The OBS Superuser Guidebook:

Open Broadcaster Software Features and Plugins for Power Users

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DEDICATION

This book is dedicated to the StreamGeeks Community.

CONTENTS

ACKNOWLEDGMENTS

I'd like to acknowledge the work done by developers around the world who have contributed to the OBS project. OBS is of course an open source project maintained by a community of developers who donate their time to create this amazing product for the world.

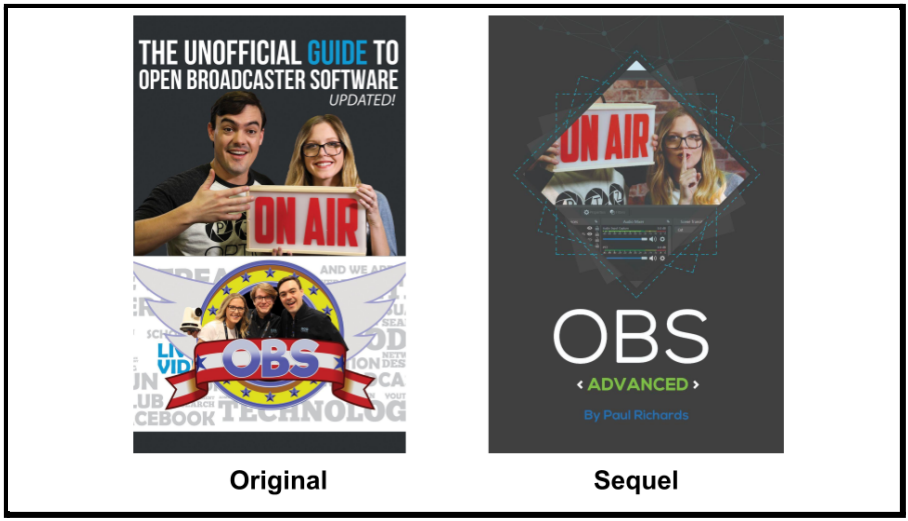
1 AN UPDATE ON THE UPDATES

Open Broadcaster Software (OBS) is an open source software designed for live streaming, and video production. The project was originally created by Hugh "Jim" Bailey and released in August of 2012. Fast forward an entire decade, and developers from around the world collaborate and contribute to the project making it possible to have up to date and stable versions of the software for Windows, Mac and Linux operating systems. OBS is the result of a large community of developers working together to create a flexible software solution for audio visual projects ranging from live streaming to video distribution and beyond. If you use the software regularly, you should seriously consider supporting the project financially on either Patreon or OpenCollective.

In 2016, OBS "**Classic**" was replaced by OBS "**Studio**" which has since become the primary version. OBS has announced many new versions over the years and each release includes a slew of updates to the platform. Before each new version is released a "release candidate" is made available on GitHub. GitHub is a code repository which is a popular destination for open source software developers. The release candidate is always made open to the public to download and test out the new features, updates and bug fixes. During the release candidate phases, users report bugs and test out new features as the developers work to bring an official bug-free version to the world. Oftentimes new features may only be released for Windows, with Mac and Linux updates planned for future releases. In general, the development team at OBS does a great job of crowd-sourcing ideas for future feature updates.

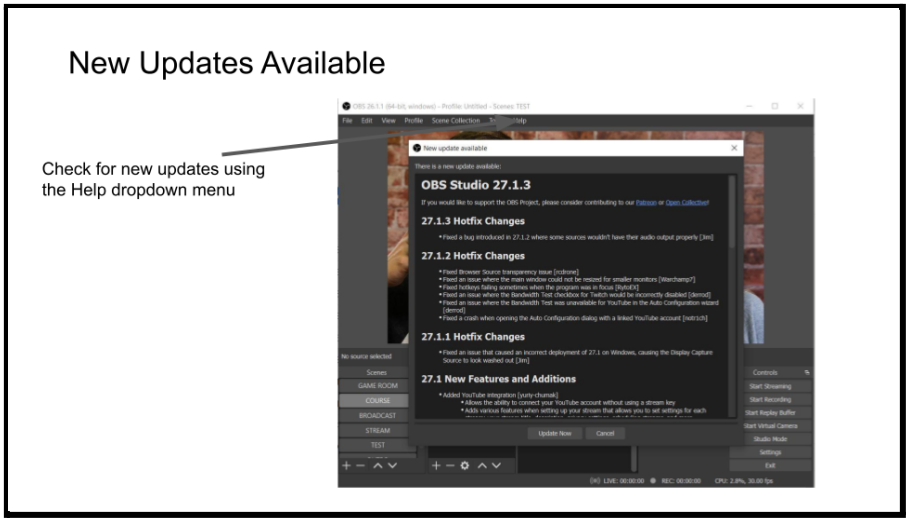
OBS has been built with an open API that allows developers to contribute to the main project or provide separate project add-ons called plugins. Plugins are open source modules that are created by individual developers who contribute new feature enhancements for OBS by adding code to the plugins folder of OBS. In this way, plugins have become a popular way for developers to contribute to the project without compromising the quality of the core program. In fact, many plugins that prove their popularity and reliability are eventually built directly into the core OBS application, after thorough testing.

This book will include detailed reviews of the top plugins available to make OBS more powerful for video production. Plugins do vary in quality and reliability, because they can be released by any developer willing to make one. Plugins are often released in a BETA phase, as developers are testing new features and allowing users to give input. For the purposes of this book, only plugins that have been thoroughly tested are included in the list.



The Unofficial Guide to OBS and *OBS Advanced.*

This book is the sequel to *The Unofficial Guide to OBS* which was written to help novices get up to speed with the software. If you are unfamiliar with OBS, you should start with *The Unofficial Guide to OBS* first and then read this book. *The OBS Super User Guidebook*, is written for those who wish to push the boundaries of what OBS is capable of using new plugins and video production standards such as NDI and SRT.



Updates to your OBS version will be shown in a dialog box.

So before you get started, review this list of updates that have come available in the past five versions of OBS to familiarize yourself with the software.

Core OBS Studio Features:

- Ability to create an unlimited number of scenes with a variety of multimedia sources.
- Ability to transition between these scenes with a preview and program/output window.

- Ability to create an unlimited number of layers in each scene made of audio and video sources.
- Ability to capture a long list of sources including audio devices, web-browser sources, screen capture (displays and games), images, slideshows, media sources (video files and live RTSP video), and text (including data from .txt files).
- Ability to record video in a variety of formats and bitrates.
- Ability to live stream video to a content delivery network. (CDN) via an RTMP stream with customizable bitrates
    - New versions include easy authentication methods with popular CDNs such as YouTube and Twitch.
- Ability to capture a screen or window in a variety of high quality formats.
- Integrated audio mixer with live audio preview meters.
- Ability to add filters to audio and video sources to enhance and customize the effect.
    - Default video effects include image mask, crop, color correction, scale, scroll, color key , sharpen and chroma key.
    - Default audio effects include gain, video delay, noise suppression, and gate.
- Ability to use hotkeys to quickly use most functions in OBS including scene transitions and overlays.
- Ability to quickly hide, show, or lock individual sources inside a scene.
- Ability to output video as a virtual webcam (for use with software such as Skype or Zoom).
- Ability to customize the entire project resolution to any size (even portrait modes such as 1080x1920).
- Ability to customize the theme.
- Ability to drag and drop interface elements and customize the software layout.

- Ability to display real time statistics for software and computer performance.

OBS v23

- **NVENC encoding** – This feature for Windows users allows you to improve video performance when using NVIDIA graphics cards.
- **New Audio Filters** - New audio limiter and expander filters have been added. These filters can be applied to audio sources.
- **Luma Key Filter** – This filter can be used to remove a specific color from the background on a video or image and make it transparent. This is useful for green screens and overlay effects.

OBS v24

- **Dynamic Bitrates** – Great for increasing the quality of your live streams especially if bandwidth or network congestion is an issue.
- **Custom Docks** – Custom docks allow you to bring websites into your OBS dashboard which is ideal for live chat rooms and other controls. This feature does work with local HTML on your computer.

OBS v25

- **SRT output** – This feature allows you to work with SRT (Secure Reliable Transport). The implementation in OBS is still rough but it does work.

- Scene Collections – Scene collections allow you to group together scenes and organize your projects. This allows you to load up projects quickly and easily.
- **T-Bar** – This is a popular video production tool used to transition between your preview and output screens. This is ideal for use in Studio Mode.
- **Volume Lock** – In OBS you have the ability to lock sources in place. This feature is now available for audio sources as well so the mix is not changed by accident.
- **Source List Icons** – A beautiful feature in OBS 25 was the addition of icons for each source type. This is very helpful for new and advanced users.

OBS v26

- **Virtual Camera Support** – This feature allows you to output your video from OBS and bring it into another program like Skype or Zoom. The virtual webcam brings any video in the output of OBS into any software that uses a webcam to ingest video.
- **Source Toolbar & Media Playback** – The media source toolbar is very helpful for scrubbing through video assets inside of OBS.
- **AI Noise Suppression** – This feature helps with noise suppression and can improve the audio quality for most microphones.
- **Screenshot Capabilities** – The ability to quickly take screenshots is now available and available via hotkeys.
- **Movable Dock UI** – The moveable Dock UI makes organizing your OBS dashboard easier and more fluid.

OBS v27

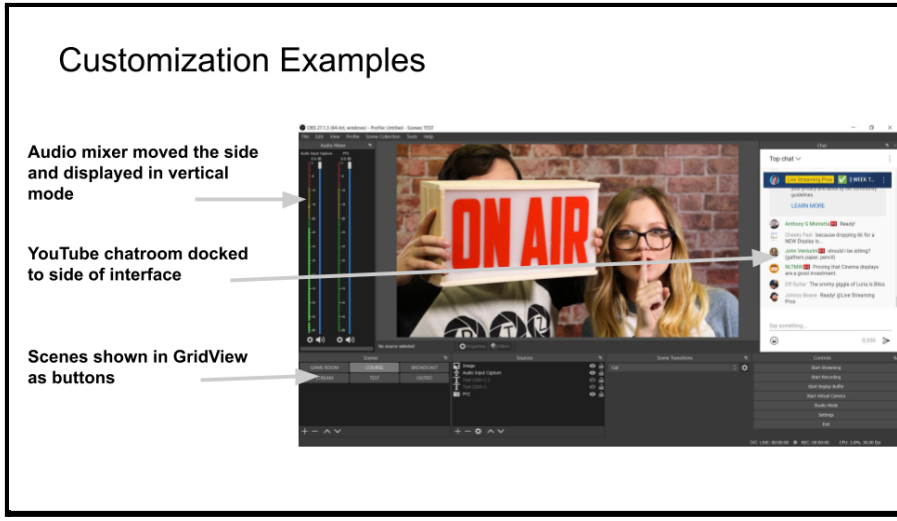
- **Undo/Redo** – This is one of the most-requested features for OBS user new and old. Fixing mistakes with the undo button can be done with a simple "CTRL + Z" or "CMD + Z" on MacOS. Redoing an option is also available with "CTRL + Y" or "CMD + SHIFT + Z" on MacOS.
- **Browsers Docks** – This feature has been available on Windows since OBS 24, but it was released for both Mac and Linux users in OBS 27.
- **Source Visibility Transitions** – Toggling to a source now allows you to choose a transition in and transition out option. You can choose any transition type available in OBS including stingers.
- **Track Mattes for Stingers** – The ability to quickly take screenshots is now available and available via hotkeys.
- **Movable Dock UI** – The moveable Dock UI makes organizing your OBS dashboard easier and more fluid.

Key Takeaways:

1. OBS is a highly flexible video production solution that has been created by a large community of developers.
2. Each year new versions of OBS are released with new features that make OBS more powerful.

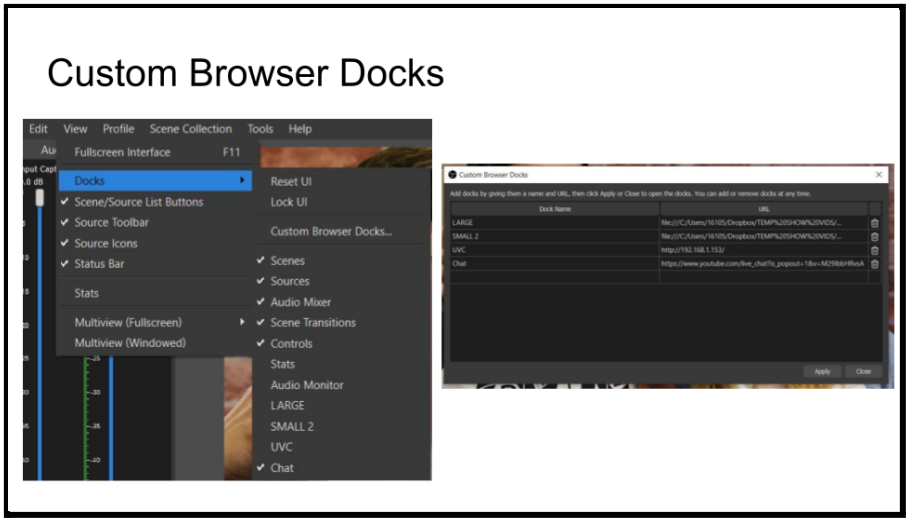
2 CUSTOMIZING OBS TO WORK FOR YOU

Once you have become comfortable with OBS, you may want to start customizing the OBS software. OBS allows users to customize many settings including the overall theme and positioning of each major user interface element. You will notice the ability to resize areas of OBS with your mouse by hovering over the edge of a particular area. For example, if you hover your mouse under the main video area you will notice you can click and drag the side to resize the element. You can also click and drag the top bar of an element to drag the entire element into a new space to reorganize the OBS interface. You can also click and drag entire interface elements outside of the main OBS application in order to create a dedicated space in a new window. Some core OBS elements such as Scenes and the Audio Mixer offer alternate layout options. For example, the image below shows the default audio mixer moved to the side and put into a vertical mode.



OBS shown with various customization options.

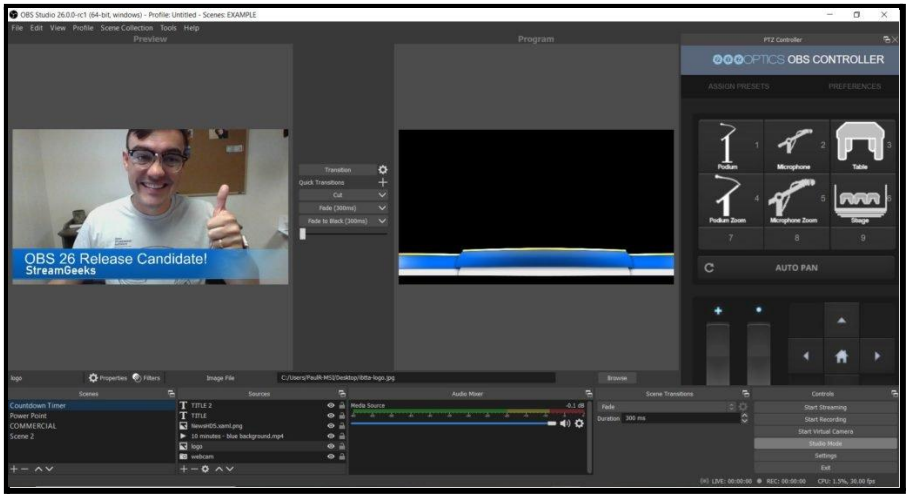
To further customize the OBS interface you can use a feature called **Browser Docks** which allows you to add new interface elements to OBS by adding web-browser sources. A popular way to use this feature is to add a panel to display the chatroom from a live stream. To do this you can click **View,** and select **Docks**, and click **Custom Browser**. This will open up the custom browser docks area where you can add an unlimited number of web-browser sources with names you can reference. Once you create one it will appear in a window you can place anywhere you like in the OBS interface.



Custom browser docks can be added to OBS from the View menu.

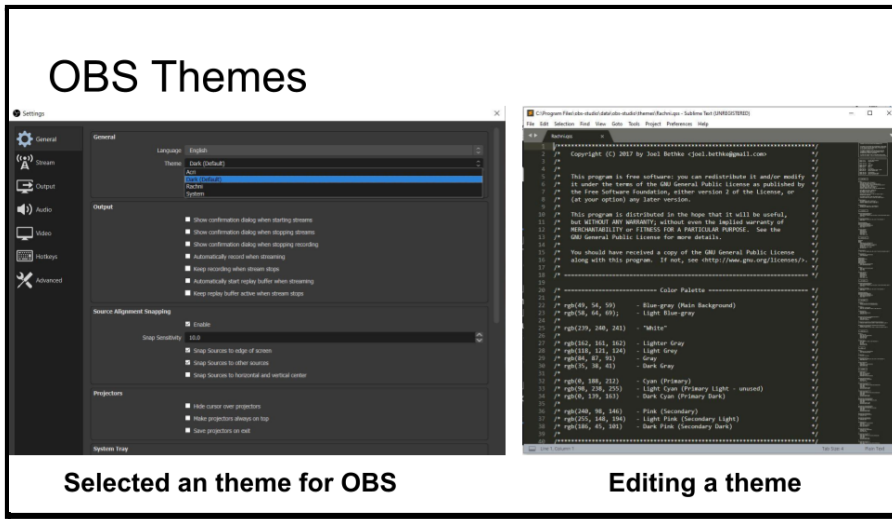
Browser Docks can be used in a variety of creative ways to enhance your OBS experience. For example, if you are using a pan, tilt and zoom (PTZ) camera, you can dock PTZ camera controls on the side of your OBS interface. For example, PTZOptics offers open source camera control codes which you can use to control robotic cameras inside of OBS. The control codes are essentially HTML files that you

can put on your local computer. **Browser Docks** can be used for web-sites on the public internet or HTML files on your local computer.



Docks can be placed in most areas of the OBS interface.

In the example above, you will notice that the OBS instance has multiple PTZ cameras connected to the system via Network Device Interface (NDI). NDI is an advanced video source option that is available via a plugin which will be discussed later in this book. **Browser Docks** can be placed on top of one another. When you drag and drop a **Browser Dock** on top of an existing dock, OBS will create a tab for you to switch between them. If you know how to write HTML code you can customize the size, shape and look of your **Browser Docks** to fit into the theme you are using.



Themes can be selected in the OBS settings and edited from the main OBS themes folder.

As you are customizing your OBS interface, you should be aware of the OBS **Themes** that are available. Themes will update the entire OBS interface color scheme along with the size and shape of most buttons. The default themes include Arci, Dark, Default, and Ranchi. It is possible to create your own OBS Theme by using QSS which is a subset of CSS2. You can also find custom themes available on the internet. The theme files for OBS can be found in the **/data/obs-studio/themes/** folder on your computer. If you would like to customize an OBS theme it is recommended that you start by editing an existing theme. The Ranchi theme which was developed by Joel Bethke in 2017, is open source and includes great documentation. The online course for this book will walk you through some basic customizations that you can do with a standard text editor.

Another helpful customization option many advanced OBS users like is called **Stats Dock**. The **Stats Dock** can be enabled in the **View** tab, under **Docks** and **Stats**. Once enabled you can drag this interface

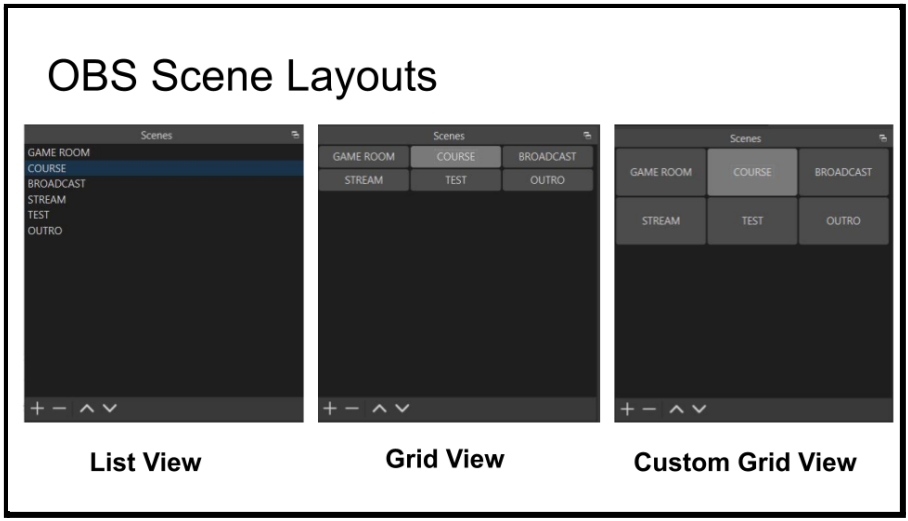
element to a space inside your OBS interface. This dock will display live statistics about your computer and the video production. For example, the **Stats Dock** will let you know the status of your live stream, whether you are recording and if there have been any dropped frames. Other important statistics include the amount of harddrive space available for your recordings and the total CPU usage.

Note: There are two Stats Dock options. One is dockable and the other is not. If you want to dock your stats panel use the Stats option found inside the docks dropdown menu.

Another decision you may decide to make is whether or not to use **Studio Mode**. When enabled **Studio Mode** will give you two windows inside your OBS production environment very much like a traditional video production switcher. **Studio Mode** is designed to allow producers the ability to preview scenes before transitioning them to the output area which is being live streamed and/or recorded. The main benefit of this is the ability to preview and edit scenes before they go live. You also gain the ability to choose a custom transition type for every scene switch including the T-bar transition type. The T-Bar transition allows producers the ability to cross-fade between the preview and output scenes by dragging the T-Bar from left to right across the screen. The drawback to **Studio Mode** is that it takes up space inside your interface and requires more clicks to switch between scenes.

Professional productions enjoy studio mode but many experienced live streamers have found useful work-arounds. For example, without using studio mode you can still choose custom in and out transitions for each scene. Many productions will then use simple hotkeys or USB connected controllers like the Elgato StreamDeck to switch between scenes without the need for a preview window. Professional

productions that have camera operators use the preview window as a way to notify camera operators that their camera is “up next” by using a Tally Light. Tally Lights are indication lights that communicate with on-air talent and camera operators letting them know which source is live and which source is about to be live. Tally Lights and other professional hardware designed for OBS will be covered in more detail in an upcoming chapter.



OBS scenes can be displayed in a variety of ways and customized for your application.

You can also customize the way OBS organizes scenes. The default view for Scenes is a simple list. But since OBS 26 a **Grid View** view has become available which makes each scene available as a button. You can turn **Grid View** on by right clicking the scenes area and selecting **Grid View**. Once enabled each scene will show up as a button which for some users is easier to click. You can also customize the size, color and shape of these buttons by editing your OBS theme file. An easy way to do this, is to create a copy of the current theme. Try naming the

copy something else such as new-theme.qss. You can then update the code for QListWidget#scenes::item with the code below.

```
QListWidget#scenes::item {
   min-height: 55px;
}
```

Another simple form of OBS customization is good old fashioned organization. OBS scenes themselves can be organized into a list and include helpful information for quick reference. This is especially useful if you are designing an OBS production system for volunteer operators. The following list of scenes comes from the Trinity United Church in North Bay, Ontario, Canada. John Roberts, the audio visual technician there has shared a list of tips for organizing OBS scenes and sources to be more productive.

0. 10:00 – Live Streaming off – setup and testing– camera & sound ON
1. 10:15 – start Live Streaming – "Live streaming will start at 10:20am" – camera & sound OFF
2. ~10:20 – prelude – live - Pre-Music: 2 choir pods
3. 10:29 - Display copyright notice
4. 10:29½ - Today's Image – William Blake: "Eternity is in love with the productions of time."
5. 10:30am - Welcome (Minister in pulpit)
6. hymn 1 - CALL TO WORSHIP (Kids Song): "LIKE A ROCK" – video
7. Prayer of Confession: (Minister near table)
8. Family Story: "Martin's Big Words" by Doreen Rappaport and Bryan Collier (Minister P-I-P)
9. An Extra Video: Free Film for Martin Luther King Jr. Day (saltproject.org) – video
10. Introduction to Scripture: (Minister at table)
11. Scripture: 1 Corinthians 6:12-20 – video
12. hymn 2 - VU 60 Come all Ye Faithful (vs.1,2,3,5) – video
13. Sermon: "In the Flesh" – 3 pictures

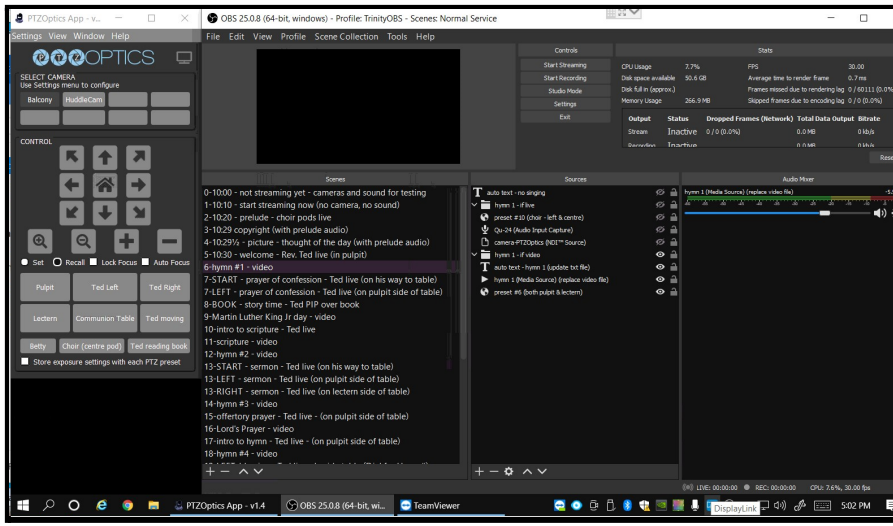
14. hymn 3 - VU 31 "O Lord How Shall I Meet You" – video
15. Offertory Prayer and Prayers of the People (Minister at table)
16. lords prayer - VU 959 – video
17. Brief Hymn Introduction: (Minister at table)
18. hymn 4 – VU 266"AMAZING GRACE" – video
19. Gratitudes and Blessing (display the "Dial for Hope" Number?) (Minister at table)
20. benediction – VU 422 "God Be with You" – video
22. postlude – live

This OBS scene layout allows the volunteer OBS operators to know exactly when each scene should be used because the time is in the title. The tech team then builds all the segments in the worship script into OBS, with each segment being a scene. They do not recreate the OBS session each week. Instead they just modify the previous week's setup as needed for the next week.

The kind of things they do change week-to-week.

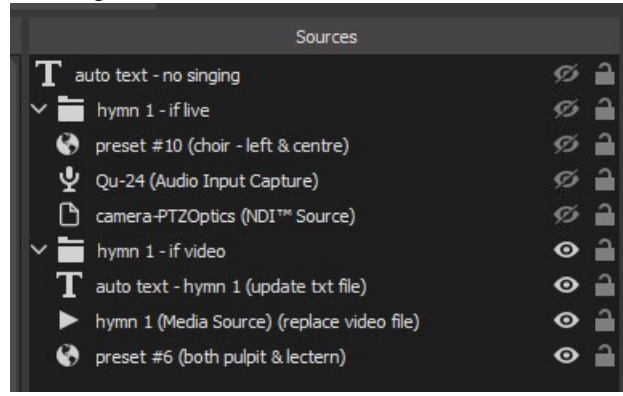
- The order of the segments, although they don't change all that much.
- If a segment is "live" or a "video." One of the key points of the "Hybrid Services" is that any given segment can be delivered live in the Sanctuary, or via video.
- For the live segments they have to know what to do with the camera, so who is it and where will they be?
- And they look for any "special effects" they have to build into OBS. Examples from this are pictures their minister wants displayed during his sermon, and the "Dial for Hope" phone number to be displayed during the Gratitudes and Blessing segment.

On Sunday mornings all they have to do is start streaming. The volunteers can simply click through the OBS scenes in sequence. They get the full script prior to the service, and that allows them to be better prepared for upcoming scene changes. They also work with the minister to determine how he'll be cuing the special effects.



OBS interface shows the scenes they built for the sample worship script.

John Roberts says, “We don’t use OBS in Studio Mode. This would give us a “Preview” and a “Program” window, and lots of neat transitions. But it doesn’t match the way we build our scenes – it can’t preview the next camera preset since we only have 1 camera and it can’t move until we switch to that scene. I expect we’ll switch to “Studio Mode” for our “Post-COVID Services” when the scene structure will be entirely different.”



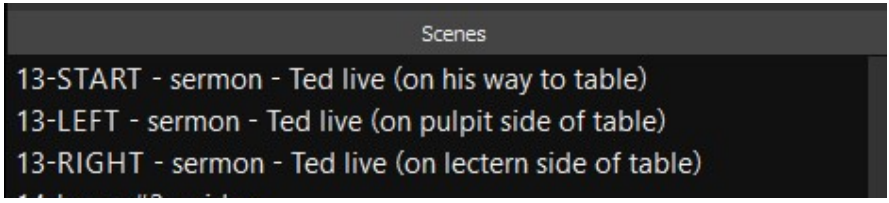
John also explained their setup process, “Once we’ve built all the scenes, we run a quick test. We start recording and run each scene long enough to get into some audio, and test the microphone for the live scenes. Then we stop recording and play the video to make sure every scene

functions as we expect it to. As we get better at all of this there is likely less need to run this test, but we're still doing it."

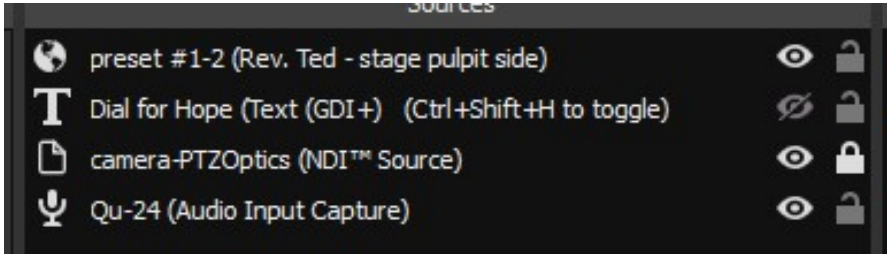
Customizing Sources with Folders

John also explained how he uses folders inside each scene to quickly switch between live and pre-recorded segments. "With some scenes in our Hybrid Services, like hymns and scripture, being live one week and a video the following week, we have built scenes to enable this flexibility. Rather than rebuild the scene every time it changed, we have both live and video sources built into the scene, and simply "hide" the one we don't need. For example, hymn 1, you'll see this week is a video source and the "if video" folder is visible."

Extra scenes for various show starting points



John has also designed various scenes to switch between depending on the start point of the session. John explains, "Our minister moves around during his segments. Using a PTZOptics camera and the HTTP



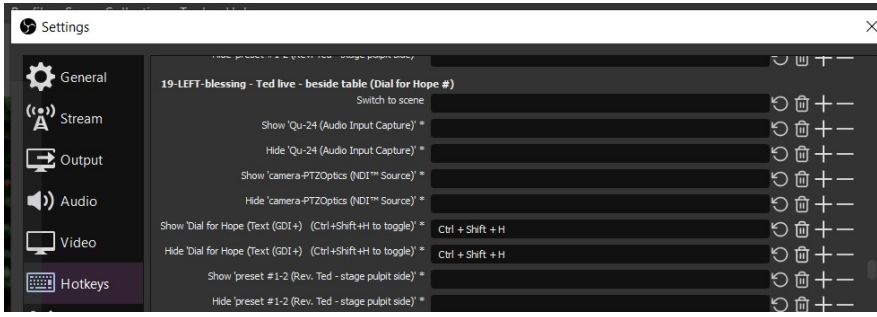
commands we have created several scenes that we use to move the camera. These are virtually identical scenes, with the only difference being the PTZ camera preset that's called in each scene. The "START" scene has a wide camera setting that'll allow the minister to move from the pulpit down to the stage. The "LEFT" and "RIGHT" scenes each

cover ½ the stage, and allow the tech operator to follow the minister as he moves back and forth."

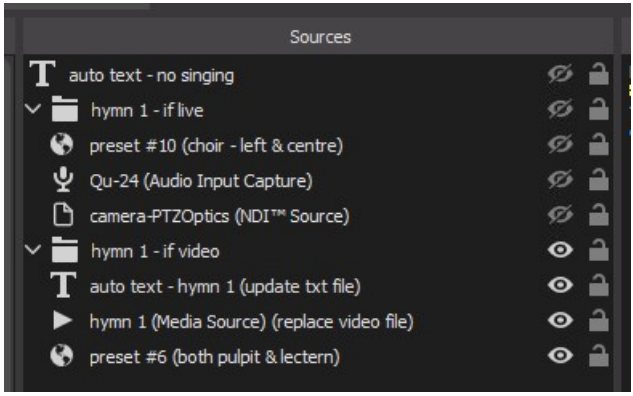
Adding Hotkeys to Source Names

John also uses OBS **Hotkeys** to toggle special effects on and then off again. In the picture to the right, you'll see that the "Dial for Hope" source can be toggled with a [Ctrl]+[Shift]+H key combination. This is well labelled so the streaming tech knows what to do.

Hotkeys can do a lot more than this simple task but the integration of the **Hotkey** sequence into the source title is an innovative way to remind OBS operators which set of keys is needed to use the specific feature in the interface.



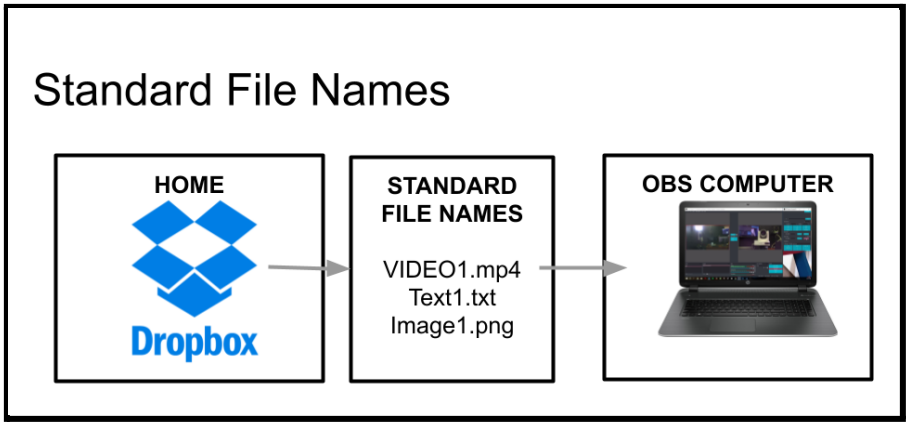
Standardization and Cloud Integration



Another tip John shared is the idea of standardization of files and source names. Organizing the files your OBS system uses allows you to easily update and replace files using a cloud-based system such as Google Drive or Dropbox. For example the, "hymn 1 (Media Source)" refers to an actual file on the computer called "hymn

1.mp4." By using that name they can easily swap that file with next week's first hymn. This way there's nothing to change in the OBS setup. This can be done locally on the computer, or set up to sync with files on a shared drive from Dropbox.

This can also be used for text files, which display things like credits for live music, and the date of the service. Those files have self-explanatory names like "prelude.txt," "postlude.txt," "hymn 1.mp4," and "date.txt."



You can remotely update the files your OBS system uses with a cloud based service such as Google Drive or Dropbox.

John explains, "We've taken this a step further by using various utilities to get these files in place. I update the files in a directory on my hard drive, which is then synced to my Dropbox, which is then synced to the Streaming PC's hard drive. So I simply update or replace the file in that folder on my hard drive, and within a few minutes the Streaming PC has the file and is all set."

