

FHIR Proxy Installation

01 - Overview

Version 1 – February 2021

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# Introduction

## Purpose of this Document

This is the first in a series of papers which provide guidance to YHCR partner organisations who wish to install and configure the standard, YHCR-provided, FHIR Proxy.

These papers cover an overview of the architecture, practical deployment considerations and also detailed technical install instructions. Evidently the main focus is on the YHCR-provided components, however the papers do also provide some guidance on related technologies, to assist with implementing a successful end-to-end solution.

## Intended Audience

***The main audience is technical staff at a Data Provider who will be involved in the installation and configuration of a YHCR FHIR Proxy***.

Other potential audiences include:

* **Technical managers and architects** – who wish to gain an overview of how the FHIR Proxy works and the what is involved in installing it
* **Data Consumers** – a Data Consumer organisation may wish to gain a deeper insight into exactly how the Data Providers they are connecting to work. It would also be possible for a Data Consumer to follow these instructions and set up their own “stub” Data Provider for internal testing purposes
* **Technical Support Staff and Testers** – to gain an understanding of how the FHIR Proxy works and thus better diagnose any issues

***Note that this document set focuses on the non-Intersystems FHIR Proxy (often known as the “Docker” or “Node” FHIR Proxy).***

There is also an Intersystems option with equivalent functionality, and separate documentation provides detailed installation instructions for this. There is however much general information provided in these documents about the workings of the YHCR, and Intersystems users should still find a skim-read of this documentation set useful.

## Document Map



This document is the first in a set which walks through the entire process of installing the FHIR Proxy and connecting to YHCR. As indicated above, some of these steps are YHCR specific whilst others provide guidance on the use of supporting 3rd party technologies. Each step builds upon the ones before, and it is recommended to work through the process in sequence

# Technical Overview



The diagram provides a very high-level conceptual overview of the FHIR Proxy architecture and the technologies involved. Key points to appreciate are as follows:

## FHIR Proxy

The FHIR Proxy is the core software provided by the YHCR. It implements a FHIR server – ie a HTTP listener endpoint which can process RESTful FHIR messages. This server is conformant with FHIR open standards and fully implements all of the YHCR messaging patterns, audit, and other requirements. It is specifically designed and tested to interoperate seamlessly with the YHCR central infrastructure.

The FHIR Proxy is written in Node.js. However in most cases this will be an internal implementation detail – as it is provided wrapped as a Docker container for ease of deployment.

## Database (FHIR Store)

The FHIR Proxy persists information in a database. This persistence requirement is relatively basic and consists of two simple schemas which allow for:

* ***Persistence of FHIR Resources*** – FHIR Resources are formatted into JSON strings and loaded in the database ready to be served. A single table handles all FHIR Resource types.
* ***Audit*** – The FHIR Proxy persists comprehensive audit records - in full compliance with YHCR audit requirements

Postgres is the currently supported database technology. This is a widely accepted industry-standard, open source database. It is possible that support for other database options might be added in future.

## Web Proxy

The YHCR is a secure system, and so it is expected that the FHIR server will be protected behind a hardened web proxy. This proxy serves several purposes including:

* ***Network Isolation*** – providing a layer of network isolation between the FHIR endpoint itself and external networks
* ***SSL and Certificate Management*** – managing keys and certificates and implementing TLS Mutual Authentication for connections to the YHCR central infrastructure. These certificates are issued as part of the YHCR Onboarding Process.
* ***Load Balancing*** – proving load balancing for a resilient deployment

There are many Web Proxy technologies available and the YHCR does not prescribe any specific one – it is assumed that your organisation will already have its own infrastructure standards and preferences. Popular web proxies, as of this writing, are IIS (on Windows) and NGINX (on Linux) and so some tips will be provided for these where relevant.

The “quickstart” deployment bundles a different proxy called Traefik. This is a lightweight and open source option, and works particularly neatly as part of a Docker configuration. However it is bundled for demonstration purposes and is in no way prescriptive.

## Docker

Docker is used as a deployment technology, and is a widely accepted industry standard for this purpose.

* The core FHIR Proxy (Node.js) component is provided as a Docker container. This makes it highly portable for deployment purposes.
* A more elaborate Docker deployment of the whole infrastructure is also provided as a “quickstart” install. This is optional, but allows a whole environment to be got up-and-running very quickly for initial development and prototyping purposes.

## Operating Systems

The following operating systems are supported:

* **Linux** – the central YHCR systems run on Linux and this is the original, native, environment of the FHIR Proxy.

***Linux supports a Production deployment, and also the “QuickStart” developer experience***

***If deployment to Linux (Ubuntu 18.04) is an option, then it is recommended as the preferred choice.***

* **Windows Server 2019** – the core FHIR Proxy can be deployed as a container on Windows Server. Specialist docker containers are required for Windows Server, and appropriate deployments of the core FHIR Proxy are provided for Windows Server 2019.

***Windows Server 2019 supports a Production deployment, but NOT the “QuickStart” developer experience[[1]](#footnote-2).***

Note that Windows Server 2019 has a roadmap to offering full Linux support in the future – at which point it would be able to run native Linux Containers and offer the full range of options.

* **Docker Desktop (Windows 10, Mac, Linux)** – this is another option for non-production deployments. Docker Desktop runs Linux Containers, and therefore offers the full “Quickstart” experience on all of the listed platforms.

*Note on Windows 10 – On Windows 10 then Microsoft now provide the Windows Subsystem on Linux v2 (WSL2). This offers full Linux support, and therefore Windows 10 can now run native Linux containers. This makes it a good choice to provide the full experience including the “Quickstart” install. Evidently this is a desktop operating system however, and not suitable for production deployments*

The table below summarises this discussion. All environments support the core FHIR Proxy, but the “Quickstart” experience is currently not possible on Windows Server.



# Assumed Skillsets

As outlined in the previous section, the YHCR FHIR Proxy itself fits into a wider technical environment. Certain skills and knowledge are assumed as a prerequisite to a successful deployment:



Excellent resources and tutorials on all of these technologies can be found online, and some preparatory research on any unfamiliar topics is highly recommended.

1. Docker support by other 3rd party components for Windows Containers can be patchy – eg there is no Windows Container version of Postgress. These components must therefore be installed in the traditional way, and the full “Quickstart” experience is not available. [↑](#footnote-ref-2)