Bangladesh Telecommunication Regulatory Commission
Plot#E-5/A, Agargaon Administrative Area
Sher-e-Bangla Nagar, Dhaka.
www.btrc.gov.bd

Administration Division

Request for Expression of Interest (EOI)

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH		
1	Ministry/Division	Post and Telecommunications Division
2	Agency	Bangladesh Telecommunication Regulatory Commission (BTRC)
3	Name of Procurement Entity	Director, Administration Division, BTRC
4	Procurement Entity Code	Not Applicable
5	Procurement Entity District	Dhaka
6	Expression of Interest for	Design, Develop, Implementation of Operation & QoS monitoring system of Fixed Broadband Operators for BTRC.
7	EOI Ref No	14.32.0000.000.400.07.0021.25.1685
8	Date (dd/mm/yyyyy)	11/12/2025
KEY INFORMATION		
9	Procurement Method	Quality and Cost Based Selection (QCBS)
FUNDING INFORMATION		
10	Budget and Source of Funds	GoB
11	Development Partner (if Applicable)	Not Applicable
PARTICULAR INFORMATION		
12	Project/Programme Code/(if Applicable)	Not Applicable
13	Project/Programme Name/(if Applicable)	Not Applicable
14	EOI Submission Location	BTRC, Level-04, Plot# E-5/A, Agargaon Administrative Area, Sher-e-Bangla Nagar, Dhaka.
15	EOI Closing Date & Time	28/12/2025; 02:00 PM
INFORMATION FOR APPLICANT		
16	Brief Description of the Assignment	The objective is to develop a comprehensive Operational and QoS Monitoring System for Fixed Broadband Operators to ensure real-time, accurate, and data-driven oversight of nationwide broadband services. The system will continuously monitor key operational indicators such as the number of active users, upstream and downstream bandwidth utilization, and Fixed Broadband Operators coverage. To ensure customers satisfaction, the system should be able to monitor and acquire data on QoS, monthly ticket generation statistics, average ticket resolution time, etc. In addition, the platform will measure critical QoS parameters including webpage loading time, network throughput, latency, packet loss, overall network availability, and Mean Time to Repair (MTTR). Through automated data collection, intelligent analytics, and standardized reporting, the system will assist the regulatory authority to enforce compliance, identify performance indicators, and significantly enhance the reliability and quality of fixed broadband services across the country.
17	Experience, Resources & Delivery Capacity Required	1. Must have minimum 5 years' experience in ICT business in Bangladesh. (Provide Contract Agreement/ Work Completion certificate to prove the experience). 2. The Vendor must have Updated/valid Trade License, TIN certificate, VAT & BIN certificate, updated Income Tax acknowledgement receipt of return/clearance certificate. 3. Must have registered in Registerer of Joint Stock Companies

		and Firms (RJSC). 4. The Firm Must have ISO 9001. ISO 27001 and ISO/IEC 20000 certifications will get preference. 5. The Firm/Company must have experience, of a minimum of 2 (ongoing or completed) projects with the Government/ Semi Government Organizations/ Multinational Companies of Bangladesh in the last 5 years with at least 2 completed projects with a single contract value of at least BDT 2 Crore. 6. Bidder shall have at least 2 (two) practical experiences in developing monitoring/analytics/SAS/OSS/BSS/QoS platforms or integrated service management platforms with integration to at least 3 external systems (e.g. NMS, billing, CRM, ERP). (please provide the relevant documents with Live URL to prove the experience). 7. The Firm/ Company must have had an average annual turnover above BDT 03 Crore in the last 03 (Three) financial years. All financial requirements must be supported by a verified audit report. 8. Must Have a minimum amount of Liquid asset/ Line (S) of credit of the firm shall be BDT 3 crore. 9. Must have minimum 20 full-time ICT personnel in company payroll related to Project Management, System Analyst, Solution Architect, Software Development, Database Administrator, Data visualization, integration, Security, QA, DevOps, UI/UX expert, Infrastructure, Training Expert and support engineer. To demonstrate the human strength, the bidder must give a list for employees mentioning educational qualification, year of experience and experience in relevant projects. 10. Must submit the management and logistic capacity of the firm/company (Website link/brochures and other documents describing company's expertise, strength and experience, core functions, products and services, project experience, availability of relevant professional staff and well-equipped office space with necessary facilities) to carry out this assignment. Also the Firm Must Have to provide a basic project understanding.			
18	Other Details (if applicable)	Detailed TOR and other relevant information are available at BTRC website (www.btrc.gov.bd).			
19	Association with foreign firms is	Not Encouraged			
	Ref No	Phasing of Services	Location	Indicative Start Data	Indicative Completion Date
20	14.32.0000.000.400.07.0021.25.1685	Single	Dhaka	From contract award	180 Days
PROCURING ENTITY DETAILS					
21	Name of the Official Inviting EOI	Mohammad Rohol Amin			
22	Designation of the Official Inviting EOI	Director, Administration Division			
23	Address of the Official Inviting EOI	Plot#E-5/A, Agargaon Administrative Area, Sher-e-Bangla Nagar, Dhaka.			
24	Contact Details of the Official Inviting EOI	Tel: +880255667766 (Ext. 105) E-mail: diradmin@btrc.gov.bd			
25	The Procurement entity reserves the right to accepts or rejects all EOI.				

