FHIR® Webinar
FHIR Exchange: REST, Messaging and Documents
March 2, 2022
**Agenda & Structure**

- House rules, intro, agenda (5’)
- Recap FHIR basics (5’)
- FHIR REST (10’)
  - Exchanging Resources
  - or groups of related resources
  - Other ways of exchanging FHIR
- FHIR messaging (5’)
- FHIR Subscriptions (5’)
- FHIR Documents (5’)
- MHDS (10’)
- How to choose (5’)
- Q&A, Discussion (5-10’)

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Goals

1. Identify the basic exchange approach for FHIR using REST
2. Explore the Document and Messaging paradigms
3. Look at the other (main) paradigms
4. Check the impact / criteria of deciding which paradigm to use
5. See a reference architecture specification for Documents
Part 1
Recap
FHIR Resource:
Usually the atomic unit of data exchange.
FHIR REST, Messaging and Documents
FHIR REST basics
REST

- Most common approach / starting point
- Handle resources with the REST verbs:
  - GET (the “read” verb)
    - GET a single resource: GET Patient/43961584
    - GET a set of resources GET Patient (...)
    - Response is a resource (a Patient, or a Bundle, or an OperationOutcome)
  - POST (create)
  - PUT (update)
  - DELETE (delete)
Parameters/payload will determine the content of the response

E.g. Search parameters, format, etc

(POST) http://hapi.fhir.org/baseR4/Patient/1607944/_history/5?_pretty=true

https://hapi.fhir.org/baseR4/Patient/1607944/$everything
One resource at a time

- All REST transactions are based on one resource at a time…
- …but often the communication includes several resources,
  - related to each other
Multiple resources
**FHIR Bundle**

- **Used to contain and group resources**
- **Different bundle types**
- **Others resources for grouping only:**
  - List
  - Composition
  - (Group)
Exchange paradigms - built on same resources as REST

- REST  https://build.fhir.org/http
- Messaging  https://build.fhir.org/messaging
- Subscription  https://build.fhir.org/subscriptions
- Documents  https://build.fhir.org/documents
- Graphql  https://build.fhir.org/graphql
FHIR Messages
Messages - are Bundles

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When to use Messaging

- Request/response workflow
- Need to drive behaviors more complex than CRUD on a single resource
  - E.g. merge, complex queries
- Need for asynchronous/indirect exchange
- Need to communicate information about many resources but want to minimize exchanges

No “identity” for many resources
FHIR Subscriptions
FHIR R4 Subscriptions

• Subscriptions are based on the Subscription resource.
  • Search criteria
  • Channels
    • REST Hook
    • WebSockets
    • Email/SMS
    • FHIR Message

• Workflow
  • Client creates Subscription resource based on search criteria.
  • Server sends updates based on the search criteria to the channel.
FHIR R5 Subscriptions

- Subscriptions are currently being revised for R5.
  - Resources: Subscription, SubscriptionTopic, SubscriptionStatus
  - https://build.fhir.org/subscriptions.html
- Workflow
  - Server maintains list of SubscriptionTopic resources.
  - Client can create a new Subscription resource based on a SubscriptionTopic.
  - Server sends updates using a subscription-notification Bundle including a SubscriptionStatus resource.
  - $events operation to retrieve missing notifications.
IHE’s Patient Master Identity Registry (PMIR) profile uses Subscriptions with a Message channel.

https://www.ihe.net/uploadedFiles/Documents/ITI/IHE_ITI_Suppl_PMIR.pdf

- ITI-93: Mobile Patient Identity Feed is a FHIR message.
- ITI-94: Subscribe to Patient Updates uses FHIR Subscriptions.
FHIR Documents
Documents – are bundles

```
<Bundle>
  <entry>
    <resource>
      <Observation />
      <Device />
      <List />
      <Condition/>
    </resource>
  </entry>
</Bundle>
```
When to use Documents

• Focus is on persistence
  – Data is ‘static’, managed by 1 person

• No workflow involved
  – Other than post/retrieve document

• Need tight rules over authenticated content

• Want to communicate multiple resources with control over how data is presented

• Data spans multiple resources
Document architecture - IHE MHDS
MHDS – Document Sharing Infrastructure

- 100% FHIR infrastructure
- Document Registry
- MHD transactions
- Persistence and lifecycle management
- Patient Identity Management
- Authorization - OAuth
- Consent Management
- Trust Framework – Certificate Authority
- Vocabulary Management
- Audit Record Repository
- Provider Directory
Which Infrastructure to use?

- Already have XDS?
  - YES: XDS +MHD
  - NO: Already have XCA?
    - YES: XCA +MHD
    - NO: Need Async backbone?
      - YES: Single Community?
        - YES: MHDS
        - NO: Need End-to-End Security?
          - YES: XDS Document Source/Consumer?
            - YES: MHDS
            - NO: No Current Infrastructure
      - NO: XDS Document Source/Consumer?
MHD Actors and Transactions

- Document Source
  - Provide Document Bundle [M-65] ↓
- Document Consumer
  - Find Document Lists [M-66] ↓
  - Find Document References [M-67] ↓
  - Retrieve Document [M-68] ↓
- Document Recipient
- Document Responder
Which How to choose
1. Point-to-point? Broadcast?
2. Integrity?
3. Idempotency?
4. Sync/Async?

https://build.fhir.org/ig/HL7/davinci-ehrx/exchanging.html
Impact

The choice of paradigm affects the entire architecture.

- Types of systems involved (repositories, registries)
- Data flows and integrity
- Access Control (who can access which resource / document)
- Type of applications expected
- ...

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Q&A, ideas
Get in touch, be active

- Check with others (at chat.fhir.org or community.fhir.org)
- Create (or ask someone to create) a change request
- Join a FHIR® event like DevDays (devdays.com), discuss
- Join a FHIR® connectathon, test and provide feedback
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Demo and hands-on

- http://ui.hl7.beda.software
- http://smartqedit4.azurewebsites.net