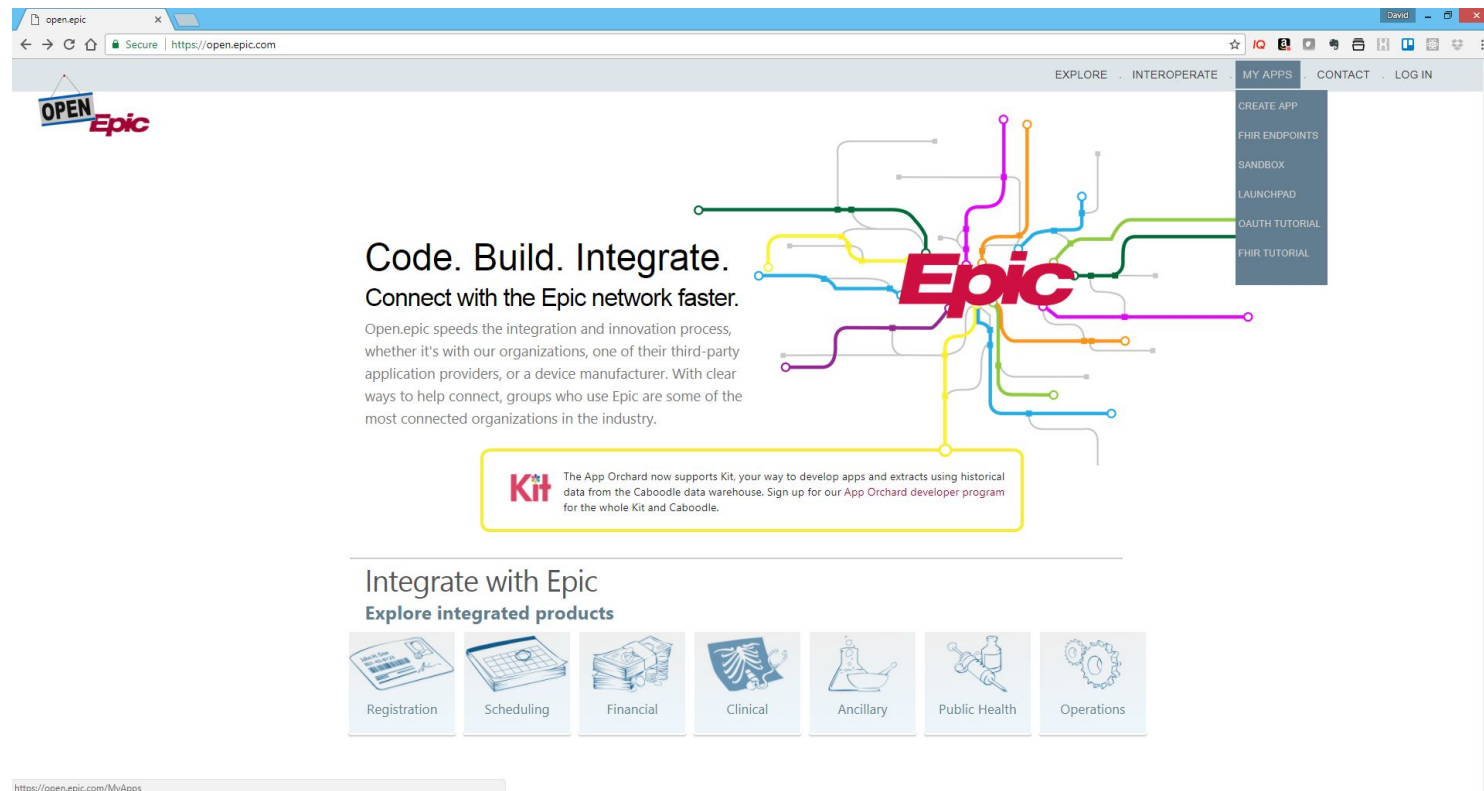


# Smart FHIR On Epic

# open.epic.com



The screenshot shows the open.epic.com website in a web browser. The browser's address bar displays "https://open.epic.com". The website features a navigation bar with links for "EXPLORE", "INTEROPERATE", "MY APPS", "CONTACT", and "LOG IN". The "MY APPS" dropdown menu is open, showing options: "CREATE APP", "FHIR ENDPOINTS", "SANDBOX", "LAUNCHPAD", "OAUTH TUTORIAL", and "FHIR TUTORIAL". The main content area has the heading "Code. Build. Integrate. Connect with the Epic network faster." followed by a paragraph about the integration process. To the right is a colorful network diagram with the "Epic" logo at its center. Below this is a yellow-bordered box containing the "Kit" logo and text about the App Orchard. At the bottom, a section titled "Integrate with Epic" and "Explore integrated products" features six icons representing different healthcare domains: Registration, Scheduling, Financial, Clinical, Ancillary, Public Health, and Operations.

open.epic

Secure | https://open.epic.com

EXPLORE · INTEROPERATE · MY APPS · CONTACT · LOG IN

CREATE APP  
FHIR ENDPOINTS  
SANDBOX  
LAUNCHPAD  
OAUTH TUTORIAL  
FHIR TUTORIAL

## Code. Build. Integrate.

Connect with the Epic network faster.

