premio

›» Case Study

A Smarter Route: Driving Better Transportation with Rugged Edge Computing

How a leading ITS company partnered with Premio to leverage powerful industrial computing solutions to fuel tolling innovation and ramp systems production

The Challenge

- Managing multiple vendors, hardware solutions, and configurations proved problematic
- Supply chain issues caused delays, resulting in extended timelines and missed deadlines
- Vendor indifference, inflexibility, and incompetence were not conducive to introducing innovation to future tolling systems
- Secure a partnership with an industrial computing expert to develop streamlined and repeatable solutions

The Solution

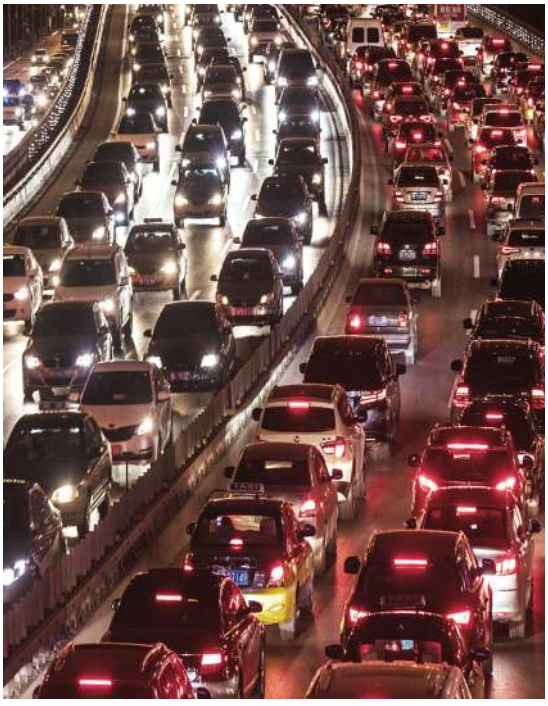
- Premio proved to be a one-stop shop for technical guidance, advice, and on-time product delivery
- Collaboration led to true understanding and decision-making based on need and growth strategy
- Turnkey, intelligent systems from Premio replaced disparate, less-effective vendor options
- Premio **RCO-6000-CML** AI edge inference computer with modular functionality features high-performance processing, storage, and connectivity
- Integrated Premio **EDGEBoost Nodes** and **EDGEBoost I/O** operate as performance-driven building blocks for custom configuration and hardware acceleration

The Benefit

- Premio meets project schedules with high-quality equipment that sets these ITS systems apart
- Enabled consolidation and simplification of the overall operation and management for the company
- The project has generated revenue that allows expansion of their business in more parts of the world
- A solid team of Premio professionals has been accountable since Day One, providing answers, doling out advice, and rectifying issues quickly
- Premio's effective supply chain management ensures timely delivery of products
- This partnership has served as a true collaboration that has yielded better ITS systems that are delivered on time, within budget, and exceeding customer expectations
- The customer is armed with a proven solution that can be applied to other projects and jurisdictions – repeatable yet customizable due to its modular performance and features

Background

A growing population brings with it transportation challenges that simply cannot be managed with existing roads and highway systems. Many jurisdictions around the world are all too familiar with this dilemma and are taking heed by introducing multi-modal transportation options to help ease traffic congestion and offer their constituents choices in how to get from Point A to Point B.

