

<epam>

Networks Concept

Computer Networks

Computer Science Basics

Lesson #1

Siarhei Kantarovich



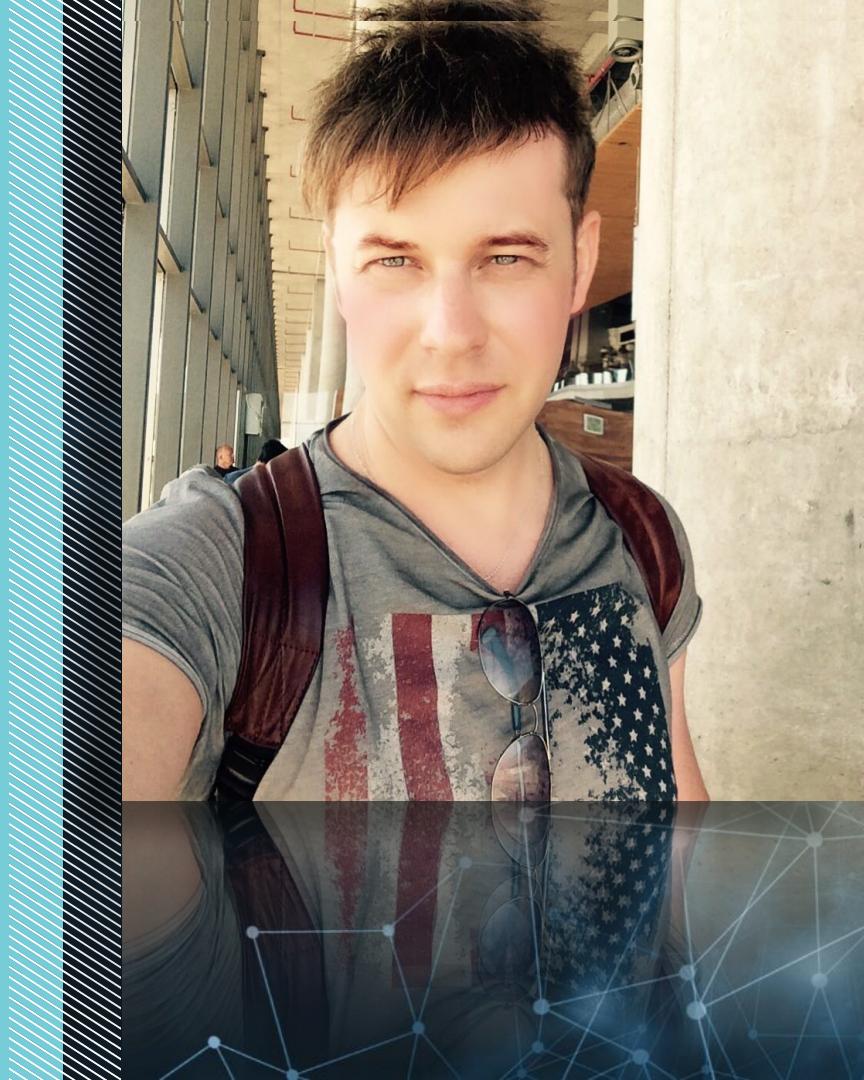
TRAINING
C E N T E R

— <epam> —



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Senior Systems Engineer
10+ years in IT



<epam>

Agenda

- NETWORK OVERVIEW
- TYPES OF NETWORKS
- NETWORK TOPOLOGIES
- NETWORK COMMUNICATION
- NETWORK ELEMENTS



A teleprinter, Teletype or TTY

electromechanical device
that can be used to send and receive typed messages through various communications channels, in both point-to-point and point-to-multipoint configurations.



Computer network

Teletype with Monitor and keyboard



Computer network

Miniprint 425 TDD.

