The Argonaut Project:
Accelerating the Next Generation of Interoperability

March 2017
Agenda

Why do we need the Argonaut Project?

Who’s behind it and what do we want to do?

What have we done?

What’s next for the Argonaut Project?
What is the Argonaut Project?

The Argonaut Project is an implementation community comprising leading technology vendors and provider organizations to accelerate the use of FHIR and OAuth in health care information exchange.

We are:
- Private sector initiated and funded
- Working collaboratively with other FHIR initiatives such as SMART-on-FHIR, the Health Systems Platform Consortium, and the FHIR Foundation
- Creating open industry Implementation Guides in high priority use cases of importance to patients, providers and the industry as a whole

We are NOT:
- A standards development activity
- A separate legal entity
- A proprietary activity
## Who’s Behind the Argonaut Project?

<table>
<thead>
<tr>
<th>Technology Vendors</th>
<th>Provider Organizations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accenture</td>
<td>Beth Israel Deaconess Medical Center</td>
</tr>
<tr>
<td>Athenahealth</td>
<td>Intermountain Health</td>
</tr>
<tr>
<td>Cerner</td>
<td>Mayo Clinic</td>
</tr>
<tr>
<td>Epic</td>
<td>Partners Healthcare</td>
</tr>
<tr>
<td>McKesson</td>
<td>SMART at Boston Children’s Hospital</td>
</tr>
<tr>
<td>MEDITECH</td>
<td></td>
</tr>
<tr>
<td>Surescripts</td>
<td></td>
</tr>
<tr>
<td>The Advisory Board Company</td>
<td></td>
</tr>
</tbody>
</table>

**Staff (current and past)**
- Prime contractor: HL7
- FHIR initiatives: Grahame Grieve, Josh Mandel, Brett Marquard, Eric Haas
- OAuth initiatives: Dixie Baker, Josh Mandel
- Project Management: Micky Tripathi, Jennifer Monahan
### 81 Organizations Registered in Argonaut Implementation Community

<table>
<thead>
<tr>
<th>Organization Name</th>
<th>Sub-Organization</th>
<th>Organization Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accenture</td>
<td>GE</td>
<td>Office of National Coordinator (ONC)</td>
</tr>
<tr>
<td>ActualMeds Corp.</td>
<td>Geisinger</td>
<td>Optum (UnitedHealth Group)</td>
</tr>
<tr>
<td>AEGIS.net,Inc.</td>
<td>Hackensack University Medical Center</td>
<td>Orion Health</td>
</tr>
<tr>
<td>Aetna</td>
<td>Health Samurai/Aidbox</td>
<td>OSIA Medical</td>
</tr>
<tr>
<td>Akana</td>
<td>i2b2/Mass General Hospital</td>
<td>Partners Healthcare</td>
</tr>
<tr>
<td>Allscripts</td>
<td>Iconic Systems</td>
<td>Persistent System Ltd</td>
</tr>
<tr>
<td>American Medical Association</td>
<td>Infor</td>
<td>Personal Medicine Plus</td>
</tr>
<tr>
<td>Amida Technology Solutions</td>
<td>Inpriva</td>
<td>Pokitdok Inc.</td>
</tr>
<tr>
<td>Apigee</td>
<td>Intermountain Healthcare</td>
<td>Practice Fusion</td>
</tr>
<tr>
<td>Applied Informatics</td>
<td>InterSystems Corporation</td>
<td>Premier Inc</td>
</tr>
<tr>
<td>athenahealth</td>
<td>KaiRx</td>
<td>Qvera</td>
</tr>
<tr>
<td>Bespoke Systems</td>
<td>Mana Health</td>
<td>Redox Engine</td>
</tr>
<tr>
<td>BIDMC</td>
<td>Mayo Clinic</td>
<td>Reliant Medical Group</td>
</tr>
<tr>
<td>Care at Hand</td>
<td>McKesson/RelayHealth</td>
<td>RxREVU</td>
</tr>
<tr>
<td>Carebox</td>
<td>Medfusion</td>
<td>SMART Health IT</td>
</tr>
<tr>
<td>Carefluence</td>
<td>MedicaSoft</td>
<td>Surescripts</td>
</tr>
<tr>
<td>Carolinas HealthCare System</td>
<td>Medicity</td>
<td>The Advisory Board Company</td>
</tr>
<tr>
<td>Cerner</td>
<td>MEDITECH</td>
<td>The Sequoia Project (formerly Healtheway)</td>
</tr>
<tr>
<td>CipherHealth</td>
<td>Medivo</td>
<td>Trinity Health</td>
</tr>
<tr>
<td>Clinical Cloud Solutions, LLC</td>
<td>MITRE</td>
<td>UC Santa Cruz</td>
</tr>
<tr>
<td>Commerce Kitchen</td>
<td>MobileSmith</td>
<td>UPMC</td>
</tr>
<tr>
<td>DoD/VA</td>
<td>ModuleMD</td>
<td>US Postal Service</td>
</tr>
<tr>
<td>Duke Medicine</td>
<td>My Total Health</td>
<td>Vetter Software</td>
</tr>
<tr>
<td>eClinicalWorks</td>
<td>NavHealth</td>
<td>VigiLanz Corporation</td>
</tr>
<tr>
<td>Eligible</td>
<td>NaviNet</td>
<td>VSee</td>
</tr>
<tr>
<td>EMR Direct</td>
<td>Netsmart</td>
<td>xG Health Solutions</td>
</tr>
<tr>
<td>Epic</td>
<td>NextGen/QSI</td>
<td>Xperterra</td>
</tr>
</tbody>
</table>
Why do we need the Argonaut Project to accelerate FHIR?

