

SS-MIXとHL7FHIR —それぞれの役割—

日本HL7協会会長
浜松医科大学医療情報部
木村通男

F_(Fast) H_(Health) I_(Interoperable) R_(Resources) 【背景】

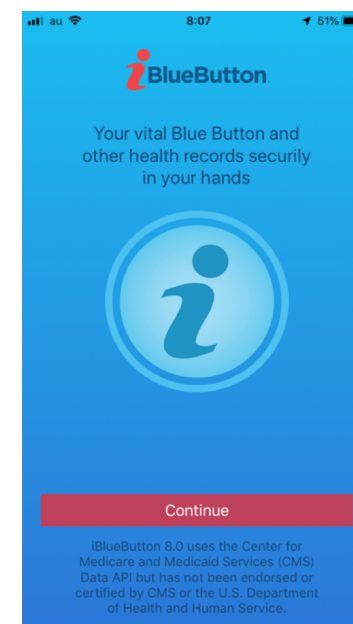


- 2004年4月ブッシュ政権 Health IT Initiative →1億ドル
 - 医療の質の向上、医療コストの削減、医療ミスの防止、医療データの管理コストの削減等
 - 2014年までに、アメリカ人の半数が自身の医療データにアクセスできる
- 2009年2月オバマ政権 (ARRA)HITECH act→ 200億ドル
 - Health IT Initiativeを継承、さらにMeaningful Use
 - 2014年までに、全アメリカ人が自身の医療データにアクセスできる

Meaningful Use

1. 医療の質、安全性・有効性の改善と医療格差をなくす
2. 患者と家族を健康につなげる
3. ケアの改善
4. PopulationとPublic Healthの改善
5. 個人の健康情報に対する適切なプライバシーとセキュリティの確保

- 高額な税金を医療情報システムに投資する
 - 米国民のためになることを説明できる必要がある
 - PCスマホ等で誰でも (米国民全員が)容易に自身のデータにアクセスできる
 - (国民自身が参加することで)処方 of 正しさを評価、確認でき、費用削減、ミスの防止につながる
- 米国のStandard strategy
 - 国際標準にしてビジネスを展開する





【何故】F (Fast) H (Health) I (Interoperable) R (Resources)



HIT → GE, IBM等大手が積極的に開発、しかし2009年でもほとんど普及せず

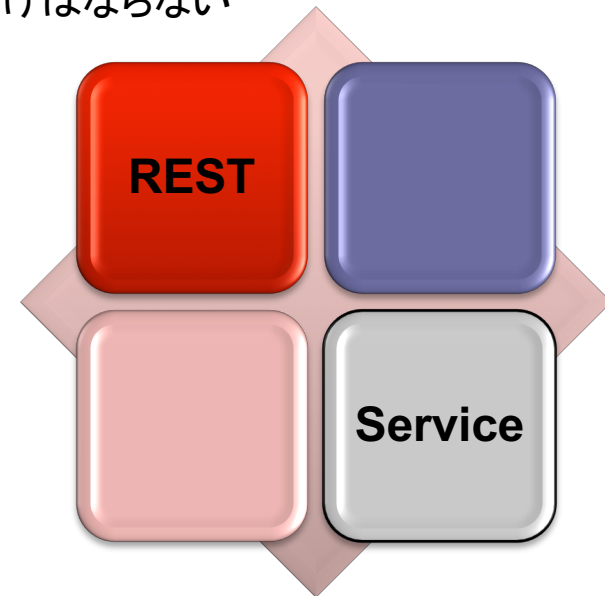
PCAST: Healthcare改善のHealth IT実現のための報告書

(アメリカ国民全員がアクセス出来るには)大量のデータを扱えなければならない

- 多くの開発者、技術者が必要
- 大企業だけでなく、中小企業も参加出来ること
- モバイル機器の利用が必須(Google, Apple等)
- 既存の標準(HL V2, V3等)で容易に実現可能か?

汎用の技術の活用できないか

- SOA(Service Oriented Architecture)
 - Modular(段階的な開発が可能)
 - SOAP/WS*(複雑、難解)
- **REST**(Simple, Easy)
- ROA/RESTful
 - RFH(Resource For Health) → **FHIR**



多くの人材が参加でき、ほとんどのアメリカ国民が自身の健康データにアクセスできる



RFH(Resource For Health)



ROA(Resource Oriented Architecture)

- HTTPを用いた分散インターネットアプリケーションSOAのように再利用、段階的開発が可能(Modular)
- (Simple & Easy)RESTによるResource Oriented Architecture(ROA)/RESTfulサービス
 - ※RESTで記述されたリソースは RESTfulでない、1方向、ピアToピア等の情報交換ができる
- Resourceとは、名前とアドレスによるURI(Uniform Resource Identifier)で示されるWeb上に存在する情報、データである

RFH(Resource For Health)の試み→FHIR 0.01(2012)

ただしミッションクリティカルな情報はCDAで→CCDA

Resource type

http://server.org/fhir/Patient/1234

endpoint

Resource id

FHIRリソースは

- データ交換の小さな論理的に独立したユニット
- 振る舞いと意味が定義されている
- 身元と所在が明確
- トランザクションの最小単位
- 医療に関連すること



リソース例

FHIRではこの様なものをリソースと呼ぼう
Whyではなく定義

- 管理上の単位
 - Patient
 - Practitioner
 - Organization
 - Location
 - Coverage
 - Invoice
- 臨床上の概念
 - Allergy
 - Condition
 - Family History
 - Care Plan
- インフラストラクチャ
 - Document
 - Message
 - Profile
 - Conformance

リソースに該当しない例

- 小さすぎる
eg. Gender
- 大きすぎる
eg. Electronic Health Record
- 限定すぎる
eg. Blood pressure
- 広すぎる
ea. Intervention



- 情報をリソースとして定義する
 - Metadata、Data elementをそれぞれタグ(URI)付けする
- 80%ルール(8割ルール)
 - 標準・規格の全てが常に使用される訳ではない
 - 国、地域ごとに言語、医療・保険制度、ルール、コード体系等と同じではない(異なる)
 - Extensionの仕組み、ルールを明確にする
- Narrativeエレメントは必須
 - XHTMLで記述する
 - Narrative部は必ず処理(表示)



http://www.hl7.org/fhir/?ref=learnmore

- Home
- Getting Started
- Documentation
- Resources
- Profiles
- Extensions
- Operations
- Terminologies

仕様書

リソース

プロフィール

This is the Current officially released version of FHIR, which is R4. For a full list of available versions, see the [Directory of published versions](#).

FHIRリリース版選択

0 Welcome to FHIR®

FHIR is a standard for health care data exchange, published by HL7®.

First time here?

See the [executive summary](#), the [developer's introduction](#), [clinical introduction](#), or [architect's introduction](#), and then the [FHIR overview / roadmap & Timelines](#). See also the [open license](#) (and don't miss the full [Table of Contents](#) and the [Community Credits](#) or you can [search this specification](#)).

概要とサマリー

Level 1 Basic framework on which the specification is built

Foundation	Base Documentation, XML, JSON, Data Types, Extensions
-------------------	---

Level 2 Supporting implementation and binding to external specifications

Implementer Support	Security & Privacy	Conformance	Terminology	Exchange
Downloads, Version Mgmt, Use Cases, Testing	Security, Consent, Provenance, AuditEvent	StructureDefinition, CapabilityStatement, ImplementationGuide, Profiling	CodeSystem, ValueSet, ConceptMap, Terminology Svc	REST API + Search Documents Messaging Services Databases

仕様カテゴリー 5つのレベル

Level 3 Linking to real world concepts in the healthcare system

Administration	Patient, Practitioner, CareTeam, Device, Organization, Location, Healthcare Service
-----------------------	---

Level 4 Record-keeping and Data Exchange for the healthcare process

Clinical	Diagnostics	Medications	Workflow	Financial
-----------------	--------------------	--------------------	-----------------	------------------






カテゴリー レベル1、2

(成熟度レベルではない)


Level 1 Basic framework on which the specification is built

 Foundation	Base Documentation, XML, JSON, Data Types, Extensions
---	---






Level 2 Supporting implementation and binding to external specifications

 Implementer Support Downloads, Version Mgmt, Use Cases, Testing	 Security & Privacy Security, Consent, Provenance, AuditEvent	 Conformance StructureDefinition, CapabilityStatement, ImplementationGuide, Profiling	 Terminology CodeSystem, ValueSet, ConceptMap, Terminology Svc	 Exchange REST API + Search Documents Messaging Services Databases
--	---	---	--	---