The acoustic coupler on the top is for use with telephone handsets. The printer records the conversation. The specific GA and SK keys allow for speedier use of common abbreviations.



```
0320 PRINT CS(A,A));" ";
0330 NEXT A
0340 GOTO 0180
0350 PRINT "\NO LETTER IN WORD SI
0360 GOTO 0400
0370 END
```



Packet data transfer principle



- To improve the efficiency of transferring information over a shared communication line, messages are divided into fixed-sized, numbered **packets**
- Network devices called routers are used to direct packets between networks

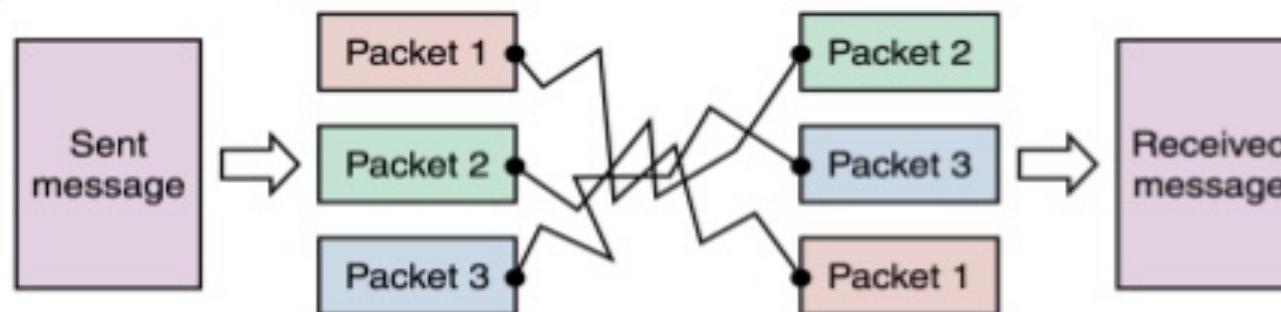


Figure 15.4
Messages sent by packet switching

Message is divided into packets

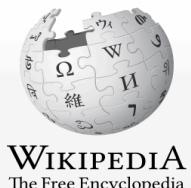
Packets are sent over the Internet by the most expedient route

Packets are reordered and then reassembled





Computer network



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ARPANET

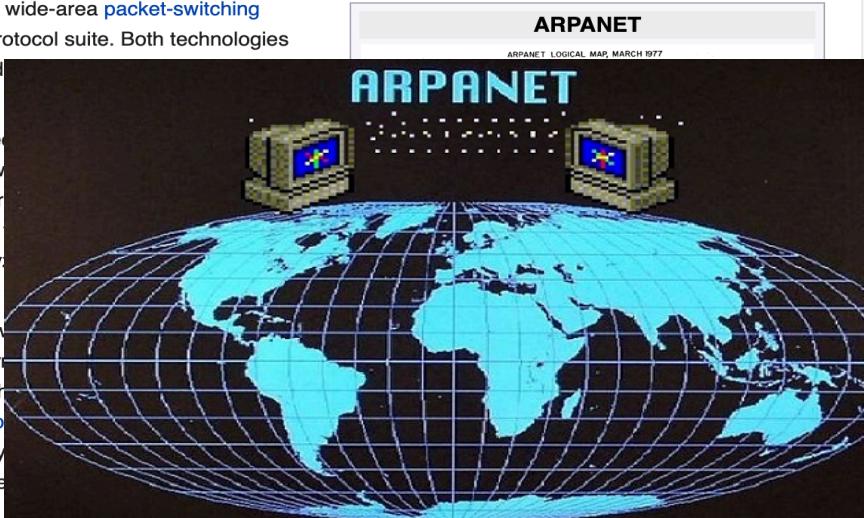
From Wikipedia, the free encyclopedia
(Redirected from [Arpanet](#))

*For the episode of the television series *The Americans*, see [Arpanet \(The Americans\)](#).*

The **Advanced Research Projects Agency Network (ARPANET)** was the first wide-area packet-switching network with distributed control and the first network to implement the [TCP/IP](#) protocol suite. Both technologies became the technical foundation of the [Internet](#). The ARPANET was established by the [Advanced Research Projects Agency \(ARPA\)](#) of the [United States Department of Defense](#).^{[1][2][3][4][5]}

Based on the ideas of [J. C. R. Licklider](#), [Bob Taylor](#) initiated the ARPANET project at [MIT](#) in 1968, with [Robert Kahn](#) as program manager.^[6] Roberts made the key decisions about the network architecture, based on [Donald Davies' concepts and designs for packet switching](#),^[8] and sought input from [Bolt Beranek & Newman](#) to build the network. In 1971, [Vint Cerf](#) and [Bob Kahn](#) developed the [Transmission Control Protocol \(TCP\)](#) at [Stanford Research Institute](#).^[9] In 1973, [Leonard Kleinrock](#) developed the [Queuing Theory](#) required to analyze the new technology.^[9]

