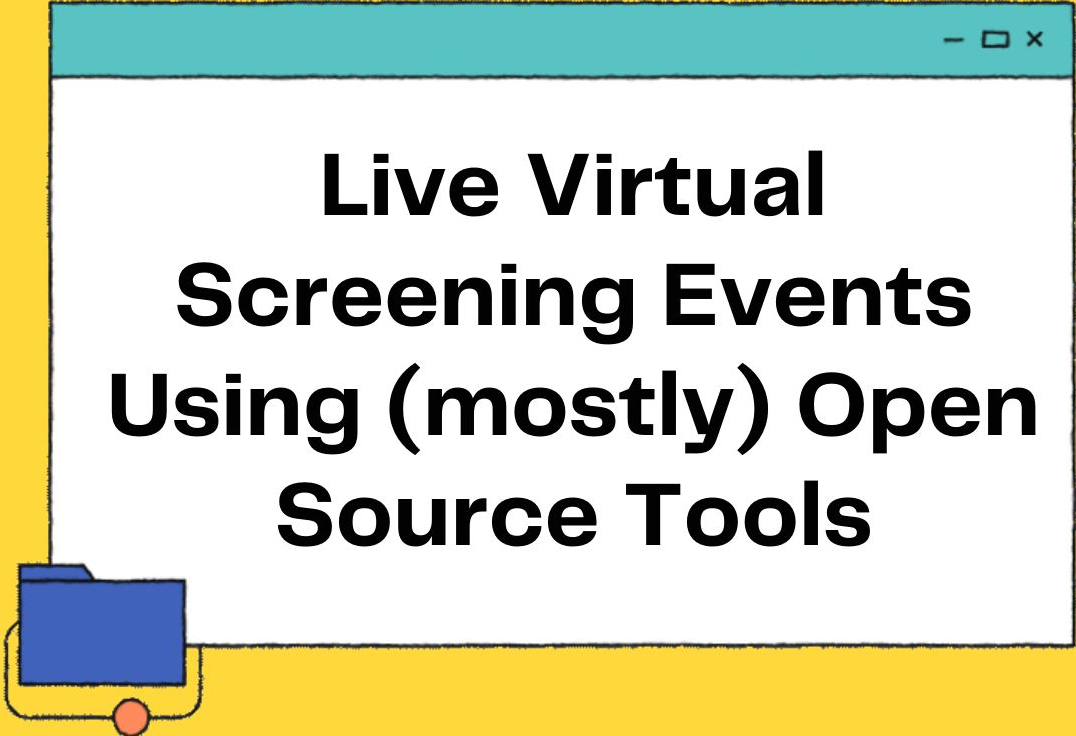


Create glitch-free and aesthetically pleasing virtual streaming events



Live Virtual Screening Events Using (mostly) Open Source Tools

THE VIRTUAL
PRESENTER
STARTER
PACK

CHM CENTER FOR
HOME MOVIES

BAVC
MEDIA

Morgan Morel



DIRECTOR OF PRESERVATION AT BAVC MEDIA

Background

- BFA in Media Arts
- MSI concentrating in Preservation of Information
- 10 Years of experience working analog media preservation

Streaming Experience

Since the early 2020 initial lockdown I've been helping organize virtual events for BAVC and our partners. The first few were rough, but now we've really got it down

The Center for Home Movies



A volunteer-run organization formed in 2005, helps coordinate Home Movie Day

Home Movie Day is a celebration of personal films and filmmaking held annually at many local venues worldwide, providing an opportunity for people to see and share their home movies with an audience of their community. In recent years, that community has extended to virtual space online.

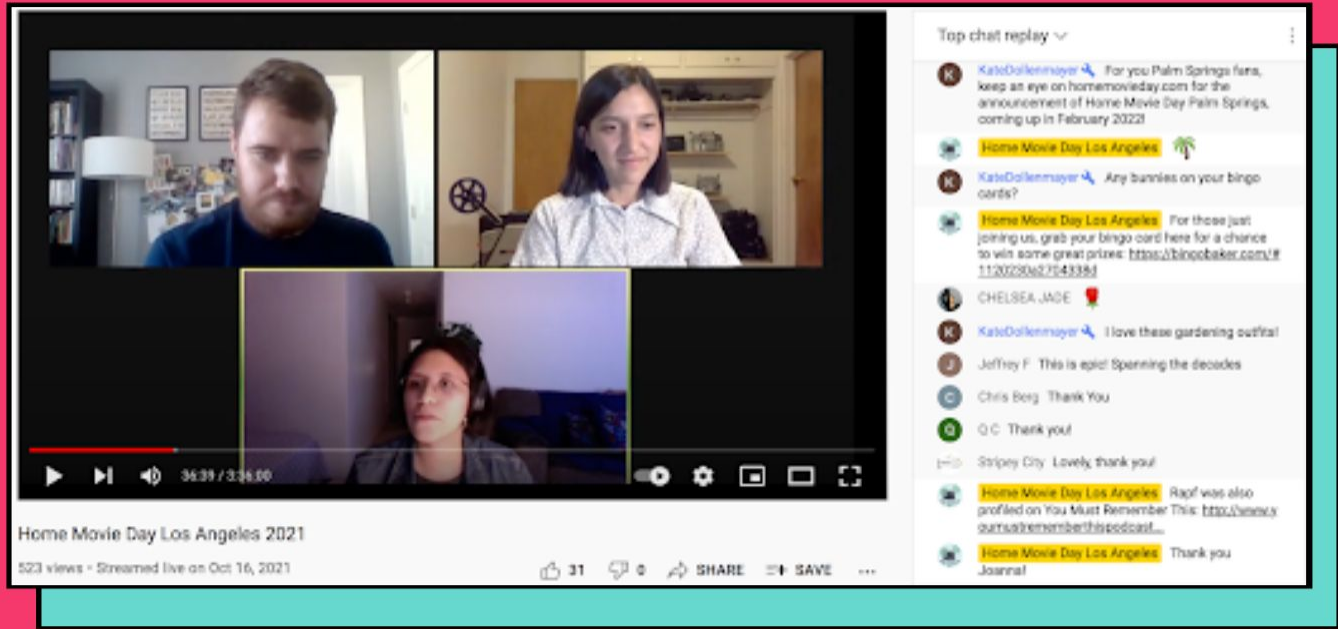


Why do we need to do this?

Home Movie Day is Special!

Zoom and other popular streaming web conferencing platforms aren't made to support events like HMD, which include both video and live commentary. Media playback is often low-quality and it can be difficult to mix various media and audio sources

In order to recreate the sense of community and engagement that HMD is all about we need to use some extra tools and techniques



Part of CHM's mission is to support people in preserving and sharing their home movies independently, without depending on institutions or big budgets. With the help of this guide, you can put on your own virtual Home Movie Day or a similar live online screening event using mostly free and open source tools. We'll get to those in a minute, but first...

Where to stream?

THERE ARE LOTS OF
OPTIONS FOR STREAMING
PLATFORMS. YOU CAN EVEN
STREAM TO MULTIPLE!



Vimeo

If you can afford the hefty fee for a pro account you get a lot of cool features, including the ability to simulcast to other streaming platforms.



Twitch

Very feature rich with cool chat and emoji options for engaging your community



YouTube

A good staple for video content



Facebook

Who knows what goes on here nowadays

Why Open Source?

FOSS = Free Open Source Software

Free as in...

Free beer: This software does not cost money to install and use

Free speech: This software can be shared and modified freely

Support Network

Most of these tools have active and helpful support networks you can use to troubleshoot.

If it breaks it can be fixed!

If the source code is open then it can potentially be fixed if your workflows depend on it.



What software we need to stream



THESE ARE THE BUILDING BLOCKS OF A GOOD STREAM

Video Conferencing

Zoom (not FOSS)

This tool will be used to combine all the presenters into a single meeting

Audio Routing

BlackHole

This tool will be used to properly route audio from the conferencing software to the broadcast software

Broadcasting

OBS

This tool is the brains of the operation, where you can create your stream then send it out to your streaming platform of choice



ZOOM

- Used to set up a meeting with all of the people who will be part of the event
- You will NOT stream your video content through this
- I'm not going to spend too much time on this because most of us are far more intimate with zoom than we would like to be
- but... we will discuss some zoom features later

BLACKHOLE



- Free and Open Source!
- A Digital Audio Mixer/Router
- This is what you'll use to route the audio from your zoom meeting and all your media to the broadcasting software.
- Easy to install

BLACKHOLE INSTALLATION

<https://github.com/ExistentialAudio/BlackHole>

Visit the BlackHole github to get the installer. You can also install via homebrew if you're comfortable with the command line

Installation Instructions

Option 1: Download Installer

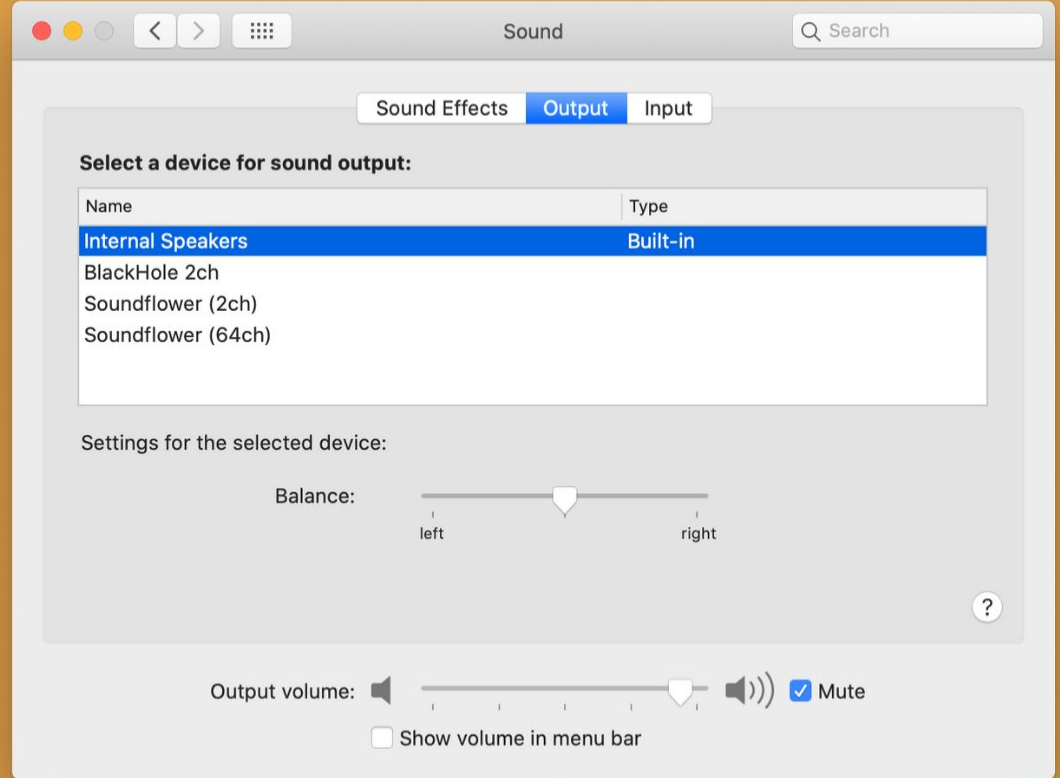
1. [Download Installer](#)
2. Close all running audio applications
3. Open and install package

Option 2: Install via Homebrew:

- 2ch: `brew install blackhole-2ch`
- 16ch: `brew install blackhole-16ch`

BLACKHOLE INSTALLATION

You'll be able to see if the software was properly installed by going to the **Sound** menu in the System Preferences. If you see **BlackHole 2ch** in your **Output** options you're all set!



