



LifeSize[®] Video Center

*The Most Powerful One Button HD Streaming,
Recording and Auto-Publishing Solution*

April 2010

White Paper

Table of Contents

1. EXECUTIVE SUMMARY	3
2. ORGANIZATIONAL NEEDS	4
3. CURRENT SOLUTIONS	4
a. Personal Video Recorders (PVRs)	5
b. Capture Stations	6
c. Network Video Recorders (NVRs)	6
4. LIFESIZE [®] VIDEO CENTER	7
a. SINGLE APPLIANCE	7
b. SCALABLE ARCHITECTURE	8
c. ONE BUTTON INTERFACE	8
d. VIEWING FLEXIBILITY	9
e. USE CASES 1 AND 2	10
5. THE LIFESIZE ADVANTAGE	11

EXECUTIVE SUMMARY

Organizations need a solution to broadcast video and data, over the internet, to large audiences – both live and on demand – and the ability to record video calls in high definition. Current solutions are difficult to implement and use, lack flexibility and scalability, and require additional equipment and special software. LifeSize® Video Center, the first single appliance for high definition recording, streaming and auto-publishing, offers organizations a method to deliver content at the touch of a button. The LifeSize Video Center appliance is specifically designed to process high definition video directly where it is created, harnessing the power of LifeSize 220 series high definition endpoints. With LifeSize Video Center, organizations instantly benefit from the ease of deployment and use. Users can easily record, stream and automatically publish to the web by initiating the record function and entering the recording key. Access to live and on demand content is simple with LifeSize Video Center's web portal. Organizations also benefit from LifeSize Video Center's unmatched quality of experience and performance. LifeSize Video Center is able to support 20 concurrent high definition (1280x720p30) recordings¹. In addition, LifeSize Video Center can support up to 1000 simultaneous high definition live streams². Capacity is significantly increased for DVD resolution recording and streaming³.

“ LifeSize Video Center makes it possible for organizations to be everywhere, live or on demand. ”



Business professional playing back a recorded HD video from LifeSize Video Center

Organizational Needs

Businesses and educational institutions are using video conferencing more and more to collaborate and share information. These organizations also need a simple solution to record and broadcast, live and on demand, video conferences and presentations for more widespread communications and playback of information. To illustrate examples of business use and related requirements, two cases will be referenced throughout this document.

USE CASE 1

A community college wants to allow students to attend class in person or remotely. The selected video recording, streaming and publishing method needs to deliver content while adhering to course schedule, regardless of severe weather or illness disruptions. The solution has to be simple to deploy and use for both instructors and students, offer live and on demand content, and publish the content online in an organized format.

USE CASE 2

An organization's Vice President (VP) of Operations needs an effective method to send routine communications over video to his global team. The VP wants his team to be able to view the messages live or on demand. He wants the solution to be simple and exclusive, so only his team members can access and view the content.

CURRENT SOLUTIONS

Video content recording, streaming and publishing devices are not new to business communications. Prior to high definition (HD) video conferencing systems, organizations used methods such as video cassette recorders (VCRs), camcorders and digital video recorders (DVRs) to record and archive content. Streaming and publishing were not simultaneous with recording. There was a delay between recording and streaming and publishing, since the recorded content required transcoding before it could be streamed over the internet. To publish recorded content for viewing by the intended audience, the webmaster would have to upload the transcoded content to a web server.

Organizations had to accept a fragmented resolution to their requirements, since the few HD streaming, recording and publishing solutions that were available to date suffered certain drawbacks. Some recording methods are not able to preserve the quality and resolution of video calls conducted using HD video conferencing systems. In addition, the high definition multimedia interface (HDMI) connection, provided on most HD video endpoints, eliminates the option of supporting various HD capture devices due to incompatible input/outputs (I/O).

PERSONAL VIDEO RECORDERS (PVRs)

Personal video recorders are similar to digital video recorders. PVRs have all of the connections of a DVR device, but include HDMI input and output connections. Therefore, PVRs can record video from HD video conferencing systems with HDMI video outputs.

PVRs are point-of-use recording devices, which mean they connect directly to the equipment providing the video content. What the user sees on the screen is what the PVR records to a local or network hard drive. Live streaming and publishing are not possible. Content recorded by PVRs requires time-intensive transcoding before streaming and publishing are possible on the web portal.