The first computers were connected in 1969 and the [Network Control Program \(NCP\)](#) was developed. Networking research in the early 1970s by [Bob Kahn](#) and [Vint Cerf](#) led to the formalization of the [Transmission Control Protocol \(TCP\)](#) in 1974,^[11] which incorporated concepts from the French engineer [Louis Pouzin](#). As the network development progressed, a protocol for [internetworking](#) was developed, allowing multiple separate networks to be joined into a network of networks. Originally developed for military purposes, the [TCP/IP](#) protocol suite was installed in the ARPANET for production use in January 1983 after the [X.25](#) standard was abandoned. The [TCP/IP](#) suite made it standard for all military computer networking.^[12]

A historical diagram titled "ARPANET LOGICAL MAP, MARCH 1977". It features a world map with a grid overlay, showing the interconnected nodes of the ARPANET. Two computer terminals are shown at the top, connected to the network. The word "ARPANET" is prominently displayed in large blue letters across the middle of the map.

USEnet





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Usenet

From Wikipedia, the free encyclopedia

Usenet (*/ju:znet/*) is a worldwide distributed discussion system available on computers. It was developed from the general-purpose [Unix-to-Unix Copy \(UUCP\)](#) dial-up network architecture. [Tom Truscott](#) and [Jim Ellis](#) conceived the idea in 1979, and it was established in 1980.^[1] Users read and post messages (called *articles* or *posts*, and collectively termed *news*) to one or more categories, known as [newsgroups](#). Usenet resembles a [bulletin board system](#) (BBS) in many respects and is the precursor to [Internet forums](#) that are widely used today. Discussions are [threaded](#), as with web forums and BBSs, though posts are stored on the server sequentially. The name comes from the term "users network".^{[2][3]}

A major difference between a BBS or web forum and Usenet is the absence of a central server and dedicated administrator. Usenet is distributed among a large, constantly changing conglomeration of servers that [store and forward](#) messages to one another via "news feeds". Individual users may read messages from and post messages to a local server, which may be operated by anyone.

Usenet is culturally and historically significant in the networked world, having given rise to, or popularized, many widely recognized concepts and terms such as "[FAQ](#)", "[flame](#)", "[sockpuppet](#)", and "[spam](#)".^[4] In the 1990s, before access to the Internet became commonly affordable, Usenet connections via [Fidonet](#)'s dial-up [BBS](#) networks made long-distance or worldwide discussions and other [communication](#) widespread, not needing a server, just (local) telephone service.^[5]

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Groups sorted by size

Only the most popular groups are shown.

Alternatively, you can [view the other groups indexed](#)

Newsgroup	Current retention	Number of files	Number of parts	Total size of files
1. alt.binaries.boneless	1341 days	109965309	10434730503	4.9 PB
2. alt.binaries.hdtv	1341 days	15763165	4042336871	1.96 PB
3. alt.binaries.mom	1341 days	27025531	4270740001	1.61 PB
4. alt.binaries.cores	1341 days	23753654	4237395623	1.55 PB
5. alt.binaries.nl	1341 days	23366853	3380009284	1.28 PB
6. alt.binaries.ath	1341 days	3128. alt.binaries.dvdr.asian		<< < 3128 rec
7. alt.binaries.erotica	1341 days			
8. alt.binaries.dvd	1341 days			
9. alt.binaries.multimedia	1341 days			
10. alt.binaries.test	1341 days			
11. alt.binaries.bloaf	1341 days			
12. alt.binaries.misc	1341 days			
13. alt.binaries.x	1341 days			

All groups



Total number of files in database:

374822647

Total size of files in database:

26725242815



FIDOnet

Computer network



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FidoNet

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(Redirected from [Fidonet](#))

"[Netmail](#)" redirects here. For the Novell/Messaging Architects server software, see [M+NetMail](#).



