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eGuide to Streaming: Operating an Online, Streaming-Based Ministry



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Streaming With Purpose

Practical considerations and solutions to make live streaming work for your multi-sites and remote locations, as well as your online attendees • **By Paul Clifford**

GONE ARE THE DAYS of just reading text and listening to audio online—now we’re watching videos as well. Oftentimes these videos are high-quality, real-time streams of major events.

Thanks to the inevitable forward march of technology, video streaming is no longer just for major events. Gone are the days when you had to raise huge sums of money to buy equipment, hire staff to run it, and create your own mini TV station. Now any event worth attending is fair game for streaming, and many churches have joined this streaming revolution.

New hardware and software options make streaming less expensive than ever before,

but there are still many factors that must be considered for a successful streaming operation. This article provides an overview of many of these factors, laying a foundation of knowledge that will help you with your early planning.

As with any type of production, always begin with your goal—and audience—in mind. As Tom Mullins from Fountain of Life Worship Center, a small church in Madison, W.V., says, “Before going into streaming you need to understand and have a plan for the reason you want to stream. Based on what your goals are, you’re going to look at it differently.”

For most churches, the target audi-



ence of a streaming ministry is either a multi-site or online congregation. Each has its unique challenges.

The multi-site audience

As more churches expand to multiple sites, live streaming to remote “campuses” is becoming more common. Unlike the lone individual streaming video to a laptop, the remote campus is composed of a group watching (and sometimes participating with) the originating campus.

Because one technical glitch can affect so many people, multi-site streaming requires both reliable equipment and a rock-solid connection. Imagine a congregation going to church only to have the pastor not show up at all, or skip the first half of the message, or freeze mid-sentence. The effect is the same if you have equipment or Internet problems during a streamed multi-site service.

To avoid equipment and Internet issues, try to have redundancies in place. If your church uses a computer to receive the live-

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stream, have a second computer configured, tested and ready to go. If possible, have accounts with two different Internet service providers (ISPs). Configure your network to fall back on the secondary connection should the first one fail.

If securing a reliable streaming connection becomes problematic, consider having a pastor (or lay leader) at the remote campus prepare a message in advance for times when the link fails.

In addition to stability, timing can be a challenge for streaming to remote campuses. Charles

Smith is the volunteer tech administrator for a group of churches in East Texas, which share one pastor through live streaming. “The biggest thing I didn’t foresee,” Smith says, “is syncing up church services to all start at the same time when a DVR is not an option.”

The least expensive way to solve this problem is to make sure that each remote campus finishes a time of musical worship before the originating campus does. Then a host can address the congregation and

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Make sure the site delivering your video stream is responsive. **A responsive site changes proportions and layout** based on the device being used to view it.

fill time until the main campus is ready to stream the sermon. A producer should be in constant communication with the main campus to keep the host informed about how much time to fill.

Having a flexible song list can also help keep the services in-sync. “Using music (congregational singing) that can be removed from the order of service or added in,” Smith continues, “seems to be the best non-technical solution so far.”

You can also solve the synchronization

problem with technology, by recording the sermon stream on a DVR (digital video recorder) to create a slight time shift. Here’s how this works: with a DVR in the loop, plan the sermon time at each remote campus to begin after the main campus. When the message starts, record it to the DVR. When the remote campus is ready for the message, begin playing it back from the DVR. The stream is not “live” (technically speaking), but a delay of a few seconds to a few minutes won’t be a problem.

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The online congregation

If you're live-streaming primarily to individuals, consider their unique needs, as well. How will they connect, and what type of screen will they be watching on? You can no longer assume your viewers will be watching your stream on a computer—you now have to accommodate mobile devices and “smart” TVs.

To deal with the variety of screen sizes and resolutions your viewers will be using, make sure the site delivering your video stream is responsive. A responsive site changes proportions and layout based on the device being used to view it. Your website should look great at resolutions low and high, on a small phone or a massive 4k display. The video playback window should grow or shrink with the site, as well.

