

Integrating FHIR Support for OpenMRS

A Design in Progress

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What we will cover

- HL7 V2 Vs. CDA Vs. FHIR in 2 minutes
- A **VERY** brief FHIR Introduction
- OpenMRS and FHIR
- Our arguments
- Our use case
- Design
- Deliverables

What we won't cover

- An introduction to HI data exchange standards
- An introduction to FHIR
- Why FHIR is better (see <http://www.hl7.org/implement/standards/fhir/comparison.html>)
- Everything and anything FHIR can do

Introduction

FHIR

- Fast Health Interoperable Resources
- The latest and the greatest
- Combines the best features of HL7's Version 2, Version 3 and CDA
- Published as a Draft Standard for Trial use
- Will (eventually) become a full normative specification (in 2016?)

HL7 V2 Vs. CDA Vs. FHIR

- Practical applications
 - CDA is restricted to clinical settings. V2 and FHIR can be used in other contexts as well.
- Reusability
 - V2, CDA and FHIR are all built around the idea of re-usable segments, but only FHIR segments maintain truly independent identities
- Human readability
 - V2 offers NTE segments, FHIR and CDA require human readable content for all resources
- Messaging paradigms
 - V2 supports event based messaging. CDA does documents. FHIR does both, plus REST and service models

HL7 V2 Vs. CDA Vs. FHIR Contd.

- Extensibility
 - V2 offers Z segments whose meaning is opaque unless prior communication by sender. In comparison, the meaning of FHIR extensions are discoverable by resolving the URI that defines each extension
- Cleanliness
 - V2 messages are the most cluttered , CDA less cluttered, FHIR least cluttered
- Relationship to non-HL7 Standards
 - FHIR resources can provide direct implementation of functionality from other standards such as DICOM
- JSON
 - FHIR supports JSON

How to imagine a FHIR resource ?

- Roughly, a FHIR Resource = V2 Segment = CDA Section
- Is 'self-aware'
- Can be independently manipulated
- Are defined by profiles
- If a resource contains other resources, it will include only a 'reference'

FHIR Resources Contd.

- Self awareness
 - *“Oh wait, you dropped an OBX segment!”* Vs. *“Look, this segment should be useful to you too, if you want !”*
- Transformers !
 - Constructicons: Multiple robots who have their own identity, but can combine into a larger being for a specific task.

OpenMRS and FHIR

OpenMRS & Standards : Current status

HL7 V2 Import	Yes	ADTA08 & ORUR01 in OpenMRS core, RGRTA module(ORU,ADT), CHICA module (ADT, ORU,VXR,VXX)
HL7 V2 Export	Yes	HL7Query module, RGRTA module(ADT,ORU), CHICA module (ORU,VXQ, VXU)
CCD Export	Yes	Export CCD module (GSOC)
CCD Import	No	RGCCD module
CDA Export	Yes...	CDA Generator module (GSOC)
CDA Import	No	

Why FHIR for OpenMRS ?

- Because FHIR is better
- Because FHIR makes more sense in the long run
- FHIR is the heralded proposed solution to be...
- We need to move with the times
- **Bangladesh is already using it !**
 - ... Consider the implications

Design Considerations

What do we want ?

- A minimum implementable unit
- A minimum implementable unit that advises implementers
- A minimum implementable unit that is actually wanted

Acceptable “excuses”

- Too difficult (for phase one)
- The scope is too broad (for phase one)
- Our implementers won't care (for now)
- Re-use
 - “Look, we can re-use that.. And that, and that and that..”

Merciless chopping

- Ability to ~~Import~~ and export data
- Support the interoperability paradigms REST, ~~Documents, Messages, Services~~
- Support ~~Tags, bundles, binary resources~~
- ~~Well.... We can use XDS...~~
- ~~Lets implement all FHIR resources!~~
- Enable search for resource by parameters ~~X,Y,Z~~ first name, last name, id ~~etc. etc.~~
- Snapshot ~~or other more sophisticated~~ data exchanges
- ~~RSS and Atomfeed~~

Our primary use case

- Allow users to search for, and export a patient's vital signs in the form of a FHIR resource
- Is a **minimum implementable unit**
- Is a well used use case
- Has work that we can build upon

