



**Submission of Technical & Financial Proposal
for
Upgradation of
Utility Management Software for Electricity, Titas Gas &
Telecommunication Bill of DWASA**



Submitted To:

Senior System Analyst
MIS & Billing Department,
WASA WASA Bhaban (7th Floor) 98,
Kazi Nazrul Islam Avenue, Dhaka-1215.



Submitted By

Coder De Dhaka Ltd.
House No.45/A, Dilu Road, New Eskaton, Dhaka 1217.
Web: <http://coderdedhaka.com> ,
Email: coderdedhaka@gmail.com
Contact: +(88) 01516197588

Ref: CDDL/DWASA/UUMS/001

7th November, 2024

To,
Senior System Analyst
MIS & Billing Department
Dhaka WASA, WASA Bhaban (7th Floor)
98, Kazi Nazrul Islam Avenue, Dhaka-1215.

Subject: Upgradation of Utility Management Software for Electricity, Titas Gas & Telecommunication Bill of DWASA.

Dear Sir,

With reference to your Request for Submission of Technical & Financial proposal for Technical & Financial proposal for Upgradation of Utility Management Software for Electricity, Titas Gas & Telecommunication Bill of DWASA, Coder De Dhaka Limited. as your vendor Software development Company proposes this offer for your kind consideration and approval.

We, the undersigned, hereby submitting our proposal, which includes Technical & Financial Proposal for this Solution.

We hereby declare that,

- a) All the information and statement made in this Proposal are true and we accept that any misinterpretation or misrepresentation contained in this Proposal is subjected to be further clarification by us.
- b) Our Proposal is binding upon us and subject to any modifications resulting from the other related negotiations.

We look forward you as our valued customer and to succeeding together.

With best regards,

Ashraful Alam
Director (Software Development)
Coder De Dhaka Ltd.
Mobile: +8801516197588

TABLE OF CONTENTS

SL No.	Page No
1. IT Farm's Organization.....	04
2. Company Profile.....	04
3. Vision.....	04
4. Technical Expertise.....	05
5. Experience in Software Development	05
6. Background.....	10
7. Scope of Work.....	11
8. Scope for Software Maintenance.....	33
9. Supporting Process.....	35
10. Technologies to be used.....	44
11. Upgradation and Development time.....	44
12. Estimated Budget of Upgradation and Develelopment.....	45
13. Conclusion.....	46
14. Legal Documents	47

1. IT Firm's Organization Coder De Dhaka Ltd.

1.	Name of the Company:	"Coder De Dhaka Ltd." a software & ICT services company committed to excellence.
2.	Business:	Software & ICT Services Company for Software Design & Development, Installation and Maintenance Services.
3.	Experience in software development	Since 2016, the company has been developing software for the different Local Companies.
5.	Age of the company	Age on date:5 years (approx.)
6.	Address:	House no. 45/A, Dilu Road, New Eskaton, Bangla MotorDhaka - 1212, Bangladesh.
7.	Contact Details:	Phone: (+88) 01516197588)
8.	E-mails:	codereddhaka@gmail.com

Company Profile

Coder De Dhaka Ltd. is an information technology and consulting companies providing the complete systems solutions from conception to implementation, consulting, training, and maintenance. We provide Integrated Accounts Information System (AIS) solutions to small and large Institutions.

At Coder De Dhaka Ltd., we believe that the most sophisticated system is the one that's simple to use. We want our customers to take advantage of what we are good at, so we work closely with our customer base to create features and functions that are easy to implement.

We are proud of our personal commitment to all our clients to provide superior service and support at all times. Our consulting and training services help organizations to develop effective solutions aimed towards achieving organizational goals.

Vision

- As a pathfinder, always to remain a center of excellence in ICT services by recruiting the best talents available and adhering to an unwavering commitment to quality.
- To always remain agile and vibrant through advanced training and cutting-edge technology in order to meet the needs of our clients.
- To always be a leader & trustworthy as a team to our clients, employees and society in general.

Technical Expertise:

Our range of skills is diverse and it covers all the significant technologies that add value to every project. The skill matrix depicts the most popular of these technologies:

Platforms	Environment
Development Languages & Framework	Oracle Forms-12c, Oracle Reports-12c, Crystal Report11, APEX, SQL/PLUS, PHP (Zend, CodeIgniter, CakePHP, Drupal, Laravel, Vue js, React js, WordPress, Magento, OpenCart). Object Oriented Programming- JAVA, Visual Studio, ASP.Net, MVC4, C#, Android Studio, Jasper Reports
RDBMS	Oracle 12c, Oracle RAC, MySQL, MS-Access.
Application Server / Middle-ware	Oracle Web-Logic Server 12c, Apache Tomcat.
Groupware and Document Management	Microsoft SharePoint Services
Project Management Tools	Microsoft Project 10
Operating System	MS-Windows (Windows12, Windows 10, Vista, XP, NT, 2000, Windows Server 2003, 2008), Unix, Linux (Red Hat AS-4,4.5,5) 32/64 bit, MS-DOS, Solaris-10 Oracle Linux 7, 8
Tools	Designer 2000, SD-PRO, TOAD, VISIO
Test tools	Quickest Professional / Selenium IDE.
Data communication and networks	TCP/IP, Bluetooth, XML, mobile communication and network management, WIFI (802.11b), GPRS, GPS, RS232, USB.

Experience in Software Development

Over the journey of more than 5 years with technical & business achievements, Coder De Dhaka Ltd. has successfully delivered a number of large & complex solutions for some organizations and SMEs. Our services include in system analysis, design and development, installation, training, operations and maintenance.

Major Client List:

- **Dhaka Carriers (Pvt.) Ltd.**
- **S.A. Khan Corporation**
- **M/S. MUNNA TRANSPORT AGENCY**
- **Hyderabad Transport Agency**
- **DHAKA WASA**

- **Project-I: Dhaka Carriers (Pvt.) Ltd.:**

- Assignment Name: Implementation of Accounting and Transport Management Software for Dhaka Carriers (Pvt.) Ltd.		Approx. value of the contract (in BDT): BDT 17,98,000/=
Country: Bangladesh Location within the country: Gazipur, Bangladesh		Duration of assignments (months): 6 months
Name of client: Dhaka Carriers (Pvt.) Ltd. Address: Gazipur, Bangladesh		Total No. of Staff month of the assignment: 20-man months
Start Date: (Month/Year) Jan 2020	Completion Date: (Month/Year) July 2020	
Name of JV/associated consultants, if any: NA		No. of Staff-Months of key professional staff provided by JV/associated consultants: N/A
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed: Ashraful Alam Acted as the Team Leader for this particular project.		
Description of actual services provided by our staffs: Set the requirements of Integrated MIS and FIS system. 1. System Design & Development 2. Training 3. Implementation of the software.		

Firm's Name:	Coder De Dhaka Ltd.
--------------	---------------------

- **Project-2: S.A. Khan Corporation**

Assignment Name: Implementation of Accounting and Transport Management Software for S.A. Khan Corporation		Approx. value of the contract (in BDT): BDT 15,50,000/=
Country: Bangladesh Location within the country: Gazipur, Bangladesh		Duration of assignments (months): 6 months
Name of client: S.A. Khan Corporation Address: Gazipur, Bangladesh		Total No. of Staff month of the assignment: 15-man months
Start Date: (Month/Year) May 2017	Completion Date: (Month/Year) Nov 2017	
Name of JV/associated consultants, if any: NA		No. of Staff-Months of key professional staff provided by JV/associated consultants: N/A
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed: Saiful Alam Acted as the Team Leader for this particular project.		
Description of actual services provided by our staffs: Set the requirements of Integrated MIS and FIS system. 1. System Design & Development 2. Training 3. Implementation of the software.		

Firm's Name:	Coder De Dhaka Ltd.
--------------	---------------------

- **Project-3: M/S. MUNNA TRANSPORT AGENCY**

Assignment Name: Implementation of Accounting and Transport Management Software for Dhaka Carriers Pvt. Ltd.		Approx. value of the contract (in BDT): BDT 11,75,000/=
Country: Bangladesh Location within the country: Gazipur, Bangladesh		Duration of assignments (months): 6 months
- Name of client: M/S. MUNNA TRANSPORT AGENCY Address: Gazipur, Bangladesh		Total No. of Staff month of the assignment: 15-man months
Start Date: (Month/Year) Jan 2018	Completion Date: (Month/Year) Aug 2018	
Name of JV/associated consultants, if any: NA		No. of Staff-Months of key professional staff provided by JV/associated consultants: N/A
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed: Saiful Alam Acted as the Team Leader for this particular project.		
Description of actual services provided by our staffs: Set the requirements of Integrated MIS and FIS system. 1. System Design & Development 2. Training 3. Implementation of the software.		

Firm's Name:	Coder De Dhaka Ltd.
--------------	---------------------

- **Project-4: DHAKA WASA**

Assignment Name: Outsource Payment (OPay) Management Software for DHAKA WASA		Approx. value of the contract (in BDT): BDT 3,80,000/=
Country: Bangladesh Location within the country: Dhaka, Bangladesh		Duration of assignments (months): 4 months
- Name of client: DHAKA WASA Address: Dhaka, Bangladesh		Total No. of Staff month of the assignment: 5 -man months
Start Date: (Month/Year) Sep 2020	Completion Date: (Month/Year) Jan 2021	
Name of JV/associated consultants, if any: NA		No. of Staff-Months of key professional staff provided by JV/associated consultants: N/A
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed: Ashraful Alam Acted as the Team Leader for this particular project.		
Description of actual services provided by our staffs: Set the requirements of Integrated MIS and FIS system. 1. System Design & Development 2. Training 3. Implementation of the software.		

Firm's Name:	Coder De Dhaka Ltd.
--------------	---------------------

- **Project-5: DHAKA WASA**

Assignment Name: File Management Software for DHAKA WASA		Approx. value of the contract (in BDT): BDT 2,80,000/=
Country: Bangladesh Location within the country: Dhaka, Bangladesh		Duration of assignments (months): 4 months
- Name of client: DHAKA WASA Address: Dhaka, Bangladesh		Total No. of Staff month of the assignment: 5 -man months
Start Date: (Month/Year) Sep 2020	Completion Date: (Month/Year) Jan 2021	
Name of JV/associated consultants, if any: NA		No. of Staff-Months of key professional staff provided by JV/associated consultants: N/A
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed: Linkan Roy Acted as the Team Leader for this particular project.		
Description of actual services provided by our staffs: Set the requirements of Integrated MIS and FIS system. 1. System Design & Development 2. Training 3. Implementation of the software.		

Firm's Name:	Coder De Dhaka Ltd.
--------------	---------------------

- **Project-6: DHAKA WASA**

Assignment Name: Budget Management System Software for DHAKA WASA		Approx. value of the contract (in BDT): BDT 28,80,000/=
Country: Bangladesh Location within the country: Dhaka, Bangladesh		Duration of assignments (months): 4 months
- Name of client: DHAKA WASA Address: Dhaka, Bangladesh		Total No. of Staff month of the assignment: 10 -man months
Start Date: (Month/Year) Jan 2023	Completion Date: (Month/Year) April 2023	
Name of JV/associated consultants, if any: NA		No. of Staff-Months of key professional staff provided by JV/associated consultants: N/A
Name of Senior Staff (Project Director/Coordinator, Team Leader) involved and functions performed: Linkan Roy Acted as the Team Leader for this particular project.		
Description of actual services provided by our staffs: Set the requirements of Integrated MIS and FIS system. 1. System Design & Development 2. Training 3. Implementation of the software.		

Firm's Name:	Coder De Dhaka Ltd.
--------------	---------------------

2. Background

Every utility provider needs an organized system for collection and billing. Previously, DWASA performs these vital tasks in a paper ledger — but now, in the age of digital transformation, we all need more efficient ways to manage the operations. The term "utility bill" can be rephrased as the invoice for essential services such as electricity, water, gas, telephone bill or other necessary utilities. A software designed for billing purposes can be rephrased as a billing utility software. This type of software is commonly used by the property management companies, real estate developers and utility service providers to effectively manage and bill for utility consumption.

