



## HL7技術委員会

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

<http://www.fhir.org>

**F<sub>(Fast)</sub>H<sub>(Health)</sub>I<sub>(Interoperable)</sub>R<sub>(Resources)</sub>【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



HL7 FHIR®

F<sub>(Fast)</sub>H<sub>(Health)</sub>I<sub>(Interoperable)</sub>R<sub>(Resources)</sub>推進の背景

- 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)処方の正しさを評価、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



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【何故】 F<sub>(Fast)</sub>H<sub>(Health)</sub>I<sub>(Interoperable)</sub>R<sub>(Resources)</sub>

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

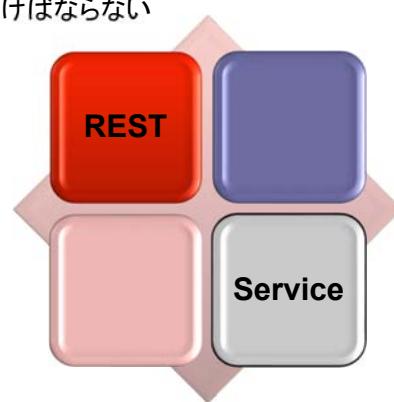
PCAST: Healthcare改善のHealth IT実現のための報告書

(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ぬいか

- 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

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## 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

http://www.hl7.org/fhir



GET /www.hl7.org/fhir HTTP/1.1

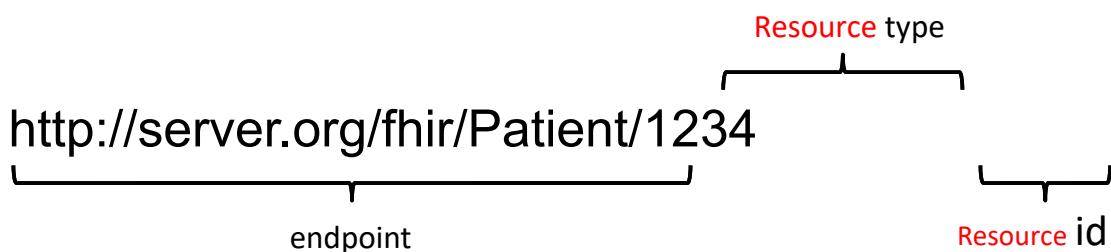


```
10 6f 3f dc 59 c7 28 f0 76 45 dd d4 08 00 45 00 .o?..Y.(. vE....E.
01 12 00 00 40 00 06 66 0b c0 a8 0b 06 40 09 ....@. @. f.....@.
c8 23 cc b2 00 50 a5 ed 45 6b 0c 34 54 5b 80 18 .#...P.. Ek.4T!...
08 04 04 21 00 00 01 01 08 0a 1f 46 a5 47 00 00 .....!....F.G. .
00 00 47 45 54 20 2f 66 68 69 72 20 48 54 54 50 .GET / fhir HTTP
2f 31 2e 31 0d 0a 63 61 63 68 65 2d 63 6f 6e 74 /1.1..ca che-cont
72 6f 6c 3a 28 6e 6f 2d 63 61 63 68 65 0d 0a 50 rol: no- cache..P
6f 73 74 6d 61 6e 2d 54 6f 6b 65 6e 3a 2b 35 64 ostman-T oken: 5d
39 37 62 38 32 34 2d 61 64 64 2d 34 31 35 97b824-a ddd-4415
2d 38 35 34 38 2d 66 38 61 39 36 31 63 62 65 38 -8548-f8 a961cbe8
62 32 0d 0a 55 73 65 72 2d 41 67 65 6e 74 3a 28 b2..User-Agent:
50 6f 73 74 6d 61 6e 52 75 6e 74 69 6d 65 2f 37 PostmanR untime/7
2e 36 2e 30 0d 0a 41 63 63 65 70 74 3a 20 2a 2f .6.0..Ac cept: */
2a 0d 0a 48 6f 73 74 3a 20 77 77 72 68 6c 37 ..Host: www.hl7
2e 6f 72 67 0d 0a 61 63 63 65 70 74 2d 65 6e 63 .org..ac cept-enc
6f 64 69 6e 67 3a 20 67 7a 69 70 2c 20 64 65 66 oding: g zip, def
6c 61 74 65 0d 0a 43 6f 6e 6b 65 63 74 69 6f 6e late..Co nnection
3a 20 6b 65 65 70 2d 61 6c 69 76 65 0d 0a 0d 0a : keep-alive...
```



```
0000 48 54 54 50 2f 31 2e 31 20 32 30 30 20 4f 4b 0d HTTP/1.1 200 OK.
0010 0a 43 6f 6e 74 65 6e 74 2d 4c 65 6e 67 74 68 3a .Content-Length: 18877.. Content-Type: te xt/html.
0020 20 31 38 38 37 37 0d 0a 43 6f 6e 74 65 6e 74 2d .Content-Location: n: http://www.hl
0030 54 79 70 65 3a 20 74 65 78 74 2f 68 74 6d 6c 0d 7.org/fhir/index
0040 0a 43 6f 6e 74 65 6e 74 2d 4c 6f 63 61 74 69 6f 0050 6e 3a 20 68 74 74 70 3a 2f 2f 77 77 77 2e 68 6c 0060 37 2e 6f 72 67 2f 66 68 69 72 2f 69 6e 64 65 78 0140 30 31 39 20 30 36 3a 30 36 3a 34 39 20 47 4d 54 0150 0d 0a 0d 0a ef bb bf 3c 21 44 4f 43 54 59 50 45 0160 20 48 54 4d 4c 3e 0d 0a 3c 68 74 6d 6c 20 78 6d 0170 62 66 73 3d 22 68 74 74 70 3a 2f 2f 77 77 77 2e 0180 77 33 2e 6f 72 67 2f 31 39 39 2f 78 68 74 6d lns="htt p://www.w3.org/1999/xhtml
0190 62 22 20 78 6d 6c 61 6e 67 3d 22 65 6e 22 01a0 20 6c 61 6e 67 3d 22 65 6e 22 3e 0d 0a 3c 68 65 l" xml:lang="en" 01b0 61 64 3e 0d 0a 20 20 3c 74 69 74 6c 65 3e 49 6e ad>.. < title>In 01c0 64 65 78 20 2d 20 46 48 49 52 20 76 34 2e 30 2e dex - FH IR v4.0.
```

```
<!DOCTYPE HTML>
<html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
<head>
<title>Index - FHIR v4.0.0</title>
<meta name="viewport" content="width=device-width, initial-scale=1.0"/>
<meta name="author" content="http://hl7.org/fhir"/>
<link rel="stylesheet" href="fhir.css"/>
<link rel="Prev" href="http://hl7.org/fhir/index.html"/>
```



### 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



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### リソース例

FHIRではこの様なものをリソースと呼ぶ  
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
  - eg. Intervention



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- 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、コード体系等は同じではない(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)

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```
<?xml version="1.0" encoding="UTF-8" ?>
<!-- XML宣言が必要 (XML文章の先頭にコメントは書けない)-->
<person>
  <name ID="00001">東京太郎</name>
  <sex>男</sex>
  <age/>          ← 内容が空の場合<xxxx/>と記述できる
  <address>        東京都港区虎ノ門1丁目19番9号
  </address>
</ person >
```

コメントの開始

コメントの終了

属性名

属性値

要素名

内容が空の場合<xxxx/>と記述できる

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- { ... } の中にダブルクオーテーション “”で囲み名前と値をコロン:で区切り記述する  
{"name":"Hirai"}
- コンマ,で区切り複数の名前:値を連結記述できる  
{"name":"Hirai","Sex":"male"}
- 階層構造を持ったオブジェクトとして記述できる  
{"user":{"name":"Hirai","sex":"male"}}
- 配列として [...]として記述できる  
{"color":["red","green","blue"]}
- 文字列("ABC"),数値(123,12.3,1.23e4),ヌル値(null),真偽値(true,false),エスケープシーケンス(\n)が使用できる
- UTF-8(BOM無し)で記述する

```

H#
"user" : {#
  "name" : "Hirai",#
  "age" : 69 #
  "organisation" : [#
    "HL7",#
    "Nihon Kohden",#
    "JAHIS"#
  #####
  ##J#
  J#
}

```

```
"{"resourceType": "Patient", "identifier": [{"system": "http://acme.org/MRNs", "value": "7000135"}], "name": [{"family": "Simpson", "given": ["Homer", "J"]}]}";#
```

## XML

```

<XXX xmlns="urn:foo">
  <B a="c" />
  <C>One</C>
  <C>Two</C>
  <D>One</D>
  <div>Not <b>so</b>
    easy</div>
</XXX>

```

## JSON

