

# Open Source Implementations

## Introduction

This page lists known open source implementations of the FHIR specification. For a list of running servers, see [Publicly Available FHIR Servers for testing](#)

## Reference Libraries

- **JAVA:** <https://github.com/jamesagnew/hapi-fhir> - James Agnew / University Health Network
  - Open-source Java library for quickly creating FHIR Servers and Clients
  - Geared towards adding FHIR capability to existing applications (e.g. it's not a database, it's a library for quickly bolting FHIR on to your own database, or connecting to other FHIR servers as a client)
  - Supports all resource types, most operations, and both xml and json encodings
  - "Tinder" code generator (Maven plugin) creates model objects and clients from Profiles and Conformance statements
- **DotNet FHIR Client:** <https://github.com/FirelyTeam/fhir-net-api>
  - Reference client with branches supporting each version of FHIR
  - Supports all resource types, searches, all operations, xml + json
  - Validation, FhirPath, very basic terminology server implementation
  - Available via NuGet
  - Documentation available here <http://docs.simplifier.net/fhirmetapi/index.html>
- **DotNet Server:** <https://github.com/FirelyTeam/spark>
  - Reference server built in parallel with Grahame's to test the specification (actively developed during DSTU2, recent updates to support STU3)
  - Supports all resource types, searches, many operations, xml + json
  - Built in .NET with the .NET reference implementation, WebApi 2.0 library, Mongo DB for storage and search.
- **Java - SMART on FHIR:** <https://sandbox.smarthealthit.org>
  - [Open source](#) reference implementation of the SMART on FHIR stack in Java and MySQL based on [MitreId Connect](#) and [HAPI FHIR](#).
  - Incorporates synthetic and de-identified [data sets](#) for [DSTU2](#) and [STU3](#), as well data management tools including the [SMART Patient Browser](#) and [FRED FHIR Resource Editor](#).
  - Sample applications for [DSTU2](#) and [STU3](#), client libraries for [JavaScript](#), [Python](#) and [Swift](#), and developer tools such as the [FHIR Support Matrix](#)
  - Technical documentation is at <http://docs.smarthealthit.org> and code is at <https://github.com/smart-on-fhir>
- **Delphi:** <http://github.com/grahamegrieve/fhirserver>
  - De facto reference server (runs at <http://test.fhir.org> and <http://tx.fhir.org>)
  - general purpose server that implements all of the specification
  - development platform: (delphi / windows / mssql)
- **Ruby:** [https://github.com/fhir-crucible/fhir\\_client](https://github.com/fhir-crucible/fhir_client) and [https://github.com/fhir-crucible/fhir\\_models](https://github.com/fhir-crucible/fhir_models)
  - Open-source Ruby library for quickly creating FHIR applications
  - Geared towards adding FHIR capability to your Ruby applications.
  - Supports R4 (default), STU3, and DSTU2, all resource types, most operations, and both xml and json encodings
- **Python - SMART on FHIR:** <https://github.com/smart-on-fhir/client-py>
  - Open-source Python library for quickly creating FHIR applications
  - Supports (R4 coming soon...), STU3, and DSTU2, all resource types, json encodings, some validation
  - \*fhirclient\*, a flexible Python client for FHIR servers supporting the SMART on FHIR protocol
  - data model classes that handle (de)serialization and allow to work with FHIR data in a Pythonic way
  - \*fhir-parser\* application to build custom resources
  - Demo Flask App
- **Swift - SMART on FHIR**
  - Open-source Swift library for quickly creating FHIR applications: Swift-FHIR <https://github.com/smart-on-fhir/Swift-FHIR>
  - Supports R4, all resource types, json encodings, some validation
  - \*Swift-SMART\*: a full client implementation of the FHIR specification for building apps: <https://github.com/smart-on-fhir/Swift-SMART>
  - Swift classes representing data models of FHIR elements and resources, compatible with iOS 11 and OS X 10.13 and later
  - \*fhir-parser\* application to build custom resources
- **PHP - PHP FHIR**
  - Open Source implementation of a FHIR model and client in PHP: <https://github.com/dcarbone/php-fhir>
- **Java - IBM FHIR Server:** <http://github.com/ibm/fhir>
  - Open-source FHIR server and libraries for manipulating FHIR resources
  - Supports R4 (all resource types), JSON and XML formats, FHIRPath 2.0
  - [Aegis Touchstone Conformance Report](#)

## JavaScript

There is no single reference implementation for JavaScript.