Level 3 Linking to real world concepts in the healthcare system

 Administration	Patient, Practitioner, CareTeam, Device, Organization, Location, Healthcare Service
---	---

Level 4 Record-keeping and Data Exchange for the healthcare process

 Clinical Allergy, Problem, Procedure, CarePlan/Goal, ServiceRequest, Family History, RiskAssessment, etc.	 Diagnostics Observation, Report, Specimen, ImagingStudy, Genomics, Specimen, ImagingStudy, etc.	 Medications Medication, Request, Dispense, Administration, Statement, Immunization, etc.	 Workflow Introduction + Task, Appointment, Schedule, Referral, PlanDefinition, etc	 Financial Claim, Account, Invoice, ChargeItem, Coverage + Eligibility Request & Response, ExplanationOfBenefit, etc.
--	---	--	---	---

Level 5 Providing the ability to reason about the healthcare process

 Clinical Reasoning	Library, PlanDefinition & GuidanceResponse, Measure/MeasureReport, etc.
---	---

レベル 1: Foundation(基礎)

仕様作成時の基本フレームワーク

レベル 2: Implementer support(実装者支援)

実装者が利用できるための支援

2: Security & Privacy(セキュリティとプライバシー)

セキュリティ、完全性、プライバシーを構築、維持するための支援

2: Conformance(適合性)

実装ガイドを定義し、適合性をテストする方法

2: Terminology(用語集)

用語および関連する成果物

2: Exchange(データ交換)

Rest API、Document、メッセージ交換、データベース等の規定

レベル 3: Administration(管理)

患者、医療従事者、組織、機器、物質などを管理、トレースするための基本規定

レベル 4: Clinical(臨床情報)

プロブレム、アレルギー、治療過程(治療計画、紹介)等の主な臨床情報

4: Diagnostics(診断情報)

所見、各種報告書、指示等

4: Medication(投薬管理)

処方、調剤、投薬管理、予防接種等の管理とトレース

4: Workflow(ワークフロー)

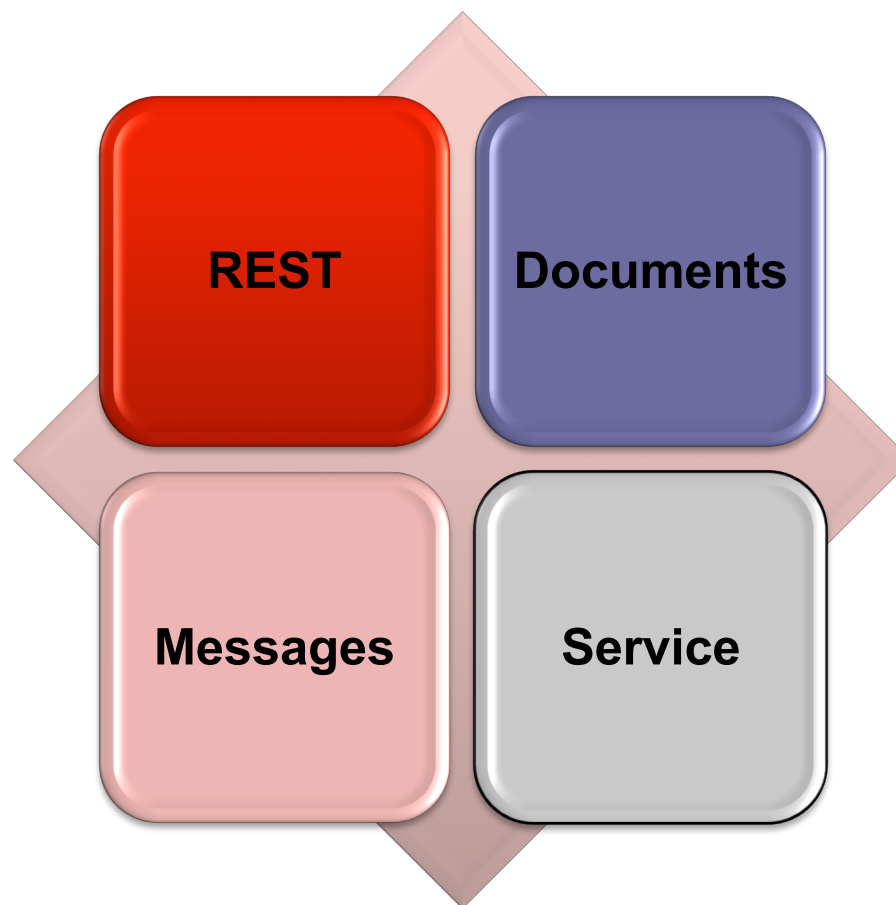
ケアプロセス、治療行為の技術的な成果物の管理

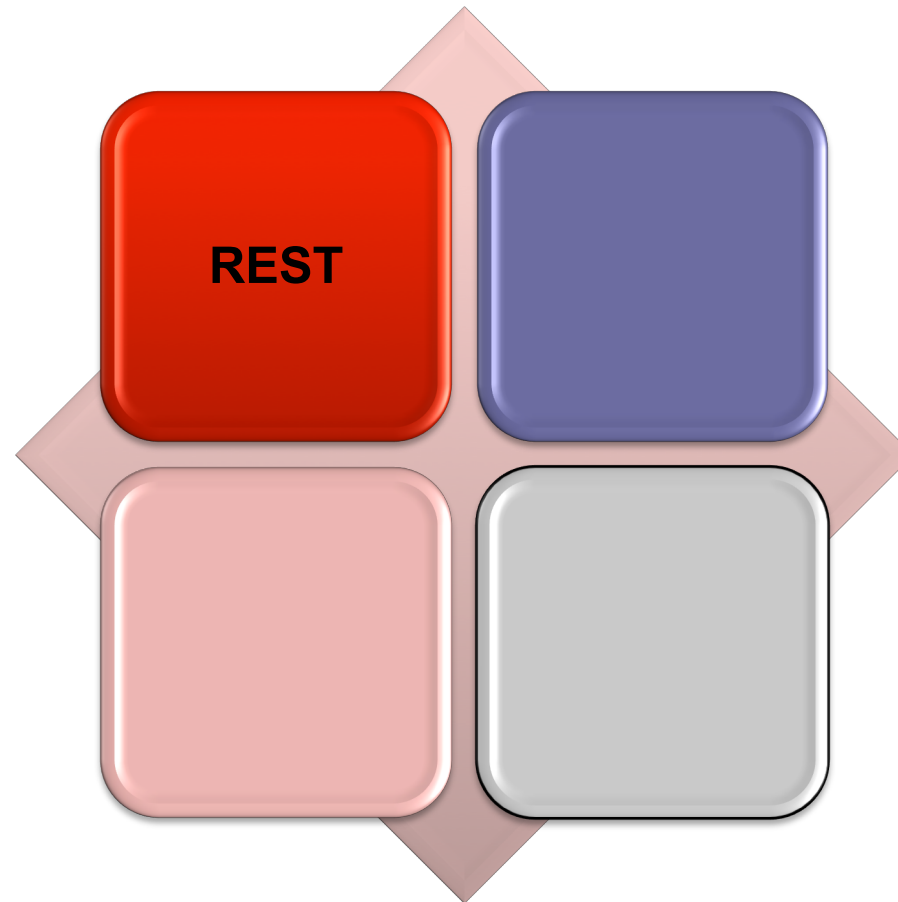
4: Financial(会計管理)

会計、保険請求の支援

レベル 5: Clinical Reasoning(臨床支援)