14.12.2025

(Mohammad Rohol Amin)
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Bangladesh Telecommunication Regulatory Commission (BTRC)
Plot#E-5/A, Agargaon Administrative Area
Sher-e-Bangla Nagar, Dhaka

Terms of Reference (ToR)

Design, Development, Implementation and Maintenance of an Online Operation and QoS Monitoring Platform for Fixed Broadband Service Providers

1. Background of the Project

Bangladesh Telecommunication Regulatory Commission (BTRC), established under the Bangladesh Telecommunication Act, 2001, is mandated to regulate, supervise and promote telecommunication services in Bangladesh, including protection of subscriber interest and ensuring service quality. With the rapid growth of fixed broadband services and increasing dependence on high-speed internet for economic and social activities, it has become essential for BTRC to monitor the operational performance, Quality of Service (QoS) and revenue-related indicators of fixed broadband service providers in a systematic, near real-time and data-driven manner as well as to ease up the report submission of the licensees.

At present, QoS and operational data are collected mostly through periodic reports and limited system integrations, which limits BTRC's ability to perform real-time supervision, detect service degradation early, and correlate QoS with coverage and revenue data. Similarly, end-users have limited tools under the regulator's domain to independently measure and report service quality.

To address these challenges, BTRC intends to establish an **Online Operation and QoS Monitoring Platform for Fixed Broadband Service Providers**, including a **regulatory portal**, **central data collection and analytics system**, and a **user-facing mobile application** to measure and crowd-source QoS indicators.

2. Objectives of the Assignment

The overall objective is to design, develop, implement and maintain a centralized, secure and scalable system that:

1. Collects **real-time / near real-time operational data** from fixed broadband networks.
2. Collects and processes **QoS indicators** (e.g. latency, throughput, availability, MTTR).

3. Receives and processes **revenue and package data** from service provider's systems for regulatory analysis.
4. Provides **dashboards, reports and analytics** for BTRC and authorized stakeholders.
5. Provides **user-facing mobile and/or web apps** to measure speed, jitter and webpage loading time and optionally send complaints/feedback.
6. Ensures **secure data collection and integration** where SNMP-based collection occurs within ISP internal networks (not exposed to public internet), and data is transmitted to BTRC systems via secured REST API endpoints.
7. Supports **long-term operation, maintenance, scalability and extensibility**.

3. Scope of Work

The consulting/implementing firm ("the Vendor") shall perform, at minimum, the following tasks.

3.1 Inception, Requirement Study and System Design

- Conduct detailed stakeholder consultations with:
  - BTRC technical and relevant divisions.
  - Selected fixed broadband service providers.
- Prepare:
  - Detailed Business Process Study and Gap Analysis.
  - **Software Requirements Specification (SRS)** covering functional and non-functional requirements.
  - **High Level Design (HLD)** and **Low Level Design (LLD)** including system architecture, modules, interfaces, security and data models.
- Define:
  - Data collection frequency, granularity (per link, per region, per package, etc.).
  - KPI definitions and computation logic.
  - SLAs and performance targets for the system.