Specifically in Use Cases 1 and 2, the content creator would have to call or use a system with a PVR. The content creator would choose the video layout that best supports only video or concurrent video and data. After recording, a videographer or editor would convert the recorded content for web usage. A webmaster would then label and upload the content to a web server or content delivery network (CDN). Overall, the process from recording to publishing could take hours to days, which fails to meet the live streaming stipulation in Use Cases 1 and 2.

Before defining each solution, it is necessary to understand the meanings of various terms used throughout this document:

- **Recording** – The storage or archiving of the content for later viewing by the creator or audience.
- **Streaming** – Live or on demand playback of the content on the portal using a web browser. The audience is able to watch the content as the creator is presenting it or at a later time.
- **Publishing** – Cataloguing and uploading the content to an accessible domain.

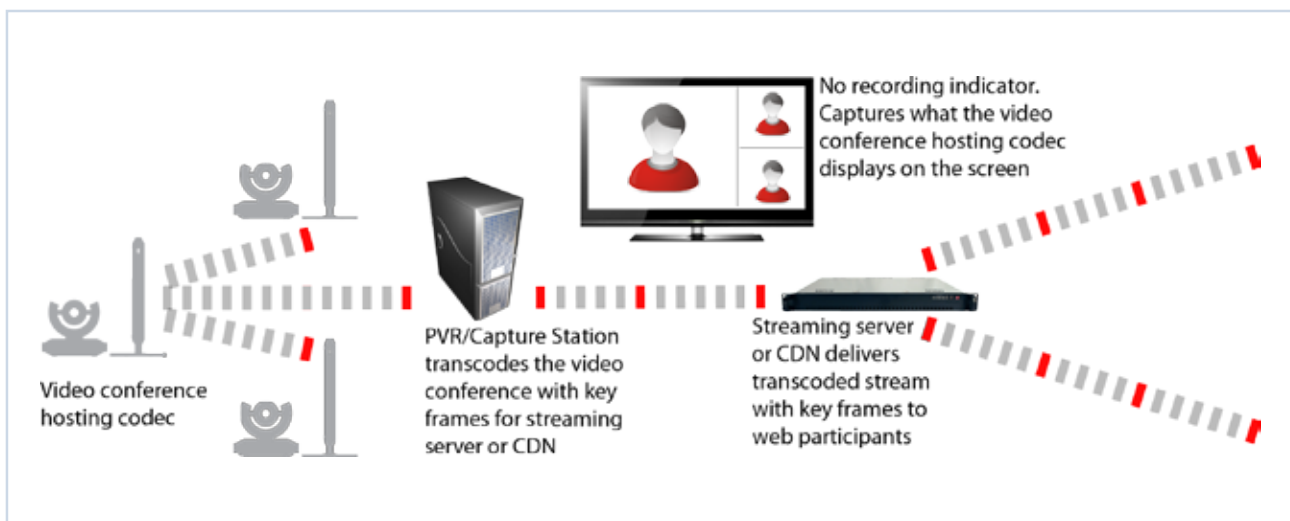


Illustration of PVR/Capture Station recording, streaming and publishing appliances

CAPTURE STATIONS

Similar to PVRs, capture stations are point-of-use devices that connect directly to the video conferencing system and record what the user sees in the display. Audio and video connections on capture stations depend upon the video capture card inside the computer or server. A good capture card can support analog, component, composite, SDI, HDMI and 2K video connections. Capture cards will support numerous video encoders, some of which are compatible for web streaming.

Capture stations support software scripts and applications that can aid in the automation of recording, streaming and publishing of video conferences; however, these stations can only support one content creator at a time. If more than one user needs to create content, then more capture stations will be necessary. Publishing categories do not follow the creator, but reside within the capture station. For example, if the capture station is not functioning, then the creator cannot record, stream or publish his content to the correct group from another capture station.

In Use Cases 1 and 2, capture stations can record, stream and publish content to a globally distributed audience. Once correctly installed and configured by a systems administrator, there is no delay between recording, streaming and publishing; however, the user needs to operate two separate devices – the video endpoint and the capture station. In Use Case 1 specifically, each professor would require a local capture station if multiple classes occur at the same time. If the professor's dedicated capture station is broken, then he would need a systems administrator to configure a backup capture station for use before he can start recording, streaming and publishing the class.

