

## Expression of Interest for Implementing a Data Management System at the Bank of Mauritius

### Response to Clarifications and Queries

No	Queries and Clarifications	Answers
1	Has the Bank of Mauritius a defined budget and can the Bank of Mauritius share the budget detail that is allocated for the data management system?	The budget is confidential and cannot be disclosed.
2	How many regulated entities does the Bank of Mauritius Regulate? Can you please break them down by sector? How many FIs are expected to submit returns to the Bank? Does the Bank also license registered representatives (Individuals)? If so, How many are currently registered?	The current list is available at: <a href="https://www.bom.mu/financial-stability/supervision/licensees/list-of-licensees">https://www.bom.mu/financial-stability/supervision/licensees/list-of-licensees</a> <a href="https://www.bom.mu/payment-systems/licensing/list-licensees">https://www.bom.mu/payment-systems/licensing/list-licensees</a> . However, the system should allow the Bank of Mauritius to add new entities.
3	Details on the motivation for migrating from the existing solution. Are there any confirmed shortfalls or challenges with the existing system? How many online data collection forms/financial returns does the Bank of Mauritius needs to be automated? What is the Total number of Schedules/online Pages across all Financial Returns? What are the approximate number of tables that are expected? How many data models are expected?	The Bank of Mauritius intends to modernise its data collection, processing, storage and dissemination processes and to this effect, wishes to implement a Data Management System. The scope of work involves (i) the examination of data collected through XBRL, Excel legacy data and the new Data Management System to design the centralized data repository to be used for data analytics and for the production of other reports and (ii) the streamlining of the data collection process to avoid duplicate submissions by regulatees of same data points. The information to be collected including the templates as well as the sizing will be determined as part of this exercise.
4	Can you please provide a comprehensive list of all Financial Returns (by division) as well as their corresponding templates/ dashboards? Data collection to be carried out following current templates or templates to be refreshed/updated?	The list/ templates cannot be shared at this stage. The project involves the streamlining of the data collection process to avoid duplicate submissions by regulatees of same data points. Accordingly, existing templates will also be revisited.
5	What are the total number of required Standard Reports, Analytics Reports, Indicators and/or Dashboards for the initial roll-out/implementation? Do you have a full list of formats expected for data collection? Do we assume that the system needs to be flexible to support adding new data types? Does the same applies to data scraping? Will there be a list of resources for data collection and scraping, or shall additional scrapers be created on demand?	The solution should provide flexibility for users to develop the required returns and dashboards. The number of templates will be communicated at a later stage.
6	What reporting tool / data store tool does the Bank of Mauritius currently use/ intend to use? Does the DMS need to connect to any of your existing/external business intelligence tools? If yes, what are the current business intelligence tools ? Is there any existing visualization tool that is being used (Tableau, PowerBI, Qlik) and is it managed and operated internally?	Respondents are required to propose reporting tools as per the requirements of their solution.
7	Does the new Solution require ongoing integration with any other internal system (CRM, Payment, Legacy system, etc.)?	Yes.
8	What existing systems are currently in scope and being utilized by the Bank of Mauritius?	XBRL, Bloomberg, Reuters, the Data Warehouse of the Bank of Mauritius and website.
9	Do all Source Systems house the data in relational databases?	No.
10	Do you require Historic Data Migration? Is data migration (historical data) for structured and unstructured data metadata required? How far back is the migration window? Where does the historic data currently reside (Relational Database, CSV, Excel)?	Data migration is within the scope of the project. All relevant (mostly structured) data will have to be migrated. Existing data is in Excel files and in the Data Warehouse of the Bank of Mauritius.
11	Does the new solution need to send the collected data to a Data Warehouse or another downstream system or database? Is this in scope for this project?	Respondents are required to propose a solution for both data collection and data analytics.

12	How long of an implementation does the Bank of Mauritius prefer? Does the Bank of Mauritius prefer a phased approach?	Respondents are required to provide the estimated implementation timeline/ plan.
13	Data Extraction: Receiving data from Reuters and Bloomberg. Could you elaborate.	This refers to pulling data from Reuters and Bloomberg using the API integration provided by Refinitiv.
