USE SOFTWARE SUPPORT FOR COMPUTER NETWORK EDUCATION

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Abstract

At the present computer networks are an integral part of work and private life. Their use is already commonplace. Graduates, however, should have at least a basic knowledge of how to computer network actually work. One of appropriate software for the visual presentation of the work of computer network, the design, management and configuration is simulation software Cisco Packet Tracer. The present paper describes how to create and control a simple computer network.

Key words: computer net, simulation, Cisco Packet Tracer

VYUŽITIE SOFTVÉROVEJ PODPORY PRI VÝUČBE POČÍTAČOVÝCH SIETÍ

Resumé

Počítačové siete tvoria v súčasnosti neoddeliteľnú súčasť pracovného aj súkromného života. Ich používanie je už samozrejmosťou. Absolventi vysokých škôl by však mali mať aspoň základné vedomosti o tom, ako vlastne fungujú. Pre názorné prezentovanie fungovania počítačovej siete, jej navrhovania, správe a konfigurácie je vhodným prostriedkom simulačný softvér Cisco Packet Tracer. V predkladanom príspevku je popísaný postup pri tvorbe a správe jednoduchej siete.

Kľúčové slová: počítačová sieť, simulácia, Cisco Packet Tracer

Introduction

Computers are used in almost every sphere of our private and professional life as well. The rapid development of information technology brings with it the urgent need for knowledge discovery in this field. Based on the requirements of society is the knowledge of informatics included at every level of education. There are obtained much information about it, but not always cares for their understanding. One of the most widespread part of informatics are computer networks. However, it is appropriate that students have had a basic knowledge of how such network actually works, how to get information about the individual part of net and what resources are required for this.

One of the way how to students present this knowledge is the use of simulation software for demonstrating the operation and setting properties of a computer network. The present paper describes an environment Cisco Packet Tracer to create a simulation of a computer network.

1. Cisco Packet Tracer

Cisco Packet Tracer is a powerful network simulation program that allows students to experiment with network behavior. Packet Tracer provides simulation, visualization, authoring, assessment, and collaboration capabilities and facilitates the teaching and learning of complex technology concepts. Packet Tracer supplements physical equipment to allow students to create a network with an almost unlimited number of devices, encouraging practice, discovery, and troubleshooting. The simulation-based learning environment helps

students develop skills such as decision making, creative and critical thinking, and problem solving.

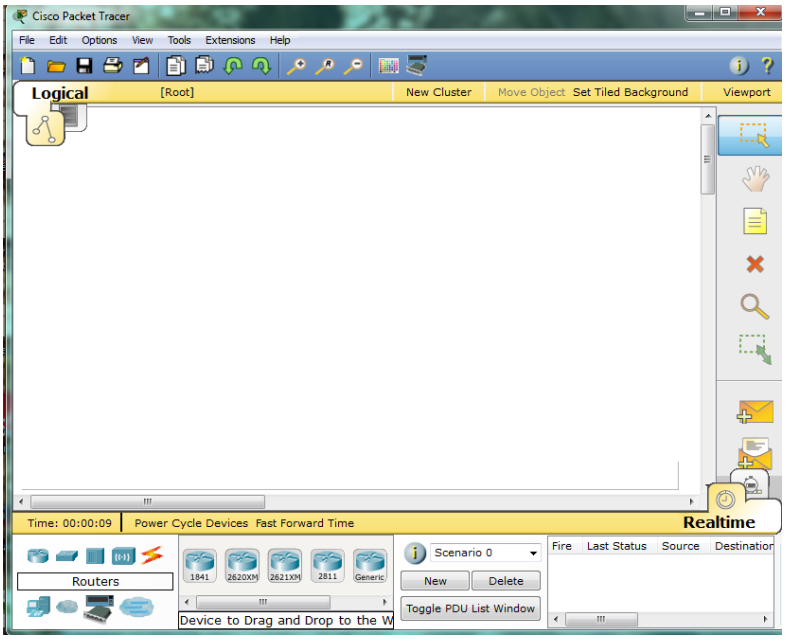

Fig. 1 The base setting of Cisco Packet Tracer

2. Application of Cisco Packet Tracer

At the Faculty of manufacturing technologies is one of the presented part of the subject "Informatika" basic knowledge about the creation and operation of computer networks. Exercise of the topic consists of some partial tasks. The students should create at least two subnets which are connected using router. Using possibility of animation they can see how work the computer net.

