REQUEST FOR PROPOSAL (RFP):

Allotrope Foundation Simple Model Transformation Tool – ASM 2021

Version: 14

Date: 04/14/2021

Allotrope Foundation

1500 K Street, NW

Washington, DC 20005

April, 2021

Contents

1 Summary and Background

Allotrope Foundation is currently accepting proposals for the development of a schema definition and related tooling to support a specialized data model transformation process. The development is required to enable the use of a simplified data model in comparison to the Allotrope Data Model (ADM) within the Allotrope Foundation's framework of products.

The purpose of this Request for Proposal (RFP) is to solicit proposals from various candidate organizations, conduct a fair and extensive evaluation based on criteria listed herein, and select the candidate who best presents the capability to meet Allotrope Foundation's strategic development and support needs.

Allotrope Foundation is a not-for-profit organization founded in 2013 and focused on developing standardization technology products which enable entities to easily standardize their data and its interpretation using our framework. Allotrope's international community consists of scientific instrument and solution vendors as well as biopharmaceutical and technology companies of various sizes who are seeking quicker and deeper insight into their data.

The Allotrope Foundation headquarters is in Washington, D.C. with a remote Product Team of full-time employees and Allotrope Foundation Members working from their respective company sites.

2 Proposal Guidelines

This Request for Proposal represents the requirements for an open and competitive process. Please submit your response electronically. Submission details can be found in the Section 4 of this document. Responses received after the requested due date may not benefit from full consideration and may be excluded from the selection process. All proposals must be signed by either an official agent or representative of the company submitting the proposal.

If the organization submitting a proposal must outsource or contract any work to meet the requirements contained herein, this must be clearly stated in the proposal. Additionally, all costs included in proposals must be all-inclusive to include any outsourced or contracted work. Any proposals which call for outsourcing or contracting work must include a name and description of the organizations being contracted as well as any limitations to the use of third-party or other licensing within the software, including cost or duration of use of such licenses.

All costs must be itemized to include an explanation of all fees and costs.

Contract terms and conditions will be negotiated upon selection of the winning bidder for this RFP. All contractual terms and conditions will be subject to review by Allotrope Foundation Secretariat and will include scope, budget, schedule where applicable, and other necessary items pertaining to this RFP.

2.1 Additional Conditions

1. This RFP is not an offer or a contract.
2. Proposals submitted in response to this RFP become property of Allotrope Foundation (AF)
3. Respondents will not be compensated or reimbursed for any costs incurred as part of the RFP process.

4. Responses to RFPs should contain only high-level discussions of product development efforts and should not contain trade secrets or confidential information. AF does not make any confidentiality commitments with respect to RFP submissions, but agrees not to publicly distribute the RFP responses outside the consortium or share RFP responses with other respondents or members of the APN.
5. AF is not obligated to contract for any of the products and services described in this RFP.
6. AF reserves the right to:
    a. Accept or reject any or all proposals.
    b. Waive any anomalies in proposals.
    c. Negotiate with any or all respondents.
    d. Modify or cancel this RFP at any time.

3 Purpose and Description

3.1 Background

The Allotrope Framework consists of the Allotrope Foundation Ontology (AFO), Allotrope Data Models (ADMs) and the Allotrope Data Format (ADF). Each piece serves a specific purpose in the context of standardizing data and its interpretation. While the framework uses advanced semantic technology as the foundation for the contextual metadata layer, this RFP will focus on creating a simplified representation of the current ADM, to be introduced as an additional component of the Allotrope Framework.

ADMs are Allotrope's fully compliant and governed data models. Using World Wide Web Consortium's (W3C) Shapes Constraint Language (SHACL), the ADM data model was created to enable use cases and techniques to be interoperable. SHACL shapes are used as a syntactic framework to provide an explicit tool for data model description and validation.

3.1.1 Current ADM Model Types

All models, whether simple or semantically rich, take the form of a semantic graph, which uses semantic triples to encode information. These semantic graphs have varying complexity that is driven by the complexity of the scientific domain that is being modeled. For some domains, a simpler set of triples which represent key/value pairs may be sufficient to represent the data while meeting the basic needs for insights or interpretation. In other cases, the need to represent data about multiple objects requires connections between these key/value pairs which creates a connected graph. When beginning a journey towards accessing data insights, an organization will often choose the simplest model which can appropriately represent the information needed for its purposes. As all graphs live on a continuum, it is possible to augment a simple model over time to capture more enriched relationships when required by an organization. The intent of this RFP is to create a schema for simpler representation of ADM than the current state offerings to support this continuum.

