Moving Forward

Discussing the journey on FHIR. Moving from learning to piloting.
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FHIR Primer Recap (The Journey)
FHIR Highlights

1. Has been widely adopted (except for US)
2. Real value for business owners that are asking for more data
3. Less costly to implement and support for IT
4. Supplements interoperability both IHE and CDA programs
5. Future platform for healthcare
F is for FAST

A common way to represent data
- Building blocks (resources)
- Rules for connecting them (references)

Defines ways (paradigms) to move data
- API (Simple & Complex)
- RESTful web services
- Messages
- Documents

Links to supporting infrastructure
- Terminology, Identity
- Security (SSL, Oauth)

Connecting communities
- PCPs, labs, ERs, Plans, Persons
- 80% of all use cases
The basic building block in FHIR is a Resource

All exchangeable content in FHIR. Resources have standard, agreed-upon atomic data elements that have consistent meaning across sharing entities. Resources all share the following set of characteristics:

- Data types that define common reusable patterns of elements
- A common set of metadata
- A human readable component

Exchange Models:
- Can be represented in XML or JSON
- Can be individual or in bundles
- Examples query results, messages, documents

Resource types include infrastructure, administrative and clinical elements

<table>
<thead>
<tr>
<th>Patient</th>
<th>List</th>
<th>Care Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Composition</td>
<td>Family History</td>
<td>Medication</td>
</tr>
<tr>
<td>Questionnaire</td>
<td>Organization</td>
<td>Media</td>
</tr>
</tbody>
</table>

http://hl7.org/implement/standards/fhir/resourcelist.html
The Resource Anatomy

The main reasons you would want to use this?

- This is an IT project focused on ease of implementation.
- XML is extensible and cost effective
- Web services are reusable and easily managed
Understanding the API (RESTful)

GET [base]/[type]/[id] {?_format=[mime-type]}

GET http://api.resources.com/Patient?name=eve

Real-time interaction
- Application to Application
- Within enterprise systems
- Person to application
- Mobile access to data

Increasingly common (ubiquitous?) outside of healthcare
- Twitter, Facebook
- SalesForce
- iPhone, Google

Simple REST calls (CRUD)
- RPC more complex
- Selling points for FHIR
Where can FHIR be used today?

- Classic in-institution interoperability
- Back-end e-business systems (e.g. financial)
- Regional Health Information Organizations (RHIO)
- National EHR systems
- Social Web (Health)
- Mobile Applications

Regardless of paradigm (Messaging, Document, REST), the content is the same and FHIR is used to bridge interoperability.
Did I forget to say it’s fast?

<table>
<thead>
<tr>
<th>Past Standards</th>
<th>Functionality</th>
<th>FHIR</th>
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<tbody>
<tr>
<td>System / Partner</td>
<td>Data Formats</td>
<td>Supports all formats</td>
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<tr>
<td>Dependent</td>
<td>(HL7 v1, v2, v3, CDA)</td>
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</tr>
<tr>
<td>Architecture</td>
<td>Paradigms</td>
<td>Support all paradigms</td>
</tr>
<tr>
<td>Dependent</td>
<td>(RESTful, Services, Document, APIs)</td>
<td>(Same content for all)</td>
</tr>
<tr>
<td>System</td>
<td>Use Cases</td>
<td>80% Supported</td>
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<tr>
<td>Dependent</td>
<td>Packaging</td>
<td>Real-time using references</td>
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<tr>
<td></td>
<td></td>
<td>(Construct/Destruct any source and system)</td>
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<tr>
<td>CDA Template</td>
<td>Development</td>
<td>Flexible and Open</td>
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<tr>
<td>(built per partnership)</td>
<td>Meaningful Use</td>
<td>Possible III</td>
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<tr>
<td>Costly and Complex</td>
<td>Architecture</td>
<td>Distributed / Open</td>
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<tr>
<td>I, II</td>
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<td>Security</td>
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<td>License fees for Documentation</td>
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</table>

**CURRENT** generation standard based on web technology for fast, flexible and cost-effective development. This is driving a paradigm shift from document sharing to discrete data sharing.

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I, II

Meaningful Use

Distributed / Open

Web API / RESTful

Oauth

Data

No charge
Key Benefits

- **(bridge investments)** You can represent a clinical attribute like a blood pressure reading using FHIR and use it unchanged in messages, documents, RESTful approaches and services.

- **(better scalability)** Build a resource once and use many times across many systems.

- **(remove explicit data sharing agreements)** Support any formats (X12/HL7) for both clinical and business use cases between any data source and systems.

- **(reduced risk)** Modern web services XML/JSON are widely used and validated.

- **(reduces implementation resources)** Access to a large pool of web developers.