Previously built the “Utility Management Software (Electricity)” is a cutting-edge technological solution designed to streamline and enhance the normal electricity billing operations for the pump houses of DWASA. This software is a specialized software solution designed to streamline and automate the processes associated with the electricity billing. It includes features such as Electricity bill entry form, Entry bill forward with the forwarding lists, Bill upload form, Missing bill form, Total bill lists, cross-checking Bills, Meters add, Users management and data management, Report generation etc. These features enable efficient management of utility billing processes and records all the related previous documents which could help for collecting meter data to generating accurate invoices and facilitated the payment procedures. But there is no facility for arrear bill, Plants, Projects, Mother meters, Mosques, Empty quarters, Common meters, Garages, Security Posts, Lamp Posts, Ansar Camps etc electricity bills.

Moreover, the bill processing for Telecommunication modules such as BTCL phone, Mobile phone, PABX, FAX and the Gas Module are still managed in manual processes.

Scope of Work

Purpose of Upgradation of Utility Management Software for Electricity, Titas Gas & Telecommunication Bill of DWASA.

- User Requirement Assessment
- Internal Services of Software
- APIs Integrated with Leave software, HRMS Software and Quarter Management Software.
- Electricity modules
- Telecommunication and Gas modules
- Full software must be responsive
- Efficiently manage and automate the utility billing processes
- Track all Bill record (Arrear bill, Unregistered bills, Missing bills, Shut Down Bills etc.)
- Include All the Common meters, Mother meters, Mosque's meters; Security post, Lifting pump, Ansar camps and Garages meters as well as empty quarters bills
- Track and monitor electricity consumption patterns
- Detailed and analytics Reports
- Customer and all user activity Log
- Generate automated forwarding letter
- Easier admin access
- Late payments track
- Alert & Notifications
- Send automatic SMS, Email (if needed)
- Reduce the delay in processing time and bill generation
- User Friendly & flexibility
- Make the maintenance simpler than the present
- Centrally store the data in order to boost the consistency and decrease the data redundancy
- Single Sign On enabled login facilities
- Provide the user friendliness in all possible ways
- Eliminate manual calculations and paperwork

Upgradation of Utility Management Software for Electricity, Titas Gas & Telecommunication Bill of DWASA module & features are given below:

1. Telecommunication Bill and Gas Bill.
2. Electricity modules.
3. Telecommunication and Gas modules.
4. Report Module.
5. User Setup
6. Units/ Branch Setup
7. Administration Setup
8. Work Details Setup
9. Notice Board
10. Dashboard
11. Billing Statement
12. Bill Follow up
13. Notice Board
14. Dashboard

15. Live Work Status Update
16. Multi-level Bill Create
17. Download select information into Pdf Excel

Described the Module FOR ELECTRICITY

Create a complete and effective solution for handling electricity billing of the MODS Zones, Plants, Projects, Mother meters, Mosques, Empty quarters, Common meters, Garages, Security Posts, Lamp Posts, Ansar Camps etc. By enabling precise and quick access to the electricity data, this Module promises to improve billing system by streamlining the workflow of Account sections' personnel, FM Division, CM Division and MODS Zones.

The Electricity Module main objectives are:

- To more efficiently manage and automate the utility billing processes.
- To provide and track all the record for the Arrear bill, Unregistered bills, Missing bills, Shut Down Bills etc.
- To include All the Common meters, Mother meters, Mosque's meters; Security post, Lifting pump, Ansar camps and Garages meters as well as empty quarters bills into the newly built software.
- Helped DWASA authority to track and monitor electricity consumption patterns, allowing them to better understand and manage their resources.
- New Electric billing software provides detailed reports and analytics, enabling DWASA to analyze consumption patterns and make decisions regarding energy management.
- To generate automated letter forwarding if needed.
- Track late payments and alert delinquent customers.
- To reduce the delay in processing time and bill generation.
- Need options for Normal Bill, Empty Quarters bill, Arrear bill, Unregistered bills, Shut Down Bills, Missing Bills etc.
- **Separate** 'Billing Menu', 'Meters Menu', 'User menu', 'Report Menu', 'Friendly User manual', 'Previous data' and 'Settings Menu' etc. are needed in an organized manner.
- The problem of **data loading and slowing issues need to be solved.**
- The problem needs to be solved for downloading the information of the page which is having more data.
- Detail address entry /Information is needed for mods zones and utility providers. Like which area, mods zone is in which utility providers.
- Total manpower information needs to be integrated according to zonal office. Like – In a particular zone, how many manpower are involved in bill processing and their detailed profile information must be in the software in an organized manner.

For Telecommunication Bill and Gas Bill

This module promises to improve billing processes by streamlining the workflow of corresponding personnel and the users by enabling precise and quick access to the Telecommunication and Gas Bill data.

Another objective of this module is, to develop a user-friendly module which automates the Telecommunication and Gas Billing system. All the key business processes have been done into one platform for Telecommunication and Gas Bill payment related data. The main objectives of this module are:

- To digitized the existing manual processes.
- Designed to streamline and simplify the process of utility billing for Telephone/Mobile/PABX/Fax/Internet/Gas bill consumption.
- To optimize the billing processes by providing a comprehensive and user-friendly

- The module provides and track all the records for the Official and Residential's Telephone bill, PABX bills, Mobile bills, Fax Bill, BTCL Broadband Internet bill, Other Internet Bills and Titas Gas Bill etc.
- Include All the Residential BTCL Numbers, Stano Phone Numbers, Direct land phone Numbers, Mobile numbers related information, PABX Numbers related information, Fax numbers related information; Broadband lines' (BTCL Numbers and other Internet billing related) information; WASA Bhaban and Plants wise Gas bill related information, empty quarters Gas bill related information etc. must be into the newly built software.
- Helped DWASA authority to track and monitor all the Telecommunication and Gas Bill consumption patterns, allowing them to better understand and manage their resources.
- This software provides detailed reports and analytics, enabling DWASA to analyze consumption patterns and make decisions regarding Telecommunication and Gas bill management.
- To lessen the staff's workload.
- To reduce the delay in processing time and bill generation.
 - Need options for BTCL Telephone numbers, Mobile Numbers, PABX Numbers, FAX, Internet etc. for telecommunication module.
 - can be searched based on name, designation, departments.
 - needs a telephone directory/ telephone diary.
 - Need options for Normal Gas Bill (for plants, WASA Bhaban, canteen), Empty Quarters Gas Bill, Arrear Gas Bill.
 - Separate 'Billing Menu', 'User menu', 'Report Menu', 'Friendly User manual', 'Previous data' and 'Settings Menu' etc. are needed in an organized manner.

□ Flow Chart:

Here is included the flow chart for newly upgraded **Electricity modules** which may change based on future requirements or the better service:

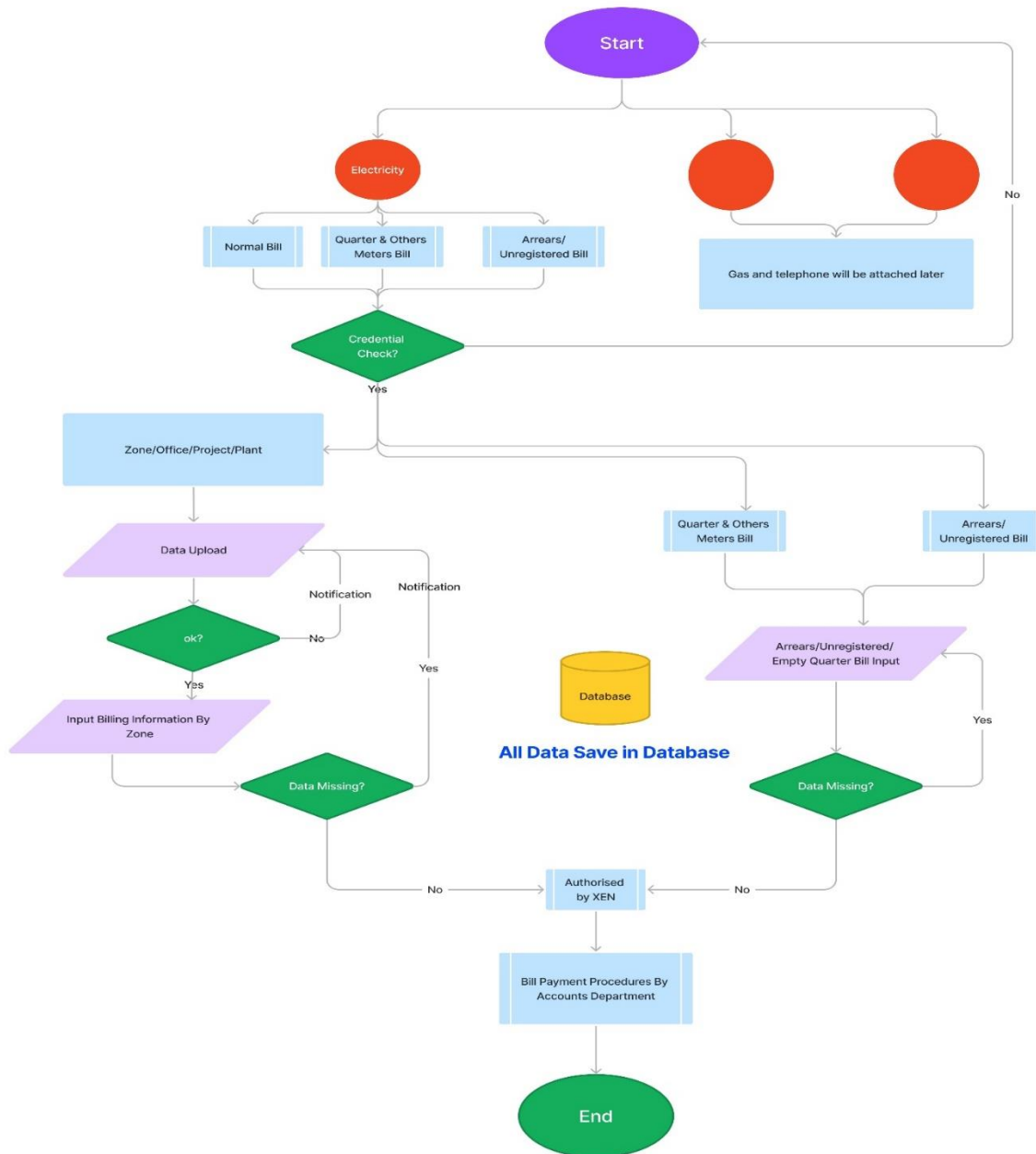


Fig: Flow Chart of Upgradation of Utility Management Software (Electricity) of Dhaka WASA

- Here is included the flow chart for newly upgraded **Telecommunication Billing modules** which may change based on future requirements or the better service:

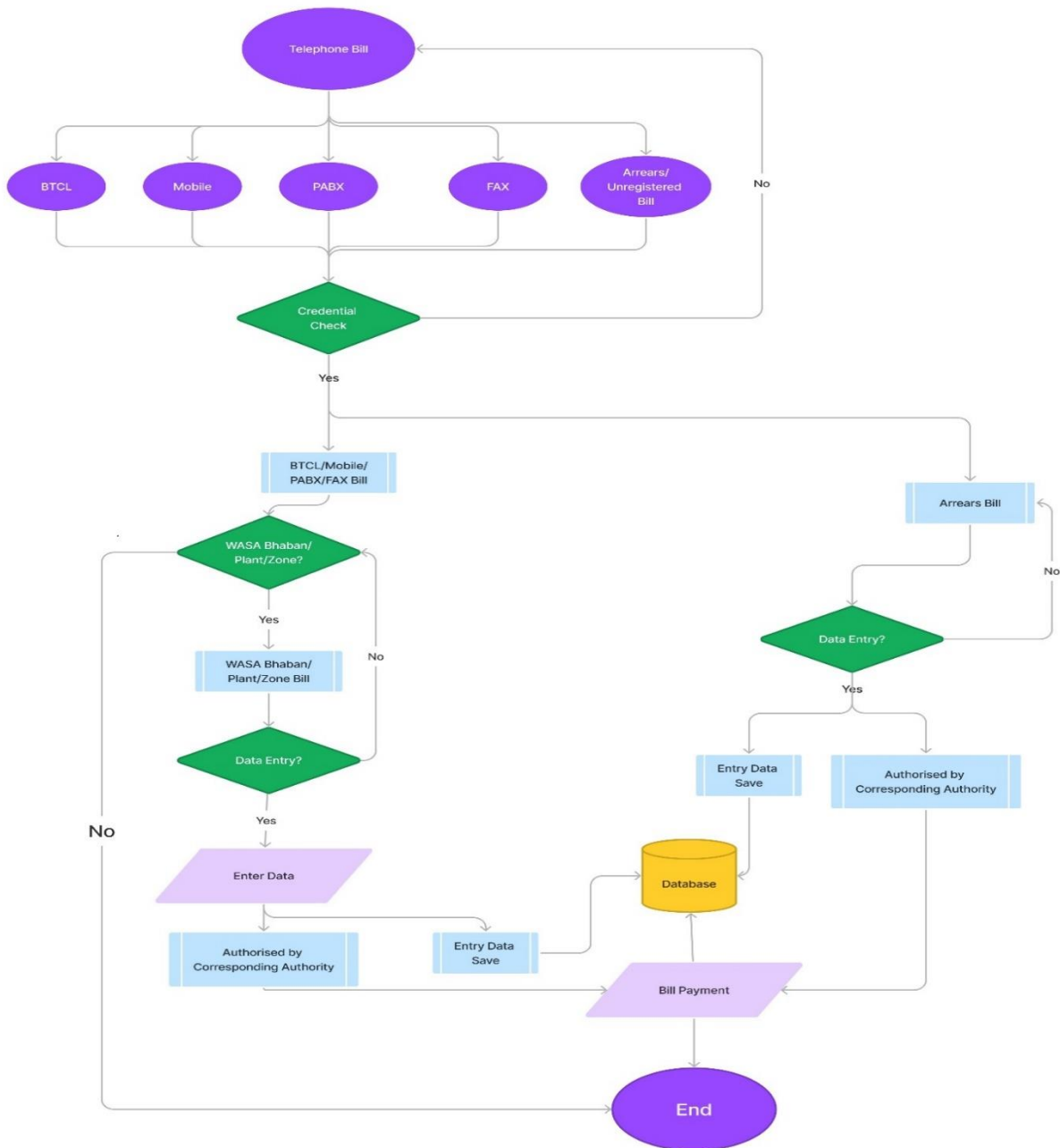


Fig: Flow Chart of Upgradation of Utility Management Software for Telecommunication Bill Module.

- Here is included the flow chart for newly upgraded **Gas Billing modules** which may change based on future requirements or the better service:

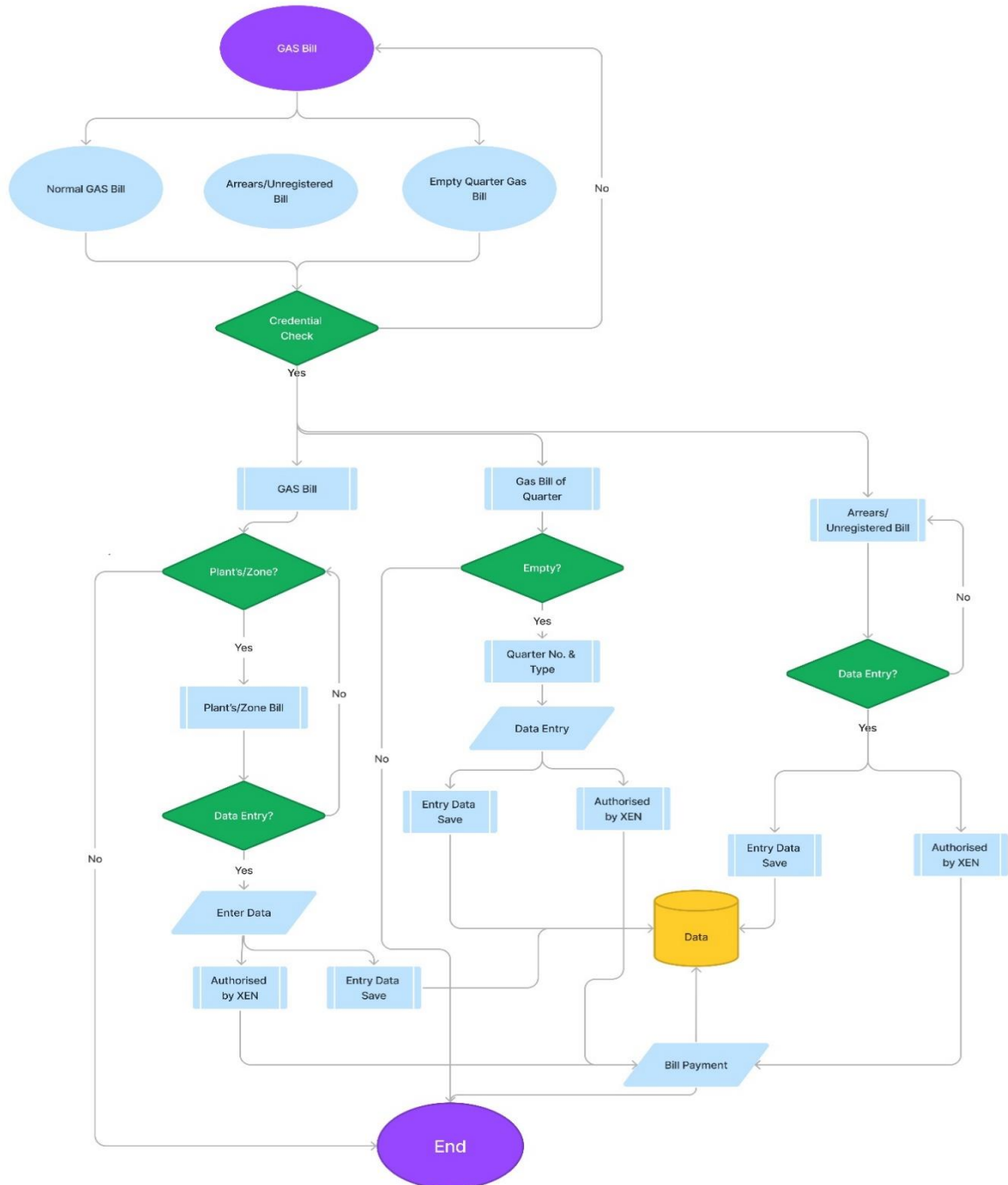


Fig: Flow Chart of Upgradation of Utility Management Software for Titas Gas Bill Module.

○ **Dashboard:**

Dashboard is to be designed in a manner that will show the project's continuous and overall picture more clearly. At the same time, the information of dashboard will ensure transparency and accountability. The software requires an informative dashboard which includes the yearly slogan of our respected Govt. according to water day and electricity purposes. The emergency messages place would be replaced. Slider images can be added for beautification and emergency message showing purposes.

○ **Meter Module:**

- In case of meters add, it must be shown in green color. The whole row will be shown into green color when adding a new meter into the system in that corresponding month.
- Needs Meter adding option which is specific for Mods zones. That is, if any new meter is added into physical location of any MODS Zones, then those meters information must be inserted by MODS Zones.
- Needs new meters summary and report option.
- Needs meter verification procedures and options from the MODS zones offices.
- When new meters are added to the system, then written word “new” will be blinked into those corresponding rows.
- The meters search option needs to be more user friendly.
- The new meters are shown the upper. Meters must be sorted according to the time frame (months, date, year wise).
- When the meter is added, only then the meters could be shown from that specific month. *It must not be shown before that adding time intervals.*
- There needs to be a system of checking whether the meter number and month are being duplicated or not, at the time of uploading the bill related information or the excel files.
- If there are any duplicate meters, those rows will be displayed in red color and blinking and show warning messages.
- *In case of inactive meters, if the bill comes to those meters, when uploading the billing files, the warning will be shown and would be marked in different color from the normal meters and that information can be notified to the authority.*
- How many meters added into per month can be searched based on mods zone wise and quarter wise.
- Who updates the meter information and when, that information is needed.
- The corresponding information of the user, who add the meters and when, will need to be shown in the chart of admin panel.
- All the common meters, mother meters, Mosque's meter; Security post, lifting pump, Ansar camps, Garages meters and empty flat's meters option and all the information must be added.
- Previous All the meters related information must be entered into the newly upgraded software.

○ **Billing Module**

- **Regular Bill:**
 - From the billing page, Off-peak reading, peak reading, flat reading, OMF value, tariff value, demand charge, permissible load, utilized load, KVR meter, transformer loss, transformer rent, meter rent and PFC charge will be Dynamically added and calculated.
 - By doing so, any mistake in the electric bill calculation can be checked easily.
 - If the unit is given, the result will be calculated along with the tariff rate. That is Auto calculation could be done.
 - Tariff rate can be modified based on govt. rate changing manner, time to time.
 - Data from the scanned document, can be easily read and calculated.
- **Arrear Bill:**
 - Arrear bill (any previous bill)/Due Bill option must be added. Through this, the due electricity bills can be paid and have a track record.
 - In Arrear bill/Due Bill, there must be an option for automated letter forwarding.
 - When this type of file entry occurs into the system, those rows must be shown into the different color.
 - For the Arrear bill sub menu– type, months, year, MODS Zone name, Area, Utility providers, Amount, Adjustment months etc. options must be there.
 - Arrear Bills for the empty quarters, shut down meters, miscellaneous bills etc. options with the corresponding menus are needed.
- **Unregistered Bill:**
 - Through this option, the dues of unregistered electricity bills would be paid whenever this type of situation arise.
 - There must be an option for automated letter forwarding
 - When this type of file entry occurs into the system, those rows must be shown into the different color.
 - For the Unregistered bill sub menu - months, year, Zone name, Area, Utility providers, Amount, Adjustment months etc. options must be there.
- **Empty Quarter Bills:**
 - Through this, the dues of empty Quarters electricity Bills would be paid whenever this type of situations will take place. The information can be retrieved from the Quarter management software.
 - Automated letter forwarding option is needed.
 - For the Empty quarters Arrear bill - There must be the quarter type, name, number, months, year, mods zone, area, bill amount etc.
- **Other Bills:**

Need proper options with sub menus for the bill checking and keeping tracks of All the *Common meters, Mother meters, Mosque's meters; Security post's meters; Lifting pump's meters; Ansar camp's meters; Garage's meters, Shut Down meters Bill, Miscellaneous bill* etc. bills options and corresponding sub-menus must be there into the newly built software.
- **Notification:**

If the bill file/ PDF files will not upload in designated time, actions could be taken. Warning, reminder will be sent to them when it is **3 days**, they have held the bills and not forwarded to the corresponding upper level. This job can be done using software notification, SMS and email notification.

- **Time Tracking Chart:**

The bill is going to whom and which time, for how long they keep those, that time schedule / time frame could be tracked by monitoring the bill movement time using a chart or list.

- **Plant option:**

- Add all the names of the new plants (Dasher Kandi, Shanti Bottled Plant etc.).
- Those names must be into the alphabetical order.
- Needs dynamic adding, modifying options as well.

