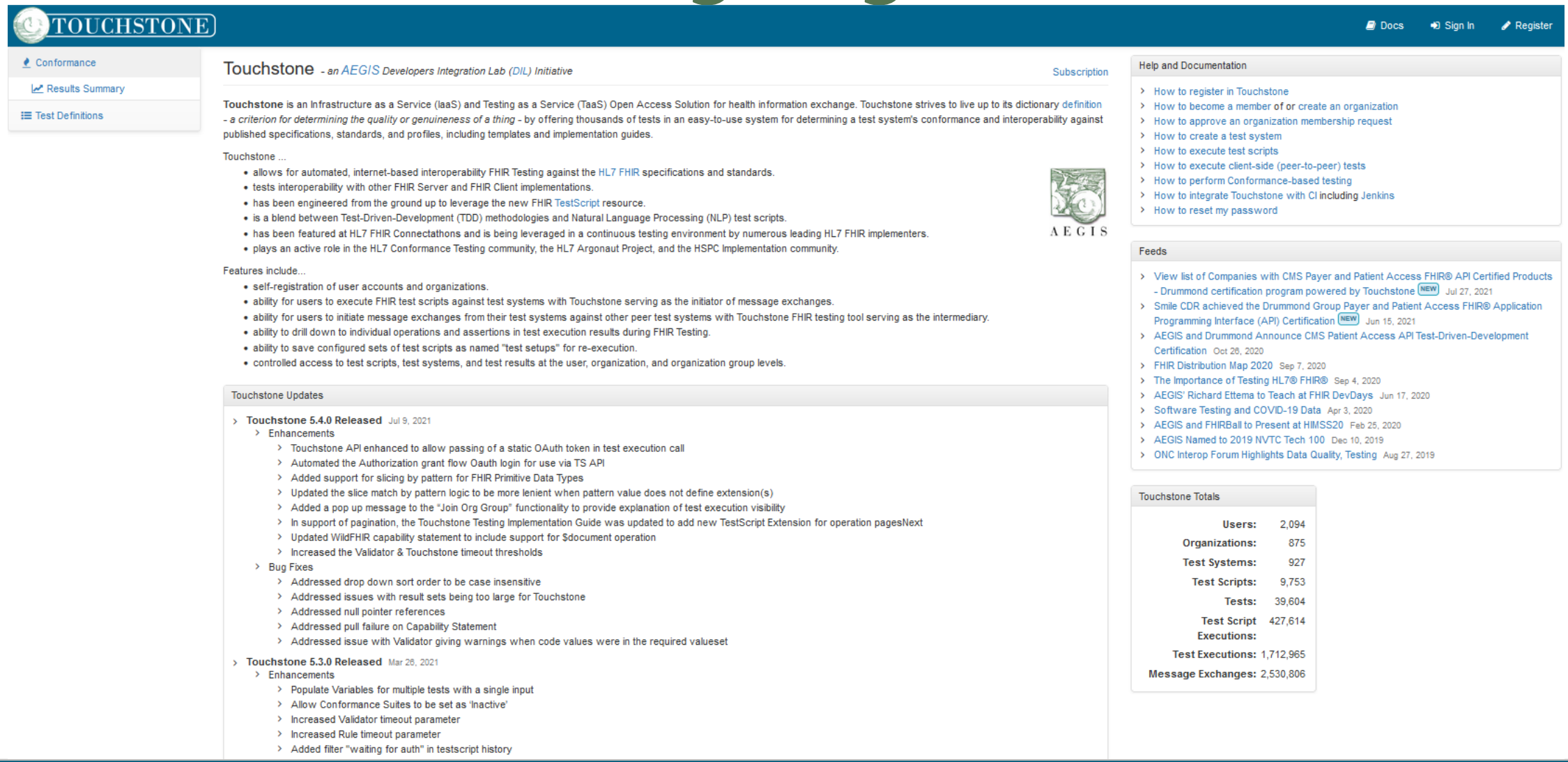
Getting Started with Touchstone

AEGIS

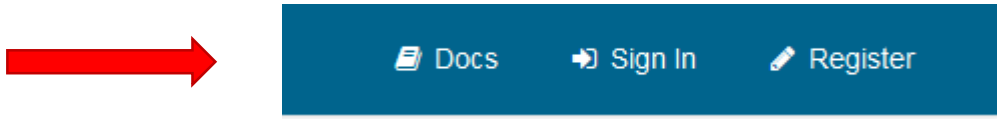
Touchstone

- Is available as a publicly accessible cloud-based testing platform
  - Touchstone.com
- Provides automated, internet-based interoperability testing of the HL7® FHIR® specification (and including CDS-Hooks)
- Tests the capabilities of and interoperability between both FHIR Server and Client implementations
- Allows easy access to test against the AEGIS.net WildFHIR servers

Touchstone Landing Page



Touchstone Docs – Online Help



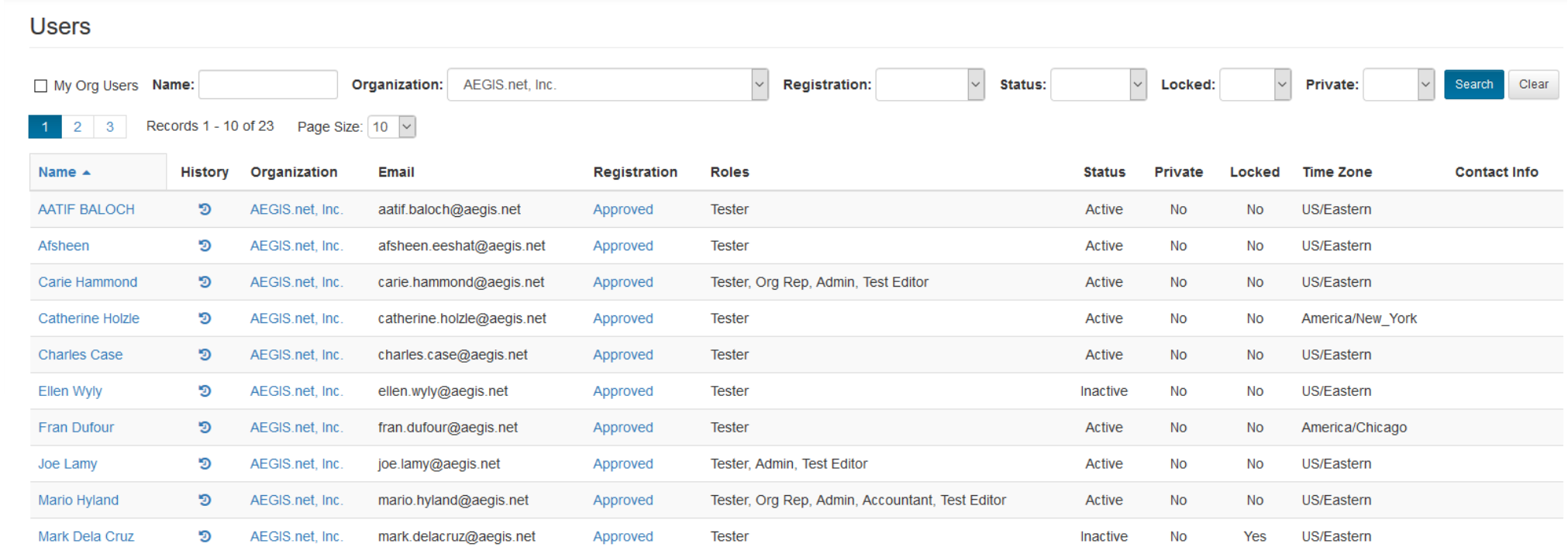
Getting Started with Touchstone

- All testing participants need to first Register with Touchstone
- Organizations may have 1 or more registered users on Touchstone (based on the organization's subscription level)
- Registration and acceptance of registration must be completed before any testing can begin
- An organization will typically have at least 1 test system and may choose to run tests against other publicly available test systems
  - There is not a limit to the number of test systems an Org can register

Role-Based Access

ORG Reps can set access for their members

- Select a USER to gain access to edit their role



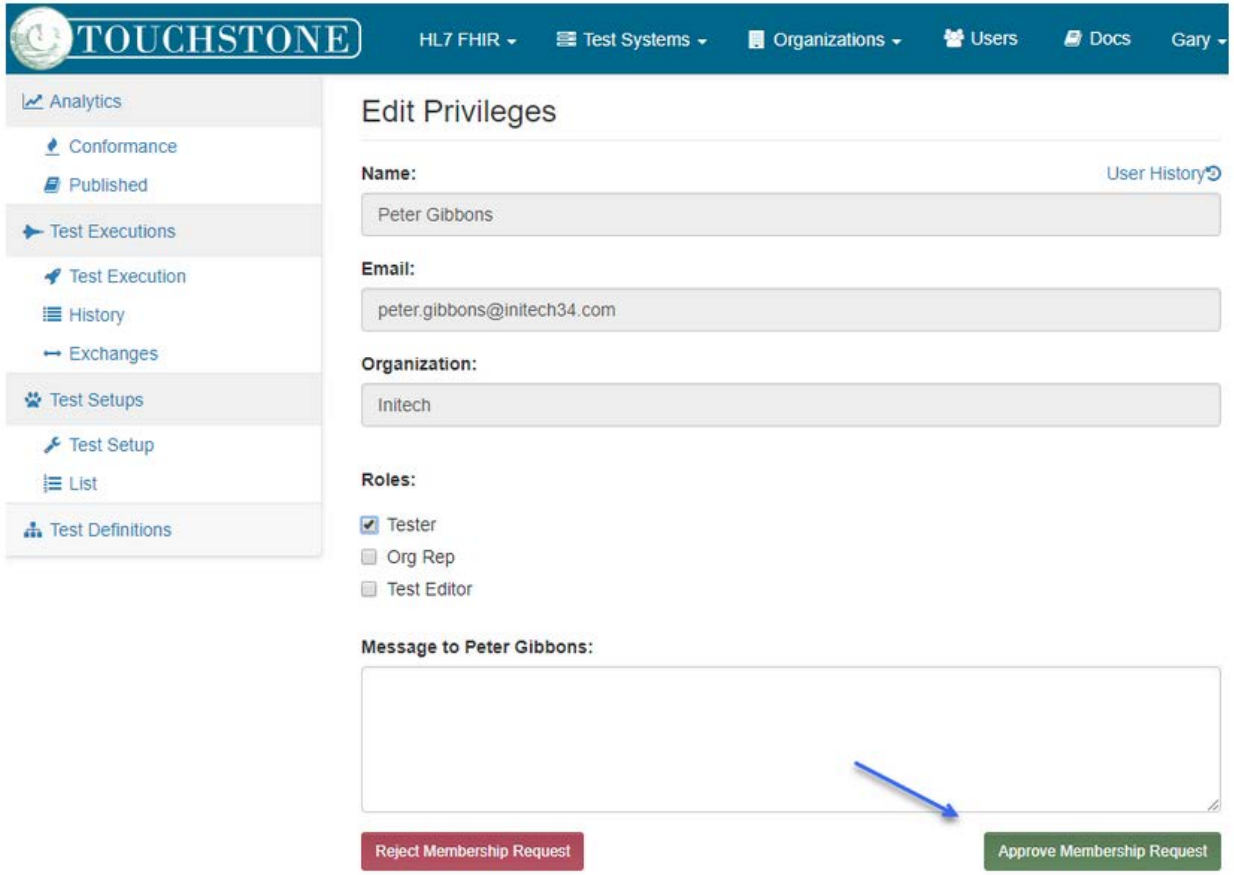
Users

My Org Users | Name: | Organization: AEGIS.net, Inc. | Registration: | Status: | Locked: | Private: | Search | Clear

