



Community of Christ

Supporting Hybrid Worship

Recommendations to create a unified
experience which integrates online and in-
person worship participants

**COMPLETE
GUIDE**

Supporting Hybrid Worship

Recommendations to integrate online and in-person worship participants creating a unified experience we call “hybrid.”

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Introduction

President Veazey offered these words of counsel at the end of the 2019 World Conference, “...be the peace of Jesus Christ. As you do, you will discover a variety of ways in which spiritual community forms and flows as expressions of the gospel of peace.”

Building and nurturing community of any kind takes commitment and dedication. The pandemic has opened a broader understanding of what it means to be in community as many areas of the church shifted rapidly to online ministries. New opportunities for worship, community-building, disciple and leader formation, and mission through technology are providing positive local and global experiences. However, building and nurturing a community that is both in person and online can be even more challenging!

How To Use This Guide

This guide was created by an international team of volunteers informed by their collective experience in streaming and hosting online worship and gatherings.

Congregations, mission centers, and campgrounds can use it to help navigate through the process of envisioning and implementing a hybrid worship model that can serve its ministry and mission goals. This includes best practices, technology, roles, and procedures, aimed at embracing participants regardless of their location while making everyone feel safe.

Hybrid worship allows people to participate in worship online and in a church building. Preparation and practice are vitally important when it comes to using Zoom and planning for the hybrid worship. The more preparation and practice you put into the technical parts of using a video conference service (Zoom or other) and running a hybrid worship, the more smoothly a worship will run.

This document also includes several appendices. These discuss different technologies in-depth and summarize the ever-changing plethora of devices, software, and other market solutions. The information can equip your group to make informed budgetary decisions if needed. Please note that the limitations and availability of technological solutions may have changed since this document was released in November 2021.

Glossary of Terms

A few simple definitions will help clarify terms used throughout this resource. Feel free to modify the terminology to match your context and need. We have defined them below for consistency.

In-person participant: a person physically at the event with others who have gathered.

Online participant: a person who has joined the event from their device at a different location.

Broadcast Worship: a worship experience intended for passive viewing with no interactive elements included (sometimes called “streaming” or “webcast”).

Zoom Church: a worship experience where all participants are online. There is no physical gathering of any group

Hybrid Worship: a worship experience that can be accessed online and in person. Online participants and in-person participants can interact with each other. Online participants can lead elements of the worship in the same way an in-person participant might lead worship.

In-person Coordinator: person who is present in the host location (church building or other physical venue) to set up the video and audio equipment, share slides or other visuals, can mute or unmute as needed.

Online Coordinator: person who is host or co-host of video conference meetings (i.e. Zoom meeting) and supports worship leaders with welcoming, muting/unmuting other online participants, and social interaction before and after worship.

Feel free to modify the terminology to match your context and need.

Preparation

STEP 1: What are we trying to achieve?

Before you discuss technology and expenses, it is critical to understand your ministry and mission goals.

We suggest starting a process of discernment together where you can consider questions like these. There are no right or wrong answers, but they will be unique to your context.

- Is this a hybrid community or is this an in-person service streamed as a webcast (via Zoom, YouTube, etc.)?
- How important is online participation?
- How important is in-person participation?
- How can technology nurture the community we are building?
- Are our services more like a casual conversation where anyone can add their voice or do we prefer to follow a carefully planned order of worship?
- How can online participants interact with in-person participants?
- Where would we like to be 5 or 10 years from now?

For assistance with a community discernment process, visit

<https://www.cofchrist.org/common/cms/resources/discernment-workbook-62018.pdf>.

Learn More About the Models

STEP 2 – What model should we consider?

It is common and normal to experience some anxiety and trepidation when you are just starting out, but a lot can be done with a simple stream-lined approach. Some groups will choose to add more equipment and complexity, but with some preparation and practice that becomes very doable. It is important to find the approach that best matches your group needs, comfort level, resident skills, and budget.

This guide provides several different models of connection. Each model provides different capabilities and requires different connection equipment. The chart below gives an overview of how people can connect and participate online and what activities each model supports.

How people connect	Basic	Enhanced Basic	Advanced
Online participants can be heard and seen by in-person participants	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Online participants watch in-person gathering (streaming component)		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Online participants watch in-person gathering and see in-person participants		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Online participants can interact and lead elements of the worship		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Enhanced lighting, video, audio, and switching capabilities			<input checked="" type="checkbox"/>

Equipment Needs	Basic	Enhanced Basic	Advanced
High-speed internet connection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Computer/Laptop	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Web cam	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
USB microphone	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tripod	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
USB extension cables		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Device to show in-person group		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Projector		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Screen		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
External Speakers		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Wired or wireless microphones		optional	<input checked="" type="checkbox"/>
Audio mixer board		optional	<input checked="" type="checkbox"/>
Digital Camera with zoom-in feature		optional	<input checked="" type="checkbox"/>
PTZ Solution (pan, tilt, zoom camera)			<input checked="" type="checkbox"/>
Extra lighting			<input checked="" type="checkbox"/>
Scene switcher			<input checked="" type="checkbox"/>
HDMI/SDI input interface			<input checked="" type="checkbox"/>

STEP 3 – Get details about different models

Click the links below to move directly to that model and learn what is needed for each one.

- [Basic](#)
- [Enhanced Basic](#)
- [Advanced](#)

STEP 4 – Best practices and pastoral helps

These best practices and pastoral helps are applicable for all hybrid worship models. Click the links below to move directly to those best practices.

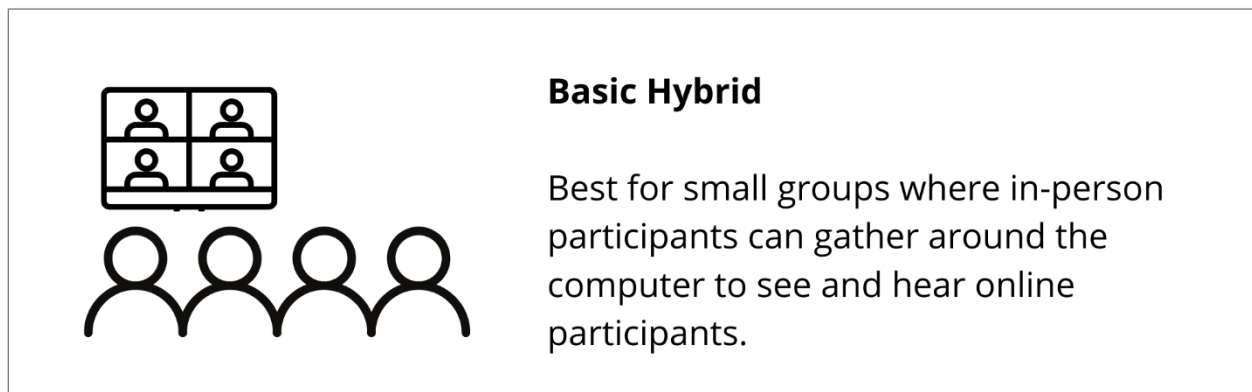
- [Worship Planning and Online Etiquette](#)
- [Supporting Tech Needs of Hybrid Worship](#)
- [Providing a Safe Environment for All](#)
- [Music and Media Copyright](#)

Basic Configuration

The basic configuration for hybrid worship provides a way for online and in-person participants in small churches or home church settings to see and hear each other.

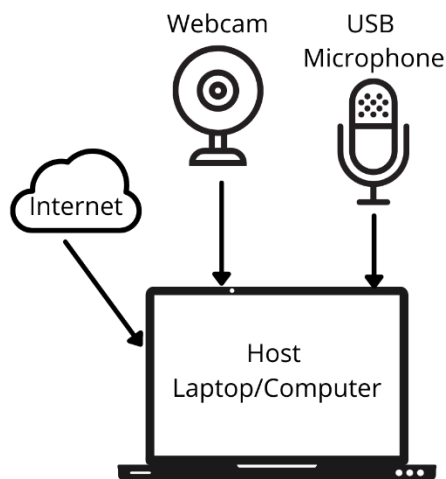
First you will need to identify the required equipment to launch your plan. Your congregation might already have devices available or have members who can bring them from home. Take an inventory of what you already have on hand or can borrow before you make purchases.

