

NIH System to System (S2S) Client Transactions Guide



Electronic Research Administration
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NIH System to System (S2S) "Client" Transactions Guide

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1. Introduction

1.1. Background

The System-to-System (S2S) interface provides external systems with a comprehensive set of RESTful APIs to interact with NIH services. Through S2S, clients can access two primary sets of APIs:

- eRA Exchange APIs: These enable various business functions, including obtaining Notice of Funding Opportunity (NOFO) information, querying grant application statuses, retrieving validation messages from grant application processing, and verifying person information details.
- Submission Validation Service(SVS) APIs: These focus on performing thorough validations at the application, component, and study levels, ensuring the integrity and compliance of submitted data.

This document serves as a comprehensive guide for software developers, offering transaction-level specifications for eRA Exchange and Submission Validation Service (SVS) System-to-System (S2S) interfaces. The aim is to supplement the YAML file definitions that themselves provide structural layout and content level data type information with field level content descriptions. Also typical usage patterns are described. Brief details of the interaction processing are provided along with details of the incoming request messages and outgoing responses.

The security considerations and requirements that ensure that response information is only returned to requesters who are authorized to receive that information are also outlined.

In summary this guide is intended to assist external organizations with the creation and processing of the transactions, their formatting and content, for the S2S exchanges currently implemented and available for use. This document is a supplemental document from, and a subset of, the formal internal NIH requirements documentation.

2. Business Process APIs

The following table shows the current business process APIs supported.

Each API is only permitted if all the security validations are passed (see following section for detailed security handling). This includes transport level checking (valid certificate uniquely identifying external party's system); process level authorization checks, and valid association between the requestor and the UEI associated with the information exchange (permitted to access that owner organizations information). The transactions are not constrained to only information associated with eSubmission data, so information may have originated from previous paper or online web entry processing. Each request is followed by a matching response transaction, or an error transaction. Within response transactions all elements would irrespective whether the element contains a value or not. If the element value is null it will be returned null.

The APIs available to external users are organized into the following service:

- Submission Agency Data Service (SADS): Provides operations for retrieving NIH data supporting electronic submissions.
- Submission Validation Service(SVS): Provides operations for validating application, component , and study xml.

2.1. Submission Agency Data Service APIs

The YAML file <https://services.external.era.nih.gov/eraexchange/swagger/swagger.html?yaml=externalSubmissionAgencyDataService.yaml> has the detailed documentation on list of operations available, input information required, expected output and proper response codes.

End point: <https://services.external.era.nih.gov/eraexchange/api/submissionagencydataservice>

Resource + Parameter	Examples	Operation	Description	Response
<ul style="list-style-type: none">• /opportunity? opportunityNumber={opportunityNumber}&receiptDate={receiptDate}• /opportunity? packageId={packageId}	<ul style="list-style-type: none">• /opportunity? opportunityNumber=AB-11-111&receiptDate=2023-08-11T21:32:52.12679• /opportunity? packageId=PKG00101181	getOpportunityInfo	Provide information regarding a specific opportunity.	"opportunityNumber": "AB-11-111", "activityCode": null, "orgCode": "AI", "orgPath": "DHHS/NIH/NIAID", "optOutCode": "N", "isCombinedMechanism": false, "programTypeCode": null, "directPhaseII": "N", "noticeTitle": "NOTICE TITLE", "noticeTypeCode": "R", "collaborativeTypeCode": null, "councilMeetingDate": "202401", "agency": "NIH", "aidsRelatedCode": "N", "isComplex": false, "projectPeriodExceptionFlag": "N", "projectCostExceptionFlag": "N", "pageLimitExceptionFlag": "N", "projectPeriodExceptionLT5YFlag": "N", "diversityFlag": "N", "clinicalTrialCode": null, "combinedActivityCode": null, "dmsPlan": null, "components": []

