

FALL 2020

EVOLUTION

By Epiphan Video

7 hard-won lessons in virtual event production

Why SRT, DASH, and HLS are
the future of streaming

Embracing the new era of
video streaming with SRT
and Pearl

+ THE FULL EPIPHAN VIDEO PRODUCT CATALOG





epiphany video

When video goes mission-critical



Mike Sandler, President & CEO,
and Misha Jiline, CTO

Businesses have long recognized video as a powerful tool for promotion, engagement, collaboration, and other key activities. But in the context of a global pandemic, video quickly became essential to many businesses' continued operations.

We were fortunate to have deployed a video conferencing platform company-wide late last year, which enabled Epiphan to shift to remote operations in short order. But we knew the relative ease of this transition was not a universal experience. What about the conference organizers facing the challenge of converting in-person events into engaging online experiences? The schools searching for ways to deliver their programs to students no longer allowed on campus? The houses of worship struggling to stay connected at a time when members need their guidance most?

Our expertise in AV technology put us in a position to help organizations overcome such challenges. We mobilized our marketing and support teams to produce and deliver content aimed at helping organizations pivot to producing video remotely. Our research and development teams accelerated work on key remote production capabilities, most notably Pearl system support for Secure Reliable Transport (SRT) encoding and decoding. We launched Videoric, a service that enables organizations to ramp up their video content production with the help of remote AV professionals. In every case, Epiphan sales staff worked closely with distribution partners to connect customers with the technology required to endure the unique circumstances of this pandemic.

It has been gratifying to hear how our products have helped customers through these challenging times. There's the hospital that uses Epiphan capture cards to perform remote ultrasounds; the university that sent Pearl Minis to instructors' homes to facilitate distance learning; the AV services company that has been able to produce events from afar thanks to Pearl's remote access capabilities. Some of these stories you will find within these pages.

In 2020, video went from being an asset to an essential element of business continuity and pandemic planning. Rest assured that Epiphan is hard at work designing and manufacturing innovative AV solutions that will help you establish or enhance your own AV infrastructure. In the meantime, we hope you find this latest issue of *EVolution* informative, entertaining, and, perhaps in some sense, reassuring.



CONTENTS

4 7 hard-won lessons in virtual event production

In the face of a global pandemic, organizations had to quickly figure out how to connect with partners and customers in a meaningful way. In this article, we discuss seven important lessons that we learned in creating video effectively and efficiently while working remotely.

8 Why SRT, DASH, and HLS are the future of streaming

13 Embracing the new era of video streaming with SRT and Pearl

16 When does latency matter?

39

Epiphan Video products



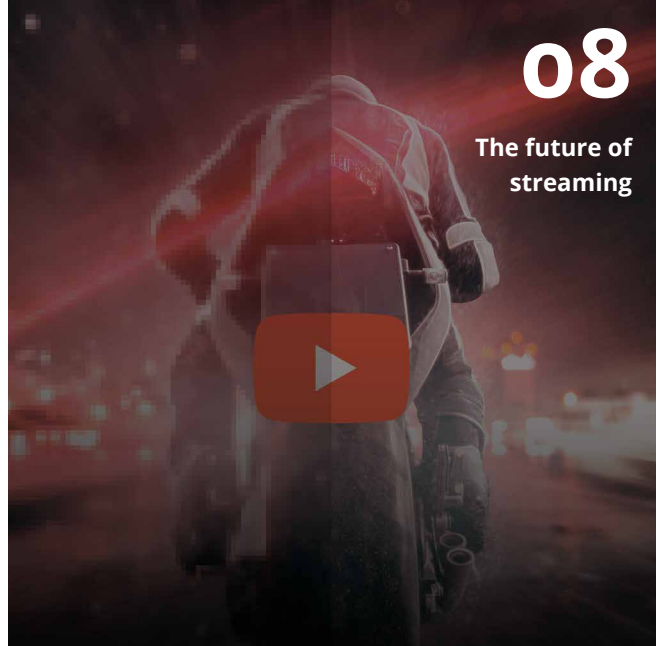
- 18 It's time to consider a remote video production service
- 22 HyFlex learning: Equipping classrooms for the new normal in education
- 27 Making video production accessible at Belgium's Thomas More University
- 32 AV.io capture cards enable remote prenatal care in Australia
- 35 Can AI help meet the demand for live transcription?
- 39 Epiphan Video products

INSIDE EIPHAN

- 45 A message from the people behind the products
- 46 In the spotlight

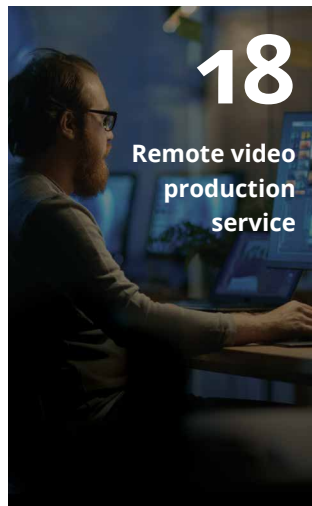
08

The future of streaming



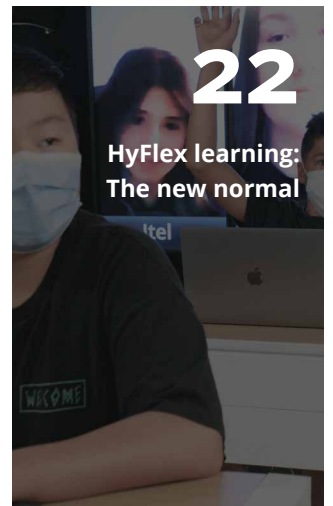
18

Remote video production service



22

HyFlex learning: The new normal



27

Thomas More University's story





7 hard-won lessons in virtual event production

In a matter of weeks, organizations around the world had to learn how to go from running in-person events with live attendees and speakers to virtual ones with all-remote guest lineups. That includes us at Epiphany. In short order, we had to figure out how to continue connecting with partners and customers in a meaningful way, at a time when in-person meetings weren't possible.



Our goal: Create a dynamic, highly polished live production featuring multiple remote guests

From the start we knew we wanted our productions to be live video streams and not prerecorded. We felt that the immediacy of live video would facilitate a more meaningful online experience for our audience. Another requirement was the ability to bring on multiple live guests and interact with them in real time during a stream.

Here's what we learned.

1 Verifying remote guests' connection quality and gear setups is critical

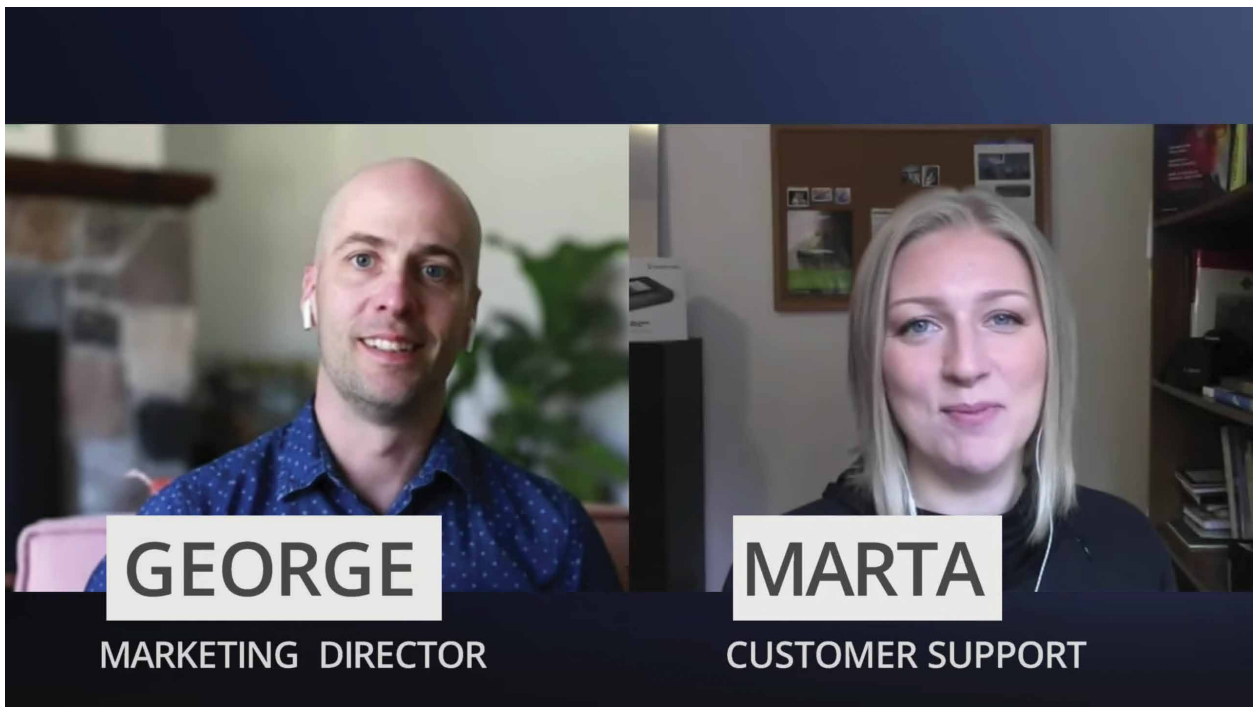
Be sure to put time and effort into testing your remote guests' setups as they are rarely perfect. Additionally, not every guest is going to be tech savvy, so be patient. Here is what you can do:

- Schedule a call before the event to test the guest's audio and video setup as well as their Internet bandwidth.
- If your guest isn't well equipped, and budget allows, ship guest speakers high-quality equipment along with setup instructions. Consider looking into a quality web camera, a desktop USB microphone, some LED video lights, and, optionally, a backdrop kit.
- Walk your guest through how to present materials virtually and discuss expectations.

2 Capturing a video call provides more creative control than streaming directly from the app

To stream multiple participants interacting in real time, we first turned to video conferencing apps with direct Real-Time Messaging Protocol (RTMP) streaming functionality (e.g., Zoom). We quickly realized this method doesn't provide an appropriate level of control over the final program: participants appear in random order, video layout is limited to the app UI, and adding graphics and titles is virtually impossible. Moreover, there's no control over the encoding settings.


Instead, we captured the video conferencing window directly from a host computer by connecting to Pearl-2 via HDMI. Using Pearl's web UI, we duplicated, cropped, and arranged participant video sources exactly how we wanted, including participant screen sharing. Pearl-2 also allowed us much more control over the encoding and streaming settings than any conferencing application.



