

Why CompleteView is Network Friendly

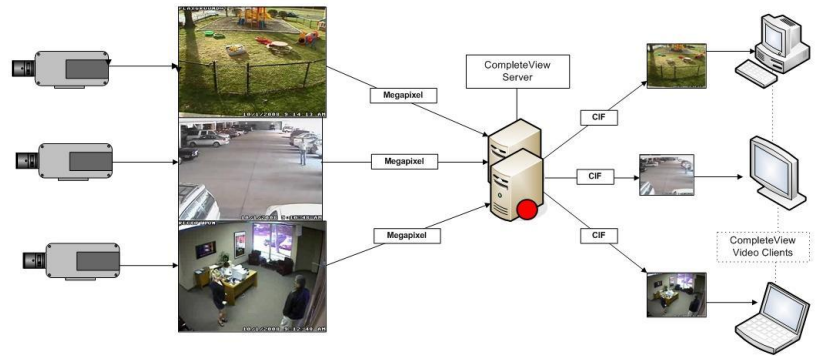
Understanding features of Video Management Systems which minimize network impact and ease system administration.

Salient Systems Corp.
10801 N. MoPac Exp.
Building 3, Suite 700
Austin, TX 78759
Phone: (512) 617-4800

Bandwidth conserving feature sets

Dynamic Resolution Scaling

Dynamic Resolution Scaling (DRS) is a feature built into CompleteView 3 and later versions. DRS is designed to deliver the most appropriately sized video stream for live view. Video resolution is automatically optimized based on the display size of the viewing window in the CompleteView



Dynamic Resolution Scaling

client application. The CompleteView server is configured to record any

resolution the camera is capable of displaying. If the configured recording resolution is high, such as a megapixel resolution video stream, a lot of bandwidth can be wasted when that video is transmitted for live display. This is because the video is typically displayed in a small viewing pane in the client application. If the viewing pane is only CIF sized but megapixel video is being transmitted to fill it, 90% of the transmitted image will never be displayed, and is simply wasting network bandwidth.

Dynamic Resolution Scaling automatically resizes the video resolution dynamically at the server before transmission to the client application for viewing. This processing occurs in the background without user intervention and *without affecting the originally recorded video*. Video is still stored at the original configured resolution.

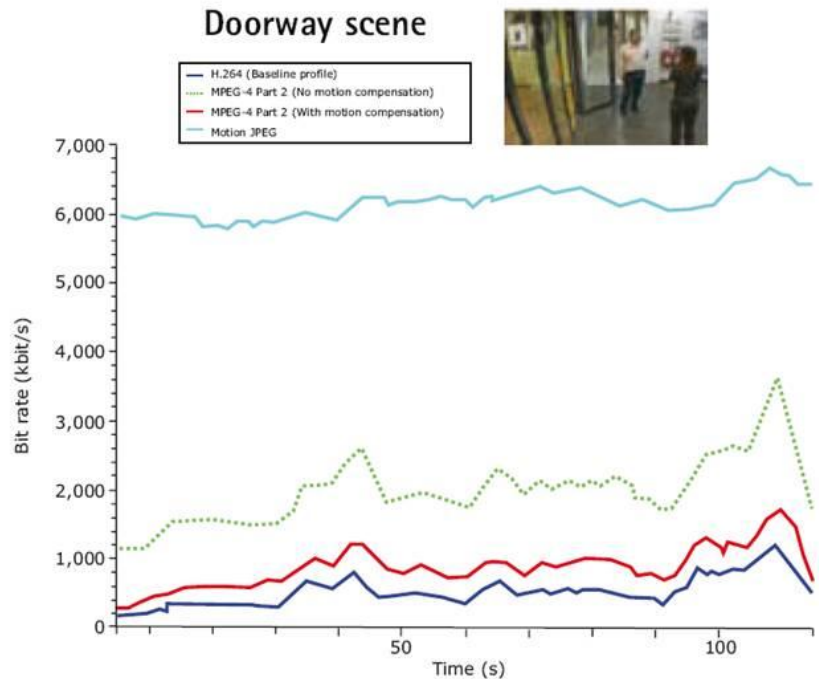
As the user resizes the viewing pane, the server automatically streams a higher or lower resolution to provide the most appropriate quality level for the size of viewing pane without any wasted bandwidth.

