**FAST Hybrid / Intermediary Exchange FHIR IG**

January 2022 Connectathon Track scenarios (draft for discussion)

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| **Goal** | **Scenario and steps** | **Participants** |
| **Single intermediary**(synchronous) | **Scenario: Synchronous search; then retrieve a resource referenced in the search results**Steps:1. Obtain public URL of a destination that uses an intermediary
* Test multiple URL formats
* *Stretch: Retrieve public URL from an endpoint directory*
1. Submit search (GET)
* Resolves to the intermediary. Forwarded to destination
* Destination responds and uses its public URL in references to itself
* Intermediary passes back results unchanged
1. Retrieve a resource referenced in the search results (GET)
* Steps as above
 | eHx |
| **Multiple intermediary**(synchronous) | *As in Single Intermediary above, except:*1. …2. Submit search (GET)* Resolves to the first intermediary
* First intermediary forwards to the second intermediary
* Second intermediary forwards to the destination
* Destination responds and uses its public URL in references to itself
* Intermediaries pass back results unchanged

3. … | eHx |
| **Asynchronous / bulk data** (single intermediary) | **Scenario: Asynchronous search for large set of data. Poll and then retrieve response**Steps:1. Obtain public URL of a destination that uses an intermediary
2. Submit search (GET) using asynchronous pattern
* Header: Include Prefer:respond-async
* Query string: Include output format parameter \_outputFormat (string, optional, defaults to application/fhir+ndjson)
* Resolves to the intermediary. Forwarded to destination with headers preserved
* Destination responds with 202 Accepted. Includes Content-Location header with a URL for subsequent status requests
* Intermediary passes back response unchanged
1. Poll the URL provided in the Content-Location header to get the request status
2. Destination responds with 200 OK (results are ready) and body containing a link to the search results. E.g.,

{ "transactionTime": "[instant]", "request" : "[base]/Patient/$export?\_type=Patient,Observation",  "requiresAccessToken" : true, "output" : [{ "type" : "Patient", "url" : <http://serverpath2/patient_file_1.ndjson> },{ "type" : "Observation", "url" : <http://serverpath2/observation_file_1.ndjson> }], "error" : []}1. Retrieve output files using links in the status response body
 | eHxCan test with a HAPI FHIR server that is configured to support bulk data $export(note: that is not enabled in HAPI FHIR by default)Note: As Mike Y pointed out, the IG’s diagram (over) simplified the async steps… leaving out the 200 status response body containing the actual links to the results as shown here.(We’ll submit a ballot comment to update the IG’s diagram and wording.) |
| **Include security aspects** | **TLS.** All exchanges in the exchange SHALL use Transport Layer Security (TLS).* The inbound gateway intermediary SHALL hold the TLS certificate for the destination’s public FHIR service base URL
* The destination system and any delegated intermediaries SHALL hold the certificates for their servers’ private URLs.

**Tokens are passed-through intermediaries.** Security tokens generated by the destination for use by the originator SHALL be forwarded by any intermediaries to the originating client. | TLS:Token pass-through: eHx |
| **Exception handling scenarios** | **Destination-reported exceptions**Exception HTTP status codes generated by the destination are passed through unchanged by the intermediary to the originator.**Intermediary-reported exceptions**When an intermediary experiences an exception (including no HTTP response from a downstream actor) it:* Stops the process of routing the request
* Returns the associated HTTP status code

When an intermediary receives an exception reported by another intermediary, it passes the HTTP status code to the originator.

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| ***Exceptions reported by an intermediary*** |
| **Destination can’t be resolved** | 404 Not Found | Indicates that the destination could not be determined based on the submitted FHIR service base URL |
| **Attempt to connect to destination server timed out** (with no response) | 504 Gateway Timeout | Indicates that a timeout occurred when trying to reach the destination server. Resource that the gateway was trying to connect to timed out |
| **System error** | 500 Internal Error | The server may not be able to generate an OperationOutcome in a system error situation |
| ***Exceptions reported by the destination*** |
| **Submitted URL path returned Page/Resource Not Found** | 404 Not Found | Generated by the destination, regardless of whether using direct connect or an intermediary. Intermediary passes through the status code and OperationOutcome if returned by the destination |
| **Invalid request** (e.g., bad query content) | 400 Bad Request | *as above* |
| **System Error** | 500 Internal Error | *as above* |

 | eHx |
| ***Other?*** |  |  |