

Integration of Leapfrog Technologies' PSG2 With Surveillance Camera Systems

Introduction

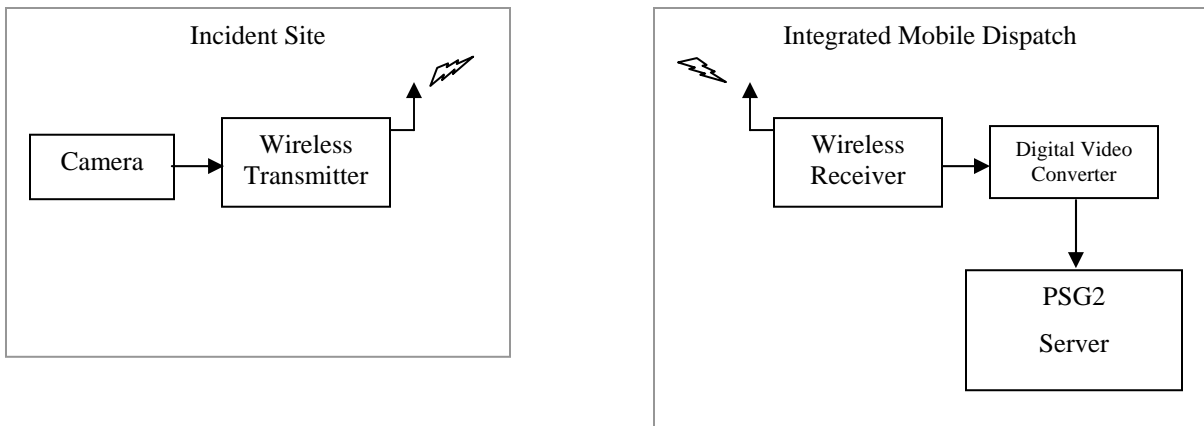
This document has been designed for Surveillance Camera based Systems and provides an Integrated Solution with PSG2, Leapfrog Technologies' system for Public Safety, Generation 2. Typical Surveillance Systems consist of multiple cameras in key areas, local and/or remote monitoring stations and a transmission medium for sending the video from the cameras to the monitoring devices. While such fixed systems are adept in delivering point to point live video, they lack the ability to dynamically and conditionally route the streams to different monitoring devices.

PSG2 greatly enhances multimedia content switching and delivery mechanisms based on policies and rules configured using its Command Centre console. Essentially PSG2 is a multimedia soft-switch and it performs the job of getting the video feed from the cameras to any monitoring point connected via a wired or wireless medium on an IP network. In regular CCTV based systems adding new monitoring stations is a costly and time consuming process. But using PSG2, new monitoring devices can be added easily and the video can be streamed live to them based on the policies configured via the Command Centre.

The PSG2 system also provides for other forms of multimedia communications like voice calls, text chat, link-forwarding and file transfer, thus providing a complete and integrated solution.

The sections to follow will focus on the various integration scenarios of PSG2 with the existing CCTV based infrastructure. It starts with a Mobile Dispatch System, followed by two large scale setups, one with Analog Cameras and the other with Digital infrastructure. The client and server architectures are explained in the Appendix.

