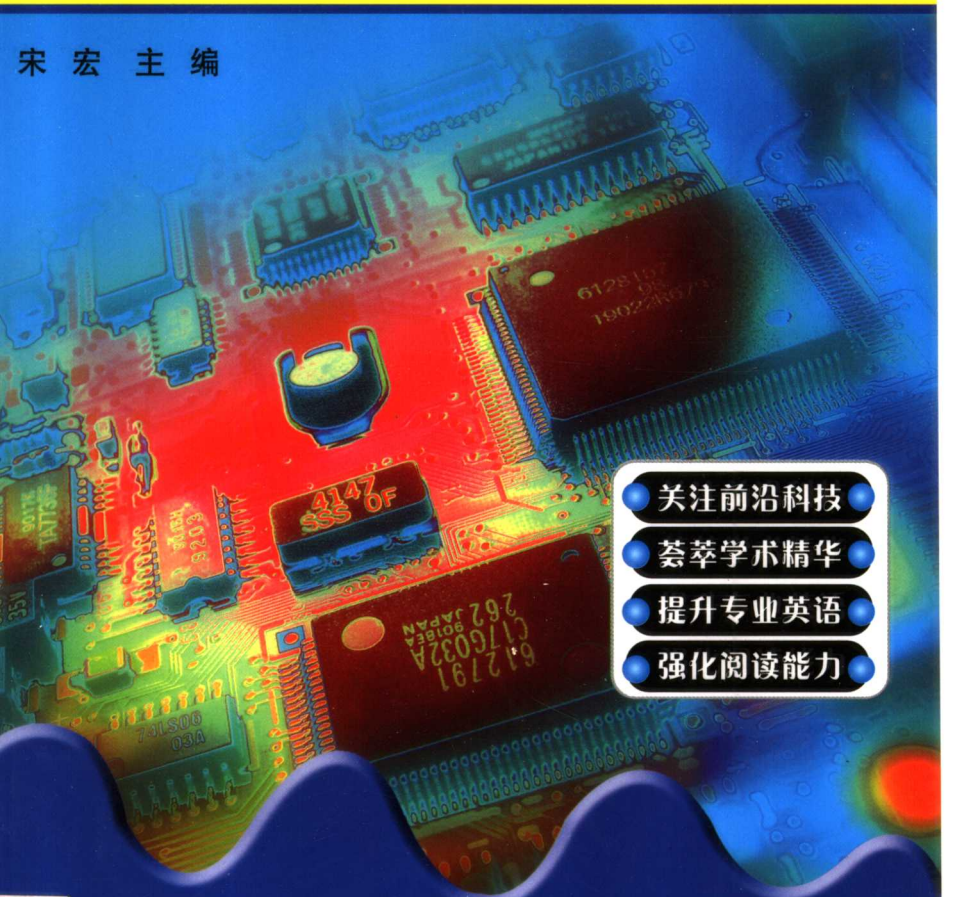
前沿科技英语阅读文选

—电子通信篇

宋宏 主编



国防工业出版社
National Defense Industry Press

前沿科技英语阅读文选——电子通信篇

宋 宏 主编
岳 瑾 刘艳春 副主编
王 欢 李文秀 侯艳丽 廖艳萍 编写

国防工业出版社

图书在版编目(CIP)数据

前沿科技英语阅读文选. 电子通信篇/宋宏主编. —北京:国防工业出版社,2007.8
ISBN 978-7-118-05247-3

Ⅰ.前… Ⅱ.宋… Ⅲ.①英语-语言读物②科学技术③通信技术 Ⅳ.H319.4:N

中国版本图书馆 CIP 数据核字(2007)第 097267 号

※

国防工业出版社出版发行
(北京市海淀区紫竹院南路 23 号 邮政编码 100044)
京南印刷厂印刷
新华书店经售
*
开本 850×1168 1/32 印张 10⅝ 字数 270 千字
2007 年 8 月第 1 版第 1 次印刷 印数 1—5000 册 定价 16.00 元

(本书如有印装错误,我社负责调换)

国防书店:(010)68428422 发行邮购:(010)68414474
发行传真:(010)68411535 发行业务:(010)68472764

前　言

理工类各专业的学生往往在通过四级考试后中断了英语学习，即使继续学习专业英语，也由于目前各院校选编的教材时效性滞后，内容陈旧，学生在专业阅读中语言和专业脱节，或者忽视了专业语言的培养，或者忽视了科技阅读中的专业价值。