As you can see OBS can be tuned to fit the needs of almost any production. The open source nature of OBS allows you to customize both the interface and the workflow of your project. Some organizational tips are obvious and they can easily improve the efficiency of your video production. Other OBS customizations require plugins which will be covered in the upcoming chapters. However you plan to use OBS, make the interface your own, by customizing the

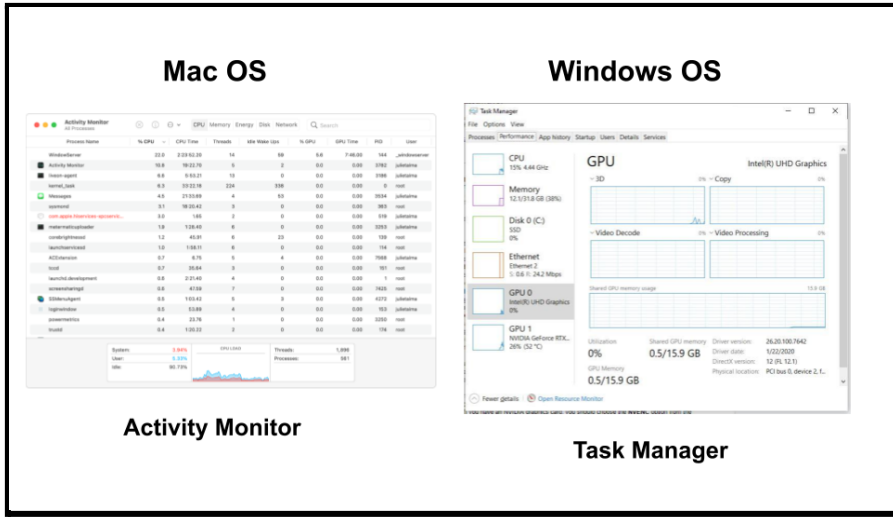
available themes, interface elements, scenes and sources to fit your project's requirements.

Key Takeaways:

1. OBS is a highly customizable open source video production software.
2. OBS is open source and you can take the code and customize it to fit your needs.
3. The OBS interface in totally configurable and dockable panels allow you to further customize the interface.
4. Good old fashion organization can go a long way to making your OBS productions more efficient.

3 OPTIMIZING YOUR OBS PRODUCTION

In this chapter, you will learn how to optimize your OBS production by using the settings available in OBS to fit your specific needs. Most users of OBS are using the software for live production, live streaming and/or recording. The more that you plan to do with OBS, the more important it will become to use the correct system settings. In general, OBS will allow you to customize your project to fit almost any resolution or frame rate. Therefore, OBS is capable of pushing your computer beyond its limits and a good understanding of your hardware and its limitations is required to optimize OBS properly. While you are using OBS, you should keep an eye on your computer's resource management tool. Windows computers can use **Task Manager**, and Mac OS uses **Activity Monitor**.



Monitoring your computer resources can be done with Activity Manager on Mac or Task Manager on Windows.

The process of encoding video is very CPU intensive. In fact, you may get a warning from OBS that says "**Encoding Overload!**" when you have maxed out your computer's processing capabilities. The first tool you should have open is "**Stats**." Stats is a tool that is available from the **View** dropdown menu which keeps tabs on your CPU usage, disk space availability and memory usage. In the **Stats**, one area you should keep an eye on is dropped frames. There are two main reasons for dropped frames and OBS breaks them out into "**Frames missed due to rendering lag**" and "**Frames missed due to encoding lag**." Frames missed due to rendering lag are caused by your graphics processing unit (GPU) and this is common when OBS uses a graphics card that is also being used for other graphics intensive software such as video gaming. Frames missed due to rendering lag refers to your computer's inability to actually create each frame of video in real time. "Skipped frames due to encoding lag" has to do with your computer's processing capabilities when you are streaming or recording. Encoding is the process of recording or streaming the rendered video inside of OBS. Encoding requires your computer to compress the video you are working with and either stream or record it.

Before you can determine the source of dropped frames or other processing related issues you must make sure that your OBS system is set up properly. The first step is to put your "**Output Mode**" into the "**Advanced**" mode in the **Output** tab found in **Settings**. This allows you to have full control over the streaming and recording profiles used for encoding. It is here that you can set the bitrate which is the amount of compression OBS will use to encode your video. The lower the bitrate the lower the quality of your video will be. The first step is to choose the correct **Encoder**. If you have an NVIDIA graphics card, you should choose the **NVENC** option from the encoder drop down menu. If you have an AMD graphics card you should choose **AMF**. Some newer Intel processors also have a **QuickSync** option you can

use without the need for a dedicated graphics card. If you are relying only on your computer's CPU for encoding you should choose **x264**.

Pro Tip: Windows computers will sometimes require you to specifically enable OBS to work with your graphics card. For NVIDIA graphics cards this can be done using the **NVIDIA Control Panel**. In this control panel, you can click **Manage 3D Settings** and add OBS to the list of programs which should use the NVIDIA graphics card.

Unless it's necessary for your production, you should avoid having OBS scaling your video content because it adds unnecessary video processing. Inside the **Video** tab of the Settings menu you should set your **Base (Canvas) Resolution** to the same **Output (Scaled) Resolution.** In the **Video** tab you can also set your project's frame rate. The higher the frame, the more processing power it will take to encode the video. If you do not need 60 frames per second, reduce this frame rate to 30 or 24. Going from 30 frames per second to 60 almost doubles the amount of bandwidth needed to live stream your video.

Pro Tip: Always make sure that your cameras are set to the same resolution and frame rate as your OBS project.

The 180 degree shutter speed rule can be used to match your camera's shutter speed to the frame rate of your project. If you are using 30fps, set your camera's shutter speed to 1/60th of a second. If you are using 60fps, set your camera's shutter speed to 1/120th of a second. This will ensure a natural looking video with a normal amount of blur.

Once you have settled on your project's resolution and frame rate, you should consider the bitrate you would like to record and stream with. Many people have to work with a limited amount of bandwidth and therefore need to perform a bandwidth test to determine the maximum

amount of bandwidth they can use. If you are limited by bandwidth you can consider recording your project locally at a higher bitrate than you are streaming. This allows you to keep a higher quality file on your computer for distribution after your live stream.

Common Streaming Resolutions:

Resolution	Pixel Count	Frame Rate	Quality	Bitrate
4K 30fps	3840x2160	30fps	High	30Mbps
4K 30fps	3840x2160	30fps	Medium	20Mbps
4K 30fps	3840x2160	30fps	Low	10Mbps
1080p60fps	1920x1080	60fps	High	12Mbps
1080p60fps	1920x1080	60fps	Medium	9Mbps
1080p60fps	1920x1080	60fps	Low	6Mbps
1080p30fps	1920x1080	30fps	High	6Mbps
1080p30fps	1920x1080	30fps	Medium	4.5Mbps
1080p30fps	1920x1080	30fps	Low	3Mbps
720p30fps	1280x720	30fps	High	3.5Mbps
720p30fps	1280x720	30fps	Medium	2.5Mbps
720p30fps	1280x720	30fps	Low	1.5Mbps

Example bitrates for streaming in a variety of resolutions and frame rates.

Once you have selected a bitrate for your project you should consider which rate of control you will select in OBS. Constant bitrate (CBR) is the most common rate of control. Constant bitrates do not fluctuate even when OBS may be able to intelligently use less bandwidth for scenes without complexity. Adaptive bitrate (ABR) allows OBS to adapt the bitrate to the scene in which you are streaming and reduce or increase it as necessary. Variable bitrate (VBR) is similar to adaptive

bitrate in the sense that it attempts to increase or decrease the bitrate based on what is needed for your given scene. The main issue with ABR and VBR comes when scenes change quickly and there is a split second where the pixels aren't quite right. If you are using an AMD or NVIDIA graphics card you may have access to the CQP rate of control which can be used for ultra high quality video recordings. As with most high quality recordings, CQP will take up a lot of hard drive space. If you do not have access to CQP the best way to increase your video recording quality is to simply increase the bitrate.

In the **Advanced** section of the OBS settings there is a **Network** area. Here you can select "**Dynamically change bitrate to manage congestion**" in order to reduce dropped frames. This option allows OBS to automatically adapt the bitrate regardless of the encoding settings you have set in the **Output** tab. While you are here consider checking the box for "**Enable network optimization**" as a way to further optimize OBS. You should also always use the "**Bind to IP**" option to make sure OBS is using your hard-wired ethernet connection instead of a WiFi connection.

Now that you have optimized your settings inside of OBS it's time to take a closer look at your sources. The best practice rule of thumb is to make sure all of your video sources match the resolution and frame rate of your project. But in some cases, you may not need the full 1920x1080p video from a camera if you are only using it in a picture-in-picture area of a specific scene. It goes without saying that you should remove any sources that are not necessary to your

production. If you do not need all your sources at full resolution, reducing their resolution and frame rate can make your production more efficient.

Other computer wide optimizations include closing programs that are running in the background and taking up precious processing power. If you must run additional programs while you are using OBS, you should increase the **Process Priority** option in OBS to **Above Normal** or **High**. In the **Advanced** settings section you can set process priority in OBS to take priority over other applications in use on your computer.

Another small detail for those who are using OBS on a laptop is to look into the Power Settings. Windows computers can be put into "**Performance Mode**" in the Power Settings which will significantly improve the performance. Another tip is to launch OBS in Administrator Mode to make sure OBS is gaining access to the privilege necessary to operate properly. It is possible to spread more ambitious OBS productions over the processing power of multiple computers using NDI. NDI will be covered in more detail later, but it's worth noting that multiple computers can be used together. Many video productions now use multiple computers to offload specific tasks such as screen capture or video gaming. The video can then be sent back to the main OBS production computer and therefore spread out the processing power necessary for the entire production.

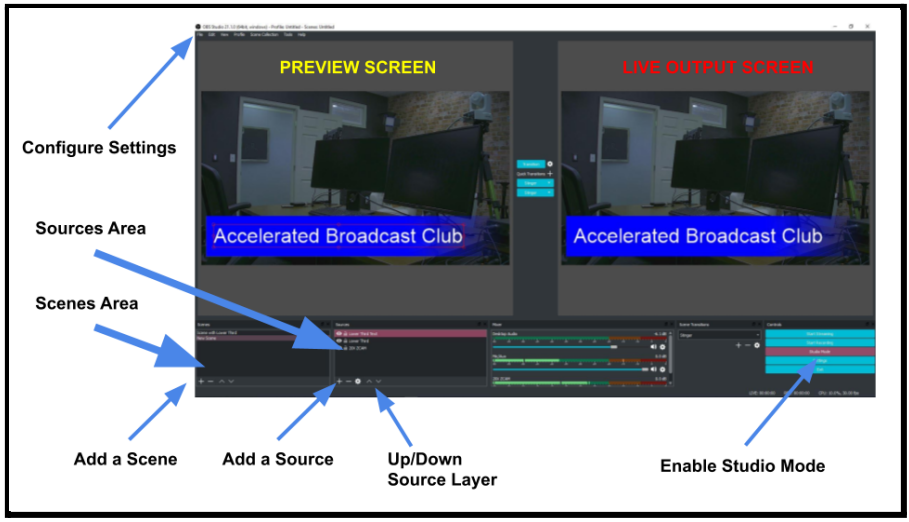
Key Takeaways:

1. OBS can scale to fit almost any production

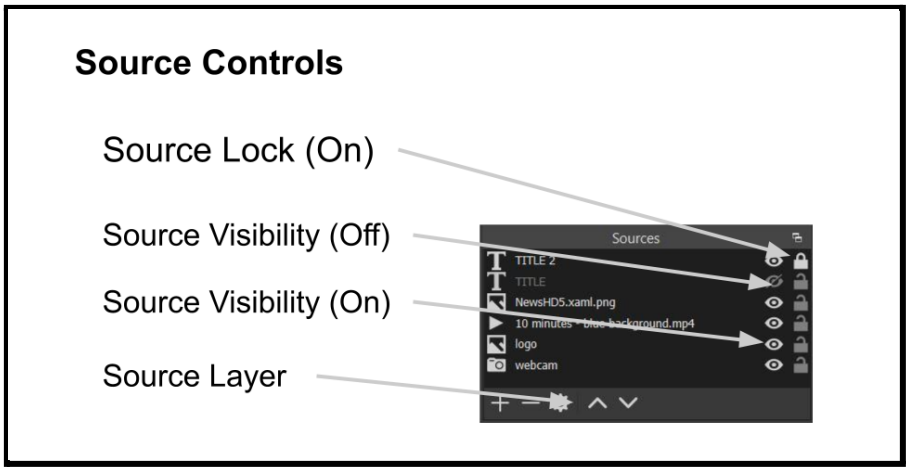
environment. The further you push the software, the most important it becomes to optimize your settings.
2. OBS will start to drop frames if your computer's hardware cannot handle the video processing you have set up.
3. OBS has advanced settings that can be used to optimize the software to fit your needs.
4. OBS features live statistics you can use to monitor your computer's resource usage.

4 CORE OBS FEATURES

In this chapter, you can learn about the core features of OBS every user should know about. OBS is full of powerful filters and audio visual enhancements that are available in the core software package without the need for plugins. Many OBS features are overlooked, because they are somewhat hidden in a busy interface or otherwise not explained to users. Other features, take a decent amount of know-how to make them useful or require a plugin to make them work smoother for some users. For example, the **Image Mask/Blend** filter can be used to turn a rectangular webcam video into a circle or another shape. Another example is the **Color Correction** filter, which can be used with a color checker card on camera to color match multiple cameras together.

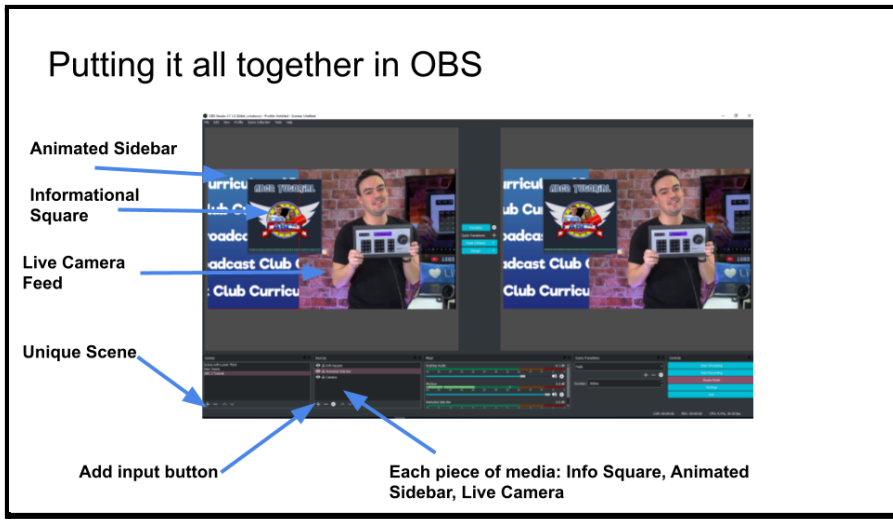


The OBS interface will include a Preview and Output screen side by side when in Studio Mode.



Source controls are found on the right side of the Sources area.

One commonly overlooked area of OBS is the source lock and visibility buttons. These two buttons can be used to toggle between on and off states for locking and viewing an individual source. The lock button is ideal for locking one source in place so that it cannot be accidentally moved. The visibility buttons can be used in a few interesting ways especially with the use of the Move Transitions plugin and Hotkeys. For example, you can set up a move transition animation to slide a source into the screen when the visibility button is clicked. You can also create an animation to remove the source when the visibility state is off. This allows you to animate portions of your OBS production based on visibility states. In an upcoming chapter, you will learn how to use this feature with a variety of remote control applications such as Touch Portal. Touch Portal will allow you to create custom buttons to toggle visibility states on and off which can include animations once you have the Move Transitions plugin setup.



More complicated scenes in OBS can benefit from animations and hotkey controls.

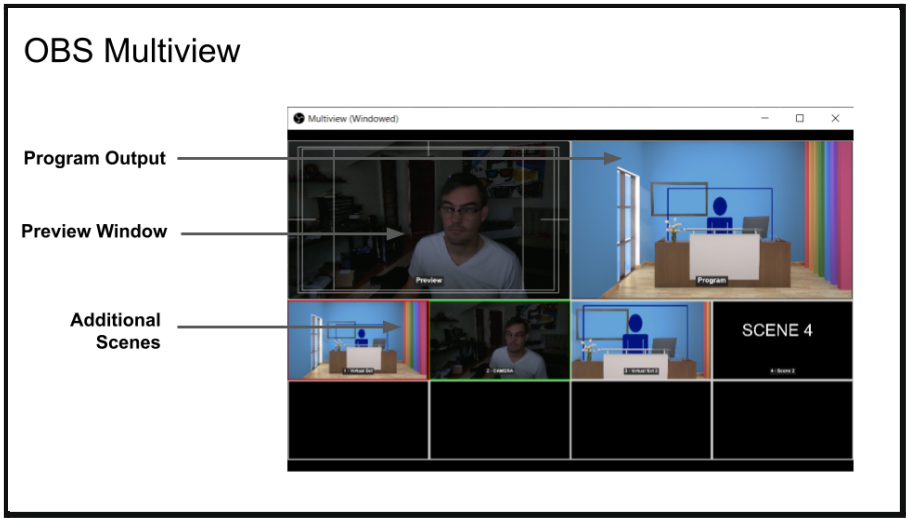
The example above, shows a scene with three layers. The bottom layer is a live video feed from a camera. The next layer is a sidebar video which is set to play on loop. The top layer is a PNG file that is used as an informational square displayed to support the content being discussed in the video. These informational squares can have animations that allow you to bring multiple images on and off screen easily by toggling the visibility status of each. You can manage the order of layers for each source by selecting a source and clicking the up and down arrows in the source management area.

Hotkeys are set up in the **Settings** area.

Hotkeys are a tool to quickly access functions inside of OBS like streaming or recording from your keyboard or other USB connected input devices. **Hotkeys** can be set up to do almost any function inside of OBS and each time that you create a scene or add a source, new **Hotkey** options are added. You can set up **Hotkeys** in the OBS **Settings** area. At the top of this section there is a search bar to quickly find the Scene or Source that you would like to control. For example, you can set up a specific key on your keyboard to switch to a specific scene. You can also set up **Hotkeys** to show or hide individual sources. You should consider using two keys to trigger a **Hotkey** in order to avoid accidentally triggering a **Hotkey**. For example, try using SHIFT + another key and putting the key sequence into the source name for easy reference.

By default, OBS allows you to start and stop many core functions with **Hotkeys** including recording and streaming. Plugins that you install may add additional hotkey options for you to use. For example, the Filters **Hotkey** plugin will allow you to toggle on and off the visibility

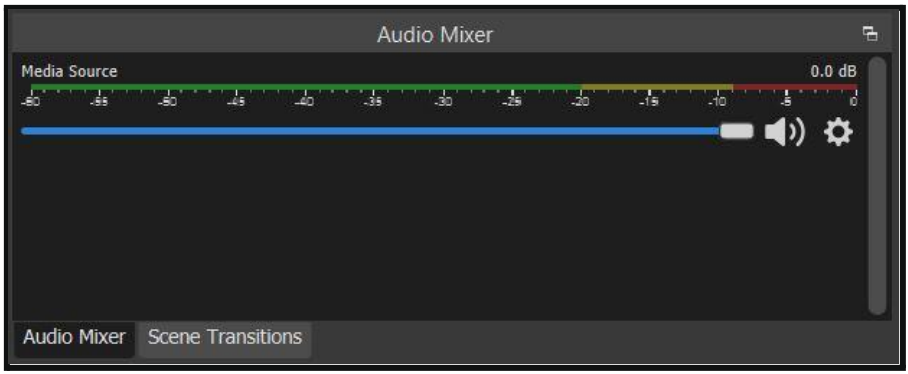
of filters. Another plugin that will be reviewed later on in the book allows you to use hotkeys to record the video of an individual source.



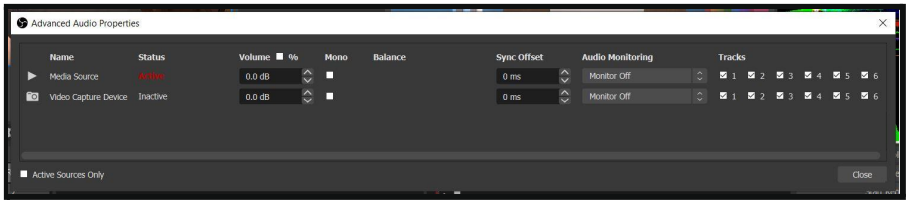
The Multiview shows scenes available in OBS up to eight.

Another tool advanced OBS users generally grow to love is called the **Multiview**. **Multiview** is available in the **View** tab and it can be used in full screen mode or as a resizable window. **Multiview** allows you to quickly view a mix of source and scenes on a secondary monitor or as a small window on any screen. By right-clicking anywhere on the Multiview you can choose to change the viewing perspective from full-screen to windowed or vice-versa. You can also choose to keep the Multiview "on-top" of all other windows.

There is a new plug-in called **Source Docks** which allows you to dock a preview of any source inside the OBS interface. By default the **Multiviewer** will show you your preview and output screens side by side followed by eight scenes for preview purposes.



The **Audio Mixer** is an area of OBS that every superuser should be familiar with. By right clicking on the **Audio Mixer** you can choose to change the layout from vertical to horizontal. You can also access the **Advanced Audio Properties** for each audio source you have inside of OBS. If you right click on a single audio source you have the ability to lock the volume, manage it's visibility in the mixer, rename the source and apply audio filters.

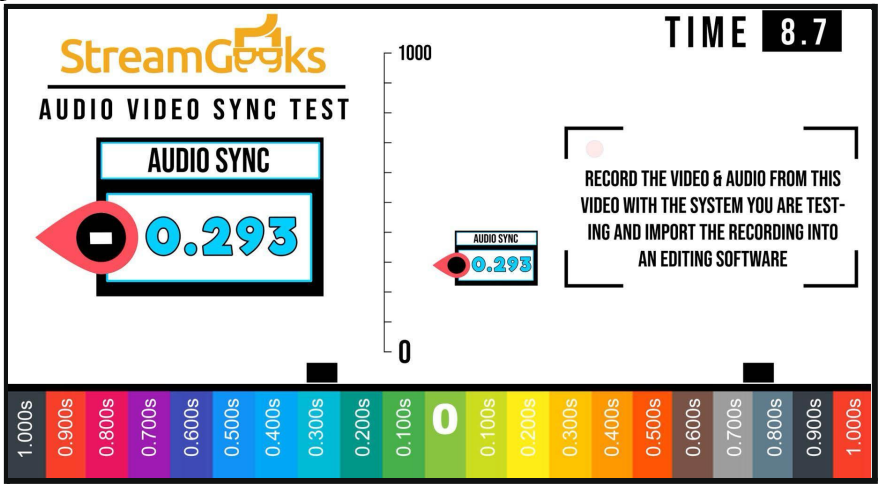


One common issue many OBS users has to do with audio synchronization. Many times audio is being processed by OBS faster than video sources which require more bandwidth and processing power. To fix this problem, you can simply add delay to the audio source using the "**Sync Offset**" option. The easy way to do this is to add delay in increments of 25ms. You can record videos of yourself talking and holding up your hand as you count to five.

In the online course, I have included a video sync tool that you can download properly syncing up audio and video sources inside OBS. This tool will help you figure out how much latency there is between your video and audio sources. With this tool you will be able to determine how much delay you need to add to your audio sources to make them sync perfectly with the video.

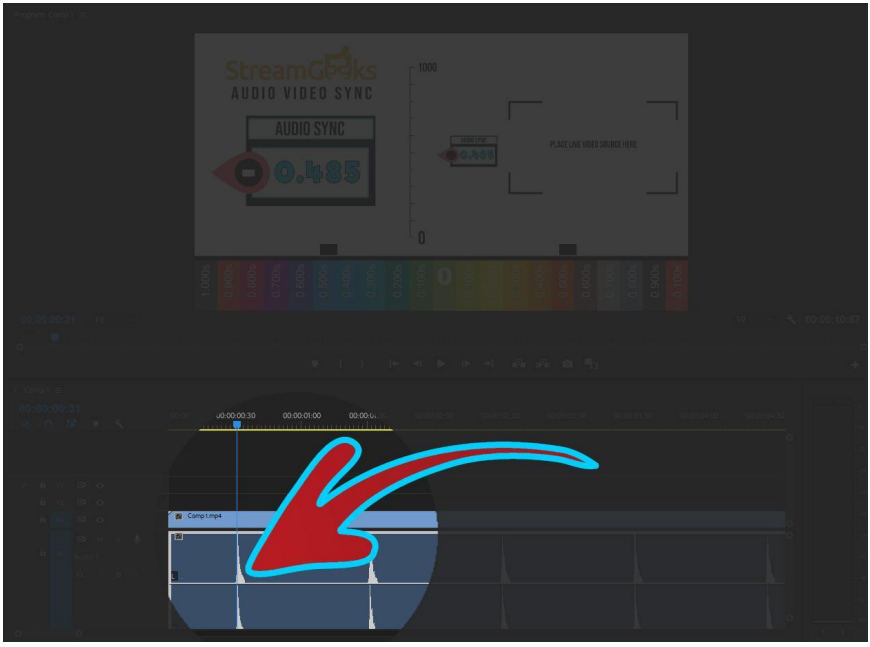
The tool is a video file which includes audio clicks used for measuring latency recorded via OBS. This is a video you can play on a laptop or screen in your space and record it through the camera and microphone you are testing in OBS. Simply point the camera you normally use for your recordings toward the screen where the video is playing and also place your microphone where it can pick up the sound coming from the video.

This audio/video syncing tool is broken up into three parts. The middle section has a vertical scale that measures milliseconds for accuracy. Beside it is a marker that moves from the top of the scale and falls to the zero mark every second. Every time the marker reaches the zero mark on the scale, the clicking sound happens. On the left of the scale, there is a bigger version of the marker that allows you to read the position of the marker on the scale.



The Audio Video Sync Test tool is a 10 second video that includes information you can use to sync audio and video in OBS.

At the bottom of the screen, there is a row of color-coded boxes that gives you an idea of how far your audio source is from zero. You can use this to visually gauge how much delay you need to add to your audio. Usually, audio is processed faster than video inside your computer. That is because audio demands fewer resources from your computer, and the system can process it faster than it does the video stream. As a result, there may be a mismatch in timing between audio and video. The video will play a clicking sound with every one second that passes, and your microphone should capture that sound. You can use the sound recorded in the test video to sync up your audio and video properly. After the recording has been saved, import the video into a video-editing software.



Inside your video-editing software, look at the audio track from your recording. You should notice several peaks in the sound. All those sound peaks occurred every one second in real time. You can use this information to match those peaks in the soundtrack with the video. The idea is to mark the difference between when the sound peaks occur and when the marker on your scale reaches zero on the video. If they do not match, then you must add delay.

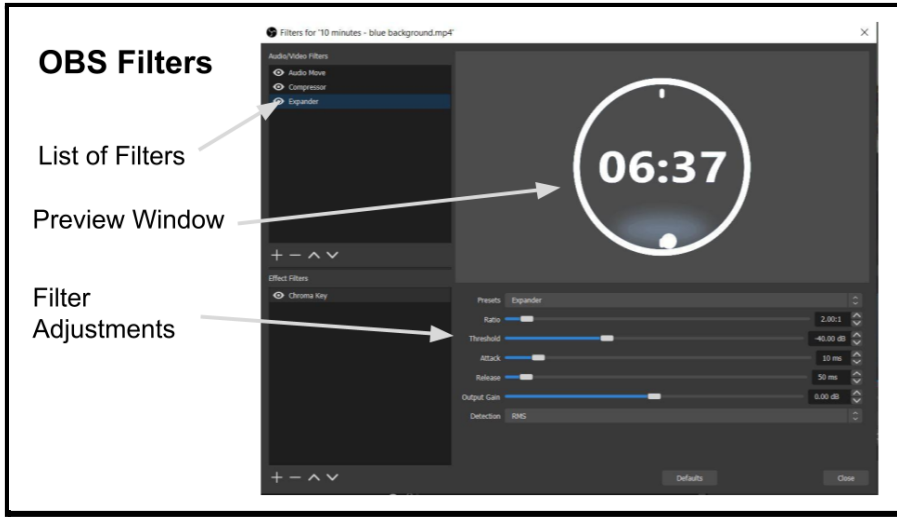
To add delay in OBS, go into your audio source, and navigate to "**Advanced Audio Properties**." Look for "**Sync Offset**" and based on what you see in the video editing software, enter a number to indicate the amount of latency you want in the audio. Oftentimes around 50-100 milliseconds of latency can be added to sync up audio and video sources.

Key Takeaways:

1. Filters can be applied to any source in order to enhance the video or audio in a variety of ways.
2. OBS sources can be locked to secure a complicated scene and avoid accidental movement.
3. OBS sources can have visibility toggled on and off. This can become a very useful tool when paired to animations and hotkeys.
4. Hotkeys allow you to quickly trigger a long list of functions available inside of OBS.

5 VIDEO FILTERS IN OBS

Video filters can be applied to any **Source** or **Scene** by right clicking on the title and selecting **Filters**. New **Filters** can be added to OBS when specific plugins are installed. Similar to **Sources**, **Filters** can have their visibility toggled on and off in the **Filters** management window. By default, OBS organizes **Filters** into **Audio/Video Filters** and **Effect Filters**. You can add a filter by selecting the "+" plus button, which will open the **Filter** and allow you to adjust the **Filter** settings. There is a plugin called **OBS Filter Hotkeys** that will allow you to toggle the visibility on and off for **Filters** using **Hotkeys** without having to open the Filters management window.



A Filter management window is available for each individual source and scene.

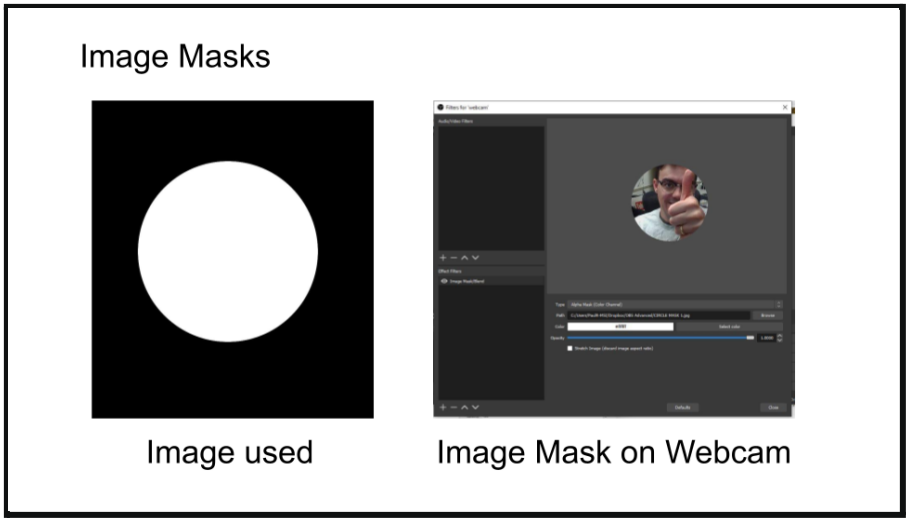
Here is a list of **Filters** available in OBS by default.

Scene and Source Filters

- Scene and Source Filters
    - **Image Mask/Blend** - This filter can be used to apply a mask to any source. The mask is uploaded to OBS in the form of a file which should only have two colors or a transparent background. You can then choose the color or mask/blend type.
    - **Crop** - This filter allows you to resize the input by removing the top/bottom/left/right sides.
    - **Color Correction** - This filter allows you to adjust the colors in your source. This filter is especially useful in combination with the OBS Color Monitor plugin.
    - **Scroll** - This filter will move your input (generally text) across the screen. You can choose between vertical and horizontal movements.
    - **Color Key & Chroma Key** - Color and Chroma Key filters are used to select a color in the source and make it transparent. Both have similar functions but work differently, so experimentation with each is necessary in most cases.
    - **LUT Filter** - LUT stands for Look Up Table. LUT filters can be applied to sources in order to apply a visual filter to the source.
    - **Sharpen** - This filter can be used to sharpen the source image.

The **Image Mask/Blend** feature is a great filter to use to add a new level of production quality to your videos. Anyone can set up a simple picture and picture setup with a webcam and screen capture. But those who take the time to set up a custom image mask for their webcam

overlays, really show they care about their production quality. An image mask can be added to any source and it will essentially use an image mask file to make all areas of the source transparent where the selected mask color is. For example, if you take an image of a black circle and select black for the image mask color, the filter will make the outside white areas transparent in the source.



Images work well in black and white when applied as an image/mask filter.

An interesting way to use Image Masks is on top of a video file. You can create a black and white image as your mask file to represent a graphical layout for your production. For example, you can draw out a lower third, a chat room area and perhaps a top-bar area. You can use this image mask file on a video source that has slow colorful movements. The image mask in this case will show the video playing in just the areas of your mask, which can be used as an animated layer in your production.

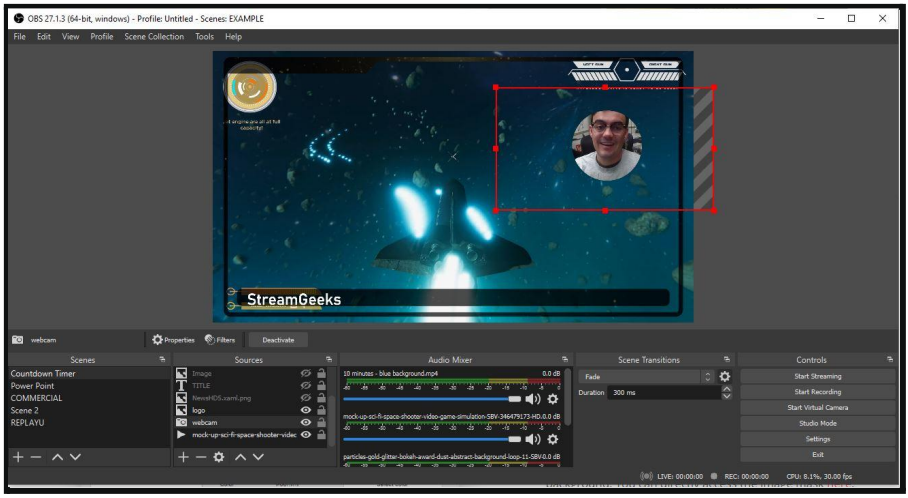
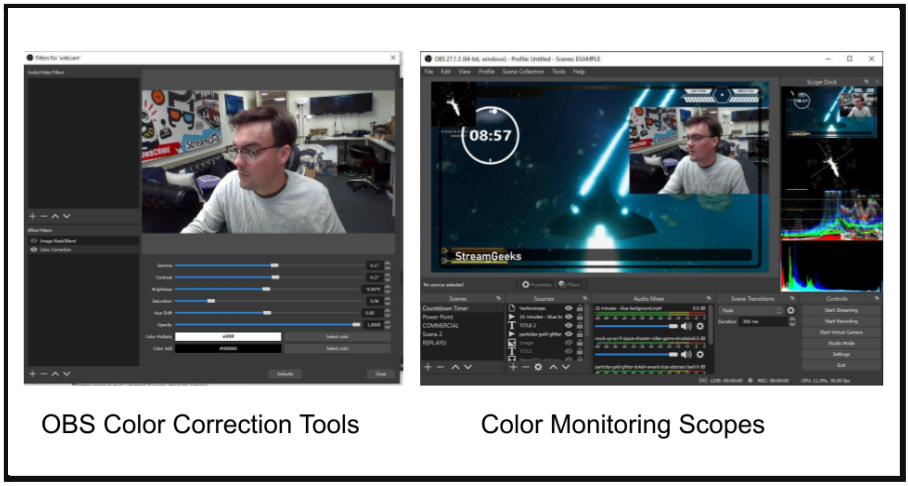


Image mask shown with circle webcam video.

