**Terms of Reference (TOR)**

**Sheikh Russel Digital Lab Monitoring and Management System through Dashboard and Mobile Application**

**Establishment of Computer and Language Training Lab in Educational Institutions all over the Country Project**

**(Sheikh Russel Digital Lab)**

**Department of Information and Communication Technology**

**Information and Communication Technology Division**

**Ministry of Posts, Telecommunications & Information Technology**

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Background:

**Introduction:** With the aim to digitalize the nation through Vision-2021, the Government of the People’s Republic of Bangladesh (GoB) has been undertaken a project called **Establishment of Computer and Language Training Lab in Educational Institutions all over the Country Project** (i.e **Sheikh Russell Digital Lab)** supervised by the **Department of ICT (DoICT)** to implement computer labs with language learning at educational institutions countrywide.

Under the same project titled 'Establishment of Computer and Language Training Labs in Educational Institutions', a total of 4001 computer labs including 65 language training ones, as digital class rooms have already been set up in High schools, Madrasha and Colleges across the country.

Working relentlessly upon this initiative, the project authority, users along with the management need to monitor and manage all the lab’s activities into a single dashboard. Also give and manage support service from a single point. To do so, the development of **Lab Monitoring and Management System (LMMS)** is proposed to be developed to transform the management reporting into an automated one. So that the labs scheduling, communication and management between authorities can be easier.

## Review of Existing Service

### **About the Organization**

Establishment of Department of Information and Communication Technology (DoICT) in 2013 along with other government institution in the materializing process of the government to achieve as said in vision 2021 plan “**Leap frogging with Digital Economy and Balanced Growth.”** The main goal of establishing of DoICT, as written in its vision and mission, is to contribute to overall development of the country by it functions. DoICT will ensure application and usage of ICT and provide technical help to the government and the citizen. It will extend and maintain ICT facilities and connectivity up to last mile of the country and implement national ICT related policy and strategy in grass root level.

### **Objectives**

The key objectives of this project, Monitoring and Management System (LMMS), will be as following:

1. Establish a central dashboard Lab Monitoring and management system
2. Automatic monitoring of Lab computers and network discoverable devices
3. Asset management of computer Labs
4. Monitor and manage the lab reservations and class schedules through Dash Board
5. Monitor the Laptop/Desktop's status through Dash Board
6. Supervise and instruct the school management on effective usage through Dash Board
7. Online lab inspection reporting

**2.3 Project description:**

* Lab Monitoring Management System (LMMS) to be deployed for all the educational institutions, its local administrative authorities, project management, ministerial management, etc.
* It is to be deployed in hosting server through internet accessibility for all users countrywide.
* Primary purpose to monitoring the usage of computer labs i.e. Sheikh Russel Digital Lab (SRDL) under this project.
* LMMS Dashboard is to be used by the administrative and project management to view lab schedules, overwrite schedules, message instructions, user management, and search or filter to view reporting as per pre-defined templates.
* Upazilla and district administrative officers to monitor schedules, submit visiting reports, and budget on pre-defined templates. As well as can view the report specific to their jurisdiction.
* Educational Institutional users can have the role based access to enter their individual lab schedules, planning, message, report submission, etc.
* General Citizens will have access to information of the project and its status through the project web page.
* With the use of this ICT and modern technology, introducing effective, efficient, organized, faster and accountable Lab Monitoring Management delivery to the citizen and the accountable users.

**2.4 Features:**

1. The proposed system should have the following features (Not limited to):

Core :

* 1. Lab Information Management System:

This feature will facilitate the authorized user to create new Lab, update its profile, address, location map, service list etc. and it will create a predefine template based web page for this Lab under the main portal.