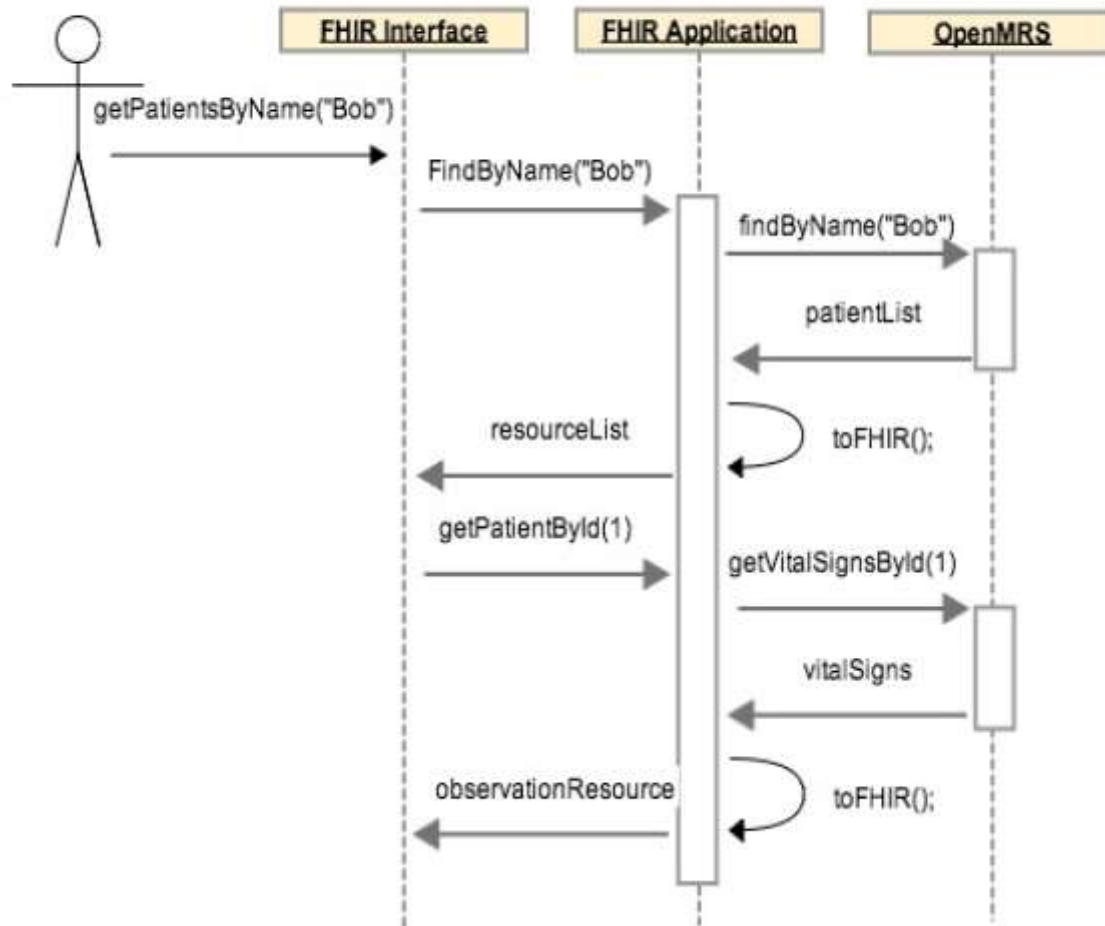
FHIR for OpenMRS : A Design

Presenting our design

- Do's
 - Understand that this is a design in progress
 - Throw stones
 - Ask questions
 - Suggest alternatives
- Don'ts
 - Think that this is 100% correct. Or 90%.. Or 80%...