14	Can you give an example of the website where the data should be scraped from, beyond Reuters and Bloomberg?	Statistical data from institutions. e.g. Statistics Mauritius, information available on relevant topics on the web, etc.
15	What tools will be used for the communication with Financial institutions? (interface, communication frequency, ruleset, if any set by the Bank of	Respondents should propose solutions.
16	Is there any time limitation of Data Processing? How much time should it take between data submission by FI and availability of a final report?	Data submitted by FIs should be reflected as soon as possible in final reports.
17	Is it a one-time activity or will some data be created in Excel and should be migrated in the new data warehouse periodically?	There will be an initial migration of data, found in Excel and in the existing data warehouse. Users should be able to migrate new data if the need arises in the future.
18	Could you provide more details about how many existing systems/warehouses are there and what technologies are used? Please provide further details on the existing data management system. Schematics indicating data flows, access controls, and software used would be much appreciated. Data samples would likewise be much appreciated.	The Bank of Mauritius already has a data warehouse. Further information cannot be shared at this stage.
19	Do you have Hardware capacities from your end or do we have to buy\prepare, configure and install it by ourselves on your premises or any other/additional hostings( Cloud etc)	Respondent is required to propose a fully functional system, including the hardware/hosting.
20	Consolidation of data into MUR equivalent (to cater for multi-currency reporting of returns). Should the currency rate change be taken into account in final reports? What would be the source of currency-exchange rates for the purpose of consolidation of data into MUR equivalent (to cater for multi-currency reporting of returns). Does the data needs to be stored back into data storage after conversion into MUR equivalent (along with data stored in reported currency)?	Yes. The Bank of Mauritius will provide the conversion rates.
21	Should setup of software and hardware be done on the Bank of Mauritius only, or in each of Financial Institution as well?	Only at the Bank of Mauritius. However, if the respondent's solution requires any application installation/configuration at Financial Institutions, the respondent should be able to cater for same.
22	Could you elaborate on the possibility to work remotely for the team (for providing software development services).	Respondents need to have an onsite presence at all times during the deployment phase. This can be supplemented by remote access for additional resources.
23	Any restricted remote locations(countries).	Yes. The Bank of Mauritius will disclose during the implementation phase.
24	Requirements for the offsite premises: Do secure premises have to be established or are engineers at liberty to work from home in case precautions measures are taken?	Secured VPN access may be provided to respondents on justifiable grounds.
25	Will the Bank of Mauritius provide a list of regulatory requirements the DMS has to comply with? What are the security and compliance requirements? Which compliance guidelines would be applicable: pcidss, iso27001, etc? What are the Data Governance policy in place? To which policies should the bidder adhere to?	The solution should comply with the Data Protection Act 2017 and relevant international standards . Specific details will be shared at a later stage. Applicants may refer to the Bank of Mauritius' website for more information on the legislative and regulatory framework. Respondents should specify which standards their solution will be compliant with.
26	Do you envision involving a compliance manager & a business analyst responsible for requirement alignment from your end?	Yes.
27	Please provide information about the expected amount of existing or forecasted amount of users, data volume, etc.	Around 400 internal users and 6000 FI users. Sizing information will be communicated at a later stage.

28	Please provide information about the existing technology stack, staff expertise, and any issues or concerns regarding matters. Do you plan to support a system with already existing staff or do you plan to hire people with specific expertise?	Respondents to provide their proposals for technology and the required expertise. The plan is to support the existing staff.
29	Are there any limitations regarding open-source software usage? Please provide details of acceptable license models, if any.	Respondents are required to propose software as per the requirements of their solution.
30	Are Bloomberg and Reuters the only 2 platforms needed for data dissemination? Or there is an extended list of platforms. It might help us to define a list of required formats for data dissemination	Data needs to be collected from other web sources/platforms as required.
