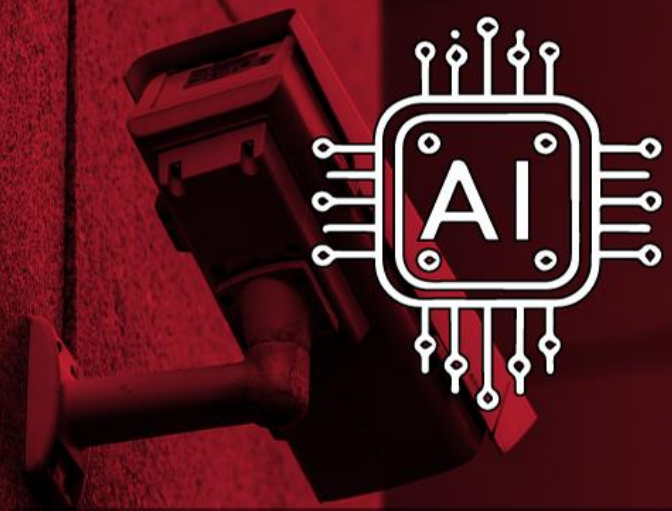
comsur™

the missing piece of CCTV

GET THE BOOK

"SEE WHAT THE CAMERA SAW"

THE FOOTAGE WHISPERER



'BETTER' AI VIA DAILY AUDITS
NO MORE DATA WALL

100+ TOPICS - AIRPORTS TO ZOOS

GAUTAM D. GORADIA

CENTRALIZED VIDEO SURVEILLANCE REIMAGINED

THE BIG BANG OF INNOVATION - THE COM-SUR™ WAY!

WELCOME

PREAMBLE: BIG TIME SAVING OF BANDWIDTH AND STORAGE

In an age dominated by ubiquitous surveillance cameras, organizations are undergoing a revolutionary shift in their approach to video surveillance. Whether it's small businesses or large enterprises with expansive operations, the imperative to monitor multiple locations efficiently has reached unprecedented levels. The proliferation of cameras is fuelled by a diverse array of motives – from safeguarding assets and ensuring employee safety to enhancing operational oversight in adherence to compliance mandates, mitigating risks, and ensuring seamless business continuity to name a few.

CENTRALIZED VIDEO SURVEILLANCE

Large organizations, especially those with geographically dispersed facilities, are faced with the challenge of managing and monitoring their operations effectively. Centralized Video Surveillance has emerged as the cornerstone of comprehensive strategies, providing a centralized command centre where live video feeds from hundreds to thousands of cameras are supposed to be observed meticulously.

CHALLENGES - NAVIGATING OPERATOR STRUGGLES TO DATA MANAGEMENT

The evolution of surveillance technology, marked notably by the rise of high-resolution cameras and mega pixels, introduces a fresh

set of challenges. The pursuit of sharper and more detailed imagery imposes an unprecedented strain on bandwidth and storage. The deluge of video data imposes a burden on existing infrastructure, casting shadows on the efficiency of centralized surveillance systems. This data surge, compounded by the intricacies of managing numerous cameras, confronts operators with an array of challenges – grappling with information overload, succumbing to video blindness, battling poor attention spans, and contending with the shortcomings of current 'automated' solutions. These challenges not only lead to wasteful expenditure but also result in decreased effectiveness, missed critical incidents, and an overall sense of disappointment.

ENTER COM-SUR

In the pursuit of extracting optimal benefits from centralized surveillance, the need for innovative solutions becomes strikingly clear. It is against this backdrop that COM-SUR takes centre stage, reshaping the contours of video surveillance with a revolutionary approach that directly confronts the fundamental challenges encountered by large-scale centralized surveillance systems. This white paper navigates through the nuances of centralized video surveillance, illuminating the existing challenges and showcasing how COM-SUR propels us into a new era marked by enhanced efficiency and intelligence.

