

PRODUCT BRIEF

Intel® Vision Products
Smart Cities IoT Solutions

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AAEON Atlas* Edge Computing Enable Consolidation of Smart Cities Data to Enhance Safety and Efficiency

Increase security, support emergency and law enforcement agencies, and enhance efficiencies with the **AAEON Atlas*** edge node, powered by Intel® Vision Products

Executive summary

The Internet of Things (IoT) can transform the way municipalities manage cities while delivering enormous savings—in both day-to-day operation and infrastructure costs. Smart video, environmental monitoring, and smart lighting capabilities bring exciting new services to the smart city here and now. Not only can these capabilities provide enhanced safety in shopping areas, streets, and neighborhoods, they can also make urban life more enjoyable in practical, convenient ways.

AAEON Atlas*, powered by Intel Vision Products, is a powerful edge node that consolidates data streams from smart lighting, environmental monitoring, and video sensors. Atlas works at the edge to allow city administrators to create a connected data hub that enables numerous new applications. For example, when the Atlas edge node is deployed in conjunction with a camera, network video recorder (NVR), and management system, it can power a citywide parking application. Car drivers can park on city streets without having to fish for change or pay at a meter—nearby smart cameras on streetlights can capture and classify images such as license plates using computer vision and charge the owner directly for the exact parking time via a gateway and cloud-based management system connected to a department of motor vehicles database.

AAEON Atlas can be added onto existing infrastructure, such as street and traffic lights. The node streamlines multiple overlapping efforts by city agencies and saves on costs (see Figure 1) by helping agencies consolidate their data and application. Atlas includes outdoor smart lighting control for streetlight systems and environmental monitoring using multiple gas sensors. The edge node can be used to monitor traffic flow, parking availability, pedestrian crossings, seismic activity, trash receptacle overflow, and even atmospheric changes in addition to numerous other use cases. With these capabilities, the AAEON Atlas edge node helps smart cities improve operational efficiency, increase citizen satisfaction, and decrease costs.



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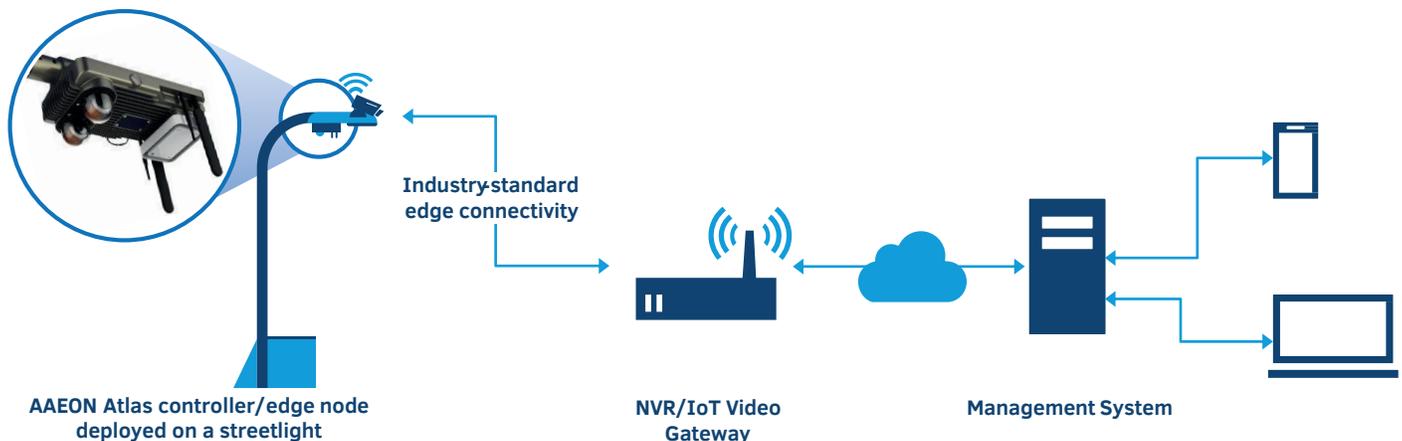
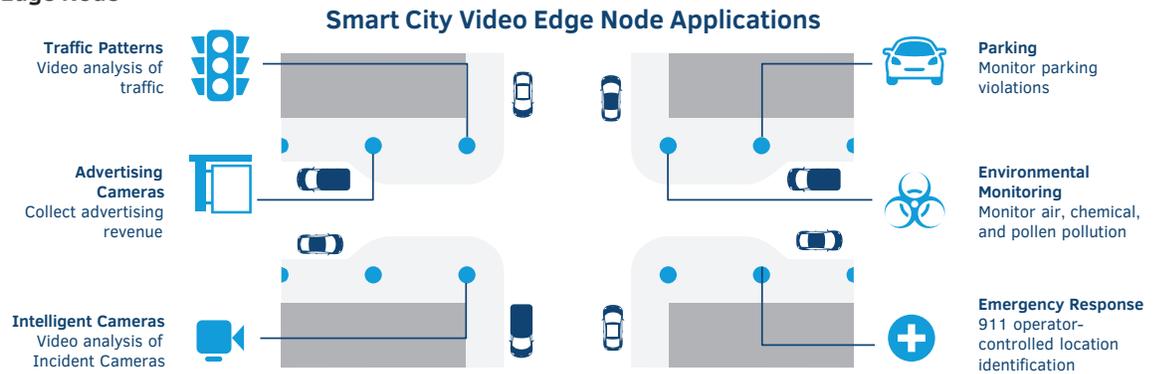


Figure 1. AAEON Atlas shown in conjunction with camera, NVR, and management system powered by Intel® Vision Products

Figure 2. The benefits of smart video, lighting, and environmental monitoring can lead to improved safety, better city services, and new revenue opportunities



How it works

The AAEON Atlas* edge node can pair with smart cameras that are deployed on existing streetlights and fixtures that capture video and images. Captured images are processed and forked into two branches—one for onboard analysis by the Intel® Movidius™ Myriad™ X vision processing unit (VPU), the other for storage and later retrieval if required. The IP66-rated ruggedized design helps ensure long-lasting durability in all climates.

