Subject: Floatation of Expression of Interest (EOI) for Identification of Vendors/ Solution Providers for Implementing Centralised Information Management System (CIMS) for Revamping Existing Data Warehouse of RBI

Department of Statistics and Information Management (DSIM), Reserve Bank of India (RBI), Data Warehousing Division (DWD), C-9, 3rd floor, Bandra Kurla Complex, Bandra East, Mumbai – 400051 invites ‘Expression of Interest (EOI)’ from eligible reputed Vendors/ Solution Provider for implementing Centralised Information Management System (CIMS) for revamping its existing Data Warehouse system.

Last date of submission of response for EOI is August 06, 2018 at 15:00 hrs. For details please visit the ‘Tenders’ section of our website (www.rbi.org.in).
Reserve Bank of India

Expression of Interest

Identification of Solution Provider for implementing Centralised Information and Management System (CIMS)

Date of Release: July 02, 2018

Department of Statistics and Information Management
C-9, 3rd floor, Reserve Bank of India,
Bandra Kurla Complex, Bandra East
Mumbai – 400 001, Maharashtra, India

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**Expression of Interest (EOI) for Identification of Solution Provider for Implementation of Centralised Information Management System (CIMS) by Overhauling the Data Warehouse of the Bank**

Department of Statistics and Information Management (DSIM), Reserve Bank of India (RBI), C-9, 3rd floor, Bandra Kurla Complex, Bandra East, Mumbai - 400001 is overhauling the existing Data Warehouse (DW) of the Bank ([https://dbie.rbi.org.in](https://dbie.rbi.org.in)).

The RBI desires to appoint a Centralised Information Management System (CIMS) solution provider for revamping the existing Data Warehouse (DW) of the Bank. The task would be executed in various phases commencing from understanding the Bank’s existing DW, IT systems, providing software solutions (automatic data collection and interfacing with external solution, processing, storage, visualisation and analytics, data security and data governance) and propose the required infrastructure (hardware), customisation and implementation of the proposed solution, data migration, interfacing with external systems, training of participants and rollout. It is desired that the solution provider should utilise the existing investment in IT by the Bank in the DW as far as possible.

The “Expression of Interest” (EOI) document can be downloaded from the Tenders Section of the Bank’s website ([www.rbi.org.in](http://www.rbi.org.in)). All expression of interest must conform to the guidelines set out in the EOI document. EOI to be submitted to the Principal Adviser, Department of Statistics and Information Management, C-9, 3rd Floor, Reserve Bank of India, Bandra Kurla Complex, Bandra East, Mumbai- 400051 in a sealed cover. The proposal in response to the EOI should be signed and submitted by a person duly authorized to bind the bidding company to the details submitted in the proposal in response to the EOI. The signatory should give a declaration and through authenticated documentary evidence establish that he/she is empowered by the competent authority to sign the necessary documents and bind the bidding. The due date for submission of EOI is 15:00 hours on August 06, 2018.
# SCHEDULE FOR SUBMISSION OF EOI:

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<td>Issue of EOI documents</td>
<td>July 02, 2018</td>
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1. Purpose

The Reserve Bank of India is hereinafter called “RBI” or “Bank” issues this ‘Expression of Interest’, hereinafter called “EOI”.
The RBI proposes to implement a CIMS comprising of DW and Data Lake (DL) which would include:
- Seamless data collection from regulated entities by creating system-to-system interface;
- System driven data validation and data review;
- Flexible and scalable data repository including DL;
- Providing a state-of-the-art data dissemination platform;
- Centralised analytics platform to facilitate creation of RBI Data Sciences Lab as announced by RBI in its “Statement on Developmental and Regulatory Policies” dated April 05, 2018 and research;

RBI subsequently will be floating a Request for Proposal (RFP) to those vendors who qualify in EOI process for selection of vendor for its development and implementation. The said RFP will be broadly covering the existing systems and processes, scope of work for the vendor which gives an overview of the entire project.

This EOI is issued for inviting proposals for the development and implementation of CIMS for the Bank.

The CIMS project would be executed in various phases commencing from understanding the Bank’s existing DW, IT systems, providing software solutions (automatic data collection and interfacing with external solution, processing, storage, visualisation and analytics, data security and data governance) and propose the required infrastructure (hardware), customisation and implementation of the proposed solution, data migration, interfacing with external systems, training of participants and rollout. It is desired that the solution provider should utilise the existing investment in IT by the Bank in the DW as far as possible.

This document does a fair amount of detailing of the requirements and expected solution architecture to enable better quality and more detailed responses. However, the final specifications will only be prescribed in the RFP. Bidders are encouraged to give additional suggestions and alternative designs and approaches in their response.

Intellectual Property Rights for all major modules / products developed specifically for the CIMS will rest solely with the Bank. This is a mandatory requirement and will form a part of the final contract between the vendor and the Bank.

A vendor submitting the proposal in response to EOI for development and implementation of the CIMS shall hereinafter be referred to as “CIMS Vendor” or “vendor”.

This EOI document is neither an offer letter nor a legal contract, but an invitation for expression of interest.

No contractual obligation on behalf of the Bank whatsoever shall arise from this EOI.

EOI and RFP for CIMS will be treated under process unless and until a formal contract is signed and executed by duly authorized officers of the RBI and the vendor.
• The RBI may modify any/all of the terms of this EOI giving due notification through the Bank’s website and shall be entitled if necessary to invite ‘Request for Proposal’ (RFP) only from select eligible vendors based upon transparently laid out norms set out in this document. The proposed RFP will provide the detailed scope of the implementation of CIMS.
• The RBI will not be liable for any costs incurred by the vendor in the preparation of the response to this EOI. The preparation of vendor’s proposal will be made without obligation by the Bank to acquire any of the items included in the vendor’s product, or to select any vendor’s proposal, or to discuss the reasons why the vendor’s proposal is accepted or rejected.
• All information included by the vendors in their proposal will be treated in strict confidence.
• The due date for submission of the expression of interest is August 06, 2018, 15:00 IST.
• Based on the eligibility criteria mentioned in Section 12, the qualified vendors would be shortlisted and would be advised within a period of ten working days from the date of finalisation of shortlisted vendors.

2. Introduction:

The RBI set up the Database on Indian Economy (DBIE), an enterprise-wide DW, with the broad objectives of (a) developing an integrated repository of current and historical data encompassing all operational and research areas; (b) building a state-of-the-art decision support infrastructure with On-Line Analytical Processing (OLAP) and dashboard capabilities; and (c) creating a user specific data mart based on central repository. Initially, the DW was made operational for web-based access over the closed user group network for users across offices of the RBI. In 2003, the publishable part of the data was made available to the public. The current website of DBIE is https://dbie.rbi.org.in/. Since then, the DBIE has matured and become an important source of data dissemination, including for multilateral agencies, and a platform for bringing out various important publications like the Real-time Handbook of Statistics (HBS), the Weekly Statistical Supplement (WSS), the current statistics portion of the RBI Bulletin, the Statistical Tables Relating to Banks in India (STRBI), the Basic Statistical Returns (BSR) of Scheduled Commercial Banks in India, International Banking Statistics (IBS), Primary Urban Co-operative Banks’ Outlook and Quarterly Statistics on Deposits and Credit of SCBs in India. The current DW system contains confidential data of various Central Office Departments (CODs) of the RBI which is accessed using DBIE or other linked web portals with login to the system.