Another popular way to use this feature is to change the shape of a webcam input. Try changing the shape of your webcam image and creating an animated background element together. In this way, you can create an animated outline around your webcam image. This is shown in the online course tutorial videos with this book.

The **Color Correction** filter is your main tool for color grading and color matching cameras and live video sources in OBS. When you are working with multiple cameras inside of OBS, sometimes you need to match the colors coming into OBS. It's always best to start with matching the actual on-camera settings. For example, you can make sure each camera is set to the same frame rate, shutter speed, and aperture. Once your cameras are coming into OBS with matching exposure and color balance settings, you can use the **OBS Color Monitor** plugin to make educated decisions about the camera's exposure. The **OBS Color Monitor plugin** will be reviewed in detail in an upcoming chapter, but in short this plugin will allow you to quickly see graphical information about the exposure and color of video sources. This will allow you to see if your cameras are over-exposed, or

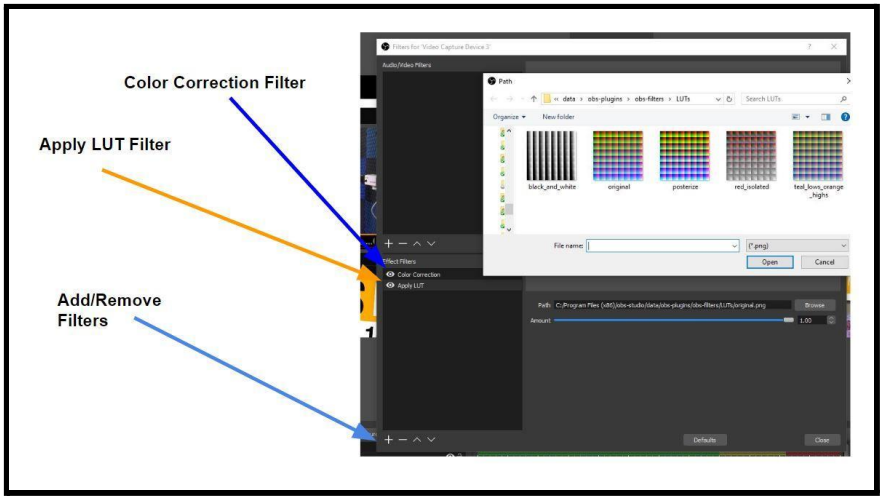
need color adjustments. You can then use the **Color Correction** filter to see how your adjustments are affecting your sources the way professional color grading is done in a production studio. Color grading is technical in nature but it's a learnable process that takes the guesswork out of color matching multiple cameras.



Color monitoring scopes can be added to the OBS interface as a side panel.

The **Color Correction** filter gives you access to Gamma, Contrast, Brightness, Saturation, Hue Shift and Opacity. The **Gamma** adjustment affects the gray scale in between full black and full white. When adjusting the **Color Correction** filter it is highly recommended that you use the **Color Monitor** plugin to see the effects you are having on your selected source. Using the **Color Monitor** plugin you can check out the **Waveform Monitor** in OBS to see how **Gamma** will affect your image. You will see the middle range of your image being lifted or lowered as you adjust the **Gamma** slider. You can use the **Contrast** adjustment to affect the gain used to bring full white and black range either closer together or further apart. Again using the **Waveform Monitor**, you will be able to see if you are crushing the blacks or

clipping the white parts of your image. **Brightness** is used to adjust the overall brightness of the image. **Saturation** adjusts the vibrancy of each color and **Hue Shift** will actually change all colors in the image. Using the **Vectorscope Monitor** you can see how **Saturation** and **Hue Shift** affect the color of your image. Finally, **Opacity** will adjust the transparency of the entire filter's effect on the image.



LUT files are stored on your computer and used by OBS to apply the filter.

LUT Filters are a popular tool used by video producers and social media managers. LUT stands for Look Up Table and they represent colors that can be applied to sources. You can find free LUT filters available for download on OBSProject.com. Once downloaded, in order to stay organized, you should put the LUT Filter files in the OBS program folder inside obs-plugins/obs-filters/LUTs. You can apply a LUT just like any filter and once open you can start by browsing for the LUT you would like to add. Most LUTs are named by the mood they are designed to portray. For example, you can apply a LUT for cinema, teal and orange, documentary style and others. Once you have selected

a LUT you have one adjustment bar that determines the amount the LUT will be applied to your source video.

Key Takeaways:

1. **Image Mask** filters can be used to hide areas of sources in OBS and create new unique production opportunities.
2. New filters can be added to OBS with the addition of plugins.
3. **LUT** filters can be used to change the color scheme or mood of your video sources.
4. The visibility status of **Filters** can be adjusted in the **Filters** management window. **Filter** visibility can be toggled on and off using **Hotkeys** with the **Filter Hotkeys** plugin.

6 AUDIO FILTERS IN OBS

Audio filters are designed to enhance audio inputs in OBS. When you are working with audio filters it's important to remember that audio device filters can be used in a chain. This is because the order in which you use each filter will affect the sound that you get in the end.

Here is a list of default OBS audio filters.

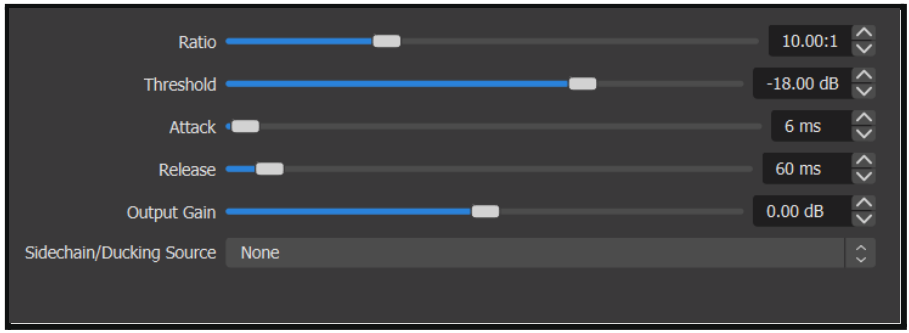
- Audio Device Filters
    - **Compressor** - The compressor can be used to make an audio source sound more full. Compressors allow you to limit audio peaking beyond 0dB by making loud noises quieter when they peak. The main compressor adjustment is called **Ratio** and the higher the ratio the more compression will be used to reduce the loudness of audio when peaking. The Compressor includes a **Threshold** setting you can use to set the audio level at which the compressor should start working. The **Attack** and **Release** settings allow you to adjust how quickly the compressor effect will ramp in and out when the **Threshold** is reached. An **Output Gain** can be used to increase the overall volume after the compression effect.
        - **Sidechain Compression** (aka Ducking) - Sidechain compression can be used to automatically adjust the volume of an audio source to make room in the audio mix for another audio source such as a microphone input. For example, you can apply a sidechain compressor to a background music track to

automatically reduce volume when you are speaking through a microphone.

- **Expander** - An expander can be used to remove unwanted background noise by setting a low level threshold for audio that you want removed. The expander works similar to a compressor but on low level noise. Therefore, the expander has similar features such as a Threshold, Attack and Release.
- **Gain** - Gain can be used to increase the volume of a source. If possible, the gain should be adjusted before it is captured into OBS to avoid unwanted noise.
- **Invert Polarity** - Only used to help with phase cancellation issues which is an audio phenomenon that reduces the audio's overall strength.
- **Limiter** - Limiters are a specialized type of compressor that are designed to be used at the end of an audio processing chain. Limiters are used to limit audio from peaking above 0dB.
- **Noise Gate** - The noise gate is a simplified version of the expander. You can set a level of noise on your audio input that you want to be automatically muted.
- **Noise Suppression** - This filter is effective at removing low level noise from computer fans and other electronic devices. When the filter is set to 0 it is off. You can adjust the noise suppression to remove background noise but keep in mind that the filter will affect the overall sound of the source as well.
- **VST Plugins** - Support for VST 1 and 2 plugins is available in the core installation of OBS.

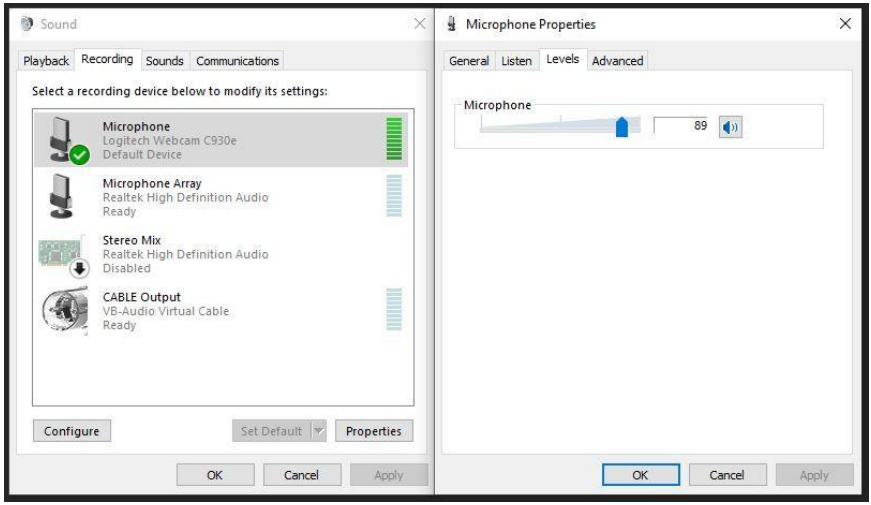
Most audio experts will recommend that you start with the following audio chain order.

1. Noise suppression
2. Gate
3. EQ
4. Compression



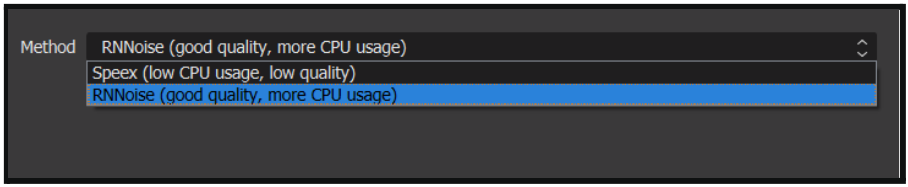
Default OBS compressor settings.

Before you start enhancing your audio with any chain of audio filters, you should always start by optimizing the gain of the audio system first. This can be done with any hardware audio mixer or directly in the operating system by using the Windows, Mac or Linux audio settings.



Default audio settings can generally be found in the operating system control panel.

When you are adjusting the incoming audio gain, speak loudly and watch the audio meter. You want to adjust the gain so that the loudest audio is a few levels below the max level. This will ensure that the audio coming into OBS is clean and undistorted.

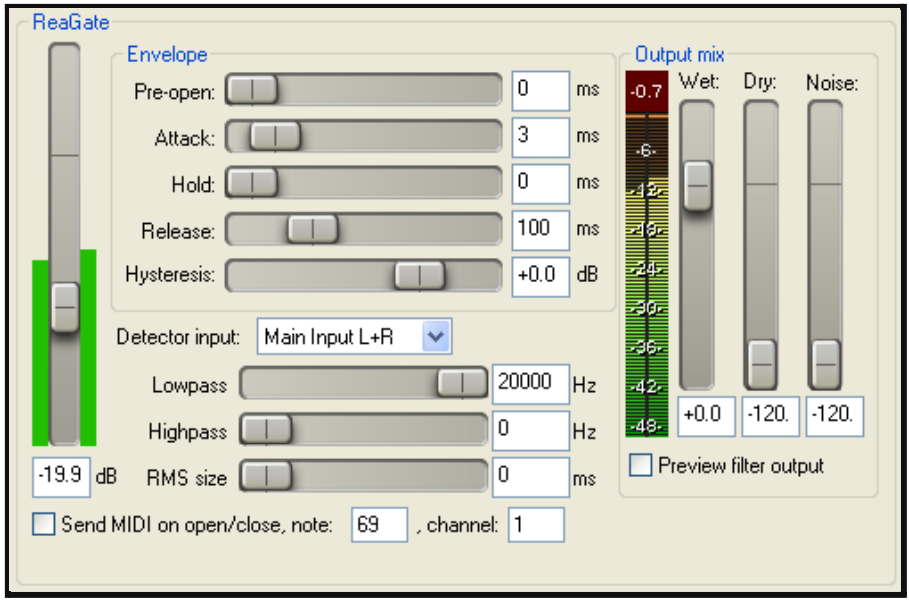


OBS offers two unique noise suppression options.

When you are adding audio filters, it's highly recommended to use headphones so that you can clearly hear the adjustments you are making. Start with a **Noise Suppression** or **Expander** to remove any unwanted noise from the background of your audio. You do not want to use too much noise suppression or you will distort the audio. Use just enough to remove any background hum or noise that may be coming into OBS. OBS offers two default noise suppression options which are Speex (low CPU usage, low quality) and RNNoise *good quality, more CPU usage).

Next you can add an **Audio Gate** to automatically mute the microphone when you are not speaking. A well configured audio gate is designed to naturally mute background audio in between breaths and sentences as you speak. A poorly designed audio gate may overreact to make your voice sound unnatural and choppy. The most important level to adjust is the **Gate** level. This is the level at which audio will be muted when you are not speaking. Here you are looking for a noticeable audio level that captures the sound of breathing but not so

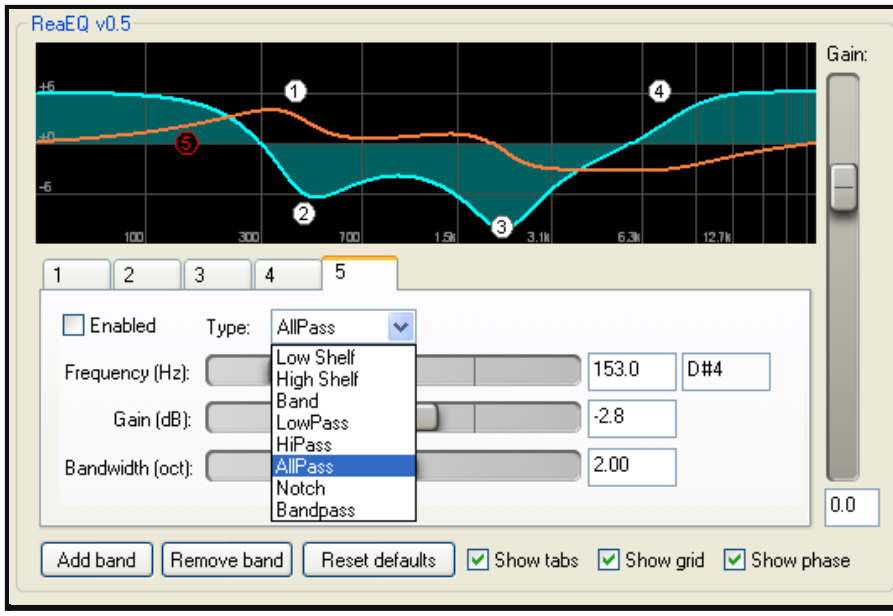
high that it would capture actual speech. It's recommended to use one of the free VST2 plugins for OBS from Reaper.fm for optimum performance. The ReaGate plugin can be installed on any Windows computer and added to OBS using the VST 2 plugin filter option.



ReaGate is a free VST 2 plugin available for use with OBS.

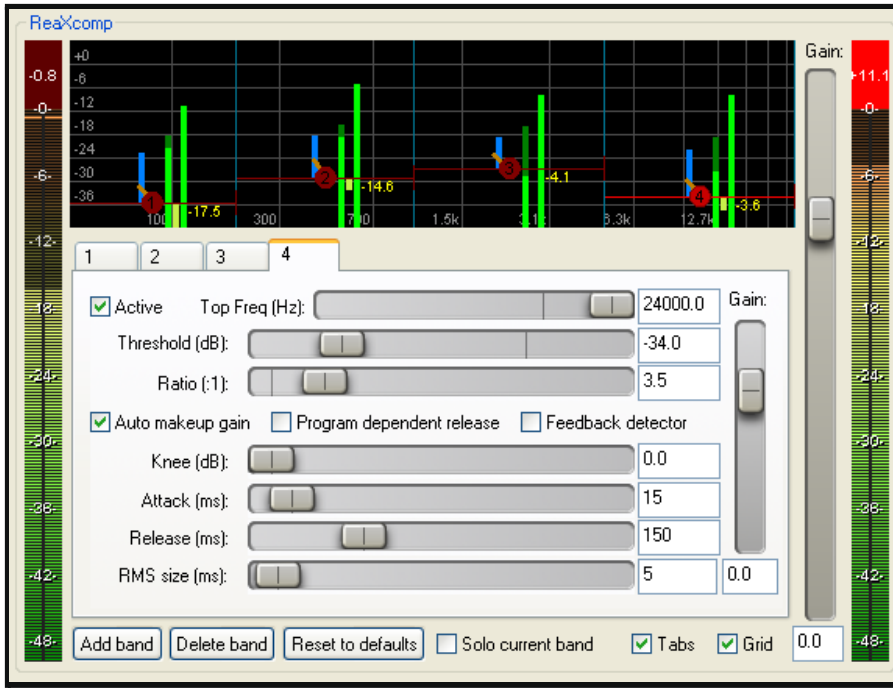
There are a few tricks you can apply to a **Noise Gate** to make it sound more natural. If you have a deep voice you can use a **High Pass Filter** around 80 Hz to make the audio gate sound more natural. If you are using the default OBS **Noise Gate** there is no option for using a high pass filter. If you find the noise gate makes your voice sound unnatural you will want to adjust the **Attack** and **Release** settings to tune how quickly the filter affects your voice. It's a good idea to record a few tests as you adjust the noise gate. Try listening with your headphones and focus on the beginning and ending of words to make sure the gate is not turning on or off too quickly.

Next, you can work on an **EQ**. An **EQ** can make a voice or other audio source easier to hear and understandable for listeners. Unfortunately, there is no default **EQ** for OBS and you will need to use a **VST 2** plugin to gain this functionality. Using an **EQ** takes some getting used to but you can apply some best practices to get started. If you are creating an **EQ** for the human voice, you can use basic high-pass and low-pass filters to remove unwanted noise and enhance the vocals. Male voices and female voices differ in the frequencies they generally exhibit. Male voices range from 80 to 500 Hz. Female voices range from 175 to 1180 Hz. Most EQ interfaces will show a graphical display that starts at 20 Hz and goes up to 20 kHz. Since the human voice generally starts at 80 Hz, there is no reason to include audio from frequencies below this area. Between 80 and 120 Hz is the lower bass sound of the voice and it is very important for intelligibility. In between 200 and 300 Hz is the boom of a voice which gives it its fullness. Between 300 – 1000 Hz you will hear the reflections of the room. Finally, between two and three kHz you can usually add clarity to your voice. Regular telephone calls generally max out at 3 kHz. Between five and 15 kHz is what is called sibilance which provides minimal nuances in the human voice. Anything above 15 kHz is not needed for most audio capture systems. In fact, you can trim out some unwanted high-pitched sounds by removing these higher frequency EQ bands.



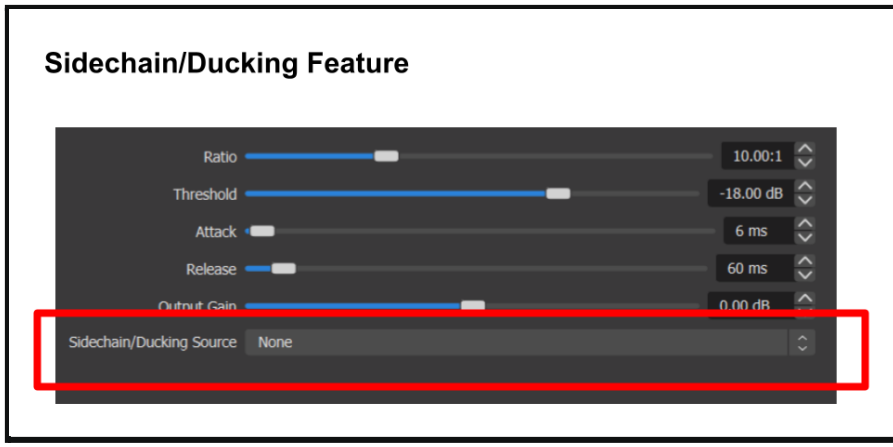
ReaEQ is a plugin available from Reaper.fm.

The final stage for most audio chains is the **Compressor**. OBS does offer a built-in compressor you can use with any audio source. The compressor will help "level out" your audio throughout an entire period of time when you may speak louder or softer at various times. The main compressor adjustment you want to start with is the **Ratio**. The **Ratio** adjusts the entire compression that is added to your audio. Adjusting the **Ratio** is easy to listen for, because the effect makes your voice sound more and more like a radio host. Once you have the ratio you like, you will need to set the **Threshold**. The **Threshold** is the level at which your compression ratio will start to kick in. To set the **Threshold** speak loudly and determine where you would like the compressor to limit your audio from peaking at the top end of your loudest moments.



ReaXcomp is a free VST plugin from Reaper.fm.

The default OBS **Compressor** offers a very interesting feature called **Sidechain/Ducking**. Once you have configured a professional audio chain, you may want to apply the **Sidechain/Ducking** feature to other audio sources you have in your audio mix. **Sidechain/Ducking** will take the audio levels from your microphone and automatically lower the audio from other sources when it is active. This is a great way to automatically mix together your audio sources when you want the audience to be able to better hear your voice over other audio sources playing the background.



The Sidechain/Ducking feature is found in the Compressor filter settings.

You can apply a **Sidechain** to any audio source with the **Compressor** filter. The **Sidechain/Ducking** dropdown menu is the last option in the default OBS **Compressor** filter. This is where you can select the audio source you would like OBS to use to effectively reduce the audio with. When you create this filter, name it specifically for "Sidechain/Ducking" so that you can remember the purpose of this filter is different from a normal compressor because it takes it's direction from the selected **Sidechain** audio source. When you create this filter, you will be able to adjust how much the audio "Ducks" when your selected microphone is active. Therefore, you can set the Threshold, Attack, and Release just like a regular compressor.

Key Takeaways:

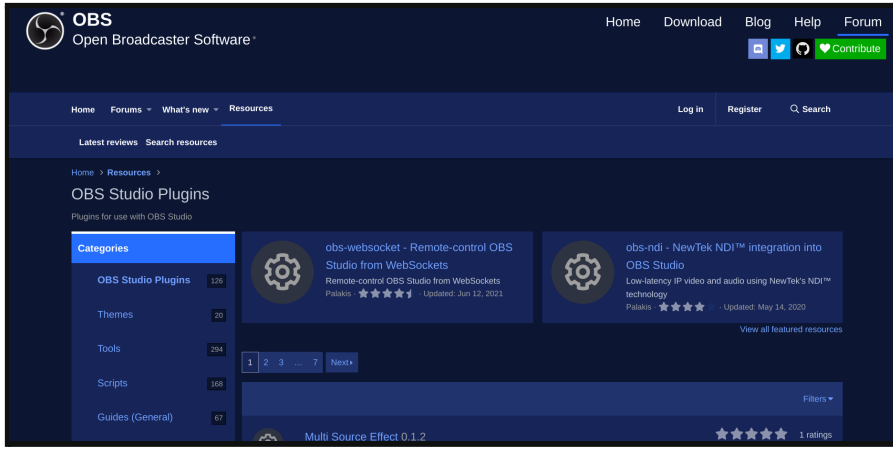
1. Audio is always one of the most important portions of a video production.
2. OBS offers default audio filters that can be used to enhance your audio production

3. OBS also supports VST plugins which provide additional enhanced audio adjustment capabilities with higher quality graphical interfaces.

7 PLUGIN TO THE PLUGINS

The core OBS Studio application features a robust API that developers use to create plugins to extend the functionality of OBS. Plugins can be found to do everything from instant replay to automatic scene switching making OBS as powerful as many paid video production software suites. Plugins for OBS can be found in the resources section of the OBS Forum page (https://obsproject.com/forum/resources/). In order to download a plug-in you will generally be directed to GitHub because all OBS plugins must be open source. Github is a social source code sharing website that allows software developers to interact and share their work. By default, OBS plugins on the website are sorted by their last update. You may find it more useful to filter the 120+ OBS Studio plugins by "**most downloaded**" or "**best rated**" to find the most reliable and useful plugins.

Pro Tip: All the plugins in this book are outlined on GitHub with download links at https://github.com/streamgeeks .



OBS Plugins can be sorted with Filters in the Forums page.

After sorting through dozens of OBS Studio plugins, the following list has been compiled of the top plugins for OBS. Each plugin in this list will be reviewed in greater detail in an upcoming chapter.

- **Plugins for Production**
  - **Multiple RTMP Output** - This plugin allows you to stream to multiple CDNs at the same time via RTMP. This is popular for live streaming to YouTube and Facebook at the same time for example but does require extra upload bandwidth to work properly.
  - **Advanced Scene Switching** - This plugin is designed to automatically switch between OBS scenes based on a variety of triggers such as audio, media, and Hotkeys. It can be used to switch to a specific camera for example, when a microphone becomes active.
  - **Source Docks** - This plugin allows you to dock any source inside the OBS interface. This is a great way to quickly view and control media inside of the OBS interface.
  - **Source Record** - This plugin creates a filter you can use to record a specific source independently from the main video recording.
  - **Replay Source** - This plugin allows you to create live instant replays using OBS. It allows you to apply a filter to any given source which will record the video for instant playback in your computer memory. This plugin offers the ability to use hotkeys and play video back in slow motion. This is a great plug-in for sports productions.

    - **NewTek NDI® Integration** - This plugin allows you to connect OBS to NDI® video sources in a couple different ways. First you can bring NDI® video sources on your network into OBS by adding NDI® as a source. Additionally you can output video from your OBS production as an NDI® source on your network. And finally, you can add an NDI® output filter on any source. This allows you to output individual sources as NDI® outputs on your network.
- **Plugins for Audio**
    - **Audio Monitor** - This plugin allows you to use a filter to route audio to any virtual or physical audio output available on your computer. This is often used to send an audio output from OBS to software such as Zoom using a virtual audio cable.
    - **Virtual Audio Cables** - While these are not officially a plugin, they will enable you to use OBS in new and powerful ways. Virtual Audio Cables are technically audio drivers which can be used to route audio on your computer using OBS.
- **Plugins for Control**
    - **Websockets** - The OBS Websockets plugin creates an API you can use to remotely control OBS. There are many plugins available that use this API.
    - **Filter Hotkeys** - This plugin allows you to use Hotkeys to turn Filters on and off. This is ideal

for toggling effects on and off during a production.

- **PTZ Controls** - PTZ camera controls are available to operate PTZ cameras from the OBS interface. This is ideal if you have PTZ cameras that you are working with inside of OBS.

- **Plugins for Graphics**
  - **Animated Lower Thirds** - This plugin allows you to control animated lower thirds with a dockable controller. The dockable controller is well designed for managing lower third content and the animations used.
  - **Move Transitions** - This plugin allows you to control transitions for individual sources as they move with scene transitions. Therefore, individual sources can move in and out of scenes with custom effects as you switch between scenes.
  - **Closed Captions** - While this is not technically a plug-in, Web-Captioner is one of the best tools for closed captions. Web-Captioner takes an audio output from OBS and creates an HTML web-page that can be brought back into OBS with the closed captions.
  - **Background Removal** - This plugin uses an advanced neural network to remove the background of images and video sources. This allows you to apply an audio/video filter to any image or video and replace the background with something else. This is popular for green screen applications used to create virtual sets or blurred backgrounds.

- **OBS Color Monitor** - This plugin adds crucial tools for color grading which include a Vectorscope, a Waveform and a Histogram. These tools allow you to properly color balance live video sources. A Vectorscope is a visual representation of color in a live video source. A Waveform Monitor is considered the counterpart to the Vectorscope and it handles exposure and brightness. The Histogram displays red, green and blue colors for the select source on a graph.

Each of these plugins will help you gain new capabilities inside of OBS. The process of installing a plugin into OBS is very straightforward. All you need to do is copy and paste the plug-in files that you download directly into the plugins folder for OBS on your computer. The OBS plugin folders can be found in the locations below.

Windows:

32-bit plugins folder = C:\Program Files (x86)\OBS\plugins
64-bit plugins folder = C:\Program Files\OBS\plugins

Mac:

Applications/OBS.app/Contents/Plugins

Here are the steps you can follow to install any OBS plugin.

1. Download the plugin files from GitHub
2. Unzip the files on to your computer
3. Copy and paste them into the OBS plugins folder

4. Launch the OBS application

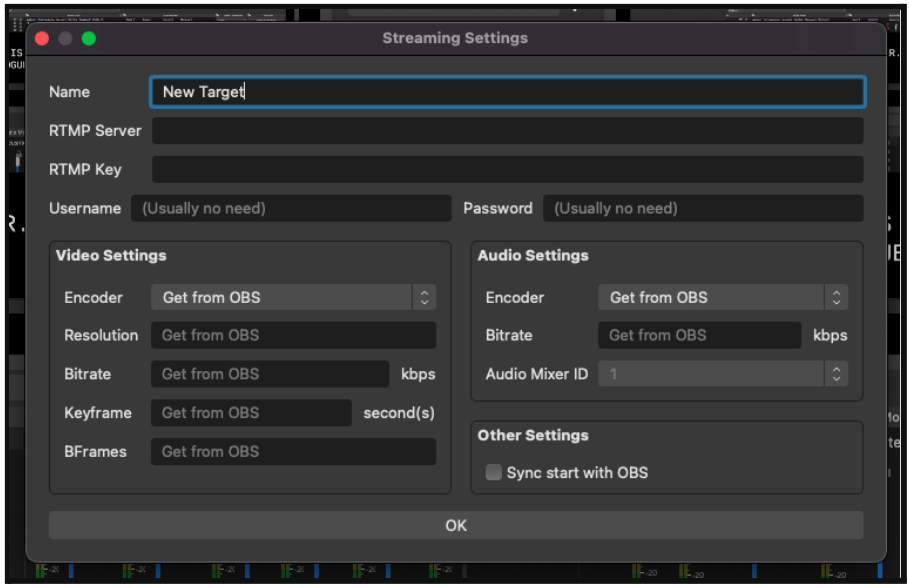
Once you have completed the steps above, the plugin you have installed should become available inside of OBS. It's really that simple. Some plugins make installation even simpler with an installation wizard that handles this process for you. The following chapters will outline each plug-in on the list and the capabilities they add to OBS. You can pick and choose which plugins will add value to your production and watch the online tutorial videos available in the Udemy course with this book to see how they work. In some cases, plugins can be used together to create new functionality the developers didn't intentionally plan out. So enjoy each plug-in overview and keep an open mind to the abilities each adds while you think about the overall functionality of OBS.

Key Takeaways:

1. Hundreds of developers have created plugins for OBS that extend the functionality of the software.
2. OBS plugins are easy to install manually and some developers even include auto-installation wizards to make the process easier.
3. All OBS plugins are open source and can therefore be customized to fit your needs.
4. This book includes reviews for a long list of reliable plugins that can significantly increase the capabilities of OBS for your video productions.

8 MULTIPLE RTMP STREAMING DESTINATIONS

As content creators seek to grow their audiences and reach new people, many want to begin streaming to multiple platforms. For example, streamers with channels on YouTube may want to expand their audience to Facebook. Gamers streaming to Twitch may also like the stream to be available on YouTube. In the past, OBS users were limited to streaming to one platform. To send streams to multiple places, many users had to change to different production software or use a third-party service to restream the OBS output to multiple platforms. While re-streaming with cloud-based streaming providers is a great way to reduce computer processing and upload bandwidth requirements, many OBS users have computers and internet speeds that can handle streaming to multiple destinations simultaneously. The Multiple RTMP streaming plugin makes it possible to stream to as many destinations as your computer and internet connection can handle.



Multiple RTMP Output is easily configured using standard RTMP server and key information.

Installing Multiple RTMP Output

The Multiple RTMP Output plug-in is available for Mac and PC and can be downloaded from the OBS website https://obsproject.com/forum/resources/multiple-rtmp-outputs-plugin.964/. Self installation wizards are available for the Mac and Windows versions. This is the best route for most users. If you would like to install the plug-in manually, extract the .zip file and place the plug-in files in the correct folder on your computer. When you are done, restart OBS.

Using Multiple RTMP Output

If the plug-in is installed correctly, you should see it as a floating panel in the upper left corner. This is a dockable panel, so you can move it around and place it anywhere in the OBS user interface.

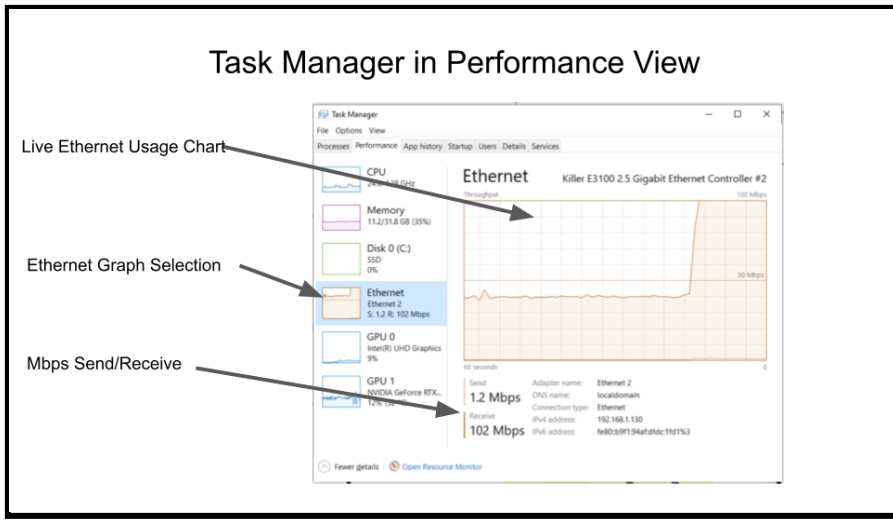
1. If it is not already configured, set up your primary stream as usual. You can access the primary stream configuration in the **Settings** menu in the **Stream** tab and more advanced options in the **Output** tab.
2. Go to the Multiple RTMP Output Panel and click **Add New Target**.
3. Manually enter the RTMP Server and RTMP Key
4. Under **Video Settings**, it is recommended that you leave all settings as "Get from OBS." This will enable Multiple RTMP Output to use the main OBS output and stream it to the additional server. There may be occasions when you want to use a separate encoder and settings, but know that it will significantly increase the demand on your computer's CPU. See more below under Bandwidth and CPU Concerns.
5. Under **Audio Settings**, it is again recommended that you use the "Get from OBS" option. But, again, you do have the option to use a separate audio source. This could be ideal for sending out a stream in another language for example.
6. Under **Other Settings**, click **Sync start with OBS** if you want the second stream to start automatically with your primary stream.
7. Repeat this process to add any additional RTMP outputs.

Bandwidth and CPU Concerns

Before sharing your first stream to multiple platforms, you will want to pay attention to the use of bandwidth and your computer's CPU. First of all, even though Multiple RTMP Output can use the primary output of OBS, it will still be using up additional bandwidth in order to stream to multiple platforms. Therefore, adding just one additional target will nearly double the bandwidth used. This is an especially important consideration if you have limited upstream bandwidth.

Try running a bandwidth test to get an idea of your available upload and download speeds. You can do this quickly by Googling "speed test" and following the instructions from Google. As a general rule, your upload bandwidth should be roughly double your total bitrate for all your streams. So, if you have an upload bandwidth of 10 Mbps, you would not want to send more than 5 Mbps. For example, if your primary stream is 2500 Kbps, a second stream would double that, giving you 5000 Kbps which is equal to 5Mbps.

