

Multimedia

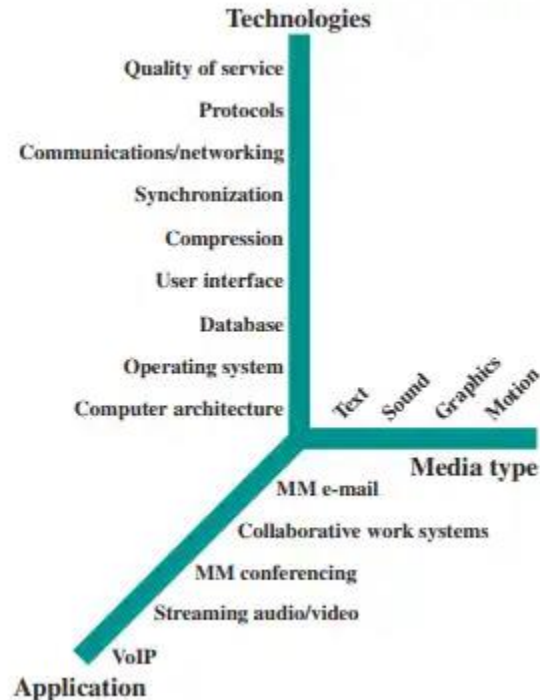
Media Refers to the form of information and includes text, still images, audio, and video.

Multimedia Human-computer interaction involving text, graphics, voice, and video. Multimedia also refers to storage devices that are used to store multimedia content.

Streaming media Refers to multimedia files, such as video clips and audio, that begin playing immediately or within seconds after it is received by a computer from the Internet or Web. Thus, the media content.

Media Types

Typically, the term multimedia refers to four distinct types of media: text, audio, graphics, and video.



From a communications perspective, the term text is self-explanatory, referring to information that can be entered via a keyboard and is directly readable and printable. Text messaging, instant messaging, and text (non-html) e-mail are common examples, as are chat rooms and message boards. However, the term often is used in the broader sense of data that can be stored in files and databases and that does not fit into the other three categories. For example, an organization's database may contain files of numerical data, in which the data are stored in a more compact form than printable characters.

The term audio generally encompasses two different ranges of sound. Voice, or speech, refers to sounds that are produced by the human speech mechanism. Generally, a modest bandwidth (under

4 kHz) is required to transmit voice. Telephony and related applications (e.g., voice mail, audio conferencing, and telemarketing) are the most common traditional applications of voice communications technology. A broader frequency spectrum is needed to support music applications, including the download of music files.

The image service supports the communication of individual pictures, charts, or drawings. Image-based applications include facsimile, computer-aided design (CAD), publishing, and medical imaging. Images can be represented in a vector graphics format, such as is used in drawing programs and PDF files. In a raster graphics format, an image is represented as a two-dimensional array of spots, called pixels.² The compressed JPG format is derived from a raster graphics format.

The video service carries sequences of pictures in time. In essence, video makes use of a sequence of raster-scan images.

Multimedia Applications

The Internet, until recently, has been dominated by information retrieval applications, e-mail, and file transfer, plus Web interfaces that emphasized text and images. Increasingly, the Internet is being used for multimedia applications that involve massive amounts of data for visualization and support of real-time interactivity. Streaming audio and video are perhaps the best known of such applications.

The following multimedia application domains:

- **Information systems:** These applications present information using multimedia. Examples include information kiosks, electronic books that include audio and video, and multimedia expert systems.
- **Communication systems:** These applications support collaborative work, such as videoconferencing.
- **Entertainment systems:** These applications include computer and network games and other forms of audiovisual entertainment.
- **Business systems:** These applications include business-oriented multimedia presentation, video brochures, and online shopping.
- **Educational systems:** These applications include electronic books with a multimedia component, simulation and modeling applets, and other teaching support systems.

Multimedia Technologies

- **Compression:** Digitized video, and to a much lesser extent audio, can generate an enormous amount of traffic on a network. A streaming application, which is delivered to many users, magnifies the traffic. Accordingly, standards have been developed for producing significant savings through compression. The most notable standards are JPG for still images and MPG for video.

- Communications/networking: This broad category refers to the transmission and networking technologies (e.g., SONET, ATM) that can support highvolume multimedia traffic.
- Protocols: A number of protocols are instrumental in supporting multimedia traffic. One example is the Real-time Transport Protocol (RTP), which is designed to support inelastic traffic (traffic that does not easily adapt, if at all, to changes in delay and throughput across an internet). RTP uses buffering and discarding strategies to assure that real-time traffic is received by the end user in a smooth continuous stream. Another example is the Session Initiation Protocol (SIP), an application-level control protocol for setting up, modifying, and terminating real-time sessions between participants over an IP data network.
- Quality of service (QoS): The Internet and its underlying local area and wide area networks must include a QoS capability to provide differing levels of service to different types of application traffic. A QoS capability can deal with priority, delay constraints, delay variability constraints, and other similar requirements.