

Research on Web Applications for Remote Laboratory Exercises on Computer Networks

Georgi Tsochev

INTRODUCTION

The aim of this paper is to describe and compare some of the most common and widely used platforms for conducting the exercises on computer networks. A specific product has been selected to be accessed via the Internet and to allow the use of different types of network devices to perform the exercises. The following tasks have been set for the successful implementation of this project:

- Review of graphical simulator on offer and choosing the most suitable one.
- Explanation of the installation process of the simulator and the accompanying programs.
- Presenting some basic functions of the simulator.



REVIEW FOR SYSTEMS



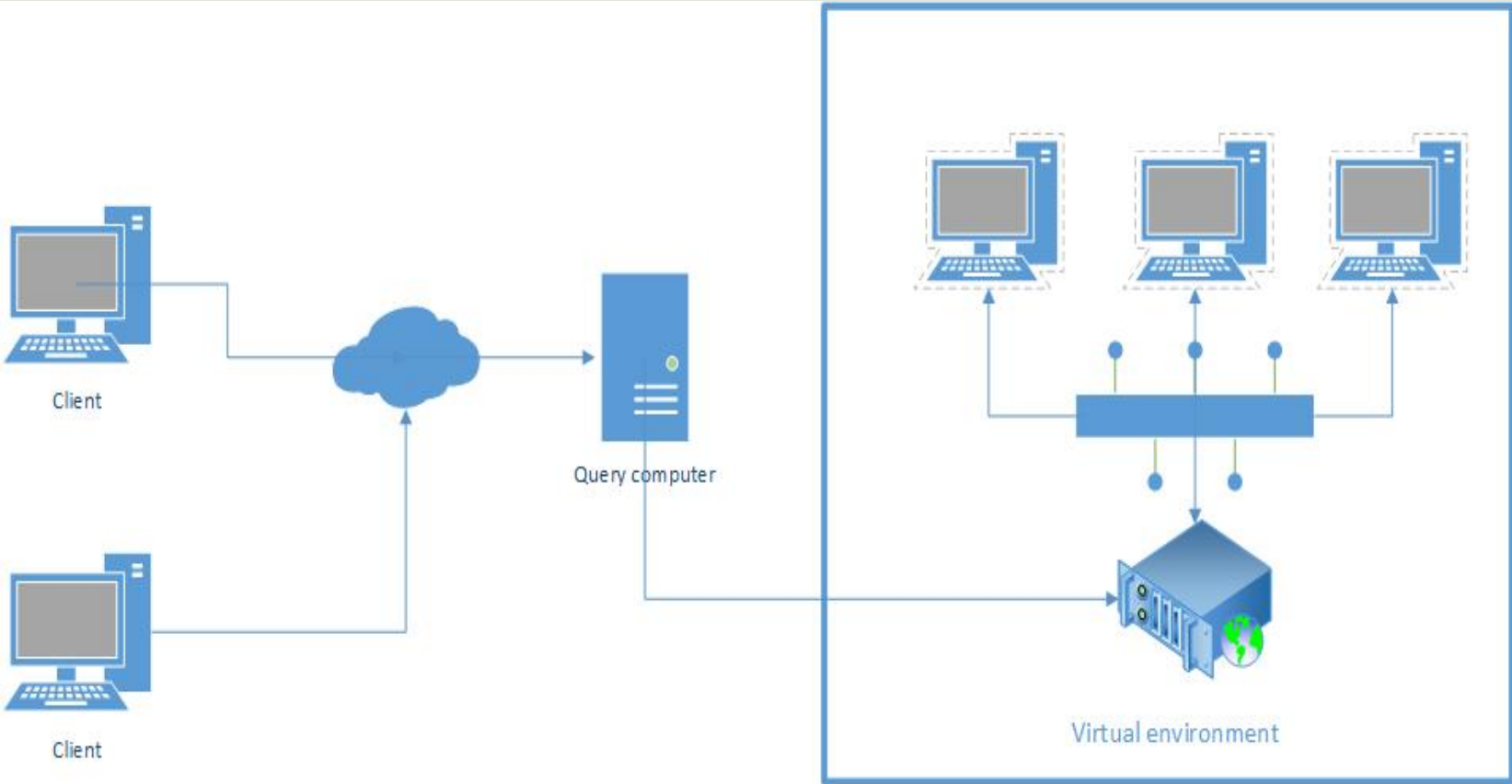
ADVANTAGES AND DISADVANTAGES OF THE SIMULATORS

Simulator	Advantages	Disadvantages
GNS3	<p>Offers versions for Linux, Mac, and Windows</p> <p>Offers installation guides.</p> <p>Automatically installs the necessary software products.</p> <p>A simple interface that makes it easier to work.</p>	<p>Requires disabling the firewall before accessing it.</p> <p>Requires the purchase of Cisco images (Images).</p> <p>For large topologies and configurations, the technical requirements are very high.</p> <p>Does not allow simulation of non-Cisco devices.</p>
PTAnywhere	<p>Does not require the purchase of Cisco images.</p> <p>Completely free additional programs.</p> <p>Freely available online simulator.</p>	<p>Long and complex installation.</p> <p>Many additional programs and libraries are required to be configured.</p> <p>A limited set of configuration devices.</p> <p>Unupdated versions of accompanying programs.</p>
CML - E	<p>Enables modeling of non-Cisco networks.</p> <p>Multiple access to one lab.</p> <p>Allows changes to be made during simulation.</p>	<p>Limited time to work on one laboratory (4 hours).</p> <p>Requires the purchase of Cisco images.</p> <p>The maximum number of devices is 20.</p> <p>High minimum requirements.</p>
Eve – NG	<p>Unlimited time to work.</p> <p>Unlimited number of reserved laboratories.</p> <p>Free Cisco images.</p> <p>Detailed installation and operation manual.</p> <p>Possibility of multiple connection to a laboratory.</p> <p>A large number of configuration devices.</p>	<p>Does not offer a graphical interface of the devices.</p> <p>The paid version is required to set different user roles (admin, user).</p> <p>Relatively high minimum requirements.</p>

IMPLANTATION

- For the successful realization of online network simulator, a VMware-enabled virtual machine has been created. This program allows us to launch a virtual machine on which to install Eve –NG. The community version which we will consider is completely free and comes with all the necessary licenses on the official website of the company. There are two options for installation. When choosing to install using a .iso file, we will have the option to fully set up the virtual machine. The .ovf file skip the original settings and go straight to configuring IP address, Domain Gateway, etc, and before starting the virtual machine we have access to some of the original settings that we can change according to our needs.
- Ready-made virtual machine is prepared for any student who wishes or does not have the opportunity to do the laboratory exercises on his computer. This is a free version of Eve–NG simulator and offers one session per person. This is why changes have been made to the server's network settings so that more people can access the resource.

IMPLANTATION



CONCLUSION

- In today's world of digitization, computer networks play an increasingly important role. The ability to simulate a virtual network before installing it in the real environment is an advantage that saves us a lot of time and money. That is why the choice of simulation software is such an important task in this research. It must be reliable, well protected and at the same time be easily accessible
- Eve – NG is the environment in which all this has been achieved. One of the main advantages is access to an HTML5 client, or access to a computer or application through a web browser. In other words, we do not need to download and install a separate application in addition to the server to virtualize, connect, and configure network devices. The advantage of the proposed model is that it offers easy implementation and convenience for tracking the actions of students.