

Solution Brief

Intelligent Transportation
Artificial Intelligence



Improving Public Safety and Traffic Management with 7StarLake's Smart Traffic Solution

The 7StarLake solution, powered by Intel® Processors and the Intel® Distribution of OpenVINO™ toolkit, helps cities improve public safety and reduce traffic congestion through data-driven insights that improve decision-making for urban management



About 7StarLake

7StarLake helps partners enhance operational efficiencies with AI-enabled infrastructures. Their top specialists support clients by putting innovation into practice to reach production goals. 7StarLake solutions are among the broadest to serve multidisciplinary tasks for transportation, warehousing, and government markets.

Managing Public Safety and Traffic Congestion in the Face of Urbanization

Urbanization is nothing new, and nearly every major city is reaching population density levels that are creating pressing traffic and public safety issues for city officials. According to Taiwan's Ministry of Transportation and Communications, traffic-related accidents claim an average of eight lives per day throughout metropolitan areas of Taiwan.¹ Intersections are an especially problematic area that are responsible for 58% of fatal crashes due to congestion, driver confusion, and failure to yield to traffic signals.²

Due to this and other safety-related concerns, city officials are looking for more efficient ways to analyze and manage vehicle and traffic patterns, but they lack knowledge of how to leverage critical advanced technologies, such as 5G, AI, and IoT.

Intelligent Traffic Systems (ITS) offer a packaged solution to the challenge city officials face of improving public safety with effective traffic and pedestrian congestion management. At the forefront of the ITS market is the 7StarLake 5G C-V2X Smart Traffic solution – a traffic and safety management system created in collaboration between Intel and 7StarLake to enable real-time analysis and address key challenges.

The 7StarLake Smart Traffic Solution

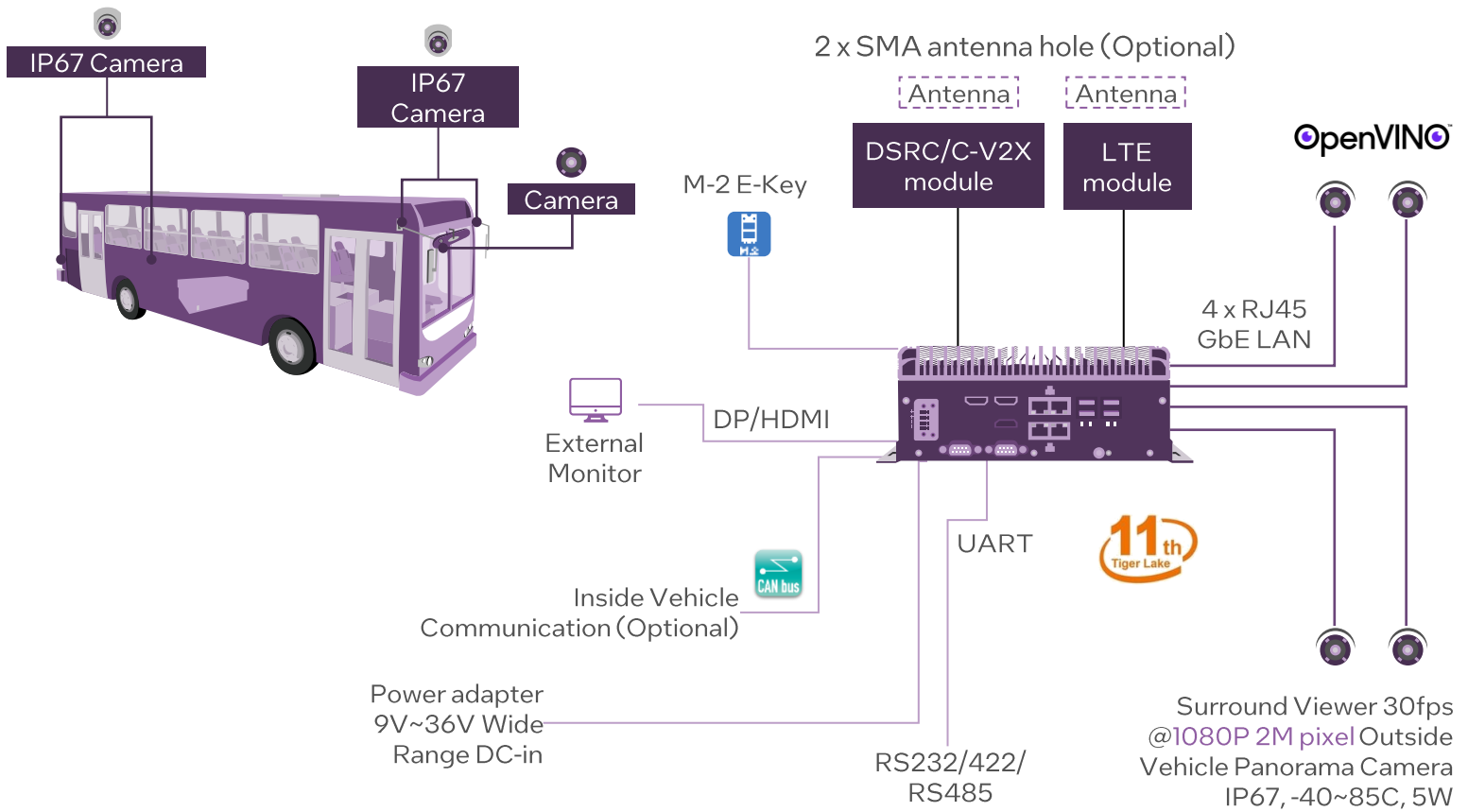
With a combination of cutting-edge AI algorithms and IoT technology, the 7StarLake 5G C-V2X Smart Traffic solution monitors pedestrian and vehicle incidents to expedite emergency responses with real-time road safety alerts and traffic pattern recognition for preventative incident planning.

