Oracle® Healthcare Data Repository

FHIR User's Guide

Release 8.1.3
F52478-01
July 2022

Oracle Healthcare Data Repository FHIR User's Guide, Release 8.1.3

F52478-01

Contents

Preface

This preface contains the following sections:

Documentation accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at http://www.oracle.com/pls/topic/lookup?ctx=acc&id=docacc.

Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

1
Getting Started

This section provides information about the platform requirements for setting up an Oracle Healthcare Data Repository HL7 FHIR server.

Introduction

Fast Healthcare Interoperability Resources (FHIR) is a standard for healthcare data exchange that is published by HL7 (www.hl7.org/fhir/).

Oracle Healthcare Data Repository (HDR) Release 8.1.3 supports the HL7 FHIR specification version R4 (4.0.1). The FHIR server module is distributed as a web application, which can be deployed to standard web containers such as WebLogic. FHIR resources are exposed as a set of REST APIs that can be accessed by REST-based applications.

Platform Requirements

The following software is required for Oracle Healthcare Data Repository and the FHIR server module:

- Operating System: Oracle Enterprise Linux 6.x or 7.x (64 bit)
- Oracle Database 12c Release 1 (12.1.0.2.0) or Release 2 (12.2.1.2.0) or Release 19c. Download from the Oracle Software Delivery Cloud at https://edelivery.oracle.com.
- WebLogic Server 12.2.1.3/12.2.1.4 with the Coherence option. Download from the Oracle Software Delivery Cloud at https://edelivery.oracle.com.
- JDK (Java Development Kit) 8u121 and later. Download from My Oracle Support. See Section 3.1, "Download and install Oracle Java Development Kit".

Download the Oracle Healthcare Data Repository 8.1.3 patch set from My Oracle Support at https://support.oracle.com. Refer to the Oracle Healthcare Data Repository 8.1.3 Release Notes (https://support.oracle.com/epmos/faces/DocumentDisplay?id=2872158.1).

2
Installation

Refer to the Oracle Healthcare Data Repository 8.1.3 Release Notes (https://support.oracle.com/epmos/faces/DocumentDisplay?id=2872158.1) for information on the prerequisites and steps to install the HDR-FHIR module.

3
HDR FHIR Server Architecture

Healthcare functional domains (administrative, clinical, and financial) and core services are exposed as RESTful endpoints.

The client application that uses the HDR FHIR RESTful APIs must properly configure the system in a secure environment to avoid unauthorized access of those APIs. To access protected FHIR APIs, the client application must provide a valid access token. For more information on this, see the HDR 8.1 Secure Configuration Guide and Secure Development Guide.

The FHIR Server can be deployed in a single or multi-node cluster as illustrated below:

Figure 3-1 Single Node

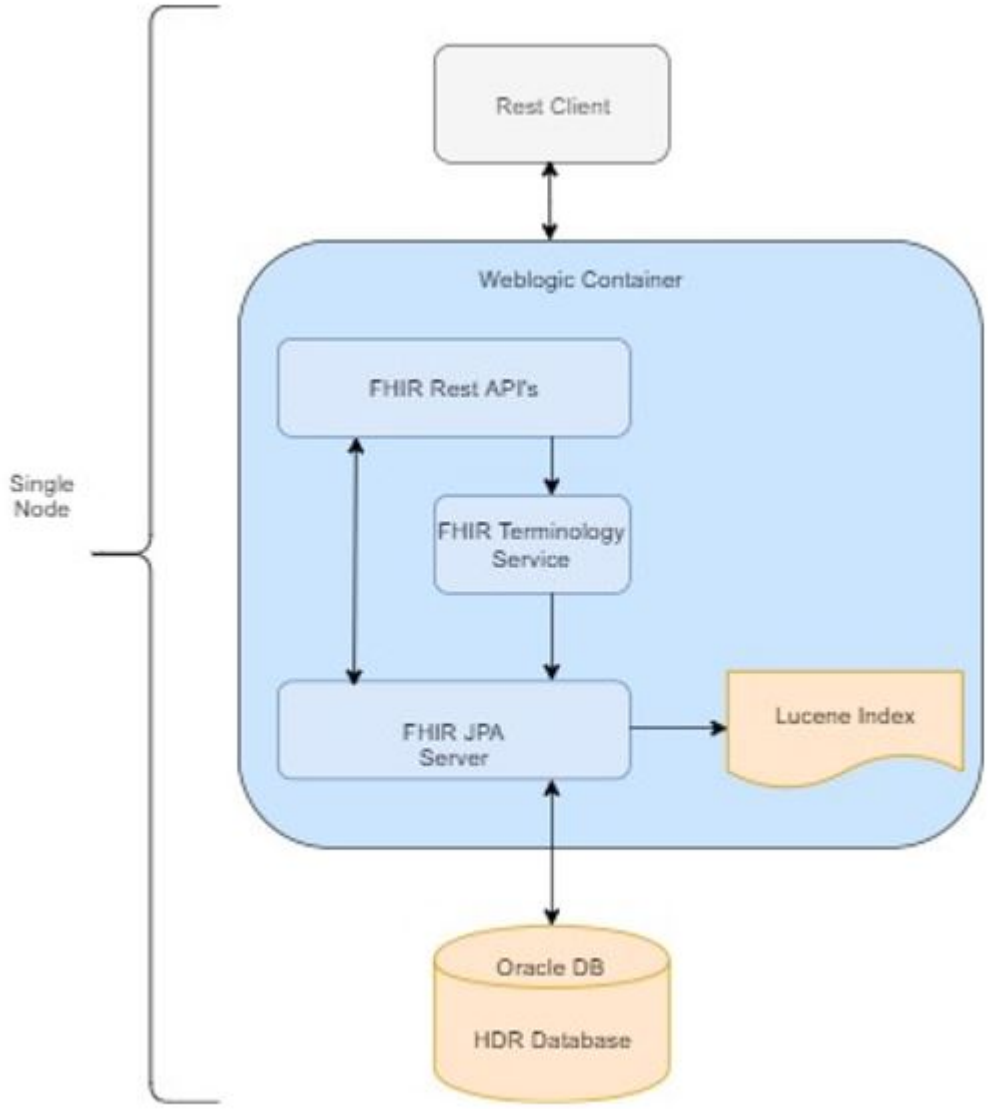
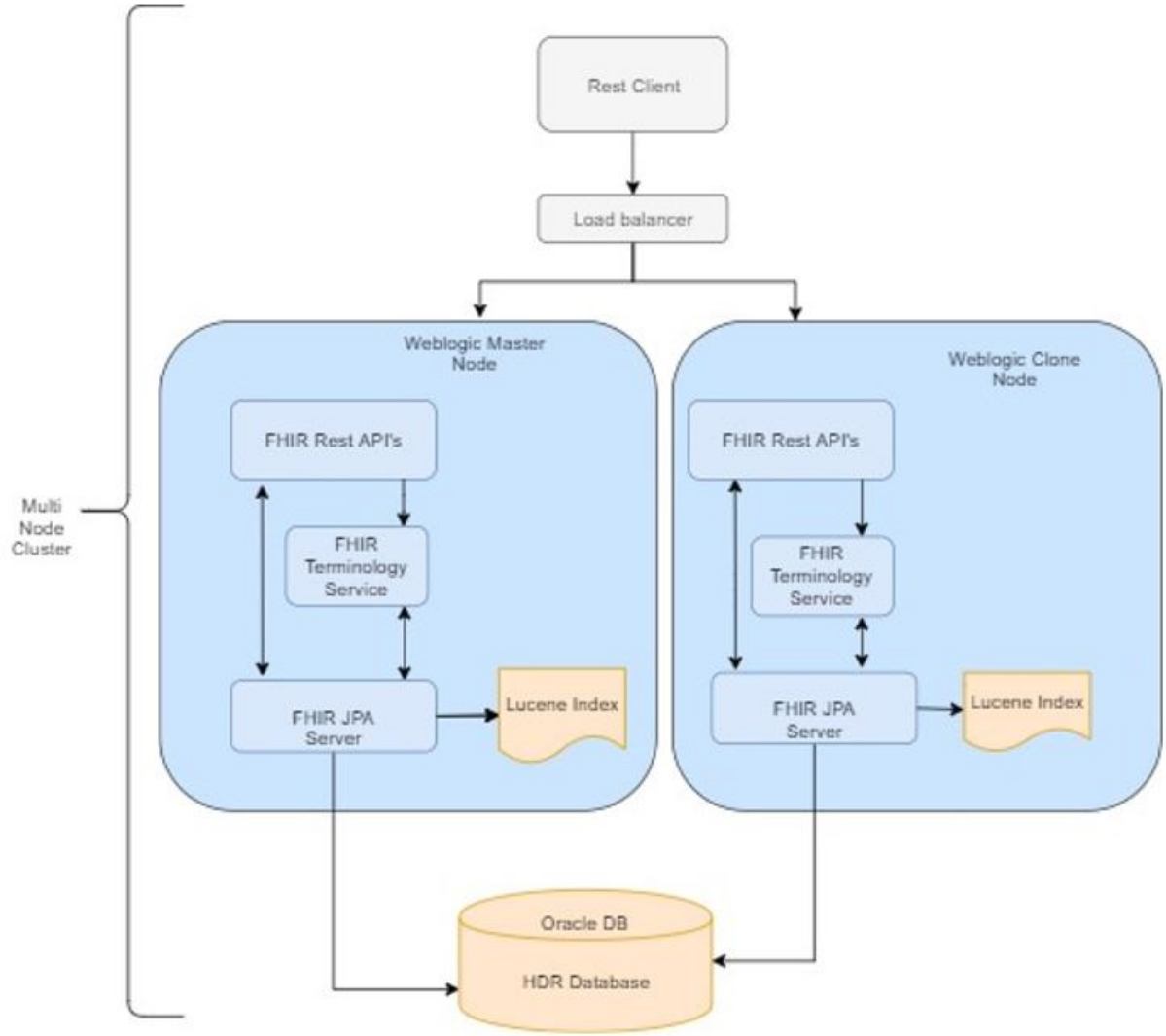


Figure 3-2 Multi-Node Cluster



4
Deployment Details

This section describes the details of the HDR FHIR Server deployment.