I. Mobile Dispatch System

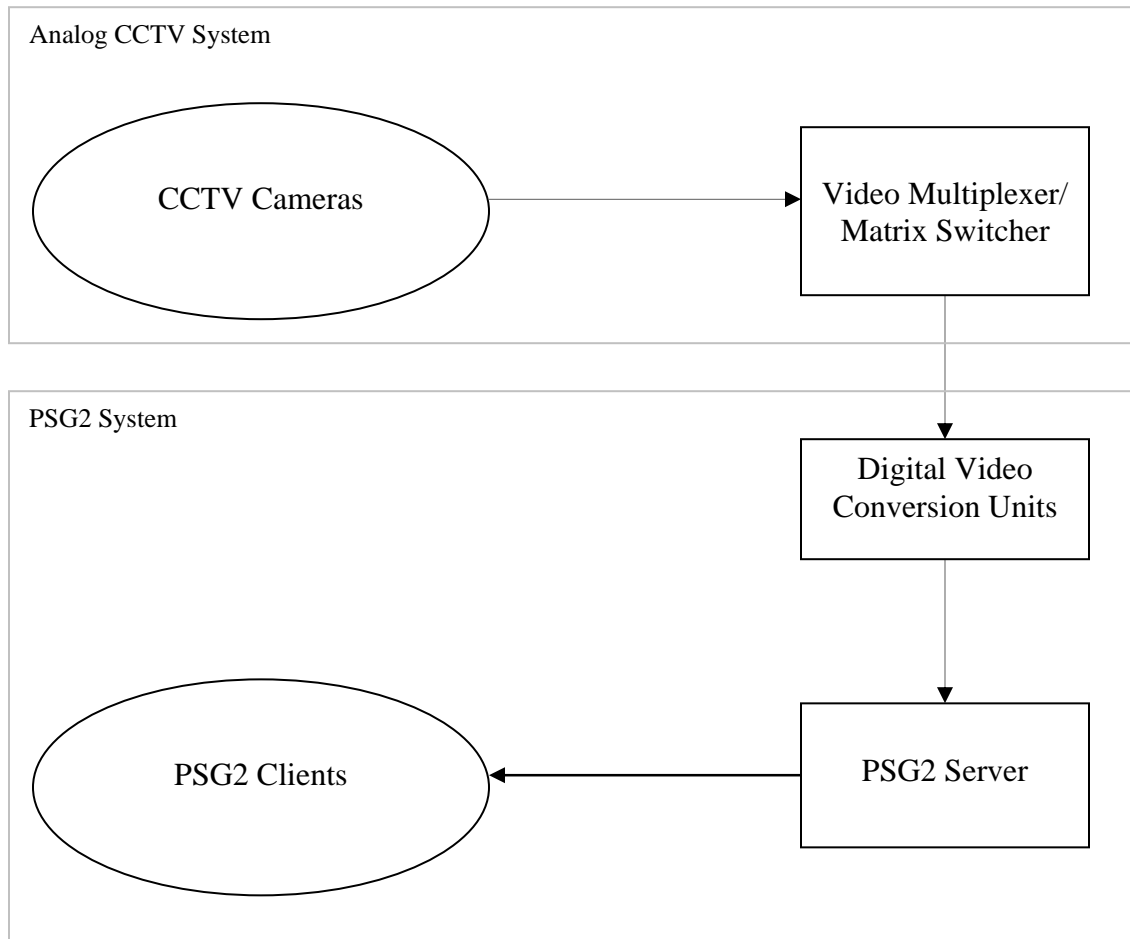


Mobile Dispatch Integration with the PSG2 System

Here we have a camera deployed at the incident site and a mobile dispatch unit monitoring it. In this setup, apart from the standard camera and transmitter-receiver pair we have two additional components, the Digital Video Converter and the PSG2 server. These components facilitate the integration of PSG2 with the Mobile Dispatch Unit.

The Digital Video Converter receives the analog video stream from the Wireless Receiver's Video-Out port. Typically this connection is made via a BNC connector for composite video. The converter also supports S-Video based conversion. It then converts the analog video data to a standard digital stream and feeds it to the PSG2 server. The PSG2 server captures the video feed and provides it live to pre-configured clients on the same machine, thus providing a remote monitoring solution. The client and server architectures are provided in the Appendix for further reference.