3.2 Data Acquisition and Integration Layer

The platform must include a robust data acquisition layer capable of integrating multiple data sources:

3.2.1 Network Operation Data via SNMP

Service Providers shall facilitate SNMP-based metric collection from within the service provider's network infrastructure. This architecture is mandated for the following information security considerations:

- **Attack Surface Minimization:** SNMP management planes shall not be exposed to external or public networks
- **Credential Protection:** SNMP authentication credentials remain within ISP security perimeter
- **Infrastructure Isolation:** Critical network management interfaces are protected from external threat actors

Only aggregated, sanitized performance data shall be transmitted to BTRC QoS Platform via secured API endpoints.

Data Collection Architecture:

Data collection shall be performed using **software-based agents** (containerized/Docker or equivalent) deployed within ISP infrastructure. Vendors may propose supplementary approaches for specific use cases.

Deployment Locations (Vendor to Propose):

Vendors shall propose their software agent deployment strategy. Deployment options include:

Deployment Location	Purpose	Agent Function
ISP PoP (Point of Presence)	Active QoS measurements	Synthetic testing: latency, throughput, packet loss, DNS, HTTP response
ISP NOC (Network Operations Center)	SNMP data aggregation	Collection from network devices: core routers, aggregation, BRAS

Deployment Flexibility:

- Vendors may propose unified agents serving both QoS and SNMP functions, OR specialized agents per location
- Deployment topology to be detailed in vendor's technical proposal
- ISPs shall provide compute infrastructure for hosting software agents

Security Requirements:

- SNMP implementations must use secure protocols; systems with known security vulnerabilities are NOT permitted

- Agent-to-platform communication via secure APIs (TLS encrypted)
- Credentials and sensitive data must remain within ISP security perimeter

Data Collection Requirements:

- Integration with routers and relevant network elements (e.g. aggregation, core, BRAS) using SNMP
- **Device Scope:** Core routers, aggregation devices, and BRAS only; CPE (Customer Premises Equipment) devices are excluded from SNMP monitoring
- Collection of real-time / scheduled network counters, including:
  - Interface bandwidth utilization (upstream/downstream)
  - Interface status and errors
  - Broadband remote access server metrics
- Support for multiple vendors' devices and MIBs (standard + vendor-specific)
- Configurable polling intervals and threshold-based alerts

Automated QoS Measurement Scope:

The solution must enable automated measurement of:

- Download and upload throughput
- Network latency and jitter
- Network trace report to multiple destinations
- Packet loss
- DNS resolution performance
- HTTP/web response times
- Website reachability (national and international)

Independent, automated measurement from ISP network points provides **verifiable QoS data** that is not dependent on end-user participation or ISP self-reporting. This serves as the **primary source** for QoS measurement and assessment as per QoS guidelines.

Vendors should describe their proposed approach for:

- Automated measurement methodology
- Software agent placement strategy

- Data integrity and tamper-resistance

3.2.2 Integration with Service Provider Systems via APIs

Data Submission Model:

- **Data Source:** Service Providers (ISPs)
- **Submission Method:** REST API endpoints provided by QoS Platform
- **Data Flow:** ISP Systems to BTRC REST API to QoS Platform
- **Responsibility:** Service Providers are accountable for data accuracy, completeness, and timely submission

Service Providers shall submit data via **REST API** (REST/JSON or equivalent) from their internal systems including:

- ERP
- NMS
- RADIUS server
- Billing software
- CRM or customer management system

Data to be collected shall include:

Operational & Product Data:

- Package definitions: name, advertised speeds, pricing, data cap, FUP details (active and discontinued)
- Total subscribers by Package and location
- Newly added subscribers by Package and location
- Removed/discontinued subscribers by Package and location
- Total subscribed bandwidth per location/POP and type (e.g. Cache internet etc)
- Access nodes/POPs count by district/upazila/thana
- Upstream bandwidth capacity (total contracted/provisioned bandwidth per location)

Service Quality Data:

- Network incident reports (outages, degradations) via web form with location data
- Affected areas and restoration times

- Customer complaint volumes and resolution metrics

QoS Data (where available from provider systems):

- Latency, packet loss, throughput statistics, uptime

Submission Frequency: To be proposed by vendor (real-time to monthly depending on data type)

Vendor shall:

- Define standard data schemas and API specifications
- Implement necessary middleware, ETL and validation mechanisms
- Ensure data integrity, deduplication and time-stamping

3.2.3 Integration with BTRC and Other Systems (if required)

- Provide APIs / data feeds for:
  - BTRC internal reporting systems
  - Data warehouse / BI tools
- Design the system such that new integrations (additional service providers, new systems) can be onboarded with minimal changes.