```

{ "B": { "a": "c" },
  "C": [ "One", "Two" ],
  "D": "One",
  "div": {
    "text-before": "Not ",
    "b": "so",
    "text-after": "easy"
  }
}

```

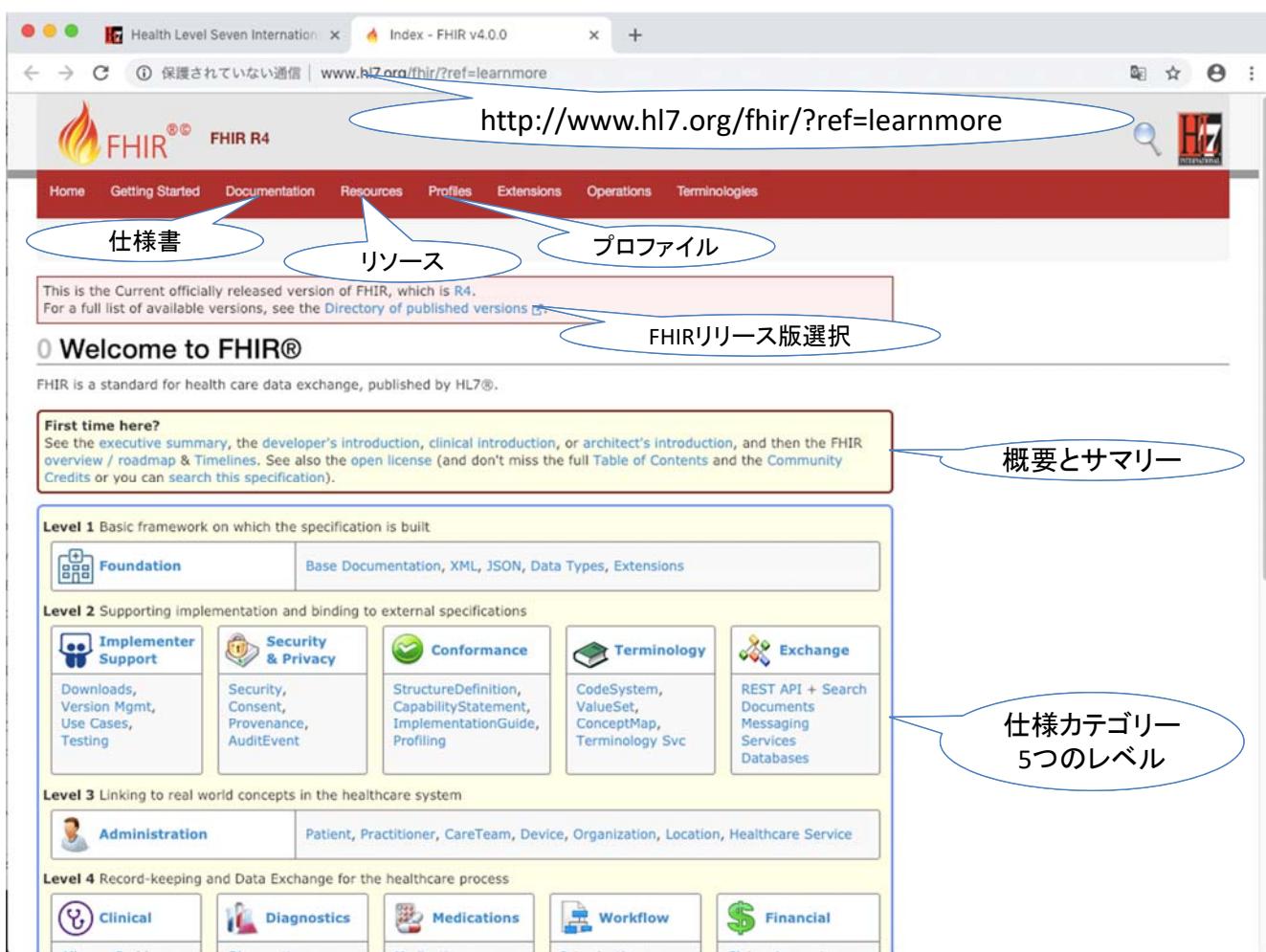
XMLでもJSONでも情報交換が可能 仕様上はTurtle(RDF)でも可能  
XML/JSONの翻訳機能のサポート

```
{
  "XML": {
    "version": "1.0",
    "encoding": "UTF-8"
  },
  "Patient": {
    "xmlns": "http://hl7.org/fhir",
    "id": {
      "value": "ihe-pcd"
    },
    "text": {
      "status": {
        "value": "generated"
      },
      "div": {
        "xmlns": "http://www.w3.org/1999/xhtml",
        "Text": "Albert Brooks, Id: AB60001"
      }
    },
    "Comment": "MRN assigned by ACME healthcare on 6-May 2001",
    "identifier": {
      "type": {
        "text": {
          "value": "Internal Identifier"
        }
      }
    }
  }
}
```

