

IoT Integration Framework Patent US10234567

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ABSTRACT

A system and method for integrating Internet of Things (IoT) devices and enterprise systems through a unified framework, comprising an adaptive protocol translation layer, secure device authentication mechanisms, and intelligent data orchestration capabilities. The framework enables seamless communication between heterogeneous IoT devices and enterprise applications while maintaining security, scalability, and real-time processing capabilities.

TECHNICAL FIELD

[0001] The present invention relates generally to enterprise IoT integration systems, and more particularly to a framework for enabling secure, scalable communication between diverse IoT devices and enterprise applications through standardized protocols and intelligent middleware.

BACKGROUND

[0002] Modern enterprise environments increasingly rely on IoT devices for operational monitoring and process optimization. However, integrating diverse IoT devices with varying protocols and data formats into enterprise systems presents significant technical challenges. Existing solutions lack standardized approaches for device authentication, data normalization, and scalable processing of IoT data streams.

[0003] There remains a need for a comprehensive framework that can seamlessly integrate heterogeneous IoT devices while ensuring security, reliability, and enterprise-grade performance.

SUMMARY OF THE INVENTION

[0004] The present invention provides a novel framework for IoT integration that addresses the limitations of existing solutions through:

a) An adaptive protocol translation layer supporting multiple IoT communication standards

- b) Secure device authentication and encryption mechanisms
- c) Intelligent data orchestration and routing capabilities
- d) Real-time processing of IoT data streams
- e) Enterprise system integration interfaces

DETAILED DESCRIPTION

Protocol Translation Layer

[0005] The framework implements a modular protocol translation layer supporting:

- MQTT
- CoAP
- HTTP/REST
- WebSocket
- Custom protocols through extensible adapters

[0006] Protocol translation occurs through a standardized intermediate format, enabling seamless communication between devices using different protocols.

Security Architecture

[0007] Device authentication utilizes:

- X.509 certificate-based authentication
- OAuth 2.0 token management
- Role-based access control
- End-to-end encryption
- Secure key rotation

Data Orchestration

[0008] The framework provides intelligent data routing through:

- Rule-based message routing
- Data transformation pipelines
- Stream processing capabilities
- Quality of Service (QoS) management

- Load balancing

Enterprise Integration

[0009] Integration with enterprise systems is achieved via:

- REST APIs
- Message queues
- Enterprise service bus (ESB) connectors
- Database adapters
- Custom integration endpoints

CLAIMS

A method for integrating IoT devices comprising:

- a) Receiving data from IoT devices using multiple protocols
- b) Authenticating devices using secure certificates
- c) Transforming data into standardized formats
- d) Routing processed data to enterprise applications

The method of claim 1, wherein protocol translation includes:

- a) Protocol detection
- b) Message parsing
- c) Format conversion
- d) Delivery confirmation

The method of claim 1, wherein security measures include:

- a) Certificate validation
- b) Encryption key management
- c) Access control enforcement
- d) Audit logging

[Claims 4-20 omitted for brevity]

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PRIORITY CLAIM

This application claims priority to U.S. Provisional Application No. 62/789,012, filed April 23, 2018.

GOVERNMENT RIGHTS

[0010] The invention was made without government support or funding.

REFERENCES CITED

US9876543 - Enterprise IoT Management System
US9987654 - Secure Device Authentication Framework
US10123456 - Protocol Translation Methods

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