3.1.1.1 Tabular Model

For domains where there is a single business object which is being measured and all of the measurements are directly related to this object, a tabular approach can be used. The tabular approach as defined by Allotrope Foundation simplifies modeling by capturing just the individual measurements and associated

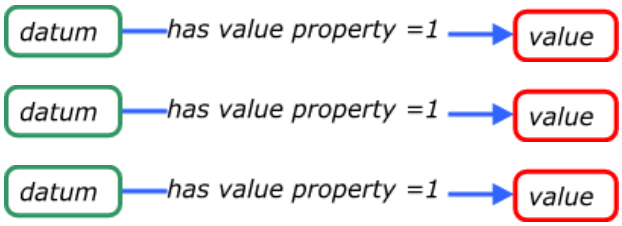
measurement units and attaches them to a single entity being measured using a leaf node data pattern and simple aggregation patterns.

Another way to think of tabular models is as a set of key/value pairs, where the keys can be clearly distinguished without ambiguity and no references are required between keys (they can stand alone and accurately describe the data without relating to anything else.) Note that the context of the key/value pairs is represented only by the Allotrope Data Format (ADF) file they are defined within; there may be no central node which connects the different keys. An example of a tabular model is the Allotrope Blood Gas Analyzer ADM. Tabular models are quick to assemble but lack the flexibility and completeness of full graph models. Nevertheless, tabular models, if constructed correctly, can be enhanced into full graph models as required. However, many domains can be adequately modeled using a tabular approach to meet primary analytics needs and no further expansion into a full graph is necessary.

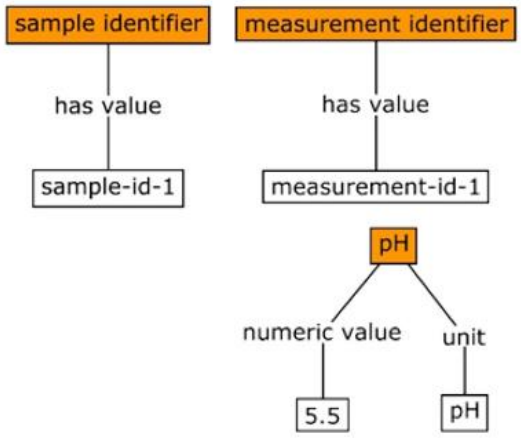
The main characteristics of a Tabular Model:

- A set of *key/value* pairs (Table)
- Keys are terms in the AFO providing a bridge to semantic usage.
- The context of the *key/value* pairs is represented only by the container they are defined in.
- Duplicate keys in a container are not allowed, as they cannot be distinguished from one another.

The abstract pattern of a Tabular Model is based on a *datum* instance which is connected via a *has value* property to a single *value* instance.



A typical sets of Key/value pair is described in the following Resource Description Framework (RDF) graph:



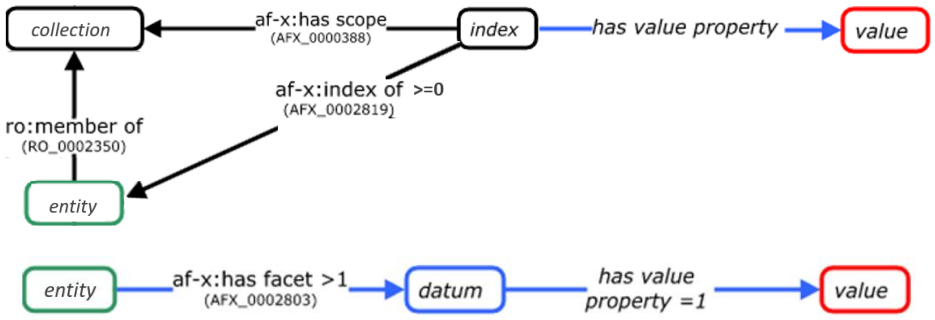
3.1.1.2 Aggregation Model - Tabular Model Extension

The Aggregation Model is an extension of the Tabular Model to allow aggregation of data attributes under a unified context and/or an indexed collection of similar data pattern.

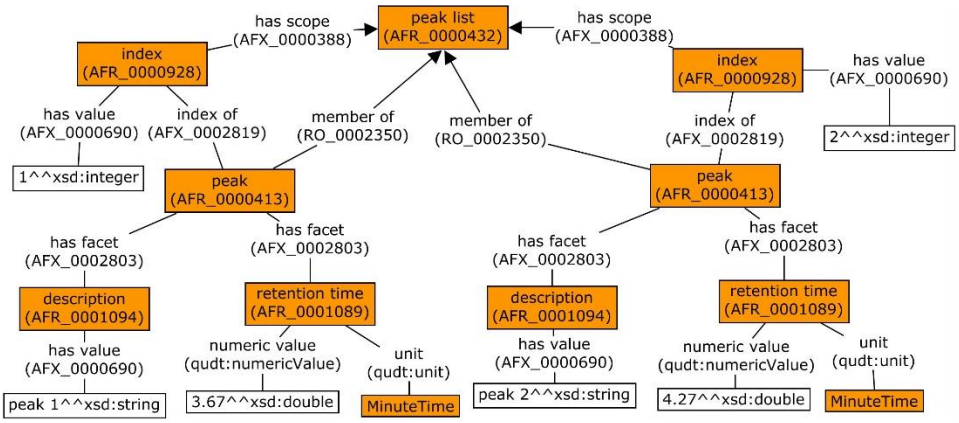
The main characteristics of an Aggregation Model:

- Extension of tabular models to allow multiple keys in the same file.
- Concepts can be aggregated as
    - a collection (e.g. a peak list contains peaks)
    - as *facets* (attributes) of another concept (e.g. retention time and description)

The abstract pattern of a Tabular Aggregation model is based on optional *indexed* information and contains multiple information entities with a defined ordering. The index must be unique. Multiple levels of aggregation are possible. Entity could be another collection or have facets itself.



A typical aggregation of a peak list is described in the following RDF graph:



3.1.1.3 Graph Model

For domains where there are multiple business objects being modeled or there are complex relationships such that it is insufficient to capture just the simple outputs of a single entity, a connected graph model

richly represents the different relationships in a complete, connected graph. An example of a connected graph model is the current Allotrope Liquid Chromatography - Ultraviolet (LC-UV) ADM.

Please note that this type of model is not in the scope of this RFP but is mentioned here for completeness.

3.2 Purpose

This RFP calls for the development of a schema definition and related tooling to support a specialized data model transformation process. The development is required to enable the use of a simplified syntactic representation of the current ADM. The simplified representation is expected to accelerate the adoption of Allotrope standardized taxonomy, ontology, and structured data model(s), thus enabling standardized interpretations.

Currently, the RDF (Resource Description Framework) is the only choice for Allotrope data model interchange. Over the years, there have been many transformations in the world of open data sharing. Lightweight formats such as JavaScript Object Notation (JSON) have become a popular alternative by software developers for various reasons:

- Minimizing verbosity
- Fast parsing
- Intuitive structure
- Term representation and coding is similar.
- Limitation in terms of what objects can be modeled. This limitation prohibits developers in a positive way, making the code simpler, more predictable, and easy to read.
- Extensive toolset support in almost every language
- Widely used to deliver and exchange data using Representational State Transfer (REST) APIs.

Another approach to simplify the syntactic of data representation is JavaScript Object Notation for Linked Data (JSON-LD). It applies the linked data concept with JSON and may present an interesting alternative solution option for various reasons:

- JSON-LD is a lightweight Linked Data format to easily read and write structured data using open vocabularies.
- It follows the JSON syntax.
- It leverages the linked data concept. (A JSON-LD document is both an RDF document and a JSON document)
- Familiarity with its syntax simplifies the usage by software developers.
- It is a concrete RDF syntax therefore it can maintain full compatibility with the ADM (Tabular and full graph models). RDF and JSON-LD are NOT two mutually exclusive approaches!
- For Web API applications the syntax is designed to easily integrate into deployed systems that already use JSON, and provides a smooth upgrade path from JSON to JSON-LD
- Relational Database Management System (RDBMS) has good support of JSON based libraries for data archive and retrieval applications.

The new development of a simplified syntactic representation of ADM will enable the use of a simplified data model in comparison to the RDF-based ADM. The simplified data model is an extension to the existing

ADM in its Tabular and Aggregation structure by transforming its syntactic representation into a simplified format while maintaining data and semantic consistency.

The simplified format shall be:

1. technically easy to access.
2. easy to store.
3. easy to interface with a variety of applications.
4. sufficient to cover many of the current and future Allotrope community use cases.
5. consistent with the original data and metadata in the semantic representation captured with an ADM with no data and information loss (requirement that can be "naturally" fulfilled with JSON-LD for every type of ADM)

For the purpose of this RFP, the temporary name of the simplified model shall be Allotrope Simple Model (ASM).

The ASM model will leverage the standardized Allotrope ontology and models of different analytical domains which have already been defined and governed by Allotrope subject matter experts. Given the support for simple formats such as JSON syntax (or JSON-LD), the extended approach will make the data accessible in a wide variety of programming languages, tools, and applications. The ASM model shall:

1. be structured with a simpler representation such as JSON or JSON-LD.
2. maintain bidirectional compatibility (as described in the section "*Bidirectional Compatibility and Schema Transformation*") with the existing ADM with RDF based representation.

This alternate approach preserves the existing Allotrope product offerings alongside a simpler approach while maintaining an alignment with a standardized Allotrope ontology. Allotrope community members will then have the choice which representation of ADM they will use for their individual applications.

3.3 Project Description

As discussed in the previous sections, this project is calling for the development of a schema definition and related tooling to support the ASM model transformation process. The development is required to enable the use of a simplified data model as an extension to the existing ADM in its Tabular and Aggregation structure by transforming its syntactic representation into a simplified format while maintaining data and semantic consistency.

