FHIR Core Concepts and Best Practices

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Senior Software Engineer

October 8th, 2018

Getting Started: HL7 Community

FHIR®© DSTU2

Home | Documentation | Implementation | Resources | Clinical | Administrative | Infrastructure | Financial

Home

This is the second DSTU version of FHIR in it's permanent home (it will always be available at this URL).
For a full list of available versions, see the Directory of published versions.

0 Welcome to FHIR®

First time here? See the executive summary, the developer's introduction, or the clinical introduction, and then the FHIR overview / roadmap. See also the open license (and don't miss the full Table of Contents or you can search this specification).

DSTU updates:

- Oct-24 2015: Corrections to invariants, generated conformance resources, extension cardinalities, examples
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Major Sections:

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http://hl7.org/fhir/dstu2/index.html

FHIR

Fast Healthcare Interoperability Resources (FHIR, pronounced "Fire") defines a set of "Resources" that represent granular clinical concepts. The resources can be managed in isolation, or aggregated into complex documents. Technically, FHIR is designed for the web; the resources are based on simple XML or JSON structures, with an http-based RESTful protocol where each resource has predictable URL. Where possible, open internet standards are used for data representation.

Community Participation Rules: FHIR Code of Conduct, FHIR Intellectual Property Rules

Main Page
Categories

groups
Work Groups
User Groups

meetings

general

Tools

FHIR Implementation

- The current specification: http://www.HL7.org/fhir/ (or the development version)
  - FHIR Specification Feedback (DSTU 2)
  - FHIR Profiles from other Organizations
- Contact Information
  - FHIR Support Page
  - Implementation help: [ask questions about FHIR]
  - Formal Contact point for the project: [fmgcontact@hl7.org]
  - FHIR Chat (Zulip) chat.fhir.org community expectations
  - FHIR gForge Tracker for change requests/corrections
  - FHIR Project Team Leads (FHIR Core Team): [Grahame Grieve], [Ewout Kramer], [Lloyd Mckenzie]
  - List server - project em
- Help / Getting Started
  - FHIR Starter - tutorial f
  - FHIR Teaching - sources of FHIR teaching, training, and tutorials
  - FHIR Cheat Sheet (DSTU 1)
  - FHIR Cheat Sheet (DSTU 2)
  - FHIR Cheat Sheet (DSTU 3)
  - Help desk FAQs & knowledge-base articles (HL7 members only)
  - FHIR Tools Registry - a list of useful tools for FHIR implementers
  - FHIR for Clinical Users - an introduction to FHIR for non-technical people that will migrate to the specification in the future
  - FHIR User Group

Getting Started

FHIR Development

- How to
  - FHIR DSTU monitoring - how to monitor DSTU feedback
  - FHIR Ballot Prep - tasks for the next ballot and milestone dates
  - FHIR Desired FMM Tracking Spreadsheet
  - FHIR Build Process - Setting up and running the FHIR build process
  - How to create resources (and How to create types)
  - Materials: gForge, SVN Trunk
    - For read-only SVN access, use "anonymous" and your email as a password.
    - For Commit privileges, send a request to lloyd@lmckenzie.com
  - FHIR resource and profile proposals - proposals for new resources & profiles
  - FHIR Profile authoring - Creating and maintaining FHIR profiles (see also Profile Tooling)
  - FHIR Change requests - Process for managing and resolving
  - FHIR_gForge_Tracker - Guidance for using the gForge tracker, including for ballot reconciliation
- Implementation Guides
  - FHIR Implementation Guides - General

Organizational

- FHIR Infrastructure Work Group
  - FHIR Workflow Project
- Governance
  - FHIR Governance Process
  - FHIR Governance Board (FGB)
  - FHIR Management Group (FMG)
  - Modeling and Methodology (MnM)
  - Work Groups
  - FHIR Escalation Processes
  - FHIR Ballot Process
  - FHIR Web Server Hosting Record
  - [FMG Tracking Sheet]
- Agendas
  - **Baltimore WGM** (next meeting, Sept. 2016)
  - Past Working Group Meetings (list of agendas/notes)
  - MnM agendas
  - FGB Agendas & Minutes
  - FMG Agendas & Minutes

http://wiki.hl7.org/index.php?title=FHIR

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Resources

Spec Details

Reference Libraries

Note: HAPI is the recommended Java Reference implementation http://hapifhir.io/index.html

Specification Versioning

Latest: STU 3
AKA: 3.0.1

http://hl7.org/fhir/directory.html

All Published Versions of FHIR

This table provides a list of all the versions of FHIR (Fast Health Interoperability Resources) that are available. See also the directory of FHIR Implementation Guides.

