Wind River Studio
Digital Feedback Loop

Gain real-time analytics and insights from combined OS-level and application-specific data to make data-driven decisions and optimize health, performance, and maintenance of assets deployed at the edge.

WHY DIGITAL FEEDBACK LOOP?

As intelligent systems become more capable, they also become more complex. These complex systems are used to operate mission-critical functions, some of which have extremely low tolerance for failure and narrow parameters for optimization. Digital feedback loops (DFL) provide rapid feedback on performance of systems and applications operating at the intelligent edge.

YOUR DATA, OVER TIME AND IN NEAR REAL TIME

Wind River® Studio DFL capabilities provide visibility and actionability that span timescales from seconds or minutes to months or years. Outliers or anomalies can be detected in real time and addressed or escalated by operations personnel. Data scientists and development teams can gain insights by combining data across fleets and over time.

FEATURES AND BENEFITS

- **DFL Edge Agent:** This SDK provides a lightweight, platform-agnostic solution to securely connect IoT endpoints during development or operations to a Studio cloud provider of choice. Deployed via the Studio Linux or VxWorks® build system in the applications and middleware, DFL Edge Agent enables secure bidirectional connectivity between the device and Studio cloud. It offers both flexibility and simplicity in accessing OS telemetry as well as device-specific data types and custom commands.

- **Device management:** The capability provides a scalable framework for the end-to-end management of devices over their lifecycles, from secure enlistment to metadata registration, remotely accessing the device state in real time. It also provides a role-based command console to troubleshoot and manage the devices, both individually and collectively as a fleet.

Digital Feedback Loops Matter

Ninety percent of embedded developers view DFL as extremely or very important, with the top outcomes being optimizing productivity and lowering risk.

As the leading provider of embedded Linux and RTOS capabilities, Studio closes the feedback loop with a role-based command console to trigger manual or automated responses such as device reboot, power cycling, configuration update, or switching operating modes.

Define, embed, and share data including telemetry, logs, images, and events from edge devices at scale. Collect and integrate metadata and telemetry data from deployed systems to provide curated real-time insights to optimize performance, features, and user behavior across these systems.

- **Real-time system analytics:** Extend the security hardening of Studio to provide a single pane of glass across the lifecycle of critical embedded workflows. Use early insights from data during development to identify and solve problems before releasing applications. During operation, use machine data to explore customer and device behavior and manage maintenance risks and costs. Configure and auto-send alerts when an anomaly is detected, such as CPU resource utilization exceeding a threshold.

- **Data management:** Studio provides built-in support for flexible schemas, a network-efficient communication protocol for data packet management, security for data at rest and in transit, a scalable data pipeline for real-time processing, and REST APIs for integration with analytics and business intelligence tools.

- **Development and integration:** Providing a resource and policy manager for granular role-based access control per device and user group, development and integration allow secure storage of device secrets with provisions for remote renewal and revocation, and RESTful APIs for device interactions with complete traceability, including request-response logs.
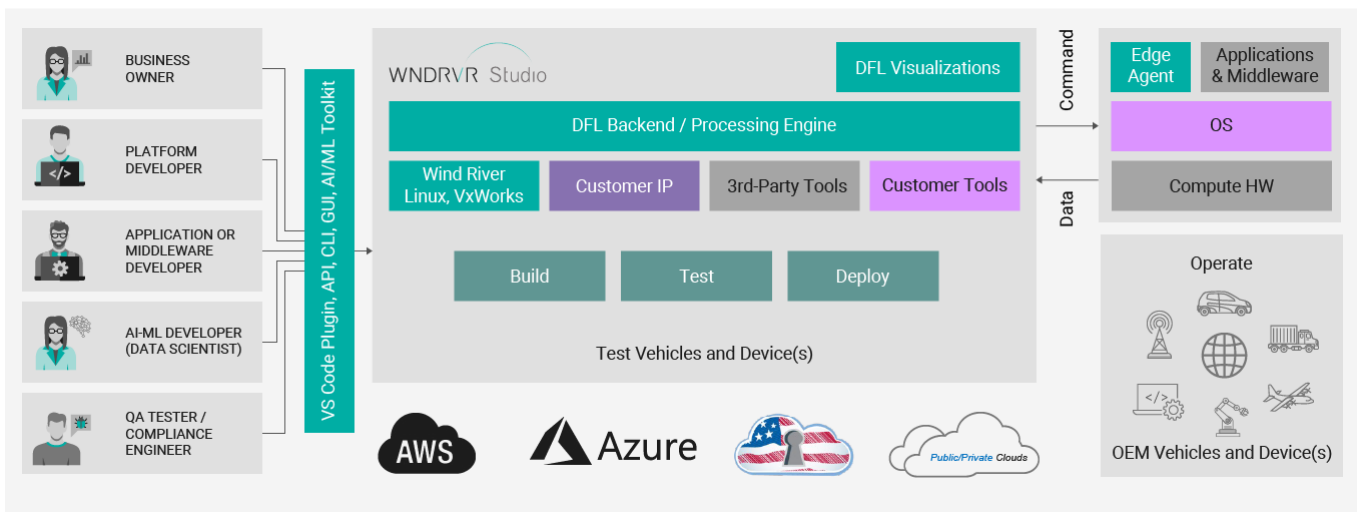
ARCHITECTURE

Figure 1. Digital feedback loop at cloud scale