/organization/uei/{uei}	/organization/uei/UYABCD6G9DT1	getOrganizationInfoByUEI	Provide information regarding a specific organization by UEI.	{ "uei": "UYABCD6G9DT1", "externalOrgID": 123456, "organizationName": "Organization Name", "ein": "10000144A1", "address": { "lineAddress1": "address 1", "lineAddress2": "address 2", "lineAddress3": null, "lineAddress4": null, "city": "LA JOLLA", "county": null, "postalCode": "902100000", "state": "CA", "countryCode": "USA" }, "status": "ACTIVE", "humanSubjectAssuranceNumber": "FWA00001111", "animalWelfareAssuranceNumber": { { "newAnimalWelfareAssuranceNumber": "F16-00001", "oldAnimalWelfareAssuranceNumber": "A0002-01" }, { "newAnimalWelfareAssuranceNumber": "D01-00001", "oldAnimalWelfareAssuranceNumber": "A00003-01" } }, "nihPolicyAcceptedFlag": "Y" }
/samorganization/uei/{uei}	/samorganization/uei/ABCDEFGFG794J1	getSAMOrgInfoByUEI	Provides SAM registration details by UEI	{ "uei": "ABCDEFGFG794J1", "samOrgId": "111111111", "dunsID": null, "dunsIDPlus4": null, "cageCode": "0P0M0", "registrationExpirationDate": "2024-09-04T00:00:00", "legalBusinessName": "Legal Business Name", "dbName": null, "companyDivision": null, "Address 1", "samAddress2": null, "samCity": "SamCity", "samPostalCode": "06405", "samProvinceOrState": "CT", "samCountryCode": "USA", "samZipCodePlus4": "6138" }
<ul style="list-style-type: none"> • /grantstatus?trackingNumber={grantTrackingNumber} • /grantstatus?accessionNumber={accessionNumber} • /grantstatus?projectTitle={projectTitle} 	<ul style="list-style-type: none"> • /grantstatus?trackingNumber=GRANT0080029 • /grantstatus?accessionNumber=1234567 • /grantstatus?projectTitle=Project Title 	getGrantStatus	Request of grant application status. Requestor provides the Grant application reference number and must have permission to access that organizations application.	{ "trackingNumber": "GRANT00800291", "esubmissionStatusDate": "2023-09-15T00:00:13", "grantStatusDate": "2023-09-12T14:03:14", "proposalReceiptDate": "2023-09-12T14:02:35", "esubmissionStatus": "PROCESSED", "grantStatus": "Application has been entered into computer", "applId": 10925688, "accessionNumber": 1234567, "projectTitle": "Project Title", "projectNum": { "applTypeCode": "1", "activityCode": "R01", "serialNum": 0, "phsOrgCode": null, "supportYear": 0, "suffixCode": null }, "irgAssignment": null, "sraContact": null, "poContact": null, "gmsContact": null, "advisoryCouncilMeeting": null, "studySectionMeeting": null }

<ul style="list-style-type: none"> • /prior-grant?federalId={federalId}&applicationType={applicationType} • /prior-grant?federalId={federalId}&applicationType={applicationType}&projectStartDate={projectStartDate}&projectEndDate={projectEndDate} 	<ul style="list-style-type: none"> • /prior-grant?federalId=R01OD123456-01&applicationType=RESUBMISSION • /prior-grant?federalId=UX1UJ123456-01&applicationType=REVISION&projectStartDate=2021-10-01&projectEndDate=2026-09-30 	getPriorGrantInfoWithUEI	Provide information for a prior grant with UEI that matched the current submission.	<pre>{ "accessionNumber": 1234567, "grantStatus": "Pending IRG Review", "rfapaNumber": "ABC23- 040", "fullRfapaNumber": null, "activityCode": "R01", "applTypeCode": "1", "interimFundingCode": null, "suffixCode": null, "projectTitle": "Project Title", "applReceivedDate": "2023- 09-12T15:40:13", "projectStartDate": "2023-10- 10T00:00:00", "projectEndDate": "2028-10- 09T00:00:00", "projectNum": "R01OD123456-01", "supportYear": 1, "uei": "ABCDEF6G9DT1", "awdDocNum": "ROD123456A", "isBudgetModular": false, "doesSummaryStatementExist": null, "isAppAwarded": null, "isVerified": true, "piCommonsID": "COMMONSID", "existingTransLastName": "RESETTING", "sbirSttrProcessCode": null }</pre>
/stem-cell-line-status?stemCellLineCodes={stemCellLineCodes}	/stem-cell-line-status?stemCellLineCodes=0482,0001	getStemCellLineStatus	Provide indicators whether identified stem cell lines are valid.	<pre>{ "stemCellLines": [{ "stemCellLineCode": "0482", "valid": true }, { "stemCellLineCode": "0001", "valid": false }]}</pre>

