HL7 Argonaut Project: One Year Later

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Micky Tripathi, PhD, MPP / President & CEO, Massachusetts eHealth Collaborative / Project Manager, Argonaut Project
Conflict of Interest

Charles Jaffe, MD, PhD

Has no real or apparent conflicts of interest to report.
Conflict of Interest

Micky Tripathi, PhD, MPP

Has no real or apparent conflicts of interest to report.
Agenda

- Overview of the Argonaut Project Phase 3
- Provide example of a FHIR app in use in a provider setting (Geisinger)
- Status of FHIR standard development in 2016 and beyond
- Review HL7 industry collaboration / partners in interoperability
Learning Objectives

• Compare the current state of FHIR development with the Argonaut Project’s initial objectives
• Assess the adoption trajectory of FHIR in the marketplace and federal legislation
• Demonstrate the ways that FHIR has improved interoperability
STEPS™ Value HealthIT

Presentation content ties into:
- E – Electronic Secure Data
- P – Patient Engagement
- S – Savings
Meet the Speakers

• Charles Jaffe, MD, PhD
  HL7 International CEO

• Micky Tripathi, PhD, MPP
  President and Chief Executive Officer, Massachusetts eHealth Collaborative; Project Manager, Argonaut Project
Overview of the Argonaut Project Phase 3
What is the Argonaut Project?

The Argonaut Project is a market-initiated code and documentation sprint to accelerate the market readiness of open industry FHIR-based APIs for patient- and provider-driven interoperability use cases.

It is:
- leveraging the work of other initiatives such as the S&I framework, SMART, and HSPC
- accelerating the maturation of FHIR for the industry
- open to all participants

It is NOT:
- an organization or entity
- competitive with other existing initiatives
- proprietary
Who’s behind the Argonaut Project?

Founding organizations
- athenahealth
- Beth Israel Deaconess Medical Center
- Cerner
- Epic
- Intermountain Health
- Mayo Clinic
- McKesson
- MEDITECH
- Partners Healthcare System
- SMART at Boston Children’s Hospital Informatics Program
- Surescripts
- The Advisory Board Company
- Accenture

• Staff
- Prime contractor – HL7
- FHIR API development: Grahame Grieve, Brett Marquard, Eric Haas
- OAuth security development: Dixie Baker, Josh Mandel
- Implementation and Testing Community: Josh Mandel, Micky Tripathi, Jennifer Monahan
- Micky Tripathi, Jennifer Monahan – Project management
81 Organizations Registered in Argonaut Implementation Community

<table>
<thead>
<tr>
<th>Accenture</th>
<th>GE</th>
<th>Office of National Coordinator (ONC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ActualMeds Corp.</td>
<td>Geisinger</td>
<td>Optum (UnitedHealth Group)</td>
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<tr>
<td>AEGIS.net, Inc.</td>
<td>Hackensack University Medical Center</td>
<td>Orion Health</td>
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<td>Aetna</td>
<td>Health Samurai/Aidbox</td>
<td>OSIA Medical</td>
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<td>Akana</td>
<td>i2b2/Mass General Hospital</td>
<td>Partners Healthcare</td>
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<td>Allscripts</td>
<td>Iconic Systems</td>
<td>Persistent System Ltd</td>
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<td>Infor</td>
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<td>Pokitdok Inc.</td>
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<td>Redox Engine</td>
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<td>Mayo Clinic</td>
<td>Reliant Medical Group</td>
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<td>Care at Hand</td>
<td>McKesson/RelayHealth</td>
<td>RxREVU</td>
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<td>MedicaSoft</td>
<td>Surescripts</td>
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<td>Carolinas HealthCare System</td>
<td>Medicity</td>
<td>The Advisory Board Company</td>
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<td>Cerner</td>
<td>MEDITECH</td>
<td>The Sequoia Project (formerly Healthway)</td>
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<td>CipherHealth</td>
<td>Medivo</td>
<td>Trinity Health</td>
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<td>Clinical Cloud Solutions, LLC</td>
<td>MITRE</td>
<td>UC Santa Cruz</td>
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<td>MobileSmith</td>
<td>UPMC</td>
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<td>ModuleMD</td>
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<td>My Total Health</td>
<td>Vetter Software</td>
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<td>Netsmart</td>
<td>xG Health Solutions</td>
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<tr>
<td>Epic</td>
<td>NextGen/QSI</td>
<td>Xperterra</td>
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</tbody>
</table>

