



# Lecture notes

## FrameVR

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# The basics

# Introduction to Frame VR

In a nutshell, Frame is your go-to for building 3D, social websites. Developed by Virbela, Frame revolutionizes how we communicate, collaborate, and create in 3D space, directly from your web browser.

## So, what exactly is frame? And what isn't it?

### *What is Frame?*

- Frame is a cutting-edge metaverse platform accessible on your browser from desktop, mobile, and VR.
- Ideal for businesses, schools, organizations, or communities, it lets you create both private and public virtual spaces.
- Frame enables immersive creation, communication, and collaboration like never before.
- Think beyond traditional video calls; this is a whole new way to connect.
- Advanced tools for everyone, from no-coders to developers, and artists, allow customization that's truly remarkable.

### *What isn't Frame?*

- Frame isn't a cryptocurrency product.
- It bypasses the blockchain entirely.
- Forget about downloads; it's not a standalone application.
- No, it's not built with Unity or Unreal.
- While engaging, Frame isn't a video game.
- It's not an expansive public world.

## How Is Frame built?

Frame leverages [babylon.js](https://babylonjs.medium.com/babylon-js-and-frame-pushing-remote-work-forward-735e1a5b98ae), an open-source 3D web development framework from Microsoft. Check out this insightful blog post (<https://babylonjs.medium.com/babylon-js-and-frame-pushing-remote-work-forward-735e1a5b98ae>) from the Babylon team, or read about Frame's transition to [babylon.js](https://learn.framevr.io/post/frame-beta-2) (<https://learn.framevr.io/post/frame-beta-2>). Additionally, other top-tier technologies like webrtc and Vue.js play a role, and the 3D environments are crafted with Blender.

## System requirements

### *Web Browser*

- On PC, Chromebook, Mac, or Android, use the latest Google Chrome or Microsoft Edge.
- On iPhones, use Safari.
- In the Meta Quest, use the Meta Quest Browser.

### *Internet Connection*

- Frame demands a broadband wired or wireless connection.
- Minimum bandwidth: 5 MBPS (up/down), recommended: 10 MBPS (up/down). Note: Better connectivity is essential as more people join your Frame for an optimal experience.

### *Operating system*

- On Mac, iPhone, or iPad use anything after OSX or iOS 15.
- On Android, use Android 10 or later.
- On PC, use Windows 7 or above.

## Features

### *Collaboration*

- Frame offers a plethora of communication and collaboration tools.
- Spatialized voice chat for small group discussions.
- Text chat (group or private, with translation features).
- Whiteboards.

- Webcam + screenshare capabilities.
- Emojis.
- Shared web browsers.
- Real-time collaborative Frame editing.

#### *No-code customization*

- Frame empowers you to unleash creativity within a spatial canvas using our intuitive drag-and-drop editor to construct stunning spatial websites.
- Add a variety of assets to your Frame: 3D models, 360 photos/videos, images, videos, PDFs, web browsers, streaming screens, shapes, news browsers, text, shaders, particle systems, 3D maps, teleport spots, non-player characters, stock tickers, and continually more!
- Customize placement and scale to your needs.
- Collaborate in real time by sharing edit permissions.
- Integrate interactivity with buttons and proximity triggers.
- Add your own 3D models, utilize the Sketchfab integration, or explore the model library.

#### *Scale*

- Frame is perfect for both intimate meetings and grand events, accommodating up to 1,000 participants in a single Frame (available only to paid version).
- Access from desktop, mobile, or VR.
- Optimized system downsizes avatars that are far away for efficiency.
- Single-user Frames are available if avatars are unnecessary.
- Create a vast metaverse with thousands of Frames if needed (available only to paid version).

#### *Presentation tools*

- Equip yourself with typical tools like webcam sharing, screen sharing, and PDF uploads, plus unique metaverse capabilities such as switching between "scenes," the 3D equivalent of PowerPoint slides.
- Share screens with spatial audio and green-screen transparency.
- Integrate live web browsers for video playback within the scene.
- Guide your audience through spatial journeys using "scenes."
- Upload PDFs, images, videos, and 360 photos or videos to immerse your audience fully.
- Closed captioning is available.

#### *Graphics*

- Your custom 3D environments and models will shine in Frame, or opt for the built-in environments!
- Features include real-time shadows, reflections, custom shaders, particle systems, lighting with lightmaps or real-time lighting, PBR materials, animations, ambient occlusion, and numerous environment creation tutorials.
- Extensive support for the .glTF model specification.

#### *Artificial Intelligence (available only to paid version)*

- AI in Frame combines with the Metaverse to amplify creativity, productivity, and accessibility.
- Features include image generation, skybox generation, GPT-powered chatbot for text chat, AI-powered non-player characters, translation in 30 languages for text chat, and closed captions via speech-to-text.

The Frame API enables developers to manage and customize their Frames with a straightforward REST API.

- Create, modify, or delete assets.
- Add or remove members or admins.
- Tweak Frame settings.
- Send text messages to a Frame's chat.
- Update text blocks or images.
- Custom scripts can be written to introduce new functionalities or designs to your metaverse.

## Security

- SOC2 Compliance.
- Detailed permissions for viewing, editing, interacting, and conversing within your Frames.
- Option for a fully custom, isolated deployment of Frame with unique infrastructure, custom SSO, and more.
- Disable unwanted features.
- Password protect your Frames for added security.

## Street view (available only to paid version)

- Import and explore Google Street View imagery collectively.
- Discover cityscapes and global locations with others.
- Virtually scout venues for events, real estate, or travel planning.
- Enhance interactivity and provide educational experiences by taking students on virtual tours of geographical locations or historical landmarks.



Have a look at my Frame: <https://framevr.io/fokidesframe>

## Useful resources



Full set of video tutorials: <https://www.youtube.com/@Framevr/videos>



Frame's knowledge base:

<https://support.framevr.io/framevr/Frame-Knowledge-Base-cfc4bc81aa1442a9a2dd9e995dbaeab0>



Frame's blog: <https://learn.framevr.io/blog>



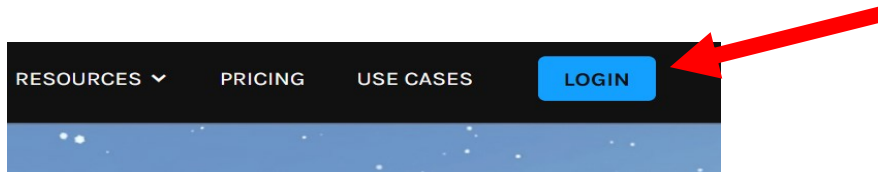


# Getting started

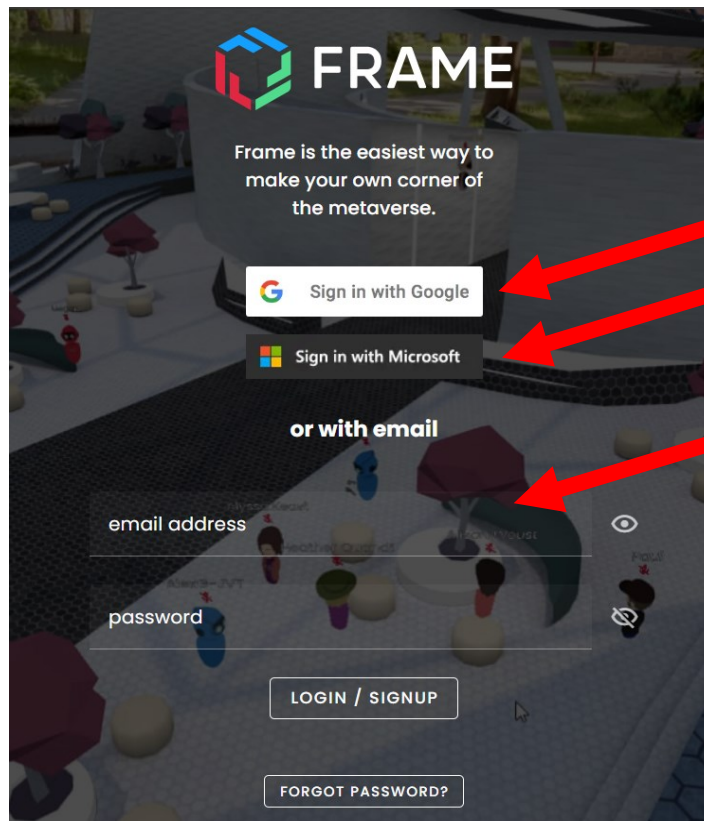
## Getting started

To start using Frame, go to: <https://learn.framevr.io/>

Create an account:

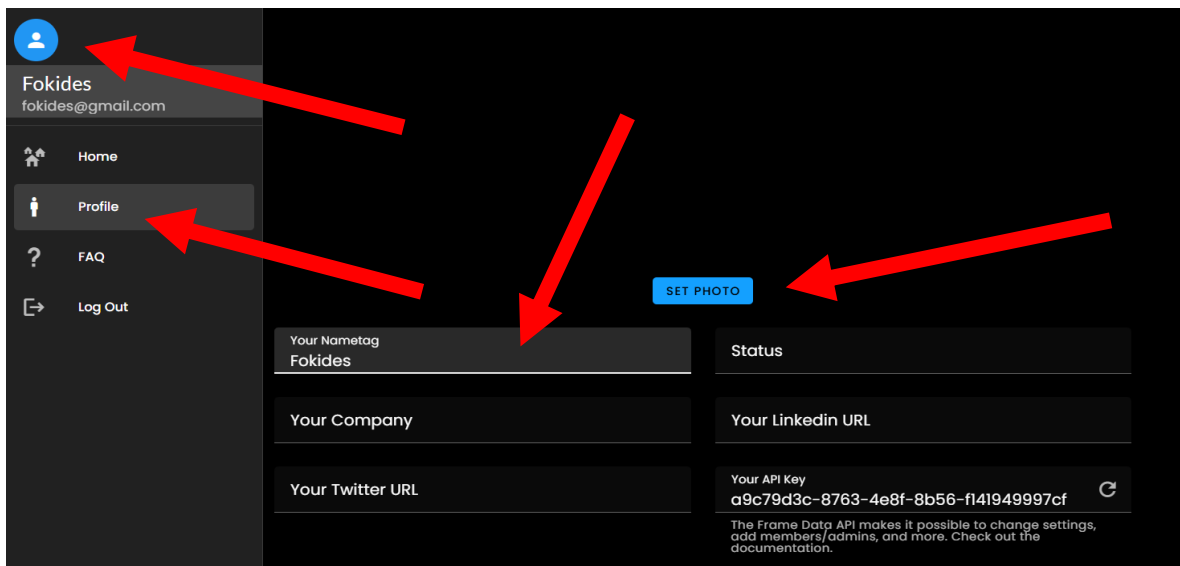


Choose any of the 3 options (Sign in with Google is suggested)



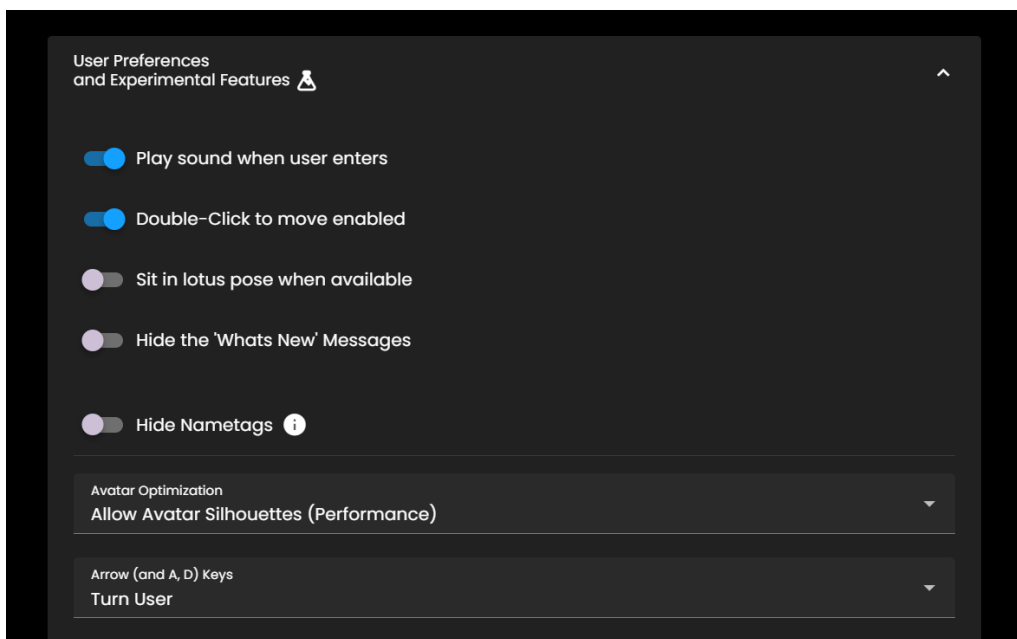
## Manage your profile and account in the dashboard

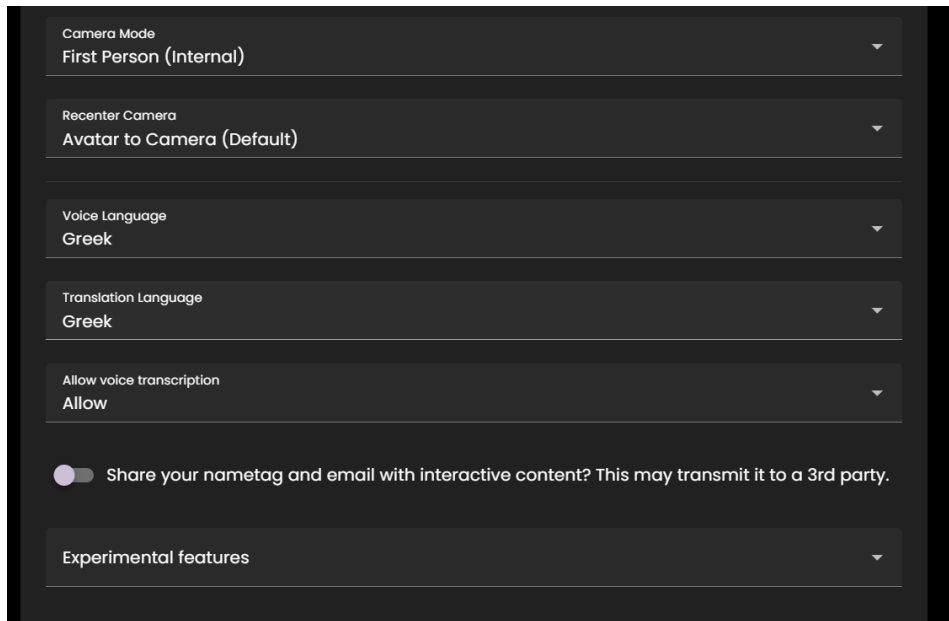
You can set your name, your photo, and some personal detail (not required).



## Additional settings

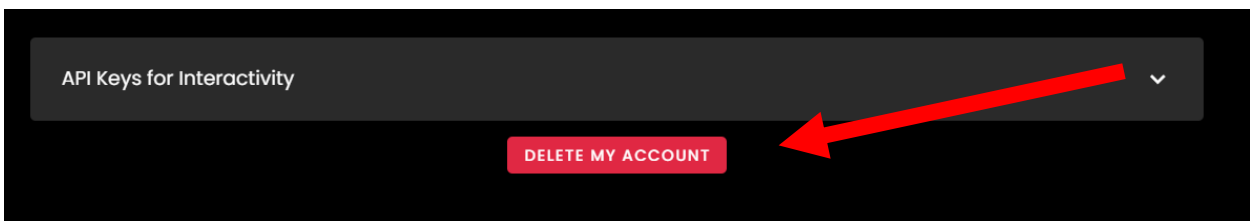
You can adjust some additional settings such as the voice and translation language and how to navigate.





### To delete your account

To delete your account, press the "Delete my account" button.



## Ports, networking, domain whitelisting

If your network is super tight on outgoing connections, you might need to grant access to one or all of the entries listed in the outbound connections table. Remember, there's a big difference between outbound port traffic, inbound port traffic, inbound connections, and outbound connections. This info probably isn't needed unless your network settings are extremely strict. So, go ahead and open up these specific ports for outbound connections in your firewall or router!

How's that? Ready to tackle your network settings with confidence? Let's do it!

Outbound Frame Connections				
Reason	Port	Transport	Domain	Protocol
Webapp	443	HTTP/S	framevr.io	TCP
Service signaling	443	HTTP/WSS	*.livekit.cloud	TCP
Authentication - Immer	443	HTTP/S	i.framevr.io	TCP
Frame Stun/Turn server	443	Stun/turn	*.turn.livekit.cloud	TCP
Frame media servers	50000-60000	WebRTC/DTLS	All IP Address	UDP
Optional Firewall Rules for Restrictive Networks				
Network pathfinding	3478	TURN (WebRTC)	*.host.turn.livekit.cloud	UDP
Outbound 3rd Party Connections				
Assets uploaded by users	443	HTTP/S	cloudinary.com	TCP
Authentication and Database	443	HTTP/S	firebase.com	TCP
3D Model Asset Library	443	HTTP/S	sketchfab.com	TCP
3D World Map	443	HTTP/S	mapbox.com	TCP
Accessibility - Language translation	443	HTTP/S	translate.google.com	TCP
Cloud Storage	443	HTTP/S	firebasestorage.googleapis.com	TCP

### Quick network diagnostics

Frame also supports failover connectivity, for special class networks using STUN/TURN.

Please run this diagnostic and report these results to Frame if unable to connect to framevr.io

Also check the STUN/TURN Server List and whitelist as appropriate (<https://networktest.twilio.com>).

STUN/TURN Server List (<https://www.twilio.com/docs/stun-turn/regions>).

## Frame in Virtual Reality

- Frame operates seamlessly in VR, but Frame's development journey typically starts on desktop, moves to mobile, and finally lands in VR. Rigorous testing on the Meta Quest hardware line is done, to ensure an optimal experience.
- To dive into VR with Frame, simply fire up the Meta Quest Browser, navigate to the specific Frame URL, and hit the VR button located in the bottom right corner to enter VR mode. If you need to log in, remember to do so using the sidebar in 2D mode before switching to VR.
- It's important to note that Frame is not compatible with Google Cardboard.
- For navigation, use your joystick to teleport effortlessly around the environment. Access the VR User Interface with ease by pressing the small button positioned where a wristwatch would be on your left wrist, right below where the Meta Quest controller appears in VR.
- Keep in mind that as not every feature is available in VR mode, it is highly recommended setting up Frame and handling complex editing tasks on your desktop. Then, switch to VR for an immersive experience during meetings or events, if VR is your thing. Get ready to elevate your virtual interactions with Frame!

Watch this video about how to use Frame in Meta Quest HMDs:

<https://youtu.be/CG1D7Ek09LQ>

## Frame on Mobile

- Frame works seamlessly on tablets and smartphones, provided they are relatively modern and equipped with an up-to-date operating system.
- If your device struggles to load Frame, don't worry! The Quick interface is a fantastic alternative for attending meetings and presentations without a hitch.
- For the best experience, it is recommended to use Safari on iOS devices and Chrome on others.

💡 While 4k textures can be challenging on iOS, especially when other texture memory is heavily used, there's a solution! Reducing the resolution of some textures and converting them to webp format can make it work smoothly. In fact, lowering the texture resolution to a maximum of 2k has proven successful for mobile iOS users.

### Navigation on Mobile

- Use the gyroscope located in the bottom corner of your screen as a joystick for movement.
- Swipe the screen to set your direction.
- Double click to move effortlessly.
- Pinch the screen to control your zoom level.

Dive in and enjoy an awesome Frame experience on your mobile device!

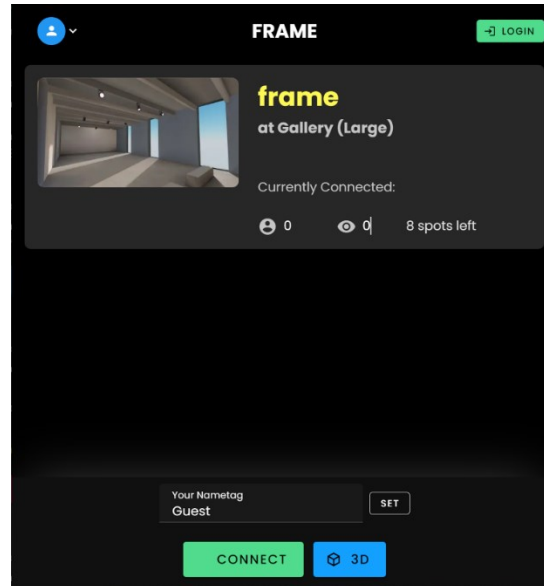
## Quick

Quick is your new go-to 2D user interface for engaging and collaborating within Frame! Whether you're diving into presentations, viewing PDF or Streaming Screen content, or just chatting with others in your Frame, Quick is your ticket to a seamless experience. Its lightweight design makes it the perfect way to access resource-heavy Frames or navigate Frame without dealing with the 3D space. Plus, Quick is optimized for performance, shining brightest on mobile devices and other access points. Getting into your Frame with Quick is a breeze! Just slap "quick" at the start of your URL. So, instead of entering `framevr.io/yourframe`, type in `quick.framevr.io/yourframe`. And boom, you're in!

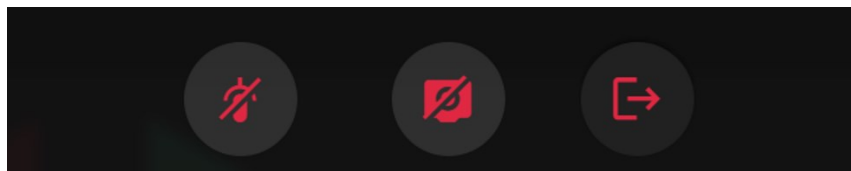
## Interface

From the Landing page, you have the power to log into your account, change your nametag, or connect to your Frame just like you do normally. A preview of the linked Frame will be right there in front of you. And if you ever feel like jumping back into the 3D space of that Frame, just hit the 3D button, and you're good to go!

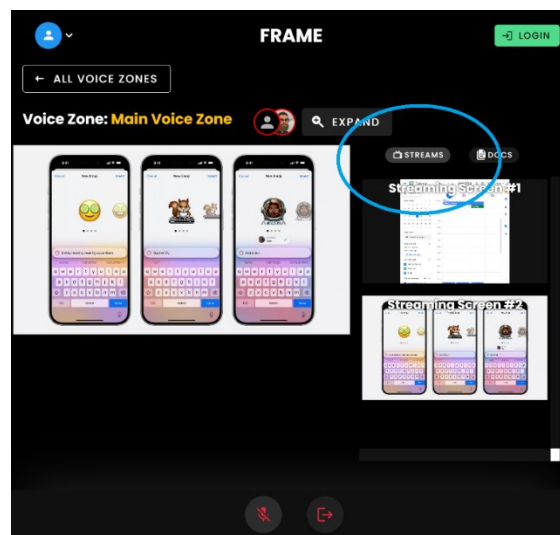
Unlock the full potential of Frame with Quick and make your collaborative experiences smoother and more dynamic than ever!



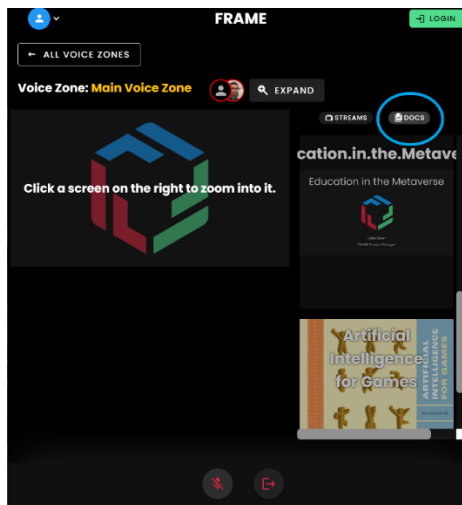
Once you're connected, you'll enter the main Voice zone, unlocking a realm of captivating 3D content within the Frame! With the right user permissions, you can use the toolbar to chat via Voice, or take charge of one of the Streaming screens to share your screen or webcam. Dive in and make the most of it!



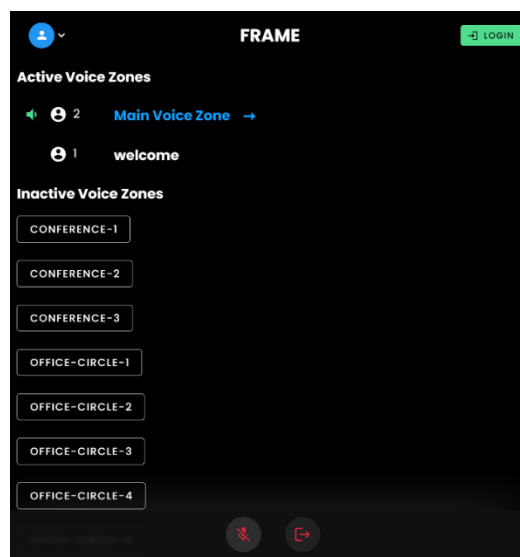
Streams can be used to view what other users are currently presenting within the scene on Streaming screens.



Docs allow you to access Documents such as PDF files which are uploaded to the Frame. These documents can be viewed at any time.



"All voice zones" open up a world of possibilities! With this feature, you can browse and engage with any active Voice Zones in your current environment. It's super easy to view and select any zone that matches your preference. Get ready to explore and connect like never before!





## Troubleshooting

Getting Metaverse applications to run straight from your browser is an intricate ballet of numerous components. Effort is put to make it "just work," but sometimes, hiccups happen. One of the most frequent challenges people face is "my mic isn't working." While it's easy to point fingers, this issue is usually not Frame's fault. More often than not, users need to grant their browser permission to access their microphone or ensure they're selecting the correct mic.

Here are some solutions to try when things aren't functioning as expected!

### Browser

First things first, ensure you're using the best web browser for the job! For most devices, Chrome or Edge are absolutely recommended, they're simply the top-notch choices out there! Now, when it comes to VR Headsets, the Meta Quest shines with its "Browser" app. For all you iOS users, you can't go wrong with Safari on your iPhones and iPads. And hey, while browsers like Firefox and Opera can do the trick, the crème de la crème for reliability on most devices is undeniably the latest version of Chrome or Edge. Dive in with confidence!



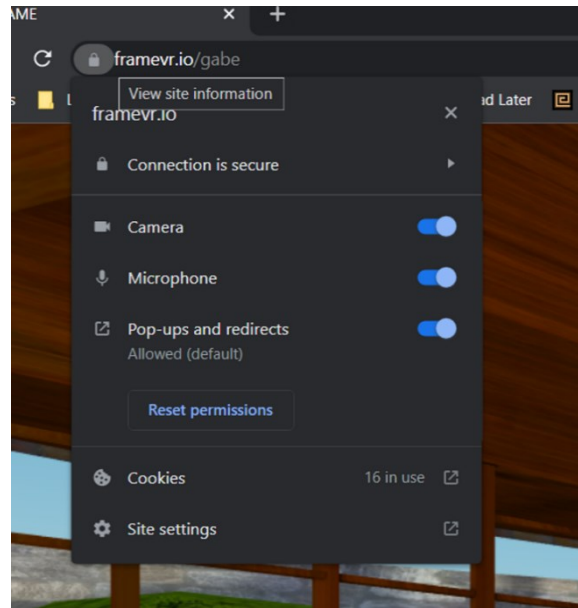
Update your browser to ensure it is on the latest version.

### Enable hardware acceleration

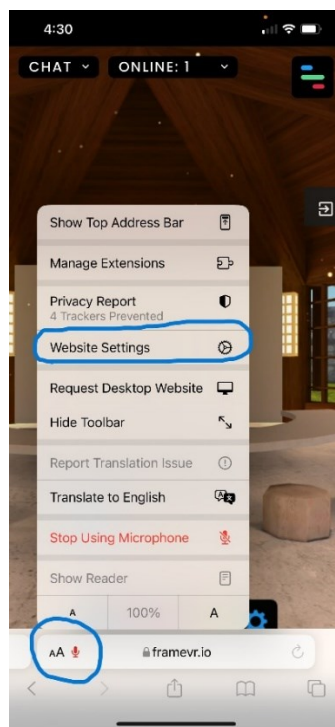
Ensuring "Hardware acceleration" is enabled in your web browser can massively enhance your browsing experience. While it's typically activated by default, it's always good to double-check. For Chrome users, click the button at the top right of your browser that looks like three little dots. Head to your settings, find the "advanced" section in the sidebar on the left, and then select "system." In the list of settings, you'll see "hardware acceleration." Make sure it's turned on! If you're using Edge, simply go to your browser settings, then navigate to "system and performance." You'll spot "Hardware acceleration" there, so ensure it's activated. And for those rocking Safari, you're in luck. Hardware acceleration is always on and ready to go!

### Browser permissions

To ensure you can use your microphone and camera, make sure your browser has the necessary permissions. While these are not essential to access Frame, they are crucial for audio and video functionality. If you're experiencing issues with sound or video, it's time to check your browser settings! Open your web browser and navigate to your Frame. Next, click the icon to the left of the URL in the address bar. This will display the permissions granted to the page. You want to make sure both the mic and camera are turned on. Get ready to dive into an optimal online experience with full audio and video capabilities!



Here's how you can ensure your browser has the necessary permissions on iOS devices: First, bring up the URL bar and tap the little icon to the left of it. Next, head over to website settings. This is where the magic happens, make sure your browser has the go-ahead to access your microphone and/or camera. You're just a few taps away from smooth, uninterrupted browsing! You got this!



Fire up your Meta Quest Browser and head straight to your Frame! But hold on, before diving into VR mode, hit the browser settings icon, you know, the one that looks like three little dots at the top right corner. From there, easily check your site permissions and make sure your microphone is all set and ready to rock!

### The right microphone/camera

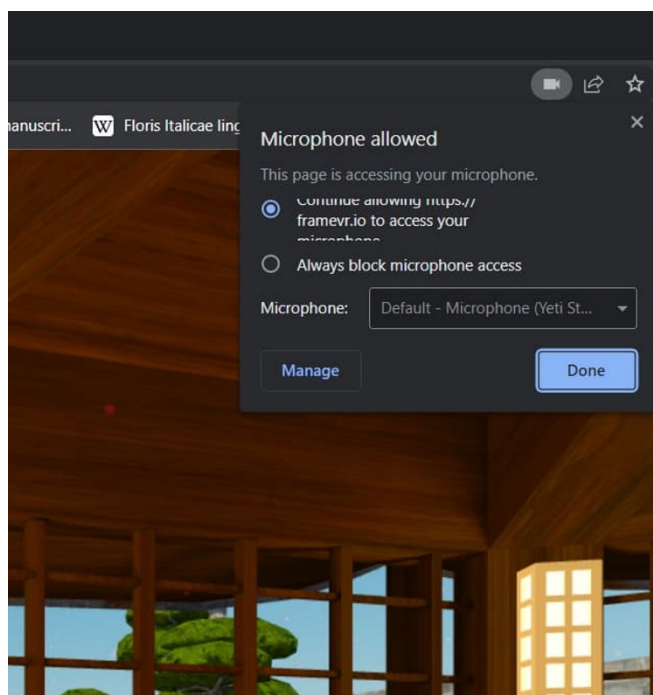
Alright, now that you've got the right browser and permissions sorted (yay!), let's tackle another common issue: making sure your browser is using the correct microphone. Different devices can be a bit finicky with multiple audio sources, but don't worry, you are covered in Frame! Before you hit that "Connect" button,

take a moment to check out the "Mic/cam settings" right below it. This feature lets you select the exact microphone and camera you want to use.