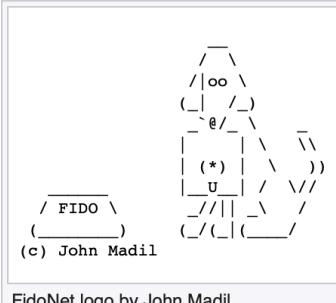
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Find sources: "FidoNet" – news · newspapers · books · scholar · JSTOR (February 2017) ([Learn how and when to remove this template message](#))

FidoNet is a worldwide [computer network](#) that is used for communication between [bulletin board systems](#) (BBSes). It uses a [store-and-forward](#) system to exchange private (email) and public (forum) messages between the BBSes in the network, as well as other files and protocols in some cases.

The FidoNet system was based on several small interacting programs, only one of which needed to be [ported](#) to support other BBS software. FidoNet was one of the few networks that was supported by almost all BBS software, as well as a number of non-BBS [online services](#). This modular construction also allowed FidoNet to easily upgrade to new [data compression](#) systems, which was important in an era using [modem](#)-based communications over telephone links with high [long-distance calling](#) charges.

The rapid improvement in modem speeds during the early 1990s, combined with the rapid decrease in price of computer systems and storage, made BBSes increasingly popular. By the mid-1990s there were almost 40,000 FidoNet systems in operation, and it was possible to communicate with millions of users around the world. Only [UUCPNET](#) came close in terms of breadth or numbers; FidoNet's user base far surpassed other networks like [BITNET](#).^[1]



FidoNet logo by John Madil

Сообщение 399 из 399
От : Returning Officer
Кому : A11
Тема : Развяснение R50C

2:5020/545

06 Ноя 16 11:00:00
06 Ноя 16 12:30:18

2k

Доброго времени суток, A11!

* Обнаружено в NETMAIL
* От: R50C (2:5020/5452), 06 Nov 2016 02:00:22
* Для: Alexey Vissarionov
* Про: Вопросы к кандидатам
Приветствую Вас, Alexey!



26 окт 16 23:44, Alexey Vissarionov wrote to R50C:

AV> Собственно, вопрос сводится к следующему: считает ли R50C допустимым,
AV> чтобы в сети, содержащей модемные узлы, хост был IP-only? И именно ему
AV> я его адресую:

Действующий R50FAQ разрешает ION-хосты только в сетях без PSTN узлов. NC_ELECT более жёсток, и запрещает ION-хосты вовсе.

На мой взгляд, выполнение функции доставки корреспонденции узлам сети никак не связана с поддерживаемыми способами её получения хостом извне. Даже если у хостового узла полностью отсутствует модемная часть (и на вход, и на выход), никто не мешает NC построить схему распространения нетмейла в сети с использованием хаб-роутинга, где хост будет отдавать неитмейл хабам по IP, а те доставлять его оконечным узлам по PSTN.

Но менять нормативные документы, регламентирующие выборы, в процессе самих выборов считаю некорректным, тем более, как я понял, оба зарегистрированных на выборах N5030C кандидата оказались способными обеспечить требования NC_ELECT. В дальнейшем R50FAQ и NC_ELECT будут переработаны с учётом вышеизложенного.

Алексей Баринов

* Копия(и) Alexey Vissarionov, Andrey Frolov

E-Mail: bav@sirena2000.ru ICQ: 24466689 Skype: huba-huba

[Team Бородатые]

--- GoldED+/w64-MSVC 1.1.5-b20160322

+ Origin: Alex at Home # 527-5343 (voice) # 22:00-00:00 (2:5020/5452)

