THE ANALYSIS AND MODELING OF EFFICIENCY OF THE DEVELOPED TELECOMMUNICATION NETWORKS ON THE BASIS OF IP PBX ASTERISK NOW

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Communication of clients with the server passes through a wireless point of WiFi access. The attacking device is the laptop that has the software package of CommView for WiFi. The analysis of stability program by automatic telephone exchange on the basis of Asterisk NOW from unauthorized access to a telecommunication network is provided in this article. The software product on the basis of Asterisk NOW uses as the server. As softfon and client base laptops, computers, and gadgets on which passes test are considered. Communication of clients with the server passes through a wireless point of WiFi access. The attacking device is the laptop on which the software package of CommView for WiFi is established. By the result of carried out test the analysis of network's vulnerability was made. Recommendations about a measure of protection from unauthorized access are made. The optimum option of network protection is offered.

Keywords: wifi, wireless network, attacks, address, network devices, server, access, Asterisk NOW.

I. INTRODUCTION

The review on development of interfaced technology of the scheme of a wireless network upon transition and the entering calls.

The provided scheme of picture 1 uses the following devices by functioning:

- Asterisk server.
- Access points.
- Personal computers (PC) clients.
- External Wi-Fi device.
- Internal device Wi-Fi.

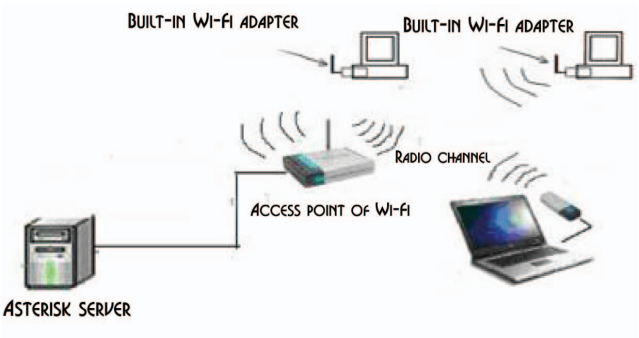


Fig. 1. The developed scheme of the organization communication of the Asterisk server with users for a wireless network.

A. *The Basic Technologies Used by Participants of a Network*

The essence of the word Server is applied in 2 concepts - the Server as the software using inquiries from clients and the server as (the providing device) — the computer with high efficiency of the processor, high-speed Windows memory, big memory of external memories, communications to connection of external devices. Simply, the server is a computer more productive, than user, safe from failures and focused on processing of the data obtained from computers users. Due to it, the network space in the local computer network is provided

and in it all data on interactions of users of computers of clients approach.

The server is the main VoIP component of telephony; this program uses the automatic telephone Asterisk, call center and other components of office telephony is used too. Therefore the combination of words the server of a telephony doesn't demand, that it is necessary to get highly productive and costing much devices. As an example it is possible to tell that by the server in general the available any computer can be used.

B. *Maintenance of the Asterisk Server*

The Asterisk server uses from the following components:

- Windows with CentOS.
- RAID data from hard drives.
- Asterisk FreePBX distribution kit.

C. *Requirements to the Asterisk Server*

Windows and fast memory - the main characteristics of the IP-telephonies server. For small office (to 10 clients) the processor of 1 GHZ and memory of 2 Gb is sufficient. If simultaneous calls is many structure of the server it is necessary to calculate precisely. The hard drive can be one, minimum volume is 160 Gb. However, if we plan to leave telephone negotiations for record, there will be a need of a high-capacity disk. We suggest to use disks of 1 Tb. After that, for safe work it's possibly to use two connected hard drives in RAID data. It gives opportunities at failure 1 HDD immediately to correct functioning of the server with the 2nd hard drive.

It is necessary for the server of a telephony to provide UPS (uninterruptible power supply). That will secure the server against change of tension, also will create a continuity of the general IP-telephony's work.

