SCM

DBMS Reference book of terms and specifications

Table of Contents

Introduction

Purpose and Scope of the Reference Book

This reference book aims to provide a comprehensive guide to the fundamental terms, concepts, and specifications of modern Database Management Systems (DBMS). It clarifies the essential elements organizations should consider when selecting and implementing a DBMS solution.

Overview of Database Management Systems (DBMS)

Database Management System (DBMS) involves the whole group of processes, technologies, and instruments which are employed in the collection, storage, organization, retrieval, and analysis of data. They are the groundwork for data management where organizations can be able to manage the data properly by ensuring data confidentiality, availability, and integrity on different platforms. These DBMS applications are employed within a broad spectrum of information systems, from the classical databases to the most advanced big data ecosystems, and cloud storage of data and data analytics in real time. Presenting data as a key asset in business strategy, innovation, and decision-making, and hence, the competency of unified manipulation, consumption, and transformation of data are irrelevant for obtaining sustainable business success are the most significant points to remember.

DBMS solutions are in diversifying forms like Database Management Systems (DBMS), Data Warehouses, Data Lakes, Master Data Management (MDM) systems, cloud platforms, etc. They acquire different datasets, i.e., structured, semi-structured, and unstructured data and may be implemented from a small-scale department system to a sizable organization.

Through the clarification of the conditions and jargon of Database Management Systems, the aim of this reference book is to:

Demystify and enumerate the DBMS components and operations.

Present the various kinds of DBMS products which have different use cases also.

Some of the techniques to attain data security, governance, and quality management are best explained and discussed.

Give a broader understanding of the latest data management trends and technologies.

Importance of Data Management in Modern Organizations

In our data-centric era, the capacity to handle and use data well plays a key role in any company's success. Data serves as the backbone of modern firms powering strategic choices, streamlining work, boosting customer satisfaction, and sparking new ideas. Yet, the sheer amount types, and speed of data created nowadays pose big hurdles for businesses aiming to get the most out of their data resources. Good data handling makes sure data stays correct,

easy to reach, safe, and trustworthy. When companies put the right Database Management Systems to work, they can: Make Better Choices: When you organize data and make it easy to find, a DBMS gives leaders the insights they need to make choices based on facts. Boost Productivity: When you automate how you handle data and connect it across departments, you make work smoother, cut down on doing things twice, and save money on running costs. Follow the Rules: As laws about data privacy like GDPR and CCPA become more important, it's crucial to manage and protect data. A strong DBMS helps you stick to these rules by putting in place policies to protect data and ways to check what's happening.

Spark New Ideas: Data forms the basis for cutting-edge tech like AI ML, and IoT. Good data handling lets companies try out these technologies and come up with new business plans and answers. Guard Company Resources: Data is key, and keeping it safe from hacks, loss, or damage is a must. A tough DBMS keeps sensitive data secure and intact while making sure it's there when the business needs it. To wrap up, a well-built Database Management System isn't just a tech need but a strategy booster that helps companies tap into all their data can do. As data grows more important, we'll need even stronger, more flexible data management tools that can grow with us. This book is a key resource to help you get to grips with and navigate today's complex DBMS tech.

System Features & Specifications

Relational Database management system

A Relational Database Management System (RDBMS) is a software system designed to manage, store, and retrieve data in a structured format using a relational model. This model organizes data into tables (also known as relations), where each table consists of rows and columns. Each row represents a unique record, and each column represents a specific attribute or field of that record.

RDBMS Key characteristics

- Primary Key: Each table typically has a unique identifier, known as a primary key, which ensures that each row can be uniquely identified.
- Foreign Key: A foreign key is a field in one table that references the primary key of another table, establishing relationships between the tables. This enforces referential integrity between related data.
- SQL (Structured Query Language): RDBMS systems use SQL to interact with the data. SQL is a standardized language used to perform tasks such as querying, updating, and managing data within the database.
- Normalization: RDBMS promotes normalization, which is the process of organizing data to reduce redundancy and improve data integrity.

Database Schemas and ERDs

- Database Schemas define the structure and organization of the data in a formal way.
- ERDs provide a graphical representation of the entities and their relationships, aiding in conceptualizing and designing the database.

Database schemas and Entity-Relationship Diagrams (ERDs) are essential tools used in database design and management to define the structure of a database and model the relationships between its components.

For each table, a schema should define the columns (attributes) and their respective data types (e.g., integer, date). This will ensure that the data is consistent and stored in the correct format.

The contractor should provide an ERD for a whole project as a reference for the creation of tables and their connections.

To ensure data integrity and system maintainability, the database design shall implement only one-to-one or one-to-many relationships. An interactive ERD tool is highly desirable. Such a tool should streamline the database design process by allowing visual creation and management of the schema, including the definition and modification of primary and foreign keys within the ERD itself. This will facilitate a clearer understanding of the data model and simplify future maintenance and modifications.

User-friendly

"User-friendly" refers to the design and functionality of a system that makes it easy to use and navigate, even for individuals with little to no technical expertise. A user-friendly system prioritizes the needs and experiences of its users by providing an intuitive interface, simple instructions, and minimizing complexity.

A user-friendly system should have a layout and design that users can easily understand without the need for extensive training or documentation. The navigation is clear, and the design aligns with common user expectations.

Tasks should be streamlined and simplified. Users can complete their objectives with minimal steps and confusion. The system avoids unnecessary complexity, making it accessible to both technical and non-technical users.

The following features are examples of having a user-friendly experience:

1. Records of the parent table can be accessed within the children data view page and vice versa.
2. Customizable Home page for each user.
3. Retrieving and searching for data can be done by AI with ease.
4. Having the ability to duplicate forms and fields.
5. Using the drag and drop feature when applicable.
6. Bulk editing field Permissions, access control, and updating data.
7. Default values, views, permissions, and any other action that can save time to do.

Languages

A well-designed multilingual application should ensure seamless transitions between left-to-right (LTR) and right-to-left (RTL) writing directions, enhancing accessibility and user experience.

Advance Search

Advanced search is a feature in Database Management Systems and applications that allows users to perform more specific and refined searches by offering additional filtering options and search parameters. Unlike basic search functionality, which typically looks for keywords or phrases across a broad data set. Key Features of Advanced Search:

Multi-Criteria Search

Users can apply several filters at once, such as searching for records between certain dates, within certain price ranges, or from specific users, providing highly customized search results.

Boolean Operators (AND, OR, NOT)

AND: This operator allows users to combine multiple search terms, returning results that meet all specified criteria. For example, searching for “product = Laptop AND status = Available” will return only available laptops.

