Automotive   North America

CUMMINS

Powering Software-Defined Vehicles with Portainer

Business overview

Cummins is a global leader in power solutions, designing and manufacturing diesel and electrified powertrains for commercial vehicles and industrial equipment.

Headquartered in Columbus, Indiana, with around 70,000 employees, Cummins supplies engines and power systems to more than 20 major OEMs, including PACCAR DAF, Daimler Trucks, and the TRATON Group (Scania, MAN, International Trucks). As vehicles become increasingly software-defined, Cummins is re-architecting how its powertrains are developed, updated, and managed. The company's vision is simple but ambitious: "Write once, run anywhere." A single, modular software architecture that can run on any connectivity device across its global OEM and fleet network.

Challenges

Cummins' legacy telematics system had evolved into 35 different versions of near-identical software, each tied to a specific vendor's hardware. Every new feature or fix required separate integration and testing across dozens of suppliers, driving up cost, risk, and time to market.

When Cummins began developing its new generation of connected powertrains in 2019, the goal was clear:

- **Unify the software stack across** all OEMs and devices
- **Enable over-the-air updates** without physical intervention
- **Meet strict security, safety, and performance standards**
- **Prove that containerized software could run reliably at the edge**

But there was one major technical gap: once these embedded Linux devices were deployed in vehicles, there was no way to remotely orchestrate or update containers across the fleet. Without that capability, the "write once, run anywhere" vision couldn't be realized.

The solution

Cummins selected **Portainer Business Edition** as its platform for managing and updating OCI containers across thousands of vehicles.

Working closely with Portainer's engineering team, Cummins deployed a server-and-agent architecture that delivers secure, atomic, and fail-safe updates to every connected device, even in the highly constrained conditions of vehicle networks (limited bandwidth, intermittent connectivity, strict security).

Key capabilities delivered through Portainer included:

- **Remote container management and orchestration** at IoT scale

- **Custom-built Portainer agents** optimized for low-bandwidth, high-latency environments

- **Centralized fleet visibility** with health monitoring and deployment tracking

- **Enterprise-grade security** and role-based access for production operations

By containerizing their edge software and standardizing deployment with Portainer, Cummins reduced its software variants from **35 to one,** delivered its new system **on time,** and established a **future-proof architecture** now being adopted as an industry reference model.

"Portainer worked alongside us from day one. They didn't just provide a tool they co-engineered the future with us."

Martin Brown, Software Architect, Cummins

The results

- **One standard architecture** replaced 35 separate software versions

- **Production-ready deployment** delivered on time - a first for Cummins' telematics platform

- **Massive cost reduction** through simplified development and maintenance

- **Industry validation** - the same containerized approach is now being adopted across the automotive sector

- **Open collaboration** - Cummins contributes its learnings and APIs to the Eclipse Software Defined Vehicle Working Group and COVESA

As Carlton Bale, Director of Software at Cummins, puts it:

"It's far more convincing to show partners what's running in production than to show slides promising it will work. Portainer helped us prove it."

Portainer's collaboration with Cummins drove major improvements in scalability and reliability for all Portainer customers. As Neil Cresswell, CEO of Portainer, explains:

"Working with Cummins pushed us to redesign core parts of Portainer to handle concurrency and reliability at IoT scale - hundreds of thousands of devices, all communicating securely and concurrently."

"For Cummins to take container technology from the data center into vehicles was bold. They showed incredible vision, and we were proud to help make it real."

What began as an ambitious prototype is now a global reference architecture for software-defined industrial and automotive systems.

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