3.2.4 Service Provider Facilitation and Accountability

For ISP-Submitted Operational Data:

Service Providers are accountable for:

- **Data Accuracy:** Ensuring submitted data accurately reflects operational status
- **Data Completeness:** Submitting all required data categories per defined specifications
- **Timely Submission:** Adhering to submission schedules as applicable

For Automated SNMP-Based Collection:

Service Providers are accountable for:

- **Facilitation:** Enabling secure access for BTRC data collection within their internal network
- **Data Access Accuracy:** Ensuring collectors can access accurate, unmodified data from network elements
- **Security Cooperation:** Maintaining the security perimeter where SNMP credentials remain protected

- **Infrastructure Provision:** Providing compute resources for hosting software agents within their network

3.2.5 Legacy DIS Data Migration

BTRC currently operates a Data Information System (DIS) that stores historical ISP operational and service data. This data must be migrated to the new QoS Monitoring Platform.

Migration Requirements:

Aspect	Requirement
Data Scope	All data categories including operation, package, user data, etc.
Estimated Volume	Less than 2 TB
Database Platform	To be disclosed during RFP stage
Transition Strategy	Full migration with data validation prior to cutover
Parallel Operation	Not required; cutover approach approved

Vendor Responsibilities:

- Conduct data assessment and mapping during inception phase
- Develop ETL (Extract-Transform-Load) pipelines for data migration
- Perform data validation and integrity verification
- Execute migration with minimal service disruption
- Provide migration completion report with data reconciliation

Migration Deliverables:

- Data migration plan and mapping document
- ETL scripts and tools
- Validation and reconciliation report
- Post-migration data reconciliation report

3.3 Operational Data Module

This module shall provide:

Real-time / near real-time dashboards on:

- Total upstream bandwidth and utilization by:
  - Provider

- Region (district/upazila/thana or other defined hierarchy)
- Time period

- Number of users:
  - Total active users.
  - New activations / churn (if data available).
- Coverage:
  - Map-based coverage visualization.
  - Number of access nodes / POPs per region.

Historical trends and comparative views across:

- Different service providers.
- Geographic regions.
- Time periods (hourly/daily/monthly).

3.4 QoS Monitoring Module

The QoS monitoring module must compute, display and store (for analytics and audit):

Key QoS parameters:

Parameter	Description
Service Availability	Network uptime percentage
Download Speed	Actual vs. advertised speed ratio
Upload Speed	Actual vs. advertised speed ratio
Network Latency	Round-trip delay (in-country and international), including 95th percentile
Packet Loss	Data transmission reliability
Jitter	Latency consistency
DNS Performance	Name resolution speed
Web Page Reachability	Web page reachability status
Web Site Response Time	Web site response time in ms/s

Parameter	Description
Network Trace	Trace route to national and international IP targets for path check
Service Degradation Detection	Automatic identification of QoS falling below thresholds
Outage Detection	Automatic detection and visualization of major incidents

Note: Specific benchmarks and thresholds will be defined in consultation with stakeholders and referenced against international standards (e.g., ITU, APT).

Features:

- Configurable QoS thresholds for each parameter and provider.
- Automatic detection and visualization of:
  - Service degradations.
  - Major incidents and outages.
- Geo-spatial view to detect regional QoS issues.
- Drill-down capabilities from national to operator to region to specific network segment.
- KPI computation engine aligned with BTRC QoS regulations/definitions.

QoS data shall be derived from:

- Network element counters (via SNMP collection facilitated within ISP internal networks, transmitted via secured API).
- Provider NMS / performance systems (via ISP data submission to REST API).
- User-end measurement app data (crowd-sourced, see section 3.6).

3.5 Revenue and Package Analytics Module

This module will use data obtained from service providers' ERP/billing/CRM systems via APIs and shall provide:

Revenue Metrics:

- Total revenue per provider, per period.
- Revenue by package, region, and customer segment (where data available).
- ARPU and related indicators (if derivable from provided data).

Package & Tariff Metrics:

- Master list of all active and historical broadband packages.
- Tariff of each package and associated attributes (speed, data cap, FUP, etc. as available).
- Number of users per package.
- Package-wise QoS and churn analysis (where data supports such mapping).

