Neusoft E-hospital Solutions

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Acknowledgement and Endorsement

This report has been written by me and has not received any previous academic credit at this or any other institution.

I would like to thank Mr. Yuan for providing this opportunity and Ms. Dong for her help and assistance during my internship.

(Signature)

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Introduction

e-hospital is the thoroughly apply of advanced IT technology and medical image technology to the healthcare and medical industry, finally come to realize the data collection, storage, handling, transformation and apply of the inner clinical and management information and the data applied hospital information system uses in the chains of every professional work. It is a Three-in-One synthetic information system contains of e-medical equipment, computer network and hospital professional work system. [1]

Neusoft e-hospital project is an advanced total solution project carefully designed for the improvement of hospital information management. It is based on international advanced image technology, combined extensively used information handle and web connection technology, and collected the long term experiences of the apply of image technology in medicinal industry.

Neusoft e-hospital project has contained a lot of world advanced diagnose and treatment technology, such as: MRI systems, NAS-PACS medical picture archiving and communication system, NAS-HIS hospital management information system, remote medical system. They can make up system independently or connected with other e-hospital system properly.

Thus, the overall solutions will improve the management level of the hospital, optimize medical treatment and management procedure. Now the Neusoft cooperates with Intel to develop this new generation hospital information system. [2]

Background

Neusoft Digital Medical Systems Co., Ltd. (hereinafter referred to as "Neusoft") is a professional developer and manufacturer of advanced digital medical equipment. In the course of researching and developing digital medical equipment, Neusoft used its advantage in software and cooperated with famous international suppliers for important components.

The company has been nothing short of a miracle in the digital medical history of China and the world. In recent years, it has developed more than 22 kinds of digital medical devices of 6 categories including the whole-body CT scanner, spiral CT, MRI, X-ray machine, digital ultrasound scanner, portable ultrasound scanner, HIS, PACS, Holter, and multi-parameter monitor. In less than five years, the company has sold about 350 CTs, 300 color ultrasound scanners, 280 X-ray systems and 35 MRI systems. During the same time, the company has set up sales and service network across China and abroad, successfully developing businesses in Europe, America, Latin America and Southeast Asia. [2]

Job Description

Part 1 – Collect and compile e-hospital development program information

The beginning of my internship is a general procedure for collecting information related e-hospital issues from other health care companies, surveying local hospitals, customizing there needs, communicating with HIS (Hospital Information System) and PACS (Picture Archiving and Communication System) departments/

Part 2- Streamline workflow in hospital perspectives

Workflow is the process of moving patients, information, and resources through out the healthcare continuum. To improve workflow enterprise-wide, I looked across the continuum of care, from the time a patient schedules a doctor's visit to the moment the patient is well again and strategically assessed the way healthcare organization currently operates. Further, I truly understood their processes and how they interconnect, implemented integrated solutions that produce measurable results, and leveraged best practices in the enterprise. This step is the main part in my internship.

Part 3 – Evaluate the existing system and establish a framework for planning and cooperation with Intel

According to information system standard of Ministry of Public Health and regarding patient's medical information as the core, the infrastructure of existing system could not fit with the satisfactions of health care providers and the development of the company. This opportunity for Cooperation with Intel would

create and implement successful e-hospital solutions that provide a real cost-benefit to the client.

Health informatics issues: Why e-hospital?

1. Current health care limitations

- Fragmented “disconnected” systems with missing linkages
- Inflexible ‘old’ legacy systems that are institutionally bound
- Lack of clinical coherence including: duplication of clinical programs, duplication of support programs, patients often have to undergo repetitive services and impossible to manage the “continuum of care”
- Paper systems result in re-work and errors
- Multi-media integration (images, voice, text, graphics) is expensive
- Integration of “open” and “closed” systems expensive and difficult
- Resistance to change by health care providers [3]

2. Designing goals of Neusoft e-hospital

The neusoft e-hospital offers a practical and innovative solution which is designed according to the following stringent goals: [4]

1. Must be completely integrated by design. A single system must be produced, not merely a system that “looks” like a single system. This ensures:
    - All operations are performed in real-time
    - All data is stored once (no duplicates data)
    - High quality data for both clinical and financial users
    - System is easier to implement and maintain than non-integrated systems
2. must cover all clinical and back office functionality comprehensively in a single system
3. Must deliver high performance levels to the users
4. Must deliver all data in real-time. There can be no batch feeds to update various parts of the system on off-peak hours
5. Must run the entire hospital in a single database. This lowers the maintenance of the information system department, as there is only one data source to backup. This also greatly enhances the ability to make the system truly fault tolerant and operate at a rating of 99.999% availability. The single database system also enables the real time updating and availability of information across the system as it is written
6. Must be international by design. Neusoft e-hospital is designed to operated in both Chinese and English without retrofitting and is 100% Unicode compliant for all data representation

7. Must accord to international standards: HL7, DICOM for data and information exchange. Neusoft e-hospital can import and display virtually any binary data and attach this data to patient records. It is specifically designed to support:
    - Scanned documents
    - Pictures from any type of input device
    - PACS images
    - Attach MS office (or any other file) to patient records
8. Must have a common UI (User Interface) across all applications
9. Log everything that occurs and allow users to view reports about those data points
10. Cost effective. It must be the most cost effective way to run a facility.
11. Must run on common hardware. Neusoft e-hospital runs on desktop PCs and Intel based servers/storage running Microsoft operating systems and database engines

3. Significance of Neusoft e-hospital

The vision of Neusoft e-hospital is built around the following goals:

- Improve the quality of care – by giving providers accurate and complete information about their clients at the point of care, including access to clinical practice guidelines and care plans.

