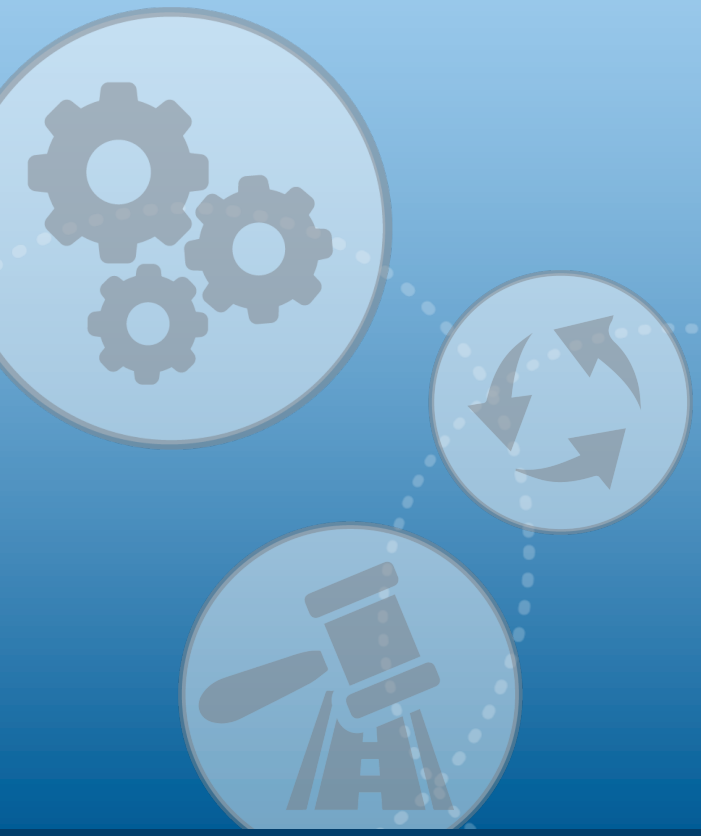

ONC FHIR at Scale Taskforce *(FAST)*:

Scalable FHIR Infrastructure to Facilitate Data Exchange

FAST Taskforce Antitrust Notice

- The ONC FHIR At Scale Taskforce (*FAST*) (Hereinafter "Taskforce") is committed to full compliance with existing federal and state antitrust laws.
- All members involved in the Taskforce effort, including its advisory groups, will comply with all applicable antitrust laws during the course of their activities. During Taskforce meetings and other associated activities, including all informal or social discussions, each member shall refrain from discussing or exchanging competitively sensitive information with any other member. Such information includes, but may not be limited to:
  - Price, premiums, or reimbursement charged or paid for products or services
  - Allocation of customers, enrollees, sales territories, sales of any products or contracts with providers
  - Any other competitively sensitive information that is proprietary to a member company
- If you have any specific questions or concerns, seek guidance from your own legal counsel.
- Members should not bring confidential information or intellectual property (hereinafter "Intellectual Property") owned by their respective member companies into Taskforce meetings. To the extent such Intellectual Property is shared with the Taskforce that shall not be construed as a waiver of member company's rights to, or ownership in, the Intellectual Property.

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Presenters – *FAST* Chief Architects

Patrick Murta

Chief Interoperability Architect & Fellow, Humana

FAST Chief Architect

Meena Jambulingam

Senior Director

Optum

FAST Tiger Team Lead

Sandy Vance

Director of Healthcare Interoperability

AEGIS

FAST Tiger Team Lead

Brett Stringham

Principal Information Security Architect

Optum

FAST Tiger Team Lead

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Agenda

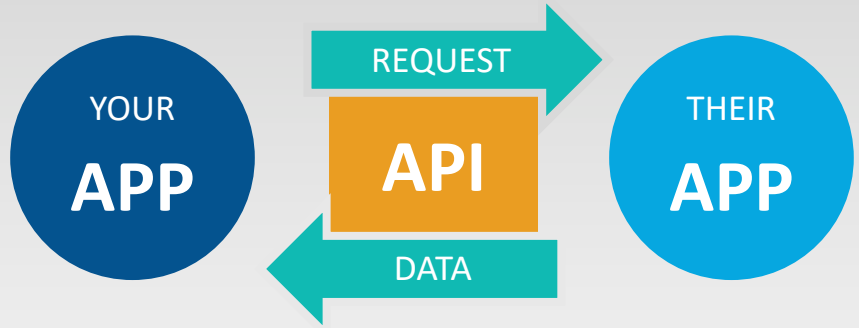
- **What is FHIR?**
  - API Overview
  - FHIR and the Health Care Ecosystem
- **What is *FAST?***
  - *FAST* Organization
  - Importance of Ecosystem Infrastructure and the *FAST* model
  - Showcase *FAST* Proposed Solutions: Identity, Security, Testing and Certification
- **Learn More & Get Involved with *FAST***

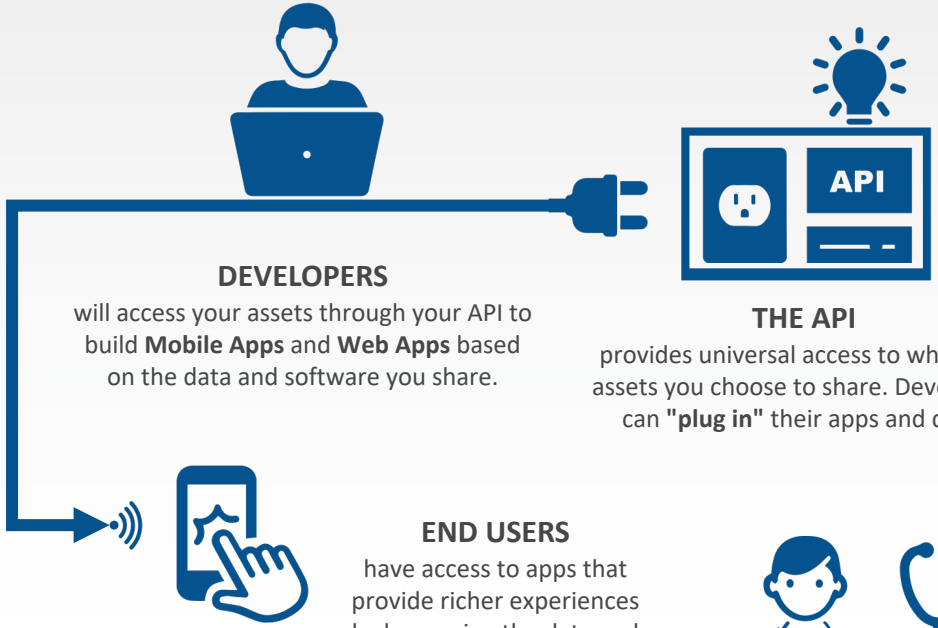
MB

API Overview

APIs…

- **An** API is a software intermediary which allows applications to talk to each other
- **APIs** allow the capabilities or data of one computer program to be used by another
  - Lego blocks of data
  - Doesn't matter what the underlying computer or technology is
- **APIs** are a foundational technology that drives modern computing and the API economy (Amazon, Netflix, Google, Facebook, EBay, YouTube, Twitter, & etc.)
- **APIs** enable innovation in an unprecedented manner
- **APIs** are not new… simplified, easy to use versions of them are





DEVELOPERS
will access your assets through your API to build **Mobile Apps** and **Web Apps** based on the data and software you share.