3 Including media playback makes virtual event streams feel much more polished

Switching exclusively between “talking heads” and screen sharing can make an event feel lackluster. Inserting small video clips like stingers and countdowns greatly enhances the viewing experience, but incorporating these elements into a live stream can be tricky. Playing back media directly through a conferencing software’s screen share feature isn’t ideal because most video conferencing solutions have lower frame rates and higher video compression.

We were able to play back video clips by connecting a computer to Pearl over HDMI or NDI (Network Device Interface). Similarly, we added live titling via NDI using NewBlueFX’s Titler Live 4 Broadcast software, cuing up the titles manually on the host computer during events.



Jump to [page 13](#) to learn more about **SRT workflows**.

4 Using SRT to bring on remote guests provides excellent audio and video quality

As time went on, we realized that capturing video conferencing signals yielded subpar results due to high levels of audio and video compression. Fortunately, we soon added Secure Reliable Transport (SRT) protocol support to our Pearl encoders. SRT allows high-quality, low-latency streaming even over unpredictable networks.

Implementing an SRT contribution workflow was a significant breakthrough in audio and video quality. Guests’ AV signals were no longer hindered by video conferencing compression. Guests could now take full advantage of professional-grade cameras and microphones by connecting these directly to an SRT encoder (a Pearl system, in our case). It’s worth noting that real-time communication between parties does not happen over SRT; backchannel communication using a voice call is required.

Because this streaming setup requires an additional piece of equipment (an SRT encoder), it may prove to be a challenge for non-technical users. For mission-critical events, pre-configuring and shipping SRT-ready units is an option.

5 Setting up a virtual green room helps prep remote guests and facilitate line production

With a lineup of multiple guest speakers, virtual event line production becomes a delicate matter. You want to be able to call in the right guest at the right time, yet having all of your guests wait on a single “live line” can lead to potential mishaps.

One solution is to set up a separate video call and invite your guests there about 30 minutes before their scheduled appearance. This will help them get situated with a line producer who can walk them through any housekeeping details. When it’s time for them to appear live, direct them to the live broadcast line.

6 Enabling real-time output monitoring allows hosts and guests to feel more confident

The ability to monitor the stream in real time provides great peace of mind. We created a separate program feed channel on Pearl and looped it back into the video call host computer using an AV.io capture card. This way, hosts and guests were able to see the final production directly on the video conferencing call.




"Advanced remote video production" webinar featuring James Broberg of StreamShark.

7 Creating backup scenarios and redundant paths increases your chances of success

Continuous practice with virtual event production helped us discover potential points of failure and come up with contingency plans. For example, to prevent published stream loss, we always record locally on Pearl for backup. This also provides a higher quality video-on-demand (VOD) asset. Additionally, by taking advantage of Pearl’s multistreaming capabilities, we are able to diversify our streaming destinations so if our primary CDN has an outage, we can direct our audience to a secondary CDN.

We’ve also built additional layouts that we could switch to in case of technical difficulties. For example if a live guest drops off unexpectedly, leaving an empty slot, the producer switches to a backup layout without said guest. Likewise, in the case of video input or network failure, a “technical difficulties” layout pops up, encouraging viewers to stay tuned.

 **What is the biggest challenge you face in virtual event production?**

Feel free to reach out to us at info@epiphan.com. We'd be happy to discuss potential solutions!



Why SRT, HLS, and MPEG-DASH are the future of streaming

The predictable future of communication, education, and business is filled with widespread use of live streaming. The need for more efficient streaming protocols is urgent. Protocols like Real-Time Messaging Protocol (RTMP) just can't offer the enhanced features that modern applications demand. So modern streaming protocols like SRT, HLS, and MPEG-DASH were developed to meet the standards of streaming well into the future.

Secure Reliable Transport (SRT)

Secure Reliable Transport (SRT) delivers high-quality video and audio with low latency over the unreliable public Internet. More than just low latency, you can actually control the latency and tune out issues like jitter due to packet loss over poor networks.

The ability to deliver high-quality content that's near real time over the low-cost Internet gives broadcasters a viable alternative to expensive satellite technology. SRT can traverse firewalls without needing help from your IT department and deploys over the existing network infrastructure. Plus, SRT offers secure streaming with up to 256-bit AES encryption.



Low latency



Firewall friendly



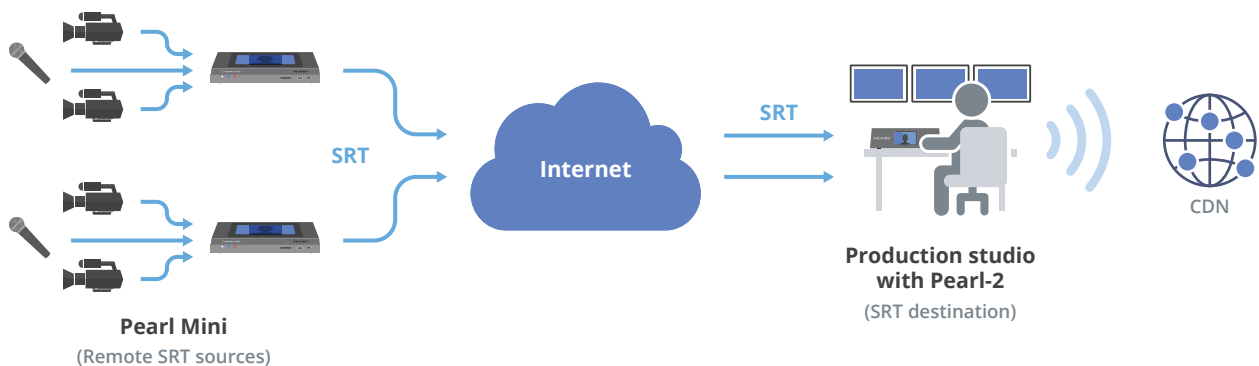
Secure

Benefits

- Delivers low-latency, high-quality video (up to 4K) and audio reliably across the existing, unreliable Internet
- Easily traverses firewalls between the SRT source (encoder) and the SRT destination (decoder)
- Allows control over latency to adjust for changing network conditions
- Deploys economically and is easy to scale using traditional network servers and technology
- Streams securely with up to 256-bit AES encryption

Multiple SRT contribution feeds

SRT excels when used to send a bunch of remote contribution feeds to a central destination for production and redistribution, such as in a broadcasting model with remote journalists reporting live on location. For live productions when you have remote guests and you need reliable video (and audio) with low latency, SRT delivers high quality with little to no noticeable delay.



The Epiphan Pearl family of encoders not only stream SRT, but can also ingest SRT streams for live switching, recording, and even redistribution to content delivery networks (CDNs) or other destinations that may not yet support SRT.

HTTP Live Streaming (HLS) and MPEG-DASH (Dynamic Adaptive Streaming over HTTP)

HTTP Live Streaming (HLS) and MPEG-DASH are both adaptive, HTTP-based streaming protocols that send video and audio content over the network in small, TCP-based media segments that get reassembled at the streaming destination. They adapt to network conditions, offering multiple versions of the stream at different resolutions and bitrates. Viewers can choose the quality of stream they want.

Another advantage of these adaptive-rate streaming protocols is support for multiple audio tracks, which means your stream could offer different languages that users can choose from. Other perks include support for closed captions, metadata, digital rights management (DRM), and even embedded advertisements. The framework is all there.

Deployment costs for HLS and MPEG-DASH are low because existing TCP-based networking technology is used. However, TCP favors Quality of Experience (QoE) over low latency and the added lag time can be seconds instead of milliseconds.

The biggest difference between these adaptive-rate streaming protocols is what they support. The International Standards Organization (ISO) and the team at MPEG designed MPEG-DASH to be codec and resolution agnostic. That means MPEG-DASH can stream video (and audio) of any format (H.264, H.265, etc.). HLS is currently limited to supporting video that is encoded using the H.264 codec. And because HLS was originally developed by Apple, it remains the standard for streaming to mobile devices and tablets.

Benefits

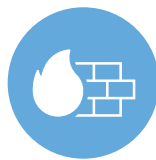
- Delivers high-quality video (up to 4K) and audio reliably over poor-quality networks where low latency isn't a requirement
- Easily traverses firewalls
- Adapts to different network conditions and sends multiple video streams at different resolutions and bitrates
- MPEG-DASH supports all video resolutions and audio codecs
- HLS is the standard for streaming to mobile devices and tablets
- Supports multiple audio tracks for things like multi-language streams
- Supports metadata and other enhanced features
- Deploys economically and is easy to scale using traditional network servers and technology
- Streams securely using HTTPS and authentication algorithms MD5 hashing and Secure Hash Algorithms (SHA)



Multiple video resolutions and audio tracks



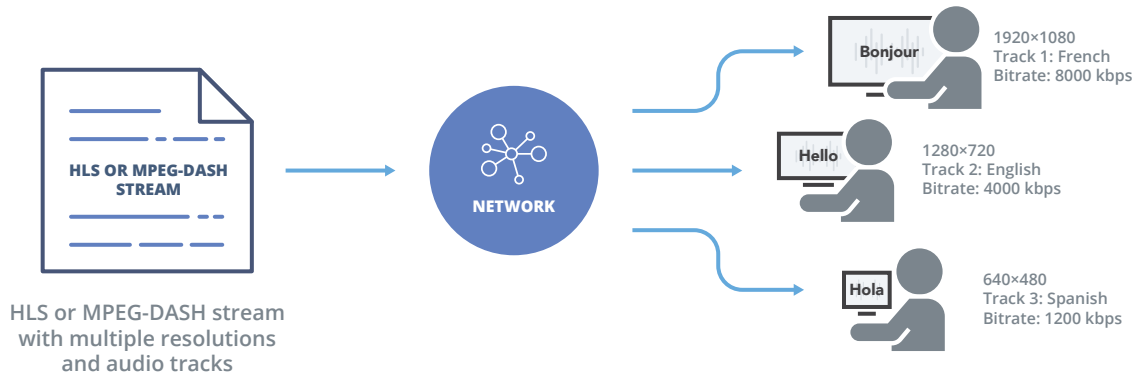
Easier and less expensive for CDNs to deploy