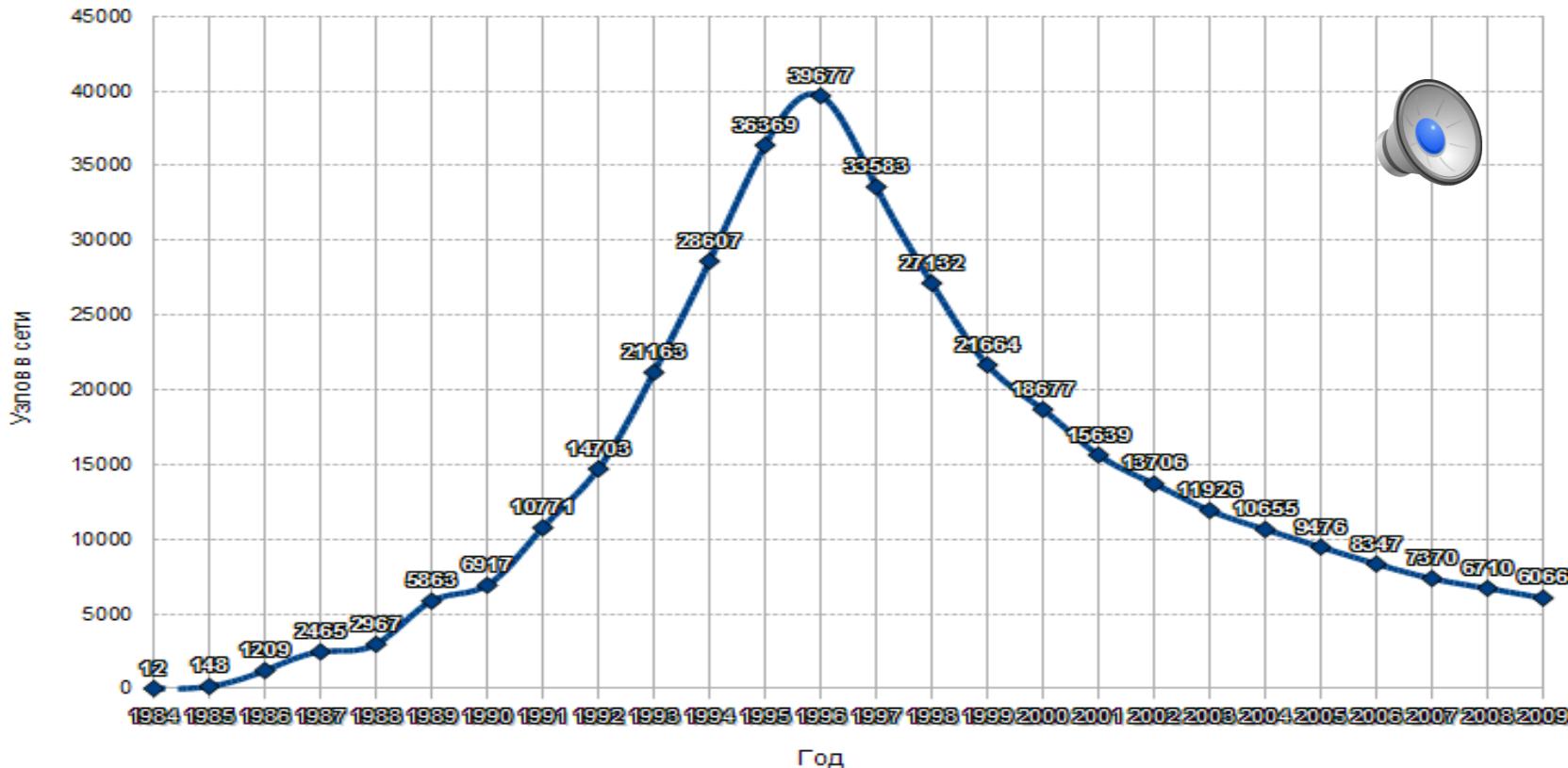
* Originally in SPB.SYSOP

F9 - список, F4 - ответ, Insert - новое [HTsQ]

| Вс 06 Ноя 16 12:51:06

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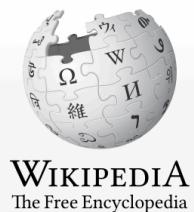
Фидонет динамика числа узлов в сети





INTERnet

Computer network



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Internet

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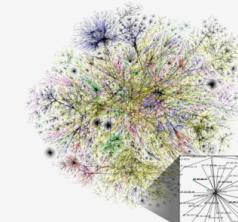
This article is about the worldwide computer network. For other uses, see [Internet \(disambiguation\)](#).

Not to be confused with the [World Wide Web](#).

