



comTM
sur

the missing piece of CCTV

**COM-SURTM EMPOWERS PEOPLE TO ACHIEVE
OPTIMAL OUTCOMES FROM SURVEILLANCE VIDEO,
LEADING TO A SAFER WORLD.**



**CCTV VIDEO DATA
SIZE REDUCTION
THE COM-SUR™
'WAY'**

OVERVIEW

Video surveillance is increasing at an unprecedented and exponential pace across the world. As per a 2020 report by Motorola Avigilon, by the year 2025, globally, an estimated 45 billion cameras will be in use. This translates to an astonishing 6 cameras to every human on the earth. IHS Markit, a leading research firm has estimated that since the end of 2019, the family of new security cameras are generating more than 2,500 petabytes of data daily. Cameras are thus becoming ubiquitous with a voracious appetite for data. This trend would only continue to accelerate.

Several factors have influenced this humungous growth of surveillance video: apart from user needs for reasons ranging from security to productivity applications, improvements in camera technology, imaging and resolution have also contributed to this growing trend.

In addition, deployment of techniques such as those of video analytics, facial recognition, encryption, image enhancements and the like, feed the ever-ballooning growth for data. This poses several challenges for storage of the video, especially when it is required by law to be stored for a long period of time. The general industry 'standard' (albeit without any scientific reasons) is 30 days of storage, after which it gets overwritten. This can lead to an irreversible loss of important information/evidence.

In order to address the issue of such massive storage requirements, the video surveillance industry has adopted several standards for video compression, most notably H.264 followed by its successor H.265 in 2016. H.264 works by processing frames of video using a block-oriented, motion-compensation-based video compression standard. H.265 is an improvement over the H.264 standard, and further reduces the video data size by close to

50%. In 2020, the H.266 was announced, which claims a further improvement on the H.265 standard. However, adoption of the same may be far away, if other technologies can make further compression immaterial, or if open-source technologies like AV1 gain traction.

The constant evolution of new compression technologies will make it more compelling for capturing and storing more data. However, despite these compression standards, in real terms, storage requirements will continue to grow because of the sheer number of cameras and the unending desire for more megapixels.

ENTER COM-SUR™

COM-SUR, in quite a revolutionary way, is making data management elegant and easy, by offering a unique way not only to reduce the storage size (TB to GB), but also to create a very cost-effective disaster recovery mechanism; thus, making it possible for users to audit dense surveillance video footage daily, as an easy-to-adopt standard operating procedure.

A FEW LINES ABOUT COM-SUR:

COM-SUR is the world's only CCTV video footage auditing, smart backup, and standardized intelligent incident reporting software; the answer to the three missing pieces of CCTV. COM-SUR is a force multiplier, a complete workflow. Just as Google was the missing piece of the internet, COM-SUR is the missing piece of CCTV. COM-SUR may also be

seen as the MS Office of CCTV/video surveillance, as it makes interaction with surveillance video footage just as easy, just as efficient, and just as a standardized package as an MS Office package which has universal appeal for documents, presentations, and communication.

COM-SUR enables people to gain optimal value and insights from surveillance video, leading to a safer and a more productive world. Its use cases range from an airport to a zoo (A to Z). The working of COM-SUR is explained through a short and interesting video ahead in this document.

HOW COM-SUR SMARTLY REDUCES 'VIDEO' STORAGE SIZE

The uniqueness of COM-SUR is that irrespective of the FPS (Frames per Second) of the video feed and/or other parameters, COM-SUR follows a very smart method to reduce the storage size of the 'video'.

As is known, video is made up of frames (I, P, and B frames). Feature films are generally shot and viewed at 24 FPS. Frame rates can be of different kinds and can even go up to 240 FPS. However, what is common and more important for this document is that any frame 'rate' is always 'per' second, and it is this 'second' that COM-SUR 'captures' very smartly as a screenshot effortlessly and automatically, once programmed.

Since COM-SUR captures the consolidated 'moment' of 'that' one second (think of this one 'second' as a 'finished product', of 'spare parts' comprising of the I, P, and B frames coming

together in one second), it means that the 'unnecessary' frames have been taken away (not literally though) without missing any vital information so to speak. This method reduces the data size drastically, which is even further reduced, when multiple cameras are being viewed on a monitor.

For example, if 16 cameras are viewed in a 4x4 grid, there is further reduction of the storage size sixteen times, since the screenshot would have captured all 16 cameras as a single image. It may be kept in mind that even with a little loss of quality (hardly material for the intended applications) between the actual video and the screenshots, the benefits that accrue to the user are numerous - ease of auditing; gaining actionable insights therefrom; longer retention periods of data, and creation of well categorized digital libraries of significant findings (which can be stored for years to come and be recovered at the click of a button). Again, since no suggestion is being made to replace the actual video with screenshots, COM-SUR acts as a wonderful supportive technology.