Plays nice with firewalls and proxies

Reliable, adaptive live streaming

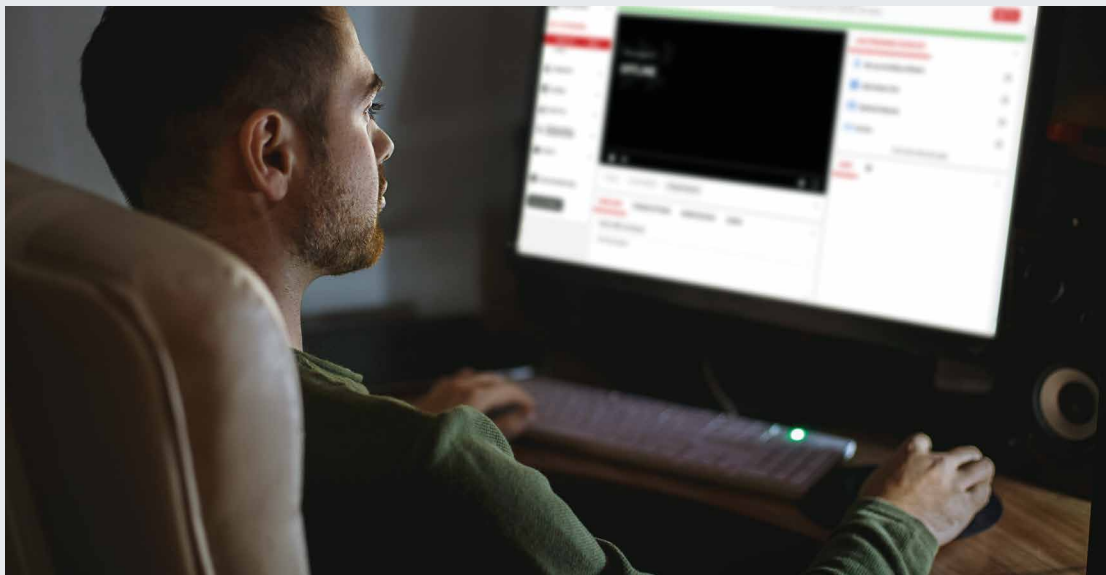
Reliability trumps low latency with HTTP-based streaming protocols. Choose HLS or MPEG-DASH to stream when low latency isn't a requirement and network conditions are poor. These protocols are well suited to securely stream corporate training and town halls over private LANs or to CDNs that no longer support RTMP, like Akamai.



Which streaming protocol is right for you?

What do adaptive HTTP-based streaming protocols HLS and MPEG-DASH have that RTMP doesn't?

- Multiple audio tracks per video track for multilingual productions
- Inclusion of metadata and other types of embedded content
- Digital rights management (DRM) support
- Multiple versions of the stream sent at different resolutions and bitrates

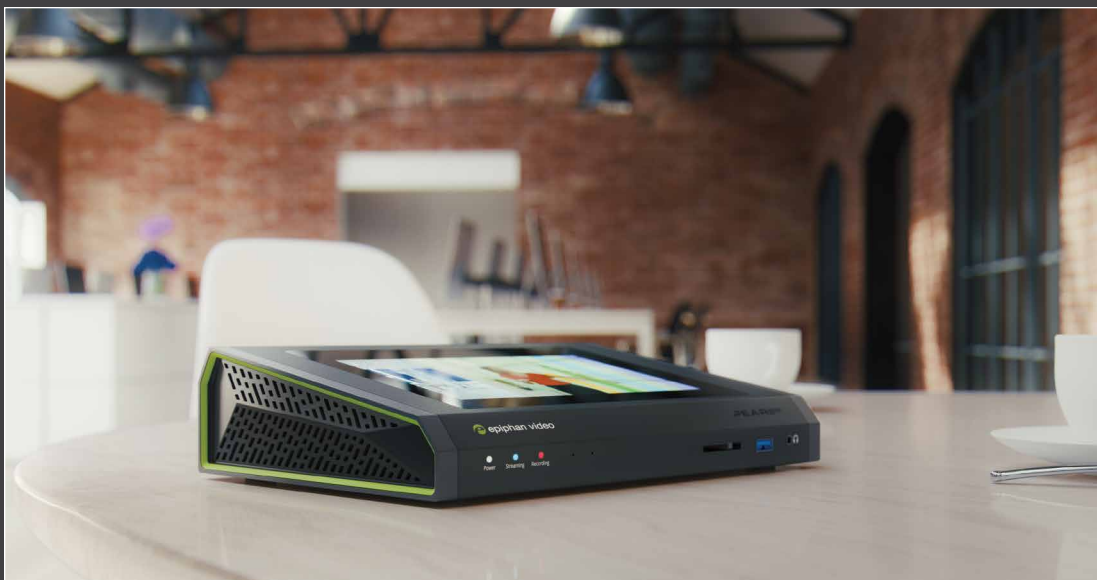


Scalability is much easier and cheaper for HLS and MPEG-DASH than for RTMP. And RTMP usually requires IT network ports to be manually opened in order to traverse firewalls.

If latency isn't an issue but reliability is, then HLS or MPEG-DASH beat out SRT. Adaptive HTTP-based streaming protocols deliver the best possible video quality to viewers with different network conditions and are more straightforward to set up than SRT.

If low latency is needed, then go with SRT for high-quality streaming. SRT establishes its own connection for packet recovery that is way more efficient than TCP. That enables SRT to deliver near real-time, two-way communications between a host and a remote guest. And you can tune the latency to adjust for network conditions.

While RTMP is still by far the most popular streaming protocol, modern protocols like SRT, HLS, and DASH are challenging that. CDNs like Akamai have already announced they're ending support for RTMP. It's old and expensive to deploy. With new protocols like SRT, HLS, and MPEG-DASH gaining popularity, it's only a matter of time before RTMP will be a thing of the past. That's why we've added support for SRT, HLS, and MPEG-DASH to our Pearl family of all-in-one video production systems. By adding support for these modern streaming protocols, you can be sure that Pearl-2 and Pearl Mini are ready for the future of live streaming.



Stream like a pro using SRT, HLS, MPEG-DASH, or RTMP/RTMPS

Flexible Epiphan Pearl all-in-one video production systems support multiple streaming protocols to enable a wide range of use cases.

Visit [epiphan.com/pearl-all-in-one-system](https://www.epiphan.com/pearl-all-in-one-system) to discover the power of Pearl!



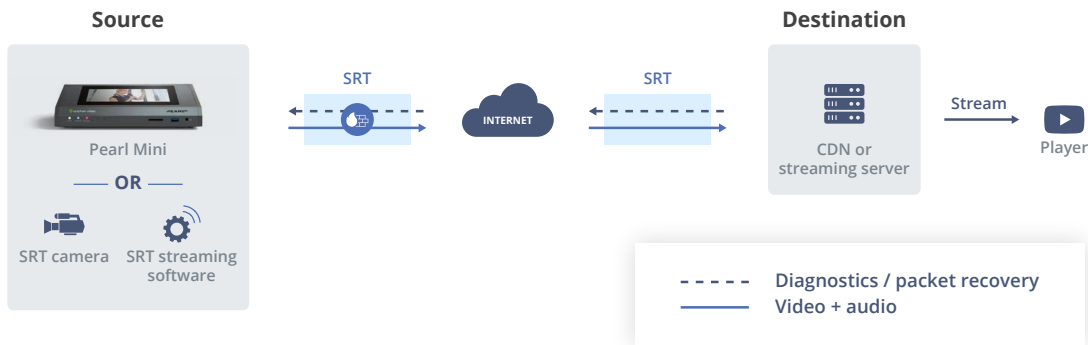
Embracing the new era of video streaming with SRT and Pearl

Secure, high-quality, low-latency live streaming – it's no longer just a dream. Haivision's open-source Secure Reliable Transport (SRT) protocol offers unparalleled control over real-time video and audio transmission to ensure the best quality possible on any given network. Pearl systems support SRT for streaming to content delivery networks (CDNs), adding remote guests to broadcasts or live streams, and serving as a contribution encoder in advanced remote production scenarios.

Application: Stream content to a CDN or streaming server

Every video producer wants the highest-quality video possible to ensure their live productions look professional. At the same time, low latency is essential for many applications. SRT technology makes it easier than ever to achieve both.

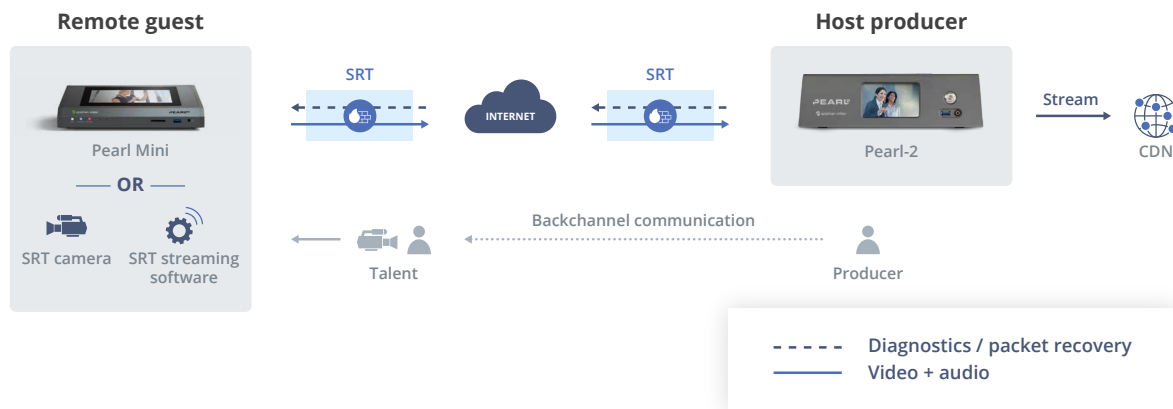
How does it work? SRT technology continuously sends and receives control data during streaming to minimize packet loss, jitter, and other threats to quality. Compare this to Real-Time Messaging Protocol (RTMP) or RTMPS, which send source data to the target streaming server or CDN without regard for any data that may get lost along the way.

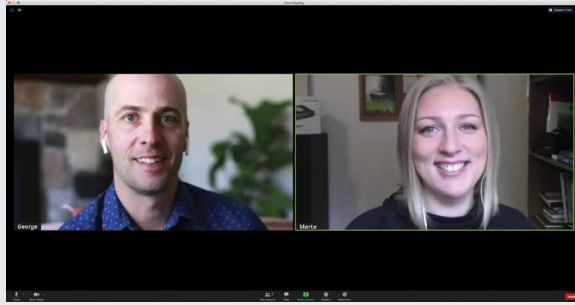


Application: Add remote guests and contributors to productions

The growing number of cameras, software, and streaming hardware that support SRT make the protocol more accessible for adding remote guests and contributors to productions. All that's required is to supply remote participants with an SRT encoder – whether it's a hardware or software solution – to bring high-quality, low-latency SRT sources into your Pearl-powered video productions.

As SRT encoders and decoders, Pearls can both send and receive SRT content. Even if a CDN or streaming server doesn't support SRT transmission, Pearl can still enhance the quality of a production on the ingest side. A producer using a Pearl system to receive one or multiple SRT sources can transmit the packaged content via any non-SRT protocol the CDN supports, such as RTMP or RTMPS.