```
.<json>
<resourceType>Patient</resourceType>
<id>ihe-pcd</id>
<text>
<status>generated</status>
<div>&lt;div xmlns="http://www.w3.org/1999/xhtml">Albert Brooks, Id: AB60001&lt;/div></div>
</text>
<identifier>
<type>
<text>Internal Identifier</text>
</type>
<value>AB60001</value>
</identifier>
<active>true</active>
<name>
<family>BROOKS</family>
<given>ALBERT</given>
</name>
</json>
```

**SOA/ROA → Serializationは必須**

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

仕様書

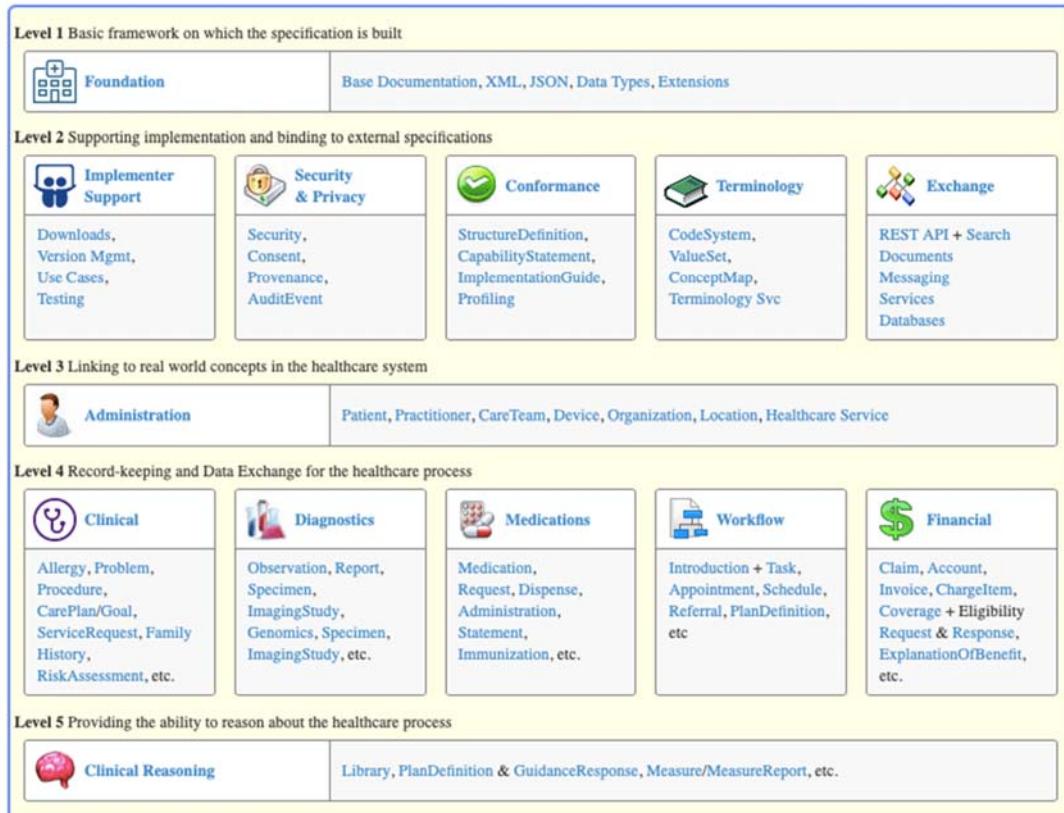
リソース

プロファイル

FHIRリリース版選択

概要とサマリー

仕様カテゴリー  
5つのレベル



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## 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

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Level 0:[Draft]現時点でビルトしたものを発行

Level 1:ビルトプロセスでwarningが無い。担当WGが実質的に実装の準備が完全であると考えている

Level 2:その項目が、現実的なデータとシナリオに基づいたリソースについて、独立して開発された3システム間でテスト、データ交換ができた結果をFMM(FHIR Management Group)が受け付けたもの

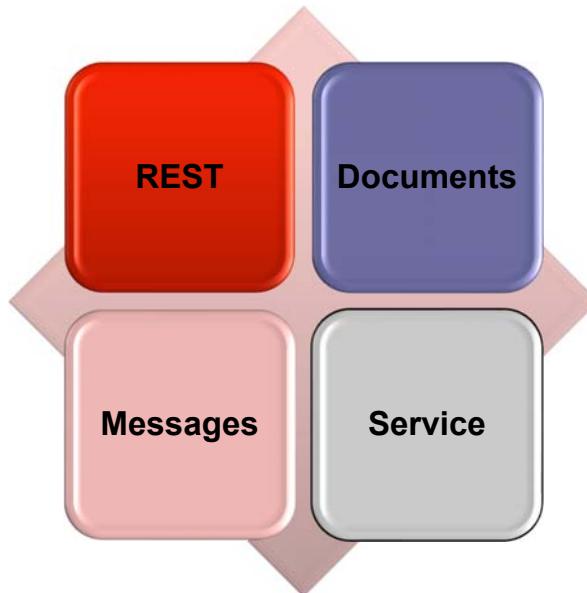
Level 3:その項目がTrial Use Quality Guidelinesの会議において審議され、公式な投票の対象になっていること。3組織から10実装者の記録がある

Level 4:その項目が公式な資料として発行され、全体がテストされていること。担当WGが実質的に安定しているとに合意されていること

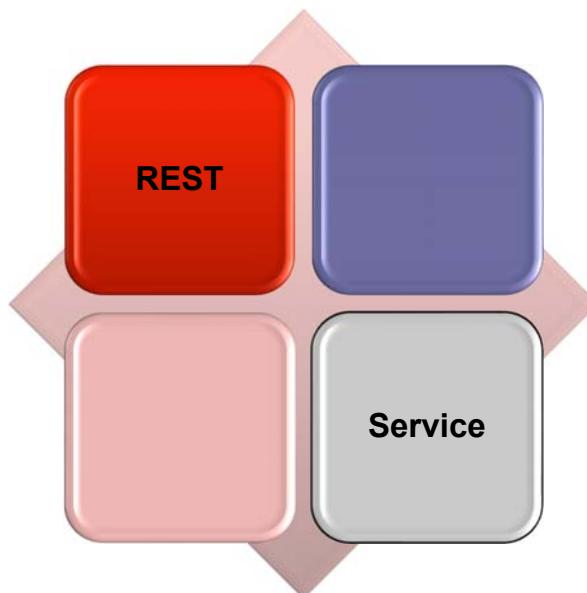
Level 5:その項目が2つの公式なFMM(FHIR Maturity Model)を満たしていること。1つ以上の少なくとも5つの独立した製品で実装されていること

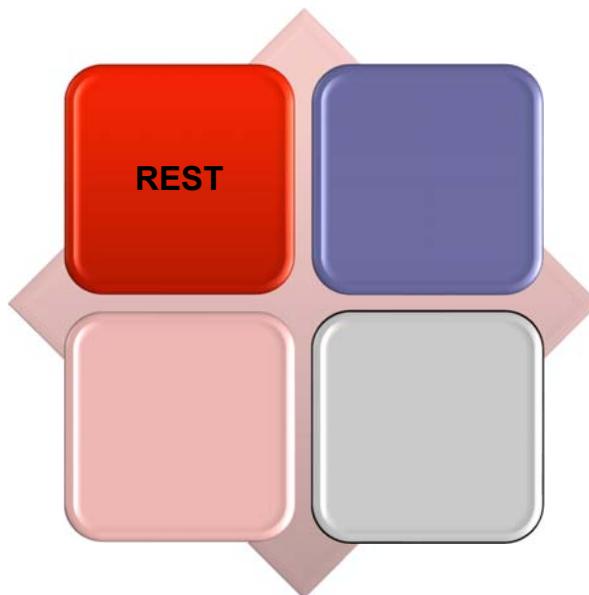
Level 6:[Normative]その項目が現時点で安定していると考えられること

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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

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## リソース仕様

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

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## 1.2 Resource Index

HL7 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**

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

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XMLでの表記

Turtle(RDF)での表記

JSONでの表記

UMLでの表記

Flagの意味

8.1.2 Resource

**Structure** **UML** **XML** **JSON** **Turtle** **R3 Diff** **All**

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

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	リソース基本エレメント(リソース参照)
	同一のリソースの一部またはプロファイルで定義された複数エレメントを有するエレメント
	複数の異なったタイプの一つを持つことができるエレメント(下記参照)
	属性/プロパティ値を有するエレメントを記述するデータタイプのエレメント。これらはプリミティブタイプで小文字で始まる
	その他のエレメントを記述するデータタイプのエレメント。これらはコンプレックスタイプで大文字で始まる
	他のリソースを参照するエレメント(referenceを参照)
	本エレメントは本リソースまたはプロファイル内でその他のエレメントと同一の内容を有する
	スライスのセットの導入(Slicing参照)
	コンプレックス拡張-ネストされた拡張の一つ(拡張性参照)
	値を有する拡張でネストされていない(拡張性参照)
	コンプレックス修飾拡張-ネストされた拡張の一つ(拡張性参照)
	値を有する拡張でネストされていない(拡張性参照)
	論理プロファイルのルート

**?! : ブール値を持つ修飾子**

**S : サポートしなければならない要素**

**Σ : 集合の一部の要素**

**I : 制約を定義するか制約の影響を受ける要素**

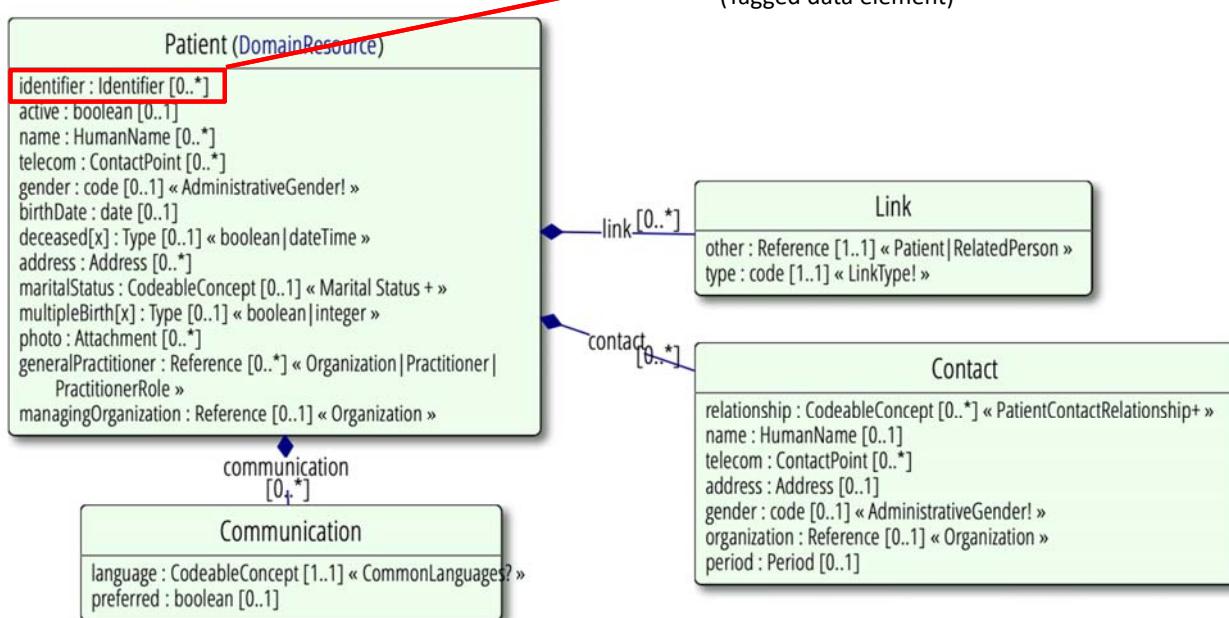
**NE: 拡張できない要素(一部のinfrastructural要素のみ)**

**TU :トライアル時のみ使用**

**N : Normative要素**

**D : ドラフト時の要素**

UML Diagram (Legend)



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```

<?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

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## Patient ↔ PID



Name	Flags	Card.	Type
Patient	N		DomainResource
identifier	S	0..*	Identifier
active	?! S	0..1	boolean
name	S	0..*	HumanName
telecom	S	0..*	ContactPoint
gender	S	0..1	code
birthDate	S	0..1	date
deceased[x]	?! S	0..1	
deceasedBoolean			boolean
deceasedDateTime			dateTime
address	S	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	S	0..1	Reference(Organization)
link	?! S	0..*	BackboneElement
other		1..1	Reference(Patient   RelatedPerson)
type		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



## Patient ↔ PID



Name	Flags	Card.	Type
Patient	N		DomainResource
identifier	S	0..*	Identifier
active	?! S	0..1	boolean
name	S	0..*	HumanName
telecom	S	0..*	ContactPoint
gender	S	0..1	code
birthDate	S	0..1	date
deceased[x]	?! S	0..1	
deceasedBoolean			boolean
deceasedDateTime			dateTime
address	S	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	S	0..1	Reference(Organization)
link	?! S	0..*	BackboneElement
other		1..1	Reference(Patient   RelatedPerson)
type		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

**FHIR**

Name	Flags	Card.	Type	V2
Patient	N		DomainResource	
identifier	S	0..*	Identifier	Code
active	?!	0..1	boolean	Display
name	S	0..*	HumanName	Definition
telecom	S	0..*	ContactPoint	
gender	S	0..1	code	
birthDate	S	0..1	date	
deceased[x]	?!	0..1	deceasedBoolean deceasedDateTime	
address	S	0..*	Address	
maritalStatus		0..1	CodeableConcept	
multipleBirth[x]		0..1	boolean 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) Reference(Organization)	
managingOrganization	S	0..1	Reference(Patient RelatedPerson)	
link	?!	0..*	BackboneElement	
other	S	1..1	Reference(Patient RelatedPerson)	
type	S	1..1	code	

**V2**

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

**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	

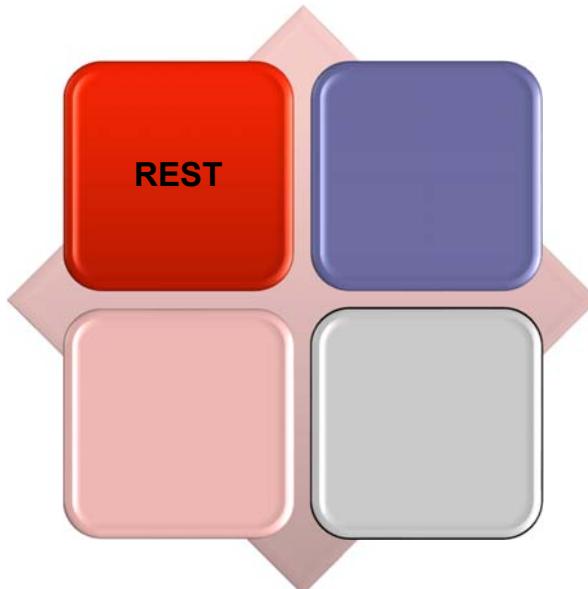
**Description & Constraints**

Name Flags Card. Type Description & Constraints

HumanName	S	N	Element	Name of a human - parts and usage Elements defined in Ancestors: id, extension usual   official   temp   nickname   anonymous   old   maiden Name Use (Optional)				
				SEQ	LEN	DT	OPT	COMPONENT NAME
use	?! S	0..1	code	1	194	FN	O	Family Name
text	S	0..1	string	2	30	ST	O	Given Name
family	S	0..1	string	3	30	A		Alias Name
given	S	0..*	string	4	20	B		Name at Birth
prefix	S	0..*	string	5	20	C		Adopted Name
suffix	S	0..*	string	6	6	D		Display Name
period	S	0..1	Period	7	1	I		Licensing Name
				8	1	L		Legal Name
				9	48	M		Maiden Name
				10	53	N		Nickname /"Call me" Name/Street Name
				11	1	P		Name of Partner/Spouse (retained for backward compatibility only)
				12	26	R		Registered Name (animals only)
				13	26	S		Coded Pseudo-Name to ensure anonymity
				14	199	T		Indigenous/Tribal/Community Name
						U		Unspecified
						SI	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>
```