But wait, there's more! You can also switch your microphone directly within Frame. Simply right-click on the mic icon at the bottom center of your screen to choose your preferred device.

Now, if you're finding it a hassle to do this every time, you're not alone! To make sure your browser picks the right devices by default, dive into your browser settings. On Chrome, look for the little video camera icon at the far right of the URL bar. On Edge, it looks like a microphone. Click on that icon. If you see the wrong device selected, no problem! Just hit the "Manage" button to access the relevant settings. There, you can set the default device your browser will always try to access.

And voilà! You're now a pro at managing your audio devices for a seamless experience. Happy connecting!



### **Browser extensions/ad blockers**

One important step to ensure a seamless experience with Frame is to check for any browser extensions, add-ons, or ad-blockers that might be causing interference. Here's a simple test: open Frame in an incognito window or temporarily disable all your extensions. If Frame starts working perfectly, then you've pinpointed the issue!

One quirky little roadblock that was identified is the Grammarly browser plugin, it just doesn't get along with Frame. So, go ahead and disable Grammarly before diving into Frame and enjoy a smooth and uninterrupted experience!

### **WIFI network**

Are you connected to an office or school WIFI network? Sometimes these networks have restrictive permissions or firewalls that might make accessing Frame a bit tricky. No worries though, Frame has implemented some measures that often allow it to tunnel through basic firewalls, although it might not work on every network. If anything fails, it might be a sign that your network is the culprit.

**A quick tip**

While this isn't usually a connectivity issue, if you find that Frame is a bit laggy, make sure "Hardware acceleration" is enabled in your browser settings. Just head over to your browser's settings, find "System" or "System & performance," and switch that setting on. Oh, and let's keep those browser tabs to a minimum for optimal performance, shall we?

If you're still running into problems after trying these steps, don't hesitate to get in touch with Frame. Provide as many details as you can, and email [support@framevr.io](mailto:support@framevr.io).



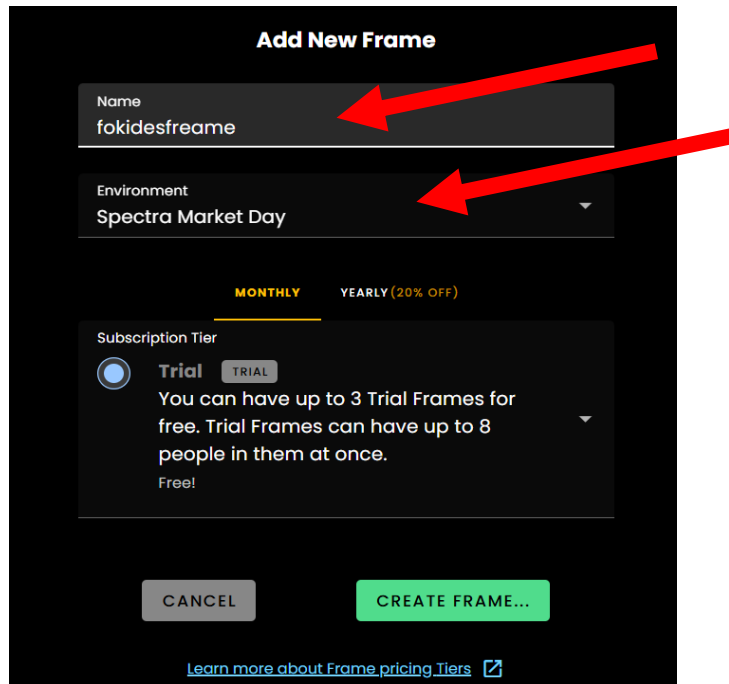
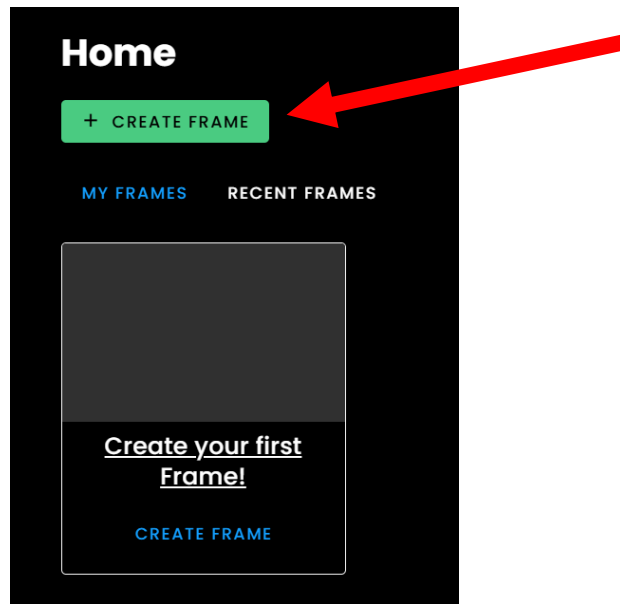
# Interface, settings, & assets

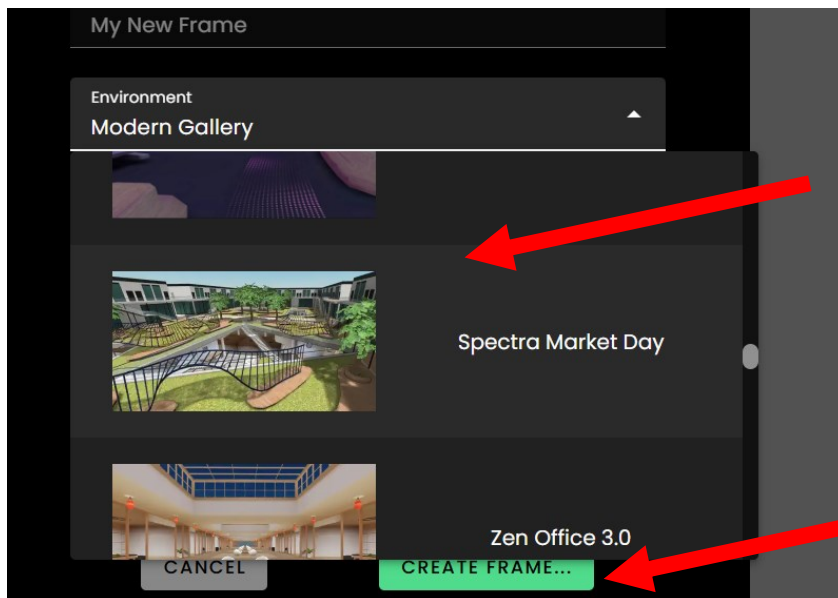
## Create your first Frame

- After logging in, click the green "Create a Frame" button on the sidebar.
- Next, give your Frame a unique name and select an environment. Remember, the name you choose will become part of your Frame URL, e.g., framevr.io/yourframename.
- Kick things off with a free trial Frame, you can always upgrade later if you need to.

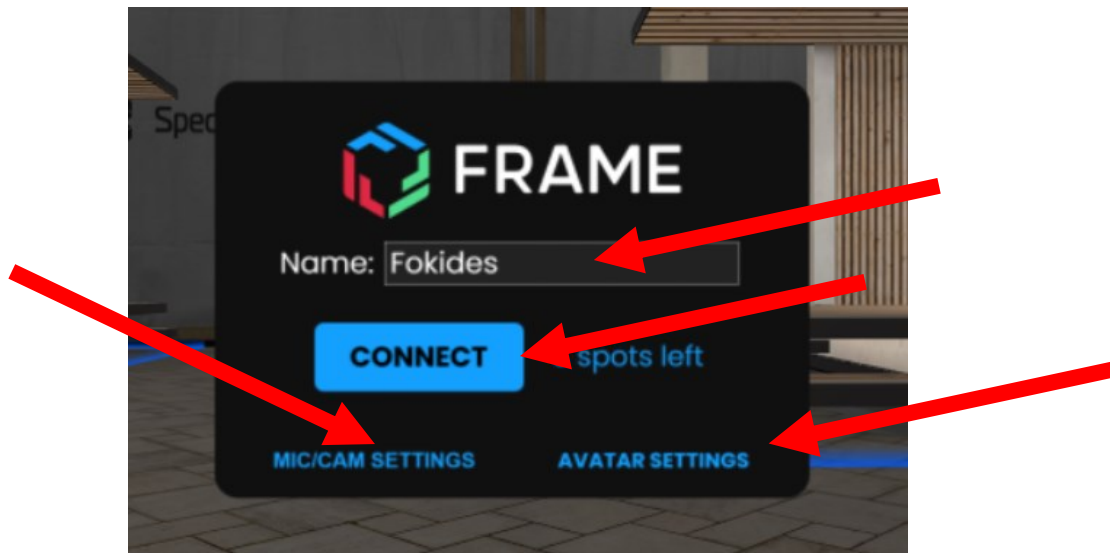


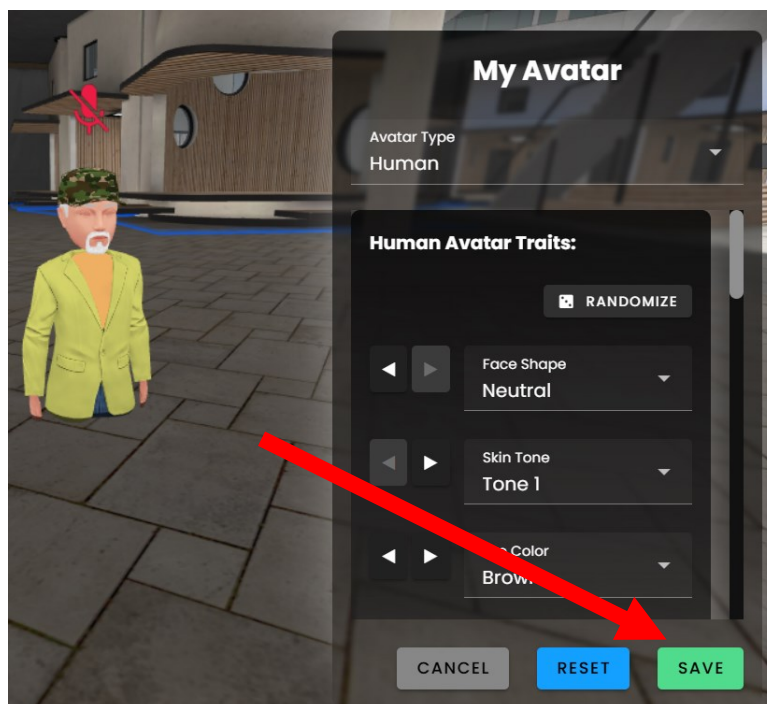
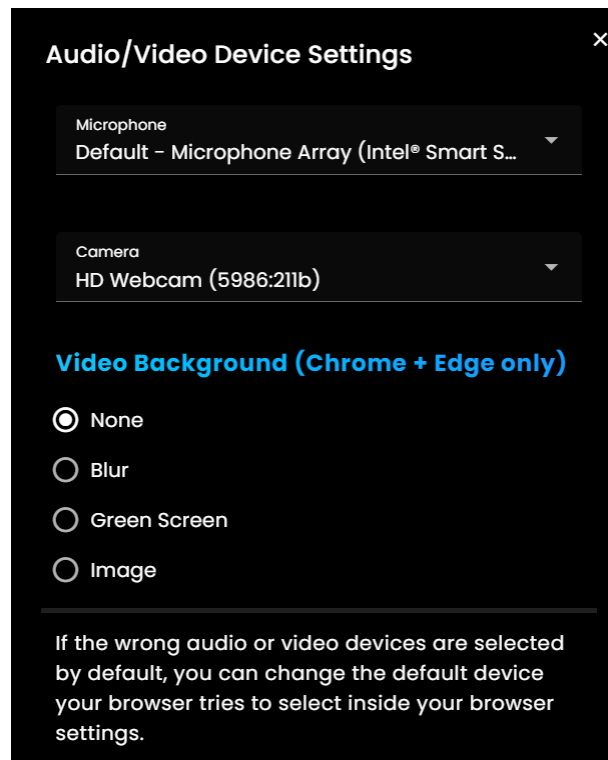
Note. Once you set your Frame name, you can't change it, so pick something great! However, your environment choice isn't set in stone; you can switch it anytime.





- Before connecting, set your mic, camera, and avatar appearance





### Avatar types

- Android bot. Default avatar for users without an account.
- Human. Full body human avatars for users to save to their Frame account.
- RPM. Integration with ReadyPlayerMe for users to use their RPM account avatars in Frame. 💡 Try it it's fun!

### Desktop Navigation

Experience seamless movement on a desktop computer with Frame's versatile options:



- Keys: Effortlessly move by using the arrow keys or the WASD keys, and for an extra burst of speed, just hold down the Shift key while moving.
- Mouse/Touchpad: Simply move your mouse or touchpad to look around. Want to move? Double-click your destination. Need to teleport? Hold down the Shift key and double-click to zip to your desired spot instantly!

### Mobile Navigation

Navigating within a Frame on a mobile device is a breeze with intuitive controls:

- Circle Gyroscope: Just move your device in the direction you want to go. This naturally intuitive feature, called the circle gyroscope, makes navigation feel like second nature.
- Swipe Screen: Explore your environment effortlessly by swiping your finger across the screen. It's a simple and effective way to look around.

### VR Navigation

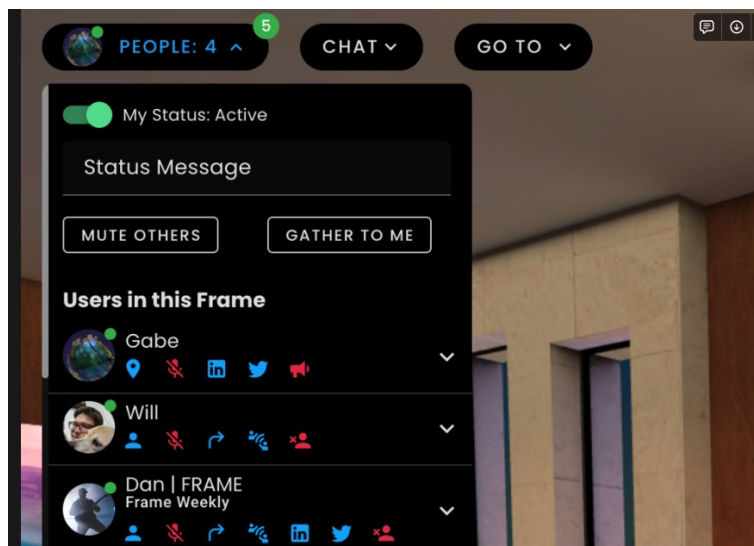
Experience the ultimate immersion with Frame on a VR headset:

- Controllers: Use your VR controllers to teleport. Simply point and press the appropriate button to teleport to your chosen location.
- Joystick: Take full control of your surroundings using the joystick on your VR headset. Look around with precision and ease, making your virtual exploration more engaging than ever.

### Gathering Other Users to You

This powerful feature will be detailed in another section, but here's a sneak peek:

- As a Frame owner or admin, you can magnetically gather all users around you with the "Gather to Me" button found in the "People" menu.
- Additionally, you can gather an individual user to you by clicking the button next to their user entry, which looks like two people surrounding a WiFi signal.

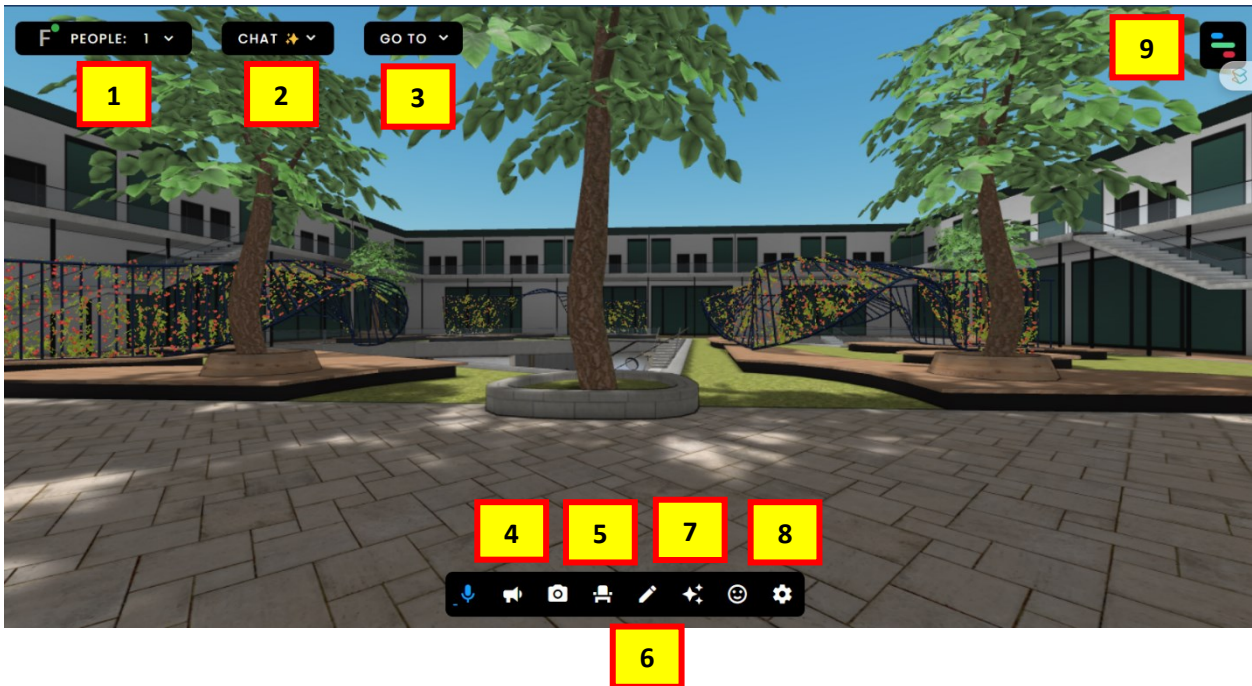


### Make Teleport Buttons (💡 this feature will be discussed at another section)

When you attach a link to an asset, one fantastic option is the "Spawn spot link." This amazing feature lets you create buttons that teleport users to any location you choose. Just bring in a Spawn spot asset, position it where you desire, and voilà! You're ready to set up your link and offer an incredible teleportation experience. So easy, yet so powerful!

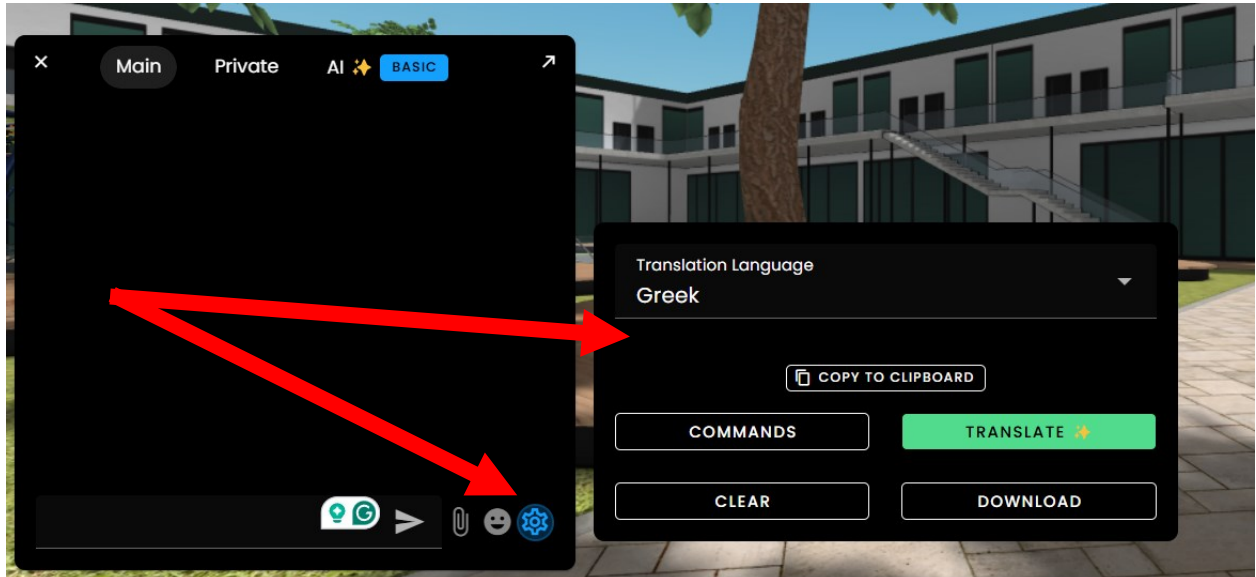
## Frame's interface, settings, settings, and, yet, more settings...

When entering a Frame, you will see 3 toolbars containing all the available functions and settings.

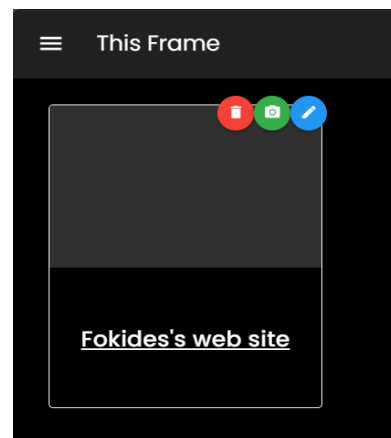
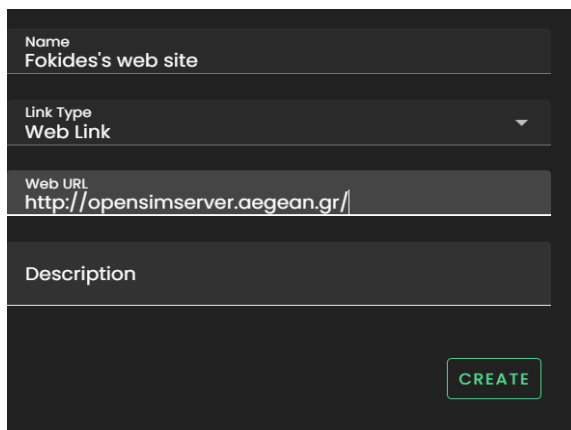
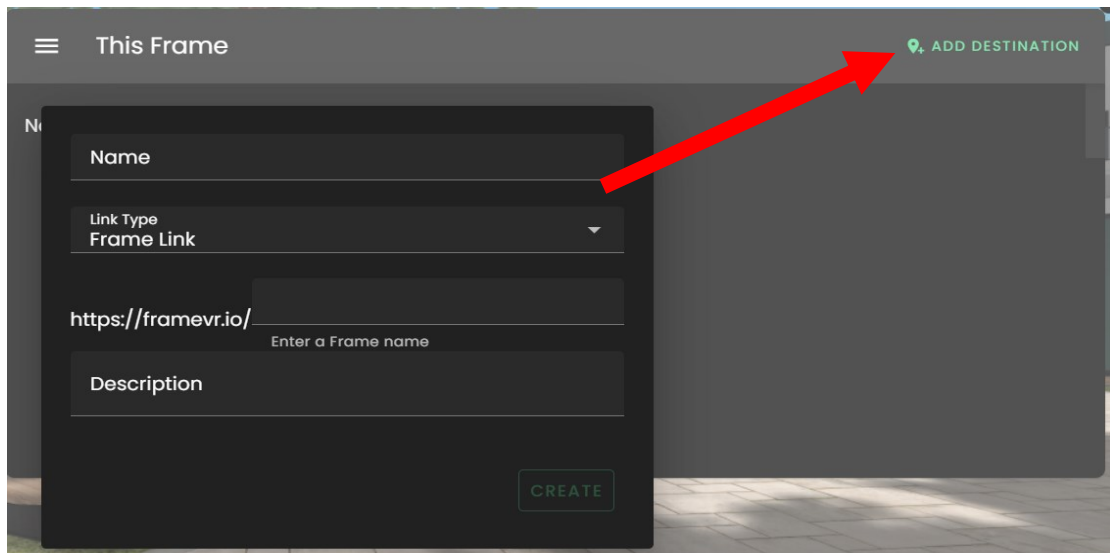


### Top toolbar

1. People in the Frame.
2. Chat with people in the Frame. You can translate the text in many languages.



3. Go to web site, another Frame, or spot. Jump to a website, leap to another Frame, or navigate to a new spot! The metaverse thrives on seamless movement between various yet interconnected destinations. Our Go to Menu revolutionizes this experience by effortlessly linking your Frames and merging them into a comprehensive metaverse ecosystem. You can easily connect to external services or create smooth transitions for users within your Frame. We've got three dynamic link types: (i) Frame link for hopping to a different frame (just grab the link!), (ii) Web link for opening a website, and (iii) Spot link for moving to another spot within your Frame (💡 this feature will be discussed at another section).



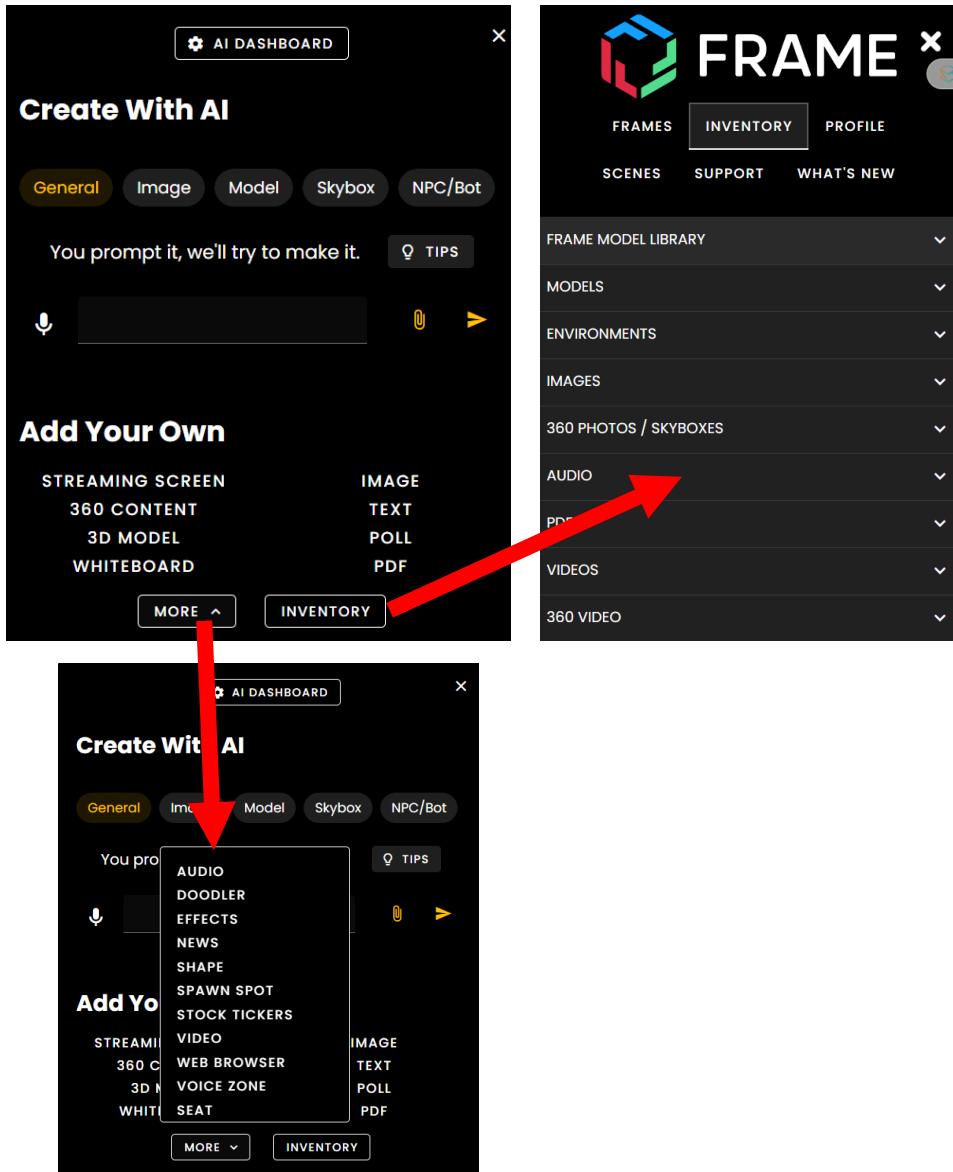
### Main toolbar



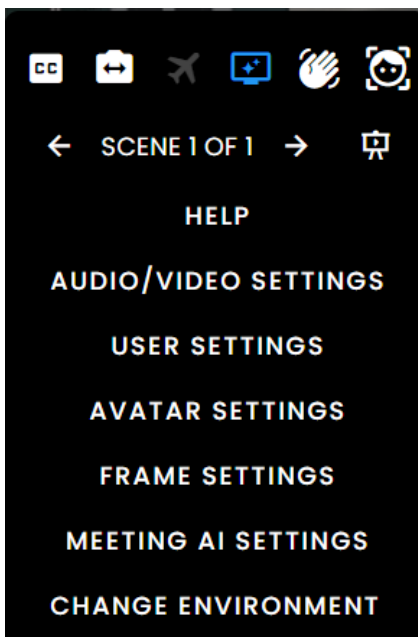
4. Microphone, megaphone, and webcam. By default, Frame automatically requests microphone access from users as soon as they connect. Prefer to keep things quieter? No problem, there's a setting to disable this feature. The magic of "spatialized" audio in Frame brings conversations to life, you'll hear voices more clearly when you're nearby and softer as people move further away, just like in real life! And in VR, the stereo spatialization takes it up a notch: you'll actually hear someone in your right ear if they're to your right. Need to project your voice over a larger distance? Simply hit the megaphone button in the toolbar to make sure everyone, no matter how far, can hear you loud and clear.

Voice zones (💡 this feature will be discussed at another section). Frame empowers you to create designated areas for private conversations effortlessly. The megaphone can't pierce through these exclusive voice zones, ensuring your discussions remain uninterrupted. As an admin, you've got the power to mute others in the "People" menu or silence all microphones through Frame settings. You can even configure it so that only admins or specific members have microphone privileges. Plus, with the handy "m" hotkey, you can quickly mute or unmute your own mic whenever needed.