* 1. Agent software:  
     Agent software will collect host computer data real-time and send to central server. The data should include uptime, used applications, mouse and keyboard activity. The agent should send this data to central server upon availability of internet connection. The data frame should be controllable from the agent server. Agent software should be developed for windows, linux and android environment. The core reporting will be based on this automated collected data. Manual reports should be validated based on the agent collected data. The agent code must be secured and central server should be able to reject rouge agent. The agent code should be digitally signed for code security.
  2. Lab asset Management System:

This feature will facilitate the authorized user to upload all inventory information (i.e. product type, product name, model no, no of product, warranty/guarantee period, current status, name of vendor, contact no of vendor, service schedule and history) can submit their complain in case of defaulter during the warranty/guarantee period.

* 1. Event Management System:

This feature will facilitate the lab owner to prepare lab for various training, workshop and seminar event.

* 1. Course Management System:

This feature enables the instructor to publish course title, schedule, joining procedure on the Web

* 1. Booking Management System:

Any agencies or organization can apply in online to use the lab for training or examination purpose and lab owner can accept

* 1. Activity Monitoring Management System:

Users can submit daily activities in a prescribed format (training information, duration, trainer information, trainee’s information etc.) and event picture capturing in real time using the mobile app.

* 1. Activity Monitoring Dashboard:

Administrator can view the lab activities in a dashboard according to their demand.

* 1. Web Portal:

General information (i.e. news, notice, event calendar) will be published in the Web Portal

* 1. Report system:

Authority can view various report on their demand

* 1. Notification management
  2. Lab inspector feedback: Anybody who are visiting the lab can leave their comment and feedback online.

Must have but not limited to following user functions requirement:

# **2.5 Admin Features**

## Role Based User creation and Management (Super Admin)

## Systems super settings

* **View Live Status of devices:**
* Overall Summary
* Division wise summary
* District wise Summary
* Sub-District Wise Summary
* School Summary

## Messages:

* Send group or individual messages/notices/Memorandums.

## View Reports:

* Offline/Online/Online-Idle reports covering various criteria.
* System Configuration Reports of PCs
* Application Usage time.
* List of application installed
* Plan submitted from all types of users
* Progress report submitted from users
* Asset report submitted by School ICT teacher.
* School infrastructure report by school administration
* Internet Connectivity report by ICT teacher/Sub-district IT officer
* Device health report by IT officer
* Visit plan report by IT officers

**2.6 User Type:**

**User Type 1:**

**School ICT Teacher/administration Features:**

## View Live Status of devices:

* Summary of all device
* Offline
* Online
* Online-Idle
* System Configuration

## Scheduler:

* + Calendar booking of different schedules- class/training/course/exam of lab.
  + Receive payments

## Messaging:

Send individual messages/notices/Memorandums

## Submission of plans and reports through online set templates:

* Training, class, exam plans
* Progress report
* Asset report
* Lab infrastructure report
* Others

**User Type 2:**

**School ICT Teacher/administration Features:**

## View Live Status of devices:

* Sub-District Wise Summary
* School Summary

## Submission of plans and reports through online set templates:

* Asset check report
* Internet Connectivity report
* Device health report
* Visit plan submission
* Cost/Budget submission

## Scheduler:

* Calendar booking of different schedules- class/training/exam of lab

## Messaging:

* Send notice/messages to single or group of schools in the sub-district

**User Type 3:**

**District ICT/Education Officer:**

## View Live Status of devices:

* District Wise Summary
* Sub-District Wise Summary
* School Summary

## Submission of plans and reports through online set templates:

* Various plan submission
* Cost/Budget submission
* Progress report submission
* Others

## Scheduler:

* Calendar booking of different schedules

## Messaging:

* Send notice/messages to single or group of sub-district ICT officers in the district

**User Type 4:**

**Computer Clubs:**

## Submission of plans and reports through online set templates:

* Various plan submission for trainings and classes
* Activity report
* Progress report
* Others

## Scheduler:

* Calendar booking of different schedules- class/training/course/exam of lab

## Messaging:

* Send notice/messages to single or group of schools in the sub-district

# Contacts Database:

## Search:

* Search individual/group/divisional personnel in-charge contacts with hierarchy.

