



Communication

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Outline

- Digital Communication
 - ISDN
 - Digital Subscriber Line (DSL)
 - Cable modems
 - Satellite broadband
- Wireless Communication
 - Bluetooth
 - IEEE802.11x



Digital Communication - ISDN

- Integrated Services Digital Network
- Cost-effective connection to the net
- A Basic Rate installation provides a maximum of 128 Kbit/s
- A Primary Rate ISDN provides a maximum of 1.92 Mbit/s



Digital Subscriber Line (DSL)

- xDSL technologies developed back in 1987
- xDSL technologies are very fast
- Typically offering download speeds up to 52 Mbit/s
- Upload speeds ranging from 64 Kbit/s to over 2 Mbit/s
- Come in a number of variants:
 - asymmetric (ADSL)
 - high-bit rate (HDSL)
 - single-line (SDSL)
 - very-high-data-rate (HDSL).
- The different approaches have differing trade-offs between signal distance and speed and differences in symmetry of upstream and downstream traffic. Recent developments make ADSL (Asymmetric Digital Subscriber Line) look the most promising for home use.



Cable Modems

- Leveraging existing broadband cable TV networks
- More applicable to home than business users
- Each cable modem has an Ethernet port that connects to the computer (or network) on one side and to the cable connection on the other.
- As far as the PC is concerned, it's hooked directly to the Internet via an Ethernet cable. There are no phone numbers to dial and no limitations on serial-port throughput (as is the case with ISDN modems).
- Cable has a number of practical disadvantages compared with the rival xDSL technology.
 - Not all homes wired for cable TV and some will never be
 - Cable offers the prospect fast Internet access at an affordable price.
 - Theoretically speeds of up to 30 Mbit/s are possible.
 - Performance and speed will degrade the greater the number of subscribers in a given locale.



Satellite Broadband

- Technology will always be literally "beyond the range" of many living in rural areas
- In theory, satellite communications can reach almost anywhere
- Satellite broadband is a feasible solution for those for whom ADSL and cable are not options
- Well established technology and typically all that's needed is a dish on or near the subscriber's home and a modem/router unit inside
- Dish is typically connected to a modem/router, which in turn connects to a PC via either a USB or Ethernet port
- Some systems provide two-way satellite communications
- Others are hybrid, combining a conventional narrowband ISP dial-up connection for uploading information to the Internet with a broadband satellite downlink.
- A basic system allows a single PC only to be connected.
- Maximum download/upload speeds for two-way systems are in the region of 500/120 Kbit/s respectively
- Performance can also be affected by weather.
- Latency can have noticeable effects, making some applications impractical. These include:
 - online gaming
 - VoIP
 - video conferencing
 - PC remote control applications, and
 - VPN applications.

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