5. Sit button. It gets you into the closest seat or frees you from the one you're in. This feature only functions in areas with seats. Want to choose a specific seat? Just double-click it with your mouse!
6. Edit mode button: Ready to unleash your creativity? Hit the "Edit mode" button! The pencil icon toggles Edit Mode on and off or you can use the "u" hotkey for quick access. With Edit Mode, you can rearrange elements, tweak asset properties, and so much more.
7. Create button. Use it to add content to your Frame (💡 this feature will be discussed at another section).

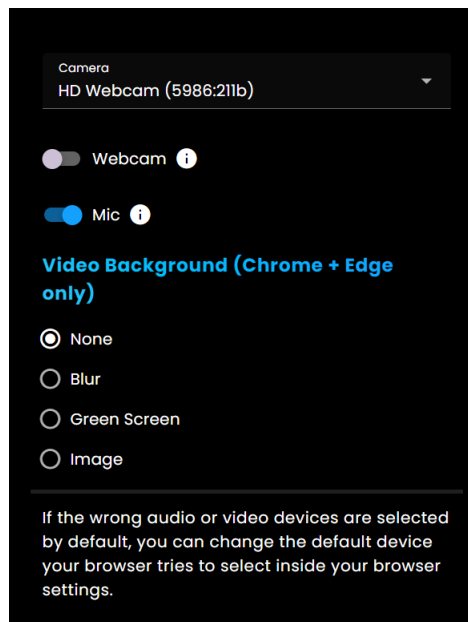


8. Settings button. Use it to adjust various settings of your Frame.



- Close captions: This feature toggles closed captions on and off, giving you a text transcription of everything people are saying. If others in your Frame haven't already given permission, they'll see a pop-up request asking to transcribe their speech, simple, right? For the best accuracy, users should set their voice language in their Profile. The spoken words will appear in a closed caption section and in text chat, so you can enjoy it in VR too. Plus, when combined with text chat translations, you'll get near real-time translations of what someone is saying! For a deeper dive into closed captions and translations in Frame, check out the blog post available at <https://learn.framevr.io/post/translation-and-closed-captions-in-the-metaverse>.
- Camera mode: This feature lets you switch between first-person and third-person views. Give it a try and see what suits you best!
- Fly mode: Exclusively available in non-AI environments, this toggle allows you to move freely in any direction. It's perfect for snapping photos or getting a bird's-eye view of the surroundings.
- Visuals button: This toggle lets you choose between visuals and performance. If Frame detects low FPS (frames per second), it can simplify avatars to boost performance. Want to reduce lag? Just switch this off and enjoy smoother operation!
- Webcam motion detection (Beta feature): Activate this feature and show a thumbs-up to your camera to send celebratory emojis. Exciting updates on this coming soon!
- Webcam face tracking (Beta feature): When enabled, RPM (ReadyPlayerMe) avatars will mimic your facial expressions and eye movements. Note, however, this might not be compatible with all devices.

- Audio/Video settings. Allows you to select the microphone, mute it, select the webcam and turn it on/off. You can also choose the video background.



- User settings. Opens the profile menu, discussed in a previous section.
- Avatar settings. Opens the avatars menu, discussed in a previous section.
- Frame settings. Opens the side toolbar (see 9).
- Meeting AI settings. Opens the menu for training the AI (not available in the free version).
- Change environments. Allows you to change the environment you initially selected during the creation of the frame.

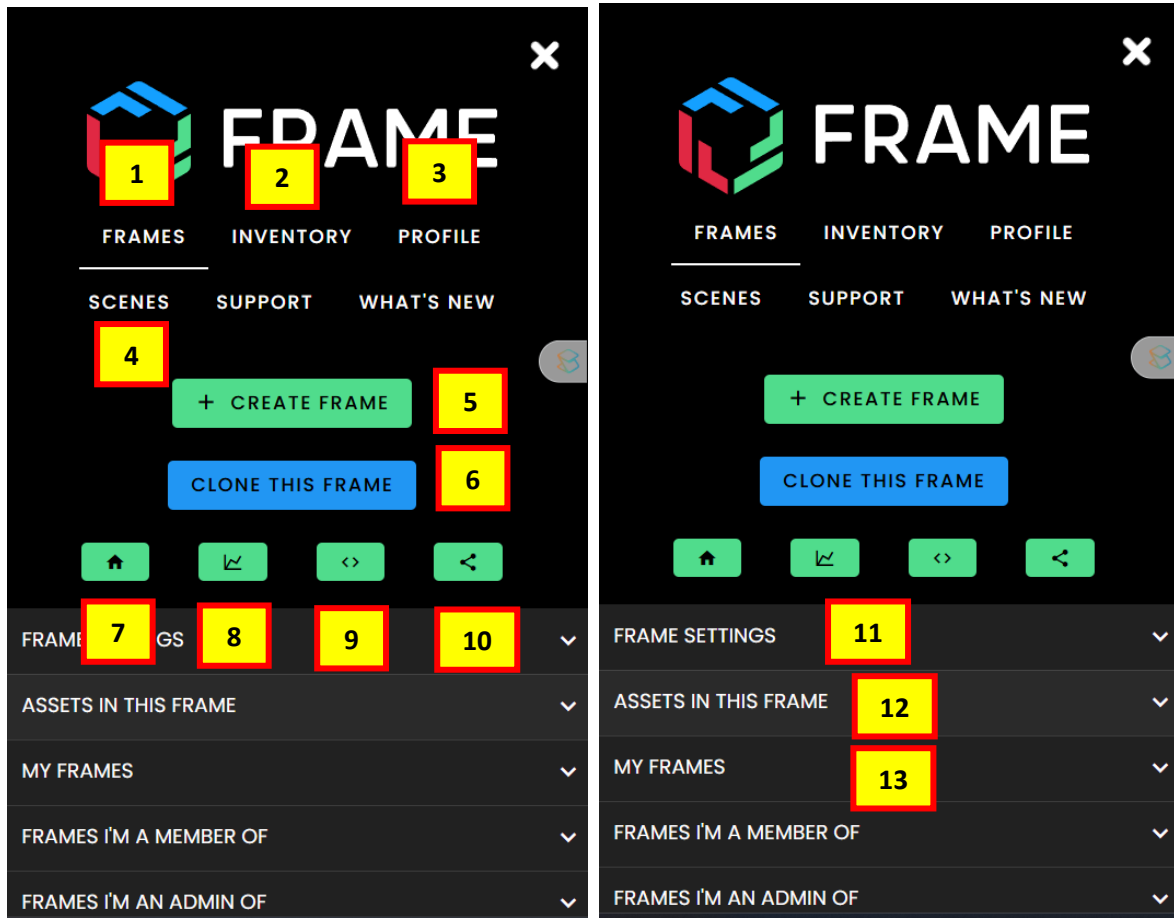


It is not advisable to change the environment if you have added content, because things might get misplaced.

## Side toolbar



9. Opens the side toolbar for managing your Frame.



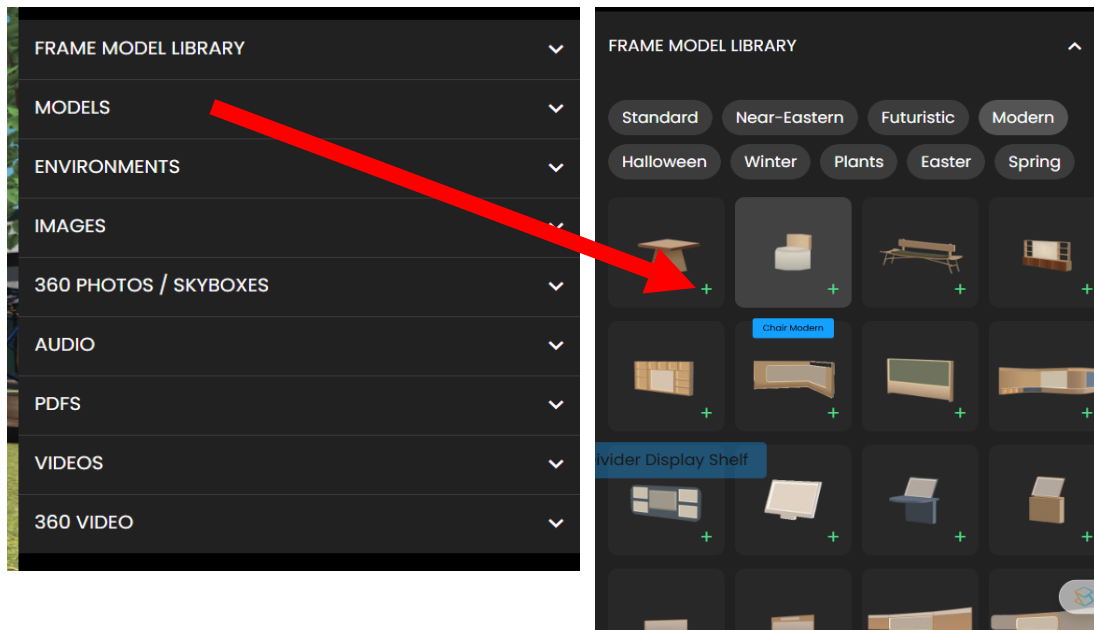
1. See 11, 12, and 13.

2. Opens your inventory. Here, you can effortlessly add or upload models, audio files, PDFs, images, videos, and a variety of other assets to enhance your Frame development. Your Inventory is your treasure trove, a repository where you can gather all these invaluable assets from the sidebar, ready to be seamlessly integrated into any Frame you've created or have editing permissions for. Remember, adding an asset to your Inventory doesn't mean it's instantly part of your current Frame, it's conveniently stored for you to bring in whenever you're ready. Just use the green plus button beside each item to incorporate it into your Frame. Your Inventory is perfect for those essential items you frequently use for building or meetings, like logos, 360 photos, and 3D models. Dive in and make the most of your creative arsenal!

You can also add these assets using the "Create" button in your main toolbar.

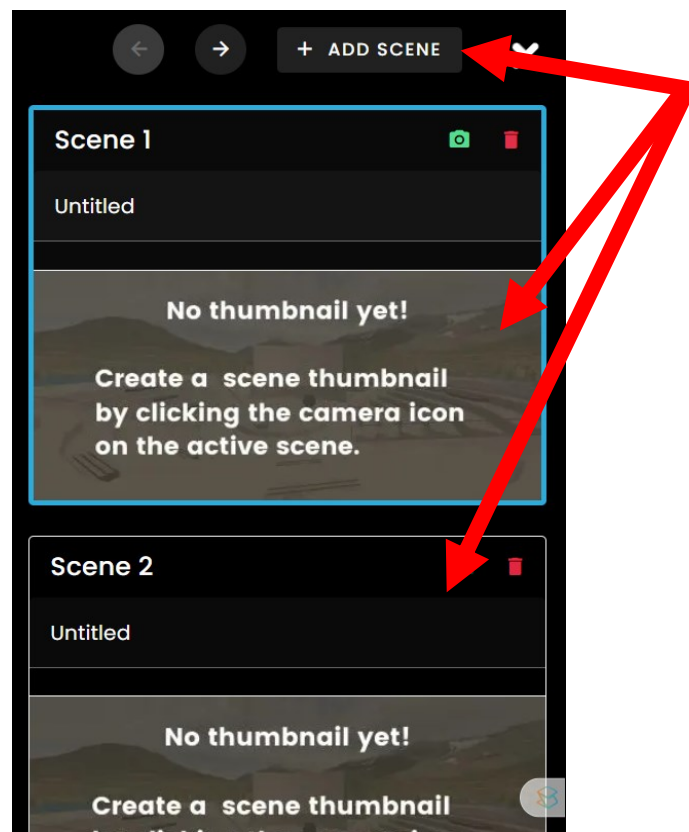


There are limits on the file sizes you can upload. For example, you have 512Mbs available in total for video files.



3. Profile. Opens the Profile menu.

4. Scenes. Unlock the power of the scenes menu in Frame! This feature allows you to craft stunning spatial presentations. Whenever you bring assets into Frame, you're placing them into a scene. What's fantastic is that you can create multiple scenes! Think of each scene as your 3D canvas, where you can arrange all your content creatively. You can then guide your audience on a mesmerizing journey through your scenes. When you're sharing a Frame with others, everyone will be exploring the same scene together. Want to make it interactive? No problem! You can set up scene links on assets. This means when users click on them, a specific scene will load instantly. The magic of scenes is all about helping you and your audience navigate through content while remaining in the same immersive 3D environment. If you're looking to transport people to completely different 3D worlds, consider using Frame links to create entirely separate Frames.



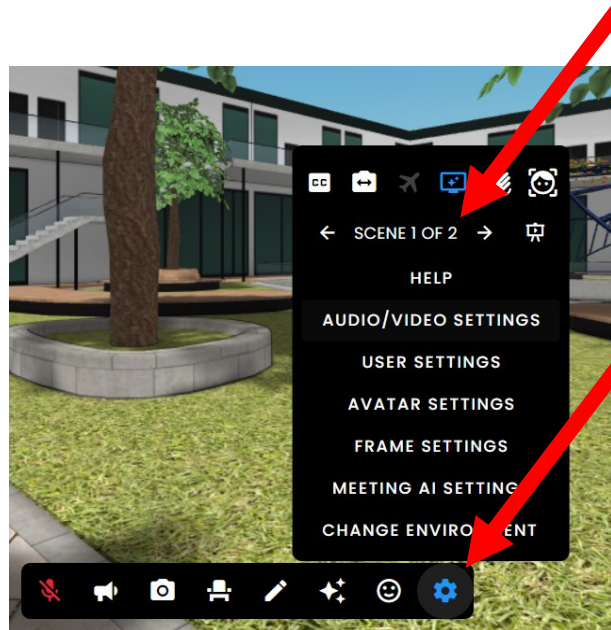




As Scenes use the same environment, it is easy to lose track which scene you are editing; always make sure you are editing the right one!

💡 How to assign actions to assets that enable users to go to different scenes will be discussed at another section.

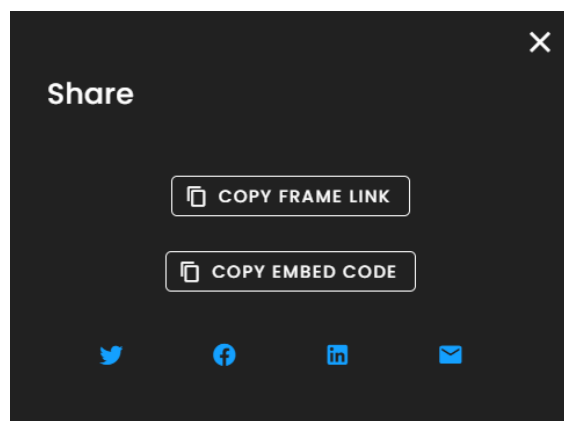
To manually navigate between scenes, use the gear button in the main toolbar.



Watch this video about scenes:

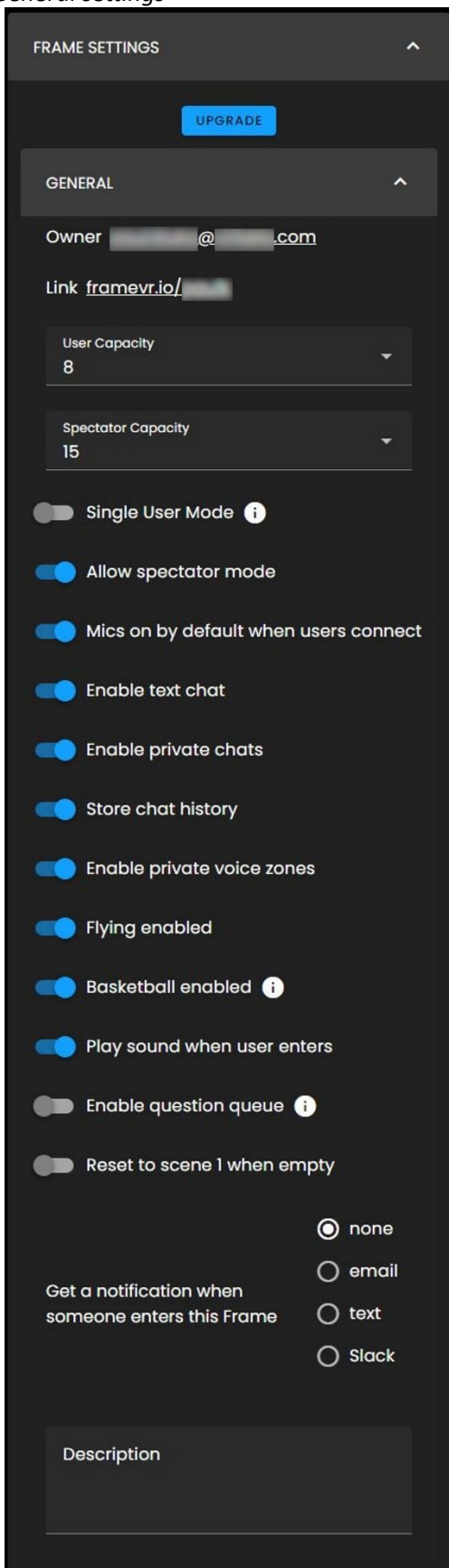
<https://www.youtube.com/watch?list=PL1MmX05qxhipAYbhB13YJZXRkHkEMM0f9&v=yzje7myU4nM>

5. Create Frame. Allows you to create a new Frame. In the free version you can have only three Frames.
6. Clone Frame. Use it to create a duplicate of your Frame.
7. Home button. Allows you to go to the starting page, in which you can select which Frame to edit.
8. Analytics button. Allows you to see various data about who and when used your Frame (available in the paid version).
9. Script editor button. Used for scripting and programming. We will not discuss this feature.
10. Share button. Use it to share the link of your Frame and send it to other users.



## 11. Frame settings. Allows you to set various parameters of your Frame.

### General settings

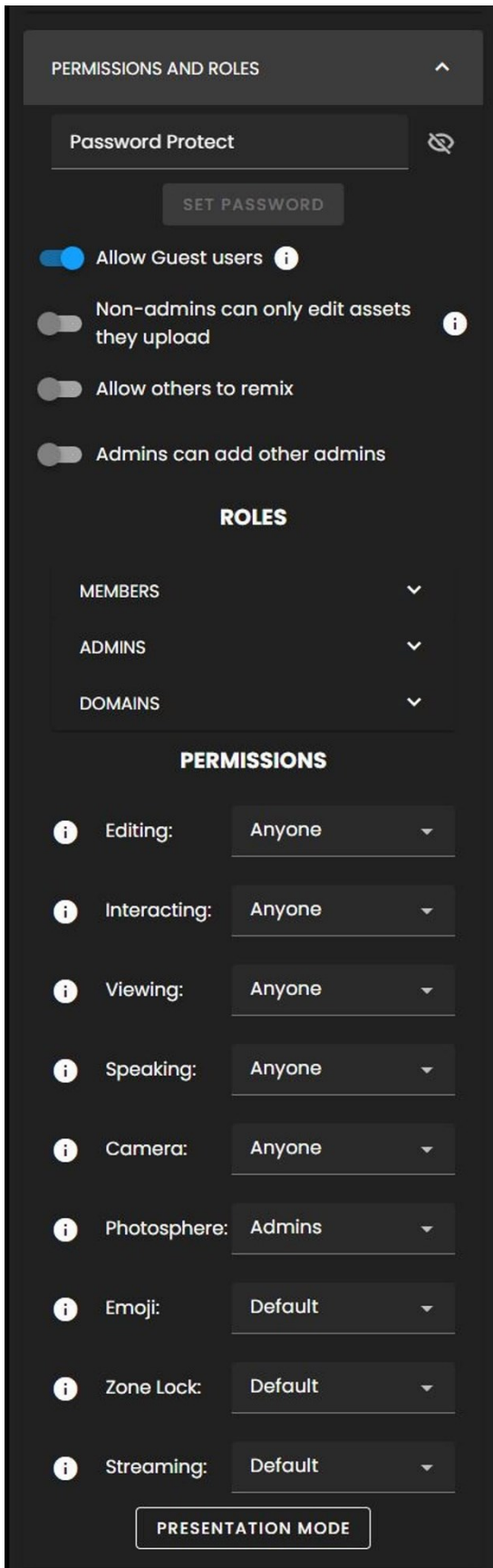


- Single user mode: Decide whether your Frame is a bustling multi-user hub or a solo adventure. By default, Frames are multi-user, allowing everyone to interact as avatars. Switch it to single-user for a solo experience without avatars, voice chat, or text. If you switch modes while people are in the Frame, it will refresh to adapt!
- Allow spectator mode: Enable spectator mode for your Frame and give users a choice, join as a fully interactive participant or as a silent observer who can move around, see, and hear everything but remain unseen and unheard. Spectators can still text chat!
- Mics on by default: Want your users' microphones to fire up as soon as they enter your Frame? Toggle this setting and make sure everyone's ready to chat from the get-go.
- Megaphones enabled by default: Empower your voice further! With megaphones on by default, you'll be heard loud and clear across your Frame, no matter the distance. Users can still switch it off if they prefer.
- Enable text chat: Control the chat vibes! Turn the text chat on or off with a simple setting.
- Enable private chats: Need some one-on-one text conversations? It's easy, just enable private text chats within the Frame.
- Store chat history: Keep tabs on the conversation! You can choose to store the last 100 messages of your text chat history.
- Enable private voice zones: Broadcast your voice clearly within designated zones. Perfect for getting everyone's attention in specific areas. Combined with the megaphone feature, you're unstoppable!
- Flying enabled: Let's take this experience up a notch, literally! Enable flying for the Frame and let users soar. Remember, they need to activate flying in the Quick settings.
- Basketball enabled: Bring some fun into the mix with basketball! Users can shoot hoops casually with a simple setup; a hoop and ball are just a click away.
- Play sound when user enters: Welcome users with a pleasant chime whenever they join your Frame. You can always switch it off if the chimes get too much.
- Show environment when spheres open: Enjoy 360 photos or skyboxes fully immersed while keeping that beautiful environment visible. Perfect for areas with windows or open spaces.
- Show scene assets when spheres open: Maintain the ambiance by controlling whether scene assets remain visible when 360 photos or skyboxes are expanded (it is not advised to enable this feature).
- Enable question queue: Transform your Frame into a dynamic support or classroom space. The "I have a

question" button adds order, allowing admins to see and address each query efficiently. No more "but teacher, I asked first" squabbles!

- Reset to scene 1 when empty: Keep it organized! Your Frame automatically resets to Scene 1 when it's empty.
- Get a notification when someone enters: Stay informed! Receive notifications via email, text, or Slack whenever someone enters your Frame.
- Description: Customize your Frame with a detailed description. Admins can easily add information here.

## Permissions and roles



- Password protect section: Secure your Frame by setting a password. This is a powerful way to limit access without demanding that users log in.
- Allow guest users: Enable guest access to let users who aren't signed into Frame join the experience without hassle.
- Non-admins can only edit assets they upload: Sometimes, you want users to contribute assets but not tinker with others' contributions. This setting ensures that only admins have universal editing rights, while non-admins can only modify what they upload.
- Allow others to remix: As an admin, you can clone your Frames to different URLs for a seamless copy that's editable independently. Want others to remix your Frames in the same way? Just turn this option on and let the creativity flow.
- Admins can add other admins: Empower all admins with the ability to add new admin users, not just the current Frame's owner.
- Roles, Members dropdown: Easily add members to your Frame with this dropdown. New members receive email invitations, making onboarding a breeze.
- Roles, Admin dropdown: Add new admins using this dropdown, and they'll be instantly notified by email about their new role and permissions.
- Roles, Domains dropdown: Configure supported domains here. Restrict access to your Frame by allowing only users with approved email domains, enhancing your Frame's security and exclusivity.

Permissions section: This is your command center for setting a comprehensive range of permissions, from who can edit and view your Frame to much more.

Frame creators: Absolute control is yours! Creators can do everything, plus they can delegate tasks by adding admins and deciding whether those admins can further add other admins.

Creators/admins abilities: Mute all microphones, tweak Frame settings, clear chat history, delete individual messages, change environments, boot users, use web browsers, and even delete the Frame if needed. The power is in your hands!

- Editing permission: Grant the ability to add, modify, or delete assets, change scenes, and use webcam/screen sharing.

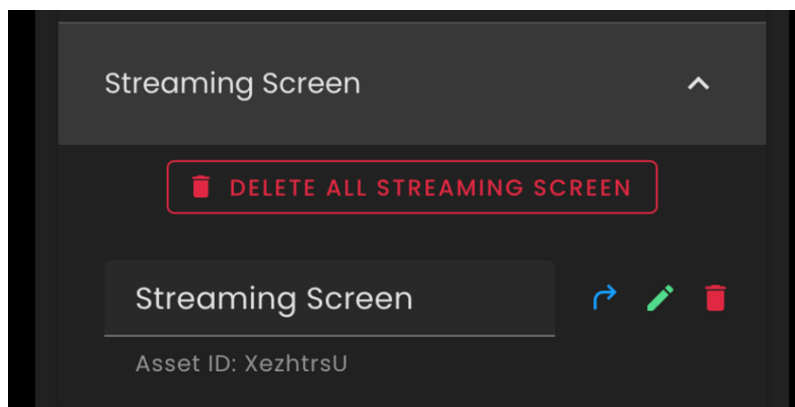
- Interacting permission: Let users interact with content, change PDF pages, expand photospheres, and play/pause media.
- Viewing permission: Allow users to connect to the Frame, use voice/text chat, create avatars, and move around the space.
- Speaking permission: Enable users to use their microphones.
- Camera permission: Allow the use of webcams or screen sharing.
- Photosphere permission: Expand or close 360-degree photos or photospheres, aligned with interaction permissions by default.
- Emoji permission: Inject fun by letting users blast Frame emojis from their avatars.
- Zone lock: Lock Private Voice Zones, preventing non-admins from entering.
- Streaming permission: Let users share their screen, but restrict them from interacting with other content unless they have Interacting permissions.
- Moderation: Access moderation options in the People menu (e.g., freeze users).
- Wall panels: Enable content addition (excluding admin-only tools) like browsers on the walls without granting full editing permissions.

## Environment and performance

- Environment drop down: Dive into a selection of pre-set environments like never before!
- Upload custom environment: Personalize your space to suit your unique style by uploading a custom environment.
- Upload frame tile map: Incorporate your own tile maps seamlessly.
- Generate navmesh: Automatically create navigation meshes for smoother interactions.
- Auto-seat enabled: Say goodbye to searching for a seat! With auto-seat enabled, you'll be instantly placed into the nearest available seat as soon as you enter the Frame.
- Restrict all assets to zones: Keep your assets meticulously organized by restricting them to specific zones.
- Enable RPM avatars: ReadyPlayerMe avatars are a game-changer! This third-party customization system lets you create avatars straight from photos. Remember, RPM avatars are a bit heavier than Frame avatars, so for big interactions, you might want to toggle this off. When on, "RPM" will appear as an option in the avatar configurator.
- Sky enabled: Enjoy skylines with the sky feature turned on.
- Enable default scene light: Keep the default scene light on for optimal visibility, unless you're setting the stage with your custom lights in a 3D imported environment.
- Enable shadows for 3D models: Bring depth and realism by enabling shadows for all objects within your Frame.
- Enable scene reflections: Turn on scene reflections for that added layer of realism. Items in your Frame will beautifully reflect each other if they have reflective textures. The Skyrise environment showcases this perfectly, though it may impact performance.
- Reflect expanded spheres: If you have an expanded photosphere and reflective textures, enable this to see stunning reflections off the sphere! Note, this will also affect performance.
- Enable bloom: Add a magical touch! Bloom spreads out bright areas, mimicking real camera lens artifacts.
- Enable image processing pass: Upgrade the visual dynamics by tweaking the camera's contrast and exposure settings.
- Enable depth of field: Create a stylish blur effect in the background that's fully adjustable to your preferences.
- Enable glow layer: Watch as meshes with emissive properties light up with a captivating glow!

- Enable grain: Add a gritty texture with grain noise to give your visuals a distinctive look.
- Performance rating: For detailed tips, check out the "Performance Optimization" section.
- Sharpen effect: Sharpen the scene to make edges more pronounced and sometimes reduce pixelation.
- Fast anti-aliasing: Smooth out those edges for a cleaner look, though be mindful of the performance cost.

12. Assets in this Frame. If you're the admin of a Frame, get ready for some organizational magic! In the Sidebar, you'll find an incredibly useful list of all the Assets within your Frame. This feature is a lifesaver, especially in those sprawling Frames where it's all too easy to lose track. Sometimes, assets might accidentally end up under the floor or misplaced somewhere, yet they're still in your Frame and possibly affecting performance. But no worries, expand that menu and you'll uncover dropdowns for each asset type. Click to expand one, and you'll see a detailed entry for every single asset!



- The blue arrow button is your magic key to instantly locating any asset within a navigable area, quick, precise, and at your fingertips! However, if it's positioned way up high or far down low, this feature won't come through.
- Next, there is the green pencil icon, your gateway to the Edit Menu for any asset. It offers a super convenient way to tweak and modify properties, even if you can't see the asset on your screen. Talk about handy!
- And then there's the trusty trash can icon, your go-to for deleting any asset with ease.
- Under each asset type, you'll find a "Delete all" option. For all assets collectively, there's the "Delete all assets" button. A word of caution though: use these power moves wisely because once you hit delete, there's no turning back.

## Performance optimization

When diving into the development of your Frame, keep these key points in mind! Frame is a metaverse platform that operates right from your web browser. This makes jumping in super easy, but it also means you need to be mindful about how much you load into your Frame at once to keep everything running smoothly. Ultimately, the choice of what to prioritize rests with you. If your audience is primarily desktop users, you might be comfortable throwing in loads of assets and creating richer 3D environments. On the other hand, if mobile accessibility is a priority, you'll need to limit assets and ensure your 3D environment is highly optimized.

The great thing is, Frame developers work hard to strike a balance between both worlds. Take iOS Safari, for instance; it has a hard time rendering a lot of high-resolution images and videos, and actually struggles with rendering a bunch of things in general. Because of this, Frame automatically downscales images and videos on iOS. Even with these measures, you'll still face limitations on iOS Safari before any other platform. So, if targeting iPhone users is crucial for your project, you'll need to be extra cautious.

