Industry Research Initiative

FOR

**The Office of the Superintendent of Financial Institutions
Data Collection Modernization (DCM)**

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INDUSTRY RESEARCH INITIATIVE

TABLE OF CONTENTS

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SECTION I

INTRODUCTION AND PROCESS FOR RESPONDING TO INDUSTRY RESEARCH INITIATIVE

1. Requirement

The Tri-agencies [which includes the Office of the Superintendent of Financial Institutions (OSFI), the Bank of Canada (the Bank), and the Canada Deposit Insurance Corporation (CDIC)] is developing a business case for the Data Collection Modernization (DCM) initiative which is aimed at achieving greater data granularity, timeliness and trustworthiness, including setting data standards and data quality expectations, related to data collected from Federally-Regulated Financial Institutions (FRFI) and Federally Regulated Private Pension Plans (FRPP). FRFIs include banks, trust companies, loan companies, life insurance companies, fraternal benefit societies and property & casualty insurance companies. OSFI is coordinating the business case for all agencies.

The main objective of this Industry Research Initiative (IRI) is to notify Industry (including Software solution providers, Industry Researchers and other Government of Canada Departments and Agencies) of the Tri-agencies' intentions with respect to the DCM initiative and encourage dialogue with the various participants in order to solicit and obtain feedback related to the proposed initiative which will help the Tri-agency partners to further develop the business case and secure necessary funding. Refer to the Questions to Industry contained in SECTION III of this document.

2. Background

Regulatory Reporting System

The Tri-agencies (also known as the Financial Information Committee (FIC) Agencies) are a consortium of OSFI, the Bank, and CDIC. The Tri-agencies individually have the legislative authority to collect regulatory return data from FRFIs and FRPPs that are required to meet their specific micro and macro prudential mandates in support of the Government of Canada's objective of contributing to public confidence in Canada's financial system.

Currently, the collection of data from regulated entities is managed for the Tri-agency partners using the Regulatory Reporting System (RRS); a customized solution built by a commercial software vendor. RRS was deployed in 2013 to support legislative and governance reporting requirements administered by these three agencies to fulfil their respective mandates. The system collects, validates, manages, and maintains financial data and the financial returns filed by FRFIs and FRPPs. The RRS is maintained on-premises by the Bank under the Tri-Agency agreement. To meet current and evolving regulatory data needs there is a requirement to modernize the Tri-agencies' data collection processes; data management practices; and technology, including the upgrade or replacement of the RRS.

Office of the Superintendent of Financial Institutions

OSFI is the primary regulator of federally registered financial institutions and federally administered pension plans. OSFI's mission is to protect the rights and interests of depositors, policyholders, pension plan members and creditors of financial institutions, and to advance and administer a regulatory framework that contributes to public confidence in a competitive financial system. OSFI supervises and regulates all banks, and all federally incorporated or registered trust and loan companies, insurance companies, cooperative credit associations, fraternal benefit societies and pension plans.

Detailed information about the OSFI can be found at www.osfi-bsif.gc.ca.

The Bank of Canada

The Bank is the nation's central bank. Its mandate, as defined in the *Bank of Canada Act*, is "to promote the economic and financial welfare of Canada." Its vision is to be a leading central bank—dynamic, engaged and trusted—committed to a better Canada.

The Bank has five core functions:

- Monetary policy—to keep inflation low, stable and predictable
- Financial system—to promote safe, sound and efficient financial systems within Canada and internationally
- Currency—to design, issue and distribute Canada's bank notes
- Funds management—to act as fiscal agent for the Government of Canada, advising on and implementing its public debt and foreign exchange reserve strategies
- Retail payments supervision—to supervise payment service providers in order to build confidence in the safety and reliability of their services and to protect users from specific risks

Detailed information about the Bank can be found at www.bankofcanada.ca

Canada Deposit Insurance Corporation

CDIC is a federal Crown corporation established in 1967 to protect the savings of Canadians and contributes to financial stability by safeguarding close to $1 trillion in deposits at more than 80 member institutions. As resolution authority, CDIC is responsible for handling the failure of any of our members, from the smallest to the largest. Our members include banks, federally regulated credit unions as well as loan and trust companies. We are funded by premiums paid by member institutions and do not receive public funds to operate. We have resolved 43 member failures affecting some two million Canadians. No one has lost a dollar of deposits under CDIC protection.

