



# A számítógépes hálózatok

## Computer networks

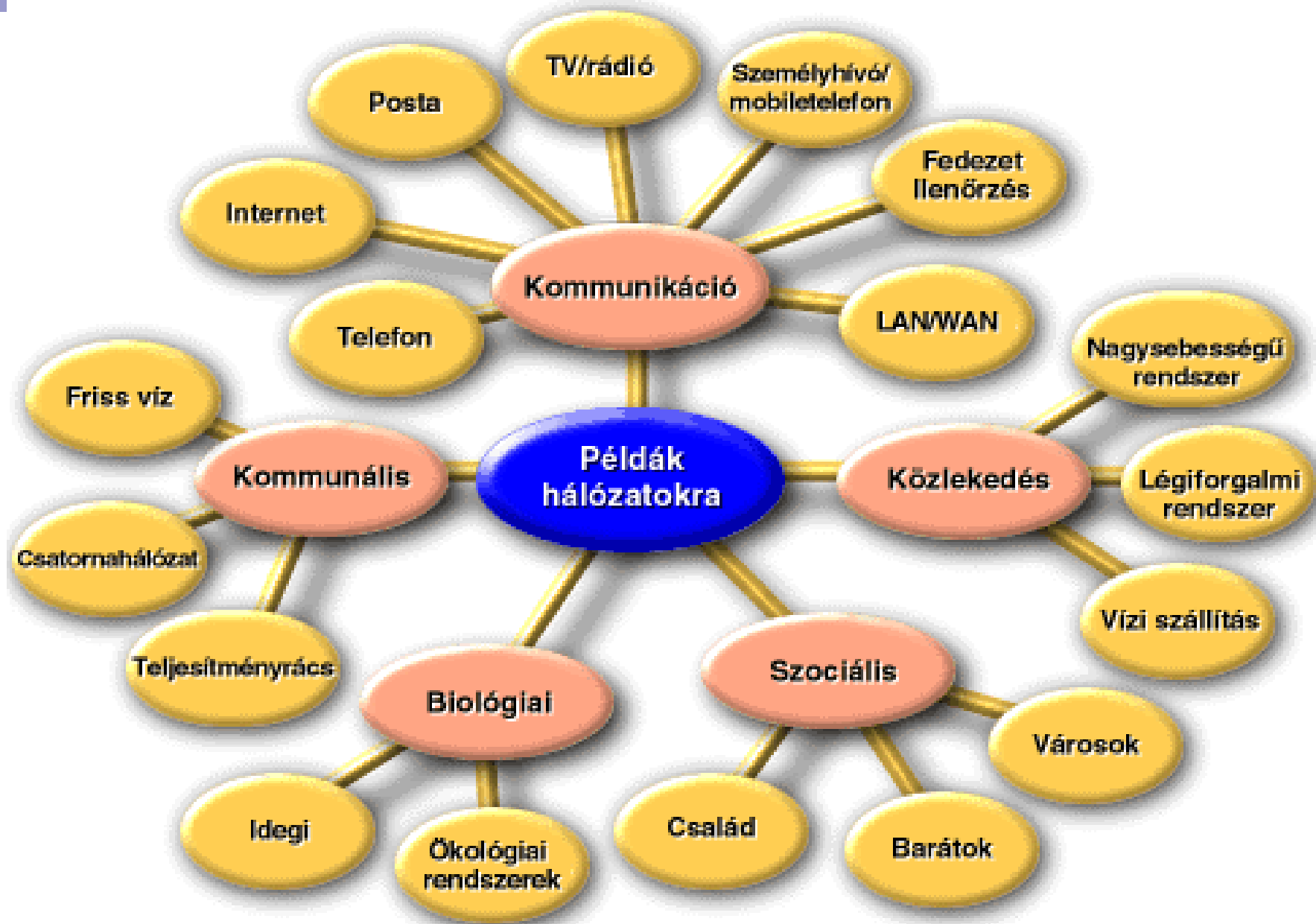
### Počítačové siete

A számítógépes hálózatok története  
History of computer networks  
História počítačových sietí

1

Imrich Okenka, Katedra matematiky a informatiky

Ekonomická fakulta Univerzity J. Selveho



This, Jen, is the Internet














# Computer network

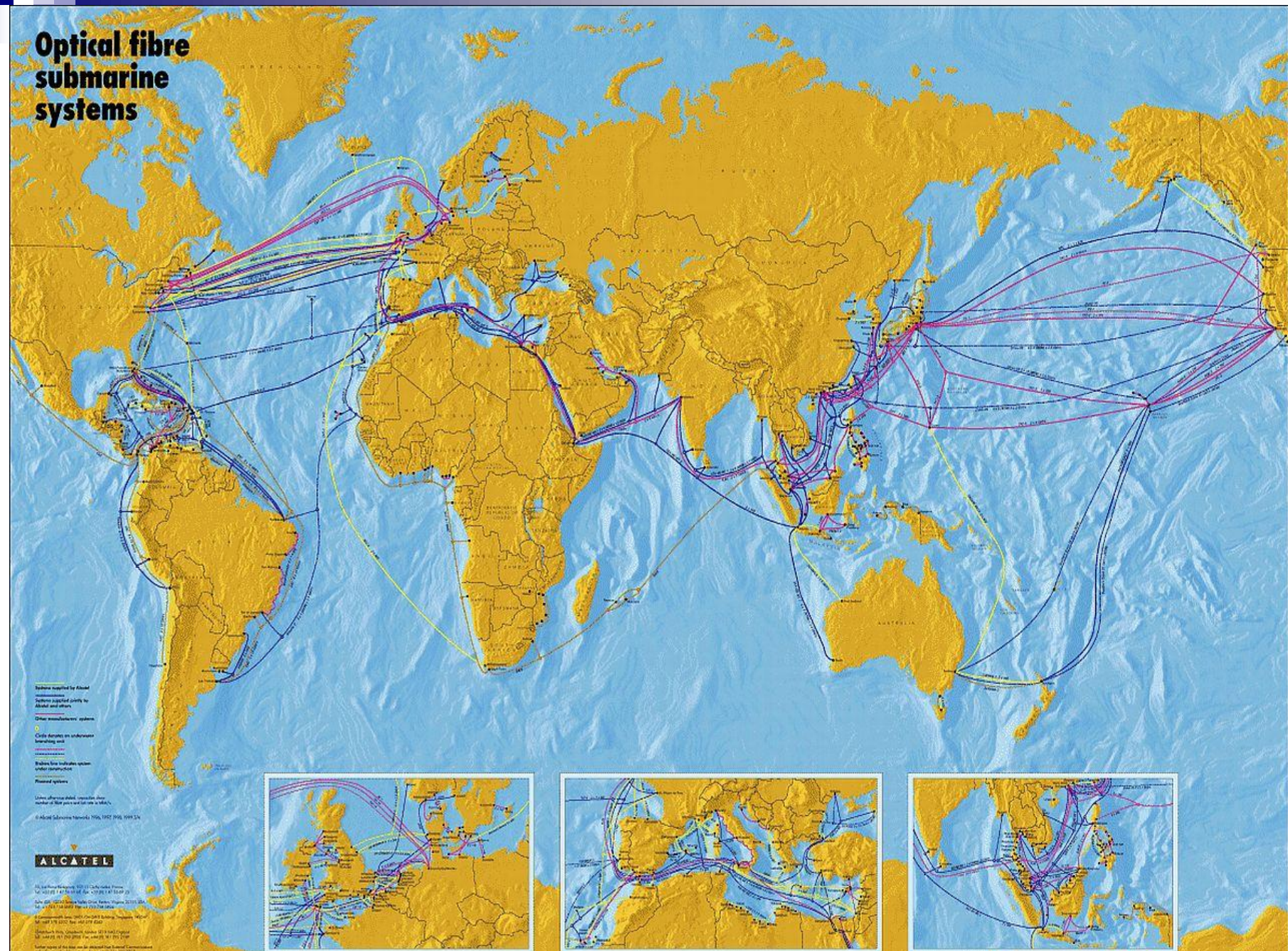
is a group of two or more computers that are interconnected to share resources (data, hardware, software...). Two computers are said to be interconnected if they are able to exchange information.

Network may involve other devices such as routers, switches, network printers, IP telephones etc. so, in general, we speak about **nodes** of a network.

- 
- Main purpose of networks is to transfer data from **source** to **destination**. Data is transferred by different types of signal and represented with sequence of bits (ones and zeros). Various **physical media** can be used for transmission of signal: coaxial cable, twisted pair, fiber optics and air.
  - Suppose that we want to transfer data from host A to host B over the network. Data may be e-mail, .mp3 file, web page etc. Furthermore that data have to be **segmented** into smaller pieces of information, **transferred** over the network and **delivered** to host B **without errors**.



## Optical fibre submarine systems



Systems supplied by Abiad  
Systems supplied jointly by  
Abiad and others  
Other manufacturer systems

Circle denotes an underway  
launching unit

Brackets line indicates system  
under construction

Planned systems

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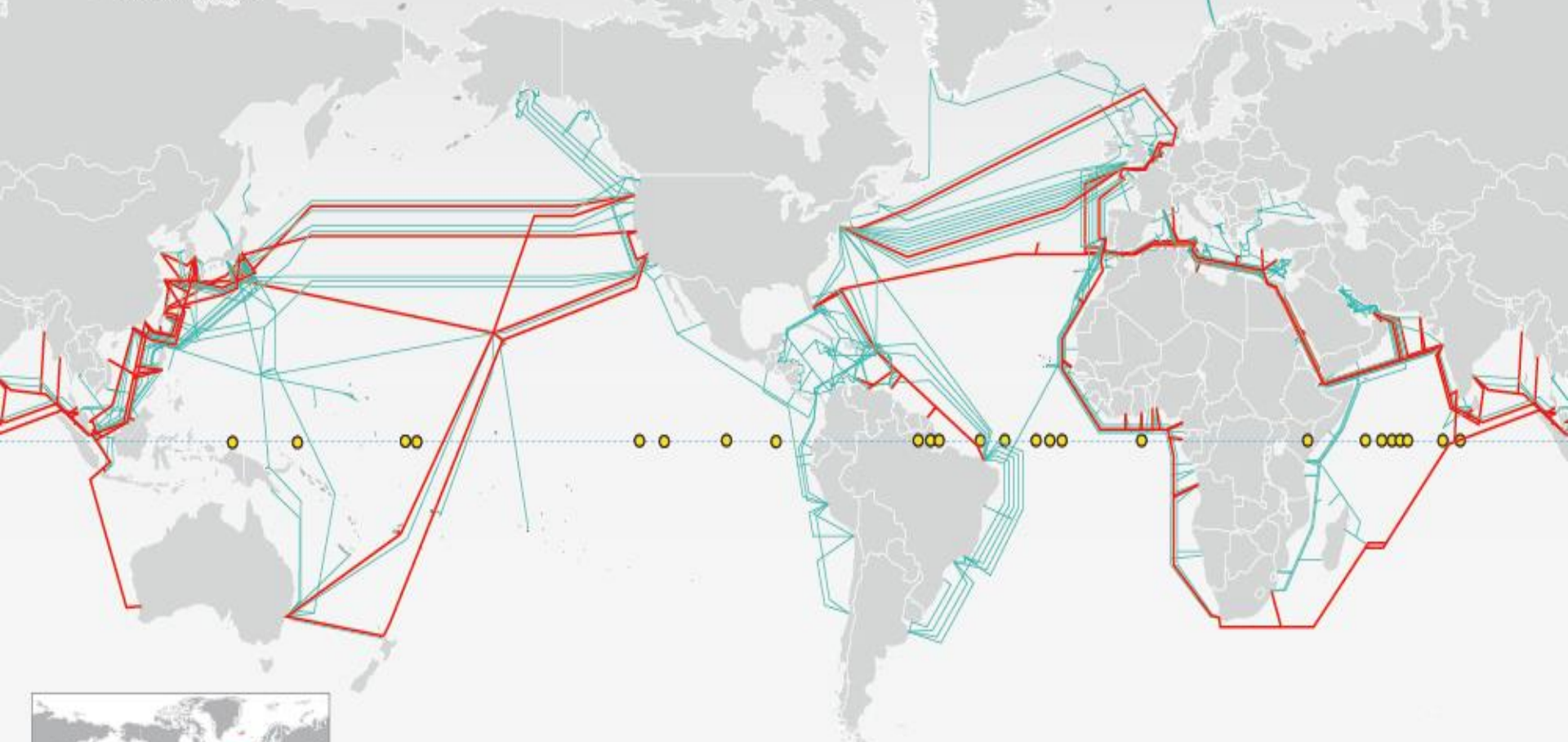
ALCATEL

[illegible]



# THE VERIZON GLOBAL NETWORK

As of November 2011



## Legend

Major Submarine Cables



Other Submarine Cables



Satellite



Mesh Network



Future Mesh Network



Mesh Node



# História počítačových sietí

- Základom k vytvoreniu počítačovej siete bol vznik Arpanet - u v roku 1969.
- Arpanet - sieť, ktorú vytvorila skupina Arpa (Advanced Research Projects Agency) založená ministerstvom obrany USA.
- Prepojenie štyroch univerzitných počítačov. Ak by sa jeden zo štyroch počítačov zničil, údaje, ktoré obsahoval sa dali získať prostredníctvom ďalších troch.





