

# LiveU + Remote Switching Solutions

COVID-19 has displaced many live video producers, with many major network operations centers evacuating and sending their staffs home to adhere to social distancing guidelines for stopping the spread of the coronavirus.

How then, to keep live content rolling? What tools can be leveraged to deliver camera feeds from various guests quarantined at their homes? Roll in pre-recorded content? Add graphics? Do everything a hardware switcher typically handles?

Because LiveU specializes in transmitting from anywhere, we can contribute into many helpful switching solutions that can be driven remotely to accommodate truly “at home” or “REMI” production workflows, the best of which are recommended below.



## LiveU Product Suite

LiveU's key products that can contribute to a remote production are:

- ▶ **LU-Smart**, our smartphone app for iOS and Android
- ▶ **LU-Lite**, our desktop app for MacOS
- ▶ **LiveU Solo**, our RTMP encoder for the web
- ▶ **LU300**, our 3+ modem broadcast HD HEVC hardware sling/mountable transmit encoder
- ▶ **LU600**, our 6+ modem broadcast 4K HEVC hardware backpack transmit encoder
- ▶ **LU2000**, our 1-4 SDI broadcast output receive server

LU-Smart, LU-Lite, LU300 and LU600 can all be controlled with our **LiveU Central** management console and pointed to a cloud or LU2000 server channel in order to deliver **RTMP** or **MPEG-TS** output. LiveU Solo has its own portal and can be pointed to stream to any **RTMP** destination.

# Cloud Switchers

There are many cloud-based switching platforms that can ingest RTMP push streams from LiveU devices. **Grass Valley AMPP, EasyLive.io, Grabyo, Kiswe Cloudcast, CloudMix, Dazzl.tv, WildMoka** and **Lightstream** all possess the capability and are turned to daily as the remote vision mixers of choice for our customers.

Each platform has its own strengths in terms of features, but most can mix live sources with pre-recorded files, and include integrations such as **Singular Live** to provide a web-based graphics suite or connection with **social media** sites like **Facebook** or **Twitter** to pull in content from those platforms.

While some cloud switchers allow screen capture of **Zoom** or other teleconferencing services to have guests join from their homes, they may also provide an **integrated remote guest** feature that sends a magic link for guests to join the session via mobile device or webcam. This relies on a single Internet connection and typically uses the WebRTC protocol, which sacrifices video quality for the sake of maintaining low-latency real-time communication.



The cloud platform's integrated WebRTC remote guest feature may get the job done, but challenged Internet environments may benefit from the increased video quality and redundancy LiveU's **LU Smart** app can provide. LU Smart bonds together the phone's cellular and WiFi interfaces to stream. Feeds from LU Smart can be sent into a cloud-based switcher as RTMP sources. The cloud switcher console provides an RTMP URL and Stream Key to push to.

## Installing/Registering LU-Smart

**LU Smart** can pair with a physical LU2000 server for SDI/RTMP/MPEG-TS/NDI output or a LiveU cloud server for RTMP/MPEG-TS out. An LU2000 or LiveU cloud server is required to use Smart. Please contact us if you'd like to get set up with a server and Smart license to test it out.



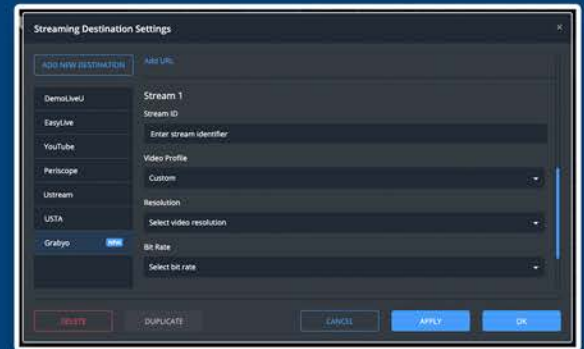
The easiest way to set up talent with LU Smart is to use the "Guest Interview" button in LiveU Central under Units > List. You can press this to create a magic link to send to a guest. When your talent opens the link, they will be sent to download LU Smart from the iOS or Android app store. Upon initial launch of the app, it will automatically open in selfie mode and start transmitting into LiveU Central, where you can then assign an output channel.

# Setting an Output Destination for LU-Smart

In the LiveU Central web console, visit:

Manage > Channels > double-click cloud or LU2000 server channel you'll be sending video to > Streaming > Enter RTMP URL/stream key provided by cloud switcher

LiveU Solo can set up generic RTMP output to a URL/stream key through the Solo portal at [solo.liveu.tv](http://solo.liveu.tv).



## Receiving via SDI for Linear Output

Most cloud switchers will offer RTMP output to web destinations such as Facebook, YouTube, Twitter/Periscope, LinkedIn, etc.

EasyLive and Kiswe support additional protocols besides RTMP, including RTMPS, SRT, ZIXI, MPEG-TS, RTSP, FTL and HLS.



A decoder that can ingest one of the aforementioned stream formats and output SDI could sit at the network operations center to receive the stream and feed linear television.