The DW is housed at the RBI’s Data Centre (DC) with an intranet web-portal for internal users of the RBI and the publishable parts of the RBI’s data are being disseminated through the public website (https://dbie.rbi.org.in/). Although the existing DW infrastructure was planned primarily to store current and historical data to provide a management information system (MIS) for the RBI, it currently serves internal and external users in terms of (a) data collection and validation; (b) data processing and (c) data dissemination and publication.
The vendors may visit the DBIE web portal https://dbie.rbi.org.in/ for study of the existing facilities and also study the XBRL returns published by the RBI (https://www.rbi.org.in/Scripts/BS_Listofreturns.aspx) in this context.

2.1 Need for Revamping DW

Considering the changes in the environment of the Bank and its regulated entities due to (a) organizational restructuring of the RBI; (b) implementation of information technology systems in various operational departments of the Bank; (c) implementation of Core Banking Solution (CBS) and Master Information System (MIS) in commercial banks; and (d) implementation of online reporting platforms such as eXtensible Business Reporting Language (XBRL), a complete overall of the existing DW system is taken up which will include latest tools, technology and open source big-data platform.

The entire project has three broad areas viz.

(i) Automation of data transmission from source entities (banks / regulated entities) to the DW;

(ii) Development of state-of-the-art architecture using latest technologies for DW and Data Lake (DL). Data migration of the existing DW by redesigning and recoding the existing facilities. This should facilitate management of high volume structured and unstructured data using big-data open source technology like Hadoop;

(iii) Development of data analytics and visualizations integrated with the revamped DW with including revamping of entire DBIE website.

3. Functional Requirements for CIMS:

The CIMS system should be state-of-the-art and end-to-end solution covering the following broad areas and will use both DW and DL technology:

i. Data collection and validations

ii. Staging area portal

iii. Meta-data repository

iv. Data dissemination portal with integrated centralized analytics facilities

The solution should meet the following expectations from various stake holders of the DW system:

- All the facilities and data available in the current DW system should be provided in the proposed CIMS with proper business process re-engineering and re-coding using new proposed technology and architecture;

- Establishing system-to-system interface for automated element based data collection from about 130 banks/entities;

- Creating data elements from all existing return based data collection templates and providing element based data collection system;
• A comprehensive data index (meta-data) is required to be developed in consultation with all the stakeholders, which will be helpful for search of data elements and facilities in the CIMS;

• The homepage of the CIMS should be user-friendly, dynamic and responsive;

• Centralised data visualization and analytic tools should be made available; and

• Historical data with time dimension should be stored so as the data can be used directly to any time series analysis.

3.1 Data Collection and validations
The following modules will be required for data collection and building staging area portal:

3.1.1 Data collection
The RBI collects the following returns from regulated entities;

a) Consolidated list of returns submitted to the RBI by the banks/ Non Bank Finance Companies (NBFCs)/ other financial institutions is available in https://www.rbi.org.in/Scripts/BS_Listofreturns.aspx;

b) File transfer/ file upload based returns (about 5 returns);

c) Any other returns to be specified by the RBI before finalisation of RFP.

Apart from the above returns, the RBI collects data from its internal systems e.g., e-Kuber and RTGS using database to database direct interface. Granular data from monetary policy surveys are being stored and processed in the DW. Corporate data collected from varied sources are also stored and analysed in the DW. Granular data from Clearing Corporation of India Limited (CCIL) is collected using file transfer. Also, data on various macro-economic variables are collected from various websites of government / other organisations. Data on macro-economic indicators are collected from SAARC countries and processed in the DW.

Vendor has to provide solution for data collection in an automated and secured manner. Vendor is required to provide solution for data to be collected in a structured and unstructured formats, system to system interfacing, social media data streaming and web scraping from the regulated entities or otherwise. Vendor has to ensure that the application has the following features:

• Element based data collection using standard format, XBRL based returns, email based returns, file transfer or file upload based returns/ data, data collection from various websites, internet based structured and unstructured data, data from internal and external systems;

• Data governance, data quality and data lineage facilities;

• Tools and technologies relating to Big-data e.g., Text mining, Natural Language Processing (NLP), Artificial Intelligence (AI), etc.;

• Linking data elements with harmonized definitions. The list of harmonized definition are already published by the RBI and links are provided below:
3.1.2 Delivery Channel Management

The system will provide multiple delivery channels for data collection from varied sources based on the best feasible technology.

3.1.2.1 System-to-System direct data transfer

This will be the most preferred delivery channel for data collection with end-to-end automation in data collection. The main data providers are the banks and most of the banks have common core banking solutions. The solution provider needs to provide technological solution for secure data transfer between systems at data provider level MIS system to CIMS seamlessly. In this context the Bank is looking for RegTech (Regulatory Technology) solutions for automatic reporting from regulated entities.

Data transfer will be using international standard formats like SDMX, XBRL, JSON etc. The system is required to support all these standards. Also, the system should provide facility to exchange ASCII file wherever required.

3.1.2.2 File upload in Data Collection and Staging Portal

The Data Collection and Staging Portal (DCSP) portal should have facility to upload pre-formatted file for data collection.

3.1.2.3 Data transfer using email attachment with pre-formatted file

There will be specific generic email id for receiving business specific data as email attachment. The processing of the attached data will be fully automated using ETL tool.

3.1.2.4 Screen-based data collection

A comprehensive secure subsystem is required to be developed by the solution provider for capturing data using screen-based forms. There are two types of users for screen-based data collection:

• The regulated entities or such data providers who will access the system using INFINET based portal (this portal may not be accessed using internet) for data entry: The data entry screen for all the XBRL based returns (https://www.rbi.org.in/Scripts/BS_Listofreturns.aspx) should be developed by the solution provider with validation logic. The validation logic may be provided as Annex in RFP.

• Launching various surveys: This system will be accessed using internet-based portal as the end users are common person or companies. The system should include all the existing surveys and state finance data collection with user friendly navigation. The solution provider is required to design in such a manner that any new surveys or data collection forms can be launched with minor efforts. There will be validations attached to elementary data and cross validations across fields as configured repository of business rules.
The vendor should use latest technology for building user friendly screens which can be made within short time.