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## 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
<code>GET</code>	リソースの取得
<code>PUT</code>	リソースの更新
<code>POST</code>	リソースの作成
<code>DELETE</code>	リソースの削除
<code>HEAD</code>	リソースのメタデータの取得
<code>OPTIONS</code>	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** : 単一のインターラ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`

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- Hapi サーバに患者を登録

The screenshot shows the Postman interface with the following details:

- Request Method:** POST
- Request URL:** `http://hapi.fhir.org/baseDstu3/Patient`
- Headers:**
  - Content-Type: application/fhir+json
- Body:** (Empty)

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This is the current officially released version of FHIR, which is R4 (v4.0.0). For a full list of all versions, see the [Directory of published versions](#).

## 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 <a href="#">Architect's Overview</a> . See also the abstract Base Resources Resource and DomainResource.				
<a href="#">Categorized</a> <a href="#">Alphabetical</a> <a href="#">R2 Layout</a> <a href="#">By Maturity</a> <a href="#">Security Category</a> <a href="#">By Standards Status</a> <a href="#">By Committee</a>				
<b>Foundation</b> <ul style="list-style-type: none"> <li>• CapabilityStatement [N]</li> <li>• StructureDefinition [N]</li> <li>• ImplementationGuide 1</li> <li>• SearchParameter 3</li> <li>• MessageDefinition 1</li> <li>• OperationDefinition [N]</li> <li>• CompartmentDefinition 1</li> <li>• StructureMap 2</li> <li>• GraphDefinition 1</li> <li>• ExampleScenario 0</li> </ul>	<b>Terminology</b> <ul style="list-style-type: none"> <li>• CodeSystem [N]</li> <li>• ValueSet [N]</li> <li>• ConceptMap 3</li> <li>• NamingSystem 1</li> <li>• TerminologyCapabilities 0</li> </ul>	<b>Security</b> <ul style="list-style-type: none"> <li>• Provenance 3</li> <li>• AuditEvent 3</li> <li>• Consent 2</li> </ul>	<b>Documents</b> <ul style="list-style-type: none"> <li>• Composition 2</li> <li>• DocumentManifest 2</li> <li>• DocumentReference 3</li> <li>• CatalogEntry 0</li> </ul>	<b>Other</b> <ul style="list-style-type: none"> <li>• Basic 1</li> <li>• Binary [N]</li> <li>• Bundle [N]</li> <li>• Linkage 0</li> <li>• MessageHeader 4</li> <li>• OperationOutcome [N]</li> <li>• Parameters [N]</li> <li>• Subscription 3</li> </ul>
<b>Base</b> <ul style="list-style-type: none"> <li><b>Patient</b> [N] (circled in red)</li> <li>• PractitionerRole 2</li> <li>• RelatedPerson 2</li> <li>• Person 2</li> <li>• Group 1</li> </ul>	<b>Entities #1</b> <ul style="list-style-type: none"> <li>• Organization 3</li> <li>• OrganizationAffiliation 0</li> <li>• HealthcareService 2</li> <li>• Endpoint 2</li> <li>• Location 3</li> </ul>	<b>Entities #2</b> <ul style="list-style-type: none"> <li>• Substance 2</li> <li>• BiologicallyDerivedProduct 0</li> <li>• Device 0</li> <li>• DeviceMetric 1</li> </ul>	<b>Workflow</b> <ul style="list-style-type: none"> <li>• Task 2</li> <li>• Appointment 3</li> <li>• AppointmentResponse 3</li> <li>• Schedule 3</li> <li>• Slot 3</li> <li>• VerificationResult 0</li> </ul>	<b>Management</b> <ul style="list-style-type: none"> <li>• Encounter 2</li> <li>• EpisodeOfCare 2</li> <li>• Flag 1</li> <li>• List 1</li> <li>• Library 2</li> </ul>
	<a href="#">Summary</a> <a href="#">Diagnostics</a> <a href="#">Medications</a>	<a href="#">Care Provision</a>		<a href="#">Request &amp; Response</a>

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## 8.1 Resource Patient - Content

Patient Administration Work Group	Maturity Level: N	Normative (from v4.0.0)	Security Category: Patient	Compartments: Patient, Practitioner, RelatedPerson
-----------------------------------	-------------------	-------------------------	----------------------------	--

Demographics and other administrative information about an individual or animal receiving care or other health-related services.

### 8.1.1 Scope and Usage

This Resource covers data about patients and animals involved in a wide range of health-related activities, including:

- Curative activities
- Psychiatric care
- Social services
- Pregnancy care
- Nursing and assisted living
- Dietary services
- Tracking of personal health and exercise data

The data in the Resource covers the "who" information about the patient: its attributes are focused on the demographic information necessary to support the administrative, financial and logistic procedures. A Patient record is generally created and maintained by each organization providing care for a patient. A patient or animal receiving care at multiple organizations may therefore have its information present in multiple Patient Resources.

Not all concepts are included within the base resource (such as race, ethnicity, organ donor status, nationalities, etc.), but may be found in profiles defined for specific jurisdictions (e.g., US Meaningful Use Program) or standard extensions. Such fields vary widely between jurisdictions and often have different names and valuesets for the similar concepts, but they are not similar enough to be able to map and exchange.

This resource is referenced by Annotation, Signature, Account, AdverseEvent, AllergyIntolerance, Appointment, AppointmentResponse, AuditEvent, Basic, BiologicallyDerivedProduct, BodyStructure, CarePlan, CareTeam, ChargeItem, Claim, ClaimResponse, ClinicalImpression, Communication, CommunicationRequest, Composition, Condition, Consent, Contract, Coverage, CoverageEligibilityRequest, CoverageEligibilityResponse, DetectedIssue, Device, DeviceRequest, DeviceUseStatement, DiagnosticReport, DocumentManifest, DocumentReference, Encounter, EnrollmentRequest, EpisodeOfCare, ExplanationOfBenefit, FamilyMemberHistory, Flag, Goal, Group, GuidanceResponse, ImagingStudy, Immunization, ImmunizationEvaluation, ImmunizationRecommendation, Invoice, List, MeasureReport, Media, MedicationAdministration, MedicationDispense, MedicationRequest, MedicationStatement, MolecularSequence, NutritionOrder, Observation, Person, Procedure, Provenance, QuestionnaireResponse, RelatedPerson, RequestGroup, ResearchSubject, RiskAssessment, Schedule, ServiceRequest, Specimen, SupplyDelivery, SupplyRequest, Task and VisionPrescription

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This is the current officially released version of FHIR, which is R4 (v4.0.0). For a full list of all versions, see the [Directory of published versions](#).

Patient Administration Work Group	Maturity Level: N/A	Standards Status: Informative	Security Category: Patient	Compartments: Patient, Practitioner, RelatedPerson
Example Name	id	Format		
General Person Example	example	XML, JSON, Turtle		
Patient 1 for linking	pat1	XML, JSON, Turtle		
Patient 2 for linking	pat2	XML, JSON, Turtle		
Deceased patient (using time)	pat3	XML, JSON, Turtle		
Deceased patient (using boolean)	pat4	XML, JSON, Turtle		
Stock people (defined by HL7 publishing)	b248b1b2-1686-4b94-9936-37d7a5f94b51	XML, JSON, Turtle		
Example People from cypress project	b0a5e4277-83c4-4adb-87c2-e3efe3369b6f	XML, JSON, Turtle		
2nd person example	xeda	XML, JSON, Turtle		
XDS Patient	xds	XML, JSON, Turtle		
An example of an animal	animal	XML, JSON, Turtle		
Taken from a DICOM sample	dicom	XML, JSON, Turtle		
Example from IHE-PCD example	ihe-pcd	XML, JSON, Turtle		
Real-world patient example (anonymized)	foo1	XML, JSON, Turtle		
Real-world patient example (anonymized)	f201	XML, JSON, Turtle		
Example for glossy	glossy	XML, JSON, Turtle		
Genetic Risk Assessment Person	proband	XML, JSON, Turtle		
Additional Genetics Example	genetics-example1	XML, JSON, Turtle		
Example Patient resource with Chinese content	ch-example	XML, JSON, Turtle		
Newborn Patient Example	newborn	XML, JSON, Turtle		
Mother of Newborn Patient Example	mom	XML, JSON, Turtle		