Open.epic speeds the integration and innovation process, whether it's with our organizations, one of their third-party application providers, or a device manufacturer. With clear ways to help connect, groups who use Epic are some of the most connected organizations in the industry.

**Kit** The App Orchard now supports Kit, your way to develop apps and extracts using historical data from the Caboodle data warehouse. Sign up for our App Orchard developer program for the whole Kit and Caboodle.

## Integrate with Epic

Explore integrated products

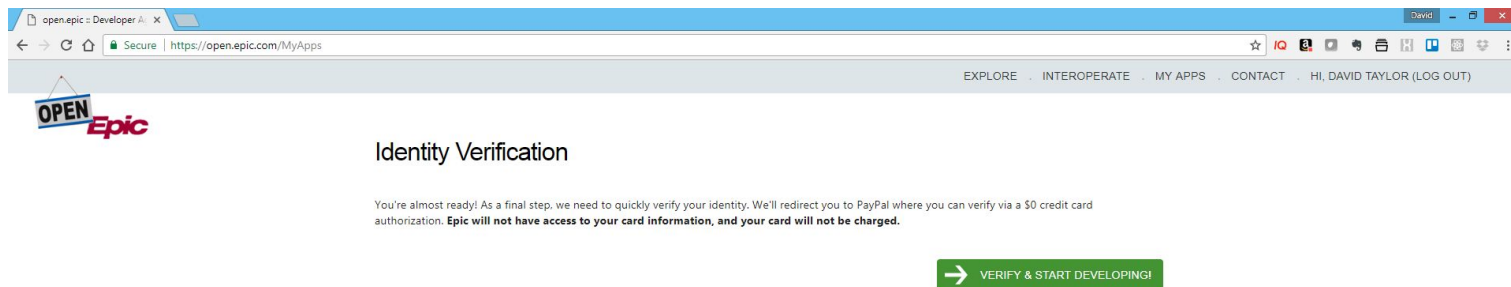
Registration Scheduling Financial Clinical Ancillary Public Health Operations

https://open.epic.com/MyApps

# Choose Auth Method

- Choose from a number of OpenID options including Google and others

# Verify Identity - Requests a Credit Card - but NOT Charged



# Fill out the form

Choose a way to pay x David






PayPal, Inc. [US] | https://payflowlink.paypal.com

**Epic**

**Verify the card**

Enter credit card details

Card Number

Expiration Date  /

CSC

[What is this ?](#)

**Billing Address**

First name

Last name

Country

Billing address

If your billing address is a PO Box, please enter the number first. Example: PO Box 123 would be entered as 123 PO Box.

City


State

ZIP

Phone Number

Email Address

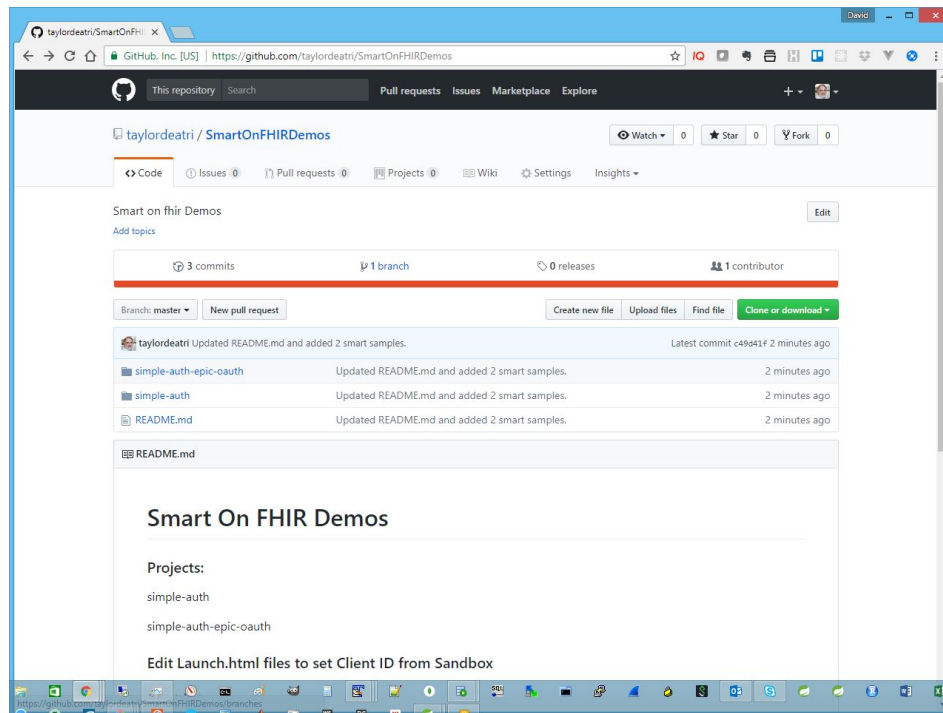
[Verify Card](#)

