# Management, Maintenance and Support Plan for XS Lagos Network


## Written and Developed for XS Broadband Ltd

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# 3. Table of Contents

# 4. Glossary of Terms

| | | |
|---|---|---|
| P&O | - | Performance and Optimization |
| FMEA | - | Failure Mode Effects and Analysis |
| RFC | - | Request for Comment |
| TOR | - | Terms of Reference |
| ROI | - | Return on Investment |
| BIA | - | Business Impact Analysis |
| UAT | - | User Acceptance Test |
| QA | - | Quality Assurance |
| SLA | - | Service Level Agreement |
| BRP | - | Business Resumption Plan |
| WBS | - | Work Breakdown Structure |

# 5. Executive Summary

## 5.1. Overview

XS Broadband has a current and imperative need to deliver quality services to its clients in a cost effective and efficient manner. XS has determined that the best means of achieving this objective is to outsource the technical management of its network to a specialized network management and implementation company.

The Network Management, Maintenance, Performance and Optimization (MMP&O) function is responsible for the collection, collation, aggregation and analysis of usage data and events, primarily for the purpose of network performance, traffic analysis, architecture optimization and the assurance of a high quality of service. This information is used to infer in near real time, the performance characteristics of the network and to enact correction and remediation measures necessary to maintain network quality. The customer is an integral part of the service delivery loop and will be preemptively informed of network activities that may affect their enjoyment of the service. The network management function also acts to support the marketing organization deliver timely, appropriate services to clients and customers.

Servica Africa Ltd offers a comprehensive network management, maintenance and operation service that covers all aspects of telecommunications operations and management.

### Business Requirements

**Objective**: To deploy teams and systems that will ensure optimal performance of the network with a view to providing quality services to XS customers in a cost effective and efficient manner. Systems to be deployed will provide intuitively accessible data analysis, storage and manipulation capabilities, facilitate the visual representation and determination of network performance statistics, permit the optimization of network architecture, predict network element failure, and model system characteristics.

Elements of the comprehensive solution are:

**Teams**: Small, mobile, coordinated, teams of skilled engineers' located proximal to geographic network element clusters to provide rapid remediation and implementation services at short notice. Teams will be aggregated into groups. There will be remediation, performance and optimization, implementation and demonstration, and planning and design groups.

**Systems**: Customized systems that will measure, predict, report, mediate, ameliorate and facilitate the repair of network inefficiencies and loss of capacity. System components will include:

1. **Visualization and Analysis**: Analyze and visualize network performance.
2. **Interpretation**: Assist in the interpretation of the causes of performance degrading conditions.
3. **Expert System**: Support the timely development of remediation measures by inferring causes, suggesting solutions and learning workable resolutions.
4. **Knowledgebase**: Provide a means of referencing solutions to previous problems of a similar nature

5. **Communications**: Give real-time notification of events, exceptions and alarms to maintenance engineers. The communications facility will be implemented as an enhanced call center with automatic message dispatch capabilities using voice, fax, SMS and pager notifications.
6. **Modeling**: Network modeling systems will help Servica engineers model why and how the network works in order to foster an enumeration and understanding of holistic performance characteristics.
7. **Network Inventory**: Identify, number and parameterize every element of the network.

## 5.2. Solution Definition

Servica will provide **8 two-man teams** stationed at strategic locations around the Lagos metropolitan area. The location of these teams has been determined by closely examining traffic patterns in both dry and wet weather and based on site clustering information. This information was used to develop patrol patterns and response locations.

Servica's proposed network management implementation provides a multi-dimensional approach to the business problem of monitoring, maintaining, managing and evaluating network performance with the objective of achieving optimal operations. **On deployment of this solution Servica will be able to**:

1. Rapidly repair defects in the XS network
2. Safely and efficiently extend the network to new customers and sites
3. Graphically represent network performance metrics in near real-time.
4. Develop, test and use detailed models of network behavior.
5. Accurately predict network performance based on previous performance and current parameters such as weather, node performance and usage.
6. Determine failure modes for the network and suggest workarounds and analyses to Servica network designers
7. Retain and replicate knowledge of problem causes and workable solutions
8. Acquire real-time notification of issues, problems, alarms and exceptions as they arise and communicate them to remediation teams

### Network Data Management

The Network Data Management process will ensure that Network Performance goals are tracked, and that notification is provided when they are not met (e.g., threshold exceeded, or performance degraded). This will include information on capacity, utilization and traffic. In some cases, changes in traffic conditions may trigger changes to the network (via Network Provisioning) for the purpose of traffic control such as request gapping in case of network congestion. Reduced levels of network capacity may result in requests to the Planning group for more resources.

The Network Data Management function in the organization can be thought of as a process that functions as below.

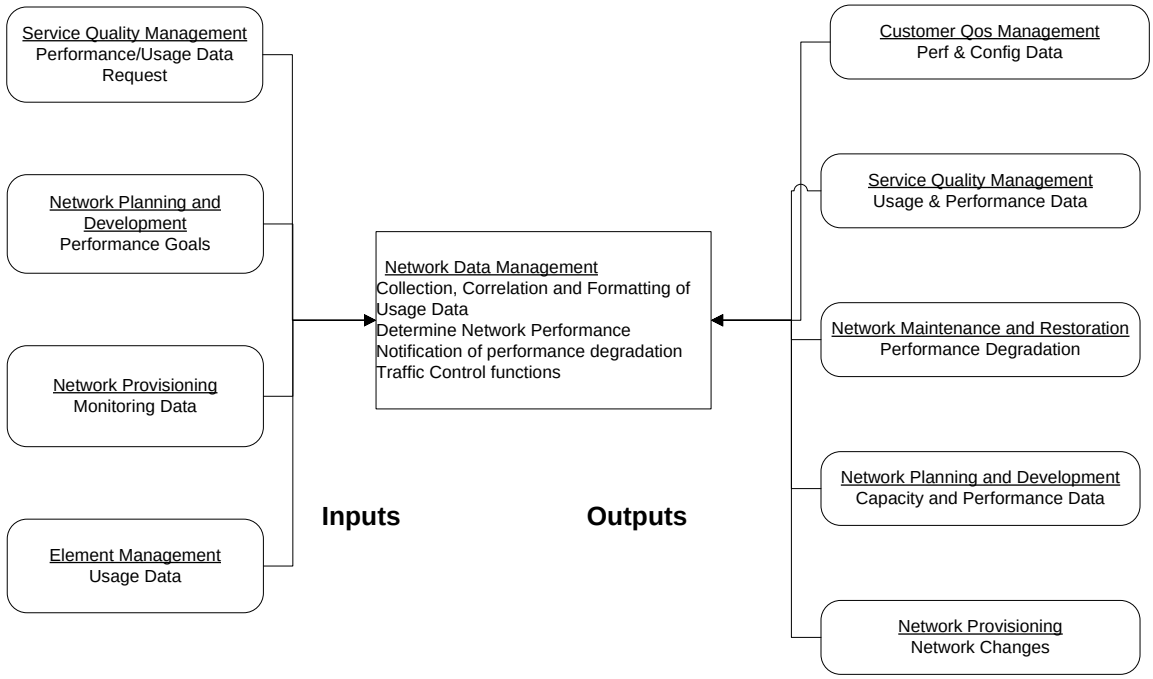


Figure 5-1: Role of Network Data Management

### Remediation and Repair

Network data management will indicate areas, elements or element groups that are performing under par and to which direct physical attention must be paid. It is projected that by using the FMEA process scheduled and unscheduled maintenance activities will be managed in such a manner as to minimize network down time. Remediation and repair teams will be strategically located throughout the Lagos metropolitan area. These mobile teams will be equipped and trained to efficiently handle network emergencies.

### Installation, Moves and Changes

Two general purpose teams will be established equipped with the specialized gear to install, move and perform significant network architecture changes.

## 5.3. Support Systems to be Installed

Some of the support and management systems to be installed will include

Network monitoring systems

Network inventory management systems

## 5.4. Project Summary

Servica will provide a holistic network management, maintenance, extension and monitoring service that will deliver exceptional value to XS clients. This will be achieved by the closely thought-out design of systems, teams and techniques in order to facilitate excellent execution of the project mission. A high level view of activities to be undertaken will include management of a call center, technical teams, network performance and security.

