# FHIRcast

http://bit.ly/fhircast201901

## Intro

January WGM, 2019

# Timeline

- Starting testing a context sync spec based on FHIR Subscriptions in Sept, 2017.
- Following significant implementer feedback in Jan, 2018, refactored the spec to move away from FHIR Subscriptions and instead used a common rest-hook communication model.
- Tested successfully in May and September, 2018 at FHIR Connectathons
- Have been adding new features based upon feedback.
- Tutorial at Boston DevDays in June.
- Dedicated time this summer to fixing bugs and improving the downloadable sandbox.
- Great open source community contributions
- Connectathon track this weekend.

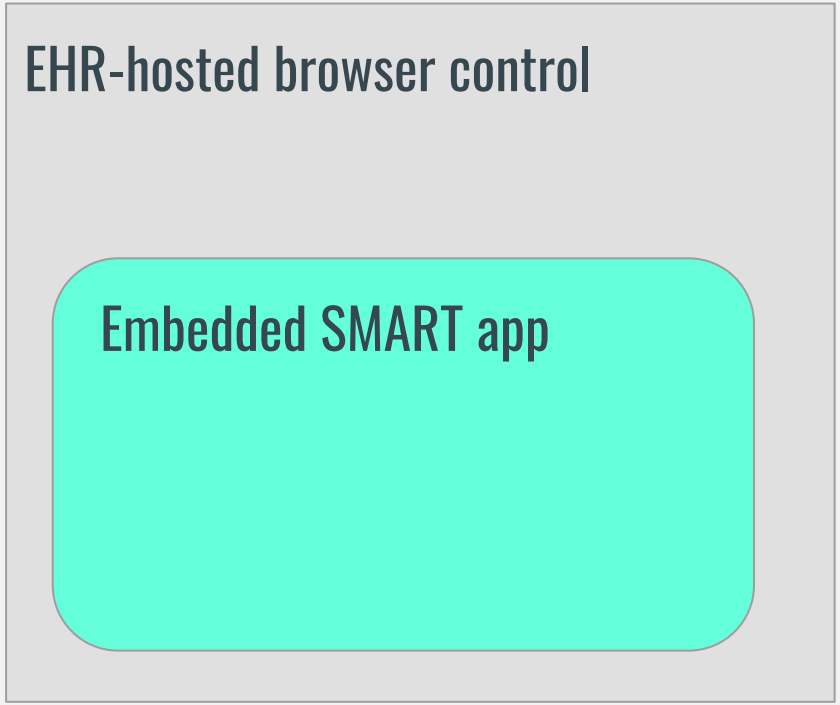
# SMART App Launch protocol

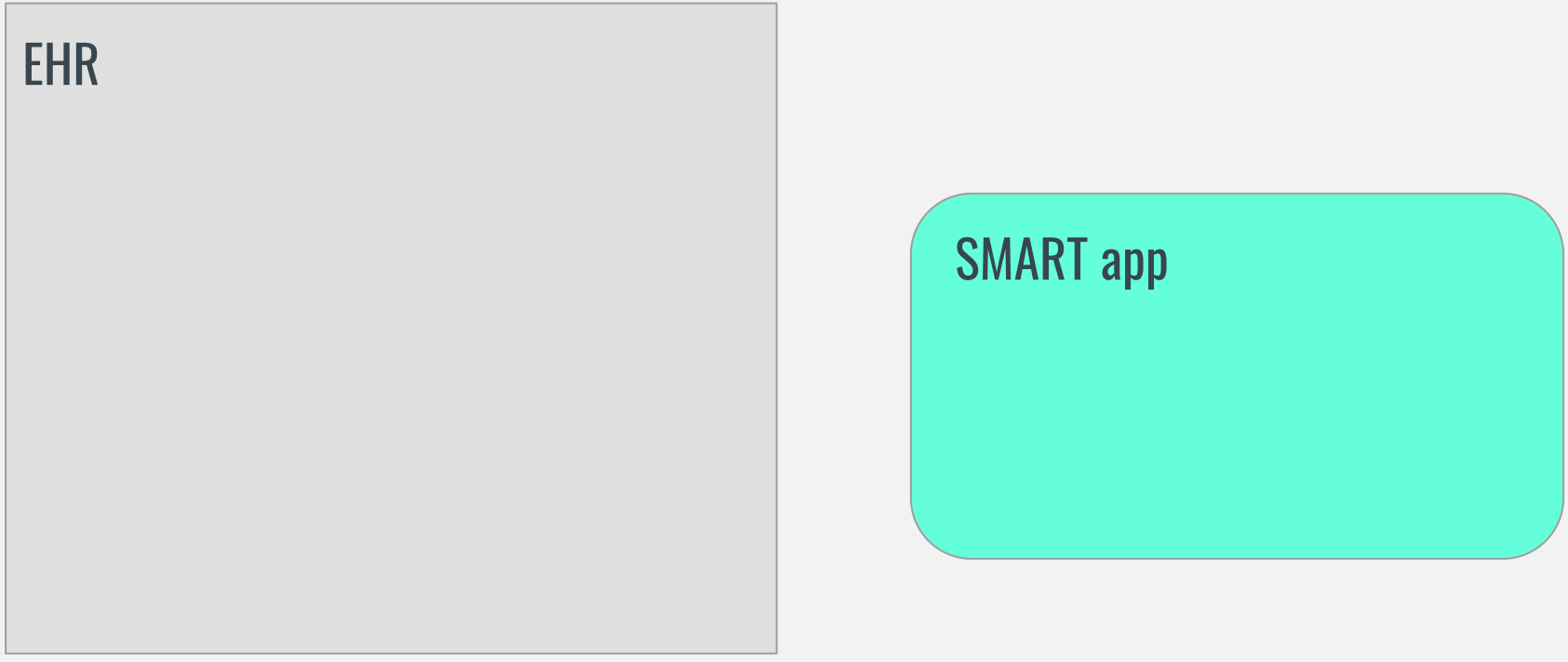
- HL7 standard
  - Authorization (patient, provider, backend system)
  - OAuth2 scopes
  - Access to FHIR server
- Standalone launch
  - User authenticates
- “EHR Launch”
  - Single sign-on.