- **Project Option:**

- Add all the names of the new projects.
- Those names are must be into the alphabetical order.
- Needs dynamic adding, modifying options as well.
- Proper filtering should be done in the software to avoid duplication.
- Billing files add, modify, delete options are mandatory in Super admin part.
- Needs bill cross checking option.
- *In case of new meters bill, for the first month payment purposes, those corresponding bills will be shown in a different color. This color must be different from the existing bills.*
- *When these new bills will be paid, then after one month, these new meters color will be changed to the existing meters color.*
- If there are any new bills come into MODS zones and then if zonal office will add those into the system, then those bills need to be shown into different color from the normal bill's color.
- Need automatic bill reconciliation and related report. (This is accounts departments specific requirement).
- Bill uploading option needs to be mandatory.
- If not uploading from any zones, they must be notified through sms, email and software notification.
- Only those bills will be paid which files are uploaded, others will not be paid, this type of option and warning messages regarding this are needed.
- Needs "Check mark" for paid and unpaid billing portion.
- How many bills have been paid and how much is left can be checked through payment checking option.
- If there is any bill due for any month, those can be checked; and how much amount is in the due bills and in which zone it is taken place, can easily be found out.
- "Bill Remove" options' activation is needed.
- In entry bill forwarding option, Division option is needed.
- When the bill amounts' differences would show/arise, then the corresponding authority can take the reports based on particular months.
- When one is uploaded the excel file, proper filtering should be done in the software to avoid duplication.
- Needs Bill surcharge related option.
- Shut Down Bill related facilities are needed.
- All the previous billing related information must be entered into the newly upgraded software.

○ **User Module:**

- User log is needed.
- **Profile:**
 - Separate user profile
 - profile editing option.
 - password resetting option
 - Zone wise Separate profile information page is needed.
- Information retrieval:
 - When any new users join/Transferred/Left the job in DWASA, then that information will be retrieved from the PMIS/HR software to the admin panel and admins get notification. This work can be done using HRMS database and API management.
- In the software, who are newly added there, the lists can be shown in a time-based sorting manner.
- The list of new/old/ transferred/inactive users can be searched. Need Options to search these.
- Super admin can generate reports on when and who is being added/ transferred/ removed. Keep these options according to date and time wise sorted manner.
- *User remove and update information options are needed.*
- When adding the user, there includes 2 more options for notification sending purposes. Those are “Phone number” and “Email Id” fields.
- Who changes the user information and when, that detailing log is needed.
- All the previous information of users must be entered into the newly upgraded software.

- **Role base Login:**

The roles can update their own personal profile information and can reset their login credential. These types of user roles must be clearly included into the software.

- XEN
- SDE
- AE
- SAE
- Bill Preparer
- Bill Uploader
- Accounts Assistant
- Accountant
- Accounts Officer
- DCAO
- CAO
- Super Admin

• **Super Admin Role:**

- Super Admin can create new role more smoothly.
- can set the priorities to another user.
- They can authorize whether the other users to have limited or partial or the full access into the software.
- They can add/modify/inactive/search as well as can correct all the information.
- can back up the database.
- can see the user id and corresponding password database table.
- They can generate monthly, yearly, MODS zones, projects and plants wise and other reports, data archiving, data backup etc.
- They can add and modify the new Plants, Projects name.

- Full Database access and authorization must be included to the admin panel.
 - Needs more user friendliness to operate the software.
 - Needs front-end data manipulation and updating facilities to operate the software.
 - All the operation needs to be operated from front end part.
 - **SMS Portal maintaining.**
 - **Basically, they should have more power towards all sorts of authorization to operate this software.**
- **Report module:**
- This module is dedicated to generate various reports. It can generate different report according to the user's request. Users will able to generate reports, formats are given as annexure but not limited to:
- Year Wise
 - Financial Year Wise
 - Month Wise
 - Date range Wise
 - MODS zone wise and areas name wise
 - Plants/Projects name wise
 - Meter no wise
 - Accounts no. wise
 - Paid/Unpaid bill wise
 - Inactive/Active Meter wise
 - New Meter wise
 - New user / Updated user wise
 - Upload/Unloaded bills according to MODS zone wise
 - Shut down meter wise
 - Old to new meter wise
 - Missing Bill wise
 - Unregistered bill wise
 - Arrear Bill wise
 - Shut Down meters wise
 - Pump house's Meter No wise (Zone wise/Area wise)
 - Mosques Meter Wise (Zone wise/Area wise)
 - Lamp Post Meters Wise (Zone wise/Area wise)
 - Ansar Camp Meters Wise (Zone wise/Area wise)
 - Mother Meter Wise (Zone wise/Area wise)
 - Garage Meter Wise (Zone wise/Area wise)
 - Empty quarters bill (Zone wise/Area wise)
 - Common meters Bill (Zone wise/Area wise)
 - Forwarded/ Not Forwarded bill wise
 - Utility providers wise
 - Checked/Not checked Bill wise
 - Hard copy entry/not entry wise
 - Automatic reconciliation reports wise

This module can be modified and updated based on future requirements of the clients and users. Customized reports facilities are needed. Previous all the reporting related information must be entered into the newly upgraded software.

- **Searching Criteria:**

Search option needs to be more user-friendly and dynamic. Searching options can be modified and updated based on future requirements of the clients and users.

Below requirements must be fulfilled but not limited to:

- All the entry screens must have several data filtering criteria based on the specific requirements.
- In every search page result, corresponding page header must be included.
- After selecting the utility providers name in the search/select option, only that particular utility providers' branches must be shown in automatically.
- Those branches names must be shown into the alphabetical order.
- Can be searched the new users and new meters list.
- Automated calendar includes into search box's date and year fields.
- Previous all searching related information must be entered into the newly upgraded software.

- **Friendly User manual Module:**

This module is specific to the all kind of users. This module should consist of but not limited to:

- Presentation slide.
- docs file.
- PDF file.
- Video tutorials.

□ Telecommunication :

This newly built software must include the below modules for Telecommunication Billing:

- **Dashboard**

Dashboard is to be designed in a manner that will show the project's continuous and overall picture more clearly. At the same time, the information of dashboard will ensure transparency and accountability. The software requires an informative and responsive dashboard. The emergency messages need to be shown here as well.

- **Telephone Module:**

- In case of **new Telephone no.**, approved scanned copy regarding BTCL No. needs to upload. For that job, scanned copy adds, modify, view, inactive, delete Options are needed.
- BTCL No. add, modify, delete, view options are mandatory based on Departments/Plant/WASA Bhaban/MODS zone.
- The search option needs to be user friendly and user specific. Search is based on name, designation, department, mods zone, plant, project etc.
- **There is No Ceiling for BTCL phone bill. and no surcharge is here.**
- In some special case, a few BTCL ceiling is approved for some specific Officers. Needs their detail information in software entry such as name, designation, ceilings amount, approved ceilings' time period and the copy of approval. Need the total information regarding this matter.
- **Types of BTCL No used in DWASA are mainly 2 types:**
 - Resident
 - Office Use Purposes.

- Official using BTCL No categorized as:
 - ✓ STANO and
 - ✓ Direct Land phone.
- BTCL no is approved against the specific Officers level.
- Needs information of BTCL no. approval Date.
- Who use BTCL Phone no for both the Resident and Office, need those information entry.
- All the previous information of users and BTCL No must be entered into the newly upgraded software.
- How many bills have been paid and how much is left can be checked.
- If there is any bill due for any month, those can be checked; and how much the amount is in the due bills and in which MODS zone/Plants it is taken place can easily be found out.
- Check mark for paid portion.
- Cross(X) for the unpaid bills.
- red mark/ unpaid message blinking option.
- Bill Cross checking mechanism is needed.
- **needs Arrear Bill option** as well. For that job, arrear bill occurred into which offices numbers, mods zone name, officer name/rank/id and when, those detailed information and bill amount, bill coming month from BTCL, adjustment month of DWASA, paying month, paying amount information etc. are needed.
- Corresponding Divisions paid the BTCL Bill from their own budget. After payment, that payment related documents must be uploaded into this software. Regarding this type of software notification. So, bill payment related files need to upload, modify, delete options are needed.
- How much BTCL bill is consumed by Whom, in which office, in which mods zones in every month, that information is needed.
- **The newly added BTCL Telephone no. related all the information are shown to the upper.**
- BTCL Telephone no. must be sorted according to the adding time frame.
- When the Telephone no. is added, only then the Telephone no. must be shown from that specific month. It will not be shown before that adding time intervals.
- There will be a system of checking whether the Telephone numbers are being duplicated or not.
- If there are any duplicate Telephone no., those rows will be displayed in red color and highlighted.
- Proper filtering should be done in the software to avoid duplication.
- **Mobile Module:**
 - In case of ceiling of new Mobile numbers - approved scanned copies regarding the ceilings file are needed to upload. For that job, scanned copy adds, modify, view, delete Options are needed.
 - Mobile No. add, modify, delete, inactive, view options are mandatory based on Departments/Plant/WASA Bhaban/MODS zone.
 - The search option needs to be user friendly. Search is based on name, designation, department, approved ceiling etc.
 - Mobile no. ceiling is approved against the specific Officers.

- Needs information of Mobile no. ceiling approval Date.
 - Whether the ceiling is increasing or as same as the earlier, need those checking information. If increasing, then those changing ceiling information against whom that information is needed.
 - The newly added Mobile numbers related all the information are shown to the upper.
 - Mobile numbers must be sorted according to the time frame as well.
 - When the Mobile numbers is added, only then the Mobile numbers must be shown from that specific month. It will not be shown before that adding time intervals.
 - There will be a system of checking whether the Mobile numbers are being duplicated or not.
 - If there are any duplicate Mobile numbers., those rows will be displayed in red color and highlighted.
 - All the previous information of users, ceiling and Mobile No must be entered into the newly upgraded software.
- **PABX Module:**
- PABX no. linked up with Seven (07) BTCL Numbers in DWASA.
 - In case of new PABX no., approved scanned copy regarding PABX no. needs to upload. For that job, scanned approval copy adds, modify, view, delete Options are needed.
 - PABX No. add, modify, delete, view options are mandatory based on Departments/Plant/WASA Bhaban/MODS zone.
 - The search option needs to be user friendly. Search is based on name, designation, department etc.
 - All the previous information of users who used PABX No., must be entered into the newly upgraded software.
 - After payment, that payment related documents must be uploaded into this software. So, we need bill payment related files upload, modify, delete options are needed. If not uploaded, then software, mail and SMS notification are needed to be sent to the corresponding personnel.
 - Needs information of PABX no. approval Date.
 - The newly added PABX no. related all the information are shown to the upper.
 - PABX no. must be sorted according to the time frame as well.
 - **When the PABX no. is added, only then from that time the PABX no. is shown from that specific month. It will not be shown before that adding time intervals.**
 - There will be a system of checking whether the PABX related information are being duplicated or not.
 - If there are any duplication, those rows will be displayed in red color and highlighted.
 - How many bills have been paid and how much is left can be checked.
 - If there is any bill due for any month, those can be checked; and how much the amount is in the due bills and in which MODS zone/Plants it is taken place can easily be found out.
 - Check mark for paid portion. Cross (X) for the unpaid bills.
 - red mark/ unpaid message blinking option.
 - Bill Cross checking, Auto calculation etc. mechanisms are needed.
- **FAX Module:**
- Fax no. is applicable for division wise.
 - In case of new Fax no., approved scanned copy regarding Fax no. needs to upload. For that job, scanned copy adds, modify, view, delete Options are needed.
 - Fax no. add, modify, delete, inactive, view options are mandatory based on Departments/Plant/WASA Bhaban/MODS zone.