THE API
provides universal access to whatever assets you choose to share. Developers can **"plug in"** their apps and data.

ASSETS
Your data and software (and brand) become more valuable by being leveraged by partners, developers, and third-party services.

END USERS
have access to apps that provide richer experiences by leveraging the data and services of other apps.

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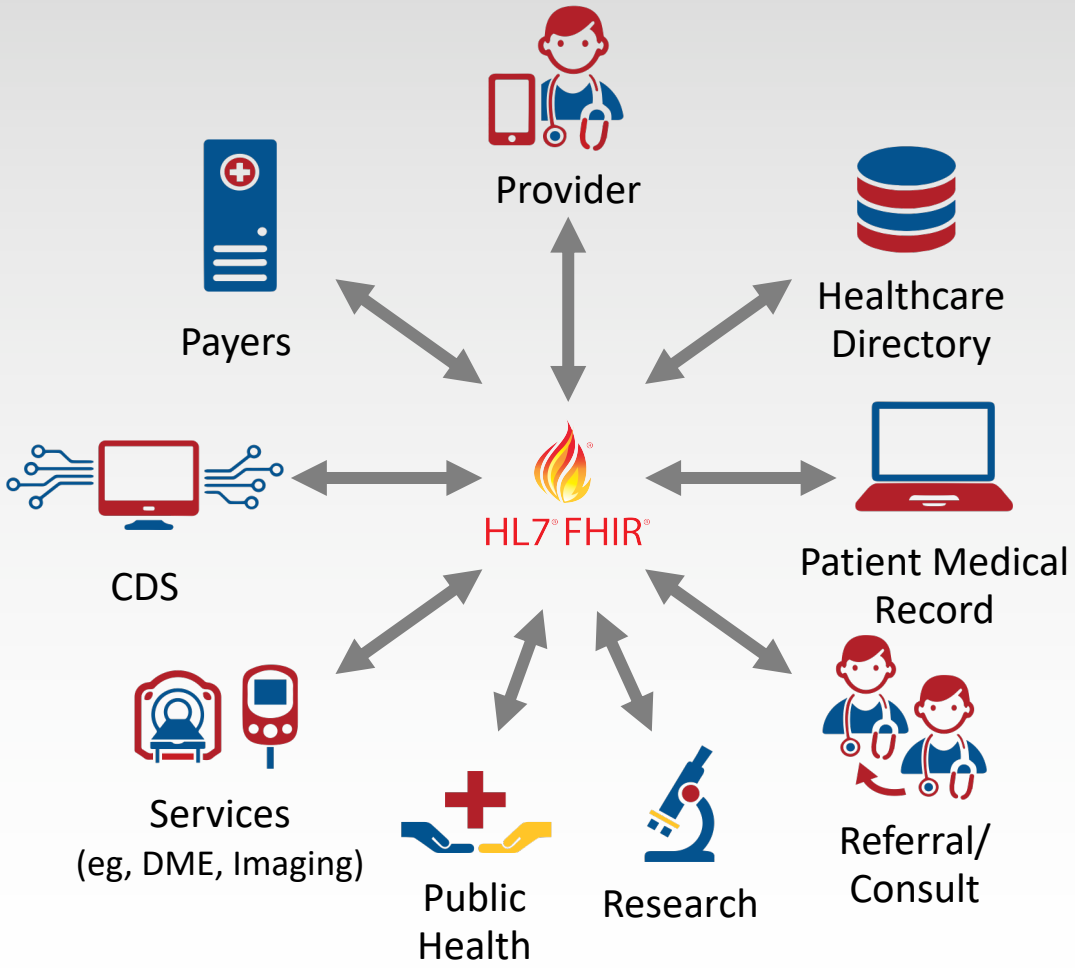
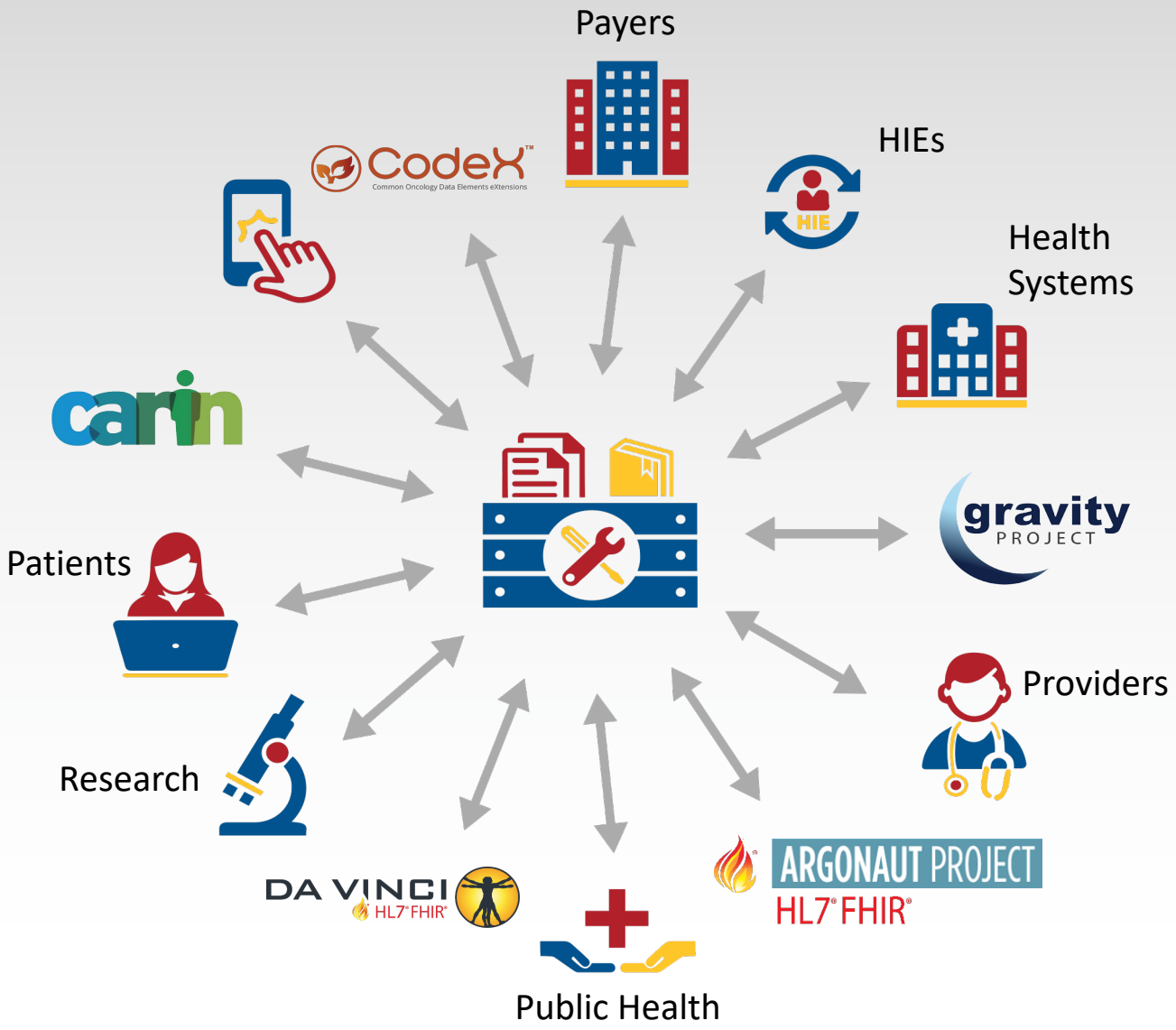
FHIR and the Health Care Ecosystem





What is *FAST*?