With more people using smart phones and tablets, which streaming protocols your live-streaming host or content delivery network (CDN) supports becomes an important issue. Without getting into too much detail here, just be sure you're delivering HLS streams (HTTP live streams) as well as RTMP (real time messaging protocol). A responsive website isn't enough if the video won't play.

Fast mobile networks (i.e., 4G) are becoming more common, allowing you to deliver a higher-quality video stream. But just because you can deliver higher bit-rate video to mobile users doesn't mean you should. Depending on a user's data plan, a single hour-long service could consume a large chunk (or even all) of their monthly bandwidth.

Adaptive bit-rate streaming is the answer. This technology automatically delivers a smaller data stream for mobile users and a full-quality stream for home connections and large displays. Some adaptive delivery systems require that you encode and deliver your video at multiple bit-rates, and it chooses between them based on the viewer's device. Other systems will take a single high-quality stream and transcode it for smaller devices in real-time. This is a discussion to have with your live-streaming host or CDN.

With the profusion of set-top boxes, compact streaming devices and “smart” televisions, you may find that a growing percentage of your online congregation is watching your service on a TV. These devices will take the highest-quality stream

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you can deliver, usually HD resolutions of 1080p or 720p. Lower resolutions will look blocky and soft. Don't forget these "high-quality" viewers when establishing your bitrate delivery scheme.

Equipment

With the unique challenges of your audience considered, equipment is the next topic of focus. You don't have to spend a fortune to accomplish effective video streaming, but you do need to be deliberate in your purchase decisions from camera to final encoder.

Cameras sit at the top of the signal chain, and churches often make two mistakes when it comes to buying cameras for live-streaming: not buying the right cameras and not buying the right number of cameras.

While it's technically possible to live-stream with only a single camera, there are two typical outcomes: the camera is stationary and the resulting shot is boring, or the camera is delivering engaging video in the hands of a very accomplished camera operator. An effective one-camera shoot requires a camera op with the steady hands of a surgeon and the eye of an artist to know where to shoot, for how long, and

what to emphasize. Finding such a person is not an easy task.

Shooting for a live-stream with just one camera shouldn't be part of your church's long-term plan. With several cameras, each camera operator can concentrate on a particular aspect of worship and the message. Two cameras is a great start. Three is better.

The flip-side is that more cameras means more floor space devoted to video production gear, and each camera requires a dedicated camera op. Large multi-camera shoots can require a team of 5-10 people to run just the video aspects of the service.

Some churches use remote pan, tilt, zoom (PTZ) cameras to maximize floor space and minimize operators—both very important factors for many churches. If space is at a premium, a few small wall-mounted cameras will have a much smaller footprint than studio-style cameras on professional tripods. PTZ cameras may be an ideal solution for some churches, but a PTZ rig may cost more than similar shoulder- or tripod-mounted cameras.

There's also an artistic cost to pay, as remote PTZ cameras can be robotic in their movements. While PTZ systems continue

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Because one technical glitch can affect so many people, multi-site streaming requires both reliable equipment and a rock-solid connection. To avoid equipment and Internet issues, **try to have redundancies in place.**

to improve, the motion of a remote camera often isn't as natural as that of a person operating a camera directly. The best option for many churches is a mix of traditional and PTZ cameras. This gives them the best variety of shots and the greatest flexibility.

Camera supports are also extremely important. Tripods are vital for professional quality video. These aren't the type of tripods you can buy at a local electronics store. A fluid-head tripod will be much sturdier, designed for larger professional cameras and lenses, and are capable of smooth movement.

Other camera support options include pedestals, dollies, jibs, gimbals, and even drones. These devices won't work in most churches, but they can add significantly to audience engagement if you have the space and the staff.

If you have more than one camera, you

need to be able to switch between your cameras "live." This requires a switcher, which is the video equivalent of an audio mixer. A simple, inexpensive switcher allows you to switch seamlessly between a few video sources with a straight cut or basic transition. A very sophisticated switcher allows you to switch between numerous sources with fancy effects like wipes or even 3-D motions.

