Automated Router Configuration Using Java PHP

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Abstract - **Automated Router Configuration using JAVA PHP is a system application that allows users to automatically generate scripting configuration especially for IP Core services. The main objective of this project is to develop a system that address the problems faced by router (IP Core) users who have had long and difficult task to validate and configure scripting manually. With this application system, validation, verification and profiling information will be carried out easily without using the traditional method of using Excel file to manually extract the router configuration. Aside to that, scripting can be automatically generated and clearly displayed. This system is developed by using several programming languages such as Virtual Basic, PHP and Java for Web Application.**

Keywords—Virtual Private Network; Service Definition; configuration Matrix

I. INTRODUCTION

Telekom Malaysia (TM) and other telecommunication providers use various networks such as Intellectual Property Core Network to provide Ethernet services to the customers that usually comprises of video, text, graphics and data in an Ethernet carrier medium. These are very powerful communication mechanisms but fall short in one way or another due to certain limitations of the equipment itself whether it is software or hardware (router) fault[1].

In TM, currently the process is based on manually scripting in Excel for configuration and users are to require enter the profile information. The problems come due to the process that takes longer time for each department to complete their own task due to longer time consuming [5]. Furthermore, certain department has to wait for other department to complete its task before other department can proceed.

Due to this problem, the initiatives is to build an application that will assist network engineers and administrator to configure IP core based services by automatically generate configuration scriptures and focusing more on the verification. It will push configuration scripting's in router automatically from the IP Core router [4][8]. Therefore, it is essential that a program is written to organize these bulks of data for storage and retrieval, at ease by the entire into related department in TM.

The main specific goal of this study is to build an application that will assist network engineers and other administrators to configure Ethernet services automatically. It will generate configuration scriptures from the network system used; in this case IP Core network based equipment (router). This research paper will also demonstrate the effectiveness of using an object oriented approach to analyze, design and programming [4].

Virtual Private Network (VPN) circuits that are configured on the IP Core network have steadily begun to gather volume with the official endorsement of the core's readiness to support it. In consistence with this, attention must be given on the preparation and verification of configuration templates of the VPNs to be provisioned. Based on the approved Configuration Matrix (CM) and Service Definition (SD) documents, each line of the VPN services Command Line Interface (CLI) is encoded into Excel formulas. Visual Basic (VB) scripting is used to filter the related configuration templates that's applied for the selected VPN design and based on type of orders. It will push configuration scripting in router automatically from the IP Core router [3][4]. This paper will also demonstrate the effectiveness of using an object oriented approach to analyze, design and program [15].

The main objectives of this project are

- To minimize the risk of human error such as misconfiguration in by strengthening true verification increases.
- To reduce time taken to generate the configuration templates using information that has been prepared earlier in the forms.
- To reduce the team's workload and improvement quality and service

During the process of creating the template, application verification will be implemented to see whether the template itself can communicate with main core programming in the respective Network System on online or offline basis [23]. It is believed that this application can only interact online with the server as most of the data are gathered and presented to their respective user interface in real time.

II. METHODOLOGY

This project is carried out in four phases called planning, system design, development and testing. These phases are discussed in following subsections.

Planning phase is to conduct a preliminary analysis that includes proposing an alternative solution. Currently, a file called "Excel Inventory" needs to be opened in order to get customer information. Thus, this project proposes alternative solutions to meet the organization's objectives and the specific problems which include several solutions [14]. Process taken for a longer time for each department to complete their task will affect the other department's processes because they are depending to each other.

The initial planning creates a system to assist users to achieve the right results in provision to the right network connection when it is requested by customer. To ensure that projects can be carried out in accordance with the given time schedule of the project, specific activities should be made so that each phase can be complete within the given target time.

The design phase is to ensure the development of the project is appropriately executed and successfully implemented. The planned is to design a database web that the configuration will automatically pushes in router system. It can be used by all potential users that are easy, time saving, efficient and proactive to validate and prepare configuration based on required information in order to service in router [6].

System design phase involves the system JAVA, PHP and VB Application interface. Graphical user Interface (GUI) is a sub-field of computer language that focuses on the design of the receiving information from the different tasks. This interface allows the user to interact with IP core systems easily and reduce complexity [26].