Date	Version	Description
Current Versions		
Apr 19, 2017	3.0.1	Current Official Published Version *(Currently: Release 3 with 1 technical errata)*
(current)	(last commit)	Current Development build (about 30min behind version control, may be incoherent and change rapidly)
R4 sequence		
Aug 21, 2018	3.5.0	R4 Ballot #2 : Mixed Normative/Trial use (Second Normative ballot + Baltimore Connectathon)
Apr 3, 2018	3.3.0	R4 Ballot #1 : Mixed Normative/Trial use (First Normative ballot)
Dec 20, 2017	3.2.0	Draft for comment / First Candidate Normative Content
STU 3 sequence		
Apr 19, 2017	3.0.1	**FHIR Release 3** (STU) with 1 technical errata (Permanent Home) *Technical Errata Archive (zip): v3.0.0*
Dec 6, 2016	1.8.0	FHIR STU3 Candidate + Connectathon 14 (San Antonio)
Aug 11, 2016	1.6.0	FHIR STU3 Ballot + Connectathon 13 (Baltimore)
Mar 30, 2016	1.4.0	CQF on FHIR Ballot + Connectathon 12 (Montreal)
Dec 3, 2015	1.1.0	GAO Ballot + draft changes to main FHIR standard
DSTU 2 sequence		
Oct 24, 2015	1.0.2	**DSTU 2 (Official version)** with 1 technical errata (Permanent home)
Aug 31, 2015	1.0.0	DSTU 2 QA Preview + CQIF Ballot (Sep 2015)
April 2, 2015	0.5.0	DSTU 2 Ballot version (May 2015 Ballot)
Dec 12, 2014	0.4.0	Draft For Comment (January 2015 Ballot)
DSTU 1 sequence		
Sept 30, 2014	0.0.82	**DSTU 1 (Official version)** with 2 technical errata (Permanent home)
Sept ?, 2013	0.11	DSTU 1 Ballot version
Dec 4, 2012	0.06	2nd Draft for Comment (January 2013 Ballot)
Sep 9, 2012	0.05	1st Draft for Comment (Sept 2012 Ballot)
Historical Versions		
May 14, 2012	0.01	First version labelled as "FHIR"
Aug, 2011	0.01	Original Proposal, labelled as RfH

iii. Service Root URL

i. Open Sandbox
ii. Secure Sandbox
iii. Resource
iv. Parameters

iv. Client Errors
v. HTTP Verbs
vi. Authorization
vii. Pagination
viii. Cross Origin Resource Sharing

Current Version

Cerner's implementation currently supports the DSTU 2 Final (1.0.2) version of the FHIR® standard.

Docum
Encou
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Medica
Medica
Observ
Patient

This wel
Please h
to it.

Latest Millennium Production: DSTU 2 / 1.0.2

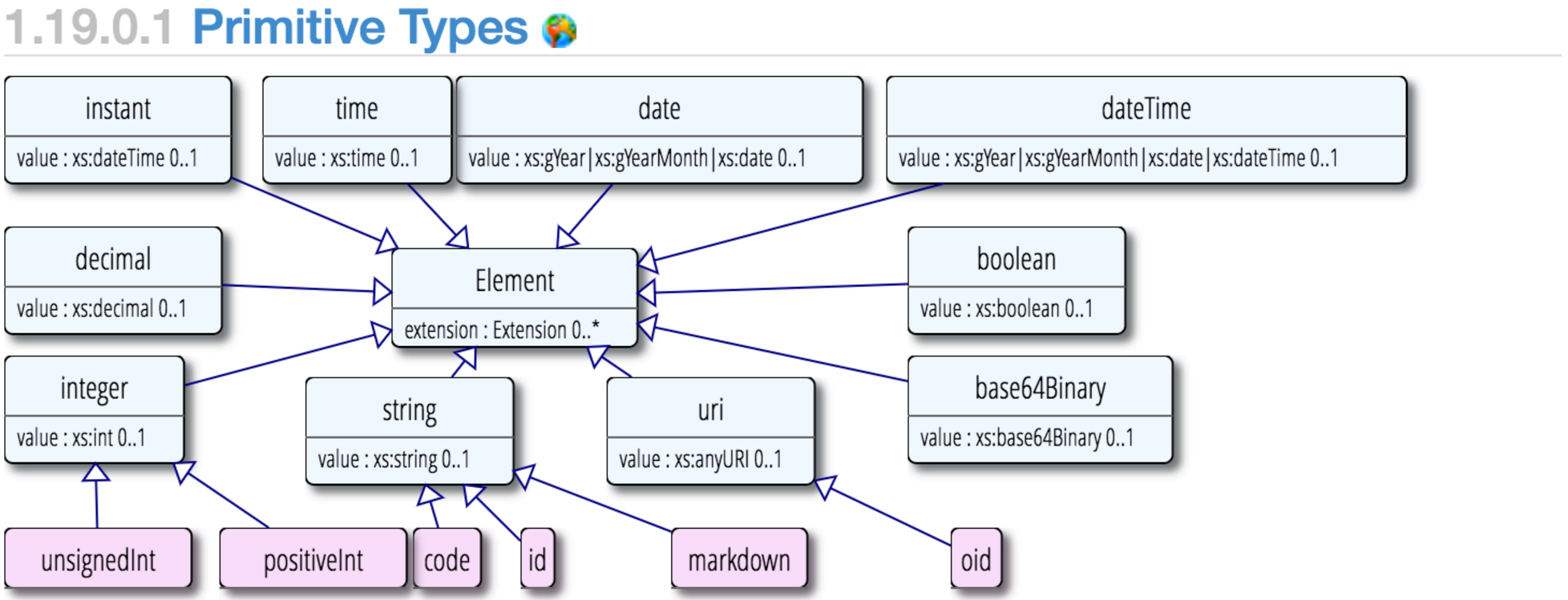
http://fhir.cerner.com/millennium/dstu2/

Which Version?

