P10K

GETTING 10000 PARTICIPANTS INTO A JITSI MEETING

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Set of Open Source projects

Easily deploy scalable and secure video conferencing solutions.

APIs and mobile SDKs

Integrate Jitsi into existing products to add video conferencing capabilities.

Community

Open Source enthusiasts from all around the world contribute to Jitsi.

Reaching new heights

How we added support for 500 participants in Jitsi Meet

Saúl Ibarra Corretgé (saghul) — CommCon 2021

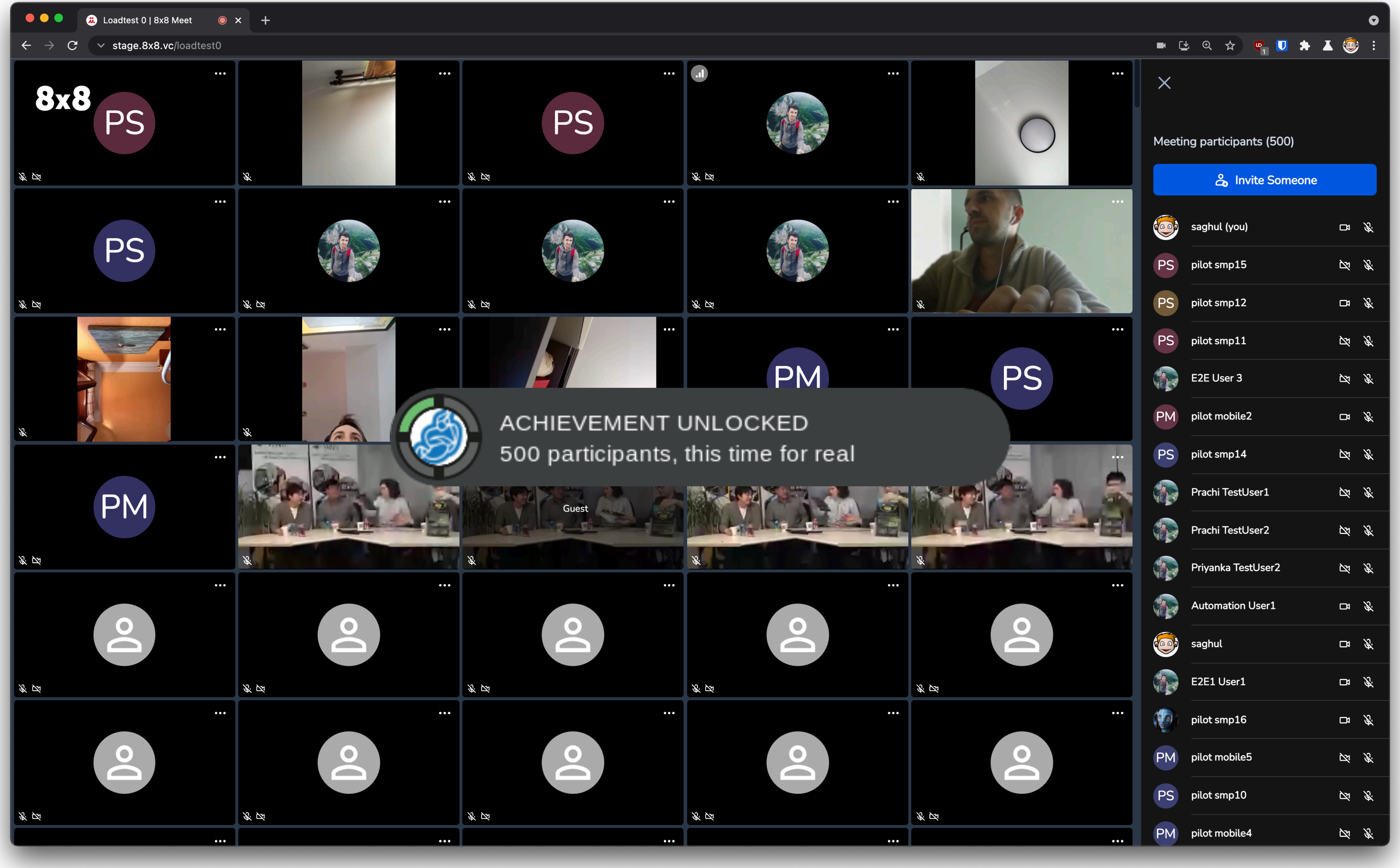
jitsi

Ibarra Corretgé (saghul) | FOSDEM 2

HOW TO SCALE UP?

