Request for Information

Data Catalog solution to support Data Governance

Issued by:
University Information Technology Services

RFI # L202002

Issue Date: August 1, 2019

Response Date: August 26, 2019
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Section 1 General Information

1.1 Purpose

The purpose of this Request for Information (RFI) is to identify qualified vendors interested in providing a Data Catalog software solution that will help enable data literacy as part of the Trellis initiative.

The issuance of this RFI does not constitute a commitment to issue a request for bids/proposals, award a contract, or pay any costs incurred in preparation of a response to this RFI.

Any information received in response to this RFI will assist the University Information Technology Services (UITS) project team in finalizing the scope of work and requirements which may be used at a future date in the issuance of a Request for Proposals (RFP). Submitting a response to this RFI is not a guarantee in any way that a vendor will be selected for any subsequent RFP, nor does it preclude any vendor from responding to future procurement opportunities.

1.2 Issuing Office

This RFI is being issued for the University of Arizona by the issuing office listed below. The issuing office is the sole point of contact for this RFI. Please refer all inquiries to:

Carissa Pasewark, Sr. Buyer  
The University of Arizona  
Procurement and Contracting Services  
P.O. Box 210300  
Tucson, AZ 85721  
Telephone: 520-626-8899  
Fax: 520-626-1391  
E-mail: carissap@email.arizona.edu

Any RFI addenda/updates will be made available at the University of Arizona’s Procurement & Contracting Services Website: http://pacs.arizona.edu/RFP-BID_Opportunities. Questions regarding the RFI must be submitted via email to the Buyer noted above.

1.3 Scope
Trellis is the University of Arizona’s Constituent Relationship Management program created to optimize university relationships through technology and data integration.

University Information Technology Services (UITS) is implementing Trellis CRM, beginning with a three-year plan to establish critical relationship workflows and develop the service model. More information about Trellis can be found on https://trellis.arizona.edu/

The Trellis Data Catalog is part of a university-wide strategy to develop a transparent and formally governed data system and user access process. This will in turn increase data literacy across the UA community, a key strategic goal. Specifically, the Trellis Data Catalog will maintain metadata about all data in the Trellis system. The catalog will allow business and system users to easily browse, locate, and understand what data is available to them in the Trellis data system.

Our requirements for this application are driven by a user-centric design process. We have interviewed potential users of the application across several personas, as well as key executive stakeholders. The interviews covered a number of industry standard features and best practices for a data catalog, as well as University-specific use cases that investigated what users do with data sets once obtained. Details of the requirements are in the subsequent sections of the document, prioritized based on user need.

The knowledge gained from responses to this RFI will allow UITS to further evaluate this opportunity and potentially craft a Request for Proposal (RFP) if enough interest was gathered from the free market.

1.4 Information Requested from Vendors

Vendors are to respond to the questions listed in Section 3. Vendors are encouraged to recommend changes to the project if it is determined, based on their experience, that there is a better approach. UITS is seeking best practices in this area.

1.5 Vendor Presentations

UITS may request vendors to provide a demo of some of the functionality described in this RFI. All costs associated by such presentations will be borne by the vendor. Promotional items shall not be provided at these presentations.

1.6 Confidentiality and RFI Ownership

This RFI is both confidential and proprietary to the University of Arizona and UITS, both of...
whom reserve the right to recall the RFI in its entirety or in part. Vendors agree that they will not duplicate, distribute or otherwise disseminate or make available this document or the information contained in it without the express written consent of the University of Arizona’s issuing office.

Vendors shall not include or reference this RFI in any publicity without prior written approval from UITS, which, if granted, shall be granted by the issuing office. Vendors must accept all of the foregoing terms and conditions without exception. All responses to the RFI will become the property of the University of Arizona and UITS and will not be returned.

