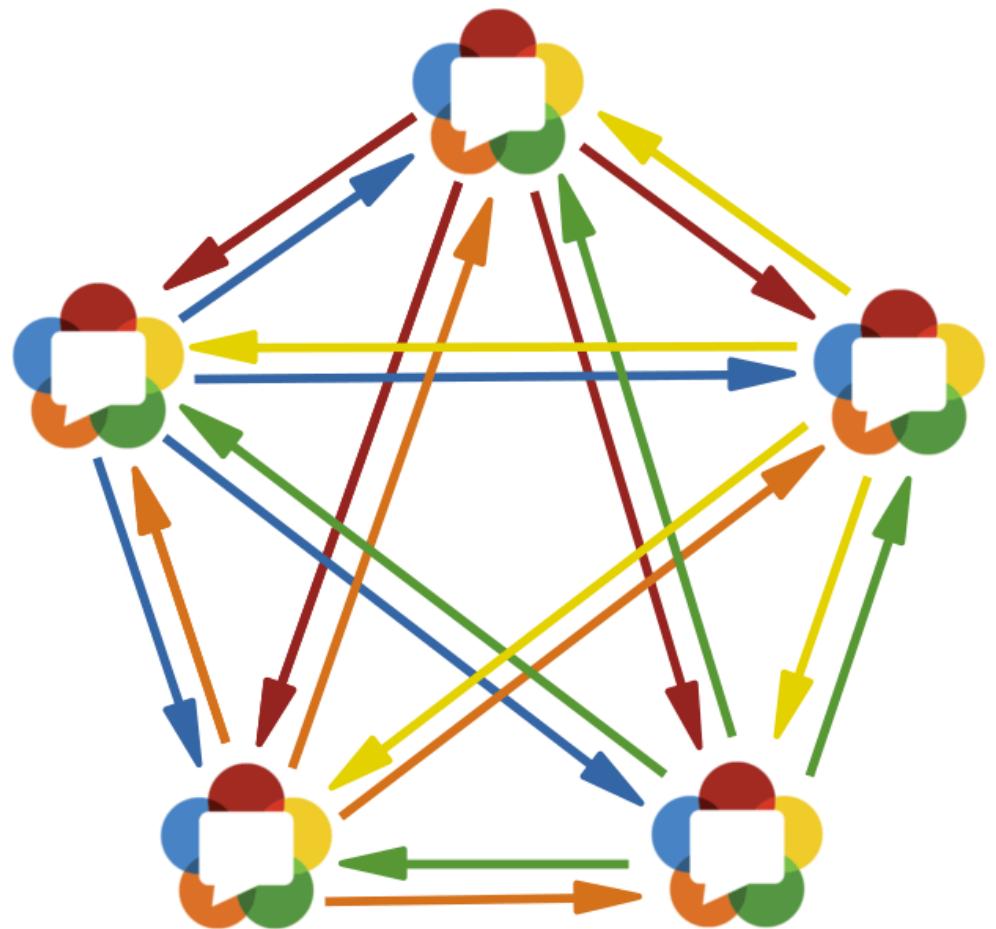
- **P2P**: A protocol to set up a P2P connection across some peers over the Internet
- **Real-time**: A way of exchanging video and audio and data streams (latency < 500ms)
- **Universal**: Implemented in most browsers (desktop and mobile) since 2013 (and any app that implements the W3C standard)
- **Secured**: Streams are sent through encrypted network ensuring integrity and confidentiality (Secured RTP, AES, HMAC-SHA1)
- **For developers**: Javascript APIs and HTML DOM objects

# How does it work?



*Scheme by Genesys*

# How does it work?



*Scheme by Fatih Erikci*

# How does it work?



*Scheme by Fatih Erikci*

# Limitations

- Scalability  
(look toward HLS or MPEG-DASH protocols for broadcasting use cases)
- Stream Integrity (UDP)  
(comparing to WebSocket for example)

# Instant Video communication

- Chroma key and background replacement
- Real-time image/audio processing  
(ex: Google Meet)

Google Meet | Team meeting

Niesha Madison

Aiden Taylor

Owen Johnson

Tarek Ayad

Nina Duffy

Owen Johnson

Parker Yang

You

Google Meet | Team meeting

Microphone

Video

Share

Hand

Smile

Upload

More

Call

Info

Participants

Chat

File

its just really not very obvious/clear

- 5 Cat Facts
- Weekend Plans
- Last of Us Recap
- # announcements
- # meetup
- MORE**
  - # movies-tv
  - # home-improvement
  - #<sup>A</sup> memes
  - # food

## Audio chat rooms

(ex: Discord)

gaming

- shawn LIVE
- jesu
- muffins
- fiona

danno Today at 9:18 AM  
iconlab is closed for the holiday

moongirl Today at 9:18 AM  
@Clyde could you send a gif to get the server hyped??

moongirl could you send a gif to get the server hyped??

