



Exercises

# Technical English



## Unit 14

Role of Networks in

Multimedia Applications



- 网络、多媒体演示、远程教学
- 主干网、局域网和广域网
- 音频和视频，模拟视频节目



Ethernet	以太网
scenario	情节, 方案
multicast	组播 (向多处播送)
collaborate	合作, 勾结
sophistication	复杂 (性)
consistent	一致的
tactile	触觉 (的)
olfactory	嗅觉的, 嗅觉器官
stimulus (pl. stimuli)	刺激
legacy	祖先遗留之物
codec	编解码器
pervade	弥漫于, 流行于
gateway	通道, 网关
protocol	规约, 协议
<u>emulation</u>	仿效, 仿真
synchrony	同步 (性)
exemplify	例证



可用带宽

Most university campus will be limited in **the bandwidth available** in their networks, often about 100Mbps Ethernets, which means the maximum available to individual users is likely to be about 10Mbps. **With time further bandwidth will become available and then the ability to handle multimedia information will be more assured.**

随着时间的推移，可用带宽会逐渐增加，人们处理多媒体信息的能力也将更有保证。



**Two scenarios will be common: first the presentation of multimedia material in the teaching space which is being relayed over the local area network from a network server and secondly by the use of standalone systems.**

一种是在教学场所展示多媒体，这些多媒体资料是由网络服务器提供，经局域网转发的；另一种是使用独立系统



通过基干网同时组播到许多节点，或是使用多点ISDN结构

When the networks are used, there are two principal methods in use: either the material may be multicast to a number of sites simultaneously over the MBone, or multipoint ISDN configurations can be used. In either case teaching can be carried out to distribution of sites collaborating in a shared teaching program.

教学过程都能传送到教学资源共享计划中相互协作的各分散节点上



通过在节点之间尽量共享路由使互联网上的数据流达到最小

The MBone operates on the Internet, and is designed to link a number of sites but uses pathways which **minimize the traffic on the Internet by sharing routes between sites as much as possible**. The MBone can be used interactively, permitting each site to communicate with every other **in the session**.

在教学过程中



**This is different to multipoint ISDN conferences between a number of sites simultaneously, where all sites are connected to a central Multipoint Control Unit (MCU).**

**The switching of the MCU is commonly achieved by voice activation so that the site where the audio is active is transmitting to all receiving sites.<sup>1</sup>**

**MCU的切换通常用语音驱动，这样有语音出现的节点就向所有接收点发送信息。**



导致整个网络都以最慢节点的速度运行

This system until recently required that all sites were operating at the same bandwidth (e.g., 128kbps for ISDN-2), which resulted in the whole network having to operate at the speed of the slowest partner. Recent advances will permit mixed working thus permitting some sites to use their equipment capable of operating at 384kbps and higher resolution, and at the same time allowing smaller sites to be part of the conference with their equipment only operating at 128kbps.<sup>2</sup>

使有些节点能在384Kbps速率下以高分辨率工作，同时又允许使用128Kbps设备的小节点也成为远程会议的一部分



## 通过各种不同的网络

The multimedia material used in teaching applications can be delivered to the user **over a variety of types of networks**, which **can be** internal departmental or campus LANs or they **can be** wide area networks (WANs) linked to various regions and institutions, supported **by the academic networks** (JANET and MANs) **or by public service provider** such as ISDN. Each of these technologies will be discussed in this paper.



在教学中提供的支持信息越复杂，对学生来说越有利

It is assumed that **the higher the sophistication of the supporting information in teaching and learning the better it is for the student.** This greater sophistication requires more effort in the production, and more sophisticated equipment for the presentation, so the teacher should always ask what is the simplest and clearest way of presenting information consistent with the use of the material.