Aspects of this activity are delineated and explained hereunder:

1). **Performance Metrics:** [Determining What, When, Where, How often and how long to keep data] Measuring network performance is more than aggregation of individual elements of performance data. The overall picture must be assessed and evaluated in a holistic fashion. The first step is to ensure that data is collected from the correct sources in a timely fashion. The next step is the aggregation of data in meaningful context dependent ways that facilitate the conversion of raw data into information.

2). **Data Integration**: [The Bigger Picture]: Integrating and aggregating data in a meaningful fashion requires not only a knowledge of what an individual datum means, but also how it interrelates with other metrics to determine the user experience.

3).**Analysis**: [Breaking it down]: The abstraction of meaning from data sets in order to derive human understandable conclusions and develop recommendations is the necessary outcome of previous activities.

4). **Integrated Quality Management**: There are several techniques and technologies whose sole purpose is to improve designs, processes and goods. Examples and brief discussions are given hereunder:

a). ***Failure Modes Effects and Analysis*** (FMEA): A systemized group of activities designed to

- Recognize and evaluate the potential failure of a product/process and its effects

- Identify actions which could eliminate or reduce the chance of potential failure occurring

- Document the process

b). ***Correlation and Trend Analysis***: Complex systems such as networks develop aggregate behavior that can often be very simply characterized. A suitable representation of network behavior will permit the discovery of these trends. This characterization is a suitable abstraction of the individual data sets and data streams that measure network performance.

5). **Knowledgebase Development**: Problems tend to recur. Similar problems tend to have similar solutions, if the similarity can be recognized. In any event, before trying out anything new in a production environment, try what has worked before you try what is untested. By developing a knowledgebase of problems and their solutions, resolution of faults and problems can be speeded up to provide a better user experience.

6). **Remediation, Maintenance and Extension**: This is the last step in the process and involves the actual physical handling of equipment.

### Call Center Management

A call center will be established to manage communication between teams, customers and the network owner. The call center will be equipped with the latest state-of-the-art communications facilities. Performance measures of the call center team will include holding time, problem solving duration, dispatch frequency and absolute number of calls handled.

### Technical Team Management

The design, location, composition and equipment of technical teams will be constantly reviewed for optimality. Performance measures of technical team management will include staff churn, documentation detail, response time, scheduled maintenance effectiveness, rate of reduction in problems occurring, training of staff, equipment management and leadership.

### Network Performance Monitoring

Network performance monitoring will be a function of the detailed modeling, and characterization of the managed network. Performance measures will include length of data storage, detail of data acquired, accuracy of interpretation of network conditions, customer experience and accuracy of fault prediction.

### Network Security Management

XS current clientele includes many banks and large corporations. These organizations require detailed knowledge of network related vulnerabilities and threats. These vulnerabilities can be from myriad sources including improper design, down-time due to acts of God, malign actions by disgruntled employees and external parties.

Tiger teams will be periodically established from the best members of all teams to test network security, business continuity and disaster recovery capabilities and to review network usage metrics to establish the execution of threatening activities.

Management performance metrics will include depth of disaster recovery and business continuity plans, threat evaluation and response capabilities and state of network knowledge.

## 5.5. Business Impact and Alignment

The optimal usage/performance of scarce resources is at least as important as the acquisition of new capacity. The priority for support and automation of these processes will become increasingly critical for XS, if not a crucial priority already.

The Network Data Management Process as defined in the TNM has two distinct aspects:

***Usage Measurement for Apportionment*** For this aspect, the need is to collect, collate and correlate large volumes of data and move them efficiently to systems that can carry out allocation and assignment to individual users or departments. The data transfer needs a high level of integrity and visibility.

***Monitoring of network traffic and performance conditions***: This aspect is crucial as network degradation usually precedes network failure. Detection and notification of problems at this stage can improve user perception of service quality. It is also essential to the Network Planning and Development processes, since it

gives early warning of exhaustion of network capacity. The process is essential to support the Network Management, Service Management, and Customer Care lifecycles.

Real time analysis data is only useful if it is reviewed and responded to in real time, otherwise the expense of creating highly robust, reliable, and fast systems is wasted. Human beings are notoriously bad at looking at screens waiting for something to happen or continuously analyzing information. It is for this reason that audible or visible alerts or exceptions have been universally adopted by Servica to notify engineers of events that merit attention. The solution set proposed adopts the same paradigm. The normal outcome of lengthy, knowledge based analyses is the assessment of the requirement or lack of it of a response. By capturing the experiential rules or knowledge in software, the rapidity of this evaluation can be dramatically increased in regularity and accuracy. Servica will implement a custom built expert system to perform this function.

## Solution Fit

XS Management has established a requirement to deliver the highest quality of service in a customer centric and friendly manner. This objective is closely served by the automation of aspects of the performance measurement, reporting, notification and optimization functions.

The comprehensive Servica solution fills in the gap between current Network Management Solutions and Enterprise Management Solutions. An expectation that engineers and customers will only feed data into the management by a combination of support calls and complaints is incomplete, the solution set must query network elements to establish their availability, state, performance, congestion, utilization and determine the possibility of failure of those elements.

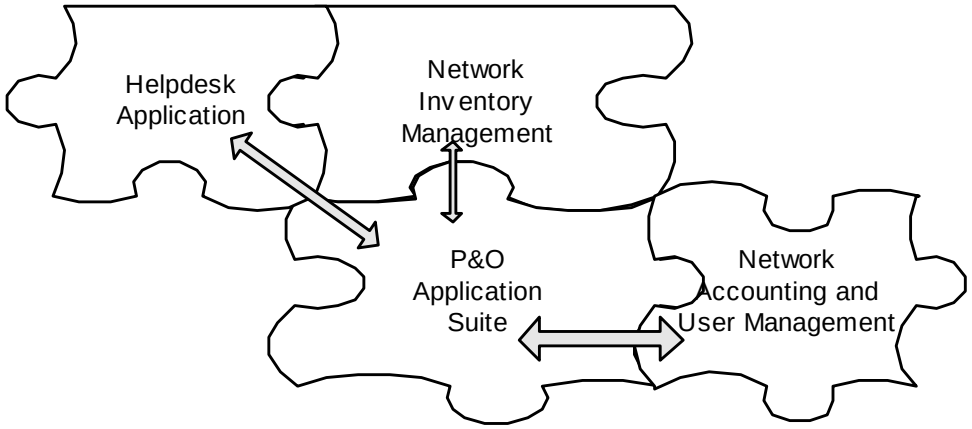


Figure 5-2: Solution Fit

## 5.6. Critical Success Factors

The success of this project will be contingent on intuitive design, ease of use, non-reliance on individuals and integration into current business processes. The critical success factors for this network management project are:

A well-defined scope and incremental approach to the delivery of functionality in order to avoid “Analysis paralysis”

A clear understanding by both parties that this is a JOINT user/implementer effort

Performance monitoring needs will grow and evolve as user requirements change and the network evolves. Servica will re-configure and change the solution set as needs evolve.

The implementation of adequate communication and management systems to ensure that all parties are informed, aware and responding to clear goals, targets and directions.

## 5.7. Implementation Approach Overview

The approaches embodied in the Project Management Body of Knowledge (PMBOK) are integrated into our comprehensive solution delivery framework to deliver industry best practice based on international standards. Our methodology combines well-defined systems, processes, standards, and procedures together with supporting methods, techniques, and tools.

A high level overview of the phases of project delivery include but are not limited to the following sequence:

1. **Handover [1 Week]** : Servica will formally take over the management of the network from incumbent technical service provider. Deliverables from this phase will include a comprehensive network assay, detailed site surveys of every XS site, network inventory, network architecture diagrams/maps and a statement of position.

2. **Establishment [1 Week]**: Deployment of a call center, help desk, problem tracking system and network monitoring software implementation and deployment of technical teams. The objective of this phase shall be to minimize interference from external agencies, provide detailed monitoring and establish rapid response capabilities. This phase shall also see the establishment of a Servica project office.

3. **Management [Continuous]**: Provision of basic network management services, regular network performance/status report submission to XS, and remediation, management and extension services on scheduled and ad-hoc basis as required.