- **(quickly enable consumer initiatives)** mHealth technologies are easier to connect, resulting in advancement of a patient centered health care system.

- **(platform for innovation)** Generation Y companies come to healthcare quicker and with new ideas.
FHIR Adoption

• The Argonaut Project: The Argonaut Project is a joint project between HL7 and various healthcare and vendor organizations and is aimed to develop a first-generation API and Core Data Services specification.

• Chat for FHIR implementations - https://chats.fhir.me/feeds/skype/implementers.html

• The Health Services Platform Consortium (HSPC) is a non-profit membership organization formed by a collaboration of healthcare organizations, software vendors and academia focused on building an open platform based on FHIR to allow rapid development of healthcare applications. The platform will include tools for developers and a sandbox for development.

• CommonWell Health Alliance and SMART (Substitutable Medical Applications, reusable technologies).[1]

• In 2014, the U.S. Health IT Policy and the Health IT Standards committees endorsed recommendations for more public (open) APIs. The JASON task force report on "A Robust Health Data Infrastructure" says that FHIR is currently the best candidate API approach, and that such APIs should be part of stage 3 of the "meaningful use" criteria of the U.S. Health Information Technology for Economic and Clinical Health Act.[9][10][11][12]

• CMS Blue Button will begin FHIR development

• Edifecs will begin supporting a FHIR client on its Smart Trading Platform this year. https://www.youtube.com/results?search_query=FHIR+edifecs
Getting Started Checklist

- You’re here
- Find your internal supporters and potential project champions
- Line up a couple of Geeks
- Get Educated
- Join a community
1. HL7 has provided open source technology
2. Connectathons now have 20+ tracks
3. EMR community is coming around
4. API models / platforms are starting to become more important.
5. HL7, Blue Cross Association and WEDI are championing FHIR for Provider to Payer sharing.
Just Swipe Right

How to learn more and test yourself against FHIR

- **Connectathons**
  - Help almost every 2-3 months across the globe. Approximately twice a year in US
  - Very friendly and open community for all levels of engagement – from first-timers to veterans
  - Good way to connect with others, who work towards similar problems

- **Virtual Connectathons**
  - Skype-based meetings – mini version of hosted Connectathons
  - Good starting point to listen and learn more
  - Less popular than regular Connectathons

- **Mail List and FHIR Website**
  - [owner-fhir@lists.hl7.org](mailto:owner-fhir@lists.hl7.org) – allows you to dive deep and talk with many key people in FHIR community
FHIR Adoption
**FHIR Themes / Tracks**

*(HL7 Payers User Group Meeting
May FHIR Connect-a-thon Update June 6th, 2016)*

- C-CDA on FHIR
- CDS Enablement Services
- CDS Hooks
- Conditional Reference
- CQF on FHIR
- Data Access Framework
- Declarative Mapping
- FHIR Genomics
- Structured Data Capture

- Financial
- Lab Orders
- PATCH proposal
- Patient track
- Provider Directories & Scheduling
- SMART-ca on FHIR
- Terminology Services
- Workflow
Below is the list of participants on this "team":

- Anthem
- Optum/UHG
- BCBSSC
- BCBSAL
- Independence
- Nant Health (aka NaviNet)
- Cigna
- Edifecs
- Epic
- Cerner
- McKesson
- Allscripts
- NCQA

Invited by not yet actively participating:

- GE
- eClinincal Works
- MiHIN
- CambiaHealth
- HCSC
- Highmark

Around 175 persons attended
Most were developers but a few payers

17 Themes or tracks

What was the process like?
Install a FHIR server and definitions from instructions given at the connect-athon. This consumed the first hour.
Use a tool to read data from the server, update the data, and write back an updated record to the server.
Write new records to the server using a template.

Broader Connect-athon results

- Almost every group reached their "limited" objectives.
- Use Cases were highlighted for several of the tracks
  - Financial
  - Value Based Payments
  - Prior Authorization
  - CDS Hooks (similar to ADT alerts)
  - An observation is recorded for a patient
  - RX prescribed in the office
  - SDC (Structured Data Capture)
  - Questionnaire could allow for automation of manual processes related to closing gaps on care
HL7 HEDIS on FHIR-CQF

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(HL7 Payers User Group Meeting
May FHIR Connect-a-thon Update June 6th, 2016)
HAPI FHIR Server

- Front end Management page – (JQuery, Bootstrap)
- RESTFull java based web service
- Embedded Apache Derby database (JPA API)
Edifecs has proven its knowledge of FHIR by successfully completing 4 tracks at the last connectathon

Edifecs Leaning-In

At Connectathon 8, Edifecs was the only company to present interoperability spanning electronic medical records (EMR) system and external partners, such as payer systems.
- Demonstrate cross-enterprise interoperability between payers and providers, Edifecs leveraged Open EMR, Edifecs XEServer and a third-party Fast Healthcare Interoperability Resource (FHIR) server.
- Showing that investments by the industry in CDA R.2 can be leveraged and made interoperable using FHIR resources without a major re-write and native EMR functionality.