Adding another target could take your bandwidth use past the guideline of half your available upload bandwidth. While it is possible to get away with using more than half the upstream bandwidth, you will want to do extensive testing to be sure there aren't any problems. You can monitor your bandwidth usage using your computer's monitoring application such as Task Manager on Windows.



Task Manager appears in the Performance view with Ethernet selected.

As covered in the setup instructions, it is recommended that you set the video settings of your secondary sources to "Get from OBS." This takes advantage of Multiple RTMP Output's ability to share the encoding work with the primary OBS output. If you do opt to encode a second stream separately, know that this will significantly impact your CPU. Adding a third source will add even more to your computer's load. Whatever settings you choose, just be sure that your PC or Mac can handle the extra work without dropping frames or crashing. This is where you can monitor your computer's performance while streaming using the OBS Stats.

How Multiple RTMP Output is Being Used

Houses of Worship

Many houses of worship are using live streaming to reach a larger audience. Some may have started streaming on YouTube and now want to expand to Facebook live or vice versa. Houses of worship often run on minimal technology budgets, so purchasing new software or using a third-party service might be out of the question. Now they can use Multiple RTMP Output right inside OBS.

Gaming
Gamers are using Multiple RTMP Output to stream their gameplay and commentary to multiple gaming and social media sites. Gamers with the proper hardware can even take advantage of the option to use multiple encoders. This way, they can send videos with different bitrates and resolutions to match the streaming platform.

Pros and Cons

Pros: It's Free and easy to setup. It can eliminate the need for a third-party restreaming services. It does not require excessive CPU power when correctly configured.
Cons: It can push the limits of upstream bandwidth when sending multiple streams. It can be highly demanding on CPU when using separate encoders for each stream.

Alternatives to Multiple RTMP Output
Currently, the only other options for streaming to multiple servers from OBS are third-party services like Castr or Restream.

Key Takeaways

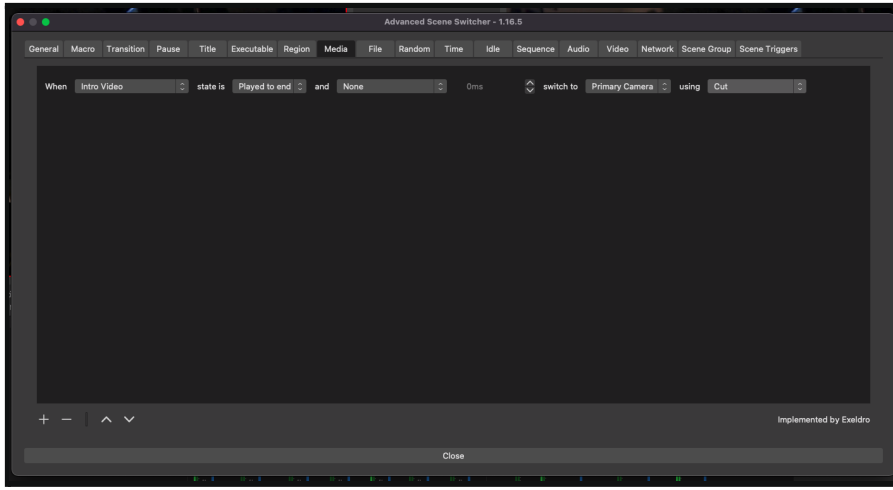
1. Before this plug-in, OBS users have had to rely on third-party services to capture their stream and restream it to other sites.
2. Now users can stream to multiple live streaming servers without ever leaving OBS.

9 ADVANCED SCENE SWITCHER PLUGIN

Many OBS users handle all the aspects of video production by themselves. In these cases, there is no dedicated producer or engineer. Instead, the streaming host is also the producer, director, camera operator, and technical director. Thanks to the flexibility and customization possibilities of OBS Studio, the software works great for solo operators who learn how to use Hotkeys and controllers such as the Elgato StreamDeck. However, it still doesn't hurt to have some help keeping everything running. **Advanced Scene Switcher** adds switching automation to OBS with a powerful plug-in that features a bunch of options to help producers automate scene switching.

Installing Advanced Scene Switcher

You can install Advanced Scene Switcher in the same manner as most other OBS plug-ins. It is available for download on the OBS website https://obsproject.com/forum/resources/advanced-scene-switcher.395/ For this plug-in, you will download one .zip file. When you extract it, you will see the auto-installers and files for Mac, PC, and Linux. Use of the auto-installer is recommended unless you have experience adding plug-ins manually.



Advanced Scene Switcher opens into a management window.

Using Advanced Scene Switcher

After installation is complete, relaunch OBS. You can access Advanced Scene Switcher in the **Tools** menu. The Advanced Scene Switcher dialog box can be a bit overwhelming at first. Fortunately, you won't likely need more than a couple of those tabs. However, a look through them will introduce you to the possibilities of Advanced Scene Switcher.

In the **General** tab, you will find some of the global settings you may need to revisit once you get some automations set up. One thing to note here is the **Status** section, where you can choose to automatically start the switcher when you start recording, streaming, or both. There is also an option to start the switcher on startup if it was running previously.

The rest of the tabs cover all the possible ways to use Advanced Scene Switcher. As you review the options available on each tab, notice that they all work on the same basic concepts – **triggers** and **actions**. Setting up automated scene switching is about assigning the trigger and action each will initiate.

- **Scene Triggers** - This allows you to trigger actions based on scene changes. For example: When Camera 1 is active, start recording after 2 seconds.
- **Video** - Video can monitor a video source and trigger an action when the source matches a predetermined video file. That action switches to the scene you pre-select. The trigger can also be set to engage when the source does not match or if it has changed.
- **Audio** - Monitors any audio source and triggers an action when the levels go above a certain threshold (or below a threshold) for a set amount of time, it will trigger a scene switch the scene you choose. This can be used to switch camera views when specific microphones become active.

- **Sequence** - Automatically switches to a scene when another scene becomes active.
- **Idle** - Switches to a preset scene if there are no keyboard or mouse inputs for a set time.
- **Time** - Can trigger a scene change based on the day and time.
- **File** - Triggers a scene based on the contents of a file. You can also write the name of the current scene to a file and use the contents of that same file to select the next scene.
- **Media** - Automatically switches scenes based on the current state of a media source. For example, when a media source ends, switch to a title slide.
- **Region** - Can automatically trigger a scene based on the cursor's position.

These are just some of the commonly used available trigger options. Next, you can set up an example trigger and action. For this example, try switching to the scene for your camera immediately after a video finishes playback.

Example Use:

1. In OBS, go to **Tools**, **Advanced Scene Switcher**.
2. Select the **Media** tab.
3. Click the **+** in the lower-left corner.
4. Moving from left to right, choose your media source.
5. After **"state is,"** choose **"Played to end"** from the dropdown menu.
6. Leave the next two boxes as is and then choose Camera 1 as the scene to switch to.

If you would like to try your first automated transition, go to the **General** tab of Advanced Scene Switcher and check to see that it is active. If not, just click the **Start button.**

How Advanced Scene Switcher is Being Used

Gaming

Gamers have enough to pay attention to without manually switching scenes. With Advanced Scene Switcher, gamers can automate nearly every transition in their stream while keeping their hands free.

Video Podcasts
Advanced Scene Switcher can keep shows moving along with automation. Producers can have countdown timers trigger intro videos which can then switch to a camera and microphone.

Houses of Worship
The Advanced Scene Switcher is very popular with houses of worship. Since they often rely on volunteers and can sometimes be shorthanded, this type of automation really helps.

Sporting Events
The fast pace of sporting events, plus the use of pre-recorded videos, graphics, and transitions, make Advanced Scene Switcher popular with sporting event streamers. It will be especially beneficial for those covering school and local sports where you don't have an entire production crew. Automating some of the switching duties can let broadcasters focus on the game.

Pros and Cons
Pros: It's free. It offers powerful automation.
Cons: The interface can be intimidating at first.

Alternatives to Advanced Scene Switcher
Advanced Scene Switcher appears to be the only plug-in currently available for automating scene switching in OBS.

Key Takeaways

1. If you want to automate some of the switching work in OBS, Advanced Scene Switcher is a great option.
2. Don't be overwhelmed by the many options, just choose what you will benefit from.

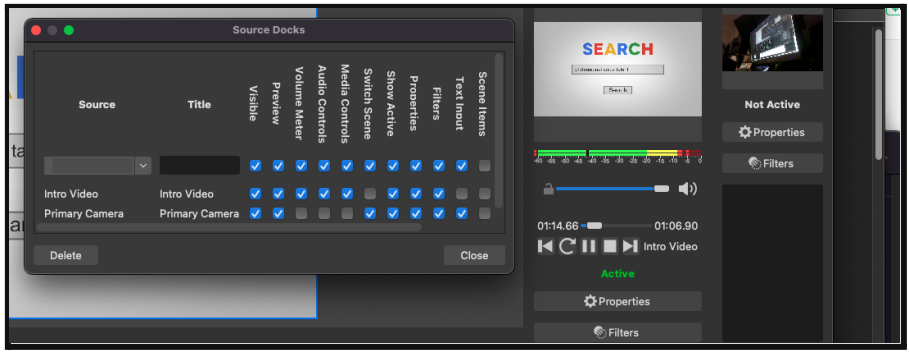
3. You may only need one or two automations to make significant improvements in your workflow.
4. You can always add more as you learn the plug-in and consider other places where automation can help.

10 SOURCE DOCK PLUGIN

OBS offers a flexible interface that allows users to customize the layout. One thing that couldn't be added as a dockable panel with the ability to preview sources. The Source Dock plug-in for OBS Studio allows users to create a dockable window inside the interface for any source. In addition, each panel can be customized to provide audio level meters, volume adjustments, and media controls you can access on the fly.

Installing Source Dock

Source Dock can be downloaded from the OBS website. https://obsproject.com/forum/resources/source-dock.1317/. Download the version for your system (PC, Mac, and Linux). Installation wizards are available for the Mac and Windows versions. This is the best route for most users. Otherwise, extract the .zip file and place the plug-in files in the correct folder on your computer. When you are done, restart OBS.



Source dock includes additional controls for the sources you are monitoring.

Using Source Dock

To create a dockable panel from any source in OBS, go to **Tools** and select **Source Dock.** In the dialog box, select the source you wish to dock. Be sure the **Visible** box is checked.

Check or uncheck boxes below the various features that you want to appear in the dock. These can be adjusted later.

- **Preview** – This will show a thumbnail of any video source.
- **Volume Meter** – This will enable the audio level meters for the source.
- **Audio Controls** –This will allow you to adjust the levels of the sources from within the Source Dock window.
- **Switch Scene** –This will enable the source to be sent to the program output when clicked on in the panel.
- **Show Active** – This will display **Active** in green when the source is active.
- **Properties** - This adds a button to access the properties of the source
- **Filters** - This adds one-button access to filters assigned to the source.
- **Text Input** – This displays a text area for notes. This could be used to display the Hotkey combination used to display the sources or other information.
- **Scene Items** – This displays scene layers and enables toggling of each item.

Next, click **Add**. The panel will appear. Click and drag it like any other panel. From there, you can adjust and rearrange the panel's location. While Source Dock can be used with any input type, it is especially useful with live web pages and media sources.

Using Source Dock with a Web Page

Add a **Browser Source** to any scene in OBS. You can use any website you like for the URL. Once the input is created, go to **Tools** and select **Source Dock**. Add the browser source and be sure the **Visible** and **Preview** boxes are checked. Click **Add** and then click and drag to drop the panel to your preferred location. Now notice that if you click into the preview window in the panel, you can use your mouse to interact with the live website. You can scroll and click when the source is live or when it is inactive. This is ideal for getting up to date website information ready for display.

Using Source Dock with a Media Source
Add a **Media Source** to any scene. Be sure that the **Local File** is checked. Click **Browse** to locate a video file on your computer. If it is a short video, you may want to check the box next to **Loop**. Click **OK.** Now once again, go to **Tools**, **Source Dock**. Choose the media source you just created. Be sure the **Visible**, **Preview**, **Volume Meter**, **Audio Controls**, and **Media Controls** are checked and click **Add**. Drag and drop the panel to your preferred location. Now you will see that you have complete control of the media source. You can start, stop, or replay the media. You can also see the audio levels and adjust them via a slider.

Using Source Dock with a Live Video Source
Add a **Video Capture Device** to any scene. Go to **Tools**, **Source Dock** and choose the Video Capture Device you just added as the source. In most cases, you will only need to check the boxes for **Visible**, **Preview**, and **Switch Scenes**. Click **Add**. Drag it to where you would like it to dock, and you now have a dedicated preview monitor that you can place nearly anywhere in the OBS interface.

How is Source Dock Being Used?

Live Multi-Camera Productions
It is now possible within OBS to have a preview monitor window for every camera and pre-recorded video. There would be no need for the Studio Mode Preview Window as you could see all sources simultaneously. With the **Switch Scenes** option selected for each input, switching would be as easy as clicking the preview of the source you wish to send to the program output.

Houses of Worship
Many houses of worship use multi-camera setups, and many of them are operated by volunteers. Using Source Docks, someone can configure a layout with each camera or other video source displayed in a preview panel. Then, once the service starts, the volunteer operator would only need to click the next desired input.

Training Videos
Some training videos rely heavily on sharing web content. With Source Dock, any Browser Source can be docked. If it is configured correctly, instructors can interact with the web page from within the Preview window. This makes displaying the web content so much simpler for instructors since the whole thing happens within the OBS interface.

Pros and Cons
Pros: It's Free. It's easy to install and to set up.
Cons: It is difficult to find any downsides to this plug-in.

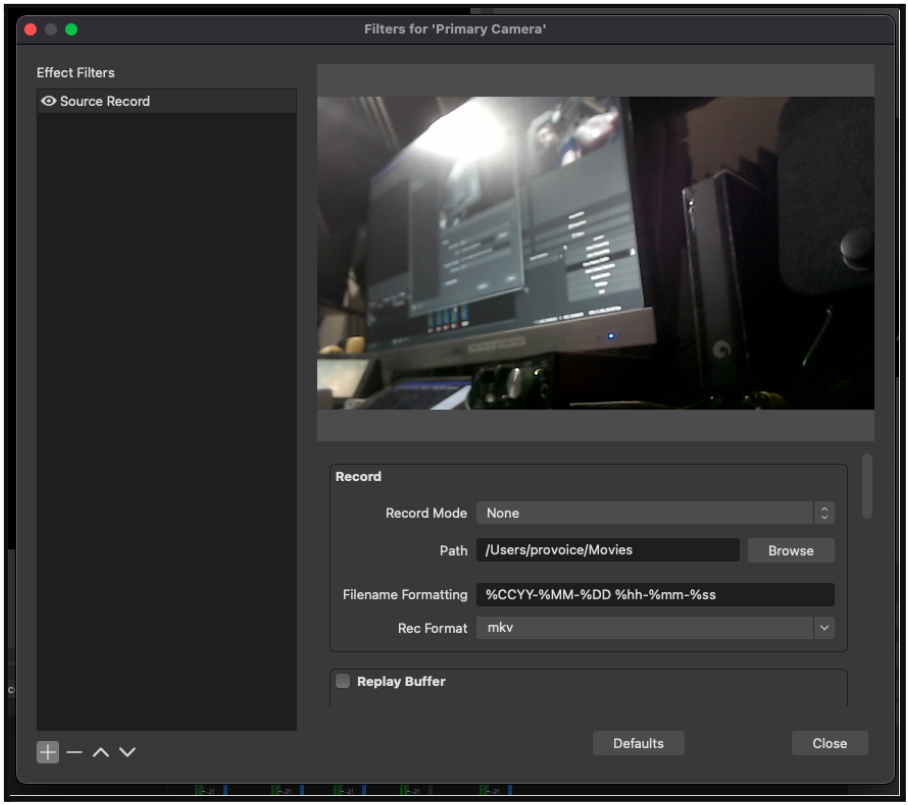
Alternatives to Source Dock
Source Dock appears to be the first and only of its kind. Users looking for more limited docking capabilities may want to look into the Custom Browser Docks feature in OBS.

Key Takeaways

1. If you want to be able to preview input sources in dockable panels in OBS, you need to install the Source Dock plugin.
2. Whether you want to interact with web content via a preview window or control of pre-recorded videos, Source Dock can do it.

11 SOURCE RECORD PLUGIN

Source Record allows you to record any source in OBS while simultaneously streaming or recording the main output of OBS. In other software and hardware platforms, this is referred to as an Isolated Output (ISO). ISO recordings are ideal for post production because they do not feature the overlays and graphics found in a full Scene and therefore can be used to easily recreate new content. Using Source Record, you can record as many sources as your computer can handle independently from the main video recording.



Source Record can be applied as an **Effect Filter** on available sources.

Whether you are recording the screen and a camera for video gameplay, streaming a sporting event with multiple cameras, recording a class session with various camera angles, or any other application, you may need to make a separate recording of just one source. You may want a clean copy of the screen share for example or a wide shot for post-production editing. In some cases, there are additional camera angles that won't be used in the primary production, that can be saved in the event they are needed later. The ability to record a "clean-feed" of any source can be a powerful video production tool. Source Record brings this functionality to OBS via an easy to apply filter.

Installing Source Record

Source Record can be downloaded for PC, Mac, and Linux from the OBS website at https://obsproject.com/forum/resources/ Download the version for your system. Depending on your system and the version you download, it may include a self-installer. Otherwise, follow the instruction to place the plug-in files in the correct folder on your computer. Once you are done, restart OBS, and you will be ready to go. Source Record will now be available as a filter for any source.

Setting Up Source Record

Launch OBS normally. If you don't already have sources and scenes set up, go ahead and add one or two. Otherwise, you can work with the setup you already have.

1. Choose the Source or Scene you wish to record by itself. There will be times that you want to record just a source by itself. However, if you're going to include more than one layer, like an overlay, you will want to set up a Scene with the Source Record filter.
2. Right-click on either a Source or the Scene you want and select **Filters.**
3. In this dialog box, click **+** to add a filter.
4. If you installed Source Record correctly, you will see it at the bottom of the list. Select it.
5. When you see Source Record in the list of filters, click on the eyeball icon next to it. This will toggle Source Connect off until you are ready.

6. In the dialog box, choose your **Record Mode**. This will be the trigger for your recording. For example, if you choose **Streaming**, Source Record will begin recording your selected source or scene at the same time you start streaming.
7. Choose the path to save the files in the correct folder.
8. Select your recording format. .mkv is recommended for most applications since, if your computer goes down, it will retain the recording up until that point. With other formats, like MP4, all the data will be lost if the recording is interrupted before it is finalized. MP4 is very popular as well for its high quality to file size ratio.
9. Review the additional advanced settings. Note that there is an option to record a separate audio track. This could be useful if you want to record a video source, plus an external microphone.
10. When ready, toggle the eye icon back on and press close.

Now, whenever you begin to stream, record, or start whatever action you set as Record Mode, OBS will start recording your selected source or scene. You can repeat this whole process up to two more times to record a total of three isolated recordings. Another plug-in called Filter Hotkeys will allow you to start and stop Source Record with the click of a button.

How is Source Record Being Used?

Gaming

A gamer streaming to a platform like Twitch may want to send a multi-layered output with a screen capture for the gaming system, a camera capturing their reactions as they play, and an overlay with information about the streamer. However, they may also want to be able to record their gameplay at full quality for posting on YouTube. Or, maybe the gamer wants to record full quality video from their camera for use in later post-production. With the Source Record plug-in, any source can be recorded separately at full quality.

Houses of Worship

Houses of worship often use volunteers to produce live video. Unfortunately, inexperienced operators are more prone to the

occasional switching or camera operating error. With Source Record, it is simple to create separate recordings of up to three cameras. This way, any glitches can be edited before the service is uploaded for on-demand viewing. Social media teams could also access all the camera angles for sermon clips or music performances.

Sporting Events
Sports streamers have long needed a way to record an isolated output. The raw footage without any overlays is excellent for highlight reels. It is also helpful to record multiple individual cameras to capture the best view of a play. Often, the best angle is not from the camera that was streaming at the moment. With Source Record, up to three cameras can be saved independently for later review and post-production.

Pros and Cons
Pros: It's free. It adds ISO capability to OBS. It's easy to use.
Cons: There are glitches for some users and configurations.

Alternatives To Source Record
Currently, there are no other plug-ins that offer this type of functionality. This makes Source Record the only presently available option other than switching to another platform such as Wirecast, ECamm Live, or vMix.

Key Takeaways

1. Source Record allows you to record as many sources as you can with your computer using OBS.
2. ISO recording is a popular feature in other live streaming platforms, and it adds crucial functionality to OBS.
3. It may be a worthwhile addition to OBS, even for those who aren't currently in need of it. The need to record a source separately could come up at any time.

12 REPLAY SOURCE

Instant replays are a great way to enhance video content for sporting events and video gameplay. While OBS does now have built-in basic replay functionality, Replay Source offers a more powerful and flexible replay solution as an OBS plug-in. Instant replays can add considerable production value to many types of content. Replay Source makes it easy to add this functionality to OBS and activate it with one or two keystrokes.

Installing Replay Source
Installing Replay Source requires a few more steps than most of the other plug-ins. However, none of the steps are particularly complicated. Moving through the steps actually goes quite quickly. The installation process requires changes to OBS settings, downloading and installing the plug-in, loading a script, and setting up hotkeys.

OBS Settings
Before you begin the actual installation, a few settings need to be adjusted in OBS.

1. Enable the Replay Buffer in OBS – In OBS, go to the **Settings** menu and select **Output** and then the **Replay Buffer** tab. If you don't see the **Replay Buffer** tab, check that **Output Mode** is set to **Advanced**. Next, check the box to activate Replay Buffer.
2. Set Buffer Maximum – This is the length of the clip it will continually capture and make available for replay.
3. Set Video Format and Path – U nder the **Output** settings, click **Recording**. Here you can choose the preferred file format and the path to the directory where files should be kept. Make a note or take a screenshot of this location for a later setup step.
4. Automatically Start Replay Recording – If you will be using Replay Source regularly, you will want to set it to begin automatically so that the replay will be there when you need it. The whole concept of

the feature is that, by recording continuously, you can always access the last few seconds of your recording and always be ready for a replay.
5. Load the Replay Script – In OBS, go to **Tools** and select **Scripts.** Hit **+** and add the Instant-Replay.lua file from the directory. Select **Replay** next to **Media Source**. Click **Close**.

Installing the Plug-in
Depending on your computer's operating system and the current version, it may include a self-installer. If you are not comfortable moving files around your computer, the self-installer would be the best option. Otherwise, follow the instruction to place the plug-in files in the correct folder on your computer. When done, restart OBS, and the plug-in should be ready to use.

Once you have installed the plug-in and relaunched OBS, notice the **Start Replay Buffer** option under **Controls**.

Setting Up the Instant Replay
1. In OBS, create a new scene and name it "Instant Replay Scene."
2. Click **+** under **Sources** and add **Media Source**.
3. Select **Create New** and name it Replay Source
4. Check to see that **Local File** is selected and locate the replay file. You set the directory path earlier in the OBS Settings.
5. Click **OK**.

Configuring Hotkeys
You can assign Hotkeys to all of the Instant Replay functions. You can set these up on any keys you want or even assign them to a Stream Deck or Touch Portal controller. Try using F1, F2, and F3 as an example for clarity. To set up the hotkeys, go to **Settings** and select **Hotkeys**. First, if you want to be able to toggle the replay buffer off and on with a hotkey, scroll down to **Start Replay Buffer** and click into the box. It will record the next keystroke or key combination and assign it to start the buffer, for now, use F1. Entering that same keystroke in the **Stop Replay Buffer** box will cause that F1 to act as a toggle to turn the recording on and off.

Next, scroll down to the **Replay Buffer** subheading and assign F2 to **Save Replay**. This key will act as the trigger to save the contents of the replay buffer for playback. Finally, scroll down to **Instant Replay** and assign it to F3. Click **Apply** and **OK**.

Using Instant Replay

There is a lot of flexibility when it comes to how to use instant replays in your production. Since Instant Replay is configured as a source, you can add it to the scene, and crop, resize and move the window within the scene. Once you have it set up, you can save and playback a replay at any time. With the example setup, you would just need to click F1 to start the Replay Buffer. Then, when you are ready to share a replay, click F2. OBS will save the video clip in the buffer, the length based on the settings entered earlier. Finally, F3 will begin the replay.

How is Replay Buffer Being Used?

Gamers

Gamers are quickly learning how to massively upgrade their production values on Twitch and YouTube using Instant Replay. There is a lot to think about when running a stream and focusing on the game. Instant Replay's use of hotkeys means that the gamer can get a replay live on the stream with just a couple of clicks of the keyboard or Stream Deck. Gamers are also using the Replay Source alongside other plug-ins to add filters and effects automatically when launching a replay.

Sporting Events

While the Instant Replay plug-in does not offer some of the more advanced features found in software like vMix or Wirecast, it can add some excitement to a sports broadcast or stream. While this solution does not let you select from multiple camera views like the more advanced software, producers can get impressive results using filters and other plug-ins.

Pros and Cons

Pros: It's free and easy to use. It includes multiple setup options. It has been well integrated with OBS.

Cons: Setup is not as simple as other plug-ins, and it can take some time and effort to get everything working properly, Can only replay OBS main output and not specific sources.

Alternatives To Replay Source
OBS – As mentioned, OBS does have replay functionality built-in. Instant Replay builds on that framework to create a more straightforward and more powerful tool.

There do not appear to be any other OBS-based alternatives to Replay Source other than OBS's built-in option. However, there are some options that work outside of OBS to capture the stream locally and have it ready for replay.

Key Takeaways

1. If you want instant replay in OBS, Replay Buffer is the best option.
2. Its operation is seamless and straightforward once you get everything set up.
3. Just be aware that getting everything configured may take some time.

13 THE NDI® PLUGIN

NDI stands for Network Device Interface and it is an IP video production protocol originally developed by NewTek. NDI was released in 2015, and it has since become one of the most popular IP video production connectivity options for professionals around the world. The NDI plugin is available for OBS Studio users on Mac, PC and Linux computers. The plugin was originally released in June of 2017 by a french developer named Stéphane Lepin with the user name Palakis. As of 2022, OBSProject.com shows the NDI plugin has been downloaded over 1.7 million times. Over the past few years, Palakis has made regular updates and improvements to the plugin.

NDI itself is not open source and therefore it can not be developed into the core OBS application. NDI is royalty-free and the plugin that Palakis has developed uses the royalty-free software development kit (SDK) to add NDI functionality into OBS. Once installed the plugin allows users to bring NDI audio and video sources into OBS and send NDI audio and video sources out of OBS.

Adding NDI sources to OBS

The nice thing about NDI is it's ease of use when discovering video sources on your network. You can bring NDI video sources into OBS using the "**NDI Source**" option available in the sources menu. This allows you to name the NDI source and search through a list of available NDI sources on your network. The current OBS plugin integration allows you to connect to NDI sources in two bandwidth modes "**highest**" and "**lowest.**" You can also choose to connect with

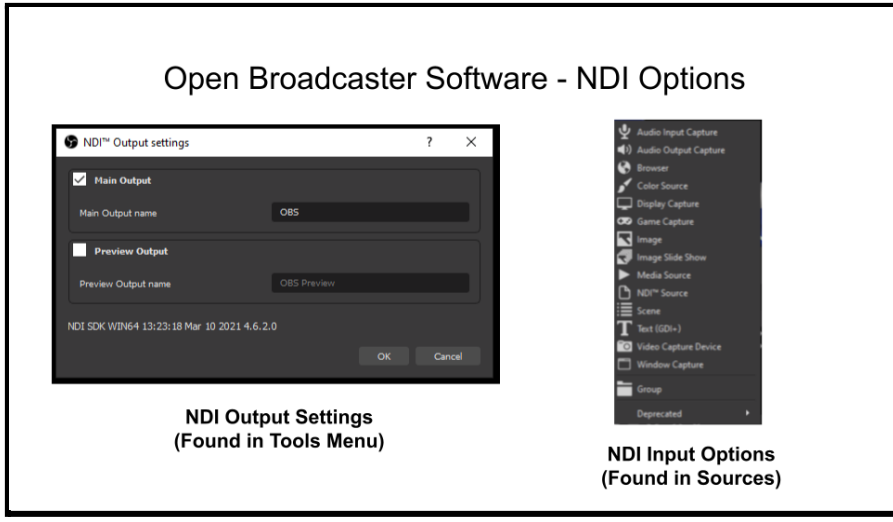
"**audio only**." An important option to understand when using multiple NDI cameras is called **Sync**. NDI is able to synchronize multiple cameras or video feeds together using time codes that can come from the device itself or the network. Most NDI video sources can be set up to synchronize with a common Network Time Protocol (NTP) server. Your network should have an NTP server in place or you can use a commonly used server such as time.windows.com or time.google.com. NTP settings are so important to IP video, they will be covered in more detail in an upcoming chapter.

Outputting NDI sources from OBS

You can send NDI video out of OBS easily using the NDI Output Settings found in the **Tools** dropdown menu. This area allows you to send two main NDI outputs. You can send the "**Main Output**" which is your "**Program**" window in OBS Studio and you can send your "**Preview Output**" which is your "**Preview**" window. Simply check the outputs you want to send via NDI, give them a name and press **OK.** Once you have done this your NDI video sources coming from OBS will be discoverable on your local area network (LAN).

The latest version of the NDI plugin for OBS also includes a special NDI filter that can be applied to any audio or video source in OBS. This is an ideal way to take a specific source and make a dedicated NDI output available on your network regardless of whether it is in preview or program. To access this filter, you can right click on any source and select the "**Filters**" option. Here you can choose to apply a dedicated NDI output with both audio and video or a dedicated NDI output just audio only. Once you create a dedicated NDI output filter you can name the NDI source and click "Apply Changes." Once done, your NDI source will be made available on your network.

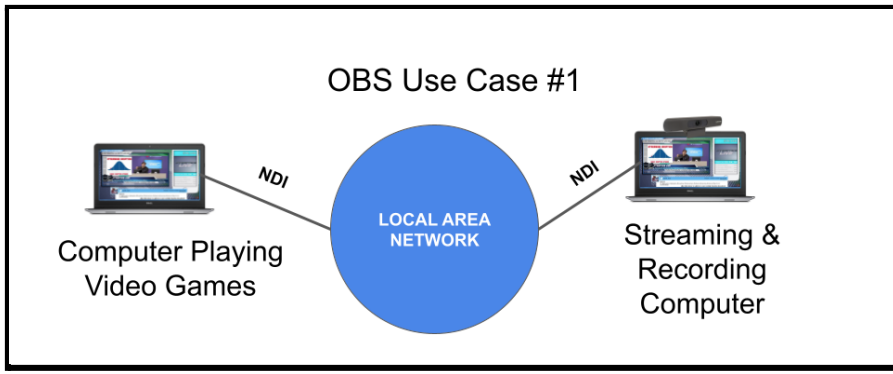
It's worth noting that OBS will never have native support for NDI. All code in the OBS project must be 100% open source. NDI itself is royalty-free, but the code is not open source. Therefore, the plugin provides a legal way for OBS to interface with NDI. So why is OBS so important to the NDI ecosystem overall? NDI essentially opens up thousands of new video input and output opportunities for OBS users. Because OBS is free, it has become a go-to solution for creating NDI video and sending it out into a LAN.



NDI® settings inside OBS.

Example: Using OBS as an NDI® output

One example of using an NDI output with OBS is a dual computer set-up. Many people have multiple computers and they want to stream, record, and play videogames at the same time. In many cases, one computer is not powerful enough to play computer games and live stream at the same time. So it's possible to have one computer for playing video games, and another for live streaming and recording the content.

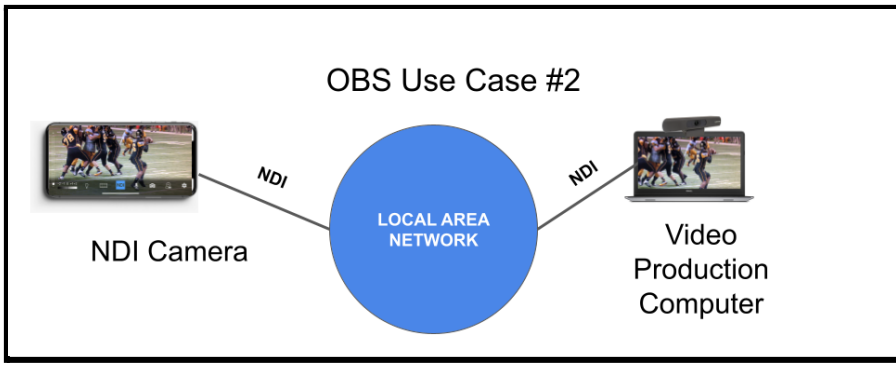


Two computers connected with NDI®.

Connecting two computers with OBS is very easy with NDI. One computer is set up to output NDI and the other simply uses NDI as an input source. As long as both computers are on the same local area network (LAN), the video should be crystal clear and reliable with minimal latency. Another popular use of OBS is to output the production to another computer as a display. In this way, you can use all the tools in OBS to create a dynamic presentation with live video and other sources. The entire production can run on a Mac, PC, or Linux computer and then distributed across the network to another computer where you want the video to be displayed.

Example: Using NDI® as an input

Perhaps the most popular way to use NDI as an input in OBS is with a smartphone. NDI offers two smartphone applications which can be used to send video in two different ways. NDI Camera turns a smartphone into an NDI camera. NDI Capture captures the screen of a smartphone and makes the video available as NDI. NDI Capture is ideal for mobile video gaming or presentations that happen on a smartphone. NDI Camera is great for sharing live camera video with OBS over a LAN.

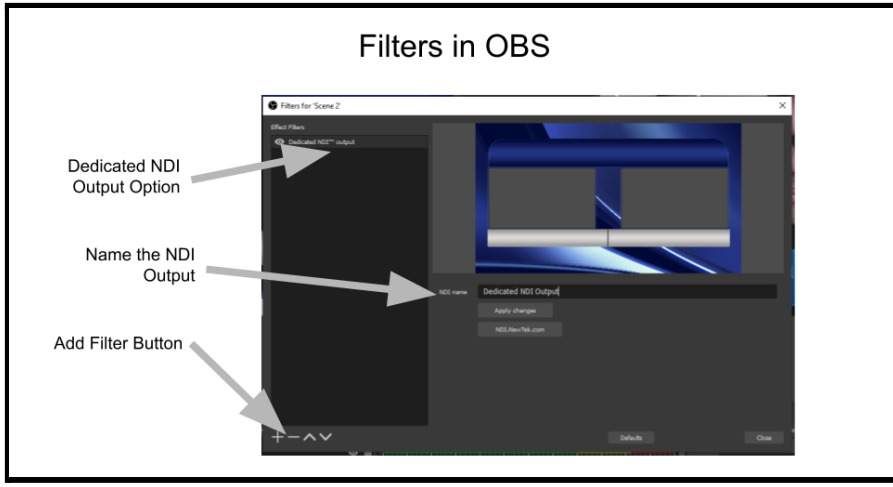


NDI Camera used with a video production computer running OBS.

There are multiple benefits to using an NDI Camera instead of a regular webcam. First of all, smartphones are popular and they feature some of the best camera technology available to consumers. Secondly, the NDI® Camera solution uses WiFi and doesn't take up a USB port like a webcam would . Therefore, NDI® Camera can be used untethered from the computer it's used with to provide new and interesting viewpoints.