Further, the screenshots created by COM-SUR will become 'relevant' training data for AI/ML/DL models, allowing for better solutions. This will help address the issue of 'hidden bias' often observed in AI/ML/DL systems which can lead to false positives.

PUSH AUDIT

Further on in this document, the angle of 'Push Audit' is explained, which is yet another wonderful feature introduced by COM-SUR.

In this case, COM-SUR reduces the storage requirements even more and creates a single video depicting cameras and 'pushes' the video available to the user at an interval of every four hours. This way the user is always in the know of what's been happening regularly.

'CAPTURING' THE SCREENSHOT OF A 'WINDOW'

To better understand how COM-SUR reduces the storage size, it is imperative to understand the concept of a 'Window'. COM-SUR captures screenshots of the 'Window' in which the video feed is displayed. Therefore, if 16 cameras are displayed in a 'Window', COM-SUR will capture screenshots of those 16 cameras as a single image. If ONE camera is displayed in a 'Window', COM-SUR will capture screenshots of that ONE camera. Essentially therefore, "what you see is what you get". However, COM-SUR's screenshots are very 'smartly' captured in the background. This means that once COM-SUR has been programmed to begin the capturing activity, even if one were to use the computer to browse the internet for example, COM-SUR will not capture the screen facing the user. COM-SUR will capture only those 'Windows' which have been 'locked' by it to capture.

Thus, the user can continue his working on the computer without fear of loss of privacy or capture of sensitive/confidential data. Now, while the time interval between each such screenshot is recommended to be of that ONE second, which has been explained earlier, COM-SUR allows complete flexibility for the

user to determine the time interval between two screenshots. This user decision would depend on the criticality of the location of where the cameras are placed, or the time of the day and/or the activity in the cameras.

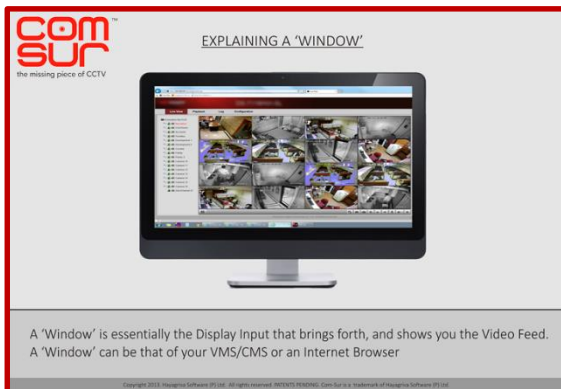
Well established industry practices indicate that users generally view anywhere between 1 to 32 cameras on a monitor, the display and management of which is managed by the video management system, or a browser.

EXPLAINING A 'WINDOW'

A 'Window' is essentially the display input that brings forth, and shows the user the video feed on a monitor.

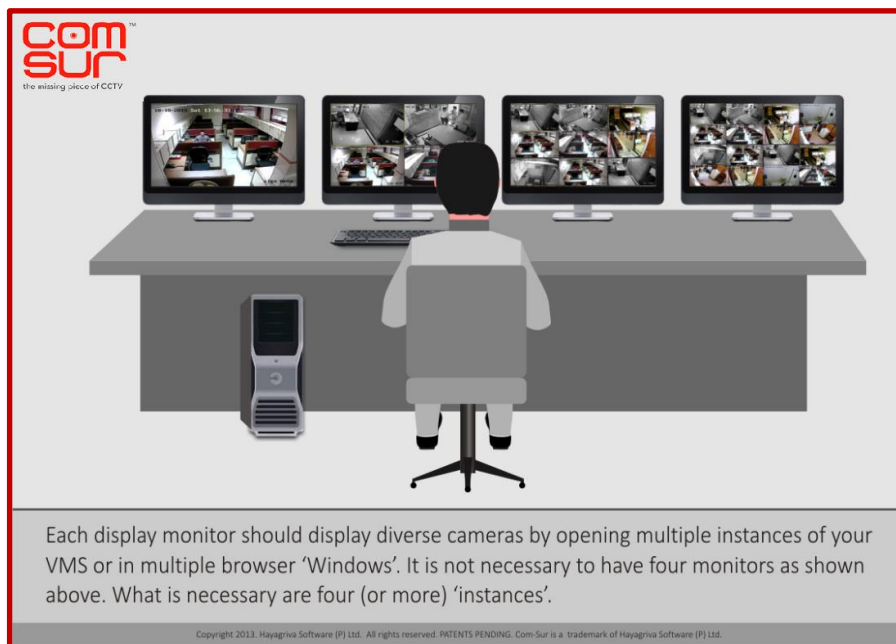
A 'Window' can be that of a VMS/Browser/Media Player.

The number of cameras per 'Window' are user-defined; for example: 1, 4, 9, 16, 25, 32



TYPICAL SET UP

Typically, operators view diverse cameras using 3 to 4 monitors.