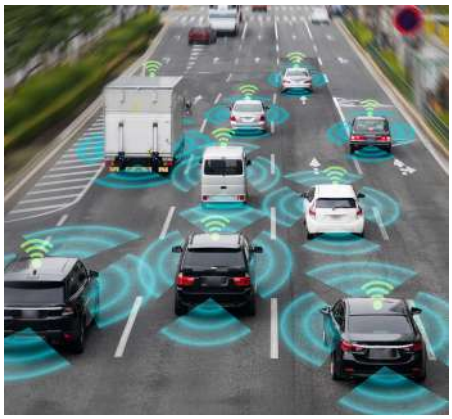


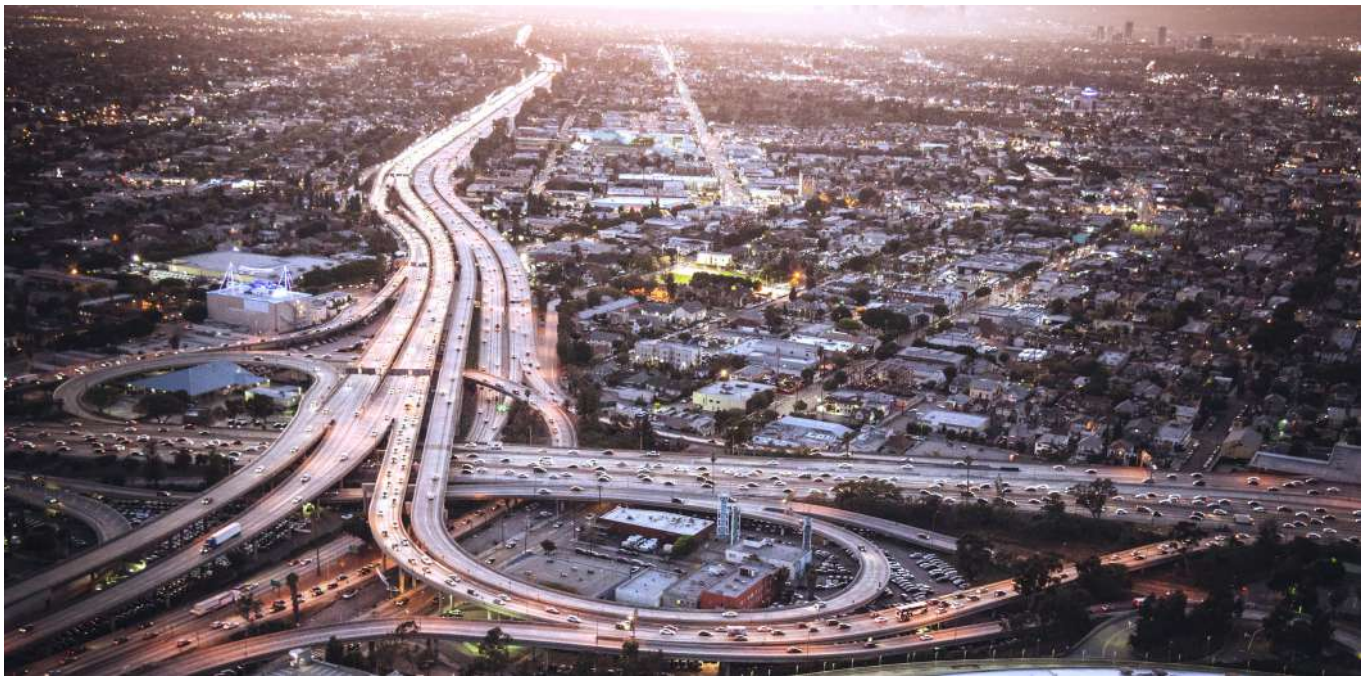
One significant part of this effort involves the implementation of tolling systems whereby a government or transportation authority makes available 'pay-for-play' access to certain roads, bridges, and tunnels (or parts of them). The revenue generated is routinely used to finance new infrastructure projects, repair existing infrastructure, and improve transportation services. Such efforts ensure that highways and other transportation infrastructure are kept in good condition, which improves safety and reduces the risk of accidents. These systems can also help manage traffic flow, as increased rush-hour tolls may encourage some people to avoid traveling at these times of day thus reducing congestion overall.

"The electronic toll collection market is projected to grow from USD 8.3 billion in 2022 to USD 11.4 billion by 2027; it is expected to grow at a CAGR of 6.5% from 2022 to 2027."

MarketsandMarkets

One multinational company offering a range of solutions for intelligent transport systems (ITS) had its sights set on improving its lineup of products and services via industrial computing for its multi-lane free-flow toll solutions. The integration of industrial computing enables seamless implementation of integral or partial multi-lane free-flow toll solutions across gantries (roadside equipment) and the control center (back office). These advanced systems effectively handle the electronic charging of tolls based on tags (electronic tolls) and/or license plates (video tolling). The incorporation of industrial computing capabilities ensures efficient operations and robust management of various aspects.





These toll solutions not only facilitate the free passage of vehicles through the infrastructure but also provide comprehensive management of customer accounts. With industrial computing at their core, these systems offer flexible payment options, including post-payment and pre-payment, to cater to diverse user needs. Additionally, the integration of industrial computing enhances the toll system's ability to identify and manage potential violators. By leveraging advanced computing technologies, such as machine learning and real-time data processing, the system effectively detects and handles violators in a prompt and efficient manner.