复杂性越高要求，制作的工作量越大，在展示中对仪器的复杂性要求也更高，所以教师总是应当寻找与材料相一致的最简单最清晰的信息传达方式。



如果信息可完全用线条图表示，那么高分辨率图像对学生就没有什么优越性了。

**A high-resolution picture has no advantage to the student if the information could be presented perfectly adequately as a line drawing.<sup>3</sup> As multimedia is expensive to produce and to present, its use must be justified. High-resolution images are good to look at but the added detail must contribute something positive to the student's knowledge.**

确认使用的必要性



The advantage of multimedia is the ability to bring together a number of different media in a way which permits synchronization of information, e.g., vision and sound, and which overall enhances the information. It should be remembered that the “people” themselves can provide information in several media naturally, e.g., **the patient demonstrating a particular clinical situation provides visual, tactile and even olfactory information of signs and symptoms, as well as being able to describe and be questioned about the effects of the disease.**<sup>4</sup>

病人会提供有关症状的视觉、触觉、甚至嗅觉信息来表达一种具体的临床症状，同时还会进行描述，并接受有关疾病后果的询问。



**Another example is the ability to link into the teaching space over remote video links which can provide visual and audio information from a distance, e.g., the application of open and distance learning techniques.<sup>5</sup>**

**通过远程视频链路联接到教学场所，这种链路可提供远方的视频和音频信息，例如开放式远程学习技术的应用**



In practice the good use of multimedia gives the teacher opportunities to **provide a number of stimuli to the students, which can make the teaching much more comprehensive and interesting.**

提供多方位的刺激，这使得教学内容更容易理解并能引起兴趣



包括让学生自主学习

The ability to provide more varied stimuli to the teaching and learning process can also **include the student working on his/her own**; the ability to present on the computer screen in a variety of colored images and sound effects can enhance the information being presented to the student. The eye is undoubtedly attracted by **colors and shapes** and **these are most frequently used to attract the interest of the student.**

颜色和形状最常被用于吸引学生的兴趣



过去留下的网络

If **legacy network**, such as optical fibers carrying analogue audio-visual signals still exist in an institution they can be used to good purpose. For example in the TLTP INSURRECT project a SONY LVR videodisc server was used to store still and moving images and the LIVENET optical fibers were used **to take these analog images into the teaching space.**<sup>6</sup>

将这些模拟图像传送到教学场所



## Asynchronous Transfer Mode

Also they carried the images to CODECs for transmission to remote teaching sites over the SuperJANET ATM video network. The SONY video server stored up to 54,000 image frames as either still images or short video sequences. This SONY system could be controlled using RS232A commands, transmitted either over the LAN or over the INTERNET from remote sites.

（这些命令）通过局域网或互联网从远处的节点发送过来。



## 越来越充斥整个校园

Thus it was possible to control slideshows easily from a laptop in the lecture theatre, either within the same institution or remotely. Video sequences could also be controlled in an interactive manner: stopping, starting and playing backwards and forwards. In the future the digital network will increasingly pervade the whole campus, but it must be remembered that the analogue network is likely to provide a higher bandwidth and therefore higher resolution images.

模拟网络很可能提供更大的带宽，  
因此能传送分辨率更高的图像



## Switched Multimegabit Data Service

In the INSURRECT project, LIVENET analogue circuits were used to transmit video and audio signals around the UCLA campus, and also were fed into CODECs to be transmitted over the SuperJANET ATM video network to the remote sites. One site (Bristol) was not on SuperJANET, and TCP/IP was transmitted over a 100Mbps **SMDS** link very successfully. In the early part of the experiment **there was some difficulty synchronizing the voice channel with the video but this was improved during the lifetime of the project.**

在将音频通道与视频同步中遇到了一些困难，不过随着项目的进展有所改进



**Ethernet LANs are common in university campus capable of providing good resolution signals using IP into the teaching space but there is no bandwidth reserved for the video signal, and thus the quality of the signal will vary according to the level of usage of the Ethernet.<sup>7</sup>**