Capture stations require maintenance and updates by the systems administrator. In an organization with numerous capture stations deployed in various conference rooms, an IT administrator needs to resolve each and every capture station hardware and software problem, as well as recording, streaming and publishing settings and issues. There is no scalable solution for capture stations.

NETWORK VIDEO RECORDERS (NVRs)

Network video recorders are either specialized video conferencing systems or multipoint control units with built-in hard drives. NVRs reside inside the network closet with other infrastructure equipment. Video conferencing systems connect to NVRs via Ethernet, which means one NVR can support multiple video endpoints.

To initiate a recording session, the content creator would dial the NVR like any other video conferencing system. Upon connection, the user navigates and selects the recording options with the far end camera control functions. The NVR acts as one participant and populates a calling port and display layout throughout the recording session, which will be viewable even on playback.

NVRs support content publishing, but with a delay that could range from minutes to days. Since NVRs encode and save the content, it takes time for NVRs to convert the content to a web friendly format. Most NVRs will require additional equipment such as streaming servers or CDNs to stream content.

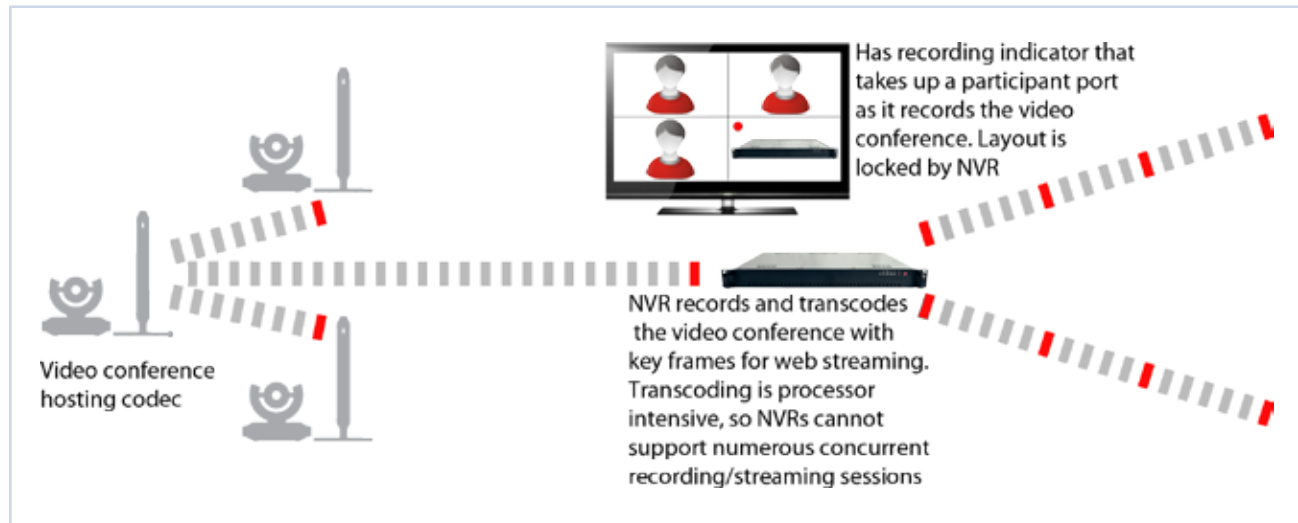


Illustration of NVR streaming, recording and publishing appliance

Customers in Use Cases 1 and 2 will find NVRs marginal for their recording, streaming and publishing needs. Some problems with the solution include difficult recording menu navigation and fixed video layout with the NVR as a participant. The delayed publishing and consumption of one communications port could hinder the work schedule for the content creator and audience.

LIFESIZE VIDEO CENTER

Similar to NVRs, LifeSize Video Center resides in the data closet on server racks with other infrastructure equipment. Communication between the video endpoints and LifeSize Video Center is Internet Protocol (IP) based.

Currently, LifeSize Video Center only works with LifeSize 220 series video conferencing systems. LifeSize 220 series endpoints are able to communicate with LifeSize Video Center to record, stream and publish content inside and outside of a call. Non-LifeSize 220 series endpoints can still benefit from LifeSize Video Center by connecting to a LifeSize 220 series endpoint for streaming, recording and publishing of content.