Install files

The HDR FHIR Server module is packaged as a deployable web application (.war) file. The war file is distributed along with the HDR 8.1.3 patch set. Once installed, FHIR resources are exposed as a set of REST endpoints.

The other component, the FHIR command line tool, is available under the HDR HOME directory on the middle tier. Refer to FHIR Command-Line Utility section for more details.

FHIR Server Base URL and REST Endpoints

FHIR REST APIs can be accessed using the base URL as show below:

http://HOSTNAME:PORT/oracle-fhir-server/fhir

A specific resource can be accessed using the URL format:

<BASE_URL>/<resourceName>

For example, to access the 'Patient' resource, use the following URL:

http://HOSTNAME:PORT/oracle-fhir-server/fhir/Patient

For the complete list of resources and their corresponding URLs, see Working with FHIR REST APIs .

Configuration Files

Runtime behavior and logging are controlled using configuration files.

Properties File

The runtime behavior of the FHIR JPA server can be managed using the hdr_fhir.properties file: <HDR_DOMAIN>/config/fhir/hdr_fhir.properties.

Example 4-1 hdr_fhir.properties file

```
# Supported FHIR version
fhir_version=R4
#below entries are for capability statement
metadata.implementation.description=Oracle FHIR Server
metadata.software.name=Oracle FHIR Server
metadata.publisher=Oracle FHIR Server
# true or false
metadata.resource.count.enabled=false

# This is the address that the FHIR server will report as its own address.
```

```
# If this server will be deployed (for example) to an internet accessible
# server, put the DNS name of that server here.

server_address=http://HOSTNAME:PORT/oracle-fhir-server/fhir
server.base=/oracle-fhir-server/fhir

default_encoding=JSON
#resource compression setting - if no value set, server defaults to compression
enabled.
resource_compression_enabled=true
etag_support=ENABLED
reuse_cached_search_results_millis=-1
default_page_size=20
max_page_size=200
allow_override_default_search_params=true
allow_contains_searches=true
allow_multiple_delete=true
allow_external_references=true
allow_cascading_deletes=true
allow_placeholder_references=true
expunge_enabled=true
persistence_unit_name=FHIR_PU
logger.name=fhirtest.access
logger.format=Path[${servletPath}] Source[${requestHeader.x-forwarded-for}]
Operation[${operationType} ${operationName} ${idOrResourceName}] UA[$
{requestHeader.user-agent}] Params[${requestParameters}] ResponseEncoding[$
{responseEncodingNoDefault}]
logger.error_format=ERROR - ${requestVerb} ${requestUrl}
logger.log_exceptions=true

server.name=HDR FHIR Server
server.id=home
test.port=

####################################################
# Validation
####################################################
# Should all incoming requests be validated
validation.requests.enabled=false
# Should outgoing responses be validated
validation.responses.enabled=false

####################################################
# Search Features
####################################################
filter_search.enabled=true
graphql.enabled=true

####################################################
# Supported Resources
####################################################
# Enable the following property if you want to customize the
# list of resources that is supported by the server (i.e. to
# disable specific resources)
#supported_resource_types=Patient,Observation,Encounter

####################################################
# Database Settings
####################################################
hibernate.dialect=org.hibernate.dialect.Oracle12cDialect
hibernate.search.model_mapping=ca.uhn.fhir.jpa.search.LuceneSearchMappingFactory
```

```
hibernate.format_sql=false
hibernate.show_sql=false
#hibernate.hbm2ddl.auto=update
hibernate.hbm2ddl.auto=none
hibernate.jdbc.batch_size=20
hibernate.cache.use_query_cache=false
hibernate.cache.use_second_level_cache=false
hibernate.cache.use_structured_entries=false
hibernate.cache.use_minimal_puts=false
hibernate.search.default.directory_provider=filesystem
hibernate.search.default.indexBase=target/lucenefiles
hibernate.search.lucene_version=LUCENE_CURRENT
tester.config.refuse_to_fetch_third_party_urls=false
hibernate.search.autoregister_listeners=false
hibernate.search.indexing_strategy=manual
hibernate.search.default.worker.execution=async

################################################
# Binary Storage Operations
################################################
binary_storage.enabled=true

################################################
# CORS Settings
################################################
cors.enabled=true
cors.allowCredentials=true
# Supports multiple, comma separated allowed origin entries
# cors.allowed_origin=http://localhost:8080,https://localhost:8080,https://
fhirtest.uhn.ca
cors.allow_origin=*

################################################
# Allowed Bundle Types for persistence (defaults are: COLLECTION,DOCUMENT,MESSAGE)
################################################
#allowed_bundle_types=COLLECTION,DOCUMENT,MESSAGE,TRANSACTION,TRANSACTIONRESPONSE,BATCH
,BATCHRESPONSE,HISTORY,SEARCHSET

################################################
# Subscriptions
################################################

# Enable REST Hook Subscription Channel
subscription.resthook.enabled=true

# Enable Email Subscription Channel
subscription.email.enabled=false
email.enabled=false
email.from=some@test.com
email.host=
email.port=0
email.username=
email.password=

# Enable Websocket Subscription Channel
subscription.websocket.enabled=false
# Specify the JNDI data source name where HDR tables are created.
datasource.jndi_name=jdbc/HdrDataSource

# Enable/disable OAuth based API access (for easier dev/QA testing)
# Shouldn't use this property in production
```

```
oauth.access.enabled=false
#below properties are required for FHIR API access using oath token
oath.token.issuer=https://dev-t9brtcqa.auth0.com/
oath.token.audience=https://fhir-hdr.auth.com/api/v2/
#FHIR Server resource access settings
hdr.fhir.scopes=fhir.admin,fhir.users,fhir.users.restricted
#scopes and access rights
fhir.admin=read,create,update,delete
fhir.users=read,create
fhir.users.restricted=read
#note: add more if needed
#scopes and allowed fhir resources
fhir.admin.allowedapis=ALL
fhir.users.allowedapis=ResearchStudy
fhir.users.restricted.allowedapis=Patient, Observation, AllergyIntolerance,
Medication, Condition, Procedure, Immunization
#fhir.users.finance.allowedapis=Patient, Practitioner, Claim, ClaimResponse,
InsurancePlan
#fhir.users.clinical.allowedapis=
#note: add more if needed

#below properties that starts with audit.* are specific to auditing module of
oracle fhir infrastructure
audit.enabled=true
#audit storage type - for now FILE or DB. this needs to be extended for kafka etc
audit.datastore.type=FILE
audit.savemessagepayload.enabled=false
#auditing standard. this can be either a custom format or standard fhir
AuditEvent(ATNA equivalent) resource
audit.standard=CUSTOM
# Just to capture timing log. Only for Testing performace, not required to
enable this always.By defaults it is false.
response_timing_log_enabled=false
```

