

## Structure

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## 9.0 OBJECTIVES

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After going through this Unit you will be able to:

- 1 understand the basic concept of information infrastructure;
- 1 know what is National Information Infrastructure;
- 1 delineate the technological characteristics and components of NII;
- 1 understand the basic issues in GII; and
- 1 feel its importance on library and information services.

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## 9.1 INTRODUCTION

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Infrastructure refers to the underlying foundation or basic framework of an organization or system. In the industrial world it refers to transportation, communications and power grids including roadways and highways. But in the post industrial world 'information' is one of the nation's most critical economic resources. This is otherwise known as information society, which is largely based on information infrastructure. Information infrastructure consists of information resources, human and knowledge and facilities necessary for processing and delivery of information. The traffic within an information infrastructure is information itself.

## 9.2 WHAT IS NATIONAL INFORMATION INFRASTRUCTURE (NII)

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National Information Infrastructure (NII) includes more than just the physical facilities used to transmit, store, process and display voice, data and images. It encompasses:

- a) A wide range of equipment including cameras, scanners, key boards, telephones, fax machines, computers, switches, compact disks, video and

audio tape, cable, wire, satellite, optical fiber transmission lines, micro wave nets, televisions, monitors, printers and much more.

- b) NII requires building foundations for living in the Information Age and for making these technological advances useful to the public including libraries.
- c) The information itself, which may be in the form of video programming, scientific or business databases, images, sound recordings, library archives and other media.
- d) Applications and software that allow users to access, manipulate, organize and digest the proliferating mass of information that the NII will facilitate to put their fingertips.
- e) The network standards and transmission codes that facilitate interconnection and interoperation between networks and, ensure the privacy of persons and the security of the information carried, as well as the security and reliability of networks.
- f) NII will enable to develop new “electronic communities” and share knowledge and experiences thereby leading to economic growth of a nation.

The United States Information Infrastructure Task Force (1993) called for the establishment of “a seamless web of communications networks, computers, databases and consumer electronics that will put vast amounts of information at user’s fingertips. This Web was portrayed as an essential national asset for developing new and better ways of learning, working and interacting with others. The Council further made bolder assertion that this new infrastructure would “enable all Americans to access information and communicate with each other easily, reliably, securely and cost effectively in any medium – voice, data, video – any time, any where”. This National Informational Infrastructure (NII) would improve the productivity of work, lead to dramatic improvements in social services, education and entertainment, and generally revolutionize the US economy and society.

National Information Infrastructure (NII) envisaged that entire nation would be connected together through optical fiber, microwave links and satellite transponders. (India as Knowledge Super Power, 2001). Development of NII also applies to development of GII as well. A GII is basic to the realization of many national and international goals. NII is a vital component of the GII and should be built with national and global objectives.

### **9.3 TECHNOLOGICAL CHARACTERISTICS OF NII**

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Both the capability and the demand for National Information Infrastructure depend much on technological change in both computers and communications. Advances in microelectronics and fiber optics have been major drivers of course. However

National Information Infrastructure (NII) would have the following technological characteristics.

- 1. **Speed:** Data transmission speed will be substantially faster e.g. hundreds of thousands, millions, or billions of bits per second. That is why optical fiber is fast replacing the traditional copper wires in certain segments of telecommunications because of its extremely high data carrying capacity.
- 1. **Integration of computer and communications:** computer and communica-

cation technologies are being woven together inextricably. Distributed computing applications are placing increasing demands on the capacity of the communication systems, and computing is embedded in the network.

- 1 **Digital formats:** Information in digital format is not only transmitted more reliably and quickly, but it is in a form directly usable by computers. That means information can be stored, manipulated and displayed in many ways it can also be recognized and interpreted within the transmission system, which is itself, computer controlled. Digital information can also be made more secure. All the security system algorithms are designed for digital information only.
- 1 **Portability:** Digital radio, digital mobile phone, lap top computers have the facility of connectivity anywhere, any time.
- 1 **Multimedia:** In digital encoding, all forms of information, sound, computer data, images, or text could be handled for, transmission or processing.
- 1 **Multiple uses:** National Information Infrastructure will carry a wide variety of applications and services in contrast with the current telephone, broadcast or cable television systems, each of which was created to provide a very narrow range of services.
- 1 **Flexibility:** The system will be far more flexible and able to support a wide variety of services beyond imagination. Of course much of the capability will reside in its computer software and databases rather than hardware.

Telecommunication is the key to growth and development of NII and GII. The NII's telecommunication system should exhibit the following characteristics.

- a) A sufficiently broad bandwidth to enable both existing and future digital systems and services,
- b) Universal connectivity among homes, business etc.,
- c) User friendly seamless interaction and interoperability within both the NII and GII,
- d) Network security, user privacy and protection of intellectual property rights.
- e) Accessibility to mobile users through fully functional wireless systems.