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```
{
  "resourceType": "Patient",
  "id": "example",
  "text": {
    "status": "generated",
    "div": "<div xmlns=\\\"http://www.w3.org/1999/\\>
      <table>
        <tr>
          <td>MRN: 12345 (Acme Healthcare)</td>
        </tr>
      </table>
    </div>"
  },
  "identifier": [
    {
      "use": "usual",
      "type": {
        "coding": [
          {
            "reference": "Organization/1"
          }
        ]
      }
    }
  ]
}
```

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## Patient例 postmanによる送受信



The screenshot shows the Postman application interface. A POST request is being made to <http://hapi.fhir.org/baseDstu3/Patient>. The request body is a JSON object representing a Patient resource:

```
{
  "resourceType": "Patient",
  "id": "example",
  "text": {
    "status": "generated",
    "div": "<div xmlns='http://www.w3.org/1999/xhtml'><table><tbody><tr><td>Name</td><td>Chalmers</td><tr><td>Address</td><td>534 Erehwon, Pleasantville, Vic, 3999</td><tr><td>Contacts</td><td>Home: unknown. Work: (03) 5555 6473</td><tr><td>Id</td><td>MRN: 12345 (Acme Healthcare)</td></tbody></table>"
  },
  "identifier": [
    {
      "use": "usual",
      "type": {
        "coding": [
          {
            "system": "http://terminology.hl7.org/CodeSystem/v2-0203",
            "code": "MR"
          }
        ]
      }
    }
  ],
  "gender": "female",
  "period": {
    "start": "2012"
  }
}
```

The response status is 201 Created, and the response body shows the created Patient resource with an ID of 1929116.



## Patient例のPOST送信と返信



```
{
  "resourceType": "Patient",
  "id": "example",
  "text": {
    "status": "generated",
    "div": "<div xmlns='http://www.w3.org/1999/xhtml'><table><tbody><tr><td>MRN: 12345 (Acme Healthcare)</td><tr></tbody></table>"
  },
  "identifier": [
    {
      "use": "usual",
      "type": {
        "coding": [
          {
            "system": "http://terminology.hl7.org/CodeSystem/v2-0203",
            "code": "MR"
          }
        ]
      }
    }
  ],
  "gender": "female",
  "period": {
    "start": "2012"
  }
}

{
  "resourceType": "Patient",
  "id": "1929116",
  "meta": {
    "versionId": "1",
    "lastUpdated": "2019-05-20T03:38:46.833+00:00"
  },
  "text": {
    "status": "generated",
    "div": "<div xmlns='http://www.w3.org/1999/xhtml'><table><tbody><tr><td>Name</td><td>Chalmers</td><tr><td>Address</td><td>534 Erehwon, Pleasantville, Vic, 3999</td><tr><td>Contacts</td><td>Home: unknown. Work: (03) 5555 6473</td><tr><td>Id</td><td>MRN: 12345 (Acme Healthcare)</td></tbody></table>"
  },
  "identifier": [
    {
      "use": "usual",
      "type": {
        "coding": [
          {
            "system": "http://terminology.hl7.org/CodeSystem/v2-0203",
            "code": "MR"
          }
        ]
      }
    }
  ],
  "gender": "female",
  "period": {
    "start": "2012"
  }
}
```



## Patient リソースのXML書式で取得 GET



Postman

Your team updated to Postman v7.0. To keep your collections and workspaces in sync with your team, you must also update to v7.0 by going to > Settings > Update.

GET http://hapi.fhir.org/baseDstu3/Patient/1929116

No Environment

Status: 200 OK Time: 346 ms Size: 4.46 KB Download

Body Cookies Headers (10) Test Results

Pretty Raw Preview XML

```
1 <Patient xmlns="http://hl7.org/fhir">
2   <id value="1929116"/>
3   <meta>
4     <versionId value="1"/>
5     <lastUpdated value="2019-05-20T03:38:46.833+00:00"/>
6   </meta>
7   <text>
8     <status value="generated"/>
9     <div xmlns="http://www.w3.org/1999/xhtml">
10    <table>
11      <tbody>
12        <tr>
13          <td>Name</td>
14          <td>Peter James
15            <b>Chalmers</b> (&quot;Jim&quot;)
16        </td>
17      </tr>
18      <tr>
19        <td>Address</td>
20        <td>534 Erewhon, Pleasantville, Vic, 3999</td>
21      </tr>
22      <tr>
23        <td>Contacts</td>
24        <td>Home: unknown. Work: (03) 5555 6473</td>
25      </tr>
26      <tr>
27        <td>Id</td>
28        <td>MRN: 12345 (Acme Healthcare)</td>
29      </tr>
30    </tbody>
31  </table>
32 </div>
33 </text>
34 </Patient>
```



## WEBブラウザ(Safari)で参照



This result is being rendered in HTML for easy viewing. You may access this content as [Raw JSON](#) or [Raw XML](#), or view this content in [HTML JSON](#) or [HTML XML](#). Response generated in 6ms.

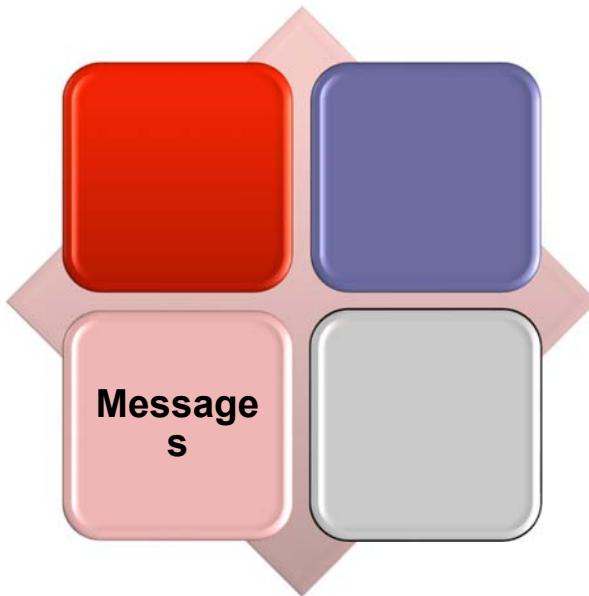
HTTP 200 OK

Response Headers

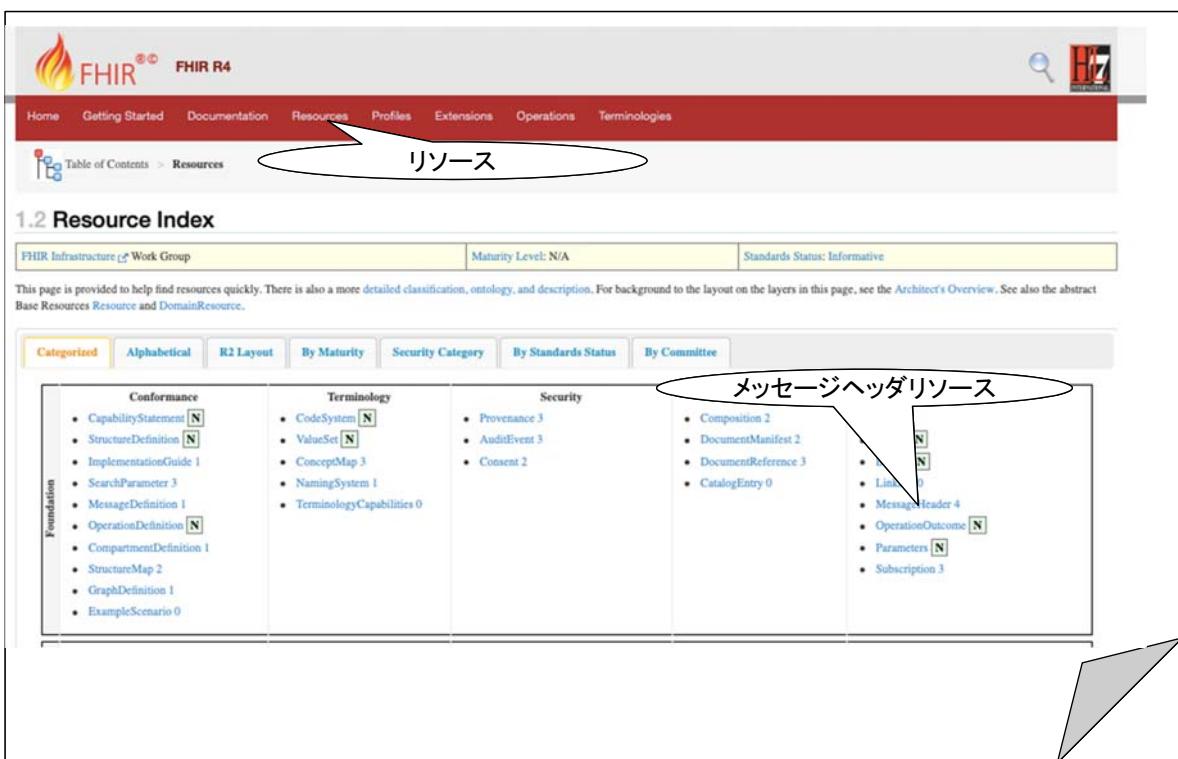
```
X-Powered-By: HAPI FHIR 3.0.0-SNAPSHOT REST Server (FHIR Server; FHIR 3.0.1/DSTU3)
Content-Type: application/fhir+xml; charset=utf-8
```

Response Body

