NEXCOM
Vision Systems

White Paper

NViS6708: The Next Generation of Surveillance Storage

A 2U Rackmount Workstation NVR with High Storage Capacity and High-Speed Storage

Trend

In the NVR market, users are increasingly demanding more than just high capacity and read/write speeds from their storage devices. Scalability for AI applications is essential. Deep learning mechanisms, such as Motion Detection, Object Detection, Face Detection, and Person Re-identification, have become common NVR features. These AI-powered functions, often enhanced by adding AI accelerators or dedicated graphics cards, improve video analysis performance. Furthermore, accurate, precise, and real-time accelerator solutions are crucial for the correct and rapid storage of data and images after identification or analysis. This data can be used for cloud deployments like data relay storage or video playback relay stations, enabling users to save data in the cloud and access it anywhere, from any device.

The Dual Challenge of High-Capacity and High-Speed Storage

NVRs face a dual storage challenge when processing high-resolution video data (like 4K and above). They require both sufficient storage capacity to handle the massive data and high-efficiency read/write speeds to support real-time analysis and access. Balancing these needs is critical to avoid system bottlenecks, as slow read/write speeds can cause latency or data loss.

The High Cost of Implementing Hardware RAID

Hardware RAID solutions, relying on dedicated RAID controller cards or specialized server-integrated hardware, are costly. This includes not only the high initial purchase price but also potential maintenance. Furthermore, this specialized hardware restricts system flexibility. Upgrades and expansions often require vendor-specific solutions, further increasing costs. Consequently, high-end hardware RAID offers a poor cost-benefit ratio for cost-sensitive applications or SMB projects.

The Challenges of Data Security and Privacy

Secure storage, encryption, and transmission are key challenges when processing identified and analyzed images. This is particularly true in cloud deployments, where systems must comply with regulations like GDPR and regional privacy laws to safeguard user data. Robust security protocols and defenses are also essential to prevent data interception and tampering during transmission.

The Challenges of Multi-Cloud or Hybrid Cloud Deployments

Users expect to access data anytime, anywhere, but multi-cloud and hybrid cloud architectures have become significantly more complex. This includes compatibility issues between different cloud service providers (CSPs) and ensuring cross-platform data consistency. For architects, the biggest challenge is reducing cross-platform latency and operating costs while maintaining a consistent user experience.

The NVR's Need for Real-Time Performance and Data Accuracy

Balancing real-time processing with analytical accuracy is a core challenge. Highly accurate analysis demands efficient software and hardware collaboration. Even under heavy workloads processing massive image data, maintaining stable performance is critical to prevent processing delays that could compromise video surveillance effectiveness.

Energy Efficiency and Thermal Management

The increasing use of performance-enhancing hardware, such as GPUs and AI accelerators, presents a significant challenge in hardware development. These components, while boosting performance, also increase energy consumption and heat generation. Therefore, developers must design solutions that effectively balance high-performance computing with the imperative for reduced energy consumption and efficient heat dissipation.

Solution

14th/13th Gen Intel® Core™ Processor Performance Upgrade for Edge Computing

The NViS 6708 leverages the powerful performance, energy efficiency, and AI integration of 14th/13th Gen Intel® Core™ processors. These processors utilize a new hybrid architecture with up to 8 performance cores and 16 efficiency cores for improved multitasking, processing speed, and energy efficiency. Intel's advancements in computing, energy efficiency, and AI enable handling multiple high-resolution images, meeting the demands of modern surveillance. The processor integrates modules (Tiles) like SoCs, compute cores, graphics cores, and I/O using varied process technologies onto a single chip. A low-power E-Core is added to the SoC module, and the media engine is moved from the graphics module to the SoC. This design allows the computing and graphics modules to be turned off during idle, low load, video playback, or video conferencing for significant energy savings.

Explore the Latest AI Features with Intel® Arc™ GPU

The Intel® Arc™ GPU further enhances the NViS 6708, unlocking AI experiences locally without cloud reliance. Its powerful DP4a instruction set, combined with the Intel Core CPU, accelerates image generation from text prompts and video processing/editing. The Intel® Xe Matrix Extensions (Intel® XMX) boost performance and empower creative workflows, simplifying processes and accelerating tedious tasks. As the world's first graphics processor to support AV1 hardware acceleration encoding, the Intel® Arc™ GPU prepares the NViS 6708 for the future of streaming. AV1 support, including resolutions up to 8K, delivers excellent performance and efficiency, significantly improving video experiences.

JMicron JMB393 Single Chip Provides HW RAID Solution

Powerful processing requires reliable storage, and the JMicron JMB393 chip is designed to meet this need. This high-performance, highly integrated 4-port SATA port multiplier chip supports hardware RAID 5 and 10. Integrating six high-speed I/O ports, a SATA structure, a RAID engine, a microprocessor, SRAM, PROM, and other control logic, the JMB393 leverages JMicron's multi-port Serial ATA PHY technology and storage processor for efficient SATA RAID operation. Hardware-accelerated RAID 5 and 10 provide robust data protection; even with hard drive failure, data can be reconstructed to ensure surveillance data integrity. The JMB393 also improves read/write speeds, reduces system latency, and ensures smooth playback.

AIEH4000/2000 PCIe x16 AI Acceleration Card with Hailo-8 (Optional)

Beyond processing and storage, intelligent analytics are crucial. The SUNIX AIEH4000/2000 AI acceleration card, featuring the high-performance Hailo-8

AI processor, provides an easy-to-deploy solution for AI developers. It reduces CPU load with higher processing power and lower power consumption, achieving low-latency deep learning inference and cost-effective edge AI computing. Offering 52-104 TOPS of computing power, this card handles complex image analysis tasks like face recognition and behavior analysis with very low power consumption. It transforms the NVR system from passive monitoring to an active analysis platform, enabling timely risk detection and comprehensive security. Whether for people flow analysis in smart cities or enhanced security in commercial settings, the AIEH4000/2000 delivers the necessary AI capabilities.

The NViS 6708 achieves its powerful capabilities through the synergistic combination of three key components: the 14th/13th Gen Intel® Core™ processor, the JMicron JMB393 chip, and the SUNIX AIEH4000/2000 AI acceleration card.

Conclusion

The NViS 6708 is designed to meet the evolving demands of the rapidly changing NVR market. Driven by advancements in processing, AI analytics, and storage, modern surveillance requires cutting-edge technology. The NViS 6708 delivers with the 14th Gen Intel® Core™ processor and Intel® Arc™ GPU, providing exceptional computing and robust AI video analytics support. The integrated JMicron JMB393 enhances storage performance for seamless high-resolution video handling. Furthermore, the NViS 6708 incorporates the SUNIX AIEH4000/2000 AI acceleration card for edge computing, enabling low-latency, high-performance deep learning inference for real-time image analysis applications like facial recognition, object detection, and behavioral analysis. Looking forward, NVR systems will see even deeper integration with AI and cloud technologies. This convergence will enable real-time, highly accurate data processing, while prioritizing energy efficiency and data security. These innovations will revolutionize surveillance and transform various aspects of daily life, from smart city management to enhanced security in commercial and residential spaces.