At Connectathon 9, Structured Data Capture (SDC), Edifecs successfully demonstrated patient access to eligibility inquiries via a mobile device.
- Edifecs delivers interoperability to reduce the administrative costs of healthcare while improving patient engagement and timeliness of data.

Connectathon 10, Edifecs successfully complete 4 of 6 FHIR themes
- Basic patient management (search, 'CRUD', history, Extensions)
- Financial Resources, Structured Data Capture, Scheduling

Connectathon 11, Edifecs successfully complete 5 of 11 FHIR themes
- Basic patient management (search, 'CRUD', history, Extensions)
- Financial Resources, Structured Data Capture, Scheduling, Provider Directories

Code-a-thon, Edifecs sponsored and participated Blue Button API Challenge
- Successfully connected to CMS/HHS Bluebutton resources (added in FHIR Portal)

Connectathon 12, Edifecs remotely participated 7 of 17 FHIR themes
- Basic patient management (search, 'CRUD', history, Extensions), Financial Resources, Structured Data Capture, Scheduling, C-CDA on FHIR, CQ on FHIR, Workflow
Edifecs team has successfully converted a Continuity of Care Document (CCD) to a FHIR Patient Resource with integration to Open EMR.

This simple demo showed that investments by the industry in CDA R.2 constructs can be leveraged and made interoperable using FHIR Resources without a major re-write of interfaces and native EMR functionality.

### Technology

**Technology (FHIR Implementation Details)**

### Servers / Systems

- **HAPI FHIR Server** (DSTU 2 Compliant)
- **Edifecs FHIR Web Portal** for Questionnaires, Eligibility, Appointments and Financial data
- **Edifecs XEngine Server** for FHIR client, transformation between HIPAA and FHIR resources
- **Edifecs MapBuilder / Translator** for maps between FHIR and Standard (HIPAA, CCD) documents

### Resources

- Patient
- Questionnaire
- QuestionnaireResponse
- Appointment
- AppointmentResponse
- Slot
- Schedule
- Claim
- Claim Response
- Eligibility Request (future)
- Eligibility Response (future)
- Enrollment Resources (future)

### Operations

- **Fetch Patient** information
- Create **new Questionnaire**
- Render **Questionnaire form**
- **Fill the answers** and store them
- Schedule an **appointment** by requesting and reserving the schedule spot
- Claim submission and **payment** confirmation
Edifecs is working with many early adopters in FHIR (Like Cigna, UPMC, BCBSA, and more). Resources (including HL7) will be combined to create a framework in which many use cases can be tested.

Our develop is focused on our FHIR client that integrates with our core product XEngine
FHIR Server

How to deploy your own FHIR server

- **HAPI Server (details will follow)**
  - If you are a developer you can use Maven or Gradle repositories to get all necessary dependencies
  - Build and deploy the server within Tomcat
  - Choose the data model – use your own database, default one or something else (NoSQL, etc.)

- **Own Server**
  - Choose application server: IIS for .NET shops, Tomcat or Jetty for Java, etc.
  - Implement the core REST API defined by FHIR - [https://www.hl7.org/fhir/http.html](https://www.hl7.org/fhir/http.html)
  - Define your data model and choose the database (MySQL, MS SQL, Oracle, NoSQL, etc.)
HAPI FHIR Server

Detailed Installation Steps

- **Install Pre-requisites**: Java JDK 8 (this version is mandatory), Git (optional), Maven, Tomcat

- **Download sources** from github repository [https://github.com/jamesagnew/hapi-fhir](https://github.com/jamesagnew/hapi-fhir). There are two options: using Git (“git clone [https://github.com/jamesagnew/hapi-fhir](https://github.com/jamesagnew/hapi-fhir”) or Zip from Git Hub

- **Build all artefacts** with help of maven - “mvn install”.

- Go to “hapi-fhir-jpaserver-example\target\” folder, rename the war file to something like hapifhir.war (this will be symbolical name of your app)

- Place the war to the **tomcat webapps folder** and start Tomcat. Deployment takes around 1 min.

