White Paper

Integrating NVRs into IP Surveillance Systems

VIVOTEK
BUILT WITH RELIABILITY

Contents

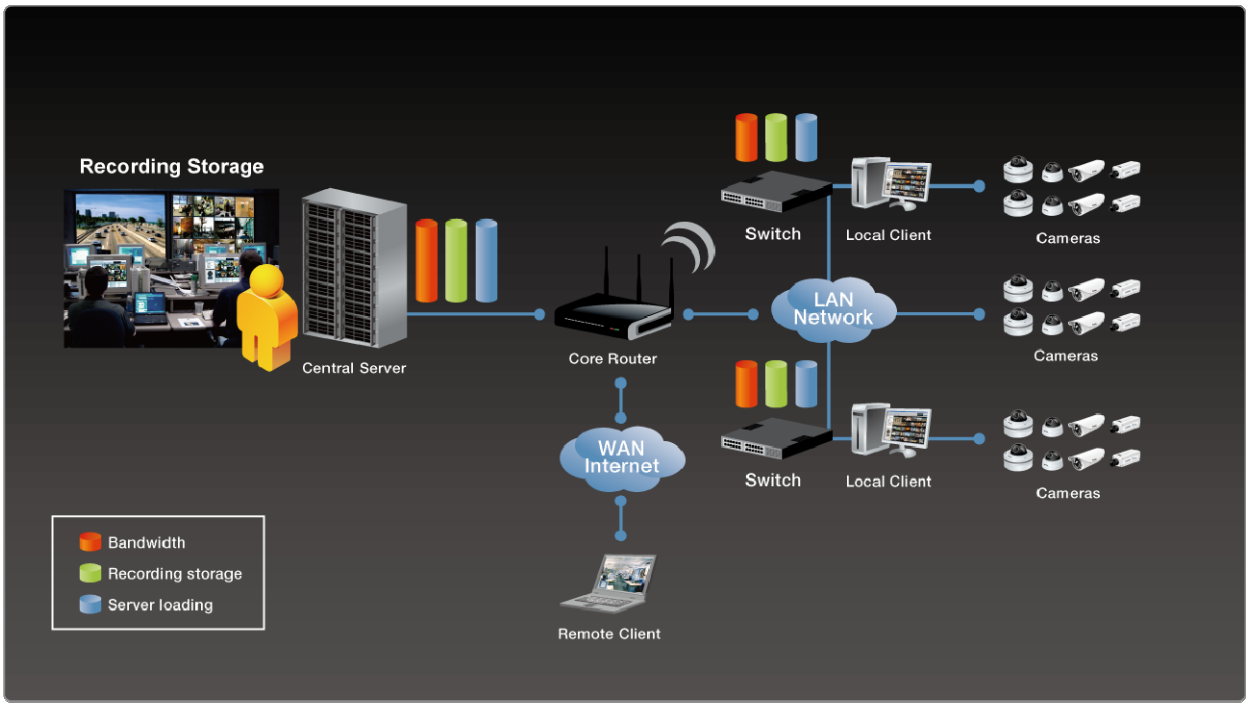
Introduction

Standalone NVRs are an increasingly popular choice among system installers and integrators for IP surveillance projects. Ease of installation, cost effectiveness, and excellent reliability are key factors that are driving their adoption for small- and medium-size sites in particular.

System architectures

IP surveillance installations can be divided into two broad categories based on the system architecture: centralized or distributed.

Centralized system



A centralized system uses a single database and storage server to record video from surveillance cameras. While simple in concept, several issues may arise when using this approach.