WHY AUTOMATED SOLUTIONS ARE FALLING SHORT

Automated solutions, although marketed as efficient and advanced, often prove inadequate when confronted with the multifaceted challenges inherent in centralized video surveillance. Here are some key reasons why these solutions fall short:

1. False Positives Overload:

- Alert Flood: Automated analytics systems, in their pursuit of identifying potential threats, often generate a flood of alerts. The sheer volume of these alerts overwhelms human operators, making it challenging to discern genuine incidents from false alarms.
- Trust Erosion (‘Cry-Wolf’ Effect): The prevalence of false positives erodes the trust operators place in automated systems. As false alarms become a common occurrence, the credibility of the entire surveillance system suffers.

2. Inability to Adapt to Complexity:

- Unforeseen Scenarios**:** Centralized video surveillance environments are dynamic, with scenarios that can be unpredictable and unprecedented. Automated systems, designed with predefined algorithms, struggle to adapt to the complexity of unexpected events or scenarios that fall outside their programmed parameters.

3. Lack of Human Empathy:

- Emotional Intelligence Absence: Automated systems lack the human touch when it comes to understanding nuanced situations. They operate purely on predefined rules and algorithms, devoid of emotional intelligence that human operators naturally possess.
- Empathy in Verification: In any situation, empathetic understanding is crucial for accurate verification. Automated systems

lack the ability to comprehend the context and emotional nuances, leaving a significant gap in the verification process.

4. Human Validation:

- Verification and Escalation: Regardless of the level of automation, the ultimate validation and escalation step always falls upon human operators. Automated systems may flag potential incidents, but human intervention remains essential to verify and escalate, emphasizing the ongoing reliance on human decision-making.

5. Resource and Cost Implications:

- Expensive Deployments: Implementing automated solutions for each camera in a large-scale surveillance network can become cost prohibitive. The need for specialized hardware, software, and continuous updates adds to the financial burden.
- Resource Consumption: Automated systems, particularly when dealing with high-resolution video feeds, consume substantial computing resources. This places an additional strain on infrastructure.

In summary, the limitations of automated solutions extend beyond false positives and adaptability issues. They encompass a lack of human empathy, need for human validation, and significant resource and cost implications, making a compelling case for innovative alternatives or additions like COM-SUR.

THE COM-SUR 'WAY'

COM-SUR represents a revolutionary approach to video surveillance, introducing:

- Daily Video Footage Auditing: Rapidly auditing 24 hours of footage in minutes at set intervals; to 'look' for issues as per set SOPs, and to be vigilant to lookout for unknown and unexpected issues.
- Smart Backup: Reducing data size by creating raster images, capturing the convergence of each 'second'. Since the 'moment' of the convergence of I, P, and B frames is 'the one' that is being converted into raster images, there is almost no loss of any critical information.
- Standardized Intelligent Reporting: Enabling business intelligence and analytics from audit findings and incident reports.

HOW COM-SUR SOLVES THE ABOVE PROBLEMS -

The Workflow:

A. Installation and Configuration:

- Install COM-SUR: The process begins with installing COM-SUR on a Windows computer equipped with a compatible VMS client. This installation is done at the 'branch' (remote or satellite site) level.
- Setup Video Display: Configure the VMS to display multiple video streams (for example 16 cameras in a 4x4 grid).
- 'Workspace' or 'Windows' Configuration: Depending on the number of cameras at the branch, open up to EIGHT 'workspaces' or 'windows,' each representing a distinct area like Perimeter cameras, Production line cameras, Pantry and canteen cameras, etc. Set up the cameras within each 'workspace' or 'window' to meet specific

requirements. In the above point where 16 cameras are mentioned, a single 'workspace' or 'window' can be opened, and 16 cameras can be displayed in the 'workspace' or 'window' in a 4x4 grid.

B. Raster Image Creation:

- Command COM-SUR: Initiate COM-SUR to convert live streams into raster images at defined intervals, such as every one second. Doing so, COM-SUR will start the process and save the images in designated folders on the same computer. This is called the 'Primary' Location.
  Each 'workspace' or 'window' corresponds to a specific folder (e.g., Perimeter cameras, Production line cameras). Note that the actual video storage will continue to occur on an NVR/DVR/Storage server.

C. Continuous Operation and Transfer to Central Location:

- 24x7x365 Processing: This process operates continuously, capturing raster images for each set of cameras within each 'workspace' or 'window.'
- 'Primary' and 'Secondary' storage: While the 'primary' storage of the images is created on the computer on which COM-SUR is installed, the images are also saved to a central mapped drive or cloud. The same folder structure as of the 'branch' is created at the centralized location. This is called the 'Secondary' Location. COM-SUR provides a utility to save the images on five 'Secondary' locations at the same time.

