Argonaut Project Implementation Program

February 25, 2015

Welcome to the Argonaut Project!

"Jason and his Greek gang of half gods and magical men made numerous bad decisions on their quest for the golden fleece…..

They also completed their fantastic mission while vanquishing monsters and employing quick wittedness as well as making important friends…."

–   from *Jason and the Quest for the Golden Fleece* by Anya Leonard

Agenda

- **Argonaut Project background and overview**

- **FHIR development**

- **Security development**

- **Implementation Program**

Origins

Argonaut Project is a focused, market-driven code and documentation sprint

Its origins lie in:

- JASON Task Force recommendations on market-based interoperability governance and coordination, and call to action on "public APIs"
- Market experience with MU 2 and associated certification
- HL7 request for resources to support FHIR DSTU2 in early summer

Small group of vendors and providers founded the effort with funds for:

- Funding for technical expertise and project management
- General support to HL7 for DSTU2 development
- Focused support for narrower focus profiles and implementation guides
- Support for implementation program for market testing/adoption

Argonaut Project welcomes all participants!

Argonaut Project: Origins and Purpose

There are three main motivations for this initiative

- Advance the recommendations of the JASON Task Force
- Support and accelerate development of market-ready, FHIR-based standards
- Spark industry leadership of the future of interoperability

Specifically, we would like to develop a first-generation FHIR-based API and Core Data Services specification and package it to support more rapid market adoption

- Support foundational FHIR work already underway at HL7
- Accelerate and focus work on more specific FHIR profiles and documentation
- Accelerate and focus accompanying security specifications and documentation

The Argonaut Project is simply pooling resources for a code and documentation sprint, the products of which will be openly available to the market

- Argonaut is not an organization or an entity – it is a time-limited project
- Argonaut does not intend to replace or compete with any existing initiatives – it will leverage and integrate relevant work already being done by other initiatives
- The products of Argonaut will be open standards and documentation available to all

Argonaut Structure

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
- The Advisory Board Company

Staff

- HL7 – prime contractor
- Grahame Grieve – FHIR API development
- Dixie Baker – OAuth Security development
- Micky Tripathi, Jennifer Monahan – Project management

Argonaut Scope

The Argonaut Project is refining and packaging specifications and implementation guides for:

- FHIR RESTful API for data element query of the Common MU Data Set

- FHIR RESTful API for document-level query of static documents (such as CCDA)

- SMART on FHIR OAuth2 security profile for authorization of enterprise-approved applications to retrieve health data

- SMART on FHIR OpenID Connect profile for single sign-on to enterprise-approved applications

Ultimate goal is to broaden the OAuth2 use cases to include authorizations for accesses that cross organizational boundaries, but the current use cases focus on simpler scenarios involving the use of hosted and mobile apps to access resources within a single organization. Specifically:

- Hosted applications that enable a patient to access her own EHR data

- Mobile apps that enable a patient to access her own EHR data

- Hosted applications that enable a clinician to access data within a single EHR

- Mobile apps that enable a clinician to access data within a single EHR

Stewardship

- The FHIR Data Query Profile and FHIR Document Query Profile and accompanying Implementation Guides will be included as an informative ballot mapped to the general FHIR DSTU R2

- The Security Implementation Guide will eventually be incorporated in the HL7 balloting process but for this project will be developed in parallel to accompany the FHIR Data Query and Document Query Profiles and Implementation Guides

High-Level Timelines

Workstream	Months					
	Dec	Jan	Feb	Mar	Apr	May
Project Initiation and Setup						
Finalize program structure, process, contracts	▭					
FHIR Team						
Team Kickoff	▲					
January FHIR Connectathon (San Antonio)		▲				
FHIR Data Query and Document Query Profiles available to HL7 community				▲		
FHIR Profiles and Implementation Guides included in informative ballots					▲	
FHIR DSTU R2 ballot						▲
FHIR Data Query and Document Query Profiles and Implementation Guides finalized, packaged, and made available to market						▲
Security Team						
Team Kickoff	▲					
Complete review and update of SMART Implementation Guide					▲	
Security Implementation Guide finalized, packaged, and made available to market						▲

Alignment with Federal Certification

The health care delivery and health care information technology markets are rapidly evolving, and so too will the balance of public versus private roles in driving interoperability

- Ultimately, we hope that successful and rapid adoption would preclude the need for further federal government intervention in interoperability standards.