- After deployment go to [http://localhost:8080/hapifhir/](http://localhost:8080/hapifhir/) - there you will see the management page. This means that server is working. **FHIR URL** then will be [http://localhost:8080/hapifhir/baseDstu2/](http://localhost:8080/hapifhir/baseDstu2/)
FHIR Client

How to connect to remote FHIR Server

- If you are a developer
  - Download the client samples for C#, Java, Pascal (https://www.hl7.org/fhir/)
    - http://fhirtest.uhn.ca/ - HAPI / University Health Network test server
  - Explore resources and exchange protocol

- If you are a business analyst or system architect
  - Learn typical business cases - http://fhir.collablynk.com
  - Explore the nature of resources - http://fhir.collablynk.com/application#claimsResources
  - Use any vendor tool such as Edifecs SpecBuilder with Edifecs XEServer or any other capable of doing maps and using REST communication
FHIR Client Portal
Edifecs Virtual Sandbox

FHIR Client Portal FREE to partners. This portal is designed to demonstrate the capabilities of Edifecs FHIR adapter on a typical Healthcare-related business cases. Please follow the scenario below to go through the most common operations with help of FHIR and Edifecs Adapter. Feel free to switch to the Technical View if you wish to learn more about underlying resource and FHIR internals.

http://fhir.collablynk.com

Welcome to Edifecs FHIR Client Portal

This portal is designed to demonstrate the capabilities of Edifecs FHIR adapter on a typical Healthcare-related business cases. Please follow the scenario below to go through the most common operations with help of FHIR and Edifecs Adapter. Feel free to switch to the Technical View if you wish to learn more about underlying resource and FHIR internals.

1. A patient plans to visit a doctor and wants to verify his eligibility and coverage by his carrier, he opens his phone and uses the mobile web portal to contact his insurance via FHIR resources. At the Payer side the FHIR resource is converted to 270 request and when 271 response is received, it is converted back to FHIR response, which allows Payer to avoid any changes to existing HIPAA eligibility system.

2. Doctor sees the patient and decides that certain treatment would require a prior authorization from the insurance company before the treatment is provided. Doctor logs in to the provider's portal where prior Authorization form is generated with use of the FHIR resources and an request-response is also handled via FHIR. At the back-end the Prior Authorization request/response is converted to 278/278 HIPAA transactions to seamlessly connect with Payer's Prior Authorization system.

3. Based on the outcomes of the treatment, PCP recommends that the patient goes for a physical therapy to a local practitioner. Patient schedules the appointment using the FHIR-driven scheduling portal, provided by a Health Plan, which network physical therapist is a part of.

4. After the therapist has performed the services, he decided to use the new financial system that uses FHIR Claims resources to submit claims and receive Payment confirmation. To connect with existing HIPAA Claims and Payment system, Edifecs Translator performs the interface from FHIR resource to/from the standard HIPAA 837 and 835 transactions.

5. After the treatment has been performed for the patient, PCP wants to share Patient's Clinical Chart with the corresponding Health Plan for Care Coordination purpose. PCP uses industry standard EMR system (Epic and Cerner), Edifecs Clinical Exchange portal performs connection to the EMR system via FHIR endpoint, extracts the necessary clinical resources from Epic / Cerner, transforms it to the Continuity of Care Document (CCD) using Edifecs Translator and sends over to a Health Plan.
1. Eligibility
(Business View / Test)

A patient plans to visit a doctor and wants to verify his eligibility and coverage by his carrier, he opens his phone and uses the mobile web portal to contact his insurance via FHIR resources. At the Payer side the FHIR resource is converted to 270 request and when 271 response is received, it is converted back to FHIR response, which allows Payer to avoid any changes to existing HIPAA eligibility system.
2. Prior Authorization
(Business View / Test)

Doctor sees the patient and decides that certain treatment would require a **prior authorization** from the insurance company before the treatment is provided. Doctor logs in to the provider’s portal where **Prior Authorization form is generated with use of the FHIR resources** and all request-response is also handled via FHIR. At the back-end the Prior Authorization request/response is **converted to 275/278 HIPAA transactions** to seamlessly connect with Payer’s Prior Authorization system.

---

**Fill the Prior Authorization Form with the Answers**

**Prior Authorization**

**Patient information**

*General information about patient*

- **Patient name**
- **Policy/group number**
- **Patient date of birth**

**Prescribing provider information**

*Information about provider*

- **Prescriber name**
- **Prescriber NPI**
- **Prescriber phone**

**Prior authorization request for drug benefit**

*Drugs information*

- **Patient diagnosis**

---

**FHIR Questionnaire resource**

```xml
<?xml version="1.0" encoding="utf-8"?>
<Questionnaire xmlns="http://hl7.org/fhir">
  <id value="1640209"/>
  <meta>
    <versionId value="1"/>
    <lastUpdated value="2015-12-17T00:30:48.322-05:00"/>
  </meta>
  <identifier>
    <value value="ProAuthorization"/>
  </identifier>
  <date value="2015-12-16T06:15:38-08:00"/>
  <publisher value="Edifics"/>
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        <linkId value="link3"/>
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      </question>
    </group>
  </group>
</Questionnaire>
```
3. Schedule Appointments (Business View / Test)