The first part of the exercise describes the different equipment needed for creating net and way how to create correct subnet.

- Hub is commonly used to connect segments of a LAN. A hub contains multiple ports. When a packet arrives at one port, it is copied to the other ports so that all segments of the LAN can see all packets. A hub works at the physical layer (layer 1) of the OSI model.
- A network switch is a small hardware device that joins multiple computers together within one local area network (LAN). Technically, network switches operate at layer two (Data Link Layer) of the OSI model. The switches are capable of inspecting data packets as they are received, determining the source and destination device of each packet, and forwarding them appropriately
- A router is a device that forwards data packets between computer network. A router is connected to two or more data lines from different networks. When routers are used in interconnected networks, the routers exchange information about destination addresses using a dynamic routing protocol. Each router builds up a table listing the preferred routes between any two systems on the interconnected networks. A router has interfaces for different physical types of network connections

Fig. 2 Possibility of equipment selection

Using end devices is created one subnet with hub. Using simulation capabilities, packets are forwarded from one terminal to another terminal. Using animation the student can observe how hub works. Condition for the proper functionality is set ip addresses and gateway for individual end devices. The following figures show the selected portion of the simulation.

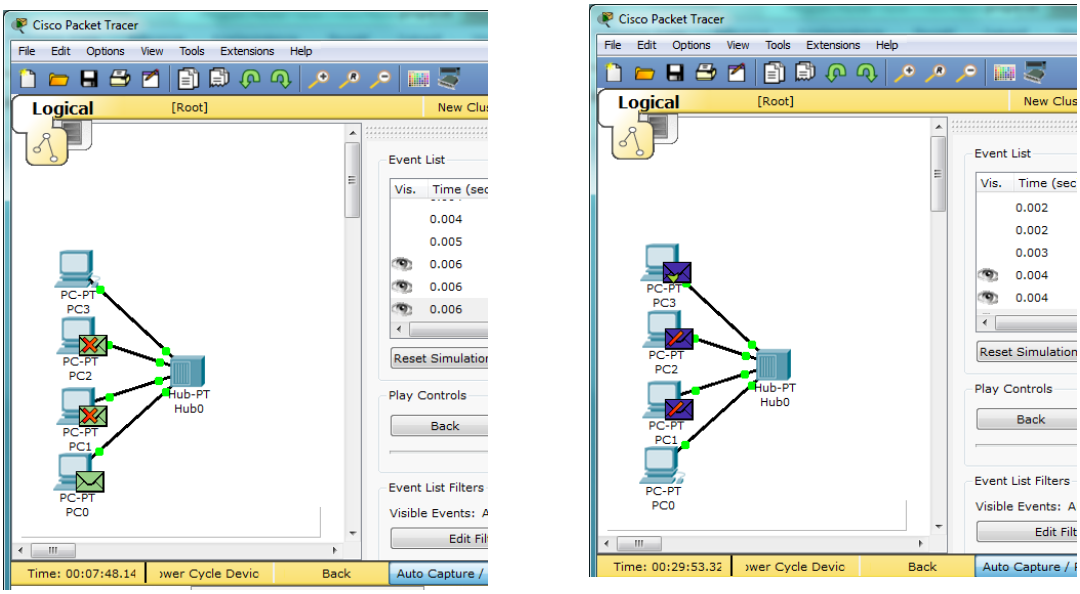

Fig. 3 Simulation using hub

The task for students in the next section is to create a second subnet with using switch. Base on simulation the students should find out differences between using hub and switch. The aim of the exercise is to create a functioning network, which would consist of at least two subnets and use a router device. There is necessary configure router to work computer net properly. The router is configured with the command line interface