- We also believe that a premature certification requirement might have an adverse effect on the development and adoption of this important work.

FHIR-based standards are not mature enough for inclusion in 2015 Edition Certification

If ONC does include FHIR-based APIs in federal certification, Argonaut timing would support the following glide path which provides a market signal in 2015 of anticipated inclusion of certification in 2016

- <u>2015 Edition Certification</u>

  - Include in Preamble, reference to the FHIR Data Query and Document Query Profiles, Resource Definitions, and Security Implementation Guides, with indication that these will be included in future Edition Certification

- <u>MU Stage 3 2015 CEHRT</u>

  - Include in Preamble, reference to the FHIR Data Query and Document Query Profiles and Security Implementation Guides, with indication that these will be included in future Edition CEHRT

- <u>Future Certification</u>

  - Include as per recommendation of HITSC based on standards maturity model

- <u>Future CEHRT</u>

  - Include as per recommendation of HITSC based on standards maturity model

Argonaut Current and Future Scope

Current scope: "within" enterprise
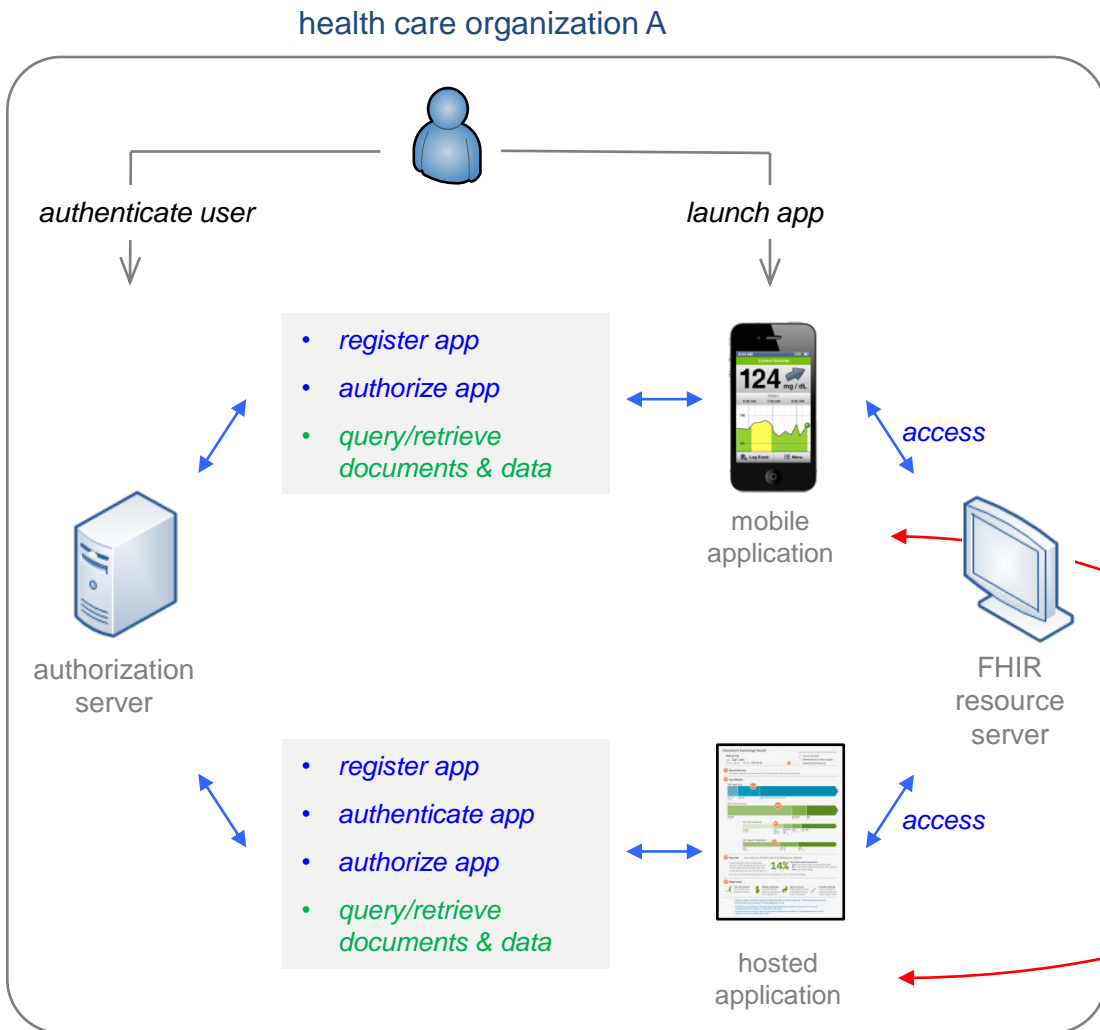
Future scope: cross-enterprise
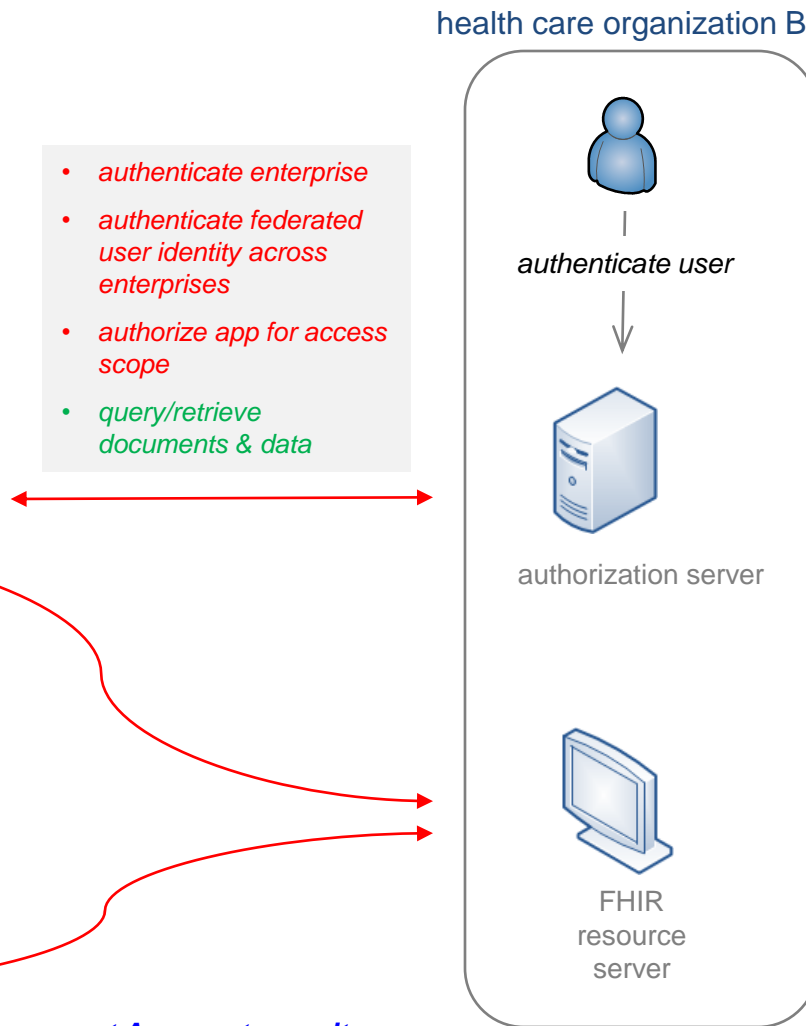
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Project Argonaut FHIR API Scope