Detailed information about CDIC can be found at www.cdic.ca

3. Nature of Industry Research Initiative

This is not a bid solicitation. This IRI will not result in the award of any contract; therefore, potential suppliers of any goods or services described in this document should not earmark stock or facilities, not allocate resources, as a result of any information contained herein. Nor will this IRI result in the creation of any source list; therefore, whether any potential supplier responds to this request will not preclude that supplier from participating in any further procurement. Also, the procurement of goods or services described in this document will not necessarily follow this IRI. This IRI is simply intended to solicit feedback from Industry with respect to the matters described in this document and its attachments.

4. Submission of Responses

a) **Time and Place for Submission of Responses.** Interested respondents should submit responses electronically (via email) to the OSFI Contracting Authority identified in section 8 below. Responses must be received by the time and date indicated on page 1 of this document. To meet its deadline for submission of the DCM Business Case, the Tri-agencies do not contemplate any further extension to the deadline for IRI responses.

b) **Responsibility for Timely Delivery.** Each respondent is solely responsible for ensuring the response is delivered on time to the correct location. Responses may be submitted electronically as indicated.

c) **Identification of Response.** Each respondent should ensure that its name and return address, the reference number and the closing date are clearly identified in the response.

d) **Return of Response**. Responses to this IRI will not be returned.

e) **Content of Responses.**
   a. Respondents should respond to the questions contained in Section III using the same numbering format.
   b. Respondents are reminded that this is an IRI and not an RFP and, in that regard, respondents are requested to provide their comments, concerns and, where

applicable, alternative recommendations regarding how the requirements or objectives described in this document could be satisfied.

    c. Responses will not be used for competitive or comparative evaluation purposes however, for ease of use and in order that the greatest value be gained from responses, OSFI requests that respondents follow the structure outlined below.

5. Response Costs

OSFI will not reimburse any respondents for expenses incurred in responding to this IRI.

6. Treatment of Responses

a) **Use of Responses.** Responses will not be formally evaluated. However, the responses received may be used to assist OSFI in the development or modification of the DCM business case and subsequent development of the procurement strategy and RFP requirements. OSFI and its Tri-agency partners will review all responses received by the deadline for responses. The Tri-agencies, may in their discretion, review responses received after the deadline.

b) **Review Team.** A review team composed of representatives of the Tri-agencies will review the responses. The Tri-agencies reserve the right to hire any independent consultant or use any Government resources that it deems necessary to review any response. Not all members of the review team will necessarily review all responses.

c) **Confidentiality.** Respondents should mark any portions of their response that they consider proprietary or confidential. The Tri-agencies will treat those portions of the response as confidential to the extent permitted by the Access to Information Act (ATIP).

7. Follow-up Activity

The Tri-agency partners, represented by OSFI, may, at its discretion, conduct follow-up activities with any IRI respondent.

Follow-up activities could include, but are not limited to, the request for clarification or additional details related to information contained in the IRI response; further written questions for response; a closed meeting to further discuss their IRI feedback; a request to conduct a product demonstration using data provided by the Tri-agencies. (Note: Should a meeting and/or demo be requested; it would be conducted virtually. A minimum of two weeks' notice would be provided to prepare for a demo.)