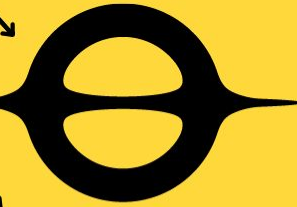
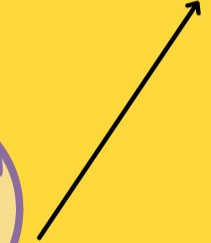
Wait so what does BlackHole even do?

BlackHole allows you to route audio between applications

You can then send everything routed to BlackHole to any application that receives an audio signal.

In this case, we route any audio from the web or zoom to OBS

Audio Sources



Audio Destinations



OBS



OBS

- This is free and open source software used to create a stream out of multiple media inputs and outputs
- This is essentially your control room. You can use this to build a simple or complex stream. The world is your oyster.
- You can also choose where to stream to from OBS.
- OBS is flexible, configurable, and easy to install
- We'll discuss how to setup and use OBS later!

What hardware we need to stream



ENOUGH WITH THE DOWNLOADS, LETS GET TO BRASS TACKS!

A computer that isn't crazy slow

You'd be surprised what you can get away with, but try to use a computer from the last 8 years. These are mac instructions, but would work on a PC as well

A good internet connection

At least 4Mbps upload speed, ideally hardwired via ethernet

Headphones

Headphones will come in very handy, without them you'll likely get crazy feedback

A second monitor

This is NOT optional!

WHY THE SECOND MONITOR?

Without a second monitor you'll be unable to use a crucial feature of OBS, which fixes lag and sync issues

They can often be found for cheap on craigslist. Tell them Morgan sent you!

Apple computer monitor - \$80 (mission district)



HERE'S WHAT YOUR SETUP SHOULD LOOK LIKE

It doesn't matter how you
setup your second monitor,
just be sure it's accessible
and easy to see



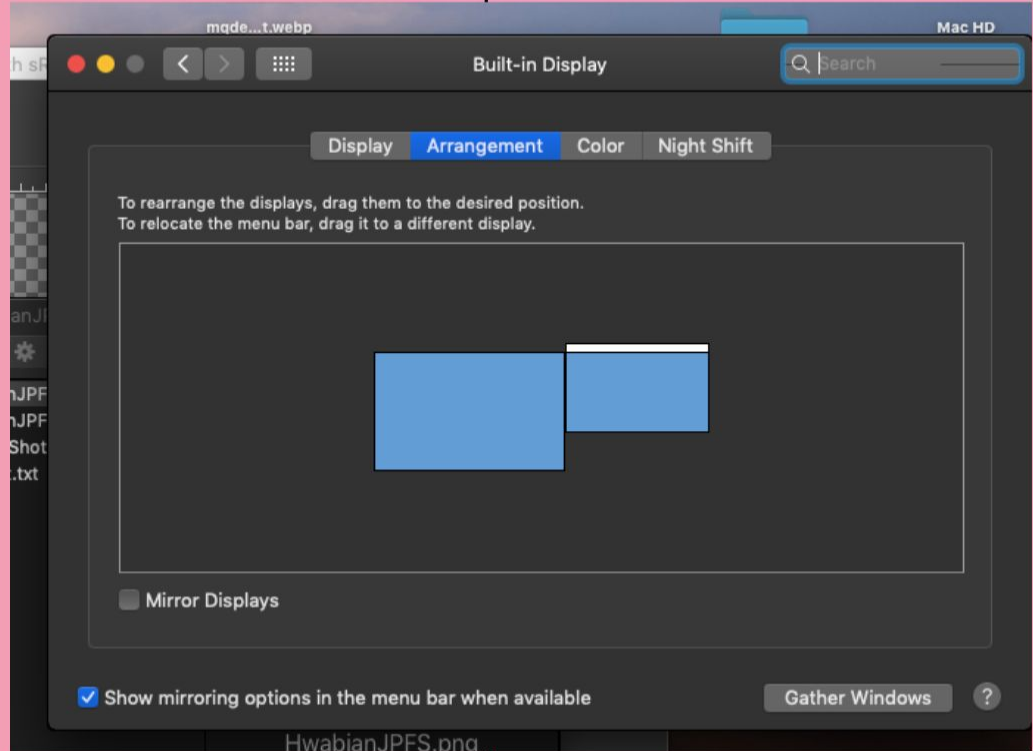
MONITOR PREFERENCES

Go to the **Display** settings in System Preferences.

Click on the **Arrangement** tab

Turn OFF **Mirror Displays**

Adjust the arrangement to match your physical setup. This makes things much easier.





So you've
got all your
software
and
hardware,
what's
next?

Create a Zoom meeting

You can make a practice meeting for now, but you'll need as many people as you plan to have during the event logged in.

The main thing you'll need to do in this zoom meeting is adjust your audio settings

Organize all your media

It's best to get all your media in an easy-to-access and reliable folder. A USB drive is fine, but your internal hard drive will be the most robust

Setup OBS for streaming

First, you're going to need to set up some preferences

Next, you're gonna have to create your scenes and sources!



Setting up your zoom

At this stage you don't need your final zoom ready.

If you plan to feature certain speakers or groups of speakers during the presentation you will need to get the same number of people you plan to have on the stream join your test zoom. Even if they're not the actual speakers for now



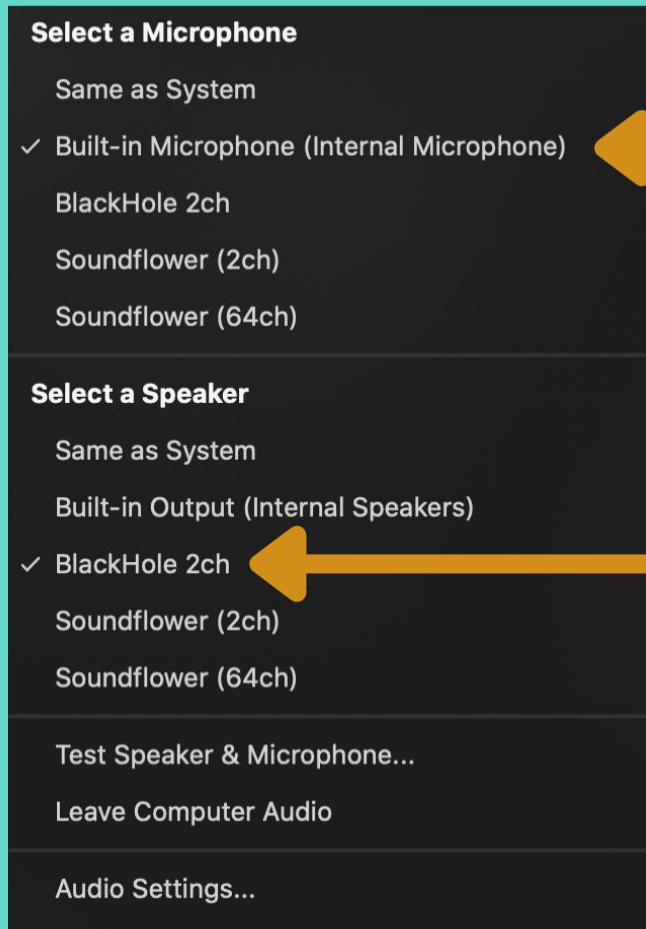
Setting up your zoom

Click on the ^ button next to the microphone to open your audio preferences

You can keep your Microphone to **Built-in**

For your speaker select **BlackHole (2ch)**

Note: You won't be able to hear anything happening in the meeting until you make some other changes later on

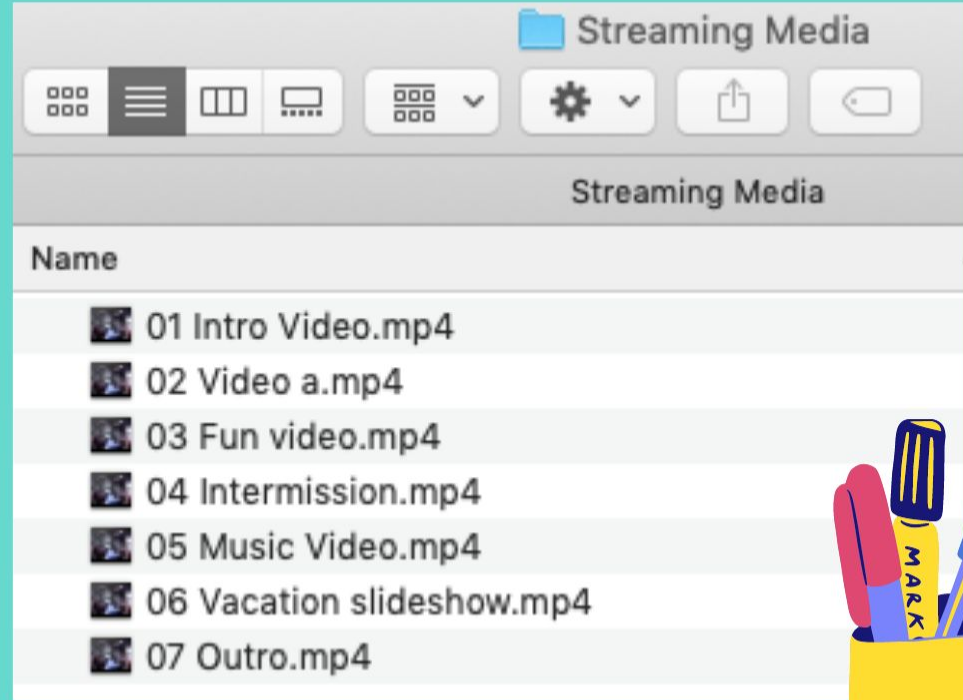


Organize all your media

If you plan to stream any **pre-recorded video** content you should organize it nicely

Prepend the file names with a number according to when it will be played so they sort nicely (use at least two-digits)

