

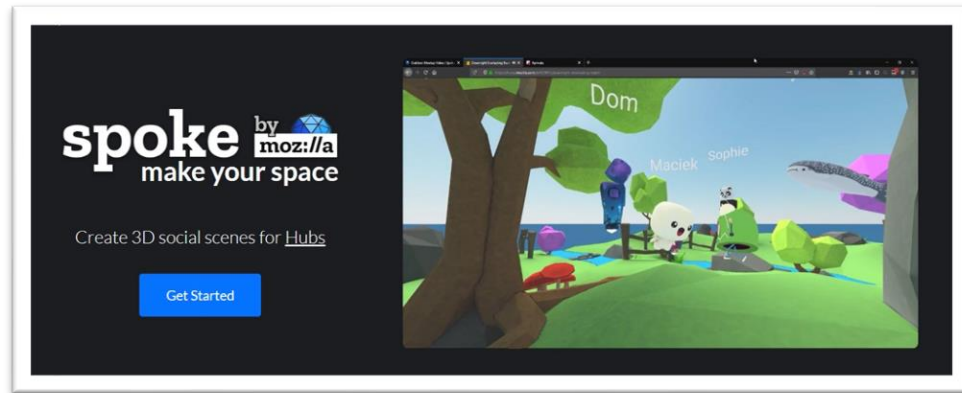


Introduction to Mozilla Hubs

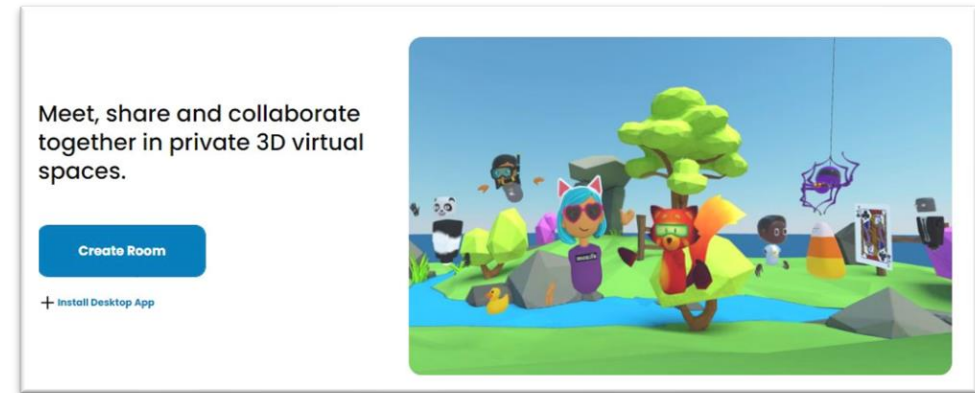
Compiled by:

Caterina Antonopoulou | Department of Digital Arts and Cinema, University of Athens

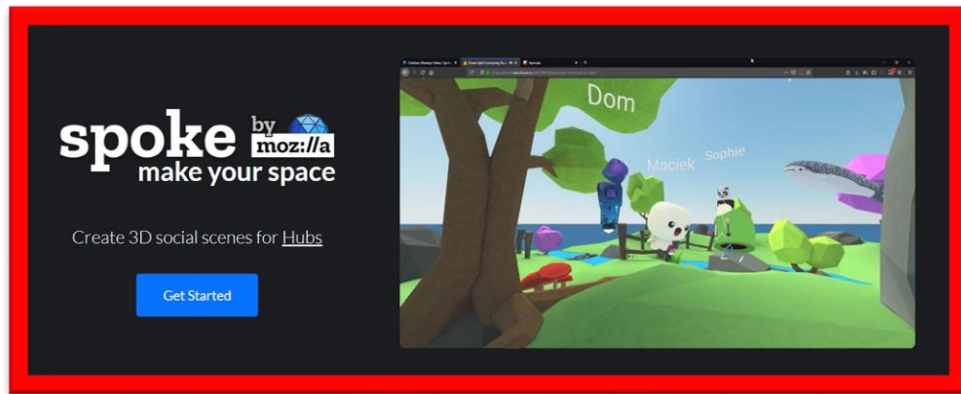
2022



Create a new scene with Spoke editor



Modification of a room's content in Mozilla Hubs



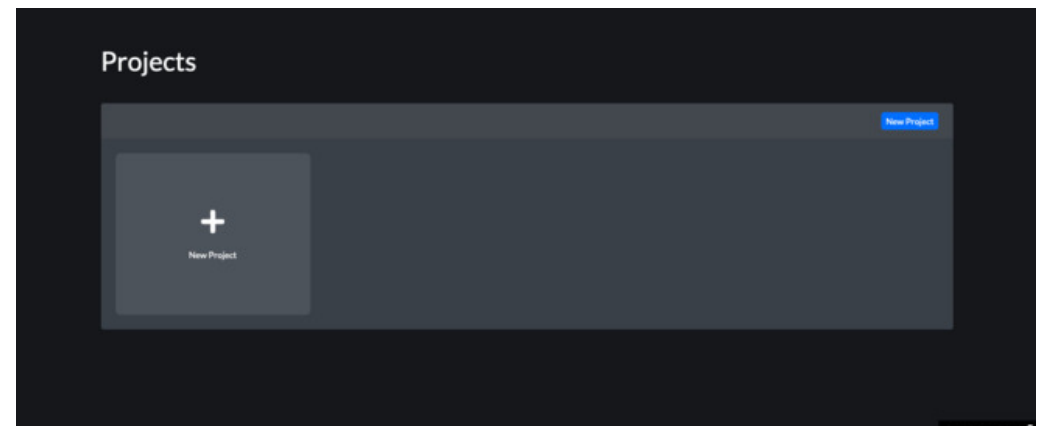
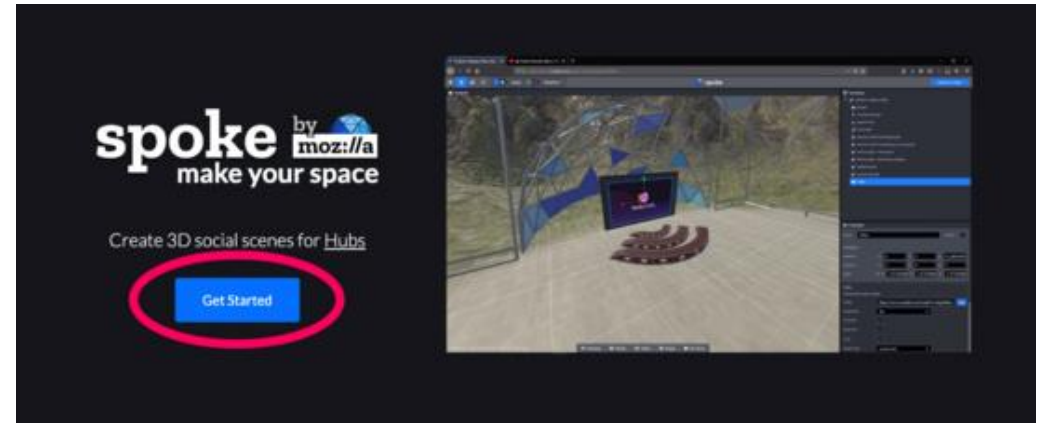
Create a new scene with Spoke editor



Modification of a room's content in Mozilla Hubs

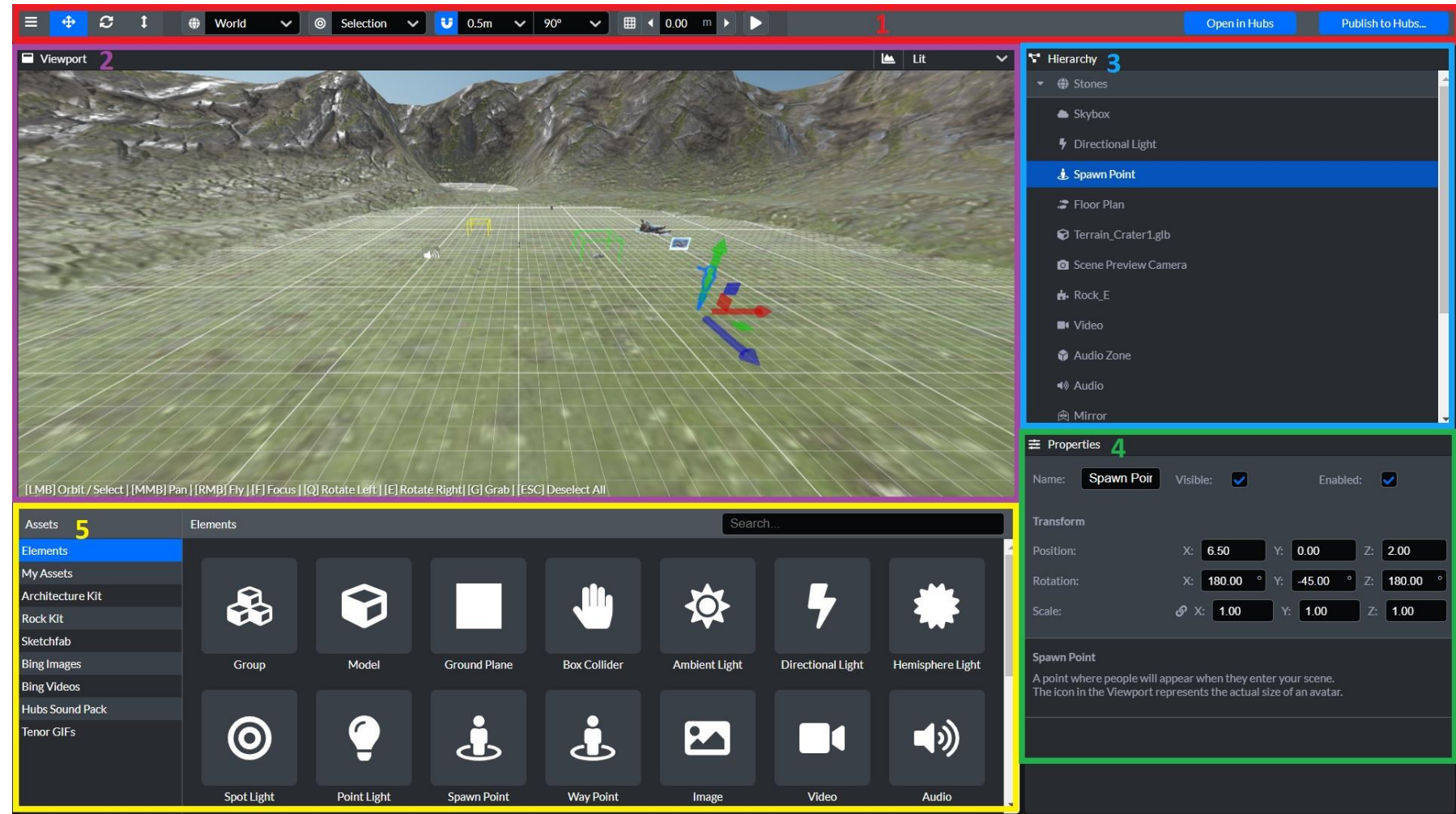
Create a new Spoke project

- Go to hubs.mozilla.com/spoke
- Click 'Get Started'
- At the projects panel: click 'New project'

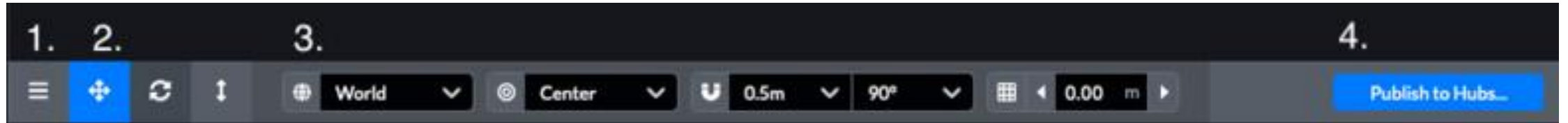


Spoke editor's interface

1. **Toolbar**
2. **Viewport Panel**
3. **Hierarchy Panel**
4. **Properties Panel**
5. **Assets Panel**



Toolbar



1. Dropdown Menu

- In the dropdown menu you will find options to save, save as, export your file, as well as find help on how to use Spoke.