- The search option needs to be user friendly. Search is based on name, designation, department etc.
 - All the previous information of users who used Fax No., must be entered into the newly upgraded software.
 - Corresponding Departments/Divisions paid the Fax Bill from their own budget. After payment, that payment related documents must be uploaded into this software. So, we need bill payment related files upload, modify, delete options are needed.
 - Needs information of Fax no. approval Date.
 - The newly added Fax no. related all the information are shown to the upper.
 - Fax no. must be sorted according to the time frame as well.
 - When the Fax no. is added, only then from that time the Fax no. is shown from that specific month. It will not be shown before that adding time intervals.
 - There will be a system of checking whether the Fax related information is being duplicated or not.
 - If there are any duplication, those rows will be displayed in red color and highlighted.
 - How many bills have been paid and how much is left can be checked.
 - If there is any bill due for any month, those can be checked; and how much the amount is in the due bills and in which MODS zone/Plants it is taken place can easily be found out.
 - Check mark for paid portion. Cross(X) for the unpaid bills.
 - red mark/ unpaid message blinking option.
 - Bill Cross checking, Auto calculation etc. mechanisms are needed.
- **Broadband Internet related Module:**
- Many Broadband Internet connection is linked up with BTCL No. DWASA took a number of connections through the phone line. Those departments names are needed with the Internet connection package name, package plan, Bandwidth, speed etc.
 - In those cases, the new Broadband Internet connections which are linked to BTCL Telephone no., those approved scanned copy regarding office name and those BTCL No. information needs to upload. For that job, scanned approval copy adds, modify, view, inactive, delete Options are needed.
 - The Broadband Internet connections which are linked to BTCL Telephone No. - add, modify, delete, view options are mandatory based on Departments/Plants/Projects/WASA Bhaban/MODS zone.
 - The search option needs to be user friendly. Search is based on name, designation, department etc.
 - Needs information of approval Date.
 - All the previous information of users and the Broadband Internet connections which are linked to BTCL No must be entered into the newly upgraded software.
 - How many bills have been paid and how much is left can be checked.
 - If there is any bill due for any month, those can be checked; and how much the amount is in the due bills and in which MODS zone/Plants it is taken place can easily be found out.
 - Check mark for paid portion.
 - Cross(X) for the unpaid bills.
 - red mark/ unpaid message blinking option.
 - Auto calculation is needed.
 - Need arrear bill option as well. For that job, arrear bill occurred into which offices and when, those detailed information and amount, bill coming month from BTCL, adjustment month of DWASA, paying month, paying amount information etc. are needed.

- Division paid the BTCL Broadband Internet Connections Bills from their own budget. After payment, that payment related documents must be uploaded into this software. So, bill payment related files need to upload, modify, delete options are needed.
 - How much BTCL Broadband Internet Connections Bills are consumed by Which offices in every month, that information is needed.
 - The newly added Broadband Internet Connections which are linked to BTCL Telephone no. – those related all the information are shown to the upper.
 - This connection information must be sorted according to the time frame.
 - When the Broadband Internet Connections which are linked to BTCL Telephone no. is added, only then the information shown from that specific month. It will not be shown before that adding time intervals.
- **User Module**
- In the software, who are **newly added** there, the lists can be shown in a time-based sorting manner.
 - The list of new/old/ transferred users can be **searched**. Need an Options to search these.
 - Super admin can generate reports on when and who is being added/ transferred/ removed. Keep these options according to date and time wise sorted manner.
 - *User remove and update information options are needed.*
 - When adding the user, there includes 2 more options for notification sending purposes. Those are “Phone number” and “Email Id” fields.
 - **Who changes the user information and when, that detailing log is needed.**
 - All the previous information of users must be entered into the newly upgraded software.
 - Log: User log is needed.
 - Profile:
 - Separate user profile
 - profile editing option: User add, modify, delete, view options are mandatory. Separate user information and profile editing option must be included.
 - **Users are only from the DWASA.**
 - password resetting option.
 - Information retrieval:
 - When any new users join/Transferred/Left the job in DWASA, then that information will be retrieved from the PMIS/HR software to the admin panel and admins get notification. This work can be done using HRMS database and API management.
 - **Role base Login:**

The roles can update their own personal profile information and can reset their login credential. These types of user roles must be clearly included into the software.

 - XEN
 - SDE
 - AE
 - SAE
 - Bill Preparer
 - Bill Uploader
 - Accounts Assistant
 - Accountant
 - Accounts Officer
 - DCAO
 - CAO
 - Super Admin

- ✓ **Super Admin Role:**
 - Super Admin can create new role more smoothly.
 - can set the priorities to another user.
 - They can authorize whether the other users to have limited or partial or the full access into the software.
 - They can add/modify/search/view/removed/inactive as well as can correct all the information, can back up the database etc. We need all the corresponding user's information must be retrieve from the Leave and HRMS software by using their corresponding office ID no.
 - can back up the database.
 - can see the user id and corresponding password database table.
 - Super admin can generate reports on when and who is being added / transferred / removed. Need this information according to date and time wise sorted manner.
 - They can generate monthly, yearly, MODS zones, projects and plants wise and other reports, data archiving, data backup etc.
 - They can add and modify the new Plants, Projects name.
 - Full Database access and authorization must be included to the admin panel.
 - Needs more user friendliness and front-end data manipulation and updating facilities to operate the software.
 - All the operation needs to be operated from front end part.
 - SMS Portal maintaining.
 - Basically, they should have more power towards all sorts of authorization to operate this software.
- **Audit/Log Management**
This will store the audit and the log data of the software. Time to time there is a need to audit the software. This section will set some parameter and store all the logs and send notifications to the appropriate authority. All the previous information of auditing related must be entered into the newly upgraded software.
- **Friendly User manual Module**
This module is specific to the all kind of users. This module consists of these **but not limited to:**
 - Presentation slide
 - docs file
 - PDF file
 - Video tutorials
- **Report module:**
- This module is dedicated for generating various reports for Telecommunication purposes. It can generate various reports based on the user's requirements. Users will be able to generate reports, formats are given as annexure but not limited to:
 - Approved Scanned Documents Wise Upload/Not Upload wise
 - Year Wise Bill for BTCL/PABX/FAX/BTCL Broadband Line No
 - Financial Year Wise Bill for BTCL/PABX/FAX/BTCL Broadband Line No
 - Month Wise Bill for BTCL/PABX/FAX/BTCL Broadband Line No
 - Time period wise Bill for BTCL/PABX/FAX/BTCL Broadband Line No
 - Date range Wise Bill for BTCL/PABX/FAX/BTCL Broadband Line No
 - Dept./Mods Zone/Plant/WASA Bhaban/Board Members wise BTCL/Mobile no./PABX/FAX/BTCL Broadband Line No
 - BTCL no. for Office/Resident/PSA/Stano/Broadband Internet No. wise

- Mobile Bill Ceiling Wise
- Mobile bill paid/unpaid wise
- Checked/Not checked BTCL/PABX/FAX/BTCL Broadband Line No. Bill wise
- Upload/Unloaded bills copy according to Departments/Plant/WASA Bhaban/MODS zone wise
- Paid/Unpaid BTCL/PABX/Fax bill wise
- New BTCL/Mobile no./PABX/FAX/BTCL Broadband Line No. wise
- Inactive/Active BTCL/Mobile no./PABX/FAX/BTCL Broadband Line No. wise
- New user / Updated user for BTCL/Mobile no./PABX/FAX/BTCL Broadband Line No. wise
- Old to new BTCL/Mobile no./PABX/FAX/BTCL Broadband Line No. wise (If any)
- Arrear BTCL/PABX/FAX/BTCL Broadband Line No. wise Bill wise
- Utility providers wise (if any)
- Banks Branches wise (For how many BTCL/PABX/FAX/BTCL Broadband Line No. Wise Bills have been paid monthly/yearly from which Banks Branches based on WASA Departments/Plants/WASA Bhaban/MODS Zone wise)
- Here Some points to be noted for:
 - Proper mechanism should be maintained for every content change performed by system user.
 - This module can be modified and updated based on future requirements or betterment of the clients and users.
 - Previous all the reporting related information must be entered into the newly upgraded software.

❑ Gas Bill:

This newly built software must include the below modules for Gas Bill option:

- Dashboard
Dashboard is to be designed in a manner that will show the project's continuous and overall picture, consumption graphs etc. more clearly. At the same time, the information of dashboard will ensure transparency and accountability. The software requires an informative dashboard. The emergency messages need to be shown here as well.
- Billing Module
 - Proper filtering should be done in the software to avoid duplication.
 - How many bills have been paid and how much is left can be checked.
 - If there is any bill due for any month, those can be checked; and how much the amount is in the due bills and in which MODS zone/Plants it is taken place can easily be found out.
 - Check mark for paid portion. Cross for the unpaid bills.
 - red mark/ unpaid message blinking option.
 - Bill Cross checking mechanism is needed.
 - Six (6) metro areas of Titas are in which MODS Zones areas of DWASA, those information needs to be synchronized and clearly shown into selection boxes.
- Bill upload:
 - Billing files add, modify, View, delete options are mandatory.
 - Notification: If the billing file/ PDF files will not upload in designated time, actions could be taken; Warning, reminder will be sent to them when it is 3 days, they have held the bills and not forwarded to the corresponding upper level. This job can be done by using Software, SMS and email notification.

- Plant option: Add the name of the new plants in the Bill Add division name option (Dasher Kandi, Shanti Bottled Plant etc.). Those names are according to the alphabetical order. needs option for manual adding or updating.
- “Bill Remove” and test data entry for checking purposes are needed.

➤ **Bill Forwarding:**

- In entry bill forwarding option, Month, Year, Gas Bill providers name, Wasa Bhaban/Plants/Division Name, MODS zone, MODS zone’s area name, bill amount, Due Amount, Adjustment month name, Adjusting Amount etc options are needed.
- In account section, Bill is going to
CAO<->DCAO<->AO<->Accountant<->Bill checker.
- In Plant/MODS Zone office, Bill is going to
Bill Preparer-> SAE-> AE-> SDE ->XEN
- The bill is going to whom and which time, for how long they keep those, that time schedule / time frame could be tracked by monitoring the bill movement time, using a chart or list.
- When the bill amounts’ differences would show, then the corresponding authority can take the reports based particular months.

➤ **Bill Type:**

- **Regular Gas bill:**

- Add, Submit, Delete.
- **Auto calculation** could be done.
- **Tariff rate** can be set and modified based on govt. rate changing manner, time to time.
- Data from the scanned document, can be easily read, enter into system and calculated options are mandatory.

- **Arrear bill:**

- Arrear bill (any previous bill)/Due Bill option must be added. Through this, the due Gas bills can be paid and authority can have a track record.
- In Arrear bill/Due Bill, there must be an option for automated letter forwarding.
- When this type of file entry occurs into the system, those rows must be shown into the different color.
- For the Arrear bill – type, months, year, WASA Bhaban/Plants/MODS Zone name, Zonal Area Name, Utility providers name, Tita’s gas metro No. and area names, Amount, Adjustment months, year, date etc. options must be there.
- Arrear Bills for the empty quarters’ gas bill, shut down gas meters bills information etc. options also needed.