Analytics and Reporting:

- Time series trends.
- Comparative views across operators and regions.
- Export to Excel/PDF/CSV.

3.6 User-facing Application (Mobile and/or Web)

The Vendor shall design, develop and deploy a user-friendly app (Android mandatory; iOS and/or web interface preferable) with at least the following functionalities:

Speed Test:

- Download and upload speed measurement.
- Logging results with timestamp, location (with user consent), and operator/package info (where possible).

Jitter Measurement:

- Measurement of jitter and, where relevant, packet loss.

Webpage Loading Time:

- Test of page load time for predefined popular or reference websites.
- Display results to user and simultaneously send anonymized/aggregated data to central platform.

Additional (to be confirmed by BTRC):

- Display of historical test results to user.
- Optional complaint/feedback submission linked to test results.
- Language support: Bengali and English.

Required Data Types from End-User Application:

- Speed test results (download/upload)

- Network quality metrics (latency, jitter, packet loss)
- DNS and webpage response times
- Geographic location (with user consent)
- ISP and connection identification
- Timestamp and device information
- Service Provider/Package/Tariff details (where possible)
- Complaint/feedback submission linked to specific test results (optional)

Submission: As and when user submits

The app must:

- Follow best practices for performance, UX and security.
- Obtain necessary permissions and user consent for data collection.
- Send measurement data securely to the central platform via APIs.

3.7 Regulatory/ Monitoring Tool

The Vendor shall design, develop and deploy a regulatory tool/ app (Android mandatory; iOS and/or web interface preferable) with at least the following functionalities:

Speed Test:

- Download and upload speed measurement.
- Logging results with timestamp, location and operator/package info (where possible).

Jitter Measurement:

- Measurement of jitter and, where relevant, packet loss.

Webpage Loading Time:

- Test of page load time for predefined popular or reference websites.
- Display results to user and simultaneously send anonymized/aggregated data to central platform.

Additional (to be confirmed by BTRC):

- Display of historical test results to user.
- Language support: Bengali and English.

Required Data Types:

- Speed test results (download/upload)
- Network quality metrics (latency, jitter, packet loss)
- DNS and webpage response times
- Geographic location (with user consent)
- ISP and connection identification
- Timestamp and device information
- Service Provider/Package/Tariff details (where possible)

3.8 Data Storage, Analytics and Dashboard

- Centralized database(s) designed for:
  - High volume time-series data.
  - Historical storage with configurable retention policies.
- Analytics engine and dashboards for:
  - BTRC management.
  - Technical users/analysts.
- Features:
  - Role-based dashboards and access control.
  - Custom report builder with filters (provider, region, time, KPI).
  - Scheduling of periodic reports (e.g. monthly QoS summary).

Platform Capability Requirements:

Capability	Requirement
Scalability	Handle data from 1500+ ISPs and millions of measurements
Availability	High uptime with disaster recovery provisions
Data Retention	1 year storage for historical analysis and audit
Security	End-to-end encryption, access controls, audit trails
Integration	Standard interfaces for ISP system connectivity

Capability	Requirement
Drill-down Analytics	Navigation from national to operator to region to network segment level
Map-based Visualization	Geographic/geo-spatial coverage and QoS visualization
Time Granularity Options	Data views by hourly, daily, weekly, monthly periods
Comparative Analytics	Cross-provider and cross-region comparison views
Data Polling Resolution	Maximum data pulling resolution no less than 15 minutes
Custom Report Builder	User-configurable reports with filters (provider, region, time, KPI)
Scheduled Reporting	Automatic generation of periodic reports (e.g., monthly QoS summary)

3.9 Security, Privacy and Compliance

- Role-based access control and user management.
- Secure authentication (multi-factor if required).
- Encryption of data at rest and in transit (TLS).
- Logging and audit trails for all critical actions and data access.
- Compliance with:
  - Relevant national cyber security and data protection regulations.
  - BTRC's internal IT/security policies.

3.10 System Architecture, Hosting and Performance

- Design scalable, modular and fault-tolerant architecture.
- Proposal for hosting:
  - Government/BTRC/BCC data center, or
  - Other arrangement as decided by BTRC.
- Performance & availability targets for the platform (e.g. 99.5% uptime).
- Backup, disaster recovery and business continuity plans.

3.10.1 Minimum Infrastructure Specifications

The platform shall be deployed on infrastructure meeting or exceeding these specifications to ensure adequate performance, availability, and scalability.

