# Video Studio Recommendations

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The power of video streaming for communications is undisputed. Yet organizations often fear that equipping a studio will be prohibitively expensive or complicated. This guide demystifies the process of choosing the gear you'll need and shows that a quality in house video studio is well within your reach, regardless of your budget. We'll walk you through the essential pieces of equipment, and consider the pros and cons of options at different price points. You're only a few steps away from creating professional looking video productions.

Cameras

Tripods

Microphones & Headphones

Lights

Encoders

Internet

# Cameras

There are a wide variety of cameras that you can use for your video production, ranging from webcam/consumer models, to prosumer, and professional. The cameras range in price, flexibility, and image quality. Most cameras offer HD functionality as the standard picture quality. Even at lower price points, the video captured will be crisp and high resolution. But higher end cameras offer some additional features that can further enhance the overall image quality and ease of use in productions. You may even encounter 4K resolution cameras. While this resolution can be useful in post production, it's not recommended for streaming live video because it increases the cost and complexity, even though online viewers aren't able to stream 4K video.

## Webcams/Consumer Camera

Pros:    Easy to use
         HD video
         Inexpensive
         Light in weight

Cons:    Image less customizable
         Fixed lenses allow moderate quality
         No professional audio inputs
         Perform Poorly in low light
         Limited optical zoom

**Canon Vixia HF R700** (~$299)
Leo Laporte outfitted his studio with 80 similar Canon cameras with an HDMI output. Check out his channel and recordings to see just how great these relatively inexpensive cameras can look when used with a properly lit and well designed set. If you are doing a multi camera video shoot, this may be the direction to go. Keep in mind that low priced cameras don't provide a way to capture pro quality audio internally, so you should plan on using an external mixer for audio.

Check Price

## Prosumer Camera

Pros:    Fully customizable image
         Higher quality lens
         Wider optical zoom
         Pro Audio Inputs
         HDMI/SDI output
         ND Filters for Outdoor shooting

Cons:    Fixed Lens
         Moderate lowlight performance

**Canon XA35**  (~$2,000)
This price level allows for an improved lens with better optics and a wider zoom range, allowing you more flexibility in how you frame your subjects, which can be important in tight spaces like conference rooms. The image capture features on prosumer cameras provide more flexibility to customize the image via manual settings — giving you a better result so long as you are willing to invest a little more time in optimizing the settings for your subject. They also have greater low light sensitivity (important if you aren't able to control ambient light levels) and professional audio inputs for higher quality microphones.

Check Price

# Webcams/Consumer Camera

Pros:     Seamless Integration
           High quality built-in lens or interchangeable lenses
           Pro audio inputs
           HDMI/SDI output
           Larger sensor
           Better performance in low light
           ND Filters for outdoor shooting

Cons:     More expensive
           Heavier build

**Canon C100 Mark II** (~$4,000)
The Canon C100 Mark II is the main camera used for productions in the IBM Watson Media Studio. This camera captures images with a more professional and cinematic feel. The large image sensor and interchangeable lenses allow you to adapt to any space and lighting environment. You can also manipulate extensive exposure settings to completely customize your image. The camera has professional audio inputs. Video output in this model is available via HDMI. The next level up, Canon C300 Mark II, provides SDI  connectors for a more secure workflow. SDI video output is preferable for higher scale production environments; you can send it over very long cables and it can interface with a wide variety of higher end video switching equipment.

Check Price

# Tripods

Not only will a sturdy tripod with a low-friction mount protect your camera investment, it will also help provide well framed, steady images and smooth camera motion. This small investment can pay large dividends when it comes to the quality of your image. Tripods vary in size and construction. Options and models are available to match any budget or use case. A quality tripod will last you many years and is a wise investment.

