



Cerner
**code Learning
Lab** 2019

Building CDS Hooks Services

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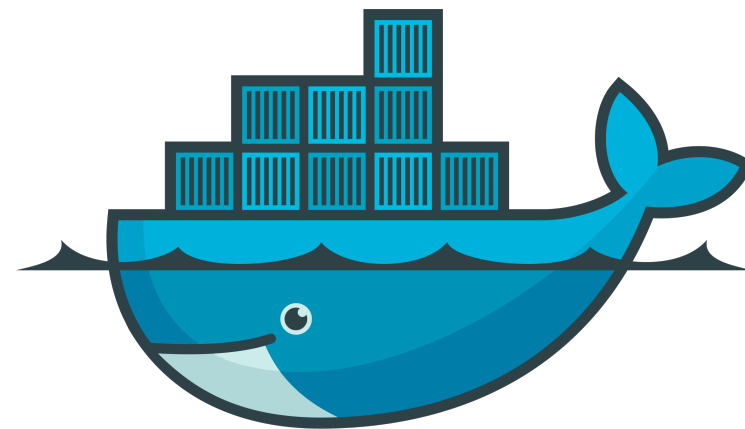


Prerequisites

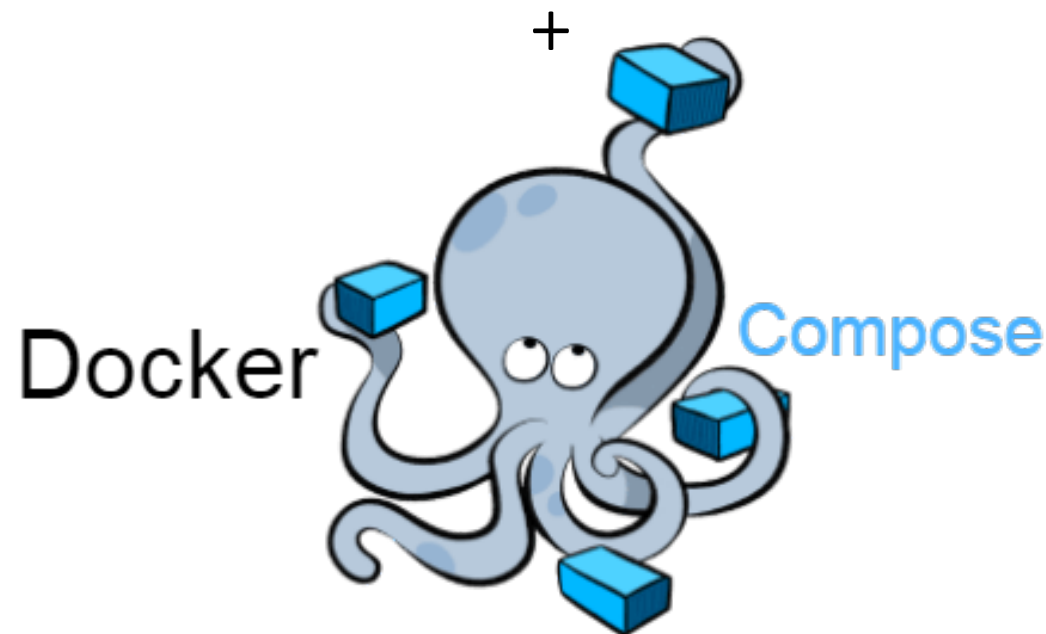
- Git + GitHub Account
- And *Either*:



OR



docker



Refer to Cheat Sheet!

...at the bottom of
<https://fire.ly>

CDS Hooks

Overview

Links

Spec:
<https://cds-hooks.hl7.org/1.0/>

Sandbox:
<http://sandbox.cds-hooks.org/>

Quick Start:
<https://cds-hooks.org/quickstart/>

CDS Service Response Body

cards - REQUIRED - an array of **Cards** with a combination of information, suggested actions, and links

Card:

- summary - REQUIRED - <140-character summary sentence for display to the user inside of this card detail
- detail - OPTIONAL - optional detailed information to display (GitHub Flavored Markdown)
- indicator - REQUIRED - urgency/importance of what this card conveys (info/warning/critical)
- source - REQUIRED - grouping structure for the **Source** of information displayed on this card
- suggestions - OPTIONAL - array of **Suggestions** for changes in the context of the current activity
- selectionBehavior - OPTIONAL - intended behavior of the suggestions. If suggestions present, value must be at-most-one
- links - OPTIONAL - array of **Links** to suggest an app or other additional information

Source:

- label - REQUIRED - short, human-readable label to display source of the card's information
- url - OPTIONAL - optional absolute URL to load to learn more about the organization or data set
- icon - OPTIONAL - absolute url for an icon for the source of this card (100x100 pixel PNG without any transparent regions)