3.1.2.5 State-of-the-art big-data collection and processing module
The CIMS should have a big-data collection sub system. The data connectors should be able to connect to various internet sites for unstructured and structured data collection using data streaming from social media, web crawling from various e-commerce web sites, connecting supermarket database or any subscribed or unsubscribed data sources approved by the RBI. This will have high-performance text mining and high volume data mining capabilities.

3.1.2.6 Broadcasting / exchange of metadata with banks/ entities
The metadata of the CIMS system should be maintained by the RBI. This metadata will be replicated by all the banks/ entities in their respective systems. During the implementation of the CIMS, the metadata prepared by the vendor will be shared with all the banks/ entities as one time efforts. Thereafter, there will be change in metadata in terms of addition, modification and deletion which need to be reflected in the systems of all banks/ entities. For this purpose, the vendor has to provide facility for exchange of metadata as and when required by the RBI with banks/ entities. The vendor is required to propose a solution for centralised management of metadata which is user-friendly and easy exchange with all the stakeholders.

3.2 Staging area portal
The data validation logic will be defined and stored in the system. The solution should provide flexible and dynamic data validation architecture so that managing data validation within element and across elements will be easy to manage and change as and when required. All the existing data validation logic and new business logic for data quality improvements should be part of the system.

The stored validation logic will be used for data validation during or after data collection based on the data loads. The detailed result of the validation either success or error will be communicated to the user by way of email alert. A staging area portal should be provided for view and as data quality improvement platform. This secure web portal will be accessed by all the banks/ entities for data quality audit by way of providing desired data view in aggregated or as-is manner. Once the bank is satisfied with the data, they should be able to submit the data with digital signature for further processing.

All the existing base reports should be provided to the data provider and the Central Office Departments of the RBI. An efficient ad-hoc query facility and data visual facility should be provided for data mining.

Also, the facility to view data as elements are required to be provided in the portal. The user should be able to search data elements in user-friendly manner and once the element is selected the option should be provided to view the data and/or dashboards with time series.

The staging area layer should be hosted in big-data environment (e.g. Hadoop platform).
3.3 Metadata, Data and Big-data repository for various subject areas

The detailed requirements relating to metadata, data and big-data specific to various business areas will be a part of application software feature of CIMS. It should have following features;

i. All current and historical data of the existing DW are to be migrated to CIMS with due audit checks / verifications and reconciliation. Existing DW and new repository will run parallel till the time complete migration takes place and users should be able to access the data/ reports available in existing DW seamlessly without any glitch. The future data (updates of existing datasets and/or new dataset) will be stored in the CIMS after due processing on regular basis. The vendor should chalk out a proper data federation policy in this regard.

ii. Both the traditional database (RDBMS) and the Data Lake (with big-data) may exist side by side and should be part of CIMS with an ultimate objective of having entire database in big-data platform in long run.

iii. The vendor should provide an effective and efficient Data Lake architect from their knowledge of big-data implementation, in addition to usual data warehouse architect.

iv. Instead of one-by-one database migration to the new platform, batch wise migration may be considered to save time. In a gross level roughly one petabyte (i.e.1000 TB) size may be considered to start with for big-data.

v. The existing projects under different business areas should be implemented in CIMS, with further changes and improvements on need basis1.

vi. In addition to the existing databases, new requirements including big-data requirements as desired by the various stakeholders should be injected into CIMS, e.g. granular payment system data, banks’ inspection report, regional developments and complaints related to banks, deployment of credit to various industry and special monthly return/s by the banks, balance sheet of companies/ banks, core banking (e-Kuber), currency data, micro data of companies, unit level data for various surveys conducted by DSIM, data from external entities (NPCI, MCA etc.), Internet of Things (IOT).

vii. Data ingestion from internet web portals should be carried out regularly using web-crawling, e.g. e-commerce portals, real estate websites, supermarkets website, job related websites etc.

viii. Real time streaming to ingest untrusted / semi-structured social media data from Twitter, Facebook, YouTube, blogs and news feeds. Since the collection of social media data may not be free (especially the historical data), the approach to collect such data may be formulated separately. However, the responsibility of integration of such data with CIMS would lie with the vendor.

ix. Generation of query facility connecting data from RDBMS based database and Hadoop based Data Lake which is termed as “Query Federation” approach is required.

x. Vendor has to facilitate data masking of confidential data elements which will be identified by the RBI.

xi. Vendor has to provide user friendly screen-based interface for metadata management.

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1 Changes required in existing databases as gathered from various stakeholders will be included in the RFP.
xii. The facility to be provided to migrate old data to big-data platform within CIMS. The old data will be categorized so based on the configuration at data element or data series level which will be decided by the RBI. However, the user should have unified view using Query Federation Tool which should be implemented in CIMS.

xiii. There should be a “Data virtualisation layer on big-data” where the user data query will be managed efficiently. Data virtualization is a generic approach to data management that allows an application to retrieve and manipulate data without requiring technical details about the data, such as how it is formatted at source, or where it is physically located, and can provide a single customer view (or single view of any other entity) of the overall data repository. This is required in order to save memory and space of CIMS.

xiv. Summary of some business use cases may be provided in RFP which may form the basis of benchmarking requirement for vendor.

xv. Metadata framework: The CIMS should capture and index various data elements (both micro and macro data) with global search facility i.e. across DW and Data Lake. CIMS should have information about the data (metadata) and it should be linked with the data and should be viewed through the link established on the same page where the data is displayed. The indicative list is as follows;

a. Description of data – information regarding report in case it is displayed with group of elements as report.

b. Harmonized definition of data - all the data elements have to be linked with the harmonized definition wherever applicable.

c. Source agency/ owner

d. Frequency

e. Changes took place over time

f. Calculation method

g. Availability (from – to)

h. List of the reports where this data are available

All the data available in any report/analytical result/graph/dashboard should have their corresponding metadata in that report/analytical result/graph/dashboard. There should be a separate module for creating/monitoring/modifying metadata. Metadata for other components such as report/dashboard should also available separately. Vendor has to provide user friendly screen-based interface for metadata management.

xvi. The Data Lake should have characteristics such as LAMBDA architecture, real time analytics, visualisation, time series/machine learning analytical capabilities, ability to seek & search both structured/unstructured/semi structured data, self-serviced business intelligence capabilities, in memory processing of data, optimised data model, file formats, replication and compression algorithm should be followed.

xvii. Proper data lineage should be created for end to end data management (from data landing to associated report/ dashboard).

xviii. Data processing framework is required to perform the necessary ETL activity on the staging area repository which should be capable of all the data transformations used in the Bank as per required business logic. There should be a framework for workflow management and scheduling tasks, auditing and troubleshooting. Any change in structure/schema of source systems or
processing rules should generate a prompt alert. Also, it should have a framework in place to monitor / handle software / hardware failures / corruption.

xix. The repository solution should have scalable (both horizontally and vertically), efficient, configurable, reliable and cost effective computing environment. Computations may be carried out in batch, iterative, transactional, near real time or real time basis.

xx. Data Lake to be implemented using commodity hardware.

xxi. Supported open source applications like R, Python, etc. with interoperable features may be considered for Data Lake implementation.

xxii. The design of repository applications should be cloud-ready so that it can run securely on private/hybrid clouds and can also use the elasticity to auto-scale in a need-based manner and deliver performance cost effectively.

xxiii. Interface requirements for the existing as well as proposed software modules, including present and proposed delivery channels should be built by the vendor, which should be loosely coupled in order to make applications more flexible, more adept at change, and easier to maintain (for ex: changes to Data Access Layer without rebuilding Business or UI Layers)

xxiv. There should be a defined user management (administrative and access control) mechanism to ensure security and privacy.

xxv. Number of concurrent users of the RBI should be defined along with performance Service Level Agreement (SLA) for the proposed CIMS.

