WHITE PAPER

Why Monitor Security Storage Hardware

The Ins and Outs of Server Monitoring

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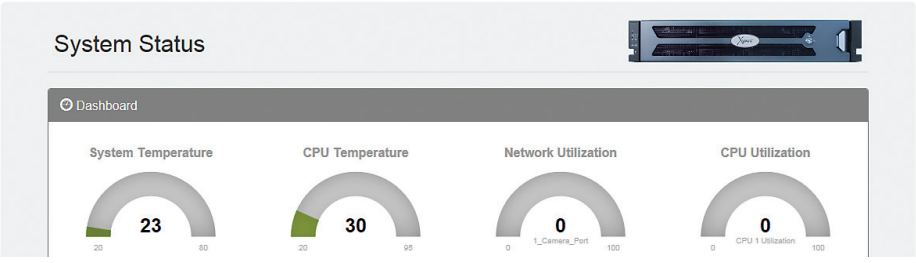
Every day, massive amounts of surveillance video are placed onto storage devices with the expectation that, at some point, some undetermined segment of video will need to be retrieved and viewed, perhaps for the first time. Be it for forensic, audit, or other purpose, the storage system must be capable of delivering the required footage reliably and without error.

Techniques such as RAID and archival storage can help mitigate the risk of data loss. However, for as reliable as electronic storage hardware can be, the fact is that components, hard drives in particular, can and will fail. The nature of enterprise grade hard drives is that they can be expected to fail in the third year of service if they survive infant mortality. Fortunately, there is another layer of defense, based in the telltale signs that failing components often provide…but you must be looking for them.

What is Storage Server Monitoring?

Storage server monitoring involves sensing certain physical parameters in the server hardware, logging those parameters to create a history, and reporting locally or to a remote location. Excessive heat is the most common sign of an impending component problem.

Further, overall system performance issues may be identified, such as hard drive utilization (volume levels), missing device connections, and environmental characteristics.



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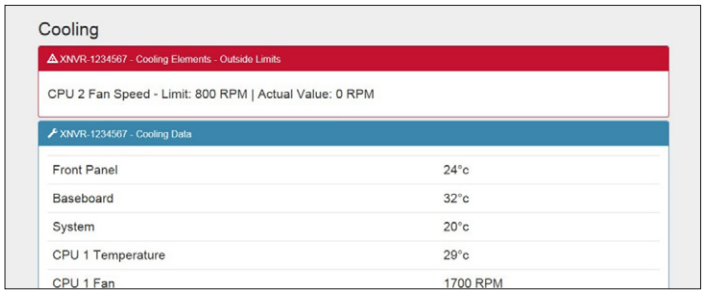
What is monitored?

If the storage server can be visualized as three separate areas – system level, storage components, and network interface – each of these has different identifiable areas which are candidates for supervision. Additionally, since cameras transmit their "payloads" to the server, the server monitoring function can be extended to provide some insight into their status.

SYSTEM LEVEL MONITORING

The key system level components that should be monitored are:

- Processor (for performance and temperature)
- Memory
- Cooling
- Power Supply
- Chassis

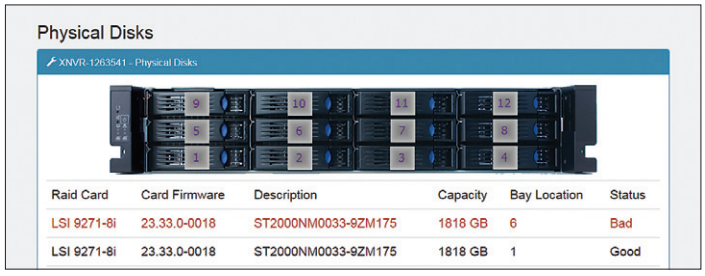


At the component level, embedded sensors in the server provide information on the unit's motherboard and backplane. Inputs are aggregated from the individual HDD's, fan, and power supplies. The system leverages RAID Controller, chassis mid-plane, and an embedded microcontroller on the motherboard, the baseboard management controller (BMC), for system information. The LSI RAID controller talks to the storage array on a lower level, reading temperature sensors on the backplane. Failing DIMM components report to the memory controller. Other sensors built into the server report to the BMC on parameters such as temperature, cooling fan speeds, power status, and operating system (OS) status. Alarms may be generated when pre-set limits are violated. For example, fan performance is tracked by logging rpm's and sending alerts when fan speed exceeds an alarm threshold. Power supply heat and current are indicators of normal vs. problem operation.