Suggestion

- label - REQUIRED - human-readable label to display for this suggestion
- uuid - OPTIONAL - unique identifier for auditing and logging suggestions
- actions - OPTIONAL - array of suggested **Actions** (logically AND'd together)

Action:

- type - REQUIRED - type of action being performed (create/update/delete)
- description - REQUIRED - human-readable description of the suggested action
- resource - OPTIONAL - FHIR resource to create/update or id of resource to delete

Link:

- label - REQUIRED - human-readable label to display
- url - REQUIRED - URL to GET when link is clicked
- type - REQUIRED - type of the given URL (absolute/smart)
- appContext - OPTIONAL - additional context to share with a linked SMART app

CDS Service Discovery - GET {baseUrl}/cds-services

Response Body

services - An array of CDS Services

```
{
  "services": [
    {
      "hook": "hook-noun-verb",
      "title": "CDS Service Example",
      "description": "An example of a CDS Service that returns a card",
      "id": "patient-greeter",
      "prefetch": {
        "patientToGreet": "Patient/((context.patientid))"
      }
    }
  ]
}
```

CDS Service Request - POST {baseUrl}/cds-services/{id}

Request Body

hook - REQUIRED - hook that triggered this CDS Service call

hookInstance - REQUIRED - UUID for this hook call

fhirServer - OPTIONAL - base URL for CDS Client's FHIR server

fhirAuthorization - OPTIONAL - structure with **FHIR Authorization** information for the above url

context - REQUIRED - hook-specific contextual data

prefetch - OPTIONAL - FHIR data prefetched by the CDS Client

FHIR Authorization

access_token - REQUIRED - OAuth 2.0 access token

token_type - REQUIRED - fixed value: Bearer

expires_in - REQUIRED - lifetime in seconds of the access token

scope - REQUIRED - scopes the access token grants to the CDS Service

subject - REQUIRED - OAuth 2.0 client id of the CDS Service's auth server registration

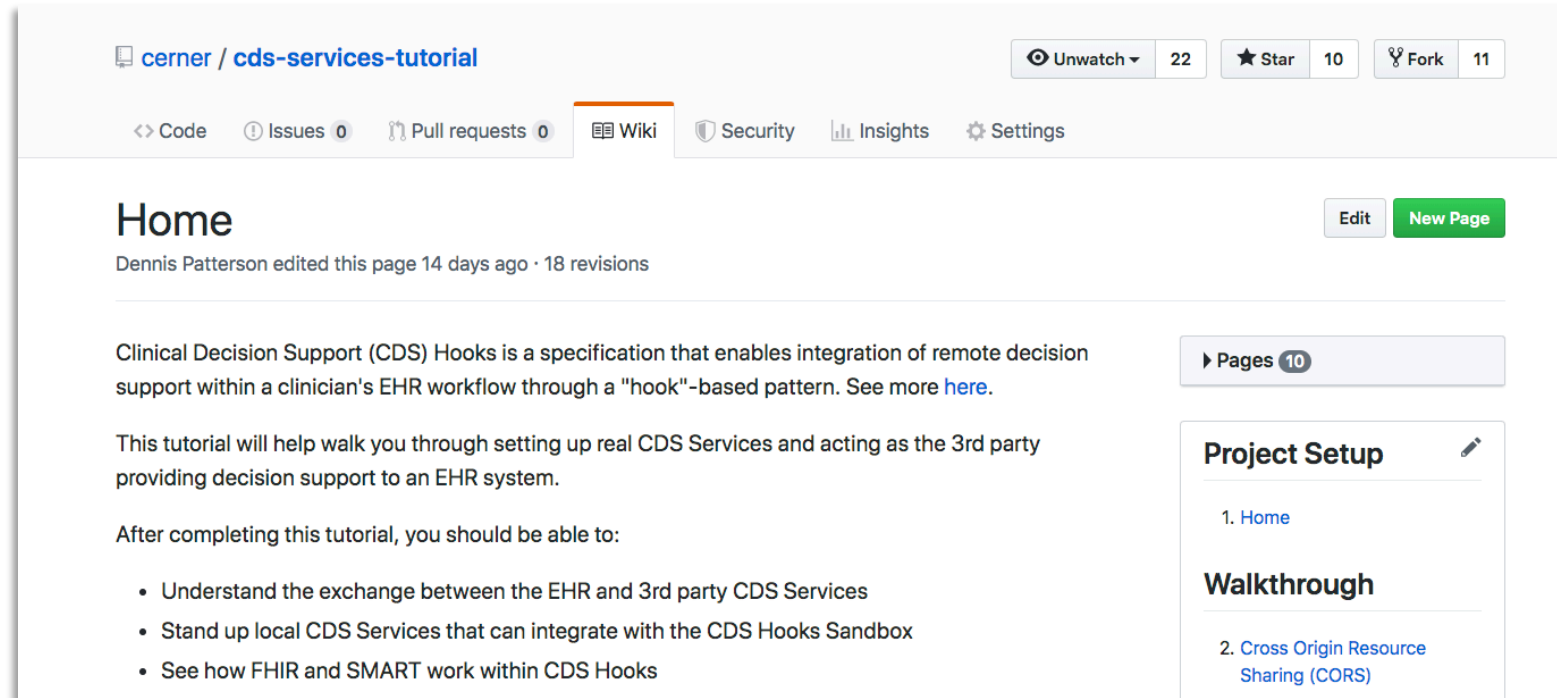
```
{
  "hook": "hook-noun-verb",
  "hookInstance": "d1577c69-df8e-44ad-ba6d-3e05e953b2ea",
  "fhirServer": "https://fhir.client.com/version",
  "fhirAuthorization": {
    "access_token": "opaque-token",
    "...": "<snipped for brevity>"
  },
  "context": {
    "userId": "Practitioner/example",
    "...": "<snipped for brevity>"
  },
  "prefetch": {
    "patientToGreet": {
      "resourceType": "Patient",
      "...": "<snipped for brevity>"
    }
  }
}
```

```
{
  "cards": [
    {
      "summary": "<140 char Summary Message>",
      "detail": "Optional GitHub Markdown details",
      "indicator": "info",
      "source": {
        "label": "Human-readable source label",
        "url": "https://example.com",
        "icon": "https://example.com/img/icon-100px.png"
      },
      "suggestions": [
        {
          "label": "Human-readable suggestion label",
          "uuid": "e1187895-ad57-4ff7-a1f1-ccf954b2fe46",
          "actions": [
            {
              "type": "create",
              "description": "Create a prescription for Acetaminophen 250 MG",
              "resource": {
                "resourceType": "MedicationRequest",
                "...": "<snipped for brevity>"
              }
            }
          ],
          "links": [
            {
              "label": "SMART Example App",
              "...": "<snipped for brevity>"
            }
          ]
        }
      ]
    }
  ]
}
```