The following business areas are required to be studied in detail and provided in the CIMS.

i. Data collection, processing and providing decision support system platforms (dashboards, trend analysis and ad hoc query) for various central office departments of the Bank.

ii. Capturing micro-level data from various payment systems of the country and providing data mining platforms.

iii. Collection, processing and compilation of data relating to finances of Central Government, State Governments and Union Territories and building analytical platforms for fiscal analysis.

iv. Data portals for CFR, CRILC and natural calamities.

v. The business requirements for building Public Credit Registry (PCR) linking with CRILC and BSR data should be considered.

vi. Collecting, processing and building decision support systems for Basic Statistical Returns (BSR) encompassing credit and deposit information at granular level.

vii. Building a repository of audited / un-audited balance sheet information on non-government non-financial public / private limited / listed companies.

viii. Collection, processing and creation of a repository in respect of unit level data for various surveys conducted by the DSIM.

ix. Collection and processing of unstructured data from social media/web scrapping or other sources and sentiment analysis / text mining/ real-time price index on the same.
x. There should be a provision to download machine readable data to facilitate time series analysis.

3.4 Data Dissemination – reports, dashboards and analytics

The following requirements relating to data dissemination, website for CIMS and Centralized analytics will be part of application software feature of CIMS.

3.4.1 CIMS Website:

The vendor should provide 5-6 alternative design/prototype (including theme, website font, backlight, etc.) for CIMS portal and the selected design should be developed with suggested modifications. It should be intuitive user interface with very friendly graphical user interface (GUI). It should also have drag-and-drop interface with effective and efficient FAQs and tutorials.

3.4.2 Portals: There should be three separate portals in CIMS.

(i) INFINET based portal for confidential data access by the RBI and commercial banks/ entities who have access to INFINET.

(ii) Internet based portal for general public. The option will be with the RBI to categorize which facility will be provided in INFINET based portal and which is to be provided through internet. Both the portals will be accessed using single User Management Module.

(iii) Internet based separate portal for centralized analytics accessible for authorized users.

3.4.3 Secured Login

There should be secured login into CIMS. Internal user should login using captcha and PKI. The login feature should be integrated with single sign on facility of the RBI. Whereas, external users should login using captcha and OTP.

3.4.4 Facilities to be provided in the CIMS web portals

The following are the essentials features which are required to be provided and it is expected that the vendor will be able to provide more advanced features that those being specified here based on their experiences.

- A site directory that will give the location of each report and publication in a structured and levelled manner;
- Device compatibility;
- Browsers compatibility;
- Machine-readable data;
3.4.5 Centralized Analytics System (CAS)

CIMS should have an integrated analytical layer that should be capable of carrying out all advance Statistical and Econometrics analysis (including Neural Network, Machine learning, FAN chart, predictive analysis, data mining, artificial intelligence, etc.) of the data. CAS should have following essential features:

i. Facility for saving the data and analysis results/graphs in local PC/device and also to export in various popular formats like docx, Excel, pdf, etc.

ii. Concurrently several users should be able to do analysis without any compromise on speed and connectivity.

iii. There should be separate user admin and user admin module for CAS. Admin for CAS user should be created by CIMS admin. CAS user admin should be able to create other user and allot temporary space and specify period of space availability for each user.

iv. Facility to implement data dissemination policy of the RBI.

v. It should include standard statistical software in CIMS.

vi. CIMS should have advance features of visual analytics. It should be interactive to facilitate the following:
   a. change graph type;
   b. add/delete variables;
   c. change the time scale;
   d. copy & paste in word/excel along with data and metadata;

vii. Dashboard for regular statistical analysis and graph.

viii. Interactive dashboards.

ix. Digitalized Map integration.

x. Temporary Space to User

xi. Search option should include:
   a. ‘search with all these words’
   b. ‘activate synonyms and abbreviations’
   c. ‘search with these exact phrase’
   d. ‘search with one or more of these words’
   e. ‘do not include these words’
   f. ‘frequency of report’
   g. ‘case sensitive search’
   h. ‘Period based search’

xii. The search facility should prompt users with associated search terms as well as show a list of recommended items/reports based on viewing history. For the purpose, the vendor may refer amazon website. It should also have a component-wise (such reports, dashboard, BO, publication, metadata etc.) search facility like the RBI website. In addition the search facility should have the following features.
xiii. Search trend capturing
xiv. Search auto completion
xv. Proximity search

3.4.6 Reports
All the reports/dashboard available in current DW system should be made available in CIMS. The data downloaded from these reports should be readily useable in several statistical software. Date, number and text format of the downloaded data should be compatible across statistical software.

3.4.7 Ad-hoc query
In addition to the standard reports, ad hoc query facility for viewing and downloading data across the DataMart should be provided.

3.4.8 Dynamic reports
The vendor should refer preferably other central bank or international institute / organization websites as mentioned above and develop all advance features of dynamic reports. Vendor may refer BIS website (http://stats.bis.org/statx/srs/table/d3) in this regard.

3.4.9 Binary feedback
This option of up voting (with a thumbs up option) or down voting (with a thumbs down option) would help to get usability of the reports. This facility should be available for all the reports irrespective of internal or public reports with comment box so that the user can express their views. However, the vendor should provide appropriate dropdown options for selecting reason for up-voting and down-voting. Vendor should provide the option to the RBI for enabling/disabling this feature.

3.4.10 Off-line data cubes
User should have facility to copy the application as “Off-line Data Cube” of all the data series for which user have permission. The user should be able to copy / install through a menu the off-line data cube in their laptop and carry. The interface to access that off-line data cube should be same as the CIMS.

3.4.11 Separate portal for CAS
Internet based separate portal for centralized analytics accessible to authorized users. The portal should be having following features:

- Intuitive user interface and user friendly GUI programming.
- FAQ and tutorials.
- With drag-and-drop interface that’s both easy-to-use and powerful.
3.4.12 Proposed Solution Architecture:
The four tier propose solution architecture overview from business requirement point of view is provided in figure 3.