To deliver, for May ballot, a US Realm Implementation Guides mapped to FHIR DSTU 2 Profiles for the following:

- FHIR Data Query Profiles. A set of FHIR Resources and accompanying profiles that enables query/response of the discrete data elements contained in the meaningful use common data element set (starting point: DAF Data Element definitions)

- FHIR Document Query Profile. A FHIR resource and profile that enables query/response of IHE X* metadata resources, and specifically, transition of care and patient summary CCDAs

Supporting the general HL7 FHIR effort, and accelerating availability of a discrete subset

FHIR DSTU1 no formal relationship to CCDA

- Narrower scope than CCDA

- No investment in alignment with CCDA

- No formal or informal migration strategy

Publish the FHIR DSTU 2

- Ballot cycle (Draft for Comment open, DSTU 2 in May)

- QA improvements to ensure overall quality of specification

- *CCDA mapping - ensure meaningful use and CCDA requirements OK*

Publish Argonaut Profiles:

- *Develop Candidate Data based & Document based Query Profile*

- *Solicit & process detailed feedback based on implementation testing*

Italics – activities that are directly supported by Project Argonaut

99 FHIR Resources (50 DSTU1, 49 DSTU2**)
16 Argonaut Common MU Dataset Resources in blue

Clinical	Administrative	Infrastructure	Financial
AllergyIntolerance	Alert	Basic**	ClaimResponse**
CarePlan	Appointment Response**	Binary**	Coverage**
CarePlan2**	Appointment**	Bundle**	EligibilityRequest**
ClinicalAssessment**	Communication**	Composition	EligibilityResponse**
Condition (aka Problem)	CommunicationRequest**	ConceptMap**	EnrollmentRequest**
Contraindication**	Contract**	Conformance	EnrollmentResponse**
DiagnosticOrder	Device	DataElement**	ExplanationOfBenefit**
DiagnosticReport	DeviceComponent**	DocumentManifest	InstitutionalClaim**
FamilyHistory	DeviceMetric**	DocumentReference	OralHealthClaim**
Goal**	DeviceUseRequest**	ExtensionDefinition**	PaymentNotice**
ImagingObjectSelection**	DeviceUseStatement**	List	PaymentReconciliation**
ImagingStudy	Encounter	Media	PendedRequest**
Immunization	EpisodeOfCare**	MessageHeader	PharmacyClaim**
ImmunizationRecommendation	Group	NamingSystem**	ProfessionalClaim**
Medication	HealthcareService**	OperationDefinition**	Readjudicate**
MedicationAdministration	Location	OperationOutcome	Reversal**
MedicationDispense	Order	Other	StatusRequest**
MedicationPrescription	OrderResponse	Profile	StatusResponse**
MedicationStatement	Organization	Provenance	SupportingDocumentation**
NutritionOrder**	Patient	SearchParameter**	VisionClaim**
Observation	Person**	SecurityEvent	
Procedure	Practitioner	Subscription**	
Questionnaire	ProcedureRequest**	ValueSet	
QuestionnaireAnswers**	RelatedPerson		
ReferralRequest**	Schedule**		
RiskAssessment**	Slot**		
Specimen	Substance		
VisionPrescription**	Supply		

Argonaut Requirements: FHIR Resources and DAF Profiles

MU Data Item	FHIR Resource	DAF Profile
Patient Details	Patient + Encounter in support	DAF Patient DAF Encounter
Smoking status	Observation	C-CDA Smoking Status Observation
Problems	Condition	DAF Condition (a.k.a. Problem)
Medications	A combination of • MedicationPrescription • MedicationDispense • MedicationAdministration • MedicationStatement • Immunization	DAF: • *Not done yet* • *Not done yet* • DAF Medication Administration • DAF MedicationStatement • DAF Immunization (note: it is expected that this be replaced by use of MedicationAdministration)
Medication allergies	AllergyIntolerance	DAF AllergyIntolerance
Laboratory test(s)	DiagnosticOrder	DAF DiagnosticOrder
Laboratory value(s)/result(s)	DiagnosticReport & Observation	DAF Diagnostic Report / DAF Results
Vital signs	Observation	DAF Vital Signs
Care Plan	CarePlan or CarePlan2	*Not done yet* (HL7 is considering two different approaches here)
Procedures	Procedure	DAF Procedure
Care team	Practitioner	*Not done yet*
Patient Documents	DocumentReference	*Not done yet* (will be consistent with IHE use in the MHD profile)

16 Resources required for Argonaut

5 DAF Profiles still to be created
11 DAF Profiles still to be confirmed

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Security Task Overview

Objectives

- To identify and characterize authentication and authorization risks associated with RESTful, FHIR-based transactions

- To enhance "SMART on FHIR" EHR Authorization Profiles as needed to address identified risks

Roles and responsibilities

- Primary Team: Dixie Baker (task lead) and Josh Mandel, (implementation lead)

- Security SME Team: Objectively review and contribute expertise to help assure quality, applicability, implementability, and adoption

Scope

Authentication and Authorization for RESTful, FHIR based transactions

- Authentication – The provision of strong evidence that a subject (person or software) is the entity it claims to be

- Authorization – The granting (or denial) of access to a resource in accordance with the requester's entitlements

- Does <u>not</u> include identity management (e.g., identity proofing, credentials management)

- Does <u>not</u> include identity federation between organizations

OAuth 2.0 and OpenID Connect Implementation Guidance

- Focus on enhancing "SMART on FHIR" implementation guidance, informed by other existing OAuth 2.0 and OpenID Connect implementation guidance

Process

1. Support definition of use cases to be addressed.

2. Identify authentication and authorization risks that need to be addressed within the defined use cases.

3. Review the "SMART on FHIR" specifications and other existing OAuth 2.0 and OpenID Connect implementation guidance with respect to their approach to countering the identified risks.