Look for a switcher that has a dedicated video output for the live stream and another for the image magnification (IMAG) feed for the main congregation. Better yet, consider setting up a dedicated switcher for each video feed. Besides hardware-based switchers commonly seen in broadcast facilities, there are many computer-based options that do a remarkable job in streaming applications.

Clear communication is crucial for any sort of live video production. For commu-

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Sony's new SRG-300SE PTZ cameras can simultaneously output 3G-SDI and live IP streaming content. The cameras also feature 30x optical zoom plus 12x digital zoom with a 65-degree viewing angle to produce H.264 IP video streaming with selectable bit rates. Designed primarily for small- to mid-sized venues, the SRG-300SE is certified to work with Wowza Media Systems' streaming server software.

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nication between a director and camera operators, cell phones and two-way radios just don't do the job. Professional-grade intercom systems enable full-duplex communication, allowing both director and camera operators to listen and talk. Don't skimp in this area. Your production will look better with less-expensive cameras and a good intercom system than top-end cameras operated by a crew having to communicate with hand signals.

Finishing touches

Once you have your video feed, you need to get it to your live-streaming host. If you're going through a video switcher, you'll need to connect its output to an encoding computer or an encoding appliance. If you're using a computer for encoding, you'll need a capture device. These vary in price and capability, but for HD you should look for a Thunderbolt/USB 3.0 external device or an internal capture card. Make sure the device captures both audio and video so that you don't have sync issues. Finally, be sure your capture device is compatible with your encoding software.

For most streaming hosts and CDNs, you'll be encoding locally and sending the encoded stream to them for distribution. Unless you have a very fast Internet upload speed (this is rare), you must strike

a delicate balance between encoding the best-quality video possible without exceeding your ability to reliably upload that video. Charles Smith says, "Most small churches don't do adequate bandwidth planning and end up disappointed with the results. This can be a real stumbling block for rural churches."

Live streams live and die by the quality of Internet access, especially at the originating location. Consider paying for a better connection, even getting a backup connection for redundancy.

The last link in the chain is the live-streaming host or CDN. Think of these as two different services that accomplish the same task—they deliver the encoded stream to the online congregation.

Live-streaming hosts deliver live video and provide structures that make doing so easier, but they tend to be more expensive than CDNs. For churches, a CDN may be a better value. Because of their more content-agnostic structures, they may be more difficult for churches to use—especially those churches without significant experience distributing streaming media.

Don't make the mistake of trying to save money with a free live-streaming host. Mike Lanahan of Grace Bible Church in Minooka (Shorewood, Ill.) says, "We started off with

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a free service that used commercials before and after service. We were assured the commercials would be clean and tasteful, however, that didn't quite happen."

Production tips for live streaming

Directing for a live video stream is different than directing for IMAG for your live

audience. Your live audience needs detail and closer shots, while your online congregation needs context and wider shots. Give your local congregation too many wide shots and the benefits of IMAG are lost. Load your video stream up with too many close-ups and the result is a confusing service. In addition, the reaction shots



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SIDEBAR

Streaming: The Latest Legal Minefield

THE LEGAL BATTLES that surrounded Napster and downloading still reverberate in courtrooms and briefs, even as confrontations over the next frontier in digital distribution—streaming media—are heating up. And it's enough to give those who stream content over the Internet, including churches, some pause.

Streaming is fundamentally different than downloading a file, which results in the user having access to the content of that file while it's in their possession. With streaming, the content is ephemeral, at least as far as the user is concerned. Last year, a European high court ruled that streaming even illegal content online is legal there for the user, as long as they aren't willfully making a copy of the content.

But that content resides on a server somewhere, and that's where it exists in a fixed form. If the content is, for example, a video of a pastor giving a sermon, the copyright—which is implicit from the moment of the content's creation—belongs to the church, which can do with it what it wants to, including making it available for streaming. Anyone can watch it without concerns about infringement.