4. **Evolution [Continuous]**: Implementation of advanced support systems such as an expert system, ERP and personnel performance measurement systems.

## 5.8. Investment Summary

Based on our analysis of information received we estimate the ***monthly*** cost of providing this service shall be **N3,800,000.00** (Three million eight hundred thousand Naira). Full service will commence in week three after commencement.

# 6. Background

## 6.1. History

In 200X XS broadband was established as a 3.5 GHz broadband provider primarily delivering service to large corporations and banks. It currently has over 150 clients distributed nationwide with a heavy preponderance in Lagos.

XS seeks in the short term to rapidly expand its client base and to offer a raft of new services including internet access to the home, multimedia on demand, VoIP services and others. In order to facilitate this expansion, XS management has decided to outsource non-core installation, demonstration, maintenance and client management services to third parties, collectively to be called the Technical Service Channel, and individually Technical Service Channel Partners.

## 6.2. Statistics

| No | Item | Count |
|---|---|---|
| 1 | Number of Clients | >150 |
| 2 | Repeaters in Lagos | 9 |
| 3 | | |

## 6.3. Maps


otta
ikeja
Akitan
Orile
Iseri
Agege
Akinogun
Lagos Airport
Ikeja
Ojota
Erunkan
Oruba
Shogunle
Ogudu
Mafoluku
OSHODI
Igando
iganmu
SHOMOLU
Ewu
Bada
Lagos University
Yaba College of Technology
National Stadium
YABA
lagos island
Lagos
Iganmu
Ijora Village
National Theatre
APAPA
Igbo
Isunba
Ajegunle
Apapa Elek
Dankaka
Apapa Wharf
Ogogoro
Badagri Creek
Onigbokun
alaba
apapa
victoria Island

# 7. Management Approach

The Lagos metropolitan area is notorious for heavy slow traffic and impassable roads in the rainy season. These factors generally imply that remediation teams cannot accurately predict the time it will take to travel from one point to another. This problem in logistics is analyzed using the following factors:

**Abnormal Demand**: Changes in demand for service that also affect the capacity to deliver service. Thus rain in Lagos increases travel time while at the same time adversely affecting network quality and hence increasing the need for technical support.

**Ramp Rate**: The rate at which we can control the growth trajectory of service requirements.

**Acceptable Quality Level [AQL]**: The maximum permitted time to respond adequately to a support call is a measure of the quality of the technical support offered. The AQL imposes a constraint on minimum team numbers, locations and equipment.

**Adaptive Control Measures**: Servica measures it capability to respond to changes in service requirements by a metric we call adaptive control. Thus the ability to redeploy, relocate or increase number of teams is a measure of our adaptive control.

**Reverse Logistics Constraints**: In case of remediation, repair and maintenance we are not delivering a product or service, but returning a service or product to its former state. This sort of activity creates unique constraints on tactics, techniques and procedures and is often more complex than direct delivery. Some of these constraints are time, cost and scope of work.

**Activity Analysis**: The process of identifying and cataloging activities for detailed understanding and documentation of their characteristics.

**Seasonality/Base Series**: The regular periodic variation in demand for technical support, say from year to year or other regular period. We take account of this seasonality by having inexpensive extra deployable capacity, (contract engineers).

## 7.1. Zoning

If our network failure prediction systems were perfect we would not need to create and staff zones, we could continuously plan to and deliver services without having to “warehouse” personnel in operational silos (Just-in-time service). Our failure prediction systems will gradually improve with time and we can begin to reduce some of the costs of engineers.

In the meanwhile, we have to develop as responsive a system as we can, with the information that we have. Our first effort at achieving this is the division of Lagos into 2 general zones: Islands and Mainland zones.

## 7.2. Team Deployment

Mobile teams will initially be deployed at 6 locations in Lagos as follows:

Apapa

Victoria Island

Ikeja

Alaba

Lagos Island

Ota

There will be three other static teams as follows:

Call Center Team

Planning, Performance, Optimization and Design Team

Administration and Training team

## 7.3. Patrol Planning

We have identified three states of readiness to be designated Network Operations Levels one to three (NETOP1 – NETOP3).

**NETOP1**: All mobile technical teams will perform routine maintenance, on demand installations, standard remediation and repair. Training at HQ every Saturday. NETOP1 is indicated as Normalcy. Operations of standard technical teams are 12/6, NOC and call center operations are 24/7.

**NETOP2**: Indicated in the event of network element failure. Focus shifts to remediation, management and extension activities. Training is suspended. Operations of standard technical teams are 12/7, HQ, NOC and call center operations are 24/7. NETOP2 can be initiated by Zonal or Regional leaders for their respective zones or regions. NETOPT2 can also be automatically initiated by the Performance and Optimization team based on certain defined performance triggers. NETOP2 is a heightened state of preparedness and responsivity.

**NETOP3**: Highest level of preparedness and readiness, all teams, including HQ and call center teams are 24/7. All personnel are deployed in support of major remediation or disaster mitigation efforts. HQ staff may be deployed at the option of the group leader in support of remediation and repair measures. If any zone or region is upgraded to NETOP3 status, all other zones and regions will be at NETOP2 status.

Operational Activity Frequency will be denoted in Standard Operating Procedures (SOPs) as either 24/7, 12/7, Daily, Weekly, Monthly, Randomly

# 8. Technical Approach

## 8.1. Background

The Servica approach to technical management emphasizes the preventative rather than the corrective maintenance of systems, processes and products.

### FMEA

Servica uses a technique called Failure Mode and Effects Analysis (FMEA) to assess network vulnerability and to mitigate such vulnerabilities before they become problems. This technique is briefly outlined below.

#### 8.1.1.1. Definitions

a. **Failure Mode** - A particular way in which an item fails, independent of the reason for failure.

b. **Failure Mode and Effects Analysis (FMEA)** - A procedure by which each credible failure mode of each item from a low indenture level to the highest is analyzed to determine the effects on the system and to classify each potential failure mode in accordance with the severity of its effect.

c. **Indenture Levels** - The hierarchy of hardware levels from the part to the component to the subsystem to the system, etc. This is derived from the Bill of Materials of the Network.

d. **Redundancy** - More than one independent means of performing a function. There are different kinds of redundancy, including:

(1) Operational - Redundant items, all of which are energized during the operating cycle; includes load-sharing, wherein redundant items are connected in a manner such that upon failure of one item, the other will continue to perform the function. It is not necessary to switch out the failed item or switch in the redundant one.

(2) Standby - Items that are inoperative (have no power applied) until they are switched in upon failure of the primary item.

(3) Like Redundancy - Identical items performing the same function.

(4) Unlike Redundancy – Non-identical items performing the same function.

#### 8.1.1.2. Description

The objective of an FMEA is to identify the way failures could occur (failure modes) and the consequences of the failures on network performance (failure effect) and the consequences on customer service objectives (severity assignment). It is based on the usual case on which failure effects, which are expressed at the system level, are caused by failure modes at lower hardware levels. The procedure does not quantify the probability for failure occurrence; rather a qualitative assessment of the failure effect is gained by assigning the failure mode to a severity category.

#### 8.1.1.3. Assigning Severity

a. Category 1, Catastrophic - Failure modes that could result in serious injury or loss of life, or damage to the network or client equipment. A lightning strike on unprotected customer equipment counts as catastrophic.

b. Category 1R, Catastrophic - Failure modes of identical or equivalent redundant hardware items that, if all failed, could result in Category 1 effects.

c. Category 2, Critical - Failure modes that could result in loss of one or more mission objectives as defined by the Servica project office.

d. Category 2R, Critical - Failure modes of identical or equivalent redundant hardware items that could result in Category 2 effects if all failed.

e. Category 3, Significant - Failure modes that could cause degradation to service quality.

f. Category 4, Minor - Failure modes that could result in insignificant or no loss to service quality.

## MPS / MRP / Sparing

A prerequisite to a comprehensive FMEA is a detailed breakdown of systems into sub-systems into components and parts. This system decomposition activity is called development of a Bill of Materials. A BoM is a tree structure showing system elements.

The FMEA of BoM elements will establish parts most likely to fail and the parts whose failure would have a highest severity. These parts should, if possible, be kept in ready stock or standby.