8. Enquiries

Because this is not a bid solicitation, the Tri-agencies will not necessarily respond to enquiries in writing by circulating answers to all potential respondents. During the IRI process, the Tri-agencies will address only questions pertaining to the research process. Requests for additional information regarding the DCM initiative (beyond that contained in this document) cannot be accommodated. Respondents with questions regarding this IRI may direct their enquiries to the OSFI Contracting Authority as follows:

> Craig Kenny
> Senior Contracting Officer, Procurement and Contracting
> Office of the Superintendent of Financial Institutions
> 255 Albert Street, 12th Floor Ottawa, ON K1A 0H2
> E-mail: Contracting@osfi-bsif.gc.ca

9. DCM Initiative Preliminary Procurement Timeline

The DCM Business Case will be submitted in the Fall of 2022. Pending Business Case approval and subsequent funding, a competitive procurement process may be required to fulfill the identified DCM requirements. Although the procurement strategy for the required solution has not yet been defined, it is estimated that a procurement process (if required) would be undertaken no earlier than the Fall of 2023. Please note that this is an estimate which has been provided for information purposes only. The Tri-agencies reserve the sole option to alter the contemplated procurement strategy and schedule as it sees fit.

SECTION II

DATA COLLECTION MODERNIZATION INITIATIVE INFORMATION

1. Current Regulatory Reporting System

As noted above, the Tri-agencies currently use the Regulatory Reporting System (RRS), a customized, COTS-based solution, to manage data from regulated entities. RRS was deployed in 2013 to support legislative and governance reporting requirements administered by these three agencies to fulfil their respective mandates. The system collects, validates, manages, and maintains financial data and the financial returns filed by Federally Regulated Financial Institutions (FRFI) as well as data from Insurance companies and Federally Regulated Private Pension Plans (FRPP). The RRS, and the analytical capabilities that use the data, are crucial for identifying both existing and emerging risks and/or vulnerabilities in the regulated entities as early and as accurately as possible, in order for the applicable Tri-agency partner to take corrective action. The RRS is maintained on-premises by the Bank of Canada under the Tri-agency agreement.

2. Data Collection Modernization (DCM) initiative

The underlying infrastructure of the RRS is aging and does not meet certain current and evolving needs, such as limitations in the variety and type of data that can be collected and the ability to facilitate regulatory return changes in an agile and timely manner. This results in sizable data collection outside of RRS in the form of ad hoc requests to compensate for the lack of required data both in a steady state, as well as to meet the data needs related to emerging or event-driven issues, such as geopolitical risks. As such the Tri-agency partners, led by OSFI, have undertaken the development of a business case for a Data Collection Modernization (DCM) initiative.

A key business driver for the DCM initiative is the rapidly evolving regulatory data environments, given a confluence of factors, such as digital transformation and increasing use of innovative technologies by regulated entities; emergence of new and evolving risks in the financial system; and the dynamic nature of both the domestic and international regulatory landscapes.

OSFI's Enterprise Data Strategy specifically calls out the need to improve overall data collection infrastructure including the ability to collect data at a granular level directly from FRFIs. As well, the strategy identifies cloud computing as a key "digital theme" to achieve decreased time to provision computing resources, robust security, increased agility, and the ability to grow and shrink capacity as required.

CDIC continues to evolve its operations and approach to meet the challenges of a changing operating environment. In response, CDIC has launched a multi-year Enterprise Technology Strategy to ensure it has appropriate, modern infrastructure and services in place to enable its employees and the organization to succeed. As part of this work, CDIC will complete a cloud migration, which includes the design, development and deployment of cloud architecture, hardware and corporate applications that support day-to-day interactions and services across the Corporation, to enhance organizational resiliency.

Similar to OSFI and CDIC, the Bank of Canada considers data and analytics capabilities to be a key strategic priority. The Bank of Canada's 2022-2024 Strategic Plan continues the focus on integrating new types of data (e.g., granular) and increasing the quality, accessibility, and usability of data. Harnessing the power of innovation remains key to all Bank programs, including leveraging new technologies (e.g., data lake) and advanced tools such as artificial intelligence and machine learning. Foundational to this work are the technology priorities with continuous focus on security, resiliency enhancements and cost optimization.