Deploying and operating this basic solution does not require special technical skills. Additionally, this model can be set up and taken down quickly. This works best for smaller groups who can gather around a computer or device to see online participants.



Equipment Needs

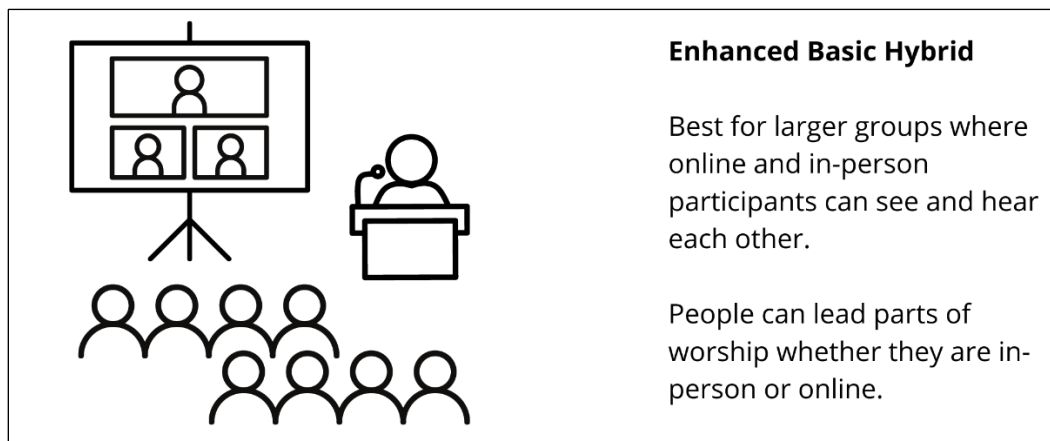
- High Speed Internet
- Computer/Laptop
- Webcam
- USB microphone
- Tripod (optional but helpful to stabilize the device)
- Zoom Pro account or other video conferencing platform



Enhanced Basic Configuration

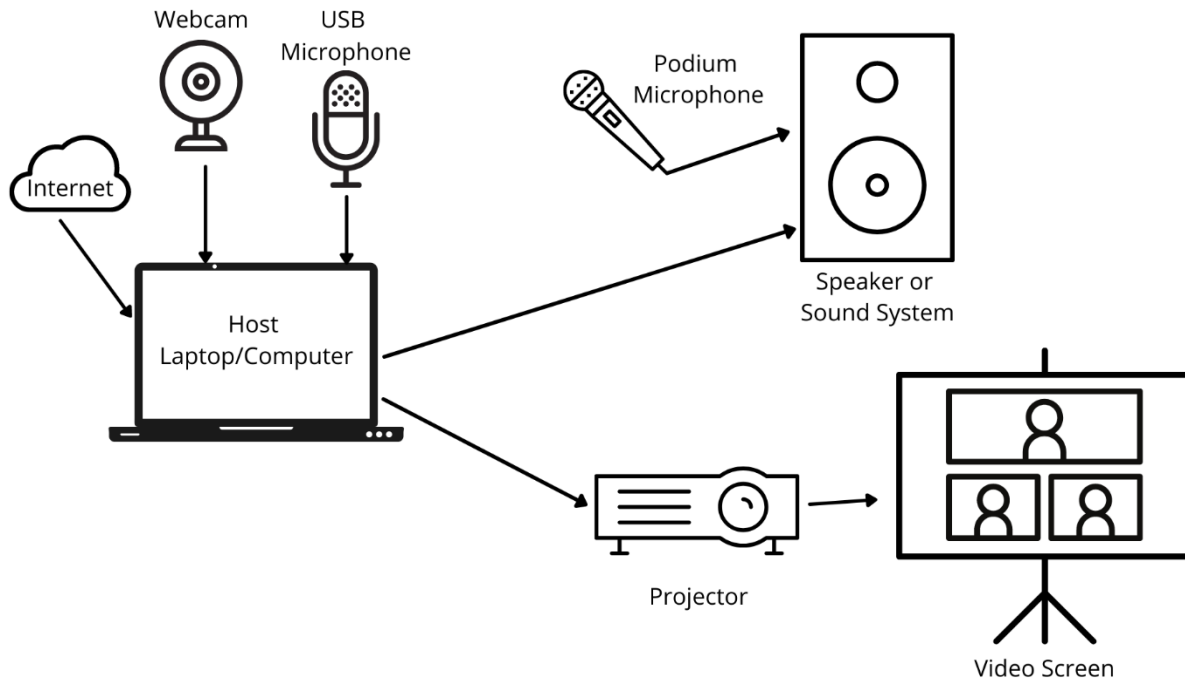
An enhanced basic configuration for hybrid worship provides a way for online and in-person participants in larger church buildings or groups to see and hear each other.

The list below includes all equipment from the basic configuration with the addition of a few extra items. By adding speakers and a projector and screen (or a large TV monitor), in-person participants will be able to see and hear online participants. This configuration would allow online participants to offer prayers, sermons, or other parts of the worship experience.



Equipment Needs

- Laptop
- Webcam
- Tripod
- USB microphone
- USB extension cables
- Projector (or large TV monitor)
- Screen
- Speakers
- A device to show in-person group:
 - This could be a phone, tablet, or laptop
 - A suitable stand/mount is needed to hold device in place



Optional Upgrades

- Audio mixer board
- Wireless microphones (transmitter and receivers)
- Digital camera and tripod

Audio Mixer Board

Connecting the mixer board AUX output to the computer line input will make any audio heard through the loudspeakers in the church building also audible online with similar quality. If you regularly use wired or wireless microphones for capturing different speakers, musicians, a choir, or people sitting in the pews, you must connect the mixer board to the computer. If you try to capture all those different persons and ministries with just one USB microphone plugged to the computer, the sound quality will likely be too low for online participants to even understand the words and enjoy the music.

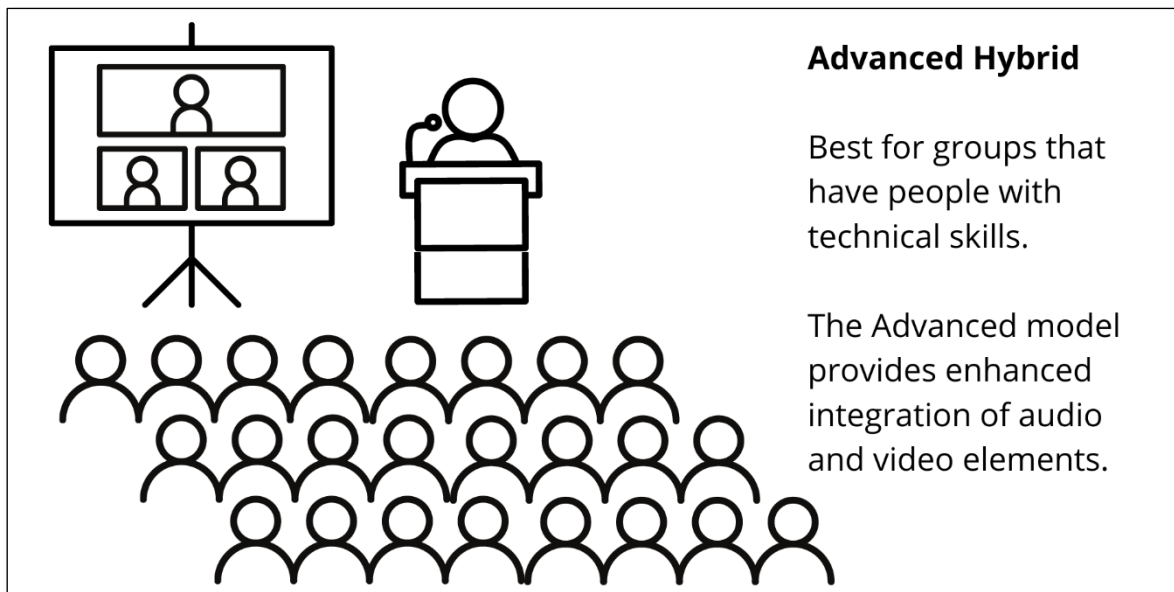
Digital Camera and Tripod

By replacing the webcam with a digital camera mounted on a tripod, you'll get better video quality and the option to zoom-in. This will allow you to place the camera away from the pulpit, even at the back of the church. Most digital cameras do not have a USB output, but they often have an HDMI video-out. All you need is an "HDMI capture card." This is a small, inexpensive, plug-and-play device that receives the video from the digital camera and sends it to the computer without compromising the video quality.

