

HL7 FHIR



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FHIR in one slide

- Fast Healthcare Interoperable Resources
- New free and open healthcare data API
- Builds on simplicity of HL7 V2
- With modern (web) standards
 - XML, JSON, HTTP, REST, UML
 - Familiar to new generation of developers
- Easy to implement the basics
- Getting very rapid take up

FHIR in one bullet

FHIR is:

a set of XML (and/or JSON) health data resources, plus a REST API for accessing them.

Possibly two unfamiliar acronyms there:

JSON is an increasingly popular alternative markup to XML

REST is the name for accessing data via basic HTTP read/write/update operations

Examples

FHIR allows XML (or JSON) data to be read from and written to URLs, via HTTP, in a controlled, organized manner.

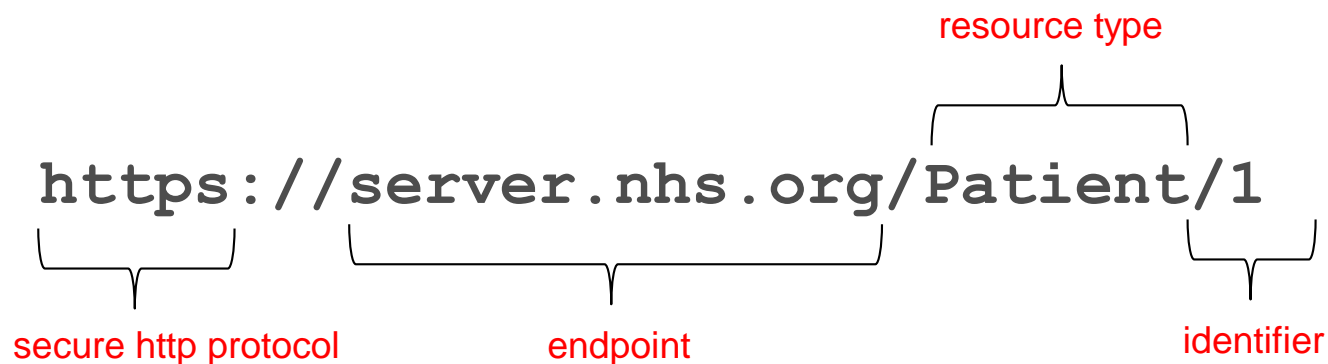
Lets see some XML...

```
<?xml version="1.0" encoding="utf-8"?>
<Patient xmlns="http://hl7.org/fhir">
  <text>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
      <p>Harley N Hobbs</p>
      <p>16 Pier Road</p>
      <p>Salisbury</p>
      <p>SY4 7IW</p>
      <p>Date of birth: 1966-06-07</p>
    </div>
  </text>
  <identifier>
    <use value="official"/>
    <type>
      <coding>
        <code value="SSN"/>
      </coding>
    </type>
    <system value="http://hl7.org/fhir/sid/us-ssn"/>
    <value value="1"/>
  </identifier>
  <name>
    <use value="official"/>
    <family value="Hobbs"/>
    <given value="Harley"/>
  </name>
  <birthDate value="1966-06-07"/>
</Patient>
```

*This is what a FHIR
Patient resource
looks like in XML*

REST: URL based API

Use REST to get patient #1 from a FHIR server



REST: JSON

JSON is an alternative format to XML

To use REST to read the same patient, but get it in JSON instead:

```
https://.../Patient/1?_format=json
```