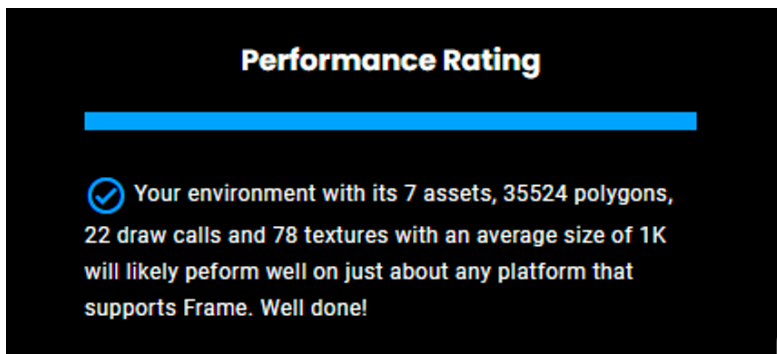
### High level tips

- To make sure your Frame runs smoothly on mobile, especially using iOS Safari, it's crucial to keep the number of assets to a minimum. Instead of cramming everything into a single Frame, spread your assets and users across multiple Frames. Make it easy for everyone to move between these Frames with the Go to menu or Frame links.
- Be mindful of the 3D models you download from Sketchfab or other platforms, they're often not optimized for seamless real-time collaboration within Frame. Choose environments that perfectly match your needs. For instance, a small meeting space doesn't require the massive Auditorium ενωπιονμεντ.
- Always set videos to NOT autoplay. This simple step can save a lot of resources. If your assets are distributed across various zones, use the Frame setting "restrict all assets to zones." This will only render assets in the zone the user is in, significantly boosting performance since users won't be rendering everything at once.
- Use webcams and streaming screens only when necessary. Compress your images and spheres with tools like squoosh.app before importing them. You can tweak the compression level to maintain image clarity. Avoid overusing particle effects like "Smoke," as they can heavily impact performance.
- Regularly clean up and delete unused assets from your Frame. Check all assets under the "Frame" tab in the sidebar. When managing many users in your Frame, toggle the "prioritize performance" option in the sidebar. This will render simplified avatars to maintain decent performance. If you prefer higher-quality avatars and can tolerate some lag, that's perfectly fine too!
- It's also wise to limit the number of open browser tabs or applications when using Frame. Whenever possible, use Chrome or Edge, but remember, for iOS users, Safari is your go-to browser. Achieving good performance on iOS Safari can be challenging. We sincerely hope that Apple will either allow other browsers to run on iOS (since Chrome is just a skin of Safari) or invest in enhancing Safari to truly compete with other web browsers.

### Performance rating

There's a basic Performance rating in Frame that you can use to get some high-level info about what's in your Frame.

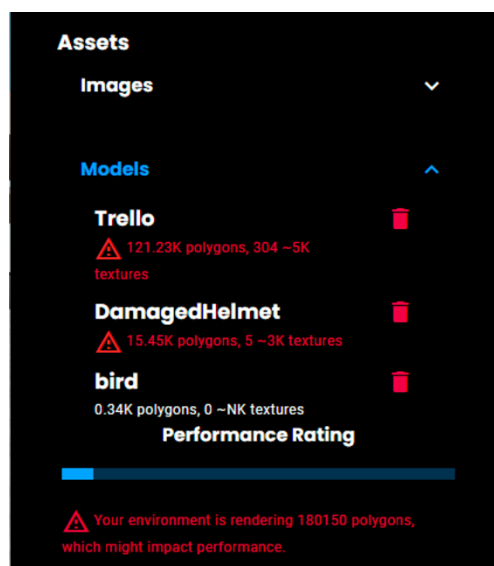




Right next to "Performance rating," you'll spot an FPS (frames-per-second) counter. Now, if your FPS is low, that's not great. Ideally, you want to hit that sweet spot of 60 FPS. Anything below 40 FPS? You're likely to experience some lag. There are several culprits behind low FPS, think an overload of textures (images), videos, or 3D models. But don't worry, Frame comes equipped with some nifty checks to diagnose the issues plaguing your performance. If there's a glaring problem, Frame will alert you! Here's how it determines your performance rating:

- Poly count: This gauges the complexity of the 3D models in your current view. A higher poly count means more intricate geometry, and that can drag your FPS down. This is why optimizing your 3D models and environments is a game-changer.
- Texture count: This tally counts how many textures you have in your Frame—like images, videos, or textures on 3D models. It also looks at the average resolution. Some devices (like iOS Safari) might choke on high-resolution textures. More textures or higher resolutions can seriously hit your performance.
- Draw call count: This measures how many meshes are being rendered from your current camera perspective. Higher draw call counts? You guessed it, worse performance.

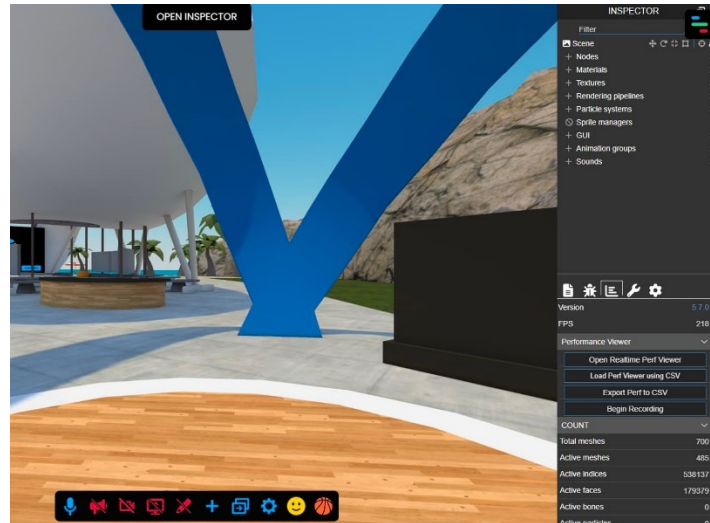
If one of these counts is sky-high and you're scratching your head wondering why, it could often be those 3D models. Models from services like Sketchfab might not be optimized for real-time collaboration on Frame. But no worries! Frame provides some basic stats about your models to help you pinpoint problematic ones. Just head to the models list under "Assets in this Frame" in the Frames tab (not in Frame settings, so make sure you collapse that if it's open).



These warnings let you know that these models might cause issues. As you can see, the overall Performance Rating for the above Frame is quite low as well. On your desktop, the Frame still does fine. On mobile it lags. It's important to point out, though, that this might not necessarily be a problem if you expect your guests to join from desktop computers. If your guests are on mobile, particularly iOS safari, this could be a problem, though. In extreme cases, it might prevent the Frame from loading altogether!

## The Babylon inspector

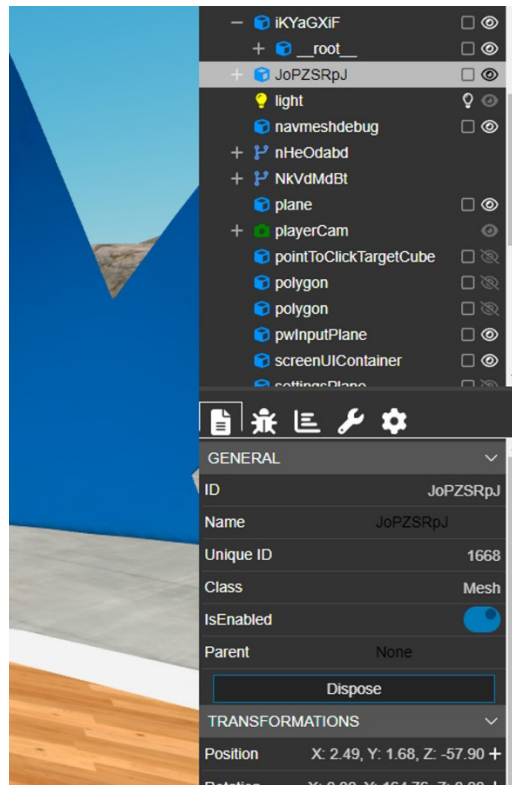
Frame was developed using the cutting-edge front-end framework Babylon.js. Thanks to this partnership, there is access to some incredible tools from Babylon.js that can help you delve even deeper into your performance issues. One such powerful tool is the Babylon Inspector. To access it, simply append "debug=true" to the end of your Frame URL. This will reveal a new button at the top-center of your Frame interface, providing you with easy access to the Babylon Inspector. Make sure to close the Frame sidebar to fully see the Babylon Inspector. Once opened, you'll notice a row of horizontal icons about halfway down. Click on the middle icon that looks like a little graph. This will give you a faster, more comprehensive view of various metrics and statistics that are crucial for optimizing your Frame's performance.



The FPS counter here isn't just updating every three seconds, it's in real time! Plus, there's an overload of details you can sink your teeth into. If you're savvy with 3D geometry or performance debugging, you'll feel right at home with these terms. Dive deep into any item in your frame by opening the "Nodes" section at the top of the Inspector. This section includes everything visible in your scene, even avatars. Just click an item and then hit the first page icon in the horizontal row to see all the info about it.

And guess what? You'll love the versatility of this tool! You can easily hide any item by clicking the eyeball icon next to it. Want to go a step further? Use the "dispose" button in the general menu to temporarily remove the item from your scene. This nifty trick lets you see how removing it impacts your performance/FPS without permanently deleting the asset.

But here's the kicker: If you dispose of an item, just refresh the frame to bring it back. If you only hide it using the eyeball icon, you can make it reappear with a simple click. Talk about control at your fingertips!



Feel free to tinker around with anything you want in the Babylon Inspector! Even if you manage to "break" something temporarily in your Frame, don't sweat it. The changes you make in the Inspector aren't permanent, and you can always restore everything to its original state just by refreshing your Frame. So go ahead and explore with confidence!



It is not recommended having any more than:

- 200 draw calls.
- 130,000 active faces.
- 20 materials.

## Admins, members, and admin superpowers

Frame creators, get ready to take control of your space like never before! You can now add admins or members to your Frame just by using their email addresses. It's super simple! Once someone gets invited to be a member or admin, they'll receive an email notification immediately. To be recognized as an official member or admin, the person must log in with the email they were invited with. Easy-peasy! And guess what? You have the power to allow admins to invite other admins right from your Frame settings. Talk about flexibility! On top of that, you can assign permissions based on your unique groupings, ensuring everything runs smoothly. For instance, you could set it so only members have the ability to edit the Frame. Curious to learn more about permissions? Check it out at <https://support.framevr.io/Permissions-43c0e35104034b6b9d26ba1b655f5d38?pvs=21>.

### Special Admin/Creator Superpowers

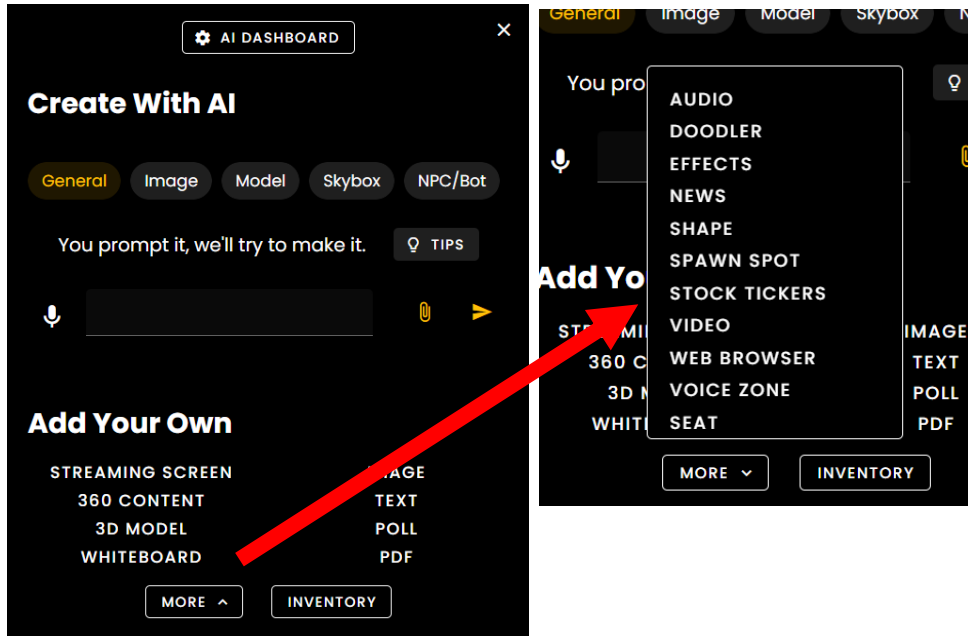
Now, let's talk about the incredible superpowers that come with being a Frame creator or admin. Adding admins to your Frame lets you delegate the management of the space seamlessly. Here's a sneak peek at the extraordinary powers you wield:

- View and modify frame settings: Keep everything under control with ease.
- Analytics access: Get insights and analytics for your Frame to make informed decisions.
- Asset editing: Edit the assets within the Frame to fit your vision perfectly.
- Special text chat commands: Use commands like '/broadcast' to send a special pop-up to everyone!
- Gather users: Use the People menu to gather all users or individual users to you. Learn more at <https://support.framevr.io/6b6fba7a1bd542b0a9cfcb001049e36c?Pvs=21>.
- Mute controls: Mute all users or specific individuals in the People Menu. Learn more at <https://support.framevr.io/6b6fba7a1bd542b0a9cfcb001049e36c?Pvs=21>.

# Everything about assets



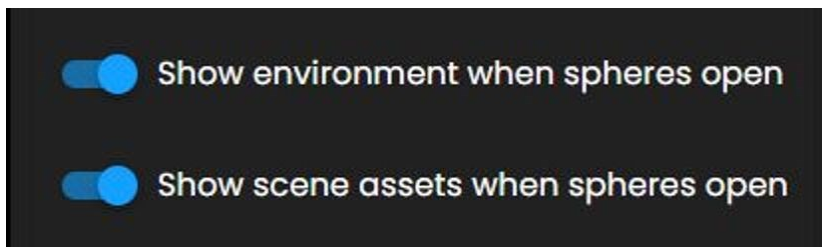
When you press the "Create" button in your main toolbar, a list of assets you can add to your Frame appears (also click the "More" button).



So, below you can find some info about each asset.

## 360 Photos/Skyboxes

Pick your favorite 360 photo and add it to your Frame! Plus, Frame offers some cool default objects ready for you to explore. In your Inventory, there's a handy drop-down menu for 360 Photos. Just hit the green plus button to bring one into your scene. Watch the magic unfold as your 360 Photo appears as a small sphere. Now, here comes the fun part: with Edit Mode off, give that sphere a click and watch it expand! To close the sphere, just click the globe icon in the toolbar or hit the "h" hotkey, easy-peasy! Normally, expanding a 360 photo hides your 3D environment, but guess what? You can totally keep the 360 environment in view while the sphere is expanded by tweaking your Frame settings under the "General" drop-down (it is not advised to use this feature).



Some considerations when making or choosing a 360 photo:

- 360 photos can be .png or .jpg files, under 15MB.
- It is recommended to compress them with something like squoosh.app before adding them to Frame.
- Images should be equirectangular, which means the width is double the height.



The laser pointer is a helpful tool when a sphere is expanded, if you are trying to guide people's attention to certain areas of it. Press p to toggle the pointer.

### 3D models

The .glb 3D model format is fully supported here! You can upload models up to a sleek 50MB or less. Worried about a larger model? Don't be! The optimizer can help compress it (check out the "Performance optimization" section for more details). Baked animations, baked lighting, PBR, and a whole range of other workflows, are supported, giving you the flexibility you need. Got a Sketchfab account? Fantastic! Use the integrated Sketchfab widget to easily import your models (see the "All About 3D Models" section). But that's not all! There is a nifty library of assets available right within the Frame Asset Library (refer to "Frame's interface, settings, settings, and, yet, more settings..." for more information). You can choose to upload your 3D models as standalone assets or go big and upload an entire Frame environment (see the "Making an Environment" section).

### 3D texts

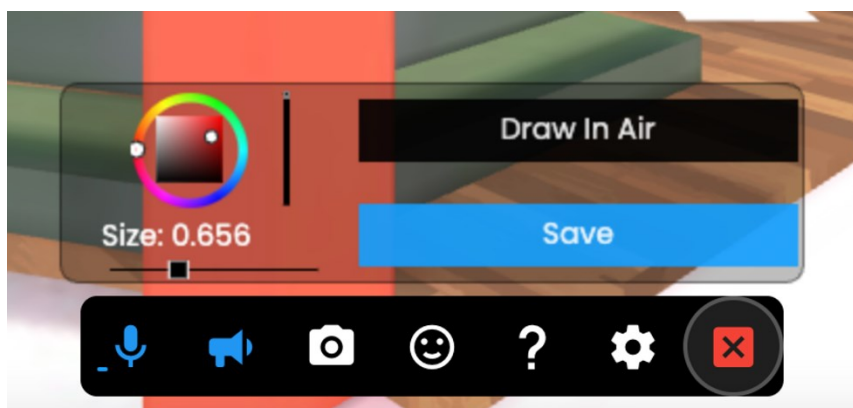
3D text is absolutely fantastic for creating eye-catching, high-impact text! It's perfect for small text chunks, though, as there's no multi-line support. You can really jazz it up with cool visual effects, whether you go for custom-built shaders or select from the curated list. Keep in mind, these 3D texts are full meshes, so having too many of them can affect performance. So, use them wisely!

### Audio

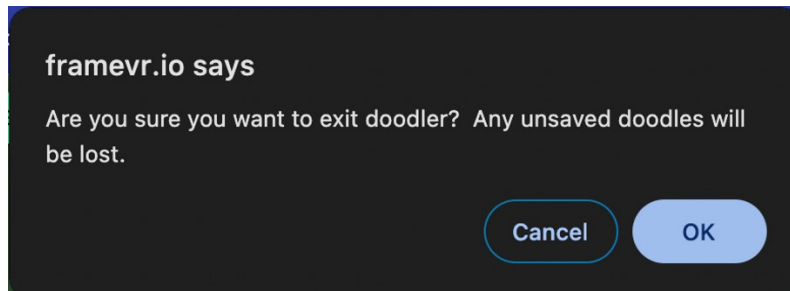
Now let's talk audio. Frame supports .mp3 files with a size limit of 15MB. Optimize your mp3s to keep the file size down. Audio assets appear as a small sphere, and users with playback permissions will see controls just below this sphere. Playback is synchronized, ensuring everyone hears roughly the same thing at the same time. If someone pauses it, it pauses for all. You can set your audio to autoplay, loop, and choose between spatialized and non-spatialized sound.

### Doodler

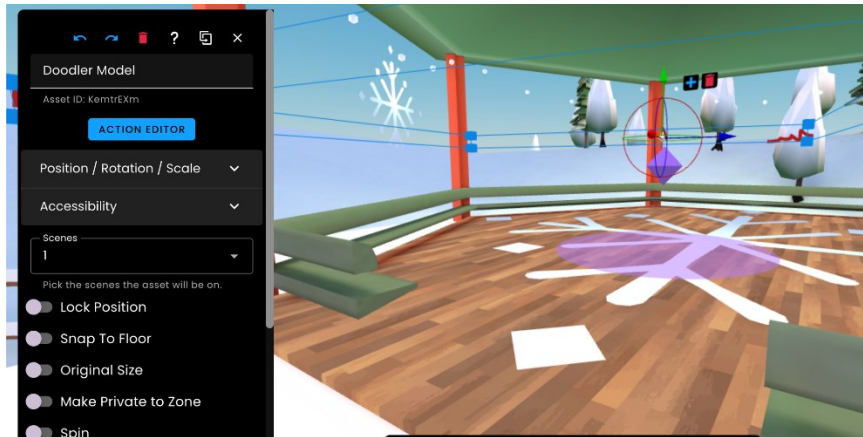
And here's something extra fun, the Doodler! This asset type lets you "draw" in 3D within the Frame. When you select the Doodler from the add asset icon on your toolbar, you'll notice your toolbar morphing to showcase Doodler options. You'll have a thickness scale, a color grid, and options to draw either on the surface or in mid-air. How cool is that?



Be sure to save your doodles, you will see a pop-up reminding you of the same if you wish to exit the asset options without saving.



Once saved, the doodle manifests as a model asset in the Frame, so if needed you can edit the placement in the edit menu.



P.S. Currently the asset is limited to desktop.

### **Green screen video and background webcam effects**

Exciting news! If you're uploading videos or streaming on a green screen background, you can easily activate video transparency. Now you can add a green screen background to your webcam automatically within the audio/video settings. Simply click the gear icon in the bottom toolbar and head to "Audio/video settings." Turn on the transparent cut-out by selecting the Video or streaming screen asset in Edit mode and flipping the Green screen transparency toggle. This feature can deliver some truly powerful effects if used wisely!

### **Images**

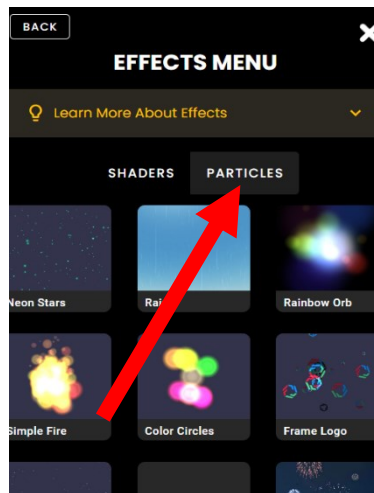
Whether you're working with .png or .jpg files, you are covered. Just make sure your file size doesn't exceed 10MB. For best results, consider compressing your images using tools like squoosh.app. Transparency is supported for .png files. When in Edit Mode, select an image and use the Edit Menu to add a link. For more about these links, check out the "Links' basics" section.

### **News**

Stay updated by picking recent headlines or searching for specific topics. You can also browse various topics and languages in the asset menu. Note that the News asset isn't available in single-user Frames.

### **Particles**

Add some flair to your Frame by integrating ready-made particles like fire or rain from the "Effects" menu. These particles bring your scene to life with animated lights or textures. You can even access additional particles from the Frame effect library or create your own particle systems using the Babylon Particle Editor.



### PDFs

The top-notch way to bring in PowerPoints is to export them as PDFs and then import them as PDFs. Our platform supports PDF transparency, so if your PDF has a transparent background, you can easily toggle this feature in the Edit menu. Users with interact permissions can seamlessly change the PDF pages, and the document is synchronized across all users. Change a page, and everyone will see it!

### Polls

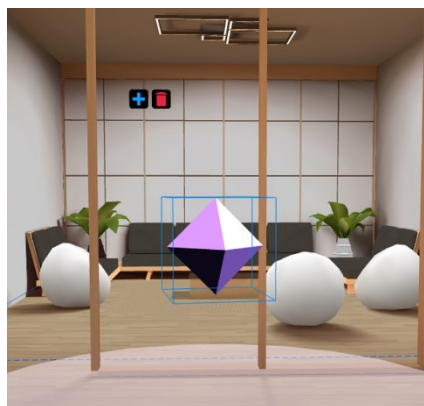
Let's talk polls! You can run as many active polls as you wish, each with a maximum of 10 responses. Choose whether to make them anonymous or not, your call! If you opt for non-anonymous polls, you can view individual responses in the people menu at the top left. Plus, poll responses are recorded in your Frame analytics, so you'll always have that data at your fingertips.

### Shaders

Get ready for some visual flair with shaders! These are small programs that run on the GPU, capable of transforming pixel fragments or vertices of a mesh—think colors and shapes. Adding shaders is as straightforward as adding particles, making it a breeze to enhance the visual impact of your content.

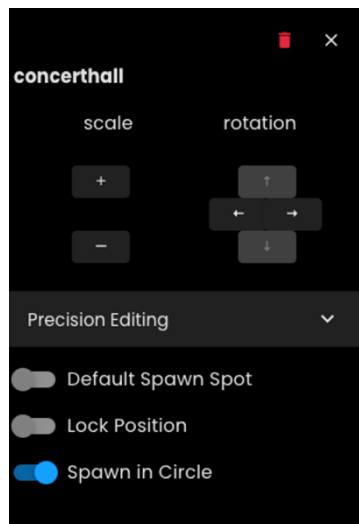
### Spawn spots

Say hello to spawn spots, identified by a small purple shape! Just switch to Edit mode to see them. Use these markers to dictate where users will spawn when they enter your Frame or as teleportation points via special links (see section "Teleportation to another scene"). For example, if your spawn spot is named "office" and your Frame is "building," users can go directly to that spawn spot by using a link like [framevr.io/building#office](https://framevr.io/building#office). You have the flexibility to create as many different spawn spots as you want!



You can also make spawn spots the destination for "spot links", so that you can make buttons that take users to a certain spawn spot! Click on them in Edit Mode to see a few configuration options or to rename them.





### *Default spawn spot*

Typically, Spawn spots are the secret sauce for creating links to different locations within your Frame, each with its own unique hashtag. But guess what? You can totally control where users land when they pop into your main Frame URL! Want to customize the experience? Just set one of your Spawn Spots as the default spot. Remember, only one spot gets to wear the crown at a time!

### *Lock position*

Say goodbye to accidental drags and misplaced assets! With the "Lock Position" feature, your assets stay put, no matter how clumsy you get in Edit mode. Click and drag all you want—it's not going anywhere!

### *Spawn In circle*

Clicking on Spawn spots in Edit mode unveils some cool config options. Choose to spawn users randomly within a circle around the spot or at a particular angle. Knowing the exact spawn angle is nifty, but it could turn your avatars into a bizarre cluster. In multi-user mode, stick with the circle setting unless you're cool with avatar pile-ups!

### **Stock tickers**

Keep your Frame buzzing with up-to-the-minute stock info (US markets only for now). You can add up to 10 stock tickers, distributed across panels however you like, 5 tickers per panel or 10 panels each with one ticker, your choice! Updates roll in every minute during trading hours and every 5 minutes pre/post-market. Trading closed? Then no updates, simple as that.

### **Streaming screen for screen share and webcam**

Streaming screens are your go-to for sharing your webcam or screen. Use as many as you need but remember, too many active screens might slow things down a bit. Share your screen with audio and watch YouTube videos together! The audio? It can be spatialized or not, up to you.

### **Street view**

Street View is a premium feature, not available in the free version.

### **Text area**

For those epic text blocks, Text Areas are your best bet. For short labels and door tags, "Text Labels" are more efficient. Got a long story to tell? Don't worry; text areas are scrollable. Editors will find a handy pencil icon for quick text changes. And in Edit mode, customize away with options for font size, background color, text color, font style, and even a REST API setup.



The REST API feature is a powerful way to bring real-time data from external sources into Frame, such as data from IOT sensors, market/weather data, or analytics or metrics for your business. As it is an advanced feature, it will not be discussed in detail.

### **Text labels**

Text Labels are ideal for labeling purposes like name tags or buttons. In Edit mode, you can easily customize their color, background, and transparency. And guess what? You can even add links to them, transforming them into engaging interactive buttons!

### **Videos**

Uploading videos is a breeze! You can add .mp4, .mov, and .avi files using the blue plus button in the toolbar. They'll take a bit to process into streaming videos, but it's worth the wait! Keep an eye on the file size—there's a limit of 100MB per video (512MB in total), depending on your plan. Users with "interact permissions" can control playback, and it'll sync for everyone in the Frame. The volume isn't automatic, just like autoplay on a website, so users need to hover over and click unmute. Using a video with a green screen background? You can enable it right here (have a look at <https://support.framevr.io/a178a77c92d340c19daaa2fd289b8fdf?pvs=21>).

### **Voice zone**

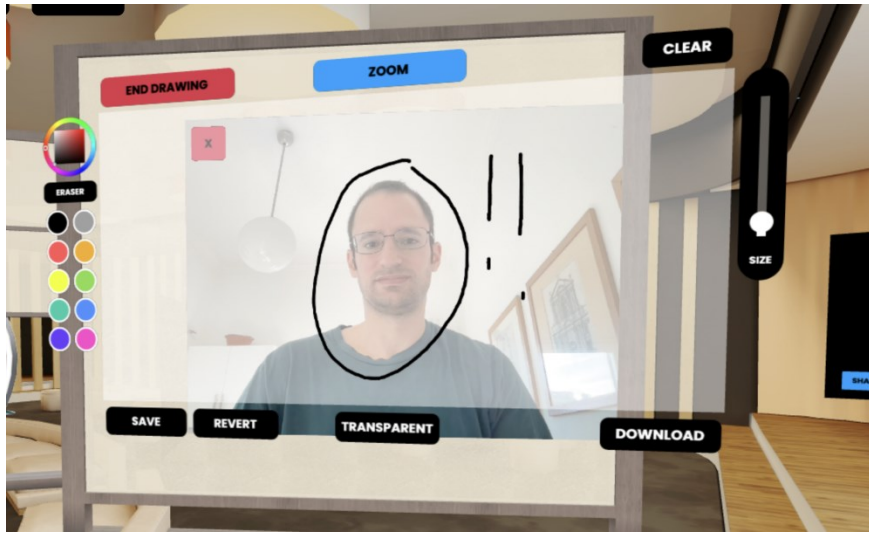
Voice zones, outlined with light blue dashed lines, are fantastic for creating private audio spaces. Inside these zones, you won't hear the outside chatter and vice versa. You can even set Streaming screens so only people within the zone can view them. Some zones come pre-set, but feel free to add your own! You can spawn directly inside a zone using its unique link and even invite others by sharing the link. Locked zones are easy to manage with a red outline from the outside using the lock icon. In Edit Mode, you can make assets visible solely to people in the Zone. This feature is a game-changer for optimizing performance when there are lots of assets!

### **Web browser**

The web browser asset is a powerful tool embedded directly in Frame! Currently, you can have just one per Frame, but this might change. It supports spatial audio, so watching YouTube videos together with friends is seamless (check the "FAQs" section for details). When creating the browser in desktop mode, you can hide the URL bar by opting for "kiosk mode." By default, only admins can interact with the web browser, but you can adjust this in Edit Mode. The browser activates when you're close, but if you're on a paid plan, it'll stay active regardless of your distance. Once everyone leaves the Frame, the session expires after about 15 minutes, clearing all browsing data.

### **Whiteboards**

Whiteboards are a hit! Anyone with interact permissions can use them, but remember to turn off Edit Mode first. Drawing on the whiteboard in VR is exhilarating! If someone joins a Frame after the whiteboard has been used, they won't see the drawings unless they've been saved. Saving is simple; just hit the save button, and your artwork persists. Multiple people can draw simultaneously, making it a fantastic collaborative tool. In Edit Mode, whiteboards can be adjusted for transparency, moved around, and annotated upon





Adding content

## Checklist before proceeding to adding content

Just a quick reminder of what you should keep in mind when developing your Frame.



When adding and editing content, always switch to Edit mode!



You can add links and interactions to almost all types of assets (see sections "Links' basics" and "Action editor-Interactivity").



Be aware which scene you are editing; you don't want to mix things!

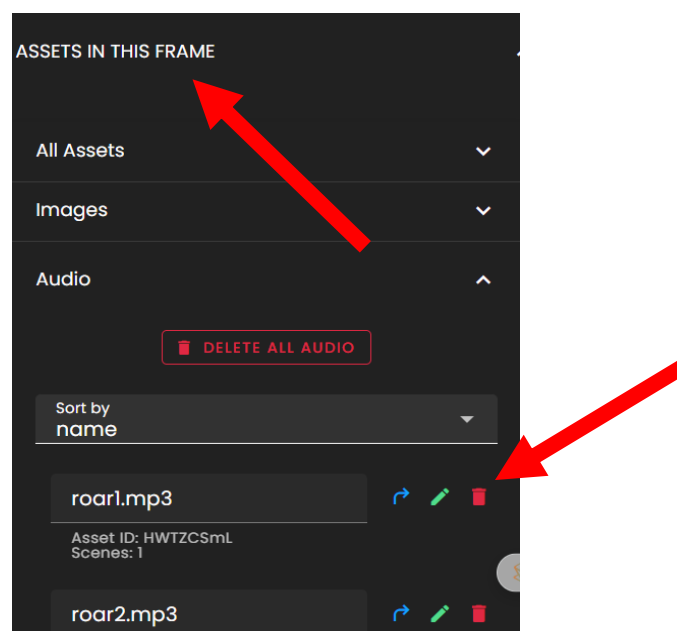


Give a name to all your assets! By default, all are named according to their type. If you don't name them, you will end up in having multiple assets named "Model," or "Audio," or "Text." You won't be able to tell which is which...