TLDR: BE SMART AND “CHEAT”

- Pagination: not all participants are shown at once
- Also paginate in the backend
- Reduce re-renders in React code
- Reduce signalling



ACHIEVEMENT UNLOCKED

500 participants, this time for real

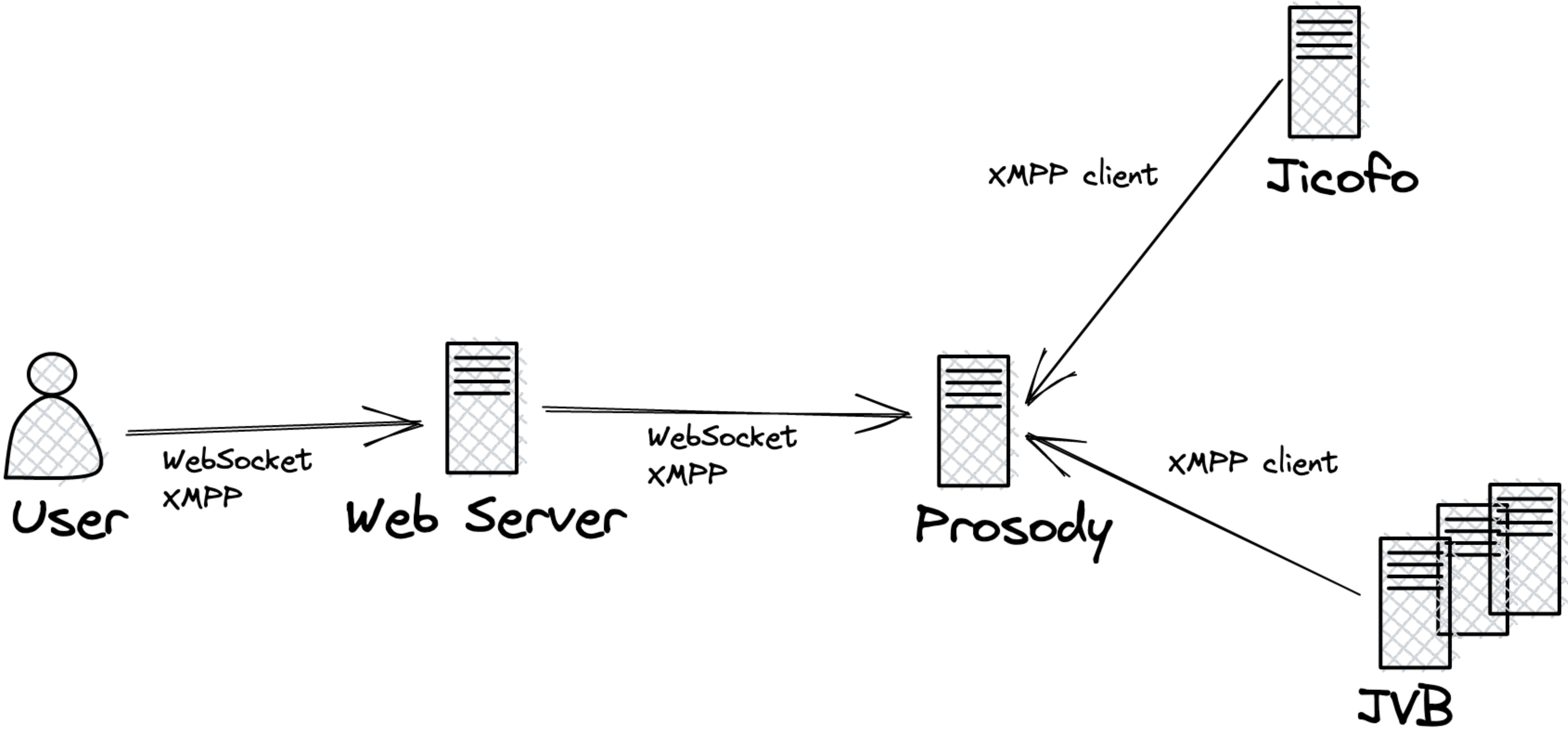
Meeting participants (500)

- saghul (you)
- pilot smp15
- pilot smp12
- pilot smp11
- E2E User 3
- pilot mobile2
- pilot smp14
- Prachi TestUser1
- Prachi TestUser2
- Priyanka TestUser2
- Automation User1
- saghul
- E2E1 User1
- pilot smp16
- pilot mobile5
- pilot smp10
- pilot mobile4

ARCHITECTURE

QUICK RECAP

- **XMPP is the core signalling protocol**
- **Participants join an XMPP MUC**
- **Jicofo, the focus, will allocate channels in an available bridge (JVB) and invite participants using Jingle**