1.7 Disclosure of RFI Contents

Cost and price information provided in RFI will be held in confidence and will not be revealed or discussed with competitors, except to the extent required by law. All other material submitted becomes the property of the University and may be returned only at the University’s option. RFI’s submitted to the University may be reviewed and evaluated by any person other than competing vendors at the discretion of the University. The University has the right to use any or all ideas presented in any reply to the RFI. Where confidential or proprietary information is required, or should the vendor deem it necessary to submit such matter, mark each page/section in large bold type (PROPRIETARY INFORMATION). If your response contains a trade secret or confidential proprietary information, you should include with your response a separate signed written statement to that effect.

1.8 Public Record

If this RFI warrants the issuance of an RFP and an award and execution of a contract results from the RFP, all vendors' proposals become public record and are available for review during the University’s regular office hours. The University will, in good faith and to the extent allowed by law, honor any vendor information that is clearly designated and conspicuously labeled as proprietary, and the University agrees that the information is proprietary. If the vendor needs to submit proprietary information with the proposal, the vendor shall ensure that it is enclosed in a separate envelope from the proposal and that it is clearly designated and conspicuously labeled as such. The envelope must also contain the reason(s) why the enclosed material is to be considered proprietary. At no time shall the entire proposal be considered proprietary and be kept confidential. The University shall not be liable in any manner or in any amount for disclosing proprietary information if such information is not clearly so designated and conspicuously so labeled. The University shall likewise not be liable if it did not know or could not have reasonably known that such information was proprietary. 
Pricing information cannot be considered proprietary or confidential.
### 1.9 Schedule of Events

The following is the tentative schedule that will apply to this RFI, but may change in accordance with the University's needs.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>08-01-19</td>
<td>Issuance of RFI</td>
</tr>
<tr>
<td>08-14-19</td>
<td>Technical Questions/Inquiries due no later than 2:00 PM/MST</td>
</tr>
<tr>
<td>08-26-19</td>
<td>RFI is Due Monday, August 26, 2019, no later than 2:00 PM, MST</td>
</tr>
<tr>
<td>Early Sept.</td>
<td>Vendor Presentations, (if necessary)</td>
</tr>
</tbody>
</table>

### 1.10 RFI Submission and Subsequent Action

RFI responses must be delivered sealed; be received by a University employee at the University of Arizona Computer Center, which is located at 1077 N. Highland Ave. Room 218, Tucson, AZ 85721, no later than **August 26, 2019 at 2:00 P.M. MST**.

Vendors, please be advised that it is your sole responsibility to ensure that your RFI response is received as described in the paragraph above. The University shall not be responsible for any delays that may occur.

RFI responses must be **delivered sealed** to:

**For U.S. Mail – Only** (please note that all U.S. Mail, including Express Mail, is delivered to the University’s Postal Services office and is then distributed to University Departments, which may delay it by a day or more):

The University of Arizona  
Information Technology Services  
1077 N. Highland Ave., Room 218  
Tucson, AZ 85721  
Attn: Carissa Pasewark, Sr. Buyer

**For other methods of delivery (e.g. FedEx, UPS, etc.):**

The University of Arizona  
Information Technology Services  
1077 N. Highland Ave., Room 218  
Tucson, AZ 85721
Attn: Carissa Pasewark, Sr. Buyer

no later than August 26, 2019 at 2:00 P.M. MST. The University shall not accept RFI responses received by facsimile or email. The University shall, at the specified due date and time, accept all RFI responses that are otherwise in order. The University will allow interested parties to be present for purposes of identifying which vendors have responded. The University will make no immediate decision at such time, and there will be no disclosure of any information contained in any RFI response until after formal notice of award and execution of any contract resulting from a separate RFP process. When multiple solicitations have been scheduled to open at the same date and time, the University will open solicitations that have interested individuals present in sequential order by solicitation number. The University will hold unopened any RFI responses received after the due date and time, and will not consider such responses. The University reserves the right to retain or dispose of such RFI responses at its discretion; however, the University may return such RFI responses to their related vendors, but only at such vendor’s request and at no cost or expense whatsoever to the University.

If the University determines that due to an insufficient number of RFI responses received, it would be in the University’s best interest, the University may extend the due date in order to determine why other vendors did not respond and to encourage other vendors to respond.