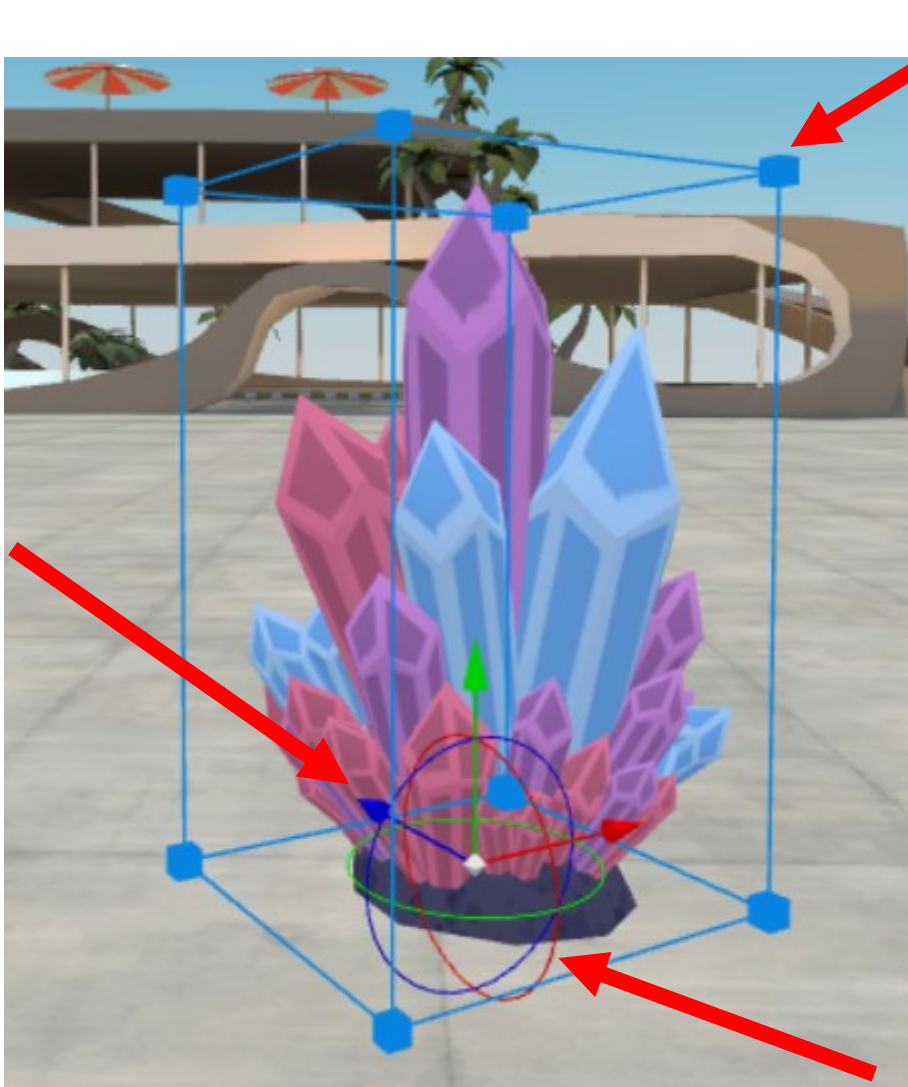
Sometimes assets disappear for no apparent reason. Don't worry, they are still there.

Just press F5 (refresh) or close the Frame tab and log in again. If this doesn't do the trick, open the sidebar, got to "Assets in this Frame," locate the missing asset, and delete it.



## Manipulating assets

When adding an asset, you can manually manipulate its size, position, and rotation. Drag the edges to change its size. Click on an arrow and move your mouse to change its position on the x, y, and z axes. Click on a circle to rotate it on the x, y, and z axes. Note that when an arrow or a circle is selected, it lights up!



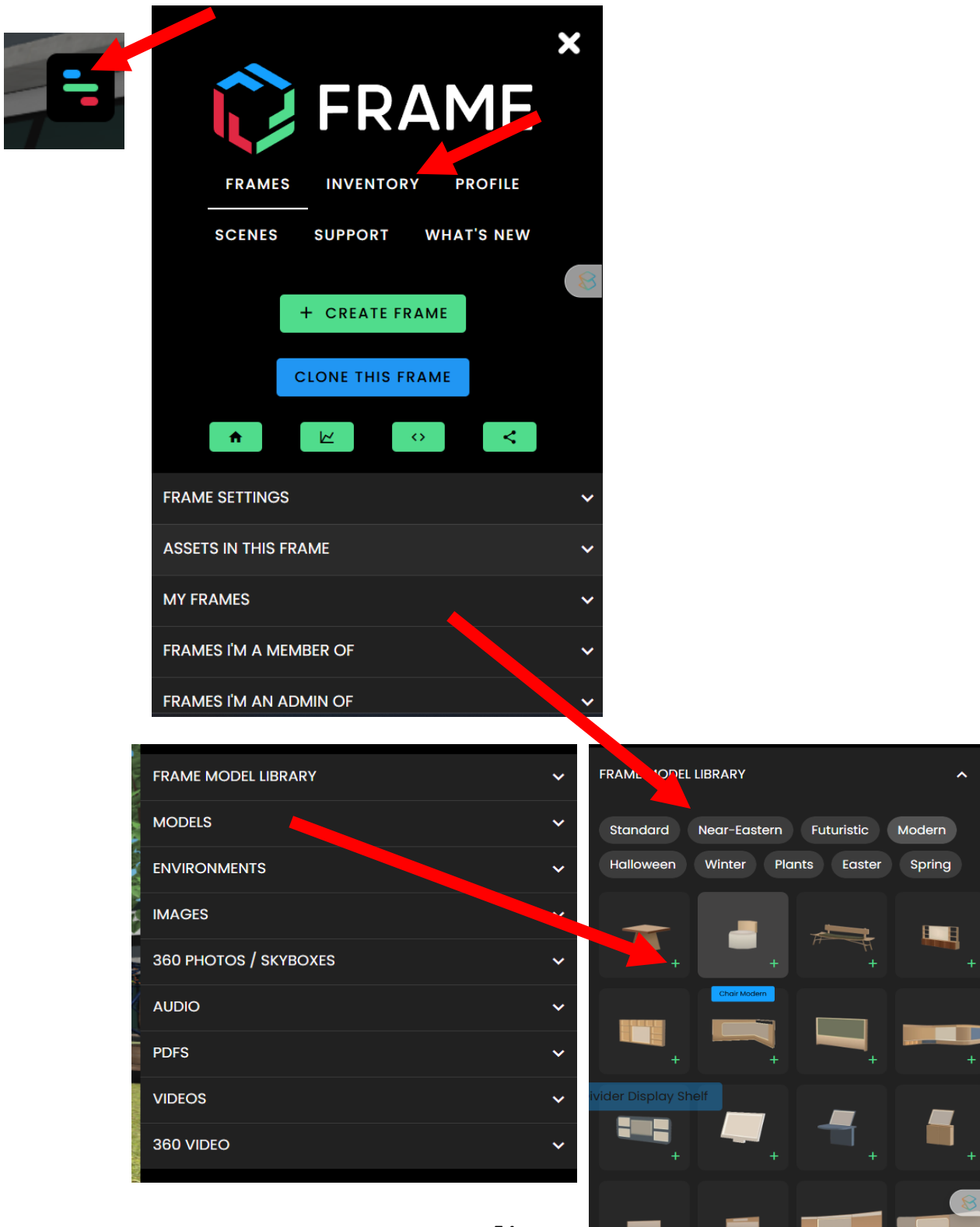
It can be tricky at first, but practice makes perfect!

## All about 3D models

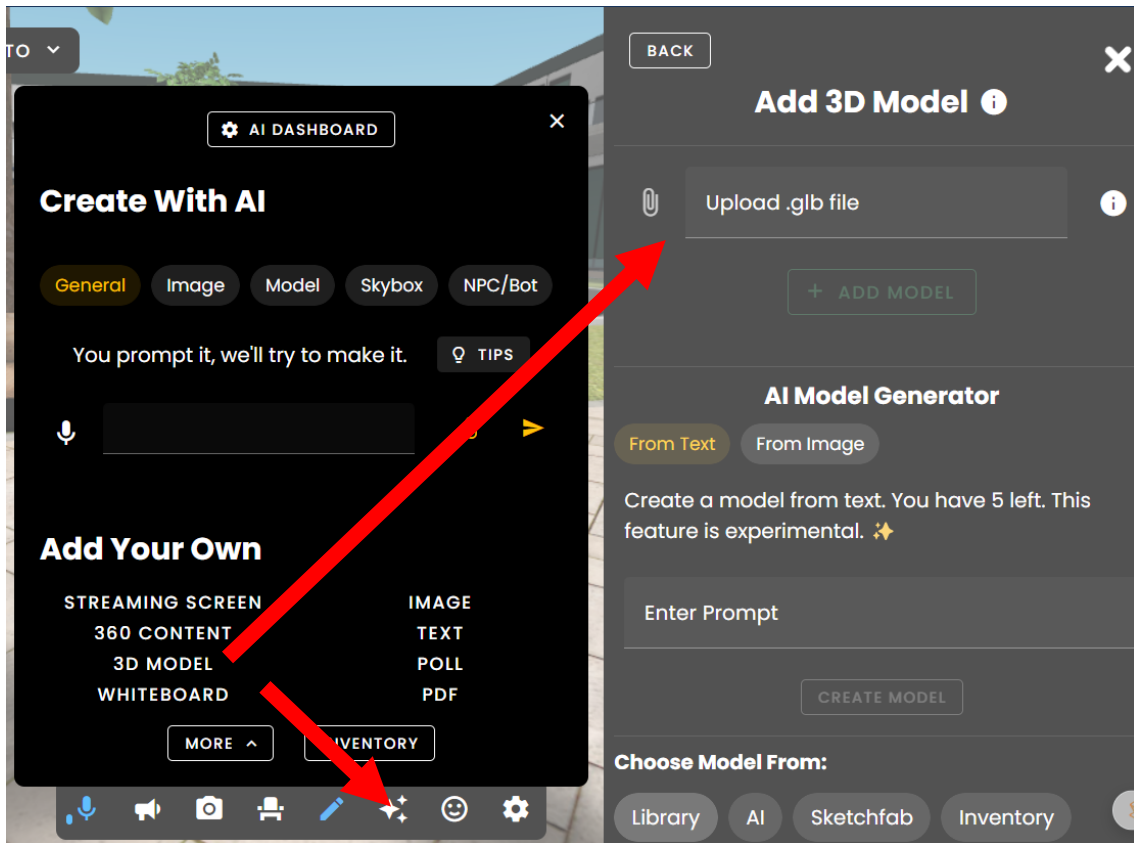


Switch to Edit mode!

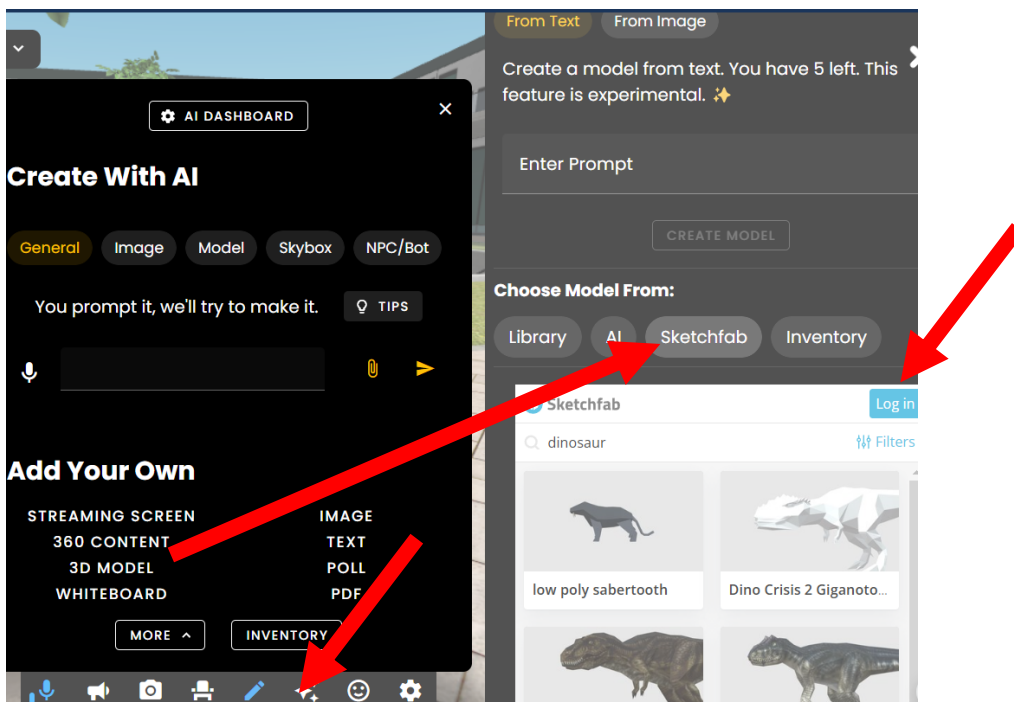
There are multiple ways to add 3D models in your Frame. One, is the models already included in your inventory (see section "Frame's interface, settings, settings, and, yet, more settings..."). As a quick reminder, follow the steps below:



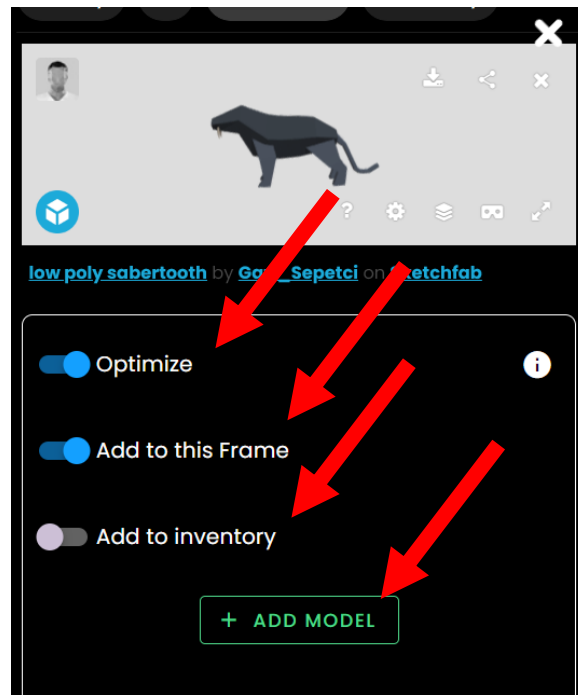
A second method is to upload your own .glb file:



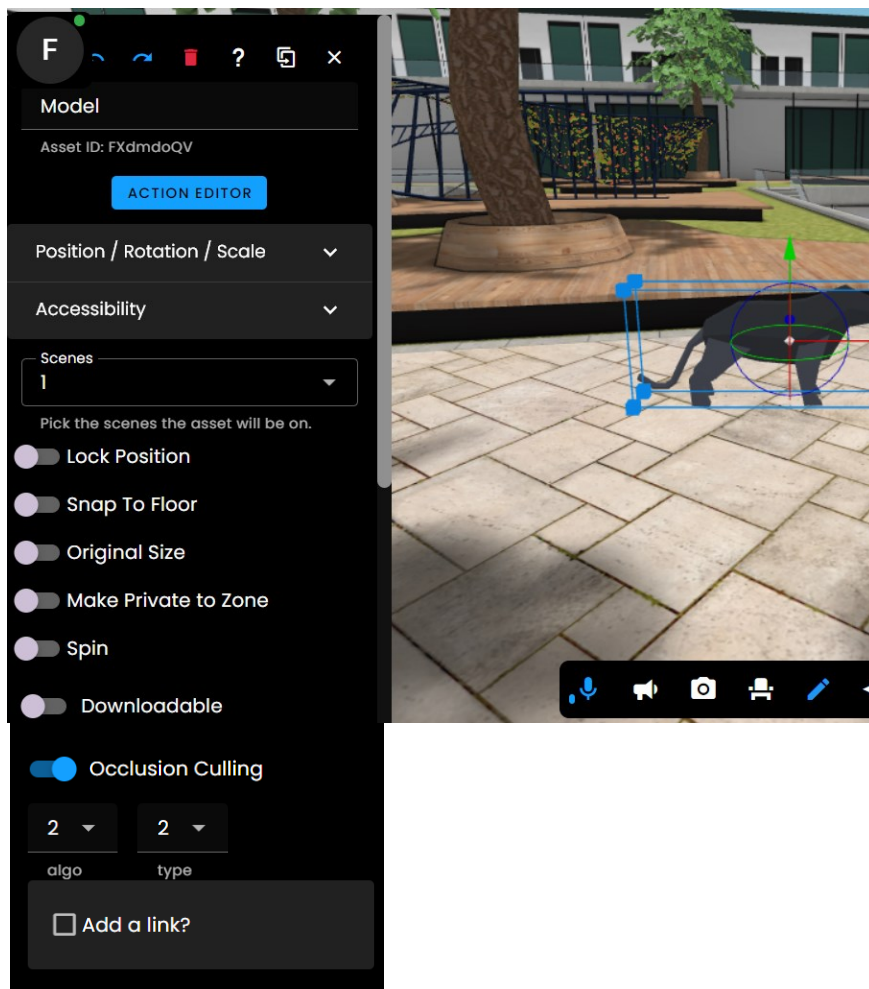
The third method is all about Sketchfab, an incredible platform boasting thousands of freely available 3D models! To get started, simply log in to download any 3D model you like. Trust me, it's that easy! Plus, it's always a smart move to optimize the model before adding it to your Frame for the best results. And guess what? You can save it to your inventory for future use whenever creativity strikes. Happy modeling! 🌟



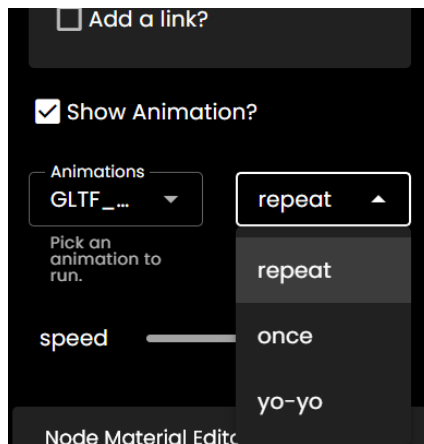




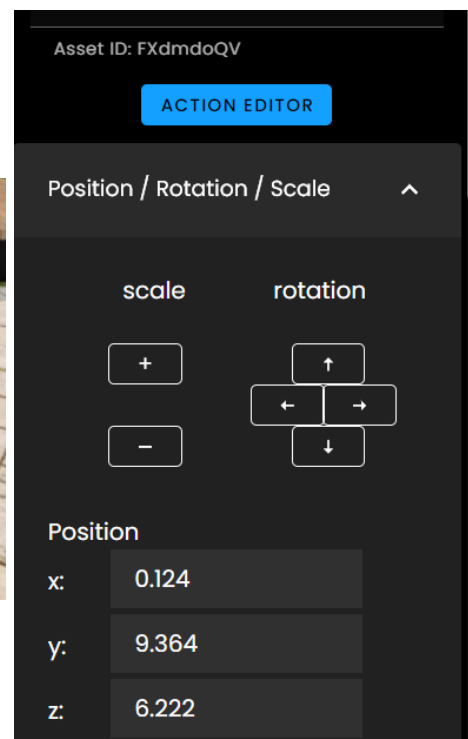
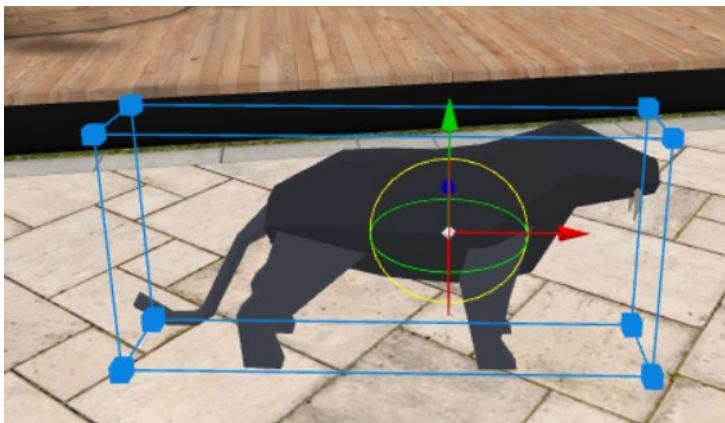
Once you've added it, the properties window will pop right up! From there, you can lock its position to keep it exactly where you want it, snap it to the floor, maintain its original size, and even make it private to a specific zone. You can also make it spin, and let users download it if you want. Plus, adding a link to it is a breeze (check out the sections "Links Basics" and "Action Editor - Interactivity" for more info).



If a model is animated, you can select which animation to play. Alternatively, you can trigger an animation using the Action editor (see section "Action editor-Interactivity").



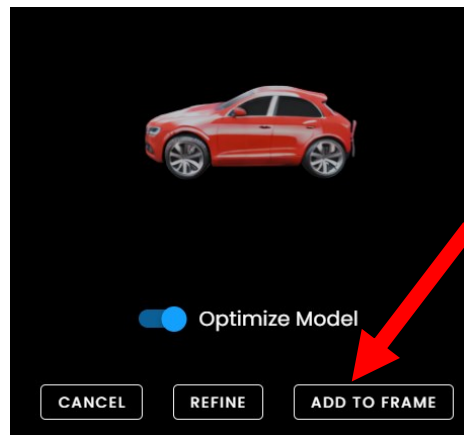
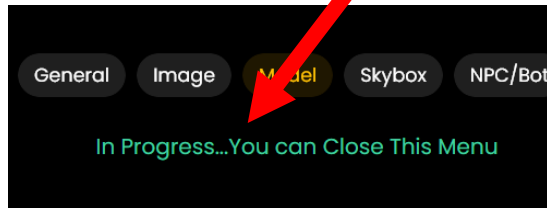
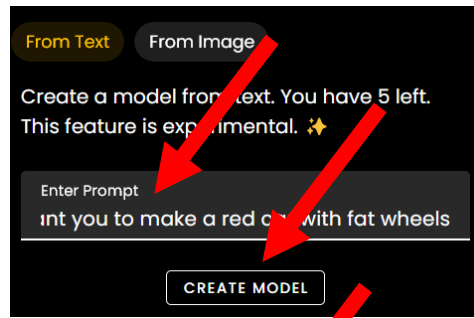
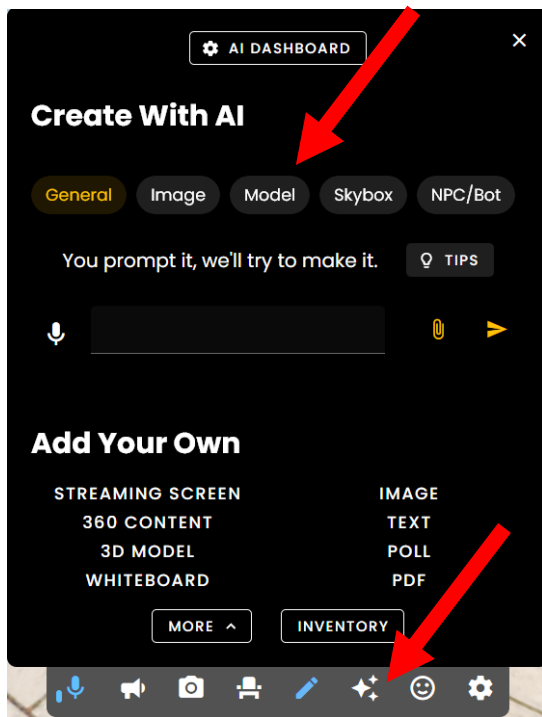
When you add a model or any asset, you can manually scale, rotate it, or provide the exact values in the properties window



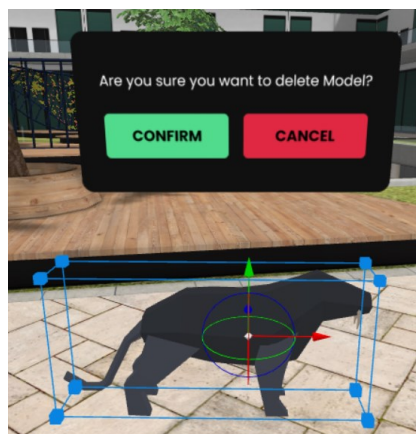
The fourth and more fun method is to allow the AI to generate a model!



The process takes some time (be patient it will appear eventually) and the result is not always what you expected. Also, there is a limit on the number of models you can create in the free version...



You can delete the 3D model or any other asset, by selecting it and pressing the "Delete" button.



## Streaming screen



Switch to Edit mode!

This asset lets you share your web camera or your screen. It works, more or less, as in Webex or Zoom.

The image shows a composite of three screenshots from an AI dashboard. On the left is a dark-themed sidebar menu titled "AI DASHBOARD" with a close button. It features a "Create With AI" section with tabs for "General", "Image", "Model", "Skybox", and "NPC/Bot". Below this is a text input field with a microphone icon, a "TIPS" button, and a paperclip icon. The "Add Your Own" section is highlighted with a red arrow pointing to the "STREAMING SCREEN" option. Other options include "360 CONTENT", "3D MODEL", "WHITEBOARD", "IMAGE", "TEXT", "POLL", and "PDF". At the bottom are "MORE ^" and "INVENTORY" buttons. On the right are two panels of a streaming screen. The top panel shows a 3D logo and the text "Exit EDIT MODE to start streaming.". The bottom panel shows the same logo and two blue buttons labeled "SHARE WEBCAM" and "SHARE SCREEN".

## Adding text

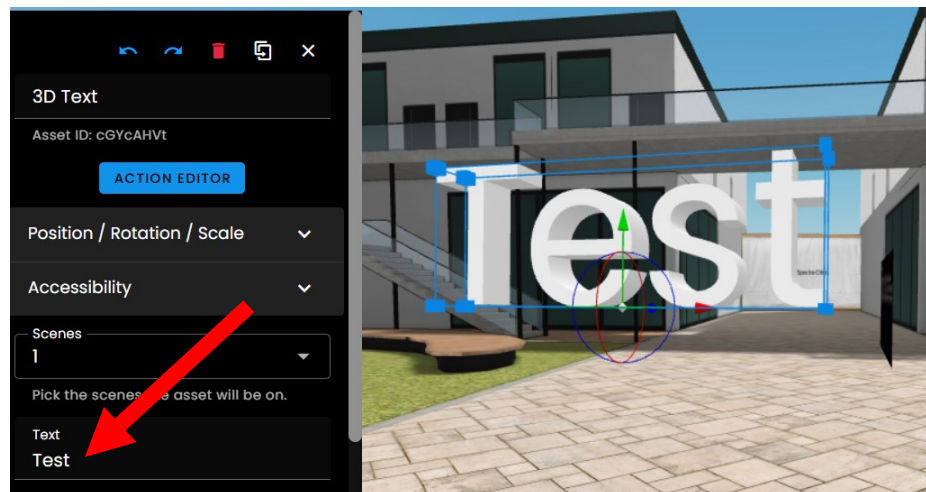
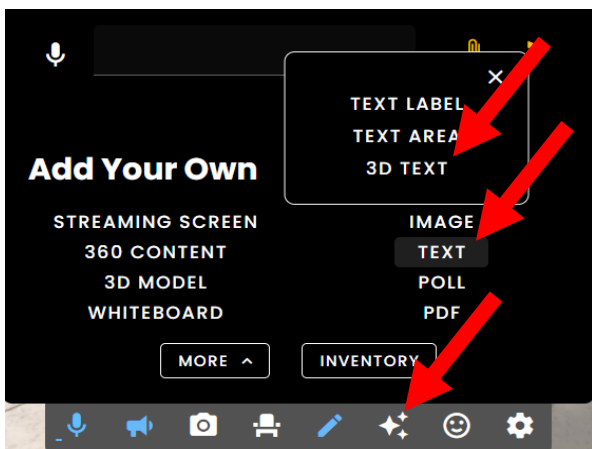


Switch to Edit mode!

There are 3 types of text you can add: (i) text label, for one-line texts, (ii) text area, for longer scrollable texts, and (iii) 3D text. In the example below, a 3D text will be added.

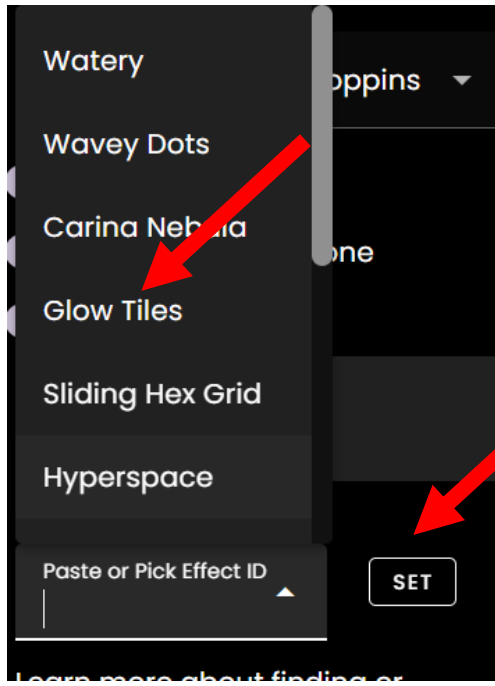
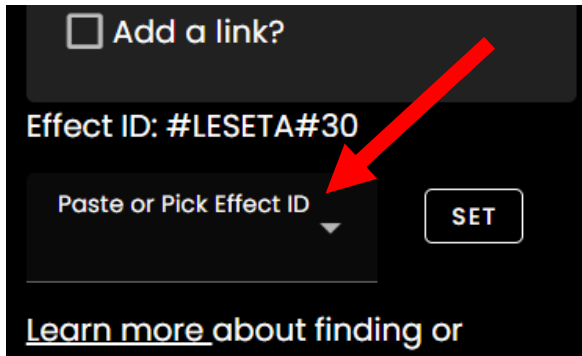


Greek is not supported in text label and 3D text!



When adding the other two types of text, you can enable the "Always face the camera" property. By doing this, the text will always rotate to the direction the user is looking at.

Now, let's make the 3D text more interesting by adding an effect to it.