Ideally put them on your **local computer** hard drive

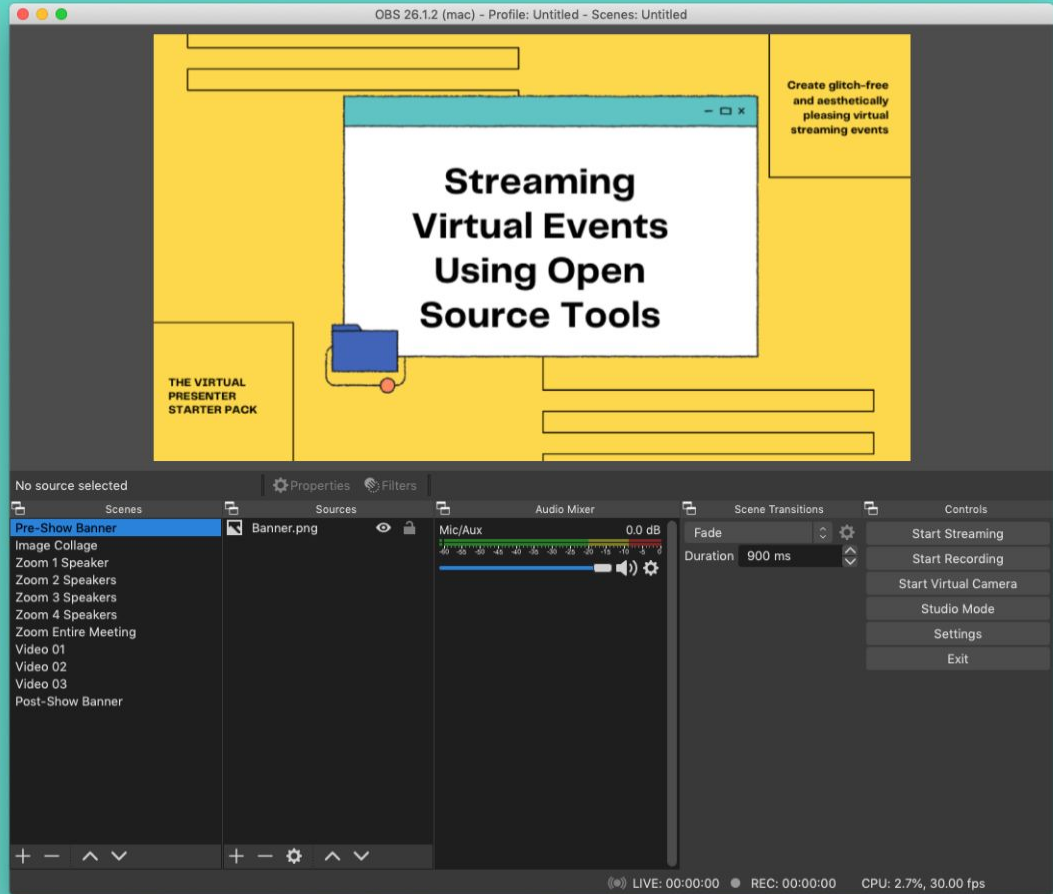


Setup OBS!

Now we'll dive into OBS.

This is a fairly complex tool, but with the right guidance it's not terribly difficult to use.

There is a large and active OBS user and support community. If you have any serious problems check out the forums!



OBS Tour

The main screen of OBS has a few major Components

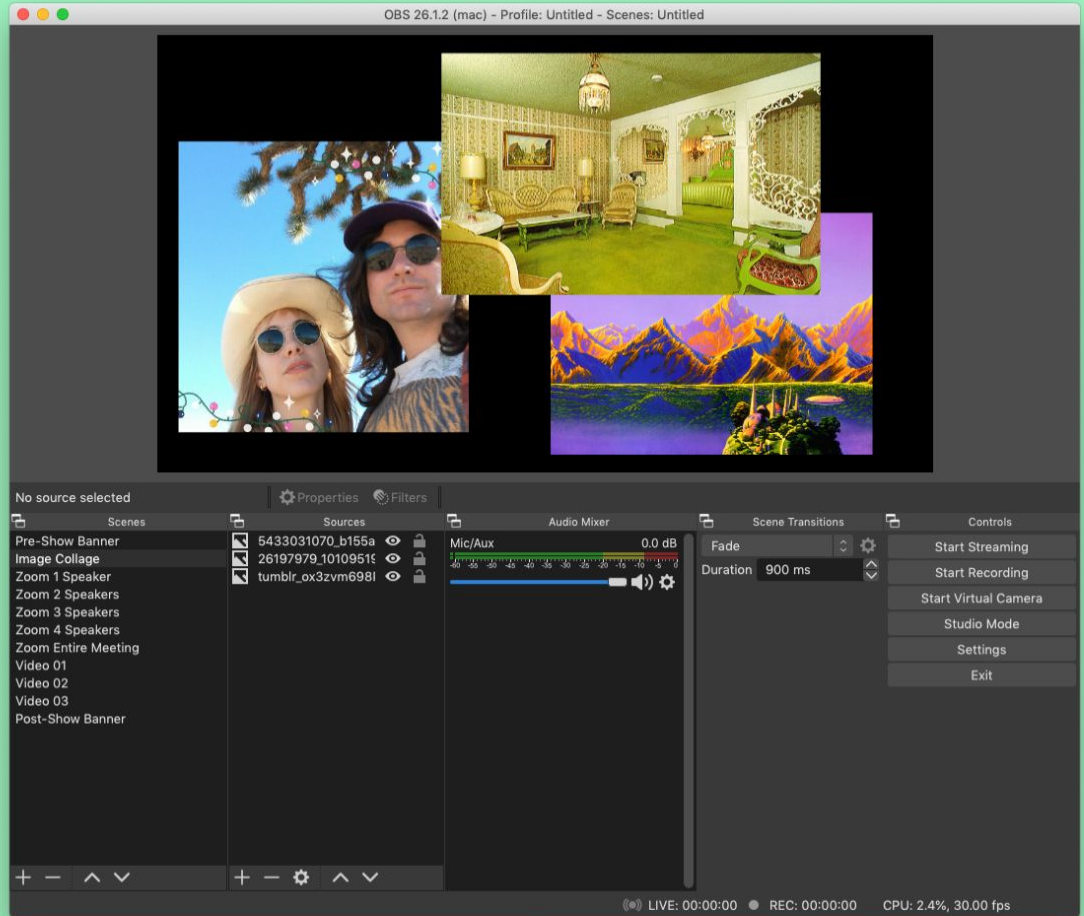
– **Preview Screen**

– **Sources**

– **Scenes**

– **Audio Mixer**

– **Controls**



OBS Tour

Preview

This is where you'll see whatever is going to to the stream.

You can adjust the size, position of cropping of any media in this window

Whatever is here is being streamed, no exceptions!

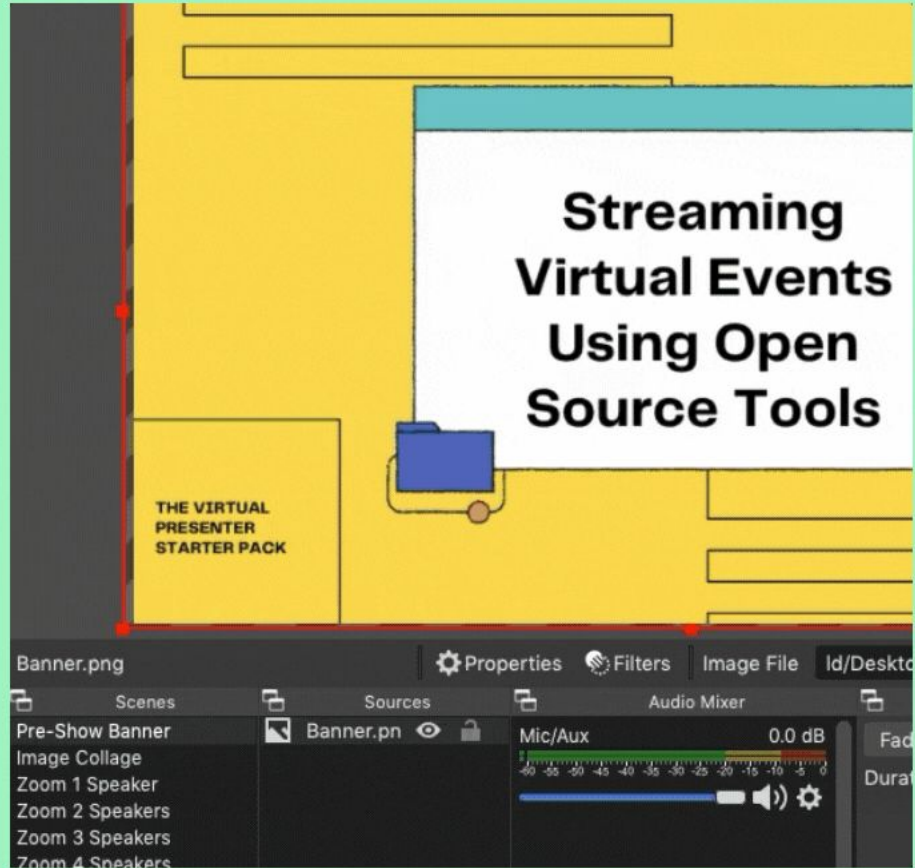


OBS Tour

Sources and Scenes

A source can be any media object, any part of a window, and part of a browser window, and part of a display, a VLC playlist, and more!

Scenes are collections of sources you can composite and quickly switch between

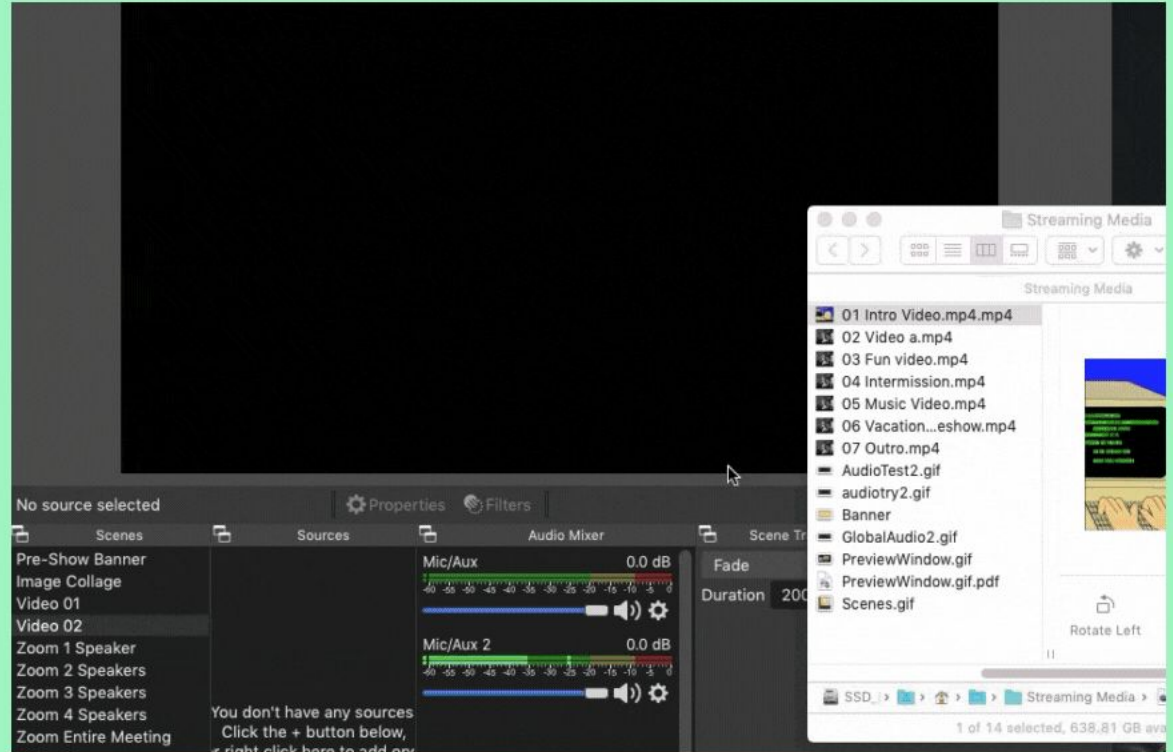


OBS Tour

You can add any type of media as a **source**, including videos

The easiest way to do this is to create a new **scene** for the video file and then drag a file into the **Sources** box.