Secure payments by  PayPal

[Return to registration](#)

# Download Sample Apps from IndyFHIR Github

<https://github.com/taylordeatri/SmartOnFHIRDemos>

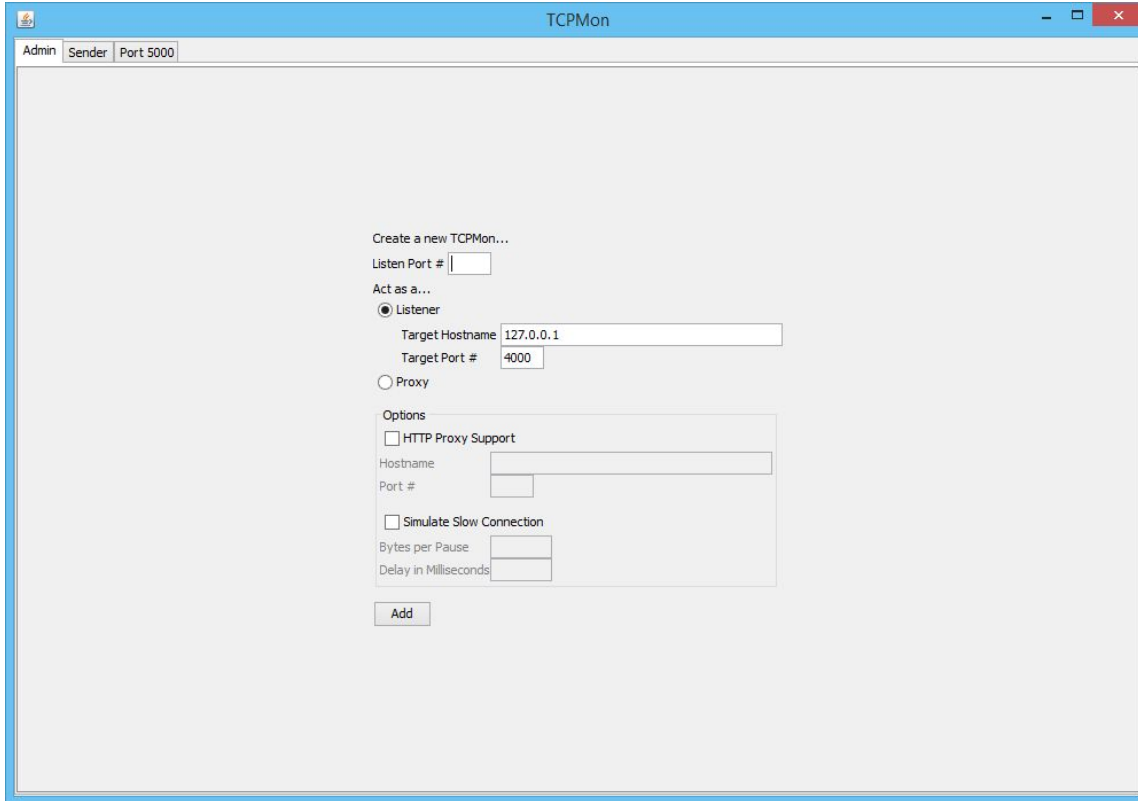


# Download tcpMon or other proxy tool

<http://archive.apache.org/dist/ws/tcpmon/1.0/>

- Download tcpmon-1.0-bin
- unzip
- cd tcpmon-1.0-bin/build
- Run tcpmon.bat
- Configure Listener:

# Configure tcpmon Admin - Listener then (Add)



The screenshot shows the TCPMon Admin window with the 'Admin' tab selected. The window title is 'TCPMon'. At the top, there are tabs for 'Admin', 'Sender', and 'Port 5000'. The main area contains the following configuration options:

Create a new TCPMon...

Listen Port #

Act as a...