Hyper-Converged Infrastructure (HCI):

The system shall be deployed on a Hyper-Converged Infrastructure with the following minimum specifications:

Cluster Configuration:

Specification	Minimum Requirement
Architecture	Hyper-Converged Infrastructure (HCI)
Cluster Size	5 nodes minimum

Per-Node Specifications:

Component	Minimum Requirement
CPU	32 cores per node
Memory	256 GB RAM per node
Boot Drives	2x per node (mirrored)
Data Drives	3x per node minimum
Cache Drives	2x per node
Network Interfaces	2x 10G SFP+ per node
Management Port	Out-of-band management (IPMI/iLO/iDRAC or equivalent)
Power Supply	Redundant PSU (1+1 minimum)

Aggregate Cluster Resources (5 Nodes):

Resource	Total Minimum
CPU Cores	160 cores
Memory	1,280 GB (1.25 TB)
Data Drives	15x
Cache Drives	10x
10G Network Ports	10x

Network Fabric:

Component	Requirement
Switch Configuration	1+1 stack configuration
Redundancy Protocol	MC-LAG (Multi-Chassis Link Aggregation) support
Compatibility	Must be compatible with proposed HCI solution
Port Capacity	Sufficient 10G SFP+ ports for all HCI nodes plus growth

Load Balancer:

Component	Requirement
Type	Virtual appliance
Deployment	High availability configuration recommended
Capabilities	Application load balancing for platform services

Infrastructure Proposal Requirements:

Vendors shall include in their infrastructure proposal:

1. **HCI Solution:** Specific platform and model meeting above specifications
2. **Bill of Materials:** Detailed BoM for all hardware components
3. **Network Fabric:** Switch model and configuration meeting requirements
4. **Load Balancer:** Virtual appliance solution meeting requirements
5. **Compatibility:** Certification or documentation confirming component compatibility
6. **Scalability:** Path for future node expansion if required
7. **Support:** Hardware support and warranty terms

Vendors may propose specifications exceeding these minimums where beneficial for platform performance and reliability.

3.11 Testing and Quality Assurance

The Vendor shall prepare and implement a comprehensive **Test Plan**, including at least:

- Unit Testing
- Integration Testing
- Functional and Non-functional Testing

- Performance and Stress Testing
- Security and Vulnerability Testing
- Compatibility Testing (browsers, mobile devices)
- User Acceptance Testing (UAT) with BTRC and selected providers

Test cases, results and defect logs must be documented and submitted to BTRC.

3.12 Training and Knowledge Transfer

- Develop and provide:
  - User Manuals (Admin, Operator, Viewer).
  - Technical Documentation (architecture, APIs, data models, deployment scripts).
- Conduct structured training sessions for:
  - BTRC technical and operational staff.
  - Helpdesk/support staff.
- Training may include:
  - Classroom/virtual sessions.
  - Hands-on exercises.
  - Evaluation/feedback.

3.13 Post-Implementation Support and Maintenance

- Provide **maintenance and technical support** for a defined period (see Section 7), including:
  - Bug fixing and minor enhancements.
  - Performance tuning.
  - Security patching.
  - Assistance with onboarding new providers or integrations.
- Provide Service Level Agreement (SLA) for:
  - Incident response time.
  - Resolution time based on severity.
  - System availability.

4. Required Experience, Resources & Capacity of the Vendor

The bidding firm/company shall meet, at minimum, the following requirements (to be evidenced with proper documents):

4.1 Business Experience

- Minimum **5 years' experience** in ICT/software development business in Bangladesh.
- Demonstrable experience with telecom network monitoring, OSS/BSS, QoS systems or similar large-scale platforms is highly preferred.

4.2 Legal and Regulatory Documents

- Valid and updated Trade License.
- TIN certificate, VAT/BIN registration, and latest Income Tax return/acknowledgement.
- RJSC registration/certificate (where applicable).

4.3 Quality and Standards

- ISO 9001 certification (mandatory).
- ISO 27001 or equivalent information security certification (preferable).
- ISO/IEC 20000 or similar IT service management certification will be considered an added advantage.