The solution first gathers data from IoT sensors—such as vehicle cameras, GPS, and Inertial Measurement Units (IMU)—to track environment activity. Key situational data is then transferred from the edge PC to the cloud.

Once in the cloud, the 7StarLake solution analyzes aggregated data to display useful and actionable insights that further inform future business and management decisions.

The 7StarLake 5G C-V2X Smart Traffic solution can aid city officials in efficiently managing traffic, parking, and pedestrian safety in the following ways:

- **Identify:** Uses sensor-fusion technology and AI to gather and analyze data, including license plates, red-light runners, jaywalking, bus stops and eligible parking zones.
- **Monitor:** Tracks drivers' behavior, in-vehicle conditions, pedestrian movement, and traffic flow, and automatically calculates safe distances between vehicles and other objects on the road for incident mitigation.
- **Improve:** Collects sensor data and leverages an AI algorithm to uncover real-time performance insights from large data sets, population density, and heat maps of behavior, displayed on the 7StarLake dashboard to help manage decisions.



7StarLake Smart Traffic Stands Out from the Competition

Traditional traffic monitoring systems on the market require a fixed position installation, and after the devices are set up and connected to the host, the position or angle of device cannot be altered. This limitation creates cost and functionality barriers for city officials that negatively impact government agencies and public citizens alike.

To transform traffic monitoring and reduce the cost of installation, the 7StarLake Smart Traffic System integrates with multiple on-device sensors, including cameras and IoT sensors, to gather all traffic-related data. Gathered data is transferred through 4G/5G to Edge devices which leverage AI algorithms to conduct object identification, image identification, semantic segmentation, and instance segmentation. In the end, all the data is transferred to the Cloud enabling public officials to monitor vehicle, traffic, and pedestrian flow, as well as city infrastructure in real-time.

7StarLake Key Customer Benefits



Enhance public safety by monitoring pedestrian and vehicle incidents to expedite emergency responses



Gain real time visibility and insights that identify, learn, and predict traffic patterns through AI + IoT connectivity with vehicle sensors that utilize 5G and cutting-edge algorithms



Improve road infrastructures by tracking traffic signs, collecting real-time heat map information, and obstacle detection tools to adapt roadway signals



Optimize traffic flow by reducing congestion and improving parking management efficiency

Intel® Technology Perfectly Complements 7StarLake's Smart Traffic System Identification Software

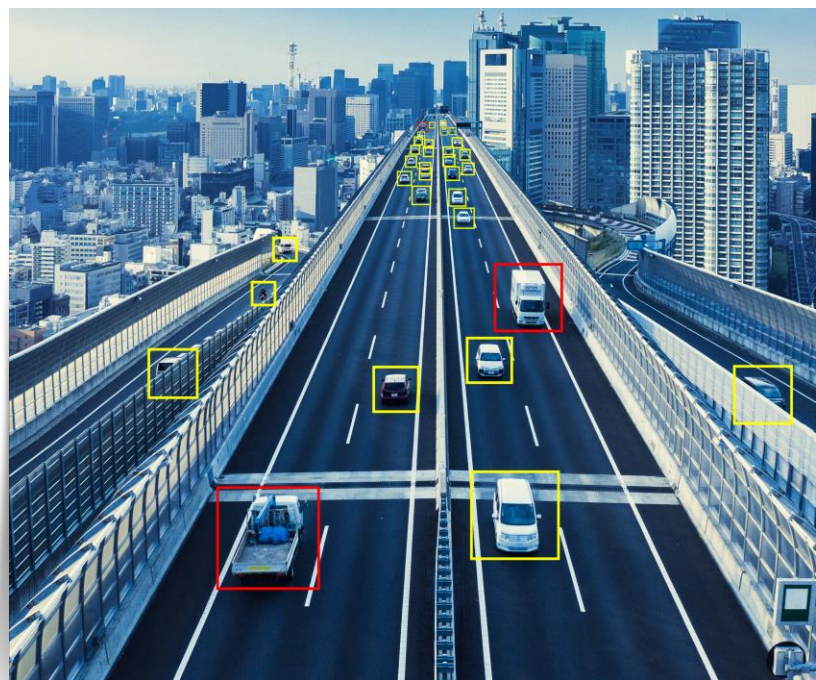
7StarLake's 5G C-V2X Smart Traffic Solution leverages Intel® Technology that enables the solution to maximize performance and scalability for intensive workloads