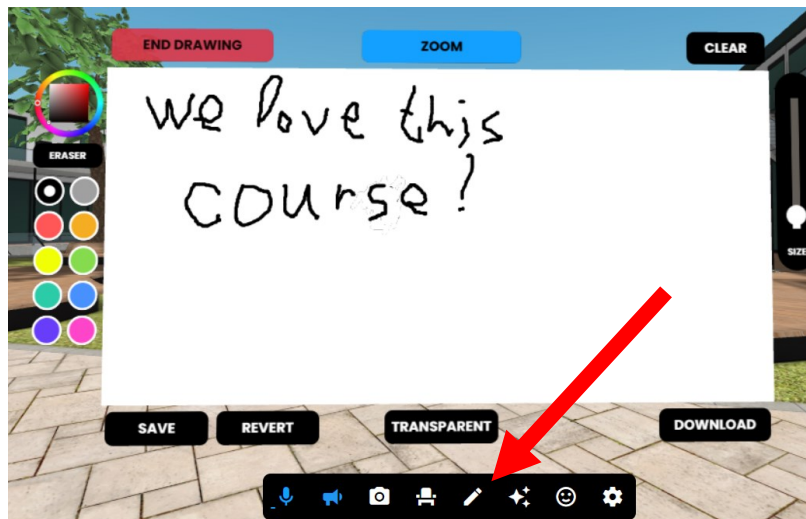
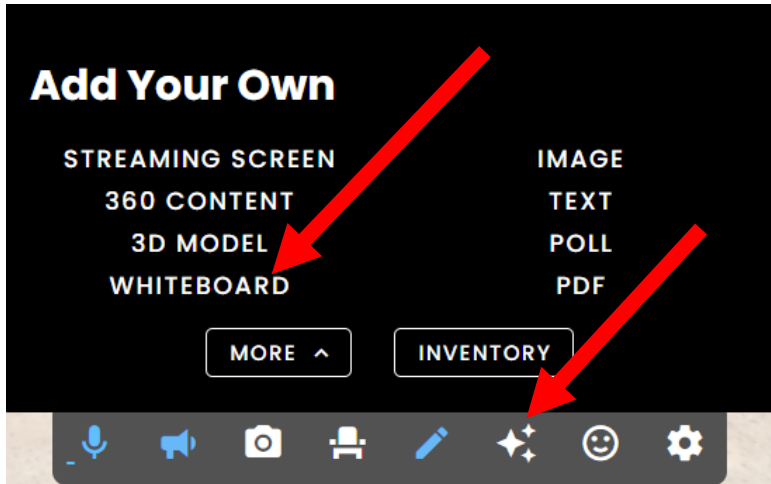


# Whiteboard



Switch to Edit mode!

Whiteboards are fun to use!

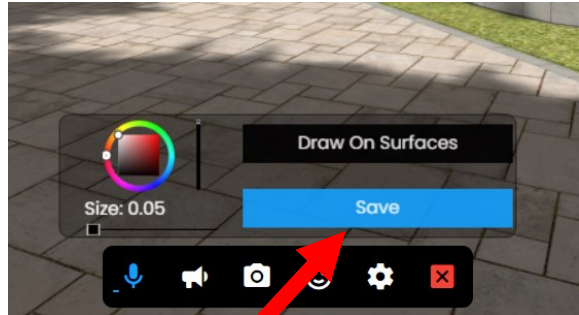
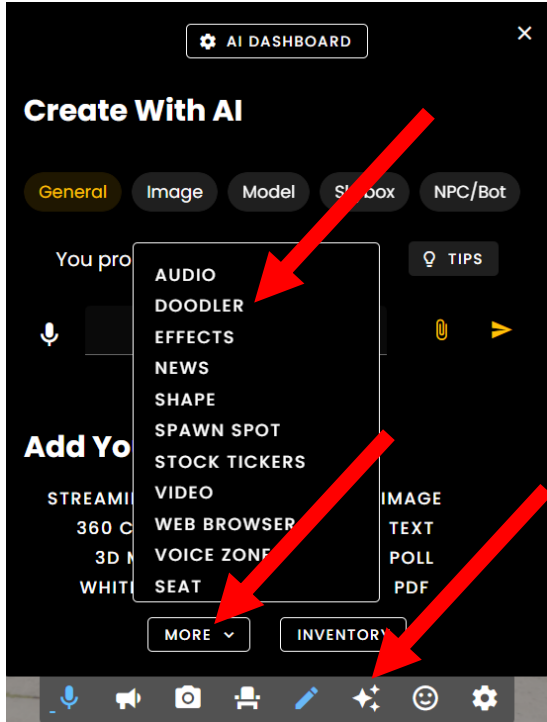


# Doodler



Switch to Edit mode!

Doodlers are similar to Whiteboards, but allow you to draw on surfaces or on air! Just make sure to save what you draw before closing it!



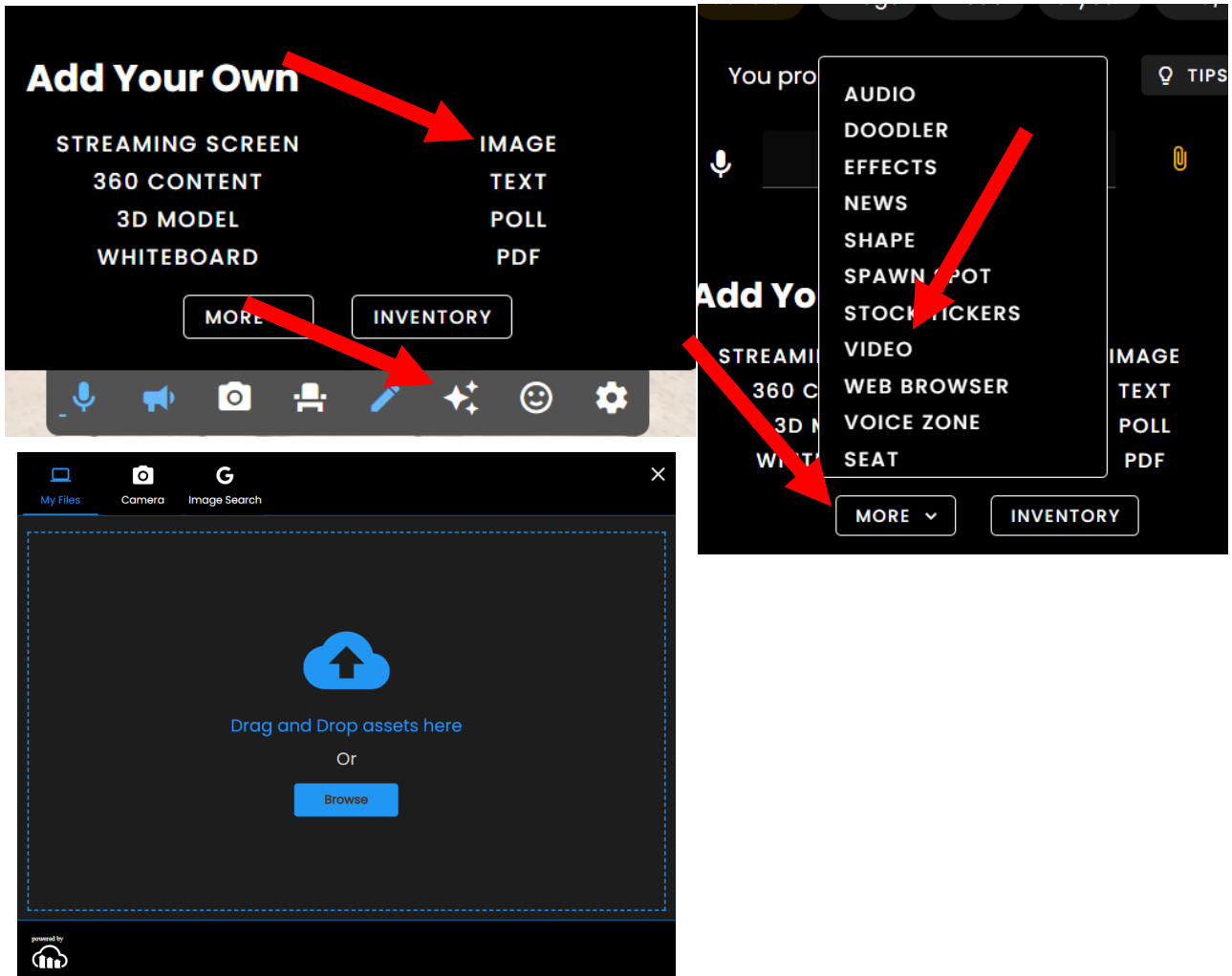


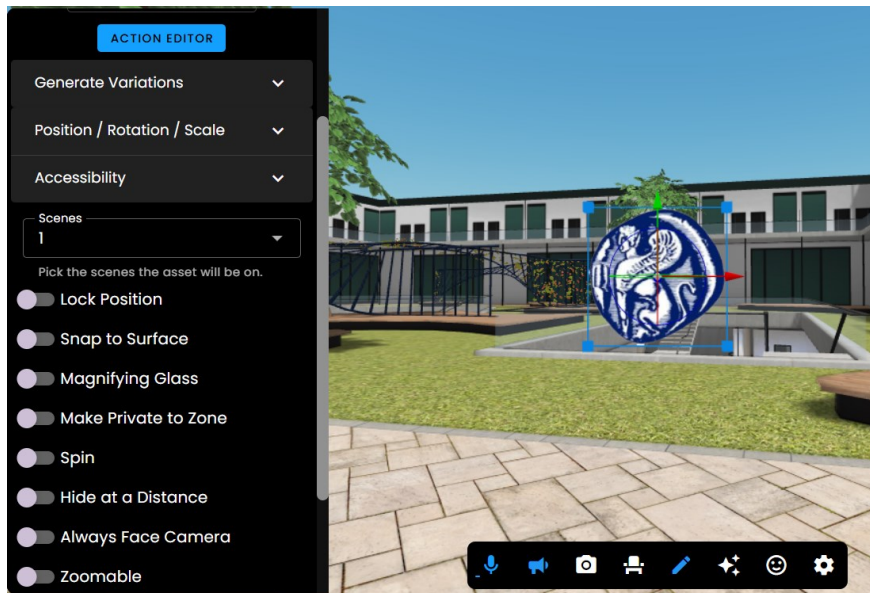
# Images and videos



Switch to Edit mode!

Adding images or videos is rather easy. Several adjustments can be made in the properties window, that are self-explanatory.

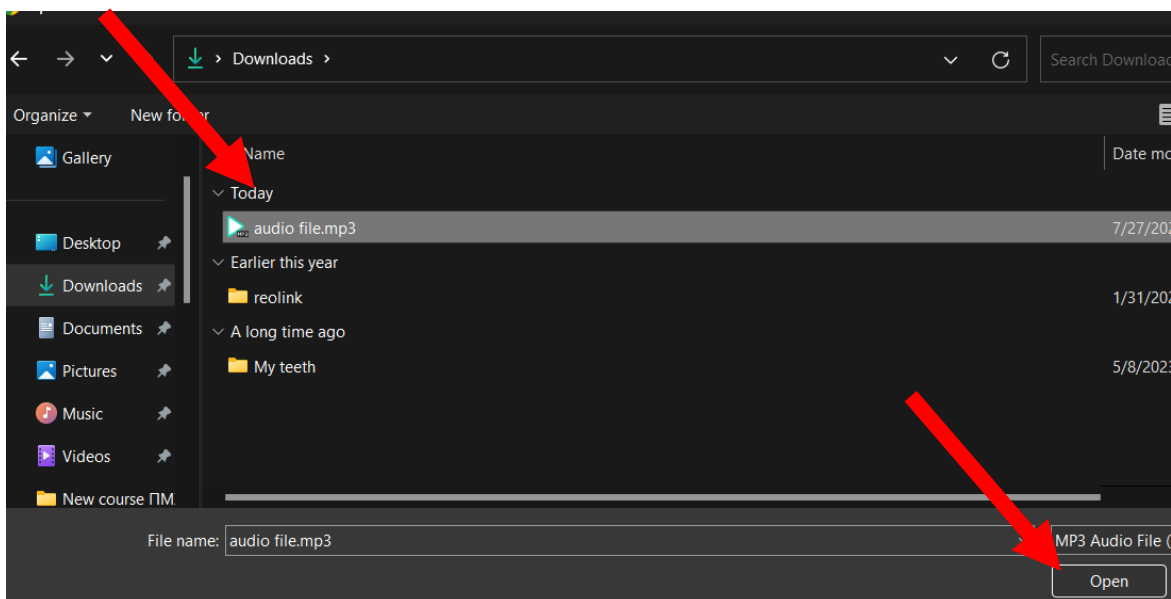
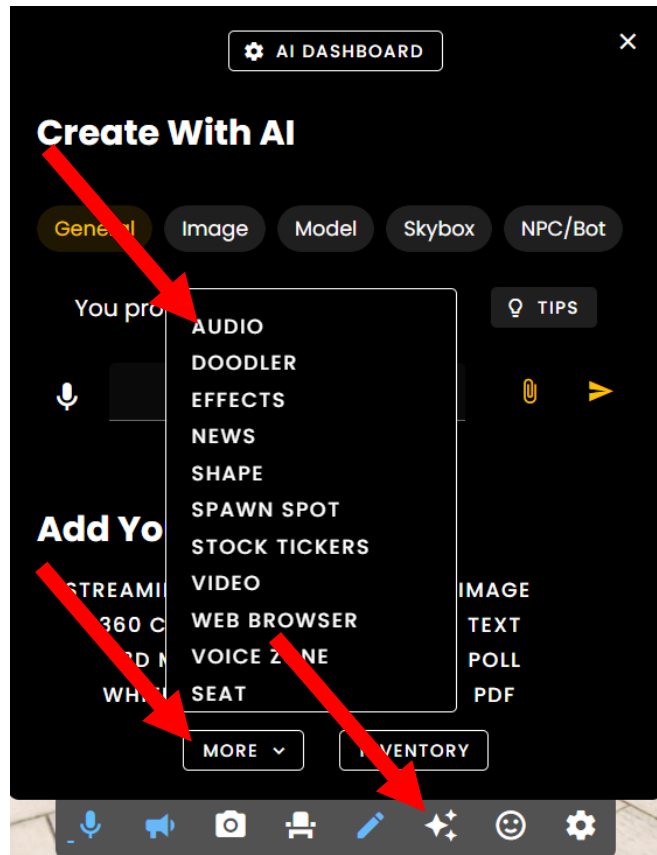




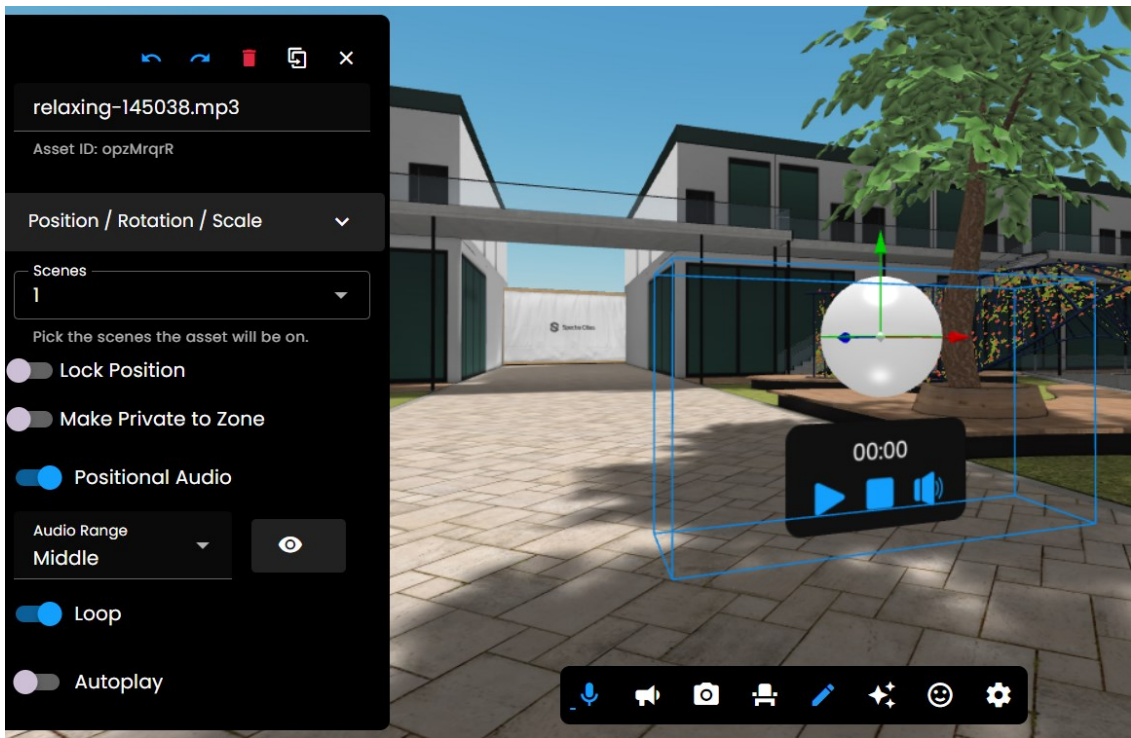
# Audio



Switch to Edit mode!



You can select whether the audio file will loop, whether it will be positional (meaning users would hear the direction the sound is coming from, and the range the sound will be heard).

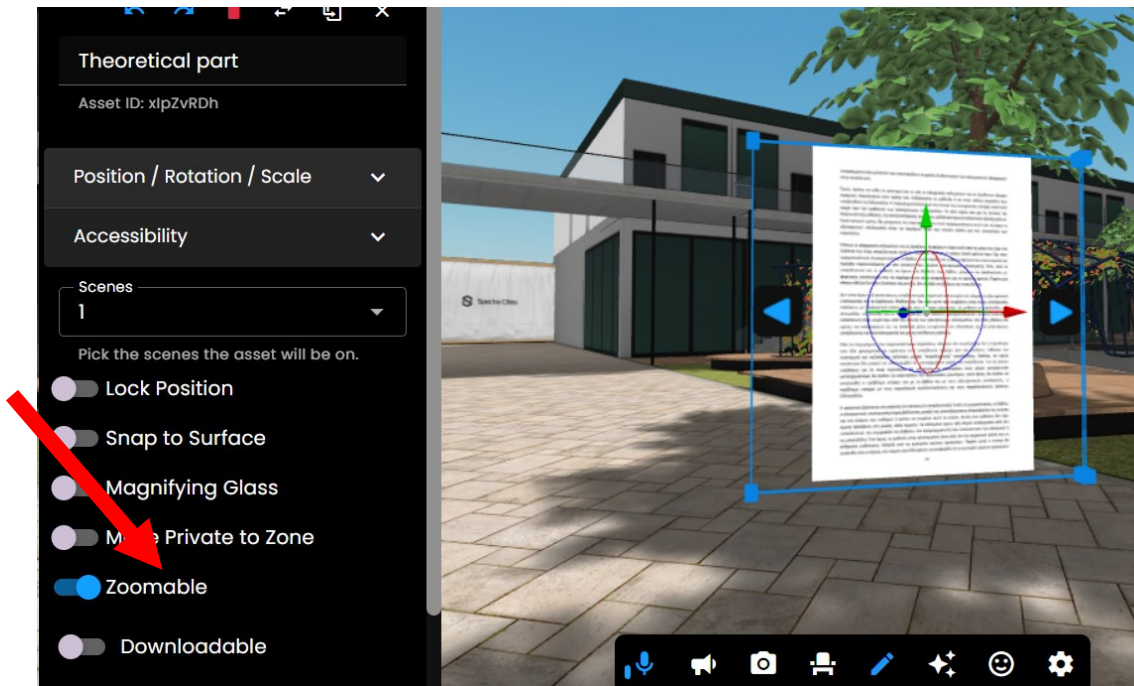


# PDF



Switch to Edit mode!

Uploading PowerPoint presentations has never been easier than with the PDF asset! Save your presentation as a PDF file, and simply follow the same straightforward steps you use for audio, images, and video uploads. Once you've got your PDF in place, don't forget to set the all-important "Zoomable" property. This ensures users can effortlessly zoom in for a closer, clearer view. Get ready to present like a pro!

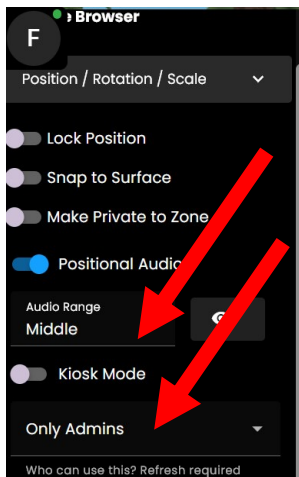
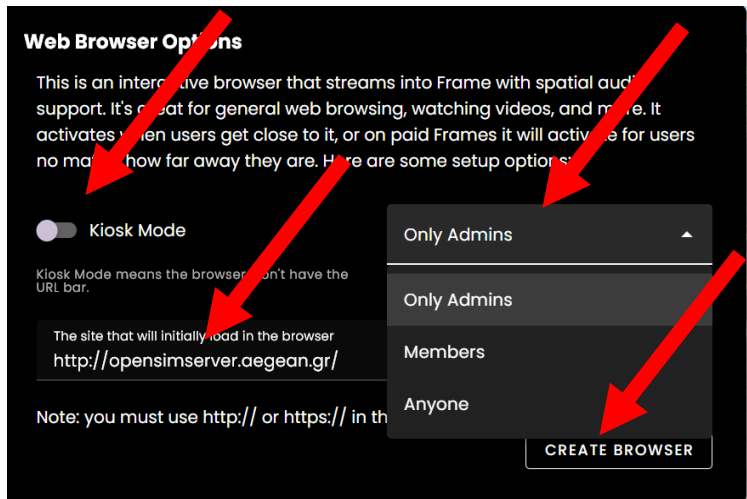
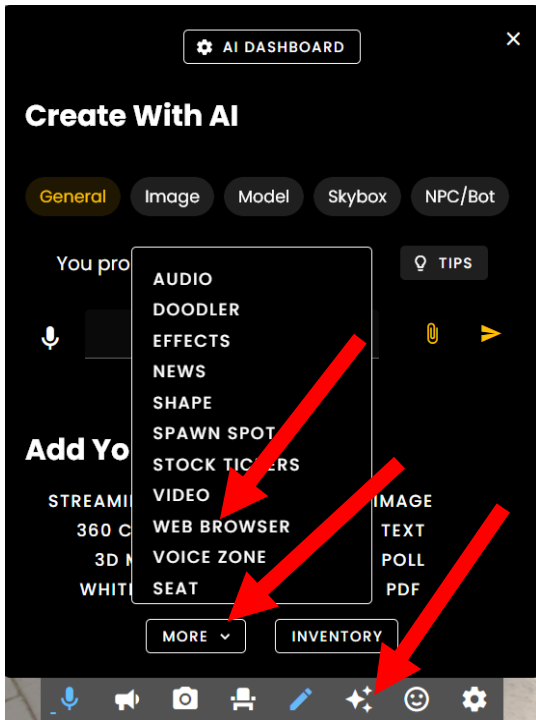


# Web browser



Switch to Edit mode!

Copy and paste the desired URL and set who will be able to use the Web browser. Also, you can hide the URL bar by selecting "Kiosk mode." You can also change these settings after adding the asset.

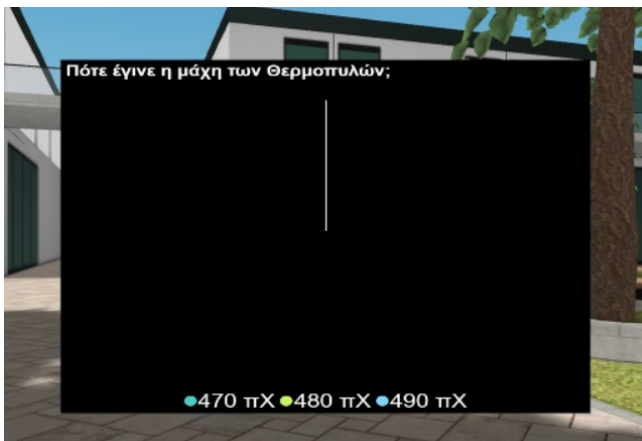
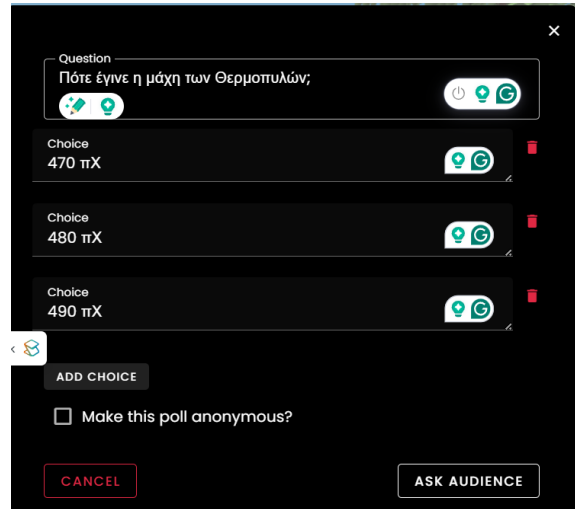
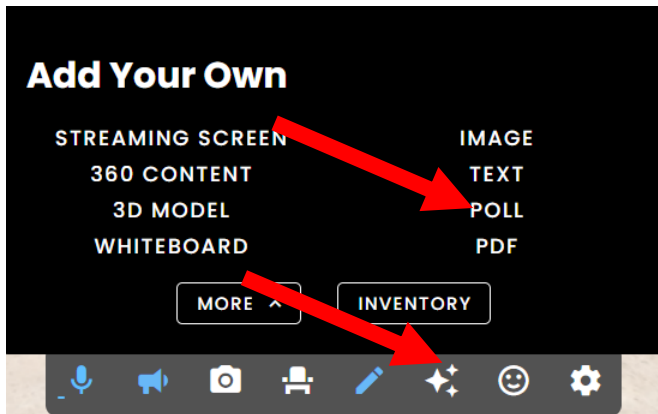


# Poll



Switch to Edit mode!

Polls can also act as single-question quizzes! You can run as many active polls as you wish, each with a maximum of 10 responses. Choose whether to make them anonymous or not. If you opt for non-anonymous polls, you can view individual responses in the people menu at the top left. Poll responses are recorded in your Frame analytics.

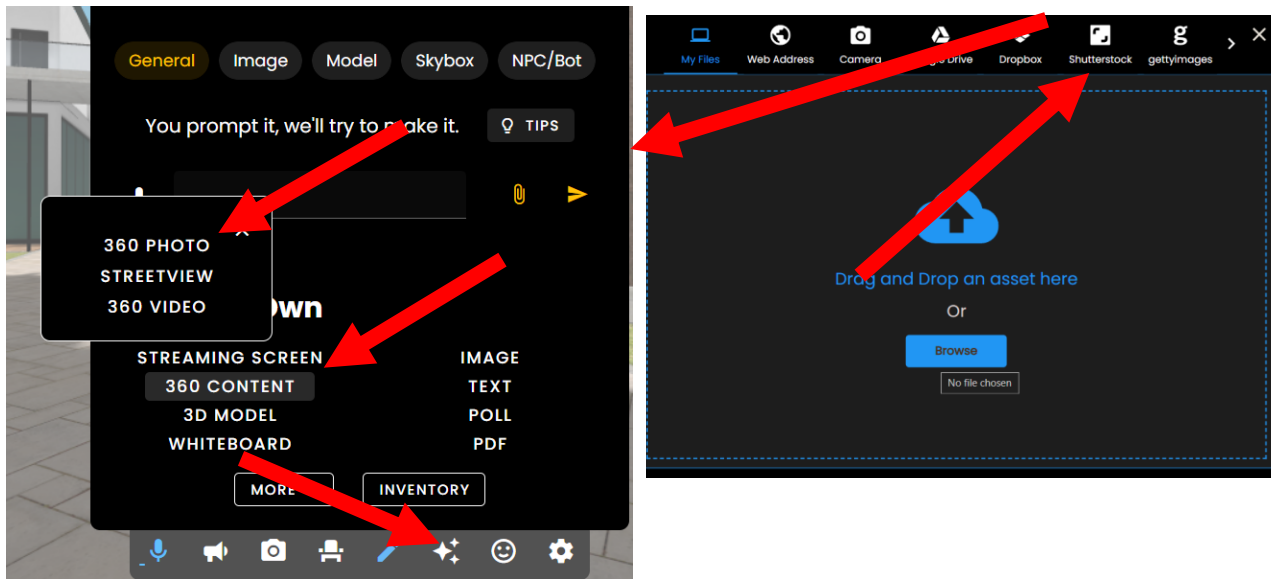


## 360 content

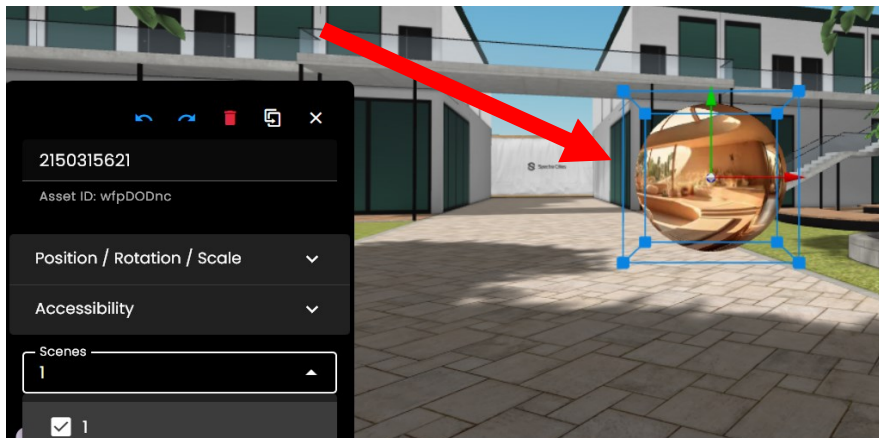


Switch to Edit mode!

360 videos or photos are an amazing way to present material. In the free version, you can add 360 photos or videos. In the example below, a 360 photo will be added. You can upload your own video or image, or you can download one from various sources available at the top of the selection window.



360 videos and images appear as spheres in Frames.