Log Configurations

HDR FHIR has several logging mechanisms that each serve a distinct purpose. These mechanisms are described in the table below. Oracle HDR FHIR uses the log4j logging framework to emit these logs. These logs are generated at runtime by all components of the FHIR. The location of the log4j.properties is: <HDR_DOMAIN>/ config/fhir/ log4j.properties.

Table 4-1 Log files

Log	File	Purpose	Retention
Application log	<HDR_DOMAIN>/ logs/ hdr-fhir.log	Application Logging is a traditional file-based log of events and internal processing details of Oracle HDR FHIR. These logs are useful for troubleshooting. Application logs can be enabled and disabled at runtime by modifying the log4j properties file.	Logs are rotated and compressed on a Time basis, although this can be configured using the log4j.properties file.

Table 4-1 (Cont.) Log files

Log	File	Purpose	Retention
Audit Log	<HDR_DOMAIN>/ logs/ audit-hdr-fhir.log	The audit log is intended to record actions taken by users. This log can be enabled or disabled using “audit.enabled" property defined in the hdr_fhir.properties file.	Logs are rotated and compressed on a Time basis, although this can be configured using log4j.properties file.

5

Using the OAuth 2.0 protected API

HDR FHIR offers a suite of REST APIs implemented per HL7 FHIR specification and secured using the OAuth 2.0 security framework. This article outlines the steps needed for clients/admin users to obtain a secure access token from HDR's OAuth Server and use the access token to invoke the HDR FHIR REST APIs.

