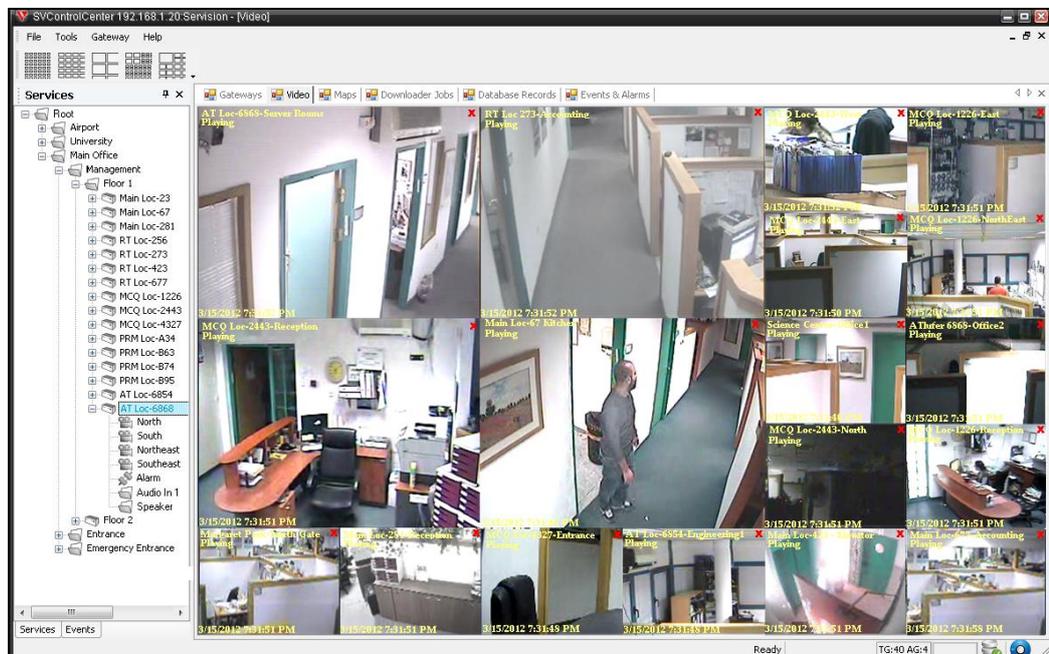




➤ Application Solution

MONITORING STATIONARY SITES

Using SerVision Video Gateways to Monitor Fixed Sites with Preexisting Cabled Networking Infrastructure



Overview

SerVision Video Gateways are powerful, multi-featured security systems that can stream high-quality video to remote PCs and other devices over a variety of types of networks. They are uniquely optimized for streaming data at exceptionally low bit rates, and are even capable of transmitting video from sites where only GPRS coverage exists. The units can record video on-site, stream live or recorded video to remote users, monitor sensors, and notify users instantly if events are detected.

This document explains how SerVision Video Gateways can be deployed at sites where a cabled networking infrastructure is available. This solution can be successfully implemented in a variety of settings, including private homes, warehouses, stores, offices, factories, hotels, housing complexes, university campuses, hospitals, and many other types of locations.

When this solution is implemented, video and other data is transmitted from the sites via high-speed cable-based networks, such as DSL networks, to the internet. SerVision client applications, running on PCs, smartphones, or tablets, can connect to the Video Gateways via the internet from virtually any location to monitor the sites in real time.

Video Gateway Models for Fixed Sites

SerVision supplies two types of Video Gateways that are optimized for deployment in stationary locations with cabled infrastructure: the four-channel HVG400 and the SVG series for up to sixteen channels. All models support transmission of video, audio, and other data over cable-based networks, include built-in motion-detection and video-lost alarm generators, and contain additional interfaces for connecting external sensors, switches, and closed-circuit monitors. These interfaces make it possible, for example, to connect an alarm that is activated when a gate is opened, or sensors that are activated when a door is opened. When these devices are activated, the unit can relay notifications to operators monitoring the site, either through the client applications or via e-mail or SMS.