1 2 3 Records 1 - 10 of 23 Page Size: 10

Name	History	Organization	Email	Registration	Roles	Status	Private	Locked	Time Zone	Contact Info
AATIF BALOCH		AEGIS.net, Inc.	aatif.baloch@aegis.net	Approved	Tester	Active	No	No	US/Eastern	
Afsheen		AEGIS.net, Inc.	afsheen.eeshat@aegis.net	Approved	Tester	Active	No	No	US/Eastern	
Carie Hammond		AEGIS.net, Inc.	carie.hammond@aegis.net	Approved	Tester, Org Rep, Admin, Test Editor	Active	No	No	US/Eastern	
Catherine Holzle		AEGIS.net, Inc.	catherine.holzle@aegis.net	Approved	Tester	Active	No	No	America/New_York	
Charles Case		AEGIS.net, Inc.	charles.case@aegis.net	Approved	Tester	Active	No	No	US/Eastern	
Ellen Wyly		AEGIS.net, Inc.	ellen.wyly@aegis.net	Approved	Tester	Inactive	No	No	US/Eastern	
Fran Dufour		AEGIS.net, Inc.	fran.dufour@aegis.net	Approved	Tester	Active	No	No	America/Chicago	
Joe Lamy		AEGIS.net, Inc.	joe.lamy@aegis.net	Approved	Tester, Admin, Test Editor	Active	No	No	US/Eastern	
Mario Hyland		AEGIS.net, Inc.	mario.hyland@aegis.net	Approved	Tester, Org Rep, Admin, Accountant, Test Editor	Active	No	No	US/Eastern	
Mark Dela Cruz		AEGIS.net, Inc.	mark.delacruz@aegis.net	Approved	Tester	Inactive	No	Yes	US/Eastern	

Role-Based Access



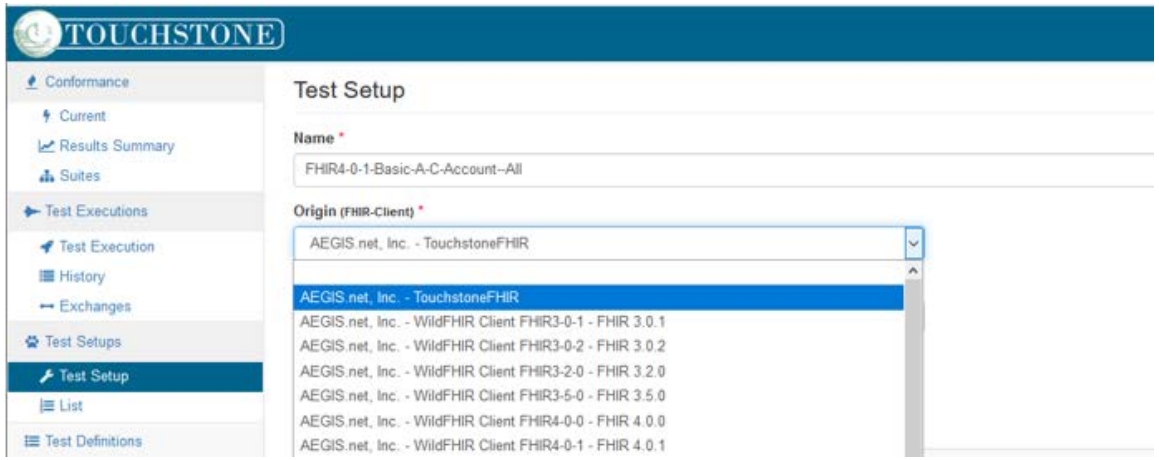
Test Systems

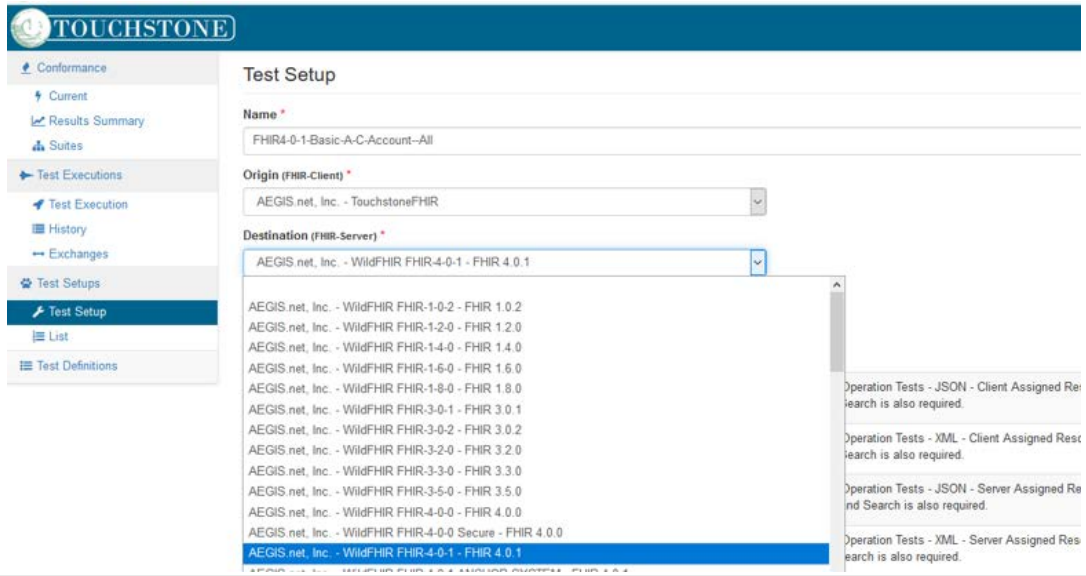
What Test Systems are already in Touchstone?

- Touchstone has over 750+ Test Systems already defined
- Not all of those Test Systems are publically available for testing
  - Of those 750+, around 475 of those are private
  - Private Test Systems are only seen by members their own Orgs
- How a Test System is defined in Touchstone determines who can see and test with it
- The Test System List shows users which Test Systems belong to their Organization AND shows public Test Systems

How are Test Systems used?

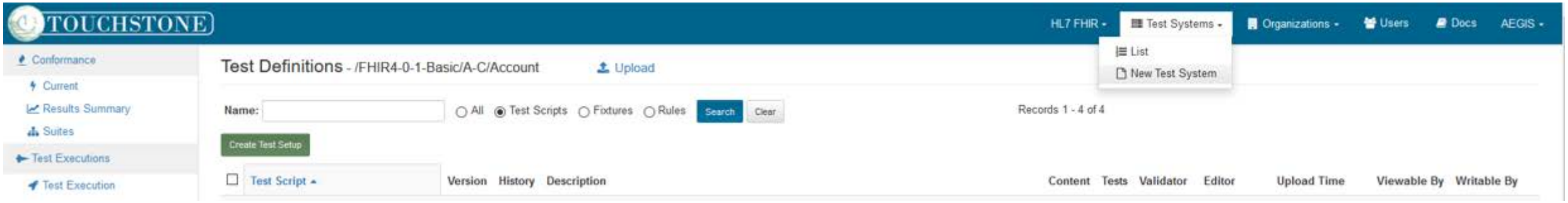
- Touchstone allows for server-side testing, client-side testing, or peer-to-peer testing
- When a test is setup, the tester can select which client (requesting system) and which server (destination system) will be used in the test





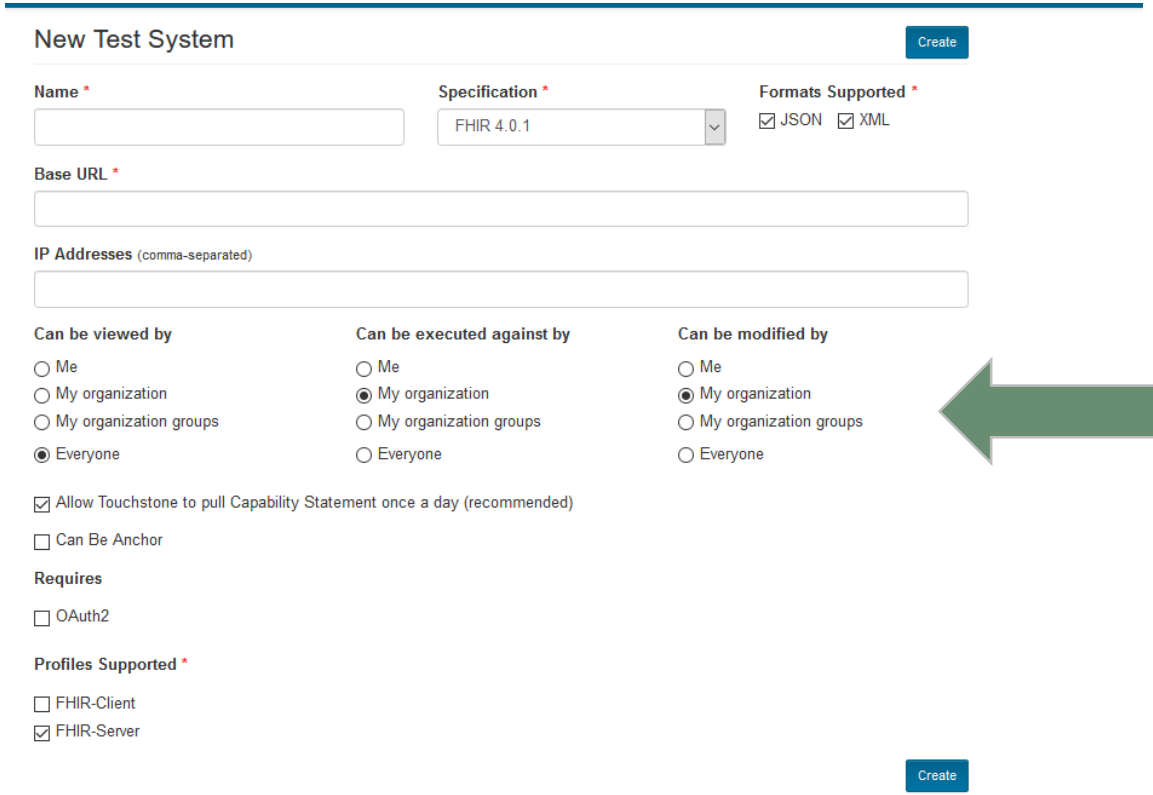
Registering Your Test System

- If you have a Test System that is not known to Touchstone yet, it will need to be registered to show up on those lists
- Navigate to the top menu, selecting Test System > New Test System



Registering Your Test System, cont.