The **Internet** ([portmanteau](#) of [interconnected network](#)) is the global system of interconnected [computer networks](#) that uses the [Internet protocol suite](#) (TCP/IP) to link devices worldwide. It is a *network of networks* that consists of private, public, academic, business, and government networks of local to global scope, linked by a broad array of electronic, wireless, and optical networking technologies. The Internet carries a vast range of information resources and services, such as the inter-linked [hypertext](#) documents and [applications](#) of the [World Wide Web](#) (WWW), [electronic mail](#), telephony, and [file sharing](#).

The origins of the Internet date back to the development of [packet switching](#) and research commissioned by the [United States Department of Defense](#) in the 1960s to enable [time-sharing](#) of mainframe computers.^[1] The primary precursor network, the [ARPANET](#), initially served as a backbone for interconnection of regional academic and military networks in the 1970s. The funding of the [National Science Foundation Network](#) as a new backbone in the 1980s, as well as private funding for other commercial extensions, led to worldwide participation in the development of new networking technologies, and the merger of many networks.^[2] The linking of commercial networks and enterprises by the early 1990s marked the beginning of the transition to the modern Internet,^[3] and generated a sustained exponential growth as generations of institutional, [personal](#), and [mobile computers](#) were connected to the network. Although the Internet was widely used by [academia](#) in the 1980s, [commercialization](#) incorporated its services and technologies into virtually every aspect of modern life.

Internet



An [Opte Project](#) visualization of [routing paths](#) through a portion of the Internet

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Governance [\[show\]](#)

Information infrastructure [\[show\]](#)

Services [\[show\]](#)

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[Internet portal](#)



Dial-Up connection

Computer network



Acoustic coupler modem

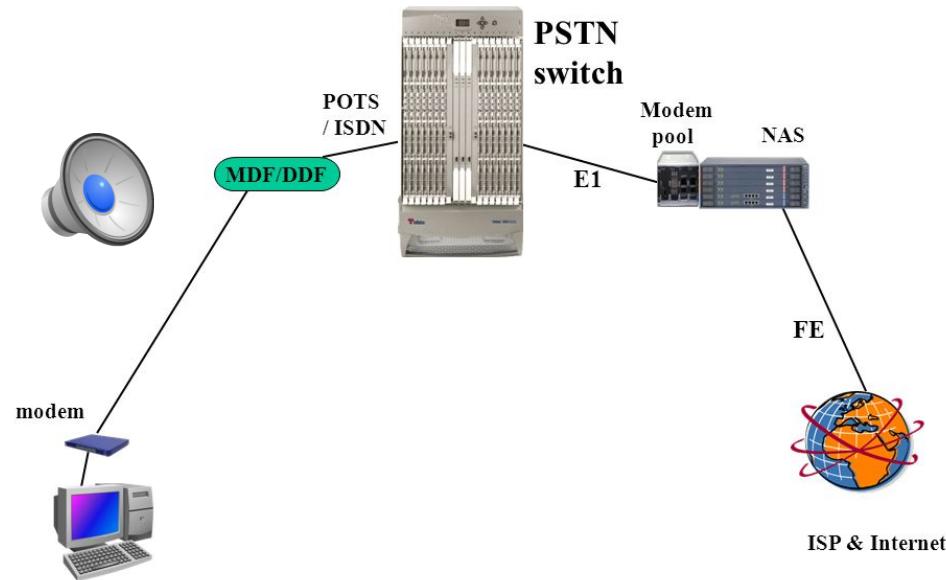


FIRST MODEM: AT&T's 1958 modem. Not exactly your small, white unobtrusive box of today, is it?

Dial-Up Connection

Dial-up Internet access is a form of Internet access that uses the facilities of the public switched telephone network (PSTN) to establish a connection to an Internet service provider (ISP) by dialing a telephone number on a conventional telephone line. Dial-up connections use modems to decode audio signals into data to send to a router or computer, and to encode signals from the latter two devices to send to another modem.

Dial up Access





Dialing...



Computer network

Message is spliced to “packets” according to Maximum Transmission Unit (**MTU**)

Packets sent to Sender's ISP

Packets routed to RECEIPT ISP over different networks according to ROUTING TABLE of each network Router

Message assembled back from packets By Recipient Computer and confirm each Packet is received by using hash.

If packet is not received or corrupted, it will be retransmitted by Sender's PC

HOW THE INTERNET WORKS