2. Transformation Tools

- Translate [T]
- Rotate [R]
- Scale [Y]

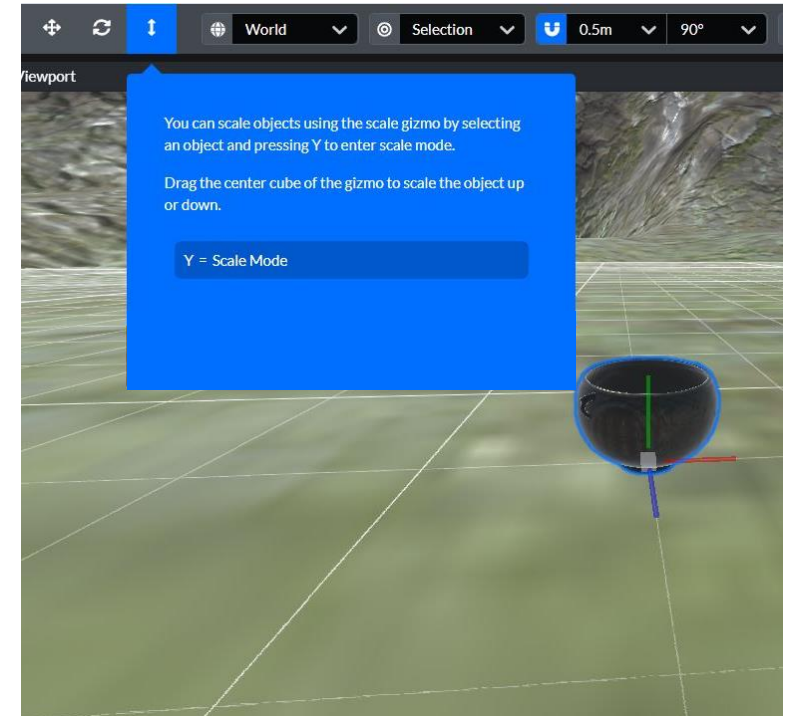
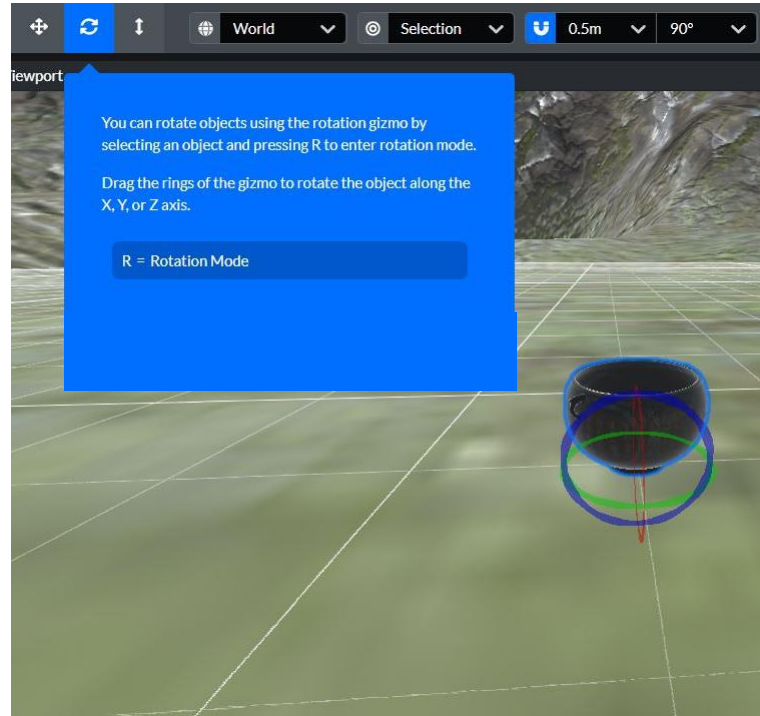
3. Grid Tools

- Toggle Transform Space [Z]
- Transform Pivot [X]
- Toggle Snap mode [C]
- Toggle Grid Visibility

4. Publish To Hubs

- Click this button to open the publish dialog where you can edit your scene's information before publishing it to Hubs.

Transformation Tools



Spoke keyboard controls

Keyboard

Action	Key	Notes
Translate Tool	T	Only in the Viewport panel
Rotate Tool	R	Only in the Viewport panel
Scale Tool	Y	Only in the Viewport panel
Focus Selection	F	Only in the Viewport panel
Toggle Global/Local Transform Space	Z	Only in the Viewport panel
Toggle Center/Selection Pivot	X	Only in the Viewport panel
Increase Grid Height	=	Only in the Viewport panel
Decrease Grid Height	-	Only in the Viewport panel
Rotate Selected Object Left	Q	Only in the Viewport panel
Rotate Selected Object Right	E	Only in the Viewport panel
Toggle Snap Mode	C	Only in the Viewport panel
Invert Snap Mode	Ctrl/Cmd	While dragging objects in the Viewport panel

Delete	Delete, Backspace	In the Viewport panel and the Hierarchy panel
Duplicate	Ctrl/Cmd + D	In the Viewport panel and the Hierarchy panel
Group Selected	Ctrl/Cmd + G	In the Viewport panel and the Hierarchy panel
Copy Selected	Ctrl/Cmd + C	In the Viewport panel and the Hierarchy panel
Paste Selected	Ctrl/Cmd + V	In the Viewport panel and the Hierarchy panel
Undo	Ctrl/Cmd + Z	In the Viewport panel and the Hierarchy panel
Redo	Ctrl/Cmd + Shift + Z	In the Viewport panel and the Hierarchy panel
Save	Ctrl/Cmd + S	In the Viewport panel and the Hierarchy panel
Scrub faster	Shift	While scrubbing numeric properties
Scrub slower	Alt/Option	While scrubbing numeric properties

Viewport Panel

The viewport shows a preview of your scene where you can select and move objects.

- **Object Selection**

You can select objects by clicking on them (hold shift to select multiple objects).

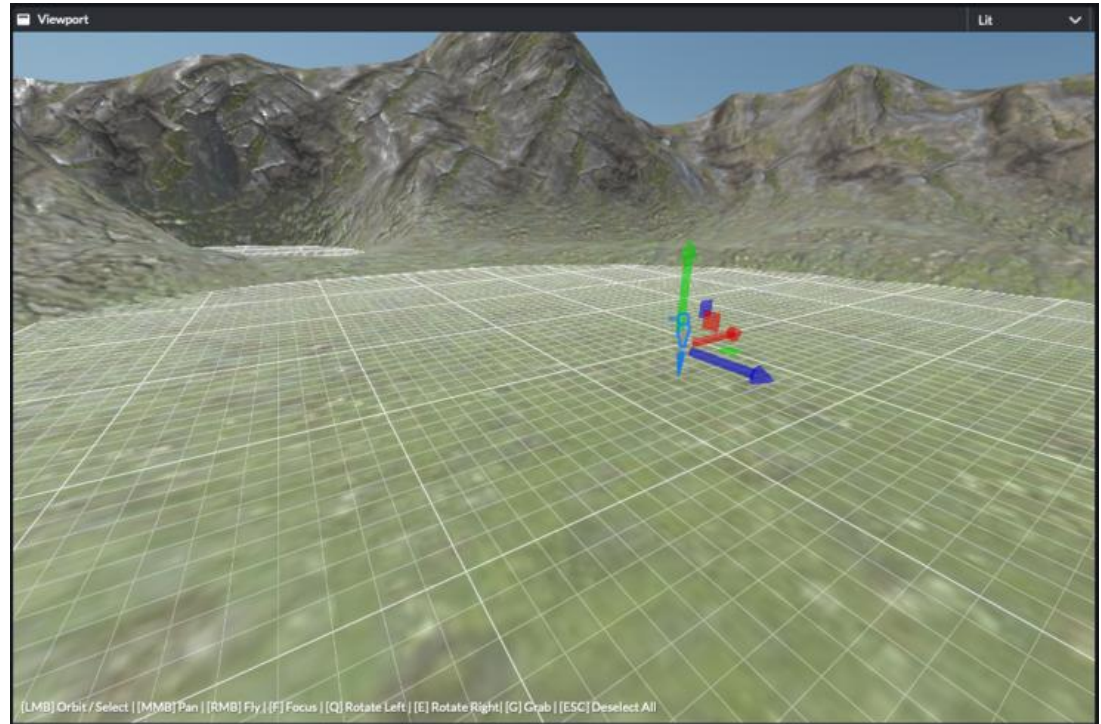
- **Camera Movement**

Orbit around your scene: Left click + Drag

Pan: Middle mouse button + Drag

Enter fly mode: Hold the right mouse button + the WASD keys to move the camera.