**Magnus VT-3000 Tripod System with Fluid Head** (~$129)

Check Price

**Manfrotto 504HD Head w/546B 2-Stage Aluminum Tripod System** (~$650)

Check Price

**Sachtler 0750 FSB-8T Tripod System with Speed Lock 75 Tripod** (~$2,500)

Check Price

# Lighting

Lighting is often the most overlooked area when setting up a video production, but it can have a major impact on the image quality of your broadcast. The variety available can be confusing: color balanced fluorescents, LEDs, tungsten, Fresnel, halogen — the list goes on. To simplify, start by buying a lighting kit: they provide everything you need to get started and will ensure you obtain appealing and consistent images, dramatically improving the look of your video productions.

With quality lights everything looks more even and professional. Skin tones appear more natural, even without makeup. Distracting shadows disappear. It takes less time to optimize the exposure settings of the camera, and the image sensor produces results that compete with more expensive cameras. Set up actually becomes simpler, even under time constraints.

One thing to consider when selecting a light kit is color temperature. This refers to how much the mixture of light leans towards the blue (cool) or orange (warm) end of the color spectrum. Daylight and artificial lights are never truly pure white. If you plan to shoot in an environment near windows or with a lot of natural light, you should select daylight balanced bulbs. They will more closely match the hue of sunlight. If you plan to shoot primarily indoors under normal office incandescent light fixtures, tungsten balanced lights are the way to go. Their color temperature will ensure that things look natural after the image has been captured and processed by the camera.

IBM Watson Media's in-house studio uses Kino Flo fluorescents which provide a nice balance. They have carefully calibrated color temperatures and are switchable between daylight and tungsten fluorescent bulbs. They are also durable, easy to transport and quick to set up. You can get similar results from lower priced lighting kits, but the color temperature may be slightly off from the standard daylight or tungsten balance levels. This means you may have to spend additional time performing a custom white balance on your camera before you start to shoot.

We highly recommended using a 3-point lighting kit for interviews and in-house studio company video productions. Here are some of our favorites:

**Genaray SpectroLED Three Light Interview Kit** (~$700)

Check Price

**Ikan LED 3 point kit** (~$1,500)

Check Price

**Litepanel Astra 3 light kit** (~$5000)

Check Price

# Three Point Lighting

Three-point lighting is a standard and effective method used in video production. The "key" light is the principal source used to illuminate the subject. You can position the key light at an angle, slightly above and in front of the subject. To prevent harsh shadows, position a "fill" light on the opposite angle. This light should not be as bright as the key light in order to maintain some texture in the subject. Place a third "back light" at an angle behind and above the subject. The aim is to illuminate the rim of the subjects head subtly in order to separate them from the background and provide depth to your image. You can use one of the recommended three light kits in a variety of setups as well to meet your needs. If you additional budget, you may want to consider adding floor lighting as well.  Lights placed on the floor can provide a glow on the wall behind the subject and add a very nice effect.