- **Empty Quarter Bills:**
 - Through this Empty Quarter Bills option, the dues of empty Quarters Gas Bills paid information and corresponding files upload options are mandatory whenever this type of situations arise.
 - Automated letter forwarding option is needed.
 - For the Empty quarters Normal and Arrear bill - There must be options for the Quarter type, Quarter No, Area name, Quarter name, Date, months, year, MODS zone, MODS zone area name, bill amount, Adjustment month, Adjusting Amount, Due Amount etc.
- **Gas Meter Module**
 - In case of new Gas line/meters - add, modify, view, delete options are mandatory.
 - The search option needs to be user friendly and more specific.
 - custom made search option is also needed.
 - The new Gas Line/meters numbers are shown in the upper. Those Meters must be sorted according to the time frame (day, months, date, year wise).
 - Gas line/meters must be sorted according to the time frame.
 - Needs Gas Meter adding option which is specific for Plants/MODS zones/area. That is, if any new Gas meter is added physically into any Plants/MODS Zones/area, then those meters information must be inserted by Plants/MODS Zones/area.
 - Needs new Gas Line/meters summary and report option.
 - Needs Gas Line/meter numbers verification procedures and options from the Plants/MODS zones offices.
 - When new Gas Line/meter numbers are added to the system, then written word “new” will be blinked into those corresponding rows.
 - When the Gas line/meters are added, only then the Gas line/meters could be shown from that specific month. It will not be shown before that adding time intervals.
 - The Gas line/meter numbers are being duplicated or not, can be checked. Needs this type of option.
 - If there are any duplicate Gas line/meters, those rows will be displayed in red color and highlighted.
 - *In case of inactive Gas line/meters, if the bill comes to those meters, when uploading the billing files and data, then warning will be shown and would be marked in different color from the normal meters and that information must be notified to the corresponding authority.*
 - How many Gasses line/meters no. are added/closed/updated per month, can be searched based on plants/ MODS zone/area wise.
 - The corresponding information of the user, who add the Gas line/meters, will need that information to be shown in tabular form.
 - Who changes the Gas line/meters information and when, that information is needed in tabular form.
 - Previous All the Gas Line/meters information must be entered into the newly upgraded software.

○ User Module

- User add, modify, delete, inactive, View options are mandatory and must be user friendly. Users are only from the DWASA officials.
- In the software, who are newly added there, the lists can be shown in a time-based sorting manner.
- The list of new/old/ transferred users can be searched. Need an Options to search these.
- Super admin can generate reports on when and who is being added/ transferred/ removed. Keep these options according to date and time wise sorted manner.
- *User remove and update information options are needed.*
- When adding the user, there includes 2 more options for notification sending purposes. Those are “Phone number” and “Email Id” fields.
- Who changes the user information and when, that detailing log is needed.
- All the previous information of users must be entered into the newly upgraded software.

➤ Log: User log is needed.

➤ Profile:

- Separate user profile
- profile editing option: User add, modify, delete, view options are mandatory. Separate user information and profile editing option must be included.
- Users are only from the DWASA.
- Password resetting option.
- The search option needs to be user friendly.
- Gas Bill related corresponding WASA Bhaban/Plants/MODS Zone wise Separate profile information pages are needed in admin panel.

➤ Information retrieval:

- When new users join in DWASA/any user is Transferred/ Left the job, then that information will be retrieved from the PMIS/HR software to the admin panel through a notification. This work can be done using HRMS database and API management.

Role base Login:

The roles can update their own personal profile information and can reset their login credential. These types of user roles must be clearly included into the software.

- XEN
- SDE
- AE
- SAE
- Bill Preparer
- Bill Uploader
- Accounts Assistant
- Accountant
- Accounts Officer
- DCAO
- CAO
- Approving head
- Super Admin
- Super Admin Role:
 - Super Admin can create new role more smoothly.
 - can set the priorities to another user.

- They can authorize whether the other users to have limited or partial or the full access into the software.
 - They can add/modify/search/Inactive as well as can correct all the information, can back up the database etc. We need all the corresponding user's information must be retrieve from the Leave and HRMS software by using their corresponding office ID/Finger ID no.
 - They can generate monthly, yearly, WASA Bhaban/Plants/MODS zones wise and other reports, data archiving, data backup etc.
 - They can add and modify the new Plants, Projects name, Providers which are related to Gas bill.
 - Full Database access and authorization must be included to the admin panel.
 - can back up the database.
 - can see the user id and corresponding password database table.
 - Needs easier access, editing option and user friendliness to operate the software.
 - Needs front-end data manipulation and updating facilities to operate the software.
 - All the operation needs to be operated from front end part.
 - SMS Portal maintaining.
 - Basically, they should have more power towards all sorts of authorization to operate this software.
- Audit/Log Management
This will store the audit and the log data of the software. Time to time there is a need to audit the software. This section will set some parameter and store all the logs and send notifications to the appropriate authority. All the previous information of auditing related must be entered into the newly upgraded software.
- Friendly User manual Module
This module is specific to the all kind of users. This module should consist of:
- Presentation slide
 - Word and PDF file
 - Video tutorial
- Report module:
This module is dedicated for generating various reports for Gas billing purposes. It can generate various reports based on the user's requirements. Users will be able to generate reports, formats are given as annexure but not limited to:
- Year Wise
 - Financial Year Wise
 - Month Wise
 - Date range Wise
 - MODS Zone/Plant/WASA Bhaban wise
 - Time period wise
 - Gas Meter no. wise
 - Accounts no. wise
 - Paid/Unpaid gas bill wise
 - New Gas line/meters no. wise

- Inactive/Active Gas line/meters no. wise
- New user / Updated user wise
- Upload/Un-Uploaded bills according to Plant/WASA Bhaban/MODS zone wise
- Shut down Gas line/meters wise
- Old to new Gas line/meters wise (If any)
- Arrear Gas Bill wise
- Empty quarters Gas Bill
- Forwarded/ Not Forwarded wise
- Utility providers name wise (if any)
- Banks Branches wise (For how many Gas Bills have been paid monthly/yearly from which Plants/WASA Bhaban/MODS Zone wise)
- Checked/Not checked Gas Bill wise (if any)
- Gas Bill's Hard copy entry/not entry wise (if any)

Scope for Software Maintenance

This section describes the Upgradation of Utility Management Software for Electricity, Titas Gas & Telecommunication Bill of DWASA. maintenance processes as:

1. The implementation process contains software preparation and transition activities, such as the conception and creation of the maintenance plan; the preparation for handling problems identified during development; and the follow- up on product configuration management.
2. The problem and modification analysis process, which is executed once the application has become the responsibility of the maintenance group. The maintenance programmer must analyze each request, confirm it (by reproducing the situation) and check its validity, investigate it and propose a solution, document the request and the solution proposal, and finally, obtain all the required authorizations to apply the modifications.
3. The process considering the implementation of the modification itself.
4. The process acceptance of the modification, by confirming the modified work with the individual who submitted the request in order to make sure the modification provided a solution.
5. The migration process (platform migration, for example) is exceptional, and is not part of daily maintenance tasks. If the software must be ported to another platform without any change in functionality, this process will be used and a maintenance project team is likely to be assigned to this task.
6. Finally, the last maintenance process, also an event which does not occur on a daily basis, is the retirement of a piece of software.
There are a number of processes, activities and practices that are unique to maintainers, for example:
 - Transition: a controlled and coordinated sequence of activities during which a system is transferred progressively from the developer to the maintainer;
 - Service Level Agreements (SLAS) and specialized maintenance contracts negotiated by maintainers;
 - Modification Request and Problem Report Help Desk: a problem-handling process used by maintainers to prioritize, documents and route the requests they receive.

2. Categories of maintenance

- **Corrective maintenance:** Reactive modification of a software product performed after delivery to correct discovered problems.
- **Adaptive maintenance:** Modification of a software product performed after delivery to keep a software product usable in a changed or changing environment.
- **Perfective maintenance:** Modification of a software product after delivery to improve performance or maintainability.
- **Preventive maintenance:** Modification of a software product after delivery to detect and correct latent faults in the software product before they become effective faults.

3. The scope of this contract does not include the following

New Software or new module design and development: Migration process (platform migration etc.), new software, new module, any other structural changes, development, designs, implementation etc. require a different contract.

4. Software Support methodology:

Coder De Dhaka Ltd. will take care of all technical faults (bugs) in the application software during the warranty period at no extra cost. However, force majeure conditions will apply for situations beyond Coder De Dhaka Ltd. control such as power disruptions, civil disobedience, earthquakes etc. Initially Coder De Dhaka Ltd. will provide **01-year** support for system maintenance to ensure uninterrupted functioning of the application software. After this period maintenance of the system will be provided as per client's requirement under separate maintenance contract.

5. Methodology of maintenance in Warranty Period

The steps initiated by our technical team to perform maintenance are as follows-

- ❖ Corrective actions are initiated within the support requirement method of defect report.
- ❖ The tester is notified. He analyzes and records the defects in the Test Report and Bug Report.
- ❖ Development Team is notified of the bug or system glitch through Bug Report.
- ❖ The Developers initially involved in the project are notified of the problem.
- ❖ Impact Analysis is performed to find corrective measures.
- **Architecture Re-design-** When specifications are altered, the hierarchy of design might be needed to change in order to fulfill the need of the client. The application will go through another software development lifecycle, and full testing of the system will be performed in order to provide maximum quality of the re-designed software. The application update is provided to the customer via an update patch.
- ❖ **Modular Re-structure-** When bugs are detected, full modular testing is performed in order to detect the bug and analyze other possibilities which may lead to its recurrence. Once a Bug Report is generated, the developer fixes the error and performs unit testing. The module goes through a cycle of Software Testing Lifecycle, before it is finally released to the client via an update patch.
- ❖ The Modular codes are edited to make corrective measures
- ❖ The developer performs Unit Testing to confirm the bug fixes.
- ❖ The tester is notified of architectural re-work/modular re-structure. He/she follows the initial test plan of the module under test in the Software Testing Life Cycle to make sure no new bugs are created.
- ❖ He/she, then, analyzes and checks all the scenarios in which the glitch might reappear

- ❖ to make sure the reported glitch is eliminated.
- ❖ In case of architectural re-work, he/she utilizes the software testing life cycle in order to verify and validate the new set of requirement specifications.
- ❖ The data is recorded in the Test Report and the Bug Report.
- ❖ Once the tester clears the defect, an update patch is generated by the development team.

The update patch is sent to the end-users via the support team.

6. Software Support and maintenance Team

Our support team will be available to support if any bugs occur during the time of agreement period. There must be a flexible notice period before asking for any service. The time period will be at least before Five (05) hour. Any bugs within the scope of work will be solved guarantee. Support request must be sent in written, e-mail or via phone. All the bugs or update will be monitored in a system priority. The details of service hour, priority of service will be explained later in this document.

7. Software support member's engagement

We have already described that our support team will be available for support the system. But the support team member wouldn't involve full time (means as an offsite) in the proposed system which indicate support team member will engage in more than one project.

8. Third Party Software Support

Computer programs that are supplied or developed for a particular purpose by a different company on a particular system. Coder De Dhaka Ltd. will not provide any technical support for that third party software.

Coder De Dhaka Ltd. Support and Maintenance Plan:

There are different types of plans available for support and maintenance. Here we are going to offer you the best plan.

9. The available plan is “Annual Maintenance Contract (AMC)”

Contract period: Contract will be for a **12 months** period, commencing from the day of signing this contract. After a 12 months period, a month-by-month maintenance plan is available if required, to meet your company's ongoing needs. (Cancellation of Contract requires thirty - 30 - day's written notice).

Payment term: Full payment will be made once contract agreement done between both parties. Payment can be done by Bank Transfer or Bank cheque.

Working Hours: The maintenance work shall normally be done during working hours of the customer. However, in case of emergency maintenance may have to be done beyond office hours and even on holidays prior arrangement through proper communication should be worked out in all cases by the servicing agencies.

Renew contract: After expire of this agreement, the document is renewable on mutual consent of both parties until terminated by either party. Terms and conditions of this agreement may be changed, modified, reviewed by mutual understandings of both the parties within the contracted period.

Supporting Process:

Technical and management process cannot themselves ensure predictability and continuous improvement of quality, cost and time, CODER DE DHAKA LTD. uses a set of defined supporting process for providing

required support to the technical and management process. Requirement Management Process, for example, helps to identify the appropriate requirements provider required for proper Requirement Capturing (a step of the technical process). Further, it manages changes to requirements, which in turn helps the management process to determine the overall impact of changes to the project. Other supporting processes - Configuration Management, Quality Assurance and Risk Management, are described in detail in the sections - Quality Assurance Process, Configuration & Change Management, and Issue & Risk Management.