Videos in a scene will **play automatically** when the scene they live in is selected. This is an option that can be changed.



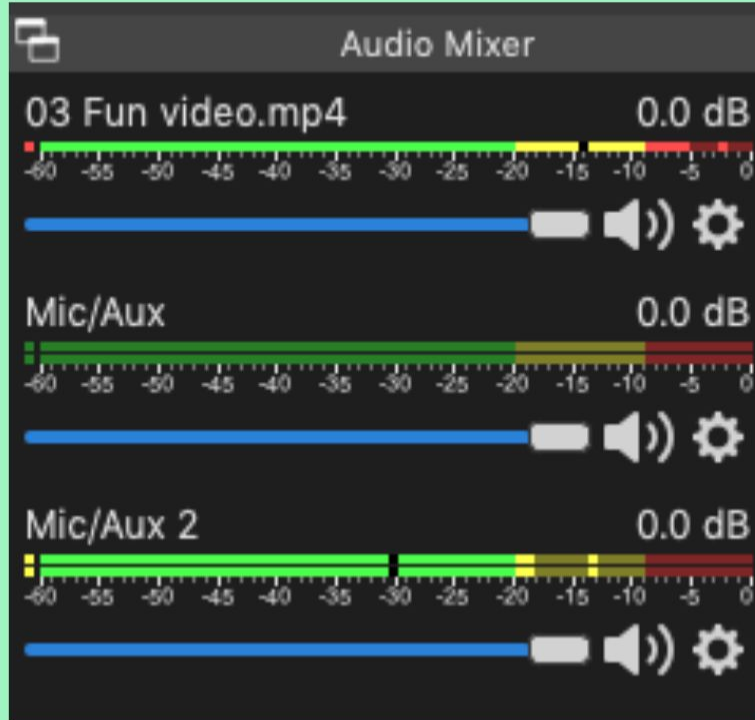
OBS Tour

Audio Mixer

You can quickly monitor your audio levels here

You can use this as an access point for more complex audio settings

This will be very useful for getting audio from zoom and other media sources properly setup



OBS Tour

Controls

You can start and stop the stream and recording

You can also access the main OBS settings from here. Let's do that now!

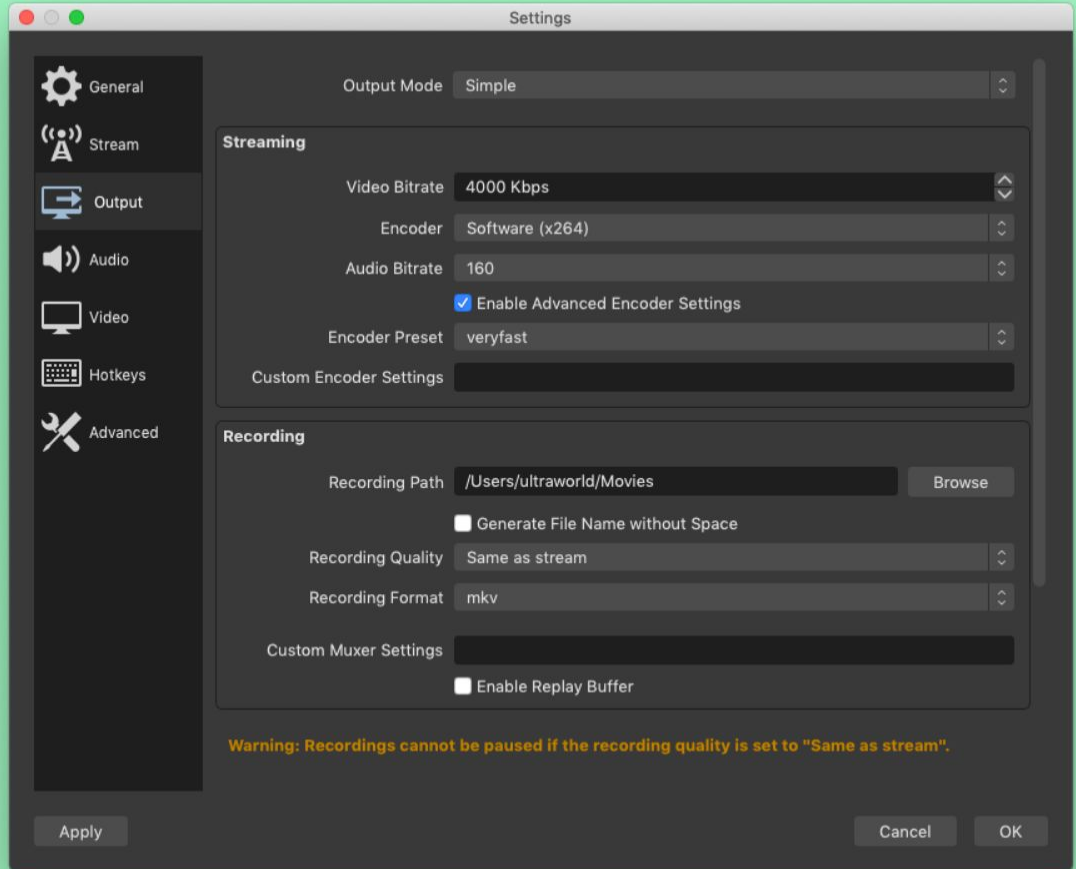


OBS Setup

Output

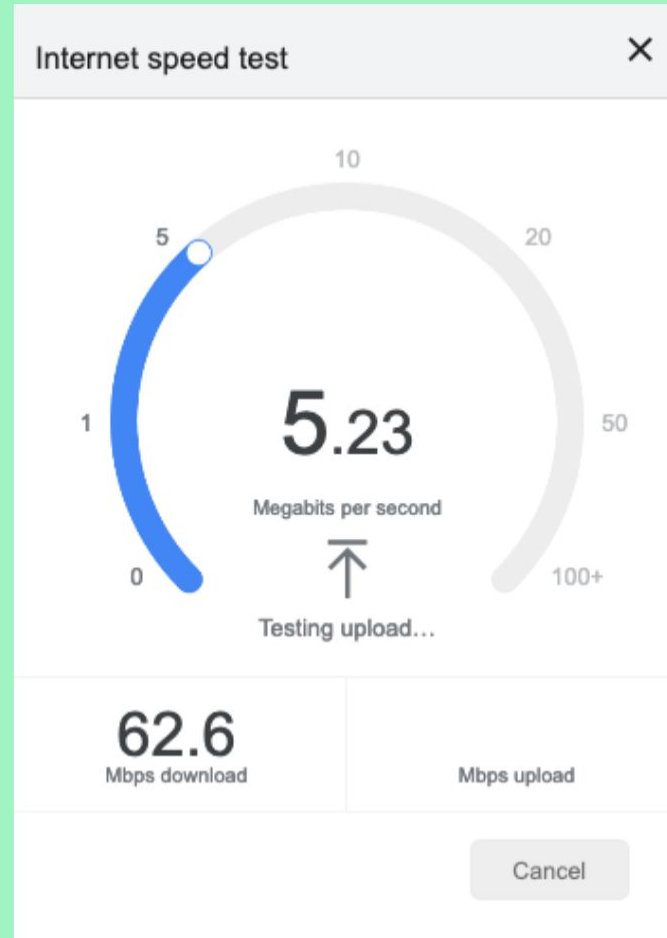
In the output setup we'll adjust the details about the stream, like where the software will record any stream you if you hit record

The important field here is **Video Bitrate**. You'll want at least 3Mbps for good quality. Also, you can't go over your max upload speed



Quick Aside

If you want to see your internet speed you can google "Internet Speed Test" and run the test. If you're getting less than 3Mbps upload speeds you might want to consider streaming from your office or somewhere else with fast speeds?

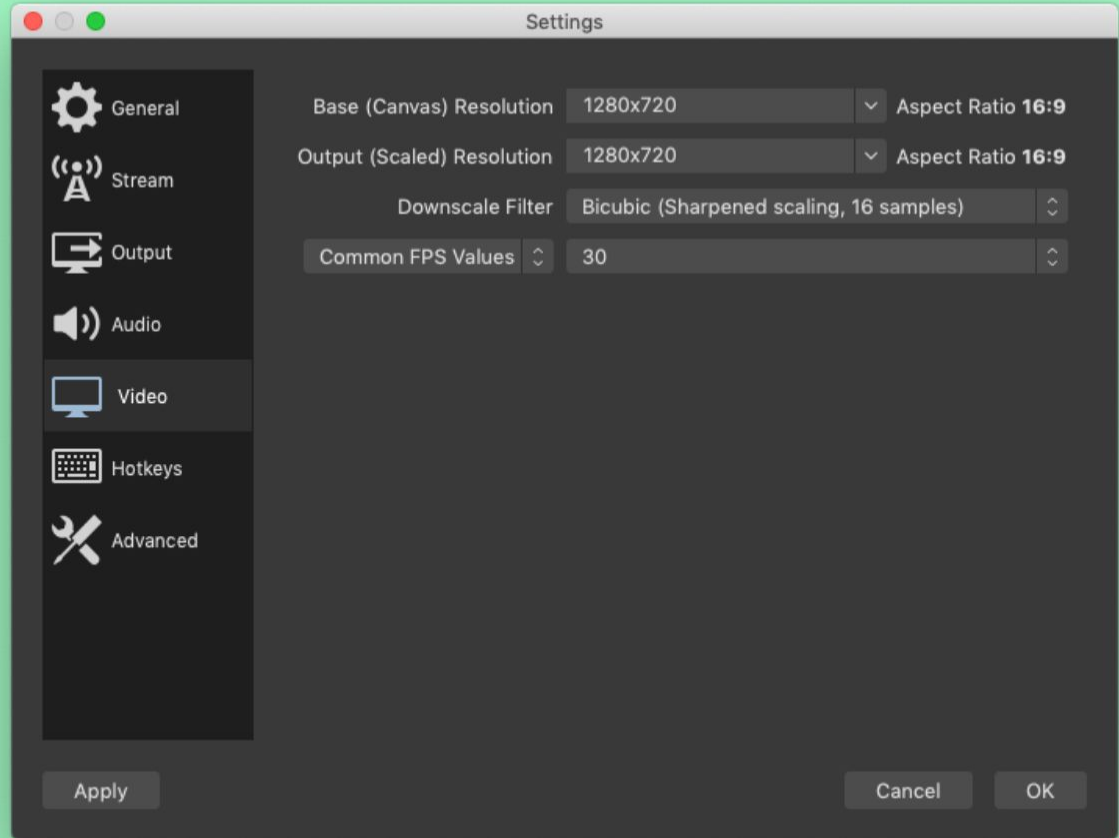


OBS Setup

Video

Here's where you'll choose the resolution and framerate of your stream. You can set it to whatever you want, but 1280x720 will use less bandwidth and be faster.