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

Market input is needed to make standards relevant and usable

• 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)

Implementers need to have greater input (i.e., deeper, earlier) into standards development

Need to get as much collaboration as early as possible in the cycle to head off problems of heterogeneous implementations down the road
STU2 Data and Document Access Implementation Guide Released!

- Access to individual data elements of Common Clinical Data Set
- Access to structured document (CCD) containing all Common Clinical Data Set elements
- Leverage OAuth2-based security and authorization

http://www.fhir.org/guides/argonaut/r2/
## 2015 Edition
Common Clinical Data Set

### Clinical
- AllergyIntolerance
- Condition (Problem)
- Procedure
- ClinicalImpression
- FamilyMemberHistory
- RiskAssessment
- DetectedIssue
- CarePlan
- Goal
- ReferralRequest
- ProcedureRequest
- NutritionOrder
- VisionPrescription
- Medication
- MedicationOrder
- MedicationAdministration
- MedicationDispense
- MedicationStatement
- Immunization
- ImmunizationRecommendation
- Observation
- DiagnosticReport
- DiagnosticOrder
- Specimen
- BodySite
- ImagingStudy
- ImagingObjectSelection

### Identification
- Patient
- Practitioner
- RelatedPerson
- Organization
- HealthcareService
- Group
- Location
- Substance
- Person
- Contract
- Device
- DeviceComponent
- DeviceMetric

### Workflow
- Encounter
- EpisodeOfCare
- Communication
- Flag
- Appointment
- AppointmentResponse
- Schedule
- Slot
- Order
- OrderResponse
- CommunicationRequest
- DeviceUseRequest
- DeviceUseStatement
- ProcessRequest
- ProcessResponse
- SupplyRequest
- SupplyDelivery

### Infrastructure
- Questionnaire
- QuestionnaireResponse
- Provenance
- AuditEvent
- Composition
- DocumentManifest
- DocumentReference
- List
- Media
- Binary
- Bundle
- Basic
- MessageHeader
- OperationOutcome
- Parameters
- Subscription

### Conformance
- ValueSet
- ConceptMap
- NamingSystem
- StructureDefinition
- DataElement
- Conformance
- OperationDefinition
- SearchParameter
- ImplementationGuide
- TestScript

### Financial
- Coverage
- EligibilityRequest
- EligibilityResponse
- EnrollmentRequest
- EnrollmentResponse
- Claim
- ClaimResponse
- PaymentNotice
- PaymentReconciliation
- ExplanationOfBenefit