Advanced Configuration

An advanced configuration for hybrid worship provides enhanced connectivity options for online and in-person participants.

It will likely require the acquisition of special audio and video components, as well as software and licenses. Setting up such systems will generally require at least one person with some technical skills. Running the system will often involve more than one operator. It is a good idea to start with a basic configuration and transition to a more sophisticated solution once technological shortcomings become evident.



Video Equipment Needs

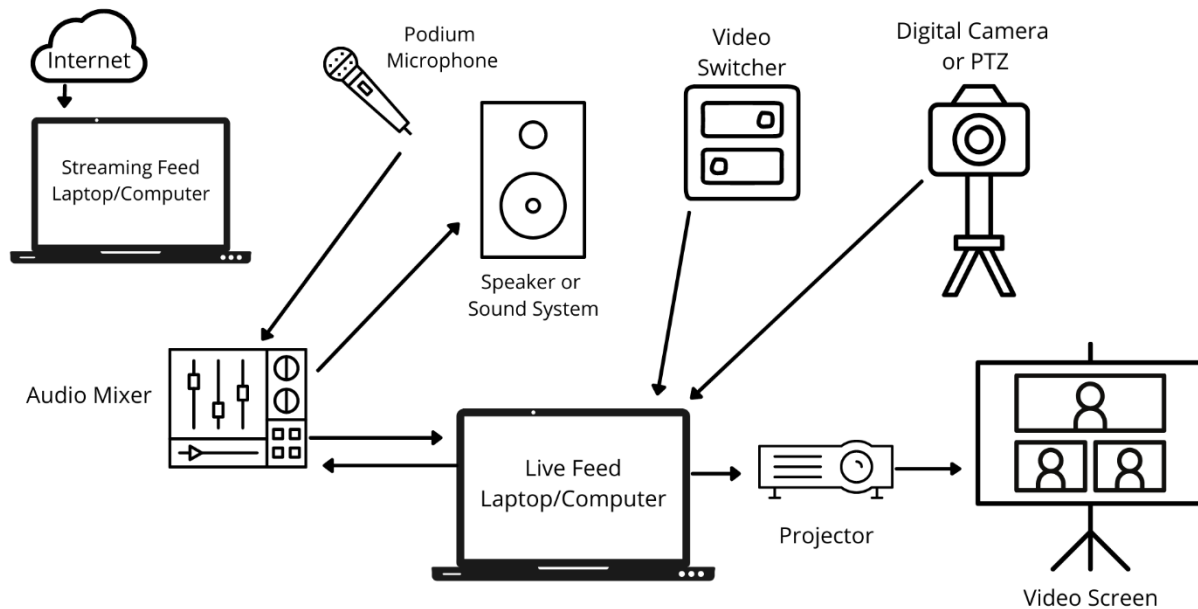
A digital camera mounted on a tripod will improve video quality and allow you to zoom-in on the speaker. This solution is not ideal if you are hoping to display more than one area of the chapel, for example a musician, a choir, or the people sitting in the audience. Tripods can disrupt the in-person experience by occupying critical floorspace, especially if you have more than one camera in a small space.

An alternative to traditional digital cameras are PTZ (Pan, Tilt, Zoom) camera solutions. The advantage of a PTZ solution is that multiple PTZ cameras can be controlled remotely by as few as one person. Since the camera and their operator(s) can be located virtually anywhere within the building, they can be positioned such that they do not obstruct the view of in-person attendees.

What is a PTZ solution?

- A PTZ solution includes one or more cameras, a controller, and an output.
- A person operating the controller can change the pan, tilt, or zoom of any connected camera

- PTZ cameras connect to the controller typically via ethernet cable.
- The video signal is sent via HDMI to the output device, which is normally a different device than the controller.
- The output device is usually an HDMI switch or a computer.
 - If connected directly to an HDMI switch, a monitor may be required to preview all cameras and the output signal.
 - If connecting directly to a computer, an HDMI capture component (USB or PCI) is needed.
- You can learn more about PTZ solutions in Appendix IV



Video Accessories

Lighting: Video quality can be greatly improved by framing the video properly and by using proper lighting. Consider getting lighting solutions from a simple USB light for webcams to semi-professional LED lighting and reflectors.

Scene switcher: A device that allows you to switch between different available sources of live video, live audio, recorded video, slideshows, etc with just one button that is labeled accordingly. There are many different options including: HDMI switches, stream controllers (Elgato Stream Deck or similar), MIDI controllers (music keyboard.) You can learn more about scene switches in the PTZ appendix.

HDMI/SDI input interface: Unlike a webcam, more sophisticated cameras require an interface to send the video signal to a computer. Digital cameras usually have an HDMI or SDI output. An HDMI/SDI capture PCIe card or USB adapter allows you to use these cameras as if they were a webcam, while taking advantage of their higher picture quality, optical zoom, and other

features. Popular manufactures of these devices are Blackmagic Design and Elgato. If you are using a PTZ solution with a video switcher, the video switcher may have a USB output which can be used to send the video signal directly to the computer.

Audio Equipment Needs

Audio is arguably the most overlooked aspect of online and hybrid worship configurations. You can have great content and amazing visuals, yet without quality audio, the overall experience will be underwhelming and even frustrating for participants. Consider the following suggestions to ensure both in-person and online participants experience the service the way it is meant to be.

If your congregation already has microphones and an audio mixer board, these might be easily integrated into the hybrid worship strategy. If this is the case for you, consider the following:

- Most mixer boards have a main output that goes to the host location speakers, and a monitor or AUX output.
- You need to route either the monitor or AUX outputs to the computer hosting the Zoom meeting and/or streaming software.
- If the mixer board is less than 10 years old it may have a USB output that you can connect to your computer.
- If the mixer board doesn't have a USB output, you may be able to connect the mixer board AUX output directly to the line-in of the audio card on the computer.
- If connecting to the computer line-in reduces the sound quality or adds line noise, consider getting a simple USB audio interface to correct the noise issue.
- An audio interface is a USB device that receives an analog audio signal, converts it to digital audio, and sends it via USB to the computer.
- Most USB audio interfaces are plug-and-play and even the most basic interface with one or two audio channels will fix the sound quality issue.
- You don't need an advanced USB audio interface with many inputs and outputs unless you plan to record professional audio with a digital audio workstation (DAW.)

Equipment Purchase Guide

Things to Consider When Purchasing Equipment

Purchasing or choosing equipment can be a challenging task, especially when available options for each component are vast. The bottom line: you usually get what you pay for. However, if your budget is tight the following tips can save money and also offer guidance for when it pays to spend a little more. Once you have your list, spending a little time comparing prices can lead to additional savings. Take a trip to your favorite tech store and ask questions.

Webcam – This is an area where you can spend a little to a lot. There is no need to buy an expensive webcam. Keep in mind that this device is how all online participants will see and experience worship, so it is one item worth prioritizing higher as your budget allows. If you plan to mount the webcam on a tripod, make certain it matches the tripod mounting thread located underneath the camera.

Digital Camera –If you want to upgrade from a Webcam, this is the next step. Shopping for a digital camera--the price range, brands, and technical specifications---can be overwhelming. These are the main things to consider.