Clyde ✓ AI Today at 9:18 AM  
You got it! Here you go:

Pen tell me more about lorem ipsum

Clyde ✓ AI Today at 9:18AM  
Sure thing! Did you know:

1. A group of cats is called a "clowder".
2. Cats are able to make over 100 different sounds.
3. The average cat spends around two-thirds of the day sleeping.
4. Most cats are lactose intolerant and can't actually digest milk properly.
5. Cats have powerful night vision, which is why they are able to see in very low light conditions.

Pod Today at 9:18 AM  
what are the best cats to have as pets?

Pod what are the best cats to have as pets?

Clyde ✓ AI Today at 9:18AM  
that's a great question! There are many breeds of cats that make great pets. Some popular ones are:

- Persian cats: Known for their long, fluffy fur and sweet personalities, Persians are a great choice for someone wanting an affectionate lap cat.
- Siamese cats: Siamese cats are known for their striking blue eyes and vocal personalities. They are often very social and like to be near their humans.
- Maine Coon cats: These cats are large and majestic. They have thick, fluffy fur and make

5 Cat Facts 3 Messages >

that's a great question! There are many breeds of cats that ma ... 3m ago

5,809

Total calls

3,786

Total inbound calls

00:02

- Stats
- Overview
- Analytics+
- Monitoring
- Activity Feed
- Settings
- Integrations and API
- Signaling achieved through classic SIP protocol (ex: Aircall)
- Help
- Profile name

Total calls evolution

700  
600  
500  
400  
300  
200  
100  
0

● Inbound calls ● Outbound calls

**Leo Garcia**

+1 415-732-7547

[View details](#)

- Mute
- Hold
- Keypad
- Start rec
- Notes
- Tags
- Assign



Add or call



Transfer

# Remote Assistance

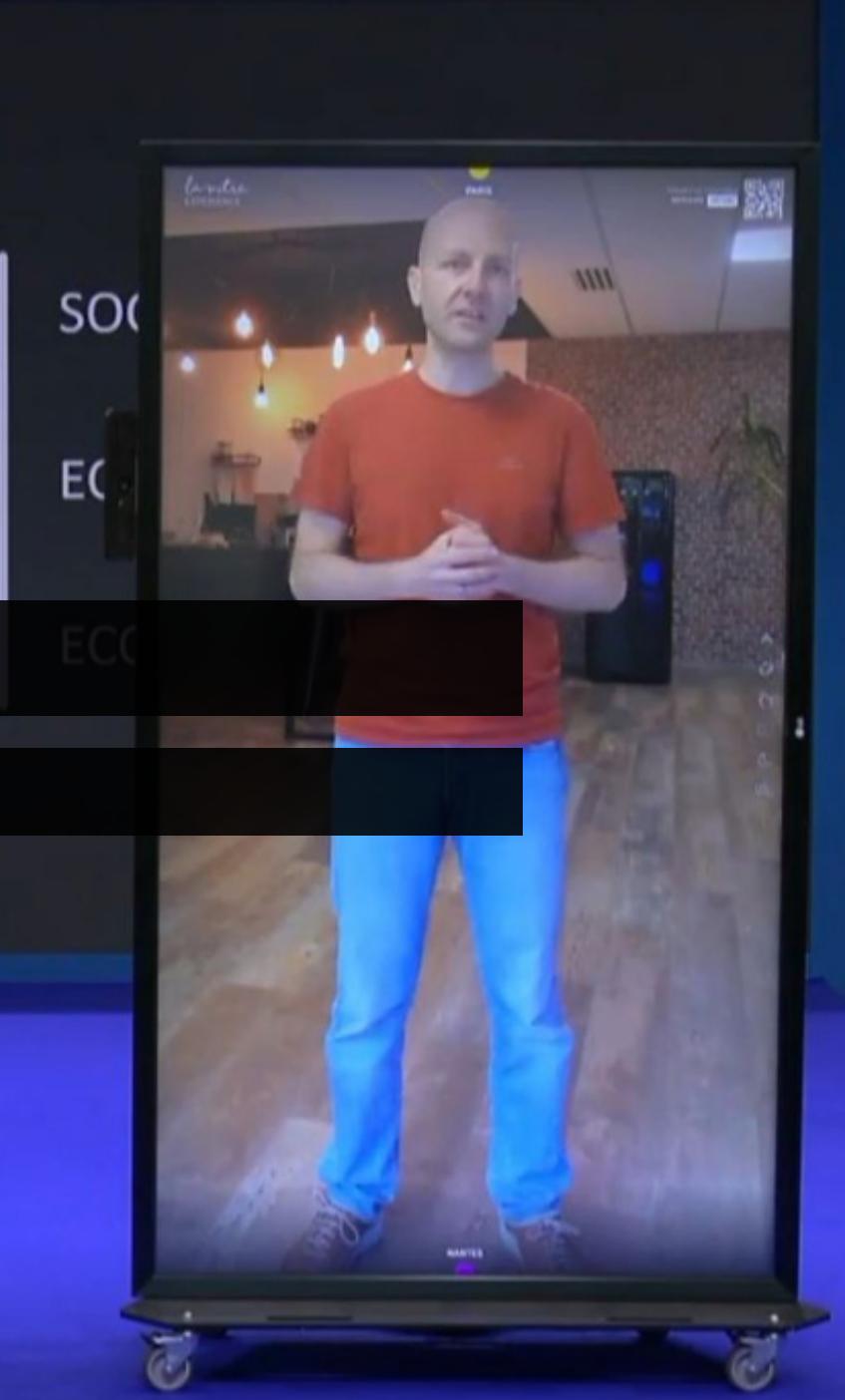
(ex: Apizee)