# História počítačových sietí

- Nápad vytvorenia počítačovej siete - rok 1966 Bob Taylor. Na jej základe sa začala budovať sieť ARPANET.
- Do konca roku 1969 ju tvorili 4 počítače ( point-to-point).
- V roku 1972 ich už bolo 23. V roku 1984, prekročil ich počet 1000.
- Prudký rozvoj internetu nastal v 80. rokoch, kedy vznikali rôzne nové počítačové siete. Už v roku 1979 sa k sieti Arpanet pripojila ďalšia počítačová sieť USENET, ktorá bola vytvorená pre potreby výskumníkov.

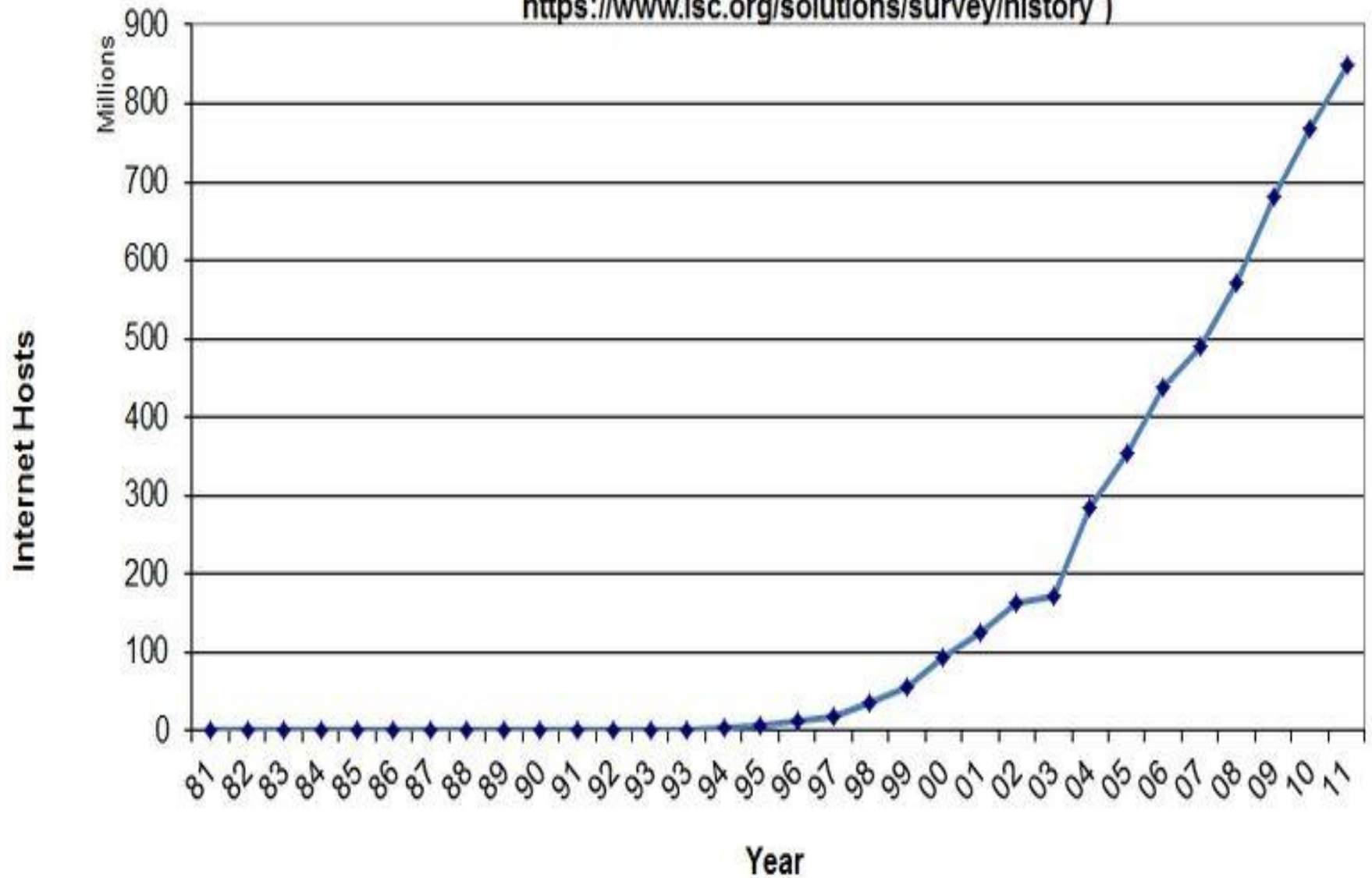


# História počítačových sietí

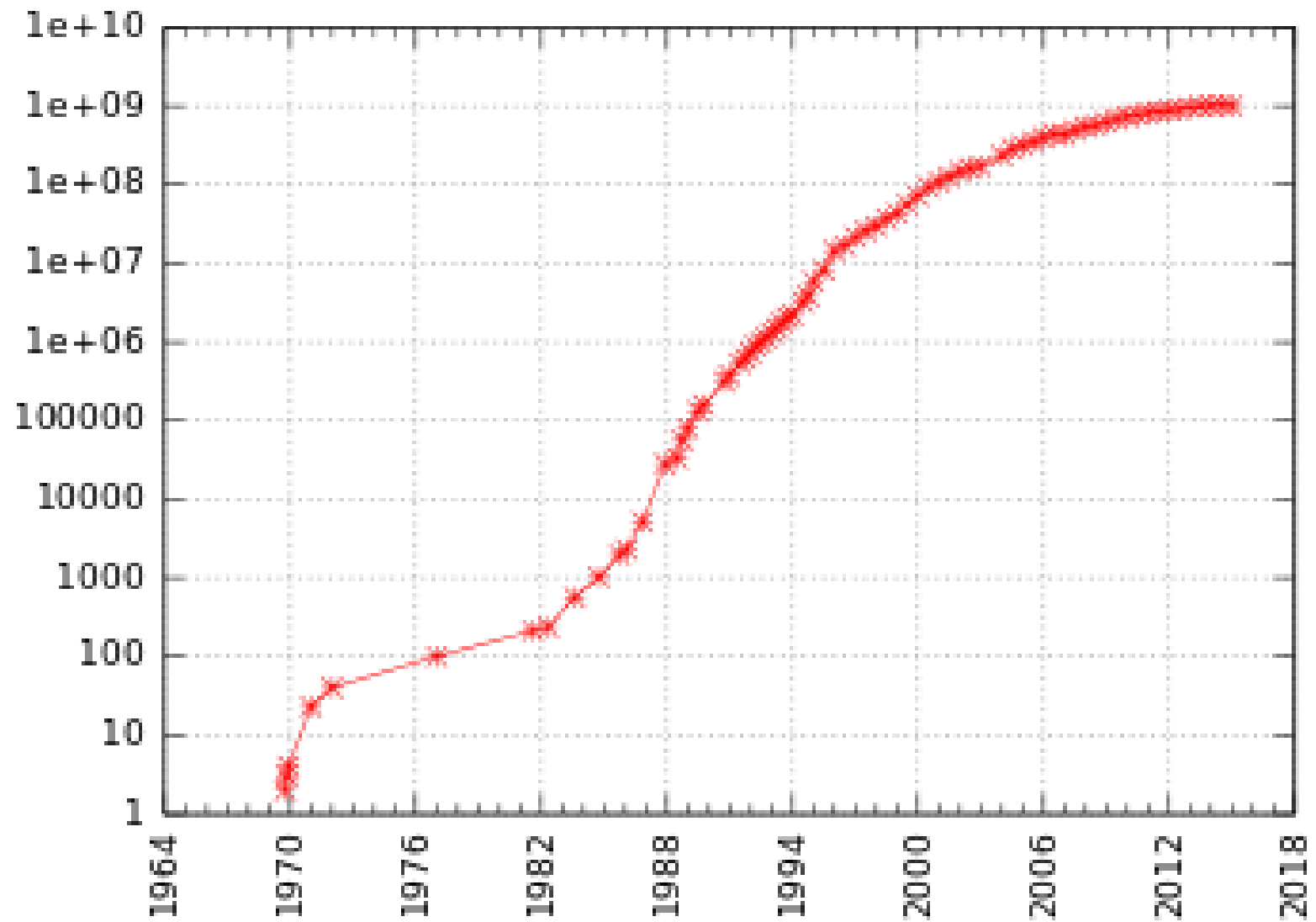
- Od roku 1975 obrovský rozmach Internetu pripájaním nových národných, regionálnych a hlavne lokálnych počítačových sietí.
- Počet pripojených počítačov sa blíži k 900 miliónom
- Internet nie je ani organizácia ani počítačová sieť. Je to „sieť sietí“.



World Internet Hosts: 1981 - July 2011 (Data Source: ISC  
<https://www.isc.org/solutions/survey/history> )