Mobile phones can be used to send screen captures with NDI® Capture too. While mobile phones are great for playing video games and making presentations, they can be clumsy when used with multimedia applications such as live streaming and video production. Therefore, NDI provides an easy way to incorporate mobile phone connectivity with larger live video productions.

Example: Using NDI® Filters



Filters area of OBS.

Once the NDI plugin is installed with OBS, a new filter called "**Dedicated NDI® Output**" becomes available. This is a great way to create a dedicated NDI® output for any Scene or Source you choose. You can add a filter to any Source or Scene by right clicking and choosing the **Filters** option. Once the Filter has been added, you can name your NDI output. This is the name that will be discoverable by other NDI solutions on your LAN.

Once you have stepped into the NDI® ecosystem, you will find a growing number of hardware and software tools available to improve your production workflow and that offer new creative possibilities. Due to the nature of NDI®, there are many software tools that can do as much or more than previous hardware options. NDI® has always offered many resources to developers to add NDI® functionality to their software and hardware systems. The NDI® Software Development Kit (SDK) has helped many developers integrate NDI® into their products over the years since its release.

NDI® Tools	Streaming Software	Graphics Software
NDI® Studio Monitor, NDI® Bridge, NDI® Remote, NDI® Screen Capture, NDI®|HX Driver, NDI® for Adobe® Creative Cloud®, NDI® Webcam Input, NDI® Access Manager, NDI® Import I/O for Adobe CC, NDI® Audio Direct, NDI® Screen Capture HX, NDI® Test Patterns	OBS, vMix, Wirecast, Livestream Studio, MimoLive, Wowza, xSplit, Manycam, NewTek Connect	ProPresenter EasyWorship Panamation Resolume Sportzcast

NDI® Hardware	Communicat	Smartphone

	ions	Apps
Magewell, Epiphan, LiveU, Teradek, PTZOptics, SONY, Panasonic, HuddleCamHD, NewTek, Cannon, Bluefish444, Tally-Lights LLC, Bird-Dog	Microsoft Teams, LiveToAir by Gnural Net, Skype	NDI® Camera NDI® Capture

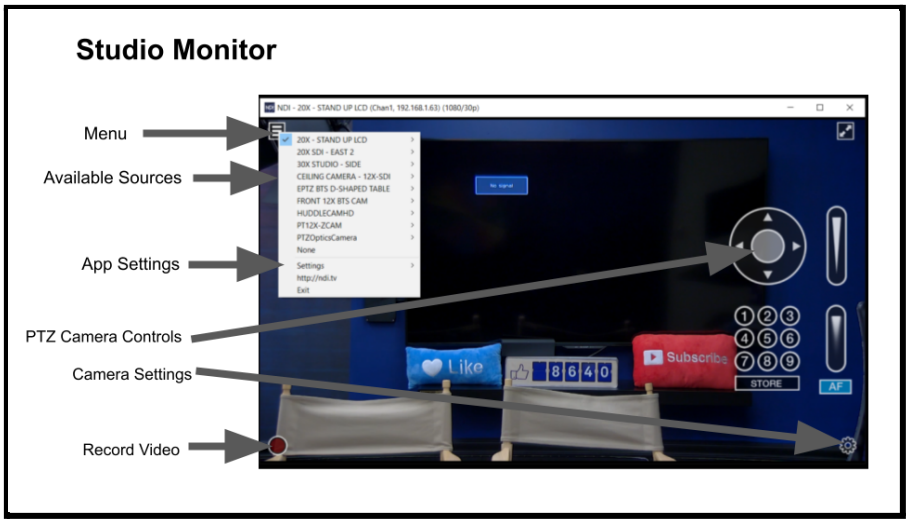
The list above offers some of the most popular NDI® supported software and hardware solutions. Please note this is not a complete list.

Free NDI® Tools

NDI® offers a free set of tools for you to get started. You can download these tools at https://www.ndi.tv/tools/. Below is a list of the most useful NDI® tools you can start using today.

Studio Monitor

Studio Monitor can be used on a Mac or PC computer to quickly display any NDI® video source available on your LAN. This application can quickly display all discoverable NDI® sources on your local area network. Studio Monitor has a long list of features which will be covered in an upcoming chapter. Most importantly, you can view any NDI® source and if the source is a PTZ camera, you can control the PTZ camera with an on screen control set.

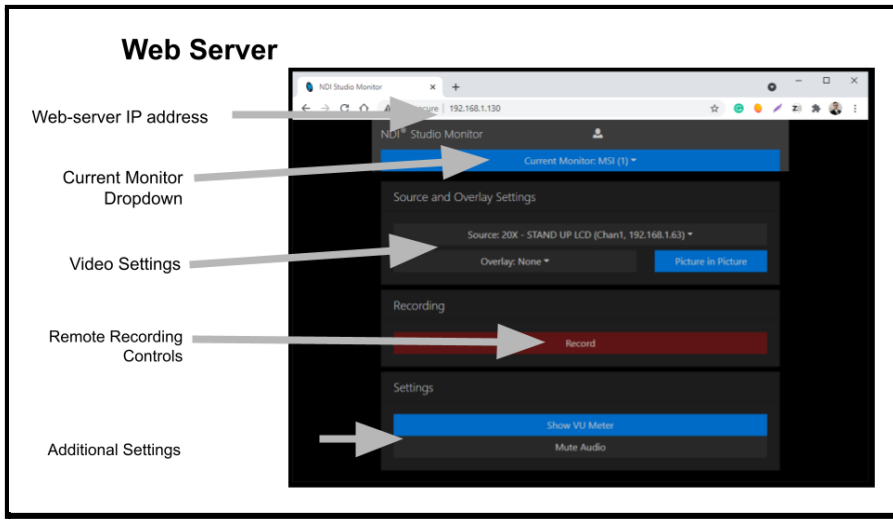


Studio Monitor connected to a PTZ camera will reveal PTZ camera controls.

NDI® Studio Monitor can also be controlled remotely by a web-server. The IP address for this web server can be found in the applications settings area. Once you enter this IP address into a web browser on the same LAN, you can access the control for Studio Monitor. This is particularly useful if you are using Studio Monitor to power a LCD screen that is remote to your current location. Applications include digital signage, video for overflow areas, and remote camera control applications. In this way, NDI® Studio Monitor can be used as a router to deliver customized NDI® video content to a number of displays on your network. Here is a summary of NDI® Studio Monitor benefits:

- Independently configurable video source, overlay, and audio per instance.
- Launch, distribute, and manage multiple instances from a single device.
- Support for control and configuration via compatible mobile devices.
- Comprehensive support for multi-monitor video wall and signage installations.
- Remote control of PTZ camera, recording, and configuration for applicable sources.

- Record NDI® files directly from multiple instances with NDI® Studio Monitor.
- Remote control via web server.
- NDI® output allows NDI® Studio Monitor to act as a router and server for delivery to multiple outboard displays.



Studio Monitor features a web server that can be used to control the application remotely.

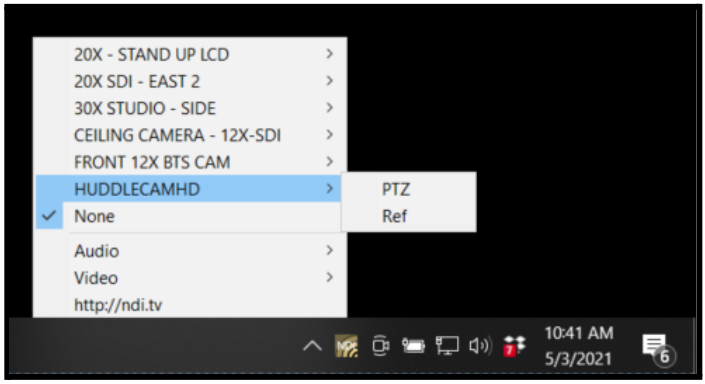
NDI® Webcam Input

The NDI® Webcam Input is a small utility which creates a virtual webcam source from any discoverable NDI® video source on your network. The NDI® virtual webcam is then usable with any software that uses the webcams. This mini application allows you to select an NDI® source that you would like to use as a webcam source in an application such as Zoom or GoToMeeting. Once selected, you can use any NDI® source on your network as a webcam in any application using the available "NewTek NDI®" virtual webcam selection.

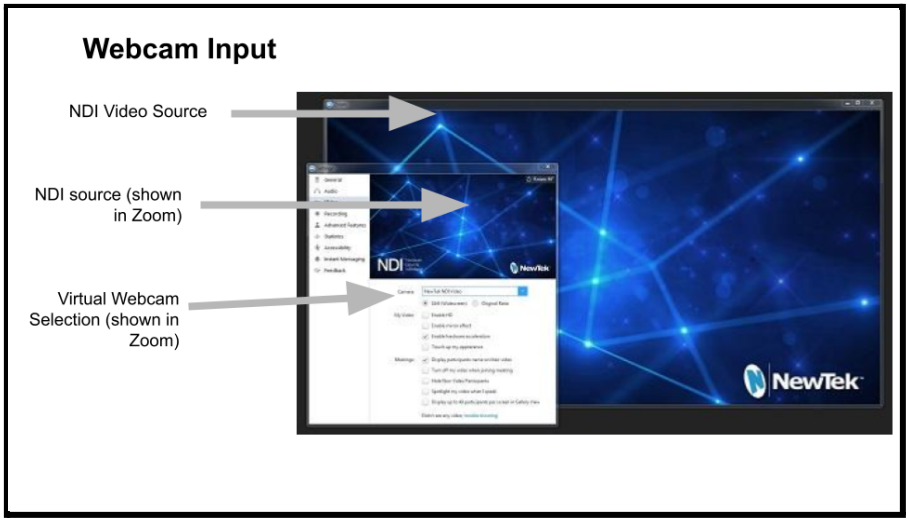
During the installation of NDI® tools, you can choose to have the NDI® Webcam Input "run at startup." When the application is running it can be found in the system tray. You can click the application to open up a small menu of settings. It is here where you can choose

the NDI® video source you would like to make available as a virtual webcam.

The NDI® Webcam Input is compatible with Google Hangouts, GoToMeeting, Skype, Zoom, and more. It supports full frame rate video and audio up to 1080p and 4K UHD at 60 fps.



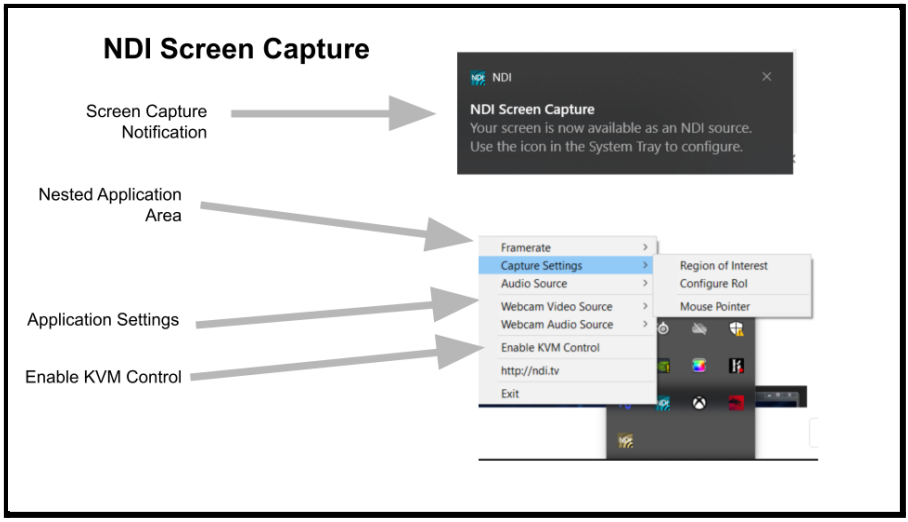
The Webcam Input application is found in the system tray.



Webcam Input can be used with popular platforms like Zoom.

NDI® Screen Capture

NDI® Screen Capture can capture the screen of the computer it is installed on and make it available as an NDI® video source. NDI® Screen Capture supports the capture of multiple monitors and it also includes the ability to capture a webcam. There are now two versions of NDI® Screen Capture -- the original version is called NDI® Screen capture, and a newer version is called NDI® Screen Capture HX. Both versions will be outlined in more detail in an upcoming chapter. The biggest difference is the encoding options which allow NDI|HX® Screen Capture to reduce bandwidth.

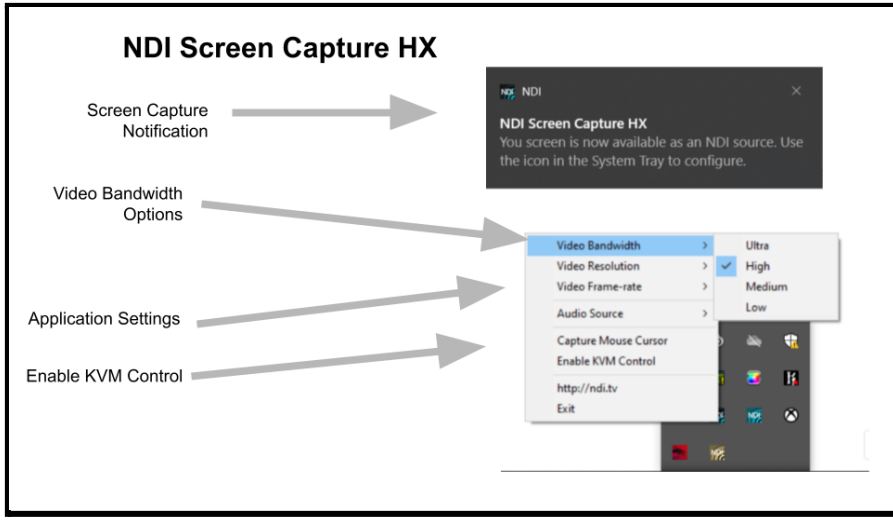


NDI® Screen Capture appears in the system tray.

Once NDI® Screen Capture is running on the computer you will receive a notification saying, "Your screen is now available as an NDI® source." You will also see the NDI® Screen Capture icon in the System Tray. From here you can open up the application settings which include Framerate, Capture Settings, Audio Source, Webcam Video Source, Webcam Audio Source, and Enable KVM Control. Most of these features are self-explanatory, but the KVM control is an interesting feature you can use to take keyboard and mouse control for the computer remotely. Once enabled, the NDI® Studio Monitor application will allow you to control any computer remotely with the

NDI® Screen Capture KVM Control feature enabled. Here are a few features the application enables:

- Generate multiple live video sources simultaneously with selectable audio.
- Support for multi-monitor capture, with independent output at up to 60Hz.
- Capture all of your system's desktops in real-time, at 60Hz and games at 120Hz or above with almost no CPU usage.
- KVM (keyboard, video, mouse) remote control of any workstation running Scan Converter from NDI® Studio Monitor.
- Consumes minimal system resources with no noticeable performance impact.



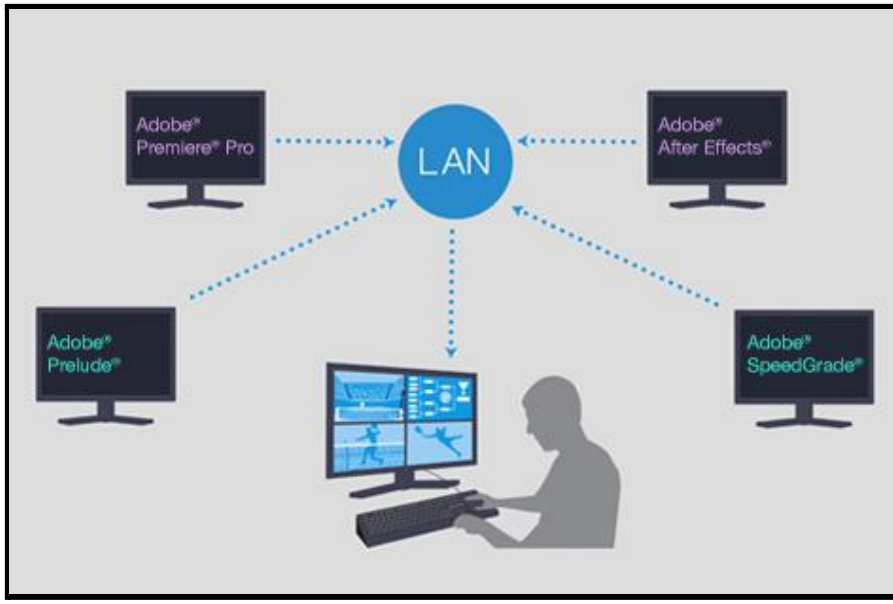
NDI® Screen Capture HX looks very similar to NDI® Screen Capture with a few new features.

NDI® Screen Capture HX

NDI® Screen Capture HX is the High Efficiency version of NDI® Screen Capture which features new levels of control for bandwidth optimization and Graphics Processor Unit (GPU) hardware acceleration. When the application is opened, a notification will let you

know that your screen is being made available on the network as an NDI® source. NDI® Screen Capture HX includes four options for bandwidth levels. You can choose between Ultra, High, Medium, and Low. NDI® Screen Capture HX takes advantage of new graphics card video compression technology which can support resolutions up to 4K with surprisingly low bandwidth requirements. It allows:

- Full resolution screen capture up to 4K and above at frame-rates up to 120 Hz or higher
- End-to-end hardware acceleration including screen capture, color conversion, and video compression.
- High-quality dedicated encoding pipeline on NVIDIA hardware and full control over the video bitrate that enables superior image quality while using any network – including wireless networks.
- Low latency screen capture.
- Support for capturing audio from any sound device – input or output – that's fully synchronized with the video signal.
- Full remote Keyboard Video Mouse (KVM) controls, allowing remote control of keyboard, mouse, clipboard, and even touch from a remote machine.
- Full control over the video bandwidth, resolution, and frame-rate being used.

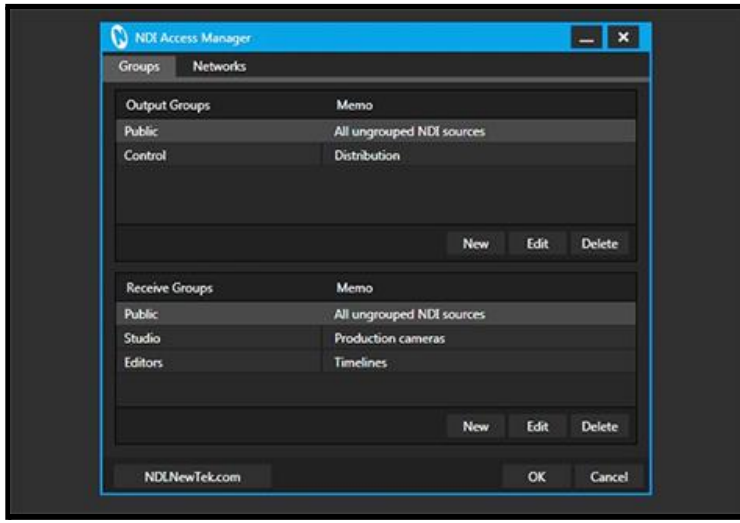


Adobe Creative Cloud products that work with NDI®.

NDI® for Adobe® Creative Cloud®

NDI® for Adobe Creative Cloud enables users to output NDI® video directly from Adobe products including After Effects and Premiere Pro. This allows video producers to quickly output video directly from the timeline of their projects for review and approval. These applications include Adobe Premiere Pro, Adobe Prelude, Adobe After Effects, and Adobe SpeedGrade. NDI® for Adobe Creative Cloud is:

- Compatible with Adobe After Effects® CC, Premiere® Pro CC, and more.
- Supports full-resolution, real-time video with audio, and transparency.
- Viewable from any NDI®-enabled receiving device anywhere on the network.



NDI® Access Manager set-up with multiple public and private groups.

NDI® Access Manager

NDI® Access Manager allows administrators to restrict access to NDI® video sources on their network. The application allows users to manage visibility and accessibility of NDI® sources to specific computers on a network. NDI® Access Manager can easily group NDI® sources together to make them either public or privately discoverable. It also enables administrators to:

- Configure NDI® channels as public or private on the network.
- Group NDI® systems, devices, and applications to preference.
- Connect to and access NDI® channels on other networks via an IP address.
- Connect to and access NDI® channels on other networks via an IP address.
- Advanced controls allow preferences for Transmission Control Protocol (TCP) or User Datagram Protocol (UDP) connections, multicast operation, and optional discovery server support.

NDI® Audio Direct

NDI® Audio Direct is a tool designed to bring NDI® audio sources into Digital Audio Workstation (DAW) software. DAW software solutions are used to record, edit, and produce audio. The NDI® Audio Direct tool leverages two plugins that are designed to transport audio in and out of DAW software solutions. NDI® Audio Direct is compatible with any DAW that supports VST 3 or LV2 audio plug-ins.

NDI® VLC Plugin

VLC is a free open source video player. VLC's wide user adoption has led NDI® to support the system with a free plugin. The plugin allows NDI® video sources to be directly accessible with compatible VLC software without the need for transcoding.

- The plugin is compatible with existing and previous versions of VLC Media Player for Windows.
- It makes content accessible without transfer, transcoding, or direct connectivity.
- It supports encoding of multiple instances of the VLC Media Player simultaneously.
- It offers virtual PTZ control for the pan function and zoom control around VLC output.

As you can see NDI can open up many possibilities for your productions.

Key Takeaways:

1. OBS is a completely free video production that continues to improve with each release.
2. OBS is open source and the project is supported by a large community of developers.
3. There is an NDI® plugin for OBS which provides NDI® connectivity for OBS.
4. NDI® can be used as a video input or output with OBS.
5. Because OBS is free, it's a great application to produce NDI®-

enabled video content for use with NDI® tools such as Studio Monitor.

14 AUDIO MONITOR PLUGIN

OBS is a great tool, but it has some limitations, especially when it comes to audio monitoring and control. An audio feature desired by many streamers has been a way to create a separate headphone mix that will allow users to monitor and send any source within OBS to any audio device they choose.

Over the years, there have been several workarounds, but the **Audio Monitor** plugin for OBS offers all the functionality producers need in an easy-to-use interface. Audio Monitor gives you the ability to send the audio of any OBS source to any audio device just by adding the **Audio Monitor** filter to the source. With this, you can create your own custom headphone or monitor mix or even create a separate mix to feed your host or guests headphones. The Audio Monitor plugin will be shown with several examples in this book including how to use OBS with Zoom and also creating closed captions with Web Captioner.

Audio Monitor can be shown as a dock inside the OBS interface.

Installing Audio Monitor

Audio Monitor can be downloaded for PC and Mac, from the OBS website

https://obsproject.com/forum/resources/audio-monitor.1186/. Download the version for your system. Depending on your system and the version you download, it may include a self-installer. Otherwise, follow the instruction to place the plugin files in the correct folder on your computer. Once you are done, restart OBS, and you will be ready to go.

Using Audio Monitor

1. Select any source with audio in the Audio Mixer.
2. Click on the settings icon at the bottom of the source in Audio Mixer.
3. Select **Filters.**
4. Under **Audio Filters** or **Audio/Video Filters**, Press the **+** and add **Audio Monitor**.
5. Select the device to which you wish to send the audio from that source. You can send it to any device connected to your system. That includes audio interfaces and even virtual options like a Virtual Audio Cable.
6. You can adjust the volume levels. This level will only impact the level of the source to the selected device.
7. You can add as many **Audio Monitor** filters as you wish and send any source to as many devices as you want.

Adding the Audio Mixer Dock

Go to the **View** menu and click **Docks** and select **Audio Monitor**. The Audio Monitor panel can be docked within the OBS interface just like any other panel. You can also move it to the same panel as the default mixer and use a tab to switch between them. While the two audio mixers look similar, the Audio Monitor panel has an extra gear icon and meter on the left. By pressing the gear icon, you can choose to display all available audio sources or just those available in the current scene.

Within the Audio Monitor panel, the sliders can adjust the output levels from that source to your selected audio device. That is unless you locked the level when you set up the filter. There are additional options within the settings menu. One handy feature is found by clicking on the

gear icon and selecting **Outputs**. As OBS allows you to record up to six audio tracks, this feature will enable you to preview and control the output levels for each track.

How is Audio Monitor Being Used?

Gaming
Audio Monitor is a great tool for gamers streaming to Twitch, YouTube, or other platforms since it allows them to send one mix to the stream and another to their monitors or headphones. Most gamers would like to control exactly what is going into their headphones and make it different from what viewers will hear. For example, gamers may or may not want to listen to their own vocals. They might want a different level for game audio. Some might even want to add music to the stream but leave it out of their mix.

Video Podcasts and Programs
Any production with a guest or multiple hosts can benefit from Audio Monitor. If the host is also operating OBS, they may need to be able to monitor some audio that the guest does not need to hear in their headphones. Audio Monitor allows users to set up a separate mix assigned only to the audio device feeding the guest's headphones. The host can also set up their own custom mix that may differ from what listeners will hear.

Live Entertainment
Live streamed music and entertainment are more popular than ever. Audio Monitor gives OBS the functionality to handle the unique challenges of live events, especially music. With Audio Monitor and the proper audio devices, you could provide separate monitor mixes for musicians, vocalists, hosts, and producers, all within OBS.

Pros and Cons
Pros: It's free. It's easy to install and has a great dockable interface. It's easy to use it with virtual audio cables with software like Skype or Zoom.

Cons: The layout and function of the interface can take some time to understand. As a relatively new plugin, there are still some bugs.

Alternatives To Audio Monitor
VoiceMeeter Virtual Audio Mixer – Prior to the release of the Audio Monitor plugin VoiceMeeter was the standard for many users. Unfortunately, it was more challenging to set up and operate. Also, as opposed to being a plugin running within OBS, VoiceMeeter is a stand-alone application.

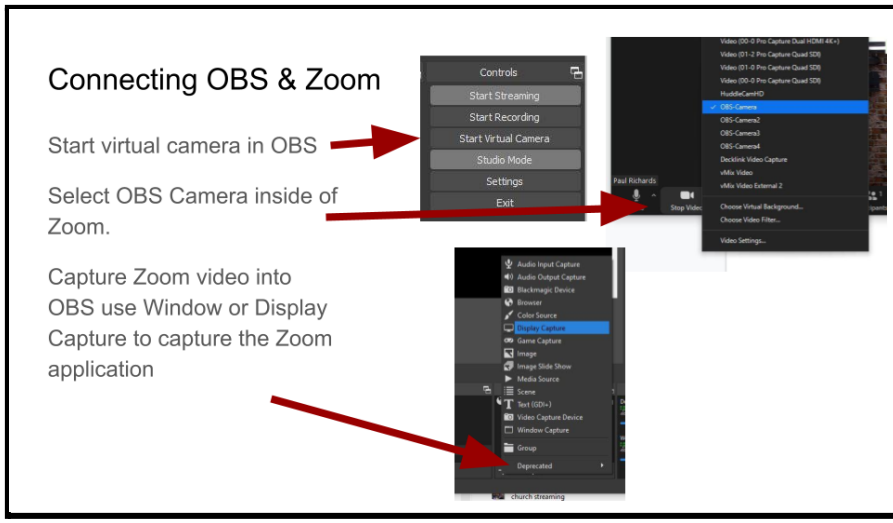
Key Takeaways

1. If you want greater control of your audio monitoring in OBS, Audio Monitor is a great plugin.
2. It can take a little time to learn but is far less complicated than VoiceMeeter.
3. Audio Monitor is ideal for complex workflows such as connecting OBS with Zoom.

15 WORKING WITH VIRTUAL AUDIO CABLES

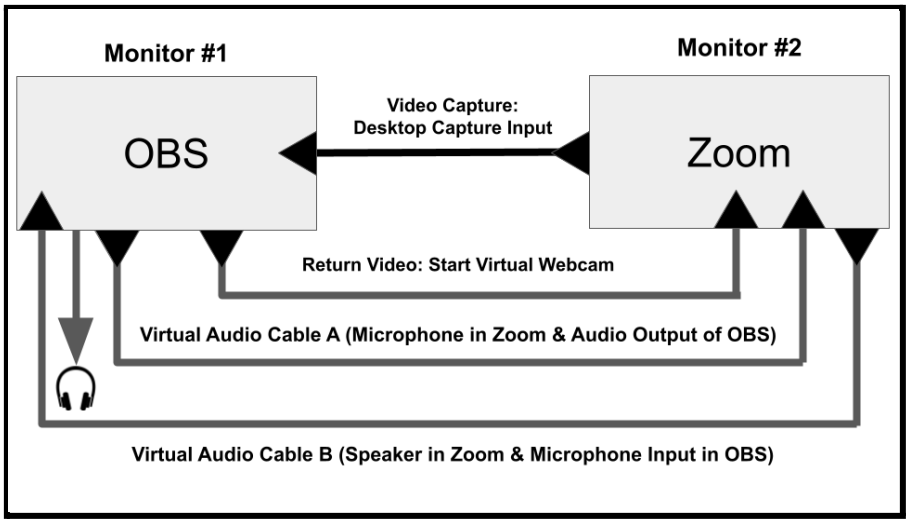
OBS has become a popular production solution for people who use video communications software such as Microsoft Teams and Zoom. Many people who use video communications software, would like more control over their audio and video, but only have the ability to use a webcam and microphone as audio visual inputs. This is where virtual video and audio cables come into play with OBS. OBS is capable of outputting a virtual video camera which can be used with software like Zoom as the webcam input. OBS is also capable of using virtual audio cables to connect audio from OBS to other applications on the same computer. These virtual audio and video connections allow you to use OBS with any software that leverages a standard webcam and microphone input.

Use cases for virtual audio and video connections vary widely. One of the most popular ways to use a virtual webcam output from OBS is with software such as Zoom. Zoom does offer some visual enhancements such as blur effects and filters, but OBS offers much more flexibility. The latest version of OBS now includes a usable USB webcam driver by default which you can select inside of any software that uses webcams. Using the **Start Virtual Camera** button inside of OBS, you can send the video directly from your OBS output to any software that is using the **OBS Camera** webcam input.



Connecting OBS and Zoom is easiest if you have two monitors.

You can also bring video from Zoom back into OBS for live streaming and recording. To bring video from Zoom back into OBS you can use a desktop or window capture source. Many users prefer recording Zoom meetings and interviews with OBS because they can control the bitrate and therefore the quality of their video recordings. After much testing, the StreamGeeks have determined that most recordings made with Zoom are less than 2 Mbps. For reference a good quality YouTube video would be at least 4-6 Mbps. Using OBS will allow you to record video in a higher quality and record locally on your harddrive without Zoom's compression settings. You can also record individual sources for use in post production after an event. This is ideal if you have a nice camera that you do not want to have compressed by Zoom's cloud-based recording process.



Connecting OBS and Zoom only has to be done once and it is easy to use once it is configured.

Setting up virtual audio cables to work with Zoom and OBS is more complicated than using the built-in virtual camera feature. OBS does not offer built-in virtual audio cable support at this time and therefore, you will need to download virtual audio cables to send audio from OBS to other applications on your computer. By using virtual audio cables, it is possible to record both audio and video from applications such as Zoom and Microsoft Teams. Using virtual audio cables allows you to enhance the audio coming in and out of OBS with audio plugins and tools that are not available in many video communications tools.

You can download two virtual audio cables for free from VB-Audio.com for your Mac or Windows computer. The VB-CABLE drivers are donationware, so they will ask you to make an optional donation to the developers. The default installation package includes two virtual audio cables, because you may require one for sending audio and one for receiving audio. Once they have been installed on your computer, you should restart. The next time you open Zoom or a

similar application you will see new virtual audio cables for input and output inside Zoom when you open the microphone and speaker area.

Inside of Zoom, you can select **CABLE Input** for your microphone and **CABLE Output** for your speaker. This will allow you to send your microphone audio into Zoom using the virtual **CABLE Input** and receive audio into Zoom using the **CABLE Output**. In order to send audio out of OBS you will need a plugin called **Audio Monitor**. The Audio Monitor plugin adds an important Audio/Video Filter to OBS which allows you to output audio from any number of sources. Find the audio sources you would like to send into Zoom and apply the Audio Monitor Filter. Inside the filter select the **CABLE Input** option. You have the option to mix audio by reducing the volume of each input that is being sent into the virtual cable.

Next, inside of OBS, you will want to create a microphone input to bring the audio from Zoom into OBS. You can do this by opening an **Audio Input Capture** source and selecting **Cable Output**. An easy way to test if everything is working, can be done within Zoom's settings area under **Audio**. You can click the **Test Speake**r button to send audio into OBS and make sure you are seeing levels for the audio. When you do this you should be hearing the test audio in your speakers or headphones. If not, check the **Audio** section of the OBS settings and check which device you have selected as your **Monitoring** Device. Your Monitoring Device is the device OBS will send the audio to. Next you should check to see if your audio sources from OBS are making it into Zoom. This can be done by playing audio in OBS and checking to see if you are receiving the audio levels inside of Zoom. Zoom has a handy audio monitoring feature inside the microphone to let you know when it's receiving audio from the selected microphone source.

Connecting OBS and Zoom can significantly increase your video and audio quality for meetings and interviews. If you have a studio or multiple cameras, you can now seamlessly switch between them in Zoom meetings. You can also use animated lower thirds to make your presentations look more professional. Another popular reason to use OBS with Zoom is the ability to play videos directly into Zoom without having to jump into a Screen Share session. In the Udemy course files, there is a transparent meeting countdown timer you can use in an upcoming meeting with this setup. The opportunity to have more fun and look more professional in online meetings is greatly enhanced by the use of OBS.

Key Takeaways:

1. OBS can be used to send audio and video directly into software such as Skype and Zoom.
2. OBS has a default Virtual Camera feature which allows you to send video to other applications using a virtual webcam.
3. OBS does not have a default virtual audio cable solution and therefore a virtual audio cable driver is necessary to send both audio and video from OBS to other applications like Zoom.

16 FILTER HOTKEYS

OBS Studio comes standard with filters. You can add filters to any source, scene, or audio source. However, there was no way to quickly and easily turn these filters on and off. Filter Hotkeys adds the ability to turn filters on and off using assignable hotkeys or even a Stream Deck or Touch Portal controller. Filter Hotkeys make it easier to control your favorite filters.

Installing Filter Hotkeys

The required files are available from the OBS website at https://obsproject.com/forum/resources/obs-filter-hotkeys.1125/. Filter Hotkeys is actually a script rather than a plug-in, so the installation process is a little different.

1. Click download, and it will send you to the GitHub page.
2. Scroll down to assets and download the zip file.
3. Extract and copy the .lua files to the directory where your OBS scripts live.
4. In OBS, go to **Tools**, **Scripts.**
5. Press **+**. It will automatically open to the correct folder where you pasted the scripts. Select both script files and click to open
6. Before you close this dialogue window take note of the note in the description where it reads, "Note: 0 - means disable filter, 2- enable, 2 - toggle, 3 - hold." You will need to know these later when setting up your hotkeys.

Using Filter Hotkeys

1. Create a source or choose an existing source, right-click on it and select **Filters**.
2. Use the **+** at the bottom of **Audio/Video Filters** or **Effect Filters** and add one or more filters. Take note of the names you give the filters. You will need those later.
3. Go to **Settings**, **Hotkeys.**

4. Find your filter by scrolling or by searching for it in the search box at the top.
When you find it, you will see that there are four fields where you can set hotkeys. They are labeled 0, 1, 2, and 3 and correspond to the note you saw in the script dialog box. The hotkey you set for 0 will disable the filter. The hotkey for 1 will enable it, 2 will toggle it on and off, and 3 will hold the filter on as long as you hold it, at which point it will turn off.

How Filter Hotkeys is Being Used
OBS users have discovered some creative uses for Filter Hotkeys. Here are some examples.