4.4 Relevant Project Experience

- At least **5 (five) similar or relevant projects** (ongoing or completed) with Government / Semi-Government / Multinational organizations in Bangladesh in the last 5 years.
- At least **2 (two) completed projects** with a single contract value of at least BDT 2 (two) Crore.
- At least **2 (two) practical experiences** in developing monitoring/analytics/OSS/BSS/QoS platforms or integrated service management platforms with integration to at least 3 external systems (e.g. NMS, billing, CRM, ERP).

4.5 Financial Capacity

- Average annual turnover of at least **BDT 3 (three) Crore** during the last 3 financial years, supported by audited financial statements.
- Minimum liquid assets / line of credit of **BDT 3 (three) Crore**.

4.6 Human Resources Capacity

- Minimum **20 full-time ICT professionals** on payroll covering:

- Project Management
- System/Business Analysis
- Solution Architecture
- Software Development (backend, frontend, mobile)
- Database Administration
- Data Engineering / Integration (SNMP & APIs)
- Network / QoS Expertise
- Security
- QA & Testing
- DevOps/Infrastructure
- UI/UX
- Training and Support

- Provide list of staff with:
  - Name, designation
  - Educational qualification
  - Years of experience
  - Relevant project experience.

4.7 Company Profile

- Company brochure/website link.
- Description of:
  - Core expertise and products.
  - Office and infrastructure.
  - Tools & technologies.
  - Project and customer references.
- A brief **project understanding note** related to this ToR.

5. Key Professional Staff Requirements

The assignment shall be carried out by a multidisciplinary team. At minimum, the following positions (or equivalent) are expected:

5.1 Project Manager (1)

- Bachelor's in CSE/EEE/ICT or related; Master's / PM certification preferable.
- Minimum 10 years' experience in managing large-scale IT/software projects.
- At least 2 similar ICT projects with Government/Semi-Government organizations.

5.2 Solution Architect / System Analyst (1)

- Bachelor's in CSE/EE/ICT or related; advanced qualifications preferred.
- Minimum 7 years' experience in system analysis, architecture and design for large ICT systems.
- Experience in telecom/network monitoring or OSS/BSS preferred.

5.3 Network & QoS Expert (1)

- Bachelor's in EEE/Telecom/CSE or related.
- Minimum 7 years' experience in IP networks, fixed broadband, and QoS measurement methodologies.
- Experience with SNMP, NMS, performance management tools.

5.4 Data Integration / Interoperability Expert (1)

- Bachelor's in CSE/ICT or related.
- Minimum 5 years' experience with:
  - API design/integration.
  - SNMP-based data collection.
  - Data pipelines/ETL between heterogeneous systems.

5.5 Senior Software Engineers (2)

- Bachelor's in CSE/Software Engineering or related.
- Minimum 5 years' experience in web-based application development.
- Strong experience in backend and frontend frameworks.

5.6 Mobile Application Developer(s) (1-2)

- Bachelor's in CSE/ICT or related.
- Minimum 3 years' experience in Android development (iOS preferred).
- Experience with network measurement/speed test apps preferred.

5.7 Database Administrator / Data Engineer (1)

- Bachelor's in CSE/ICT or related.
- Minimum 5-7 years' experience in database design, optimization, and administration.
- Experience with large time-series datasets and reporting.

5.8 Security Expert (1)

- Bachelor's in CSE/ICT or related; security certifications preferred.
- Minimum 5-7 years' experience in application and infrastructure security.

5.9 Quality Assurance Engineer (1)

- Bachelor's in CSE/ICT or related.
- Minimum 5 years' experience in QA for web and mobile applications.

5.10 UI/UX Designer (1)

- Bachelor's in relevant field.
- Minimum 3 years' experience in UI/UX for dashboards and mobile apps.

5.11 Business Analyst (1)

- Bachelor's in Business/Engineering/ICT.
- Minimum 5 years' experience in requirement gathering and process analysis, preferably with public sector ICT projects.

5.12 Trainer / Support Engineers (2-3)

- Bachelor's in ICT-related discipline.
- Experience in user training and Level 1/2 support.

5.13 Technical Documentation Expert (1)

- Bachelor's degree; strong English writing skills.
- Minimum 4 years' experience in technical documentation for ICT projects.

BTRC reserves the right to review, accept or require changes in the proposed team composition.