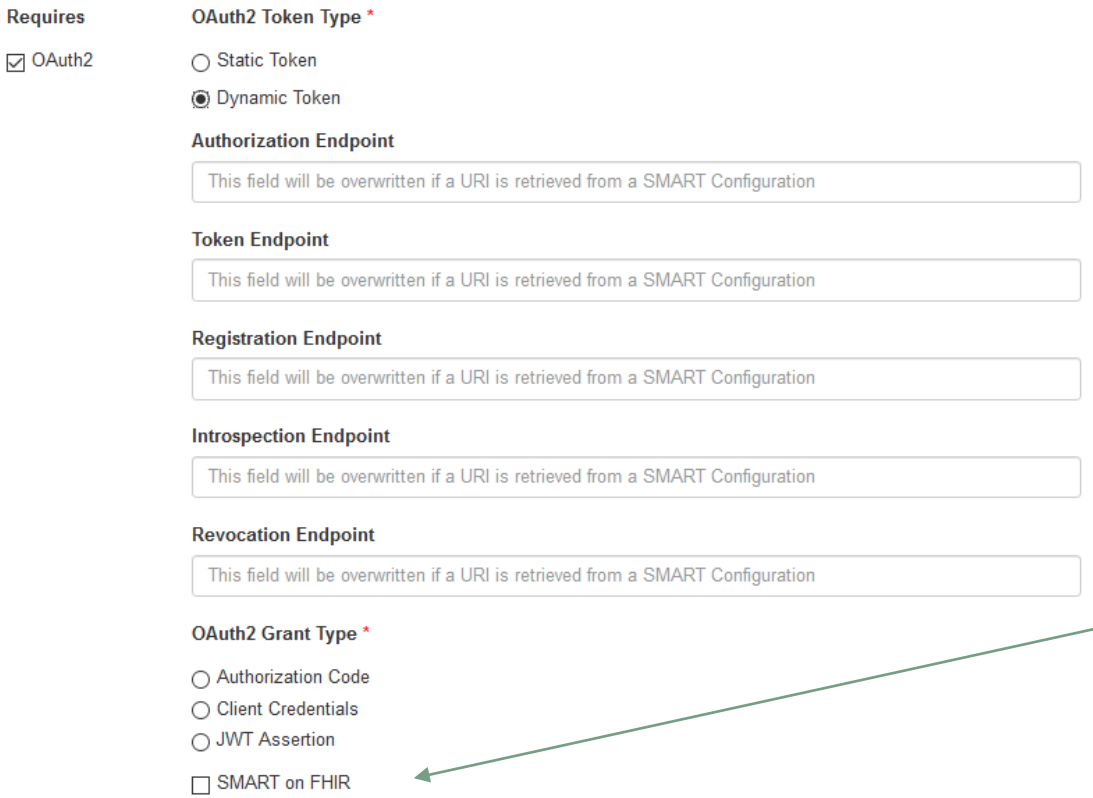
- Touchstone will open a new blank Test System screen



Selections in this section will drive who can see your Test System or run tests against it

Registering Your Test System, cont.

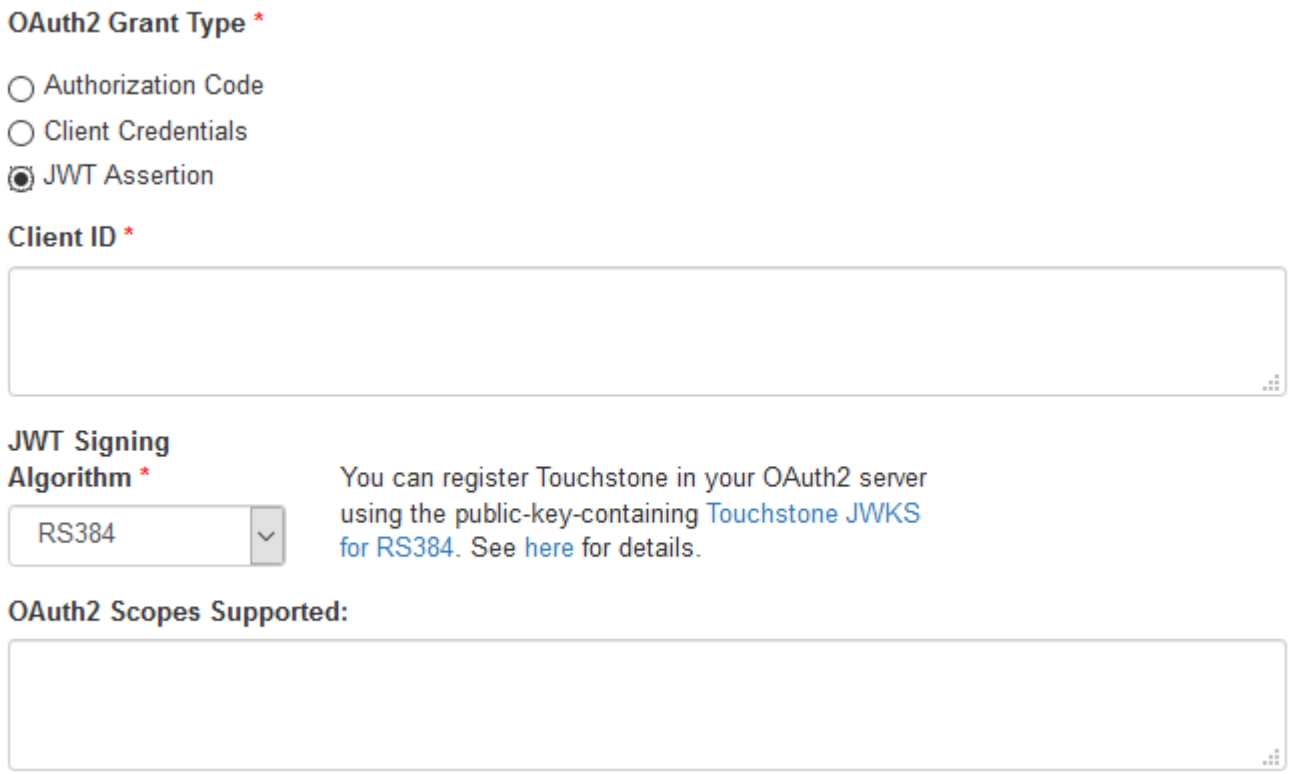
- If your system is OAuth enabled, select the Oauth2 checkbox for additional configuration



Selecting SMART-on-FHIR will cause Touchstone to attempt to pull the SMART Well-Known configuration when the Capability Statement is pulled.

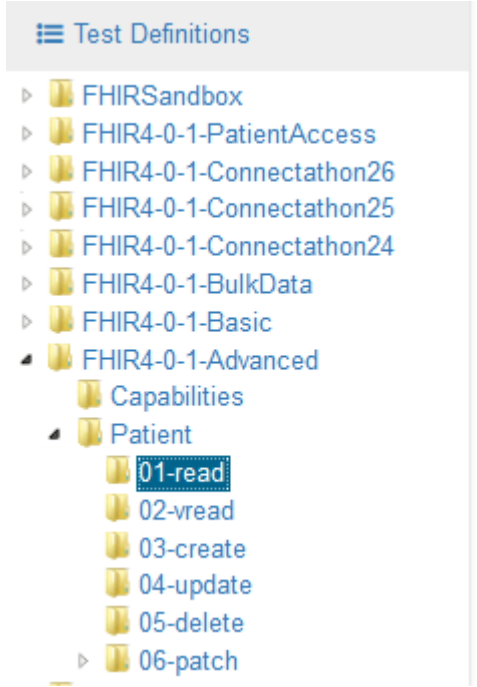
Registering Your Test System, cont.

- Selection of Oauth2 Grant Type will open further configuration fields



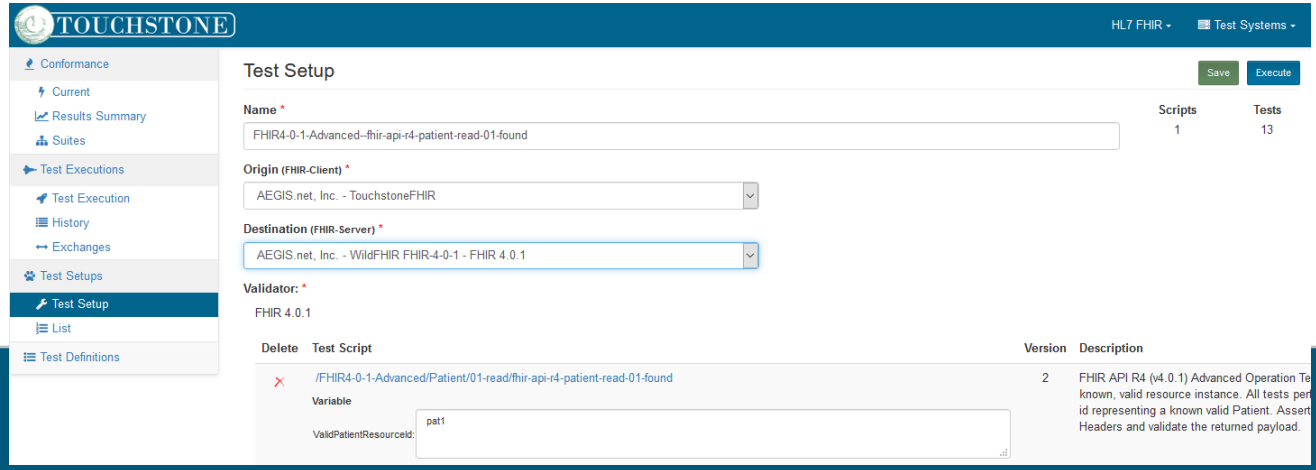
Completing Setup

- Once created, pull your Test System's Capability Statement (and potentially SMART Well-Known configuration file)
  - Verifies basic connectivity
  - Caches a copy of the CapabilityStatement for conformance checking
  - Can populate your SMART end-points dynamically
- Once ready, try running a quick test
  - suggestion, FHIR4-0-1-Advanced > Patient > 01-read



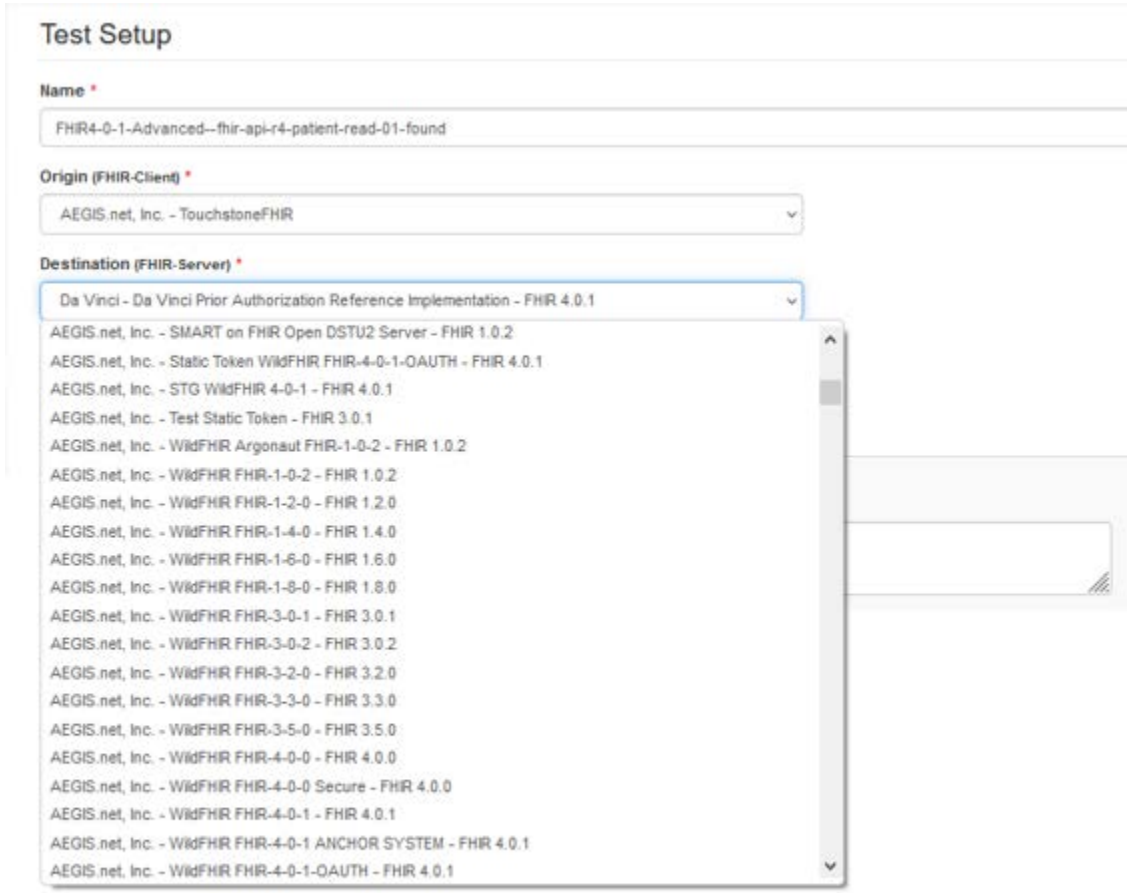
Selecting Test Systems on a Test

- When a Test Setup is created, the tester can choose which Test Systems should be involved in the test
- If you are testing a FHIR-Server, you may select AEGIS TouchstoneFHIR as your FHIR-Client in the Origin list (Touchstone will act as the client) if needed
  - Select your Test System from the Destination list
- If you are testing a FHIR-Client, select that client from the Origin list
  - Select a Test System from the Destination list (If you need a server to test your client with, you may select an AEGIS WildFHIR server or any publically available server from the list)
- Only Test Systems available to the user will display in the lists for selection



Selecting Test Systems on a Test (cont.)