Program IP automatic telephone exchange remains base, a telephony VoIP server framework. On the basis of program automatic telephone the necessary structure of office telephony with the directions of distribution of calls, the voice menu, estimates of reflection of telephone conversations, etc. are developed.

Implementation of the following requirements to the server is obliged:

- Big delays by passing packages to the Internet – it is no more than 150 ms.
- Big percent of losses by passing packages to the Internet – it is no more than 3%.
- Big deviations between consecutive transfers of packages to the Internet – it is no more than 50 ms.

D. *Personal computer*

The personal computer carries out applied tasks of clients gives possibilities of creation of requests of users to the server.

E. *External Wi-Fi Adapter*

External Wi-Fi adapter is always connected through USB port and doesn't use for the functioning the external power supply. External Wi-Fi adapter is the terminal, allowing the computer to function with other components of the local computer network, by means of devices for information transfer - a radio channel and components of network management - an access point. Basic parameters of the adapter are:

- Transmitter productivity.
- Sensitivity.
- Number of the internal or built-in antennas: 1 antenna.
- The highest speed of wireless information transfer makes 54 Mbit/sec.

F. *Internal Wi-Fi Adapter*

The internal or arranged in Wi-Fi adapter is the Wi-Fi network interface card which doesn't more differ from traditional network interface cards, for apart from some exceptions of control. Wi - Fi network interface card is represented in the option executed as the internal PCI card with the same parameters as well as the external adapter.

G. *Access Point*

Input points of Wi-Fi are the components providing association of users of a network (both wire, and wireless) in a uniform network. Otherwise an input point is only HUB (concentrator) for Wi-Fi users. For users of a wire network there is need of access to the network to wireless users.

Wi-fi's point of input is shown in 2 basic cases of execution. There are for application in the building and for external application. There are cases of creation of entry points, joint with panel antennas for external use.

External Wi-Fi's point of input uses for connection Wi-fi users outside rooms, for example in open places. External points of input contain safe performance, more constant operational assessment etc. By using several external points of input it is possible to connect rather remote organizations, and to be engaged well-known spot jotas. External Wi-Fi's point of input differs also with the high extending power.

To all external points of a input it is possible to turn on more antennas that creates the expanded area of providing Wi-Fi with a network.

External Wi - Fi antennas are used for increase in a signal that the area of equipment of Wi-fi provides with a network increase.

Basic parameters of a point of input are:

- Transmitter productivity.
- Sensitivity.
- Number of antennas: one - two antennas.
- The greatest speed of wireless information transfer makes: 54 Mbit/sec.

- The network standard - 802.11a, 802.11b, 802.11g, 802.3.

II. Ease of Use

Creating the model on the software package of Opnet Modeler V.14 of the wireless local computer network on the basis of IP PBX Asterisk.

For carrying out experiment on modeling of the local computer network on the basis of IP PBX Asterisk we will create on a desktop. Its model is shown in picture 2.

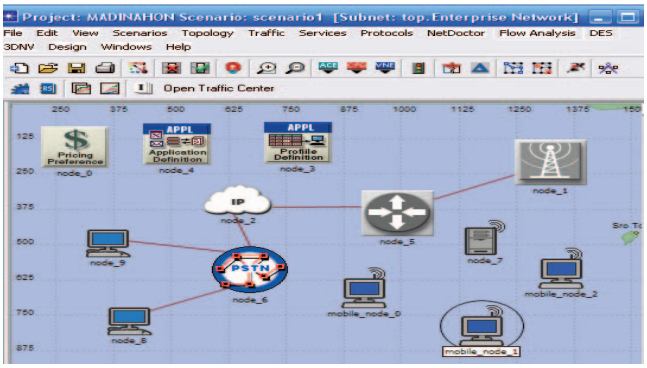


Fig. 2. The LAN Model Window on the basis of IP PBX Asterisk on a desktop of the software package of OpnetModeler v.14.