4. Revise recommendations in response to feedback, integrate agreed upon changes.

5. Document the security assessment and implementation guidance

Use Case Considerations

These specifications will introduce a new architectural pattern (REST), a new style for accessing data and services (FHIR), and new, more flexible and open, methods for authorizing access to health information (OAuth 2.0)

For a healthcare organization, "newness" represents risk

Therefore, we defined use cases that are <u>simple, yet functional</u>, and that address both <u>real security risks and trust risks associated with potential discomfort</u> with these new ways of doing things, as both of these can impede vendor and provider adoption

Once these methods and technologies are safely implemented, greater functionality will follow

Draft Use Cases

1. **Patient uses provider-approved, hosted web application to access health data**

   - Client type: Deployment-specific "client_id" with pre-registered "redirect_uri" and with "client_secret")

2. **Patient uses provider-approved mobile app to access health data**

   - Client type: Deployment-independent "client_id" with pre-registered "redirect_uri" and without "client_secret"

3. **Clinician uses provider-approved, hosted web application to access health data**

4. **Clinician uses provider-approved mobile app to access health data**

Broad Definitions

"EHR System" – any system that holds and controls individually identifiable <u>health</u> data

"Provider approved" – named application that has been approved and registered by the data holder

"Web application" – hosted on trusted server and capable of protecting a secret used to authenticate its own identity

"Mobile app" – incapable of providing assured protection of secrets

Overview of SMART on FHIR EHR Authorization Profiles
(1 of 2)

Two OAuth 2.0 profiles:

- Confidential clients – apps that have server-side business logic and are capable of protecting a secret for use in authenticating the app's identity (e.g., hosted apps) http://docs.smartplatforms.org/authorization/confidential/

- Public clients – apps that run entirely on the end-user's device and that are unable to protect a secret usable for authenticating the app's identity (e.g., mobile apps) http://docs.smartplatforms.org/authorization/public/

Implementation guidance for Scopes and Launch Context for both profiles are given in a separate document

- http://docs.smartplatforms.org/authorization/scopes-and-launch-context/

Overview of SMART on FHIR EHR Authorization Profiles
(2 of 2)

Intended audience is app developers (not server implementers)

All of the OAuth 2.0 actors (authorization server, resource server, OpenID provider) are encompassed in a single "EHR" actor

Apps may be launched from within an EHR/Portal or standalone – the former get context from the EHR

Guidance for requesting OpenID profile is given in Scopes and Launch Context document; defers to the OpenID specification profile for details regarding ID Token validation

Risk Assessment

Approach

- Use OAuth 2.0 Threat Model and Security Considerations (RFC 6819) as primary source, supplemented by OAuth 2.0 Framework (RFC 6749), Bearer Tokens (RFC 6750), and OpenID Connect Core specifications

- Assess applicability to Argonaut use cases

- Assess SMART on FHIR specifications approaches for countering identified risks

- Recommend and coordinate changes as warranted

Current status

- Preliminary assessment complete

- Discussions underway

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Argonaut Pilot/Implementation Plan

Key aims of the Argonaut Project are to facilitate rapid adoption of FHIR APIs through:

- <u>Narrowly focused initial use cases</u>: Simple low-risk use cases that offer low barrier to entry, and an opportunity for organizations to get comfortable with new ways of doing things

- <u>Specification and Implementation Guides</u>: Rapid development of focused implementation guides for RESTful FHIR APIs and OAuth 2.0 security

- <u>Market feedback</u>: Market testing, pilot implementations and feedback, ideally while specification is still unstable

- <u>Market diffusion</u>: Engagement of broad array of market participants (vendors and providers)

Open participation in Argonaut Project

- Make available emerging specification and documentation artifacts for any interested vendor and provider participants

- Participation in collaborative community for Q&A, information sharing, and results dissemination

- Regular communications and updates

- Pilot implementations

Key Implementation Goals and Principles

Participation

- Agree to write and deploy working code
- Participate at the level most appropriate to your organization's interest and capacity
- Share learnings with others through Argonaut channels
- Communicate results through Argonaut channels
- Abide by HL7 rules for IP and anti-competitive practices

Scope

- Implement, test and pilot both FHIR API(s) and security
- Minimally test Argonaut-specific specs/IGs and use cases