## Remote presence

(ex: LaVitre)



A woman with dark hair is seen from behind, facing a large screen. On the screen, a man wearing glasses and a blue t-shirt with "The KINGDOME" logo is smiling. They appear to be engaged in a video call. The setting is a modern room with a wooden desk, a laptop displaying a document, a notebook, and some small electronic devices. A shelf in the background holds various decorative items like vases and a small potted plant.

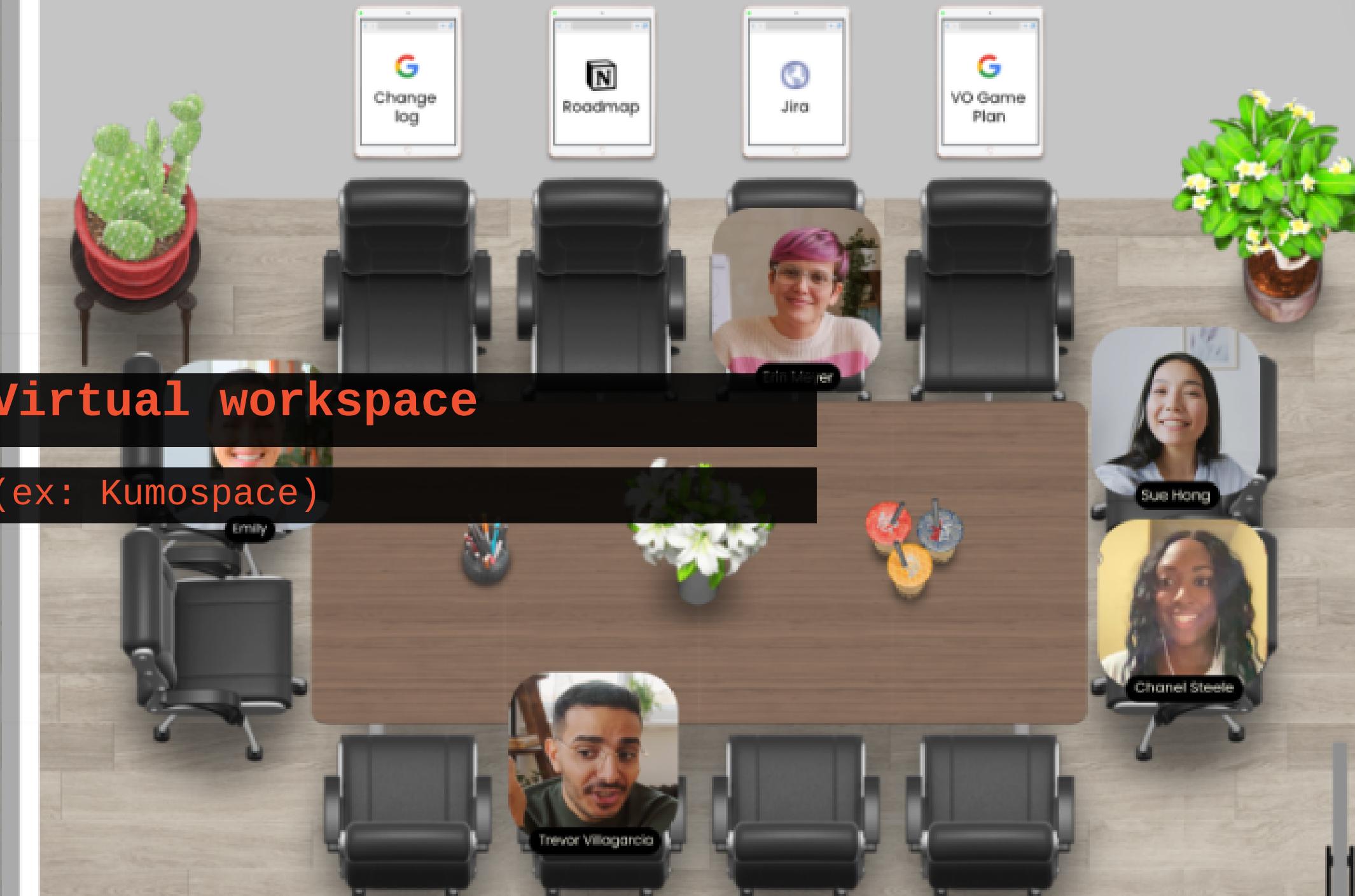
**Remote presence**

(ex: Google Starline)



## Virtual events

(ex: Workadventure)



# TUNADESK

Total Privacy for Remote Control

<ws://localhost:5080/TunaDesk/websocket>

Remote Control

testsession

( ex:TunaDesk )

Session started

Host ID: 428430

Controller List(1):