- 1080p resolution is ideal (it can be advertised as HD or ULTRA HD, check the number)
- 720p resolution is enough for Zoom but not for live streaming
- 4K resolution is unsupported by Zoom and most social media as of November 2021
- 30 fps is enough
- Make sure it has optical zoom, 12X or higher (ignore any digital zoom specifications)
- Make sure it has a USB or HDMI output
- Microphone specifications and inputs are not relevant if you have a mixer board
- Storage and battery life are not worth considering unless you plan to record off-site

Microphone - The best microphone to broadcast worship in most settings is a USB conference microphone. This will be omnidirectional and pick up audio without having to speak directly into it making it an ideal 'set and forget' option. A reasonably priced microphone which has tested well in the field is the "TONOR Conference USB Microphone" available on Amazon as of November 2021. Tight budgets may want to explore purchasing a webcam with an integrated microphone, however the audio quality will be reduced.

Tripod – Tripods are needed to mount the webcam and any secondary broadcasting device being used. Webcams are generally very light and do not require the use of a heavy-duty tripod. This is an area where you can save some money with a budget/travel tripod. Match any additional tripods needed to the device they will hold, paying special attention to the tripod mount. For example a cell phone needs a different type of mount than a webcam. Another option may be a mini-tripod which can be used to mount a phone or other small device on a windowsill or table in the corner of a room.

USB Extension Cables – Extension cables may be required to allow someone in the congregation to control a laptop with a webcam/microphone closer to the speaker. These can be obtained cheaply and with no appreciable difference in quality up to 10-15 feet (3-4.5 meters). Get the cheapest cable in the needed length. Remember to buy two if you need to connect a webcam and microphone separately. A single cable and a USB hub on the distal end of the extension is also an option.

Speakers – Many people have speakers at home. A loaner from someone may be sufficient for hybrid worship needs. If purchasing speakers specifically for use in worship, choose a size that matches your space. Avoid speakers with lots of added functionality, extra features needlessly increase the price.

Screen - If you are using a projector, you will need a screen or a pale colored wall strategically located. Screen options include freestanding and wall mounted. Freestanding screens can be easily moved, but they will also need storage and they are more expensive. Mounted screens are more permanent, but some available options hang on discretely located hooks, and the screen can be stored when not in use. These screens are cheaper.

Projector – Projectors are one of the most expensive pieces of equipment to buy. Cheap projectors are available, but they are designed to be used in completely dark rooms and don't have the power to make the image easily visible in well-lit rooms making them inappropriate for most church sanctuaries and other gathering locations. The most important factor when choosing a projector is how bright it is (how many lumens or lux). Be sure to clarify which measure your projector is advertising. Ideally a projector needs at least 2500 lumens or 10,000L to be effective in a lit room. Calculators can be found online to take into consideration your specific needs, screen size, angle of the projector to the screen, etc., which will help you purchase the correct projector for your needs based on either the lumen or lux brightness rating advertised for a given projector.

Audio Mixer Board—The purpose of this device is to allow you to mix all audio into one stereo signal that you can send simultaneously to the speakers located in the chapel and to the computer.

- A simple mixer board with as little as 4 channels might be enough for your needs
- These very affordable and easy to use devices are sometimes called “portable mixers”
- Make sure the mixer board you choose has a USB output that you can connect to the computer
- Make sure a compressor is available for the microphone channels. This is often a knob labeled “COMP.”
- A compressor allows you to turn the microphone volume up without causing distortion. This is important for making sure online people can clearly hear people speaking in the chapel
- More sophisticated mixer boards will not necessarily improve the sound quality, but will allow to connect more microphones, musical instruments, and other sources of audio.

- Digital mixers, although usually pricier than analog ones, offer a number of advantages like:
 - Reduced noise ratio
 - May be controlled with a tablet or computer from anywhere in the chapel.
 - May have overall better audio quality
 - Additional effects and audio signal processing
 - Reduced size

Microphones—there are many options for microphones if you need to purchase or upgrade. Here are a few things to consider as you make decisions about specific products.

- USB microphones must be plugged directly to the computer
- In most cases, the computer will only be able to use one USB microphone at a time
- Instead, look for XLR microphones
- XLR microphones can be plugged into and controlled from the mixer board
- XLR microphones tend to offer similar quality at a lower cost
- Lavalier and wireless handheld microphones are good for:
 - Minimizing the use of cables
 - Allowing a person to walk as they speak
 - Passing a microphone to people sitting in the pews
- Any wireless microphone will have a transmitter (the microphone itself) and a receiver (box near the audio mixer board).
- Connect the receiver's XLR output to any microphone channel of the mixer board.
- Microphone reception patterns can be omnidirectional or unidirectional:
 - Unidirectional: better for capturing a single person speaking at a podium.
 - Omnidirectional: better for capturing a conference or a group of people singing
- Microphones have two primary construction types:
 - Dynamic microphones are recommended for live settings with strong vocals or sounds. These microphones are frequently used by congregations.
 - Condenser microphones require phantom voltage (+48v) from either a battery or the audio mixer board. These microphones are used as conference microphones and low volume microphones, since they are more sensitive than dynamic microphones. Depending on the venue, their added sensitivity may introduce unwanted room noise.

Roles and Volunteers

These responsibilities need to be assigned ahead of time to ensure your worship runs smoothly.

- **In-person Coordinator:** person who is present in the host location (church building or other physical venue) to set up the video and audio equipment, share slides or other visuals, can mute or unmute as needed.
- **Online Coordinator:** person who is host or co-host of video conference meetings (i.e. Zoom meeting) and supports worship leaders with welcoming, muting/unmuting other online participants, and social interaction before and after worship.

If you have a lot of volunteers, these functions could be separated from the two above and allow others to be included.

- **Greeter:** lets people in the waiting room into the meeting and removes people who have harmful intentions.
- **Microphone Manager:** mutes and unmutes participants.
- **Spotlighter:** adds and removes participants from spotlight.

If you are video conferencing and live streaming to Facebook, YouTube, etc, these functions will also be helpful.

- **Stream Controller:** selects the scene (live video of different cameras, recorded video, slideshow, image, etc.) that is streamed at any given time.
- **Live Chat Moderator:** Keeps the live chat clean of trolls and spam.
- **Online Welcoming and Engagement Agent:** Welcomes online participants and encourages them to share and interact with each other.
- **Online Ambassador:** Speaks on behalf of the online participants to the offline (in-person) ones.

Best Practices: Planning and Etiquette

Worship Planning

These simple ideas can help plan a worship that nurtures the hybrid community you are building together. It may take some practice and trial and error to fine tune the technology needs and new roles for in-person and online participants, but it will make for a smooth and welcoming experience for all.

Connecting visually: If technology allows, it may be helpful for community building for the pulpit and at least part of the congregation are both visible during the entire gathering rather than filming only the rostrum. *see section about Safety

Before worship or gatherings: If the in-person group is having a coffee hour or potluck, consider having coffee hour on Zoom but host them separately so each group has an opportunity for smaller group discussion. This is also an option for Sunday school if numbers allow.

Consider providing a pre-worship fellowship time. Let participants know they can join the meeting before the scheduled start time, for technical troubleshooting or fellowship time.

During the prelude: Project a welcome screen which those online and in-person can see. This can contain instructions for those meeting in-person and for those meeting online.

For example: Welcome to worship! We invite you to listen to the music playing and reflect on your journey with God this week. If you are joining us online, give us a wave to say hello and put yourself on mute. Please share your name and location in the chat. If you are joining us in-person, please take a seat with your household.

During the welcome: Welcome each person by name both online and in the church building if your group is small enough. The worship leader could welcome those online and the in-person coordinator could welcome those in-person if the group is too large.

During readings, sermons, scriptures, other worship elements: Schedule individuals from the online group to share with the full group. Coordinate logistics and practice in advance with the in-person and online coordinators.

During songs: Invite those online to sing on mute and invite those in person to sing or reflect on the words silently. Please follow any necessary COVID precautions related to singing. If the congregation is singing a hymn together, consider how you can ensure online participants have access to the words so they can participate rather than passively observe.