II. Large Scale Analog System

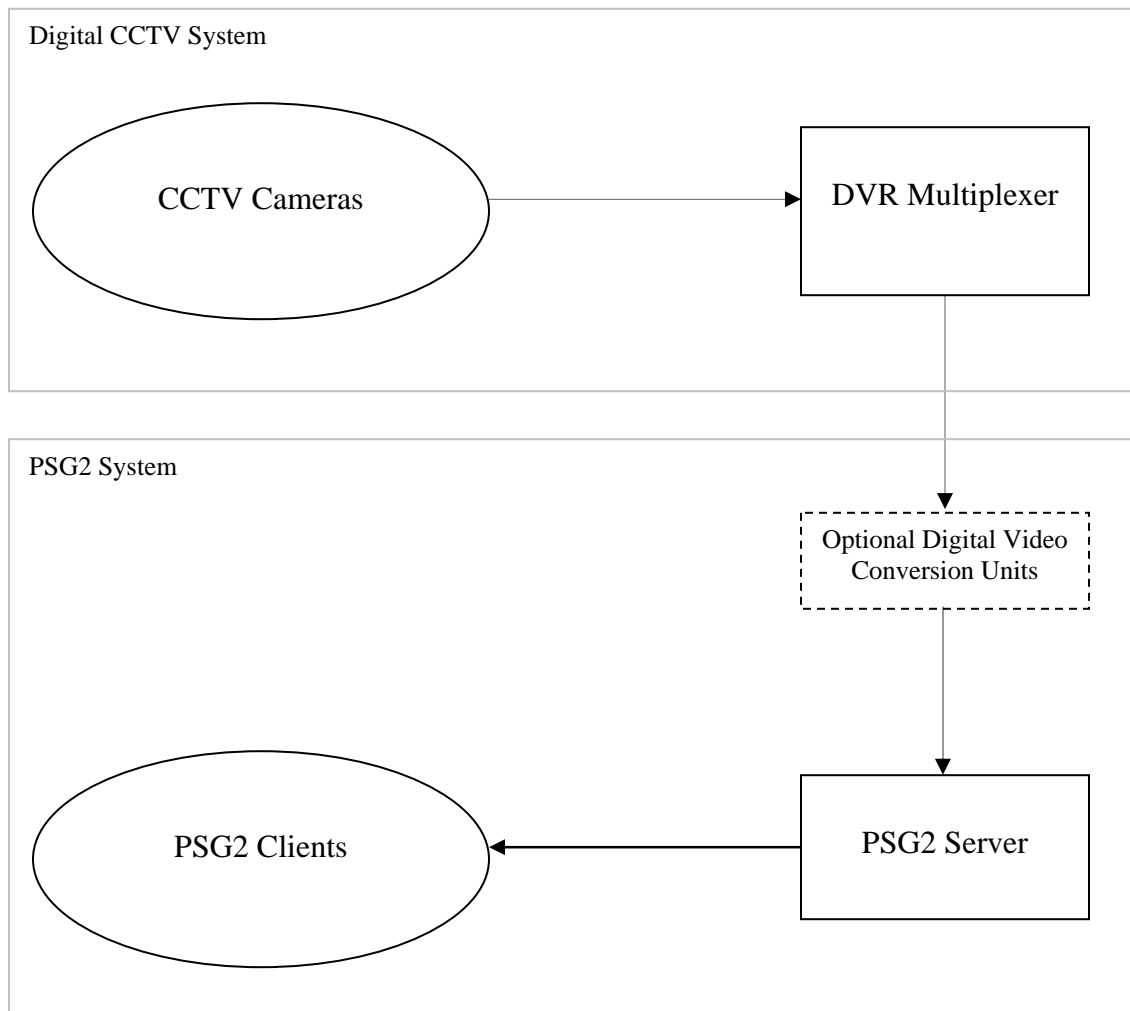


Analog CCTV System integration with PSG2

This scenario shows a deployment of PSG2 with a pre-existing Analog CCTV System. The integration occurs at the output of the Multiplexer/Matrix Switcher unit of the CCTV infrastructure. Depending on the type of output provided by the Multiplexer we can have either a BNC connector for a composite signal or an S-Video connector providing the video data to the Digital Video Conversion Units. The Digital Video Conversion Units convert the analog video to a digital format acceptable by the PSG2 Server. The PSG2 system supports the most popular MPEG and Windows Media Video encoding formats. The digital video data is then captured by the server, ready to be transmitted to the PSG2 clients in real time.