意思決定支援、品質管理支援

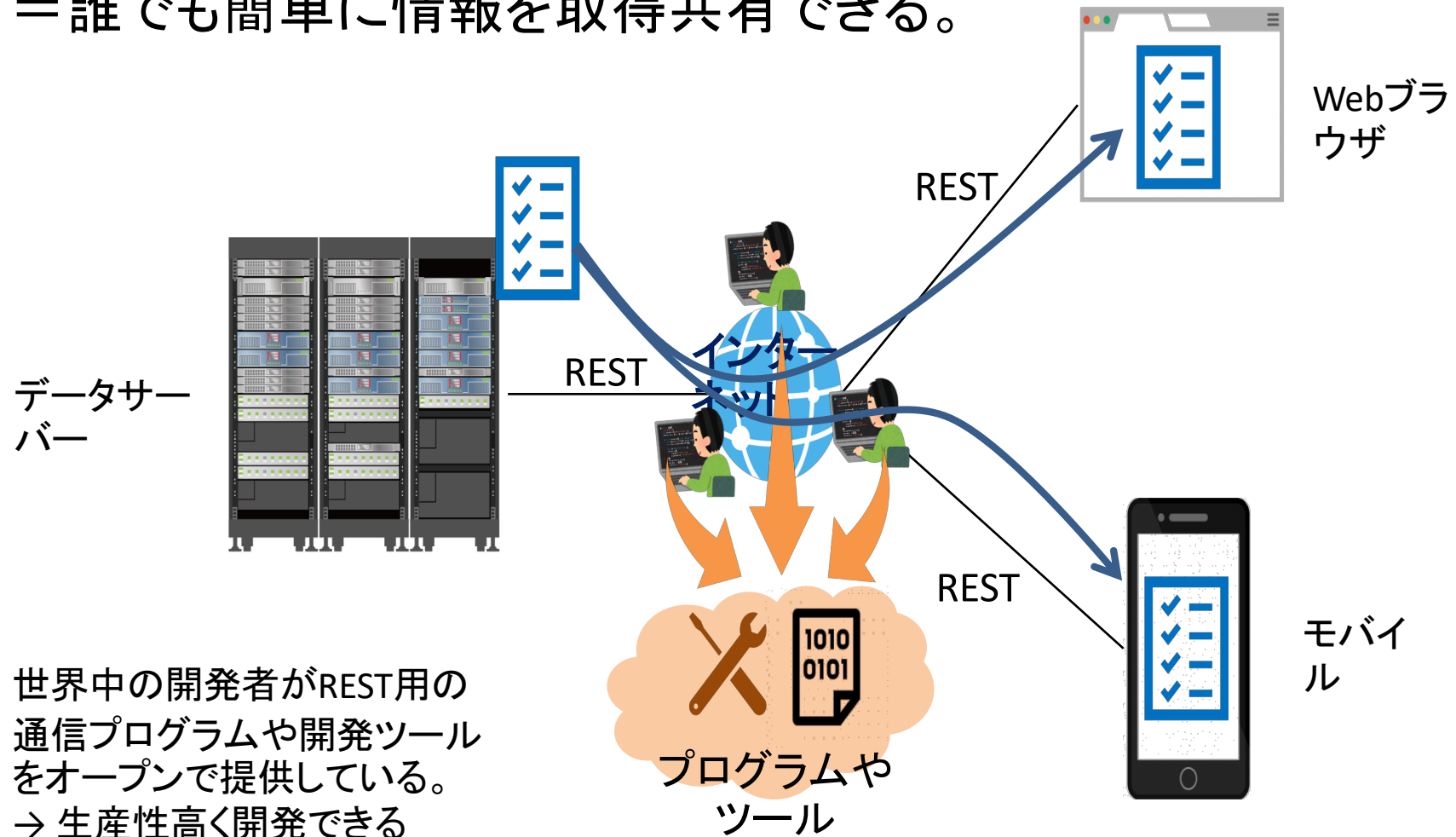


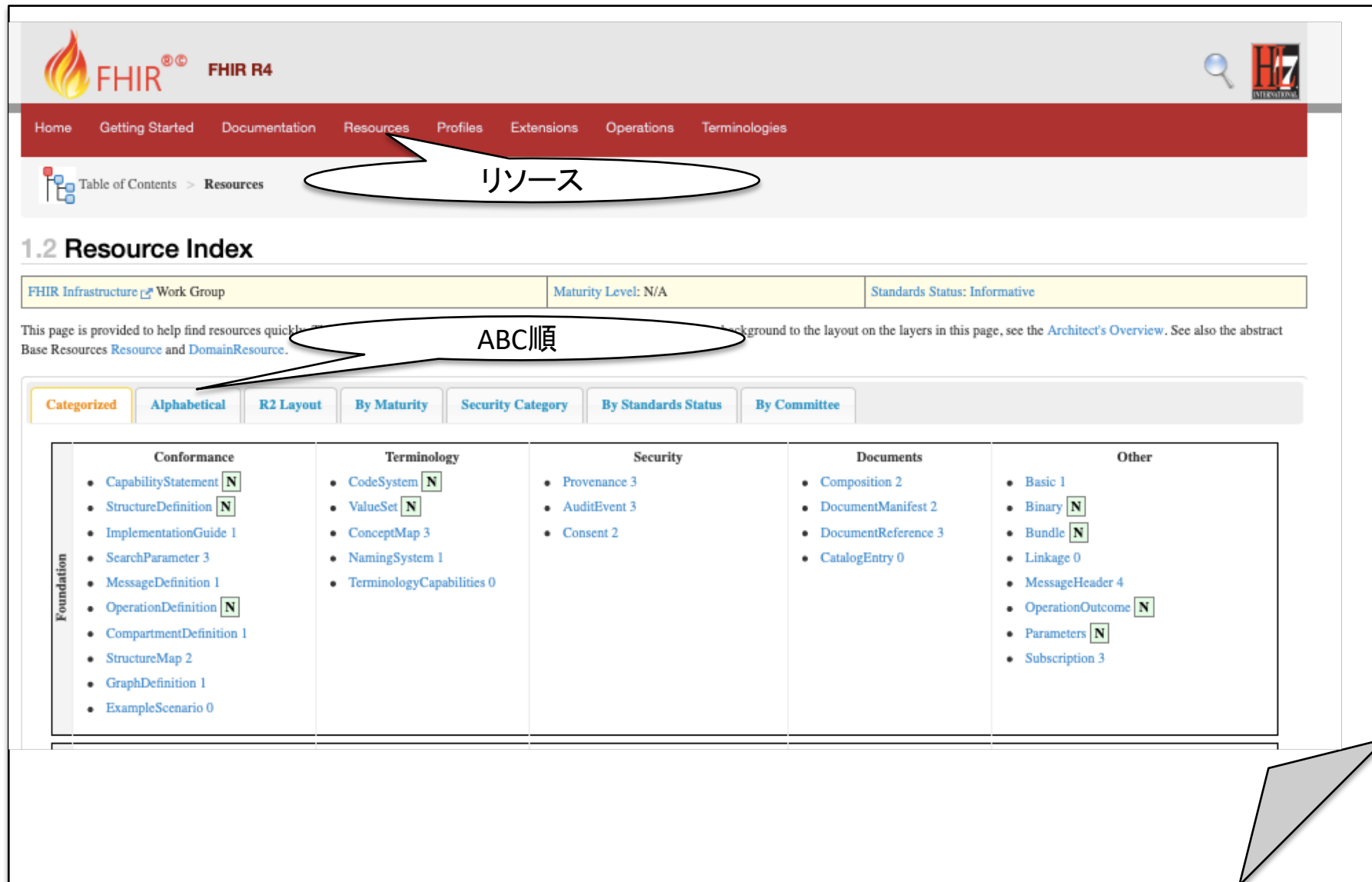


RESTとはリソースに基づいた設計基準で、RESTによるWEBサービスを行うアーキテクチャROAをRESTfulという

FHIR が Web通信を採用した理由

- 世界中の情報共有はブラウザ経由で簡単に
→ RESTという世界共通の一般的な通信手順
＝誰でも簡単に情報を取得共有できる。





The screenshot shows the FHIR R4 Resources page. A callout bubble points to the 'Resources' menu item in the top navigation bar, labeled 'リソース'. Another callout bubble points to the 'Alphabetical' filter button, labeled 'ABC順'. The main content area displays a '1.2 Resource Index' table with columns for Conformance, Terminology, Security, Documents, and Other. The 'Alphabetical' filter is selected, showing a list of resources under the 'Foundation' category.

リソース

ABC順

1.2 Resource Index

FHIR Infrastructure [Work Group](#) | Maturity Level: N/A | Standards Status: Informative

This page is provided to help find resources quickly. For background to the layout on the layers in this page, see the [Architect's Overview](#). See also the abstract Base Resources [Resource](#) and [DomainResource](#).