Through the integration of industrial computing, multi-lane free-flow toll solutions combine advanced tolling technologies with robust computing capabilities. This integration enables smooth toll operations, efficient customer account management, and effective handling of violators, ensuring a seamless and secure tolling experience.

The Challenge

In the highly competitive ITS landscape, this company knew that to excel, it would need to significantly enhance its computing roadmap. But where to start? Its existing technology vendors were just that – vendors. They were more inclined to serve as 'order takers' rather than collaborative business allies intent on helping their customer enhance future offerings and increase market share. Timelines and deadlines were routinely ignored. Terms and conditions were non-negotiable. And in recent years, they have (like so many others) fallen victim to supply chain and technical support issues, leaving the ITS company in the lurch on numerous occasions. These vendors created a series of seemingly insurmountable bottlenecks that drove the company to seek a new route.

Moving forward, the company was determined to team up with an experienced, knowledgeable partner – a one-stop shop that would challenge the status quo via innovation, partnership, and strategic thinking. The ideal team would ask smart questions, develop recommendations to meet business objectives, and, perhaps most importantly, prove a flexible resource.

"After our experience with other vendors, we knew it was time to make a significant change, one that would allow us to forge a true partnership that was more conducive to our strategic sensibilities and plans for the future," said the company's executive vice president for product development.

Ready for its next phase, the company approached Premio, a leader in rugged edge and embedded computing technology, with a laundry list of hardware combinations that enabled a range of applications within their ITS systems. Some served as Edge IoT monitoring devices, others controlled IoT sensors and cameras, and some served as NVR recorders. The variations made consolidation and simplification difficult. The hope was to partner with a reliable industrial computing expert for the long term, one that could review the overall requirements and propose a more universal solution for the system that could also be replicated for future similar projects. This would help them streamline supply chain management, as well as their technical support library (drivers, BIOS, OS, etc.), track and manage system costs, and meet delivery commitments to their customers.

Premio's RCO-6000 Series & bottom module EDGEBoost Nodes

The Solution

Initial meetings with the tolling system company's engineering and business teams yielded a deep understanding by Premio of the pain points involved. These discussions gave Premio personnel insight to develop an overall business support program that incorporated the best available solutions.

As a result, Premio recommended the RCO-6000-CML AI Edge Inference Computer for its wide range of capabilities, making it suitable not only for the most fundamental of tasks but also for those most critical. This Premio network video recorder (NVR) platform is compatible with a full range of CPUs – from Celeron® to Xeon®, a particularly flexible and effective value in managing various computing applications across all projects without changing the core hardware platform footprint and drivers/BIOS/OS management. Premio's RCO-6000-CML AI Edge Inference Computers provide high-performance edge AI processing, high-speed NVMe storage, modular I/O configurability, and wireless connectivity in a ruggedized enclosure.

"Safety Eject" button for ensured safe hot swapping procedures

With its rugged and high-performance socket-type processor design, these units are extremely modular. They include Premio EDGEBoost Nodes and EDGEBoost I/O modules that serve as performance-driven building blocks for custom configurations requiring hardware acceleration. This enables more expansive I/O and storage features, which can be tapped as needed making it ready for growth in future applications. For example, EDGEboost I/O modules allow for scalable but modular m.2 NVMe storage – featuring up to x4 m.2 b-key PCIe x2 NVMe (2242/3042/3052) or x2 m.2 m key PCIe x3 (2242/2260) solid-state drives (SSD) for high-speed storage in a rugged and fanless design. NVMe SSDs offer access to high-speed read/write performance for mission-critical data in need of local real-time processing – in this case, read/write of real-time toll data. The platform recognizes that greater demands for automation and real-time processing require even more I/O connectivity. Its modular daughterboards consolidate analog and digital workloads, increasing flexibility to exactly match I/O with the needs of edge-level deployments.