/person/userId/{userId}	/person/userId/USERID	getPersonInfo WithUEI	Request of Commons User Account information based on the Account ID value; returns person, degree, address, affiliation information and UEI. Requestor must have permission to access accounts for the associated organization. Response contains information supported by the transaction schema and on file.	<pre> { "commonsUserId": "USERID", "address": { "lineAddress1": "123 Street", "lineAddress2": null, "lineAddress3": null, "lineAddress4": null, "city": "La Jolla", "county": null, "postalCode": "920930000", "state": "MD", "countryCode": "USA" }, "contact": { "phone": "(301) 123-1234", "fax": null, "email": "preethi. bodepudi@nih.gov" }, "name": { "prefix": "Dr", "firstName": "Please", "middleName": "Stop", "lastName": "Resetting", "suffix": null }, "roles": [{ "role": "PI", "externalOrgId": 577507, "uei": "UYTTZT6G9DT1" }], "positionTitle": "Principle Investigator", "priorAwardedGrants": [{ "appTypeCode": "1", "activityCode": "B09", "serialNum": 87973, "phsOrgCode": "SM", "supportYear": 1, "suffixCode": null }], "degrees": [{ "name": "PHD", "date": "2022" }], "preferredAddressCode": true, "personId": 139486831, "orcls": ["0000-0002-2400- 9021"] } </pre>
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/person-employment/userId/{userId}	/person-employment/userId/USERID	getPersonEmploymentInfoWithUEI	Request of Commons User Account information based on the Account ID value; returns person, degree, address, employments, affiliation information, and UEI. Requestor must have permission to access accounts for the associated organization. Response contains information supported by the transaction schema and on file.	<pre> { "employment": [{ "address": { "lineAddress1": "123 Street", "lineAddress2": null, "lineAddress3": null, "lineAddress4": null, "city": "La Jolla", "county": null, "postalCode": "920930000", "state": "MD", "countryCode": "USA" }, "organizationId": "577507", "organizationName": "UNIVERSITY OF CALIFORNIA, SAN DIEGO", "contact": { "phone": "3011231234", "fax": null, "email": "joe.viola@nih. gov" }, "preferredAddressCode": true, "positionTitle": "Principle Investigator" }], "commonsUserId": "USERID", "name": { "prefix": "Dr", "firstName": "Please", "middleName": "Stop", "lastName": "Resetting", "suffix": null }, "roles": [{ "role": "PI", "externalOrgId": 577507, "uei": "ABCDEF6G9DT1" }, { "role": "SPONSOR", "externalOrgId": 577507, "uei": "ABCDEF6G9DT1" }], "priorAwardedGrants": [{ "applTypeCode": "1", "activityCode": "B09", "serialNum": 87973, "phsOrgCode": "SM", "supportYear": 1, "suffixCode": null }], "degrees": ["PHD", "BA"] } </pre>
/person-basic/userId/{userId}	/person-basic/userId/USERID	getPersonBasicInfoWithUEI	Gets Person Basic information.	<pre> { "name": { "prefix": "Dr", "firstName": "Please", "middleName": "Stop", "lastName": "Resetting", "suffix": null }, "roles": [{ "role": "PI", "externalOrgId": 654321, "uei": "ABCDEF6G9DT1" }, { "role": "SPONSOR", "externalOrgId": 654321, "uei": "ABCDEF6G9DT1" }] } </pre>

<ul style="list-style-type: none"> • /validation-messages?trackingNumber={trackingNumber} • /validation-messages?accessionNumber={accessionNumber} 	<ul style="list-style-type: none"> • /validation-messages?trackingNumber=GRANT00798899 • /validation-messages?accessionNumber=1234567 	getValidationMessages	Allows the receipt of agency validation error and/or warning messages resulting from the processing of an electronic grant application submitted to Grants.gov . Request contains either the Grants.gov tracking number or the NIH accession number and requestor must have permission to the application. The response contains a list of agency error and/or warning messages that resulted from processing the grant application.	[{ "severity": "W", "messageText": "The Employer Identification Number should be a length of 9 characters or 12 characters. The application will be accepted by the agency. (001.28.1)", "componentId": " ", "formName": "RR_SF424", "ruleNum": "001.28.1" }]
/person-credential/{lastname}/{lastname}/email/{email}	/person-credential/{lastname}/LAST_NAME/{email}/aa@bb.com	getPersonCredential	Request for Commons User ID based on the last name and email address of a person. Returns the list of User IDs that match the last name and email in commons.	["TEST_PI", "TEST_SO"]
/person-orcid/userid/{userid}	/person-orcid/userid/{USERID}	hasOrcid	Checks if user has orcid.	true