D. Activities at the Central Location:

Aggregation of images: Images from each branch are aggregated in the respective folders at a central location.

- Auditing: Using COM-SUR which may be installed on any computer at the Central Location or even installed on a Virtual Machine, an audit team can access the images of each of the folders and carry out the audit process.
- Remote Access: Another alternative is for the audit team to remotely access the computer at the branch level and audit the images using COM-SUR which is installed on the branch computer.

F. Benefits:

- Huge Data Size Reduction: Image v/s Video - By capturing raster images at the 'one second' interval, COM-SUR significantly reduces data size. Each raster image encapsulates multiple cameras' perspectives within a single snapshot, thereby hugely reducing the data size. Further reduction is possible if the interval between two images is set to two to three seconds.
- Instant Disaster Recovery Backup: Local Backup - Storing raster images on the same computer provides an instant local backup in case of unforeseen events, ensuring data integrity and availability.
- Lightweight Image Transfer: Instead of transmitting heavy video files, COM-SUR transfers lightweight raster images to the cloud. This minimizes bandwidth usage and accelerates cloud-based storage.
  As explained above, if the raster images are created at every two or three seconds,

then the transfer also takes place at every two to three seconds. This further reduces the need for bandwidth.

G. Reconvert to Video

- Video on demand: Just as COM-SUR converts live video into raster images, on demand, COM-SUR reconverts images to video and embeds the same into reports that are generated using PowerPoint.

H. Efficient Auditing and Reporting:

- Quick Review: The raster images, when played back using COM-SUR's media player, provide a rapid yet comprehensive review of 24 hours of footage. The media player simulates video playback offering multiple playback mechanisms along with advanced zoom, pan, and forensic filters to enhance the quality of the images. Other features include flagging, tagging, one-click creation of reports in PowerPoint, Word, Excel, and PDF.

I. Assurance of availability of a 'lost scene':

- Auditing v/s Monitoring: Unlike live monitoring, the auditing process facilitated by COM-SUR is a dedicated and meticulous endeavour that eliminates the concerns associated with missing crucial scenes. In live monitoring, video is inherently transient, susceptible to the slightest disruptions, such as a momentary distraction or a subtle shift in the operator's focus. These minor lapses can lead to the inadvertent loss of critical footage. However, with COM-SUR, operators are empowered to revisit and review any timeframe with unparalleled efficiency and speed. The system's robust capabilities ensure that no scene is truly 'lost,' providing a reliable and comprehensive solution for retrospective analysis and incident reconstruction.

J. Background Capture:

- Unobtrusive Operation: COM-SUR's background capture ensures that the image creation process operates seamlessly, without interfering with the user's ongoing tasks or requiring the display of video feeds.

In summary, COM-SUR's workflow not only addresses the challenges of centralized video surveillance in terms of bandwidth and storage issues but introduces a new thought process of daily and periodic auditing, cost-effective disaster recovery backup, and cloud-friendly image transfer. Each feature contributes to the overall effectiveness and reliability of COM-SUR in enhancing centralized video surveillance operations – "THE COM-SUR WAY!"

HOW COM-SUR'S RASTER IMAGES COMPARE – BANDWIDTH REQUIREMENTS

Assuming 16 cameras at 25 FPS are captured as 'one' (single) image by COM-SUR, and each image is 300 KB:

Resolution	Cameras	Total Megapixels	H.264 Compression – High Quality	H.265 Compression – High Quality	COM-SUR Image Bandwidth (Mbps)
2MP	16	32 MP	60.3 Mbps	44.7 Mbps	2.4 Mbps
8 MP	16	128 MP	241.0 Mbps	178.7 Mbps	2.4 Mbps

HOW COM-SUR'S RASTER IMAGES COMPARE – STORAGE REQUIREMENTS

Assuming 16 cameras at 25 FPS are captured as 'one' (single) image by COM-SUR, and each image is 300 KB:

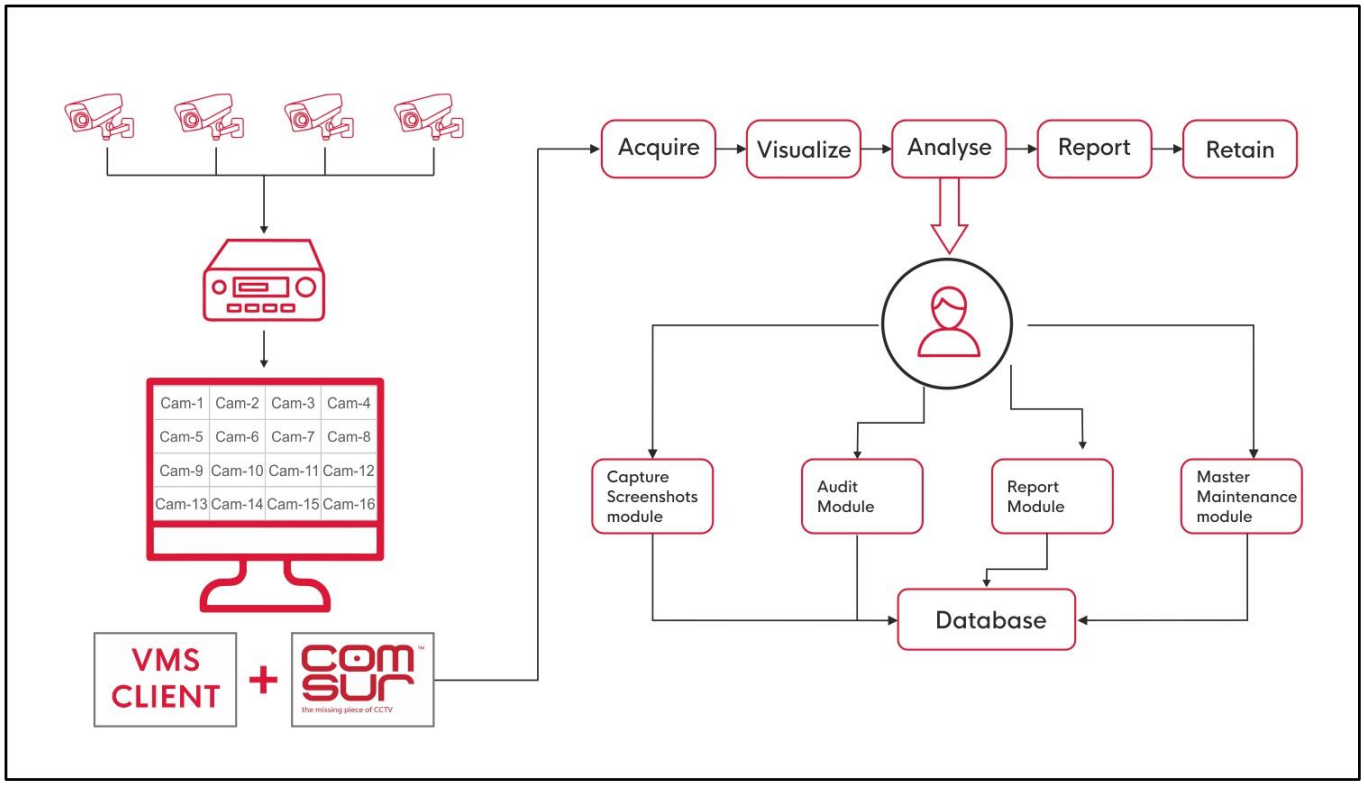
Resolution	Cameras	Total Megapixels	H.264 Storage for 30 Days (GB)	H.265 Storage for 30 Days (GB)	COM-SUR Storage for 30 Days (GB)
2MP	16	32 MP	18.62 TB	13.80 TB	750 GB
8 MP	16	128 MP	74.49 TB	55.20 TB	750 GB

Note: For the above calculations, the following calculators have been used.