# Ticketing:

## Input hardware status of the computer/lab:

* Create and submit an information ticket or update status, with attachment
* Ticket status query

**Mobile Application:**

* **Application for Top Management to view overall summary**
* **View Live Status of devices:**
  + Overall Summary
  + Division wise summary
  + District wise Summary
  + Sub-District Wise Summary
  + School Summary
* **Messages:**
  + Send group or individual messages/notices/Memorandums

## 3. Proposed Solution Scope of work



**3.1 Solution Development:**

1. Analyze, Design and develop Lab Monitoring and Management System (LMMS) under n-tier application model compatible with cloud infrastructure environment.
2. Design the solution architecture of the LMM Ssystem for better performance, flexibility, salability and extendibility.
3. Prepare Technical Documents including (Not limited to) SRS, Data Dictionary, Use cases, Test Cases, Training Manual and ERD.
4. Provide concrete revamping plan in the SRS, which should include context diagram of the proposed system, Sequence Diagram, Use case Diagram, and Process Flow Diagram.
5. Design and Develop Database for the software in a structured architecture.
6. Vendor will ensure addressing acceptable UX survey and update the system by reasonable time.
7. Integrate plug-ins for integrating SMS gateway and Payment Gateway.
8. Share source code, data structure, technical documents and all other design documents with Authority or its nominated experts.
9. Convert complex on premise application services into developer-friendly RESTful APIs.
10. Protect Information Assets Exposed via APIs to Prevent Misuse. (This security test should be considered during the testing phase)
11. Vendor shall provide a user Friendly API Guideline Document or future development and integration purpose.
12. Define technical managed hosting requirements and prepare its technical document.
13. Provide necessary support to Data Center and users for data, content and application configuration.
14. Track all input, output and reports of the system and change the process for data capturing to make the system more saleable and centralized.
15. Provide updated technology services, development and implementing those services/solution for enhanced performance of the system.
16. Piloting of the system
17. Knowledge transfer
18. Support and Maintenance

### **3.2 Reports Requirement**

Reports are very important and vital feature of any automated system. The system user as well as top management of the organization can view the current, periodical, time based status, details/summary information which allow the concern person and organization management to take important and vital decision for the organization. Each component/module/feature will have some basic report relevant to that feature in a predefined format. Beside this an advance report generator will be available in the system, which will act as a BI to take smart, effective and prompt decision by the top authority of the system. The authorized admin user can create report format and logic for this advance report generation in a very easy and user friendly way and can save as template for further use.

### **3.3** **Security and Privacy Requirements**

The system should provide complete data privacy and security to the users. The vendor should follow any of the industry standard secure development methodology such as (but not limited to) Comprehensive Lightweight Application Security Process (CLASP) by OWASP etc. The vendor should consider (but not limited to) common vulnerabilities such as SQL Injection, Cross Site Scripting (XSS) etc. Vendor will undertake responsibility for Input Validation Controls, Authorization/Authentication Control and other security controls in place in both test and production environment of application. The vendor should submit an extensive and complete security and privacy plan for this e-Service application considering the following issues

* Project technical scope
* Functional and nonfunctional requirements and Ultimate objectives
* Concerned service provider organization’s operational environments and capacity
* User roles - Accessibility, Authorization and Accountability
* Importance of data management
* Technologies to be used for development & run
* Hosting
* Client and service side
* Overall standard application security requirements.

Apart from this the vendor should keep in account the following considerations also as well as vendor should provide a checklist based on system and hosting security plan (i.e fraud, hacking, SQL injection etc) & have to provide the test report of that checklist.

### **3.4** **Integration Requirements**

The possible integration scopes of this e-Service application are mentioned below as reference for the vendor

|  |  |  |
| --- | --- | --- |
| **No** | **Name of the System** | **Integration Purpose** |
|  | SMS Gateway | Send and Receive SMS |
|  | Payment Gateway | Pay Fees& Collect Fees |
|  | Other | As required |

### **3.5** **Hosting Requirements**

Bangladesh Government is providing an extensive and standard hosting facility for all types of government organization applications and software that is named as National Data Center under Bangladesh computer council (BCC). It may be mentioned here that the vendor developed application will be hosted in government provided data center i.e. National data center (NDC). Therefore, at this stage, vendor is requested to submit a preliminary recommended hosting plan considering technology platform, architecture and data traffic of the e-system.