The developed transformation process will provide an automated methodology to transform the current ADM in its Tabular and Aggregation structure into a simplified model. In other words, it is a schema transformation process from ADM to a simplified model and not a data instance conversion (as described in the section "*Bidirectional Compatibility and Schema Transformation*")

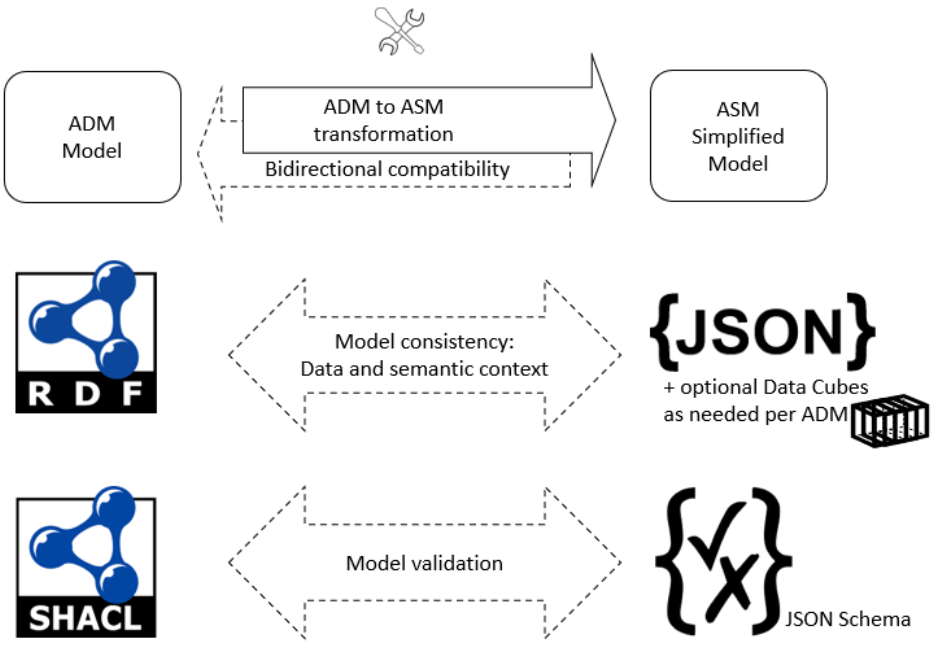
In addition to the new developed simplified model, a binding to Data Cube (multidimensional array) representations, as well as the actual Data Cube storage format, shall be proposed as an integral part of the schema definition. This model shall be consistent with specific ADMs where the associated ADF file stores Data Cube related metadata within the Data Description using an RDF Data Model. For more

information on the "*ADF Data Cube to HDF5 Mapping Ontology*" please refer to the following page on the Allotrope Foundation specifications website.

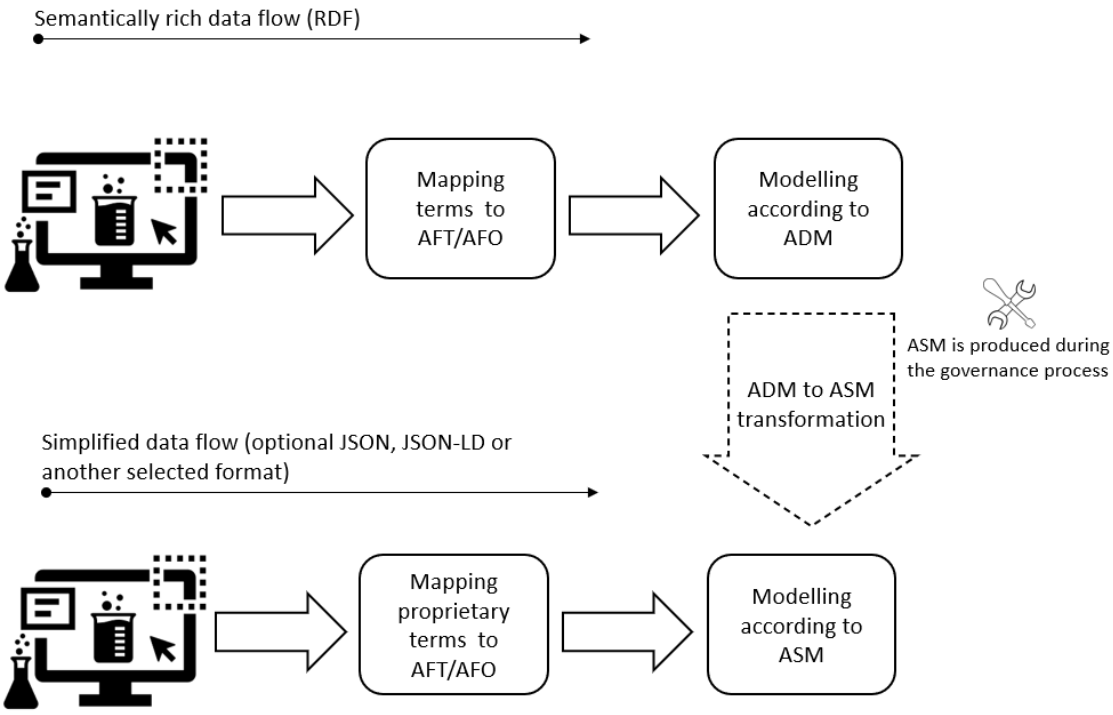
In addition, the developed transformation process will provide bidirectional compatibility between the simplified model and the semantic ADM in its Tabular and Aggregation structure. This methodology maintains the consistency across Allotrope products (as described in the section "*Bidirectional Compatibility and Schema Transformation*").