OR: The OR operator expands search results by returning records that match any of the search criteria. For example, searching for “product = Laptop OR product = Tablet” will return both laptops and tablets.

NOT: This operator excludes certain results. For example, “product = Laptop NOT status = Discontinued” will return only laptops that are not discontinued.

Range Search

Date Range: Users can search for records within a specific time-period by a Timeline scrolling tool inside the data view and report pages. For example, users could search for all records between January 1, 2023, and March 31, 2023, or filter records based on last updated dates.

Numeric Range: Advanced search allows searches within numerical ranges, such as prices, quantities, or any other numeric field.

Wildcard Search

Partial Matches: Wildcards allow users to search for incomplete or partial matches. For example, searching for "Joh*" could return records for John, Johnson, or Johanna. The use of wildcards broadens search capabilities, especially when exact matches are not required.

Flexible Matching: Wildcards are helpful when users are unsure of the exact spelling or phrasing, offering flexibility in retrieving relevant data.

Full-Text Search

Search Across All Data: Advanced search should support full-text search across all fields in a record, allowing users to search for keywords or phrases in any part of the data even if it was a document or an image. This is particularly useful for unstructured data, such as open-ended questions.

Keyword Matching: Full-text search often includes keyword-based ranking, so the most relevant records based on the search terms appear first in the results.

Saved Searches and Templates

Save Search Queries: Advanced search should include the ability to save complex search queries for future use. Users can quickly access commonly used search parameters without needing to re-enter them every time.

Custom Search Templates: Users can create templates with predefined search criteria for common use cases, speeding up the search process and ensuring consistency.

Fuzzy Search

Handling Typos and Variants: Fuzzy search allows the DBMS to find results even when there are small differences between the search term and the actual data, such as typos or variations in spelling. For example, searching for “reciept” may return results for “receipt.”

Similarity Matching: Fuzzy search uses algorithms to match records that are similar to the search term, broadening the scope of search results while still maintaining relevance.

Hierarchical Data Search

Nested Queries: Advanced search supports hierarchical data structures, allowing users to search within parent-child relationships, Where the system would return both parent categories and their sub-categories.

Geospatial Search

Location-Based Searching: For systems that handle geospatial data, advanced search can allow users to search based on location, such as finding records within a certain radius or searching for entities in a specific geographical area.

Maps Integration: Advanced search should be integrated with mapping tools to display search results geographically on maps.

Technical Requirements

The DBMS should support transactions, which ensure that multiple operations on the database are executed as a single unit of work, maintaining data consistency. They also provide mechanisms for handling large datasets efficiently.

The DBMS should be designed to grow with work, it can accommodate increasing amounts of data and additional users or departments as the organization expands.

The deployment of the primary DBMS will be on Cloud-Based server under the management of SCM's IT dept.

Importing/Exporting

The Importing/Exporting feature will allow users to easily transfer data to and from the Database Management System (DBMS) in bulk. This capability is crucial for tasks like data migration, record-keeping, compliance, and ensuring compatibility with other systems. The aim is to enhance communication workflows by facilitating the seamless integration of external data into the system and enabling the extraction of conversation history or media for use outside the platform.

The data import process must be automated to handle cases where unique identifiers are not supplied in the uploaded data. In such instances, the system shall generate and assign the necessary IDs.

The data import/export process should have the following formats and file extensions:

CSV (Comma Separated Values): .csv - A very common format, simple and widely supported. Data is organized in rows and columns, with commas separating values.

XLS/XLSX (Microsoft Excel): .xls, .xlsx - For direct use in spreadsheets.

SQL (Structured Query Language): SQL (Structured Query Language) is a standard language used to manage and manipulate relational databases. It allows users to create, retrieve, update, and delete data efficiently.

And any other format required by the API like JSON and XML.

API

The API feature will enable real-time link of data from and to other database systems. This dynamic connection allows for continuous data synchronization, ensuring that the Database Management System (DBMS) always reflects the most up-to-date information from external sources and vice versa. This capability is vital for applications requiring immediate access to live data, such as collaborative workflows that depend on current information from various databases. By establishing real-time data links, the DBMS can provide a unified and current view of data across disparate systems, improving decision-making and operational efficiency.

This API specification outlines the secure, one-way communication interface for interacting with the Database Management System (DBMS). This API adheres to the principle of least privilege, ensuring that external systems only have access to the resources and functionalities necessary for their designated purpose. All communication will be encrypted and authenticated to protect sensitive data. The following sections provide a detailed description of the API:

Authentication and Authorization: (Bidders should describe the authentication method - e.g., API keys, OAuth 2.0, JWT - and authorization mechanisms used to control access to API endpoints. Include details on key management and rotation.)

Request/Response Formats: (Bidders should specify the data format used for requests and responses - e.g., JSON, XML. Provide detailed schemas for each API endpoint, including data types, validation rules, and required/optional fields. Specify how "real-time" updates are handled - e.g., WebSockets, Server-Sent Events, or polling at defined intervals.)

API Endpoints: (Bidders should list and describe each available API endpoint, including the HTTP method (POST, GET, PUT, DELETE), URL, request parameters, and response format. Clearly define the functionality of each endpoint, specifying which endpoints are for data retrieval and which are for data submission. Clearly differentiate between endpoints used for initial data synchronization vs. oSCMing updates.)

Error Handling: (Bidders should describe the error codes and messages returned by the API in case of invalid requests, data conflicts, or other issues. Explain how clients should handle errors, especially in the context of real-time updates.)

Rate Limiting: (Bidders should specify any rate limits imposed on the API to prevent abuse and ensure availability, and explain the consequences of exceeding rate limits, particularly related to the impact on real-time data synchronization.)

Security Considerations: (Bidders should detail any specific security measures implemented, such as input validation, data sanitization, and protection against common web vulnerabilities like cross-site scripting (XSS) and SQL injection. Address security concerns related to real-time communication channels.)

Versioning: (Bidders should specify the API version and the process for handling future API updates and deprecations.)

Logging and Auditing: (Bidders should describe how API requests and responses are logged and audited for security and monitoring purposes, including logs related to data synchronization events.)

Data Consistency and Conflict Resolution: (Bidders should describe the mechanisms in place to ensure data consistency across systems, especially during real-time updates. Outline the strategy for handling data conflicts that may arise from concurrent updates from different sources.)

Data Transformation and Mapping: (Bidders should detail how data is transformed and mapped between the DBMS and external systems to ensure compatibility. This should cover data type conversions and any necessary data enrichment or filtering.)

