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Computer Protocols

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Анотація

Для того, щоб комп'ютери могли зв'язуватися один з одним, були розроблені стандартні методи передачі та обробки інформації. Вони називаються "протоколи" і деякі з найбільш поширених з них, таких як TCP, IP, UDP, POP, SMTP, HTTP і FTP обговорюються в цій статті.

Ключові слова

Комп'ютерні протоколи, передача інформації, обробка інформації, Інтернет протоколи, Поштові протоколи

Abstract

In order for computers to communicate with one another, standard methods of information transfer and processing have been devised. These are referred to as "protocols" and some of the more common ones such as TCP, IP, UDP, POP, SMTP, HTTP, and FTP are discussed in this article.

Keywords

Computer Protocols, information transfer, information processing, Internet protocols, Mail protocols

What are protocols?

When two humans converse, they may have to use the same language but they generally understand each other without having to adhere to rigid rules of grammar or formal language frameworks. Computers, on the other hand, have to have everything explicitly defined and structured. If computers wish to communicate with one another, they have to know in advance exactly how information is to be exchanged and precisely what the format will be. Therefore, standard methods of transmitting and processing various kinds of information are used and these methods are called "protocols". Protocols are established by international agreement and ensure that computers everywhere can talk to one another. There are a variety of protocols for different kinds of information and functions. This article will discuss some of the common protocols that the average PC user is likely to encounter.

Hypertext Transfer Protocol

Web pages are constructed according to a standard method called Hypertext Markup Language (HTML). An HTML page is transmitted over the Web in a standard way and format known as Hypertext Transfer Protocol (HTTP). This protocol uses TCP/IP to manage the Web transmission.

A related protocol is "Hypertext Transfer Protocol over Secure Socket Layer" (HTTPS), first introduced by Netscape. It provides for the transmission in encrypted form to provide security for sensitive data. A Web page using this protocol will have https: at the front of its URL.

TCP/IP

TCP (Transmission Control Protocol) and IP (Internet Protocol) are two different procedures that are often linked together. The linking of several protocols is common since the functions of different protocols can be complementary so that together they carry out some complete task. The combination of several protocols to carry out a particular task is often called a "stack" because it has layers of operations. In fact, the term "TCP/IP" is normally used to refer to a whole suite of protocols, each with different functions. This suite of protocols is what carries out the basic operations of the Web. TCP/IP is also used on many local area networks. The details of how the Web works are beyond the scope of this article but I will briefly describe some of the basics of this very important group of protocols. More details can be found in the references in the last section.

When information is sent over the Internet, it is generally broken up into smaller pieces or "packets". The use of packets facilitates speedy transmission since different parts of a message can be sent by different routes and then reassembled at the destination. It is also a safety measure to minimize the chances of losing information in the transmission process. TCP is the means for creating the packets, putting them back together in the correct order at the end, and checking to make sure that no packets got lost in transmission. If necessary, TCP will request that a packet be resent.

Internet Protocol (IP) is the method used to route information to the proper address. Every computer on the Internet has to have its own unique address known as the IP address. Every packet sent will contain an IP address showing where it is supposed to go. A packet may go through a number of computer routers before arriving at its final destination and IP controls the process of getting everything to the designated computer. Note that IP does not make physical connections between computers but relies on TCP for this function. IP is also used in conjunction with other protocols that create connections.

Mail Protocols POP3 and SMTP

Email requires its own set of protocols and there are a variety, both for sending and for receiving mail. The most common protocol for sending mail is Simple Mail Transfer Protocol (SMTP). When configuring email clients, an Internet address for an SMTP server must be entered. The most common protocol used by PCs for receiving mail is Post Office Protocol(POP). It is now in version 3 so it is called POP3. Email clients require an address for a POP3 server before they can read mail. The SMTP and POP3 servers may or may not be the same address. Both SMTP and POP3 use TCP for managing the transmission and delivery of mail across the Internet.

A more powerful protocol for reading mail is Interactive Mail Access Protocol (IMAP). This protocol allows for the reading of individual mailboxes at a single account and is more common in business environments. IMAP also uses TCP to manage the actual transmission of mail.

File Transfer Protocol

File Transfer Protocol (FTP) lives up to its name and provides a method for copying files over a network from one computer to another. More generally, it provides for some simple file management on the contents of a remote computer. It is an old protocol and is used less than it was before the World Wide Web came along. Today, Its primary use is uploading files to a Web site. It can also be used for downloading from the Web but, more often than not, downloading is done via HTTP. Sites that have a lot of downloading (software sites, for example) will often have an FTP server to handle the traffic. If FTP is involved, the URL will have *ftp:* at the front.

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