5.14 Dedicated Operations Personnel

In addition to the project team above, the Vendor shall provide **two (2) full-time dedicated personnel** for system operations throughout the entire project duration:

Aspect	Requirement
Number of Personnel	2 FTEs (Full-Time Equivalents)
Combined Role Coverage	System Administration, NOC Operations, Data Analysis
Location	On-site at BTRC premises
Duration	Full 30 months (6-month build phase + 24-month operate phase)
Reporting	To BTRC-designated Project Coordinator

Responsibilities:

- **System Administration:** Server management, system health monitoring, backup operations, software updates
- **NOC Operations:** Real-time platform monitoring, incident detection and response, escalation management
- **Data Analysis:** Dashboard monitoring, report generation, data quality assurance, anomaly detection

Qualifications:

- Bachelor's degree in CSE/ICT/EEE or related field
- Minimum 3 years' experience in system administration or network operations
- Experience with monitoring platforms and data analytics preferred

Knowledge Transfer:

- Operations personnel shall participate in knowledge transfer activities to BTRC staff
- Comprehensive handover documentation required before project completion

6. Deliverables and Indicative Payment Schedule

The Vendor shall deliver, at minimum, the following:

6.1 Inception Report & Project Plan

- Detailed work plan, project governance and risk plan.

- Refined scope and methodology.
- Legacy MIS data assessment and migration plan.

6.2 SRS, HLD & Prototype

- Approved SRS and HLD documents.
- Non-functional prototype of key screens/dashboards.
- Data migration mapping document.

6.3 Beta Release of Platform & App

- Core modules implemented:
  - Data acquisition (SNMP & APIs) for pilot providers.
  - Operational, QoS and revenue dashboards.
  - User app beta with speed test, jitter, webpage loading time.
- Legacy MIS data migration completed and validated.
- Testing documentation and reports.

6.4 Final System, Go-Live & UAT Completion

- Full system deployment (production).
- Successful completion of UAT and Provisional Acceptance Test (PAT).
- All integrations and required features completed.
- Legacy MIS data migration validated and reconciled.

6.5 Training, Documentation & Handover

- Final technical and user documentation.
- Training completion and evaluation reports.
- Source code, configuration and deployment handover.

6.6 Payment Schedule

- Payment for hardware and software will be milestone based.
- Exact deliverables and payment percentages will be finalized in the contract.

7. Project Duration

The total duration of the assignment is expected to be **30 (thirty) months**, comprising:

- **6 (six) months** for design, development, testing and Go-Live.
- **24 (twenty-four) months** for maintenance and technical support.

(These durations may be adjusted by BTRC during procurement/contracting.)

8. Maintenance and Support

During the maintenance period, the Vendor shall:

- Provide helpdesk and technical support during agreed hours.
- Monitor system health and performance.
- Perform bug fixing, minor enhancements and performance optimization.
- Apply security patches and resolve vulnerabilities.
- Support onboarding of new operators/systems as per BTRC instructions.
- Maintain dedicated on-site operations personnel as specified in Section 5.14.
- Provide periodic reports on:
  - Incidents and resolutions.
  - System performance and availability.
  - Security events and mitigations.

9. Performance Monitoring

- The Vendor shall submit **monthly progress and performance reports** including:
  - Development/maintenance status.
  - Issues and resolutions.
  - System KPIs (uptime, response times, etc.).
- BTRC may conduct:
  - Periodic technical and financial audits.
  - Independent validation of QoS computation and data integrity.

10. Taxation

- The Vendor shall be fully responsible for all applicable taxes, duties and levies as per the laws of the Government of Bangladesh.

- Prices quoted shall be inclusive/exclusive of taxes as per the instructions in the bidding documents.

11. Intellectual Property & Copyright

- All source code, documentation, configurations, data models and other deliverables produced under this assignment shall be the **exclusive property of BTRC / Government of Bangladesh**.
- The Vendor shall deliver all approved source code and related materials to BTRC.
- The Vendor shall not claim any royalty or proprietary rights over the system or its components and shall not reuse or replicate them for other clients without explicit written consent of BTRC, if applicable.

12. Confidentiality

- The Vendor shall treat all data, information and documents obtained in the course of the project as confidential.
- No information may be disclosed to third parties without prior written consent of BTRC, except as required by law.

This Terms of Reference (ToR) will form the basis for the Request for Proposal (RFP), evaluation of bids, and subsequent contract with the selected Vendor for the Online Operation and QoS Monitoring Platform for Fixed Broadband Service Providers.