

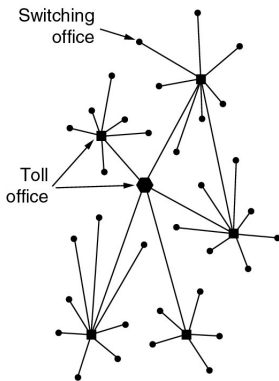
1 Introdução

- Uso das Redes de Computadores
- Hardware de Rede
- Software de Rede
- Modelos de Referência
- Exemplos de Rede

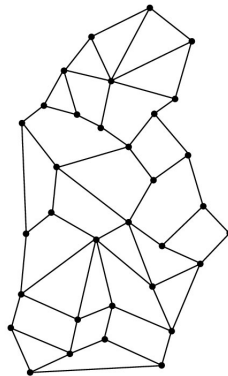
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A Internet

- A idéia era que a Arpanet pudesse resistir a guerras



(a)



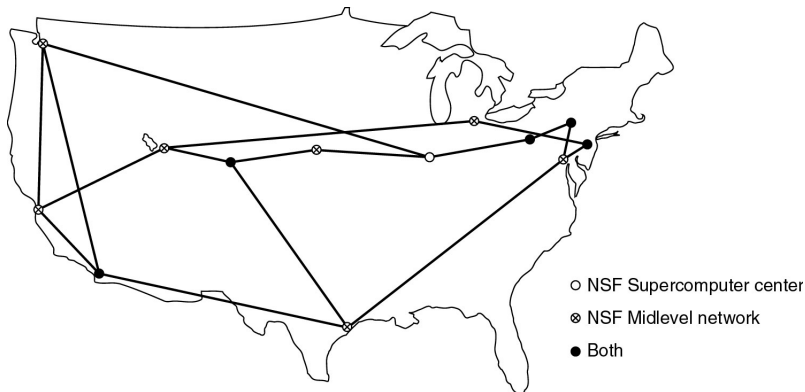
(b)

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- The diagram shows a subnet containing four IMPs (Intermediate Message Processors) and two Hosts. The Hosts are connected to the IMPs via the Host-IMP protocol. The IMPs are connected to each other via the IMP-IMP protocol. A dashed line indicates the Source IMP to destination IMP protocol path.

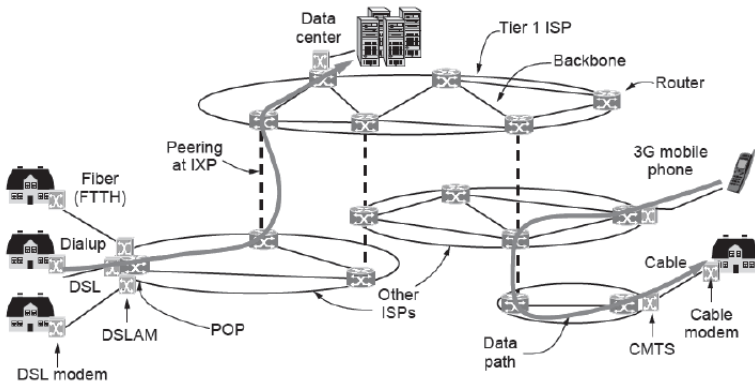
- Testes de comunicação entre hospedeiros situados em diferentes universidades mostraram a necessidade de desenvolver protocolos adequados
- O TCP/IP foi implementado em diferentes plataformas
- A versão 4.2BSD do Unix desenvolvido pela universidade de Berkeley vinha com o TCP/IP com uma interface de soquetes
- A medida que a rede cresceu, foi necessário desenvolver o sistema de nomes de domínio DNS (Domain Name System)

- A Arpanet teve um impacto considerável nas pesquisas nos Estados Unidos, mas estava restrito às universidades com contratos militares
- A NSF (National Science Foundation) desenvolveu uma rede que se integrou a Arpanet e depois decidiu desenvolver uma rede sucessora da Arpanet
- A NSF desenvolveu um backbone que permitia ligar várias universidades, laboratórios de pesquisa e museus
- A rede da NSF era chamada de NSFNET
- Com a entrada de grandes empresas privadas, a rede se ampliou formando a ANSNET
- A partir daí, os serviços de rede passaram a ser oferecidos comercialmente
- A partir de 1990, com o surgimento da World Wide Web, a Internet explodiu

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- Atualmente, a Internet possui uma arquitetura similar à figura abaixo