Focus the selected objects: 'F' key



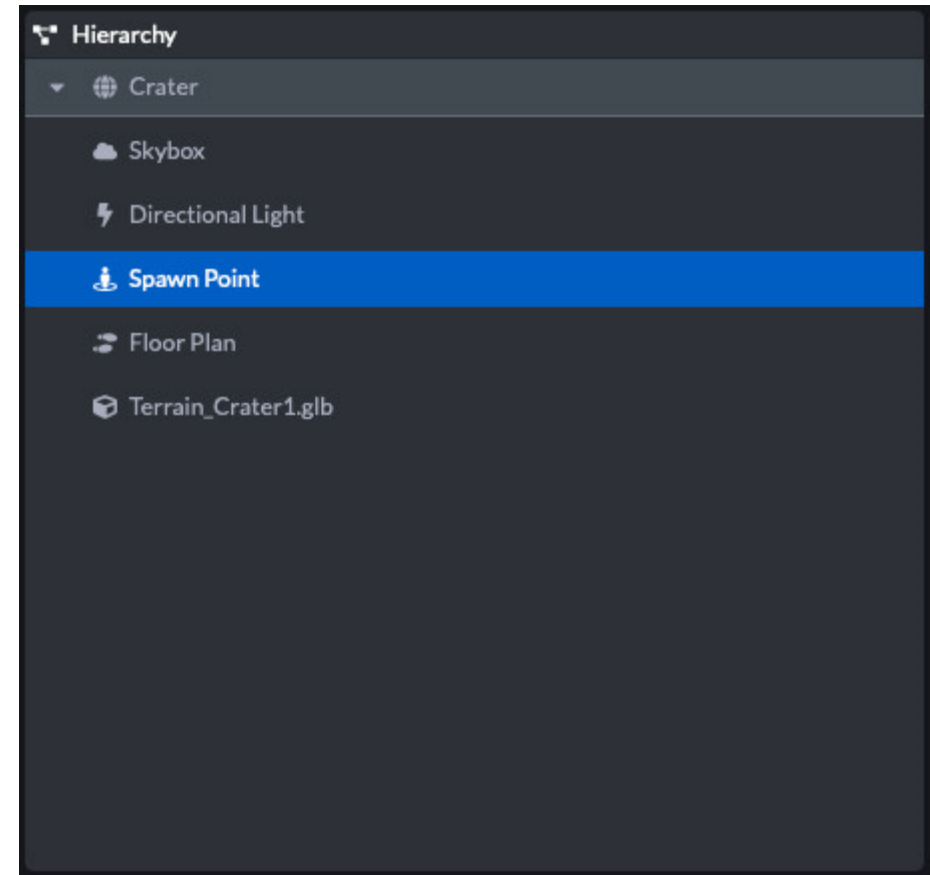
Spoke mouse Controls

Mouse

Action	Button	Notes
Rotate Scene	Left Mouse Button	In the Viewport panel
Pan Scene	Middle Mouse Button	In the Viewport panel
Fly	Right Mouse Button + WASD keys	In the Viewport panel
Zoom Scene	Scrollwheel	In the Viewport panel
Focus Object	Double-click	In the Hierarchy panel

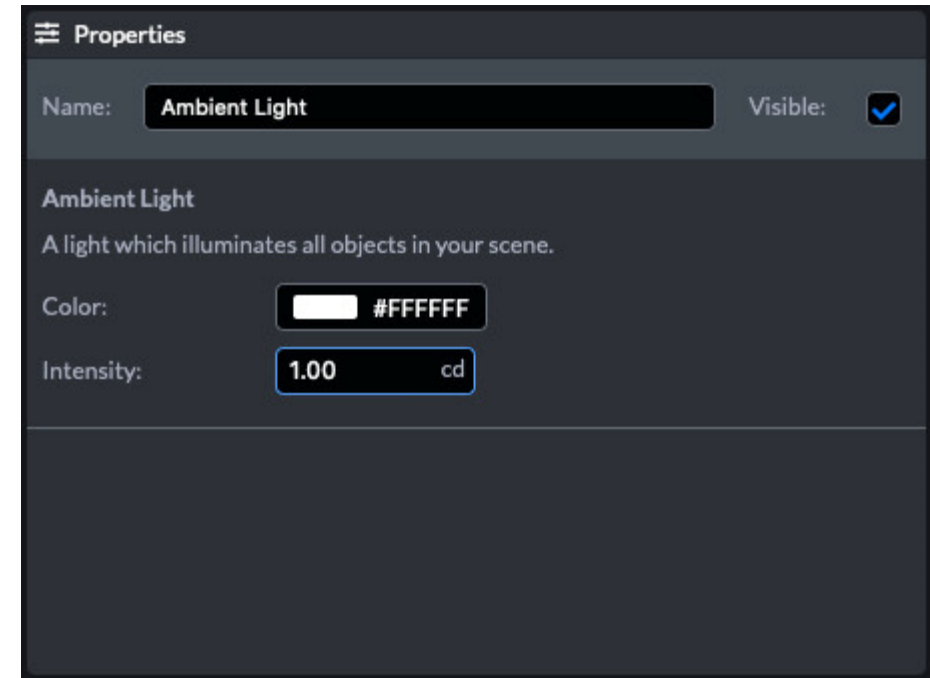
Hierarchy Panel

- Objects you add to the scene show up in the hierarchy panel.
- Double click the object focus it in the viewport.
- Drag objects inside the hierarchy panel to reorder or reparent them.
- Drag & Drop items from the assets panel and files from your computer into the hierarchy panel to add them to your scene.



Properties Panel

- Additional object properties can be set in the properties panel.
- Different types of objects have different properties available to them



Assets Panel

You can find content to add to your scene in the assets panel. You can click on assets to add them to the scene. Assets can also be dragged from the assets panel and dropped onto the viewport, hierarchy panel, or properties panel. On the left side of the assets panel are a list of sources:

- **Elements**

Elements are the basic building blocks in Spoke. You'll find lights, media, spawn points, and every other type of object here.

- **My Assets**

Upload and search your own 3D models, images, videos, and audio.

- **Architecture Kit**

- **Rock Kit**

- **Sketchfab**

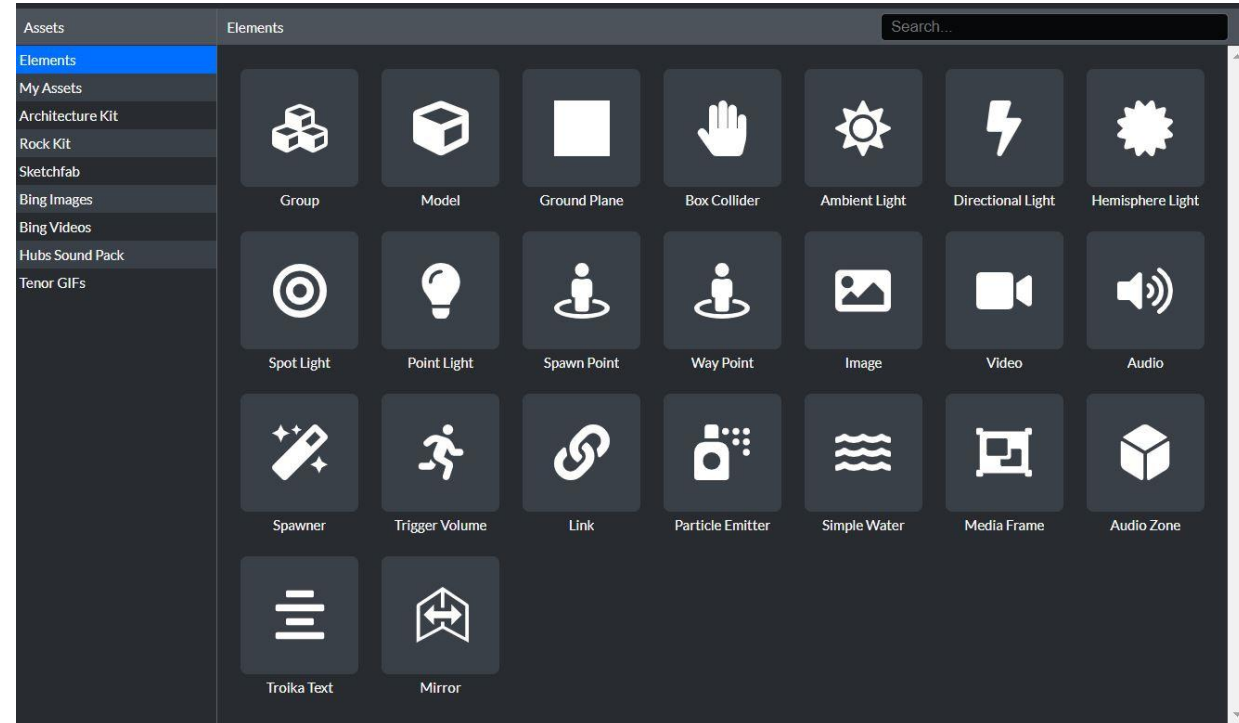
- **Google Poly**

- **Bing Images**

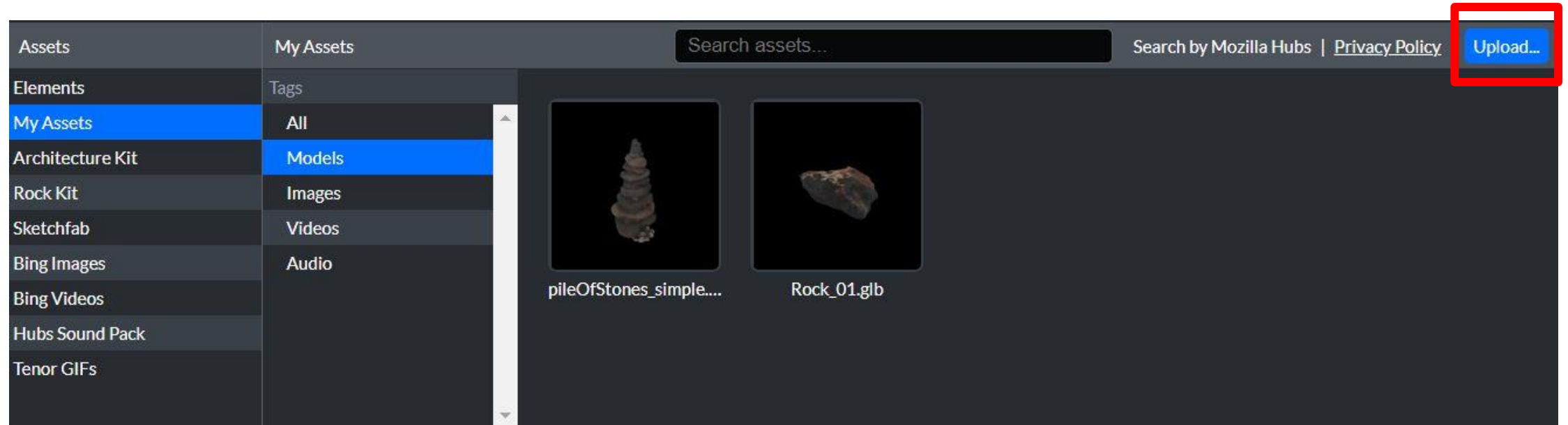
- **Bing Videos**

- **Twitch**

- **Tenor Gifs**



Upload Assets



- Select the 'My Assets' tab in the Assets panel of the Spoke editor and Click the 'Upload' button in the 'My Assets' panel and choose the file to upload
- Spoke projects have a size limit of 128MB for publishing to Hubs
- Supported formats:
 - 3D models: .glb files
 - Audio: .mp3 files
 - Video: .mp4 files
 - Images: .jpeg, .png, .gif files