针对这些问题，国防工业出版社组织了一批长期从事专业英语教学和精通英语的专业研究人员，精心编译了这套《前沿科技英语阅读文选》。本丛书选编的内容均是由业内资深研究人员通过对近期大量科技文献的严格筛选而选定的，主要选自2004年以来新近出版的本专业国际核心期刊、著作，内容涉及本专业前沿领域的热点问题。每篇文章的注释部分包括专业导航、词汇注释、难句释疑和译文点拨。

科技英语的阅读和翻译既需要专业知识，也需要扎实的语言功底。尤其是当那些日常生活中常用的词作为某一领域中的专门术语出现时，理解起来更要小心，这些词虽然看起来很浅显，很熟悉，但如果简单地用日常用语中的常用义来解释专业术语，或者望文生义，往往会闹出“牛头不对马嘴”的笑话。比如有人把 basic pig 翻译为“基本猪”——这究竟是什么意思呢？原来是表示“碱性生铁”。

本套丛书的编者既有长期从事专业英语教学和英语语言研究的一线骨干教师——他们具有比较丰富的编写教辅材料的经验；也有精通英语的本专业研究人员——他们熟悉专业领

域，保证了注释的专业性和准确性。通过具有各学科背景的编者的倾力合作，本丛书尽可能将专业学习和语言学习有机地结合起来，将理论性和应用性有机结合起来，为读者提供一套取材新颖、信息量丰富的科技英语阅读材料。

本系列丛书所选文章难度适中，适合于通过四级考试后的理工科本科生和研究生作为补充阅读和专业学习，也对论文写作具有参考价值，也适合于相近程度的科研人员提高英语、了解专业前沿信息。

目　录

1 Current Situation and the Future in the Telecommunication World
电信世界的现状及未来

专业导航

电信系统是指各种协调工作的电信装备集合的整体。最简单的电信系统是只在两个用户间建立的专线系统，较复杂的系统则是由多级交换的电信网提供信道，在一次呼叫中所构成的系统。按日常运行维护专业进行划分，电信系统由交换专业、传输专业、线路专业、接入网、应急通信、资源管理、电源专业、网管组成。还有 IC/ID 卡系统、160/168 系统、计费账务系统、九七业务系统等由经营部维护，数据网由数据局维护。按种类分，分为传送网、业务网、支撑网、用户终端设备。

Today's telecommunication networks are characterized by specialization. This means that for every individual telecommunication service at least one network that transports this service exists. A few examples of existing public networks are described below:

Telex① network transports telex information, i. e. messages of characters, transported at very low speed. The characters are coded on the basis of a specific 5-bit code.

PLTS (plain old telephone service) is transported via the public

① telex: 电报，电传打字机

switched telephone network (Pstn). This ubiquitous① network offers the customers classical two-way voice conversation.

Computer data are transported in the public domain either by a packet switched data network based on X. 25 protocols or in a very limited number of countries by a circuit switched data network based on X. 21 protocols. [1]

Television signals can be transported in three ways: broadcast via radio waves by using ground antenna②, by the coaxial③ tree network of community antenna TV network or recently via a satellite, by using the so-called direct broadcast system. [2]

In the private domain, computer data are mainly transported by LANs(Local area network). The most famous ones are Ethernet, token④ bus and token ring(IEEE 802 series).

Each of these networks was specially designed for that specific service and is often not at all applicable to transporting another service. For instance, the original CATV networks did not allow the transportation of POTS; or the PSTN does not transport TV signals; or the transfer of voice over an X. 25 network is very problematic because of too large end-to-end delay and jitter⑤ on this delay.

Only in limited and special cases can service types other than the one-the network was originally designed for being transported over it. This is for instance the case for the PSTN which is capable of transporting computer data at a limited speed, if modems are provided at both ends of the network.

An important consequence of this service specialization is the ex-

---

① ubiqitous:到处存在的,(同时)普遍存在的

② antenna:天线

③ coaxial:同轴的,共轴的

④ token:表示,象征,记号,代币

⑤ jitter:颤抖,跳动

istence of a large number of often world-wide independent networks, each requiring its own design phase, manufacturing and maintenance.[3] In addition, the dimensioning① of each network must be done for every individual service type. Even if resources are freely available in one network, they cannot be used by another service type. For example, the peak hours in the telephone network are between 9 a. m. and 5 p. m., whereas the peak hours in the CATV network are during evening. Since resource pooling② is impossible, each network must be dimensioned for its worst case of traffic conditions which are the peak hour traffic.