Argonaut specs/IGs

- FHIR document-level API: IHE Mobile Access to Health Documents (MHD) to access static CCDA and other IHE X* documents
- FHIR data-level API: Query for MU common data set (DAF definitions)
- Security: SMART on FHIR OAuth 2.0 implementation guides for implementing mobile and hosted apps

Argonaut use cases

- Patient uses provider-approved, hosted web application to access health data
- Patient uses provider-approved mobile app to access health data
- Clinician uses provider-approved, hosted web application to access health data
- Clinician uses provider-approved mobile app to access health data

Three Argonaut Implementation Tiers

- Pilot Implementations
  - • For highly committed organizations ready to begin pre-production deployment

- Synchronous Testing and Connectathons
  - • For organizations not yet ready to commit to production implementation but would like some programmatic structure

- Asynchronous Testing
  - • For organizations who want to test and experiment at their own pace
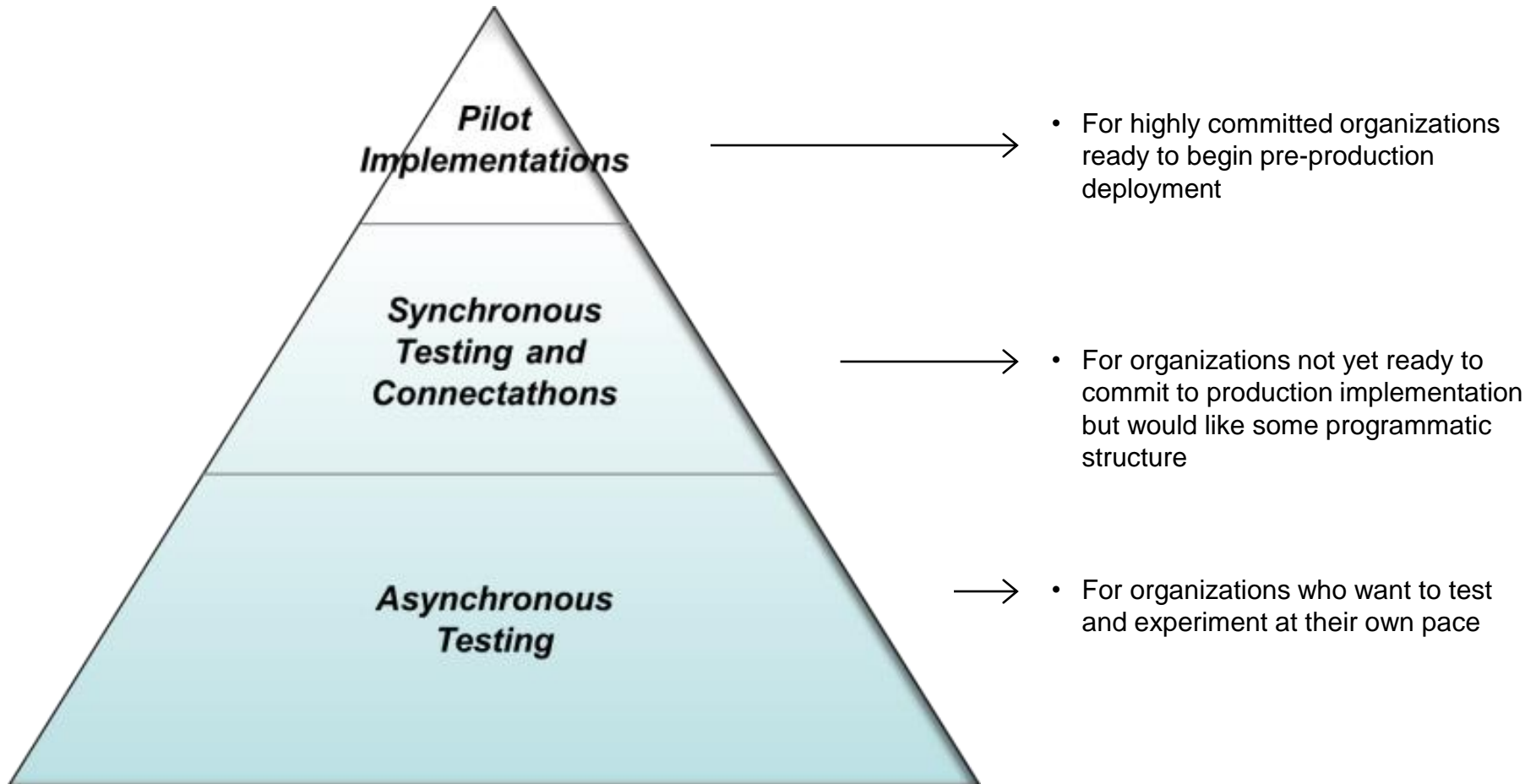
Tier Descriptions

Pilot Implementation tier will engage highly committed organizations who are committed to deploying pre-production capabilities for a discrete single or multiple use cases as soon as possible. An Argonaut Project Manager will assist by providing development/testing materials and guides, coordinating multi-organization activities, monitoring and tracking progress, and navigating questions and feedback to appropriate technical experts.