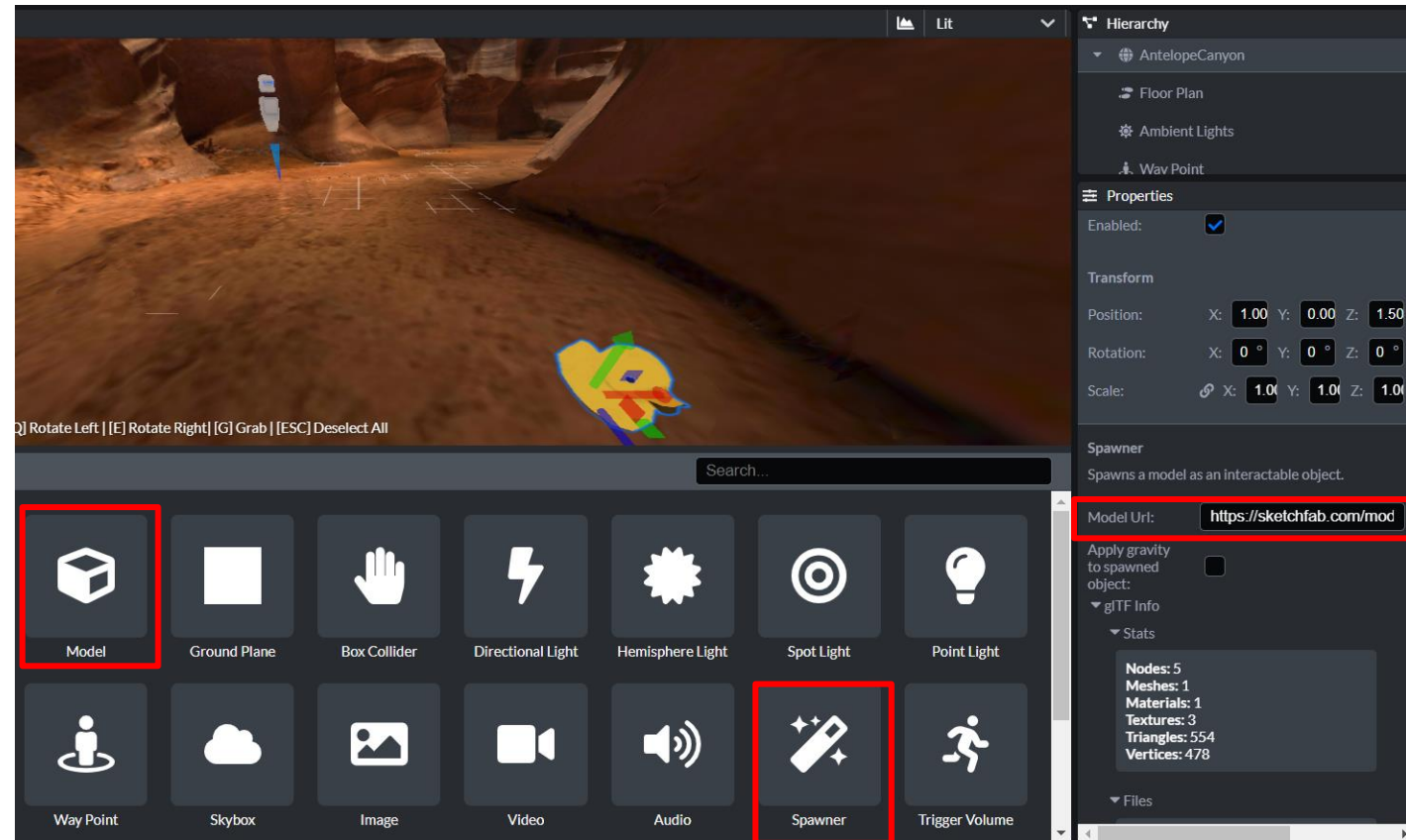
Adding Content I

- **3D models**

Select a 3D model from 'My Assets' or other sources of the Assets Panel
Drag and Drop 3D models from Assets Panel to Viewport

- **Spawners**

Spawners are interactable 3D objects that people can make copies of and manipulate.



Adding Content II

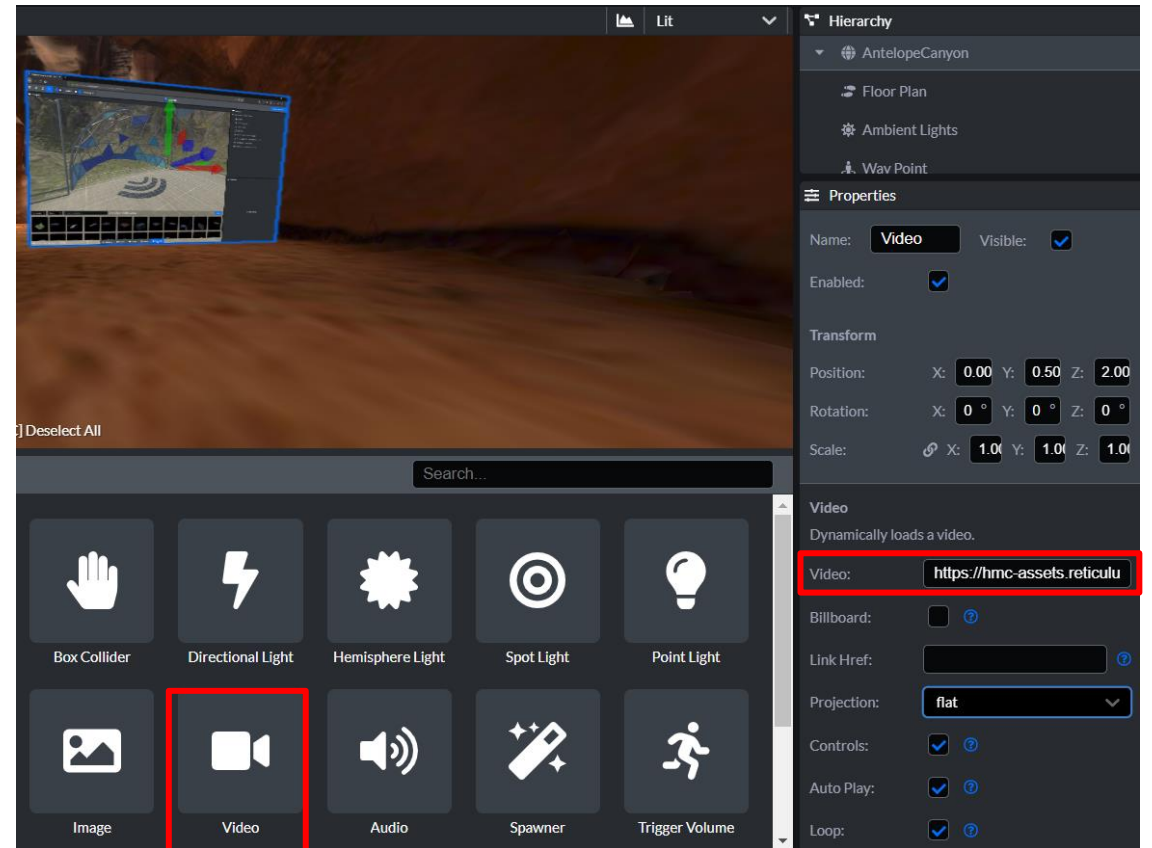
- **Images**

You can upload images or gifs from your own computer or use the built-in search tool from within Spoke to find media online.

- **Video**

You can link to online videos in Spoke to create a permanent player for video content. If you want to temporarily add a video that can be removed, you may want to consider adding it to Hubs and pinning it to your room instead.

If you want to use additional types of feeds, such as a screen or window share from your desktop or your webcam, you can add these after you create a Hubs room with your scene.



Adding Content III

- **Audio**

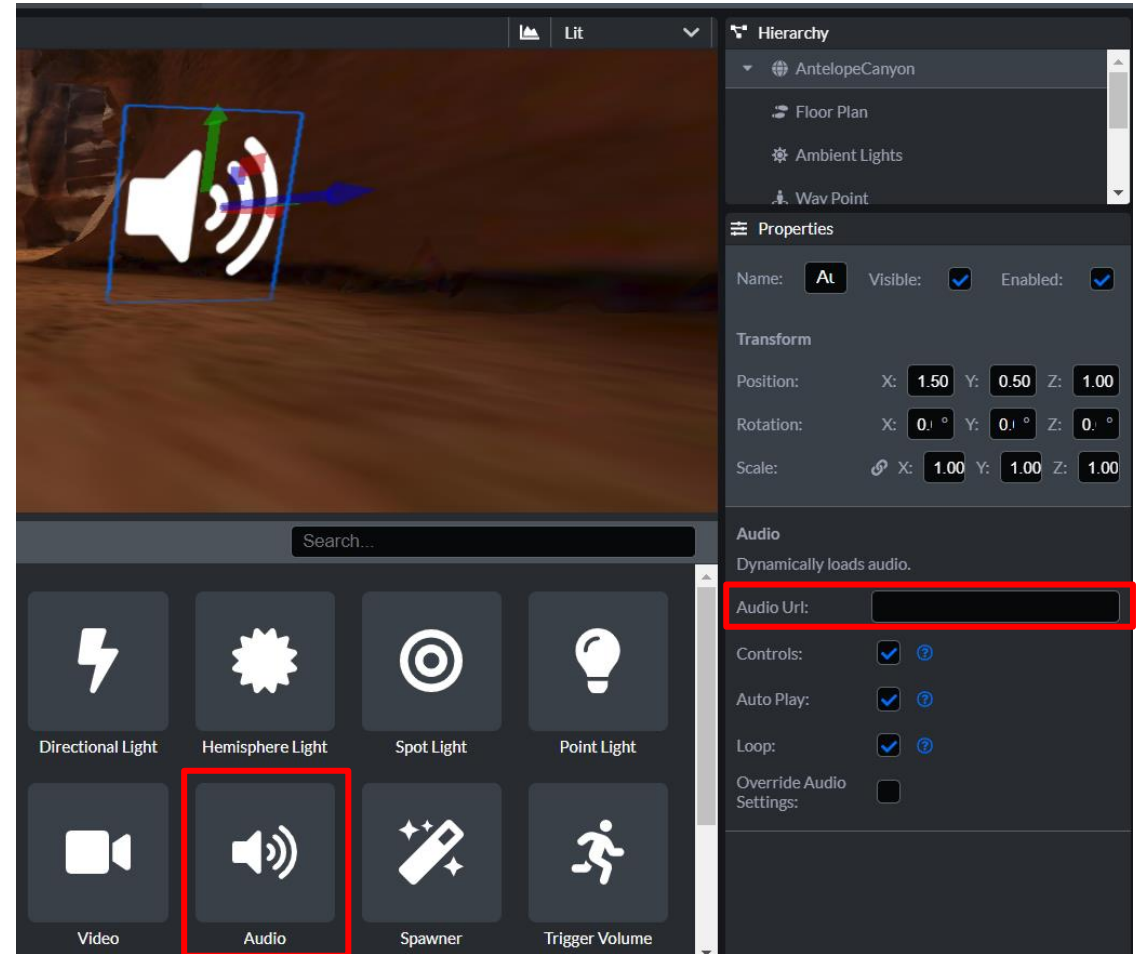
You can add links to .mp3 files to add audio to a Hubs scene. Currently, however, there are no controls on audio clips added using Spoke. If you add audio files to a Hubs room directly, you can access the volume