Important! Transcode your media to match the resolution, frame rate, and data rate (previous slides) you choose for the best results



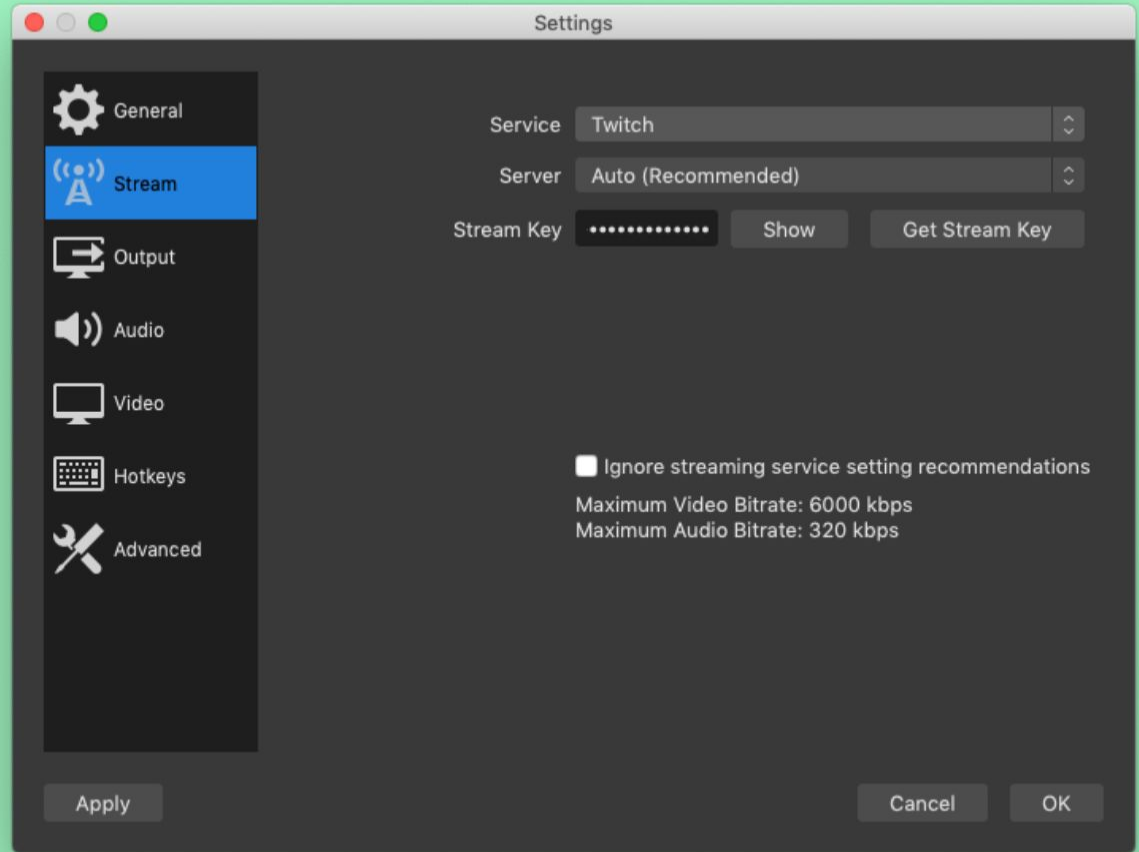
OBS Setup

Stream

This is how you'll connect OBS to whatever streaming service you chose to use

OBS has native support for many services, including Twitch, YouTube, Facebook, etc...

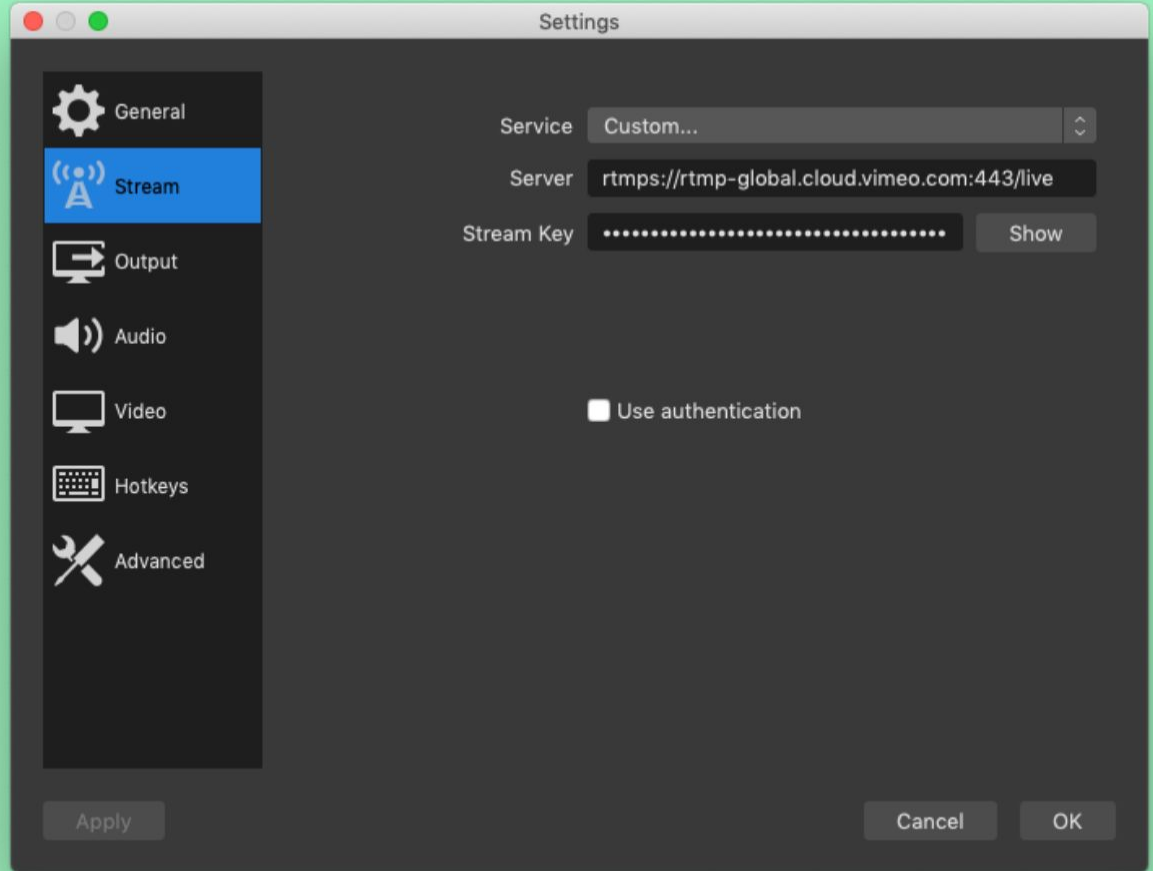
Each streaming service should have instructions on accessing your **Stream Key**



OBS Setup

Stream

If you want to stream to a platform that isn't supported (like Vimeo) you can select **Custom** . . . and then type in the rtmps server address (you get that from your streaming service)



Now time for
the fancy stuff!



Making aesthetically pleasing and functional scenes from your zoom meeting



Getting zoom audio, media audio, and your microphone into OBS without feedback loops or delay

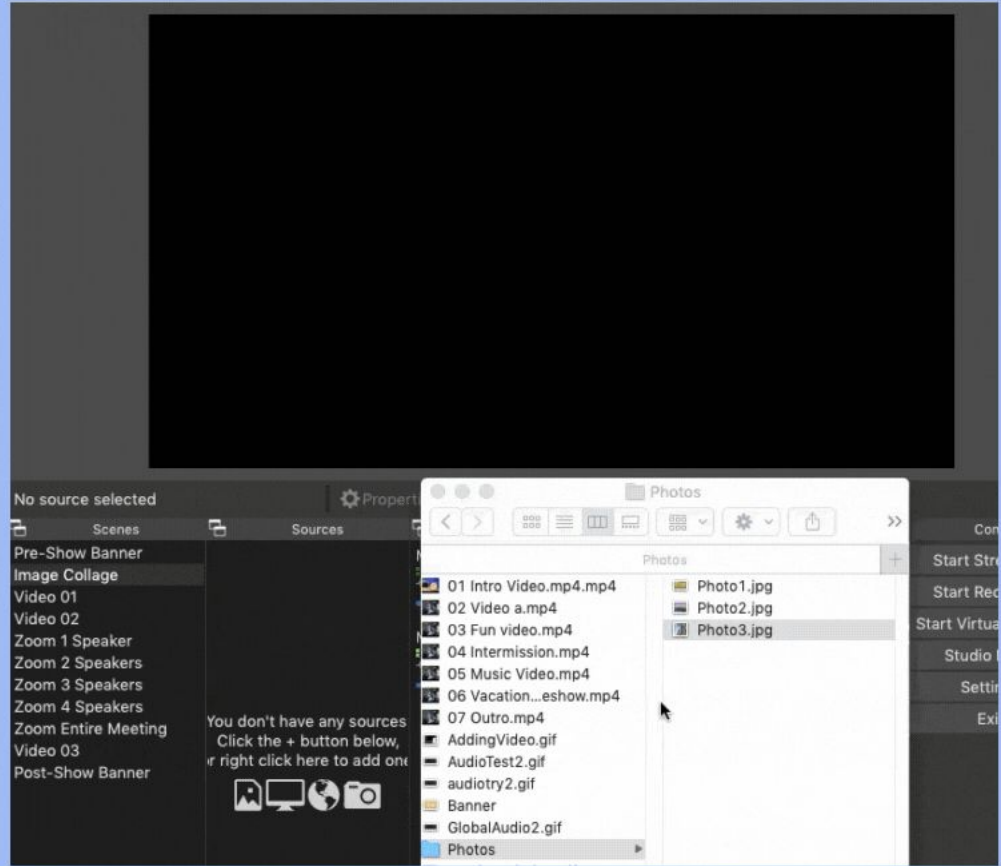


Make it possible for zoom participants to see a non-delayed version of the stream

Making aesthetically pleasing and functional scenes from your zoom meeting

The first step is to know how to make pretty scenes in OBS

You can add various types of sources to each scene. For now let's just drag in some image files



Making aesthetically pleasing and functional scenes from your zoom meeting

In each scene you can adjust the following

Spacial Order: Sources will appear on top of each other in the same order they are listed in the Sources window