## Quality Management

Servica's quality systems revolve around two principal interrelated concepts – LEAN Manufacturing and Six Sigma.

Six Sigma.

The Servica Six Sigma approach defines high level objectives to be achieved within a performance improvement model called DMAIC, Define, Measure, Analyze, Improve, Control.

| | |
|---|---|
| DEFINE | Define the goals of the improvement activity. At the top level the goals will be the strategic objectives of the organization, such as a higher ROI or market share. At the operations level, a goal might be to increase the throughput of a production department. At the project level goals might be to reduce the defect level and increase throughput. Apply data mining methods to identify potential improvement opportunities. |
| MEASURE | Measure the existing system. Establish valid and reliable metrics to help monitor progress towards the goal(s) defined at the previous step. Begin by determining the current baseline. Use exploratory and descriptive data analysis to help you understand the data. |
| ANALYZE | Analyze the system to identify ways to eliminate the gap between the |

| | |
|---|---|
| | current performance of the system or process and the desired goal. Apply statistical tools to guide the analysis. |
| IMPROVE | Improve the system. Be creative in finding new ways to do things better, cheaper, or faster. Use project management and other planning and management tools to implement the new approach. Use statistical methods to validate the improvement. |
| CONTROL | Control the new system. Institutionalize the improved system by modifying compensation and incentive systems, policies, procedures, MRP, budgets, operating instructions and other management systems. Servica uses ISO 9000 systems to assure that documentation is correct. |

Servica currently has one Six Sigma master black belt implementing a project we call meta-sigma, the application of six sigma methods to implement six sigma in the organization.

LEAN.

The principle of LEAN manufacturing or process management hinges on the elimination of waste. Our LEAN initiative is focused on eliminating all waste in our processes. Our goals for our LEAN initiative include zero waiting time, zero inventory, scheduling (internal customer pull instead of push system), batch to flow (cut batch sizes), line balancing and cutting actual process times.

## 8.2. Support Systems to be Installed

In order to provide top-notch services, several systems will have to be implemented. We propose to use **Linux** as our standard operating system for both desktops and servers. A summary is provided hereunder of some of the systems to be implemented

| Component | Functionality |
|---|---|
| Help Desk Application | Record, resolve, escalate and track user complaints. Manages assignment of work tickets, assignment of teams to troubleshooting, tracks problem resolution and interfaces with the knowledgebase to assist user self help and remedial engineering teams. The helpdesk application maintains a resource registry, people who are capable of solving particular problems and a maintenance engineer can ask these people to resolve a problem. |
| P&O Query Suite | Performs routine pings, traceroutes, whois, netstats etc on the network, collects data from active elements and stores configurations and versions, |

| | |
|---|---|
| | manages configuration change on all devices and restores state in the event of failure. The who-is-alive function will notify administrators when a critical device is offline. The Query suite can monitor software, BIOS and OS patches and updates. |
| Network Inventory Management | The Network Inventory management application will keep track of all equipment on the network, network elements and computers. The NIM will track computers down to component level. The NIMS will track repairs, removals, replacements, issues and returns. It includes a Bar Code printer to uniquely identify each device on the network and to ease stock takes. |
| Unified Network Accounting System | The Unified Network Accounting system will enable/disable, create, manage, and remove users from the system. |
| Failure Mode Effects and Analysis | PFMEA and DFMEA; Continuing Evaluation procedures. The FMEA is a living document and should always reflect the latest design level, as well as the latest relevant actions, including those occurring after the start of production operations.<br><br>System will support statistical analysis and reporting using Pareto Diagrams, Cause and Effect (fishbone) diagrams, Control Charts, Histograms and scatter diagrams.<br><br>The process will calculate the Risk Priority Number (RPN) for each event by determining severity, occurrence and detection ranking |
| Knowledgebase | The knowledgebase will capture and present knowledge about problems, their solutions and occurrence, and permit performance engineers to share insights, knowledge, tactics, techniques and procedures. It will act as a continuing repository for domain specific knowledge |
| TPM Expert System | Automation is the only viable technique to reduce human error, shorten response times and minimize performance penalties. |

| | |
|---|---|
| | A Generic On Line Diagnostic System (GOLDS) will be implemented to perform metrication, canonicalization, evaluation and inference on the available data. This will permit the classification of faults, errors and performance degradation, develop responses and using domain specific knowledge, recommend Lines of Action (LOA's) for remediation or attenuation. |
| Data Warehouse/ Integration Platform | A PostgreSQL database and DW/BI infrastructure will be leveraged to provide a consistent, consolidated view of network performance and configuration data. |

## Help Desk/CRM

A web based help desk solution will be implemented to provide trouble ticket management. The help desk system will support the problem resolution process including integration with the call center.

The help desk will support technical team communications, managements tracking of progress, allocation of tasks to individuals and teams, and will also support shift management, and NETOPT status implementation.

The Help desk will form an integral part of the quality assurance function. Servica will design and implement the processes to support the help desk function.

## Call Center

A full featured 5 seat call center will be implemented to support XS operations. The call center will be integrated with the Help desk application. Servica will implement and support the call center infrastructure as part of this effort. The fee for technical support of the call center is included in the monthly price.

## Groupware

A web based groupware solution will facilitate information sharing between the network owner and Servica, and between the different operational groups and teams. The groupware system to be implemented will provide a central repository for equipment manuals, policies, procedures, plans, maps and processes. Access to the groupware solution will be controlled tightly.

## TPM Expert System

Servica as part of its Six Sigma and LEAN system deployment will implement a Total Productive Maintenance custom built expert system to automate acquisition of network knowledge.

Many tasks can be broken down into sequences of activity and decisions. The decisions are guided by experience, knowledge of the problem domain and access to detailed problem descriptions. Performance engineering encompasses all these diverse attributes of skill. The expert system shell will provide a method of:

Collecting data from archives and the data warehouse – determine what information is important and how to describe a particular state of the system numerically.

Acquire Heuristic knowledge of how parameters interrelate with each other. This heuristic knowledge can be presented to performance engineers to validate and as the basis for investigation into parametric relationships. The capabilities of the TPM Expert system shell increase as the knowledgebase, rules and production system increase.

The expert system will act as a repository of basic knowledge and parametric relationships. It will eventually be able to make recommendations based on trends, events and thresholds.

## Data Warehouse

All alarms, configuration information, changes, adds, PING test results will be stored permanently in a data warehouse. This will provide Servica performance engineers with the trend and performance data that they need to optimize the network.

# 9. Project Management Plan

Servica has adopted a management by projects approach to delivering the highest quality network management, enhancement and remediation service. In order to prosecute this project Servica will establish a head office on the Lagos mainland, close to most clients and easily accessible by all parties. Remediation teams will be located at 7 points around the Lagos metropolitan area.

## 9.1. Introduction

Servica believes that in order to have a successful outcome we need strong project management. Strong project management and documented processes and methodologies will lead to:

1. Detailed cost control
2. Consistent quality of deliverables and outputs
3. Predictable results
4. Verifiable performance of personnel, components and infrastructure
5. Measurable success: If you can't measure it, you don't know it
6. Realization of Business Benefits

## 9.2. Project Management Overview

In order to provide end-to-end visibility of all project activities, each deliverable will take account of:

- Time Constraints, expectations
- Cost Implications and management options
- Risks (Inherent and Systemic risks must be identified and addressed)
- Scope Management
- Quality Control and Management
- Integration Management and business benefit analysis
- Communication Management
- Human Resources Management

## Elements of our Project management approach

Our project management approach adheres closely to best-practice and the project management body of knowledge. This defines the activities involved in project management as the following:

Integration Management: The definition of a project, the business outcome required and the means of achieving the specified goals by coordinating and managing resources.

## Reasons for Project Failure

There are myriad reasons why projects do not deliver the value they ought to, on time and in the manner they were supposed to. By a clear identification of these risks early in the process and the determination of how to address them, the success of a project is better assured.

Some of the reasons why projects fail are:

Solution not aligned with Business Objectives:

- Business Benefits not properly qualified
- Objectives and requirements poorly understood
- Addressing only part of, or the wrong problem

Insufficient Preparation before Project Execution:

- Under estimating the effort required
- Deliverables not properly defined
- Insufficient metrics
- No proper change management system
- No acceptance criteria to measure completion & quality
- Key project team members not appointed or the wrong skills.