Compression Support: Motion JPEG, MPEG4 and H.264

CompleteView's recording engine supports recording all analog cameras and supported IP cameras in all major compression formats, including H.264. Each compression format has its advantages. Motion JPEG's strengths are noted as widely available support in IP Cameras and limited processing power required to decode the video. If native support for a compression is not available in the camera, CompleteView has the capability of transcoding

video from any supported format to any other supported format. This means an MJPEG-only camera can be recorded as H.264 or MPEG4. The benefit is lower storage consumption, but the downside is greater processing requirement on the server. Motion JPEG compression is not considered a true video compression standard. A Motion JPEG video stream is a series of individually compressed JPEG images. The goal of JPEG compression is to reduce 'spacial redundancies', or areas of similar color in the image. A block of pixels is grouped and the colors are averaged in that area, called a macro block. The luma component of each pixel (brightness) is maintained because our eyes perceive brightness more than color.

MPEG4 strikes a good balance between MJPEG and H.264. MPEG4 is supported on a wide array of IP Cameras however not as broadly as MJPEG. MPEG4 does require more processing power on the video management server to decode video but much less than H.264. This means more cameras can be processed on the same computer as compared to H.264, but fewer than Motion JPEG. MPEG4 provides a storage and bandwidth savings of approximately 50-80% of the equivalent quality MJPEG stream. It achieves this by using true video compression techniques. Video compression, including MPEG4 and H.264, reduces redundant information *between* frames in a video stream. The goal of MPEG4 and H.264 is to reduce temporal redundancies in the video stream which are areas of similarity between frames (i.e. the background). The stream itself is composed of a reference frame, called an 'I Frame'. This is similar to a JPEG image. After the 'I Frame', 'P' and 'B' frames are transmitted which are the movement in the video. The P/B frames are overlaid on top of the original I Frame to create



the current frame representing the scene. Eventually a new I Frame is sent and the process starts over. The number of images from one I frame to the next is called the Group of Video objects or GOV. MPEG4 and H.264 achieve their great bandwidth and storage savings by not retransmitting the still areas of the video stream each frame.

H.264 uses additional techniques to achieve greater bandwidth and storage savings than even MPEG4. H.264 can employ techniques to reduce bitrate such as Motion Estimation. Motion Estimation allows the camera and video management system to identify objects in the scene and send motion vector information about those objects instead of transmitting pixel level information. This further reduces bandwidth and storage consumption. Note that some version of MPEG4 can also use Motion Estimation techniques but H.264 has a host of other features. H.264 also has algorithms to enhance image quality, such as a Deblocking Filter. When video is highly compressed there is noticeable pixelization. Deblocking averages the colors on the edge of a macro block to create a smooth look which means video can be more highly compressed (colors can be averaged more) but the resulting video can be perceived as acceptable for the application further reducing storage and bandwidth.

CompleteView has full support for Motion JPEG, MPEG4 and H.264 so the most appropriate compression can be chosen for the security system.

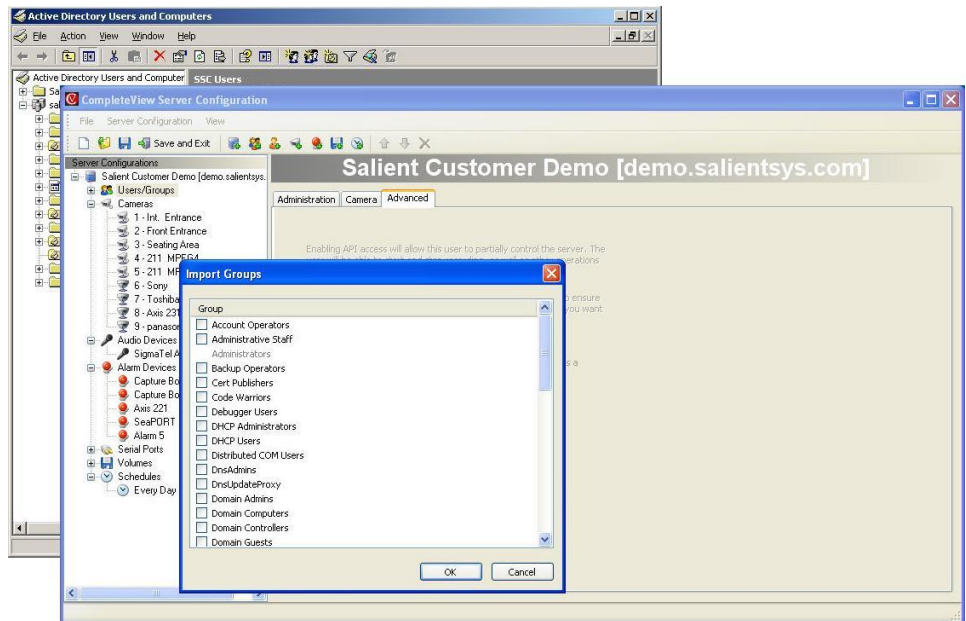
Integration with existing security and server management

CompleteView is designed to integrate with your network, not the other way around. From the ground up the product can be managed like any other enterprise system running on your network. IT practices and policies don't have to be bent or reworked for the network video system.

