Advanced Digital Security and Surveillance (DSS) Systems Offer Many New Possibilities for Businesses and Government

Video surveillance is playing a more extensive role than ever in everything from manufacturing process improvement and business automation to improving performance in retail and government. Leading the way is a new generation of intelligent, connected DSS systems with advanced video analytics.

The central role of video surveillance remains to protect people and property. Advanced DSS solutions, with real-time video analytics, can recognize objects such as a bag left unattended at an airport, or detect a fire and sound an alarm automatically. Next generation DSS solutions with video analytics and machine vision technology are enabling powerful new use cases which offer critical business value. In retail, for example, these systems can track foot traffic and demographics that lead to real-time reports and heatmaps. In smart homes and buildings, this new DSS technology can help reduce waste in lighting, HVAC, and other systems by tracking occupancy.

Meeting the challenges of achieving new DSS features
Advanced DSS systems offer exciting new capabilities. They also present the challenges of storage demands, design complexity, energy consumption, performance requirements, and transmission costs. Intel is helping DSS visionaries design new, more efficient, and more capable systems that address these concerns with a new series of compact, low-power processors that offer exceptional compute-per-watt, and integrated image and graphics processing. What’s more, Intel offers application developers an interoperable architecture that simplifies solutions, and software tools to speed the design and development of powerful, new DSS systems that can perform advanced computer vision tasks.

Object Identification can improve security by alerting personnel to potential hazards.

Facial Recognition in retail delivers real-time demographics to improve business strategy.

Machine Vision enables manufacturing machines to perform automated product inspection and quality control.

Moving Object Tracking can be used to detect traffic patterns, leading to improved infrastructure planning.

Intel is Unlocking Possibilities for Digital Security and Surveillance

Computer vision is the next wave in business intelligence. Intel is helping businesses overcome the challenges and reap the benefits of DSS.

In 2016 alone, the total raw capacity of enterprise DSS storage will increase by 48%.

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New Processors for the New DSS

Intel is investing its expertise in Internet of Things (IoT) technology and processors to address the challenges arising from the evolution of DSS systems, while opening the way for the design and development of systems with greater intelligence. The latest Intel® Atom™ processor E3900 series, Intel® Pentium® processor N4200, and Intel® Celeron® processor N3350 offer powerful integrated graphics and exceptional compute per watt in a compact, low-power package.

**Powerful integrated graphics technology**

These new Intel Atom, Celeron, and Pentium processors feature integrated graphics capable of supporting advanced DSS systems. They eliminate the need for discrete GPUs in Network Video Recorders (NVR) and video gateways, and make possible more intelligent IP and smart cameras that provide higher definition imagery. They enable the capture of video up to 4Kp30, slow motion video at 1080p120, and 13MP stills even while capturing 1080p video. Just one of these processors can support three independent displays at 4K Ultra HD resolution for simple monitor setups that offer higher definition. They also offer powerful video analytics capabilities and the ability to handle 15 simultaneous 1080p30 decode streams.

**More compute in a compact, low-power package**

Built into a compact flip chip ball grid array (FCBGA) and featuring 14 nm silicon technology, these new Intel Atom, Celeron, and Pentium processors are equipped to handle the challenging processor loads generated by encoding and decoding high-resolution video feeds and real-time video analytics. They offer up to 2.5 GHz of processing power and up to 8 GB of memory (specifications vary by SKU). The small packaging and low power draw of these processors can also enable the creation DSS solutions in demanding environments, such as inside manufacturing machines. They also enable smarter cameras and mobile NVR for more flexible DSS solutions with higher levels of distributed intelligence. Placing more compute power at the edge enables real-time analytics that can help reduce storage and transmission demands. Instead of transmitting video to a data center and waiting for instructions to be transmitted back, a smart camera or video gateway featuring the Intel Atom can perform analytics before the video needs to be stored or transmitted.

**A comprehensive, powerful tool for video applications**

DSS developers can dramatically reduce time to market while developing DSS applications by leveraging the Intel® Media Server Studio 2017. It simplifies development of media applications by offering state-of-the-art components and features for tailoring visual quality versus performance. This software enables efficient, hardware-accelerated video transcoding and real-time 4K HEVC@60fps encoding. It also supports a number of hardware-accelerated video codecs, including HEVC, H.264, VP9, and JPEG.

**SDKs to speed more capable DSS solutions**

Intel Computer Vision SDK is a powerful framework for the design of computer vision applications. From algorithm development to platform product optimization, it allows for the development of advanced DSS capabilities such as facial recognition, object detection, and scene analytics. It allows developers to choose from a variety of optimized building blocks.

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**Figure 1. Intel can provide compute power for an end-to-end DSS system**
blocks, or to create custom kernels. Intel also provides the Intel® SDK for OpenCL®, which enables developers to build, debug, and analyze their applications in less time.

**Scalable, interoperable end-to-end architecture**

Intel is the only silicon provider that can take a DSS system from camera to cloud. Developers can save time and resources by optimizing DSS applications once, and then deploying across SKUs, from Intel Atom-powered smart cameras to Intel® Xeon® processor-based network servers and end-user desktops running on Intel® Core™ processors—even Intel-powered mobile devices. Not only do these advantages in interoperability create development efficiencies, but they can lead to improved stability for improved long-term value and reduced total cost of ownership. Intel compute also offers the scalability and processing headroom to provide design flexibility, and allow for future advancements in DSS technology.

**Hardware-level security and enhanced reliability**

Video feeds, stored footage and video analytics are critical assets that need to be protected with robust security. The new Intel Atom, Celeron, and Pentium processors can help reduce vulnerabilities by offering advanced protection at the hardware level. They feature the integral Intel® Security Engine, a dedicated security coprocessor that dynamically adapts the security level to function criticality. They also offer secure boot and fast cryptographic execution with Intel® AES New Instructions (Intel® AES-NI). And with the new Intel® Trusted Execution Engine (Intel® TXE), select data can be kept away from hackers, even if the OS is compromised. These new processors also offer a seven-year lifetime and SKUs with a junction temperature rating of -40°C to 110°C for use in industrial environments, and other demanding applications.

**More versatile connectivity**

These new versions of the Intel Atom, Pentium, and Celeron processors help make designing DSS solutions easier by allowing more complex configurations while requiring fewer external hubs thanks to an expanded number of I/Os, including six USB 3.0 and four PCIe* Gen 2.0 ports (6 lanes), allowing for ultrahigh data transfer rates with a greatly expanded number of peripherals. They also offer advanced connectivity options that include 10/100/1000 Mbps self-adaptive Ethernet interfaces.

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Intel Is Addressing the Challenges of Next-Generation DSS Solutions

Computer vision and video analytics capabilities such as object recognition, face detection, video tracking, event detection, and machine vision can do everything from helping to secure facilities and increasing the quality of products leaving a factory to improving a retailer’s marketing strategies. The latest Intel Atom, Celeron, and Pentium processors will not only have the processing power to perform these tasks, but will be able to accomplish them with greater efficiency. They also add the support of Intel® end-to-end architecture, making DSS systems simpler to develop while taking advantage of the latest cloud storage technology and enterprise-level analytics tools. The efficiency and integrated graphics capabilities of these processors can also reduce the complexity, power consumption, and footprint of NVR and smart cameras while increasing their intelligence. What’s more, edge analytics capabilities, combined with better responsiveness and high resolution displays, will make the job of on-site staff easier, while making their efforts more effective.