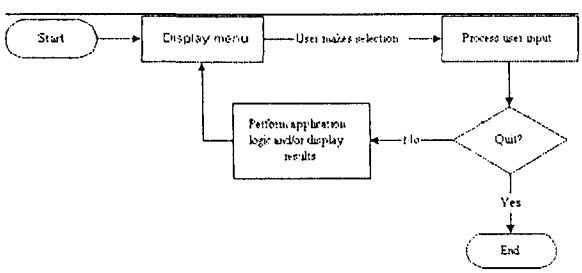

Fig. 2. Diagram GUI

Once the relevant information of the customers in Query and Details (QND) has been collected, a database needs to be created to store all the data. Physical directory structure is created so that navigation between applications with the database system can be connected to the stored data and therefore can be accessed by users of the system [28]. Figure 2 show the system design as below

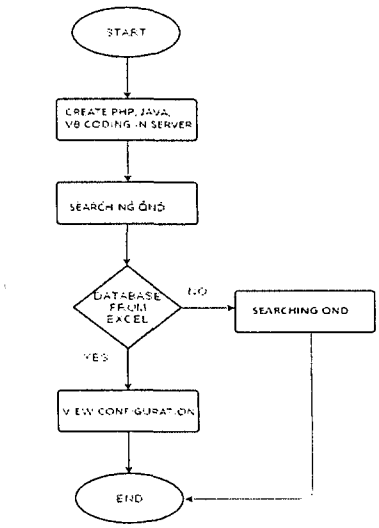

Fig. 1. System Design

Development phase is the final stage in the development of projects where the software is put into production and is running in real time. Development stage consists of two components, namely coding and debugging [23]. This component iteration is carried out by moving from coding to debugging again, and then the new code debugging, and so on until all the errors are found and removed [19].

Once the system is developed, the database used for the system will be used to test data integrity and referential integrity to meet the demands of database and security, duplicate copies and recovery [29]. Safety issues needs to be addressed with the introduction of a passage. The issue of duplicating and recovering is to face things undesirable that in the event of a system crash then there are backups to restore data. The result of this activity is the construction and testing of a database structure to the system. A special program is written to transfer data from a flat file to a database file. If all coding's and databases function properly and produces the correct decisions required by the user, then the developed system be can operated and used as intended [5].

At this stage testing phase the system will be tested to ensure that the interface and applications built are working accordingly. Testing is also done by entering an invalid input, which displays a message on the screen of the user. It is also done by entering test data to ensure the

system receives and processes the data and hence stored in the database system. The purpose of the test is to detect errors. It is considered successful if there are no errors or failures occur [30].

The testing process consists of four steps implemented in sequence, known as unit testing, integration testing, validation testing and system testing.

a) The unit test is created to find any errors in the component. The step is to check that execute macros (code walkthrough), prove the code is correct (formal verification technique), test and program component comparison [19].

b) System test will ensure that all elements of the system (such as users, databases) to work properly and the overall functioning of the system and its capabilities can be achieved [16].

c) Validation data test is to check the configuration lines by lines as in configuration matrix. Since this test is only point to point connection, the information in the Query and Details (QnD) must be accurate as per customer request such as bandwidth, encapsulation, mode, port, VLAN and QOS [8].

d) Integration testing will ensure all the system and database can work together correctly even though it is using separate systems (Visual Basic, Java, PHP).Router and real database can communicate with each other by using the right coding [26].

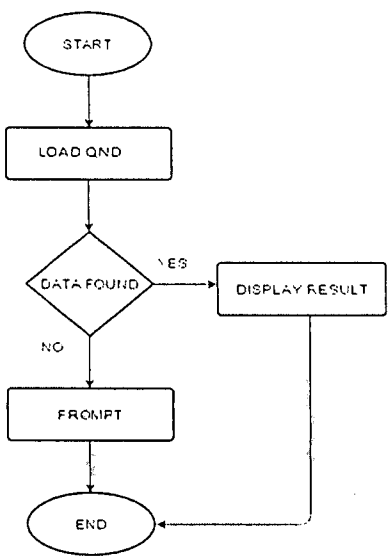

Fig. 3. Phase Design

A. Database Requirement

Data or information relevant to the application system is one of the key requirements that are important. To develop the Automated Router Configuration System application, important information that is needed is a Customer requirement (QnD) and configuration Matrix in IP Core network[18].