Synchronous Testing tier will organize coordinated virtual testing activities among participants at scheduled times over the next few months. An Argonaut Project Manager will provide facilitation for these testing events. This tier will assist those organizations that would like to begin experimenting and testing with some programmatic support, but who are not yet ready to commit to production implementation.

Asynchronous Testing tier is a largely self-service and self-paced activity. The Argonaut Project will make available all testing materials, testing guidelines, and results/issues tracking tools, and provide channels to answer questions that arise. This tier is for organizations who would like to begin experimenting and testing but who are not yet ready to commit to a schedule.

The Argonaut Project is a focused effort to accelerate development of production exchange capabilities. As such, there is no organized effort for public "demonstrations" of capability that are not inherently implementation-oriented. The Argonaut Project is happy to identify and bring together organizations interested in participating in sub-production "demonstrations" at industry events such as HIMSS, but such activities will not be a focus of the Argonaut implementation effort.

Support Provided for Each Tier

		Asynchronous Testing	Synchronous Testing	Pilot Production
Type of organization engagement		Test against reference implementations	Participate in joint or coordinated testing activities	Develop production capability for discrete use case(s)
Argonaut Project Support	**Facilitate access to implementation documents and tracking/reporting templates**	X	X	X
	Facilitate access to public servers and reference implementations	X	X	X
	Assist with progress tracking and results reporting	X	X	X
	Facilitate joint testing activities and peer collaboration		X	
	Facilitate issue resolution with peers and HL7 technical SMEs		X	X
	Assist with activities and milestones plan development			X

Phased implementation complexity

Implementing RESTful data- and document-level APIs and OAuth-based authorization introduces a lot of complexity.

The implementation program thus engenders a phased approach to allow incremental development that builds over time, roughly as follows:

1. Query for patient demographics with no added security layer
2. Add: Query for CCDA and security for hosted (confidential) applications
3. Add: Query for additional data fields (Problems?, Medications?)
4. Add: Security for mobile (public) applications

Tentative Release Schedule for Implementation Artifacts

Argonaut Release version	FHIR data-element API	FHIR document-level API	OAuth2 Security
Argonaut Release 1 March 2, 2015	Resources and Profiles for: - Patient demographics	NA	NA
Argonaut Release 2 March 16, 2015	Resources and Profiles for: - Patient demographics	IHE MHD spec and implementation guide for CCDA	Authorization profiles for: - Hosted applications
Argonaut Release 3 March 30, 2015	Resources and Profiles for: - Patient demographics - Problem list	Updated IHE MHD spec and implementation guide for CCDA	Authorization profiles for: - Hosted applications - Mobile Applications
Argonaut Release 4 April 13, 2015	Resources and Profiles for: - Patient demographics - Problem list - Other - TBD	Updated IHE MHD spec and implementation guide for CCDA	Authorization profiles for: - Hosted applications - Mobile Applications

Participation

The Argonaut Project is open to all

We would like participants to register for a tier (or tiers) of participation in order to allocate resources appropriately and gather test results and feedback.

If you would like to become part of the Argonaut Project, please contact Jennifer Monahan (jmonahan@maehc.org) with the following information by February 27, 2015:

- Organization name
- Point of contact
- Desired implementation tier
- Desired specifications to test
- Desired start date

Participants may join at any time on a rolling basis

Next Steps

We will synthesize all requests and communicate back to each of you with next steps appropriate to your preferred tier

Ongoing communications:

- A regular update on release status, implementation progress, and emerging lessons/results

- We will post materials on the Argonaut website: www.argonautproject.org

Thank you for joining the Argonaut Project!

Please direct any questions, comments, concerns to:

- Administrative/Logistical: Jennifer Monahan (jmonahan@maehc.org)

- Policy/Technical: Micky Tripathi (mtripathi@maehc.org)