☒ Listener

Target Hostname

Target Port #

☐ Proxy

Options

☐ HTTP Proxy Support

Hostname

Port #

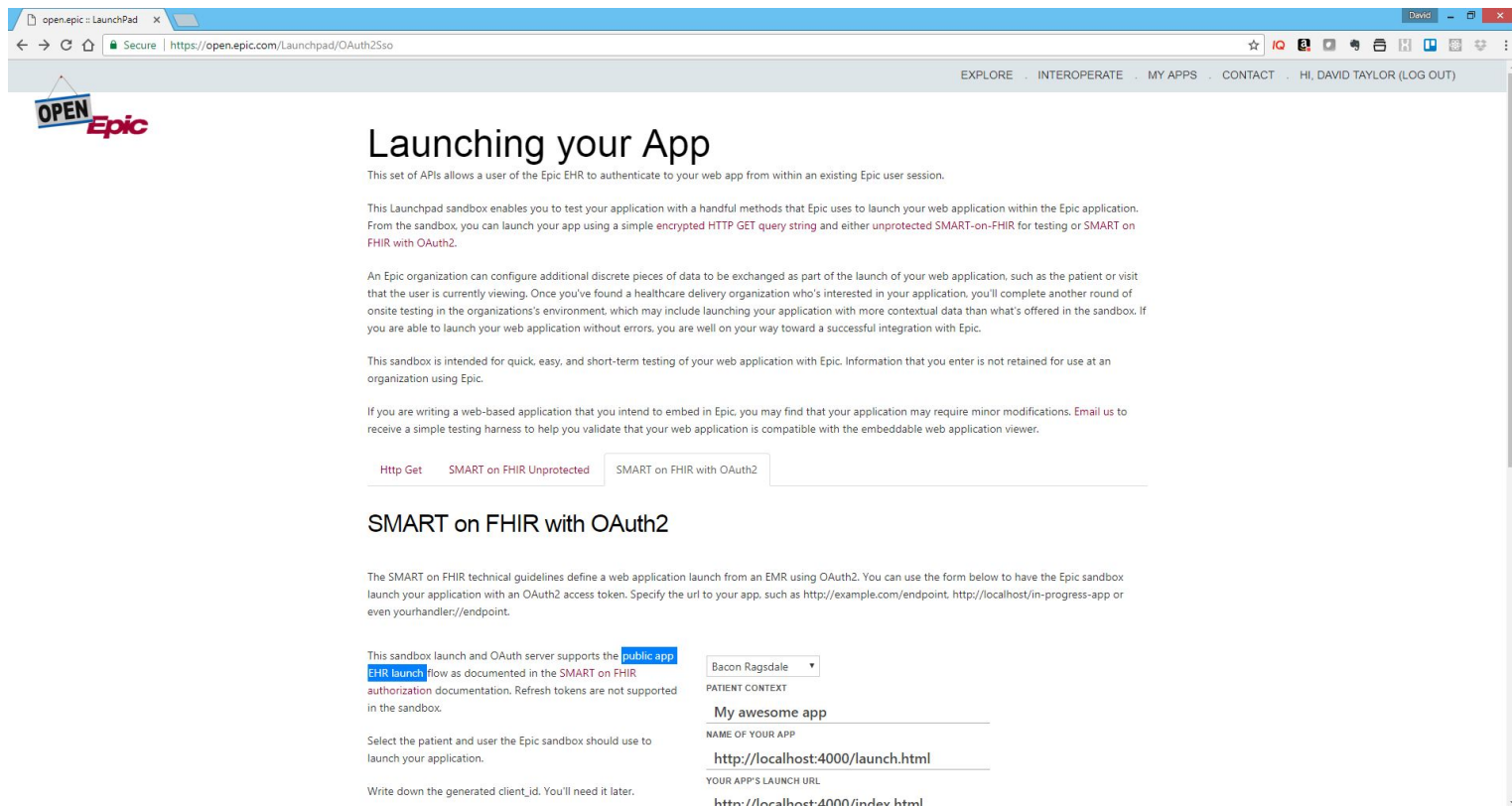
☐ Simulate Slow Connection

Bytes per Pause

Delay in Milliseconds



# Goto Epic Launch Pad



The screenshot shows a web browser window with the address bar displaying `https://open.epic.com/Launchpad/OAuth2Sso`. The page header includes the Epic logo and navigation links: [EXPLORE](#), [INTEROPERATE](#), [MY APPS](#), [CONTACT](#), and [HI, DAVID TAYLOR \(LOG OUT\)](#). The main content area is titled "Launching your App" and contains several paragraphs of text explaining the purpose of the Launchpad sandbox and how to use it. Below the text, there are three tabs: "Http Get", "SMART on FHIR Unprotected", and "SMART on FHIR with OAuth2". The "SMART on FHIR with OAuth2" tab is currently selected. Below the tabs, there is a section titled "SMART on FHIR with OAuth2" which contains a paragraph of text and a form. The form has a dropdown menu for "Patient Context" with the value "Bacon Ragsdale" selected. Below the dropdown, there is a section titled "My awesome app" with two input fields: "NAME OF YOUR APP" and "YOUR APP'S LAUNCH URL". The "NAME OF YOUR APP" field contains the text "http://localhost:4000/launch.html" and the "YOUR APP'S LAUNCH URL" field contains the text "http://localhost:4000/index.html".

open.epic :: LaunchPad

Secure | <https://open.epic.com/Launchpad/OAuth2Sso>

EXPLORE INTEROPERATE MY APPS CONTACT HI, DAVID TAYLOR (LOG OUT)

## Launching your App

This set of APIs allows a user of the Epic EHR to authenticate to your web app from within an existing Epic user session.

This Launchpad sandbox enables you to test your application with a handful of methods that Epic uses to launch your web application within the Epic application. From the sandbox, you can launch your app using a simple **encrypted HTTP GET query string** and either **unprotected SMART-on-FHIR** for testing or **SMART on FHIR with OAuth2**.