Setting up a backchannel for communication

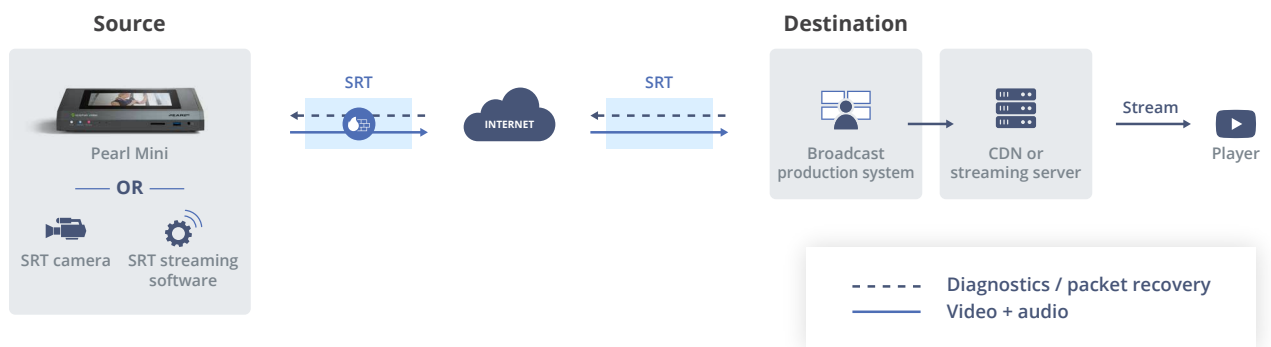
Producers need some way to communicate with guests and contributors in real time to ensure they're set to go live and queue them up for their appearance. A backchannel for communication is also essential when your production involves interaction between remote participants.

The backchannel can be a separate SRT stream or a video conferencing platform like Zoom. Which option makes the most sense depends on the performance of the networks involved as well as the physical distance between sources and the destination.

Application: Use Pearl as a contribution encoder

Broadcasters can integrate a Pearl hardware encoder into their production systems to bring in high-quality SRT sources from anywhere in the world. A producer can then mix, title, and switch between these sources during live production.

One big advantage of using Pearl as a contribution encoder is the system's remote control capabilities. Producers can remotely access a participant's Pearl using Pearl's browser-based or local console interface, facilitating configuration and testing to minimize errors during events.



Discover the full potential of Pearl SRT support

Check out [epiphany.com/srt-support-for-pearl](https://www.epiphany.com/srt-support-for-pearl) to learn more about the advantages of SRT support on Pearl and to download the complete Pearl SRT application note.



When does latency matter?

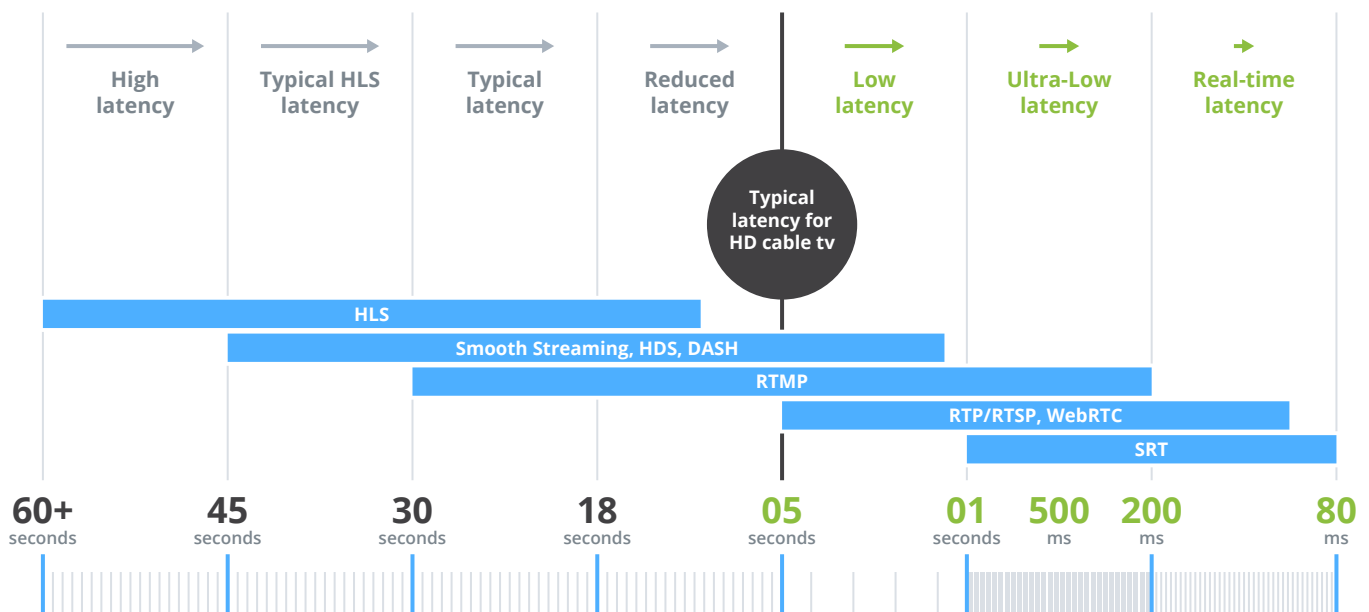
During the recent uptake in live streaming and virtual live events, the question of latency is increasingly relevant. We've all experienced that awkward silence waiting for an interviewee to respond to a host's question during a live broadcast. Near real-time, two-way communication is needed for natural sounding conversation.

It's important to consider the issue of latency if you have remote guests on the same production or your hosts are interacting live with viewers on chat. However, for many people doing live streaming, latency shouldn't be a worry. Even a minute of latency using Real-Time Messaging Protocol (RTMP) is fine for many broadcasts.

While RTMP is by far the most popular streaming protocol and works well for many applications, modern protocols like Secure Reliable Transport (SRT) and WebRTC are gaining recognition for good reason. These new protocols are pushing the latency boundaries closer to a real-time experience.

Choosing a low-latency protocol

For high-quality, low-latency streaming over the unpredictable Internet, SRT is the superior choice. With SRT you can achieve near real-time, low-latency broadcasts that are very high quality (up to 4K). Plus, you can tune the amount of latency to adjust for changing network conditions. Protocols like RTP/RTSP and WebRTC can deliver low latency, but they do so at a lesser quality than both SRT and RTMP.



Source: Bitmovin Magazine, 4th edition, 2020

Reliability over low latency

But what if you're streaming a conference or live event that doesn't include remote participants and you need reliability and good Quality of Experience (QoE) more than low latency? In that case, adaptive HTTP-based streaming protocols HLS and MPEG-DASH beat out SRT, RTMP, and the others.

Adaptive HTTP-based streaming protocols use existing networking technology, making them cheap and easy to deploy. They use the heavy packet loss and recovery method of the HTTP network and can deliver a reliable live stream over unreliable networks. But high reliability comes at a cost. All that packet recovery can mean latencies that measure in the seconds instead of milliseconds. In their favor, these protocols support multiple audio tracks, metadata, and offer viewers a choice of different video stream qualities for the best possible viewing experience for their network condition.

The future of streaming is fast, pristine, and here to stay. Streaming gear like the Pearl family of all-in-one video production systems are ready to stream well into the future and support SRT, HLS, MPEG-DASH, RTMP, and more.



It's time to consider a remote video production service

How does your organization create new video assets? The process likely starts with planning the message and finding a film crew. Then come price negotiations, location scouting, and lengthy equipment setup, finishing off with a hectic shoot. The point is that this process can be complicated and stressful, and it's an even more difficult puzzle with restrictions on in-person gatherings.

What if, instead, you had access to your own video studio fully staffed with production professionals? And what if, rather than working in the studio, these staff were operating all the equipment remotely? All you have to do is walk in, step in front of the camera, and begin delivering your message. Sounds pretty convenient, doesn't it?

Enter the remote video production service, a turnkey solution designed to optimize an organization's video production workflow. It starts with an on-premises professional AV gear installation followed by full-service remote video production, providing an entirely hands-off experience for the client. It's a cost-efficient, hassle-free, and safe way to record, stream, and broadcast video.



Four benefits of remote video production for your business

1 Safe and secure

With the global pandemic in full swing, the demand for remote video production workflows has skyrocketed. Organizations are looking for ways to create a lot of video quickly – but, most importantly, safely.

A key feature of a remote production service is a dedicated, isolated space for talent to create video. By signing up for such a service, organizations can meet all their video production needs safely and without bringing additional people onto the set.

In addition to complying with physical distance guidelines, the service can also be protected digitally. The client can configure remote access through a secure VPN connection, so even organizations with the highest security standards can feel safe.

2 Cost effective

Creating video content is expensive, both in terms of time and financial investment. Organizing video shoots requires hours of planning and coordination. Travel times between locations also add up.

Remote video production eliminates travel costs for both talent and crew. In fact, there's no need to hire a physical crew to shoot the video. You get access to the professional expertise of remote producers – for both filming and post-production – without any added costs.

3 Flexible and scalable

Committing to a large-scale solution or a contract with a single video producer is limiting. In addition, your demand for video production can grow and evolve over time, and many existing solutions may fail to adapt quickly enough.

A remote production service can be customized to fit the exact needs of each organization. It can be as large or small as needed, installed in a home residence, an office space, or conference hall. If your organization's video production demand grows, additional production facilities can be added quickly.

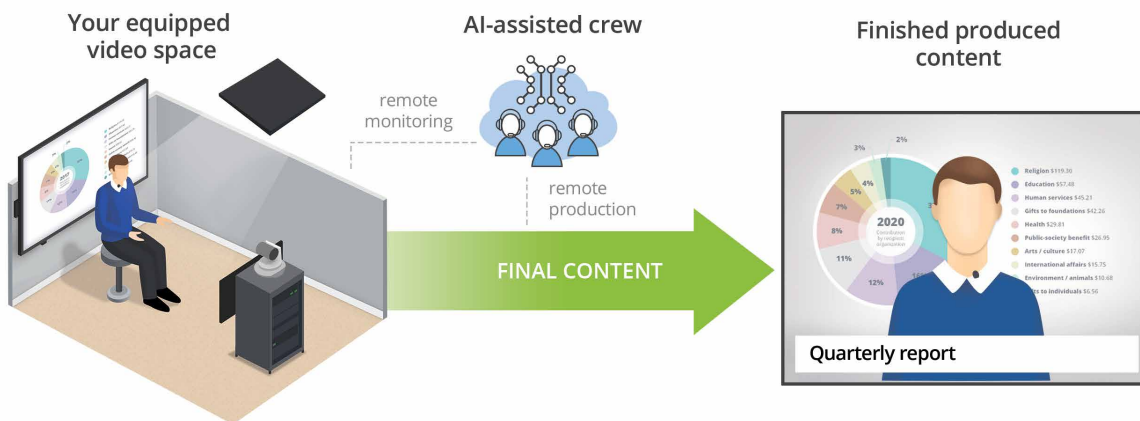


Remote video production fits a wide variety of cases, including those in education, corporate settings, and government. Hybrid classes, distance learning, remote interviews, and live executive addresses are possible with remote video production. Recording, streaming, live broadcasting, and post-production services are all available as part of the solution.