The API should be integrated with the following systems:

One way from the DBMS: Power BI, Odoo

One way to the DBMS and Two ways from/to the DBMS will be requested upon need.

Source Code

The source code should be shared to ensure full control over the DBMS. It must either be open-source or highly customizable to accommodate future development needs.

Cloud Storage

A method of storing data on remote servers accessed over the internet. offering remote accessibility and scalability for more data to come.

Block Storage

Used in data centers and cloud environments, block storage divides data into fixed-size blocks. It’s ideal for databases and transaction-heavy applications due to its high performance and reliability.

Performance

Latency: The time the DBMS takes to access data from storage, where it should provide faster data retrieval times.

I/O Operations Per Second (IOPS): A measure of how many read/write operations a storage device can handle per second. The DBMS should have high IOPS, which is critical for requiring frequent access to large volumes of data.

The system shall meet the following scalability requirements:

Data Volume: The system must be capable of handling 1 million+ records volume of data.

User Concurrency: The system must support at least 45 concurrent users.

Growth Rate: The system must be designed to scale and accommodate an annual growth rate of 50% at least in both data volume and user concurrency.

While maintaining the following measures:

Response Time: Maximum query response time of 2 seconds under normal load.
Uptime: 99.9% system availability.

The system's data model and reporting engine must support a hierarchical structure with a minimum depth of 4 levels. This includes the ability to store, retrieve, and display data at each of these levels.

Workflow System

Workflows are designed to automate and streamline complex processes, often involving multiple steps and participants, making it easier to track progress, improve efficiency, and ensure accountability. Workflows are essential for standardizing operations and ensuring that each step is completed in a timely manner.

Tasks and Steps

Each workflow consists of a series of tasks that must be completed in a specific order, where some tasks are dependent on the completion of previous tasks. Tasks can be manual (e.g., reviewing documents, making decisions) or automated (e.g., generating reports, sending notifications).

Roles and Responsibilities

Each task in a workflow is assigned to specific users or teams, ensuring that everyone knows what they are responsible for. Users can also be collaborators or approvers.

Approvers can accept adjustments to data.

Conditions and Rules

Workflows should include decision points where the process can branch off in different directions depending on specific conditions. For example, if a document is approved, it moves to the next stage; if rejected, it may return to a previous step for revisions.

Stages or Phases

Categorizing workflow tasks into stages is essential for work simplicity and where bottlenecks may be occurring. Example: Data Collecting → Data Cleansing → Case Filing → Trial Preparation → Trial → Post-Trial Motions → Case Closure

Notifications and Alerts

Users receive notifications or alerts when tasks are assigned to them, deadlines are approaching, or the entire workflow has been completed, helping keep the workflow on track.

Profile

A Profile in a Database Management System represents a centralized and personalized record for an individual, entity, or process, encompassing all essential information, related forms, documents, and interactions. Customizable profiles allow users to tailor the content to meet specific needs, integrate data from various sources, and maintain a comprehensive view of all activities and related assets.

Customization and Personalization

Each profile can be customized with personalized fields or forms' views in a grid-based canvas to focus on the information most relevant to them. A case profile can have specific location for documents, events timeline, case process workflow, and/or specific aggregations.

Relational Data View

Users can easily navigate between the profile and its related forms without the need to exit and search in separate areas of the system. For example, a case reaching a manual process of approving a document, the user should be able to interact with the approval and the document within the profile.

Access Control

Permissions and access settings should be applied to the profile sections, ensuring that only authorized personnel can view or edit specific protected and sensitive processes or information.

Internal Notes and Comments

users can leave internal notes within records, providing context or instructions for other team members, a profile should show up these notes while hovering the mouse over specific information.

Offline mode Mobile Application (not required but a plus)

Offline mode refers to the functionality of a DBMS that allows users to continue accessing features, performing tasks, and interacting with content (submitting) without requiring an active internet connection. Offline mode is designed to provide a seamless user experience when network connectivity is limited or unavailable, ensuring that essential tasks can still be completed.

The following features should work while there is no internet connection:

Local Data Storage

- In offline mode, data is stored locally on the device rather than being fetched from the internet or cloud in real-time. This local storage can be in the form of cached files, databases, or other types of local storage mechanisms.

- The DBMS must intelligently sync this locally stored data with the online database or cloud when the device reconnects to the internet, ensuring that no data is lost, and everything stays up to date.

Offline Capabilities

- **Content Viewing**: Users can view previously accessed content such as media files, and documents while offline.
- **Data Entry**: Offline mode allows users to input data and perform tasks, such as filling out forms, creating documents, or capturing images, which are stored locally until an internet connection is available for syncing.
- the app can upload a punch of records per click on “send or submit”.

App Security

- The app should be hidden and can be shown somehow such as dialing a code.
- The storage should be encrypted and cannot be viewed.

Notifications and Alerts

The goal is to implement an Alarm Feature in the DBMS that enables users to create custom alerts and notifications based on certain conditions. This feature aims to boost user productivity, facilitate timely follow-ups, and enhance communication efficiency by ensuring that important messages or events in conversations are not missed.

Data Collection

The process involves collecting, measuring, and analyzing information from different sources to gain insights or make informed decisions. This step is essential in research, analytics, and decision-making.

Forms

Fields Types

ID

AutoNumber

Yes/No

Text

Masked data (Password)

Phone

Email

Hyperlink

Email

Number

Range

Today

Date

Time

Currency

Radio

Checkbox

Dropdown List

Custom list (extensible lists, allowing users to add new values during data entry.)

File

Audio

image

Video

Location (Long, Lat, P-code)

Calculated field

Features

Constraints

These include rules like uniqueness, not null constraints, and check constraints to maintain the integrity and validity of the data.

Forms Classifying

Forms can be organized inside folders or containers.

Related fields

Fields that are interconnected or logically related within a DBMS play a crucial role in enhancing data organization, searchability, and the overall management of document workflows. By establishing dynamic relationships between fields, these DBMS facilitate more accurate categorization and tagging of documents, ensuring that information is systematically organized and easily accessible.

For example, when a specific option is chosen in one field, related fields automatically adjust to show only the relevant choices. A typical scenario involves location-based fields: if "Syria" is selected in the Country field, the subsequent Governorates field will only present Syrian governorates. Likewise, once a governorate is selected, the Region field will refine its options to display only the regions within that governorate.

Example:

- Country: Syria
- Governorates: Aleppo, Damascus, Homs (only Syrian governorates are shown)
- Region: Aleppo District, Douma (only regions related to the selected governorate are displayed)

This interconnected structure ensures that data entry is both accurate and efficient, improving user experience and maintaining data integrity within the DBMS.

