



Solution 3: US-Wide SCALING Requirements for FHIR RESTful Exchange Intermediaries

As FHIR scales and the number of participants exchanging data grows, intermediaries (eg, clearinghouses, HIEs, or any entity that participates in the exchange of a FHIR-based transaction other than the ultimate Requestor and Responder) will wind up sitting in the middle of transactions for a variety of purposes, such as routing, value-added services (eg, endpoint resolution, patient matching, record location, version translation, error handling), and acting on behalf of organizations to become their endpoint. These intermediary implementations need to be complementary to, and supportive of, the end-to-end transaction requirements for FHIR. In order to achieve interoperability, rules of the road need to be defined for their participation in the healthcare ecosystem.

The existence of hybrid exchange models (eg, spoke/hub, direct connections/point-to-point, and regionally interconnected spoke/hub) create challenges in adopting standards for scaling FHIR and implementing consistent approaches for authentication, endpoint detection, standards for matching, and end-to-end performance. Additionally, providers and payers increasingly need to support real-time transactions embedded in the clinical workflow, which in many cases require a response prior to providers proceeding with diagnosis or treatment. Many intermediary models do not support these end-to-end synchronous real-time transactions, leading to lack of predictability, reliability, and consistent response times.

To address these challenges, the *FAST* team is proposing a solution that will support a hybrid environment moving forward, including point-to-point, gateway, and intermediary models. Minimum availability and performance requirements need to be established for any scale architecture including one or more intermediaries, with the requirement to support synchronous transactions and maintain “state” across intermediaries (ie, systems remember preceding events that occurred across multiple systems or actors). Intermediaries will need to support all FHIR workflow operations and be capable of handling volume, response time, and routing to all available endpoints. Consistent support of metadata is also needed for routing through multiple intermediaries. Finally, testing will validate conformance with these exchange and Service Level Agreement (SLA) requirements.

The goal is for ubiquitous access to permitted endpoints regardless of the architecture (ie, point-to-point, one intermediary, or multiple intermediaries). The performance reliability and availability characteristics should be substantially the same for intermediary connections and point-to-point connections and must be acceptable for real-time information exchange where there is a provider/patient waiting for the response before clinical workflow can continue. The ultimate application user, system, and API endpoint should see the rest of the world as a consistent set of endpoints, regardless of whether there is one or more intermediaries sitting in the middle of the exchange.



Solution 3: US-Wide SCALING Requirements for FHIR RESTful Exchange Intermediaries

Quick Reference Summary of Barrier and Solution With Links to Resources



BARRIER

Intermediaries will be needed to scale FHIR across a growing number of healthcare ecosystem participants in anticipation of future healthcare needs and increased transactions embedded in clinical workflows. Yet there are no rules of the road for intermediaries to meet minimum requirements for performance, availability, response times, or specific FHIR operations in support of synchronous end-to-end real-time data exchange



SOLUTION

- Ability to utilize intermediaries to reduce the complexity of connecting with a large number of endpoints and managing authentication and authorization with each
- Intermediaries will have predictable performance required to meet real-time exchanges
 - FHIR-enabled intermediaries
 - Standard for intermediary performance (SLAs)
 - Testing for conformance with exchange and SLAs
- Intermediaries may provide value-added services to assist in patient matching, version translation, etc.



OPEN ITEMS

- Determine scope of requirements
- Explore standards for intermediary-to-intermediary exchanges
- Clarify exchange services that must be supported
- Detail the specific availability and performance requirements
- Determine the best method for establishing requirements



IN SCOPE

- Interoperability models with, point-to-point, single and multiple intermediaries
- Issues related to RESTful FHIR exchanges/messages and related technologies (like CDS Hooks) via intermediaries
- Related authentication and authorization models (OAuth, OpenID, UDAP)
- Planning for future volume increase
- Establishing SLA and Performance requirements for intermediaries and endpoints
- Establishing functionality of endpoints and the method of declaration



BENEFIT

- Predictable end-end performance for FHIR RESTful exchanges
- Availability of FHIR endpoints regardless of the specific exchange architecture



OUT OF SCOPE

- Identification, security, directory, versioning, metadata, certification or piloting
- Ownership models
- Trust frameworks
- Legal agreements
- Non-RESTful exchange methods (eg, Direct)
- Technical Implementation



STATUS

Finalizing V2 solution documentation to obtain SME input



CURRENT SOLUTION

[FAST Scaling requirements for FHIR RESTful Exchange Intermediaries solution document \(V3 in progress\)](#)