1.11 Submittal Costs
The University is not liable in any manner or to any extent for any cost or expense incurred by any vendor in the preparation, submission, presentation, or any other action connected with proposing or otherwise responding to this RFI. Such exemption from liability applies whether such costs are incurred directly by the vendor or indirectly through the vendor’s agents, employees, assigns or others, whether related or not to the vendor.

1.12 Faxes and Emails Not Accepted
The University shall not accept proposals received by fax or email.

1.13 Number of Proposal Copies to be Furnished
Vendors are to submit one (1) original, in hardcopy form, along with an original version in electronic form, on a CD, flash drive or other removable storage device, in either Microsoft Word or as an Adobe PDF file.

1.14 Marking of Envelopes
Vendors shall ensure that the submittal envelope(s) clearly and conspicuously display the following identifying information in addition to any other information otherwise required for transmittal, and are sealed.
1.15 Summary

**THIS IS A REQUEST FOR INFORMATION (RFI) ONLY** and its sole purpose is to identify vendors that can provide a list of functionalities (explored later on in the document) that can be provided by a Data Catalog solution with estimated pricing. The information provided in the RFI is subject to change and is not binding on the University of Arizona. The University has not made a commitment to procure any of the items discussed, and release of this RFI should not be construed as such a commitment or as authorization to incur cost for which reimbursement would be required or sought. All submissions become the property of the University of Arizona and UITS and will not be returned.

Section 2 Description of the Organization

2.1 University of Arizona

The University of Arizona (UA) is a place without limits—where teaching, research, service, and innovation merge to improve lives in Arizona and beyond.

Established in 1885, the University of Arizona, the state’s super land-grant university with two medical schools, produces graduates who are real-world ready through its 100% Student Engagement Initiative. Recognized as a global leader and ranked 16th for the employability of its graduates, the UA is also a leader in research, bringing more than $580 million in research investment each year, and ranking 20th among all public universities. The UA is advancing the frontiers of interdisciplinary scholarship and entrepreneurial partnerships and is a member of the Association of American Universities, the 62 leading public and private research universities. It benefits the state with an estimated economic impact of $8.3 billion annually.

2.2 University Information Technology Services

University Information Technology Services (UITS) is the University of Arizona's central IT unit, headed by the Chief Information Officer.

The work of UITS encompasses developing and managing the campus network and collaboration infrastructure, information security, high-performance research computing environments, enterprise applications, analytics and reporting needs, services and spaces that support student achievement, and coordinating with the campus’s distributed IT work force.
Section 3 Requirements

3.1 General Vendor Information

The University of Arizona is asking interested vendors to submit a response containing, at a minimum, the following information:

1. Brief overview of your firm.
2. Brief description of experience providing similar services, especially for higher education institutions as well as Salesforce implementation.
3. Typical timeframe for deploying your solution.
4. Company brochure/literature if available.

Complete list of requirements for response can be found in Section 3.6.

3.2 User Personas

Different groups of users across UA will be accessing the Trellis Data Catalog. We captured the key user types or personas with some example use cases that would benefit from a successful implementation below for context.

Note: Because most requirements would be leveraged by multiple personas with different use case context, we did not specify a requirement-persona mapping.

3.2.1 Analyst

User primarily involved in reporting, data science, and discovery work.

Sample use cases
- Analyst only has access to 10 of the 10,000 data sets at the University and is looking at what other data could potentially be used to predict the effectiveness of advisors whether they have access to said data or not
- Analyst needs to develop a report that calculates the average times a student enters the student union of the last five days (yesterday -> yesterday-4)
- Analyst is developing features for a predictive model and needs to remove outliers and missing data prior to any feature engineering
- Analyst is developing a report to understand student sentiment about specific faculty and its correlation to grades and advisor discussions, but typically does not work with potentially sensitive data that will be needed

“Day in the life” with the Data Catalog
The analyst is looking at what other data could potentially be used to predict the effectiveness of advisors whether they have access to said data or not. However, the analyst only has access to a portion of the catalog and is looking to request access from
the relevant data steward.