III. RESULT AND DISCUSSION

A. Database test result

The system design that has been developed with an orderly arrangement as shown in the previous section has now arrived at the phase of implementation or development of the system. The aim of the system execution is to make the new system available to users, and provide continuous ongoing support and maintenance of the system. System initial operation consists of carrying out all the steps necessary to educate the users of the system on how to use the new system, the steps needed to develop the system into production, how to verify that all the necessary correct data at the start of the operation, and how to confirm whether the particular order are suitable with the configuration [26]. Results have shown Figure 4 as below.

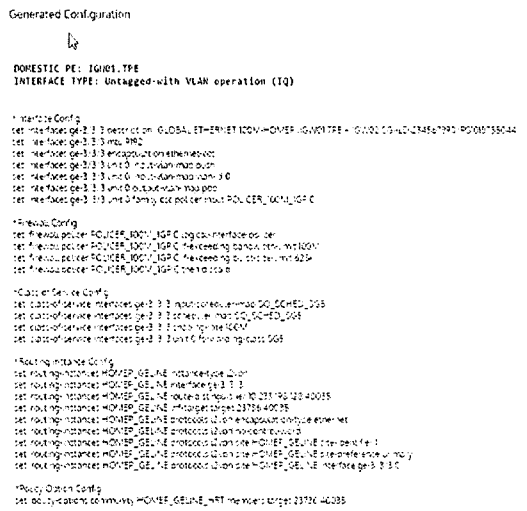

Fig. 4. Examples of output configuration from Database

B. Users from the System's Excel Virtual Basic, PHP and Java Application

Normal users only use the application to load the QnD details which is to be processed, press the submit button to push the configuration system that connects to Configuration Matrix in the database. The result will appear in Excel. Users cannot edit any information or coding found on the system.

Administrators may use the administrative console to manage and determine which users may have administrator status. The administrator is able to edit or change any part of the application or coding for these applications. Administrators can also add data to the database if there is a new configuration in the IP Core network [4]. Figure 5 shows the scripting php-driven applications to create scale applications complete with custom variable boxes, and lots of other accoutrements.

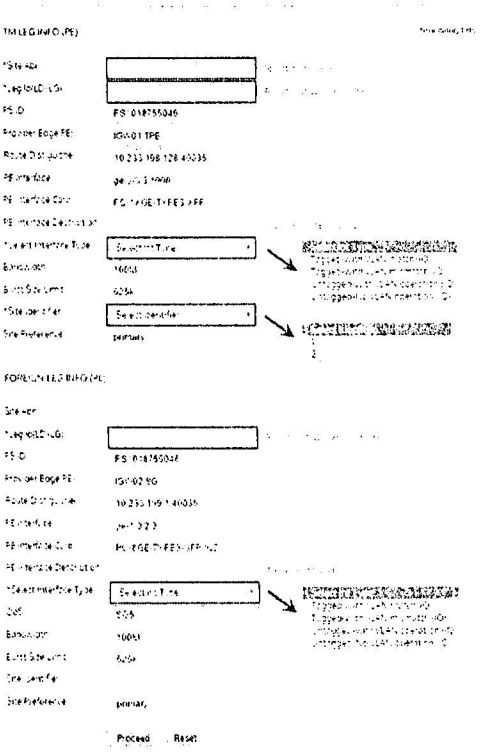

Fig. 5. Information from QnD

C. *Service Configuration and Verification Test*

Once the service is configured in router, the service cam is tested where the test is conducted by checking the configuration lines by lines. Since this test is only point to point connection, the information in the QnD must be accurate as per customer request such as bandwidth, encapsulation, mode, port, VLAN and QoS [3].

An example for the configuration of bandwidth, firewall and QoS, in order to test the effectiveness of bandwidth is by configuring the right bandwidth in policies that the customer needs in order to avoid latency and instability in the network. If the latency/packet loss has a number of issues between 1-100%, it means that an interruption occurs. The configuration will need to be checked and the error must be fixed until the latency is 0%. The QoS configuration is also need to be check either in the form of multimedia, standard data, network control [8].

The QoS must be configured correctly based on the respective classes (Multimedia, Standard Data, Network Control and Mission Critical). If the configuration is done incorrectly, the customer will not be able to download or upload any form of media files [8]. The test is based on speed test where if the speed above 20%, it means it works well when the client makes connection to the router so they can access the IP Core network to access the internet and generate their own network within the area[1].