The FHIR at Scale Taskforce (FAST), convened by the Office of the National Coordinator for Health IT (ONC), brings together a highly representative group of motivated healthcare industry stakeholders and health information technology experts.

The group is set to identify HL7® Fast Healthcare Interoperability Resources (FHIR®) scalability gaps and possible solutions, analysis that will address current barriers and will accelerate FHIR adoption at scale.

PM

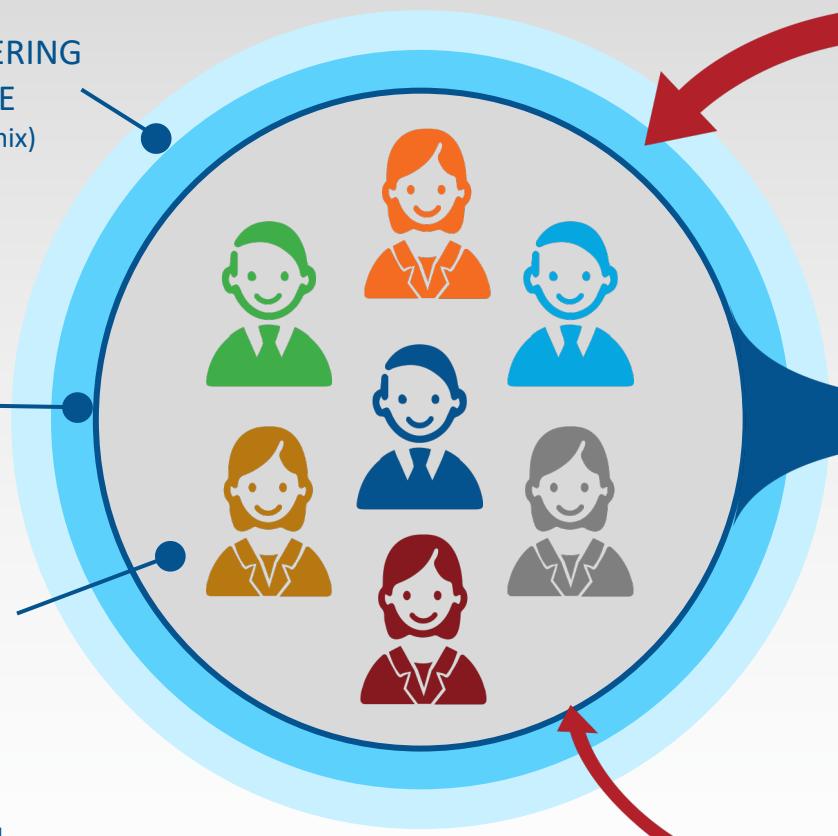
FAST Organization & Community Engagement

EXECUTIVE STEERING COMMITTEE
(public-private mix)

COORDINATING COMMITTEE
(public-private mix)

SEVEN TIGER TEAMS

- Ecosystem Use Cases
- Identity
- Security
- Directory, Versioning and Scale
- Exchange
- Certification and Testing
- Pilots



FEEDBACK

UPDATES

TECHNICAL LEARNING COMMUNITY (TLC)

Subject Matter Expert (SME) Panels

Information Sharing with TLC through:

- Website
- Periodic webinars
- Newsletters
- TLC Meetings
- LinkedIn Group

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Lack of Consistent Infrastructure Impacts Flow

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Well-Planned Infrastructure Creates Efficiency

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Example FHIR Transaction Journey in the *FAST* Ecosystem

Patient visits Primary Care Physician (PCP)

PCP needs information from Payer

Payer receives PCP request

REQUESTING SYSTEM

RECEIVING SYSTEM

1 → 2 → 3 → 4 → 5a → 5b → 6

1 Formulates FHIR Request

2 Looks Up the FHIR Endpoint for Recipient

2 Transaction Information (eg, Header) Appropriately Configured

3 Receives Transaction, Validates Requestor, Validates Version

4 Performs Patient Matching and Sends Back Not Found If Unable To Do So

5a Authenticates FHIR User's Role

5b Filters Out Data That Does Not Have Consent

6 Generates & Returns FHIR Response

DIRECTORY

7

Requesting System Receives Data

EXCHANGE | **IDENTITY**

VERSIONING

DIRECTORY | **EXCHANGE** | **VERSIONING**

PCP views patient information

CONFORMANCE & CERTIFICATION

SECURITY

PILOTS

PM

FAST Solution Process and Where Are We Now

FAST Solution Input

- Tiger Teams
- Technical Learning Community (TLC)
- SMEs

Ecosystem Use Cases

Core Capabilities

Technical Barriers

Proposed (V2) Infrastructure Solutions

Recommended (V3) Infrastructure Solutions

Standards

Process

Regulation

Evaluation, Feedback, and Pilots

Operationalize Solutions

- Ecosystem Use Case
- Directory, Version & Scale
- Exchange Process
- Identity
- Security
- Testing & Certification
- Pilots

