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COMPUTERIZED TELECOM NETWORK SPARE PARTS MANAGEMENT SYSTEM

Dr. Egho-Promise Ehigiator Iyobor[*1], Bamidele Ola[2] & Nii Armar Adjaidoo[3]
[*1]Glo Mobile Ghana Ltd, Tamale, Ghana
[2]Technobeacon Consulting Ltd, London, UK
[3]Digital Core Technologies Ltd, Koforidua, Ghana

ABSTRACT
To keep providing network services to subscribers without downtime cause by equipment failure, telecom operators must ensure spare parts are available and are properly managed. No telecom operators can survive without spare parts because it is the life blood for reliable and sustainable network services [1].

The research is focus on designing and developing a web system that will provide adequate information of faulty equipment at telecom base station, will allow online request for spares parts to be done, provide details of transmission media(fiber) faults and capture all faulty equipment due for repairs at the warehouse(technical workshop).

Qualitative research approach will be adopted in the study and interview will be used to collect data (users requirements).

The automated telecom network spares parts management system will provide efficient access to spares parts, reduce downtime of network services due to equipment failure and boost customers satisfaction.

KEYWORDS: Spares parts, network, telecom.

1. INTRODUCTION
Telecommunication network is a group of interconnected nodes that exchange data with each other [2]. Transmission links or system, access network and core network form telecommunication network. Transmission links connect all the network nodes together.

The types of transmission media used to establish transmission link could be digital microwave radio, optical fiber cable, coaxial cable, etc.

The access network enables customers to acquire services provided by the telecom operators. It acts as an interface between the mobile station and the core network via transmission system. Core network does switching of voice or data traffic from source to destination. These different parts that form telecommunication network use equipment which must be in service always in order to satisfy subscribers.

Efficient management of telecom network spares parts is required to keep telecom network services active always because spares parts are the lifeblood of reliable and efficient telecommunication network.

Telecommunication operators in Ghana use spreadsheet to manage their spars parts and this form of manual system is not efficient. In this study, a we based computerized telecom network spares parts system will be designed and developed to eradicate this

1.1 Problem Statement
Increase and frequent downtime of network services due to inefficient manual system of managing spares parts.

1.2 Objectives of the study
The objectives of the research include:
1. To provide online access to spares parts information

2. To determine nonfunctioning equipment at base stations that need replacement
3. To improve subscribers satisfaction

1.3 Importance of the study
The system will help to prevent telecom network to be out of service due to equipment failure.

1.4 Scope of study
The system focuses on only management of spares parts in telecommunication industry.

2.   MATERIALS AND METHODS
The research methodology approach to be applied in the system is qualitative because it provides comprehensive insight of a problem [3] and interview will be used in collecting users requirements because it allows adequate information to be collected [4]. Flowchart will be used in designing the system while agile model will be adopted in developing the system. Use case diagram will be used to demonstrate relationship between the system and users. Finally, in this session, appropriate programming tools will be utilized in coding the system.

2.1 Agile Model
It is a model for software development and it will be used in the system because allows to modifications at any phases [5].

2.2 Agile Model Phases
The figure below demonstrates the different phases of agile model.

Figure 1: Agile model diagram

2.3 Use case diagram

Figure 2: use case diagram: it illustrates the relationship between the system and users