Data Validation

Data validation is a crucial process used in various fields, including database management, programming, and data analysis, to ensure the accuracy, quality, and consistency of data. The primary goal of data validation is to verify that the data meets specific criteria and constraints before it is processed or utilized.

Key aspects of data validation include:

- Accuracy: Ensuring that the data is correct and represents real-world values accurately.
- Completeness: Verifying that all required data fields are filled, and no necessary information is missing.
- Consistency: Checking that the data does not have conflicting or contradictory information.

- Format: Confirming that the data conforms to the expected format, such as dates, phone numbers, or email addresses.
- Range: Ensuring that numerical data falls within a specified range or set of acceptable values.
- Uniqueness: Verifying that data values are unique where necessary, such as in primary key fields of a database.

Form Completion

A Form can be disaggregated into sub-forms where a user can fill in part of the form and another user can fill the rest.

Show if Field (show if-or)

The "Show if" or "Show if-or" functionality, allows certain fields or sections of a form to be displayed dynamically based on specific conditions. This feature enhances user interaction by showing only relevant fields when certain criteria are met, making the user interface cleaner and more intuitive.

Key Concepts of "Show if" or "Show if-or":

Conditional Display:

"Show if" rules are typically tied to a condition based on the values of other fields. For example, a field may appear only if the user selects a particular option from a dropdown menu or checks a box.

The condition could be simple (one criterion) or complex (multiple criteria combined with "OR" or "AND" logic).

"Show if" Logic:

This logic uses boolean expressions (true/false) to determine whether a field should be visible. The field will only appear if the condition evaluates to "true."

For example:

"Show this field if the user selects 'Yes' in a previous question."

"Show this section if the date is after a certain day."

"Show if-Or":

The "Show if-or" rule allows fields to be shown if any of multiple conditions are met (hence the use of "OR").

Implementation:

Platforms implementing "Show if" typically allow you to set these rules using simple scripting or logical conditions. The conditions are based on the data entered in other fields (e.g., dropdown choices, checkboxes, or text input).

Required fields

This functionality ensures that essential information is gathered and documented during the process of storing and managing documents. It requires users to complete specific mandatory fields before saving or submitting documents into the DBMS, which helps maintain consistency, accuracy, and completeness of records.

Key Aspects:

- **Ensures Data Completeness:** By designating certain fields as mandatory, it prevents documents from being saved without essential information.
- **Improved Searchability:** Consistently filling out key fields enhances the search capabilities within the DBMS, allowing users to quickly find documents using specific metadata.
- **Automation and Workflow Management:** Required fields can be integrated into automated workflows within the DBMS. If a mandatory field is left empty, the document cannot move to the next stage in the workflow, ensuring data integrity before actions such as approval, review, or sharing are taken.

Custom ID generation

This feature enables organizations to automatically assign unique, customized identifiers to forms within the DBMS. These identifiers are generally utilized for more efficient tracking, organizing, and referencing of documents.

Key Aspects of Custom ID Generation:

- **Uniqueness and Consistency:** Each record in the Document Management System (DBMS) is assigned a unique ID to prevent duplicates and facilitate easy tracking. Custom ID generation ensures that there is consistency throughout the system, which simplifies the management of large volumes of records.
- **Customization and Flexibility:** Organizations have the ability to tailor the structure of these IDs to meet their specific needs. This could involve incorporating prefixes, suffixes, or additional metadata such as project numbers, document types, or dates.
- **Automated and Scalable:** Custom IDs are generated automatically, minimizing the risk of human error during manual data entry. This feature is especially beneficial for scalability, as organizations handling thousands or even millions of documents can depend on the DBMS to effortlessly create and maintain unique IDs.

- **Improved Search and Retrieval:** Custom IDs significantly enhance the searchability of documents within the DBMS. Users can quickly find documents using the ID or parts of it, particularly if the ID contains meaningful elements like document type or date. This is especially advantageous in settings where large quantities of documents need to be accessed swiftly.

Global and Public Forms

- **Global Form:** Type of forms that is accessible for all the users despite its units or access on the DBMS, this will prevent data duplicate for the major type. such as “Person form, event form”.
- **Public form:** type of forms that can be shared with anyone via URL to be filled.

Library (ready to use Fields and choices)

the DBMS needs to have a dataset section for frequently asked questions in the form.

some questions have a lot of options and need to be used in multiple forms so it’s going to be hard to build the same question with its options in every form manually, such as “country, governorates”.

Metadata management

In a Database Management System (DBMS), metadata is crucial for understanding the structure and content of the database itself. It's often referred to as "data about data" and is typically stored in a data dictionary or system catalog. Each new form should have fixed metadata fields to monitor all the changes and modifying process that happened on the DBMS.

Here are some key examples of metadata you'd find in a DBMS:

Table Names: The names of exported tables can be added to the columns.

Data Types: The data type of each filed. This defines the kind of data that can be stored in each column, can be shown on the ERD, and form view and edit.

Table Relationships: How tables are related to each other (e.g., one-to-many, one-to-one). This can be defined in an interactive ERD and checked within reports.

Constraints: Rules that define what data can be stored in a table (e.g., primary keys, unique keys, not null constraints, check constraints). For instance, a primary key constraint ensures that each row in a table has a unique identifier.

Indexed Columns: Indexes speed up data retrieval, type of index can be (e.g., B-tree, hash).

Usernames: The names of all users who have access to the database, or made input, edit, or any relative action.

Creation and Modification Date: The date and time when the database, a table, or a value was created or modified.

Database Version: The version of the database software.

Scoring System

Choices and Fields can be given a certain score to be calculated.

Data Privacy

The data should have privacy on the records and columns levels. The AI should also have Zero data retention.

User Management (levels)

The DBMS will incorporate a robust user role management system with distinct levels: Super Admin, Admin, Collaborator, and Submitter. Each level will be assigned specific permissions and access controls, ensuring data security and maintaining the integrity of the system. This tiered approach allows for granular control over user interactions, enabling administrators to delegate tasks effectively and limit access to sensitive information based on individual roles and responsibilities. This feature enhances data security, improves operational efficiency, and facilitates collaboration within the organization. The roles are as follows:

Submitter

Most restricted role: Primarily responsible for data entry and submission. Limited to specific forms and fields for data input.

Collaborator

Data access: Can Input, view, edit, and collaborate on specific data within their assigned projects or teams.

Data analysis and reporting: Analyze data to identify trends and insights relevant to their projects. Generate reports and visualizations to communicate findings.