- Only Test Systems available to the user will display in the lists for selection



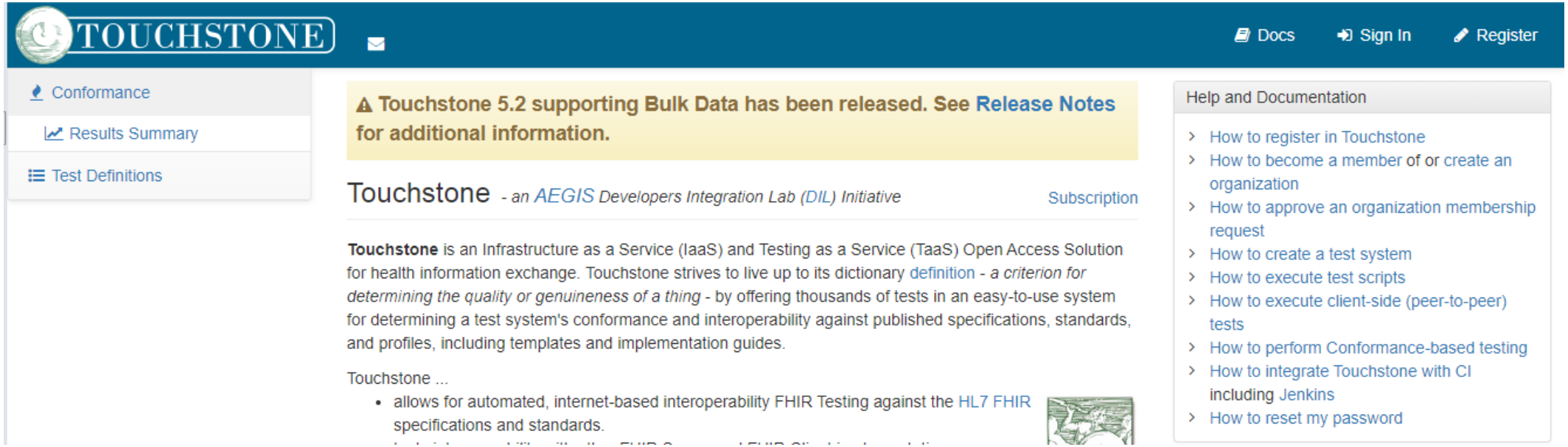
Common Issues

- The server under test is returning a 401 error instead of good response
  - Verify the Test System setup
    - Is the Client ID/Client Secret correct for Oauth2 enabled systems?
    - Are the scopes correct?
- I cannot get a response from my Test System at all
  - Is your endpoint correct?
  - Is your Test System accessible outside your firewall?
  - Does your organization need to white-list Touchstone? Check with Touchstone_Support@aegis.net for full list of IP ranges
- My Test System sent a CapabilityStatement, but Touchstone indicated a problem
  - Touchstone will automatically validate a Test System CapabilityStatement when pulled, even when the system is not yet under test.
  - Touchstone WILL still allow that system to continue testing, but will remind the tester of the issues
- My Test System doesn't have a CapabilityStatement
  - Touchstone will still allow that system to continue testing, but will remind the tester at each test that it is required per the FHIR specification

Running Tests &
Reviewing Test Results

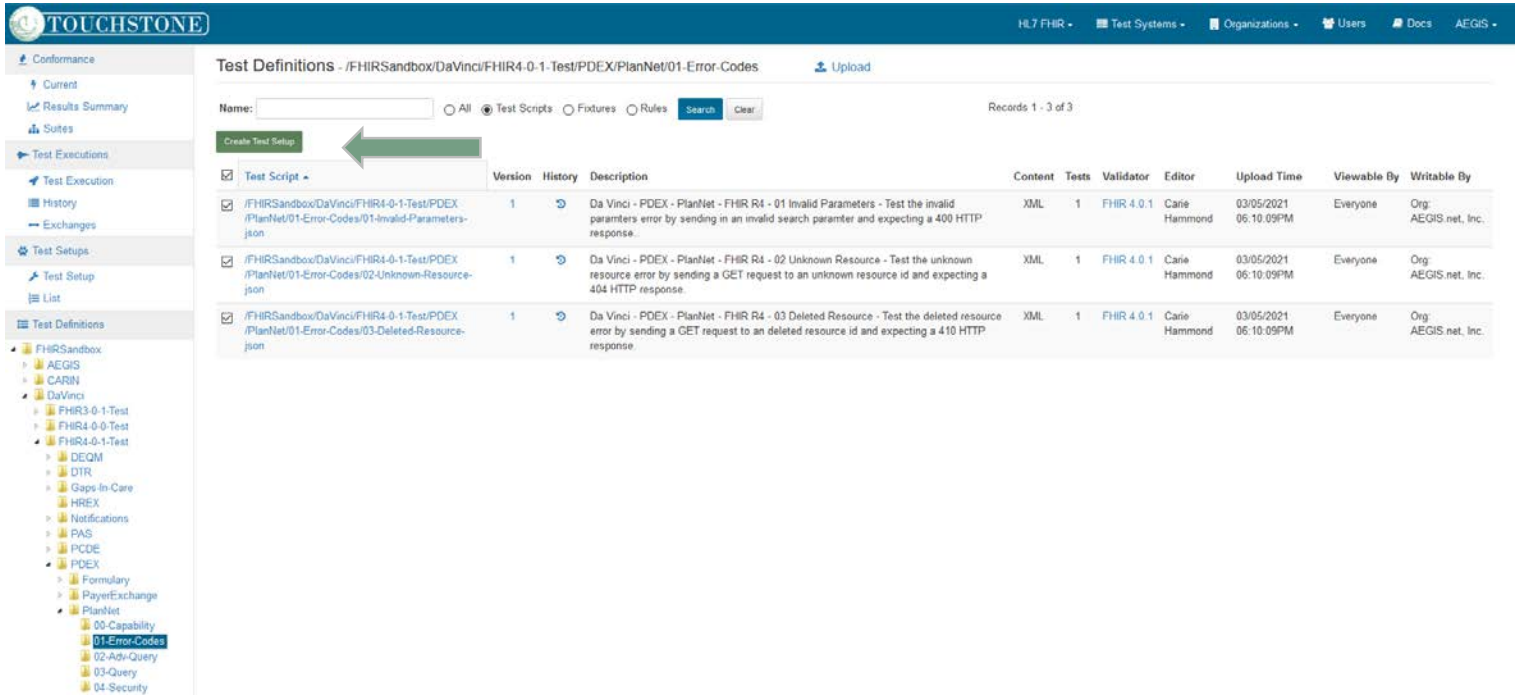
Finding Tests in Touchstone

- From the Home Page, select **Test Definitions** from the left side menu
  - Signing-in makes the Test Definitions available to execute
  - Users can only see the Tests viewable to them – some are hidden by their Org



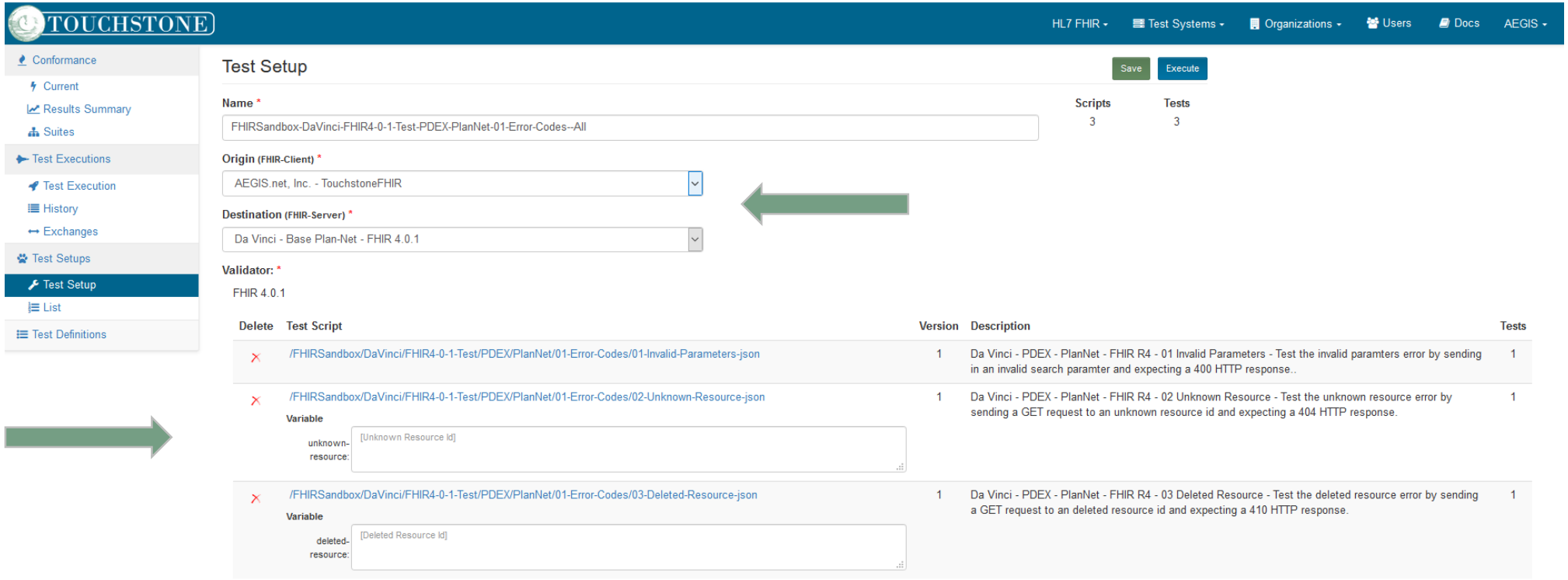
Create a Test Setup

- Under the Test Definitions menu, select a test folder
- Select one or more TestScripts, then
- Click **Create Test Setup**