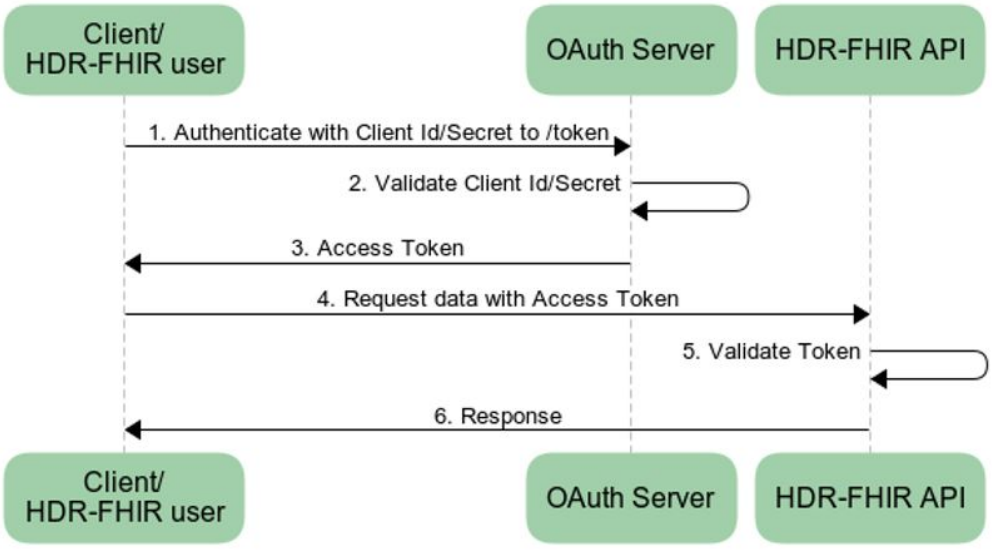
Prerequisites

Prerequisites for using the OAuth protected API are as follows:

- HDR FHIR is successfully registered with an OAuth Server as a Resource Server (that is protecting its endpoints).
- A client representing the HDR FHIR API admin user has been registered with OAuth Server as an OAuth Client and is authorized to invoke HDR FHIR APIs.

How It Works

Figure 5-1 Access Token Process



1. Client application or user authenticates with the OAuth Server (at say, the /ms_oauth/oauth2/endpoints/tokens endpoint) using the client ID and secret. The client ID and secret would have been obtained at the time of registering the OAuth client with OAuth Server.
2. OAuth Server validates the client ID and secret.

3. OAuth Server responds with an Access Token.
4. Client application or user uses the Access Token to call an HDR FHIR API.
5. HDR FHIR server intercepts the request and validates the Access Token.
6. HDR FHIR API responds with requested data.

Obtaining the Access Token from the OAuth Server

The client/user can ask the OAuth Server for tokens for any of the authorized applications by issuing the following API call:

```
curl --request POST \
  --url https://example.oauthserver.com/ms_oauth/oauth2/endpoints/tokens \
  --header 'content-type: application/json' \
  --data
'{"client_id":"CqwUDq2VQ6AH416sf7n42CZ2rNyElkDW","client_secret":"iA6bJ9OQ-
tMWhVNUZylx6Km1_9tMuxVyKC4xNfWtPye72MjXyC3f1GJ38ttQ0oH9","audience":"hdr_fhir_api
","grant_type":"client_credentials"}'
```

In this example, client_id and client_secret are assigned random representative values. You should change these values with the actual client Id and secret, obtained after registering the client with OAuth Server.

```
{
  "access_token": "eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsI........N7KT4ig",
  "token_type": "Bearer",
  "expires_in":600
}
```

You can now extract the access_token property value from the response to make authorized requests to your API.

Calling the HDR FHIR API with an Access Token

You can use this bearer token with an Authorization Header in your request to obtain authorized access to the HDR FHIR API.

```
curl --request GET \
  --url  http://<SERVER BASE URL>/fhir/Medication \
  --header 'accept: application/json' \
  --header 'authorization: Bearer
eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsI........N7KT4ig'
```

Error Messages

Here is a list of a few common OAuth-related error messages that can be thrown by HDR FHIR APIs and the associated remediation steps.