4 Fast and efficient

Coordinating with filming crews and awaiting final video assets can be a lengthy process. At the same time, many organizations count on delivering video communications daily.

A remote video production service is intended for frequent, daily use. Because the video creation process is streamlined, you can expect shortened production times and quick turnarounds.



Remote video production



See a remote video production service in action

Videoric is a turnkey remote video production solution that can deliver all these benefits and more to your organization. This secure solution eliminates the need for a filming crew, offering a much safer environment for video creation when it comes to social distancing guidelines. Using Videoric is like having access to a professional, always-on video studio – without the hassle of installing and managing the complex equipment.

Along with professional support from remote producers, Videoric is also assisted by artificial intelligence (AI). The AI technology greatly improves the video production process and eliminates many manual tasks.

Videoric is designed with ease of use in mind: there is absolutely no production knowledge required on your part. Anyone can walk into the dedicated recording space and get started right away. The remote production team will assist and direct the on-screen talent.

Videoric introduces a convenient and straightforward booking process: scheduling a time is as easy as creating a calendar event. The always-on filming studio and remote staff are always available and ready to go.

Lastly, by taking advantage of Videoric's subscription-based service model, you can avoid costs associated with purchasing and maintaining expensive AV equipment.



Want to learn more about what Videoric can do for your organization?

Let's talk! Reach us at info@videoric.com. You can also visit videoric.com for more information.

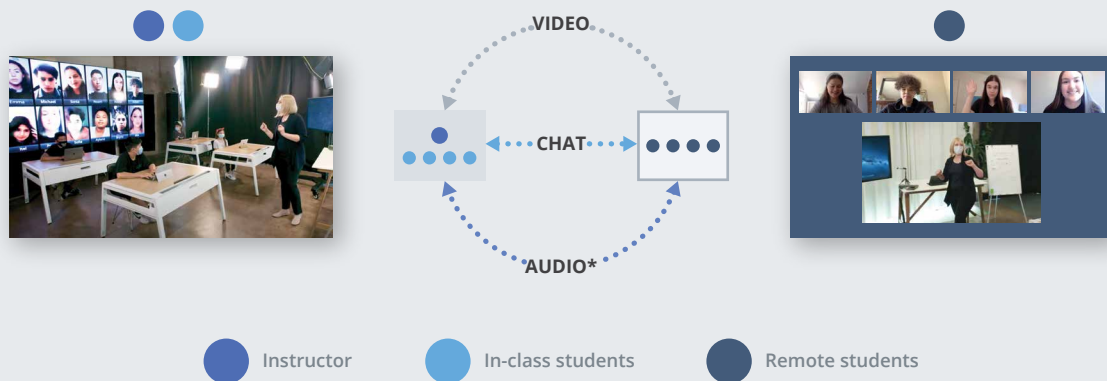


HyFlex learning: Equipping classrooms for the new normal in education

With policymakers in some jurisdictions advising against a full return to school this year, many educational institutions have opted for a hybrid part-online, part face-to-face teaching model known as "HyFlex." These schools are now grappling with an important question: how can we deliver a similarly enriching experience online and in class? The technology piece is key, but the large number of available solutions can overwhelm.

What is HyFlex?

HyFlex (Hybrid + Flexible) is a teaching model that combines elements of face-to-face and online instruction. It was first introduced in higher education in 2006 to give students the option of attending sessions in the classroom, participating online, or doing both. In the context of the pandemic, HyFlex is an especially viable learning solution because it reduces the number of students who have to be in class. Its flexible nature offers a future-proofing bonus, too: as local policies remain in flux, HyFlex-ready classrooms will be better able to adjust to new circumstances.



Three guiding principles for equipping a HyFlex classroom

To convert regular classrooms into HyFlex-ready ones, schools are working with systems integrators and their own IT staff to consider various options. Key capabilities for any technical solution boil down to the following three goals.

1 Enhances the overall learning experience

On a more basic level, schools may be looking at using video conferencing solutions like Zoom to fill all their needs. After all, video conferencing tools are easy to use and highly accessible. But if used alone, video conferencing just can't provide the level of interaction and engagement students need. To keep today's students interested and present, teachers need a much broader arsenal than just webcam video, laptop audio, and a few screen-sharing features.

The solution should offer advanced video capture features with emphasis on interactivity and quality. Schools should give teachers the tools to inspire and

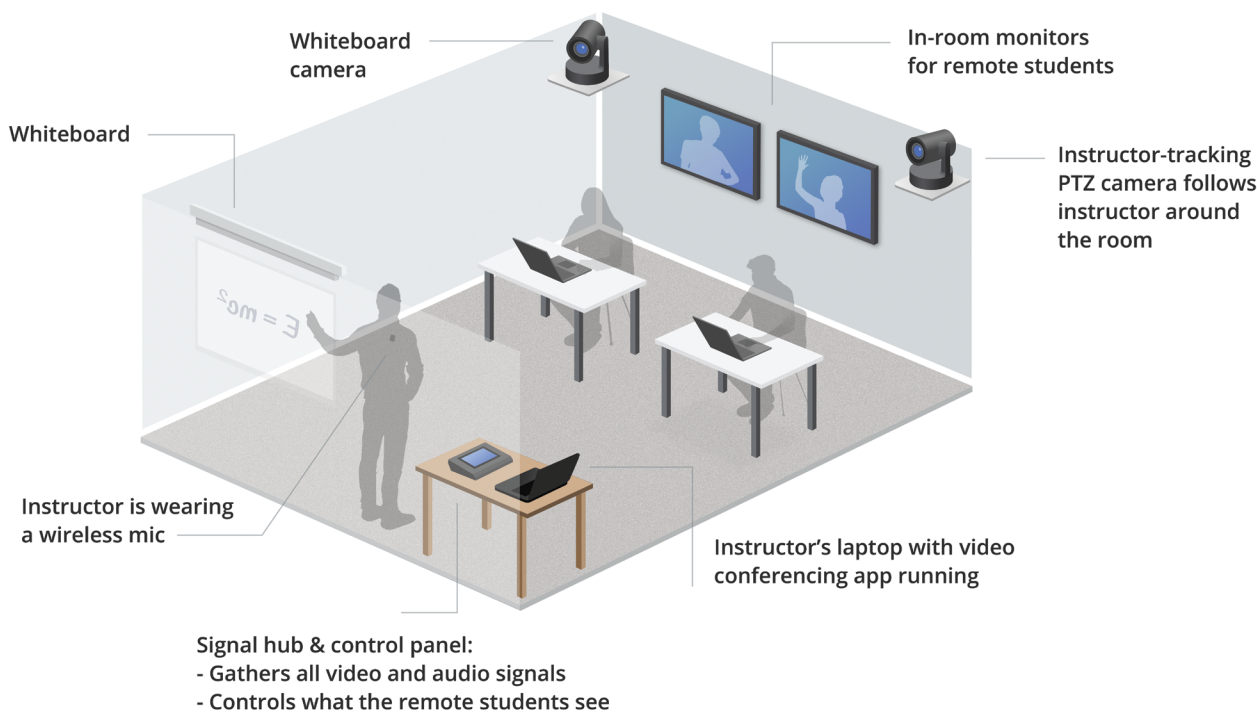
engage students by, for example, sharing rich media and capturing HD video. The audiovisual information remote and in-person students have access to should match as closely as possible. For example, if students in class are receiving information on the whiteboard, the online students should be able to see it clearly as well. If an in-class student is asking a question, online students should hear it, too. The solution is to capture and transmit computer and TV screens, projector feeds, and in-room audio and video in high quality and in real time.

2 Simple to use for instructors

Ease of use will be the primary concern for many instructors. They won't want to fumble around with technology before class. A smooth and streamlined experience is essential, requiring direct integration with existing tools such as the school's learning management system (LMS). Also important are workflow automations such as the ability to schedule lecture recording and automatic file uploading, ensuring video files are available for students to review at any time.

3 Easy for staff to install and maintain

Understandably, reliability is a factor both IT staff and instructors will expect from any solution. It is reasonable to demand consistent, high-quality results every time. This means that each HyFlex classroom should be equipped with the most reliable cameras, audio, and AV capture equipment — and endure rigorous testing.

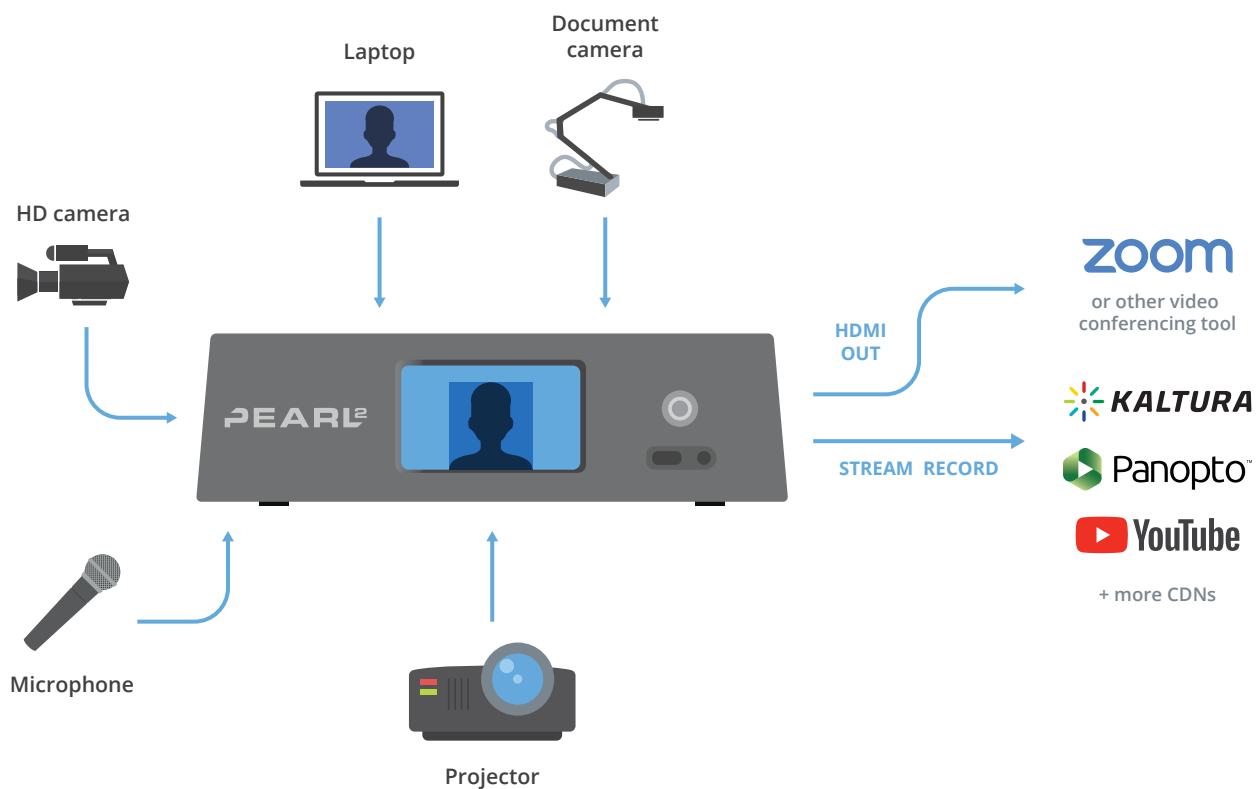


What's inside a HyFlex classroom?

