

Abstract

A plug-and-play infusion-pump onboarding and compliance-management system is disclosed. A pass-through edge gateway non-intrusively “sniffs” data traffic from any connected infusion pump, automatically identifies the underlying communication protocol (HL7-v2, vendor-specific serial, etc.) with an adaptive signature library, extracts the pump’s model, firmware and active drug-library checksum, then streams normalised status messages to a cloud server through a token-authenticated, TLS-encrypted MQTT/HTTP link. The cloud platform builds and maintains a live inventory of all pumps, continuously compares each configuration against stored compliance rules (e.g. current firmware or DERS library versions) and safety bulletins, flags non-compliant devices, and algorithmically generates staged upgrade plans that minimise clinical disruption. All detection events, configuration changes and remedial actions are immutably hashed and recorded in an append-only ledger, providing tamper-evident audit trails for regulatory audits. The system eliminates manual interface coding and spreadsheet audits, enabling rapid integration of heterogeneous pumps and continuous verification of device safety compliance across a healthcare enterprise..