Table 5-1 OAuth-Related Error Messages

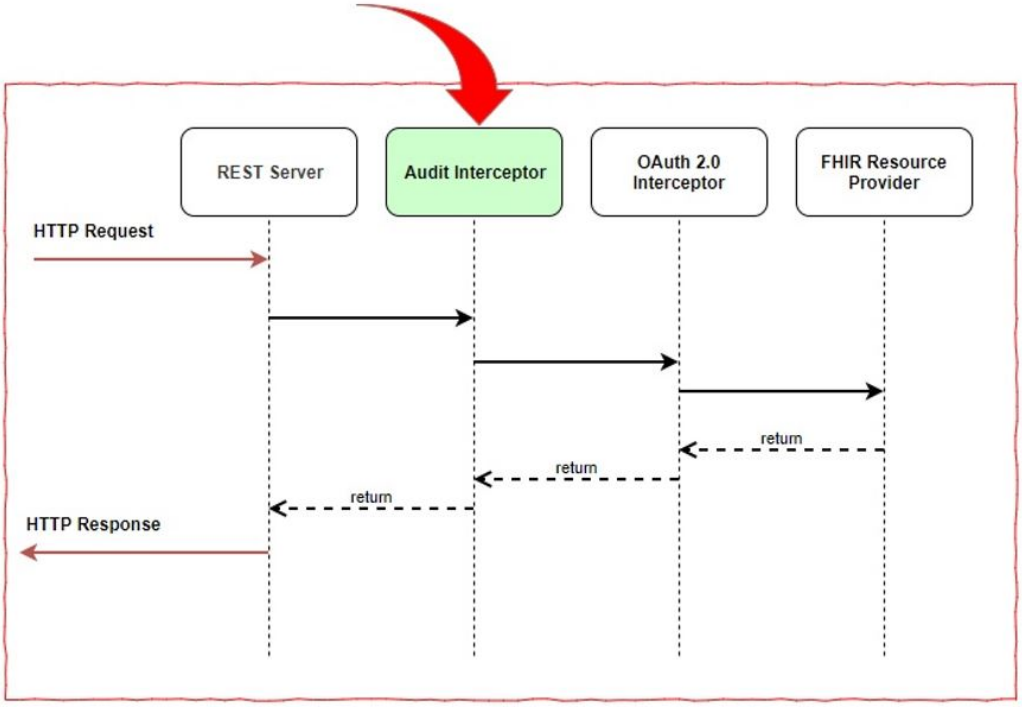
HTTP Status Code	Message	Meaning	Remediation
401	BAD_TOKEN: Invalid Algorithm. Algorithm is empty or not supported.	Signature algorithm is empty or not supported by the FHIR server.	Recommended algorithm is RS256. Make sure JWT header contains - "alg": "RS256".
200, 201	--	Success.	Authentication was successful. Operation was successful.
401	BAD_TOKEN: Invalid JWT token. Bad claims. Expired JWT	Unauthorized - expired OAuth token sent in request.	Current access token has expired. Obtain a fresh access token from OAuth Server and use it.
401	BAD_TOKEN: Invalid JWT token. Token is null or empty.	Unauthorized - no OAuth token sent in request.	Obtain a valid access token from OAuth Server. Pass it in request as bearer token in HTTP Auth header.
401	<Other error messages that start with "BAD_TOKEN: Invalid JWT token" >	Unauthorized - reason to be investigated.	Contact HDR administrator with the error message for further assistance.
401	BAD_TOKEN: Invalid JWT token. Bad claims. Invalid 'aud' attribute. Expected audience '<correct_audience>' does not exist in audience '<incorrect_audience>'	Unauthorized - token sent has incorrect audience value specified.	Ensure that you are using a correct audience value while requesting access token from OAuth Server.

6
Auditing

This module is responsible for collecting and storing audit data from incoming REST request and response. Key details such as user id, IP address, resource name, HTTP request type and request URL etc. are collected from the incoming request and stored in a secure location. Audit records can be stored either in a database table or in a file.

Audit Interceptor Execution Flow

Figure 6-1 Audit Interceptor Execution Flow



The audit module (rendered in green) design follows an interceptor pattern as shown in the above flow diagram. Here, incoming and outgoing REST API transactions are intercepted for extracting audit data elements.

Once the data is extracted, audit information goes to either a database table or a file (depending on storage settings defined in the FHIR server configuration file).

Audit Record Format

Audit record data format is as shown below.

Audit data element	Description
AUDIT_ID	Unique identifier for audit record
USER_ID	User ID
RESOURCE_NAME	FHIR resource name
HTTP_REQ_TYPE	HTTP request type - GET, POST, and so forth
REQUEST_URL	Incoming request URL
HTTP_RES_CODE	HTTP response code - 200, 201, 500, ...
SOURCE_IP_ADDRESS	Source system IP address
PROCESSING_TIME_MILLIS	Time taken to complete REST request
REQUEST_PAYLOAD	Payload
RESPONSE_PAYLOAD	Response payload
EVENT_TIMESTAMP	Timestamp
ATNA_AUDITEVENT	Audit record in the form of AuditEvent json

Settings

Audit service functionality can be controlled using a configuration file. The file is located at <HDR_DOMAIN>/config/fhir/hdr_fhir.properties.

For example, if there is a requirement to store message payload as part of an audit record, change “audit.savemessagepayload.enabled" property to true. Other important entries in the properties file is as shown below.

```
#audit enabled - true or false

audit.enabled=true

#audit storage type - FILE or DB

audit.datastore.type=FILE
```

If ‘FILE' is selected as the storage type, audit data goes to a file named audit-hdr-fhir.log.

If ‘DB' is selected as the storage type, audit data goes to a table called OHF_HDR_FHIR_AUDIT. Refer to the FHIR eTRM document for more information about the Audit table.

```
#collect request/response payload message - true or false

audit.savemessagepayload.enabled=false
```

7

FHIR Command-Line Utility

The HDR FHIR command-line interface (CLI) tool is a standalone command-line tool distributed with HDR 8.1 that contains a number of commands to ingest terminology data provided by the LOINC and SNOMED organizations.

The current version of the HDR FHIR command-line interface tool supports LOINC and SNOMED terminology data to be loaded into the HDR FHIR repository.

The tool is distributed in the form of zip file (hdr-fhir-cli-app-8.1.0-SNAPSHOT.zip) and is located in the <HDR_HOME>/weblogic/hdrfhircli/ directory when the HDR 8.1 installation is complete.

Extract it into a directory where you will keep it, and add this directory to your path.

The zip file **hdr-fhir-cli-app-8.1.0-SNAPSHOT.zip** contains the following files:

File	Description
lib	All runtime executable jar file.
hdr-fhir-cli.sh	Linux script to manage the command line tool.