By pressing, in the main Edit-Preferense-Repozitories-OK menu we provide a database of application technology of the software package for the modeling of a LAN constructed on the basis of IP PBX Asterisk. After that we engage control of components of the modelled network. For this purpose we will bring the cursor on the corresponding knot (node) of a network and we press the right button of a mouse, there will be an Attributes window, as shown in picture 3 for PSTN, the server, a router and others.

Fig. 3. Window of Control of the Equipment of the IP PBX Asterisk LAN components.

We make further experiment generating a traffic. When planning a traffic imitated on OPNET Modeler 14 its choice from 4 types given below is offered:

IP Unicast, IP Muticast, VoIP and MPLS VPN. For a start we choose from the offered types of traffic of VoIP, pressing the button of the main Trafic menu – Create traffic flows-VoIP, as shown in picture 4.

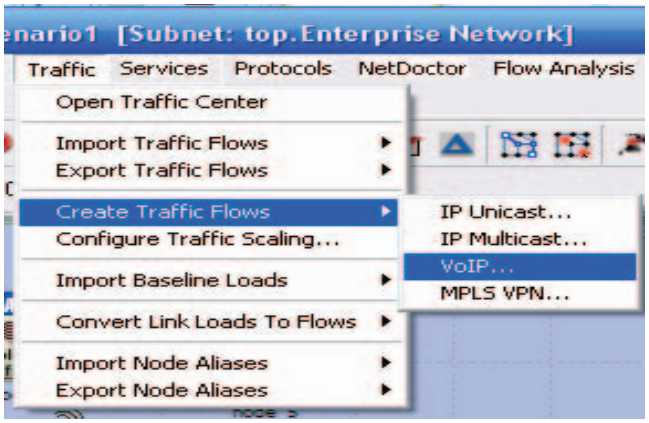


Fig. 4. Traffic task.

For this purpose it is necessary to analyze parameters of a window of picture 4 of the type of a traffic of picture 3 received at a choice where for a mark for carrying out model we allocate with "birdie" in the Set start time window and others. After that we press the pictogram of Create.

In the same way we generate creation of traffic's other type, for example, IP Unicast on technology we arrive, as well as at a generation technique of a traffic on VoIP, As shown in pictures 5 and 6.

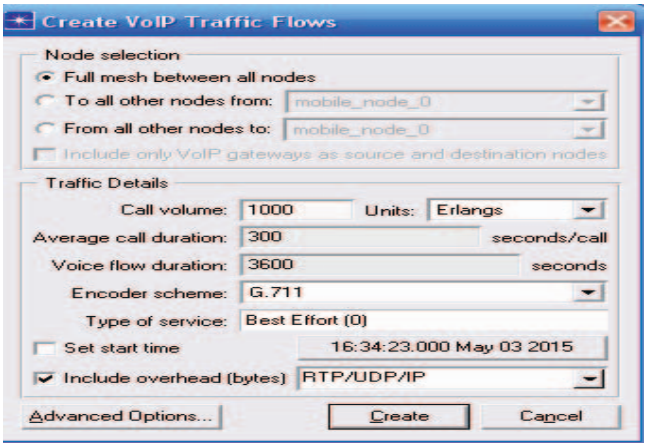


Fig. 5. Control for modeling parameters on VoIP loading.

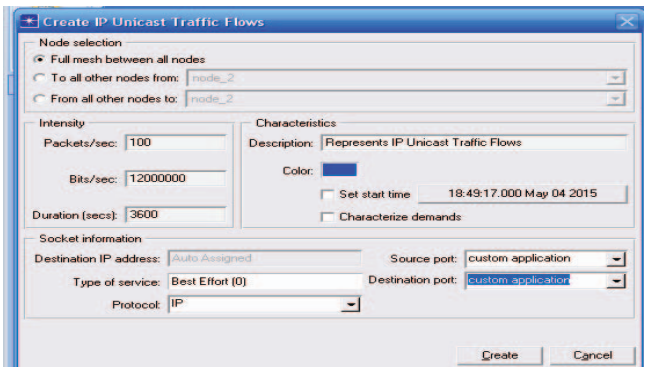


Fig. 6. Window of a task of parameters of modeling.