- Multiple available
- Deprecate oldest
- Time to uplift applications

Data Types

Primitive Types

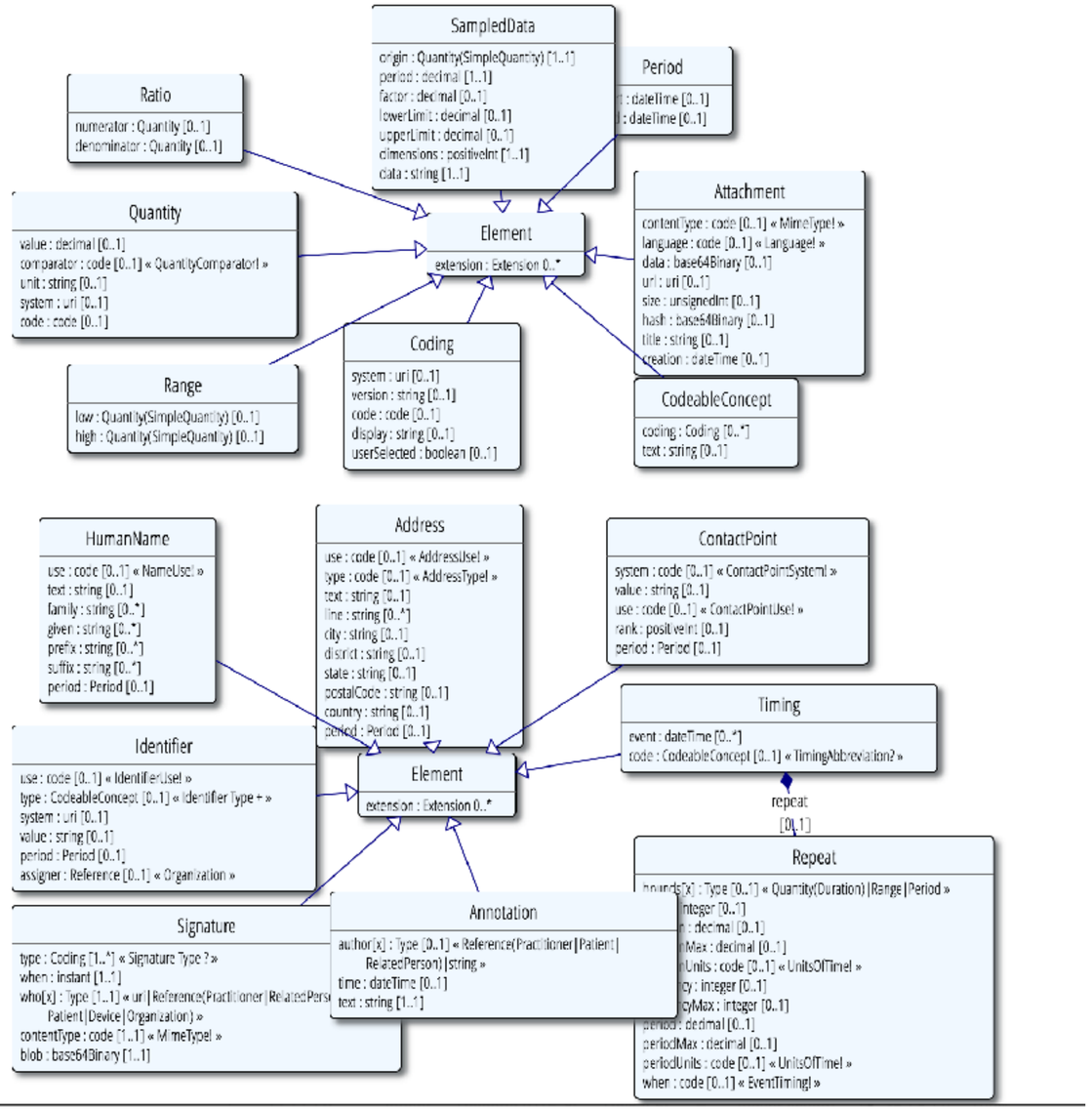


http://hl7.org/fhir/dstu2/datatypes.html#primitive

Surprises

- Decimal: 1.01, 1.010
- Instant vs DateTime
- DateTime vs Date vs Time

Complex Types



http://hl7.org/fhir/dstu2/datatypes.html#complex

Code Systems

Design Note: This specification defines two types for representing coded values:

- **Coding**: a simple direct reference to a code defined by a code system
- **CodeableConcept**: a text description and/or a list of Codings (i.e. a list of references to codes defined by code systems)

The `Coding` data type corresponds to the simple case of selecting a single code from a code list. However this type is rarely used in the FHIR specifications; long experience with exchanging coded values in HL7 shows that in the general case, systems need to able to exchange multiple translation codes, and/or an original text.

The `Coding` data type is used directly when there is certainty that the value must be selected directly from one of the available codes, and the list of possible codes is agreed to by all participants. This is not usually the case in the context of FHIR - general interoperability - so Coding is mostly used in extensions, which are usually intended to be defined for a well-controlled context of use.

http://hl7.org/fhir/dstu2/datatypes.html#codesystem

Formats

- JSON and/or XML
- Via Accept (for GET) or Content-Type (for POST) headers
- Via _format parameter

http://hl7.org/fhir/dstu2/http.html#mime-type

Resources

Resources

- Patient, Condition, MedicationOrder, etc.
- All resources have
  - metadata
  - narrative
- Resources differ in other structured data items
- [base]/[Resource] (case sensitive)
  - Example: [base]/Patient

http://hl7.org/fhir/dstu2/resource.html

3.0 Resource Index

Categorized | Alphabetical

This page is provided to help find resources quickly. There is also a more detailed classification, ontology, and description.