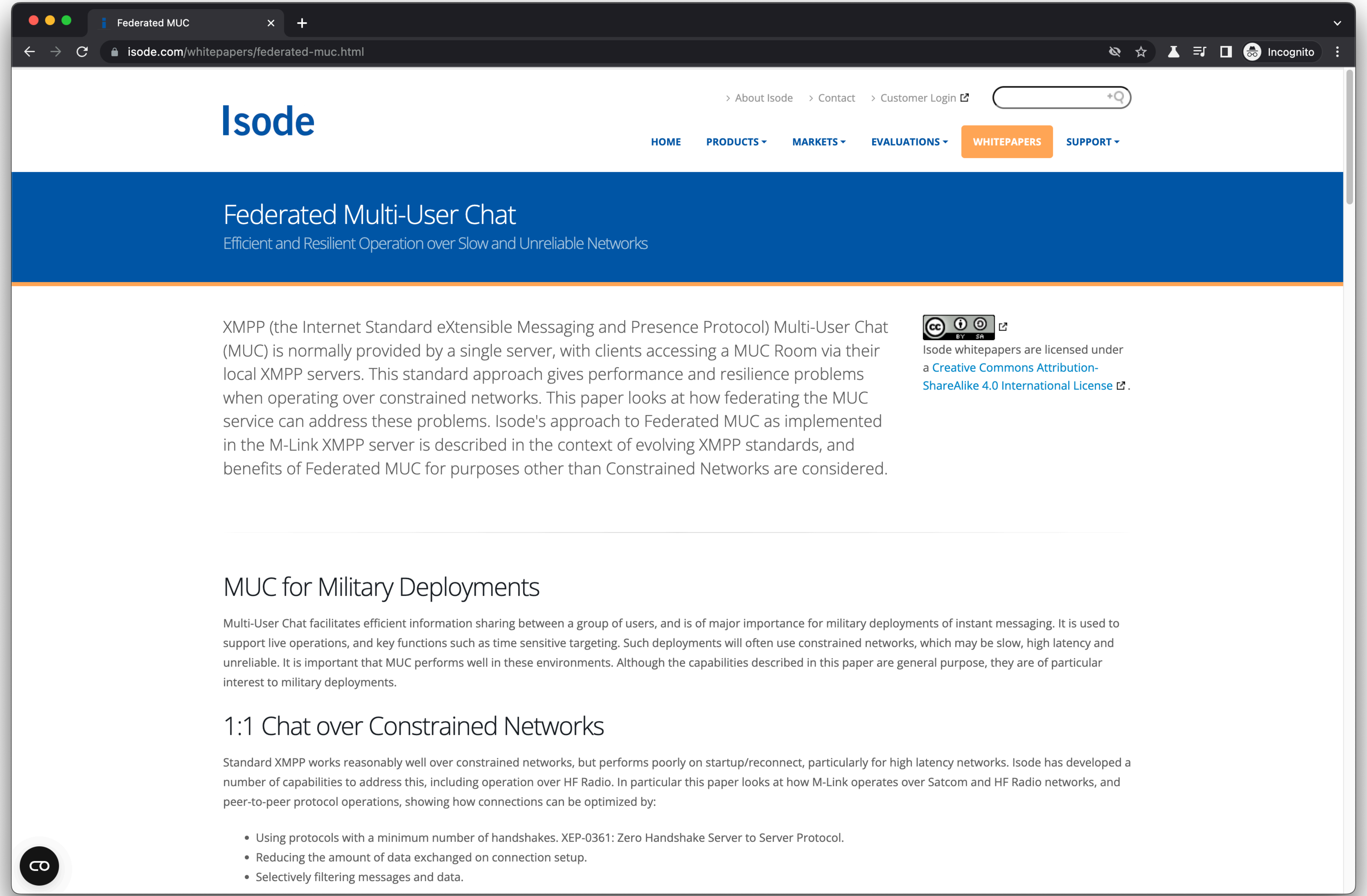

Jicofo
XMPP client
User
WebSocket
XMPP
Web Server
WebSocket
XMPP
Prosody
XMPP client
JVB

STEP 0

RESEARCH

- **We needed to reduce presence stanzas, it's our achilles heel**
- **Shard users in multiple MUCs? -> FMUC?**
- **Turns out the military had run into this!**

https://www.isode.com/whitepapers/federated-muc.html



Federated Multi-User Chat

Efficient and Resilient Operation over Slow and Unreliable Networks

XMPP (the Internet Standard eXtensible Messaging and Presence Protocol) Multi-User Chat (MUC) is normally provided by a single server, with clients accessing a MUC Room via their local XMPP servers. This standard approach gives performance and resilience problems when operating over constrained networks. This paper looks at how federating the MUC service can address these problems. Isode's approach to Federated MUC as implemented in the M-Link XMPP server is described in the context of evolving XMPP standards, and benefits of Federated MUC for purposes other than Constrained Networks are considered.