Management Process: This is the project-oriented process. It defines the activities and methods for planning the work, organizing and motivating those who will do the work, and tracking progress to ensure the project is completed on time within budget and at the highest level of quality. This particular section contains detail description of this process, which is provided in the following sections.

To estimate the task duration, CODER DE DHAKA LTD. Follows a defined and documented process to estimate task duration; cost and other estimation parameters, following section contain description of the defined estimation process.

Estimation Process:

The estimation process can be defined in terms of the followings:

- **Estimate size:** Analyzing functional requirements, historical data, and past experience software size in source lines of code (SLOC) or requirements are determined. Maximum, minimum, and most likely estimates are developed and then averages are considered as the final estimates. All of the estimation rationale or assumptions are documented and reviewed.
- **Estimate cost and effort:** Labor hours and cost are determined for the identified tasks of software engineering phases, documentation, configuration management, quality assurance, and management efforts. Environmental parameters such as program complexity, programming language, requirements volatility, analyst capability, and execution time constraints are evaluated. In this case also, the estimation is verified against the historical data and assumptions are documented.
- **Estimate critical computer resources:** Determine the critical computer resources needed to complete the project are determined and the estimate is then compared to the actual critical resources available. Critical resources are project-specific, and may include memory usage, throughput capacity, timing, software licenses, and hard drive usage. The estimation method that is followed includes historical experience and analogy with similar projects.
- **Track and report estimates:** During the project life, actual measurements and status against the estimates are tracked, using organization standard tracking templates. Comparing estimates to actual status over time allows the project to track status and see how accurate the estimates are. Updates to estimates are made as needed. Estimation data, both planned and actual, are recorded for the benefit of other projects in the organization.

Analyze Issues and Determine Corrective Actions:

For controlling the project deviations and other noncompliance, collected issues are analyzed to determine need for corrective action. The appropriate actions needed to address the identified issues are determined and documented. These corrective actions are reflected in the subsequent processes – control scope, control project resources and control cost and schedule.

Control Project Resources:

Resource control involves assessing both how they are being utilized and in the case of human resources, whether they are able to devote the time needed to complete their activities on time. In case of discrepancies, corrective actions as adding resources might occur. In that case the project manager justifiably adds resources to the project.

Modify the Project Plan:

All identified and approved changes are reflected in the project plan document and the execution and controlling phase continues throughout the project life.

Revisit the Planning Phase:

In case of major changes, the planning phase is revisited to determine objectively the impact of changes to the overall project quality, cost and time. Definition of major changes is defined during the planning phase.

Closing project:

The project requires closure after achieving its objectives. Closing the project not only provides for completion of administrative activities, but also provides evaluation of project performance, which can be a valuable for the future projects.

Security Features and Access Control

Security is the ideal state where all information can be communicated across the internet secure from unauthorized persons being able to read it and/or manipulate it. Security deals with the techniques employed to maintain security within a computer system. Security is also the process of preventing and detecting unauthorized use of one's computer. Application security is the use of software, hardware, and procedural methods to protect applications from external threats. Security measures built into applications and a sound application security routine minimize the likelihood that hackers will be able to manipulate applications and access, steal, modify or delete sensitive data. Once an afterthought in software design; security is becoming an increasingly important concern during development as applications become more frequently accessible over networks and are, as a result, vulnerable to a wide variety of threats.

1. Security challenges:

- Protecting data from viruses and worms introduced into the network via downloaded files and e-mail Attachments.
- Controlling access to business-sensitive data by internal and potentially external users; unauthorized access to protected data can result in legal issues and the loss of trade secrets.
- Protecting corporate Web sites running on general-purpose operating systems from denial of service (DOS) attacks and service exploits-both of which can render them inaccessible and unusable.
- Preventing the exploitation of Internet access privileges by employees.

2. Threats:

The possible threats of the proposed e-Government solution can be posed as:

- Some technology-related threats might not be present
- The human-generated threats would be more prone to the proposed application.

3. Threats to Confidentiality

Confidentiality is the way of protecting the information from unauthorized persons, thus they cannot access to the system and perform any task, which might cause data loss or data damage. It is important to safeguard the valuable documents and records from such access. The confidentiality factor should be well defined and will be carefully implemented. We should consider the aspects of confidentiality as a crucial issue that includes user identification, authentication etc. In the proposed software application, confidentiality can be breached in the following security levels.

System-level Security: Unauthorized user activity at system level resources, lacks in the Local area networks (LAN) security.

Server/Machine Security: Unauthorized physical access to a machine, which may lead to creating hole in system level security.

User Group-level Security: Unauthorized user activity at the application resources. **File/Database Security:** Unauthorized user activity at the database resources.

To eliminate the security threats, authentication and authorization along with password control to limit the user from the following activities should be incorporated with the system:

Limiting the user to retrieve any information Limiting the user to use module or generate report.

Authentication is the process in which the application verifies a user's identity and credentials.

Authorization will actually verify the authenticated user's permissions for a requested resource.

Modification of sensitive data will automatically invoke the trigger to store the old data to audit.

4. Server/Machine Security

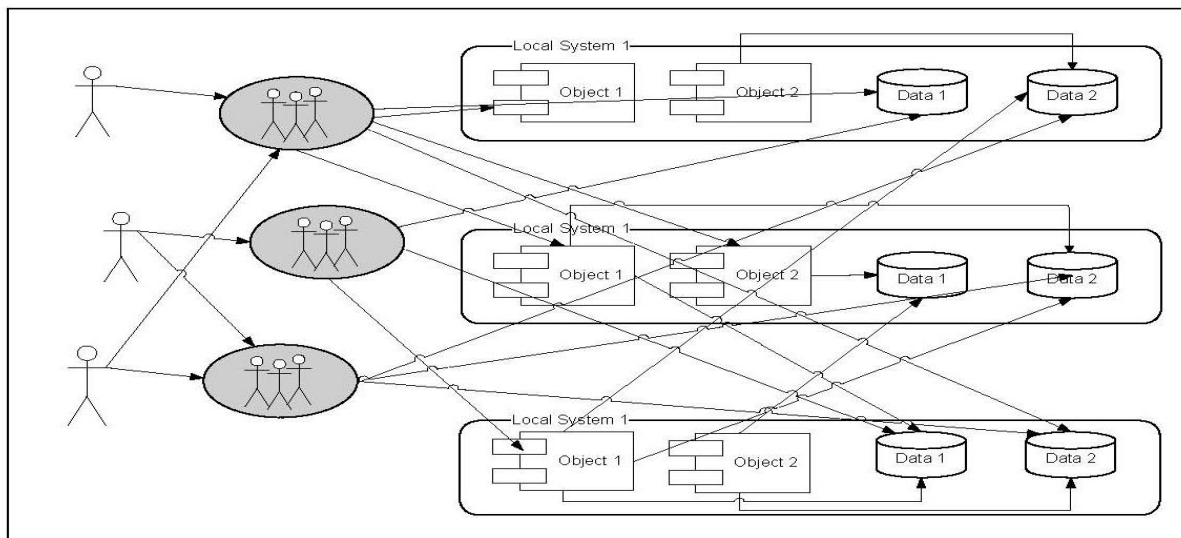
It means the limitation of physical access to a machine and generally would require an additional login in order to gain access. The operating system will restrict unauthorized users to log on or open the computer and database itself secure database to delete or to add any data from unauthorized user. This system is based on LAN therefore firewall or the protection from hacker is not needed.

5. User Group-level Security

Since the system is a web-based application, where separate managements at different locations manage users, a multi-layered user rights policy need to be applied. Block diagrams of such multi-layer user rights are shown below.

Users having common activities constitute a user group where all of them have common rights and common resources (objects and data). A user can be granted right to access (any combination of view, insert, update or delete, or executing processes) any object or data. The rights can be granted to the user group also, where all members of the group get the rights of the group.

Further, if any object of a system is granted access to data or other objects, then users or members of a user group that have right of execution of the object, get the right to access those object or data.



User, User Groups and Objects and Database Rights

This multi-layered security structure provides flexibility to the security management, and the security management policy can be implemented in a better way.

Database Backup and Recovery:

To maintain backup data and ensure data are not lost, we can use the standard backup procedure or replication between multiple servers. This utility is used to back up the System database from the Database to a file in **local** or **network directory** or in **remote** location. Alternative **DVD/Tap** (storage device) can be used to store the periodic data and keep in separate location/area. Later it can be retrieved from DVD if any hazard occurs. **Restore** This utility is used to restore a database that was previously backed up using the Database Backup Utility.

Threats to Integrity

The unawareness of the authorized users to the system is the primary threat to data integrity. The following causes can be defined as unawareness of the users:

- Errors

- Omissions
- Deletion –etc.

This sort of unawareness can cause valuable data to be lost, damaged, or altered. The employees will bring such causes to disaster unless they are trained reasonably in computers, security threats and vulnerabilities.

There could be another threat of intentional attempt of tempering or manipulation the stored images and data by the authorized users.

Threats to Availability

- **Crash or Virus Attack:** Failure or disruption of resources could cause the computer to crash. This will create denial of services in the proposed system. Denial-of-Service may also arise due to attacks by Trojan horses and viruses.
- **Lack of Fault Tolerance and Disaster:** Fault of the system and hardware may collapse the whole system if there is no fault tolerance measure. Such causes may halt providing valuable services to the public. Even, there could be major disasters due to flood, fire, earthquake or any other natural calamity causing complete loss of the valuable data archives.

Fault Tolerances

For the proposed system we strongly suggest fault tolerance implementation in both hardware and software of the application system. Our proposals for fault tolerances are as follows:

- **Hardware Fault Tolerance:** Hardware fault tolerance will be implemented by RAID configuration of Disk Mirroring with striping.
- **Software Fault Tolerance:** Software fault tolerance would be implemented using Oracle Server. This means, in the event of an error, all information can be restored to its prior state without restoring to backups or being required to know the previous information.

Disaster Management

There could be major disasters due to flood, fire, earthquake or any other natural calamity causing complete loss of the valuable data archives. This must be addressed by adopting the following measures:

For ensuring database and image security, we propose to maintain at least two backups of the entire database in Tape and CDROM to be kept outside the premise of Project office in a remote location. Additionally, a backup server should be considered for ensuring an un-interrupted operation of the system in some disaster events.