[Categorized](#) | [Alphabetical](#) | [R2 Layout](#) | [By Maturity](#) | [Security Category](#) | [By Standards Status](#) | [By Committee](#)

	Conformance	Terminology	Security	Documents	Other
Foundation	<ul style="list-style-type: none"> CapabilityStatement N StructureDefinition N ImplementationGuide 1 SearchParameter 3 MessageDefinition 1 OperationDefinition N CompartmentDefinition 1 StructureMap 2 GraphDefinition 1 ExampleScenario 0 	<ul style="list-style-type: none"> CodeSystem N ValueSet N ConceptMap 3 NamingSystem 1 TerminologyCapabilities 0 	<ul style="list-style-type: none"> Provenance 3 AuditEvent 3 Consent 2 	<ul style="list-style-type: none"> Composition 2 DocumentManifest 2 DocumentReference 3 CatalogEntry 0 	<ul style="list-style-type: none"> Basic 1 Binary N Bundle N Linkage 0 MessageHeader 4 OperationOutcome N Parameters N Subscription 3

1.2 Resource Index

FHIR Infrastructure Work Group	Maturity Level: N/A	Standards Status: Informative
--	---------------------	-------------------------------

This page is provided to help find resources quickly. There is also a more [detailed classification, ontology, and description](#). For background to the layout on the layers in this page, see the [Architect's Overview](#). See also the abstract Base Resources [Resource](#) and [DomainResource](#).

Categorized	Alphabetical	R2 Layout	By Maturity	Security Category	By Standards Status	By Committee
--------------------	--------------	-----------	-------------	-------------------	---------------------	--------------

	Conformance	Terminology	Security	Documents	Other
Foundation	<ul style="list-style-type: none"> CapabilityStatement N StructureDefinition N ImplementationGuide 1 SearchParameter 3 MessageDefinition 1 OperationDefinition N CompartmentDefinition 1 StructureMap 2 GraphDefinition 1 ExampleScenario 0 	<ul style="list-style-type: none"> CodeSystem N ValueSet N ConceptMap 3 NamingSystem 1 TerminologyCapabilities 0 	<ul style="list-style-type: none"> Provenance 3 AuditEvent 3 Consent 2 	<ul style="list-style-type: none"> Composition 2 DocumentManifest 2 DocumentReference 3 CatalogEntry 0 	<ul style="list-style-type: none"> Basic 1 Binary N Bundle N Linkage 0 MessageHeader 4 OperationOutcome N Parameters N Subscription 3
	Base	Individuals	Entities #1	Entities #2	Workflow
<ul style="list-style-type: none"> Patient N Practitioner 3 PractitionerRole 2 		<ul style="list-style-type: none"> Organization 3 OrganizationAffiliation 0 HealthcareService 2 	<ul style="list-style-type: none"> Substance 2 BiologicallyDerivedProduct 0 Device 0 	<ul style="list-style-type: none"> Task 2 Appointment 3 AppointmentResponse 3 	<ul style="list-style-type: none"> Encounter 2 EpisodeOfCare 2 Flag 1

Patientリソース

Patientリソース仕様書の構造

8.1.2 Resource Patient

Structure UML XML JSON Turtle R3 Diff All

Structure

Name

Patient

UMLでの表記

XMLでの表記

Turtle(RDF)での表記

JSONでの表記

Flagの意味

Name	Flags	Card.	Type	Description & Constraints
Patient	N	0..*	DomainResource	Information about an individual or animal receiving health care services Elements defined in Ancestors: id, meta, implicitRules, language, text, content
active	?! Σ	0..1	boolean	Whether this patient's record is in active use
name	Σ	0..*	HumanName	A name for the patient
telecom	Σ	0..*	ContactPoint	A contact point for the patient
gender	Σ	0..1	code	male female other unknown AdministrativeGender (Required)
birthDate	Σ	0..1	date	The date of birth for the individual
deceased[x]	?! Σ	0..1		Indicates if the individual is deceased or not
deceasedBoolean			boolean	
deceasedDateTime			dateTime	
address	Σ	0..*	Address	An address for the individual
maritalStatus		0..1	CodeableConcept	Marital (civil) status of a patient MaritalStatus (Extensible)
multipleBirth[x]		0..1		Whether patient is part of a multiple birth
multipleBirthBoolean			boolean	
multipleBirthInteger			integer	
photo		0..*	Attachment	Image of the patient



```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<Patient xmlns="http://hl7.org/fhir">
```

```
<id value="glossy"/>  
<meta>  
  <lastUpdated value="2014-11-13T11:41:00+11:00"/>  
</meta>
```

```
<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>
```

```
<extension url="http://example.org/StructureDefinition/trials">  
  <valueCode value="renal"/>  
</extension>
```

```
<identifier>  
  <use value="usual"/>  
  <type>  
    <coding>  
      <system value="http://terminology.hl7.org/CodeSystem/v2-0203"/>  
      <code value="MR"/>  
    </coding>  
  </type>  
  <system value="http://www.goodhealth.org/identifiers/mrn"/>  
  <value value="123456"/>  
</identifier>  
<active value="true"/>  
<name>  
  <family value="Levin"/>  
  <given value="Henry"/>  
  <suffix value="The 7th"/>  
</name>  
<gender value="male"/>  
<birthDate value="1932-09-24"/>  
<generalPractitioner>  
  <reference value="Practitioner/example"/>  
  <display value="Dr Adam Careful"/>  
</generalPractitioner>  
<managingOrganization>  
  <reference value="Organization/2"/>  
  <display value="Good Health Clinic"/>  
</managingOrganization>
```

```
</Patient>
```



Resource, Identity, Metadata

Human Readable Summary
安全確保のための Fallback

Extension with reference(URL)
to definition

Standard Data

- MR(v2 0203 Medical Record Number)
- Name
- Gender
- Date of Birth
- Provider

Patient ↔ PID

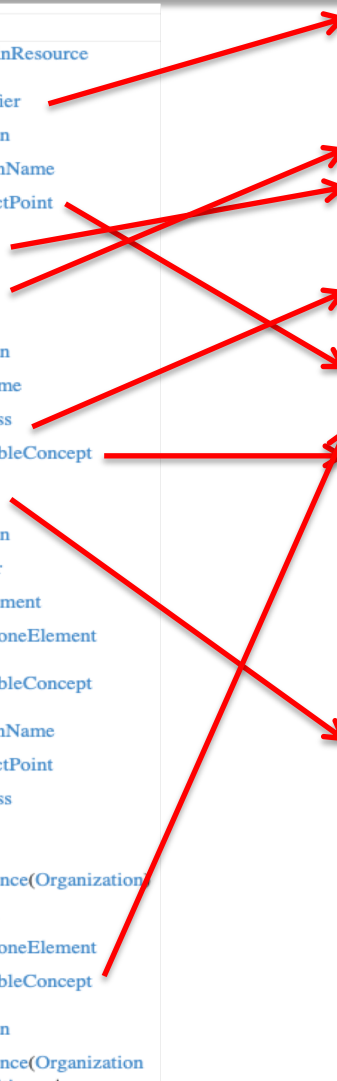
Name	Flags	Card.	Type
Patient	N		DomainResource
identifier	Σ	0..*	Identifier
active	?! Σ	0..1	boolean
name	Σ	0..*	HumanName
telecom	Σ	0..*	ContactPoint
gender	Σ	0..1	code
birthDate	Σ	0..1	date
deceased[x]	?! Σ	0..1	
deceasedBoolean			boolean
deceasedDateTime			dateTime
address	Σ	0..*	Address
maritalStatus		0..1	CodeableConcept
multipleBirth[x]		0..1	
multipleBirthBoolean			boolean
multipleBirthInteger			integer
photo		0..*	Attachment
contact	I	0..*	BackboneElement
relationship		0..*	CodeableConcept
name		0..1	HumanName
telecom		0..*	ContactPoint
address		0..1	Address
gender		0..1	code
organization	I	0..1	Reference(Organization)
period		0..1	Period
communication		0..*	BackboneElement
language		1..1	CodeableConcept
preferred		0..1	boolean
generalPractitioner		0..*	Reference(Organization Practitioner PractitionerRole)
managingOrganization	Σ	0..1	Reference(Organization)
link	?! Σ	0..*	BackboneElement
other	Σ	1..1	Reference(Patient RelatedPerson)
type	Σ	1..1	code

