Medical Device Management System

FOR HEALTHCARE FACILITIES SUPPORTING BOTH INTERNAL AND EXTERNAL DEVICES
On Premise Device

OPTIONAL FRINGE EDGE DEVICE IN PATIENT ROOM
COLLECT DATA FROM ALL DEVICES IN ROOM
PUSHES THE DATA TO BizTalk
Remote Device

TRANSMIT DATA TO AZURE API MANAGEMENT
USES API MANAGEMENT BIZTALK ADAPTER TO SEND DATA TO BIZTALK
On Premise Device

OPEN SOURCE USING MIRTH CONNECT
Hospital Management

Patient Room

Mirth Connect

FHIR

CLOUD

Data Viewers

Server

Device Data

MQTT

Settings

Smart on FHIR

FHIR API

Devices

Provisioning Service

Real time Analysis of collected Device Data

Fringe Relay Device

IOT Hub

Stream Analytics

Time Series

Machine Learning

Provisioning Service

HTTPS

HiveMQ

Mirth Connect

MQTT Adapter

Docker Host

FHIR API

SQL

HL7 FHIR

Fringe Relay Device

Device Data

IOT Hub

Stream Analytics

Time Series

Machine Learning

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Real time Analysis of collected Device Data
Remote Device

OPEN SOURCE USING MIRTH CONNECT
Hybrid Cloud Devices

BIZTALK WITH HYBRID FHIR SERVER ON PREMISE AND ON AZURE
Integrating Tibco
External Management

Tibco

Mirth Connect

Patient

MQTT Adapter

Docker Host

Smart on FHIR compliant

Server

FH

IR

AP

I

TIBCO™

MQTT Adapter

Mirth

Smart on FHIR compliant

Docker Host
Device, DeviceMetric, and Observation

EACH ONE OF THESE PROFILES DEFINES CONSTRAINTS, EXTENSIONS, AND TERMINOLOGY REQUIREMENTS FOR IMPLEMENTATION
Point-of-Care Devices

A POINT-OF-CARE DEVICE MODEL IS MADE OF MULTIPLE RESOURCE INSTANCES AND THE RELATIONSHIPS BETWEEN THEM.
FHIR Profile Relationships

- VMD Device
- MD 5 Device
- Channel Device
- Numeric DeviceMetric
- Enumeration DeviceMetric
- Simple Array DeviceMetric
- Numeric Observation
- Compound Numeric Observation
- Enumeration Observation
- Sample Array Observation
- Patient
- Location
- Source
- Subject
- Device
- Parent
- Location
- Subject
- Source
- Device
Profiles Artifacts List

❖ **Channel Device** – Structure Definition for Device resources that represent Channels, which are used for grouping metrics together.

❖ **Enumeration Device Metric** – Structure Definition for DeviceMetric resources that represent coded or text status, annotations, or settings characteristics and capabilities.

❖ **Numeric Observation** – Structure Definition for Observation resources that represent numerical measurements, calculations, or settings.

❖ **Compound Numeric Observation** – Structure Definition for Observation resources that represent numerical measurements, calculations, or settings with multiple components.

❖ **Enumeration Observation** – Structure Definition for Observation resources that represent coded or text status, annotations, or settings.

❖ **Mds Device** – Structure Definition for Device resources that represent a Medical Device System (MDS). This is the top-level resource in the hierarchical model of a Point-of-Care device.

❖ **VMD Device** – Structure Definition for Device resources that represent a Medical Device System (MDS). This is the top-level resource in the hierarchical model of a Point-of-Care device.

❖ **Numeric Device Metric** – Structure Definition for DeviceMetric resources that represent numerical measurements, calculations, or settings characteristics and capabilities.

❖ **Device Instance Extension** – Structure Definition that adds an instance number to Device.
Device Supplier

PROVISION AND UPDATE
Management

BizTalk

3rd Party

Docker Host

HiveMQ

Device
Manufacture and suppliers

FHIR

MQTT Adapter

SFTP

Docker Host

FHIR API

HL7* FHIR*

Smart on FHIR compliant

Server

SQL
Assign Device to Patient
Push Schedule to Device
Send Device Data to Azure IOT Hub
Diagnostic Results

DIAGRAMS
Diagnostic Report Generator

Meg Event
Receive ServiceRequest
GET Observations
Count > 0
Return
count = 0
False
True
Create Results Instances
Map Instances to Diagnostic Report
Send Report
Sent
Compensation
Redirect