During the development and testing period the vendor will arrange necessary hosting environment.

## 4. e-Service Non-Functional Requirements



### **Application Compliance Requirements**

* The application which is a web based solution , has to be hosted in a centralized Web-server
* The application should be developed following Service Oriented Architecture (SOA)
* Application should support MVC framework.
* Considering the operating/client environment at different level of this application, it should be developed in such a way so that it requires low bandwidth to run.
* The web-based application should support cross browser platforms (popular web-browsers such Mozilla Firefox, Opera, Chrome, Internet Explorer, Safari etc.)
* Should have ability to seamless integration with future module/components/applications
* Application should be lightweight and rich client-side scripting
* UI should be developed based on the analysis of UX.
* Any web interface of this application should be fully responsive

### **Sizing, Performance and Scalability Requirements**

1. The system shall be designed to handle estimated 1,000 simultaneous connection (online users) when it is ultimately rolled out.
2. The system should be to handle 40000 labs in next three years.
3. The vendor must conduct an extensive load testing task taking above factors into consideration and submit a load testing results.
4. The database architecture should be such that the system is available to user 24 x 7 x 365 days a year without any unapproved down-time.
5. Page load time, login response-time, on-click‟ load time for the web application should be less than 3 seconds while this is accessed over the intranet.
6. Average transaction response time, on-submit response-time, or any other database access/ search time should be less than 5 seconds when the system solution is accessed over the intranet.
7. Considering the network infrastructure challenges in Bangladesh, the solution must support low bandwidth conditions for the services defined in the functional requirements.
8. In case of mobile application also, this should support very low bandwidth even in 2G network provided internet bandwidth.
9. The proposed solution should be highly scalable to accommodate current and future requirements within the scope of the scope mentioned in the TOR
10. Analyze the requirements whether both horizontal scaling (scale out) and vertical scaling (scale up) will be required for application or not?
11. The e-Service application should be provided with appropriate caching mechanism to handle very high-traffic scalability
12. The vendor may propose here other relevant measures for the e-Service application scalability.

### **UI/UX.**

The vendor must propose a UI/ UX plan containing UI designing method and tools, prototype or Mockup design (if applicable) , UI review method , process for study and analyze UX , collaboration of basic web and mobile UX issues and expected result and outcome of UX, finalizing the UI/UX design. Apart from this, the vendor should consider the following issues as requirement at the time of UI/UX plan.

1. The web UI must follow WCAG 2.0 accessibility
2. The system interfaces should be highly user friendly, easy to navigate and ensure fast loading.
3. The UI shall design by using well-established, supported and lightweight UI framework so that it follows widely used industry flow patterns   
   UI shall be easily configurable if any changes are needed.
4. Menu, content and navigation shall be based on the user entitlements, roles and permissions.

### **Language Support**

The system should support multilingual option i.e. Bangla and English. All the user interfaces will be able to display and input controls can take input both in Bangla and English. System/App users can choose and set his/her preferred language in profile setting for the system interfaces. The system should support Unicode for the Bangla Language.

### **Tools and Technologies to be used**

Vendor is recommended to choose the appropriate tools and technologies to be used for the development and implementation of the application. The selected vendor has to consult with project office to finalize the tools, technologies, framework and platform with the approval of same authorities consent.

The main components of the software will be web based application. It should be run in Windows/Linux operating system at user end and should be compatible to all major browsers such as – Internet Explorer, Firefox, Google Chrome, Opera etc.

The agent software should be native application that run in background and send data to central server when internet connection is available. The agent should be able to run in windows, linux and android.

The System UI should be compatible with Tab & Smart Phone browsers.