An Epic organization can configure additional discrete pieces of data to be exchanged as part of the launch of your web application, such as the patient or visit that the user is currently viewing. Once you've found a healthcare delivery organization who's interested in your application, you'll complete another round of onsite testing in the organization's environment, which may include launching your application with more contextual data than what's offered in the sandbox. If you are able to launch your web application without errors, you are well on your way toward a successful integration with Epic.

This sandbox is intended for quick, easy, and short-term testing of your web application with Epic. Information that you enter is not retained for use at an organization using Epic.

If you are writing a web-based application that you intend to embed in Epic, you may find that your application may require minor modifications. [Email us](#) to receive a simple testing harness to help you validate that your web application is compatible with the embeddable web application viewer.

Http Get SMART on FHIR Unprotected SMART on FHIR with OAuth2

## SMART on FHIR with OAuth2

The SMART on FHIR technical guidelines define a web application launch from an EMR using OAuth2. You can use the form below to have the Epic sandbox launch your application with an OAuth2 access token. Specify the url to your app, such as `http://example.com/endpoint`, `http://localhost/in-progress-app` or even `yourhandler//endpoint`.

This sandbox launch and OAuth server supports the [public app EHR launch](#) flow as documented in the SMART on FHIR authorization documentation. Refresh tokens are not supported in the sandbox.

Select the patient and user the Epic sandbox should use to launch your application.

Write down the generated `client_id`. You'll need it later.