Bandwidth calculator: https://www.cctvcalculator.net/en/calculations/bandwidth-calculator/

Storage calculator: https://www.cctvcalculator.net/en/calculations/storage-needs-calculator/

ARCHITECTURE



1. Acquire: At each 'branch' Live or recorded video streams are received on a computer on which COM-SUR is installed. COM-SUR sits as a 'stack' or 'layer' over multiple video streams and is commanded to convert such multiple video streams into raster images at an interval of every 'ONE' second, i.e., 'the second' when I, P, and B frames converge. The time interval between two images can be customized by the operator. The images are first stored in the 'PRIMARY' folder on the computer on which COM-SUR has been installed.

Note: Instead of transferring heavy video streams to the user's cloud or server, the raster images depicting multiple cameras (for example - 16 cameras as shown in the image above) are transferred. This reduces the need for huge bandwidth and storage requirements.

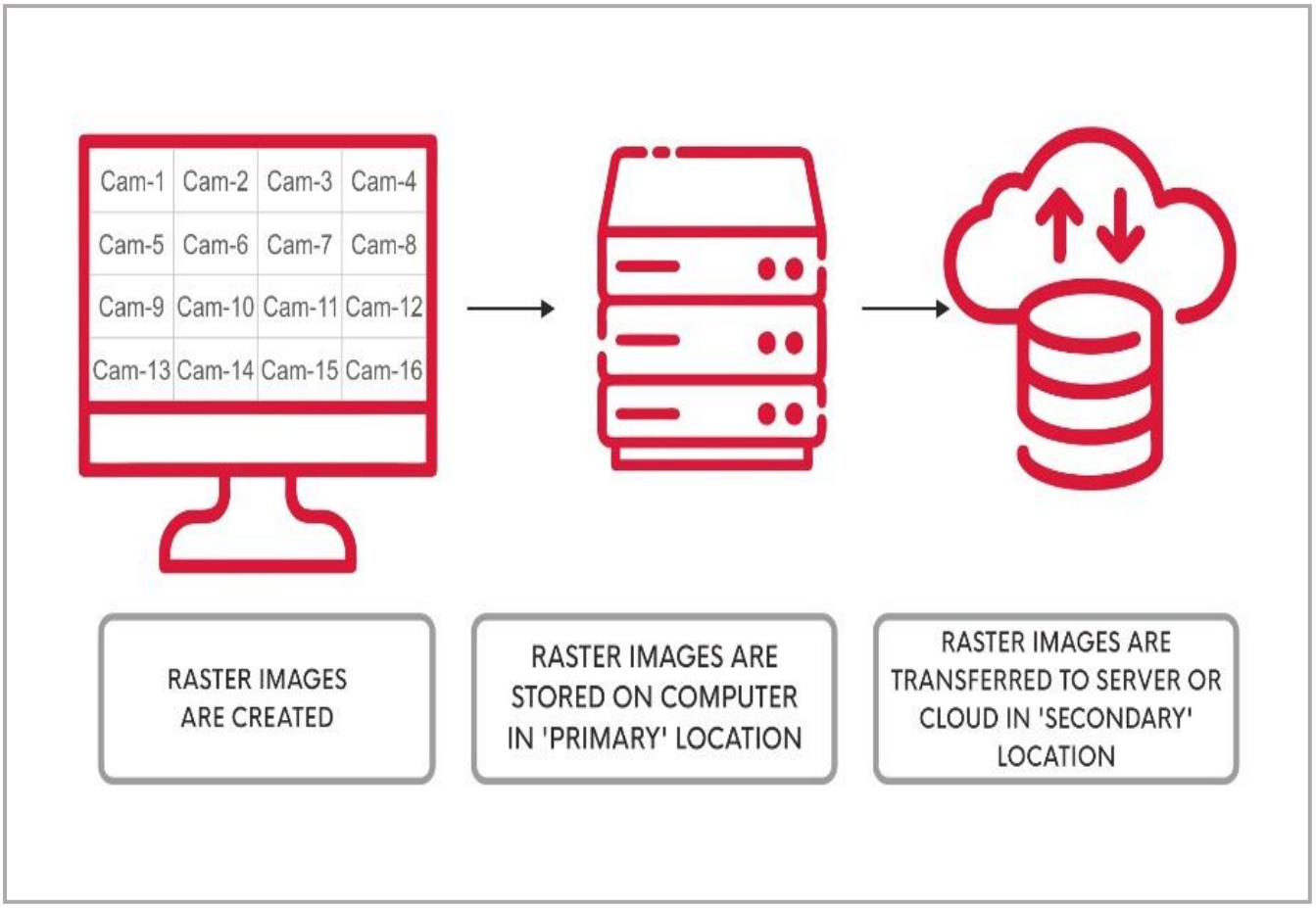
2. Visualize: COM-SUR's Smart Media Player allows the operator to effortlessly go through hours of these images depicting multiple cameras using up to six playback mechanisms. Even though 'images' are playing back, to the operator it seems like video is playing back.