Clinical

General:

- AllergyIntolerance 1
- Condition (Problem) 2
- Procedure 1
- ClinicalImpression 0
- FamilyMemberHistory 1
- RiskAssessment 0
- DetectedIssue 1

Care Provision:

- CarePlan 1
- Goal 1
- ReferralRequest 1
- ProcedureRequest 1
- NutritionOrder 1
- VisionPrescription 0

Medication & Immunization:

- Medication 1
- MedicationOrder 1
- MedicationAdministration 1
- MedicationDispense 1
- MedicationStatement 1
- Immunization 1
- ImmunizationRecommendation 1

Diagnostics:

- Observation 3
- DiagnosticReport 3
- DiagnosticOrder 1
- Specimen 1
- BodySite 0
- ImagingStudy 2
- ImagingObjectSelection 1

Identification

Individuals:

- Patient 3
- Practitioner 1
- RelatedPerson 1

Groups:

- Organization 1
- HealthcareService 1
- Group 1

Entities:

- Location 1
- Substance 1
- Person 1
- Contract 0

Devices:

- Device 1
- DeviceComponent 1
- DeviceMetric 1

Workflow

Patient Management:

- Encounter 1
- EpisodeOfCare 1
- Communication 1
- Flag 1

Scheduling:

- Appointment 1
- AppointmentResponse 1
- Schedule 1
- Slot 1

Workflow #1:

- Order 0
- OrderResponse 0
- CommunicationRequest 1
- DeviceUseRequest 0
- DeviceUseStatement 0

Workflow #2:

- ProcessRequest 0
- ProcessResponse 0
- SupplyRequest 0
- SupplyDelivery 0

Infrastructure

Information Tracking:

Documents & Lists:

Structure:

Exchange:

http://hl7.org/fhir/dstu2/resourcelist.html

Maturity Levels

- Risk for change
- Lower number, highest risk
- 0-5

http://hl7.org/fhir/dstu2/resource.html#maturity

Terminology Bindings

Terminology Bindings

5.1.2.1 Terminology Bindings

Path	Definition	Type	Reference
Patient.gender Patient.contact.gender	The gender of a person used for administrative purposes.	Required	AdministrativeGender
Patient.maritalStatus	The domestic partnership status of a person.	Required	Marital Status Codes
Patient.contact.relationship	The nature of the relationship between a patient and a contact person for that patient.	Extensible	PatientContactRelationship
Patient.animal.species	The species of an animal.	Example	AnimalSpecies
Patient.animal.breed	The breed of an animal.	Example	AnimalBreeds
Patient.animal.genderStatus	The state of the animal's reproductive organs.	Example	GenderStatus
Patient.communication.language	A human language.	Required	IETF language tag
Patient.link.type	The type of link between this patient resource and another patient resource.	Required	LinkType

http://hl7.org/fhir/dstu2/patient.html#tx

Type/Binding Strength

required	To be conformant, instances of this element SHALL include a code from the specified value set
extensible	To be conformant, instances of this element must include a code from the specified value set if any of the codes within the value set can apply to the concept being communicated. If the valueset does not cover the concept (based on human review), alternate codings (from different code systems, including local ones) or (data type allowing) text) may be included instead.
preferred	Instances are encouraged, to draw from the specified codes for interoperability purposes but are not required to do so to be considered conformant
example	Instances are not expected or even encouraged to draw from the specified value set. The value set merely provides examples of the types of concepts intended to be included

http://hl7.org/fhir/dstu2/terminologies.html#strength

Terminology Bindings

Condition.code

Description

Identification of the condition or diagnosis.

Details: SNOMED CT
System: http://snomed.info/sct

Details: ICD-9-CM
System: http://hl7.org/fhir/sid/icd-9-cm

Details: ICD-10-CM
System: http://hl7.org/fhir/sid/icd-10-cm

Condition.category

Description

A category assigned to the condition.

Note

Category codes `diagnosis`, `problem` and `health-concern` are supported for search and retrieve functionality. Codes `diagnosis` and `problem` are supported for conditions add and update functionality.

Details: Condition Category Codes
System: http://hl7.org/fhir/condition-category

http://fhir.cerner.com/millennium/dstu2/general-clinical/condition/#terminology-bindings

Narrative

*"Any resource that is a domain resource (almost all types of resource) may include a **human-readable** narrative that contains a summary of the resource, and may be used to represent the content of the resource to a human. If narrative is present, it SHALL reflect all content needed for a human to **understand the essential clinical and business information** otherwise encoded within the resource. Resource definitions may define what content should be represented in the narrative to ensure clinical safety."*

http://hl7.org/fhir/dstu2/narrative.html#Narrative

```
…"text": {

    "status": "generated",

    "div": "<div><table><tbody><tr><td>Name</
td><td>Peter James                    <b>Chalmers</b>
(&quot;Jim&quot;)</td></tr><tr><td>Address</
td><td>534 Erewhon, Pleasantville, Vic, 3999</td></
tr><tr><td>Contacts</td><td>Home: unknown. Work: (03)
5555 6473</td></tr><tr><td>Id</td><td>MRN: 12345
(Acme Healthcare)</td></tr></tbody></table></div>"

  }…
```

Name	Peter James **Chalmers** ("Jim")
Address	534 Erewhon, Pleasantville, Vic, 3999
Contacts	Home: unknown. Work: (03) 5555 6473
Id	MRN: 12345 (Acme Healthcare)

Example 1

Example 1

- Identify the FMM (maturity model) of the Following resources for DSTU 2:
  - Patient
  - Condition
  - Observation
  - Coverage

Example 2

Example 2

- What type of authorization does the Millennium DSTU 2 Patient search operation in Cerner’s sandbox server accept?

Example 3

Example 3

- What search parameters does the Millennium DSTU 2 implementation of Patient support? Are there any limitations or considerations?