During times of sharing: Have speaking participants in the church building come to the podium microphone, use a mobile microphone, or have the in-person coordinator repeat what was shared so that online participants can also hear. Have online participants unmute to share or have the online coordinator repeat what was shared so that in-person participants can hear.

Etiquette For Online Worshippers

As you move into a hybrid form of gathering, many people may not be familiar with the standards and behaviors of the online experience. This simple list may be helpful to those who are new to this environment and a good reminder to those who are more familiar.

- Do your own tech support before you start to be sure your microphone and camera are working.
- Use good lighting. A strong light source behind you will make it difficult for others to see you.
- Share your real name on your icon. It is suggested to also include your pronouns (ex: they, she, he). For example, change “iPhone 123” to “First Last (she/her)”.
- Stay on mute if you are not talking. Background noise can be distracting, and private conversations may be overheard.
- If you want to share with the group, use the “raise your hand” function or similar feature in your software to communicate to the host that you would like to speak.
- Leave your camera on while others are talking and look at the camera if possible. This helps us form meaningful connections when we can use non-verbal cues to communicate online. It is especially helpful for speakers and guests.
- Give the worship space your full attention and avoid creating distractions for others while your camera is on. If you need to eat, groom, or step away from your device, please turn off your camera. Be aware of what is behind you and choose carefully what you share.

Best Practices: Supporting Tech Needs of Hybrid Worship

Plan your service considering common issues that might disrupt the service should they happen. This is especially important if you have multiple technicians that switch off (take turns) running the equipment where each has their own unique way of configuring and setting up everything for the worship that they're responsible for.

- Have charged batteries available for all equipment that utilized batteries.
- All devices must be fully charged and ready before the service.
- Check all microphones for both in-person and online sound levels.
 - Identify participants who have weak or loud voices and prepare to adjust the in-person and online volume levels when they speak.
- Check any audio files you will use. Notice sound quality and be prepared to make any necessary adjustments in the mixer board for both in-person and online.
- Check video sources for connectivity and 'resolution' when 'switching' between multiple video source signals e.g. camera(s), video clips, and PPT/PDF slides.
- Keep your main computer up to date with all necessary software and security updates. (It is recommended that updates be installed at least 1 hour before the event to allow sufficient time for the update installation to complete, followed by a reboot.)
- Minimize background processes during the service. For example, unless you'll show a web page during the service, close the browser.
- If you are recording the service, check for available recording storage space.
- Check the Zoom cloud recording space available (if applicable.)
- Always have backup copies of any files you will be using during the service available locally to minimize internet usage.
- Create a Technical Order of Service Document, detailing all the transitions between slides, different camera views and presets for different participants, files, and all resources for the service. All technicians on duty should have a printed or off-line copy.
- Prior to the event, run through the entire program with all participants so that everyone knows what to expect. This may be several days or just before the event.
- Take note of audio, video, and connectivity issues with remote participants and consider pre-recording their segments for use during the event.

Monitoring the service

It is essential to know what the experience looks and sounds like for the online participants. Therefore, a technician should monitor the service on a separate device as the service takes place.

- Consider using a different internet connection, for example, a phone with its own data plan that is not connected to the church's WiFi.

- Monitor all audio feeds and adjust the mixer accordingly.
- Monitor video feeds and adjust accordingly.
- Have someone moderating the chats.
- Be prepared to pass wireless microphones to people speaking from the audience.
- Be prepared to cover up any technical difficulties or other unexpected disruptions. For example, a music video or a message explaining that you are “Currently experiencing Technical Difficulties.”
- Take notes regarding participation, engagement, requests, and issues that need to be addressed and debrief with the appropriate parties (pastor, presider, other technicians, etc.) after the service.

Zoom events

Zoom allows for very different types of worship services, from a very informal or unscripted meeting to carefully planned events where only pre-assigned participants speak. This section focuses primarily on tips that will be useful mostly in more programmed services, while allowing for interaction of online and in-person participants.

- Use a waiting room as a basic security measure. Although many people won’t have the name properly setup, you’ll know when someone is allowed into the meeting in case you suspect the person may try to disrupt the service intentionally.
- Set up a number of co-hosts with different responsibilities, including letting people in and removing malicious participants, spotlighting, muting and unmuting, etc. A best practice to consider is the larger your meeting, the more co-hosts necessary to run the service smoothly.
- Rename Zoom participants who are in the order of worship so that you can find them easily in case you want to spotlight them for their segment.
- Set the meeting to “mute participants upon entry” to avoid new arrivals accidentally talking to all in-person and online participants.
 - These mute/unmute measures help to prevent unwanted background noises from people who accidentally activate their microphone and reduces the “your microphone is muted” situations, giving Zoom participants peace of mind.
- This prevents unwanted background noises from people who accidentally activate their microphone and reduces the “your microphone is muted” situations, giving Zoom participants peace of mind.
- Check the microphone and video of all Zoom participants who are scheduled to speak during the service.
- Consider spotlighting the person speaking.
- Consider opening a Tech Support room at all times in case a Zoom participant with an important role in the service requires assistance.

- If one of the Zoom participants is speaking and the audio sounds choppy, turn their video off, their internet connection might not be able to handle the video and, as of November 2021, Zoom is not smart enough to fix that.

Live streamed events

- Create an event in advance on your social media channels for your live streams: See [Appendix I - Streaming to Facebook](#) and [Appendix II - Streaming to YouTube](#).
- Streaming video is a resource intensive process, close any applications that you don't need for the service.
- Run a test: record a video with your streaming software to identify common audio issues including: no audio, echo, audio and video are out of sync, feedback with the speakers at the venue. (See [Appendix III - Streaming with XSplit](#) for troubleshooting tips).
- Remind all those offering ministry to acknowledge the online participants (and to look at the camera every now and then).
- Go Live just before the service starts.
- As much as possible, leave the streaming computer alone once you go live (if this computer is running a PowerPoint or PDF presentation, every time you operate the streaming software, the presentation will lose focus and the slides may not advance).
- Start monitoring your Facebook page and / or YouTube channel on a different device (if you monitor the stream on the stream source, you may create an audio feedback loop).
- Make sure all the roles have a way of communicating behind the scenes (for example, a private Facebook chat/group or text message).
- When the service ends, remember to say goodbye to the online participants before you end the stream.

Integrating XSplit and Zoom

XSplit can capture the video and audio of a Zoom meeting and integrate it with other components like live HD video, live music, recorded video, slideshows, etc. See [Appendix III - Livestreaming with XSplit](#) to learn more.

Best Practices: Providing a Safe Environment for All

When you offer your worship service online, you need to take measures to ensure all participants feel comfortable and safe. In this section we focus on issues of privacy and moderation. Privacy refers to people's right to decide whether or not they consent to appearing on camera. Moderation refers to actions you must take to prevent any action that might either disrupt the service or offend anyone participating.

Privacy concerns

Consider the following:

- Do all in-person participants consent to being shown on camera?
- Do online participants consent to streaming their video and audio to Facebook or YouTube?
- Have a designated area or areas where those who do not want to be on camera can still fully participate. The whole community should safeguard all persons who cannot or do not want to be seen on camera.
- Have you talked to parents about their children appearing on camera during the service?
- Are in-person participants aware their concerns or prayer requests shared during the service will be heard by people not physically present?

Each congregation will decide how to best address these issues but be mindful of privacy and child protection laws that apply in your district. Some solutions you can easily implement include:

- Limit access to your online event
- Do not share the Zoom link and password on social media
- Live stream to a private Facebook group
- Mark the areas of the chapel that are within the camera
- Announce at the beginning of each service whether it is being shared online or recorded
- Announce Zoom participants before a screenshot with everyone's video is captured
- Consider sharing concerns before the livestream starts

Moderating Zoom meetings

- Use a waiting room
- Do not allow screen sharing for all participants.
- Instead, whoever will be sharing their screen can be made a co-cost
- Keep an eye on the chat for offensive words or spam.
- Invite everyone to write their name (many times the device name will appear)

- Ask permission to rename participants who don't know how to do that themselves
- Be ready to mute anyone who starts speaking unaware that their microphone is on.
- Be ready to turn anyone's video off if something inappropriate or "too private" is on camera.
- Especially in the case of smaller, intimate meetings, or if you are running breakout rooms, try to confirm the identity of all participants.
- Consider opening a dedicated breakout room where you can take people aside to confirm their identity
- If you are unable to confirm someone's identity, especially if their video and audio have been off the whole time and their Zoom name doesn't help, consider putting them in the waiting room or keeping them in a separate room until they start interacting.