3. DCM Business Needs

Ultimately the business needs for modernizing the processes, practices and technologies for data collection are to enable broader, better, and more efficient use of collected data. Principal business needs for the DCM initiative include:

- Setting a new standard for regulatory data that satisfies the data requirements for all the Tri-agency partners in a consistent manner
- Increasing the timeliness, granularity, and trustworthiness of the data
- Increasing the agility of technical solutions to responsively accommodate a rapidly changing landscape with regards to risk, policy, data, and technology
- Increasing the efficiency of the process of data provision
- Increasing the reliability of data-driven decisions
- Increasing the ability to use advanced analytics to extract insights to better manage risks
- Increasing the responsiveness for Supervision and Regulation in a dynamic environment scaled for risk, thereby enabling the reduction of risks for the Financial Institutions Supervisory Committee (FISC) and Industry
- Reducing the frequency and amount of ad hoc data calls to the regulated entities
- Increasing industry satisfaction with the data provision process

4. High Level Business Requirements

The high-level business requirements (HLBR) for the DCM initiative, in support of the business needs (above), have been defined as set out in the table below. The solution conceptual overview diagram, contained in section 5 below, depicts which HLBRs are anticipated to be delivered by the technology solution. Some HLBRs, while not technology specific, will be delivered by the overall DCM program with some technology support.

It should be noted that all data and data management services, data centre, call/contact centres, and centres of operation associated with the DCM solution must be located in Canada at all times. All products and services provided (i.e., under a future contract) must comply with Government of Canada security and privacy requirements.

ID	Category	Description
1	**Data Collection**	The ability to support the combined collection of a variety of data types, including granular/transactional, dimensional, aggregated, and event-driven information needs, using either a "push" or "pull" approach. Data can be both structured & unstructured and available in different formats.
2	**Data Standardization & Quality**	Support for definition of common data standards and 'easy to interpret' reporting instructions to enable high quality regulatory reporting to minimize the burden on FRFIs/FRPPs and reduce the challenges posed from additional data requests. Support the development of common data input layers and simple reporting instructions to support the provision of high quality and reliable data. Consistency with definitions and concepts and across reporting institutions is key.
3	**Data Availability**	Access data in a timely manner for supervisors and policymakers operating in a dynamic risk environment. Provision on-demand data from reporting entities such that Tri-agencies can access the data they need, when they need it.
4	**Data Management**	The ability to define processes and policies for the management of data that involves collection, storage, retention, distribution, validation, and processing of regulatory data.
5	**Legacy Data Management**	Migration of legacy data and metadata from current state to future state. Mapping datasets from existing application to the new solution supported by seamless transition and data inventory assessment.
6	**Returns Management & Rule Definition**	Broader use of consistent rules and definitions combined with simpler reporting instructions to enable scheduled returns, granular data, and event driven information requirements. The ability to define and apply business rules to validate the collected data, including version control of rules.
7	**Data Sharing and Distribution**	The ability to collaborate and share data among Tri-agency partners in near real time by minimizing the time taken to process and transform data. Develop secure channels for data sharing that are supported by modern technology.