31	Are there any rules and regulations (requirements) for data storage and installation? Should it be only on the premises? Can we also offer a cloud solution that will be accessible for all parts of the Bank of Mauritius without physical installation in-house? Would the Bank of Mauritius consider a proposed solution which is hosted in a local cloud infrastructure instead of the Bank of Mauritius current DC/DR environment? Is the preference of the Bank of Mauritius to use on-premise solutions, or Public/Private cloud options can be proposed for Primary & DR Sites? Should the solution be developed using SaaS platforms with recurrent costs, or be developed bespoke and stand-alone.	The applicant should clearly indicate if the solution being proposed is a cloud-based or on premise deployment. Respondents may propose multiple deployment options. Source data is required to be hosted on premise. Respondent is required to propose a fully functional system, including all supported options for system operations and hosting.
32	We assume that support should include both 1st line support for any critical issues but also any additional functionality or improvements that will be formed as additional projects. Please confirm or provide your vision to the support expected.	Support should include both 1st line support for any critical issues but also any additional functionality or improvements that will be formed as additional projects.
33	What is the expected volume and frequency of data updates from Reuters and Bloomberg?	Expected frequency is daily but the system should cater for more frequent updates.
34	Please share any preference for the type/make of AI tools for Web scraping/data extraction to collect unstructured data, if already deployed and in use with the Bank of Mauritius.	Respondents are required to specify the tools as per the requirements of their solution.
35	Any preference for the multi-factor authentication (MFA) required for data collection portal based on mechanism already in use at the Bank of Mauritius? Is digital signature required for authentication of users during data submission on collection portal?	The solution might be required to integrate with the Single Sign-On solution of the Bank of Mauritius or the respondent may propose their own MFA solution.
36	Can we get Business rules samples along with volume information?	Business rules/samples are confidential and will be shared at a later stage.
37	What will be the purpose and scope of SDMX during implementation? Is it to exchange data with IMF/BIS? Please share details of kind/type of data to be disseminated in SDMX and expected recipients, is the relevant SDMX-DSD from recipients be made available for the purpose of data dissemination?	The proposed system should be able to handle (generate/read and transform) SDMX format data. Additional information will be shared at a later stage.
38	What are the key risk factors and indicators that the RBS framework aims to monitor and manage? Please share a brief on existing RBS framework in place at the Bank of Mauritius which can be leveraged in the new system. Please provide full requirements and specification for each of the risk based modules. Can a new and modern RBS framework be proposed by the vendor? Please confirm whether we should perform collection of data from the existing risk modules at the Bank of Mauritius or should we also propose risk based supervision modules as part of the project for Data Management system. What types of Risk Modules are required to implement?	The solution should cater for the RBS framework developed by the Bank of Mauritius. The Bank of Mauritius is looking into the implementation of an end-to-end solution for the RBS framework and other requirements which provides for: <ul style="list-style-type: none"> <li>• A data collection tool;</li> <li>• The automation of the above-described process;</li> <li>• Dashboards on indicators for the different risk modules;</li> <li>• Generation of 'heat-maps' for the different risk modules; and</li> <li>• Inclusion of comments from supervisors scoring the model.</li> </ul> There are different modules for the different risk categories such as credit, liquidity, AML, Market, etc as well as an aggregate module. However, further details of the RBS framework cannot be shared at this stage.

39	If the Bank of Mauritius chooses the option to evaluate new database technology, can we understand the current size of oracle database in GB and the rate of growth per year. What are the size of source databases in TBs and how much data is generated daily. Kindly provide a rough estimate.	Sizing information will be shared at a later stage.
40	Does the training requirements extend to training the FIs (regulated entities) as well apart from the users of the Bank of Mauritius?	Yes, where relevant.
41	Are there any limitations of requirements in terms of licensing and associated costs.	There is no restriction or preference in terms of solutions. Respondents are requested to propose solutions.
42	Would the Bank of Mauritius have appetite to split contracts into a scoping contract and an implementation contract as follows: a.scoping is undertaken first to specify the requirements of the system; b.implementation is designed following completion of the scoping contract, and used to secure a service provider based on the identified requirements.	The submissions may comprise of such arrangements as long as they are in line with the requirements of the Expression of Interest.
43	Is there any guidance on expectations for training and capacity building, both in terms of form, as well as period.	Training and knowledge transfer on the proposed system should be provided to end-users and technical users.