- **Audio Zones**

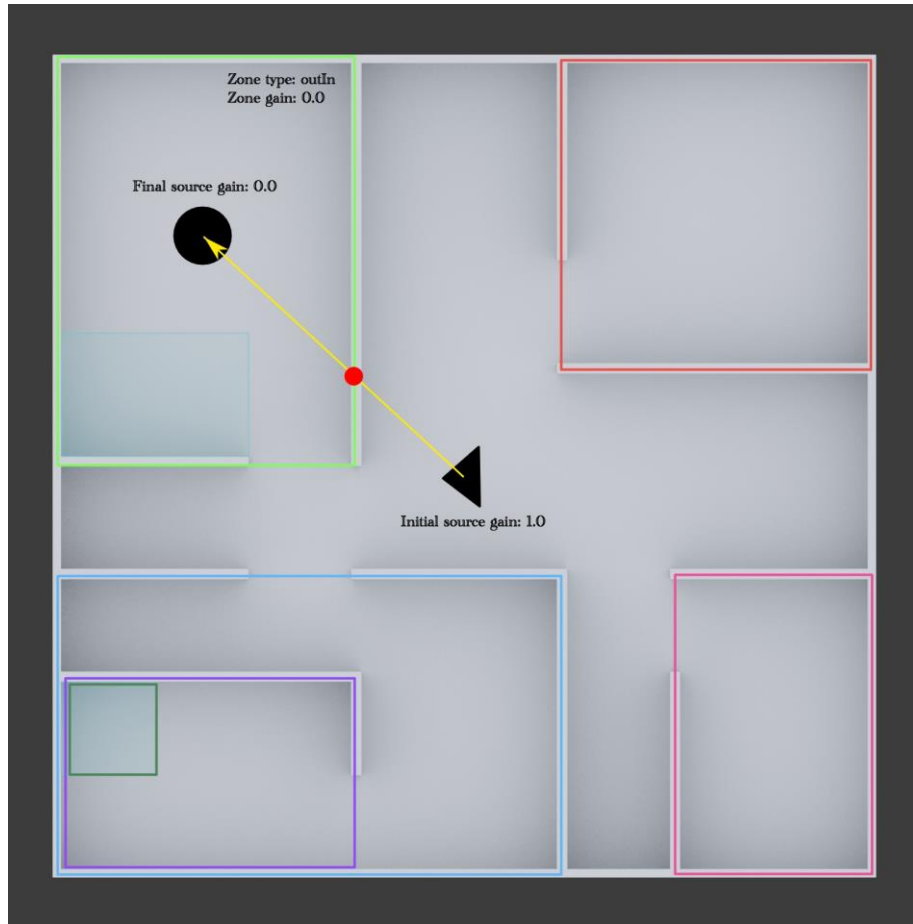
Audio Zones are 3D volumes that modify the audio properties of audio sources (avatars, videos, audios, audio targets, etc) based on the source's and listener's positions with respect to the audio zone.

Audio Zones work based on the audio source and the audio listener's position and they can be of inOut and/or outIn types.

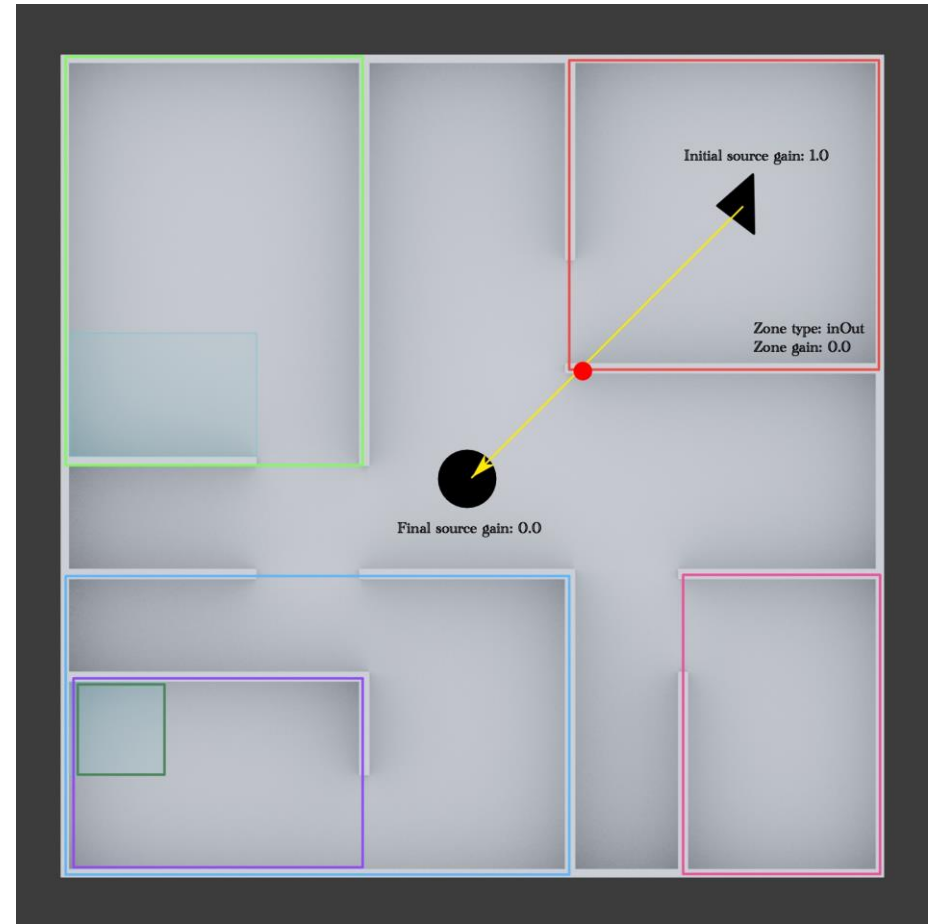
- inOut: The audio zone's parameters will be applied to audio sources inside the audio zone volume when the listener is outside the zone.
- outIn: The audio zone's parameters will be applied to audio sources outside the audio zone volume when the listener is inside.



Audio Zones



OutIn zone that blocks all the audio sources coming from the outside.



InOut zone that blocks all the audio sources coming from the inside.

Adding content IV

- **Links**

You can include links in your scene to point to other Hubs rooms or to different places on the web.

- **Spawn point**

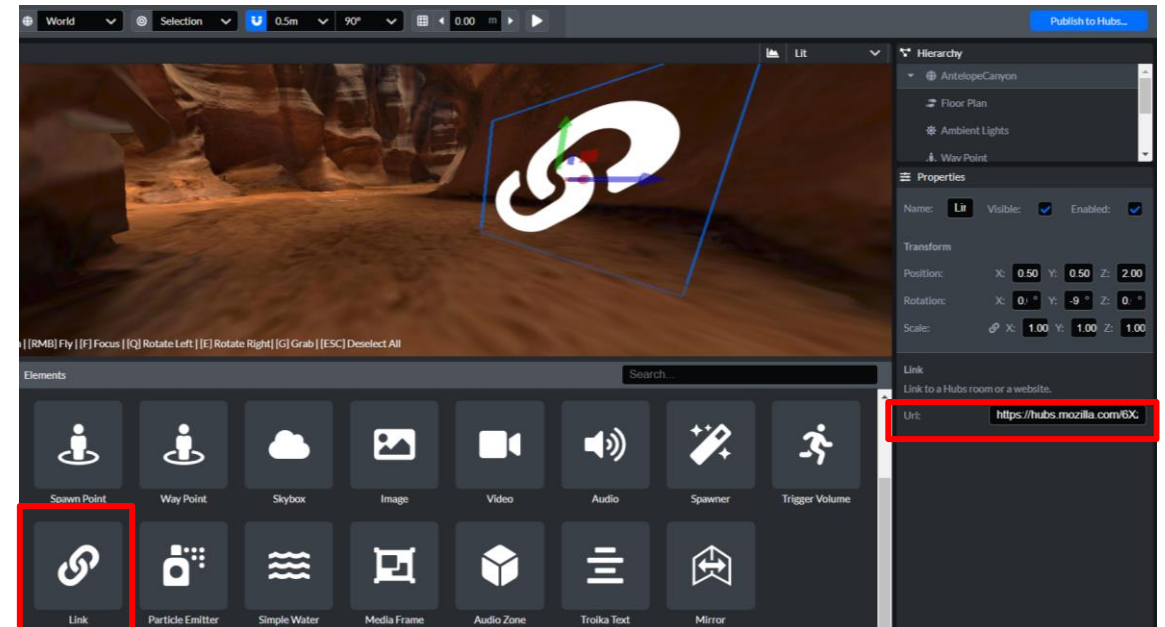
A point where people will appear on entering the scene

- **Lights**

- Directional
- Ambient
- Spot
- Hemispherical

- **Particle Emitter**

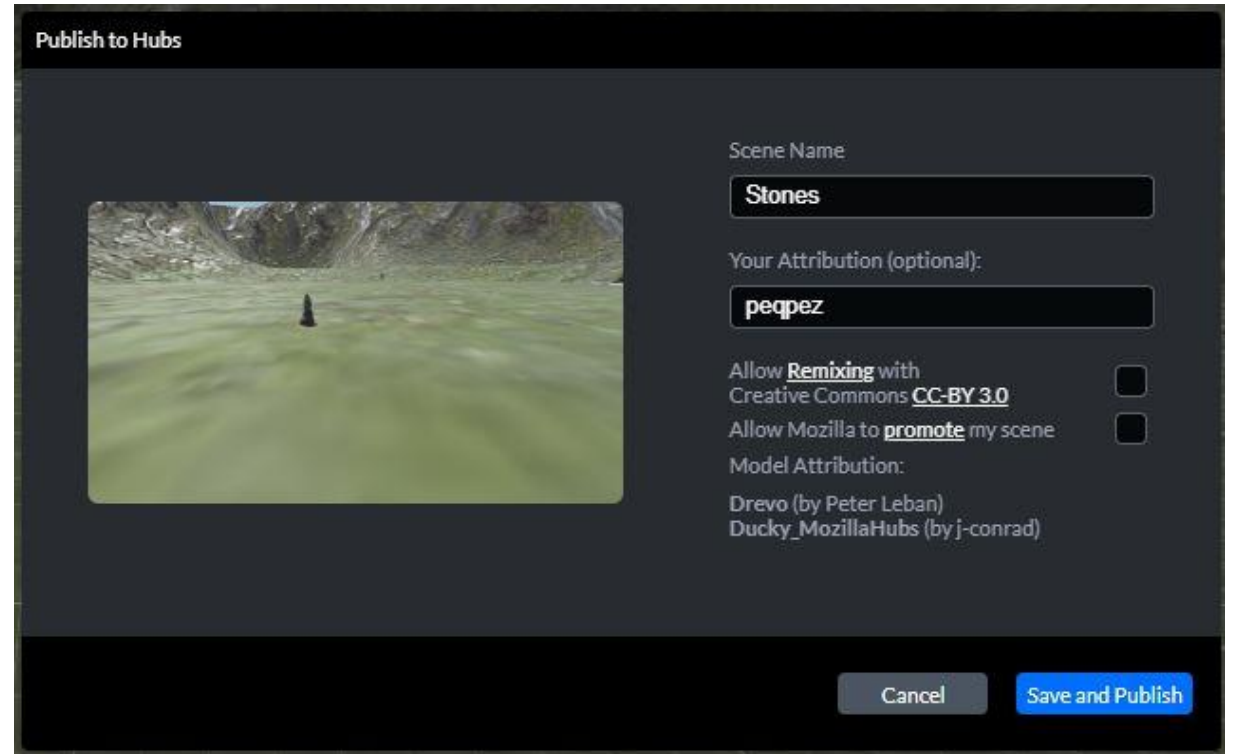
The particle emitter is a Spoke object that spawns moving particles.