- Thinks there may be value in mining Trellis data, but has never interacted with Trellis
- Goes to catalog and finds several data sets of interest, some of which she has access
- Uses data queries to filter the data across parameters such as date the data was updated, by commonly defined ‘grouping’ tags, and can then rate each dataset based on its relevance
- Analyst requests access to the sets of interest from the data steward within the environment of the catalog.
- Designated resource provisions data to analyst through data governance process

3.2.2 Developer

User focused on integrating systems and developing applications.

Sample use cases

- Developer wants to build understanding of data elements available and business definitions in current environment that can be used to support specific application feature development
- Developer needs to understand relationships between objects/tables to build reports and visualization
- Developer examines gaps information that may require bringing in additional data sets to meet requirement
- Developer needs to know security classification of data elements to determine what regulations (e.g. FERPA, GDPR) need to be followed for feature build

“Day in the life” with the Data Catalog

The developer is building a software application that requires data available on the data catalog and is looking to view samples of the data and then source them.

- The developer uses the appropriate metadata to determine what data sets would be relevant in the development of the app
- They use the data visualization feature of the catalog, allowing them to view the lineage of the data, and a preview of the table to help determine what to request access for
- The request for access is sent and approved by the data-steward, all within the functionality of the data catalog. To get input from other users, they insert comments on the data that asks for clarification or advice on what is the best way to choose the right data elements
- The user then chooses the appropriate API for the chosen dataset to help aid application development
- The developer rates the dataset based on its relevance and quality helping future users use the right data for the appropriate purpose
3.2.3 Data Steward

User responsible for making data a shareable, high-quality asset for UA. They do this by utilizing data governance processes to ensure fitness of data elements and provisioning appropriate levels of access to data given the role of requestors.

Sample use cases

- Steward makes governance decisions about data within their domain, including data access
- Steward serves as subject matter expert accountable for a subset of Trellis data, working with stakeholders to define and control data
- Steward remedies data quality issues in collaboration with system owners

“Day in the life” with the Data Catalog

The data steward receives a log from an analyst that highlights an issue around the quality of a data point and looks to resolve this.

- Data steward is regularly monitoring quality issues surrounding the updated data and manages access to data sets under their management
- Receives a log from a business user that source for the data catalog isn’t collecting information for a particular data point
- The lineage of the data point is investigated which helps the steward narrow down the underlying root cause
- They then check when the last update to the table was made, allowing to know exactly when the issue arose and how long for has there been a compromise in quality
- All these functions enable the steward to notice a pattern in the issue, determine the impact this can have on the university, and to then escalate to the relevant authority

3.3 Requirements

Vendor responses to the following requirements are to be provided with the attached spreadsheet.

Trellis Data Catalog requirements are broken down into three categories:

- **Metadata Requirements** – The specific types of metadata to be available for viewing in the Data Catalog (could be applicable to individual data elements or higher-order data structures like tables unless specified)
- **Functional Requirements** – Requirements that describe how a user (e.g. analyst, developer, steward) will use the Data Catalog
- **Non-functional Requirements** – Requirements that describe the operation of the Data Catalog (e.g. technical, security)
These requirements represent the synthesis of interviews and workshops with prospective users of the application across UA. Priorities should be understood as follows:

- **High** - “Must Have” – Required for the Data Catalog
- **Medium** - “Should Have” – Not necessary, but still a priority item
- **Low** - “Nice to Have” – Features that will add value, but not immediately needed

For clarity, we define a hierarchy of data as follows:

- **System** – Application or repository that contains one or more datasets
- **Dataset** – Grouping of information from a specific source system or assembled by analyst/developer (e.g. Student Data Warehouse)
- **Table** – Specific data structure within data set used for analysis and reporting (e.g. Student Demographics)
- **Data Element** - Individual “field” within table (e.g. Student Date of Birth)
### 3.3.1 Metadata Requirements