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## 9.4 COMPONENTS OF NATIONAL INFORMATION INFRASTRUCTURE

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Broadly speaking, the National Information infrastructure consists of four parts:

- 1) **Hardware:** Microelectronics and the related technologies of satellites, fiber optics, digital networks, local area networks, coaxial cable system, along with all the mainframe, mini and micro computers, terminals and workstations that store and access information
- 2) **Software:** Software comprises the information systems and computer programmes that enable end users to operate hardware efficiently and effectively by telling it what to do, how to do it, when to do it, and so forth.
- 3) **Supporting physical and human resources:** This component is composed of all the physical plant and facilities and the supporting human resources.

4) **Data, Information and Knowledge:** The fourth component is the actual data, information and knowledge in what ever media or format: electronic, optical, hard copy in the form of bits and bytes in computer data banks, in document or archival repositories, or in literature on the shelves in libraries.

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## 9.5 GLOBAL INFORMATION INFRASTRUCTURE

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Global standardization is becoming more and more important in achieving a global information infrastructure. There are a large number of worldwide telecommunication and information organisation such as International Telecommunication Union (ITU), International Organisation for Standardisation/ International Electrotechnic Commission (ISO/IES) etc. which have formed the special groups focus on defining standards for GII. GII standardization is becoming more and more important in achieving a global information infrastructure.

Standardisation activities of the various bodies are well designed by even government agencies as important requirement for GII. To promote GII and the expected role of the government, various projects were identified which are listed below.

- 1 Global Interchangeability for broadband.
- 1 Electronic/Digital Libraries
- 1 Electronic museums
- 1 Environment and national resource management
- 1 Global emergency management
- 1 Global health care application.

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## 9.6 IMPACT OF NII ON LIBRARY AND INFORMATION SERVICES

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Development of National Information Infrastructure (NII) not only contributes to automation and networking for providing library and information services and its delivery but also to a wide range of applications viz. digital libraries, e-documents and publishing, multimedia on the net and web, delivery of information over cyberspace which can reach anywhere, anytime and to any one. The use of Internet and WWW make it possible for us to virtually have a real global library. The growth and development of library and information networks at local and international level is not limited to one country rather connected to information superhighway thereby providing access to digital information resources of all subjects, types and formats. Of course this requires adequate information infrastructure, IT based professionals, finance, legislations (Copyright, Intellectual Property Right, Right to Information), National Information Policy (NIP) etc. Today it has become a common practice to subscribe an e-journal or magazine, order books and make payment electronically. As we know that [www.amazon.com](http://www.amazon.com) has become one of the largest book selling web site worldwide. As a part of NII initiative in India, many university libraries, special libraries attached to R & D organizations are currently engaged in the developing digital libraries, resource sharing library and information networks, consortia etc.

## Self Check Exercises

- 1) What will be the major impact of NII and GII initiatives?
- 2) How are NII and GII related to each other?
- 3) List the important characteristics of telecommunication system as recommended by NII initiative.

**Note:** i) Write your answer in the space given below.

ii) Check your answers with the answers given at the end of this Unit

## 9.7 SUMMARY

NII/GII is a federation of networks that at any time may be composed of diverse segments such as wired, modem, cable, broadcast and satellite delivery systems. Bandwidth, transponder, access mode and inter interoperability are assumed design requirements while security, privacy, reliability and standards fall into the user requirement category.

In this unit we addressed a number of issues related to NII which includes technological characteristics and components of NII. Development of NII also applies to development of GII as well. NII is central component of GII and should be built with national and global objectives. The unit further discussed on standardisation of activities related to GII. With the emergence of Internet a global information infrastructure, digital libraries have become very useful service available on the net. The future of NII/GII initiatives look very promising and will have major impact on e-learning, e-governance and e-commerce.

## 9.8 ANSWERS TO SELF CHECK EXERCISES

- 1) The major impact of NII/GII initiative will be on integration of country's economy with a global economy. The convergence technology will get a major boost. There will be availability of very high network bandwidth fiber optics. There will be a transition towards e-learning, e-commerce and e-governance.
- 2) From the infrastructure development point of view both are inter related. The development of NII will lead to development of GII. Therefore NII is a vital component of GII.

3) The NII's technological initiative for telecommunication system should contain the following characteristics:

- i) support of very high bandwidth.
- ii) seamless integration and interoperability of various systems.
- iii) network security

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## 9.9 KEYWORDS

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<b>Bandwidth</b>	: A frequency measurement, expressed in cycles per second or bits per second (bps), of the amount of information that can flow through a channel. The higher the frequency, the higher the bandwidth.
<b>Data Communication</b>	: The transfer of information from one computer to another either through cable, telephone or satellite.
<b>Microelectronics</b>	: Design and manufacture of electronic circuits with integrated circuits and chips.
<b>Transponder</b>	: Communications device that receives and retransmits signals.

## 9.10 REFERENCES AND FURTHER READING

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