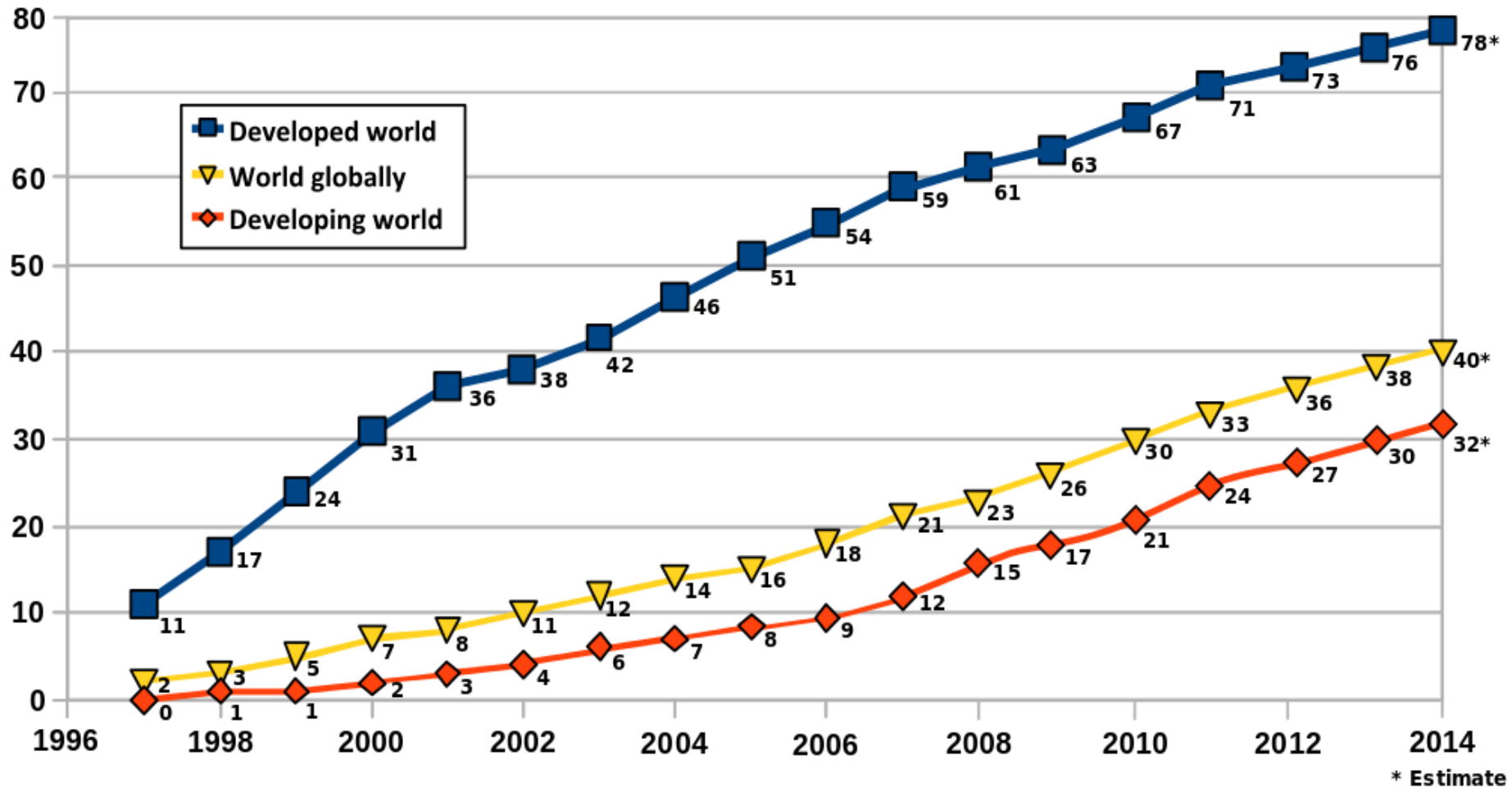
Internet Hosts Count

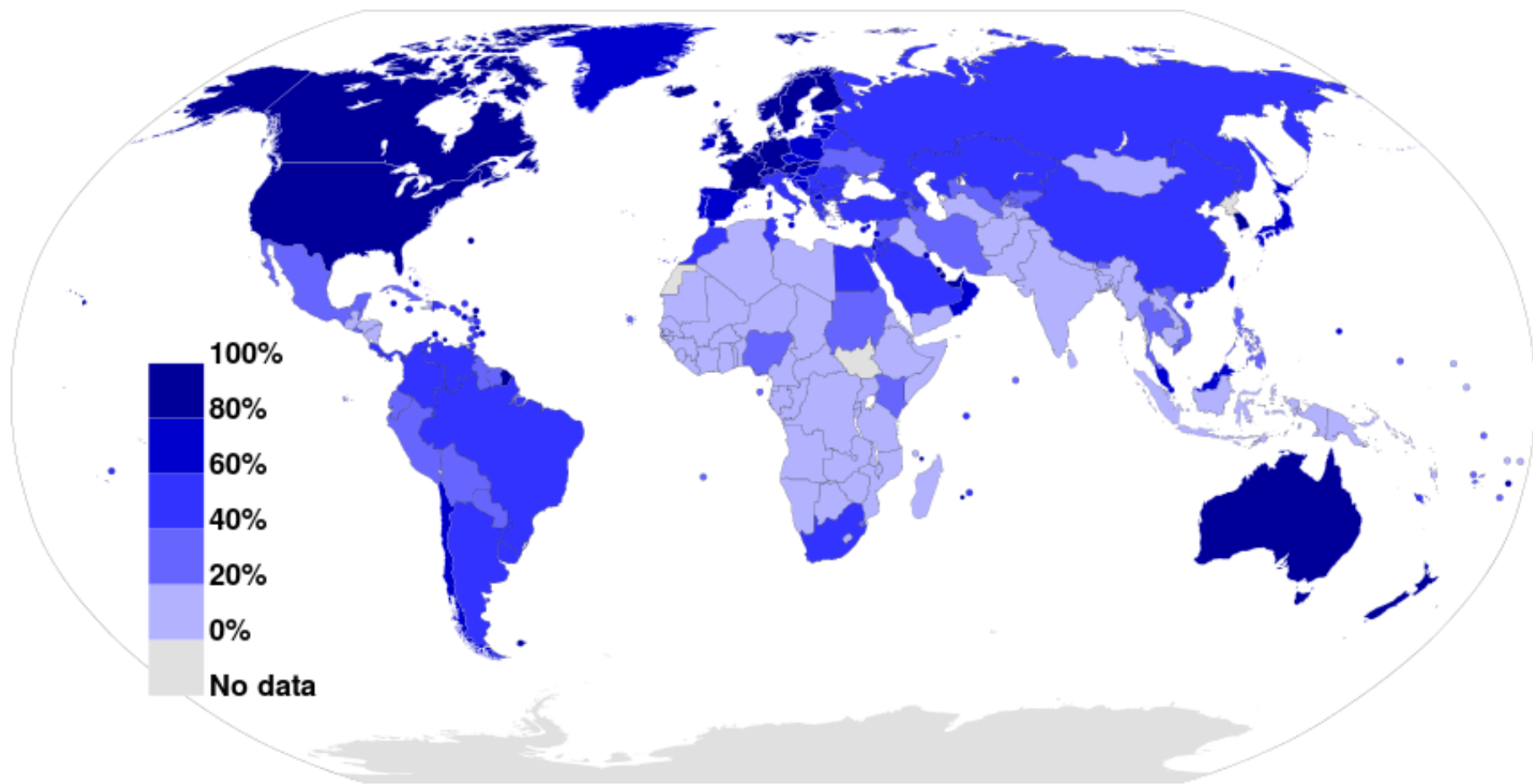




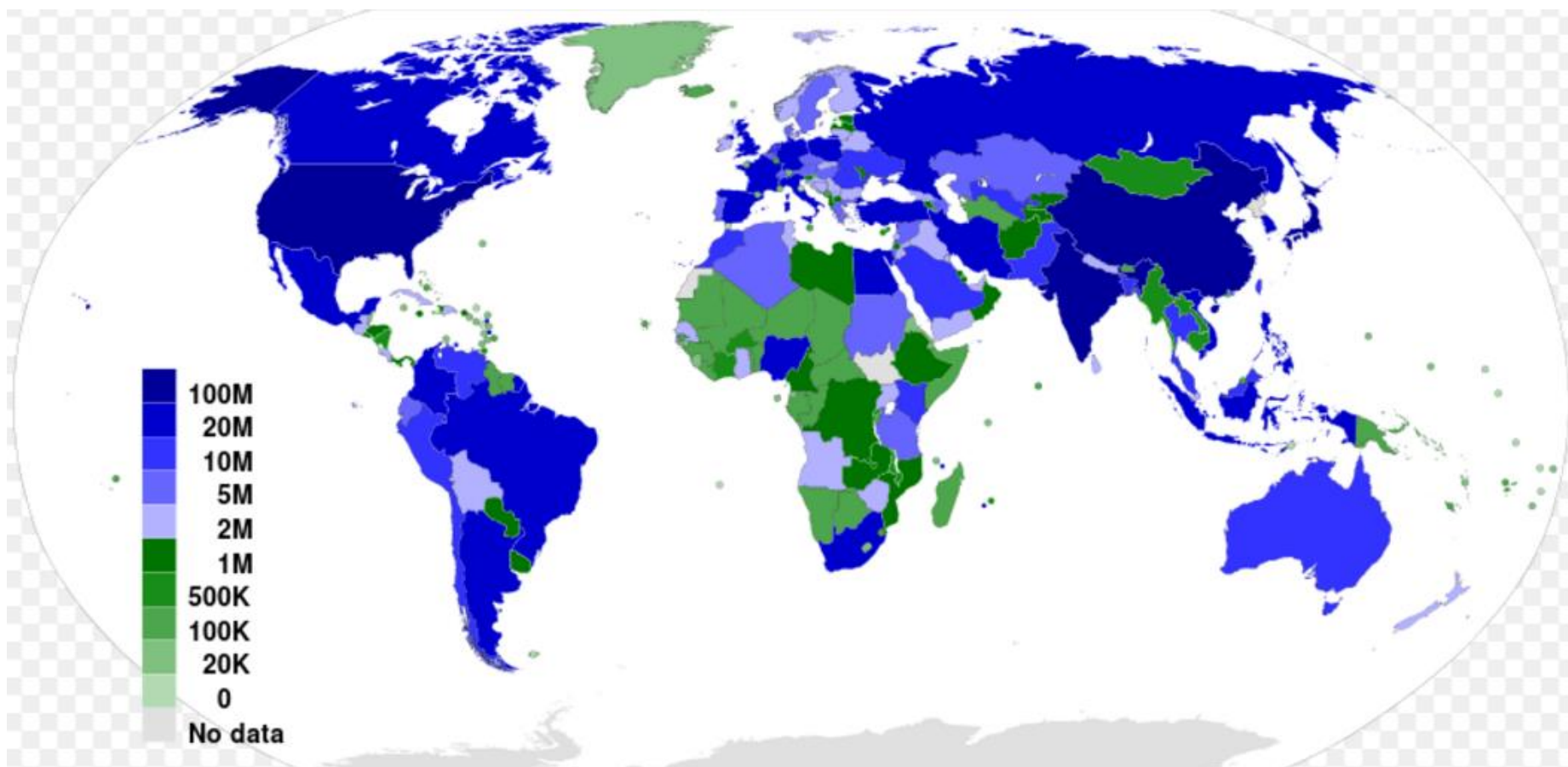
# Internet users per 100 inhabitants

Source: [International Telecommunications Union](#)





Internet users in 2012 as a percentage of a country's population

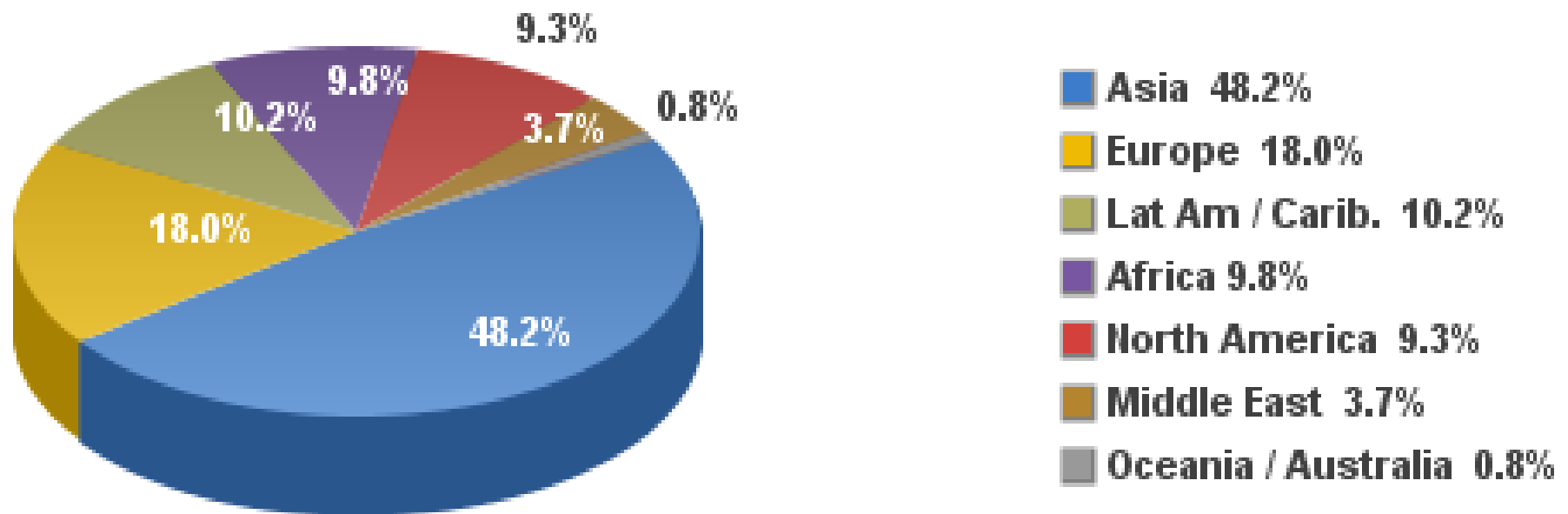


**Number of Internet users in 2012**



# Internet Users in the World by Regions

## November 2015

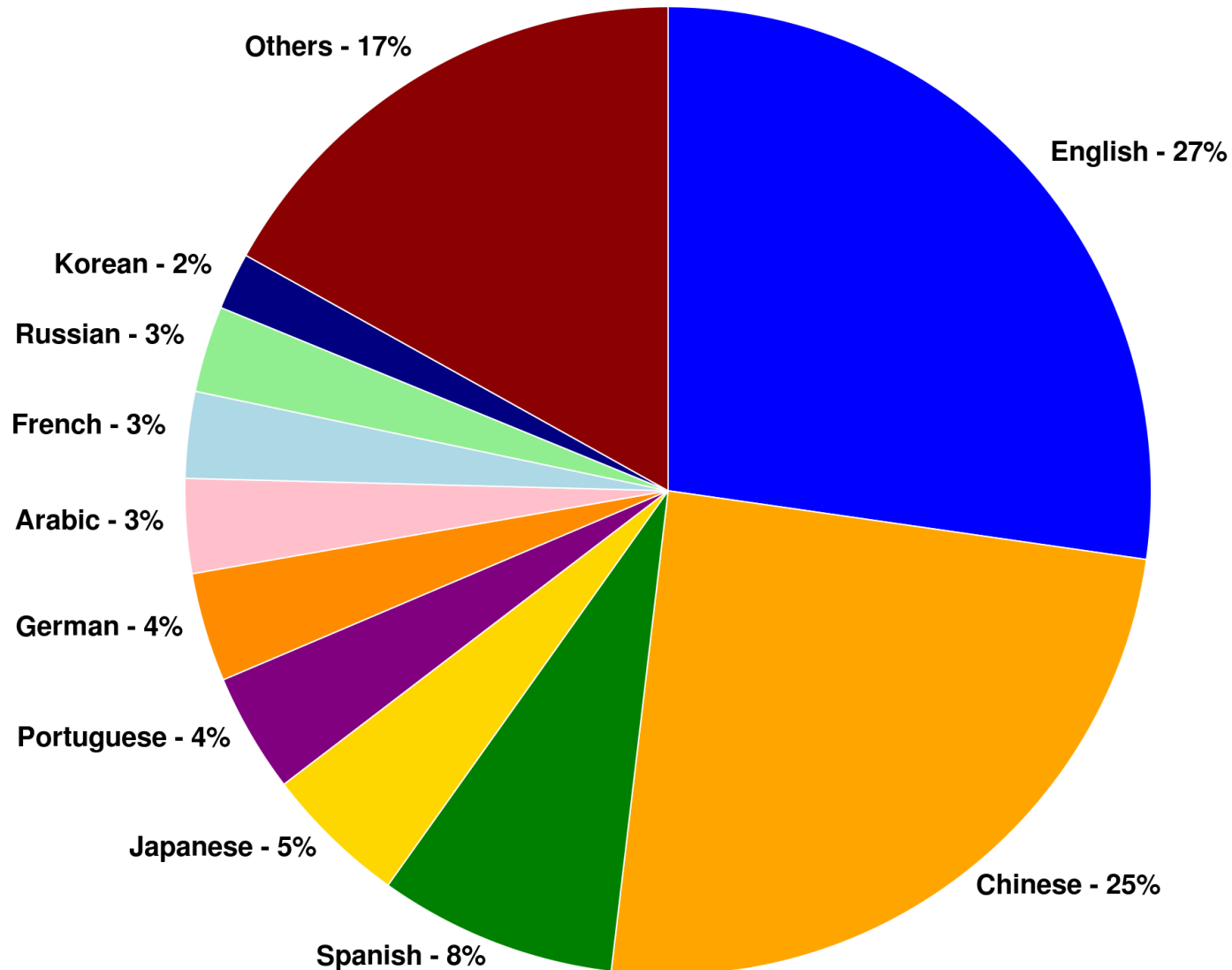


Source: Internet World Stats - [www.internetworldstats.com/stats.htm](http://www.internetworldstats.com/stats.htm)