2.4 Flowchart diagram
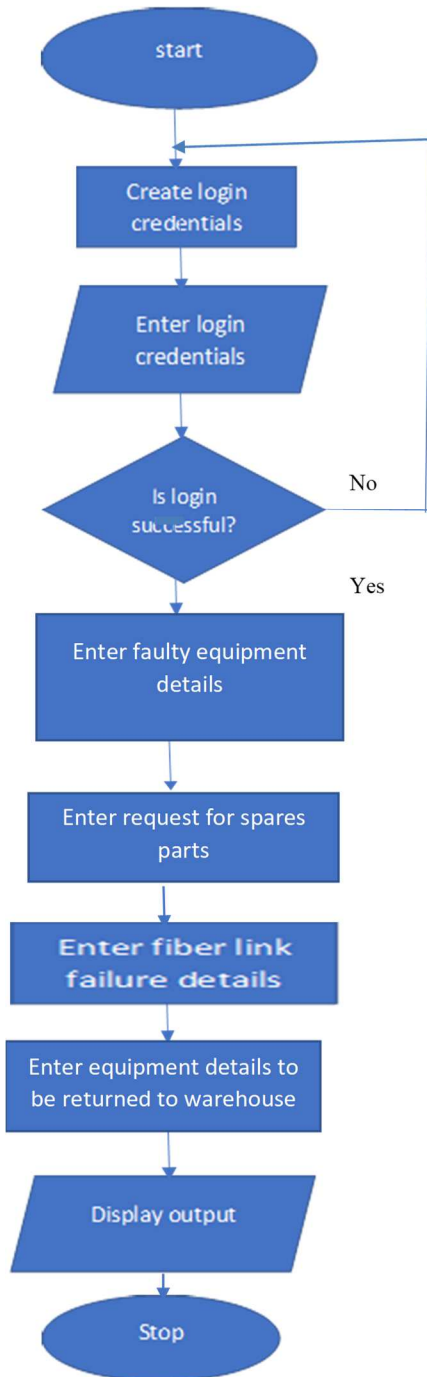
Figure 3: it displays pictorial representation of the system and its logical flow.

2.5 Data types declarations table

Table 1: it shows the declarations of data types of faulty equipment

ID	TYPE	COLLATION	NULL	DEFAULT
id	Int (11)	latin1_swedish_ci	No	*None*
siteid	Varchar (20)	latin1_swedish_ci	No	*None*
issue	text	latin1_swedish_ci	No	*None*
other	text	latin1_swedish_ci	No	*None*
impact	text	latin1_swedish_ci	No	*None*
action	text	latin1_swedish_ci	No	*None*
comment	text	latin1_swedish_ci	No	*None*
username	varchar(50)	latin1_swedish_ci	No	*None*

2.6 Data structure declarations
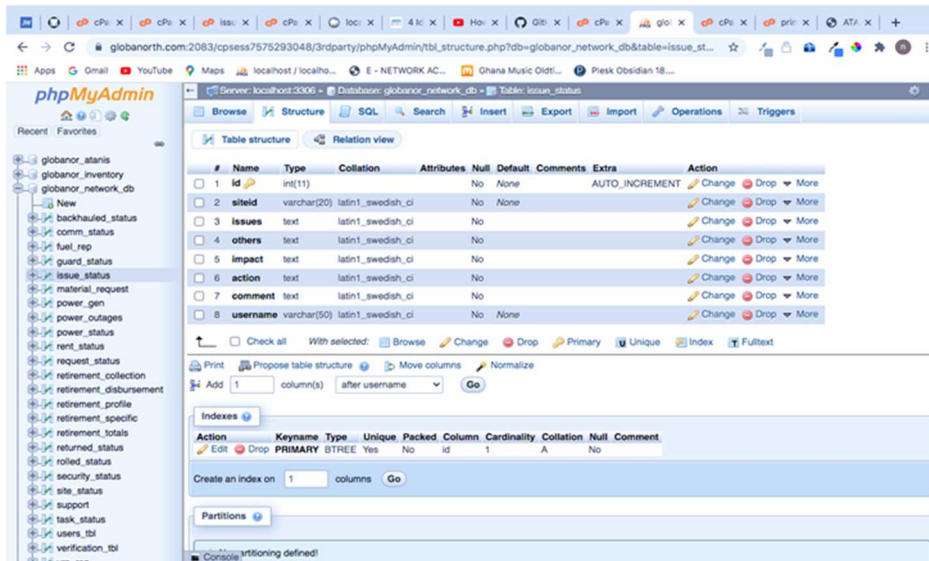
Figure 4: it displays the database structure of faulty equipment