Modular & Scalable EDGEBoost I/O Modules

The Benefit

Premio has consistently provided high-quality equipment that meets project schedules. Their modular approach to rugged computing solutions, particularly with **EDGEBoost Nodes** and **EDGEboost I/Os**, has remained scalable and compatible with the tolling system's software integration requirements. The **RCO-6000-CML** AI Edge Inference computer can process an influx of data and make critical decisions in real-time with its performance-based features. Key benefits are better responses to situational data, low-latency data processing, and mission critical business insights based on actionable intelligence.

A primary differentiator for the RCO-6000-CML AI Edge Inference computer is its two-piece modular design, allowing the ITS provider to mix and match performance-based nodes directly for any workload. Upgrades for next-generation processors are hassle-free and can be easily integrated across a variety of Premio's EDGEboost nodes. Performance nodes include options in NVMe storage, high-density SATA storage, and even GPU/M.2 acceleration modules for real-time machine learning applications. This unique mechanical design provides both a rugged and fanless industrial computer that powers the universal approach this ITS company had been seeking, enabling consolidation and simplification of their overall operation and management efforts. The project has boosted the company's bottom line, allowing them to expand their business into more regions in a timely and effective manner.

Premio has also demonstrated excellent customer support through dedicated account managers, engineering teams, and efficient supply chain management. During the initial stages, Premio provided a small batch of the standard RCO-6000-CML units. These units underwent thorough testing and performed exactly as expected. While Premio offered the option to bring in a unit for validation before deployment, the company chose not to, citing their confidence in Premio's equipment. This decision has been justified, as all configurations have functioned as intended without any issues.

> “The assurance of receiving quality products that seamlessly integrate into our tolling solutions gives us more time to focus on winning future projects,” added the company’s executive vice president for design. “Premio has displayed professionalism and facilitated a smooth relationship from the get-go. Their comprehensive planning, from quoting to production – including accurate forecasting and stock management – ensures that our needs, as well as our customers’ needs, are always met.”

This ability to work closely with Premio's sales team to forecast and schedule deliveries has been instrumental in meeting customer deadlines. By relying on Premio’s platforms, easily accommodating minor variations in storage sizes, the ITS company benefits from reduced engineering efforts and increased focus on overall project implementation and completion. This streamlined approach allows them to create and implement smart, safe, and secure tolling platforms more efficiently – creating a cascade of value featuring enhanced safety and environmental sustainability.

The collaboration isn’t viewed as merely a transactional partnership. Premio's reliable products, efficient processes, and commitment to this customer’s success have established a valuable, trust-based relationship primed for future infrastructure advancement.

Premio's Manufacturing Facility in Los Angeles, California.

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NEW

RCO-6000-CML GPU SERIES

	RCO-6000-CML-2060S	RCO-6000-CML-4N-2060S	RCO-6000-CML-2N-2060S
Processor	Support 10th Gen Intel® CML S Processor (LGA 1200, 65W/35W TDP) or Optional Intel XEON-W Processors		
Memory	2x 260-Pin DDR4 2666 /2933MHz SODIMM. Max. up to 64GB (ECC and Non-ECC)		
GPU	RTX 2060S		
Display	3x DisplayPort, 1x DVI-I, 1x DVI-D, 1x HDMI		
SATA Storage	2x External SIM socket (Mini PCIE attached) 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm) 2x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable) Support RAID 0, 1, 5, 10		
NVMe Storage	-	1x Removable Module with 2.5" 4 Bay U.2 NVMe SSD (7mm) *Patented NVMe drives trays are tooless and hot-swappable	1x Removable Module with 2.5" 2 Bay U.2 NVMe SSD (15mm) *Patented NVMe drives trays are tooless and hot-swappable
Internal Expansion Slot	2x Full-size Mini PCIe, 1x PCIe x16 (occupied by GPU)	2x Full-size mini-PCIe (1 shared by 1x mSATA), 1x M.2 E Key	
I/O	6x USB 3.2 Gen 2 (10 Gbps), 3x USB 3.2 Gen 1 (5 Gbps, 1x Internal), 2x USB 2.0 header (internal), 8x RS-232/422/485 (6x internal), 16x isolated digital I/O, 2x GbE RJ45 (Support Wake-on-LAN and PXE)		
Power	9 to 48 VDC and 12~48VDC for GPU/Card Expansion, AT/ATX Select, 5-pin Terminal Block, 4-pin Terminal Block for GPU Expansion	9 to 48 VDC, AT/ATX Select, 5-pin Terminal Block, 4-pin Terminal Block for GPU and Storage (12V requires 4-pin terminal block)	
Operating Temperature	-25°C to 60°C (35W/65W CPU)		
Certification	UL 62368 Ed. 3, CE, FCC Class A		