Client access is setup via a Command Center configuration tool that is part of the server. This tool can be used to permit user access to different video streams based on security levels/designation of the individuals or of groups of users. The clients use off the shelf computers or PDAs to view the video. They connect to the server via a standard IP network which can be wired or wireless in nature. Additional information on the client and server architecture is provided in the Appendix.

III. Large Scale Digital System



Digital CCTV System integration with PSG2

The setup above depicts the integration of PSG2 with a DVR based Digital CCTV System. Depending on the type of output video format from the DVR multiplexer we have the following cases.

1. Standard Format DVR output: The most popular formats for DVR based systems are the MPEG-4 (Part2, ASP) and H.264 (MPEG-4, Part10, AVC). The video in these formats can be directly sent from the network port of the DVR multiplexer to the PSG2 Server via an IP network. If the DVR and server are in the same data center then they can be directly connected via a switch. If they are in separate locations then a remote IP network can be used.

2. Proprietary Format DVR output: If the DVR encodes the data in a non-standard digital format then the PSG2 System integration occurs via the Digital Video Conversion Units. This setup makes use of the Analog Video output from the DVR multiplexer and converts it to a standard MPEG or Windows Media Video encoded format for the PSG2 Server. The converter is capable of converting Composite Video as well as S-Video based streams.

Once the digital video is sent to the server it can then be routed to various clients that have been pre-configured with appropriate access privileges. Client privileges can be setup and modified via the Command Center component of the PSG2 server.

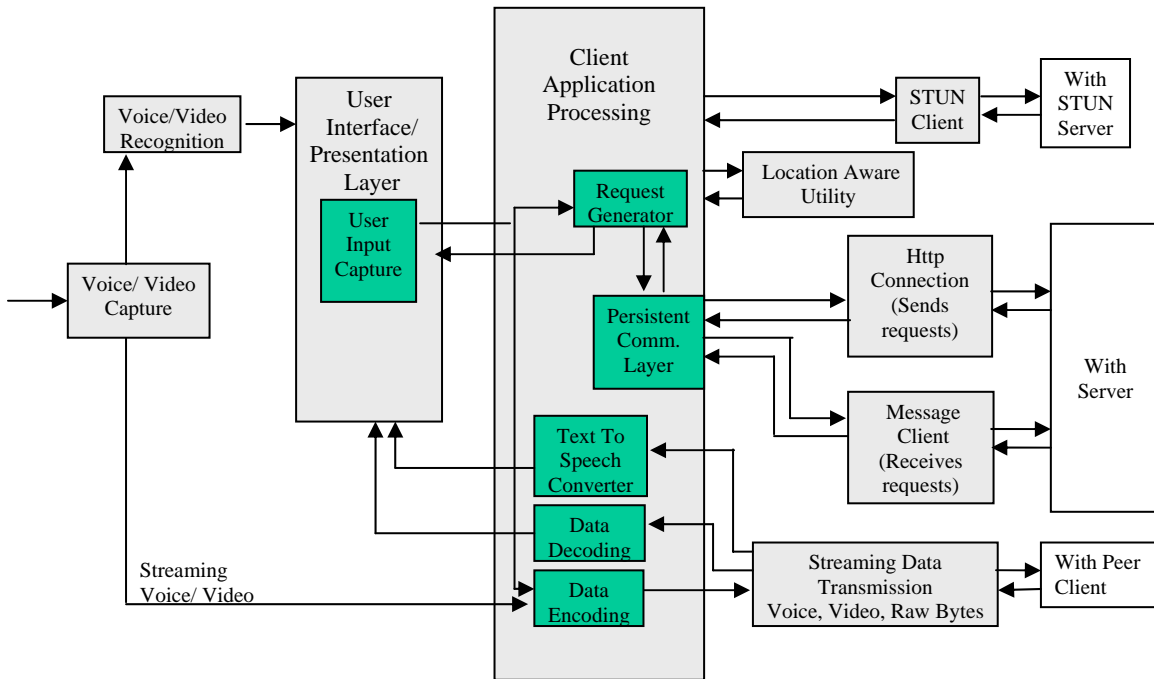
Summary

This document gave an outline of the ways in which the PSG2 System can be Integrated with different pre-installed CCTV based systems. The Integration process is easy to implement and involves the addition of the PSG2 Server, the Digital Video Converter Units and PSG2 Client devices. If the CCTV system is digital in nature and provides the video output in the industry standard MPEG or Windows Media Video formats, then the Converter Units are not required, further reducing the additional components required for the setup.