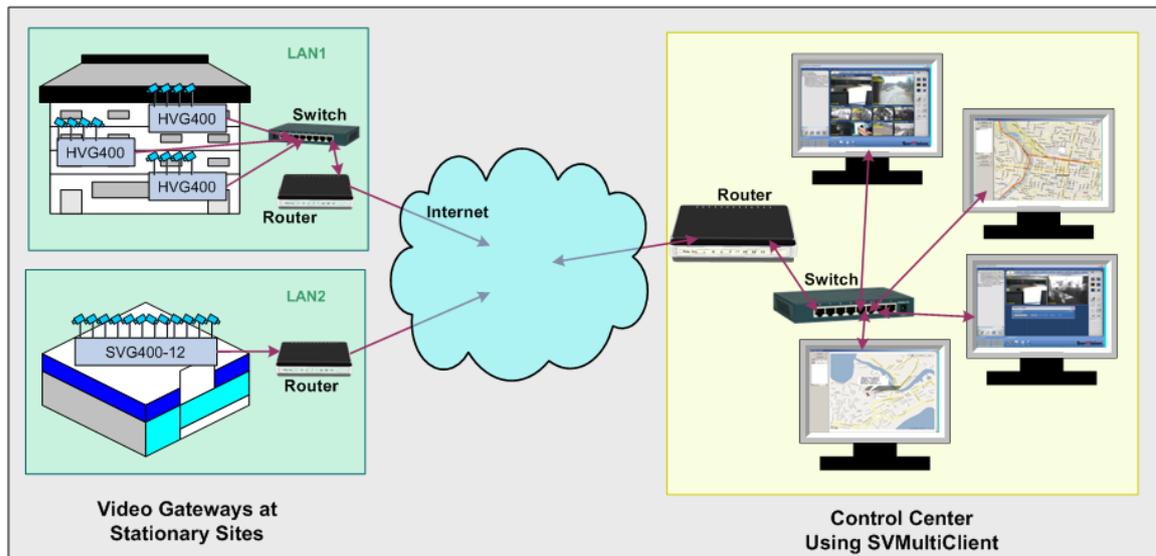
SVG models also support connections to 3G cellular networks and WiFi. Cellular connections can be used as backups for cable-based networks, enabling transmission of video and other data to clients when the cabled network connection fails for some reason. This is especially important for banks and other institutions that require communication with their sites at all times, because it allows them to check on their sites even when standard communication lines are damaged or tampered with. WiFi support provides an alternative way for the Video Gateway to connect to the local network when a WiFi router is deployed on site. This can simplify the installation process, because it obviates the need for an Ethernet jack for each Video Gateway.

The four-channel model of the SVG (SVG400-4) also supports RAID. This technology ensures that all video is stored on the unit twice, on two separate hard disks. If one disk fails, no data is lost, because it can be retrieved from the other disk.

Client Applications for Monitoring the Video Gateway Units

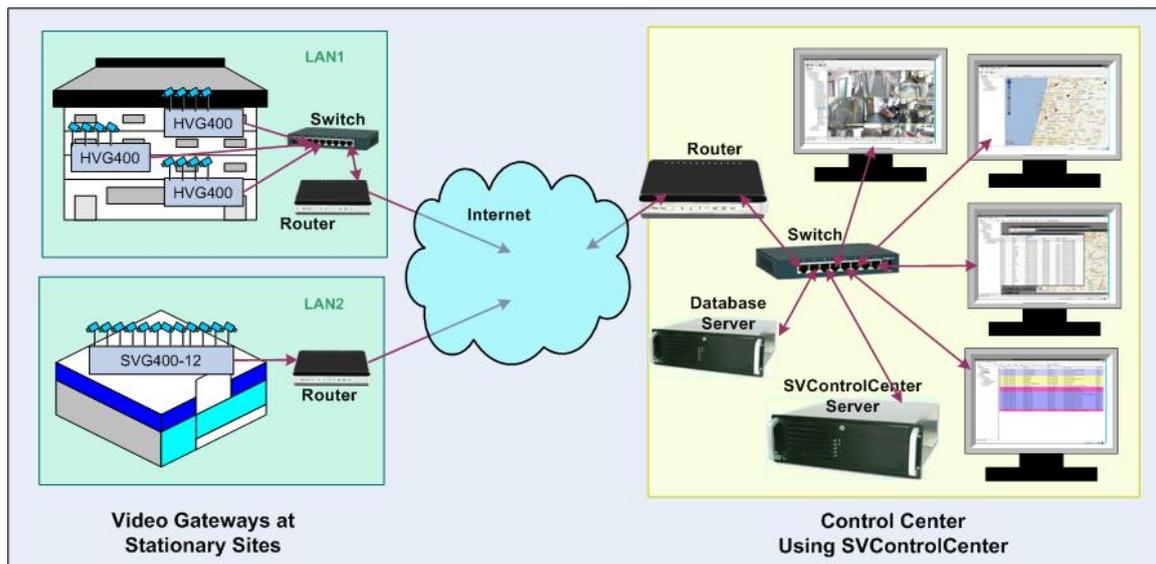
SerVision offers two alternative monitoring solutions for PCs:

