Tie Die: IoT Onboarding and Control

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What doesn’t scale for the enterprise?

Proprietary stovepipes

Apps and devices are developed with network ‘bridges’, typically 1 app – 1 stack

Closed incompatible systems, no centralized management

Dongle Dash!

First one to get the USB slot (or IoX app) wins! (Everyone else loses)
Solving Silofication

Standards-based approach

Onboarding: app-based realtime/non-realtime

Control: Policy-based (defined in the network)

Telemetry/data: Structured API, data + meta-data

Standardization enables an ecosystem and reduces deployment costs

Dongle Dash and Stove Pipes
Standardizing APIs: Accelerating use case deployment

Common APIs across connection technologies for flexibility based on market needs

Enterprise Network

Gateway

BLE
Zigbee
Wi-Fi
Wired
...

Onboarding
CRUD
Create, Read, Update, Delete devices

Device Control (NIPC)
(HTTP or MQTT)

Device Telemetry (MQTT)

Data Receiver
Broadcasts
Streaming data
Connection state

Application

 ...
Provisioning the device: System for Cross Identity Management (SCIM)

• (Mostly) RESTful interface to provision device access.
• Schema defined for each access / onboarding technology
• May be used as a dispatch interface for various types of connectivity
  • BLE, Zigbee, onboarding with DPP/Matter/Fido Device Onboarding/other
• Underlying technology in the device governs what needs to be communicated
• Also:
  • Don’t take a position on L2/onboarding/ALG tech. Just dispatch to the next step.
  • Connectivity works in reverse from normal SCIM: enterprise deployment is the server, partner is the client.
Application Layer Gateway Functionality for non-IP devices

• Yeah, yeah, IP on everything, but...

• Provide **slightly** abstracted interface for common non-IP technologies like BLE and Zigbee (maybe also LoRaWAN).

• Works well with provisioned scim model since application endpoint can be provisioned in that model
  • Devices provisioned by an entity can only be controlled by that entity

• Support for:
  • reads, writes, indications & notifications, and bulk operations
  • Transmitting to groups of devices.

• Works with MQTT, might be made MQTT-native
Nurse scans QR code on patient ID bracelet and on sensor.

Sensor is provisioned on network by Hospital Patient Monitoring Device Mgmt.

Onboarding

EMR Sensor Connected to network

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Onboarding

Device Control

Data Receiver

HMS

Network sets up telemetry data stream from sensor.

Nurses’ Station receives patient from through the pub-sub interface.
What’s out of scope

- These are application-to-network interfaces
- Application has very small number of points of contact
- Topology discovery is not necessary or supported
- Interpretation of application data by network is strictly out of scope
  - But might be possible anyway, depending on whether encryption occurs at higher levels.
More info

• draft-ietf-scim-device-model-01
• draft-brinckman-nipc-00
• https://github.com/iot-onboarding/tiedie
Thank you.