Active Directory support

CompleteView Enterprise supports Active Directory users and groups. Users and groups configured in Active Directory can be imported into CompleteView and configured with security system specific permissions.

This avoids duplicate entry of user information during setup and system maintenance. Additionally it allows the user to use their corporate network login credentials to access the CompleteView security system.

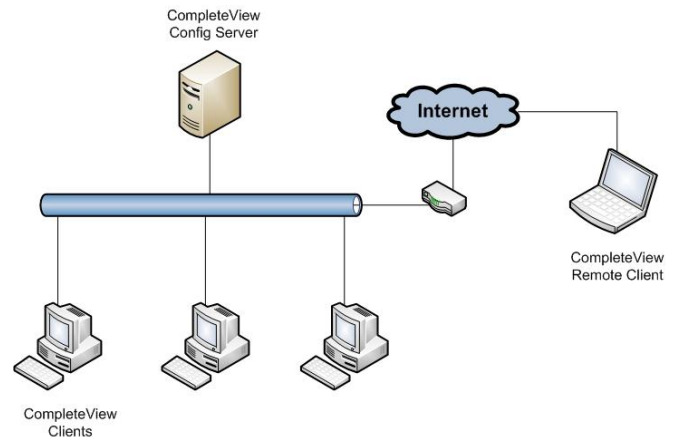


Importing users from Active Directory

Permissions can be assigned down to a very granular level if desired. Individual users and groups can be assigned access to specific cameras and can be given permissions to access live view, playback or pan tilt and zoom functions, or any combination of those rights. Additionally users can be given access to set and/or retrieve preset positions on a camera-by-camera and preset-by-preset basis. Finally users and groups can be given priority access to PTZ cameras. Up to ten levels of priority are definable which allow the administrator to specify who gets access to PTZ camera functions when multiple users are accessing the camera simultaneously.

Roaming users

CompleteView comes with a configuration server (Config Server). Config Server is an optionally installable component of CompleteView and allows for centralized user configuration storage. Config Server allows users to log into any workstation or monitoring center and maintain their configured views, camera access and other settings. For security operations with multiple monitoring centers this can be an especially useful tool for scheduling guards



Config Server enables roaming users

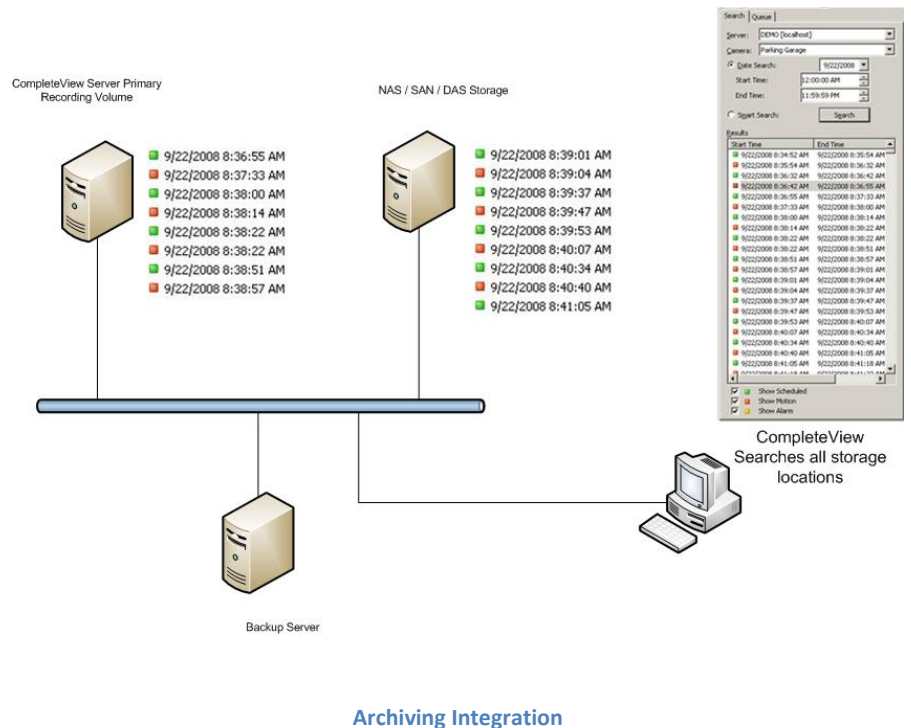
at different stations. Additionally, security does not have to be sacrificed in situations where a user without access to certain cameras needs to log into the security system from a workstation configured to access normally unauthorized cameras and views.