The developed transformation process is intended to be used as part of the Allotrope model creation and the governance process, where a compatible ASM will be released in conjunction with the ADM. For more information on the "*Allotrope Foundation Data Model and Ontology Governance Process*" please refer to the following page on the Allotrope Foundation community website.

The following diagram describes one possible functionality of the model transformation process and tool into a simplified JSON and data cubes (multidimensional arrays) binding. The type of binding and the format of the Data Cubes are not specified in the diagram. Please note that this diagram is an example. The ASM model shall maintain bi-directional compatibility with the existing ADM to maintain consistency across Allotrope products. For validation, the tool transforms between the SHACL shapes and a JSON schema. It is important to mention that this RFP is open to any other simplified alternative such as JSON-LD as needed to meet the requirements described in the "*Detailed requirements*" table.



With the simplified ASM model in place, an alternative data flow within the enterprise IT infrastructure will be available for data integration, exchange, storage and analytics. Please note that the transformation from the ADM to the ASM is done during the governance process phase and it is not part of the data flow. The following diagram describes the optional data flows:



3.4 Bidirectional Compatibility and Schema Transformation

The current Allotrope Foundation ADMs are expressed using Shapes Constraint Language (SHACL), a language for validating RDF graphs against a set of conditions. These conditions are provided as shapes and other constructs expressed in the form of an RDF graph. RDF graphs that are used in this manner are called "*shapes graphs*" in SHACL and the RDF graphs that are validated against a shapes graph are called "*data graphs*". As SHACL *"shapes graphs"* are used to validate that *"data graphs"* satisfy a set of conditions, they can also be viewed as a description of the *"data graphs"* that do satisfy these conditions. Such descriptions may be used for a variety of purposes beside validation, including code generation and data integration.

Similar technique for data validation and description exists in other data formats as well. For example, JSON Schema is a vocabulary that allows one to annotate and validate JSON documents. With JSON Schema one can describe the data structure, provide clear human and machine-readable documentation, and validate data.

Similarly, it is important to mention that since JSON-LD is another serialization format of RDF, the use of SHACL *"shapes graphs"* to describe or validate a JSON-LD "*data graph*" is applicable.

3.4.1 Schema Transformation

The developed schema transformation process will provide an automated methodology to transform the current ADM in its Tabular and Aggregation structure into a simplified model ASM with no information loss. The input to the transformation process is the ADM described in its associated SHACL file ("*shapes graphs*"), and the output of the transformation process is the proposed ASM in its proposed schema

definition. (for example, schema transformation from SHACL to JSON-Schema in the case of a JSON representation)

Additional point to mention is that having a possible deterministic process to transform vice versa from the proposed ASM schema to the associated ADM SHACL file with its original content ("*shapes graphs*"), ensures bidirectional schema compatibility between ADM and ASM, but it may miss some optional "*instance data*" edge cases.

3.4.2 Bidirectional Compatibility

In addition to the automated schema transformation, the proposed methodology shall guarantee bidirectional compatibility of the instance RDF "*data graph*" to the proposed "*instance data*" with no data loss. A trivial option to ensure such compatibility is to demonstrate that we can achieve a full circle of data transformation. That means transforming the RDF "*data graph*" to the proposed "*instance data*", and then back to an identical RDF "*data graph*" to the original RDF "*data graph*". This will guarantee bidirectional compatibility.

As requested in the section "Detailed Requirements for the Schema Transformation Tool" please provide the methodology and the testing mechanism to guarantee bidirectional compatibility.