## 5. General Requirement:

## Coding convention:

## The software development has to follow coding convention for the source code and documentation to improve the readability, quality and maintainability of the software following the guidelines given below:

## A well-planned coding and naming convention is important to reduce the effort needed to read and understand the source code, maintain and extend the source code.

## The convention should be designed to keep consistency within a development team, reconcile integration conflicts, and enhance the aesthetic and professional appearance of software.

## The quality of the software also requires to be tested in Bangladesh Software Quality Testing center established by Bangladesh computer council

## Version control and management:

## The project has to track, make, and manage revisions of the source code in an organized and efficient way. The code should be hosted in Git and the development works should be committed in the system as work progress/daily basis. DoICT authority must be granted access to view code and work progress.

## Project management and bug tracking:

## The use of professional project management and bug-tracking tools (such as Confluence and Jira) are recommended for this project. Relevant requirements:

## The vendor should manage all components of the project in one place creating, prioritizing and resolving bugs made easy & traceable by the tool.

## The vendor should organize bugs into components for grouping into smaller parts, and into versions for scheduling activity for milestones or releases. The project monitoring team is expected to be able to browse projects to measure progress and view.

## With Activity streams & Change Log, detailed changes across bugs, issues, projects or people can be followed.

## The vendor should also track important milestones. There has to be provision to assign, track, and complete targeted actions like commenting on page.

* 1. **Handover of source code and relevant materials:**

All source codes and any relevant material required to reproduce results must be submitted to the client with detail documentation.

* 1. **Requirement analysis:**

The bidder will follow the functional and technical requirements and receive idea about the scope of the system. Once selected, the vendor will study various citizen services available in services.portal.gov.bd and discuss with stakeholder and experts for realizing the scope of the system better. All their findings from documents and discussion need to be documented and final requirements should be presented before the project team as SRS with justification for approval.

* 1. **Testing:** After development is complete, the full application will be tested comprehensively. The test outcomes of the vendor will be monitored. Project office have rights to hire separate Here we discuss different types of testing to be performed in this project.

**UI Testing**  
User interface testing is a testing technique used to identify the presence of defects in a product/software using Graphical user interface [GUI]. There are three basic approaches for UI testing and all of these approaches will be adopted in this project. The approaches are:

* + - * Manual- In this approach the system is tested manually based on the domain and application knowledge of the tester.
      * Capture and Replay - In this approach different automation tools are used to test the application in two steps: record and playback. During record, test steps are captured by the automation tool. During playback, the recorded test steps are executed on the system. Tools like Selenium, Watir, Appium (for mobile app) are encouraged to be used for this task.
      * Model-based testing - Based on the execution of user sessions based on a GUI model.

**5.7 User Acceptance Testing:**

At the stage of the system delivery, a release to be implemented for User Acceptance Test (UAT), which will be tested by some selected users. Based on UAT report/ feedback the vendor will review the system, incorporate all feedback and make sure that all the requirements and specification of the proposed system are met. If any further modification is required, the vendor will take necessary steps to update the system.

The User Acceptance Testing phase also includes alpha testing, beta testing, application testing or end user testing, or performance test etc. Then the system will be ready for final release.

**Deliverable:** UAT Report

**5.8 Security Testing:**

In order to ensure the security of the system, it is necessary to design a security development lifecycle. Security should be considered and tested throughout the project lifecycle. Security testing will be performed to ensure that the system protects the data and maintains its intended functionality. The security testing will involve an active analysis of the application for any weaknesses, technical flaws, or vulnerabilities.  The primary purpose will be to identify the vulnerabilities, and subsequently repairing them. The vendor team will perform extensive tests to check the system for security vulnerabilities and critical portions of the source codes should also be reviewed for known security threats. The tests carried out by the vendor team will include from the following security vulnerabilities wherever applicable:

SQL Injection

Cross Site Scripting

Broken Authentication and Session Management

Insecure Direct Object References

Cross Site Request Forgery

Invalidated Redirects and Forwards

Sensitive Data Exposure

Using components with known vulnerabilities

There are several tools available for security testing e.g., Zed Attack Proxy (ZAP), Meta sploit, Vega, SQL Map which should be used for testing the application for security vulnerabilities. The vendor team is required to provide a brief plan of their security testing. The plan should explicitly list the vulnerabilities that the vendor plans to address and the tools they will be using to detect them.

