

# Chapter 26

## A Preventive Action Management Platform in Healthcare Information Systems

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### ABSTRACT

*Preventive actions management plays a crucial role in clinical applications, not only for those who depend on data to make decisions, but also for those who monitor the operational and financial impact of the systems. This paper presents an open-source platform, named ScheduleIT, capable of managing preventive routines. The platform is based on an estimation model that determines the optimal time interval for interventions, according to the criticality of the system and the number of non-programmed faults, among others. ScheduleIT has a web-based interface available to a different area end-user, ranging from IT technicians to administrative staff. At this point, the platform covers around 75% of the healthcare systems and it is fully accepted by its main users as a reliable and effective preventive tool.*

### INTRODUCTION

Information Communication Technology interventions can effectively improve the efficiency of healthcare services as Handel & Hackman indicate in their study of 2010 (Handel & Hackman, 2010). Healthcare unities could improve patient treatment increasing the uptime of their Information

Systems. Improving Hospital Information Systems can not only reduce the number of hours spent going through disaster plans, but also increase cost effectiveness workflows. Hospital Information Systems (HIS) are integrated computer-assisted systems used to store, manipulate, and retrieve healthcare administrative and clinical data and are becoming a vital part of healthcare unities

DOI: 10.4018/978-1-4666-7230-7.ch026

(Langefors & Sundgren, 1975; MeSH, 1987). HIS make part of day-to-day workflows in healthcare facilities and are used by doctors, nurses and administrative teams. Such systems have become embedded in all processes, and it is really hard to imagine few hours without them. Although all the good things HIS bring to users, this reliance only becomes evident in case of failure, and in healthcare failure is even more critical (Anderson, 2002; Kovach, 1999; Valenstein & Walsh, 2003).

Several studies have been taking place during the last years to understand the total impact of HIS failures. In 2001 Anderson Consulting Group Inc. was able to determine the total cost per minute of downtime for a Hospital with 1400 beds: the results showed a value of 1000 dollars per minute of downtime (Anderson, 2002).

Thus, a downtime minute can reveal really expensive within healthcare facilities reality when it comes to reduce costs and improve health treatment, which is, nowadays, one of the major concerns for healthcare boards throughout the world is information quality (Machado, Abelha, Novais, & Neves, 2008).

Another relevant aspect that effects risk management is the current precarious disaster recovery plan, or contingency plan. A study performed by Barnard (2002) showed that alternative procedures are often forgotten by the end-users, either if they are based on secondary electronic systems, or on traditional paper records. This kind of actions results in an ineffective, complicated and time-consuming transition from the main to the alternative Information System, which, in most situations, leads to an overload on the trouble requests submitted to the IT professionals, making them solve secondary problems instead of being focused on the answering on time the real problem (Barnard, 2002).

In order to reduce costs, not only financial but also due to time constraints, and to improve the healthcare services, it is necessary to develop

methods for preventive actions that can avoid non-programmed stops (corrective maintenance). Thus, to catalog and schedule stops for interventions, such as software cleaning, updates or simple system restarts, is extremely important and can make a difference when it comes to proper system operation. One immediate advantage of a preventive action is that it can be planned and, in fact, can be cheaper when compared to the results of a fault in an operating system (Nakagawa, 1989).

Some recent studies present different approaches for preventive actions, but one aspect that seems to be common to all of them is the study of all systems uptime. In a complex Information System, which is the case of HIS, it is necessary a conjoint effort between different directive sectors/units to develop a precise and reliable availability study. Some examples of such studies can be consulted in many reports published in the Information Systems area (Jardine, 1985; Sherif & Smith, 1981; Valdez-Flores & Feldman, 1989).

This paper presents an open-source-based platform, named ScheduleIT, capable of managing preventive actions within a healthcare facility. The proposed platform will allow to reduce non-programmed stops, improving the quality of healthcare services and decreasing the number of complaints by the users. In addition, the use of open-source software in the healthcare area has intrinsic advantages and has become well established and accepted among IT professionals.

The impact of open-source software in healthcare is still limited due to several factors, from corporate licenses to user resilience, although several other areas are now using them. Janamanchi and colleagues (2009) managed to publish a study on the state and profile of open source software projects in health care and medical informatics, and they state that more and more healthcare organizations tend to be sponsors of such projects and not only pure users (Janamanchi, Katsamakos, Raghupathi, & Gao, 2009).

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