```
1 <Patient xmlns="http://hl7.org/fhir">
2   <id value="1929116"/>
3   <meta>
4     <versionId value="1"/>
5     <lastUpdated value="2019-05-20T03:38:46.833+00:00"/>
6   </meta>
7   <text>
8     <status value="generated"/>
9     <div xmlns="http://www.w3.org/1999/xhtml">
10    <table>
11      <tbody>
12        <tr>
13          <td>Name</td>
14          <td>Peter James
15            <b>Chalmers</b> (&quot;Jim&quot;)
16        </td>
17      </tr>
18      <tr>
19        <td>Address</td>
20        <td>534 Erewhon, Pleasantville, Vic, 3999</td>
21      </tr>
22      <tr>
23        <td>Contacts</td>
24        <td>Home: unknown. Work: (03) 5555 6473</td>
25      </tr>
26      <tr>
27        <td>Id</td>
28        <td>MRN: 12345 (Acme Healthcare)</td>
29      </tr>
30    </tbody>
31  </table>
32 </div>
33 </text>
34 <identifier>
35   <use value="usual"/>
36   <type>
37     <coding>
38       <system value="http://terminology.hl7.org/CodeSystem/v2-0203"/>
39       <code value="MR"/>
40     </coding>
41   </type>
42   <system value="urn:oid:1.2.36.146.595.217.0.1"/>
43   <value value="12345"/>
44 </Patient>
```



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**1.2 Resource Index**

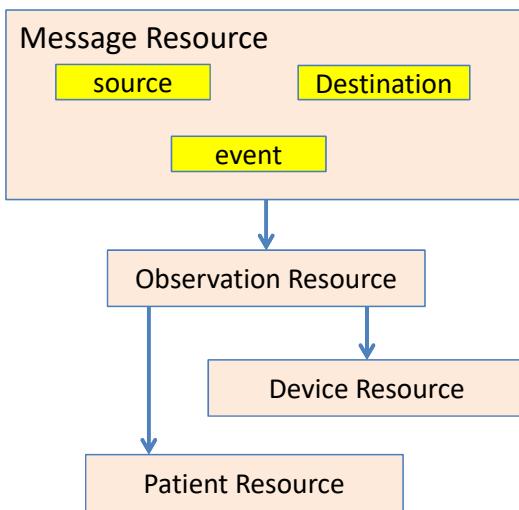
Table of Contents > Resources

**リソース**

**メッセージヘッダリソース**

Categorized	Alphabetical	R2 Layout	By Maturity	Security Category	By Standards Status	By Committee
Foundation	Conformance	Terminology	Security			
<ul style="list-style-type: none"> <li>CapabilityStatement [N]</li> <li>StructureDefinition [N]</li> <li>ImplementationGuide 1</li> <li>SearchParameter 3</li> <li>MessageDefinition 1</li> <li>OperationDefinition [N]</li> <li>CompartmentDefinition 1</li> <li>StructureMap 2</li> <li>GraphDefinition 1</li> <li>ExampleScenario 0</li> </ul>	<ul style="list-style-type: none"> <li>CodeSystem [N]</li> <li>ValueSet [N]</li> <li>ConceptMap 3</li> <li>NamingSystem 1</li> <li>TerminologyCapabilities 0</li> </ul>	<ul style="list-style-type: none"> <li>Provenance 3</li> <li>AuditEvent 3</li> <li>Consent 2</li> </ul>	<ul style="list-style-type: none"> <li>Composition 2</li> <li>DocumentManifest 2</li> <li>DocumentReference 3</li> <li>CatalogEntry 0</li> </ul>	<ul style="list-style-type: none"> <li>Link 0</li> <li>MessageHeader 4</li> <li>OperationOutcome [N]</li> <li>Parameters [N]</li> <li>Subscription 3</li> </ul>		

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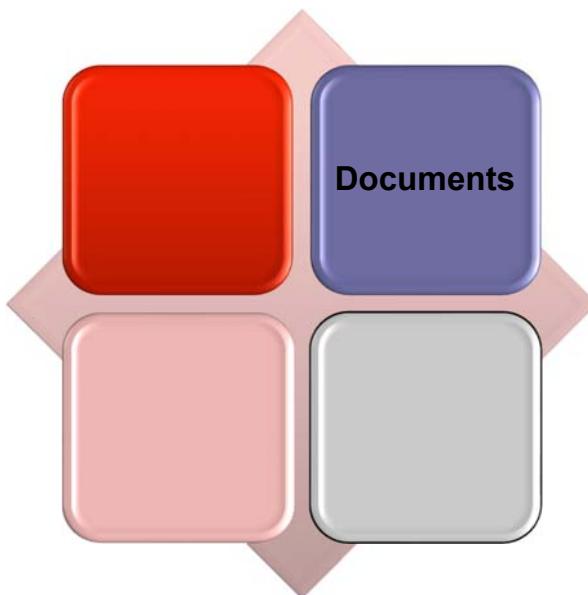


```

<Bundle>
  <type value="message"/>
  <entry>
    <MessageHeader/>
  </entry>
  <entry>
    <Observation/>
  </entry>
  <entry>
    <Patient/>
  </entry>
  <entry>
    <Device/>
  </entry>
</Bundle>
  
```

MessageHeaderによりSimpleなメッセージングとして使えるが、多くはBundleリソースによるプロファイリングにより構成される

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**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](#).

**Resource Index Categories:**

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

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

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**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](#).

**Resource Index Categories:**

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

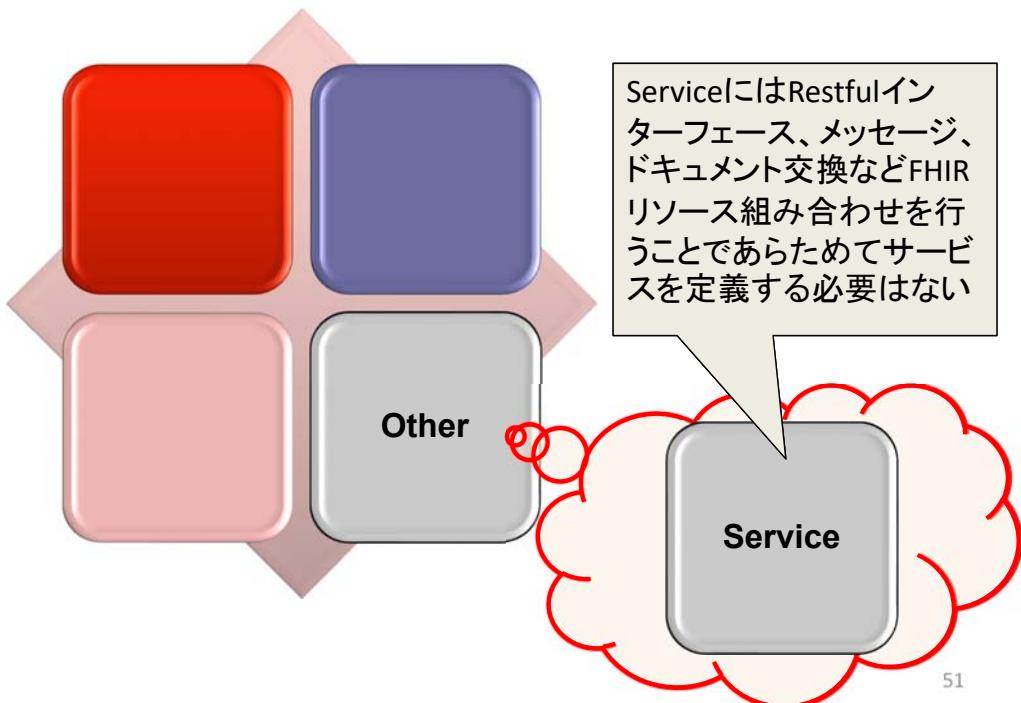
  

Individuals	Entities #1	Entities #2	Workflow	Management
<ul style="list-style-type: none"> <li>Patient [N]</li> <li>Practitioner 3</li> <li>PractitionerRole 2</li> <li>RelatedPerson 2</li> <li>Person 2</li> <li>Group 1</li> </ul>	<ul style="list-style-type: none"> <li>Organization 3</li> <li>OrganizationAffiliation 0</li> <li>HealthcareService 2</li> <li>Endpoint 2</li> <li>Location 3</li> </ul>	<ul style="list-style-type: none"> <li>Substance 2</li> <li>BiologicallyDerivedProduct 0</li> <li>Device 0</li> <li>DeviceMetric 1</li> </ul>	<ul style="list-style-type: none"> <li>Task 2</li> <li>Appointment 3</li> <li>AppointmentResponse 3</li> <li>Schedule 3</li> <li>Slot 3</li> <li>VerificationResult 0</li> </ul>	<ul style="list-style-type: none"> <li>Encounter 2</li> <li>EpisodeOfCare 2</li> <li>Flag 1</li> <li>List 1</li> <li>Library 2</li> </ul>

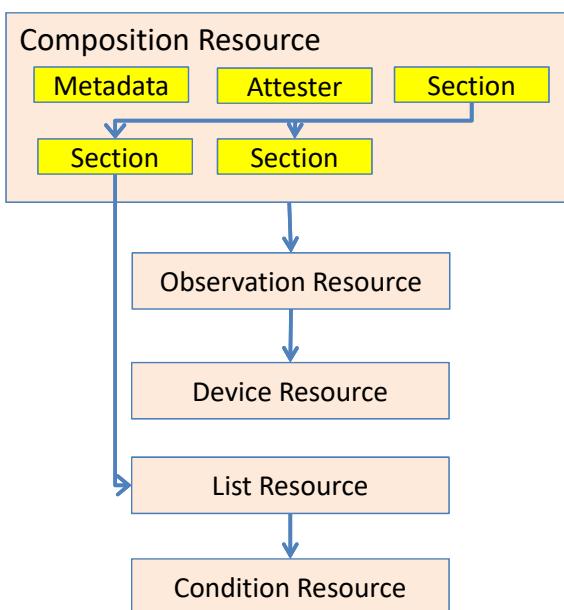
  

Summary	Diagnostics	Medications	Care Provision	Request & Response
<ul style="list-style-type: none"> <li>AllergyIntolerance 3</li> <li>AdverseEvent 0</li> </ul>	<ul style="list-style-type: none"> <li>Observation [N]</li> <li>Media 1</li> </ul>	<ul style="list-style-type: none"> <li>MedicationRequest 3</li> <li>MedicationAdministration 2</li> </ul>	<ul style="list-style-type: none"> <li>CarePlan 2</li> <li>CareTeam 2</li> </ul>	<ul style="list-style-type: none"> <li>Communication 2</li> <li>CommunicationRequest 2</li> </ul>

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```

<Bundle>
  <type value="document"/>
  <entry>
    <Composition/>
  </entry>
  <entry>
    <Observation/>
  </entry>
  <entry>
    <List/>
  </entry>
  <entry>
    <Condition/>
  </entry>
</Bundle>
  