<table>
<thead>
<tr>
<th>Metadata Category</th>
<th>Metadata Elements</th>
<th>Priority</th>
</tr>
</thead>
</table>
| Basic Information | • Business name for data element/table  
                     • Business definition for data element/table  
                     • Technical name for data element/table  
                     • Data element type (e.g. INT, VARCHAR)  
                     • Default values for data element (if applicable)  
                     • # of records in table  
                     • Possible values for enumerated field (e.g. picklist) | H        |
| Lineage           | • Original source system for data element/table  
                     • Intermediary systems comprising lineage  
                     • Transformation/ETL applied to data element/table | H        |
| Freshness/Rетention | • Date of entry for specific data element  
                      • Last update to table  
                      • Data retention rules (e.g. data stored in table for 5 years)  
                      • Refresh timing/cadence for dataset | H        |
| Quality           | • Metrics for determining quality of dataset, including:  
                      o # or % missing for data element  
                      o Min/max/avg. for numerical data elements  
                      • Data processing/quality issues with dataset or table | H        |
| Access            | • Access requirements to data & systems  
                     • Indication if specific user can access dataset  
                     • Data security classification (regulated, confidential, etc.) | H        |
| Governance        | • Data owner  
                     • Process for gaining access to dataset  
                     • Mastered data element designation | H        |
<p>| Business Process Context | • Business process context that led to changes in metadata | M        |
| Integration Options | • Available APIs/connection mechanisms for accessing dataset | M        |</p>
<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
<th>Priority</th>
</tr>
</thead>
</table>
| Natural Language Search      | • The user can access a robust natural language search that allows for typical data catalog queries, such as where a specific field is used across tables, or filtering by date last updated, source system, fields and by program  
• Queries are suggested to user when typing into search | H        |
| Field Masking                | • Solution can hide a certain field or column from the preview of data in a table based on user role.                                                                                                                                                               | H        |
| Tagging and Grouping         | • The user has the ability to organize datasets/tables/elements into logical groups through user-defined tags  
• The user can search or filter data using these tags                                                                                                           | H        |
| Change History               | • The user is able to view any changes, edits, and modifications made to a piece of metadata over time  
• The user can set up notifications or a watchlist for changes to a specific piece of metadata (e.g. the business def of a table changes)                                                            | H        |
| Rating System                | • The user can rate individual datasets based on quality or usefulness  
• Access to data can be limited based on a specific rating  
• The dataset ratings are crowdsourced and aggregated from users                                                                                          | H        |
| Data Access/Governance       | • The user has the ability to request permission/access to a restricted data set and the relevant party be consequently notified  
• Designated administrators should be able to control access to specific sections of the data catalog  
• A data steward should be able to view who has access to specific datasets                                                                 | H        |
<p>| Automated Dataset Grouping   | • The application groups similar datasets/tables/elements together and makes that information available to the user (e.g. locating student demographic tables across multiple datasets)                                      | M        |
| Training                     | • The user can access training videos/documentation through the application interface                                                                                                                          | M        |
| Comments/Chat                | • The user can insert comments or notes on a specific dataset/table/element for the purpose of asking questions, making clarifications, and communicating with other users                                         | M        |
| Data Visualization           | • The user has access to simple visualizations in the catalog, including lineage                                                                                                                           | M        |</p>
<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample View</td>
<td>The user is able to preview a portion of the dataset as a sample before either accessing or requesting access</td>
<td>M</td>
</tr>
<tr>
<td>User Defined Fields</td>
<td>The user is able to add customer defined fields to the metadata</td>
<td>M</td>
</tr>
<tr>
<td>Manual Metadata Load</td>
<td>The user can manually add data to the catalog (e.g. not through an automated connector)</td>
<td>M</td>
</tr>
<tr>
<td>Data-Application Linkage</td>
<td>Ability to not only show where an element is in the data structure, but also how it relates to the application the data is stored in (e.g. which screen in Peoplesoft does this table refer to)</td>
<td>M</td>
</tr>
</tbody>
</table>
| Automated Annotation         | Automatically tag data sets and discovered lineage using deep learning/machine learning  
                                | Automatically add annotations to data based on built-in curation capabilities                                                                           | M     |
| Chat Bot                     | The user can ask questions to an automated chat bot that has the answers to frequently asked questions                                                                                                   | L     |
| Usage Metrics                | The user should be able to view how much a dataset is being used/accessed                                                                                                                                     | L     |
| Relevance Check              | An email can be sent to users to verify if a dataset/metadata is still relevant if metadata is not modified for a defined period                                                                             | L     |
### 3.3.3 Non-functional Requirements