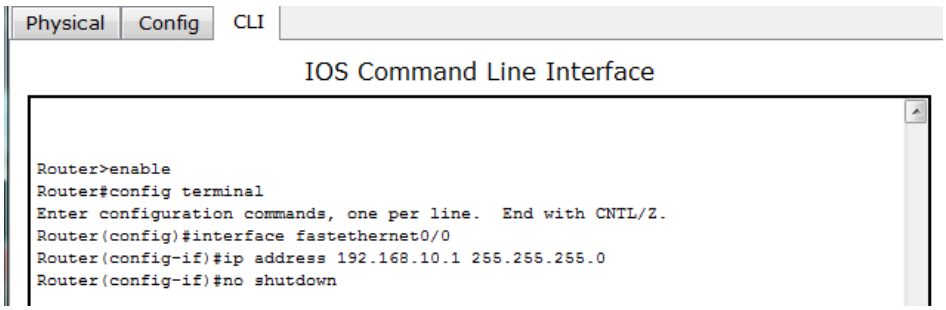

Fig. 4 Router configuration

Correct configuration of router indicates to us a green paint balls at individual facilities. We can verify the accuracy by sending a packet from one subnet to another subnet as well. The following figure shows the observed computer net.

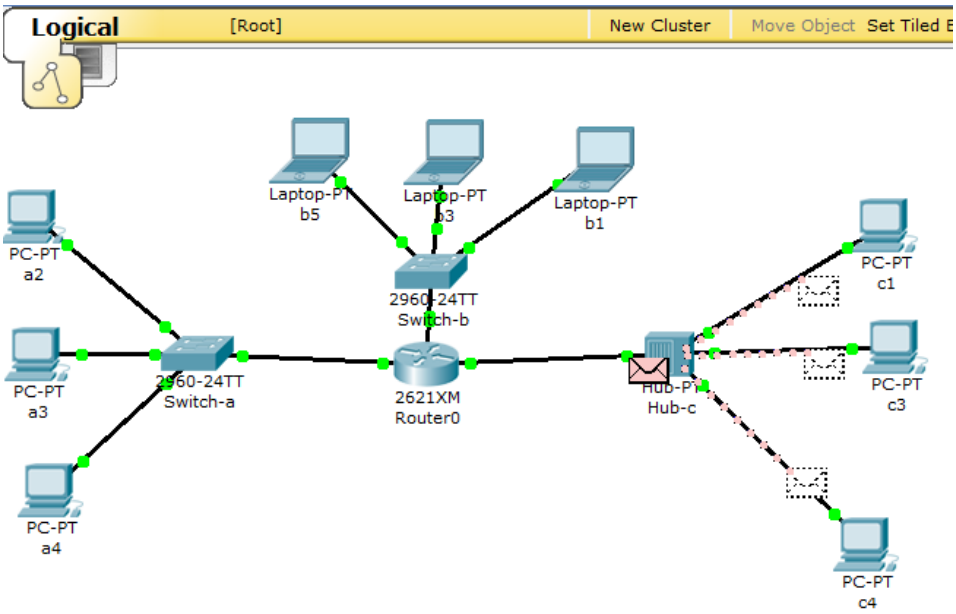

Fig. 5 The observed computer net

Conclusion

This paper describes only the basic methods to create a functional computer network. Cisco Packet Tracer provides much greater opportunities for creating and managing computer networks. Students obtain knowledge of server configuration options, setting dynamic ip addresses, physical modifications to the selected device and much more. In the current environment is the possibility of creating not only the logical structure of computer network, but also its physical layout. By using these tools students acquire basic knowledge about the functioning of computer networks.

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