COM-SUR'S SCREENSHOTS' STORAGE SIZE

Having understood how COM-SUR hugely reduces the storage size, let us look at the storage sizes of the screenshots captured by COM-SUR with respect to the number of cameras displayed in a 'Window'.

It may be noted that irrespective of the type of cameras, i.e., IP/AHD/Analog, the size per screenshot will remain more or less the same.:

GENERAL INFORMATION ABOUT THE SIZE OF THE SCREENSHOTS CAPTURED BY COM-SUR

Cameras Displayed in a 'Window'	Per Screenshot file size	Storage size requirements	
		For 1 day	For 30 days
1	100 KB	8.2 GB	246 GB
4	140 KB	11.5 GB	345 GB
9	175 KB	14.4 GB	432 GB
16	200 KB	16.45 GB	494 GB

Notes:

1. The more the number of cameras in one screenshot, the lesser is the overall requirement for storage.
2. The average size of each screenshot captured is approximately 100 kb - 200 kb depending on the number of cameras captured in a screenshot. However, criteria such as image complexity, screen resolution, etc. may affect the data size.
3. For the above calculations, the screen resolution of the computer monitor has been considered to be 1920x1080 pixels, and the image complexity has been considered to be medium. The size of each screenshot has been considered as the average of the screenshot sizes for day and night (in this case black and white screenshots have been considered) scenes. In case the user has a computer monitor which is set to a higher resolution such as 4K (3840x2160 pixels) or 8K (7680 × 4320 pixels), then the data size of the screenshots would increase accordingly. If the user does not want to store the screenshots with this large data size, then COM-SUR offers a setting which allows him/her to capture the screenshots in a lower resolution (the user can select a desired custom resolution), thereby reducing the data size considerably.
4. If the user captures screenshots at an interval of TWO seconds instead of ONE second, the data size will reduce by 50%, without compromising too much on loss of any frame.

STORAGE SIZE COMPARISON BETWEEN
COM-SUR AND CCTV CAMERAS (4K/2MP/D1
RESOLUTIONS)

To see a detailed storage size comparison between COM-SUR (screenshots data size and push audit video data size) and CCTV cameras (4K/2MP/D1 resolution), please click the link below:

<https://www.comsur.biz/Data Size Comparison - The COM-SUR Way.pdf>

COM-SUR's push audit plug-in and the video it generates, has been explained further in this document.

HOW DOES COM-SUR WORK?

ENGLISH

<https://www.youtube.com/watch?v=V JEUvgG1wU>

HINDI

<https://www.youtube.com/watch?v=TGNDngc96mM>

COM-SUR'S 'PUSH AUDIT' PLUGIN – FURTHER
REDUCTION OF SIZE, MULTIPLE TIME INTERVAL
CHOICES, AND READILY AVAILABLE VIDEO EVERY
FOUR HOURS

Pretty much like 'push email' COM-SUR offers a unique add-on (as a plug-in), where screenshots captured by COM-SUR are re-converted into video, further reduced in size, and 'pushed' to the user's account with Google Drive, OneDrive, and Dropbox, every four hours.

Another great benefit that this plug-in offers is that it allows the user to make multiple selections of the interval between two screenshots.

For example, the user can choose to:

- 1) Capture screenshots at every ONE second from 7.00 AM to 4.00 PM (when there is peak activity).
- 2) Capture screenshots at every TWO seconds from 4.00 PM to Midnight (when there is lesser activity).
- 3) Capture screenshots at every FIVE seconds from Midnight to 7.00 AM (when there is very little or no activity).

This solution is especially useful for organizations that have several sites and wish to centralize their video surveillance activities without making huge investments on resources like hardware, manpower, connectivity and associated infrastructure. In this case, videos are 'pushed' from multiple sites to a central location every FOUR hours. Since the video size is tiny, there is very little consumption of bandwidth, as against the case of streaming the actual video from the DVR/NVR to a central location.

The team at the central location receives the links to the respective videos. They can then audit these videos either by downloading from the link, or by playing the videos from the respective link itself. This facility of playing videos from links is provided by Google Drive, OneDrive, and Dropbox.

Here is an explanation of how the team can access the respective videos from each of these services:

Google Drive – The team will be able to play the entire video from the respective Google Drive link opened in a browser. The team can also download the video from the link.

OneDrive - The team will be able to play the entire video from the respective OneDrive link opened in a browser. The team can also download the video from the link.

Dropbox – The team will be able to play a 15-minute preview of the video from the respective Dropbox link opened in a browser. In order to access the entire video, Dropbox offers the facility of downloading the video from the link, as well as adding the link to the team's Dropbox account (this can be done by logging in to the respective account).

If you need to see how a 4-hour video looks like with multiple cameras, you can write to us at pushaudit@comsur.biz.