- ▶ TelVue's HyperCaster B100, B1000 or B2000 has RTMP, HLS or MPEG-TS in, SDI out
- ▶ Cisco's D9800 can convert MPEG-TS to SDI

## Streaming to Multiple Destinations

Integrated multistreaming is a common feature amongst cloud switching platforms. Should the platform not provide for simultaneous RTMP output to multiple destinations, we recommend Switchboard Live, EasyLive or Restream.io to accomplish the task.



## Software Switchers

In addition to “all cloud” options, even in the era of social distancing it may make sense to use a local, software option.

**Wirecast, vMix, Production Truck, Livestream Studio and OBS** are all software that can be used to ingest LiveU feeds, mix them, and send them on to RTMP web destinations, or SDI out to linear television workflows. All of them could be operated remotely with **TeamViewer** software.



Both Telestream and vMix offer turnkey systems which provide SDI output. Telestream’s **Wirecast Gear 420** provides 5 SDI inputs and 1 SDI output. vMix’s **reseller network** can build a custom Windows PC with SDI in/out devices installed.

All of these softwares run on Windows 10, and a Blackmagic Decklink I/O card could be used for SDI output if building your own system. Wirecast, Production Truck and OBS have Mac versions as well, and it is also possible to run any of these softwares on an AWS cloud instance, though you’ll really want to know what you’re doing if you’re trying to set it up on AWS, as it can get complex.

Whether running on a physical PC or in the cloud, the system’s CPU/GPU need to be taken into consideration, as vision mixer software can tend to be resource intensive. Gaming computers can be a good choice, anything with an **Intel i7 quad-core CPU** or better (or AMD equivalent), **16 GB of RAM** and a **discrete GPU with 1+ GB video RAM** should be able to handle mixing at least 3 simultaneous inbound sources, with higher end hardware supporting a greater number.



**LU2000 physical servers** would allow 1-4 feeds from LiveU remote encoders to be received, then go SDI into a software switcher. If the LU2000 and switcher computer are on the same network, the switching software can grab any feed being sent into the LU2000 via the NDI protocol, which enables easy sharing of video sources across a local area network.

**LiveU cloud servers, LU2000s or the LiveU Solo portal** can RTMP push to a client software to receive the stream. We recommend **RTMP MiniServer** to receive RTMP push feeds and convert them to NDI sources. RTMP MiniServer provides an RTMP URL and stream key to send video into it. NDI sources then become available under the switcher software’s list of network-based sources.



You can run RTMP MiniServer on the same computer as the vision mixer software, but it will consume additional hardware resources and it may be advisable to dedicate another PC on the same network to receive the feeds and convert them to NDI. To make adjustments for video sources to be in sync, you’ll want to hard set RTMP MiniServer’s Start Delay and Max Delay settings to the same value. 500ms is suggested to provide a 5 second buffer for RTMP MiniServer to receive feeds and convert them to NDI.

vMix supports MPEG-TS in, so you could pull a LiveU feed into it directly, setting your MPEG-TS destination IP/port in LiveU Central > Manage > Channels > (Double-Click Channel) > Streaming

Have a NewTek Tricaster, Blackmagic ATEM, Sony, Grass Valley or Ross hardware switcher? You'll want an LU2000 physical server to receive LiveU feeds and pass output into your switcher over SDI. Tricaster and ATEM can ingest NDI sources that are available on the network. Otherwise, you could use Wowza or run Nginx on a Linux virtual machine to receive the stream and pull RTMP in with the Tricaster, though this workflow would add considerable latency and complexity to the workflow.

There are various tools on the NDI website that can feed into software switcher workflows and be helpful such as NDI ScanConverter, which can screen capture from teleconferencing sites like Zoom and make those sources available over the LAN.

## Comms and Video Return

LU Smart, LU300 or LU600 RTMP sources will have some latency versus a switcher's integrated WebRTC-based remote guest feature.

Setting up a talkback can be done with:

- ▶ LiveU's integrated IFB, which would require a compatible USB audio interface to be connected to an LU2000 physical server, and then program audio mix minus the guest audio sent back
- ▶ Or a separate comms system:
  - ▶ Simple as a teleconferencing service like **Skype** or **Zoom** run on a secondary device that the talent is listening to with headphones to avoid audio spillover
  - ▶ Production-specific solutions such as **Unity Intercom**, **RTS** or **Riedel Systems**

**Wirecast Rendezvous** and **vMix Call** are remote guest features provided by their respective softwares that provide the ability to share program output video return back to guests.

A **LiveU Video Return server** could be used to deliver program video/audio to our **LU Control app** for iOS/Android or see it on an **LU600 backpack encoder**, which has a built-in screen or micro HDMI out for viewing on a larger monitor.



Another way to achieve video return would be to push program feed out of a switcher via SDI into a **UVC-based USB capture card** such as **Magewell USB Capture HDMI/SDI** or **AJA U-Tap** and then select the capture card as a webcam source in **Zoom** or another teleconferencing platform. Cutting out the need for additional hardware, **Wirecast** offers **virtual camera output** which can send its program output into a teleconferencing service like **Zoom** as a webcam source.