2.7 Programming tools
The programming tools that will be used in coding the system include:
- PHP
- HTML
- MySQL
- WAMP
- JavaScript
- Sublime text Editor
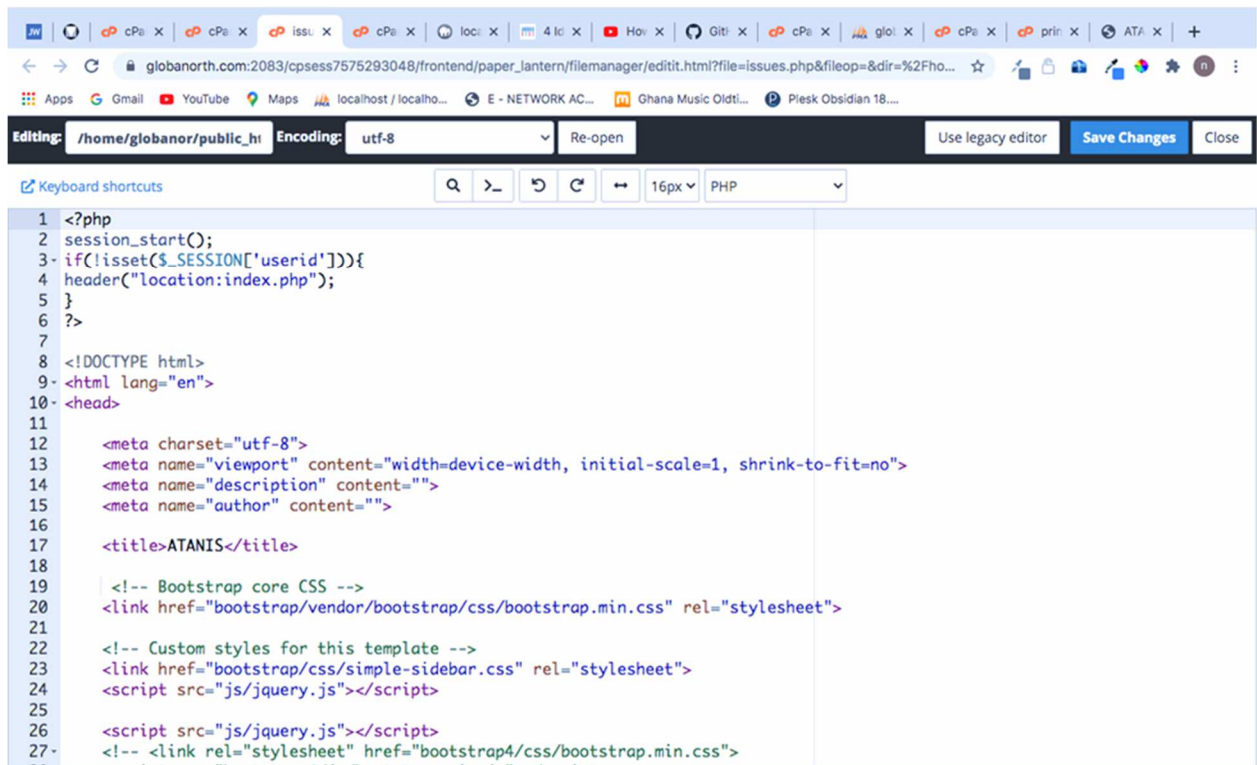
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3.   RESULTS AND DISCUSSION

3.1 System source codes

The system source codes were developed using the programming tools mentioned in the above session. Figures 5 and 6 represent some of the system source codes.

Figure 5: system source codes

Figure 6: system source codes

3.2. System testing
Different tests were carried out on the system to determine its efficiency, reliability, maintainability and usability. The outcome of all the test proved successful.

3.3 System interfaces
The figures 7 to 10 demonstrate the various interfaces of the system after it was developed and adequately tested.