Test Setup

- The Test Setup screen is displayed
- This screen allows for selection of the test system(s) involved in the test
- Variables may also be entered on this screen

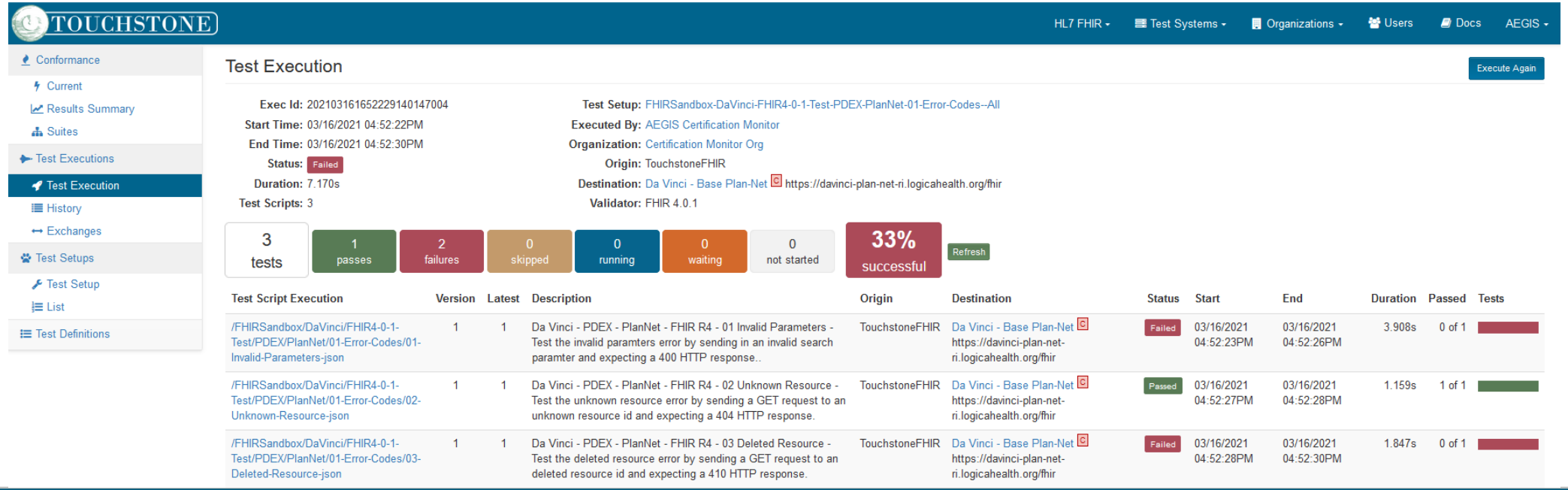


Test Execution

- **Execute** starts the execution and takes you to the Test Execution page
- Click the links under Test Script Execution for details

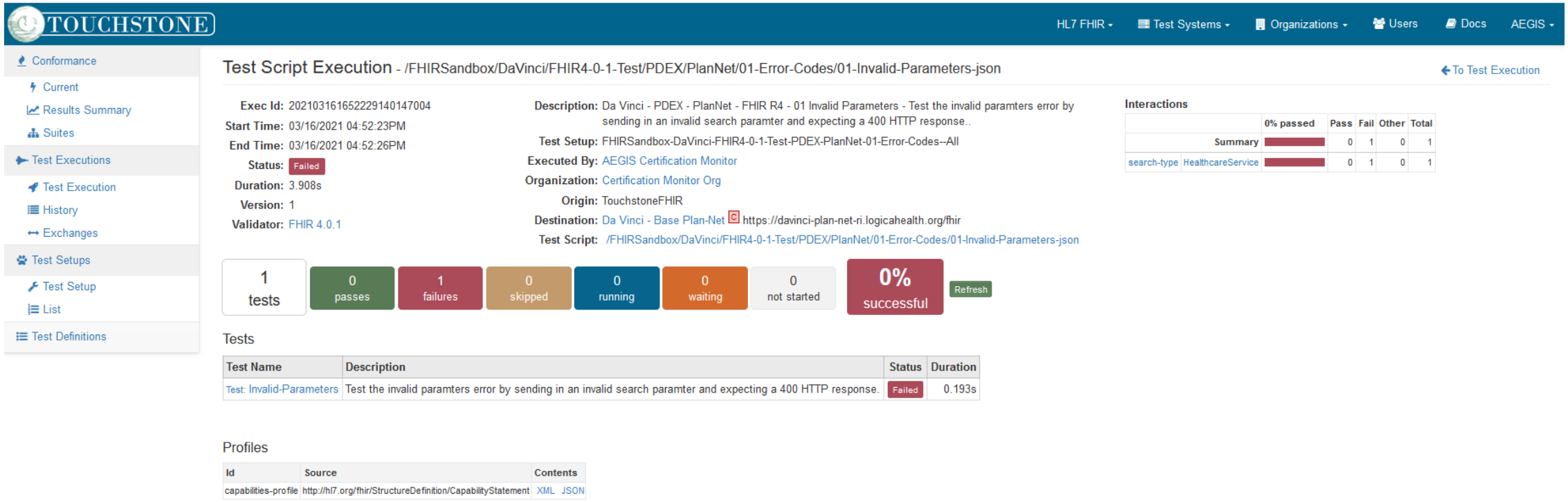
Test Results

- Execution details for each test in the TestScript are displayed on Test Script Execution
- Click on the Test Name OR the Status button for details about each test in the testscript
- The details of each test including Operations and Asserts are displayed
- Test Step operation details can be expanded (...), displayed (**Body**) and collapsed/hidden (hide)



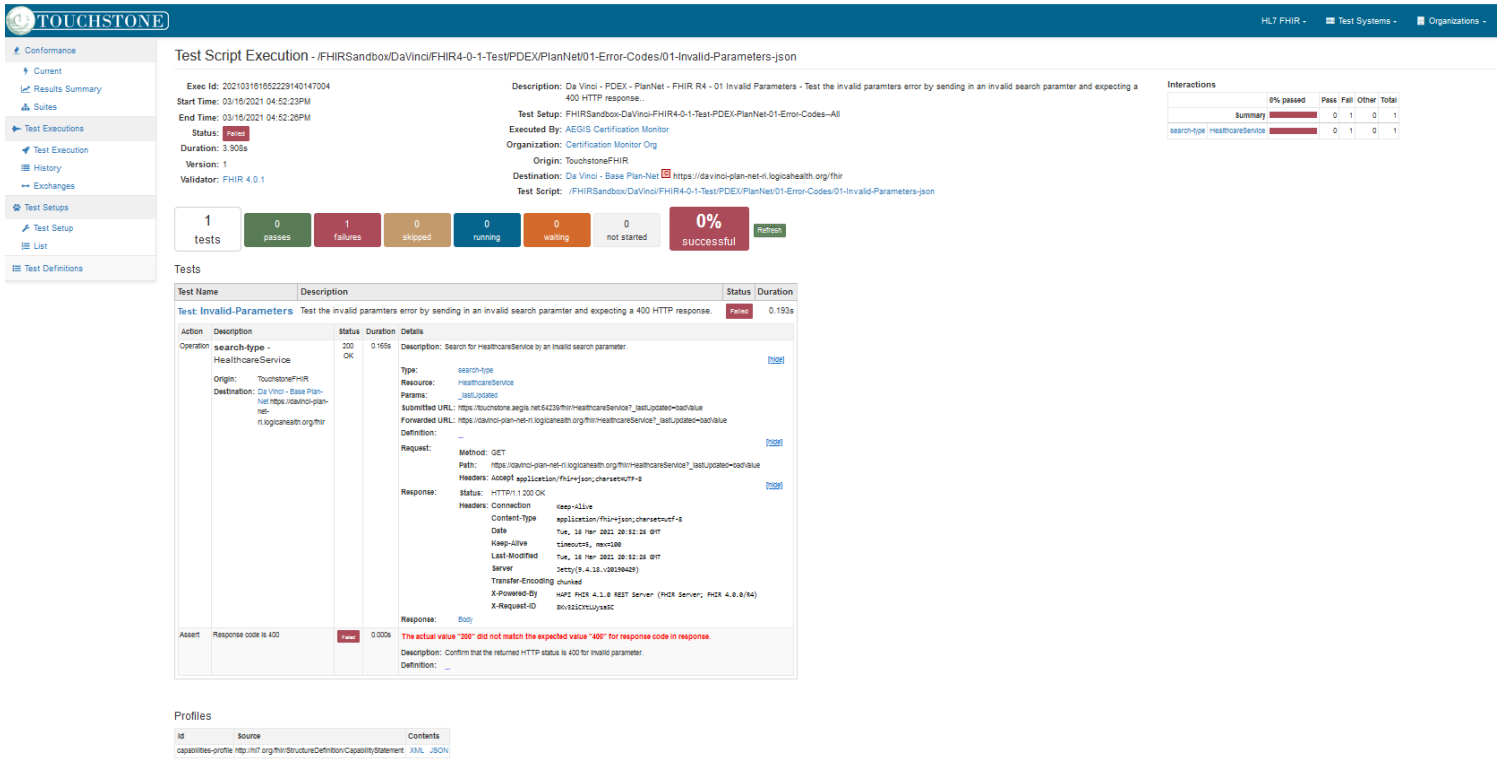
Test Results, Cont.

- Click on the Status button or the hyperlink for the test to see individual test results



Test Results, Cont.

- Continue to dig deeper into results by clicking the Status or Test Name hyperlinks to see assertions and operations as well as detailed results



In this example, the test is searching using an invalid search parameter and the expected response is a 400.
This server returned a 200 & fails.

6.1.2.1 FHIR RESTful Capabilities

The Plan-Net Server **SHALL**:

1. Support all profiles defined in this Implementation Guide..
2. Implement the RESTful behavior according to the FHIR specification.
3. Return the following response classes:
   - (Status 400): invalid parameter
   - (Status 401/4xx): unauthorized request
   - (Status 403): insufficient scope
   - (Status 404): unknown resource
   - (Status 410): deleted resource.