A streamer wanted to be able to add EQ and Reverb to his microphone to deliver a spooky evil laugh. With Filter Hotkeys, he can toggle it on and off with one keystroke.

A gaming streamer needed the ability to toggle the Chroma Key to alternate from her green screen to a replacement background. She was able to set up the filter and activate it with a hotkey

Another streamer uses Filter Hotkeys to enable a Scroll filter. A text source list of his supporters and other credits is set up, and when ready, the host can hit one key to start the scroll and another to end it.

Producers with multiple hosts and guests use Filter Hotkey to turn audio filters on and off. Without it, it can be difficult to make audio adjustments on the fly. However, with Filter Hotkeys, one keystroke can turn on gain adjustment, a noise gate, noise suppression, or compression. This can at least temporarily fix audio issues at least until further adjustments can be made.

Pros and Cons

Pros: Free. Easy to use once set up.
Cons: With no auto-installer package, setup and configuration can be difficult.

Alternatives to Filter Hotkeys
Filter Hotkeys appears to be the only plug-in currently available for toggling filters with hotkeys in OBS.

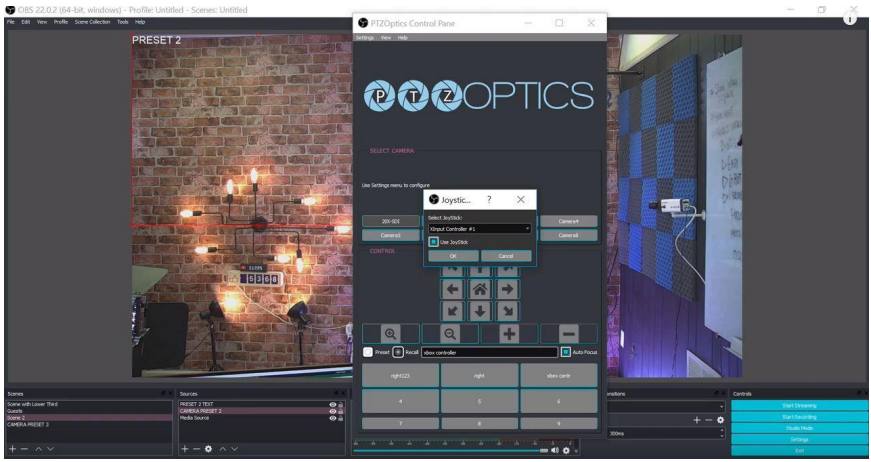
Key Takeaways

1. Not everyone needs the power to toggle filters with Hotkeys. However, if you do, Filter Hotkeys is the only option for OBS.
2. Fortunately, it is extremely easy to set up and use.

17 PTZ CAMERA CONTROLS

Many OBS plugins build off the functionality provided by others and PTZOptics camera control plugin is one that works well with NDI for those using an IP based video production workflow. PTZOptics is a live streaming camera manufacturer who is an active OBSProject supporter and developer of the PTZ camera control plugin. The plugin allows users to take control of PTZ cameras inside of OBS and use Hotkeys inside OBS to automatically call PTZ camera presets for a camera when you use an OBS scene.

A "PTZ" or pan, tilt, and zoom camera preset is a saved camera position stored inside a PTZ camera which can be recalled during a production to get the perfect view in a particular space. The PTZOptics plugin that allows you to control up to eight PTZOptics cameras directly from inside OBS. The plugin also features Xbox joystick and Hotkeys support. Using only an Xbox joystick, plugged into your computer via USB, you can fully control PTZ robotic cameras over an ethernet connection on your local area network.



The PTZOptics camera control plugin can be installed easily with a few files.

Using an Xbox joystick inside OBS to control your PTZOptics camera is quite simple and powerful for many live steamers. After you have the plugin installed, go to the main menu on the OBS dashboard and click on "**TOOLS**" to find the new "**PTZOptics controller.**" Clicking on this will bring up the PTZOptics Control panel, and you can immediately see that it offers complete control for up to eight cameras.

PTZOptics also offers a free open source version of the control software that you can customize for your own needs. Some OBS users find it is easier to build PTZ camera controls into each scene using a "**Browser**" input. To do this, you can use the new HTTP-CGI Command Sheet from PTZOptics. This allows you to select a command and build it into your OBS scene via the web browser input. You can download the HTTP-CGI Command Sheet here: PTZOptics.com/Downloads. This is an exciting example of extending the power of OBS with a video-production plugin.

Key Takeaways

1. PTZ cameras are a great option for OBS productions because they can be controlled directly inside the OBS interface.
2. Using OBS browser sources you can send HTTP commands to control IP connected devices like PTZ cameras.

18 ANIMATED LOWER THIRDS

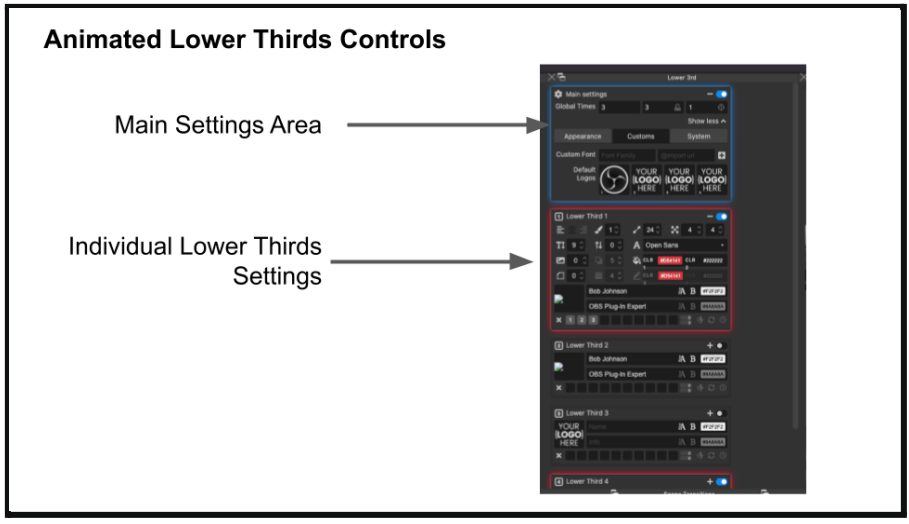
Have you ever wanted to control your lower thirds on the fly? With Animated Lower Thirds you can control four different lower thirds simultaneously with an easy to use dockable control panel. Even better, you can include logos, have total control over formatting, and trigger the lower thirds using hotkeys.

Installing Animated Lower Thirds with Dockable Control Panel
You can download the necessary files for Animated Lower Thirds with Dockable Control Panel from the OBS website. https://obsproject.com/forum/resources/animated-lower-thirds-with-dockable-control-panel.1057. It is available for Windows, Mac and Linux. This is another add-on that is not actually a plug-in, so the installation instructions are somewhat different.

1. Download and extract the .zip file. Next, you will need to move that "Lower-Thirds" folder into the OBS program files folder. You can find that location by opening OBS. Once OBS is running, right-click the icon and the taskbar, then right-click on OBS and click properties. Next to Target, you can see where your program files are.
2. Next, go into the "Lower-Thirds" folder and then the "lower thirds" folder.
3. Get the local URL of control-panel.html by clicking it to open in your browser. Copy the URL from the browser's address bar.
4. In OBS, click **View**, **Docks**, **Custom Browser Docks.**
5. Under **Dock** Name, give the dock a name, in this case, Lower 3rd.
6. Next, paste the URL you just copied into the URL field. Hit **Apply** and **Close.**
7. You will see the dock on the screen. You can drag and drop it anywhere in your interface

Setting Up Hotkeys for Animated Lower Thirds with Dockable Control Panel

1. In OBS, go to **Tools**, **Scripts**.
2. Click the **+** sign in the lower-left corner. That will take you to the default .lua script location. However, you will need to navigate to the folder where you moved the downloaded Lower-Thirds folder. Click into the "lower thirds" folder and select the *lower-thirds_+hotkeys.lua* file. Click **Close.**
3. Go to **Settings**, **Hotkeys**
4. Scroll down until you see **Lower Third Switch** #1, #2, #3, and #4. Type your selected key or keys into the fields. These will now toggle your lower thirds on and off.



Lower thirds can be edited in the management panel.

Completing Setup for Animated Lower Thirds with Dockable Control Panel

1. Set up a source for your lower thirds in OBS studio. Click **+** under **Sources**, select **Brower** and name it Lower 3rd.
2. Ensure that the box next to **Local file** is checked.

3. Click the **Browse** button and go to the "Lower-Thirds" folder you downloaded and moved earlier. Next, click into the "lower thirds" folder, click "browser-source," and click open.
4. Double-check the width to ensure it matches your current canvas resolution,
5. Highlight the text in the **Custom CSS** section and delete it.
6. Be sure there are checks in the boxes next to **Shutdown source when not visible** and **Refresh Browser when the scene becomes active**.
7. Click **OK.**

Configuring Animated Lower Thirds with Dockable Control Panel

1. Turn on the Main settings toggle at the top of the Lower Thirds control panel.
2. There are also toggle sliders next to each of the four lower thirds. We will later assign hotkeys to turn these on and off as needed.
3. Click the **+** next to **Main Settings** to access the global settings for all the lower thirds.
4. The **Global Times** field sets the transition time, visibility time, and the amount of time until the lower third starts over.
5. Select the theme from the three options.

Using Custom Fonts

If you would like to use custom fonts in your web browser, go to fonts.google.com and choose a font. **Click Select this style** next to the font and style you wish to use. In the column at the right of the screen, check the radio button next to @import. Highlight and copy the text under "CSS rules to specify families."

Back in OBS, in the Animated Lower Thirds panel, click the + next to **Main Settings** to expand the window. Next, click on the **Customs** tab. Paste the text you copied into the field next to **Custom Font**. Next, go back to your web browser and copy in the other box. In OBS, paste

that in the other field next to **Custom Font**. Hit the **+,** and the font is installed. You can repeat the process to add additional fonts.

Adding Logos

In order to add logos, you need first to place those graphics in the correct folder and give them the correct name inside the Lower-Thirds folder that you moved into the OBS program files folder, open logos. To add logos, you must replace the existing files with files of the exact same names. For example, one of your logos will need to be named logo_1.png and replace the current logo_1.png file in the folder. In addition, they must be ping 24 with transparency.

Setting Parameters for Individual Lower Thirds

1. Toggle the selected Lower Third on using the slider at the top.
2. Click the **+** to expand the settings options
3. Here, you can toggle the logo on and off, set the background color and text colors, add a drop shadow, alignment, size, position of the lower third, and more.

How Lower Thirds with Dockable Control Panel is Being Used

News Broadcasts

Those producing streaming or broadcast news programming with OBS love the convenience of triggering and modifying lower thirds on the fly. Since the settings are in a dockable panel, it is fast and easy to make changes or add new text or logos right from the OBS interface. With hotkeys configured, any of these lower thirds can be triggered from the keyboard.

Online Meetings

Users add a professional touch to their appearance in online meetings using animated lower thirds. With OBS connected to Zoom, Microsoft Teams, or other video conferencing platforms, hosts can use text and

logos to introduce themselves or guests and include additional on-screen information with just a couple of keystrokes.

Houses of Worship

Live stream producers can add professionalism to their services with lower thirds. These can be used to introduce worship leaders and other people involved in the services.

Pros and Cons

Pros: Free. Extremely customizable.
Cons: Multi-step installation can be overwhelming.

Alternatives to Animated Lower Thirds with Dockable Control Panel

There are not currently any plug-ins or other options that match the power and features of Animated Lower Thirds with Dockable Control Panel. However, simple lower thirds can be created in OBS just by creating additional layers for graphics and text and including them as part of a scene.

Key Takeaways

1. A lower third is a common graphic used to display information about a video in the lower third of the screen.
2. Great-looking lower thirds are easy to manage, edit, and trigger, with the Animated Lower Thirds plugin.
3. This plugin includes an easy to use Dockable Control Panel.

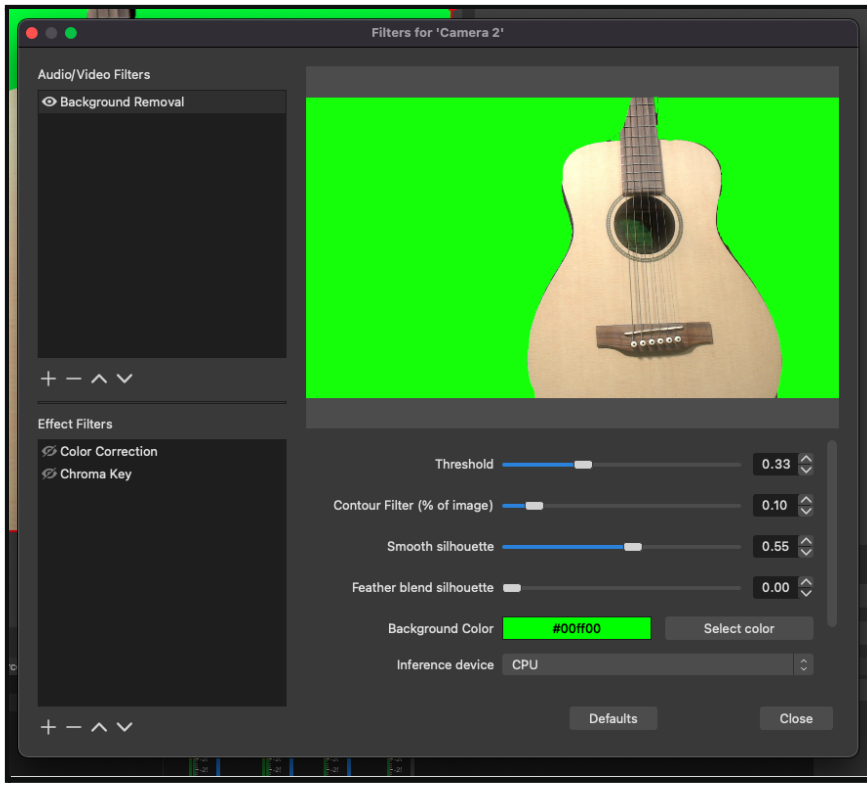
19 BACKGROUND REMOVAL

Background removal tools, which allow you to remove or replace a video background without a green screen, are more popular than ever. They are showing up as an included feature in popular video conferencing applications like Google Meet and Zoom. However, background removal was not available in OBS directly until this plug-in was developed. Fortunately, with the Background Removal plug-in for OBS studio, you can remove backgrounds without a green screen. It is easy to set up and absolutely free.

Installing Background Removal
Background Removal is available for download for Windows, Mac, and Linux from the OBS website at https://obsproject.com/forum/resources/background-removal-portrait-segmentation.1260. Clicking the download link will take you to the GitHub page.

Unfortunately, there is no installer package available, so you will need to unzip the files and place them in the correct folders with your OBS program files. Instructions are included on the page. The actual downloads are located under "assets" at the bottom of the page.

Using Background Removal
Background removal is available as a filter. You can add the filter to any video source.
1. Create a video source or choose one that is already available in OBS.
2. Right-click the source and select **Filters.**
3. Under Audio/Video Filters, click **+**.
4. Select **Background Removal** from the list.



Background Removal Settings

If everything is correctly installed, you should see your video source in the dialog box window. Below that, you will see the adjustable settings for the filter. You can perfect the effect with the following sliders.

- **Threshold** - Adjusts the required color differentiation between the subject and background. If you turn this all the way down, you will likely find that the subject itself is removed from the image. However, if it is too high, you will see a sort of halo around the subject, and eventually, the entire background will show.
- **Contour Filter** – Adjust the tightness of the contour around the subject that separates it from the background.
- **Smooth silhouette** – The higher the setting, the more it will try to smooth the edges of where the subject meets the removed background. If you turn it all the way down, the edges

will be rough and pixelated. You can see them smooth out as you move the slider to the right.

- **Feather blend silhouette** – The higher the setting on this slider, the more the filter will try to soften the edges of the subject.
- **Background Color** – Selects the color that will be shown in place of the original background image. This can be any color, but if you plan to use a chroma key to replace the background, you should set this to the appropriate shade of green.
- **Segmentation Model** – Selects the method of differentiating the background from the subject. You may want to click through the options to see which one works best for your use.

As with any background removal tool, you will likely need to experiment for the best results. If you are having trouble getting the results you want with just the filter settings, take a look at your physical environment. For example, you may need to add more light on your subject or increase the distance from the background to make it easier for the filter to make the differentiation.

Once your background has been removed and replaced with a single color you can use the chromakey filter to make the background transparent.

The Threshold slider is one of the most important adjustments to fine tune your removal of the background.

How Background Removal is Being Used

Online Meetings/Video Conferencing

While background removal is becoming standard in many video conferencing platforms, many users prefer to connect OBS to the video platform for better control. This enables users to have finer control of background removal from within OBS.

Gamers

Many gamers like to remove their background from the webcam, but green screens are not always a viable alternative. With a bit of experimentation, they can get green screen quality results without the green screen.

News

Newscasts have been using green screens for years, especially for weather and sports. Now producers without access to green screens can remove the background from behind the talent, replace it with green and get the same effect.

Pros and Cons
Pros: It's free. It does not require a green screen.
Cons: Like all background removal filters, the quality will largely depend on things like lighting and background. If you can get everything just right, you may not get the results you are looking for.

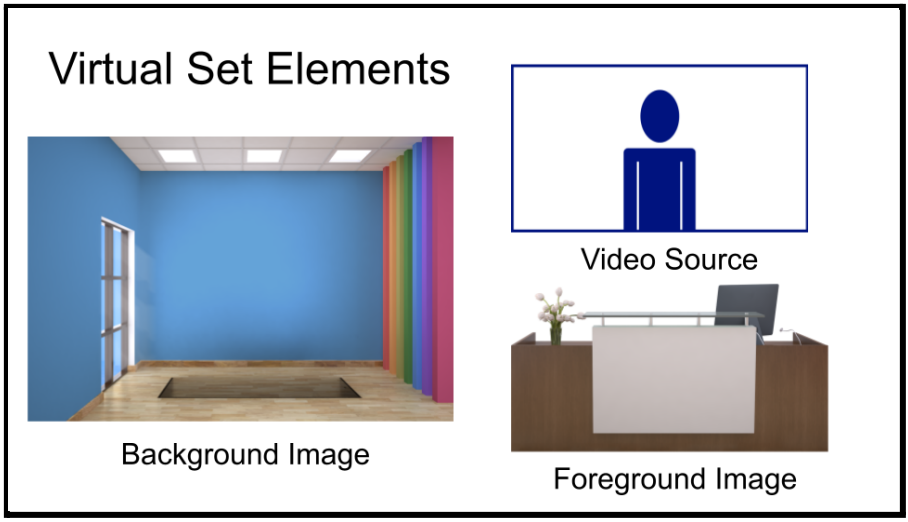
Alternatives to Background Removal
With a green screen, users can use the built-in chroma key filter for the same purpose.

Key Takeaways

1. It will take some experimentation to get results nearing those of a properly used green screen.
2. In the right setting, this is a powerful background removal tool that works great inside OBS.

20 USING VIRTUAL SETS IN OBS

Virtual sets are an awesome way to enhance your OBS video productions in a variety of ways. A "virtual set" is a video production space designed to be used with a video source that has a transparent background. Most virtual sets combine a foreground and background element to create a realistic looking space for the production. Virtual sets can be used in creative ways to transform presentation spaces and video productions with graphics designed to look professional even without a real studio.

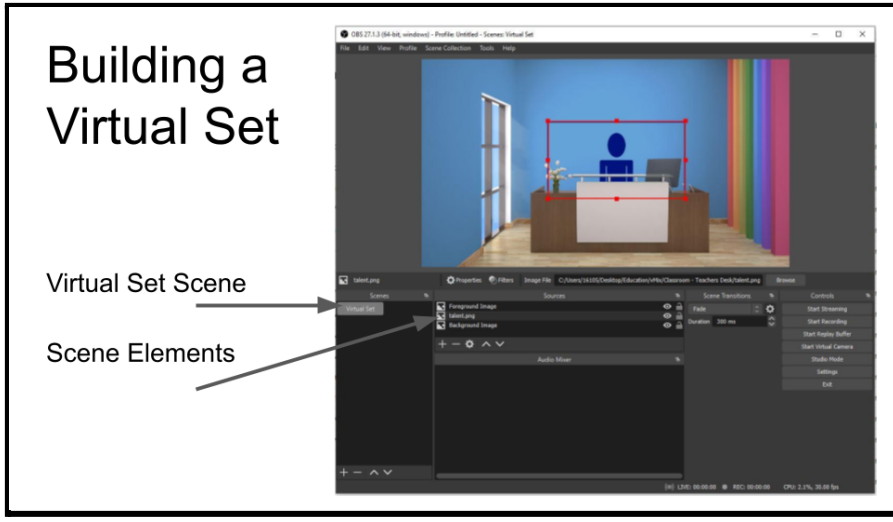


The basic elements of a virtual set include a background, a video source and a foreground image.

OBS now features two plugins that can be used together to create very realistic looking virtual sets. The first plugin is Move Transitions. You can use this plugin to effectively make camera movements inside of your virtual set. The second plugin is Background Removal.

Background Removal will allow you to remove the background of your video without a green screen. The Background Removal plugin works very well in most lighting conditions, but it is worth noting that you can improve performance by using a solid background or an actual green screen.

To build a virtual set you can start by selecting a foreground and background element. In the Udemy course for this book, a zip file is provided with the sample files for over ten virtual sets. Building a realistic virtual set requires background and foreground elements that match. Both images should be high resolution if you want to make good use of the Move Transitions plugin for zooming into your set.

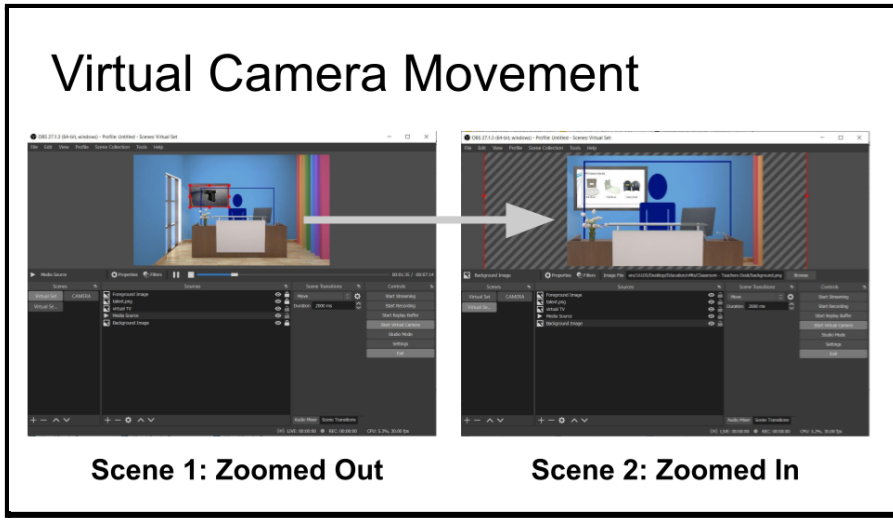


OBS shown with a virtual set scene that includes foreground, talent, and background sources.

Configuring a video input with a virtual background is straightforward in OBS. It can be done in the filter's area of your source. You can use the Remove Background filter in combination with the Chroma Key filter for best results. Once you have your scene set up the way you

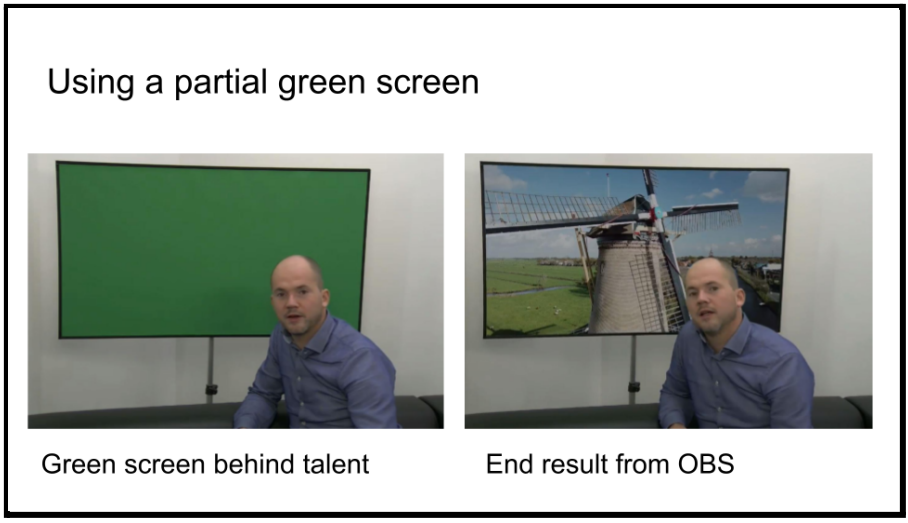
want you should lock each source in place. The lock button is located to the right of each source row and it will stop any unwanted or accidental movement of the source's placement in your workspace.

If you would like to add some movement into your virtual set you can duplicate the scene by right clicking the scene and selecting **Duplicate**. Inside of your new scene you can adjust the layout of your scene and use a custom Move transition to create a realistic virtual camera movement inside your virtual set. To do this, unlock each source and increase their size to create your new scene. In scene transitions click **Add Move** and this will bring up the properties for your animated transition. Move transitions can be used to make the transitions look as if a camera is actually moving inside your studio. Get creative and try panning across your virtual set and easing into your presentation space. You can continue to create duplicate scenes for as many presentation spaces as you would like to create.



Virtual camera movement inside of OBS scenes will make virtual sets look more realistic.

One creative way to use virtual sets is to place a virtual television inside of your set. There is a png file included in the Udemy files that can be used to frame a media source inside your virtual set. You can continue to add new elements to your virtual sets to make them look more realistic. When you create a second scene you may need to resize and organize your sources to make the transitions look natural. If you decide to use a virtual television screen, you can put any type of media source into this screen. A virtual television space can be used to display live video from a document camera or a pre recorded video from your computer. In an upcoming chapter, you will learn how to use NDI and other technologies like VDO.ninja to bring live video into OBS using your phone and other network connected sources.



A rectangle shaped green screen has been placed in the background of this video.

Finally, a friend of mine shared an amazing way to use green screen technology to create a virtual monitor in a real space. The picture above shows how you can create a virtual monitor by using a green screen in only part of your video image. Green screens and virtual sets are fun

technology to play around with. Get creative and try combining real and virtual elements to your OBS video productions. Using virtual audio and video cables, you can make your next video meeting much more interesting.

Key Takeaways:

1. Virtual sets allow you to use a green screen or background removal plugin to place talent in a new space.
2. Virtual sets combine foreground and background elements to make productions look more realistic.

21 CLOSED CAPTIONS FOR OBS

Adding captions to your production is a great way to improve the accessibility and reach of your video content. Closed captions can remove language barriers, make content accessible for those with hearing limitations, and allow people to watch videos when it isn't practical to have the sound on. Captioning also offers SEO (search engine optimization) benefits as Google and other search engines can index the captions and improve your performance in search results.

Given the many advantages of captioning, adding this feature to nearly any video production makes sense. However, while some video platforms offer captioning, many streamers like to control both the content and layout of captions. This is especially true for broadcasts with many on-screen components (titles, graphics, etc.) that could be blocked by auto-generated captions. There are multiple closed captioning solutions available for OBS, but Web Captioner is one of the easiest to use because it allows OBS users to add closed captions to in just a few steps. There are two options for using the platform. The simplest option is to use Web Captioner in the Google Chrome browser and capture the window in OBS. The more advanced method will encode the caption data into the live stream.

Web captioner shown overlaid on top of the OBS interface.

Getting Started with Web Captioner - Option 1 - Screen Capture

Web Captioner is technically not a plug-in for OBS. However, it is covered here since it is free and it adds a superior level of functionality to most plugins that are currently available. Since Web Captioner is not a plug-in, there is no installation required. Instead, just go to webcaptioner.com from your Chrome Browser. Please note that Web Captioner currently only works in Google Chrome. That is because it uses the Web Speech API, which is only supported by Chrome.

Just click the "START CAPTIONING" button to begin. This click will take you to a mostly black screen. Next, press the "Start Captioning" button at the bottom of this page. The first time you use this web-app you will be asked to give permission to access your microphone. Now any system audio from your microphone, audio interface, or a pre-recorded file will be captured, and Web Captioner will create text from any dialog. If you would like to route audio out of OBS and into Web-Captioner you can do so using a virtual audio cable and the **Audio Monitor** filter you learned about earlier in this book.

Getting this into OBS is as simple as adding a new **Window Capture** source and choosing the Chrome window showing Web Captioner. That will bring in the entire window, and it can be used like any other

source. However, it isn't very likely that most users will want to show a full screen of captions. So instead, you can use OBS's built-in tools to crop, resize, and move the window.

If you want access to more tools to customize your caption text, return to your Chrome browsers and Web Captioner. Click on the three-dot menu at the bottom right of the screen to launch the menu and click **Settings**. Here you can adjust nearly every aspect of the look and format of the caption text. Under "Appearance," you can change fonts, text color, line height, letter spacing, alignment, capitalization, and even background color.

On the General tab of the settings, you can control what will happen when there is no audio. For example, when you or your video host stop speaking, you can have it do nothing and hold on to the last words, add between one and five line breaks, or clear the entire transcript. If you want to save your settings, just sign up for a free account and be sure you are signed in.

Using Chroma Key for a Transparent Background

If you would like your captions to display with a transparent background in your OBS production, you will need to take steps in the Web Captioner Setting and in OBS.

1. In Web Captioner, open the **Settings** menu and select the Appearance tab. Be sure the text color is correct for your needs.
2. Scroll down to **Background Color**. Change it green or whatever key color type you wish to use for your chroma key. If you aren't sure, type "0 177 64" into the RGB fields.
3. In OBS, right-click on the **Window Capture** source you set up for Web Captioner. and select **Filters.**
4. In **Effect Filters,** click + and select **Chroma Ke,y** and give it a name. Click OK.
5. Click on your new filter in the **Effect Filters** box. If you used green, you should see it already replaced with grey. Below you can change the **Key Color Type** and fine-tune the chroma key.

Getting Started with Web Captioner - Option 2 - Embedded Closed Captioning

While Web Capture is not a plug-in, this method of use does require the installation of the OBS Websocket plug-in. The Websocket plug-in is covered elsewhere in this section. This method will encode closed-caption data into your stream. While you won't see the text in OBS, viewers will be able to use the "CC" button to turn on captions on platforms like Facebook, YouTube, and Twitch.

Note: This method requires OBS Studio Version 26.1 or later.

1. Be sure the WebSocket plug-in is installed and restart OBS.
2. In OBS, go to **Tools** and select **WebSockets Server Settings.**
3. Enable the WebSockets server and then set the port number. Adding a password is optional but recommended.
4. Return to Web Captioner in your Chrome web browser and open the Settings menu.
5. Select the Channels tab and select OBS Studio. Enter the port number and password you previously added in OBS.

How is Web Captioner Being Used?

Educational and Instructional Content

Many instructors teaching in online virtual classrooms know that captions can be critical for many different types of learners. Teachers often want to control their captions and feel uncomfortable with anything auto generated outside their control. They also might be using a teaching or video conferencing platform that does not provide auto-captions. More instructors are starting to use OBS and connecting it to Google Meet, Zoom, Skype, Microsoft Teams, and other video conferencing software.

Conferences and Events

Even after the pandemic, virtual and hybrid conferences and events will continue to allow people to connect to resources and colleagues without the cost and time associated with travel. The online virtual component becomes far more accessible when live captioning is available. This benefit may be significant for attendees traveling from

other countries who don't speak the primary language of the conference. People who are less than fluent can have an easier time if they can see the text simultaneously.

Houses of Worship
Houses of worship strive to be accessible to as many people as possible. With more people than ever attending online, they need platforms like Web Captioner to ensure accurate captions for sermons and other spoken-word content.

Pros and Cons
Pros: It's free. It has Multiple setup options. It's easy to use with OBS.
Cons: No punctuation unless explicitly spoken (i.e., question mark.), Some users find it frustrating that the Web Captioner Chrome window needs to remain open for the screen capture method to work.

Alternatives To Web Captioner
Closed Captioning via Google Speech Recognition
(https://obsproject.com/forum/resources/closed-captioning-via-google-speech-recognition.833/)
This plug-in provides closed captioning via the same Google Cloud Speech Recognition API as Web Captioner but in a standalone OBS plug-in. Unfortunately, since it uses Twitch's built-in caption support, it only works on that platform.
Caption.Ninja

This bare-bones option works similarly to Web Captioner but only allows for the Screen Capture method. It also lacks any customization settings, so you get black letters on a white background as your only option.

Key Takeaways

1. Web Captioner is an easy and powerful way to add live

captioning to your video production.

2. Web Captioned can be used to add captions on-screen with screen capture or embedding captions into your production via a web-browser input

22 USING WEB-CAPTIONER WITH NDI

Now that you have learned how to use NDI and the web-captioner tool, you can apply these skills to expand your capabilities with video production. In this chapter, you will learn how to use NDI to capture the output of one OBS streaming system with a second computer. Using a second computer, you can create a stream that accommodates a second language and optionally include closed captions. Additionally, you can create a private Zoom or Teams meeting designed to provide accessibility that includes closed captions, sign language and additional language translations.

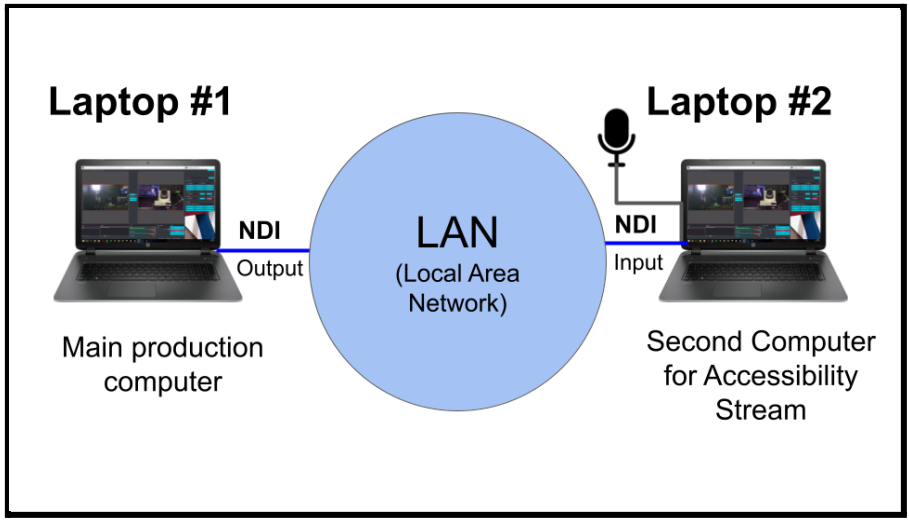
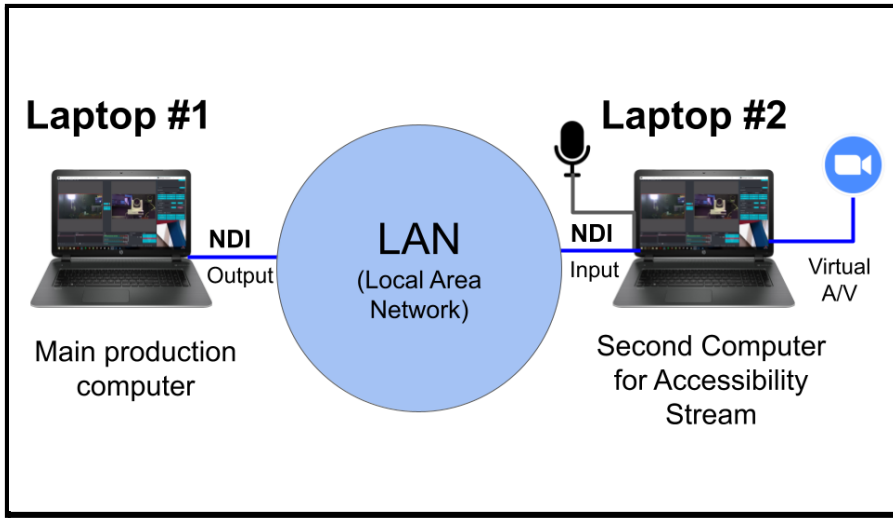


Diagram showing the LAN connecting two computers using OBS and NDI.

