Modernizing Grants Management with Salesforce and MuleSoft

Accelerated Delivery of Salesforce Grants Management Application through MuleSoft Powered Integrations with Grants.gov

Technical White Paper

Introduction and Background

The United States government offers nearly 1,000 different grant programs to qualified academic institutions, nonprofits, small business, individuals and research organizations. Grants are critical instruments for the government to fund ideas and projects and to provide public services and stimulate the economy .These grants are distributed by 26 grant-specific agencies, and divided into 21 distinct categories. The grant process follows a linear life cycle that includes creating the funding opportunity, applying, making award decisions, and successfully implementing the award. Both grantor and applicants perform specific actions along the lifecycle. These actions are grouped into three main phases.

1. Pre-Award Phase- Funding Opportunities and Application Review
2. Award Phase- Award Decisions and Notifications
3. Post Award- Implementation, Reporting, and Closeout

In the Pre-Award phase, Grantors would plan, announce an opportunity whereas applicants would be searching for available opportunities, researching the details and applying for potential grants opportunities. As the applicants apply for the grants, Grantors would need to retrieve/receive the applications and put the information through a multi-step review process that could span across various teams and personnels. After a grant is awarded, Awardees provide status update and spending records to enable Grantors to maintain oversight, assess the progress of the projects and attainment of the goals.

The U.S. Government Accountability Office (GAO) has identified several challenges with federal grants management in its work spanning several decades. These challenges include:

- Streamlining: Requirements that are duplicative and conflicting can burden recipients of federal grants.
- Transparency: Inconsistencies with the completeness and quality of the reported information.
- Collaboration and consultation: Collaboration between grantor and grantee is inefficient and slow, resulting in poor implementation and prioritization of initiatives.
- Duplication, overlap, and fragmentation: Duplication and overlap of grants cost agencies.
- Internal controls and oversight: Weaknesses in grants oversight and accountability.
- Slow: Running on legacy systems or paper-based manual processes.
- Data silos: Difficulty getting data from other lines of business because of inadequate data management strategy.
- Hard to measure: Difficulties reporting and measuring grant outcomes.

Without significant change to the grants management process, we will continue to lose trillions of dollars that could be used for critical needs. To solve the above challenges, the GAO proposed initiatives aimed at grants management reform and presented opportunities to improve the efficiency, effectiveness, and transparency of federal grants.

Salesforce's purpose-built **Grant Program Management** application is designed to address these challenges and streamline the grants management process from both Grantors and the Applicants perspectives. Grants Program Management application includes a number of capabilities to help Grantors track, manage, deliver grants programs with increased visibility across the entire funding lifecycle while the underlying platform delivers additional visibility and insights to power effective decision making.

Integrating Salesforce and Grants.gov

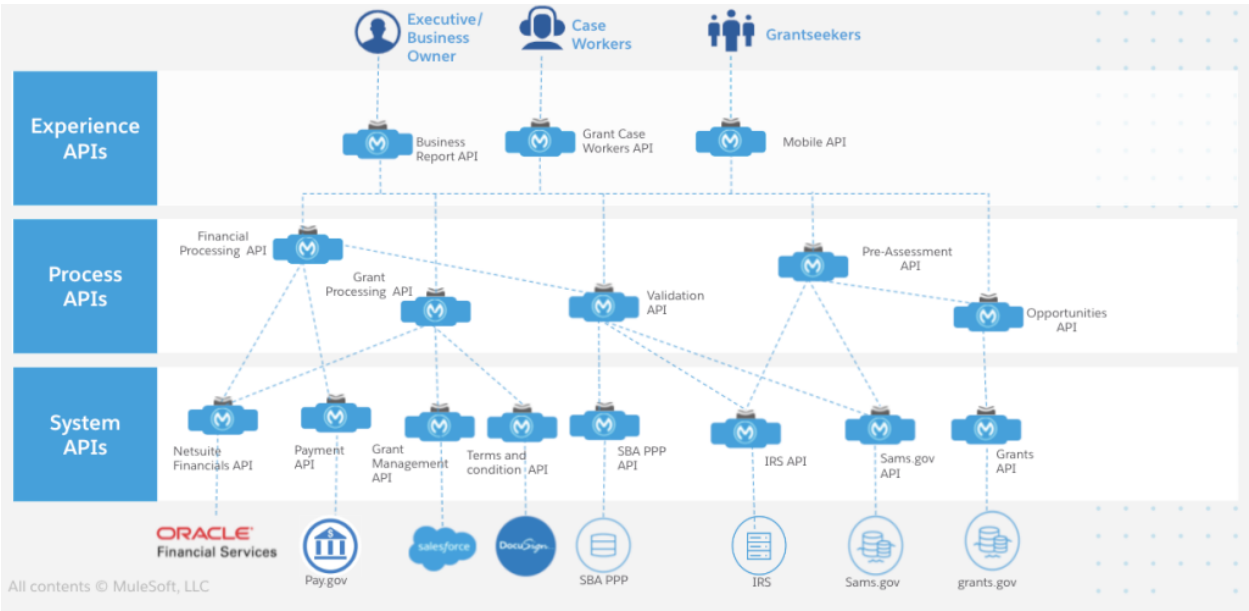
As Grants.gov remains a place for where grant opportunities are published for wider socialization by grantors and a platform for applicants to acquire necessary information, apply for the grants and supply the updates on their projects, it is imperative that any Grants Management system has a meaningful integration with Grants.gov.