3.5 Detailed Requirements for the Schema Transformation Tool

#	Requirement	Details
3.5.1	**Input model**	The input model is based on ADM
3.5.1.1		The input model is based on the following ADM types:
3.5.1.2		Tabular Model • Samples of the model can be found at Allotrope ADM repository at https://gitlab.com/allotrope/adm/-/tree/develop/purl/shapes • Specific example: BGA https://gitlab.com/allotrope/adm/-/blob/develop/purl/shapes/adm/bga/REC/2020/03/bga.shapes.ttl
3.5.1.3		Aggregation Model • Samples of the model can be found at Allotrope ADM repository at https://gitlab.com/allotrope/adm/-/tree/develop/purl/shapes • Specific example: Bulk Density https://gitlab.com/allotrope/adm/-/blob/develop/purl/shapes/adm/bulk-density/REC/2020/12/bulk-density.shapes.ttl
3.5.1.4		Associated reference to the Multidimensional Arrays (DataCubes)

3.5.2	**Input file format**	TURTLE (.ttl)
3.5.3	**Output model**	Please provide the output model schema definition and the proposed data representation (JSON, JSON-LD or other)
3.5.3.1		The output model is for the following ADM types:
3.5.3.2		Structure for Tabular Model
3.5.3.2.1		• Please provide a sample data instance
3.5.3.2.2		• Please provide schema definition
3.5.3.3		Structure for Aggregation Model
3.5.3.3.1		• Please provide a sample data instance
3.5.3.3.2		• Please provide schema definition
3.5.3.4		Output file format
3.5.3.5		Please provide details of how the below requirement for representation of multidimensional arrays (as described in the in the below section of “Multidimensional arrays”) has been addressed in the proposed schema.
3.5.4	**Multidimensional arrays**	Please provide one or more methods to represent multidimensional arrays. The bidder representation choices below are suggestions (final selection to be defined as part of the execution of this RFP) Some of the potential associated representations of the multidimensional arrays are:
3.5.4.1		JSON structure for Text representation of Multidimensional Arrays
3.5.4.1.1		• Multidimensional Arrays representation as part of the JSON structure
3.5.4.1.2		• Multidimensional Arrays representation as part of the JSON structure with Base64 encoding
3.5.4.1.3		• Multidimensional Arrays representation external to the JSON structure
3.5.4.2		Optional external binary representation of Multidimensional Arrays

3.5.4.2.1		• HDF5 (https://www.hdfgroup.org/solutions/hdf5/)
3.5.4.2.2		• Cubes (http://cubes.databrewery.org/)
3.5.4.2.3		• Apache parquet (https://parquet.apache.org/documentation/latest/)
3.5.4.2.4		• SDMX-JSON (https://github.com/sdmx-twg/sdmx-json/wiki, https://sdmx.org/?page_id=5008)
3.5.4.2.5		• Other options
3.5.4.3		External "open" representation (with a mime type) of Multidimensional Arrays
3.5.5	**Validation**	
3.5.5.1	**Validation input**	Input model for validation: ADM SHACL Shape (https://www.w3.org/TR/shacl/)
3.5.5.1.1		Input Model validation file format: TURTLE (.ttl)
3.5.5.2	**Validation output**	Please suggested an output schema for validation
3.5.5.3	**Validation output (JSON option)**	An optional JSON schema for validation. It is not mandatory. It is suggested in case the proposed model representation is based on JSON format.
3.5.5.3.1		• Output Schema: JSON Schema (https://json-schema.org/ latest version 2020-12)
3.5.5.3.2		• Output schema validation file format: JSON (.json)
3.5.5.3.3		• Integration of a validation tool: https://json-schema.org/implementations.html
3.5.6	**Bidirectional compatibility**	Please provide the methodology and techniques to preserve data and contextual metadata consistency throughout the model transformation. (more information can be found in a previous section "*Bidirectional Compatibility and Schema Transformation*")
3.5.6.1		Compatibility in the transformation from ADM to ASM
3.5.6.2		Compatibility in the transformation from ASM to ADM
3.5.6.3		Testing methodology for the ADM and ASM bidirectional compatibility
3.5.7	**Language**	The tool shall be written in a widely used programming language such as Python (if written in Python it should be compatible with the most recent releases of Python versions 3.7.x or newer) or Java (if written in Java it should be compatible with Java LTS (long-term support) Java 11)

3.5.8	**Software Development Lifecycle (SDLC)**	
3.5.8.1		Source Code Management: Gitlab https://gitlab.com/allotrope
3.5.8.2		Continuous Integration: Gitlab https://gitlab.com/allotrope-internal/adf-library
3.5.8.3		Artifacts repository: jFrog https://allotrope.jfrog.io/
3.5.8.4		Release copy on Allotrope's Client Connect
3.5.9	**Packaging**	Please provide your software packaging methodology. • If the programing language of choice is: - Python - please follow the standard Python packaging according to PyPa Python Packaging Guide https://www.pypa.io/en/latest/ with PIP installation. - Java – please use the Maven tool for software built and dependencies management. - C# - please use NuGet package manager
3.5.9.1		While it is not mandatory, it is a good practice to minimize the use of dependencies
3.5.10	**Testing**	
3.5.10.1		Automated functional tests
3.5.10.2		Test automation scripts
3.5.11	**Content Documentation**	
3.5.11.1		User guide - Including a tutorial
3.5.11.2		Installation guide
3.5.11.3		Developer guide
3.5.11.4		Product release: - Release Note - Required information (including licensing) - Release package guide - Release build protocol - Release shipping document
3.5.12	**Source code ownership and licensing**	• Dependencies that require a copyleft style license must not be used. • Dependencies that require any licensing fees or royalties must not be used.