MUC for Military Deployments

Multi-User Chat facilitates efficient information sharing between a group of users, and is of major importance for military deployments of instant messaging. It is used to support live operations, and key functions such as time sensitive targeting. Such deployments will often use constrained networks, which may be slow, high latency and unreliable. It is important that MUC performs well in these environments. Although the capabilities described in this paper are general purpose, they are of particular interest to military deployments.

1:1 Chat over Constrained Networks

Standard XMPP works reasonably well over constrained networks, but performs poorly on startup/reconnect, particularly for high latency networks. Isode has developed a number of capabilities to address this, including operation over HF Radio. In particular this paper looks at how M-Link operates over Satcom and HF Radio networks, and peer-to-peer protocol operations, showing how connections can be optimized by:

- Using protocols with a minimum number of handshakes. XEP-0361: Zero Handshake Server to Server Protocol.
- Reducing the amount of data exchanged on connection setup.
- Selectively filtering messages and data.

STEP 1

WE GOT A PLAN!

- “Active” vs “passive” participants
  - No need to know about every single passive participant
- A passive participant can become an active one
- NOT live streaming

STEP 2

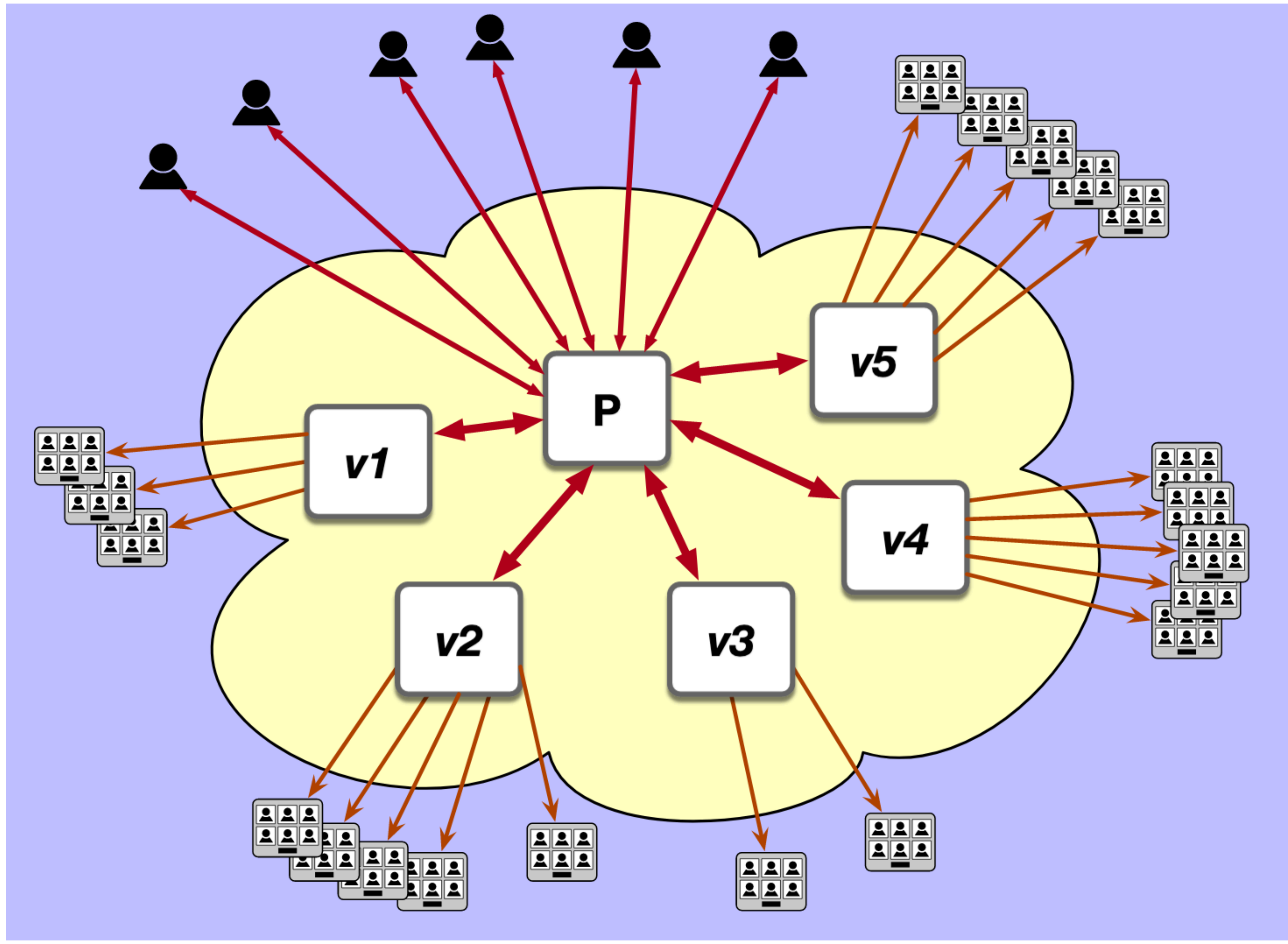
HOW DO WE TEST THIS?