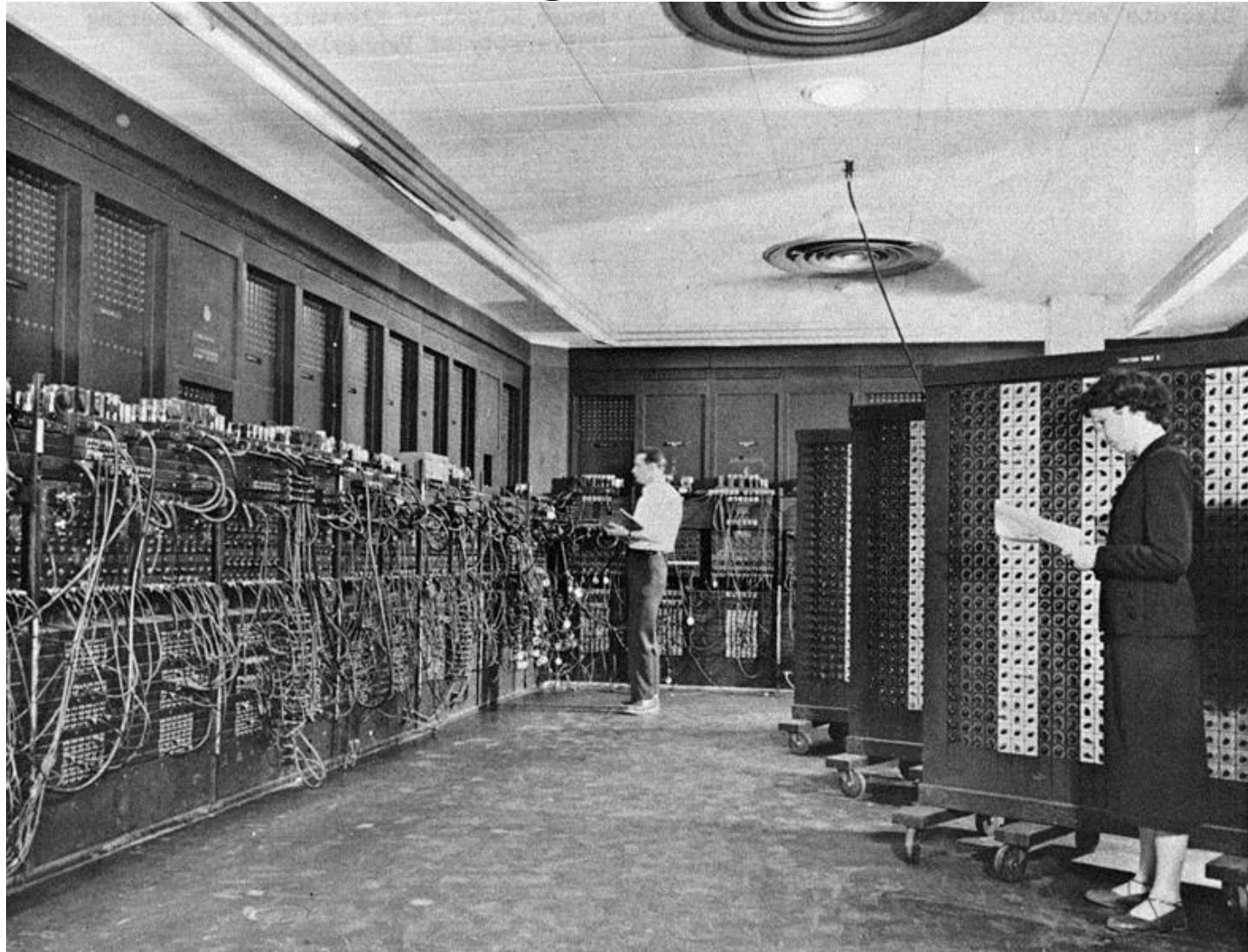
Basis: 3,366,261,156 Internet users on November 30, 2015

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# Internet users by language