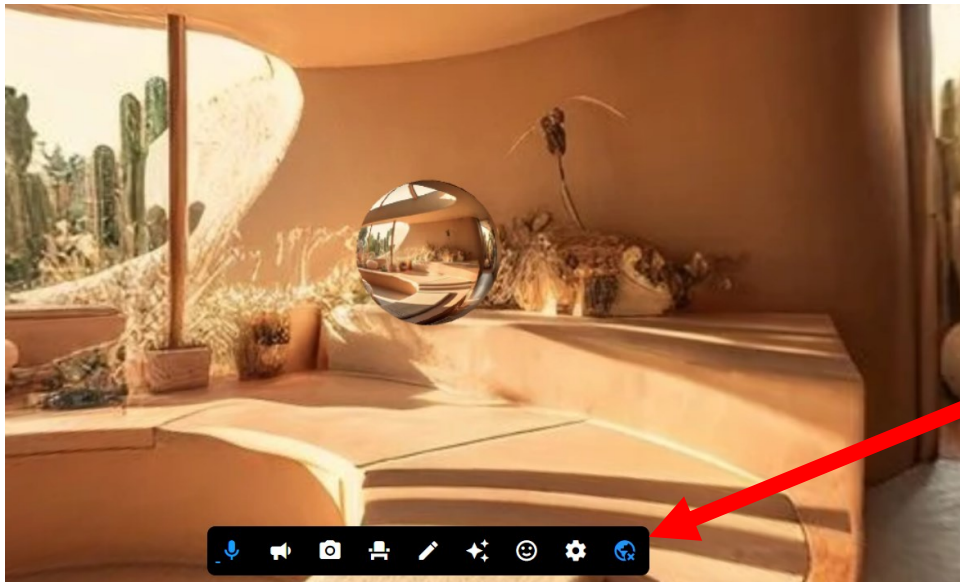


When clicking them (not in editing mode), they will expand and allow you to look around.



To close an expanded 360 video or image, press the "Close" button at your Main toolbar!



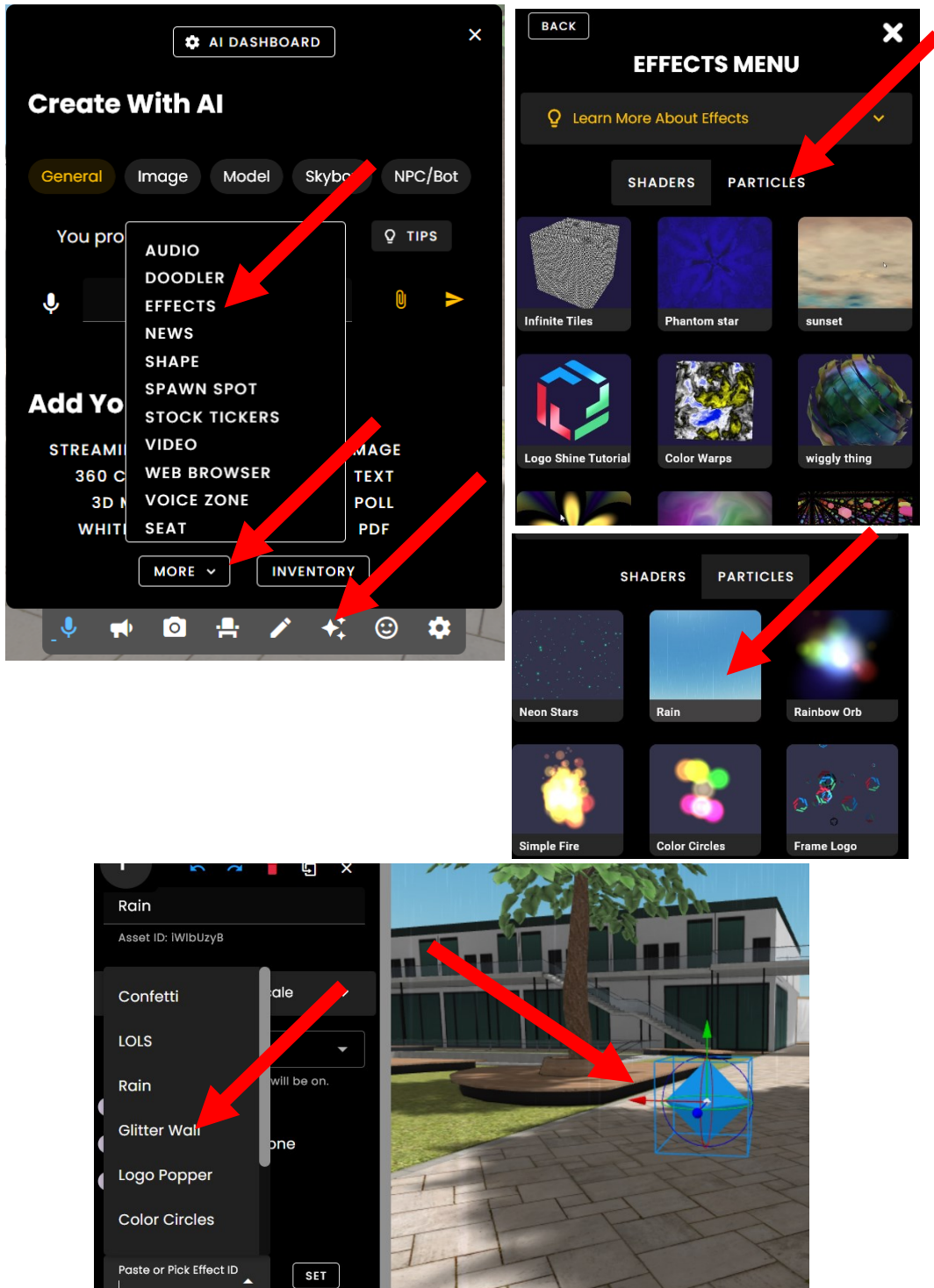


# Effects!



Switch to Edit mode!

There are two types of effects: (i) shaders and (ii) particles that can apply to the whole Frame or to a specific location in a Frame. In the example below, rain will be added, which is applied to the whole Frame (meaning that it will rain everywhere!). You can also change the type of particles after adding them.

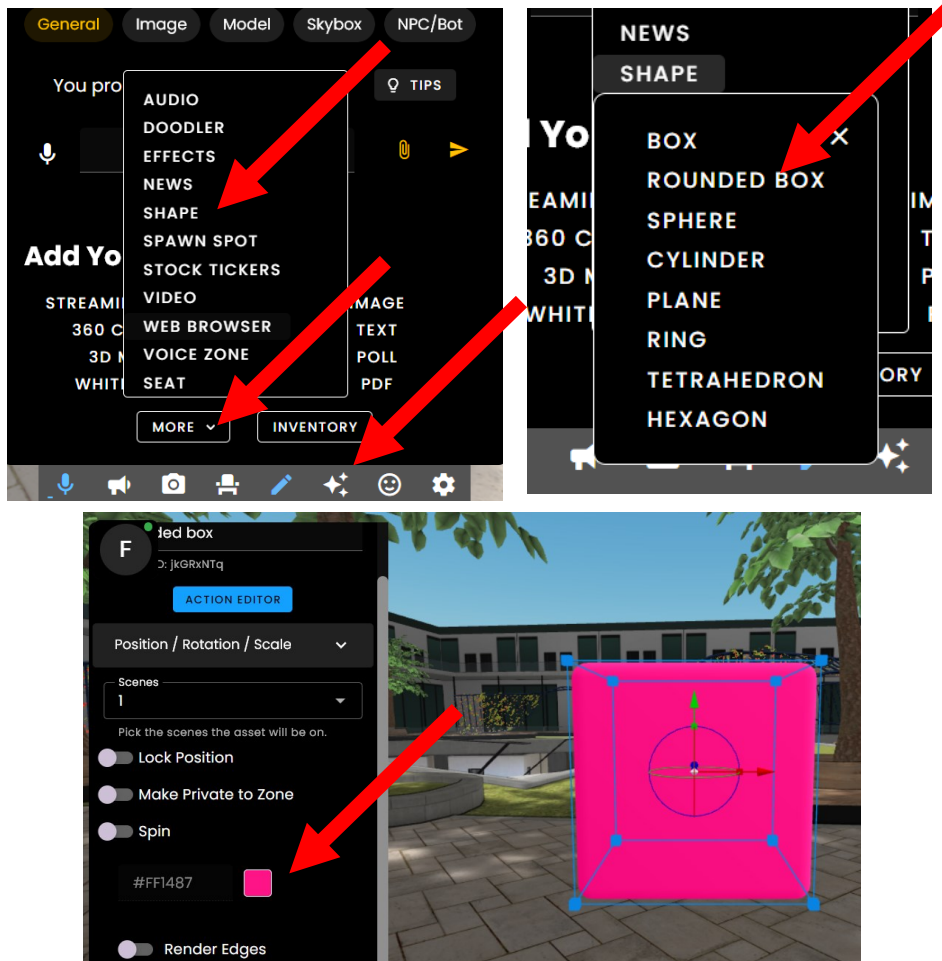


# Shapes



Switch to Edit mode!

Adding simple 3D shapes is rather easy and straightforward. After adding a shape, you can change some of its properties, such as its color.

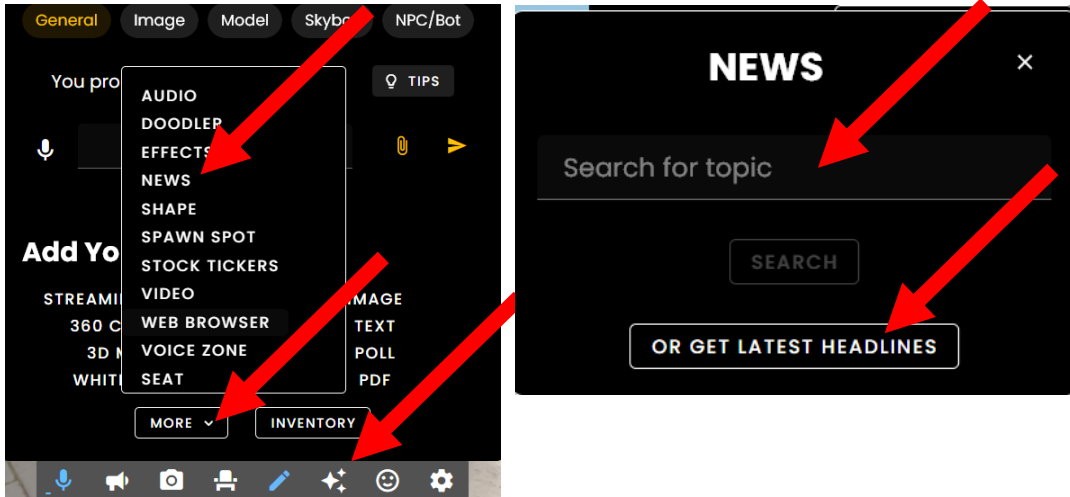


# News



Switch to Edit mode!

An interesting feature is to add news headlines or news about a topic of interest (not available in Greek).

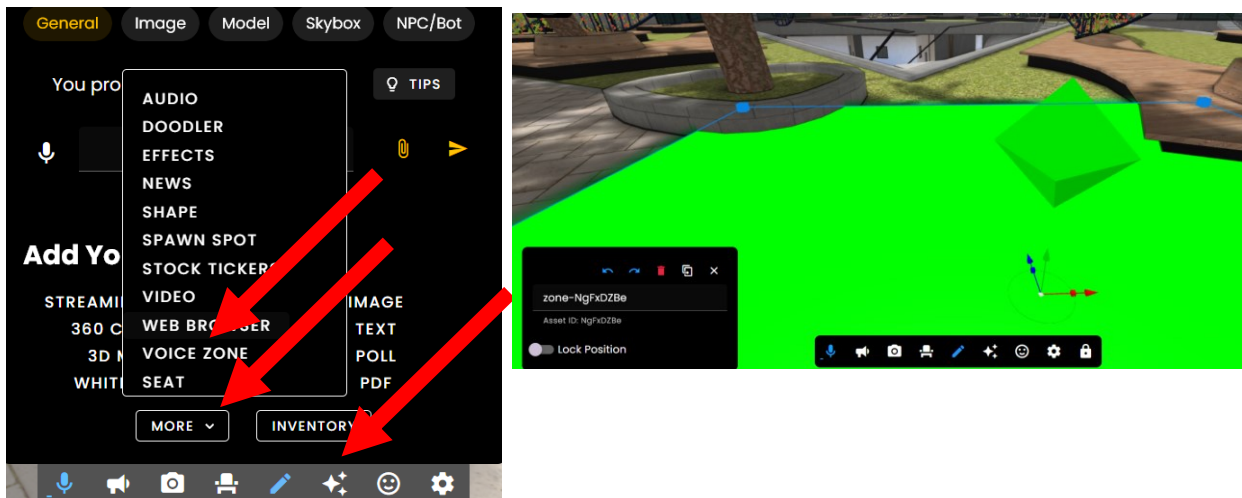


# Voice zones



Switch to Edit mode!

Voice zones act as areas for private conversations; inside these zones, you won't hear the outside chatter and vice versa. You can make assets visible solely to people in the Zone. You can set Streaming screens so only people within the zone can view them. You can even configure them so that only admins or specific members have microphone privileges. Voice zones are outlined with light blue lines. You can spawn directly inside a zone (see section "Teleportation to the same scene-Spawn spots") using its unique link and even invite others by sharing the link. Locked zones are easy to manage using the lock icon and appear with a red outline.



Remember to Enable private voice zones in the "General settings."



You can also enable the "Lock private voice zones" property in the "Permissions and roles settings," preventing non-admins from entering.

## Interact with an AI-NPC (non-player character)



Switch to Edit mode!

Let's add an AI non-player character (NPC).

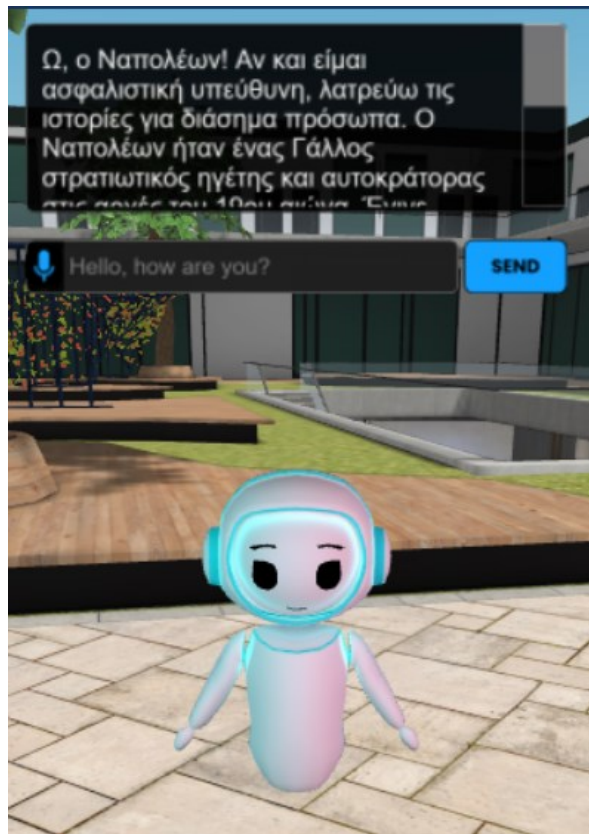
There is an option to set the tone of the conversation by picking the right demeanor for your use case. In addition to this text field, there is also the option to use uploaded PDFs as resources for the NPC to refer to.

The image consists of four screenshots from a mobile application, illustrating the steps to create an AI NPC:

- Top-left:** The 'Create With AI' menu is shown with 'NPC/Bot' selected. A red arrow points to this option.
- Top-right:** A dialog box titled 'CREATE NPC' is shown, with a red arrow pointing to the 'CREATE NPC' button.
- Middle-right:** The NPC configuration screen for 'Morissa' is shown. The 'Demeanor' is set to 'Happy'. A red arrow points to this dropdown menu.
- Bottom-left:** The settings menu is shown, with 'Use uploaded files?' checked. A red arrow points to this toggle switch.

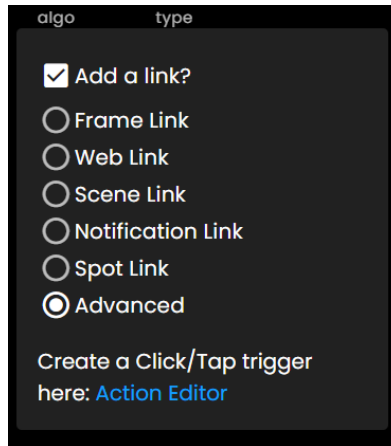


After pressing the "Create NPC" button, just close the window, the NPC is added.



## Links' basics

When you add an asset, whether it's an image, text label, or 3D model—and click on it in Editing mode, its properties pop right up! Scroll down a bit, and you'll find a treasure trove of links to add to your asset. These links make your assets clickable and capable of doing all sorts of amazing things. You're in control, and the possibilities are endless!



There are a few link types:

- **Frame link:** Frame links are your personal teleporters, whisking users away to entirely new Frames in a flash!
- **Web link.** Click on a Web link, and voilà! The linked website opens, either in a shiny new tab or within a sleek mini-overlay at the bottom left. Only some websites snugly fit into this embed mode, thanks to iframe compatibility. Curious to learn more? Check the "FAQs" section!
- **Scene link.** Hit a Scene link and watch as the entire Frame transports you to the designated scene. It's like stepping into a new world with a single click!
- **Notification link.** Notification links are all about keeping you in the loop. They send alerts directly to the Frame creator via text or email, so you're always informed!
- **Spot link.** Choose a Spot link, and you're instantly teleported to your selected spawn spot. Just pick from the dropdown menu and off you go!
- **Advanced link.** Ready for some serious customization? Advanced links unlock the Action editor, your ultimate tool for crafting bespoke interactions tailored to your vision (see section "Action editor-Interactivity").



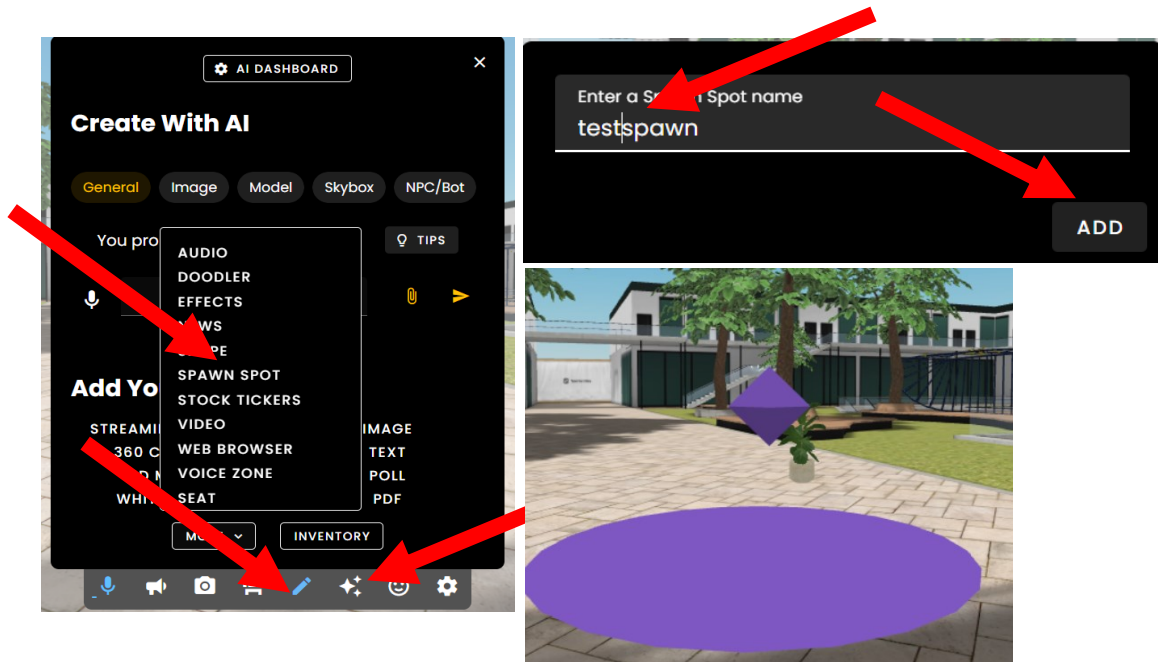
## Teleportation to the same scene-Spawn spots



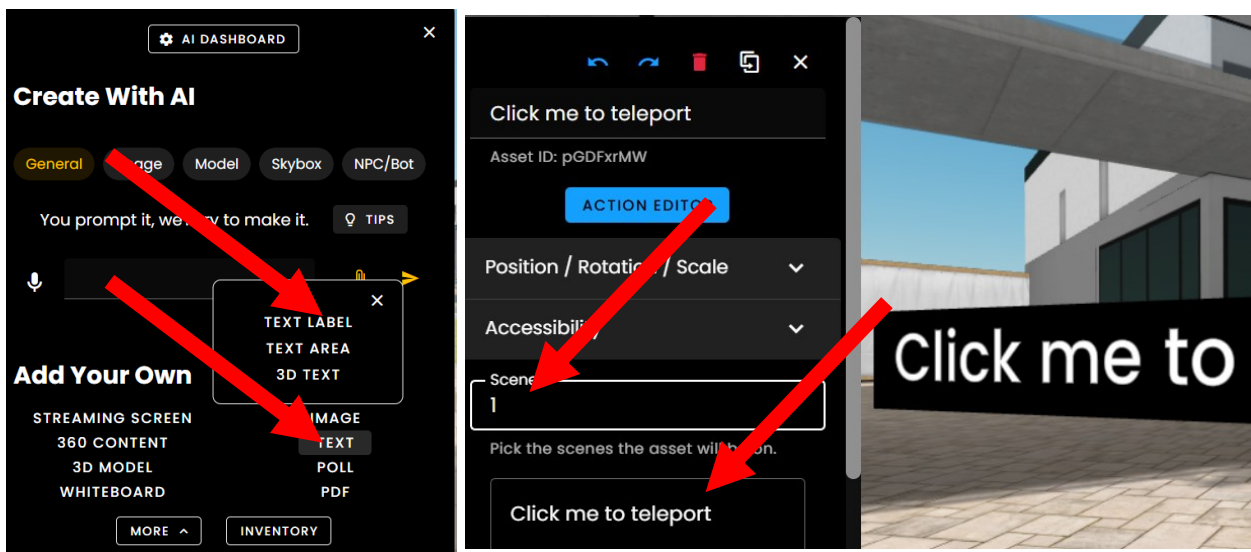
Switch to Edit mode!

To teleport to various places within a Frame's scene, you can use Spot links and make buttons that teleport users to your Spawn spots:

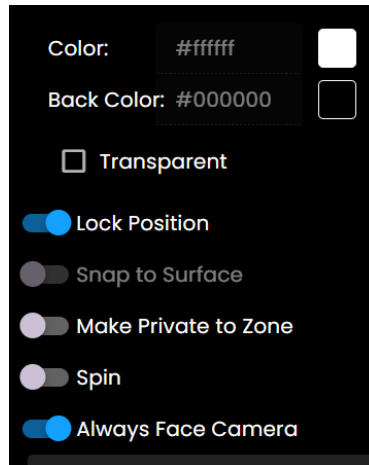
- Create a spawn spot in your Frame.



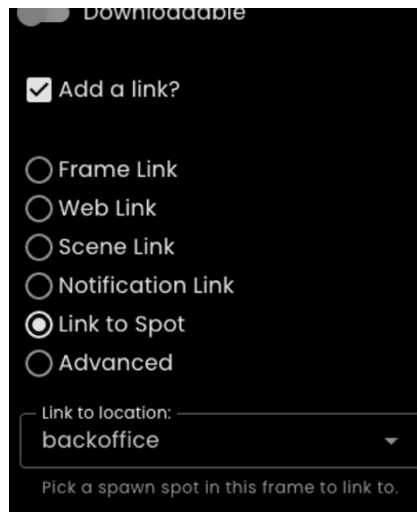
- In Edit mode, select an asset like an Image or a Text label. Select in which scene(s) this asset will be available.



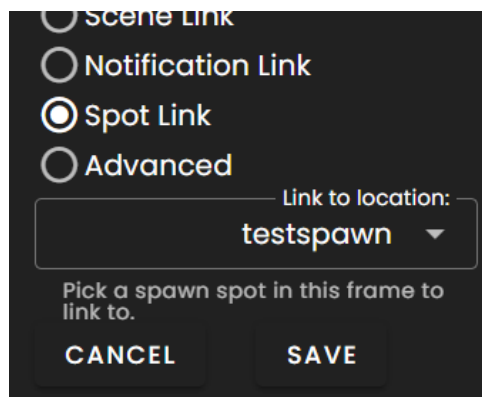
- Adjust its settings if necessary.



- Find the "add link" checkbox and pick "Spot link" as the link type.



- Choose one of your Spawn spots from the dropdown and select "Save."



- Turn off Edit mode.
- Click on your asset you just put the link on.
- Relish your new surroundings!

## Teleportation to another scene



Switch to Edit mode!



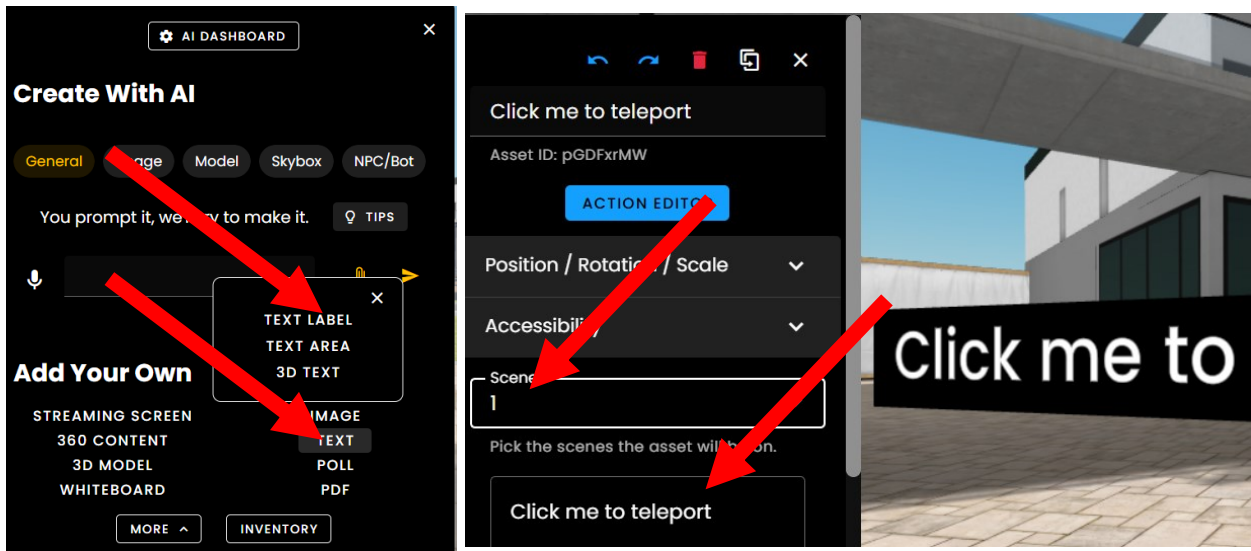
Make sure that you have more than one scenes!



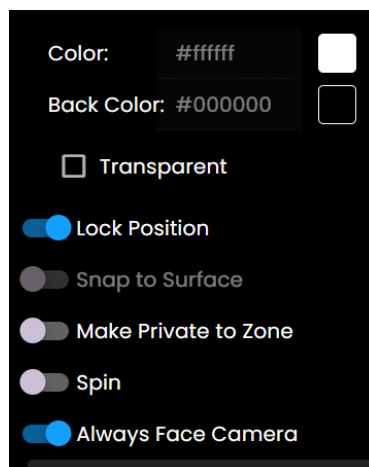
Make sure that you are working in the right scene!

If you want users to be teleported to another scene, use the procedure below.

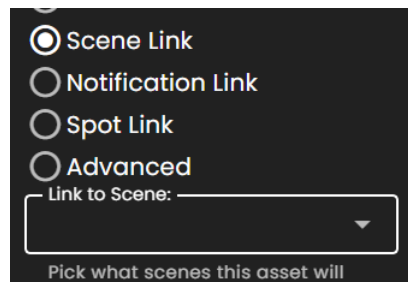
- In Edit mode, select an asset like an Image or a Text label. Select in which scene(s) this asset will be available.



- Adjust its settings if necessary.



- Find the "add link" checkbox and pick "Scene link" as the link type.



- Choose one of your scenes from the dropdown and select "Save."
- Turn off Edit Mode.
- Click on your asset you just put the link on.
- You are teleported to another scene!

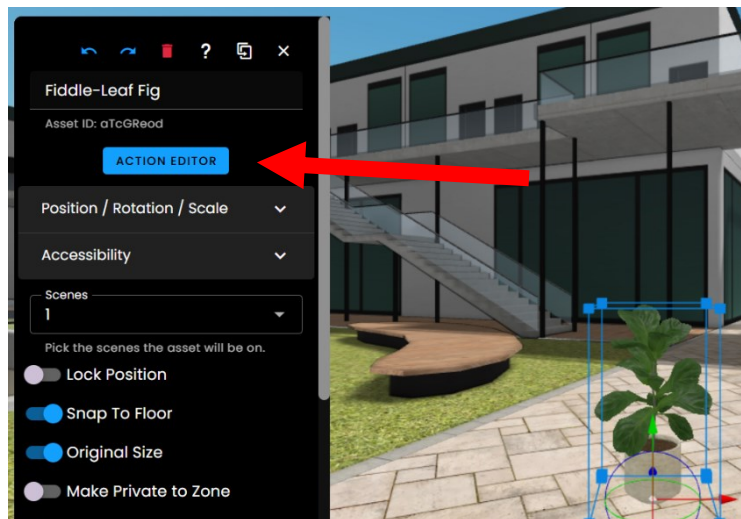
## Action editor-Interactivity

The Action editor empowers you to set up actions for your assets without needing any code! Imagine a button that, when clicked, scales another asset up or down, triggers a mesmerizing animation on a 3D model, or alters other asset properties, it's all possible and incredibly easy. You have the flexibility to make these actions "local" or not! If an action is local, it will only affect the user who triggers it. But, if it's not local, then get ready for a synchronized, persistent update that impacts everyone in the Frame. The possibilities are endless, and you are in complete control!

💡 A trigger is what the user has to do on the asset to make the action happen. Assets can have multiple triggers.

💡 An action is what will happen when the user does the trigger, or in this case clicks on your incredible button.

When you add an asset, like an Image, Text label, or 3D model and click on it while in Editing mode, you'll see its properties pop up. And guess what? Right at the top of the properties window, there's a button named "Action editor." Clicking this button instantly brings up the Action Editor. So simple and powerful, isn't it?