Prerequisites

The following prerequisites are required to use the command-line utility:

- Install the JDK 1.8
- Set the environment variable JAVA_HOME
- Extract the hdr-fhir-cli-app-8.1.0-SNAPSHOT.zip file into the <HDR_HOME>/weblogic/hdrfhircli directory
- Set the environment variable CLI_HOME to the location where hdr-fhir-cli-app-8.1.0-SNAPSHOT.zip file is extracted

Commands

The HDR FHIR command line tool has a number of supported functions, called commands. Each command has a name and a set of supported arguments.

You can see a list of supported commands by simply executing the below command. For example:

```
$>{$CLI_HOME}/hdr-fhir-cli.sh

Usage:
  hdr-fhir-cli {command} [options]

Commands:
  export-conceptmap-to-csv  - Exports a specific ConceptMap resource to a CSV file.
```

```
  import-csv-to-conceptmap - Imports a CSV file to a ConceptMap resource.

  upload-definitions       - Uploads the conformance resources
(StructureDefinition and ValueSet) from the official FHIR
definitions.
  upload-examples          - Downloads the resource example pack from the
HL7.org FHIR specification website, and uploads all of the example resources to
a given server.

  upload-terminology       - Uploads a terminology package (e.g. a SNOMED CT ZIP
file) to a server, using the $upload-external-code-system operation.
```

You can also see the list of supported arguments for a given command by issuing command help [commandname]. For example:

```
$>{$CLI_HOME}/hdr-fhir-cli.sh help upload-terminology

Usage:
  hdr-fhir-cli upload-terminology [options]

Uploads a terminology package (e.g. a SNOMED CT ZIP file) to a server, using the
$upload-external-code-system operation.

Options:

  -d,--data <arg>              Local file to use to upload (can be a raw file
or   a ZIP containing the raw file)
  -l,--logging                 If specified, verbose logging will be used.
  -t,--target <target>         Base URL for the target server (e.g.
                               " http://localhost:7001/oracle-fhir-server/fhir").
  -u,--url <arg>               The code system URL associated with this upload
(e.g. http://snomed.info/sct)
  -v,--fhir-version <version>  The FHIR version being used. Valid values: r4
```

export-conceptmap-to-csv

The export-conceptmap-to-csv command can be used to export a ConceptMap resource as a CSV file of terminology mappings.

The first row of the CSV file will include the following headers:

```
    SOURCE_CODE_SYSTEM - ConceptMap.group.source
    SOURCE_CODE_SYSTEM_VERSION - ConceptMap.group.sourceVersion
    TARGET_CODE_SYSTEM - ConceptMap.group.target
    TARGET_CODE_SYSTEM_VERSION - ConceptMap.group.targetVersion
    SOURCE_CODE - ConceptMap.group.element.code
    SOURCE_DISPLAY - ConceptMap.group.element.display
    TARGET_CODE - ConceptMap.group.element.target.code
    TARGET_DISPLAY - ConceptMap.group.element.target.display
    EQUIVALENCE - ConceptMap.group.element.target.equivalence
ConceptMapEquivalence)
    COMMENT - ConceptMap.group.element.target.comment
```

Usage:

```
hdr-fhir-cli export-conceptmap-to-csv [options]
```

Exports a specific ConceptMap resource to a CSV file.

Options:

-f,--filename <filename>	The path and filename of the CSV file to be exported (./output.csv).
-l,--logging	If specified, verbose logging will be used.
-t,--target <target>	Base URL for the target server (e.g. “http://localhost:7001/oracle-fhir-server/fhir").
u,--url <url>	The URL of the ConceptMap resource to be exported (i.e. ConceptMap.url).
-v,--fhir-version <version>	The FHIR version being used. Valid values: r4.

These terminology mappings could then be exported with the following command:

```
./hdr-fhir-cli.sh export-conceptmap-to-csv --fhir-version R4 -t http://localhost:8080//
oracle-fhir-server/fhir -u http://hl7.org/fhir/ConceptMap/cm-administrative-gender-v2 -
f /u01/output.csv
```

import-csv-to-conceptmap

The import-csv-to-conceptmap command can be used to import a CSV file of terminology mappings and store it as a ConceptMap resource.

The first row of the CSV file is expected to include the following headers:

```
SOURCE_CODE_SYSTEM - ConceptMap.group.source
SOURCE_CODE_SYSTEM_VERSION - ConceptMap.group.sourceVersion
TARGET_CODE_SYSTEM - ConceptMap.group.target
TARGET_CODE_SYSTEM_VERSION - ConceptMap.group.targetVersion
SOURCE_CODE - ConceptMap.group.element.code
SOURCE_DISPLAY - ConceptMap.group.element.display
TARGET_CODE - ConceptMap.group.element.target.code
TARGET_DISPLAY - ConceptMap.group.element.target.display
EQUIVALENCE - ConceptMap.group.element.target.equivalence (ConceptMapEquivalence)
COMMENT - ConceptMap.group.element.target.comment
```

An example CSV file that describes the mapping of FHIR to HL7v2 for Administrative Gender would appear as follows:

```
"SOURCE_CODE_SYSTEM","SOURCE_CODE_SYSTEM_VERSION","TARGET_CODE_SYSTEM","TARGET_CODE_SYS
TEM_VERSION","SOURCE_CODE","SOURCE_DISPLAY","TARGET_CODE","TARGET_DISPLAY","EQUIVALENCE
","COMMENT"
"http://hl7.org/fhir/administrative-gender","","http://hl7.org/
fhir/v2/0001","","male","Male","M","Male","equal",""
```

Usage:

```
hdr-fhir-cli import-csv-to-conceptmap [options]
```

Imports a CSV file to a ConceptMap resource.