Authentication:

Application authentication is built around the concept of role-based membership of the users. Few database tables namely User, User Group, User Log, Page, Field, Field User are designed to implement the application security. The Super user or Database Custodian or administrator can manage the security features like:

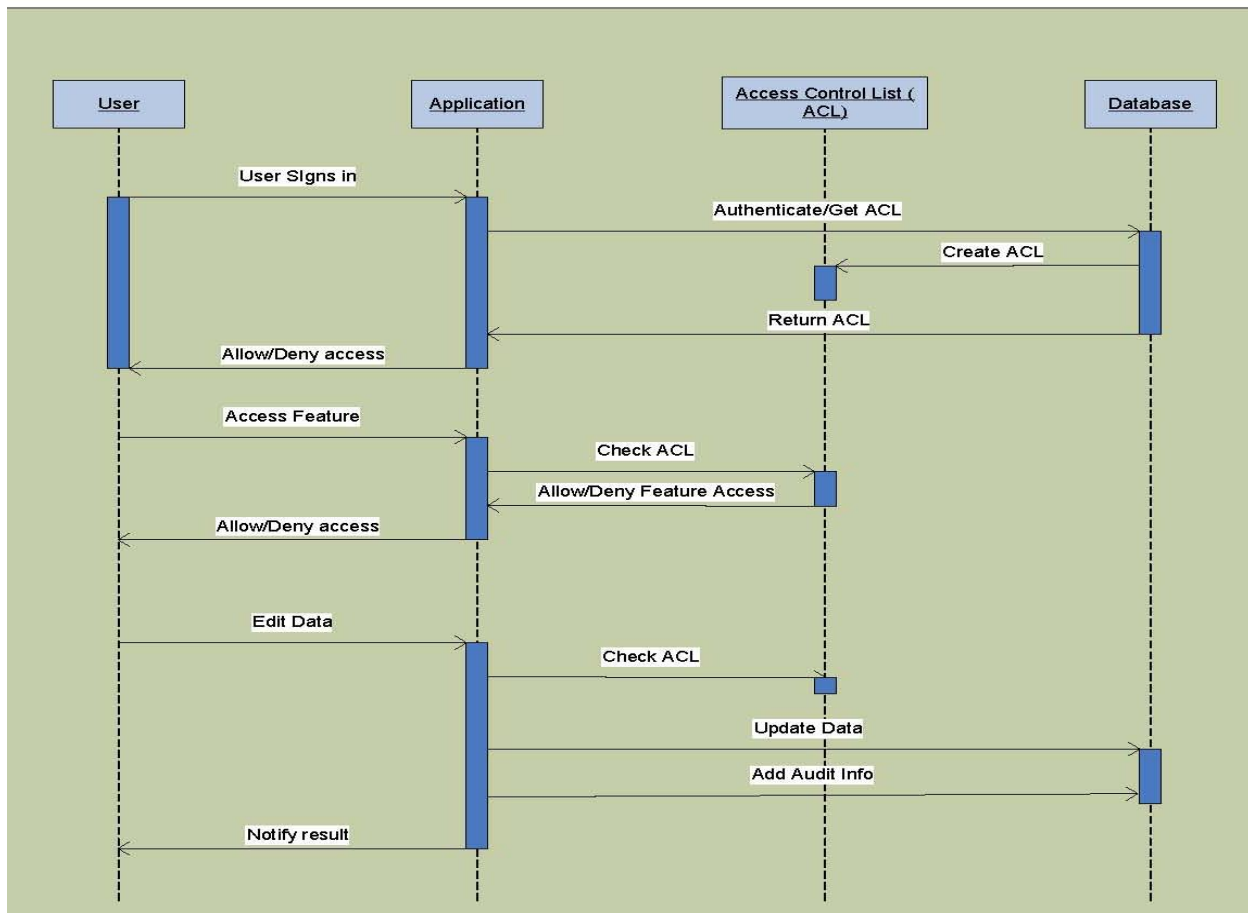
- Create a new user account
- Change password of a user
- Create User Group
- Assigning or changing a user's role membership
- Administer access rights for a user
- Administer access rights for a role
- Will have also access to track & view the **history log**, from where Super user can monitor last modified person information with date & time in which form/record, the person has changed or updated information.
- **Edit history** of last five/ten times/days will be maintained with user name, date & time.

User type	Add	Update/Edit	Delete
Level1	✓	✓	✓
Level 2	✓	✓	✗
Level 3	✓	✗	✗
Level 4	✗	✗	✗

Authorization

A user must be assigned a role. All the features are defined in the Application table with unique feature ID. To verify if a user has rights on a feature, the steps followed are:

1. The user is the administrator or a member of admin role or a member of guest role, then allows or goes to next step.
2. The user has rights same as role then collect roles' rights or collect user's rights and check for rights. The following sequence describes how access right is implemented.



Access Control Sequence Diagram

Data Migration Plan

Data Migration is the relocation of data from existing sources data in both digital and paper-based format into a

new solution. It is performed as part of the implementation of the new solution. The purpose of data migration is to preserve core business knowledge and make it accessible from the new application. Through the use of best practices, technology-driven focus and domain experience, the process of migrating data has been broken down into a series of well-defined atomic level tasks, control metrics and procedures that reduce both cost and time to completion.

1. Normalization

By building a fully normalized relational model based on and fully supported by the consolidation of all the data, so that the data model will not fail.

2 Installation media:

Software installation media also needs to be protected in the event of a disaster, though it should be easily accessible to support staff as well. To ensure safety in the event of a disaster, we recommend our valued client to locate copies of all installation media in a protected, offsite location. To provide support staff with needed access we will also keep a central library of installation media available for use. The offsite repository should be updated as regularly as possible.

One original of the installation media for each software title should be set aside and taken to the offsite repository. This media (CD, user manuals, etc.) should always be an original so that it can provide additional proof of ownership if needed. The offsite repository should be updated as often as is feasible, quarterly at a minimum. No more than one copy of media for each version of each software title should be stored offsite in order to minimize the size of the repository.

If the manufacturer permits making backup copies, at least one copy of the software installation media should be filed in the central installation media library for use by technicians. If copies are not allowed, additional original media will be needed. If the client does not own several copies of the software package, and hence several copies of the media, additional copies of the installation media can usually be obtained by us for a small fee. Any additional copies of the media should also be stored in the onsite library, to give as much flexibility to our support staff as possible.

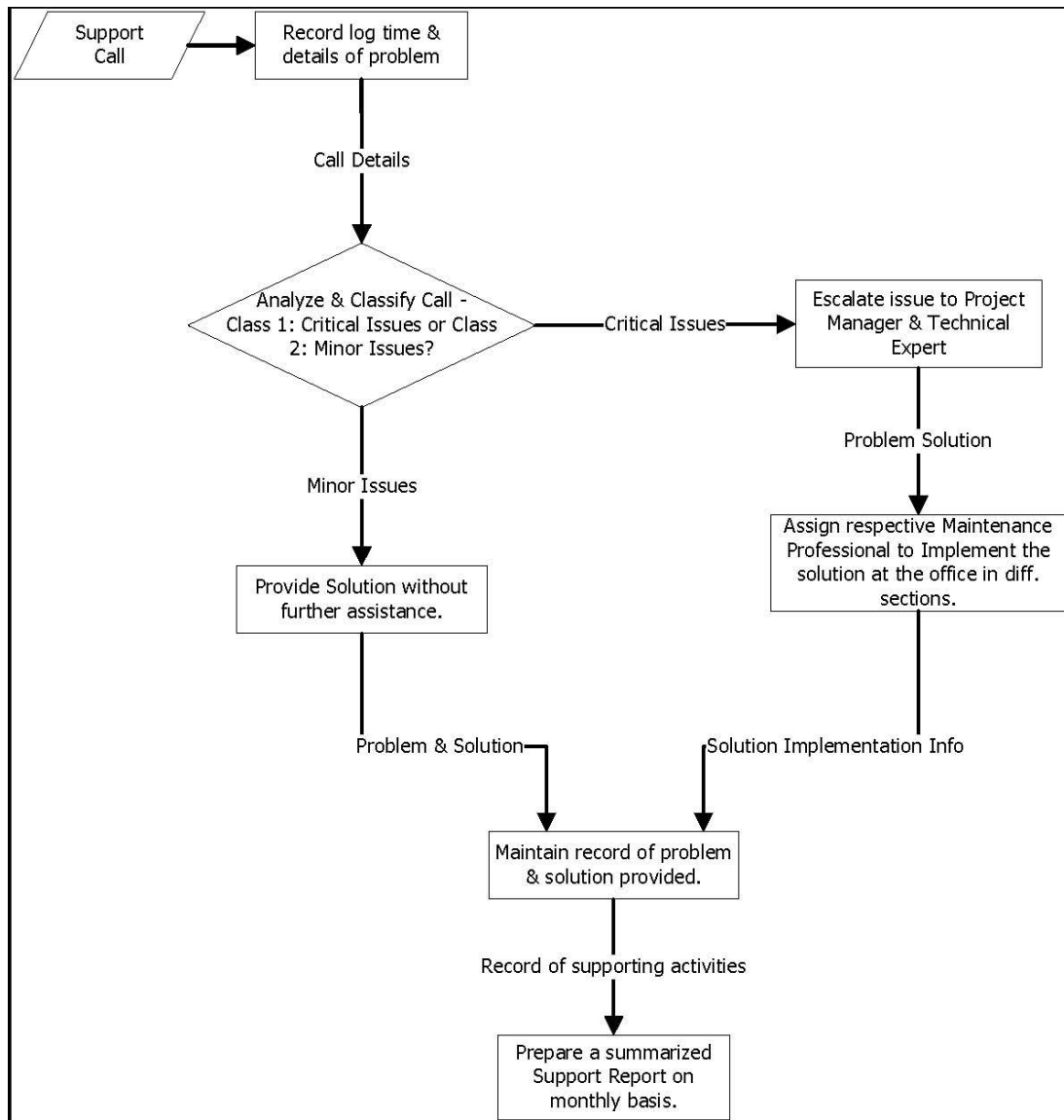


Figure: System Administration & Maintenance

Support Services for the Software

Support services for the software consist of technical support and assistance by e-mail or telephone to the user. These services include receiving, classifying, and logging support requests, and the assignments thereof to the technical experts and project managers who are responsible for troubleshooting the problem until it is resolved.

A problem is considered resolved when:

- The software conforms substantially to its specifications; or
- The user has been advised on how to correct or bypass the error through telephone; or
- Security issues or any other software problem/defect is fixed by the Maintenance Professionals within the specified time frame.

The Support Team will support the user by call handling and problem resolution as well as call classification and escalation. Any sort of software problem is fixed within 3 days; and in case of security issues (including virus attacks and other security problems) are fixed within 36 hours.

Call Classification

The following classification will be used to identify the call based on its severity:

- **Class 1 – Critical Issues** include any sort of bugs/problems identified in the software and new requirements provided by the users of offices.
- **Class 2 – Minor Issues** consist of any sort of problems which can be solved immediately or at most within 3-4 hours by the **Maintenance Professionals** without further assistance.

Call Escalation Technical issues that cannot be solved by the **Support Engineers** are escalated (based on the above specified Call Classification) to the Technical Expert and Project Manager via e-mail. These professionals involve other required resources such as analyst, programmer, tester, etc. to resolve the problem. After determining the solution to the problem, it is reported back to the **Project Manager/Team Leader**, who then assigns the Support Engineers to implement the solution at the respective office.

Technologies to be used

If awarded, Coder De Dhaka Ltd. Will maintenance the systems in the following technology platform:

SL	Tools/Technology	Features
1.	Software Development Mythology	Agile Scrum
2.	Operating System	Windows/Linux
3.	Architecture	three-tier base / Micro service
4.	Backend Technology	Java
5.	Frontend Technology	React, Vue.JS, HTML, CSS, Bootstrap, JavaScript, jQuery
6.	Database	Oracle 19c
7.	Web Server	Apache
8.	API	REST

Upgradation and Development time:

Total time duration = 4 (Four) Months.

Serial	Description	Days/Months
2	Analysis Upgradation and Software Development	4 Months
3	DWASA provide Integrated APIs and Other Needed Document file for Software Analysis, Install & Operation.	



Estimated Budget of Upgradation and Development

Financial Proposal for Maintenance & Support Service of Upgradation of Utility Management Software for Electricity, Titas Gas & Telecommunication Bill of DWASA.

:

Sl.	Descriptions	Qty	Duration	Unit Price	Total Price (TK)
1.	Requirement Analysis and of Upgradation of Utility Management Software for Electricity, Titas Gas & Telecommunication Bill of DWASA	1	Four (4) Months	24,00,000.00	24,00,000.00
2	User Training	1	Seven (7) Dayas	1,50,000.00	1,50,000.00
2	Vat 5%			5 %	1,27,500.00
Total Amount					26,77,500.00
Total Amount (In words): BDT. Twenty-Six Lac-Seventy-Seven Thousand Five Hundred Taka Only.					

TERMS AND CONDITIONS

1. All prices are Including VAT & Tax as service charge.
2. A/C related transaction dependent on Coder De Dhaka Ltd. standard terms & Condition.
3. Including additional features which are excluded from the proposal will apply charges (depends on the modules, pages and reports)

Conclusion:

Digital Bangladesh is being targeted by government and private organizations to build this system. Automation will certainly bring dynamism and efficiency to government organizations and facilitate the ease of doing business leading to better government services and development. Digitized systems promote more effective monitoring of systems, allowing governments to take quick and timely action.