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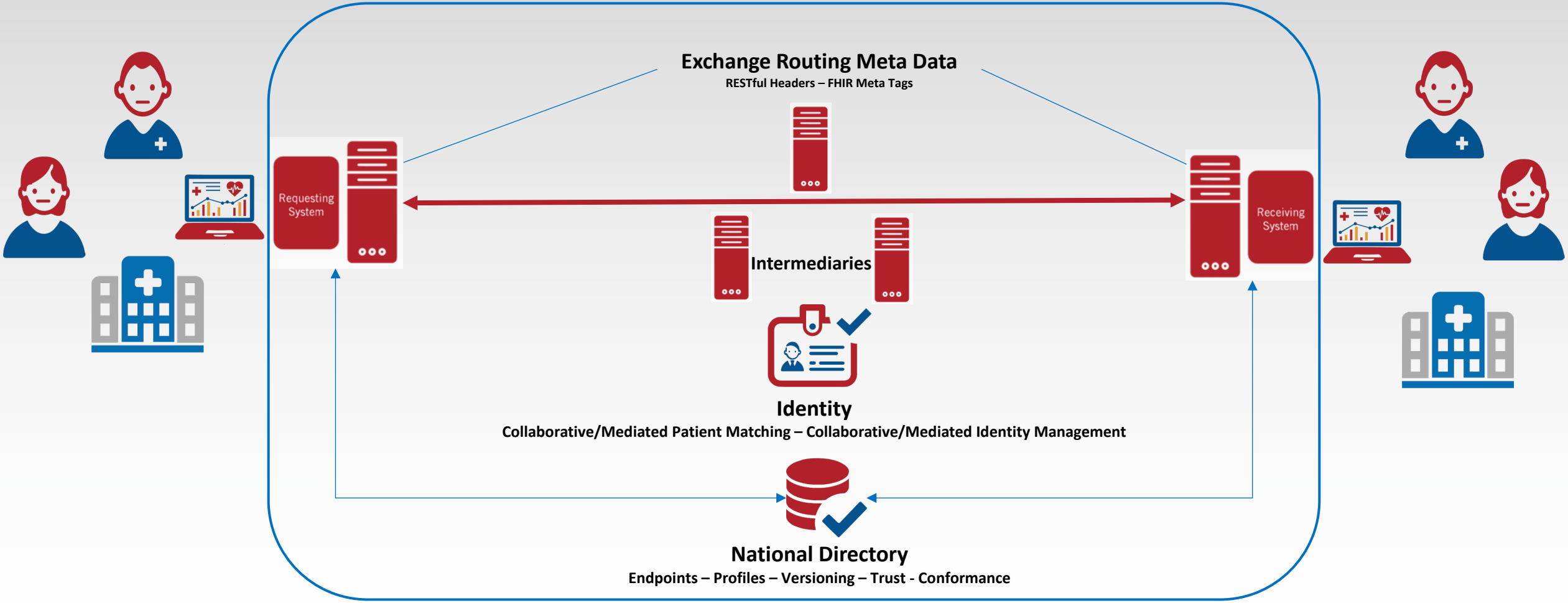
Conceptual Integrated Architecture

Security (Authenticate/Authorize)

UDAP Trusted Dynamic Client Registration - UDAP Tiered OAuth User Authentication - UDAP JWT-Based Client Authentication - UDAP JWT-Based Authorization Assertions



CONFORMANCE & CERTIFICATION (Testing & Certification Program)

PILOTS (FAST Capability Vetting with Existing HL7 Accelerators)

PM

FHIR Scalability - Technical Challenges & *FAST* Proposed Solutions

DIRECTORY, VERSIONS AND SCALE

DIRECTORY

CHALLENGE:

There are multiple places to find endpoints. Is there a place I can go to find all of them?

PROPOSED SOLUTION:

A national solution for FHIR Endpoint Discovery

VERSIONS

CHALLENGE:

A way to communicate and manage multiple versions

PROPOSED SOLUTION:

Supporting multiple production versions of FHIR

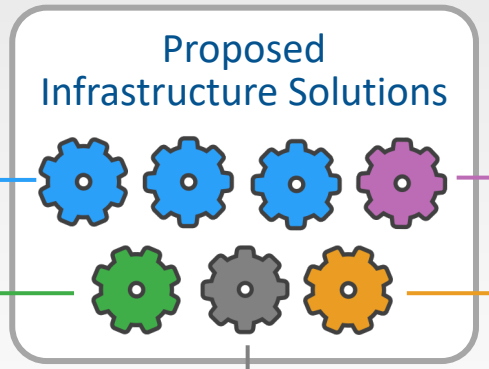
SCALE

CHALLENGE:

How can a high volume of FHIR transactions be consistently and predictably exchanged in a hybrid exchange model?

PROPOSED SOLUTION:

Requirements for FHIR RESTful exchange intermediaries



EXCHANGE PROCESS

CHALLENGE:

How do we enable consistent and reliable transaction exchange?

PROPOSED SOLUTIONS:

- Reliable Routing with Metadata Across Intermediaries
- Reliable Routing Across Intermediaries Using Destination Specific Endpoints

TESTING & CERTIFICATION

CHALLENGE:

A way to measure conformance to the standard

PROPOSED SOLUTION:

ONC FHIR Testing and Certification Program

IDENTITY

CHALLENGE:

How can a requestor and receiver uniquely identify the patient/member?

PROPOSED SOLUTIONS:

- Mediated Patient Matching
- Collaborative Identifier for Patient
- Distributed Identity Management
- Networked Identity Management

SECURITY

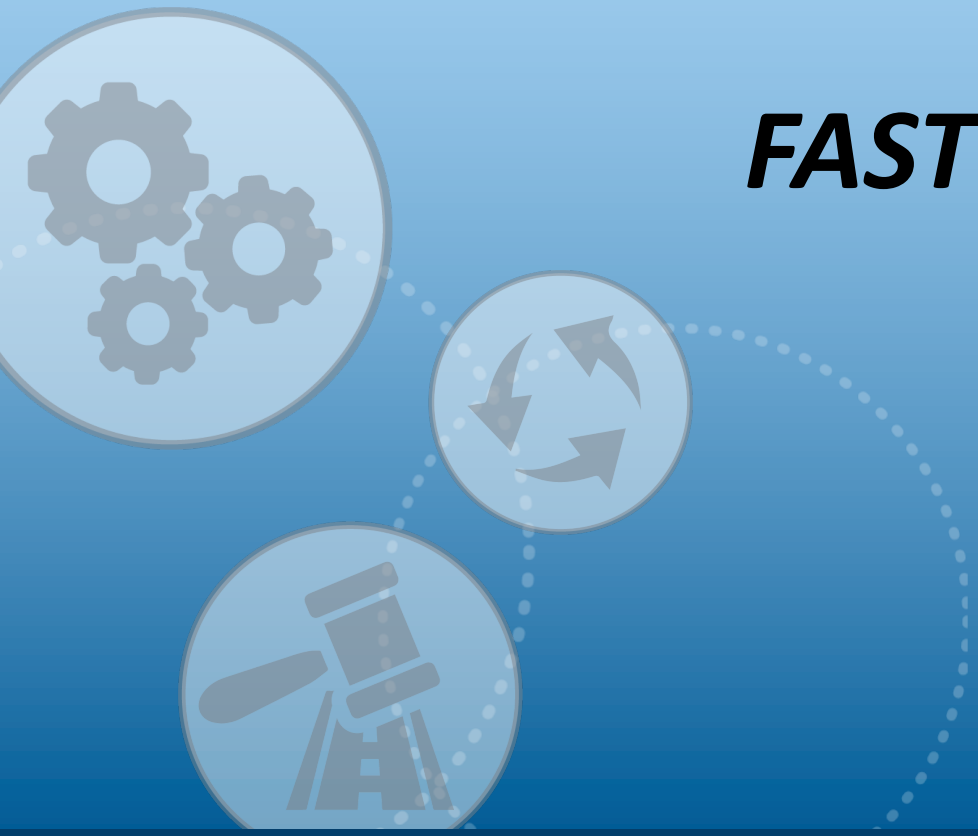
CHALLENGE:

How do we manage permissions & security across millions of patients/payers/providers?