Data quality assurance: Review and validate data to ensure accuracy and completeness. Identify and resolve data quality issues.

Admin

The Admin role encompasses all capabilities of the Collaborator role, augmented by a broader set of administrative privileges.

Data access: Can access and manage all data within the organization forms and projects. Based on the permission given by the Super Admin.

Data management: Import, export, and manage data within the DBMS. Define data structures, schemas, and relationships.

Forms: Can generate and manage forms and assign units as required.

User management: view, edit, and delete user accounts. Assign and revoke permissions as needed.

Workflow management: Design and configure workflows to automate data processes and approvals. Monitor and manage workflow progress.

Data governance: Enforce data standards and policies. Ensure data security and privacy. Collaborate with other stakeholders to maintain data integrity.

In general, the Admin role possesses comprehensive authority over all data management functionalities pertaining to the organization's projects.

Super Admin

Highest level of authority: Possesses complete control over the entire DBMS.

Data access: Has unrestricted access to all data within the system.

User management: Has the authority to manage the accounts of all users, including other Administrators, reset their passwords, and control their administrative permissions. Can create new user levels as required, deactivate compromised accounts, or delete them.

System Management: Possesses the authority to configure and maintain the DBMS. This includes access to a dedicated monitoring page for assessing system performance, and the ability to allocate and monitor system resources such as storage (image maximum size) and bandwidths for processing reports and other system functionalities, and activities for security threats. Can schedule and execute system backups and access them to check their integrity and recover the system to a certain restore point.

Reporting and analytics: Generate reports and visualizations to gain insights from the data. Analyze system performance and usage patterns. Open sessions with accounts user names.

Users' groups (Units)

In a Database Management System (DBMS), User Units refer to the various organizational divisions, departments, or groups that individual users are part of. This concept aids in organizing users according to their roles, responsibilities, and the types of documents they handle. By categorizing users into units, DBMS can implement permissions, access controls, and workflows that cater to specific organizational requirements.

Key Aspects of User Units in DBMS

Role-Based Access Control (RBAC): User units allow the DBMS to assign permissions and access rights based on the unit a user is affiliated with.

Document Ownership and Accountability

In many organizations, specific user units are tasked with managing certain types of documents. This promotes accountability by clearly defining which unit is responsible for document creation, approval, modification, or archiving.

Segregation of Duties

User units help enforce segregation of duties, which is essential for ensuring compliance with regulatory standards.

Collaboration and Sharing

Although user units are typically separated by function, DBMS often support cross-unit collaboration on documents when necessary. Users from different units can work together on shared documents to achieve common goals.

Permissions

The Permissions pertain to the capability of controlling and managing user access to particular forms, fields, and the associated data. These permissions are essential for upholding data security, ensuring compliance, and permitting only authorized individuals to view, edit, or submit information according to their role within the organization.

Key Aspects:

Field-Level Permissions

- **View:** Certain users may have the ability to view specific fields, while others may not.
- **Edit:** Some users can edit or update specific fields, while others may only have viewing rights or no access at all.
- **Required/Optional:** Permissions can dictate whether certain fields are mandatory for specific users.
- **Hidden Fields:** Certain fields may be completely hidden from specific users.
- **Submit:** Certain fields may be completely blocked to some users, so they cannot fill it.
- **Approval/Review:** record-level validation process for all data submissions.

Form-Level Permissions

- **Access Control:** Permissions at the form level determine who can access and interact with a specific form.
- **Create:** Depending on their role, users may have the ability to create new forms.
- **Submit:** Some users are permitted to fill out and submit forms, while others may only have the ability to review or comment.
- **Approval/Review:** Certain roles, such as managers or admin, may have the authority to review and approve submissions.

Data Quality

Cleansing

Data Verification

Users should be able to create comparisons between certain columns and save the process for further use.

Layer of Approval

Higher-level users shall possess the authority to review and approve data entries submitted by other users. This approval process may be selectively applied to specific fields, such as those associated with critical documents.

Comments

Being able to comment and resolve them on Form and Filed levels.

Cleaning

- Remove Spaces: Trim leading/trailing spaces, remove extra spaces within text.
- Data Matching Accuracy: Field, Row, and Value Matching Percentage.
- Find and Replace: Search and replace specific text strings with other values.
- Handling missing values.
- Identifying and correcting inconsistencies.
- Case Conversion: Convert text to uppercase, lowercase, or proper case.
- Transforming data into a consistent format.

Data Maintenance

Redo History

In the world of Database Management System (DBMS), "Redo History" typically refers to a feature that enables users to revisit, undo, or modify their previous actions and interactions. This functionality is important for various reasons, such as correcting mistakes, managing errors, and enhancing communication efficiency. It can come as version control for tracking changes, and data history logs for auditing purposes.

data retention

Data storage policies must often comply with regulations such as GDPR, which dictate how long data must be retained and how it must be secured. These policies ensure that sensitive and critical data is stored securely and can be retrieved for audits or legal purposes when necessary.

Archiving

Archiving is the process of moving data that is no longer actively used to a separate storage location for long-term retention. It's like moving files from your active "Documents" folder to a less frequently accessed "Archive" folder. Here's a breakdown of what archiving entails:

Key Characteristics of Archiving

Long-term preservation: Archiving is primarily about keeping data available for future use, even if it's not needed regularly. This might be for legal or regulatory compliance, historical preservation, or knowledge management. Archived data is often kept for years, or even decades.

Freeing up primary storage: By moving less-used data to cheaper storage, you can free up space on your primary, high-performance storage systems for data that needs to be accessed quickly.

Cost reduction: Archival storage is typically less expensive than primary storage.

Data integrity: It's crucial that the archived data remains unchanged and accessible over time.

Hybrid archiving: A combination of on-premises and cloud archiving.

Data lifecycle management: Archiving is a key part of data lifecycle management, ensuring that data is systematically moved through stages from active use to long-term storage and eventual deletion. Proper lifecycle management helps organizations comply with regulations, optimize storage costs, and maintain data accessibility according to business needs.

Real-time data

Controlled access: Access to bulk update functionality shall be restricted based on user roles and permissions.

Data filtering: Users must be able to filter the data displayed in the spreadsheet-like interface before performing bulk updates, ensuring only the intended records are modified.

Data Transformation

Data Sorting

Data views must be highly customizable, allowing users to define multi-level sorting criteria. These custom sorting configurations can be saved as either default views (applied system-wide) or personal views (specific to the user who created them).