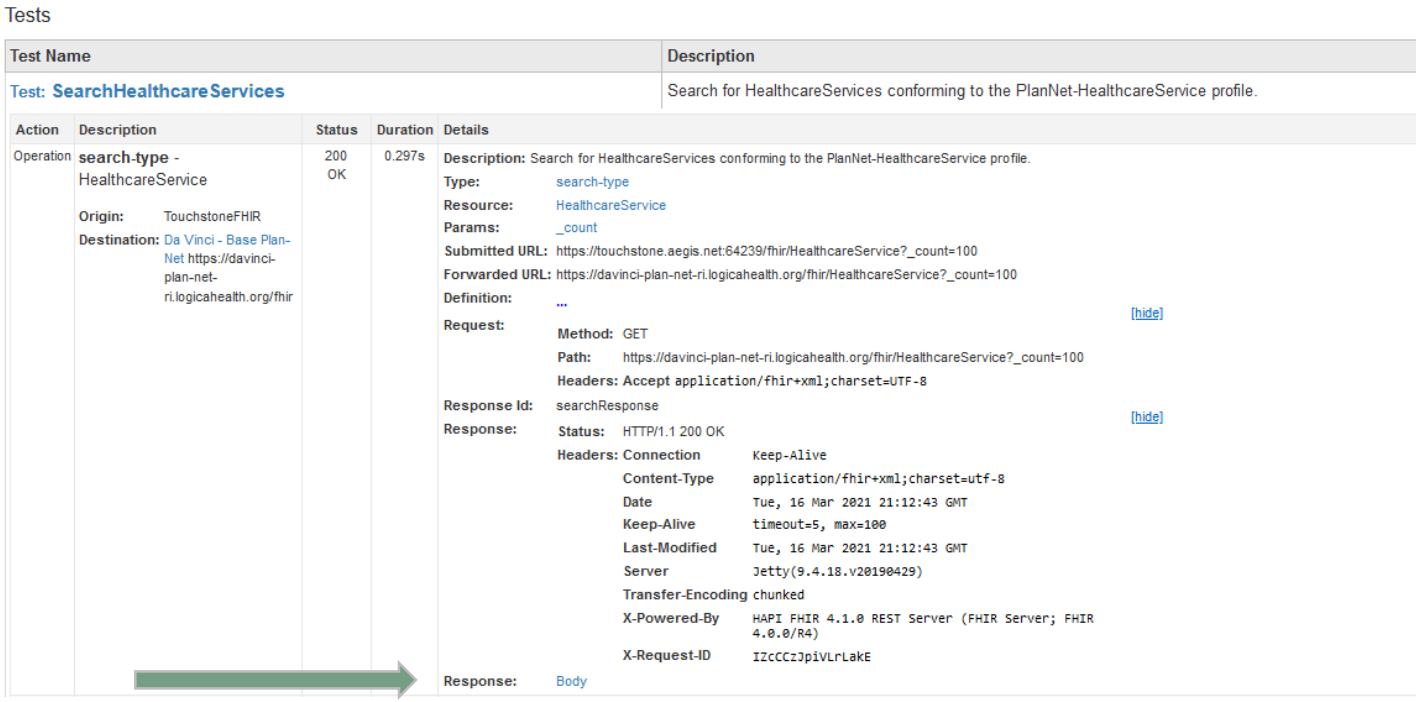
Test Results When Profile Validation fails

- In this example of Test Results, the TestScript has an assertion performing Profile Validation. A listing of ALL found errors and warnings will be displayed. These come from the Validation engine interpreting the Structure Definition of the resource being tested and provide detailed descriptions of non-compliance.
  - Errors are shown in Red
  - Warnings are shown in Orange

Assert	Response validates against the profile id 'PDex-PlanNet-HealthcareService-profile'	Warning	0.070s	Validation of response body against profile 'http://hl7.org/fhir/us/davinci-pdex-plan-net/StructureDefinition/plannet-HealthcareService' by FHIR specification's Validation Engine produced the following results: 1. WARNING: [Display Name for http://hl7.org/fhir/us/davinci-pdex-plan-net/CodeSystem/HealthcareServiceCategoryCS#pharm should be one of 'Pharmacy' instead of Pharm]. Location: HealthcareService.category[0] (line 35, col 14). 2. WARNING: None of the codes provided are in the value set http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS (http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS, and a code from this value set is required) (codes = http://nucc.org/provider-taxonomy#333600000X). Location: HealthcareService.specialty[0] (line 43, col 15). 3. WARNING: None of the codes provided are in the value set http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS (http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS, and a code from this value set is required) (codes = http://nucc.org/provider-taxonomy#3336C0002X). Location: HealthcareService.specialty[1] (line 51, col 15). 4. WARNING: None of the codes provided are in the value set http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS (http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS, and a code from this value set is required) (codes = http://nucc.org/provider-taxonomy#3336C0003X). Location: HealthcareService.specialty[2] (line 59, col 15). 5. WARNING: None of the codes provided are in the value set http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS (http://hl7.org/fhir/us/davinci-pdex-plan-net/ValueSet/SpecialtiesVS, and a code from this value set is required) (codes = http://nucc.org/provider-taxonomy#3336H0001X). Location: HealthcareService.specialty[3] (line 67, col 15). 6. WARNING: A resource should have narrative for robust management [text.div.exists()]. Location: HealthcareService (line 1, col 48). **Description:** (WARNING ONLY) Validate PDex HealthcareService within the response. Warning only to allow review of all assert results. **Definition:** ...

Test Results - More

- Touchstone allows for the tester to see all details of a Request and Response for any Operation
  - Use the ellipsis **...** on any Operation step to expand the details
  - Hyperlinks expand to show details like Request Body or Response Body



Tests

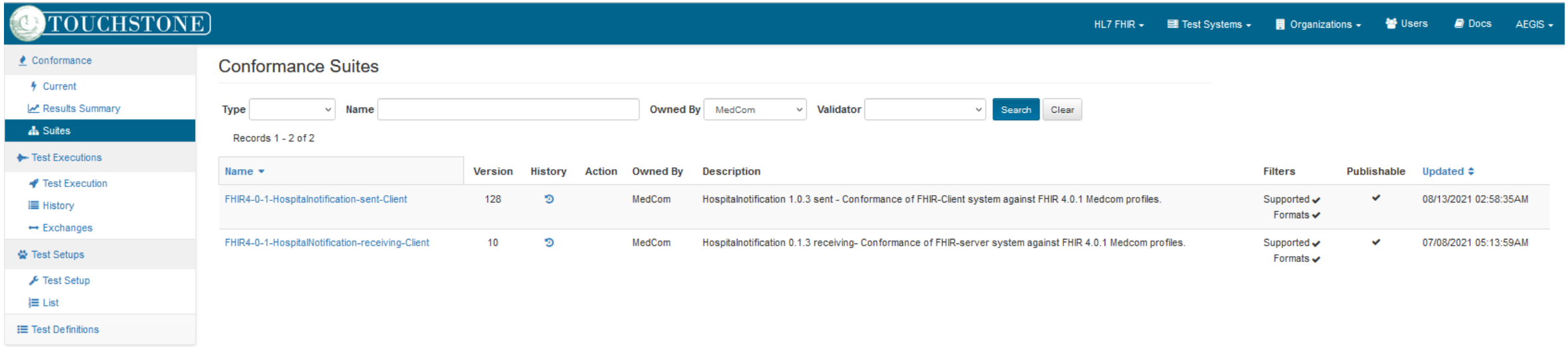
Test Name	Description
Test: **SearchHealthcareServices**	Search for HealthcareServices conforming to the PlanNet-HealthcareService profile.

Action	Description	Status	Duration	Details
Operation	**search-type** - HealthcareService **Origin:** TouchstoneFHIR **Destination:** Da Vinci - Base Plan-Net https://davinci-plan-net-ri.logicahealth.org/fhir	200 OK	0.297s	**Description:** Search for HealthcareServices conforming to the PlanNet-HealthcareService profile. **Type:** search-type **Resource:** HealthcareService **Params:** _count **Submitted URL:** https://touchstone.aegis.net:64239/fhir/HealthcareService?_count=100 **Forwarded URL:** https://davinci-plan-net-ri.logicahealth.org/fhir/HealthcareService?_count=100 **Definition:** ... [hide] **Request:** **Method:** GET **Path:** https://davinci-plan-net-ri.logicahealth.org/fhir/HealthcareService?_count=100 **Headers:** Accept application/fhir+xml;charset=UTF-8 **Response Id:** searchResponse [hide] **Response:** **Status:** HTTP/1.1 200 OK **Headers:** Connection: Keep-Alive Content-Type: application/fhir+xml;charset=utf-8 Date: Tue, 16 Mar 2021 21:12:43 GMT Keep-Alive: timeout=5, max=100 Last-Modified: Tue, 16 Mar 2021 21:12:43 GMT Server: Jetty(9.4.18.v20190429) Transfer-Encoding: chunked X-Powered-By: HAPI FHIR 4.1.0 REST Server (FHIR Server; FHIR 4.0.0/R4) X-Request-ID: IZcCCzJpiVLrLakE **Response:** Body

Testing Using Suites

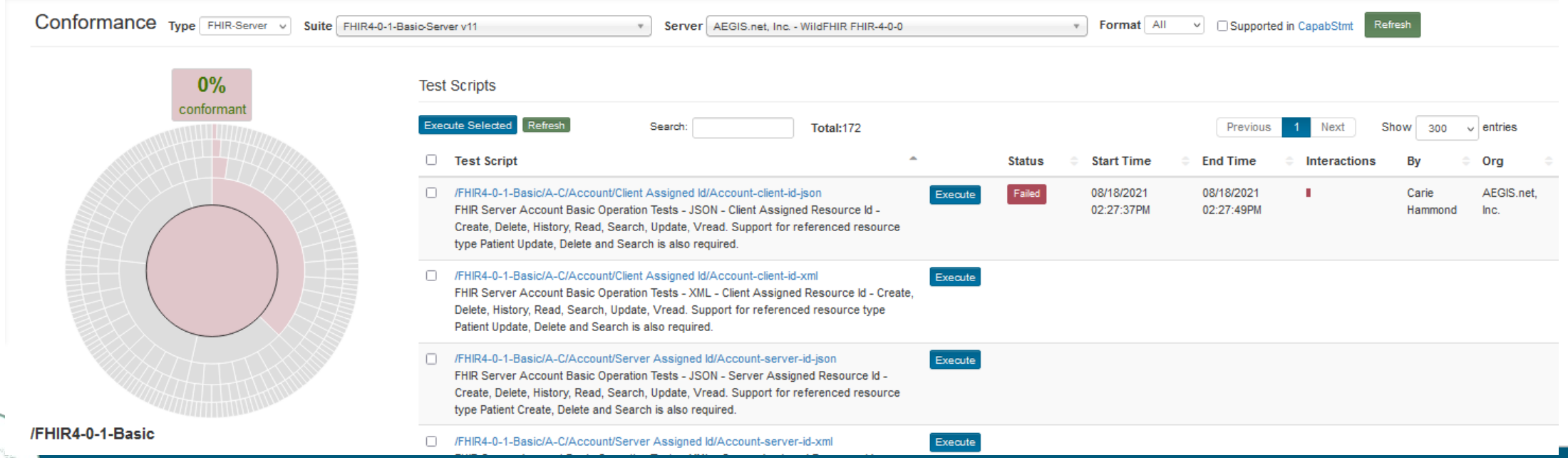
Conformance Suites

- Suites are collections of Test Scripts that are grouped together and provide an easy way to test and to see test results
- From the left side menu, select Suites and the list of Suites available to that user will display



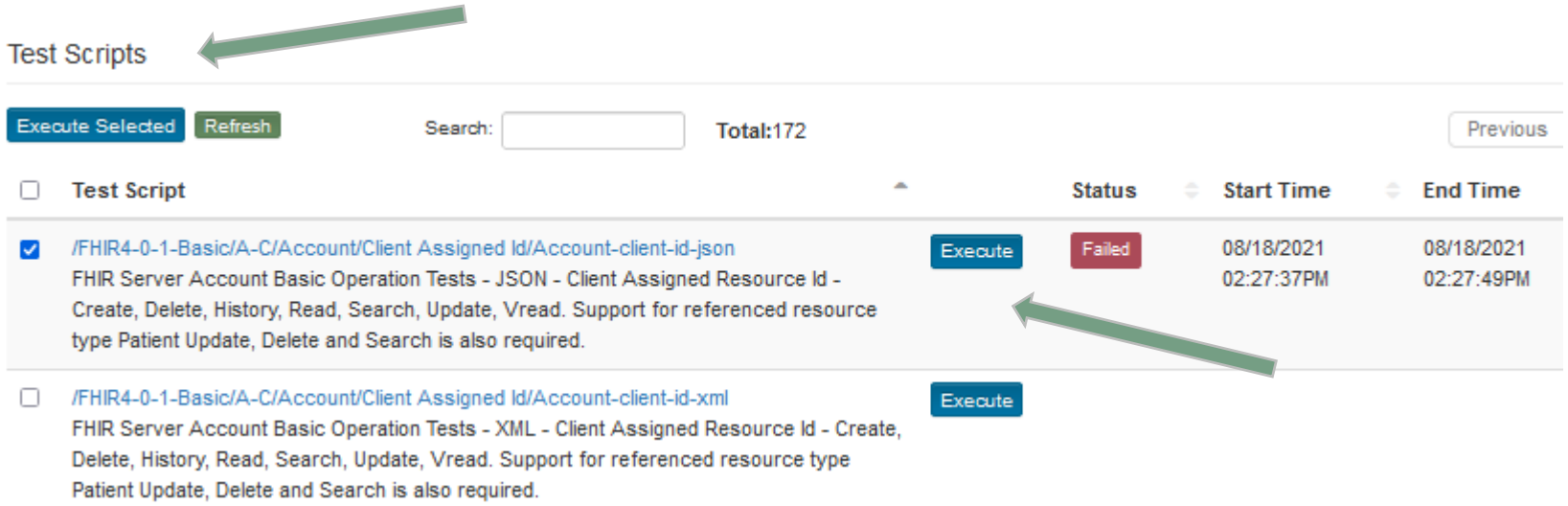
Conformance Suites (cont.)