STORAGE COMPONENT MONITORING

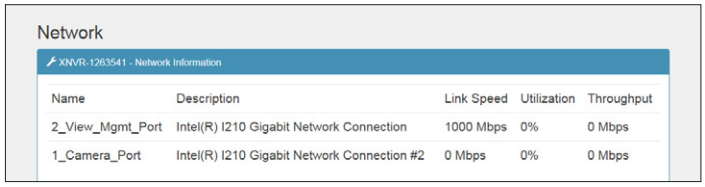
Hard drive monitoring tracks problem conditions such as overheating, bad sectors, or array degradation. The benefits of this are several:

- Identify drive failures and which ones need to be replaced
- Avoid pulling the wrong drive
- Check drive bays are in use
- Monitor system capacity and utilization



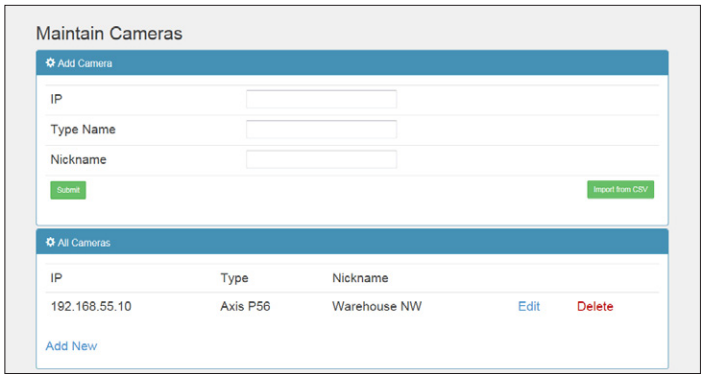
NETWORK INTERFACE MONITORING

Monitoring the performance of Network Interface Cards (NIC's) indicates how much of the network throughput is being used to identify if it will impact performance.



CAMERA CONNECTION MONITORING

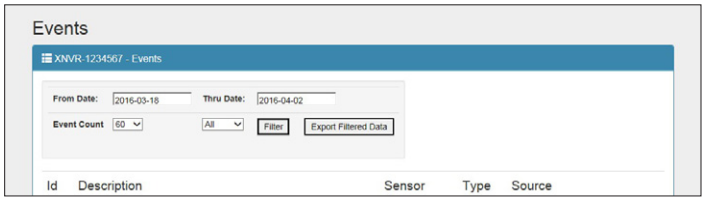
For cameras that are registered with the server, the monitoring software identifies cameras with missing or intermittent connections. It also allows editing of selected camera properties, such as network address and registration of additional cameras.



SYSTEM ADMINISTRATION

Collected inputs are logged and formatted for access through a user dashboard. As a result, the user is presented with a holistic view of his storage environment. Alerts may be set up for e-mail after configuring an SMTP server.

The system maintains an Event log file, which may be filtered, searched by date range and event cause, and exported. The same events are logged into Windows Event Log (WEL) database for redundancy.

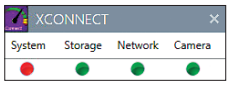


Client Applications

xConnect client is a desktop web based application that allows customers to monitor the key components remotely. The client application provides an unseen advantage of remote monitoring because audio and visual alerts on the storage server may not be heard or seen when units are deployed in a noisy equipment room.