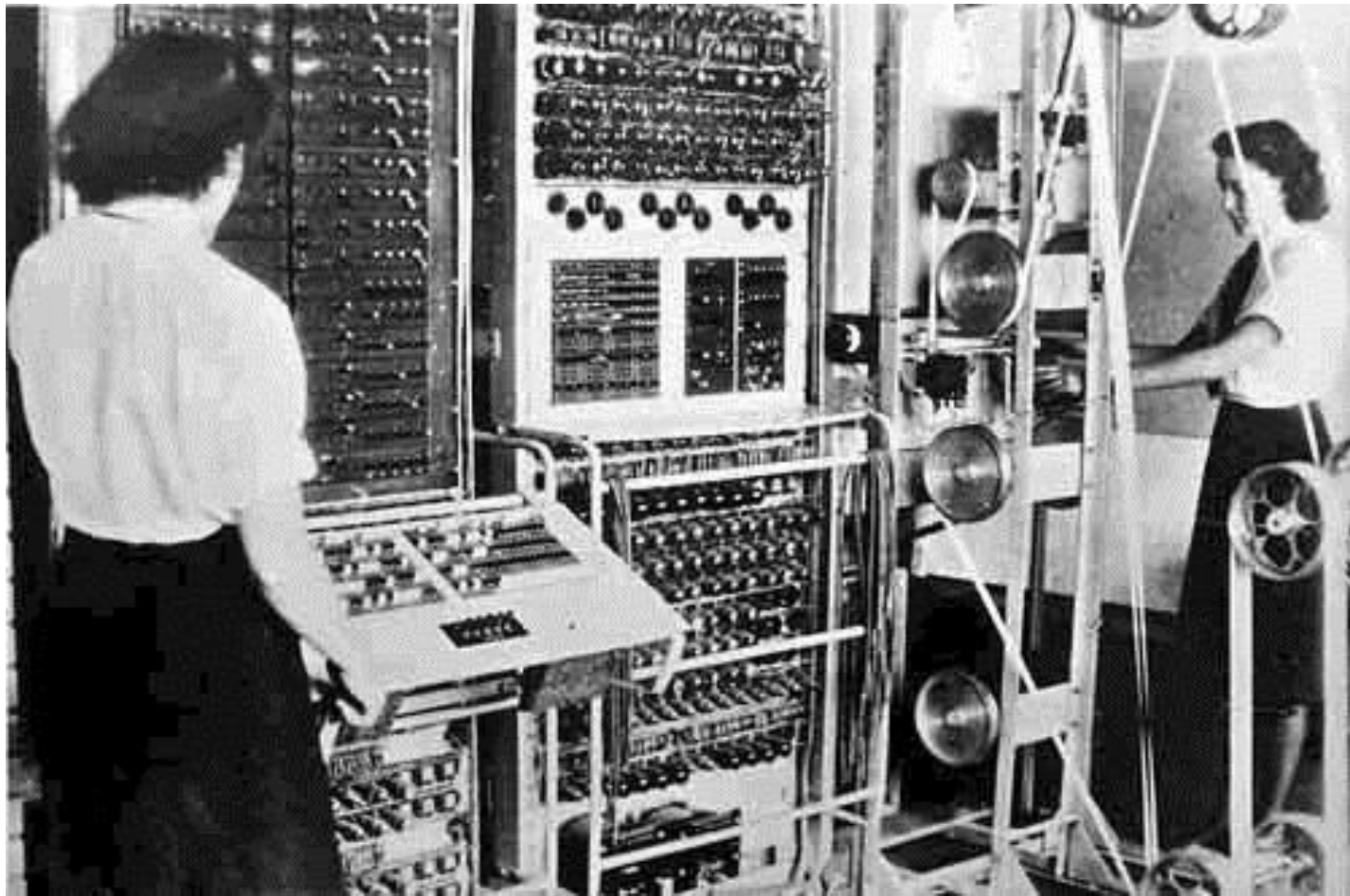


# Mainframe 1. generation

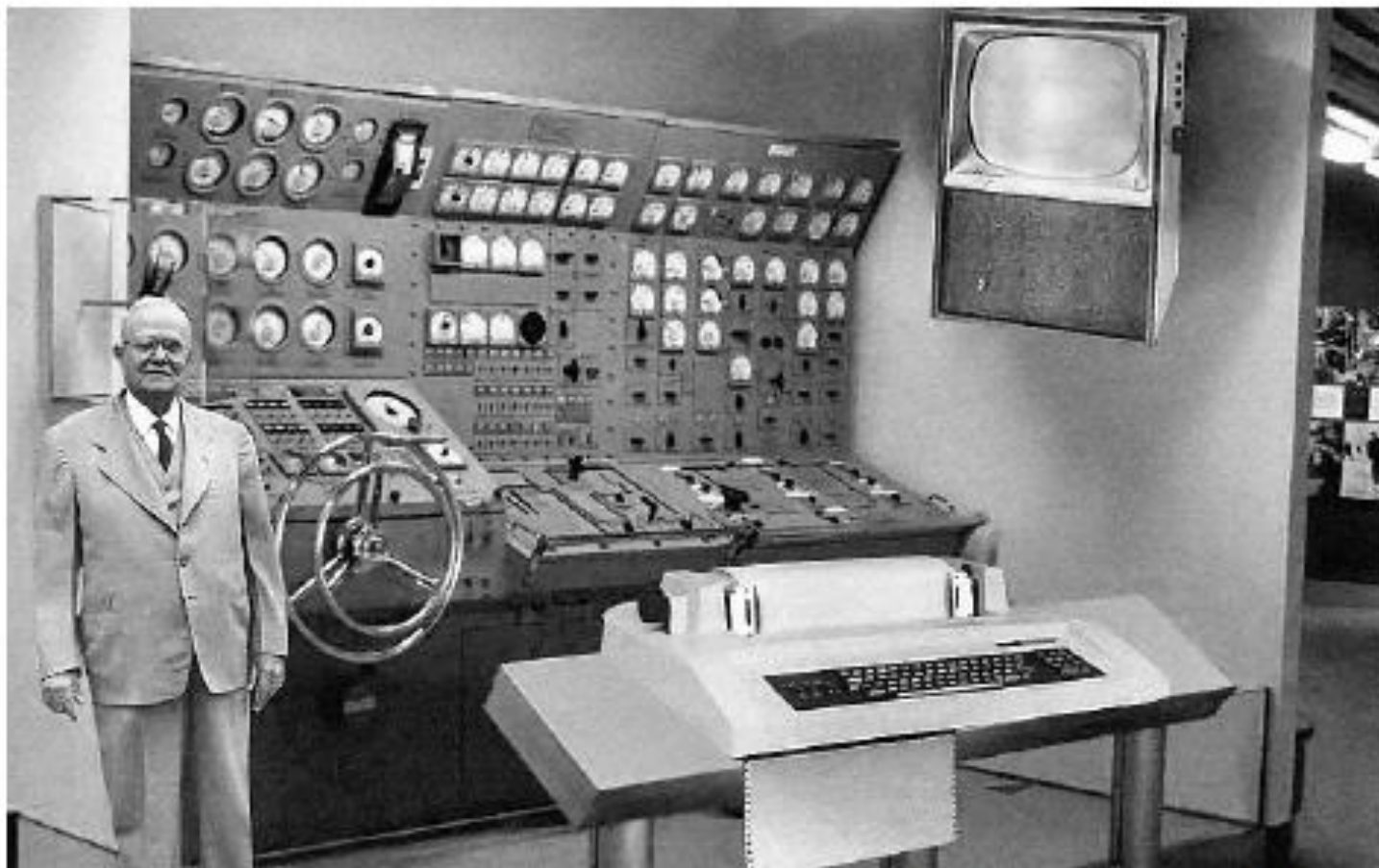




# Mainframe 1. generation



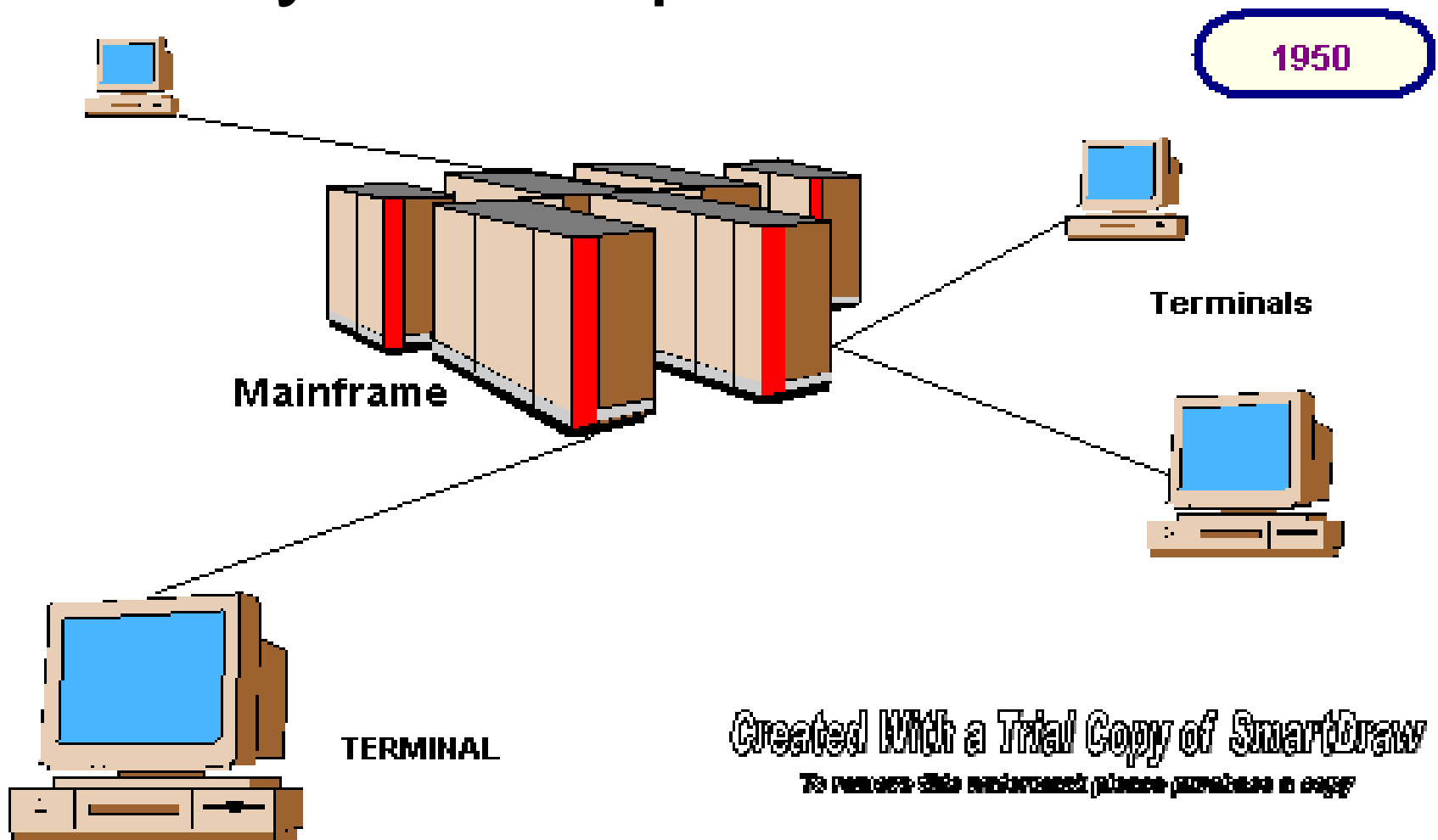




**Predstava domáceho počítača v roku 2004 od spoločnosti RAND (1954)**

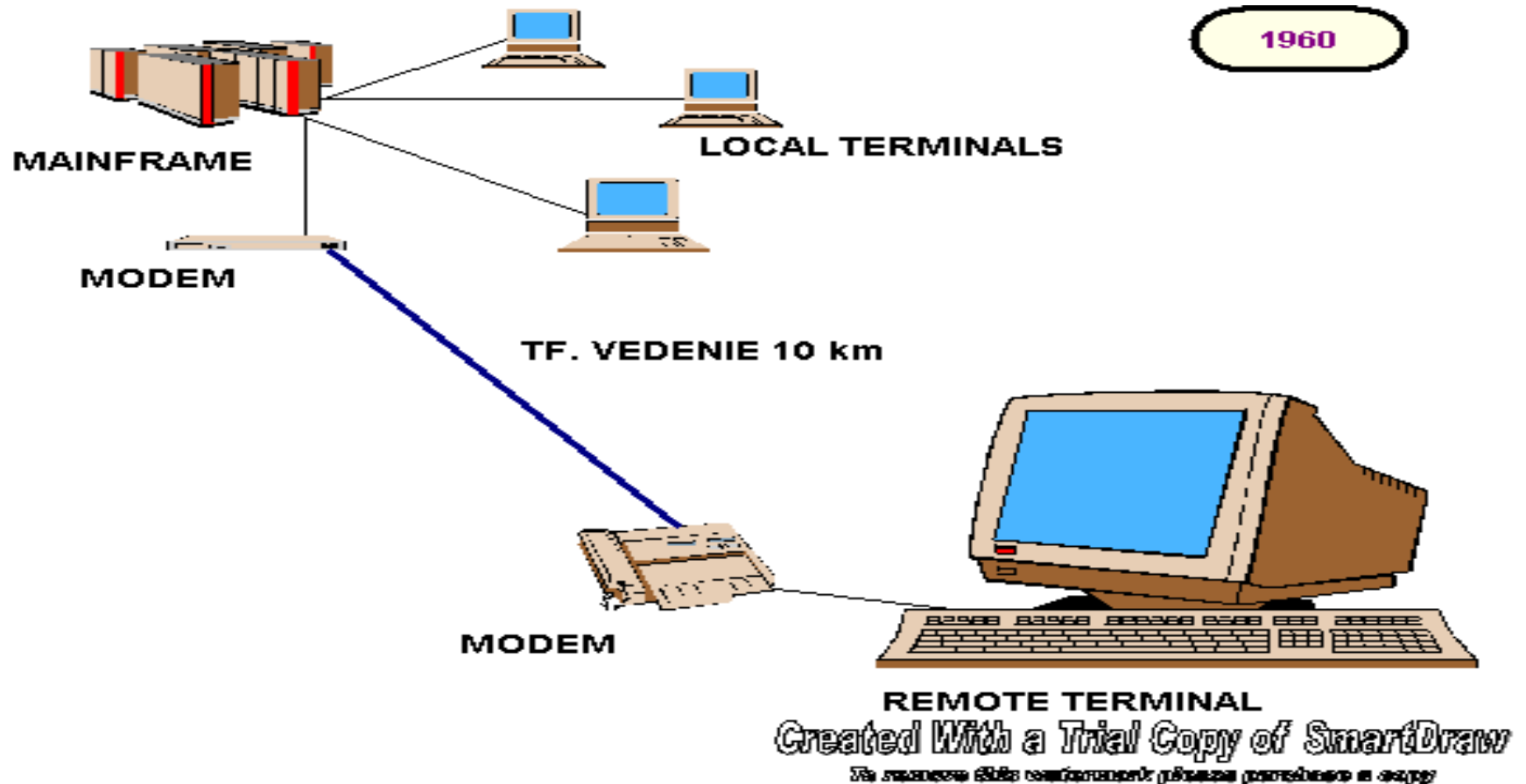


# History of computer networks

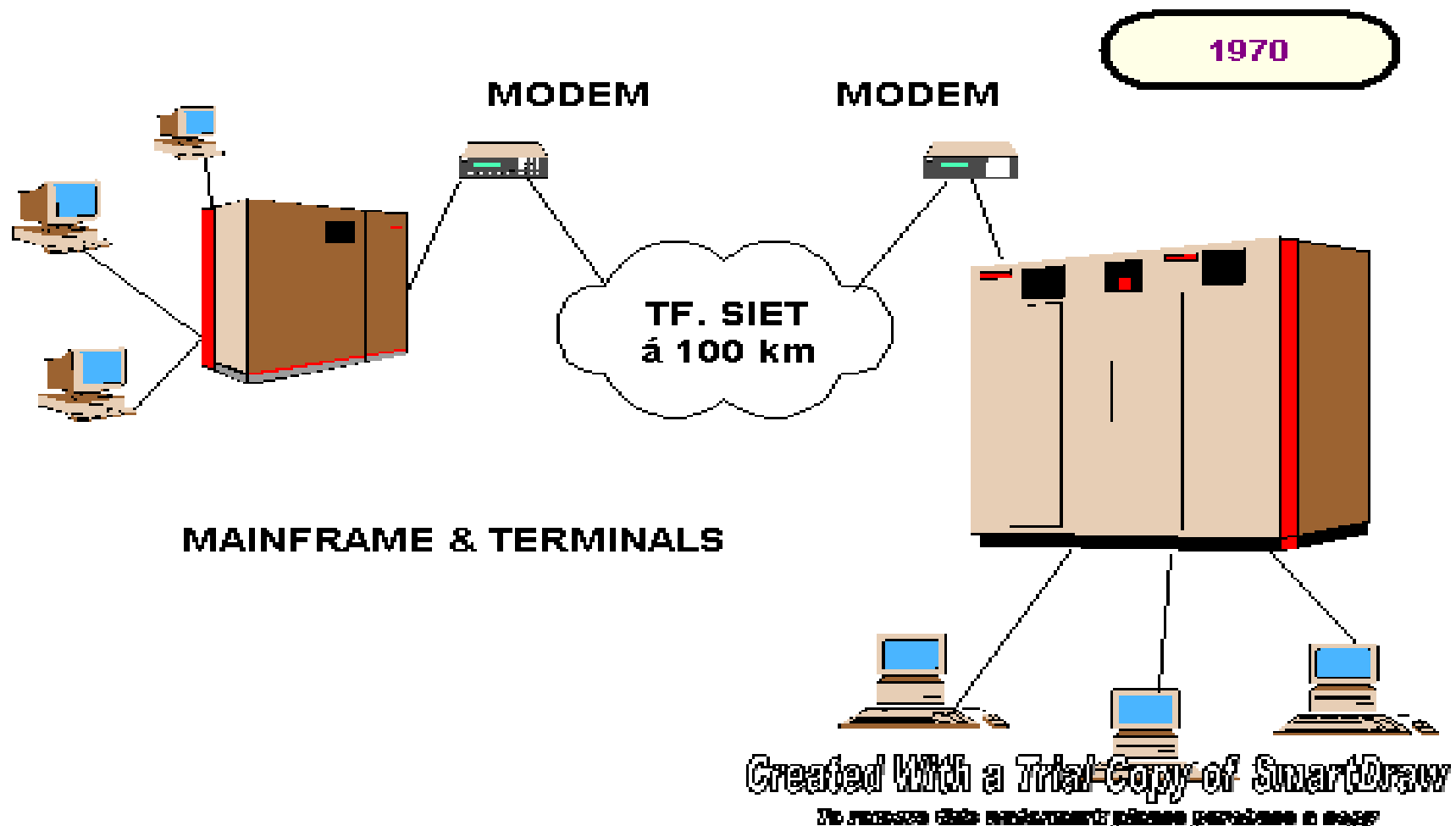




# History of computer networks

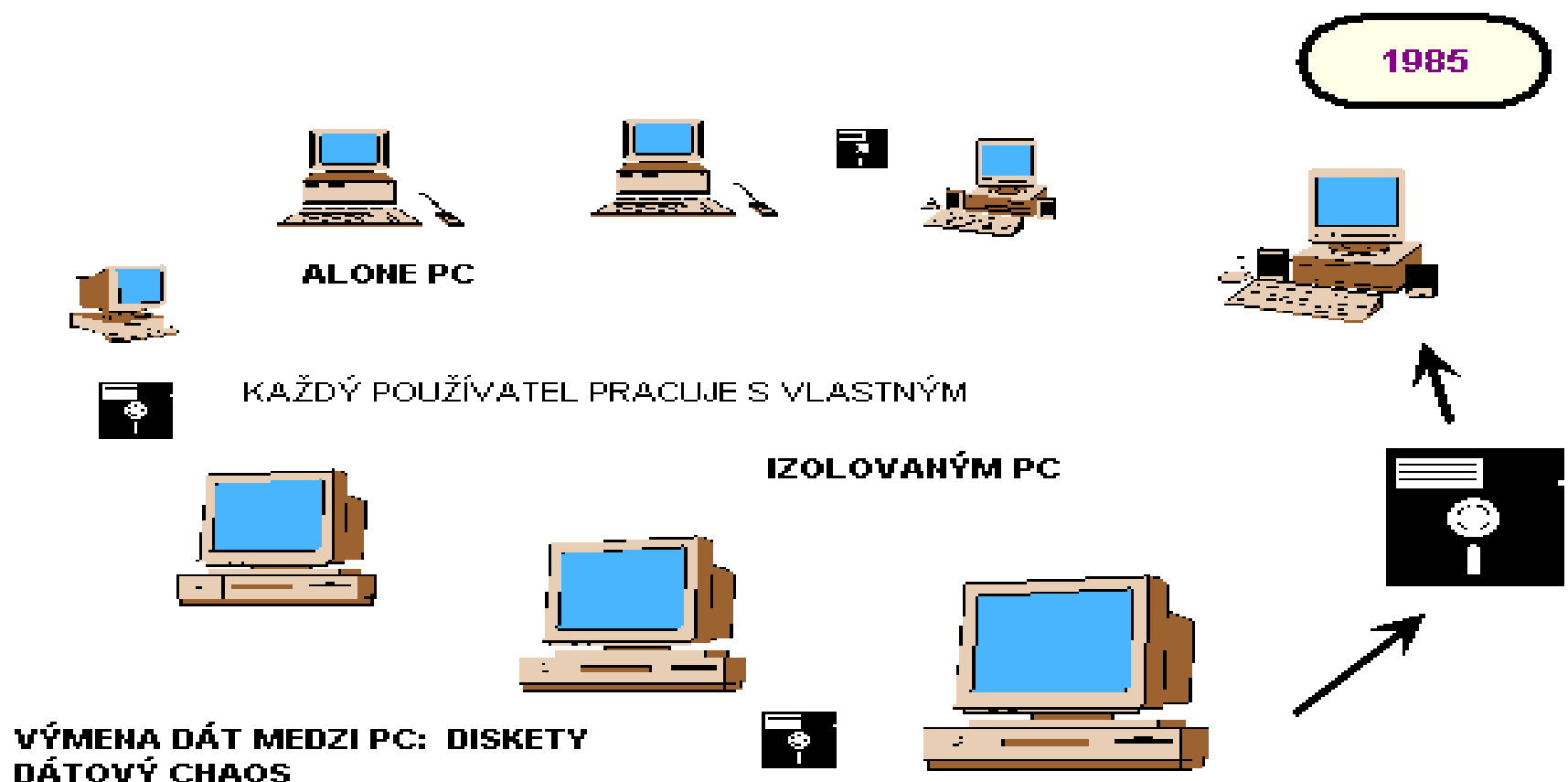


# History of computer networks





# History of computer networks

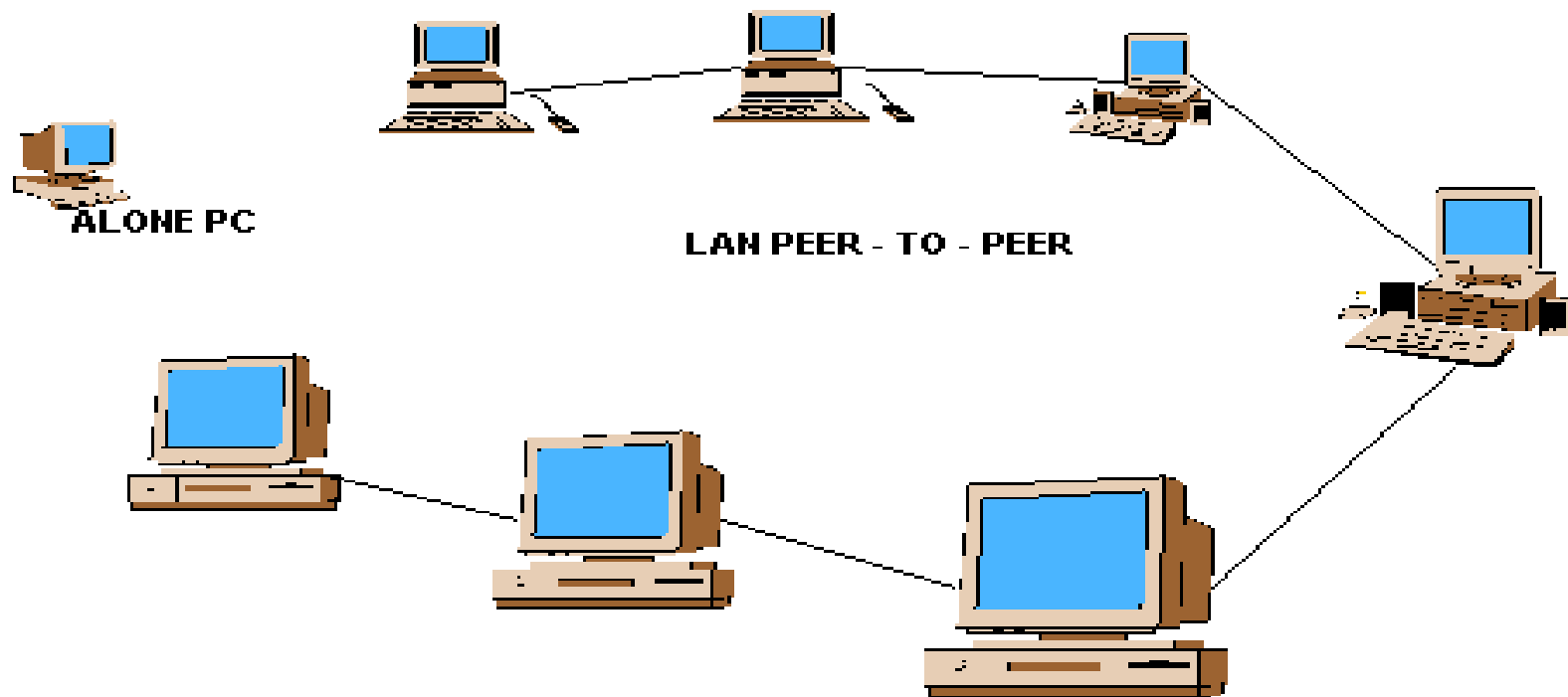