Size and Position: You can resize any source by clicking the corners or sides and dragging. You can move by clicking anywhere on the source and dragging

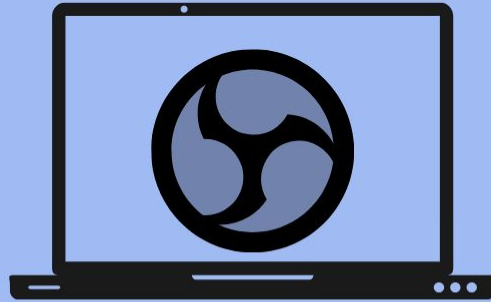
Cropping: You can crop any source you want by Option+Clicking the sides or corners and dragging



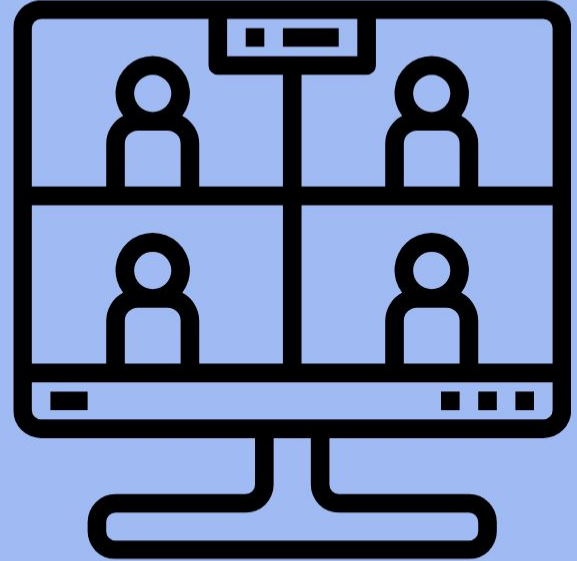
Making aesthetically pleasing and functional scenes from your zoom meeting

The configuration of your computer and external monitor is critical here. You'll want to have your zoom meeting full-screened in your external monitor with nothing else there.

Everything else, including OBS, will be running on your main computer display



Laptop Running OBS

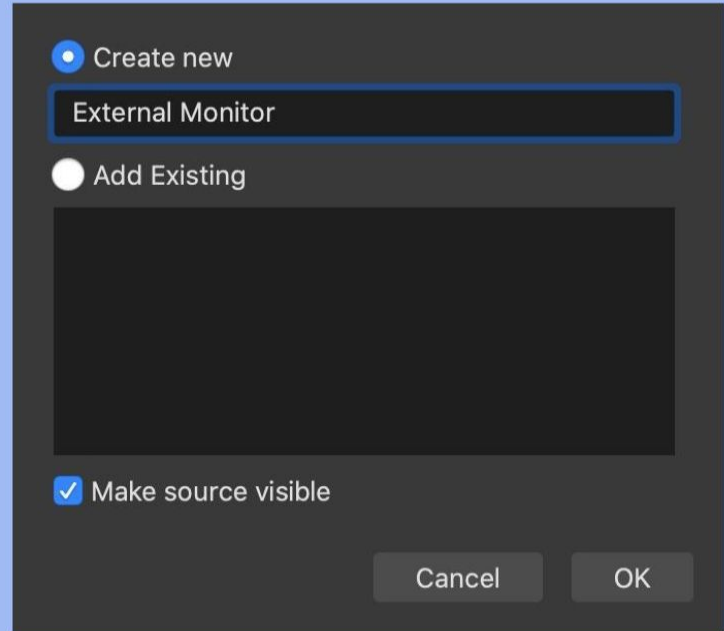
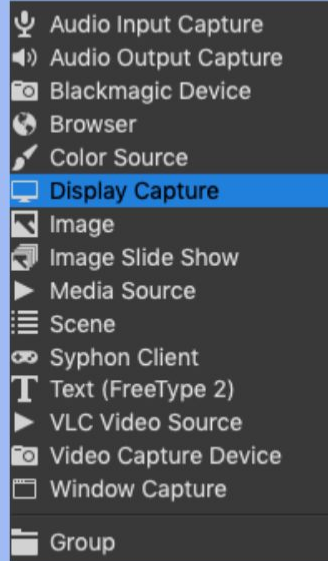


External Monitor with full-screen Zoom meeting

Making aesthetically pleasing and functional scenes from your zoom meeting

In your sources window press + and then add a Display Capture

Name the Display Capture source whatever you'd like

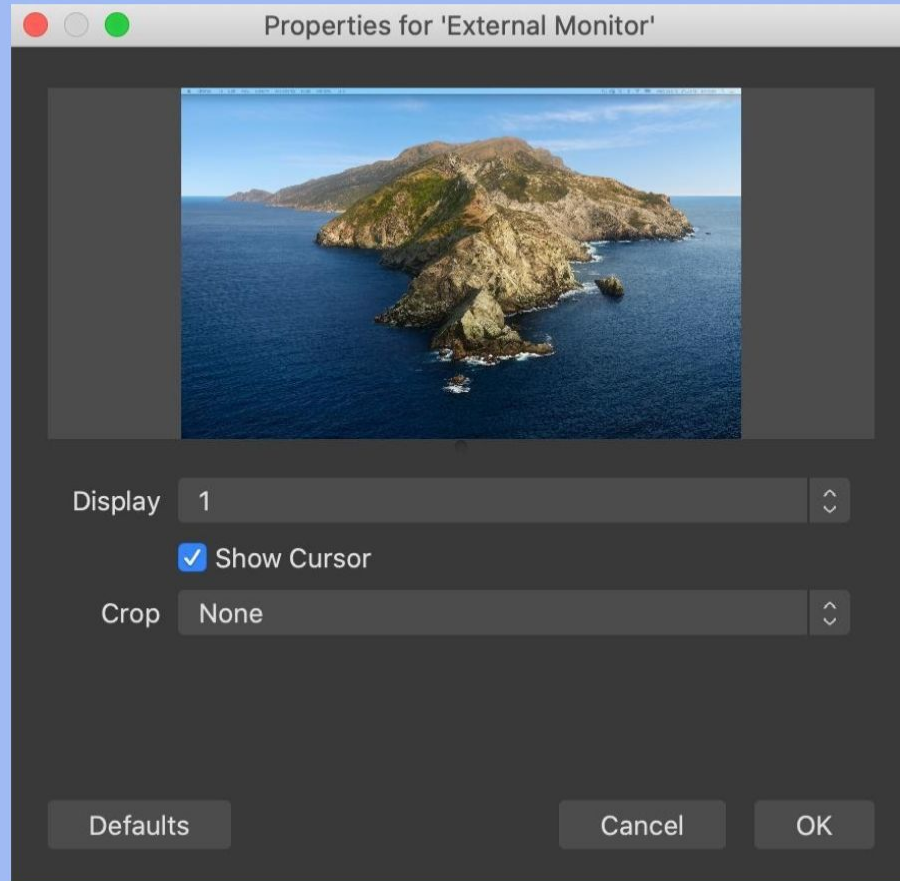


Making aesthetically pleasing and functional scenes from your zoom meeting

Double-click this source to enter the preferences.

You now select your external monitor as the source. Your main monitor will be labeled "0" your external monitor will be labeled "1".

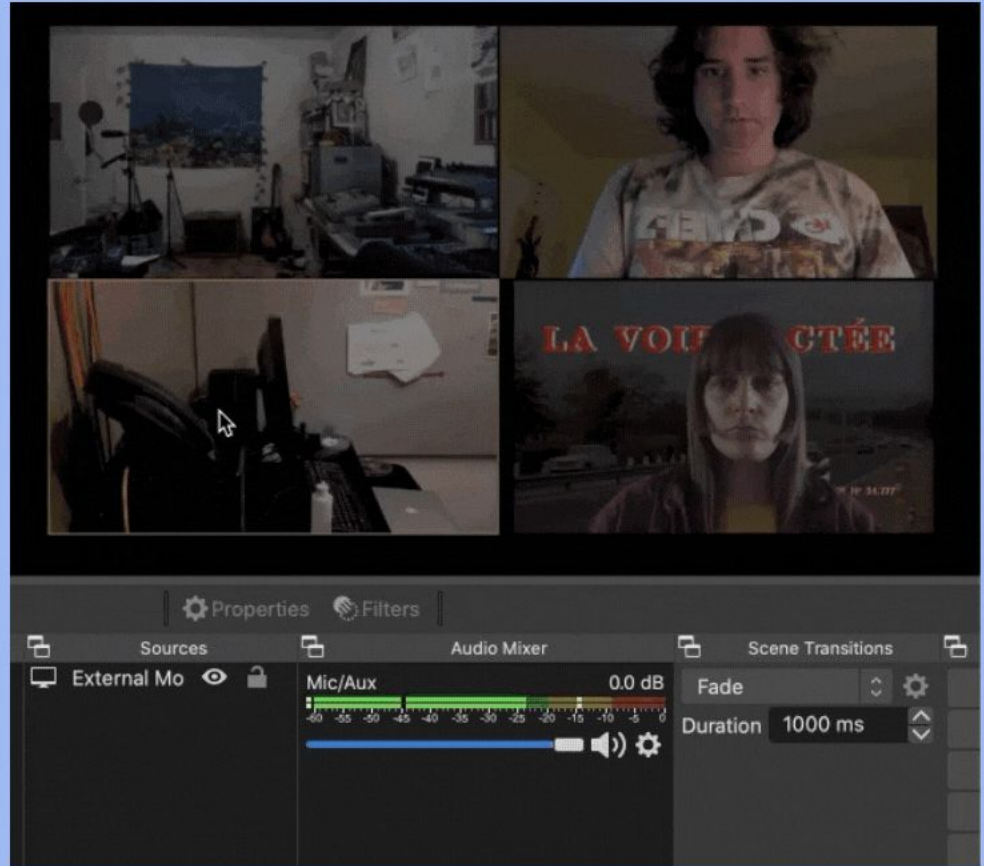
You do not need to select any cropping options, we will do that manually



Making aesthetically pleasing and functional scenes from your zoom meeting

You can either stream the entire zoom meeting with all attendees, or crop the window to individual attendees

If you chose to crop more than one attendee you can duplicate the Display Capture source and crop each source differently



Making aesthetically pleasing and functional scenes from your zoom meeting

You can even set up one-up, two-up, or whatever combination of talking-head style scenes using this method.

Note: If you plan to setup talking-head style Scenes using this method you'll need to use the same monitor and have the same number of people in your zoom, or the crop settings will be different!