Figure 3: Conceptual architecture of CIMS

- **Tier-I:** Data Collection Layer (DCL)
- **Tier-II:** Data Processing Layer (DPL)
- **Tier-III:** Final Data Repository Layer (FDRL)
- **Tier-IV:** Dissemination and Analytics Layer (DAL)

This four-tier architecture is a comprehensive top-down design that addresses all the limitations of the existing DW. The revamped DW i.e. the CIMS will have following five broad components:

I. System-to-System automated data collection of Macro and Micro data from source systems of banks and other entities to CIMS.

II. Staging Area Data Portal (SADP) system for accessing/authorization/ revision of data by banks and entities.

III. Relational Database Management Systems (RDBMS) based repository with fact and dimension tables.

IV. Data Lake - which is composed of commodity hardware (one time write and multiple reads) as micro level big-data are stored in both structured and unstructured forms. Hadoop is one of the most popular open source big-data platforms.
V. Centralised Analytics Server will facilitate user friendly analytics and multi-dimensional view of data, its trends and relationships/ correlations and the like.

4. User Management Module

CIMS should have proper user management module. One user administrator for CIMS should have sole authority for managing the CIMS user. CIMS should have a module for administrating all the users having access to CIMS which would be accessible only to the user administrator. Administrator should be enabled for creating/editing super user for nodal officer of each Department. Super user in turn can create other users for his department and banks. System should enable various level of users and allocating access rights to users.

5. Technology and Data Quality requirements

i. It is required that all the data are collected in DL and a staging area portal should be provided to view data for data quality improvement. The data from DL may be processed further to populate repository of DW and DL. The solution provider is required to assess all the business requirements and accordingly propose for inclusion of business areas in DL or DW. However, over a period of time, it is desirable that all data are migrated to DL.

ii. The data quality of the CIMS should be enhanced multi-fold in terms of consistency and timeliness by establishing end-to-end straight through processing (STP), connecting data source systems with DW.

iii. It is important to provide a summarized view/ base of data to the data owner using staging area portal to establish data audit and data governance facility.

iv. User-friendly and dynamic interface should be facilitated by building centralized analytics solutions with in-built information security layers for providing different types of access rights to data and analytics.

v. A powerful search engine with catalogue and hyperlink should be provided to the end user for easy navigation and facility to bring the user’s own data into a temporary storage to enable data appendage.

vi. Implementation of international standards like Statistical Data and Metadata eXchange (SDMX) is necessary for the macro-economic database for SAARC countries and exchange of select macro-economic information at regular frequency with international organizations like the BIS and the IMF.

vii. The validation logic that has been implemented in respect returns which are being collected through XBRL should be considered for data quality enhancement. Any modification to micro data should be reflected on the related aggregated data on real-time or batch processes (within a specified period of time).
viii. A framework should be built to prioritize activities as per user recommendations, wherever applicable.

ix. A facility for downloading large data, which is technically feasible with proper masking, should be made available to authorized users. Vendor has to facilitate data masking of confidential data elements which will be identified by the RBI.

x. A facility for accessing data by using mobile applications and through Application Program Interface (API) should be provided.

xi. Off-line data cube preparations should be implemented with proper security and authentication to enable users to access data when they do not have proper connectivity.

xii. The Master Office File (MOF) (including geo-location tag) for capturing bank and branch locational details, which has been taken up as a separate project, needs to be linked with the DW for housing all bank branch details along with geo-location data. A facility should be built in CIMS for map-based drill down search for locating bank branch.

xiii. For User interface (UI), the coding should be based on best of industry practice which will ensure the support part for relevant browser, OS, any other required plugin is readily available as and when the required on case to case basis.

xiv. The interface technology should be provided such that it supports reusability and integration with existing hardware, software of RBI or member bank. Interfacing technology shall be lightly coupled, forward & backward compatibility with proposed solution.

6. Information Security requirements

The solution should have strong built in security features as well as sufficient audit logs to maintain historical footprint of all activities performed by various users. Activities from all delivery channels should have traceability. The system should include following security features:

i. The CIMS should be PKI enabled, wherein the system will have option for all users (i.e., RBI, banks, FIs, etc.) to login using their Private Key stored in a smart card / USB token. The Key-Pair must be issued by an Indian Certifying Agency (CA).

ii. The CIMS should be integrated with the existing single sign on facility of the RBI and it is required to integrate and facilitate LDAP technology. For digital certificates, the validity of certificates to be carried out by interfacing with LDAP of the respective Certifying Authorities (CAs). Also, the system to facilitate interoperability of CAs.

iii. Develop, implement, maintain and use best in class industry proven safeguards that prevents the misuse of information systems and appropriately protect the confidentiality, integrity, and availability of information systems. Follow industry standards like OWASP, CERT etc. during design and development phase.
iv. Maintain a security plan that complies with industry accepted security requirements. Security Plan should be embedded within the Project Plan & approved by the RBI Information security officer (ISO).

v. The RBI will perform a security risk assessment of the proposed solution or carry out the same by third party vendor. Risks identified should be remediated by the vendor at their own cost.

vi. Static & Dynamic application security testing should be conducted by the vendor. All gaps identified will be fixed by vendor prior to go-live. A development manager of vendor must certify in writing to the RBI that a security review has been conducted and risks that are open is shared with the RBI for acceptance before release of final code. The penetration testing report shall be shared with the RBI.

vii. Vendor shall disclose the origin of all software components used in the product including any open source or 3rd party licensed components.

viii. The RBI reserves the right to conduct further security testing of the system by either RBI personnel or another party. Any gaps identified during this testing will be fixed by vendor at their own cost.

ix. The solution shall not be considered accepted until the independent review by RBI is complete and all security issues have been closed or assigned to a mutually agreed upon remediation roadmap.

x. Ensure access granted to any agent, including a vendor or subcontractor, agrees to the same restrictions and conditions that apply through the agreement. These access levels ensure to implement reasonable and appropriate safeguards to ensure the confidentiality, integrity, and availability of the information systems.

xi. Vendor will not copy any data obtained while performing services under this EOI and RFP to any media, including hard drives, flash drives, or other electronic device, other than as expressly approved by the RBI.

xii. Standards Benchmark - to ensure that all parties have a common understanding of any security issues uncovered, the independent organization that conducts the VAPT shall provide vulnerability rating’s (preferably) based on industry standards as defined by First's Common Vulnerability Scoring System (CVSS) and Mitre’s Common Weakness Enumeration (CWE)

xiii. Vendor should develop a disaster recovery plan for restoration of the system in the event of a disaster or major incident. The Disaster Recovery Plan will be tested prior to the go-live to verify DR readiness.

xiv. Ensure the promotion of the build to production environment is done in a secure manner and the production environment is ready for the system go-live.

xv. The solution should have proper encryption and secure transmission of data and information throughout the application.

xvi. Two-factor authentication feature to login into application.

xvii. The solution should ensure there should be no data leakages by implementation of distributed programming frameworks.
xviii. The solution should secure data storage and logs.

xix. Auditing should be enabled to track each activity.

xx. Privacy assessment needs to be done before any data source is on boarded aligned to existing legal requirements.

xxi. Implement granular access control.