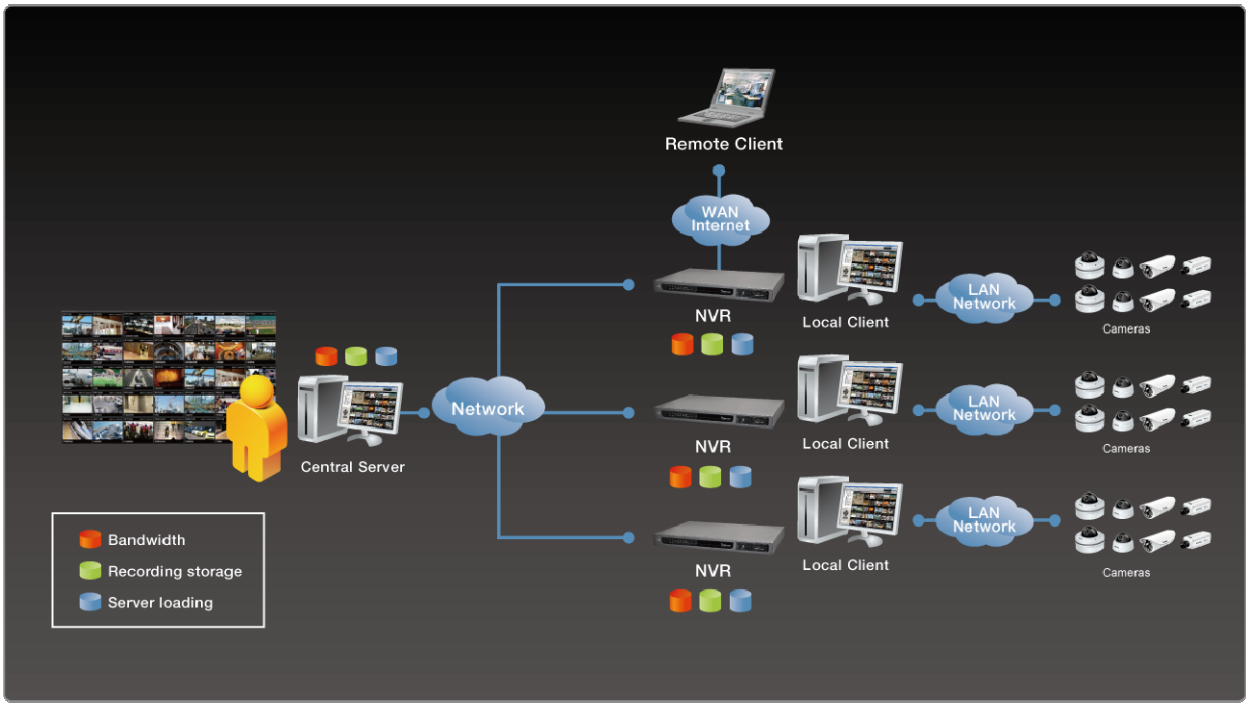
1. **Constrained Network Bandwidth**: Since all video data must be routed to the centralized server, bandwidth on the network must be very carefully managed. If the network is based on Internet communication protocols, the restricted bandwidth will severely impact the quality of the video that can be recorded. Even if the network is closed, the enormous loads created by the transmission of multiple simultaneous video feeds can easily lead to network congestion and reliability problems.

2. **High System Cost**: The central server is the core of a centralized surveillance system, as all users need to maintain a continuous connection. This generally means an expensive high-end server and LAN switches must be purchased, raising the overall cost of network infrastructure.

3. **Lowered Reliability**: If the WAN or core LAN switch fail, not only will users be unable to access the system, but recording will be interrupted.

4. **Lack of Fault Tolerance**: Because all users of the system depend on access to the central server, it represents a single point of failure that can bring down the entire system.

Distributed system



In a distributed system, the installation is segregated into discrete LANs connected to a WAN via a backbone network or the Internet. In many cases, this architecture is necessitated by the fact that the installation is multisite. Each LAN maintains its own recording server to record video from cameras on that LAN. One or more local NVRs at each remote site reduces traffic across the WAN and allows users at these sites to access recordings and alarms even when the WAN is not available.

1. **Reduced Network Loads**: Because the recording data is stored within each LAN, traffic on the backbone network is reduced when users only need to view recorded video.

2. **Cost-effective Solution**: Because the central server and associated equipment are not as critical in a distributed site as in a centralized system, a high-end server and LAN switches are no longer necessary. Different users only need to access the server on their LAN. While local recording servers like NVRs must be purchased, the additional cost is typically more than offset by savings on the central server and LAN switches, especially since standalone NVRs typically integrate functionality such as a LAN/WAN gateway and PoE switch, eliminating the need for dedicated hardware.

3. **Increased Reliability**: The system allows users to access video and network resources even in the event of WAN or core LAN switch failures. In addition, local recording can continue uninterrupted even in the event that the WAN is not available.

4. **Fault Tolerance**: The system as a whole is not put at risk by having a single point of failure, as is the case in a centralized system.

Following is the comparison chart of centralized and distributed system:

Architecture	Centralized System	Distributed System
Recording	Centralized	Distributed or local
Bandwidth	High	Low
Cost	High	Low
Reliability	Mid	High
System risk	High risk	Low risk

Standalone NVRs make a distributed system architecture more attractive

The use of NVRs as local recording servers in distributed-architecture surveillance installations is increasing. The combination of CMS and NVRs reduces overall system costs, both for initial outlays and maintenance, while built-in dual network interface cards make it easier to integrate NVRs into mixed network environments. Moreover, a multi-functional standalone NVR can replace a LAN/WAN gateway, Internet router, and even a PoE switch—which also reduces net power consumption, saving on electricity costs and reducing the environmental burden.

Compared to standalone NVRs, PC-based NVRs are encumbered by more complex hardware, the need to install software and ensure compatibility, and higher maintenance costs. All these factors are persuading system integrators and installers to build distributed-architecture surveillance systems around standalone NVRs for small- and medium-sized organizations.

Case study

Surveillance vendor VIVOTEK recently launched the NR8201 and NR8301 NVRs as recording solutions for the company's network cameras, delivering simultaneous real-time monitoring and recording. Built on an embedded Linux system, the two NVRs offer a secure, stable platform for sites such as factories, offices, schools, and health care institutions.