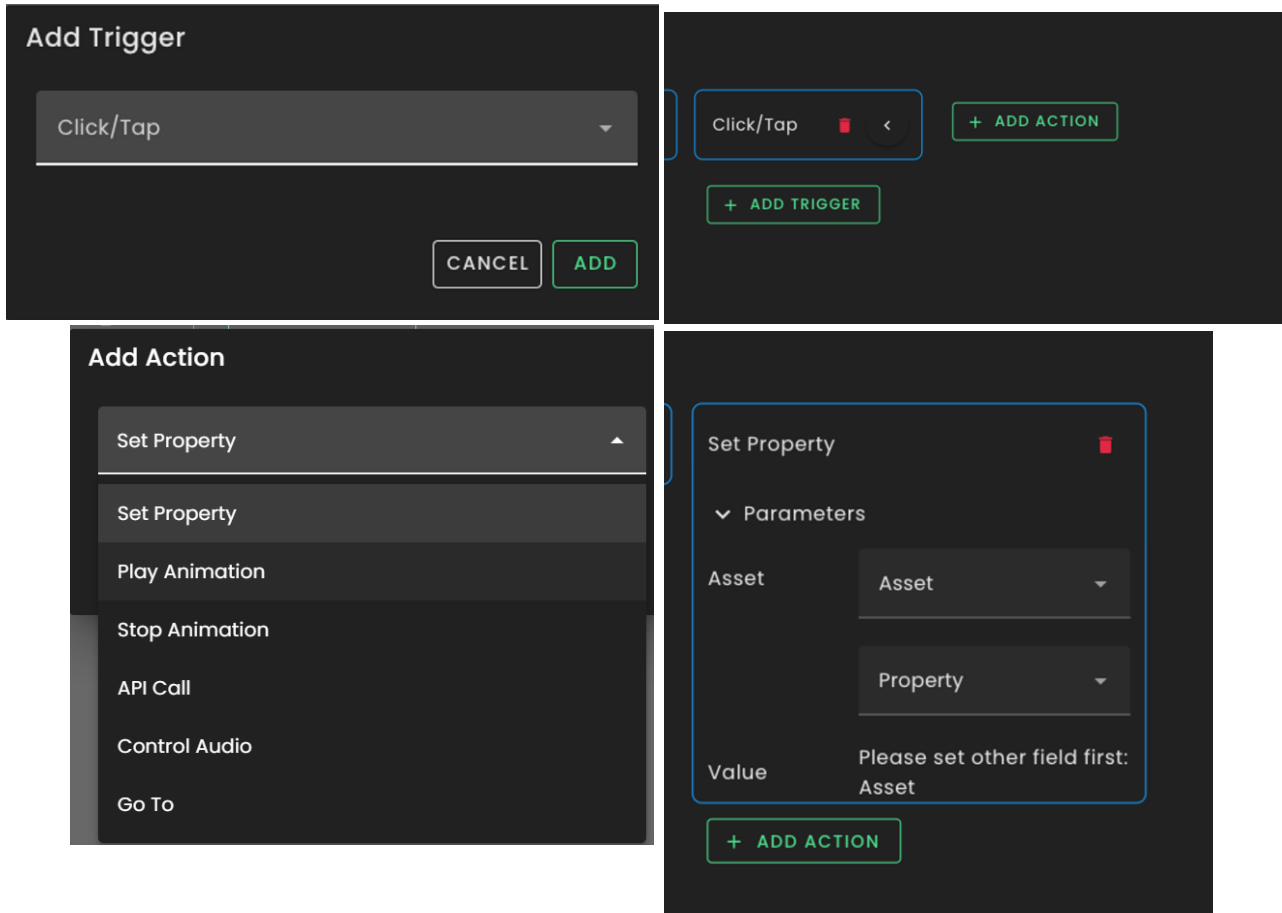
When you open the Action Editor, it will look something like this, assuming it's your first time in:



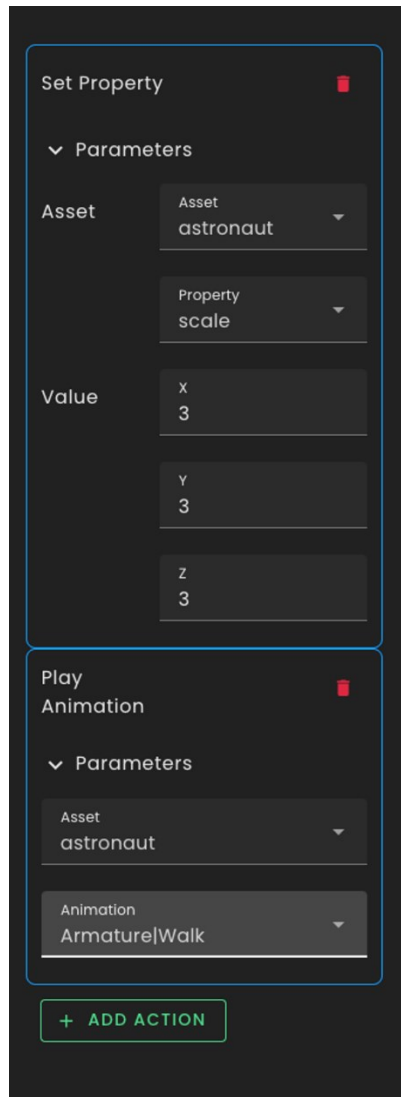
Let's dive right in and add a trigger! Click the green "Add trigger" button to get started. There are two types of triggers you can use: click/tap and proximity. Click/tap triggers the action when a user clicks or taps on it, while proximity triggers it when a user gets close to the asset with the action. Next, hit the "Add action" button. Here's where the fun begins! You have several exciting actions to choose from. For instance, "Set property" lets you tweak another asset's properties in the Frame, like its scale, rotation, or position. "Play

animation" will kick off an animation on a 3D model, making it come to life, while "Stop animation" will halt it. And with "Go to," you can create a link to another Frame, Web page, or even a specific spot in your Frame.

In this example, let's go with a "Set property" action. A menu will pop up where you'll select the asset you want to modify, the property you want to adjust, and the new value you want to set. It's straightforward and super empowering, get ready to see your vision unfold!

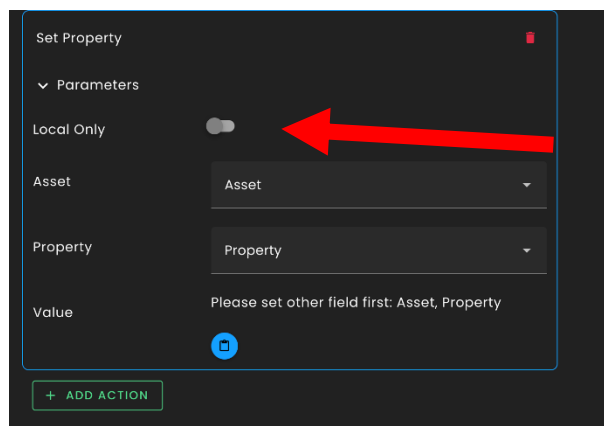


Imagine this: you want to scale up another model in the Frame. Good news! You can actually link multiple actions to the same trigger. This means you can not only scale the model but also play one of its animations when the click trigger is activated. Here's how everything looks once both actions are configured:



### Local vs. networked actions

In the Action editor, setting up an action is a breeze, and you get to choose whether that action is Local or Networked! Check out the "Local only" checkbox. Local actions are a fantastic feature because they only happen for the user who triggers them. On the other hand, Networked actions, which are the default, happen for everyone in the Frame. This flexibility is awesome, especially for things like tooltips designed to pop up just for the user who clicks on an asset. How cool is that?





Various



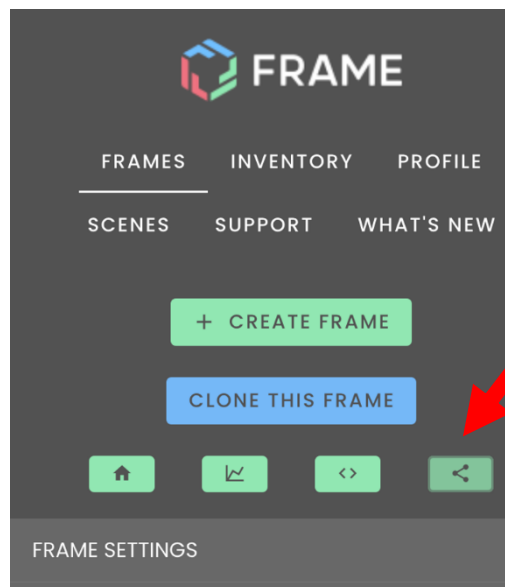
## FAQs

### Hot Keys

- C. Opens the "Customize avatar" panel.
- F. Toggle fly mode on/off.
- H. Return home from a photosphere.
- L. Toggle default scene lights on/off.
- M. Mute/unmute yourself.
- P. Switch the pointer on and off.
- Q-E. Turn left or right.
- U. Activate/deactivate edit mode.
- V. Switch between 1st and 3rd person mode.
- WASD. Move around like arrow keys.
- 1. Raise your hand.
- 2. Wave.
- 3. Clap your hands.
- 4. Dance away.
- < >. Rotate 360 image in edit mode.
- Enter. Connect to a Frame as a participant.
- Control + Enter. Connect to a Frame as a spectator.
- Shift. Press down with arrows/WASD to run.
- Spacebar. Opens the sidebar.
- Shift + double click. Teleport across the Frame.

### How do I invite other people into Frame?

Just share the link to your Frame with anyone that you want, however you want! By default, anyone who has your Frame link can connect to it.



If you want to ensure that only specific individuals can access your Frame, you have a few robust options:

- Password protect. Head over to the Permissions and roles section of your Frame Settings to add a password. This way, only those with the password can enter!
- Members only. Switch your Frame's Viewing Permissions to "Members only" and invite your chosen people via their email addresses. They'll receive an email linking them directly to your Frame, and they must be logged in with that address to gain access. Easy and secure!

- Domain access. Set your Frame's Viewing Permissions to "Domains" and add trusted domains to your approved list. Anyone logged in with an email from one of those domains will automatically have access. It's a seamless way to manage who can connect!

### Why my microphone doesn't work?

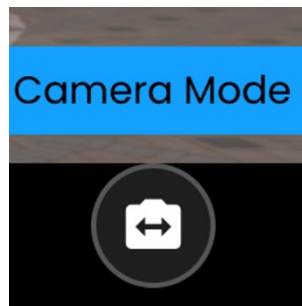
First things first: Ensure your browser has the permissions to use your microphone. In Chrome or Edge, look for that tiny lock icon to the left of the URL in the address bar. Click it to check and confirm your microphone or webcam permissions. Once those permissions are in place, verify that the site is accessing the correct microphone. Hit the gear icon in your toolbar, then navigate to audio/video settings. In the pop-up window, you'll see which microphone your browser is using. Make sure it's the right one, and after selecting it, you might need to refresh the page. If that still doesn't do the trick, double-check that your mic is plugged in and turned on. Also, ensure you've activated your mic in Frame by clicking the mic icon at the far left of the toolbar; it should turn blue when active.

### Why are my arrow/ WASD keys not working?

Frame has two interaction zones: the Environment and the sidebar/chat. If you were using the chat or sidebar, those keys operate within that area. To get back to navigating with arrows or WASD keys, simply click or tap somewhere in the environment, and voilà, all keys should function again. If navigation remains stubborn, try double-clicking on the ground to move; Just make sure this feature is enabled in your Profile section.

### Why can't I see my avatar?

Frame's default view is first-person, but shifting to a third-person view is a breeze. Just press the "V" key or click the icon under settings in the toolbar. This setting should carry over across Frames. In third-person or camera view, you can drag your screen with the mouse to get a full 360-degree view of your avatar!



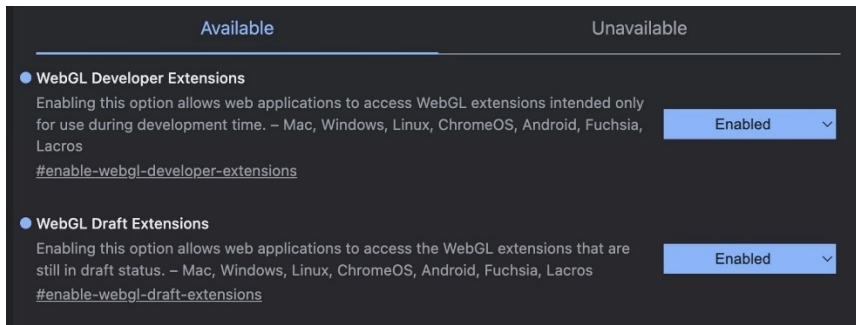
### How to fix "Only WebGL 1 was found, but WebGL 2 is required" error

In case you see the text "Only WebGL 1 was found, but WebGL 2 is required" in your updated Chrome browser, be sure to confirm these settings:

1. Hardware Acceleration: Under `chrome://settings/system`, be sure to enable this setting



2. WebGL Settings: Under `chrome://flags/`, be sure these two options are enabled

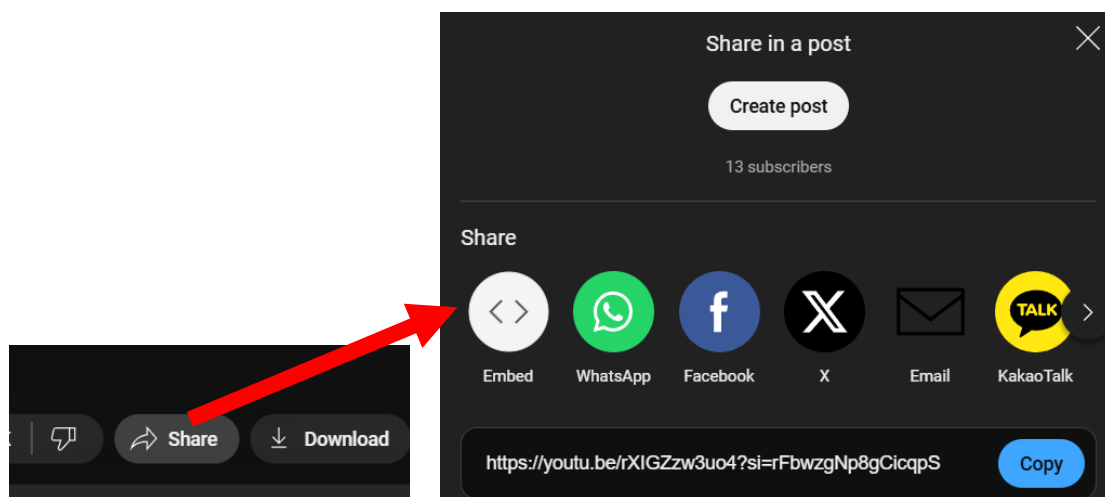


### How can I make breakout rooms?

- You can use Private Voice Zone assets to create multiple breakout room type experience.
- Insert a private voice zone-PVZ in any room(have a look at <https://support.framevr.io/Voice-Zone-77d9358925444666815d7e584533120e?pvs=2>).
- Name the zone or place a Spawn Spot inside for easy navigation.
- Lock the PVZ from inside so no one from outside can intrude (Admins still have access to locked zones).
- Make content private to the zone, such as streaming screens.

### How can I embed a YouTube video?

Get the right link: Using "Add a link,' you can include any weblink. However, for embedding, make sure you grab the embed-specific link. For YouTube videos, you can find this link in the video's share options.



### How do I delete assets in Frame?

There are multiple ways to Delete assets in Frame.

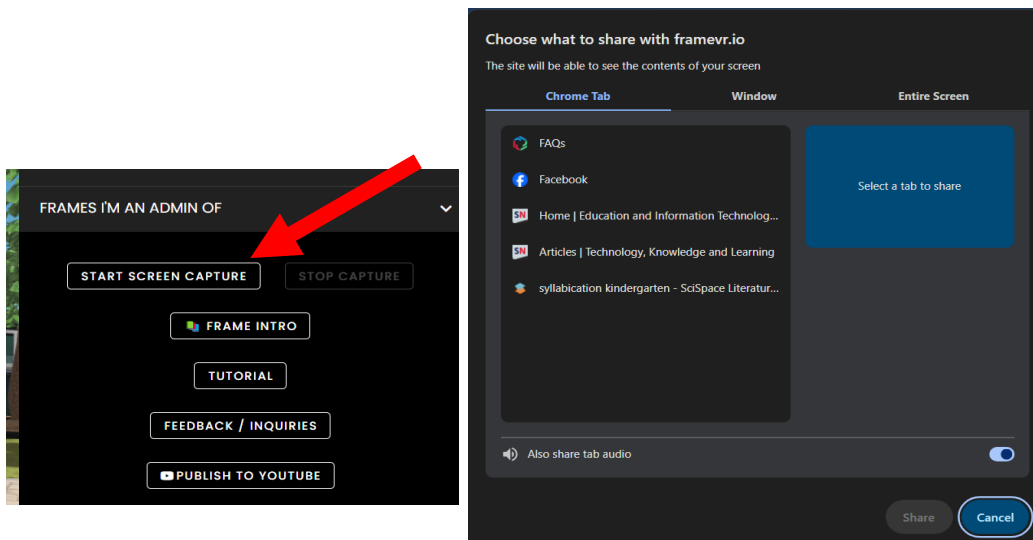
- For editable assets: Simply enter edit mode, click on the asset you want to remove, then hit the delete icon in the edit menu or press the delete key. It's that simple!
- For non-editable assets: If you've got a 3D model that's too complex to interact with or your network is slow, don't worry! You can easily remove the asset from the "Assets in this Frame" section. Problem solved!

### Can I record a Frame Session?

There are two ways to record a Frame session.

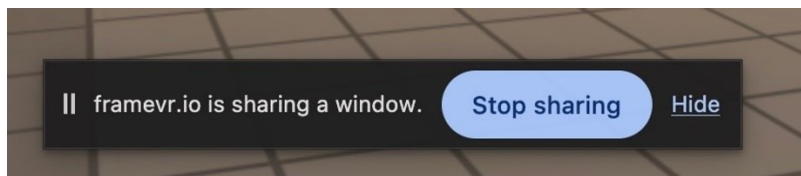
- Using external software: Fire up any screen recording software you have (like the inbuilt one on MacBook, or even a camcorder) and make sure your audio levels are perfect. Easy peasy!
- Using Frame's built-in recorder: For the best recording experience, make sure Frame is the only tab open in your window. Open the sidebar, click on the "Start screen capture" button, and watch as it transforms with Frame-colored text. A pop-up will appear, letting you choose between recording a tab, window, or

entire screen. Select the window with Frame, and voilà! You're ready to browse your system while only recording the Frame window. It's as seamless as it gets!

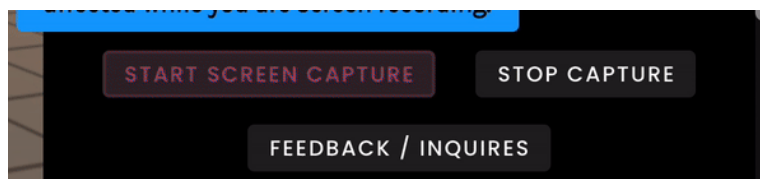


💡 If you pick window, and select the one with Frame, you can then browse your system while only the Frame window gets recorded.

When you select an option and click on "Share" you should see a small perpetual note like this at the bottom of your screen. This is an indicator that your Frame recording has begun. You can hide it if you want to.



Another indicator that your recording is active:



To save your file, make sure to click "Stop capture"! It's crucial because if you close your tab, stop recording, or take any other action, your file won't be saved. Once you open your sidebar and click "Stop capture," a pop-up will appear asking for a file name and destination. Get ready to see your work safely stored!

## Tips for various scenarios

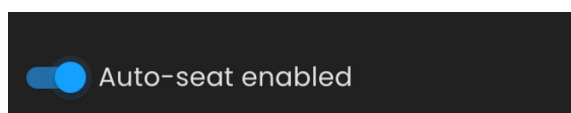
### Tips for hosting classes in Frame

#### *Recommended environments*

- Morey hall. Closed class space with a office hours room and and open outdoors for 360 views.
- Campus. Open teaching space, an admin block, and showcase rooms for reference content.
- School. Large environment with teaching space, collaboration area, faculty rooms, and student rooms.
- Floating hall. Simple theatre classroom with visible outdoors.

#### *Auto seat*

Every student gets a "Seat" option where they can sit in a seat closest to their avatar. As creator, you can also automatically seat everyone as they connect to the Frame using this setting:



#### *Permissions*

- Give your students "Interaction" permissions whenever they need to share their screens.
- Give your students "Editing" permissions when they need to add content/their assignments to the Frame.
- "Non-Admins can only edit assets they upload" setting lets students (non-admins) edit only content they add.

#### *Streaming screen tips*

- Give your educators interaction permissions so only they can share the screen. When required, change interaction permission to anyone so students can share too.
- Sharing YouTube videos via Chrome Tab will give you the option to share system audio as well.

#### *Breakout Rooms*

- Use Private Voice Zones to create different areas/rooms where students can do group work. The zone will keep the mic audio confined. You can also make it so the content in the voice zones is only visible to users who join the zone.
- You can also create spawn spots in these zones so students can directly go to their rooms using the Go-To menu or a linked asset.

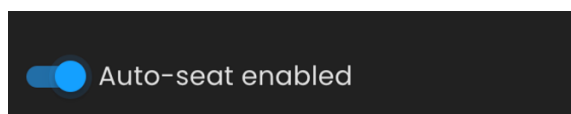
### Tips for events in Frame

#### *Recommended environments*

- Outdoor theater. Simple presentations.
- Auditorium. Large presentations and conferences.
- Event horizon. Immersive experiences with auto seat.
- Resort. Casual events, multiple collaboration areas.
- Convention center. Trade shows, exhibitions.

#### *Auto seat*

Every user gets a "Seat" option where they can sit in a seat closest to their avatar. As creator, you can also automatically seat everyone as they connect to the Frame using this setting:



#### *Light*

Use the Lights enabled option to mimic a "lights out/on stage aesthetic" for performances.

### *Streaming screen*

- Give your speakers interaction permissions so only they can share the screen.
- Webcam. Use the webcam to stream the speaker's video. You can also use the Green Screen feature to create a perception of users being in Frame, in person.



### *Breakout Rooms*

- Use Private voice zones to create different areas/rooms where students can do group work. The zone will keep the mic audio confined. You can also make it so the content in the voice zones is only visible to users who join the zone.
- You can also create spawn spots in these zones so students can directly go to their rooms using the Go-To menu or a linked asset.

### *Engaging ideas*

You can use Frame features to create interactive experiences for your users:

- Use Whiteboard for Pictionary. Divide participants into teams and allow them to take turns drawing on the whiteboard while their team members guess the word or phrase being drawn. To make it more challenging, you can set a time limit for each round.
- Use images to host a scavenger hunt. Choose a theme for the scavenger hunt and create a list of items for participants to find in images. For example, if the theme is "nature," you can include images of different types of trees, animals, and flowers. Participants can work individually or in teams to search for and identify the items on the list.
- Use Web browser to host a karaoke event. Create a playlist of popular songs and provide the lyrics on the screen for participants to sing along. To make it more interactive, you can have participants vote for their favorite performances using Polls or offer prizes for the best performances.
- Action editor. Set up local instances for an immersive experience.

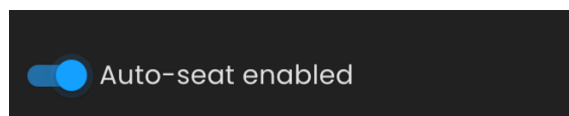
### **Tips for hosting meetings in Frame**

#### *Recommended environments*

- Zen office 3.0. More than 30 small office rooms.
- Atrium. Open office with collaboration spots.
- Lounge. Informal meeting space with windows for 360 content.
- Floating hall. Simple theatre classroom with visible outdoors.
- Zen office 2.0. Private voice zooms rooms.

### *Auto seat*

Every user gets a "Seat" option where they can sit in a seat closest to their avatar. As creator, you can also automatically seat everyone as they connect to the Frame using this setting:



### *Permissions*

- Set viewing permission to allow certain people (members) to enter your Frame.
- Set interaction permissions according to who can share their screen.

## Making an environment

💡 This is an advanced topic and will not be discussed in detail.

### Introduction

Welcome to a world where your creativity takes center stage! Beyond the predefined Frame environments available in our environment picker, you have the power to upload your own 3D models, bringing your unique vision to life. To make this process as seamless as possible, some essential requirements, tips, and tricks are discussed, to help you create stunning environments effortlessly. Are you ready to elevate your virtual space? Let's get started! And don't forget, to have a look at this video tutorial <https://youtu.be/9gXeDSSs3Jg>, which will show you the exact steps to upload your model to Frame.

First things first, your model must be a .glb file and should not exceed 50MB in size. Additionally, the environment model must fit within a bounding radius of 500m or less. For precise scene scaling, use this sample avatar (<https://drive.google.com/file/d/12-k2oJ01rXdHhMe50GKzI0244rj7SLdl/view?usp=sharing>), which includes both sitting and standing positions.

Frame operates smoothly from a web browser, so if you anticipate users joining from VR headsets, mobile devices, or older desktops, it's crucial to keep your file size as low as possible. If you're having difficulty getting your model in shape, don't hesitate to contact [hello@framevr.io](mailto:hello@framevr.io).

### GLB/GLTF

As mentioned, only .glb models are supported. The .glb format is the binary, single-file variant of a gltf model. Dive deeper into the gltf format here (<https://www.khronos.org/gltf/>), an open-source standard designed specifically for web environments like Frame. Most 3D design tools readily offer .glb export capabilities.

Blender is a fantastic tool for creating your models, often serving as the final stop before exporting, thanks to its robust gltf/glb support. Microsoft also offers an exporter ([https://doc.babylonjs.com/extensions/Exporters/3DSMax\\_to\\_gltf](https://doc.babylonjs.com/extensions/Exporters/3DSMax_to_gltf)) for 3ds Max, along with various other tools. Ensure your model is a valid gltf/glb model here (<https://github.khronos.org/gltf-Validator/>). If you're new to GLTF, especially if you use Blender, this comprehensive article ([https://docs.blender.org/manual/en/2.80/addons/io\\_scene\\_gltf2.html](https://docs.blender.org/manual/en/2.80/addons/io_scene_gltf2.html)) will guide you through.

### Spawn spot

The origin point (0, 0, 0) of your 3D scene serves as the default spawn location for users entering your Frame. Position this point strategically to ensure a smooth user experience. Make sure it's not too far from your model or within any enclosed geometry. Ideally, your origin point should be in an open area with minimal distractions to avoid overwhelming users upon entry.

### Textures/Materials

Limit the number and complexity of textures in your model. Opt for vertex colors or color palettes whenever possible. Heavy textures can bog down performance. If you are having a hard time reducing the heaviness of your textures and you want help, email [hello@framevr.io](mailto:hello@framevr.io) for help.

### Considerations with the Blender gltf exporter

For those using Blender, the material definitions in the node editor might not always translate perfectly when exporting to .glb. Follow these steps for seamless exports:

1. Enable the Node wrangler Blender add-on.
2. Use CTRL + SHIFT + T to open Node wrangler from within the Node Editor.
3. Navigate to your folder of PBR textures, select them, and let Node Wrangler set up the node material definition.
4. Pack external assets automatically and reduce PBR texture maps to 512x512 or 1024x1024.
5. Export with adjusted scaling for mapping nodes.



## Geometry/poly count

Minimize your poly count as much as possible. For repeatable geometry, set them as linked duplicates in Blender ([https://docs.blender.org/manual/en/latest/scene\\_layout/object/editing/duplicate\\_linked.html](https://docs.blender.org/manual/en/latest/scene_layout/object/editing/duplicate_linked.html)). Use back-face culling appropriately. For advanced geometry compression, Draco compression (<https://google.github.io/draco/>) is your best bet. Build the Draco library yourself or use tools like Cesium's gltf-pipeline library (<https://github.com/CesiumGS/gltf-pipeline>). Complex models will see substantial improvements, while simpler models will benefit less.

## Navigation mesh

Frame automatically generates a nav-mesh from your uploaded environment. If you prefer to define your own, include a .glb file named with \_\_nm when you upload your environment. Learn to create your custom nav-mesh at <http://learn.framevr.io/post/create-navmesh>.

## Lighting

Frame currently does not support real-time lighting, so utilize unlit materials and baked lighting/shadows. To create unlit materials in Blender, use the background material type. Lightmapping boosts scene highlights and shadows while leveraging tiled textures. Create your lightmap, export it, and light up your environment with ease!

Include a secondary UV set for meshes using the lightmap. For meshes not using the lightmap, name them with \_\_skiplm. No specific node graph material is required for Frame's lightmapping, just the second UV set and LM file. Combine separate lightmaps by creating a new UV channel for each object, packing their UVs, and baking a single lightmap texture applied to the second UV channel.

Include custom lights in your .glb file, but remember that PBR materials responding to real-time lighting can impact performance. To turn off the default Frame scene light, adjust the settings in Frame. Watch the lights dance with custom animations, as seen in the example available at <https://framevr.io/sol-test>.

Explore more on baking lightmaps at <https://support.framevr.io/Tutorial-Part-1-Baking-Light-in-a-Simple-Environment-1a1c421e18464653bb13af007796d1a9?pvs=21>) and lightmapping Frame environments at <https://support.framevr.io/Tutorial-Part-3-Lightmapping-Deep-Dive-b399705af2504bd3a912de0d63c785ed?pvs=21>).

## Scale

Different 3D tools have varying scale systems. In Frame, it's "1 unit is 1 meter." Visualize this easily using the avatar model available at <https://drive.google.com/file/d/12-k2oJ01rXdHhMe50GKzI0244rj7SLdl/view?usp=sharing>. Note: the avatar shows only the torso and head; typical eye height is 1.6 meters.

## Animations

Frame supports animations baked into your .glb model, including animated lights. Check out a sample at <https://framevr.io/sol-test>.

## Seats and easy panels

Frame features special environment assets like seats and "easy panels" for user convenience.

To add seats to your custom environment:

1. Add an empty in Blender and name it "fcta."
2. Place it atop the object you'd like the avatar to sit on.
3. Align the local y-axis of the fcta empty with the direction you want the avatar to face when seated.

For easy panels:

1. Create an empty and name it "ezpanel," facing its local y-axis.

2. When scaled at a 1.8y:1x ratio, the +- buttons are in the top right corner. Center the easy panel on the object it's fitted to and match its height with the x-axis scale.
3. Ensure "Show wall buttons" is enabled in Frame settings.

For more about seats, ezpanels, and navmeshes, watch the video available at <https://support.framevr.io/Tutorial-Part-2-Adding-Seats-Ezpanels-Custom-Nav-Meshes-021361eb973a4f5da96361a6a6c4137b?pvs=21>.

### Custom WebGL shaders

Add shaders to your environment model, either from the Frame library (<https://library.framevr.io/>) or the Babylon node material editor (<https://nme.babylonjs.com/>). In Blender, name the mesh with the shader tag: shader\_nm\_#yoursnippetid (replace "yoursnippetid" with your shader's snippet ID). For example, to apply the hyperbeam shader, name your mesh shader\_nm\_#13LGZG#2. For an in-depth guide on custom shaders and particle systems, visit the blog post available at <https://learn.framevr.io/post/custom-shaders-and-particle-systems-in-frame-environments>.

### Target metrics

- Try to keep your model within these bounds, on the lower side if you can:
- 30 draw calls.
- 130,000 active faces.
- 20 materials.

You can upload your model to the babylon sandbox (<https://sandbox.babylonjs.com/>) to see how it does before uploading it to Frame!



Full set of video tutorials on how to create an environment available at:

<https://support.framevr.io/framevr/c4606695cf664630939ba80ca055be6e?v=b4e989ce281f44d08bfd45d16a9e2dd7>



You've reached the end of the notes! If you read them carefully, you are experts at Frame!