Mix of EHR vendors, providers, app developers, government agencies, and others....
Why do we need the Argonaut Project?

• JASON Task Force (2014) makes a call to action for “public APIs based on FHIR”

• Meaningful Use Stage 2 experience with Direct standard highlights need to prevent inclusion of immature standards in ONC certification

• Leadership initiative by providers and vendors to bring market discipline to standards development process

• Industry initiative to swing the balance of responsibility for nationwide interoperability back to the private sector
What’s wrong with current standards?

Limited
- Document exchange (e.g., CCDA) is too broad, while existing data-level exchange (e.g., HL7 v2, NCPDP) is too narrow
- No nationwide standards to support query-based use cases

Complex
- CCDAs are inefficient and cumbersome
- IHE-based standards are complex

Myopic
- Not based on modern internet standards, protocols, or conventions
- Not scalable

Implication
- Standards and ecosystem don’t support a rich set of use cases
- Cost and complexity of standards are barrier to adoption
- Discourages innovators from outside health care
Why FHIR-based APIs?

• Flexible to document-level and data-level exchange
  – Sometimes individual data elements are important, sometimes entire documents are appropriate

• Based on modern internet conventions
  – RESTful API – same browser-based approach as used by Facebook, google, twitter, etc
  – Infinitely extensible to detailed resources/profiles to meet any use case
  – Supports push and pull use cases

• FHIR isn’t the only way to approach APIs, but it’s the leading candidate
  – Gaining rapid enthusiasm in the health information technology community
  – Supported by an existing health care SDO (HL7)
Examples of FHIR apps in use in a provider setting
Geisinger Health System

- EnrG Rheum is a rheumatology app created by Geisinger and xG Health Solutions, a technology company founded by Geisinger and part of the EnrG suite of interoperable software applications.

- The web-based interoperable SMART container and the corresponding HL7 FHIR interface can exchange information in real-time with any SMART-using FHIR-enabled HER.

- FHIR used to connect the app in real-time to a number of EHRs, including Epic and Cerner.
Geisinger Health System

- EnrG Rheum integrates data streams from patients, doctors and nurses

- The app enables doctors to auto fill the majority of the record and focus on consultation
Additional provider solutions

• Duke Medicine: implemented the FHIR interface in conjunction with Apple's HealthKit

• Other providers and vendors have also recently developed programs to give users access to data across platforms
Why do we need the Argonaut Project to accelerate FHIR?

• Standards development process, by design, values comprehensiveness over speed-to-market

• SDOs not resourced to provide dedicated project management and SME support to implementation-oriented activities
  – Identification of priority use cases to meet market needs
  – Development of well-packaged implementation guides
  – Facilitation of testing and implementation community
  – Coupling with other standards or protocols needed for implementation (e.g., security)
### Argonaut Implementation Guides Based on DAF Profiles