SINGLE APPLIANCE

LifeSize Video Center is a single appliance HD streaming, recording and auto-publishing solution that meets and exceeds the demands users. One LifeSize Video Center appliance can support up to 20 concurrent HD recording sessions¹. Organizations would need to purchase 20 separate PVRs/Capture Stations or several NVRs to match this level of performance. One LifeSize Video Center can also support up to 1000 simultaneous live HD streams, connecting audiences to live video content². In DVD resolution recording and streaming, LifeSize Video Center can handle a significantly greater capacity of concurrent recording and streaming sessions³. Unlike PVRs, Capture Stations and NVRs, LifeSize Video Center does not require software scripts, special applications or additional equipment to deliver the HD streams.

1, 2, 3 – Value based on LifeSize internal testing

Because it is a single appliance, LifeSize Video Center is as quick and simple to install and deploy as mounting a new device on the server rack. Accessibility to LifeSize Video Center's operational menus is through IP. Network administrators can control accessibility to LifeSize Video Center by assigning it a private or public IP address. With a private IP address, employees within an organization or professors and students of an educational institution can access LifeSize Video Center.

SCALABLE ARCHITECTURE

Live or on demand transcoding of audio/visual (AV) content is a very processor intensive operation. LifeSize Video Center does not transcode the content from the video conferencing system like PVRs, Capture Stations and NVRs. LifeSize Video Center, instead, utilizes the powerful, purpose-built encoding engine within the LifeSize 220 series endpoint to transcode the content. As the data arrives from the LifeSize 220 series endpoint, LifeSize Video Center records, streams and publishes the HD content. The result is superior performance without compromises around HD recording or live streaming.

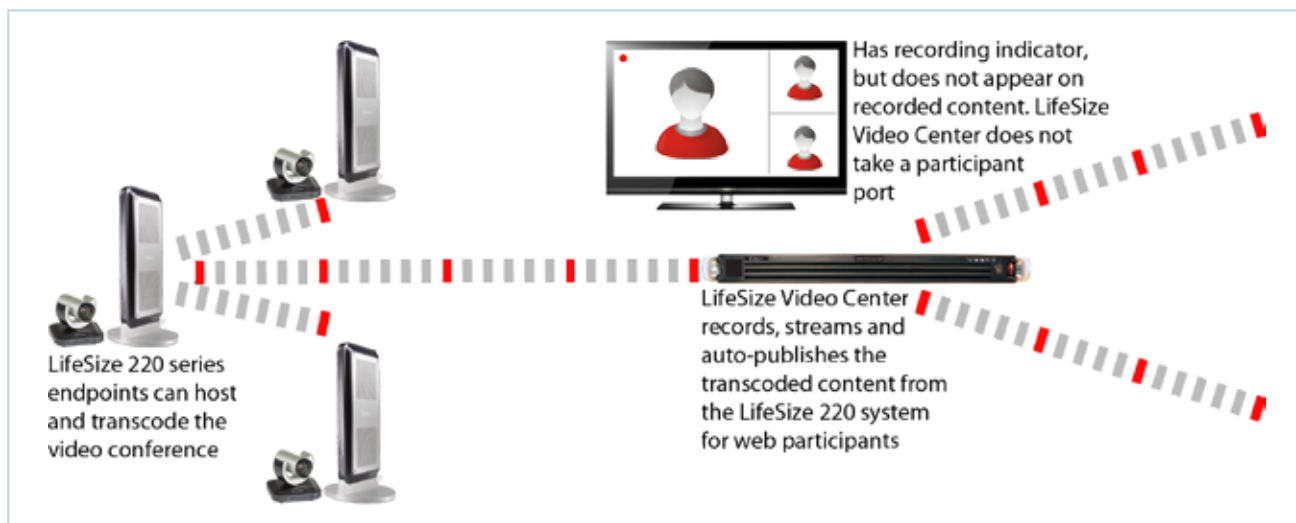


Illustration of LifeSize Video Center recording, streaming, and auto-publishing solution

Interoperability is the key to the powerful relationship between the LifeSize 220 series endpoints and LifeSize Video Center. With a one time entry of the LifeSize Video Center IP address into the video setup menu of the LifeSize 220 series endpoints, organizations can start to stream, record and publish HD video content with the touch of a button, both during a video call and out of a call.