The AAEON Atlas* edge node connects to an integrated edge gateway gathers and ingests data from multiple sensors and analyzes this data using edge computing. This includes the video capture from cameras, but can also include data from a variety of other sensors including lighting controllers, environmental monitoring sensors, and audio sensors. The gateway is built on the AAEON NANOCOM-APL*, powered by an Intel® Atom™ x7 processor. The gateway’s onboard 512 GB SSD provides NVR support and 15 hours of storage for 3840x2160 resolution (or longer for 1920 x 1080 resolution).

Captured data retrieval can be achieved by streaming via an LTE or Ethernet interface, and images are backhauled to a cloud for deeper analysis and remote monitoring and control. The solution includes connectivity features via WIFI, Gigabit Ethernet, and 4G/LTE. Users can easily monitor the status of the entire system with the management app using an intuitive dashboard. The web-based interface allows authorized users to access applications that alert them to

use-case-specific actions.

To meet the requirements of any smart city application, neural networks based on Intel® Distribution of OpenVINO™ toolkit enable users to customize the solution leveraging different AI and deep learning algorithms. The Intel® Distribution of OpenVINO™ toolkit provides further flexibility, enabling users to convert trained AI models to run on any Intel-based solution across smart city use cases.

Key capabilities and uses

The AAEON Atlas edge node can be used in any outdoor application, including intersections, parking lots, recreational parks and sports fields, shopping malls and shopping districts, airports, office parks, and college campuses, for numerous use cases, including:

- Pedestrian detection and crowd/pedestrian flow monitoring
- Alerts for overflowing trash receptacles, water-main breaks
- Automated parking, including fee collection
- Crime prevention: license plate/vehicle recognition, crowd monitoring, accident detection, safety violation detection
- Traffic congestion monitoring and real-time signal optimization
- Vehicle detection and classification

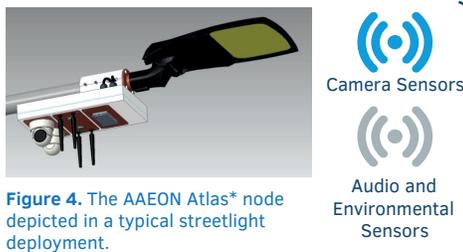


Figure 4. The AAEON Atlas* node depicted in a typical streetlight deployment.

Solution Benefits

Increased safety and citizen satisfaction. Adding an edge node for data consolidation contributes to more livable cities by helping to enhance safety and reduce congestion, improve traffic and parking, and increase convenience.

Analytics at the edge or in the cloud. Mission-critical, low-latency data can be analyzed at the edge to allow city agencies to make quick decisions. Algorithms developed using the Intel® Distribution of OpenVINO™ toolkit can classify images into predefined categories.

Reduced energy and operational costs. Without the need for infrastructure replacement or hardware overhaul, the Intel Distribution of OpenVINO toolkit allows smart cities to leverage computer vision and deep learning capabilities on existing edge devices.

Intel® Movidius™ Myriad™ X VPUs are capable of operating on customizable complex networks and network layers with high compute and ultra-low power consumption, resulting in industry-leading performance and costs.

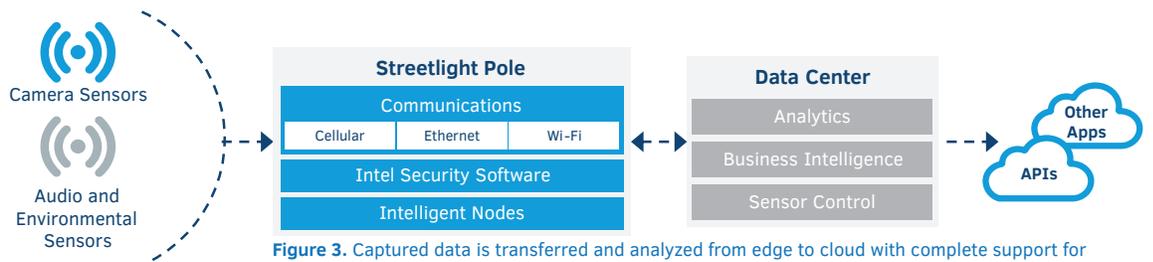


Figure 3. Captured data is transferred and analyzed from edge to cloud with complete support for scalability and back-end security. Through the open architecture design, developers can work with cities to create new solutions that utilize the data.

Increased revenue opportunities. Smart video and edge node capabilities can provide new revenue opportunities and added capabilities through Intel’s vast developer community and powerful processing capabilities. Cities can decide how to engage users of captured video and other data, then define the revenue opportunities that the data generates.

Enhanced management through IoT. With an IoT network, cities can create a smart city platform for centralized command and control operation across multiple agencies.

Multilevel end-to-end security. The Intel technology-based solution provides end-to-end protection across the entire IoT platform. Hardware- and software-fortified security creates a chain of trust, from edge to network to cloud. This solution is designed to enable IoT networks to identify and secure communications, safeguarding all data against theft and tampering. Only trusted data is analyzed, allowing cities to prevent, detect, and correct attacks.