During Project Execution:

- Failure to identify, monitor and control the activities
- Life Cycle models not defined or not customized to specific solution
- Lack of coordination of resources, expertise and activities
- Lack of control over progress

Organization and Communication:

- Failure to keep all the stakeholders involved at each step
- Lack of senior management commitment and support
- Insufficient end-user involvement
- Lack of communication with all interested parties
- Unclear responsibility, authority and accountability

## 9.3. Our Approach

We are focused on delivering a world class service using the best practice and best-of-breed methodologies. We customize PMBOK (Project Management Body of Knowledge) to suite the specific circumstances pertaining to the XS broadband network. We will use those standards as templates for our deliverables and outputs. In addition to the technical standards we also use business best practices for our projects as follows:

- Obtain Business sponsorship for the project
- We take ownership, responsibility and accountability of projects
- Use proven, and tested methodologies
- Phased approach to successful delivery of a project
- Set up a well balanced management and team structures
- Well defined escalation procedures
- Communicate - keep all the relevant stakeholders informed, all the time (Identify Accountable, Responsible, Consulted, Informed categories)
- Manage Expectations
- Manage Change, Risk, Quality, Cost and Contracts
- Skill Transfer to the client

### Project Management Processes

The PMBOK identifies project management to consist of four interacting principal processes:

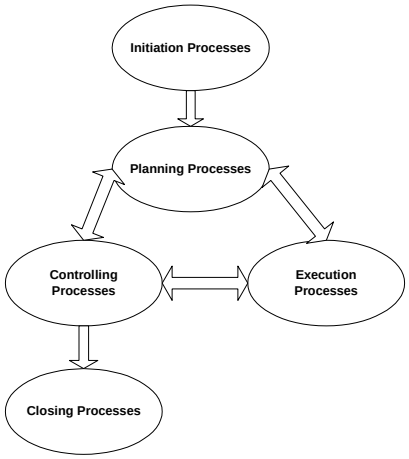


Figure 9-1: PMBOK Project Management Processes

## Initiation

Project initiation consists of a project definition conference or kick-off meeting. The outcome of which is a Project Definition Document (PDD) which specifies the following:

Goals and Objectives

Work Breakdown Structure (WBS)

Scope

Project Plan

Organizational Responsibilities and Resources

Management Systems

Risks, Assumptions and Dependencies

Critical Success Factors

Signatories

## Planning

The planning processes involve the validation, management and tracking of the project plan. We use Microsoft Project for our WBS. An important part of our planning and planning management process is risk assessment and mitigation.

## Execution

These are the technical activities involved in delivering the project. We have developed an iterative method of developing software derived from the Dean Genopersistence model.

## Controlling

Change Management, scope control, cost and quality management, system integration, documentation and knowledge transfer are the key foci of this activity in our project management methodology.

## Closing

At project closure we develop an After Action Report (AAR) to capture any lessons learnt. We also have administrative and contractual closure of the project (Sign off). We hand over the completed applications to client operations.

## 9.4. Project Management Roles and Responsibilities

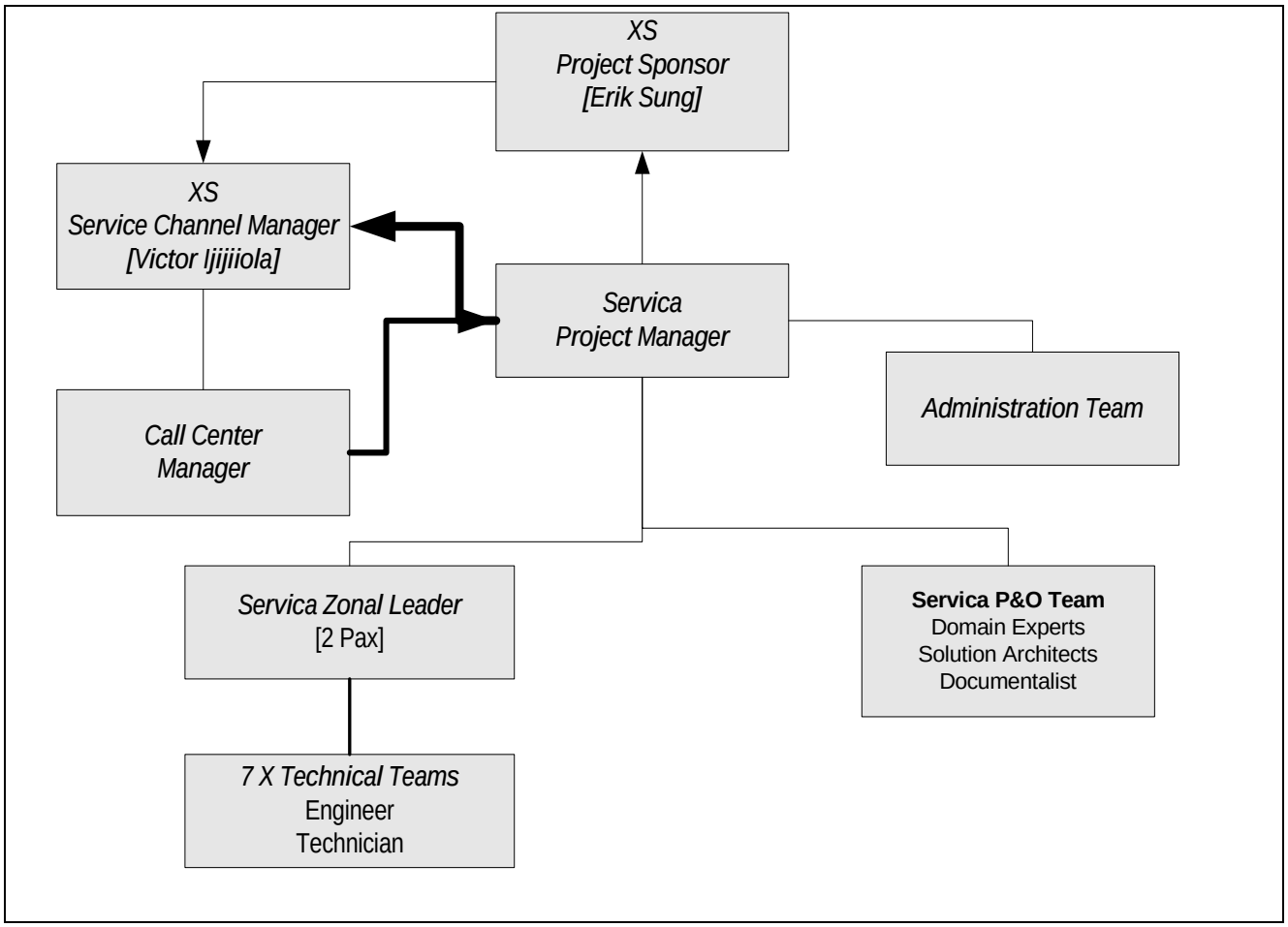


Figure 4: Project Roles

Our hierarchy has been simplified to facilitate communications across all levels of the organization and to shorten the chain of command.

### Servica Project Office

The Servica Project Office physically consists of the Servica Project Manager and the Zonal leaders. The members of the Project Management Office jointly monitor the project budget, status, issues, and change requests. They share responsibility and accountability for project success. They report directly to the XS Service channel manager and provide weekly reports to the XS Project sponsor. The project sponsor may request reports at any time. The project office will work closely with the XS team to ensure prompt, appropriate and adequate responses to plans, exigencies and circumstances.

## Servica Project Manager

The basic responsibilities of the Servica Project Manager include:

High level issue resolution

High level contingency support

High level monitoring of changes or activities affecting cost, schedule and quality of the project

Liaising closely with XS to establish future directions, plans and requirements so as to position Servica to respond appropriately.