Publish Scenes

You can publish a scene either directly to Hubs, or you can export it as a .glb file or as a legacy Spoke scene.

- Click the 'Publish to Hubs...' button in the upper right corner. You will receive a prompt to rename your scene.
- Add attributions
- Choose whether to allow remixing under CC license
- click 'Save and publish'



Performance check

Performance Check

High	Polygon Count: 83,976 Triangles We recommend your scene use no more than 50,000 triangles for mobile devices. Learn More
Low	Materials: 9 Unique Materials We recommend using no more than 25 unique materials in your scene to reduce draw calls on mobile devices. Learn More
High	Textures: ~470 MB Video RAM, 4 Large Textures We recommend your textures use no more than 256MB of video RAM for mobile devices. We also recommend against using textures larger than 2048 x 2048. Learn More
Low	Lights: 1 Lights While dynamic lights are not enabled on mobile devices, we recommend using no more than 3 lights in your scene (excluding ambient and hemisphere lights) for your scene to run on low end PCs. Learn More
Medium	File Size: 31 MB We recommend a final file size of no more than 16MB for low bandwidth connections. Reducing the file size will reduce the time it takes to download your scene. Learn More

[Cancel](#) [Publish Scene](#)

hubs

moz://a

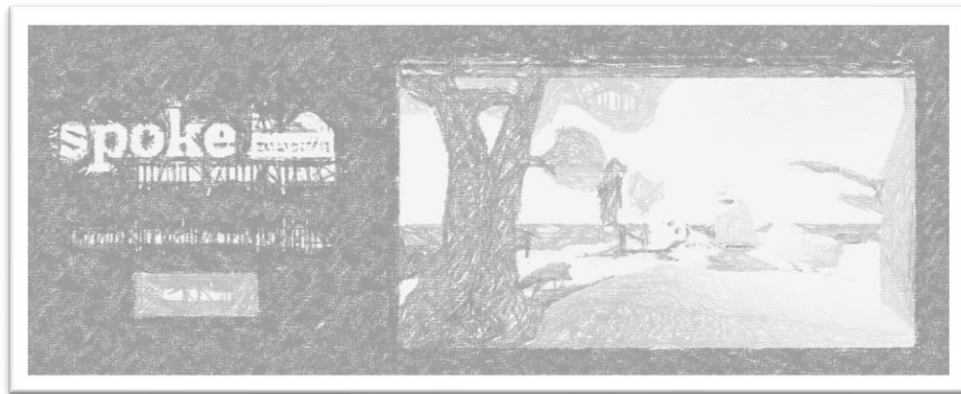
Private, virtual 3D spaces in your browser

[Create a room with this scene](#)

[/ Edit in Spoke](#)

[Share on Twitter](#)





Create a new scene with Spoke editor



Modification of a room's content in Mozilla Hubs

Create a room

- Go to <https://hubs.mozilla.com/>
- Click on 'Create a room'

Meet, share and collaborate together in private 3D virtual spaces.

Create Room

+ Install Desktop App

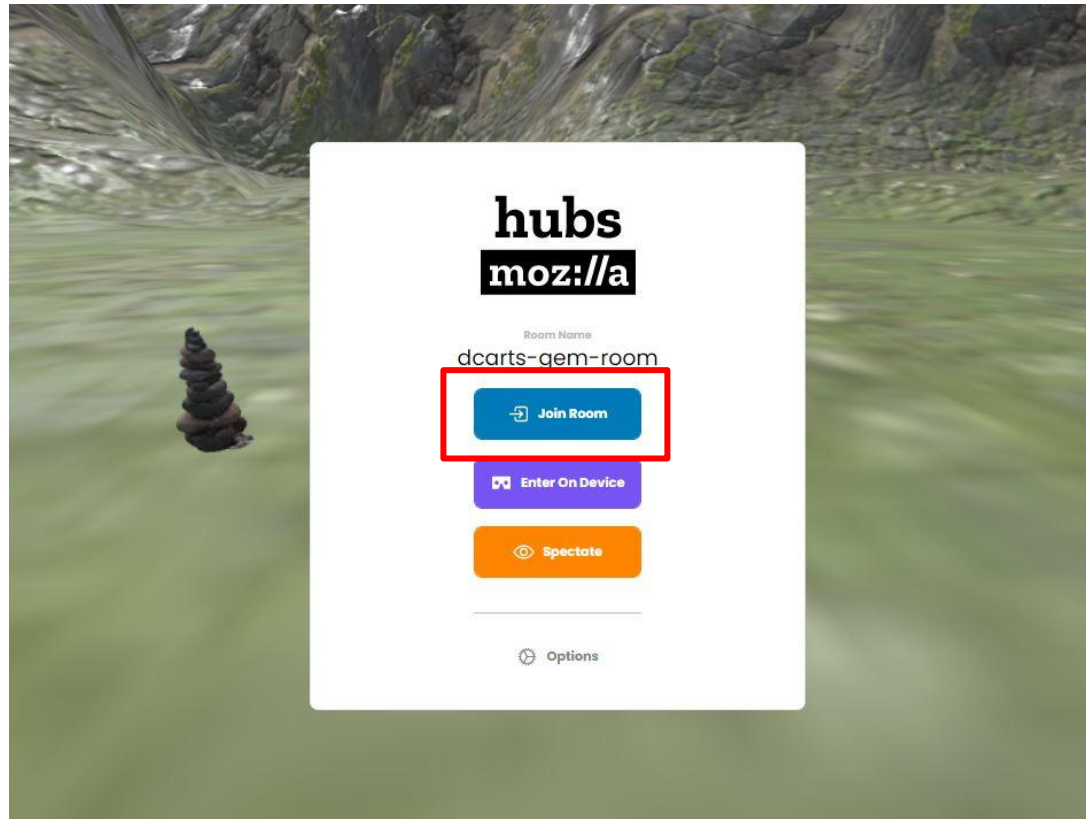


Room configuration

- Click on options
- Change scene
- Change room name (and URL)
- Add a description
- Change room size
- Configure room settings

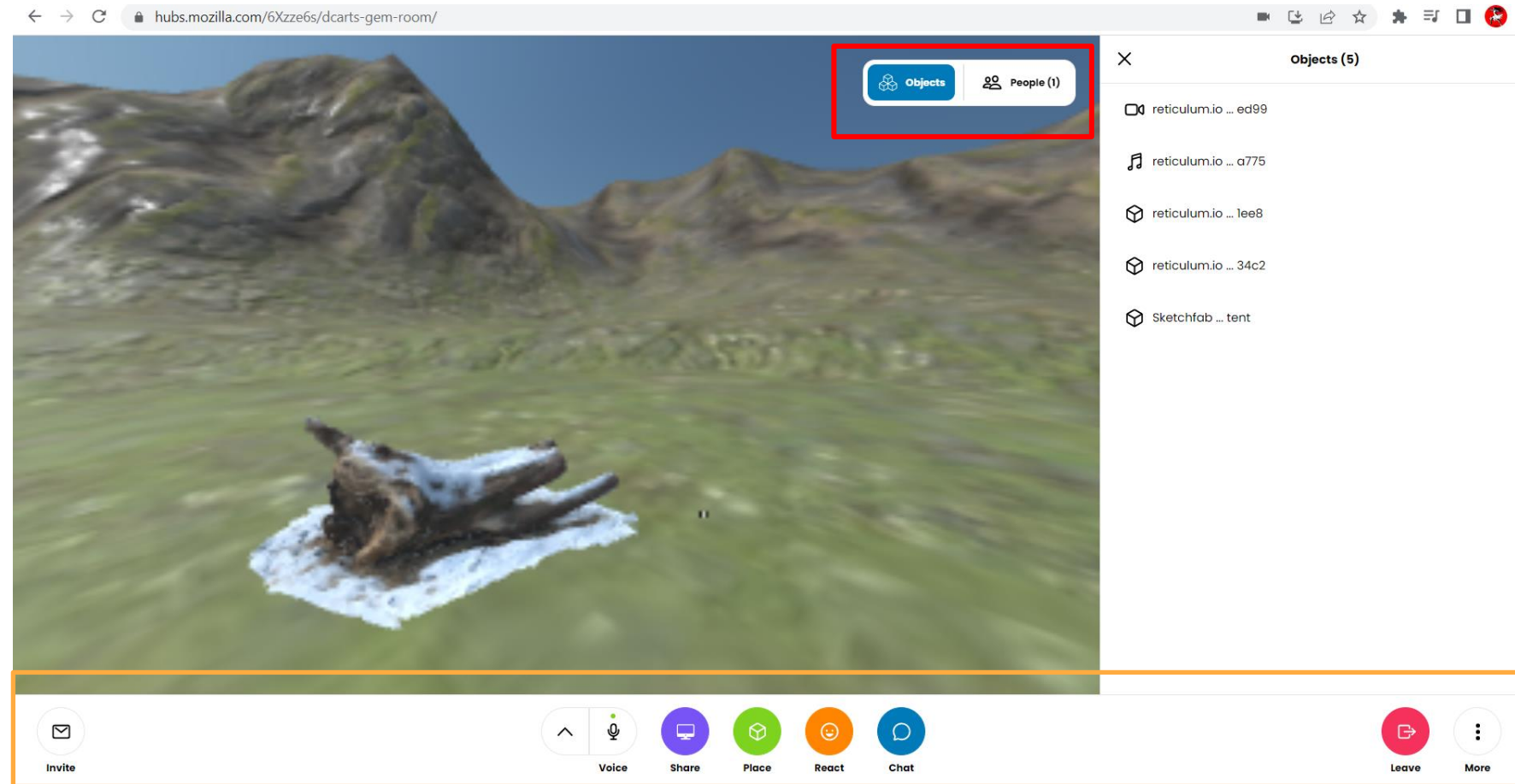
The screenshot displays a virtual meeting room interface. In the center, a white overlay menu is shown with the 'hubs moz://a' logo and the room name 'Icy Crimson Assembly'. The menu includes buttons for 'Join Room', 'Enter On Device', 'Spectate', and 'Options', with the 'Options' button highlighted by a red box. At the bottom of the screen, there are 'Invite' and 'Chat' icons. On the right side, a 'Room Settings' panel is open, also with a red box highlighting its content. The settings panel includes a 'Scene' preview, a 'Change Scene' button, and input fields for 'Room Name' (containing 'dcarts-gem-room'), 'Room Description' (containing 'A meeting room for GEM project'), and 'Room Size' (containing '24'). The 'Room Access' section is set to 'Shared link' with the note 'Only those with the link can join'. At the bottom right of the settings panel is a 'More' icon.