Moderating Live Streamed Services

When you live stream to Facebook and YouTube, you open your worship service to anyone around the world, including people who will intentionally try to disrupt the service by trolling, bashing, etc. Therefore, it is essential that one or more persons moderate the live stream chat at all times.

Common practices for moderation include:

- Set up "Slow mode" on YouTube chat so that spammers cannot send many messages at once.
- Assign moderators according to the number of live viewers.
- A moderator can be the same person who is engaging with the gathering in the chat.
- If you don't know what a person's intentions are, keep an eye on them.
- If a person is obviously disrupting, do not engage with them, block them. If you engage, you will be adding to the disruption.
 - Note - YouTube will automatically block links in the chat window, but Facebook will not.
- It is very important that you delete any links shared by people you don't know. These links might lead participants to dangerous websites.
- You can prevent disruptions by setting up the stream to be available only to your page followers or channel subscribers, these are more likely to be people you know or who are legitimately interested in the event.
- On Facebook, set up your event to only allow comments from admins or to have admins approve messages before the comment is published to the whole community.
- A common hacker's strategy on Facebook is to post fake comments pretending to be a congregation member saying things like "We're live, click on this link" which will take people to dangerous websites.

Best Practices: Music and Media Copyright

Because Facebook and YouTube make your service public, you have to take music copyright very seriously. You should never use music videos or audio of other people without their permission. If you live stream to YouTube and you use someone else's YouTube video (even if you downloaded it, which you are also not supposed to do) the channel that created the content will get a notice and they will have the option to take legal action against you. Furthermore, you should not play a CD of someone else's music if this music will go on the live stream, unless you obtain written permission.

Performing hymns at the church with your own musicians and singers may still result in copyright infringement. Check the copyright status of the hymns you will be using during the service. You can obtain a special license for online content that will cover most of the hymns but not all. Some copyright owners are not associated with any large publishers so you may need to contact them directly. This process can be very time consuming; therefore, please prepare well in advance or use hymns in the public domain. You can find the copyright status of CCS hymns in this document <https://www.cofchrist.org/common/cms/documents/CCS-Applicable-Copyright-Licenses-April-2019.xlsx>

Most contemporary hymns, including some of everyone's favourites like "For Everyone Born," are not in the public domain. If you sing one of those and this content goes on your Facebook or YouTube livestream the copyright bots may flag this content. In general, you will be fine while you're live and the video might be blocked afterwards, but Facebook might block or mute your stream even while the service is happening.

YouTube has better arrangements with big publishers and in many cases, it will automatically assign a license to your video. However, the copyright owners will be allowed to display ads of their choice on your video, all the revenue will go to them, not you, and you also have no control over the kind of ads they will show to your audience. This is what happens daily to almost everyone who posts music on YouTube. Facebook on the other hand will generally mute or block the video.

There's a chance you might get a formal copyright infringement claim. Albeit very unlikely, this is bad. The first time this happens YouTube or Facebook may disable account features like going live, but if it happens several times, they might terminate your account, delete all your content, and prevent you from creating a new account.

Consult with [Community of Christ Office of General Counsel](#) to learn more about copyright.

Acquiring Software

A teleconference-based model requires software like Zoom, WebEx, or Microsoft Teams, among others, that allow all participants to share their audio and video. Free plans usually limit the duration of meetings and the number of participants. A Zoom pro plan would suffice for most congregations and it includes the option of streaming the meeting to Facebook and YouTube.

The stream-based model we consider in this recommendation requires the use of streaming software, sometimes called an encoder or broadcaster. This is a very competitive industry and new products become available regularly. As a result streaming software comes in many forms, from easy to use cloud-based services like Restream, to professional and enterprise solutions like Wirecast or Wowza. In this document we recommend two of the most popular encoders that run locally on your computer: XSplit and OBS. Both are available for free, although XSplit requires a license to unlock advanced features.

PowerPoint presentations and other software resources can greatly enhance the worship experience for all participants. Other tools are useful for creating, sharing, and organizing documents used during worship and outreach initiatives. This section also includes tips for acquiring useful software at a discount price.

Google for Nonprofits

Google for NonProfits is a grant offered by Google to qualifying non-profit organizations. As of November 2021, religious organizations are eligible to receive this grant and can begin the application process here: <https://www.google.com/nonprofits/>.

When approved, grant recipients can gain access to the following services for free:

- Google Workspace (*Gmail, Calendar, Drive, Docs, Sheets, Slides, Meet, and many more*)
 - While a gmail account is traditionally free, Workspace allows you to utilize the Google suite of services under your domain name. For example, Calgary Community of Christ owns www.cofchristyyc.ca; therefore, we utilize email addresses @cofchristyyc.ca and can create as many aliases as needed (e.g. pastor@, cfo@, firstname@, etc.).
- Other opportunities include the YouTube NonProfit Program (provides access to grants giving access to studios around the world and equipment to shoot high quality content, monetization tools, ad tools, etc.) and other Google Ad grants to help promote your initiatives.

TechSoup

TechSoup is a nonprofit organization that acts as a database for eligible nonprofits to gain access to donated technology from companies such as Google, Microsoft, computer

manufacturers, software developers, and more. Religious organizations are eligible to participate through TechSoup and can begin the application process here:

<https://www.techsoup.org/joining-techsoup/registration>.

When approved, TechSoup members can gain access to helpful free/discounted services such as:

- Microsoft Office
- Intuit QuickBooks
- Microsoft Windows 10 Upgrade
- Norton Security
- AWS (Amazon Web Services)

Note: *TechSoup works with partners and nonprofits in multiple countries. Ensure you select your country at the top left drop-down to ensure you are viewing eligible offers.*

Prepare for Technical Difficulties

Mitigation and contingency plans

All ministries can benefit from mitigation and contingency planning, that is, a plan to minimize the impact of common errors, and a plan to respond when a major disruption occurs. Is it highly recommended that congregations adopting a hybrid experience model develop mitigation and contingency plans.

Common things to consider include:

- How will you communicate with remote participants if complete failure occurs? For example, a power failure.
- Can you afford backup equipment of any sort? For example, extra mics, cameras, lights, computers, amplifiers, etc.
- Make an inventory of devices that you can use during a major disruption like power failure, for example, battery powered lighting and microphones.
- Use a cell phone not connected to the church's WiFi to remain in the Zoom meeting if the internet connection fails at the church.
- Keep backup files of everything needed for the service in a shared folder, so that a remote leader will be able to take over the service if the connection at the church goes down.
- Have backup technicians or more than one person trained to operate the equipment.
- What other events might cause a major disruption at your church building? Is there a way to work around them?

