Problem-solving IP video system challenges

sourceSecurity.com
making the world a safer place

Alcatel·Lucent
Enterprise

Table of Contents

Alcatel-Lucent Enterprise commissioned SourceSecurity.com to produce this document.

Best practices to avoid finger-pointing when something goes wrong

An IP video system is a multi-vendor environment. Various components from multiple manufacturers interact to perform the tasks required of the system. Any problem with system operation might originate with any of the various components.

Consider an analogy: If your car isn't running, the goal is to get it running again. It takes a mechanic to analyse the "why" and address the problem, whether it is the transmission, engine, or whatever. In short, observing a symptom does not immediately point to the cause of the problem.

So it is when troubleshooting IP video systems: The problem could be the camera, the recording device, the network, or any number of other issues (or even multiple failures). How can you diagnose the problem and get to an answer?

Alcatel-Lucent Enterprise worked with industry experts SourceSecurity.com and Stone Security to examine some of the best practices when it comes to troubleshooting IP video systems. In this White Paper, we review the role of the manufacturer, systems integrator and end user. As well, we discuss the merits of a managed network switch and highlight the kinds of training, support agreements and troubleshooting approaches that contribute to a speedy and appropriate resolution to the problem.

Developing an approach beyond the "Blame Game"

When an IP video system fails, it fails as a whole, regardless of the cause. If something is not going well – for example, if images are blurry or jumpy – the failure is a failure of the entire system. Therefore, problems should be solved in the context of the broader system.

Because multiple vendors are involved, problems might become the subject of finger-pointing as each vendor seeks to shift the blame for the problem away from their products and onto another part of the system.

> **"IP video systems are complex beasts, and every stakeholder has something to contribute."**
>
> Brian Witt,
> Network Architect, ALE

Each component of a system, whether the firewall, cameras, servers or switches, has a process to manage and troubleshoot the performance of their own components. Notably, however, the manufacturers involved in the system do not have access to information about the system as a whole. This lack of a broader view feeds into an environment where players might seek to avoid responsibility for a problem on the premise that it originates with a different system component.

Manufacturers are aware of the time they spend resolving customer problems. Sometimes, however, manufacturers do not emphasise the "time to problem resolution." Rather, they emphasise the goal of minimising "time to innocence," in effect, minimising how long it takes to confirm that the solution to the problem is "not me." In contrast, other manufacturers are more constructive in their approach.

Too often, when diagnosing an IP video problem, there is a tendency to default to a "favourite" cause, which might be a problem that has come up often in the past. It's important to go beyond a preconceived solution and look more broadly at the situation.

How manufacturers can play a constructive role

A role of manufacturers in troubleshooting is to contribute information that will help create a path to solving the problem. However, the information is limited to the manufacturer's own products, whether a camera, a recording server, or software.

Given the multiple vendors in an IP video system, where does an end user turn for help when there is a problem? In the absence of an active integrator or reseller, it comes down to which manufacturer has a relationship with the customer and can facilitate good and clear communications. Communications can help alleviate stress, which impedes a constructive approach to problem-solving.

The early stages of troubleshooting involve collecting information to define the nature and scope of the problem. A systematic approach is required with collaboration and coordination among all the involved parties. A constructive attitude focuses on finding the root cause of an issue, rather than leading the conversation with "not me." Customers react well to a constructive, non-emotional approach.

The alternatives – chasing rabbit holes or assuming a response based on a previous project (which might not even be comparable) – only prolong the process and can annoy the customer.

> **"It's a team sport when something is broken. It depends on the manufacturer support model, whether a manufacturer will take the first call from a customer or require that the customer approach the problem first through a reseller. Sometimes requests are made in parallel among several manufacturers and the integrator."**
>
> Dr. Jack Jachner, VP Business Transformation, North America, ALE

Troubleshooting challenges for customers

The nature of troubleshooting requires a broad (if relatively shallow) understanding of several different technologies. It is not realistic to expect a customer to have that wide range of knowledge. A customer might have a deep understanding of one technology, but what they need instead is a wider understanding of many technologies. Generally, customers have a small staff operating in the IP video environment, so they will not have sufficient expertise in all the system components.

> **"I'm not sure it's realistic to expect a customer to be deep in all the technologies. The issue becomes: How can we explore an issue quickly?"**
>
> Brian Witt, ALE

The customer's biggest role in troubleshooting is to provide as much information about a problem as possible. "The video is bad" is not sufficient information to guide anyone to solve a technology issue. More guidance is needed: Was the problem specific to cameras or recording or live viewing? Was it limited to a certain location or time of day? What else was going on at the time the problem was observed? The role of the customer is to communicate such information and be as patient as possible during an investigation into what's going on.

Customers should provide details as clearly as possible and be available to answer questions such as which, when and how. Based on that information, those addressing an issue can start building a modell against a hypothesis and adjusting various elements.

In general, all parties involved in IP video troubleshooting should stay constructive, reserve judgment, look forpatterns and maintain a climate of respect for the knowledge and expertise that others bring to the table.