As you can see from above, two computers on the same LAN are using the NDI plugin for OBS to send video. The second laptop has its own microphone that can be used by an interpreter to provide a translated live stream. Using a technology like NDI is great for the local area network because you can connect two computers together to create a second modified production from the original version. Using the

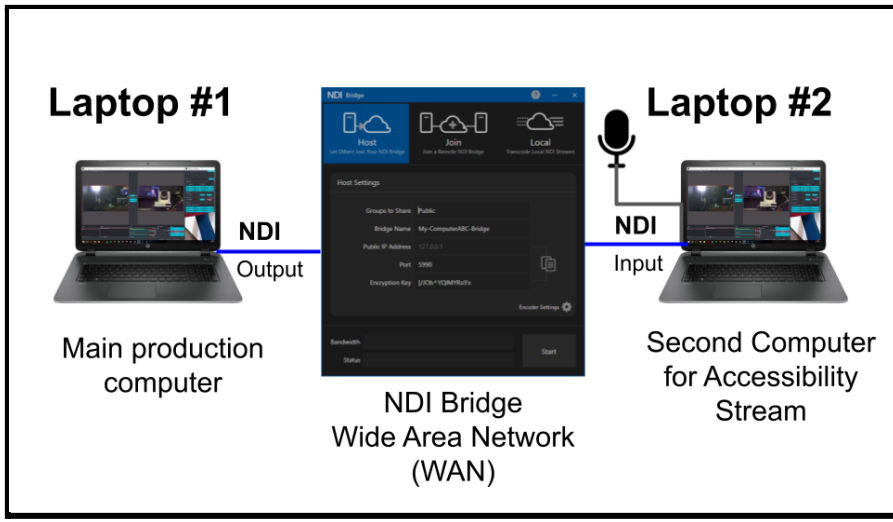
second computer, you can change the audio source and create a new set of closed captions using web-captioner. To do this, you would use the second computer's audio source with Webcaptioner as explained in chapter X. This would allow you to display closed captions in the language that you are choosing for your second stream. You can also add a second camera to this system to provide a picture in picture view of a sign-language interpreter.



OBS can be used to create custom video content for private video meetings on software such as Zoom.

An easy way to add an interpreter to your second production would be to use a software like Zoom or VDO.ninja. NDI even has a solution for connecting to remote guests called NDI Remote. Using virtual video and audio cables you are able to connect to a remote interpreter who can contribute video and audio to your secondary production. You may decide to bring audio and video into your production with a software like VDO.ninja to connect to your interpreter. Then you can output that video to a private meeting software such as Zoom to create an accessibility area which provides close captions, sign language and translation services. On your main stream you may promote access to the accessibility area via a QR code or lower third animation letting people know that it is available.

Note: Zoom does offer paid translation services for many of their customers. It might be easier than trying to hire your own translator.



The NDI Bridge is able to connect multiple computers together over the public internet (WAN).

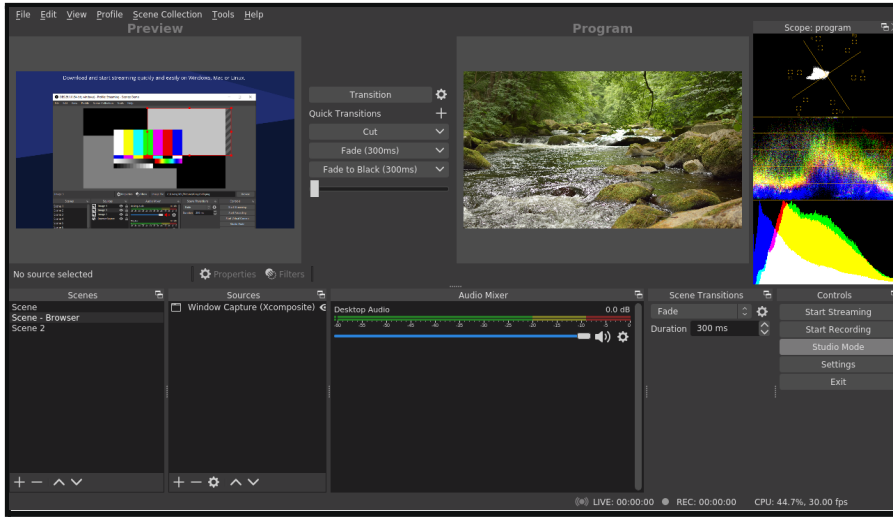
For those who are technically inclined, using the NDI Bridge may become a useful tool for these types of workflows. Many video production companies can help their clients create new and dynamic live streams without having to fly out to be on-site by using the NDI Bridge. Essentially, the NDI Bridge allows one OBS computer to output NDI directly to another that is anywhere in the world. One OBS computer would be the NDI Bridge host and the other would simply "Join" the NDI Bridge from a remote location. The NDI Bridge does require the host to open up a port on their network for the video traffic to flow properly, but this is easy to do with a little networking knowledge. In this scenario, you are not restricted to computers within your local area network. This allows you to expand your OBS production capabilities for collaboration possibilities and much more.

Key Takeaways:

1. Closed captions can be used to provide a highly accessible live stream.
2. Multiple computers can be connected together with NDI and your network to create new and unique streams.
3. Using a second computer with OBS is a great way to add closed captions to video production designed for accessibility.

23 OBS COLOR MONITOR

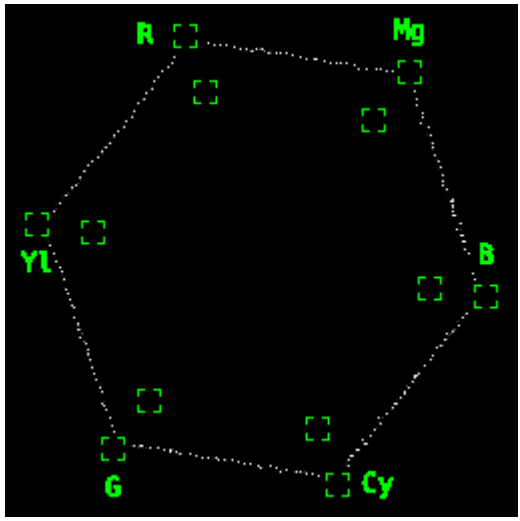
Many video production professionals have learned how to color grade video with professional tools such as waveform monitors, vectorscope and histograms. These tools are available in non-linear editing (NLE) software programs such as Adobe Premiere, DaVinci Resolve, and Final Cut Pro but also in live video production software solutions such as vMix and the NewTek TriCaster. Live color grading tools help aid professionals who are color grading video sources. While monitors and scopes can look intimidating, once you understand how they work, you will wonder how you ever used color correction tools without them.



Color scopes can be added to the OBS interface as a side bar.

Today, many of these tools have been made available to OBS users via a new plugin called OBS Color Monitor. This tool allows you to view three essential color grading monitors for any video source in OBS. Learning how to use these video monitoring tools will help you color

grade video inside of OBS. The first tool is the waveform monitor which displays color brightness broken out into red, green and blue charted on a graph. The waveform monitor will easily help you see which colors need to be altered to achieve a variety of color grading improvements. The second tool is the vectorscope which is a graph that focuses on color accuracy. The vectorscope monitor allows you to see how color adjustments mainly from hue and saturation affect the video. Finally, a histogram monitor is available to quickly see the brightness of each color value with red, green and blue plotted out on a live chart.



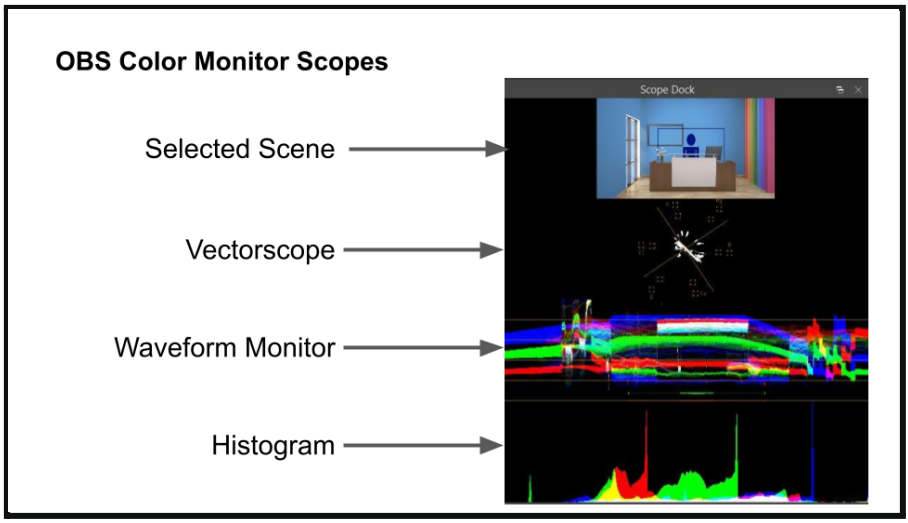
Vectorscope show areas on a graph where the perfect representation of each color should be.

Learning about a Vectorscope

A Vectorscope is a monitor that represents the color of your image. It is an x and y graph representation of the color accuracy of your live video feed. Each major color is displayed on the graph with an area that represents the perfect area of true color representation. At the top left

side of a Vectorscope you have red. Toward the bottom you have cyan and green. The Vectorscope graph allows you to see the balance of the colors coming from the live video source you are monitoring by overlaying the values on top of the ideal color value positions.

One example of how to use a Vectorscope to accurately tune a camera source, is to put a color checker chart on camera and look at the vectorscope values. A color checker chart is a tool that features color accurate swatches printed on a physical area that can be used on camera. In a perfect world, a color checker chart on camera should produce lines in a vectorscope that connect the image with the ideal colors on the graph. A Vectorscope is a tool that is ideal for live video color correction without having to rely on your own eyes and potentially inaccurate monitor representations of an image. The Vectorscope is all about color and provides you with tools to accurately adjust your camera settings. You should always adjust the camera source you are using before you use **OBS Color Correction** filters. For example, you can use the Vectorscope to choose an accurate color balance mode on the camera before you adjust the gamma or hue in OBS. Once the camera has been accurately tuned the finishing color corrections can be done inside of OBS.



OBS scopes are nested together for easy previewing.

Learning about a Waveform Monitor

For those with color correction experience or those who want to learn, OBS Color Monitor also includes a Waveform Monitor. The Waveform Monitor is the counterpart for the Vectorscope available to handle brightness and exposure for your video source. With a Waveform Monitor, you can easily see if your image is clipping at the top or if the blacks are getting crushed. The Waveform Monitor will allow camera operators the ability to adjust the image preferably in the camera first to ensure your image has a good exposure.

Ideally, you want your camera's image to be within the limits of your Waveform Monitor. You can use the Waveform Monitor to make sure your video has perfect whites and blacks using the Color Correction filters as needed to make adjustments. A Waveform Monitor is essential for completing precise color correction adjustments. This can often help even novices detect and correct color issues. When you are reading the Waveform Monitor keep in mind that red, green and blue graphs

are actually stacked on top of each other. Each graph represents how bright or dark the individual color is represented in the video. Looking at these colors on a graph helps you determine which color may need to be adjusted in order to balance the image with the color grade you are looking for.

Learning about Histograms

Histograms are very easy graphs to look at because they read left to right giving red, green and blue colors very clear representation. The horizontal axis on the chart represents brightness (or luminance) and the vertical axis shows the percentage of pixels that are in the image of the specific color. Using a Histogram, you can see exactly how bright 100% of all red, green and blue pixels in your image are. In this way, histograms that represent lighter images would have data mainly on the right side of the graph. On the other side, Histograms representing dark images would mainly have information on the left side of the graph. Furthermore, each color is represented individually to allow you to adjust colors and see their overall effect on the image plotted out in an easy to visualize monitor.

Conclusion

Knowing the problem you want to solve is always half the battle. The OBS Color Monitor plugin gives you the tools necessary to perform live color corrections based on live results. Color monitors take the guesswork out of the color grading process. Using professional video monitoring tools allow you to remove unavoidable imperfections in color representation from the human eye and physical displays. While the actual OBS color correction filter could use an upgrade in the future, the OBS Color Monitor tools provide a huge leap forward for professional color correction with OBS.

Key Takeaways:

1. Monitoring colors is ideal when you are trying to match multiple cameras together.

24 USING IP VIDEO WITH OBS

The live streaming industry is going through a renaissance of innovation. This is specifically true in the IP video space. The entire broadcast industry is well on its way to working with IP video and OBS is no exception. You can look no further than the top downloaded OBS plugins page for proof. You will find the NewTek NDI® (Network Device Interface) plugin with more than 1.7 million downloads. You will also find detailed support pages on OBSProject.com explaining how Secure Reliable Transport (SRT) works for sending video over IP around the world from one OBS computer to another. Other IP video systems such as VDO.ninja are bringing cutting-edge peer-to-peer video and screen sharing to OBS as well. A new open source IP Video standard to keep your eye on is called IPMX.

The great news is NDI®, SRT, IPMX and VDO.ninja are all free to use. It seems like each year there are new and innovative ways to leverage networking equipment with OBS to increase what's possible with video production. Some IP video technologies are easier to use than others, and most will require some high level networking knowledge. In this book, it is assumed that you have already read *The Unofficial Guide to OBS* which includes an entire chapter on networking basics. Therefore, you should already be familiar with standard networking equipment such as routers, network switches and WiFi access points. You should also know how to identify your computer's IP address, access your network router and connect devices to your network with ethernet cabling.

WIth even a basic understanding of networking you can start to transform the way you use OBS with IP video. For example, using NDI

you can quickly connect the video and audio between two computers connected to your network. In this way, you can set up one dedicated computer for streaming and another for a high-performance task such as gaming or multi-camera capture. Using IP video will allow you to connect to cameras over the network making it easier and less expensive to capture video sources. IP video technology has become so advanced that it is now possible to skip the purchase of expensive capture cards and use off the shelf networking equipment instead.

The following three chapters will outline VDO.ninja, NDI and SRT in use with OBS. VDO.ninja is one of the easiest solutions for quickly bringing video into your OBS production from another computer anywhere in the world with internet access. It requires no downloads or drivers to be installed because it's browser based. NDI on the other hand, does require the NDI plugin for OBS and the NDI tools that you can download at NDI.tv. As you start to recognize opportunities to use IP video on your network the NDI toolset may become very useful to you. NDI will allow you to send video to and from computers on your network. There are many devices that support NDI. You can even use NDI with video production software such as Adobe Premiere and After Effects. For those looking to set up video streams that span the globe, a chapter will be dedicated to using SRT with OBS. SRT is a protocol designed specifically for sending and receiving IP video over the wide area network (WAN). Finally, due to popular demand, a chapter will be included to cover Real Time Streaming Protocol (RTSP). RTSP video streams are available from a variety of camera manufacturers and the stream type allows you to pull video from network connected cameras into your OBS production.

So get your networking equipment ready and prepare to download some free IP video tools that will open your eyes to the limitless possibilities OBS holds for video productions.

Key Takeaways:

1. There are new ways to connect video into OBS beyond capture cards and USB connections today.
2. There are multiple ways to connect video to OBS over a network connection including NDI, SRT, RTSP and VDO.ninja.

25 USING VDO.NINJA WITH OBS

VDO.ninja (formerly known as OBS.ninja) is a quick and easy way to add live video into your OBS production from a smartphone, a tablet or a remote computer. VDO.ninja is totally free and available as a free web service but it can also be customized and deployed on your own private server. The nice thing about VDO.ninja is that it has been designed around the OBS use case and has great documentation on how to use it to bring remote guests into your OBS production. The technology behind VDO.ninja is called WebRTC which is a free and open source standard for online communications.

VDO.Ninja needs just two things to work properly.

- Someone sending a video feed from their device
- Someone accepting that video feed

To get started you can visit VDO.ninja and **Create a Room**. When you are creating a room you can decide if you would like the guests to only see the director's video or if you would like the director to appear in scenes. Once you have created the room you will be given a link to invite guests. You will notice the developers have created over 30 ways to customize the guest experience including a pro-audio mode, 1080p 60fps video mode, low-CPU broadcast mode and much more.

While many people may use VDO.ninja to bring in remote guests into their production, the solution can be used for simple IP video solutions such as connecting the video from a smartphone into your OBS production. Here is a short list of use cases.

- Allow your mobile device to be used as a wireless remote camera.
- Pull in other people's video and audio for podcasting/broadcast (guest appearances)
- For sharing high-quality and low-latency audio and video across the Internet and within LANs.
- Bring a friend's remote game stream into your OBS and do side-by-side gaming together.
- For high-quality audio streaming, including remote DJing
- Wirelessly stream video from any pro camera using just a $10 Raspberry Pi and HDMI adapter.
- For sending any streaming-data peer-to-peer over the Internet in a few lines of code, including JSON.
- Use as a remote low-latency teleprompter feed.
- Recording remote or local video at high quality without needing any downloads.

Using VDO.ninja to connect a smartphone to your OBS production has become a popular solution to add a wireless camera to OBS. Perhaps the most popular solution for VDO.ninja is the ability to remotely connect with guests in your OBS production for interviews and podcasts. In fact, a group room inside of VDO.ninja can handle up to 30 guests. Each person in the room will be able to see and hear each other using their web-browsers to connect their cameras, microphones and speakers.

Capturing a single source of video or an entire group of guests into OBS is quite easy. All you have to do is copy and paste the **Capture a Group Scene** link using a web-browser source in OBS. When doing so, un-check the **Local file** box because you will be entering in the HTTP address you copied from your VDO.ninja room. You can choose almost any resolution but either 1280x720 or 1920x1080 is

recommended. Next you should check **Control audio via OBS**. You can optionally choose to add **Custom CSS** to change the appearance of source inside of OBS.

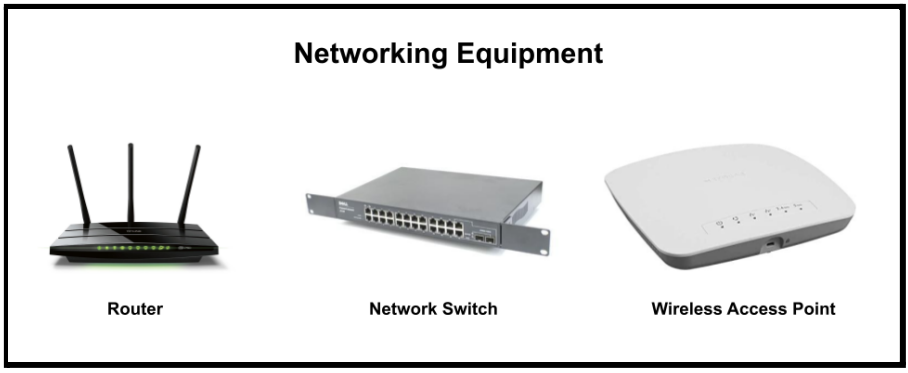
VDO.ninja is an ideal solution for professional productions because unlike most video communication tools, it has the flexibility to adjust bitrates and customize the entire experience for your production. You can of course use a paid solution such as Zoom or Microsoft Teams but these solutions are designed for meetings and do not always meet the requirements of live video productions. VDO.ninja has become a popular tool for OBS users looking for free and open solutions to improve their video production capabilities.

Key Takeaways:

1. VDO.ninja is a totally free tool you can use to bring video into OBS from any device with a camera and internet access.
2. VDO.ninja is an ideal way to bring guests into your OBS production because it supports two way audio and video communications via a web-browser connection.

25 NETWORKING & NDI

At the heart of NDI® connectivity is your local area network (LAN). A LAN is a group of computers and other hardware or devices that are connected using established networking protocols. These devices may be connected using ethernet cables or via WiFi connectivity. A LAN can be as simple as a computer, tablet, or printer connected on a basic home network, or as complicated as hundreds of computers and devices in an office building. All computers and devices connected with networking equipment are considered part of a local area network. Outside of the LAN is the wide area network (WAN). An Internet Service Provider (ISP) provides LANs with a secure connection to the WAN which delivers internet access.



Common types of networking equipment.

A router is a common type of networking equipment which provides a safe communication space for computers connected to the network to access the internet. The rules of the LAN are generally managed by the router which has a management page that can be accessed securely by a computer on the network. The router manages the other computers and devices on the network and can even give devices IP addresses automatically using a protocol called Dynamic Host Configuration Protocol (DHCP). Some routers include a built-in network switch, but

most are connected to a larger network switch which provides connectivity between all of the devices on the network. Some routers include WiFi connectivity with a built-in Wireless Access Point (WAP). Many networks distribute WAPs throughout an area to provide WiFi connectivity throughout a large space. Each WAP should be connected to the network with ethernet cables and many are Power Over Ethernet (PoE) capable. A PoE device can be powered by PoE enabled networking equipment using standard ethernet cables.

Below is an example of an IP address table. It's important that you are organized when it comes to managing the 254 IP addresses available on a single IP range, in order to effectively manage your LAN.

IP Address	Device
192.168.1.0	This is the network number that identifies the network as a whole.
192.168.1.1	This is assigned to the router
192.168.1.2-254	These addresses may be assigned to devices on your network.
192.168.1.255	This is the broadcast address. Anything sent to this address is automatically broadcast to IP addresses 1-254.

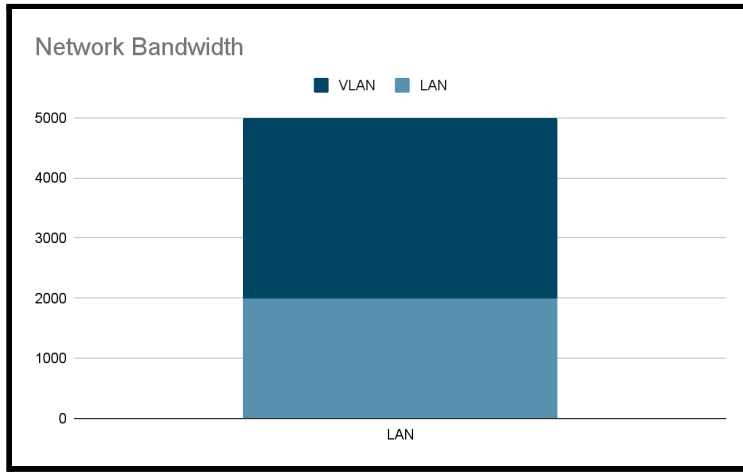
Don't worry if the IP addresses on your network are different. The starting numbers can vary depending on how the network is set up.

Besides the computers and devices that are a part of the network, LANs require additional hardware to keep everything connected. In a home or small office, the network may be managed by a single router. ISPs often provide multipurpose all-in-one routers that offer access to the internet (via cable, fiber, or other connection). They also provide a wired and/or wireless network connection that enables connected devices to communicate with the internet and other devices on the LAN. Larger and more robust LANs may require additional hardware such as routers, switches, firewalls, and wireless access points.

Professional-grade equipment at this level allows for more devices, better security, and network management.

There are several possibilities regarding the type of LAN you will be using for your NDI® set-up. In many cases, you will use your existing network. In that case, it will just be a matter of ensuring that your network is correctly configured and has the necessary capacity. In large organizations with more complex LANs, you may need to work with a network administrator to ensure that your NDI® devices and software have the required access and permissions. A network administrator can also help assign the correct IP address to communicate across the network and ensure that there's enough available bandwidth to handle your set-up.

In some situations, the administrator can also prioritize video traffic to avoid latency issues when there is too much traffic on the network. You may need to set up your own network for use specifically with NDI®. It's possible to connect a computer to multiple LANs at the same time. This is easy to do if your computer has two Network Interface Cards (NICs). If your computer only has one NIC, you can purchase a USB to ethernet adapter to add an additional NIC port to your computer. Adding an additional NIC port will increase the amount of bandwidth your computer can access. Because NDI® can load balance multiple NIC cards on a computer, this is an easy way to increase the amount of NDI® sources you can use for your video production.



This example LAN shows bandwidth partitioning for a VLAN.

A virtual LAN (VLAN) can be used to set up a segmented part of a network specifically for NDI. Network administrators can set up a VLAN to partition resources inside of a larger LAN and provide additional reliability and security. VLANs are ideal for limiting network access to specific computers. A VLAN is ideal for NDI video traffic because you can reduce network traffic and the potential for packet collisions. Most networking equipment allows you to create a large number of VLANs. Each VLAN can be set up with access to specific resources on the network. The example above shows a VLAN that has been set up within a 5 gigabit network. The example VLAN has been set up with access to 3 gigabits of bandwidth.

Networking equipment does have limitations which are important to understand when you're working with NDI® video. NDI® is designed to work on networking hardware that supports gigabit or greater transfer speeds. But what is a gigabit? Bits are units of measurement used to represent data transfer. Gigabit networking hardware can send and receive 1,000 megabits of data every second. Ten-gigabit networking hardware can send and receive 10,000 megabits of data every second. NDI® video traffic will use this available bandwidth on your network to send and receive video. Therefore, it's useful to know

how much bandwidth each NDI® video source will require and the maximum amount of bandwidth available on your LAN.

Here at the StreamGeeks

The StreamGeeks are a small team of content creators from West Chester, PA, USA who produce live shows and video content all about live streaming. The StreamGeeks have been using NDI® in a variety of ways to produce video content, live streams, and webinars. The team at StreamGeeks uses NDI® with OBS often to capture presentation materials, manage Zoom meeting participants, social media comments, and cameras.

Simple Presentation Slides

During most live streams and video recordings, the team at StreamGeeks creates a presentation. This presentation is made with Google Slides and then runs on a computer in the studio. The laptop displaying the presentations is connected to an HDMI monitor so that it can be easily seen from any camera angle in the studio. Using NDI® Screen Capture, the "Presentation Laptop" easily sends the presentation slides directly to the "Live Streaming Computer," over the LAN.

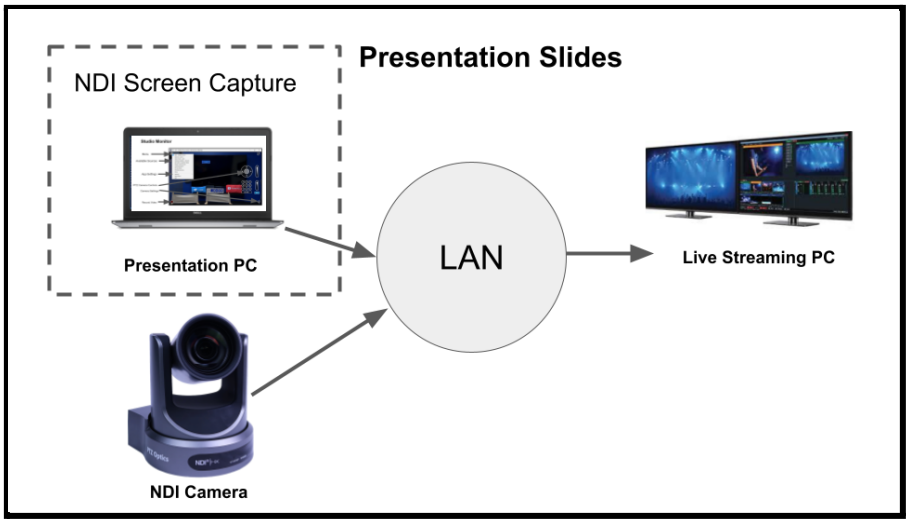
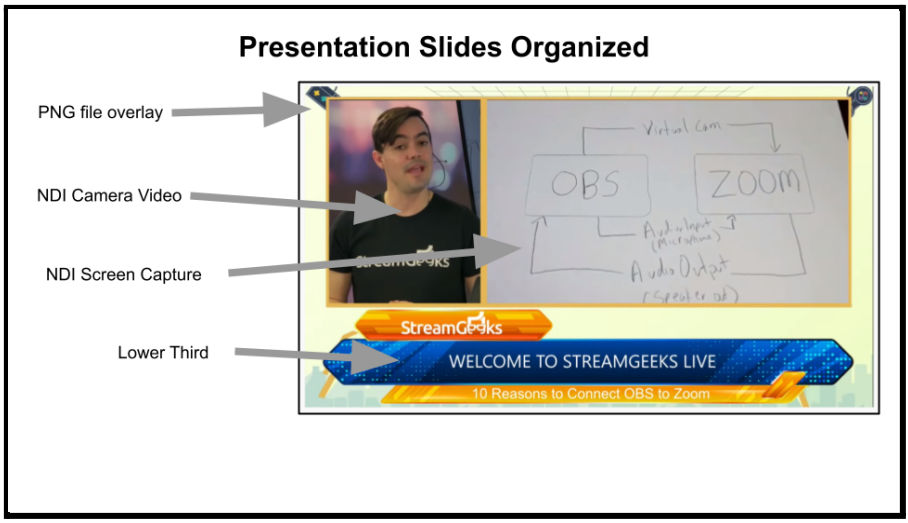


Diagram shows two computers on the same network using NDI®.

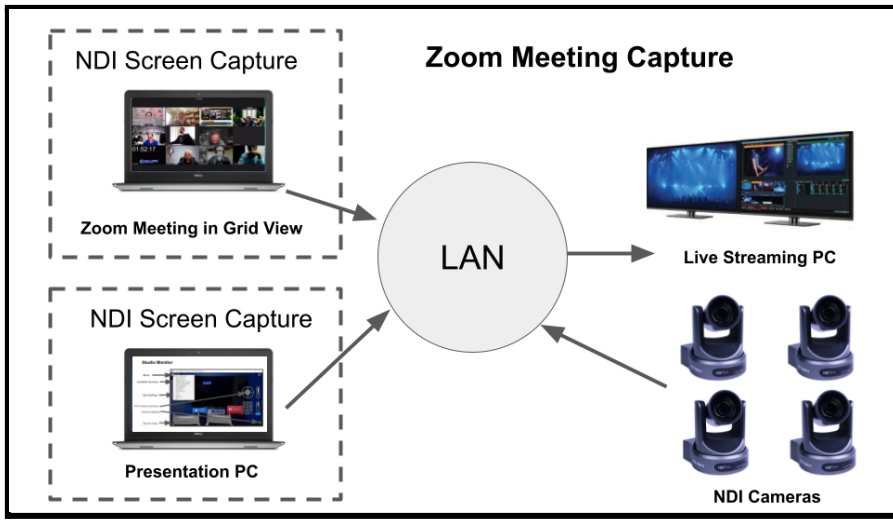
The live streaming computer uses an NDI source to bring the laptop's presentation feed into OBS. It is possible to use OBS instead of NDI Screen Capture but using the official NDI tools is a cleaner solution overall. Inside of OBS, there are multiple NDI® camera inputs, an audio input, and a variety of other media assets. One of these media assets is a PNG file that is used to organize a live camera view and the presentation slides. You can see in the screenshot below how OBS is used to layer together two NDI® video sources.



The output of OBS with multiple NDI® video sources in a live show format.

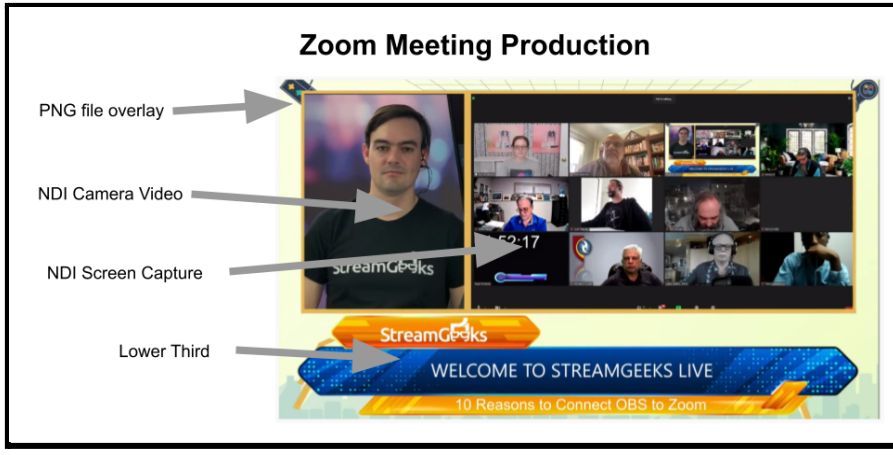
Many video productions are built from multiple layers of media sources. Local to the computer, there is a PNG file and a lower third. Underneath the transparent PNG file, there are two NDI® video sources that are connected over the network. This allows the producer the flexibility to create a scene where viewers can see the speaker next to their presentation but also cut to a full screen view of either the camera or the presentation at any time.

Capturing a Zoom Meeting



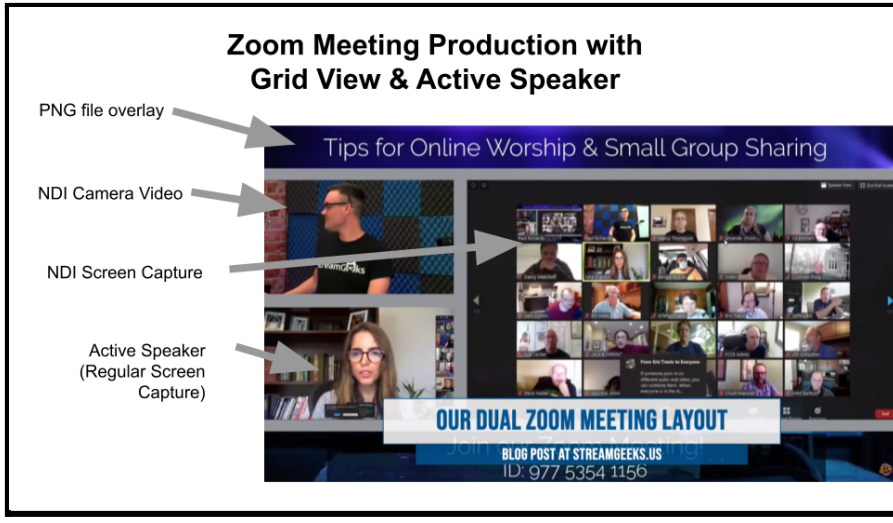
NDI® Screen Capture and a few more NDI® cameras.

The beauty of IP Video is scalability. The diagram above shows an additional four NDI® cameras and a second NDI® Screen Capture computer. It's customary to have a Zoom meeting going during most StreamGeeks' livestreams. This allows the team to connect with viewers in real time to answer questions and collaborate. Just like the presentation slides, the Zoom meeting is captured in a Grid View and made available to the producer.



Output of a StreamGeeks show with Zoom Grid View.

As you can see, NDI® video sources can easily be added to your LAN in order to provide more options for your production. The NDI® capture of Zoom meetings has become very popular. During a typical live stream, the StreamGeeks will also use a NDI® Webcam Input to bring NDI® video back into Zoom for guests who are not watching the livestream to view. To take this NDI® Zoom capture project one step further, you can see the next diagram includes two different video capture methods in the same Zoom meeting. How is this possible? Using multiple computers, the StreamGeeks will often connect to the same Zoom meeting to display the content in various ways.



A Zoom meeting with an active speaker alongside the Grid View built from NDI® video sources.