**From US Data Access Framework Implementation Guide**

<table>
<thead>
<tr>
<th>Meaningful Use conceptual data element</th>
<th>DAF profile</th>
<th>FHIR Resource</th>
</tr>
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<tbody>
<tr>
<td>Medication allergies</td>
<td>DAF-AllergyIntolerance</td>
<td>AllergyIntolerance</td>
</tr>
<tr>
<td>Laboratory Order(s)</td>
<td>DAF-DiagnosticOrder</td>
<td>DiagnosticOrder</td>
</tr>
<tr>
<td>Laboratory Test(s)</td>
<td>DAF-DiagnosticReport</td>
<td>DiagnosticReport</td>
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<tr>
<td>Encounter Diagnoses</td>
<td>DAF-Encounter</td>
<td>Encounter</td>
</tr>
<tr>
<td>Family Health History</td>
<td>DAF-FamilyMemberHistory</td>
<td>FamilyMemberHistory</td>
</tr>
<tr>
<td>Immunizations</td>
<td>DAF-Immunization</td>
<td>Immunization</td>
</tr>
<tr>
<td>Laboratory Result Value(s)</td>
<td>DAF-Results</td>
<td>Observation</td>
</tr>
<tr>
<td>Medications</td>
<td>DAF profiles for medications, DAF-Medication, DAF-MedicationStatement, DAF-MedicationAdministration, DAF-MedicationDispense, DAF-MedicationOrder</td>
<td>Medication, MedicationStatement, MedicationAdministration, MedicationDispense, MedicationOrder</td>
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<tr>
<td>Patient name, Sex, Date of Birth, Race, Ethnicity, Preferred Language</td>
<td>DAF-Patient</td>
<td>Patient</td>
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<tr>
<td>Problems</td>
<td>DAF-Condition (Problem)</td>
<td>Condition</td>
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<tr>
<td>Procedures</td>
<td>DAF-Procedure</td>
<td>Procedure</td>
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<tr>
<td>Smoking status</td>
<td>DAF-SmokingStatus</td>
<td>Observation</td>
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<tr>
<td>Vital Signs (Height, weight, BP, BMI)</td>
<td>DAF-VitalSigns</td>
<td>Observation</td>
</tr>
<tr>
<td>MedicationAllergies list, Problem list, Medication List, Immunizations, Encounters, Laboratory Result Values, Procedure List</td>
<td>DAF List (DAF-AllergyList, DAF-ProblemList, DAF-MedicationList, DAF-ImmunizationList, DAF-EncounterList, DAF-ResultsList, DAF-ProcedureList)</td>
<td>List</td>
</tr>
<tr>
<td>DAF Supporting Profiles:DAF-Organization, DAF-Location, DAF-Practitioner, DAF-Substance, DAF-RelatedPerson, DAF-Specimen</td>
<td></td>
<td>Organization, Location, Practitioner, Substance, RelatedPerson,Specimen</td>
</tr>
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</table>
What will the Argonaut Project produce?

**FHIR RESTful API Implementation Guides**
- Data element query of the Common MU Dataset
- Document (CCDA) query
- Provider directory query

**OAuth/OIDC Implementation Guides**
- Single-sign on to enterprise-approved applications
- Federated authorization with other enterprises

FHIR Implementation Guides map to FHIR DSTU 2
OAuth/OIDC Implementation Guides currently being developed outside of HL7 but will eventually be incorporated in HL7 balloting process
What will Argonaut Implementation Guides allow people to do?

2015 Edition Common Clinical Data Set

- **Within enterprise:**
  - Patient or Provider uses authorized hosted or mobile application to query for data or documents from a single enterprise EHR

- **Cross enterprise:**
  - Provider uses hosted or mobile application to query for data or documents from EHRs in other enterprises

<table>
<thead>
<tr>
<th>Patient name</th>
<th>Sex</th>
<th>Date of birth</th>
<th>Race</th>
<th>Ethnicity</th>
<th>Preferred language</th>
<th>Smoking status</th>
<th>Problems</th>
<th>Medications</th>
<th>Medication allergies</th>
<th>Laboratory tests</th>
<th>Laboratory results</th>
<th>Vital signs</th>
<th>Procedures</th>
<th>Care team members</th>
<th>Immunizations</th>
<th>Unique Device identifiers</th>
<th>Assessment and Plan of Treatment</th>
<th>Goals</th>
<th>Health concerns</th>
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</thead>
</table>
What will Argonaut Implementation Guides allow people to do? (continued)