Visit <https://cds-hooks.org/> for details.

Overview

- Clone tutorial repo
- Tour the code
- Test via the Sandbox
- Enhance!



github.com/cerner/cds-services-tutorial

Beyond localhost



Find a home for your services



Protect your endpoint with TLS

Resiliency





Validate requests to your services




Handle the unexpected

Follow Documented Best Practices

 CDS Hooks

 Search

 GitHub
75 Stars · 27 Forks

CDS Hooks
Overview
Specification ▾
Hooks ▾
Quick Start
[Best Practices](#)
Examples
Community
Logo Use

Implementation Best Practices

This page serves as best practice guidance for CDS Hooks implementers. The best practices outlined here are not mandatory implementation rules; rather, they are suggested guidance. This is a living, in progress document and the best practices outlined here should not be considered absolute or complete.

Security

The CDS Hooks security model requires thought and consideration from implementers. Security topics are never binary, are often complex, and robust implementations should factor in concepts such as risk and usability. Implementers should approach their security related development with thoughtful care.

The CDS Hooks specifications already provides some guidance in this space. The information here is supplemental to the existing specification documentation.

The CDS Hooks security model leverages several existing RFCs. These should be read and fully understood by all implementers.

- [rfc7519: JSON Web Tokens \(JWT\)](#)
- [rfc7517: JSON Web Key \(JWK\)](#)

Table of contents
Security
CDS Clients
CDS Services
JWT
FHIR Access

Contribute


 [cds-hooks](#) / [docs](#)

 Unwatch ▾ 40

 Unstar 75

 Fork 27

 Code

 Issues 64

 Pull requests 7

 Projects 0

 Wiki

 Security

 Insights

CDS Hooks website & specification <http://cds-hooks.org>

[interoperability](#)

[fhir](#)

[cds](#)

[clinical-decision-support](#)

[smart-on-fhir](#)

 985 commits

Branch: master ▾

 [cds-hooks](#) / [sandbox](#)

 Unwatch ▾ 10



 Code

 Issues 13

 Pull requests 2

 Projects 0


 Wiki

 Security

 Insights

CDS Hooks Sandbox <http://sandbox.cds-hooks.org>

 281 commits

 3 branches

 0 releases

 37 environments

 12 contributors

Branch: master ▾

New pull request

Create new file

Upload files

Finish

Get Involved

Log in to Zulip



fhir

<https://chat.fhir.org>

FHIR is a platform specification that defines a set of capabilities used across the healthcare process.

- Sign in here to chat with the FHIR community.
- Before joining, please read and make sure you can follow the [chat.fhir.org community expectations](#)

Email

Password

Log in

OR



Log in with Google



Log in with GitHub

[Forgot your password?](#)

[Sign up](#)

Thanks!