Case Study
Ertan Hydroelectric Power Plant

Infinova provides IP cameras and video management software to help the Ertan Hydroelectric power plant migrate from an analog to an IP video surveillance system.

Ertan Hydroelectric Power Plant implements Infinova Digital Video Surveillance

The Ertan hydroelectric power plant was built in late 90's with power generation capacity of more than 3 million KW and is an important energy supplier in the west China power grid. Because of the complexity and limited scalability of the original analog CCTV system the plant had implemented as gradual migration to digital video surveillance using the Infinova V2216 Network Video Management Platform as the core of the digital solution. The software controls all the plant's IP video surveillance cameras, it is both easy to use and reliable and has made a significant improvement in the plant's security and operational safety.
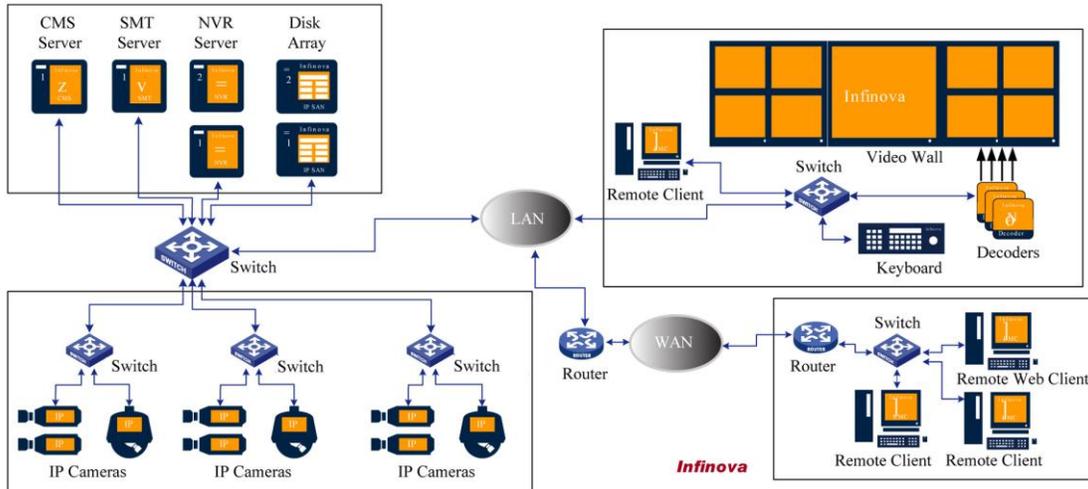
System Structure
The solution consists four simple sections:
- Network cameras & networking
- Central servers
- LAN user access (including control center and normal clients)
- WAN user access

The LAN user access includes a 1GB/s network connection between remote users and the WAN access to the system provides 10 video channels.
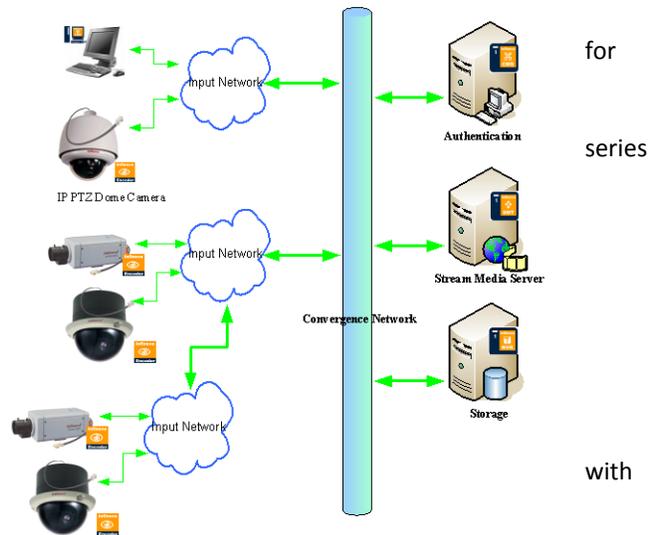
Cameras are located in all areas of the plant, for example the main dam, upper river area of the reservoir, flood discharge tunnels, flood gate control room, hydraulic turbine floor, transformer station and switch room. The cameras are all IP and are connected to the command center via local switched and a fiber optic LAN.

HD Cameras

The cameras monitor many different environments, for the high risk areas high definition (HD) cameras were required to provide HD videos and evidence when required. For example, the Infinova V1700N-M series day/night network PTZ dome camera is used for general/patrol surveillance of open areas and the Infinova V6102-M series day/night network fixed camera is used for specific objects that require constant surveillance.

All cameras support MPEG-4/M-JPEG dual encoding technology and dual streaming with a high resolution stream for live viewing and a lower resolution stream for archiving or for remote users with low bandwidth connections. In addition, the cameras support Power over Ethernet (PoE) which reduces construction costs for and improves reliability.

Command Center

The command center has multiple servers to manage the large number of surveillance cameras in the plant. The central management server manages all servers, monitors operational status and provides operator prompts and failure warnings based on the plant's operating policies.

A separate stream media server provides access to live and archive video for all users on the system. Should the stream media server go out of service, the solution enables priority users to obtain video via a direction connection to camera. When the stream media server resumes service, all users are transferred seamlessly back to the stream media server again.