A first step, despite a limited one towards a single universal network, is the introduction of NISDN in which voice and data are transported over a single medium③.[4] This network cannot transport TV signals due to its limited bandwidth capabilities, so a special TV network is still required. Even in NISDN, the integration④ of narrowness and services such as data and voice can be considered as being rather limited: the user access to the network is fully integrated⑤ either by a basic access or primary rate interfaces. However, inside the network there will still exist for some time a packet switched and a circuit switched network as two overlay networks incapable of transporting other traffic types and each dimensioned either for voice or X. 25 data.[5]

Another important consequence of this service specialization is the inability of the network to benefit highly from the progress made in technology and coding algorithms. For instance, current digital NIS-

① dimensioning:定尺寸
② pool:合伙经营,共享
③ medium:媒体,方法,媒介
④ integration:综合
⑤ integrate:使成整体,使一体化

DN switches are designed for 64 kbit/s voice channels. However, with the current progress in speech coding and chip① technology, bit rates of 32 kbit/s, 13 kbit/s and even lower will be used in the future. The existing switches and transmission systems are not directly suited and thus need an adaptation, or will not efficiently use their internal resources for these lower speed bit rates.

When designing the future BISDN network, one must take into account all possible existing and future services. Suppose a network is capable of transporting a specific service, e. g. a circuit switched service with a channel rate of 70 Mbit/s. Suppose also that it is specifically designed to transport this bit rate. Some years later a new teleservice of, for example, 40 Mbit/s appears on the scene. This would mean that the network signed for that service (i. e. 70 Mbit/s) will be capable of transporting the new teleservice, but with a large inefficiency: only 40 out of the 70 Mbit/s available will be used. This example is not unrealistic. ②It is very likely that in the future new services will emerge which have not yet been identified, and of which the requirements are unknown today. [6]

Disadvantages

As can be concluded from the above examples, the networks of today are very specialized and suffer from a large number of disadvantages, the most important being:

Service Dependence

Each network is only capable of transporting one specific service for which it was intentionally designed. Only in a limited number of cases and by using additional equipment (e. g. a modem) and with

① chip:集成芯片

② unrealistic:不切实际的,不实在的

an inefficient use of its resources can it be adapted to other services.

Inflexibility

Advances in audio, video① and speech coding and compression② algorithms and progress in very Large Systems integration (VLSI) technology influence the bit rate generated by a certain service and thus change the service requirements for the network. In the future, new service with unknown requirements will appear. For the time being it is yet unclear, e. g. what the requirements in terms of bit rate for HDTV will be. A specialized network has great difficulties in adapting to changes or service requirements.

Inefficiency

The internal available resources are used inefficiently. Resources which are available in one network cannot be made available to other networks.

If we take into account all these considerations on flexibility, service dependence and resource usage, it is consequently very important in the future that only a single network exists and that this network of the future (B-ISDN) is service-independent.[7] This implies a single network capable of transporting all services, sharing all its available resources between the different services.

Advantages

A single service-independent network will not suffer from the disadvantages described above, but it will have the following main advantages:

Flexible and Future-safe

Advances in the state of the art of coding algorithms and VLSI

① video:电视,录像,视频

② compression:浓缩,压缩,压榨

technology may reduce the bandwidth① of existing teleservices. A network capable of transporting all types of services will be able to adapt itself to changing or new needs.

Efficient in the Use of Its Available Resources

All available resources can be shared between all services, such that an optimal② statistical sharing of the resources can be obtained.

Less Expensive

Since only one network needs to be designed, manufactured and maintained, the overall costs of the design, manufacturing, operations and maintenance will be smaller.

The integrated services digital network (ISDN) is the road map to the future for all forms of digital communications. Since more than 90% of al communication systems will be digital by the year 2000, consequently ISDN standards and system architecture will largely dictate③ the shape and form of global communications in the 21st century. ISDN is, therefore, a mega-telecommunication④ issue and as such, it is probably the world's best kept trillion dollar secret.