Based on the outcomes of the treatment, PCP recommends that the patient goes for a physical therapy to a local practitioner. **Patient schedules the appointment** using the FHIR-driven scheduling portal, provided by a Health Plan, which network physical therapist is a part of.
4. Submit a Claim (Business View / Test)

After the therapist has performed the services, he decided to use the new financial system that uses **FHIR Claims resources** to submit claims and **receive Payment** confirmation. To connect with existing HIPAA Claims and Payment system, **Edifecs Translator** performs the interface from FHIR resource to/from the standard **HIPAA 837 and 835 transactions**.
5. Clinical Exchange
(Business View / Test)

After the treatment has been performed for the patient, **PCP wants to share Patient's Clinical Chart** with the corresponding **Health Plan for Care Coordination** purpose. PCP uses industry standard **EMR system (Epic and Cerner)**. **Edifecs Clinical Exchange** portal performs connection to the EMR system via FHIR endpoint, extracts the necessary clinical resources from **Epic / Cerner**, transforms it to the **Continuity of Care Document (CCD)** using Edifecs Translator and sends over to a Health Plan.

---

### Edifecs Clinical Exchange

<table>
<thead>
<tr>
<th>Select EMR System</th>
<th>FHIR ID</th>
<th>EMR ID</th>
<th>Family Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epic</td>
<td>687923</td>
<td>230</td>
<td>SMART</td>
</tr>
<tr>
<td></td>
<td>1388025</td>
<td>1000412</td>
<td>Smart</td>
</tr>
<tr>
<td></td>
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<tr>
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<tr>
<td></td>
<td>3256007</td>
<td>1002094</td>
<td>SMART</td>
</tr>
</tbody>
</table>

---

### Clinical Document

- **Patient**: Janie Argaman
- **Date of Birth**: January 23, 1982, 00:06:00
- **Sex**: Male
- **Contact info**: Pleasantville, NY 10609
  - Tel: (93) 5055-6473
  - salr 1 739 500
- **Document ID**: 916F4E-3ECE-42CF-8653-774341199A88
- **Document Created**: January 4, 2016, 16:45:27 +0006
- **Author**: Physician Family Medicine

### Table of Contents

- Allergies and Adverse Reactions
- Medications
- Results

#### Allergies and Adverse Reactions

- Fish - dietary (substance)

#### Medications

- 0131314003, Amoxicillin (Amoxicillin Trihydrate) 250mg/5mL

#### Results

- Hemoglobin [Mass/volume] in Blood, 7.2 g/dL
5. FHIR to CCD (Mapping)
Finding Dory

Look for partners willing to invest a little effort and some spare server capacity in interoperability using FHIR and CDA standards. Demonstrate technical feasibility and operational value.

Technical Requests:
1. Agree to become critical actors in a FHIR use cases and build out demo scenarios.
2. Provide (user only) access to development servers that run clinical and administrative applications including Epic, Cerner, Allscripts and a financial/claim system. De-Identified data must be loaded so no BAA is required.
3. A technical/developer resource to work to integrate workflows, data formatting, and other data orchestration needs.
4. Permission to use servers and access 3rd party vendors UIs when demoing these FHIR use cases. Agreement that these servers will not be take offline or configurations be changed without a notification (either on the server or via email)

Business Requests:
1. If technically successful, be willing to publish and share your efforts.
2. Attend HL7 workgroups and/or FHIR connectathons to showcase capabilities and drive industry use.
3. Consider doing formal write ups and presentations to industry events and forums (MHDC???)
Finding Partners Checklist

- You’re here
- Decide the top one or two use cases that can deliver real value on Day 1
- Scan this room and network with colleagues and competitors who need the data you have or have the data you want
- Work together to plan the work necessary to socialize the project with Business and IT at both companies
- Talk up your work. Get others in the community to watch what you are doing.
PATHWAYS TO PARTNERSHIPS

FHIR Use Case Recap (The Dance)
Top 5 FHIR Pilots

1. Sharing Care Plans (Transition of Care)
2. Quality Measures (HEDIS)
3. Wellness Programs (Patient Data)
4. Administrative Simplification (Claims)
5. Web-Based Questionnaire / Structured Data Capture (SDC)
Can “CDA on FHIR” replace “CDA on HL7 V3” for all clinical documents? Lantana Consulting says “Yes”.

**Strengths**
- Significant implementer & vendor engagement & participation
- Significant collaboration with other work groups
- FHIR is well positioned in industry which reflects on this work group

**Weakness**
- Dependency on other work groups for certain resources/pages
- Not always good with “process”
- Requires more sharing, cooperation and trust than is familiar.