SEQ	LEN	DT	OPT	RP/#	ELEMENT NAME	Value	Description
1	4	SI	O		Set ID - PID		
2	20	CX	B		Patient ID		
3	250	CX	R	Y	Patient Identifier List		
4	20	CX	B	Y	Alternate Patient ID -		
5	250	XP	R	Y	Patient Name	F	Female
6	250	XP	O	Y	Mother's Maiden Name	M	Male
7	26	TS	O		Date/Time of Birth	O	Other
8	1	IS	O		Administrative Sex	U	Unknown
9	250	XP	B	Y	Patient Alias	A	Ambiguous
10	250	CE	O	Y	Race		
11	250	XAD	O	Y	Patient Address	N	Not applicable
12	4	IS	B		County Code		
13	250	XTN	O	Y	Phone Number - Home		
14	250	XTN	O	Y	Phone Number - Business		
15	250	CE	O		Primary Language		
16	250	CE	O		Marital Status		
17	250	CE	O		Religion		
18	250	CX	O		Patient Account Number		
19	16	ST	B		SSN Number - Patient		
20	25	DLN	B		Driver's License Number - Patient		
21	250	CX	O	Y	Mother's Identifier		
22	250	CE	O	Y	Ethnic Group		
23	250	ST	O		Birth Place		
24	1	ID	O		Multiple Birth Indicator		
25	2	NM	O		Birth Order		
26	250	CE	O	Y	Citizenship		
27	250	CE	O		Veterans Military Status		
28	250	CE	B		Nationality		
29	26	TS	O		Patient Death Date and Time		
30	1	ID	O		Patient Death Indicator		
31	1	ID	O		Identity Unknown Indicator		
32	20	IS	O	Y	Identity Reliability Code		
33	26	TS	O		Last Update Date/Time		
34	241	HD	O		Last Update Facility		
35	250	CE	C		Species Code		
36	250	CE	C		Breed Code		
37	80	ST	O		Strain		
38	250	CE	O	2	Production Class Code		
39	250	CWE	O	Y	Tribal Citizenship		

Patient ↔ PID

Name	Flags	Card.	Type
Patient	N		DomainResource
identifier	Σ	0..*	Identifier
active	?! Σ	0..1	boolean
name	Σ	0..*	HumanName
telecom	Σ	0..*	ContactPoint
gender	Σ	0..1	code
birthDate	Σ	0..1	date
deceased[x]	?! Σ	0..1	
deceasedBoolean			boolean
deceasedDateTime			dateTime
address	Σ	0..*	Address
maritalStatus		0..1	CodeableConcept
multipleBirth[x]		0..1	
multipleBirthBoolean			boolean
multipleBirthInteger			integer
photo		0..*	Attachment
contact	I	0..*	BackboneElement
relationship		0..*	CodeableConcept
name		0..1	HumanName
telecom		0..*	ContactPoint
address		0..1	Address
gender		0..1	code
organization	I	0..1	Reference(Organization)
period		0..1	Period
communication		0..*	BackboneElement
language		1..1	CodeableConcept
preferred		0..1	boolean
generalPractitioner		0..*	Reference(Organization Practitioner PractitionerRole)
managingOrganization	Σ	0..1	Reference(Organization)
link	?! Σ	0..*	BackboneElement
other	Σ	1..1	Reference(Patient RelatedPerson)
type	Σ	1..1	code

SEQ	LEN	DT	OPT	RP/#	ELEMENT NAME
1	4	SI	O		Set ID - PID
2	20	CX	B		Patient ID
3	250	CX	R	Y	Patient Identifier List
4	20	CX	B	Y	Alternate Patient ID - PID
5	250	XPN	R	Y	Patient Name
6	250	XPN	O	Y	Mother's Maiden Name
7	26	TS	O		Date/Time of Birth
8	1	IS	O		Administrative Sex
9	250	XPN	B	Y	Patient Alias
10	250	CE	O	Y	Race
11	250	XAD	O	Y	Patient Address
12	4	IS	B		County Code
13	250	XTN	O	Y	Phone Number - Home
14	250	XTN	O	Y	Phone Number - Business
15	250	CE	O		Primary Language
16	250	CE	O		Marital Status
17	250	CE	O		Religion
18	250	CX	O		Patient Account Number
19	16	ST	B		SSN Number - Patient
20	25	DLN	B		Driver's License Number - Patient
21	250	CX	O	Y	Mother's Identifier
22	250	CE	O	Y	Ethnic Group
23	250	ST	O		Birth Place
24	1	ID	O		Multiple Birth Indicator
25	2	NM	O		Birth Order
26	250	CE	O	Y	Citizenship
27	250	CE	O		Veterans Military Status
28	250	CE	B		Nationality
29	26	TS	O		Patient Death Date and Time
30	1	ID	O		Patient Death Indicator
31	1	ID	O		Identity Unknown Indicator
32	20	IS	O	Y	Identity Reliability Code
33	26	TS	O		Last Update Date/Time
34	241	HD	O		Last Update Facility
35	250	CE	C		Species Code
36	250	CE	C		Breed Code
37	80	ST	O		Strain
38	250	CE	O	2	Production Class Code
39	250	CWE	O	Y	Tribal Citizenship



【例】Gender Codeの比較

Name	Flags	Card.	Type
Patient	N		DomainResource
identifier	Σ	0..*	Identifier
active	?! Σ	0..1	boolean
name	Σ	0..*	HumanName
telecom	Σ	0..*	ContactPoint
gender	Σ	0..1	code
birthDate	Σ	0..1	date
deceased[x]	?! Σ	0..1	
deceasedBoolean			boolean
deceasedDateTime			dateTime
address	Σ	0..*	Address
maritalStatus		0..1	CodeableConcept
multipleBirth[x]		0..1	
multipleBirthBoolean			boolean
multipleBirthInteger			integer
photo		0..*	Attachment
contact	I	0..*	BackboneElement
relationship		0..*	CodeableConcept
name		0..1	HumanName
telecom		0..*	ContactPoint
address		0..1	Address
gender		0..1	code
organization	I	0..1	Reference(Organization)
period		0..1	Period
communication		0..*	BackboneElement
language		1..1	CodeableConcept
preferred		0..1	boolean
generalPractitioner		0..*	Reference(Organization Practitioner PractitionerRole)
managingOrganization	Σ	0..1	Reference(Organization)
link	?! Σ	0..*	BackboneElement
other	Σ	1..1	Reference(Patient RelatedPerson)
type	Σ	1..1	code

FHIR

Code	Display	Definition
male	Male	Male.
female	Female	Female.
other	Other	Other.
unknown	Unknown	Unknown.

V2

Value	Description
F	Female
M	Male
O	Other
U	Unknown
A	Ambiguous
N	Not applicable

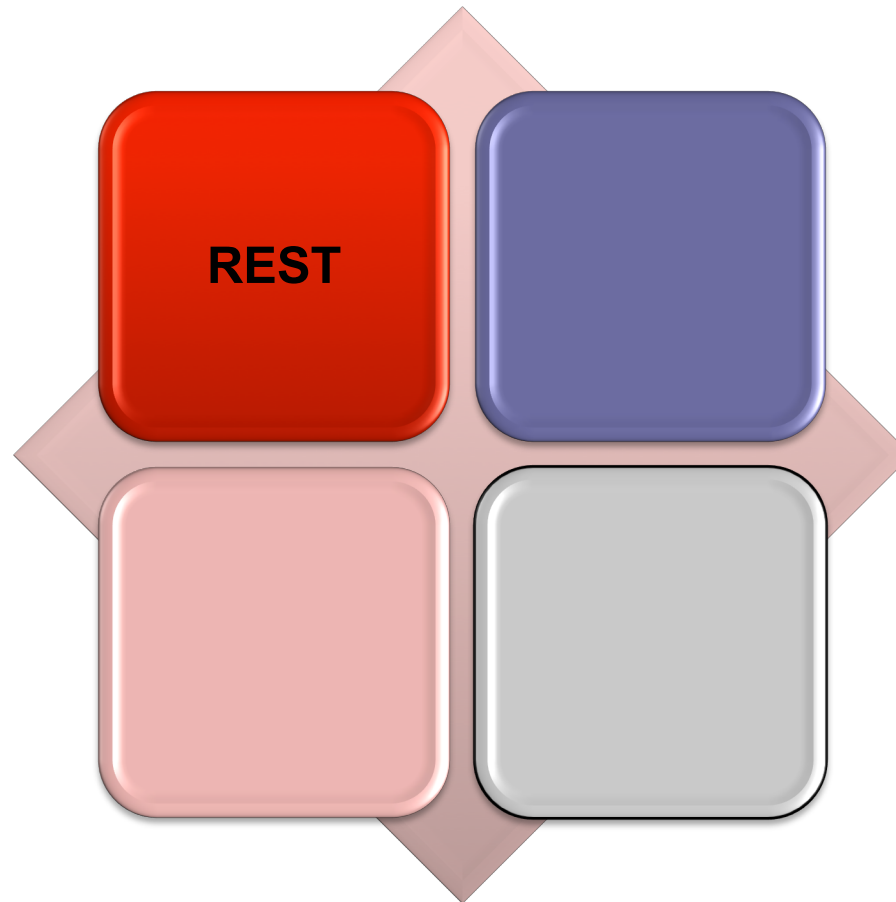
V3

Code	Concept ID	Print Name	Definition/Description
F	10174	Female	Female
M	10173	Male	Male
UN	17718	Undifferentiated	The gender of a person could not be uniquely defined as male or female, such as hermaphrodite
CWE	coded with extensions, meaning that the code set can be expanded to meet local implementation needs		