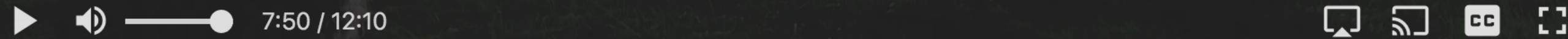
Controller: vmJv

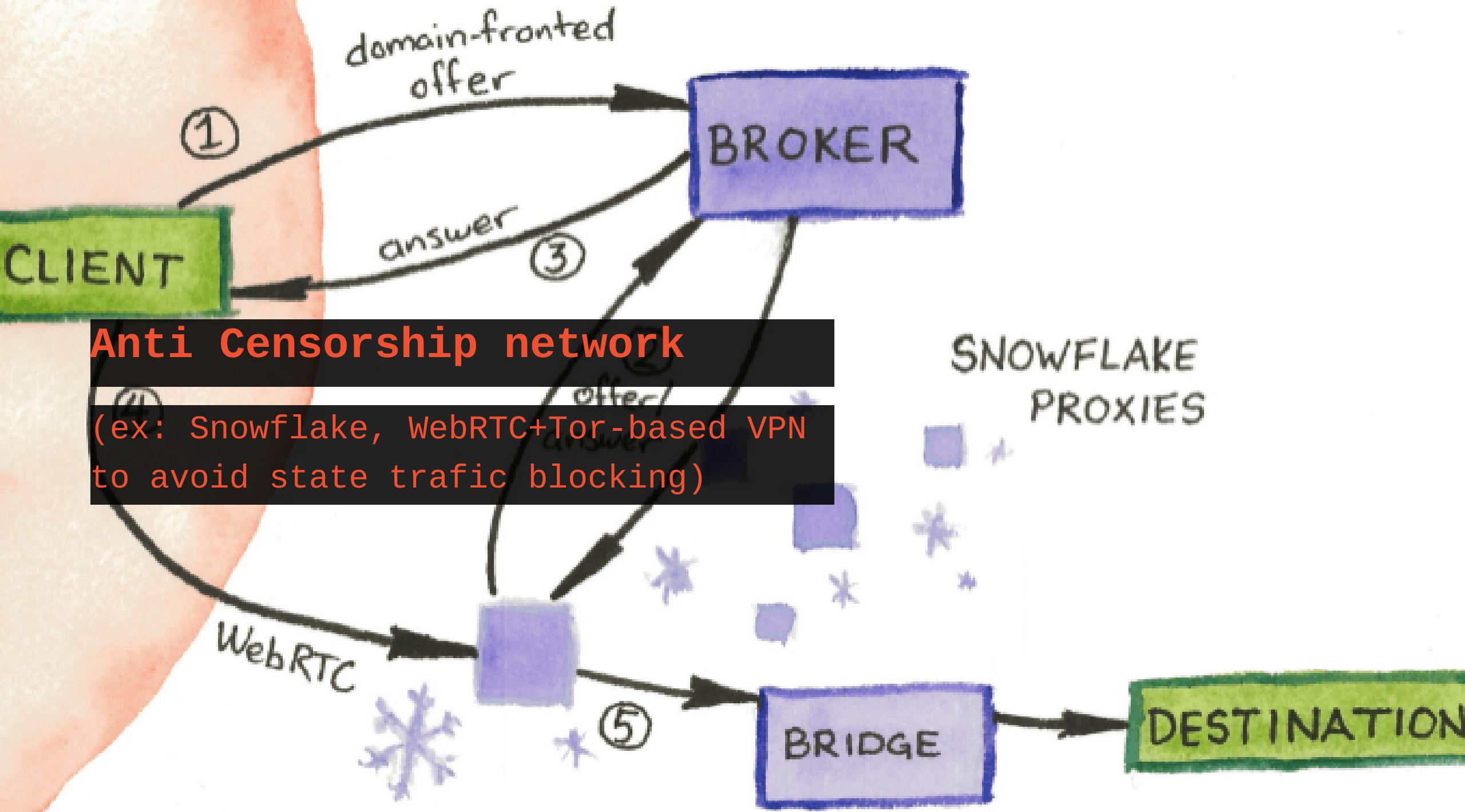


Cosmos Laundromat - First Cycle (1080p).mp4

## File streaming

(ex: WebTorrent.io, PeerTube)





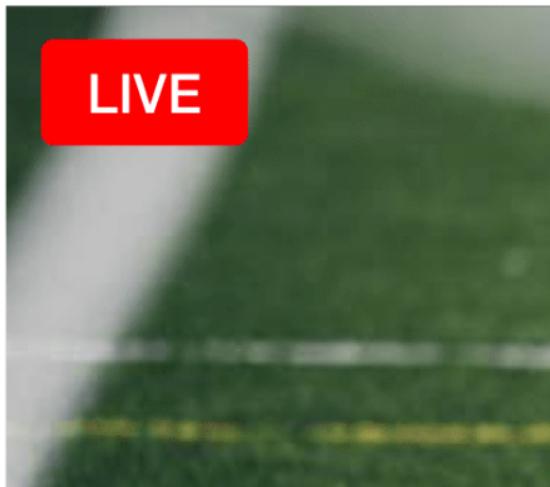
## Auctions

(ex:

<https://github.com/dedalusmax/live-auction>)

A close-up photograph of a dark wood gavel with a brass band around its handle. The head of the gavel rests on a block of light-colored wood. The word "AUCTION" is carved into the wood in large, capital letters. The background is a blurred wooden surface.

A U C T I O N



53.000

Submit Answer



Will he score this penalty?

## Gambling and Betting

Yes

No

TIME TO PLACE YOUR BET: 0:36



Jersey  
€ 8,00 € 10,00

Size: Select an option

Color: Select an option

Add to cart

PaulvB: Seeing how strong the competitor is during the last phase of the game makes me doubt if we will win.

FrankB: We will win this game easily.