**Opportunities**
- Influence provided by popularity of the standard and influx of newcomers opens the possibility to evolve how standards are developed. Value based payments can’t succeed without lots to structured data.

**Threats**
- Scalability of WG to meet workload is a challenge, particularly on specification aspects that require depth of familiarity/experience
- WG may be target of large stakeholder groups who want to “steer” FHIR
- Some knowledge, particularly development tools, is still too concentrated

**Business Case**
(Determine FHIR Value For Yourself)
Investment areas for FHIR

Where Payers and Providers can utilize FHIR, the initial focus will be to fill current technology gaps.

LOW RISK / HIGH RETURN

- Legacy systems that require outside access
- Leveraging native EMR support for FHIR
- Leverage identity frameworks where users are known & trusted
- Targeted clinical repositories (e.g., Care Mgmt)
- Augmenting PHRs and patient portals
- mHealth and mobile patient engagement strategies
- Accelerated web apps development (e.g., wellness)
- Leverage investments in SMART applications locally

HIGH RISK / LOW RETURN

- Mature EDI transaction processes (Eligibility, Claims, etc)
- Replacing ETL and SOA applications
- Use cases that can't leverage OAuth
- Population health / Big Data Analytics (leave your $100M data warehouse alone)
- Don’t look for clearinghouse to add automation using FHIR – No conformance or standard security policies
- Persistent data requirements (time-based) better for RPC and services calls (not quite FHIR and forget but..)
There are many data exchange options available to automate business processes. Most are not integrated into daily workflow nor are they fully automated.

### Maturity Model Matrix

<table>
<thead>
<tr>
<th>Use Case</th>
<th>Fax / Calls</th>
<th>EDI</th>
<th>WS / Clipboard</th>
<th>HL7</th>
<th>FHIR</th>
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<tr>
<td>Eligibility</td>
<td>Maturity</td>
<td>Maturity</td>
<td>Emerging</td>
<td>NA</td>
<td>Exploring</td>
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<tr>
<td>Prior Auth</td>
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<tr>
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<td>NA</td>
<td>Exploring</td>
<td>Exploring</td>
<td>Exploring</td>
</tr>
</tbody>
</table>
Answering Key Questions (Insights)

1st Type of Query (Full Document)
Audit, Claims Review, Encounter Risk Scoring
- Give me info about most recent episode/encounter.
- All info going back X months/Y Visits
- Most often manual but HL7 CCD is well suited

2nd Type of Query (Specific Clinical Question)
- Subset of data about a patient is needed: medication, allergies, vaccinations, labs
- FHIR resources could provide granular answers
Finding insights in the noise, complexity with data exchange

**Answering Key Questions (Insights)**

3rd Type of Query (Conversational)

**Eligibility, Prior Auth, Adjudication**

- Requesting data points to approve a request, procedure, etc. Often conversational, situational.
- Not yet coded as a standard but active development underway (e.g., Interqual and Milliman guidelines)
- FHIR profile could provide access to resources to create patient summary document (CDA) for attachment and process documentation.

4th Type of Query (Portal Modes)

- Have questions pop up to guide the data collection process. Don’t ask for everything if it is not necessary
- Extend existing architecture to embrace FHIR
- Render that FHIR resource response in a CDA
- Attach to a 275/277 message
- Import automatically – same as a physical attachment or file upload to portal to drive standardization
- A FHIR resource server could broker conversations in a request response model.
- FHIR client or SDC (Web Questionnaire) could be utilized to assemble required data.
Attachment on FHIR - High Effort/High Reward

Three questions:
1. Visit history related to this diagnosis/procedure (notes, results, orders)
2. Statement of medical necessity
3. Previous treatments and therapies associated with this diagnosis

EDI (275)

<table>
<thead>
<tr>
<th>PCP</th>
<th>+ $</th>
<th>Payer</th>
</tr>
</thead>
</table>

< > File Formats:
- .PDF
- .X12

PORTAL / CLIPBOARD

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<th>PCP</th>
<th>Portal</th>
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< > File Formats:
- .PDF

FHIR

<table>
<thead>
<tr>
<th>PCP</th>
<th>Portal</th>
<th>Payer</th>
</tr>
</thead>
</table>

< > File Formats:
- .XML

2-3 Weeks
- Make calls for required info
- Must export CCD manually
- Attached to EDI (not reusable)

<2 Weeks
- Must export CCD manually
- Upload CCD
- Not correlated into workflow

Real-Time
- CCD generated on fly
- Auto submit
- Integrated into workflow
Setting Your Exchange on FHIR (Key Use Cases)

1. Basic Patient Management - Fetching the patient information and population of the data into the EMR system. This includes patient admit / discharge messages with payer sending alert to provider.