**Back**

**Key**

**Fill**

**Camera**
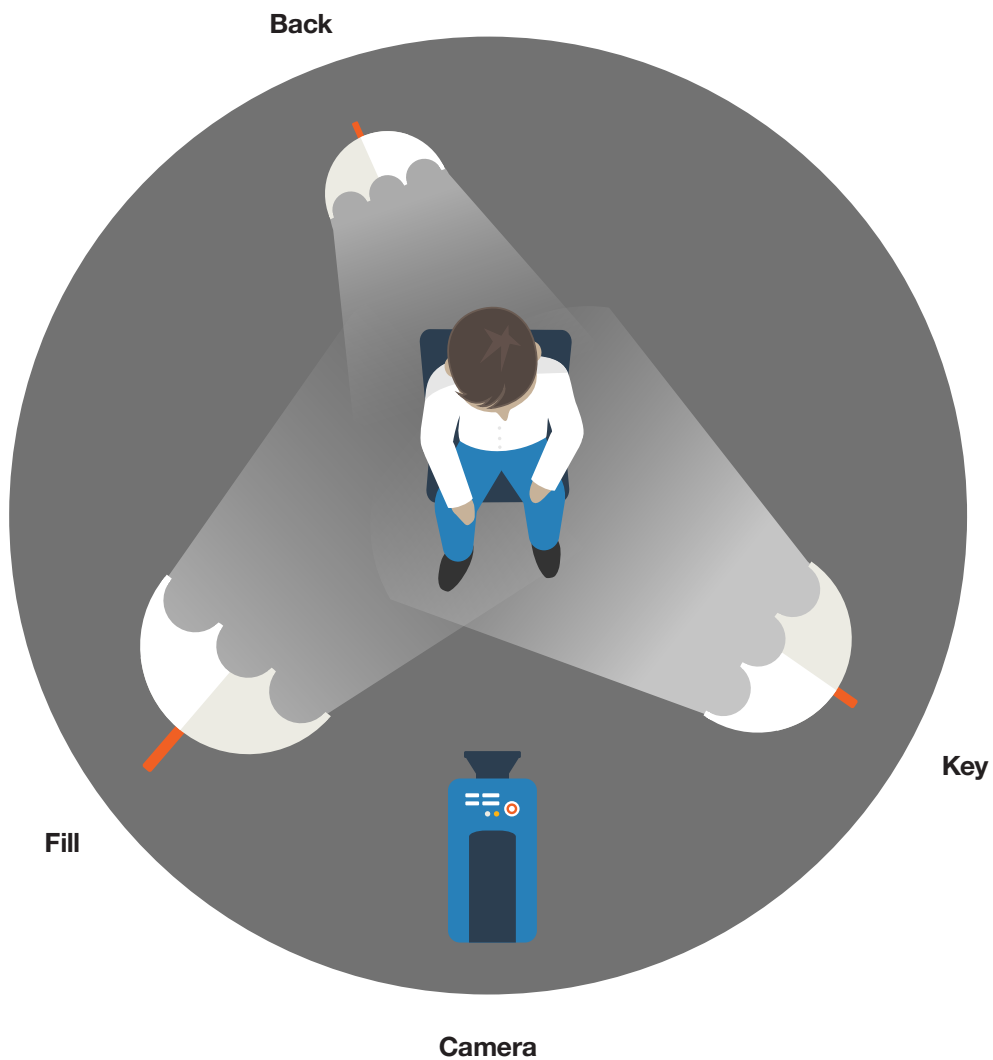
# Audio

It's hard to overstate the importance of good audio. If your audience can't hear what's going on, they will quickly lose interest even if the video images look glorious. Good audio starts with choosing the right microphone for the job. This depends greatly on your environment, your presenters, and how much freedom they need.

One key decision is between wired or wireless microphones. For static setups with one presenter, a wired lavalier mic is often very effective. Lavalier mics are small clip on mics attached to the presenter's shirt or coat, allowing hands free audio pickup. You can easily hide the cable and you don't have worry about battery life or signal strength, the two big concerns with wireless mics.

Another type of wired mic is the shotgun mic. You can use a shotgun mic on a stand close to and pointing directly at the presenter but positioned out of the shot but as close to them as possible. In general, these setups only work where you are able to ensure that the presenter doesn't move around, because they have a narrowly focused pickup area. A shotgun microphone with a boom pole is sometimes used for outdoor interviews, but this approach requires an additional crew member to keep the boom focused on the subject as well as to monitor the audio.

If the speaker will be moving around or if you'd like to minimize wiring in the studio, we recommend wireless lavalier mics. The IBM Watson Media studios use Sennheiser Wireless EW-100 mics. These have excellent sound quality and because they are wire-free, they allow for more mobility and less clutter in the studio. Make sure to put in fresh batteries before each broadcast!

**Shure BLX14** (~$299)

Check Price

**Audio-Technica AT 8015** (~$299)

Check Price

**Shure PGXD** (~$499)

Check Price

**Sennheiser EW 100** (~$799)

Check Price

# Headphones

Quality headphones allow you to detect audio problems early on and avoid frustrating your viewers. We recommend a pair of comfortable over-the-ear headphones because they ensure that you can shut out the noise from the environment and hear only the audio that is going out on your stream. Many consumer models come with noise cancelling features which we advise against as they may muffle the sound.