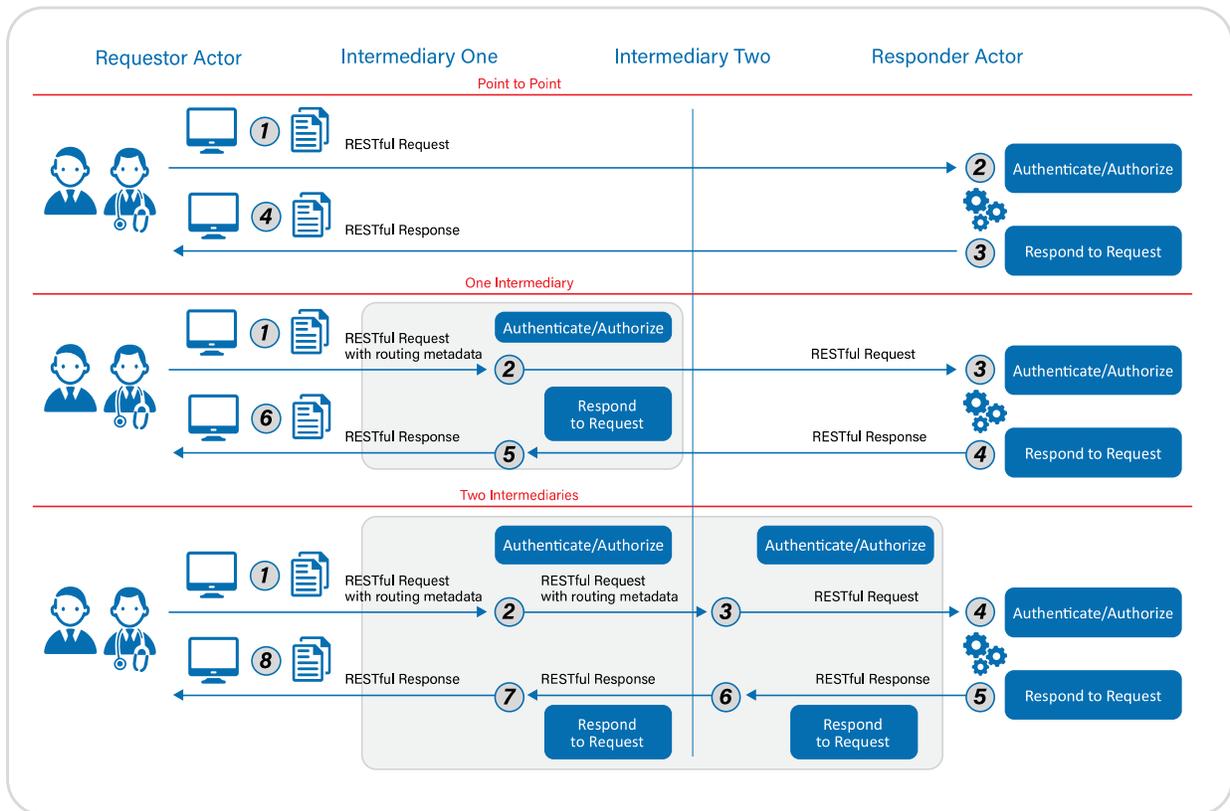
Solution 3: US-Wide SCALING Requirements for FHIR RESTful Exchange Intermediaries

Assuming the endpoint has already been determined via directory query, the following diagram represents 3 different exchange models that need to be supported in a mixed model environment with full connectivity.

Point-to-point: The Requestor uses the endpoint directory information to connect to the Responder endpoint and send the request. The Responder authenticates the Requestor, processes the request, and returns the results. The Requestor receives the response back from the Responder.

One intermediary: The Requestor uses the endpoint directory information to connect to the Intermediary endpoint and send the request including routing information. The Intermediary uses the routing information to connect to the Responder endpoint and sends the request. The Responder authenticates the Requestor/Intermediary, processes the request, and returns the results to the Intermediary. The Intermediary then returns the response to the Requestor and the Requestor receives the response from the intermediary.

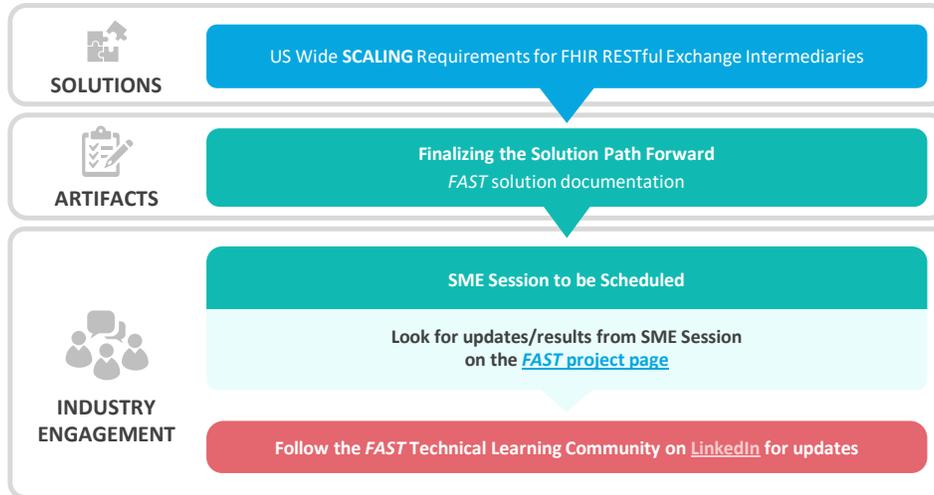
Two (or more) intermediaries: The Requestor uses the endpoint directory information to connect to Intermediary One's endpoint and send the request including routing information. Intermediary One uses endpoint directory information to connect to Intermediary Two's endpoint supporting the Responder and forwards the request including routing information. Intermediary Two uses the routing information to connect to the Responder endpoint and sends the request to the Responder. The Responder authenticates the Requestor/Intermediary, processes the request, and returns the results to Intermediary Two. Intermediary Two sends the response to Intermediary One and Intermediary One returns the response to the Requestor. The Requestor receives the response from Intermediary One.





Solution 3: US-Wide SCALING Requirements for FHIR RESTful Exchange Intermediaries

Next Steps and Industry Impact



The next steps for this solution are to:

Obtain SME input on the proposed solution



Next Steps

This solution will have the biggest impact on:

Payers, providers, health systems, EHRs, public health, application vendors, and intermediaries



Impacts

This solution offers these key benefits:

- Support adherence to the CMS proposed rules on reducing provider and patient burden by improving prior authorization processes and promoting patient's Electronic Access to Health Information
- Streamline and support value-based care workflows
- Increase scalability and improve interoperability between exchange partners



Key Benefits

Stakeholders of all stripes and types can help shape how this solution crystallizes for industry use by:

- Join the [FAST Technical Learning Community](#) on LinkedIn and stay tuned for updates coming out of the SME Session
- Visit the [FAST project page](#) for more information



Stakeholders