Cerner’s Google Group

- Search for “Cerner FHIR Developers”
- Focused on providing troubleshooting / technical assistance to anyone consuming Cerner’s sandbox FHIR server

Read

Read

- “By ID”
- [base]/[Resource]/[id]
  - Example: [base]/Patient/123ABC

http://hl7.org/fhir/dstu2/http.html#read

id vs identifier

- id: logical identifier, must be unique within the FHIR server and resource
- identifier: business identifier or “alias”
  - SSN
  - MRN
  - Military ID

http://hl7.org/fhir/dstu2/resource.html#id

Search

5.1.9 Search Parameters

Search parameters for this resource. The common parameters also apply. See Searching for more information about searching in REST, messaging, and services.

Name	Type	Description	Paths
active	token	Whether the patient record is active	Patient.active
address	string	An address in any kind of address/part of the patient	Patient.address
address-city	string	A city specified in an address	Patient.address.city
address-country	string	A country specified in an address	Patient.address.country
address-postalcode	string	A postalCode specified in an address	Patient.address.postalCode
address-state	string	A state specified in an address	Patient.address.state
address-use	token	A use code specified in an address	Patient.address.use
animal-breed	token	The breed for animal patients	Patient.animal.breed
animal-species	token	The species for animal patients	Patient.animal.species
birthdate	date	The patient's date of birth	Patient.birthDate
careprovider	reference	Patient's nominated care provider, could be a care manager, not the organization that manages the record	Patient.careProvider (Organization, Practitioner)
deathdate	date	The date of death has been provided and satisfies this search value	Patient.deceasedDateTime
deceased	token	This patient has been marked as deceased, or as a death date entered	Patient.deceased[x]
email	token	A value in an email contact	Patient.telecom(system=email)
family	string	A portion of the family name of the patient	Patient.name.family
gender	token	Gender of the patient	Patient.gender
given	string	A portion of the given name of the patient	Patient.name.given
identifier	token	A patient identifier	Patient.identifier
language	token	Language code (irrespective of use value)	Patient.communication.language
link	reference	All patients linked to the given patient	Patient.link.other

http://hl7.org/fhir/dstu2/patient.html#search

search param, or _id			Example: 1961-01-16
phone	This and/or any other search param, or _id	token	The patient's phone number. Example: 1111111111
email	This and/or any other search param, or _id	token	The patient's email address. Example: example@example.com
address-postalcode	This and/or any other search param, or _id	string	The postal code in the address details of the patient. Example: 11111
gender	No	token	The gender of the patient. Example: male
_count	No	number	The maximum number of results to return. Defaults to 20.

Notes:

- Either the `_id`, or a combination of `identifier` , `birthdate`, `name`, `given`, `family`, `address-postalcode`, `phone`, or `email` parameters must be provided.
- The `gender` parameter may only be provided if at least one of `identifier` , `birthdate`, `name` , `given`, `family`, `address-postalcode`, `phone`, or `email` parameters is provided.
- The `name`, `family`, and `given` parameters support the ':exact' modifier and will search for current names only.
- The `identifier`, `name`, `family`, `given`, `phone`, `email`, `address-postalcode`, or `gender` parameters may be provided exactly once and may have only a single value.
- The `birthdate` parameter may be provided twice to indicate a date range, but must contain the inclusive prefixes 'le' and 'ge'
- The `birthdate` parameter may be provided once with the following prefixes: 'ge', 'le', 'gt', 'lt', 'eq'

http://fhir.cerner.com/millennium/dstu2/individuals/patient/#parameters

2.1.1.2 Introduction 🌍

In the simplest case, a search is executed by performing a `GET` operation in the RESTful framework:

```
GET [base]/[resourcetype]?name=value&...
```

For this RESTful search (see definition in RESTful API), the parameters are a series of name=[value] pairs encoded in the URL or as an application/x-www-form-urlencoded submission for a POST:

```
POST  [base]/[type]/_search{?[parameters]{&_format=[mime-type]}}
```

The server determines which of the set of resources it serves meet the specific criteria, and returns the results in the HTTP response as a bundle which includes the resources that are the results of the search.