## Consumer Headphones

**Polsen HPC-A30** (~$29)
These will get the job done. It is important to get headphones that are comfortable for extended periods of time.

Check Price

## Prosumer Headphones

**Sony MDR-7506** (~$99)
These are very reliable and durable headphones. Every professional has owned a pair of these at some point. They are comfortable, produce good sound, and will last a long time.

Check Price

## Professional Headphones

**Beyerdynamic DT 770 Pro** (~$180)
The legendary DT 770 PRO 80 from Beyer dynamic is a closed, 80 ohm dynamic headphone. Designed for critical music and sound monitoring. The long term comfort and accurate performance make the DT 770 PRO the perfect monitoring headphone for recording studios, post production or broadcasting situations.

Check Price

# Mixing/Switching

## Audio Mixer

Audio Mixers are essential when you have multiple speakers in your production, or need to add in playback of music or a pre-recorded video. The individual inputs allow you to adjust the levels for multiple microphones or sources. You can then take the mixed audio output directly into the video switcher or encoder.

If you have a professional encoder set-up (e.g. a Tricaster) you can run the audio output directly into the Tricaster via professional XLR audio cables. If you plan to encode using computer software (Telestream Wirecast), USB-powered mixers are reliable, portable, and very easy to use. Mixers are available for almost any number of sources. Size and complexity increases as the input count goes up.

For more advanced set-ups, the Yamaha MG12 is very reliable and has many more options to customize the audio. With 6 mono mic inputs, 3 stereo line inputs and 4 output buses, this is the perfect mixer for adapting to wide range of different applications and configurations.

**Behringer XENYX 802 8-Channel Compact Audio Mixer** (~$65)

Check Price

**Behringer USB mixer** (~$159)

Check Price

**Mackie ProFX12v2** (~$250)

Check Price

# Switcher

A switcher enables you to control the output video stream by changing between different cameras, adding graphics over the video images, and even combining multiple cameras and inputs into a single composite image. Switchers can be hardware devices or software running in combination with a simple hardware interface which captures one or more camera inputs.

Telestream Wirecast is an example of a highly flexible software switcher. It can be installed on Mac or Windows and works with many different cameras and video interfaces, turning your computer into a full blown multi camera switcher.

**Telestream Wirecast Workstation Switcher** (~$3,261) :
(This example setup includes a desktop computer, 3 video capture cards, a USB compatible audio mixer, and Telestream Wirecast. It provides a lot of flexibility at a lower starting price.)

**Price**    **HP Z240 Series Tower Workstation** (~$1,250)

**Price**    **Blackmagic Intensity Pro** (~$189 x 3)

**Price**    **Telestream Wirecast** (~$549)

**Price**    **Behringer XENYX 802 8-Channel Compact Audio Mixer** (~$65)

This system will require you to install video interface cards and software, then test the entire integration before implementation. If this is not appealing, check out these companies that produce pre-configured computers specifically for out-of-the-box video production and encoding. Paladin Innovators

**Roland VR50HD** (~$7,495)
The VR50HD is an all-purpose device that combines an audio mixer and a video switcher in a solid, standalone unit. It doesn't encode the video for live streaming, but the USB 3.0 output can be used to send video into Telestream Wirecast on a PC. Alternatively, you can take the HDMI or SDI output into the hardware encoder of your choice.

**Check Price**

**NewTek Tricaster 410** (~$9995)
The long time leader in all-in-one streaming production, the Newtek Tricaster 410 provides 4 SDI inputs, titles and graphic overlays, media playback, virtual sets and more. The Tricaster also has on board audio mixing. It is capable of encoding live streams and can store your login details for your IBM Enterprise Video Streaming account, simplifying workflows. At the higher-end, many professionals prefer to separate switching and encoding, letting the Tricaster and its operator focus on the graphics, switching and media playback.

**Check Price**

# Encoding

### Telestream Wirecast (~$199-549)

Telestream Wirecast is an all-in-one production software suite for Windows or Mac, giving you multi-camera switching and compositing, titles, and graphic overlays. It also allows you to capture a presenter's laptop so you can include slide presentations or demonstrations in your production. Upgrade to Telestream Wirecast for green screen chroma keying, 3D virtual sets and scoreboard overlays.