Approving or rejecting submitted Change Requests as valid or invalid before time is spent on assessment

Ensuring that project issues are resolved and resolutions are implemented

Managing organizational and business process changes

Develop and track the project budget with XS Service Channel Manager and Project Sponsor

Participate in all Project Checkpoint Reviews

## Servica Zonal Leaders

The Servica zonal leaders will have the ultimate responsibility for their allocated zones and will have the power to change the NETOP level. Their duties include:

Scheduling and day to day management of team leaders

Quality assurance on work performed

Providing daily reports to the Servica Project Manager

Identifying Servica project resource requirements (skills and level of participation)

Providing work effort estimates for assigned tasks

Acquiring commitment of XS resources

Conducting project-based performance evaluations

Ensuring capture of project tracking data

Review project risks and risk management strategies

Store Project Status Reports

Coordinate the resolution of project Issues and Change Requests with the Servica Project Manager

Participate in all Project Checkpoint Reviews

Attend all meetings with the Project Sponsor

Participate in requirements review

Sign off on requirements and design with the XS Service Channel Managerand Servica Project Manager

Develop and execute the Acceptance Test Plan

Develop the Implementation Strategy as required

Develop the Implementation Plan as required

## Servica Call Center Manager

The Call center manager will provide leadership of the call center team and provide last line support to customers. The Call center manager will also be expected to:

Recruit, induct and train new call center attendants

Manage and reduce attendant churn by keeping staff morale high

Develop and manage Key performance indicators for call center staff

Arbitrate disputes, manage irate clients and provide last line counseling the call center staff

Manage discipline and implement sanction and benefit scheme

## Servica Engineers

The Servica technical Team will be comprised of technical personnel to complete the tasks associated with each work segment. Collectively, the basic responsibilities of the team include:

Design, implement, support, install and manage network nodes and elements.

Respond in a timely manner to support orders from the call center

Provide after action reports (AARs) after site visits and support calls

Contribute to the knowledgebase and provide Lessons-learnt

Ensuring adherence to design and performance standards

Ensuring adherence to object reuse principles and guidelines set in the design phase

Escalating unresolved issues

Configuration management and release control

Understanding the application area thoroughly

Status reporting to Project Manager

Participating in design, technical and progress review meetings

Provide ‘Early Warning Signals’ to the Project Manager

Provide architectural inputs for the project

Evaluating impact of changes on design and architecture

Adhering to all project standards and methodologies

Assisting clients and others in using and understanding the network, systems and services

Making constructive suggestions about the improvement of the processes, forms, techniques, and structure of the project management methodology

## 9.5. Knowledge Transfer

Servica has developed a detailed information distribution strategy to ensure that XS is kept "in the loop" as maintenance, deployment and network management activities are performed. Aspects of this information deployment strategy include:

Servica Groupware solution

Knowledgebase

Network Inventory Access

TPM Expert system access for designated XS employee

## 9.6. Management Meetings and Status Reports

There will be a weekly management meeting on Fridays at 1100 Hrs which will be attended by the XS Service Channel Manager and the Servica Project Manager. Zonal Managers may attend by appointment.

Zonal managers will submit a detailed status report every Thursday by latest noon, detailing performance of their zones, lists of support calls received, customer satisfaction surveys (if any), problem resolution durations and listing any issues that they think deserves the attention of the management team.

# 10. Responsibility Matrix

## 10.1. General Responsibilities

| GENERAL RESPONSIBILITIES | | XS | Servica | |
|---|---|---|---|---|
| Item | Description | Supply | Supply | Implem. |
| | | | | |
| 1 | GENERAL | | | |
| | | | | |
| 1.1 | Project Management including all administrative charges | | X | X |
| 1.2 | Construction Supervision including all administrative costs | | X | X |
| 1.3 | All Risks, Public Indemnity and other on site insurances | | X | |
| 1.4 | Quality Control and on-site acceptance | X | X | |
| 1.5 | Quality Control of the materials supplied by XS | X | | |
| 1.6 | Quality Control of the materials supplied by Servica | X | X | |
| 1.7 | All required Permits regarding Lease, Building, Council permissions, Tribal Chiefs permission, AC Applications, Environmental Applications and other required Permits | X | | |
| 1.8 | All payments due for 1.7 | X | | |
| 1.9 | 24 Hour on-site security requirements | X | | |
| | | | | |
| 2 | MOBILISATION AND DEMOBILISATION | | | |
| | | | | |
| 2.1 | Civil Works Teams | | X | |
| 2.2 | Remediation Engineering Teams | | X | |
| 2.3 | Tower Rigging Teams | | X | |
| 2.4 | Electrical Works Teams | | X | |
| 2.5 | RF equipment installation Teams | | X | |
| 2.6 | BS installation Teams | | X | |
| 2.7 | Microwave equipment installation Teams | | X | |
| 2.8 | Road construction teams as may be required | | X | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 3 | LOGISTICS | | | |
| | | | | |
| 3.1 | Warehousing of the materials and Equipment supplied by XS | X | | |
| 3.2 | Warehousing of the materials and equipment supplied by Servica | | X | |
| 3.3 | Transport to site of the materials and Equipment supplied by XS | X | X | |
| 3.4 | Transport to site of the materials and equipment supplied by Servica, including all necessary plant, tools and equipment | | X | |
| 3.5 | Loading and unloading of the materials and equipment supplied by XS | | X | |
| 3.6 | Loading and unloading of the materials and equipment supplied by Servica | | X | |
| | | | | |
| 4 | SUNDRIES | | | |
| | | | | |
| 4.1 | Training of Servica's personnel in respect to BS Commissioning | X | X | |
| 4.2 | Electrical Certificate of Compliance as per Servica format | | X | |
| 4.3 | Supply of Test Procedures | X | X | |
| 4.5 | Earthing Test Results Certificate | | X | |
| | | | | |
| 5 | ACCEPTANCE | | | |
| | | | | |
| 5.1 | Supply of the Acceptance procedure | X | X | |
| 5.2 | Supervision of the Acceptance Tests | X | X | |
| 5.3 | Supply of manpower, tools and equipment for carrying out the Acceptance tests | | X | |
| 5.4 | Supply of the Acceptance Test report, including Sweep test report and Earthing Test Report | | X | |
| 5.5 | Supply of the As-Built drawings | | X | |