Options:

-f,--filename <filename>	The path and filename of the CSV file to be imported (for example, ./input.csv).
-i,--input <input>	The source value set of the ConceptMap to be imported (i.e. ConceptMap.sourceUri).
-l,--logging	If specified, verbose logging will be used.

-o,--output <output>	The target value set of the ConceptMap to be imported (i.e. ConceptMap.targetUri).
-t,--target <target>	Base URL for the target server (e.g. "http://localhost:7001/oracle-fhir-server/fhir").
-u,--url <url>	The URL of the ConceptMap resource to be imported/exported (i.e. ConceptMap.url).
-v,--fhir-version <version>	The FHIR version being used. Valid values: r4.

These terminology mappings could then be imported with the following command:

```
./hdr-fhir-cli.sh import-csv-to-conceptmap --fhir-version R4 -t http://
localhost:8080//oracle-fhir-server/fhir -u http://hl7.org/fhir/ConceptMap/cm-
administrative-gender-v2 -i http://hl7.org/fhir/ValueSet/administrative-gender -
o http://hl7.org/fhir/ValueSet/v2-0001 -f  /u01/sampleInputFile.csv
```

upload-definitions and upload-examples

The upload-definitions command uploads the conformance resources (StructureDefinition and ValueSet) from the official FHIR definitions.

The upload-examples command uploads the example resources from the official FHIR definitions.

Usage:

```
hdr-fhir-cli upload-definitions/upload-examples [options]
```

The conformance rules are available at https://www.hl7.org/fhir/conformance-rules.html.

Options:

-e,--exclude <arg>	Exclude uploading the given resources, such as "-e dicom-dcim,foo".
-t,--target <arg>	Base URL for the target server (such as "http://localhost:7001/oracle-fhir-server/fhir ").
-v,--fhir-version <version>	The FHIR version being used. Valid values: r4.

Command usage:

```
./hdr-fhir-cli.sh upload-definitions --fhir-version R4 -t http://localhost:8181/
baseR4 "-e dicom-dcim,foo"

./hdr-fhir-cli.sh upload-examples --fhir-version R4 -t http://localhost:8181/
baseR4 "-e dicom-dcim,foo"
```

upload-terminology

The HDR FHIR server provides a terminology server, which supports ingestion of terminology data provided by LOINC and SNOMED. For more information on obtaining the above terminology data refer to the respective websites.

The HDR FHIR server provides a repository for terminology content used across the HDR platform, and an API suite to access the content.

The server provides a mechanism for ingestion of the terminology data via the upload-terminology command of the CLI tool. This command supports only LOINC and SNOMED terminologies in the current release.

> **Note:**
>
> The path and exact filename of the terminology files will likely need to be adjusted for your local disk structure.

Usage:

```
hdr-fhir-cli upload-terminology [options]
```

Uploads a terminology package (such as a SNOMED CT ZIP file) to a server, using the $upload-external-code-system operation.

Options:

-d,--data <arg>	Local file to use to upload (can be a raw file or a ZIP containing the raw file).
-l,--logging	If specified, verbose logging will be used.
-t,--target <target>	Base URL for the target server (such as "http://localhost:7001/oracle-fhir-server/fhir").
-u,--url <arg>	The code system URL associated with this upload (such as http://snomed.info/sct).
-v,--fhir-version <version>	The FHIR version being used. Valid values: r4.

Command usage:

```
$>{$CLI_HOME}$./hdr-fhir-cli.sh upload-terminology -d /scratch/fhir/Loinc_2.65.zip -d /
scratch/fhir/loincupload.properties --fhir-version R4 -t http://localhost:8080//oracle-
fhir-server/fhir -u http://loinc.org
```

8

Working with FHIR REST APIs

Oracle Healthcare Data Repository 8.1.3-FHIR offers a suite of REST APIs implemented as per the HL7 FHIR specification and is secured using the OAuth 2.0 security framework. For more information, refer to the HDR FHIR REST API documentation.

9
HDR FHIR Data Model

For information on the Oracle Healthcare Data Repository 8.1.3-FHIR data model, see the FHIR Technical Reference Manual, available from the Oracle Help Center:

https://support.oracle.com/epmos/faces/DocumentDisplay?id=2879549.1