APPENDIX

Client architecture

The PSG2 client can be any desktop, laptop or PDA with the Internet Explorer browser, Macromedia Flash plugin and the Windows Media Player software. The client architecture is shown below.

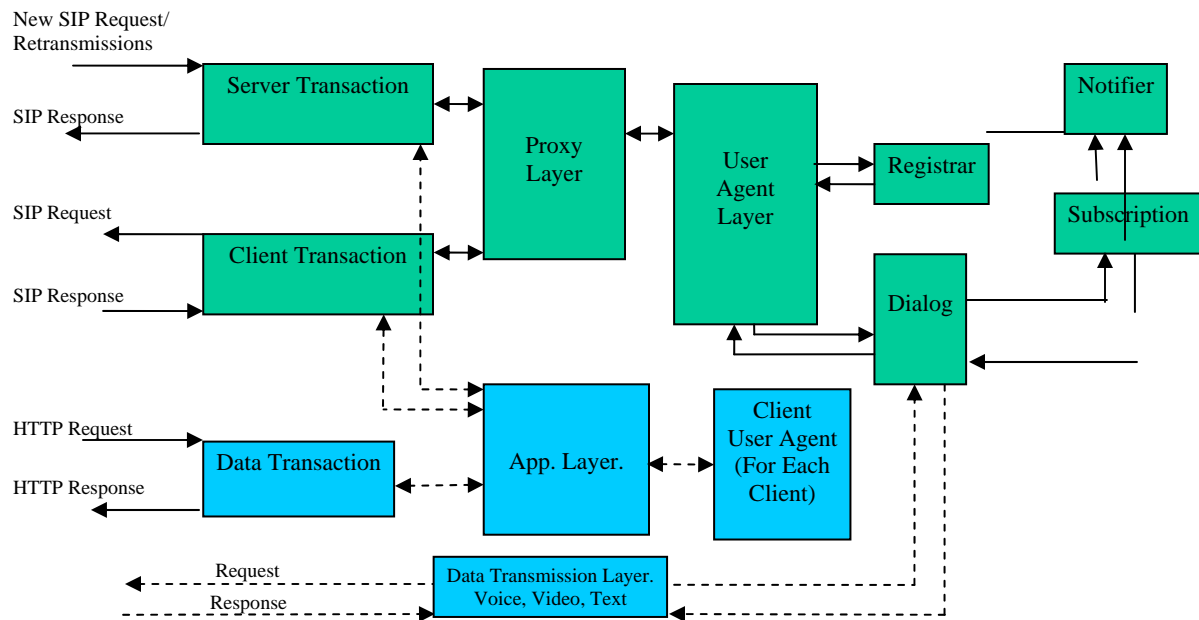


The client consists of

- HTTP Connection and Message Client components that enable both request response and asynchronous communication modes with the PSG2 server
- Streaming Data Transmission unit that transfers Voice, Video and Raw byte information
- Location Aware Utility that helps the client process location based information
- Client Application Processing unit which comprises of the request and data processing components
- User Interface Layer that is responsible for the user interaction, receiving their inputs and displaying the processed results
- Voice/Video processing component which executes the capture and recognition requests

Server architecture

The PSG2 server is essentially a multimedia soft-switch. Its strength is its ability to seamlessly route multimedia information based on configuration policies. The server architecture is described below.



The server consists of

- Integrated data and multimedia architecture using open standard protocols like SIP and HTTP
- The SIP processing unit which processes the initiation, modification and termination of the client's multimedia sessions
- The HTTP Request/Response component responsible for HTTP interaction with the client
- Subscription and Notifier modules that process event registration and notification
- Multimedia processing layer which serves the request/response requirements for Voice, Video and Text based communication