3. Structured Data Capture - Prior authorizations, eligibility, and claim attachments requests via FHIR questionnaire forms and submission of those into Edifecs engine as an HTML documents for workflow. The user could use a mobile device as well.

4. Patient Scheduling - Remote appointment scheduling on the provider calendar system. Payer may have nurse lines, which can make doctor appointments on behalf of the patients and this long and expensive process now

5. Financial Resources – Mapping XML request/response to a X12 transaction to claims system. (Note: There was little support in the workgroups to change this process but it still have value when consolidating systems are required.)
FHIR Use Cases

These are just a few use cases between payer and providers that could benefit from the use of FHIR.

Use Case 1 – Emergency Notifications
(FHIR Track 1: Patient)

Basic Patient Management - Fetching the patient information and population of the data into the EMR system. This includes patient admit / discharge messages with payer sending alert to provider.

Use Case 2 – Eligibility Verification
(FHL7 Track 5: Financial Management)

Financial Resources – Mapping XML request/response to a X12 transaction to claims system. There was little support in the workgroups to change this process but it still have value when consolidating projects are required.

Use Case 3 – Appointments
(FHL7 Track 10: Scheduling Services)

Patient Scheduling - Remote appointment scheduling on the provider calendar system. Payer may have nurse lines, which can make doctor appointments on behalf of the patients and this long and expensive process now

Use Case 4 – Prior Authorization, Eligibility, Attachments
(FHL7 Track 10: SDC)

Structured Data Capture – Prior authorizations, eligibility, and claim attachments requests via FHIR questionnaire forms and submission of those into Edifecs engine as an HTML documents for workflow. The user could use a mobile device as well.
Care Plan Pilot (Partnership)

HL7 C-CDA Care Plan Document DSTU
Proof of Concept Project

“Clear and specific refinements of many clinical standards are needed and will, no doubt, come about because of careful, reality-based evaluations.”

Find a Medicaid Provider (RESTful API)

1. Find a Provider using search (Method Types GET | POST)
   To search for a provider, you can send a GET request to


   with the query parameters. You can combine as many query parameters as you want. By default, the limit of results at a time is 20. You can change that number by sending the limit option. You can search for another batch of results (pagination) by sending the offset parameter. As the result, you get the JSON response with the success parameter set to "true" and the response parameter with providers’ details. If no providers are found, the JSON response has the success parameter set to "false".

2. Find a Provider using NPI Number
   If you know the NPI number of a provider, you can send a GET request to

   https://www.collablynk.com/npi-rest/api/npis/:npi/:token,

   replacing :npi with the NPI number of the provider and :token with the authentication token. If the provider is found, the JSON response is returned with the parameter success set to "true" and the parameter response with the provider’s details. If no providers are found, the JSON response has the parameter success set to "false".

Value:

- Patient lookup of the provider for FHIR appointment scheduling, using free form provider search as part of NPI Service
- Pharmacy search in the geographical area
- Nursing 911 assistance for home care patients
- Provider and specialist referrals
- Patient lookup of the provider for FHIR appointment scheduling, using free form provider search as part of NPI Service
- Pharmacy search in the geographical area
- Nursing 911 assistance for home care patients
- Provider and specialist referrals

The NPI service can be utilized in the following Medicaid scenarios:
Beneficiary Interaction
(FHIR / EDI Transparency)

Achieve payer/provider transparency using FHIR for beneficiary interactions and explanations of benefits and payments.

**Medicaid PATIENT** can use blue button or human-friendly web-based portal to schedule provider visit, and/or confirm Medicaid eligibility/status.

**PROVIDER** see patient and submits claim to CMS.

**CMS** sends payment to **PROVIDER** and EOB to **PATIENT**.

**PATIENT** logs into Blue Button to review EOBs.

**PROVIDER** receives payment from CMS. Logs into PORTAL to see patient claims and bills **PATIENT**.

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**REST FHIR**
- Schedule, Eligibility

**FHIR**
- Server/EMR

**CMS**
- ADJUDICATION

**BLUE BUTTON**
- PATIENT

**PAYER**
- 837, 835

**PCP**
- FHIR RESOURCES

**EDR**
- Claim

**PORTAL**
- REST EOB

**PATIENT**
- REST FHIR

**PROVIDER**
- Dashboard

Scalable WS
- Reduce Calls
- Self-Service
- Research Tool

Shared/Reuse
- Reduce Admin Costs
- Shared Patient Info

Broker FHIR to EDI
- Integrate Current Workflows
- Reduce Costs for Integration

Transparency
- Remove Billing Complexity

Broker EDI to FHIR
- Visibility to CMS
- Broader financial info

Dashboard
- Ability to compare coverage to actual payments.
- By patient/By Provider/etc

FHIR Portal Registration: [https://fhir.collablynk.com/](https://fhir.collablynk.com/)
Blue Button / Care Plan (FHIR / CDA Interoperability Pilot)

Medicaid PATIENT can use blue button or human-friendly web-based search to look up provider address, driving directions, schedule visit, and/or confirm eligibility.