PROPOSED SOLUTIONS:

- UDAP Trusted Dynamic Client Registration
- UDAP Tiered OAuth for User Authentication
- UDAP JWT-Based Client Authentication
- UDAP JWT-Based Authorization Assertions

PM



FAST Solutions Overview

FAST Identity Management

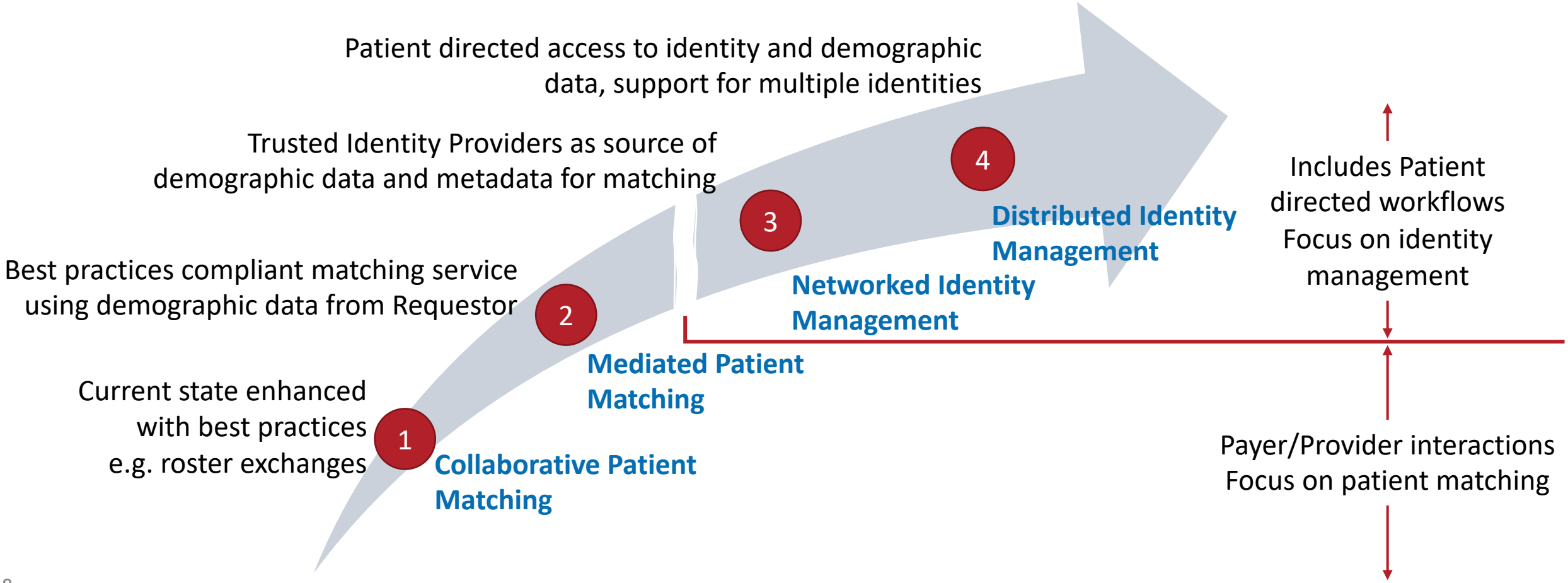
FAST Identity Barriers to FHIR Scalability

IDENTITY BARRIERS		IMPLICATIONS
USE OF DIFFERENT IDENTIFIERS	How do we know who the patient is? The payer? The physician?	Identifiers such as medical record numbers and insurance ids are not meaningful beyond the boundaries of a specific organization. They are of limited value in identity matching across organizations.
MINIMUM DATA SET	How do we know the minimum patient data to use in matching?	Reliably identifying Patients across organizations may require a minimum necessary set of data to be included in the transaction. This set of data may not always be available for all use cases.
PRIVACY	What patient data should be returned in responses, including error messages?	Privacy considerations must be applied in developing recommendations on data to be sent in responses, including error messages.
CUSTOM IDENTITY MATCHING PROCESSES	Can we rely on the consistency of identity-matching services across organizations?	Most organizations utilize custom built identity matching processes and any proposed solutions from FAST will need to accommodate this diversity.
CROSS-WALKS ARE NOT SCALABLE	How do we map patient identity real-time?	Small groups of organizations may exchange Patient and Provider rosters, thereby building a common and perhaps shared cross walk for identifiers. However, this solution is not scalable at the national level and real-time identification may be impacted by data latencies in maintaining the crosswalks.
LIABILITY	How do we address the misidentification risk?	Liability in the event of overlaps, overlays, duplicate records, and incorrect matches could require legislative consideration beyond technical recommendations.

MJ

Solution Options: Low to High Complexity

Multiple options progressing from low to high complexity (technical and process)



FAST Security

Problems to be Solved

CREDENTIAL SPRAWL	How can we minimize the number of credentials the requestor and responder are required to securely maintain?
CLIENT APPLICATION SPRAWL	How can we streamline the registration and user of client applications across multiple endpoints?
AUTHENTICATION & AUTHORIZATION	How can we increase assurance that the requestor is appropriately authenticated and has the authorization to review and use the data requested?
EXISTING PROCESSES & TOOLS LIMIT SCALABILITY	Techniques such as Open Authorization (OAuth 2.0) are widely accepted but can they be extended to improve scalability in FHIR?
HIPAA MINIMUM NECESSARY	When payers have access to patients' medical records using FHIR, the question of "minimum necessary" will become a significant issue since the current human mediated response will no longer take place. However, having direct access to clinical data allows the industry to reduce provider burden by decreasing the number of manual interventions providers need to manage to exchange data with payers and other providers. Instead of setting the bar at the "minimum necessary," which can be interpreted differently by different stakeholders, the industry will need to move away from concerns about data access and shift toward defining the stated purpose for using the data (e.g., "I need access to these data for quality reporting measures"), which then becomes the approved use.