### Patient name
- Sex
- Date of birth
- Race
- Ethnicity
- Preferred language
- Smoking status

### Problems
- Medications
- Medication allergies
- Laboratory tests
- Laboratory results
- Vital signs

### Procedures
- Care team members
- Immunizations
- Unique Device identifiers

### Assessment and Plan of Treatment
- Goals
- Health concerns

### 93 FHIR DSTU2 Resources (17 Argonaut CCDS Resources in red)

### Argonaut Focusing on FHIR Resources Supporting CCDS

---

**2015 Edition**

**Common Clinical Data Set**

<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>
</tr>
</thead>
</table>

**Clinical**
- AllergyIntolerance
- Condition (Problem)
- Procedure
- ClinicalImpression
- FamilyMemberHistory
- RiskAssessment
- DetectedIssue
- CarePlan
- Goal
- ReferralRequest
- ProcedureRequest
- NutritionOrder
- VisionPrescription
- Medication
- MedicationOrder
- MedicationAdministration
- MedicationDispense
- MedicationStatement
- Immunization
- ImmunizationRecommendation
- Observation
- DiagnosticReport
- DiagnosticOrder
- Specimen
- BodySite
- ImagingStudy
- ImagingObjectSelection

**Identification**
- Patient
- Practitioner
- RelatedPerson
- Organization
- HealthcareService
- Group
- Location
- Substance
- Person
- Contract
- Device
- DeviceComponent
- DeviceMetric

**Workflow**
- Encounter
- EpisodeOfCare
- Communication
- Flag
- Appointment
- AppointmentResponse
- Schedule
- Slot
- Order
- OrderResponse
- CommunicationRequest
- DeviceUseRequest
- DeviceUseStatement
- ProcessRequest
- ProcessResponse
- SupplyRequest
- SupplyDelivery

**Infrastructure**
- Questionnaire
- QuestionnaireResponse
- Provenance
- AuditEvent
- Composition
- DocumentManifest
- DocumentReference
- List
- Media
- Binary
- Bundle
- Basic
- MessageHeader
- OperationOutcome
- Parameters
- Subscription

**Conformance**
- ValueSet
- ConceptMap
- NamingSystem
- StructureDefinition
- DataElement
- Conformance
- OperationDefinition
- SearchParameter
- ImplementationGuide
- TestScript

**Financial**
- Coverage
- EligibilityRequest
- EligibilityResponse
- EnrollmentRequest
- EnrollmentResponse
- Claim
- ClaimResponse
- PaymentNotice
- PaymentReconciliation
- ExplanationOfBenefit

---

**93 FHIR DSTU2 Resources (17 Argonaut CCDS Resources in red)**

**Argonaut Focusing on FHIR Resources Supporting CCDS**

---

2015 Edition
Common Clinical Data Set

### Clinical
- AllergyIntolerance
- Condition (Problem)
- Procedure
- ClinicalImpression
- FamilyMemberHistory
- RiskAssessment
- DetectedIssue
- CarePlan
- Goal
- ReferralRequest
- ProcedureRequest
- NutritionOrder
- VisionPrescription
- Medication
- MedicationOrder
- MedicationAdministration
- MedicationDispense
- MedicationStatement
- Immunization
- ImmunizationRecommendation
- Observation
- DiagnosticReport
- DiagnosticOrder
- Specimen
- BodySite
- ImagingStudy
- ImagingObjectSelection

### Identification
- Patient
- Practitioner
- RelatedPerson
- Organization
- HealthcareService
- Group
- Location
- Substance
- Person
- Contract
- Device
- DeviceComponent
- DeviceMetric

### Workflow
- Encounter
- EpisodeOfCare
- Communication
- Flag
- Appointment
- AppointmentResponse
- Schedule
- Slot
- Order
- OrderResponse
- CommunicationRequest
- DeviceUseRequest
- DeviceUseStatement
- ProcessRequest
- ProcessResponse
- SupplyRequest
- SupplyDelivery