```

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# FHIR demo



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リソース DEMO  
HAPI Java開発Tutorialより



- 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>

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# FHIRツール



The screenshot shows the HL7 FHIR homepage with the 'Welcome to FHIR' section. Under 'Level 2 Supporting implementation at', there is a table for Java. The 'HAPI-FHIR' entry is circled in red.

**Reference Implementations**

- There are [10 open source reference implementations available to help implementers](#). Here are a list of the more common implementations used by implementers:
- HAPI-FHIR**: Object Models, Parsers, Client + Server Framework, FHIR Validator, & Utilities. The specification is built with this Java code.
- [HL7 FHIR](#): Object models, Parsers/Serializers, Utilities, and a Client. Source code on GitHub at <http://github.com/eWoutKraemer/fhir-net-api>.
- [PhirServer](#): Object models, Parsers/Serializers, Validator, Utilities, Client, and the FHIR Reference server. Requires Delphi (Unicode versions)
- [XML Tools](#): Document Rendering Stylesheet, supplementary implementation schemas and transforms
- See the [HL7 wiki for Javascript libraries](#) (Clients and Utilities for both servers and clients)
- 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.



# HAPI FHIR統合開発環境



```

public class Example01_CreateAPatient {
    public static void main(String[] theArgs) {

        // Create a resource instance
        Patient pat = new Patient();

        // Add a "name" element
        HumanName name = pat.addName();
        name.setFamily("Simpson");

        // Add an "identifier"
        Identifier identifier = pat.addIdentifier();
        identifier.setSystem("http://hl7.org/fhir/sid/us-ns");
        identifier.setValue("1234567890");

        // Model is designed to support multiple identifiers
        pat.addIdentifier();
    }
}

```

A code completion tooltip is displayed, listing the following suggestions:

- pat : Patient
- Patient - org.hl7.fhir.dstu3.model
- Patch - ca.uhn.fhir.rest.annotation
- Patch - javax.sound.midi
- Patcher - com.sun.xml.bind.unmarshaller
- Patcher - com.sun.xml.bind.v2.runtime.unmarshaller
- PatchMethodBinding - ca.uhn.fhir.rest.client
- PatchTypeEnum - ca.uhn.fhir.rest.api
- Path - java.nio.file
- Path2D - java.awt.geom

'^Space' の押下でテンプレート候補を表示

```

<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="トウキョウ" />
  <given value="タロウ" />
</name>
<name>
  <extension url="http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation">
    <valueCode value="ABC" />
  </extension>
  <family value="Tokyo" />
  <given value="Taro" />
</name>

```

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```

// 患者情報の設定
Patient pat = new Patient();
// 患者名 : 漢字 設定
HumanName name = pat.addName();
name.addExtension()
  .setUrl("http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation")
  .setValue(new CodeType("IDE"));
name.setFamily("東京").addGiven("太郎");
// 患者名 : フリガナ 設定
name = pat.addName();
name.addExtension()
  .setUrl("http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation")
  .setValue(new CodeType("SYL"));
name.setFamily("トウキョウ").addGiven("タロウ");
// 患者名 : ローマ字 設定
name = pat.addName();
name.addExtension()
  .setUrl("http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation")
  .setValue(new CodeType("ABC"));
name.setFamily("Tokyo").addGiven("Taro");

```

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```
// 患者情報の設定
Patient pat = new Patient();
// 患者名：漢字 設定
HumanName name = pat.addName();
name.addExtension()
    .setU
    .setV
name.setF
// 患者名：フリガナ
name = pa
name.addE
    .setU
    .setV
name.setF
// 患者名：ローマ字
name = pa
name.addE
    .setU
    .setV
.name.setValue(new CodeType("ABC"));
name.setFamily("Tokyo").addGiven("Taro");
```

A screenshot of an Eclipse IDE showing code completion for the `name.addExtension()` method. A tooltip lists several methods:

- `addChild(String name) : Base - HumanName`
- `addExtension() : Extension - Element`
- `addExtension(Extension t) : Element - Element`
- `addExtension(String url, Type value) : void - Element`
- `addGiven(String value) : HumanName - HumanName`
- `addGivenElement() : StringType - HumanName`
- `addPrefix(String value) : HumanName - HumanName`
- `addPrefixElement() : StringType - HumanName`
- `addSuffix(String value) : HumanName - HumanName`
- `addSuffixElement() : StringType - HumanName`
- `castToAddress(Base b) : Address - Base`

The tooltip also includes a note: "'^Space' の押下でテンプレート候補を表示" (Pressing '^Space' displays template candidates).

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```
// 患者ID設定
Identifier identifier = pat.addIdentifier();
identifier.setSystem("http://www.hl7.jp").setValue("HL7J0000123");
// 連絡先電話番号
pat.addTelecom().setUse(ContactPointUse.HOME).
    setSystem(ContactPointSystem.PHONE).setValue("03-3506-8010");
// 性別：列挙型性別情報
pat.setGender(AdministrativeGender.MALE);
```

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```
// FHIRコンテキストに変換
FhirContext ctx = FhirContext.forDstu3();
IParser parser = ctx.newJsonParser();           // Json変換
// IParser parser = ctx.newXmlParser();          // XML変換
parser.setPrettyPrint(true);                    // 清書
String encode = parser.encodeResourceToString(pat);
System.out.println(encode);
```

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```
{
  "resourceType": "Patient",
  "identifier": [
    {
      "system": "http://www.hl7.jp",
      "value": "HL7J0000123"
    }
  ],
  "name": [
    {
      "extension": [
        {
          "url": "http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation",
          "valueCode": "IDE"
        }
      ],
      "family": "東京",
      "given": [
        "太郎"
      ]
    },
    {
      "extension": [
        {
          "url": "http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation",
          "valueCode": "SYL"
        }
      ],
      "family": "トウキョウ",
      "given": [
        "タロウ"
      ]
    },
    {
      "extension": [
        {
          "url": "http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation",
          "valueCode": "ABC"
        }
      ],
      "family": "Tokyo",
      "given": [
        "Taro"
      ]
    }
  ],
  "telecom": [
    {
      "system": "phone",
      "value": "03-3506-8010",
      "use": "home"
    }
  ],
  "gender": "male"
}
```

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```
<Patient xmlns="http://hl7.org/fhir">
  <id identifier="HL7J0000123" system="http://www.hl7.jp"/>
  <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="トウキョウ"/>
    <given value="タロウ"/>
  </name>
  <name>
    <extension url="http://hl7.org/fhir/StructureDefinition/iso21090-EN-representation">
      <valueCode value="ABC"/>
    </extension>
    <family value="Tokyo"/>
    <given value="Taro"/>
  </name>
  <telecom>
    <system value="phone"/>
    <value value="03-3506-8010"/>
    <use value="home"/>
  </telecom>
  <gender value="male"/>
</Patient>
```

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```
public class Example01_CreateAPatient {
  public static void main(String[] theArgs) {

    // Create a resource instance
    Patient pat = new Patient();

    // Add a "name" element
    HumanName name = pat.addName();
    name.setFamily("Simpson").addGiven("Homer").addGiven("J");

    // Add an "identifier" element
    Identifier identifier = pat.addIdentifier();
    identifier.setSystem("http://acme.org/MRNs").setValue("7000135");

    // Model is designed to be chained
    pat.addIdentifier().setSystem("http://acme.org/MRNs").setValue("12345");
  }
}
```

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```

public class Example06_ClientCreate {
    public static void main(String[] theArgs) {

        Patient pat = new Patient();
        pat.addName().setFamily("Tokyo").addGiven("Taro").addGiven("J");
        pat.addIdentifier().setSystem("http://acme.org/MRNs").setValue("HL7000138");
        pat.setGender(AdministrativeGender.MALE);

        // Create a context
        FhirContext ctx = FhirContext.forDstu3();

        // Create a client
        String serverBaseUrl = "http://fhirtest.uhn.ca/baseDstu3";
        IGenericClient client = ctx.newRestfulGenericClient(serverBaseUrl);

        // Use the client to store a new resource instance
        MethodOutcome outcome = client
            .create()
            .resource(pat)
            .execute();

        // Print the ID of the newly created resource
        System.out.println(outcome.getId());
    }
}