High-performance hardware for HyFlex classrooms

At the heart of any HyFlex classroom solution is the video streaming and recording hardware, which enables remote learning by capturing, mixing, and delivering video content online.

Pearl-2 and Pearl Mini all-in-one lecture capture, streaming, and recording systems are ideal for HyFlex classrooms.



Easy to use

Instructors can operate any Pearl system at the touch of a button. Pearls are also IT-friendly with an easy, out-of-the-box network setup process. Staff can also access and manage any device remotely through Epiphan Cloud.

Versatile and flexible

Packed with advanced features, Pearl lecture capture hardware can adapt to your specific use cases. Stream lectures live for synchronous learning or record lectures for asynchronous remote learning. Use Pearl to capture, mix, and switch between various video sources such as professional video cameras, document cameras, microscopes, and more.

Integrates with Panopto and Kaltura

Pearl devices feature comprehensive integration with popular content management systems Kaltura and Panopto. This allows users to easily create scheduled, recurring, or ad hoc sessions. File upload happens automatically, saving administration time after events.

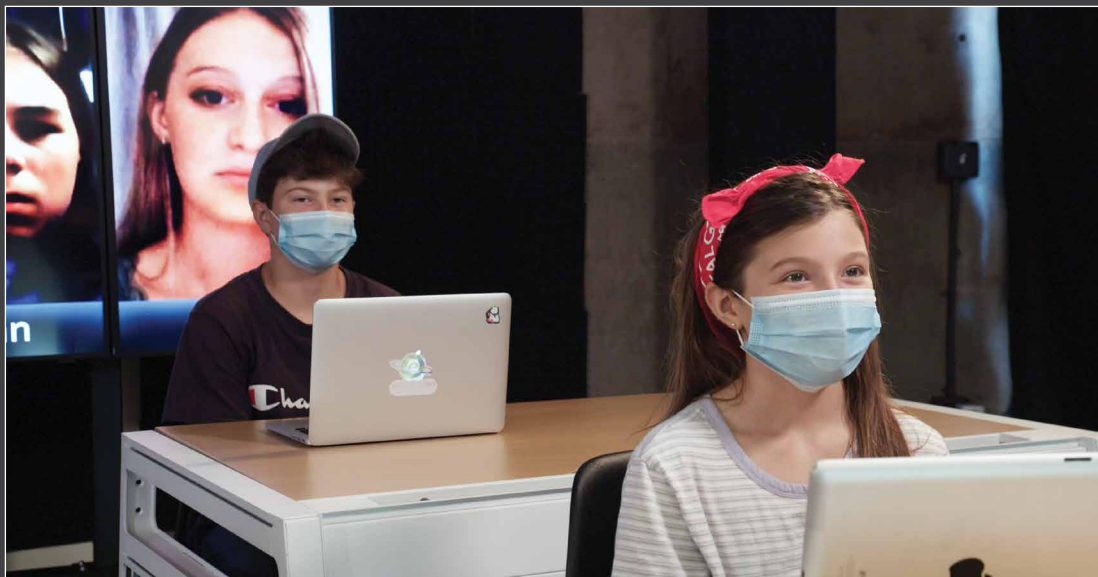
Reliable

Pearl-2 and Pearl Mini can run 24/7, delivering high-quality video streaming and recording every time. Should there be any questions, Epiphan's outstanding support team is always there to help. The school's IT team can feel confident outfitting numerous classrooms with Pearl devices.



Designing for HyFlex is all about how to use technology to create a favorable learning environment for both online and face-to-face students. It's important to give instructors the tools to inspire and engage their remote students, but also benefit the in-class participants. Lastly, it's important for solution equipment to be reliable and easy for the instructors to use.

Epiphan Pearl-2 and Pearl Mini are the easiest video encoder and all-in-one video production systems for school event productions, lecture capture, distance learning, HyFlex classrooms, and much more. To learn more about Pearl-2 and Pearl Mini, please visit [epiphan.com/pearl-all-in-one-system](https://www.epiphan.com/pearl-all-in-one-system) or email us at: info@epiphan.com.



Want to learn more about installing a HyFlex solution at your school?

Let's talk! Reach us at info@videoric.com.



Making video production accessible at Belgium's Thomas More University

Thomas More University of Applied Sciences is the largest of its kind in Belgium's Flanders region, with 14 campuses across the province of Antwerp. To enhance its world-class programs and make them more accessible to people with disabilities, the institution needed video production hardware that was versatile, compact, and easy to use for students and faculty alike.

Epiphan's Pearl Mini hardware encoder proved a perfect fit.

The need: A portable, powerful video production solution

Video is an integral part of the student experience at Thomas More University – and not only for those enrolled in video production or multimedia courses. From lecture capture and remote education to blended learning and flipped classrooms, video content is ubiquitous across the institution's dozens of programs.



"Students often prefer to be at the live course, but once they start studying, they really like the fact that there are videos available to them," says Caroline Deceuninck, a midwifery instructor at Thomas More.

More than a study aid, video content also helps the university meet another, more critical need: accessibility.

"It's in our mission that we provide videos of courses to students with disabilities," says program manager Tom Segers. "That way, if a student has to spend a day in the hospital, they can still see the lesson."

To maximize access to the institution's AV gear, the IT team at Thomas More needed a mobile video production system staff could easily move between rooms. That solution also had to work well with the university's already deployed video content management system (CMS) and learning management system (LMS).

"It's in our mission that we provide videos of courses to students with disabilities."

Tom Segers
Program manager at Thomas More

"There wasn't anything like that on the market at the time," Segers says, "so we built our own."

Thomas More's custom-built solution was serviceable, but not without its drawbacks.

Functional but impractical

"It was very big, very large," says Nico Beckers, a project manager at Thomas More. "For setup, you needed to go back and forth for the camera, tripod, recording device... When a teacher would ask to record 10 minutes before a lecture, it wasn't enough time. It was stressful."

Faculty also found Thomas More's mobile video production solution bulky and hard to use. "It took a lot of space, and you had to really look at which button to click on," Deceuninck says. "Sometimes you'd just push the wrong button, so that at the end of the day you didn't have your video. That was really sad."

Ultimately, Thomas More's AV behemoth wasn't worth its weight, says Segers. Happily, a new device hit the market that satisfied the university's key criteria of portability, simplicity, reliability, and flexibility: Epiphan's Pearl Mini hardware encoder.



The solution: Pearl Mini all-in-one video production system

Computer hardware distributor Intronics Belgium recognized Pearl Mini as the solution to its customer's video production woes.

"Pearl Mini could do everything they wanted with a much smaller box," says Intronics technical sales engineer Mikis Goos. "It also offered other possibilities for streamlining their video production even more."

Thomas More's IT team concluded the same. "It was small, it was mobile," Segers says, "so we did some tests with it and it was great."

Pearl Mini's portability and all-in-one design were key to simplifying the AV setup process at Thomas More. But the benefits the system brought the school go well beyond its compact form factor.

Comprehensive integration with Kaltura

All Pearl systems feature comprehensive integration with industry-leading video platforms Kaltura and Panopto. In the case of Thomas More, Pearl's direct integration with Kaltura helped streamline the video production process for faculty and staff.

Instructors simply enter their Kaltura credentials through Pearl Mini's built-in touch screen to authenticate to the platform. Pearl will then automatically upload recordings to the user's Kaltura folder, saving administration time after lectures and other streaming or recording events.

Adding to this benefit is the fact that Kaltura also features tight integration with Canvas, Thomas More's LMS. "Students don't even realize they are in Kaltura when they access it through Canvas," Segers says.

Accessible for faculty and students

For Thomas More, ease of use was another major point in Pearl Mini's favor. Pearl systems are powerful and versatile enough to support a broad range of use cases in education. At the same time, Pearl's user interface is easy to grasp even for instructors, students, and staff with little instruction or technical background.

This level of accessibility is a need many educational institutions share, says Yves Van Hullebusch, a project and account manager for Intronic Belgium. "What a lot of universities are looking for is a machine that can do it all, but it has to be simple to use. With Pearl Mini, there's just one button to push and the device will record, stream, and do everything you've preconfigured it to do."

About Thomas More University of Applied Sciences

With 14 campuses across the province of Antwerp in Belgium, Thomas More University of Applied Sciences is the largest institution of its kind in Belgium's Flanders region. Thomas More offers over 30 Dutch-taught programs along with a range of English-taught bachelor degree and post-graduate programs.



Pearl Mini earns top marks at Thomas More University

Thomas More's adoption of Pearl Mini has earned positive feedback from every corner.

IT: Simple to set up and support

For IT staff, the system's all-in-one design greatly reduced lecture recording setup times. "I can set up a web lecture recording session in less than five minutes," Beckers says.

Pearl Mini's portability also enabled the team to maximize the institution's AV budget with a permanent and accessible on-campus studio available to faculty and students.

Faculty: No-hassle lecture recording

Instructors have found lecture capture and other video applications in education far easier with Pearl Mini than with the institution's homegrown solution. "I just walked into the classroom, put in my credentials, pushed start, and immediately I could start teaching," Deceuninck says. "And when I pushed stop after I was done teaching, some minutes later the device sent me the recordings so I could make it available to students."