44	May we request details on expectations for maintenance and hand-over. Does the Bank of Mauritius expect to be independently managing the entire stack, or is there appetite for the support of implementing service providers?	Post implementation support would be required with knowledge transfer to the Bank of Mauritius.
45	What unit in the Bank of Mauritius is the custodian of this initiative, and will be the custodian of the solution once delivered?	The system to be delivered will be used by several departments at the Bank of Mauritius. The IT Department will provide first level support.
46	What type of Validations and Data Quality checks are required? What is the number of validation checks per template? Are all validation checks only between Maker and Checker, or are there validations at the time of the final submission of data? Are there any requirements for Data Quality reports and a Data Quality Management System?	Validation rules should at least cover submission and post submission stage. Relevant reports should be available.
47	Is data extraction capability from these unstructured sources required, or will this only be used for cataloguing information/documentation?	Data extraction from unstructured sources will also be required.
48	In the subscription model for Bloomberg & Reuters APIs, will the subscription be owned by the Bank of Mauritius or the vendor? What are the Domain/Data Attributes, Volume, Velocity, and Data Usage to be collected from these Bloomberg & Reuters APIs? What are the sources for Web Scrapping and On-Prem AI Capabilities?	The subscription model will be finalised at a later stage. Data to be collected, frequency and source would be as per user requirements.
49	Will users of the Bank of Mauritius use the same web portal/interface to view/manage data inputted by various FIs? Will user management/access management be the FIs' responsibility, or will this be managed at the end of the Bank of Mauritius? What kind of Multi factor Authentication (MFA) is expected - Email Token, SMS Token, Authenticator Apps, Security Questions, Image-based authentication?	Respondents may propose solutions.
50	Is Checker authorized to change data created by Maker, or any comments by Checker should only be routed & actioned by Makers?	Respondents to specify available options.
51	What are the other sources that can send Returns Data to the system other than FIs? What is the process in this case of Cross-Validation for Success / Failure?	Data can be sourced from other authorities and stakeholders. The solution will require relevant Cross-Validation process.
52	End-user technical capability - What type of End Users would require this functionality (technical developers/business users)?	Both.
53	What notifications are expected - Email/SMS notification, Push Notification etc.?	Respondents are required to propose all supported notification channels.

54	Is a Messaging / Push Notification Engine subscription already in place, or must it be procured?	No. Respondents to propose options.
55	Is a built feature of the web portal expected, or is a separate communication portal expected?	Respondents may propose portals for their solution as per their requirements.
56	Provide details on the Data warehouse & other systems with interface details. Is this interfacing required to ingest data from existing systems/Datawarehouse into a new CDP solution (upstream), data extraction/outbound (downstream), or both?	Details for interfacing with existing systems will be shared at a later stage. Both types of integration should be possible.
57	How many such systems are there? Provide details on the type of system, type of interface, Domain/Data Attributes, Volume, Velocity, & Usage of Data from these systems.	The solution would be required to interface with the Data Warehouse of the Bank of Mauritius and website; amongst others.
58	What kind of different personas/user profiles will the end users have?	Respondent to provide available options for user profiles.
59	Can you share the XBRL specifications in use today? Also, since it appears that the XBRL used has some proprietary specifications, is the Bank of Mauritius willing to provide the tool it is using today to convert those XBRL files?	Respondents are required to provide their solution specification. The Bank currently has a XBRL-based data collection system in place.
60	Does the Bank of Mauritius have an Enterprise agreement with Microsoft, whereby this can be used for some of the solution components we are envisaging?	Respondents to propose the available options
61	Is there a specified document outline structure for submitting the EOI proposal. Kindly share the same if any.	The required details and Annexures should be provided.
62	You mentioned "Users should be able to design their own dashboards"; are we referring to Users from the Bank of Mauritius? Or also users of the commercial banks that are submitting data for the Bank of Mauritius?	Users at the Bank of Mauritius.
63	How many users are planned to work in the analytical system, including the number of report developers, users working with pre-built reports, administrators?	Around 10 Developers/Administrators
64	Can you provide specific examples of the types of structured and unstructured data currently collected from financial institutions and other sources?	Prudential returns, Annual reports, Financial statements, Information available on the web.