**Check Price**

### Teradek VidiU (~$699)

Teradek VidiU is a compact and portable encoder with HDMI input that allows you to go live anywhere with a network connection and without the need for a computer. Whether you're using a switcher with HDMI output or directly mounting it on a camera, the VidiU has seamless IBM Watson Media integration that makes going live as simple as pressing the red "stream" button on the front panel.

**Check Price**

### Elemental (~ $10K-80K)

Elemental Live encoders are enterprise level and provide broadcast quality encoding in multiple simultaneous formats and bitrates.

**Check Price**

# Internet

The final piece of the streaming puzzle is ensuring you have a quality internet connection. A minimum of consistent 3-8 Mbps upload bandwidth is needed for an HD stream. Wired connections are always best, as wireless network bandwidth typically and unpredictably fluctuates throughout the course of a 30-60 minute video production. Check out this help center article for more details. If there is no internet connection at your production location, bonded cellular solutions from companies like LiveU and Teradek may be an option.

**Help Article**

# Potential Studio Package

Putting it all together, here are example packages for a 3 camera studio set-up at different price levels. Each package assumes you are starting from nothing, but if you already have some of the gear listed it is possible to simply augment your in-house video equipment to get streaming quickly.

A quality in-house production studio for live online video streaming can match most budgets.

## Good (~$5000)

If this is your first production studio, you should start here. Although each piece of equipment is basic, very good results can be achieved. The 3 separate cameras allow you to switch angles and framing during your productions, providing a very professional feel.

3 Consumer Cameras
3 Consumer Tripods
1 Entry Level 3 point Light kit
2 Shure microphone kits
3 mini to full HDMI cables
1 PC/Mac tower
3 Blackmagic Intensity Pro
Telestream Wirecast
1 Behringer USB Mixer
2 Headphones

## Better (~$12,500)

The upgraded cameras and better lighting kit in this package will make a big difference to the image quality you can obtain. Since you may move up to this package after getting started with the 'Good' package, it includes most of the same components, simplifying the upgrade process.

3 Prosumer Cameras
3 Prosumer Tripods
1 Prosumer Level 3-point Light Kit
3 HDMI cables (refer to camera for correct cable)
2 Shure microphones
1 PC/Mac tower
3 Blackmagic Intensity Pro
Telestream Wirecast
1 Behringer USB Mixer
2 Prosumer Headphones

## Best (~$25,000)

For superior image quality, choose this package. It features a single very high quality camera. All the other components are also high quality and extremely reliable, reducing the time you need to spend troubleshooting. To upgrade this package for even greater flexibility, just add additional cameras. For best results, we recommend separating the encoding and switching. We included the Tricaster for its industry standard switching and graphics, and the PC/Mac tower with the Blackmagic Intensity Pro for encoding the stream.

| | |
|---|---|
| 1 Professional Camera | 2 Sennheiser EW 100 Microphones |
| 1 Zoom Lens | 1 PC/Mac tower |
| 1 Professional Tripod | 1 Blackmagic Intensity Pro |
| 2 SDI cables | Telestream Wirecast |
| 1 HDMI cable | 1 Tricaster 410 |
| 1 HDMI to SDI converter | 1 Mackie mixer |
| 1 Litepanel LED kit | 2 Professional Headphones |