During certain livestreams, it's nice to be able to show the active speaker in a larger window. And as a producer, it's good to have the active speaker in the Zoom meeting available as its own input to appear in a full screen. Here you can see the active speaker is actually shown in a regular screen capture. This means that OBS is capturing a screen that is connected to the computer directly without NDI®. While this does take up precious monitor space, the StreamGeeks will often use NDI® on a separate computer to capture the active speaker view.

Using NDI® this way is ideal for many organizations that seek to add volunteers to their team. NDI® will allow anyone with a computer and some technical skills to contribute to the video production.

Key Takeaways:

1. NDI® is a technology that makes it easier to implement high quality video productions.
2. The StreamGeeks use NDI® in most live video productions from their studio.
3. NDI® makes it easier to work with a team and allow others to contribute content to your production.

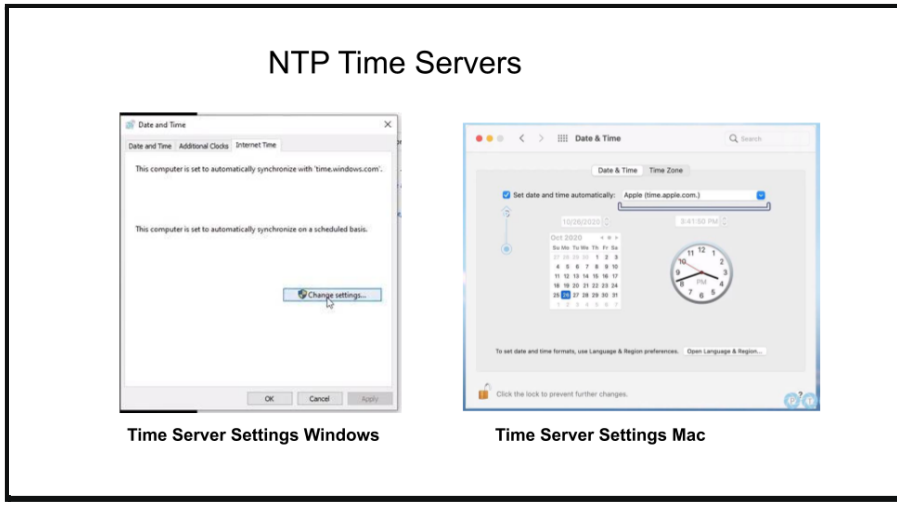
27 USING RTSP VIDEO WITH OBS

Real Time Streaming Protocol (RTSP) is a convenient way to connect video sources to OBS because it is widely available on network connected cameras. From simple security cameras to advanced production encoders, you will likely find that most network connected video devices have the ability to produce an RTSP video feed that you can pull into OBS as a source. RTSP video sources can be connected using the "Media Source" source type. Using RTSP video requires some networking knowledge because the device you are connecting to should have a unique IP address for communication.

NDI is superior to RTSP in a variety of ways. For example, NDI video sources on your network can be discovered automatically and that simplifies the process of connecting to video sources. NDI also features lower latency than RTSP in many cases which helps to reduce audio synchronization issues. Both RTSP and NDI video sources can benefit when they are synchronized with an Network Time Protocol (NTP) server. Each device that you connect with over your network should be synchronized with the same NTP time server that your computer is using.

Network Time Protocol (NTP) is a networking protocol for time synchronization and IP video connections. Network connected cameras can use this technology to synchronize multiple RTSP and NDI® video feeds. NTP servers are available all over the world and therefore video productions can choose local time servers to achieve the best performance. An NTP time server can be used to time-stamp each frame of video being sent over a network. Time-stamped video frames can be used to organize video frames in time and therefore synchronize video from multiple cameras being received into one location.

Network Time Protocol is a network protocol designed to synchronize multiple network connected computers using a network server. Network Time Servers (NTS) are available on most networks and they can be used with IP cameras and a computer that you use with them to ensure proper synchronization. The first thing you will want to do is identify the time server that your network equipment uses. It is possible to use a public time server (example: time.google.com) if you are not sure which NTP server your network uses. The router in your network should have the NTP server information and it can usually be accessed by entering the very first IP address in your network range (example: 192.168.1.1). If you are unable to determine the time server that your network uses, set the PC and cameras to the same time server. You should always select a time server that is close to your physical location. For example if you are located in Philadelphia, select a time server from NY or VA, to ensure the least amount of latency when synchronizing. You will also find a plethora of available network time servers to use with a simple Google search.



Time Server Settings Windows

Time Server Settings Mac

Time server settings on both Mac and Windows operating systems.

For Windows computers, apply the same time server information from your networking equipment into the operating system. For Windows-based computers this information is found in the "Clock and Region" section in the settings tab; select "Set the time and date." Then look for an area with "Internet Time" where you can update the NTP time settings. This process may require an administrative account to configure. You should make sure the "Synchronize with an Internet time server" is checked before you update the settings. A similar process for Mac computers can be found in the "System Preferences" area by clicking the date and time button. Mac computers can be set up to "Set Date & Time Automatically" and configured with a NTP time server.

Once you have configured your cameras and computer with these settings you should notice significantly improved performance and lower latency. To test this, follow the steps below to connect an RTSP camera to OBS.

Step 1: Connect your IP cameras to OBS

To connect an IP camera to OBS using an RTSP video feed you can use the "Media Source" input. This source can be added in the sources area by clicking the plus button. To stay organized use an identifiable name for each camera that you add as a "Media Source" and consider adding "-RTSP" to note it's type in the name. Next, you should uncheck "Local Source." Local sources are used to bring video clips and other local media sources from your computer in OBS. Next click "Restart playback when source becomes active." This allows you to use the "Input" area to enter the camera's RTSP video feed. Using PTZOptics cameras as an example you can type in "rtsp://THE-IP-ADDRESS/1" to connect to your camera's RTSP video feed. Another box to check is "Use hardware decoding when

available." Also, reduce "Network Buffering" and "Reconnect Delay" to decrease latency and performance on your network.

Step 2: Optimize OBS for IP camera viewing

The next step is to optimize OBS for IP camera connectivity. In the "Advanced," area of OBS choose "High" for "Process Priority." Next you should optimize the network settings. In "Bind IP", make sure to choose the IP address that is local to your network and not a WiFi network interface card (NIC) if possible. Some computers feature both hardwired ethernet NIC ports and WiFi NIC ports. Make sure the IP address you are using is in the same range as all of your IP cameras. Also check "Enable Network Optimizations."

Optional Tip: IP Camera Control and HTTP Commands

Some network connected cameras offer HTTP camera controls. For example, PTZOptics cameras offer an HTTP command set that you can use to move the robotically controllable PTZ camera movements within OBS. To do this, you can use a "Browser Source" and enter in the HTTP command that moves the camera. For example, with PTZOptics cameras you can enter "http://[camera ip]/cgi-bin/ptzctrl.cgi?ptzcmd&[action]&[position number]" into an OBS web-browser source and it will send the command to the camera.

Once you have connected to your RTSP video streams in OBS, you may want to perform a test to determine the latency introduced by your network. In many cases, your audio will be coming into OBS slightly faster than your video causing a lip-sync issue. Audio tends to be processed faster by computers because it requires less bandwidth. To fix this issue you can go into the audio source in the OBS audio mixer and add a small amount of latency. It's recommended to add just 25 milliseconds of latency at a time in order to find the correct amount.

In the Udemy course for this book, there is a video file you can use to

perform an audio sync test. You can also count out loud holding up five fingers and removing one per second. This is an easy way to quickly judge your video sync. Stand in front of a camera, count up to five, using your fingers as a visual cue and record the video. When you play back the video, see if you notice a lip-sync issue. Then start to add latency in small amounts until the issue is fixed. Assuming that your RTSP video feeds are using the same NTP server as your computer, the latency should remain fixed and not drift in and out of time.

You have now learned how to connect RTSP video feeds into OBS and optimize their performance. Next you can learn about sending SRT video feeds over the public internet to the other side of the world.

Key Takeaways:

1. RTSP is a common IP video source that can be used with OBS.
2. RTSP can be brought into OBS using a live media source input.
3. RTSP video sources reliability can be improved by using a NTP time server.

28 USING SRT VIDEO SOURCES WITH OBS

Secure Reliable Transport (SRT) is an open source video transport protocol released by Haivision in 2013. The SRT Alliance is a group of broadcast and streaming companies that have adopted the standard and promote its use for streaming video over the public internet (or Wide Area Network). The SRT Alliance includes hundreds of companies who have built software and hardware solutions for streaming video with SRT making it easy to find solutions for streaming with SRT.

Sending high-quality video over the public internet is not an easy task, when you consider the issues with packet loss, jitters, delays and bandwidth fluctuations. SRT has been designed to make sending video on the internet more reliable while reducing the latency. The result is usable video streams which can be used in video productions from remote locations. For example, an SRT video feed from a remote sports game can be ingested into a larger television production. SRT is becoming a favorable replacement for RTMP. In fact, development on RTMP was abandoned in 2012.

So, you may ask if SRT is so great, why does YouTube, Facebook and all the other major streaming platforms still use RTMP. The answer is that it is under development, and SRT at this point is generally used by professionals who are not your standard video producers. The good news is that OBS is capable of sending and receiving SRT video and it could become an important part of your video production workflow.

In many ways, OBS can become a television studio on your laptop. By using SRT video feeds from remote locations, you can produce high quality productions from the comfort of your home or studio. For

example, imagine you are asked to live stream an event that is happening on the other side of the world. It may be easier and more cost effective to have the event send video feeds to you over the public internet using SRT than fly you out to capture all the video locally.

Bringing SRT video into OBS

Connecting an SRT video feed to OBS works a lot like an RTSP video feed. The main difference being that SRT video feeds are being sent over the public internet and RTSP video feeds remain within the LAN. When you are connecting SRT feeds together one is considered the listening and one is considered the caller. The device you set as the caller (or listener) is arbitrary.

SRT does require an advanced level of networking knowledge and access. SRT requires that the person receiving the video knows their public IP address and opens up a port on their router to receive that video. Those interested in using SRT will need to read the technical specifications for video routing on their network before proceeding.

One simple way to test SRT video is with a smartphone using a cellular data service. There is a free application called Larix Broadcaster that can be used to send SRT video into OBS. To send SRT video into your OBS production from outside your LAN you will need to know your network's public IP address. To find your public IP address you can simply google "Find my Public IP."

The next step is to open up a port in your router (or modem) to receive the SRT video stream. Inside your router there should be a port forwarding section where you can enter the port you would like to use. Here you should select the UDP video option. Now you can finally add your SRT video stream into OBS using the "**Media Source**" source

input box. Just like an RTSP video feed, uncheck the local box and type in your SRT video information into the input field. It should be "srt://YOUR-OUTSIDE-IP-ADDRESS:THE-PORT-YOUR-SELECTED."

What you have done here is create an easy way to send video into your OBS production from outside your network. The great thing about SRT is that the video can have a specific amount of latency and therefore can be synchronized well even when sent from far away places on the other side of the world.

Sending SRT video out of OBS

OBS can also send SRT video to other places in the world using the OBS streaming settings area. If you have a known destination to send SRT video to like the example above, you can send video from one OBS instance to another. To send video out of OBS you can simply enter the SRT video destination into the OBS streaming settings area. In the drop down menu, select "custom" and then simply enter the SRT destination. You do not need to enter a stream key.

For a full list of SRT streaming options you can visit - http://ffmpeg.org/ffmpeg-protocols.html#srt

You can now start testing SRT video streaming with OBS. This is a great tool for advanced OBS video producers who are attempting to create productions that go beyond the boundaries of the LAN.

Key Takeaways:

1. SRT is an open-source video transport protocol that

works with OBS.

2. SRT is one of the industry's most reliable ways to send video over the public internet.

29 CHOOSING A COMPUTER AND ADDITIONAL HARDWARE FOR OBS

Almost any computer can be used to livestream today. With that being said, every computer has its limitations.

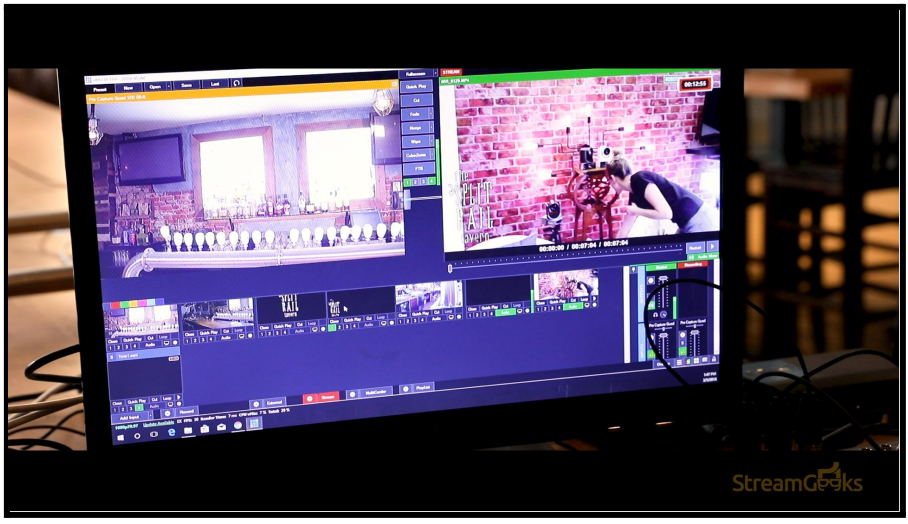
In general, you should look for an i5 computer processor @ 2.5 Ghz for streaming in 720p, and an i7 computer processor @ 3.0 Ghz for 1080p streaming. Each of these specifications also requires a minimum of 4GB of ram and 2 gigabytes of free hard drive space.

An Intel NUC i7 computer with a 256 GB SSD plugged into an ethernet LAN.

In general, you should consider using an i7 processor with 16 GBs of RAM and a solid state hard-drive for any new live streaming project with more than one or two cameras. AMD often offers a better price to performance ratio than Intel and it offers significantly better processors for livestreaming than any other company.

CPU core count/thread count as well as clock speed are of equal importance for livestreaming. So purchasing a CPU with the most cores/threads and highest clock speed within your budget is your best bet to achieve optimal performance.

Note: Different CPUs have different thread to core ratios. It is important to compare the thread count of CPUs that have the same amount of cores. For example, one 8 core CPU may use 8 threads, while another different 8 core CPU may use 16 threads. More threads is almost always better when comparing CPUs with the same number of cores. So the 16- thread 8-core CPU will likely outperform the 8-thread 8- core CPU. Most CPUs do not use more than 2 threads per core, however many use only 1 per core instead of 2.



Livestreaming computer on-site running vMix.

Having more and faster cores results in higher multi-thread counts as well as faster thread processing, thus more instructions can be executed in the same period of time. This reduces overall processing time and

latency, while also improving multitasking ability so that more programs and cameras can be run simultaneously. These capabilities are crucial for live- streaming, video gaming, and large productions. Ultra high-end streaming solutions that are used by large organizations like ESPN, may use up to 128 or even 256 cores for extremely high resolutions and low latency. On the other hand, low resolution, high latency streams that are used for applications like security camera systems may only require 2-4 cores. Simply put, the higher the stream quality and complexity, the more cores/clock speed you will need.

The 4-16 core range of CPUs offers the best streaming performance relative to the price for the average livestream. Where your use case falls on this spectrum is determined by the amount of multitasking you plan on doing during your livestreams as well as the stream quality you want to achieve. If you are streaming with only 1 program open and 1 or 2 cameras at 1080p, 4-6 cores is all you need. If you plan on having multiple programs open at once and/or streaming with multiple cameras, you will likely need 6-10 cores to achieve smooth performance. Ten-16 core CPUs are only necessary for semi-professional productions using more than 6 cameras which often use CPU-intensive programs simultaneously, such as video editing software or 3D/CGI programs.

Another important component of most livestreaming computers is the graphics card. For example, vMix recommends an NVIDIA GTX 1660 for livestreaming systems using 4 1080p cameras and an NVIDIA 2080 Ti graphics card for up to 6 4K cameras. Graphics cards are essential to most livestreaming software solutions because they take the processing off your main CPU and handle it in the graphics card. This helps reduce the number of dropped frames for video game streamers and rendering time for 3d programs during a stream.

Choosing a GPU is very similar to choosing a CPU in the sense that higher clock speeds are better. Where they differ is, instead of focusing on core count for GPUs, we will focus on VRAM, which is the memory the graphics card uses to hold information processed by the CPU. The absolute bare minimum recommended VRAM for livestreaming is 2gb. For many applications this is not realistic, however there are use cases where it is all that is needed. For the vast majority of streaming applications, 4-12 gb of VRAM is sufficient. Just like with CPUs, you will need to account for the level of multitasking you do during your livestream and choose a GPU with sufficient VRAM for your purpose. Typically, 4-8gb cards are sufficient for up to 4 1080p cameras, while 8-12 gb cards are capable of handling up to 6 4k cameras. If you want to use even more 4k cameras in your stream and/or game while using 4-6 4k cameras, you will likely need a card with 12 - 24 gb of VRAM.

Pro Tip: Make sure to go into your livestreaming software and ensure that you have enabled it to use your graphics card. Even some simple Intel NUC and laptop computers have integrated Intel Graphics cards that can be used for basic live video production systems.

The same logic can be applied to choosing DRAM, which is the computer's system memory, as opposed to the dedicated video memory found in a GPU. Like VRAM, clock speed and memory quantity are the most important factors for streaming. Where DRAM differs from VRAM, is the amount of it that is required for a smooth system performance. The simplest streaming set-ups using 1-4 cameras at 1080p will require 8-16 gb of DRAM, while using more cameras at 1080p or multiple 4k cameras will require around 16-32 gb of DRAM. More intensive multitasking situations, like Gaming in 4k while streaming multiple 4k cameras simultaneously, or Using VRAM

intensive programs while streaming, such as video editing or CGI software, can require 32-64gb of VRAM for optimal performance.

Note: All modern computer platforms (since 2017) have switched to DDR4 DRAM compatibility only, and most Intel platforms have shifted away from DDR3. So if you're looking at an 8th or 9th Gen Intel CPU or later, or an AMD Ryzen processor, you'll need DDR4.

Custom computer by ThinkComputers.org.

The type of storage you choose for your livestreaming PCwill have very little effect on your livestream performance. In general, SSDs are better in almost every way than HDDs, however buying a HDD instead of an SSD can be a good way to save money on a streaming computer without losing streaming performance. However, using HDD vs. SSD will affect the performance of some non-streaming tasks, so a SSD is always recommended over a HDD if your budget allows for it. In addition, SSDs are also significantly quieter than HDDs as they have no moving parts, which is a benefit for live productions requiring quiet on set.

Assuming that you understand the processor and graphics card requirements for your next livestreaming computer, you also need to think about inputs and outputs. For inputs, you have a bunch of options. Start by counting the number of USB ports you think you will need. Obviously you'll need a keyboard and mouse, but what about your audio mixer and a secondary USB controller like the Elgato StreamDeck? You may also want to get a built-in HDMI or SDI input. You can insert PCIe cards into many desktop computers in order to create multiple SDI or HDMI video inputs. In most cases, if you only need two cameras, it's easiest to purchase two HDMI or SDI to USB capture cards. However, if you need 3 or 4 cameras, it's easier and more affordable to purchase and install a PCIe card. You can purchase PCIe cards that can be configured to provide a couple of inputs and extra video outputs for your project. Keep in mind that most graphics cards also provide unique outputs that power confidence monitors, multiview monitors, and more.

Finally, you can use additional video switching hardware to take the processing load off of your computer and handle it in hardware. For example, if you need to set up a 6-camera livestreaming system, you can do most of the video processing and switching using a Blackmagic ATEM switcher. Then you can use a simple computer to capture a single mixed output with a capture card into a software like OBS. This approach is effective because hardware switchers rarely have computer issues such as Windows updates. The ATEM Mini is a perfect example of an affordable 4-input switcher with a built-in USB output for streaming or recording. The trade-off with hardware systems is the lack of flexibility that software switchers provide given their access to multiple cameras.

When evaluating the equipment needed for livestreaming, the first item to look for should be a camera. While you also may need a microphone, software, and other encoding hardware, considering the type of camera you need for livestreaming is the most important step in building a live video production system.

What are the different types of livestreaming cameras?

Here are all the livestreaming camera types available today, for all budget types.

1. Webcams
2. Camcorders
3. DSLR Cameras
4. PTZ Cameras
5. Broadcast Cameras

What is the best webcam for livestreaming?

Webcams are the most affordable and they offer a variety of features for livestreaming. Most webcams today are HD, which is 1280x720p or Full HD, which is 1920x1080p. Most webcams also support 30 frames per second but some also support 60 frames per second. When you are considering the resolution and frame rate of a webcam for livestreaming, think about the production software you plan to use and the bitrate you plan to stream at. If you plan to stream in 720p resolution at 30 frames per second, most streaming destinations recommend a bit-rate of 2-4 megabits per second. If you plan to stream at 1080p in 30 frames per second, use a higher bitrate between 4-6 megabits per second.

PTZOptics 1080p webcam.

Once the resolution for your livestreaming project has been determined, you can look for additional features such as electronic pan, tilt, and zoom. For example, the HuddleCamHD Pro features a 4K image sensor which digitally zooms in, pans, and tilts just like a PTZ camera. You may also consider using the HuddleCamHD Pro IP which is an NDI camera. But, before we dig into NDI cameras that can be used as webcams, let's cover camcorders.

The HuddleCamHD Pro IP is an NDI webcam.

By the way, if you are still watching this video, hit the "like" button. We check out the likes on all of our videos to see which type of videos you enjoy the most.

What is the best camcorder for livestreaming?

Camcorders will provide great video quality for your next livestreaming project and they are not that expensive. A brand new Canon VIXIA camcorder starts at only $299 and is ideal for zooming in long distances. If you are considering a camcorder for livestreaming, you need to think about how you will connect the camera to your live streaming system. Unlike a webcam, most camcorders do not have a USB port. Therefore, you should look for an HDMI output that you can use with an HDMI capture card. The card converts HDMI into a usable USB connection with any computer. Once you connect the USB from the capture card to your computer, you can bring the camcorder into a software like OBS, Wirecast, or vMix just like a webcam.

Standard camcorder.

What is the best DSLR camera for livestreaming?

Many people \ like to use DSLR cameras for livestreaming because they provide great value and performance. DSLR cameras offer isuper sharp auto-focus and interchangeable lenses that can provide beautiful, blurry backgrounds. DSLR cameras have amazing quality but they do come with their own set of challenges when used for livestreaming. Because of the popularity of livestreaming, many DSLR camera manufacturers are adding new firmware and features specifically designed for livestreaming.

A DSLR camera.

Although DSLR cameras were designed for photography and filmmaking, companies like Canon have added features that allow the USB port to be used for live streaming. When selecting a DSLR camera for livestreaming, look for a "clean" HDMI feed which is used with a capture card that does not include the on-screen display menu options. While DSLR cameras require a battery, when they are being used to livestream, they are typically plugged in for a long time. In the early years of DSLR cameras being used for livestreaming, prolonged use led to overheating. Today, most manufacturers have adapted their models to address this issue.

What is the best PTZ camera for livestreaming?

PTZ cameras are ideal for livestreaming because they combine the ease of use of a webcam with the functionality of a camcorder. This is because pan, tilt, and zoom cameras almost always include optical zoom which is used to zoom into subjects from long distances. What makes PTZ cameras unique is their ability to be remotely controlled. For

example, PTZOptics cameras can be controlled with software solutions such as vMix, Wirecast, OBS, Livestream Studio, and Mimolive. This allows a one-person production to operate the livestreaming software and automate camera controls for one or more cameras.

A PTZ camera.

PTZ cameras are built for 24/7 use and offer easy installation options such as Power Over Ethernet so you can power a PTZ camera using a single ethernet cable from your network. PTZ cameras are also very small and discreet. This makes them ideal for installing in a church, or any space that you are adding livestreaming. PTZ cameras can be installed on walls, ceilings, and even under balconies.

What is the best broadcast camera for livestreaming?

Broadcast cameras are used for professional video production environments and cinema. Cameras such as the Blackmagic URSA or Sony over-the-shoulder style cameras are expensive, but they offer large image sensors and unmatched quality. If you are considering a project with professional broadcast cameras, it's nice to know that these

cameras can also be used for field shooting and live work. If you are installing multiple broadcast cameras in the same space, it's important to test them in your studio environment. Many professional projects will use the same camera make and model to ensure consistent color matching and quality throughout the project. Consider professional broadcast cameras from Blackmagic, Sony, and Panasonic.

A camera operator uses a professional broadcast camera.

Most professional broadcast cameras connect to live video production systems via SDI but there are high quality wireless connections available as well. These SDI video connections feature locking connectors that are ideal for high-profile applications such as sports, television and production. Examples of SDI-based broadcast systems include Grass Valley video switchers, NewTek Tricasters, and Roland video switchers.

What is the best NDI camera for livestreaming?

Some would argue that the best NDI camera for live streaming is your smartphone. For example, with the latest NDI HX apps available for iOS, you can send 4K high quality video over WiFi into your video

production switcher such as OBS, Wirecast, vMix, Livestream Studio, and Tricasters. NDI cameras are also available in the form factor of a webcam, a PTZ camera, and broadcast-style over-the-shoulder cameras. NDI is a technology that in many cases can replace SDI because of its easy implementation.

NDI-enabled PTZ cameras.

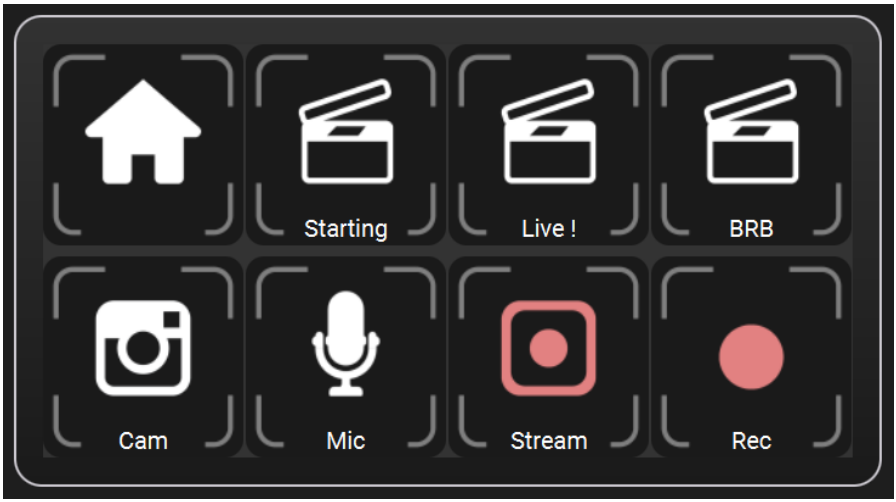
So what is the best camera for livestreaming?

The best camera for livestreaming is the camera that you have. The quality of a great webcam just might surprise you once you adjust the lock in the focus and adjust the color settings, like on the PTZOptics PT-WEBCAM-80, for example. The quality of your DSLR will improve plus you can use it to shoot great pictures for your next project. If you are permanently installing cameras in a space or setting up for larger venues, PTZ cameras will be your best bet. It's all about understanding your application of livestreaming and perhaps one day, you will be shopping for broadcast cameras to shoot a Hollywood-style livestream.

What's the best control solution for OBS?

The Elgato StreamDeck is a popular control system for OBS.

Hotkeys make it possible to control OBS with any keyboard. While keyboards are a great way to quickly control OBS, many OBS users prefer a dedicated device such as a StreamDeck or a smartphone with Touch Portal. The Elgato StreamDeck is by far the most popular hardware controller for OBS. The StreamDeck comes with a great OBS integration that is very easy to set up. All you have to do is run the StreamDeck Software which will automatically detect your OBS software. This software will allow you to drag and drop popular control functions such as scene switching or muting audio. It's very easy to get a customized OBS control surface up and running these days.



Touch Portal offers multiple icons you can download and use for free.

Touch Portal is another popular way to set up a dedicated control surface for your OBS production. Touch Portal is totally free for up to two pages of controls on your smartphone. Touch Portal leverages the web-sockets plugin for OBS to communicate with your smartphone device over WiFi. Touch Portal also uses a desktop application like StreamDeck to communicate with OBS. You can then install the iOS or Android version of Touch Portal to send commands directly to OBS with your smartphone.

Both solutions allow you to control OBS with a dedicated control area freeing up your keyboard for actual typing.

Key Takeaways:

1. OBS is often restricted by the hardware it is operating on.
2. Carefully choosing a computer to use with OBS will allow you to do more with your video productions.
3. Video production computers can also include various inputs

such as capture cards and USB ports that should be considered when building a production PC.

13 CONCLUSION

Open Broadcaster Software is the result of some very intelligent programmers who were unable to accept expensive alternatives for basic video production functionality. The response from users around the world has been so positive, OBS has become a platform hundreds of programmers gladly contribute to in order to further the noble cause. OBS is a grass-root development project that has gathered an incredible amount of momentum. New features are being released and developed each week that break new ground in an increasingly popular online landscape.

As you develop your own skills and create your next OBS projects take a moment to consider contributing to the OBS project. You can contribute code, or you can contribute funds, either way you can become an important part of the OBS community.

The online course that accompanies this book is published at Udemy.com. This course is a great way to communicate directly with me if you have any questions. Each chapter has its own dedicated tutorial video with additional online resources.

Feel free to send me an email,

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ABOUT THE AUTHOR

Paul Richards is a father, author, and business executive leading his company in the field of digital video communications. Richards is the author of multiple top-selling books including, “The Virtual Ticket,” “The Online Meeting Survival Guide,” and "Helping Your Church Livestream.”

Richards’ books draw on his hands-on experience in the multimedia technology industry. As the Director of Business Development for HuddleCamHD and PTZOptics, Richards is the host of multiple online shows that feature his work on YouTube, Facebook, LinkedIn, and Twitch.

Richards is also the Chief Streaming Officer at StreamGeeks and teaches Udemy courses online to over 50,000 registered students. Course topics include live video production, online communications, and social media connectivity.

GLOSSARY OF TERMS

3.5mm Audio Cable: Male to male stereo cable, common in standard audio uses.

4K: A high definition resolution option (3840 x 2160 pixels or 4096 x 2160 pixels)

Application Program Interface (API): A streaming API is a set of data a social media network uses to transmit on the web in real time.

Bandwidth - The range of frequencies within a given band that are used for transmitting a signal.

Broadcasting - The distribution of audio or video content to a dispersed audience via any electronic mass communications medium.

Broadcast Frame Rates - Used to describe how many frames per second are captured in broadcasting. Common frame rates in broadcast video include: **29.97fps and 59.97 fps**.

Capture Card - A device with inputs and outputs that allow a camera to connect to a computer.

Chroma Key - A video effect that allows you to layer images and manipulate color hues (i.e. green screen).

Cloud-Based Streaming - Streaming and video production interaction that occurs within the cloud, therefore accessible beyond a single user's computer device.

Color Matching - The process of managing color and lighting settings on multiple cameras to match their appearance.

Community Strategy - The strategy of building one's brand and product recognition by building meaningful relationships with an audience, partner, and client base.

Content Delivery Network (CDN) - A network of servers that delivers web-based content to an end user.

CPU (Central Processing Unit Usage) - The electronic circuitry within a computer that carries out the instructions of a computer program by performing the basic arithmetic, logical, control, and input/output (I/O) operations specified by the instructions.

DAW - Digital Audio Workstation.

DB9 Cable - A common cable connection for camera joystick serial control.

Dynamic Host Configuration Protocol (DHCP) Router - A router with a network management protocol that dynamically sets IP addresses so the server can communicate with its sources.

Encoder - A device or software that converts a piece of code or info to then distribute it.

H.264 & H.265 - Common formats of video recording, compression, and delivery.

High Definition Multimedia Interface (HDMI) - A cable commonly used for transmitting audio/video.

High Efficiency Video Coding (HEVC) - H.264, one of the most common formats of video, MJPEG-H Part 2.

Internet Protocol (IP) Camera/Video - A camera or video source that can send and receive information via a network & internet.

IP Control - The ability to control/connect a camera or device via a network or internet.

Latency - The time it takes between sending a signal and the recipient receiving it.

Livestreaming - The process of sending and receiving audio and or video over the internet.

Local Area Network (LAN) - A network of computers linked together in one location.

Multicorder - A feature of streaming software that allows the user to record raw footage or a camera feed to a file separate from the stream output.

Network Device Interface (NDI®) - A software standard developed by NewTek to enable video-compatible products to communicate, deliver, and receive broadcast quality video in a high quality, low latency manner that is frame-accurate and suitable for switching in a live production environment.

NDI® Camera - A camera that allows you to send and receive video over your LAN.

NDI®|HX - NDI® High Efficiency, optimizes NDI® for limited bandwidth environments.

Network - A digital telecommunications network which allows nodes to share resources. In computer networks, computing devices exchange data with each other using connections between nodes.

NTSC - Video standard used in North America.

OTT Streaming (Over-The-Top) - When a media service bypasses conventional typical media outlets and distribution networks (ie. Facebook, YouTube, Twitch) to distribute content.

PAL - Analog video format widely used outside of North America.

PCIe Card - Enables high bandwidth communication between a device and the computer's motherboard.

PoE - Power over ethernet.

PTZ - Pan, tilt, zoom.

RS-232 - Serial camera control transmission.

Real Time Messaging Protocol (RTMP) - RTMP is a standard protocol for sending and receiving video. RTMP is used to deliver video streams over the public internet to CDNs such as Facebook or YouTube.

Real Time Streaming Protocol (RTSP) - Network control protocol for streaming from point to point.

Additional Online Courses:

Join over 50,000 other students who are learning how to use the power of livestreaming! Take the following courses taught by Paul Richards for free by downloading the course coupon codes available at streamgeeks.us/start.

- **Facebook Live Streaming** - *Beginner*

This course will take you through the basics of Facebook Live. The course has been updated twice and includes instructions for using Facebook Live Reactions.

- **YouTube Live Streaming** - *Beginner*

This course covers the basics of YouTube Live.. It also includes essential branding and marketing tips.

- **Introduction to OBS (Open Broadcaster Software)**

This course covers one of the world's most popular FREE livestreaming software solutions. OBS is a great place to start live streaming for free.

- **Introduction to xSplit Software** - *Beginner*

This course takes you through xSplit which has more features than OBS but costs roughly $5/month. Learn how to create impressive live productions and make your videos much faster with xSplit.

- **Introduction to vMix** - *Intermediate*

The vMix Windows-based software tool will have you livestreaming like the pros in no time.

- **Introduction to Wirecast** - *Intermediate*

Wirecast is the preferred software for many professional livestreamers and is

available for Mac and PC.

- **Introduction to NewTek NDI®** - *Intermediate*

NewTek's innovative IP video standard NDI® (Network Device Interface) will change the way you think about live video production. Learn how to use this innovative new technology for livestreaming and video production system design.

- **Introduction to Livestreaming course** - *Beginner*

This course includes everything you need to start designing your show like a starter pack of course files including Photoshop, After Effects, and free Virtual Sets.

- **Introduction to Livestreaming** - *Intermediate*

This course focuses on more advanced techniques for optimizing your production workflow and using compression to get the most out of your processor. This course includes files for Photoshop, After Effects, and free Virtual Sets.

- **Helping Your Church Livetsream** - *Intermediate*

This course focuses on livestreaming for churches and houses of worship. We tackle some of the specific challenges about live streaming in a house of worship.

- **How to Livestream A Wedding** - *Beginner*

This is a great course for anyone looking to start livestreaming weddings. It was originally designed for wedding photographers to add a livestreaming service to their existing portfolio of offerings.