		• Full license to modify the code for adding new model patterns. • Strong preference will be given to submissions which all content produced by this project, including but not limited to source code, testing materials, and documentation will be owned by Allotrope Foundation (AF) and may be licensed by AF in any manner it so chooses, including the release of the package using an open-source or similar permissive license. As such, it is important that the respondent's strategy to deliver the product takes into account any licensing issues for an open-source project including not only avoiding reliance on any software tools or libraries where use in software released under an open-source license is not legally permissible; similarly, any copyleft or "viral" licenses should be similarly avoided.
3.5.13	**Warranties, Support and Maintenance**	Please include in your proposal the following information:
3.5.13.1		• Warranty of software performance
3.5.13.2		• How your organization can facilitate the support and maintenance for the provided tool.

For the next section please refer to the next page!

3.6 Development Phases

The project lifecycle will be divided into the following phases and the related deliverables.

#	Phase	Deliverables	Remarks
3.6.1	1	Schema definition (including multidimensional arrays)	To be reviewed by Allotrope Foundation Semantic Working Group (coordinated by Allotrope Foundation Product Team) • Estimated 1-2 weeks.
3.6.2	2	Proof-of-Concept (PoC) and testing of the schema	This phase begins after the completion of phase 1 and the approval of the schema. • Please provide the transformation methodology • Please provide testing methodology • Please provide the mechanism to test for bidirectional compatibility. Final approval for the proposed schema definition and transformation methodology will be communicated by the Allotrope Foundation Product team.
3.6.3	3	Tool development	This phase begins after the completion of phase 1 and upon approval by Allotrope Foundation Product Team
3.6.4	4	Tool testing including ASM models generation	The testing shall include all the existing Allotrope Tabular and Aggregation models at that time
3.6.5	5	Final deliverables and demo with a Tabular model	• Delivery of the complete set of the project artifacts as defined in the *"Design, Test, Document and Release Specifications"* section • The Tabular model will be based on existing tabular model suite

4 Project Scope

The scope of this project includes the full lifecycle: requirements gathering, design, development, coding, testing, continuous integration and product release. Documents for all lifecycle phases shall be generated by the selected bidder: analysis, design, build, testing, and release to be shared with the Allotrope Foundation Product Team.

The selected bidder will be responsible for planning and aligning on specifications with assistance from Allotrope Foundation designated representatives.

4.1 Development Phases and Cycles

The following criteria are in scope and must be met to achieve a successful project:

#	Cycle	Details
4.1.1	**Project Phases**	The project will be implemented in several phases as detailed in the section *"Development Phases"*. At the end of each phase a product demonstration will be conducted

4.1.2	**Short weekly project meetings**	Weekly meetings with the Allotrope Foundation product team will be conducted to discuss product design considerations, project execution and demonstrations. This meetings cycle may be changed, pending schedule, progress and/or group alignment.
4.1.3	**Working Group and community participation**	Throughout the development phases the selected bidder may get involved with the Allotrope community and the different working groups to seek proposed schema review, early testers and other considerations. Final approval for the proposed schema definition and transformation methodology will be communicated by the Allotrope Foundation Product team. Related communications, schedules and activities with the Allotrope Foundation community will be coordinated and approved by the Allotrope Foundation product team

4.2 Design, Test, Document and Release Specifications

The following criteria are in scope and must be met to achieve a successful project:

#	Requirement	Details
4.2.1	**Model transformation tool development and schema definition**	Detailed requirements are specified in the related section of *"Detailed Requirements for the Schema Transformation Tool"*
4.2.2	**Validation**	Detailed requirements are specified in the related section of *"Detailed Requirements for the Schema Transformation Tool"*
4.2.3	**SDLC, packaging and testing**	Detailed requirements are specified in the related section of *"Detailed Requirements for the Schema Transformation Tool"*
4.2.4	**Documentation**	Detailed requirements are specified in the related section of *"Detailed Requirements for the Schema Transformation Tool"*
4.2.5	**Source code ownership and licensing**	Detailed requirements are specified in the related section of "*Detailed Requirements for the Schema Transformation Tool*"
4.2.6	**Warranties, Support and Maintenance**	Detailed requirements are specified in the related section of "*Detailed Requirements for the Schema Transformation Tool*"
4.2.7	**Project phases**	Detailed requirements are specified in the related section of *"Development Phases and Cycles"*

4.3 Timeline

All timelines are anticipated dates and are subject to change.

- All proposals in response to this RFP are due via email no later than 5pm EST May 7th, 2021. Submissions received after this date are not guaranteed to have full consideration.
- The bidder is requested to confirm his intention to respond no later than 5pm EST April 26st, 2021.