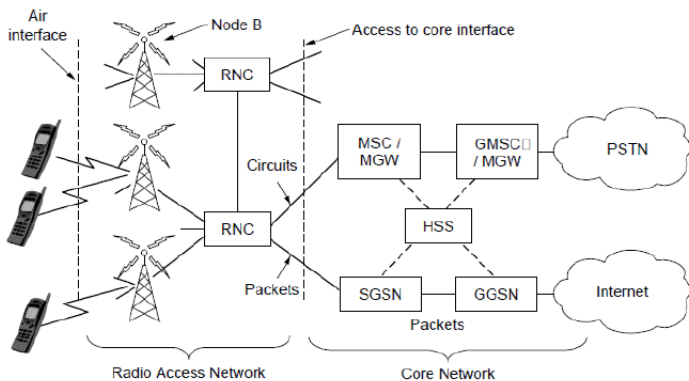


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- O número de usuários de telefonia móvel supera com folga o número de computadores e de linhas de telefone fixos
- A evolução do sistema de telefonia móvel passou por 3 gerações
 - 1ª geração: AMPS (Advanced Mobile Phone System)
 - 2ª geração: D-AMPS, CDMA e GSM (Global System for Mobile Communications)
 - 3ª geração: UMTS (Universal Telecommunications System) também chamado de WCDMA (Wideband Code Division Multiple Access)

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- The diagram illustrates a cellular network structure. It features a central hexagonal cell shaded in gray, which contains a radio tower icon and a mobile phone icon. This central cell is surrounded by six other hexagonal cells, each also containing a radio tower icon. The entire structure is labeled 'Cells' with an arrow pointing to the leftmost cell. To the right, a label 'Base station' has an arrow pointing to the radio tower in the rightmost cell. The diagram represents a hexagonal grid used for mobile communication coverage.

- Arquitetura da rede de telefonia móvel 3G UMTS



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- The diagram illustrates two types of network connectivity. On the left, a box labeled 'Access Point' is connected to a 'To wired network' line. Below the box, three lightning bolts represent wireless signals connecting to three laptops. On the right, a single laptop is at the top, connected by two lightning bolts to two laptops below it. A lightning bolt also connects the two bottom laptops, representing a peer-to-peer wireless network.

- A transmissão sem fio enfrenta mais desafios que a transmissão guiada
 - Atenuação e desvanecimento de multipercursos
 - Terminais ocultos
 - Necessidade de mobilidade
- Outro fator que merece destaque é a segurança, já que o meio físico é a princípio acessível a todos
 - Técnicas de criptografia como WEP (Wired Equivalent Privacy) e WPA/WPA2 (WiFi Protected Access) são utilizadas

The diagram shows a wireless transmitter on the left with two antennas. Multiple paths are indicated by curved arrows originating from the transmitter. Two receivers are shown on the right: a laptop labeled 'Wireless receiver' and a mobile phone. A 'Reflector' is positioned between the transmitter and the laptop. The signal to the laptop is labeled 'Non-faded signal' and is represented by a large, high-amplitude sine wave. The signal to the mobile phone is labeled 'Faded signal' and is represented by a small, low-amplitude sine wave, indicating destructive interference.

Multipath fading

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- The diagram shows two overlapping circles representing the radio ranges of two devices, A and C. Device A is on the left, and device C is on the right. The overlapping region is shaded with a cross-hatch pattern. Arrows point from the text 'Range of A's radio' to the left circle and 'Range of C's radio' to the right circle. Three laptops are shown: A, B (in the overlap), and C.

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Diagram illustrating the application of RFID technology. A cat with an RFID tag is shown communicating with an RFID reader. The reader is connected to a database (represented by a server icon) and a document (represented by a book icon). The database is also connected to a driver's license icon.

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- The diagram illustrates a multi-hop wireless network topology. A central laptop, labeled "Data collection point", is connected to a central node. This central node is connected to several other nodes, some of which are further connected to each other, forming a mesh. A curved arrow labeled "Wireless hop" indicates the communication between nodes. One node on the right is labeled "Sensor node".

- Várias organizações mundiais operam na padronização de redes e da Internet
 - ITU (International Telecommunication Union)
 - ISO (International Standards Organization)
 - IEEE (Institute of Electrical and Electronics Engineers)
 - IETF (Internet Engineering Task Force)
 - IAB (Internet Architecture Board)
- Protocolos da Internet são descritos nos RFCs (Request for Comments)

Grupos IEEE

Number	Topic
802.1	Overview and architecture of LANs
802.2 ↓	Logical link control
802.3 *	Ethernet
802.4 ↓	Token bus (was briefly used in manufacturing plants)
802.5	Token ring (IBM's entry into the LAN world)
802.6 ↓	Dual queue dual bus (early metropolitan area network)
802.7 ↓	Technical advisory group on broadband technologies
802.8 †	Technical advisory group on fiber optic technologies
802.9 ↓	Isochronous LANs (for real-time applications)
802.10 ↓	Virtual LANs and security
802.11 *	Wireless LANs (WiFi)
802.12 ↓	Demand priority (Hewlett-Packard's AnyLAN)

The 802 working groups. The important ones are marked with *.
 The ones marked with ↓ are hibernating. The one marked with †
 gave up and disbanded itself.

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