- **SVMultiClient:** A PC-based monitoring system that uses the SVMultiClient client application to interact directly with the Video Gateways in the field, this solution enables users to monitor up to 70 Video Gateways, with minimal infrastructure. SVMultiClient features a multi-stream video player, configurable alarms, downloading of recorded video, and many other features. SVMultiClient is available free of charge to all SerVision customers.



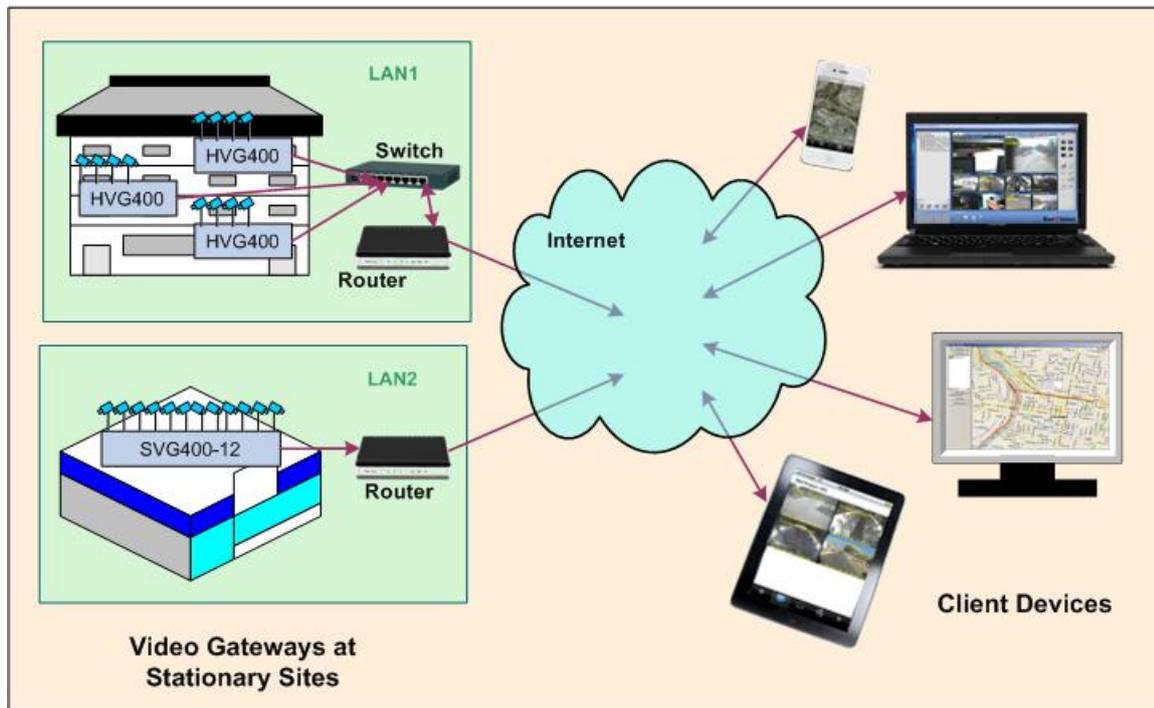
Control Center setup using the SVMultiClient PC-based application for site monitoring

- SVControlCenter:** A complete server-based monitoring system that is optimized for large enterprises (up to 5,000 Video Gateways), SVControlCenter is a highly customizable system featuring a multi-stream video player, configurable alarms, and an alarm management system. In addition, a Downloader module enables automated downloading of video to an internal database for long-term storage. SVControlCenter is available for purchase from SerVision.



Control Center setup using the server-based SVControlCenter solution for site monitoring.

Video Gateways can also be accessed remotely using a client application running on a smartphone or tablet. SerVision client applications are available free of charge for iPhone, iPad, Android, Windows Mobile, and Symbian devices. SerVision also provides a free SDK/API that can be used to develop alternative client software or to integrate SerVision's protocol into third party client software.