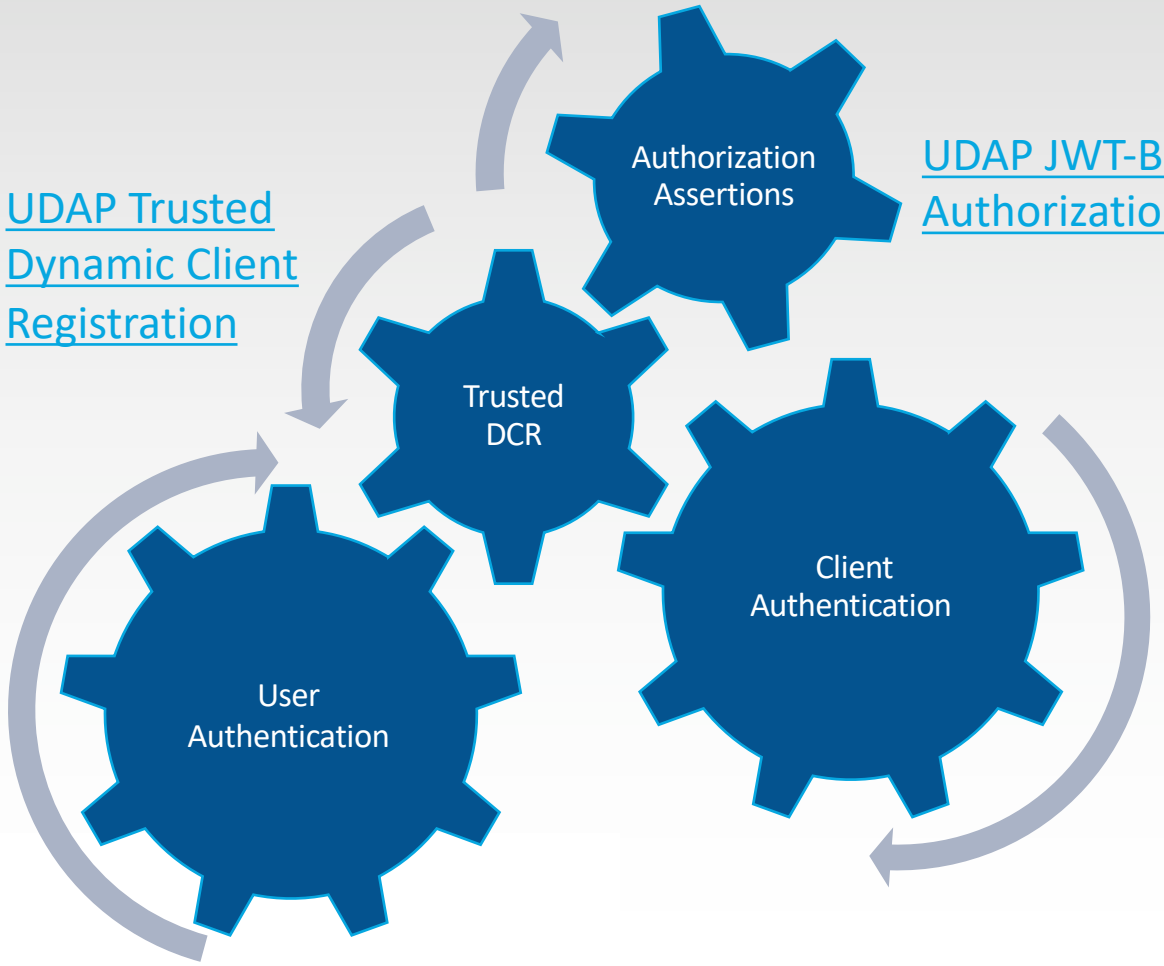
LM

FAST Solution Approach

- **Leverage existing credentials and authorizations**
  - Enabled by portable electronic requestor certifications
  - Securely communicate the verified attributes behind a requestor's digital identity to responder
- **Enable federated access**
  - Federated use of credentials
  - Federated authorization servers
- **Leverage best practices (existing standards) — workable solutions**
  - OAuth 2.0 Authorization Framework
  - OpenID Connect
  - Unified Data Access Profiles
  - PKI-Based Health Information Networks
- **Facilitate automated exchange (i.e., reduce bottlenecks)**
  - Minimize time for participants to actively exchange with a new endpoint
  - Identify areas where solutions to authorization and authentication can be reused in more than one technical exchange protocol
- **Implement Role Based Access (where necessary)**
- **Reuse existing infrastructure where possible**

LM

Proposed Solution: Trusted Ecosystem



UDAP Trusted Dynamic Client Registration

UDAP JWT-Based Authorization Assertions

UDAP Tiered OAuth

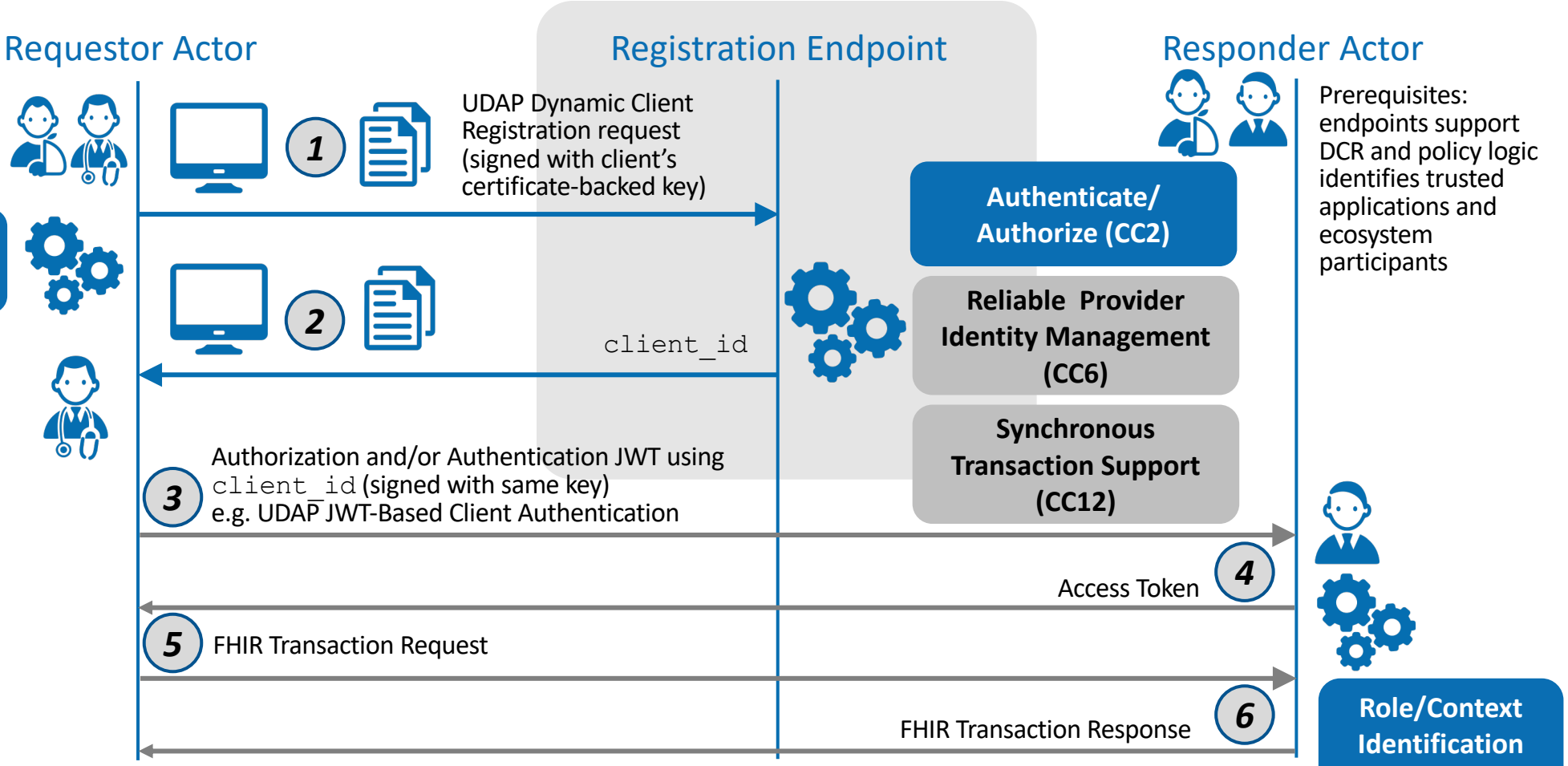
UDAP JWT-Based Client Authentication

LM

Proposed Solution: Trusted Dynamic Client Registration & Token Request

Prerequisites: Client app obtains a trusted digital certificate and end user at requestor organization is authorized to use the app