Next we pass to run of model. For this purpose we come back to the main menu of the program and we press the pictogram of Conpicture/Run flow analiz picture 6 for carrying out the general run of model and, pressing RUN we receive drawing of 7 results of modeling given on this drawing.

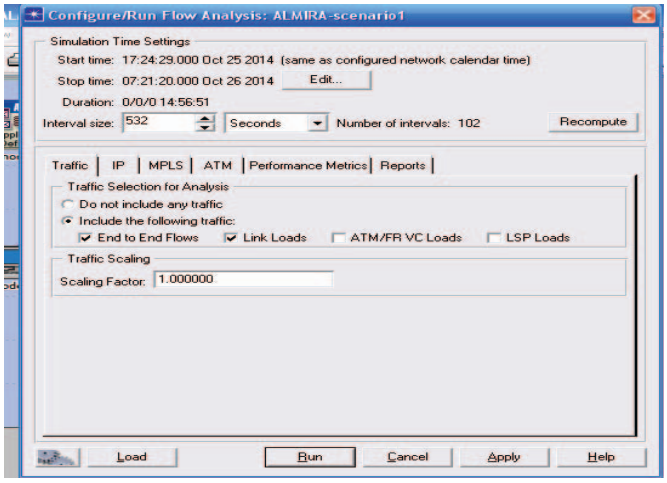
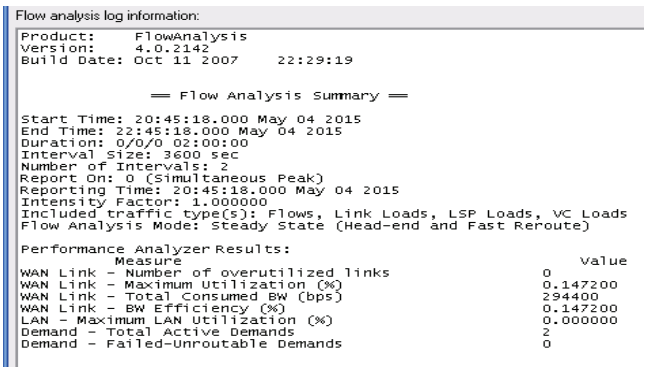


Fig. 7. Task window of model's parameters run.