- Evaluation of proposals will be conducted starting May 10th, 2021 until May 21st, 2021. If additional information or discussions are needed with any bidders during this time window, the bidder(s) will be notified.
- The selection decision for the winning bidder will be made no later than May 27th, 2021, and contract negotiations with the winning bidder will commence immediately.
- Notifications to bidders who were not selected will be completed by June 4th, 2021 or as appropriate.
- The tentative project start day is June 7th, 2021.

The specific dates and timeline given in this section are subject to change without notice.

5 Budget

All proposals must include proposed costs to complete the tasks described in the project scope section. Costs should be stated as one-time, non-recurring costs (NRC) or monthly recurring costs (MRC) if applicable.

5.1 Additional Budget Considerations

- Travel Time will not be reimbursed.
- Pre-approved Travel Expenses will be subject to the Allotrope travel guidelines which will be provided to the selected vendor.

6 Bidder Qualifications

The organization selected and contracted to conduct the work effort must be a member in good standing of the Allotrope Partner Network (APN) on or before the date the contract is executed and throughout the duration of the contract.

Bidders should provide the following items as part of their proposal for consideration:

- Description of experience in designing, building, and deploying an integrated software product solution related to or within data modeling, semantics or similar technical taxonomy or ontology-based product.
- List of how many full time, part time, and contractor staff in your organization, as well as which staff member(s) would be assigned for the project.
    - Anticipated resources you will assign to this service (total number, role, title, experience)
- Examples of 3 or more products designed and implemented or supported by your organization.
- Testimonials from past clients on similar or related projects
- Details of applicable best practices with regards to software development processes which are currently used within your company as they relate to this RFP.
- Project management methodology

6.1 Specific Technical Questionnaire to the Bidder

As it relates to your team's experience and expertise, please provide high level examples or references (if any exist) to projects or integrations of the following:

#	Domain	Please provide some details or references
6.1.1	RDF and semantic technology development	
6.1.2	Data mapping, data model and schema development	
6.1.3	Software and tool development in Python and/or Java and/or C#	

7 Access to Applicable Material for Response

For non-Allotrope APN members to gain access to relevant API information, please inquire to the below email the below contact details in the "*Submission*" section for the necessary paperwork.

8 Proposal Evaluation Criteria

Allotrope Foundation will evaluate all proposals based on the following criteria. Please note that as a policy Allotrope Foundation does not share or discuss the results of the proposal evaluation process nor provide any feedback why a bidder was not selected.

To ensure consideration for this Request for Proposal, your proposal should be complete and include all the following criteria:

- Overall proposal suitability: proposed solution(s) must meet the scope and needs included herein and be presented in a clear and organized manner.
- Organizational Experience: Bidders will be evaluated on their experience as it pertains to the scope of this RFP.
- Previous work: Bidders will be evaluated on examples of their work pertaining to the technical design and or support as applicable, as well as client testimonials and references if included.
- Value and cost: Bidders will be evaluated on the cost of their solution(s) based on the work to be performed in accordance with the scope of this RFP.
- Technical expertise and experience: Bidders must provide descriptions and documentation of staff technical expertise and experience.

8.1 Peer Questions and Answers

In the event that clarifying questions are asked to the Allotrope team, the prudent questions will be deidentified as necessary to shield the requester and then the questions and answers will be posted to the Allotrope website where the RFP document is posted. This is to keep all interested parties informed of insights or oversights by the Allotrope team and to ensure an equal opportunity to all potential bidders.

8.2 Submission

Each bidder must submit their proposal to the email address below by the day and time noted above in in the related Timeline section:

Allotrope Foundation Product Team Email Contact for RFP Submission: matthew.fox@allotrope.org

9 References

1. Description of Allotrope Framework: https://www.allotrope.org/allotrope-framework
2. ADM GitLab repository https://gitlab.com/allotrope/adm/-/tree/develop/purl
    a. ADM diagrams: https://gitlab.com/allotrope/adm/-/tree/develop/purl/diagrams/adm
    b. Manifest files: https://gitlab.com/allotrope/adm/-/tree/develop/purl/manifests
    c. SHACL Shape files: https://gitlab.com/allotrope/adm/-/tree/develop/purl/shapes
    d. Test files: https://gitlab.com/allotrope/adm/-/tree/develop/purl/test/adm
    e. Query files: https://gitlab.com/allotrope/adm/-/tree/develop/purl/queries/adm
3. ADM pattern catalog: GitLab https://gitlab.com/allotrope/adm-patterns, Client Connect https://highq.in/3wy6ct2jj3
4. Allotrope Foundation Data Model and Ontology Governance Process: https://community.allotrope.org/resources/reference/semantic/governance/afo_adm_governance_process/
5. ADF Specifications: https://docs.allotrope.org/
6. RDF Data Model: https://www.w3.org/RDF
7. W3C Shapes Constraint Language (SHACL): https://www.w3.org/TR/shacl/