- **Client for communicating with FHIR servers:** <https://github.com/FHIR/fhir.js>
  - Open-source JavaScript library for communication with FHIR servers
- **Node.js / Express:** <https://github.com/Asymmetrik/node-fhir-server-core>
  - Standalone open-source FHIR server from Asymmetri <https://www.asymmetrik.com/asymmetrik-fhir/>

- Winner of the ONC Secure FHIR Server Challenge (2018) <https://www.challenge.gov/challenge/secure-api-server-showdown-challenge/>
- Additional resource profiles in heavy development
- Implements a core FHIR server, with custom adapters for non-FHIR data sources.
- Example adapter for MongoDB: <https://github.com/Asymmetrik/node-fhir-server-mongo> [1]
- **JSON-to-XML-Converter** - JavaScript based open source library to convert FHIR between JSON and XML. It is built from the FHIR XML Schema.
- **FHIR Kit Client** - A Node.js FHIR client library
- **FHIR Kit Create React App** - "Create React App" template for a confidential FHIR ReactJS application.
- **fhirpaths.js** – a JavaScript implementation of FHIRPath
- **LHC-Forms** – NLM's JavaScript form rendering package with support for FHIR Questionnaire and partial support for the Questionnaire's SDC profile.
- **NLM's Form Builder** – A builder for forms that can import or export FHIR Questionnaire resources. Open source, at <https://github.com/lhncbc/formbuilder-lhcforms>.
- **NLM's SMART on FHIR SDC Questionnaire App** (uses LHC-Forms)
- **UCUM-LHC** – NLM's open source library for validating and converting units from the Unified Code for Units of Measure (UCUM).

## Other Open source Implementations

- **FHIRBase** - open source relational storage for FHIR with document API based on PostgreSQL. FHIRBase is an attempt to take the best parts of Relational & Document Databases for persistence of FHIR resources. FHIRBase stores resources relationally and gives you the power of SQL for querying & aggregating. At the same time FHIRBase provides a set of SQL procedures & views to persist and retrieve resources as a json documents in one hop.
- the FHIR build tool itself is open source and includes various definitional and reasoning tools. See [2].
- [4] - DSTU-2 FHIR entities compatible with .Net Core
- FHIR terminology resources are available on Valentia SnoChillies terminology Server: <https://valentiatech.snochillies.com/>
  - Value Sets
    - \$expand
    - \$validate-code
  - Code Systems (SNOMED CT, LOINC)
    - \$lookup
    - \$subsumes
  - Concept Map
    - \$translate
    - \$closure
  - Capability Statement ( format can in xml or in json )
    - <https://valentiatech.snochillies.com/fhir/metadata> (as in XML default)
    - <https://valentiatech.snochillies.com> ( GUI )
  - SNOMED browser: <https://snochillies.com/> by Abdul Rauf (abdul\_rauf\_2005@msn.com)
- **Patients First NZ Terminology Server** - Exemplar FHIR-based Terminology Service, including SNOMED CT International Edition.
- <https://github.com/fhir-crucible/crucible> - Crucible FHIR Testing Platform. Public instance at <https://projectcrucible.org>
- **Synthea** - Synthetic patient simulation that generates longitudinal FHIR (R4, STU3, and DSTU2) records suitable for software development, integration, testing, demoing. Over 60 diseases with reasonable comorbidities and treatments. Supports Patient, Condition, Encounter, Observation, DiagnosticReport, Immunization, AllergyIntolerance, MedicationRequest, Procedure, ImagingStudy, Organization, Practitioner, Claim, ExplanationOfBenefit.
- **onfhir.io** - HL7 FHIR Based secure data repository. Open source, at <https://github.com/srdc/onfhir>