Data Provenance (CC5)



Authenticate/ Authorize (CC2)

Reliable Provider Identity Management (CC6)

Synchronous Transaction Support (CC12)

Prerequisites: endpoints support DCR and policy logic identifies trusted applications and ecosystem participants

Role/Context Identification (CC9)

In Scope

Out of Scope

LM

FAST Testing & Certification

FAST Testing & Certification Barriers to FHIR Scalability

TESTING/CERTIFICATION BARRIERS	IMPLICATIONS
Maturity of Requirements	FHIR specification itself is continually evolving. Any conformance process needs to account for versioning with full backward compatibility
Lack of Minimum Level of Conformance	Need to be able to assume Conformance to BASE FHIR prior to working on scaling, but this pushes the limits for this group's scope
Tooling	Needs to support validation of several layers, multiple versions and standard tests
Certification Governance	Define steps and levels to achieve certification, what or whom is being certified (i.e., FHIR implementation approach or participants, stakeholders, and intermediaries)
Costs	Costs must not be prohibitive to vendors who are developing systems for payers, providers, or patients

SV/LB

Steps to FHIR Scalability

FHIR SPECIFICATION CONFORMANCE

HL7® FHIR®

1. Conformance statements
2. Resources, Profiles and Operations
3. FHIR Versions

+

INFRASTRUCTURE USE CASE CERTIFICATION

FAST
FHIR AT SCALE TASKFORCE

1. End Point Discovery
2. Authentication
3. Authorization
4. Resource Version Identification
5. Reliable Patient Identity Management
6. Data Provenance
7. Reliable Provider Identity Management
8. Event/Message/Topic Subscription/ Publication
9. Guaranteed Message Delivery
10. Role/Context Identification
11. Readiness Credential
12. Standard Based Endpoint Access
13. Synchronous Transaction Support
14. Asynchronous Transaction Support
15. Reliable Payor Identification

+

FUNCTIONAL USE CASES

FHIR Solutions for VBC

DA VINCI
HL7® FHIR®

Payers/Providers

Core Data Services

ARGONAUT PROJECT
HL7® FHIR®

Provider/Provider

FHIR Consumer Solutions

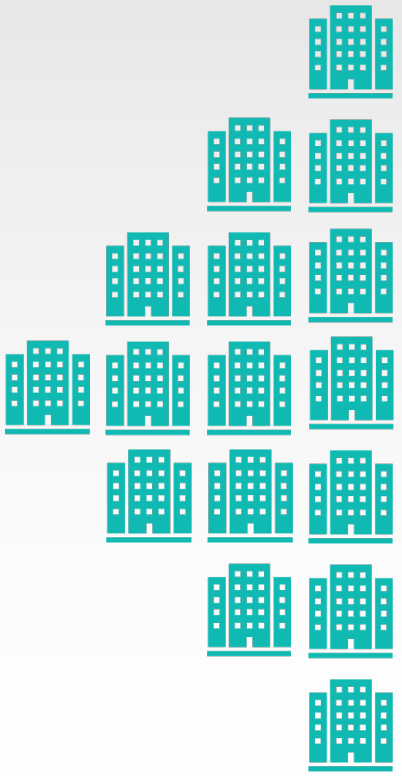
carin

Consumers

Other Collaborative Efforts to Develop & Implement FHIR Solutions

=

RAPID INDUSTRY ADOPTION



SV

Proposed Solution: ONC *FAST* Testing & Certification Program

DEVELOPER

Automated Test Platform

HL7 FHIR Validation Engine

Basic FHIR Conformance

FHIR IG Conformance

FAST Criteria Test Scripts

Certification Body

***FAST* Readiness Criteria related to…**

1. End Point Discovery
2. Authentication
3. Authorization
4. Resource Version Identification
5. Reliable Patient Identity Management
6. Data Provenance
7. Reliable Provider Identity Management
8. Event/Message/Topic Subscription/Publication
9. Guaranteed Message Delivery
10. Role/Context Identification
11. Readiness Credential
12. Standard Based Endpoint Access
13. Synchronous Transaction Support
14. Asynchronous Transaction Support
15. Reliable Payor Identification

SV

Proposed Solution: Automated FHIR Testing Platform – Scope

In Scope

- Base FHIR Specification
- *FAST* Readiness Criteria

Out of Scope

- HL7 FHIR Validation Engine
- RFP development to select entity to provide services
- Validate ease of establishing connections
- Validate conformance to non-blocking requirements
- Validate conformance to HIPAA patient privacy regulations

Assumptions

- Easy to use and submit FHIR transactions
- Dashboard Review of transaction with feedback
- Cost of certification is low and is not a barrier

Pre-Conditions

- This program must either commit to validating Base FHIR conformance or use a separate conformance assessment
- Specifications and requirements are agreed upon
- FHIR Validation Engine is determined
- Certifier(s) are selected
- Developers involved in reviewing and beta testing of platform are committed to process

Post-Conditions

- Systems will become ONC *FAST* Certified, which ensures interoperability with other ONC *FAST* Certified systems
- Reporting process and mechanism will be in place
- Feedback mechanism for developers/users will refine and streamline the process
- Ongoing interaction will occur with HL7, ONC, developers and other key stakeholders

Complexity: High

SV

Getting Involved

FAST Initiative Output & Products

FAST Artifacts

- *FAST* Initiative Use Cases, Version 1
- *FAST* Initiative Core Capabilities
- *FAST* Regulatory and Policy Barriers, Version 1
- *FAST* Technical Barriers, Version 1
- *FAST* Solutions (Version 2)

FAST COMMUNITY ENGAGEMENT

- FAST 101 and Keystone Presentations
- SME Sessions
- Technical Learning Community
- *FAST* Workshop (*Coming Soon*)

Stay Engaged!
JOIN THE LINKEDIN GROUP
400+ members & growing!

All content is available on the *FAST* Project Page *or* https://tinyurl.com/ONC-FAST