Name	Flags	Card.	Type	Description & Constraints
HumanName	Σ N		Element	Name of a human - parts and usage Elements defined in Ancestors: id , extension
use	?! Σ	0..1	code	usual official temp nickname anonymous old maiden NameUse (Deprecated)
text	Σ	0..1	string	
family	Σ	0..1	string	
given	Σ	0..*	string	
prefix	Σ	0..*	string	
suffix	Σ	0..*	string	
period	Σ	0..1	Period	

SEQ	LEN	DT	OPT	COMPONENT NAME
1	194	FN	O	Family Name
2	30	ST	O	Given Name
3	30	A		Alias Name
4	20	B		Name at Birth
5	20	C		Adopted Name
6	6	D		Display Name
7	1	I		Licensing Name
8	1	L		Legal Name
9	1	M		Maiden Name
9	48	N		Nickname /"Call me" Name/Street Name
10	53	P		Name of Partner/Spouse (retained for backward compatibility only)
11	1	R		Registered Name (animals only)
12	26	S		Coded Pseudo-Name to ensure anonymity
13	26	T		Indigenous/Tribal/Community Name
14	199	U		Unspecified
		ST	O	Professional Suffix

```
<name>
  <extension url="http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation">
    <valueCode value="IDE" />
  </extension>
  <family value="東京" />
  <given value="太郎" />
</name>
<name>
  <extension url="http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation">
    <valueCode value="SYL" />
  </extension>
  <family value="とうきょう" />
  <given value="たろう" />
</name>
<name>
  <extension url="http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation">
    <valueCode value="ABC" />
  </extension>
  <family value="Tokyo" />
  <given value="Tarou" />
</name>
```

Instance Level Interactions

- **Read** : リソースの現在の状態の読み込む
 - **GET** [base]/Patient/100
- **Update** : id指定の既存のリソースの更新。但しなければリソースを作成する
 - **PUT** [base]/Patient/100
- **Delete** : リソースを削除する
 - **DELETE** [base]/Patient/100
- **History** : 特定のリソースの変更履歴を参照する
 - **GET** [base]/Patient/100/_history
- **Vread** : リソースの特定バージョンの状態の読み込む
 - **GET** [base]/Patient/100/_history/{vid}
- **Patch** : 既存のリソースの位置指定した所を書き換える
 - **PATCH** [base]/[type]/[id] {?_format=[mime-type]}

統一インターフェースには完全に適合していない

HTTPメソッド	操作
GET	リソースの取得
PUT	リソースの更新
POST	リソースの作成
DELETE	リソースの削除
HEAD	リソースのメタデータの取得
OPTIONS	リソースがサポートするメソッドを調べる

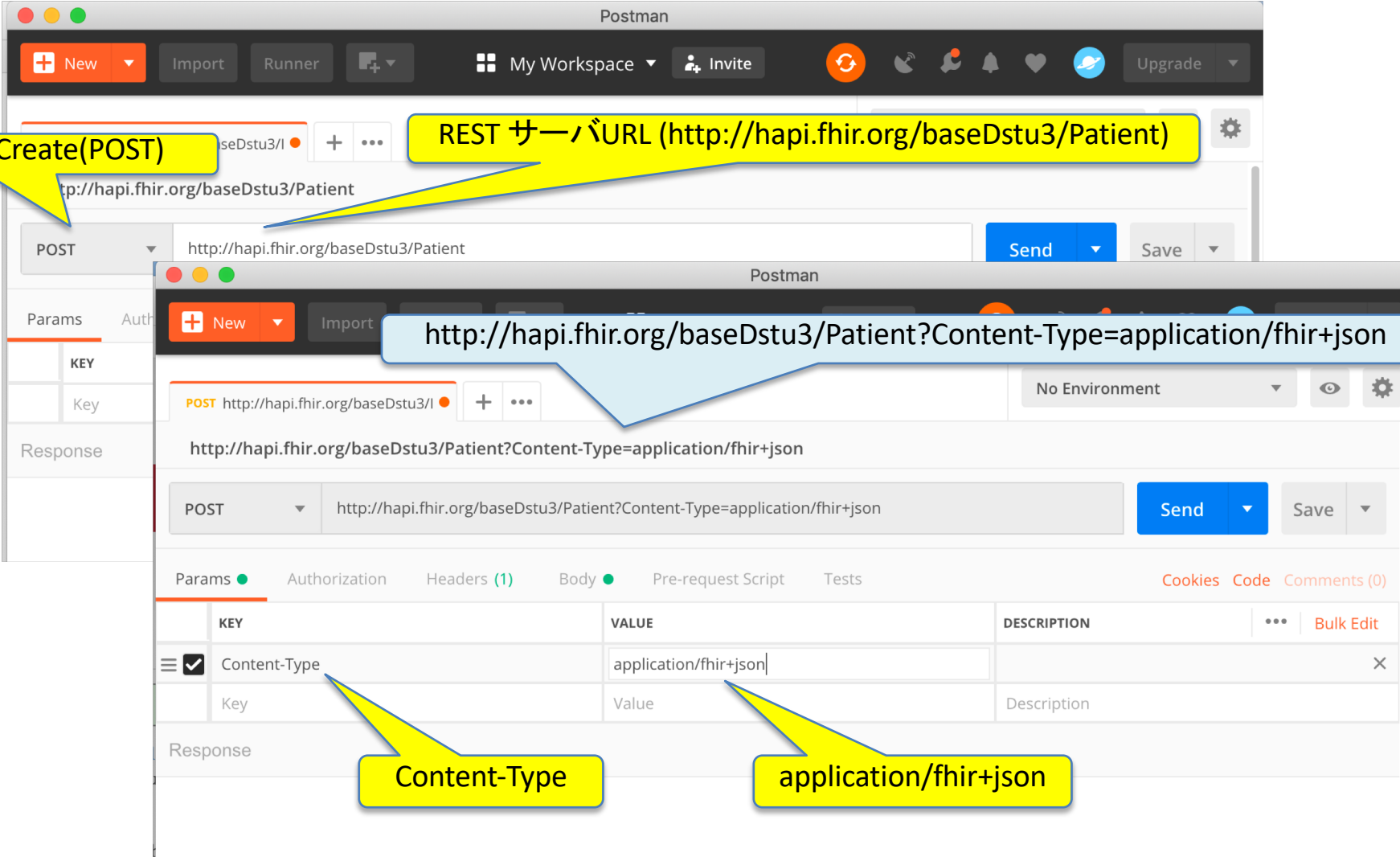
Type Level Interactions

- **Create** : サーバが特定したidで新しいリソースを作成する
 - **POST** [base]/Patient
- **Search** : いくつかののフィルター基準でリソースを検索する
 - **GET** [base]/Observation?code=3141-9
- **History** : 特定のリソースタイプの変更履歴を参照する
 - **GET** [base]/Patient/_history

Whole System Interactions

- **Capabilities** : システムの機能宣言を取得する(mode: full, normative, terminology)
 - **GET** [base]/metadata{?mode=[mode]} {&_format=[mime-type]}
- **Batch/Transaction** : 単一のインターアクションでリソースのセットを更新、作成、削除する
 - **POST** [base] {?_format=[mime-type]}History
- **History** : 全てのリソースの変更履歴を参照する
 - **GET** [base]/_history{?[parameters]&_format=[mime-type]}
- **Search** : いくつかののフィルター基準に基づいた全てのリソースタイプにまたがって検索する
 - **GET** [base]/Patient?name=eve

- Hapi サーバに患者を登録



REST サーバURL (<http://hapi.fhir.org/baseDstu3/Patient>)