With Salesforce Grants Management Application, a grantor can see all grant recipients, gain insights into spending and view specific milestones. Meanwhile, the grantee can view the grant programs they're enrolled in ,implementation and milestone status, compliance records and more. These capabilities can be extended and augmented with a deeper integration with the Grants.gov, Pay.gov and SAM.gov system to system interfaces.

This is where MuleSoft comes in the picture. MuleSoft Anypoint Platform comes with a set of prescriptive blueprints to build **API driven Integrations** and a library of Pre-Built components that enable organizations to extend and enrich Salesforce **Grants Program Management** Application. This white paper will provide technical details on how these integrations can be implemented and how MuleSoft can provide necessary acceleration while enhancing Salesforce Grants Management Application to deliver a highly differentiated solution while increasing the returns of investments for the Salesforce customer base.

Solution Outline

Apart from the technical capabilities of the AnyPoint platform that allow rapid development of API driven integration solutions, MuleSoft also provides a prescriptive framework that facilitates the creation of composable APIs that can be designed, developed and deployed in a secured and governed environment. One of the key requirements for a Grants Management solution is to deliver a Single 360-degree view of the grant life cycle for the grantor and grantee to improve transparency and accountability. Following API Led Architecture, would allow



In this API-led architecture, an agency can publish any opportunity to the grants.gov website by using an opportunities API in the Process layer. From there, grant seekers can discover the opportunity using their mobile phone or web app channels. Then grant seekers can quickly check pre-assessment to determine if they are eligible to apply for the given opportunity or not by using a pre-assessment API. If the grant seeker is eligible, they can apply for the grant and will be checked for further conditions by the validation process API. After a successful condition, a grant is awarded and payment will be dispersed by the grantor by using pay.gov payment API. Periodically, the grant seekers will perform reporting. Finally, the executive team or business owner will have a 360-degree view of the grant and its business outcome.

Below is the summary of how MuleSoft Anypoint Platform can solve the challenge of grants management according to the GAO recommendations:

- Efficiency: Design and implement modern APIs using MuleSoft Anypoint Platform that will help to improve data completeness and quality which will improve the efficiency of data-driven decision making.
- Effectiveness: Adopting API-led methodology improves real-time decision-making and intelligence to close out grants on time, identify, and redirect unused funds to other priority projects.
- Transparency: Accelerate transparency by rapidly unlocking core data from grant management systems to show auditing, payment, financial, reporting, and other data by using 200+ out-of-the-box MuleSoft Connectors from Anypoint Exchange. Integration coverage provided by these connectors would allow enrichment of the workflow capabilities of the Salesforce Grants Management solution by providing secured, configuration driven connectivity to the systems within Applicants'/Grantors' organizations. Grants.gov, SAM.gov, and Pay.gov systems.

We will dive deeper into simplifying the integration of Salesforce Grants Management solution with Grants.gov Systems to System Web Services in the next section.

Integration with Grants.gov

Managed by the Department of Health and Human Services, **Grants.gov** is an E-Government initiative operating under the governance of the Office of Management and Budget. Grants.gov provides an extensive list of web services for Applicants and Agencies to perform the Find and Apply functions using System-to-System (S2S) interfaces.

There are two sets of Grants.gov web services that make data and functionality available to automate system to system interactions. First is intended to facilitate integrations for the **Grantor** audiences and the other offers the resources and methods for the **Applicants** focused workflows.

Grantor S2S Web Services

Grantor focused Grants.gov web services include a number of operations for the agencies and organizations to manage the opportunities that they are planning on offering or have already listed with the Grants.gov. These operations are presented as SOAP Web Services interfaces that use XML as the data exchange protocol. They are organized under three categories: 1) Forms, 2) Opportunities (multiple), 3) Submitted Applications. Operations in these categories range from getting forms from a particular form family, creating / updating / deleting various aspects of a funding opportunity, to retrieval of the applications for a particular opportunity.

Applicant S2S Web Services

For the Applicants focused web services, operations are organized into following categories. 1) Opportunities - Package, 2) Submit Application, 3) Submitted Applications, 4) Authentication. These operations are also presented as SOAP endpoints and use XML as the Data Exchange protocol. These operations allow the Applicants to search for available opportunities, submit application packages, retrieve previously submitted applications and authenticate and verify their identity.