65	What levels of access and permissions are required for different user roles within the new system?	Role-based access control to be implemented. Respondents to specify the different user roles defined in the proposed solution.
66	Are there any streaming data processing to consider?	Respondents to propose.
67	What is the existent data collection duration? What is time reduction expected?	Respondents to propose the time taken for their solution.
68	Could you provide more details on the functionalities and features required in the web portal/interface for submission of returns by Financial Institutions (FIs)?	Respondents should provide details about the features and functionalities of their web portal/interface.
69	Are there any specific security standards or compliance requirements for the portal for submission of returns by Financial Institutions (FIs)?	Respondents should provide details about the security features of their proposed solution.
70	Should a new interface be developed to maintain creation/modification of data and survey templates? Or is there an existent solution which requires modification?	A new interface will have to be developed.
71	What types of hardware tests are required?	Respondents should propose.
72	What currency should be used (USD, EUR, ...) to provide price estimation from our side?	USD
73	The Bank of Mauritius to confirm the whether the DMS Platform will be facing the internet, or on a private network.	The portal(s) for data collection may be internet facing. However, the analytics will be on the internal network of the Bank of Mauritius.
74	Is data cleaning required?	Yes.

75	Is a tool required where data should be standardized/harmonised by definitions or documents of KPIs ? (For example - a data catalogue tool)	Yes. Respondents to propose solutions.
76	Is a real time data synchronisation required?	Yes.
77	Are Interactive/Advanced features for reports required (features like copy and paste etc.) ?	Yes. Respondents to propose relevant features.
78	Would the Big Data Solution be restricted on the private network of the Bank of Mauritius only or should it be exposed to internet also?	The portal(s) for data collection may be internet facing. However, the analytics will be on the Bank's internal network.
79	Where are the source data located? Are they all in Mauritius (on premise) or do you also have some cloud based solutions?	All source data is on premise.
80	Do you have oracle database from which the DMS needs to get data from? If there are Oracle Databases and what are their versions?	Proposed system should be able to connect to different types of databases, including Oracle.
81	Are there any other vendor specific databases e.g. supabase, or databases in public clouds e.g. in Azure, AWS, GCP, etc?	All existing databases are hosted on premise.
82	Does the Bank of Mauritius already have a team of data analyst who are conversant with SQL? Will the team of the Bank of Mauritius manage the data operations? Is a fully managed service expected or will the Bank of Mauritius manage the data operations related to the DMS (create new dashboards, models, add data source, data quality check)?	Respondents should propose their operational model post deployment. The Bank has an internal IT and BI Team for supporting the operation.
83	What are the Data Governance policy in place? To which policies should the bidder adhere to?	To be shared at a later stage. Respondents to submit proposals.
84	Does the Bank of Mauritius already have RPA (Robotic Process Automation) solutions and tools?	No.
85	What is the bandwidth and latency between your production and DR site?	Additional technical details will be shared at a later stage.
86	How many users is expected to create dashboards?	Around 20.
87	How many users are expected to view only dashboards?	Around 400.
88	What is the yearly growth in data that is currently expected? (during the 5 year contractual period)	Additional technical details will be shared at a later stage.
89	What kind of analytics and reporting capabilities are needed?	Respondents should propose.
90	Should bidder propose a backup solution or do you have existing backup solutions like Veeam? What is the Bank of Mauritius' backup retention policy requirements for the analytics platforms? Could you provide details on the types of backup for the systems (Full/incremental)? Are there specific regulatory or compliance requirements that dictate the backup retention periods for the Bank of Mauritius' DMS platform? How frequently are backups performed for each type backup type? Are there any specific data archiving requirements in addition to backup retention? Does the Bank of Mauritius require any off-site backup for its DMS platforms? If so, could you provide details on the off-site backup procedures and retention periods? Do you need a high availability solution? What's the minimum downtime, RPO, RTO?	Respondents may propose their backup and archiving solutions. Additional details will be shared at a later stage. However, the system should be resilient and provide redundancy of service in case of downtime.