# Live Video Studio Setup
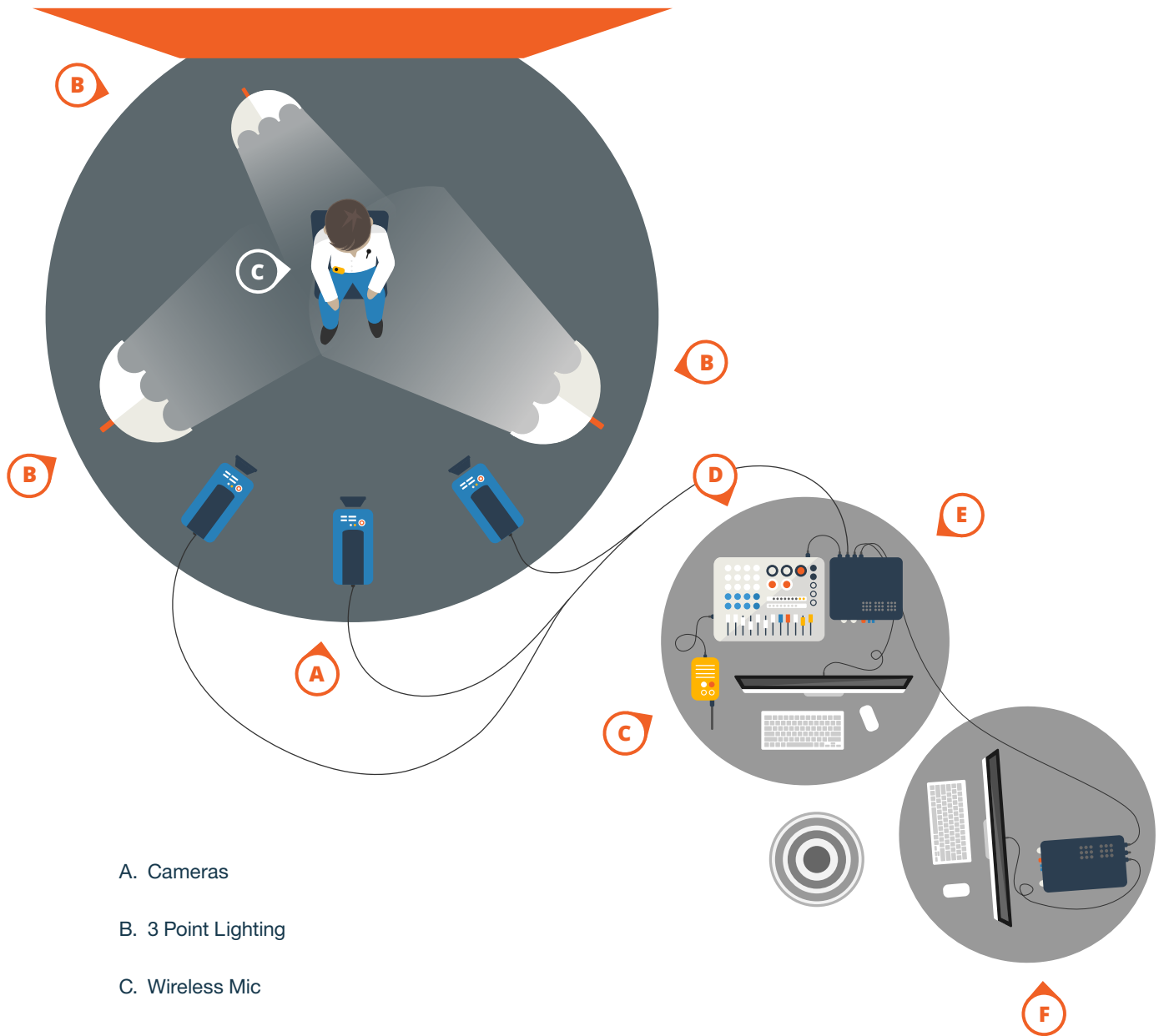


A.  Cameras

B.  3 Point Lighting

C.  Wireless Mic

D.  USB Audio Mixer

E.  Switcher

F.  Computer with Producer + capture card

## About IBM Watson Media

Created in January 2016, IBM Watson Media brings together innovations from IBM's R&D labs with the cloud video platform capabilities of Clearleap and Ustream. Through the unit, IBM delivers a powerful portfolio of video services that spans open API development, digital and visual analytics, simplified management and consistent delivery across global industries. IBM Watson Media supports top media and enterprise companies with reliable video on-demand and streaming services.

For more information on IBM Watson Media, please visit www. ibm.com/cloud-computing/solutions/video.

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