- Lightweight clients, no UI
- Multiple client tabs
- Multiple windows
- Insertable Streams to drop all media
- Delay track creation for those who join muted

STEP 3

SCALE SIGNALLING

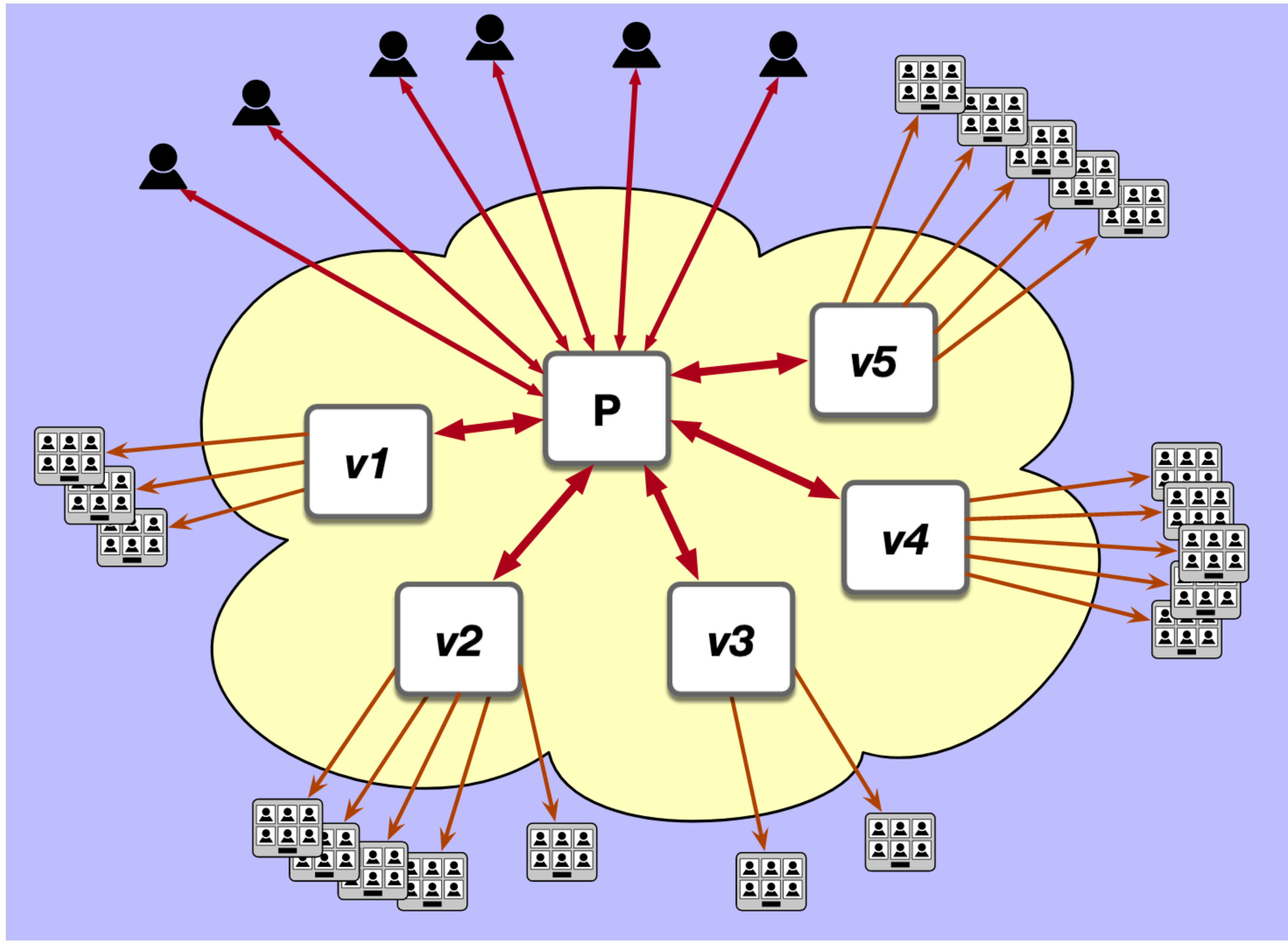
- Use multiple Prosody servers!
- Active users have a ***participant*** role and join the main server
- Passive users have a ***visitor*** role and join a "visitor node"
- Jicofo decides which mode you join in
- Visitor's presence is not broadcasted
- All Prosody nodes federate