3. Analyse: COM-SUR's Smart Media Player offers exceptional false colours (forensic filters) and exceptional zoom, pan, and flagging features to make it easy for the operator to minutely analyse and examine the images.

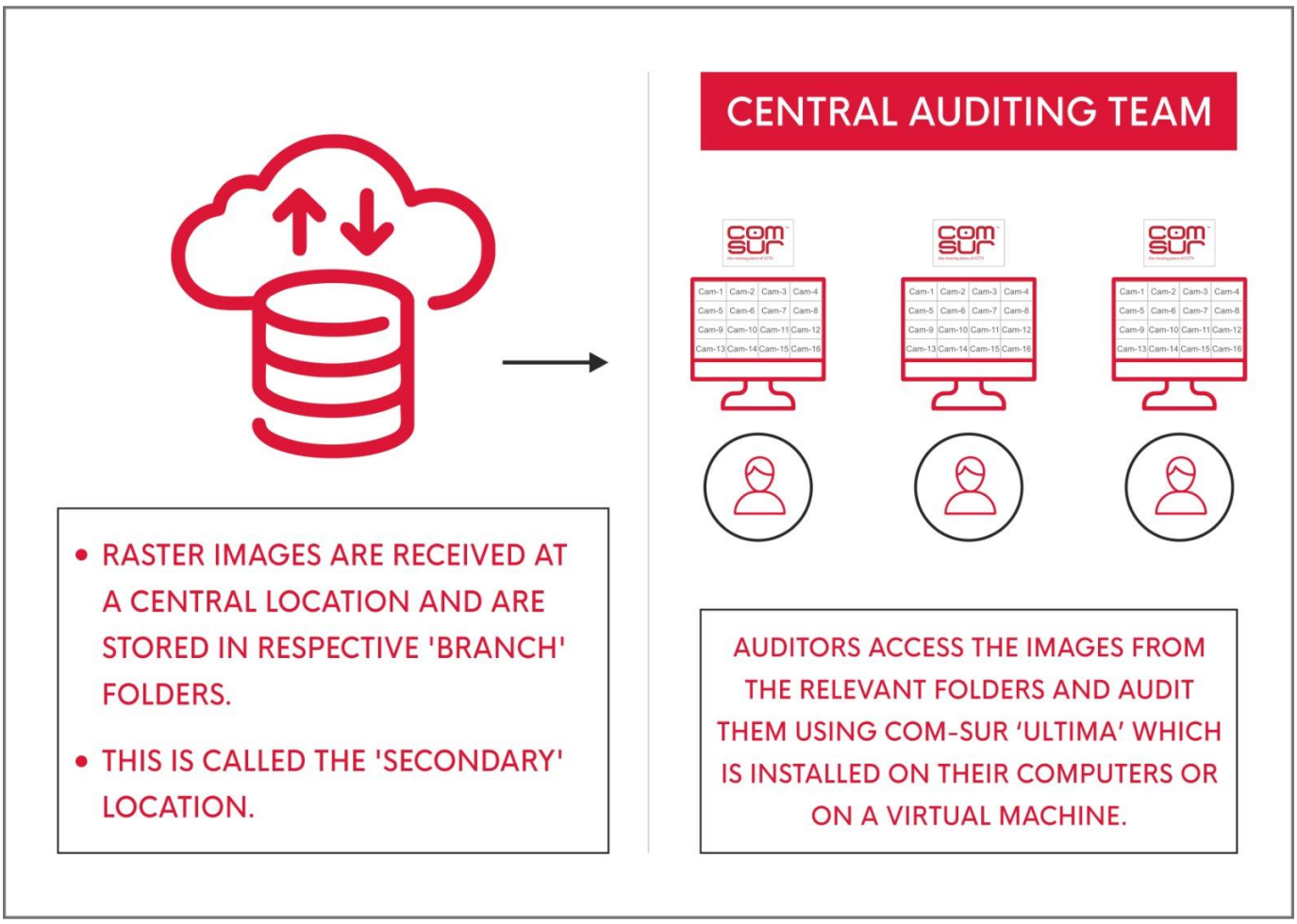
4. Report: COM-SUR's Smart Media Player allows the operator to create several reports in PowerPoint, Word, Excel, and PDF. These reports deliver Business Intelligence/Analytics.