Intel® Core™ Processors: Intel's highest-performance CPUs for laptops and desktops, Intel® Core™ Processors deliver advanced responsiveness, connectivity, and graphics performance. For 7StarLake 5G C-V2X Smart Traffic Solution, all the data collected from sensors is sent back to PER360-X11, which is the Edge AI device built on Intel® Core™.

Intel® Distribution of OpenVINO™ Toolkit: The high-performance, deep learning inference toolkit provides a full suite of development and deployment tools. The toolkit offers deep-learning models, device portability, and higher inferencing capabilities to offer minimal disruption and maximum performance and enables developers to quickly build, optimize, and scale AI-based computer vision models. This makes it easier to convert modules to take advantage of existing Intel processor architectures. By optimizing their solution with the OpenVINO™ Toolkit, 7StarLake was able to improve the accuracy and speed of their visual recognition processing abilities.

Intel® DevCloud: Designed with the ability to optimize solutions for Edge devices, Intel® DevCloud was used to test workloads and design the prototype of the 7StarLake AI model, making it is easy for rapid deployment on Intel hardware.

Intel® Xeon® Processors: These processors are built specifically for the flexibility to run complex AI workloads on the same hardware as existing workloads. With AI acceleration and optimization that goes silicon deep and ecosystem wide, Intel® Xeon® Scalable processors take embedded AI performance to the next level with Intel® Deep Learning Boost to increase model optimization by up to five times when compared to non-optimized models running on other CPU instruction sets. After implementing the AI algorithms, the Smart Traffic Solution sends all data to the Cloud Inference Server that is found on the Intel® dual socket Xeon® servers, where it categorizes and analyzes all data.




Customer Success Story: A City Bus Service in Southern Taiwan Turns to 7StarLake to Help Them Implement Situational Monitoring

Challenge: A city bus service in Southern Taiwan needed a better way to monitor pedestrians and vehicles during transit to preserve passenger safety and mitigate potential accidents caused by human error. Lawsuits related to transit passengers falling due to sudden stops are a common occurrence, and it is difficult for bus service companies to clarify responsibility. Reckless driving behavior and illegal parking in bus zones contribute to transit services constantly needing to avoid obstacles that threaten passenger and pedestrian safety.

Solution: In collaboration with 7StarLake, the city bus service installed the 5G C-V2X Smart Traffic solution to track traffic signs, collect real-time heat-map information, and detect obstacles on the road. The solution combined several cameras and sensors connected with IoT technology to help bus service companies recreate real-time in-vehicle situations as a means to clarify the cause behind accidents and mitigate lawsuits.

Result: After implementing the 7StarLake 5G C-V2X Smart Traffic solution, the city bus service was able to increase public and passenger safety, as well as make more informed decisions when navigating traffic. This resulted in a significant decrease in passenger lawsuits and a considerable reduction in traffic accidents related to road congestion and obstacles near bus parking zones.



After installing 7StarLake's 5G C-V2X Smart Traffic solution, complaints about falling events among standing passengers drastically dropped, and illegal parking was significantly decreased

– Public Transit Organization in Southern Taiwan



In Summary

City officials in charge of public safety in metropolitan areas need ways to overcome the challenges that arise from an ever-increasing population density. 7StarLake is enabling city officials to bridge the gap and solve for issues such as traffic congestion, pedestrian safety, fatal accidents, and parking management. The highly accurate, real-time recognition capabilities of this solution generate actionable insights for data-driven decision making, help increase public safety through accident prevention, and improve parking management efficiency.



Learn More

To learn more about the 5G C-V2X Smart Traffic Solution visit:

- [7StarLake Website](#)
- [AI Infrastructure For Autonomous Driving Video](#)

To learn about Intel® technologies visit:

- [Intel® DevCloud Product Page](#)
- [Intel® Core™ Processors Product Page](#)
- [Intel® Xeon® Scalable Processors Product Page](#)
- [Intel® Distribution of OpenVINO™ Toolkit Product Page](#)

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Sources:

¹[Traffic Accidents Claimed Eight Lives a Day Last Year](#), Taipei Times, 2021, Center for Disease Control and Prevention, 2021

²[Daoan Information Inquiry Network](#), Taiwanese Ministry of Transportation and Communications, 2020

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