## 10.2. Maintenance Responsibilities

| Maintenance | XS | Servica |
|---|---|---|

| Item | Description | Supply | Pay | Approve | Impl. | Supply | Pay | Impl. |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| 1 | Technical Team | | | | | | | |
| | Location/Site Space | X | X | | | | | X |
| | Marshalling Area | | X | | | X | | X |
| | Aperto Training | X | | | X | | | |
| | ISM Training | | | | | X | | X |
| | Process Training | | | | | X | | X |
| | Transport | | | | | X | | X |
| | Mechanical Tools | | | | | X | | X |
| | Electrical Tools | | | | | X | | X |
| | RF Tools and Equipment | | | X | | X | | X |
| | GSM Phones | | | | | X | | X |
| | Phone Cards | | | | | X | | X |
| | Palm Pilots | | | | | X | | X |
| | Salaries & Allowances | | | | | X | | X |
| | Access Authorization | X | | | | | | X |
| | Site Visit Form | | | | | X | | X |
| | | | | | | | | |
| 2 | Planning and design team | | | | | | | |
| | Office Space | | X | | | X | | X |
| | Transport | | | | | | X | X |
| | Aperto Training | X | X | | | | | X |
| | ISM Training | | | | | X | X | X |
| | Process training | | | | | X | X | X |
| | Laptops | | | | | X | X | X |
| | Work stations | | | | | X | X | X |
| | Internet Access | | X | | | X | | X |
| | Design Software | | | | | X | X | X |
| | Salaries and Allowances | | | | | | X | X |
| | | | | | | | | |
| 3 | Administration Team | | | | | | | |
| | Office Space | X | X | | | | | X |
| | Transport | | | | | X | X | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Aperto Training | X | X | | | | | |
| | ISM Training | | | | | X | X | X |
| | Process training | | | | | X | X | X |
| | Laptops | | | | | X | X | |
| | Work stations | | | | | X | X | |
| | Internet Access | | X | | | X | | X |
| | Office Automation Software | | | | | X | X | |
| | | | | | | | | |
| 4 | RF Equipment | | | | | | | |
| | Supply New Aperto Radios | X | X | | | | | |
| | Supply New ISM Radios | | X | | | X | | X |
| | Aperto Radio RMA | | X | | | X | | X |
| | ISM Radio RMA | | X | | | X | | X |
| | Aperto TechSupport Contract | X | X | | | | | X |
| | ISM TechSupport Contract | | X | | | X | | X |
| | Aperto Warranty | X | X | | | | | X |
| | ISM Warranty | | X | | | X | | X |
| | RMA Shipping Cost | | X | | | | | X |
| | RMA Communications Cost | | X | | | X | | X |
| | Acquire Asset Register | X | | | | | | |
| | Maintain Asset Register | | | | | X | X | X |
| | Water Proofing | | X | | | X | | X |
| | | | | | | | | |
| 5 | Towers and Supports Maintain | | | | | | | |
| | Self Supporting Mast | | X | | | X | | X |
| | Guyed Ground Mast | | X | | | X | | X |
| | Guyed Rooftop Mast | | X | | | X | | X |
| | Guyed Poles | | X | | | X | | X |
| | Self Supporting Poles | | X | | | X | | X |
| | TPM Inspection | | | | | X | X | X |
| | Monthly Status Reports | | | | | X | X | X |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | Maintain Gensets | | | | | | | |
| | TPM Inspection | | | | | X | X | X |
| | Cleaning | | | | | X | X | X |
| | Oil Change | | X | | | X | | X |
| | Coolant | | X | | | X | | X |
| | Moves, Removals | | X | | | X | | X |
| | Transport genset | | X | | | X | | X |
| | Install | | X | | | X | | X |
| | Spare Parts | | X | | | X | | X |
| | Routine Maintenance | | | | | X | X | X |
| | Poka Yoke Maintenance Lists | | | | | X | X | X |
| | Certify Earthing | | X | | | X | | X |
| | Supply Fire Extinguisher | | X | | | X | | X |
| | Fire Extinguisher Maintenance | | | | | X | X | X |
| | Fuel Supply | | X | | | X | | |
| | Fuel Level Notification | | | | | X | X | X |
| | Major Maintenance | | X | | | X | | X |
| | Fuel Storage | | X | | | X | | X |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| 7 | Call Center | | | | | | | |
| | Office Space | X | X | | | | | |
| | Equipment | | X | | | X | | X |
| | Recruitment | | X | | | X | | X |
| | Training | | X | | | X | | X |
| | Process Development | | | | | X | X | X |
| | Nitel Lines | | X | | | X | | |
| | GSM Modems | | X | | | X | | |
| | Nitel Maintenance | | | | | X | | X |
| | Nitel Bills | | X | | | | | |
| | GSM Bills | | X | | | | | |
| | Electricity | | X | | | | | |
| | Water Supply | | X | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Staff Salaries | | | | | X | X | X |
| | HR management | | X | | | X | | X |
| | Rostering and Management | | | | | X | X | X |
| | Performance Management | | | | | X | X | X |
| | Performance Reporting | | | | | X | X | X |
| | | | | | | | | |
| | | | | | | | | |
| 8 | Network Management | | | | | | | |
| | Office Space | X | X | | | | | |
| | LAN Maitenance | | X | | | X | | X |
| | Network Inventory System | | | | | X | X | X |
| | Network Monitoring System | | | | | X | X | X |
| | TPM Expert System | | | | | X | X | X |
| | Help Desk | | | | | X | X | X |
| | Groupware | | | | | X | X | X |
| | Initial Network Map | X | | | | | | X |
| | Intial Asset Register | X | | | | | | X |
| | Maintain Asset Register | | | | | X | X | X |
| | Initial Configuration Parameters | X | | | | | | X |
| | Maintain Network Parameters | | | | | X | X | X |
| | Inspect Network | | | | | X | X | X |
| | Maintain Performance Metrics | | | | | | | X |
| | Performance Reports | | | | | | | X |
| | Customer Contact List | X | | | | | | X |
| | Initiate NETOPT Change | X | | | | | | X |
| | Tiger Teams | | X | | | X | | X |
| | Security Audit Quarterly | | X | | | X | | X |

## 10.3. Engineering Responsibilities

| SITE ENGINEERING | | XS | Servica | |
|---|---|---|---|---|
| Item | Description | Supply | Supply | Implem. |
| | | | | |
| | | | | |

| | | | | |
|---|---|---|---|---|
| 1 | Site survey | | | |
| | | | | |
| 1.1 | Authorisation letter | X | | |
| 1.2 | Preliminary site survey (including technical site visit) | | | X |
| 1.4 | Validation of the report | X | | |
| | | | | |
| 2 | Site engineering | | | |
| | | | | |
| 2.2 | Site engineering format | | X | X |
| 2.3 | Detailed BS site engineering (including drawings and calculation notes) | | | X |
| 2.3.1 | New site | X | | X |
| 2.3.2 | Existing site | X | | X |
| 2.5 | Soil investigation, including report | | X | X |
| 2.6 | Tower Design calculations | | X | |
| 2.7 | Foundation Static calculations (including report and reinforcement solutions) | | | |
| 2.8 | Validation of the site engineering | X | X | |
| | | | | |
| 3 | As built drawings | | | |
| 3.1 | Electronic format construction drawings and all items necessary to produce as built documentation | | X | |
| 3.2 | Supply of as built drawings | | X | X |

## 10.4. Site Preparation Responsibilities

| SITE PREPARATION | | XS | Servica | |
|---|---|---|---|---|
| Item | Description | Supply | Supply | Implement. |
| | | | | |
| 1 | Civil Works | | X | X |
| | | | | |
| 1.1 | Indoor site (As needed Basis) | | | |
| | Collocation Site Survey | | X | |
| | | | | |
| 1.2 | Greenfield site | | | |
| 1.2.1 | Site clearing | | X | X |
| 1.2.2 | Backfilling with laterite (20 cm thick) | | X | X |
| 1.2.3 | Polyethylene film (0.25 mm thick) | | X | X |
| 1.2.4 | Site finishing with crushed rock (7 cm thick - max. diam. 30 mm) | | X | X |
| 1.2.5 | Concrete foundation for outdoor BS (W : 2000, L : 2000, D : 500 mm) | | X | X |
| 1.2.6 | Foundation slab for shelter (5,50 m x 2,90 m x 0,30 m) | | X | X |
| | | | | |
| 1.3 | Rooftop site | | | |
| 1.3.2 | Steel support structure for outdoor BS | | X | X |
| | | | | |
| 2 | Electrical works | | | |
| 2.1 | Complete alarm system | X | ? | X |
| 2.2 | Emergency lighting system | ? | X | X |
| 2.3 | Main distribution board (MDB) | ? | X | X |
| 2.4 | Complete lighting system including arriving and sockets | ? | X | X |
| 2.5 | Design of Earthing system | | X | X |
| 2.6 | Earthing and lightning protection system for site preparation | | X | X |
| 2.7 | Earthing and lightning protection system (on towers & masts) | | X | X |
| 2.8 | Connection to the earthing system | | X | X |

| | | | | |
|---|---|---|---|---|
| 2.9 | Area lighting fixture with photo cells, including pole, cable and duct | | X | X |

| | | | | |
|---|---|---|---|---|
| 3 | General | | | |
| | | | | |
| 3.8.1 | Defensive fence (2.50 m high) with barbed wire including touch up paint (when applicable) | X | | X |
| 3.8.2 | Footing and foundations for defensive fence | | X | X |
| 3.10 | Pile driving if required by soil conditions (diam. 250 mm; 20 m deep max.) | | X | X |
| 3.11 | Production on site of concrete for any type of foundations & slabs | | X | X |
| | | | | |
| 4 | Antenna supports | | | |
| | Hold down bolts, setting template, warning light with control panel, down conductor, lightning protection system, fixing brackets and painting of tower supplied by servica | | X | X |
| | | | | |
| 4.1 | Antenna mounting poles | | | |
| 4.1.1 | Pole (diam. 60 mm) 4 m high | | X | X |
| 4.1.2 | Pole (diam. 114 mm) 6 m high | | X | X |
| 4.1.3 | Self supporting pole (diam 114 mm) 4 m high | | X | X |
| 4.1.4 | Self supporting pole (diam 114 mm) 6 m high | | X | X |
| | | | | |
| 4.2 | Guyed masts or towers on roof | | | |
| 4.2.1 | 10 m high mast (Installation includes erection and foundation) | | X | X |
| 4.2.2 | 15 m high mast (Installation includes erection and foundation) | | X | X |
| | | | | |
| 4.3 | Guyed masts on ground | | | |
| 4.3.1 | 25 m high mast (Installation includes erection and foundation) | | X | X |
| 4.3.2 | 30 m high mast (Installation includes erection and foundation) | | X | X |
| 4.3.3 | 40 m high mast (Installation includes erection and foundation) | | X | X |