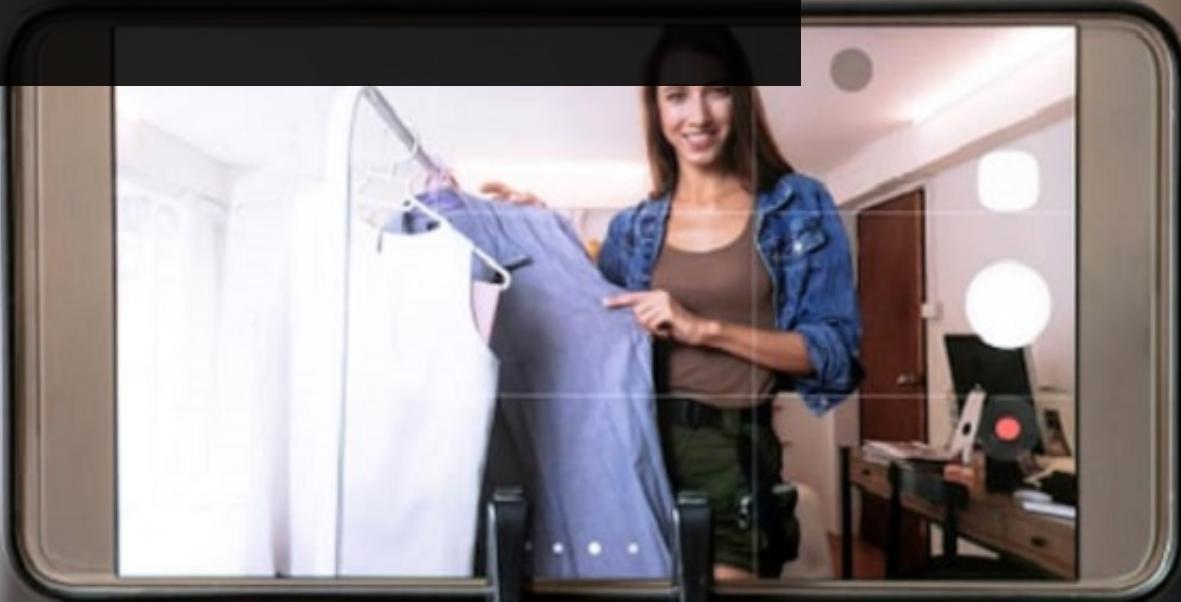
Jerome75: Go go go! 🎉🎉

Bradley D7: This is much better than last match

Charlotte: I think I am going to lose some money here 😅.