### Infrastructure
- Questionnaire
- QuestionnaireResponse
- Provenance
- AuditEvent
- Composition
- DocumentManifest
- DocumentReference
- List
- Media
- Binary
- Bundle
- Basic
- MessageHeader
- OperationOutcome
- Parameters
- Subscription

### Conformance
- ValueSet
- ConceptMap
- NamingSystem
- StructureDefinition
- DataElement
- Conformance
- OperationDefinition
- SearchParameter
- ImplementationGuide
- TestScript

### Financial
- Coverage
- EligibilityRequest
- EligibilityResponse
- EnrollmentRequest
- EnrollmentResponse
- Claim
- ClaimResponse
- PaymentNotice
- PaymentReconciliation
- ExplanationOfBenefit
### Setting Practical Constraints on Server-Client Interactions

<table>
<thead>
<tr>
<th>What search criteria can you use?</th>
<th>What type of data will you get in response?</th>
<th>How will that data be represented?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Search operations</td>
<td>Scope of response</td>
<td>Content of response</td>
</tr>
<tr>
<td>Examples:</td>
<td>Examples:</td>
<td>Examples:</td>
</tr>
</tbody>
</table>
| • Can search for individual patient by identifier (e.g., MRN) OR full name & gender OR full name & birthdate | • Search for patient will get all FHIR patient resources  
• Search for Procedures will get all current and historical procedures or within specified date range | • Patient search will get name, identifier, gender, birthdate, birth sex, REL  
• Procedures search will get type of procedure, date performed, and procedure status  
• In some cases created Argonaut extensions and value sets |
# Argonaut Implementation Guides In a Nutshell

<table>
<thead>
<tr>
<th>Query</th>
<th>Supported searches</th>
<th>Scope of response</th>
<th>Content of response</th>
</tr>
</thead>
</table>
| Patient                    | Identifier (e.g., MRN) OR (Full name + gender OR Full name + birthdate)            | FHIR patient resources                                                            | • Name  
• Patient identifier  
• Gender  
• Birthdate  
• Birth sex  
• Race, ethnicity, language                                                                 |
| Allergies                  | Patient OR Patient + Date                                                           | All allergies                                                                      | • Type of allergy  
• Allergy status                                                                 |
| Assessment and Plan of Treatment | Patient OR Patient + Category OR Patient + Status OR Patient + Specified date range | All Assessment and Plan of Treatment information                                    | • Care plan category (Argonaut extensions)  
• Care plan status  
• Narrative summary                                                                 |
| Care Team                  | Patient OR Patient + Category OR Patient + Status                                    | All current Care Team members                                                      | • Care plan category (Argonaut extensions)  
• Care plan status  
• Care team members  
• Care team provider roles                                                                 |
| Goals                      | Patient OR Patient + Specified date range                                          | All patient goals                                                                  | • Narrative description of goals  
• Goals status                                                                 |
| Immunizations              | Patient                                                                            | All immunizations                                                                  | • Immunization status (Argonaut valueset)  
• Date of administration  
• Type of vaccine  
• Indicator of vaccine given or reported                                                                 |
| Medications (statements)   | Patient                                                                            | All medications                                                                    | • Medication  
• Medication status  
• Date or date range                                                                 |
| Medications (order)        | Patient                                                                            | All medication orders                                                              | • Medication  
• Order date  
• Order status  
• Prescriber                                                                 |
<table>
<thead>
<tr>
<th>Query</th>
<th>Supported search operations</th>
<th>Scope of response</th>
<th>Content of response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory results (diagnostic reports)</td>
<td>Patient OR Patient + Diagnostic Report Code(s) OR Patient + Specified date range</td>
<td>All diagnostic reports</td>
<td>• Laboratory code (LOINC) • Result • Status • Time of measurement • Time of report • Source of report</td>
</tr>
<tr>
<td>Laboratory results (observations)</td>
<td>Patient OR Patient + Laboratory Code(s) OR Patient + Specified date range</td>
<td>All observations</td>
<td>• Laboratory code (LOINC) • Result value • Status • Time of measurement • Reference range</td>
</tr>
<tr>
<td>Problems and Health Concerns</td>
<td>Patient</td>
<td>All problems and health concerns, current and historical</td>
<td>• Problem or health concern code • Problem or health concern category code (Argonaut extension) • Problem or health concern status • Verification status</td>
</tr>
<tr>
<td>Procedures</td>
<td>Patient OR Patient + Specified date range</td>
<td>All procedures, current and historical</td>
<td>• Type of procedure • Date performed • Procedure status</td>
</tr>
<tr>
<td>Smoking status</td>
<td>Patient</td>
<td>Smoking status</td>
<td>• Smoking observation status • Result value code (LOINC) • Date recorded • Smoking status</td>
</tr>
<tr>
<td>Vital signs</td>
<td>Patient OR Patient + Specified date range</td>
<td>All vitals</td>
<td>• Type of measurement (Argonaut value set) • Time of measurement • Result value (Argonaut value set) • Observation status</td>
</tr>
<tr>
<td>Implantable devices</td>
<td>Patient</td>
<td>All UDIs for a patient’s implantable devices</td>
<td>• Human readable form of barcode string • Type of device</td>
</tr>
</tbody>
</table>
## Argonaut Implementation Guides In a Nutshell (continued)