www.hl7.org/fhir/smart-app-launch/

# SMART App launched from the EHR

- Embedded
  - iframe or embedded browser
  - web app
- “Sidecar” or external
  - Browser external to EHR or native app (mobile or desktop)
- Multiple machines
  - Simultaneous: desktop EHR + mobile app
  - Sequential: EHR then mobile app


EHR-hosted browser control
Embedded SMART app

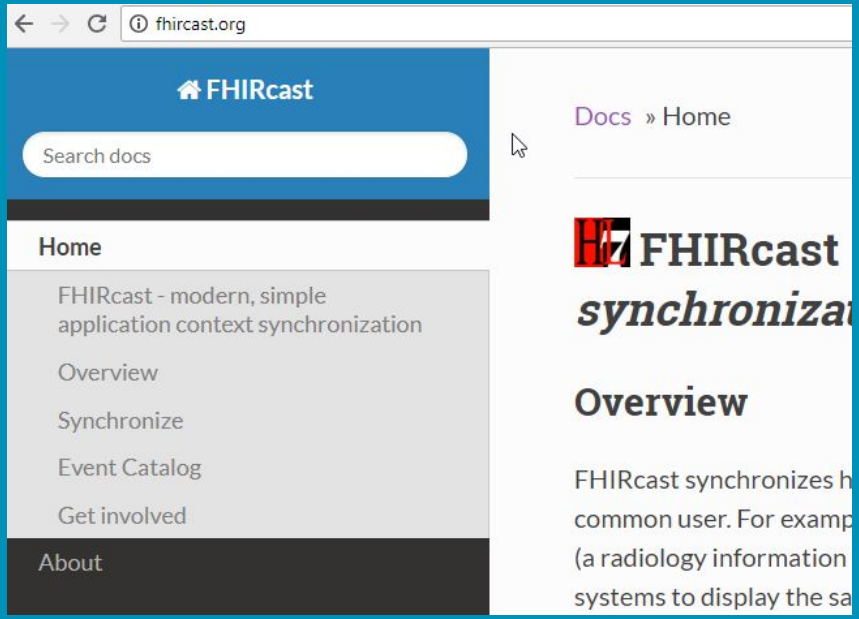

EHR
SMART app

# App context synchronization

- Widely used in healthcare
- Typically proprietary
- Disparate implementations
- May only support desktop apps
- May require apps to be on same machine

# FHIRcast: modern, simple app context sync

- Based on http, webhook, json
- Extends SMART on FHIR
- Doesn't require context manager




http://fhircast.org/

# FHIRcast: EHR launches SMART on FHIR App

SMART launch parameters include:

1) hub base url
2) session identifier

```
{
"access_token": "i8hweunweunweofiwweoijewiwe",
"token_type": "bearer",
"expires_in": 3600,
"patient": "123",
"encounter": "456",
"imagingstudy": "789",
"cast-hub" : "https://hub.example.com",
"cast-session": “https://hub.example.com/7jaa86kgdudewiaq0wtu”
}
```

# FHIRcast: App subscribes to session

## Subscriber HTTP POSTs to the hub base url to create subscription

| Field | Description |
|---|---|
| hub.callback | Subscriber's callback url. |
| hub.mode | The literal string "subscribe". |
| hub.topic | Uri of user's session. |
| hub.secret | Unique secret string, used to verify subscription request. |
| hub.events | List of events to subscribe to. |
| hub.lease_seconds | Length of subscription in seconds. |

# FHIRcast: App subscribes to session

Subscriber HTTP POSTs to the hub base url to create subscription

```
POST https://hub.example.com
Host: hub.example.com
Authorization: Bearer i8hweunweunweofiwweoijewiwe
Content-Type: application/x-www-form-urlencoded
hub.callback=https%3A%2F%2Fapp.example.com%2Fsession%2Fcallback%2Fv7tfwuk17a&hub.mode=subscribe
&hub.topic=https%3A%2F%2Fhub.example.com%2F7jaa86kgdudewiaq0wtu&hub.secret=shhh-this-is-a-secre
t&hub.events=patient-open-chart,patient-close-chart
```

# FHIRcast: Hub verifies callback url

The hub performs verification of intent of the subscriber.

```
GET https://app.example.com/session/callback/v7tfwuk17a?hub.mode=subscribe&hub.topic=7jaa86kgdu
dewiaq0wtu&hub.events=patient-open-chart,patient-close-chart&hub.challenge=meu3we944ix80ox HTTP
1.1
Host: subscriber
```

The subscriber confirms.

```
HTTP/1.1 200 Success
Content-Type: text/html

meu3we944ix80ox
```

# FHIRcast: Workflow event occurs and subscriber is notified

Hub POSTs event notification with relevant FHIR resources to subscriber.

```
POST https://app.example.com/session/callback/v7tfwuk17a HTTP/1.1
Host: subscriber
X-Hub-Signature: sha256=dce85dc8dfde2426079063ad413268ac72dcf845f9f923193285e693be6ff3ae

{
  "timestamp": "2018-01-08T01:37:05.14",
  "id": "q9v3jubddqt63n1",
  "event": {
    "hub.topic": "https://hub.example.com/7jaa86kgdudewiaq0wtu",
    "hub.event": "open-patient-chart",
    "context": [
      {
        "key": "patient",
        // Patient FHIR Resource
      }
     ]
   }
 }
```

# FHIRcast: App unsubscribes from session

Same as subscription request, but for *hub.mode='unsubscribe'*

```
POST https://hub.example.com
Host: hub
Authorization: Bearer i8hweunweunweofiwweoijewiwe
Content-Type: application/x-www-form-urlencoded

hub.callback=https%3A%2F%2Fapp.example.com%2Fsession%2Fcallback%2Fv7tfwuk17a&hub.mode=unsubscribe&hub
opic=https%3A%2F%2Fhub.example.com%2F7jaa86kgdudewiaq0wtu&hub.secret=shhh-this-is-a-secret&hub.events
atient-open-chart,patient-close-chart
```

# Recent updates

- Add capability for the client to query for current context
- Informative description of security considerations for FHIRcast
  Exploring optional support for websockets in addition to web hooks
- Informative description of synchronization failure considerations
- implementers

# Get involved

- Read the spec
  - http://fhircast.org
- Download, test, contribute to the sandbox
  - https://github.com/fhircast/sandbox
- Log issues, participate via github
  - https://github.com/fhircast/docs
- Ask questions, learn, chat
  - https://chat.fhir.org/#narrow/stream/118-FHIRcast

# Connectathon Update

January, 2019
San Antonio, TX

Nuance, Sectra, Epic, Philips, Siemens Healthineers

# Connectathon report

- Testing with the sandboxes
- Philips published their prototypes
  - https://github.com/PhilipsOnFhir/fhir-cast
- Design discussions:
  - websockets - issue 33
  - Retrieve context without event - issue 28
  - Non-OAuth2 launching and session id generation
  - websockets vs SSE vs HTML5 Web Messaging
- Implementers want a standard, and the standard needs implementers

# FHIRcast report

Two sandboxes - js, .Net, open source implementations, experimental websockets

Ballot in May

# Next steps

1) Experimental websocket support in specification.
2) Polish WebSub spec
3) Ballot