SOLUTION BRIEF

# Video Analytics at the Edge


## Enabling Next-Generation Distributed Video Analytics

When it comes to Digital Security and Surveillance (DSS) systems and video analytics services, the sooner critical information reaches the user or back-end systems, the more valuable the edge systems and data become. Today's sensing, processing, storage, and connectivity technologies, available in high-density, low-power packages, enable the next step in distributed video analytics, where each camera itself is a server. New IP cameras and camera technologies coupled with microserver-like compute, storage, and I/O resources, plus sophisticated software are able to form very robust, highly scalable edge analytics for surveillance and security, parking, toll management, retail footfall, and other real-time analytics where the monitoring takes place.

Video analytics at the edge minimizes video processing in the back end, which simplifies balancing the entire system from the edge to the data center. Edge analytics also enables easier and faster scaling to accommodate more points of video capture and analysis.

By doing the analytics at the edge with capable hardware, such as good-quality MIPI-CSI sensors (mipi.org/specifications/camera-interface), and software, companies can acquire higher quality, uncompressed video streams at the camera without detrimental compression artifact that can creep in downstream. Plus, with analytics right at the sensor, companies have the option of passing only the results as meta data, saving potentially expensive bandwidth and accelerating the analytics and data searches in the back end. For example, by offloading face recognition and signature generation to the camera and sending only the signature, database searches on the face data can speed up significantly.

This edge-based approach, with high-capacity SSDs for fast, local storage, also allows uninterrupted monitoring should the connection to the data center go down. And local processing of sophisticated video analysis (VA) algorithms means instant actionable intelligence concerning your protection objectives is readily available.

## From the Edge to the Cloud

With video analytics at the edge, cloud customers can implement different use cases with local image processing that sends only metadata instead of video streams back to the cloud data center. For example, such implementations might be valuable for Smart Parking camera systems that process the video locally using OpenCV* (opencv.org) and send only the available parking slot information to the cloud data center. Such a model efficiently utilizes limited and metered 3G/LTE networks.

## Powerful Media Processing and Analytics Support

The Intel® Atom™ processor E3800 series, with up to four cores and supporting hardware-enhanced Intel® technologies, delivers the compute and I/O capabilities that video analytics at the edge demand. This processor series integrates Intel® Quick Sync Video, a hardware-based video transcode

engine that includes the H.264/AVC codec. With Kraftway* (www.kraftway.ru/en) video software designed using Intel® Media Server Studio, platforms based on the Intel Atom processor E3800 series can encode up to three 1080p60 streams at different bit rates with close to zero CPU load.[1]

Intel Atom processor cores implement the same x86 Streaming SIMD Extensions (SSE) 4.2 instruction set as Intel® Core™ processor and Intel® Xeon® processor families. Thus, developers can directly port existing VA algorithms from server-centric solutions to Intel Atom processor E3800 series-based intelligent camera heads and leverage the processing power of multiple cores. And, with MIPI-CSI-compatible cameras systems can take advantage of a CPU-supported image quality pipeline that utilizes Image Signal Processing (ISP) statistics and allows customers to balance between image quality and CPU load to optimize the solution to their particular video requirements.

## Strong Protection for Platforms and Video Data

Intelligent IP camera heads connected to the network can be vulnerable to attack without adequate security support. Intel Atom processor E3800 series integrates Intel® Advanced Encryption Standard New Instructions (Intel® AES-NI) encryption/decryption hardware engine, enabling very fast processing of today's advanced algorithms. Developers can choose different schemes to protect data in transit without concern for burdening the processor resources.

Platforms with these Intel® processors can also be protected against BIOS tampering when designed with UEFI Secure Boot support.

Many intelligent IP camera heads are designed with remote manageability, utilizing a proprietary management agent to update software and recover from operating system failures.

## Rich Support for Quick, Innovative Solution Designs

The video design community is endowed with rich support for innovative designs. Some resources include the following:

- Kraftway (www.kraftway.ru/en) provides sophisticated video software for surveillance and analytics.
- Complete solutions are available from Kedacom* (www.kedacom.com/en).
- Intel Media Server Studio provides software development tools and libraries needed to develop, debug, and deploy enterprise grade media solutions on Intel® technologies.
- The open source Mediapipe Framework (sourceforge.net/projects/mediapipe/) is a flexible framework to manipulate media streams. It allows building customized decoding/filtering/encoding pipelines.
- Open source Linux* software cuts license costs for IP camera deployments.
- The LibXcam framework (github.com/01org/libxcam/wiki), shared by Intel under an Apache* license, adds flexibility to designs and allows customers to add their own proprietary CPU-executed filters.
- Linux also provides access to a wide set of Linux network solutions (local servers, network security, etc.).

Using existing frameworks, available open source software, and rich video hardware and software available in the ecosystem, designers have access to repeatable building blocks for fast time-to-market of innovative video analytics solutions at the edge of the network.

## Local Storage Maintains Video Streams During Outages

Dual SATA2 ports built into the processor allow local recording and buffering of video streams onto terabyte Solid State Drives (SSDs), protecting against server-side or network failures. Solutions built with Intel® SSD Pro Series can include full-disk encryption, protecting recorded video streams against attack and alteration.

## For more information on video analytics at the edge of the network visit these sites:

**Intel**

www.intel.com/content/www/us/en/intelligent-systems/digital-surveillance/digital-surveillance-intel-dss-enhances-video-security-solutions.html

www.intel.com/content/www/us/en/internet-of-things/videos/iot-intel-surveillance-video.html

**Kraftway**

www.kraftway.ru/en

[1] Measured by Kraftway. Intel® Atom™ processor E3800 series can encode up to three 1080p60 streams at different bit rates with close to zero CPU load.


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