Appendix I - Live Streaming to Facebook

- On Facebook, go to your page and create a new event
- Select Online > General > Free
- Enter the event name, date, description, and category
- Under “Location” select “Facebook Live”
- Under “Event Settings”, make sure one of these is selected (see Risk Management for details)
- Only admins can post in event
- Posts must be approved by a host or co-host.
- Publish Event
- Click on “Setup Live Video” (Opens the Live Producer interface)
- Under “Get Started” select “Use Stream Key”
- Copy the Server URL and Stream Key and paste this information in your streaming software.
- Do not select “Go live automatically”
- When the service is about to start, start streaming with your streaming software (see Appendix III - Live Streaming with XSplit)
- Wait until the connection is established (you should see a preview of your stream)
- If you don’t see a preview of the stream, you may have entered the wrong information on your streaming software. Copy and paste the URL and key once again.
- When the service is ready to start, click on “Go Live”

Appendix II - Live Streaming to YouTube

- Go to YouTube
- Make sure you're logged with the account that own the desired channel for your livestream
- Go to YouTube Studio: Click on your profile icon and the option will appear in the drop-down menu
- Alternatively, you can go to <https://studio.YouTube.com/>
- Click on "Go Live" - This will take you to the Stream Manager
- Click on "Schedule Stream"
- In the "Create Stream" dialog, enter all the relevant information about your livestream
- You must ask this required question: Is this video made for kids?
- If the intended audience is kids, then, you should answer YES. For a regular worship service, you should answer NO.
 - Please note this doesn't mean your video will be restricted to adults only. Instead, videos categorized as content for kids are subject to additional regulations.
- Select the date and time for your live stream
- Once the stream is scheduled, copy and paste the stream key and the stream URL in your streaming software
- We suggest you turn off auto-start and auto-stop in order to avoid common errors like accidentally going live or ending the stream too early with your streaming software
- When the service is about to start, start streaming with your streaming software (see Appendix III - Live Streaming with XSplit)
- Wait until the connection is established (you should see a preview of your stream.)
- If you don't see a preview of the stream, you may have entered the wrong information on your streaming software. Copy and paste the URL and key once again.
- When the service is ready to start, click on "Go Live"

Appendix III - Live Streaming with XSplit

XSplit is a streaming software (or encoder) that allows you to set up a number of scenes containing live video, recorded video, a Zoom meeting, a slideshow, etc. The selected scene will be then sent out to a destination as a video stream. There are multiple popular destinations like Facebook, YouTube, or multi-streaming services like Restream.

Setting up XSplit

- Go to the “Tools” menu item and click on “Settings.”
- In the Settings-Audio tab, a usual configuration will have:
 - Audio Preview: none
 - System Sound: Default Speakers
 - Microphone: Usually your mixer board if you can connect it to the computer through USB. This way, whatever goes to the house speakers will also go to the stream with the same quality.
 - Delay (for microphone): Audio and video can get out of sync depending on your computer processing power and other factors. Minimize the problem by adding delay, you’ll have to try different amounts until you find the right one.
 - Microphone Mono mix: None
 - Audio Mixing Sample Rate: 48k. This is very important because it is the sample rate that most destinations expect. Other values may cause audio issues.
- On the top-right corner of your XSplit you can select the video resolution and frame rate.
- Be careful not to select unnecessarily high resolutions and frame rates that your computer won’t be able to process.
- If you’re using a laptop, don’t go higher than 1080p / 30 frames per second (fps).

Setting up scenes

A scene is audio/visual information that will be sent to the live stream at any given time during the service. With a premium license, you can configure many scenes to serve the needs of your worship experience.

- Select one scene and click on add source
- Popular sources include video devices, recorded video and audio, slideshows, Zoom, screen captures, etc.
- You can add multiple components to the same scene, for example, in the same scene you can have a video of the person speaking at the pulpit and a slideshow presentation.
- The more live video (HD cams, webcams, Zoom) you add to your scenes, the more processing power is required.
- If your computer cannot properly process all this video information, video glitches will occur every now and then.

- Add scene transitions like a simple fade effect so that changing from one scene to another is not abrupt.

Setting up Zoom as a source

These are the necessary steps to integrate Zoom and XSplit:

- On XSplit, select a scene and click on “Add Source”
- Add the Zoom meeting window as “Game Capture”
- Every time you select this scene, the Zoom audio and the Zoom video “as seen from this computer” will go to the live stream.
- It is recommended that a Zoom co-host (using a different device) is assigned the task of adding and removing participants from “spotlight.”

Setting up a scene switcher

If you are using PowerPoint or a PDF presentation, this app will have to remain in focus or the clicker won’t be able to advance the slides. Instead of changing scenes with a mouse click, use a scene switcher. There are many devices in the market, just Google “stream scene switcher.” An affordable option to expensive scene switchers are MIDI keyboards with a USB port that you may already have at your congregation. You can assign each key in this musical keyboard to a scene.

- To configure this, go to the menu item “Tools” and click on “Settings.”
- In the settings dialogue, go to the “Hotkeys” tab.
- “Select hotkey mode” should be “advanced”
- “Change the behaviour of hotkeys” should be “Global”
- Now locate a scene, double click on the “trigger” value (it should say “none”) now press a key in the MIDI keyboard.
- Repeat the last step for all scenes and save these settings by clicking “OK”

Setting up a destination for your stream (output)

- In order to stream to Facebook or YouTube you must first set up an “output.”
- XSplit only allows you to output your stream to one destination.
- Most of these destinations are available as plugins. Go to the menu item “Tools” and click on “Plug in Store” to see all the available options.
- If you wish to livestream to several destinations simultaneously, you need to output to a multi-streaming service like Restream.io. Find out more at <https://restream.io/about>
- Go to the main menu > Tools > Plugin Store > OUTPUTS
- Download the desired outputs, the most popular options include “Facebook Live” and “YouTube Live.”

- Go to the main menu > Broadcast > Setup a new output > Choose the output you downloaded in the previous step
- If you choose Facebook or YouTube, XSplit will prompt you to authenticate your account.
- For example, for YouTube, XSplit will show you a properties dialog
- Click on “Authorize XSplit to use YouTube Live”
- A browser window will open, make sure you choose the right account.
- Unless you are an advanced user, you should leave all other parameters with the default values.

Streaming with XSplit

In this document, we will cover teleconferencing with Zoom and livestreaming to Facebook and YouTube with a streaming software called XSplit. A popular alternative to XSplit is an open source software called OBS Studio. Most features and limitations of XSplit described in this step will generally also apply to OBS, but be aware that these two products differ in many ways.

This chart will help you decide which approach is best for your congregation.

Everyone (in-person and online participants) should be able to...	Zoom	XSplit	XSplit with Zoom
See and hear ministers at the pulpit	yes	yes	yes
Receive video ministry from a remote location	yes	no	yes
Interact with video and audio	yes	no	some but not all
Interact through live chat	yes	yes	yes
Watch a recording of the service	requires additional step	automatic	automatic
View a slideshow (PowerPoint, etc)	yes	yes	yes
See a recorded video or hear recorded music	limited quality	full quality	full quality
Experience live music performed at the church	limited quality	full quality	full quality
Experience live music performed remotely	limited quality	limited quality	limited quality

Other considerations	Zoom	XSplit	XSplit with Zoom
Video quality	Up to 720p	Up to 4K	mixed quality
How remote participants connect	Zoom	Facebook or YouTube	Facebook, YouTube, or Zoom
Paid license required	yes	optional (for added features)	Zoom yes, XSplit optional

Any approach you choose will require supporting technology, including computer hardware and software, audio visual (AV) equipment, and web services. Although buying expensive cameras and microphones will add possibilities and improve image and sound quality, what your online participants receive will depend on a number of factors, including:

- Whether you use Zoom or XSplit
- Your internet connection
- Their internet connection
- Lighting and acoustics in the chapel
- The processing capacity of the computer running Zoom or XSplit

The next two sections discuss limitations and best practices when using Zoom and XSplit

Zoom

Zoom offers the following options to enhance AV quality for any participant:

HD video

- Original Audio for microphone
- High fidelity and stereo sound for screen-sharing with music

However,

- The AV quality that participants receive is always lower than what the camera and microphone capture.
- Improved AV quality on Zoom will use more computer resources and internet bandwidth.

Therefore:

- Sophisticated cameras and hi-fi microphones may not improve AV quality for online participants.