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# History of computer networks

1990

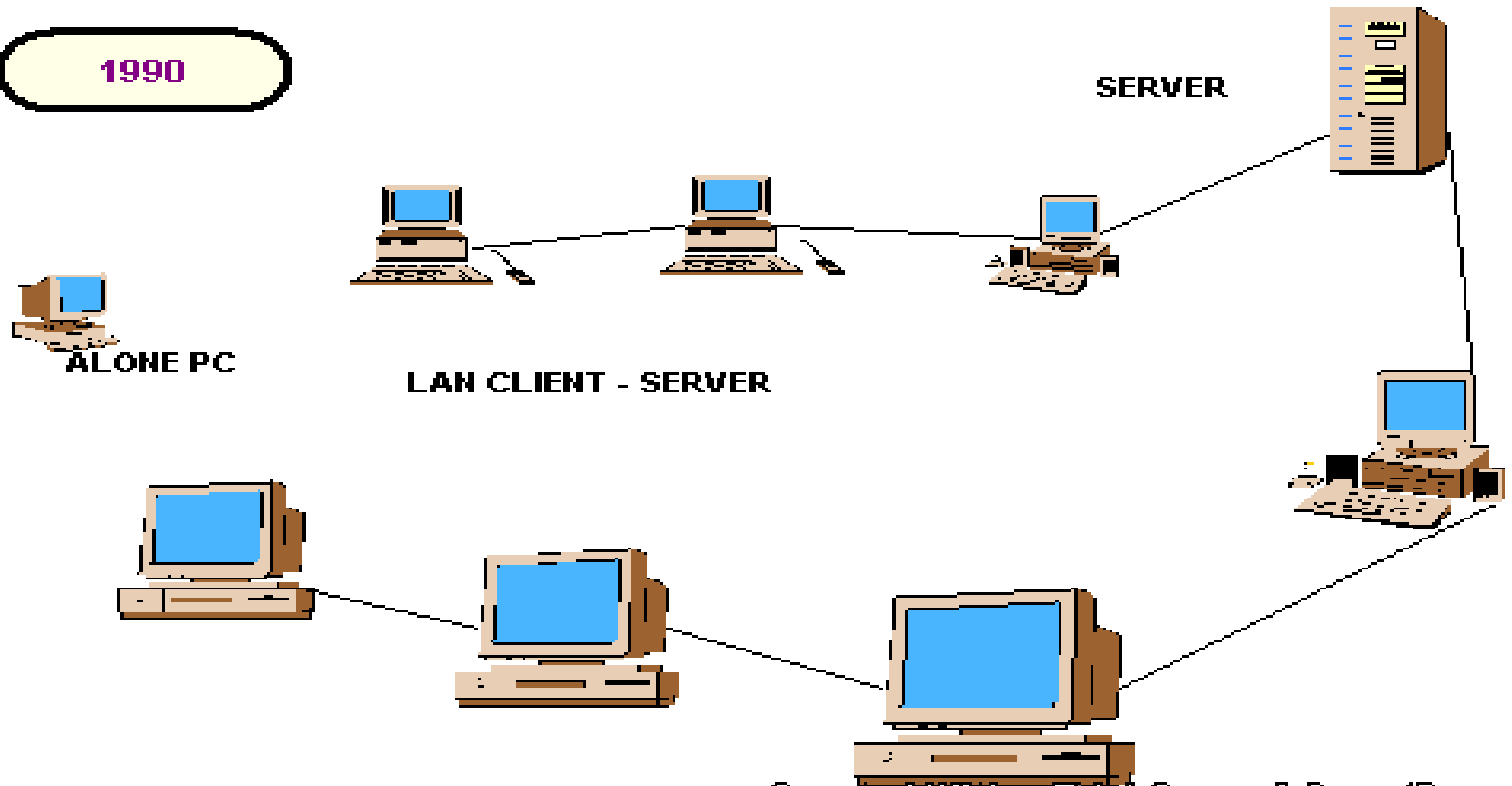


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# History of computer networks

1990



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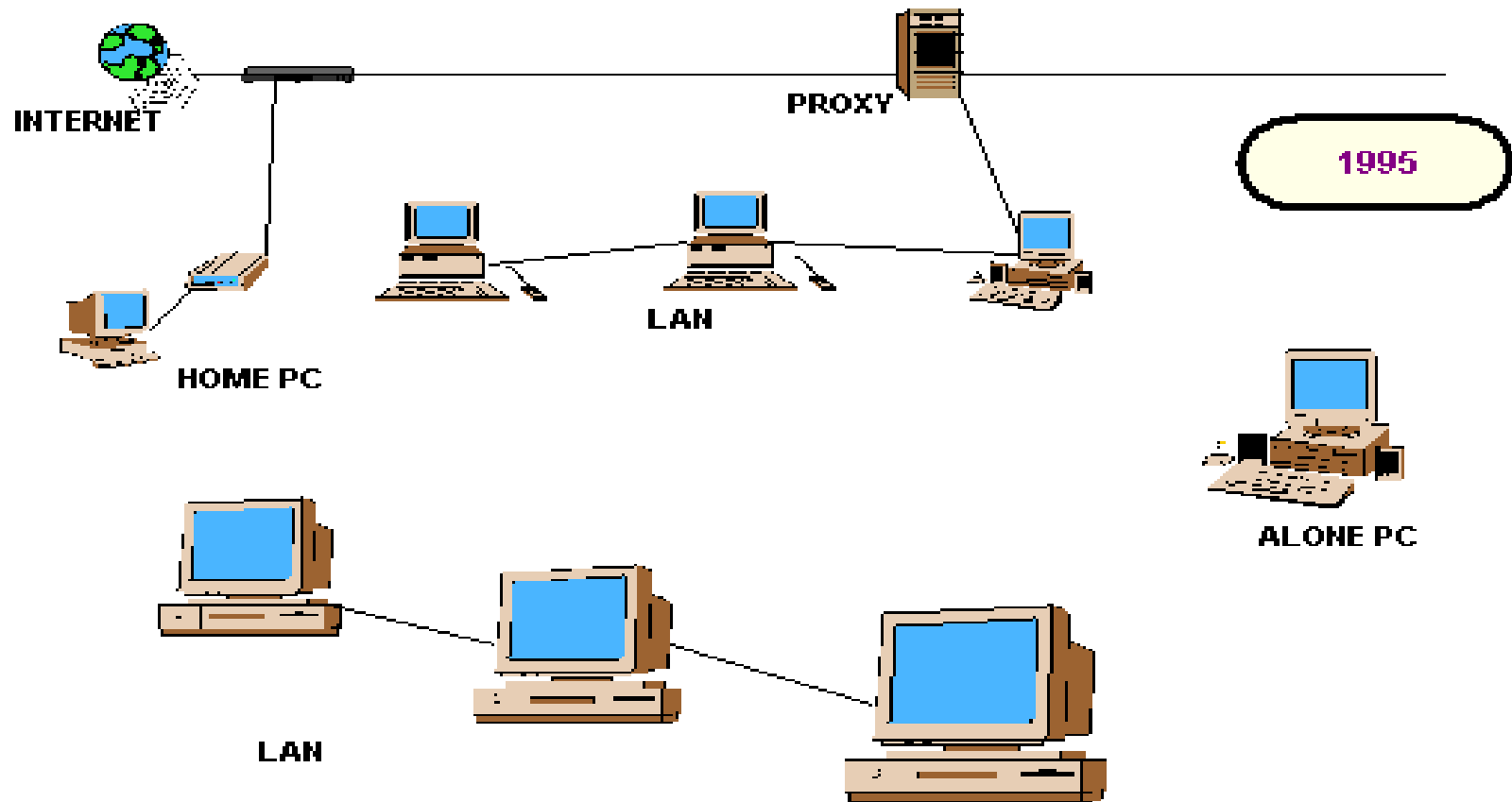
# História počítačových sietí

## ■ polovica 90-tych rokov

- uvoľnenie armádnej siete DARPA pre verejnosť – INTERNET
- pripájanie osamotených PC (domácnosti, malé firmy) k internetu
- pripájanie firemných LAN k Internetu
- riziká: Internet – nezabezpečené prostredie