Sequence diagram

Use Case : Obtain A Patient's Vital Signs



OpenMRS

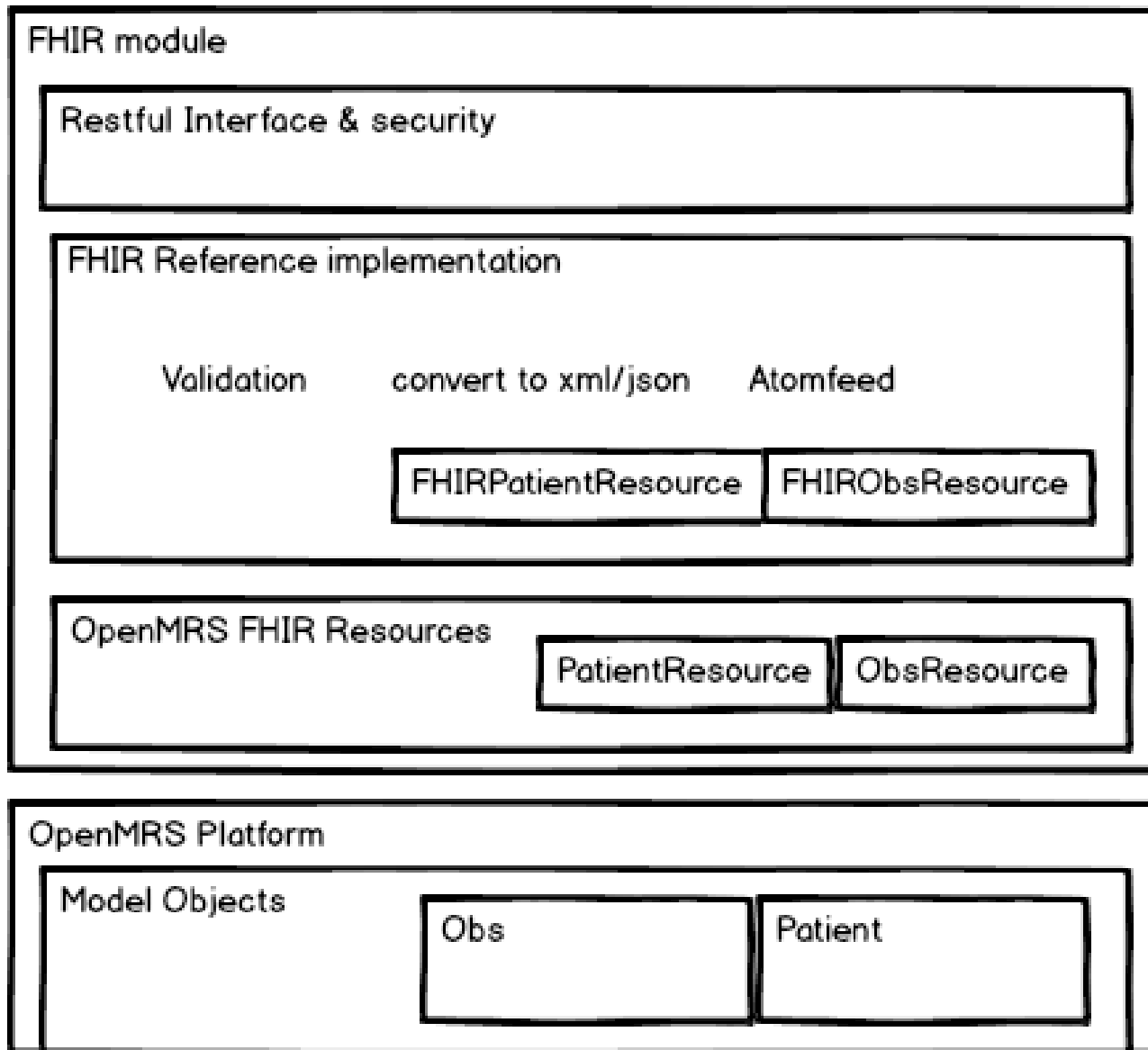
Things we need to worry about

- Security
- How to search for FHIR Resource objects
- How to model FHIR Resources
- Converting OMRS objects to FHIR Resources
- FHIR Validation
- Converting FHIR to XML / JSON
- Logging

The FHIR Reference implementation

- Why use the reference implementation ?
 - Already exists and works
 - Takes care of FHIR specific work
 - Is managed by the experts

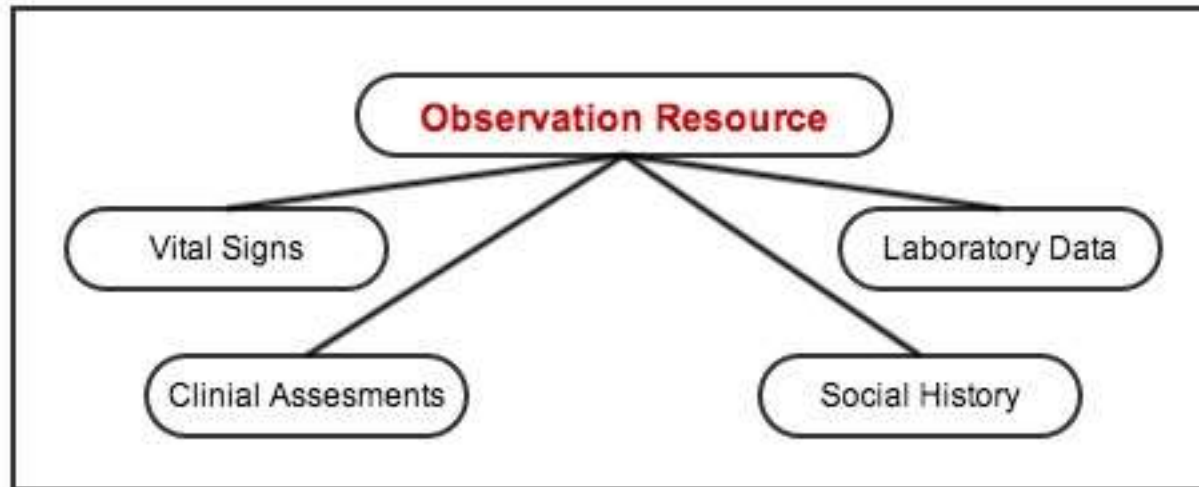
High level architecture diagram



Designing our FHIR Resources

- What resource can be used to model vital signs ?