ID	Category	Description
8	**Industry Adoption**	Implement improved data collection system(s), enabled by enhanced processes to increase industry's ease of use, convenience to operate and ability to provide data while reducing overall burden.
9	**Solution Residency**	Implementation of a cloud enabled application that is scalable and agile enabled by SaaS, PaaS, or IaaS. This follows Government of Canada policy.
10	**Agility & Scalability**	Agility and flexibility of the data processing capabilities to support the increasing data provisioning demands and changing needs in the regulatory environment.
11	**Solution Capabilities**	Ability to seamlessly integrate with other systems, provide robust search capabilities and ability to define workflows to automate data collection and organization.
12	**Architectural Considerations**	Clearly defined architectural considerations that the solution must meet. Architectural considerations must include but are not limited to: • security assurance testing, • cyber security threats, • GoC accessibility standards, • vendor/product viability, • performance capabilities, • scalability, • disaster and recovery management, • user profile and access management, • external systems integration • product upgrades, maintenance & support, and • data protection requirements
13	**Process Automation**	Minimize the filing time for FRFIs/FRPPs through process automation by accepting data from filers in near real time. Enabled by modern technologies, data definitions could be mapped to filers' source systems for quicker and faster regulatory data provisioning.
14	**User Experience**	Convenience and ease of use for data filers (i.e., FRFIs and FRPPs) to leverage a web-based interface to provide functionality like web-form data input, data file upload with asynchronous processing, display of return on submitted data, self-serve account management, and regulator pushed notifications and alerts. Usability is also a key requirement for data management staff that will manage, validate and publish metadata definitions for returns including data and rule definitions. The ability to make bulk metadata updates, auto-generate web forms from metadata, test rules prior to deployment and make rule updates without lengthy deployment processes are some

ID	Category	Description
		examples of key capabilities demonstrating usability in this area. Finally, a user-friendly experience for Tri-agency data consumers such as supervisors to be able to readily consume data from the solution in analytics friendly formats using common access protocols and connectors is needed.
15	**Analytics**	The ability to provision the raw data coupled with the data definition to automatically transform into a data repository format that can be readily consumed by analytic tools for insight generation and evidence-based decision making.
16	**Governance and Oversight**	Executive representatives with strategic authority over the DCM project to make decisions and be accountable on data collection technology solutions that support Tri-agencies' information needs, plans and goals.

5. Conceptual Architecture

This section provides a conceptual high-level view of the solution architecture. It is intended to be technology independent, showing key functional areas of the solution and its primary data flows. Descriptions of the functional areas of the solution are provided in the table below and is followed by the conceptual architecture diagram. The diagram also highlights where the solution is expected to support high-level requirements defined in the table above. It should be noted that certain requirements such as Data Standardization & Quality, Governance & Oversight and Legacy Data Management will need to be supported by initiative work streams in aspects that go beyond capabilities provided by just the solution itself.