| | | | | |
|---|---|---|---|---|
| | | | | |
| 4.4 | Self supporting towers | | | |
| 4.4.1 | 25 m high tower (Installation includes erection and foundation) | | X | X |
| 4.4.2 | 35/36 m high tower (Installation includes erection and foundation) | | X | X |
| 4.4.3 | 50 m high tower (Installation includes erection and foundation) | | X | X |
| | | | | |
| 5 | Shelter | | | |
| | Including access and stairs | | X | X |
| | | | | |
| 5.1 | On roof | | | |
| 5.1.1 | Flat pack shelter (W : 2500, L : 3000, H : 2680 mm) | | X | X |
| 5.1.2 | Fully equipped shelter (W : 2500, L : 3000, H : 2680 mm) | | X | X |
| | | | | |
| 5.2 | On ground | | | |
| 5.2.1 | Fully equipped shelter (W : 2500, L : 3000, H : 2680 mm) | | X | X |

# 11. Assumptions

## 11.1. General Assumptions

XS broadband will provide all 3.5 GHz radio equipment

The responsibility matrix provides a definitive guide as to the responsibility of all parties

XS shall cause to be a continuing network management contract with Servica

XS Shall provide access to all network nodes on an as-needed basis, Servica shall provide forward notice of a requirement for such access.

Maintenance, Installation, Network Management and Customer Care functions shall be within scope of this project

Servica shall deploy and operate such network management systems as it deems fit and necessary to effectively deliver the service

Servica shall create, install and manage a data warehouse and business intelligence functionality (Software). XS shall provide all hardware to be used for this functionality

XS shall own all metric and parameter data gathered and used for provision of this service

XS or its agents shall provide initial network inventory, network architecture and parameter data

Servica shall have full and unfettered rights to employ any person it deems fits as an engineer.

Servica shall build a 5 seat call center at XS cost. Servica shall recruit personnel for XS to man and manage the call center. The salaries of call center staff will be paid by XS, Servica shall employ and pay the managers salary.

### Out of Scope Assumptions

Sales and marketing activities that are not directly part of installation, maintenance and network management activities are outside of scope. Servica will make a best effort to offer clients a solution appropriate to their needs.

Consulting to clients is outside of scope. Servica reserves the right to provide service to third parties who are not XS clients

## 11.2. Project Approach Assumptions

XS personnel will be available to meet with Servica Engineers on a scheduled as well as ad-hoc basis to discuss functionality and network related issues to facilitate the problem resolution in a timely manner.

Management meetings will be conducted weekly at the XS facility or by telephone as the situation may require. A weekly status report will be submitted to XS every Thursday by noon.

Servica will use its documentation and system management standards in the event of a request from XS or where a standard is not provided. Servica will use best-practice methodologies and systems at all times.

After Installation and Servica's internal performance tests, a link/connection will be delivered to XS for acceptance test.

XS will provide the initial network data within the first week of commencement, Servica can provide a list of documents required.

## 11.3. Technical Approach Assumptions

The network will be managed using best practices and XS may at any time order a methodology audit from third parties top assure itself of this. Servica will be given the opportunity to modify/justify its processes and methodology or if necessary change them to suit XS standards.

Network performance and management will be governed by a Service Level Agreement. Servica will strive to deliver a minimum of 99.9% (3 9s) uptime.

As is the case with the deployment of third party equipment, products used may exhibit limitations or bugs that can impede the service delivery process. To reduce the impact of such problems, alternative approaches may need to be evaluated during the course of the Project, including possible modifications to the system's design and/or functional requirements.

If the Servica's engineering teams cannot implement a particular functionality because of limitations in deployed products, the team will report such defects, limitations or bugs to technical support of the vendor/manufacturer for any patches / alternate suggestions to implement the same. If a solution is not forwarded by the technical support of the vendor/manufacturer within a short period, it may affect the deployment schedule. In such situations, Servica will propose an alternate implementation strategy around the equipment features available at that time.

## 11.4. Infrastructure Assumptions

XS shall provide office space for a small administrative team at a proximity close to their offices.

Servica shall acquire, man and maintain a Network Operations Center in Lagos. XS to supply connectivity equipment, phone lines and communications facilities to their network.

## 11.5. Pricing Assumptions

All payments for standard service shall be made quarterly in advance

All Servica invoices to XS shall be settled in 14 days or less

All activities out of scope that Servica performs for XS shall be invoiced for at the end of the month in which they were performed.

# 12. Project Communications

Servica believes that good communication is the key to the success of any project. In order to encourage and facilitate communication, standard templates and processes have been developed for weekly status reports, weekly status meetings and weekly project reports.

## 12.1. Weekly Status Report

A weekly status report will include activities planned, completed and not completed for the week and any issues or concerns that arose during the week. It will be produced and delivered prior to 12:00 a.m. CAT each Thursday. This will be used to drive the weekly status meeting.

The weekly status report shall include a summary of performance data, any predictions on the future performance of the network, suggestions on architectural changes that need to be implemented and such other detailed performance data as may be required to understand the summary. The performance data will include statistics from the call center.

## 12.2. Network Inventory Report

XS may request a printed Network Inventory report at any time. An up to date copy will always be available via a secure web interface.

## 12.3. Ad-hoc Suggestions

In the interests of speed and efficiency Servica will provide suggestions, notifications and communications outside the normal weekly meeting. Any such communications will be documented and provided with the weekly status report. Servica shall provide 24 hours support.

# 13. Change / Issue Management Process

## 13.1. Overview of Processes

Scope creep is a principal cause of project failure and conflict. Uncontrolled change can disrupt service and project implementation and impact the balance between schedule, quality and cost. We use the PMBOK five step approach in specification change management:

| |
|---|
| **Define** : review the request for change and its impact |
| **Evaluate**: conduct impact analysis, log and report status |
| **Approve**: negotiate and document necessary contract changes, log and communicate status and obtain signoff |
| **Implement**: update the baseline information, track and report status |
| **Verify**: check for correctness and completeness, log and report final status. |

Table 3: Change management process overview

## 13.2. Change Order Process

The responsibility matrix reflects the scope of work to be performed under this project. Any changes in requirements, which are beyond that scope, shall be handled using the change order procedure. XS may request changes to the responsibility matrix by informing Servica in writing, of the desired changes. Within three (3) business days, or such additional time as may be agreed upon in writing between the parties, following receipt of this request, Servica shall provide XS with a written response to the request. This response shall specify the cost to effect the change expressed in number of person hours, Naira, and delay, if any, to the deliverables schedule. The XS Project Sponsor must accept any change resulting in increased costs or delays in writing. Servica shall not initiate any such change until it receives XS's written acceptance.

The Change Order process will be administered using Servica change management forms. The process is defined as follows:

Any requested change to said functionality, scope, cost, duration or project work plan must be submitted in writing to the XS Service Channel Manager for approval of the cost required to engage in an analysis of the change.

Upon approval, the Servica Project Manager or designee will perform an analysis of the proposed change, including impact on project, risks associated with inclusion or omission, time and cost estimates, and changes to overall project schedule and cost as a result.

The aforementioned analysis will be presented to the XS Service Channel Manager for approval or rejection to complete prior to adding to the scope of project at hand.

Upon signed approval of the requested change to the scope of the project from the XS Service Channel Manager, the change will be incorporated into the responsibility matrix and executed as set forth in the analysis of the change.

The XS Service Channel Manager will be required to review all requests for change in a timely manner so as to not impede the performance of Servica resources.

Servica uses standardized forms for Project Change Requests and a log for tracking all change requests and actions. The information covered includes change type, change description, benefits of change, priorities, and impact.