Bacon Ragsdale

PATIENT CONTEXT

My awesome app

NAME OF YOUR APP

`http://localhost:4000/launch.html`

YOUR APP'S LAUNCH URL

`http://localhost:4000/index.html`

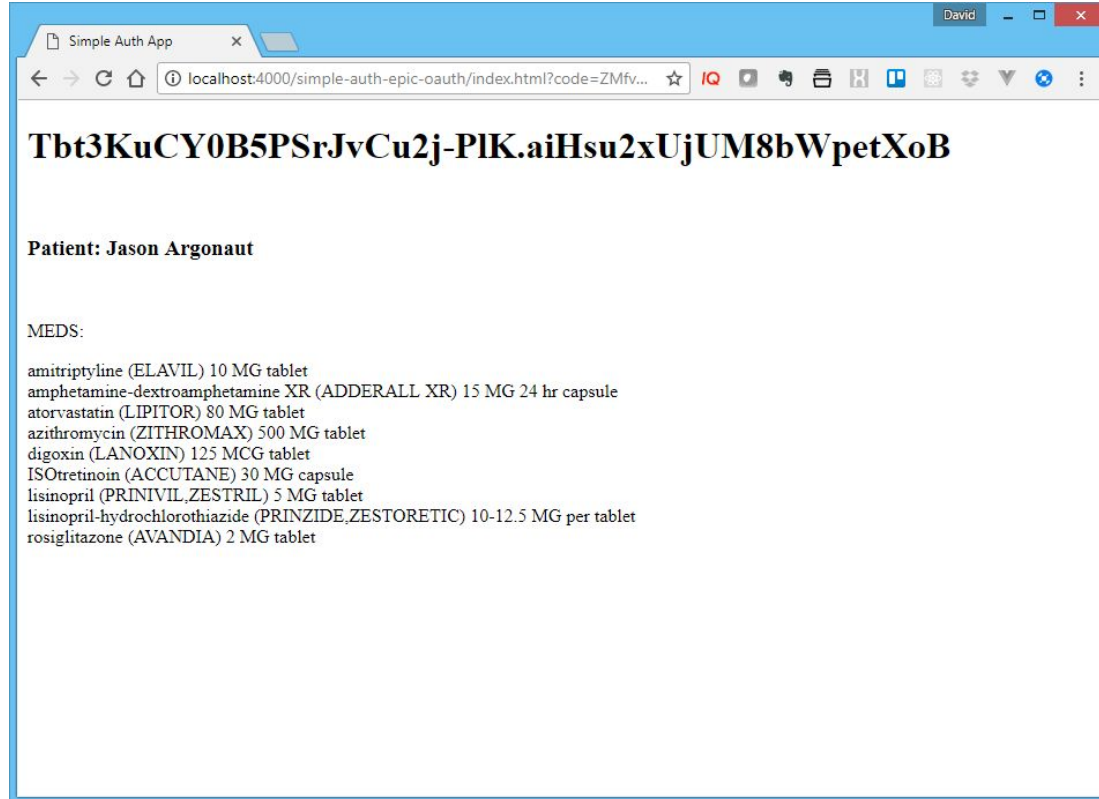
# Message / URL Exchanges

1. Epic will open your web app's launch URL with at least two URL parameters:
  - **launch** contains a SMART on FHIR **launch token**
  - **iss** contains Epic's base FHIR server URL
2. Your web application should query Epic's FHIR server's metadata endpoint (<https://open-ic.epic.com/Argonaut/api/FHIR/Argonaut/metadata>) to find Epic's OAuth2 authorization and token endpoints.
3. In order to bind your web app's session with the existing end-user's EHR session, your app should redirect the browser to the Epic OAuth authorization endpoint with the following parameters:
  - `response_type = "code"`
  - `client_id = client_id` (defined above)
  - `redirect_uri = redirect_url` (defined in the above form)
  - `launch` = the launch token (as passed to your web app's launch URL)
  - `state` = <an opaque value used by the client to maintain state between the request and callback.>
4. Epic will then redirect to your provided redirect URL with an authorization *code* and the *state* parameter you provided.
5. Your web app should exchange the authorization code for an access token by posting the following parameters to Epic's OAuth token service:
  - `grant_type = "authorization_code"`
  - `code` = the authorization code your web app received
  - `redirect_uri = redirect_url` (defined in the above form)
  - `client_id = client_id` (defined in the above form)
6. Epic will return an `access_token`.
7. Your web app can use the time-limited access token to access Epic FHIR resources. Include the token as a "Bearer" token in the Authorization HTTP header as part of your RESTful queries.

# Modify the smarthealthit.org Sample Simple Auth

- Go to LaunchPad
- Select OAuth2 Tab
- Select Patient
- Configure URLs - Use TCPMonitor Listener Port
  - Enter Launch URL: `http://localhost:<port>/simple-auth-epic-oauth/launch.html`
  - Enter Redirect URL: `http://localhost:<port>/simple-auth-epic-oauth/index.html`
- Set ClientId that is shown on the LaunchPad page
- Start `http-server -p <port#>`
- Click the LAUNCH button back on the open.epic page

# Result of launch



TCPMon

Admin

Sender

Port 5000

Stop

Listen Port: 5000

Host: 127.0.0.1

Port: 4000

☐ Proxy

State	Time	Request Host	Target Host	Request...	Elapsed Time
---	Most Recent	---	---	---	---
Done	2017-10-03 23:24:25	0:0:0:0:0:0:1	127.0.0.1	GET /simple-auth/launch.html?iss=https%3A%2F%2Flocalhost:5000/	361
Done	2017-10-03 23:24:25	0:0:0:0:0:0:1	127.0.0.1		0
Done	2017-10-03 23:24:25	0:0:0:0:0:0:1	127.0.0.1		0
Done	2017-10-03 23:24:25	0:0:0:0:0:0:1	127.0.0.1		0

Remove Selected

Remove All

GET /simple-auth/launch.html?iss=https%3A%2F%2Flocalhost:5000/

Host: 127.0.0.1:5000

Connection: keep-alive

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (Windows NT 6.3; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/61.0.3163.100 Safari/537.36

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,\*/\*;q=0.8

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.8

Cookie: shellInABox=3:101010; \_ga=GA1.1.590711457.1503184323.1503184323.1503184323.1503184323

GET /favicon.ico HTTP/1.1

Host: localhost:5000

Connection: keep-alive

User-Agent: Mozilla/5.0 (Windows NT 6.3; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/61.0.3163.100 Safari/537.36