ISDN's enormous importance is only gradually being understood. Years of work have been carried out by the international telegraph and telephone consultative committee (CCITT) and the international organization for standardization (ISO). As it evolved⑤, ISDN has been put into the spotlight⑥. This new prominence⑦ does not mean that the

---

① bandwidth:带宽
② optimal:最佳的,最理想的
③ dictate:口述,口授,使听写,指令
④ mega-telecommunication:电信
⑤ evolve:(使)发展,(使)进展,(使)进化
⑥ spotlight:聚光灯
⑦ prominence:突出,显著,突出物

idea is new. In fact, ISDN was conceived a quarter of a century ago and is only now beginning to reach maturity.① The ISDN concept was born in the mid 1960s as a part of the progressive application of digital technology in public switched telephone network (PSTN). The digital service offered the PTTs and other public communication carriers three very appealing characteristics: enhanced quality, economy, and flexibility.

The first characteristic is achieved when a signal is digitally encoded to overcome degradation due to the transmission medium. As regards economy, early studies suggested that digital services offered significant advantages since a substantial② quantity of interface equipment in the telephone exchange could be eliminated. Finally, digital service also provides flexibility in the transmission of voice, data, video, and other services with equal ease. These new digital services were beginning to increase substantially in the early 1970s but their potential growth was stunted③ by bandwidth limitations inherent in a 4 kHz voice channel which characterized the analogue④ transmission and exchange facilities typical of that time.

The term ISDN was first defined within the CCITT in 1972. It referred to a network providing end-to-end digital connectivity for a range of services. It also used the idea of a totally open network with universally available and standardized "ports" that can plug in everywhere. The concept has since then evolved from the existing telephone networks of countries undergoing changes due to the introduction of totally new digital technology in the switching an transmission equipment. Similarly, the introduction of voice encoding techniques

---

① maturity:成熟,完备;(票据)到期
② substantial:坚固的,充实的
③ stunt:阻碍发育,妨碍生长
④ analogue:类似物,相似体

using pulse① code modulation② contributed to the concept's evolution. Initially③, voice encoding was based upon a 64 kbit/s basic access signaling rate of 16 kbit/s, that is, the D-channel, constitutes the essential ISDN transmission rate of 144kbit/s (2b + d). Currently PSTN, available in almost 200 countries and territories④ around the world, offers universal voice access to almost 750 million telephones around the world. [8] ISDN is the network which will progressively provide a similar universal access for not only voice, facsimile⑤, video, text, but also other services.

In the industrialized countries, the evolutionary nature of the ISDN concept has been a matter of economic practicality in view of the vast telephone infrastructure already in place. The primary emphasis, however, has been the enhancement of services rather than a simple replacement of existing equipment. This evolutionary approach has also merit for most of the developing countries, although in some instances where analogue facilities⑥ do not exist presently or where they are very limited, the direct installation of digital facilities could allow a direct leapfrog⑦ to ISDN capabilities.

Many planners believe that the transition from experimental ISDN technology to operational system will be convincingly made in the next few years. Certainly the 1990s will be the time of rapid operational growth. If true, a lot of issues will have to be resolved in coming months rather than in coming years. The current study period of the

---

① pulse:脉搏,脉冲
② modulation:调制
③ initially:最初,开头
④ territory:领土,版图,地域
⑤ facsimile:摹写,传真
⑥ facility:简易,灵巧;设备,工具
⑦ leapfrog:蛙跳

CCITT(1989-1992) will, of necessity, resolve virtually all standards issues on ISDN including even wideband ISDN for transmission rates up to 155 Mbit/s.

难句释疑：

[1] Computer data are transported in the public domain either by a packet switched data network based on X.25 protocols, or in a very limited number of countries by a circuit switched data network based on X.21 protocols.

参考译文：

在公众域，计算机数据或者是以基于 X.25 协议的分组交换数据网传输，或者是在有限的几个国家以基于 X.21 协议的电路交换数据网传输。

译文点拨：

本句采用了 either..., or... 的结构，表示“或者……，或者……”。

based on X.25 protocols 是过去分词短语作定语，修饰 data network。

[2] Television signals can be transported in three ways: broadcast via radio waves by using ground antenna, by the coaxial tree network of community antenna TV network or recently via a satellite, by using the so-called direct broadcast system.

参考译文：

电视信号可以通过三种方式传输：利用地面天线或者电视网共用天线的同轴树状网通过无线电波来进行播放；近来，又利用所谓的直播系统通过卫星来播放。

译文点拨：

via：介词，源自拉丁语，表示“经由；通过；凭借”。

“via radio waves by using... by the coaxial tree network... or