POST <http://hapi.fhir.org/baseDstu3/Patient>

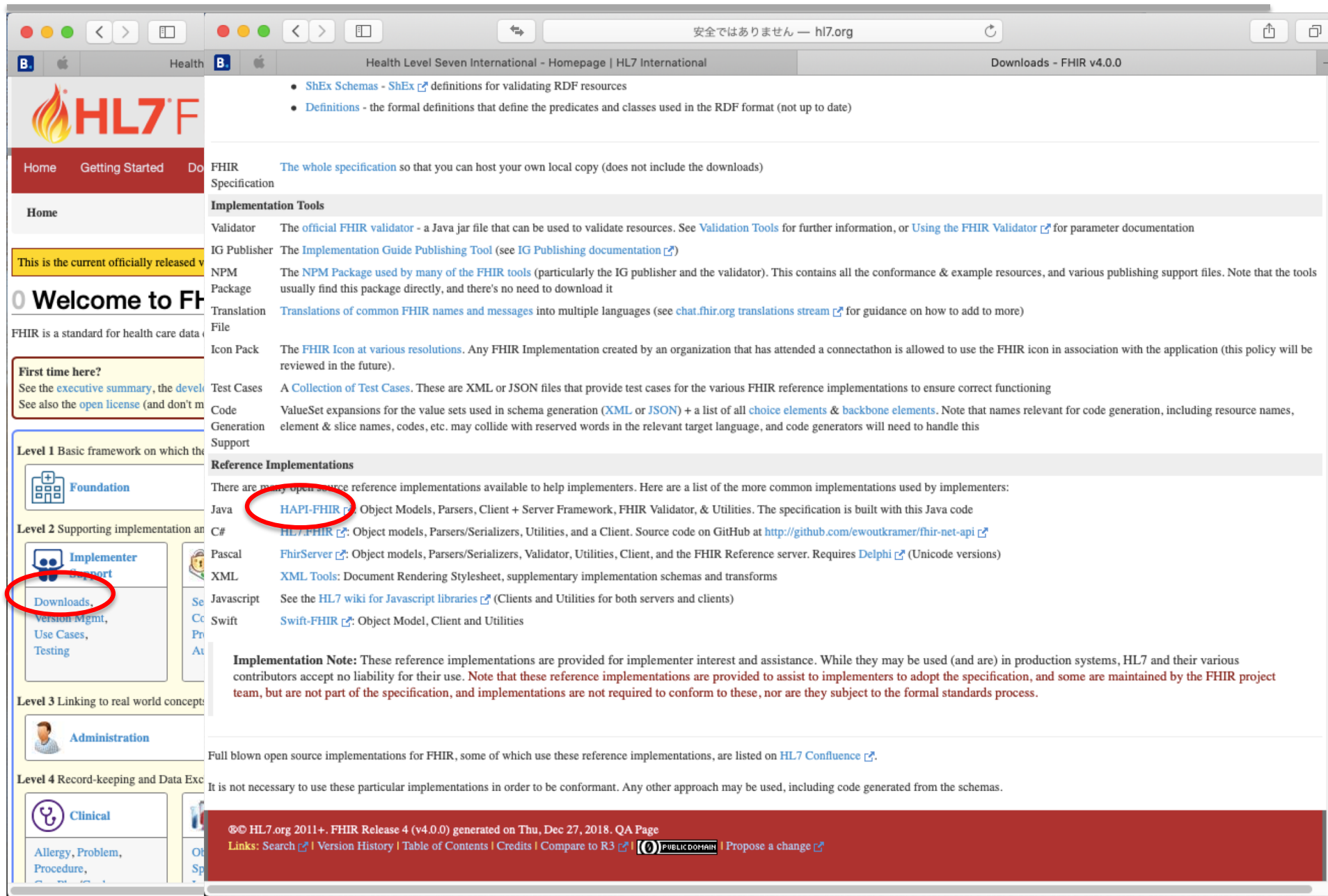
<http://hapi.fhir.org/baseDstu3/Patient?Content-Type=application/fhir+json>

KEY	VALUE	DESCRIPTION
<input checked="" type="checkbox"/> Content-Type	application/fhir+json	
Key	Value	Description

Content-Type

application/fhir+json

- サンプルプログラム
<https://github.com/FirelyTeam/fhirstarters>
- RESTクライアント(Postman)
<https://github.com/FirelyTeam/fhirstarters/tree/master/postman/crud>
- FHIR Hapiサーバ
<http://hapi.fhir.org/baseDstu3/Patient>
Header name → Key: Content-Type
Header value → Value: application/fhir+json
- JAVAクラス仕様 (R4 注:1月末STU3)
<http://hapifhir.io/apidocs-dstu3/index.html>



The screenshot shows the HL7 FHIR website. The left sidebar contains navigation links: Home, Getting Started, Downloads, Version Mgmt, Use Cases, Testing, Administration, Clinical, Allergy, Problem, Procedure, etc. The 'Downloads' link is circled in red. The main content area lists various tools and resources. The 'HAPI-FHIR' link under the 'Reference Implementations' section is circled in red. The browser address bar shows '安全ではありません — hl7.org'.

Health Level Seven International - Homepage | HL7 International

Downloads - FHIR v4.0.0

HL7 FHIR

Home Getting Started Downloads

Home

This is the current officially released version

Welcome to FHIR

FHIR is a standard for health care data exchange

First time here?
See the [executive summary](#), the [development](#),
See also the [open license](#) (and don't miss the [FAQ](#))

Level 1 Basic framework on which the specification is based

Foundation

Level 2 Supporting implementation and implementation support

Implementer Support

Downloads
Version Mgmt,
Use Cases,
Testing

Level 3 Linking to real world concepts

Administration

Level 4 Record-keeping and Data Exchange

Clinical
Allergy, Problem,
Procedure,
etc.

- [ShEx Schemas](#) - [ShEx](#) definitions for validating RDF resources
- [Definitions](#) - the formal definitions that define the predicates and classes used in the RDF format (not up to date)

FHIR Specification
The whole specification so that you can host your own local copy (does not include the downloads)

Implementation Tools

Validator The official FHIR validator - a Java jar file that can be used to validate resources. See [Validation Tools](#) for further information, or [Using the FHIR Validator](#) for parameter documentation

IG Publisher The [Implementation Guide Publishing Tool](#) (see [IG Publishing documentation](#))

NPM Package The [NPM Package](#) used by many of the FHIR tools (particularly the IG publisher and the validator). This contains all the conformance & example resources, and various publishing support files. Note that the tools usually find this package directly, and there's no need to download it

Translation File [Translations of common FHIR names and messages](#) into multiple languages (see [chat.fhir.org translations stream](#) for guidance on how to add to more)

Icon Pack The [FHIR Icon](#) at various resolutions. Any FHIR Implementation created by an organization that has attended a connectathon is allowed to use the FHIR icon in association with the application (this policy will be reviewed in the future).

Test Cases A [Collection of Test Cases](#). These are XML or JSON files that provide test cases for the various FHIR reference implementations to ensure correct functioning

Code Generation Support ValueSet expansions for the value sets used in schema generation (XML or JSON) + a list of all [choice elements](#) & [backbone elements](#). Note that names relevant for code generation, including resource names, element & slice names, codes, etc. may collide with reserved words in the relevant target language, and code generators will need to handle this

Reference Implementations

There are many open source reference implementations available to help implementers. Here are a list of the more common implementations used by implementers:

Java [HAPI-FHIR](#): Object Models, Parsers, Client + Server Framework, FHIR Validator, & Utilities. The specification is built with this Java code

C# [HL7 FHIR](#): Object models, Parsers/Serializers, Utilities, and a Client. Source code on GitHub at <http://github.com/ewoutkramer/fhir-net-api>

Pascal [FhirServer](#): Object models, Parsers/Serializers, Validator, Utilities, Client, and the FHIR Reference server. Requires [Delphi](#) (Unicode versions)

XML [XML Tools](#): Document Rendering Stylesheet, supplementary implementation schemas and transforms

Javascript See the [HL7 wiki for Javascript libraries](#) (Clients and Utilities for both servers and clients)