```

`http://hapi.fhir.org/baseDstu3/Patient/`

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```

{
  "resourceType": "Patient",
  "identifier": [
    {
      "system": "http://acme.org/MRNs",
      "value": "7000135" 患者id
    }
  ],
  "name": [
    {
      "family": "Simpson",
      "given": [
        "Homer",
        "J"
      ]
    }
  ],
  "telecom": [
    {
      "system": "phone",
      "value": "1 (416) 340-4800",
      "use": "home"
    }
  ],
  "gender": "male"
}

```

`parser.setPrettyPrint(true);` JSON Non Format  
 {"resourceType":"Patient","identifier":[{"system":"http://acme.org/MRNs","value":"7000135"}],"name":[{"family":"Simpson","given":["Homer","J"]}], "telecom":[{"system":"phone","value":"1 (416) 340-4800","use":"home"}], "gender":"male"}



## Create: POST

### Patient リソース 要求



Create (POST)

Rest サーバURL+Content他

要求

Body(患者情報)

```

1  {
2    "resourceType": "Patient",
3    "identifier": [
4      {
5        "system": "http://acme.org/MRNs",
6        "value": "HL7000135"
7      }
8    ],
9    "name": [
10      {
11        "family": "東京",
12        "given": [
13          "太郎"
14        ]
15      }
16    ],
17    "telecom": [
18      {
19        "system": "phone",
20        "value": "1 (416) 340-4800",
21        "use": "home"
22      }
23    ],
24    "gender": "male"
25  }
26

```



## Create “Patient” 応答



Body Cookies Headers (10) Test Results Status: 200 OK Time: 1646 ms Size: 1.15 KB Download

Pretty Raw Preview JSON

```

1  {
2    "resourceType": "Patient",
3    "id": "1521481",
4    "meta": {
5      "versionId": "1",
6      "lastUpdated": "2019-02-28T23:57:22.072+00:00"
7    },
8    "text": {
9      "status": "generated",
10     "div": "<div xmlns='http://www.w3.org/1999/xhtml'><div class='\"hapiHeaderText\">太郎 <b>東京</b> </div><table class='\"hapiPropertyTable\"'><tbody><tr><td>Identifier</td><td>HL7000135</td></tr></tbody></table></div>"
11  },
12  "identifier": [
13    {
14      "system": "http://acme.org/MRNs",
15      "value": "HL7000135"
16    }
17  ],
18  "name": [
19    {
20      "family": "東京",
21      "given": [
22        "太郎"
23      ]
24    }
25  ],
26  "telecom": [
27    {
28      "system": "phone",
29      "value": "1 (416) 340-4800",
30      "use": "home"
31    }
32  ],
33  "gender": "male"
34 }

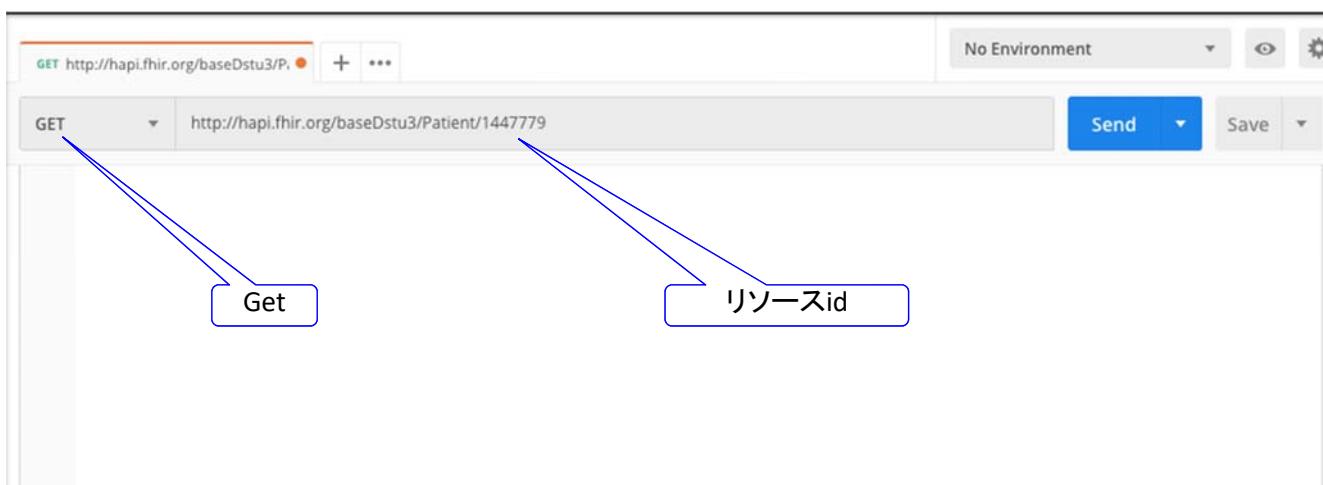
```

```
{
  "resourceType": "Patient",
  "id": "1521481",
  "meta": {
    "versionId": "1",
    "lastUpdated": "2019-02-28T23:57:22.072+00:00"
  },
  "text": {
    "status": "generated",
    "div": "<div
xmlns='http://www.w3.org/1999/xhtml'><div
class='hapiHeaderText'>太郎 <b>東京
</b></div><table
class='hapiPropertyTable'><tbody><tr><td>Identifier</td><td>HL7000135</td></tr></tbody></table></div>"}
  },
  "identifier": [
    {
      "system": "http://acme.org/MRNs",
      "value": "HL7000135"
    }
  ],
  "name": [
    {
      "family": "東京",
      "given": [
        "太郎"
      ]
    }
  ],
  "telecom": [
    {
      "system": "phone",
      "value": "1 (416) 340-4800",
      "use": "home"
    }
  ],
  "gender": "male"
}
```

Unique ID(Resource id)が付加  
患者id

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## Read: GET Patient リソース要求



The screenshot shows a web-based FHIR client interface. At the top, there is a header bar with the URL `GET http://hapi.fhir.org/baseDstu3/Patient/1447779`, a `Send` button, and other environment settings. Below the header, the main area displays the FHIR JSON response for the Patient resource with the ID `1447779`. Two annotations are present: a blue box labeled `Get` pointing to the `GET` method in the URL bar, and another blue box labeled `リソースid` pointing to the resource ID `1447779` in the URL.

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```
{
  "resourceType": "Patient",
  "id": "1447779",
  "meta": {
    "versionId": "1",
    "lastUpdated": "2019-02-25T05:39:16.626+00:00"
  },
  "text": {
    "status": "generated",
    "div": "<div xmlns='http://www.w3.org/1999/xhtml'><div>Homer J <b>SIMPSON</b></div><table><tbody><tr><td>Identifier</td><td>7000135</td></tr></tbody></table></div>"
  },
  "identifier": [
    {
      "system": "http://acme.org/MRNs",
      "value": "7000135"
    }
  ],
  "name": [
    {
      "family": "Simpson",
      "given": [
        "Homer",
        "J"
      ]
    }
  ],
  "telecom": [
    {
      "system": "phone",
      "value": "1 (416) 340-4800",
      "use": "home"
    }
  ],
  "gender": "male"
}
```

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Put

PUT http://hapi.fhir.org/baseDstu3/Patient/1447779

No Environment

Send Save

リソースid

変更情報

```

1 {
2   "resourceType": "Patient",
3   "id": "1447779",
4   "identifier": [
5     {
6       "system": "http://acme.org/MRNs",
7       "value": "7000135"
8     }
9   ],
10  "name": [
11    {
12      "family": "東京",
13      "given": "太郎"
14    }
15  ]
16}
17

```

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none form-data x-www-form-urlencoded raw binary Text ▾

```

1  {
2    "resourceType": "Patient",
3    "identifier": [
4      {
5        "system": "http://acme.org/MRNs",
6        "value": "HL7000135"
7      }
8    ],
9    "name": [
10      {
11        "family": "東京",
12        "given": [
13          "花子"
14        ]
15      }
16    ],
17    "telecom": [
18      {
19        "system": "phone",
20        "value": "1 (416) 340-4800",
21        "use": "home"
22      }
23    ],
24    "gender": "female"
25  }
26

```

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```

public class Example07_ClientReadAndUpdate {
    public static void main(String[] theArgs) {
// Create a client
        String serverBaseUrl = "http://fhirtest.uhn.ca/baseDstu3";
        FhirContext ctx = FhirContext.forDstu3();
        IGenericClient client = ctx.newRestfulGenericClient(serverBaseUrl);
// Use the client to read back the new instance using the
// ID we retrieved from the read
        Patient patient = client
            .read()
            .resource(Patient.class)
            .withId("1521938")
            .execute();
// Print the ID of the newly created resource
        System.out.println("Found ID: " + patient.getId());
// Change the gender
        patient.setGender(patient.getGender() == AdministrativeGender.MALE ?
            AdministrativeGender.FEMALE : AdministrativeGender.MALE);
// Update the patient
        MethodOutcome outcome = client
            .update()
            .resource(patient)
            .execute();
        System.out.println("Now have ID: " + outcome.getId());
    }
}

```

Found ID: http://hapi.fhir.org/baseDstu3/Patient/1521938/\_history/1  
Now have ID: http://hapi.fhir.org/baseDstu3/Patient/1521938/\_history/2

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<http://fhirtest.uhn.ca>



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## Hapiツール



ご静聴ありがとうございました