Making a copy of that sermon, however, could be considered infringement, even if the copier does nothing with the file, because the infringement occurs with the very act of copying the content. Similarly, retransmission of that content, when it's streamed as a "public performance"—i.e., when it's shown to a substantial number of people outside the family circle or close acquaintances—also constitutes a copyright violation.

But it can get fuzzy: what if you don't capture a stream as a file or upload an unlicensed content file to stream from your

own site, but rather direct others to a third site that's streaming content from others? That's what pirate sites have been doing for years: acting as search engines for links to content streamed from elsewhere. In that case, accountability is determined by the "inducement rule," a test created in a 2005 Supreme Court ruling that held that a company or website can only be held liable for distributing unlicensed content if it clearly encourages users to infringe a copyright.

For churches, streaming content that they themselves have created should keep them on solid legal ground. Use of any other content requires a license. An exception is the fair-use rule, which allows users other than the copyright owner to copy part or, under certain circumstances, all of a copyrighted work, even where the copyright holder has not given permission. For fair use to be valid the use must meet some specific criteria, such as the extent to which the use transforms the copyrighted work, such as using it in a parody of the original work, and how the use might affect the ability of the original work to sustain itself in its markets. But legitimate churches have a step up with fair use because the law favors nonprofit use cases, along with educational and purely personal uses of copyrighted material.

The bottom line is, you're fine streaming your own content; when it comes to content owned by others, if you're not clearly meeting the requirements of fair use, get a license. If you're just watching, then the rule is, look but don't touch.

—Dan Daley

Dan Daley is a journalist covering the business of media arts, production, manufacturing, distribution, and related issues globally.



There are many options for mounting cameras, but the most versatile camera mount is still the **trusty tripod with a fluid video head.**

that can help a remote congregation feel connected may be very distracting to the live audience.

Trying to mix audiences can result in a confusing video feed and a bland IMAG experience. The best setup devotes one director and switcher to the IMAG and a second director and switcher to the video stream. Both can select their own shots from the same cameras, though the video stream director will appreciate one camera dedicated to wider context shots.

Churches often overlook the unique needs of audio for the live stream, which is a huge mistake. What sounds awesome in the main congregation may sound horrible on the live stream. This is because the live stream gets no benefit from the acoustic sound in the main venue. Instead, the stream carries only what is picked up by mics. It's a vastly different experience from listening in the room live.

Streaming music is especially problematic. Louder instruments like drums,



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- VS-102-HDSDI Encoder/Decoder**: A silver and black hardware device with a monitor showing a priest speaking.
- CV342-CSB**: A large, black, professional video camera with a lens and a viewfinder.
- CV350-5XB**: A black, cylindrical video camera with a lens.
- CV500-MB2**: A small, black, square-shaped camera mounted on a base.
- CV200-MB**: A small, black, cylindrical camera.

Cameras sit at the top of the signal chain, and churches often make two mistakes when it comes to buying cameras for live-streaming: **not buying the right cameras and not buying the right number of cameras.**

brass instruments and electric guitars may require only modest reinforcement live, which makes those instruments sound weak and distant (or virtually non-existent) on the video stream.

As with video switching, the best solution for streaming audio is a dedicated sound engineer and mixer situated in an isolated space. There he or she can blend the audio inputs for optimum sound in the live stream. If that's impossible, placing additional ambient mics in the venue—and mixing them in for the stream only—can help fill out the sound of the video stream.

A streaming opportunity

Live streaming is a powerful tool that can help your church reach people it could never have reached before, whether they're across town or on the other side of the planet. Ours is the first generation to have this incredible opportunity. May your church take on the challenges of live streaming and thrive at reaching those who can't join you in person.

Paul Alan Clifford is the author of "Podcasting Church, Tweeting Church, and The Serving Church." He live-streams free tech training five days a week on Trinity Digital Media.

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