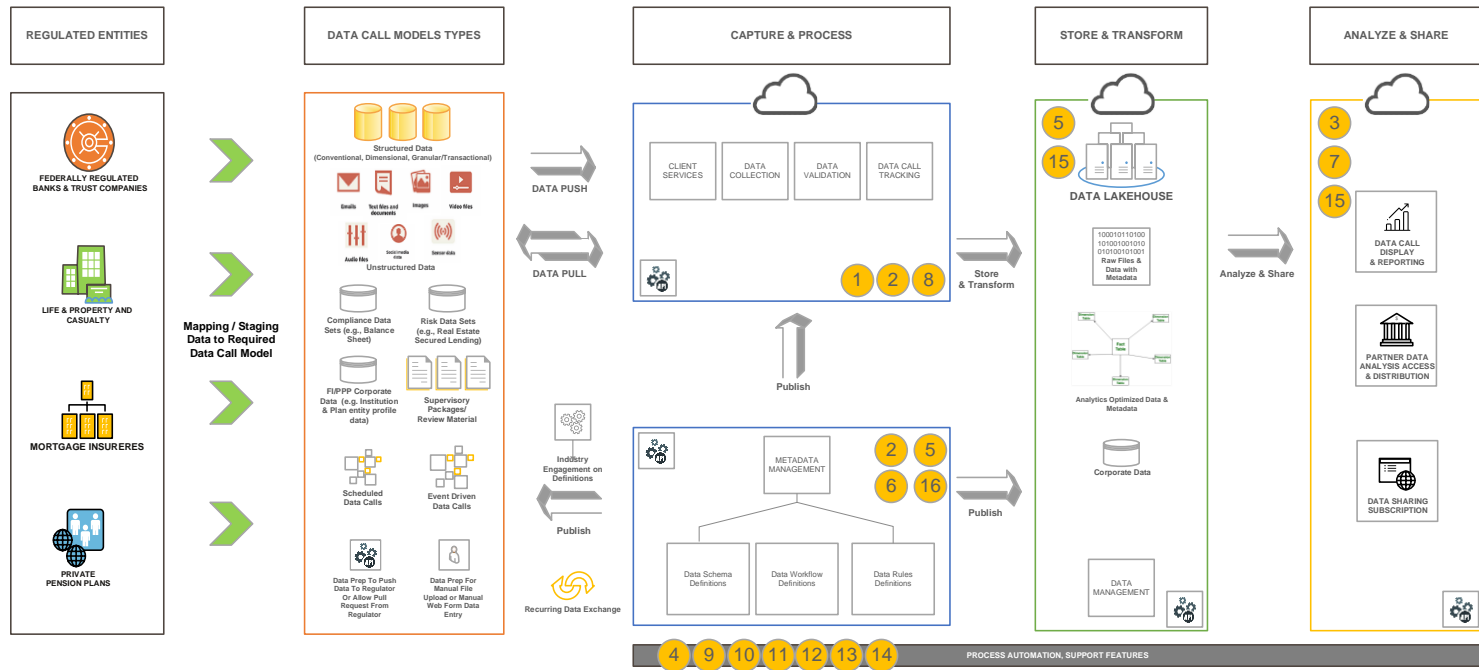| Functional Area	Description
1. Metadata Management	This is the core of the solution where all definitions are created, versioned, and published from. Definitions are for aspects such as data calls (aka datasets, returns), data points, dimensional data, rules, and automation workflows. It is envisioned that this capability will also allow for use of industry data standards such as XBRL as well as the ability to define new standards for granular data models.
	Definitions should allow searching, querying, reporting, and publishing in human and machine-readable formats for review or usage purposes.
	Definitions should enable bulk management capabilities through a variety of interfaces, both user and API accessible.
2. Data Call Model Types	This expresses the different types of data that the Tri-agencies must be able to accommodate, as defined through the solution's metadata management capability, for collection purposes.

Functional Area	Description
	This encompasses a variety of data formats as well as collection frequencies (e.g., hourly, daily, weekly, monthly, quarterly, annually, bi-annually) including data collections triggered from ad hoc or recurring business events.
	Regulated entities will be required to map their internal data to these definitions in order to meet collection specification requirements.
3. Capture and Process	Regulated entities include a broad spectrum of technical capabilities. Therefore, the solution requires the ability to be flexible in how the same data is collected from these entities ranging from web portal form-based data entry and data file uploads to more sophisticated system-to-system API managed collections, both push and pull.
	Collected data will need to pass through any published validation rules prior to it being accepted as a valid submission. Validation features should include capabilities such as automated anomaly detection warning or alerts based on data patterns such as prior & current submissions.
	Data collections should be automatically tracked and be reportable with alerting and notification mechanisms.
	Client services include aspects such as self-service password management, portal and email-based notifications and announcements.
4. Store and Transform	This area includes a number of data management capabilities. Regardless of the mechanism of data collection (e.g., portal vs API), the collected data should be transformed and stored in a standardized solution format.
	Storage should be able to accommodate all required collected data formats per data definitions (see data call model types). Built-in process automation capabilities should include the automatic storage of data along with all related regulated entity and data call metadata (e.g., entity name, data call name, data point name) as well as operational data of the submission (e.g., submission date & time, submission revision, reporting period date).
	Data submissions may be large volume and/or highly frequent and/or include a variety of formats (e.g., a large package of heterogeneous unstructured files). Periodic peak filing periods mean that the solution must be able to manage performance and scalability with minimal administration.
	The solution should allow for the automated transformation of any data calls to an analytic friendly storage format thereby allowing for any 3rd party reporting and analytic tools to access this data using industry standard protocols and connectors.