Things to consider instead:

- Improving the internet connection
- Upgrading the computer
- Using a PTZ (pan, tilt, zoom) camera solution
- Improve the audio connectivity instead of getting new microphones

XSplit

- XSplit offers video stream quality of up to 4K / 60fps
- However, Facebook limits video quality to 720p / 30fps
- The higher the video quality the more demand on the computer and the internet connection
- A GPU for gaming or video editing and more than 16Gb of RAM are highly recommended
- A full license is required for streaming with high quality video and audio
- The license will also unlock many additional features

Best Practices

- It is recommended that all other applications are closed when you use XSplit.
- Make sure your computer system speakers are set to the right output. This is the output that XSplit will use.
- Make sure the selected audio input is the one you intend to use.
- Check all your scenes before you go live
- Check also the audio of all participants and pre-recorded segments.
- Open the audio mixer and notice the MIC and SYSTEM levels of each system trying to make it more or less stable. You may need to adjust these levels on your mixer board.
- It is recommended to record a test run through and then play it to identify audio problems.
- If in the recorded run-through you notice echo in some scenes (a common issue) you may need to mute either the microphone or the system sound for that scene.
- You can configure this in the menu item "Extensions" > "Per-scene audio."
- An easier alternative to prevent echo is using either the MIC or SYSTEM audio, but not both for all scenes.
- For example, if you route pre-recorded audio through your mixer board, you can use only MIC and mute SYSTEM.
- When you are ready to go live just click on the "Stream" button.

Appendix IV - PTZ Solutions

This section describes the components, human resources, and procedures needed to deploy a PTZ solution.

Hardware Components

- Camera(s) - Can be any combination of:
 - 'Digital' zoom PTZ (old equipment still available?)
 - Electronic Pan Tilt Zoom Camera or ePTZ (inexpensive new technology for the budget conscious)
 - 'Analog' zoom cameras (Price goes up with mechanical zoom - 12x, 20x, etc.)
- Camera quantity:
 - Basic installation typically includes 1-2 cameras
 - Standard installation typically includes 3 cameras
 - Advanced installation typically includes 4+ cameras
- Controller device(s) for PTZ Camera for camera control and presets. This can be an app installed in a mobile device or hardware with a joystick
- Video switcher for multiple Audio/Video source input selector
 - If not included with the video switcher, you will need a monitor connected to the video switcher to preview all cameras and see what is being output for online participants to see

Roles

Standard:

1. One or more online greeters with co-host rights in the Zoom meeting will:
 - a. Admit people into the session (and screen for any potential hackers/bombers)
 - b. Greet people online as they enter
 - c. Monitor everyone's mic in the session and mute them if necessary
 - d. Monitor everyone's video in the session and turn off their video if necessary
2. An Audio Operator: Manages the audio mixer to mute/unmute all host location mics at the right time and adjust levels as needed

PTZ specific:

3. Video Operators: One or more persons who manage the switching of slides, cameras, and scenes of the video broadcasting software. For more elaborate PTZ solutions, 2-3 video operators might be necessary:
 - a. The Zoom meeting operator may handle switching between the camera and slides
 - b. PTZ operator controls the camera(s)

- c. PTZ operator or another person manages which camera is sent to the video broadcast software (Zoom, FB, YouTube, etc.)
- d. Depending on the PTZ team, specific software/hardware setup and event complexity, additional team members may be needed

Best Practices

Camera Mounting/Placement:

- PTZ cameras should be mounted about 7-8 feet high (2.1-2.4 meters) so that people who are standing between the camera and the podium/speaker will not obstruct the view.
- Mounting your center camera around the average speaker's eye-level provides a pleasing camera angle for the video participants.
- Be sure you mount the camera no more than 1 foot (30 cm) above/below eye-level for every 10 feet (3 m) distance from the camera or you run the risk of an unnatural camera angle that makes the video participant feel disconnected from the speaker/event.

Camera and location recommendations, in order of typical importance:

1. Rear, center, facing podium/speaker - Mounted 7'-8' high, and 2-5 degrees off-center (typically about 3 ft left or right of straight on to the speaker in most buildings). The slight off-center mounting helps give depth perception of the speaker's face on the video. Used for:
 - Close-up straight on view of podium/speaker/stage
 - Wide straight on view of podium/speaker/stage
 - Following the speaker as they move
 - Wide view of the entire venue from behind the attendees
 - Recommended primary camera location for a single or dual camera basic installation
2. Rear, off-center, facing podium/speaker - Mounted 7'-8' high, and 20-30 degrees off-center. Used for:
 - Wide views of the podium/speaker/stage (quickly switch to this view if the center camera cannot keep up with the speaker's movement)
 - Close-up angled view of podium/speaker/stage
 - Wide view of the entire venue from behind the attendee
 - Ministry of music/piano/organ
 - Recommended 2nd camera location for a dual camera basic installation
 - Note: Encourage attendees to face this camera when speaking on-camera during interactive video sessions like business meetings or conferences
3. Front, off-center, facing attendees - Mounted 7'-8' high and typically 5-10 ft off center, ensuring the camera is slightly higher than attendees and positioned so the speaker will

not block the attendees speaking on camera. When choosing a location, be sure all attendees who wish to participate on-camera can be seen clearly. Used for:

- Attendee reaction(s)
 - Attendee participation during interactive video sessions like business meetings or conferences (only within the venue areas designated for on-camera, being sure to never show people in an area designated as off-camera)
 - Baptismal font view
 - Note that this camera could be mounted on a tripod/pole for mobility and flexibility at your venue
4. Additional cameras can be installed in other locations to supplement the 3 recommended primary locations.
- May be mounted on tripod/pole for mobility and flexibility, or permanently mounted
 - Additional up-front camera, possibly controlled by a 2nd operator, in conference or business meeting settings to quickly find and display participants in various locations within the meeting space
 - Camera installed in an overflow or alternative location such as a fellowship hall or gymnasium
 - Ministry of music/piano/organ

Camera setup and use:

- Multiple (software) controllers for PTZ cameras
- Multiple labeled presets so that technicians know what each one is
- Common presets for rear cameras (facing the podium) include:
 1. Podium (close)
 2. Podium (zoomed out a little further for tall participants)
 3. Rostrum full view to capture Peace Candle being lit
 4. Rostrum full (zoomed out little further) view with Pianist or other participants visible
 5. Communion Table (close-up) for use during the serving of communion
 6. Full view of sanctuary with full view of rostrum
 7. Ministry of music/piano/organ
- Common presets for front cameras (facing the attendees) include:
 1. Full view of in-person participants, being sure to exclude any designated off-camera portions of the venue
 2. Right side of the sanctuary/venue (medium close to help find an attendee participant quickly)
 3. Left side of the sanctuary/venue (medium close to help find an attendee participant quickly)

- Your camera presets will depend upon your venue setup and typical needs. The above is intended to help you think about what you will want to “show” to those participating through your video and audio technology.

Appendix V - Recommended Devices and Technologies

Examples of portable mixer boards with USB include:

- Behringer Xenyx Q502USB (\$60 USD Oct 2021)
- Mackie ProFX6v3 (\$150 USD Oct 2021)
- Yamaha MG10XU (\$220 USD Oct 2021).

...and without USB:

- Mackie DL1608 (\$700 USD, Oct 2021)

Examples of HD camcorders include:

- Canon Vixia HF R800 (\$349 USD, Oct 2021)

Examples of mics include:

- Catchbox (with CofC logo, \$469-\$720 USD, Oct 2021)

Examples of PTZ controllers include:

- LEFTEK Video Conference PTZ Controller (\$266 USD, Oct 2021)

Examples of wired HDMI extenders include:

- Cable Matters Wall Mount HDMI Extender (\$98 USD, Oct 2021)
- J-Tech Digital HDMI Extender By Single Cat 5E/6 (\$56 USD, Oct 2021)

Examples of wireless HDMI extenders include:

- J-Tech Digital Wireless HDMI 4K Extender (\$290 USD, Oct 2021)

Examples of HDMI switches include:

- Blackmagic Design ATEM Mini HDMI (\$300 USD, Oct 2021)
- ...or use multiple video capture cards in your computer such as AVerMedia Live Gamer HD 2 (\$136 USD, Oct 2021)

Examples of scene switchers include:

- Elgato StreamDeck 15 (\$150 USD, Oct 2021)

SOFTWARE-BASED TECHNOLOGIES:

- Digital Bulletins: <https://usebltn.com/>
- QR Code Generator: <https://www.qr-code-generator.com/>

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