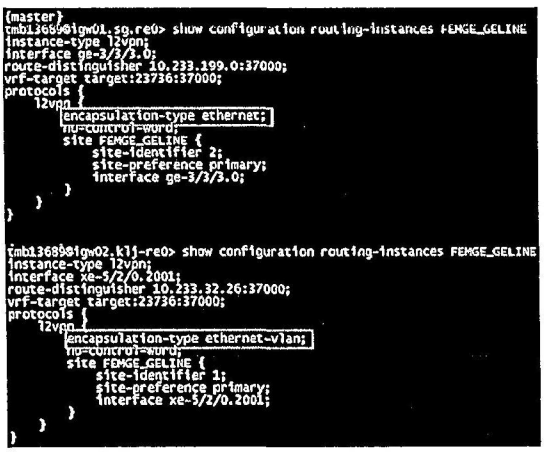

Fig. 6. Configuration in Router

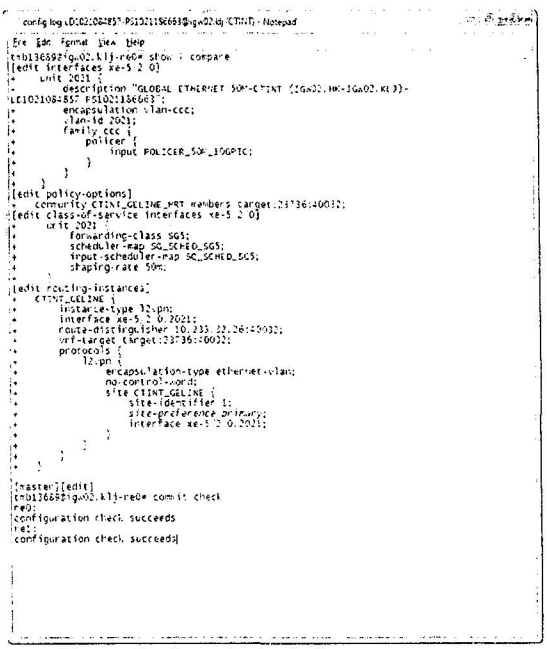

Fig. 7. Configuration log in Router

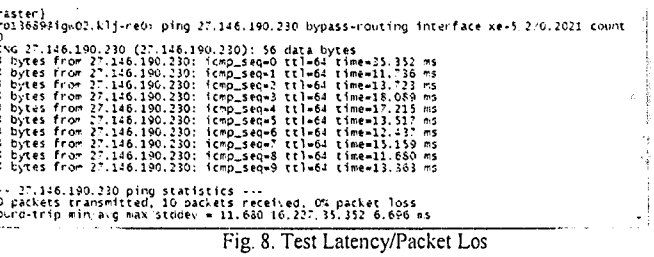

Fig. 8. Test Latency/Packet Los

IV. CONCLUSION AND RECOMMENDATION

This project has developed; 'Automated Router Configuration uses JAVA PHP' by using JAVA, PHP, and Visual Basic fully meets the objectives of the system development [26]. This system has achieved the target and helped to accelerate configuration by automating all manual configurations. The system is also operated at a high level of efficiency and all the staff and users of the system understand and appreciate its advantages. Finally, the fully functional system could be further enhanced with minor changes into a device that could help people with special needs. The recommendations for future work are innovative program is a model through which we provide on- going contribution to some of the organization most impactful humanitarian open source software projects and the Environmental Systems Program recognizes the growing demand for environmental specialists and is designed to enter a broad spectrum of environmental careers programs.

REFERENCE

[1] Andreas Baumgartner, Varon S. Reddy, Thomas Bauschert, "Mobile Core Network Virtualization: A Model for combined Virtual Core," Chemnitz University of Te chnology Chair for Communication Networks, Feb 2011

[2] K.Prosyukova, 'The virtual university model as the main platform for implementation of retraining program for teacher by the examples of Syrian Virtual', KS, vol. 0, no. 4, p. 7, 2014.