An Observation resource

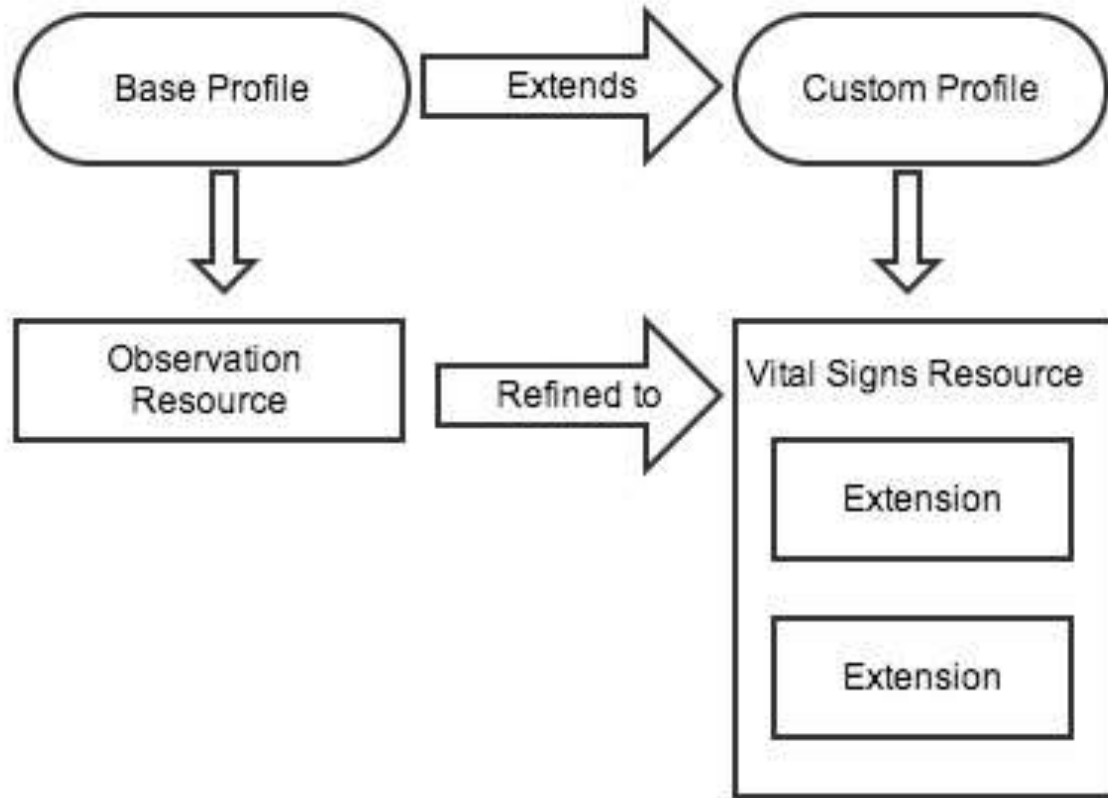


From an Observation resource to vital signs

- Questions that we need to answer
 - What content will remain mandatory / optional ?
 - What extensions (If any) are required ?
 - What value sets will be our questions and answers ?
- Represent these Q's & A's in the form of a **profile** that makes our Observation a vital signs resource

Observation Resource to vital signs :

Contd.



To be determined...

- What FHIR Resources does our use case require ?
 - Patient, Observation, Practitioner...
 - Will we recursively end up implementing everything ?
- What value sets can we use / modify ?
 - FHIR work groups define their own, somewhat similar to IHE does...

Deliverables

- An OpenMRS module that allows the export of patient vital signs data
- OpenMRS Developers who are comfortable with FHIR
- A re-usable design that can be applied for other resources / use cases
- Our own profiles, and the expertise to build / edit them
- Friends in the FHIR community

Challenges

- Determining value sets
- Keeping an eye on the larger picture
- Building and maintaining profiles
- Trying to Keep the MVP CIEL Dictionary in sync.
- Getting implemented by users

Thanks to...

- The usual suspects:
 - Dr. Paul Biondich
 - Dr. Burke Mamlin
 - Darius Jazayeri
 - Roger Friedman
- New partners in crime:
 - Grahame Grieve
 - Lloyd McKenzie
 - David Hay

Resources

- OpenMRS project page :
<https://wiki.openmrs.org/display/projects/Building+FHIR+support+for+OpenMRS>
- FHIR Documentation :
<http://www.hl7.org/implement/standards/fhir>
- Mailing lists : fhir@lists.hl7.org / dev@openmrs.org
- FHIR Reference implementation :
<http://www.hl7.org/documentcenter/public/standards/FHIR/fhir-0.0.81-Java-0.81.zip>

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