<table>
<thead>
<tr>
<th>Query</th>
<th>Supported search operations</th>
<th>Scope of response</th>
<th>Content of response</th>
</tr>
</thead>
</table>
| Provider Directory | Practitioner  
OR Practitioner + Specialty  
OR Practitioner + Location (WIP)  
OR Organization Identifier  
OR Organization Name  
OR Organization Address  
OR Endpoint identifier  
OR Endpoint name | All practitioner, organization, and endpoint information | • Practitioner name  
• Practitioner Identifier  
• Practitioner Role and organization  
• Practitioner Qualifications  
• Organization name  
• Organization identifier  
• Organization status  
• Organization contact  
• Organization physical address  
• Organization endpoint address  
• Endpoint name  
• Endpoint status  
• Endpoint organization  
• Endpoint channel type  
• Endpoint address |
| Document          | Document  
OR Patient | All documents for a patient | • Patient  
• Document HTTPS address  
• Document type  
• Document format  
• Document reference date  
• Status  
• Document identifier |
What will Argonaut Implementation Guides allow people to do?

**Within enterprise**
- health care organization A
  - authenticate user
  - launch app
  - register app
  - authorize app

**Cross-enterprise**
- health care organization B
  - authenticate user
  - authenticate enterprise
  - authenticate federated user identity across enterprises
  - authorize app for access scope

Access data & documents

Diagram shows:
- Mobile application
- Authorization server
- FHIR resource server
- Hosted application

Process:
- User authenticates
- Launches app
- Registers/approves
- Accesses data/documents

Enterprise B details:
- Access data/documents
- Federated user identity
Who’s using the Argonaut Project Implementation Guides

The following Argonaut founders are basing their FHIR APIs on the Argonaut Implementation Guides:

• Accenture
• athenahealth
• Cerner
• Epic
• MEDITECH
• Surescripts
• The Advisory Board Company

The following nationwide health information networks are implementing Argonaut specifications:

• Carequality – have already implemented a preliminary version of the upcoming Argonaut Project Provider Directory Implementation Guide
• CommonWell Health Alliance – are building FHIR into their core services using the Argonaut Implementation Guides for Data & Document Access and Provider Directory
Argonaut Project: 2017 Plan

1. Publication of Provider Directory Implementation Guide based on FHIR STU3

2. Scheduling
   • Appointments request – request for appointment
   • Appointment response – reply to an appointment request
   • Slots – blocks of time available for booking appointments

3. Enhancing integration of EHRs and Apps (in collaboration with CDS Hooks Project)
   • Integration of an external app into an EHR workflow
   • Validation of security model for integration of external apps with EHRs
FHIR Technical Experts:  Brett Marquard (brett@riverrockassociates.com), Eric Haas (ehaas@healthedatainc.com), Graham Grieve (grahame@healthintersections.com.au)

Project management:  Micky Tripathi (mtripathi@maehc.org), Jennifer Monahan (jmonahan@maehc.org)

www.argonautproject.org