5. Retain: COM-SUR's Smart Media Player allows the operator to tag and annotate important images or scenes. Not only does this create an institutional library, but it also creates datasets for AI models.

RASTER IMAGES DEPICTING MULTIPLE CAMERAS ARE CREATED AT AN INTERVAL AS PER USER REQUIREMENT, STORED ON THE COMPUTER IN THE 'PRIMARY' LOCATION AND ARE SIMULTANEOUSLY TRANSFERRED TO UP TO FIVE 'SECONDARY' LOCATIONS.



CENTRALIZED AUDITING



In the centralized auditing process facilitated by COM-SUR, auditors from a central location have the capability to efficiently audit raster images originating from various branches. Each auditor has COM-SUR installed on their respective computers (or on a Virtual Machine), allowing them to access and review the raster images captured by the system. The images, organized based on specific branches, are aggregated at the central location, creating a comprehensive repository for auditing.

Auditors utilize COM-SUR's advanced features, such as the Smart Media Player, to conduct meticulous reviews of the raster images. The player offers a range of tools, including exceptional zoom, pan, and forensic filters, enabling auditors to scrutinize the images with precision. The intuitive interface and multiple playback mechanisms enhance the efficiency of the auditing process, allowing auditors to quickly navigate through hours of footage. Moreover, the system supports collaboration among auditors, as they can simultaneously analyze images from different branches. The tagging and annotation features provided by COM-SUR allow auditors to highlight and document significant findings, contributing to the creation of an institutional library and valuable datasets for further analysis.

CONCLUSION: THE FUTURE OF CENTRALIZED SURVEILLANCE: TODAY!

In conclusion, our revolutionary approach to centralized video surveillance marks a pivotal moment in the evolution of security and operational oversight. As we usher in a new era, let's succinctly outline the tangible benefits that our system brings to the forefront:

- Substantial Bandwidth and Data Size Reduction:
  Our system significantly minimizes data size by converting live streams into lightweight raster images. This not only reduces bandwidth strain, but also optimizes storage requirements.
- Instant Disaster Recovery Backup:
  Storing raster images on the same computer provides an immediate local backup. In unforeseen events, this ensures data integrity and availability, contributing to uninterrupted surveillance.
- Flexible Video Reconversion on Demand:
  Our system empowers users to convert raster images back into video on demand. This flexibility enhances analysis capabilities, allowing for tailored reports that cater to specific user preferences.
- Efficient Auditing and Reporting:
  Raster images, when played back using our system's media player, facilitate a rapid yet comprehensive review of 24 hours of footage. Advanced features such as zoom, pan, and forensic filters enhance the quality of images, while one-click report generation streamlines the auditing process.
- Assurance of 'Lost Scenes': In contrast to live monitoring, our system's auditing process ensures that no scene is truly 'lost.'
- Minor lapses, distractions, or shifts in focus, inherent in live monitoring, are eliminated, providing a reliable solution for retrospective analysis and incident reconstruction.
- Unobtrusive Background Capture:
  Our system operates seamlessly in the background, ensuring that the image creation process does not interfere with the user's ongoing tasks or require the constant display of video feeds.

As organizations navigate the dynamic landscape of surveillance challenges, our system stands as a beacon of efficiency and intelligence. The benefits outlined above collectively contribute to an enhanced, reliable, and cost-effective centralized video surveillance ecosystem. It's not just the future of surveillance; it's the reality of today.

Embrace the Future of Surveillance with Us - Where Every Frame Counts!

