

Fact Sheet for Transportatio n and Mobility

Datasance PoT: The Enterprise Open Source
EdgeOps Platform for distributed environments.

Introduction

DATASANCE Platform of Everything (PoT) is a fully **Open Source**, enterprise-ready distributed edge computing platform. Built upon the foundation of Eclipse ioFog, PoT is designed to resolve critical infrastructure challenges across the entire **Cloud-Edge-IoT continuum**.

PoT transcends basic orchestration by integrating core features for workload lifecycle management across diverse edge environments with essential enterprise capabilities developed by Datasance.

Key Enhancements by Datasance

Datasance transforms Eclipse ioFog from an orchestration-only tool into a comprehensive EdgeOps platform with built-in operational and security features, including:

- **Hardware Agnostic Edge Orchestration:** Deploy and manage diverse edge workloads, including Edge-AI and analytics, through a unified orchestration layer that abstracts underlying hardware complexities. PoT excels in high-security and remote scenarios, enabling seamless workload deployment on edge devices that lack any connectivity to public or private registries.
- **Cluster deployment and Edge device onboarding:** Regardless of your infrastructure - Kubernetes, bare-metal, or cloud-based- PoT automates the deployment and initialization of your cluster control plane in minutes, pre-configured with full security and networking. Its unique capability allows you to remotely onboard geographically distributed edge devices into the cluster, even in restricted environments with no public or private registry access.
- **Secure & Distributed Messaging with NATs:** PoT engineers a robust messaging backbone featuring decentralized JWT authentication and dynamic RBAC. Support for pub/sub, request/reply, K/V store, and persistent messaging is built-in. We ensure total application isolation through granular subject-level import/export rules. Furthermore, microservices are automatically provisioned into the Message Bus with pre-configured authentication credentials and fine-grained access policies, eliminating manual overhead.
- **Router-Based Service Mesh:** Creates a Layer 7 service mesh for secure, isolated network communication, a capability that requires complex manual setup in competing solutions.
- **Integrated Certificate Management:** Automatic generation and distribution of x.509 certificates for all platform components and user workloads, eliminating complex manual security configuration.
- **Agent Security Model & IAM Integration:** Provides a robust security model, RBAC and seamless identity and access management (IAM) integration.

Addressing Critical Edge Computing Challenges

Modern public transportation and mobility networks increasingly rely on edge computing to power distributed software across vehicles, stations, depots, and roadside infrastructure. However, managing operations across these moving and geographically dispersed environments introduces significant structural complexities:

- **Massive Scale & Distribution:** Orchestrating workloads across thousands of dynamic, moving edge nodes, including public transit fleets and interconnected roadside infrastructure.
- **Heterogeneity:** Managing highly diverse hardware, ranging from in-vehicle computers and roadside units to legacy station servers, spanning different processor architectures, operating systems, and vendors.
- **Operational Demands:** The necessity for automation, rapid deployment, and ensuring local autonomy so that mission-critical applications continue to operate locally on vehicles and stations even during network disruptions.
- **Networking:** Transportation relies on highly mobile assets operating on unstable, latency-sensitive network conditions. Building secure inter-service connectivity between moving vehicles, central operational centers, and roadside infrastructure is incredibly complex.
- **Data Pipelines:** As these environments generate an enormous amount of data at the edge, there is a critical need for a robust, persistent messaging infrastructure to handle complex data pipelines, ensuring that massive data streams and flows are managed securely and consistently without disruption.
- **Regulatory & Security Strain:** Devices are frequently deployed in physically exposed, untrusted public environments, necessitating strict security perimeters and secure encrypted communications.
- **Cost:** Increasing Total Cost of Ownership (TCO) driven by parallel hardware deployments, excessive manual interventions at remote stations or on vehicles, and the operational overhead of fragmented toolchains.

PoT's Unique Value Proposition

Datasance PoT directly addresses the complexity that hinders the modernization of transportation and mobility systems. By eliminating infrastructure fragmentation, PoT offers a unified, secure platform tailored for highly distributed and mobile environments.

Core Differentiators

Feature	PoT Advantage
Vendor Neutrality	Lightweight, fully open-source and designed to operate on any Linux distribution , regardless of hardware brand or processor architecture. This prevents vendor lock-in and maximizes the utility of existing in-vehicle and station hardware.
Consistent Deployment	Enables consistent deployment of diverse applications (e.g., asset tracking, traffic management, passenger services) across heterogeneous edge environments, from stations to moving vehicles.
Operational Automation	Delivers automated remote node provisioning and cluster deployment without manual onsite interventions that is ideal for updating software across vast vehicle fleets.
Dynamic Configuration	Provides dynamic reconfiguration API and dynamic Volume Mounts from Secrets and ConfigMaps without requiring service restarts , allowing operators to adapt to real-time changes and problems, crucial for ensuring uninterrupted operational continuity for critical transportation and mobility services.
Integrated Marketplaces	Application Templates and Catalog Image Items enable the creation of internal marketplaces for edge applications, accelerate the rollout of new digital services and algorithms across public transportation networks.

Security and Networking Excellence

Unlike fragmented market offerings, PoT provides cohesive, first-class features to manage secure communication between central systems and isolated mobility edges:

- **Built-in Security:** Integrated mTLS and IAM simplify security deployment for physically exposed roadside and vehicle networks.
- **Isolated Network Communication:** The unique router architecture creates a Layer 7 service mesh that ensures secure communication, even between nodes operating on isolated or mobile networks.
- **Distributed Messaging Infrastructure:** PoT introduces secure, lightweight, and persistent NATs messaging infrastructure between vehicles, stations, and the backend, allowing decentralized authorization and transparent control over data streams.

In a Nutshell

PoT represents a significant innovation by providing a unified operating model that seamlessly integrates workload management, service mesh communication, and robust security. By eliminating the operational overhead associated with managing fragile collections of transit endpoints, **PoT**:

- Reduces Total Cost of Ownership (TCO) by minimizing manual, site-by-site interventions.
- Simplifies lifecycle management and accelerates the rollout of new digital services across public transit networks.
- Enables organizations to focus on passenger experience and operational software rather than infrastructure management and complex networking.
- Provides the foundational orchestration layer required for Connected, Cooperative, and Automated Mobility (CCAM) architectures as they evolve alongside 5G/6G networks.
- Brings intelligence, security, and true autonomous connectivity to geographically dispersed vehicles, stations, depots, and roadside infrastructures.