Data Aggregation and Summarization

Users should be able to aggregate data, calculate summary statistics (e.g., averages, sums, counts), truncate decimal values, and create derived variables for in-depth analysis.

Conditional Column: Create new columns based on conditions applied to existing data.

Text Extraction

Extract Substrings: Extract specific portions of text based on character position or patterns.

Extract Numbers: Extract numeric values from text strings.

Text to Columns

Advanced Splitting: Extend beyond simple delimiters to split by character count, regular expressions, or custom patterns.

Multiple Delimiters: Allow users to specify multiple delimiters for more complex text splitting scenarios.

Data Security

Data Redundancy

The system should employ a cloud-based backup solution for the whole system functionalities to ensure data protection and business continuity. This solution must provide offsite, redundant data storage. The system administrator must have full control over the backup process, including the ability to define backup frequency, initiate and manage recovery procedures, and monitor the security of the backed-up data.

Encryption

Encrypting data ensures that even if unauthorized individuals access the storage system, they cannot read the data without the encryption key. All data at rest and in transit must be encrypted using AES-256 encryption or an equivalent standard.

Access Control

Role-based access controls (RBAC) and permission settings ensure that only authorized users can access, modify, or delete stored data.

Data Masking

Sensitive data is obfuscated to prevent unauthorized access while still allowing some level of usability for non-sensitive portions. For example, Sensitive data like names should be masked while in viewing mode and can only be shown by certain users' levels.

Login Authorization

Secure user authentication is required. The system must be integrated with a security platform (e.g., Cloudflare) to enhance login security. Users must authenticate using a combination of username/password and 2FA. The admins will have the ability to reset passwords and reactivating accounts as required.

Secure Communication

All communication between the system and users, as well as between system components, must be secured using TLS 1.3 or a more recent secure protocol.

Audit Trails

The system must maintain comprehensive audit trails of all user activity, including data access, modifications, and system events. These audit trails must be securely stored and readily accessible for review. The Super admin should have the ability to focus on monitoring data leaks or export processes.

Vulnerability Management

The system must undergo regular vulnerability assessments and penetration testing to identify and address security weaknesses.

Incident Response

The system must have a documented incident response plan to address security breaches and data leaks.

Data Protection and Compliance

The system must comply with the General Data Protection Regulation (GDPR) and ISO 27001 standards for information security management.

All personal data must be processed in accordance with GDPR principles, including data minimization, purpose limitation, accuracy, storage limitation, integrity and confidentiality, and accountability.

The system must support data subject rights, including access, rectification, erasure, restriction of processing, and data portability.

The system must implement appropriate technical and organizational measures to ensure the security of personal data, considering the state of the art, the costs of implementation, and the nature, scope, context, and purposes of processing as well as the risk of varying likelihood and severity for the rights and freedoms of natural people.

Additional Considerations

Data Retention: Define specific data retention policies in compliance with GDPR and business requirements.

Data Breach Notification: The system must support timely notification of data breaches to affected individuals and supervisory authorities as required by GDPR.

Data Processing Agreements: If third-party processors are involved, ensure appropriate data processing agreements are in place to ensure compliance with GDPR.

The system should provide notifications and alert messages that can enforce security policies and measures.

Reporting

Collaboration Tools: Modern reporting tools often include collaboration features, enabling multiple users to view, comment, or edit reports in real-time, facilitating better decision-making and teamwork.

Types of Reports

Scheduled Reports

Reports that are automatically generated and delivered at predefined intervals, such as daily, weekly, or monthly. This automation ensures that key stakeholders regularly receive updated insights without needing to manually run the report each time.

Custom Reports

Reports tailored to specific needs or queries, allowing users to define their own parameters, filters, and data sets. Custom reports are useful for addressing unique requirements.

Trigger-Based Reporting

Reports can be generated based on specific triggers or events.

Goal Setting and Monitoring

Reports can be used to measure progress toward specific goals or objectives.

Parent-Child Relationship Reports

The report consolidates data from multiple forms or tables that are linked to a central entity, where all Related Information will be presented in one place with Drill-up or Down Capabilities, such as:

Tree or Hierarchical View: The report can use a visual tree structure to represent parent-child relationships. The main entity (e.g., person) appears at the top, with child and/or parent records branching out below and/or above.

Workflow Report

Sequential Progression: The report clearly shows detailed stage information like the current stage of a workflow and the order in which completed stages occur with access to their relative information, ensuring users understand the process flow and any dependencies between stages, and which upcoming stages or required actions remain. A timeline chart could be used to show a case history alongside key events.

Delay Indicators: If for example a case has exceeded a deadline, the report highlights these delays, offering details on why the stage is delayed and what actions are needed to move it forward.

Additional Reports

Report should be on a large scale and should have types of report such as:

Pivot tables

Merged and appended tables

Aggregated tables

duplicate report.

Visual Reporting Tools

Advanced reporting tools should include interactive data visualization capabilities that allow users to drill down into specific data points or filter information dynamically.

Charts & Graphs

bar charts, pie charts, line graphs, heat maps help users understand trends, patterns, and comparisons in their data, making complex information easier to digest.

Dashboards

Dashboards provide visual representations of key performance indicators (KPIs), metrics, and data points, making it easy for users to explore data and monitor performance immediately.

AI Features

AI features enhance the efficiency, accuracy, and intelligence of data management processes, enabling organizations to harness the full potential of their data in real-time.

Automated Data Entry and Processing

Intelligent Data Capture

AI uses machine learning and optical character recognition (OCR) to automate the process of capturing data from various sources like invoices, receipts, and emails. This reduces manual data entry errors and speeds up processing times.

Natural Language Processing (NLP)

AI-driven NLP can interpret and extract meaningful information from unstructured data, such as emails, reports, or voice inputs, converting it into structured formats (Narrative Reports).

AI-Powered Search can help interpret vague or incomplete search queries by suggesting likely matches or guiding the user toward relevant data.

Real-time Data Insights and Reporting

Dynamic Dashboards

AI continuously analyzes data streams in real-time, generating up-to-date insights and reports. This allows organizations to make data-driven decisions faster and with greater accuracy.

Automated Reporting

AI can automatically generate detailed reports based on predefined templates or custom parameters, reducing the time spent on manual report creation and analysis (Bulk reports).

AI-Powered Data Cleansing and Quality Assurance

Data Cleansing

AI algorithms can automatically detect and correct data inconsistencies, duplicates, or errors, improving the accuracy and reliability of the data.

Data Normalization

The system should support data normalization, data discretization, and data encoding, to prepare data for analysis and modeling.