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NEW

RCO-6000-CML NVMe SERIES

UL CERTIFIED SAFETY US-CA E357184

	RCO-6000-CML-8NS	RCO-6000-CML-4NS	RCO-6000-CML-4NH
Processor	Support 10th Gen Intel® CML S Processor (LGA 1200, 65W/35W TDP) or Optional Intel XEON-W Processors		
Memory	2x 260-Pin DDR4 2666 /2933MHz SODIMM. Max. up to 64GB (ECC and Non-ECC)		
Display	1x DVI-I, 2x DisplayPort		
SATA Storage	2x External SIM socket (Mini PCIE attached) 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm) 2x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable) Support RAID 0, 1, 5, 10		
NVMe Storage	2x Removable 4 Bay NVMe SSD Module (7mm) with RAID 0, 1, 5, 10 support *Patented NVMe drives trays are tooless and hot-swappable	2x Removable 2 Bay NVMe SSD Module (15mm) with RAID 0, 1, 5, 10 support *Patented NVMe drives trays are tooless and hot-swappable	2x Removable 2 Bay NVMe SSD Module (15mm) with Hardware RAID 0, 1, 5, 6, 10 support *Patented NVMe drives trays are tooless and hot-swappable
Internal Expansion Slot	2x Full-size mini-PCIe (1 shared by 1x mSATA), 1x M.2 E Key		
I/O	6x USB 3.2 Gen 2 (10 Gbps), 3x USB 3.2 Gen 1 (5 Gbps, 1x Internal), 2x USB 2.0 header (internal), 8x RS-232/422/485 (6x internal), 16x isolated digital I/O, 2x GbE RJ45 (Support Wake-on-LAN and PXE)		
Power	9 to 48 VDC, AT/ATX Select, 5-pin Terminal Block, 4-pin Terminal Block for Storage (12V requires 4-pin terminal block)		
Operating Temperature	-25°C to 60°C (35W/65W CPU)		
Certification	UL 62368 Ed. 3, CE, FCC Class A		

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NEW

RCO-6000-CML SATA SERIES

	RCO-6000-CML	RCO-6000-CML-2C-4B7M	RCO-6000-CML-2C-2B15M
Processor	Support 10th Gen Intel® CML S Processor (LGA 1200, 65W/35W TDP) or Optional Intel XEON-W Processors		
Memory	2x 260-Pin DDR4 2666 /2933MHz SODIMM. Max. up to 64GB (ECC and Non-ECC)		
Display	1x DVI-I, 2x DisplayPort		
SATA Storage	2x External SIM socket (Mini PCIE attached) 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm) 2x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable) Support RAID 0, 1, 5, 10	2x External SIM socket (Mini PCIE attached) 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm) 6x Removable 2.5" SATA HDD Bay (support H=7mm, Hot-swappable) Support RAID 0, 1, 5, 10	2x External SIM socket (Mini PCIE attached) 1x Internal 2.5" SATA/SSD HDD Bay (support H=9mm) 2x 7mm, 2x 15mm Hot-swappable 2.5" SATA HDD/SSD Bay, Support RAID 0, 1, 5, 10
Internal Expansion Slot	2x Full-size Mini PCIe	2x Full-size Mini PCIe, 1x PCI and 1x PCIe optional:2x PCI (Model 2I), 2x PCIe x16 (8-lane) (Model 2E)	
I/O	6x USB 3.2 Gen 2 (10 Gbps), 3x USB 3.2 Gen 1 (5 Gbps, 1x Internal), 2x USB 2.0 header (internal), 8x RS-232/422/485 (6x internal), 16x isolated digital I/O, 2x GbE RJ45 (Support Wake-on-LAN and PXE)		
Power	9 to 48 VDC, AT/ATX Select, 5-pin Terminal Block	9 to 48 VDC, AT/ATX Select, 5-pin Terminal Block	
Operating Temperature	-25°C to 70°C (35W/65W CPU)		
Certification	UL 62368 Ed. 3, CE, FCC Class A		

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