Tracking information on the network

Among component manufacturers, the switch or network vendor has perhaps the best tools available to shed light on how the other components interact and where problems might lie. Information from a network's managed switch helps operators to scope out a problem, analyse the extent of a problem and proceed from there with new information.

The network vendor adds value during troubleshooting because intelligent, managed and enterprise-grade switches can collect detailed information from among a range of system components – information that can be helpful to identifying and solving an issue. If a system is dropping packets, the issue can be on the network, at the camera level, or at the server level. Managed switches can help to diagnose the issue by knowing where packets are coming from, the size of the packets and information about the data stream.

Switches may not track "where is the problem?" – but they do monitor "where is the information?". By doing so, they can point to the problem.

> **"Managed network switches are positioned to be the connective tissue, equipped with nerve endings that can tell you where the pain is. They are the man in the middle, equipped to monitor and manage what's going on and provide information to help with troubleshooting."**
>
> Dr. Jack Jachner, ALE

For example, tracking the data bandwidth (in bytes/second) going to the video recorder can identify if it is oversubscribed. The network manufacturer knows the bandwidth of data going into the recorder and the recorder manufacturer knows the capacity. Together that information points to the problem. In one recent case, tracking this data point eliminated 90% of issues with image blurring. That is because the network could see the bandwidth and the video management system (VMS) knew the capacity – numbers which, when taken together, identify what needs to be fixed.

In another example, a casino was reporting a small number of high-definition cameras that displayed blurry video during recorded and live sessions which involved a lot of motion. It turned out that the casino, which had combined three different generations of recording equipment, had oversubscribed their video recorders and then truncated the bit rate of the video stream coming from the camera. "Packet capture" by the network identified the problem.

Managed switches are critical to troubleshooting a system and can be a lifesaver in terms of remote support.

New or old, all systems present challenges

Sometimes problems with systems do not originate with the individual components but are a function of how the systems were designed and implemented. They can be new or old systems. Newer systems may have more "bugs" to work out, but older systems present their own brand of challenges.

There are likely more troubleshooting variables during the initial install and implementation of the system. Some devices just do not work out of the box.

When Stone Security delivers a new system, it starts out with a lifetime workmanship guarantee: Customers are assured that problems will not occur because of a failure of workmanship during installation. For example, installing a weatherproof gland on camera connections at installation ensures no moisture seeps into the camera and causes failure.

After a network is designed, and as it evolves over time, new cameras are added, higher resolution is required, and there are other changes that increase demands on the network, and that can be the source of performance concerns. For example, a new camera does not work well if the network bandwidth setting is too low.

The video market has historically expected longer lifecycles compared to those of IT components. In the past, some analogue video systems remained in operation for 15 years or more. In the troubleshooting realm, an IP video system in place for that length of time equates to a network built on first generation deployment or even consumer grade products. Early installations of IP video systems "mirrored" the design of previous analogue systems, without giving sufficient thought to the requirements of putting video on the network.

A network that met requirements five or more years ago likely does not meet today's requirements. Older equipment does not have the features to deliver high availability in a complex environment. Given that many older networks are also shared with other applications outside of video, the requirements and challenges of scalability escalate.

Providing additional information on the VMS

Managed switches provide information at a more detailed level regarding network utilisation, error information and other factors. A managed switch can capture the network's camera output without having to climb a single ladder. Managed switches have the ability, behind the scenes, to measure the performance of a switch and perform analytics. The switch becomes more than a mysterious black box that provides binary information – it works, or it doesn't work. Rather, the switch addresses multiple factors of how the system works.

Information about ALE's managed switches is available through integration with the Milestone XProtect® video management software using a plugin. The OmniSwitch® Milestone Plugin provides an additional level of control and visibility for the video. If an end user is looking at a particular camera and there are quality issues, information about the associated switch is provided in the environment of the VMS.

Using the OmniSwitch Milestone Plugin, the operator has access to additional information about the switch, port and other factors. The operator can reboot the camera and manage the switch right from the VMS with one click. The service assurance solution enables remote troubleshooting of common camera issues directly from the VMS. It allows operations to remotely reset out-of-service cameras and quickly apply resolutions. The plug-in also enables the locking of camera ports to prevent tampering. Tasks can be offloaded to the operations teams, allowing IT to perform more strategic work.

Alcatel-Lucent Enterprise provides Internet of Things (IoT) tools to help manage applications in Operational Technology (OT), including video systems. The goal is to provide tools directly to the operations team so they can leverage the network to solve problems. Leveraging the value of IoT tools in an OT environment facilitates adoption of IT technologies within OT applications.

How integrators take the lead in troubleshooting

When a customer reports an issue, assessing the problem is often a process of elimination. Is there a valid network connection? Can it power up? Can we get in? The analysis starts at the top (in the VMS platform) and extends to the edge devices and then works its way back again. In fact, when there is a problem, it is generally at either the device or server level.

Some 70% of troubleshooting or more can be performed remotely. An integrator creates a remote connection into the device and cycles power to the port. Software and firmware updates can also be performed remotely, thus avoiding the dreaded (and expensive) roll of the truck. Problems that are solved remotely save money for both the customer and the integrator.