STEP 3

SCALE SIGNALLING

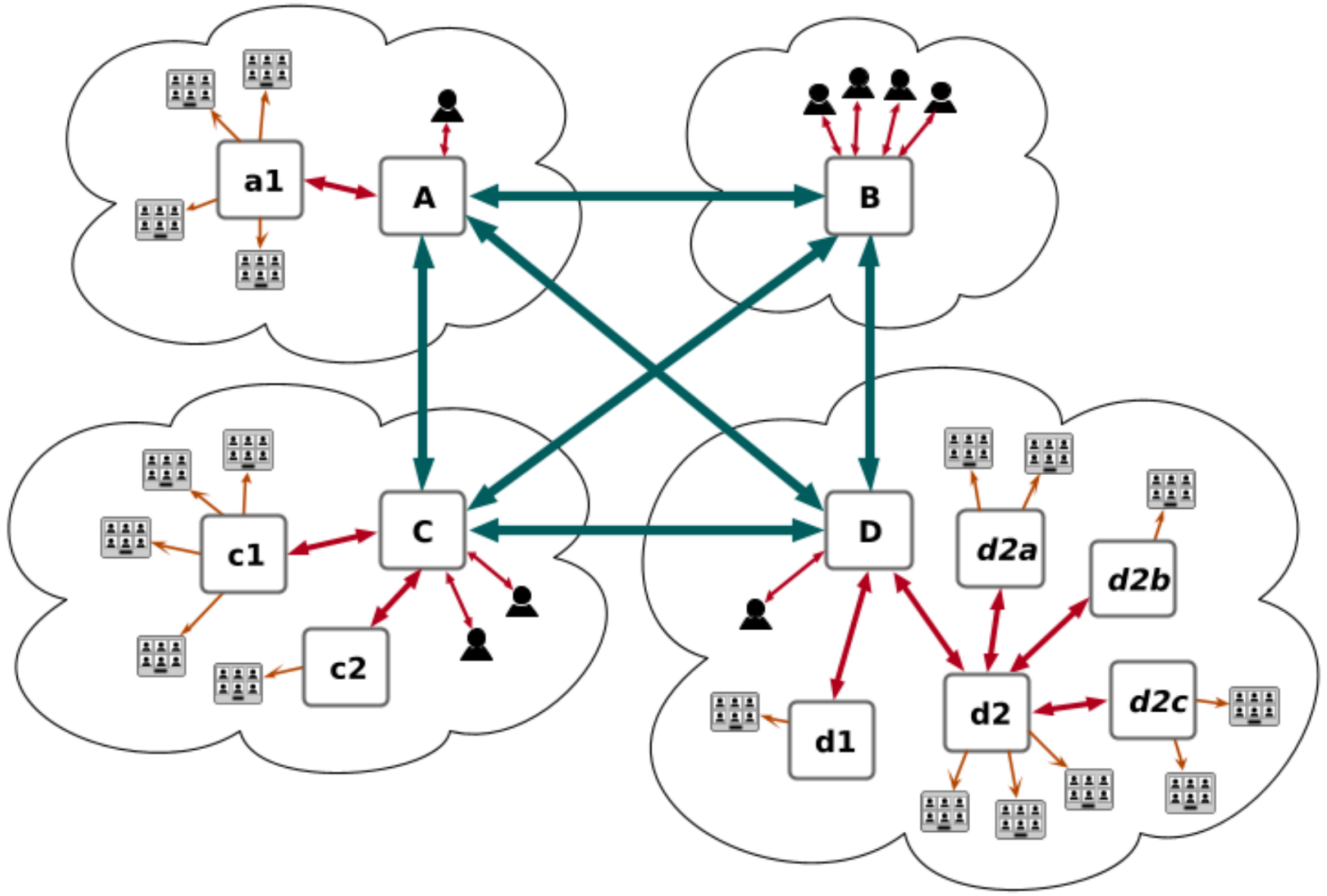
- S2S bidirectional connections between visitor nodes and the main Prosody server
- Custom modules to inject chat messages to the main MUC
- Participants can become active by joining the main MUC
  - Fast, no need to re-create the XMPP connection!