For user agent and mobile apps, there should be enough measure to counter security threats such as code tempering or sensitive information leakage.

The security of the application also requires to be tested in CIRT of Bangladesh Computer Council.

## 6. Piloting:

Pilot with minimum 50 Schools need to be started before final production deployment. Vendor will share required installation package and guide DoICT assigned personnel for installations. Vendor will provide remote support and DoICT assigned personnel will provide feedback based on findings.

## 7. Training and Knowledge Transfer:

1. Assist SRDL Implementation team in Piloting the news module/features of software.
2. The vendor should include necessary training methodology, documentation and training materials support in their training plan
3. The training materials may include user manual ,administration manual, quick start tutorial, online help, frequently asked questions
4. The training instructions should be in Bengali language.
5. The training activities should cover the training feedback, evaluation and report also.
6. The vendor also needs to propose their smooth, efficient and effective knowledge transfer idea and plan here in this technical proposal with the training plan.
7. Test and confirm Prototype of the software piloting in 50 Labs as Technical PoC.
8. Provide 01(one) day Training of Trainers (ToT) for minimum 200 DoICT official’s in 05 batches(including TK1000/- honorarium per person, TK 500/- for Lunch & Snacks per person, Printed Training Manuals, Video Tutorials).
9. Provide technical consultancy to the client for operational management during implementation.
10. On-demand facilitation of system update information to client as mini-training session (Quarterly and/or in case of major changes executed)
11. Provide authentic access to client experts to source code and documents.
12. 5 person will be trained as administrator of the system. They should be trained as required by the vendor and nominated personnel.
13. The vendor should develop multimedia training materials for all users. These materials shall be available for viewing and reviewing for all users through a web portal.

## 8. Maintenance and Support Service:

The selected Vendor has to provide a period of **two year** maintenance and support service. After the development and deployment phase when the implementation period starts the vendor has to provide maintenance and support service for the **two year**. Here it is expected that, the vendor must provide detail maintenance and support service plan in the technical proposal which may include the followings-

* Service desk functionalities
* Change management
* Service layers for support
* Tools will be used for Support service management
* Communication management and modality
* Problem management
* SLA (Service Level Agreement)
* Maintenance and support service related reporting

## 9. Duration of the Project and Work Station:

The selected vendor will need to work for the above-mentioned scope as per approved project schedule. The Vendor has to complete the defined work within the stipulated approved timeline. Total duration of the contract will be divided in two parts.   
1st part: For application development which duration will be 6 months from the date of the contract signing.

2nd part: For Warranty & Maintenance, which will be 1 years from the approval date of UAT signing.

Now here in their technical proposal vendor is requested to propose detailed timeframe plan which may include -

* Total duration of the application development
* Total duration of the Maintenance and support service at implementation phase
* Proposed SDLC Phase wise and deliverable wise time distribution and duration
* The schedule may cover Activity, Deliverables, Time in Days, Dependencies etc.
* Can be present as table or Gantt chart

### **10. Deliverables:**

* Approved URS (User Requirement Specification).
* Approved SRS (System Requirement Specifications) SDD (System Design Document).
* UAT Report.
* Approved final released version of the developed system.
* Source Code & Database of all developed solutions with detailed documentation
* System deployment to department of ICT arranged hosting environment
* Piloting
* User Manual.
* Reports on TOT and user feedback.

### **11. Copyright:**

The source code developed under this TOR will be owned by DoICT. The vendor should properly document all such codes and deliver it to Department of ICT and cannot claim any royalty or authority of any sort in case of replicating the source code /database or any other deliverables under this TOR for any future use may see fit. Any studies, documents, reports or other material, graphic or otherwise, prepared by the vendor for the project under this TOR shall belong to and remain the property of Government of the People’s Republic of Bangladesh.