[3] Madhusanka Liyanage, Mika Ylianttila, Andrei Gurtov," VPN Secure Hierarchical Virtual Private LAN Services for Provider," Department of Computer Science and Engineering, Aalto University, Finland, Apr 2012

[4] Andreas Baumgartner, Varon S. Reddy, Thomas Bauschert,"Mobile Core Network Virtualization: A Model for combined Virtual Core," Chemnitz University of Technology Chair for Communication Networks, Germany, August 2010

[5] Karl M. Goeschka, Juergen Falb, Wolfgang Radinger ,"Database Access with HTML and Java — A Comparison Based on Practical," Vienna University of Technology Institute of Computer Technology,Australia, Apr 2010

[6] Mrutyunjaya Swain,"Database Programming Using JAVA", South Carolina State University, Orangeburg, Columbia, Dec 2012

[7] ARPIT DAS, DR. Satinderpaul S. Devgan ,"Implementation of streaming audio and video for online web base courses using mysql,database server and PHP," Department of Electrical and Computer Engineering Tennessee State , Jan 2012

[8] Bala Krishna Maddali," Core network supported multicast routing protocol for wireless sensor," University School of Information and Communication Technology (USICT), India, March 2014

[9] Mohamed A. Mgheder and M. J. Ridley,"Automatic Generation of Web User Interfaces in PHP Using Database," University of Bradford, Richmond Road, UK, Dec 2011

[10] Ravneet S. Mann, Dr. Satinderpaul S. Devgan."Impletion of embeded streaming of application using object-relational database and PHP, Tennessee State University, Feb 2013

[11] David Taniar,"High Performance Database Processing," Clayton School of Information Technology Monash University, Australia, Jun 2012

[12] Susamma Barua,"Java Database Connectivity," California State University, Fullerton, Jan 2010

[13] David Taniar,"High Performance Database Processing "Clayton School of Information Technology Monash University", Australia, Jan 2012

[14] Hamptos, "Specification engineering and modular verification using a web-integrated verifying compiler" School of Computing Clemson University, Clemson, Jan 2015

[15] L. Wang "Open Architecture-Based Factory Automation JAVA Systems", National University of Singapore, Singapore, Feb 2013

[16] Hooson Ku, "Web-based Configuration Management Architecture for Router Networks ", Datacom Networks and IP Services, Singapore August 2012

[17] J. Boyle, H. Truong, N. Nour, "Providing a web-based view of your managed network", Proc. of IEEE International Conference on Communication, 2011

[18] Andreas Baumgartner Varon S. Reddy Thomas Bauschert, "Mobile Core Network Virtualization: A Model for combined Virtual Core," Chemnitz University of Technology Chair for Communication Networks, August 2010

[19] Mrutyunjaya Swain," Database Programming Using JAVA," Department of Computer Science and Engineering, Aalto University, Finland, Dec 2012

[20] Karl M. Goeschka Juergen Falb, Wolfgang, 23Radinger," VPN Secure Hierarchical Virtual Private LAN Services for Provider," Department of Computer Science and Engineering, Aalto University, Finland, Apr 2010

[21] ARPIT DAS, DR. Satinderpaul S. Devgan," Implementation of streaming audio and video for online web base courses using MySQL, database server and PHP," Chemnitz University of Technology Chair for Communication Networks, Germany, Jan 2012

[22] Bala Krishna Maddali," Core network supported multicast routing protocol for wireless sensor," Vienna University of Technology Institute of Computer Technology,Australia, March 2014

[23] David Taniar,"High Performance Database Processing," Clayton School of Information Technology Monash University, Australia, Jun 2012

[24] Susamma Barua,"Java Database Connectivity," California State University, Fullerton, Jan 2010

[25] David Taniar,"High Performance Database Processing "Clayton School of Information," South Carolina State University, Orangeburg, Columbia, Jan 2012

[26] Mohamed A. Mgheder and M. J. Ridley," Automatic Generation of Web User Interfaces in PHP Using Database," South Carolina State University, Orangeburg, Columbia, Dec 2011

[27] Ravneet S. Mann, Dr. Satinderpaul S. Devgan ," Impletion of Embedded streaming

Of application using object Relational database and PHP," Department of Electrical and Computer Engineering Tennessee State, Feb 2013

[28] Susamma Barua,"Java Database Connectivity," University School of Information and Communication Technology (USICT), India, Jan 2010

[29] David Taniar," High Performance Database Processing," University of Bradford, Richmond Road, UK, Jan 2012

[30] Ravneet S. Mann, Dr. Satinderpaul S. Devgan,"Impletion of embedded streaming of application using object-relational database and PHP, Tennessee State University, Feb 2013