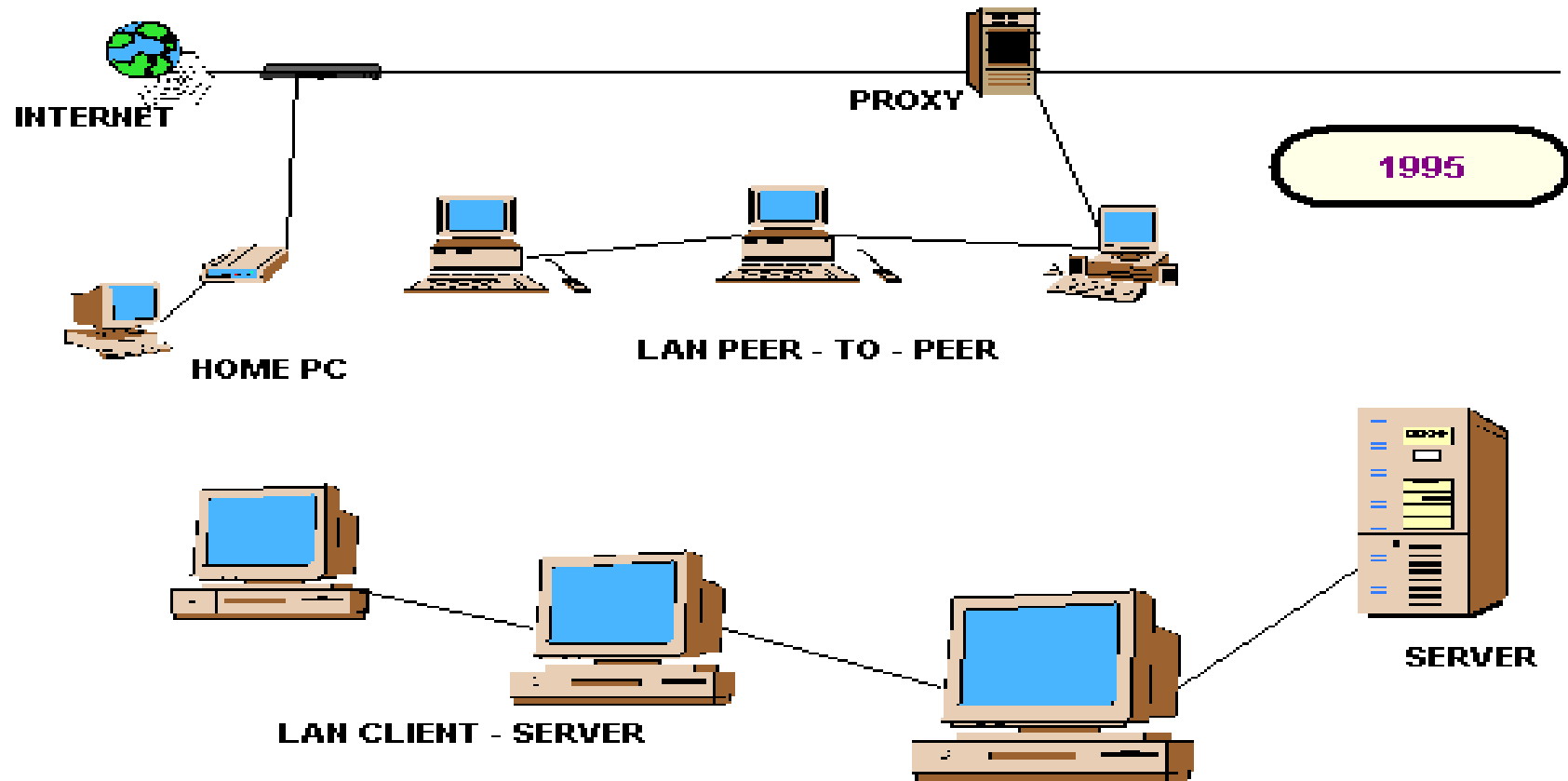
# History of Internet



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# History of Internet



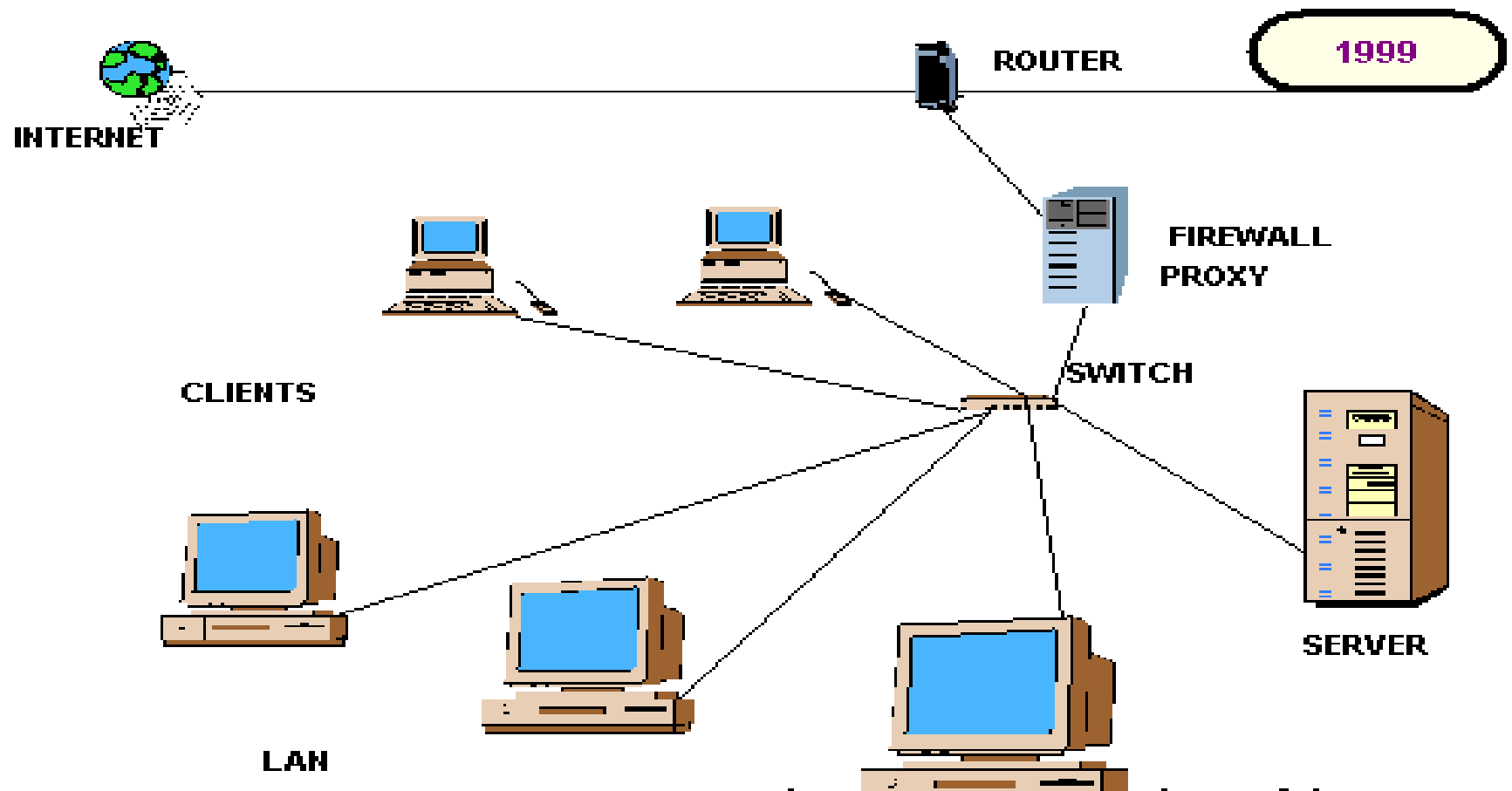
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# Rozvoj Internetu

- masívne pripájanie lokálnych sietí k Internetu
- prvoradá úloha: bezpečnosť
- Intranet: lokálna sieť, pripojená k Internetu prostredníctvom Proxy servera a zabezpečená firewallom
- Virtual Private Network: Virtuálna lokálna sieť vytvorená a zabezpečená na Internete softwarovými prostriedkami

# Internet's development



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The network diagram is automatically generated in a single



The Internet is a **world-wide network** that has grown and evolved from an experimental network (Arpanet) created by the US military back in the 1960s. Over the years, as more and more computers and networks have connected to this network, it has grown into the Internet that we know today.





# What Can We Use the Internet For?

The Internet provides the network connections that links computers together. There are many ways that we can use these connections:

View **web pages** on the WWW (World-Wide Web)

Sending and receiving **e-mail** messages

**Sharing files**

Communicating using **voice** (VOIP) and **video** (video-conferencing)

Playing **multi-player games**

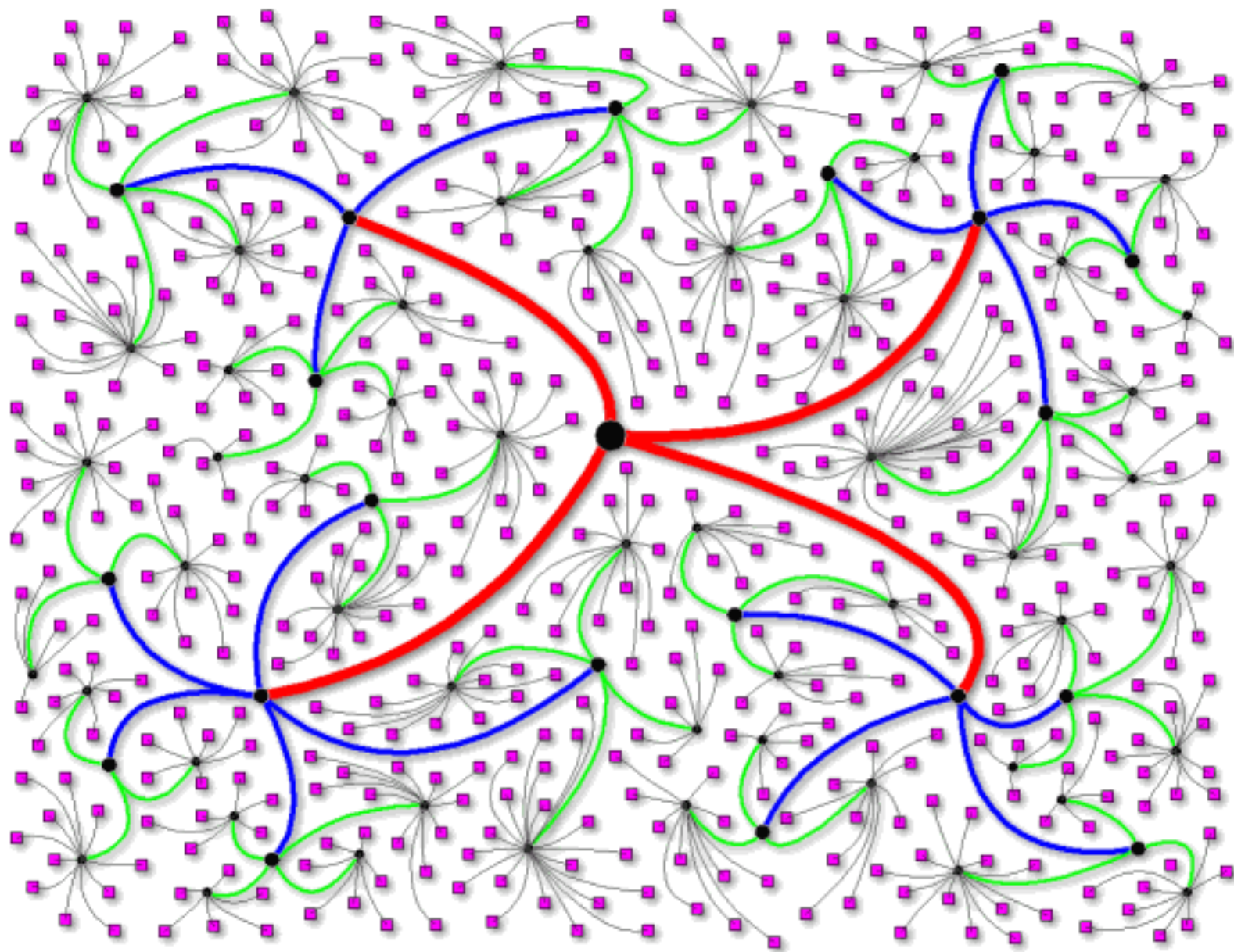
Listening to **streamed music** or watching **streamed video**