GET [base]/AllergyIntolerance?patient=123

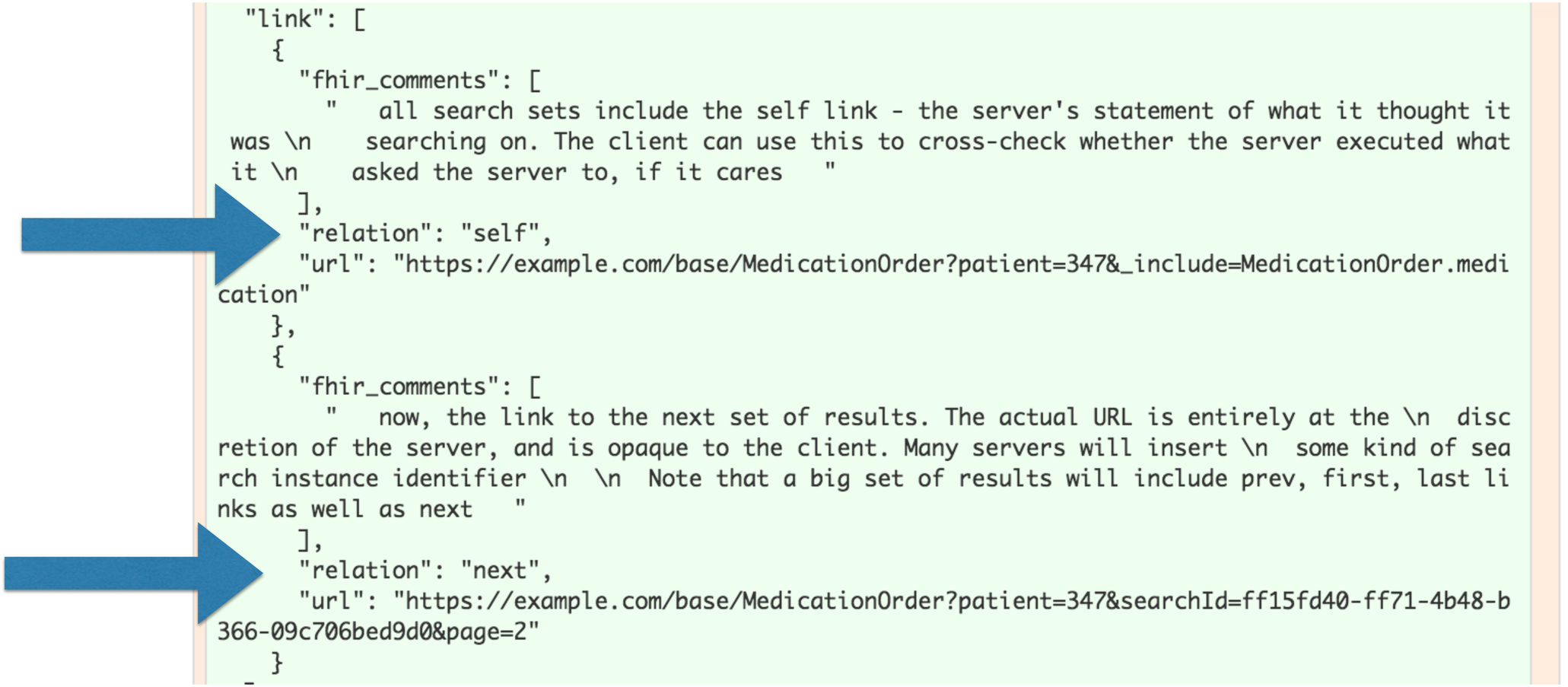
http://hl7.org/fhir/dstu2/search.html

Paging

Paging

- **Self**, First, **Previous**, **Next**, Last
- Must use link as provided, changing it has undefined consequences
- _count parameter
  - Less but not more
- For interoperability - handle paging

http://hl7.org/fhir/dstu2/http.html#paging




```
  "link": [
    {
      "fhir_comments": [
        "   all search sets include the self link - the server's statement of what it thought it
 was \n    searching on. The client can use this to cross-check whether the server executed what
 it \n    asked the server to, if it cares   "
      ],
      "relation": "self",
      "url": "https://example.com/base/MedicationOrder?patient=347&_include=MedicationOrder.medi
cation"
    },
    {
      "fhir_comments": [
        "   now, the link to the next set of results. The actual URL is entirely at the \n  disc
retion of the server, and is opaque to the client. Many servers will insert \n  some kind of sea
rch instance identifier \n  \n  Note that a big set of results will include prev, first, last li
nks as well as next   "
      ],
      "relation": "next",
      "url": "https://example.com/base/MedicationOrder?patient=347&searchId=ff15fd40-ff71-4b48-b
366-09c706bed9d0&page=2"
    }
```

Writes

Create

- POST [base]/[Resource]
  - Example: POST [base]/AllergyIntolerance
- Body (content-type) must match supported FHIR format

http://hl7.org/fhir/dstu2/http.html#create

Update

- PUT [base]/[Resource]/[id]
  - Example: PUT [base]/AllergyIntolerance/123
- Body (content-type) must match supported FHIR format

http://hl7.org/fhir/dstu2/http.html#update

Conditional Update

- Optimistic Locking via “If-Match” request header
- Example: Version in database: 2a
    - Version in “If-Match”: 1a - failure
    - Version in “If-Match”: 2a - success

http://hl7.org/fhir/dstu2/http.html#2.1.0.10.2

Example 4

Example 4

- Find out the middle name for Patient Fred Smart (id: 4478007)

Example 5

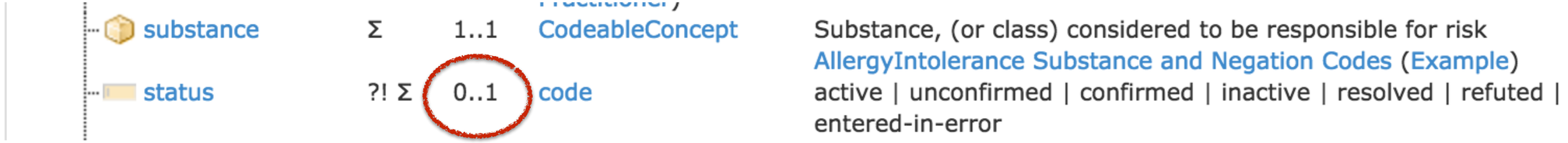
Example 5

- How many **current** allergies or intolerances does Tim Peters (id: 1316024) have?
  - Current: actual or possible existing allergies or intolerances
  - Hint: What indicates “current” for this FHIR resource?

