11 Application Service Provider Technology in the Healthcare Environment

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Abstract

With the advancement of medical technology and thus the complexity of the equipment under their care, clinical engineering departments (CEDs) must continue to make use of computerized tools in the management of departmental activities. Researchers at ISPJAE have designed, installed and implemented an Application Service Provider model, at the laboratory level, to offer value added management tools in an online format to CEDs. This completed project to help meet demands across multiple healthcare organizations and provide a means of access for organizations, which otherwise might not be able to take advantage or readily participate in the benefits of those tools has been well received. Ten (10) hospitals have requested the service and five (5) of those are ready to proceed with the implementation of the ASP. With the proposed centralized system architecture, the model has shown promise in reducing network infrastructure labor and equipment costs, benchmarking of equipment performance indicators and the development of avenues for proper and timely problem reporting. The following is a detailed description of the design process through conception to the implementation of the five (5) main software modules and supporting system architecture.

11.1 Introduction

Today, the use of software tools in clinical engineering departments (CEDs) can be considered commonplace [1,2]. Their use is justified not only by the convenience in performing and managing the day-to-day operations,¹ but also by the advantages within harmonization activities and information exchange between institutions.

The use of computerized systems in CEDs can generally be divided into two main areas:

¹ Easy storage and retrieval of amounts of information facilitate data-processing analysis, reducing manual paperwork, etc.
1. Remote diagnostics used by original equipment manufacturers (OEMs) and/or third-party companies in order to monitor and increase service productivity.
2. Computerized systems to support the maintenance and technology management tasks inside the clinical/hospital environment.

The remote diagnostic in the service field environment is usually part of the overall call-managing process. It is based on the strategic use of information and data acquisition methods to identify, isolate, analyze, and ultimately diagnose and evaluate faults within units of equipment or within systems [3].

In turn, the evolution of information technology (IT) solutions in support of both areas has branched into three main paths:

1. Computerized maintenance management system (CMMS).
2. Fully integrated field management systems (FSMS) software.
3. Application service providers (ASPs).

### 11.1.1 Computerized Maintenance Management System

A few years ago, and currently in many cases, CEDs have relied on CMMSs to maintain information about preventive maintenance activity, equipment inventory, parts, service contracts, and vendor service report, etc. These systems are basically automated databases that enable an organization to track and monitor equipment service requirements and history. The core of a generic CMMS consists of two modules [4]:

- **Equipment inventory records.** Consisting of one record for each device. This record contains information specific to that piece of equipment, such as model, serial number, date of installation, facility, location, and information regarding when it is scheduled for maintenance inspections.
- **Equipment maintenance and repair records.** Contains summary data on each maintenance and repair task that was completed for a given work-order on the equipment.

### 11.1.2 Fully Integrated Field Management Systems Software

New demands for improved service productivity and efficiency in service quality have forced the use of a new generation of software tools in CEDs. That demand has manifested itself in the form of FSMSs. In contrast to CMMSs, FSMSs provide intelligence for the management and coordination of daily service delivery by providing expanded functionality over and above standard asset management systems. An FSMS offers comprehensive and in-depth automation of data and intelligence related to service tasks, activities, and process, resulting in improved profitability, efficiency, and productivity.

It is estimated that expenditure on FSMSs represents a market of approximately US$100 million. Research indicates that 35% of all purchases in the next year will