**Within enterprise**

- Health care organization A
  - Authenticate user
  - Launch app
  - Hosted application
    - Register app
    - Authorize app
  - Authorization server
- Mobile application
  - Access data & documents

**Cross-enterprise**

- Health care organization B
  - Authenticate user
  - Authorization server
  - FHIR resource server
  - Access data & documents
- Hosted application
  - Access data & documents
- FHIR resource server
  - Access data & documents

- Enterprise
  - Authenticate enterprise
  - Authenticate federated user identity across enterprises
  - Authorize app for access scope
# Implementation Sprints Testing

## CCDS Elements

<table>
<thead>
<tr>
<th>Dates</th>
<th>Server Sprint</th>
<th>Client Sprint</th>
<th>Checkin Meetings (all times America/New_York)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aug 6th - 21st</td>
<td>Sprint 1 <em>(Patient search &amp; read)</em></td>
<td>Sprint 1</td>
<td>Aug 21st 3-4:30pm</td>
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<tr>
<td>Aug 24th - Sep 9th</td>
<td>Sprint 2 <em>(Authorization with OAuth2)</em></td>
<td>Sprint 2</td>
<td>Sept 9th 4-5:30pm</td>
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<tr>
<td>Sep 16th - Oct 23rd</td>
<td>Sprint 3 <em>(Search for document)</em></td>
<td>Sprint 2</td>
<td>Oct 23rd 3:30-5pm</td>
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<td>DSTU2 Cutover</td>
<td></td>
<td></td>
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<tr>
<td>Nov 11th-Dec 2nd</td>
<td>Sprint 4 <em>(Medications, EHR launch with context)</em></td>
<td>Sprint 3</td>
<td>Nov 6th 3:30-5pm</td>
</tr>
<tr>
<td>Dec 2nd - Dec 22nd</td>
<td>Sprint 5 <em>(Problems, Allergies, App integration)</em></td>
<td>Sprint 4</td>
<td>Nov 30th 1:30-3pm</td>
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<tr>
<td>Dec 22nd - Feb 5th</td>
<td>Sprint 6 <em>(Quantitative labs, Refresh tokens)</em></td>
<td>Sprint 5</td>
<td>Feb 5th 12-1:00pm</td>
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<tr>
<td>Feb 5th - Feb 24th</td>
<td>Sprint 7 <em>(Vital signs, smoking status)</em></td>
<td>Sprint 6</td>
<td>Feb 24th 2-3:00pm</td>
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<tr>
<td>HIMSS Feb 29th - Mar 4th</td>
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<tr>
<td>Feb 24th - Mar 18th</td>
<td>Sprint 8 <em>(Immunizations)</em></td>
<td>Sprint 7</td>
<td>Mar 18th 1-2:00pm</td>
</tr>
<tr>
<td>Mar 18th - April 1st</td>
<td>Sprint 9 <em>(UDI)</em></td>
<td>Sprint 8</td>
<td>April 1st 3-4:00pm</td>
</tr>
</tbody>
</table>

[https://github.com/argonautproject/implementation-program/wiki](https://github.com/argonautproject/implementation-program/wiki)
Hitting the Peak of the Hype Cycle

Source: KLAS
Delivering on the FHIR Promise

- FHIR development is much easier than existing standards -- sprint cycles in the Argonaut Project have shown a massive reduction in development cycle (from 3 – 5 months to 2 – 3 weeks)

- Foundational work has been laid, but still much work to do before FHIR is ready for prime-time
  - Aligning search parameters and expectations
  - How much detail needs to be specified as structured data versus “human interpretable”?

- Rapidly increasing market demand for Argonaut deliverables to align FHIR development activities as soon as possible
  - Provider directories
  - Precision Medicine and Sync for Science
  - ONC calls to action for patient-designated applications
Delivering on the FHIR Promise (cont.)