STEP 4

BETTER OCTO TOPOLOGIES

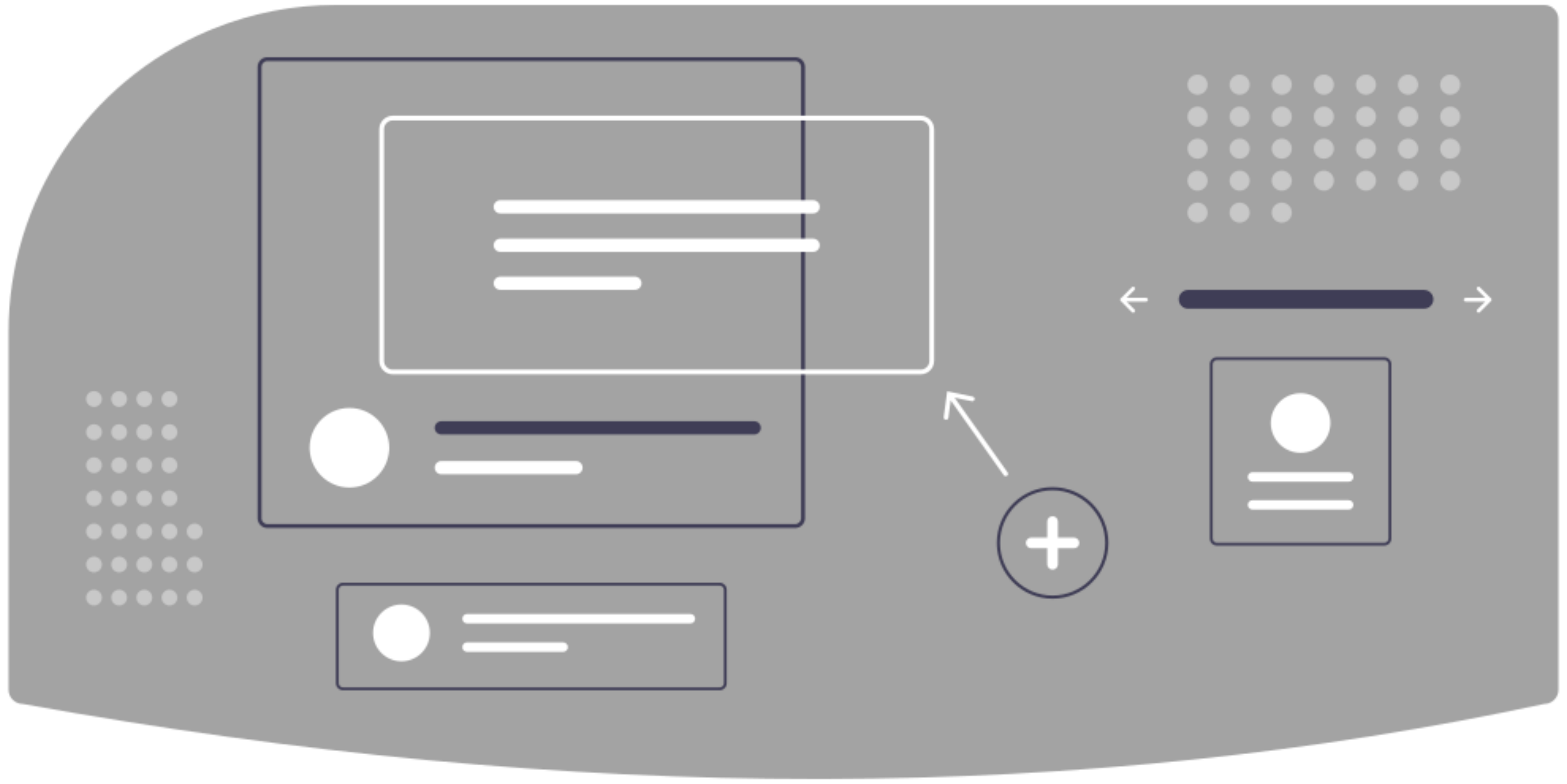
- Active participants connect to a pool of JVBs connected in full-mesh
- Passive participants connect to a pool of JVBs in tree topology
- Visitor-only bridges