Functional Area	Description
	Data calls managed by the solution include the definition, collection, and storage of regulated entity corporate data. This type of data is typically non-financial in nature and constitutes master data about each organization.
5. Analyze and Share	The solution should have built-in capabilities to report and analyze the collected data. Where a data call includes the definition of a web-form this includes the ability to view any collected data via the published form. Any data and metadata should be configurable for automated distribution to a consistent data format for Tri-agency consumers as well as be directly accessible for Tri-agency consumers via an external application using the solution's API. The API must allow for the authentication, authorization, and access to any of its collected data and associated metadata. Collected data is often required to be shared with partner organizations (beyond the Tri-agency). A secure mechanism to do this is required such as a provider/subscriber model within the solution.
6. Process Automation	This is seen as a key capability for a modern data collection solution to be agile. The solution should provide the ability to provide built-in, configurable and API accessible mechanisms to automate and expedite as much of the data definition and collection process as possible. Examples include the ability to create and update metadata definition changes in bulk, to publish metadata updates to the solution with minimal downtown, to auto-scale capacity based on usage, and to transform collected data to analytic friendly data formats for analytics.
7. Support Features	This area includes all the management tools required to administer and support the solution by IT datacentre and data management teams. For example, this includes aspects such as operational monitoring & alerts, update and patch management, environment management, security management, and release management of metadata updates.

Solution Conceptual Overview Diagram

ID	HLBR Category
1	Data Collection
2	Data Standardization & Quality
3	Data Availability
4	Data Management
5	Legacy Data Management
6	Returns Management & Rule Definition
7	Data Sharing & Distribution
8	Industry Adoption
9	Solution Residency
10	Agility & Scalability
11	Solution Capabilities
12	Architectural Consideratons
13	Process Automation
14	User Experience
15	Analytics
16	Governance & Oversight

REGULATED ENTITIES

- FEDERALLY REGULATED BANKS & TRUST COMPANIES
- LIFE & PROPERTY AND CASUALTY
- MORTGAGE INSURERES
- PRIVATE PENSION PLANS

Mapping / Staging Data to Required Data Call Model

DATA CALL MODELS TYPES

Structured Data (Conventional, Dimensional, Granular/Transactional)

Emails, Text files and documents, Images, Video files

Audio files, Social media data, Sensor data

Unstructured Data

- Compliance Data Sets (e.g., Balance Sheet)
- Risk Data Sets (e.g., Real Estate Secured Lending)
- FI/PPP Corporate Data (e.g. Institution & Plan entity profile data)
- Supervisory Packages/ Review Material
- Scheduled Data Calls
- Event Driven Data Calls
- Data Prep To Push Data To Regulator Or Allow Pull Request From Regulator
- Data Prep For Manual File Upload or Manual Web Form Data Entry

DATA PUSH

DATA PULL

CAPTURE & PROCESS

- CLIENT SERVICES
- DATA COLLECTION
- DATA VALIDATION
- DATA CALL TRACKING

(1) (2) (8)

Store & Transform

Publish

Industry Engagement on Definitions

Publish

Recurring Data Exchange

METADATA MANAGEMENT

(2) (5) (6) (16)

- Data Schema Definitions
- Data Workflow Definitions
- Data Rules Definitions

Publish

STORE & TRANSFORM

(5) (15)

DATA LAKEHOUSE

1000101110100 1010010010101 0101001001 Raw Files & Data with Metadata

Analytics Optimized Data & Metadata

Corporate Data

DATA MANAGEMENT

Analyze & Share

ANALYZE & SHARE

(3) (7) (15)

- DATA CALL DISPLAY & REPORTING
- PARTNER DATA ANALYSIS ACCESS & DISTRIBUTION
- DATA SHARING SUBSCRIPTION

(4) (9) (10) (11) (12) (13) (14) PROCESS AUTOMATION, SUPPORT FEATURES

6. Volumetric Information

The following information with respect to the required solution is provided to assist potential respondents in responding to this IRI.