Additional Grants.gov Resources

Besides the Web Service specifications in the form of a WSDL file, Grants.gov also provides a reference implementation for a client application developed in JAVA that showcases how the web services can be consumed. Following provides the links to the WSDL files, training environments and the reference implementations.

WSDLs

Grantor: AgencyWebServices-V2.0.wsdl

Applicant: ApplicantWebServices-V2.0.wsdl

Training Environment:

https://training.grants.gov/

Grantor S2S Reference Implementation:
https://www.grants.gov/web/grants/s2s/grantor/reference-implementation.html

Applicant S2S Reference Implementation:

https://www.grants.gov/web/grants/s2s/applicant/reference-implementation.html

Consuming Grants.gov Applicant S2S Interfaces

Following section describes how Web Services Consumer Connector along with Data Transformation components can be utilized to develop similar System APIs to simplify integration with the Grants.gov System to System web services.

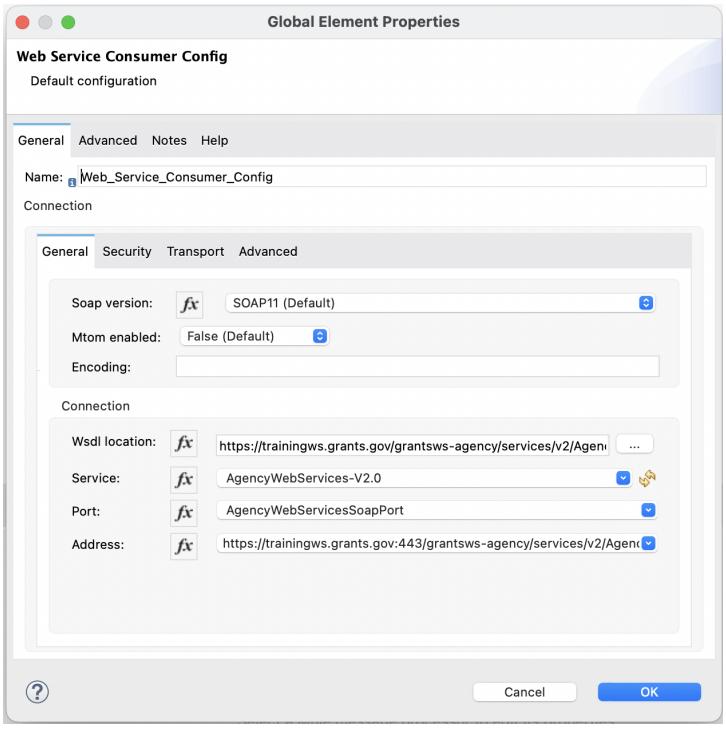
Using Web Services Consumer Connector in a Mule Project

In Studio, create a new Mule project in which to add and configure the connector:

1. In Studio, select **File > New > Mule Project**.
2. Enter a name for your Mule project and click **Finish**.
3. In the **Mule Palette** view, click **(X) Search in Exchange**.
4. In **Add Dependencies to Project**, type `web service consumer` in the search field.
5. Click **Web Service Consumer** in **Available modules**. Click **Add**.
6. Click **Finish**.

When you add a connector operation to your flow, you can define a specific operation for that connector to perform. To add the Consume operation to Web Service Consumer Connector, follow these steps:

1. In the **Mule Palette** view, select **Web Service Consumer** and then select the **Consume** operation.
2. Drag the operation onto the Studio canvas to the right of the input source.
3. When Web Services Consumer Connector is used in the project for the first time, Connector Configuration drop down will be empty. Click the  sign to add new configuration. This will present a wizard with several options to specify various settings across multiple tabs. At the least, you will specify a WSDL Location (this will be the Grants.gov Web Services WSDL file. Once specified a valid location, Service Name, Port, And Address Information should be populated automatically. Please adjust other parameters as needed. See the screenshot below for reference.



4. Once the Web Services Consumer Connector is configured, tile configuration will allow selection of the Operation. Please choose the operation that needs to be implemented.
5. Upon selection of the operation, MuleSoft flow can then be updated to transform the incoming payload.