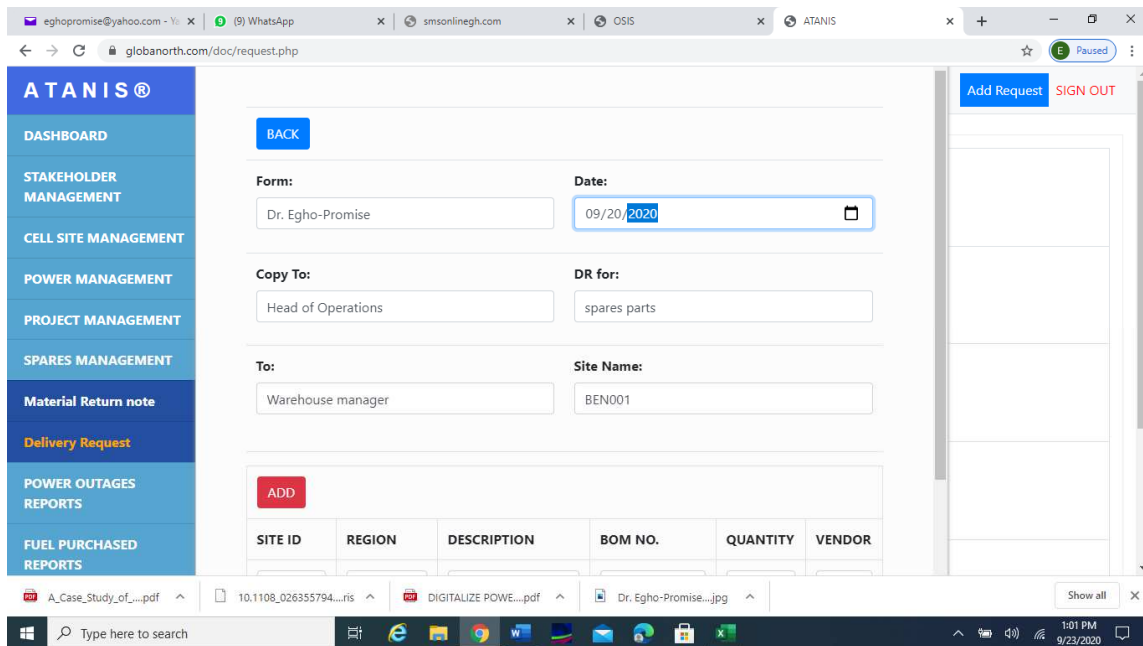*Figure 7: Faulty equipment page. It is used to capture all faulty equipment at base stations*

Figure 8: Spares parts request page. It allows users to request for spares parts and get instant response
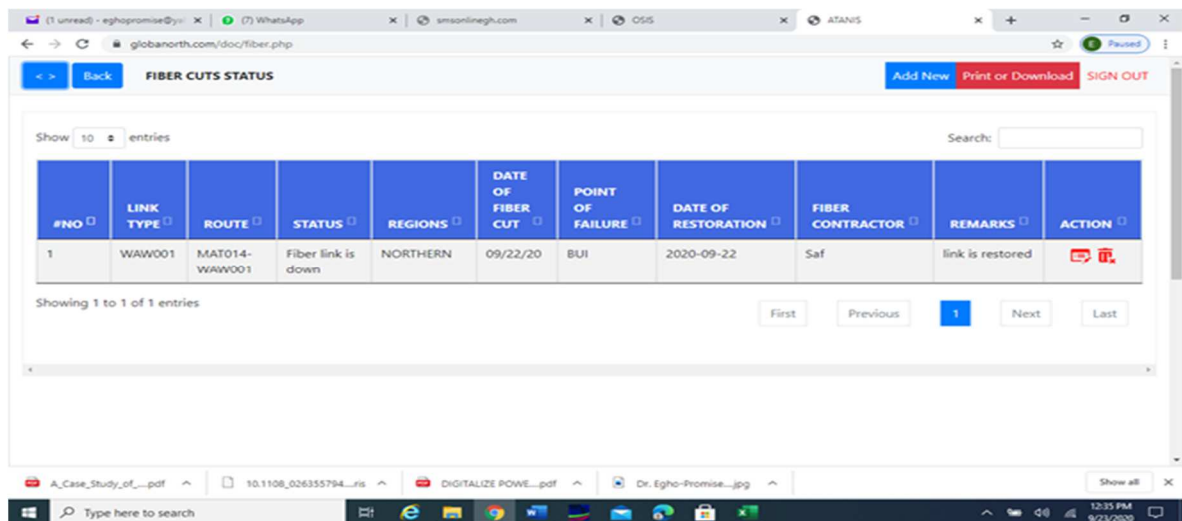