Backup video with 3rd party enterprise backup tools

CompleteView's unique recording architecture along with the server's ability to automatically search multiple recording volumes allow recorded video to be moved between storage volumes by 3rd party backup applications. This capability allows a network administrator to archive the video system using the common server backup platform.

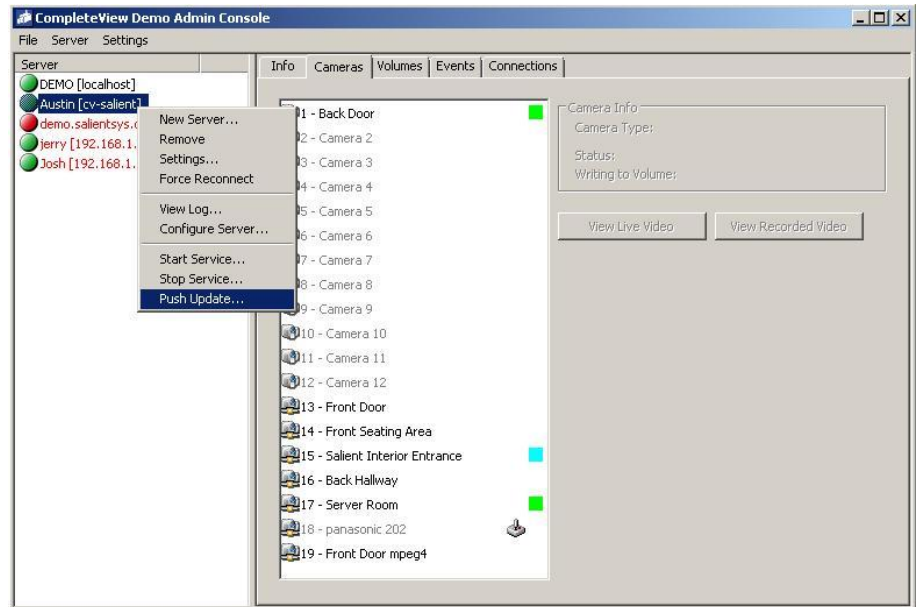
Several storage locations can be associated to a camera. Each camera can have the same storage points as others, or unique storage locations. Video files can be moved to any associated storage location.

In the CompleteView client application, when a user searches for video the desired clips are found automatically, regardless of their current location. If the CompleteView server does not find the requested video clip in its originally recorded location then it searches the other drives associated with the camera until it's found. This action happens instantly and without the user noticing. The investigator does not need to specify whether the video is archived or normally recorded. All video is made available to the investigator regardless of location or age of the video clip.



Multi server management console

Using the Admin Console, System administrators are able to perform almost any single server management task on multiple servers simultaneously. Tasks such as copying server configuration, updating software and managing camera licenses are available. Real time monitoring of storage volumes on a camera-by-camera basis is possible. Server statistics such as memory and processor utilization can be seen in real time so cameras can be allocated to servers with available resources. Finally, server and attached-device troubleshooting can be accomplished in the Admin Console's color-coded interface. Server status and attached device status are indicated by color and problems can be identified by clicking on a color and tracing the device problem within the Admin Console.



Admin Console

Centralized client software release distribution

CompleteView's Config Server also allows for client software release distribution. When new versions of CompleteView client applications become available, the CV administrator can push the new release to the CV Config Server. The next time a client app logs in, the user is prompted to upgrade with no further administrator intervention.

Conclusion

CompleteView comes with a host of features making it network friendly. Bandwidth management, centralized client/server administration and network security and server management come together to provide a system which integrates into your existing network with minimal impact on bandwidth.

ABOUT SALIENT SYSTEMS

Salient Systems offers network friendly, comprehensive IP and analog video surveillance management systems (VMS) built on open architecture. As the recognized transition leader from analog to digital video, Salient Systems' VMS, CompleteView™, is scalable and provides everything needed to manage a multi-server enterprise from a single desktop. Salient delivers simple and scalable security today...and tomorrow. For more information about Salient Systems and CompleteView, visit www.salientsys.com.

ABOUT THE AUTHOR

Brian Carle is the Director of Product Strategy for Salient Systems Corporation. Prior to Salient he worked as the ADP Program Manager for Axis Communications.

For information about this white paper or CompleteView, email info@salientsys.com.

Salient Systems

10801 N. MoPac Expy.

Building 3, Suite 700

Austin, TX 78759

512.617.4800

512.617.4801 Fax

www.salientsys.com