Enter room



Hubs interface

- Invite
- Voice
- Share
- Place
- React
- Chat
- Leave
- More options
- Objects panel
- People Panel



In room interaction

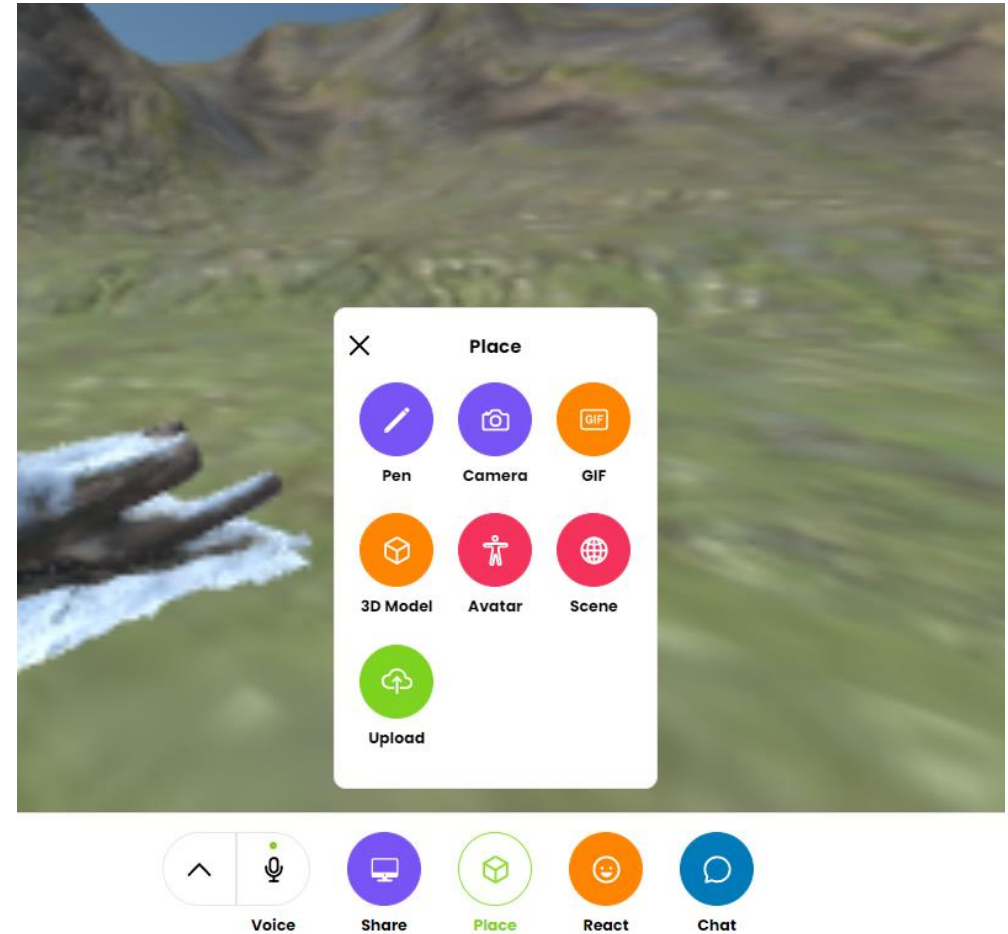
- **Move around**
Use the mouse and keyboard controls
- **Fly mode**
Use the `"/fly"` command in the chat box to toggle fly mode.
- **Grow and shrink**
Use the `"/grow"` and `"/shrink"` commands in the chat box to change the size of your avatar.
- **Mute audio**
Click or tap on the **Voice** icon on the bottom menu to mute/unmute yourself.

Keyboard and mouse controls

Action	Controls
Move	Arrow or W, A, S, D keys
Turn	Q and E or left mouse button
Move faster	Shift

Place new objects

Click the **Place** button on the bottom menu to add a variety of objects to Hubs rooms (3D models, images, videos, audios and PDFs).



Manipulate room objects

- You can move, rotate and scale objects freely in the room.
- Hover your cursor over the object and press the space bar or tab key to see the object options.
- Pin objects.

By default, an object disappears when it's owner (the person that last touched them) leaves the room. If you would like an object to stay in the room permanently, you can click or tap the pin button from the object menu.



Rotate object

Move mouse

After pressing and holding the **Rotate** button in the object's menu

Scale object

Shift + Mouse wheel

While holding an object

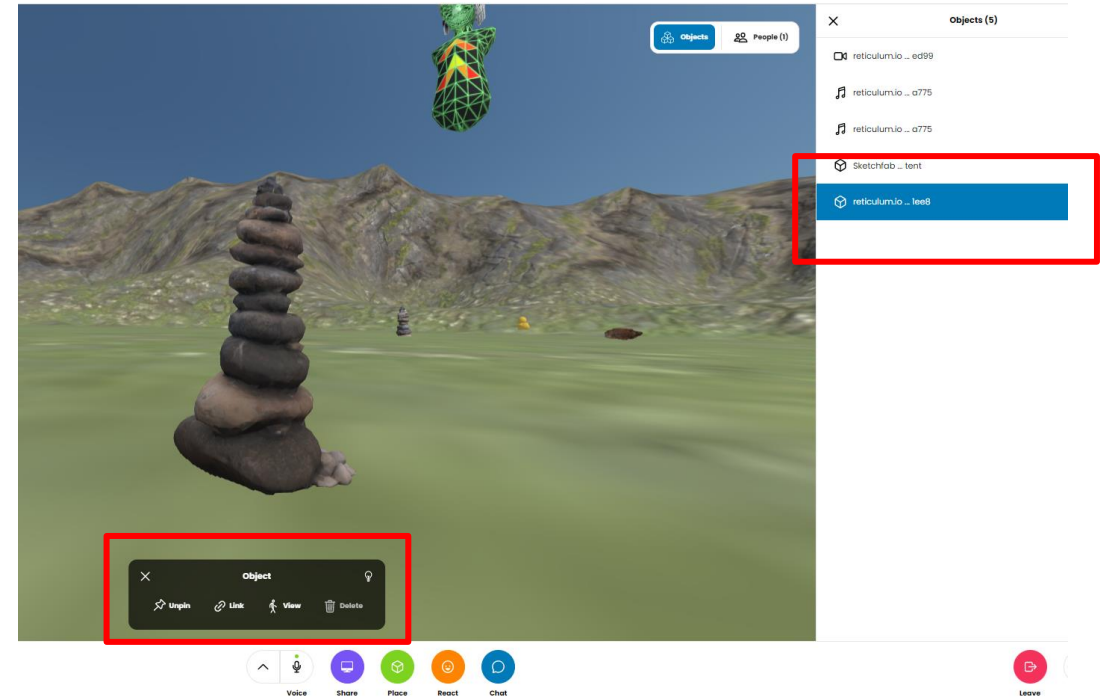
Move object closer/away

Mouse wheel

While holding an object

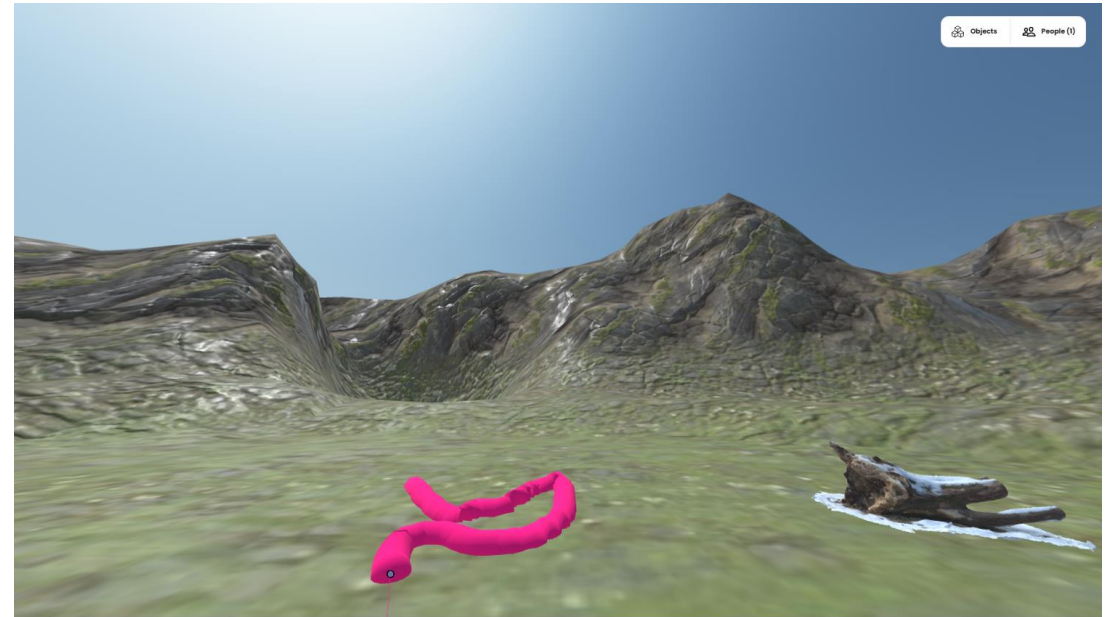
Manipulate room objects

- To see the list of current room objects, click the **Objects** button on the top right corner of the screen.
- When you click on an object from the list you will see additional options, such as to **Pin**, **Link**, **View** and **Delete**.



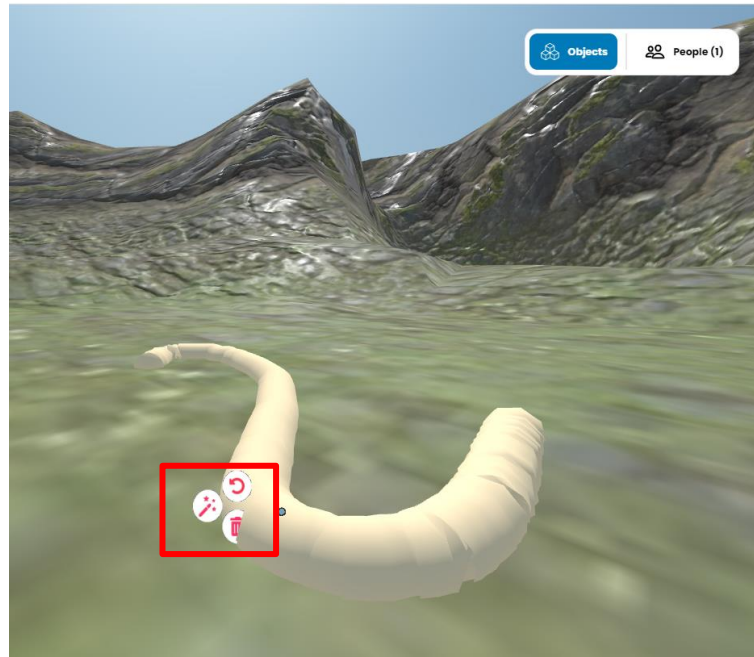
Use the pen

The Pen lets you draw in 3D space. You can change the pen's size and color undo strokes, and generate 3D models from your drawing.