"Everything works very fast, very quickly," says Piet Lamberts Van Assche, who teaches law, philosophy, and economics courses at Thomas More. "You get in the studio, you log in. You make a video clip and it is transmitted immediately to the Kaltura platform. And when you get home, or even in the studio, you can go and check it out."

Students: Easy to grasp for video production

Pearl Mini is a hit among students, too. "Every year we ask the students what they think of the course," Lamberts Van Assche says. "Last year and this year, those reactions were very positive."

"The fact that it's easy to use is amazing," says Sam Sheenan, who studies international media and entertainment business at the university. "It means we can get on with our projects faster."

That simplicity is essential especially in education, video production student Carolien Porrez explains. "[The equipment] has to be up to date and it has to be easy to use so everyone can learn it."



Simplify your school's video production

Reliable and versatile, Pearl Mini is the perfect solution for a host of video applications in education – from lecture capture and remote learning to flipped classrooms and blended learning content.

Visit epiphany.com for more details or email info@epiphany.com to schedule a one-on-one demo.



AV.io capture cards enable remote prenatal care in Australia

One of South Australia's hospitals is the country's leading institution in prenatal care. The hospital's maternal-fetal medicine (MFM) service is the tertiary referral center for complex maternity care for a number of Australia's remote regions. To better support its largely rural patient base, the hospital needed a way to deliver care from a distance – a requirement that became all the more urgent with the global spread of COVID-19.



Helping vulnerable patients stay safe and healthy

Though expectant mothers get access to excellent care at the hospital, many of them have to travel upwards of five hours for an ultrasound. In addition to the time and costs, there are health risks associated with such lengthy travel for pregnant women. Restrictions imposed by the global pandemic complicate the matter even further, since traveling around and being in close contact with others increases the risk of contracting or spreading the disease.

Delivering healthcare from a distance

To provide referring clinicians in remote areas and their patients with timely, complete, and understandable consultative reports, the hospital turned to telemedicine technology.

Because most hospitals in rural areas don't have the technical capacity for ultrasounds, the hospital looked into establishing direct video communication with local private radiology clinics. The idea was to receive and review ultrasound images in real time through the hospital's video conferencing infrastructure.

The main challenge was capturing the ultrasound output and sharing it in a video call without losing the quality that was required for an accurate diagnosis. The solution also needed to be affordable and easy to implement in the private radiology clinics without disrupting existing workflows.

“We needed a solution that was simple for non-technical end users so they could just plug the device in and it would just work.”

Hospital staff member

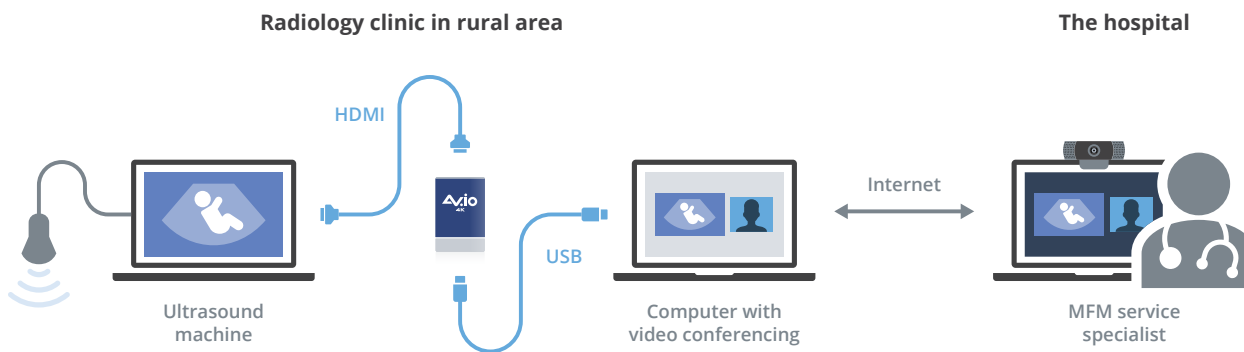
Achieving high quality with AV.io capture cards

Fortunately, there was a solution to the image-quality issues the hospital experienced using video conferencing software. Epiphan AV.io 4K frame grabbers enabled staff to capture ultrasound machine images directly and bring them into the conferencing software as a USB camera source. The result is a high-resolution image of the procedure.

The hospital installed Epiphan AV.io 4K capture cards in six private ultrasound clinics around the region to capture and transmit ultrasound imagery in HD. Now referring clinicians have fast, easy access to subspecialist consultations and patients can receive excellent medical care safely from home. This allows local doctors to stay connected with MFM specialists virtually and spares pregnant women from lengthy travel to distant care centers. It also promotes better use of healthcare resources, all while keeping everyone safe during the pandemic.

“It is really reassuring to know that you can have your baby and yourself cared for to the same extent even if you are hundreds of kilometers away.”

Hospital's MFM patient



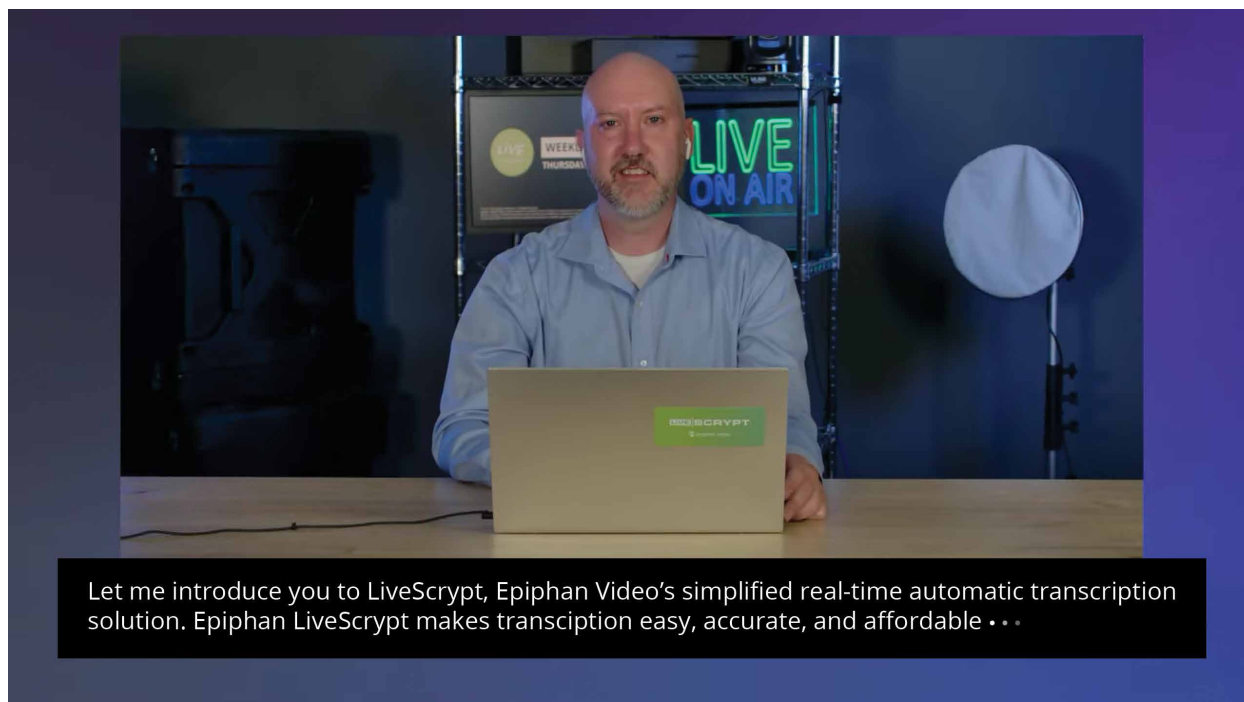
The simplest way to capture video

AV.io HDMI-to-USB capture cards offer the easiest way to capture video from any device. Learn more at [epiphan.com/products/compare-usb-video-grabbers](https://www.epiphan.com/products/compare-usb-video-grabbers)



Can AI help meet the demand for live transcription?

Transcriptionists who can work in real time are in short supply and command premium prices. For many organizations, this puts live transcription services out of reach. Can today's speech recognition technology help meet the demand for accurate and affordable real-time transcription? Yes – and we have the data to prove it.



Evaluating the real-time readiness of AI-transcription engines

Earlier this year, we compared three leading speech recognition application programming Interfaces (APIs) – Amazon Transcribe, Google Cloud Speech-to-Text, and IBM Watson Speech to Text – to human transcriptionists¹ on a number of criteria:

- **Accuracy:** The rate at which the solution makes mistakes in transcribing uttered words, measured as the Word Error Rate (WER [Transcript, Reference] = [Substitutions + Deletions + Insertions] / Words in Reference).
- **First-hypothesis latency:** The time between the utterance of a word and the output of text.
- **Stable-hypothesis latency:** The time between the utterance of a word and the output of correct text.
- **Cost:** The fee for use of the associated service.

We fed each API over 1,500 sample phrases from a test set made available by Texas Instruments and the Massachusetts Institute of Technology. We compared the results to the reference transcriptions included with the test set and measured latency. Ultimately, we decided against adjusting transcription timings for round-trip time (RTT) since RTT made up a relatively small portion of overall latency in every case.

To establish a baseline for human transcription performance, we drew and generalized results from multiple academic sources.

¹ By “transcriptionist” we mean a professional who transcribes speech using a computer keyboard versus a stenographer, who would be capable of typing at higher speeds using a stenograph. The corporate, education, and special events markets tend to use transcriptionists because stenographers charge considerably higher rates.

Results: AI- and human-based transcription compared

	Accuracy (mean WER)	First-hypothesis latency (seconds)	Stable- hypothesis latency (seconds)	Cost per hour (USD)
Human (generalized)	0.04–0.09	–	4.2	60–200
Amazon	0.088	2.956	3.034	1.44
Google	0.085	0.576	0.738	1.44
Google (Enhanced)	0.06	0.605	0.761	2.16
IBM	0.104	1.329	1.434	1.2

It's important to note that these results reflect the state of each API in January 2020, when testing took place. Performance could only be better if we ran the same tests today since speech recognition technology, as a piece of machine learning, improves over time.

Conclusion: Automatic transcription technology is ready for real time

Each API achieved a level of accuracy and latency sufficient for live event applications. The latency of Amazon's API was a bit higher than IBM's and Google's engines, but the three are comparable when it comes to accuracy and cost. We also tested each engine for noise resilience (transcription accuracy in the presence of noise) and found that audio equipment quality, microphone placement, and other factors are essential for acceptable performance.