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Description</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Source Integration</td>
<td>• Data catalog can automatically ingest metadata from the following data sources:</td>
<td>H</td>
</tr>
<tr>
<td></td>
<td>o Salesforce</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o PeopleSoft</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o AWS S3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>o Oracle Data Warehouse</td>
<td></td>
</tr>
<tr>
<td>New Data Source Integration</td>
<td>• Simple methodology for developing connectors to data sources that are not available out of the box</td>
<td>H</td>
</tr>
<tr>
<td>Hosting</td>
<td>• The application can be hosted in an AWS environment</td>
<td>H</td>
</tr>
<tr>
<td>Authentication/Access Control</td>
<td>• Solution can use industry standard protocols and middleware technologies to leverage campus SSO and provide robust access control</td>
<td>H</td>
</tr>
<tr>
<td>API Availability</td>
<td>• API available to maintain the catalog itself (e.g. bulk upload of data)</td>
<td>M</td>
</tr>
<tr>
<td></td>
<td>• Ability to take metadata in catalog and extract that for use in a reporting tool or other application</td>
<td></td>
</tr>
<tr>
<td>Selective Data Sourcing</td>
<td>• Catalog can limit objects/tables metadata is pulled from for a given system (e.g. curated list of tables that are most relevant)</td>
<td>M</td>
</tr>
<tr>
<td>Bulk Rights Provisioning</td>
<td>• The ability to distribute rights to edit data in catalog to users in bulk</td>
<td>M</td>
</tr>
</tbody>
</table>
3.4 Assumptions

Some key assumptions for the successful implementation of a data catalog for Trellis are listed below. Please note that this list will likely expand over time as we move through the solutioning process.

- Data catalog will meet the data owners’ expectations of ability to control access to their datasets.
- Data catalog application will be developed independently of any specific data source or system.
- The data catalog will be primarily accessed by three type of users (analyst/data scientist, developer, steward), and will not be used by people outside the UA employee/contractor ecosystem.
- Metadata stored in the data catalog will potentially be consumed by other data applications and systems, including those used for Master Data Management, data prep/ETL, and data quality. However, this solicitation is solely for a Data Catalog solution.

3.5 Questions

The University of Arizona and UITS requests that the vendors answer the following questions in their response to this RFI:

- From your experience, has the University of Arizona identified all the major requirements necessary to complete this project? If not, please provide information on other necessary requirements
- Provide a list of potential problems/risks that the University may encounter during this project
- Provide any ideas or suggestions about how such problems/risks should be addressed in a procurement solicitation
- What is the support model for your solution?
- Who owns metadata in the Data Catalog and other associated intellectual property?
- Provide estimated pricing for your solution, including:
  - How costs scale as users and data sources are added
  - Implementation services
  - Support services
  - Assumptions made when estimating pricing

3.6 Response Format

Responses are to be straightforward, clear, concise and specific to the information requested. For submissions to be considered complete, vendors must provide the following information:
- Transmittal Letter; include a statement of any proprietary information if applicable
- Response to Section 3.1 - General Vendor Information
- Completed requirements mapping in response to Section 3.3 (See spreadsheet provided with solicitation)
- Response to Section 3.5 - Questions, including a pricing sheet for your solution
- Any comments, observations or suggestions which may assist the University of Arizona in drafting a procurement solicitation