2.2. Submission Validation Service APIs

The YAML file <https://services.external.era.nih.gov/svs/swagger/swagger.html?yaml=externalSubmissionValidation.yaml> has the detailed documentation on list of operations available, input information required, expected output and proper response codes.

End point: <https://services.external.era.nih.gov/svs/api/submissionvalidationservice>

Resource + Parameter	Examples	Operation	Description	Response
/application-validation Request Parameter: applicationXMLName(string) attachmentMetadata(string) attachments: application xml attachment metadata (Optional)	/application-validation applicationXMLName: FormsGApplication.xml attachmentMetadata: FormsGApplicationMetadata.txt attachments: applicationXML: File attachment containing the grant application information. attachmentMetadata: File attachments present in the grant application xml.	application-validation	validate application	[{ "formName": "PHS398_ResearchPlan", "subApplicationGroupId": " ", "subApplicationId": " ", "ruleNumber": "010.12.1", "severityCode": "E", "messageId": 94, "messageText": "The Multiple PI Leadership Plan attachment on the PHS 398 Research Plan must be included if multiple PD/PIs have been included on the Senior/Key Person Profile." }, { "formName": "RR_OtherProjectInfo", "subApplicationGroupId": " ", "subApplicationId": " ", "ruleNumber": "004.22.1", "severityCode": "W", "messageId": 196, "messageText": "In most cases, a Bibliography and References Cited attachment should be included." }]

/component-validation Request Parameter: opportunityID (string componentXML Name(string) attachments: component xml attachment metadata (Optional)	/component-validation opportunityID: AA-01-001 componentXMLName: FormsGApplication.xml componentXml: File attachment containing the form xml information. attachmentMetadata: File attachments present in the component xml.	component- validation	validate component	[{ "formName": "PHS398_CareerDevelopmentAwardSup", "subApplicationGroupId": "Career-Dev", "subApplicationId": "826-Career-Dev", "ruleNumber": "013.5.2", "severityCode": "E", "messageId": 345, "messageText": "The Training in the Responsible Conduct of Research attachment is limited to 1 page." }, { "formName": "PHS398_CareerDevelopmentAwardSup", "subApplicationGroupId": "Career-Dev", "subApplicationId": "826-Career-Dev", "ruleNumber": "013.10.1", "severityCode": "W", "messageId": 349, "messageText": "The Institutional Commitment to Candidate's Research Career Development attachment may be subject to a page limitation. Be sure to comply with announcement and application guide instructions." }]
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3. Security Considerations Use the Client Certificate for One Request

Each request contains the UEI of the organization associated with the data requested. The UEI must be registered and associated with the digital certificate used to make the request. When a mismatch occurs between data requested and authorized, the failed attempt is recorded and may be construed as an attempt to access un-authorized information. The partner is responsible for acquiring and setting up their own digital certificate for use with SSL communications.

The submitting organization is given access to all applications, grants and person data within that organization.

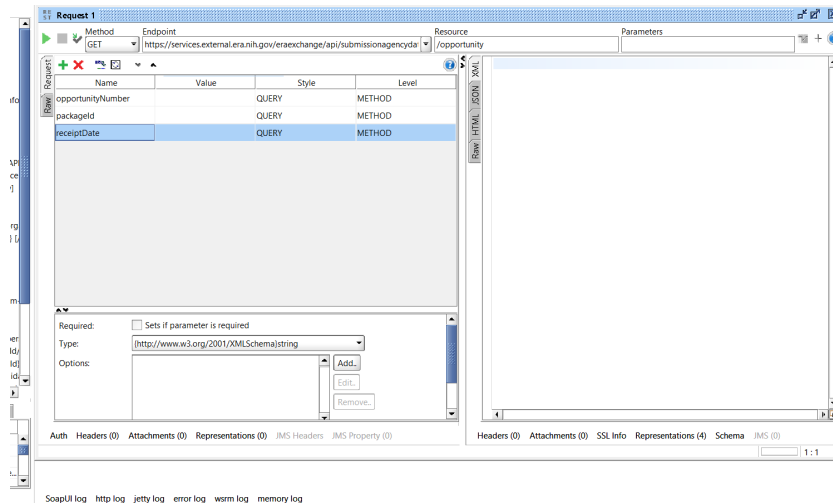
The following table summarizes the Roles necessary to access the Submission Agency Data Service:

Service Name	Role	Role Context
Submission Agency Data Service	APPLICANT_RETRIEVAL_DATA_SERV	Institution
Submission Validation Service	SVS_APPLICANT_DATA_SERV	Institution

4. Appendices

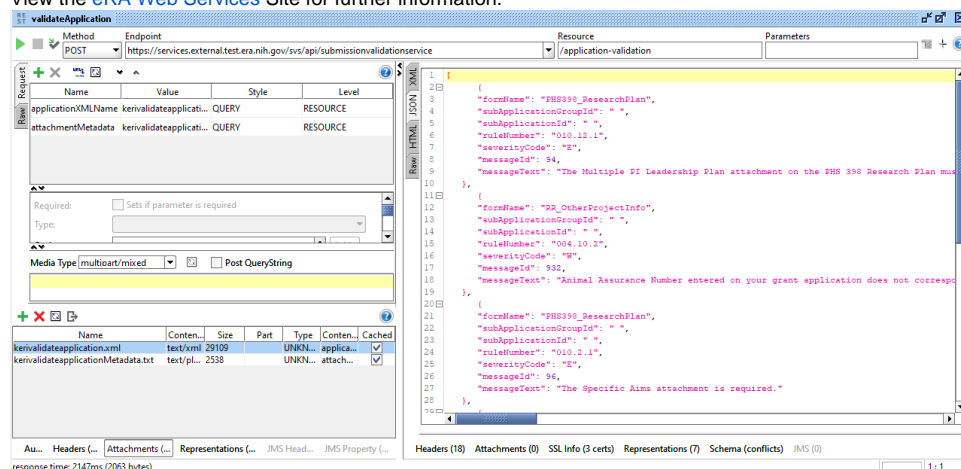
4.1. Testing SADS Services via SOAP UI

- Create an Empty Project in SOAP UI.
- Download the YAML file given for the service that needs to be tested. Sample <https://services.external.era.nih.gov/eraexchange/swagger/externalSubmissionAgencyDataService.yaml>
- Right click on the Empty Project created and select "Import Swagger/Open API Definition" and browse for the file downloaded.
- This action creates all the end point resources defined in the YAML file.
- Expand the one of the resource and open the Request section. Set the end point and resource request information as defined in the YAML.
- Refer to sections **"Use the Client Certificate for One Request"** and **"Use the Client Certificate for All Requests"** in <https://www.soapui.org/docs/functional-testing/sending-https-requests/> for associated certificate information with the requests.
- Submit the request. If the Certificate is valid and no validation errors associated with the request the response should be retrieved successfully.
- View the [eRA Web Services](#) Site for further information.



4.2. Testing Submission Validation Services via SOAP UI

- Create an Empty Project in SOAP UI.
- Download the YAML file given for the service that needs to be tested. Sample <https://services.external.era.nih.gov/svs/swagger/swagger.html?yaml=externalSubmissionValidation.yaml>
- Right click on the Empty Project created and select "Import Swagger/Open API Definition" and browse for the file downloaded.
- This action creates all the end point resources defined in the YAML file.
- Expand the one of the resource and open the Request section. Set the end point and resource request information as defined in the YAML.
- Refer to sections **"Use the Client Certificate for One Request"** and **"Use the Client Certificate for All Requests"** in <https://www.soapui.org/docs/functional-testing/sending-https-requests/> for associated certificate information with the requests.
- Submit the request. If the Certificate is valid and no validation errors associated with the request the response should be retrieved successfully.
- View the [eRA Web Services](#) Site for further information.



5. Revision History

Version	Revision Date	Author	Summary of Changes
1.0	27 Jul 2023	eRA Team	Initial S2S client transaction guide.
1.1	09 Sep 2023	eRA Team	Update external Restful Web Services
1.2	23 Aug 2024	eRA Team	Added Submission Validation Service external Restful Web Service