Client devices using SVMultiClient or cellular clients to connect to Video Gateways through the internet

Setting Up the System

Setting up monitoring of a fixed location entails a number of steps. To begin, you must select the appropriate Video Gateway model(s) for the job and purchase the required equipment. Then, you must ensure that a network connection is available for each Video Gateway you will be using. Once you have done this, you can install the Video Gateways and their peripheral equipment on site and ensure they are connected to the internet. Finally, you must install the client applications on the PCs and other devices you will use to monitor the Video Gateways. If you will be using SVControlCenter to monitor the site, you will also have to purchase it and set it up in your control center.

This Document

The rest of this document provides additional information about setting up the fixed-site monitoring solution, including information about the various options available and the resources each option requires.

Site Setup

Depending on the model of Video Gateway you choose, you can connect up to sixteen cameras to each Video Gateway. In addition, you may want to connect other peripheral equipment, such as sensors and activators, to the units. This equipment needs to be installed at the sites you want to monitor. The required and optional equipment are explained in this section.

Before you can begin using the Video Gateways, they must be configured to ensure that they function as required and can be accessed by client devices remotely. Instructions and support for the configuration process are provided by SerVision.

Required Equipment

The following equipment is required for each Video Gateway:

- Hardware (including cables) supplied with the unit (supplied by SerVision)
- Up to sixteen video cameras (supplied by SerVision or purchased separately)
- Additional cabling for cameras, power, and other hardware, as required for installation of all devices (supplied by the customer)

Optional Equipment

In addition to the required equipment, you may wish to use some or all of the following optional equipment:

- Dry-contact sensors
- External sensor adapter (required if you are connecting dry-contact sensors to SVG-series Video Gateways; available for purchase from SerVision)
- Activators (outputs devices like switches for activating other devices)
- Microphones
- External speaker (All Video Gateway units have built-in speakers.)
- CCTV monitor
- Switches for changing the CCTV display or the unit's settings
- Additional storage media (hard drives) that have been approved by SerVision
- Converter for connecting extra sensors and/or switches (ADAM module or IA relay board)
- 3G USB cellular modem (appropriate GSM or CDMA modems can be supplied by SerVision or provided by the local operator; a list of supported modems is available on the SerVision website, <http://www.servision.net>)
- SIM card for the cellular modem (for SVG-series Video Gateways, if you want to set up a cellular connection to the internet to use as a backup in case the cable-based connection fails; for GSM networks; supplied by the customer)
- USB WiFi adaptor

Selecting a Video Gateway Model

You can choose any of the following models of Video Gateways to install at your site. If you are using more than one Video Gateway, you do not have to use the same model in all locations; choose the most appropriate model for each location.

HVG400

The HVG400 is optimized for deployment in stationary sites. It supports up to four cameras and multiple sensor and activator connections, and has extensive video-recording capacity. The standard HVG400 unit comes with a 250GB hard drive, which provides sufficient storage capacity for recording four video channels continuously (24/7) at the default quality setting (10FPS, 128kbps, SIF), for nearly 50 days of recorded video. The unit can be supplied with a larger-capacity hard drive (up to 1 TB) upon request.

SVG400 Series

The SVG400 series is suitable for larger sites that require up to sixteen cameras. Units are available in four, eight, twelve, or sixteen channel models. All models are supplied with a 250GB hard drive, enabling continuous recording at the default recording settings (10FPS, 96kbps, SIF) for approximately 60, 30, 20, or 15 days, respectively. The units can be supplied with larger-capacity hard drives (up to 2 TB) upon request.

In addition to the normal cable-based internet connection, SVG models also support cellular and WiFi connections to the internet via USB connectors on the units. Although cellular connections do not offer the same bandwidth as cable-based connections, they can be used as back-ups in case the cable-based connections are temporarily unavailable for some reason. WiFi support enables the units to connect to the local network through WiFi access points, so that Ethernet jacks are not needed for each Video Gateway.

The four-channel SVG400-4 also supports RAID for added data-storage security.

Choosing Cameras and Other Peripherals

Any analog video camera can be used with SerVision Video Gateways. SerVision supplies a limited range of cameras with different features, but you can purchase cameras from other sources if you wish. Since any analog camera is compatible with the Video Gateways, many installers prefer to source cameras locally. This enables them to select a suitable model camera that is fully compliant with the project specification and will meet the customer's expectations.