- Clicking on the Suite name hyperlink will take the user to the Current view where the test scripts display and the user can select the server to run against
- Note that Suites that test FHIR-Clients have an anchor system already defined as the destination server, so that does not need to be selected
- Note that Suites that test FHIR-Servers have an origin system already defined as the FHIR-Client, so that does not need to be selected



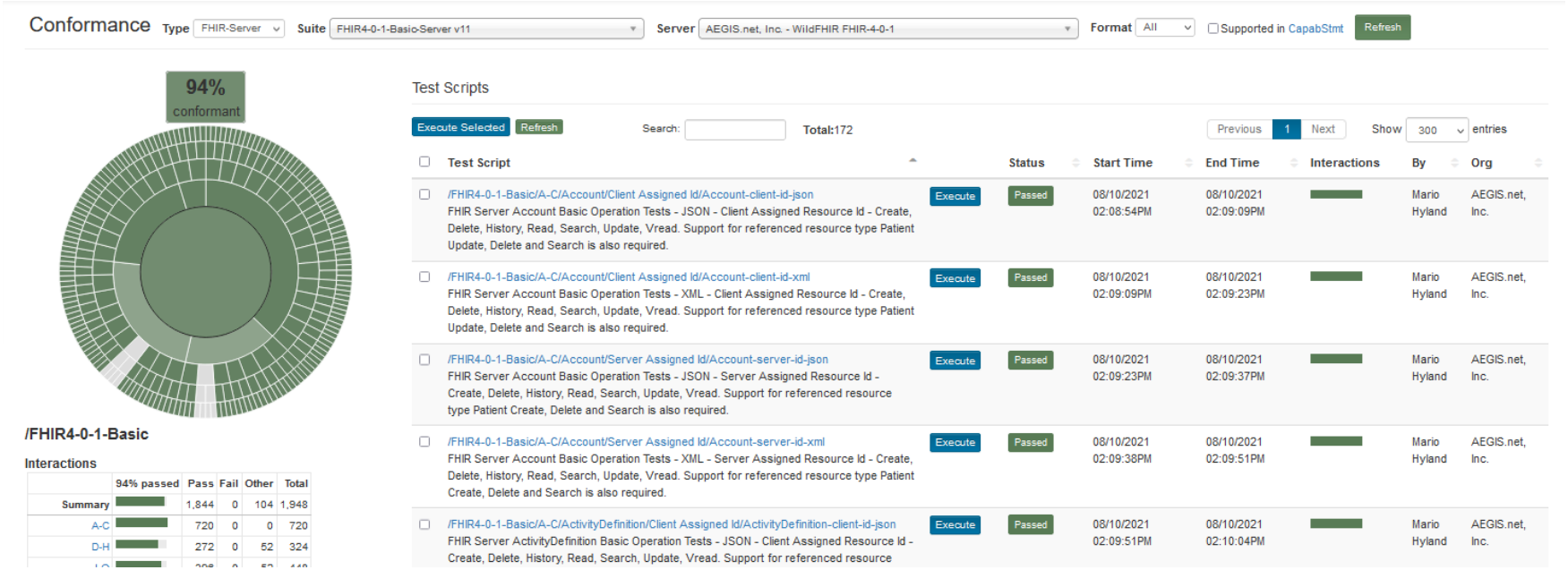
Conformance Suites (cont.)

- Testers can select any or all of the tests on this page and either run them one at a time or select several and execute the ones selected
- The page will refresh automatically and results will be shown on the page
  - Note that for FHIR-Client Tests, the test will remain in Waiting status until the Client issues a request to Touchstone
- Select any test execution Status on the page to view the details of that test



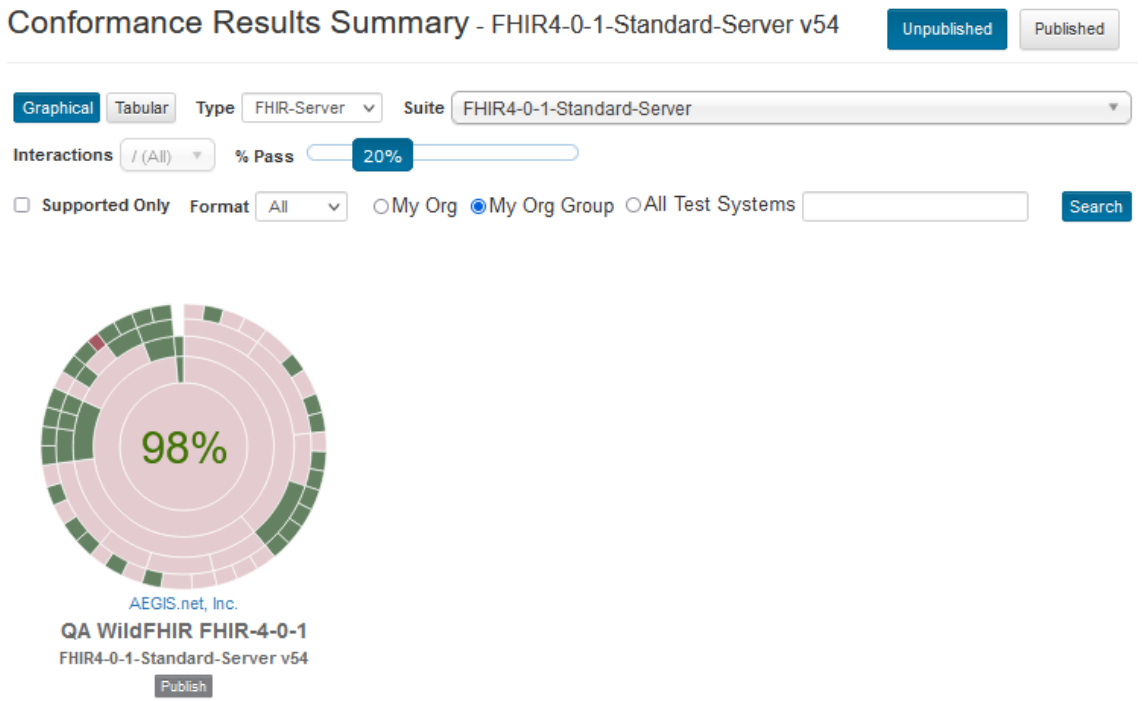
Conformance Suites (cont.)

- Testers can rerun tests after correcting their test server behavior as needed
- The Conformance Suite will overlay the latest test run results
  - Servers that previously failed a test can update that result by running it again here



Conformance Suites (cont.)

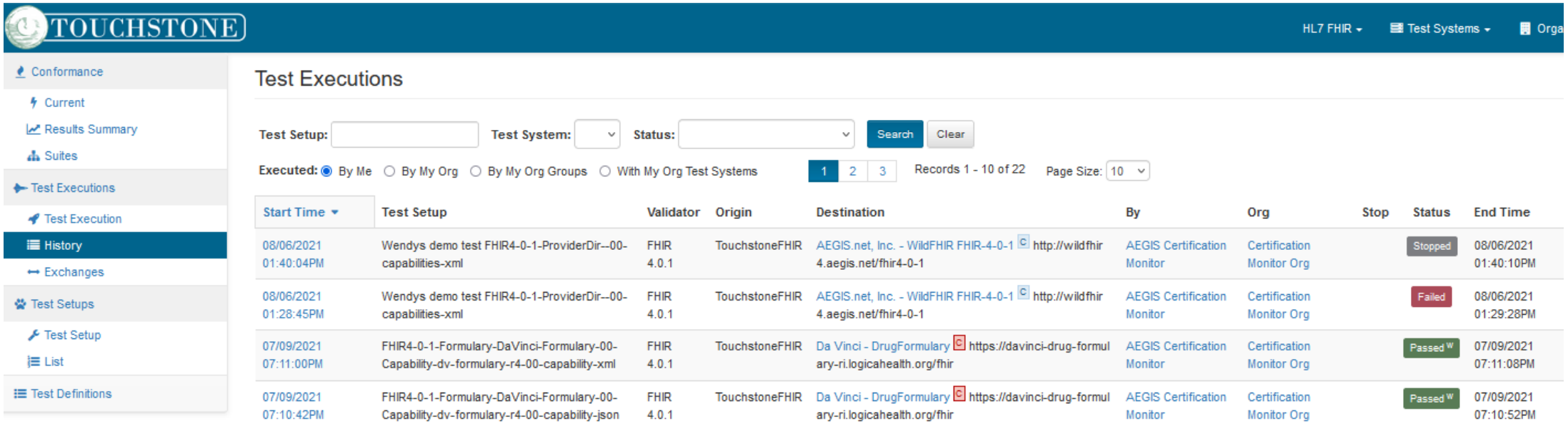
- Test Systems can choose to publish results by going to the Results Summary page
  - Select the Suite and Server
  - You will only see Test Systems belonging to your Org in Unpublished results
  - Only users from your Org can Publish results from your Test Systems
  - Once published, anyone can see the Test System results (optional)