Intelligent Search and Data Retrieval

Smart Search

AI-powered search features within DBMS enable users to find relevant data or documents quickly by understanding the context of the query rather than relying solely on keyword matches.

The AI should have the ability to interact with users and provide them with suitable answers and/or queries.

Contextual Data Retrieval

AI helps users retrieve related information based on their interactions or tasks, automatically suggesting relevant reports, documents, or contacts without requiring manual searches.

Challenges of using AI

Data Privacy and Security: AI systems must comply with data protection regulations and ensure that sensitive data is handled securely.

Implementation Costs: Integrating AI into existing DBMS can involve significant upfront costs, including hardware upgrades, software licensing, and employee training.

Complexity: AI features can be complex to implement and require skilled personnel to maintain and interpret AI-driven insights.

General Conditions and Requirements

General Information

Customer Name: The Syrian Center for Media and Freedom of Expression (SCM)

Project Name: Database Management System (DBMS).

Offer Requirements:

The desired Database Management System (DBMS) is structured into two main phases:

1. **Minimum Viable Product (MVP)**
2. **Additional Features and Requirements**

Offers should carefully read and meet the requirements for each phase as listed in the following tables:

Phase 1: Minimum Viable Product (MVP)

Title	Deliverables	Priority
WebApp	▪ UI/UX Prototype to check User-friendly interface ▪ Hidden from web search engines (e.g. Cloudflare) ▪ On-premises webapp ▪ System architecture	High
RDBMS	▪ Relational Tables with Primary & Foreign keys. ▪ columns attributes and data types. ▪ Relational schemas and ERDs. ▪ LTR & RTL text directions for Arabic and English.	High High Low High
User-friendly	▪ Customizable Home page for each user. ▪ Retrieving and searching for data can be done by AI with ease. ▪ Duplicate forms and fields. ▪ Drag and Drop of Fields, workflow processes, etc. ▪ Bulk editing field Permissions, access control, and updating data.	Low Medium Medium Medium High High

	▪ Default values, views, permissions, and any other action that can save time to do.	
Advance Search	▪ Multi-Criteria Search ▪ Boolean Operators (AND, OR, NOT) ▪ Range Search ▪ Wildcard Search ▪ Full-Text Search	High
Technical Requirements	▪ Import Capabilities of XLS, CSV, or SQL formats ▪ Back up Cloud storage ▪ Block storage for System ▪ Performance Response Time ▪ Performance system availability	High
Workflow	▪ Tasks and Steps ▪ Roles and Responsibilities ▪ Conditions and Rules ▪ Stages or Phases ▪ Notifications and Alerts	High
Profile	▪ Customization and Personalization ▪ Relational Data View ▪ Access Control ▪ Internal Notes and Comments	High
Data Collection	▪ All Fields Types except for Audio, Video, Calculated field ▪ Constraints ▪ Related fields ▪ Data Validation ▪ Form Completion	High

	▪ Show if Field (show if-or) ▪ Required fields ▪ Custom ID generation ▪ Global and Public Forms ▪ Metadata	
User Management	▪ Role-based access control (Submitter, Collaborator, Admin, Super Admin). ▪ Users' groups / user unit classification. ▪ Forms and Fields Permissions.	High
Permissions	▪ Field-Level Permissions (View, Submit, Edit, Required/Optional, Hidden Fields, Approval/Review) ▪ Form-Level Permissions (Access Control, Create, Submit, Approval/Review)	High
Data Quality Cleansing	▪ Data Verification ▪ Layer of Approval ▪ Comments	High High Low
Data Quality Cleaning	▪ Remove Spaces ▪ Find and Replace ▪ Handling missing values	Medium
Data Maintenance	▪ Redo History ▪ data retention ▪ Archiving ▪ Data Transformation (Data Sorting)	High
Data Security	▪ Data Redundancy ▪ Encryption ▪ Access Control ▪ Data Masking	High High High High High High High

	▪ Login Authorization ▪ Secure Communication ▪ Audit Trails ▪ Vulnerability Management ▪ Incident Response ▪ Data Protection and Compliance	Low Low High
Reporting	▪ Scheduled Reports ▪ Custom Reports ▪ Trigger-Based Reporting ▪ Parent-Child Relationship Reports ▪ Workflow Report ▪ Additional Reports	High High High High High Medium
Training	▪ Training course for admins ▪ DBMS user manual as PDF/Video guideline	High Medium
Testing	▪ Using specific database and hardware with a realistic workload	High

Phase 2: Additional Features and Requirements

Title	Deliverables	Priority
RDBMS	▪ SQL queries and interaction ▪ Interactive ERD	Medium Low
Advance Search	▪ Saved Searches & Templates ▪ Fuzzy Search ▪ Hierarchical Data Search ▪ Geospatial Search	High High High Low
Technical Requirements	▪ Export Capabilities of XLS, CSV, & SQL formats ▪ API with Odoo	High Medium Low

	▪ API with Power BI	
Offline-mode Mobile Application	▪ Secured and encrypted Local Data Storage ▪ Offline Capabilities ▪ App Security	Will be discussed
Data Collection	▪ Audio, Video, Calculated field Fields Types ▪ Forms Classifying ▪ Library (ready to use Fields and choices) ▪ Score system	High High High Low
User Management	▪ Creating customized roles as required	High
Data Quality Cleaning	▪ Data Matching Accuracy ▪ Identifying and correcting inconsistencies ▪ Case Conversion ▪ Transforming data into a consistent format	High
Data Maintenance	▪ Real-time data ▪ Data Transformation (Data Aggregation, Text Extraction, Text to Columns)	High
Reporting	▪ Goal Setting and Monitoring ▪ Charts & Graphs ▪ Dashboards	High
AI Integration	▪ Automated Data Entry and Processing ▪ Real-time Data Insights and Reporting ▪ AI-Powered Data Cleansing and Quality Assurance ▪ Intelligent Search and Data Retrieval ▪ Data Normalization	High High High High Low
Notifications and Alerts	▪ Email ▪ Mobile App	Medium

Training	▪ Training course for admins ▪ DBMS user manual as PDF/Video guideline	High Medium
Testing	▪ Using specific database and hardware with a realistic workload	High

The following documents are required and considered as part of the final set of deliverables and integral part of the contract closure phase:

- Workflow diagram
- Sample ERD

Offer Content:

The contractor is required to submit the following documents for the Database Management System (DBMS) tender:

3. **Technical Offer** – Should include:
    a. Overview of the contractor's experience in developing similar systems.
    b. Profiles of key technical staff involved in the project.
    c. References to similar projects successfully completed.
4. **Financial Offer** – Should include:
    a. Total project cost and detailed cost breakdown.
    b. Applicable taxes.
    c. Proposed payment and installment schedule.
5. **Work Plan** – Should outline:
    a. Timeline and estimated duration for each project phase.
    b. Prioritization of tasks based on the provided project roadmap.
    c. Key milestones and deliverables, allowing time for testing, feedback, and approval.