The uniform user management policy envisaged by the RBI in which single-sign-on concept for a user should be implemented and user-based application availability should be visible in the web layer. Implementation of open source technologies should be taken up in compliance with Information Security (IS) policy of the Bank.

7. Hardware Requirements for CIMS

i. The vendor is required to propose hardware to support the proposed solution. The vendor is expected to perform adequate sizing from the perspective of performance and storage capacity. It is desired that the solution provider should utilise the existing investment in IT by the Bank in the DW as far as possible.

ii. CIMS’s primary site should be at DC and there should be a disaster recovery DC. The Test and Development site should be at a separate DC. The vendor is expected to propose the hardware at all the DCs. The DR should be exact replica of primary DC.

iii. The solution should be flexible for scalability of hardware including forward & backward compatibility between software component and underlying hardware.

iv. The maintenance of the proposed Hardware, OS, databases, big-data applications, tools and any third party API, and all related applications will be the responsibility of the vendor for a period of seven years.

v. Any Hardware component for which ‘End of Sale’ has been declared by the manufacturer cannot be proposed by the vendor in its response.

vi. In case any hardware reaches its ‘end of support’ date during the period of the contract, the vendor shall be required to replace the hardware at no cost to the RBI unless it provides a counter-guarantee from the hardware manufacturer regarding support for the hardware even after the ‘end of support’ date.

vii. The RBI reserves the right to procure the hardware proposed by the vendor directly.

viii. The response time for data collection and data dissemination is very critical for CIMS. The system should provide satisfactory response time.

Functionalities relating to secure data collection, facility of encryption of data at various stage (e.g., data in transmission, data in repository and data sharing), data lineage, maintaining list of computer assets, monitoring usage of computing resources, archiving and restoring data, regular data backup, and other data
governance related activities are to be provided by the vendor. The vendor will be required to integrate the computing systems with existing resource monitoring system of the RBI DC.

7.1 Storage Requirements
At present, the database size is about 3.3 TB. On the basis of current data flow and future requirements, it is estimated that the data size at the end of 10 years could be about 60 TB. This requirement does not include sizing for big-data. However, based on the various high frequency micro data and potential unstructured data requirements, it is required that the vendor should provide about 1 petabyte (i.e., 1000 terabyte) of big-data (Hadoop) system with appropriate number of nodes and configurations. The vendor is required to provide detailed big-data architecture and various big-data related facilities and features.

7.2 Security Mechanism
It shall be highly secure, safe, providing sophisticated security mechanism, upgradable with the change in technology. It should be PKI enabled. At the same time security provided in the system shall be commensurate with the need and should not unduly hamper efficiency.

8 Backup and Archiving
Solution provided should have online/automatic backup facility. The CIMS should have fully automated archival and retrieval system with capability of flexible archival and extraction of data to the Data Warehouse to facilitate compliance with various statutes. The new solution should provide proper backup facility of the data and applications/systems. This should also include software change management framework. The DR set up should be similar to the actual production set up, in line with IS policy of the Bank and should adhere to the defined RTO and RPO.
- Full backup system on-site (hot standby)
- Off-Site backup (warm standby)
- Disaster recovery and backup arrangements

9. Operational Reliability and Contingency Arrangements
Business Continuity Plan (BCP) shall be fully automated with no single point of failure.

- The BCP shall be one of the deliverables by system integrator and needs to be defined, provided and documented in detail with clear defined procedure, roles and responsibilities. It should also have provision for scenario-based periodical and surprise tests to judge the robustness of the fall back arrangement.
• The system shall also provide alternative mechanism either for settlement in case of non-availability of CIMS. This can be done through some other payment system or by inputting the instructions in standalone workstations. As a last resort, it should deliver at least minimum possible operations which could be carried out manually till some alternate arrangement is put in place.

• The system shall have test bed similar to live environment for participants to test entire flow of CIMS data / information. This will be very useful to test the change requests and major architectural changes

10. Performance of CIMS
• The performance of CIMS shall be monitorable on a continuous basis by deploying suitable diagnostic and recovery tools. The system shall be capable of conducting periodical stress tests with projected peak volumes in a simulated environment.
• The multiplicity of supplier and support vendors for CIMS like hardware, software, network, OS, database, message middleware set up and the applications lead to responsibility conflict in case of failure of any part of the system, besides delay in the restoration of the system. In order to achieve optimal performance, a single system integrator for end to end solution shall be considered for the CIMS.
• **System Control Facilities**: Housekeeping, closedown, etc., should be automated as far as possible. Vendor’s response should describe how the solution is operationally managed and what manual and automated processes are required.

11. Miscellaneous
i. **User Friendly**: The application should provide a summarized view of data to the data owner using staging area portal to establish data audit and data governance facility. Also the user-friendly and dynamic interface should provide with in-built information security layers for providing different types of access rights to data and analytics. A powerful search engine with catalogue and hyperlink should provide to the end user for easy navigation and facility to bring the user’s own data into a temporary storage to enable data appendage.

ii. **Language**: The language supported by the system for all computer inquiries, reports and screens shall include English and Hindi language.

iii. **Reporting**: The reporting functionality shall be both standardized and user-defined based. i.e., the user shall have the option of either querying the database to produce a standard report or obtaining reports or inquiries based on specific criteria which the user defines. The database will be robust and the user should be able to define the required field and presentation format.
iv. **Audit Trail:** The system should have all necessary logs, inquiries and reports that would aid all forms of audit investigation-system or transactional audit reports.

v. **Reporting Database:** Capable of maintaining statistical database with query and reporting facilities.

vi. **Scheduled Reports production:** CIMS should have feature to provide various standard system reports like Operating Session Report, Exceptional Report, Management Summary report, etc.

vii. **Support & Maintenance:** The support team should be resident in India. The Support Team should have sufficient technical knowledge and application knowledge to be able to carry out their tasks.

viii. **Problem Reporting:** The solution must have auditable mechanisms for reporting failures in the various components of the systems. E.g. communications, host application modules, end user devices, database, etc.

ix. **Secured Development:** The solution proposed should be developed based on secure software coding standards and OWASP Top ten vulnerabilities. Code should be developed as per secure coding practices and peer reviewed (or through tool) to ensure the same. Source code access should be authenticated and logged for authorized users only which will ensure integrity and confidentiality of code.