What does all this mean in practical terms? These APIs are ready for use in live event scenarios – but how can organizations put them to use? It would require developing an automatic speech recognition edge agent to capture and stream audio data to the cloud; a digital signage platform and agent to receive, render, and display transcriptions; a Web portal or mobile application to accommodate users seated far from in-room monitors or who have visual impairments or vision loss; and so on.

The other, less burdensome option is to use an off-the-shelf dedicated automatic transcription device.

Get the best of automatic transcription technology today

Powered by Google’s advanced speech recognition technology, LiveScript features professional audio inputs (XLR, TRS) so you can capture crystal-clear audio that’s conducive to accurate AI transcription. LiveScript also includes HDMI and SDI inputs, a built-in screen for configuration, and a QR code system for easy streaming – simplifying setup and making for fewer points of failure.



Easy, accurate, and affordable live transcription

Visit [epiphan.com/products/livescript](https://www.epiphan.com/products/livescript) to learn more about how our dedicated automatic transcription device can help make your live events more accessible and engaging.





Epiphan Pearl Mini™

Simplify your lecture capture or live event production. Record, stream, and switch multiple HD inputs simultaneously.



1920 × 1200 - 60 fps



Epiphan Pearl-2™

Powerful, all-in-one live production system with 4K HDMI, 12G SDI, NDI, and the capacity for six simultaneous 1080p channels.



4096 × 2160 - 30 fps



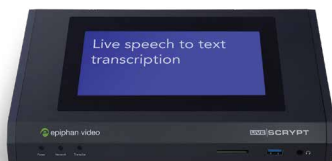
Epiphan Pearl-2™ Rackmount

All the same features as Pearl-2 but designed for installation in a rack.



Epiphan Pearl-2™ Rackmount Twin

Two completely independent Pearl-2 systems for a high-density rack installation.



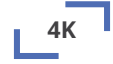
Epiphan LiveScript™

Real-time automatic transcription with built-in professional audio inputs, making it easier to achieve accurate AI-based transcription.



Epiphan AV.io 4K™

Capture 4K over HDMI in perfect fidelity or use hardware scaling to capture any resolution needed for your application.



4096 × 2160 - 30 fps
1920 × 1080 - 60 fps



Epiphan AV.io HD™

The simplest way to capture HDMI, VGA, or DVI video sources at resolutions up to 1080p.



1920 × 1080 - 60 fps



Epiphan AV.io SDI™

Works seamlessly with your SDI video sources, including SD-SDI, HD-SDI, and 3G-SDI.



1920 × 1080 - 60 fps



Epiphan DVI2USB 3.0™

Get precision video capture control over color space, cropping, resolution, and scaling for any device with HDMI, DVI, or VGA output ports.



1920 × 1200 - 60 fps



Epiphan SDI2USB 3.0™

Rugged and portable video grabber for AV professionals looking to capture 3G-SDI, HD-SDI, and SD-SDI signals.



1920 × 1080 - 60 fps



Epiphan DVI2PCIe Duo™

Internal PCIe capture card captures lossless video from dual-link and single-link DVI video sources, as well as VGA, HDMI, and SDI video sources with audio from SDI and HDMI sources.



2560 × 1600 - 85 fps
2048 × 2048 - 85 fps



Epiphan KVM2USB 3.0™

Manage local servers and headless computers using KVM over USB 3.0 with HDMI, DVI, or VGA connectors.



1920 × 1200 - 60 fps



Epiphan VGADVI Broadcaster™

Capture, combine, and stream audio plus full HD and SD video. A quiet and portable video recorder for DVI, HDMI, VGA, DisplayPort, S-Video, and composite sources.



1920 × 1200 - 30 fps



Interested in learning more about the Epiphan Video product line?

Visit epiphan.com/products for full product details, technical specifications, videos, and more.

INTRODUCING



A screenshot of the Epiphan Cloud web interface. At the top left, there is a notification bell icon with the number '3'. Below it, a device card for 'Pearl-2' is shown with IP address '10.1.2.208' and storage '43 / 500 GB'. A 'System Load' indicator is visible. Below the device card are two classroom cards: 'Classroom 1A' and 'Classroom 1B'. Classroom 1A has a 'Start' button. Classroom 1B has a 'Zoom Class' button with a checkmark and a 'Start' button. At the bottom left, there is a 'Live Transcription' button with a microphone icon. On the right side of the interface, there are logos for 'PEARL2', 'PEARL MINI', and 'LIVE SCRIPT'.

One platform for all your Epiphan devices

Time is everything when you have a fleet of devices to manage. Enter Epiphan Cloud™, an online platform that centralizes configuration and monitoring of Epiphan hardware.



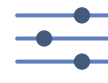
24/7 device monitoring



Time-saving batch actions



Automatic email alerting



Customizable UI

See what's possible with Epiphan Cloud
epiphan.com/cloud

PEARL NANO



COMING SOON



INSIDE EPIPHAN



A message from the people behind the products

Here at Epiphan, we've always touted video's ability to bridge distances and help businesses connect with their audiences. Has 2020 ever put our claims to the test!

Like many other businesses, restrictions on in-person gatherings plunged us into a video-only world overnight. Using Zoom with Pearl, introducing Secure Reliable Transport (SRT) into our workflows, and finding our presence on Crowdcast helped us stay connected with you, keep our weekly live broadcasts running smoothly, and allowed our highly collaborative teams to continue working together from a distance.

We organized virtual painting parties, trivia nights, and cooking classes over Zoom. We shared photos of pets, and even let the stars of said photos tag along to a few of our weekly meetings. Some of us discovered the convenience of only ever having to iron the fronts of our shirts.

These experiences have given us new appreciation for the power of video and deep insight into the needs of businesses that rely on video to operate and engage with their audiences. This perspective has already served us well as we develop new products and features to meet your organization's video production needs.

We've missed seeing many of you in person with trade shows cancelled this year, but you can always reach us on our social media pages and through our sales and support channels. Our product specialists are always eager to answer your questions and discuss solutions.

From our Epiphan community to yours, thanks for reading, and we hope to see you soon.

- Team Epiphan

In the spotlight

Anh Mai

Order manager extraordinaire and master task wrangler

Every company has a go-to person who knows the inner workings of the organization and is known for getting things done. Well, Anh Mai is that person at Epiphan. From making sure customer orders are processed and delivered without a hitch to manning our trade show booth, Anh's attention to detail means the job is done right.

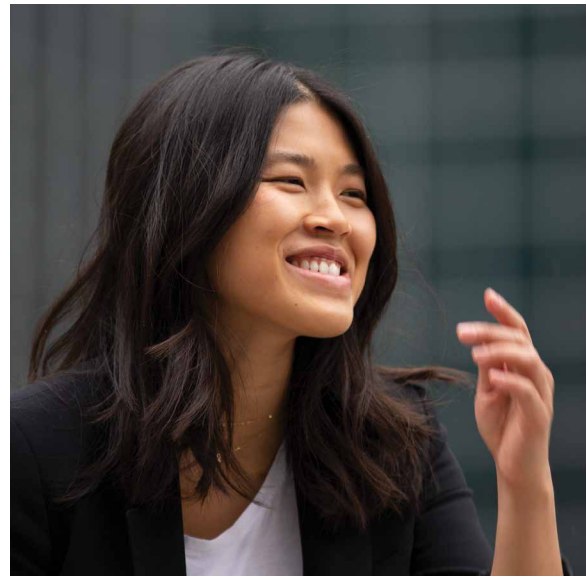
Anh has been with Epiphan Video for about seven years and has many roles. You may already know her by her friendly voice on the phone if you've ever called for pricing or to place an order.

"I have a lot of duties, too many to count!" says Anh. "I oversee orders so I work closely with our supply chain and manufacturing. But I also help the accounting team with checks and balances. And as a backup shipper, I can not only process your orders, but ship them to you too!"

One of Anh's many stand-out qualities is how she works hard to find solutions that work for everyone, no matter how sticky the situation.

"I know that people value and appreciate someone looking out for their best interest. This is how you maintain and build a strong customer base," says Anh. "This is something that not only contributes to my current role but it's something Epiphan values and practices across all our teams."

We want to wish Anh well as she takes some well-deserved time off to welcome a new addition to her family over the coming months. We'll all miss her, but know she'll be back to continue helping customers with orders and all the other important work she does with excellence. As Anh puts it, "Epiphan is about community and connecting people together no matter the distance."



I know that people value and appreciate someone looking out for their best interest. This is how you maintain and build a strong customer base.

Anh Mai
Order Manager

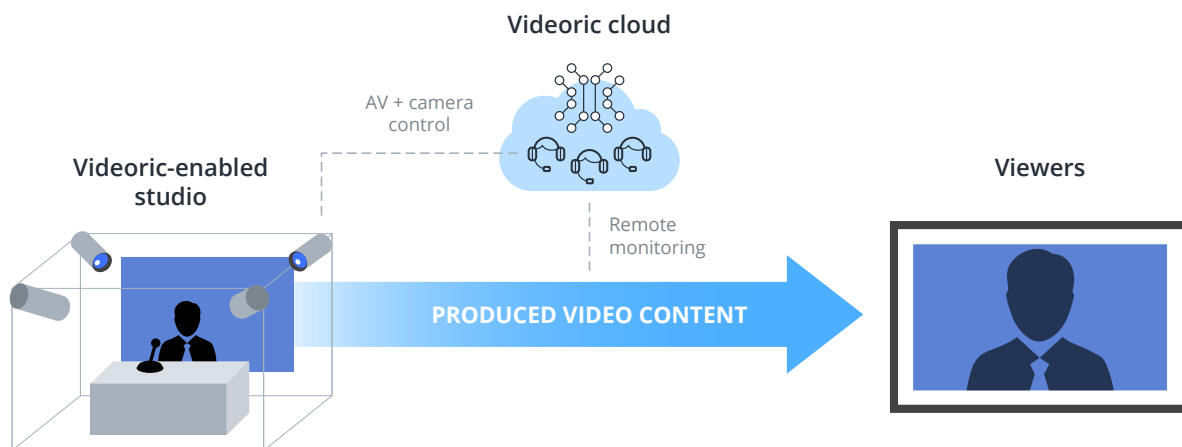
Videoric

VIDEORIC™ BY EPIPHAN

The all-in-one remote live production solution

You focus on delivering your content — we take care of the rest

Videoric is your virtual, on-call video production crew for professional-quality live streaming, broadcasting, and recording. Videoric's production team works remotely, handling everything from initial installation to running your live productions. Our team can also outfit your space with everything you need for hands-off video production.





LIVE

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for pro AV

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