This value set has an inline code system http://hl7.org/fhir/allergy-intolerance-status, which defines the following codes:

Lvl	Code	Display	Definition
1	active	Active	An active record of a reaction to the identified Substance.
2	unconfirmed	Unconfirmed	A low level of certainty about the propensity for a reaction to the identified Substance.
2	confirmed	Confirmed	A high level of certainty about the propensity for a reaction to the identified Substance, which may include clinical evidence by testing or rechallenge.
1	inactive	Inactive	An inactive record of a reaction to the identified Substance.
2	resolved	Resolved	A reaction to the identified Substance has been clinically reassessed by testing or rechallenge and considered to be resolved.
2	refuted	Refuted	A propensity for a reaction to the identified Substance has been disproven with a high level of clinical certainty, which may include testing or rechallenge, and is refuted.
2	entered-in-error	Entered In Error	The statement was entered in error and is not valid.

http://hl7.org/fhir/DSTU2/valueset-allergy-intolerance-status.html



What if it wasn't mapped/known?

http://hl7.org/fhir/dstu2/allergyintolerance.html

Example 6

Example 6

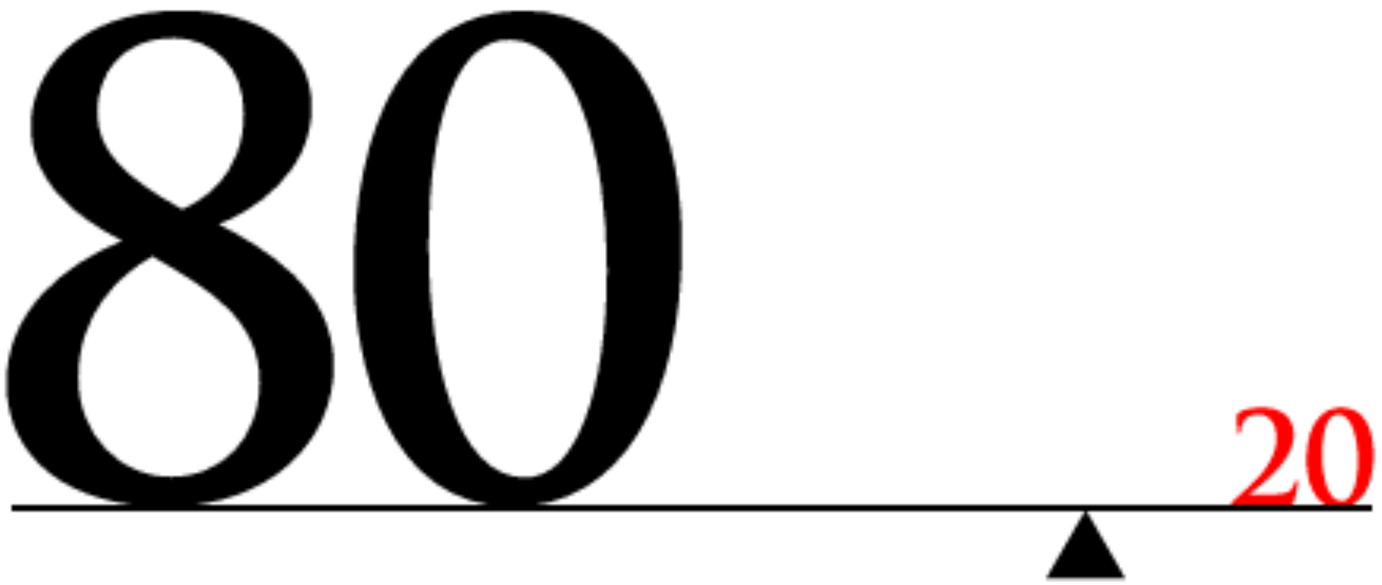
- How many different **MedicationOrder**s of *Advil Cold and Sinus* does Tim Peters (id: 1316024) have?
  - Hint: filter for statuses of active and on-hold

Example 7

Example 7

- What is the name of the patient with MRN 10000363
  - Hint: the system is urn:oid:1.1.1.1.1.1.1 (oid)

Extensions



http://hl7.org/fhir/dstu2/extensibility.html

Extension “Rules”

- They’re expected
- They can nest
- Server/client cannot reject because of extension
  - Unless it’s a modifier

Examples

Here is an example of an extension in XML:

```
<name>
  <extension url="http://hl7.org/fhir/StructureDefinition/iso-21090-name-use" >
    <valueCode value="I" />
  </extension>
  <text value="Chief Red Cloud"/>
</name>
```

In this example, the name with text = "Chief Red Cloud" is extended to have a name use code of "Indigenous" (defined in ISO 21090, but very rarely used in practice).

In JSON, extensions are represented similarly:

```
  "name" : {
    "extension" : [{
      "url" : "http://hl7.org/fhir/StructureDefinition/iso-21090-name-use",
      "valueCode" : "I"
    }],
   "text" : "Chief Red Cloud"
  }
```

Modifier Example

Example: There's no element on MedicationOrder to write an "anti-prescription" - an instruction not to take a medication for a particular time. Classical clinical recording systems do not record this as a prescription - but one particular system does, and these "anti-prescription" records need to be shared within the institution where this happens, as they are an important part of the workflow. Hence, applications are allowed to extend a resource with data like this:

```
<MedicationOrder>
  <modifierExtension url="http://example.org/fhir/StructureDefinition/anti-prescription">
    <valueBoolean value="true"/>
  </modifierExtension>
  <!-- ... other content ... -->
</MedicationOrder>
```

Or in JSON:

```
{
  "resourceType" : "MedicationOrder",
  "modifierExtension" : [{
    "url" : "http://example.org/fhir/StructureDefinition/anti-prescription",
    "valueBoolean" : "true"
  }],
  .. other content ...
}
```

Content | Detailed Descriptions | Mappings | XML | JSON

Extension: Time of day of birth

URL for this extension:

```
http://hl7.org/fhir/StructureDefinition/patient-birthTime
```

Status: draft. Extension maintained by: HL7

The time of day that the Patient was born. This includes the date to ensure that the timezone information can be communicated effectively.