SCM will allocate sufficient time to test the developed features, provide feedback, and approve each milestone before proceeding to the next phase and releasing the corresponding payment.

Offer Submission:

Submission Deadline: All offers must be received by **[25 April 2025.]**. Late submissions will not be considered.

Submission Format: Proposals should be submitted via email to **[jobs@scm.ngo]**, with the subject line: **"DBMS Development Proposal – SCM"**.

Procurement Process:

- SCM will review and analyze the received proposals within one month of the submission deadline.
- Bidders may be contacted for clarifications or additional information.
- SCM reserves the right to negotiate aspects of the proposal before making a final decision.
- All bidders will be informed of the results, and the selected contractor will be invited for a contract negotiation meeting.

Payment Schedule

The SCM will pay for the provided services based on a deliverables basis. The following schedule will be the payment schedule for the winning bidder.

Phase 1: Contract Signature

Upon selecting the winning bidder, and negotiating the contract details, the SCM will pay 30% of the full contract amount upon the signature of the contract, to the bank account specified in the contract document.

Phase 2: Functional DBMS Deployment.

This phase encompasses the development of a fully "*functional DBMS"*, incorporating all required features as specified in the "*Minimum Viable Product (MVP)*" table above. Upon successful completion, testing, and written approval, 25% of the total contract value will be released.

Phase 3: System Enhancement and Completion

This phase encompasses the development of the "*enhanced features"*, incorporating all required features as specified in the "*Additional Features and Requirements*" table above. Upon successful completion, testing, and written approval, 20% of the total contract value will be released.

Phase 4: Contract Closure

Upon successful completion, testing, and written approval of the complete system, including all Phase 2 enhancements. The remaining 25% will be released.

Payment Terms

Net Days: The SCM will pay submitted invoices within 30 days.

Payment Method: Bank Transfer to the bank account of the contractor that is listed in the Contract.

Currency: the payment currency is Euro.

Taxes: the SCM is not responsible for any taxes related to this project and paid by the contractor. it is the responsibility of the contractor to provide a financial offer that clearly identifies incurred taxes if any.

Deductions and Penalties

Late Delivery Penalties: 3% percent of the project budget will be deducted for each week delayed beyond the agreed-upon date.

Performance Guarantees: 5-10% percent of the project budget will be deducted if the system fails to meet specified performance metrics.

Defect Penalties: 10% percent of the project budget will be deducted for unresolved critical defects discovered during testing.

Other Terms and Conditions

SCM's responsibilities

legacy system migration

The SCM team will provide the contractor with a detailed description of the current data architecture, and an analysis of potential challenges associated with migrating data from the existing system to the proposed system.

Evaluation Criteria for the DBMS

The testing process will be conducted in two phases. The first phase will be carried out by the providing company, which must have an app tester. The second phase will involve system testing by the SCM team. and after each test we will provide the contractor with feedback about the evaluation results based on the following criteria:

1. **Functionality & Feature s (25%)**
    - The system meets the specified requirements for both the Minimum Viable Product (MVP) and additional features.
    - Core functionalities operate as expected without major bugs or missing elements.
    - Ability to handle relational data, user roles, and access controls as required.
2. **Performance & Reliability (20%)**
    - The system runs smoothly with minimal downtime or crashes.
    - Response time and data processing speed are optimal under expected workload conditions.
    - Ability to handle concurrent users efficiently.
3. **User Experience & Usability (15%)**
    - The system is user-friendly and intuitive for non-technical users.
    - Navigation, design, and accessibility standards are met.

    - Training and documentation provided for easy onboarding.
4. **Security & Compliance (20%)**
    - System implements robust security measures (e.g., data encryption, access controls, authentication).
    - Compliance with relevant data protection regulations (e.g., GDPR if applicable).
    - Protection against unauthorized access, data leaks, and cyber threats.
5. **Scalability & Maintainability (10%)**
    - System can be easily upgraded and extended in the future.
    - Well-documented code and database structure for easy maintenance.
    - Support for integrations with other platforms/tools.
6. **Support & Training (10%)**
    - Availability of technical support during testing and after deployment.
    - Quality and clarity of training materials and user manuals.
    - Responsiveness to feedback and issue resolution.

Confidentiality

The selected service provider must ensure the confidentiality, integrity, and security of all data, information, and system components related to this project. Any data accessed, processed, or stored during the development and implementation of the Database Management System (DBMS) shall remain the exclusive property of SCM and must not be shared, disclosed, or used for any purpose outside the scope of this assignment without prior written consent. The service provider will be required to sign a **Non-Disclosure Agreement (NDA)** and implement strict data protection measures in compliance with relevant legal and regulatory frameworks. Breach of confidentiality may result in contract termination and potential legal action.

Intellectual Property

All intellectual property rights in the project deliverables, including but not limited to reports, data, software, and other materials, shall remain with the SCM. The contractor grants the SCM a non-exclusive, royalty-free license to use the deliverables for the purposes of this project. The contractor shall not use the deliverables for any other purpose without the prior written consent of the SCM except for the source-code used in the DBMS development process.

Warranty and Maintenance

Warranty

The contractor warrants that the Deliverables - e.g., software, system, report - will substantially conform to the specifications outlined in this TOR for a period of this project from the date of the contract acceptance. This warranty covers defects in design, functions, and features. The contractor will, at its sole discretion, repair or replace any defective deliverables during the warranty period. This warranty does not cover defects arising from: (a) misuse, negligence, or

accident; (b) unauthorized modification; (c) use outside of the specified operating environment; or (d) third-party software or hardware.

It is the responsibility of the contractor to highlight relevant costs if any in the financial offer.

Maintenance

The contractor will provide maintenance services for the deliverables for a period of 1 year following the warranty period. Maintenance services will include bug fixes, updates, technical support. If there is a need to access the host-system using RDP/SSH, a temporary access will be granted for maintenance and support operations upon request. Maintenance services beyond the initial 1 year will be subject to a separate maintenance agreement and associated fees.

More features can be requested to be added to the system and agreed upon in the future, where the terms will be discussed based on the requirements.

It is the responsibility of the contractor to highlight relevant costs if any in the financial offer.