The Infinova V2216 Network Video Management Platform uses an IP Storage Area Network (SAN) for centralized storage, and a RAID 5 disk array to increase the storage capacity and to ensure continuity and reliability for the long-term storage archive.
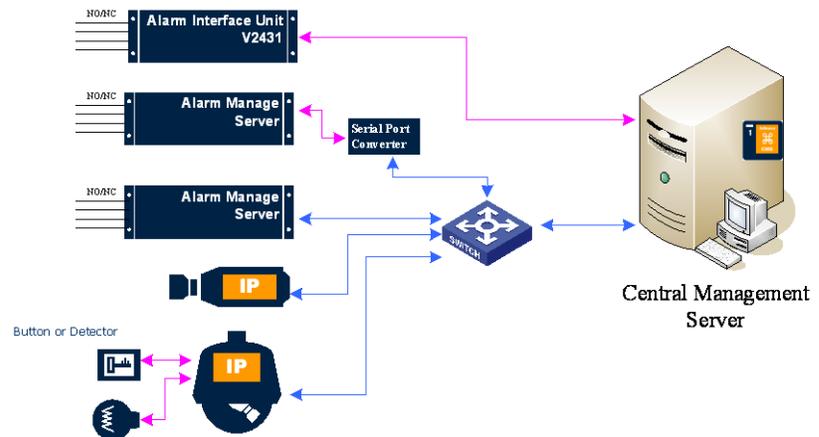
The centralized storage approach requires that all cameras send video to command center. To guarantee bandwidth the central management servers, stream media servers and network video recorders are all connected through a core convergence switch. Load balancing technology is used to even out the load on individual servers and improve the reliability of the command center servers.

Integration with Honeywell Vista Series Fire Alarm System

The project specification required the surveillance and security system to be integrated with the existing Honeywell Vista Series fire alarm system including infrared detectors at the newly built sites.

When the fire alarm system generates an alarm, the Infinova platform switches the video from the camera closest to the alarm detector command center monitor. For some cameras, video management system also switches on lamps to provide better lighting for the camera. Alarm codes are managed centrally and are routed automatically to the V2216 management platform CMS module. Alarms from all edge devices are managed in a uniform way using dedicated alarm code in the software to switch video to monitors and display maps to show where the alarm originated.

The Ertan plant's original analog video system used an Infinova V2431 Alarm Interface unit to connect the fire alarm system to the CCTV system. The V2216 Network Video Management Platform was able to extend the life of existing analog equipment at the plant because it is fully compatible with many analog systems. As a result the fire alarm system was integrated to the new IP system using the existing V2431 Alarm Interface unit. Alarm devices with a network interface can be connected directly to the central management server via the Ethernet network.

For the newly built sites, the alarm signal is transmitted to the video management system directly via the IO port of the nearest camera. The output of IP camera is used to trigger lighting etc., the relevant device being controlled via relay.

The Infinova V2216 Network Video Management Platform provides four approaches to integrate with an existing fire alarm system such as the Honeywell Vista system in this case.
- Direct digital signal input using IP edge devices (cameras)
- Digital signal input to the Infinova V2431 Alarm Interface unit
- Alarm code input to an RS-232 port
- Alarm command input via TCP/IP network

If required, Infinova provides an alarm input signal customization service to meet any users' special requirements.

Maximizing Bandwidth Usage for Remote Users

Because the hydroelectric plant is a large facility with many remote locations, the security management required operators to be able to view video at the remote sites using a web browser. The V2216 software provides support for remote video viewing via network and users can view video through Internet using V2216 client software or a plain web browser. Remote users have the same priorities as a local user when they access video via the Internet.

In Ertan plant, the bandwidth between a sub area and its main area is 10M bps. To maximize the efficiency of bandwidth to remote users the V2216 enables command center operators to limit the number of video streams that a remote user can access. In addition, the system automatically switches remote users to the lower frame rate stream (lower bandwidth) from dual stream cameras.

Flexible Archiving Strategy
The hydroelectric plant had different requirements for archiving periods depending on the security risk for different parts of the site. For example, for normal areas or the site 15-day archiving is required, while for higher risk areas such as the reservoir and dam, generator floor and other core areas of the power plant, a month or longer archiving was required.

Using the V2216 Network Video Management platform different archiving times can be set for each video channel. Channels can be grouped so that a change to the group affects all the cameras in that group at once without having to change each individual camera. The V2216 failover routine provides redundancy to maintain continual operation and recording and protect archives from server errors or network interruptions. Once the error has been fixed the archive is seamlessly restored from the failover server completely transparent to the user

By helping channel partners provide their customers with complete, affordable, best-in-class, large and small video surveillance solutions, Infinova helps integrators generate more business more profitably. Leveraging a manufacturing process certified to ISO 9001:2000 standards and over 250 engineers with a list of video industry firsts, Infinova channel partners provide their end-users with industry-acknowledged product reliability and technical leadership.

So that Infinova channel partners can create complete solutions, Infinova provides IP surveillance cameras and components, CCTV analog cameras, DVRs and components, camera accessories, monitors, power supplies and fiber optics communications devices. Infinova also has the technical ability and manufacturing flexibility to let integrators propose customized solutions. In addition, Infinova will partner with other manufacturers making other surveillance equipment and software to help its channel partners create turnkey solutions. Contrary to most other companies, Infinova will back-up their partners' products as well as its own to assure both the integrator and its customers that one call – to Infinova only – takes care of everything.

Infinova works diligently to assure its channel partners can provide cost-conscious solutions. With Infinova's hybrid systems, channel partners can propose systems that protect a customer's investment in its already-installed analog surveillance system but that also put them on a dynamic migration pathway to IP systems.

Infinova is lauded for its exceptional maintenance programs. A major highlight is the company's 24-hour advanced replacement policy in which a substitute product is shipped immediately upon notice of a problem.

With such customer focus, Infinova is often referred to as "the integrators' manufacturer."

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