但对于视频信号却没有预留带宽，因此信号质量将随以太网的使用情况而变化



It is notable that current LAN video conferencing systems are using IP for the campus networks, but use an ISDN gateway to connect with remote sites because **the guaranteed bandwidth available on ISDN ensures that the picture quality can be maintained.**

因为ISDN确保可用的带宽保证了图像的质量



**ATM 网络常用作传输媒介，使用多种协议如IP，SMDS和局域网仿真。**

**ATM networks can be used with typical bandwidths of 25Mbps to 155Mbps, both in LANs and WANs. ATM networks are often used as a transport medium carrying a number of protocols such as IP, SMDS and LAN Emulation. In some applications native ATM technology is utilized to transmit the audio and video information.**

**基本的ATM技术**



In many campus networks there is a mixture of different technologies in use; **a typical scenario would be an ATM backbone with Ethernets connected.** As far as possible the ATM backbone should be routed close to major teaching areas.

一种典型情况就是以ATM为主干，连接以太网。



When teaching there is frequently a need to link more than two sites, and then Mbone and multipoint configuration are necessary. A multipoint conference uses a star network configuration, and is capable of being interactive **as each port on the MCU will support two-way video and audio**. The audio signal is used to control the switching in voice switching systems.

因为MCU各个节点支持视频和音频的双向传送



**Multi-casting is particularly relevant to IP networks, and the Mbone has been developed to economize/minimize the traffic on the network by choosing routes between all sites so that as much as possible of the traffic can share the same routes and branching out in the final stages of the links.<sup>8</sup> Ideally the multi-cast network will link all sites to each other and further this network can support interactive traffic.**

人们开发了组播骨干网，在各节点间选择路由，使尽可能多的数据流共享同样的路由，在链路最后阶段才分流，以节省网络资源，使数据流量最小化。



**ISDN — Integrated Services Digital Network — is a telephone service that enables you to have high-speed data connections through your phone line. ISDN is basically the telephone network turned completely digital, using existing wiring. ISDN is capable of transmitting large amounts of data rapidly between sites, and it is possible to support compressed video transmission because the bandwidth is guaranteed and therefore the audio and video synchrony of the signal is maintained.**

**原则上ISDN是利用已有的联线，将电话网完全转变成数字式。**



在某些领域里，能与14.4Kbps调制解调器、传真和电话自动答复机可靠地配合工作的普通电话线被称为POTS

ISDN is much cheaper than many other methods of moving data at high speeds, but it is still expensive relative to a normal phone line. Normal phone lines — the kind that work reliably with your 14.4kbps modem, fax, and answering machine, are known in some circles as POTS — plain old telephone service. There are serious attempts to provide video on these circuits as exemplified by video-telephones, but these in general do not provide the resolution necessary for teaching.



## ISDN的一个主要缺点

**A major drawback to ISDN is that because it moves digital data instead of analogue data, it doesn't work with your regular modem, or answering machine. You need special, expensive equipment to perform those functions at ISDN speeds. However, ISDN is faster than a standard modem, and is available in various parts of the world, including Australia, Western Europe, Japan, Singapore, France, and portions of the U.S.**



- **Why is bandwidth important in the distance learning using multimedia?**
- **How can analog techniques be utilized in the network environment?**
- **What are the types of links that are used in network-based education systems as discussed in the text?**



- **Operation of the radar is based on the measurement of the time it takes for a pulse transmitted from an antenna to get reflected by the object to be detected and to return at the antenna and the receiver.**
- 雷达的工作是基于对天线发出的脉冲被所要探测的目标反射，（然后）回到天线和接收机所需时间的测量。



- **The degradation of the transmitted signal is a result of signal distortion due to imperfect response of the channel and due to undesirable electrical signals (noise) and interference. Noise and signal distortion are two basic problems of electrical communication.**
- 传输信号的退化是信号失真的结果，而这种失真又是由信道的非理想响应及不想要的电信号（噪声）和干扰引起的。噪声和信号失真是电子通信的两个基本问题。