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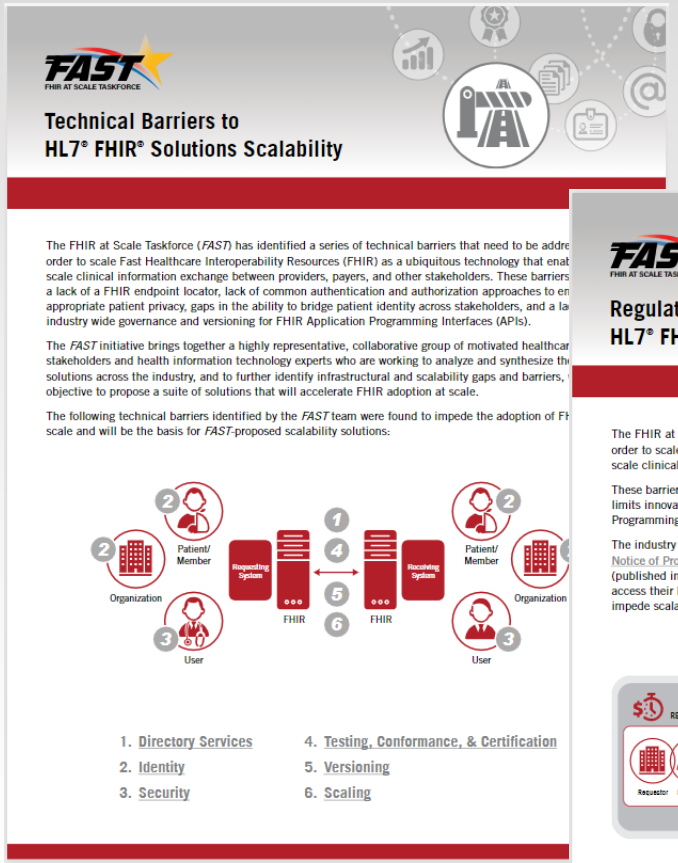
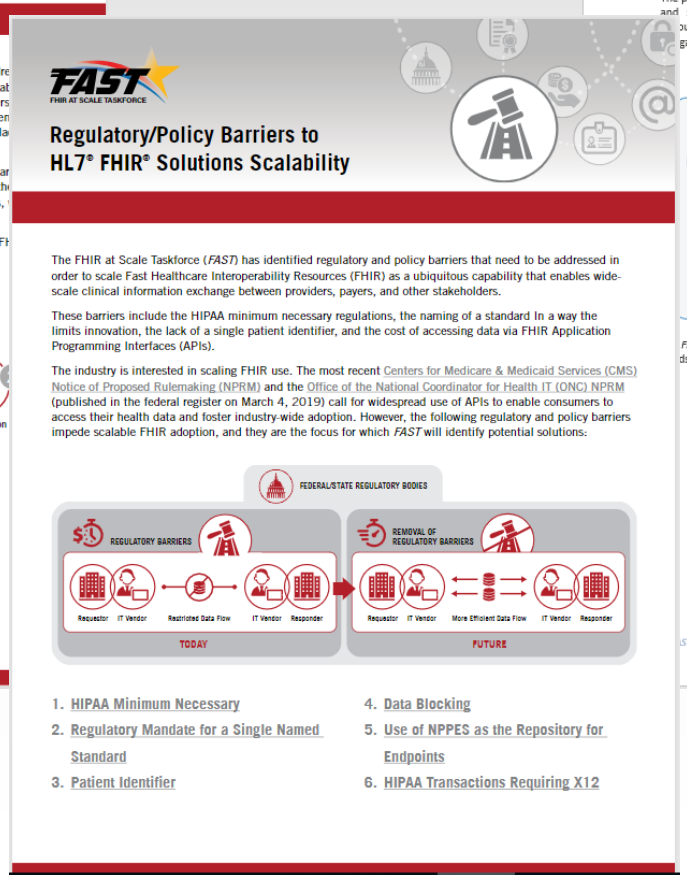
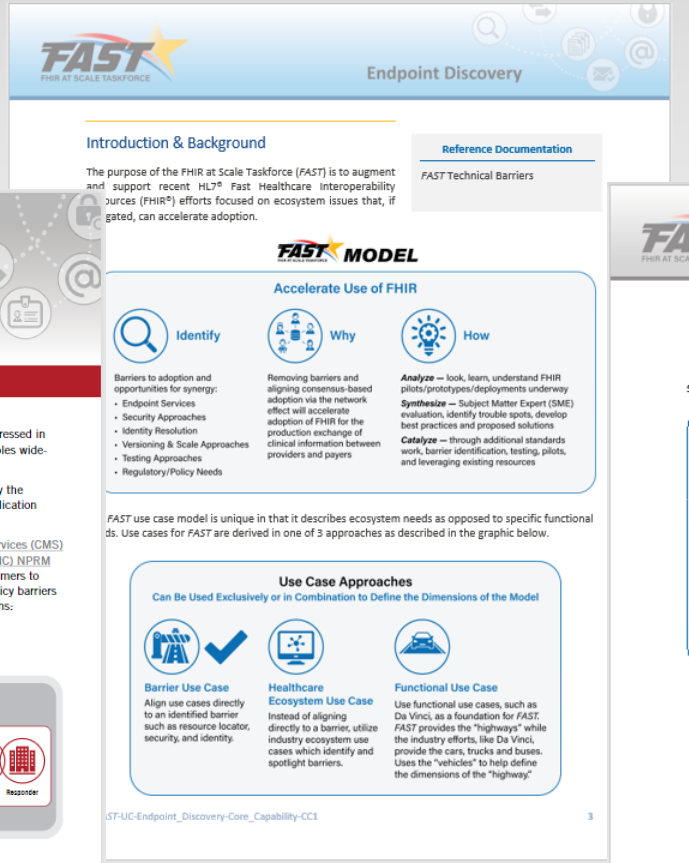
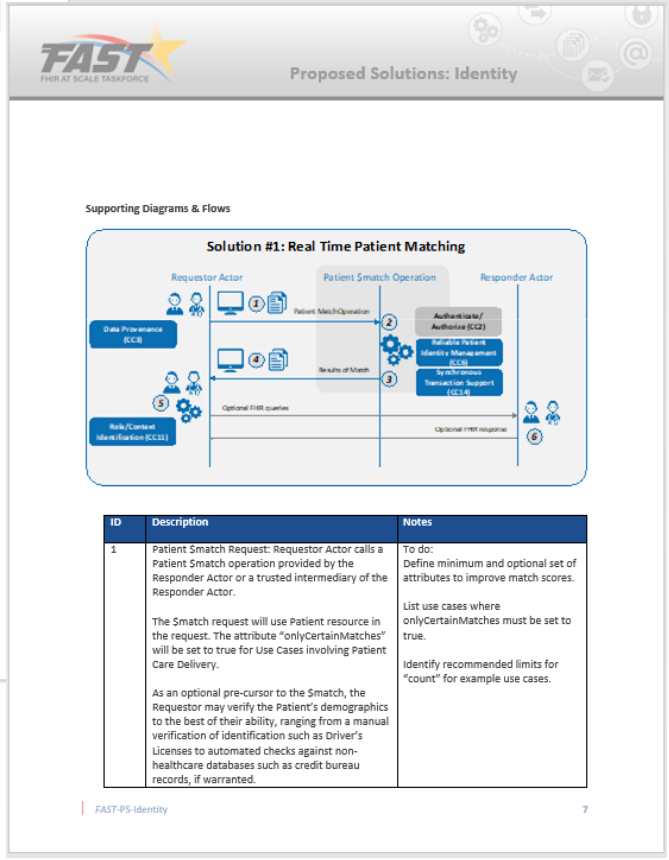
Published Content and *FAST* Artifacts









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FAST In View & Stay Connected

FAST In View:

- ***FAST* Workshop, September 14th, 2020** (*registration will open soon*)
- **Publish V3 of *FAST* Recommended Solutions**
- **Publish *FAST* Action Plan and Solutions Path Forward**
- **Continue Industry Engagement**

WANT TO GET INVOLVED??

Join the Technical Learning Community (TLC) to get updates and provide input on the technical and regulatory barriers, use cases, and proposed solutions as they are developed.

- ***Visit Project Page***
- ***SIGN UP!!***
- ***JOIN THE LINKEDIN GROUP (400+ members & growing!)***

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Questions?