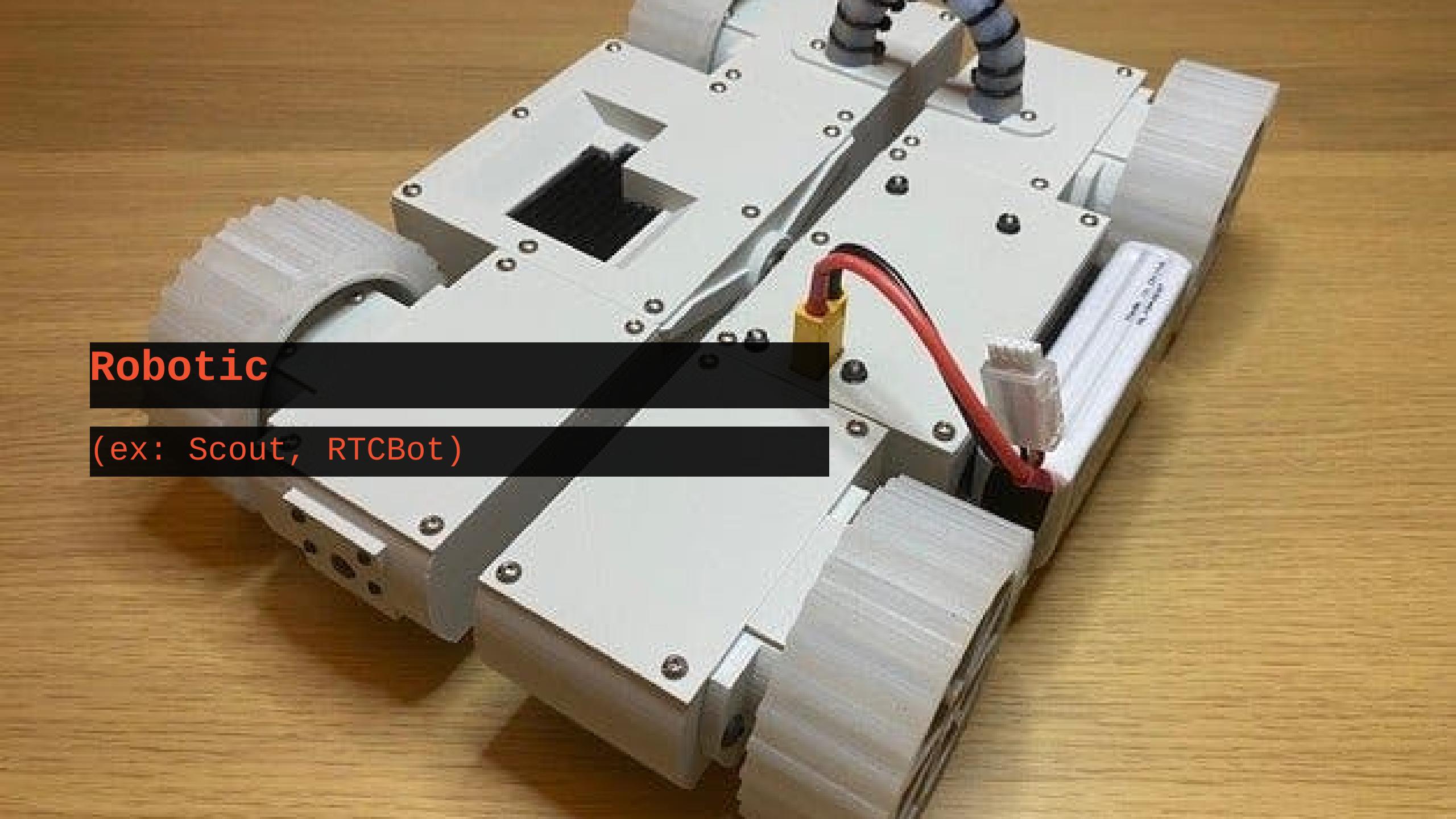
Adam: Never expected this to happen

## Live Commerce and Shoppable Video





Online Education



**Robotic**

(ex: Scout, RTCBot)



## Telehealth and Remote Monitoring



A photograph showing a car accident scene in a wooded area. A man in a white shirt is leaning over the front of a silver car, looking concerned. Two firefighters in dark uniforms and red helmets are kneeling on the ground, attending to an injured person who is lying on a stretcher. The firefighter on the right is holding a communication device. The background is filled with dense green trees.

## Emergency Response and Communication

A woman with long dark hair, wearing a blue tank top and grey leggings, is performing a plank exercise on a grey mat in a bright living room. She is looking towards a laptop screen which is open on the floor in front of her. The room has a white sofa, a small shelf with decorative items, and a potted plant in the background.

**Connected Fitness and Health**

YouTube

Search

Top chat ▾

A AlanB I've heard it doesn't work as well (latency) for jazz musicians. True?

Dmitrii Sutiagin I was really amazed by when there was a long pause and then both musicians started in perfect sync - I was like... HOW - do they have metronome in their ears?... 😊 even if so

N Noro Laz @Bob Evola I agree. I am curious how they made it work. Would love to know the setups etc.