- **The preceding chapters have described how the automatic computer performs, but have not described how the automatic computer can be put to use to do data handling work to serve an organization, nor why such work is done in the way that it is.**
- 前面的章节讲述了自动计算机是如何工作的，但没有讲述自动计算机如何能用于数据处理来为一个机构服务，也没有讲为什么要用这种方法来完成这一任务。



- **For a long time the internal speaker was the only sound source for the PC. Unfortunately, the internal speaker can only produce a few simple beeps. Not until 1987, when audio adapter cards began appearing on the market, did PC users get an opportunity to hear and create true sound.**
- 长期以来内部扬声器是PC的唯一发声源。可惜内部扬声器只能发出几种简单的嘟嘟声。直到1987年市场上开始出现音频适配卡时PC的用户才有机会听到并产生真正的声音。



- **In an MP3 encoder, quantization is done via a power-law quantizer with larger sample values automatically coded with less accuracy. The quantized values are coded by Huffman coding, which is called noiseless coding because no noise is added to the audio signal. The Huffman code tables assign shorter code words to smaller and more frequent quantized values.**
- **在MP3编码器中量化由幂律量化器完成，这种量化器对较大的样本自动以较低的精度编码。对量化后的值进行Huffman编码。由于这种编码不在音频信号中引入噪声，故称为无损编码。Huffman码表给较小而又频繁出现的值赋予较短的码字。**



- **If the number of resulted bits exceeds the number of bits available for a given data block, the global gain is adjusted to result in a larger quantization step size and smaller quantized values. This operation is repeated until the resulting bit demand for Huffman coding is small enough. The system starts with a default factor of 1.0 for each band. If the quantization noise in a given band exceeds the allowed noise as supplied by the perceptual model, the scale factor is adjusted to reduce the quantization noise.**
- **如果产生的比特数超过给定数据块可用的比特数，就调整全局增益，导致较大的量化步长和较小的量化值。这一过程重复进行直到用于Huffman编码要求的比特数足够小为止。系统对每一个频段均从默认值1.0开始。如果某一频段的量化误差超过听觉模型允许的噪声，就调整尺度因子以降低量化噪声。**



- **We shall work out the signal-to-noise ratio required to detect a target, when it appears, with a certain probability of success, the probability of a false alarm being specified at some tolerable level.**
- 我们将寻求当目标出现时能以一定成功概率检测目标所要求的信噪比，同时虚警概率要控制在某一允许的水平上。



- **While this chapter discusses logic circuits in connection with the digital computer it should be recognized that the same circuits are often applied directly to other fields.**
- 虽然本章是联系数字计算机来讨论逻辑电路的，但应当了解同样这些电路也常直接用于其他领域。



- **Although it is possible to generate an infinite number of amplitude values, the process of transmission will for a real system be impossible to recover the original information.**
- 虽然有可能产生无穷多种幅度值，对于一个实际系统而言是不可能恢复出原有信息的。

# Exercise



- **The identity of an amplitude modulated message signal may under certain circumstances be communicated by transmitting regular samples of the message, rather than the continuous signal.**
- 在某种条件下，调幅信号可以通过发送对消息的等间隔取样而不是连续信号本身来进行传输。



- **Rectangular pulses will during their passage down a transmission path become dispersed, and spread out. Consequently, successive pulses will tend to overlap and cause a distortion known as inter-symbol interference.**
- 矩形脉冲在它们传输过程中会由于色散效应而散开，因此接连的脉冲趋于重叠，引起称之为符号间干扰的失真。



- **Stability and repeatability are fundamental attributes of digital circuits, and the necessary accuracy can be obtained in a digital version of the modulator by an appropriate choice of word length to represent the signals.**
- **稳定性和可重复性是数字电路的基本性质，在数字调制器中必要的精度可通过适当地选择代表信号的字长而获得。**