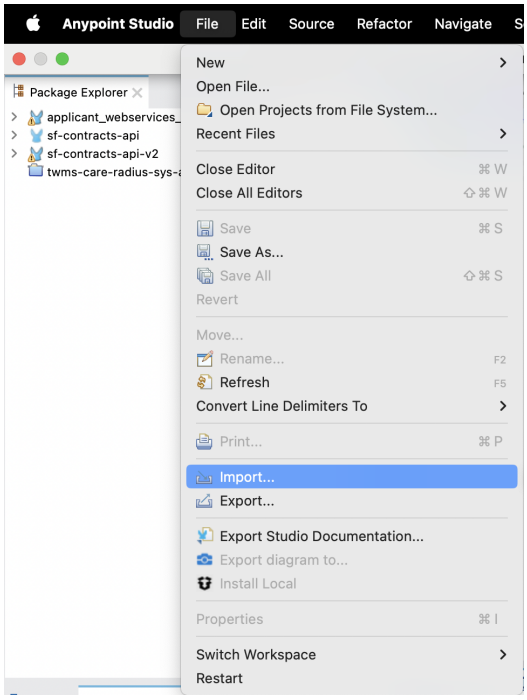
Grants.gov Applicant S2S - System API Implementation

This project contains a pre-built API implementation that you can customize. This implementation provides an APIKit enabled System API which showcases how to surface the Applicant S2S operations as a RESTful API and can be used with AnyPoint Studio version 7.15+ . It showcases examples of the following:

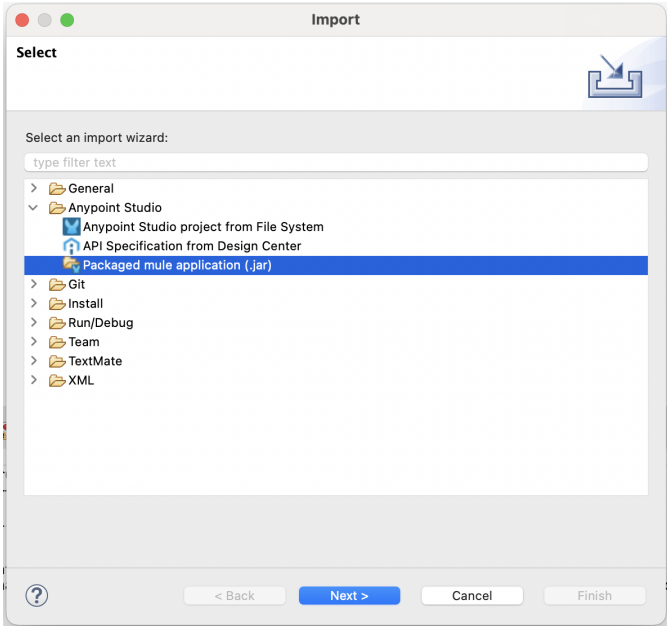
- RAML Specifications for the Grants.gov Applicant S2S System API
- Configuration of the Web Services Consumer Connector to demonstrate how Grants.gov S2S interface can be consumed
- Preparation of the xml payloads that are required to invoke Grants.gov S2S operations
- Transformation of XML outputs from the Grants.gov S2S operations to JSON format

Importing Example Application into Anypoint Studio

1. Download the jar file that is attached with this project.
2. Open AnyPoint Studio and Go to File → Import



3. Select Packaged Mule Application option from AnyPoint Studio category



4. Navigate to the location where the jar file was downloaded in the step 1.
5. Click Finish.

Running Templates in Anypoint Studio

After you import your template into Studio, follow these configuration steps to run it.

1. Right-click the project folder.
2. Hover your mouse over 'Run as'.
3. Click **Mule Application** (configure).
4. Inside the dialog, select Environment and set the variable mule.env to the appropriate value (e.g., dev or local).
5. Inside the dialog, select Environment and set the variable mule.encryptionKey to the property encryption key that you used to encrypt your secure properties.
6. Inside the dialog, go to 'Clear Application Data' select 'always' radio button.
7. Click **Run**.

Additional Information

- Please refer to the attached link on how to secure the configuration properties.
- Please refer to the attached link on how to generate the Keystore.
- This solution was developed and tested on Anypoint Studio 7.15 and Mule Runtime 4.4.0.

Assumptions and Constraints

Setting up System To System with Grants.gov

This section assumes that your organization is already set up with EBiz POC account on the Grants.gov User Interface. For clients connecting to Grants.gov Web Services for the first time:

- Obtain a digital certificate and ensure it is properly set up to communicate securely via a mutual authentication with Grants.gov. See the Applicant Certificates.
- Grants.gov S2S interfaces require authentication of the end user's identity through a personal user authentication certificate that utilizes a 2048 bit public RSA key and a SHA-2 based digital signature. A personal user authentication certificate is also known as an SSL client, PKI, web browser, or email certificate and must be purchased from a recognized Certificate Authority (CA). Grants.gov S2S team provides a PDF form that can be used to submit the user authentication certificate to be loaded on the server side.
- Become familiar with the Grants.gov Hashing Standards.

If you have questions regarding gaining access to the Grants.gov S2S interface, please contact Grants.gov.

References:

Grants.gov S2S Interface Documentation:
https://grants.gov/system-to-system/applicant-system-to-system/