

NETWORK SWITCHES

Jamshid Ortiqovich Urinov¹

¹ Assistant at the Samarkand branch of the Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Akram Nug'monovich Nizamov¹

¹ Docent at the Samarkand branch of the Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Abdiev Jo'rabek Muzaffar o'g'li^{2,3}

²Physical-technical institute, SPA "Physics-Sun" of the Academy of Sciences of the Republic of Uzbekistan, Tashkent 100084, Uzbekistan

³Laboratory of Environmental Science and Technology, The Xinjiang Technical Institute of Physics and Chemistry, Key

Laboratory of Functional Materials and Devices for Special Environments, Chinese Academy of Sciences, Urumqi 830000, People's Republic of China

Sunnat Shoto'ra o'g'li Suvonov¹

¹Student at the Samarkand branch of the Tashkent University of Information Technologies named after Muhammad al-Khwarizmi

Suhrob Zayniddin o'g'li Nosirov⁴

⁴Student at the Samarkand Construction and Architecture Technical School

Abstract: Currently, various types of switches are used to connect electrical circuits and change the direction of current. These devices are widely used in electrical engineering and are considered important devices.

Keywords: switch, commutator, modem, router, LAN, ADSL, xDSL.

A commutator (from Latin "commuto" meaning "I exchange, I change") is a device used to connect, isolate, exchange connections, and change the direction of the current passing through the circuit. The exchange of connections can be done manually or automatically based on a specific program. There are electromechanical, electronic and optic-electronic commutators. Common electromechanical commutators include switches, electric machine collectors; electromagnetic relay assemblies and other electronic commutators are electronic devices assembled from ion devices, electron lamps, semiconductors according to certain functional schemes. An optical-electronic commutator changes the connection scheme of another device with the help of light. Commutators are used in electrical engineering, communication, telemechanics, and other areas.

A commutator or switch is used for the interconnection of devices when the number of devices connected to the local network exceeds two. Thus, the commutator is a key communication device in forming a local computer network. It is important to note that a network concentrator can also be used instead of a commutator. The differences in forming local networks based on a concentrator and a commutator are examined below.

The advantage of a concentrator over a commutator lies only in the ability to strengthen the signal of its ports and its cheapness. However, when the number of connected devices in the local network exceeds eight, the concentrator decreases the network's operating speed. Commutators can have different ports, such as Fast Ethernet ports that provide a 100 Mbit/s connection or Gigabit Ethernet ports that provide a 1 Gbit/s connection. The number of ports in home-used commutators usually does not exceed eight.

Commutators can be divided into two groups: managed and unmanaged. Managed commutators can be configured via a special software tool with the help of a computer. This means that such commutators can be connected to a computer with a console cable, then enter the configuration window using the software installed on the computer and perform the configuration. However, these commutators are almost never used in forming local networks due to their high cost and their usage being impractical in building local networks. Using unmanaged commutators is the most efficient solution in building local networks.

Routers. The main device that provides the connection of devices connected to the local computer network (computers, tablets, smartphones, and other end devices connected to the network) to another network, for example, the Internet, through a single channel. Routers allow devices to connect directly or through network commutators. Routers used in building local networks have LAN ports for connecting local network devices, so using a commutator is not necessary. Additionally, routers have a WAN (Wide Area Network) port for connecting to another network. This port is mainly used to connect to the Internet. The main task of routers used in local networks is to provide the connection of local network devices with another network (mainly with the Internet). Local network routers allow various devices to be connected in the local network either through the Ethernet standard or the Wi-Fi standard.

Another function of the router is to limit access to the local network from the external Internet network. The router performs the function of blocking traffic from the outside via the NAT mechanism. It changes the private IP addresses of users in the local network to a public IP address given by the Internet provider for functioning on the Internet. When receiving data from the Internet, it performs the reverse task - it changes the public IP address to the private IP addresses used within the boundaries of the local network.

Usually, routers have four LAN ports for connecting local network devices. There is one WAN port for connecting to the Internet. If there are more than four devices in the local network connected via the Ethernet standard (through UTP cable), then it is enough to connect a commutator to one of the LAN ports of the router and connect other local network devices to the commutator.

Modem. A modem can also be used to connect local network devices to the internet. If the area where the local network is established is provided with internet through xDSL technology via a telephone line (for example, through the most widely used variant, ADSL), the subscriber needs to have an ADSL modem to connect their local network to the internet. However, it should also be noted that not only ADSL modems that provide internet connection through a telephone line can be used to connect a local network to the internet, but also modems that provide an internet connection via a mobile communication network.

Parts of the Switch and their Functions

These devices are determined based on certain aspects that are of great importance and we are now developing as a clarification method for the student:

- Case: it provides the greatest protection, allowing all contacts in the inner part to mesh and is responsible for giving aesthetics to the product.
- 1st LAN port of the "Cascade": it is used for connection with other network devices and switches.
- 2 x LAN ports: These provide the possibility of interconnecting them with other devices on the local network.
- LAN PoE ports: It achieves interconnection of various devices compatible with PoE technology.



- RJ45 port for management: through this, we can directly connect between the switch and computer equipment, all of which is only to access the command console (TUI) and continue setting certain specific parameters. This port is only available on manageable switches.
- Fan: It is responsible for expelling hot air from the inside of the switch.
- AC adapter: Its function is to receive current from the electric network.

REFERENCES

1. Vatamanyuk A. I. "Creating, Saving and Managing Networks"
2. Stakhnov A.A. "Linux Network Administration"
3. James Hogan System and Network Management. Practical manual 2nd edition 2013.
4. Evie Nemet, Garth Snyder, Trent R. Hein, Ben Whaley: "Unix and Linux. System Administration Handbook".
5. Lynn S. : "Microsoft Windows Server 2012 Administration" 2014.
6. Denis Kolisnisenko, "Wireless Network at Home and Office". 2009