After that we make conclusion that in general the developed network works steadily poorly utilized packages, the demanded efficiency still is in a state allowing carrying out expansion of a network.



```
Flow analysis log information:
Product:    FlowAnalysis
Version:    4.0.2142
Build Date: Oct 11 2007    22:29:19

              == Flow Analysis Summary ==

Start Time: 20:45:18.000 May 04 2015
End Time: 22:45:18.000 May 04 2015
Duration: 0/0/0 02:00:00
Interval Size: 3600 sec
Number of Intervals: 2
Report On: 0 (Simultaneous Peak)
Reporting Time: 20:45:18.000 May 04 2015
Intensity Factor: 1.000000
Included traffic type(s): Flows, Link Loads, LSP Loads, VC Loads
Flow Analysis Mode: Steady State (Head-end and Fast Reroute)

Performance Analyzer Results:
          Measure                                        Value
WAN Link - Number of overutilized links                  0
WAN Link - Maximum Utilization (%)                       0.147200
WAN Link - Total Consumed BW (bps)                       294400
WAN Link - BW Efficiency (%)                             0.147200
LAN - Maximum LAN Utilization (%)                        0.000000
Demand - Total Active Demands                            2
Demand - Failed-Unroutable Demands                       0
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Fig. 8. Window of results of modeling .

At this point we will pass to obtaining the statistical datas were received as a result of modeling. For this purpose in the main menu we press the TRAFIC window and further Open traffic centure and we receive the results of modeling given on picture 8.

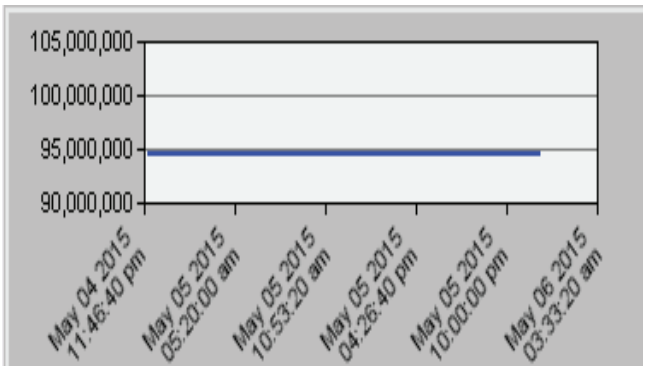

Fig. 9. The size of the transferred traffic for the entire period of model time.

From drawing it is visible that the collected network functions steadily, it is proved to that during model time the size of loading doesn't change.

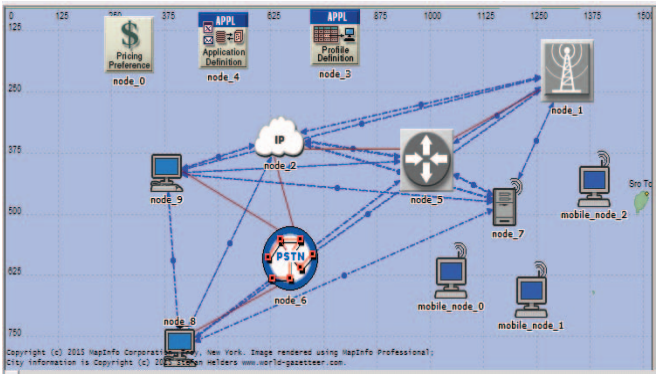

Fig. 10. Window of communications between devices

From picture 10 we see the communications functioning between network components.

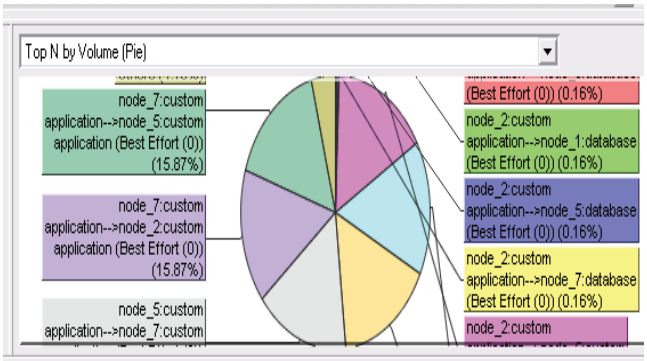

Fig. 11. A window of information transferred as a percentage between components of the local computer network.

Conclusions: The developed technique when modeling shows that at creation of the LAN model on Asterisk on the basis of the software package of Opnet Modeler v.14 it is possible to investigate network productivity, setting different types of the law on distribution the traffic, delay time on the server and others, necessary at real design of networks.

III. CONCLUSION

In the course of performance of this work the choice and the AsteriskNow installation was made under control of a distribution kit of CentOS 6.5 of the RedHat company. CentOS 6.5 was chosen because at expansion of its functions campaign of RedHat provided the users of all with novelties free of charge. Further experiment on creation and functioning of locally computer network on the basis of AteriskNow in process of which all advantages of program IP ATC AsteriskNow are revealed is developed and made. Calculations of volume of a traffic in a point of access of a network on the basis of AsteriskNow are made. The IP PBX AsteriskNow LAN model on the software package of Opnet Modeler v.14 is developed for research of characteristics and parameters of such network. On the basis of the carried-out modeling of a LAN on the software package of Opnet Modeler v.14 at research in results are received such characteristics, as behavior of a network in the period of model time, total of the bits passed in a network in the course of modeling, distribution of loading between network components determination of productivity of such network, definition of loading on the server

The performed work is directed on uses of its development at design by experts engaged, designing of telecommunication networks and their researches at decision-making at its design. This work is applicable further in the enterprises of the Republic of Kazakhstan.

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