Drop pen or camera	Right mouse button or Escape	While holding a pen or camera
Next/previous pen color	Shift + E, Shift + Q	While holding a pen
Change pen size	Shift + Mouse wheel	While holding a pen
Undo pen stroke	Ctrl + Z	While holding a pen

Create a 3D object with the pen

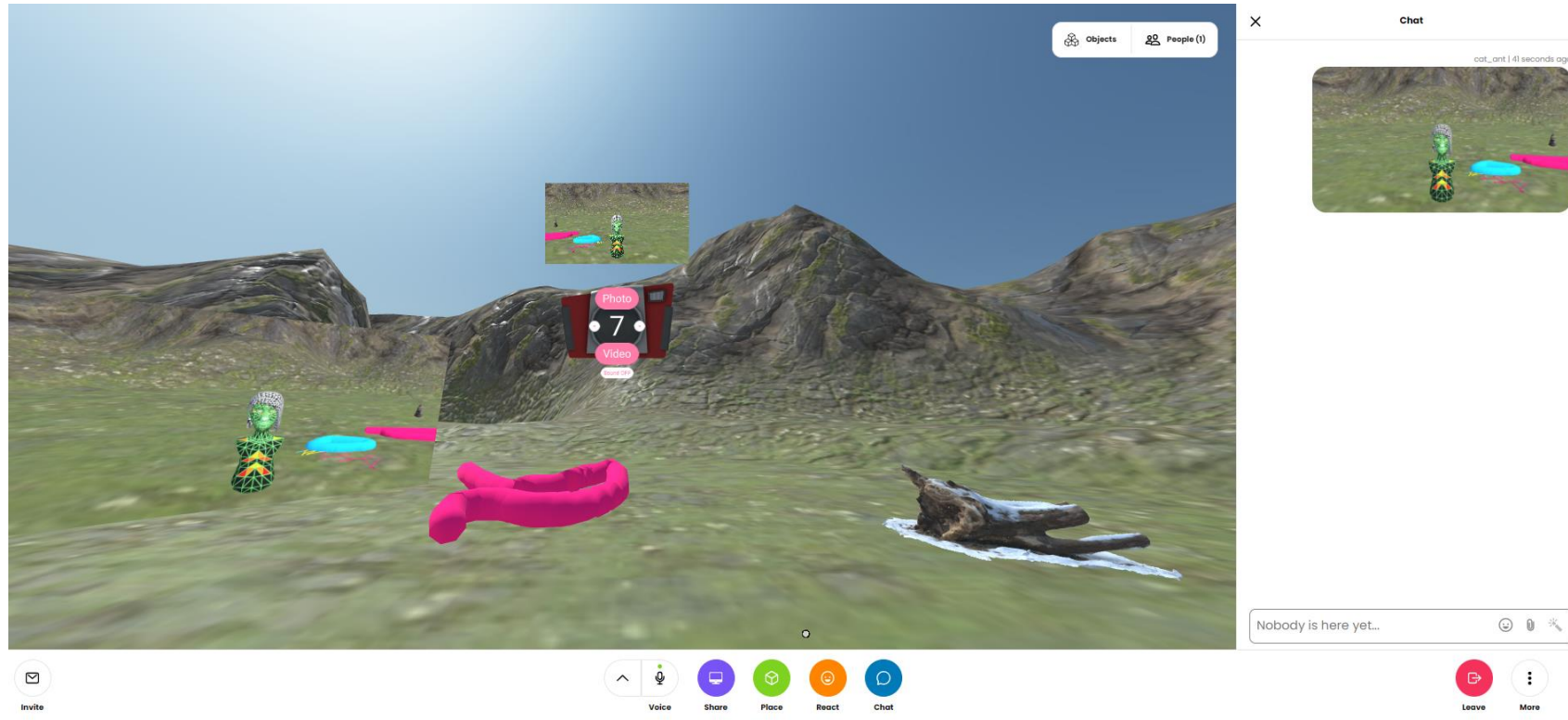


- Objects (5)
- reticulum.io ... ed99
 - reticulum.io ... a775
 - reticulum.io ... lee8
 - reticulum.io ... 34c2
 - Sketchfab ... tent



- Objects (6)
- reticulum.io ... ed99
 - reticulum.io ... a775
 - reticulum.io ... lee8
 - reticulum.io ... 34c2
 - Sketchfab ... tent
 - reticulum.io ... 52ec

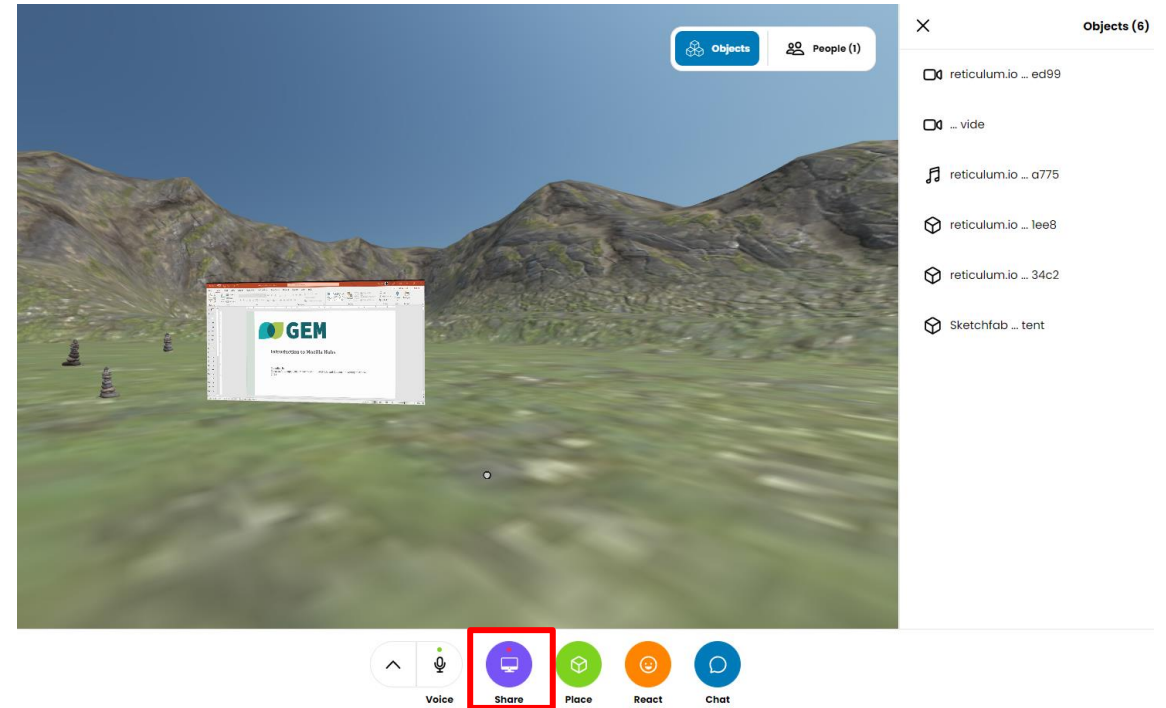
Use the Camera



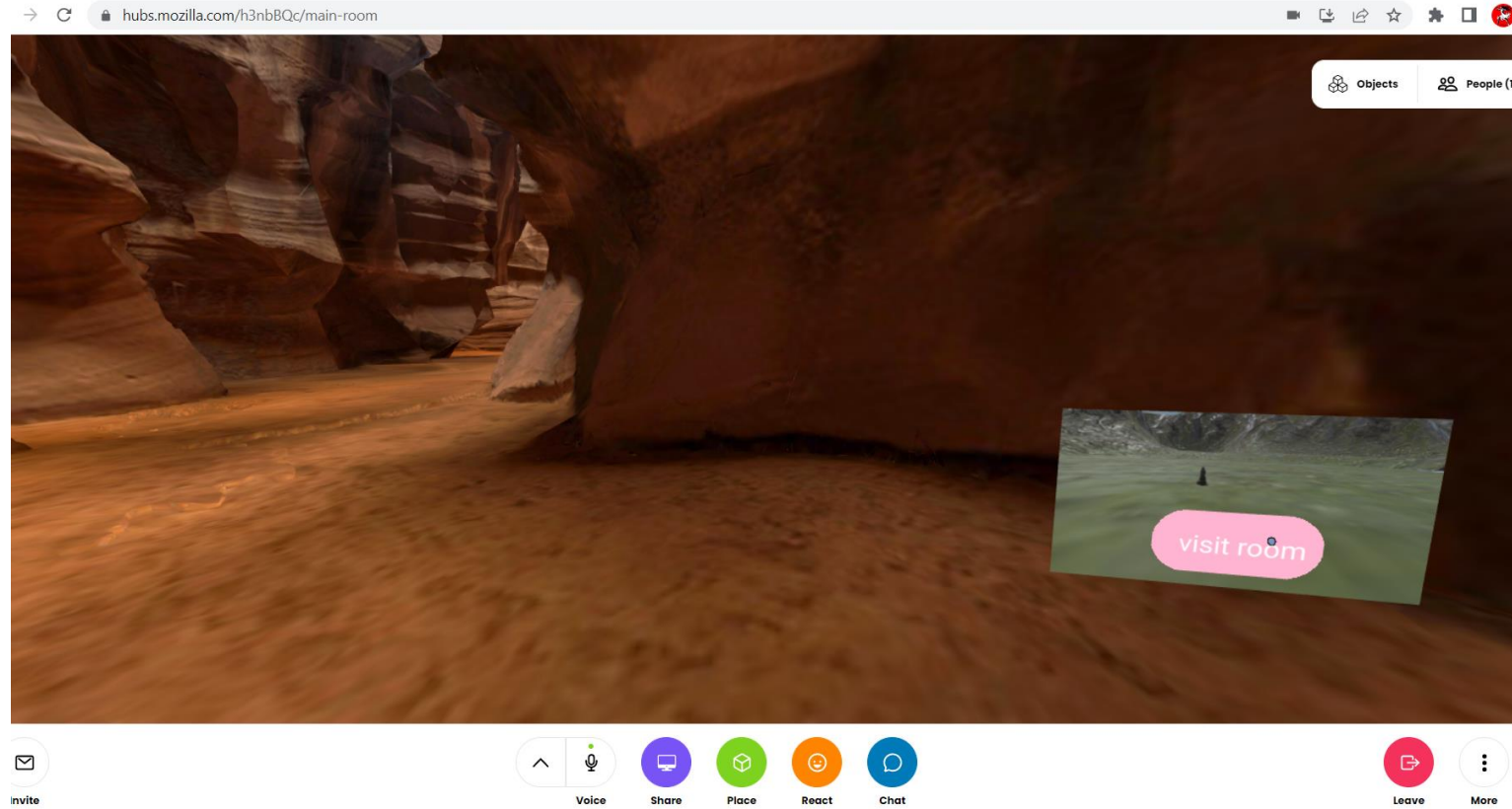
The 'Camera' option creates a camera object that can take photos and videos of the room then add them to the room as objects. When you take a photo or video, a link also appears in the chat. Click the camera button again to remove the camera object.

More actions/interactions

- **Share**
Click the Share button in the bottom menu to share your desktop screen, webcam or phone camera with users in the room. The shared media will appear like a video in the room. You can remove the shared media from the object's menu.
- **Chat**
Click the Chat button on the bottom menu to message users who are in the room and lobby.
- **React**
Your reaction will appear inside the 3D environment
- **Hide/show people**
Click the People button to open a list of users. Here you can click Hide to not see or hear them in the room.



Enter a linked Mozilla Hubs room





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- **Adapt** — remix, transform, and build upon the material for any purpose, even commercially

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