Video Gateways support a variety of other optional peripheral equipment, such as sensors, switches, and CCTV monitors (see *Optional Equipment*, above). SerVision can supply some of this equipment, but you must purchase other items on your own.

Upload Bandwidth Requirements

The internet each Video Gateway uses to transmit video and other data to client devices must have an upload bandwidth that is sufficient for the amount of traffic that will be handled by it. The required capacity varies depending on a range of factors: the number of cameras in use, the quality of the video that will be transmitted, and how much video will be transmitted. The bitrate of video that is transmitted can be configured to optimize it for the available resources. By default, the HVG400's bitrate is 128 kilobits/second (kbps), and the SVG400's bitrate is 96 kbps. These bitrates provide excellent video quality for SIF frames, but they can be reduced by sending lower-quality SIF video or by reducing the resolution to QSIF. On the other hand, if you have the bandwidth available, you may choose to increase the resolution to VGA or D1.

Client Setup

SerVision client applications, SVMultiClient and SVControlCenter, run on standard Windows-based PCs and provide a full range of site-monitoring features. Regardless of which of these clients you use, you must provide the PCs for them to run on.

In addition to the PCs and client applications, some projects may also require the following systems:

- SVProxy3 server: A system that facilitates network connections in certain environments and expands video transmission capacities
- SVMonitor system: An application that monitors the system for technical problems and malfunctions affecting the Video Gateways. (This application is only required for small projects that are using the SVMultiClient PC application for monitoring. The server-

based SVControlCenter solution has its own internal mechanism for monitoring Video Gateway statistics.)

SVMultiClient-Based Site-Monitoring

Smaller operations can use the SVMultiClient client application for PCs to monitor their Video Gateways. SVMultiClient can play live and recorded video and display notifications when sensors are activated. It also allows you to remotely control PTZ cameras and devices that are connected to the system's alarm outputs, to communicate with people on site, and to download video to the PC. It is appropriate for use by individuals monitoring small sites in which only one or two Video Gateways are installed, as well as by control centers with multiple operators monitoring more extensive sites in which up to 70 Video Gateways are deployed.

Required Equipment

If you use SVMultiClient for monitoring your Video Gateways, you will need the following equipment and infrastructure:

- PCs for all operators (supplied by the customer; operators working different shifts can share a single PC)
- High-speed internet connection (supplied by the customer)

Optional Equipment

Control centers using SVMultiClient for vehicle monitoring may also require the following equipment:

- SVProxy3 server (supplied by SerVision; for additional information, see page 7)
- Designated PC for SVMonitor application (supplied by the customer)

SVMonitor

Control-centers using SVMultiClient for vehicle monitoring may also choose to set up a dedicated PC on which to run the SVMonitor application. This application helps control-center operators monitor the Video Gateway units for technical problems that may require maintenance, such as malfunctioning storage media, overheating of Video Gateway units, and lost video connections. It automatically connects to each Video Gateway it monitors at specified intervals and retrieves status information from it. If any of the information indicates a possible problem, the system generates an alarm.

SVControlCenter-Based Control Centers

Larger-scale operations require the server-based SVControlCenter for Video Gateway monitoring. SVControlCenter is an enterprise-level management and video-monitoring system that can monitor up to 5,000 Video Gateway units. As its name implies, it is intended exclusively for use in a control-center environment. The system's server retrieves data from Video Gateways, stores it in an internal database, and manages the alarm and notification system. Control-center operators receive information from the SVControlCenter servers via SVControlCenter client applications. Each operator runs an SVControlCenter client application on a PC workstation at the control center. Both the server and the operator workstations are located at the control center and connected to the same LAN. The system can handle up to 20 SVControlCenter clients simultaneously.

All the SVControlCenter clients in the system are locally connected to the database server whenever they are open, and the SVControlCenter server automatically relays event information and alarm notifications to them. In addition, operators can connect directly from

the SVControlCenter client application to Video Gateways in order to view live video and to play back recorded video that is stored on the Video Gateway.

SVControlCenter is supplied by SerVision as two separate industrial-strength servers that are preloaded with all the required software: one server with Windows Server 2008 and the SVControlCenter server application, and the other server with Windows Server 2008 and a licensed copy of Microsoft's SQL server. When large numbers of Video Gateways are being monitored, the system should be scaled to several computers to improve performance. All of the servers must be physically located in the control-center and connected to the same LAN as the PC workstations that will be used by the control-center operators.