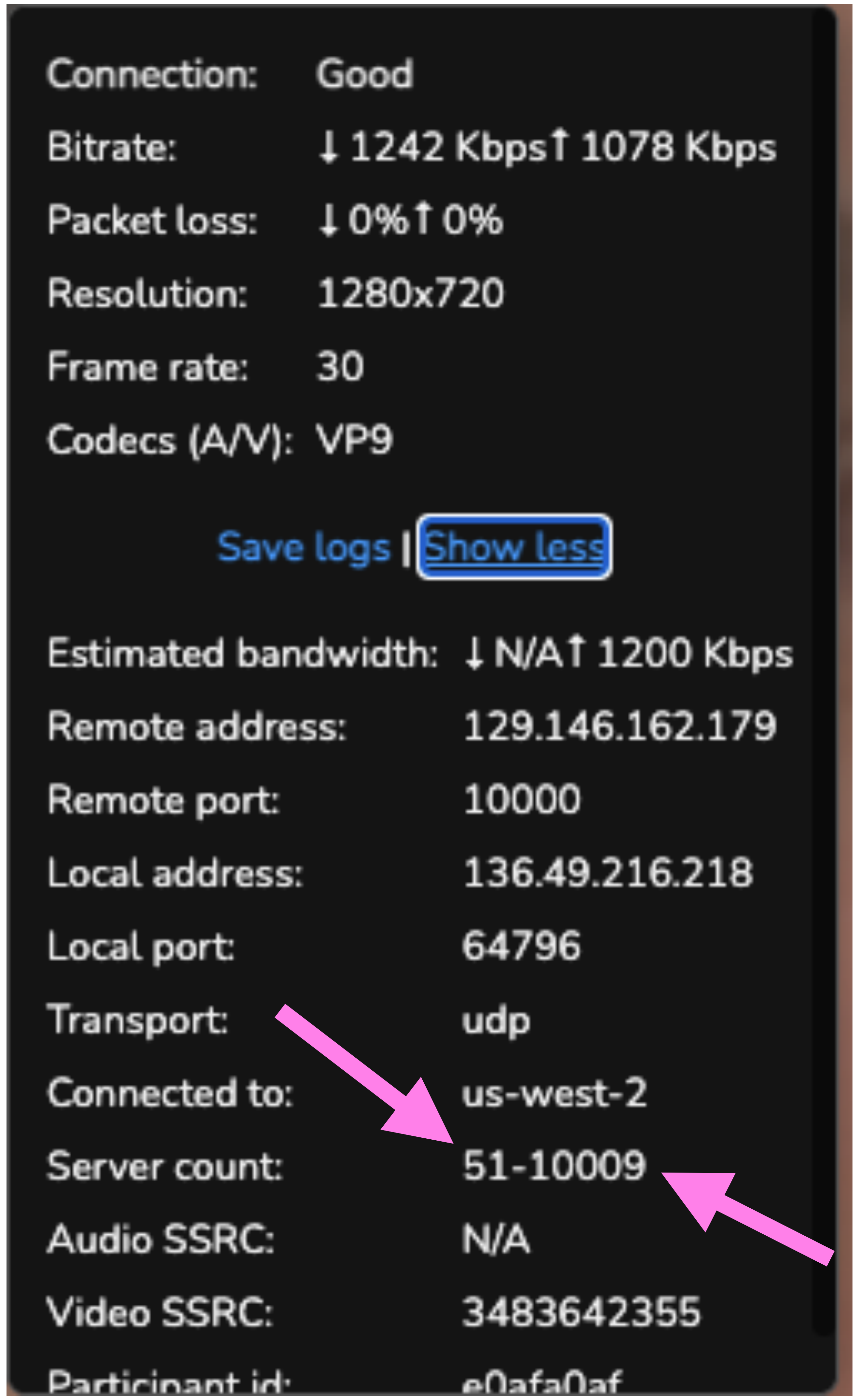
STEP 5

UI / UX

- **No need to render all visitors, just the count**
- **Redefine UX for visitors**
  - **Raise hand to become an active participant?**



HOW IS IT GOING?



```
Connection:     Good
Bitrate:        ↓1242 Kbps↑1078 Kbps
Packet loss:    ↓0%↑0%
Resolution:     1280x720
Frame rate:     30
Codecs (A/V):   VP9

              Save logs | Show less

Estimated bandwidth:   ↓N/A↑1200 Kbps
Remote address:        129.146.162.179
Remote port:           10000
Local address:         136.49.216.218
Local port:            64796
Transport:             udp
Connected to:          us-west-2
Server count:          51-10009
Audio SSRC:            N/A
Video SSRC:            3483642355
Participant id:        e0afa0af
```

51 bridges
10009 participants

FUTURE

WHERE DO WE GO FROM HERE?

- UI / UX is not yet final
- With visitors maybe we don’t need to support 500 (real) participants anymore?
- Configurable threshold?
- Make sure it’s easy to deploy for everyone

MEET THE HEROES

Boris Grozev

Damyan Minkov

Jonathan Lennox

❤️ PROSODY

- We do push it hard
- Its versatility has allowed us to reach new heights
- Thanks Matt and team, for answering our questions and maintaining Prosody

Q&A

XMPP PEEPS, HAVE MERCY!

You can check the current status here:

https://github.com/jitsi/jitsi-meet/tree/master/resources/extra-large-conference