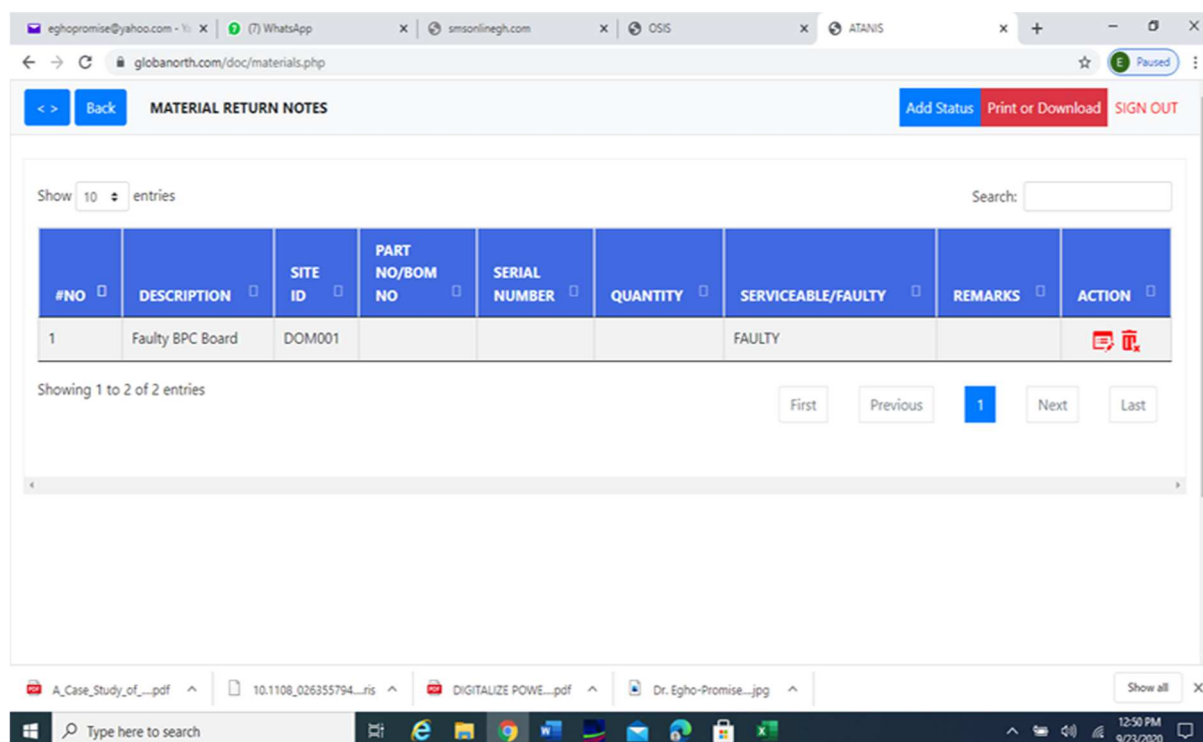*Figure 9: fiber cut page. It is used to capture fiber cuts data for immediate restoration*

Figure 10: Equipment return page. It is used to record faulty equipment to be returned to warehouse

4.   CONCLUSION

The results indicated above showed that we have successfully developed a web-based telecom network spares parts management system that provide online access to spares parts information, determine nonfunctioning equipment at base stations for immediate replacement, fiber cuts status for prompt restoration. The system is able to improve subscribers satisfaction as a result of network downtime which is minimized or prevented.

5.   ACKNOWLEDGEMENTS

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