Accept: image/webp,image/apng,image/\*,\*/\*;q=0.8

Referer: http://localhost:5000/simple-auth/launch.html?iss=https%3A%2F%2Flocalhost:5000/

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.8

Cookie: shellInABox=3:101010; \_ga=GA1.1.590711457.1503184323.1503184323.1503184323.1503184323

GET /simple-auth/index.html?code=rHICmM&state=60173679 HTTP/1.1

Host: localhost:5000

Connection: keep-alive

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (Windows NT 6.3; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko) Chrome/61.0.3163.100 Safari/537.36

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,\*/\*;q=0.8

Referer: http://localhost:5000/simple-auth/launch.html?iss=https%3A%2F%2Flocalhost:5000/

Accept-Encoding: gzip, deflate, br

HTTP/1.1 200 OK

server: ecstatic-1.4.1

last-modified: Wed, 02 Aug 2017 00:20:45 GMT

etag: "1125899907510173-4527-"2017-08-02T00:20:45.486Z"

cache-control: max-age=3600

content-length: 4527

content-type: text/html; charset=UTF-8

Date: Wed, 04 Oct 2017 03:24:25 GMT

Connection: keep-alive

<!DOCTYPE html>

<html>

<head>

<title>Simple Auth App - Launch</title>

<script src="http://ajax.googleapis.com/ajax/libs/jquery/1.11.3/jquery.min.js"></script>

</head>

<body>

Loading...

<script>

// Change this to the ID of the client that you registered

var clientId = "cce04507-8cfd-4323-a0b4-a115d53e4ff6"

// For demonstration purposes, if you registered a client

// you can enter its secret here. The demo app will

// app (in reality it cannot be confidential, since

// browser)591b4681063d

var secret = null; // set me, if confidential

☐ XML Format

Save

Resend

Switch Layout

Close

# Launch.html with **iss** and **launch**

GET

**/simple-auth/launch.html?iss=https%3A%2F%2Fsb-fhir-dstu2.smarthealthit.org%2Fsmartdstu2%2Fdata&launch=sS7L2g HTTP/1.1**

Host: 127.0.0.1:5000

Connection: keep-alive

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (Windows NT 6.3; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko)

Chrome/61.0.3163.100 Safari/537.36

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,\*/\*;q=0.8

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.8

Cookie: shellInABox=3:101010; \_ga=GA1.1.590711457.1503184323

# Index.html request with code

GET /simple-auth/index.html?code=rHlCmM&state=60173679 HTTP/1.1

**Host:** localhost:5000

Connection: keep-alive

Upgrade-Insecure-Requests: 1

User-Agent: Mozilla/5.0 (Windows NT 6.3; Win64; x64) AppleWebKit/537.36 (KHTML, like Gecko)

Chrome/61.0.3163.100 Safari/537.36

Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,\*/\*;q=0.8

**Referer:**

**http://localhost:5000/simple-auth/launch.html?iss=https%3A%2F%2Fsb-fhir-dstu2.smarthealthit.org%2Fsmartdstu2%2Fdata&launch=sS7L2g**

Accept-Encoding: gzip, deflate, br

Accept-Language: en-US,en;q=0.8

Cookie: shellInABox=3:101010; \_ga=GA1.1.590711457.1503184323

# Homework

- Add more Epic FHIR Resources
  - Procedures
  - Conditions
  - Observations
  - DiagnosticReport
  - Immunization
  - Allergy
  - etc.