- Increase the productivity of providers – by providing all relevant health records in a timely manner.
- Enhance the continuum of care – by providing integrated clinical, administrative and decision support date to all practitioners at the point of care, on a need – to – know basis.
- Reduce costs – by sharing information in a more efficient electronic manner, rather than by telephone, photocopies, faxed, mail or courier, as well as avoiding potential duplication of tests.
- Enhance patient safety – the use of a legible standardized electronic format on – screen for the presentation of all test results eliminates the chance of confusion or error, which sometimes occurs with handwritten paper lab reports. It also will help ensure that the patient data history and current results are linked together around the same patient identifier. This will reduce the errors associated with the confusion that results from duplicate patient identities. [5]

The Executive Series

1. Current State of e-hospital Solutions

Largely paper-based locally engineered e-hospital solutions built on varying standards limited connectivity among providers and consumers. Varying levels of technological functionality fragmented and incomparable data resulted

duplication of services due to limited data capture and poor information management and sharing. The uncoordinated effort of e-hospital across the hospital and health care system is unsustainable.

2. Expectations of Healthcare Providers for e-hospital

Healthcare providers now in China grapple with a dual challenge: operating within tightening budget restrictions while striving to increase the quality of patient care and the availability of services. Traditional healthcare systems are not typically designed to support the rising expectations of healthcare providers and their patients. Often, the existing infrastructure consists of non-integrated legacy data islands. According to my survey in hospital, health professionals expect the e-hospital is enabler of appropriate and timely access, transfer and updating of information. Healthcare needs a system that can: [6]

- Ensure that patients can rely on their healthcare professionals to have ready access to all necessary personal health information, 24 hours a day.
- Eliminate unnecessary travel and delay for patients y providing remote on-line access to services, specialists and care, wherever and whenever it is practical.
- Provide patient access to accredited, independent references and recommendations in rich media formats for better understanding health issues and medical conditions.
- Provide every healthcare professional with on-line access to the latest local guidance and national data on treating specific illness, as well as

information to evaluate the effectiveness of their work and to support their professional development.

- Ensure the availability of accurate information for managers and planners to support local health initiatives and performance assessment.
- Provide fast, convenient access for the public to accredited multimedia advice on lifestyle and health issues.
- Offer supporting information to involve the public in the development and formation of local and national health service policies.

3. The Solution Overview

Built on powerful Intel processors and middleware technology, Neusoft e-hospital solutions provide an open standards-based exchange infrastructure that seamlessly connects data and users throughout the enterprise. The solutions will employ a n-tier web services architecture. Key components include: [7]

- XML data translation – An XML integration server tier provides a common XML schema, an enterprise object model, and translation services based on open industry standards, including HL7 and DICOM,
- Web services – The application components that provide data access and retrieval, workflow definition, process automation, authentication, authorization and other integration services are typically implemented as web services. An application server environment provides simple

deployment and highly scalable execution resources. Both J2EE and .NET – based solutions are available.

- Data warehousing services – A data warehouse provide aggregation services in Neusoft e-hospital architectures and enables the creation of a medical record repository. Asynchronous messaging and event-based publishing/subscription services provide automatic synchronization with departmental systems and data.
- Portal services provide convenient web-based access and on-the-fly content personalization based on user preferences and client platform capabilities.
- A browser-based client interface gives end users a familiar environment and enables convenient data access from a wide range of client platforms.

Conclusions

Health organizations would stand to benefit from the new generation of health information systems based on web applications and open standards platforms. By delivering vital patient information to health professionals through a convenient, highly accessible web portal, the Neusoft e-hospital solutions will help healthcare providers deliver exceptional patient care services in a cost-effective and flexible manner and effectively satisfy patient expectations while giving healthcare organizations the tools and technologies to successfully overcome the toughest challenges in the industry. [8]

Recommendations for Neusoft

1. Currently, the clinical, technical and healthcare policy landscape is constantly changing. Shortage of trained professionals in the company will not mount consumer expectations.

2. Because e-hospital involves sharing information in a secure, reliable environment, respecting the privacy of the individual is the first and most important element to address now and future in the company.

3. The trends of Neusoft e-hospital solutions could be focused on providing information for clinical and managerial decision support and making.

References

[1] e-hospital TotalSolution.http://www.eastimage.com.cn/products/EH.htm

[2] Neusoft Health Care Solutions. http://www.neusoft.com

[3] Roger Girard, Smart Systems for Health Agency - May 21, 2003. http://infranet.uwaterloo.ca/talks/2003-05-21/default_files/frame.htm

[4] Hospital 2000 Total Hospital Information System (THIS) http://www.hospital2000.com/english/product_h2000_overview.asp

[5] Get Connected: Central Station Electronic Health Record Solutions. http://www.sierrasystems.com/NR/rdonlyres/2AC958AA-58B7-4D2E-876E-A902C91F24F1/0/CentralStation_brochure.pdf

[6]Increasing Efficiency in Health Care, Siemens Medical. http://www.medical.siemens.com/siemens/en_US/rg_marcom_FBAs/files/brochures/Solutions.pdf

[7] Secure Patient Framework Solutions and Intel® Technology Synchronize Medical Data. www.intel.com/go/healthcare

[8] iSoft Electronic Patient Record (i. EPR). www.isoftplc.com