Context of Use: Use on element: Patient.birthDate

usage info: insert a list of places where this extension is used

Extension Content

Summary | Full Structure | XML | JSON | All

Fulle Structure

Name	Flags	Card.	Type	Description & Constraints
extension		0..1	Extension	URL = http://hl7.org/fhir/StructureDefinition/patient-birthTime Time of day of birth: The time of day that the Patient was born. This includes the date to ensure that the timezone information can be communicated effectively. Use on element: Patient.birthDate
~~extension~~		~~0..0~~		
url		1..1	uri	"http://hl7.org/fhir/StructureDefinition/patient-birthTime"
valueDateTime		1..1	dateTime	Value of extension

Documentation for this format

http://hl7.org/fhir/dstu2/extension-patient-birthtime.html

Conformance

Conformance Resource

- Weird: located at ~~[base]/Conformance~~ [base]/metadata
- Describes the Server
- Step towards auto-config

http://hl7.org/fhir/dstu2/conformance.html

What?

- Which operations?
- Which parameters?
- Which formats?
- Profiles…

Example 8

Example 8

- Which extensions are supported by the Millennium DSTU 2 Patient resource?

Example 9

Example 9

- According to the Conformance statement, does this FHIR server support OAuth? https://fhir-open.sandboxcerner.com/dstu2/0b8a0111-e8e6-4c26-a91c-5069cbc6b1ca/

Profiles

What

2.13.0.3 Two uses of Profiles

The Conformance resource describes two different uses for profiles on resources: Resource Profiles and System Profiles. Resource Profiles are specified using the *Conformance.rest.resource.profile* element and System Profiles are specified using the *Conformance.profile* element.

2.13.0.3.1 Conformance.rest.resource.profile

These profiles describe the general features that are supported by the system for each kind of resource. Typically, this is the superset of all the different use-cases implemented by the system. This is a resource-level perspective of a system's functionality.

2.13.0.3.2 Conformance.profile

These profiles describe the information handled/produced by the system on a per use case basis. Some examples of the uses for these kind of profiles:

- A Laboratory service producing a set of different reports - general chemistry, blood count, etc. Typical labs would support several hundred different reports

http://hl7.org/fhir/dstu2/profiling.html

Rules

- Detailed contract
- Parameters, operations, API calls
- Fields, cardinality
- Terminology binding, extensions
- Must be compatible with core
  - Can’t change required binding
  - Cardinality can restrict more (1..* to 1..1 but not 0..*)
  - Can’t rename fields

DAF Condition

The official URL for this profile is:

```
http://hl7.org/fhir/StructureDefinition/daf-condition
```

Defines constraints and extensions on the condition resource for use in querying and retrieving patient's information related to problems which includes conditions, findings, symptoms etc.

This profile was published on Thu, Aug 21, 2014 00:00+1000 as a draft by Health Level Seven International (Infrastructure and Messaging - Data Access Framework).

D.18.1.1 Formal Views of Profile Content

Description of Profiles, Differentials, Snapshots, and how the XML and JSON presentations work.

Text Summary | **Differential Table** | Snapshot Table | XML Template | JSON Template | All

This structure is derived from Condition.

Name	Flags	Card.	Type	Description & Constraints
Condition		0..*	Condition	
identifier	S	0..*	Identifier	
patient	S	1..1	Reference(DAF-Patient)	
encounter	S	0..1	Reference(DAF-Encounter)	
asserter	S	0..1	Reference(DAF-Pract | DAF-Patient)	
dateRecorded	S	0..1	date	
code	S	1..1	CodeableConcept	**Binding:** Problem Value Set (extensible)
category	S	0..1	CodeableConcept	
clinicalStatus	S	1..1	code	
severity	S	0..1	CodeableConcept	mild | moderate | severe | fatal **Binding:** Condition/Diagnosis Severity (extensible)
onset[x]			*dateTime, Age, Period, Range*	***Slice:*** *Unordered, Open, by @type*

http://hl7.org/fhir/dstu2/daf/daf-condition.html

Argonaut IG

- http://www.fhir.org/guides/argonaut/r2/
- Standard Profiles for defined use cases
- Address issues from the JASON Task Force reports

http://hl7.org/fhir/dstu2/iglist.html

Questions?

More Examples!

Example 10

Exercise 10

- Does Fred Smart (id: 4478007) have a normal blood pressure?
  - Hint: LOINC 55284-4 can be used to find blood pressures

Example 11

Example 11

- Is Fred Smart (id: 4478007) currently taking insulin?

Example 12

Example 12

- Which patient has a pacemaker: Fred Smart (id: 4478007) or Tim Peters (id: 1316024)?

Example 13

Example 13

- Who is patient Tim Peters’ (id: 1316024) son?

Example 14

Example 14

- What happens when you query MedicationStatement for Joe Smart (id: 4342010) and filter by a status of draft? Why?

1.25.2.1.197.1 Content Logical Definition

This value set has an inline code system http://hl7.org/fhir/medication-statement-status, which defines the following codes:

Code	Display	Definition	v3 Map (ActStatus)
active	Active	The medication is still being taken.	=active
completed	Completed	The medication is no longer being taken.	=completed
entered-in-error	Entered in Error	The statement was entered in error.	=nullified
intended	Intended	The medication may be taken at some time in the future.	

http://hl7.org/fhir/DSTU2/valueset-medication-statement-status.html

Questions?

Thanks for listening!