

Mafalda SFU



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Who am I?

- Master on Computers Engineering, Rey Juan Carlos university, 2016
- Three times winner of the Free Software University Contest
- 20 years of experience in software development, 11 years as WebRTC Expert
- CTO of two startups

What is Mafalda SFU?

Highly scalable video conferencing SFU (Selective Forwarding Unit) software

- Built on top of Mediasoup
- Allow to by-pass Mediasoup CPU limits (*vertical scalability*), and interconnect instances running on several servers (*horizontal scalability*)
- Unlimited number of participants in a single room call (in theory)
- In development since March 2021

How did I get with the idea?

- During Covid-19 pandemic, multiple videoconference services were created, and interest on WebRTC technologies skyrocketed 🚀
- Around January 2021, two companies contacted me as WebRTC Expert looking for help regarding Mediasoup scalability
- Since I didn't know about the topic, I started an use-and-throw proof of concept project to understand the problem
- Once I commented about it, I was contacted by 9 companies just in the first month interested in the technology I was working on, even with commercial interest
- I decided to convert that proof of concept into a real commercial project, and that's how Mafalda SFU was born

What problems did Mafalda SFU come up with?

- Increase the number of participants in a room call beyond Mediasoup limits
- Run Mediasoup instances in a different server than the application code, for better performance and optimization of resources
- Manage and orchestrate automatically multiple media servers in different world regions, so developer don't need to worry about that
- Don't need to change actual application code, migration from Mediasoup to Mafalda SFU can be done in some minutes and less than 25 lines of code

What are the target clients of Mafalda SFU?

Companies and developers of conferencing and streaming applications based on Mediasoup that:

1. need a high scalability and performance
 - hundred or thousand concurrent users, both in a single or multiple sessions
2. their actual architecture limit their growth
 - MVP that grew too fast and it's tightly coupled to the application code
 - lack of media streaming and/or scalability skills in the team
3. want to reduce the maintenance of their in-house media scalability solution
 - simplify their code by delegating the media management to Mafalda SFU

What alternatives does they have?

1. Dedicate more than 1 man year of their developers to build their own media streaming scalability solution, and later maintain it
 - ad-hoc, half-baked and unreliable due to lack of in-house expertise
2. Hire a WebRTC Expert to build a custom solution, and later maintain it
 - Way more expensive than the previous option, but with better results
3. Use an off-the-shelf solution
 - Need to adapt the application code to the new solution, and can get to be very expensive for commercial ones
4. Use a cloud based commercial solution
 - Only make sense for low traffic sites, costs can be prohibitive expensive for big applications, and with less control (not only need to adapt the application code, but also gets attached to the cloud stream provider)
5. Acquire some Mafalda SFU licenses
 - Performant and robust solution focused on quality, developed by a +11 years WebRTC Expert, for a fraction of a custom solution from scratch, without need almost changes in clients current application code, and available on production in minutes

What have I been working on so far?

- Original Mafalda module (vertical scalability)
 - API based on Mediasoup one, making easy to migrate current apps
- Remote control of Mafalda and Mediasoup instances, and Mediasoup-horizontal (horizontal scalability)
 - Same API than Mediasoup, making it easier to migrate current apps (less than 25 lines of code)
 - Multiple simultaneous clients, automatic reconnections, and state synchronization
- Automated testing and documentation generation, more than 90% tests coverage in almost all projects
- Code protection and licensing, and product marketing

Detailed information available at <https://mafalda.io/chronology>

What are my future projects, and next implementations?

Short term

- Development of Mediasoup-vertical, vertical scaling module with same API than Mediasoup
 - Allowing in combination of Mediasoup-horizontal to span a single call room over multiple servers
- Improve documentation of all the multiple projects
- Focus on monetization and business management, both in the form of looking for investors and sale of licenses

Medium and long term

- ``Mafalda-swarm``, decentralized and self-managed P2P network that allows scaling horizontally in an organic way
 - Connect to the network from different entry point servers distributed around the world close to the users
 - Self-balancing and offers access to the streams over the most optimal route
- ``Mafalda monitor``, monitoring tool for global view of the network statistics (both Remote Mediasoup nodes and Mafalda-swarm) in real time
- Notify servers usage in real time, and create new instances on demand
- *Mafalda as a Service*, cloud service offering instances of Remote Mafalda and Remote Mediasoup out of the box. Business model would be on a per-minute usage basis rather than license sales

How can the investment be profitable?

How will the product be sold?

- Companies developing video conferencing applications based on Mediasoup that need to scale beyond its limits
- Niche development and few clients
- High monetization: licenses between 2000€ - 100,000€ depending of client needs
 - Average of 10,000€ per client/year
 - Type of scalability, access to code source, resell it to third parties...
 - Their alternative: develop, test and maintain a custom solution during several months or even more than a year of work
- Maintenance and support licenses
- Alternatively, percentage of profits or shares of the client, specially for start-ups and small companies in expansion
- Ultimately, sell company and intellectual property to a bigger company

How easy would it be to be copied?

- Several companies already have their own solutions for Mediasoup scalability, but all of them are private and custom tailored to their own software
 - Main reason they have built it themselves is because they couldn't find any generic solution ready to use
 - Only known Mediasoup horizontal scalability Open Source solution is EduMeet v4, being fairly new (May 2023), focused only on its own videoconference application (not low level or general purpose) and without vertical scalability
- I've been hired during the last two years by several companies to help them with their own scalability solutions
 - Dyte, Virbela / FrameVR, Fermax, SoundStage...

What makes it difficult for others to offer the same as Mafalda SFU?

- A video streaming scalability solution is a multi-month complex development
- There are few experts with the necessary skillset to develop similar solutions
- Companies consider it part of their intellectual property and a competitive advantage, so usually they are not willing to provide access to third parties
- If so, they provide it as a *Software as a Service* (SaaS) solution, not as a component that can be integrated and deployed in the client infrastructure, just to protect that intellectual property and their business model

Mafalda SFU approach and main advantage is that it's a generic solution that replicates Mediasoup API, so it's easy to migrate any existing application or integrate into new ones, and companies can have their own "competitive advantage" in minutes instead of several months of development.