PROVIDER can access FHIR (SDC enabled) portal to view/update patient charts, prior-authorization for a procedure.

PLAN or CARE TEAM could receive patient record, enroll in care program and create / update care plan.

PROVIDER will be notified and receive the care plan via portal or as full document via DIRECT messaging.

Medicaid PATIENT can use blue button or human-friendly web-based search to see updated care plan and instructions on and/or reporting adherence.

Achieve payer/provider care plan interoperability the easy way with Edifecs (FHIR enabled) Smart Trading Solutions

Scalable WS
Reduce Calls
Self-Service
Research Tool

Shared/Reuse
Reduce Admin Costs
Shared Patient Info
More Efficient Care Planning

Broker FHIR to CCD
Integrate Current Workflows
Reduce Costs for Integration

Enable VBC
Early Interventions
Auto Enrollment
Reduce ED admits

Broker CDA to FHIR
Seamless workflow
Care Plan Interoperability

Provider Notify
Recommendations
Patient Treatments
Care Planning

Adherence
Tools to ensure actions
Patient and Provider Transparency

FHIR Portal Registration: https://fhir.collablynk.com/
Successful Pilot Checklist

- Commit with your partner
- Don’t aim too high. Be certain of your use case. Know your ROI
- Take full advantage of the FHIR Community
- Make sure you have at least one technologist that is an expert on REST and OAUTH
- Test extensively with de-identified data/non-PHI
PATHWAYS TO PARTNERSHIPS

Moving Forward (Before the Music Starts)
FHIR Challenges

1. Finding Transparent EMR Partners
2. Emerging Standards and Fear
3. Striving for difficult use cases and justifying ROI
4. Interoperability vs. Governance.
5. Finding Funding & Resources—"you want how much to do what!"
FHIR Current Stage

The Good, the Bad, the Ugly

- FHIR resources are still in various draft stages of balloting by HL7
  - Can be used for early implementations
  - Frequent changes, no backward compatibility is guaranteed
  - Rapidly evolves – lots of new resources to implement business use-cases

- Wide range of test servers
  - Many test servers exist (see below)
  - Test servers vary significantly in maturity
  - Only couple of test servers support very latest and greatest builds of FHIR

- Client-side support
  - Open source code is published by HL7
  - Vendors, including Edifecs

- Did I say it’s FAST?
MHDC Kicking the Can: ONC Grant

ONC is seeking to advance the use of interoperable standards through health IT for the identified priority categories to improve the areas of practice efficiency, clinical quality, cost efficiency, privacy and security, safety, patient engagement, and interoperable exchange. Please see Pages 4 (Project Objectives, Desired Impact and Outcomes) and 10 (Structure and Approach and Project Deliverables and Evaluation) of the Funding Opportunity Announcement for more information.
ONC Grant

Program Objectives, Desired Impact and Outcomes
These Cooperative Agreements focus on addressing interoperability through implementation of Technology Solutions. The Projects funded through this FOA will support increased use of health information technology solutions. Furthermore, the lessons learned, and evidence generated, by these Cooperative Agreements will help advance industry understanding of health IT’s potential.

Key Tasks, Deliverables, and Timeline

Task 1: Project Plan Execution
Task 1 involves the execution of the recipients’ Project Plan, which includes the deployment of the Technology Solution and measurement of the Project. Execution of the Technology Solution may involve collaborators. The Project Plan must reflect, and be consistent with, the Project Budget and must cover the 12-month period of performance. The Project Plan must identify important objectives and deliverables and each major task or action step needed to reach those objectives and deliverables. For each major task or action step, the Project Plan must identify timeframes involved, including start- and end-dates.
Reporting HEDIS measures using FHIR

Leveraging native EMR capability to automate a common industry practice of sharing HEDIS data among providers and payers.
Finding Funding Checklist

- You’re here
- Look to the community (MHDC Forums, NEHEN, MeHI, Mass HIway)
- Incorporate FHIR reporting into value based contracting commitments
- Skunk works and science projects
- Leverage your vendors and anticipated infrastructure/project funding (FHIR is faster, better, cheaper)
A Few Words from Denny Brennan
Then, Q & A
Beyond multi-year honors as one of the fastest-growing healthcare technology companies nationwide, Edifecs has ranked on multiple "best workplace" lists and continues to garner industry recognition for its technology leadership and customers’ success.