x. **Ownership of source Code:** Intellectual Property Rights for all major modules / products developed specifically for the RBI and integrated with CIMS will rest solely with the RBI. This is a mandatory requirement and will form a part of the final contract between the vendor and the RBI. The RBI wishes to place the source code of the proposed solution in Escrow to protect the RBI’s investment. A perpetual right to access, use and modify the solution delivered as part of this project (including the entire source code for all application software) for internal business purposes is essential. Developer shall implement measures to protect the source code (if development is done on their premises), the RBI reserves the right to review the measures.

xi. **Documents, Testing and support:** There shall be adequate testing platform for all the functionalities of the CIMS including test loading for system stress capacity.

a) The vendor shall undertake to provide necessary and adequate training to the personnel of the Bank as well as the other participants.

b) The training schedule must be finalised in consultation with the Bank, and will form a part of the purchase contract.

c) The scope of the training shall cover all aspects of the operation of the system from both commercial and technical viewpoints.
d) The training must also cover the requisite know-how so as to enable the officials of the Bank to make modifications / improvements in the total solution (customised application software) by themselves.

e) The vendor will take all steps necessary to ensure a high quality of the training. In case the Bank finds the quality of the training lacking, the supplier will have to repeat such training as per the Bank’s requirements at no extra cost to the Bank. For the purpose of ‘Quality of Training’, certain quantitative criteria will be deemed as per mutual agreement between the supplier and the Bank and finalised in the purchase contract.

12. Eligibility Criteria:

The vendors who meet the eligibility criteria as given in paragraph 12.1 and 12.2 below can submit EOI to RBI along with documentary evidence (duly signed and stamped by authorised signatory) for all the items listed therein. The responses from the vendors will be scrutinised and those who qualify the eligibility criteria will be invited for making presentation to the Technical Advisory Group (TAG).

12.1 Primary Criteria

Only Original Equipment Manufacturers (OEM) / Product Vendors of DW and DL, or organizations that are authorized by the OEM/ Product Vendors to make customizations to the DW and DL application (Solution Provider) who satisfy the following eligibility creation should apply and provide response.

Table 1: Primary Eligibility Criteria

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Criteria</th>
<th>Criteria Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Past Experience in end-to-end implementation of DW and DL applications. Experience should strictly be end-to-end implementation and not implementation of part/parts of a DW and DL project. This cannot be treated as end-to-end implementation of DW or DL project.</td>
<td>At least one BFSI or Telecom company in India or abroad with at least 50 TB data stored and peak load of data ingestion 10 GB in a day.</td>
</tr>
<tr>
<td>2</td>
<td>Vendor should have sufficient experts in DW and DL across its organization.</td>
<td>Should have at least 15 data modeller and 15 big-data ETL/ELT and BI developers across the organization</td>
</tr>
<tr>
<td>3</td>
<td>Vendor should have experience in DW/DL operations.</td>
<td>Vendor should have been in DW/DL operation for minimum 3 years</td>
</tr>
<tr>
<td>Serial No.</td>
<td>Criteria</td>
<td>Criteria Parameters</td>
</tr>
<tr>
<td>------------</td>
<td>----------</td>
<td>---------------------</td>
</tr>
<tr>
<td>4</td>
<td>The Solution Provider should be an entity having a local presence of support centre.</td>
<td>Support at Mumbai and Nagpur.</td>
</tr>
<tr>
<td>5</td>
<td>The vendor should agree with clauses for Service Level Agreement, should they become L1/TC1 in the reverse auction to execute a contract with the RBI.</td>
<td>Signing SLA with the RBI post selection.</td>
</tr>
<tr>
<td>6</td>
<td>Vendor should have sufficient number of staff in its payroll for the project.</td>
<td>Primary vendor should have at least 25% of the implementation team on his roles.</td>
</tr>
</tbody>
</table>

12.2 Secondary Criteria

Table 2: Secondary Eligibility Criteria

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Criteria</th>
<th>Criteria Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Company Details: All companies must have a permanent establishment with adequate technical staff attending to product development work as well as maintenance and customer support services in Mumbai and Nagpur. A standalone liaison office will not be considered as a permanent establishment. Note: All vendors must ensure that the name of the legal entity on the technical proposal must correspond to the name on the financial statements.</td>
<td>• Companies must have presence in India for at least 5 years. • Company must be a profit making company for the last three years and its net worth should be positive • Company must have an average annual financial turnover of at least Rs 100 crore during the last three years ending 31st March 2018. Documentary evidence, attested copies of the certificate of incorporation and all financial statements. In case of joint bid, only the prime vendor’s documentary evidence will be considered. For staff strength, attested copies indicating the breakup of staff is required.</td>
</tr>
</tbody>
</table>
Vendors would be shortlisted based on the evaluation criteria as given in the following table.

Table 3: Evaluation Criteria of vendors

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Item</th>
<th>Marks</th>
<th>Qualifying Marks (75%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Requirements understanding of the project (CIMS)</td>
<td>25</td>
<td>18.75</td>
</tr>
<tr>
<td>2</td>
<td>Solution architecture of the proposed CIMS</td>
<td>25</td>
<td>18.75</td>
</tr>
<tr>
<td>3</td>
<td>Approach and methodology for project (CIMS) implementation</td>
<td>20</td>
<td>15.00</td>
</tr>
<tr>
<td>4</td>
<td>Data migration Strategy</td>
<td>15</td>
<td>11.25</td>
</tr>
<tr>
<td>5</td>
<td>Quality of Previous Experience</td>
<td>15</td>
<td>11.25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The vendors who obtained qualifying marks for all the above criteria individually and overall more than 80 per cent marks as per evaluation criteria mentioned above, would be considered as qualified vendor for this EOI. RBI reserves the right to select top 5 vendors (arranged as per technical score obtained by vendors on presentation) as qualified for this EOI in case required. The RFP for the CIMS will be issued only to those who are declared as qualified for EOI and after signing a Non-Disclosure Agreement with the RBI in a specific format.

As part of evaluation process of RFP, the short listed vendors may also be required to demonstrate the Proof of Concept (POC).

13. Vendor’s Response:
   - Only the vendors who qualify the Eligibility Criteria should apply and provide response.
   - In case where the vendor ties up with another vendor, the proposal should clearly indicate the role of prime vendor and other vendors.
• A vendor can only bid with a single CIMS solution product for the EOI. Bids from the same vendor proposing multiple CIMS solution products will not be considered.
• A vendor can only propose a CIMS solution product adhering to the Secondary Criteria (1) as mentioned in qualification process.
• The Bank will interface / communicate only with the prime vendor for all requirements and other project management activities.
• Vendors are expected to provide information about their company and product in the format provided in Section 16 of the EOI.
• The Bank requires the vendors to respond in the following sequence:
  - Company & Product Information
  - Approach (maximum 20 pages)
  - The vendor should provide an Excel sheet indicating the gap/availability on the functional requirements (mentioned in Section 3) in the proposed CIMS Solution product.
  - Proposed Team Structure
  - Client Reference
• The vendor must ensure that the response to the EOI should not exceed a total of 75 pages excluding the documentary evidence.
• The standard bidding process of the RBI will be followed using e-tendering with MSTC web site.
• **No reference to cost or price of the services must be mentioned. If any commercial reference is made, the bid would be disqualified.**
• All queries must be addressed by email only. Telephonic queries will not be entertained.
• All replied queries would be periodically updated on the Bank’s website.