ONE BUTTON INTERFACE

To initiate a recording session, the content creator can select the record function from the LifeSize 220 series endpoint's main menu screen. At the prompt, the content creator will enter the recording key. The recording key

provides the LifeSize Video Center with information such as video recording resolution, video title and description, meta-tags for web search, video channel, and viewing accessibility. LifeSize Video Center processes the recording key to start the recording and streaming of the content and simultaneously publishes everything until the content creator terminates the recording session. The recording key makes it easy for the user to start streaming and recording.

From the LifeSize 220 series endpoint, the content creator can start a recording session at anytime during a call. If the content creator needs to record something during the middle of a video conference, she can initiate a recording session via the one button interface. The start of a recording session is a seamless experience for the other participants of a video conference call.

VIEWING FLEXIBILITY

When audience members go to the web portal of LifeSize Video Center, they can select to watch video content live, if available, or on demand. If the content offers both video and data, viewers can select which stream to watch as the dominant view. Regardless of what the content creator has selected as the layout for video and data while recording, each individual viewer can still specify the layout of the presentation on the screen. LifeSize Video Center does not restrict layout options for the viewers, so switching between layouts is possible throughout the live or playback session. This unique feature enabled by LifeSize Video Center allows viewers to choose to see the information that is most important to them.



LifeSize Video Center web-based portal

Using multiple device (MD) redundant array of independent disks (RAID) across two drives, LifeSize Video Center can store up to 2000 hours of HD video content¹. At DVD resolution, LifeSize Video Center can store up to 4000 hours of video content². Viewers will have access to all the content they are allowed to see from their web browser.

Use Case 1 and 2

LifeSize Video Center exceeds the requirements of customers in Use Cases 1 and 2. Specifically for Use Case 1, LifeSize Video Center can easily stream, record and publish educational content live or on demand to students, no matter their location. LifeSize Video Center does not only support one professor and his class, but can stream, record and publish for numerous professors and courses simultaneously. Each professor can have a unique recording key, which will inform LifeSize Video Center where to catalog and publish the content. The recording key will aid LifeSize Video Center in limiting content access to only students currently enrolled in the course.



Student playing back a recorded lecture via LifeSize Video Center

With Use Case 2, LifeSize Video Center simplifies the process of streaming, recording and publishing the VP’s message down to the touch of one button. With his unique recording key, the VP of Operations can record his message for the team from any LifeSize 220 series endpoint. Regardless of his current location and time zone, he can consistently communicate to his global team members through LifeSize Video Center. The VP’s unique recording key ensures that LifeSize Video Center permits only his global team members access to the content, live or on demand.

THE LIFESIZE ADVANTAGE

Functions	PVR	Capture Stations	NVR	LifeSize® Video Center
Records HD Content	Yes	Yes	Yes	Yes
Streams Live and On demand HD Content	No	Yes*	Yes*	Yes
Publishes Live and On demand HD Content	No	Yes*	Yes*	Yes
Organizes video content on web portal	No	No	No	Yes
Allows user-specified view layouts	No	No	No	Yes
Supports concurrent HD recording sessions	1	1	5 to 10	20**

* Requires additional equipment, applications and software to accomplish tasks. ** Value based on LifeSize internal testing.

With LifeSize Video Center, organizations possess the most powerful one button HD streaming, recording and auto-publishing appliance in the market. LifeSize Video Center is able to record and stream HD content to hundreds of web participants. Heavy users of video communications can instantly benefit from LifeSize’s unmatched capacity of 20 concurrent HD recordings¹. Recording in DVD quality resolution increases capacity significantly². In addition, the simplicity of deployment and operation ensures content creators can start streaming, recording and auto-publishing with the touch of a button. Furthermore, LifeSize Video Center will correctly publish, categorize and set accessibility of all created content. LifeSize Video Center ensures that critical business communications and educational content can be viewed everywhere, live or on demand.

Bit Rate	Resolution	Concurrent Recordings	Live Viewers	On Demand Viewers	Hours of Storage
768 Kbps	720p30	20	1,000	350	2,600
400 Kbps	480p30	40	2,000	400	5,200
270 Kbps	360p30	50+	2,500	450	7,800

* Each of the above concurrent recordings/ live viewers/ on demand viewers are independent numbers. Presentation stream was not part of the recorded stream tested for concurrent recordings/ live viewers/ on demand viewers. Based on LifeSize internal testing.

1, 2 – Value based on LifeSize internal testing