Tips for Touchstone

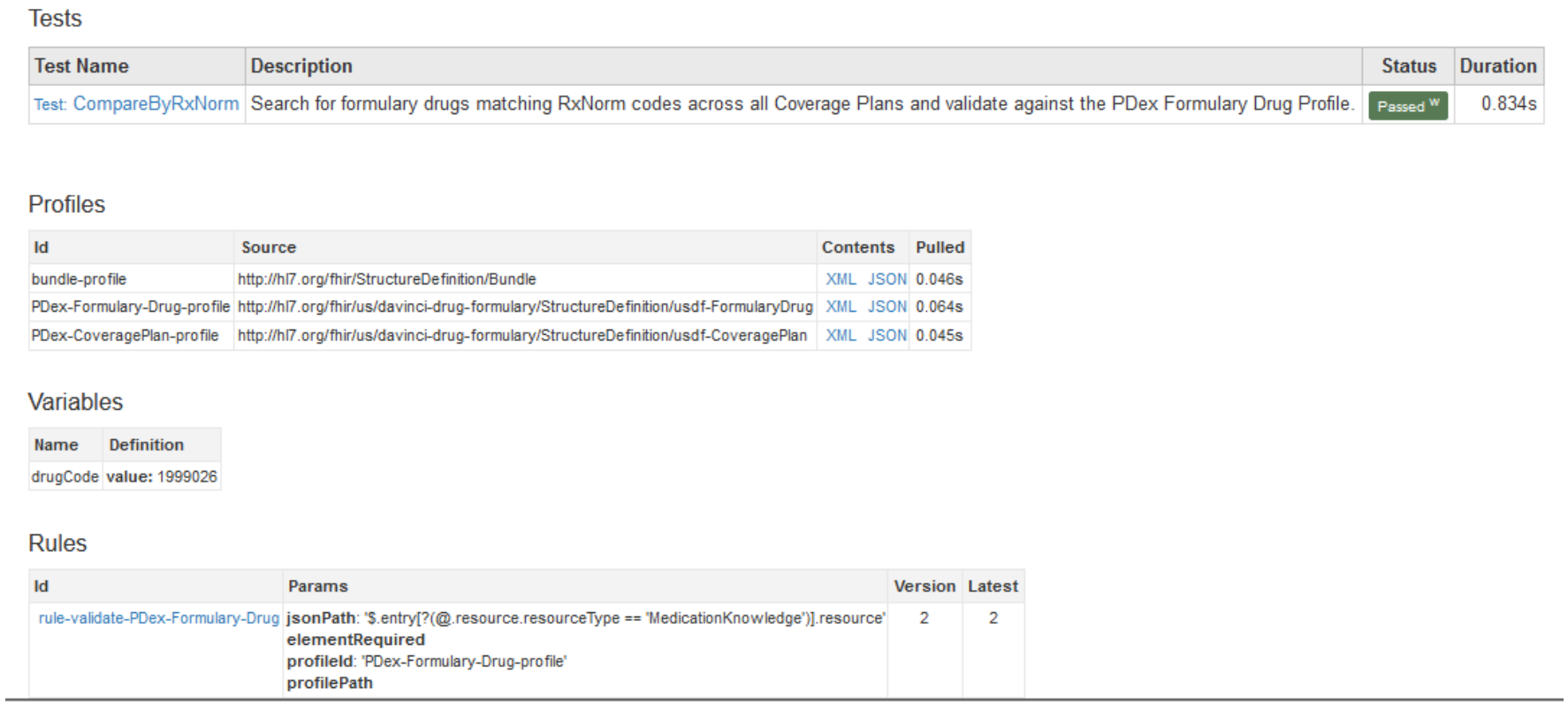
Tip: Use the History View to find test runs

- From the left menu, click on History and a running list of all your past tests will display
- Filter Test Setup keyword, Test System name, and/or Status (such as Failed or Passed)
- Only History for your Org or Org Group is displayed
- ALL tests can be found here – Touchstone does not archive old tests from view



Tip: Additional details about your Test are in the results

- By scrolling to the bottom of any Test Script Execution Detail, testers can see which profiles the test uses, any variables and the values used in the test, and details on any rule that was used



Tests

Test Name	Description	Status	Duration
Test: CompareByRxNorm	Search for formulary drugs matching RxNorm codes across all Coverage Plans and validate against the PDex Formulary Drug Profile.	Passed W	0.834s

Profiles

Id	Source	Contents	Pulled
bundle-profile	http://hl7.org/fhir/StructureDefinition/Bundle	XML JSON	0.046s
PDex-Formulary-Drug-profile	http://hl7.org/fhir/us/davinci-drug-formulary/StructureDefinition/usdf-FormularyDrug	XML JSON	0.064s
PDex-CoveragePlan-profile	http://hl7.org/fhir/us/davinci-drug-formulary/StructureDefinition/usdf-CoveragePlan	XML JSON	0.045s

Variables

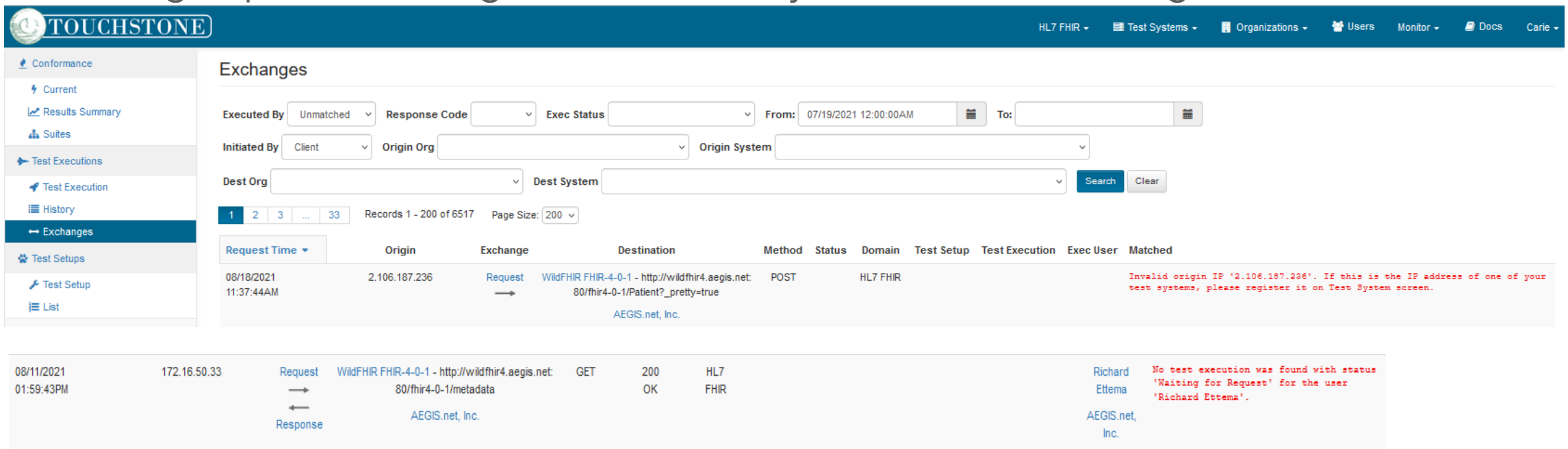
Name	Definition
drugCode	**value:** 1999026

Rules

Id	Params	Version	Latest
rule-validate-PDex-Formulary-Drug	**jsonPath**: '$.entry[?(@.resource.resourceType == 'MedicationKnowledge')].resource' **elementRequired** **profileId**: 'PDex-Formulary-Drug-profile' **profilePath**	2	2

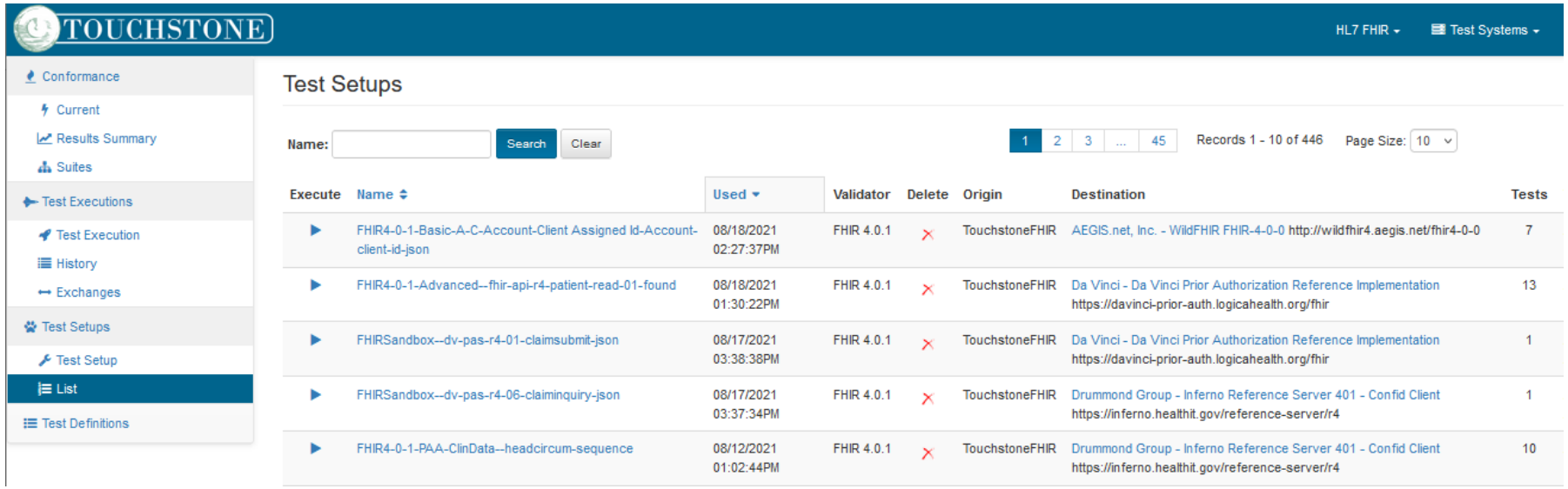
Tip: Check the Exchanges Page if your Waiting test is not moving

- Touchstone must be aware of the requesting system (registered as a Test System) to match incoming requests to waiting tests
- Check the Exchanges page if your tests are not being picked up and ensure that your incoming requests are being matched correctly or that a test is waiting



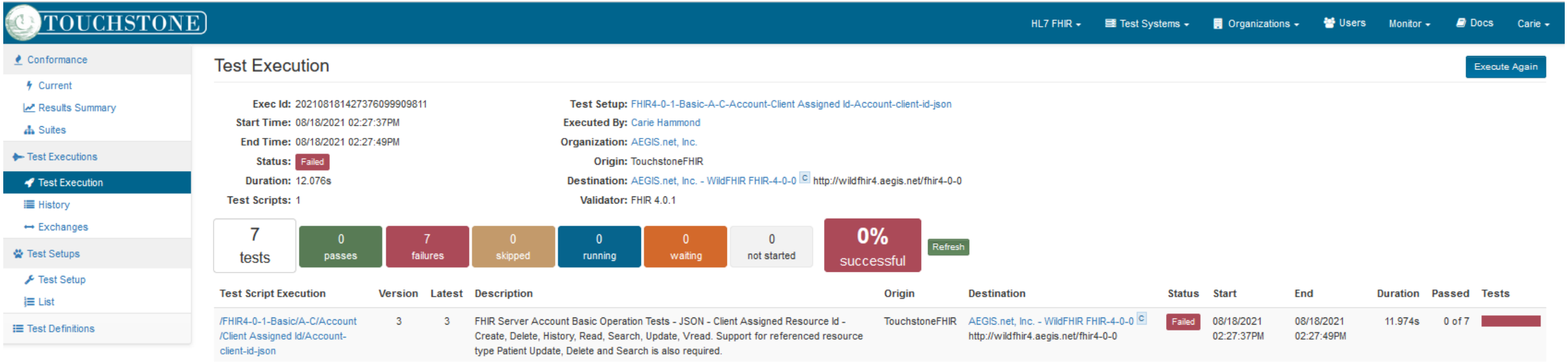
Tip: Reuse the same Test Setup easily

- Touchstone will save your Test Setups for easy reuse. Using the left menu, select List under Test Setups
  - Click on the Test Setup Name hyperlink
  - The previously used Test Setup will be found and can be run
- Select Test Setup under Test Setups and that will take you to the last Test Setup run if you are attempting to re-run



Tip: Reuse the same Test Setup easily

- Testers wishing to re-run a test can also use the Execute Again button on the upper right hand corner of any Test Execution they are viewing
  - This will run the same test, using the same Origin and Destination servers and the same variables



Q&A