**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 | eHx  Can 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.   |  |  |  | | --- | --- | --- | | ***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?*** |  |  |