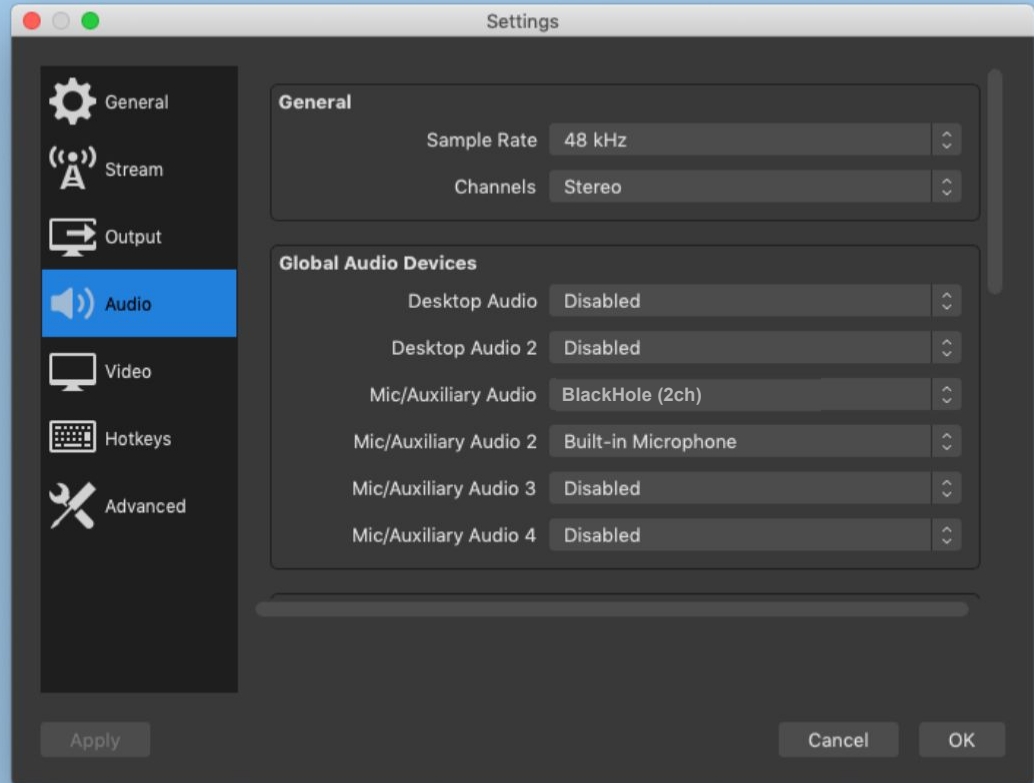
Getting zoom audio, media audio, and your microphone into OBS without feedback loops or delay

This part is a little complex, but isn't too bad once it's setup.

Go to the **Audio** section of OBS settings menu

Set **Mix/Auxiliary Audio** to **BlackHole (2ch)**

Set **Mix/Auxiliary Audio 2** to **Built-In Microphone**

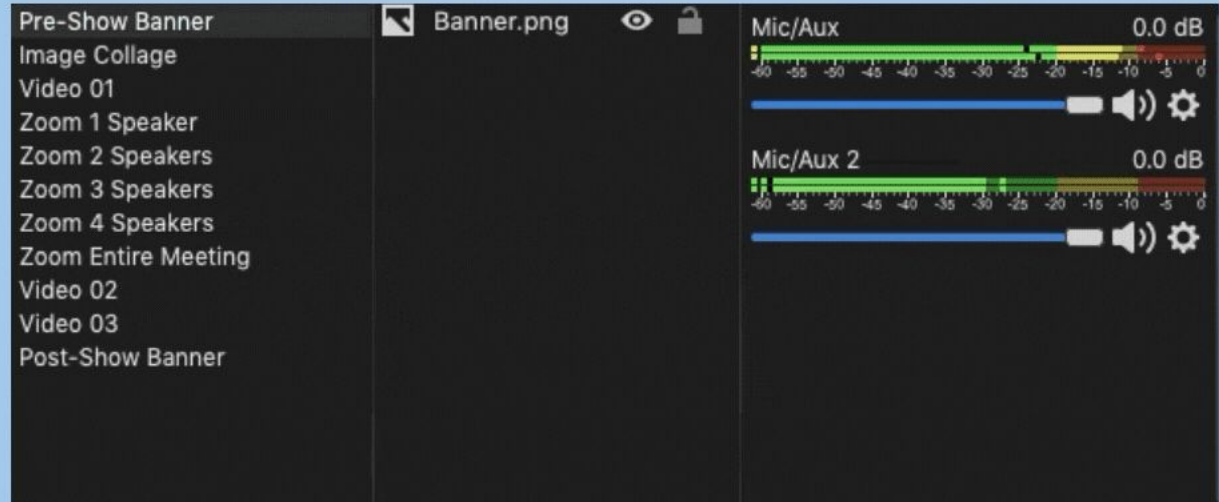


Getting zoom audio, media audio, and your microphone into OBS without feedback loops or delay

By doing this you've set BlackHole audio (which contains Zoom Audio) and your internal microphone as **Global Audio Sources**

This means they will **always** be accessible in every scene

Notice how if a scene contains media with audio, you'll see the meters for that audio when you enter the scene

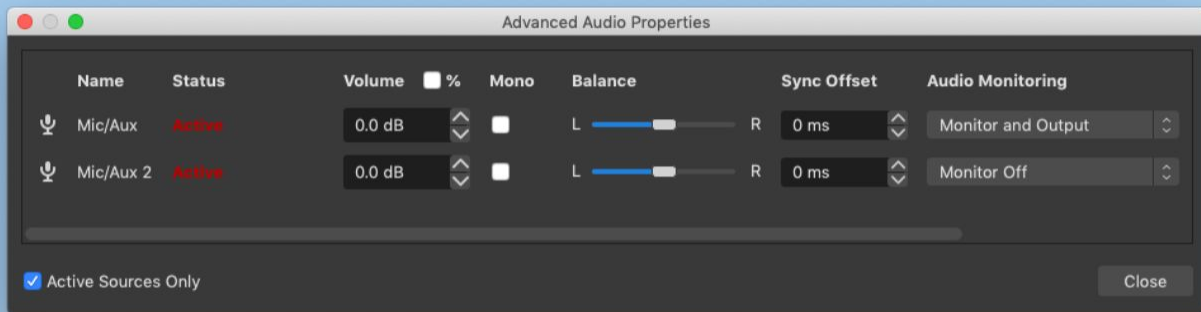
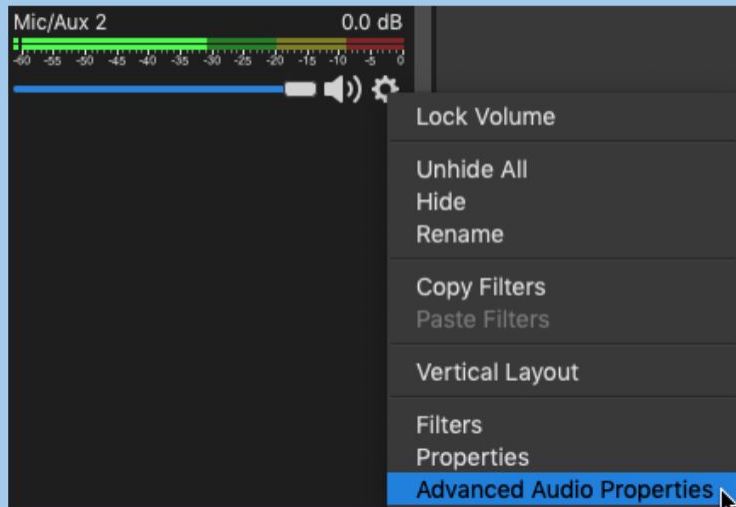


Getting zoom audio, media audio, and your microphone into OBS without feedback loops or delay

Click the **Gear** under any audio source and select **Advanced Audio Properties**.

Set **Mix/Aux** to **Monitor and Output**. Now you can hear the Zoom meeting and it gets broadcast

Set **Mix/Aux 2** to **Monitor Off**. Now your microphone audio will get broadcast, but you won't hear yourself with a slight delay



**Getting zoom audio,
media audio, and your
microphone into OBS
without feedback loops
or delay**

You're now set for audio!

Just remember: If you
mute your mic or the zoom
mic in one scene that mute
will apply for all scenes.

Mute carefully!

You **must** wear
headphones, or else it's
very easy to cause a
feedback loop



**Make it possible for
zoom participants to see
a non-delayed version of
the stream**

This part is tricky, but is critical to re-create the **Home Movie Day** magic!

During in-person HMD events it's typical for someone to speak over a film, particularly films without soundtracks, to describe what's happening and who's on the screen. In order to make this work properly you'll need to employ some more advanced Zoom and OBS techniques.

The need to do this comes from the fact that zoom attendees will not see the media you broadcast, and if they watch the stream they will get a very delayed version

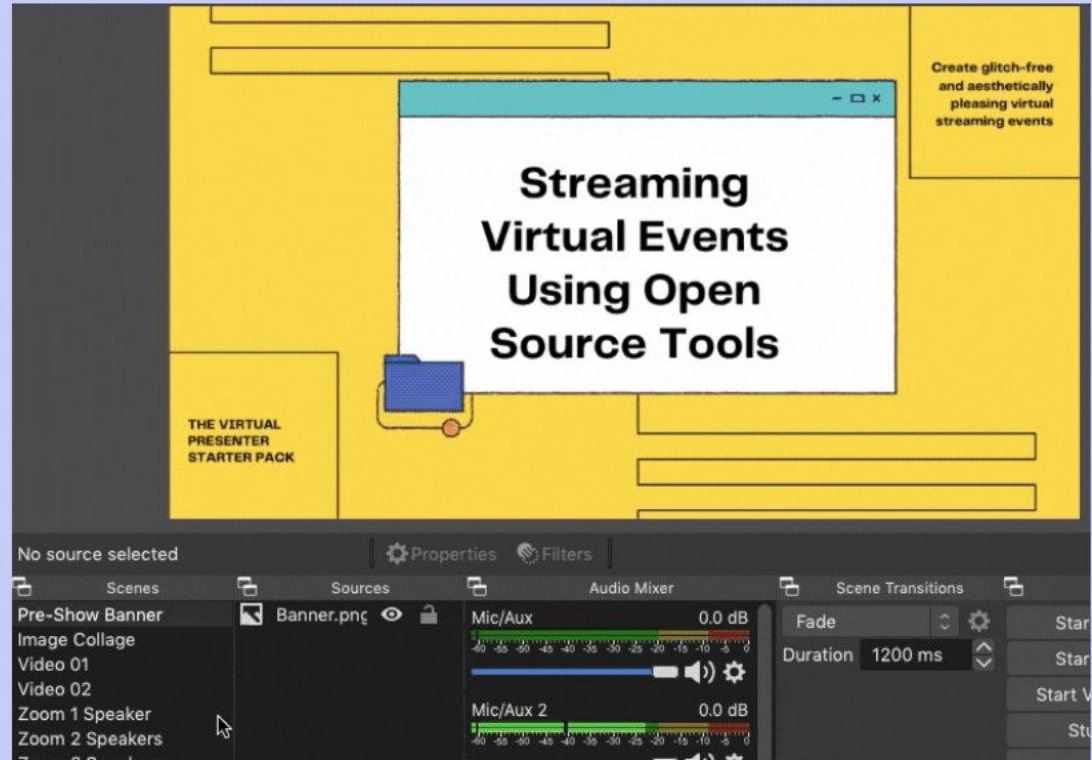


Make it possible for zoom participants to see a non-delayed version of the stream

You will need to perform the following steps each time you start playing back pre-recorded media.