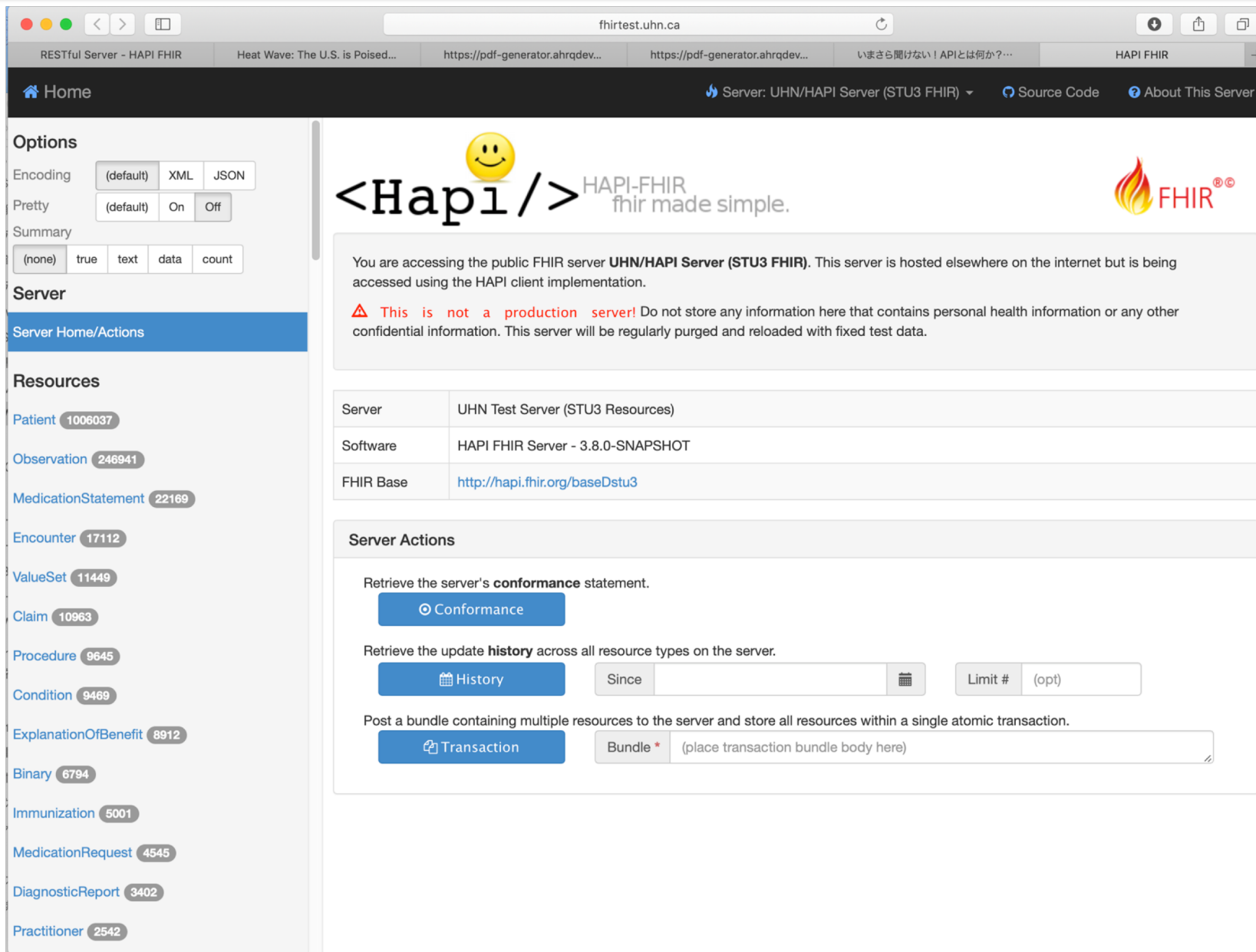
Swift [Swift-FHIR](#): Object Model, Client and Utilities

Implementation Note: These reference implementations are provided for implementer interest and assistance. While they may be used (and are) in production systems, HL7 and their various contributors accept no liability for their use. Note that these reference implementations are provided to assist to implementers to adopt the specification, and some are maintained by the FHIR project team, but are not part of the specification, and implementations are not required to conform to these, nor are they subject to the formal standards process.

Full blown open source implementations for FHIR, some of which use these reference implementations, are listed on [HL7 Confluence](#).

It is not necessary to use these particular implementations in order to be conformant. Any other approach may be used, including code generated from the schemas.

© HL7.org 2011+. FHIR Release 4 (v4.0.0) generated on Thu, Dec 27, 2018. QA Page
Links: [Search](#) | [Version History](#) | [Table of Contents](#) | [Credits](#) | [Compare to R3](#) | [PUBLIC DOMAIN](#) | [Propose a change](#)



The screenshot shows the HAPI FHIR web interface. The browser address bar displays `fhirtest.uhn.ca`. The page title is "RESTful Server - HAPI FHIR". The navigation bar includes "Home", "Server: UHN/HAPI Server (STU3 FHIR)", "Source Code", and "About This Server".

Options

- Encoding: (default), XML, JSON
- Pretty: (default), On, Off
- Summary: (none), true, text, data, count

Server

Server Home/Actions

Resources

- Patient: 1006037
- Observation: 246941
- MedicationStatement: 22169
- Encounter: 17112
- ValueSet: 11449
- Claim: 10963
- Procedure: 9645
- Condition: 9469
- ExplanationOfBenefit: 8912
- Binary: 6794
- Immunization: 5001
- MedicationRequest: 4545
- DiagnosticReport: 3402
- Practitioner: 2542

Server Information

Server	UHN Test Server (STU3 Resources)
Software	HAPI FHIR Server - 3.8.0-SNAPSHOT
FHIR Base	http://hapi.fhir.org/baseDstu3

Server Actions

- Retrieve the server's **conformance** statement.
 - Conformance
- Retrieve the update **history** across all resource types on the server.
 - History
 - Since:
 - Limit #: (opt)
- Post a bundle containing multiple resources to the server and store all resources within a single atomic transaction.
 - Transaction
 - Bundle *



Hapiツール





Health Level Seven International - Homepage | HL7 International

HAPI FHIR - The Open Source FHIR API for Java

HAPI FHIR


Support Download GitHub Project Documentation Get Help Test Server

 **HAPI-FHIR**
fhir made simple.




This is the homepage for the HAPI-FHIR library. We are developing an open-source implementation of the FHIR specification in Java. [FHIR](#) (Fast Healthcare Interoperability Resources) is a specification for exchanging healthcare data in a modern and developer friendly way.

Note that this is the home for the FHIR version of HAPI. If you are looking for HL7 v2 support, [click here](#).

 **Demonstration/Test Page**

A public test server is now operating at <http://hapi.fhir.org>. This server is built entirely using components of HAPI-FHIR and demonstrates all of its capabilities. This server is also entirely open source. You can host your own copy by following instructions on our [JPA Server](#) documentation.

 **Commercial Support**

Commercial support for HAPI FHIR is available through [Smile CDR](#).

Announcements

Feb 6, 2019 - HAPI FHIR 3.7.0 (Gale) Released - The next release of HAPI has now been uploaded to the Maven repos and GitHub's releases section.

This release includes support for the now-completed FHIR R4 release (FHIR 4.0.0). It also brings support for Java 11, along with a big number of bugfixes and new features.

As always, see the [changelog](#) for a full list of changes.

Watch 138
Star 778
Fork 683
build failing
coverage 76%
maven central 3.7.0
license apache 2.0

- 画像
- 処方、検査結果、病名、医
事行為、DPCコード他
- 各種文書、カルテ記事
- 外注検査(ゲノムなど含む)
- 外部サーバアクセスデータ
- 連携系カルテ記事
- IoTデバイスからのデータ

DICOM PACS

巨大なデータ以外は、

SS-MIX標準ストレージ

コード、値の定義の標準化

SS-MIX拡張ストレージ

ここまでのものは、すでにまとまっているので、わざわざ別の穴をあける必要はない。

必要であれば、SS-MIXストレージからRESTで取り出すAPIを作っては？

これらのアプリに | を数えろ(v2)
とは言わない

- アメリカ政府は百億ドルレベルのインセンティブで、国民へのデータの提供などを目指した (Meaningful Use)
- FHIRはリソース単位、REST通信
- 80%ルール、各プロジェクト単位での接続性試験(Project-a-thon)
 - ということは、A地区でのリソースがB地区でそのまま使える保証はない
- 日本では、SS-MIXでまとまっているデータはそこから使い、他のものをFHIR利用しては？
- バックドア大丈夫？



ISO Meeting, Hangzhou, PRC

ご静聴ありがとうございました