Network capabilities

Following are the network capabilities of the NR8201 and NR8301:

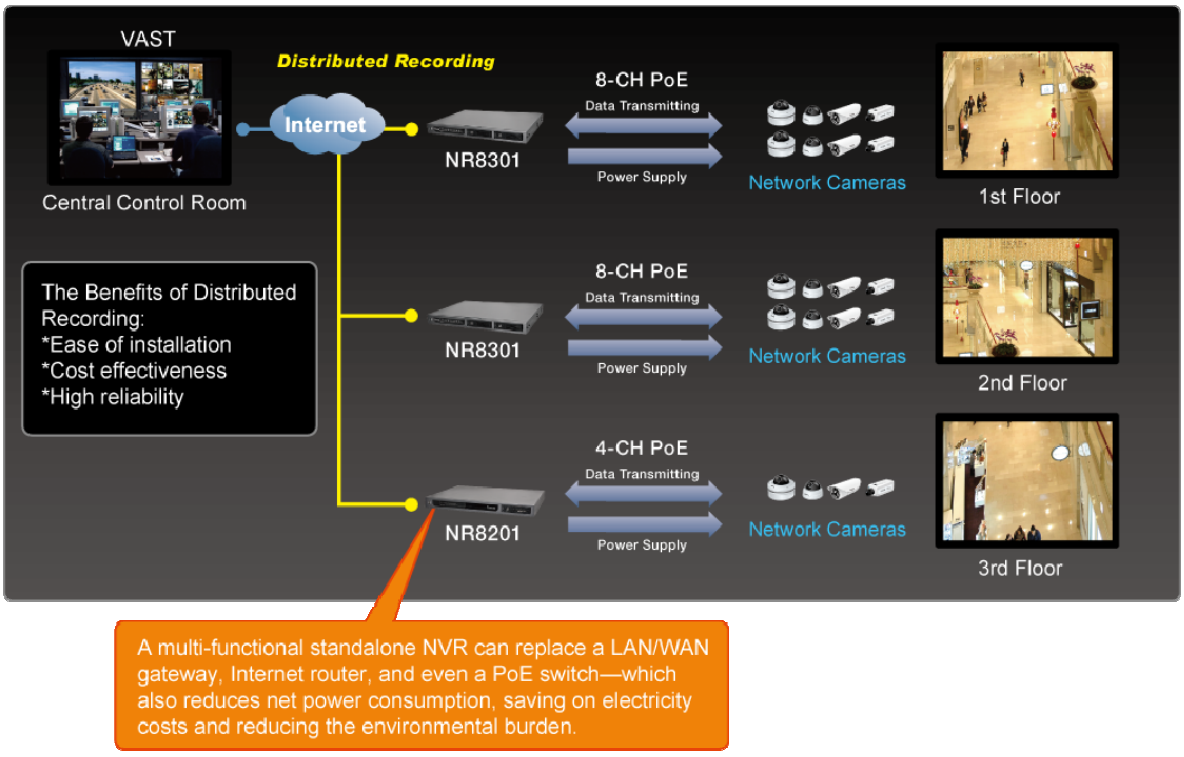
1. Serve as a LAN/WAN gateway
   NR8201: 4 LAN ports (Ethernet 10/100 BaseTX, RJ-45) + 1 WAN port as gateway (10/100/1000 Mbps Gigabit Ethernet, RJ-45)
   NR8301: 8 LAN ports (Ethernet 10/100 BaseTX, RJ-45) + 1 WAN port as gateway (10/100/1000 Mbps Gigabit Ethernet, RJ-45)
   Both NVRs include a DHCP server for assigning IP to cameras and other network devices, while the plug-and-play functionality allows auto-detection of cameras for easy setup and recording.

2. Serve as an Internet router:
   They support PPPoE for direct connections to the Internet and include a DDNS solution for dynamic IP address configuration.

3. Built-in 802.3af-compliant PoE (Power over Ethernet)
   The PoE feature helps reduce cable and adapter clutter, while facilitating simple, flexible installation.
   NR8201 power consumption: 60W (feed DC 12V power supply and data transmission for 4-CH cameras)
   NR8301 power consumption: 120W (feed DC 12V power supply and data transmission for 8-CH cameras)

Compatible with central management software

VIVOTEK's NR8201 and NR8301 are also compatible with the company's VAST central management software, which supports hundreds of channels and multiple stations in a hierarchical system architecture for monitoring, recording, playback, and event trigger management. VAST can be used to manage the NR8201 or NR8301 as sub-stations, as well as to remotely monitor live video and play back archived data from cameras managed by an NVR. Thus, the combination of VAST and the NR8201 or NR8301 is an excellent option for a distributed-architecture surveillance system.



Special features

1. Flexible storage
   Removable and lockable HDD tray, scalable storage
   NR8201: 3.5" SATA I/II HDD x1 (2TB), external eSATA interface for storage expansion, external USB interface for video backup
   NR8301: 3.5" SATA I/II HDD x2 (4TB), supports RAID 0, 1 storage solution, external USB interface for video backup

2. Professional rack mount design (1U)

3. Alert system: 4 DI and 1 DO interfaces for integration with security sensors and alarms

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