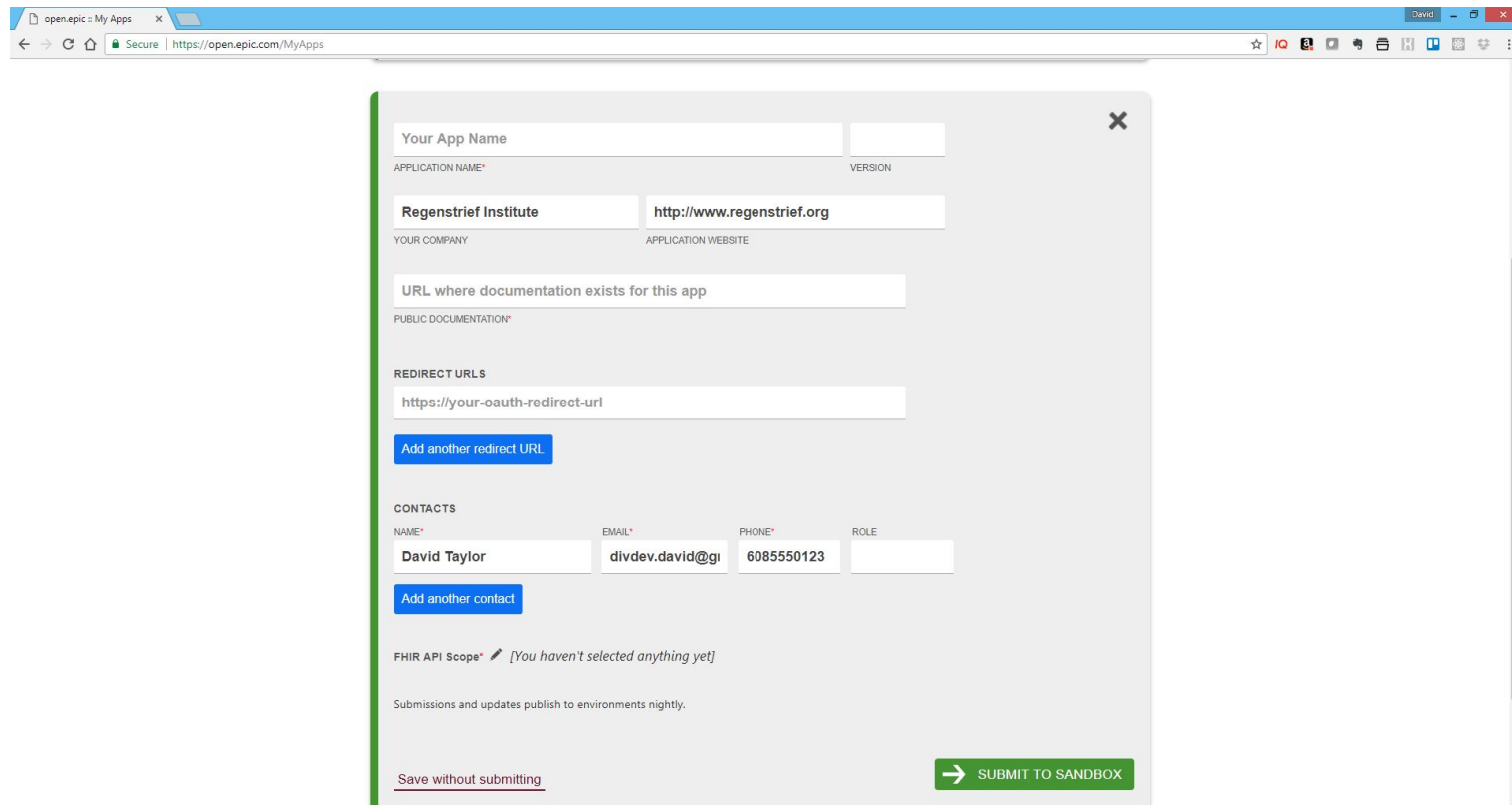
# Questions







# Fill Out Application Form



The screenshot shows a web browser window with the address bar displaying "https://open.epic.com/MyApps". The browser tab is labeled "open.epic: My Apps". The page content is a form for creating a new application. The form is titled "Your App Name" and includes a "VERSION" field. The "YOUR COMPANY" field is filled with "Regenstrief Institute" and the "APPLICATION WEBSITE" field is filled with "http://www.regenstrief.org". The "PUBLIC DOCUMENTATION" field is empty. The "REDIRECT URLS" section has a field filled with "https://your-oauth-redirect-url" and a button "Add another redirect URL". The "CONTACTS" section has a table with columns "NAME\*", "EMAIL\*", "PHONE\*", and "ROLE". The first row is filled with "David Taylor", "divdev.david@gi", "6085550123", and an empty role field. There is a button "Add another contact". Below the contacts section, there is a section for "FHIR API Scope\*" with a note "[You haven't selected anything yet]". At the bottom, there is a link "Save without submitting" and a green button "→ SUBMIT TO SANDBOX".

open.epic: My Apps x

Secure | https://open.epic.com/MyApps

David

Your App Name

APPLICATION NAME\*

VERSION

Regenstrief Institute

http://www.regenstrief.org

YOUR COMPANY

APPLICATION WEBSITE

URL where documentation exists for this app

PUBLIC DOCUMENTATION\*

REDIRECT URLS

https://your-oauth-redirect-url

Add another redirect URL

CONTACTS

NAME\*

EMAIL\*

PHONE\*

ROLE

David Taylor

divdev.david@gi

6085550123

Add another contact

FHIR API Scope\* [You haven't selected anything yet]

Submissions and updates publish to environments nightly.

[Save without submitting](#)

→ SUBMIT TO SANDBOX



