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COMPUTERIZED TELECOM NETWORK SPARE PARTS MANAGEMENT

SYSTEM

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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

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- 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

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2.3 Use case diagram



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

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2.4 Flowchart diagram



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2.5 Data types declarations table

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

ID	ТҮРЕ	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

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phpMyAdmin	📻 🕼 Server: localhost 3006 + 🗑 Database: globanor_network_db + 👹 Table: issue_status 🕴 🖂
2000¢	📑 Browse 📝 Structure 📄 SQL 🔍 Search 🏂 Insert 🚔 Export 🚔 Import 🥜 Operations 🕮 Triggers
Recent Favorites	H Table structure 42 Relation view
E-globanor_atanis	# Name Type Collation Attributes Null Default Comments Extra Action
	1 I Id P Initian No None AUTO INCREMENT Change Drop V More
gobanor_network_db	2 sited varchar(20) latin1 swedish ci No None Change Drop w More
B- backhauled_status	□ 3 issues text latin swedish ci No 2 Chance @ Droc ▼ More
B.M comm_status	4 others text latint swetch ci No //Change @ Drop w More
E-J fuel_rep	6 image but bit marked in No. Change 6 Drop w More
guard_status	
E material_request	o action text latin_swear.o No Change Output Not
E. power_gen	Change ⊖ Urop ♥ More
power_outages	B username varchar(50) latin1_swedish_ci No None Change G Drop ♥ More
Power_status	Check all With selected: Browse & Change Orop Primary U Unique Pladex T Fulltext
P request status	O Dist III Descent table structure O De Mana sciumes A Normaliza
R retirement_collection	En risk Barrober isos strocter al Dinote commis - romaice
Relief retirement_disbursement	e Add 1 column(s) after username V Go
e- retirement_profile	Induces 0
retrement_specific	IIIURAES &
Pulle returned status	Action Keyname Type Unique Packed Column Cardinality Collation Null Comment
P. rolled_status	CON CORP PRIMARY DIRECTES NO IO I A NO
B-M security_status	Create an index on 1 columns Go
B-M site_status	
troqque N	Partitions
task_status	Paradicity
Construction for	
(B) 14 up and	Console Inflicting defined

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.

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2	session_start();
3-	<pre>it(lisset(\$_StSSIDN['userta'])){ bodds("lissetiantiaday about the second seco</pre>
5	lieuer(totatton, max, php),
6	?>
7	
8	html
9-	<pre><html lang="en"></html></pre>
10-	<neaa></neaa>
12	<meta charset="utf-8"/>
13	<pre><meta content="width=device-width, initial-scale=1, shrink-to-fit=no" name="viewport"/></pre>
14	<meta content="" name="description"/>
15	<meta content="" name="author"/>
16	
18	<tttle>ATANIS</tttle>
19	Bootstrap core CSS
20	k href="bootstrap/vendor/bootstrap/css/bootstrap.min.css" rel="stylesheet">
21	
22	Custom styles for this template
23	k href="bootstrap/css/simple-sidebar.css" rel="stylesheet">
25	kscript src= js/jquery.js/scscripts
26	<script src="is/jauery.js"></script>
27 -	<link rel="stylesheet" href="bootstrap4/css/bootstrap.min.css"

Figure 5: system source codes

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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.

NO D	DATE 🗆	REGION D	TECHNICAL ISSUES	EFFECT ON THE NETWORK		ACTION BY	REMARKS	NON TECHNICAL ISSUES	ACTION
	2020-09- 23	NORTHERN	BEN001 is down due to BPC board	BEN001 is down due to BPC board	3G network service is down	RTH	Warehouse manager to send the board to RTH immediately	Rent to be paid at the site	I) R
wing 1 t	o 1 of 1 entr	ies	board	BPC board		First	send the board to RTH immediately Previous	1 Next	La

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

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POWER MANAGEMENT	Сору То:			DR for:					
PROJECT MANAGEMENT	Head of C	Operations		spares parts					. 1
SPARES MANAGEMENT	То:			Site Name:					
Material Return note	Warehous	se manager		BEN001					
Delivery Request									
POWER OUTAGES REPORTS	ADD								
FUEL PURCHASED REPORTS	SITE ID	REGION	DESCRIPTION	BOM NO.	QUANTITY	VENDOR	-		-
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Figure 8: Spares parts request page. It allows users to request for spares parts and get instant response

1					DATE					
FNO D			STATUS 0		OF FIBER CUT	POINT OF FAILURE	DATE OF RESTORATION	FIBER CONTRACTOR	REMARKS D	
	WAW001	MAT014- WAW001	Fiber link is down	NORTHERN	09/22/20	BUI	2020-09-22	Saf	link is restored	III Ā,
wing 1 to	1 of 1 entri	es					Firs	t Previous	1 Next	Last

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

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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.

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