Market ecosystem needs to develop to support FHIR-based interoperability

- Terms and conditions of “open APIs”
- Contracting
- Intellectual property
- Safety

With highly fragmented market, unclear at present what scalable models will emerge and survive:

- SMART
- EHR vendor-mediated
- Industry consortium (CommonWell, HSPC, Carequality, EHRA, Argonaut, other)
- SDOs and standards facilitation organizations (HL7, IHE)
- Federal government (ONC, CMS, DoD, other)
- Other new initiative?
Argonaut Project: What’s next?

• Publication of Argonaut FHIR and OAuth2 Implementation Guides to support 2015 Edition Certification API requirement
  – Working with ONC to streamline certification process for those implementing Argonaut profiles

• Publication of Argonaut FHIR Provider Directory Implementation Guide
  – Urgent need due to overwhelming market rejection of HPD

• Continued cultivation and growth of Implementation Program
Links to Argonaut Deliverables

- **Argonaut FHIR API deliverables**
  - Argonaut FHIR Data Access Implementation Guide:  
  - Argonaut FHIR Document Access Implementation Guide:  
  - Argonaut FHIR Provider Directory Implementation Guide:  

- **Argonaut OAuth deliverables**
  - *Use Cases Description*, Version 1.1 available at  
    [http://argonautwiki.hl7.org/images/e/ec/Argonaut_UseCasesV1-1.pdf](http://argonautwiki.hl7.org/images/e/ec/Argonaut_UseCasesV1-1.pdf)
  - *Application Authorization Profile* available at  
    [http://docs.smarthealthit.org/authorization/](http://docs.smarthealthit.org/authorization/)
  - *Cross-Organizational Authorization Profile* available at  
  - DRAFT *Risk Assessment Update*
    - Updates Risk Assessment through Phase 2
    - Available for review on Argonaut Auth: SMART on FHIR Google Drive  
      ([https://drive.google.com/open?id=0B8NVHvNTY_HUXp2NzRfX2tjbjA](https://drive.google.com/open?id=0B8NVHvNTY_HUXp2NzRfX2tjbjA))

- **Argonaut Implementation Program**
  - [https://github.com/argonautproject/implementation-program/wiki](https://github.com/argonautproject/implementation-program/wiki)
All Providers and Vendors are Welcome to Join the Argonaut Project!

www.argonautproject.org

• HL7 CEO: Charles Jaffe (cjaffe@hl7.org)
• Project management: Micky Tripathi (mtripathi@maehc.org), Jennifer Monahan (jmonahan@maehc.org)
• FHIR Technical Expert: Graham Grieve (grahame@healthintersections.com.au)
• FHIR/OAuth Technical Expert: Josh Mandel (jmandel@gmail.com)
HL7 Vision:
A world in which everyone can securely access and use the right health data when and where they need it.

HL7 FHIR developed in support of that vision

Argonaut Project Phase 3
OAuth security projects are examples
Status of FHIR standard development in 2016 & beyond
Update on FHIR standard development

- September 2015: Release 2 of standard for Trial Use
- January 2016: HL7 announced hire of Grahame Grieve as HL7 FHIR Product Director
- Continue work from Argonaut Project
- Updates on May ballot and FHIR governance
Review industry collaboration efforts in support of interoperability
HL7 Industry Collaborations

• Partners in Interoperability

• FHIR Foundation
HL7, HL7 FHIR and the Argonaut Project:
- Primary goal is to support the value of step E
- Real world-applications of the FHIR standard show value that supports steps P and S
Questions

• Speaker contact information:
  Charles Jaffe, MD, PhD
  Email: cjaffe@HL7.org
  Twitter: @HL7

  Micky Tripathi, PhD, MPP
  Email: mtripathi@maehc.org
  Twitter: @MAeHC_org

• Online resources:
  HL7 website: www.HL7.org
  Argonaut Project website: argonautproject.org
  FHIR resources: www.HL7.org/FHIR
  SMART on FHIR: smarthealthit.org