A Downloader module is available for use with SVControlCenter (see *Backing Up Recorded Video*, page 8).

Required Equipment

Control centers using SVControlCenter for site monitoring require the following equipment:

- SVControlCenter server (supplied by SerVision)
- MS SQL server (supplied by SerVision, or supplied by the customer if only the SVControlCenter license is purchased)
- PCs for each operator (supplied by the customer; operators working different shifts can share a single PC)
- A high-speed internet connection (supplied by the customer)
- SVProxy3 server (optional, as explained below; supplied by SerVision)

Redundancy Solutions

To ensure system stability in case of equipment failures, key system functions and data can be duplicated. Redundancy solutions such as failover clustering, database mirroring, and database mirroring using a witness server, can all be implemented. Consultation with a SerVision support engineer is recommended.

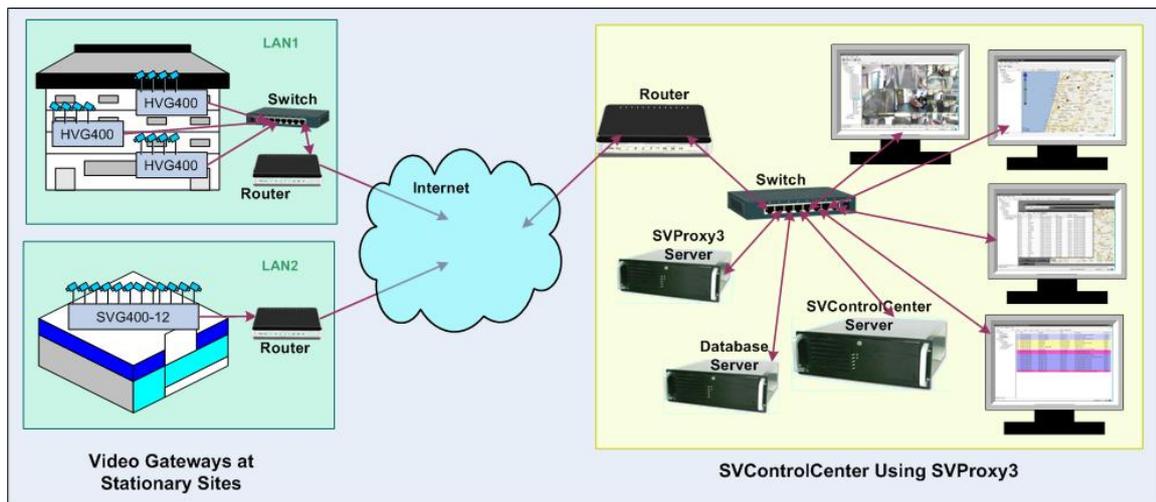
SVProxy3

In addition to the PCs, you may require an SVProxy3 server. SVProxy3 provides a number of services:

- **Proxy service (SVProxy):** This service facilitates connections between client applications and Video Gateways that do not have public IP addresses. The proxy server is required when a cellular line is in use for uploading data from a Video Gateway and the local cellular provider is not able to assign a public IP address to its cellular lines.
- **Video-Distribution service (SVDistributor):** This service distributes a single live video stream from a Video Gateway to multiple clients simultaneously without compromising the quality of the image. This is helpful if many control-room operators need to access images from the same camera simultaneously.
- **Dynamic DNS (SVDDNS):** This service can be used to assign a name to a Video Gateway, whether it has a fixed public IP address or not.

If you are not using a cellular internet connection, or your cellular lines all have public fixed IP addresses or connect to a VPN with a fixed IP address, the SVProxy3 server is not necessary. In these cases, the other services are not required for successful operation of the control center either.

Both the hardware and software of SVProxy3 are supplied by SerVision. One SVProxy3 server can support connectivity for up to 300 Video Gateway units.



SVProxy3 deployed in a control center

Control-Center Bandwidth Requirements

If you are managing a large number of Video Gateways from a control center, you must ensure the control center has an internet connection that has enough bandwidth and is fast enough to allow operators to view video as required. Video and other data is relayed from Video Gateways to the internet, and is transmitted over the internet to the control center.

