FHIR, Commercial and Industrial Research

Introducing the HL7 FHIR

- FHIR (Fast Healthcare Interoperability Resources) – standard for transferring healthcare information electronically.

- FHIR is suitable for use in a wide variety of contexts – mobile phone apps, cloud communications, EHR-based data sharing, server communication in large institutional healthcare providers, and much more.

- FHIR can be used independently or together with existing standards.

Why do we need FHIR?

- Healthcare records are increasingly becoming digitized. Patients' electronic health records must be available, reliable, and understandable.

- To support some network communication, machine learning and algorithmic processing, the data must be structured and standardized.

- FHIR is a relatively new specification, informed by years of lessons around requirements, gained through earlier standards, HL7, RIM, CDA.

- Importantly, FHIR can be used as a stand-alone data exchange standard, but is also used with existing widely used standards. (Compatibility)

FHIR vs other standards

- Fast and easy to implement
- Multiple available libraries - helps to kick-start development.
- Strong foundation in Web standards (XML, JSON , HTTP, OAuth, etc.)
- Supports HTTP-based RESTful architectures.
- Well written, free documentation

```xml
<Patient xmlns="http://hl7.org/fhir">
  <id value="glossy"/>
  <meta>
    <lastUpdated value="2014-11-13T11:41:00+11:00"/>
  </meta>
```
Resource Identity & Metadata

```xml
  <text>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
      <p>Henry Levin the 7th</p>
      <p>MRN: 123456. Male, 24-Sept 1932</p>
    </div>
  </text>
```
Human Readable Summary

```xml
  <extension url="http://example.org/consent#trials">
    <valueCode value="renal"/>
  </extension>
```
Extension with URL to definition

```xml
  <identifier>
    <use value="usual"/>
    <label value="MRN"/>
    <system value="http://www.goodhealth.org/identifiers/m..."/>
    <value value="123456"/>
  </identifier>
  <name>
    <family value="Levin"/>
    <given value="Henry"/>
    <suffix value="The 7th"/>
  </name>
  <gender value="male"/>
  <birthDate value="1932-09-24"/>
  <careProvider>
    <reference value="Organization/2"/>
    <display value="Good Health Clinic"/>
  </careProvider>
```
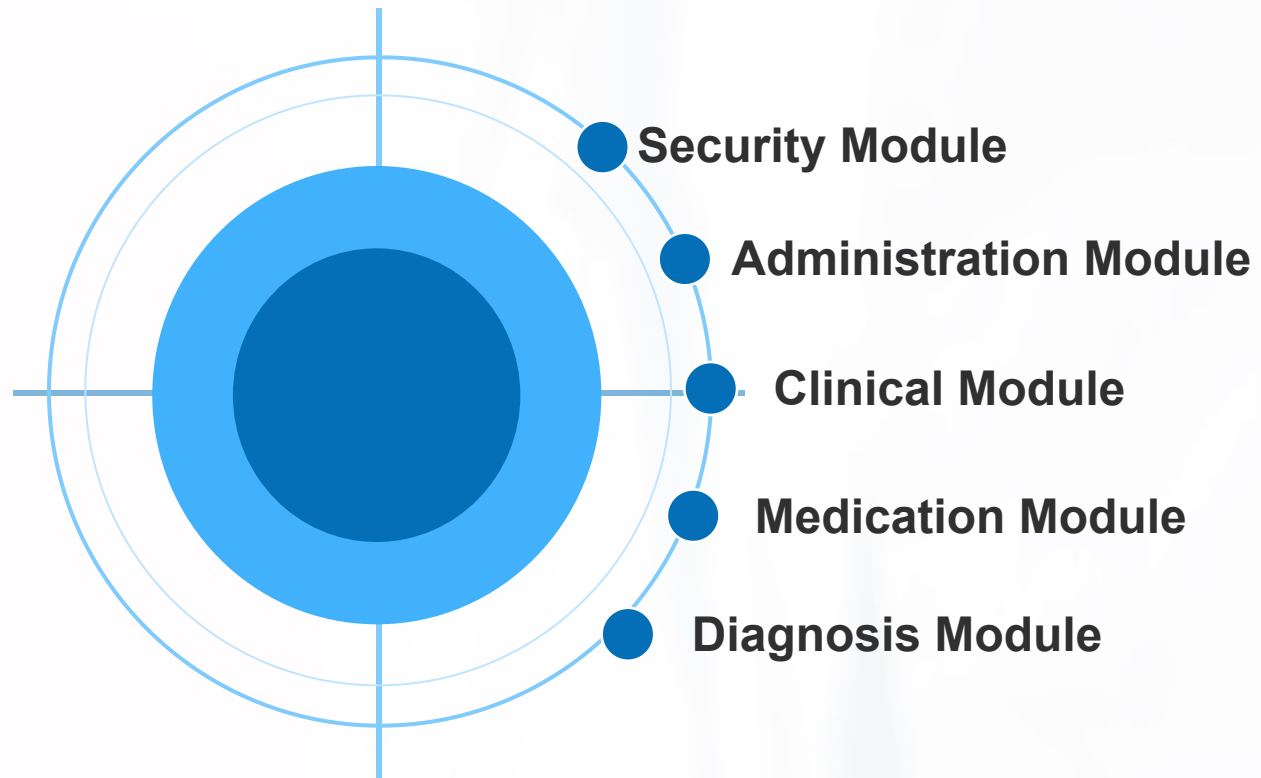Standard Data:
- MRN
- Name
- Gender
- Birth Date
- Provider

FHIR Modules

Security Module

Administration Module

Clinical Module

Medication Module

Diagnosis Module

FHIR Components

The basic component of FHIR is a Resource, and all exchangeable content is defined as resource. Resources can be represented by XML or JSON. The resources have been defined so far have the following characteristics:

- URL
- Common metadata
- Overview of human readable file
- A set of defined common data elements
- An extensible framework

Sensors in the Industry

Honeywell

114 years of manufacturing electrical and other devices.

Provides full range of sensors and switches required in smart infusion pumps.

Has a great manual for each sensor with thorough guidelines.

TE connectivity

Big emphasis on sensors for medical pump applications.

Easy integration and 20 years of proven performance.

TE offers ISO 13485 certification and FDA registration for various sensors and assemblies.

STRAIN MEASUREMENT DEVICES

Provides a wide range of advanced sensors and switches, including different load cells.

30-year presence in the industry – known for exceptional accuracy and long-term performance.

Different Force Sensors

S256 Force Sensor (SMD)

- Long term stability
- Sensitive and accurate
- Overload protection
- Compact and low power consumption
- Low hysteresis

MicroForce FMA Series (Honeywell)

- Piezoresistive based
- Calibrated with ASIC
- Direct mechanical coupling
- Overload protection
- Compact
- Enhanced accuracy
- Diagnostic functions

Different Pressure Sensors

B354 Pressure Sensor (SMD)

- Long term stability and low power consumption

- Stainless steel

- Can be used with pressure fittings

- Durable

MicroPressure MPR Series (Honeywell)

- Piezoresistive silicon pressure sensor

- Calibrated with ASIC

- Compact and low power consumption

THANK YOU!