Patient resource in JSON

```
{
  "resourceType": "Patient",
  "text": {
    "status": "generated",
    "div": "<div xmlns='http://www.w3.org/1999/xhtml'><p>Harley Hobbs</p>...."
  },
  "identifier": [{
    "use": "official",
    "label": "SSN",
    "system": "http://hl7.org/fhir/sid/us-ssn",
    "value": "1"
  }],
  "name": [{
    "use": "official",
    "family": ["Hobbs"],
    "given": ["Harley"]
  }],
  "birthDate": "1966-06-07",
  "address": [{
    "use": "home",
    "text": "16 Pier Road, Salisbury, SY4 7IW",
    "line": ["16 Pier Road"],
    "city": "Salisbury",
    "zip": "SY4 7IW"
  }]
}
```

```
<?xml version="1.0" encoding="utf-8"?>
<Patient xmlns="http://hl7.org/fhir">
  <text>
    <status value="generated"/>
    <div xmlns="http://www.w3.org/1999/xhtml">
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      <p>Date of birth: 1966-06-07</p>
    </div>
  </text>
  <identifier>
    <use value="official"/>
    <type>
      <coding>
        <code value="SSN"/>
      </coding>
    </type>
    <system value="http://hl7.org/ ... "/>
    <value value="1"/>
  </identifier>
  <name>
    <use value="official"/>
    <family value="Hobbs"/>
    <given value="Harley"/>
  </name>
  <birthDate value="1966-06-07"/>
</Patient>
```

```
{
  "resourceType": "Patient",
  "text": {
    "status": "generated",
    "div": "<div
xmlns='http://www.w3.org/1999/xhtml'><p>Harley
N Hobbs</p><p>16 Pier
Road</p><Salisbury</p><p>SY4 7IW</p>
<p>Date of birth: 1966-06-07</p>
</div>"
  },
  "identifier":
  [{
    "use": "official",
    "type": {
      "coding":
      [{"code": "SSN"}]
    },
    "system": "http://hl7.org/ ... ",
    "value": "1"
  }],
  "name": [{
    "use": "official",
    "family": ["Hobbs"],
    "given": ["Harley"]
  }],
  "birthDate": "1966-06-07"
}
```

REST: Searching

Search is also via URL

`https://.../Patient/search?name=Smith`



This URL searches patient resources.

Step back - why FHIR?

- HL7 V3 works - but is too hard
- Documents (CDA) aren't enough for all use cases
- HL7 V2 needs a transition path
- The world has evolved
- New markets, web, mobile, cloud
- Faster – integration in days or weeks, not months or years

The result



- HL7 undertook a “Fresh look”
 - What would healthcare exchange look like if we started from
 - scratch today - using modern approaches?
- Research on what makes a good interface, led to “RESTful” based APIs
 - Amazon, Twitter, Facebook...
- Drafted a healthcare exchange API based on this approach



This is the DSTU candidate version, for QA review. There's also the version that was balloted for DSTU, and a Nightly Build is also available.

Welcome to FHIR®

First time here? Read the [high level summary](#) and then the [FHIR overview / roadmap](#). See also the [open license](#).

Major Sections:



hl7.org/fhir (FHIR home)

Quick links:

Documentation

- [Resource List](#)
- [XML & JSON](#)
- [REST API & Search](#)
- [Data Types](#)
- [Using Terminologies](#)
- [Extensions](#)
- [Full table of contents](#)

Implementation

- [Downloads](#)
- [FHIR Schemas & Schematrons](#)
- [Examples: XML, JSON](#)
- [Code: Java, C#, Pascal](#)
- [Common Use Cases & Profiles](#)
- [Security](#)
- [Support Links](#)

External Links

- [Stack Overflow \(When to use\)](#)
- [Public Test Servers & Software](#)
- [FHIR Wiki](#)
- [Translations: Japanese](#)

Search the FHIR Specification:

Google™ Custom Search

Note: FHIR requires a browser that is SVG compatible. (Microsoft Internet Explorer 10+, Firefox 3.0+, Chrome, or Safari).