Remote monitoring systems have been around for years, and some now use more intelligence to simplify monitoring of an IP video system.

Software enables integrators and end users to be proactive in predicting which component might fail, and to automate firmware updates and patches. The monitoring solutions provide a better experience for end users. They provide dashboards of system health and yield predictive analytics of possible performance degradation. An alert provides notification before a disk fails. Software can "see" if a camera has gone offline for a certain amount of time.

> **"The integrator absolutely should be one throat to choke. It really doesn't matter which component is at fault. That's our job, it's where our expertise kicks in. We work with the network team to deliver a functioning system. I think 100% it must be the integrator who is responsible, top to bottom."**
>
> Aaron H. Simpson, Stone Security

Tools that use more intelligence now can be leveraged to manage system performance. Monitoring can ensure that a system is being used to its complete capabilities – something that is not happening today with many systems, including their proactive approach to troubleshooting.

In case a technician needs to be dispatched to solve a problem, he or she should carry along the right tools for the job, such as a battery pack and a network diagnostic tool, as well as a keyboard, monitor and a mouse to plug into a server on a rack. Technicians who go on site should be equipped to solve at least 99% of issues.

If an integrator does not have access to all parts of the network (for example, the video system connects using the enterprise network), they must first exhaust all their possible problem sources to prove that the issue must be something else on the network.

Impact of support agreements on troubleshooting

The presence (or absence) of service support agreements can impact how troubleshooting efforts unfold. If there is a support agreement in place, it behooves the integrator to ensure the system is robust, which means fewer calls. Integrators therefore tend to be more proactive in their approach when there is a service agreement in place.

The tendency is more to address the root cause rather than going for a temporary "Band-Aid" fix. If a customer has a support agreement in place, the integrator's service level perfectly complements the manufacturer's warranty of any equipment. If something goes wrong, the integrator handles it, including dealing with the manufacturer to replace any equipment.

Given the proactive approach of a service agreement, a system that is five years old should be as up to date as a system in its first year.

The alternative to a support agreement is a "time and materials" arrangement in which the customer pays the integrator for his time and any materials that are not under warranty. This arrangement tends to keep the integrator at arm's length, responding to specific issues but not taking a broader view of system performance. If a root cause is identified, it is up to the customer to decide whether to pay for the additional work.

Manufacturer warranties cover only the equipment. The integrator's time and labour to travel to a site or to swap out a camera become a cost under a "time and materials" arrangement.

Software support agreements also do not account for the time it takes an integrator to install a software update. If an integrator has a support contract in place, they might update the firmware on the entire system at once. If a support agreement is maintained, the system should never go out of date. Systems are evolving entities that can benefit from each new software release. Applying upgrades, patches and fixes ensures that problems do not become an issue, thus avoiding future troubleshooting challenges.

Sometimes delivery on a manufacturer's warranty depends on their relationship with the integrator. A generous honouring of warranties – even if the warranty might have expired by a day or so, for example – helps to encourage future business with an integrator and his or her end user customer. Warranty terms might be impacted by how long a product sat on the shelf at a distributor, for instance.

Whether an integrator provides service under a support agreement or in a "time and materials" arrangement is a consequence of each individual customer's needs and preferences. Some customers are happy to take a more hands-on approach to troubleshooting and eliminate some of the more obvious possible problems before calling in the integrators. In that instance the integrator becomes a tier two or tier three support partner, and a "time and materials" arrangement might be the best choice.

Training to facilitate troubleshooting

Any service call can also be an opportunity to educate a customer to solve a similar problem in the future.

That opportunity will vary by customer, as some are interested in learning more and handling more. Other customers might prefer (and be willing to pay the recurring cost of) a more proactive support agreement approach. Among the benefits of a support agreement is that the integrator provides free training to the end user's staff, which could boost their level of expertise over time and enable less day-to-day involvement of the integrator in troubleshooting. The support level might be decreased a couple of years into a system's life to reflect greater expertise by the end user.

> **"The more educated and competent the customers, the better the experience. There is a direct correlation between customer satisfaction and training."**
>
> Aaron H. Simpson, Stone Security

Although a training portal is provided when a new system is implemented, utilisation of the resource might lag because most people prefer – and benefit from – in-person training and a more customised approach.

Being proactive minimises troubleshooting

Cooperation among involved parties ensures successful troubleshooting. And a good way to minimise the need for troubleshooting is to ensure the quality of the products used in an installation. Stewardship and due diligence are required to deliver a good product and will build confidence in the team of suppliers.

In the end, there are two factors involved in troubleshooting an IP video problem. One is managing the technology, and the other is managing the customer's expectations. Communicating with a technology-oriented stakeholder at the company and using a systematic approach can avoid stress. Technology knowledge can go a long way to diffuse the situation. The customer management aspect of IP troubleshooting is critical, and more art than science.

Learn more about Alcatel-Lucent Enterprise video surveillance solutions.

Alcatel·Lucent Enterprise