

## Chapter 26

# Grid for Post Operative Care through Wireless Sensor Networks

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### ABSTRACT

*To address the solution for problems of e-health systems, the various new algorithms are developed. Today, the parallel and distributed programming concepts have motivated the doctors and technology experts for the development of e-health grid systems. This e-health grid system is expected to provide more efficient patient care system, better security and more dedicated links among patients, pharmaceutical companies and their experts. The chapter discusses the project significance of grid computing with its past, present and future in the perspective of e-health. The interdisciplinary research and development in the field of biochemistry, health care, information technology and biomedical engineering has enabled technologists to develop equipments and systems for patient monitoring at distances. The pharmaceutical companies, doctors and technology experts have been working for platforms with continuous connectivity for the treatment and post operative care for patients in homes and in hospitals. The practical significance of such developments shall be discussed in the Chapter including the exponential growth and exploration of new areas in post operative care systems where Wireless Sensor Network (WSN) is playing a vital role. Moreover, the chapter explains that 'how video conferencing or face to face examination of patient can be performed in the preview of e-learning'. Since, this e-health grid system contains varied parametric input and output and there is a need of data fusion system. The last, but not least, we discuss here the challenges and process of acquisition and retrieval of the abstract data types (medical images and different sonic beats) using web-portal and MIS e-health care systems.*

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## **GRID COMPUTING FOR E-HEALTH SYSTEMS**

The Grid Computing is an interaction of computing networks, communication and information systems. It has applications in government, businesses and medical sciences where a useful data excerpts are gathered from different data locations.

In fact, the Grid Computing is an advance form of distributed data system which was termed with different names in the past such as operations research, distributed database management and parallel processing. The Grid Computing is popular because it is secure, flexible and helps in data sharing among the experts. With the time, the Grid Computing has got boost with the application of e-Health in the fields of biosciences, medicine and genomics.

This Chapter discusses e-Health Grid in community services to develop a Community Grid. The Community Grid is a term that should exhibit system security, automation, and end-to-end recovery during disaster management. The Chapter enlightens the extraction of useful information from e-Health Grid using some web-portal. This approach shall help doctors to provide contact their patient from remote locations. This Chapter focuses on recent developments in e-Health and share a discussion on it, with its reader. It debates on latest concepts and developments of e-Health Grid and its optimization with the use of new technologies like Wireless Sensor Networks for Post Operative Care.

### **Overview of Grid Technology: From the Perspective of Technology and Scope**

In the mid of 1980s, multiple users concept was developed for parallel processing. The procedures were then run on the priority queues. The searching techniques were implemented through the area of statistics and engineering known as operation research by using matrices to solve the problems. The network techniques were introduced at some

limited nodes of local area networks with data transfer rate of 56 Kilo bits/sec. Then, the concept of wide area networks evolved but, restrained to metropolitan cities at speed of 155 Mega bits/sec globally. Later on, the sharing data was extended by scientists with the speed of penta bytes to Giga bits/sec. Thus, the process of parallel computing was utilized -to make advantage of OOP- to solve parallel processing problems. With the passage of time, emergence of internet, complex and global networks, speedy computing and large memory demanded to introduce a new concept of Grid Computing.

The use of Grid Computing in e-Health is viable as multiple resources are shared in the form of distributed data. In an e-Health System, doctors give consultancy to patients remotely and can access the distributed information if it is supported by e-Health Grid. This patient related information is recorded as history in the hospital MIS.

The advantage of Grid Computing is the extraction of real-time patient specific data from a huge data repository. This is achieved through Grid planning and scheduling for parallel processing of e-Health Grid. The concept of e-Health Grid can be thought as an enhanced Hospital MIS, as illustrated in Figure 1. Every patient, ward attendant, consultant and the pharmacist are building blocks of an e-Health Grid.

In the following scenario, the patient is denoted with  $P_n$ , the ward attendant with  $W_n$ , the corresponding consultant with  $C_n$ , and the particular pharmacists with  $Ph_n$ . In this figure, there is always an alternative route in case of non-availability of node parameters.

### **The Past, Present and Future of e-Health Systems**

Though, modern telecommunication technology has made remote consultation between doctors and patient easy, the telemedicine has evolved from the era of Air-mail, Telephony and Telegraph, and Internet. These means have been in use by a large

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