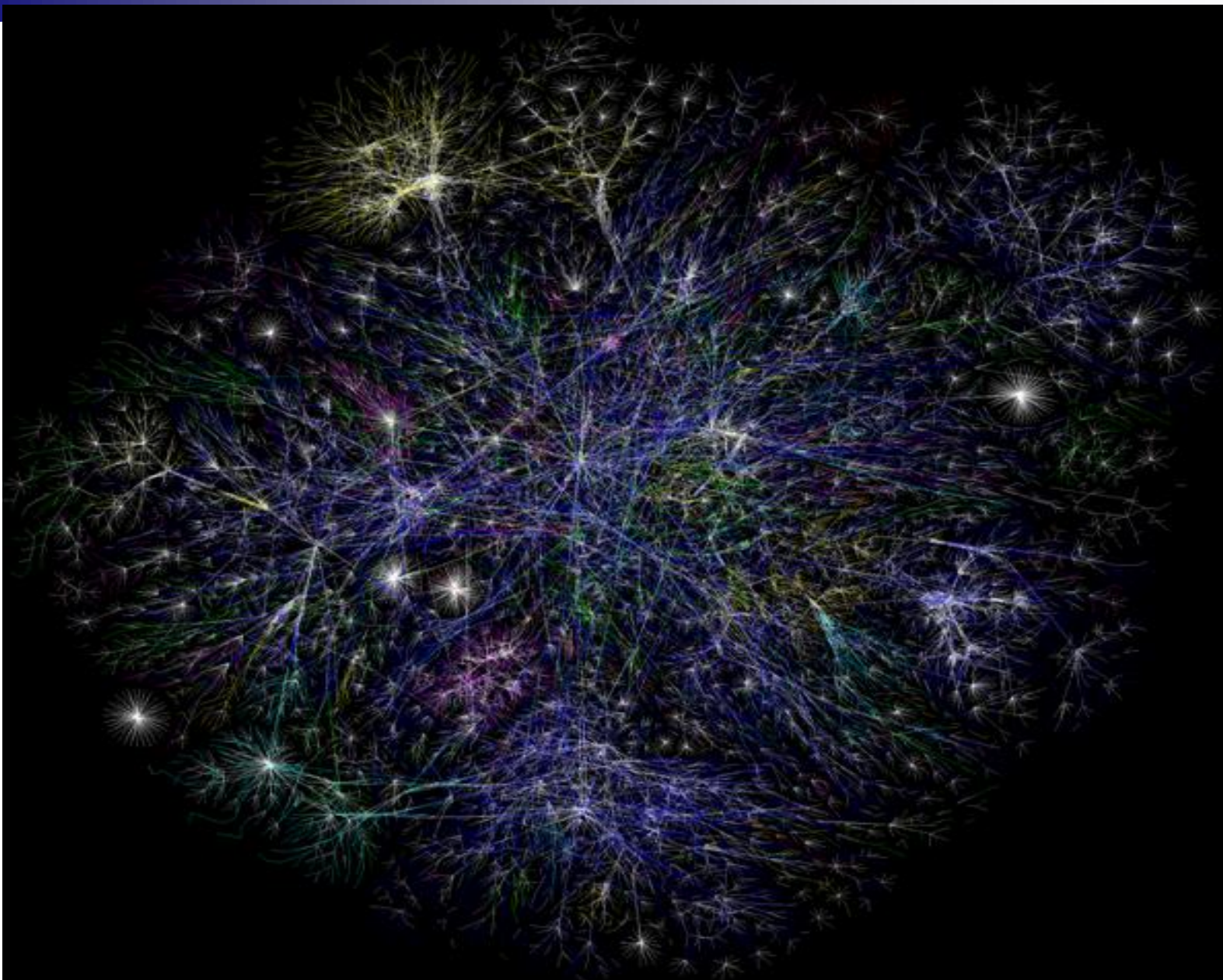
# History of computer networks

[https://www.youtube.com/watch?v=vDrUUqHsy0k&feature=player\\_embedded](https://www.youtube.com/watch?v=vDrUUqHsy0k&feature=player_embedded)

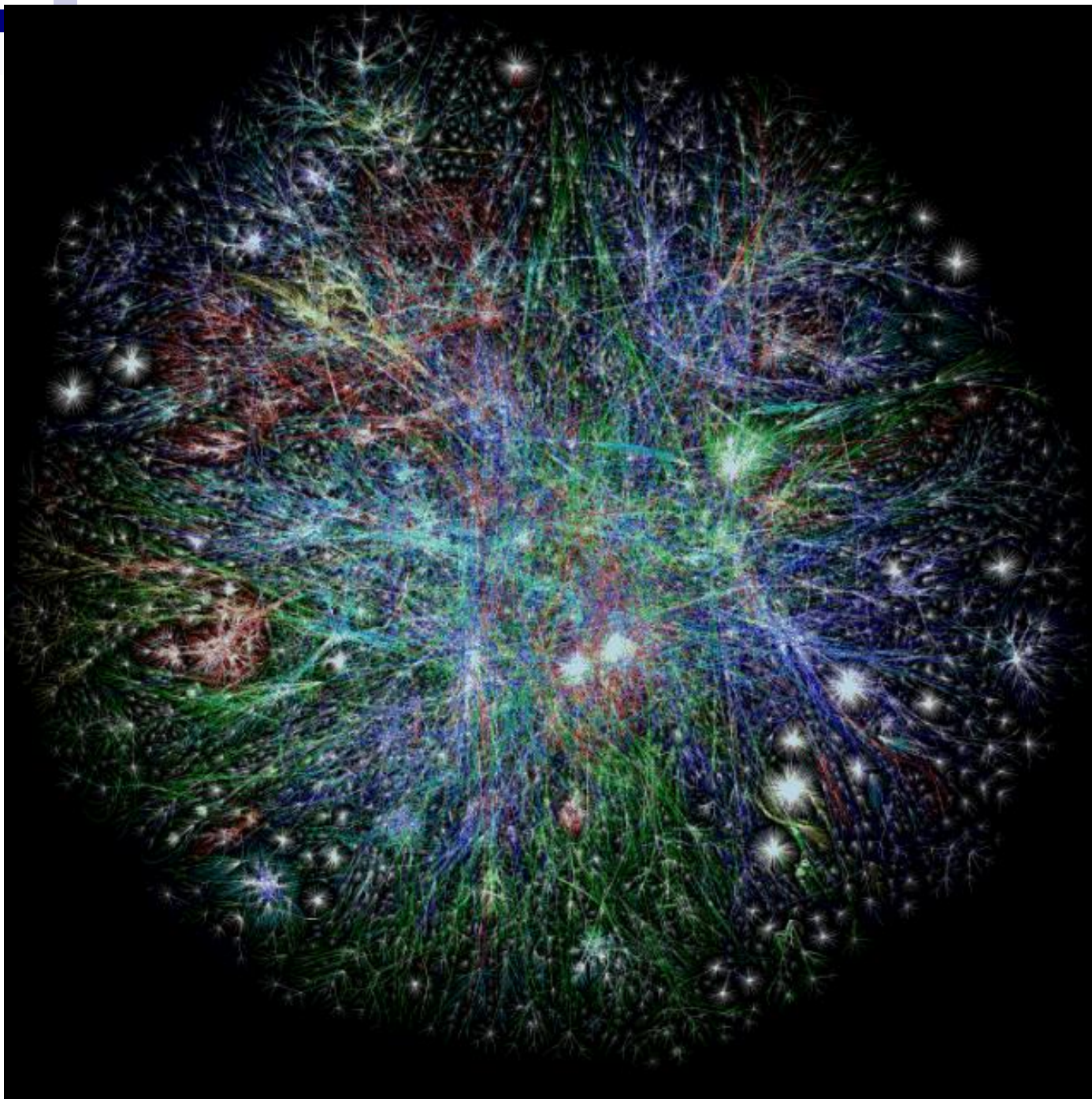
<http://www.internetsociety.org/internet/what-internet/history-internet/brief-history-internet> - az internet rövid története



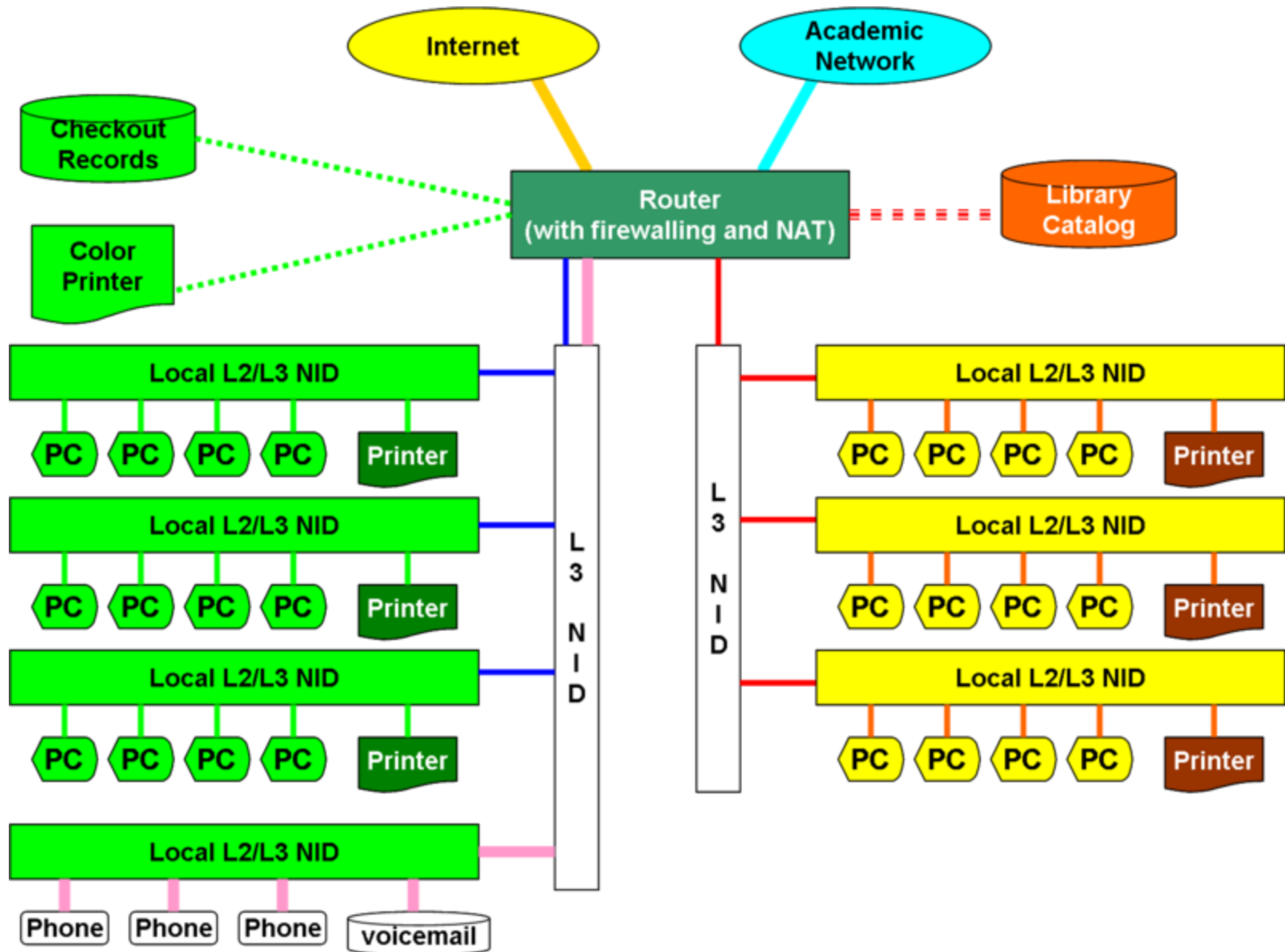








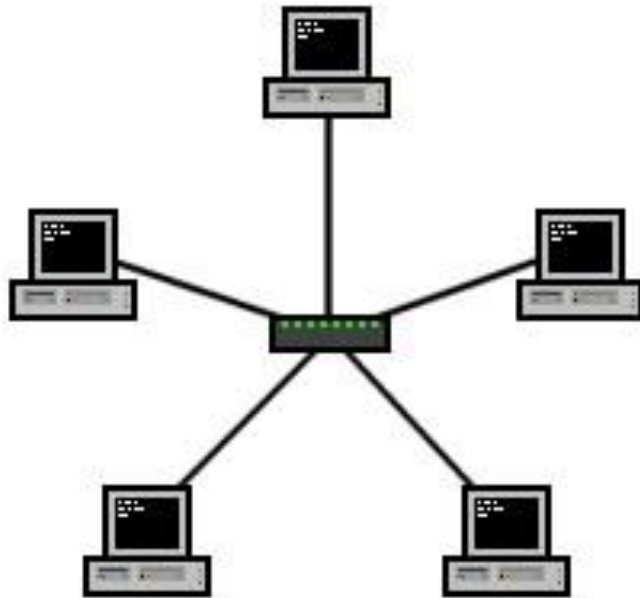
This is a graphic representation of the Internet circa 2003, showing the links between Internet routers.



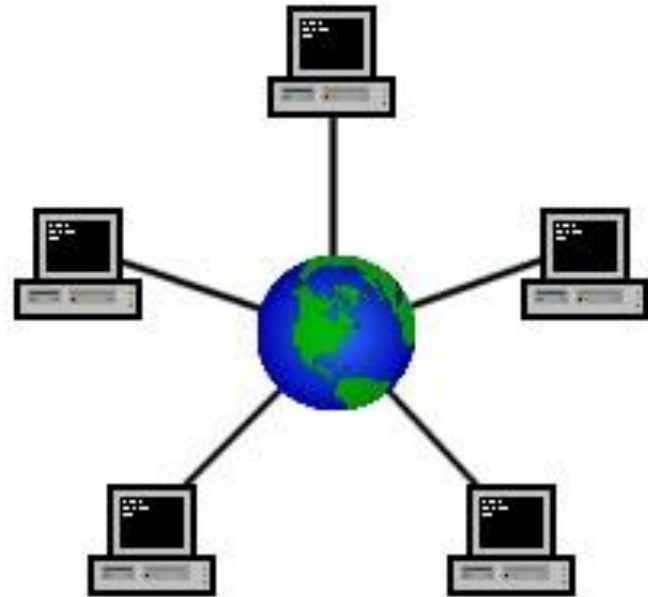
NID – Network Interface Device, NAT – Network Address Translation

# Intranet vs. Internet

## Intranet



## Internet





## SANET - Slovenská akademická a dátová sieť (Jún 2011)