To calculate the required Control-Center's bandwidth and modem speed, determine the maximum number of video streams that will be opened by the control center simultaneously, and then multiply this number by the maximum transmission bitrate of each video stream. If, for example, the control center will have four PCs, and each one will have at most eight video streams from one or more SVG400s open at one time, at a maximum bitrate of 96 kbps per stream, the required network capacity would be about three Mbps ($96\text{kbps} \times 8\text{streams} \times 4\text{clients} = 3,072\text{kbps} \approx 3\text{Mbps}$).

This calculation should be viewed as the absolute minimum bandwidth requirement. It is highly recommended to get a more robust internet connection than the initial calculation suggests you need, especially if you will also be downloading recorded video, or other devices are also connecting to the internet over the same connection. For most projects, we recommend a download capacity of at least 10 Mbps.

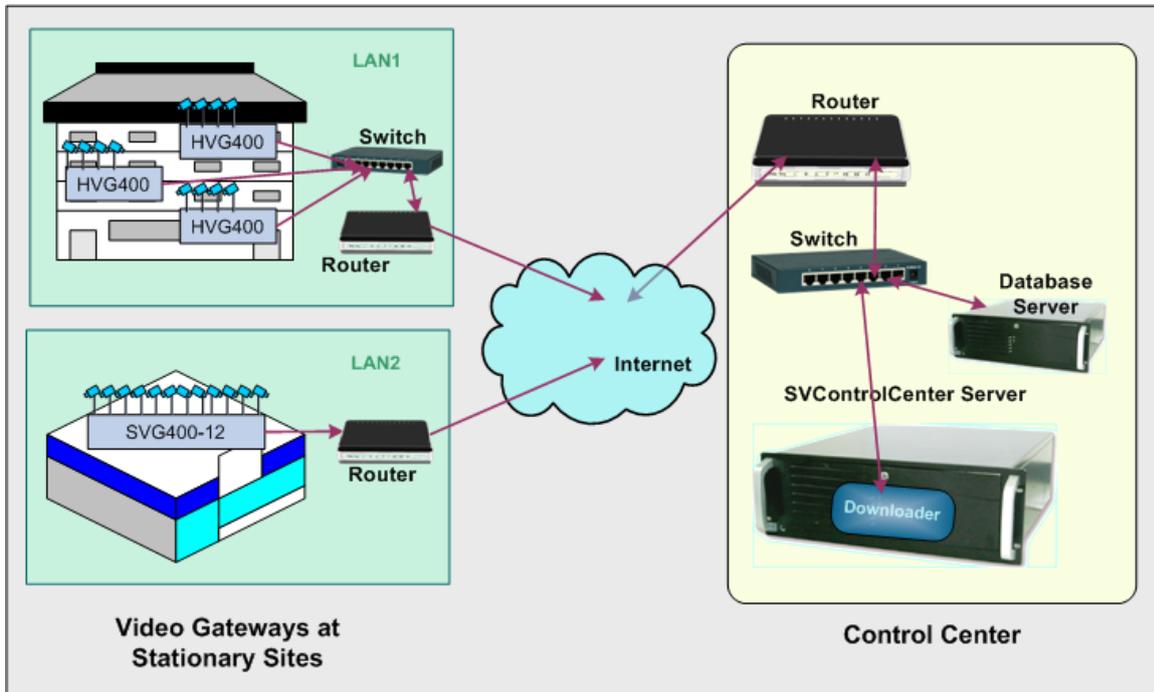
Setting Up a VPN

If the internet service provided by your local ISP does not provide sufficient bandwidth for your needs, or if a high level of network security is required, the ISP may be able to set up a private VPN for you. You can use the VPN to connect all of your sites to the control center.

Backing Up Recorded Video

Once you have your system set up, you can download recorded video from your Video Gateways for long-term storage. All locally recorded video stored on the Video Gateway's disk or micro SD card can be downloaded to the database, or you can opt to only download video of events that were detected by sensors. Both SVMultiClient and SVControlCenter can download video to the PCs on which they are running. SVControlCenter can also download video to the SVControlCenter database, and can be configured to automatically capture and store live video streams upon sensor trigger.

Downloading video for back-up along with streaming live video may significantly increase your bandwidth requirements. When you calculate your required bandwidth, be sure to take video downloading into account. You may be able to reduce the load by backing up recorded video during off-hours when less live video-streaming is taking place. SVControlCenter's Downloader module can be configured to download video to the SVControlCenter database during specified times.



Downloading data to the SVControlCenter database