  a) There are approximately 21,000 users as listed below:
    ☐ Internal:
        i.   OSFI users: 300
        ii. Bank of Canada users: 60
        iii. CDIC users: 50
    ☐ External:
        i. Filer users: 20,000
        ii. Organizations: 400 FRFIs (banking and insurance) and 1,200 FRPPs

  b) There are approximately 120 – 150 regulatory returns to be re-engineered

  c) There are approximately 100 recurring ad hoc data requests in addition to regulatory returns

  d) There are approximately 300,000 defined data points for regulatory returns (Note that this does not include current ad hoc or unstructured data collected, as well as anticipated growth in data volume from the collection of more granular data in the future)

  e) There can be approximately 20,000 logins during a two-week period

  f) There can be approximately 5,000 successful submissions during a two-week period

SECTION III

QUESTIONS TO INDUSTRY

Respondents are requested to address, but are not limited to, the questions below:

1) Is there a Commercial off the Shelf (COTS) software product available to meet the business needs of the DCM initiative requirements? If so, to what extent does the proposed software solution fulfill the requirements as expressed by the high-level business requirements and conceptual architecture (refer to sections 4 and 5 in Section II above)? To the extent possible, please comment on your product roadmap. Where gaps exist in the COTS solution, what would be the recommended way to address them?

2) Is the proposed software solution deployed via a traditional on-premise model or are there available cloud-based solutions and services [e.g., SaaS, PaaS, IaaS)?

3) If applicable, elaborate on any managed services that are available. Are these services currently approved for Government of Canada Protected 'B' data, or certified by a third party (e.g., ISO 27001, ISO27017, AICPA SOC2 Type II)? If cloud-based services are available, have these services been assessed under the Canadian Centre for Cyber Security (CCCS) Cloud Service Provider Information Technology (IT) Security Assessment Process?

4) What is the installed base for the proposed software solution? Is it currently in use at any Government entities? Has the software solution been implemented at similar organizations such as national financial supervisors, regulators, or a central bank?

5) What is the typical implementation process/effort for the proposed solution? To what extent is customization typically required? (Note: customization is considered to be any extension of out-of-the-box functionality that cannot be accommodated through built-in configuration capabilities of the solution). Are specialized skills required to set-up or use the solution?

6) Approximately what proportion of the proposed software solution's installed base is using APIs to collect data in a production environment? What are some of the key benefits and challenges experienced when adopting this type of collection mechanism?

7) Elaborate on data quality controls that are in place within the solution. Are there any automations to support data quality checks such as anomaly detection? In addition to the functionality provided by the solution, are there any common data standards and practices to support a data quality program?

8) Based on your experience with similar projects, are there any best practices or guidelines that you can suggest for legacy data management?

9) Does the proposed software solution provide support for case management and/or workflow and process management?

10) Does the proposed software solution contain capabilities to securely manage personally identifiable information (PII) that may be collected?

11) What cyber security threats (actors or events) have you identified in this initiative and how do you propose we mitigate them?

12) Based on the information that has been provided, and your experience with similar initiatives, what do you see as the key challenges with this proposed initiative and how can these challenges or risks be minimized?

13) What is the recommended licencing model for the proposed solution given the Tri-agency requirements articulated in this document?

14) Based on the information that has been provided, what do you see as a rough order of magnitude (ROM) (i.e., -25% / +75%) cost estimate for the DCM development and implementation effort?
   a) <$10,000,000
   b) Between $10,000,000 and $20,000,000
   c) Between $20,000,000 and $30,000,000
   d) More than $30,000,000

   In addition, what is a rough order of magnitude estimate of the ongoing/recurring annual operational costs for the proposed solution?

15) Based on the information that has been provided, what do you see as the approximate overall duration for the DCM solution implementation?

16) Can you offer any other comments or recommendations related to this initiative and the anticipated procurement process?