Step 1: Start playing back the desired media clip by clicking the scene it lives in.

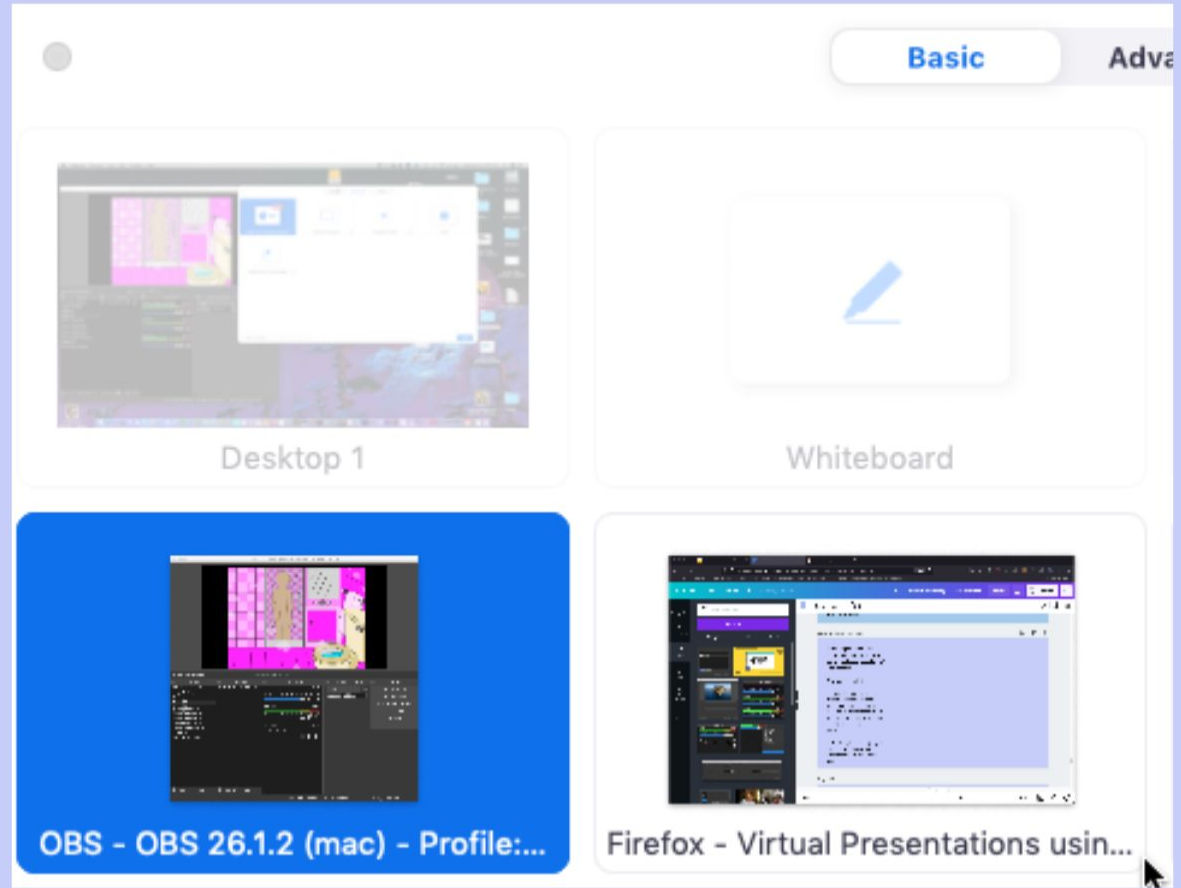
It's best to put a few seconds of black on the beginning and end of your clips!



Make it possible for zoom participants to see a non-delayed version of the stream

Step 2: In your zoom meeting click Share Screen. Then select the OBS window.

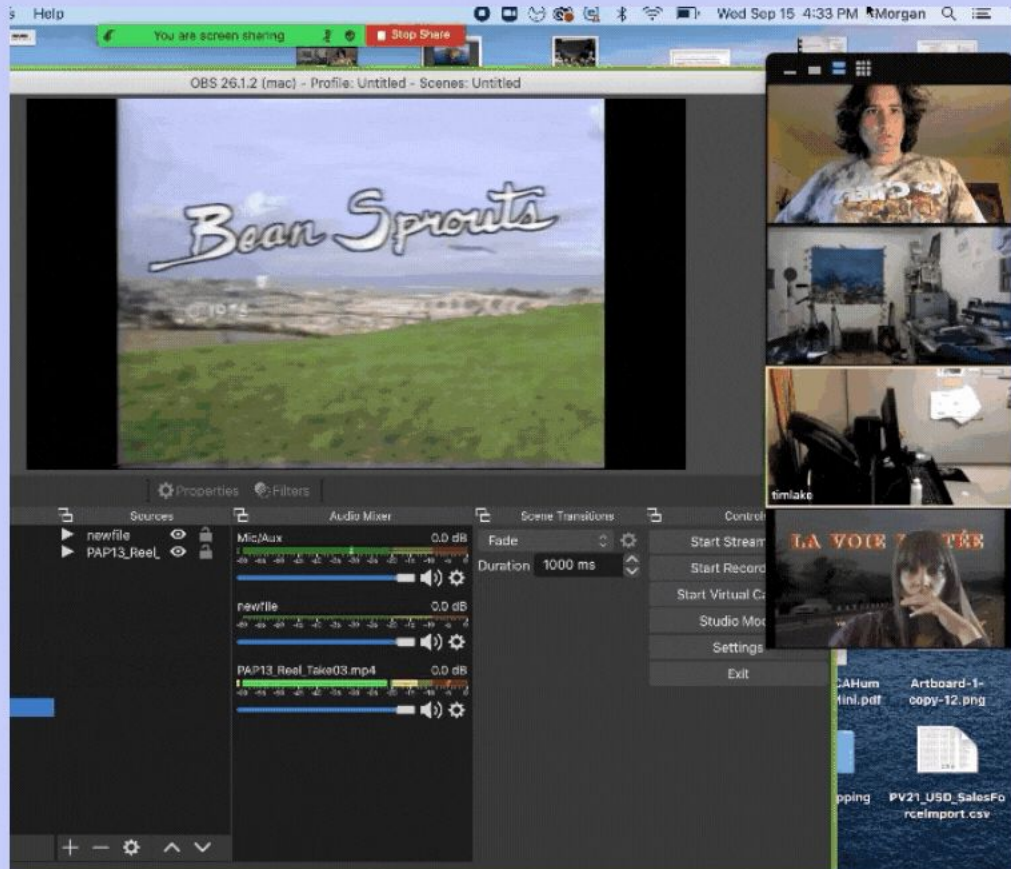
Your zoom attendees will now be able to see the media you're streaming with minimal delay, and the stream will not be interrupted or experience low quality.



Make it possible for zoom participants to see a non-delayed version of the stream

Step 3: When the content is finished, stop sharing your zoom screen, make sure the zoom window is full screen again, and then switch to the next desired scene.

This part can be tricky, especially because zoom might switch your windows around. Make sure it's full screen in your external monitor before returning to a zoom-based scene

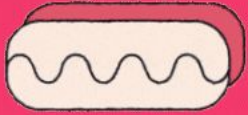


**Make it possible for
zoom participants to see
a non-delayed version of
the stream**

Practice Makes Perfect!

It's very easy to get this wrong, so make sure to practice it a few times to get the steps in order. Once you do it a few times you'll be a master!

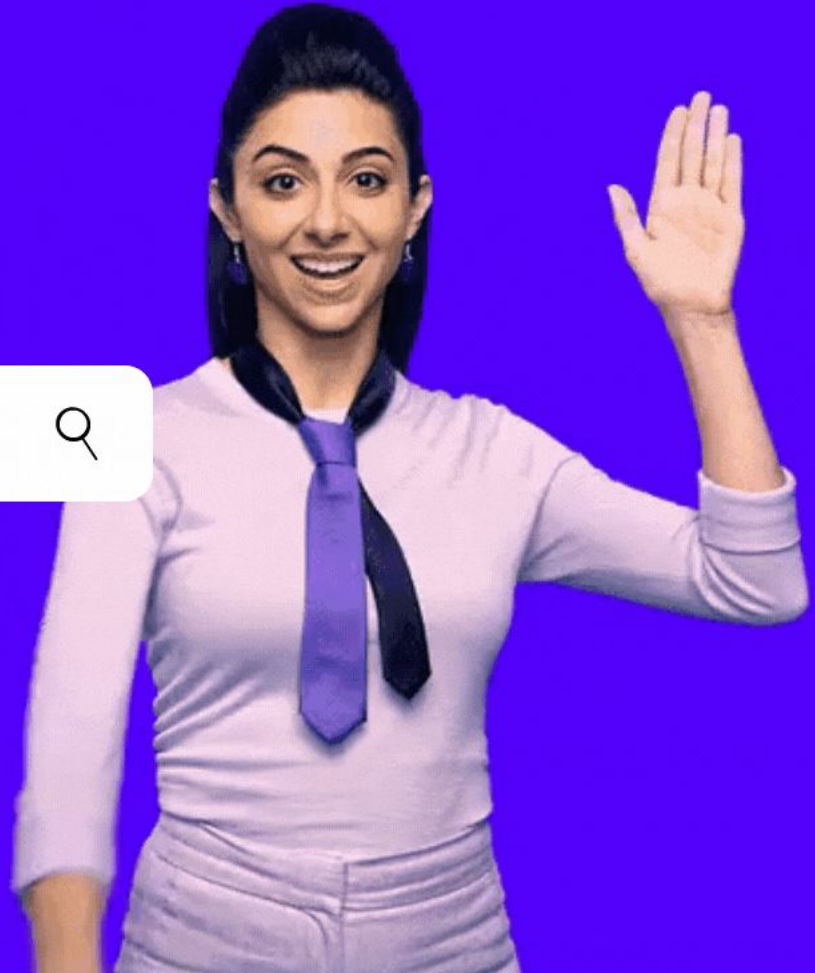




That's the hard stuff!



You did it! Now you can download
the software and give it a try!



Audience Engagement Techniques



Monitor The Chat

Assign someone to monitor the chat for questions. They can also be a hype-person to build up excitement in the chat and encourage people to play Home Movie Day Bingo:
<https://bit.ly/3bpAZcK>



Use The Features!

Platforms like Twitch allow streamers audiences to create emojis, reward subscriptions, and interact with other related channels. Take the time to research what others on these platforms do to increase engagement



No Dead Air

Create interesting backgrounds, intermission slides, and music to fill up what would otherwise be blank spaces or dead air. Make slides for before and after the show and create a playlist so people who show up early or late are still engaged.



Happy Streaming!!

Check out the Center for Home Movies' website
www.centerforhomemovies.org for more information about
Home Movie Day and home movies generally.

You can reach us by email with any questions:
info@centerforhomemovies.org