Dmitrii Sutiagin @AlanB I think genre doesn't matter, as long as you are geographically close enough should work fine, say within 1000 miles or less from each other, and all use wired reliable connection

Mark & Vicki Nice!

Malcolm Heeley I was impressed that the piano seemed to come in based on the flautist's audible intake of breath - think we'll use that technique!

Dmitrii Sutiagin probably 1000 miles is a bit too much, probably under 250 works best

Stephanie Griffin Say something...

0/200

HIDE CHAT

Virtual concert  
(ex: JamKazam)

powered by jamkazam

zam Classical Music Festival

## Where to start?

1. Have a glance at the architecture (20min by Tashi):  
<https://www.youtube.com/watch?v=5ci91dfKCyc>
2. Try plain WebRTC: <https://webrtc.org/> or  
[https://developer.mozilla.org/en-US/docs/Web/API/WebRTC\\_API](https://developer.mozilla.org/en-US/docs/Web/API/WebRTC_API)  
or <https://web.dev/webrtc-basics/>
3. Find it too hard and look for shortcuts: some real-time video service platforms offers out-of-the-box WebRTC SDK to speed up and stabilise your app: <https://bfy.tw/UBcM>

## These slides

On my github account:

[https://rvailleux.github.io/presentations/Web\\_technologies\\_for\\_a\\_pplication\\_2023/](https://rvailleux.github.io/presentations/Web_technologies_for_a_pplication_2023/)

Thx



@rvailleurx

# Worthy advertisement