14. Disclaimer and Disclosures:

• This EOI is not an offer to enter into a contract. This EOI is a description of the Bank's objectives and requirements articulated in a structured manner to enable the Bank to evaluate all the responses received and make an informed decision.
• The Bank makes no commitments, implied or otherwise, that the issuance of this EOI, the vendor's preparation and submission of a response and subsequent evaluation of the vendor's response can result in a business transaction with the vendor or any other participant, even if all the requirements in the EOI are met.
• The Bank reserves the right to accept or reject any responses, in whole or in part, and to enter into discussions and/or negotiations with any one or more prospective service providers at the same time and/or at any time, and to terminate negotiations at any time without incurring any liability.
• In no event can the Bank and its affiliates have any liability for any direct, indirect, special, punitive, consequential or any other damages (including, without limitation, lost profits) relating to the subject matter of this EOI or to awarding (or not awarding) any contract to any entity.
• By participating in this EOI process, the vendor agrees to be bound by each of
the terms and conditions set forth under “Disclaimer and Disclosures.”
• The proposal in response to the EOI should be signed and submitted by a
person duly authorized to bind the bidding company to the details submitted in
the proposal in response to the EOI. The signatory should give a declaration
and through authenticated documentary evidence establish that he/she is
empowered by the competent authority to sign the necessary documents and
bind the bidding. All pages of the tender documents except brochures if any
are to be signed by the authorized signatory.
• Any queries seeking clarification can be mailed to pverma@rbi.org.in and
msadki@rbi.org.in. All queries shall be replied individually and will also be
posted on the Bank's website. All queries should be sought, ideally, three
days prior to the closure of the last date of submission of the EOI.

15. Company & Product Information:
• All vendors are required to enter data in the below forms
• In case where a system integrator and product vendor bid, company
information form must be filled up by both product vendor and system
integrator.

<p>| Table-4: COMPANY INFORMATION PRODUCT VENDOR / SYSTEM INTEGRATOR |
| Head Tel: |
| Office: Fax: |
| Key Contact Web: &amp; Email ID: Position: |
| Company formed Year /Place / Core activities |
| Countries in which company has offices: |
| Offices in India: |
| Product Development Centre: |
| Product Service Centre: |
| Countries in which company has distributors: |
| Number of employees in India: |
| out of which number employees engaged in payment system project product design and development (which is being offered under this EOI) ii) Customer support services |
| Number of employees across the world excluding India: |
| Turnover in India for 2016-2017: |
| Turnover in India for 2017-2018: |
| Worldwide turnover for 2016-2017: |</p>
<table>
<thead>
<tr>
<th>Worldwide turnover for 2017-2018:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Target industry / markets:</td>
<td></td>
</tr>
</tbody>
</table>

| Table-5: DW and DL APPLICATIONS PROPOSED BY THE RESPONDENT – TECHNICAL INFORMATION |
| Core Product manufacturing Company: |
| Core Product (mention latest version number): |
| Name of the country where implemented along with volume and amount of transaction handled per day: |
| Product modules available: |
| Alliances (third-party products) |
| First commercial installation by the respondent (mention product version): |
| Latest commercial installation by the respondent (mention product version): |
| Current version and date of release: |
| Indian languages available: |
| Operating systems supported: (mention version number) |
| RDBMS supported: (mention version) |
| Open Source Big-data information: |
| Product developed in: (programming language) |
| Product Web-enabled i.e. accessible through standard web browser: |
| Solution architecture: (2 tier or 3 tier; thick/thin client etc) |
| Support end-to-end Public Key Infrastructure for all transactions: |
| Maximum number of users supported concurrently |
| Details of the multiple channels supported |
| Highest volume throughput |

Please indicate the type of security features enabled for the system. Is it PKI based/any other security feature is available? |

Whether application and database reside in the same system? |
Application running on what type of system e.g. Mainframes, Windows/Linux OS on Intel/AMD Servers, Hadoop, etc. |
What database used e.g. Oracle, MySQL, DB2, SQL Server, Hadoop based, etc.? |
What type of International Formats are adopted for transmission of data? |
Whether XML based standards adopted? |

Whether element based data and metadata repository available? |
What type of interfacing technology is available for automatic data transfer connecting external systems situating on different campus over WAN. |
Please mention features that provide flexibility of addition/modification/deletion of data elements. |
What kind of Data Governance facility is available? |
What kind of big-data technology is proposed and what are the facilities for text mining, real-time data streaming from social media, newsfeed, etc. |
What type of analytics are available? How the analytics and data access is handled? |
What kind of access rights to data and data quality improvements are proposed? |
BCP and DR capabilities of the application |
16. Additional Inputs and Suggestions:

The vendor is required to provide details with relevant suggestions and proposal related to the aspects provided in the following table.

Table 6: Additional Inputs and Suggestions

<table>
<thead>
<tr>
<th>Serial No.</th>
<th>Suggestions/ proposals on</th>
<th>Broad parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Performance of the proposed solution and mechanism for measurement and monitoring</td>
<td>Design architecture, monitoring tools and processes</td>
</tr>
<tr>
<td>2</td>
<td>Service Level Agreement (SLA) metrics for various aspects of the implementation/ production and support</td>
<td>Project plan, post production support service proposal and escalation matrix</td>
</tr>
<tr>
<td>3</td>
<td>Licencing terms and conditions for different s/w components</td>
<td>Suggested tools and licencing details</td>
</tr>
<tr>
<td>4</td>
<td>Change Requests (CR) /New Features</td>
<td>CR process, effort estimation methodology/ per man-month cost and timeliness</td>
</tr>
<tr>
<td>5</td>
<td>Hardware sizing for current scope and future growth</td>
<td>Scalability for the solution for additional channels/ source-entities, augment bandwidth, add more APIs for pulling/sending data, etc.</td>
</tr>
<tr>
<td>6</td>
<td>Analytic tools, co-existence of multiple tools different and procedure/ process for addition/ deletion of tools</td>
<td>Technical architecture and framework for hosting multiple analytical and statistical tools</td>
</tr>
<tr>
<td>7</td>
<td>Providing analysis/reports as a service with costing/billing</td>
<td>Availability of qualified human resources to provide services like data scientists (per man-month rate) and suggestions in this direction</td>
</tr>
</tbody>
</table>

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