### **12. Work Distribution and Team Composition:**

The consultant will propose a development team and an operational team as deemed suited based on the project requirements and milestones. However, for proper execution of the project the consultant’s proposal must include at least the following personnel.

Minimum requirement for the project are as follows:

|  |  |  |
| --- | --- | --- |
| **SL** | **Position** | **No. of**  **Person** |
| 1 | Project Manager | 1 |
| 2 | Software Architect | 1 |
| 3 | System Analyst | 1 |
| 4 | Business Analyst | 1 |
| 5 | Database Designer/Administrator | 1 |
| 6 | System Administrator | 1 |
| 7 | Interoperability Expert | 1 |
| 8 | QA Expert | 1 |
| 9 | Sr. Software Engineer | 1 |
| 10 | Software Engineer | 2 |
| 11 | Jr. Software Engineer | 3 |
| 12 | Technical Documentation Engineer | 1 |
| 13 | Network Engineer/Expert | 1 |
| 14 | UI/UX Expert | 1 |
| 15 | Implementation Engineer | 2 |
| 16 | Training Expert | 2 |
| 17 | Mobile Developer | 2 |
|  | **Totals** | **23** |
|  |  |  |

## The minimum required qualification and experience of the Key professional staffs are as follows:

## Project Manager: At least Bachelor in any Computer Science related discipline with minimum 8 years’ experience in Software Solution Development, Implementation and Software Development Management. Proposed personnel should have minimum 4 years’ experience in government project management. PMP Certification is necessary.

## Software Architect/Sr. Software Engineer: Minimum Bachelor in any Computer Science related discipline. Proposed personnel should have at least 8 years’ working experience with minimum 5 years’ experience in any Project.

## System Analyst: Minimum Bachelors in any science related discipline. Proposed personnel should have at least 5 years’ working experience with minimum 3 years’ experience in related project.

## Database Administrator: Minimum Bachelors in any science related discipline. Proposed personnel should have at least 5 years’ working experience with minimum 3 years’ experience in related field. Relevant Certification will be added advantage.

## Connectivity/Integration Expert: Minimum Bachelors in any Science related discipline with at least 5 years’ working experience. Minimum have CCNA & CCNP certifications.

## System Administrator: Minimum Bachelors in any discipline with at least 5years’ working experience with minimum 3 years’ experience in related field.

## Quality Assurance Expert: Minimum Bachelors in any computer science related discipline and 05 years’ experience with minimum 03 years’ experience in related field.

## Training Expert: Minimum Bachelors in any discipline with at least 5 years’ Working experience.

## Programmer/Developer: Minimum Bachelors in any computer science related discipline. Proposed personnel should have at least 05 years’ working experience in related field.

## Mobile App Developer: Minimum Bachelors in any computer science related discipline. Proposed personnel should have at least 03 years of working experience.

## Technical Documentation writer: Minimum Bachelors in any computer science related discipline with minimum 03 years of working experience.

## Network Engineer: Minimum Bachelors in any science related discipline with at least 03 years’ working experience. CCNA certification will be added advantage.

## Business Analyst: Minimum Bachelors in any Science related discipline. Proposed personnel should have at least 8 years’ working experience with minimum 4 years’ experience in related Business Analyst in IT Project. Relevant Certification will be added advantage.

## User Interface (UI) Designer/Expert: Minimum Graduate preferably in CSE or in any discipline having 5 years’ experience in related field.

## Interoperability Expert: Minimum Bachelors in any computer science related discipline and 05 years’ experience with minimum 03 years’ experience in related field.

## 13. Vendor Qualification:

Vendor having following qualification can only participate in this bid:

* 1. Must have 8+ years of software development experience
  2. Must be CMMI Level-3 or ISO 9001:2008 Certified
  3. Must have completion certificate of 3 Government or any reputed international organization web-based projects in last 5 years.
  4. Must have minimum work order value in single contract BDT 20 Lakh in last three years.
  5. Must have permanent staff minimum 50