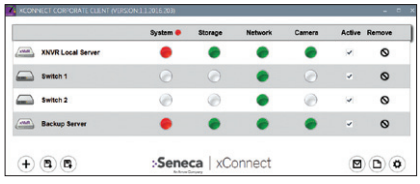
- Accessible through any Windows based device for on-the-go monitoring
- High level status view of system, storage, network and cameras
- Multiple client versions with increasing features

XCONNECT STANDARD CLIENT



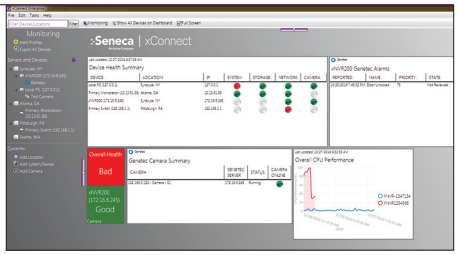
- Single xNVR monitor for status report
- System icon opens xConnect Server Web-UI for more details
- Comprehensive event log for NVR

XCONNECT CORPORATE CLIENT



- Monitor status of multiple xNVRs in one panel
- Simple 3rd party monitoring - monitor any IP device that is accessible from the client (ping)
- Simple e-mail configuration (push e-mail server [SMTP] settings to each XNVR)

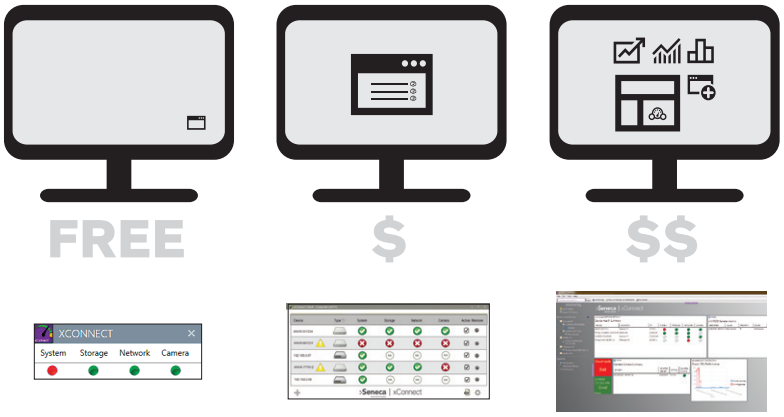
XCONNECT ENTERPRISE CLIENT



- Multi-site, multi-server xNVR monitoring on a single customizable dashboard
- Advanced 3rd party monitoring, with VMS integration - any IP device that is accessible
- Global e-mail notifications with an Alert Profile Wizard and centralized management

BENEFITS

	xConnect Standard Client	xConnect Corporate Client	xConnect Enterprise Client
MSRP	FREE	$649	$2,000
SERVERS	Single Server Monitor	Multi Server Monitor	Advanced Multi-Server
ALERT	e-mail	Simple e-mail	Global e-mail
MONITOR	No 3rd party monitor	Basic 3rd party monitor	Advanced 3rd party monitor
VMS	No VMS Integration	No VMS Integration	Yes
EVENTS	No Event Monitoring	Simple Event Monitoring	Detailed Event Monitoring



More About xConnect

xConnect, a web-based software utility to manage, monitor and report on server health, environmental and performance characteristics, is available via direct connection with the storage server and as a remote client. The remote client is accessible through any Windows-based device and provides a high level status view of the system, storage, network and cameras. Advanced options include multi-server monitoring, email configuration, and third party monitoring.

About Arrow

In August 2014, we joined the Arrow Electronics, Inc. (Arrow) family. Even as our company name has changed, our commitment to innovation, quality and service, remains the same – so much so that the Seneca name lives on through the Seneca brand of products we continue to design and manufacture. We have a demonstrated competency of integrating products and services that result in customized solutions for our customers. From hardware to software and systems, we embed it, connect it and bring it all together through a global network of more than 465 locations serving over 90 countries. A Fortune 150 company with 18,500 employees worldwide, Arrow brings technology solutions to a breadth of markets including: digital signage, digital broadcasting, security and surveillance, telecommunications, information systems, transportation, medical, industrial and consumer electronics. Arrow provides specialized services and expertise across the product lifecycle. Arrow does this by connecting customers to the right technology at the right place at the right time and at the right price. Arrow provides extraordinary value to customers and suppliers – the best technology companies in the world – and connects them through the company's industry leading services.