PATIENT VIEWER



COLLINS, CLAIRE ELI

21 Ulinga Crescent 8 Bimbah Street ALGEST
1997-01-23 Female

Home
21 ULINGA CRESCENT
8 BIMBAH STREET
ALGESTER
4115

Home
153-6156

Medicare Card PLS Patient ID
Number 916610
22062340191

Medications

Penicillin VK oral suspension 125mg/5ml
10.0 ml oral administration of treatment
on 2/06/2012 12:30 AM



PATIENT VIEWER



Collins, Calvin

99 Booth Drive, Merricks, 3916
1992-12-29 Male

Home
99 Booth Drive
Merricks
Victoria
3916

Home
5975 9999

Mobile
0419 999 999

Medications

Penicillin VK oral suspension 125mg/5ml
10.0 ml oral administration of treatment
on 2/06/2012 12:30 AM

Penicillin VK oral suspension 125mg/5ml
10 ml oral administration of treatment
on 1/06/2012 2:30 PM



F. H. I. R.?

- F – Fast, to design & to implement
- H – Health, that's what it is about
- I – Interoperable, ditto
- R – Resources
 - Building blocks – more on these to follow

Freely available



Free for use

Free as in beer (gratis)
and as in speech (freedom)

If you are looking for the simple free open health API,
this is it

FHIR License

1.0.3

FHIR plain English license:

- FHIR is © HL7. The right to maintain FHIR remains vested in HL7
- You can redistribute FHIR
- You can create derivative specifications or implementation-related products and services
- Derivative Specifications cannot redefine what conformance to FHIR means
- You can't claim that HL7 or any of its members endorses your derived [thing] because it uses content from this specification
- Neither HL7 nor any of the contributors to this specification accept any liability for your use of FHIR

Principles: keep it simple

- You should be able to “figure it out” over a weekend
- Easy to get started, grow into the spec for more complex scenarios
- *FHIR is interoperability for people who have other things to do*
- Support common scenarios and items (80/20 rule)
- Remainder is not forgotten (built in extension mechanism), but core is kept manageable

Existing technologies

- XML and/or JSON - for data
 - REST API – http web calls
 - like Amazon, Facebook, Twitter
 - read/write data via URLs (web addresses).
 - UML class diagrams - for models
 - XSD, Schematron - for validation
 - HTTPS, OAuth – industry standard security
- ...things you should have heard of ;-)

Implementer Focus

- Specification is written to be implemented
- Implementers have been forgotten recently
 - You can design what you want, but if I can't be built...
 - FHIR is tested by implementation *before publication*
- Publicly available test servers
- Working open source code is published with the specification
 - C#, Java (and also exist for ObjC, JavaScript, Swift, Clojure...)
- Connectathons, verify specification works
- Lots of examples, easy to understand

FHIR Resources



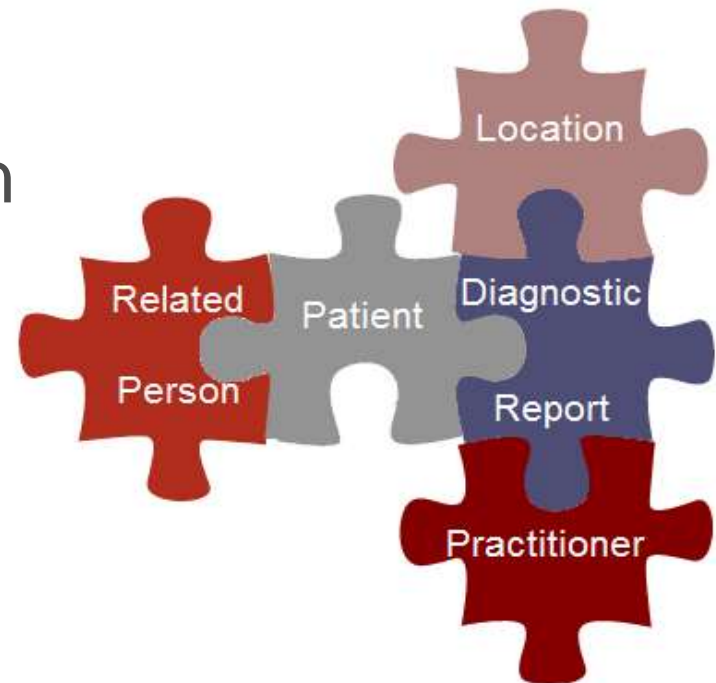
“Resources” are:

Small logically discrete units of exchanged data

Defined behaviour and meaning

Known identity / location

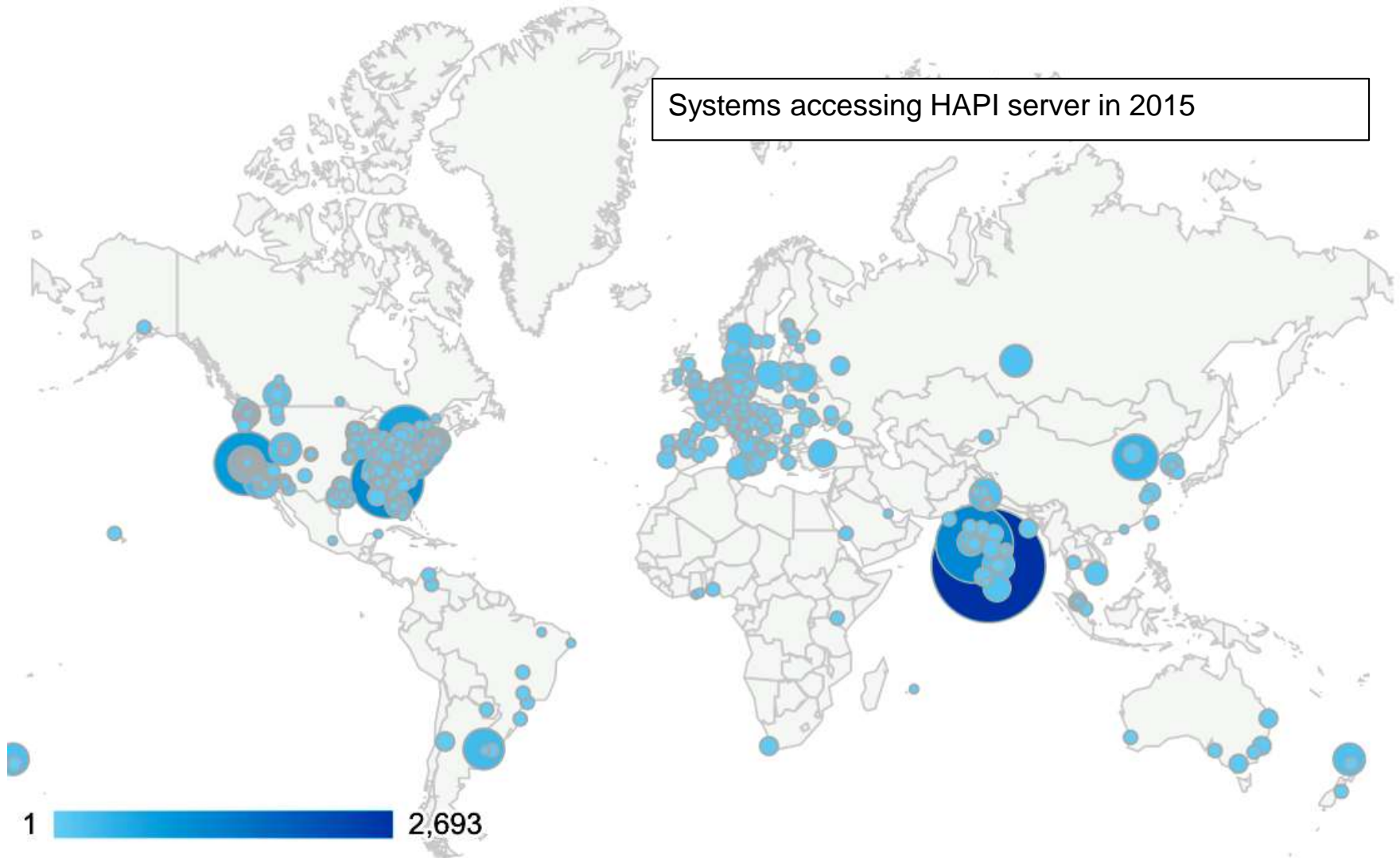
Smallest unit of transaction



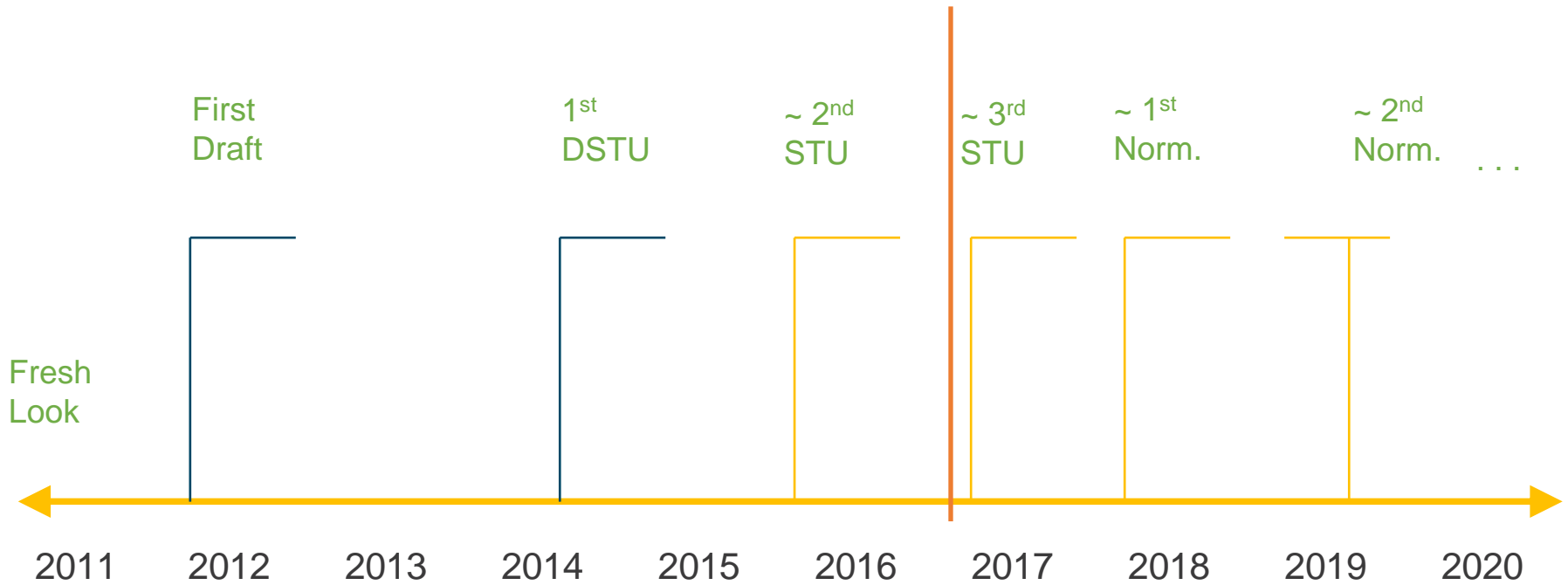
R.E.S.T.

- The API in FHIR – a key advantage
 - Adds the *behavior* onto the content of the *resources*
- Use HTTP to do “*CRUD*” operations (create, read, update, delete) on resources (records).
- The data is not a website, *but it is convenient to treat it like one.*
- Normal security can be applied via HTTP, firewalls etc.
- Other paradigms: documents, messages, services
 - Same FHIR resources are used

Who's using FHIR?



FHIR Timeline



Final message

FHIR

is easier and cheaper

is being implemented now (and in UK)

is likely to significantly impact Health IT

Decide how you want it to impact **your** organization

Live demo:

<http://nprogram.azurewebsites.net/>